UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2022

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from _____ to

Commission File No. 001-37627

WAVE LIFE SCIENCES LTD.

(Exact name of registrant as specified in its charter)

Singapore	**98-1356880**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
7 Straits View #12-00, Marina One East Tower Singapore	**018936**
(Address of principal executive offices)	**(Zip code)**

Registrant's telephone number, including area code: +65 6236 3388

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading symbol	Name of each exchange on which registered
$0 Par Value Ordinary Shares	WVE	The Nasdaq Global Market

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ No ☒

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of ''large accelerated filer,'' ''accelerated filer,'' ''smaller reporting company,'' and ''emerging growth company'' in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☒
		Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☐

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The aggregate market value of the registrant's voting and non-voting ordinary shares held by non-affiliates of the registrant (without admitting that any person whose shares are not included in such calculation is an affiliate) computed by reference to the price at which the ordinary shares were last sold as of the last business day of the registrant's most recently completed second fiscal quarter (June 30, 2022) was $205,332,422.

The number of outstanding ordinary shares of the registrant as of March 10, 2023 was 98,104,844.

DOCUMENTS INCORPORATED BY REFERENCE

If the Registrant's Definitive Proxy Statement relating to the 2023 Annual General Meeting of Shareholders (the "Proxy Statement") is filed with the Commission within 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K, then portions of the Proxy Statement will be incorporated by reference into Part III of this Annual Report on Form 10-K. If the Proxy Statement is not filed within such 120-day period, then the Registrant will file an amendment to this Annual Report within such 120-day period that will contain the information required to be included or incorporated by reference into Part III of this Annual Report.

WAVE LIFE SCIENCES LTD.

ANNUAL REPORT ON FORM 10-K

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Special Note Regarding Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), that relate to future events or to our future operations or financial performance. Any forward-looking statement involves known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to differ materially from any future results, levels of activity, performance or achievements expressed or implied by such forward-looking statement. In some cases, forward-looking statements are identified by the words "anticipate," "believe," "continue," "could," "estimate," "expect," "future," "goals," "intend," "likely," "may," "might," "ongoing," "objective," "plan," "potential," "predict," "project," "seek," "should," "strategy," "target," "will" and "would" or the negative of these terms, or other comparable terminology intended to identify statements about the future, although not all forward-looking statements contain these identifying words. Forward-looking statements include statements, other than statements of historical fact, about, among other things: our ability to fund our future operations; our financial position, revenues, costs, expenses, uses of cash and capital requirements; our need for additional financing or the period for which our existing cash resources will be sufficient to meet our operating requirements; the success, progress, number, scope, cost, duration, timing or results of our research and development activities, preclinical studies and clinical trials, including the timing for initiation or completion of or availability of results from any preclinical studies and clinical trials or for submission, review or approval of any regulatory filing; the timing of, and our ability to, obtain and maintain regulatory approvals for any of our product candidates; the potential benefits that may be derived from any of our product candidates; our strategies, prospects, plans, goals, expectations, forecasts or objectives; the success of our collaborations with third parties; any payment that our collaboration partners may make to us; our ability to identify and develop new product candidates; our intellectual property position; our commercialization, marketing and manufacturing capabilities and strategy; our ability to develop sales and marketing capabilities; our estimates regarding future expenses and needs for additional financing; our ability to identify, recruit and retain key personnel; our financial performance; developments and projections relating to our competitors in the industry; our liquidity and working capital requirements; the expected impact of new accounting standards; and our expectations regarding the impact of the coronavirus ("COVID-19"), and variants thereof, on our business, including our research and development activities, preclinical studies and clinical trials, supply of drug product, and our workforce.

Although we believe that we have a reasonable basis for each forward-looking statement contained in this report, we caution you that these statements are based on our estimates or projections of the future that are subject to known and unknown risks and uncertainties and other important factors that may cause our actual results, level of activity, performance or achievements expressed or implied by any forward-looking statement to differ. These risks, uncertainties and other factors include, among other things, the ability of our preclinical studies to produce data sufficient to support the filing of global clinical trial applications and the timing thereof; our ability to continue to build and maintain the company infrastructure and personnel needed to achieve our goals; the clinical results and timing of our programs, which may not support further development of our product candidates; actions of regulatory agencies, which may affect the initiation, timing and progress of clinical trials; our effectiveness in managing current and future clinical trials and regulatory processes; the success of our platform in identifying viable candidates; the continued development and acceptance of nucleic acid therapeutics as a class of drugs; our ability to demonstrate the therapeutic benefits of our stereopure candidates in clinical trials, including our ability to develop candidates across multiple therapeutic modalities; our ability to obtain, maintain and protect intellectual property; our ability to enforce our patents against infringers and defend our patent portfolio against challenges from third parties; our ability to fund our operations and to raise additional capital as needed; competition from others developing therapies for similar uses; the severity and duration of the COVID-19 pandemic; the COVID-19 pandemic, and variants thereof, may negatively impact the conduct of, and the timing of enrollment, completion and reporting with respect to, our clinical trials; any other impacts on our business as a result of or related to the COVID-19 pandemic; any impacts on our business of the conflict involving Russia and Ukraine, global economic uncertainty, rising inflation, rising interest rates or market disruptions on our business; and our critical accounting policies, as well as other risks and uncertainties under the "Risk Factors" section of this Annual Report on Form 10-K and in other filings we make with the Securities and Exchange Commission ("SEC").

Each forward-looking statement contained in this report is based on a combination of facts and factors currently known by us and our expectations of the future, about which we cannot be certain.

As a result of these factors, we cannot assure you that the forward-looking statements in this Annual Report on Form 10-K will prove to be accurate. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, these statements should not be regarded as representations or warranties by us or any other person that we will achieve our objectives and plans in any specified timeframe, or at all. We caution you not to place undue reliance on any forward-looking statement.

In addition, any forward-looking statement in this report represents our views only as of the date of this report and should not be relied upon as representing our views as of any subsequent date. We anticipate that subsequent events and developments may cause our views to change. Although we may elect to update these forward-looking statements publicly at some point in the future, we undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by applicable law. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.

As used in this Annual Report on Form 10-K, unless otherwise stated or the context otherwise indicates, references to "Wave," the "Company," "we," "our," "us" or similar terms refer to Wave Life Sciences Ltd. and our wholly-owned subsidiaries.

The Wave Life Sciences Ltd. and Wave Life Sciences Pte. Ltd. names, the Wave Life Sciences mark, PRISM and the other registered and pending trademarks, trade names and service marks of Wave Life Sciences Ltd. appearing in this Annual Report on Form 10-K are the property of Wave Life Sciences Ltd. This Annual Report on Form 10-K also contains additional trade names, trademarks and service marks belonging to Wave Life Sciences Ltd. and to other companies. We do not intend our use or display of other parties' trademarks, trade names or service marks to imply, and such use or display should not be construed to imply, a relationship with, or endorsement or sponsorship of us by, these other parties. Solely for convenience, the trademarks and trade names in this Annual Report on Form 10-K are referred to without the ® and ™ symbols, but such reference should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

Summary of Risk Factors

We are providing the following summary of the risk factors contained in this Annual Report on Form 10-K to enhance the readability and accessibility of our risk factor disclosures. We encourage you to carefully review the full risk factors contained in this Annual Report on Form 10-K in their entirety for additional information regarding the material factors that make an investment in our securities speculative or risky. These risks and uncertainties include, but are not limited to, the following:

- We are a clinical-stage genetic medicines company with a history of losses, and we expect to continue to incur losses for the foreseeable future, and we may never achieve or maintain profitability.
- We will require substantial additional funding, which may not be available on acceptable terms, or at all.
- Our management has broad discretion over the use of proceeds received from sales of our securities and our collaborations with third parties and the proceeds may not be used effectively.
- Our short operating history may make it difficult for shareholders to evaluate the success of our business to date and to assess our future viability.
- We, or third parties upon whom we depend, may face risks related to health epidemics, including the COVID-19 pandemic and variants thereof, which may delay our ability to complete our ongoing clinical trials, initiate additional clinical trials, delay regulatory activities and have other adverse effects on our business and operations.
- The approach we are taking to discover and develop oligonucleotides is novel and may never lead to marketable products.
- We may not be able to conduct clinical trials successfully due to various process-related factors that could negatively impact our business plans.
- If we cannot successfully manufacture our product candidates for our research and development and preclinical activities, or manufacture sufficient amounts of our product candidates to meet our clinical requirements and timelines, our business may be materially harmed.
- Results of preclinical studies and early clinical trials may not be predictive of results of future clinical trials.
- If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary regulatory approvals could be delayed or prevented.
- We may be unable to obtain regulatory approval in the United States or foreign jurisdictions and, as a result, be unable to commercialize our product candidates and our ability to generate revenue will be materially impaired.
- Even if we obtain regulatory approvals, our marketed drugs will be subject to ongoing regulatory oversight. If we fail to comply with continuing U.S. and foreign requirements, our approvals, if obtained, could be limited or withdrawn, we could be subject to other penalties, and our business would be seriously harmed.
- The pharmaceutical industry is intensely competitive. If we are unable to compete effectively with existing drugs, new treatment methods and new technologies, we may be unable to successfully commercialize any drugs that we develop.

- Risks associated with our operations outside of the United States and developments in international trade by the U.S. and foreign governments could adversely affect our business.
- We may not be able to execute our business strategy optimally if we are unable to maintain our existing collaborations or enter into new collaborations with partners that can provide sales, marketing and distribution capabilities and funds for the development and commercialization of our product candidates.
- We rely, and expect to continue to rely, on third parties to conduct some aspects of our compound formulation, research, preclinical studies and clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such formulation, research or testing.
- If any of our product candidates are approved for marketing and commercialization and we are unable to develop sales, marketing and distribution capabilities on our own, or enter into agreements with third parties to perform these functions on acceptable terms, we will be unable to commercialize successfully any such future products.
- If we are unable to attract and retain qualified key management and scientists, staff, consultants and advisors, our ability to implement our business plan may be adversely affected.
- If we are not able to obtain and enforce market exclusivity for our technologies or product candidates, development and commercialization of our product candidates may be adversely affected.
- We license patent rights from third-party owners or licensees. If such owners or licensees do not properly or successfully obtain, maintain or enforce the patents underlying such licenses, or if they retain or license to others any competing rights, our competitive position and business prospects may be adversely affected.
- Other companies or organizations may challenge our or our licensors' patent rights or may assert patent rights that prevent us from developing and commercializing our products.
- Intellectual property rights of third parties could adversely affect our ability to commercialize our product candidates, and we might be required to litigate or obtain licenses from third parties in order to develop or market our product candidates. Such litigation or licenses could be costly or not available on commercially reasonable terms.
- We are incorporated in Singapore and our shareholders may have more difficulty in protecting their interests than they would as shareholders of a corporation incorporated in the United States.
- We are subject to the laws of Singapore, which differ in certain material respects from the laws of the United States.
- The public market may not be liquid enough for our shareholders to sell their ordinary shares quickly or at market price, or at all.
- The market price of our ordinary shares is likely to be highly volatile, and our shareholders may lose some or all of their investment.

PART I

Item 1. Business

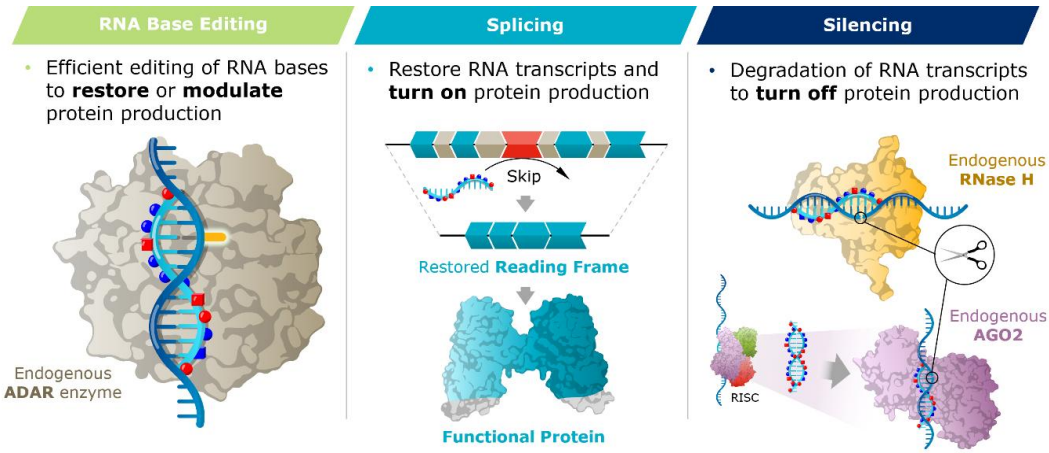
Overview

We are a clinical-stage genetic medicines company committed to delivering life-changing treatments for people battling devastating diseases. Using PRISM, our proprietary discovery and drug development platform that enables the precise design, optimization, and production of novel stereopure oligonucleotides, we are working to develop first-or best-in-class medicines that target the transcriptome (the full set of ribonucleic acid, or "RNA," molecules produced from the human genome) to treat genetically defined diseases with a high degree of unmet need.

Our RNA-targeting oligonucleotides are designed to correct disease-causing mutations, modulate protein activity, restore the production of functional proteins or reduce the expression of disease-promoting RNAs or proteins. Data from our ongoing clinical and preclinical studies has demonstrated significant improvements in potency, durability, and distribution for our oligonucleotides designed through PRISM, compared with competitor chemistries. These data support our platform as best-in-class for designing and optimizing RNA-targeting medicines.

Since our inception, we have seen the value of developing RNA-targeting medicines compared to other nucleic acid therapeutics, including gene therapy and DNA editing. By intervening at the RNA level, we have the potential to address diseases that have historically been difficult to treat with small molecules or biologics, while retaining the ability to titrate dose, modulate duration of effect, and avoid risk of permanent off-target genetic changes and other challenges associated with DNA editing or gene therapy approaches. Oligonucleotides have additional advantages as a therapeutic class, including the ability to access multiple tissue types and the ability to modulate the frequency of dosing to ensure broad distribution within tissues over time. Oligonucleotides also have well-established manufacturing processes and validated test methods based on decades of improvements, as well as established regulatory, access, and reimbursement pathways.

Our approach is based on the scientific insight that the biological machinery necessary to address genetic diseases already exists in human cells and can be harnessed for therapeutic purposes with the right tools. We have built a versatile platform comprised of multiple therapeutic modalities, which provides flexibility to design built-for-purpose molecules that optimally address disease biology. These modalities are RNA base editing, splicing, and silencing, including both RNA interference ("RNAi") and antisense, all of which incorporate proprietary and novel chemistries to optimize the pharmacological properties of our therapeutic oligonucleotides.



We have a robust and diverse pipeline of potential first-or best-in-class programs. Our lead programs are designed to treat genetic diseases, including those in muscle, including Duchenne muscular dystrophy ("DMD"); liver, including alpha-1 antitrypsin deficiency ("AATD"); and the central nervous system ("CNS"), including Huntington's disease ("HD"), amyotrophic lateral sclerosis ("ALS") and frontotemporal dementia ("FTD"). These programs include:

- WVE-N531 (splicing), our exon 53 molecule for the treatment of DMD;
- WVE-006 (editing), our SERPINA1 molecule for the treatment of AATD;
- WVE-003 (silencing), our mHTT SNP3 molecule for the treatment of HD; and
- WVE-004 (silencing), our C9orf72 molecule for the treatment of C9orf72-associated ALS and FTD.

Over the last several years, we have built a leading RNA base editing capability. Our A-to-I RNA base editing oligonucleotides ("AIMers") enable access to areas of disease biology that are not viable for other therapeutic modalities. Our editing capability affords us the dexterity to address both rare diseases, as well as diseases impacting large patient populations.

AIMers are designed to target single bases on an RNA transcript and recruit proteins that exist in the body, called ADAR (adenosine deaminases acting on RNA) enzymes, which naturally possess the ability to change an adenine (A) to an inosine (I), which cells read as guanine (G). This approach enables both the correction of G-to-A point mutations, as well as the modulation of RNA to upregulate protein expression, modify protein-protein interactions, or alter RNA folding and processing. AIMers enable simplified delivery and avoid the risk of permanent changes to the genome and irreversible off-target effects with DNA-targeting approaches. AIMers are short in length, fully chemically modified, and use novel chemistry, including proprietary PN backbone modifications and chiral control, which make them distinct from other ADAR-mediated editing approaches.

Our PRISM platform was built on the recognition that a significant opportunity exists to tune the pharmacological properties of oligonucleotide therapeutics by leveraging three key features of these molecules: sequence, chemistry, and stereochemistry. Our unique ability to control stereochemistry provides the resolution necessary to optimize pharmacological profiles and develop and manufacture stereopure oligonucleotides. Stereopure oligonucleotides are comprised of molecules with atoms precisely and purposefully arranged in three-dimensional orientations at each linkage. These differ from the mixture-based oligonucleotides currently on the market or in development by others. Additionally, to mitigate pharmacological risks and potential manufacturing challenges, our approach focuses on designing short, chemically modified oligonucleotides without the need for complex delivery vehicles. We have also established and continue to enhance our internal cGMP (current good manufacturing practices) manufacturing capabilities to increase control and visibility of our drug substance supply chain, while continuing to innovate oligonucleotide manufacturing.

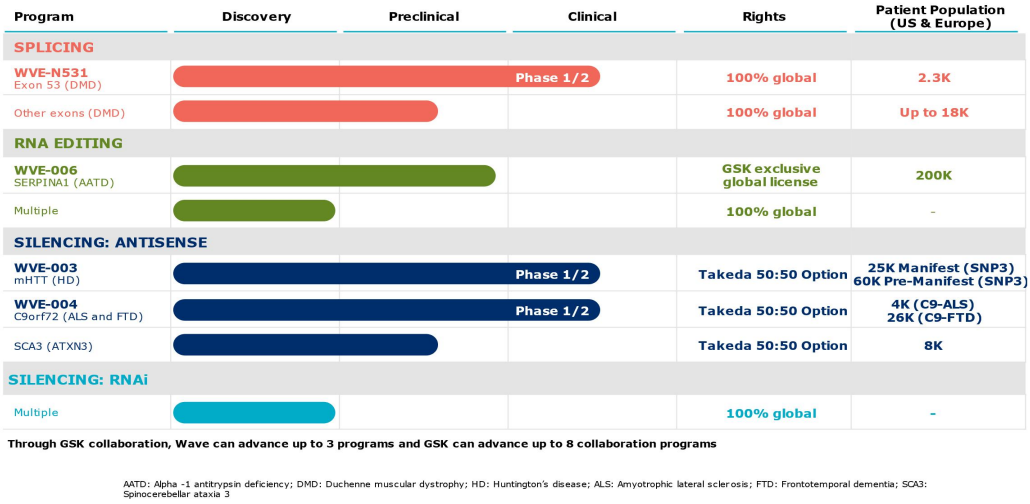
PRISM also incorporates our novel, proprietary PN backbone chemistry modifications, which have been shown preclinically and clinically to increase potency, distribution, and durability of effect across our various modalities. PN chemistry is incorporated in all of our current clinical, preclinical and discovery-stage programs.

In December 2022, we announced a strategic collaboration with GSK to advance transformative oligonucleotide therapeutics, including WVE-006. The collaboration combines GSK's unique insights in human genetics, as well as its global development and commercial capabilities, with our PRISM platform and oligonucleotide expertise. The collaboration will enable us to continue building a pipeline of first-in-class oligonucleotide-based therapeutics and unlock new areas of disease biology, as well as realize the full value of WVE-006 as a potential best-in-class treatment for AATD that has the potential to simultaneously address both liver and lung manifestations of the disease.

The GSK collaboration has three components:

1) A discovery collaboration which enables us to advance up to three programs leveraging targets informed by GSK's novel insights;
2) A discovery collaboration which enables GSK to advance up to eight programs leveraging PRISM and our oligonucleotide expertise and discovery capabilities; and
3) An exclusive global license for GSK to WVE-006, our preclinical program for AATD that uses our proprietary AIMer technology. Wave will maintain development responsibilities for WVE-006 through completion of the first clinical study, at which point development and commercial responsibilities will transition to GSK.

Our Current Programs



Additional details regarding our lead therapeutic programs are set forth below.

Duchenne muscular dystrophy ("DMD")

In DMD, we are advancing WVE-N531, which is designed to skip exon 53 within the dystrophin gene – a therapeutic approach that would address approximately 8-10% of DMD cases. WVE-N531 is designed to cause the cellular splicing machinery to skip over this exon during pre-mRNA processing, which restores the dystrophin mRNA reading frame and enables production of truncated, but functional, dystrophin protein. Exon skipping produces dystrophin from the endogenous dystrophin gene (not micro or mini dystrophin expressed from a vector), under the control of native gene-regulatory elements, resulting in normal expression. WVE-N531 is both our first splicing candidate and our first systemically administered candidate incorporating PN chemistry to be assessed in the clinic.

In December 2022 (data cut-off: December 6, 2022), we announced a positive update from Part A of the Phase 1b/2a proof-of-concept study of WVE-N531 in three boys with DMD amenable to exon 53 skipping. High muscle concentrations of WVE-N531 and exon skipping were observed six weeks after initiating biweekly multi-dosing at 10 mg/kg, achieving proof-of-concept in the study. WVE-N531 also appeared safe and well-tolerated.

To evaluate dystrophin protein restoration, we are initiating the Phase 2 portion of the WVE-N531 open-label study ("Part B"), and plan to enroll up to ten boys. Boys will be dosed at 10 mg/kg biweekly, and we plan to assess dystrophin protein after 24 and 48 weeks of dosing. The primary endpoint will be dystrophin protein levels, and the study will also evaluate pharmacokinetics, functional endpoints and safety and tolerability. We expect to initiate dosing in 2023 and to deliver data in 2024. Based on results from this study, we would consider advancing a broader DMD pipeline with PN-modified splicing oligonucleotides for skipping other exons, with the goal of providing new treatment options for a larger population of boys with DMD.

Alpha-1 antitrypsin deficiency ("AATD")

Our AATD program is the first to leverage our novel RNA editing capability and uses clinically proven *N*-acetylgalactosamine ("GalNAc")-conjugated AIMers with subcutaneous dosing. By correcting the single RNA base mutation that causes a majority of AATD cases with the Pi*ZZ phenotype (approximately 200,000 in the U.S. and Europe), RNA editing may provide an ideal approach for increasing circulating levels of wild-type AAT protein and reducing mutant protein aggregation in the liver, thus simultaneously addressing both the lung and liver manifestations of the disease.

In the third quarter of 2022, we announced WVE-006 as our development candidate for AATD. WVE-006 is first-in-class in AATD and is the most advanced program currently in development using an oligonucleotide to harness an endogenous enzyme for RNA editing. WVE-006 is currently in IND-enabling studies, and we expect to submit clinical trial applications (CTAs) in the second half

of 2023. Additionally, under the GSK collaboration, GSK received the exclusive global license for WVE-006, with clinical development and commercial responsibilities transitioning to GSK after we complete the first clinical trial. Under the terms of the collaboration, we are eligible to receive up to $525 million in development, launch and sales-related milestones, as well as double-digit tiered royalties as a percentage of net sales up to the high teens, for WVE-006.

Preclinical data show that treatment with WVE-006 resulted in approximately 50% RNA editing of SERPINA1 transcript and approximately 7-fold greater AAT protein levels (well above the predicted protective threshold of 11uM) at 13 weeks in an established AATD mouse model (NSG-PiZ). WVE-006 also led to restoration of approximately 50% wild-type M-AAT protein in serum and a 3-fold increase in neutrophil elastase inhibition activity, indicating that the restored M-AAT protein was functional. Wave's AATD AIMers are highly specific to SERPINA1 RNA *in vitro* and *in vivo* based on transcriptome-wide analyses.

If we are successful in the clinic with WVE-006, we will both validate our clinical approach to AATD, as well as validate the feasibility of RNA editing in humans.

Huntington's disease ("HD")

In HD, we are currently advancing WVE-003, a stereopure antisense oligonucleotide designed to selectively target an undisclosed single nucleotide polymorphism ("SNP"), "mHTT SNP3", associated with the disease-causing mutant huntingtin ("mHTT") mRNA transcript within the *Huntingtin ("HTT")* gene. Approximately 40% of the HD population carries SNP3 according to published literature (Carroll et al., Molecular Therapy, 2011).

WVE-003 incorporates our novel PN chemistry, as well as learnings from our first-generation HD programs. Targeting mRNA with SNP3 allows us to lower expression of transcript from the mutant allele, while leaving the healthy transcript relatively intact, thereby preserving wild-type (healthy) huntingtin ("wtHTT") protein, which is important for neuronal function. Our allele-selective approach may also enable us to address the pre-manifest, or asymptomatic, HD patient population in the future. In preclinical studies, WVE-003 showed dose-dependent and selective reduction of mHTT mRNA *in vitro*, as well as potent and durable knockdown of mHTT mRNA and protein *in vivo* in mouse models.

The SELECT-HD trial is a multicenter, randomized, double-blind, placebo-controlled Phase 1b/2a clinical trial to assess the safety and tolerability of intrathecally administered WVE-003 for patients with early manifest HD. Additional objectives include measurement of mHTT and wtHTT protein and exploratory pharmacokinetic, pharmacodynamic, clinical and magnetic resonance imaging ("MRI") endpoints. The SELECT-HD trial is designed to be adaptive, with dose level and dosing frequency being guided by an independent committee.

In September 2022 (data cut-off: August 29, 2022), we announced a positive update from SELECT-HD driven by the observation of reductions in mHTT protein in cerebrospinal fluid ("CSF") after study participants received either a single 30 or 60 mg dose of WVE-003. Additionally, wtHTT protein levels appeared consistent with allele-selectivity. Single doses (30 mg, 60 mg, and 90 mg) of WVE-003 appeared generally safe and well-tolerated. Based on the SELECT-HD data, we have adapted the trial to expand the single dose cohorts, and we expect to share additional single-dose biomarker and safety data in the first half of 2023.

C9orf72-associated amyotrophic lateral sclerosis and frontotemporal dementia (C9-ALS/FTD)

In ALS and FTD, we are advancing WVE-004, which uses our novel PN chemistry and preferentially targets the transcripts containing the hexanucleotide G4C2 expansion in the *C9orf72* gene. Approximately 2,000 ALS patients and 10,000 FTD patients in the U.S. have this mutation in *C9orf72.* In C9 BAC transgenic mice, WVE-004 led to substantial reductions in repeat-containing C9orf72 transcripts and dipeptide repeat ("DPR") proteins that are sustained for at least six months, without disrupting total C9orf72 protein expression.

The FOCUS-C9 trial is a global, multicenter, randomized, double-blind, placebo-controlled Phase 1b/2a clinical trial to assess the safety and tolerability of intrathecal doses of WVE-004 for patients with C9-ALS and/or C9-FTD. Additional objectives include measurement of poly(GP) proteins in the CSF, plasma and CSF pharmacokinetics, and exploratory biomarker and clinical endpoints. The FOCUS-C9 trial is designed to be adaptive with dose level and dosing frequency being guided by an independent committee.

In April 2022 (data cut-off: March 24, 2022), we announced a positive update from FOCUS-C9 driven by the observation of potent and durable reductions of poly(GP) dipeptide repeat proteins in CSF, a C9-ALS/C9-FTD disease biomarker that, when reduced in CSF, indicates WVE-004's engagement of target in the brain and spinal cord. Based on the poly(GP) reduction data, the observation period for single dose cohorts was extended and additional patients were enrolled into the trial to further characterize the depth of knockdown, durability and longer-term safety profile. Additionally, we have initiated multi-dosing cohorts, starting at 10 mg monthly and moving through 10 mg quarterly based on the potency and durability of pharmacodynamic effects. Additional single and

multidose data are expected in the first half of 2023. Additionally, an open-label extension trial for FOCUS-C9 participants was initiated in the fourth quarter of 2022 and is ongoing.

Discovery Pipeline:

We are working to pursue new targets across multiple disease areas, given preclinical data indicating our oligonucleotides can distribute to various tissues and cells without complex delivery vehicles. We are also focusing on targets that have been genetically validated and offer biomarkers for target engagement to enable early proof-of-concept in the clinic. We expect this research to result in multiple new programs with first-in-class potential being added to our pipeline over the next several years.

Our Strategy

We are building a fully integrated genetic medicines company by leveraging PRISM to design, develop and commercialize optimized disease-modifying medicines for indications with a high degree of unmet medical need. We have a robust and diverse pipeline of PN-modified, stereopure oligonucleotides, including programs using our editing, splicing, and silencing modalities. Our lead clinical programs are focused in, and aim to address, muscle diseases (DMD - splicing), hepatic diseases (AATD – RNA editing), and CNS diseases (HD, ALS and FTD - silencing). In addition to driving clinical and preclinical programs, we are continuously investing in PRISM to fully unlock the potential of our unique and expanding platform capabilities. Additionally, we are conducting discovery research on multiple targets where we have the potential to deliver first-in-class therapeutics, starting with RNA editing.

The key components of our strategy are as follows:

- ***Extend our leadership in oligonucleotides***. We intend to establish a dominant position in the field of oligonucleotides, advancing basic research and pharmacology using stereochemistry and novel modifications across multiple therapeutic modalities and target classes. Our work has already led to the development of AIMers for RNA base editing, as well as the introduction of PN backbone chemistry modifications for potential therapeutic use. Through PRISM, our efforts continue to reveal structure-activity relationships among sequence, chemistry and backbone stereochemistry that may allow us to further tune the activity of our oligonucleotides in a previously unexplored, modality-specific manner.

- ***Rapidly advance and sustainably grow our differentiated portfolio.*** We are committed to transforming the care of devastating diseases where patients have limited treatment options. Our current and future portfolio is focused on novel therapeutic approaches that optimally address disease biology and which offer biomarkers for target engagement to enable early proof-of-concept. We are currently advancing three clinical-stage candidates: WVE-N531, WVE-003 and WVE-004, which were all designed with novel PN backbone chemistry modifications developed from our PRISM platform. Additionally, we expect to file clinical trial applications (CTAs) for WVE-006 in 2023. We are also conducting our own discovery-stage research on novel therapeutic approaches, and additionally will have the opportunity through our GSK collaboration to advance programs leveraging GSK's novel genetic and genomics insights. We expect these activities will add multiple first-in-class therapeutics to our pipeline over the next several years.

- ***Expand our pipeline of high-value programs, starting with GalNAc-conjugated RNA editing.*** In 2022, we made meaningful progress in advancing our RNA base editing modality, ("AIMers"), including unlocking new applications beyond correction, such as upregulation. We also continued to optimize our RNAi capability for silencing and anticipate increasing our activities in RNAi. With these therapeutic modalities, we are positioned to develop first-in-class therapeutics, starting with hepatic indications that leverage GalNAc-conjugated delivery.

- ***Leverage manufacturing leadership in oligonucleotides.*** We have built a hybrid internal / external manufacturing model that gives us the capability to produce stereopure oligonucleotides at scales from one micromole to potential commercial scale. Through our internal manufacturing, based in our Lexington, Massachusetts facility, we have the capacity to support multiple discovery, preclinical, and early clinical-stage programs and have the established expertise to efficiently conduct manufacturing runs for oligonucleotides across a spectrum of modalities. We believe that leveraging our internal manufacturing capabilities along with expertise from contract manufacturing organizations ("CMOs") facilitates our growth and enhances our ability to secure drug substance for current and future development activities.

Oligonucleotides

Nucleic acid therapeutics, including oligonucleotides, are an innovative class of drugs that can modulate the function of target RNAs to ultimately affect the production of disease-associated proteins or prevent the accumulation of pathogenic RNA species, which are emerging as important factors in human disease. Oligonucleotides can regulate protein and RNA via several different molecular

mechanisms. These mechanisms can be broadly categorized as RNA base editing; splicing, those that involve binding to the target RNA and modulating its function by promoting exon skipping; and silencing, those that promote degradation of the target RNA, including antisense and RNAi.

The unique capability of oligonucleotides to address a wide range of genomic targets that impact multiple therapeutic areas creates potentially significant market opportunities for us to develop molecules to treat a broad spectrum of human diseases, including diseases where no medicines currently exist or for which existing treatments are not optimal.

The investigational oligonucleotides we are currently developing employ the following molecular mechanisms:

- **RNA base editing,** which involves an oligonucleotide that uses endogenous ADAR (adenosine deaminases acting on RNA) enzymes to edit adenosines in target RNAs. This technology can be used to correct missense and nonsense mutations to restore protein activity. It can also be used to modulate protein activity, for example correcting a disease-causing mutation, altering a post-translational modification site, a protease cleavage site, or a protein-protein interaction interface. Other applications of this technology include the ability to target regulatory elements in RNA that impact its stability or function, for example, AUGs in the 5'-UTR for translational upregulation or AG splice acceptor sites to modify exon splicing.

- **Splicing / exon skipping**, which is the processing of a nascent pre-mRNA transcript into messenger RNA ("mRNA") by removing introns and joining exons together. Exon skipping uses an oligonucleotide designed to bind to a particular sequence within a target pre-mRNA and direct the cellular machinery to delete, or splice out, certain specific regions of that RNA. Often, the underlying mutation leads to non-productive mRNA, yielding no functional protein. Use of the exon-skipping modality permits the cellular machinery to bypass and assemble a partially functional protein, thereby mitigating or alleviating the disease that would otherwise result.

- **RNA interference (RNAi) (silencing)**, which uses double-stranded RNA to engage RNAi machinery known as the RNA-induced silencing complex ("RISC") and to silence a target RNA that is either pathogenic itself or encodes a disease-associated protein, thereby preventing the accumulation of the pathogenic species (RNA or protein).

- **Antisense (silencing)**, which uses an oligonucleotide designed to bind to a specific sequence in a target RNA strand that encodes a disease-associated protein or pathogenic RNA. The resulting two-stranded molecule ("duplex") is then recognized by a cellular enzyme called RNase H, which cleaves, or cuts, the target RNA in the duplex, thereby preventing the disease-associated protein from being made.

Stereochemistry of Oligonucleotide Backbone Modifications Impacts Pharmacology

Oligonucleotides are comprised of a sequence of nucleotides—the building blocks of RNA and DNA—that are linked together by a backbone of chemical bonds. In nucleic acid molecules that have not been modified for therapeutic use, the nucleotides are linked by phosphodiester ("PO") bonds. Such unmodified nucleic acid molecules are unsuitable for use as therapeutics because they are rapidly degraded, rapidly cleared by the kidneys and taken up poorly by targeted cells.

Backbone chemistry modifications such as the phosphorothioate ("PS") modification, one of the most common backbone modifications used in oligonucleotides, can improve the stability, biodistribution and cellular uptake of oligonucleotides.

A consequence of introducing backbone modifications, such as PS modifications, into an oligonucleotide is that it also introduces a chiral center at each phosphorus, creating stereoisomers designated as either an "*S*p" or "*R*p" isomer. As shown below, these stereoisomers have identical chemical compositions but different three-dimensional arrangements of their atoms and consequently have different chemical and biological properties.

During traditional oligonucleotide synthesis, the isomeric configuration at each chiral backbone modification is random (either *R*p or *S*p), resulting in a complex mixture containing many stereoisomers (known as diastereomers). Using PS modifications as an example, each PS linkage introduces a chiral center, thereby doubling the number of stereoisomers in the product, so that a traditional preparation of a PS-containing oligonucleotide contains 2^N stereoisomers, where N represents the number of PS modifications.

Stereoisomers can possess different chemical and pharmacological properties. For example, certain stereoisomers can drive the therapeutic effects of a drug while others can be less beneficial or can even contribute to undesirable side effects. The greater the variation among a drug's constituent stereoisomers, the greater the potential to diminish the drug's efficacy and safety when it is a complex mixture.

Prior to the development of our technology, it was not possible to create stereopure oligonucleotides – molecules where the configuration of each chiral backbone linkage is precisely controlled during chemical synthesis. Moreover, because of the sheer number of stereoisomers present in a mixture, it would be impractical, if not impossible, to physically isolate the most therapeutically optimal stereoisomer from within a mixture. For these reasons, all chiral backbone-modified oligonucleotides currently on the market and in development by others are mixtures of many stereoisomers, which we believe are not optimized for stability, catalytic activity, efficacy or toxicity.

In small molecule therapeutics, U.S. regulators have long sought to eliminate the risks potentially posed by drug mixtures containing multiple stereoisomers. Since 1992, the FDA has recommended full molecular characterization of stereoisomers within small-molecule drug mixtures. Historically, it has not been possible to achieve such characterization for nucleic acid therapeutic drug mixtures, which can contain tens of thousands to millions of distinct pharmacological entities. Based on our published and ongoing clinical and preclinical studies, we believe that we can design and synthesize stereopure chemically modified oligonucleotides that demonstrate superior pharmacological properties compared with mixture-based oligonucleotides. We believe that PRISM has the potential to set a new industry standard for the molecular characterization of complex nucleic acid therapeutic drug mixtures.

We continue to develop new types of backbone modifications, other than PS and PN modifications, that can be chirally controlled with our technology.

PRISM: Our proprietary discovery and drug development platform

Through PRISM, our proprietary discovery and drug development platform, we have discovered and expect to continuously elaborate on the relationships between the chemical makeup of an oligonucleotide, including the three-dimensional orientation or arrangement of its atoms, and its pharmacology (i.e., stability of the drug, activity against the target, specificity for the target and safety of the molecule). For example, we realized the impact of our novel PN backbone chemistry *in vivo* in preclinical studies when we evaluated its impact in the context of an otherwise stereopure backbone (Kandasamy et al., 2022; doi: 10.1093/nar/gkac037, Kandasamy et al., 2022; doi: 10.1093/nar/gkac018). In addition, we have defined relationships between various 2'-sugar modifications to the nucleotide (such as methoxy, methoxyethyl, fluoro), and the chemistry and stereochemistry of the backbone that enhances oligonucleotide pharmacology, providing a potentially enhanced therapeutic profile.

Our rational process for designing stereopure oligonucleotides, which is based on the interplay among oligonucleotide sequence, chemistry and backbone stereochemistry, allows us to selectively optimize for the therapeutic modality in order to generate best-in-class oligonucleotides. With PRISM, we leverage the diversity created by backbone stereochemistry to expand the parameters that we explore to optimize oligonucleotides. Moreover, through continued exploration of these interactions using iterative analysis of *in vitro* and *in vivo* outcomes and machine learning-driven predictive modeling, we also continue to refine our design principles that we deploy across subsequent programs. We are using these ongoing discoveries to guide our drug development activities, which we believe will lead to medicines that are more specific, can be dosed at lower concentrations, less frequently, or some combination of these characteristics as well as with improved therapeutic profiles.

Advantages of Our Approach

We believe that PRISM is a significant advancement in the development of oligonucleotides. The advantages of our approach include:

- ***Ability to rationally design product candidates with optimized pharmacological properties***. Our platform combines our unique ability to construct stereopure oligonucleotides with a deep understanding of how the interplay among oligonucleotide sequence, chemistry and backbone stereochemistry impacts key pharmacological properties. By exploring these interactions through iterative analysis of *in vitro* and *in vivo* outcomes and machine learning-driven predictive modeling, we continue to define design principles that we deploy across programs to rapidly develop and manufacture clinical candidates that meet pre-defined product profiles. PRISM has also enabled us to further innovate our chemistry, including the application of novel PN backbone chemistry modifications to our pipeline programs.

- ***Broad applicability***. PRISM is applicable to oligonucleotides acting via multiple therapeutic modalities, including RNA editing, splicing, and silencing (including RNAi and antisense). It is also compatible with a broad range of chemical modifications and targeting moieties.

- ***Simplified delivery***. We can take advantage of simplified delivery strategies, such as free-uptake or GalNAc conjugation, to reach endogenous enzymes. This approach avoids the need, and certain limitations, for complex delivery vehicles such as lipid nanoparticles ("LNPs") or adeno-associated viruses ("AAV").

- ***Proprietary production of stereopure oligonucleotides***. Our scientists have developed expertise in the techniques required to produce adequate supplies of chemically modified stereopure oligonucleotide materials for our preclinical and clinical activities. In addition, we believe we have the intellectual property position and know-how necessary to protect, advance and scale these production processes to support our clinical trials and potential future commercial supply.

- ***Scalability and manufacturing***. Our manufacturing process and technical expertise in designing stereopure oligonucleotides is unique. We believe that our scalable synthesis processes will allow us to meet demand for cGMP-qualified clinical trial supply, as well as the potential for commercial manufacturing at a cost of goods and potential cost-per-patient that are comparable to stereorandom oligonucleotides.

Our Proprietary Chemistry

Backbone Stereochemistry

In our foundational *Nature Biotechnology* paper (Iwamoto N, et al. Nature Biotechnol. 2017;35(9):845-851), we described our studies using our proprietary chemistry to design and synthesize stereopure oligonucleotides and oligonucleotide mixtures based on mipomersen. Mipomersen, an oligonucleotide containing 20 nucleotides and 19 PS modifications, is synthesized by traditional oligonucleotide chemistry; thus, it is a mixture of over 500,000 different stereoisomers (2^{19} = 524,288). We rationally designed and synthesized individual stereoisomers of mipomersen, each having position-specific and distinct stereochemistry, and conducted studies comparing these defined stereoisomers with the mipomersen stereomixture. These and other preclinical studies have demonstrated that stereochemistry and pharmacology are directly related, and that by controlling stereochemistry, we can impact multiple aspects of pharmacology, including stability, catalytic activity, efficacy, specificity, and safety.

We have subsequently published multiple additional manuscripts that provide evidence that stereopure oligonucleotides can be developed to have superior pharmacology to stereorandom oligonucleotides. These manuscripts are listed below:

- *Nature Biotechnology* (Monian P, et. al., 2022; doi.org/10.1038/s41587-022-01225-1), which is discussed in more depth under “RNA Editing” below;

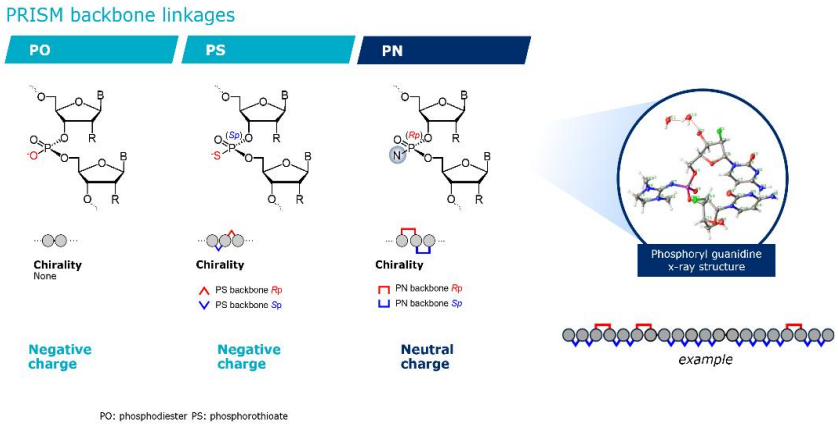
- *Nucleic Acids Research* papers (Kandasamy et al., 2022; doi: 10.1093/nar/gkac037, Kandasamy et al., 2022; doi: 10.1093/nar/gkac018), which are discussed in more depth under “PRISM Therapeutic Modality Types” below;

- *Nature Communications* paper (Liu Y, et al. Nature Communications. 2021; 12:847), which is discussed in more depth under “Therapeutic Programs – Amyotrophic Lateral Sclerosis and Frontotemporal Dementia” below; and

- *Translational Vision Science & Technology* paper (Byrne M, et al. Trans Vis Sci Tech. 2021 ; 10(1) :23).

PN Backbone Chemistry Modifications

Our initial investigations into backbone chemistry and stereochemistry on oligonucleotide pharmacology focused on the widely used PO and PS backbones because they are amenable to all oligonucleotide modalities. In 2020, we announced the introduction of PN backbone chemistry modifications ("PN") to our repertoire of backbone modifications, which involve replacing a non-bridging oxygen atom with a nitrogen-containing moiety, as shown below.



We have incorporated these PN modifications – specifically phosphoryl guanidine – into oligonucleotide compounds. As with PS modifications, PN modifications are chiral, and we have the capacity to control PN backbone stereochemistry. Unlike PS modifications, PN modifications are neutral, meaning that the negative charge of the oligonucleotide is reduced with every PN modification added to the backbone. In preclinical experiments, we have demonstrated that judicious use of PN backbone chemistry modifications in stereopure oligonucleotides have generally increased potency, tissue exposure and durability of effect across our editing, splicing and silencing modalities.

PRISM Therapeutic Modality Types

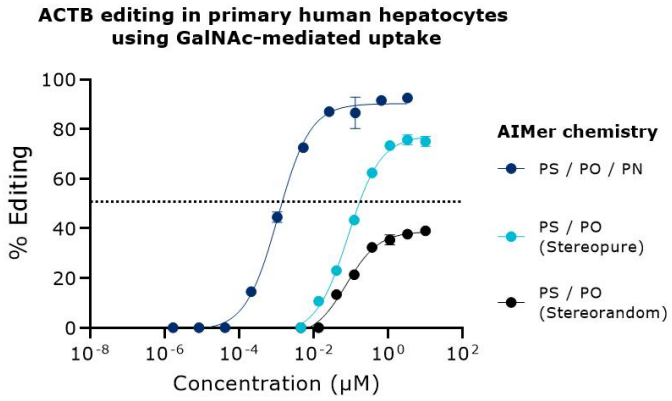
Using PRISM, we have designed and optimized diverse sets of stereopure oligonucleotides, which allows us to characterize and compare the behavior of various stereoisomers. With each new target, we gain insight into how the interplay between sequence, chemistry, including 2'-modifications, backbone chemistry, and stereochemistry impacts activity, and we build these learnings into our future programs.

In the next section, we describe different therapeutic modalities for which we have used PRISM to optimize stereopure oligonucleotides and develop built-for-purpose candidates to optimally address disease biology.

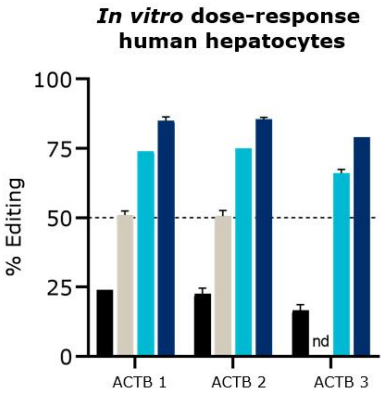
RNA base editing

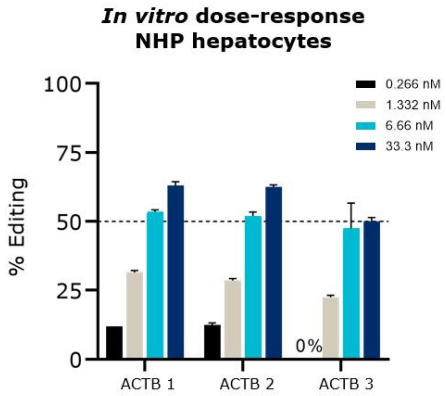
We have applied our PRISM platform to the generation of short, single-stranded, highly specific A-to-I (G) RNA-base editing oligonucleotides – called "AIMers". Because our AIMers are relatively short and stable (fully chemically modified), we can leverage clinically proven GalNAc-mediated delivery to hepatocytes to further increase tissue uptake with subcutaneous dosing. We are developing fully chemically modified AIMers with and without GalNAc conjugation. In preclinical studies, we have evaluated thousands of AIMers, assessing a variety of sugar and base modifications, backbone chemistry and stereochemistry, and other parameters such as AIMer length to produce insight into the relationship between an AIMer's structure and its ability to elicit RNA editing activity.

With PRISM, we have generated stereopure AIMers, optimized for chemistry and stereochemistry, which promote RNA editing with endogenous adenosine deaminase acting on RNA (ADAR) enzymes in cellular models. As shown in the figure below, we show the activity of beta-actin-editing stereopure AIMers, with and without PN linkages, compared to a matched stereorandom AIMer (shown in black) in primary human hepatocytes. These AIMers are GalNAc conjugated to increase uptake in hepatocytes. The addition of PN chemistry substantially improves both potency and editing efficiency.



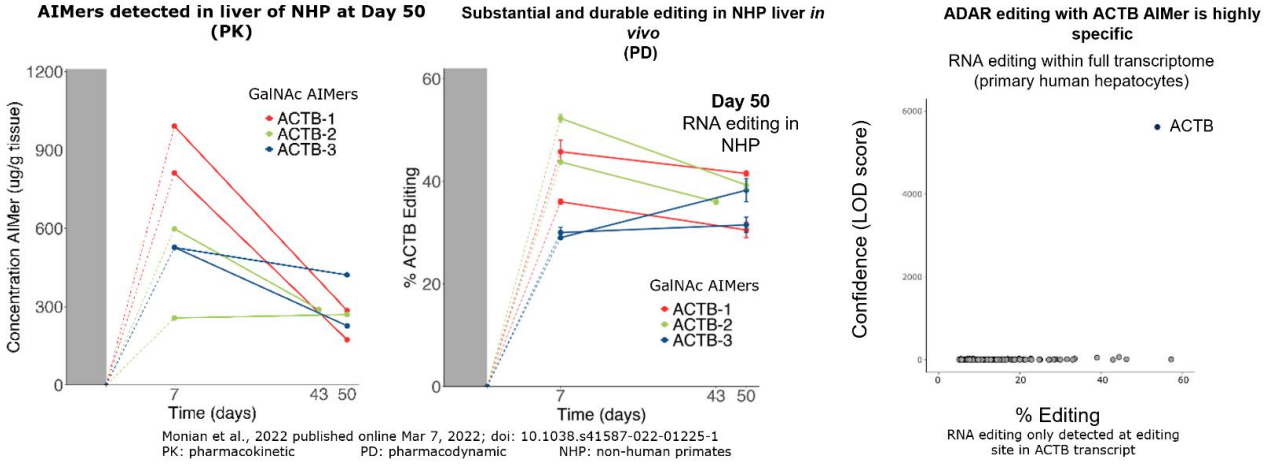
In our *Nature Biotechnology* paper (Monian P, et. al., 2022; doi.org/10.1038/s41587-022-01225-1), we demonstrated efficient RNA editing *in vitro* with our AIMers across a variety of cell lines, including non-human primate and human primary hepatocytes, as shown in the figures below. We observed potent, dose-dependent RNA editing with three chemically distinct stereopure AIMers (ACTB 1, ACTB 2, ACTB 3) via GalNAc-mediated uptake.



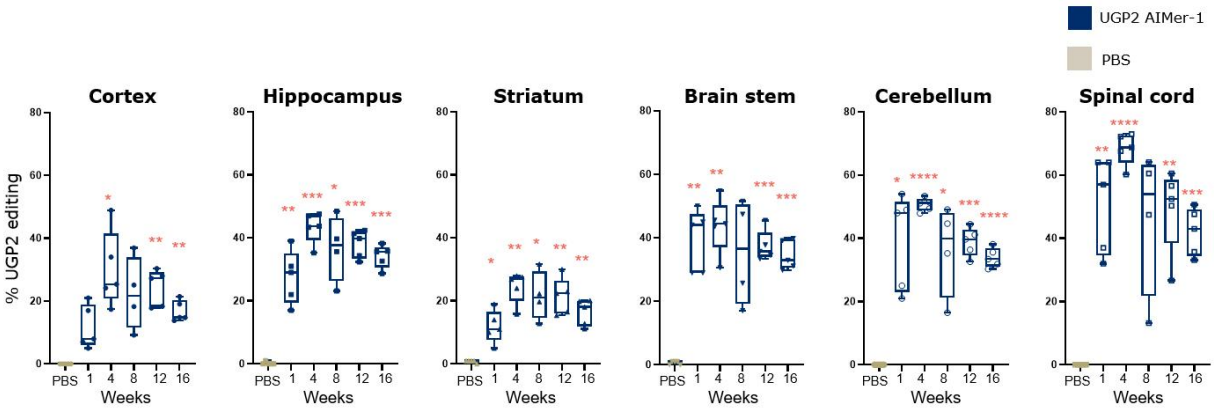


We next evaluated these same ACTB-editing AIMers *in vivo* in non-human primates ("NHPs"), and the results are shown in the figures below. For this study, we dosed NHPs subcutaneously once a day for five days. We took liver biopsy samples at baseline at two days and 45 days after the last dose to evaluate editing. We detected up to 50% editing two days after the last dose as compared to a baseline of 0% editing, as shown in the figure below on the left. These editing results were durable: we continued to see significant editing 45 days after the last dose. The pharmacokinetic data, shown in the figure below in the center, confirmed that a significant amount of AIMer was still detectable in the liver at that time. To assess off-target editing for the whole transcriptome, a mutation-calling software was used to call edit sites. From this analysis, we observed nominal off-target editing across the transcriptome. Sites

where potential off-target editing occurred mapped predominantly to non-coding regions of the transcriptome and had either low read coverage in the analysis or occurred at low percentages of less than 10%, indicating that these are relatively rare events, as shown in the figure below on the right.

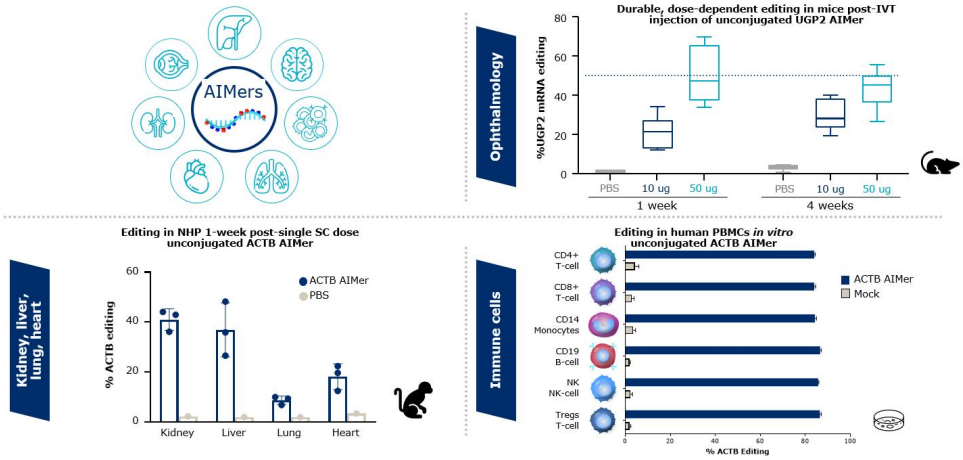


We have demonstrated potent (up to 65%) and durable (out to at least four months) editing of UGP2 mRNA *in vivo* in multiple regions of the CNS following a single unconjugated AIMer dose in a mouse model with human ADAR, as shown in the figure below.

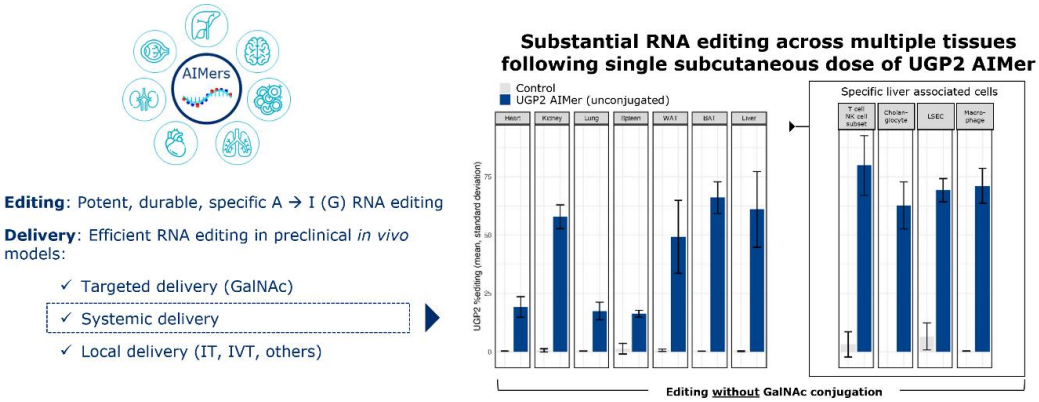


Peak editing	**30%**	**>40%**	**25%**	**>40%**	**50%**	**>65%**

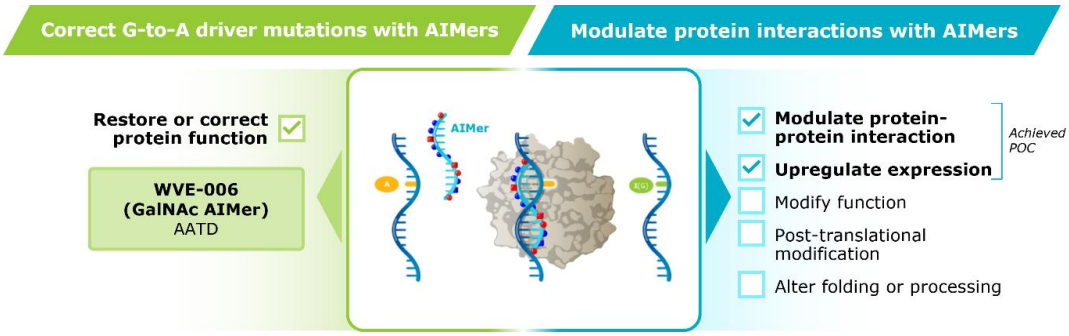
We have also observed productive editing beyond liver and CNS with unconjugated AIMers in multiple tissue types including the retina in mice (below top right), kidney, liver, lung and heart of NHPs (below bottom left), and human PBMCs *in vitro* (below bottom right).



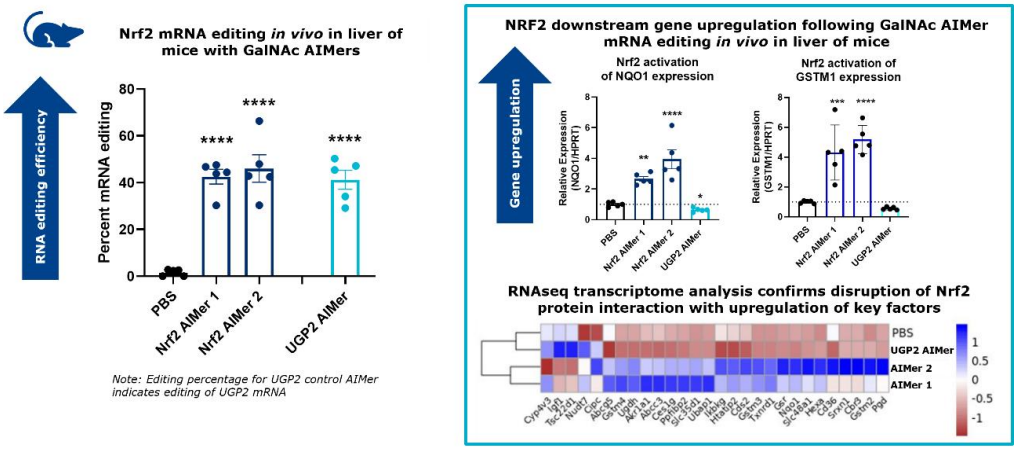
We also observed potent, durable, and specific editing across multiple additional tissues following systemic administration of a single dose of an unconjugated UGP2 AIMer in mice. These additional tissues in mice include heart, kidney, lung, and spleen, as well as liver cells beyond hepatocytes.



The application of PRISM to RNA editing opens the door to therapeutic applications extending beyond precise correction of genetic mutations, including upregulation of expression, modification of protein function, or alteration of protein stability. To date, we have achieved *in vivo* proof-of-concept modulating protein-protein interactions and upregulating protein expression.

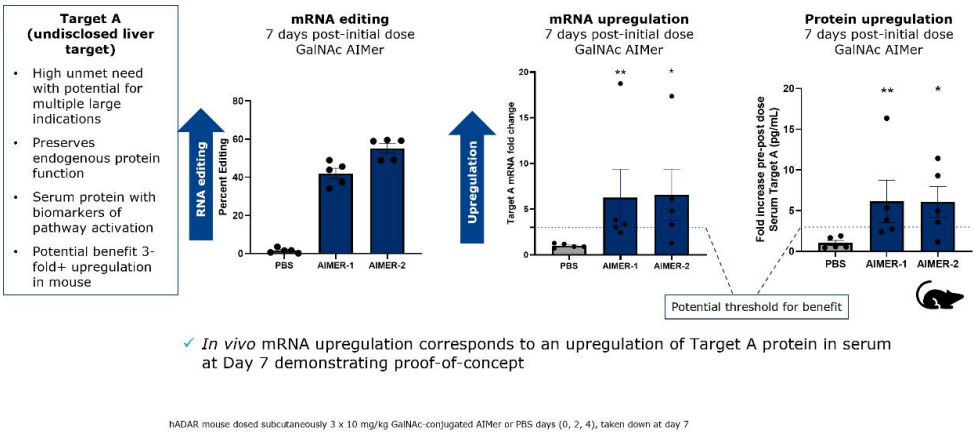


To exemplify our ability to modulate protein-protein interactions using ADAR, we evaluated the well characterized KEAP1/NRF2 system. Through direct protein-protein interactions, KEAP1 negatively regulates the activity of NRF2 as an inducer of antioxidant gene expression. As a proof-of-concept experiment, we investigated if we could mimic the cellular stress response by using ADAR to edit individual amino acids at the protein-protein interaction interface between NRF2 and KEAP1 *in vivo* in mice. If these edits work as designed, we would expect to see downstream upregulation of the NRF2-dependent gene expression program even in the absence of cellular stressors. As shown below, treatment with AIMers resulted in increased expression of known downstream NRF2-dependent genes involved in the antioxidant response. Control treatment did not increase expression of any of the NRF2-dependent genes, indicating that AIMer treatment did not lead to NRF2-dependent gene expression changes through non-specific mechanisms such as increased cellular stress.



Methods: hADAR C57BL/6 mice dosed subQ (days 0, 2, 4) at 10mg/kg GalNAc-conjugated AIMers. Livers harvested (day 7), analyzed for editing and NQO1 expression via Sanger sequencing or qPCR, respectively. Data analyzed via One-way ANOVA with Tukey's multiple comparison test. Asterisks indicate statistical significance to PBS-treated animals as follows: * = p<0.05; ** = p<0.01; *** = p<0.001; **** = p<0.0001

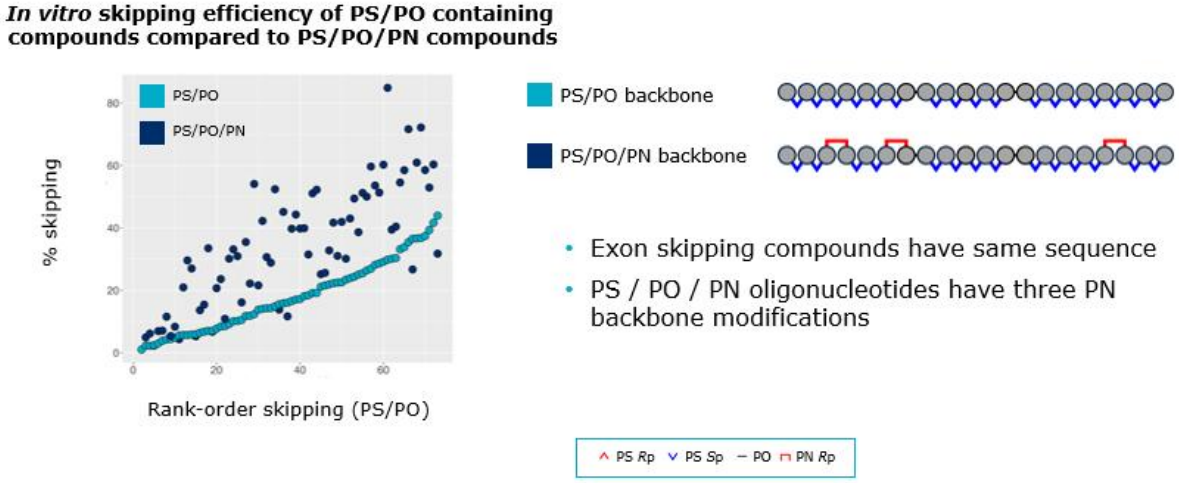
To exemplify our ability to upregulate protein expression levels using ADAR, we evaluated AIMers designed to modify regulatory elements in RNA that mediate protein-RNA or RNA-RNA interactions. Specific structural or sequence motifs that mediate these intermolecular interactions impact RNA processing and stability. As a proof-of-concept experiment, we investigated whether modification of these regulatory elements could increase protein expression in the mouse liver. If these edits work as designed, we would expect to see upregulation of both mRNA and protein. As shown below, treatment of mice with GalNAc-AIMers resulted in editing of the target mRNA in liver, increased levels of the transcript in liver, and increased serum protein levels one week after dosing. These data demonstrate that AIMers designed to edit protein-RNA or RNA-RNA interaction motifs can be applied to increase protein expression.



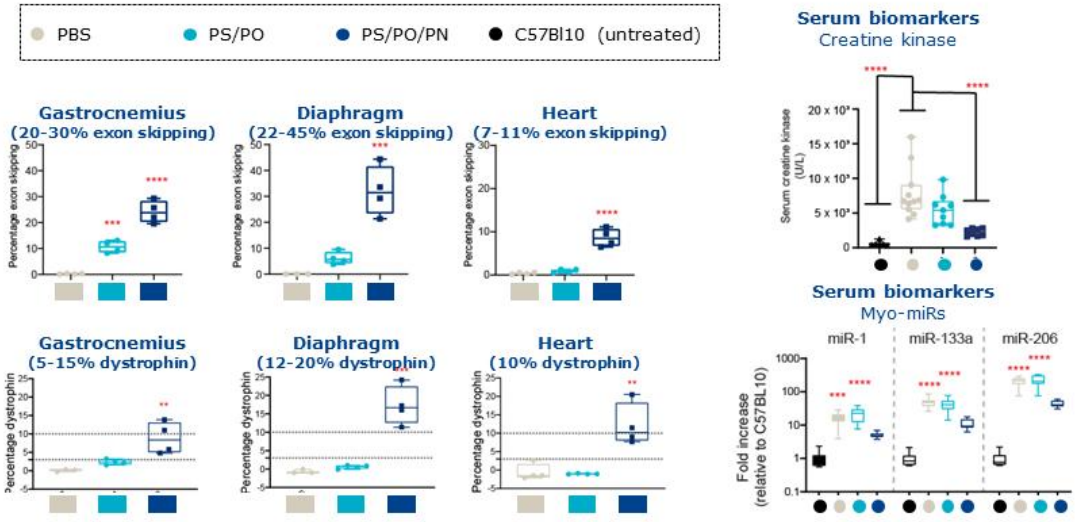
Splicing

With PRISM, we have optimized stereopure oligonucleotides that promote efficient splicing *in vitro*, *ex vivo*, and *in vivo* to restore protein production. In our splicing programs, as with our other modalities, the sequence, chemistry and backbone stereochemistry of oligonucleotides impact their activity.

In our *Nucleic Acids Research* paper (Kandasamy et al., 2022; doi: 10.1093/nar/gkac018), we highlight the impact of PN chemistry on exon skipping. In one application from the paper, we plotted the *in vitro* skipping efficiency of compounds containing PS / PO backbone chemistry modifications, depicted in the graph below by the teal dots, which are rank-ordered from left-to-right based on their exon-skipping potency in human myoblasts. The more potent molecules are shifted upwards as they are restoring expression. The navy dots represent the impact of a few stereopure PN modifications in compounds with otherwise identical sequences and 2'-ribose chemical modifications. There is an overall shift upwards in activity among the PS / PO / PN compounds, representing a substantial potency gain in most cases.



Moving *in vivo*, we demonstrated successful exon skipping in double knockout mice ("dKO"), which lack both utrophin and dystrophin and therefore develop a severe muscular dystrophy phenotype comparable to that observed in patients with DMD. In these mice, exon skipping correlated with dystrophin protein expression, and PN-modified oligonucleotides led to more exon skipping and dystrophin production in all muscles examined after six weeks of treatment (shown below, left). Exon skipping and dystrophin expression improvements correlated with improved serum biomarker profiles in the same mice (shown below, right). These results demonstrate the impact of the judicious placement of PN linkages – with no delivery vehicle or conjugate – which can significantly improve the pharmacological profiles for stereopure compounds.



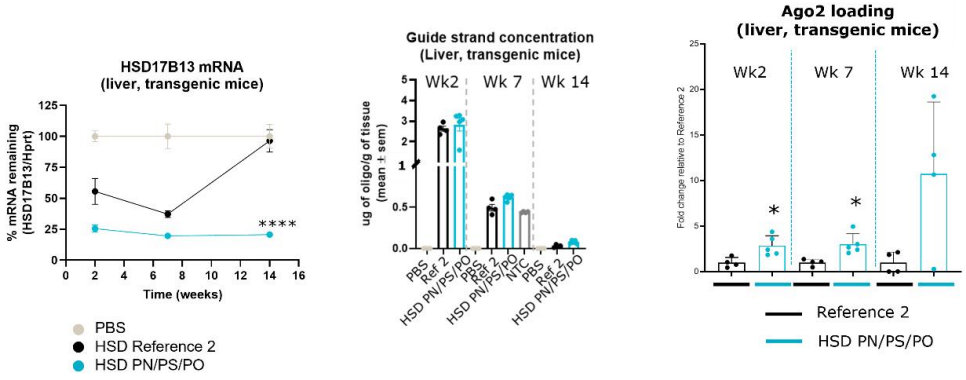
Data adapted from Figure 8, Kandasamy et al., 2022; doi: 10.1093/nar/gkac018 (Stats: One-way ANOVA: *P<0.05, **P<0.01, ***P<0.001, ****P<0.0001)

Silencing – RNAi and RNase H-mediated degradation

Using PRISM, we can produce stereopure PN-modified oligonucleotides that promote potent and specific RNA transcript silencing activity in preclinical experiments.

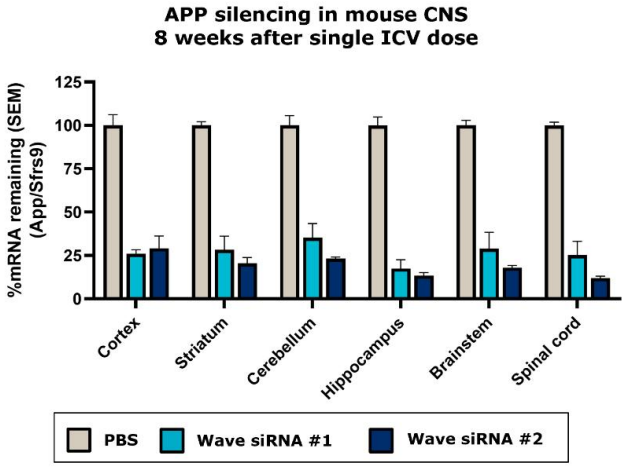
RNAi: We have applied our stereopure PS and PN modifications to the RNAi modality using double-stranded siRNAs and demonstrated potent and durable silencing *in vivo* in transgenic mice. We once again leverage GalNAc to enhance delivery to liver hepatocytes. The data, shown below, illustrate a GalNAc-siRNA, with controlled stereochemistry and PN backbone chemistry, that led to remarkably durable transcript silencing in mice three months after a single dose, compared with mice treated with a siRNA

based on state-of-the-art designs, where expression levels had recovered to control levels (left). The data below (middle and right) also highlight that siRNAs developed with PRISM show improved activity profiles because they support more Ago2 loading than controls.



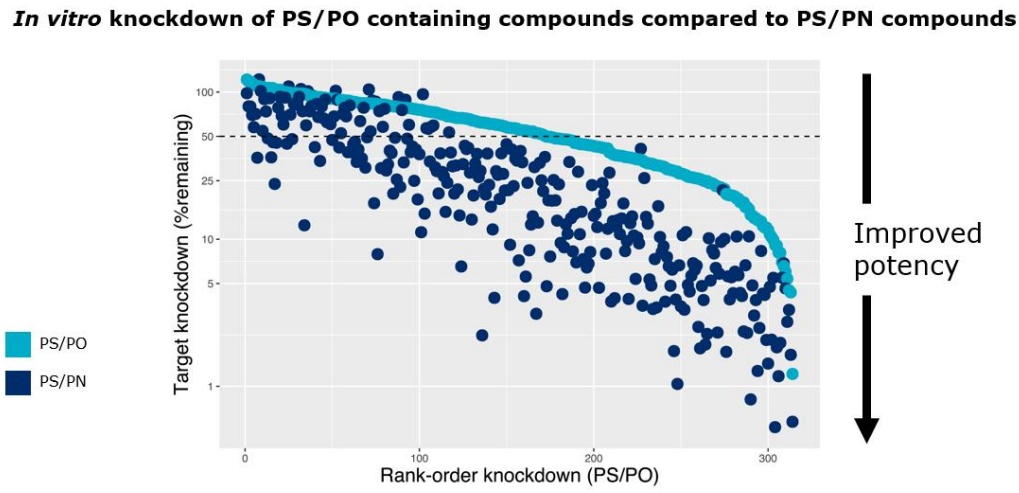
Mice expressing a human *HSD17B13* transgene were treated with 3 mg/kg of the indicated siRNA or PBS, and liver mRNA, guide strand concentration, and Ago2 loading were quantified at the indicated times post-dose. Stats: Two-way ANOVA with post-hoc test * P<0.05, ****P<0.0001. Reference 2 is based on Foster, et al., 2018. Mol. Ther. 26, 708-717

Additionally, in our first *in vivo* non-GalNAc siRNA study, we demonstrated that our unconjugated siRNA constructs led to 70-90% APP silencing across six brain regions in mouse CNS at 8 weeks, following a single intracerebroventricular (ICV) dose.

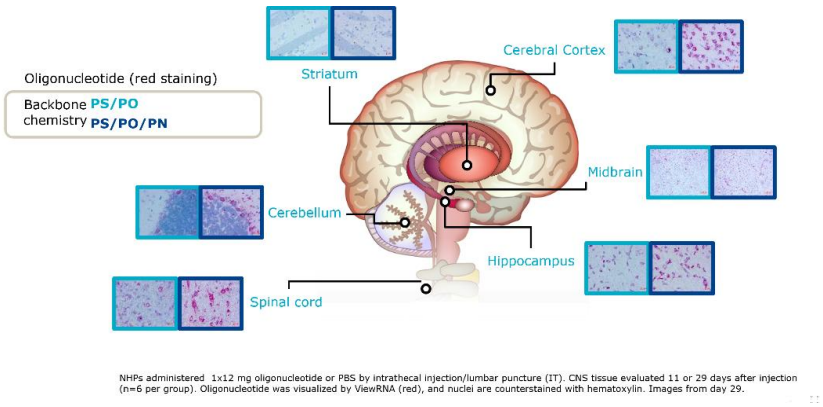


ICV: Intracerebroventricular; APP: Amyloid precursor protein ; CNS: central nervous system
B6 mice were administered PBS or 100 µg of APP siRNA by ICV injection on day 0 (n=7). Mice were euthanized 8 weeks after the administration. Taqman qPCR assays were used for RNA PD, the relative fold changes of *App* to *Sfrs9* mRNA were normalized to the percentage of PBS group. All treated group show $P \leq 0.0001$ compared to PBS group in 2way ANOVA.

<u>*RNase H-mediated degradation (antisense)*</u>: In our *Nucleic Acids Research* paper (Kandasamy et al., 2022; doi: 10.1093/nar/gkac018), we illustrated the impact of PN backbone chemistry modifications for an RNase-H mediated silencing modality. In addition to the data reported in the paper, we have performed screens for identifying RNase H-targeting sequences in iCell neurons *in vitro* using free uptake. This screen was initially performed with stereopure molecules with PS and PO backbone chemistry modifications, and the oligonucleotides are rank-ordered from left to right according to their potency. Next, we performed a head-to-head comparison with molecules that contained the same sequence and the same 2'-ribose chemistry, but with the addition of PN chemistry at select locations in the backbone. The introduction of a few PN linkages significantly increases the potency of the vast majority of the stereopure PS / PO molecules, with ~80% of them yielding at least 75% knockdown. These results, shown below, suggest we are able to target sequence space that would otherwise be inaccessible.



Moving *in vivo*, we have demonstrated potent silencing activity of multiple targets in the CNS of non-human primates with stereopure, PN-modified oligonucleotides. In the results shown below, non-human primates received a single 12 mg dose by intrathecal injection. This single dose led to substantial and widespread mRNA reduction in the CNS one month after administration.



Therapeutic Programs

Our clinical-stage therapeutic programs include a splicing program for protein restoration in muscle – WVE-N531 for DMD, and two silencing programs for indications in the CNS – WVE-003 for HD and WVE-004 for ALS / FTD. In 2022, we also selected a development candidate and initiated IND-enabling toxicology studies for our first RNA editing program, WVE-006, which leverages GalNAc-conjugated delivery for AATD.

See below for more information on these programs and the diseases we are targeting.

Duchenne Muscular Dystrophy

Background and Market Opportunity

DMD is a rare, genetic progressive neuromuscular disorder caused by mutations in the dystrophin gene on the X chromosome that affects approximately one in 5,000 newborn boys around the world (approximately 20,000 new cases annually). The dystrophin protein is part of a protein complex called the dystrophin-associated protein complex that acts as an anchor, connecting each muscle cell's structural framework with a lattice of proteins and other molecules outside the cell through the muscle cell membrane. The dystrophin-associated protein complex protects the muscle from injury during contraction and relaxation. Patients with DMD typically develop muscle weakness in the early years of life and become wheelchair-bound in their early teens. As the disease progresses, DMD patients typically develop respiratory, orthopedic, and cardiac complications. Cardiomyopathy and breathing difficulties usually begin by the age of 20, and few individuals with DMD live beyond their thirties.

Current Treatments

While there are approved therapies for DMD, there is no cure, and there continues to be significant unmet medical need. In most countries, corticosteroids are the standard drug therapy, which slows the progression of muscle weakness and delays loss of ambulation by two to three years. In February 2017, Emflaza (deflazacort) became the first corticosteroid in the United States approved by the FDA as a treatment for DMD patients older than five years of age.

In 2016, Sarepta Therapeutics' Exondys 51™ *(*eteplirsen) received accelerated approval in the United States for the treatment of patients with DMD, who have a confirmed mutation of the dystrophin gene amenable to exon 51 skipping. Two drugs have received accelerated approval in the United States for DMD patients with a confirmed mutation of the dystrophin gene amenable to exon 53 skipping: Sarepta Therapeutics' Vyondys 53™ (golodirsen) in 2019 and NS Pharma's Viltepso™ (viltolarsen) in 2020. NS Pharma has also received Marketing Authorization for Viltepso in Japan. In 2021, Sarepta's Amondys 45™ (casimersen) received accelerated approval for DMD patients with a mutation amenable to exon 45 skipping. According to U.S. accelerated approval guidelines, approval is based on a surrogate endpoint that is likely to predict clinical benefit, but no clinical benefit needs to be established at the time of FDA approval. No clinical benefit has yet been established for eteplirsen, golodirsen, viltolarsen, or casimersen. Thus, in accordance with the U.S. accelerated approval regulations, the FDA is requiring Sarepta to conduct clinical trials to verify and describe the clinical benefit of eteplirsen, golodirsen, and casimersen. Similarly, NS Pharma is required to conduct a clinical trial to verify and describe the clinical benefit of viltolarsen. If any of these confirmatory trials fail to verify clinical benefit, the FDA could initiate proceedings to withdraw approval of the respective drug(s).

In 2014, PTC Therapeutics' Translarna™ (ataluren) was the first disease-modifying treatment to receive conditional approval by the European Medicines Agency ("EMA") for the treatment of ambulatory DMD patients over 5 years of age who have a nonsense mutation (12% of DMD cases) in the dystrophin gene. In 2016, the EMA did not allow Translarna to convert to full marketing authorization; rather, it granted a renewal of the conditional approval. In 2018, EMA expanded the conditional approval for Translarna to include treatment of ambulatory DMD patients ≥2 years of age who have a nonsense mutation in the dystrophin gene. In June 2020, the EMA removed a statement from the summary of product characteristics ("SmPC") for Translarna that "efficacy has not been demonstrated in non-ambulatory patients."

Our DMD Program

WVE-N531: In DMD, we are advancing WVE-N531, which is designed to skip exon 53 within the dystrophin gene. WVE-N531 is designed to cause the cellular splicing machinery to skip over this exon during pre-mRNA processing, which restores the dystrophin mRNA reading frame and enables production of truncated, but functional dystrophin protein. Exon-skipping produces dystrophin from the endogenous dystrophin gene (not micro or mini dystrophin expressed from a vector), under the control of native gene-regulatory elements, resulting in normal temporospatial expression. WVE-N531 is both our first splicing candidate and our first systemically administered candidate incorporating PN chemistry to be assessed in the clinic.

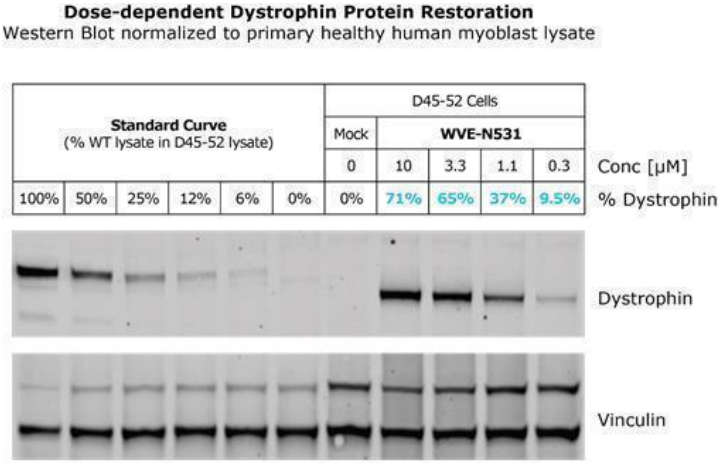
WVE-N531 clinical trial: In December 2022 (data cut-off: December 6, 2022), we announced a positive update from Part A of the Phase 1b/2a proof-of-concept study for WVE-N531 in DMD. This was an open-label, intra-patient dose escalation clinical trial where three boys received single escalating doses of 1, 3, 6 and 10 mg/kg; in the multidose portion of the study, the same boys received three doses of 10 mg/kg every other week. A muscle biopsy was taken two weeks after the third and final dose (six weeks after the first dose).

WVE-N531 resulted in a mean tissue concentration of 42 micrograms/gram (6.1 micromolar), and RNAscope results indicated WVE-N531 is reaching the nucleus in muscle cells. WVE-N531 resulted in mean exon skipping of 53% (range: 48-62%) as measured by RT-PCR. Mean dystrophin production was 0.27% of normal as measured by western blot, which was below the level of quantification (BLQ: 1%). While dystrophin was below the lower limit of detection, it is expected that dystrophin protein production would lag splicing of the RNA transcript. Plasma concentrations and other pharmacokinetic parameters following a single dose of 10 mg/kg demonstrate a half-life of 25 days. Adverse events were all mild, except for a COVID-19 infection of moderate intensity. There were no serious adverse events, no trends in labs, and no oligonucleotide class-related safety events.

Based on these data, we plan to initiate the Phase 2 portion of the WVE-N531 open-label study ("Part B") to enroll up to ten boys to assess dystrophin protein restoration. Boys will be dosed at 10 mg/kg biweekly, and we plan to assess dystrophin protein after 24 and 48 weeks of dosing. The primary endpoint will be dystrophin protein levels, and the study will also evaluate pharmacokinetics, functional endpoints and safety and tolerability. We expect to initiate dosing in 2023 and to deliver data in 2024.

Preclinical data

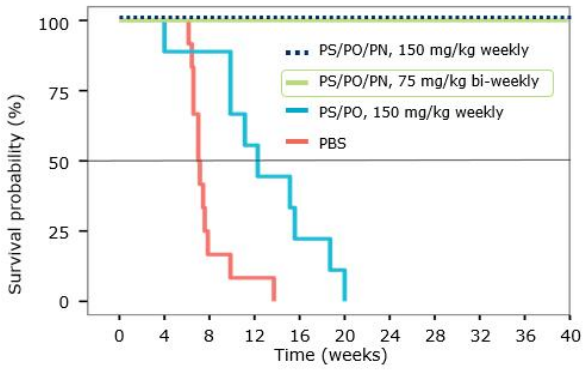
In vitro, WVE-N531 induced dose-dependent exon 53 skipping up to 49% and dystrophin protein restoration up to 71% in DMD patient-derived myoblasts carrying a deletion of exons 45-52. In these experiments, cells were exposed to WVE-N531 at 0.1 µM-10 µM under gymnotic conditions. After four days of oligonucleotide treatment, efficiency at skipping exon 53 was determined by quantitative RT-PCR. After six days of oligonucleotide treatment, protein lysate was analyzed by western blot for dystrophin protein expression.



In NHPs, plasma and tissue concentrations of WVE-N531 were significantly higher than suvodirsen (our first-generation PS/PO). WVE-N531 concentrations in heart and diaphragm were substantially higher than skeletal muscle concentrations. We also observed higher plasma Cmax, AUC and Ctrough levels compared with suvodirsen.

To understand the effects of PN backbone chemistry modifications *in vivo*, we conducted a study in a dKO mouse model, which has a mutation in exon 23 leading to a lack of dystrophin, as well as a mutation leading to a lack of utrophin. We compared the effects of a PS/PO-containing molecule dosed at 150 mg/kg weekly to a PN-containing compound dosed at the same level, a PN-containing compound at 75 mg/kg every other week and a control group dosed with PBS. Other than the placement of the three PN backbone linkages, these molecules have the same sequence and chemistry. There is a significant increase in survival in those animals treated with PN containing compounds as compared with the other treatment groups. As shown in the figure below, both cohorts of mice receiving the PN-containing molecules (shown in dark blue and light green) had 100% survival at the time of study termination, with a median age of approximately 40 weeks. By comparison, the median survival for the mice receiving the PS/PO-containing molecule dosed at 150 mg/kg weekly was approximately 12 weeks and the dKO control animals that received PBS had a median survival of

approximately seven weeks. These results were published in *Nucleic Acids Research* (Kandasamy et al., 2022; doi: 101.1093/nar/gkac018).



Note: Untreated, age-matched mdx mice had 100% survival at study termination [not shown]

Alpha-1 Antitrypsin Deficiency

Background and Market Opportunity

We are leveraging our RNA editing platform capability to develop a potentially novel treatment for AATD. AATD is a rare, inherited genetic disorder that is commonly caused by a G-to-A point mutation in the *SERPINA1* gene; this mutant allele is termed the *Z* allele. This mutation leads to misfolding and aggregation of alpha-1 antitrypsin ("AAT") protein in hepatocytes and a lack of functional AAT in the lungs. People with AATD typically exhibit progressive lung damage, liver damage or both, leading to frequent hospitalizations and potentially terminal lung disease and/or liver disease. While the few approved therapies for AATD modestly increase circulating levels of AAT in those with the lung pathology, there are no approved therapies to address the liver pathology. Approximately 200,000 people in the United States and Europe are homozygous for the Z allele, which is the most common form of severe disease.

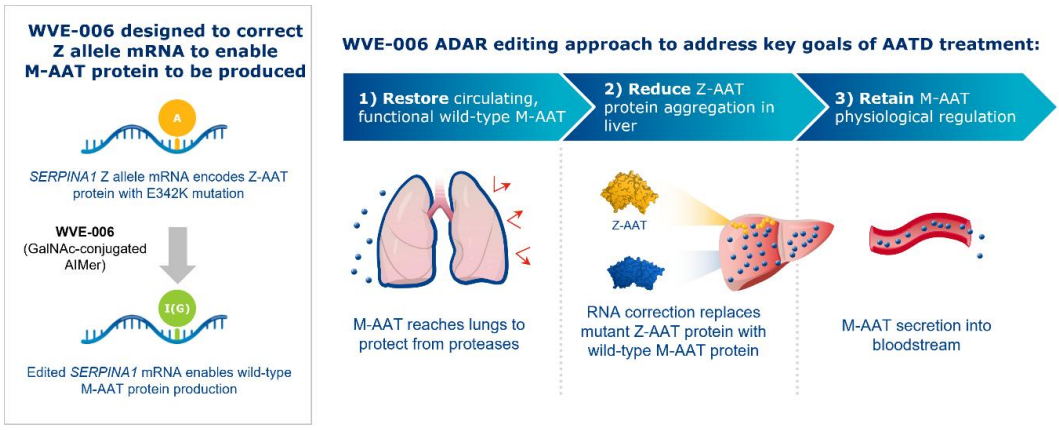
Current Treatments

There are five treatments currently approved in the United States for chronic augmentation and maintenance therapy in adults with emphysema due to congenital deficiency of alpha1-proteinase inhibitor (Alpha1-PI). Per FDA labeling for each, the effect of augmentation therapy with any alpha1-proteinase inhibitor on pulmonary exacerbations and on the progression of emphysema in Alpha1-PI deficiency has not been demonstrated in randomized, controlled clinical trials. Patients with AATD can also be treated with therapies used in other lung diseases including bronchodilators to open airways and corticosteroids to reduce chronic inflammation common in the lungs of AATD patients.

There are currently no approved therapies to prevent the accumulation of the misfolded AAT protein in the liver. Treatments are available to help deal with intestinal bleeding, fluid in the abdomen, nutritional issues, and other complications from scarring of the liver, but ultimately many patients will progress towards requiring a liver transplant.

Our AATD Program

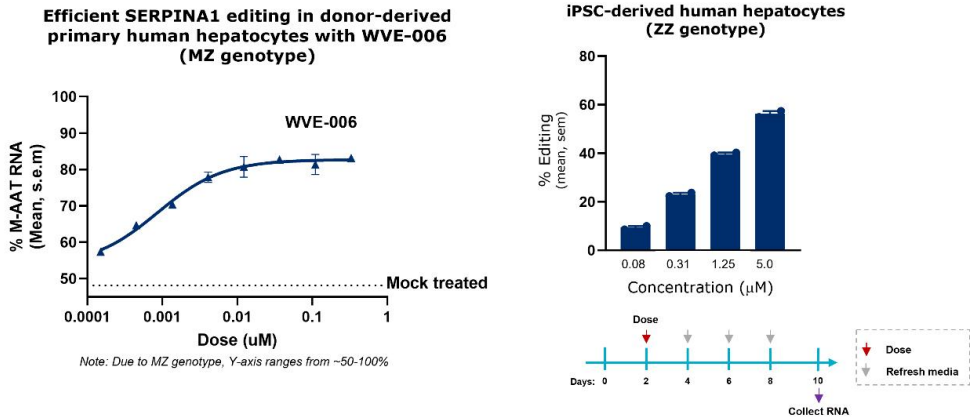
Our AATD program is the first to leverage our novel RNA editing capability that uses GalNAc-conjugated AIMers (RNA base editing oligonucleotides) and endogenous ADAR enzymes by correcting a single base in the mutant SERPINA1 mRNA. ADAR editing may provide an ideal approach for increasing circulating levels of wild-type AAT protein and reducing aggregation in the liver, thus simultaneously addressing both the lung and liver manifestations of the disease. In the third quarter of 2022, we announced WVE-006 as our development candidate for AATD. WVE-006 is first-in-class in AATD and will be administered using subcutaneous administration. It is the most advanced program currently in development using an oligonucleotide to harness an endogenous enzyme for RNA base editing. WVE-006 is currently in IND-enabling studies and we expect to submit clinical trial applications in the second half of 2023.



AAT: Alpha-1 antitrypsin Strnad *et al.*, 2020 *N Engl J Med* 382:1443-55; Blanco *et al.*, 2017 *Int J Chron Obstruct Pulmon Dis* 12:561-69; Remih *et al.*, 2021 *Curr Opin Pharmacol* 59:149-56.

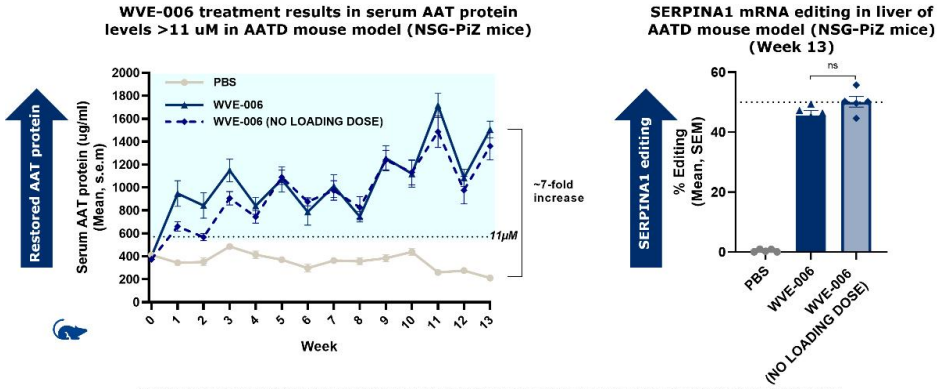
Preclinical data

Preclinical data for WVE-006 demonstrated that WVE-006 supports dose-dependent RNA editing in human preclinical model systems, as shown in the figure below. We observed efficient SERPINA1 editing in donor-derived primary human hepatocytes (MZ genotype) after 48 hours, as well as a dose-dependent increase in RNA editing in iPSC-derived human hepatocytes (ZZ genotype) eight days after a single dose.



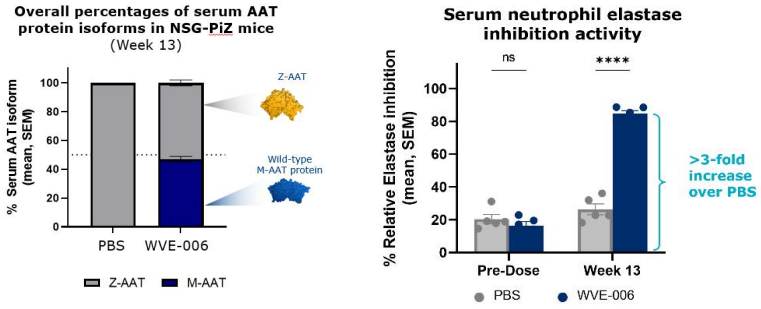
Left: MZ-donor derived primary human hepatocytes treated with WVE-006 at indicated concentrations for 48 hours
Right: Patient-iPSC derived hepatocytes (ZZ genotype) plated on day 0 and treated on day 2 with WVE-006 at indicated concentrations. Media refreshed every 2 days (days 4, 6, 8). RNA was collected on day 10. In each experiment, RNA editing was quantified by Sanger sequencing (n=2 biological replicates)

In an *in vivo* preclinical study in NSG-PiZ mice, we demonstrated restoration of functional AAT protein with bi-weekly doses of 10 mg/kg. At 13 weeks, AAT protein levels with WVE-006 were approximately 7-fold greater than PBS-administered controls and well above the predicted protective threshold of 11 uM, as shown below (left). This increase was observed at week 13 both in mice that received a loading dose, as well as mice that did not. WVE-006 also resulted in approximately 50% RNA editing of SERPINA1 transcript at 13 weeks in this same model, regardless of whether a loading dose was used, as shown below (right).



WVE-006 administered subcutaneously (10 mg/kg bi-weekly) in 7-week old NSG-PiZ mice (n=5 per group); Loading dose: 3 x 10 mg/kg at Day 0. Left: Liver biopsies collected at week 13 (one week after last dose) and SERPINA1 editing was quantified by Sanger sequencing; Stats: One-way ANOVA with adjustment for multiple comparisons (Tukey); Right: Total serum AAT protein quantified by ELISA; Stats: Two-Way ANOVA with adjustment for multiple comparisons (Tukey)

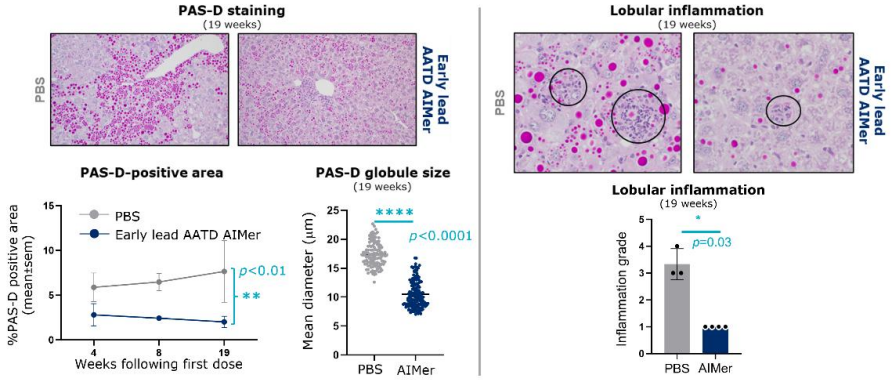
We then sought to determine whether the restored serum AAT protein from the mouse experiment described above was wild-type M-AAT protein. WVE-006 led to restoration of approximately 50% wild-type M-AAT protein in serum, as measured by mass spectrometry, as shown below (left), as well as a 3-fold increase in neutrophil elastase inhibition activity, as shown below (right), indicating the restored M-AAT protein was functional.



WVE-006 administered in 7-week old NSG-PiZ mice (n=5 per group). Relative proportion of M- vs. Z-AAT protein in serum collected from animals at week 13 (one week after last dose) was measured by mass spectrometry

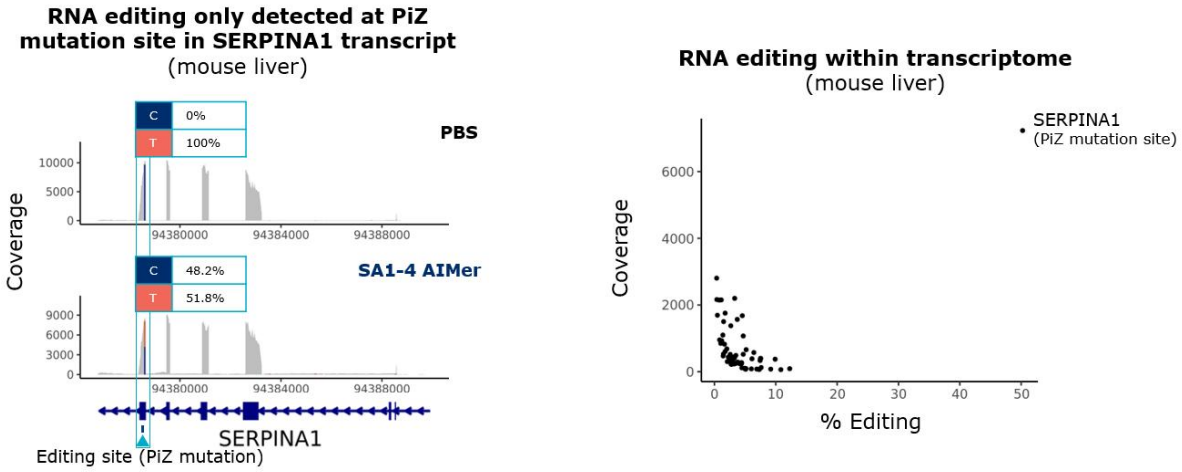
GalNAc-conjugated AIMers administered in 7-week old NSG-PiZ mice (n=5 per group). Serum collected from mice was tested for ability to inhibit fixed concentration of neutrophil elastase in an *in vitro* reaction. Stats: Two-way ANOVA with adjustment for multiple comparisons (Bonferroni)

An earlier lead (pre-optimization) GalNAc-AIMer reduced Z-AAT aggregates and inflammation in mouse livers (mouse model: huADARxSA1), as indicated below.



Early lead pre-optimization AATD AIMer (SA1-5) administered in hu*ADAR/SERPINA1* mice (8-10 wks old); lower left: 20x liver images PAS-D stained, 19 weeks; Quantification of PAS-D positive staining, Stats 2-way ANOVA; Right: Quantification lobular inflammation grade (Grade based on # of inflammatory foci in lobules: Grade 0: 0; G1 1-5; G2 6-10; G3 11-15; G4 ≥16) and mean globular diameter (40 largest globules/ animal) with HALO. Stats Wilcox rank-sum tests

To evaluate the specificity of our GalNAc-AIMers (specifically "SA1-4 AIMer"), we performed RNA-seq on liver biopsies from treated animals. The figure below on the left shows total sequence coverage across the entire SERPINA1 transcript for the AIMer-treated samples. The percentage of unedited "T" and edited "C" reads are indicated for each group. Editing is only detected at the intended, on-target sequence in the SERPINA1 transcript. Thus, the protein being produced using this approach is truly wild-type M-AAT protein. This also confirms there is no editing of bystander residues, as has been seen with DNA targeting approaches. To assess off-target editing for the whole transcriptome, we applied a mutation-calling software to search edit sites. From this analysis, we observed minimal off-target editing across the transcriptome. Sites where potential off-target editing occurred had either low read coverage in the analysis or occurred at low percentages (less than 10%), indicating that these are rare events, as shown below on the right. In both analyses, we find a high percentage of editing that is specific for the target site in the SERPINA1 transcript.



Huntington's Disease

Background and Market Opportunity

Huntington's Disease ("HD"): HD is a rare hereditary neurodegenerative disease that results in early death and for which there is no cure. In HD patients, there is a progressive loss of neurons in the brain leading to cognitive, psychiatric, and motor disabilities. HD is caused by a defect (an expanded CAG triplet repeat) in the *HTT* gene, which results in production of mutant HTT ("mHTT") protein. HD patients still possess some wild-type (healthy) HTT ("wtHTT") protein, which is important for neuronal function, and which may

be neuroprotective in an adult brain. Studies suggest a multifaceted mechanism by which gain of mHTT protein and a concurrent loss of wtHTT protein may drive the pathophysiology of HD. Accordingly, therapeutic approaches for HD that aim to lower mHTT but that also suppress wtHTT may have detrimental long-term consequences. Wild-type HTT is important both for normal neuronal function in the adult CNS and for protection against HD. It can protect against stress-induced neurodegeneration in multiple model systems: in cultured neurons, wtHTT is protective against stress-induced apoptosis; in mice, postnatal deletion of wtHTT leads to progressive neurological phenotypes, neurodegeneration, and premature death, whereas overexpression of wtHTT conveys neural protection during stress, including ischemia and other types of CNS injury, as well as NMDA-induced excitotoxicity. In the YAC128 mouse model of HD, overexpression of wtHTT ameliorates striatal neuropathology, whereas loss of the wild-type mouse HTT worsens motor performance, survival, and striatal neuronal size. In patients with HD, the A variant of a non-coding single nucleotide polymorphism ("SNP") disrupts a binding site for the transcription factor NF-κB and decreases expression of the associated HTT gene: when the A variant associates with mHTT, disease onset is late (on average, 10-years later than when the G variant associates with mHTT); when the A variant associates with wtHTT, disease onset is earlier (on average, four years earlier than when the G variant associates with wtHTT), indicating that increased expression of wtHTT can be protective against HD in patients. Together, these studies provide evidence that wtHTT is both neural protective during stress and is specifically protective against HD; thus, we believe an allele-selective therapeutic, one that can diminish the production of mHTT while sparing wtHTT, may be ideal.

Symptoms of HD typically appear between the ages of 30 and 50 and worsen over the next 10 to 20 years. Many describe the symptoms of HD as similar to having amyotrophic lateral sclerosis, Parkinson's Disease and Alzheimer's Disease simultaneously. Patients experience a reduction in motor function and psychological disturbances. Life expectancy after symptom onset is approximately 20 years. In the most symptomatic stages, often lasting over 10 years, affected persons become fully dependent upon others to manage all activities of daily living; they lose the ability to make decisions, feed themselves and walk, and often require premature placement in a long-term care facility. It is estimated that approximately 30,000 people in the United States have symptomatic HD. Our allele-selective approach may also enable us to address the pre-manifest, or asymptomatic, HD patient population in the future. More than 200,000 people in the United States are at-risk of developing HD.

Current Treatments

There are no approved treatments that can reverse or slow HD progression. Current pharmacological therapies only address HD symptoms. Antipsychotics are used to manage depression, irritability, and chorea (involuntary movements). Xenazine (tetrabenazine) and Austedo (deutetrabenazine) are the only two therapies approved for the treatment of chorea associated with HD in the United States. In the EU, Xenazine, Haldol (haloperidol), and Tiapridal (tiapride) are approved for the treatment of chorea associated with HD.

Our HD Program

WVE-003: In HD, we are currently advancing WVE-003, a stereopure antisense oligonucleotide designed to selectively target an undisclosed SNP, "mHTT SNP3", associated with the disease-causing mutant huntingtin ("mHTT") mRNA transcript within the *HTT* gene. SNPs are naturally occurring variations within a given genetic sequence and in certain instances can be used to distinguish between two related copies of a gene where only one is associated with the expression of a disease-causing protein. Approximately 40% of the HD population carries SNP3 according to published literature (Carroll et al., Molecular Therapy, 2011). WVE-003 incorporates our novel PN chemistry, as well as learnings from our first-generation HD programs. Targeting mRNA with SNP3 allows us to lower expression of transcript from the mutant allele, while leaving the healthy transcript relatively intact. The healthy transcript produces wtHTT protein, which is important for neuronal function. We commonly refer to this method (or approach) as "allele-selective targeting." Our allele-selective approach may also enable us to address the pre-manifest, or asymptomatic, HD patient population in the future.

In preclinical studies, WVE-003 showed dose-dependent and selective reduction of mHTT mRNA *in vitro*, and potent and durable knockdown of mHTT mRNA and protein *in vivo*. A pharmacokinetic-pharmacodynamic (PK-PD) model for WVE-003 based on preclinical data predicts that WVE-003 may attain sufficient concentrations to engage mHTT transcript in both the cortex and striatum and decrease expression of mHTT protein.

SNP Phasing Technology: To verify that potential HD patients have a heterozygous SNP with the right variant in-phase with the mutant allele, we investigated multiple technologies that could provide highly accurate results and rapid turnaround. We conducted a prospective observational study of the frequency of two SNPs in patients with HD, which confirmed the feasibility of rapidly and prospectively identifying SNPs in association with the mHTT allele in patients with HD (Claassen et al., Neurol Genet 2020; Svrzikapa et al., Molecular Therapy 2020). We have an agreement with Asuragen, Inc. ("Asuragen"), a molecular diagnostics company that was acquired by Bio-Techne Corporation in April 2021, for the development and potential commercialization of companion diagnostics for our allele-selective therapeutic program in HD. This agreement includes the use of their scalable SNP phasing technology (AmplideX® *HTT* SNP/Repeat Phasing Clinical Trial Assay) in our SELECT-HD trial for WVE-003.

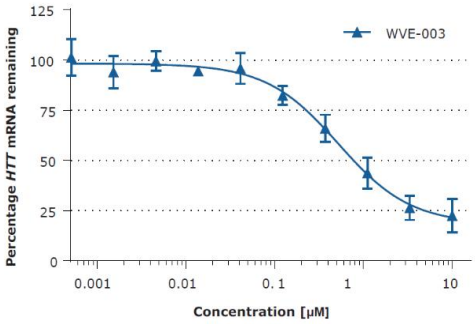
SELECT-HD Phase 1b/2a clinical trial: The SELECT-HD trial is a multicenter, randomized, double-blind, placebo-controlled Phase 1b/2a trial to assess the safety and tolerability of intrathecally administered WVE-003 for patients with early manifest HD. Additional objectives include measurement of CSF mHTT and wtHTT protein and exploratory pharmacokinetic, pharmacodynamic, clinical and MRI endpoints. The SELECT-HD trial is designed to be adaptive, with dose level and dosing frequency being guided by an independent committee. Preclinical models that have established pharmacologic activity have informed the starting dose for this trial.

In September 2022 (data cut-off: August 29, 2022), we announced a positive update from SELECT-HD, with initial results indicating allele-selective target engagement with WVE-003 in HD. Single doses of WVE-003 up to 90 mg appeared generally safe and well-tolerated. Among participants in the 30 and 60 mg WVE-003 cohorts, the mean reduction in CSF mHTT from baseline was 22% (median reduction 30%) at 85 days following a single dose. Participants in the 90 mg cohort had not yet reached day 85, so they were not included in the biomarker analysis. The difference in the mean reduction in CSF mHTT compared to placebo was 35% at 85 days post-single dose. For these analyses, the 30 and 60 mg single dose cohorts were pooled as there was no apparent dose response between these two cohorts. In the 30 and 60 mg cohorts, wtHTT protein levels appeared consistent with allele-selectivity. Increases in neurofilament light chain ("NfL") from baseline were observed in some participants. There were no clinically meaningful elevations in CSF white blood cell counts or protein that would indicate inflammation in the CNS, and there were no meaningful changes in clinical outcome measures, although the dataset and duration were not sufficient to assess clinical effects.

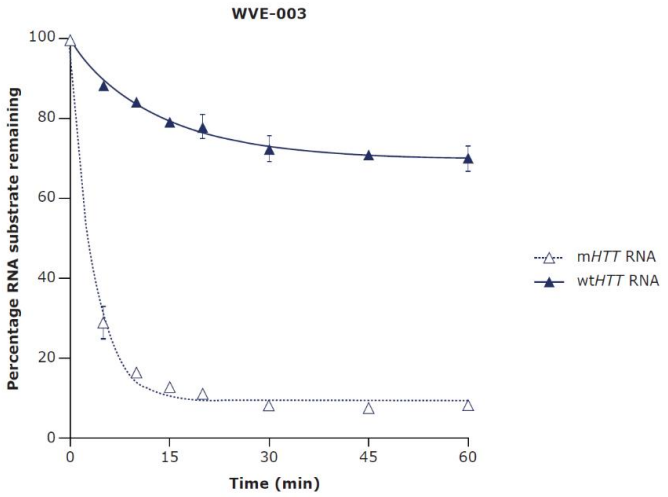
Based on the SELECT-HD data, we have adapted the trial to expand the single dose cohorts and expect to share additional single-dose biomarker and safety data in the first half of 2023.

Preclinical studies

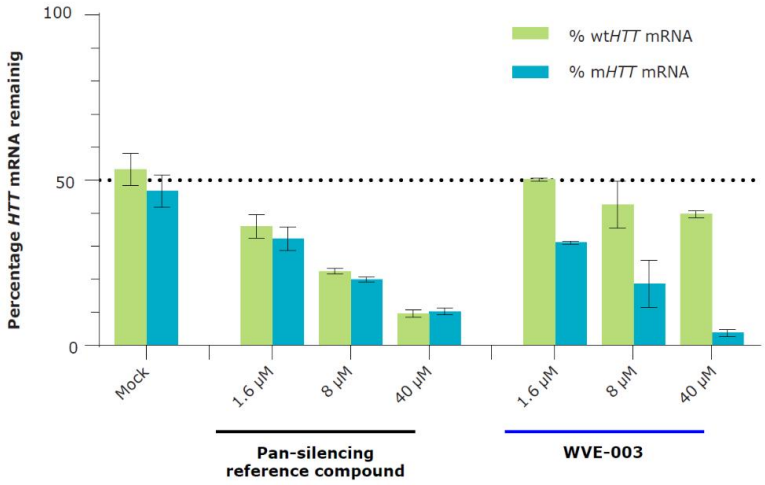
WVE-003 showed potent knockdown of HTT mRNA in a preclinical study using induced pluripotent stem cell ("iPSC")-derived motor neurons homozygous for SNP3 (as shown below).



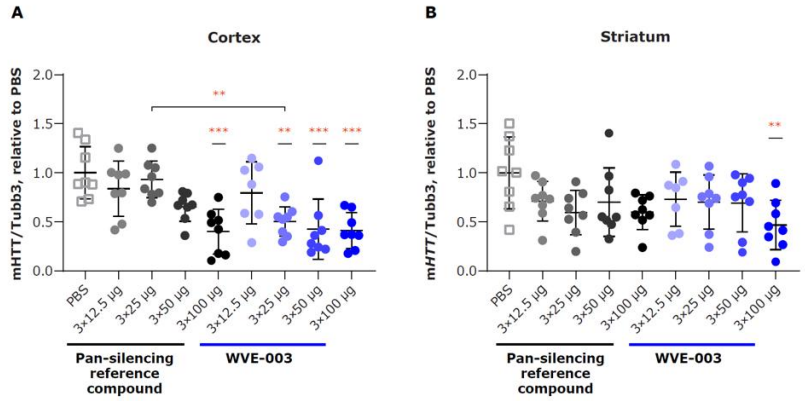
WVE-003 promoted RNase H–mediated degradation of mHTT RNA while sparing wtHTT RNA in a biochemical assay.



We further demonstrated selectivity of WVE-003 in assays performed in induced pluripotent stem cell (iPSC) neurons from patients with HD that are heterozygous for SNP3. WVE-003 selectively silenced the mutant transcript while largely sparing the wild-type transcript. By comparison, the pan-silencing active comparator silenced both mutant and wild-type HTT transcripts.

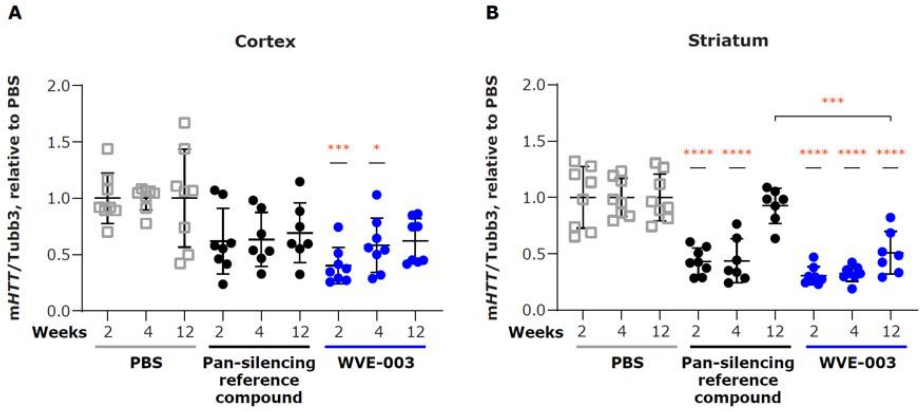


We next tested our SNP3 compounds *in vivo* in a BACHD model for HD. This model expresses a mutant version of the human *HTT* gene. Because it is a transgenic model that lacks human wtHTT, BACHD mice are not suitable for assessing selectivity, but they enable assessment of target engagement *in vivo*. Importantly, the model contains multiple copies of the human mHTT transgene; however, not all of the copies contain SNP3. Thus SNP3-targeting compounds cannot target all the human mHTT transcripts expressed in these mice. After administration, WVE-003 showed significant mHTT mRNA knockdown compared with phosphate-buffered saline (PBS) at the highest concentration tested in the striatum and all but the lowest concentration tested in the cortex. WVE-003 showed comparable reduction of mHTT mRNA to that of the pan-silencing oligonucleotide, despite having fewer targets in these mice.



**P<0.0021, ***P<0.0002 versus PBS unless otherwise noted

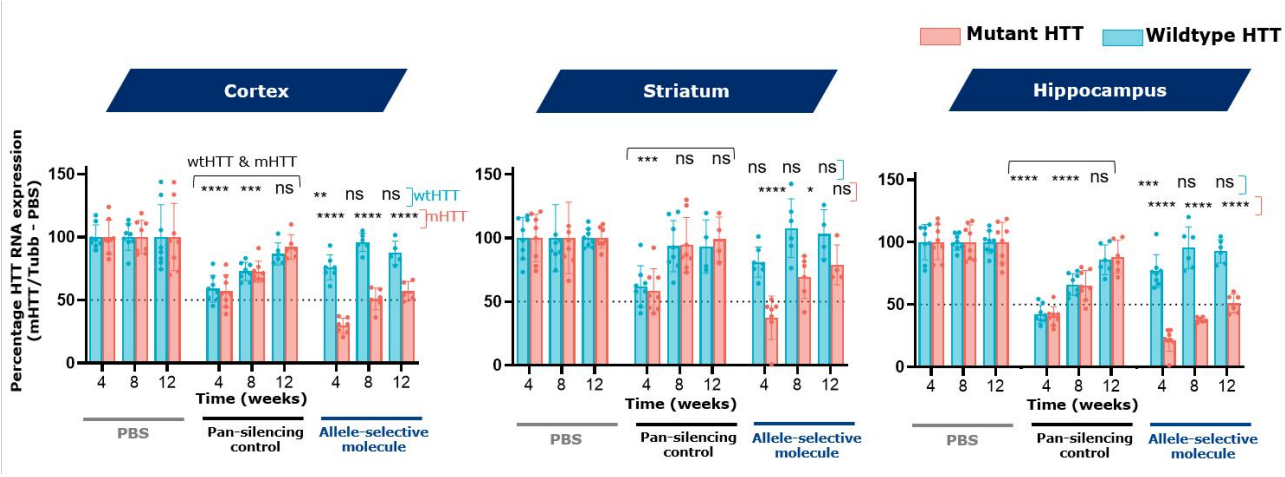
In the cortex of BACHD mice, WVE-003 showed significant mHTT knockdown compared to PBS through week four. In the striatum, WVE-003 led to significant and durable mHTT knockdown that was sustained for 12 weeks, compared with PBS. WVE-003 led to significantly more knockdown than the pan-silencing reference compound at week 12 in the striatum. Since most but not all of the transgenes in this model contain SNP3, our SNP3 compounds are disadvantaged versus the pan-silencing active comparator.



*P<0.0332, ***P<0.0002, ****P<0.0001 versus PBS unless otherwise noted

In vivo allele-selectivity: We then tested in vivo allele-selectivity using an allele-selective mHTT SNP3 targeting oligonucleotide in a humanized mouse model ("Hu97/18"). The mice express a human YAC wtHTT transgene (with 18 CAG repeats) and a human BAC mHTT transgene (with 97 CAG repeats). The mice carry the SNP3 variant associated with the human mHTT allele, and they do not

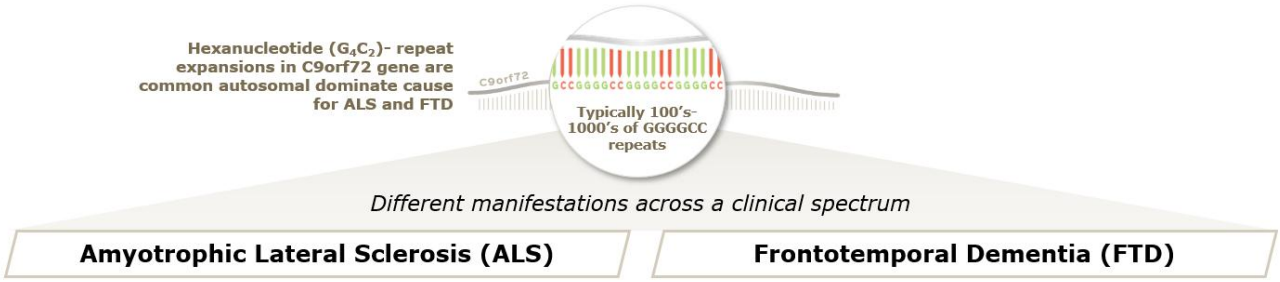
express mouse huntingtin. After administration (3 x 100 ug ICV doses), the allele-selective molecule decreased mHTT and spared wtHTT in the cortex, striatum, and hippocampus of Hu97/18 mice up to 12 weeks post-injection throughout the brain. By contrast a pan-silencing control decreased expression of both mHTT and wtHTT, and the silencing activity was both less potent and less durable than the allele-selective molecule, especially in the striatum.



Data are mean ± SD, n=8; Stats: ns non-significant, *P<0.05, **P<0.01, ***P<0.0001, ****P<0.0001 versus PBS by 1-way ANOVA

Amyotrophic Lateral Sclerosis and Frontotemporal Dementia

Hexanucleotide G4C2 expansions found in the *C9orf72* gene are one of the most common genetic causes of the sporadic and inherited forms of Amyotrophic Lateral Sclerosis (ALS) and Frontotemporal Dementia (FTD). Some patients exhibit characteristics of both ALS and FTD, indicating that these diseases form part of a continuum of neurological disease with some overlap in symptoms between them.



ALS Background and Market Opportunity

ALS is a neurodegenerative disease characterized by the progression and degeneration of motor neurons in the brain and spinal cord. Diagnosis may take up to 12 months and is made clinically by assessing the signs of upper and lower motor neuron degeneration in the same region of the body. Patients initially present with limb-onset disease (approximately 70% of patients), bulbar-onset disease (approximately 25% of patients) or with initial trunk or respiratory involvement (approximately 5% of patients). Age of onset is generally in the mid-to-late 50s, and median survival is three years; however, up to 24% of patients survive for five to ten years. Survival in patients with *C9orf72* ALS may be shorter than in patients with sporadic ALS.

In the United States and Europe combined, there are approximately three to five ALS patients per 100,000 people. This translates to approximately 13,000 diagnosed patients in the United States, although the total prevalence may be around 20,000 people in the United States. There are one or two newly diagnosed cases of ALS per year, per 100,000 people in the United States and Europe combined, resulting in approximately 5,000 newly diagnosed patients in the United States each year. While the majority of ALS cases

are sporadic, approximately 10% of cases are found to be familial in nature. The *C9orf72* gene mutation is currently the most common demonstrated mutation related to ALS and is present in approximately 40% of familial ALS and 8 – 10% of sporadic ALS patients.

ALS Current Treatments

There is significant unmet need for the treatment of ALS. Three medicines are currently approved in the United States for the treatment of ALS. Rilutek (riluzole), an inhibitor of glutamate release, was approved in 1995 for the treatment of patients with ALS. It was demonstrated to extend survival by three to six months. Radicava (edaravone) was approved in 2017 for the treatment of ALS. Administration of edaravone resulted in a significantly smaller decline in the ALS Functional Rating Scale-Revised ("ALSFRS-R") through six months of treatment as compared to placebo. Relyvrio (sodium phenylbutyrate and taurursodiol) was approved in 2022 for the treatment of ALS. In a clinical trial, patients treated with Relyvrio scored on average 2.32 points higher than placebo on the ALSFRS-R after 6 months. A post-hoc exploratory survival analysis showed that patients originally randomized to Relyvrio had a 4.8 month longer median overall survival compared to those in the placebo group.

FTD Background and Market Opportunity

FTD is a neurodegenerative disorder of the frontal and anterior temporal lobes of the brain. It is characterized by changes in personality, cognition (e.g., language impairment and executive dysfunction), and behavior (e.g., disinhibition, apathy and compulsivity). Diagnostic criteria categorize FTD into either the behavioral variant (approximately 60% of patients) or speech/language variant (approximately 40% of patients) based on the primary symptom observed at presentation; however, FTD results in dementia in all patients. The majority of FTD associated with the G4C2 expansion in the *C9orf72* gene is categorized as the behavioral variant. FTD frequently has an onset in mid-life, and death typically occurs within three to 14 years of onset. FTD is the second most common form of early-onset dementia in people under the age of 65, after AD.

In FTD, the *C9orf72* gene mutations appear in approximately 38% of familial cases and approximately 6% of sporadic cases. FTD affects approximately 55,000 people in the United States, of which 10 – 50% are familial cases and 50 – 90% are sporadic cases.

FTD Current Treatments

There are currently no disease-modifying therapies approved for the treatment of FTD. Treatment to date has involved use of medications for symptomatic management.

C9-ALS and C9-FTD Pathology

Expansion of the G4C2 repeat alters the normal expression of the *C9orf72* gene and causes the production of repeat-containing RNA sense and antisense variants. These RNAs accumulate in cellular nuclei in the form of RNA foci and can be translated into dipeptide repeat ("DPR") proteins. Neuronal degeneration associated with the expression of the repeat expansion is hypothesized to arise either from a toxic loss-of-function mechanism due to a reduction in C9orf72 protein, a toxic RNA gain-of-function mechanism through the accumulation of RNA foci and/or DPRs accumulating in the brain and spinal cord, or both. WVE-004 is designed to affect multiple drivers of toxicity by preserving C9orf72 protein, thereby not exacerbating loss-of-function, and reducing the toxic gain-of-function drivers of disease – RNA foci and DPRs.

Our ALS and FTD Program

WVE-004: In ALS and FTD, we are advancing WVE-004, which uses our novel PN chemistry and preferentially targets the transcripts containing the hexanucleotide G4C2 expansion in the *C9orf72* gene. WVE-004 is designed to minimize the impact on normal C9orf72 protein in patients, thereby reducing potential on-target risk. *In vitro*, WVE-004 potently and selectively reduced V3 transcripts in iPSC-derived motor neurons, which were derived from a patient carrying a *C9orf72*-repeat expansion. In C9 BAC transgenic mice, WVE-004 led to substantial reductions in repeat-containing C9orf72 transcripts and dipeptide repeat ("DPR") proteins that are sustained for at least six months, without disrupting total C9orf72 protein expression.

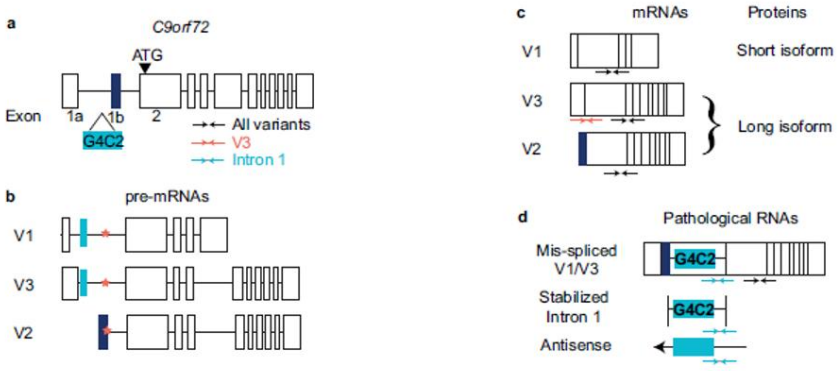
FOCUS-C9 Phase 1b/2a clinical trial: The FOCUS-C9 trial is a global, multicenter, randomized, double-blind, placebo-controlled Phase 1b/2a clinical trial to assess the safety and tolerability of intrathecal doses of WVE-004 for patients with C9-ALS and/or C9-FTD. Additional objectives include measurement of poly(GP) proteins in the cerebrospinal fluid ("CSF"), plasma and CSF pharmacokinetics, and exploratory biomarker and clinical endpoints. The FOCUS-C9 trial is designed to be adaptive with dose level and dosing frequency being guided by an independent committee. Preclinical models that have established pharmacologic activity have informed the starting dose for this trial.

In April 2022 (data cut-off: March 24, 2022), we announced a positive update from FOCUS-C9 driven by the observation of potent, durable reductions of poly(GP) dipeptide repeat proteins in CSF with low, single doses of WVE-004. Poly(GP) is a key C9-ALS/C9-FTD disease biomarker that, when reduced in CSF, indicates WVE-004's engagement of target in the brain and spinal cord. In the initial data analysis, reductions in poly(GP) were observed across all active treatment groups (10 mg, n=2 patients; 30 mg, n=4 patients; 60 mg, n=3 patients), reaching statistical significance versus placebo (n=3 patients) after single 30 mg doses, with a 34% reduction in poly(GP) at day 85 (p=0.011). At the time of analysis, none of the patients dosed with 60 mg had reached day 85. Adverse events ("AEs") were balanced across treatment groups, including placebo, and were mostly mild to moderate in intensity. Four patients (including one on placebo) experienced severe and/or serious adverse events; three were reported by the investigators to be related to ALS or administration, and one was reported by the investigator to be related to study drug. CSF NfL elevations were observed in some patients in the 30 mg and 60 mg single dose cohorts with no meaningful changes in clinical outcome measures, although the dataset and duration were not sufficient to assess clinical effects. There were no treatment-associated elevations in CSF white blood cell counts or protein and no other notable laboratory abnormalities were observed.

Based on the poly(GP) reduction data, the observation period for single dose cohorts was extended and additional patients were enrolled into the trial to further characterize depth of knockdown, durability and longer-term safety profile. We have also initiated multi-dosing cohorts starting at 10 mg monthly and moving through 10 mg quarterly, based on potency and durability of pharmacodynamic effects. Additional data are expected in the first half of 2023. An open-label extension trial for FOCUS-C9 participants was initiated in the fourth quarter of 2022 and is ongoing.

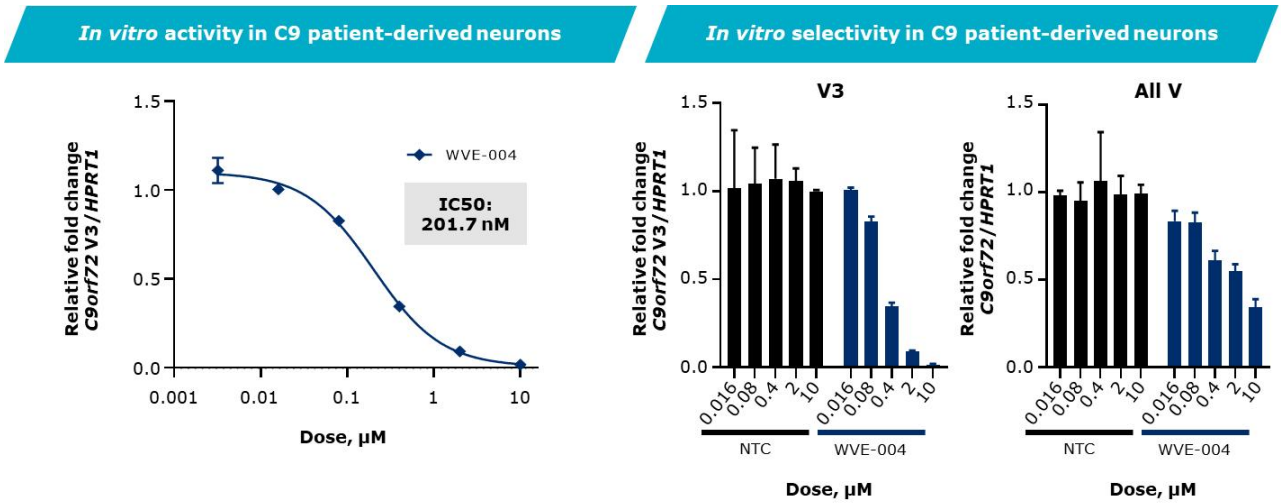
Preclinical studies

In our *Nature Communications* paper (Liu, Y et al. Nat Comms. 2021), we report the discovery of a new targeting sequence that is common to all C9orf72 transcripts but enables preferential knockdown of repeat-containing transcripts in multiple models and C9BAC transgenic mice. Wild-type *C9orf72* alleles produce three mRNA transcripts: variant 1 (V1), variant (V2), and variant (V3). We apply our platform to generate stereopure oligonucleotides that target a sequence at the exon 1b-intron 1 junction, termed Splice Site-1b ("SS1b"), that is common to all C9orf72 transcripts (shown below in "b", pre-mRNAs corresponding to V1-V3 are illustrated; the coral star indicates SS1b). In multiple *in vitro* model systems, an unoptimized stereopure oligonucleotide yields preferential knockdown of exon1a-containing transcripts. The *Nature Communications* paper describes our work to identify and validate the targeting site to achieve variant-selective knockdown of expansion-containing C9orf72 transcripts. The publication highlights the foundational work that led to the development of our clinical candidate.

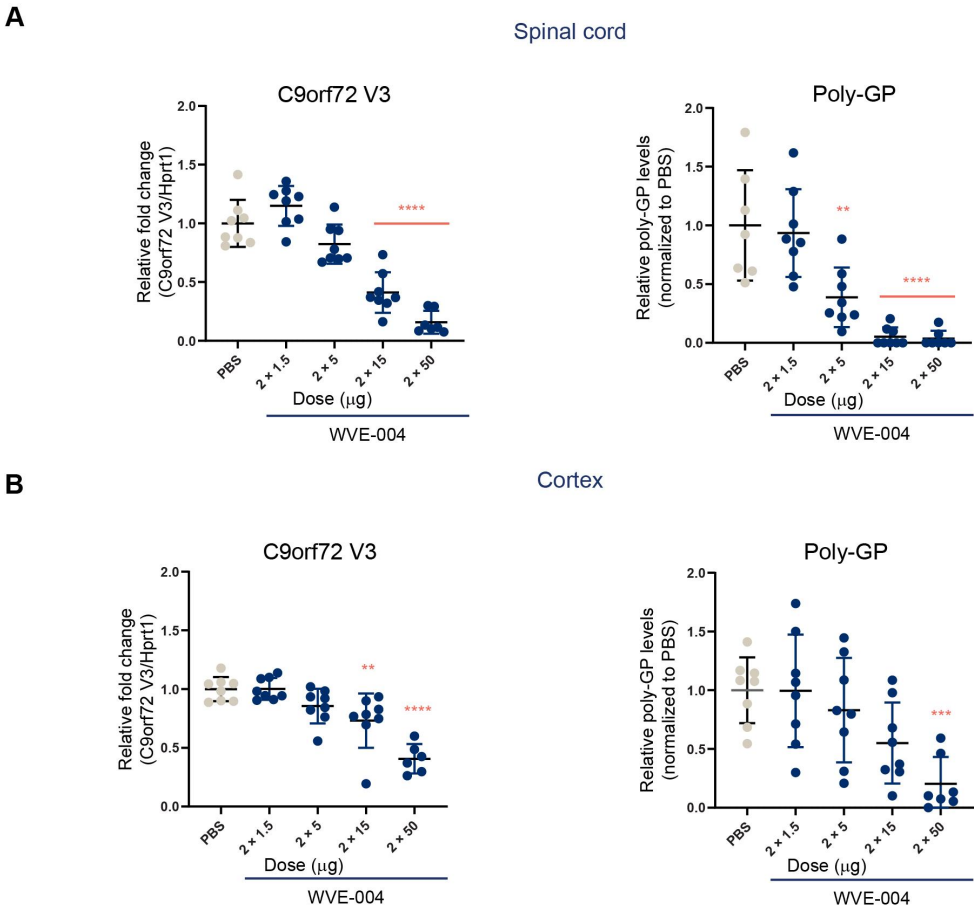


By targeting the V1 and V3 mRNA transcripts that contain the G4C2 expansion and sparing V2 transcripts and healthy C9orf72 protein, WVE-004 has the potential to reduce both RNA-based and protein-based toxicity, thereby impacting the disease course and slowing the progression of ALS or FTD.

In 2022, we published preclinical data in support of WVE-004 in *Molecular Therapy Nucleic Acids* (doi: 10.1016/j.omtn.2022.04.007). The publication highlights work to demonstrate the potency and durability of effect for WVE-004, as well as its pharmacological properties and ability to preserve C9orf72 protein in C9 BAC transgenic mice. *In vitro*, WVE-004 potently and selectively reduced V3 transcripts in iPSC-derived motor neurons, which were derived from a patient carrying a *C9orf72* repeat expansion.

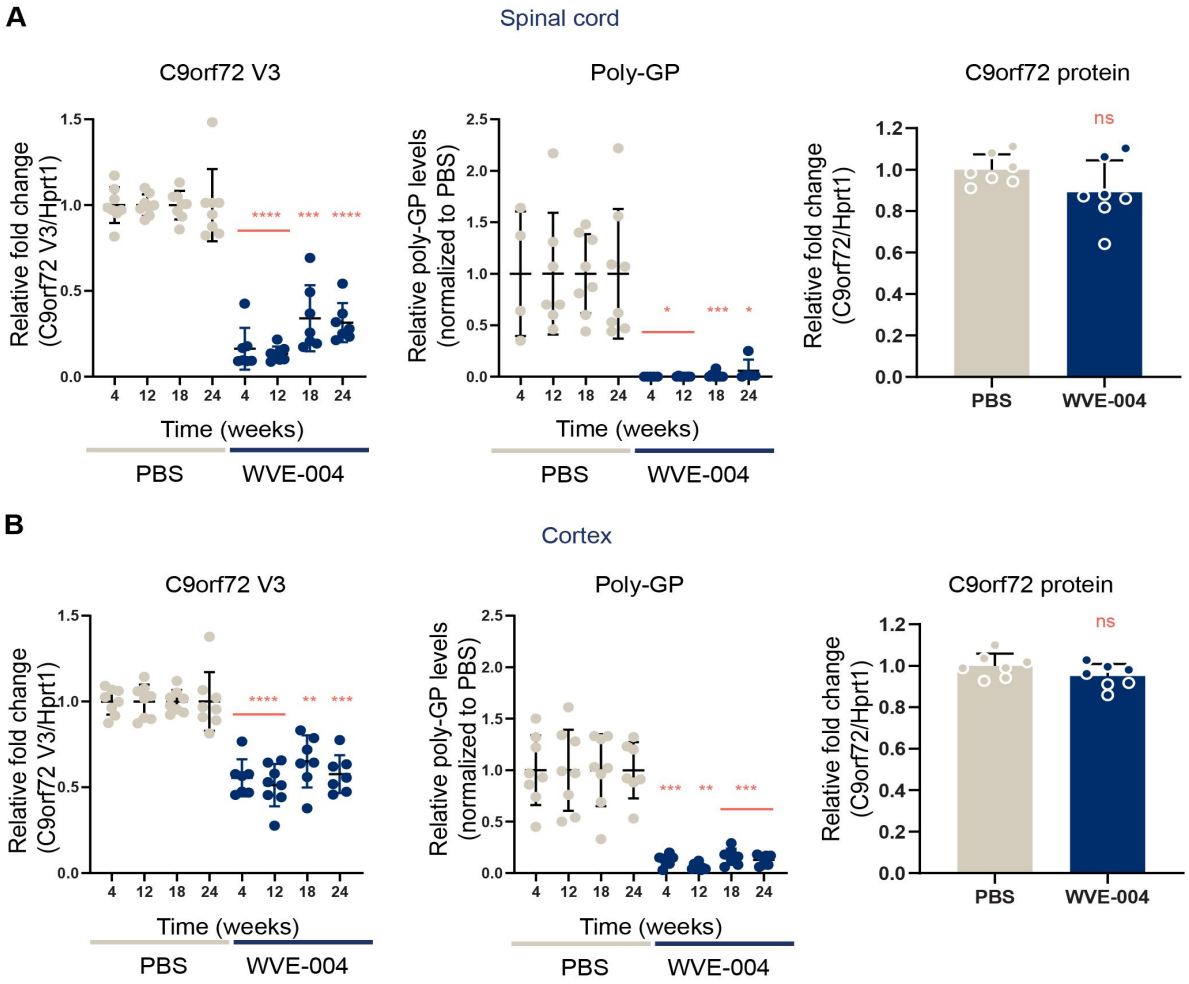


WVE-004 led to dose-dependent knockdown of V3 transcripts and DPRs in mouse spinal cord tissue. In the transgenic model, mice express the human *C9orf72* repeat-containing gene from a bacterial artificial chromosome ("BAC") insertion. We observed qualitatively similar dose-dependent knockdown of V3 transcripts and the polyGP DPR protein in mouse cortex tissue.



Data adapted from Figure 4, Liu et al., 2022; doi: 10.1016/j.omtn.2022.04.007

In C9 BAC transgenic mice, WVE-004 led to substantial reductions in repeat-containing *C9orf72* transcripts and dipeptide repeat proteins that are sustained for at least six months, without disrupting total protein expression as shown below.



Data adapted from Figure 6, Liu et al., 2022; doi: 10.1016/j.omtn.2022.04.007

Spinocerebellar ataxia 3

Background and Market Opportunity

SCA3 is a rare, hereditary (autosomal dominant) progressive neurodegenerative disorder that results in a lack of muscle control and coordination of the upper and lower extremities. Signs and symptoms of SCA3 may begin between childhood and late adulthood and vary greatly. Symptoms may include progressive clumsiness in the arms and legs, spasticity, difficulty with gait, and impaired speaking, swallowing and eye movements. Symptoms of the disease worsen over time, eventually leading to paralysis. Some patients with SCA3 develop dystonia or symptoms similar to those of PD, including twitching of the face or tongue, and nerve damage (neuropathy). Life expectancy ranges from the mid-30s in the more severe forms, to a nearly normal life expectancy for those with milder forms of the disease.

SCA3 is caused by a CAG-repeat expansion in the *ATXN3* gene, resulting in an abnormally long polyglutamine stretch in the encoded ataxin-3 protein. Mutant ataxin-3 protein is thought to cause widespread neuronal loss in the brain and spinal cord, likely through a toxic gain-of-function mechanism. SCA3 is the most common dominantly inherited form of ataxia. The prevalence of SCA3 is believed to be one to two cases in 100,000 people with significant geographic and ethnic variations.

Current Treatments

There are currently no disease-modifying therapies approved for treatment of SCA3. Treatment to date has involved the use of medications for symptomatic management, as well as physical and occupational therapy.

Our Program

In SCA3, we are continuing to advance our program targeting ATXN3.

Our Collaborations

Our business strategy is to develop and commercialize a broad pipeline of novel oligonucleotide therapies. As part of this strategy, we have entered into, and may enter into new partnership and collaboration agreements as a means of advancing our own therapeutic programs, investing in third-party technologies to further strengthen PRISM and leveraging external partnerships to extend the reach of PRISM into therapeutic areas where our platform demonstrates a competitive advantage.

GSK

On December 13, 2022, Wave Life Sciences USA, Inc. and Wave Life Sciences UK Limited, two of our direct, wholly-owned subsidiaries entered into a Collaboration and License Agreement (the "GSK Collaboration Agreement") with GlaxoSmithKline Intellectual Property (No. 3) ("GSK"), which became effective on January 27, 2023. Pursuant to the GSK Collaboration Agreement, we and GSK have agreed to collaborate on the research, development, and commercialization of oligonucleotide therapeutics, including a global exclusive license to WVE-006. The discovery collaboration has an initial four-year research term and combines our proprietary discovery and drug development platform, PRISM™, with GSK's unique insights from human genetics and its global development and commercial capabilities.

Under the terms of the GSK Collaboration Agreement, we received an upfront payment of $170.0 million, which included a cash payment of $120.0 million and a $50.0 million equity investment. In addition, assuming WVE-006 and GSK's eight collaboration programs achieve initiation, development, launch, and commercialization milestones, we would be eligible to receive up to $3.3 billion in cash milestone payments, which are described in the following two paragraphs.

GSK will receive the exclusive global license to WVE-006, our preclinical, first-in-class A-to-I(G) RNA editing candidate for alpha-1 antitrypsin deficiency, with development and commercialization responsibilities transferring to GSK after we complete the first-in-patient study. We will be responsible for preclinical, regulatory, manufacturing, and clinical activities for WVE-006 through the initial Phase 1/2 study, at our sole cost. Thereafter, GSK will be responsible for advancing WVE-006 through pivotal studies, registration, and global commercialization at GSK's sole cost. For the WVE-006 program, we would be eligible to receive up to $225.0 million in development and launch milestone payments and up to $300.0 million in commercialization milestone payments, as well as double-digit tiered royalties as a percentage of net sales up to the high teens.

The collaboration has three components:

1) A discovery collaboration which enables us to advance up to three programs leveraging targets informed by GSK's novel insights;
2) A discovery collaboration which enables GSK to advance up to eight programs leveraging PRISM and our oligonucleotide expertise and discovery capabilities; and
3) An exclusive global license for GSK to WVE-006, our preclinical program for AATD that uses our proprietary AIMer technology. Wave will maintain development responsibilities for WVE-006 through completion of the first clinical study, at which point development and commercial responsibilities will transition to GSK.

The collaboration will enable us to continue building a pipeline of transformational oligonucleotide-based therapeutics and unlock new areas of disease biology, as well as realize the full value of WVE-006 as a potential best-in-class treatment for AATD that has potential to simultaneously address both liver and lung manifestations of the disease.

The GSK Collaboration Agreement includes options to extend the research term for up to three additional years, which would increase the number of programs available to both parties. We will lead all preclinical research for GSK and our collaboration programs up to IND-enabling studies. We will lead IND-enabling studies, clinical development and commercialization for our collaboration programs. GSK collaboration programs will transfer to GSK for IND-enabling studies, clinical development, and commercialization.

Assuming GSK advances eight programs under the collaboration that achieve initiation, development, launch and commercial milestones, we would be eligible to receive up to $1.2 billion in initiation, development, and launch milestones and up to $1.6 billion in commercialization milestones, as well as tiered royalties as a percentage of net sales into the low-teens. Assuming we advance our collaboration programs through the achievement of pre-determined milestones, GSK would be eligible to receive royalty payments and commercial milestones from us.

Under the GSK Collaboration Agreement, each party grants to the other party certain licenses to the collaboration products resulting from the parties' respective collaboration programs as well as specific intellectual property licenses to enable the other party to perform its obligations and exercise its rights under the GSK Collaboration Agreement, including license grants to enable each party to conduct research, development, and commercialization activities pursuant to the terms of the GSK Collaboration Agreement. The parties' exclusivity obligations to each other are limited on a target-by-target basis with regard to targets in the collaboration.

The GSK Collaboration Agreement, unless terminated earlier, will continue until the date on which: (i) with respect to a validation target, the date on which such validation target is not advanced into a collaboration program; or (ii) with respect to a collaboration target, the royalty term has expired for all collaboration products directed to the applicable collaboration target. The GSK Collaboration Agreement contains customary termination provisions, including certain termination rights for convenience, breach, and others, including on a target/program basis or of the Collaboration Agreement in its entirety.

With respect to the $50.0 million equity investment referred to above, simultaneously with our entry into the GSK Collaboration Agreement, we entered into a share purchase agreement with Glaxo Group Limited ("GGL"), an affiliate of GSK, pursuant to which we agreed to sell to GGL 10,683,761 of our ordinary shares at a purchase price of $4.68 per share, for an aggregate purchase price of approximately $50.0 million (the "GSK Equity Investment"). The GSK Equity Investment closed on January 26, 2023. The shares purchased by GGL are subject to lock-up and standstill restrictions and carry certain registration rights, customary for transactions of this kind.

Takeda

In February 2018, Wave Life Sciences USA, Inc. ("Wave USA") and Wave Life Sciences UK Limited ("Wave UK") entered into a collaboration and license agreement (the "Takeda Collaboration Agreement") for a global strategic collaboration (the "Takeda Collaboration") with Takeda Pharmaceutical Company Limited ("Takeda"), pursuant to which Wave USA, Wave UK and Takeda agreed to collaborate on the research, development and commercialization of oligonucleotide therapeutics for disorders of the Central Nervous System ("CNS"). The Takeda Collaboration provided us with at least $230.0 million in committed cash and Takeda with the option to co-develop and co-commercialize our CNS development programs in (1) Huntington's disease ("HD"); (2) amyotrophic lateral sclerosis ("ALS") and frontotemporal dementia ("FTD"); and (3) our discovery-stage program targeting *ATXN3* for the treatment of spinocerebellar ataxia 3 ("SCA3") (collectively, "Category 1 Programs"), which we will have the right to co-commercialize in the United States. In addition, the Takeda Collaboration provided Takeda with the right to exclusively license multiple preclinical programs for CNS disorders, including Alzheimer's disease and Parkinson's disease (collectively, "Category 2 Programs"). In April 2018, the Takeda Collaboration became effective and Takeda paid Wave $110.0 million as an upfront payment. Takeda also agreed to fund our research and preclinical activities in the amount of $60.0 million during the four-year research term and to reimburse Wave for any collaboration-budgeted research and preclinical expenses incurred by us that exceed that amount.

On October 15, 2021, we and Takeda entered into the Second Amendment (the "Amendment") to the Takeda Collaboration Agreement, which amended the Category 2 component of the two-part collaboration (the "Category 2 Programs"). As discussed above, under Category 2 of the Takeda Collaboration Agreement, we had granted Takeda the right to exclusively license multiple preclinical programs for CNS disorders during a four-year research term. Pursuant to the terms of the Amendment, we and Takeda discontinued the Category 2 component of the Takeda Collaboration Agreement and Takeda paid us an additional $22.5 million for collaboration-related research and preclinical expenses. As a result of the Amendment, we are free to advance our CNS programs independently or enter partnerships in the CNS field outside of the three specified targets, C9orf72, HTT and ATXN3, including WVE-004 and WVE-003, that are part of the ongoing late-stage Category 1 Programs. The Category 1 component of the original Takeda Collaboration Agreement remains in effect and is unchanged by the Amendment.

Simultaneously with Wave USA and Wave UK's entry into the Takeda Collaboration Agreement, we entered into a share purchase agreement with Takeda (the "Takeda Equity Agreement," and together with the Takeda Collaboration Agreement, the "Takeda Agreements") pursuant to which we agreed to sell to Takeda 1,096,892 of our ordinary shares at a purchase price of $54.70 per share. In April 2018, we closed the Takeda Equity Agreement and received aggregate cash proceeds of $60.0 million. The parties also agreed for the shares purchased by Takeda to be subject to certain lock-up and standstill restrictions and carry certain registration rights, customary for transactions of this kind.

With respect to Category 1 Programs, we will be responsible for researching and developing products and companion diagnostics for Category 1 Programs through completion of the first proof of mechanism study for such products. Takeda will have an exclusive option for each target and all associated products and companion diagnostics for such target, which it may exercise at any time through completion of the proof of mechanism study. If Takeda exercises this option, we will receive an opt-in payment and will lead manufacturing and joint clinical co-development activities and Takeda will lead joint co-commercial activities in the United States and

all commercial activities outside of the United States. Global costs and potential profits will be shared 50:50 and we will be eligible to receive development and commercial milestone payments. In addition to its 50% profit share, we are eligible to receive option exercise fees and development and commercial milestone payments for each of the Category 1 Programs.

Under the Takeda Collaboration Agreement, each party grants to the other party specific intellectual property licenses to enable the other party to perform its obligations and exercise its rights under the Takeda Collaboration Agreement, including license grants to enable each party to conduct research, development and commercialization activities pursuant to the terms of the Takeda Collaboration Agreement.

The term of the Takeda Collaboration Agreement commenced on April 2, 2018 and, unless terminated earlier, will continue until the date on which: (i) with respect to each Category 1 Program target for which Takeda does not exercise its option, the expiration or termination of the development program with respect to such target; or (ii) with respect to each Category 1 Program target for which Takeda exercises its option, the date on which neither party is researching, developing or manufacturing any products or companion diagnostics directed to such target.

Takeda may terminate the Takeda Collaboration Agreement for convenience on 180 days' notice, in its entirety or on a target-by-target basis. Subject to certain exceptions, each party has the right to terminate the Takeda Collaboration Agreement on a target-by-target basis if the other party, or a third party related to such party, challenges the patentability, enforceability or validity of any patents within the licensed technology that cover any product or companion diagnostic that is subject to the Takeda Collaboration Agreement. In the event of any material breach of the Takeda Collaboration Agreement by a party, subject to cure rights, the other party may terminate the Takeda Collaboration Agreement in its entirety if the breach relates to all targets or on a target-by-target basis if the breach relates to a specific target. In the event that Takeda and its affiliates cease development, manufacturing and commercialization activities with respect to compounds or products subject to the Takeda Collaboration Agreement and directed to a particular target, we may terminate the Takeda Collaboration Agreement with respect to such target. Either party may terminate the Takeda Collaboration Agreement for the other party's insolvency. In certain termination circumstances, we would receive a license from Takeda to continue researching, developing and manufacturing certain products, and companion diagnostics.

Asuragen

In November 2019, we entered into an agreement with Asuragen, Inc. (which was acquired by Bio-Techne Corporation in April 2021) ("Asuragen"), a molecular diagnostics company, for the development and potential commercialization of companion diagnostics for our investigational allele-selective therapeutic programs targeting HD. This collaboration uses Asuragen's market-leading repetitive sequence diagnostic expertise to provide scalable SNP phasing to support global development programs and future commercialization at a global level. Asuragen has leveraged its AmplideX® PCR technology to develop companion diagnostic tests designed to size and phase HTT CAG repeats with the SNPs targeted by our previous investigational therapeutic programs in HD, as well as WVE-003, our current HD program being investigated in the ongoing SELECT-HD clinical trial. These tests are designed to aid clinicians in selecting HD patients by identifying the SNPs that are in phase with the CAG-expanded allele.

Manufacturing

To provide internal cGMP manufacturing capabilities and increase control and visibility of our drug product supply chain, we entered into a lease in September 2016 for a multi-use facility of approximately 90,000 square feet in Lexington, Massachusetts and initiated the build out of manufacturing space and related capabilities. Through our internal manufacturing, we have the capacity to support multiple discovery-, preclinical-, and early clinical-stage programs and have the established expertise to efficiently conduct manufacturing runs for oligonucleotides across a spectrum of modalities. In addition to manufacturing space, the Lexington facility includes additional laboratory and office space. This facility supplements our existing Cambridge, Massachusetts laboratory and office space headquarters, enhances our ability to secure drug substance for current and future development activities and may provide commercial-scale manufacturing capabilities. In July 2017, we took occupancy of the Lexington facility and began manufacturing production in the fourth quarter of 2017.

We believe that leveraging our internal manufacturing capabilities along with expertise from CMOs facilitates our growth and enhances our ability to secure drug substance for current and future research, clinical and early-stage commercial development activities. We believe that the addition of our internal cGMP manufacturing capabilities, together with the supply capacity we have established externally, will be sufficient to meet our anticipated manufacturing needs for the next several years. We monitor the availability of capacity for the manufacture of drug substance and drug product and believe that our supply agreements with our contract manufacturers and the lead times for new supply agreements would allow us to access additional capacity if needed. We

believe that our product candidates can be manufactured at scale and with production and procurement efficiencies that will result in commercially competitive costs.

Intellectual Property

We believe that we have a strong intellectual property position relating to the development and commercialization of our stereopure oligonucleotides. Our intellectual property portfolio includes filings designed to protect stereopure oligonucleotide compositions generally, as well as filings designed to protect stereopure compositions of oligonucleotides with particular stereochemical patterns (for example, that affect or confer biological activity). Our portfolio also includes filings for both proprietary methods and reagents, as well as various chemical methodologies that enable production of such stereopure oligonucleotide compositions. In addition, our portfolio includes filings designed to protect methods of using stereopure oligonucleotide compositions and filings designed to protect particular stereopure oligonucleotide products, such as those having a particular sequence, pattern of nucleoside and/or backbone modification, pattern of backbone linkages and/or pattern of backbone chiral centers.

We own or have rights to worldwide patent filings that protect our proprietary technologies for making stereopure oligonucleotide compositions, and that also protect the compositions themselves, as well as methods of using them, including in the treatment of diseases. Our portfolio includes multiple issued patents, including in major market jurisdictions such as the United States, Europe and Japan. We also have applications pending in multiple jurisdictions around the world, including these major market jurisdictions.

Synthetic Methodologies

Our patent portfolio includes multiple families that protect synthetic methodologies and/or reagents for generating stereopure oligonucleotide compositions. Certain synthetic methodologies and/or reagents are covered by families, which include an issued Japanese patent whose 20-year term extends to 2025.

Additional synthetic methodologies and/or reagents are protected by other families in our patent portfolio. Certain such families have 20-year expiration dates that range from 2029 to at least 2042. Some of these families have issued patents in several jurisdictions, including in major market jurisdictions such as the United States, Europe, and/or Japan, have pending applications in multiple jurisdictions including in these major market jurisdictions, or are in the international stage.

We also co-own with the University of Tokyo certain filings that are directed to certain methods and/or reagents for synthesizing oligonucleotides; their 20-year expiration dates fall in 2031.

Stereopure Oligonucleotide Compositions

Certain of our patent filings protect stereopure compositions, particularly of therapeutically relevant oligonucleotides. Some such filings are directed to compositions whose oligonucleotides are characterized by particular patterns of chemical modification (including modifications of bases, sugars and/or internucleotidic linkages) and/or of internucleotidic linkage stereochemistry. Certain patent filings describe specific compositions designed for use in the treatment of particular diseases. Several of our patent filings directed to stereopure compositions have entered national stage prosecution in multiple jurisdictions and some have issued in one or more jurisdictions; others are in the international stage. Certain filings offer 20-year protection terms that range from 2033 to at least 2042.

We also co-own with Shin Nippon Biomedical Laboratories, Ltd. various patent families, some of which include one or more issued patents, including in major market jurisdictions; these filings have 20-year terms extending to 2033-2035.

Future Filings

We maintain a thoughtful and ambitious program for developing and protecting additional intellectual property, including new synthetic methodologies and reagents. We also intend to prepare and submit patent filings specifically directed to protecting individual product candidates and their uses as we finalize leads and collect relevant data, which is expected to include comparison data confirming novel and/or beneficial attributes of our product candidates.

Singapore Intellectual Property Law

Section 34 of the Patents Act 1994 of Singapore (the "Singapore Patents Act") provides that a person residing in Singapore is required to obtain written authorization from the Singapore Registrar of Patents (the "Registrar") before filing an application for a patent for an invention outside of Singapore, unless all of the following conditions have been satisfied: (a) the person has filed an application for a patent for the same invention in the Singapore Registry of Patents at least two months before the filing of the patent application outside Singapore, and (b) the Singapore Registrar of Patents has not, in respect of this patent application, given directions to prohibit or restrict the publication of information contained in the patent application or its communication to any persons or description of

persons pursuant to Section 33 of the Singapore Patents Act, or if the Registrar has given any such directions, all such directions have been revoked. A violation of Section 34 is a criminal offense punishable by a fine not exceeding S$5,000, or imprisonment for a term not exceeding two years, or both. There have been some instances where we have undertaken filings outside of Singapore, and there may be instances where we are required to make such filings in the future, without first obtaining written authorization from the Registrar. We have notified the Registrar of such filings and we have since implemented measures to address the requirements of Section 34 moving forward. To date, the Registrar has offered a compound of some of the offences considered against payment of a sum of S$50 to S$150 per considered case. Under Singapore law, the Registrar has discretion to offer a compound of such offences against payment of a sum of money of up to S$2,000, or to prosecute the offence subject to the other penalties noted above. Per requests in the Registrar's most recent decision, we have submitted approximately 140 patent applications in multiple patent families, most of which are related to previously reported applications, to the Intellectual Property Office of Singapore ("IPOS"). The IPOS may consider the filing of some or all of these applications to have breached Section 34 requirements per IPOS' current interpretation of Section 34, and we are waiting for IPOS' decision on these applications. We cannot assure you that the Registrar will offer to compound any such violations of Section 34, or that any offer to compound will be for an amount similar to previous compound offers.

Competition

The biotechnology and pharmaceutical marketplace is characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. While we believe that our expertise in oligonucleotides, scientific knowledge and intellectual property estate provide us with competitive advantages, we face potential competition from many different sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions, governmental agencies and public and private research institutions. Not only must we compete with other companies that are focused on oligonucleotides, but any product candidates that we successfully develop and commercialize will compete with existing therapies and new therapies that may become available in the future.

Many of our competitors may have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Mergers and acquisitions in the pharmaceutical, biotechnology and diagnostic industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

Duchenne Muscular Dystrophy

There are two treatments approved in the United States for the treatment of DMD in patients who have a confirmed mutation of the DMD gene amenable to exon 53 skipping: Sarepta Therapeutics' Vyondys 53 (golodirsen), an exon skipping nucleic acid therapeutic, was approved by the FDA in 2019, and NS Pharma's Viltepso (viltolarsen), an exon skipping nucleic acid therapeutic, was approved by the FDA in 2020. Both therapies received accelerated approval, as the FDA concluded that the data submitted by each company demonstrated an increase in dystrophin production that is reasonably likely to predict clinical benefit in some patients with DMD who have a confirmed mutation of the DMD gene amenable to exon 53 skipping. No clinical benefit of golodirsen or viltolarsen has been established. Thus, in accordance with the U.S. accelerated approval regulations, the FDA is requiring Sarepta and NS Pharma to each conduct a clinical trial to verify and describe their drug's clinical benefit. Sarepta's study of golodirsen would need to assess whether golodirsen improves motor function of DMD patients with a confirmed mutation of the DMD gene amenable to exon 53 skipping, and NS Pharma's study of viltolarsen is designed to assess whether viltolarsen improves the time to stand for DMD patients amenable to exon 53 skipping. If the trials fail to verify clinical benefit, the FDA could initiate proceedings to withdraw approval of the respective drug.

Several other companies have investigational drugs in clinical development targeting DMD more broadly, including patients amenable to exon 53 skipping. These include Capricor Therapeutics (Phase 3), Dystrogen Therapeutics (Phase 1), Edgewise Therapeutics (Phase 2), FibroGen (Phase 3), Pfizer (Phase 3), Santhera Pharmaceuticals (pre-registration), and Sarepta Therapeutics (pre-registration), among others. Based on available information, we do not believe there are other companies with investigational programs for exon 53 skipping in clinical development.

Several companies also have ongoing preclinical programs for DMD that may directly or indirectly target patients amenable to exon 53 skipping. These companies include Code Bio, Dyne Therapeutics, Daiichi Sankyo, Entrada Therapeutics, PepGen, Precision BioSciences, Sarepta Therapeutics, Solid Biosciences, and Ultragenyx, among others.

Alpha-1 Antitrypsin Deficiency ("AATD")

There are five treatments approved in the United States for AATD: Prolastin, Prolastin-C, Aralast NP, Zemaira, and Glassia. All five contain plasma-derived human alpha1-proteinase inhibitor and are indicated for chronic augmentation and maintenance therapy in adults with emphysema due to congenital deficiency of alpha1-proteinase inhibitor (Alpha1-PI). The prescribing information for each notes that the effect of augmentation therapy with any alpha1-proteinase inhibitor on pulmonary exacerbations and on the progression of emphysema in Alpha1-PI deficiency has not been demonstrated in randomized, controlled clinical trials.

There are also a number of companies with investigational drugs in clinical development: Arrowhead Pharmaceuticals and Takeda (Phase 3), Dicerna Pharmaceuticals and Alnylam Pharmaceuticals (Phase 2), InhibRx (Phase 1), Kamada (Phase 3), Mereo BioPharma (Phase 2), and Vertex Pharmaceuticals (Phase 2).

There are also several companies with ongoing discovery or preclinical programs for AATD including Apic Bio, Beam Therapeutics, Biomarin, Epic Bio, Intellia Therapeutics, KorroBio, and Krystal Biotech, among others.

Huntington's Disease

There are no approved treatments available to slow the progression of HD. We believe, based on publicly available information, that Annexon Biosciences (Phase 2), AskBio (Phase 1/2), Ionis Pharmaceuticals and Roche (Phase 2), Mitochon Pharmaceuticals (Phase 2), Prilenia Therapeutics (Phase 3), PTC Therapeutics (Phase 2), and uniQure (Phase 1/2), among others, have investigational drugs in clinical development.

Several companies have ongoing discovery or preclinical programs for HD, including Alnylam Pharmaceuticals, Atalanta Therapeutics, LocanaBio, Neurimmune, Ophidion, Sangamo Therapeutics and Takeda, Spark Therapeutics, Vico, and Voyager Therapeutics, among others.

A number of companies are developing molecules to treat symptoms associated with HD, including Neurocrine Biosciences (Phase 3), Sage Therapeutics (Phase 2), and SOM Biotech (Phase 2), among others.

Amyotrophic Lateral Sclerosis and Frontotemporal Dementia

There are three treatments approved in the United States for the treatment of ALS: riluzole, approved in 1995, edaravone, approved in 2017, and RELYVRIO (sodium phenylbutyrate and taurursodiol), approved in 2022. There are a number of companies with potential therapeutics for the treatment of ALS in clinical development, including AB Science (Phase 3), Alector (Phase 2), Biohaven Pharmaceuticals (Phase 2/3), BrainStorm Cell Therapeutics (Phase 3 completed), Prilenia (Phase 2/3), and UCB (Phase 2/3), among others. We believe that Transposon Therapeutics has a Phase 2 study targeting patients with ALS or FTD due to a C9orf72 mutation.

Several companies have ongoing discovery or preclinical programs for ALS that may directly or indirectly target patients with the C9orf72 mutation, including AGTC, Apic Bio, Biogen and Neurimmune, Expansion Therapeutics, Locana Bio, Passage Bio, Pfizer and Sangamo Therapeutics, and uniQure.

There are no approved treatments available to slow the progression of FTD. Multiple companies have investigational therapies in clinical development for the broad FTD population, including Anavex (Phase 1 completed), Denali (Phase 1), and TauRx Pharmaceuticals (Phase 3 complete). Alector and Transposon Therapeutics each have ongoing Phase 2 studies targeting patients with FTD due to a C9orf72 mutation.

There are several companies with ongoing discovery or preclinical programs for FTD that may directly or indirectly target patients with the C9orf72 mutation, including Biogen and Neurimmune, Expansion Therapeutics, and Pfizer and Sangamo Therapeutics.

ADAR-mediated RNA Editing ("ADAR editing")

There are several companies pursuing editing approaches that may compete with our ADAR editing modality. These companies are in various stages of development (discovery through the clinic) and are developing investigational drugs via viral (Shape Therapeutics) and non-viral delivery for RNA editing (ProQR and Korro Bio), DNA base-editing (Beam), and DNA editing (Editas Medicine, Intellia Therapeutics, and Sangamo Therapeutics), among others. These companies may leverage these approaches to target the same indications that we intend to target or indications where we do not currently plan to compete.

Government Regulation

FDA Approval Process for Drug Products

In the United States, pharmaceutical products are subject to extensive regulation by the FDA. The Federal Food, Drug and Cosmetic Act ("FDCA"), and other federal and state statutes and regulations, govern, among other things, the research, development, testing, manufacture, storage, recordkeeping, approval, labeling, promotion and marketing, distribution, post-approval monitoring and reporting, sampling, and import and export of pharmaceutical products. Failure to comply with applicable FDA or other requirements may subject a pharmaceutical company to a variety of administrative or judicial sanctions, such as the FDA's refusal to approve pending applications, a clinical hold, warning letters, recall or seizure of drug products, partial or total suspension of production, withdrawal of drug products from the market, injunctions, fines, civil penalties or criminal prosecution.

FDA approval is required before any new drug, such as a new molecular or chemical entity, or a new dosage form, new use or new route of administration of a previously approved product, can be marketed in the United States. The process required by the FDA before a new drug product may be marketed in the United States generally involves:

- completion of preclinical testing in compliance with applicable FDA good laboratory practice regulations and other requirements ("GLP");
- submission to the FDA of an Investigational New Drug application ("IND") for human clinical testing which must become effective before human clinical trials may begin in the United States;
- approval by an independent institutional review board ("IRB") at each site where a clinical trial will be performed before the trial may be initiated at that site;
- performance of adequate and well-controlled human clinical trials in accordance with good clinical practice ("GCP") to establish safety and substantial evidence of effectiveness of the proposed product candidate for each intended use;
- thorough characterization of the product candidate and establishment of acceptable standards to ensure suitable purity, identity, strength, quality and stability in compliance with cGMP;
- satisfactory completion of an FDA pre-approval inspection of the facility or facilities at which the product is manufactured to assess compliance with cGMP;
- satisfactory completion of an FDA pre-approval inspection of one or more clinical trial site(s) or the sponsor's site and/or contract research organization responsible for conduct of key clinical trials in accordance with GCP;
- submission to the FDA of a New Drug Application ("NDA"), which must be accepted for filing by the FDA;
- completion of an FDA advisory committee review, if applicable;
- payment of user fees, if applicable; and
- FDA review and approval of the NDA.

The manufacturing development, preclinical and clinical testing, and review process requires substantial time, effort and financial resources. Manufacturing development includes laboratory evaluation of product chemistry, formulation, development of manufacturing and control procedures, evaluation of stability, and the establishment of procedures to ensure continued product quality.

Nonclinical tests may include *in vitro* and *in vivo* (animal model) studies to assess the toxicity and other safety characteristics of the product candidate, as well as important aspects of drug pharmacology and pharmacodynamics. The Consolidated Appropriations Act for 2023, signed into law on December 29, 2022, (P.L. 117-328) amended the FDCA and the Public Health Service Act to specify that nonclinical testing for drugs and biologics may, but is not required to, include *in vivo* animal testing. According to the amended language, a sponsor may fulfill nonclinical testing requirements by completing various *in vitro* assays (e.g., cell-based assays, organ chips, or microphysiological systems), *in silico* studies (i.e., computer modeling), other human or nonhuman biology-based tests (e.g., bioprinting), or *in vivo* animal tests.

The results of nonclinical tests, together with manufacturing information, analytical data and a proposed clinical trial protocol and other information, are submitted as part of an IND to the FDA. Some long-term nonclinical testing to further establish the safety profile of the product candidate, as well as manufacturing processes development and drug quality evaluation, continues after the IND is submitted. An IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day time period, raises concerns or questions related to the proposed clinical trial and places the IND on a clinical hold. In such a case, the IND sponsor must resolve all outstanding concerns before the clinical trial can begin. As a result, our submission of an IND may not result in FDA authorization to commence a clinical trial. A separate submission to an existing IND must also be made for each successive

clinical trial conducted during product development, or if changes are made in trial design. Even if the IND becomes effective and the trial proceeds without initial FDA objection, the FDA may stop the trial at a later time if it has concerns, such as if unacceptable safety risks arise.

Further, an IRB for each site proposing to conduct the clinical trial must review and approve the plan for any clinical trial and informed consent information for subjects before the trial commences at that site and it must perform an ongoing review of the research on an annual basis until the trial is completed. The FDA or the sponsor may suspend a clinical trial at any time on various grounds, including a finding that the subjects or patients are being exposed to an unacceptable health risk or that the trials are not being conducted in accordance with the clinical plan or in compliance with GCP. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients.

Clinical trials involve the administration of the product candidate to human subjects under the supervision of qualified investigators in accordance with GCP requirements, which include the requirement that all research subjects provide their informed consent in writing for their participation in any clinical trial. Sponsors of clinical trials of certain FDA-regulated products generally must register and disclose certain clinical trial information to a public registry maintained by the National Institutes of Health ("NIH"). In particular, information related to the product, patient population, phase of investigation, study sites and investigators and other aspects of the clinical trial is made public as part of the registration of the clinical trial. Competitors may use this publicly available information to gain knowledge regarding the progress of development programs. Although sponsors are also obligated to disclose the results of their clinical trials after completion, disclosure of the results can be delayed in some cases for up to two years after the date of completion of the trial. Failure to timely register a covered clinical study or to submit study results as provided for in the law can give rise to civil monetary penalties and also prevent the non-compliant party from receiving future grant funds from the federal government. The NIH's Final Rule on ClinicalTrials.gov registration and reporting requirements became effective in 2017, and the government has brought enforcement actions against non-compliant clinical trial sponsors.

Human clinical trials are typically conducted in the following sequential phases, which may overlap or be combined:

- ***Phase 1.*** The product is initially introduced into healthy human subjects or patients and tested for safety, dose tolerance, absorption, metabolism, distribution and excretion and, if possible, to gain an early indication of its effectiveness.
- ***Phase 2.*** The product is administered to a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted indications and to determine dose tolerance and optimal dosage. Multiple Phase 2 clinical trials may be conducted by the sponsor to obtain information prior to beginning larger and more extensive clinical trials.
- ***Phase 3.*** These are commonly referred to as pivotal studies. When Phase 2 evaluations demonstrate that a dose range of the product appears to be effective and has an acceptable safety profile, trials are undertaken in larger patient populations to further evaluate dosage, to obtain substantial, statistical evidence of clinical efficacy and safety, generally at multiple, geographically-dispersed clinical trial sites, to establish the overall risk-benefit relationship of the product and to provide adequate information for approval of the product.
- ***Phase 4.*** In some cases, the FDA may condition approval of an NDA for a product candidate on the sponsor's agreement to conduct additional clinical trials to further assess the product's safety and effectiveness after NDA approval. Such post-approval trials are typically referred to as Phase 4 studies.

Progress reports detailing progress and safety data gathered from clinical trials must be submitted at least annually to the FDA. Safety reports are submitted more frequently if certain serious adverse effects ("SAEs") occur. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. The FDA will typically inspect one or more clinical sites to assure compliance with GCP and the integrity of the clinical data submitted as part of NDA review. Information related to the product, patient population, phase of investigation, study sites and investigators and other aspects of the clinical trial is made public as part of the registration of the clinical trial. Sponsors are also obligated to disclose the results of most clinical trials after completion, although in some cases disclosure of the results of these trials can be delayed for up to two years after the trial completion date. Competitors may use this publicly available information to gain knowledge regarding the progress of development programs.

In the Consolidated Appropriations Act for 2023, Congress amended the FDCA to require sponsors of a Phase 3 clinical trial, or other "pivotal study" of a new drug to support marketing authorization, to submit a diversity action plan for such clinical trial. The action plan must include the sponsor's diversity goals for enrollment, as well as a rationale for the goals and a description of how the sponsor will meet them. A sponsor must submit a diversity action plan to FDA by the time the sponsor submits the trial protocol to the agency for review. The FDA may grant a waiver for some or all of the requirements for a diversity action plan. It is unknown at this time how the diversity action plan may affect Phase 3 trial planning and timing or what specific information FDA will expect in such plans, but

if FDA objects to a sponsor's diversity action plan and requires the sponsor to amend the plan or take other actions, it may delay trial initiation.

Assuming successful completion of the required clinical testing, the results of the preclinical studies and clinical trials, along with information relating to the product's pharmacology, chemistry, manufacturing, and controls, and proposed labeling, are submitted to the FDA as part of an NDA requesting approval to market the product for one or more indications. Data may come from company-sponsored clinical trials intended to test the safety and efficacy of a product's use or from a number of alternative sources, including studies initiated by investigators. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and efficacy of the investigational product to the satisfaction of the FDA. Under federal law, the fee for the submission of an NDA with clinical data is substantial (for example, for fiscal year 2023 this application fee exceeds $3.2 million), and the sponsor of an approved NDA is also subject to an annual program fee, currently more than $390,000 per program. These fees are typically adjusted annually, but exemptions and waivers may be available under certain circumstances, including NDA fees for products with orphan designation.

The FDA has 60 days from its receipt of an NDA to determine whether the application will be accepted for filing based on the agency's threshold determination that it is sufficiently complete to permit substantive review. The FDA may request additional information rather than accept an NDA for filing. Any resubmitted application, following a refusal to file action, is also subject to 60-day review before the FDA accepts it for filing.

Under the Prescription Drug User Fee Act ("PDUFA"), for original NDAs, the FDA has ten months from the filing date in which to complete its initial review of a standard application and respond to the applicant, and six months from the filing date for an application with priority review. For all new molecular entity ("NME") NDAs, the ten and six-month time periods run from the filing date; for all other original applications, the ten and six-month time periods run from the submission date. Despite these review goals, it is not uncommon for FDA review of an NDA to extend beyond the goal date.

Once the submission has been accepted for filing, the FDA begins an in-depth review. As noted above, the FDA has agreed to specified performance goals in the review process of NDAs. Most such applications are meant to be reviewed within ten months from the date it is accepted for filing (i.e., 12 months), and most applications for "priority review" products are meant to be reviewed within six months from the date the application is accepted for filing (i.e., eight months). The review process may be extended by the FDA for three additional months to consider new information or in the case of a clarification provided by the applicant to address an outstanding deficiency identified by the FDA following the original submission.

Before approving an NDA, the FDA may inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP. The FDA may also inspect one or more of the clinical sites where pivotal trials were conducted and the contract research organization facilities with oversight of the trial, in order to ensure compliance with GCP and the integrity of the study data.

Additionally, the FDA may refer any NDA, including applications for novel biologic candidates which present difficult questions of safety or efficacy, to an advisory committee. Typically, an advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendation of an advisory committee, but it considers such recommendations when making final decisions on approval. The FDA likely will re-analyze the clinical trial data, which could result in extensive discussions between the FDA and the applicant during the review process. The FDA also may require submission of a risk evaluation and mitigation strategy ("REMS") if it determines that a REMS is necessary to ensure that the benefits of the drug outweigh its risks and to assure the safe use of the drug or biological product. The REMS could include medication guides, physician communication plans, assessment plans and/or elements to assure safe use, such as restricted distribution methods, patient registries or other risk minimization tools. In addition, the REMS must include a timetable to assess the strategy, often at 18 months, three years, and seven years after the strategy's approval. The FDA determines the requirement for a REMS, as well as the specific REMS provisions, on a case-by-case basis. If the FDA concludes a REMS is needed, the sponsor of the NDA must submit a proposed REMS. The FDA will not approve an NDA without a REMS, if required.

In determining whether a REMS is necessary, the FDA may consider the size of the population likely to use the drug, the seriousness of the disease or condition to be treated, the expected benefit of the drug, the duration of treatment, the seriousness of known or potential adverse events, and whether the drug is an NME. If the FDA determines a REMS is necessary, the drug sponsor must agree to the REMS plan at the time of approval, or at a later date should significant new risk information come to light. The FDA may impose a REMS requirement on a drug already on the market if the FDA determines, based on new safety information, that a REMS is necessary to ensure that the drug's benefits outweigh its risks.

Under the Pediatric Research Equity Act ("PREA"), as amended, an NDA or supplement to an NDA must contain data that are adequate to assess the safety and efficacy of the product candidate for the claimed indications in all relevant pediatric populations and to support dosing and administration for each pediatric population for which the product is safe and effective. The FDA may grant deferrals for submission of pediatric data or full or partial waivers. PREA requires a sponsor who is planning to submit a marketing application for a product that includes a new active ingredient, new indication, new dosage form, new dosing regimen or new route of administration to submit an initial Pediatric Study Plan ("PSP") within 60 days of an end-of-Phase 2 meeting or, if there is no such

meeting, as early as practicable before the initiation of the Phase 3 or Phase 2/3 clinical trial. The initial PSP must include an outline of the pediatric study or studies that the sponsor plans to conduct, including trial objectives and design, age groups, relevant endpoints and statistical approach, or a justification for not including such detailed information, and any request for a deferral of pediatric assessments or a full or partial waiver of the requirement to provide data from pediatric studies along with supporting information. The FDA and the sponsor must reach an agreement on the PSP. A sponsor can submit amendments to an agreed upon initial PSP at any time if changes to the pediatric plan need to be considered based on data collected from pre-clinical studies, early phase clinical trials or other clinical development programs.

The FDA reviews an NDA to determine, among other things, whether a product is safe and effective for its intended use and whether its manufacturing is cGMP-compliant to assure and preserve the product's identity, strength, quality and purity. The approval process is lengthy and often difficult, and the FDA may refuse to approve an NDA if the applicable regulatory criteria are not satisfied or may require additional clinical or other data and information. On the basis of the FDA's evaluation of the NDA and accompanying information, including the results of the inspection of the manufacturing facilities, it may issue an approval letter or a Complete Response Letter ("CRL"). An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A CRL indicates that the review cycle for an application is complete and that the application will not be approved in its present form. CRLs outline the deficiencies in the submission and may require substantial additional testing or information in order for the FDA to reconsider the application. The CRL may require additional clinical or other data, additional pivotal Phase 3 clinical trial(s) and/or other significant and time-consuming requirements related to clinical trials, preclinical studies or manufacturing. If a CRL is issued, the applicant may choose to either resubmit the NDA addressing all of the deficiencies identified in the letter or withdraw the application. The FDA has committed to reviewing such resubmissions in response to an issued CRL in either two or six months depending on the type of information included. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval. If and when the deficiencies have been addressed to the FDA's satisfaction, the FDA will typically issue an approval letter.

The FDA may withdraw product approval if ongoing regulatory requirements are not met or if safety problems are identified after the product reaches the market. In addition, the FDA may require post-approval testing, including Phase 4 studies, and surveillance programs to monitor the effect of approved products which have been commercialized, and the FDA has the authority to prevent or limit further marketing of a product based on the results of these post-marketing programs. Products may be marketed only for the approved indications and in accordance with the provisions of the approved label and, even if the FDA approves a product, the FDA may limit the approved indications for use for the product or impose other conditions, including labeling or distribution restrictions or other risk-management mechanisms, such as a Boxed Warning, which highlights a serious safety concern that should be mitigated under a REMS program. Further, if there are any modifications to the product, including changes in indications, labeling, or manufacturing processes or facilities, a company is generally required to submit and obtain FDA approval of a supplemental NDA, which may require the company to develop additional data or conduct additional nonclinical studies and clinical trials.

Fast Track, Breakthrough Therapy and Priority Review Designations

The FDA is authorized to designate certain products for expedited development or review if they are intended to address an unmet medical need in the treatment of a serious or life-threatening disease or condition. These programs include fast track designation, breakthrough therapy designation and priority review designation.

To be eligible for a fast track designation, the FDA must determine, based on the request of a sponsor, that a product is intended to treat a serious or life-threatening disease or condition and demonstrates the potential to address an unmet medical need by providing a therapy where none exists or a therapy that may be potentially superior to existing therapy based on efficacy or safety factors. Fast track designation provides opportunities for more frequent interactions with the FDA review team to expedite development and review of the product. The FDA may also review sections of the NDA for a fast track product on a rolling basis before the complete application is submitted, if the sponsor and the FDA agree on a schedule for the submission of the application sections and the sponsor pays any required user fees upon submission of the first section of the NDA. In addition, fast track designation may be withdrawn by the sponsor or rescinded by the FDA if the designation is no longer supported by data emerging from the clinical trial process.

In addition, in 2012 Congress created a regulatory program for product candidates designated by FDA as "breakthrough therapies" upon a request made by the IND sponsors. A breakthrough therapy is defined as a drug or biologic that is intended, alone or in combination with one or more other drugs or biologics, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug or biologic may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. Drugs or biologics designated as breakthrough therapies are also eligible for accelerated approval of their respective marketing applications. The FDA must take certain actions with respect to breakthrough therapies, such as holding timely meetings with and providing advice to the product sponsor, which are intended to expedite the development and review of an application for approval of a breakthrough therapy.

Finally, the FDA may designate a product for priority review if it is a drug or biologic that treats a serious condition and, if approved, would provide a significant improvement in safety or effectiveness over existing therapy. The FDA determines at the time that the

marketing application is submitted, on a case- by-case basis, whether the proposed drug represents a significant improvement in treatment, prevention or diagnosis of disease when compared with other available therapies. Significant improvement may be illustrated by evidence of increased effectiveness in the treatment of a condition, elimination or substantial reduction of a treatment-limiting drug reaction, documented enhancement of patient compliance that may lead to improvement in serious outcomes, or evidence of safety and effectiveness in a new subpopulation. A priority review designation is intended to direct overall attention and resources to the evaluation of such applications, and to shorten the FDA's goal for taking action on a marketing application from ten months to six months for an NME NDA from the date of filing.

Even if a product qualifies for one or more of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened. Furthermore, fast track designation, breakthrough therapy designation and priority review do not change the standards for approval and may not ultimately expedite the development or approval process.

Accelerated Approval Pathway

In addition, products studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval from the FDA and may be approved on the basis of adequate and well-controlled clinical trials establishing that the drug product has an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit. The FDA may also grant accelerated approval for such a drug or biologic when the product has an effect on an intermediate clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality ("IMM") and that is reasonably likely to predict an effect on IMM or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. As a condition of approval, the FDA will require that a sponsor of a drug receiving accelerated approval perform post-marketing clinical trials to verify and describe the predicted effect on IMM or other clinical endpoint, and the product may be subject to expedited withdrawal procedures. Drugs and biologics granted accelerated approval must meet the same statutory standards for safety and effectiveness as those granted traditional approval.

For the purposes of accelerated approval, a surrogate endpoint is a marker, such as a laboratory measurement, radiographic image, physical sign, or other measure that is thought to predict clinical benefit, but is not itself a measure of clinical benefit. Surrogate endpoints can often be measured more easily or more rapidly than clinical endpoints. An intermediate clinical endpoint is a measurement of a therapeutic effect that is considered reasonably likely to predict the clinical benefit of a drug, such as an effect on IMM. The FDA has limited experience with accelerated approvals based on intermediate clinical endpoints, but has indicated that such endpoints generally may support accelerated approval when the therapeutic effect measured by the endpoint is not itself a clinical benefit and basis for traditional approval, if there is a basis for concluding that the therapeutic effect is reasonably likely to predict the ultimate long-term clinical benefit of a drug.

The accelerated approval pathway is most often used in settings in which the course of a disease is long and an extended period of time is required to measure the intended clinical benefit of a drug, even if the effect on the surrogate or intermediate clinical endpoint occurs rapidly. For example, accelerated approval has been used extensively in the development and approval of drugs for treatment of a variety of cancers in which the goal of therapy is generally to improve survival or decrease morbidity and the duration of the typical disease course requires lengthy and sometimes large clinical trials to demonstrate a clinical or survival benefit.

The accelerated approval pathway is usually contingent on a sponsor's agreement to conduct, in a diligent manner, additional post-approval confirmatory studies to verify and describe the drug's clinical benefit. As a result, a product candidate approved on this basis is subject to rigorous post-marketing compliance requirements, including the completion of Phase 4 or post-approval clinical trials to establish the effect on the clinical endpoint. Failure to conduct required post-approval studies, or to confirm the predicted clinical benefit of the product during post-marketing studies, would allow the FDA to withdraw approval of the drug. As part of the Consolidated Appropriations Act for 2023, Congress provided FDA additional statutory authority to mitigate potential risks to patients from continued marketing of ineffective drugs previously granted accelerated approval. Under the act's amendments to the FDCA, FDA may require the sponsor of a product granted accelerated approval to have a confirmatory trial underway prior to approval. The sponsor must also submit progress reports on a confirmatory trial every six months until the trial is complete, and such reports are published on FDA's website. The amendments also give FDA the option of using expedited procedures to withdraw product approval if the sponsor's confirmatory trial fails to verify the claimed clinical benefits of the product.

All promotional materials for product candidates being considered and approved under the accelerated approval program are subject to prior review by the FDA.

Post-Approval Requirements

Once an NDA is approved, a product will be subject to continuing regulation by the FDA, including, among other things, requirements relating to safety surveillance and adverse event reporting, periodic reporting, continued cGMP compliance and quality oversight,

compliance with post-marketing commitments, recordkeeping, advertising and promotion, and reporting manufacturing and labeling changes, as applicable.

In addition, drug manufacturers and other entities involved in the manufacture and distribution of approved drugs (including third-party manufacturers) are required to register their establishments with the FDA and some state agencies and are subject to periodic unannounced inspections by the FDA and some state agencies for assessment of compliance with cGMP. Changes to the manufacturing process are strictly regulated and often require prior FDA approval before being implemented. FDA regulations also require investigation and correction, and sometimes notification of, any deviations from cGMP. These regulations impose reporting and documentation requirements on the sponsor and any third-party manufacturers that we may decide to use. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance.

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Discovery of previously unknown problems with a product, including adverse events of unlisted severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements such as noncompliance with cGMP or failure to correct previously identified inspection findings, may result in mandatory revisions to the approved labeling to add new safety information; imposition of post-market or clinical trials to assess new safety risks; or imposition of distribution or other restrictions under a REMS program. Other potential consequences include, among other things:

- issuance of field alerts, restrictions on the marketing or manufacturing of the product, product recalls, or complete withdrawal of the product from the market;
- mandated modification of promotional materials and labeling and the issuance of corrective information;
- fines, warning letters or other enforcement-related letters or holds on clinical trials using the product or other products manufactured at the same facility;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product approvals;
- product seizure or detention, or refusal to permit the import or export of products;
- injunctions or the imposition of civil or criminal penalties; and
- consent decrees, corporate integrity agreements, debarment, or exclusion from federal health care programs.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. While physicians may generally prescribe a drug for off-label uses, manufacturers may only promote the drug in accordance with the approved product label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have promoted false and misleading information about the product may be subject to significant liability, both at the federal and state levels.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act ("PDMA") which regulates the distribution of drugs and drug samples at the federal level, and sets minimum standards for the registration and regulation of drug distributors by the states. Both the PDMA and state laws limit the distribution of prescription drug product samples and impose requirements to ensure accountability in distribution. Most recently, the Drug Supply Chain Security Act ("DSCSA") was enacted with the aim of building an electronic system to identify and trace certain prescription drugs distributed in the United States. The DSCSA mandates phased-in and resource-intensive obligations for pharmaceutical manufacturers, wholesale distributors, and dispensers over a ten-year period that is expected to culminate in November 2023. From time to time, new legislation and regulations may be implemented that could significantly change the statutory provisions governing the approval, manufacturing and marketing of products regulated by the FDA. It is impossible to predict whether further legislative or regulatory changes will be enacted, or FDA regulations, guidance or interpretations changed or what the impact of such changes, if any, may be.

Orphan Drug Designation

Under the Orphan Drug Act, the FDA may grant orphan drug designation to a drug intended to treat a rare disease or condition, which is defined as one affecting fewer than 200,000 individuals in the United States or more than 200,000 individuals where there is no reasonable expectation that the product development cost will be recovered from product sales in the United States. Orphan drug designation must be requested before submitting an NDA. After the FDA grants orphan drug designation, the identity of the drug and its potential orphan use will be disclosed publicly by the FDA; the posting will also indicate whether a drug is no longer designated as an orphan drug. More than one product candidate may receive an orphan drug designation for the same indication. Orphan drug designation does not convey any advantage in or shorten the duration of the regulatory review and approval process.

Under PREA, submission of a pediatric assessment is not required for pediatric investigation of a product that has been granted orphan drug designation. However, under the FDA Reauthorization Act of 2017 ("FDASIA"), the scope of the PREA was extended to require pediatric studies for products intended for the treatment of an adult cancer that are directed at a molecular target that are determined to be substantially relevant to the growth or progression of a pediatric cancer. In addition, the FDA finalized guidance in 2018 indicating that it does not expect to grant any additional orphan drug designation to products for pediatric subpopulations of common diseases. Nevertheless, the FDA intends to still grant orphan drug designation to a drug or biologic that otherwise meets all other criteria for designation when it prevents, diagnoses or treats either (i) a rare disease that includes a rare pediatric subpopulation, (ii) a pediatric subpopulation that constitutes a valid orphan subset, or (iii) a rare disease that is in fact a different disease in the pediatric population as compared to the adult population.

If an orphan drug-designated product subsequently receives FDA approval for the disease for which it was designed, the product will be entitled to seven years of product exclusivity, which means that the FDA may not approve any other applications to market the same drug for the same indication, except in very limited circumstances (such as a showing of clinical superiority to the product with orphan exclusivity by means of greater effectiveness, greater safety or providing a major contribution to patient care or in instances of drug supply issues), for seven years. Orphan exclusivity does not block the approval of a different drug or biologic for the same rare disease or condition, nor does it block the approval of the same drug or biologic for different conditions. If a competitor obtains approval of the same drug, as defined by the FDA, or if our product candidate is determined to be the same drug as a competitor's product for the same indication or disease, the competitor's exclusivity could block the approval of our product candidate in the designated orphan indication for seven years, unless our product is demonstrated to be clinically superior to the competitor's drug.

European Union Orphan Drug Designation

In the European Union (the "EU"), orphan drug designation by the European Commission (the "EC") provides regulatory and financial incentives for companies to develop and market therapies that meet the following requirements: (1) the product is intended for the diagnosis, prevention or treatment of life-threatening or chronically debilitating conditions; (2) either (a) such condition affects no more than five in 10,000 persons in the European Union when the application is made, or (b) the product, without the benefits derived from orphan status, would not generate sufficient return in the European Union to justify investment; and (3) there exists no satisfactory method of diagnosis, prevention or treatment of such condition authorized for marketing in the European Union, or if such a method exists, the product will be of significant benefit to those affected by the condition, as defined in Regulation (EC) 847/2000. To be considered for orphan drug designation in the EU, companies must provide data that demonstrate the plausibility for use of the investigational therapy in the treatment of the disease and establish that the drug has the potential to provide relevant advantages or a major contribution to patient care over existing therapies.

Among the incentives available to medicines designated as orphan drugs by the EC are ten-year market exclusivity in the EU after product approval, eligibility for conditional marketing authorization, protocol assistance from the European Medicines Agency at reduced fees during the product development phase and direct access to centralized marketing authorization in the EU. The exclusivity period may be reduced to six years if, at the end of the fifth year, the orphan drug designation criteria are no longer met, including where it is shown that the product is sufficiently profitable not to justify maintenance of market exclusivity. In addition, marketing authorization may be granted to a similar medicinal product with the same orphan indication during the ten-year period with the consent of the marketing authorization holder for the original orphan medicinal product or if the manufacturer of the original orphan medicinal product is unable to supply sufficient quantities of the product. Marketing authorization may also be granted to a similar medicinal product with the same orphan indication if the similar product is deemed safer, more effective or otherwise clinically superior to the original orphan medicinal product. Orphan drug designation must be requested before submitting an application for marketing authorization. Orphan drug designation does not, in itself, convey any advantage in, or shorten the duration of, the regulatory review and authorization process.

Pediatric Exclusivity and Pediatric Use

The Best Pharmaceuticals for Children Act ("BPCA") provides NDA holders a six-month period of non-patent marketing exclusivity attached to any other exclusivity listed with FDA—patent or non-patent—for a drug if certain conditions are met. Conditions for pediatric exclusivity include a determination by the FDA that information relating to the use of a new drug in the pediatric population may produce health benefits in that population; a written request by the FDA for pediatric studies; and agreement by the applicant to perform the requested studies and the submission to the FDA, completion of the studies in accordance with the written request, and the acceptance by the FDA, of the reports of the requested studies within the statutory timeframe. The data do not need to show the product to be effective in the pediatric population studied; rather, if the clinical trial is deemed to fairly respond to the FDA's request, the additional protection is granted. If reports of requested pediatric studies are submitted to and accepted by the FDA within the statutory time limits, whatever statutory or regulatory periods of exclusivity or patent protection cover the product are extended by six months. This is not a patent term extension, but it effectively extends the regulatory period during which the FDA cannot approve another application. The issuance of a written request does not require the sponsor to undertake the described studies. Applications under the BPCA are treated as priority applications.

The Hatch-Waxman Act and Marketing Exclusivity

In 1984, with passage of the Hatch-Waxman Amendments to the FDCA, Congress authorized the FDA to approve generic drugs that are the same as drugs previously approved by the FDA under the NDA provisions of the statute and also enacted Section 505(b)(2) of the FDCA. To obtain approval of a generic drug, an applicant must submit an abbreviated new drug application ("ANDA") to the agency. In support of such applications, a generic manufacturer may rely on the preclinical and clinical testing conducted for a drug product previously approved under an NDA, known as the reference listed drug ("RLD"). Specifically, in order for an ANDA to be approved, the FDA must find that the generic version is identical to the RLD with respect to the active ingredients, the route of administration, the dosage form, and the strength of the drug. At the same time, the FDA must also determine that the generic drug is "bioequivalent" to the innovator drug.

Upon NDA approval of a new chemical entity ("NCE"), which is a drug that contains no active moiety that has been approved by the FDA in any other NDA, that drug receives five years of marketing exclusivity. During the exclusivity period, the FDA cannot accept for review any ANDA or 505(b)(2) NDA submitted by another company for another version of such drug where the applicant does not own or have a legal right of reference to all the data required for approval. However, an application may be submitted one year before NCE exclusivity expires if a Paragraph IV certification is filed on an NCE patent and any time after approval if the application is filed based on a new indication or a new formulation.

The Hatch-Waxman Act also provides three years of data exclusivity for an NDA, 505(b)(2) NDA or supplement to an existing NDA if new clinical investigations, other than bioavailability studies, that were conducted or sponsored by the applicant are deemed by the FDA to be essential to the approval of the application, for example, new indications, dosages or strengths of an existing drug. This three-year exclusivity covers only the conditions of use associated with the new clinical investigations and does not prohibit the FDA from approving follow-on applications for drugs containing the original active agent. If there is no listed patent in the Orange Book, there may not be a Paragraph IV certification, and, thus, no ANDA or 505(b)(2) NDA may be filed before the expiration of the exclusivity period. Five-year and three-year exclusivity also will not delay the submission or approval of a traditional NDA filed under Section 505(b)(1) of the FDCA. However, an applicant submitting a traditional NDA would be required to either conduct or obtain a right of reference to all of the preclinical studies and adequate and well-controlled clinical trials necessary to demonstrate safety and effectiveness.

Patent Term Restoration

Depending upon the timing, duration and specifics of FDA approval of the use of our therapeutic candidates, some of our U.S. patents may be eligible for limited patent term extension under the Hatch-Waxman Act. The Hatch-Waxman Act permits a patent restoration term of up to five years as compensation for any patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the effective date of an IND and the submission date of an NDA, plus the time between the submission date of an NDA and the approval of that application. Only one patent applicable to an approved drug is eligible for the extension and the application for extension must be made prior to the expiration of the patent. The United States Patent and Trademark Office ("USPTO"), in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we intend to apply for restorations of patent term for some of our currently owned or licensed patents to add patent life beyond their current expiration date, depending on the expected length of clinical trials and other factors involved in the submission of the relevant NDA.

In Vitro Diagnostic Tests for Biomarkers

For some of our product candidates, we plan to work with collaborators to develop or obtain access to *in vitro* companion diagnostic tests to identify appropriate patients for these targeted therapies. If a sponsor or the FDA believes that a diagnostic test is essential for the safe and effective use of a corresponding therapeutic product, a sponsor will typically work with a collaborator to develop an *in vitro* diagnostic ("IVD"). IVDs are regulated by the FDA as medical devices, and since 2014 the agency has issued final and draft guidance documents that are intended to assist companies developing *in vitro* companion diagnostic devices and companies developing therapeutic products that depend on the use of a specific *in vitro* companion diagnostic for the safe and effective use of the therapeutic product.

The three types of marketing pathways for medical devices are clearance of a premarket notification under Section 510(k) of the FDCA ("510(k)"), approval of a premarket approval application ("PMA") and a *de novo* classification request, or *de novo*. If a company is required to perform clinical trials to support the safety and effectiveness of an IVD, and the IVD is viewed as a significant risk device, the sponsor will have to submit an investigational device exemption application ("IDE") to the FDA, which is similar in format and function to an IND. If the diagnostic test and the therapeutic drug are studied together to support their respective approvals, any clinical trials involving both product candidates must meet both the IDE and IND requirements.

The FDA expects that the therapeutic sponsor will address the need for an IVD companion diagnostic device in its therapeutic product development plan and that, in most cases, the therapeutic product and its corresponding IVD companion diagnostic device will be

developed contemporaneously. If the companion diagnostic test will be used to make critical treatment decisions such as patient selection, treatment assignment, or treatment arm, it will likely be considered a significant risk device for which a clinical trial will be required. After approval, the use of an IVD companion diagnostic device with a therapeutic product will be stipulated in the instructions for use in the labeling of both the diagnostic device and the corresponding therapeutic product. In addition, a diagnostic test that was approved through the PMA process, or one that was cleared through the 510(k) process or reclassified through the *de novo* process, and placed on the market will be subject to many of the same regulatory requirements that apply to approved drugs.

However, the FDA may decide that it is appropriate to approve such a therapeutic product without an approved or cleared *in vitro* companion diagnostic device when the drug or therapeutic biologic is intended to treat a serious or life-threatening condition for which no satisfactory alternative treatment exists and the FDA determines that the benefits from the use of a product with an unapproved or uncleared *in vitro* companion diagnostic device are so pronounced as to outweigh the risks from the lack of an approved or cleared *in vitro* companion diagnostic device. The FDA encourages sponsors considering developing a therapeutic product that requires a companion diagnostic to request a meeting with both relevant device and therapeutic product review divisions to ensure that the product development plan will produce sufficient data to establish the safety and effectiveness of both the therapeutic product and the companion diagnostic. Because the FDA's policies on companion diagnostics is set forth only in guidance, this policy is subject to change and is not legally binding.

European Union Regulation of Drug Products

In addition to regulations in the United States, we are and will be subject, either directly or through our distribution partners, to a variety of regulations in other jurisdictions governing, among other things, clinical trials, the privacy of personal data and commercial sales and distribution of our products, if approved.

Whether or not we obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in non-U.S. countries prior to the commencement of clinical trials or marketing of the product in those countries. Certain countries outside of the United States have a process that requires the submission of a clinical trial application much like an IND prior to the commencement of human clinical trials. In Europe, for example, a clinical trial application ("CTA"), must be submitted to the competent national health authority and to independent ethics committees in each country in which a company plans to conduct clinical trials. Once the CTA is approved in accordance with a country's requirements, clinical trials may proceed in that country. Under the EU Clinical Trials Regulation, a harmonized assessment and supervision process was implemented as of January 31, 2022 for clinical trials throughout the EU, via a Clinical Trials Information System ("CTIS"). The CTIS will contain the centralized EU portal and database for clinical trials conducted in the EU and will allow for a centralized review process. This harmonized submission process became mandatory for new CTA submissions to be filed beginning on February 1, 2023. Under the new centralized process, if the EU member state leading the CTA review approves or rejects the application, the decision will apply to all involved member states.

The requirements and process governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country, even though there is already some degree of legal harmonization in the EU member states resulting from the national implementation of underlying EU legislation. In all cases, the clinical trials are conducted in accordance with GCP and other applicable regulatory requirements.

To obtain a marketing license for a new drug or medicinal product in the European Union, the sponsor must obtain approval of a marketing authorization application ("MAA"). The way in which a medicinal product can be approved in the European Union depends on the nature of the medicinal product. As of January 31, 2020, the United Kingdom ("UK") is no longer a member state of the EU, and therefore a separate MAA and approval will be required to market a medicinal product in the UK. The UK's Medicines and Healthcare products Regulatory Agency ("MHRA") has issued guidance regarding the requirements for licensing and marketing therapeutic drugs and biologics post-Brexit.

The centralized procedure results in a single marketing authorization granted by the European Commission that is valid across the European Union, as well as in Iceland, Liechtenstein, and Norway. The centralized procedure is compulsory for human drugs that: (i) are derived from biotechnology processes, such as genetic engineering, (ii) contain a new active substance indicated for the treatment of certain diseases, such as HIV/AIDS, cancer, diabetes, neurodegenerative diseases, autoimmune and other immune dysfunctions and viral diseases, (iii) are officially designated "orphan drugs" (drugs used for rare human diseases) and (iv) are advanced-therapy medicines, such as gene-therapy, somatic cell-therapy or tissue-engineered medicines. The centralized procedure may at the request of the applicant also be used for human drugs which do not fall within the above mentioned categories if (a) the human drug contains a new active substance which was not authorized in the European Community; or (b) the applicant shows that the medicinal product constitutes a significant therapeutic, scientific or technical innovation or that the granting of authorization in the centralized procedure is in the interests of patients or animal health at the European Community level.

Under the centralized procedure in the European Union, the maximum timeframe for the evaluation of a marketing authorization application by the EMA is 210 days (excluding clock stops, when additional written or oral information is to be provided by the applicant in response to questions asked by the Committee for Medicinal Products for Human Use ("CHMP")), with adoption of the actual marketing authorization by the European Commission thereafter. Accelerated evaluation might be granted by the CHMP in exceptional cases, when a medicinal product is expected to be of a major public health interest from the point of view of therapeutic innovation, defined by three cumulative criteria: the seriousness of the disease to be treated; the absence of an appropriate alternative

therapeutic approach, and anticipation of exceptional high therapeutic benefit. In this circumstance, EMA ensures that the evaluation for the opinion of the CHMP is completed within 150 days and the opinion issued thereafter.

The mutual recognition procedure ("MRP") for the approval of human drugs is an alternative approach to facilitate individual national marketing authorizations within the European Union. Basically, the MRP may be applied for all human drugs for which the centralized procedure is not obligatory. The MRP is applicable to the majority of conventional medicinal products, and is based on the principle of recognition of an already existing national marketing authorization by one or more member states. In the MRP, a marketing authorization for a drug already exists in one or more member states of the European Union and subsequently marketing authorization applications are made in other European Union member states by referring to the initial marketing authorization. The member state in which the marketing authorization was first granted will then act as the reference member state. The member states where the marketing authorization is subsequently applied for act as concerned member states. After a product assessment is completed by the reference member state, copies of the report are sent to all member states, together with the approved summary of product characteristics, labeling and package leaflet. The concerned member states then have 90 days to recognize the decision of the reference member state and the summary of product characteristics, labeling and package leaflet. National marketing authorizations within individual member states shall be granted within 30 days after acknowledgement of the agreement.

Should any member state refuse to recognize the marketing authorization by the reference member state, on the grounds of potential serious risk to public health, the issue will be referred to a coordination group. Within a timeframe of 60 days, member states shall, within the coordination group, make all efforts to reach a consensus. If this fails, the procedure is submitted to an EMA scientific committee for arbitration. The opinion of this EMA committee is then forwarded to the Commission, for the start of the decision-making process. As in the centralized procedure, this process entails consulting various European Commission Directorates General and the Standing Committee on Human Medicinal Products or Veterinary Medicinal Products, as appropriate.

European Union Regulation of IVD Products

In May 2022, the In Vitro Diagnostic Device Regulation (IVDR) (EU) 2017/746 became effective, replacing the previous IVD Directive (EU-Directive 98/79/EC). The IVDR was published in May 2017 and given a five-year transition period until its full implementation on May 26, 2022. Unlike the IVD Directive, the IVDR has binding legal force throughout every Member State. The major goals of the IVDR are to standardize diagnostic procedures within the EU, increase reliability of diagnostic analysis and enhance patient safety. Among other things, the IVDR introduces a new risk-based classification system for IVDs and requirements for IVD conformity assessments. Under the IVDR and subsequent amendments, IVDs already certified by a Notified Body may remain on the market until May 26, 2025, and IVDs certified without the involvement of a Notified Body may remain on the market for up to two additional years (until May 26, 2027) depending on the classification of the IVD. The manufacturers of such devices remaining on the market must comply with specific requirements in the IVDR, but ultimately, such products, as with all new IVDs, will have to undergo the IVDR's conformity assessment procedures. In addition, IVDs in the highest risk class will have to be tested by a Designated Reference Laboratory. The IVDR imposes additional requirements relating to post-market surveillance and submission of post-market performance follow-up reports.

The EC has designated six Notified Bodies to perform conformity assessments under the IVDR. MedTech Europe has issued guidance relating to the IVDR in several areas, e.g., clinical benefit, technical documentation, state of art, accessories, and EUDAMED.

Rest of World Government Regulation

For countries outside of the United States and the European Union, such as countries in Eastern Europe, Latin America or Asia, the requirements governing the conduct of clinical trials, product licensing, pricing and reimbursement vary from country to country. In all cases, the clinical trials must be conducted in accordance with GCP and the other applicable regulatory requirements.

If we fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension of clinical trials, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions, and criminal prosecution.

Other Healthcare Laws

Although we currently do not have any products on the market, if our product candidates are approved in the United States, we will have to comply with various U.S. federal and state laws, rules and regulations pertaining to healthcare fraud and abuse, including anti-kickback laws and physician self-referral laws, rules and regulations. Violations of the fraud and abuse laws are punishable by criminal and civil sanctions, including, in some instances, exclusion from participation in federal and state healthcare programs, including Medicare and Medicaid. These laws include the following:

- the federal Anti-Kickback Statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare and Medicaid;

- the federal False Claims Act imposes civil penalties, and provides for civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996 ("HIPAA") imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act and its implementing regulations, also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information;
- the federal false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services;
- the federal transparency requirements under the Physician Payments Sunshine Act require manufacturers of FDA-approved drugs, devices, biologics and medical supplies covered by Medicare or Medicaid to report, on an annual basis, to the Department of Health and Human Services information related to payments and other transfers of value to physicians, teaching hospitals, and certain advanced non-physician health care practitioners and physician ownership and investment interests; and
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by nongovernmental third-party payors, including private insurers.

Some state laws require pharmaceutical or medical device companies to comply with the relevant industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to payments to physicians and other health care providers or marketing expenditures.

In November 2020, the Department of Health and Human Services ("DHHS") finalized significant changes to the regulations implementing the Anti-Kickback Statute, as well as the civil monetary penalty rules regarding beneficiary inducements, with the goal of offering the healthcare industry more flexibility and reducing the regulatory burden associated with those fraud and abuse laws, particularly with respect to value-based arrangements among industry participants.

State and foreign laws also govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts. We also are subject to, or may in the future become subject to, U.S. federal and state, and foreign laws and regulations imposing obligations on how we collect, use, disclose, store and process personal information. Our actual or perceived failure to comply with such obligations could result in liability or reputational harm and could harm our business.

Pharmaceutical Coverage, Pricing, and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of products approved by the FDA and other government authorities. Sales of our products, when and if approved for marketing in the United States, will depend, in part, on the extent to which our products will be covered by third-party payors, such as federal, state, and foreign government healthcare programs, commercial insurance and managed healthcare organizations. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third-party payors may limit coverage to specific products on an approved list, or formulary, which might not include all of the approved products for a particular indication. In addition, these third-party payors are increasingly reducing reimbursements for medical products, drugs and services. Furthermore, the U.S. government, state legislatures and foreign governments have continued implementing cost containment programs, including price controls, restrictions on coverage and reimbursement and requirements for substitution of generic products. Adoption of price controls and cost containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit our net revenue and results. Limited third-party reimbursement for our product candidates or a decision by a third-party payor not to cover our product candidates could reduce physician usage of our products once approved and have a material adverse effect on our sales, results of operations and financial condition.

In Europe and other countries outside of the United States, pricing and reimbursement schemes vary widely from country to country. Some countries provide that drug products may be marketed only after a reimbursement price has been agreed to. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies. In some countries, cross-border imports from low-priced markets exert competitive pressure that may reduce pricing within a country. Any country that has price controls or reimbursement limitations for drug products may not allow favorable reimbursement and pricing arrangements.

Healthcare Reform

In the United States and some foreign jurisdictions, there have been, and continue to be, several legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of product and therapeutic candidates, restrict or regulate post-approval activities, and affect the ability to profitably sell product and therapeutic candidates that obtain marketing approval. The FDA's and other regulatory authorities' policies may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product and therapeutic candidates. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we otherwise may have obtained and we may not achieve or sustain profitability, which would adversely affect our business, prospects, financial condition and results of operations. Moreover, among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and/or expanding access.

For example, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (collectively, the "ACA"), was enacted in March 2010 and has had a significant impact on the health care industry in the United States. The ACA expanded coverage for the uninsured while at the same time containing overall healthcare costs. With regard to biopharmaceutical products, the ACA, among other things, addressed a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected, increased the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extended the rebate program to individuals enrolled in Medicaid managed care organizations, established annual fees on manufacturers of certain branded prescription drugs, and created a new Medicare Part D coverage gap discount program. Additionally, on December 20, 2019, the Further Consolidated Appropriations Act for 2020 was signed into law (P.L. 116-94) and includes a piece of bipartisan legislation called the Creating and Restoring Equal Access to Equivalent Samples Act of 2019 or the "CREATES Act." The CREATES Act aims to address the concern articulated by both the FDA and others in the industry that some brand manufacturers have improperly restricted the distribution of their products, including by invoking the existence of a REMS for certain products, to deny generic product developers access to samples of brand products. Because generic product developers need samples to conduct certain comparative testing required by the FDA, some have attributed the inability to timely obtain samples as a cause of delay in the entry of generic products. To remedy this concern, the CREATES Act establishes a private cause of action that permits a generic product developer to sue the brand manufacturer to compel it to furnish the necessary samples on "commercially reasonable, market-based terms." Whether and how generic product developments will use this new pathway, as well as the likely outcome of any legal challenges to provisions of the CREATES Act, remain highly uncertain and its potential effects on any of our future commercial products are unknown.

Since the enactment of the ACA, there have been executive, judicial and Congressional challenges to certain aspects and as a result certain sections of the ACA have not been fully implemented or have been effectively repealed through Executive Orders and/or executive agency actions. However, following several years of litigation in the federal courts, in June 2021, the U.S. Supreme Court upheld the ACA when it dismissed a legal challenge to the ACA's constitutionality. Further legislative and regulatory changes under the ACA remain possible, although the Biden Administration has signaled that it plans to build on the ACA and expand the number of people who are eligible for health insurance subsidies under it. It is unknown what form any such changes or any law would take, and how or whether it may affect the biopharmaceutical industry as a whole or our business in the future. We expect that changes or additions to the ACA, the Medicare and Medicaid programs, and changes stemming from other healthcare reform measures, especially with regard to healthcare access, financing or other legislation in individual states, could have a material adverse effect on the health care industry in the United States.

In addition, other legislative changes have been proposed and adopted in the United States since the ACA that affect health care expenditures. These changes include aggregate reductions to Medicare payments to providers of up to 2% per fiscal year pursuant to the Budget Control Act of 2011, which began in 2013 and was extended by the Consolidated Appropriations Act for 2023, and will remain in effect through 2032 unless additional Congressional action is taken.

Moreover, there has been heightened governmental scrutiny over the manner in which manufacturers set prices for their marketed products, which has resulted in several Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for drug products. In May 2019, DHHS issued a final rule to allow Medicare Advantage plans the option to use step therapy for Part B drugs beginning January 1, 2020. This final rule codified a DHHS policy change that was effective January 1, 2019.

More recently, in August 2022, President Biden signed into the law the Inflation Reduction Act of 2022, or the IRA. Among other things, the IRA has multiple provisions that may impact the prices of drug products that are both sold into the Medicare program and throughout the United States. Starting in 2023, a manufacturer of a drug or biological product covered by Medicare Parts B or D must pay a rebate to the federal government if the drug product's price increases faster than the rate of inflation. This calculation is made on a drug product by drug product basis and the amount of the rebate owed to the federal government is directly dependent on the volume of a drug product that is paid for by Medicare Parts B or D. Additionally, starting in payment year 2026, CMS will negotiate drug prices annually for a select number of single source Part D drugs without generic or biosimilar competition. CMS will also negotiate drug prices for a select number of Part B drugs starting for payment year 2028. If a drug product is selected by CMS for negotiation, it is expected that the revenue generated from such drug will decrease.

Individual states in the United States have also increasingly passed legislation and implemented regulations designed to control pharmaceutical product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In December 2020, the U.S. Supreme Court held unanimously that federal law does not preempt the states' ability to regulate pharmaceutical benefit managers ("PBMs") and other members of the health care and pharmaceutical supply chain, an important decision that may lead to further and more aggressive efforts by states in this area.

We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative or executive action, either in the United States or abroad. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, including any future drug products for which we secure marketing approval.

Manufacturing Requirements

We and our third-party manufacturers must comply with applicable cGMP requirements. The cGMP requirements include requirements relating to, among other things, organization of personnel, buildings and facilities, equipment, control of components and drug product containers and closures, production and process controls, packaging and labeling controls, holding and distribution, laboratory controls, records and reports, and returned or salvaged products. The manufacturing facilities for our products must meet cGMP requirements to the satisfaction of the FDA pursuant to a pre-approval inspection before we can use them to manufacture commercial products. We and our third-party manufacturers are also subject to periodic announced or for-cause unannounced inspections of facilities by the FDA and other authorities, including procedures and operations used in the testing and manufacture of our commercial products, if any, to assess our compliance with applicable regulations. Failure to comply with statutory and regulatory requirements subjects a manufacturer to possible legal or regulatory action, including, among other things, warning or other enforcement letters, voluntary corrective action, the seizure of products, injunctions, consent decrees placing significant restrictions on or suspending manufacturing operations, disgorgement of profits, and other civil and criminal penalties.

Other Regulatory Requirements

We are also subject to various laws and regulations regarding laboratory practices, the experimental use of animals, and the use and disposal of hazardous or potentially hazardous substances in connection with our research. In each of these areas, as above, the FDA has broad regulatory and enforcement authority, including, among other things, the ability to levy fines and civil penalties, suspend or delay issuance of approvals, seize or recall products, and withdraw approvals, any one or more of which could have an adverse effect on our ability to operate our business and generate revenues. Compliance with applicable environmental laws and regulations is expensive, and current or future environmental regulations may impair our research, development and production efforts, which could harm our business, operating results and financial condition.

Human Capital

As of December 31, 2022, we employed 252 employees, of which 250 were full-time employees. A significant number of our management and professional employees have had prior experience with pharmaceutical, biotechnology or medical product companies. None of our employees are represented by a labor union or covered under a collective bargaining agreement. Management considers relations with our employees to be good.

Our approach to how we recruit, develop, retain and manage our talent is driven by our values statement: Making an impact through innovation, inclusion, and inspiration. Our values are at the core of who we are as an organization, and what drive us to envision a brighter future for the patients and families we serve. Critical to achieving our strategic imperatives is our ability to build a world-class organization and retain an exceptional team in which each member plays a unique and important role. We value diversity, inclusion, and social responsibility where our employees have a strong sense of belonging and contributing, while being empowered to make a real difference. This commitment is company-wide and our Nominating and Corporate Governance Committee charter reflects the Nominating and Corporate Governance Committee's oversight of our strategies and policies related to our people and diversity, equity

and inclusion ("DEI"), in addition to the Nominating and Corporate Governance Committee's oversight of our environmental, social and governance ("ESG") strategy, initiatives and policies.

We recognize that maintaining an engaged and high-performing workforce who share a connection with the communities we serve is critical to our success. Comradery and cohesion are at the core of who we are as a company, and are integral facets of our human capital strategy. Whether it is coming together throughout the year to connect at our town halls or participating in a global fitness challenge to support the health and well-being of our employees, we take a team approach to our work. We are inspired by the communities we serve, the opportunities to engage and learn from individuals and their families, and the possibilities of what we can achieve together.

We understand that in order to drive innovation, we must continuously improve our people strategies and find ways to foster engagement and growth within our organization. To this end, below are some of our initiatives:

Employee Engagement: We embrace the idea that our employees do their best work when they have equity ownership in the business. Having an engaged and dedicated workforce is essential for us to achieve our goals. Employee engagement ensures that our employees feel passionate about the work they are doing, and with this commitment, we recognize that this is when results happen. It is more apparent than ever that we are all in this together, and as a company, we need to set up our employees for success and continue to cultivate their engagement with our company. We regularly conduct surveys as a means of engaging with employees and gaining their insights. We use the data and input as a tool for improving our human resources management going forward. Engagement is also directly correlated to the interactions our employees have with each other and their teams. Our Wave Activities Committee is a cross-functional team dedicated to organizing activities, such as themed social gatherings, charity and volunteer opportunities, and health and wellness events, which enrich our culture and bring employees together. We also work to ensure that we are deeply aligned with our corporate goals as a company, that functional goals are clear and transparent, and that employees understand how their work contributes to the company's success.

Employee Health and Safety: Compliance with environmental, health and safety ("EH&S") laws and regulations forms the basis of the EH&S policy and programs we have in place, which include occupational health and safety measures that apply to all of our employees, contractors and visitors. These programs detail the proactive, risk-based approach that we take to prevent workplace injuries and protect the health and safety of our employees and the communities around us. We have implemented an EH&S management system to monitor and track the effectiveness of our programs, ensure EH&S compliance, respond to incidents and manage corrective actions to reinforce safeguards. Our training programs provide training to our employees that is commensurate with their level of risk exposure and are designed to ensure that employees have the knowledge and equipment available to mitigate risk. Our cross-functional Safety Committee meets monthly to discuss any concerns and ways to improve our EH&S programs. Employees are also required to report any incidents, no matter how small, and are encouraged to voice any health or safety concerns to management or a member of our EH&S team. As we continue to monitor the COVID-19 situation, we have implemented and will continue to implement measures designed to safeguard the health and safety of our employees and our patients, which includes our mandatory COVID-19 vaccination policy.

Professional Development Programs and Opportunities: Employees are our most valuable resource, and we aspire to provide them with opportunities so that they can continue to grow and excel in their functions and our company. Professional growth of our employees leads to engagement and development, and allows us to leverage opportunities to hire and promote key talent from within our organization. We have also implemented a personal development plan program, and leadership and management development programs, which we recognize is a critical part of our future success. In 2022, we initiated "Building Coaching Leaders," a learning series designed to build strong coaching capabilities and strengthen a manager's engagement with their teams. Through development planning, we strive for employees at all levels to focus on strengthening the skills required in their current role and potentially their next role. We conduct annual performance reviews for all employees, but, as importantly, we are focused on building a culture of continuous coaching, feedback and open communication between managers and their direct reports throughout the entire year. We provide managers and employees with training on how to conduct effective forward-looking performance conversations and to set effective goals that are specific, measurable, attainable, relevant and timebound (SMART). We provide our employees with unlimited access to LinkedIn Learning, to advance their professional development, interests and goals. Another example where we provide company-wide leadership and development opportunities is through the Wave Learning Series, which was developed to build awareness of all functional areas, special areas of interest or importance, timely subject matters and to expand knowledge of industry trends and other matters of interest and relevance within the biopharmaceutical industry. The Wave Learning Series is conducted through company-wide presentations by employees at various levels, providing opportunities for development and cross-functional exposure for our employees. To further assist our employees, we also offer all full-time employees the option to participate in our Education Assistance Program, where we reimburse employees for tuition and eligible expenses.

Health and Well-Being: We believe that the overall well-being of our employees and ensuring that their basic health and wellness needs are met, is fundamental for us to achieve success as a company. We understand that a key part of our ongoing efforts to prioritize wellness initiatives, includes providing our employees with access to mental health, behavioral health, and/or substance abuse services through our medical plans. We provide an Employee Assistance Program ("EAP"), as a cost-free benefit, which is available to help employees and their household members confidentially manage everyday life, work challenges, stress, and other

personal issues, by providing consultation, referrals and resources, along with ongoing webinars on various work-life, mental health and wellness topics for employees. In addition, we understand that workplace flexibility is an important component to our employees' well-being. Throughout the COVID-19 pandemic, safeguarding employee and patient health has been our top priority, as we advance our business through the research and development of our therapeutic candidates. Prioritizing employee safety while achieving our goals has provided us with a greater appreciation for workplace flexibility, which keeps our employees engaged and motivated, while also creating a sense of trust throughout our organization.

Diversity, Equity and Inclusion ("DEI"): Our commitment to maintaining a top-performing company means investing in and creating ongoing opportunities for employee development in a diverse and inclusive workplace. We provide equal employment opportunities without regard to race, color, religion, gender, sexual orientation, national origin, age, disability, veteran status or genetics. In 2021, we formalized our DEI efforts through various initiatives, including the formation of a DEI Steering Group to be intentional about creating and maintaining a diverse, equitable, culturally competent and supportive environment for all of our employees and other stakeholders. Some of our preliminary DEI initiatives included creating opportunities for our employees to be engaged with our DEI initiatives through participation in a cultural assessment survey and creating various focus groups. The data we received from this preliminary work enabled us to create a DEI strategy and define our strategic DEI goals to enhance our overall awareness of DEI and elevate our inclusive leadership and workplace through a broad range of initiatives. Our DEI Steering Group also defined our DEI Vision: *At Wave we celebrate diversity and the power of unique perspectives. Together, we are building an inclusive and empowered culture where everyone is valued, able to thrive and feels a sense of belonging. By embracing our differences, we inspire each other, spark innovation and drive meaningful impact for our patients, their families and the communities that we serve.* Our DEI Vision will guide us as we further our understanding of the DEI matters that affect our company and stakeholders, and take the appropriate actions to achieve our goals.

We believe that a diverse and inclusive workforce positively impacts our performance, fosters innovation and inspires us to achieve greater results. In addition to this, our intentional focus on DEI continues to strengthen our culture and helps ensure that we continue to cultivate an effective next generation of experienced leaders and managers necessary to execute on our mission and plans for ambitious growth. Hiring for diversity of thought, background and experience, and diversity of personal characteristics such as gender, race and ethnicity, among many others, is intentional, and continues to be an area of focus for us as we build and grow our workforce. Despite the historical lack of institutional emphasis on the importance of girls and women focusing on education in science, technology, engineering and mathematics ("STEM") and the resulting disproportionate occupation by men in the STEM-educated talent pool, we have prioritized and hired a gender diverse workforce. As of December 31, 2022, women made up approximately 53% of our global workforce and constitute approximately 48% of senior management (defined as vice president level and above). We are also committed to building a racially and ethnically diverse workforce. As of December 31, 2022, racially diverse employees (those self-identifying as Black or African American, Hispanic or Latinx, Asian, or being of two or more races) make up approximately 36% of our global workforce and approximately 22% of senior management (defined as vice president level and above) (20% of our employees did not provide us with this information). In addition, we continue to partner with Project Onramp, which is an organization that is working to bridge the opportunity gap for Massachusetts college students in underserved and minority communities. Through this partnership, we provide students with summer internships.

Community Outreach and Engagement: Our community engagement activities are focused on seeking to better understand the lives of people living with rare disease and identifying opportunities to support the rare disease community. We believe that partnering with, and understanding the lives of individuals impacted by disease and their families and caregivers, connects us more deeply to our mission, differentiates us and enhances our ability to discover and develop potential therapies. Through collaboration with patient communities and advocacy organizations, and participation in community-focused conferences and events, we aim to broaden our understanding of the lived experiences of these individuals and families and to incorporate their perspectives into every aspect of our work. These insights inform the design and execution of our clinical trials, the enrichment of our corporate culture, and other initiatives that make a positive impact on people's lives. Employee volunteerism is another important component of our community engagement initiatives. We partner with advocacy and service organizations to provide opportunities for employees to contribute directly to our local communities, including through our Wave Service Day and holiday giving drives. By participating in a broad range of volunteer activities, our employees donate time and resources to support individuals and families in the rare disease community and beyond. We also recognize that external factors and current events, including systems and policies, impact our employees, as well as the communities with which we are connected. We prioritize providing mental health resources for our employees, creating forums for dialogue, and finding opportunities to give back to impacted groups.

Rewards and Recognition: We have a multi-tiered awards program, including peer-to-peer recognition, which our employees use to recognize and reward one another for their contributions and achievements, taking into consideration the combination of employees who best exemplify our values and the achievement of results. We believe that providing a rewards program not only increases engagement and performance, but meaningfully recognizes those employees who go above and beyond to positively impact our company and culture. In addition, we offer a team rewards and recognition program to provide another opportunity to recognize and reward collaborative teamwork.

Compensation, Equity and Benefits (Total Rewards): Compensation programs are one of the most powerful tools available to companies to attract, retain and motivate employees, as well as align their interests with those of shareholders. We have developed a broad-based compensation program that is designed to attract, retain and motivate our employees, while driving sustainable long-term value creation. We seek to deliver performance-driven, market competitive reward opportunities commensurate with company and individual performance. All of our employees receive competitive base salaries, cash bonuses, new hire equity grants and annual long-term incentive grants, in addition to our comprehensive benefits package. We believe that providing employees with an ownership interest in our company through grants of equity awards, further strengthens the level of employee engagement. Furthermore, equity awards help align the interests of our employees with the long-term interests of our shareholders. In addition, we have an Employee Share Purchase Plan ("ESPP"), which provides our employees with an opportunity to purchase shares of our Company at a 15% discount to the market price.

Offering a highly competitive, industry-leading, benefits package is another integral piece of our total rewards package and differentiated employee value proposition. Notably, we provide our employees with access to choice and offer employees a very progressive health insurance package, with no premiums. We also offer a 401(k) plan with matching contributions for all eligible employees. We continue to provide innovative solutions that are key to attracting, engaging and motivating employees, including (i) our excellent benefits and compensation programs and strategies; (ii) our employee well-being approach and strategy; (iii) our health plan and how we have managed this over time; and (iv) internal communications and education around our total rewards strategy.

We will continue to evolve and strengthen our strategies relating to talent, while furthering our investment in our employees, culture, community partnerships and outreach, and other human capital measures.

Note on the COVID-19 Global Pandemic

The ongoing COVID-19 global pandemic, and variants thereof, continues to have widespread, rapidly evolving, and unpredictable impacts on global societies, economies, financial markets, and business practices. We are closely monitoring the impact of the pandemic and related developments, and our focus remains on safeguarding employee and patient health, while minimizing the negative effects on our business and continuing to advance the research and development of our therapeutic candidates. For discussion regarding the impact of the COVID-19 global pandemic on our business and financial results, see "Risk Factors" in Part I, Item 1A and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in Part II, Item 7 of this Annual Report on Form 10-K.

Corporate Information

We were incorporated under the name Wave Life Sciences Pte. Ltd. (Registration No.: 201218209G) under the laws of Singapore on July 23, 2012. On November 16, 2015, we closed our initial public offering. In preparation for our initial public offering, on November 5, 2015, Wave Life Sciences Pte. Ltd. converted from a private limited company to a public limited company known as Wave Life Sciences Ltd. ("Wave"). Wave has four wholly-owned subsidiaries: Wave Life Sciences USA, Inc. ("Wave USA"), a Delaware corporation (formerly Ontorii, Inc.); Wave Life Sciences Japan, Inc. ("Wave Japan"), a company organized under the laws of Japan (formerly Chiralgen., Ltd.); Wave Life Sciences Ireland Limited ("Wave Ireland"), a company organized under the laws of Ireland; and Wave Life Sciences UK Limited ("Wave UK"), a company organized under the laws of the United Kingdom.

Our registered office is located at 7 Straits View #12-00, Marina One East Tower, Singapore 018936, and our telephone number at that address is +65 6236 3388. Our principal office for Wave USA is located at 733 Concord Avenue, Cambridge, MA 02138, and our telephone number at that address is +1-617-949-2900. Our registered office for Wave Japan is 2438 Miyanoura-cho, Kagoshima-shi, Kagoshima pref. 891-1394, Japan. Our registered office for Wave Ireland is One Spencer Dock, North Wall Quay, Dublin 1, D01 X9R7, Ireland. Our registered office for Wave UK is 1 Chamberlain Square CS, Birmingham B3 3AX, United Kingdom.

Information Available on the Internet

Our Internet website address is http://www.wavelifesciences.com. The information contained on, or that can be accessed through, our website is not a part of, or incorporated by reference in, this Annual Report on Form 10-K or our other filings with the SEC. We have included our website address in this Annual Report on Form 10-K solely as an inactive textual reference. We make available free of charge through our website our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Exchange Act. We make these reports available through the "For Investors & Media – SEC Filings" section of our website as soon as reasonably practicable after we electronically file such reports with, or furnish such reports to, the SEC. We also make available, free of charge on our website, the reports filed with the SEC by our executive officers, directors and 10% shareholders pursuant to Section 16 under the Exchange Act as soon as reasonably practicable after copies of those filings are filed with the SEC. You can review our electronically filed reports and other information that we file with the SEC on the SEC's website at http://www.sec.gov.

In addition, we regularly use our website to post information regarding our business and governance, and we encourage investors to use our website, particularly the information in the section entitled "For Investors & Media," as a source of information about us.

Item 1A. Risk Factors

Risk Factors

You should carefully consider the following risk factors, in addition to the other information contained in this Annual Report on Form 10-K, including the section of this report titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements and related notes. If any of the events described in the following risk factors and the risks described elsewhere in this Annual Report on Form 10-K occurs, our business, operating results and financial condition could be seriously harmed and the trading price of our ordinary shares could decline. This Annual Report on Form 10-K also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of factors that are described below and elsewhere in this Annual Report on Form 10-K.

Risks Related to Our Financial Results and Capital Requirements

We are a clinical-stage genetic medicines company with a history of losses, and we expect to continue to incur losses for the foreseeable future, and we may never achieve or maintain profitability.

We are a clinical-stage genetic medicines company and have incurred significant operating losses since our incorporation in 2012. Our net loss was $161.8 million and $122.2 million for the fiscal years ended December 31, 2022 and 2021, respectively. As of December 31, 2022 and 2021, we had an accumulated deficit of $967.3 million and $805.5 million, respectively. To date, we have not generated any product revenue. Substantially all of our losses have resulted from expenses incurred in connection with our research and development programs and from general and administrative costs associated with our operations.

We currently have no products on the market and expect that it may be many years, if ever, before we have a product candidate ready for commercialization. We have a robust and diverse pipeline of PN-modified, stereopure oligonucleotides, including programs using our editing, splicing, and silencing modalities. Our lead clinical programs are focused in, and aim to address, muscle diseases (DMD – splicing), hepatic diseases (AATD – editing), and CNS diseases (HD, ALS and FTD – silencing). We have not generated, and do not expect to generate, any product revenue for the foreseeable future, and we expect to continue to incur significant operating losses for the foreseeable future due to the cost of research and development, manufacturing, preclinical studies and clinical trials and the regulatory review process for product candidates. The amount of future losses is uncertain. To achieve profitability, we must successfully develop product candidates, obtain regulatory approvals to market and commercialize product candidates, manufacture any approved product candidates on commercially reasonable terms, establish a sales and marketing organization or suitable third-party alternatives for any approved product and raise sufficient funds to finance our business activities. We may never succeed in these activities and, even if we do, may never generate revenues that are significant or large enough to achieve profitability. Even if we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would decrease the value of our company and could impair our ability to raise capital, maintain our research and development efforts, expand our business or continue our operations. A decline in the value of our company could also cause our shareholders to lose all or part of their investment.

We will require substantial additional funding, which may not be available on acceptable terms, or at all.

We have used substantial funds to develop our programs and PRISM, our proprietary discovery and drug development platform, and will require substantial funds to conduct further research and development, including preclinical studies and clinical trials of our product candidates, seek regulatory approvals for our product candidates and manufacture and market any products that are approved for commercial sale. We believe that our existing cash and cash equivalents will be sufficient to fund our operations for at least the next 12 months.

Our future capital requirements and the period for which we expect our existing resources to support our operations may vary significantly from what we expect. We do not expect to realize any appreciable revenue from product sales or royalties in the foreseeable future, if at all. Our revenue sources will remain extremely limited unless and until our product candidates complete clinical development and are approved for commercialization and successfully marketed. Because we cannot be certain of the length of time or activities associated with successful development and commercialization of our product candidates, we are unable to estimate the actual funds we will require to develop and commercialize them.

Our future capital requirements will depend on many factors, including, but not limited to, the following:

- our monthly spending levels, based on new and ongoing development and corporate activities;
- the scope, progress, results and costs of drug discovery, preclinical and clinical development for our product candidates;
- our ability to establish and maintain collaboration arrangements, and whether our collaboration partners decide to exercise option rights in connection with targets and development programs;

- the costs, timing and outcome of regulatory review of our product candidates;
- our ability to obtain marketing approval for our product candidates;
- the impacts of the COVID-19 global pandemic (and emerging or future variants of COVID-19) on our business;
- the achievement of milestones and other development targets that trigger payments under our agreements with our key collaboration partners, or any other strategic collaborations into which we may enter;
- the extent to which we are obligated to reimburse clinical trial costs or expenses and other costs and expenses associated with clinical activities under our agreements with our key collaboration partners, or any other future collaboration agreements, if any;
- the costs and timing of future commercialization activities, including manufacturing, marketing, sales and distribution, for any of our product candidates for which we receive marketing approval;
- market acceptance of our product candidates, to the extent any are approved for commercial sale, and the revenue, if any, received from commercial sales of our product candidates for which we receive marketing approval;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims;
- the costs of securing manufacturing arrangements internally or with third parties for drug supply.

To date, we have primarily financed our operations through sales of our securities and our collaborations with third parties. Through December 31, 2022, we have received an aggregate of approximately $1,021.2 million in net proceeds from these transactions, consisting of $630.9 million in net proceeds from public and other registered offerings of our ordinary shares, $301.0 million from our collaborations, exclusive of any potential future milestone and royalty payments, and $89.3 million in net proceeds from private placements of our debt and equity securities. Subsequent to December 31, 2022, we received $170.0 million in cash, of which $120.0 million was an upfront payment under the GSK Collaboration Agreement and $50.0 million was under the GSK Equity Investment.

On March 3, 2022, we filed a new universal shelf registration on Form S-3 with the SEC, which was declared effective by the SEC on May 4, 2022, pursuant to which we registered for sale up to $500.0 million of any combination of our ordinary shares, debt securities, warrants, rights and/or units from time to time and at prices and on terms that we may determine, which we refer to as the "2022 Form S-3." The 2022 Form S-3 includes a prospectus covering up to approximately $132.0 million in ordinary shares that had not yet been issued or sold under our Sales Agreement with Jefferies LLC ("Jefferies") for our "at-the-market" equity program. As of March 22, 2023, we have $430.0 million in securities available for issuance under the 2022 Form S-3, including approximately $132.0 million in ordinary shares available for issuance under our at-the-market equity program. As of March 22, 2023, we have received approximately $118.0 million in gross proceeds from our at-the-market equity program. We intend to seek additional funding in the future through collaborations, public or private equity offerings or debt financings, credit or loan facilities or a combination of one or more of these financing sources.

Our ability to raise additional funds will depend on financial, economic and other factors, many of which are beyond our control. We may seek access to the capital and credit markets for working capital, capital expenditure, and other business initiatives. The capital and credit markets have experienced extreme volatility and disruption, which may lead to uncertainty and liquidity issues for both borrowers and investors. In the event of adverse market conditions, or other factors, additional funds may not be available to us on acceptable terms or at all. For example, the global economy has been experiencing increasing interest rates and inflation, which could negatively impact our business and our ability to raise additional funds. If we raise additional funds by issuing equity or convertible debt securities, our shareholders will suffer dilution and the terms of any financing may adversely affect the rights of our shareholders. In addition, as a condition to providing additional funds to us, future investors may demand, and may be granted, rights superior to those of existing shareholders. Debt financing, if available, may involve restrictive covenants limiting our flexibility in conducting future business activities, and, in the event of insolvency, debt holders would be repaid before holders of equity securities received any distribution of corporate assets.

If we are unable to obtain funding on a timely basis or on acceptable terms, we may have to delay, limit or terminate our research and development programs and preclinical studies or clinical trials, limit strategic opportunities or undergo reductions in our workforce or other corporate restructuring activities. We also could be required to seek funds through arrangements with collaborators or others that may require us to relinquish rights to some of our product candidates or technologies that we would otherwise pursue on our own.

Our business may be impacted by macroeconomic conditions, including fears concerning the financial services industry, inflation, rising interest rates and volatile market conditions, and other uncertainties beyond our control.

Actual events involving limited liquidity, defaults, non-performance or other adverse developments that affect financial institutions, transactional counterparties or other companies in the financial services industry or the financial services industry generally, or

concerns or rumors about any events of these kinds or other similar risks, have in the past and may in the future lead to market-wide liquidity problems. For example, on March 10, 2023, Silicon Valley Bank failed and was taken into receivership by the Federal Deposit Insurance Corporation; on March 12, 2023, Signature Bank and Silvergate Capital Corp. were each swept into receivership;

the following week, a syndicate of U.S. banks infused $30 billion in First Republic Bank; and later that same week, the Swiss Central Bank provided $54 billion in covered loan and short-term liquidity facilities to Credit Suisse Group AG, all in an attempt to reassure depositors and calm fears of a banking contagion. Our ability to effectively run our business could be adversely affected by general conditions in the global economy and in the financial services industry. Various macroeconomic factors could adversely affect our business, including fears concerning the banking sector, changes in inflation, interest rates and overall economic conditions and uncertainties. A severe or prolonged economic downturn could result in a variety of risks, including our ability to raise additional funding on a timely basis or on acceptable terms. A weak or declining economy could also impact third parties upon whom we depend to run our business. Increasing concerns over bank failures and bailouts and their potential broader effects and potential systemic risk on the banking sector generally and on the biotechnology industry and its participants may adversely affect our access to capital and our business and operations more generally. Although we assess our banking relationships as we believe necessary or appropriate, our access to funding sources in amounts adequate to finance or capitalize our current and projected future business operations could be significantly impaired by factors that affect us, the financial institutions with which we have arrangements directly, or the financial services industry or economy in general

Our management has broad discretion over the use of proceeds received from sales of our securities and our collaborations with third parties and the proceeds may not be used effectively.

Our management has broad discretion as to the use of proceeds we receive from conducting sales of our securities and our collaborations with third parties and could use the proceeds for purposes other than those contemplated at the time of such transactions. It is also possible that the proceeds we have received, or may receive, from securities sales and collaborations will be invested in a way that does not yield a favorable, or any, return for us.

Our short operating history may make it difficult for shareholders to evaluate the success of our business to date and to assess our future viability.

We are a clinical-stage genetic medicines company with a limited operating history. We commenced active operations in 2012. Our operations to date have primarily included research and development activities, manufacturing, preclinical and clinical development, patient advocacy activities, business planning and raising capital. We have a robust and diverse pipeline of PN-modified, stereopure oligonucleotides, including programs using our editing, splicing, and silencing modalities. Our lead clinical programs are focused in, and aim to address, muscle diseases (DMD – splicing), hepatic diseases (AATD – editing), and CNS diseases (HD, ALS and FTD – silencing). We have not yet demonstrated our ability to successfully complete pivotal clinical trials, obtain marketing approvals, or conduct sales and marketing activities necessary for successful product commercialization. We have limited experience manufacturing our products at commercial scale or arranging for a third party to do so on our behalf. Typically, it takes many years to develop and commercialize a therapeutic from the time it is discovered to when it is available for treating patients. Further, drug development is a capital-intensive and highly speculative undertaking that involves a substantial degree of risk. You should consider our prospects in light of the costs, uncertainties, delays and difficulties frequently encountered by biotechnology companies in the early stages of clinical development, such as ours. Any predictions about our future success or viability may not be as accurate as they could be if we had a longer operating history or a history of successfully developing and commercializing pharmaceutical products.

We, or third parties upon whom we depend, may face risks related to health epidemics, including the COVID-19 pandemic and variants thereof, which may delay our ability to complete our ongoing clinical trials, initiate additional clinical trials, delay regulatory activities and have other adverse effects on our business and operations.

Since December 2019, multiple countries throughout the world and their economies, including the United States, have been subject to intermittent shutdowns and adversely affected by the COVID-19 global pandemic. We are continuing to evaluate any continued impacts from the global pandemic and the extent to which any responsive measures may materially and adversely affect our business operations and financial condition.

As a clinical-stage company with multiple programs and multiple clinical trials currently underway, the pandemic is impacting the execution of our clinical trials. We have clinical trial sites located in countries that have been affected by COVID-19 and variants thereof. Clinical site initiation and patient enrollment has been delayed due to prioritization of hospital resources in favor of COVID-19 patients and difficulties in recruiting clinical site investigators and clinical site staff. Some patients have not been able to travel or gain access to clinical trial sites due to local restrictions. Similarly, our ability to recruit and retain patients and principal investigators

and site staff who, as healthcare providers, may have heightened risk of exposure to COVID-19, has been negatively impacted, which has delayed the timelines of our clinical trial operations.

We rely upon third parties for many aspects of our business, including the raw materials used to make our product candidates and the conduct of our clinical trials and preclinical studies. While we have built up inventory to assist us through this uncertain operating environment, our suppliers may be disrupted now or in the future, which may affect our ability to procure items that are essential for our research and development activities and may cause pricing increases, inflation, and significant disruptions to our business.

The COVID-19 global pandemic, including any emerging variants of COVID-19, is continuing to evolve and is subject to change. While we have adapted our processes to lessen the impact that COVID-19, and variants thereof, may have on our business, any potential delays or long-term impacts on our business, our clinical trials, healthcare systems or the global economy are highly uncertain. These effects may materially adversely affect our business, financial condition, results of operations, and prospects.

Risks Related to the Discovery, Manufacturing, Development and Commercialization of Our Product Candidates

The approach we are taking to discover and develop oligonucleotides is novel and may never lead to marketable products.

We have concentrated our efforts and research and development activities on oligonucleotides and enhancing PRISM, our proprietary discovery and drug development platform. PRISM enables us to target genetically defined diseases with stereopure oligonucleotides across multiple therapeutic modalities. Our future success depends on the successful development of stereopure oligonucleotides and the effectiveness of PRISM. The scientific discoveries that form the basis for our efforts to discover and develop new product candidates, including our discoveries about the relationships between oligonucleotide stereochemistry and pharmacology, are relatively new. We use PRISM to screen candidates and optimize pharmacologic profiles based on predefined design principles, which reflect a deep understanding of how the interplay among oligonucleotide sequence, chemistry and backbone stereochemistry impacts key pharmacological properties. The scientific evidence to support the feasibility of developing medicines based on these discoveries is limited. Skepticism as to the feasibility of developing oligonucleotides generally has been, and may continue to be, expressed in scientific literature. In addition, decisions by other companies with respect to their oligonucleotide development efforts may increase skepticism in the marketplace regarding the potential for oligonucleotides.

A number of clinical trials for oligonucleotide products conducted by other companies have not been successful, but some have received regulatory approval. The pharmacological properties ascribed to the investigational compounds we are testing in laboratory studies may not be positively demonstrated in clinical trials in patients, and they may interact with human biological systems in unforeseen, ineffective or harmful ways. If our product candidates prove to be ineffective, unsafe or commercially unviable, PRISM and our pipeline would have little, if any, value, which would substantially harm our business, financial condition, results of operations and prospects. In addition, our approach, which focuses on using oligonucleotides for drug development, as opposed to multiple or other, more advanced proven technologies, and new products and technologies that may enter the market, may expose us to additional financial risks and make it more difficult to raise additional capital if we are not successful in developing one or more oligonucleotides that receive regulatory approval.

Because we are developing oligonucleotides, which are considered a relatively new class of drugs, there is increased risk that the outcome of our clinical trials will not be sufficient to obtain regulatory approval.

The FDA and comparable ex-U.S. regulatory agencies have relatively limited experience with oligonucleotides, which may increase the complexity, uncertainty and length of the regulatory review process for our product candidates. To date, the FDA has approved 15 oligonucleotides for marketing and commercialization. Even though the FDA issued in December 2021 two draft guidance documents relating to IND submissions for individualized antisense oligonucleotide drugs for severely debilitating or life-threatening genetic diseases, one with clinical focus, the other with chemistry manufacturing and controls focus, and in June 2022 a draft guidance on clinical pharmacology considerations for the development of oligonucleotide therapeutics, the FDA and its foreign counterparts have not yet established any definitive policies, practices or guidelines in relation to overall development considerations for oligonucleotide drugs. The general lack of policies, practices or guidelines specific to oligonucleotides may hinder or slow review by the FDA or other foreign homologues of any regulatory filings that we may submit. Moreover, the FDA or other foreign homologues may respond to these submissions by defining requirements we may not have anticipated. Addressing such requirements could lead to significant delays in the development of our product candidates. In addition, because there may be approved treatments for some of the diseases for which we may seek approval, in order to receive regulatory approval, we may need to demonstrate through clinical trials that the product candidates we develop to treat these diseases, if any, are not only safe and effective, but safer or more effective than existing products. Furthermore, in recent years, there has been increased public and political pressure on the FDA with respect to the approval process for new drugs. As a result of the foregoing factors, we may never receive regulatory approval to market and commercialize any product candidate.

Even if we obtain regulatory approval, the approval may be for disease indications or patient populations that are not as broad as we intended or desired or may require labeling that includes significant use or distribution restrictions or safety warnings. We may be

required to perform additional or unanticipated clinical trials to obtain regulatory approval or be subject to additional post-marketing studies or other requirements to maintain such approval. As a result, we may never succeed in developing a marketable product, we may not become profitable and the value of our ordinary shares could decline.

Our preclinical studies and clinical trials may not be successful. If we are unable to commercialize our product candidates or experience significant delays in doing so, our business will be materially harmed.

We have a robust and diverse pipeline of PN-modified, stereopure oligonucleotides, including programs using our editing, splicing, and silencing modalities. Our lead clinical programs are focused in, and aim to address, muscle diseases (DMD – splicing), hepatic diseases (AATD – editing), and CNS diseases (HD, ALS and FTD – silencing).

However, we currently have no products on the market. We have invested a significant portion of our efforts and financial resources in the identification and preclinical and clinical development of our oligonucleotides, the development of PRISM, including our ADAR editing capability, and our novel PN backbone chemistry modifications, and the continued growth of our manufacturing capabilities. Our ability to generate product revenue, which we do not expect will occur for many years, if ever, will depend heavily on the successful development, regulatory approvals, and eventual commercialization of our product candidates. Our success will depend on several factors, including the following:

- successfully completing preclinical studies and clinical trials;
- successfully conducting process development and manufacturing campaigns in accordance with cGMP;
- receiving regulatory approvals from applicable regulatory authorities to market our product candidates and, to the extent necessary, our companion diagnostic tests;
- establishing commercial manufacturing capabilities or making arrangements with third party CMOs;
- obtaining and maintaining patent and trade secret protection and regulatory exclusivity for our product candidates;
- the degree to which we are successful in our current collaborations, and any additional collaborations we may establish;
- launching commercial sales of the products, if and when approved, whether alone or in collaboration with others;
- acceptance of the products, if and when approved, by patients, the medical community and third-party payors;
- effectively competing with other therapies;
- continuing to maintain an acceptable safety and efficacy profile of the products following regulatory approval; and
- appropriately addressing the post-marketing requirements and/or commitments made upon regulatory approval.

If we do not achieve one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize our product candidates, which would materially harm our business.

We may not be able to conduct clinical trials successfully due to various process-related factors that could negatively impact our business plans.

The successful initiation and completion of any of our clinical trials, within timeframes consistent with our business plans, is dependent on various factors, which include, but are not limited to, our ability to:

- retain and recruit employees, contractors or consultants with the required level of knowledge and experience;
- retain and recruit in a timely manner a sufficient number of patients necessary to conduct a clinical trial, which is a function of many factors, including the impact of the COVID-19 global pandemic, the proximity of participants to clinical sites, the size of the relevant population, the eligibility criteria for the trial, possible adverse effects from treatments, the existence of competing clinical trials, the involvement of patient advocacy groups, the availability of new or alternative treatments, lack of efficacy, personnel issues and ease of participation in our clinical trials;
- manage the impact of the COVID-19 pandemic on our early-stage discovery efforts and clinical trials;
- open study sites, and enroll, treat, and monitor patients due to local restrictions implemented in response to the COVID-19 or other global health pandemics;
- develop companion diagnostic tests for use with certain of our product candidates or identify partners with such expertise;
- manufacture and maintain a sufficient amount of clinical material, internally or through third parties;

- ensure adherence to trial designs and protocols agreed upon and approved by regulatory authorities and applicable regulatory and legal guidelines;
- apply the appropriate pharmacovigilance measures in case of adverse effects emerging during a clinical trial;
- execute clinical trial designs and protocols approved by regulatory authorities without deficiencies;
- timely and effectively contract with (under reasonable terms), manage and work with investigators, institutions, hospitals and the contract research organizations ("CROs") involved in the clinical trial;
- negotiate contracts and other related documents with clinical trial parties and institutional review boards ("IRBs"), CRO agreements and site agreements, which can be subject to extensive negotiations that could cause significant delays in the clinical trial process, with terms possibly varying significantly among different trial sites and CROs and possibly subjecting us to various risks; and
- conduct clinical trials in a cost-effective manner, including management of foreign currency risk in clinical trials conducted in foreign jurisdictions and cost increases due to unforeseen or unexpected complications such as enrollment delays, or needing to outsource certain functions during the clinical trial.

If we are not able to manage the clinical trial process successfully, our business plans could be delayed or be rendered unfeasible for us to execute within our planned or required time frames, or at all.

If we cannot successfully manufacture our product candidates for our research and development and preclinical activities, or manufacture sufficient amounts of our product candidates to meet our clinical requirements and timelines, our business may be materially harmed.

In order to develop our product candidates, apply for regulatory approvals and commercialize our product candidates, we will need to develop, contract for, or otherwise arrange for the necessary manufacturing capabilities. In September 2016, we entered into a lease for a multi-use facility of approximately 90,000 square feet in Lexington, Massachusetts to provide internal cGMP manufacturing capabilities and increase control and visibility of our drug substance supply chain, and we began cGMP manufacturing in this facility at the beginning of 2018. This facility supplements our existing Cambridge, Massachusetts laboratory and office space headquarters, enhances our ability to secure drug substance for current and future development activities and may provide commercial-scale manufacturing capabilities. However, while we have established and continue to enhance our internal cGMP manufacturing capabilities, we have limited experience manufacturing drug substance on a commercial scale, and we will incur significant costs to develop this expertise internally.

In addition to the oligonucleotides that we manufacture internally, we may utilize CMOs to manufacture the oligonucleotides required for our preclinical studies and clinical trials. There are a limited number of manufacturers that supply oligonucleotides. There are risks inherent in pharmaceutical manufacturing that could affect our ability or the ability of our CMOs to meet our delivery time requirements or provide adequate amounts of material to meet our clinical trial demands on our projected timelines. Included in these risks are potential synthesis and purification failures and/or contamination during the manufacturing process, as well as other issues with our facility or the CMOs' facilities and ability to comply with the applicable manufacturing requirements and quality standards, which could result in unusable product and cause delays in our manufacturing timelines and ultimately delay our clinical trials, as well as result in additional expense to us. To manufacture our oligonucleotides, we rely on third parties to supply the required raw materials. We will likely need to secure alternative suppliers for these raw materials, and such alternative suppliers are limited and may not be readily available, or we may be unable to enter into agreements with them on reasonable terms and in a timely manner. For example, we source certain materials used in the manufacture of our products from China and other countries outside of the United States; the coronavirus outbreak or other similar global disruptions has made access to our existing supply chain difficult and further supply chain disruptions could impact our business. Additionally, our cost of goods development is at an early stage. The actual cost to manufacture and process our product candidates could be greater than we expect and could materially and adversely affect the commercial viability of our product candidates.

The process of manufacturing oligonucleotides is complex and we may encounter difficulties in production, particularly with respect to process development or scaling-up of our manufacturing capabilities.

The process of manufacturing oligonucleotides is complex, highly-regulated and subject to multiple risks. The complex processes associated with the manufacture of our product candidates expose us to various manufacturing challenges and risks, which may include delays in manufacturing adequate supply of our product candidates, limits on our ability to increase manufacturing capacity, and the potential for product failure and product variation in quality that may interfere with preclinical studies and clinical trials, along with additional costs. We also may make changes to our manufacturing process at various points during development, and even after commercialization, for various reasons, such as optimizing costs, achieving scale, decreasing processing time, increasing

manufacturing success rate, or other reasons. Such changes carry the risk that they will not achieve their intended objectives, and any of these changes could cause our product candidates to perform differently and affect the results of current or future clinical trials, or the performance of the product, once commercialized. In some circumstances, changes in the manufacturing process may require us to perform *ex vivo* comparability studies, and/or conduct animal studies, and to collect additional data from patients prior to undertaking more advanced clinical trials. For instance, changes in our process during the course of clinical development may require us to show the comparability of the product used in earlier clinical trials or at earlier portions of a trial to the product used in later clinical trials or later portions of the trial. We may also make further changes to our manufacturing process before or after commercialization, and such changes may require us to show the comparability of the resulting product to the product produced via earlier manufacturing processes and supplied in clinical studies. We may be required to collect additional preclinical and/or clinical data from any modified process prior to obtaining marketing approval for the product candidate produced with such modified process. If preclinical and/or clinical data are not ultimately comparable to those seen in the earlier trials, we may be required to make further changes to our process and/or undertake additional clinical testing, either of which could significantly delay the clinical development or commercialization of the associated product candidate.

We have a robust and diverse pipeline of PN-modified, stereopure oligonucleotides, including programs using our editing, splicing, and silencing modalities. Our lead clinical programs are focused in, and aim to address, muscle diseases (DMD – splicing), hepatic diseases (AATD – editing), and CNS diseases (HD, ALS and FTD – silencing). Although we continue to build on our experience in manufacturing oligonucleotides, we have limited experience as a company manufacturing product candidates for commercial supply. We may never be successful in manufacturing product candidates in sufficient quantities or with sufficient quality for commercial use. Our manufacturing capabilities could be affected by cost-overruns, unexpected delays, equipment failures, labor shortages, operator error, natural disasters, unavailability of qualified personnel, difficulties with logistics and shipping, problems regarding yields or stability of product, contamination or other quality control issues, power failures, and numerous other factors that could prevent us from realizing the intended benefits of our manufacturing strategy and have a material adverse effect on our business.

Furthermore, compliance with cGMP requirements and other quality issues may arise during our internal efforts to scale-up manufacturing, and with our current or any future CMOs. If contaminants are discovered in our supply of our product candidates or in our manufacturing facilities or those of our CMOs, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination. We cannot assure you that any stability failures or other issues relating to the manufacture of our product candidates will not occur in the future. Additionally, we and our CMOs may experience manufacturing difficulties due to resource constraints or as a result of labor disputes or unstable political environments. If we or our CMOs were to encounter any of these difficulties, our ability to provide our product candidate to patients in clinical trials, or to provide product for treatment of patients once approved, would be jeopardized.

We may expend our limited resources to pursue a particular product candidate or indication and fail to capitalize on product candidates or indications that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial resources, we intend to focus on developing product candidates for specific indications that we identify as most likely to succeed, in terms of both regulatory approval and commercialization. As a result, we may forego or delay pursuit of opportunities with other product candidates or for other indications that may prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate.

Any product candidates we develop may fail in preclinical or clinical development or be delayed to a point where they do not become commercially viable.

Before obtaining regulatory approval for the commercial distribution of any of our product candidates, we must conduct, at our own expense, extensive preclinical studies and clinical trials to demonstrate the safety and efficacy in humans of our product candidates. Preclinical and clinical testing are expensive, difficult to design and implement, can take many years to complete, are uncertain as to outcome, and the historical failure rate for drugs in preclinical and clinical development is high. For example, we depend on the availability of non-human primates to conduct certain preclinical studies. Over the past several years there has been an increasing global shortage of non-human primates available for drug development that has matured into an acute global supply chain issue. The supply of these non-human primates is currently constrained due to factors such as their limited worldwide availability, domestic regulatory restrictions and trade relations. If we are unable to obtain access to a sufficient supply of these non-human primates in a timely manner or at all, our timelines and our ability to complete preclinical testing and submit CTA applications may be adversely affected.

We, the FDA or comparable foreign regulatory authorities or an IRB, or similar foreign review board or ethics committee, may suspend clinical trials of a product candidate at any time for various reasons, including if we or they believe the healthy volunteer subjects or patients participating in such trials are being exposed to unacceptable health risks. Among other reasons, unacceptable side effects or other more serious adverse events of a product candidate in healthy volunteer subjects or patients in a clinical trial could result in the FDA or comparable foreign regulatory authorities suspending or terminating the trial and refusing to approve a particular product candidate for any or all indications of use.

Clinical trials also require the review, oversight and approval of IRBs or ethics committees, which review the clinical protocols and informed consent form for investigations that will be conducted at their institutions in order to protect the rights and welfare of human subjects. Inability to obtain or delay in obtaining IRB approval can prevent or delay the initiation and completion of clinical trials at particular sites. Furthermore, failure to provide information to the IRB and relevant regulatory authorities, as required throughout the study, such as emergent safety reports and annual updates, may result in suspension of the approval of the trial. Our product candidates may encounter problems during clinical trials that will cause us or regulatory authorities to delay, suspend or terminate these trials, or that will delay or confound the analysis of data from these trials. If we experience any such problems, we may not have the financial resources to continue development of the product candidate that is affected or any of our other product candidates. We may also lose, or be unable to enter into, collaborative arrangements for the affected product candidate and for other product candidates we are developing. The development of one or more of our product candidates can fail at any stage of testing. We may experience numerous unforeseen events during, or as a result of, preclinical studies and clinical trials that could delay or prevent regulatory approval or our ability to commercialize our product candidates, including:

- our preclinical studies or clinical trials may produce negative or inconclusive results, including results that may not meet the level of significance or clinical benefit required by the FDA or other regulators, and we may decide, or regulators may require us, to conduct additional preclinical studies or clinical trials, or we may abandon projects that we had expected to be promising;
- delays in filing clinical trial applications or comparable foreign applications or delays or failure in obtaining the necessary approvals from regulators or IRBs in order to commence a clinical trial at a prospective trial site, or their suspension or termination of a clinical trial once commenced;
- conditions imposed on us by the FDA or comparable foreign authorities regarding the scope or design of our clinical trials;
- divergent views between FDA and other homologue regulatory authorities as to the objectives and/or design of the clinical trials required in support of marketing registration;
- problems in obtaining or maintaining IRB approval of trials;
- delays in enrolling patients or volunteers into clinical trials, and variability in the number and types of patients eligible for clinical trials;
- delays in developing and receiving regulatory approval for companion diagnostic tests, to the extent such tests are needed, to identify patients for our clinical trials;
- high drop-out rates for patients in clinical trials and substantial missing data;
- an inability to open study sites, or enroll, treat, and monitor patients due to local restrictions implemented in response to COVID-19 (emerging or future variants of COVID-19) or other global health pandemics;
- negative or inconclusive results from our clinical trials or the clinical trials of others for product candidates similar to ours;
- results from future clinical trials may not confirm positive results, if any, from earlier preclinical studies and clinical trials;
- inability to consistently manufacture, inadequate supply, or unacceptable quality of product candidate materials or other materials necessary for the conduct of our clinical trials;
- greater than anticipated clinical trial costs;
- serious and unexpected side effects that may or may not be related to the product candidate being tested that are experienced by participants in our clinical trials or by individuals using drugs similar to our product candidates;
- poor or disappointing effectiveness of our product candidates during clinical trials;
- unfavorable outcome of FDA or other regulatory agency inspection and review of a manufacturing or clinical trial site or other records relating to the clinical investigation;
- failure of our third-party contractors, investigators, or collaboration partners to comply with regulatory requirements or otherwise meet their contractual obligations in a timely manner, or at all;

- governmental or regulatory delays and changes in regulatory requirements, policy and guidelines, including the imposition of additional regulatory oversight around manufacturing, preclinical, or clinical testing generally or with respect to our product candidates class, in particular; or
- varying interpretations of data by the FDA and similar foreign regulatory agencies.

If we do not successfully conduct clinical development, we will not be able to market and sell products derived from our product candidates and to generate product revenues. Even if we do successfully complete clinical trials, those results are not necessarily predictive of results of additional trials that may be needed before we can submit an application for regulatory approval to the FDA or foreign regulatory agencies. If the development of any of our product candidates fails or is delayed to a point where such product candidate is no longer commercially viable, our business may be materially harmed.

Results of preclinical studies and early clinical trials may not be predictive of results of future clinical trials.

The results from preclinical studies or early clinical trials of a product candidate may not predict the results that will be obtained in subsequent subjects or in subsequent clinical trials of that product candidate or any other product candidate. The design of a clinical trial can determine whether its results will support approval of a product candidate and flaws in the design of a clinical trial may not become apparent until the clinical trial is well advanced. In addition, preclinical and clinical data are often susceptible to varying interpretations and analyses. Product candidates that seemingly perform satisfactorily in preclinical studies may nonetheless fail to reach late development stages or obtain regulatory approval for marketing. For example, our preclinical studies for suvodirsen yielded positive results. However, in December 2019, the interim analysis of the Phase 1 open-label extension (OLE) study of suvodirsen for patients with DMD showed no change from baseline in dystrophin expression and resulted in our discontinuation of the suvodirsen program. There is a high failure rate for drugs proceeding through clinical trials. A number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in clinical development even after achieving promising results in earlier studies, and any such setbacks in our clinical development could negatively affect our business and operating results.

If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary regulatory approvals could be delayed or prevented.

Clinical trials of a new product candidate require the enrollment of a sufficient number of patients, including patients who are suffering from the disease the product candidate is intended to treat and who meet other eligibility criteria. Rates of patient enrollment are affected by many factors, including the COVID-19 global pandemic or emerging or future variants of COVID-19, the size of the patient population, the age and condition of the patients, the stage and severity of disease, the nature and requirements of the protocol, the proximity of patients to clinical sites, the availability of effective treatments for the relevant disease, and the eligibility criteria for the clinical trial. Delays or difficulties in patient enrollment or difficulties retaining trial participants, including as a result of the availability of existing or other investigational treatments, can result in increased costs, longer development times or termination of a clinical trial.

In addition, our success may depend, in part, on our ability to identify patients who qualify for our clinical trials, or are likely to benefit from any medicines that we may develop, which will require those potential patients to undergo a screening assay, which we also refer to as a companion diagnostic test, for the presence or absence of a particular genetic sequence. For example, in HD, we are conducting a clinical trial for WVE-003, which targets a SNP associated with the mutant allele of the *HTT* gene. Approximately 40% of the HD patient population carry this SNP. We have developed a novel screening assay that is intended to identify whether a patient has the particular SNP that our product candidate is targeting, and partnered with a third party for testing in future trials. If we, or any third parties that we engage to assist us are unable to successfully identify patients with the appropriate SNP that we are targeting, the percentage of patients with the SNP we are targeting is lower than expected, or we experience delays in testing, we may not realize the full commercial potential of any product candidates we develop.

If we are unable to successfully develop or obtain regulatory approval for companion diagnostic tests for our product candidates, or experience significant delays in doing so, our clinical trials may be delayed and our business could be materially harmed.

The development programs for some of our product candidates contemplate the development of companion diagnostic tests, which are assays or tests to identify an appropriate patient population. The success of certain of our product candidates will depend on several factors, including the successful development of, and ability to obtain regulatory approval for, companion diagnostic tests that will be used to screen and identify the right patients for our product candidates. Our goal is to develop and commercialize disease-modifying medicines for genetically defined diseases with a high degree of unmet medical need, and to become a fully integrated genetic medicines company. The target patient populations for several of our product candidates are relatively small, and it will be difficult to successfully identify the appropriate patients for whom our product candidates are being designed without performant, fit-for-purpose, accessible, relatively inexpensive, and easy-to-use companion diagnostic tests.

Companion diagnostic tests are subject to regulation by the FDA and similar regulatory authorities outside the United States as medical devices, often *in vitro* devices, and require separate regulatory authorization prior to commercialization. We are not a medical device company, and we have limited experience developing medical devices. A more detailed description of the FDA approval process for companion diagnostic tests is included under "Business – Government Regulation – In Vitro Diagnostic Tests for Biomarkers." Given our limited experience in developing and commercializing companion diagnostic tests, we may seek to collaborate with third parties to assist us in the design, manufacture, regulatory authorization and commercialization of the companion diagnostic tests for some of our product candidates. In November 2019, we entered into a collaboration with Asuragen, Inc. ("Asuragen") for the development and commercialization of companion diagnostics for our allele-selective product candidate in HD. We, Asuragen and other potential collaborators may encounter difficulties in developing and obtaining approval for the companion diagnostic tests, including issues relating to sensitivity/specificity, analytical validation, reproducibility, or clinical validation. Any delay or failure by us or our collaborators to develop or obtain regulatory authorization of the relevant companion diagnostic tests could delay or prevent approval of our product candidates. If we, Asuragen or any other third parties that we engage to assist us, are unable to successfully develop, validate, and commercialize companion diagnostic tests for our drug candidates, or experience delays in doing so, our clinical trials and our business could be materially harmed.

We may be unable to obtain regulatory approval in the United States or foreign jurisdictions and, as a result, be unable to commercialize our product candidates and our ability to generate revenue will be materially impaired.

Our product candidates are subject to extensive governmental regulations relating to, among other things, research, testing, development, manufacturing, quality, safety, efficacy, approval, recordkeeping, reporting, labeling, storage, packaging, advertising and promotion, pricing, marketing and distribution of drugs. Rigorous preclinical studies and clinical trials, and an extensive regulatory approval process are required to be successfully completed in the United States and in many foreign jurisdictions before a new drug can be marketed. Satisfaction of these and other regulatory requirements is costly, time consuming, uncertain, and subject to a continuously evolving regulatory environment and unanticipated delays. It is possible that none of the product candidates we may develop will obtain the regulatory approvals necessary for us or our collaborators to begin selling them.

The time required to obtain FDA and other approvals is unpredictable but typically takes many years following the commencement of clinical trials, depending upon the type, complexity and novelty of the product candidate. The standards that the FDA and its foreign counterparts use when regulating companies such as ours are not always applied predictably or uniformly and can change. Any analysis we perform of data from chemistry, manufacturing and controls, preclinical and clinical activities is subject to confirmation and interpretation by regulatory authorities, which could delay, limit or prevent regulatory approval. We may also encounter unexpected delays or increased costs due to new government regulations, for example, from future legislation or administrative action, or from changes in FDA policy during the period of product development, clinical trials and FDA regulatory review. It is impossible to predict whether legislative changes will be enacted, or whether FDA or foreign regulations, guidance or interpretations will be changed, or what the impact of such changes, if any, may be.

Any delay or failure in obtaining required approvals could adversely affect our ability to generate revenues from the particular product candidate for which we are seeking approval. Furthermore, any regulatory approval to market a product may be subject to limitations on the approved uses for which we may market the product or the labeling or other restrictions. In addition, the FDA has the authority to require a Risk Evaluation and Mitigation Strategy ("REMS"), as a condition of approval, which may impose further requirements or restrictions on the distribution or safe use of an approved drug, such as limiting prescribing rights to certain physicians or medical centers that have undergone specialized training, limiting treatment to patients as specially defined by the indication statement or who meet certain safe-use criteria, and requiring treated patients to enroll in a registry, among other requirements. These limitations and restrictions may limit the size of the market for the product and affect reimbursement by third-party payors.

We are also subject to numerous foreign regulatory requirements governing, among other things, the conduct of clinical trials, manufacturing and marketing authorization, pricing and payment. The foreign regulatory approval process varies among countries and may include all of the risks associated with FDA approval described above, as well as risks attributable to the satisfaction of local regulations in foreign jurisdictions. Approval by the FDA does not ensure approval by comparable regulatory authorities outside of the United States and vice versa.

If we are granted orphan drug designations in the United States for any of our product candidates, there can be no guarantee that we will maintain orphan status for these product candidates or receive approval for any product candidate with an orphan drug designation.

Subject to receiving approval from the FDA of an NDA or Biologics License Application ("BLA"), products granted orphan drug designation are provided with seven years of orphan marketing exclusivity in the United States, meaning the FDA generally will not approve applications for other product candidates for the same orphan indication that contain the same active ingredient.

We are not guaranteed to maintain or receive orphan designation for our current or future product candidates, and if our product candidates that were granted orphan designation were to lose their status as an orphan drug or the orphan marketing exclusivity provided to it in the United States, our business and results of operations could be materially adversely affected. While orphan status for any of our products, if granted or maintained, would provide market exclusivity in the United States for the time periods specified above, we would not be able to exclude other companies from manufacturing and/or selling products using the same active ingredient for the same indication beyond the exclusivity period applicable to our product on the sole basis of orphan drug status. In addition, orphan exclusivity does not block the approval of a different drug or biologic for the same rare disease or condition, nor does it block the approval of the same drug or biologic for different conditions. Even if we are the first to obtain approval of an orphan product candidate and are granted exclusivity in the United States, there are circumstances under which a later competitor product may be approved for the same indication during the period of marketing exclusivity, such as if the later product is shown to be clinically superior to our product or if we are not able to provide a sufficient quantity of the orphan drug.

Even if we obtain regulatory approvals, our marketed drugs will be subject to ongoing regulatory oversight. If we fail to comply with continuing U.S. and foreign requirements, our approvals, if obtained, could be limited or withdrawn, we could be subject to other penalties, and our business would be seriously harmed.

Following any initial regulatory approval of any drugs we may develop, we will also be subject to continuing regulatory oversight, including the review of adverse drug experiences and safety data that are reported after our drug products are made commercially available. This would include results from any post-marketing studies or surveillance to monitor the safety and efficacy of the drug product required as a condition of approval or agreed to by us. Any regulatory approvals that we receive for our product candidates may also be subject to limitations on the approved uses for which the product may be marketed. Other ongoing regulatory requirements include, among other things, submissions of safety and other post-marketing information and reports, registration and listing, as well as continued maintenance of our marketing application, compliance with cGMP requirements and quality oversight, compliance with post-marketing commitments, and compliance with GCP for any clinical trials that we conduct post-approval. Failure to comply with these requirements could result in warning or untitled letters, criminal or civil penalties, recalls, or product withdrawals. In addition, we are conducting our clinical trials and we intend to seek approval to market our product candidates in jurisdictions outside of the United States, and therefore will be subject to, and must comply with, regulatory requirements in those jurisdictions.

The FDA has significant post-market authority, including, for example, the authority to require labeling changes based on new safety information and to require post-market studies or clinical trials for a variety of reasons. The FDA also has the authority to require a REMS plan after approval, which may impose further requirements or restrictions on the distribution or use of an approved drug.

We, our CMOs, and the manufacturing facilities we use to make our product candidates will also be subject to ongoing assessment of product quality, compliance with cGMP, and periodic inspection by the FDA and potentially other regulatory agencies. We or our CMOs may not be able to comply with applicable cGMP regulations or similar regulatory requirements outside of the United States. Our failure, or the failure of our CMOs, to comply with applicable regulations could result in regulatory actions, such as the issuance of FDA Form 483 notices of observations, warning letters or sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or drugs, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products. We may not have the ability or capacity to manufacture material at a broader commercial scale in the future. We and our CMOs currently manufacture a limited supply of clinical trial materials. Reliance on CMOs entails risks to which we would not be subject if we manufactured all of our material ourselves, including reliance on the CMO for regulatory compliance. Our product promotion and advertising will also be subject to regulatory requirements and continuing regulatory review.

If we or our collaborators, manufacturers or service providers fail to comply with applicable continuing regulatory requirements in the United States or foreign jurisdictions in which we may seek to market our products, we or they may be subject to, among other things, fines, warning letters, holds on clinical trials, refusal by the FDA or comparable foreign regulatory authorities to approve pending applications or supplements to approved applications, suspension or withdrawal of regulatory approval, product recalls and seizures, refusal to permit the import or export of products, operating restrictions, injunction, consent decree, civil penalties and criminal prosecution.

Even if we receive regulatory approval to market our product candidates, the market may not be receptive to our product candidates upon their commercial introduction, which will prevent us from becoming profitable.

Our product candidates are based upon new discoveries, technologies and therapeutic approaches. Key participants in pharmaceutical marketplaces, such as physicians, third-party payors and consumers, may not adopt a product intended to improve therapeutic results that is based on the technology employed by oligonucleotides. As a result, it may be more difficult for us to convince the medical community and third-party payors to accept and use our product, or to provide favorable reimbursement.

Other factors that we believe will materially affect market acceptance of our product candidates include:

- the timing of our receipt of any regulatory approvals, the terms of any approvals and the countries in which approvals are obtained;
- the ability to consistently manufacture our products within acceptable quality standards;
- the safety and efficacy of our product candidates, as demonstrated in clinical trials and as compared with alternative treatments, if any;
- the incidence, seriousness and severity of any side effects;
- the relative convenience and ease of administration of our product candidates;
- the willingness of patients to accept potentially new routes of administration and their risk tolerance as it relates to potentially serious side effects;
- the success of our physician education programs;
- the availability of government and third-party payer coverage and adequate reimbursement;
- the pricing of our products, particularly as compared to alternative treatments; and
- the availability of alternative effective treatments for the diseases that product candidates we develop are intended to treat and the relative risks, benefits and costs of those treatments.

In addition, our estimates regarding the potential market size may be materially different from what we currently expect at the time we commence commercialization, which could result in significant changes in our business plan and may significantly harm our results of operations and financial condition.

The pharmaceutical industry is intensely competitive. If we are unable to compete effectively with existing drugs, new treatment methods and new technologies, we may be unable to commercialize successfully any drugs that we develop.

The pharmaceutical industry is intensely competitive and rapidly changing. Many large pharmaceutical and biotechnology companies, academic institutions, governmental agencies and other public and private research organizations are pursuing the development of novel drugs for the same diseases that we are targeting or expect to target. Many of our competitors have:

- much greater financial, technical and human resources than we have at every stage of the discovery, development, manufacture and commercialization of products;
- more extensive experience in designing and conducting preclinical studies and clinical trials, obtaining regulatory approvals, and manufacturing, marketing and selling pharmaceutical products;
- product candidates that are based on previously tested or accepted technologies;
- products that have been approved or are in late stages of development; and
- collaborative arrangements in our target markets with leading companies and research institutions.

We will face intense competition from drugs that have already been approved and accepted by the medical community for the treatment of the conditions for which we may develop drugs. We also expect to face competition from new drugs that enter the market. We believe a significant number of drugs are currently under development, and may become commercially available in the future, for the treatment of conditions that our current or future product candidates are or may be designed to treat. These drugs may be more effective, safer, less expensive, or marketed and sold more effectively, than any products we develop.

Our competitors may develop or commercialize products with significant advantages over any products we are able to develop and commercialize based on many different factors, including:

- the safety and effectiveness of our products relative to alternative therapies, if any;
- the ease with which our products can be administered and the extent to which patients accept relatively new routes of administration;
- the timing and scope of regulatory approvals for these products;
- the availability and cost of manufacturing, marketing and sales capabilities;

- price;
- more extensive coverage and higher levels of reimbursement; and
- patent position.

Our competitors may therefore be more successful in commercializing their products than we are, which could adversely affect our competitive position and business. Competitive products may make any products we develop obsolete or noncompetitive before we can recover the expenses of developing and commercializing our product candidates. Such competitors could also recruit our employees, which could negatively impact our level of expertise and our ability to execute on our business plan.

If we or our collaborators, manufacturers, service providers or other third parties fail to comply with applicable healthcare laws and regulations, we or they could be subject to enforcement actions, which could affect our ability to develop, market and sell our products and may harm our reputation.

We are currently, or may in the future, be subject to federal, state, local, and comparable foreign healthcare laws and regulations relating to areas such as fraud and abuse and patients' rights. These laws may constrain the business or financial arrangements and relationships through which we conduct our operations, including how we research, market, sell and distribute our products for which we obtain marketing approval. These laws and regulations include:

- the U.S. federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward, or in return for, either the referral of an individual for a healthcare item or service, or the purchasing, recommending, or ordering of an item or service, for which payment may be made under a federal healthcare program such as Medicare or Medicaid;
- the U.S. federal false claims and civil monetary penalties laws, including the False Claims Act, which prohibits, among other things, individuals or entities from knowingly presenting or causing to be presented, claims for payment by government-funded programs such as Medicare or Medicaid that are false or fraudulent, or making a false statement to avoid, decrease, or conceal an obligation to pay money to the federal government;
- the U.S. federal Health Insurance Portability and Accountability Act ("HIPAA"), which, among other things, criminalizes a wide array of conduct involving public and private healthcare benefits, creates new civil enforcement mechanisms and increases civil and criminal penalties for healthcare fraud;
- HIPAA as amended by the Health Information Technology for Economic and Clinical Health ("HITECH") Act, and its implementing regulations, which strengthen and expand requirements relating to the privacy, security, and transmission of individually identifiable health information; and require notification to affected individuals and regulatory authorities of certain breaches of security of individually identifiable health information;
- the U.S. federal Physician Payments Sunshine Act, which requires certain manufacturers of medical devices, biological products, medical supplies, and drugs for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, to report annually to the Centers for Medicare and Medicaid Services ("CMS") all transfers of value, including consulting fees, travel reimbursements, research grants, and other payments or gifts with values over $10 made to physicians, certain advanced non-physician health care practitioners, or teaching hospitals and requires applicable manufacturers and applicable group purchasing organizations to report annually to CMS ownership and investment interests held by physicians and their immediate family members. Disclosure of such information is made by CMS on a publicly available website; and
- state and foreign laws comparable to each of the above federal laws, such as, for example: state anti-kickback and false claims laws applicable to commercial insurers and other non-federal payors; state laws that require pharmaceutical manufacturers to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government; state laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; and state and foreign laws governing the privacy and security of health information, some which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

If our operations are found to be in violation of any such requirements, we may be subject to penalties, including civil or criminal penalties, criminal prosecution, monetary damages, the curtailment or restructuring of our operations, loss of eligibility to obtain approvals from the FDA, exclusion from participation in federal healthcare programs including Medicare and Medicaid, the imposition of a corporate integrity agreement with the Office of Inspector General of the Department of Health and Human Services,

disgorgement, individual imprisonment, contractual damages, reputational harm, and diminished profits and future earnings, any of which could adversely affect our financial results and adversely affect our ability to operate our business. We intend to develop and implement a comprehensive corporate compliance program prior to the commercialization of our product candidates. Although effective compliance programs can mitigate the risk of investigation and prosecution for violations of these laws, these risks cannot be entirely eliminated. Any action against us for an alleged or suspected violation could cause us to incur significant legal expenses, could divert our management's attention from the operation of our business, and could harm our reputation, even if our defense is successful. In addition, achieving and sustaining compliance with applicable laws and regulations may be costly to us in terms of money, time and resources.

If we or our collaborators, manufacturers or service providers fail to comply with applicable federal, state or foreign laws or regulations, we could be subject to enforcement actions, which could affect our ability to develop, market and sell our products successfully and could harm our reputation and lead to reduced acceptance of our products by the market. These enforcement actions include, among others:

- adverse regulatory inspection findings;
- warning and/or untitled letters;
- voluntary or mandatory product recalls or public notification or medical product safety alerts to healthcare professionals;
- restrictions on, or prohibitions against, marketing our products;
- restrictions on, or prohibitions against, importation or exportation of our products;
- suspension of review or refusal to approve pending applications or supplements to approved applications;
- exclusion from participation in government-funded healthcare programs;
- exclusion from eligibility for the award of government contracts for our products;
- suspension or withdrawal of product approvals;
- product seizures;
- injunctions;
- consent decrees; and
- civil and criminal penalties, up to and including criminal prosecution resulting in fines, exclusion from healthcare reimbursement programs and imprisonment.

Moreover, federal, state or foreign laws or regulations are subject to change, and while we, our collaborators, manufacturers and/or service providers currently may be compliant, that could change due to changes in interpretation, prevailing industry standards or other reasons.

Any drugs we develop may become subject to unfavorable pricing regulations, third-party reimbursement practices or healthcare reform initiatives, thereby harming our business.

Because our product candidates represent new approaches to the treatment of genetic-based diseases, we cannot be sure that coverage and reimbursement will be available for, or accurately estimate the potential revenue from, our product candidates or assure that coverage and reimbursement will be available for any product that we may develop. The regulations that govern marketing approvals, pricing and reimbursement for new drugs vary widely from country to country. Some countries require approval of the sale price of a drug before it can be marketed. In many countries, the pricing review period begins after marketing or product licensing approval is granted. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. We are monitoring these regulations as several of our programs move into later stages of development; however, many of our programs are currently in the earlier stages of development and we will not be able to assess the impact of price regulations for a number of years. As a result, we might obtain regulatory approval for a product in a particular country, but then be subject to price regulations that could delay our commercial launch of the product and negatively impact any potential revenues we may be able to generate from the sale of the product in that country and potentially in other countries due to reference pricing.

Our ability to commercialize any products successfully will also depend in part on the extent to which coverage and adequate reimbursement/payment for these products and related treatments will be available from government health administration authorities, private health insurers and other organizations. Even if we succeed in bringing one or more products to the market, these products may

not be considered medically necessary and/or cost-effective, and the amount reimbursed for any products may be insufficient to allow us to sell our products on a competitive basis. At this time, we are unable to determine their cost effectiveness or the likely level or method of reimbursement for our product candidates. Increasingly, third-party payors, such as government and private insurance plans, are requiring that drug companies provide them with predetermined discounts from list prices, and are seeking to reduce the prices charged or the amounts paid for pharmaceutical products. If the price we are able to charge for any products we develop, or the payments provided for such products, is inadequate in light of our development and other costs, our return on investment could be adversely affected.

We currently expect that any drugs we develop may need to be administered under the supervision of a physician on an outpatient basis. Under currently applicable U.S. law, certain drugs that are not usually self-administered (such as most injectable drugs) may be eligible for coverage under the Medicare Part B program if:

- they are incident to a physician's services;
- they are reasonable and necessary for the diagnosis or treatment of the illness or injury for which they are administered according to accepted standards of medical practice; and
- they have been approved by the FDA and meet other requirements of the statute.

There may be significant delays in obtaining coverage for newly-approved drugs, and coverage may be more limited than the indications for which the drug is approved by the FDA or comparable foreign regulatory authorities. Patients who are prescribed medications for the treatment of their conditions, and their prescribing physicians, generally rely on third-party payors to pay all or part of the costs associated with their prescription drugs. Patients are unlikely to use our products unless coverage is provided and payment is adequate to cover all or a significant portion of the cost of our products. Therefore, coverage and adequate payment is critical to new product acceptance. Coverage decisions may depend upon clinical and economic standards that disfavor new drug products when more established or lower cost therapeutic alternatives are already available or subsequently become available. Moreover, eligibility for coverage does not imply that any drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution. Interim payments for new drugs, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Reimbursement may be based on payments allowed for lower-cost drugs that are already reimbursed, may be incorporated into existing payments for other services and may reflect budgetary constraints or imperfections in Medicare data. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement rates. However, no uniform policy requirement for coverage and reimbursement for drug products exists among third-party payors in the United States. Therefore, coverage and reimbursement for drug products can differ significantly from payor to payor. As a result, the coverage determination process is often a time-consuming and costly process that will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage and adequate reimbursement will be applied consistently or obtained in the first instance. Our inability to promptly obtain coverage and adequate reimbursement rates from both government-funded and private payors for new drugs that we develop and for which we obtain regulatory approval could adversely affect our operating results, our ability to raise capital needed to commercialize products, and our overall financial condition.

We believe that the efforts of governments and third-party payors to contain or reduce the cost of healthcare and legislative and regulatory proposals to broaden the availability of healthcare will continue to affect the business and financial condition of pharmaceutical and biopharmaceutical companies. A number of legislative and regulatory changes in the healthcare system in the United States and other major healthcare markets have been proposed and/or adopted in recent years, and such efforts have expanded substantially in recent years. These developments have included prescription drug benefit legislation that was enacted in 2003 and took effect in January 2006, healthcare reform legislation enacted by certain states, and major healthcare reform legislation that was passed by Congress and enacted into law in the United States in 2010. These developments could, directly or indirectly, affect our ability to sell our products, if approved, at a favorable price.

In particular, in March 2010, the Patient Protection and Affordable Care Act (the "ACA") was signed into law. This legislation changed the system of healthcare insurance and benefits and was intended to broaden access to healthcare coverage, enhance remedies against fraud and abuse, add transparency requirements for the healthcare and health insurance industries, impose taxes and fees on the healthcare industry, impose health policy reforms, and control costs. This law also contains provisions that would affect companies in the pharmaceutical industry and other healthcare related industries by imposing additional costs and changes to business practices. Since its enactment, there have been judicial and Congressional challenges to certain aspects of the ACA. The uncertainty around the future of the ACA, and in particular the impact to reimbursement levels, may lead to uncertainty or delay in the purchasing decisions of our customers, which may in turn negatively impact our product sales. We continue to evaluate the effect that the ACA has or any potential changes to the ACA could have on our business. Additional federal and state legislative and regulatory developments are

likely, and we expect ongoing initiatives in the United States to increase pressure on drug pricing and reimbursement. Such reforms could have an adverse effect on anticipated revenues from product candidates that we may successfully develop and for which we may obtain regulatory approval and may affect our overall financial condition and ability to develop product candidates.

Changes in laws and regulations affecting the healthcare industry could adversely affect our business.

All aspects of our business, including research and development, manufacturing, marketing, pricing, sales, litigation, and intellectual property rights, are subject to extensive legislation and regulation. Changes in applicable U.S. federal and state laws and agency regulation, as well as foreign laws and regulations, could have a materially negative impact on our business. In the United States and in some other jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of our product candidates or any potential future product candidates of ours, restrict or regulate post-approval activities, or affect our ability to profitably sell any product candidates for which we obtain marketing approval. Increased scrutiny by the U.S. Congress of the FDA's approval process may significantly delay or prevent marketing approval, as well as subject us to more stringent product labeling and post-marketing testing and other requirements. Congress also must reauthorize the FDA's user fee programs every five years and often makes changes to those programs in addition to policy or procedural changes that may be negotiated between the FDA and industry stakeholders as part of this periodic reauthorization process. Congress most recently reauthorized the user fee programs in September 2022 without any substantive policy changes.

Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in health care systems with the stated goals of containing health care costs, improving quality and/or expanding access. In the United States, the pharmaceutical industry has been a focus of these efforts and has been significantly affected by major legislative initiatives. In March 2010, Congress passed the ACA, which substantially changed the way health care is financed by both the government and private insurers, and significantly impacts the U.S. pharmaceutical industry.

There remain judicial and Congressional challenges to certain aspects of the ACA, and as a result certain sections of the ACA have not been fully implemented or effectively repealed. However, following several years of litigation in the federal courts, in June 2021, the U.S. Supreme Court upheld the ACA when it dismissed a legal challenge to the law's constitutionality. Further legislative and regulatory changes under the ACA remain possible, although the new federal administration under President Biden has signaled that it plans to build on the ACA and expand the number of people who are eligible for health insurance subsidies under it. It is unknown what form any such changes or any law would take, and how or whether it may affect the pharmaceutical industry as a whole or our business in the future. We expect that changes or additions to the ACA, the Medicare and Medicaid programs, and changes stemming from other healthcare reform measures, especially with regard to healthcare access, financing or other legislation in individual states, could have a material adverse effect on the healthcare industry in the United States.

The uncertainty around the future of the ACA, and in particular the impact to reimbursement levels, may lead to uncertainty or delay in the purchasing decisions of our customers, which may in turn negatively impact our product sales. If there are not adequate reimbursement levels, our business and results of operations could be adversely affected.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. These changes include aggregate reductions to Medicare payments to providers of up to 2% per fiscal year pursuant to the Budget Control Act of 2011, which began in 2013 and was extended by the Consolidated Appropriations Act for 2023, and will remain in effect through 2032 unless additional Congressional action is taken.

In addition, the Drug Supply Chain Security Act enacted in 2013 imposed obligations on manufacturers of pharmaceutical products related to product tracking and tracing, and in February 2022, FDA released proposed regulations to amend the national standards for licensing of wholesale drug distributors by the states; establish new minimum standards for state licensing third-party logistics providers; and create a federal system for licensure for use in the absence of a State program, each of which is mandated by the DSCSA. As another example, in December 2019, the Further Consolidated Appropriations Act for 2020 (P.L. 116-94) was enacted that includes a piece of bipartisan legislation called the CREATES Act. The CREATES Act aims to address the concern articulated by both the FDA and others in the industry that some brand manufacturers have improperly restricted the distribution of their products, including by invoking the existence of a REMS for certain products, to deny generic and biosimilar product developers access to samples of brand products. The CREATES Act establishes a private cause of action that permits a generic or biosimilar product developer to sue the brand manufacturer to compel it to furnish the necessary samples on "commercially reasonable, market-based terms." Whether and how generic and biosimilar product developments will use this new pathway, as well as the likely outcome of any legal challenges to provisions of the CREATES Act, remain highly uncertain and its potential effects on our future commercial products are unknown. Other legislative and regulatory proposals have been made to expand post-approval requirements and restrict

sales and promotional activities for pharmaceutical products. We are unsure whether additional legislative changes will be enacted, or whether the current regulations, guidance or interpretations will be changed, or whether such changes will have any impact on our business.

Additionally, there has been heightened governmental scrutiny in the United States of pharmaceutical pricing practices considering the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. For example, state legislatures are increasingly passing legislation and implementing regulations designed to control pharmaceutical pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In December 2020, the U.S. Supreme Court held unanimously that federal law does not preempt the states' ability to regulate pharmaceutical benefit managers (PBMs) and other members of the health care and pharmaceutical supply chain, an important decision that may lead to further and more aggressive efforts by states in this area.

At the federal level, DHHS has solicited feedback on various measures intended to lower drug prices and reduce the out of pocket costs of drugs and has implemented others under its existing authority. For example, in May 2019, CMS issued a final rule to allow Medicare Advantage plans the option to use step therapy for Part B drugs beginning January 1, 2020. This final rule codified CMS's policy change that was effective January 1, 2019.

Most recently, in August 2022, President Biden signed into the law the Inflation Reduction Act of 2022 (the "IRA"). Among other things, the IRA has multiple provisions that may impact the prices of drug products that are both sold into the Medicare program and throughout the United States. Starting in 2023, a manufacturer of a drug or biological product covered by Medicare Parts B or D must pay a rebate to the federal government if the product's price increases faster than the rate of inflation. This calculation is made on a drug product by drug product basis and the amount of the rebate owed to the federal government is directly dependent on the volume of a drug product that is paid for by Medicare Parts B or D. Additionally, starting in payment year 2026, CMS will negotiate drug prices annually for a select number of single source Part D drugs without generic or biosimilar competition. CMS will also negotiate drug prices for a select number of Part B drugs starting for payment year 2028. If a drug product is selected by CMS for negotiation, it is expected that the revenue generated from such drug will decrease.

Any additional federal or state health care reform measures could limit the amounts that third-party payers will pay for future health care products and services, and, in turn, could significantly reduce the projected value of certain development projects and reduce our profitability.

Risks associated with our operations outside of the United States and developments in international trade by the U.S. and foreign governments could adversely affect our business.

We have operations and conduct business outside the United States, and we plan to continue to expand these operations. Therefore, we are subject to risks related to operating in foreign countries, which include unfamiliar foreign laws or regulatory requirements or unexpected changes to those laws or requirements; other laws and regulatory requirements to which our business activities abroad are subject, such as the Foreign Corrupt Practices Act and the U.K. Bribery Act; changes in the political or economic condition of a specific country or region, including Russia's invasion of Ukraine and the potential for a wider European or global conflict; fluctuations in the value of foreign currency versus the U.S. dollar; increasing inflation and interest rate changes, our ability to deploy overseas funds in an efficient manner; tariffs, trade protection measures, import or export licensing requirements, trade embargoes, and sanctions (including those administered by the Office of Foreign Assets Control of the U.S. Department of the Treasury), and other trade barriers; global instability from an outbreak of pandemic or contagious disease, including the COVID-19 global pandemic and variants thereof; difficulties in attracting and retaining qualified personnel; and cultural differences in the conduct of business. For example, given developments related to international trade over the past few years, unexpected changes in tariffs could adversely affect our cost of goods sold and/or the foreign sales of our product candidates. Further complicating potential uncertainties caused by conducting business outside the United States are political movements that are changing decades-old institutions, including, for example, in 2016, the United Kingdom held a referendum in which voters approved an exit from the European Union, commonly referred to as "Brexit." The withdrawal of the United Kingdom from the European Union took effect on January 31, 2020, the effective date of the withdrawal agreement, with a transition period that ended on December 31, 2020. Since a significant proportion of the regulatory framework in the United Kingdom was, prior to Brexit, derived from European Union directives and regulations, Brexit and the new Trade and Cooperation Agreement between the European Union and the United Kingdom that took provisional effect on January 1, 2021 could materially impact the regulatory regime with respect to the approval of any product candidates in the United Kingdom. Changes impacting our ability to conduct business in the United Kingdom or other European Union countries, or

changes to the regulatory regime applicable to our operations in those countries (such as with respect to the approval of our product candidates), may materially and adversely impact our business, prospects, operating results, and financial condition.

We or third parties upon whom we depend may be adversely affected by natural disasters and/or health epidemics, and our business, financial condition and results of operations could be adversely affected.

Natural disasters could severely disrupt our operations and have a material adverse effect on our business operations. If a natural disaster, health epidemic, or other event beyond our control occurred that prevented us from using all or a significant portion of our office, manufacturing and/or lab spaces, that damaged critical infrastructure, such as the manufacturing facilities of our third-party contract manufacturers, or that otherwise disrupted operations, it may be difficult for us to continue our business for a substantial period of time. Any outbreak of contagious diseases, or other adverse public health developments, could have a material and adverse effect on our business operations. For example, during the COVID-19 global pandemic, clinical site initiation and patient enrollment in our clinical trials were delayed due to prioritization of hospital resources in favor of COVID-19 patients and difficulties in recruiting clinical site investigators and clinical site staff. The COVID-19 global pandemic, including emerging or future variants of COVID-19, and its impact on our business is highly uncertain and subject to change. We do not yet know the full extent of potential delays or long-term impacts on our business, our preclinical studies and clinical trials, healthcare systems or the global economy. In addition, certain of our research and development efforts are conducted globally. A health epidemic or other outbreak could materially and adversely affect our business, financial condition and results of operations.

The disaster recovery and business continuity plans we have in place may prove inadequate in the event of a serious disaster or similar event. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which could have a material adverse effect on our business.

There is a substantial risk of product liability claims in our business. If we are unable to obtain or maintain sufficient insurance, a product liability claim against us could adversely affect our business.

Our business exposes us to significant potential product liability risks that are inherent in the development, testing, manufacturing and marketing of human therapeutic products. Product liability claims could delay or prevent completion of our clinical development programs. In addition, if any of our collaboration partners face product liability claims, our programs could also be affected and our business could be harmed. If we succeed in marketing products, such claims could result in an FDA investigation of the safety and effectiveness of our products, our manufacturing processes and facilities or our marketing programs, and potentially a recall of our products or more serious enforcement action, limitations on the approved indications for which they may be used, or suspension or withdrawal of approvals. Regardless of the merits or eventual outcome, liability claims may also result in decreased demand for our products, injury to our reputation, costs to defend the related litigation, a diversion of management's time and our resources, substantial monetary awards to trial participants or patients and a decline in our share price. Any insurance we obtain may not provide sufficient coverage against potential liabilities. Furthermore, clinical trial and product liability insurance is becoming increasingly expensive. As a result, we may be unable to obtain or maintain sufficient insurance at a reasonable cost to protect us against losses caused by product liability claims that could adversely affect our business.

If we do not comply with laws regulating the protection of the environment and health and human safety, our business could be adversely affected.

Our research, development and manufacturing processes involve the use of hazardous materials. We maintain quantities of various flammable and toxic chemicals in our facilities that are required for our research, development and manufacturing activities. We are subject to federal, state and local laws and regulations governing the use, manufacture, storage, handling and disposal of these hazardous materials. Our procedures for storing, handling and disposing of these materials are reviewed against the relevant guidelines and laws of the jurisdictions in which our facilities are located on a regular basis. Although we believe that our safety procedures for handling and disposing of these materials sufficiently mitigate the risk of accidental contamination or injury from these materials, the risk cannot be completely eliminated. If an accident occurs, we could be held liable for resulting damages, which could be substantial. We are also subject to numerous environmental, health and workplace safety laws and regulations, including those governing laboratory procedures, exposure to blood-borne pathogens and the handling of biohazardous materials. Although we maintain workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of these materials, this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological or hazardous materials. Additional federal, state and local laws and regulations affecting our operations may become applicable in the future. We may incur substantial costs to comply with, and substantial fines or penalties if we violate any of, these laws or regulations.

Risks Related to Our Dependence on Third Parties

We depend on collaborations with third parties for the development and commercialization of certain of our product candidates.

We depend on third-party collaborators for the co-development and co-commercialization of certain of our product candidates and we face significant competition to the extent we elect to collaborate with others. Our potential future collaborators include large and mid-size pharmaceutical companies, regional and national pharmaceutical companies and biotechnology companies. In addition, there have been a significant number of business combinations among these companies that have resulted in a reduced number of potential future collaborators. In January 2023, we commenced a collaboration with GSK to research, develop, and commercialize oligonucleotide therapeutics, including WVE-006, our preclinical, first-in-class A-to-I(G) RNA editing candidate for AATD. In April 2018, we commenced a collaboration with Takeda to discover, develop and commercialize oligonucleotides for disorders of the CNS. The collaboration provides Takeda with the option to globally co-develop and commercialize programs targeting HD, ALS, FTD, and SCA3, which we will have the right to co-commercialize in the United States. Collaborations are complex and time-consuming to negotiate and document. We may not be able to negotiate collaborations on a timely basis, on acceptable terms, or at all. We may also be restricted under existing license or collaboration agreements from entering into agreements on certain terms with other potential collaborators. If we are unable to enter into collaborations with respect to a product candidate, we may have to curtail the development of such product candidate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to increase our expenditures to fund development or commercialization activities on our own, we may need to obtain additional capital, which may not be available to us on acceptable terms or at all. If we do not have sufficient funds, we may not be able to further develop our product candidates or bring them to market and generate product revenue.

Depending on the type of collaborations we enter into, we may have limited control over the amount and timing of resources that our collaborators dedicate to the development or commercialization of our product candidates. Our ability to generate revenues from these arrangements will depend on our collaborators' abilities and efforts to successfully perform the functions assigned to them in these arrangements.

Collaborations involving our product candidates may pose the following risks to us:

- collaborators have significant discretion in determining the efforts and resources that they will apply to these collaborations;
- collaborators may not pursue development and commercialization of our product candidates or may elect not to continue or renew development or commercialization programs based on clinical trial results, changes in the collaborator's strategic focus or available funding or external factors such as an acquisition that diverts resources or creates competing priorities;
- collaborators may delay clinical trials, provide insufficient funding for a clinical trial program, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for clinical testing;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our products or product candidates if the collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- collaborators may require us to enter into collaboration agreements that contain exclusivity provisions and/or termination penalties;
- a collaborator with marketing and distribution rights to one or more products may not commit sufficient resources to the marketing and distribution of such product or products;
- collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation that could jeopardize or invalidate our proprietary information or expose us to potential litigation;
- disputes may arise between the collaborators and us that result in the delay or termination of the research, development or commercialization of our products or product candidates or that result in costly litigation or arbitration that diverts management attention and resources; and
- collaborations may be terminated and, if terminated, may result in a need for additional capital to pursue further development or commercialization of the applicable product candidates.

Collaboration agreements may not lead to development or commercialization of product candidates in the most efficient manner, or at all. Further, if a present or future collaborator of ours were to be involved in a business combination, the continued pursuit and emphasis on our product development or commercialization program could be delayed, diminished or terminated.

We may not be able to execute our business strategy optimally if we are unable to maintain our existing collaborations or enter into new collaborations with partners that can provide sales, marketing and distribution capabilities and funds for the development and commercialization of our product candidates.

We do not currently have any sales and marketing or distribution capabilities. Accordingly, we entered into collaborations with GSK and Takeda, which we believe can assist us in building these capabilities. We may also enter into additional alliances in the future. We have selectively chosen to enter into our strategic collaborations because we believe this is the optimal way for us to leverage our resources and create significant value for ourselves and our shareholders, as we advance oligonucleotide candidates for genetically defined diseases.

Depending on the collaborations that we enter into, we may expect our collaborators to provide assistance with development, regulatory affairs, marketing, sales and distribution, among other areas. Our future revenues may depend heavily on the success of the efforts of these third parties. For example, under our collaboration with Takeda, if Takeda exercises its option with respect to any of our programs in HD, ALS, FTD or SCA3, we will rely on Takeda for commercialization of such optioned programs outside of the United States. Under our collaboration with GSK, GSK is responsible for later clinical development and commercialization of our program in AATD.

We may not be successful in our collaborations due to various factors, including our ability to successfully demonstrate proof of mechanism in humans, our ability to demonstrate the safety and efficacy of our specific product candidates, our ability to manufacture or have third parties manufacture our product candidates, the strength of our intellectual property and/or concerns about potential challenges to or limitations of our intellectual property. To the extent we have entered into, or enter into new, collaborations, we may not be able to maintain them if, for example, development or approval of a product candidate is delayed, challenges are raised as to the validity or scope of our intellectual property or sales of an approved drug are lower than we or our collaboration partner expected.

For certain product candidates that we may develop, we have formed collaborations to fund all or part of the costs of drug development and commercialization, such as our collaborations with GSK and Takeda. We may not, however, be able to enter into additional collaborations for certain other programs, and the terms of any collaboration agreement we do secure may not be favorable to us. If we are not successful in our efforts to enter into future collaboration arrangements with respect to one or more of our product candidates, we may not have sufficient funds to develop that or any other product candidate internally, or to bring any product candidates to market. If we do not have sufficient funds to develop and bring our product candidates to market, we will not be able to generate sales revenues from these product candidates, and this will substantially harm our business.

We rely, and expect to continue to rely, on third parties to conduct some aspects of our compound formulation, research, preclinical studies and clinical trials, and those third parties may not perform satisfactorily, including failing to meet deadlines for the completion of such formulation, research or testing.

We do not independently conduct all aspects of our drug discovery activities, compound formulation research, preclinical studies, or clinical trials of product candidates. We currently rely, and expect to continue to rely, on third parties to conduct some aspects of our research and development, preclinical and clinical studies. Any of these third parties may terminate their engagements with us at any time. If we need to enter into alternative arrangements, it would delay our product development activities. Our reliance on these third parties for research and development activities will reduce our control over these activities but will not relieve us of our responsibilities. For example, for product candidates that we develop and commercialize on our own, we will remain responsible for ensuring that each of our studies that support our clinical trial applications and our clinical trials are conducted in accordance with GCP, the study plan and protocols for the trial. If these third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our studies in accordance with regulatory requirements or our stated study plans and protocols, we will not be able to complete, or may be delayed in completing, the necessary preclinical studies to enable us or our strategic alliance partners to select viable product candidates for clinical trial application submissions and will not be able to, or may be delayed in our efforts to, successfully develop and commercialize such product candidates.

We rely on third parties to design, conduct, supervise and monitor our preclinical studies and clinical trials, and if those third parties perform in an unsatisfactory manner, it may harm our business.

We rely on third party clinical investigators, CROs, clinical data management organizations and consultants to design, conduct, supervise and monitor preclinical studies and clinical trials of our product candidates. Because we rely on third parties and do not have the ability to conduct preclinical studies or clinical trials independently, we have less control over the timing, quality and other aspects

of preclinical studies and clinical trials than we would if we conducted them on our own, including our inability to control whether sufficient resources are applied to our programs. If any of our CROs are acquired or consolidated, these concerns are likely to be exacerbated and our preclinical studies or clinical trials may be further impacted due to potential integration, streamlining, staffing and logistical changes. These investigators, CROs and consultants are not our employees and we have limited control over the amount of time and resources that they dedicate to our programs. These third parties may have contractual relationships with other entities, some of which may be our competitors, which may draw time and resources from our programs. Further, these third parties may not be diligent, careful or timely in conducting our preclinical studies or clinical trials, resulting in the preclinical studies or clinical trials being delayed or unsuccessful.

If we cannot contract with acceptable third parties on commercially reasonable terms, or at all, or if these third parties do not carry out their contractual duties, satisfy legal and regulatory requirements for the conduct of preclinical studies or clinical trials or meet expected deadlines, our preclinical and clinical development programs could be delayed and otherwise adversely affected. In all events, we are responsible for ensuring that each of our preclinical studies and clinical trials is conducted in accordance with the general investigational plan and protocols for the trial. The FDA and other health authorities require clinical trials to be conducted in accordance with GCP, including conducting, recording and reporting the results of clinical trials to assure that data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. If we or our CROs fail to comply with these requirements, the data generated in our clinical trials may be deemed unreliable or uninterpretable and the FDA and other health authorities may require us to perform additional clinical trials. Our reliance on third parties that we do not control does not relieve us of these responsibilities and requirements. Any such event could adversely affect our business, financial condition, results of operations and prospects.

We rely on third parties in the supply and manufacture of our product candidates for our research, preclinical and clinical activities, and may do the same for commercial supplies of our product candidates.

While we have built our own internal manufacturing capabilities, we have not yet manufactured our product candidates on a commercial scale, and may not be able to do so for any of our product candidates. In addition, we currently rely on third parties in the supply and manufacture of materials for our research, preclinical and clinical activities and may continue to do so for the foreseeable future. We may do the same for the commercial supply of our drug product. We use third parties to perform additional steps in the manufacturing process, such as the filling, finishing and labeling of vials and storage of our product candidates and we expect to do so for the foreseeable future. There can be no assurance that our supply of research, preclinical and clinical development drug candidates and other materials will not be limited, interrupted or restricted or will be of satisfactory quality or continue to be available at acceptable prices. Replacement of any of the third parties we may engage could require significant effort and expertise because there may be a limited number of qualified replacements. In addition, raw materials, reagents, and components used in the manufacturing process, particularly those for which we have no other source or supplier, may not be available, may not be suitable or acceptable for use due to material or component defects, or may introduce variability into the supply of our product candidates. Furthermore, with the increase of companies developing nucleic acid therapeutics, there may be increased competition for the supply of the raw materials that are necessary to make our oligonucleotides, which could severely impact the manufacturing of our product candidates.

We may be unable to identify manufacturers on acceptable terms or at all because the number of potential manufacturers is limited and they must be acceptable to the FDA or approved by foreign regulatory authorities Suppliers and manufacturers, including us, must meet applicable manufacturing requirements, including compliance with cGMP regulations, and undergo rigorous facility and process validation tests required by regulatory authorities in order to comply with regulatory standards. In the event that any of our suppliers or manufacturers fail to comply with such requirements or to perform their obligations to us in relation to quality, timing or otherwise, some of which may be out of their or our control, or if our supply of components or other materials becomes limited or interrupted for other reasons, we may be forced to increase the manufacturing of the materials ourselves, for which we currently have limited capabilities and resources, or enter into an agreement with another third party, which we may not be able to do on reasonable terms, if at all. Any interruption of the development or operation of the manufacturing of our product candidates, such as order delays for equipment or materials, equipment malfunction, quality control and quality assurance issues, regulatory delays and possible negative effects of such delays on supply chains and expected timelines for product availability, production yield issues, shortages of qualified personnel, discontinuation of a facility or business or failure or damage to a facility resulting from natural disasters, could result in the cancellation of shipments, loss of product in the manufacturing process or a shortfall in available product candidates or materials. In some cases, the technical skills or technology required to manufacture our product candidates may be unique or proprietary to the original manufacturer and we may have difficulty, or there may be contractual restrictions prohibiting us from, transferring such skills or technology to another third party and a feasible alternative may not exist. These factors would increase our reliance on such manufacturer or require us to obtain a license from such manufacturer in order to have another third party manufacture our product candidates. If we are required to change manufacturers for any reason, we will be required to verify that the new manufacturer maintains facilities and procedures that comply with quality standards and with all applicable regulations and guidelines. The delays associated with the verification of a new manufacturer could negatively affect our ability to develop product candidates in a timely manner or within budget.

We may rely on third-party manufacturers if we receive regulatory approval for any product candidate. To the extent that we have existing, or enter into future, manufacturing arrangements with third parties, we will depend on these third parties to perform their

obligations in a timely manner consistent with contractual and regulatory requirements, including those related to quality control and assurance. In complying with the manufacturing regulations of the FDA and other comparable foreign regulatory authorities, we and our third-party manufacturers must spend significant time, money, and effort in the areas of design and development, testing, production, record-keeping and quality control to assure that the products meet applicable specifications and other regulatory requirements. Although our agreements with third-party manufacturers require them to perform according to certain cGMP requirements such as those relating to quality control, quality assurance and qualified personnel, we cannot control the conduct of our third-party manufacturers to implement and maintain these standards. If any of our third-party manufacturers cannot successfully manufacture material that conforms to our specifications and the regulatory requirements of the FDA, or other comparable foreign authorities, we would be prevented from obtaining regulatory approval for our drug candidates unless and until we engage a substitute supplier that can comply with such requirements, which we may not be able to do. In addition, we and our third-party manufacturers responsible for the manufacture of commercial supplies of our products for which we retain regulatory approval, if any, are subject to inspection and approval by regulatory authorities before we may commence the manufacture and sale of any of such products, and thereafter are subject to ongoing inspection from time to time. Our third-party manufacturers may not be able to comply with applicable cGMP regulations or similar regulatory requirements outside of the United States. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in regulatory actions, such as the issuance of FDA Form 483 notices of observations, warning letters or sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or drugs, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products. Any such failure by us or any of our suppliers would significantly impact our ability to develop, obtain regulatory approval for or market our drug candidates, if approved.

We may also be required to enter into long-term manufacturing agreements that contain exclusivity provisions and/or substantial termination penalties which could have a material adverse effect on our business prior to or after commercialization of any of our product candidates. If we are unable to obtain or maintain third-party manufacturing for product candidates, or to do so on commercially reasonable terms, we may not be able to develop and commercialize our product candidates successfully. Failure to execute on our manufacturing requirements, either by us or by one of our third-party vendors, could adversely affect our business in a number of ways, including:

- an inability to initiate or continue clinical trials of product candidates under development;
- delays in submitting regulatory applications, or receiving regulatory approvals, for product candidates;
- loss of the cooperation of a collaborator;
- additional inspections by regulatory authorities;
- requirements to cease distribution or to recall batches of our product candidates; and
- in the event of approval to market and commercialize a product candidate, an inability to meet commercial demands for our products.

If any of our product candidates are approved for marketing and commercialization and we are unable to develop sales, marketing and distribution capabilities on our own, or enter into agreements with third parties to perform these functions on acceptable terms, we will be unable to commercialize successfully any such future products.

We currently have no sales, marketing or distribution capabilities. In addition, while our collaboration with Takeda and GSK will provide us with know-how and experience related to commercialization, we have limited experience of our own. If any of our product candidates is approved, we will need to develop internal sales, marketing and distribution capabilities to commercialize such products, which would be expensive and time-consuming, or rely on or enter into additional collaborations with third parties to perform these services. If we decide to market our products directly, we will need to commit significant financial and managerial resources to develop a marketing and sales force with technical expertise and supporting distribution, administration and compliance capabilities. If we rely on third parties with such capabilities to market our products or decide to co-promote products with collaborators, we will need to establish and maintain marketing and distribution arrangements with third parties, and there can be no assurance that we will be able to enter into such arrangements on acceptable terms or at all. In entering into third-party marketing or distribution arrangements, any revenue we may receive will depend upon the efforts of the third parties and there can be no assurance that such third parties will establish adequate sales and distribution capabilities or be successful in gaining market acceptance of any approved

product. If we are not successful in commercializing any product approved in the future, either on our own or through third parties, our business, financial condition, results of operations and prospects would be adversely affected.

Risks Related to Managing Our Operations

If we are unable to attract and retain qualified key management and scientists, staff, consultants and advisors, our ability to implement our business plan may be adversely affected.

We are highly dependent upon our senior management and our scientific, clinical and medical staff and advisors. The loss of the service of any of the members of our senior management or other key employees could delay our research and development programs and materially harm our business, financial condition, results of operations and prospects. In addition, we expect that we will continue to have an increased need to recruit and hire qualified personnel as we advance our programs and expand operations. Failure to successfully recruit and retain personnel could impact our anticipated development plans and timelines. For example, in 2019, as a result of the stock price decline and our workforce reduction following the announcement of our decision to discontinue our development of suvodirsen in DMD, we have faced challenges in retaining and attracting employees to support our research and development efforts, and our failure to do so could have an adverse effect on our ability to execute on our business plan. We are dependent on the continued service of our technical personnel because of the highly technical and novel nature of our product candidates, platform and technologies and the specialized nature of the regulatory approval process. Replacing such personnel may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully execute our business strategy, and we cannot assure you that we will be able to identify or employ qualified personnel for any such position on acceptable terms, if at all. Many of the biotechnology and pharmaceutical companies with whom we compete for qualified personnel have greater financial and other resources, different risk profiles and longer histories in the industry than we do. Because our management team and key employees are not obligated to provide us with continued service, they could terminate their employment with us at any time without penalty. We do not maintain key person life insurance policies on any of our management team members or key employees. Our future success will depend in large part on our continued ability to attract and retain highly qualified scientific, technical and management personnel, as well as personnel with expertise in preclinical and clinical testing, manufacturing, governmental regulation and commercialization. In order to do so, we may need to pay higher compensation or fees to our employees or consultants than we currently expect, and such higher compensation payments may have a negative effect on our operating results. We face increased competition for personnel from other companies, universities, public and private research institutions, government entities and other organizations. If we are unable to attract and retain qualified personnel, the rate and success at which we may be able to discover and develop our product candidates and implement our business plan will be limited.

As we continue our preclinical studies and clinical trials and advance to further clinical development, we may experience difficulties in managing our growth and expanding our operations.

Although we have assembled a team of employees with experience developing medicines and obtaining regulatory approval to market those medicines, we have limited experience as a company in drug development. We have a robust and diverse pipeline of PN-modified, stereopure oligonucleotides, including programs using our editing, splicing, and silencing modalities. Our lead clinical programs are focused in, and aim to address, muscle diseases (DMD – splicing), hepatic diseases (AATD – editing), and CNS diseases (HD, ALS and FTD – silencing). As we advance product candidates through preclinical studies and clinical trials, we will need to expand our development, regulatory and manufacturing capabilities or contract with other organizations to provide these capabilities for us. In addition, we must manage our relationships with collaborators or partners, suppliers and other organizations, including our collaborations with GSK and Takeda. Our ability to manage our operations and future growth will require us to continue to improve our operational, financial and management controls, reporting systems and procedures. We may not be able to implement improvements to our management information and control systems in an efficient or timely manner and may discover deficiencies in existing systems and controls. In addition, our future growth may require significant capital expenditures and may divert financial resources from other projects, such as the development of our product candidates. If we are unable to effectively manage our future growth, our expenses may increase and our ability to generate revenue could be reduced.

Our employees, consultants and collaborators may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.

We are exposed to the risk of fraud and other misconduct by our employees, consultants and collaborators. Such misconduct could include intentional failures to comply with FDA and other foreign agency regulations, provide accurate information to the FDA, comply with manufacturing standards required by the FDA or us, comply with federal and state healthcare fraud and abuse laws and regulations, report financial information or data accurately or disclose unauthorized activities to us. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, kickbacks, self-dealing and other abusive practices. These laws and regulations may restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs and other business arrangements. Such misconduct could

also involve the improper use of information obtained in the course of clinical trials, which could result in regulatory sanctions and serious harm to our reputation. It is not always possible to identify and deter such misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of significant fines or other sanctions.

Security breaches, cyber security threats, loss of data and other disruptions could compromise sensitive information related to our business, prevent us from accessing critical information or expose us to liability, which could adversely affect our business and our reputation.

In the ordinary course of our business, we, our CROs and other third parties, including our managed service providers ("MSPs"), on which we rely collect and store sensitive data, including legally protected patient health information, personally identifiable information about our employees, intellectual property, vendor information, and proprietary business information. We, along with our MSPs, manage and maintain our applications and data utilizing cloud-based and on-site systems. These applications and data encompass a wide variety of business-critical information, including research and development information and business and financial information.

The secure processing, storage, maintenance and transmission of this critical information by us, or our CROs and other third parties with whom Wave does business, is vital to our operations and business strategy. We also have systems in place at our facilities to mitigate disruptions to our communications systems, including the prevention of a loss to our electrical systems. Although we are proactive in our approach and take measures to protect sensitive information from unauthorized access or disclosure, our information technology and infrastructure, or that of our CROs or other third party partners, may be vulnerable to attacks by hackers, viruses, breaches, interruptions due to employee error, malfeasance or other disruptions, lapses in compliance with privacy and security mandates, or damage from natural disasters, terrorism, war and telecommunication and electrical failures. For example, the COVID-19 pandemic has led to an increase in those working remotely, including our employees and third parties with whom we do business, which increases our cyber security risk. This increased risk has created data accessibility concerns and has made us more susceptible to communication disruptions. In addition, cyberattacks, malicious internet-based activity and fraud are prevalent and continue to increase in frequency. Any such event, including a cyberattack, could compromise our networks, or that of our CROs or other third parties, and the information stored there could be accessed by unauthorized parties, publicly disclosed, lost or stolen. Furthermore, any such event could result in information theft, data corruption, operational disruption, damage to our reputation, or financial loss, and could subject us to liability or negatively impact our business operations.

As part of our robust data protection practices, we regularly conduct business continuity and disaster recovery testing of our key information systems and data. We have measures in place that are designed to detect and respond to such security incidents and breaches of privacy and security mandates. Any such access, disclosure or other loss of information could result in legal claims or proceedings, liability under laws that protect the privacy of personal information (including GDPR, HIPAA and HITECH, among others), government enforcement actions and regulatory penalties. Unauthorized access, loss or dissemination could also disrupt our operations, including our ability to conduct research and development activities, process and prepare company financial information, manage various general and administrative aspects of our business and damage our reputation, any of which could adversely affect our business. For example, the loss of clinical trial data from completed or ongoing clinical trials, in addition to privacy concerns, could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. In addition, while we take measures to help ensure early detection, there can be no assurance that we, or our CROs and other third party partners, will promptly detect any such disruption or security breach, if at all. To the extent that any disruption or security breach were to result in a loss of or damage to our data or applications, or inappropriate disclosure of personal, confidential or proprietary information, we could incur liability and the further development of our product candidates could be delayed.

Numerous federal, state and international laws address privacy, data protection and the collection, storing, sharing, use, disclosure and protection of personally identifiable information and other user data. Numerous states already have, and are looking to expand, data protection legislation. For example, in 2018, California enacted the California Consumer Privacy Act ("CCPA"), which became effective on January 1, 2020 giving California residents expanded privacy rights and protections and imposing fines and penalties. 2023 will also see new privacy laws in Virginia (effective January 1, 2023), Connecticut (effective July 1, 2023), Colorado (effective July 1, 2023), and Utah (effective December 31, 2023). Each year, many state legislatures continue to consider similar privacy laws, further expanding the patchwork of US privacy laws. State enforcement of data privacy and cybersecurity breaches has increased, along with the cost. California issued its first fine under the CCPA in the amount of $1.2 million, and the New York Attorney General has enforced its NY SHIELD Act by fining companies over $3,000,000. In addition, the Federal Trade Commission has zeroed in on data privacy and security as a central role, and 2023 may see increased enforcement and regulation.

Outside the United States, personally identifiable information and other user data is increasingly subject to legislation and regulations in numerous jurisdictions around the world, the intent of which is to protect the privacy of information that is collected, processed and transmitted in or from the governing jurisdiction. Foreign data protection, privacy, information security, user protection and other laws and regulations are often more restrictive than those in the United States. For example, in April 2016, European legislative bodies adopted the General Data Protection Regulation ("GDPR"), which became effective May 25, 2018, and which applies to any company, regardless of location, that collects or processes personal data of EU residents in connection with offering goods or services in the EU or monitoring the behavior of EU residents. The GDPR enhances data protection obligations for processors and controllers of personal data, including, for example, expanded disclosures about how personal information is to be used, limitations on retention of information, data minimization obligations, record-keeping requirements, mandatory data breach notification requirements, and correlated obligations on services providers. The GDPR also strictly regulates cross-border transfer of personal data, including requirements for data transfer impact assessments. Non-compliance with the GDPR may result in monetary penalties of up to €20 million or 4% of annual worldwide revenue, whichever is higher. In addition, post-Brexit the UK has also adopted its own version of the GDPR, which requires additional compliance measures.

While we have taken steps to comply with applicable privacy laws and regulations, including the GDPR, by taking measures including enhancing our security procedures, updating our website, revising our clinical trial informed consents, adopting the standard contractual clauses for cross-border transfers of personal data, and entering into data processing agreements with relevant CROs and third party partners, we cannot assure you that our efforts to remain in compliance will be fully successful. The GDPR and other changes in laws or regulations associated with the enhanced protection of personal data may increase our costs of compliance and result in greater legal risks.

Foreign currency exchange rates may adversely affect our results.

Due to our operations outside of the United States, we are exposed to market risk related to changes in foreign currency exchange rates. Historically, we have not hedged our foreign currency exposure. Changes in the relative values of currencies occur regularly and, in some instances, could materially adversely affect our business, our financial condition, the results of our operations or our cash flows.

For the years ended December 31, 2022 and 2021, changes in foreign currency exchange rates did not have a material impact on our historical financial position, our business, our financial condition, the results of our operations or our cash flows. A hypothetical 10% change in foreign currency rates would not have a material impact on our historical financial position or results of operations. However, there can be no assurance that changes in foreign currency exchange rates will not have a material adverse impact on us in the future.

The U.S. tax legislation and future changes to applicable U.S. or foreign tax laws and regulations may have a material adverse effect on our business, financial condition and results of operations.

We are subject to income and other taxes in the United States and foreign jurisdictions. Changes in laws and policy relating to taxes or trade, including increases in tax rates or modifications, technical corrections or clarifications to tax laws, such as the Tax Cuts and Jobs Act of 2017, which eliminates the option to deduct research and development expenditures currently and requires corporations to capitalize and amortize them over a period of years, may have an adverse effect on our business, financial condition and results of operations. This Annual Report on Form 10-K does not discuss any such tax legislation or changes to tax laws and legislation, or the manner in which it might affect us or purchasers of our securities. We urge our investors to consult with their legal and tax advisors with respect to such legislation and the potential tax consequences of investing in our securities.

We are also subject to different tax regulations in each of the jurisdictions where we conduct our business or where our management is located. We expect the scope and extent of regulation in the jurisdictions in which we conduct our business, or where our management is located, as well as regulatory oversight and supervision, to generally continue to increase. Generally, future changes in applicable U.S. or foreign tax laws and regulations, or their interpretation and application could have an adverse effect on our business, financial condition and results of operations.

Inadequate funding for the FDA, the SEC and other government agencies, or a work slowdown or stoppage at those agencies as part of a broader federal government shutdown, could hinder their ability to hire and retain key leadership and other personnel, prevent new products and services from being developed or commercialized in a timely manner, or otherwise prevent those agencies from performing normal business functions on which the operation of our business may rely, which could negatively impact our business.

The ability of the FDA to review and approve new products can be affected by a variety of factors, including government budget and funding levels, the ability to hire and retain key personnel and accept the payment of user fees, and statutory, regulatory, and policy

changes. Average review times at the agency have fluctuated in recent years as a result. In addition, government funding of the SEC and other government agencies on which our operations may rely, including those that fund research and development activities, is subject to the political process, which is inherently fluid and unpredictable.

Disruptions at the FDA and other agencies may also extend the time necessary for new drugs to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA and the SEC, have had to furlough critical FDA, SEC and other government employees and stop critical activities. Additionally, the FDA and regulatory authorities outside the United States have imposed and may continue to impose various restrictions or other policy measures in response to the COVID-19 pandemic. If a prolonged government shutdown or slowdown occurs, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business. Further, future government shutdowns could impact our ability to access the public markets and obtain necessary capital in order to properly capitalize and continue our operations.

Risks Related to Our Intellectual Property

If we are not able to obtain and enforce market exclusivity for our technologies or product candidates, development and commercialization of our product candidates may be adversely affected.

In our industry, the majority of an innovative product's commercial value is usually realized during the period in which it has market exclusivity. Market exclusivity is comprised of both patent and other intellectual property protection, as well as regulatory exclusivity. In the United States and some other countries, when market exclusivity expires and generic versions of a product are approved and marketed, there usually are very substantial and rapid declines in the product's sales. Accordingly, our success depends in part on our ability to obtain and maintain patents and other forms of intellectual property rights, including trademarks, trade secrets and in-licenses of intellectual property rights of others, for our product candidates and platform technologies, methods used to manufacture our product candidates, methods of patient stratification and methods for treating patients using our product candidates, as well as our ability to preserve our trade secrets, to prevent third parties from infringing upon our proprietary rights and to operate without infringing upon the proprietary rights of others. Certain research and development activities involved in pharmaceutical development are exempt from patent infringement in the United States and other jurisdictions, for example, in the United States by the provisions of 35 U.S.C. § 271(e)(1) (the "Safe Harbor"). However, in the United States and certain other jurisdictions, the Safe Harbor exemption terminates when the sponsor submits an application for marketing approval (e.g., a New Drug Application ("NDA") in the United States). Therefore, the risk that a third party might allege patent infringement may increase as our products approach commercialization. We may not be able to apply for patents or obtain patent protection on certain aspects of our product candidates or our platform in a timely fashion or at all. Our existing issued and granted patents and any future patents we obtain may not be sufficiently broad to prevent others from using our technology or from developing competing products and technology. There is no guarantee that any of our pending patent applications will result in issued or granted patents, that any of our issued or granted patents will not later be found to be invalid or unenforceable, or that any issued or granted patents will include claims that are sufficiently broad to cover our product candidates, our platform technologies, or any methods relating to them, or to provide meaningful protection from our competitors. Moreover, the patent position of biotechnology and pharmaceutical companies can be highly uncertain and involves complex legal and factual questions. We will be able to protect our proprietary rights from unauthorized use by third parties only to the extent that our current and future proprietary technology and product candidates are covered by valid and enforceable patents or are effectively maintained as trade secrets. If third parties disclose or misappropriate our proprietary rights, it may materially and adversely impact our position in the market.

Legal issues related to the patentability of biopharmaceuticals, and methods of their manufacture and use, are complex and uncertain in some countries. In some countries, applicants are not able to protect methods of treating human beings or medical treatment processes. Intellectual property protection varies throughout the world and is subject to change over time. Certain jurisdictions have enacted various rules and laws precluding issuance of patents encompassing any methods a doctor may practice on a human being or any other animal to treat a disease or condition. Further, many countries have enacted laws and regulatory regimes that do not allow patent protection for methods of use of known compounds. Particularly given that some of our product candidates may represent stereopure versions of previously described oligonucleotides, it may be difficult or impossible to obtain patent protection for them in relevant jurisdictions. Thus, in some countries and jurisdictions, it may not be possible to patent some of our product candidates at all. In some countries and jurisdictions, only composition claims may be obtained, and only when those compositions are or contain compounds that are new and/or novel. Also, patents issued with composition claims (*i.e.,* covering product candidates) cannot always be enforced to protect methods of using those compositions to treat or diagnose diseases or medical conditions. In such countries or jurisdictions, enforcement of patents to protect our product candidates, or their uses, may be difficult or impossible. Lack of patent protection in such cases may have a materially adverse effect on our business and financial condition.

Furthermore, given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates, their manufacture or their use might expire before or shortly after those candidates receive regulatory

approval and are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours. We expect to seek extensions of patent terms where these are available upon regulatory approval in those countries where we are prosecuting patents. This includes in the United States under the Drug Price Competition and Patent Term Restoration Act of 1984, which permits a patent term extension of up to five years beyond the expiration of the patent. However, the applicable authorities, including the FDA in the United States, and any equivalent regulatory authority in other countries, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to our patents, or may grant more limited extensions than we request. If this occurs, our competitors may take advantage of our investment in development and clinical trials by referencing our clinical and preclinical data and launch their product earlier than might otherwise be possible.

The U.S. Patent and Trademark Office ("USPTO") and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other provisions during the patent prosecution process. There are situations in which noncompliance can result in abandonment or lapse of a patent or patent application, or loss of right to enforce patent claims, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, competitors might be able to enter the market earlier than would otherwise have been the case. The standards applied by the USPTO and foreign patent offices in granting patents are not uniform, can vary substantially from country to country, and are not always applied predictably, requiring country-specific patent expertise in each jurisdiction in which patent protection is sought. For example, there is no uniform worldwide policy regarding patentable subject matter or the scope of claims allowable in biotechnology and pharmaceutical patents. As such, we do not know the degree of future protection that we will have on our proprietary products and technologies. While we will endeavor to try to protect our product candidates and platform technology with intellectual property rights such as patents, as appropriate, the process of filing and prosecuting patent applications, and obtaining, maintaining and defending patents is time-consuming, expensive, uncertain, and sometimes unpredictable.

In addition, periodic changes to the patent laws and rules of patent offices around the world, including the USPTO can have a significant impact on our ability to protect our technology and enforce our intellectual property rights. For example, the America Invents Act, enacted in 2011, involved significant changes in patent legislation. Furthermore, the U.S. Supreme Court has ruled on several patent cases in recent years, some of which cases either narrow the scope of patent protection available in certain circumstances or weaken the rights of patent owners in certain situations. The 2013 decision by the U.S. Supreme Court in *Association for Molecular Pathology v. Myriad Genetics, Inc.* precludes a claim to a nucleic acid having a stated nucleotide sequence which is identical to a sequence found in nature and unmodified. We currently are not aware of an immediate impact of this decision on our patents or patent applications because we are developing oligonucleotides which contain modifications that we believe are not found in nature. However, we cannot make assurances that the interpretations of this decision or subsequent rulings will not adversely impact our patents or patent applications. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts and the USPTO, and by analogous bodies around the world, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future. For example, in 2012, European countries and the European Parliament agreed to a legislative package that would create a unitary patent protection system in the EU; aspects of this system are scheduled to be implemented beginning in 2023 for at least some European countries. The impact of the proposed unitary patent protection system on patents in Europe is currently unclear.

Once granted, patents may remain open to opposition, interference, re-examination, post-grant review, *inter partes* review, nullification or derivation action in court or before patent offices or similar proceedings for a given period after allowance or grant, during which time third parties can raise objections against such initial grant. In the course of such proceedings, which may continue for a protracted period of time, the patent owner may be compelled to limit the scope of the allowed or granted claims attacked or may lose the allowed or granted claims altogether. In addition, there can be no assurance that:

- Others will not or may not be able to make, use or sell compounds that are the same as or similar to our product candidates but that are not covered by the claims of the patents that we own or license.
- We or our licensors, collaborators or any future collaborators are the first to make the inventions covered by each of our issued patents and pending patent applications that we own or license.
- We or our licensors, collaborators or any future collaborators are the first to file patent applications covering certain aspects of our inventions.
- Others will not independently develop similar or alternative technologies or duplicate any of our technologies without infringing our intellectual property rights.
- A third party may not challenge, invalidate, circumvent or weaken our patents, or that, if any of these events should occur, that a court would hold that our patents are valid, enforceable and infringed.

- Any issued patents that we own or have licensed will provide us with any competitive advantages, or will not be challenged, invalidated, circumvented or weakened by third parties.
- We may develop additional proprietary technologies that are patentable.
- The patents of others will not have an adverse effect on our business.
- Our competitors do not conduct research and development activities in countries where we do not have enforceable patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets.

We license patent rights from third-party owners or licensees. If such owners or licensees do not properly or successfully obtain, maintain or enforce the patents underlying such licenses, or if they retain or license to others any competing rights, our competitive position and business prospects may be adversely affected.

We license patent rights from third parties that we may use from time to time to protect certain aspects of our technology and programs. We may license additional third-party intellectual property in the future. To the extent that we use, and ultimately rely on, in-licensed technologies in our platform and our programs, our success will depend in part on the ability of our licensors to obtain, maintain and enforce patent protection for those in-licensed technologies. Our licensors may not successfully prosecute the patent applications licensed to us. Even if patents issue or are granted, our licensors may fail to maintain these patents, may determine not to pursue litigation against other companies that are infringing these patents, or may pursue litigation less aggressively than we would. Further, we may not obtain exclusive rights, which would allow for third parties to develop competing products. Without protection for, or exclusive right to, the intellectual property we license, other companies might be able to offer substantially identical products for sale, which could adversely affect our competitive business position and harm our business prospects. In addition, we may sublicense our rights under our third-party licenses to current or future collaborators or any future strategic partners. Any impairment of these sublicensed rights could result in reduced revenue under any future collaboration agreements we may enter into or result in termination of an agreement by one or more of our current or future collaborators or any future strategic partners.

Other companies or organizations may challenge our or our licensors' patent rights or may assert patent rights that prevent us from developing and commercializing our products.

Nucleic acid therapeutics is a relatively new scientific field, the commercial exploitation of which has resulted in many different patents and patent applications from organizations and individuals seeking to obtain patent protection in the field. We have obtained grants and issuances of patents in this field. The issued patents and pending patent applications in the United States and in key markets around the world that we own or license claim certain methods, compositions and processes relating to the discovery, development, manufacture and/or commercialization of oligonucleotides and/or our platform.

As the field of oligonucleotides matures, patent applications are being processed by national patent offices around the world. There is uncertainty about which patents will issue, and, if they do, as to when, to whom, and with what claims. It is likely that there will be significant litigation in the courts and other proceedings, such as interference, reexamination and opposition proceedings, in various patent offices relating to patent rights in the oligonucleotides field. In many cases, the possibility of appeal or opposition exists for either us or our opponents, and it may be years before final, unappealable rulings are made with respect to these patents in certain jurisdictions. The timing and outcome of these and other proceedings is uncertain and may adversely affect our business, particularly if we are not successful in defending the patentability and scope of our pending and issued patent claims or if third parties are successful in obtaining claims that cover any of our product candidates or our platform. In addition, third parties may attempt to invalidate our intellectual property rights. Even if our rights are not directly challenged, invalidated or circumvented, disputes could lead to the weakening of our intellectual property rights. Our defense against any attempt by third parties to challenge, invalidate, circumvent or weaken our intellectual property rights could be costly to us, could require significant time and attention of our management and could adversely affect our business and our ability to successfully compete in the field of oligonucleotides.

We may not be able to protect our intellectual property rights throughout the world.

Obtaining a valid and enforceable issued or granted patent covering our technology in the United States and worldwide can be extremely costly. In jurisdictions where we have not obtained patent protection, competitors may use our technology to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but where it is more difficult to enforce a patent as compared to the United States. Competitor products may compete with our future products in jurisdictions where we do not have issued or granted patents or where our issued or granted patent claims or other intellectual property rights are not sufficient to prevent competitor activities in these jurisdictions. The legal systems of certain countries, particularly certain developing countries, make it difficult to enforce patents and such countries may not recognize other types of intellectual property protection, particularly relating to biopharmaceuticals. This could make it difficult for us to prevent the infringement of our

patents or marketing of competing products in violation of our proprietary rights generally in certain jurisdictions. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial cost and divert our efforts and attention from other aspects of our business.

We generally file a provisional patent application first (a priority filing) at the USPTO. A Patent Cooperation Treaty ("PCT") application is usually filed within 12 months after the priority filing. Regional and/or national patent applications may be pursued outside of the United States, either based on a PCT application or as a direct filing, in some cases claiming priority to a prior U.S. or PCT filing. Some of our cases have been filed in multiple jurisdictions, including major market jurisdictions. We also commonly enter the national stage in the United States through a PCT filing. We have so far not filed for patent protection in all national and regional jurisdictions where such protection may be available. In addition, we may decide to abandon national and regional patent applications before grant. Finally, the grant proceeding of each national or regional patent is an independent proceeding which may lead to situations in which applications might in some jurisdictions be refused by the relevant registration authorities, while granted by others. It is also quite common that depending on the country, different scopes of patent protection may be granted on the same product or technology.

The laws of some jurisdictions do not protect intellectual property rights to the same extent as the laws in the United States, and many companies have encountered significant difficulties in protecting and defending such rights in such jurisdictions. If we or our licensors encounter difficulties in protecting, or are otherwise precluded from effectively protecting, the intellectual property rights important for our business in such jurisdictions, the value of these rights may be diminished and we may face additional competition from others in those jurisdictions. Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties, allowing competitors to manufacture and sell their own versions of our product, thereby reducing our sales. In addition, many countries do not permit enforcement of patents, or limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such a patent. If we or any of our licensors, collaborators or present or future partners are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position in the relevant jurisdiction may be impaired and our business and results of operations may be adversely affected.

The requirements for patentability may differ in certain countries. For example, some jurisdictions may have heightened requirements for patentability compared to others, and may specifically require a detailed description of medical uses of a claimed drug. In some jurisdictions, unlike the United States, there is no link between regulatory approval of a drug and its patent status. Furthermore, generic or biosimilar drug manufacturers or other competitors may challenge the scope, validity or enforceability of our or our licensors' or collaborators' patents, requiring us or our licensors or collaborators to engage in complex, lengthy and costly litigation or other proceedings. Generic or biosimilar drug manufacturers may develop, seek approval for, and launch generic versions of our products. Accordingly, our and our licensors' and collaborators' efforts to enforce intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we own or license.

We or our licensors, collaborators or any future strategic partners may become subject to third party claims or litigation alleging infringement of patents or other proprietary rights or seeking to invalidate patents or other proprietary rights, and we may need to resort to litigation to protect or enforce our patents or other proprietary rights, all of which could be costly and time consuming, or delay or prevent the development and commercialization of our product candidates, or put our patents and other proprietary rights at risk.

We or our licensors, collaborators or any future strategic partners may be subject to third-party claims for infringement or misappropriation of patent or other proprietary rights. We are generally obligated under our license or collaboration agreements to indemnify and hold harmless our licensors or collaborators for damages arising from intellectual property infringement by us. If we or our licensors, collaborators or any future strategic partners are found to infringe a third-party patent or other intellectual property rights, we could be required to pay damages, potentially including treble damages, if we are found to have willfully infringed. In addition, we or our licensors, collaborators or any future strategic partners may choose to seek, or be required to seek, a license from a third party, which may not be available on acceptable terms, if at all. Even if a license can be obtained on acceptable terms, the rights may be non-exclusive, which could give our competitors access to the same technology or intellectual property rights licensed to us. If we fail to obtain a required license, we or our collaborator, or any future collaborator, may be unable to effectively market product candidates based on our technology, which could limit our ability to generate revenue or achieve profitability and possibly prevent us from generating revenue sufficient to sustain our operations. In addition, we may find it necessary to pursue claims or initiate lawsuits to protect or enforce our patent or other intellectual property rights. The cost to us in defending or initiating any litigation or other proceeding relating to patent or other proprietary rights, even if resolved in our favor, could be substantial, and litigation would divert our management's attention. Some of our competitors may be able to sustain the costs of complex patent litigation more effectively than we can because they have substantially greater resources. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could delay our research and development efforts and limit our ability to continue our operations.

If we were to initiate legal proceedings against a third party to enforce a patent covering one of our products or our technology, the defendant could counterclaim that our patent is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, for example, lack of novelty, lack of written disclosure, obviousness, or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. The outcome following legal allegations of invalidity and unenforceability during patent litigation is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of the patent protection on one or more of our products or certain aspects of our platform technology. Such a loss of patent protection could negatively impact our business. Patents and other intellectual property rights also will not protect our technology if competitors design around our protected technology without legally infringing our patents or other intellectual property rights.

Intellectual property rights of third parties could adversely affect our ability to commercialize our product candidates, and we might be required to litigate or obtain licenses from third parties in order to develop or market our product candidates. Such litigation or licenses could be costly or not available on commercially reasonable terms.

Because the oligonucleotide intellectual property landscape is still evolving and our product candidates have not yet reached commercialization, it is difficult to conclusively assess our freedom to operate. There are numerous companies that have pending patent applications and issued patents directed to certain aspects of oligonucleotides. We are aware of third-party competitors in the oligonucleotide therapeutics space, whose patent filings and/or issued patents may include claims directed to targets and/or products related to some of our programs. It is possible that at the time that we commercialize our products these third-party patent portfolios may include issued patent claims that cover our products or critical features of their production or use. Our competitive position may suffer if patents issued to third parties or other third-party intellectual property rights cover, or may be alleged to cover, our products or elements thereof, or methods of manufacture or use relevant to our development plans. In such cases, we may not be in a position to develop or commercialize product candidates unless we successfully pursue litigation to nullify or invalidate the third party intellectual property right concerned or enter into a license agreement with the intellectual property right holder, if available on commercially reasonable terms.

It is also possible that we have failed to identify relevant third-party patents or applications. For example, U.S. applications filed before November 29, 2000, and certain U.S. applications filed after that date that will not be filed outside the United States remain confidential until patents issue. Patent applications in the United States and elsewhere are published approximately 18 months after the earliest filing date for which priority is claimed, with such earliest filing date being commonly referred to as the priority date. Therefore, patent applications covering our products or platform technology could have been filed by others without our knowledge. Additionally, pending patent applications which have been published can, subject to certain limitations, be later amended in a manner that could cover our platform technologies, our products or the use of our products. Third party intellectual property right holders may also actively bring infringement claims against us. We cannot guarantee that we will be able to successfully settle or otherwise resolve such infringement claims. If we are unable to successfully settle future claims on terms acceptable to us, we may be required to engage in or continue costly, unpredictable and time-consuming litigation and may be prevented from or experience substantial delays in marketing our products. If we fail in any such dispute, in addition to being forced to pay damages, we may be temporarily or permanently prohibited from commercializing any of our product candidates that are held to be infringing. We might, if possible, also be forced to redesign product candidates so that we no longer infringe the third-party intellectual property rights. Any of these events, even if we were ultimately to prevail, could require us to divert substantial financial and management resources that we would otherwise be able to devote to our business.

If we fail to comply with our obligations under any license, collaboration or other agreement, we may be required to pay damages and could lose intellectual property rights that are necessary for developing and protecting our product candidates, or we could lose certain rights to grant sublicenses.

There are many issued patents and/or pending patent applications that claim aspects of oligonucleotide compositions, chemistry and/or modifications that we may want or need to apply to our product candidates. There are also many issued patents and/or pending patent applications that claim targeted genes or portions of genes that may be relevant for the oligonucleotides we wish to develop. We are aware of third-party competitors in the oligonucleotide therapeutics space whose patent filings and/or issued patents may include claims directed to targets and/or product candidates related to some of our development programs. It is possible that these third-party patent portfolios may include issued patent claims that cover our product candidates or critical features of their production or use. Thus, it is possible that one or more organizations will hold patent rights to which we will need or want a license. If those organizations refuse to grant us a license to such patent rights on reasonable terms, or at all, we may not be able to market products or perform research and development or other activities covered by these patents.

Our technology licenses and any future licenses we enter into are likely to impose various development, commercialization, funding, milestone, royalty, diligence, sublicensing, insurance, patent prosecution and enforcement, and/or other obligations on us. If we breach any of these imposed obligations, or use the intellectual property licensed to us in an unauthorized manner, we may be required to pay damages and the licensor may have the right to terminate the license, which could result in us being unable to develop, manufacture and sell products that are covered by the licensed technology or enable a competitor to gain access to the licensed technology. Moreover, our licensors may own or control intellectual property that has not been licensed to us and, as a result, we may be subject to claims, regardless of their merit, that we are infringing or otherwise violating the licensor's rights. In addition, while we cannot currently determine the amount of the royalty obligations we would be required to pay on sales of future products, if any, the amounts may be significant. The amount of our future royalty obligations will depend on the technology and intellectual property we use in products that we successfully develop and commercialize, if any. Therefore, even if we successfully develop and commercialize products, we may be unable to achieve or maintain profitability.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to seeking patent protection for certain aspects of our product candidates, we also consider trade secrets, including confidential and unpatented know-how, improvements and technological innovation important to the maintenance of our competitive position. We protect trade secrets and confidential and unpatented know-how, improvements and technological innovation, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to such knowledge, such as our employees, corporate collaborators, outside scientific collaborators, CROs, contract manufacturers, consultants, advisors and other third parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants that obligate them to maintain confidentiality and assign their inventions to us. Despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable. In addition, some courts in the United States and certain foreign jurisdictions are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, our competitive position would be harmed.

We may be subject to claims that we or our employees or consultants have wrongfully used or disclosed alleged trade secrets of our employees' or consultants' former employers or their clients. These claims may be costly to defend and if we do not successfully do so, we may be required to pay monetary damages and may lose valuable intellectual property rights or personnel.

Many of our employees were previously employed at universities or biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although no claims against us are currently pending, we may be subject to claims that these employees or we have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers. Litigation may be necessary to defend against these claims. If we fail in defending such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. A loss of key research personnel or their work product could hamper our ability to commercialize, or prevent us from commercializing, our product candidates, which could severely harm our business. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Our trademarks or trade names may be infringed, challenged, invalidated, circumvented, weakened or declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names or may be forced to stop using these names, which we need for name recognition by potential partners or customers in our markets of interest. If we are unable to establish name recognition based on our trademarks and trade names, we may not be able to compete effectively and our business may be adversely affected.

Risks Related to Our Being a Singapore Company

We are a Singapore incorporated company and it may be difficult to enforce a judgment of U.S. courts for civil liabilities under U.S. federal securities laws against us, our directors or our officers in Singapore.

We are incorporated under the laws of the Republic of Singapore, and certain of our directors are residents outside the United States. Moreover, a significant portion of our consolidated assets are located outside the United States. Although we are incorporated outside the United States, we have agreed to accept service of process in the United States through our agent designated for that purpose.

Nevertheless, because a majority of the consolidated assets owned by us are located outside the United States, any judgment obtained in the United States against us may not be enforceable within the United States.

There is no treaty between the United States and Singapore providing for the reciprocal recognition and enforcement of judgments in civil and commercial matters and a final judgment for the payment of money rendered by any federal or state court in the United States based on civil liability, whether or not predicated solely upon the federal securities laws, would, therefore, not be automatically enforceable in Singapore. There is uncertainty as to whether judgments of courts in the United States based upon the civil liability provisions of the federal securities laws of the United States would be recognized or enforceable in Singapore. In addition, holders of book-entry interests in our shares will be required to be registered shareholders as reflected in our shareholder register in order to have standing to bring a shareholder action and, if successful, to enforce a foreign judgment against us, our directors or our executive officers in the Singapore courts. The administrative process of becoming a registered holder could result in delays prejudicial to any legal proceedings or enforcement action. Consequently, it may be difficult for investors to enforce against us, our directors or our officers in Singapore judgments obtained in the United States which are predicated upon the civil liability provisions of the federal securities laws of the United States.

We are incorporated in Singapore and our shareholders may have more difficulty in protecting their interests than they would as shareholders of a corporation incorporated in the United States.

Our corporate affairs are governed by our constitution and by the laws governing corporations incorporated in Singapore. The rights of our shareholders and the responsibilities of the members of our board of directors under Singapore law are different from those applicable to a corporation incorporated in the United States. Principal shareholders of Singapore companies do not owe fiduciary duties to minority shareholders, as compared, for example, to controlling shareholders in corporations incorporated in Delaware. Our public shareholders may have more difficulty in protecting their interests in connection with actions taken by our management, members of our board of directors or our principal shareholders than they would as shareholders of a corporation incorporated in the United States.

In addition, only persons who are registered as shareholders in our shareholder register are recognized under Singapore law as shareholders of our company. Only registered shareholders have legal standing to institute shareholder actions against us or otherwise seek to enforce their rights as shareholders. Investors in our shares who are not specifically registered as shareholders in our shareholder register (for example, where such shareholders hold shares indirectly through the Depository Trust Company) are required to become registered as shareholders in our shareholder register in order to institute or enforce any legal proceedings or claims against us, our directors or our executive officers relating to shareholder rights. Holders of book-entry interests in our shares may become registered shareholders by exchanging their book-entry interests in our shares for certificated shares and being registered in our shareholder register. Such process could result in administrative delays which may be prejudicial to any legal proceeding or enforcement action.

We are subject to the laws of Singapore, which differ in certain material respects from the laws of the United States.

As a company incorporated under the laws of the Republic of Singapore, we are required to comply with the laws of Singapore, certain of which are capable of extra-territorial application, as well as our constitution. In particular, we are required to comply with certain provisions of the Securities and Futures Act 2001 of Singapore (the "SFA"), which prohibit certain forms of market conduct and require certain information disclosures, and impose criminal and civil penalties on corporations, directors and officers in respect of any breach of such provisions. We are required to comply with the Singapore Code on Take-Overs and Mergers (the "Singapore Takeover Code"), which specifies, among other things, certain circumstances in which a general offer is to be made upon a change in effective control, and further specifies the manner and price at which voluntary and mandatory general offers are to be made.

We are also subject to Section 34 of the Singapore Patents Act, which provides that a person residing in Singapore is required to obtain written authorization from the Singapore Registrar of Patents (the "Registrar") before filing an application for a patent for an invention outside of Singapore, unless certain conditions have been satisfied. A violation of Section 34 is a criminal offense punishable by a fine not exceeding S$5,000, or imprisonment for a term not exceeding two years, or both. There have been some instances where we have undertaken filings outside of Singapore, and there may be instances where we are required to make such filings in the future, without first obtaining written authorization from the Registrar. We have notified the Registrar of such filings and we have since implemented measures to address the requirements of Section 34 moving forward. To date, the Registrar has offered a compound of some of the offences considered against payment of a sum of S$50 to S$150 per considered case. Under Singapore law, the Registrar has discretion to offer a compound of such offences against payment of a sum of money of up to S$2,000, or to prosecute the offence subject to the other penalties noted above. Per requests in the Registrar's most recent decision, we have submitted approximately 140 patent applications in multiple patent families, most of which are related to previously reported applications, to the Intellectual Property Office of Singapore ("IPOS"). The IPOS may consider the filing of some or all of these applications to have breached Section 34 requirements per IPOS' current interpretation of Section 34, and we are waiting for IPOS' decision on these

applications. We cannot assure you that the Registrar will offer to compound any such violations of Section 34, or that any offer to compound will be for an amount similar to previous compound offer.

The laws of Singapore and of the United States differ in certain significant respects. The rights of our shareholders and the obligations of our directors and officers under Singapore law (including under the Companies Act 1967 of Singapore (the "Singapore Companies Act") are different from those applicable to a company incorporated in the State of Delaware in material respects, and our shareholders may have more difficulty and less clarity in protecting their interests in connection with actions taken by our management, members of our board of directors or our affiliated shareholders than would otherwise apply to a company incorporated in the State of Delaware.

The application of Singapore law, in particular, the Singapore Companies Act may, in certain circumstances, impose more restrictions on us and our shareholders, directors and officers than would otherwise be applicable to a company incorporated in the State of Delaware. For example, the Singapore Companies Act requires directors to act with a reasonable degree of diligence and, in certain circumstances, imposes criminal liability for specified contraventions of particular statutory requirements or prohibitions. In addition, pursuant to the provisions of the Singapore Companies Act, shareholders holding 10% or more of the total number of paid-up shares carrying the right of voting in general meetings may require the convening of an extraordinary general meeting of shareholders by our directors. If our directors fail to comply with such request within 21 days of the receipt thereof, the original requisitioning shareholders, or any of them holding more than 50% of the voting rights represented by the original requisitioning shareholders, may proceed to convene such meeting, and we will be liable for the reasonable expenses incurred by such requisitioning shareholders. We are also required by the Singapore Companies Act to deduct such corresponding amounts from fees or other remuneration payable by us to such non-complying directors.

We are subject to the Singapore Takeover Code, which requires a person acquiring 30% or more of our voting shares to conduct a takeover offer for all of our voting shares. This could have the effect of discouraging, delaying or preventing a merger or acquisition and limit the market price of our ordinary shares.

We are subject to the Singapore Takeover Code. The Singapore Takeover Code contains provisions that may delay, deter or prevent a future takeover or change in control of our company and limit the market price of our ordinary shares for so long as we remain a public company with more than 50 shareholders and net tangible assets of S$5 million (Singapore dollars) or more. For example, under the Singapore Takeover Code, any person acquiring, whether by a series of transactions over a period of time or not, either on such person's own or together with parties acting in concert with such person, 30% or more of our voting shares, or if such person holds, either on such person's own or together with parties acting in concert with such person, between 30% and 50% (both inclusive) of our voting shares, and if such person (or parties acting in concert with such person) acquires additional voting shares representing more than 1% of our voting shares in any six-month period, must, except with the consent of Securities Industry Council in Singapore, extend a takeover offer for our remaining voting shares in accordance with the Singapore Takeover Code. Therefore, any investor seeking to acquire a significant stake in our company may be deterred from doing so if, as a result, such investor would be required to conduct a takeover offer for all of our voting shares.

These same provisions could discourage potential investors from acquiring a stake or making a significant investment in our company and may substantially impede the ability of our shareholders to benefit from a change of effective control and, as a result, may adversely affect the market price of our ordinary shares and the ability to realize any benefits from a potential change of control.

For a limited period of time, our directors have general authority to allot and issue new ordinary shares on terms and conditions and for such purposes as may be determined by our board of directors in its sole discretion.

Under Singapore law, we may only allot and issue new shares with the prior approval of our shareholders in a general meeting. At our most recent annual general meeting of shareholders, our shareholders provided our directors with a general authority, subject to the provisions of the Singapore Companies Act and our constitution, to allot and issue any number of new ordinary shares and/or make or grant offers, agreements, options or other instruments (including the grant of awards or options pursuant to our equity-based incentive plans and agreements in effect from time to time) that might or would require ordinary shares to be allotted and issued (collectively, the "Instruments"); and unless revoked or varied by us in a general meeting, such authority will continue in force until the earlier of (i) the conclusion of our next annual general meeting of shareholders, or (ii) the expiration of the period within which our next annual general meeting of shareholders is required by law to be held. Subject to the general requirements of the Singapore Companies Act and our constitution, the general authority given to our directors by our shareholders to allot and issue ordinary shares and/or make or grant the Instruments may be exercised by our directors on such terms and conditions, for such purposes and for consideration as they may in their sole discretion deem fit, and with such rights or restrictions as they may think fit to impose and as are set forth in our constitution. Any additional issuances of new ordinary shares and/or any grant of the Instruments by our directors may dilute our shareholders' interests in our ordinary shares and/or adversely impact the market price of our ordinary shares.

We may be or become a passive foreign investment company, which could result in adverse U.S. federal income tax consequences to U.S. Holders.

The rules governing passive foreign investment companies ("PFICs") can have adverse effects for U.S. federal income tax purposes. The tests for determining PFIC status for a taxable year depend upon the relative values of certain categories of assets and the relative amounts of certain kinds of income. The determination of whether we are a PFIC, which must be made annually after the close of each taxable year, depends on the particular facts and circumstances (such as the valuation of our assets, including goodwill and other intangible assets) and may also be affected by the application of the PFIC rules, which are subject to differing interpretations. The fair market value of our assets is expected to relate, in part, to (a) the market price of our ordinary shares and (b) the composition of our income and assets, which will be affected by how, and how quickly, we spend any cash that is raised in any financing transaction. Moreover, our ability to earn specific types of income that we currently treat as non-passive for purposes of the PFIC rules is uncertain with respect to future years. Based on our gross income, the average value of our assets, including goodwill and the nature of our active business, we do not expect to be treated as a PFIC for U.S. federal income tax purposes for the taxable year ended December 31, 2022. Because the value of our assets for purposes of determining PFIC status will depend in part on the market price of our ordinary shares, which may fluctuate significantly, there can be no assurance that we will not be considered a PFIC for our current taxable year ending December 31, 2023 or for any future taxable year.

If we are a PFIC, a U.S. Holder (defined below) would be subject to adverse U.S. federal income tax consequences, such as ineligibility for any preferred tax rates on capital gains or on actual or deemed dividends, interest charges on certain taxes treated as deferred, and additional reporting requirements under U.S. federal income tax laws and regulations. A U.S. Holder may in certain circumstances mitigate adverse tax consequences of the PFIC rules by filing an election to treat the PFIC as a qualified electing fund ("QEF") or, if shares of the PFIC are "marketable stock" for purposes of the PFIC rules, by making a mark-to-market election with respect to the shares of the PFIC. If a U.S. Holder makes a mark-to-market election with respect to its ordinary shares, the U.S. Holder is required to include annually in its U.S. federal taxable income an amount reflecting any year end increase in the value of its ordinary shares. For purposes of this discussion, a "U.S. Holder" is a beneficial owner of ordinary shares that is for U.S. federal income tax purposes: (i) an individual who is a citizen or resident of the United States; (ii) a corporation (or other entity taxable as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia; (iii) an estate the income of which is subject to U.S. federal income taxation regardless of its source; or (iv) a trust (a) if a court within the U.S. can exercise primary supervision over its administration, and one or more U.S. persons have the authority to control all of the substantial decisions of that trust, or (b) that was in existence on August 20, 1996, and validly elected under applicable Treasury Regulations to continue to be treated as a domestic trust.

Investors should consult their own tax advisors regarding all aspects of the application of the PFIC rules to the ordinary shares.

Singapore taxes may differ from the tax laws of other jurisdictions.

Prospective investors should consult their tax advisors concerning the overall tax consequences of purchasing, owning and disposing of our shares. Singapore tax law may differ from the tax laws of other jurisdictions, including the United States.

We may become subject to unanticipated tax liabilities.

We are incorporated under the laws of Singapore. We are, however, subject to income, withholding or other taxes in certain jurisdictions by reason of our activities and operations, and it is also possible that tax authorities in any such jurisdictions could assert that we are subject to greater taxation than we currently anticipate. Any such non-Singaporean tax liability could materially adversely affect our results of operations.

Tax authorities could challenge the allocation of income and deductions among our subsidiaries, which could increase our overall tax liability.

We are organized in Singapore, and we currently have subsidiaries in the United States, Japan, the United Kingdom, and Ireland. As we grow our business, we conduct, and expect to continue to conduct, increased operations through our subsidiaries in various jurisdictions. If two or more affiliated companies are located in different jurisdictions, the tax laws or regulations of each country generally will require transactions between those affiliated companies to be conducted on terms consistent with those between unrelated companies dealing at arms' length, and appropriate documentation generally must be maintained to support the transfer prices. We maintain our transfer pricing policies to be compliant with applicable transfer pricing laws, but our transfer pricing procedures are not binding on applicable tax authorities.

If tax authorities were to successfully challenge our transfer pricing, there could be an increase in our overall tax liability, which could adversely affect our financial condition, results of operations and cash flows. In addition, the tax laws in the jurisdictions in which we operate are subject to differing interpretations. Tax authorities may challenge our tax positions, and if successful, such challenges

could increase our overall tax liability. In addition, the tax laws in the jurisdictions in which we operate are subject to change. We cannot predict the timing or content of such potential changes, and such changes could increase our overall tax liability, which could adversely affect our financial condition, results of operations and cash flows.

Our financial results reflect the effect of certain tax credits and the operation of certain tax regimes within the United Kingdom. Legislation in the United Kingdom will limit the amount we may be able to claim as a payable tax credit in the future which could impact our financial condition, results of operations and cash flows.

As a company that carries out extensive research and development activities, we benefit from the U.K. research and development tax credit regime for small and medium sized companies, whereby our subsidiary in the United Kingdom is able to surrender the trading losses that arise from its research and development activities for a payable tax credit of up to 33.4% of eligible research and development expenditure on staff and consumables incurred on or before March 31, 2023 and generally up to 18.6% of such expenditure incurred on or after April 1, 2023. Expenditure of staff supplied by unconnected third parties incurred on or before March 31, 2023 are eligible for a cash rebate of up to 21.7% and generally up to 12.1% for such expenditure incurred on or after April 1, 2023.

Due to a change in the U.K. legislation affecting the U.K. research and development tax credit regime for small and medium sized companies, our ability to receive a payable tax credit for the surrender of our trading losses from research and development activities incurred from January 1, 2022 will be limited to the amount equal to three times our "pay as you earn" and U.K. national insurance tax liabilities, absent our qualification under an exception from such limitation.

Further, we may not be able to continue to claim a U.K. tax credit for research and development tax credits under the small and medium-sized companies regime in the future if we increase our personnel and expand our business because we may no longer qualify as a small or medium-sized enterprise.

Risks Related to Our Ordinary Shares

The public market for our ordinary shares may not be liquid enough for our shareholders to sell their ordinary shares quickly or at market price, or at all.

Our ordinary shares are currently listed for trading on the Nasdaq Global Market. There is no assurance that the trading market for our shares will be or remain active. Our shareholders may not be able to sell their ordinary shares quickly or at the market price, or at all. Our executive officers, our directors and their respective affiliates, and our other significant shareholders beneficially own a significant portion of our outstanding ordinary shares, and therefore, liquidity in our ordinary shares is limited. Due to the limited liquidity in our ordinary shares, relatively small orders can have a disproportionate impact on the trading price of our shares. Further, the limited liquidity in our ordinary shares may also impair our ability to raise capital by conducting offerings of our ordinary shares and may impair our ability to enter into strategic partnerships or acquire companies or products by using our ordinary shares as consideration.

The market price of our ordinary shares is likely to be highly volatile, and our shareholders may lose some or all of their investment.

The market price of our ordinary shares is likely to continue to be highly volatile, including in response to factors that are beyond our control. The stock market in general experiences extreme price and volume fluctuations. In particular, the market prices of securities of pharmaceutical and biotechnology companies are extremely volatile, and experience fluctuations that are often unrelated or disproportionate to the operating performance of these companies. These broad and sector-specific market fluctuations can result in extreme fluctuations in the price of our ordinary shares, regardless of our operating performance, and can cause our shareholders to lose some or all of their investment in us.

We issued pre-funded warrants as part of our June 2022 financing, which may cause additional dilution to our shareholders.

In June 2022, we closed an underwritten offering in which we issued and sold 25,464,483 ordinary shares and, to RA Capital Management, L.P. in lieu of additional ordinary shares, pre-funded warrants ("Pre-Funded Warrants") to purchase up to 7,093,656 ordinary shares at an exercise price of $0.0001 per share. The Pre-Funded Warrants contain a so-called "blocker" provision which provides that they are only exercisable upon receipt of shareholder approval or if such exercise would not cause the aggregate number of ordinary shares or the combined voting power of total securities, in each case, beneficially owned by the holder (together with its affiliates) to exceed 19.99% of the number of ordinary shares or total securities, respectively, outstanding immediately after giving effect to the exercise. To the extent the Pre-Funded Warrants above are exercised, additional ordinary shares will be issued and such issuance would dilute existing shareholders and increase the number of shares eligible for resale in the public market.

Our principal shareholders and management own a significant percentage of our ordinary shares and will be able to exert significant control over matters subject to shareholder approval.

Based on information publicly available to us as of December 31, 2022, our executive officers, our directors and their respective affiliates, and our other significant shareholders beneficially own a significant portion of our outstanding ordinary shares. As a result, these shareholders, if acting together, will continue to have significant influence over the outcome of corporate actions requiring shareholder approval, including the election of directors, any merger, consolidation or sale of all or substantially all of our assets and any other significant corporate transaction. The interests of these shareholders may not be the same as or may even conflict with the interests of our other shareholders. For example, these shareholders could delay or prevent a change of control of our company, even if such a change of control would benefit our other shareholders, which could deprive shareholders of an opportunity to receive a premium for their ordinary shares as part of a sale of our company or our assets and might affect the prevailing market price of our ordinary shares. The significant concentration of share ownership may adversely affect the trading price of our ordinary shares due to investors' perception that conflicts of interest may exist or arise.

We incur significant costs due to operating as a public company, and our management is required to devote substantial time to compliance initiatives.

As a public company, we incur significant legal, accounting and other expenses. We are subject to the reporting and other requirements of the Exchange Act, the Sarbanes-Oxley Act of 2002 (the "Sarbanes-Oxley Act"), and the Dodd-Frank Wall Street Reform and Protection Act, as well as rules subsequently adopted by the SEC and the Nasdaq Stock Market. These rules and regulations require, among other things, that we file annual, quarterly and current reports with respect to our business and financial condition and establish and maintain effective disclosure and financial controls and corporate governance practices. We expect that compliance with these rules and regulations will continue to result in substantial legal and financial compliance costs and will make some activities more time-consuming and costly. Our management and other personnel devote a substantial amount of time to these compliance requirements.

If we fail to maintain proper and effective internal controls, our ability to produce accurate and timely financial statements could be impaired, which could harm our operating results, our ability to operate our business and investors' views of us.

We are required to comply with Section 404 of the Sarbanes-Oxley Act. Section 404 of the Sarbanes-Oxley Act requires public companies to maintain effective internal control over financial reporting. In particular, we must perform system and process evaluation and testing of our internal control over financial reporting to allow management to report on the effectiveness of our internal control over financial reporting. Ensuring that we have adequate internal financial and accounting controls and procedures in place so that we can produce accurate financial statements on a timely basis is a costly and time-consuming effort that is evaluated frequently. If we fail to maintain the effectiveness of our internal controls or fail to comply in a timely manner with the requirements of the Sarbanes-Oxley Act, or if we identify deficiencies in our internal control over financial reporting that are deemed to be material weaknesses, this could have a material adverse effect on our business. We could lose investor confidence in the accuracy and completeness of our financial reports, which could have an adverse effect on the price of our ordinary shares and we could be subject to sanctions or investigations by Nasdaq, the SEC or other regulatory authorities, which would require additional financial and management resources. In addition, if our efforts to comply with new or changed laws, regulations, and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to practice, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

The estimates and judgments we make, or the assumptions on which we rely, in preparing our consolidated financial statements could prove inaccurate.

Our consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States ("U.S. GAAP"). The preparation of these consolidated financial statements requires us to make estimates and judgments that affect the reported amounts of our assets, liabilities, revenues and expenses, the amounts of charges accrued by us and related disclosure of contingent assets and liabilities. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. We cannot assure, however, that our estimates, or the assumptions underlying them, will not change over time or otherwise prove inaccurate. For example, our estimates as they relate to anticipated timelines and milestones for our clinical trials or preclinical development may prove to be inaccurate. If this is the case, we may be required to restate our consolidated financial statements, which could, in turn, subject us to securities class action litigation. Defending against such potential litigation relating to a restatement of our consolidated financial statements or otherwise would be expensive and would require significant attention and resources of our management. Moreover, our insurance to cover our obligations with respect to the ultimate resolution of any such litigation may be inadequate. As a result of these factors, any such potential litigation could have a material adverse effect on our financial results, harm our business, and cause our share price to decline.

We do not anticipate paying any cash dividends on our ordinary shares in the foreseeable future.

We have never declared or paid cash dividends on our ordinary shares. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business, and we do not anticipate paying any cash dividends on our ordinary shares in the foreseeable future. In addition, the terms of any future debt agreements may preclude us from paying dividends. As a result, capital appreciation, if any, of our ordinary shares will be our shareholders' sole source of gain for the foreseeable future.

We may incur significant costs from class action litigation due to share volatility.

Our share price may fluctuate for many reasons, including as a result of public announcements regarding the progress of our development efforts or the development efforts of our collaborators and/or competitors, the addition or departure of our key personnel, variations in our quarterly operating results and changes in market valuations of pharmaceutical and biotechnology companies. Holders of stock that has experienced significant price and trading volatility have occasionally brought securities class action litigation against the companies that issued the stock. If any of our shareholders were to bring a lawsuit of this type against us, even if the lawsuit is without merit, we could incur substantial costs defending the lawsuit. The lawsuit could also divert the time and attention of our management, which could harm our business.

Sales of additional ordinary shares could cause the price of our ordinary shares to decline.

Sales of substantial amounts of our ordinary shares in the public market, or the availability of such shares for sale, by us or others, including the issuance of ordinary shares upon exercise of outstanding options or Pre-Funded Warrants or vesting of outstanding restricted share units, or the perception that such sales could occur, could adversely affect the price of our ordinary shares. Certain of our shareholders have required us, or have the right to require us, to register the sales of their shares under the Securities Act under agreements between us and such shareholders. For example, in August 2019, we filed a registration statement on Form S-3, which was declared effective on August 14, 2019, to register the resale from time to time by certain of our executive officers, directors and their affiliates of up to approximately 7.1 million ordinary shares.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our share price and trading volume could decline.

The trading market for our ordinary shares may depend in part on the research and reports that securities or industry analysts publish about us or our business. If too few securities or industry analysts cover our company, the trading price for our ordinary shares would likely be negatively impacted. If one or more of the analysts who cover us downgrade our ordinary shares or publish inaccurate or unfavorable research about our business, our share price would likely decline. If one or more of these analysts cease coverage of our company or fail to publish reports on us regularly, demand for our ordinary shares could decrease, which might cause our share price and trading volume to decline.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

We maintain our U.S. corporate offices and research and development facilities in Cambridge, Massachusetts, where we lease office and laboratory space of approximately 44,000 square feet.

We lease approximately 90,000 square feet of office and laboratory space in Lexington, Massachusetts, which we use for our research, development and cGMP manufacturing.

We also occupy laboratory and office space in Japan. We believe our existing facilities are adequate to meet our current needs.

Item 3. Legal Proceedings

We are not currently a party to any material legal proceedings.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Information

Our ordinary shares are traded on the Nasdaq Global Market under the symbol "WVE".

Shareholders

As of March 10, 2023, we had 98,104,844 ordinary shares outstanding and approximately 11 shareholders of record of our ordinary shares.

Dividends

We have never declared or paid cash dividends on our ordinary shares. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business, and we do not anticipate paying any cash dividends on our ordinary shares in the foreseeable future. In addition, the terms of any future debt agreements may preclude us from paying dividends.

Unregistered Sales of Securities

Not applicable.

Issuer Purchases of Equity Securities

None.

Item 6. [Reserved]

Item 7.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the "Risk Factors" section of this Annual Report on Form 10-K, our actual results could differ materially from the results described in, or implied by, these forward-looking statements.

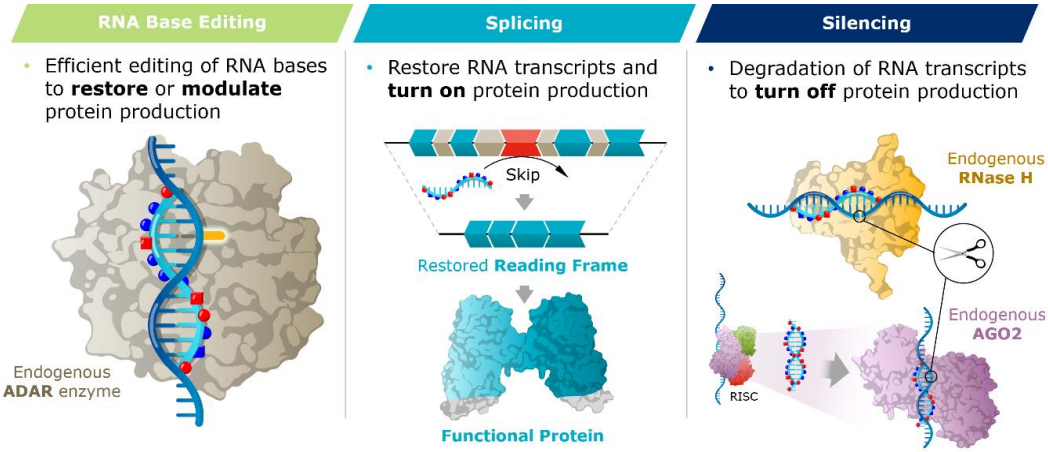
Overview

We are a clinical-stage genetic medicines company committed to delivering life-changing treatments for people battling devastating diseases. Using PRISM, our proprietary discovery and drug development platform that enables the precise design, optimization, and production of novel stereopure oligonucleotides, we are working to develop first-or best-in-class medicines that target the transcriptome (the full set of ribonucleic acid, or "RNA," molecules produced from the human genome) to treat genetically defined diseases with a high degree of unmet need.

Our RNA-targeting oligonucleotides are designed to correct disease-causing mutations, modulate protein activity, restore the production of functional proteins or reduce the expression of disease-promoting RNAs or proteins. Data from our ongoing clinical and preclinical studies has demonstrated significant improvements in potency, durability, and distribution for our oligonucleotides designed through PRISM, compared with competitor chemistries. These data support our platform as best-in-class for designing and optimizing RNA-targeting medicines.

Since our inception, we have seen the value of developing RNA-targeting medicines compared to other nucleic acid therapeutics, including gene therapy and DNA editing. By intervening at the RNA level, we have the potential to address diseases that have historically been difficult to treat with small molecules or biologics, while retaining the ability to titrate dose, modulate duration of effect, and avoid risk of permanent off-target genetic changes and other challenges associated with DNA editing or gene therapy approaches. Oligonucleotides have additional advantages as a therapeutic class, including the ability to access multiple tissue types and the ability to modulate the frequency of dosing to ensure broad distribution within tissues over time. Oligonucleotides also have well-established manufacturing processes and validated test methods based on decades of improvements, as well as established regulatory, access, and reimbursement pathways.

Our approach is based on the scientific insight that the biological machinery necessary to address genetic diseases already exists in human cells and can be harnessed for therapeutic purposes with the right tools. We have built a versatile platform comprised of multiple therapeutic modalities, which provides flexibility to design built-for-purpose molecules that optimally address disease biology. These modalities are RNA base editing, splicing, and silencing, including both RNA interference ("RNAi") and antisense, all of which incorporate proprietary and novel chemistries to optimize the pharmacological properties of our therapeutic oligonucleotides.



We have a robust and diverse pipeline of potential first-or best-in-class programs. Our lead programs are designed to treat genetic diseases, including those in muscle, including Duchenne muscular dystrophy ("DMD"); liver, including alpha-1 antitrypsin deficiency ("AATD"); and the central nervous system ("CNS"), including Huntington's disease ("HD"), amyotrophic lateral sclerosis ("ALS") and frontotemporal dementia ("FTD"). These programs include:

- WVE-N531 (splicing), our exon 53 molecule for the treatment of DMD;
- WVE-006 (editing), our SERPINA1 molecule for the treatment of AATD;
- WVE-003 (silencing), our mHTT SNP3 molecule for the treatment of HD; and
- WVE-004 (silencing), our C9orf72 molecule for the treatment of C9orf72-associated ALS and FTD.

Over the last several years, we have built a leading RNA base editing capability. Our A-to-I RNA base editing oligonucleotides ("AIMers") enable access to areas of disease biology that are not viable for other therapeutic modalities. Our editing capability affords us the dexterity to address both rare diseases, as well as diseases impacting large patient populations.

AIMers are designed to target single bases on an RNA transcript and recruit proteins that exist in the body, called ADAR (adenosine deaminases acting on RNA) enzymes, which naturally possess the ability to change an adenine (A) to an inosine (I), which cells read as guanine (G). This approach enables both the correction of G-to-A point mutations, as well as the modulation of RNA to upregulate protein expression, modify protein-protein interactions, or alter RNA folding and processing. AIMers enable simplified delivery and avoid the risk of permanent changes to the genome and irreversible off-target effects with DNA-targeting approaches. AIMers are short in length, fully chemically modified, and use novel chemistry, including proprietary PN backbone modifications and chiral control, which make them distinct from other ADAR-mediated editing approaches.

Our PRISM platform was built on the recognition that a significant opportunity exists to tune the pharmacological properties of oligonucleotide therapeutics by leveraging three key features of these molecules: sequence, chemistry, and stereochemistry. Our unique ability to control stereochemistry provides the resolution necessary to optimize pharmacological profiles and develop and manufacture stereopure oligonucleotides. Stereopure oligonucleotides are comprised of molecules with atoms precisely and purposefully arranged in three-dimensional orientations at each linkage. These differ from the mixture-based oligonucleotides currently on the market or in development by others. Additionally, to mitigate pharmacological risks and potential manufacturing challenges, our approach focuses on designing short, chemically modified oligonucleotides without the need for complex delivery vehicles. We have also established and continue to enhance our internal cGMP (current good manufacturing practices) manufacturing capabilities to increase control and visibility of our drug substance supply chain, while continuing to innovate oligonucleotide manufacturing.

PRISM also incorporates our novel, proprietary PN backbone chemistry modifications, which have been shown preclinically and clinically to increase potency, distribution, and durability of effect across our various modalities. PN chemistry is incorporated in all of our current clinical, preclinical and discovery-stage programs.

COVID-19 Business Update

We continue to closely monitor developments related to COVID-19, which was declared a pandemic by the World Health Organization on March 11, 2020. In response to this global pandemic, we have concentrated our efforts on the health and safety of our employees and patients, while maintaining business continuity and honoring our commitment to deliver life-changing treatments for people battling devastating diseases.

Our on-site activities continue with protocols for safely accessing and working within our facilities. While we continue to conduct research and development activities, including our ongoing clinical trials, the COVID-19 pandemic has impacted, and may continue to impact, certain of our early-stage discovery efforts and clinical trials. We are working with our clinical investigators, research and development vendors, and supply chain vendors to continually assess and take steps to mitigate the potential impact of COVID-19 on our manufacturing operations and research and development activities.

We will continue to closely monitor the COVID-19 situation as we evolve our business continuity plans. Given the global risks and uncertainties associated with COVID-19, our business, results of operations, and prospects have been and could be materially adversely affected. For additional information, see "Item 1A. Risk Factors" of this Annual Report on Form 10-K.

Recent Developments

On December 13, 2022, Wave Life Sciences USA, Inc. and Wave Life Sciences UK Limited, entered into a Collaboration and License Agreement (the "GSK Collaboration Agreement") with GlaxoSmithKline Intellectual Property (No. 3) ("GSK"), which became effective on January 27, 2023. Pursuant to the GSK Collaboration Agreement, we and GSK have agreed to collaborate on the research, development, and commercialization of oligonucleotide therapeutics, including an exclusive global license to WVE-006. The discovery collaboration has an initial four-year research term and combines our proprietary discovery and drug development platform, PRISM, with GSK's unique insights from human genetics and its global development and commercial capabilities.

Under the terms of the GSK Collaboration Agreement, we received an upfront payment of $170.0 million, which included a cash payment of $120.0 million and a $50.0 million equity investment. On January 26, 2023, pursuant to a share purchase agreement we entered into with Glaxo Group Limited ("GGL") dated as of December 13, 2022, we closed on the $50.0 million equity investment by selling 10,683,761 of our ordinary shares at a purchase price of $4.68 per share to GGL. Subsequent to the GSK Collaboration Agreement becoming effective on January 27, 2023, we received the upfront payment of $120.0 million and the first installment of research support funding in respect of target validation activities under the collaboration.

Financial Operations Overview

We have never been profitable, and since our inception, we have incurred significant operating losses. Our net loss was $161.8 million in 2022 and $122.2 million in 2021. As of December 31, 2022 and 2021, we had an accumulated deficit of $967.3 million and $805.5 million, respectively. We expect to incur significant expenses and operating losses for the foreseeable future.

Revenue

We recognize collaboration revenue under the Takeda Collaboration Agreement (as defined in Note 5 in the notes to the consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K, "Note 5"), which became effective in April 2018. We have not generated any product revenue since our inception and do not expect to generate any revenue from the sale of products for the foreseeable future.

Operating Expenses

Our operating expenses since inception have consisted primarily of research and development expenses and general and administrative expenses.

Research and Development Expenses

Research and development expenses consist primarily of costs incurred for our research activities, including our discovery efforts, and the development of our product candidates, which include:

- compensation-related expenses, including employee salaries, bonuses, share-based compensation expense and other related benefits expenses for personnel in our research and development organization;
- expenses incurred under agreements with third parties, including contract research organizations ("CROs") that conduct research, preclinical and clinical activities on our behalf, as well as contract manufacturing organizations ("CMOs") that manufacture drug product for use in our preclinical studies and clinical trials;
- expenses incurred related to our internal manufacturing of drug substance for use in our preclinical studies and clinical trials;
- expenses related to compliance with regulatory requirements;
- expenses related to third-party consultants;
- research and development supplies and services expenses; and
- facility-related expenses, including rent, maintenance and other general operating expenses.

We recognize research and development costs as incurred. We recognize external development costs based on an evaluation of the progress to completion of specific tasks using information provided to us by our vendors. Payments for these activities are based on the terms of the individual agreements, which may differ from the pattern of costs incurred, and are reflected in our financial statements as prepaid or accrued expenses.

Our primary research and development focus since inception has been the development of our proprietary discovery and drug development platform, PRISM. We are using PRISM, which includes our novel PN backbone chemistry modifications, to design, develop and commercialize a broad pipeline of nucleic acid therapeutic candidates that target RNA using RNA editing, splicing, and silencing.

Our research and development expenses consist primarily of expenses related to our CROs, CMOs, consultants, other external vendors and fees paid to global regulatory agencies to conduct our clinical trials, in addition to compensation-related expenses, internal manufacturing expenses, facility-related expenses and other general operating expenses. These expenses are incurred in connection with research and development efforts and our preclinical studies and clinical trials. We track certain external expenses on a program-by-program basis. However, we do not allocate compensation-related expenses, internal manufacturing expenses, equipment repairs and maintenance expense, facility-related expenses or other operating expenses to specific programs. These expenses, which are not allocated on a program-by-program basis, are included in the "PRISM and other research and development expenses" category along with other external expenses related to our discovery and development programs, as well as platform development and identification of potential drug discovery candidates.

Product candidates in later stages of clinical development generally have higher development costs than those in earlier stages of clinical development, primarily due to the increased size and duration of later-stage clinical trials. We expect to continue to incur significant research and development expenses in the foreseeable future as we continue to manage our existing clinical trials, initiate additional clinical trials for certain product candidates, pursue later stages of clinical development for certain product candidates, maintain our manufacturing capabilities and continue to discover and develop additional product candidates in multiple therapeutic areas.

General and Administrative Expenses

General and administrative expenses consist primarily of compensation-related expenses, including salaries, bonuses, share-based compensation and other related benefits costs for personnel in our executive, finance, corporate, legal and administrative functions, as well as compensation-related expenses for our board of directors. General and administrative expenses also include legal fees; expenses associated with being a public company; professional fees for accounting, auditing, tax and consulting services; insurance costs; travel expenses; other operating costs; and facility-related expenses.

Other Income, Net

Other income, net is comprised of refundable tax credits from tax authorities, dividend and interest income earned on cash and cash equivalents balances, gains and losses on foreign currency transactions, and real estate taxes. We recognize refundable tax credits when there is reasonable assurance that we will comply with the requirements of the refundable tax credit and that the refundable tax credit will be received.

Income Taxes

We are a Singapore multi-national company subject to taxation in the United States and various other jurisdictions.

As of December 31, 2022 and 2021, we have recorded a full valuation allowance against our net operating loss carryforwards and federal and state tax credits in all jurisdictions due to uncertainty regarding future taxable income.

Results of Operations

In this section, we discuss the results of our operations for the year ended December 31, 2022 compared to the year ended December 31, 2021.

Comparison of the Year Ended December 31, 2022 to the Year Ended December 31, 2021

The following table summarizes our results of operations for 2022 and 2021:

	For the Year Ended December 31,		
	2022	2021	Change
		(in thousands)	
Revenue	$ 3,649	$ 40,964	$ (37,315)
Operating expenses:			
Research and development	115,856	121,875	(6,019)
General and administrative	50,513	46,105	4,408
Total operating expenses	166,369	167,980	(1,611)
Loss from operations	(162,720)	(127,016)	(35,704)
Total other income, net	1,578	4,567	(2,989)
Loss before income taxes	(161,142)	(122,449)	(38,693)
Income tax benefit (provision)	(681)	204	(885)
Net loss	$ (161,823)	$ (122,245)	$ (39,578)

Revenue

Revenue for the years ended December 31, 2022 and 2021 was approximately $3.6 million and $41.0 million, respectively, and was primarily earned under the Takeda Collaboration Agreement. The $37.3 million decrease was primarily due to the amendment to our Takeda Collaboration Agreement in 2021, which discontinued the Category 2 component and resulted in the recognition of the previously constrained revenue and an additional $22.5 million for research and development services related to the Category 2 component. Furthermore, in 2022 there was an increase in the expected future research and development services under the Takeda Collaboration Agreement based on the revenue recognition standard.

Research and Development Expenses

The following table summarizes our research and development expenses incurred for the years ended December 31, 2022 and 2021:

	For the Year Ended December 31,		
	2022	2021	Change
		(in thousands)	
ALS and FTD programs	$ 11,539	$ 10,100	$ 1,439
HD programs	7,952	23,565	(15,613)
DMD Programs	2,610	1,115	1,495
AATD program	3,763	396	3,367
PRISM and other research and development expenses (1)	89,992	86,699	3,293
Total research and development expenses	$ 115,856	$ 121,875	$ (6,019)

(1) Includes discovery and development programs, identification of potential drug discovery candidates, and compensation-related expenses, internal manufacturing expenses, equipment repairs and maintenance expense, facility-related expenses and other operating expenses, which are not allocated to specific programs.

Research and development expenses were $115.9 million for the year ended December 31, 2022, compared to $121.9 million for the year ended December 31, 2021. The decrease of approximately $6.0 million was due primarily to the following:

- an increase of $1.4 million in external expenses related to our ALS and FTD program, WVE-004 (PN-modified silencing oligonucleotide);
- a decrease of $15.7 million in external expenses related to our HD programs, driven by decreased external expenses related to our discontinued WVE-120101 and WVE-120102 programs, partially offset by continuing external expenses for our WVE-003 (PN-modified silencing oligonucleotide) program;

- an increase of $1.5 million in external expenses related to our DMD programs, including WVE-N531 (PN-modified splicing oligonucleotide);
- an increase of $3.4 million in external expenses related to our AATD program, WVE-006 (PN-modified RNA editing oligonucleotide); and
- an increase of $3.3 million in internal and external research and development expenses that are not allocated on a program-by-program basis and are related to other discovery and development programs, including PRISM and the identification of potential drug discovery candidates, mainly due to increases in compensation-related expenses and facilities-related expenses, partially offset by decreases in other external research and development expenses.

General and Administrative Expenses

General and administrative expenses were $50.5 million for the year ended December 31, 2022 compared to $46.1 million for the year ended December 31, 2021. The increase of $4.4 million was primarily driven by increases in compensation-related expenses, as well as increases in other general and administrative operating expenses.

Other Income, Net

Other income, net for the years ended December 31, 2022 and 2021 was $1.6 million and $4.6 million, respectively. The decrease of $3.0 million in other income, net was primarily driven by a decrease in estimated refundable tax credits, partially offset by an increase in dividend income during the year ended December 31, 2022.

Income Tax Benefit (Provision)

During the years ended December 31, 2022 and 2021, we recorded income tax provision of $0.7 million and an income tax benefit of $0.2 million, respectively. The income tax provision for the year ended December 31, 2022 was primarily due to the requirement under the Tax Cuts and Jobs Act of 2017 for taxpayers to capitalize and amortize research and development expenditures over five or fifteen years pursuant to Section 174 of the Internal Revenue Code of 1986, as amended, partially offset by the utilization of net operating losses subject to the Section 382 limitation. The income tax benefit for the year ended December 31, 2021 was primarily due to the release of a portion of our uncertain tax positions as a result of a lapse in the statute of limitations.

Liquidity and Capital Resources

Since our inception, we have not generated any product revenue and have incurred recurring net losses. To date, we have primarily funded our operations through public and other registered offerings of our ordinary shares, collaborations with third parties and private placements of debt and equity securities. Through December 31, 2022, we have received an aggregate of approximately $1,021.2 million in net proceeds from these transactions, consisting of $630.9 million in net proceeds from public and other registered offerings of our ordinary shares, $301.0 million from our collaborations and $89.3 million in net proceeds from private placements of our debt and equity securities.

As of December 31, 2022, we had cash and cash equivalents of $88.5 million, restricted cash of $3.7 million and an accumulated deficit of $967.3 million.

Subsequent to December 31, 2022, we received $170.0 million in cash, of which $120.0 million was an upfront payment under the GSK Collaboration Agreement and $50.0 million was under the GSK Equity Investment.

We expect that our existing cash and cash equivalents will be sufficient to fund our operations for at least the next twelve months. We have based this expectation on assumptions that may prove to be incorrect, and we may use our available capital resources sooner than we currently expect. In addition, we may elect to raise additional funds before we need them if the conditions for raising capital are favorable due to market conditions or strategic considerations, even if we expect we have sufficient funds for our current or future operating plans.

Our operating lease commitments as of December 31, 2022 total $47.0 million, of which $8.7 million is related to payments in 2023 and approximately $38.3 million is related to payments beyond 2023.

Until we can generate significant revenue from product sales, if ever, we expect to continue to finance our operations through a combination of public or private equity or debt financings or other sources, which may include collaborations with third parties. In May 2019, we filed a shelf registration statement on Form S-3ASR with the SEC pursuant to which we registered for sale an indeterminate amount of any combination of our ordinary shares, debt securities, warrants, rights and/or units from time to time and at prices and on terms that we may determine. Our shelf registration statement on Form S-3ASR also includes a prospectus covering up to an aggregate of $250.0 million in ordinary shares that we may issue and sell from time to time, through Jefferies LLC (“Jefferies”) acting as our sales agent, pursuant to the open market sales agreement that we entered into with Jefferies in May 2019, as amended in

March 2020 and March 2022 (the "Sales Agreement"), for our "at-the-market" equity program. Since we no longer qualified as a "well-known seasoned issuer" at the time of the filing of our Annual Report on Form 10-K for the year ended December 31, 2019, we previously amended the shelf registration statement to register for sale up to $500.0 million of any combination of our ordinary shares, debt securities, warrants, rights and/or units from time to time and at prices and on terms that we may determine, including the $250.0 million in ordinary shares that we may issue and sell from time to time pursuant to our "at-the-market" equity program. This registration statement, which we refer to as the "2019 Form S-3," remained effective until our 2022 Form S-3 (as defined below) was declared effective on May 4, 2022, after which time we may no longer offer or sell any securities under the 2019 Form S-3. During the year ended December 31, 2022, the Company sold 458,092 ordinary shares under its at-the-market equity program for aggregate net proceeds of $1.2 million.

On March 3, 2022, we filed a new universal shelf registration on Form S-3 with the SEC, which was declared effective by the SEC on May 4, 2022, pursuant to which we registered for sale up to $500.0 million of any combination of our ordinary shares, debt securities, warrants, rights and/or units from time to time and at prices and on terms that we may determine, which we refer to as the "2022 Form S-3." The 2022 Form S-3 includes a prospectus covering up to approximately $132.0 million in ordinary shares that had not yet been issued or sold under our Sales Agreement with Jefferies. As of March 22, 2023 we have $430.0 million in securities available for issuance under the 2022 Form S-3, including approximately $132.0 million in ordinary shares available for issuance under our at-the-market equity program.

Adequate additional financing may not be available to us on acceptable terms, or at all. Our inability to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy. We will need to generate significant revenue to achieve profitability, and we may never do so.

Cash Flows

The following table summarizes our sources and uses of cash for each of the periods presented:

	For the Year Ended December 31,	
	2022	2021
	(in thousands)	
Net cash used in operating activities	$ (127,781)	$ (88,993)
Net cash used in investing activities	(1,255)	(560)
Net cash provided by financing activities	67,188	55,828
Effect of foreign exchange rates on cash	(210)	(208)
Net decrease in cash, cash equivalents and restricted cash	$ (62,058)	$ (33,933)

Operating Activities

During 2022, operating activities used $127.8 million of cash, primarily due to our net loss of $161.8 million, partially offset by non-cash charges of $27.3 million and changes in our operating assets and liabilities of $6.7 million. The non-cash charges for 2022 related mainly to share-based compensation expense of $17.2 million and depreciation expense of $6.6 million. The largest change in operating assets and liabilities was a $9.3 million increase in accounts payable.

During 2021, operating activities used $89.0 million of cash, primarily due to our net loss of $122.2 million, offset by non-cash charges of $26.2 million, partially offset by changes in our operating assets and liabilities of $7.0 million. The non-cash charges for 2021 related mainly to share-based compensation expense of $16.4 million and depreciation expense of $7.5 million. The largest changes in operating assets and liabilities were a decrease of $30.0 million in accounts receivable and a decrease of $18.5 million in deferred revenue related to the Takeda Collaboration Agreement, as well as a decrease in accounts payable of approximately $6.6 million.

Investing Activities

During 2022, investing activities used $1.3 million of cash, primarily consisting of purchases of property and equipment. Additionally, we purchased $75.0 million of short-term investments during 2022, all of which matured in 2022.

During 2021, investing activities used $0.6 million of cash, consisting of purchases of property and equipment.

Financing Activities

During 2022, net cash provided by financing activities was $67.2 million, primarily due to the $65.5 million in net proceeds from the underwritten offering we completed in June 2022, which was comprised of sales of ordinary shares and pre-funded warrants. Additionally, there were $1.1 million in net proceeds from our at-the-market equity program.

During 2021, net cash provided by financing activities was $55.8 million, which was mainly due to the approximately $55.0 million in net proceeds from our at-the-market equity program.

Funding Requirements

We expect to continue to incur significant expenses in connection with our ongoing research and development activities and our internal cGMP manufacturing activities. Furthermore, we anticipate that our expenses will continue to vary if and as we:

- continue to conduct our clinical trials evaluating our product candidates in patients;
- conduct research and preclinical development of discovery targets and advance additional programs into clinical development;
- file clinical trial applications with global regulatory agencies and conduct clinical trials for our programs;
- evaluate next steps for our programs in rare, inherited eye diseases;
- make strategic investments in continuing to innovate our research and development platform, PRISM, and in optimizing our manufacturing processes and formulations;
- maintain our manufacturing capabilities through our internal facility and our CMOs;
- maintain our intellectual property portfolio and consider the acquisition of complementary intellectual property;
- seek and obtain regulatory approvals for our product candidates;
- respond to the impacts of the COVID-19 global pandemic, the conflict involving Russia and Ukraine, global economic uncertainty, rising inflation, rising interest rates or market disruptions on our business; and
- establish and build capabilities to market, distribute and sell our product candidates.

We may experience delays or encounter issues with any of the above, including but not limited to failed studies, complex results, safety issues or other regulatory challenges.

Because of the numerous risks and uncertainties associated with the development of drug candidates and because the extent to which we may enter into collaborations with third parties for development of product candidates is unknown, we are unable to estimate the amounts of future capital outlays and operating expenses associated with completing the research and development for our therapeutic programs. Our future capital requirements for our therapeutic programs will depend on many factors, including:

- the progress, results and costs of conducting research and continued preclinical and clinical development for our therapeutic programs and future potential pipeline candidates;
- the number and characteristics of product candidates and programs that we pursue;
- the cost of manufacturing clinical supplies of our product candidates;
- whether and to what extent milestone events are achieved under our collaborations with Takeda and GSK or any potential future licensee or collaborator;
- the costs, timing and outcome of regulatory review of our product candidates;
- our ability to obtain marketing approval for our product candidates;
- the impacts of the COVID-19 global pandemic, the conflict involving Russia and Ukraine, global economic uncertainty, rising inflation, rising interest rates or market disruptions on our business;
- the costs and timing of future commercialization activities, including manufacturing, marketing, sales and distribution, for any of our product candidates for which we receive marketing approval;
- market acceptance of our product candidates, to the extent any are approved for commercial sale, and the revenue, if any, received from commercial sales of our product candidates for which we receive marketing approval;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims;
- the effect of competing technological and market developments; and

- the extent to which we acquire or invest in businesses, products and technologies, including entering into licensing or collaboration arrangements for product candidates.

Identifying potential product candidates and conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain marketing approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our product revenue, if any, will be derived from sales of products that we do not expect to be commercially available for many years, if ever. Accordingly, we will need to obtain substantial additional funds to achieve our business objectives.

Adequate additional funds may not be available to us on acceptable terms when we need them, or at all. We do not currently have any committed external source of funds, except for possible future payments from Takeda or GSK under our collaborations with them. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our existing shareholders will be diluted, and the terms may include liquidation or other preferences that adversely affect the rights of our shareholders. Additional debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends and may require the issuance of warrants, which could potentially dilute our shareholders' ownership interests.

If we raise additional funds through collaborations, strategic alliances or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development programs or any future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Recently Issued and Adopted Accounting Pronouncements

For detailed information regarding recently issued and adopted accounting pronouncements and the expected impact on our consolidated financial statements, see Note 2 "Significant Accounting Policies" in the notes to the consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K.

Critical Accounting Policies and Significant Judgments and Estimates

Our consolidated financial statements are prepared in accordance with generally accepted accounting principles in the United States of America ("U.S. GAAP"). The preparation of our financial statements and related disclosures requires us to make estimates and assumptions that affect the reported amount of assets, liabilities, revenue, costs and expenses and related disclosures. We believe that our revenue recognition policy, particularly (a) assessing the number of performance obligations; (b) determining the transaction price; (c) allocating the transaction price to the performance obligations in the contract; and (d) determining the pattern over which performance obligations are satisfied, including estimates to complete performance obligations, and the assumptions and estimates used in our analysis of contracts with CROs and CMOs to estimate the contract expense, involve a greater degree of judgment, and therefore we consider them to be our critical accounting policies. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions and conditions.

Revenue Recognition

The Company recognizes revenue in accordance with Accounting Standards Codification ("ASC") Topic 606, Revenue from Contracts with Customers ("ASC 606"). This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, and financial instruments. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration that the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five-step analysis: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. The Company only applies the five-step analysis to contracts when it is probable that the entity will collect the consideration to which it is entitled in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, the Company assesses the goods or services promised within each contract, determines those that are performance obligations, and assesses whether each promised good or service is distinct. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

The Company has entered into collaboration agreements for research, development, and commercial services, under which the Company licenses certain rights to its product candidates to third parties. The terms of these arrangements typically include payment

to the Company of one or more of the following: non-refundable, upfront license fees; reimbursement of certain costs; customer option exercise fees; development, regulatory and commercial milestone payments; and royalties on net sales of licensed products. Any variable consideration is constrained, and therefore, the cumulative revenue associated with this consideration is not recognized until it is deemed not to be at significant risk of reversal.

In determining the appropriate amount of revenue to be recognized as the Company fulfills its obligations under each of its agreements for which the collaboration partner is also a customer, the Company performs the following steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation. As part of the accounting for these arrangements, the Company must use significant judgment to determine: (a) the number of performance obligations based on the determination under step (ii) above; (b) the transaction price under step (iii) above; and (c) the timing of satisfaction of performance obligations as a measure of progress in step (v) above. The Company uses significant judgment to determine whether milestones or other variable consideration, except for royalties, should be included in the transaction price as described further below. The transaction price is allocated to the optional goods and services the Company expects to provide. The Company uses estimates to determine the timing of satisfaction of performance obligations.

Amounts received prior to being recognized as revenue are recorded as deferred revenue. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as current portion of deferred revenue in the accompanying consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as deferred revenue, net of current portion.

Licenses of intellectual property: In assessing whether a promise or performance obligation is distinct from the other promises, the Company considers factors such as the research, development, manufacturing and commercialization capabilities of the customer and the availability of the associated expertise in the general marketplace. In addition, the Company considers whether the customer can benefit from a promise for its intended purpose without the receipt of the remaining promise, whether the value of the promise is dependent on the unsatisfied promise, whether there are other vendors that could provide the remaining promise, and whether it is separately identifiable from the remaining promise. For licenses that are combined with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Research and development services: If an arrangement is determined to contain a promise or obligation for the Company to perform research and development services, the Company must determine whether these services are distinct from other promises in the arrangement. In assessing whether the services are distinct from the other promises, the Company considers the capabilities of the customer to perform these same services. In addition, the Company considers whether the customer can benefit from a promise for its intended purpose without the receipt of the remaining promise, whether the value of the promise is dependent on the unsatisfied promise, whether there are other vendors that could provide the remaining promise, and whether it is separately identifiable from the remaining promise. For research and development services that are combined with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Customer options: If an arrangement is determined to contain customer options that allow the customer to acquire additional goods or services, the goods and services underlying the customer options are not considered to be performance obligations at the outset of the arrangement, as they are contingent upon option exercise. The Company evaluates the customer options for material rights, that is, the option to acquire additional goods or services for free or at a discount. If the customer options are determined to represent a material right, the material right is recognized as a separate performance obligation at the outset of the arrangement. The Company allocates the transaction price to material rights based on the standalone selling price. As a practical alternative to estimating the standalone selling price when the goods or services are both (i) similar to the original goods and services in the contract and (ii) provided in accordance with the terms of the original contract, the Company allocates the total amount of consideration expected to be received from the customer to the total goods or services expected to be provided to the customer. Amounts allocated to any material right are not recognized as revenue until the option is exercised and the performance obligation is satisfied.

Milestone payments: At the inception of each arrangement that includes milestone payments, the Company evaluates whether a significant reversal of cumulative revenue provided in conjunction with achieving the milestones is probable, and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant reversal of cumulative revenue would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of the Company or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. For other milestones, the Company evaluates factors such as the scientific, clinical, regulatory, commercial, and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant reversal of cumulative revenue would not occur. At the end of each subsequent reporting period, the Company reevaluates the probability of achievement of all milestones subject to constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

Royalties: For arrangements that include sales-based royalties, including milestone payments based on a level of sales, and the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue resulting from any of its licensing arrangements.

Contract costs: The Company recognizes as an asset the incremental costs of obtaining a contract with a customer if the costs are expected to be recovered. As a practical expedient, the Company recognizes the incremental costs of obtaining a contract as an expense when incurred if the amortization period of the asset that it otherwise would have recognized is one year or less. To date, the Company has not incurred any incremental costs of obtaining a contract with a customer.

For additional discussion of accounting for collaboration revenues, see Note 5 of our consolidated financial statements.

Prepaid and Accrued Research and Development Expenses

As we prepare our consolidated financial statements, we are required to estimate our prepaid and accrued expenses. For certain contracts with our CROs and CMOs, if the billing terms do not align with the pattern in which the work is completed by the CRO or CMO as of the end of the period, we are required to perform an analysis to estimate the expense, for the period and to date for each contract.

Contracts that are subject to this analysis generally relate to the following services: research and development services, manufacturing services, toxicology studies and clinical trial services. Once we have completed our analysis, we will record the estimated expense in the period for each contract and, depending on the invoicing activity related to each contract, we either have a prepayment or accrual as of the end of the period. We base our estimates on communications with internal study managers, our knowledge of the ongoing and past work at the CROs and CMOs, and communications and reporting from our CROs and CMOs, where applicable.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our market risk exposure is primarily the result of fluctuations in interest rates and foreign exchange rates as well as, to a lesser extent, inflation and capital market risk.

Interest Rate Risk

We are exposed to interest rate risk in the ordinary course of our business. Our cash and cash equivalents are comprised of funds held in checking accounts and money market accounts. Our short-term investments were comprised of term deposits which had fixed interest rates.

There were no short-term investments as of December 31, 2022 or 2021, as the $75.0 million of term deposits that constitute the Company's short-term investments were purchased and all matured during the twelve months ended December 31, 2022.

Foreign Currency Risk

Due to our operations outside of the United States, we are exposed to market risk related to changes in foreign currency exchange rates. Historically, we have not hedged our foreign currency exposure. Changes in the relative values of currencies occur regularly and, in some instances, could materially adversely affect our business, our financial condition, our results of operations or our cash flows. For the years ended December 31, 2022 and 2021, changes in foreign currency exchange rates did not have a material impact on our historical financial position, our business, our financial condition, our results of operations or our cash flows.

A hypothetical 10% change in foreign currency rates would not have a material impact on our historical financial position or results of operations. However, there can be no assurance that changes in foreign currency exchange rates will not have a material adverse impact on us in the future.

Inflation Risk

We do not believe that inflation had a material effect on our business, financial condition, results of operations, or cash flows in the last two years. If global inflation trends continue, we expect appreciable increases in clinical trial, labor, and other operating costs.

Capital Market Risk

We currently have no product revenues and depend on funds raised through other sources. One possible source of funding is through further equity offerings. Our ability to raise funds in this manner depends upon capital market forces affecting our share price, including impacts of the COVID-19 pandemic and global economic uncertainty on the capital markets.

Item 8. Financial Statements and Supplementary Data

The information required by this Item 8 is included at the end of this Annual Report on Form 10-K beginning on page F-1.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2022. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to its management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2022, our principal executive officer and principal financial officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting identified in connection with the evaluation of such internal control required by Rule 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the fiscal quarter ended December 31, 2022 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934, as amended, as a process designed by, or under the supervision of, the company's principal executive and principal financial officers and effected by the company's board of directors, management and other personnel to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that:

- Pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures are being made only in accordance with authorizations of management and directors of the company; and
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2022. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") in Internal Control-Integrated Framework (2013).

Based on our assessment, management believes that, as of December 31, 2022, our internal control over financial reporting is effective based on those criteria.

As a "non-accelerated filer," we are exempt from the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act of 2002. As a result, KPMG LLP, our independent registered public accounting firm, has not audited or issued an attestation report with respect to the effectiveness of our internal control over financial reporting as of December 31, 2022.

Item 9B. Other Information

Singapore Goods and Services Tax ("GST") Rate

The Singapore GST rate was increased from 7% to 8% from January 1, 2023 and will be further increased to 9% from January 1, 2024. The issue or transfer of ownership of our ordinary shares would be exempt from GST, although the sale of our ordinary shares by a GST-registered investor may be considered to be a taxable supply subject to GST at 0% if certain conditions are met. Services consisting of arranging, brokering, underwriting or advising on the issue, allotment or transfer of ownership of our ordinary shares rendered by a GST-registered person to an investor belonging in Singapore for GST purposes in connection with the investor's purchase, sale or holding of our ordinary shares will be subject to GST at the standard rate. Similar services rendered by a GST-registered person contractually to an investor belonging outside Singapore and for the direct benefit of an investor belonging outside Singapore or a GST-registered person in Singapore should generally, subject to the satisfaction of certain conditions, be subject to GST at 0%.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information required by this item will be contained in our definitive proxy statement to be filed with the SEC on Schedule 14A in connection with our 2023 Annual General Meeting of Shareholders, or the Proxy Statement, if the Proxy Statement is filed not later than 120 days after the end of our fiscal year ended December 31, 2022, in the sections titled "Management and Corporate Governance," and "Code of Business Conduct and Ethics," and is incorporated herein by reference. If the Proxy Statement is not filed within such 120-day period, the information required by this item will be contained in an amendment to this Annual Report on Form 10-K to be filed with the SEC, or the Form 10-K/A.

Item 11. Executive Compensation

The information required by this item is incorporated by reference to the information set forth in the section titled "Executive Officer and Director Compensation" in our Proxy Statement. If the Proxy Statement is not filed within 120 days after the end of our fiscal year ended December 31, 2022, the information required by this item will be contained in the Form 10-K/A.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this item is incorporated by reference to the information set forth in the sections titled "Security Ownership of Certain Beneficial Owners and Management" and "Equity Compensation Plan Information" in our Proxy Statement. If the Proxy Statement is not filed within 120 days after the end of our fiscal year ended December 31, 2022, the information required by this item will be contained in the Form 10-K/A.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this item is incorporated by reference to the information set forth in the sections titled "Certain Relationships and Related Person Transactions" and "Management and Corporate Governance – Director Independence" in our Proxy Statement. If the Proxy Statement is not filed within 120 days after the end of our fiscal year ended December 31, 2022, the information required by this item will be contained in the Form 10-K/A.

Item 14. Principal Accountant Fees and Services

The information required by this item regarding principal accountant fees and services is incorporated by reference to the information set forth in the sections titled "Principal Accountant Fees and Services" and "Policy on Audit Committee Pre-Approval of Audit and Permissible Non-Audit Services of Independent Public Accounting Firm" in our Proxy Statement. If the Proxy Statement is not filed within 120 days after the end of our fiscal year ended December 31, 2022, the information required by this item will be contained in the Form 10-K/A.

Our independent registered public accounting firm is KPMG LLP, Boston, MA, Auditor Firm ID: 185.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

1. Financial Statements

See Index to Consolidated Financial Statements on page 121 of this Annual Report on Form 10-K.

2. Financial Statement Schedules

All schedules are omitted because they are not applicable or the required information is shown in the financial statements or notes thereto.

3. Exhibits

The following is a list of exhibits filed as part of this Annual Report on Form 10-K.

Exhibit Number	Exhibit Description	Filed with this Report	Incorporated by Reference herein from Form or Schedule	Filing Date	SEC File/Reg. Number
3.1	Constitution (formerly known as Memorandum of Association and Articles of Association)		Amendment No. 5 to Form S-1 (Exhibit 3.2)	11/10/2015	333-207379
4.1	Form of Specimen Ordinary Share Certificate		Amendment No. 3 to Form S-1 (Exhibit 4.1)	11/06/2015	333-207379
4.2	Description of Securities of the Registrant and Comparison of Shareholder Rights	X			
4.3	Form of Pre-Funded Warrant		Form 8-K (Exhibit 4.1)	06/14/2022	001-37627
4.4.1	Investors' Rights Agreement by and among the Registrant and certain of its shareholders, dated as of August 14, 2015		Form S-1 (Exhibit 4.2)	10/09/2015	333-207379
4.4.2	Amendment No. 1 to Investors' Rights Agreement by and among the Registrant and certain of its shareholders, dated as of November 8, 2018		Form 10-Q (Exhibit 10.2)	11/09/2018	001-37627
4.5	Share Purchase Agreement by and between the Registrant and C.P. Pharmaceuticals International C.V., dated as of May 5, 2016		Form 10-Q (Exhibit 10.2)	08/15/2016	001-37627
Lease Agreements					
10.1.1	Lease Agreement by and between Wave Life Sciences USA, Inc., the Registrant, and King 733 Concord LLC, dated as of April 6, 2015		Form S-1 (Exhibit 10.7)	10/09/2015	333-207379
10.1.2	First Amendment (to Lease) by and between Wave Life Sciences USA, Inc. and CPI/King 733 Concord Owner, LLC, dated as of December 9, 2020		Form 10-K (Exhibit 10.5.2)	03/04/2021	001-37627
10.1.3	Second Amendment (to Lease) by and between Wave Life Sciences USA, Inc. and CPI/King 733 Concord Owner, LLC, dated as of August 8, 2022		Form 10-Q (Exhibit 10.1)	08/11/2022	001-37627

10.2.1	Lease Agreement by and between Wave Life Sciences USA, Inc. and King 115 Hartwell LLC, dated as of September 26, 2016		Form 8-K (Exhibit 10.1)	01/06/2017	001-37627
10.2.2	First Amendment (to Lease) by and between Wave Life Sciences USA, Inc. and King 115 Hartwell LLC, dated as of December 31, 2016		Form 8-K (Exhibit 10.1)	01/06/2017	001-37627
Collaboration and License Agreements					
10.3††	Collaboration and License Agreement by and between Wave Life Sciences USA, Inc., Wave Life Sciences UK Limited and GlaxoSmithKline Intellectual Property (No. 3), dated as of December 13, 2022	X			
10.4	Share Purchase Agreement by and between Glaxo Group Limited and the Registrant, dated as of December 13, 2022	X			
10.5	Investor Agreement by and between Glaxo Group Limited and the Registrant, dated as of January 26, 2023	X			
10.6.1†	Collaboration and License Agreement by and between Wave Life Sciences USA, Inc., Wave Life Sciences UK Limited and Takeda Pharmaceutical Company Limited, dated as of February 19, 2018		Form 10-Q (Exhibit 10.1)	05/09/2018	001-37627
10.6.2	First Amendment to Collaboration and License Agreement by and between Wave Life Sciences USA, Inc., Wave Life Sciences UK Limited and Takeda Pharmaceutical Company Limited, dated as of August 4, 2020		Form 10-Q (Exhibit 10.3)	05/12/2022	001-37627
10.6.3††	Second Amendment to Collaboration and License Agreement by and between Wave Life Sciences USA, Inc., Wave Life Sciences UK Limited and Takeda Pharmaceutical Company Limited, dated as of October 15, 2021		Form 10-K (Exhibit 10.3.2)	03/03/2022	001-37627
10.7	Share Purchase Agreement by and between Takeda Pharmaceutical Company Limited and the Registrant, dated as of February 19, 2018		Form 10-Q (Exhibit 10.2)	05/09/2018	001-37627
10.8	Investor Agreement by and between Takeda Pharmaceutical Company Limited and the Registrant, dated as of April 2, 2018		Form 10-Q (Exhibit 10.3)	05/09/2018	001-37627
Agreements with Executive Officers and Directors					
10.9+	Form of Deed of Indemnity by and between the Registrant and each of its directors and certain of its officers		Form S-1 (Exhibit 10.11)	10/09/2015	333-207379
10.10+	Employment Agreement, as amended and restated, between the Registrant and Paul B. Bolno, dated as of May 8, 2020		Form 10-Q (Exhibit 10.1)	08/10/2020	333-207379
10.11+	Employment Agreement, as amended and restated, between the Registrant and Chandra Vargeese, dated as of May 8, 2020		Form 10-Q (Exhibit 10.2)	08/10/2020	333-207379

10.12+	Employment Agreement between the Registrant and Christopher Francis, Ph.D., dated as of November 8, 2022	X			
10.13+	Employment Agreement between the Registrant and Michael Panzara, M.D. dated as of July 11, 2016		Form 10-Q (Exhibit 10.4)	11/09/2016	001-37627
10.14+	Employment Agreement, as amended and restated, between the Registrant and Kyle Moran, dated as of January 1, 2021		Form 10-K (Exhibit 10.15)	03/04/2021	001-37627
10.15+	Non-Employee Director Compensation Policy, as amended, effective as of August 15, 2022		Form 10-Q (Exhibit 10.1)	11/10/2022	001-37627
10.16+	Consulting Agreement by and between Ontorii, Inc. (now Wave Life Sciences USA, Inc.) and Gregory Verdine, dated as of April 1, 2012		Form S-1 (Exhibit 10.16)	10/09/2015	333-207379
10.17+	Nominee Director Fee Agreement by and between the Registrant and Miura & Associates Management Consultants Pte. Ltd., dated as of October 23, 2012		Form S-1 (Exhibit 10.17)	10/09/2015	333-207379
Equity and Other Compensation Plans					
10.18+	Wave Life Sciences Ltd. 2014 Equity Incentive Plan, as amended (the "2014 Equity Plan")		Form 10-Q (Exhibit 10.1)	11/09/2017	001-37627
10.19+	Wave Life Sciences Ltd. 2021 Equity Incentive Plan, as amended (the "2021 Equity Plan")		Form 8-K (Exhibit 10.1)	08/15/2022	001-37627
10.20+	Wave Life Sciences Ltd. 2019 Employee Share Purchase Plan, effective as of August 15, 2019		Form 10-Q (Exhibit 10.1)	11/05/2019	001-37627
10.21.1+	Form of Non-qualified Share Option Agreement under the 2014 Equity Plan, effective as of September 20, 2016		Form 10-Q (Exhibit 10.2)	11/09/2017	001-37627
10.21.2+	Form of Non-qualified Share Option Agreement under the 2014 Equity Plan, effective as of January 1, 2018		Form 10-K (Exhibit 10.23.3)	03/01/2019	001-37627
10.21.3+	Form of Non-qualified Share Option Agreement under the 2021 Equity Plan, effective as August 10, 2021		Form 10-K (Exhibit 10.3)	11/10/2021	001-37627
10.22.1+	Form of Incentive Share Option Agreement under the 2014 Equity Plan, effective as of December 2014		Form S-8 (Exhibit 10.1)	12/17/2015	333-208598
10.22.2+	Form of Incentive Share Option Agreement under the 2014 Equity Plan, effective as of September 20, 2016		Form 10-Q (Exhibit 10.3)	11/09/2017	001-37627
10.23.1+	Form of Restricted Share Unit Agreement under the 2014 Equity Plan, effective as of June 16, 2016		Form 10-Q (Exhibit 10.4)	11/09/2017	001-37627
10.23.2+	Form of Restricted Share Unit Agreement under the 2014 Equity Plan, effective as of January 1, 2018		Form 10-K (Exhibit 10.25.2)	03/01/2019	001-37627
10.23.3+	Form of Restricted Share Unit Agreement under the 2014 Equity Incentive Plan, effective as of January 1, 2019		Form 10-Q (Exhibit 10.1)	05/10/2019	001-37627

10.23.4+	Form of Restricted Share Unit Agreement under the 2021 Equity Plan, effective as of August 10, 2021		Form 10-Q (Exhibit 10.4)	11/10/2021	001-37627
10.23.5+	Form of Amended and Restated 2019 Performance-Based Restricted Share Unit Agreement under the 2014 Equity Incentive Plan, effective as of March 17, 2021		Form 10-Q (Exhibit 10.2)	05/13/2021	001-37627
10.23.6+	Form of 2021 Performance-Based Restricted Share Unit Agreement under the 2014 Equity Incentive Plan, effective as of March 17, 2021		Form 10-Q (Exhibit 10.3)	05/13/2021	001-37627
10.24.1+	Form of Non-qualified Share Option Agreement for UK Participants under the 2014 Equity Plan, effective as of June 21, 2017		Form 10-Q (Exhibit 10.5)	11/09/2017	001-37627
10.24.2+	Form of Non-qualified Share Option Agreement for UK Participants under the 2014 Equity Plan, effective as of January 1, 2018		Form 10-K (Exhibit 10.26.2)	03/01/2019	001-37627
10.24.3+	Form of Non-qualified Share Option Agreement for UK Participants under the 2021 Equity Plan, effective as of August 10, 2021		Form 10-Q (Exhibit 10.5)	11/10/2021	001-37627
10.24.4+	Form of Restricted Share Unit Agreement for UK Participants under the 2021 Equity Plan, effective as of August 10, 2021		Form 10-Q (Exhibit 10.6)	11/10/2021	001-37627
10.25.1	Form of Inducement Non-qualified Share Option Agreement		Form 10-Q (Exhibit 10.3)	08/10/2020	001-37627
10.25.2	Form of Inducement Restricted Share Unit Agreement		Form 10-Q (Exhibit 10.7)	11/10/2021	001-37627
10.26.1	Open Market Sale Agreement, dated as of May 10, 2019, by and between the Registrant and Jefferies LLC		Form S-3ASR (Exhibit 1.2)	05/10/2019	333-231382
10.26.2	Amendment No. 1 to Open Market Sale Agreement, dated as of March 2, 2020, by and between the Registrant and Jefferies LLC		POSASR (Exhibit 1.3)	03/02/2020	333-231382
10.26.3	Amendment No. 2, dated March 3, 2022, to the Open Market Sale Agreement, dated as of May 10, 2019, by and between Wave Life Sciences Ltd. and Jefferies LLC.		Form 8-K (Exhibit 10.1)	03/03/2022	001-37627
21.1	List of Subsidiaries of the Registrant		Form 10-K (Exhibit 21.1)	03/12/2018	001-37627
23.1	Consent of Independent Registered Public Accounting Firm	X			
24.1	Power of Attorney (included on signature page to this Annual Report on Form 10-K)	X			
31.1	Certifications of Principal Executive Officer pursuant to Rule 13a-14(a)	X			
31.2	Certifications of Principal Financial Officer pursuant to Rule 13a-14(a)	X			
32*	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the	X			

	Sarbanes-Oxley Act of 2002, by Principal Executive Officer and Principal Financial Officer.	
101.INS	XBRL Instance Document – The Instance Document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document	X
101.SCH	Inline XBRL Taxonomy Extension Schema Document	X
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document	X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document	X
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document	X
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document	X
104	The cover page for this Annual Report on Form 10-K for the year ended December 31, 2022 is contained in Exhibit 101 and has been formatted in Inline XBRL.	X

(*) The certification attached as Exhibit 32 that accompanies this Annual Report on Form 10-K is not deemed filed with the SEC and is not to be incorporated by reference into any filing of Wave Life Sciences Ltd. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Form 10-K, irrespective of any general incorporation language contained in such filing.

(+) Indicates management contract or compensatory plan or arrangement.

(†) Confidential treatment has been granted with respect to certain portions of this exhibit. Omitted portions have been filed separately with the SEC.

(††) Certain confidential portions of this Exhibit were omitted by means of marking such portions with brackets ("[***]") because the identified confidential portions (i) are not material and (ii) is the type that the Registrant treats as private or confidential.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Wave Life Sciences Ltd.

Date: March 23, 2023

By: /s/ Paul B. Bolno, M.D.

Paul B. Bolno, M.D.
President and Chief Executive Officer

POWER OF ATTORNEY

Each person whose individual signature appears below hereby authorizes and appoints Paul B. Bolno, M.D. with full power of substitution and resubstitution and full power to act, as his or her true and lawful attorney-in-fact and agent to act in his or her name, place and stead and to execute in the name and on behalf of each person, individually and in each capacity stated below, and to file any and all amendments to this Report and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing, ratifying and confirming all that said attorney-in-fact and agent or his substitute or substitutes may lawfully do or cause to be done by virtue thereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this Report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Paul B. Bolno, M.D. Paul B. Bolno, M.D.	President, Chief Executive Officer and Director (*principal executive officer*)	March 23, 2023
/s/ Kyle Moran Kyle Moran	Chief Financial Officer (*principal financial officer and principal accounting officer*)	March 23, 2023
/s/ Christian Henry Christian Henry	Chairman of the Board of Directors	March 23, 2023
/s/ Gregory L. Verdine, Ph.D. Gregory L. Verdine, Ph.D.	Director	March 23, 2023
/s/ Peter Kolchinsky, Ph.D. Peter Kolchinsky, Ph.D.	Director	March 23, 2023
/s/ Aik-Na Tan Aik-Na Tan	Director	March 23, 2023
/s/ Adrian Rawcliffe Adrian Rawcliffe	Director	March 23, 2023
/s/ Ken Takanashi Ken Takanashi	Director	March 23, 2023
/s/ Mark H. N. Corrigan, M.D. Mark H. N. Corrigan, M.D.	Director	March 23, 2023
/s/ Heidi L. Wagner Heidi L. Wagner	Director	March 23, 2023

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors
Wave Life Sciences Ltd.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Wave Life Sciences Ltd. and subsidiaries (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations and comprehensive loss, Series A preferred shares and shareholders' equity (deficit), and cash flows for the years then ended, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for the years then ended, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ KPMG LLP

We have served as the Company's auditor since 2015.

Boston, Massachusetts
March 23, 2023

WAVE LIFE SCIENCES LTD.
CONSOLIDATED BALANCE SHEETS

(In thousands, except share amounts)

	December 31, 2022	December 31, 2021
Assets		
Current assets:		
Cash and cash equivalents	$ 88,497	$ 150,564
Prepaid expenses	7,932	6,584
Other current assets	2,108	5,416
Total current assets	98,537	162,564
Long-term assets:		
Property and equipment, net	17,284	22,266
Operating lease right-of-use assets	26,843	18,378
Restricted cash	3,660	3,651
Other assets	62	148
Total long-term assets	47,849	44,443
Total assets	$ 146,386	$ 207,007
Liabilities, Series A preferred shares and shareholders' equity (deficit)		
Current liabilities:		
Accounts payable	$ 16,915	$ 7,281
Accrued expenses and other current liabilities	17,552	14,861
Current portion of deferred revenue	31,558	37,098
Current portion of operating lease liability	5,496	4,961
Total current liabilities	71,521	64,201
Long-term liabilities:		
Deferred revenue, net of current portion	79,774	77,479
Operating lease liability, net of current portion	32,118	24,955
Other liabilities	190	—
Total long-term liabilities	112,082	102,434
Total liabilities	$ 183,603	$ 166,635
Series A preferred shares, no par value; 3,901,348 shares issued and outstanding at December 31, 2022 and 2021	$ 7,874	$ 7,874
Shareholders' equity (deficit):		
Ordinary shares, no par value; 86,924,643 and 59,841,116 shares issued and outstanding at December 31, 2022 and 2021, respectively	$ 802,833	$ 749,851
Additional paid-in capital	119,442	87,980
Accumulated other comprehensive income (loss)	(29)	181
Accumulated deficit	(967,337)	(805,514)
Total shareholders' equity (deficit)	(45,091)	32,498
Total liabilities, Series A preferred shares and shareholders' equity (deficit)	$ 146,386	$ 207,007

The accompanying notes are an integral part of the consolidated financial statements.

WAVE LIFE SCIENCES LTD.
CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

(In thousands, except share and per share amounts)

	For the Year Ended December 31,	
	2022	**2021**
Revenue	$ 3,649	$ 40,964
Operating expenses:		
Research and development	115,856	121,875
General and administrative	50,513	46,105
Total operating expenses	166,369	167,980
Loss from operations	(162,720)	(127,016)
Other income, net:		
Dividend income and interest income, net	1,571	30
Other income, net	7	4,537
Total other income, net	1,578	4,567
Loss before income taxes	(161,142)	(122,449)
Income tax benefit (provision)	(681)	204
Net loss	$ (161,823)	$ (122,245)
Net loss per share attributable to ordinary shareholders—basic and diluted	$ (2.05)	$ (2.36)
Weighted-average ordinary shares used in computing net loss per share attributable to ordinary shareholders—basic and diluted	78,855,810	51,825,566
Other comprehensive income (loss):		
Net loss	$ (161,823)	$ (122,245)
Foreign currency translation	(210)	(208)
Comprehensive loss	(162,033)	(122,453)

The accompanying notes are an integral part of the consolidated financial statements.

WAVE LIFE SCIENCES LTD.
CONSOLIDATED STATEMENTS OF SERIES A PREFERRED SHARES AND SHAREHOLDERS' EQUITY (DEFICIT)

(In thousands, except share amounts)

	Series A Preferred Shares		Ordinary Shares		Additional Paid-In-Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Shareholders' Equity (Deficit)
	Shares	Amount	Shares	Amount				
Balance at December 31, 2020	3,901,348	$ 7,874	48,778,678	$ 694,085	$ 71,573	$ 389	$ (683,269)	$ 82,778
Issuance of ordinary shares pursuant to the at-the-market equity program, net	—	—	10,740,915	54,908	—	—	—	54,908
Share-based compensation	—	—	—	—	16,407	—	—	16,407
Vesting of RSUs	—	—	177,279	—	—	—	—	—
Option exercises	—	—	51,957	250	—	—	—	250
Issuance of ordinary shares under the ESPP	—	—	92,287	608	—	—	—	608
Other comprehensive loss	—	—	—	—	—	(208)	—	(208)
Net loss	—	—	—	—	—	—	(122,245)	(122,245)
Balance at December 31, 2021	3,901,348	$ 7,874	59,841,116	$ 749,851	$ 87,980	$ 181	$ (805,514)	$ 32,498
Issuance of ordinary shares, net of offering costs	—	—	25,464,483	51,220	—	—	—	51,220
Issuance of ordinary shares pursuant to the at-the-market equity program, net	—	—	458,092	1,167	—	—	—	1,167
Issuance of pre-funded warrants, net of offering costs	—	—	—	—	14,268	—	—	14,268
Share-based compensation	—	—	—	—	17,194	—	—	17,194
Vesting of RSUs	—	—	904,891	—	—	—	—	—
Option exercises	—	—	90,000	223	—	—	—	223
Issuance of ordinary shares under the ESPP	—	—	166,061	372	—	—	—	372
Other comprehensive loss	—	—	—	—	—	(210)	—	(210)
Net loss	—	—	—	—	—	—	(161,823)	(161,823)
Balance at December 31, 2022	3,901,348	$ 7,874	86,924,643	$ 802,833	$ 119,442	$ (29)	$ (967,337)	$ (45,091)

The accompanying notes are an integral part of the consolidated financial statements.

WAVE LIFE SCIENCES LTD.
CONSOLIDATED STATEMENTS OF CASH FLOWS

(In thousands)

	For the Year Ended December 31,	
	2022	**2021**
Cash flows from operating activities		
Net loss	$ (161,823)	$ (122,245)
Adjustments to reconcile net loss to net cash used in operating activities:		
Amortization of right-of-use assets	3,540	2,352
Depreciation of property and equipment	6,574	7,483
Share-based compensation expense	17,194	16,407
Loss on disposal of property and equipment	12	—
Changes in operating assets and liabilities:		
Accounts receivable	—	30,000
Prepaid expenses	(1,348)	3,850
Other assets	3,394	(338)
Accounts payable	9,348	(6,567)
Accrued expenses and other current liabilities	2,691	2,890
Deferred revenue	(3,245)	(18,464)
Operating lease liabilities	(4,308)	(3,887)
Other non-current liabilities	190	(474)
Net cash used in operating activities	(127,781)	(88,993)
Cash flows from investing activities		
Purchases of property and equipment	(1,361)	(560)
Proceeds from the sale of property and equipment	106	—
Purchase of short-term investments	(75,044)	—
Proceeds from the maturity of short-term investments	75,044	—
Net cash used in investing activities	(1,255)	(560)
Cash flows from financing activities		
Proceeds from issuance of ordinary shares, net of offering costs	51,220	—
Proceeds from issuance pre-funded warrants, net of offering costs	14,268	—
Proceeds from issuance of ordinary shares pursuant to the at-the-market equity program, net	1,105	54,970
Proceeds from the exercise of share options	223	250
Proceeds from the ESPP	372	608
Net cash provided by financing activities	67,188	55,828
Effect of foreign exchange rates on cash	(210)	(208)
Net decrease in cash, cash equivalents and restricted cash	(62,058)	(33,933)
Cash, cash equivalents and restricted cash, beginning of period	154,215	188,148
Cash, cash equivalents and restricted cash, end of period	$ 92,157	$ 154,215
Supplemental disclosure of cash flow information:		
Increase in operating lease right-of-use assets and lease liabilities related to new lease	$ 12,006	$ 4,498

The accompanying notes are an integral part of the consolidated financial statements.

1. THE COMPANY

Organization

Wave Life Sciences Ltd. (together with its subsidiaries, "Wave" or the "Company") is a clinical-stage genetic medicines company committed to delivering life-changing treatments for people battling devastating diseases. Using PRISM, Wave's proprietary discovery and drug development platform that enables the precise design, optimization, and production of novel stereopure oligonucleotides, Wave is working to develop best- or first-in-class medicines that target the transcriptome (the full set of ribonucleic acid ("RNA") molecules produced from the human genome) to treat genetically defined diseases with a high degree of unmet need.

The Company was incorporated in Singapore on July 23, 2012 and has its principal U.S. office in Cambridge, Massachusetts. The Company was incorporated with the purpose of combining two commonly held companies, Wave Life Sciences USA, Inc. ("Wave USA"), a Delaware corporation (formerly Ontorii, Inc.), and Wave Life Sciences Japan, Inc. ("Wave Japan"), a company organized under the laws of Japan (formerly Chiralgen., Ltd.), which occurred on September 13, 2012. On May 31, 2016, Wave Life Sciences Ireland Limited ("Wave Ireland") was formed as a wholly-owned subsidiary of Wave Life Sciences Ltd. On April 3, 2017, Wave Life Sciences UK Limited ("Wave UK") was formed as a wholly-owned subsidiary of Wave Life Sciences Ltd.

The Company's primary activities since inception have been developing and evolving PRISM to design, develop and commercialize oligonucleotide therapeutics, advancing the Company's differentiated portfolio, building the Company's research, development and manufacturing capabilities, advancing programs into the clinic, furthering clinical development of such clinical-stage programs, building the Company's intellectual property, and assuring adequate capital to support these activities.

Liquidity

Since its inception, the Company has not generated any product revenue and has incurred recurring net losses. To date, the Company has primarily funded its operations through private placements of debt and equity securities, public and other registered offerings of its equity securities and collaborations with third parties. Until the Company can generate significant revenue from product sales, if ever, the Company expects to continue to finance operations through a combination of public or private equity or debt financings or other sources, which may include collaborations with third parties. Adequate additional financing may not be available to the Company on acceptable terms, or at all. The inability to raise capital as and when needed would have a negative impact on the Company's financial condition and ability to pursue its business strategy.

As of December 31, 2022, the Company had cash and cash equivalents of $88.5 million. Subsequent to December 31, 2022, the Company received $170.0 million in cash, of which $120.0 million was an upfront payment under the GSK Collaboration Agreement (as defined in note 14) and $50.0 million was the GSK Equity Investment (as defined in note 14). The Company expects that its existing cash and cash equivalents will be sufficient to fund its operations for at least the next twelve months. The Company has based this expectation on assumptions that may prove to be incorrect, and the Company may use its available capital resources sooner than it currently expects. If the Company's anticipated operating results are not achieved in future periods, planned expenditures may need to be further reduced in order to extend the time period over which the then-available resources would be able to fund the Company's operations. In addition, the Company may elect to raise additional funds before it needs them if the conditions for raising capital are favorable due to market conditions or strategic considerations, even if the Company expects it has sufficient funds for its current or future operating plans.

Risks and Uncertainties

The Company is subject to risks common to companies in the biotechnology industry including, but not limited to, new technological innovations, protection of proprietary technology, maintaining internal manufacturing capabilities, dependence on key personnel, compliance with government regulations and the need to obtain additional financing. The Company's therapeutic programs will require significant additional research and development efforts, including extensive preclinical and clinical testing and regulatory approval, prior to commercialization of any product candidates. These efforts require significant amounts of additional capital, adequate personnel infrastructure and extensive compliance-reporting capabilities. There can be no assurance that the Company's research and development efforts will be successful, that adequate protection for the Company's intellectual property will be obtained, that any products developed will obtain necessary government regulatory approval or that any approved products will be commercially viable. Even if the Company's product development efforts are successful, it is uncertain when, if ever, the Company will generate significant revenue from product sales. The Company operates in an environment of rapid change in technology and substantial competition from pharmaceutical and biotechnology companies.

Basis of Presentation

The Company has prepared the accompanying consolidated financial statements in conformity with generally accepted accounting principles in the United States ("U.S. GAAP") and in U.S. dollars.

2. SIGNIFICANT ACCOUNTING POLICIES

Cash and Cash Equivalents

The Company considers all highly liquid securities with maturities of three months or less from the date of purchase to be cash equivalents. The Company's cash and cash equivalents are comprised of funds held in checking and money market accounts.

Short-Term Investments

The Company's short-term investments consist of term deposits.

Principles of Consolidation

The Company's consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of expenses during the reporting periods. Significant estimates and assumptions reflected in these consolidated financial statements include the assumptions used to determine the fair value of share-based awards, the Company's revenue recognition policy, particularly, (a) assessing the number of performance obligations; (b) determining the transaction price; (c) allocating the transaction price to the performance obligations in the contract; and (d) determining the pattern over which performance obligations are satisfied, including estimates to complete performance obligations, the evaluation of progress to completion of external research and development costs which can result in prepaid or accrued expenses related to the Company's contract research organizations ("CROs") and contract manufacturing organizations ("CMOs"), the valuation allowance required for the Company's deferred tax assets, determining uncertain tax positions and the related liabilities, and estimating refundable tax credits. Estimates are periodically reviewed in light of changes in circumstances, facts and experience. Actual results could differ from the Company's estimates.

Segment Data

The Company manages its operations as a single segment for the purposes of assessing performance and making operating decisions. The Company's singular focus is on developing its proprietary discovery and drug development platform, PRISM, to develop and commercialize a broad pipeline of nucleic acid-based therapeutics, or oligonucleotides.

Going Concern

At each reporting period, the Company evaluates whether there are conditions or events that raise substantial doubt about the Company's ability to continue as a going concern within one year after the date that the financial statements are issued. The Company is required to make certain additional disclosures if the Company concludes substantial doubt exists and it is not alleviated by the Company's plans or when the Company's plans alleviate substantial doubt about the Company's ability to continue as a going concern. The Company's evaluation entails analyzing prospective operating budgets and forecasts for expectations of the Company's cash needs and comparing those needs to the current cash and cash equivalent balance.

Foreign Currency Translation

The functional currency is the U.S. dollar for all of the Company's entities aside from Wave Japan, which has the Japanese Yen as its functional currency. Assets and liabilities of Wave Japan are translated at period end exchange rates while revenues and expenses of Wave Japan are translated at average exchange rates for the period. Net unrealized gains and losses from foreign currency translation are reflected as other comprehensive income (loss) within the consolidated statements of Series A preferred shares and shareholders' equity (deficit) and the consolidated statements of operations and comprehensive loss. Gains and losses on foreign currency transactions are included in the consolidated statements of operations and comprehensive loss within other income, net.

Fair Value of Financial Instruments

The Company is required to disclose information on all assets and liabilities reported at fair value that enables an assessment of the inputs used in determining the reported fair values. The fair value hierarchy is a hierarchy of inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that the observable inputs be used when available. Observable inputs are inputs that market participants would use in pricing the financial instrument based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the financial instrument and are developed based on the information available in the circumstances. The fair value hierarchy applies only to the valuation inputs used in determining the reported fair value of the investments and is not a measure of the investment credit quality. The hierarchy defines three levels of valuation inputs:

Level 1—Unadjusted quoted prices in active markets that are accessible at the measurement date of identical, unrestricted assets.

Level 2—Quoted prices for similar assets, or inputs that are observable, either directly or indirectly, for substantially the full term through corroboration with observable market data. Level 2 includes investments valued at quoted prices adjusted for legal or contractual restrictions specific to the security.

Level 3—Pricing inputs are unobservable for the asset, that is, inputs that reflect the reporting entity's own assumptions about the assumptions market participants would use in pricing the asset. Level 3 includes private investments that are supported by little or no market activity.

Cash, cash equivalents and restricted cash are Level 1 assets which are comprised of funds held in checking and money market accounts. Short-term investments are Level 2 assets which are comprised of term deposits. Cash, cash equivalents and restricted cash were recorded at fair value as of December 31, 2022 and 2021, totaling $92.2 million and $154.2 million, respectively. There were no short-term investments as of December 31, 2022 or 2021, as the $75.0 million of term deposits that constitute the Company's short-term investments were all purchased and reached maturity during the twelve months ended December 31, 2022. The carrying amounts of accounts payable and accrued expenses approximate their fair values due to their short-term maturities.

Concentration of Credit Risk

Cash, cash equivalents, restricted cash and short-term investments are financial instruments that potentially subject the Company to concentration of credit risk. The Company uses several financial institutions to maintain its cash, cash equivalents, restricted cash and short-term investments, all of which are high quality, accredited financial institutions and, accordingly, such funds are subject to minimal credit risk. The Company has not experienced any losses in such accounts and management believes that the Company is not exposed to significant credit risk due to the financial position of the depository institutions in which those deposits are held. The Company has no financial instruments with off-balance sheet risk of loss.

Restricted Cash

Restricted cash consists primarily of cash placed in separate restricted bank accounts as required under the terms of the Company's lease agreements for its Cambridge, Massachusetts and Lexington, Massachusetts facilities (refer to Note 8). As of December 31, 2022 and 2021, the Company had $3.7 million of restricted cash, of which $2.7 million related to the Lexington facility and $1.0 million related to the Cambridge facility.

Property and Equipment

Property and equipment, which consists primarily of equipment, furniture, software and leasehold improvements, are stated at cost less accumulated depreciation. Depreciation is calculated on a straight-line basis over the following estimated useful lives of the assets:

Equipment, Furniture and Software	3-7 years
Leasehold Improvements	Shorter of asset life or lease term

Depreciation begins at the time the asset is placed in service. Maintenance and repairs are charged to operations as incurred. Upon retirement or sale, the cost of the disposed asset and the related accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in the consolidated statements of operations and comprehensive loss.

Impairment of Long-Lived Assets

Long-lived assets consist of property and equipment. Long-lived assets are reviewed for impairment whenever events or other changes in circumstances indicate that the carrying amount may not be recoverable. Certain factors may exist or events may occur that indicate

that impairment exists including, but not limited to, the following: significant underperformance relative to historical or projected future operating results; significant changes in the manner of use of the underlying assets; and significant adverse industry or market economic trends.

When performing the impairment assessment for long-lived assets, the Company compares the carrying value of such assets to the estimated undiscounted future net cash flows expected from the use of the assets and their eventual disposition. In the event that the carrying value of the assets is determined to be unrecoverable, the Company would estimate the fair value of the assets and record an impairment charge for the excess of the carrying value over the fair value.

Revenue Recognition

The Company recognizes revenue in accordance with Accounting Standards Codification ("ASC") Topic 606, Revenue from Contracts with Customers ("ASC 606").

This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, and financial instruments. Under ASC 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration that the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that an entity determines are within the scope of ASC 606, the entity performs the following five-step analysis: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. The Company only applies the five-step analysis to contracts when it is probable that the entity will collect the consideration to which it is entitled in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC 606, the Company assesses the goods or services promised within each contract, determines those that are performance obligations, and assesses whether each promised good or service is distinct. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

The Company has entered into collaboration agreements for research, development, and commercial services, under which the Company licenses certain rights to its product candidates to third parties. The terms of these arrangements typically include payment to the Company of one or more of the following: non-refundable, upfront license fees; reimbursement of certain costs; customer option exercise fees; development, regulatory and commercial milestone payments; and royalties on net sales of licensed products. Any variable consideration is constrained and, therefore, the cumulative revenue associated with this consideration is not recognized until it is deemed not to be at significant risk of reversal.

In determining the appropriate amount of revenue to be recognized as the Company fulfills its obligations under each of its agreements for which the collaboration partner is also a customer, the Company performs the following steps: (i) identification of the promised goods or services in the contract; (ii) determination of whether the promised goods or services are performance obligations, including whether they are distinct in the context of the contract; (iii) measurement of the transaction price, including the constraint on variable consideration; (iv) allocation of the transaction price to the performance obligations; and (v) recognition of revenue when (or as) the Company satisfies each performance obligation. As part of the accounting for these arrangements, the Company must use significant judgment to determine: (a) the number of performance obligations based on the determination under step (ii) above; (b) the transaction price under step (iii) above; and (c) the timing of satisfaction of performance obligations as a measure of progress in step (v) above. The Company uses significant judgment to determine whether milestones or other variable consideration, except for royalties, should be included in the transaction price as described further below. The transaction price is allocated to the optional goods and services the Company expects to provide. The Company uses estimates to determine the timing of satisfaction of performance obligations.

Amounts received prior to being recognized as revenue are recorded as deferred revenue. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as current portion of deferred revenue in the accompanying consolidated balance sheets. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as deferred revenue, net of current portion.

Licenses of intellectual property: In assessing whether a promise or performance obligation is distinct from the other promises, the Company considers factors such as the research, development, manufacturing and commercialization capabilities of the customer and the availability of the associated expertise in the general marketplace. In addition, the Company considers whether the customer can benefit from a promise for its intended purpose without the receipt of the remaining promise, whether the value of the promise is dependent on the unsatisfied promise, whether there are other vendors that could provide the remaining promise, and whether it is separately identifiable from the remaining promise. For licenses that are combined with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing

revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Research and development services: If an arrangement is determined to contain a promise or obligation for the Company to perform research and development services, the Company must determine whether these services are distinct from other promises in the arrangement. In assessing whether the services are distinct from the other promises, the Company considers the capabilities of the customer to perform these same services. In addition, the Company considers whether the customer can benefit from a promise for its intended purpose without the receipt of the remaining promise, whether the value of the promise is dependent on the unsatisfied promise, whether there are other vendors that could provide the remaining promise, and whether it is separately identifiable from the remaining promise. For research and development services that are combined with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Customer options: If an arrangement is determined to contain customer options that allow the customer to acquire additional goods or services, the goods and services underlying the customer options are not considered to be performance obligations at the outset of the arrangement, as they are contingent upon option exercise. The Company evaluates the customer options for material rights, that is, the option to acquire additional goods or services for free or at a discount. If the customer options are determined to represent a material right, the material right is recognized as a separate performance obligation at the outset of the arrangement. The Company allocates the transaction price to material rights based on the standalone selling price. As a practical alternative to estimating the standalone selling price when the goods or services are both (i) similar to the original goods and services in the contract and (ii) provided in accordance with the terms of the original contract, the Company allocates the total amount of consideration expected to be received from the customer to the total goods or services expected to be provided to the customer. Amounts allocated to any material right are not recognized as revenue until the option is exercised and the performance obligation is satisfied.

Milestone payments: At the inception of each arrangement that includes milestone payments, the Company evaluates whether a significant reversal of cumulative revenue provided in conjunction with achieving the milestones is probable, and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant reversal of cumulative revenue would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of the Company or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. For other milestones, the Company evaluates factors such as the scientific, clinical, regulatory, commercial, and other risks that must be overcome to achieve the particular milestone in making this assessment. There is considerable judgment involved in determining whether it is probable that a significant reversal of cumulative revenue would not occur. At the end of each subsequent reporting period, the Company reevaluates the probability of achievement of all milestones subject to constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

Royalties: For arrangements that include sales-based royalties, including milestone payments based on a level of sales, and the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue resulting from any of its licensing arrangements.

Contract costs: The Company recognizes as an asset the incremental costs of obtaining a contract with a customer if the costs are expected to be recovered. As a practical expedient, the Company recognizes the incremental costs of obtaining a contract as an expense when incurred if the amortization period of the asset that it otherwise would have recognized is one year or less. To date, the Company has not incurred any incremental costs of obtaining a contract with a customer.

Research and Development Expenses

Research and development expenses are expensed as incurred. External development costs are recognized based on an evaluation of the progress to completion of specific tasks. Payments for these activities are based on the terms of the individual agreements, which may differ from the pattern of costs incurred, and are reflected in the accompanying consolidated balance sheets as prepaid or accrued expenses.

License Agreements and Patent Costs

Costs associated with licenses of technology and patent costs are expensed as incurred and are generally included in research and development expense in the consolidated statements of operations and comprehensive loss.

Refundable Tax Credits

The Company is eligible for refundable tax credits with tax authorities for certain qualified operating expenses. The Company recognizes refundable tax credits when there is reasonable assurance that the Company will comply with the requirements of the refundable tax credit and that the refundable tax credit will be received. Refundable tax credits are recorded as income and classified in other income, net in the consolidated statements of operations and comprehensive loss.

Net Loss per Share

Basic net loss per share is computed using the weighted-average number of ordinary shares outstanding during the period. The outstanding Pre-Funded Warrants (as defined in note 6) are included in the weighted-average number of ordinary shares outstanding used in the calculation of basic net loss per share as the exercise price is negligible and the warrants are fully vested and exercisable. Diluted net loss per share is computed using the sum of the weighted-average number of ordinary shares outstanding during the period and, if dilutive, the weighted-average number of potential ordinary shares, including the assumed exercise of share options and the assumed vesting of RSUs (as defined in note 7).

The Company applies the two-class method to calculate its basic and diluted net loss per share attributable to ordinary shareholders, as its Series A preferred shares are participating securities. The two-class method is an earnings allocation formula that treats a participating security as having rights to earnings that otherwise would have been available to ordinary shareholders. However, for the periods presented, the two-class method does not impact the net loss per ordinary share as the Company was in a net loss position for each of the periods presented and holders of Series A preferred shares do not participate in losses.

The Company's Series A preferred shares contractually entitle the holders of such shares to participate in dividends but do not contractually require the holders of such shares to participate in losses of the Company. Accordingly, for periods in which the Company reports a net loss attributable to ordinary shareholders, diluted net loss per share attributable to ordinary shareholders is the same as basic net loss per share attributable to ordinary shareholders, since dilutive ordinary shares are not assumed to have been issued if their effect is anti-dilutive.

Share-Based Compensation

The Company measures and recognizes share-based compensation expense, for both employee and director option awards, based on the grant date fair value of the awards. The Company calculates the fair value of restricted share unit awards based on the grant date fair value of the underlying ordinary shares. The Company determines the fair value of share-based awards granted to non-employees as either the fair value of the consideration received or the fair value of the equity instruments issued, whichever is more reliably measurable. Equity instruments issued to non-employees as consideration for goods or services received by the Company have been accounted for based on the fair value of the equity instruments issued. The Company recognizes share-based compensation expense on a straight-line basis over the requisite service period of the awards, which is generally the vesting period. The Company accounts for forfeitures as they occur.

The Company classifies share-based compensation expense in its consolidated statements of operations and comprehensive loss in the same manner in which the award recipient's compensation costs are classified or in which the award recipient's service payments are classified.

The fair value of each share option grant was determined using the methods and assumptions discussed below. These inputs are generally subjective and require significant judgment and estimation by management.

- *Fair Value of Ordinary Shares* The fair value of the ordinary shares underlying the Company's share-based awards is based on the closing price of the Company's ordinary shares as reported by the Nasdaq Global Market on the date of grant.
- *Expected Term* The expected term of share options represents the weighted-average period that the share options are expected to remain outstanding. The Company estimated the expected term using the simplified method, which is an average of the contractual term of the option and the vesting period.
- *Expected Volatility* Since there was limited historical data for the Company's ordinary shares and limited company-specific historical volatility through the third quarter of 2021, the Company determined the share price volatility for options granted based on an analysis of the volatility used by a peer group of publicly traded companies. In evaluating similarity, the Company considers factors such as industry, stage of life cycle and size. Beginning in the fourth quarter of 2021, the Company had sufficient historical volatility data for its ordinary shares and as such no longer relies on an analysis of the volatility from a peer group to calculate expected volatility.

- *Risk-free Interest Rate* The risk-free interest rate is based on the U.S. Treasury yield in effect at the time of the grant for zero-coupon U.S. Treasury notes with remaining terms similar to the expected term of the options.
- *Dividend Rate* The expected dividend was assumed to be zero as the Company has never paid dividends and has no current plans to do so.

Income Taxes

The Company accounts for income taxes using an asset and liability approach, which requires recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in the consolidated financial statements but have not been reflected in taxable income. A valuation allowance is established to reduce deferred tax assets to their estimated realizable value. Therefore, the Company provides a valuation allowance to the extent that it is more likely than not that all or a portion of the deferred tax assets will not be realized in the future.

The Company accounts for uncertainty in income taxes recognized in the financial statements by applying a two-step process to determine the amount of tax benefit to be recognized. First, the tax position must be evaluated to determine the likelihood that it will be sustained upon external examination by the tax authorities. If the tax position is deemed more-likely-than-not to be sustained, the tax position is then assessed to determine the amount of benefit to recognize in the financial statements. The amount of the benefit that may be recognized is the largest amount that has a greater than 50% likelihood of being realized upon ultimate settlement. The provision for income taxes includes the effects of any resulting tax reserves, or unrecognized tax benefits, that are considered appropriate as well as the related net interest and penalties. The Company recognizes interest and penalties related to uncertain tax positions in the income tax provision on the consolidated statements of operations and comprehensive loss.

The Company has certain service arrangements in place between its U.S., Japan, U.K. and Singapore entities, which include transfer pricing assumptions. The determination of the appropriate level of transfer pricing requires judgment based on transfer pricing analyses of comparable companies. The Company monitors the nature of its service arrangements for changes in its operations as well as economic conditions. The Company also periodically reviews the transfer pricing analyses for changes in the composition in the pool of comparable companies as well as the related ongoing results of the comparable companies.

Leases

The Company accounts for leases in accordance with ASC Topic 842, *Leases* (“ASC 842”). At the inception of an arrangement, the Company determines whether the arrangement is or contains a lease based on the unique facts and circumstances present in the arrangement. Most leases with a term greater than one year are recognized on the balance sheet as right-of-use assets and short-term and long-term lease liabilities, as applicable. The Company typically only includes an initial lease term in its assessment of a lease arrangement. Options to renew a lease are not included in the Company’s assessment unless there is reasonable certainty that the Company will renew the lease. The Company monitors its plans to renew its leases on a quarterly basis.

Certain lease agreements include rental payments that are adjusted periodically for inflation or other variables. In addition to rent, the leases may require the Company to pay additional amounts for taxes, insurance, maintenance, or other expenses, which are generally referred to as non-lease components. Such adjustments to rental payments and variable non-lease components are treated as variable lease payments and recognized in the period in which the obligation for these payments are incurred. Variable lease components and variable non-lease components are not measured as part of the right-of-use asset and lease liability. Only when lease components and their associated non-lease components are fixed are they accounted for as a single lease component and are recognized as part of a right-of-use asset and lease liability. Total contract consideration is allocated to the combined fixed lease and non-lease component. This policy election applies consistently to all asset classes under lease agreements.

Operating lease liabilities and their corresponding right-of-use assets are recorded based on the present value of lease payments over the expected remaining lease term. Certain adjustments to the right-of-use asset may be required for items such as incentives received. The interest rate implicit in lease contracts is typically not readily determinable. As a result, the Company utilizes its incremental borrowing rate, which reflects the fixed rate at which the Company could borrow on a collateralized basis the amount of the lease payments in the same currency, for a similar term, in a similar economic environment.

Accounting Pronouncements

There were no recently issued or adopted accounting pronouncements that would have a material impact on the Company's consolidated financial statements.

3. PROPERTY AND EQUIPMENT, NET

Property and equipment, net, consists of the following:

	December 31,	
	2022	2021
	(in thousands)	
Furniture and equipment	$ 25,509	$ 25,657
Software	890	817
Leasehold improvements	28,413	27,994
Fixed assets in progress	318	28
Total	55,130	54,496
Less accumulated depreciation	(37,846)	(32,230)
Property and equipment, net	$ 17,284	$ 22,266

Substantially all of the Company's long-lived assets were located in the United States as of December 31, 2022 and 2021.

Depreciation expense was $6.6 million and $7.5 million for the years ended December 31, 2022 and 2021, respectively.

4. ACCRUED EXPENSES AND OTHER CURRENT LIABILITIES

Accrued expenses and other current liabilities consist of the following:

	December 31,	
	2022	2021
	(in thousands)	
Accrued compensation	$ 12,287	$ 10,181
Accrued expenses related to CROs and CMOs	3,516	3,571
Accrued expenses and other current liabilities	1,749	1,109
Total accrued expenses and other current liabilities	$ 17,552	$ 14,861

5. COLLABORATION AGREEMENTS

Takeda Collaboration and Equity Agreements

In February 2018, Wave USA and Wave UK entered into a global strategic collaboration (the "Takeda Collaboration") with Takeda Pharmaceutical Company Limited ("Takeda"), pursuant to which Wave USA, Wave UK and Takeda agreed to collaborate on the research, development and commercialization of oligonucleotide therapeutics for disorders of the Central Nervous System ("CNS"). The Takeda Collaboration provides the Company with at least $230.0 million in committed cash and Takeda with the option to co-develop and co-commercialize the Company's CNS development programs in (1) Huntington's disease ("HD"); (2) amyotrophic lateral sclerosis ("ALS") and frontotemporal dementia ("FTD"); and (3) the Company's discovery-stage program targeting *ATXN3* for the treatment of spinocerebellar ataxia 3 ("SCA3") (collectively, "Category 1 Programs"). In addition, the Takeda Collaboration provided Takeda the right to exclusively license multiple preclinical programs for CNS disorders, including Alzheimer's disease and Parkinson's disease (collectively, "Category 2 Programs"). In April 2018, the Takeda Collaboration became effective and Takeda paid the Company $110.0 million as an upfront payment. Takeda also agreed to fund the Company's research and preclinical activities in the amount of $60.0 million during the four-year research term and to reimburse the Company for any collaboration-budgeted research and preclinical expenses incurred by Wave that exceed that amount.

Simultaneously with Wave USA and Wave UK's entry into the collaboration and license agreement with Takeda (the "Takeda Collaboration Agreement"), the Company entered into a share purchase agreement with Takeda (the "Takeda Equity Agreement," and together with the Takeda Collaboration Agreement, the "Takeda Agreements") pursuant to which it agreed to sell to Takeda 1,096,892 of its ordinary shares at a purchase price of $54.70 per share. In April 2018, the Company closed the Takeda Equity Agreement and received aggregate cash proceeds of $60.0 million. The Company did not incur any material costs in connection with the issuance of shares.

With respect to Category 1 Programs, the Company will be responsible for researching and developing products and companion diagnostics for Category 1 Programs through completion of the first proof of mechanism study for such products. Takeda will have an exclusive option for each target and all associated products and companion diagnostics for such target, which it may exercise at any time through completion of the proof of mechanism study. If Takeda exercises this option, the Company will receive an opt-in payment and will lead manufacturing and joint clinical co-development activities and Takeda will lead joint co-commercial activities

in the United States and all commercial activities outside of the United States. Global costs and potential profits will be shared 50:50 and the Company will be eligible to receive development and commercial milestone payments. In addition to its 50% profit share, the Company is eligible to receive option exercise fees and development and commercial milestone payments for each of the Category 1 Programs.

With respect to Category 2 Programs, the Company granted Takeda the right to exclusively license multiple preclinical programs during a four-year research term (subject to limited extension for programs that were initiated prior to the expiration of the research term, in accordance with the Takeda Collaboration Agreement) ("Category 2 Research Term"). During that term, the Takeda Collaboration provided that the parties may collaborate on preclinical programs for up to six targets at any one time. The Company was responsible for researching and preclinically developing products and companion diagnostics directed to the agreed upon targets through completion of Investigational New Drug application ("IND")-enabling studies in the first major market country. Thereafter, Takeda would have an exclusive worldwide license to develop and commercialize products and companion diagnostics directed to such targets, subject to the Company's retained rights to lead manufacturing activities for products directed to such targets. Takeda agreed to fund the Company's research and preclinical activities in the amount of $60.0 million during the research term and reimburse the Company for any collaboration-budgeted research and preclinical expenses incurred by the Company that exceeded that amount. The Company was also eligible to receive tiered high single-digit to mid-teen royalties on Takeda's global commercial sales of products from each Category 2 Program.

Under the Takeda Collaboration Agreement, each party granted to the other party specific intellectual property licenses to enable the other party to perform its obligations and exercise its rights under the Takeda Collaboration Agreement, including license grants to enable each party to conduct research, development and commercialization activities pursuant to the terms of the Takeda Collaboration Agreement.

The term of the Takeda Collaboration Agreement commenced on April 2, 2018 and, unless terminated earlier, will continue until the date on which: (i) with respect to each Category 1 Program target for which Takeda does not exercise its option, the expiration or termination of the development program with respect to such target; (ii) with respect to each Category 1 Program target for which Takeda exercises its option, the date on which neither party is researching, developing or manufacturing any products or companion diagnostics directed to such target; or (iii) with respect to each Category 2 Program target, the date on which royalties are no longer payable with respect to products directed to such target.

Takeda may terminate the Takeda Collaboration Agreement for convenience on 180 days' notice, in its entirety or on a target-by-target basis. Subject to certain exceptions, each party has the right to terminate the Takeda Collaboration Agreement on a target-by-target basis if the other party, or a third party related to such party, challenges the patentability, enforceability or validity of any patents within the licensed technology that cover any product or companion diagnostic that is subject to the Takeda Collaboration Agreement. In the event of any material breach of the Takeda Collaboration Agreement by a party, subject to cure rights, the other party may terminate the Takeda Collaboration Agreement in its entirety if the breach relates to all targets or on a target-by-target basis if the breach relates to a specific target. In the event that Takeda and its affiliates cease development, manufacturing and commercialization activities with respect to compounds or products subject to the Takeda Collaboration Agreement and directed to a particular target, the Company may terminate the Takeda Collaboration Agreement with respect to such target. Either party may terminate the Takeda Collaboration Agreement for the other party's insolvency. In certain termination circumstances, the Company would receive a license from Takeda to continue researching, developing and manufacturing certain products, and companion diagnostics.

The Takeda Collaboration is managed by a joint steering committee in which both parties are represented equally. The joint steering committee is tasked with overseeing the scientific progression of each Category 1 Program and, prior to the Amendment (discussed below), the Category 2 Programs.

The Company assessed this arrangement in accordance with ASC 606 and concluded that the contract counterparty, Takeda, is a customer for Category 1 Programs prior to Takeda exercising its option, and for Category 2 Programs during the Category 2 Research Term. The Company identified the following material promises under the arrangement: (1) the non-exclusive, royalty-free research and development license for each Category 1 Program; (2) the research and development services for each Category 1 Program through completion of the first proof of mechanism study; (3) the exclusive option to license, co-develop and co-commercialize each Category 1 Program; (4) the right to exclusively license the Category 2 Programs; and (5) the research and preclinical development services of the Category 2 Programs through completion of IND-enabling studies. The research and development services for each Category 1 Program were determined to not be distinct from the research and development license and should therefore be combined into a single performance obligation for each Category 1 Program. The research and preclinical development services for the Category

2 Programs were determined to not be distinct from the exclusive licenses for the Category 2 Programs and should therefore were combined into a single performance obligation.

Additionally, the Company determined that the exclusive option for each Category 1 Program was priced at a discount and, as such, provide material rights to Takeda, representing three separate performance obligations. Based on these assessments, the Company identified seven performance obligations in the Takeda Collaboration Agreement: (1) research and development services through completion of the first proof of mechanism and non-exclusive research and development license for HD; (2) research and development services through completion of the first proof of mechanism and non-exclusive research and development license for ALS and FTD; (3) research and development services through completion of the first proof of mechanism and non-exclusive research and development license for SCA3; (4) the material right provided for the exclusive option to license, co-develop and co-commercialize HD; (5) the material right provided for the exclusive option to license, co-develop and co-commercialize ALS and FTD; (6) the material right provided for the exclusive option to license, co-develop and co-commercialize SCA3; and (7) the research and preclinical development services and right to exclusively license the Category 2 Programs.

At the outset of the arrangement, the transaction price included the $110.0 million upfront consideration received and the $60.0 million of committed research and preclinical funding for the Category 2 Programs. The Company determined that the Takeda Collaboration Agreement did not contain a significant financing component. The option exercise fees to license, co-develop and co-commercialize each Category 1 Program that may be received are excluded from the transaction price until each customer option is exercised. The potential milestone payments were excluded from the transaction price, as all milestone amounts were fully constrained at the inception of the Takeda Collaboration Agreement. The Company will reevaluate the transaction price at the end of each reporting period and, as uncertain events are resolved or other changes in circumstances occur, if necessary, will adjust its estimate of the transaction price.

The Company allocated the transaction price to the performance obligations on a relative standalone selling price basis. For the performance obligations associated with the research and development services through completion of the first proof of mechanism and non-exclusive research and development license for HD; the research and development services through completion of the first proof of mechanism and non-exclusive research and development license for ALS and FTD; the research and development services through completion of the first proof of mechanism and non-exclusive research and development license for SCA3; and the research and preclinical development services and right to exclusively license the Category 2 Programs, the Company determined the standalone selling price using estimates of the costs to perform the research and development services, including expected internal and external costs for services and supplies, adjusted to reflect a profit margin. The total estimated cost of the research and development services reflected the nature of the services to be performed and the Company's best estimate of the length of time required to perform the services. For the performance obligations associated with the material right provided for the exclusive option to license, co-develop and co-commercialize HD; the material right provided for the exclusive option to license, co-develop and co-commercialize ALS and FTD; and the material right provided for the exclusive option to license, co-develop and co-commercialize SCA3, the Company estimated the standalone fair value of the option to license each Category 1 Program utilizing an adjusted market assessment approach, and determined that any standalone fair value in excess of the amounts to be paid by Takeda associated with each option represented a material right.

Revenue associated with the research and development services for each Category 1 Program performance obligation is being recognized as the research and development services are provided using an input method, according to the costs incurred on each Category 1 Program and the total costs expected to be incurred to satisfy each Category 1 Program performance obligation. Prior to the Amendment described below, revenue associated with the research and preclinical development services for the Category 2 Programs performance obligation was recognized as the research and preclinical development services that were provided using an input method, according to the costs incurred on Category 2 Programs and the total costs expected to be incurred to satisfy the performance obligation. The amount allocated to the material right for each Category 1 Program option will be recognized on the date that Takeda exercises each respective option, or immediately as each option expires unexercised. The amounts received that have not yet been recognized as revenue are recorded in deferred revenue on the Company's consolidated balance sheet.

On October 15, 2021, Wave USA, Wave UK and Takeda entered into the Second Amendment to the Takeda Collaboration Agreement (the "Amendment"), which discontinued the Category 2 component of the Takeda Collaboration. The Category 1 Programs under the Collaboration Agreement remain in effect and are unchanged by the Amendment. Pursuant to the Amendment, Takeda agreed to pay the Company an additional $22.5 million as full payment for reimbursable Category 2 Programs collaboration-budgeted research and preclinical expenses. The Company received this payment from Takeda related to the Category 2 component and recognized the full amount as collaboration revenue in the year ended December 31, 2021. During the year ended December 31, 2021, in addition to the revenue recognized related to the Amendment, the Company recognized another $18.5 million of collaboration revenue related to services pertaining to the Category 1 Programs and Category 2 Programs.

During the years ended December 31, 2022 and 2021, the Company recognized revenue of approximately $3.3 million and $41.0 million, respectively, under the Takeda Collaboration Agreement in the Company's consolidated statements of operations and comprehensive loss. Through December 31, 2022, the Company had recognized revenue of $81.2 million under the Takeda Collaboration Agreement as collaboration revenue in the Company's consolidated statements of operations and comprehensive loss.

The aggregate amount of the transaction price allocated to the Company's unsatisfied and partially unsatisfied performance obligations and recorded in deferred revenue as of December 31, 2022 and 2021, was $111.3 million and $114.6 million, respectively. The deferred revenue included in current liabilities as of December 31, 2022 and 2021, was approximately $31.6 million and $37.1 million, respectively. The deferred revenue included in long-term liabilities as of December 31, 2022 and 2021, was $79.8 million and approximately $77.5 million, respectively. The increase in the long-term portion of deferred revenue was due to an increase in the period over which certain Category 1 Program performance obligations are expected to be satisfied, which led to a corresponding decrease to the current portion of deferred revenue as of December 31, 2022. Additionally, the current portion of deferred revenue decreased from December 31, 2021 to December 31, 2022 due to revenue recognized during the year ended December 31, 2022. The Company expects to recognize revenue for the portion of the deferred revenue that relates to the research and development services for each Category 1 Program as costs are incurred over the remaining research term. The Company expects to recognize revenue for the portion of the deferred revenue that relates to the material right for each Category 1 Program option upon Takeda's exercise of such option, or immediately as each option expires unexercised.

6. SHARE CAPITAL

The following represents the Company's financing transactions during the years ended December 31, 2022 and 2021:

- The Company entered into an open market sales agreement with Jefferies LLC in May 2019, as amended in March 2020 and March 2022, for its at-the-market equity program. During the year ended December 31, 2021, the Company sold 10,740,915 ordinary shares under its at-the-market equity program for aggregate net proceeds of $54.9 million after deducting commissions and offering expenses. During the year ended December 31, 2022, the Company sold 458,092 ordinary shares under its at-the-market equity program for aggregate net proceeds of $1.2 million after deducting commissions and offering expenses.
- On June 16, 2022, the Company closed an underwritten offering (the "June 2022 Offering") in which the Company issued and sold 25,464,483 of the Company's ordinary shares at a price of $2.15 per share and pre-funded warrants (the "Pre-Funded Warrants") to purchase up to 7,093,656 of the Company's ordinary shares at an offering price of $2.1499 per Pre-Funded Warrant, which represents the per share offering price for the ordinary shares less the $0.0001 per share exercise price for each Pre-Funded Warrant. These Pre-Funded Warrants were recorded as a component of shareholders' equity within additional paid-in capital. The gross proceeds to the Company from the June 2022 Offering were $70.0 million before deducting underwriting discounts and commissions and other offering expenses. The net proceeds to the Company from the June 2022 Offering were approximately $65.5 million after deducting underwriting commissions and offering expenses. The Pre-Funded Warrants are exercisable at any time after their original issuance and on or prior to the five-year anniversary of the original issuance date. A holder of Pre-Funded Warrants may not exercise the warrant if the holder, together with its affiliates, would beneficially own more than 19.99% of the number of the Company's ordinary shares outstanding or more than 19.99% of the combined voting power of the Company's securities outstanding immediately after giving effect to such exercise, unless and until shareholder approval is obtained.

Features of the Series A Preferred Shares and Ordinary Shares

The Series A preferred shares and ordinary shares have no par value and there is no concept of authorized share capital under Singapore law. The Series A preferred shares are not redeemable and have no entitlement to dividends.

Voting

The holders of Series A preferred shares are not entitled to vote on any of the matters proposed to shareholders, other than as specified in the Company's Constitution. The holders of ordinary shares are entitled to one vote for each ordinary share held at all meetings of shareholders and written actions in lieu of meetings.

Dividends

All dividends, if any, shall be declared and paid pro rata according to the number of ordinary shares held by each member entitled to receive dividends. The Company's board of directors may deduct from any dividend all sums of money presently payable by the member to the Company on account of calls.

Liquidation

In the event of a liquidation, dissolution or winding up of, or a return of capital by the Company, the ordinary shares will rank equally with the Series A preferred shares after the payment of the liquidation preference of an aggregate of approximately $10 thousand for Series A preferred shares.

7. SHARE-BASED COMPENSATION

The Wave Life Sciences Ltd. 2021 Equity Incentive Plan (the "2021 Plan") was approved by the Company's shareholders and went into effect on August 10, 2021. The 2021 Plan serves as the successor to the Wave Life Sciences Ltd. 2014 Equity Incentive Plan, as amended (the "2014 Plan"), such that outstanding awards granted under the 2014 Plan continue to be governed by the terms of the 2014 Plan, but no awards may be made under the 2014 Plan after August 10, 2021. The aggregate number of ordinary shares authorized for issuance of awards under the 2021 Plan was originally 5,450,000 ordinary shares, and was subsequently increased to 11,450,000 in August 2022, plus the number of ordinary shares underlying any awards under the 2014 Plan that are forfeited, cancelled or otherwise terminated (other than by exercise or withheld by the Company to satisfy any tax withholding obligation) on or after August 10, 2021.

The 2021 Plan authorizes (and the 2014 Plan previously authorized) the board of directors or a committee of the board of directors to, among other things, grant non-qualified share options, restricted awards, which include restricted shares and restricted share units ("RSUs"), and performance awards to eligible employees and directors of the Company. The Company accounts for grants to its board of directors as grants to employees.

As of December 31, 2022, 6,339,480 ordinary shares remained available for future grant under the 2021 Plan. In accordance with Nasdaq Listing Rule 5635(c)(4), the board of directors or a committee of the board may also issue inducement grants outside of the 2021 Plan, material to an individual's entering into employment with the Company.

Options and RSUs

Share option activity is summarized as follows:

	Number of Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (in thousands)[1]
Outstanding as of January 1, 2022	6,958,160	$ 10.22		
Granted	3,844,242	3.16		
Exercised	(90,000)	2.48		
Forfeited or cancelled	(1,030,348)	7.90		
Outstanding as of December 31, 2022	9,682,054	$ 7.73	7.06	$ 25,032
Options exercisable as of December 31, 2022	4,051,769	$ 13.11	4.77	$ 5,994

(1) The aggregate intrinsic value of options is calculated as the difference between the exercise price of the share options and the fair value of the Company's ordinary shares for those share options that had exercise prices lower than the fair value of the ordinary shares as of the end of the period.

Options generally vest over periods of one to four years, and options that are forfeited or cancelled are available to be granted again. The contractual life of options is generally five or ten years from the grant date.

The assumptions used in the Black-Scholes option pricing model to determine the fair value of share options granted to employees during the period were as follows:

	For the Year Ended December 31,	
	2022	2021
Risk-free interest rate	1.35% – 4.23%	0.42% – 1.34%
Expected term (in years)	3.0 – 6.1	3.0 – 6.1
Expected volatility	63% – 96%	71% – 86%
Expected dividend yield	0%	0%

In October 2022, the compensation committee of the Company's board of directors granted Dr. Verdine, one of the Company's founders and a member of the Company's board of directors, a non-qualified share option for 163,467 ordinary shares as form of payment under Dr. Verdine's consulting agreement for scientific advisory services (as described in Note 13) for the service period of October 1, 2022 through December 31, 2024, the vesting of which is subject to Dr. Verdine's continued service under the consulting agreement. This was the only non-employee grant made during the year ended December 31, 2022 and there were no options granted to non-employees during the year ended December 31, 2021.

The assumptions used in the Black-Scholes option pricing model to determine the fair value of share options granted to non-employees during the period were as follows:

	Year Ended December 31, 2022
Risk-free interest rate	4.29%
Expected term (in years)	2.5
Expected volatility	99%
Expected dividend yield	0%

RSU activity for the year ended December 31, 2022 is summarized as follows:

	RSUs	Average Grant Date Fair Value (in dollars per share)
Outstanding as of January 1, 2022	1,875,350	$ 13.70
Granted	143,700	2.94
Vested	(904,891)	14.20
Forfeited	(179,817)	17.04
RSUs Outstanding at December 31, 2022	934,342	$ 10.94

RSUs can be time-based or performance-based. Vesting of the performance-based RSUs is contingent on the occurrence of certain regulatory or commercial milestones. In March 2021, the Compensation Committee approved an amendment and restatement of the Company's outstanding 2019 performance-based RSUs to add an additional milestone to the existing milestones. In 2021, the Company also granted performance-based RSUs with the same terms to certain employees who did not receive the 2019 performance-based RSUs. The Company did not recognize expense in 2021 related to the performance-based RSUs as the related milestones were not considered probable of achievement. In April 2022, the Company determined that a performance-based RSU milestone was achieved and consequently 50% of the outstanding performance-based RSUs vested, which resulted in the issuance of 384,646 ordinary shares. During the year ended December 31, 2022, the Company recorded share-based compensation expense of approximately $3.8 million, which represents all of the expense related to the achievement of this performance-based RSU milestone. The Company did not recognize any expense related to the other performance-based RSU milestones, as the remaining milestones were not considered probable of achievement as of December 31, 2022.

RSUs that are forfeited are available to be granted again. During the year ended December 31, 2022, 143,700 time-based RSUs were granted to employees. Of the RSUs outstanding at December 31, 2022, 607,764 are time-based RSUs and 326,578 are performance-based RSUs. Time-based RSUs generally vest over periods of one to four years.

As of December 31, 2022, the unrecognized compensation cost related to outstanding options was $9.7 million. The unrecognized compensation cost related to outstanding options is expected to be recognized over a weighted-average period of approximately 2.3 years. For the years ended December 31, 2022 and 2021, the weighted-average grant date fair value per granted option was $2.06 and $3.48, respectively. The aggregate fair value of options that vested during the years ended December 31, 2022 and 2021 was $6.9 million and $5.7 million, respectively. The unrecognized compensation costs related to outstanding time-based RSUs was $1.7 million as of December 31, 2022, and is expected to be recognized over a weighted-average period of approximately 1.3 years. The total fair value of RSUs vested during the years ended December 31, 2022 and 2021 was $1.3 million and $1.7 million, respectively.

Employee Share Purchase Plan

The Wave Life Sciences Ltd. Employee Share Purchase Plan ("ESPP") allows full-time and certain part-time employees to purchase the Company's ordinary shares at a discount to fair market value. Eligible employees may enroll in a six-month offering period beginning every January 15th and July 15th. Shares are purchased at a price equal to 85% of the lower of the fair market value of the Company's ordinary shares on the first business day or the last business day of an offering period. During the years ended

December 31, 2022 and 2021, 166,061 and 92,287 ordinary shares were issued under the ESPP, respectively. As of December 31, 2022, there were 716,413 ordinary shares available for issuance under the ESPP.

Share-Based Compensation Expense

Share-based compensation expense for the years ended December 31, 2022 and 2021 is classified as operating expenses in the consolidated statements of operations and comprehensive loss as follows:

	For the Year Ended December 31,	
	2022	2021
	(in thousands)	
Research and development expenses	$ 7,467	$ 7,267
General and administrative expenses	9,727	9,140
Total share-based compensation expense	$ 17,194	$ 16,407

Of the total share-based compensation expense recorded for the year ended December 31, 2022, less than $0.1 million related to non-employee option grants, all of which is included in research and development expenses on the consolidated statements of operations and comprehensive loss. There was no share-based compensation expense recorded for the year ended December 31, 2021 related to options granted to non-employees.

8. LEASES

Lease Arrangements

The Company enters into lease arrangements for its facilities. A summary of the arrangements is as follows:

Operating Leases

Lexington

On September 26, 2016, and as amended on December 31, 2016, the Company entered into a 10 year and 9-month lease, which includes two successive five-year renewal options, for its facility in Lexington, Massachusetts, which the Company uses primarily for its current good manufacturing practices ("cGMP") manufacturing, as well as for additional laboratory and office space. As there is not reasonable certainty that the renewal options will be exercised, the lease liabilities and the right-of-use assets pertaining to the Lexington Lease do not account for the two successive five-year renewal options. Throughout the term of the lease, the Company is responsible for paying certain costs and expenses, in addition to the rent, as specified in the lease, including a proportionate share of applicable taxes, operating expenses and utilities. As required under the terms of the lease agreement, the Company has placed restricted cash of approximately $2.7 million in a separate bank account as of December 31, 2022 and 2021.

Cambridge

In April 2015, the Company entered into a lease agreement for an office and laboratory facility in Cambridge, Massachusetts (the "Cambridge Lease"), which commenced in October 2015 with a term of 7.5 years with a five-year renewal option to extend the lease. Throughout the term of the lease, the Company is responsible for paying certain costs and expenses, in addition to the rent, as specified in the lease, including a proportionate share of applicable taxes, operating expenses and utilities. As required under the terms of the lease agreement, the Company has placed restricted cash of $1.0 million in a separate bank account as of December 31, 2022 and 2021.

In December 2020, the Company exercised its option under the Cambridge Lease to lease the additional office and laboratory space at the existing facility. The combined space constitutes the entire building. The lease for the additional space commenced on October 1, 2021, with a term of five years and is considered a separate lease from the Cambridge Lease. On the commencement date, the Company utilized the operating lease classification and recorded a right-of-use asset and corresponding operating lease liability of $4.5 million and began recognizing straight-line rent expense under ASC 842. Throughout the term of the lease, the Company is responsible for paying certain costs and expenses, in addition to the rent, as specified in the lease, including a proportionate share of applicable taxes, operating expenses and utilities.

In June 2022, the Company exercised the five-year renewal option under the Cambridge Lease to extend the lease term through March 2028 (the "Cambridge Lease Extension"). Therefore, as required by ASC 842, the Company calculated an incremental borrowing rate of 10.53% and remeasured the right-of-use asset and the lease liabilities related to the Cambridge Lease Extension. As a result, an additional $12.0 million of operating right-of-use asset and corresponding operating lease liabilities were recorded relating to the Cambridge Lease Extension.

The following table contains a summary of the lease costs recognized under ASC 842 and other information pertaining to the Company's operating leases for the years ended December 31, 2022 and 2021:

	For the Year Ended December 31,	
	2022	2021
	(in thousands)	
Lease cost		
Operating lease cost	$ 6,458	$ 4,742
Variable lease cost	2,508	2,150
Total lease cost	$ 8,966	$ 6,892
Other information		
Operating cash flows used for operating leases	$ 7,226	$ 6,275
Increase in operating right-of-use assets	$ 12,006	$ 4,498
Operating lease liabilities arising from obtaining right-of-use assets	$ 12,006	$ 4,498
Weighted average remaining lease term	5 years	5.5 years
Weighted average discount rate	9.2%	8.4%

Future minimum lease payments under the Company's non-cancelable operating leases as of December 31, 2022, are as follows:

	As of December 31, 2022
	(in thousands)
2023	$ 8,655
2024	9,311
2025	9,591
2026	9,584
2027	8,987
Thereafter	886
Total lease payments	$ 47,014
Less: imputed interest	(9,400)
Total operating lease liabilities	$ 37,614

9. COMMITMENTS AND CONTINGENCIES

Unasserted Claims

In the ordinary course of business, the Company may be subject to legal proceedings, claims and litigation as the Company operates in an industry susceptible to patent and other legal claims. The Company accounts for estimated losses with respect to legal proceedings and claims when such losses are probable and estimable. Legal costs associated with these matters are expensed when incurred. The Company is not currently a party to any material legal proceedings.

10. NET LOSS PER ORDINARY SHARE

Basic loss per share is computed by dividing net loss attributable to ordinary shareholders by the weighted-average number of ordinary shares outstanding:

	Year Ended December 31,	
	2022	2021
	(in thousands except share and per share data)	
Numerator:		
Net loss attributable to ordinary shareholders	$ (161,823)	$ (122,245)
Denominator:		
Weighted-average ordinary shares outstanding	78,855,810	51,825,566
Net loss per share, basic and diluted	$ (2.05)	$ (2.36)

As of December 31, 2022, there were 7,093,656 vested and exercisable Pre-Funded Warrants outstanding to purchase ordinary shares for the exercise price of $0.0001 per share. The Pre-Funded Warrants are included in the weighted-average shares outstanding used in the calculation of basic net loss per share as the exercise price is negligible and the warrants are fully vested and exercisable.

The Company's potentially dilutive shares, which include outstanding share options to purchase ordinary shares and restricted share units, are considered to be ordinary share equivalents and are only included in the calculation of diluted net loss per share when their effect is dilutive.

The following potential ordinary shares, presented based on amounts outstanding at each period end, were excluded from the calculation of diluted net loss per share attributable to ordinary shareholders for the periods indicated because including them would have had an anti-dilutive effect:

	As of December 31,	
	2022	2021
Options to purchase ordinary shares	9,682,054	6,958,160
RSUs	934,342	1,875,350
Series A preferred shares	3,901,348	3,901,348

11. INCOME TAXES

The components of loss before income taxes were as follows:

	Year Ended December 31,	
	2022	2021
	(in thousands)	
Singapore	$ (8,714)	$ (10,842)
Rest of world	(152,428)	(111,607)
Loss before income taxes	$ (161,142)	$ (122,449)

During the years ended December 31, 2022 and 2021, the Company recorded an income tax provision of $0.7 million and an income tax benefit of $0.2 million, respectively. The income tax provision for the year ended December 31, 2022 was primarily due to the requirement under the Tax Cuts and Jobs Act of 2017 for taxpayers to capitalize and amortize research and development expenditures over five or fifteen years pursuant to Section 174 of the Internal Revenue Code of 1986, as amended (the "Code"), partially offset by the utilization of net operating losses subject to the Section 382 limitation discussed below. The income tax benefit for the year ended December 31, 2021 was primarily due to the release of a portion of the Company's uncertain tax positions as a result of a lapse in the statute of limitations.

The components of the benefit (provision) for income taxes were as follows:

	Year Ended December 31,	
	2022	2021
	(in thousands)	
Current benefit (provision) for income taxes:		
Singapore	$ —	$ —
Rest of world	(681)	204
Total current benefit (provision) for income taxes	$ (681)	$ 204
Deferred benefit for income taxes:		
Singapore	$ —	$ —
Rest of world	—	—
Total deferred benefit (provision) for income taxes	$ —	$ —
Total benefit (provision) for income taxes	$ (681)	$ 204

A reconciliation of the Singapore statutory income tax rate to the Company's effective income tax rate is as follows:

	Year Ended December 31,	
	2022	2021
Singapore statutory income tax rate	17.0%	17.0%
Federal and state tax credits	3.3	5.1
Permanent differences	0.1	(2.6)
Changes in reserves for uncertain tax positions	0.4	(2.1)
Foreign rate differential	8.8	6.3
Tax rate change	—	12.5
Other	(1.0)	(1.1)
Change in deferred tax asset valuation allowance	7.3	(34.9)
Deferred tax adjustments	(36.3)	—
Effective income tax rate	(0.4)%	0.2%

The components of the Company's deferred tax assets and liabilities as of December 31, 2022 and 2021 are as follows:

	December 31,	
	2022	2021
	(in thousands)	
Deferred tax assets:		
Net operating loss carryforwards	$ 158,413	$ 170,997
Federal and state tax credits	368	40,163
Share-based compensation	7,265	7,194
Accumulated amortization	782	872
Operating lease liabilities	10,276	8,173
Deferred revenue	16,786	13,546
Capitalized research and development	36,643	—
Other	3,164	2,351
Total deferred tax assets	233,697	243,296
Valuation allowance	(226,273)	(238,170)
Net deferred tax assets	7,424	5,126
Deferred tax liabilities:		
Operating lease right-of-use assets	(7,333)	(5,021)
Accumulated depreciation	(86)	(98)
Other	(5)	(7)
Total deferred tax liabilities	(7,424)	(5,126)
Net deferred tax assets (liabilities)	$ —	$ —

A roll-forward of the valuation allowance for the years ended December 31, 2022 and 2021 is as follows:

	Year Ended December 31,	
	2022	2021
	(in thousands)	
Balance at beginning of year	$ 238,170	$ 195,381
Increase in valuation allowance	3,134	42,886
Decrease in valuation allowance	(14,934)	—
Effect of foreign currency translation	(97)	(97)
Balance at end of year	$ 226,273	$ 238,170

As of December 31, 2022, the Company had federal net operating loss carryforwards in the United States of $272.4 million, of which $271.6 million may be available to offset future income tax liabilities indefinitely, while $0.8 million of carryforwards that were in existence as of December 31, 2017 may offset future income tax liabilities up through 2037. As of December 31, 2022, the Company had state net operating loss carryforwards of $43.9 million that will begin to expire in 2038. As of December 31, 2022 and 2021, the Company had U.S. federal research and development tax credit carryforwards of approximately $0.2 million and $12.8 million, respectively, available to offset future U.S. federal income taxes and will begin to expire in 2042. As of December 31, 2022 and 2021, the Company had state research and development tax credit carryforwards of approximately $0.2 million and $9.1 million, respectively, available to offset future state income taxes and will begin to expire in 2037, and no longer had state investment tax credit carryforwards. As of December 31, 2022, the Company no longer had a U.S. orphan drug credit carryforward.

As of December 31, 2022 and 2021, the Company had net operating loss carryforwards in Japan of $2.3 million and $2.7 million, respectively, which may be available to offset future income tax liabilities and begin to expire in 2023.

As of December 31, 2022 and 2021, the Company had net operating loss carryforwards in Singapore of $111.2 million and $189.2 million, respectively, which may be available to offset future income tax liabilities and can be carried forward indefinitely.

As of December 31, 2022 and 2021, the Company had net operating loss carryforwards in the United Kingdom of $314.5 million and $254.3 million, respectively, which may be available to offset future income tax liabilities and can be carried forward indefinitely.

The Company has evaluated the positive and negative evidence bearing upon its ability to realize its deferred tax assets. As of December 31, 2022, management has considered the Company's history of cumulative net losses incurred since inception and its lack of commercialization of any products or generation of any revenue from product sales since inception and has concluded that it is more likely than not that the Company will not realize the benefits of the deferred tax assets in all jurisdictions. Accordingly, a full valuation allowance has been established against those deferred tax assets as of December 31, 2022.

The valuation allowance decreased by approximately $11.9 million in 2022. The decrease in the valuation allowance for 2022 was primarily a result of the 2022 Section 382 limitation on the Company's utilization of its federal and state tax credits and state net operating losses before their expiration. The Company may release this valuation allowance when management determines that it is more-likely-than-not that the deferred tax assets will be realized. Any release of valuation allowance will be recorded as a tax benefit either increasing net income or decreasing net loss.

The Company's reserves related to taxes and its accounting for uncertain tax positions are based on a determination of whether and how much of a tax benefit taken by the Company in its tax filings or positions is more-likely-than-not to be realized following resolution of any potential contingencies present related to the tax benefit.

A summary of activity in the Company's unrecognized tax benefits is as follows:

	2022	2021
	(in thousands)	
Unrecognized tax benefit at the beginning of the year	$ 19,864	$ 18,416
Tax positions related to prior years	(7,320)	(56)
Tax positions related to statute lapse	—	(575)
Tax positions related to the current year	1,401	2,079
Unrecognized tax benefit at the end of the year	$ 13,945	$ 19,864

As of December 31, 2022 and 2021, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was $13.9 million and $19.9 million, respectively. At December 31, 2022, $0.2 million of the net unrecognized tax benefits would affect the Company's annual effective tax rate if recognized.

The Company files income tax returns as prescribed by the tax laws of the jurisdictions in which it operates. In the normal course of business, the Company is subject to examination by various tax authorities in the United States, Japan, Singapore and the United Kingdom. Tax years from 2019 to the present are still open to examination in the United States, from 2017 to the present in Japan, from 2018 to the present in Singapore and from 2021 to the present in the United Kingdom. To the extent that the Company has tax attribute carryforwards, the tax years in which the attribute was generated may still be adjusted upon examination by the tax authorities to the extent utilized in a future period.

In October 2022, the Inland Revenue Authority of Singapore ("IRAS") completed its examination of the Company's corporate income tax returns for the 2016 and 2017 tax years. The Company received notice of adjustments from IRAS indicating that certain R&D expenses are temporarily disallowed until the Company recognizes income related to the R&D initiatives. As a result of the final assessments made by IRAS, the Company reclassified $14.9 million of its net operating loss carryforward deferred tax assets to capitalized research and development deferred tax assets that remained subject to a full valuation allowance.

As of December 31, 2022 and 2021, $44.1 million and $21.1 million, respectively, of cash and cash equivalents were held by the subsidiaries outside of Singapore. The Company does not provide for Singapore income tax or foreign withholding taxes on foreign unrepatriated earnings, as the Company intends to permanently reinvest undistributed earnings in its foreign subsidiaries. If the Company decides to change this assertion in the future to repatriate any additional foreign earnings, the Company may be required to accrue and pay taxes. Because of the complexity of Singapore and foreign tax rules applicable to the distribution of earnings from foreign subsidiaries to Singapore, the determination of the unrecognized deferred tax liability on these earnings is not practicable.

Utilization of the net operating loss carryforwards and research and development tax credit carryforwards in the United States may be subject to a substantial annual limitation under Section 382 of the Code, due to ownership changes that have occurred previously or

that could occur in the future. These ownership changes may limit the amount of carryforwards that can be utilized annually to offset future taxable income. In general, an ownership change, as defined by Section 382, results from transactions increasing the ownership of certain shareholders or public groups in the shares of a corporation by more than 50% over a three-year period. In 2018, 2020 and 2022, the Company completed studies to assess whether an ownership change had occurred or whether there have been multiple ownership changes since its formation. The results of the 2018 study indicated that the Company experienced an ownership change as defined by Section 382 of the Code. Based on the results of the 2018 study, management had determined that the limitations will not have a material impact on the Company's ability to utilize its net operating losses and research and development credit carryforwards to offset future tax liabilities. The results of the 2020 study indicated that the Company did not experience an ownership change since the 2018 study. The results of the 2022 study indicated that the Company experienced an ownership change and will be limited in its ability to utilize net operating losses and its research and development credit carryforwards in the 2022 tax year and going forward. Based on the 2022 study, $46.8 million of federal and state tax credits and $218.2 million of state net operating losses will expire unutilized. Should one or more ownership changes occur in the future, the Company's ability to utilize its net operating losses and research and development credit carryforwards may be further limited.

12. EMPLOYEE BENEFIT PLANS

The Company has a 401(k) retirement and savings plan (the "401(k) Plan") covering employees of Wave USA. The 401(k) Plan allows employees to make contributions up to the maximum allowable amount set by the Internal Revenue Service. Under the 401(k) Plan, the Company may make discretionary contributions as approved by the board of directors. The Company made contributions of $1.1 million and $1.0 million in the years ended December 31, 2022 and 2021, respectively.

13. RELATED PARTIES

The Company had the following related party transactions for the periods presented in the accompanying consolidated financial statements:

- In 2012, the Company entered into a consulting agreement for scientific advisory services with Dr. Gregory L. Verdine, one of the Company's founders and a member of the Company's board of directors. The consulting agreement does not have a specific term and may be terminated by either party upon 14 days' prior written notice. Pursuant to the consulting agreement, the Company pays Dr. Verdine approximately $13 thousand per month, plus reimbursement for certain expenses. In October 2022, the compensation committee of the Company's board of directors granted Dr. Verdine a non-qualified share option for 163,467 ordinary shares as form of payment under this consulting agreement for the service period of October 1, 2022 through December 31, 2024, the vesting of which is subject to Dr. Verdine's continued service under the consulting agreement.

14. SUBSEQUENT EVENTS

GSK Collaboration Agreement and GSK Equity Investment

On December 13, 2022, Wave USA and Wave UK entered into a Collaboration and License Agreement (the "GSK Collaboration Agreement") with GlaxoSmithKline Intellectual Property (No. 3) ("GSK"). Pursuant to the GSK Collaboration Agreement, Wave and GSK have agreed to collaborate on the research, development, and commercialization of oligonucleotide therapeutics, including an exclusive global license to WVE-006. The discovery collaboration has an initial four-year research term and combines Wave's proprietary discovery and drug development platform, PRISM, with GSK's unique insights from human genetics and its global development and commercial capabilities. The GSK Collaboration Agreement became effective as of January 27, 2023, following the completion of customary closing conditions.

In connection with the parties' entry into the GSK Collaboration Agreement, Wave entered into a share purchase agreement on December 13, 2022 with Glaxo Group Limited ("GGL"), an affiliate of GSK, pursuant to which Wave agreed to sell to GGL 10,683,761 of its ordinary shares at a purchase price of $4.68 per share (the "GSK Equity Investment"). The GSK Equity Investment closed on January 26, 2023, following the completion of customary closing conditions.

Subsequent to December 31, 2022 and in respect to the above referenced transactions, Wave received $170.0 million in cash, of which $120.0 million was an upfront payment under the GSK Collaboration Agreement and $50.0 million was the GSK Equity Investment.

DESCRIPTION OF SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

Wave Life Sciences Ltd. (the "Company," "we," "us" or "our") has one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"): our ordinary shares, no par value.

DESCRIPTION OF SHARE CAPITAL

General

The following description of our share capital and provisions of our constitution (formerly known as our memorandum and articles of association) are summaries and are qualified by reference to the Companies Act 1967 of Singapore ("Singapore Companies Act") and our constitution. A copy of our constitution has been filed with the Securities and Exchange Commission as an exhibit to our Annual Report on Form 10-K of which this Exhibit is a part.

Ordinary Shares

As of December 31, 2022, our issued and paid-up ordinary share capital consists of 86,924,643 ordinary shares. We currently have only one class of issued ordinary shares, which have identical rights in all respects and rank equally with one another. Our ordinary shares have no par value and there is no authorized share capital under Singapore law. There is a provision in our constitution which provides that we may issue shares with such preferred, deferred or other special rights or such restrictions, whether in regard to dividend, voting, return of capital or otherwise as our board of directors may determine.

All of our shares presently issued are fully paid-up, and existing shareholders are not subject to any calls on these shares. Although Singapore law does not recognize the concept of "non-assessability" with respect to newly-issued shares, we note that any purchaser of our shares who has fully paid up all amounts due with respect to such shares will not be subject under Singapore law to any personal liability to contribute to the assets or liabilities of our company in such purchaser's capacity solely as a holder of such shares. We believe that this interpretation is substantively consistent with the concept of "non-assessability" under most, if not all, U.S. state corporations laws. All of our shares are in registered form. We cannot, except in the circumstances permitted by the Singapore Companies Act, grant any financial assistance for the acquisition or proposed acquisition of our own shares. Except as described below under "—Takeovers," there are no limitations imposed by the Singapore Companies Act or by our constitution on the right of shareholders not resident in Singapore to hold or vote ordinary shares.

Transfer Agent and Registrar

The transfer agent and registrar for our ordinary shares is Computershare Trust Company, N.A.

Nasdaq Global Market

Our ordinary shares are listed for quotation on The Nasdaq Global Market under the symbol "WVE."

New Shares

Under the Singapore Companies Act, new shares may be issued only with the prior approval of our shareholders in a general meeting. General approval may be sought from our shareholders in a general meeting for the issue of shares. Approval, if granted, will lapse at the earlier of:

- the conclusion of the next annual general meeting; or
- the expiration of the period within which the next annual general meeting is required by law to be held (i.e., within six months after the end of each financial year),

but any approval may be revoked or varied by the company in a general meeting.

Our shareholders have provided such general authority to issue new ordinary shares until the conclusion of our 2023 annual general meeting. Such approval will lapse in accordance with the preceding paragraph if our shareholders do not grant a new approval at our 2023 annual general meeting. Subject to this and the provisions of the Singapore Companies Act and our constitution, our board

of directors may allot and issue or grant options over or otherwise dispose of new ordinary shares to such persons on such terms and conditions and with the rights and restrictions as they may think fit to impose.

Preferred Shares

Series A Preferred Shares

As of December 31, 2022, we have 3,901,348 Series A preferred shares outstanding. These shares are currently held by one of our largest shareholders, Shin Nippon Biomedical Laboratories, Ltd. The terms of the Series A preferred shares as set out in our constitution include (1) no voting rights at any general meeting other than in limited circumstances, (2) a liquidation preference equal to $0.002 per Series A preferred share, (3) no entitlement to dividends and (4) the right to convert the Series A preferred shares at any time on a one-for-one basis into ordinary shares at the discretion of the holder in accordance with the constitution.

The holders of the Series A preferred shares are not entitled to vote at any general meeting. The only instances in which the holders of the Series A preferred shares are able to vote at a general meeting would be if (but only if) the matters to be discussed at the meeting relate to or there is intent to pass resolutions on (i) abrogating or changing the rights attached to the Series A preferred shares; and (ii) for the winding up of the Company. Such resolutions would require the unanimous approval of the holders of the Series A preferred shares.

Other Preferred Shares

Under the Singapore Companies Act, different classes of shares in a public company may be issued only if (a) the issue of the class or classes of shares is provided for in the constitution of the public company and (b) the constitution of the public company sets out in respect of each class of shares the rights attached to that class of shares. Our constitution provides that we may issue shares of a different class with preferred, deferred or other special rights, or such restrictions, whether in regard to dividend, voting, return of capital or otherwise as our board of directors may determine. Under Singapore law, our preferred shareholders will have the right to attend any general meeting and in a poll at such general meeting, to have at least one vote for every preferred share held:

- upon any resolution concerning the voluntary winding-up of our company under Section 160 of the Insolvency, Restructuring and Dissolution Act 2018;
- upon any resolution which varies the rights attached to such preferred shares; or
- in the case of preferred shares issued after August 15, 1984, but before the commencement of Section 96 of the Companies (Amendment) Act 2014, when the dividends to be paid on our preferred shares or any part thereof are more than twelve months in arrears and unpaid, for the period they remain in arrears and unpaid.

We may, subject to the Singapore Companies Act and the prior approval in a general meeting of our shareholders, issue preferred shares which are, or at our option or are to be, subject to redemption provided that such preferred shares may not be redeemed out of capital unless:

- all the directors have made a solvency statement in relation to such redemption; and
- we have lodged a copy of the statement with the Accounting and Corporate Regulatory Authority of Singapore.

Further, such shares must be fully paid-up before they are redeemed.

As of December 31, 2022, we have no preferred shares outstanding other than the Series A preferred shares described above. At present, we have no plans to issue additional preferred shares.

Pre-Funded Warrants

As of December 31, 2022, we have pre-funded warrants outstanding to purchase up to 7,093,656 ordinary shares. The pre-funded warrants are exercisable at any time after their original issuance and on or prior to 5:00 p.m. (New York City time) on the five year anniversary of the original issuance date, which was June 16, 2022. The pre-funded warrants are exercisable, at the option of each holder, in whole or in part by delivering to us a duly executed exercise notice and by payment in full of the exercise price in immediately available funds for the number of ordinary shares purchased upon such exercise. As an alternative to payment in immediately available funds, the holder may elect to exercise the pre-funded warrant through a cashless exercise, in which the holder would receive upon such exercise the net number of ordinary shares determined according to the formula set forth in the pre-funded warrant. No fractional ordinary shares will be issued in connection with the exercise of a pre-funded warrant.

Exercise Limitations

Under the pre-funded warrants, unless and until the Shareholder Approval (as defined below) is obtained, we may not effect the exercise of any pre-funded warrant, and a holder will not be entitled to exercise any portion of any pre-funded warrant, which, upon giving effect to such exercise, would cause (i) the aggregate number of our ordinary shares beneficially owned by the holder (together with its affiliates) to exceed 19.99% of the number of our ordinary shares outstanding immediately after giving effect to the exercise, or (ii) the combined voting power of our securities beneficially owned by the holder (together with its affiliates) to exceed 19.99% of the combined voting power of all of our securities then outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the pre-funded warrants.

Upon the written request of the holder delivered to us and subsequent to December 31, 2022, we shall use commercially reasonable efforts to obtain shareholder approval (the "Shareholder Approval"), at our next regularly scheduled annual general meeting of shareholders, for the issuance of the pre-funded warrant shares upon the exercise of all or any portion of the pre-funded warrants such that such issuance of pre-funded warrant shares will comply with the Listing Rules of the Nasdaq Stock Market, including, without limitation, Listing Rule 5635, and with applicable Singapore law. In the event that the holder requests the Shareholder Approval, we use commercially reasonable efforts to obtain Shareholder Approval at our next regularly scheduled annual general meeting, and Shareholder Approval is not obtained at such meeting for any reason, then the holder may again request Shareholder Approval each year pursuant to and subject to the terms of the pre-funded warrants, at each of our subsequent regularly scheduled annual general meetings that occur prior to the termination date of the pre-funded warrants. We shall not be obligated to seek the Shareholder Approval at any shareholder meeting other than our regularly scheduled annual shareholder meeting and such written request of the holder must be received by us at least 90 days in advance of such annual meeting.

Exercise Price

The exercise price per whole share of our ordinary shares purchasable upon the exercise of the pre-funded warrants is $0.0001 per ordinary share. The exercise price of the pre-funded warrants and the number of our ordinary shares issuable upon exercise of the pre-funded warrants is subject to appropriate adjustment in the event of certain share dividends and distributions, share splits, share combinations, reclassifications or similar events affecting our ordinary shares.

Transferability

Subject to applicable laws, the pre-funded warrants may be offered for sale, sold, transferred or assigned without our consent.

Exchange Listing

We do not plan on applying to list the pre-funded warrants on The Nasdaq Global Market, any other national securities exchange or any other nationally recognized trading system.

Fundamental Transactions

In the event of a fundamental transaction, as described in the pre-funded warrants and generally including any reorganization, recapitalization or reclassification of our ordinary shares, the sale, transfer or other disposition of all or substantially all of our properties or assets, our consolidation or merger with or into another person, the acquisition of more than 50% of our outstanding ordinary shares, or any person or group becoming the beneficial owner of 50% of the voting power represented by our outstanding ordinary shares, upon consummation of such a fundamental transaction, the holders of the pre-funded warrants will be entitled to receive upon exercise of the pre-funded warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the pre-funded warrants immediately prior to such fundamental transaction without regard to any limitations on exercise contained in the pre-funded warrants.

No Rights as a Shareholder

Except by virtue of such holder's ownership of our ordinary shares, the holder of a pre-funded warrant does not have the rights or privileges of a holder of our ordinary shares, including any voting rights, until the holder exercises the pre-funded warrant. In the event of certain distributions, including cash dividends, if any, to all holders of our ordinary shares for no consideration, the holder of a pre-funded warrant shall be entitled to participate in such distributions to the same extent as if a holder of our ordinary shares, subject to not exceeding the ownership limitations described above under "—Exercise Limitations," in which case such distribution shall be held in abeyance for the benefit of such holder until the earlier of such time as the ownership limitations would not be exceeded or the warrant is exercised.

Registration Rights under our Share Purchase Agreement with Pfizer

Under the terms of our Share Purchase Agreement dated as of May 5, 2016 with an affiliate of Pfizer Inc., or the Pfizer Affiliate, under which the Pfizer Affiliate purchased 1,875,000 ordinary shares from, or the Pfizer Shares, subject to certain conditions and

limitations, we agreed to provide certain demand registration rights to the Pfizer Affiliate in order to register all or a portion of the Pfizer Shares purchased by the Pfizer Affiliate. We also provided the Pfizer Affiliate with certain "piggyback" registration rights for a certain period of time, subject to certain conditions and limitations, such that when we propose to register our ordinary shares for our account, the Pfizer Affiliate will have the right to include some or all of the Pfizer Shares in such registration. The Share Purchase Agreement also contains other customary terms and conditions of the parties with respect to the registration of the Pfizer Shares.

Registration Rights under our Share Purchase Agreement with Takeda

On February 19, 2018, we entered into a Share Purchase Agreement (the "Takeda Share Purchase Agreement") with Takeda Pharmaceutical Company Limited ("Takeda"), pursuant to which Takeda purchased 1,096,892 of our ordinary shares (the "Takeda Shares"). In connection with the Takeda Share Purchase Agreement, Takeda and we agreed upon certain rights and restrictions as set forth in the Investor Agreement, dated as of April 2, 2018 (the "Takeda Investor Agreement"). Subject to certain conditions and limitations, we agreed to provide certain demand registration rights to Takeda in order to register all or a portion of the Takeda Shares purchased by Takeda. We also provided Takeda with certain "piggyback" registration rights for a certain period of time, subject to certain conditions and limitations, such that when we propose to register our ordinary shares for our account, Takeda will have the right to include some or all of the Takeda Shares in such registration. The Takeda Investor Agreement also contains other customary terms and conditions of the parties with respect to the registration of Takeda Shares.

Registration Rights under our Share Purchase Agreement with GSK

On December 13, 2022, we entered into a Share Purchase Agreement (the "GSK Share Purchase Agreement") with Glaxo Group Limited ("GGL"), an affiliate of GlaxoSmithKline Intellectual Property (No. 3) ("GSK"), pursuant to which we sold 10,683,761 of our ordinary shares to GGL (the "GGL Shares"). In connection with the GSK Share Purchase Agreement, GGL and we agreed upon certain rights and restrictions as set forth in the Investor Agreement, dated as of January 26, 2023 (the "GSK Investor Agreement"). The GGL Shares are subject to a lock-up restriction, such that GGL will not, and will also cause its affiliates not to, without our prior approval, sell, transfer or otherwise dispose of the GGL Shares during the 30-month period after the effective date of the GGL Investor Agreement. For a certain period following the expiration of the lock-up period, subject to certain conditions and limitations, we agreed to provide certain demand registration rights to GGL in order to register all or a portion of the GGL Shares purchased by GGL. We also provided GGL with certain "piggyback" registration rights for a certain period following the expiration of the lock-up period, subject to certain conditions and limitations, such that when we propose to register our ordinary shares for our account, GGL will have the right to include some or all of the GGL Shares in such registration. The GSK Investor Agreement also contains other customary terms and conditions of the parties with respect to the registration of GGL Shares.

Transfer of Ordinary Shares

Subject to applicable securities laws in relevant jurisdictions and our constitution, our ordinary shares are freely transferable. Our constitution provides that shares may be transferred by a duly signed instrument of transfer in any usual or common form or in a form approved by the directors and The Nasdaq Stock Market. The directors may decline to register any transfer unless, among other things, evidence of payment of any stamp duty payable with respect to the transfer is provided together with other evidence of ownership and title as the directors may reasonably require to show the right of the transferor to make the transfer. We will replace lost or destroyed certificates for shares upon notice to us and upon, among other things, the applicant furnishing evidence and indemnity as the directors may require and the payment of all applicable fees.

Election and Re-election of Directors

We may, by ordinary resolution, remove any director before the expiration of his or her period of office, notwithstanding anything in our constitution or in any agreement between us and such director. We may also, by an ordinary resolution, appoint another person in place of a director removed from office pursuant to the foregoing.

Under our constitution, subject to the Singapore Companies Act, any director shall retire at the next annual general meeting and shall then be eligible for re-election at that meeting.

Our board of directors shall have the power, at any time and from time to time, to appoint any person to be a director either to fill a casual vacancy or as an additional director so long as the total number of directors shall not at any time exceed the maximum number (if any) fixed by or in accordance with our constitution.

Shareholders' Meetings

We are required to hold an annual general meeting each calendar year and within six months after the end of each financial year. The directors may convene an extraordinary general meeting whenever they think fit and they must do so upon the written request of shareholders holding not less than 10% of the total number of paid-up shares as of the date of deposit of the requisition carrying the

right to vote at a general meeting. In addition, two or more shareholders holding not less than 10% of our total number of issued shares (excluding our treasury shares) may call a meeting of our shareholders.

The Singapore Companies Act provides that a shareholder is entitled to attend any general meeting and speak on any resolution put before the general meeting. Unless otherwise required by law or by our constitution, resolutions put forth at general meetings may be decided by ordinary resolution, requiring the affirmative vote of a majority of the shareholders present in person or represented by proxy at the meeting and entitled to vote on the resolution. An ordinary resolution suffices, for example, for appointments of directors. A special resolution, requiring an affirmative vote of not less than three-fourths of the shareholders present in person or represented by proxy at the meeting and entitled to vote on the resolution, is necessary for certain matters under Singapore law, such as an alteration of our constitution. A shareholder entitled to attend and vote at a meeting of the company, or at a meeting of any class of shareholders of the company, is entitled to appoint another person or persons, whether a shareholder of the company or not, as the shareholder's proxy to attend and vote instead of the shareholder at the meeting. Under the Singapore Companies Act, a proxy appointed to attend and vote instead of the shareholder also has the same right as the shareholder to speak at the meeting, but unless the constitution of the company otherwise provides, (i) a proxy is not entitled to vote except on a poll, (ii) a shareholder is not entitled to appoint more than two proxies to attend and vote at the same meeting and (iii) where a shareholder appoints two proxies the appointments are invalid unless the shareholder specifies the proportions of the shareholder's holdings to be represented by each proxy.

Notwithstanding the foregoing, a registered shareholder entitled to attend and vote at a meeting of the company held pursuant to an order of court under Section 210(1) of the Singapore Companies Act, or at any adjourned meeting under Section 210(3) of the Singapore Companies Act, is, unless the court orders otherwise, entitled to appoint only one proxy to attend and vote at the same meeting, and except where the aforementioned applies, a registered shareholder having a share capital who is a relevant intermediary (as defined under the Singapore Companies Act) may appoint more than two proxies in relation to a meeting to exercise all or any of the shareholder's rights to attend and to speak and vote at the meeting, but each proxy must be appointed to exercise the rights attached to a different share or shares held by the shareholder (which number and class of shares shall be specified), and at such meeting, the proxy has the right to vote on a show of hands.

Only registered shareholders of our company, and their proxies, will be entitled to attend, speak and vote at any meeting of shareholders. Under the Singapore Companies Act, public companies may issue non-voting shares and shares that confer special, limited or conditional voting rights, such that the holder of a share may vote on a resolution before a general meeting of the company if, in accordance with the provisions of Section 64A of the Singapore Companies Act, the share confers on the holder a right to vote on that resolution.

Voting Rights

As provided under our constitution and the Singapore Companies Act, voting at any meeting of shareholders is by show of hands unless a poll has been demanded prior to the declaration of the result of the show of hands by, among others, (i) the chairman or (ii) at least one shareholder present in person or by proxy or by attorney or, in the case of a corporation, by a representative entitled to vote thereat, in each case representing in the aggregate not less than 5% of the total voting rights of all shareholders having the right to vote at the general meeting, provided that no poll shall be demanded in respect of an election of a chairman or relating to any adjournment of such meeting. On a poll every shareholder who is present in person or by proxy or by attorney, or in the case of a corporation, by a representative, has one vote for every share held by such shareholder. Proxies need not be shareholders.

Only those shareholders who are registered in our register of members as holders of ordinary shares will be entitled to vote at any meeting of shareholders. Therefore, DTC, or its nominee, will grant an omnibus proxy to DTC participants holding our shares in book-entry form through a broker, bank, nominee, or other institution that is a direct or indirect participant in the DTC. Such shareholders will have the right to instruct their broker, bank, nominee or other institution holding these shares on how to vote such shares by completing the voting instruction form provided by the applicable broker, bank, nominee, or other institution. Whether voting is by a show of hands or by a poll, DTC’s vote will be voted by the chairman of the meeting according to the results of the DTC’s participants’ votes (which results will reflect the instructions received from shareholders that own our shares electronically in book-entry form).

Minority Rights

The rights of minority shareholders of Singapore companies are protected, among other things, under Section 216 of the Singapore Companies Act, which gives the Singapore courts a general power to make any order, upon application by any shareholder of a company, as they think fit to remedy any of the following situations:

- the affairs of a company are being conducted or the powers of the board of directors are being exercised in a manner oppressive to, or in disregard of the interests of, one or more of the shareholders, including the applicant; or

- a company takes an action, or threatens to take an action, or the shareholders pass a resolution, or propose to pass a resolution, which unfairly discriminates against, or is otherwise prejudicial to, one or more of the shareholders, including the applicant.

Singapore courts have wide discretion as to the remedy they may grant, and the remedies listed in the Singapore Companies Act itself are not exclusive. In general, Singapore courts may, with a view to bringing to an end or remedying the matters complained of:

- direct or prohibit any act or cancel or modify any transaction or resolution;
- regulate the conduct of the affairs of the company in the future;
- authorize civil proceedings to be brought in the name of, or on behalf of, the company by a person or persons and on such terms as the court may direct;
- provide for the purchase of a minority shareholder's shares by the other shareholders or by the company itself;
- in the case of a purchase of shares by the company provide for a reduction accordingly of the company's capital; or
- provide that the company be wound up.

Dividends

Subject to any preferential rights of holders of any outstanding preferred shares, holders of our ordinary shares will be entitled to receive dividends and other distributions in cash, shares or property as may be declared by our company from time to time. We may, by ordinary resolution, declare dividends at a general meeting of shareholders, but we are restricted from paying dividends in excess of the amount recommended by our board of directors. Pursuant to Singapore law and our constitution, no dividend may be paid except out of our profits. To date, we have not declared any cash dividends on our ordinary shares and have no current plans to pay cash dividends in the foreseeable future.

Bonus and Rights Issues

In a general meeting, our shareholders may, upon the recommendation of the directors, capitalize any reserves or profits and distribute them as bonus shares, credited as paid-up, to the shareholders in proportion to their shareholdings.

Subject to the provisions of the Singapore Companies Act and our constitution, our directors may also issue rights to take up additional ordinary shares to our shareholders in proportion to their respective ownership. Such rights are subject to any condition attached to such issue and the regulations of any stock exchange on which our shares are listed, as well as U.S. federal and blue sky securities laws applicable to such issue.

Takeovers

The Singapore Code on Take-overs and Mergers applies to, among other things, the acquisition of voting shares of Singapore-incorporated listed public companies or unlisted public companies with more than 50 shareholders and net tangible assets of S$5 million or more. Any person acquiring, whether by a series of transactions over a period of time or not, either on his or her own or together with parties acting in concert with such person, 30% or more of our voting shares, or, if such person holds, either on his or her own or together with parties acting in concert with such person, between 30% and 50% (both amounts inclusive) of our voting shares, and if such person (or parties acting in concert with such person) acquires additional voting shares representing more than 1% of our voting shares in any six-month period, must, except with the consent of the Securities Industry Council in Singapore, extend a mandatory takeover offer for the remaining voting shares in accordance with the provisions of the Singapore Code on Take-overs and Mergers. Responsibility for ensuring compliance with the Singapore Code on Take-overs and Mergers rests with parties (including company directors) to a take-over or merger and their advisors.

"Parties acting in concert" comprise individuals or companies who, pursuant to an agreement or understanding (whether formal or informal), cooperate, through the acquisition by any of them of shares in a company, to obtain or consolidate effective control of that company. Certain persons are presumed (unless the presumption is rebutted) to be acting in concert with each other. They are as follows:

- a company, its parent company, subsidiaries and fellow subsidiaries, the associated companies of any of the company and its related companies, subsidiaries and fellow subsidiaries, companies whose associated companies include any of these companies and any person who has provided financial assistance (other than a bank in the ordinary course of business) to any of the foregoing for the purchase of voting rights;
- a company with any of its directors (together with their close relatives, related trusts and companies controlled by any of the directors, their close relatives and related trusts);

- a company with any of its pension funds and employee share schemes;
- a person with any investment company, unit trust or other fund whose investment such person manages on a discretionary basis, but only in respect of the investment account which such person manages;
- a financial or other professional advisor, including a stockbroker, with its client in respect of the shareholdings of the advisor and persons controlling, controlled by or under the same control as the advisor;
- directors of a company (together with their close relatives, related trusts and companies controlled by any of such directors, their close relatives and related trusts) which is subject to an offer or where the directors have reason to believe a bona fide offer for their company may be imminent;
- partners; and
- an individual and (i) such person's close relatives, (ii) such person's related trusts, (iii) any person who is accustomed to act in accordance with such person's instructions, (iv) companies controlled by the individual, such person's close relatives, related trusts or any person who is accustomed to act in accordance with such person's instructions and (v) any person who has provided financial assistance (other than a bank in the ordinary course of business) to any of the foregoing for the purchase of voting rights.

Subject to certain exceptions, a mandatory offer must be in cash or be accompanied by a cash alternative at not less than the highest price paid by the offeror or parties acting in concert with the offeror during the offer period and within the six months prior to its commencement.

Under the Singapore Code on Take-overs and Mergers, where effective control of a company is acquired or consolidated by a person, or persons acting in concert, a general offer to all other shareholders is normally required. An offeror must treat all shareholders of the same class in an offeree company equally. A fundamental requirement is that shareholders in the company subject to the takeover offer must be given sufficient information, advice and time to consider and decide on the offer. These legal requirements may impede or delay a takeover of our company by a third party.

We may submit an application to the Securities Industry Council of Singapore for a waiver from the Singapore Code on Take-overs and Mergers so that the Singapore Code on Take-overs and Mergers will not apply to our company for so long as we are not listed on a securities exchange in Singapore. We will make an appropriate announcement if we submit the application and when the result of the application is known.

Liquidation or Other Return of Capital

On a winding-up or other return of capital, subject to any special rights attaching to the Series A preferred shares or to any other class of shares, holders of ordinary shares will be entitled to participate in any surplus assets in proportion to their shareholdings.

COMPARISON OF SHAREHOLDER RIGHTS

We are incorporated under the laws of Singapore. The following discussion summarizes material differences between the rights of holders of our ordinary shares and the rights of holders of the common stock of a typical corporation incorporated under the laws of the state of Delaware which result from differences in governing documents and the laws of Singapore and Delaware.

This discussion does not purport to be a complete statement of the rights of holders of our ordinary shares under applicable law in Singapore and our constitution or the rights of holders of the common stock of a typical corporation under applicable Delaware law and a typical certificate of incorporation and bylaws.

Delaware	Singapore
Board of Directors	
A typical certificate of incorporation and bylaws provides that the number of directors on the board of directors will be fixed from time to time by a vote of the majority of the authorized directors. Under Delaware law, a board of directors can be divided into classes and cumulative voting in the election of directors is only permitted if expressly authorized in a corporation's certificate of incorporation.	The constitution of companies will typically state the minimum and maximum number of directors as well as provide that the number of directors may be increased or reduced by shareholders via ordinary resolution passed at a general meeting, provided that the number of directors following such increase or reduction is within the maximum (if any) and minimum number of directors provided in our constitution and the Singapore Companies Act, respectively.
Limitation on Personal Liability of Directors and Officers	
A typical certificate of incorporation provides for the elimination of personal monetary liability of directors or officers for breach of fiduciary duties as directors or officers to the fullest extent permissible under the laws of Delaware, except for liability (i) for any breach of a director's or officer's duty of loyalty to the corporation or its stockholders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) of directors under Section 174 of the Delaware General Corporation Law (relating to the liability of directors for unlawful payment of a dividend or an unlawful stock purchase or redemption), (iv) for any transaction from which the director or officer derived an improper personal benefit, or (v) of officers in any action by or in the right of the corporation. A typical certificate of incorporation also provides that if the Delaware General Corporation Law is amended so as to allow further elimination of, or limitations on, director or officer liability, then the liability of directors or officers will be eliminated or limited to the fullest extent permitted by the Delaware General Corporation Law as so amended.	Pursuant to the Singapore Companies Act, any provision (whether in the constitution, a contract with the company or otherwise) exempting or indemnifying a director against any liability which by law would otherwise attach to him or her in respect of any negligence, default, breach of duty or breach of trust of which such director may be guilty in relation to the company is void. However, a company is not prohibited from (a) purchasing and maintaining for any such director insurance against any such liability, or (b) indemnifying such director against any liability incurred by him or her to a person other than the company except when the indemnity is against any liability (i) of the director to pay a fine in criminal proceedings, (ii) of the director to pay a penalty in respect of non-compliance with any regulatory requirements, (iii) incurred by the director in defending criminal proceedings in which he or she is convicted, (iv) incurred by the director in defending civil proceedings brought by the company or a related company in which judgment is given against him or her, or (v) incurred by the director in connection with an application for relief under Section 76A(13) or Section 391 of the Singapore Companies Act in which the court refuses to grant him or her relief. Nevertheless, a director can be released by the shareholders of a company for breaches of duty to a company except in the case of fraud, illegality, insolvency of the company and oppression or disregard of minority interests. Subject to the Singapore Companies Act and every other Singapore statute for the time being in force and affecting the Company, we may indemnify our directors against costs, charges, fees, and other expenses that may be incurred by any of them in defending any proceedings (whether civil or criminal) relating to anything done or omitted or alleged to be done or omitted by such person acting in his or her capacity as a director of our company, in which judgment is given in his or her favor, or in which he or she is acquitted or in which the courts have granted relief pursuant to the provisions of the Singapore Companies Act,

Delaware	Singapore
	provided that such indemnity shall not extend to any liability which by law would otherwise attach to him or her in respect of any negligence, default, breach of duty or breach of trust of which he may be guilty in relation to our company, or which would otherwise result in such indemnity being voided under applicable Singapore laws.
Interested Shareholders	
Section 203 of the Delaware General Corporation Law generally prohibits a Delaware corporation from engaging in specified corporate transactions (such as mergers, stock and asset sales, and loans) with an "interested stockholder" for three years following the time that the stockholder becomes an interested stockholder. Subject to specified exceptions, an "interested stockholder" is a person or group that owns 15% or more of the corporation's outstanding voting stock (including any rights to acquire stock pursuant to an option, warrant, agreement, arrangement or understanding, or upon the exercise of conversion or exchange rights, and stock with respect to which the person has voting rights only), or is an affiliate or associate of the corporation and was the owner of 15% or more of the voting stock at any time within the previous three years. A Delaware corporation may elect to "opt out" of, and not be governed by, Section 203 through a provision in either its original certificate of incorporation, or an amendment to its original certificate or bylaws that was approved by majority stockholder vote. With a limited exception, this amendment would not become effective until 12 months following its adoption.	There are no comparable provisions under the Singapore Companies Act with respect to public companies which are not listed on the Singapore Exchange Securities Trading Limited.
Removal of Directors	
A typical certificate of incorporation and bylaws provide that, subject to the rights of holders of any preferred stock, directors may be removed at any time by the affirmative vote of the holders of at least a majority, or in some instances a supermajority, of the voting power of all of the then outstanding shares entitled to vote generally in the election of directors, voting together as a single class. A certificate of incorporation could also provide that such a right is only exercisable when a director is being removed for cause (removal of a director only for cause is the default rule in the case of a classified board).	Under the Singapore Companies Act, directors of a public company may be removed before expiration of their term of office, despite anything in its constitution or in any agreement between the public company and such directors, by ordinary resolution (i.e., a resolution which is passed by a simple majority of those shareholders present and voting in person or by proxy). Notice of the intention to move such a resolution has to be given to the company not less than 28 days before the meeting at which it is moved. The company must then give notice of such resolution to its shareholders not less than 14 days before the meeting. Where any director removed in this manner was appointed to represent the interests of any particular class of shareholders or debenture holders, the resolution to remove the director does not take effect until the director's successor has been appointed.
Filling Vacancies on the Board of Directors	
A typical certificate of incorporation and bylaws provide that, subject to the rights of the holders of any preferred stock, any vacancy, whether arising through death, resignation, retirement, disqualification, removal, an increase in the number of directors or any other reason, may be filled by a majority vote of the remaining directors, even if such directors remaining in office constitute less than a quorum, or by the sole remaining director. Any newly elected director usually holds office for the remainder	The constitution of a Singapore company typically provides that the directors have the power to appoint any person to be a director, either to fill a vacancy or as an addition to the existing directors, but so that the total number of directors shall not at any time exceed the maximum number (if any) fixed by or in accordance with the constitution. Any director so appointed shall hold office until the next following annual general meeting, where such director will then be eligible for re-election. Our

Delaware	Singapore
of the full term expiring at the annual meeting of stockholders at which the term of the class of directors to which the newly elected director has been elected expires.	constitution provides that the directors may appoint any person to be a director either to fill a casual vacancy or as an additional director but so that the total number of directors shall not at any time exceed the maximum number fixed by or in accordance with the constitution.
Amendment of Governing Documents	
Under the Delaware General Corporation Law, amendments to a corporation's certificate of incorporation require the approval of stockholders holding a majority of the outstanding shares entitled to vote on the amendment. If a class vote on the amendment is required by the Delaware General Corporation Law, a majority of the outstanding stock of the class is required, unless a greater proportion is specified in the certificate of incorporation or by other provisions of the Delaware General Corporation Law. Under the Delaware General Corporation Law, the board of directors may amend bylaws if so authorized in the certificate of incorporation. The stockholders of a Delaware corporation also have the power to amend bylaws.	Our constitution may be altered by special resolution (i.e., a resolution passed by at least a three-fourths majority of the shareholders entitled to vote, present in person or by proxy at a meeting for which not less than 21 days' written notice is given). The board of directors has no right to amend the constitution. Under the Singapore Companies Act, an entrenching provision may be included in the constitution with which a company is formed and may at any time be inserted into the constitution of a company only if all the shareholders of the company agree. An entrenching provision is a provision of the constitution of a company to the effect that other specified provisions of the constitution may not be altered in the manner provided by the Singapore Companies Act or may not be so altered except (i) by a resolution passed by a specified majority greater than 75% (the minimum majority required by the Singapore Companies Act for a special resolution) or (ii) where other specified conditions are met. The Singapore Companies Act provides that such entrenching provision may be removed or altered only if all the members of the company agree.
Meetings of Shareholders	
Annual and Special Meetings Typical bylaws provide that annual meetings of stockholders are to be held on a date and at a time fixed by the board of directors. Under the Delaware General Corporation Law, a special meeting of stockholders may be called by the board of directors or by any other person authorized to do so in the certificate of incorporation or the bylaws.	*Annual General Meetings* All companies are required to hold an annual general meeting after the end of each financial year within either 4 months (in the case of a public company that is listed on an exchange in Singapore approved by the Monetary Authority of Singapore) or 6 months (in the case of any other company). *Extraordinary General Meetings* Any general meeting other than the annual general meeting is called an "extraordinary general meeting." Despite anything in the constitution, directors of a company must convene an extraordinary general meeting if required to do so by requisition (i.e. written notice, requiring that a meeting be called, given to the directors) by shareholder(s) holding not less than 10% of the total number of paid-up shares as at the date of the deposit of the requisition carrying the right of voting at general meetings of the company. In addition, the constitution usually also provides that general meetings may be convened in accordance with the Singapore Companies Act by the directors.
Quorum Requirements Under the Delaware General Corporation Law, a corporation's certificate of incorporation or bylaws can specify the number of shares which constitute the quorum required to conduct business	*Quorum Requirements* Our constitution provides that any two shareholders present in person or by proxy or by attorney or, in the case of a corporation, by a representative and entitled to vote thereat; in each case

Delaware	Singapore
at a meeting, provided that in no event shall a quorum consist of less than one-third of the shares entitled to vote at a meeting.	representing in aggregate not less than a majority of the total voting rights of all shareholders having the right to vote at a general meeting, shall constitute a quorum. In the event a quorum is not present, the meeting if not convened on the requisition of shareholders may be adjourned for one week. When reconvened, the quorum for the meeting will be the same and if at such adjourned meeting a quorum is not present, the meeting will be dissolved. *Shareholders' Rights at Meetings* The Singapore Companies Act provides that every member has, despite any provision in the constitution, a right to attend any general meeting of the company and to speak on any resolution before the meeting. The company's constitution may provide that a member shall not be entitled to vote unless all calls or other sums personally payable by the member in respect of shares in the company have been paid. Public companies may issue non-voting shares and shares that confer special, limited and conditional voting rights, such that the holder of a share may vote on a resolution before a general meeting if, in accordance with the provisions of Section 64A of the Singapore Companies Act, the share confers on the holder a right to vote on the resolution. *Circulation of Shareholders' Resolutions* Under the Singapore Companies Act, (a) any number of shareholders representing not less than 5% of the total voting rights of all the shareholders having at the date of requisition a right to vote at a meeting to which the requisition relates or (b) not less than 100 shareholders holding shares on which there has been paid up an average sum, per shareholder, of not less than S$500, may requisition the company to give to shareholders notice of any resolution which may properly be moved and is intended to be moved at the next annual general meeting, and circulate to shareholders any statement of not more than 1,000 words with respect to the matter referred to in any proposed resolution or the business to be dealt with at that meeting.
Indemnification of Officers, Directors and Employees	
Under the Delaware General Corporation Law, subject to specified limitations in the case of derivative suits brought by a corporation's stockholders in its name, a corporation may indemnify any person who is made a party to any third-party action, suit or proceeding on account of being a director, officer, employee or agent of the corporation (or was serving at the request of the corporation in such capacity for another corporation, partnership, joint venture, trust or other enterprise) against expenses, including attorney's fees, judgments, fines and amounts paid in settlement actually and reasonably incurred by him or her in connection with the action, suit or proceeding through, among other things, a majority vote of a quorum consisting of directors who were not parties to the suit or proceeding, if the person:	Under Section 172 of the Singapore Companies Act, any provision exempting or indemnifying the officers of a company (including directors) against liability, which by law would otherwise attach to them in connection with any negligence, default, breach of duty or breach of trust in relation to the company is void. However, the Singapore Companies Act allows a company to: • purchase and maintain for any officer insurance against any liability which by law would otherwise attach to such officer in connection with any negligence, default, breach of duty or breach of trust in relation to the company; • indemnify such officer against any liability incurred by him or her to a person other than the company

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• acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation or, in some circumstances, at least not opposed to its best interests; and • in a criminal proceeding, had no reasonable cause to believe his or her conduct was unlawful. Delaware corporate law permits indemnification by a corporation under similar circumstances for expenses (including attorneys' fees) actually and reasonably incurred by such persons in connection with the defense or settlement of a derivative action or suit, except that no indemnification may be made in respect of any claim, issue or matter as to which the person is adjudged to be liable to the corporation unless the Delaware Court of Chancery or the court in which the action or suit was brought determines upon application that the person is fairly and reasonably entitled to indemnity for the expenses which the court deems to be proper. To the extent a director, officer, employee or agent is successful in the defense of such an action, suit or proceeding, the corporation is required by Delaware corporate law to indemnify such person for reasonable expenses incurred thereby. Expenses (including attorneys' fees) incurred by such persons in defending any action, suit or proceeding may be paid in advance of the final disposition of such action, suit or proceeding upon receipt of an undertaking by or on behalf of that person to repay the amount if it is ultimately determined that that person is not entitled to be so indemnified.	except when the indemnity is against any liability (i) of the officer to pay a fine in criminal proceedings, (ii) of the officer to pay a penalty in respect of non-compliance with any regulatory requirements, (iii) incurred by the officer in defending criminal proceedings in which he or she is convicted, (iv) incurred by the officer in defending civil proceedings brought by the company or a related company in which judgment is given against him or her, or (v) incurred by the officer in connection with an application for relief under Section 76A(13) or Section 391 of the Singapore Companies Act in which the court refuses to grant him or her relief. In cases where a director is sued by the company, the Singapore Companies Act gives the court the power to relieve directors either wholly or partially from their liability for their negligence, default, breach of duty or breach of trust. In order for relief to be obtained, it must be shown that (i) the director acted reasonably and honestly; and (ii) it is fair, having regard to all the circumstances of the case including those connected with such director's appointment, to excuse the director. However, Singapore case law has indicated that such relief will not be granted to a director who has benefited as a result of his or her breach of trust. Our constitution provides that subject to the provisions of the Singapore Companies Act and every other applicable statute for the time being in force concerning companies and affecting the company, the directors and officers are entitled to be indemnified against costs, charges, fees and other expenses that may be incurred by such person in defending any proceedings, whether civil or criminal, which relates to anything done or omitted or alleged to be done or omitted by such person as a director, officer or employee of the company and in which judgment is given in his or her favor or in which such person is acquitted or in which the courts have granted relief pursuant to the provisions of the Singapore Companies Act, provided that such indemnity shall not extend to any liability which by law would otherwise attach to him or her in respect of any negligence, default, breach of duty or breach of trust of which he or she may be guilty in relation to the company, or which would otherwise result in such indemnity being voided under applicable Singapore laws.
Shareholder Approval of Issuances of Shares	
Under Delaware law, the board of directors has the authority to issue, from time to time, capital stock in its sole discretion, as long the number the shares to be issued, together with those shares that are already issued and outstanding and those shares reserved to be issued, do not exceed the authorized capital for the corporation as previously approved by the stockholders and set forth in the corporation's certificate of incorporation. Under the foregoing circumstances, no additional stockholder approval is required for the issuance of capital stock. Under Delaware law, stockholder approval is required (i) for any amendment to the corporation's certificate of incorporation to increase the authorized capital and (ii) for the issuance of stock in a direct merger transaction where the number of shares exceeds 20% of	Section 161 of the Singapore Companies Act provides that despite anything in the company's constitution, the directors must not exercise any power to issue shares without prior approval of Company's shareholders in a general meeting. The affirmative vote of shareholders holding at least a majority of the ordinary shares held by the shareholders present in person or represented by proxy at the annual general meeting and entitled to vote is required for this authorization. Once this shareholders' approval is obtained, unless previously revoked or varied by the company in general meeting, it continues in force until the conclusion of the next annual general meeting or the expiration of the period within which the next annual general meeting after that date is required by law to be held, whichever is earlier; but any approval may be revoked or varied by the company in general meeting.

Delaware	Singapore
the corporation's shares outstanding prior to the transaction, regardless of whether there is sufficient authorized capital.	Notwithstanding this general authorization to allot and issue our ordinary shares, Wave will be required to seek shareholder approval with respect to future issuances of ordinary shares, where required under The Nasdaq Stock Market rules, such as if we were to propose an issuance of ordinary shares that would result in a change in control of Wave or in connection with certain transactions involving the issuance of ordinary shares representing 20% or more of our outstanding ordinary shares.
Shareholder Approval of Business Combinations	
Generally, under the Delaware General Corporation Law, completion of a merger, consolidation, or the sale, lease or exchange of substantially all of a corporation's assets or dissolution requires approval by the board of directors and by a majority (unless the certificate of incorporation requires a higher percentage) of outstanding stock of the corporation entitled to vote. The Delaware General Corporation Law also requires a special vote of stockholders in connection with a business combination with an "interested stockholder" as defined in section 203 of the Delaware General Corporation Law. See "—Interested Shareholders" above.	The Singapore Companies Act and the Insolvency, Restructuring and Dissolution Act 2018 mandates that specified corporate actions require approval by the shareholders in a general meeting, notably: • despite anything in the company's constitution, directors must not carry into effect any proposals for disposing of the whole or substantially the whole of the company's undertaking or property unless those proposals have been approved by shareholders in a general meeting; • the company may by special resolution resolve that it be wound up voluntarily; • subject to the constitution of each amalgamating company, an amalgamation proposal must be approved by the shareholders of each amalgamating company via special resolution at a general meeting; • a compromise or arrangement proposed between a company and its shareholders, or any class of them, must, among other things, be approved by a majority in number representing three-fourths in value of the shareholders or class of shareholders present and voting either in person or by proxy at the meeting ordered by the court; and • despite anything in the company's constitution, the directors must not, without the prior approval of shareholders, issue shares, including shares being issued in connection with corporate actions.
Shareholder Action Without A Meeting	
Under the Delaware General Corporation Law, unless otherwise provided in a corporation's certificate of incorporation, any action that may be taken at a meeting of stockholders may be taken without a meeting, without prior notice and without a vote if the holders of outstanding stock, having not less than the minimum number of votes that would be necessary to authorize such action, consent in writing. It is not uncommon for a corporation's certificate of incorporation to prohibit such action.	There are no equivalent provisions under the Singapore Companies Act in respect of public companies which are listed on a securities exchange, like our company.
Shareholder Suits	
Under the Delaware General Corporation Law, a stockholder may bring a derivative action on behalf of the corporation to enforce the rights of the corporation. An individual also may commence a class action suit on behalf of himself or herself and other	*Standing* Only registered shareholders of our company reflected in our register of members are recognized under Singapore law as shareholders of our company. As a result, only registered

Delaware	Singapore
similarly situated stockholders where the requirements for maintaining a class action under the Delaware General Corporation Law have been met. A person may institute and maintain such a suit only if such person was a stockholder at the time of the transaction which is the subject of the suit or his or her shares thereafter devolved upon him or her by operation of law. Additionally, under Delaware case law, the plaintiff generally must be a stockholder not only at the time of the transaction which is the subject of the suit, but also through the duration of the derivative suit. The Delaware General Corporation Law also requires that the derivative plaintiff make a demand on the directors of the corporation to assert the corporate claim before the suit may be prosecuted by the derivative plaintiff, unless such demand would be futile.	shareholders have legal standing to institute shareholder actions against us or otherwise seek to enforce their rights as shareholders. Holders of book-entry interests in our shares will be required to exchange their book-entry interests for certificated shares and to be registered as shareholders in our shareholder register in order to institute or enforce any legal proceedings or claims against us, our directors or our executive officers relating to shareholder rights. A holder of book-entry interests may become a registered shareholder of our company by exchanging its interest in our shares for certificated shares and being registered in our shareholder register. *Personal remedies in cases of oppression or injustice* A shareholder may apply to the court for an order under Section 216 of the Singapore Companies Act to remedy situations where (i) the company's affairs are being conducted or the powers of the company's directors are being exercised in a manner oppressive to, or in disregard of the interests of one or more of the shareholders or holders of debentures of the company, including the applicant; or (ii) the company has done an act, or threatens to do an act, or the shareholders or holders of debentures have passed some resolution, which unfairly discriminates against, or is otherwise prejudicial to, one or more of the company's shareholders or holders of debentures, including the applicant. Singapore courts have wide discretion as to the relief they may grant under such application, including, *inter alia*, directing or prohibiting any act or cancelling or varying any transaction or resolution, providing that the company be wound up, or authorizing civil proceedings to be brought in the name of or on behalf of the company by such person or persons and on such terms as the court directs. *Derivative actions and arbitrations* The Singapore Companies Act has a provision which provides a mechanism enabling shareholders to apply to the court for leave to bring a derivative action or commence an arbitration on behalf of the company. Derivative actions are also allowed as a common law action. Applications are generally made by shareholders of the company, but courts are given the discretion to allow such persons as they deem proper to apply (e.g., beneficial owner of shares). It should be noted that this provision of the Singapore Companies Act is primarily used by minority shareholders to bring an action or arbitration in the name and on behalf of the company or intervene in an action or arbitration to which the company is a party for the purpose of prosecuting, defending or discontinuing the action or arbitration on behalf of the company. Prior to commencing a derivative action or arbitration, the court must be satisfied that (i) 14 days' notice has been given to the directors of the company of the party's intention to commence such action or arbitration if the directors of the company do not bring, diligently prosecute or defend or discontinue the action, (ii) the party is acting in good faith and (iii) it appears to be prima facie in the interests of the company that the action be brought, prosecuted, defended or discontinued.

Delaware	Singapore
	Class actions The concept of class action suits in the United States, which allows individual shareholders to bring an action seeking to represent the class or classes of shareholders, does not exist in the same manner in Singapore. In Singapore, it is possible as a matter of procedure for a number of shareholders who have a common interest in any proceedings, to begin proceedings as a group with one or more of such shareholders representing the group.
Distributions and Dividends; Repurchases and Redemptions	
The Delaware General Corporation Law permits a corporation to declare and pay dividends out of statutory surplus or, if there is no surplus, out of net profits for the fiscal year in which the dividend is declared and/or for the preceding fiscal year as long as the amount of capital of the corporation following the declaration and payment of the dividend is not less than the aggregate amount of the capital represented by the issued and outstanding stock of all classes having a preference upon the distribution of assets. Under the Delaware General Corporation Law, any corporation may purchase or redeem its own shares, except that generally it may not purchase or redeem these shares if the capital of the corporation is impaired at the time or would become impaired as a result of the redemption. A corporation may, however, purchase or redeem out of capital shares that are entitled upon any distribution of its assets to a preference over another class or series of its shares if the shares are to be retired and the capital reduced.	The Singapore Companies Act provides that no dividend is payable to the shareholders of any company except out of profits. The Singapore Companies Act does not provide a definition on when profits are deemed to be available for the purpose of paying dividends and this is accordingly governed by case law. Our constitution provides that no dividend can be paid otherwise than out of profits. *Acquisition of a company's own shares* The Singapore Companies Act generally prohibits a company from acquiring its own shares or purporting to acquire the shares of its holding company or ultimate holding company, whether directly or indirectly, in any way, subject to certain exceptions. Any contract or transaction made or entered into in contravention of the aforementioned prohibition by which a company acquires or purports to acquire its own shares or shares in its holding company or ultimate holding company is void. However, provided that it is expressly permitted to do so by its constitution and subject to the special conditions of each permitted acquisition contained in the Singapore Companies Act, a company may: • redeem redeemable preferred shares on such terms and in such manner as is provided by its constitution. Preferred shares may be redeemed out of capital only if all the directors make a solvency statement in relation to such redemption in accordance with the Singapore Companies Act, and the company lodges a copy of the statement with the Registrar of Companies; • whether listed on an exchange in Singapore approved by the Monetary Authority of Singapore or any securities exchange outside Singapore, or not, make an off-market purchase of its own shares in accordance with an equal access scheme authorized in advance at a general meeting; • make a selective off-market purchase of its own shares in accordance with an agreement authorized in advance at a general meeting by a special resolution where persons whose shares are to be acquired and their associated persons have abstained from voting; and

- whether listed on an exchange in Singapore approved by the Monetary Authority of Singapore or any securities exchange outside Singapore, or not, make an acquisition of its own shares under a contingent purchase contract which has been authorized in advance at a general meeting by a special resolution.

A company may also purchase its own shares by an order of a Singapore court.

- The total number of ordinary shares, stocks in any class and non-redeemable preferred shares that may be acquired by a company in a relevant period must not exceed 20% (or such other prescribed percentage) of the total number of ordinary shares, stocks in any class or non-redeemable preferred shares (as the case may be) as of the date of the resolution to acquire the shares. Where, however, a company has reduced its share capital by a special resolution or a Singapore court made an order to such effect, the total number of ordinary shares, stocks in any class or non-redeemable preferred shares shall be taken to be the total number of ordinary shares, stocks in any class or non-redeemable preferred shares (as the case may be) as altered by the special resolution or the order of the court. Payment, including any expenses (including brokerage or commission) incurred directly in the acquisition by the company of its own shares, may be made out of the company's profits or capital, provided that the company is solvent.

Financial assistance for the acquisition of shares

A public company or a company whose holding company or ultimate holding company is a public company must not give financial assistance to any person whether directly or indirectly for the purpose of or in connection with:

- the acquisition or proposed acquisition of shares in the company or units of such shares; or
- the acquisition or proposed acquisition of shares in its holding company or ultimate holding company, or units of such shares.

Financial assistance may take the form of a loan, the giving of a guarantee, the provision of security, the release of an obligation, the release of a debt or otherwise.

However, it should be noted that a company may provide financial assistance for the acquisition of its shares or shares in its holding company or ultimate holding company if it complies with the requirements (including approval by special resolution) set out in the Singapore Companies Act.

Our constitution provides that subject to the provisions of the Singapore Companies Act, we may purchase or otherwise acquire our own shares upon such terms and subject to such conditions as we may deem fit. We may deal with any such shares which is so purchased or acquired by us in such manner as may be permitted

Delaware	Singapore
	under the Singapore Companies Act (including, without limitation, hold such shares as treasury shares).
Transactions with Officers or Directors	
Under the Delaware General Corporation Law, some contracts or transactions in which one or more of a corporation's directors has an interest are not void or voidable because of such interest provided that some conditions, such as obtaining the required approval and fulfilling the requirements of good faith and full disclosure, are met. Under the Delaware General Corporation Law, either (a) the stockholders or the board of directors of a corporation must approve in good faith any such contract or transaction after full disclosure of the material facts or (b) the contract or transaction must have been "fair" as to the corporation at the time it was approved. If board approval is sought, the contract or transaction must be approved in good faith by a majority of disinterested directors after full disclosure of material facts, even though less than a majority of a quorum.	Under the Singapore Companies Act, directors and the chief executive officer of the company are not prohibited from dealing with the company, but where they have an interest, whether directly or indirectly, in a transaction with the company, that interest must be disclosed to the board of directors. In particular, every director or chief executive officer who is in any way, whether directly or indirectly, interested in a transaction or proposed transaction with the company must, as soon as is practicable after the relevant facts have come to such director's or, as the case may be, the chief executive officer's knowledge, declare the nature of such interest at a meeting of the directors or send a written notice to the company detailing the nature, character and extent of the interest. In addition, a director or chief executive officer who holds any office or possesses any property which directly or indirectly might create interests in conflict with such director's or, as the case may be, the chief executive officer's duties as director or chief executive officer is required to declare the fact and the nature, character and extent of the conflict at a meeting of directors or send a written notice to the company detailing the nature, character and extent of the conflict. The Singapore Companies Act extends the scope of this statutory duty of a director and chief executive officer to disclose any interests by pronouncing that an interest of a member of a director's or, as the case may be, the chief executive officer's family (including spouse, son, adopted son, step-son, daughter, adopted daughter and step-daughter) will be treated as an interest of the director or chief executive officer (as the case may be). A director or chief executive officer is not deemed to be interested or to have been at any time interested in any transaction or proposed transaction where the interest of the director or chief executive officer (as the case may be) consists only of being a member or creditor of a corporation which is interested in the transaction or proposed transaction with the company if the interest may properly be regarded as immaterial. Where the transaction or the proposed transaction relates to any loan to the company, no disclosure need be made where the director or chief executive officer (as the case may be) has only guaranteed the repayment of such loan, unless the constitution provides otherwise. Further, where any transaction or proposed transaction has been or will be made with or for the benefit of or on behalf of a related corporation (i.e., the holding company, subsidiary or subsidiary of a common holding company), the director or chief executive officer is not deemed to be interested or to have been at any time interested in such transaction or proposed transaction by virtue of only being a director or chief executive officer (as the case may be) of the related corporation, unless the constitution provides otherwise.

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	Subject to specified exceptions, the Singapore Companies Act prohibits a company (other than an exempt private company) from, among others, (i) making a loan or a quasi-loan to its directors or to directors of a related corporation, or giving a guarantee or security in connection with such a loan or quasi-loan, (ii) entering into a credit transaction as creditor for the benefit of its directors or the directors of a related corporation, or giving a guarantee or any security in connection with such a credit transaction, (iii) arranging an assignment to or assumption by us of any rights, obligations or liabilities under a transaction which, if it had been entered into by us, would have been a restricted transaction, and (iv) taking part in an arrangement under which another person enters into a transaction which, if entered into by us, would have been a restricted transaction and such person obtains a benefit from us or our related corporation pursuant thereto. Companies are also prohibited from entering into any of these transactions with the spouse or children (whether adopted or natural or step-children) of its directors. Subject to specified exceptions, the Singapore Companies Act prohibits a company (other than an exempt private company) from making a loan or a quasi-loan to another company or a limited liability partnership or entering into any guarantee or providing any security in connection with a loan or a quasi-loan made to another company or a limited liability partnership by a person other than the first-mentioned company, entering into a credit transaction as a creditor for the benefit of another company or a limited liability partnership, or entering into any guarantee or provide any security in connection with a credit transaction entered into by any person for the benefit of another company or a limited liability partnership if a director or directors of the first-mentioned company is or together are interested in 20% or more of the total voting power in the other company or the limited liability partnership (as the case may be). Such prohibition also applies to a loan or quasi-loan made by a company (other than an exempt private company), a credit transaction made by a company (other than an exempt private company) for the benefit of another company or limited liability partnership and a guarantee entered into or security provided by a company (other than an exempt private company) in connection with a loan or quasi-loan made by a person other than the first-mentioned company to another company or a limited liability partnership or with a credit transaction made for the benefit of another company or limited liability partnership entered into by a person other than the first-mentioned company, where such other company or limited liability partnership is incorporated or formed (as the case may be) outside Singapore, if a director or directors of the first-mentioned company (a) is or together are interested in 20% or more of the total voting power in the other company or limited liability partnership or (b) in a case where the other company does not have a share capital, exercises or together exercise control over the other company whether by reason of having the power to appoint directors or otherwise. The Singapore Companies Act also provides that an interest of a member of a director’s family (including spouse, son, adopted son, step-son, daughter, adopted daughter and step-daughter) will be treated as an interest of the director.

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Dissenters' Rights	
Under the Delaware General Corporation Law, a stockholder of a corporation participating in some types of major corporate transactions may, under varying circumstances, be entitled to appraisal rights pursuant to which the stockholder may receive cash in the amount of the fair market value of his or her shares in lieu of the consideration he or she would otherwise receive in the transaction.	There are no equivalent provisions in Singapore under the Singapore Companies Act.
Cumulative Voting	
Under the Delaware General Corporation Law, a corporation may adopt in its bylaws that its directors shall be elected by cumulative voting. When directors are elected by cumulative voting, a stockholder has the number of votes equal to the number of shares held by such stockholder times the number of directors nominated for election. The stockholder may cast all of such votes for one director or among the directors in any proportion.	There are no equivalent provisions in Singapore under the Singapore Companies Act.

CERTAIN INFORMATION IDENTIFIED BY "[***]" HAS BEEN EXCLUDED FROM THE EXHIBIT BECAUSE IT IS BOTH NOT MATERIAL AND IS THE TYPE OF INFORMATION THAT THE REGISTRANT TREATS AS PRIVATE OR CONFIDENTIAL.

Collaboration And License Agreement

by and among

Wave Life Sciences USA, Inc.,

Wave Life Sciences UK Limited

and

GLAXOSMITHKLINE INTELLECTUAL PROPERTY (NO. 3) LIMITED

December 13, 2022

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COLLABORATION AND LICENSE AGREEMENT

THIS COLLABORATION AND LICENSE AGREEMENT (this "**Agreement**"), entered into as of December 13, 2022 (the "**Execution Date**"), is entered into by and among Wave Life Sciences USA, Inc., a corporation organized and existing under the Laws of the State of Delaware ("**Wave US**"), Wave Life Sciences UK Limited, a private limited company incorporated under the laws of England and Wales ("**Wave UK**", and together with Wave US, "**Wave**"), and GlaxoSmithKline Intellectual Property (No. 3) Limited, a company existing under the laws of England, with offices at 980 Great West Road, Brentford, Middlesex, TW8 9GS ("**GSK**"). Wave and GSK are referred to in this Agreement individually as a "**Party**" and collectively as the "**Parties**."

RECITALS:

WHEREAS, Wave is a genetic medicine company focused on advancing Oligonucleotides that precisely target the underlying causes of diseases;

WHEREAS, GSK possesses expertise in developing and commercializing therapeutics;

WHEREAS, Wave and GSK desire to collaborate to develop and commercialize Oligonucleotide therapeutics designed to modulate alpha-1 antitrypsin; and

WHEREAS, Wave and GSK also desire to collaborate on multiple research programs for the validation of additional targets and the development, manufacturing, and commercialization of Oligonucleotides directed to certain targets, as further described in this Agreement.

NOW, **THEREFORE**, in consideration of the foregoing premises and the mutual covenants herein contained, the Parties hereby agree as follows:

1. DEFINITIONS

Unless specifically set forth to the contrary herein, the following terms, whether used in the singular or plural, will have the respective meanings set forth below:

1.1 "**AAA**" has the meaning set forth in Section 15.4 (Arbitration).

1.2 "**AAA Rules**" has the meaning set forth in Section 15.4 (Arbitration).

1.3 **"Accounting Standards"** means with respect to a Party, (a) United States generally accepted accounting principles ("**GAAP**"); or (b) International Financial Reporting Standards ("**IFRS**"), depending on which accounting standard is normally applied by such Party with respect to the filing of its reporting, as applicable, in each case, consistently applied.

1.4 [***].

1.5 "**Acquirer**" means, collectively, with respect to the acquisition of a Party by a Third Party, a Third Party referenced in the definition of Change of Control and such Third Party's Affiliates, other than the applicable Party in the definition of Change of Control and such Party's Affiliates (determined as of immediately prior to the closing of such Change of Control).

1.6 "**Affiliate**" means, with respect to a Person, any other Person that controls, is controlled by, or is under common control with such Person. For purposes of this Agreement, a Person will be deemed

to control another Person if it owns or controls, directly or indirectly, more than fifty percent (50%) of the equity securities of such other Person entitled to vote in the election of directors (or, in the case that such other Person is not a corporation, for the election of the corresponding managing authority), or otherwise has the power to direct the management and policies of such other Person. The Parties acknowledge that in the case of certain entities organized under the laws of certain countries outside the United States, the maximum percentage ownership permitted by law for a foreign investor may be less than fifty percent (50%), and that in such case such lower percentage will be substituted in the preceding sentence, *provided that* such foreign investor has the power to direct the management and policies of such entity.

1.7 "**Agreed Network**" has the meaning set forth in Section 6.5 (Network of Third Party Providers).

1.8 "**Agreement**" has the meaning set forth in the Preamble.

1.9 "**Alliance Manager**" has the meaning set forth in Section 2.1 (Alliance Manager).

1.10 "**ANDA**" means an Abbreviated New Drug Application and all amendments and supplements thereto filed with the FDA under Section 505(j) of the FD&C Act (21 U.S.C. § 355(j)), or the equivalent application filed with any equivalent Regulatory Authority outside the U.S. (including any supra-national agency), including pursuant to Article 10.1 of Directive 2001/83/EC of the European Parliament and Council of 6 November 2001, or any enabling legislation thereof.

1.11 "**Antitrust Clearance Date**" means the earliest date on which all applicable waiting periods and approvals required under Antitrust Laws with respect to the transactions contemplated under this Agreement have expired or have been terminated (in the case of waiting periods) or been received (in the case of approvals).

1.12 "**Antitrust Filing**" has the meaning set forth in Section 14.2 (Antitrust Filings).

1.13 "**Antitrust Laws**" means any and all Applicable Laws designed to govern competition, trade regulation, foreign investment, or national security or defense matters or to prohibit, restrict, or regulate actions for the purpose or effect of monopolization or restraint of trade, including the Hart-Scott Rodino Antitrust Improvements Act of 1976 ("**HSR Act**").

1.14 "**Applicable Law**" means all applicable national, supranational, regional, state and local laws, statutes, rules, regulations, ordinances, treaties, administrative codes, guidance, judgments, decrees, directives, injunctions, orders, permits, of or from any court, arbitrator, Regulatory Authority, or Governmental Authority having jurisdiction over or related to the subject item, including GCP, GLP and cGMP, the United States Federal Food, Drug, and Cosmetic Act, the Prescription Drug Marketing Act of 1987, the Generic Drug Enforcement Act of 1992 (21 U.S.C. § 335a et seq.), the Anti-Kickback Statute (42 U.S.C. § 1320a-7b et seq.), the False Claims Act (31 U.S.C. § 3729 et seq.), Civil Monetary Penalties Law (42 U.S.C. § 1320a-7a), the Patient Protection and Affordable Care Act (42 U.S.C. § 18001 et seq.), the Social Security Act (42 U.S.C. Chapter 7), the Antifraud and Abuse Amendment to the Social Security Act, Federal Program Fraud Civil Remedies Act (31 U.S.C. § 3801 et seq.), Foreign Corrupt Practices Act (FCPA), Data Protection Laws, and all applicable implementing regulations for the foregoing, and all applicable state or foreign laws corresponding to any of the foregoing, all as amended from time to time.

1.15 "Available Proposed Target" has the meaning set forth in Section 3.3.2.2(b)(ii) (Gatekeeper Procedures).

1.16 "**Available Proposed Target Notice**" has the meaning set forth in Section 3.3.2.2(b)(ii) (Gatekeeper Procedures).

1.17 "**Backup Criteria**" means, for a given Collaboration Program, the selection criteria [***]to determine if a Collaboration Compound [***].

1.18 "**Bankrupt Party**" has the meaning set forth in Section 7.7 (Bankruptcy).

1.19 "**Bankruptcy Code**" means Title 11 of the United States Code, as amended, or analogous provisions of Applicable Law outside the United States.

1.20 "**Breaching Party**" has the meaning set forth in Section 13.5.1 (Right to Terminate for Material Breach).

1.21 "**Business Day**" means a calendar day other than a Saturday, Sunday, or a bank or other public holiday in Massachusetts or New York in the United States or in London, United Kingdom and excludes the continuous period between 24 December to 2 January each year when the offices of each Party are closed.

1.22 "**Calendar Quarter**" means each three (3) month period commencing January 1, April 1, July 1 or October 1 of any Calendar Year; provided, however, that (a) the first Calendar Quarter of the Term will extend from the Effective Date to the end of the first full Calendar Quarter thereafter; and (b) the last Calendar Quarter of the Term will end upon the expiration or termination of this Agreement.

1.23 "**Calendar Year**" means the period beginning on January 1 and ending on December 31 of the same year; provided, however, that (a) the first Calendar Year of the Term will commence on the Effective Date and end on December 31 of the same year; and (b) the last Calendar Year of the Term will commence on January 1 of the Calendar Year in which this Agreement terminates or expires and end on the effective date of termination or expiration of this Agreement.

1.24 "**cGMP**" means all applicable Good Manufacturing Practices, including: (a) the applicable part of quality assurance to ensure that products are consistently produced and controlled in accordance with the quality standards appropriate for their intended use, as defined in European Commission Directive 2003/94/EC laying down the principals and guidelines of good manufacturing practice; (b) the principles detailed in the U.S. Current Good Manufacturing Practices, 21 C.F.R. Sections 210, 211, 601, 610 and 820; (c) the Rules Governing Medicinal Products in the European Community, Volume IV Good Manufacturing Practice for Medicinal Products; (d) the principles detailed in the ICH Q7A guidelines; and (e) the equivalent Laws in any relevant country, each as may be amended and applicable from time to time.

1.25 "**Change of Control**" means, with respect to a Party, (a) a merger, consolidation, recapitalization, or reorganization of such Party with a Third Party that results in the voting securities of such Party outstanding immediately prior thereto, or any securities into which such voting securities have been converted or exchanged, ceasing to represent at least fifty percent (50%) of the combined voting power of the surviving entity or the parent of the surviving entity immediately after such merger, consolidation, recapitalization, or reorganization, (b) a transaction or series of related transactions in which a Third Party, together with its Affiliates, becomes the direct or indirect beneficial owner of fifty percent (50%) or more of the combined voting power of the outstanding securities of such Party, or (c) the sale or other transfer to a Third Party of all or substantially all of such Party's and its controlled Affiliates' assets. Notwithstanding the foregoing, any transaction or series of

transactions effected for the purpose of financing the operations of the applicable Party or changing the form or jurisdiction of organization of such Party (such as an initial public offering or other offering of equity securities to non-strategic investors or corporate reorganization) will not be deemed a "Change of Control" for purposes of this Agreement.

1.26 "**Clinical Failure**" means with respect to the [***].

1.27 "**Clinical Study**" means a Phase 1 Study, Phase 2 Study, Phase 3 Study, Registrational Study, any study incorporating more than one (1) of these phases, any study performed as part of any Post-Marketing Commitment (whether required or optional), or any other study (including a non-interventional study) in humans to obtain information regarding a product, including information relating to the safety, tolerability, pharmacological activity, pharmacokinetics, dose ranging, or efficacy of such product.

1.28 "**CMC**" means Chemistry, Manufacturing and Controls, which includes (a) Manufacturing process development records for a Collaboration Compound, Collaboration Product, or Combination Product directed to any Collaboration Target, (b) all chemistry, Manufacturing, and control procedures necessary for Manufacture of a Collaboration Compound, Collaboration Product, or Combination Product directed to any Collaboration Target, and (c) sourcing and testing of all raw materials and components used in the Manufacture of a Collaboration Compound, Collaboration Product, or Combination Product directed to any Collaboration Target.

1.29 "**CMO**" means any Third Party contract manufacturing organization or similar Third Party subcontractor.

1.30 "**Collaboration Compound**" means any SERPINA1 Compound, GSK Collaboration Compound or Wave Collaboration Compound.

1.31 "**Collaboration In-Licenses**" means [***].

1.32 "**Collaboration Know-How**" means all Know-How conceived, discovered, developed or otherwise made by or on behalf of a particular Party or any of its Affiliates, Sublicensees or permitted subcontractors of any of the foregoing (solely or jointly by or on behalf of a particular Party or any of its Affiliates or permitted subcontractors of any of the foregoing) in the course of performing activities under this Agreement.

1.33 "**Collaboration Patents**" means any and all Patents that Cover any of the Collaboration Know-How.

1.34 "**Collaboration Product**" means any SERPINA1 Product, GSK Collaboration Product or Wave Collaboration Product.

1.35 "**Collaboration Program**" means any Target Validation Program, any GSK CP, any Wave CP, the SERPINA1 Phase 1/2 Program or the SERPINA1 Program, as applicable.

1.36 "**Collaboration Program Technology**" means any Collaboration Know-How or Collaboration Patents, other than [***].

1.37 "**Collaboration Target**" means the SERPINA1 Target, any GSK Collaboration Target or any Wave Collaboration Target. For clarity, a Validation Target is not a Collaboration Target.

1.38 "**Collaboration Term**" means, (a) with respect to a given Target Validation Program, the Target Validation Term for such Target Validation Program, (b) with respect to the SERPINA1 Program, the SERPINA1 Program Term, (c) with respect to a given GSK CP, the GSK CP Term for such GSK CP, and (d) with respect to a given Wave CP, the Wave CP Term for such Wave CP.

1.39 "**Combination Product**" means a Collaboration Product that is (a) sold in the form of a combination that contains or comprises one or more additional therapeutically active pharmaceutical agents (whether coformulated or copackaged or otherwise sold for a single price) other than a Collaboration Compound in the Collaboration Product, or (b) sold for a single price together with any (i) delivery device or component therefor, (ii) companion diagnostic related to any Collaboration Product, process, service, or therapy, or (iii) product, process, service, or therapy other than the Collaboration Product (each, (i) – (iii), an "**Other Component**").

1.40 "**Commercial Supply Agreement**" has the meaning set forth in Section 6.3 (Supply Agreements).

1.41 "**Commercialization**" **or** "**Commercialize**" means any and all activities directed to transporting, storing, marketing, detailing, Promotion, distributing, importing, exporting, using, offering to sell or selling a product, including (a) strategic marketing, sales force detailing, sales force training and allocation, advertising, planning, messaging, branding; (b) all customer support, patient services, case management, Distribution Matters, invoicing and sales activities; (c) design and conduct of Post-Marketing Commitments or other post-approval Clinical Studies not required to obtain, support, or maintain Regulatory Approval (other than Pricing Approval) for the applicable product; and (d) activities directed to obtaining Pricing Approvals, negotiating discounts and obtaining product access, as applicable.

1.42 "**Commercially Reasonable Efforts**" means [***]. Notwithstanding the foregoing, neither Party will be obligated to Develop, seek Regulatory Approval for, or Commercialize a Collaboration Compound or Collaboration Product: (i) that, in its reasonable opinion after discussion with the other Party, caused or is sufficiently high risk of causing a Material Safety Concern based upon then available data; or (ii) in a manner inconsistent with Applicable Law.

1.43 "**Committee Disputes**" has the meaning set forth in Section 2.8.4 (Escalatable Disputes).

1.44 "**Competitive Infringement**" has the meaning set forth in Section 8.8.1 (Notification).

1.45 "**Completion**" means, with respect to the SERPINA1 Phase 1/2 Program, the [***]. "**Completed**", "**Completing**", or "**Completes**" will each have a correlative meaning.

1.46 "**Confidential Information**" means any and all confidential or proprietary information and data and all other scientific, pre-clinical, clinical, regulatory, manufacturing, marketing, financial and commercial information or data that is or has been provided by one Party (the "**Disclosing Party**") to the other Party (the "**Receiving Party**") in connection with this Agreement, whether communicated in writing or orally or by any other method.

1.47 "**Control**" means, with respect to any Materials, Regulatory Documents, or intellectual property rights, including any Patents or Know-How, the possession (whether by ownership, license, or sublicense, other than by a license, sublicense, or other right granted pursuant to this Agreement (but not assignment)) by a Party of the ability to assign, transfer, or grant to the other Party the licenses, sublicenses, or rights to access and use such Materials, Regulatory Documents, or intellectual property rights as provided for in this Agreement, without violating the terms of any agreement or other arrangement with any Third Party in existence as of the time such Party would

be required hereunder to grant such license, sublicense, or rights of access and use. Notwithstanding anything in this Agreement to the contrary, a Party will be deemed not to Control any Materials, Regulatory Documents, or intellectual property rights that are owned or in-licensed by an Acquirer, except (a) with respect to any such Materials, Regulatory Documents, or intellectual property rights arising from participation by employees or consultants of such Acquirer in furtherance of this Agreement after such Change of Control, (b) to the extent that any such Materials, Regulatory Documents, or intellectual property rights are included in or used in furtherance of this Agreement by the Acquirer after such Change of Control, or (c) for intellectual property rights constituting improvements (or direct improvements to such improvements) to the Wave Technology or the GSK Technology (as applicable) in existence prior to such Change of Control, in each case, developed or conceived by any employees or consultants of the Acquirer.

1.48 "**Cover**," "**Covering**," or "**Covered**" means, with respect to a particular subject matter at issue and the relevant Patent, that, but (a) for a license granted to a Person under a claim included in such Patent or (b) ownership of such Patent, the Exploitation by such Person of the subject matter at issue, would infringe such claim or, in the case of a Patent that is a patent application, would infringe a claim in such patent application if it were to issue as a patent.

1.49 "**Critical Matter**" has the meaning set forth in Section 2.8.3 (Final Decision-Making; Critical Matters).

1.50 "**CRO**" means a contract research organization.

1.51 "**DC Criteria**" means, for a given Collaboration Program, the requirements that [***].

1.52 "Declined Target" means a [***].

1.53 "**Develop**" and "**Development**" means any and all activities related to the design, discovery, generation, identification, profiling, characterization, production, process development, testing method development, pre-clinical development or non-clinical or pre-clinical studies, clinical drug development activities conducted before or after obtaining Regulatory Approval that are reasonably related to or leading to the development, preparation, or submission of data and information to a Regulatory Authority for the purpose of obtaining, supporting or expanding Regulatory Approval (other than Pricing Approval), including all activities related to pharmacokinetic profiling, design and conduct of Clinical Studies (but excluding Post-Marketing Commitments).

1.54 "**Development Milestone Event**" has the meaning set forth in Section 9.6.2 (GSK Collaboration Products Development Milestone Payments).

1.55 "**Development Milestone Payment**" has the meaning set forth in Section 9.6.2 (GSK Collaboration Products Development Milestone Payments).

1.56 "**Disclosing Party**" has the meaning set forth in Section 1.46 (Confidential Information).

1.57 "**Disputes**" has the meaning set forth in Section 15.1 (Disputes).

1.58 "**Distribution Matters**" means all issues and decisions regarding the distribution of a Collaboration Product, including decisions as to whether and with which wholesalers and Distributors to contract, and the terms of contracts with such wholesalers and Distributors.

1.59 "**Distributor**" means a Third Party, to whom GSK or an Affiliate of GSK has granted the right to market, promote, co-promote, advertise, detail, sell and/or distribute a Collaboration Product in a limited jurisdiction in the Territory in order to assist GSK in its Commercialization of a Collaboration Product without holding or otherwise controlling the Regulatory Approval for the Collaboration Product in such jurisdiction, which Third Party purchases Collaboration Product from GSK or its Affiliates for resale without making any modifications to such Collaboration Product other than label changes to the outer packaging.

1.60 "**DOJ**" has the meaning set forth in Section 14.2 (Antitrust Filings).

1.61 "**Dollars**" or "**$**" means the legal tender of the United States of America.

1.62 "**Effective Date**" has the meaning set forth in Section 14.1 (Effective Date).

1.63 "**EMA**" means the European Medicines Agency and any successor Governmental Authority having substantially the same function.

1.64 "**Encumbrances**" means all encumbrances that exist solely as a result of, and in accordance with, the provisions of the applicable [***].

1.65 "**Equity Agreements**" means that certain (a) Share Purchase Agreement entered into by Glaxo Group Limited and Wave Singapore, on or about the date hereof (the "**Share Purchase Agreement**"), and (b) Investor Agreement entered into by Glaxo Group Limited and Wave Singapore, on or about the date hereof, in each case, as may be amended or restated from time to time.

1.66 "**Escalatable Dispute**" has the meaning set forth in Section 15.2 (Resolution by Executive Officers).

1.67 "**European Union**", "**E.U.**" or "**EU**" means the economic, scientific, and political organization of member states of the European Union as it may be constituted from time to time.

1.68 "**Execution Date**" has the meaning set forth in the preamble.

1.69 "**Executive Officer**" means, for Wave, its [***], and for GSK, its [***] or another senior executive officer or their respective designee with appropriate responsibilities, seniority, and decision-making authority. In the event that the position of any of the Executive Officers identified in this Section 1.69 (Executive Officer) no longer exists due to a Change of Control, corporate reorganization, corporate restructuring, or the like that results in the elimination of the identified position, then the applicable Party will replace the applicable Executive Officer with another executive officer with responsibilities and seniority comparable to the eliminated Executive Officer.

1.70 "**Existing Confidentiality Agreement**" means that certain Mutual Confidentiality Agreement by and between Wave Life Sciences USA, Inc., having offices at 733 Concord Avenue, Cambridge, MA 02138 and GlaxoSmithKline LLC, a Delaware limited liability company having offices at Five Moore Drive, Research Triangle Park, NC 27709, dated November 14, 2019, as amended by that certain Amendment #1 to Mutual Confidentiality Agreement, dated November 14, 2020.

1.71 "**Existing GSK Third Party Agreements**" means (a) with respect to a given Target that is set forth on the Target List as of the Execution Date, the Third Party agreements identified in Part 1 of Schedule 1.71, and (b) with respect to a given Target that is added to the Target List after the

Execution Date, any other Third Party agreements identified in Part 2 of Schedule 1.71, if any, that are designated as "**Existing GSK Third Party Agreements**" for such new Target in accordance with Section 3.3.2.2(b)(ii).

1.72 "**Existing Wave Third Party Agreements**" means [***].

1.73 "**Exploit**" or "**Exploitation**" means to make, have made, import, have imported, export, have exported, distribute, have distributed, use, have used, sell, have sold, offer for sale, or have offered for sale, including to research, Develop, Manufacture, Commercialize, register, modify, enhance, improve, or otherwise dispose of.

1.74 "**FD&C Act**" means the United States Federal Food, Drug, and Cosmetic Act, as amended.

1.75 "**FDA**" means the United States Food and Drug Administration or any successor agency thereto.

1.76 "**Field**" means any human use or purpose.

1.77 "**First Commercial Sale**" means, with respect to a Collaboration Product, on a country-by-country basis, the first commercial sale for monetary value in an arms-length transaction of such Collaboration Product by or on behalf of a Party or any of its respective Affiliates and Sublicensees in such country following receipt of applicable Regulatory Approval and Pricing Approval of such Collaboration Product in such country; provided, however, that First Commercial Sale will not include any transfer of a Collaboration Product [***].

1.78 "**First Research Term Extension Fee**" has the meaning set forth in Section 9.3.1 (Research Term Extension Fees).

1.79 "**First Research Term Extension Period**" has the meaning set forth in Section 3.2.2 (First Research Term Extension Period).

1.80 "**Force Majeure Events**" has the meaning set forth in Section 16.6.1.

1.81 "**FTC**" has the meaning set forth in Section 14.2 (Antitrust Filings).

1.82 "**FTE**" means a full-time person, or in the case of less than a full-time person, a full-time equivalent [***], carried out by an appropriately qualified employee of a Party or its Related Parties, based on [***] person-hours per year. [***].

1.83 "**FTE Costs**" means, for any period, the FTE Rate multiplied by the number of FTEs in such period. FTEs will be pro-rated on a daily basis if necessary.

1.84 "**FTE Rate**" means [***] per full twelve (12) month Calendar Year, which rate includes [***]. Starting [***] the foregoing rate will adjust on January 1 of each Calendar Year by an amount equal to the change, if any, in the [***] during the immediately preceding Calendar Year or any successor to such published measure, not seasonally adjusted, as published by the [***]. Notwithstanding the foregoing, for any Calendar Year during the Term that is less than a full year, the above referenced rate will be proportionately reduced to reflect such portion of FTEs for such full Calendar Year.

1.85 [***] has the meaning set forth in 4.4.3.1.

1.86 "**Gatekeeper**" has the meaning set forth in 3.3.2.1 (Gatekeeper).

1.87 "**Gene Therapy**" means a therapy that involves administering to a subject a biologically or synthetically produced product which (a) delivers, in vivo or ex vivo, nucleic acid, such as DNA or RNA, and results in the transient or stable expression of an RNA sequence or sequences or protein(s) either from an episome or following integration into the genome, wherein the RNA sequence or sequences and/or protein(s) is encoded by the delivered nucleic acid, or (b) delivers an mRNA and results in the expression of a protein from the delivered mRNA, or (c) delivers any gene-editing or base-editing system, including TALENS, Megatal, zinc-finger proteins, CRISPR/Cas9 or other Cas-based systems, such delivery of a gene editing or base editing system resulting in (1) epigenetic control of chromosomal transcription, or (2) deletion or insertion or modification (including epigenetic modification) of DNA or RNA sequence(s) of a genome or transcriptome, wherein the gene editing or base editing system includes at least one protein component, and components can be administered together or separately in one or more steps.

1.88 "**Generic Product**" means, with respect to a particular Collaboration Product and on a country-by-country basis, a generic pharmaceutical product that is marketed for sale by a Third Party (not licensed, supplied or otherwise permitted by a Party or any Related Parties) and that contains the same or substantially the same active ingredient as the Collaboration Compound in such Collaboration Product and is approved for use in such country by a Regulatory Authority (a) pursuant to an ANDA; or (b) through a regulatory pathway referencing clinical data submitted by a Party or its Related Parties to obtain Regulatory Approval for such Collaboration Product.

1.89 "**GLP**" means good laboratory practice as required by the FDA under 21 C.F.R. Part 58 and all applicable FDA rules, regulations, orders, and guidances, and the requirements with respect to good laboratory practices prescribed by the European Community, the OECD (Organization for Economic Cooperation and Development Council) and the ICH Guidelines, or as otherwise required by Applicable Laws.

1.90 "**Good Clinical Practices**" or "**GCPs**" means the ethical, scientific, and quality standards required by FDA for designing, conducting, recording, and reporting trials that involve the participation of human subjects, as set forth in FDA regulations in 21 C.F.R. Parts 11, 50, 54, 56, 312, 314, and 320 and all related FDA rules, regulations, orders, and guidances, and by the International Conference on Harmonization E6: Good Clinical Practices Consolidated Guideline (the "**ICH Guidelines**"), or as otherwise required by Applicable Laws.

1.91 "**Governmental Authority**" means any applicable government authority, court, council, tribunal, arbitrator, agency, department, bureau, branch, office, legislative body, commission, Tax Authority or other instrumentality of (a) any government of any country or territory, (b) any nation, state, province, county, city, or other political subdivision thereof, or (c) any supranational body.

1.92 "**GSK**" has the meaning set forth in the preamble.

1.93 "**GSK Acquisition of a Third Party**" has the meaning set forth in Section 7.8.6 (GSK Acquisition of a Third Party).

1.94 "**GSK Acquisition Program**" has the meaning set forth in Section 7.8.6 (GSK Acquisition of a Third Party).

1.95 "**GSK Background Know-How**" means, on a Collaboration Program-by-Collaboration Program basis, any and all Know-How Controlled by GSK or any of its Affiliates [***].

1.96 "**GSK Background Patents"** means, on a Collaboration Program-by-Collaboration Program basis, those Patents that are Controlled by GSK or any of its Affiliates [***].

1.97 "**GSK Background Technology**" means GSK Background Know-How and GSK Background Patents.

1.98 "**GSK CMC Platform**" means [***].

1.99 "**GSK CMC Platform Background Technology**" means [***].

1.100 "**GSK CMC Platform Collaboration Know-How**" means [***].

1.101 "**GSK CMC Platform Collaboration Technology**" means [***].

1.102 "**GSK CMC Platform Technology**" means [***].

1.103 "**GSK CMC Platform Technology Patents**" means all [***].

1.104 "**GSK COC Program**" has the meaning set forth in Section 7.8.5 (GSK Change of Control).

1.105 "**GSK Collaboration Compounds**" means, for each GSK Collaboration Target, any Oligonucleotides designed to modulate such GSK Collaboration Target [***].

1.106 "**GSK Collaboration Development Milestone Event**" has the meaning set forth in Section 9.6.2 (GSK Collaboration Products Development Milestone Payments).

1.107 "**GSK Collaboration Development Milestone Payment**" has the meaning set forth in Section 9.6.2 (GSK Collaboration Products Development Milestone Payments).

1.108 "**GSK Collaboration Product**" means any pharmaceutical product, including all forms, presentations, strengths, doses and formulations thereof (including any method of delivery), containing or delivering a GSK Collaboration Compound alone or as a Combination Product.

1.109 "**GSK Collaboration Product Royalty**" has the meaning set forth in Section 9.8.2 (GSK Collaboration Product Royalties).

1.110 "**GSK Collaboration Product Sales Milestone Event**" has the meaning set forth in Section 9.7.1.2 (GSK Collaboration Product Sales Milestone Payments).

1.111 "**GSK Collaboration Product Sales Milestone Payment**" has the meaning set forth in Section 9.7.1.2 (GSK Collaboration Product Sales Milestone Payments).

1.112 "**GSK Collaboration Product Specific Patent**" means, with respect to a given GSK CP, any Patent within the GSK Technology or Wave Technology that [***] for such GSK CP, [***] for such GSK CP, [***] for such GSK CP, [***] for such GSK CP, and [***] for such GSK CP [***] for such GSK CP; [***] for such GSK CP; [***].

1.113 "**GSK Collaboration Program**" or "**GSK CP**" means, on a GSK Collaboration Target-by-GSK Collaboration Target basis, the Development and Commercialization, or other Exploitation of all GSK Collaboration Compounds and GSK Collaboration Products directed to a given GSK Collaboration Target in accordance with this Agreement.

1.114 **"GSK Collaboration Program Initiation Fee**" has the meaning set forth in Section 9.4 (GSK Collaboration Program Initiation Fee).

1.115 "**GSK Collaboration Target**" means each Validation Target that is designated by GSK as a GSK Collaboration Target in accordance with Section 3.4.9 (Advancement to Collaboration Program).

1.116 "**GSK CP Backup Development**" has the meaning set forth in Section 4.2.7.2.

1.117 "**GSK CP Backup Development Plan**" has the meaning set forth in Section 4.2.7.3.

1.118 "**GSK CP Backup Development Term**" has the meaning set forth in Section 4.2.7.3.

1.119 "**[***]**" has the meaning set forth in Section 13.5.3.2.

1.120 "**GSK CP Early Development Term**" means, for each GSK CP, the period commencing on the date that [***]for such GSK CP [***] and ending upon the earliest of [***] or (c) the effective date of termination of this Agreement in its entirety or with respect to such GSK CP.

1.121 "**GSK CP Infringement Action**" has the meaning set forth in Section 8.8.3.1.

1.122 "**GSK CP Late Development Term**" means, for each GSK CP, the period commencing on the date after the last day of the GSK CP Early Development Term for such GSK CP and ending upon the earlier of (a) the commercial launch of the final GSK Collaboration Product for such GSK CP or (b) the effective date of termination of this Agreement in its entirety or with respect to such GSK CP.

1.123 "**GSK CP Specific Patents**" means for a given GSK CP, all GSK Collaboration Product Specific Patents for such GSK CP.

1.124 "**GSK CP Term**" means, for a given GSK CP, the Initiation of such GSK CP and continuing for the remainder of the Term for such GSK CP. For clarity, the GSK CP Term for a given GSK CP includes the GSK CP Early Development Term and the GSK CP Late Development Term for such GSK CP.

1.125 "**GSK Indemnitees**" has the meaning set forth in Section 12.2 (Indemnification by Wave).

1.126 "**GSK Novel Target**" means a Target that, prior to the applicable nomination date of such Target by GSK in accordance with Section 3.3, has [***] as a Target that has the potential as [***] provided that (i) a given Target will not be a "GSK Novel Target" under clause (a) of this definition if, prior to the applicable nomination date of such Target by GSK in accordance with Section 3.3, such Target is [***] and (ii) a given Target will not be a "GSK Novel Target" under clause (b) of this definition if, prior to the applicable nomination date of such Target by GSK in accordance with Section 3.3, such Target [***].

1.127 **"GSK Novel Target Background Technology"** means, for a given GSK Novel Target that is a Validation Target, GSK Collaboration Target or Wave Collaboration Target (as applicable), [***].

1.128 "**GSK Novel Target Collaboration Technology**" means, for a given GSK Novel Target that is a Validation Target, GSK Collaboration Target or Wave Collaboration Target (as applicable), [***].

1.129 "**GSK Novel Target Patents**" means, for a given GSK Novel Target that is a Validation Target, GSK Collaboration Target or Wave Collaboration Target (as applicable), all Patents within the [***]

1.130 "**GSK Other Patents**" means (a) all Patents in the GSK Technology other than [***].

1.131 "**GSK Sales Milestone Event**" has the meaning set forth in Section 9.7.1.2 (GSK Collaboration Product Sales Milestone Payments).

1.132 "**GSK Sales Milestone Payment**" has the meaning set forth in Section 9.7.1.2 (GSK Collaboration Product Sales Milestone Payments).

1.133 "**GSK Technology**" means collectively, the GSK Background Technology, GSK Novel Target Collaboration Technology, and GSK's interest in Collaboration Program Technology; [***].

1.134 "**GSK Third Party Agreements**" means any Existing GSK Third Party Agreements or any Collaboration In-Licenses to which GSK is a Party.

1.135 "**ICH Guidelines**" has the meaning set forth in Section 1.90 (GCP).

1.136 "**IND/CTA**" means, in the United States, an effective Investigational New Drug Application ("**IND**") filed with the FDA as more fully defined in 21 C.F.R. § 312.3, and, with respect to any other country or jurisdiction, the Clinical Study notification, Clinical Study application or other equivalent application ("**CTA**") (i.e., a filing that must be made prior to commencing a Clinical Study or other clinical testing of any product in humans) filed with the applicable Regulatory Authority in such country or jurisdiction.

1.137 "**Initial Research Term**" has the meaning set forth in Section 3.2.1 (Initial Research Term).

1.138 "**Initiation**" or "**Initiate**" means, (i) with respect to a program, (a) that is a given Target Validation Program, [***], (b) that is the SERPINA1 Program, [***] (c) that is a given GSK CP, the date that a given [***], (d) that is a given Wave CP, [***], and (ii) with respect to a Clinical Study of a product, the date of the [***].

1.139 "**Joint Development Committee**" or "**JDC**" has the meaning set forth in Section 2.4.1 (Composition).

1.140 "**Joint Know-How**" means all Collaboration Know-How within the Collaboration Program Technology that is jointly owned by the Parties in accordance with Section 8.3 (Ownership of Collaboration Program Technology; Joint Technology).

1.141 "**Joint Patent Committee**" or "**JPC**" has the meaning set forth in Section 2.5.1 (Composition).

1.142 "**Joint Patents**" means all Collaboration Patents within the Collaboration Program Technology that are jointly owned by the Parties in accordance with Section 8.3 (Ownership of Collaboration Program Technology; Joint Technology).

1.143 "**Joint Research Committee**" or "**JRC**" has the meaning set forth in Section 2.6.1 (Composition).

1.144 "**Joint Steering Committee**" or "**JSC**" has the meaning set forth in Section 2.1 (Alliance Manager).

1.145 "**Joint Technology**" means all Joint Know-How and Joint Patents.

1.146 "**JRA Exception**" has the meaning set forth in Section 8.4.2.

1.147 "**JRC TVP Special Meeting**" has the meaning set forth in Section 3.4.8.2.

1.148 "**Know-How**" means all commercial, technical, scientific, CMC, and other know-how and information, inventions, discoveries, trade secrets, knowledge, technology, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, ideas, technical assistance, designs, drawings, assembly procedures, computer programs, specifications, data and results (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, preclinical, clinical, safety, manufacturing (including batch records for any relevant historic manufacturing campaigns), stability and quality control data and know-how, including, regulatory data, study designs and protocols), and Materials, in all cases, whether or not confidential, proprietary, patentable, in written, electronic or any other form now known or hereafter developed, but excluding all Patents.

1.149 "**Loss of Market Exclusivity**" means an event where, with respect to any Collaboration Product in any country: [***].

1.150 "**Losses**" has the meaning set forth in Section 12.1 (Indemnification by GSK).

1.151 "**Major Market Country(ies)**" means [***].

1.152 "**Manufacturing**" or "**Manufacture**" means all activities related to the manufacture of compounds or products or any component or ingredient thereof, including manufacturing supplies for Development or Commercialization, formulation, analytical methods, manufacturing process development, manufacturing scale-up, labeling, filling, processing, packaging, in-process and finished product testing, release of product or any component or ingredient thereof, quality assurance and quality control activities related to manufacturing and release of product, ongoing stability tests, storage, shipment, and regulatory activities related to any of the foregoing.

1.153 "**Manufacturing Costs**" means, with respect to any Collaboration Product [***]:

(a) [***];

(b) [***];

(c) [***];

(d) [***].

1.154 "**Manufacturing Lead**" has the meaning set forth in Section 6.1.1 (General).

1.155 "**Material Safety Concern**" means that in the good faith determination of a Party, a given Collaboration Product, or a Development, Manufacturing or Commercialization activity for such Collaboration Product, [***].

1.156 "**Materials**" means all tangible compositions of matter, devices, articles of manufacture, assays, biological, chemical, or physical materials, and other similar materials.

1.157 "**Materials Receiving Party**" has the meaning set forth in Section 4.4.3.1 (Transfer of Materials).

1.158 "**Materials Supplying Party**" has the meaning set forth in Section 4.4.3.1 (Transfer of Materials).

1.159 "**NDA**" means any (a) New Drug Application pursuant to the FD&C Act submitted to the FDA, or (b) substantially similar application or submission thereto submitted to a Regulatory Authority in a country or group of countries within the Territory to obtain Regulatory Approval (but not Pricing Approval) to Commercialize a Collaboration Product in that country or in that group of countries, including with respect to the EU, a Marketing Authorization Application submitted to the EMA pursuant to the centralized approval procedure or to the applicable Regulatory Authority of a country in the EU with respect to the mutual recognition or any other national approval.

1.160 "**Net Sales**" means, with respect to a Collaboration Product during a stated time period, the gross invoiced sales amounts for such Collaboration Product sold by or on behalf of the applicable Party or any of such Party's Affiliates or Sublicensees (each, a "**Selling Party**") in arm's length transactions to Third Parties (but not including sales relating to transactions by and between a Party and its Affiliates or Sublicensees) as determined in accordance with such Selling Party's applicable Accounting Standards as consistently applied, less the following deductions from such gross amounts which are actually incurred, allowed, paid, accrued or specifically allocated to such Collaboration Product and to the extent that such amounts are deducted from gross invoiced sales amounts as reported by such Selling Party in its financial statements in accordance with its applicable Accounting Standards, applied on a consistent basis:

(a) [***];

(b) [***];

(c) [***];

(d) [***];

(e) [***];

(f) [***]

(g) [***].

[***].

To the extent that a Selling Party receives consideration other than or in addition to cash upon the sale or disposition of a Collaboration Product, Net Sales will [***].

Notwithstanding anything to the contrary, [***].

For purposes of the definition of Net Sales: If any Collaboration Product under this Agreement is sold in the form of a Combination Product, a[***].

[***].

[***].

[***].

1.161 "**Non-Bankrupt Party**" has the meaning set forth in Section 7.7 (Bankruptcy).

1.162 "**Non-Breaching Party**" has the meaning set forth in Section 13.5.1 (Right to Terminate for Material Breach).

1.163 "**Non-Escalatable Dispute**" has the meaning set forth in Section 15.2 (Resolution by Executive Officers).

1.164 "**Oligonucleotide**" means a polymer or oligomer of nucleotides, either individually or as part of a compound or a complex, and may contain any combination of natural and non-natural nucleobases, sugars, and internucleotidic linkages. Natural nucleobases, sugars, and internucleotidic linkages include those found in natural DNA or RNA, and non-natural nucleobases, sugars, and internucleotidic linkages include structures that [***]. For the avoidance of doubt, "Oligonucleotide" will not include a polymer or oligomer of nucleotides used to produce or manufacture a protein product by expressing the protein product from the polymer or oligomer.

1.165 "**Other Component**" has the meaning set forth in Section 1.39 (Combination Product).

1.166 "**Out-of-Pocket Costs**" means, with respect to certain activities for a Collaboration Compound or Collaboration Product directed to any Collaboration Target, as applicable, hereunder, [***].

1.167 "**Party**" or "**Parties**" has the meaning set forth in the preamble.

1.168 "**Patent**" means all patents and patent applications (including all continuations, continuations-in-part, divisionals, and substitutions), or other filings claiming priority thereto or sharing any common priority therewith, as well as any patents issued with respect to any such patent applications, reissues, re-examinations, renewals, or extensions (including patent term adjustments, patent term extensions, supplemental protection certificates, or the equivalents thereof), registration or confirmation patents, patents resulting from post-grant proceedings, patents of addition, restorations and extensions thereof, and any inventor's certificates, and all equivalents and counterparts thereof in any country. For clarity, a patent filing (a patent or a patent application) is considered to have been made (or to be pending or in force) within a selected time period if the filing itself, or any other filing to which it claims priority or with which it shares any common priority, was made within (or was pending or in force within) the time period.

1.169 "**Patent Challenge**" has the meaning set forth in Section 13.4 (Termination for Patent Challenge).

1.170 "**Patent(s) Costs**" means [***].

1.171 "**Person**" means any natural person, corporation, unincorporated organization, partnership, association, sole proprietorship, joint stock company, joint venture, limited liability company, trust or government, or Governmental Authority, or any other similar entity.

1.172 "**Personnel**" means, with respect to any Person, its officers, directors, employees, workers, contractors, advisors, consultants, agents or other representatives.

1.173 "**Pharmacovigilance Agreement**" has the meaning set forth in Section 5.4.3.

1.174 "**Phase 1 Study**" means a clinical study of an investigational product in subjects with the primary objective of characterizing its safety, tolerability, pharmacodynamics and pharmacokinetics and identifying a recommended dose and regimen for future studies as described in 21 C.F.R. 312.21(a), or a comparable Clinical Study prescribed by the relevant Regulatory Authority in a country other than the United States.

1.175 "**Phase 1/2 Study**" means a Clinical Study that is designed to satisfy the requirements of 21 C.F.R. 312.21(a) or corresponding foreign regulations and is subsequently optimized or expanded to satisfy the requirements of 21 C.F.R. 312.21(b) (or corresponding foreign regulations).

1.176 "**Phase 2 Study**" means a clinical study of an investigational product in subjects with the primary objective of characterizing its activity in a specific disease state as well as generating more detailed safety, tolerability, pharmacokinetics, pharmacodynamics, and dose finding information as described in 21 C.F.R. 312.21(b), or a comparable Clinical Study prescribed by the relevant Regulatory Authority in a country other than the United States including a human clinical trial that is also designed to satisfy the requirements of 21 C.F.R. 312.21(a) or corresponding foreign regulations and is subsequently optimized or expanded to satisfy the requirements of 21 C.F.R. 312.21(b) (or corresponding foreign regulations) or otherwise to enable a Phase 3 Study (*e.g.*, a phase 1/2 trial).

1.177 "**Phase 3 Study**" means a clinical study or real world study of an investigational product in subjects that incorporates accepted endpoints for confirmation of statistical significance of efficacy, and safety, with the aim to generate data and results to evaluate the overall benefit-risk relationship of the investigational product that can be submitted to obtain Regulatory Approval as described in 21 C.F.R. 312.21(c), or a comparable Clinical Study prescribed by the relevant Regulatory Authority in a country other than the United States.

1.178 **[***]**.

1.179 "**Post-Marketing Commitments**" means any item, activity, task, a non-human study, human clinical study, or other commitment with respect to a product initiated after receipt of Regulatory Approval (other than Pricing Approval) for such product in a country or territory, the completion of which is recommended or required by the Regulatory Authority in such country or territory in connection with the initial grant of, or to support or maintain such, Regulatory Approval for such product in such country or territory.

1.180 "**Pre-clinical or Clinical Supply Agreement**" has the meaning set forth in Section 6.3 (Supply Agreements).

1.181 "**Prepaid Research Account**" has the meaning set forth in Section 9.3.2 (Prepaid Research).

1.182 "**Pricing Approval**" means any governmental approval, agreement, determination, or decision establishing the prices for a product that can be charged or reimbursed in regulatory jurisdictions where the applicable Governmental Authorities negotiate, approve, or determine the price or reimbursement of pharmaceutical products.

1.183 "**Pricing Matters**" means all issues and decisions regarding (a) price, price terms and other contract terms with respect to product sales, including discounts, rebates, other price concessions and service fees to payors and purchasers, and (b) reimbursement programs applicable to a product. For clarity, "Pricing Matters" includes all financial issues and financial decisions with respect to contracting with managed care entities, hospitals, pharmacies, group purchasing organizations, pharmacy benefit managers, and Governmental Authorities, and specifically includes issues and decisions about the offer of discounts or rebates for formulary placement for products.

1.184 "**Promotion**" means (a) any and all activities directed to the marketing, detailing, promotion of a product after Regulatory Approval has been obtained (including making, having made, using, importing, exporting, selling, and offering for sale such product), and will include post-launch

marketing, promoting, detailing, marketing research, distributing, customer service, administering commercially selling, having sold, or otherwise disposing or offering to dispose of such product, importing, exporting, or transporting such product for commercial sale, and all regulatory compliance with respect to the foregoing, and (b) otherwise marketing, selling, or exploiting commercially a product.

1.185 "**Proposed Target**" has the meaning set forth in Section 3.3.2.2(a) (Gatekeeper Procedures).

1.186 "**Proposed Target Notice**" has the meaning set forth in Section 3.3.2.2(a) (Gatekeeper Procedures).

1.187 "**Prosecution and Maintenance**" or "**Prosecute and Maintain**" means, with regard to a particular Patent in a jurisdiction in the Territory, the preparation, drafting, filing, prosecution, maintenance and extension of such Patent (including any Patent Office proceedings such as any oppositions, interferences, reissue proceedings, *ex-parte* reexaminations, IPRs, and other post-grant proceedings for such Patent).

1.188 [***].

1.189 "**Quality Audit**" has the meaning set forth in Section 6.6 (Audit of Wave's Quality System).

1.190 "**[***]**" means a conflict-free individual with sufficient experience for the relevant matter at issue, who [***].

1.191 "**[***]**" has the meaning set forth in Section 2.8.3.1 (Referral to [***]).

1.192 "**Receiving Party**" has the meaning set forth in Section 1.46 (Confidential Information).

1.193 "**Registrational Study**" means a Clinical Study (regardless of whether or not called a "Phase 3 Study") for a product the results of which, together with prior data and information concerning such product, are intended to be sufficient to meet the evidentiary standard for demonstrating the safety and efficacy of such active substance of such product established by a Regulatory Authority in any particular jurisdiction and is sufficient for filing of an NDA for such product in patients having the disease or condition being studied.

1.194 "**Regulatory Approval**" means, with respect to a country or extra-national territory, any and all approvals (including approvals of NDAs), licenses, registrations, or authorizations of any Regulatory Authority necessary in order to commercially distribute, sell, or market a pharmaceutical product in such country or some or all of such extra-national territory, but excluding any Pricing Approvals. For the avoidance of doubt, Regulatory Approval received in the US in an expedited manner or in the EU in a conditional or exceptional manner, in each case, is a Regulatory Approval for purposes of this definition.

1.195 "**Regulatory Authority**" means any Governmental Authority involved in granting Regulatory Approvals of pharmaceutical products, including the FDA, the EMA, the Japanese Ministry of Health, Labour and Welfare, and the Pharmaceuticals and Medical Devices Agency in Japan.

1.196 "**Regulatory Documents**" means any regulatory application, submission, notification, communication, correspondence, registration, Regulatory Approval, or other filing made to, received from or otherwise conducted with a Regulatory Authority related to Developing,

Manufacturing, obtaining marketing authorization, marketing, selling or otherwise Commercializing a pharmaceutical product in a particular country or jurisdiction.

1.197 "**Regulatory Exclusivity**" means, with respect to a Collaboration Product in a country, any data exclusivity rights, market exclusivity rights, or other exclusive right, other than a Patent, granted, conferred or afforded by any Regulatory Authority in such country or otherwise under Applicable Law with respect to such Collaboration Product in such country, which either confers exclusive marketing rights with respect to a product or prevents another party from using or otherwise relying on the data supporting the approval of the Regulatory Approval for a product without the prior written authorization of the Regulatory Approval holder, as applicable, such as new chemical entity exclusivity, exclusivity associated with new Clinical Studies necessary to approval of a change (e.g., new indication or use), orphan drug exclusivity, non-patent-related pediatric exclusivity, or any other applicable marketing or data exclusivity, including any such periods under national implementations in the EU of Article 10 of Directive 2001/83/EC, Article 14(11) of Parliament and Council Regulation (EC) No 726/2004, Parliament and Council Regulation (EC) No 141/2000 on orphan medicines, Parliament and Council Regulation (EC) No 1901/2006 on medicinal products for pediatric use and all international equivalent.

1.198 "**Regulatory Lead**" has the meaning set forth in Section 5.1 (General).

1.199 "**Related Party(ies)**" means a Party's Affiliates and Sublicensees.

1.200 "**Representatives**" has the meaning set forth in Section 10.1 (Confidentiality Obligations).

1.201 "**Research Period**" means each consecutive six (6) month period commencing January 1 and July 1 of any Calendar Year during the Research Term; provided, however that (a) the first Research Period of the Research Term will extend from the Effective Date until June 30, 2023; and (b) the last Research Period of the Research Term will end upon the expiration or termination of the Research Term.

1.202 "**Research Term**" has the meaning set forth in Section 3.2.4 (Research Term).

1.203 "**Reversion License**" has the meaning set forth in Section 13.7.5.2 (Reversion License).

1.204 "**Reversion Technology**" means [***] in each case, [***].

1.205 "**Royalties**" means, collectively, the SERPINA1 Product Royalty, GSK Collaboration Product Royalty, and Wave Collaboration Product Royalty.

1.206 "**Royalty Patents**" means [***].

1.207 "**Royalty Rates**" means, collectively, the royalty rates for the SERPINA1 Product Royalty set forth in Table 9.8.1, the GSK Collaboration Product Royalty set forth in Table 9.8.2 and the Wave Collaboration Product Royalty set forth in Table 9.8.3.

1.208 "**Royalty Report**" has the meaning set forth in Section 9.10.2 (Reports and Royalty Payments).

1.209 "**Royalty Term**" has the meaning set forth in Section 9.8.4.1 (Royalty Term).

1.210 "**Second Research Term Extension Fee**" has the meaning set forth in Section 9.3.1 (Research Term Extension Fees).

1.211 "**Second Research Term Extension Period**" has the meaning set forth in Section 3.2.3 (Second Research Term Extension Period).

1.212 "**Selection of a Development Candidate**" means [***].

1.213 "**Selling Party**" has the meaning set forth in Section 1.160 (Net Sales).

1.214 "**Serious Adverse Event**" means an adverse drug experience or circumstance that results in any of the following outcomes (a) death, (b) life-threatening condition, (c) inpatient hospitalization or a prolongation of existing hospitalization, (d) persistent or significant disability or incapacity or substantial disruption of the ability to conduct normal life functions, (e) or a congenital anomaly/birth defect, (f) significant intervention required to prevent permanent impairment or damage, or (g) a medical event that may not result in death, be life-threatening, or require hospitalization but, based on appropriate medical judgment, that may jeopardize the patient or subject and may require medical or surgical intervention to prevent one of the outcomes described in clauses (a) through (f).

1.215 "**SERPINA1 Backup Development**" has the meaning set forth in Section 4.1.2.2.

1.216 "**SERPINA1 Backup Development Plan**" has the meaning set forth in Section 4.1.2.3.

1.217 "**SERPINA1 Backup Development Term**" has the meaning set forth in Section 4.1.2.3.

1.218 [***].

1.219 "**[***]**" has the meaning set forth in Section 13.5.3.1.

1.220 "**SERPINA1 Collaboration In-License**" has the meaning set forth in Section 7.6.2.2.

1.221 "**SERPINA1 Compound**" means any Oligonucleotide designed to modulate alpha-1 antitrypsin protein by editing a mutation in the SERPINA1 gene transcript [***].

1.222 "**SERPINA1 Development Milestone Event**" has the meaning set forth in Section 9.6.1 (SERPINA1 Development Milestone Payments).

1.223 "**SERPINA1 Development Milestone Payment**" has the meaning set forth in Section 9.6.1 (SERPINA1 Development Milestone Payments).

1.224 "**SERPINA1 Infringement Action**" has the meaning set forth in Section 8.8.2.1.

1.225 "**SERPINA1 Late Development Term**" means, for the SERPINA1 Program, the period commencing on the date after the last day of the SERPINA1 Phase 1/2 Program Term and ending upon the [***] Program.

1.226 "**SERPINA1 Phase 1/2 Program**" means the program for Wave to conduct [***] for the SERPINA1 Target through [***].

1.227 "**SERPINA1 Phase 1/2 Program Plan**" has the meaning set forth in Section 4.1.1.1.

1.228 "**SERPINA1 Phase 1/2 Program Term**" means the period commencing on the Effective Date and ending upon the [***].

1.229 "**SERPINA1 Phase 1/2 Study**" means [***].

1.230 "**SERPINA1 Phase 1/2 Study Data Package**" means, with respect to the SERPINA1 Phase 1/2 Study, the following: [***].

1.231 "**SERPINA1 Potential In-License**" has the meaning set forth in Section 7.6.2.1.

1.232 "**SERPINA1 Product**" any pharmaceutical product, including all forms, presentations, strengths, doses and formulations thereof (including any method of delivery), containing or delivering a SERPINA1 Compound alone or as a Combination Product.

1.233 "**SERPINA1 Product Royalty**" has the meaning set forth in Section 9.8.1 (SERPINA1 Product Royalties).

1.234 "**SERPINA1 Product Sales Milestone Event**" has the meaning set forth in Section 9.7.1.1 (SERPINA1 Product Sales Milestone Payments).

1.235 "**SERPINA1 Product Sales Milestone Payment**" has the meaning set forth in Section 9.7.1.1 (SERPINA1 Product Sales Milestone Payments).

1.236 "**SERPINA1 Program**" means the Development and Commercialization, or other Exploitation of all SERPINA1 Compounds and SERPINA1 Products in accordance with this Agreement. For clarity, the SERPINA1 Program includes the SERPINA1 Phase 1/2 Program.

1.237 "**SERPINA1 Program Term**" means the period commencing on the Initiation of the SERPINA1 Program and continuing for the remainder of the Term for the SERPINA1 Program. For clarity, the SERPINA1 Program Term includes the SERPINA1 Phase 1/2 Program Term and the SERPINA1 Late Development Term.

1.238 "**SERPINA1 Specific Patents**" means, with respect to the SERPINA1 Program, [***].

1.239 "**SERPINA1 Target**" means the Target identified on Schedule 1.239.

1.240 "**Subcommittees**" has the meaning set forth in Section 2.3 (Subcommittees).

1.241 "**Sublicensee**" means a Third Party to which a Party or its Affiliate has granted or grants rights to Develop, Manufacture, or Commercialize any Collaboration Compound or Collaboration Product, or any further sublicensee of such rights (regardless of the number of tiers, layers or levels of sublicenses of such rights), in each case, in accordance with Section 7.5 (Sublicensing Terms), as applicable.

1.242 "**Supply Agreement Dispute**" has the meaning set forth in Section 6.3 (Supply Agreements).

1.243 "**Supply Agreements**" has the meaning set forth in Section 6.3 (Supply Agreements).

1.244 "**Target**" means (a) any specific nucleic acid or protein identified by (i) for each publicly known target, its NCBI Gene ID, or (ii) for each GSK Novel Target, its NCBI Gene ID (if available) or GSK's internal identification number, and (b) if applicable, its genomic mutant identifier.

1.245 "**Target List**" has the meaning set forth in Section 3.3.1 (Target List).

1.246 [***].

1.247 [***].

1.248 [***].

1.249 "**Target Validation Budget**" has the meaning set forth in Section 3.4.3 (Target Validation Plan and Approval).

1.250 "**Target Validation Plan**" or "**TVP**" has the meaning set forth in Section 3.4.3 (Target Validation Plan and Approval).

1.251 "**Target Validation Program**" has the meaning set forth in Section 3.4.1 (Overview).

1.252 "**Target Validation Report**" has the meaning set forth in Section 3.4.8.2.

1.253 "**Target Validation Term**" means, for a given Target Validation Program, the period commencing on the Initiation of the applicable Target Validation Program and ending upon [***].

1.254 "**Tax**" and "**Taxation**" means any U.S. and non-U.S. federal, state, local, regional, municipal, or other tax or taxation, levy, duty, charge, withholding, or other assessment of any kind (including any related fine, penalty, addition to tax, surcharge, or interest) imposed by, or payable to, a Tax Authority, including sales, use, excise, stamp, transfer, property, value added, goods and services, withholding, and franchise taxes.

1.255 "**Tax Authority**" means any government, state or municipality or local, state, federal or other fiscal, revenue, customs or excise authority body or official in the United States or elsewhere.

1.256 "**Technical Failure**" means with respect to any GSK CP, [***].

1.257 "**Terminated Product**" means all Collaboration Compounds and Collaboration Products that are directed to a Terminated Target, in each case, in the form that each such Collaboration Compound and Collaboration Product exist as of the date of notice of such termination. For clarity, in the case of termination of this Agreement in its entirety, all Collaboration Compounds and Collaboration Products will be Terminated Products; provided that a termination of this Agreement in its entirety by GSK will not result in a termination with respect to any Wave Collaboration Targets or any Wave Collaboration Compound or Wave Collaboration Product for such Wave Collaboration Targets.

1.258 "**Terminated Target**" means any Collaboration Target for which this Agreement has been terminated by either Party. All Collaboration Targets will be deemed Terminated Targets to the extent this Agreement is terminated in its entirety; provided that a termination of this Agreement in its entirety by GSK will not result in a termination with respect to any Wave Collaboration Targets. For clarity, once a Collaboration Target becomes a "Terminated Target" it will no longer be a Collaboration Target for purposes of this Agreement.

1.259 "**Territory**" means worldwide.

1.260 "**Third Party**" means any Person other than GSK, Wave, or their respective Affiliates.

1.261 "**Third Party Agreements**" means, collectively, the Existing GSK Third Party Agreements, the Existing Wave Third Party Agreements and the Collaboration In-Licenses.

1.262 "**Third Party Claims**" has the meaning set forth in Section 12.1 (Indemnification by GSK).

1.263 "**Third Party Patent Challenge**" means any court action or administrative proceedings (e.g., in front of a patent office or other Governmental Authority) that challenges or seeks reexamination of any aspect of enforceability, inventorship, ownership, priority, scope, term, or validity, of a Patent, or that seeks to compel licensing of such a Patent.

1.264 "**Trademark**" means any trademark, trade name, service mark, service name, brand, domain name, trade dress, logo, slogan, or other indicia of origin or ownership, including the goodwill and activities associated with each of the foregoing.

1.265 "**Unavailable Target**" means a Target that, at the relevant time, is [***].

1.266 "**United Kingdom**", "**U.K.**" or "**UK**" means the United Kingdom and its territories and possessions.

1.267 "**United States**", "**U.S.**" or "**US**" means the United States of America and its territories and possessions.

1.268 "**Upfront Payment**" has the meaning set forth in Section 9.1 (Upfront Payment).

1.269 "**US Government**" means the federal government of the United States.

1.270 "**Valid Claim**" means a claim of a Patent that (a) has not been rejected, revoked or held to be invalid, unpatentable, or unenforceable by a court or other authority of competent jurisdiction, from which decision no appeal can be further taken, and (b) has not been finally abandoned, disclaimed or admitted to be invalid or unenforceable through reissue, re-examination, or disclaimer, or otherwise, provided that any claim in any patent application pending for more than [***] from the earliest date to which such patent application claims priority will not be considered a Valid Claim for purposes of the Agreement from and after such [***], unless and until it is issued or granted.

1.271 "**Validation Target**" means each Target that is designated as a Validation Target under Section 3.4.1 (Overview). For clarity, once [***] for purposes of this Agreement.

1.272 "**VAT**" means any value added, sales, purchase, turnover or consumption tax as may be applicable in any relevant jurisdiction, including value added tax chargeable under legislation implementing Council Directive 2006/112/EC.

1.273 "**Wave**" has the meaning set forth in the preamble.

1.274 "**Wave Acquisition**" has the meaning set forth in Section 7.8.4 (Wave Acquisition of a Third Party).

1.275 "**Wave Acquisition Program**" has the meaning set forth in Section 7.8.4 (Wave Acquisition of a Third Party).

1.276 "**Wave Background Know-How**" means, on a Collaboration Program-by-Collaboration Program basis, any and all Know-How Controlled by Wave or any of its Affiliates [***].

1.277 "**Wave Background Patents**" means, on a Collaboration Program-by-Collaboration Program basis, those Patents that are Controlled by Wave or any of its Affiliates [***].

1.278 "**Wave Background Technology**" means Wave Background Know-How and Wave Background Patents.

1.279 "**Wave COC Program**" has the meaning set forth in Section 7.8.3 (Wave Change of Control).

1.280 "**Wave Collaboration Compounds**" means, for each Wave Collaboration Target, any Oligonucleotides designed to modulate such Wave Collaboration Target [***].

1.281 "**Wave Collaboration Product**" means any pharmaceutical product, including all forms, presentations, strengths, doses and formulations thereof (including any method of delivery), containing or delivering a Wave Collaboration Compound alone or as a Combination Product.

1.282 "**Wave Collaboration Product Royalty**" has the meaning set forth in Section 9.8.3 (Wave Collaboration Product Royalty).

1.283 "**Wave Collaboration Product Specific Patent**" means, with respect to a given Wave CP, any Patent within the GSK Technology or Wave Technology that [***] for such Wave CP.

1.284 "**Wave Collaboration Program**" or "**Wave CP**" means, on a Wave Collaboration Target-by-Wave Collaboration Target basis, the Development, Commercialization and other Exploitation of all Wave Collaboration Compounds and Wave Collaboration Products directed to a given Wave Collaboration Target in accordance with this Agreement.

1.285 "**Wave Collaboration Target**" means each Validation Target that is designated by Wave as a Wave Collaboration Target in accordance with Section 3.4.9 (Advancement to Collaboration Program).

1.286 "**Wave CP Infringement Action**" has the meaning set forth in Section 8.8.4.1.

1.287 "**Wave CP Specific Patents**" means for a given Wave CP, all Wave Collaboration Product Specific Patents for such Wave CP.

1.288 "**Wave CP Term**" means, for a given Wave CP, the period commencing on the Initiation of such Wave CP and continuing for the remainder of the Term for such Wave CP.

1.289 "**Wave Indemnitees**" has the meaning set forth in Section 12.1 (Indemnification by GSK).

1.290 [***] means a Target that, [***].

1.291 [***] means all activities and services [***].

1.292 "**Wave Other Patents**" means all Patents in the Wave Technology other than [***].

1.293 "**Wave Party**" means Wave UK or Wave US, as applicable.

1.294 "**Wave Platform**" means [***].

1.295 "**Wave Platform Background Technology**" means (a) all Wave Background Know-How that is specifically directed to or otherwise pertaining to the Wave Platform, and (b) all Wave Background Patents that Cover any technology included in the Wave Platform, or any use thereof.

1.296 "**Wave Platform Collaboration Know-How**" means all Collaboration Know-How that constitutes or is otherwise directed to [***]. For clarity, Wave Platform Collaboration Know-How does not include [***].

1.297 "**Wave Platform Collaboration Technology**" means (a) all Wave Platform Collaboration Know-How, and (b) all Collaboration Patents to the extent [***]. For clarity, Wave Platform Collaboration Technology does not include [***].

1.298 "**Wave Platform Technology Patents**" means all Patents [***].

1.299 "**Wave Ratio**" has the meaning set forth in Section 9.1 (Upfront Payment).

1.300 "**Wave Sales Milestone Event**" has the meaning set forth in Section 9.7.2 (Wave Sales Milestone Payments).

1.301 "**Wave Sales Milestone Payment**" has the meaning set forth in Section 9.7.2 (Wave Sales Milestone Payments).

1.302 "**Wave Singapore**" means Wave Life Sciences Ltd.

1.303 "**Wave Technology**" means collectively, the Wave Background Technology, the Wave Platform Collaboration Technology and Wave's interest in Collaboration Program Technology.

1.304 "**Wave Third Party Agreements**" means any Existing Wave Third Party Agreements or any Collaboration In-Licenses to which Wave is a Party.

1.305 "**Wave UK**" has the meaning set forth in the preamble.

1.306 "**Wave US**" has the meaning set forth in the preamble.

2. GOVERNANCE

2.1 Alliance Manager. Promptly following the Effective Date, each Party will designate an individual to facilitate communication and coordination of the Parties' activities under this Agreement relating to Collaboration Compounds and Collaboration Products and to provide support and guidance to the joint steering committee (the "**Joint Steering Committee**" or "**JSC**") and any Subcommittees (each, an "**Alliance Manager**"). Alliance Managers are considered standing invitees to all JSC and Subcommittee meetings, but shall not be representatives of the JSC.

2.2 Joint Steering Committee.

2.2.1 Purpose; Composition. Within [***] after the Effective Date, the Parties will establish the JSC that will provide strategic oversight of the activities under this Agreement and facilitate communication between the Parties with respect to the Exploitation of Collaboration Compounds and Collaboration Products, all in accordance with this Agreement. The JSC will be composed of at least two (2) representatives of each Party (or such additional number of representatives as the Parties may mutually agree), with each representative having knowledge and expertise in the Exploitation of compounds and products similar to the Collaboration Compounds and Collaboration Products under this Agreement, and having sufficient seniority within the applicable Party to provide meaningful input and make decisions arising within the scope of the JSC's responsibilities.

Each Party may change its representatives to the JSC from time to time in its sole discretion, effective upon written notice to the other Party of such change. The JSC will be co-chaired by one (1) representative from each Party, whose responsibilities will include conducting meetings, including ensuring that objectives for each meeting are set and achieved, and meeting minutes will be taken. The chairpersons have no additional powers or rights beyond those held by the other JSC representatives.

2.2.2 JSC Meetings.

2.2.2.1 The JSC will meet once per Calendar Quarter (or more or less frequently as agreed by the Parties in writing). The meetings may occur in person or via teleconference or videoconference. For in person meetings, the location of JSC meetings will alternate between a location designated by GSK and a location designated by Wave. Each Party may also call for special meetings of the JSC to discuss matters requested by such Party (to the extent within the purview of the JSC or as otherwise mutually agreed by the Parties). As appropriate, the Parties may invite, on written confirmation by email to the other Party, a reasonable number of its employees that are needed for the specific discussion, and external consultants and scientific advisors only upon notice and written approval of the other Party, to attend its meetings as non-voting observers; provided that such invitees are bound by appropriate confidentiality and non-use obligations substantially similar to the ones set forth in this Agreement. The Alliance Managers will provide the members of the JSC with reasonable notice, which shall be no less than [***] notice of each regularly scheduled meeting except under exceptional circumstances and, to the extent reasonably practicable under the circumstances, no less than [***] notice of any special meetings of the JSC called by either Party. Each Party will be responsible for its own expenses in attending such meetings.

2.2.2.2 Meetings of the JSC will be effective only if at least one (1) representative of each Party (which representative is not such Party's Alliance Manager) is present or participating in such meeting. The Alliance Managers will be responsible for preparing agendas (together with the Co-Chairs) and, after each JSC meeting, preparing reasonably detailed written minutes (in English) of all JSC meetings that reflect material decisions made and action items identified at such meetings. Minutes will be circulated via e-mail for review and JSC approval within [***] after each JSC meeting. Approval of JSC meeting minutes will be documented in the minutes of the next JSC meeting.

2.2.2.3 For the avoidance of doubt, any references to a written report being prepared by the Parties and submitted or reviewed at the JSC, or at any Subcommittee, may be in the form of a visual presentation (with supporting analysis as required) unless the Parties mutually agree otherwise. In addition, where approval of the JSC is required in writing this may be as documented in minutes at a JSC meeting or recorded by email between the Parties and subsequently noted at the next JSC and recorded in the minutes of such JSC meeting.

2.2.3 Specific Responsibilities. In addition to its overall responsibility for providing strategic oversight with respect to the Parties' activities under this Agreement, the JSC will have the following responsibilities:

2.2.3.1 review and update Target Lists to include new Available Proposed Targets and relevant information as described in Section 3.3.2.2(b)(ii);

2.2.3.2 review notices to initiate Target Validation Programs, as described in Section 3.4.1;

2.2.3.3 document the extension of the Initial Research Term or First Research Term Extension Period, as described in Section 3.2.2 and 3.2.3, respectively;

2.2.3.4 document any JDC approved written development plan and budget for Wave's or its Affiliates' performance of certain aspects of Development activities mutually agreed upon by the Parties for the SERPINA1 Compounds and SERPINA1 Products during the SERPINA1 Late Development Term as described in Section 4.1.4.2;

2.2.3.5 facilitate the exchange of proposed Regulatory Documents and Regulatory Approvals between the Parties as described in Section 5.2.2 and 5.2.3;

2.2.3.6 review, discuss, and determine whether to approve as a SERPINA1 Collaboration In-License any SERPINA1 Potential In-License, as described in Section 7.6.2 (SERPINA1 Potential In-Licenses);

2.2.3.7 in the event that Wave is selected to be the Manufacturing Lead for [***] then the JSC will document this;

2.2.3.8 establish a joint manufacturing committee as a Subcommittee of the JSC that reports to the JSC, in accordance with terms mutually agreed by the JSC;

2.2.3.9 determine whether a [***] has occurred;

2.2.3.10 establish any such additional Subcommittees as it deems necessary to achieve the objective and intent of this Agreement;

2.2.3.11 oversee and supervise the Subcommittees and resolve issues or disputes elevated to it by the JDC, JPC and JRC, or any Subcommittee the JSC may establish; and

2.2.3.12 perform such other functions as are set forth in this Agreement, or as the Parties may mutually agree in writing, except where in conflict with any provision of this Agreement.

2.3 Subcommittees.

2.3.1 **Meetings**. From time to time, the JSC may establish working groups or subcommittees of the JSC ("**Subcommittees**") as it deems necessary to oversee particular activities or otherwise achieve the objectives and intent of this Agreement in addition to the Subcommittees of the JSC that are the JDC, JPC and JRC (which have been set out in this Agreement), and such Subcommittees will be constituted and have such responsibility, and be subject to such procedures, as the JSC approves. The JDC, JPC and JRC will meet as necessary to carry out their respective duties, but at least once per Calendar Quarter during their respective tenure, unless otherwise agreed by its members. The meetings may occur in person or via teleconference or videoconference. For in person meetings, the location

of Subcommittee meetings will alternate between a location designated by GSK and a location designated by Wave. Each Party will be responsible for its own expenses in attending such meetings. Meetings of each such Subcommittee will be effective only if at least one (1) representative of each Party (which representative is not such Party's Alliance Manager) is present or participating in such meeting. As appropriate, the Parties may invite, on written confirmation by email to the other Party, a reasonable number of its employees that are needed for the specific discussion, and external consultants and scientific advisors only upon notice and written approval of the other Party, to attend its meetings as non-voting observers; provided that such invitees are bound by appropriate confidentiality and non-use obligations substantially similar to the ones set forth in this Agreement. The Alliance Managers will be responsible for preparing agendas and, after each meeting of each such Subcommittee, preparing reasonably detailed written minutes (in English) that reflect material recommendations made and action items identified at all such meetings. Minutes will be circulated via e-mail for review and approval of each such Subcommittee within [***] after each meeting. Approval of Subcommittee meeting minutes will be documented in the minutes of the next meeting of such Subcommittee.

2.4 Joint Development Committee.

2.4.1 Composition. Within [***] after the Effective Date, the Parties will establish a joint Development committee (the "**Joint Development Committee**" or the "**JDC**"), a Subcommittee of the JSC that reports to the JSC. The JDC will oversee the conduct of, coordinate the Parties' activities, and facilitate communication between the Parties with respect to the responsibilities for the JDC set forth in Section 2.4.2 (JDC Responsibilities). The JDC will be composed of at least two (2) representatives of each Party (or such additional number of representatives as the Parties may mutually agree), with each representative having appropriate expertise, seniority, decision-making authority and ongoing familiarity with the collaboration under this Agreement, and each Party's representatives collectively will have relevant expertise in the Development of pharmaceutical products. Each Party may change its representatives to the JDC from time to time in its sole discretion, effective upon written notice to the other Party of such change. The JDC will be co-chaired by one (1) representative from each Party, whose responsibilities will include conducting meetings, including, when feasible, ensuring that objectives for each meeting are set and achieved. The chairpersons have no additional powers or rights beyond those held by the other JDC representatives.

2.4.2 JDC Responsibilities. The JDC will provide input regarding Development activities with respect to the SERPINA1 Program during [***]. The JDC will have the following responsibilities:

2.4.2.1 review, discuss and determine whether to approve amendments to the SERPINA1 Phase 1/2 Program Plan, as described in Section 4.1.1.1;

2.4.2.2 determine whether the SERPINA1 Phase 1/2 Program has [***];

2.4.2.3 document any election by GSK to advance the SERPINA1 Phase 1/2 Program for additional Development activities by GSK under Section 4.1.4 (Additional Development) as described in Section 4.1.1;

2.4.2.4 review any notice of [***] for the SERPINA1 Phase 1/2 Program and review and comment on any wind-down plan for the SERPINA1 Phase 1/2 Program (or any subsequent amendments thereto) as described in Section 4.1.2.1;

2.4.2.5 determine whether the SERPINA1 Compound has [***] for the SERPINA1 Program;

2.4.2.6 document any election by GSK to advance a SERPINA1 Compound selected by it as a development candidate as described in Section 4.1.2.8;

2.4.2.7 prepare and approve a written development plan and budget for Wave's or its Affiliates' performance of certain aspects of Development activities mutually agreed upon by the Parties for the SERPINA1 Compounds and SERPINA1 Products during the SERPINA1 Late Development Term as described in Section 4.1.4.2;

2.4.2.8 review the Parties' activities and progress with respect to the Development of any SERPINA1 Products in the Territory during the SERPINA1 Program Term;

2.4.2.9 provide updates to the JSC on the status of JDC activities; and

2.4.2.10 such other matters that as the Parties agree in writing will be the responsibility of the JDC.

2.4.3 Decision-Making Authority. The JDC will be a decision-making committee for the collaboration under this Agreement and to the Parties and will make decisions by consensus.

2.4.4 JDC Term. The JDC will terminate upon [***].

2.5 Joint Patent Committee.

2.5.1 Composition. Within [***] after the Effective Date, the Parties will establish a joint patent committee (the "**Joint Patent Committee**" or the "**JPC**"), a Subcommittee of the JSC that reports to the JSC. The JPC will monitor and provide strategic oversight of the activities under this Agreement and facilitate communication between the Parties with respect to the responsibilities for the JPC set forth in Section 2.5.2 (JPC Responsibilities). The JPC will be composed of at least one (1) representative of each Party (or such additional number of representatives as the Parties may mutually agree), with each representative having appropriate expertise, seniority, decision-making authority and ongoing familiarity with the collaboration under this Agreement, and each Party's representatives collectively will have relevant expertise in intellectual property portfolio management and licensing matters. Each Party may change its representatives to the JPC from time to time in its sole discretion, effective upon written notice to the other Party of such change. The JPC will be co-chaired by one (1) representative from each Party, whose responsibilities will include conducting meetings, including, when feasible, ensuring that objectives for each meeting are set and achieved. The chairpersons have no additional powers or rights beyond those held by the other JPC representatives.

2.5.2 JPC Responsibilities. The JPC will provide input regarding [***] including, [***], the following activities:

2.5.2.1 the substance to be included in a new patent application, including disclosures and claims of such applications;

2.5.2.2 decisions regarding whether or not to respond to an office action, and, if so, the substance of the response;

2.5.2.3 decisions regarding whether or not to file a continuation, continuation-in-part or divisional patent application, and, if so, the substance of each such filing;

2.5.2.4 decisions regarding whether or not to appeal a final rejection, and, if so, the substance of the appeal;

2.5.2.5 amendments;

2.5.2.6 decisions regarding abandonment of pending applications;

2.5.2.7 decisions whether or not to request or attend examiner interviews, and, if so, the strategy and content of, and attendance of, such interviews;

2.5.2.8 petitions to applicable patent offices, including whether to petition and, if so, the content of the petition;

2.5.2.9 decisions whether to reissue, and, if so, the substance of the reissue;

2.5.2.10 decisions relating to the countries or jurisdictions in which to file patent applications;

2.5.2.11 providing updates to the JSC on the status of JPC activities; and

2.5.2.12 such other matters that as the Parties agree in writing will be the responsibility of the JPC.

2.5.3 **Decision-Making Authority**. The JPC will be an advisory committee for the collaboration under this Agreement and to the Parties and will make recommendations to the Party who is responsible for decision-making in accordance with Section 8 (Intellectual Property).

2.6 Joint Research Committee

2.6.1 **Composition**. Within [***] after the Effective Date, the Parties will establish a joint research committee (the "**Joint Research Committee**" or the "**JRC**"), a Subcommittee of the JSC that reports to the JSC. The JRC will oversee the conduct of, coordinate the Parties' activities, and facilitate communication between the Parties with respect to the responsibilities for the JRC set forth in Section 2.6.2 (JRC Responsibilities). The JRC will be composed of at least two (2) representatives of each Party (or such additional number of representatives as the Parties may mutually agree), with each representative having appropriate expertise, seniority, decision-making authority and ongoing familiarity with the collaboration under this Agreement, and each Party's representatives collectively will have relevant expertise in the research of pharmaceutical products. Each Party may change its representatives to the JRC from time to time in its sole discretion, effective upon written notice to the other Party of such change. The JRC will be co-chaired by one (1) representative from each Party, whose responsibilities will include conducting meetings,

including, when feasible, ensuring that objectives for each meeting are set and achieved. The chairpersons have no additional powers or rights beyond those held by the other JRC representatives.

2.6.2 JRC Responsibilities. The JRC will provide input regarding (a) each Target Validation Program under this Agreement, and (b) Development activities with respect to each GSK Collaboration Program during the [***], including the following activities:

2.6.2.1 review, discuss and approve Target Validation Plans and the corresponding Target Validation Budget and discuss, propose and approve material updates and material amendments to any Target Validation Plan and corresponding Target Validation Budget as described in Sections 3.4.3 and 3.4.4;

2.6.2.2 review the Parties' activities and progress with respect to Target Validation Programs as described in 3.4.8;

2.6.2.3 convene the JRC TVP Special Meeting to review and discuss each Target Validation Report as described in Section 3.4.8.2, including whether there has been a technical failure for any Target Validation Program;

2.6.2.4 review notices from the Parties regarding whether to advance Validation Targets into Collaboration Programs, as described in Section 3.4.9;

2.6.2.5 determine whether there has [***];

2.6.2.6 document the Parties' mutual written agreement that GSK or its Affiliates will perform certain aspects of Development activities for a given GSK CP during the GSK CP Early Development Term for such GSK CP as described in Section 4.2.1.3;

2.6.2.7 determine whether a GSK Collaboration Compound has [***];

2.6.2.8 document any election by GSK to advance a GSK Collaboration Compound selected by it as a development candidate as described in Section 4.2.1.8;

2.6.2.9 document the Parties' mutual written agreement where Wave or its Affiliates may perform certain aspects of Development activities for a given GSK CP during the GSK CP Late Development Term as described in Section 4.2.2;

2.6.2.10 review the Parties' activities and progress with respect to the Development of any GSK Collaboration Products for a given GSK CP in the Territory during the GSK CP Term;

2.6.2.11 review any notice of a [***] for a given GSK CP [***];

2.6.2.12 determine whether a GSK Collaboration Compound has [***] for a given GSK CP;

2.6.2.13 document any election by GSK to advance a GSK Collaboration Compound selected by it as a development candidate as described in Section 4.2.7.8;

2.6.2.14 providing updates to the JSC on the status of JRC activities; and

2.6.2.15 such other matters that as the Parties agree in writing will be the responsibility of the JRC.

2.6.3 Decision-Making Authority. The JRC will be a decision-making committee for the collaboration under this Agreement and to the Parties and will make decisions by consensus.

2.6.4 JRC Term. The JRC as a committee in its entirety will terminate upon the expiration or earlier termination of [***]. The JRC will expire with respect to each GSK CP upon [***].

2.7 Decision-Making. Subject to the remainder of this Section 2.7 (Decision-Making) and Section 2.8 (Resolution of Committee Disputes), decisions of the JSC and each Subcommittee will be made by [***].

2.7.1 Decisions of the Subcommittees. If a Subcommittee cannot reach [***] that comes before the Subcommittee within [***] of the meeting where such issue was raised and over which the applicable Subcommittee has oversight, then the Parties will refer such matter to the JSC for resolution in accordance with 2.7.2 (Decisions of the JSC). If a Subcommittee is empowered to make a decision and reaches [***] on the matter being decided, then such agreement on such issue shall be deemed to be a decision by (and agreement of) the JSC for all purposes under this Agreement. For clarity, the JPC is an advisory committee and does not have any decision-making authority.

2.7.2 Decisions of the JSC. The JSC has the authority (a) for matters specifically delegated to it or expressly specified in this Agreement, (b) to resolve disputes within the jurisdiction of any Subcommittees, (c) to establish Subcommittees as it deems necessary to achieve the objective and intent of this Agreement, and (d) with respect to any other matter agreed to by the Parties in writing. For clarity, neither the JSC nor any Subcommittee will have any power to amend, modify, or waive compliance with this Agreement. The JSC has no other authority under this Agreement. The JSC will use good faith efforts, in compliance with this Section 2.7.2 (Decisions of the JSC), to promptly resolve any such matter for which it has authority. If the JSC is unable to reach consensus with respect to any such matter for which it is responsible within [***] after a Party affirmatively states to the other Party that a decision needs to be made, then either Party may elect to submit such issue to the Parties' Executive Officers in accordance with Section 2.8.1 (Referral to Executive Officers).

2.8 Resolution of Committee Disputes.

2.8.1 Referral to Executive Officers. If a Party makes an election under Section 2.7.2 (Decisions of the JSC) to refer a matter as to which the JSC cannot reach a consensus decision to the Executive Officers, then the JSC will submit in writing the respective positions of the Parties to their respective Executive Officers. Such Executive Officers will use good faith efforts, in compliance with this Section 2.8.1 (Referral to Executive Officers), to resolve promptly such matter within [***] after the JSC's submission of such matter to such Executive Officers, which good faith efforts will include at least one in-person meeting or meeting via teleconference or videoconference between such Executive Officers within [***] period.

2.8.2 Final Decision-Making Authority; Non-Critical Matters. If the Executive Officers are unable to reach agreement on any such matter referred to such Executive Officers under Section 2.8.1 (Referral to Executive Officers) within such [***], then, if such matter is not a Critical Matter:

2.8.2.1 Wave Decisions. Notwithstanding Section 2.8.2.3 (Manufacturing Lead Decisions), but subject to Section 2.8.5 (Mutual Agreement), Wave will have final decision-making authority over:

(a) matters related to the [***];

(b) [***];

(c) [***].

2.8.2.2 GSK Decisions. Notwithstanding Section 2.8.2.3 (Manufacturing Lead Decisions), but subject to Section 2.8.5 (Mutual Agreement), GSK will have final decision-making authority over:

(a) the development of any [***];

(b) all matters [***] related to [***];

(c) [***];

(d) all matters [***] related to [***]

(e) [***].

2.8.2.3 Manufacturing Lead Decisions. The applicable Manufacturing Lead will have final decision making authority over all other matters related to the conduct of Manufacturing of the applicable Collaboration Compounds and Collaboration Products directed to any Collaboration Target for which such Party is the Manufacturing Lead but will not have final decision making authority over [***] with respect to a particular Collaboration Target and the Collaboration Compounds and Collaboration Products directed to such Collaboration Target, which shall be determined in accordance with [***].

2.8.2.4 Wave CP. For clarity, the JSC will not oversee any Wave CP and Wave will have sole decision-making with respect to any Development or Commercialization of Wave Collaboration Compounds and Wave Collaboration Products for each Wave CP in the Field in the Territory, subject to the other applicable terms and conditions of this Agreement (for example, but not by way of limitation, limitations on license rights, including sublicensing, financial terms, exclusivity and diligence).

2.8.3 Final Decision-Making Authority; Critical Matters . If the Executive Officers are unable to reach unanimous agreement on any matter set forth in [***] then:

2.8.3.1 [***]. The following matters [***] will be referred to [***]:

(a) Determination of whether the [***].

(b) Determination of whether a [***].

(c) Determination of whether a [***].

(d) Determination of whether a [***].

(e) Determination of whether a [***].

2.8.3.2 [***].

2.8.4 Escalatable Disputes. All matters specifically addressed in Section 2.8.2 (Final Decision-Making Authority; Non-Critical Matters) or 2.8.3 (Final Decision-Making Authority; Critical Matters) (collectively "**Committee Disputes**"), will be treated as specified in Section 2.8.2 (Final Decision-Making Authority; Non-Critical Matters) or 2.8.3 (Final Decision-Making Authority; Critical Matters), as applicable, [***]. All other matters for which [***] are unable to reach unanimous agreement on as specified [***] will be deemed Escalatable Disputes and escalated to [***].

2.8.5 Mutual Agreement. Notwithstanding anything to the contrary in Section 2.7 (Decision-Making) or 2.8 (Resolution of Committee Disputes), or anything else to the contrary in this Agreement, no changes will be adopted with respect to, and the Parties must reach mutual agreement regarding:

2.8.5.1 [***];

2.8.5.2 [***];

2.8.5.3 [***];

2.8.5.4 [***];

2.8.5.5 [***];

2.8.5.6 [***];

2.8.5.7 [***]; and

2.8.5.8 [***].

2.8.6 Limitations on Decisions. Notwithstanding anything to the contrary set forth in this Agreement, without the other Party's prior written consent, no exercise of a Party's decision-making authority on any such matters may, without the other Party's prior written consent, [***] (b) impose any requirements that the other Party take or decline to take any action that would result in a violation of any Applicable Law or any agreement with any Third Party (including any Third Party Agreement) or the infringement of intellectual property rights of any Third Party, (c) cause or have a sufficiently high likelihood of causing a Material Safety Concern, or (d) otherwise conflict with this Agreement.

2.9 Discontinuation of Participation on the JSC or any Subcommittee. The activities to be performed by the JSC and each Subcommittee will solely relate to governance under this

Agreement, and are not intended to be or involve the delivery of services. Except as set forth in this Section 2 (Governance), the JSC and each Subcommittee will continue to exist unless and until the Parties mutually agree to disband any of the JSC or any Subcommittee.

3. RESEARCH COLLABORATION

3.1 Overview. The Parties will conduct a research collaboration during the Research Term under and in accordance with the terms and conditions of this Agreement (including the parameters set forth in Section 3.4.2 (Parameters for Target Validation Programs)), pursuant to which (a) the Parties will select Targets for inclusion in the research collaboration, (b) the Parties will conduct Target Validation Programs for Validation Targets, and (c) the Parties will select Collaboration Targets for use in Wave CPs or GSK CPs.

3.2 Research Term; Extension.

3.2.1 Initial Research Term. The initial term for the research collaboration will commence on the Effective Date and end upon the earliest of (a) 11:59 pm Eastern Time on the fourth (4th) anniversary of the Effective Date, (b) the effective date of termination of this Agreement in its entirety, and (c) the effective date of termination of this Agreement with respect to all Target Validation Programs and GSK CPs (the "**Initial Research Term**").

3.2.2 First Research Term Extension Period. GSK will have the right, in its sole discretion, to extend the Initial Research Term by (a) [***] and (b) GSK thereafter paying Wave the First Research Term Extension Fee within [***] after the date of such notice. In the event that GSK complies with the foregoing notice and payment obligation, then the Initial Research Term will extend for the period commencing on the day after the end of the Initial Research Term and ending upon the earliest of (x) 11:59 pm Eastern Time on the [***] of the end of the Initial Research Term, (y) the effective date of termination of this Agreement in its entirety, and (z) the effective date of termination of this Agreement with respect to all Target Validation Programs and GSK CPs (the "**First Research Term Extension Period**").

3.2.3 Second Research Term Extension Period. The Parties will have the right to extend the First Research Term Extension Period by (a) [***] and (b) GSK thereafter paying Wave the Second Research Term Extension Fee within [***] after the date of the Parties' agreement (as documented by the JSC) to extend the First Research Term Extension Period. In the event that the Parties mutually agree to such extension and GSK complies with the foregoing payment obligation, then the First Research Term Extension Period will extend for the period commencing on the day after the end of the First Research Term Extension Period and ending upon the earliest of (x) 11:59 pm Eastern Time on the [***] of the end of the First Research Term Extension Period, (y) the effective date of termination of this Agreement in its entirety, and (z) the effective date of termination of this Agreement with respect to all Target Validation Programs and GSK CPs (the "**Second Research Term Extension Period**").

3.2.4 Research Term. For purposes of this Agreement, the "**Research Term**" means the Initial Research Term plus (a) if applicable, the First Research Term Extension Period and (b) if applicable, the Second Research Term Extension Period.

3.3 Target Entry.

3.3.1 **Target List**. As of the Execution Date, the Parties have mutually agreed to include the Targets set forth on Schedule 3.3.1 for entry into the research collaboration (such schedule, the "**Target List**"). The Target List [***]. The Target List indicates each Target [***]. The Target List may be updated from time to time in accordance with the gatekeeper provisions set forth in Section 3.3.2 (Gatekeeper).

3.3.2 **Gatekeeper**.

3.3.2.1 **Gatekeeper**. The Parties have engaged [***] to serve as a gatekeeper for the research collaboration under this Agreement (the "**Gatekeeper**") through which GSK may inquire as to whether any Target that GSK would like to add to the Target List is available for inclusion in the research collaboration at such time (i.e., is not an Unavailable Target).

3.3.2.2 **Gatekeeper Procedures**.

(a) During the Research Term, GSK may, at its discretion, submit written inquiries to the Gatekeeper to determine if a Target is available for inclusion as a Target [***] under this Agreement (each, a "**Proposed Target**"); provided, for clarity, that (i) GSK will comply with the parameters on Targets as set forth in Section 3.4.2 (Parameters for Target Validation Programs); and (ii) Targets may not be added [***] after the Execution Date. GSK's written inquiry to the Gatekeeper for each Proposed Target will include the following information (each, a "**Proposed Target Notice**"): (1) the identity of such Proposed Target (which includes the NCBI Gene ID for known targets), and if no such NCBI Gene ID exists then an unequivocal identifier of such target, and, if applicable, whether such Proposed Target is a[***].

(b) Upon receipt of a Proposed Target Notice, the Gatekeeper will notify Wave as soon as practicable of such inquiry by GSK without disclosing the identity of the Proposed Target, after which Wave will have [***] to provide the Gatekeeper a then-current list of Unavailable Targets, [***] (which includes the NCBI Gene ID for known targets), and if no such NCBI Gene ID exists then an unequivocal identifier of such target. Within [***] of receipt of the list of Unavailable Targets from Wave, the Gatekeeper will inform GSK in writing whether the Proposed Target is available.

(i) If the Gatekeeper informs GSK that a Proposed Target is an Unavailable Target, then such Proposed Target will not become a Target on the Target List, and the Parties will have no further obligations under this Agreement with respect to such Target.

(ii) If the Gatekeeper confirms that a Proposed Target is available for inclusion on the Target List (i.e., not an Unavailable Target) (an "**Available Proposed Target**"), then the Gatekeeper will provide written notice to both Parties, specifying all of the information that was included in the Proposed Target Notice (such notice, the "**Available Proposed Target Notice**"). Following the Parties' receipt of an Available Proposed Target Notice from the

Gatekeeper, the Parties will update [***] Target List[***] to include the new Target and its identity (including the NCBI Gene ID for known targets), and if no such NCBI Gene ID exists then an unequivocal identifier of such target, and, [***].

3.4 Target Validation Programs.

3.4.1 Overview. During the Research Term, each Party will have the right to select Targets from the Target List to initiate target validation programs under this Agreement (each Target that is selected, a "**Validation Target**", and each program for a Validation Target, a "**Target Validation Program**"); provided that the Target Validation Programs will be subject to the parameters set forth in Section 3.4.2 (Parameters for Target Validation Programs). A Party will provide written notice to the JSC in order to initiate a Target Validation Program, which notice will include (a) the identity of the Party initiating the Target Validation Program, (b) the identity of the applicable Validation Target, and (c) the [***].

3.4.2 Parameters for Target Validation Programs. The Parties acknowledge and agree that the Targets selected for target entry under this Section 3.4 (Target Validation Programs) will be subject to the following parameters:

3.4.2.1 the Targets selected for inclusion in a Target Validation Program will be limited to the Targets set forth on the Target List (as such Target List may be updated from time to time in accordance with Section 3.3 (Target Entry);

3.4.2.2 Wave is entitled to initiate Target Validation Programs with Targets [***], and Wave may do so with respect to a specific Target [***];

3.4.2.3 GSK is entitled to initiate Target Validation Programs with Targets [***];

3.4.2.4 GSK will be entitled to initiate up to a total of [***] Target Validation Programs during the Initial Research Term [***];

3.4.2.5 if the First Research Term Extension Period occurs, GSK will be entitled to initiate up to a total of [***] additional Target Validation Programs during the First Research Term Extension Period;

3.4.2.6 if the Second Research Term Extension Period occurs, GSK will be entitled to initiate up to a total of [***] additional Target Validation Programs during the Second Research Term Extension Period;

3.4.2.7 GSK will be entitled to initiate no more than [***] Target Validation Programs across each Calendar Year of the Research Term;

3.4.2.8 no more than [***] Target Validation Programs initiated by GSK may be active at any one time during the Research Term [***] and

3.4.2.9 new Target Validation Programs may be initiated only during the [***].

3.4.3 Target Validation Plan and Approval. Within [***] after the date of a Party's written notice to the JSC to initiate a new Target Validation Program for a new Validation Target

(or such longer period of time as the Parties mutually agree), the Parties will prepare and provide the JRC with a proposed written research plan for the Target Validation Program for such Validation Target (each, a "**Target Validation Plan**") for the JRC's review, discussion and approval, which must be [***] Each Target Validation Plan shall include: [***]. A sample Target Validation Plan for a Validation Target [***] is attached hereto as Schedule 3.4.3; provided that the Parties acknowledge and agree that the activities to be conducted by the Parties may be different in scope (including the amount of activities, the timeline, the list of deliverables, etc.) as compared to the sample Target Validation Plan set forth in Schedule 3.4.3 [***]. The JRC will endeavor to approve each Target Validation Plan within [***] after the receipt of the proposed Target Validation Plan (or such other time period as the Parties may mutually agree).

3.4.4 **Target Validation Plan Amendments**. Following the JRC's approval of the Target Validation Plan for a given Target Validation Program, the JRC will discuss, propose and approve updates and amendments thereto; provided that no amendment to a given Target Validation Plan will be effective unless and until approved by the JRC.

3.4.5 **Target Validation Program Diligence**. For each Target Validation Program, each Party will use Commercially Reasonable Efforts to (a) perform the activities assigned to such Party under the Target Validation Plan for such Target Validation Program in accordance with the timelines set forth therein, and (b) deliver the deliverables set forth in the Target Validation Plan for such Target Validation Program.

3.4.6 **Target Validation Program Costs**. All costs and expenses for the performance of Target Validation Programs [***]. All costs and expenses for the performance of Target Validation Programs [***] provided that, upon Initiation of any Target Validation Program [***] for such Target Validation Program at no cost to Wave (which information may only be used by Wave for the limited purpose of conducting such Target Validation Program and for no other use or purpose).

3.4.7 **Operational Discretion**. Subject to the terms and conditions of this Agreement, the Party to which an activity under any Target Validation Plan is assigned will have the right to make decisions with respect to how such activity is conducted from an operational perspective; provided that (a) such decisions are consistent with this Agreement and the applicable Target Validation Plan and (b) such decisions are consistent with customary business practices for other of its similar products. For clarity, as between the Parties, Wave will make all operational decisions for [***].

3.4.8 **Information Rights; Target Validation Report**.

3.4.8.1 For each Target Validation Program, each Party will provide the JRC with a summary of the material activities conducted by or on behalf of such Party or any of its Affiliates or Sublicensees for such Target Validation Program. Such summary will be provided to the JRC at least [***] during the Target Validation Term for such Target Validation Program.

3.4.8.2 For each Target Validation Program, each Party will provide a written report to the JRC summarizing the results and deliverables of its activities for such Target Validation Program (the "**Target Validation Report**") within [***] after the earliest of [***]; provided that (i) Wave will be entitled, in its sole discretion, to initiate a Wave CP for [***] in accordance with Section 3.4.9 (Advancement to

Collaboration Program) without the Parties' completing a Target Validation Report for such Validation Target; and (ii) GSK will be entitled, in its sole discretion, to initiate a GSK CP, subject to Section 3.4.9.4(d), for [***] in accordance with Section 3.4.9 (Advancement to Collaboration Program) without the Parties' completing a Target Validation Report for such Validation Target. The JRC will convene a special meeting to review and discuss each Target Validation Report within [***] after the date of the JRC's receipt of such report (or such other time period as the Parties may mutually agree) (the "**JRC TVP Special Meeting**").

3.4.9 Advancement to Collaboration Program.

3.4.9.1 A Party may, in its sole discretion, provide written notice to the JRC indicating whether such Party desires to advance a Validation Target into a GSK CP or Wave CP under this Agreement in accordance with this Section 3.4.9 (Advancement to Collaboration Program) and subject to the parameters set forth in Section 3.4.9.2.

3.4.9.2 The Parties acknowledge and agree that the advancement of Validation Targets into Wave CPs and GSK CPs under this Agreement will be subject to the following parameters:

(a) Wave is entitled to initiate up to 3 Wave CPs with Validation Targets listed [***] during the Initial Research Term; provided that Wave will be entitled to initiate additional Wave CPs for Validation Targets [***] during the Research Term if agreed by GSK, such agreement not to be unreasonably withheld, conditioned or delayed; [***]:

(i) if Wave has [***] then Wave will be entitled [***],

(ii) if Wave has [***] then Wave will be entitled [***] and

(iii) if Wave is [***].

(b) GSK is entitled to initiate GSK CPs with Validation Targets [***];

(c) GSK will be entitled to initiate up to a total of 8 GSK CPs during the Initial Research Term;

(d) if the First Research Term Extension Period occurs, and Wave has not initiated [***] by the beginning of the First Research Term Extension Period, Wave will be entitled to initiate [***] Wave CP with Validation Targets listed [***] during the First Research Term Extension Period (or Second Research Term Extension Period, if applicable);

(e) if the First Research Term Extension Period occurs, GSK will be entitled to initiate up to a total of [***] additional GSK CPs during the First Research Term Extension Period;

(f) if the Second Research Term Extension Period occurs, GSK will be entitled to initiate up to a total of [***] additional GSK CPs during the Second Research Term Extension Period; and

(g) Wave CPs and GSK CPs may be initiated only during the Research Term.

3.4.9.3 If the applicable Validation Target for a given Target Validation Program is [***] then Wave is entitled, in its sole discretion, to provide written notice to the JRC indicating that Wave would like to advance such Validation Target into a Collaboration Program under this Agreement (including, for clarity, without initiating or completing a Target Validation Program for such Validation Target); provided that if a JRC TVP Special Meeting occurs for such Validation Target, then Wave must issue such written notice by no later than [***]. If Wave provides such written notice to the JRC, then (a) such Target will cease to be a Validation Target and will be removed from [***] effective as of the date of Wave's notice, (b) such Target will become a "**Wave Collaboration Target**" under this Agreement effective as of the date of Wave's notice, and (c) Wave will conduct a Collaboration Program for such Wave Collaboration Target (a "**Wave Collaboration Program**" or "**Wave CP**") in accordance with Section 4.3 (Wave Collaboration Programs). If Wave provides written notice to the JRC that Wave does not want to advance such Validation Target to a Wave CP (or Wave does not provide such written notice to the JRC during such [***] then (i) such Target will cease to be a Validation Target and will be removed [***] whichever is earlier.

3.4.9.4 If the applicable Validation Target for a given Target Validation Program is [***], then (X) Wave may provide written notice to the JRC during the [***] or if GSK provided written notice to the JSC indicating that GSK would like to advance such Validation Target into a Collaboration Program under this Agreement without initiating or completing a Target Validation Program for such Validation Target, then during the [***], in each case indicating that Wave would like to advance such Validation Target into a Collaboration Program under this Agreement, and (Y) GSK may provide written notice to the JSC during the [***] for such Validation Target, or if GSK provided written notice to the JSC indicating that GSK would like to advance such Validation Target into a Collaboration Program under this Agreement without initiating or completing a Target Validation Program for such Validation Target, then during the [***] in each case, indicating that GSK would like to advance such Validation Target into a Collaboration Program under this Agreement. If a Party fails to provide written notice to the JRC during the foregoing period of time applicable to it [***] for a given Validation Target indicating whether such Party would like to advance such Validation Target into a Collaboration Program under this Agreement, then such Party will be deemed to have provided a notice indicating that such Party does not want to advance such Validation Target into a Collaboration Program as of the last day of such applicable period of time.

(a) If (i) Wave's notice indicates that Wave wants to advance such Validation Target into a Collaboration Program and (ii) GSK's notice indicates that GSK does not want to advance such Validation Target into a Collaboration Program, then [***] (B) such Target will become a Wave Collaboration Target under this Agreement effective as of the latter date of such notices,

and (C) Wave will conduct a Wave CP for such Wave Collaboration Target in accordance with Section 4.3 (Wave Collaboration Programs).

(b) If (i) GSK's notice indicates that GSK wants to advance such Validation Target into a Collaboration Program and (ii) Wave's notice indicates that Wave does not want to advance such Validation Target into a Collaboration Program, then [***] (B) such Target will become a "**GSK Collaboration Target**" under this Agreement effective as of the latter date of such notices, (C) Wave will conduct a Collaboration Program for such GSK Collaboration Target (a "**GSK Collaboration Program**" or "**GSK CP**") in accordance with Section 4.2 (GSK Collaboration Programs), and (D) GSK will pay the GSK Collaboration Program Initiation Fee for such GSK CP in accordance with Section 9.4 (GSK Collaboration Program Initiation Fee).

(c) If both Parties' notices indicate that the respective Party does not want to advance such Validation Target into a Collaboration Program, then (i) such Target will cease to be a Validation Target [***].

(d) [***]:

(i) if Wave has [***] as of the latter date of such notices, then (A) such Target will cease to be a Validation Target and will be removed from [***] as of the latter date of such notices, (B) such Target will become a GSK Collaboration Target under this Agreement effective as of the latter date of such notices, (C) Wave will conduct a GSK CP in accordance with Section 4.2 (GSK Collaboration Programs), and (D) GSK will pay the GSK Collaboration Program Initiation Fee for such GSK CP in accordance with Section 9.4 (GSK Collaboration Program Initiation Fee).

(ii) If (A) Wave has [***] as of the latter date of such notices, and [***] then (1) such Target will cease to be a Validation Target and will be removed from [***] as of the latter date of such notices, (2) such Target will become a Wave Collaboration Target under this Agreement effective as of the latter date of such notices, and (3) Wave will conduct a Wave CP for such Wave Collaboration Target in accordance with Section 4.3 (Wave Collaboration Programs).

(iii) If (A) Wave has [***] then (1) such Target will cease to be a Validation Target and will be removed from [***] as of the latter date of such notices, (2) such Target will become a GSK Collaboration Target under this Agreement effective as of the latter date of such notices, (3) Wave will conduct a GSK CP in accordance with Section 4.2 (GSK Collaboration Programs), and (4) GSK will pay the GSK Collaboration Program Initiation Fee for such GSK CP in accordance with Section 9.4 (GSK Collaboration Program Initiation Fee).

(iv) For purposes of this Section 3.4.9.4, within the earlier of [***] (2) if the First Research Term Extension Period occurs, (x) GSK will be entitled to [***] and (3) if the Second Research Term Extension Period occurs, [***].

3.4.9.5 If the applicable Validation Target for a given Target Validation Program is [***] then GSK is entitled, in its sole discretion, to provide written notice to the JSC indicating that GSK would like to advance such Validation Target into a Collaboration Program under this Agreement (including, for clarity, without initiating or completing a Target Validation Program for such Validation Target); provided that if a JRC TVP Special Meeting occurs for such Validation Target, then GSK must issue such written notice by no later than [***]. If GSK provides such written notice to the JRC, then (a) such Target will cease to be a Validation Target [***] (b) such Target will become a GSK Collaboration Target under this Agreement effective as of the date of GSK's notice, (c) Wave will conduct a GSK CP for such GSK Collaboration Target in accordance with Section 4.2 (GSK Collaboration Programs), and (d) GSK will pay the GSK Collaboration Program Initiation Fee for such GSK Collaboration Program in accordance with Section 9.4 (GSK Collaboration Program Initiation Fee). If GSK provides written notice to the JRC that GSK does not want to advance such Validation Target to a GSK CP or GSK does not provide a written notice to the JRC during such [***] then (i) such Target will cease to be a Validation Target [***].

3.4.9.6 On the last day of the Initial Research Term [***].

3.4.9.7 On the last day of the Research Term, [***].

4. DEVELOPMENT AND COMMERCIALIZATION

4.1 SERPINA1 Program.

4.1.1 SERPINA1 Phase 1/2 Program.

4.1.1.1 During the SERPINA1 Phase 1/2 Program Term, Wave will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees, [***], the SERPINA1 Phase 1/2 Program, [***]. The SERPINA1 Phase 1/2 Program will be conducted in accordance with a written plan setting forth the SERPINA1 Phase 1/2 Program, including the relevant timelines with respect thereto (the "**SERPINA1 Phase 1/2 Program Plan**"); provided that (a) the initial SERPINA1 Phase 1/2 Program Plan is set forth on Schedule 4.1.1 and (b) from time to time during the SERPINA1 Phase 1/2 Program Term, [***] have the right to propose amendments to the SERPINA1 Phase 1/2 Program Plan, to the JDC to review, discuss and determine whether to approve in accordance with Section 2.4.2 (JDC Responsibilities).

4.1.1.2 During the SERPINA1 Phase 1/2 Program Term, within [***] Wave will present a written report to the JDC that identifies and includes all relevant data and results relating to the SERPINA1 Phase 1/2 Program, [***]. Within thirty (30) days after the delivery of such report (or such longer period of time as may be reasonably determined by the JDC, but in no event longer than [***], the JDC

will (a) meet, discuss and review the report and associated material data and results and (b) determine whether such SERPINA1 Phase 1/2 Program has [***].

4.1.1.3 In the event that the JDC does not agree on whether the SERPINA1 Phase 1/2 Program has [***], then such dispute will be escalated to the JSC for resolution. In the event that the JSC does not agree on whether such the SERPINA1 Phase 1/2 Program has [***].

4.1.1.4 Upon any such agreement or decision [***] that the SERPINA1 Phase 1/2 Program has [***], (a) it will be recorded in the minutes of a JSC meeting, and (b) the SERPINA1 Development Milestone Payment for having [***] will be due and payable by GSK to Wave in accordance with Section 9.6.1 (SERPINA1 Development Milestone Payments).

4.1.1.5 Promptly following the availability [***] Wave will deliver to GSK the [***]. Following receipt of such notice, Wave will promptly deliver to GSK the [***]. Within the time period that is the [***], GSK may in [***] advance the SERPINA1 Phase 1/2 Program for additional Development activities by GSK under Section 4.1.4 (Additional Development); provided, for clarity, that such [***] will thereafter be commenced on the date of GSK's receipt of the [***]. Upon such election by GSK, (a) such election will be recorded in the minutes of a JSC meeting, (b) GSK will use Commercially Reasonable Efforts to perform Development activities for the SERPINA1 Compounds and SERPINA1 Products in accordance with Section 4.1.4 (Additional Development) and (c) the SERPINA1 Development Milestone Payment for the [***] will be due and payable by GSK to Wave in accordance with Section 9.6.1 (SERPINA1 Development Milestone Payments).

4.1.2 Clinical Failure.

4.1.2.1 If, at any time during the SERPINA1 Phase 1/2 Program Term, Wave reasonably believes that there has been a Clinical Failure for the SERPINA1 Phase 1/2 Program, Wave will provide written notice of such Clinical Failure to the JDC, which notice will identify whether [***]. Promptly following the receipt of Wave's notice of such Clinical Failure, Wave will prepare a wind-down plan for the SERPINA1 Phase 1/2 Program, which wind-down plan (or any subsequent amendments thereto) will be subject to review and comment by the JDC, which comments Wave will take reasonably into account. The Parties will conduct the activities set forth in the wind-down plan in accordance with the terms and conditions thereof and otherwise in accordance with this Agreement, and the SERPINA1 Phase 1/2 Program will terminate upon the completion of the activities under the wind-down plan. [***].

4.1.2.2 Upon GSK's written request, which request must be made [***] after the date of Wave's notice of a Clinical Failure for the SERPINA1 Phase 1/2 Program to the JSC, Wave will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees, and at its own cost and expense), and will undertake, under the oversight and decision-making of the JDC, additional Development activities to identify a SERPINA1 Compound that satisfies the Backup Criteria for the SERPINA1 Program in accordance with this Section 4.1 (SERPINA1 Program) (the "**SERPINA1 Backup Development**"). If GSK does

not make such request within such [***] period, then this Agreement will terminate automatically for the SERPINA1 Target, effective as of the last day of such [***] period.

4.1.2.3 Prior to Wave commencing any SERPINA1 Backup Development for the SERPINA1 Target, Wave will prepare, in consultation with GSK and taking into good faith consideration comments from GSK, a reasonable written plan for such SERPINA1 Backup Development (the "**SERPINA1 Backup Development Plan**"), which will include (a) a description of the Development activities to be conducted by or on behalf of Wave for the SERPINA1 Backup Development, (b) the duration of such SERPINA1 Backup Development [***]. The SERPINA1 Backup Development Term may be extended one time for up to an [***] period upon the mutual agreement of the Parties; provided that GSK will be responsible for all costs and expenses incurred during such extension period.

4.1.2.4 During the SERPINA1 Backup Development Term, within [***] after Wave reasonably believes that it has identified a SERPINA1 Compound that has satisfied the Backup Criteria for the SERPINA1 Program, Wave will present a written report to the JDC that identifies such SERPINA1 Compound and includes all relevant data and results relating to such SERPINA1 Compound, including [***]. [***] after the delivery of such report (or such longer period of time as may be reasonably determined by the JDC, but in no event longer than [***], the JDC will (a) meet, discuss and review the report and associated data and results and (b) determine whether such SERPINA1 Compound has satisfied the Backup Criteria for the SERPINA1 Program. If the JDC does not believe that such SERPINA1 Compound has satisfied the Backup Criteria for the SERPINA1 Program, then Wave will use Commercially Reasonable Efforts during the remainder of the SERPINA1 Backup Development Term to conduct additional Development activities in accordance with the SERPINA1 Backup Development Plan, and thereafter present a report to the JDC as and to the extent applicable in this Section 4.2.1.4.

4.1.2.5 In the event that the JDC does not agree on whether such SERPINA1 Compound has satisfied the Backup Criteria, then such dispute will be escalated to the JSC for resolution. In the event that the JSC does not agree on whether such SERPINA1 Compound has satisfied the Backup Criteria, then such dispute will be escalated to the Executive Officers for resolution. [***].

4.1.2.6 Upon any such agreement or decision [***] that the SERPINA1 Compound has satisfied the Backup Criteria, (a) it will be recorded in the minutes of a JSC meeting, and (b) such SERPINA1 Compound will be designated as [***]. If the Clinical Failure of the SERPINA1 Phase 1/2 Program that led to the SERPINA1 Backup Development occurred [***]. If the Clinical Failure of the SERPINA1 Phase 1/2 Program that led to the SERPINA1 Backup Development occurred [***] provided that if there is a Clinical Failure of [***] for the SERPINA1 Target, effective as of the [***] after such Clinical Failure is reported to the JDC.

4.1.2.7 Upon any such agreement or decision [***] that the SERPINA1 Compound has not satisfied the Backup Criteria, (a) it will be recorded in the minutes of a JSC meeting, and [***].

4.1.2.8 GSK may, in its sole discretion, elect to advance a SERPINA1 Compound selected by it as a [***]. Upon any such selection of a SERPINA1 Compound as a [***] by GSK, (a) such selection will be recorded in the minutes of a JSC meeting, and (b) GSK will use Commercially Reasonable Efforts to perform Development activities for the SERPINA1 Compounds and SERPINA1 Products in accordance with Section 4.1.4 (Additional Development).

4.1.2.9 In the event that a new [***] is not designated or selected in accordance with Section 4.1.2.6 or 4.1.2.8 during the SERPINA1 Backup Development Term for the SERPINA1 Target, then [***].

4.1.3 Technology Transfer.

4.1.3.1 Wave will, [***], conduct a one-time technology transfer to GSK as follows: (a) promptly (but no later than [***] following the Effective Date, transfer to GSK existing [***] including as set forth in Schedule 4.1.3.1 attached hereto, (b) provide GSK with each [***] with respect to the SERPINA1 Phase 1/2 Program within [***] after each such report is complete, (c) provide GSK with the [***] for the SERPINA1 Product within [***] after its filing, and (d) provide GSK with additional supportive data related to such [***]. In addition, Wave will, [***] following either (i) the [***] in accordance with Section 4.1.2.4, transfer to GSK or its designated Affiliate (to the extent not already transferred) a copy of all Know-How (excluding [***] and Regulatory Documents (if applicable) in the Wave Technology that are related to SERPINA1 Compounds or SERPINA1 Products, in its possession or Control, including any documentation (whether held in paper or electronic format) or similar removable media (including e-mails, documents, spreadsheets, copies of standard operating procedures or technical specifications); provided that any documentation transferred electronically will be in an electronic format reasonably acceptable to both Parties and such disclosure will be subject to Section 8.1.2 (Disclosure), which, without limiting the foregoing, shall include all of the information provided for on Schedule 4.1.3.1 attached hereto.

4.1.3.2 To assist with any transfer of Know-How (excluding [***]) under this Section 4.1.3 (Technology Transfer) in addition to information provided for on Schedule 4.1.3.1 and GSK's exploitation thereof in accordance with the terms of this Agreement, Wave will make up to [***] of its personnel that worked on the SERPINA1 Target reasonably available to GSK during normal business hours at a mutually agreeable date and time to transfer such Know-How ([***]) to GSK and respond to GSK's reasonable inquiries with respect thereto, provided that, such assistance will not exceed [***] of time provided by Wave employees unless otherwise agreed by Wave. All assistance provided pursuant to this Section 4.1.3 (Technology Transfer) will be at [***] incurred in connection with providing such assistance in accordance with a budget to be agreed in advance.

4.1.4 Additional Development.

4.1.4.1 Subject to Section 4.1.4.2, during the SERPINA1 Late Development Term, GSK will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees, and, subject to Section 9.5.1 (SERPINA1 Program Expenses), at its own cost and expense), and the sole responsibility for undertaking, under

the oversight and decision-making of the JDC [***] thereafter in its sole decision-making authority in all matters relating to, all Development of SERPINA1 Compounds and SERPINA1 Products in the Field in the Territory.

4.1.4.2 The Parties may mutually agree that Wave or its Affiliates will perform (a) certain activities prior to the SERPINA1 Late Development Term that are outside the scope of the SERPINA1 Phase 1/2 Program, such as Manufacturing activities in preparation of activities to be conducted under Section 4.1.4.1 or chronic toxicology studies or (b) certain aspects of Development activities for the SERPINA1 Compounds and SERPINA1 Products during the SERPINA1 Late Development Term, in each case ((a) or (b)), at GSK's cost and expense in accordance with a written development plan and budget that is prepared and approved by the JDC and documented via the JSC.

4.1.5 Commercialization. Commencing on the first day of the SERPINA1 Late Development Term and continuing during the remainder of SERPINA1 Term, GSK will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees, and at its own cost and expense), and the sole responsibility for undertaking and sole decision-making authority in all matters relating to, any Commercialization of the SERPINA1 Compounds and SERPINA1 Products in the Field in the Territory, including sole responsibility for any decisions and negotiations with relevant Governmental Authorities regarding price and reimbursement status of any SERPINA1 Products in the Territory.

4.1.6 SERPINA1 Diligence Obligations.

4.1.6.1 During the SERPINA1 Phase 1/2 Program Term, Wave will use Commercially Reasonable Efforts to conduct the SERPINA1 Phase 1/2 Program.

4.1.6.2 During the SERPINA1 Backup Development Term (if any), Wave will use Commercially Reasonable Efforts to conduct the SERPINA1 Backup Development.

4.1.6.3 Commencing on the first day of the SERPINA1 Late Development Term and continuing during the remainder of SERPINA1 Term, GSK will use Commercially Reasonable Efforts (a) to Develop and seek Regulatory Approval, and (b) after receiving Regulatory Approval as well as Pricing Approvals, Commercialize, in each case ((a)-(b)), [***]. GSK will have the exclusive right to determine, in its sole discretion, the launch strategy for the SERPINA1 Products, subject to its exercise of Commercially Reasonable Efforts and the availability of any necessary Third Party licenses or other rights.

4.1.7 Trademarks. Subject to the terms and conditions herein, as between the Parties, GSK will have the sole authority to select trademarks for the SERPINA1 Products in the Territory and will own all such trademarks, including all goodwill and rights therein. For each SERPINA1 Product, to the extent permitted by applicable Regulatory Authorities and subject to the availability of sufficient space on product packaging to do so, GSK will indicate that such SERPINA1 Product is being Commercialized under a license from Wave.

4.1.8 Information Rights. After the [***] for the SERPINA1 Product and continuing until the [***] GSK will provide the JSC, and thereafter will provide Wave during the Term so long

as material Development is being undertaken in connection with SERPINA1 Program, with a summary of the activities and progress with respect to the material Development activities for the SERPINA1 Program in the Territory conducted by or on behalf of GSK or any of its Affiliates or Sublicensees conducted for the prior year, any material issues affecting Development or timelines for Development, as well as a high-level plan showing anticipated potential material Development inflection points for the coming year. Such summary will be provided on or before March 31 of each Calendar Year. In addition, if there are material developments regarding such matters during the course of the year, GSK will inform Wave of such developments. GSK agrees to meet with Wave or its designee(s) upon reasonable advance written notice from Wave and during normal business hours for the purposes of discussing each such summary; provided, however, that Wave shall not request such meetings, and GSK shall have no obligation to attend any such meetings, more than one time during each Calendar Year. Each such meeting shall be held either telephonically, by video conference or at GSK's offices. [***]. For the avoidance of doubt, each Party acknowledges and agrees that all reports, summaries or other information provided under this Section 4.1.8 (Information Rights) will be deemed to be the Confidential Information of GSK.

4.2 GSK Collaboration Programs.

4.2.1 Development during GSK CP Early Development Term.

4.2.1.1 Within [***] of the Initiation of each GSK CP (or such other time period as the Parties may mutually agree), (a) GSK will, in consultation with Wave via the JRC, establish the preliminary target product profile for such GSK CP, and (b) the Parties will [***] for such GSK CP which shall be consistent with the specifications provided in Schedule 4.2 attached hereto; provided that the Parties will review the [***] in light of the particular circumstances for a given GSK CP.

4.2.1.2 Subject to Section 4.2.1.3, for each GSK CP, during the GSK CP Early Development Term for such GSK CP, Wave will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees, [***], any Development of GSK Collaboration Compounds and GSK Collaboration Products for such GSK CP in the Field in the Territory until the first development candidate for such GSK CP has been selected.

4.2.1.3 For each GSK CP, during the GSK CP Early Development Term for such GSK CP, the Parties may mutually agree that GSK or its Affiliates will perform certain aspects of such Development activities [***] in accordance with a written development plan and budget that is prepared and approved by the JRC in writing and documented via the JSC.

4.2.1.4 For each GSK CP, during the GSK CP Early Development Term, within [***] after Wave reasonably believes that it has identified a GSK Collaboration Compound [***] Wave will present a written report to the JRC that identifies such GSK Collaboration Compound and includes all relevant data and results relating to such GSK Collaboration Compound, [***]. Within [***] after the delivery of such report (or such longer period of time as may be reasonably determined by the JRC, but in no event longer than [***], the JRC will (a) meet, discuss and review the report and associated material data and results and (b)

determine whether such GSK Collaboration Compound has [***]. If the JRC does not believe that such GSK Collaboration Compound [***], then Wave will use Commercially Reasonable Efforts during the remainder of the GSK CP Early Development Term to conduct additional Development activities to identify a development candidate for such GSK CP, and thereafter present a report to the JRC as and to the extent applicable in this Section 4.2.1.4.

4.2.1.5 In the event that the JRC does not agree on whether such GSK Collaboration Compound has [***], then such dispute will be escalated to the JSC for resolution. In the event that the JSC does not agree on whether such GSK Collaboration Compound has [***], then such dispute will be escalated to the Executive Officers for resolution. In the event that the Executive Officers does not agree on whether such GSK Collaboration Compound has [***].

4.2.1.6 Upon any such agreement or decision [***] (a) it will be recorded in the minutes of a JSC meeting, and (b) Wave will have no further obligations to conduct additional Development activities to identify a development candidate for such GSK CP.

4.2.1.7 Upon any such agreement or decision [***] (a) it will be recorded in the minutes of a JSC meeting, and (b) Wave will use Commercially Reasonable Efforts during the remainder of the GSK CP Early Development Term to conduct additional Development activities to identify a development candidate for such GSK CP, and thereafter present a report to the JDC as and to the extent applicable in this Section 4.2.1 (Development during GSK CP Early Development Term).

4.2.1.8 GSK may, in its sole discretion, elect to advance a GSK Collaboration Compound selected by it as a development candidate [***]. Upon any such selection of a GSK Collaboration Compound as a development candidate by GSK, (a) such selection will be recorded in the minutes of a JSC meeting, (b) the Development Milestone Payment for the [***] will be due and payable by GSK to Wave in accordance with Section 9.6.2 (GSK Collaboration Products Development Milestone Payments) and (c) GSK will use Commercially Reasonable Efforts to perform Development activities for GSK Collaboration Compounds and GSK Collaboration Products for such GSK CP in accordance with Section 4.2.2 (Development during GSK CP Late Development Term).

4.2.2 Development during GSK CP Late Development Term.

4.2.2.1 Subject to Section 4.2.2.2 and 4.2.7, for each GSK CP, during the GSK CP Late Development Term for such GSK CP, GSK will have the exclusive right to conduct (directly or through any of its Affiliates, Sublicensees or other Third Party subcontractors selected by GSK, and at its own cost and expense), and the sole responsibility for undertaking and sole decision-making authority in all matters relating to, any Development of GSK Collaboration Compounds and GSK Collaboration Products for such GSK CP in the Field in the Territory.

4.2.2.2 For each GSK CP, during the GSK CP Late Development Term for such GSK CP, the Parties may mutually agree (including in a separate written agreement in Wave's discretion depending on the nature of the activities involved) that Wave or its Affiliates will perform certain aspects of such Development activities at

GSK's cost and expense in accordance with a written development plan and budget that is prepared and approved by the JRC in writing and documented via the JSC.

4.2.3 Commercialization. For each GSK CP, commencing on the first day of the GSK CP Late Development Term and continuing during the remainder of the GSK CP Term for such GSK CP, GSK will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees, and at its own cost and expense), and the sole responsibility for undertaking and sole decision-making authority in all matters relating to, any Commercialization of the GSK Collaboration Compounds and GSK Collaboration Products for such GSK CP in the Field in the Territory, including sole responsibility for any decisions and negotiations with relevant Governmental Authorities regarding price and reimbursement status of any GSK Collaboration Products for such GSK CP in the Territory.

4.2.4 GSK CP Diligence Obligations.

4.2.4.1 During the GSK Early Development Term for each GSK CP, Wave (together with its Affiliates) will use Commercially Reasonable Efforts to Develop GSK Collaboration Compounds until the first development candidate for such GSK CP has been selected.

4.2.4.2 Commencing on the first day of the GSK CP Late Development Term and continuing during the remainder of GSK CP Term for each GSK CP, GSK (together with its Affiliates or Sublicensees) will use Commercially Reasonable Efforts (a) to Develop and seek Regulatory Approval, and (b) after receiving Regulatory Approval as well as Pricing Approvals, Commercialize, in each case ((a)-(b)), [***]. GSK will have the exclusive right to determine, in its sole discretion, the launch strategy for the GSK Collaboration Products for such GSK CP, subject to its exercise of Commercially Reasonable Efforts and the availability of any necessary Third Party licenses or other rights.

4.2.5 Trademarks. Subject to the terms and conditions herein, as between the Parties, GSK will have the sole authority to select trademarks for the GSK Collaboration Products for each GSK CP in the Territory and will own all such trademarks, including all goodwill and rights therein. For each GSK Collaboration Product, to the extent permitted by applicable Regulatory Authorities and subject to the availability of sufficient space on product packaging to do so, GSK will indicate that such GSK Collaboration Product is being Commercialized under a license from Wave.

4.2.6 Information Rights. For each GSK CP, [***], GSK will provide the JRC, and thereafter during the Term for such GSK CP will provide Wave during the Term so long as material Development is being undertaken in connection with GSK CP, with a summary of the activities and progress with respect to the material Development activities for the GSK CP in the Territory conducted by or on behalf of GSK or any of its Affiliates or Sublicensees for the prior year, any material issues affecting Development or timelines for Development, as well as a high-level plan showing anticipated potential material Development inflection points for the coming year. Such summary will be provided on or before March 31 of each Calendar Year. GSK agrees to meet with Wave or its designee(s) upon reasonable advance written notice from Wave and during normal business hours for the purposes of discussing each such summary; provided, however, that Wave shall not request such meetings, and

GSK shall have no obligation to attend any such meetings, more than one time during each Calendar Year. Each such meeting shall be held either telephonically, by video conference or at GSK's offices. [***]. For the avoidance of doubt, each Party acknowledges and agrees that all reports, summaries or other information provided under this Section 4.2.6 (Information Rights) will be deemed to be the Confidential Information of GSK.

4.2.7 Technical Failure.

4.2.7.1 If, at any time during the GSK CP Late Development Term for a given GSK CP, GSK reasonably believes that there has been a Technical Failure for a given GSK CP, GSK will provide written notice of such Technical Failure to the JSC.

4.2.7.2 Upon GSK's written request, which request must be made within [***] after the date of GSK's notice of a Technical Failure for a GSK CP to the JSC, (a) the JRC shall be re-instated to [***] for additional Development activities to identify a GSK Collaboration Compound for the GSK CP, and (b) thereafter Wave will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees, and [***], and Wave will undertake, and have the sole responsibility for undertaking, under the oversight and decision-making of the JRC and consistent with the agreed GSK CP Backup Development Plan, additional Development activities to identify a GSK Collaboration Compound that [***] for such GSK CP in accordance with this Section 4.2.7 (Technical Failure) (the "**GSK CP Backup Development**"). If GSK does not make such request within such [***] period, then this Agreement will terminate automatically for such GSK CP, effective as the last day of such [***].

4.2.7.3 Prior to Wave commencing any GSK CP Backup Development for a given GSK CP, Wave will prepare in consultation with GSK and for JRC approval a reasonable written plan for such GSK CP Backup Development (the "**GSK CP Backup Development Plan**"), which will include (a) a description of the Development activities to be conducted by or on behalf of Wave for the GSK CP Backup Development, (b) the duration of such GSK CP Backup Development [***] (the "**GSK CP Backup Development Term**"), and [***] for the applicable GSK CP. The GSK CP Backup Development Term may be extended one time for up [***] upon the mutual agreement of the Parties; provided that [***] for all costs and expenses incurred during such extension period.

4.2.7.4 During the GSK CP Backup Development Term for a given GSK CP, within [***] after Wave reasonably believes that it has identified a GSK Collaboration Compound that has [***] for the applicable GSK CP, Wave will present a written report to the JRC that identifies such GSK Collaboration Compound and includes all relevant data and results relating to such GSK Collaboration Compound, [***]. Within [***] after the delivery of such report (or such longer period of time as may be reasonably determined by the JRC, but in no event longer than [***], the JRC will (a) meet, discuss and review the report and associated data and results and (b) determine whether such GSK Collaboration Compound [***] for the applicable GSK CP. If the JRC does not believe that such GSK Collaboration Compound [***] for the applicable GSK CP, then Wave will use Commercially Reasonable Efforts during the remainder of the GSK CP Backup Development Term to conduct additional Development

activities in accordance with the GSK CP Backup Development Plan, and thereafter present a report to the JRC as and to the extent applicable in this Section 4.2.7.4.

4.2.7.5 In the event that the JRC does not agree on whether such GSK Collaboration Compound [***] for the applicable GSK CP, then such dispute will be escalated to the JSC for resolution. In the event that the JSC does not agree on whether such GSK Collaboration Compound [***] for the applicable GSK CP, then such dispute will be escalated to the Executive Officers for resolution. [***].

4.2.7.6 Upon any such agreement or decision [***] that GSK Collaboration Compound [***] for the applicable GSK CP, (a) it will be recorded in the minutes of a JSC meeting, (b) such GSK Collaboration Compound will be designated as a development candidate, and (c) Wave will have no further obligations to conduct additional Development activities in accordance with the GSK CP Backup Development Plan.

4.2.7.7 Upon any such agreement or decision [***] that GSK Collaboration Compound has [***] for the applicable GSK CP, (a) it will be recorded in the minutes of a JSC meeting, and (b) Wave will use Commercially Reasonable Efforts during the remainder of the GSK CP Backup Development Term to conduct additional Development activities in accordance with the GSK CP Backup Development Plan, and thereafter present a report to the JDC as and to the extent applicable in this Section 4.2.7 (Technical Failure).

4.2.7.8 GSK may, in its sole discretion, elect to advance a GSK Collaboration Compound selected by it as a development candidate [***]. Upon any such selection of a GSK Collaboration Compound as a development candidate by GSK, (a) such selection will be recorded in the minutes of a JSC meeting, and (b) GSK will use Commercially Reasonable Efforts to perform Development activities for GSK Collaboration Compounds and GSK Collaboration Products for such GSK CP in accordance with Section 4.2.2 (Development during GSK CP Late Development Term).

4.2.7.9 In the event that a new development candidate is not designated or selected in accordance with Section 4.2.7.6 or 4.2.7.8 during the [***] for a given GSK CP, then this Agreement will terminate automatically for such GSK CP, effective as of the last day of the [***].

4.3 Wave Collaboration Programs.

4.3.1 **Development**. During the Wave CP Term for each Wave CP, as between the Parties, Wave will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees and at its own cost and expense), and the sole responsibility for undertaking and sole decision-making authority in all matters relating to, any Development of Wave Collaboration Compounds and Wave Collaboration Products for such Wave CP in the Field in the Territory. The Parties may mutually agree (including in a separate written agreement in GSK's discretion depending on the nature of the activities involved) that GSK or its Affiliates will perform certain aspects of each Wave CP at Wave's cost and expense in accordance with a written development plan and budget that is mutually agreed by the Parties in writing.

4.3.2 **Commercialization**. During the Wave CP Term for each Wave CP, subject to the terms of this Agreement, as between the Parties, Wave will have the exclusive right to conduct (directly or through any of its Affiliates or Sublicensees, and at its own cost and expense), and the sole responsibility for undertaking and sole decision-making authority in all matters relating to, any Commercialization of the Wave Collaboration Compounds and Wave Collaboration Products for such Wave CP in the Field in the Territory, including sole responsibility for any decisions and negotiations with relevant Governmental Authorities regarding price and reimbursement status of any Wave Collaboration Products for such Wave CP in the Territory.

4.3.3 **Wave CP Diligence Obligations**. During the Wave CP Term for each Wave CP, Wave (together with its Affiliates and Sublicensees) will use Commercially Reasonable Efforts (a) to Develop and seek Regulatory Approval, and (b) after receiving Regulatory Approval as well as Pricing Approvals, Commercialize, in each case ((a)-(b)), [***]. Wave will have the exclusive right to determine, in its sole discretion, the launch strategy for the Wave Collaboration Products for such Wave CP, subject to its exercise of Commercially Reasonable Efforts and the availability of any necessary Third Party licenses or other rights.

4.3.4 **Trademarks**. Subject to the terms and conditions herein, as between the Parties, Wave will have the sole authority to select trademarks for the Wave Collaboration Products for each Wave CP in the Territory and will own all such trademarks, including all goodwill and rights therein.

4.3.5 **Information Rights**. For each Wave CP, during [***] so long as material Development is being undertaken in connection with the Wave CP, Wave will provide GSK with a summary of the activities and progress with respect to the material Development activities for the Wave CP in the Territory conducted by or on behalf of Wave or any of its Affiliates or Sublicensees for the prior year, any material issues affecting Development or timelines for Development, as well as a high-level plan showing anticipated potential material Development inflection points for the coming year. Such summary will be provided to GSK on or before March 31 of each Calendar Year during the Wave CP Term. In addition, Wave shall provide written notice to GSK within [***] after any election by Wave or its Affiliates or Sublicensees to no longer proceed with Developing or seeking Regulatory Approval for any Wave Collaboration Product for a given Wave CP. For the avoidance of doubt, each Party acknowledges and agrees that all reports, summaries or other information provided under this Section 4.3.5 (Information Rights) will be deemed to be the Confidential Information of Wave.

4.4 Additional Provisions.

4.4.1 **Subcontracting**. For each Collaboration Program, each Party (and its Affiliates and Sublicensees) may exercise any of its rights, or perform any of its obligations, under this Agreement (including any Development or Commercialization of the Collaboration Compounds and Collaboration Products for such Collaboration Program in the Field in the Territory) or otherwise the exercise of any of the rights licensed to such Party by subcontracting the exercise or performance of all or any portion of such rights and obligations on such Party's (or such Affiliate's or Sublicensee's, as applicable) behalf to a Third Party subcontractor. Any subcontract granted or entered into by a Party (or its Affiliate or Sublicensee) as contemplated by this Section 4.4.1 (Subcontracting) will not relieve such Party (or such Affiliate or Sublicensee, as applicable) from any of its

obligations under this Agreement. Each Party will be responsible for the acts and omissions of its (and its Affiliate's or Sublicensee's, as applicable) subcontractors in connection with their performance of any of such Party's obligations or exercise of any of such Party's rights hereunder. Any agreement with a subcontractor to perform such Party's obligations under this Agreement will be consistent with such Party's obligations under this Agreement, including confidentiality and non-use provisions which are no less stringent than those set forth in Section 10 (Confidentiality).

4.4.2 **Records**. Each Party will maintain, and cause its Affiliates, Sublicensees and subcontractors to maintain, records of the Development and Commercialization activities under this Agreement in sufficient detail and in good scientific manner appropriate for scientific, patent and regulatory purposes, which will be complete and accurate in all material respects and will fully and properly reflect all work done, data and developments made, and results achieved.

4.4.3 **Transfer of Materials**.

4.4.3.1 To facilitate the conduct of activities under any Collaboration Program: (a) a Party may, at its election or as contemplated under any applicable development plan, provide Materials (the "**Materials Supplying Party**") to the other Party (the "**Materials Receiving Party**") to facilitate the Development activities for such Collaboration Program (in which case the transfer of such Materials will be in accordance with a materials transfer letter in a format agreed to by the Parties), and (b) the Materials Supplying Party will provide to the Materials Receiving Party reasonable quantities of such Materials as are reasonably necessary to permit the Materials Receiving Party to conduct the applicable Development activities for such Collaboration Program. Without limiting the generality of the foregoing, under such materials transfer letter, the Parties have agreed that Wave will provide GSK with [***].

4.4.3.2 All Materials transferred pursuant to this Section 4.4.3 (Transfer of Material) (a) will remain the sole property of the Materials Supplying Party (it being understood that jointly-owned Materials will remain jointly-owned, notwithstanding any physical transfer between the Parties), (b) will be used only in the fulfillment of the Materials Receiving Party's obligations or exercise of rights under this Agreement, (c) will remain solely under the control of the Materials Receiving Party, (d) will not be used or delivered by the Materials Receiving Party to or for the benefit of any Third Party (other than a subcontractor or Sublicensee) without the prior written consent of the Materials Supplying Party and, for the avoidance of doubt, consent shall not be required where the Materials are delivered to a member of the Agreed Network (as defined in Section 6.5 (Networks of Third Party Providers)), and (e) will not be used in research or testing involving human subjects, unless expressly agreed in writing. The Materials Receiving Party will use the Materials in compliance with Applicable Laws and the terms and conditions of this Agreement, and will not reverse engineer or chemically analyze such Materials, except as specified in the applicable materials transfer letter.

4.4.3.3 Any intellectual property generated by or on behalf of either Party in connection with the use of Materials transferred pursuant to this Section 4.4.3 (Transfer of Materials) will be governed by the following:

(a) All intellectual property created, conceived or generated by or on behalf of either Party using Materials will be governed by the provisions of this Agreement, including Sections 7 (Licenses), 8 (Intellectual Property) and 10 (Confidentiality).

4.4.3.4 All Materials supplied under this Section 4.4.3 (Transfer of Materials) are supplied "as is", with no warranties of fitness for a particular purpose and must be used with prudence and appropriate caution in any experimental work, as not all of their characteristics may be known. The Materials Receiving Party assumes all liability for damages that may arise from its use, storage or disposal of the Materials. Except as otherwise set forth in this Agreement, the Materials Supplying Party will not be liable to the Materials Receiving Party for any loss, claim or demand made by the Materials Receiving Party, or made against the Materials Receiving Party by any Third Party, due to or arising from the use of the Materials under this Agreement, except to the extent such loss, claim or demand is caused by the gross negligence or willful misconduct of the Materials Supplying Party.

4.4.4 Additional Compliance Terms. Each Party will comply with the additional terms set forth on Schedule 4.4.4 (Additional Compliance Terms) in the conduct of its Development activities under this Agreement.

5. REGULATORY MATTERS

5.1 General. From and after the Effective Date, as between the Parties, the Regulatory Lead will have the exclusive right to conduct (directly or through any of its Affiliates, Sublicensees or other Third Party subcontractors selected by the Regulatory Lead and [***] and the sole responsibility [***] in all matters relating to, all regulatory matters for the Collaboration Compounds or Collaboration Products in the Territory, including with respect to (a) any communications, filings, submissions or interactions with any Regulatory Authority in the Territory in connection with any Development of the Collaboration Compounds or Collaboration Products; (b) seeking or maintaining any Regulatory Approvals in the Territory for any Collaboration Product in the Territory; and (c) determining whether and how to implement a recall or other market withdrawal of any Collaboration Product in the Territory. For purposes of this Agreement, the "**Regulatory Lead**" means: [***].

5.2 Regulatory Filings.

5.2.1 As between the Parties, the Regulatory Lead will solely own and have the exclusive right to file and maintain any and all Regulatory Documents and Regulatory Approvals for any Collaboration Products in the Territory, including all IND/CTAs and NDAs.

5.2.2 For each GSK CP, GSK will provide Wave, through the JSC, with a copy of all proposed Regulatory Documents and Regulatory Approvals for any GSK Collaboration Products for such GSK CP for Wave's review and comment with respect to the Wave Platform sufficiently in advance (in parallel with the Regulatory Lead's senior management's review) of GSK's filing or submission thereof, and GSK will reasonably consider and incorporate all comments timely provided by Wave in connection therewith.

5.2.3 For the SERPINA1 Program, the Regulatory Lead will provide the non-Regulatory Lead Party, through the JSC, with a copy of all proposed Regulatory Documents to be submitted

to Regulatory Authorities for any SERPINA1 Products for the non-Regulatory Lead Party's review and comment sufficiently in advance (in parallel with the Regulatory Lead's senior management's review) of the Regulatory Lead's filing or submission thereof, and the Regulatory Lead will reasonably consider all comments timely provided by the non-Regulatory Lead Party in connection therewith. For the avoidance of doubt, no later than [***], as between the Parties, the Parties will ensure [***] has been transferred to GSK so that GSK can (as IND holder) become and be responsible [***] for the SERPINA1 Program, including [***], and the like.

5.2.4 Notwithstanding the foregoing, Wave shall provide GSK with access to and copies of all Know-How, Regulatory Documents and any other information necessary to enable GSK to perform its activities as the Regulatory Lead and make any relevant regulatory filings (including batch records, details of processes used to prepare drug substance and/or drug product, analytical methods and data and all information regarding how the relevant compounds are synthesized), in each case that relate to SERPINA1 Compounds, SERPINA1 Products, GSK Collaboration Compounds or GSK Collaboration Products, as applicable. For the avoidance of doubt, nothing in this Section 5.2.4 shall [***].

5.3 Communications with Regulatory Authorities.

5.3.1 Subject to the remainder of this Section 5.3 (Communication with Regulatory Authorities), during the Term, the Regulatory Lead (or one of its Affiliates or Sublicensees) will be responsible, and act as the primary point of contact, for communications with Regulatory Authorities in connection with the Collaboration Compounds or Collaboration Products.

5.3.2 For each GSK CP, GSK will provide Wave with reasonable advance notice of all formal regulatory meetings that are planned in advance with Regulatory Authorities [***]. To the extent permitted by the applicable Regulatory Authorities, [***]. For clarity and notwithstanding the foregoing, [***] may undertake impromptu or informal regulatory meetings with Regulatory Authorities for any GSK CP [***].

5.3.3 For the SERPINA1 Program, the Regulatory Lead will provide the other Party with reasonable advance notice of all regulatory meetings with Regulatory Authorities in connection with the SERPINA1 Products. To the extent permitted by the applicable Regulatory Authorities, the non-Regulatory Lead Party will be to entitled to [***] all such meetings.

5.4 Additional Provisions for SERPINA1 Program.

5.4.1 Except to the extent prohibited under Applicable Law, Wave will use diligent efforts to transfer and assign to GSK (or its designee) [***].

5.4.2 Upon GSK's request, Wave will, and will cause its Affiliates to, support GSK and its Affiliates, as may be reasonably necessary, in obtaining Regulatory Approvals for any SERPINA1 Product in the Territory and in the activities in support thereof, including providing any documents or other materials in the possession or Control of Wave or any of its Affiliates as may be reasonably necessary or useful for GSK or any of its Affiliates or Sublicensees to obtain Regulatory Approvals for any SERPINA1 Product in the Territory. If any Regulatory Authority [***].

5.4.3 For the SERPINA1 Program, the Parties will cooperate with each other with regard to the reporting and handling of safety information involving the SERPINA1 Compounds and SERPINA1 Products in accordance with Applicable Law, regulatory requirements and regulations on pharmacovigilance, clinical safety and data privacy. Without limiting the foregoing, (a) upon GSK's request, (i) Wave will transfer a copy of such safety database for the SERPINA1 Program to GSK (or its Affiliate) and thereafter GSK will establish a global safety database for each SERPINA1 Product Developed hereunder and, as between the Parties, will own and maintain such global safety database for each such SERPINA1 Product; and (ii) thereafter the Parties will establish a joint safety review team to oversee the Parties' safety evaluation and risk management relationship, and provide processes and procedures for the resolution of any conflict or dispute with respect to pharmacovigilance and other safety matters; and (b) at GSK's request, the Parties will negotiate in good faith and enter into a pharmacovigilance agreement related to the SERPINA1 Compounds and SERPINA1 Products, which will define the pharmacovigilance responsibilities of the Parties and include safety data exchange procedures governing the exchange of information affecting the SERPINA1 Compounds and SERPINA1 Products (e.g., adverse events, serious adverse events, emerging safety issues) to enable each Party to comply with all Applicable Laws related to the SERPINA1 Compounds and SERPINA1 Products (the "**Pharmacovigilance Agreement**").

6. MANUFACTURING

6.1 General.

6.1.1 For purposes of this Agreement, on Collaboration Compound/Collaboration Product-by- Collaboration Compound/Collaboration Product basis, the "**Manufacturing Lead**" will be the Party that has the exclusive right to conduct [***] and the sole responsibility for undertaking and sole decision-making authority in all matters relating to, any Manufacturing of the Collaboration Compounds or Collaboration Products in the Territory.

6.1.2 For Wave CPs, [***] will be the Manufacturing Lead.

6.1.3 For the SERPINA1 Program, [***]. If [***]is selected as the Manufacturing Lead for clinical supply or commercial supply for the SERPINA1 Program, such selection will be recorded in the minutes of the JSC.

6.1.4 For GSK CPs, [***]. If [***]is selected as the Manufacturing Lead for pre-clinical, clinical or commercial supply for any GSK CP as set forth in clause (b), such selection will be recorded in the minutes of the JSC.

6.1.5 GSK has the right to undertake [***] even where GSK is not the Manufacturing Lead.

6.2 Supply to GSK. For all Collaboration Compounds and Collaboration Products for any GSK CP or the SERPINA1 Program for which Wave is the Manufacturing Lead, Wave will supply such Collaboration Compounds and Collaboration Products to GSK (a) for pre-clinical and clinical Development purposes, in accordance with the Pre-Clinical and Clinical Supply Agreement to be entered into in accordance with Section 6.3 (Supply Agreements), and (b) for Commercialization purposes, in accordance with the Commercial Supply Agreement to be entered into in accordance with Section 6.3 (Supply Agreements).

6.3 Supply Agreements. For each GSK CP or the SERPINA1 Program, if Wave is [***] the Manufacturing Lead for Collaboration Compounds or Collaboration Products directed to a GSK Collaboration Target or the SERPINA1 Target, then the Parties will use Commercially Reasonable Efforts to negotiate in good faith for a period of [***] and agree on the terms of separate supply agreement(s) pursuant to which (a) Wave would Manufacture and supply to GSK the applicable Collaboration Compounds and Collaboration Products for Development purposes (the "**Pre-Clinical or Clinical Supply Agreement**") and (b) Wave would Manufacture and supply to GSK the applicable Collaboration Compounds and Collaboration Products for Commercialization purposes (the "**Commercial Supply Agreement**," and together with the Pre-Clinical and Clinical Supply Agreement, the "**Supply Agreements**"). Each Supply Agreement will (i) contain customary terms and conditions, [***]. In the event that the Parties cannot reach resolution on a Supply Agreement before [***] (a "**Supply Agreement Dispute**"), then [***].

6.4 Transfer of Manufacturing.

6.4.1 Upon request of GSK [***] Wave will enable, support and assist with the transfer of relevant manufacturing methods, processes and analytical methods together with all other reasonably necessary information and knowledge utilized by or on behalf of Wave in its manufacturing or supply of GSK Collaboration Products for such GSK CP to GSK or its nominee to support the manufacturing and supply of GSK Collaboration Products for such GSK CP.

6.4.2 Within [***] (or within [***] of such information becoming available (if later)), Wave will provide GSK with the [***]. All other information relating to how the [***] will be provided to GSK within [***] unless mutually agreed upon at the joint manufacturing committee to be provided earlier. Further, upon request of GSK, in connection with the foregoing and including in line with the timeline contemplated by the foregoing, Wave will enable, support and assist with [***].

6.4.3 To assist with any transfer under Sections 6.4.1 or 6.4.2, Wave will make up to two (2) of its personnel [***] reasonably available to GSK during normal business hours at a mutually agreeable date and time to transfer such manufacturing methods, processes and analytical methods (or any other relevant information or knowledge) to GSK and respond to GSK's reasonable inquiries with respect thereto, provided that, such assistance will not exceed [***] provided by Wave employees unless otherwise agreed by Wave. All assistance provided pursuant to this Section 6.4.3 will be [***]; provided to the extent any assistance is provided by Wave in excess of [***] incurred in connection with providing such assistance in accordance with a budget to be agreed in advance.

6.5 Network of Third Party Providers. Within [***] after the Effective Date of this Agreement, the Parties shall agree a list of (a) drug substance and drug product contract manufacturer organizations and (b) analytical quality control release and stability providers that both Parties would be comfortable engaging, which for the avoidance of doubt shall [***]. Any Third Party to be engaged to perform the aforementioned manufacturing or quality control activities in connection with this Agreement shall be selected from the Agreed Network (as such network may be amended from time to time by the mutual agreement of the Parties).

6.6 Audit of Wave's Quality System. Upon the expiry of [***] after the Effective Date of this Agreement, GSK shall be permitted to request access to Wave's manufacturing facility at Lexington, MA for the purposes of carrying out an audit of Wave's quality systems and procedures (the "**Quality Audit**"). The date of the Quality Audit shall be agreed between the Parties but shall

occur no later than [***] following the receipt by Wave of a request from GSK to carry out such an audit. Wave shall ensure that GSK is provided with (a) copies of all relevant documentation and (b) access to all relevant personnel, in each case as is necessary to enable GSK to complete the Quality Audit in a timely manner. Each Party will bear its own internal and external costs incurred in connection with the Quality Audit.

7. LICENSES

7.1 Validation Targets.

7.1.1 **License Grant to GSK**. Subject to the terms and conditions of this Agreement, on a Validation Target-by-Validation Target basis, Wave and its Affiliates hereby grants GSK a non-transferable (except as provided in Section 16.2 (Assignment)), co-exclusive (with Wave), non-sublicensable (except to subcontractors performing activities for GSK under the applicable Target Validation Plan) license under the Wave Technology solely to the extent necessary for GSK to perform its obligations for the applicable Target Validation Program under the Target Validation Plan for such Validation Target.

7.1.2 **License Grant to Wave**. Subject to the terms and conditions of this Agreement, on a Validation Target-by-Validation Target basis, GSK hereby grants Wave and its Affiliates a non-transferable (except as provided in Section 16.2 (Assignment)), co-exclusive (with GSK), non-sublicensable (except to subcontractors performing activities for Wave under the applicable Target Validation Plan) license under the GSK Technology solely to the extent necessary for Wave to perform its obligations for the applicable Target Validation Program under the Target Validation Plan for such Validation Target.

7.2 SERPINA1 Program.

7.2.1 **License Grants to GSK**. Subject to the terms and conditions of this Agreement, for the SERPINA1 Program, during the SERPINA1 Program Term, Wave and its Affiliates hereby grants GSK a non-transferable (except as provided in Section 16.2 (Assignment)), exclusive license, with the right to grant sublicenses in accordance with Section 7.5 (Sublicensing Terms), under the Wave Technology to Exploit SERPINA1 Compounds and SERPINA1 Products in the Field and in the Territory. Notwithstanding the foregoing, Wave retains the right under the Wave Technology, with the right to grant licenses in accordance with Section 7.5 (Sublicensing Terms), solely to the extent necessary for Wave to (a) exercise its rights and perform its obligations for the SERPINA1 Program, and (b) Manufacture (or have Manufactured) any SERPINA1 Compounds or SERPINA1 Products.

7.2.2 **License Grant to Wave**. Subject to the terms and conditions of this Agreement, for the SERPINA1 Program, during the SERPINA1 Program Term, GSK hereby grants Wave and its Affiliates a non-transferable (except as provided in Section 16.2 (Assignment)), non-exclusive, non-sublicensable (except to subcontractors performing activities for Wave) license under the GSK Technology solely to the extent necessary for Wave to (a) exercise its rights and perform its obligations for the SERPINA1 Program, and (b) Manufacture (or have Manufactured) any SERPINA1 Compounds or SERPINA1 Products.

7.3 GSK CPs.

7.3.1 **License Grants to GSK**. Subject to the terms and conditions of this Agreement, for each GSK CP, during the GSK CP Term for such GSK CP, Wave and its Affiliates hereby grants

GSK a non-transferable (except as provided in Section 16.2 (Assignment)), exclusive license, with the right to grant sublicenses in accordance with Section 7.5 (Sublicensing Terms), under the Wave Technology to Exploit GSK Collaboration Compounds and GSK Collaboration Products for such GSK CP in the Field and in the Territory. Notwithstanding the foregoing, Wave retains the right under the Wave Technology, with the right to grant licenses in accordance with Section 7.5 (Sublicensing Terms), solely to the extent necessary for Wave to (a) exercise its rights and perform its obligations for such GSK CP, and (b) Manufacture (or have Manufactured) any GSK Collaboration Compounds or GSK Collaboration Products for such GSK CP.

7.3.2 **License Grant to Wave**. Subject to the terms and conditions of this Agreement, for each GSK CP, during the GSK CP Term for such GSK CP, GSK hereby grants Wave and its Affiliates a non-transferable (except as provided in Section 16.2 (Assignment)), non-exclusive, non-sublicensable (except to subcontractors performing activities for Wave) license under the GSK Technology solely to the extent necessary for Wave to (a) exercise its rights and perform its obligations for such GSK CP, and (b) Manufacture (or have Manufactured) any GSK Collaboration Compounds or GSK Collaboration Products for such GSK CP.

7.4 Wave CPs.

7.4.1 **License Grants to GSK**. Subject to the terms and conditions of this Agreement, for each Wave CP, during the Wave CP Term for such Wave CP, Wave and its Affiliates hereby grants GSK a non-transferable (except as provided in Section 16.2 (Assignment)), non-exclusive (with Wave), non-sublicensable (except to subcontractors performing activities for GSK) license under the Wave Technology solely to the extent necessary for GSK to perform its obligations for such Wave CP.

7.4.2 **License Grant to Wave**. Subject to the terms and conditions of this Agreement, for each Wave CP, GSK hereby grants Wave and its Affiliates a non-transferable (except as provided in Section 16.2 (Assignment)), exclusive license, with the right to grant sublicenses in accordance with Section 7.5 (Sublicensing Terms), under the GSK Technology to Exploit Wave Collaboration Compounds and Wave Collaboration Products for such Wave CP in the Field and in the Territory. Notwithstanding the foregoing, GSK retains the right under the GSK Technology solely to the extent necessary for GSK to perform its obligations for such Wave CP.

7.5 Sublicensing Terms.

7.5.1 **GSK Sublicensing Rights**. Subject to the requirements of this Section 7.5 (Sublicensing Terms), (a) GSK has the right to sublicense any of its rights under Sections 7.1.1 (License Grant to GSK), 7.2.1 (License Grant to GSK), 7.3.1 (License Grant to GSK) and 7.4.1 (License Grant to GSK), in each case, to any of its Affiliates or any subcontractors performing activities for GSK under each Collaboration Program, without obtaining Wave's prior consent, [***].

7.5.2 **Wave Sublicensing Rights**. Subject to the requirements of this Section 7.5 (Sublicensing Terms), (a) Wave has the right to sublicense any of its rights under Sections 7.1.2 (License Grant to Wave), 7.2.2 (License Grant to Wave), 7.3.2 (License Grant to Wave) and 7.4.2 (License Grant to Wave), in each case, to any of its Affiliates or any subcontractors

performing activities for Wave under each Collaboration Program, without obtaining GSK's prior consent, [***].

7.5.3 **Sublicensing Agreements**. Each sublicense granted by a Party pursuant to this Section 7.5 (Sublicensing Terms) will be subject and subordinate to this Agreement and will contain provisions consistent with the terms and conditions of this Agreement. Each Party will, as soon as reasonably practicable thereafter, provide the other Party with a copy of any executed sublicense agreement covering a material sublicense granted hereunder to a non-Affiliate Third Party (which copy may be redacted to remove provisions that are not necessary to monitor compliance with this Section 7.5 (Sublicensing Terms)), and each such sublicense agreement will contain the following provisions: a requirement that the Sublicensee comply with the confidentiality and non-use provisions of Section 10 (Confidentiality) with respect to the other Party's Confidential Information.

7.5.4 **Liability of the Sublicensing Party**. Notwithstanding any sublicense, the sublicensing Party will remain primarily liable to the other Party for the performance of all of its obligations under, and such Party's compliance with all provisions of, this Agreement.

7.5.5 **Continued Rights of a Sublicensee.** If this Agreement is terminated for any reason with respect to a Wave Collaboration Product that has been the subject of a sublicense granted by Wave pursuant to this Section 7.5 (Sublicensing Terms) and it is expressly provided in such sublicense that the sublicense would survive a termination of this Agreement, then both Parties hereby agree that, upon the request of the sublicensee under such sublicense, such sublicensee shall become a direct licensee of GSK with respect to any of the rights originally sublicensed to it by Wave that are Controlled by GSK, subject to the condition that such sublicensee is not in breach of any of its obligations under its sublicense. If this Agreement is terminated for any reason with respect to a GSK Collaboration Product or SERPINA1 Product that has been the subject of a sublicense granted by GSK pursuant to this Section 7.5 (Sublicensing Terms) and it is expressly provided in such sublicense that the sublicense would survive a termination of this Agreement, then both Parties hereby agree that, upon the request of the sublicensee under such sublicense, such sublicensee shall become a direct licensee of Wave with respect to any of the rights originally sublicensed to it by GSK that are Controlled by Wave, subject to the condition that such sublicensee is not in breach of any of its obligations under its sublicense.

7.6 In-Licenses.

7.6.1 **Existing Third Party Agreements**. Responsibility for Existing Wave Third Party Agreements and Existing GSK Third Party Agreements will be as follows:

7.6.1.1 **Existing Wave Third Party Agreements**. [***].

7.6.1.2 **Existing GSK Third Party Agreements**. [***].

7.6.2 **SERPINA1 Potential In-Licenses**.

7.6.2.1 For the SERPINA1 Target, the JSC may determine that Exploitation of SERPINA1 Compounds or SERPINA1 Products may require or benefit from a grant of rights under additional Patents or Know-How of Third Parties, whether by license or acquisition (each, a "**SERPINA1 Potential In-License**"). If a Party desires to acquire or otherwise enter into any SERPINA1 Potential

In-License with respect to the SERPINA1 Target after the Effective Date (or has entered into such a SERPINA1 Potential In-License that it desires for the JSC to approve as a SERPINA1 Collaboration In-License), then in each case such Party will bring such SERPINA1 Potential In-License to the attention of the JSC. If a SERPINA1 Potential In-License is brought to the attention of the JSC pursuant to this Section 7.6.2 (SERPINA1 Potential In-Licenses), then the Parties will, through the JSC, review, discuss, and determine whether to approve making the rights to be granted under such SERPINA1 Potential In-License available for use by the Parties pursuant to this Agreement with respect to such Party's rights under this Agreement to Exploit SERPINA1 Compounds and SERPINA1 Products to which such SERPINA1 Potential In-License relates. The JSC will review and discuss the rationale of including such SERPINA1 Potential In-License for use by the Parties with respect to the SERPINA1 Target pursuant to this Agreement [***]. As between the Parties, [***]. If a Party enters into a SERPINA1 Potential In-License, notwithstanding anything to the contrary set forth in this Agreement, such Party will [***].

7.6.2.2 For any SERPINA1 Potential In-License that the JSC approves for use by the Parties pursuant to this Agreement, (a) such SERPINA1 Potential In-License will be deemed to be a "**SERPINA1 Collaboration In-License**" hereunder, (b) if it has not already done so, the Party proposing to enter into a SERPINA1 Collaboration In-License may enter into such SERPINA1 Collaboration In-License [***], (c) solely following approval by the JSC (and execution of such SERPINA1 Collaboration In-License if it had not yet been entered into), the Patents and Know-How in-licensed under such SERPINA1 Collaboration In-License will be deemed "Controlled" under this Agreement as Wave Technology or GSK Technology for purposes of the Exploitation of SERPINA1 Compounds and SERPINA1 Products, [***].

7.6.2.3 Non Approved SERPINA1 Potential In-Licenses. [***] (a) such SERPINA1 Potential In-License will not be a SERPINA1 Collaboration In-License hereunder, and (b) the Patents and Know-How in-licensed under such SERPINA1 Potential In-License will not be included as Wave Technology or GSK Technology and will not be "Controlled" by the party to the SERPINA1 Potential In-License for purposes of this Agreement.

7.6.3 GSK CP Collaboration In-Licenses. For each GSK CP, GSK will have the sole right to determine that Exploitation of GSK Collaboration Compounds or GSK Collaboration Products for such GSK CP may require or benefit from a grant of rights under additional Patents or Know-How of Third Parties, whether by license or acquisition. In the event that GSK enters into an agreement with a Third Party for the grant of rights under additional Patents or Know-How of such Third Party Exploitation of GSK Collaboration Compounds or GSK Collaboration Products for such GSK CP, (a) such agreement will be deemed to be a "Collaboration In-License" hereunder, [***].

7.6.4 Wave CP Collaboration In-Licenses. For each Wave CP, Wave will have the sole right to determine that Exploitation of Wave Collaboration Compounds or Wave Collaboration Products for such Wave CP may require or benefit from a grant of rights under additional Patents or Know-How of Third Parties, whether by license or acquisition. In the event that Wave enters into an agreement with a Third Party for the grant of rights under additional Patents or Know-How of such Third Party Exploitation of Wave Collaboration Compounds

or Wave Collaboration Products for such Wave CP, (a) such agreement will be deemed to be a "Collaboration In-License" hereunder, [***].

7.6.5 Compliance with Third Party Agreements. All licenses and other rights granted to GSK under this Section 7 (Licenses) are subject to the rights and obligations of Wave under the Wave Third Party Agreements. All licenses and other rights granted to Wave under this Section 7 (Licenses) are subject to the rights and obligations of GSK under the GSK Third Party Agreements. Each Party will comply with all applicable provisions of the Third Party Agreements, and will perform and take such actions as may be required to allow the Party that is party to such Third Party Agreement to comply with its obligations thereunder, including obligations relating to sublicensing, patent matters, confidentiality, reporting, audit rights, indemnification and diligence, in each case, to the extent that such Party is provided a copy of such Third Party Agreement by the Party that is the party thereto. Without limiting the foregoing, each Party will prepare and deliver to the other Party any additional reports required under the applicable Third Party Agreements and reasonably requested by such other Party, in each case sufficiently in advance to enable the Party that is party to such Third Party Agreement to comply with its obligations under the applicable Third Party Agreement. In addition, each Party agrees, upon the other Party's reasonable request, to provide the other Party with copies of any other Third Party Agreements to which it is a party. Confidential Information of the providing Party or its counterparty may be redacted from such copies, except to the extent that such information is required in order to enable the other Party to comply with its obligations to the providing Party under this Agreement with respect to such Third Party Agreement or in order to enable the providing Party to ascertain compliance with the terms and conditions of this Agreement.

7.7 Bankruptcy. All rights and licenses granted under or pursuant to this Agreement by a Party to the other are and will otherwise be deemed to be, for purposes of Section 365(n) of the Bankruptcy Code, licenses of right to "intellectual property" as defined under Section 101 of the Bankruptcy Code. The Parties agree that the Parties and their respective Sublicensees, as Sublicensees of such rights under this Agreement, will retain and may fully exercise all of their rights and elections under the Bankruptcy Code and any foreign counterpart thereto. The Parties further agree that upon commencement of a bankruptcy proceeding by or against a Party (the "**Bankrupt Party**") under the Bankruptcy Code, the other Party (the "**Non-Bankrupt Party**") will be entitled to a complete duplicate of, or complete access to (as the Non-Bankrupt Party deems appropriate), all such intellectual property and all embodiments of such intellectual property. Such intellectual property and all embodiments of such intellectual property will be promptly delivered to the Non-Bankrupt Party (a) upon any such commencement of a bankruptcy proceeding and upon written request by the Non-Bankrupt Party, unless the Bankrupt Party elects to continue to perform all of its obligations under this Agreement, or (b) if not delivered under clause (a) above, upon the rejection of this Agreement by or on behalf of the Bankrupt Party and upon written request by the Non-Bankrupt Party. The Bankrupt Party (in any capacity, including debtor-in-possession) and its successors and assigns (including any trustee) agree not to interfere with the exercise by the Non-Bankrupt Party or its Related Parties of its rights and licenses to such intellectual property and such embodiments of intellectual property in accordance with this Agreement, and agrees to assist the Non-Bankrupt Party and its Related Parties in obtaining such intellectual property and such embodiments of intellectual property in the possession or Control of Third Parties as are reasonably necessary or desirable for the Non-Bankrupt Party to exercise such rights and licenses in accordance with this Agreement. The foregoing provisions are without prejudice to any rights the Non-Bankrupt Party may have arising under the Bankruptcy Code or other Applicable Laws.

7.8 Exclusivity; Competing Programs.

7.8.1 Exclusivity.

7.8.1.1 Validation Targets. For each Validation Target, except as expressly permitted in accordance with this Agreement, each Party will not, alone or with any Affiliates or Third Parties, [***] directed to such Validation Target.

7.8.1.2 SERPINA1 Target. Except as expressly permitted in accordance with this Agreement, each Party will not, alone or with any Affiliates or Third Parties, [***].

7.8.1.3 GSK Collaboration Targets. For each GSK Collaboration Target, except as expressly permitted in accordance with this Agreement, each Party will not, alone or with any Affiliates or Third Parties, [***].

7.8.1.4 Wave Collaboration Targets. For each Wave Collaboration Target, except as expressly permitted in accordance with this Agreement, each Party will not, alone or with any Affiliates or Third Parties, [***].

7.8.2 Exceptions. The Parties hereby acknowledge and agree that (a) the restrictions set forth in Section 7.8.1 (Exclusivity) will not apply to [***].

7.8.3 Wave Change of Control. Notwithstanding Section 7.8.1 (Exclusivity), if a Change of Control occurs with respect to Wave or its parent Affiliate with an Acquirer, and the Acquirer (or any of such Acquirer's successors or assigns, other than Wave and its Affiliates as of the Change of Control) as of the Change of Control, or later, has a program or product (or rights thereto) that would otherwise violate Section 7.8.1 (Exclusivity) (each, a "**Wave COC Program**"), [***].

7.8.4 Wave Acquisition of a Third Party. In addition, notwithstanding Section 7.8.1 (Exclusivity), during the Term, if (a) Wave or its Affiliate acquires a Third Party (by merger, sale, consolidation, reorganization, or otherwise) so that such Third Party becomes an Affiliate over which Wave or its Affiliate has control, or (b) Wave or its Affiliate acquires all or substantially all of the assets of a Third Party (including any subsidiaries or divisions thereof) (each of (a) and (b), a "**Wave Acquisition**"), and, in each case, the Third Party (or any of such Third Party's Affiliates or any successors or assigns of such Third Party or such Third Party's Affiliates, other than Wave and its Affiliates as of the Wave Acquisition) already has, or the acquired assets contain, as applicable, a program or product that existed prior to the Wave Acquisition (a "**Wave Acquisition Program**") that would otherwise violate:

7.8.4.1 Section 7.8.1.1 (Validation Targets) or 7.8.1.2 (SERPINA1 Target), then Wave or such Affiliate [***] of the applicable Wave Acquisition, giving due consideration to ethical concerns and requirements under Applicable Law and any agreements with Third Parties;

7.8.4.2 Section 7.8.1.3 (GSK Collaboration Targets), then Wave's and its Affiliates' Development and Commercialization of such Wave Acquisition Program shall [***]; or

7.8.4.3 Section 7.8.1.4 (Wave Collaboration Targets), then Wave or such Affiliate will either [***], giving due consideration to ethical concerns and requirements under Applicable Law and any agreements with Third Parties.

7.8.5 GSK Change of Control. Notwithstanding Section 7.8.1 (Exclusivity), if a Change of Control occurs with respect to GSK or its parent Affiliate with an Acquirer, and the Acquirer (or any of such Third Party's successors or assigns, other than GSK and its Affiliates as of the Change of Control) as of the Change of Control, or later, has a program or product (or rights thereto) that would otherwise violate Section 7.8.1 (Exclusivity) (each, a "**GSK COC Program**"), then [***].

7.8.6 GSK Acquisition of a Third Party. In addition, notwithstanding Section 7.8.1 (Exclusivity), during the Term, if (a) GSK or its Affiliate acquires a Third Party (by merger, sale, consolidation, reorganization, or otherwise) so that such Third Party becomes an Affiliate over which GSK or its Affiliate has control, or (b) GSK or its Affiliate acquires all or substantially all of the assets of a Third Party (including any subsidiaries or divisions thereof) (each of (a) and (b), a "**GSK Acquisition**"), and, in each case, the Third Party (or any of such Third Party's Affiliates or any successors or assigns of such Third Party or such Third Party's Affiliates, other than GSK and its Affiliates as of the GSK Acquisition) already has, or the acquired assets contain, as applicable, a program or product that existed prior to the GSK Acquisition (a "**GSK Acquisition Program**") that would otherwise violate:

7.8.6.1 Section 7.8.1.1 (Validation Targets) or 7.8.1.2 (SERPINA1 Target), then GSK or such Affiliate will [***], giving due consideration to ethical concerns and requirements under Applicable Law and any agreements with Third Parties;

7.8.6.2 Section 7.8.1.3 (GSK Collaboration Targets), then GSK or such Affiliate will either:

(a) [***];

(b) [***] under this Agreement as soon as reasonably practicable, giving due consideration to ethical concerns and requirements under Applicable Law and any agreements with Third Parties, or

(c) [***] as soon as reasonably practicable, giving due consideration to ethical concerns and requirements under Applicable Law and any agreements with Third Parties.

7.8.6.3 Section 7.8.1.4 (Wave Collaboration Targets), then GSK's and its Affiliates' Development and Commercialization of such GSK Acquisition Program shall [***] *provided that*, for purposes of this Section 7.8.6.3, [***] under such GSK Acquisition Program.

8. INTELLECTUAL PROPERTY

8.1 Disclosure.

8.1.1 Subject to Section 8.1.2, each Party will promptly disclose to the other Party in writing, and will cause its Affiliates and subcontractors to so disclose, the conception, creation or discovery of any Collaboration Know-How.

8.1.2 Notwithstanding anything herein to the contrary, Wave may redact from documents provided or made available to GSK or its Affiliates, and otherwise decline to disclose or provide GSK access to, Confidential Information that is specifically directed to or otherwise pertaining to the Wave Platform Background Technology or Wave Platform Collaboration Technology; provided that in event that GSK or its Affiliates reasonably needs Confidential Information that is specifically directed to or otherwise pertaining to the Wave Platform Background Technology or Wave Platform Collaboration Technology due to a Material Safety Concern, intellectual property assertion or dispute with any Third Party, or as necessary to (i) complete any Regulatory submission or application in connection with a SERPINA1 Product or GSK Collaboration Product, (ii) fully respond to a request by any Regulatory Authority or any patent office in connection with a SERPINA1 Product or GSK Collaboration Product, or (iii) ensure that any transfer to GSK of manufacturing methods, processes and analytical methods pursuant to Section 6.4.1 or 6.4.2 is fully implemented, then Wave will promptly provide the relevant Confidential Information to GSK with respect to such SERPINA1 Product or GSK Collaboration Product (as applicable) and GSK will be entitled to use and disclose such Confidential Information solely for such permitted purpose; provided that GSK or its Affiliates shall not characterize any such Wave Platform Background Technology or Wave Platform Collaboration Technology without prior written consent from Wave, which consent shall not be unreasonably withheld, conditioned or delayed.

8.1.3 Notwithstanding anything herein to the contrary, GSK may redact from documents provided or made available to Wave or its Affiliates, and otherwise decline to disclose or provide Wave access to, Confidential Information that is specifically directed to or otherwise pertaining to the GSK CMC Platform Technology; provided that in event that Wave or its Affiliates reasonably needs Confidential Information that is specifically directed to or otherwise pertaining to the GSK CMC Platform Technology (a) in Wave's capacity as a Manufacturing Lead for a SERPINA1 Product or GSK Collaboration Product (as applicable), or (b) due to a Material Safety Concern, intellectual property assertion or dispute with any Third Party, or as necessary to fully respond to a request by any Regulatory Authority or any patent office in connection with a SERPINA1 Product or GSK Collaboration Product (as applicable), then GSK will promptly provide the relevant Confidential Information to Wave with respect to such SERPINA1 Product or GSK Collaboration Product (as applicable) and Wave will be entitled to use and disclose such Confidential Information solely for such permitted purpose; provided that Wave or its Affiliates shall not characterize any such GSK CMC Platform Technology without prior written consent from GSK, which consent shall not be unreasonably withheld, conditioned or delayed.

8.2 Ownership of Wave Platform Collaboration Technology, GSK Novel Target Collaboration Technology and GSK CMC Platform Collaboration Technology.

8.2.1 Subject to the license grants to GSK under this Agreement, as between the Parties, Wave or its Affiliates will own and retain, and owns and retains, all right, title and interest in and to all Wave Platform Collaboration Technology. Accordingly, GSK will promptly disclose to Wave in writing, the conception, creation, or the discovery, of any Wave Platform Collaboration Technology by or on behalf of GSK or its Affiliates. GSK, for itself and on

behalf of its Affiliates, hereby assigns (and to the extent such assignment can only be made in the future hereby agrees to assign) to Wave or Wave's Affiliates all its right, title and interest, including all right of priority, in and to any Wave Platform Collaboration Technology. GSK will cooperate, and will cause the foregoing persons and entities to cooperate, with Wave to effectuate and perfect the foregoing ownership, including by promptly executing and recording assignments and other documents consistent with such ownership.

8.2.2 Subject to the license grants by one Party to the other under this Agreement, as between the Parties, GSK or its Affiliates will own and retain, and owns and retains, all right, title and interest in and to all GSK Novel Target Collaboration Technology.

8.2.3 Subject to the license grants by one Party to the other under this Agreement, as between the Parties, GSK or its Affiliates will own and retain, and owns and retains, all right, title and interest in and to all GSK CMC Platform Collaboration Technology.

8.3 Ownership of Collaboration Program Technology; Joint Technology.

8.3.1 For each Target Validation Program, subject to the license grants by one Party to the other under this Agreement, as between the Parties, ownership of all Collaboration Program Technology related to a given Target Validation Program conceived, created or discovered, by or on behalf of either Party or its Affiliates either alone or jointly with Third Party(ies), or by the Parties or their Affiliates jointly under or in connection with this Agreement, whether or not conceived, created or discovered at a facility owned or controlled by such Party and whether or not patented or patentable (including any and all Patents and other intellectual property rights with respect thereto), will be determined [***] each Party will, and does hereby, assign, for itself and on behalf of its Affiliates to the other Party or its Affiliates, without additional compensation, any and all right, title and interest including any and all intellectual property rights, including any and all right of priority, in and to any Know-How and Patents, as is necessary to fully effect ownership as would have been determined under U.S. law. For each Target Validation Program, each Party acknowledges and agrees that such Party will not (a) prepare or file any Patent that Covers any Collaboration Program Technology related to a given Target Validation Program, or (b) disclose or use any data, results or information from a Target Validation Program in any Patent, in each case ((a)-(b)) unless and until the Validation Target in such Target Validation Program becomes a Collaboration Target for a GSK CP or Wave CP, as applicable.

8.3.2 For each GSK CP, subject to the license grants by one Party to the other under this Agreement, as between the Parties, all Collaboration Program Technology related to a given GSK CP conceived, created or discovered, by or on behalf of either Party or its Affiliates either alone or jointly with Third Party(ies), or by the Parties or their Affiliates jointly under or in connection with this Agreement, whether or not conceived, created or discovered at a facility owned or controlled by such Party and whether or not patented or patentable (including any and all Patents and other intellectual property rights with respect thereto), [***] and subject to the license grants in this Agreement, [***]. Each Party will, and does hereby, assign, for itself and on behalf of its Affiliates to the other Party or its Affiliates, without additional compensation, any and all right, title and interest including any and all intellectual property rights, including any and all right of priority, in and to any Joint Technology as well as any intellectual property rights with respect thereto, including

any right of priority, as is necessary to fully effect the joint ownership provided for in the foregoing sentence of this Section 8.3.2.

8.3.3 For the SERPINA1 Program, subject to the license grants by one Party to the other under this Agreement, as between the Parties, ownership of all Collaboration Program Technology related to the SERPINA1 Program conceived, created or discovered, by or on behalf of either Party or its Affiliates either alone or jointly with Third Party(ies), or by the Parties or their Affiliates jointly under or in connection with this Agreement, whether or not conceived, created or discovered at a facility owned or controlled by such Party and whether or not patented or patentable (including any and all Patents and other intellectual property rights with respect thereto), [***].

8.3.4 For each Wave CP, subject to the license grants by one Party to the other under this Agreement, as between the Parties, ownership of all Collaboration Program Technology related to a given Wave CP conceived, created or discovered, by or on behalf of either Party or its Affiliates either alone or jointly with Third Party(ies), or by the Parties or their Affiliates jointly under or in connection with this Agreement, whether or not conceived, created or discovered at a facility owned or controlled by such Party and whether or not patented or patentable (including any and all Patents and other intellectual property rights with respect thereto), [***].

8.4 Inventorship.

8.4.1 [***].

8.4.2 Notwithstanding anything to the contrary in this Agreement, each Party will have the right to invoke the America Invents Act Joint Research Agreement exception codified at 35 U.S.C. § 102(c) (the "**JRA Exception**") when exercising its rights under this Agreement, but only with prior written consent of the other Party in its sole discretion. In the event that a Party intends to invoke the JRA Exception, once agreed to by the other Party if required by the preceding sentence, it will notify the other Party and the other Party will cooperate and coordinate its activities with such Party with respect to any filings or other activities in support thereof. The Parties acknowledge and agree that this Agreement is a "joint research agreement" as defined in 35 U.S.C. § 100(h).

8.5 Exploitation of Joint Technology. Each Party or its Affiliates will exercise its ownership rights in and to the Joint Technology, including the right to license and sublicense or otherwise to exploit, transfer or encumber its ownership interest, without an accounting or obligation to, or consent required from, the other Party, but subject to Section 10 (Confidentiality) and the license grants under this Agreement. At the reasonable written request of a Party, the other Party will in writing grant such consents and confirm that no such accounting is required to effect the foregoing regarding Joint Technology.

8.6 No Implied Rights. No license, sublicense or other right is or will be created or granted hereunder by implication, estoppel or otherwise. Any licenses, sublicenses or rights will be granted only as expressly provided in this Agreement. Neither Party nor any of its Affiliates will use or practice any Know-How or Patents licensed or provided to such Party or any of its Affiliates outside the scope of or otherwise not in compliance with the rights and licenses granted to such Party and its Affiliates under this Agreement.

8.7 Prosecution and Maintenance.

8.7.1 SERPINA1 Specific Patents.

8.7.1.1 During the Term, Wave or its Affiliates will have the first right, but not the obligation, in consultation with the JPC, to Prosecute and Maintain in all jurisdictions in the Territory the SERPINA1 Specific Patents (the "**Lead SERPINA1 Patent Party**"). The Lead SERPINA1 Patent Party will [***]. The Lead SERPINA1 Patent Party will have lead responsibility and decision-making control for such Prosecution and Maintenance of the SERPINA1 Specific Patents. For clarity, (i) where the JPC is unable to reach consensus regarding any Prosecution and Maintenance related decision for a SERPINA1 Specific Patent, the Lead SERPINA1 Patent Party will have final decision-making authority with respect to such decision; and (ii) each Party will bear its own internal costs (i.e., those costs that are not Patent Costs) with respect to its Prosecution and Maintenance activities for the SERPINA1 Specific Patents.

8.7.1.2 In the event that the Lead SERPINA1 Patent Party elects not to Prosecute and Maintain in any country any SERPINA1 Specific Patent, such Lead SERPINA1 Patent Party will give the other Party at least [***] notice before any relevant deadline and provide to such other Party information it reasonably requests relating to the SERPINA1 Specific Patent, and such other Party will then have the right to request the Lead SERPINA1 Patent Party to continue the Prosecution and Maintenance of such SERPINA1 Specific Patent. [***].

8.7.1.3 Each Party will provide the other Party all reasonable assistance and cooperation in the Prosecution and Maintenance of the SERPINA1 Specific Patents in all respects, including providing any necessary powers of attorney and executing any other required documents or instruments for such Prosecution and Maintenance, as necessary to Prosecute and Maintain the SERPINA1 Specific Patents. Each Party will provide the other Party with copies of any documents it receives or prepares in connection with such Prosecution and Maintenance and will inform the other Party of the progress of it. Before filing in connection with such Prosecution and Maintenance any document with a patent office, each Party will provide a copy of the document to the other Party sufficiently in advance to enable the other Party to comment on it, and the first Party will give due consideration to such comments and will reasonably incorporate any of such comments in the first Party's filings or responses to the extent such comments are provided sufficiently in advance of any applicable filing deadlines. In particular, each Party agrees to provide the other Party with all information necessary or desirable to enable the other Party to comply with the duty of candor/duty of disclosure/duty of reasonable inquiry requirements of any patent authority.

8.7.1.4 The Parties will confer regarding the desirability of seeking in any country any patent term extension, supplemental patent certificate or related extension of rights with respect to the SERPINA1 Specific Patents. The Lead SERPINA1 Patent Party will have the sole right, but not the obligation, to apply for any such extension or supplemental patent certificate or related extension of rights with respect to the SERPINA1 Specific Patents. Neither Party will proceed with such an extension until the Parties have consulted with one another and agreed to a strategy therefor, provided that in the case where the Parties are unable to reach consensus, the Lead SERPINA1 Patent Party will have the final decision making

authority with respect to such decision, including whether or not to seek an extension for any SERPINA1 Specific Patent. Without limiting the foregoing, the Party that is not the Lead SERPINA1 Patent Party covenants that it will not seek patent term extensions, supplemental protection certificates, or similar rights or extensions for the SERPINA1 Specific Patents without the prior written consent of the Lead SERPINA1 Patent Party. Each Party will cooperate fully with and provide all reasonable assistance to the other Party and use all commercially reasonable efforts consistent with its obligations under Applicable Law (including any applicable consent order or decree) in connection with obtaining any such extensions for the SERPINA1 Specific Patents consistent with such strategy. To the extent reasonably and legally required in order to obtain any such extension in a particular country, each Party will make available to the other a copy of the necessary documentation to enable such other Party to use the same for the purpose of obtaining the extension in such country.

8.7.2 GSK CP Specific Patents.

8.7.2.1 GSK will have the first right, but not the obligation, in consultation with the JPC, to Prosecute and Maintain in all jurisdictions in the Territory the GSK CP Specific Patents. Subject to Section 8.7.2.2, GSK will bear one hundred percent (100%) of the Patent Costs for the GSK CP Specific Patents. GSK will have lead responsibility and decision-making control for such Prosecution and Maintenance of the GSK CP Specific Patents. For clarity, (i) where the JPC is unable to reach consensus regarding any Prosecution and Maintenance related decision for a GSK CP Specific Patent, GSK will have final decision-making authority with respect to such decision within the scope of the GSK CP Specific Patent; and (ii) each Party will bear its own internal costs (i.e., those costs that are not Patent Costs) with respect to its Prosecution and Maintenance activities for the GSK CP Specific Patents.

8.7.2.2 In the event that GSK elects not to Prosecute and Maintain in any country any GSK CP Specific Patent, GSK will give Wave at least [***] notice before any relevant deadline and provide to Wave information it reasonably requests relating to the GSK CP Specific Patent, and Wave will then have the right to assume responsibility, using patent counsel of its choice, for the Prosecution and Maintenance of such GSK CP Specific Patent. If Wave assumes responsibility for the Prosecution and Maintenance for any such GSK CP Specific Patent as set forth above, then (a) the Patent Costs incurred by Wave in the course of such Prosecution and Maintenance will thereafter be borne by Wave, and (b) if such GSK CP Specific Patent is in the Wave Technology, then (i) such Patent will thereafter be deemed to be a Wave Other Patent and (ii) GSK's license rights with respect to such Patent (and any continuation or divisional thereof) under Section 7.3 (GSK CPs) will become non-exclusive.

8.7.2.3 Each Party will provide the other Party all reasonable assistance and cooperation in the Prosecution and Maintenance of the GSK CP Specific Patents in all respects, including providing any necessary powers of attorney and executing any other required documents or instruments for such Prosecution and Maintenance, as necessary to Prosecute and Maintain the GSK CP Specific Patents. Each Party will provide the other Party with copies of any documents it receives or prepares in connection with such Prosecution and Maintenance and

will inform the other Party of the progress of it. Before filing in connection with such Prosecution and Maintenance any document with a patent office, each Party will provide a copy of the document to the other Party sufficiently in advance to enable the other Party to comment on it, and the first Party will give due consideration to such comments and will reasonably incorporate any of such comments in the first Party's filings or responses to the extent such comments are provided sufficiently in advance of any applicable filing deadlines. In particular, each Party agrees to provide the other Party with all information necessary or desirable to enable the other Party to comply with the duty of candor/duty of disclosure requirements of any patent authority.

8.7.2.4 The Parties will confer regarding the desirability of seeking in any country any patent term extension, supplemental patent certificate or related extension of rights with respect to the GSK CP Specific Patents. GSK will have the sole right, but not the obligation, to apply for any such extension or supplemental patent certificate or related extension of rights with respect to the GSK CP Specific Patents. Neither Party will proceed with such an extension until the Parties have consulted with one another and agreed to a strategy therefor, provided that in the case where the Parties are unable to reach consensus, GSK will have the final decision making authority with respect to such decision, including whether or not to seek an extension for any GSK CP Specific Patent. Without limiting the foregoing, Wave covenants that it will not seek patent term extensions, supplemental protection certificates, or similar rights or extensions for the GSK CP Specific Patents without the prior written consent of GSK. Each Party will cooperate fully with and provide all reasonable assistance to the other Party and use all commercially reasonable efforts consistent with its obligations under Applicable Law (including any applicable consent order or decree) in connection with obtaining any such extensions for the GSK CP Specific Patents consistent with such strategy. To the extent reasonably and legally required in order to obtain any such extension in a particular country, each Party will make available to the other a copy of the necessary documentation to enable such other Party to use the same for the purpose of obtaining the extension in such country.

8.7.3 Wave CP Specific Patents.

8.7.3.1 Wave will have the first right, but not the obligation, in consultation with the JPC, to Prosecute and Maintain in all jurisdictions in the Territory the Wave CP Specific Patents. Subject to Section 8.7.3.2, Wave will bear one hundred percent (100%) of the Patent Costs for the Wave CP Specific Patents. Wave will have lead responsibility and decision-making control for such Prosecution and Maintenance of the Wave CP Specific Patents. For clarity, (i) where the JPC is unable to reach consensus regarding any Prosecution and Maintenance related decision for a Wave CP Specific Patent, Wave will have final decision-making authority with respect to such decision; and (ii) each Party will bear its own internal costs (i.e., those costs that are not Patent Costs) with respect to its Prosecution and Maintenance activities for the Wave CP Specific Patents.

8.7.3.2 In the event that Wave elects not to Prosecute and Maintain in any country any Wave CP Specific Patent, Wave will give GSK at least [***] notice before any relevant deadline and provide to GSK information it reasonably requests relating to the Wave CP Specific Patent, and GSK will then have the right to assume

responsibility, using patent counsel of its choice, for the Prosecution and Maintenance of such Wave CP Specific Patent. If GSK assumes responsibility for the Prosecution and Maintenance for any such Wave CP Specific Patent as set forth above, then (a) the Patent Costs incurred by GSK in the course of such Prosecution and Maintenance will thereafter be borne by GSK, and (b) if such Wave CP Specific Patent is in the GSK Technology, then (i) such Patent will thereafter be deemed to be a GSK Other Patent and (ii) Wave's license rights with respect to such Patent (and any continuation or divisional thereof) under Section 7.4 (Wave CPs) will become non-exclusive.

8.7.3.3 Each Party will provide the other Party all reasonable assistance and cooperation in the Prosecution and Maintenance of the Wave CP Specific Patents in all respects, including providing any necessary powers of attorney and executing any other required documents or instruments for such Prosecution and Maintenance, as necessary to Prosecute and Maintain the Wave CP Specific Patents. Each Party will provide the other Party with copies of any documents it receives or prepares in connection with such Prosecution and Maintenance and will inform the other Party of the progress of it. Before filing in connection with such Prosecution and Maintenance any document with a patent office, each Party will provide a copy of the document to the other Party sufficiently in advance to enable the other Party to comment on it, and the first Party will give due consideration to such comments and will reasonably incorporate any of such comments in the first Party's filings or responses to the extent such comments are provided sufficiently in advance of any applicable filing deadlines. In particular, each Party agrees to provide the other Party with all information necessary or desirable to enable the other Party to comply with the duty of candor/duty of disclosure requirements of any patent authority.

8.7.3.4 The Parties will confer regarding the desirability of seeking in any country any patent term extension, supplemental patent certificate or related extension of rights with respect to the Wave CP Specific Patents. Wave will have the sole right, but not the obligation, to apply for any such extension or supplemental patent certificate or related extension of rights with respect to the Wave CP Specific Patents. Neither Party will proceed with such an extension until the Parties have consulted with one another and agreed to a strategy therefor, provided that in the case where the Parties are unable to reach consensus, Wave will have the final decision making authority with respect to such decision, including whether or not to seek an extension for any Wave CP Specific Patent. Without limiting the foregoing, GSK covenants that it will not seek patent term extensions, supplemental protection certificates, or similar rights or extensions for the Wave CP Specific Patents without the prior written consent of Wave. Each Party will cooperate fully with and provide all reasonable assistance to the other Party and use all commercially reasonable efforts consistent with its obligations under Applicable Law (including any applicable consent order or decree) in connection with obtaining any such extensions for the Wave CP Specific Patents consistent with such strategy. To the extent reasonably and legally required in order to obtain any such extension in a particular country, each Party will make available to the other a copy of the necessary documentation to enable such other Party to use the same for the purpose of obtaining the extension in such country.

8.7.4 Wave Platform Technology Patents. As between the Parties, Wave will have the sole right and authority, at its sole cost and expense, with respect to the Prosecution and Maintenance of all Wave Platform Technology Patents.

8.7.5 GSK Other Patents. As between the Parties, GSK will have the sole right and authority, at its sole cost and expense, with respect to the Prosecution and Maintenance of all GSK Other Patents.

8.7.6 Wave Other Patents. As between the Parties, Wave will have the sole right and authority, at its sole cost and expense, with respect to the Prosecution and Maintenance of all Wave Other Patents.

8.7.7 Additional Provisions. The Parties acknowledge and agree that, except with respect to GSK Background Patents and Wave Background Patents that exists prior to the date that a Target is added to the Target List, neither Party will Prosecute or Maintain any Patent that Covers (a) a Target on a Target List or (b) a Validation Target, in each case ((a)-(b)) until such Target or Validation Target becomes a GSK Collaboration Target or Wave Collaboration Target or a Declined Target, as applicable, in accordance with Section 3.4.9 (Advancement to Collaboration Program).

8.7.8 Third Party Patent Challenges. Subject to Section 8.10 (Patent Challenges by Third Parties), the Parties agree that if a Third Party files a Third Party Patent Challenge in front of a patent office against any Patents that are Prosecuted and Maintained in accordance with this Section, the Parties shall defend such Patent in accordance with this Section, provided that if a Party requests assistance from the other Party with the defense, the Party that requests the assistance shall pay the cost and expenses incurred by the other Party for providing the requested assistance, which assistance shall not be unreasonably withheld, conditioned or delayed.

8.7.9 Consent for Characterization. Notwithstanding anything to the contrary set forth in this Agreement, during the Prosecution and Maintenance in accordance with this Section 8.7 (Prosecution and Maintenance), (i) a Party or its Affiliates shall not characterize any disclosures, actions or inactions, e.g., publications, Patents, sale, offer for sale, etc., of the other Party without prior written consent from the other Party, which consent shall not be unreasonably withheld, conditioned or delayed; (ii) GSK or its Affiliates shall not characterize any Wave Technology without prior written consent from Wave, which consent shall not be unreasonably withheld, conditioned or delayed; and (iii) Wave or its Affiliates shall not characterize any GSK Technology without prior written consent from GSK, which consent shall not be unreasonably withheld, conditioned or delayed.

8.8 Enforcement.

8.8.1 Notification. On a Collaboration Program-by-Collaboration Program basis, the Parties will promptly notify each other, through the JSC, JDC and the JPC, of any actual, threatened or alleged infringement by a Third Party of the SERPINA1 Specific Patents, GSK CP Specific Patents or Wave CP Specific Patents with respect to any Third Party products targeting, modulating or otherwise directed to the Collaboration Target for such Collaboration Program in the Territory (a "**Competitive Infringement**"). A notice under 42 U.S.C. 262(l) (however such section may be amended from time to time during the Term) with respect to a Collaboration Compound or Collaboration Product will be deemed to describe an act of Competitive Infringement, regardless of its content. As permitted by

Applicable Law, each Party will promptly notify the other Party in writing, through the JSC, JDC and the JPC, of any such Competitive Infringement of which it becomes aware, and will provide evidence in such Party's possession demonstrating such Competitive Infringement. In particular, each Party will notify and provide the other Party with copies of any allegations of patent invalidity, unenforceability or non-infringement of any SERPINA1 Specific Patents, GSK Specific Patents or Wave Specific Patents Covering a Collaboration Compound or Collaboration Product (including methods of use or manufacture thereof). The JPC will discuss in good faith strategies for abating such Competitive Infringement. Such notification and copies will be provided by the Party receiving such certification to the JPC as soon as practicable and, unless prohibited by Applicable Law, at least within [***] after the receiving Party receives such certification.

8.8.2 SERPINA1 Specific Patents.

8.8.2.1 GSK will have the first right, but not the obligation, to bring and control, at its cost and expense, an appropriate suit or other action before any government or private tribunal against any person or entity allegedly engaged in any Competitive Infringement of any SERPINA1 Specific Patent ("**SERPINA1 Infringement Action**") to remedy such Competitive Infringement (or to settle or otherwise secure the abatement of such Competitive Infringement). The foregoing right of GSK will include the right to perform all actions of a reference product sponsor set forth in 42 U.S.C. § 262(l). Wave will have the right, at its own cost and expense and by counsel of its choice, to be represented in (but not control) any SERPINA1 Infringement Action. At GSK's request, Wave will join any SERPINA1 Infringement Action as a party (all at GSK's cost and expense) if doing so is necessary for the purposes of establishing standing or is otherwise required by Applicable Law to pursue such action. GSK will have a period of [***] after its receipt or delivery of notice and evidence pursuant to Section 8.8.1 (Notification) to elect to so enforce such SERPINA1 Specific Patents in the applicable jurisdiction to remedy the Competitive Infringement (or to settle or otherwise secure the abatement of such Competitive Infringement), provided, however, that such period will be more than [***] to the extent Applicable Law prevents earlier enforcement of such SERPINA1 Specific Patents (such as the enforcement process set forth in 42 U.S.C. § 262(l)) and such period will be less than [***] to the extent that a delay in bringing an action to enforce the applicable SERPINA1 Specific Patents against such alleged Third Party infringer would limit or compromise the remedies (including monetary and injunctive relief) available against such alleged Third Party infringer. In the event GSK does not so elect to remedy the Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement) within the aforementioned period of time or [***] before the time limit, if any, for the filing of a SERPINA1 Infringement Action, whichever is sooner, it will so notify Wave in writing and in the case where Wave then desires to commence a suit or take action to enforce the applicable SERPINA1 Specific Patents with respect to such Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement) in the applicable jurisdiction, the Parties will confer and, upon GSK's prior written consent (not to be unreasonably withheld, conditioned or delayed), Wave will have the right to commence such a suit or take such action to enforce the applicable SERPINA1 Specific Patents with respect to such Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement), at Wave's cost and expense. Each

Party will provide to the Party enforcing any such rights under this Section 8.8.2.1 reasonable assistance in such enforcement, at such enforcing Party's request and cost and expense, including joining such action as a party plaintiff if required by Applicable Law to pursue such action. The enforcing Party will keep the other Party regularly informed of the status and progress of such enforcement efforts, and will reasonably consider the other Party's comments on any such efforts.

8.8.2.2 Without the prior written consent of the other Party (not to be unreasonably withheld, conditioned or delayed), neither Party will settle any SERPINA1 Infringement Action in any manner that would adversely affect a SERPINA1 Specific Patent; provided, that GSK will have the right to grant (sub)licenses under the SERPINA1 Specific Patents in its sole discretion and Wave will reasonably cooperate with such efforts (including by granting any license to GSK to effect the same) or that would limit or restrict the ability of GSK (or its Affiliates or its or their Sublicensees, as applicable) to sell SERPINA1 Products anywhere in the Territory.

8.8.2.3 A Party bringing a SERPINA1 Infringement Action under this Section 8.8.2 (SERPINA1 Specific Patents) against any Third Party engaged in Competitive Infringement of the SERPINA1 Specific Patents will be solely responsible for any costs and expenses incurred by such Party as a result of such SERPINA1 Infringement Action. If such Party recovers monetary damages from such Third Party in such SERPINA1 Infringement Action, such recovery [***].

8.8.3 GSK CP Specific Patents.

8.8.3.1 GSK will have the first right, but not the obligation, to bring and control, at its cost and expense, an appropriate suit or other action before any government or private tribunal against any person or entity allegedly engaged in any Competitive Infringement of any GSK CP Specific Patent ("**GSK CP Infringement Action**") to remedy such Competitive Infringement (or to settle or otherwise secure the abatement of such Competitive Infringement). The foregoing right of GSK will include the right to perform all actions of a reference product sponsor set forth in 42 USC 262(l). Wave will have the right, at its own cost and expense and by counsel of its choice, to be represented in (but not control) any GSK CP Infringement Action. At GSK's request, Wave will join any GSK CP Infringement Action as a party (all at GSK's cost and expense) if doing so is necessary for the purposes of establishing standing or is otherwise required by Applicable Law to pursue such action. GSK will have a period of [***] after its receipt or delivery of notice and evidence pursuant to Section 8.8.1 (Notification) to elect to so enforce such GSK CP Specific Patents in the applicable jurisdiction to remedy the Competitive Infringement (or to settle or otherwise secure the abatement of such Competitive Infringement), provided, however, that such period will be more than [***] to the extent Applicable Law prevents earlier enforcement of such GSK CP Specific Patents (such as the enforcement process set forth in 42 U.S.C. § 262(l)) and such period will be less [***] to the extent that a delay in bringing an action to enforce the applicable GSK CP Specific Patents against such alleged Third Party infringer would limit or compromise the remedies (including monetary and injunctive relief) available against such alleged Third Party infringer. In the event GSK does not so elect

to remedy the Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement) within the aforementioned period of time or [***] before the time limit, if any, for the filing of a GSK CP Infringement Action, whichever is sooner, it will so notify Wave in writing and in the case where Wave then desires to commence a suit or take action to enforce the applicable GSK CP Specific Patents with respect to such Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement) in the applicable jurisdiction, the Parties will confer and, upon GSK's prior written consent (not to be unreasonably withheld, conditioned or delayed), Wave will have the right to commence such a suit or take such action to enforce the applicable GSK CP Specific Patents with respect to such Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement), at Wave's cost and expense. Each Party will provide to the Party enforcing any such rights under this Section 8.8.3.1 reasonable assistance in such enforcement, at such enforcing Party's request and cost and expense, including joining such action as a party plaintiff if required by Applicable Law to pursue such action. The enforcing Party will keep the other Party regularly informed of the status and progress of such enforcement efforts, and will reasonably consider the other Party's comments on any such efforts.

8.8.3.2 Without the prior written consent of the other Party (not to be unreasonably withheld, conditioned or delayed), neither Party will settle any GSK CP Infringement Action in any manner that would adversely affect a GSK CP Specific Patent; provided, that GSK will have the right to grant (sub)licenses under the GSK CP Specific Patents in its sole discretion and Wave will reasonably cooperate with such efforts (including by granting any license to GSK to effect the same) or that would limit or restrict the ability of GSK (or its Affiliates or its or their Sublicensees, as applicable) to sell GSK Collaboration Products anywhere in the Territory.

8.8.3.3 A Party bringing a GSK CP Infringement Action under this Section 8.8.3 (GSK CP Specific Patents) against any Third Party engaged in Competitive Infringement of the GSK CP Specific Patents will be solely responsible for any costs and expenses incurred by such Party as a result of such GSK CP Infringement Action. If such Party recovers monetary damages from such Third Party in such GSK CP Infringement Action, such recovery will [***].

8.8.4 Wave CP Specific Patents.

8.8.4.1 Wave will have the first right, but not the obligation, to bring and control, at its cost and expense, an appropriate suit or other action before any government or private tribunal against any person or entity allegedly engaged in any Competitive Infringement of any Wave CP Specific Patent ("**Wave CP Infringement Action**") to remedy such Competitive Infringement (or to settle or otherwise secure the abatement of such Competitive Infringement). The foregoing right of Wave will include the right to perform all actions of a reference product sponsor set forth in 42 U.S.C. § 262(l). GSK will have the right, at its own cost and expense and by counsel of its choice, to be represented in (but not control) any Wave CP Infringement Action. At Wave's request, GSK will join any Wave CP Infringement Action as a party (all at Wave's cost and expense) if doing so is necessary for the purposes of establishing standing or is

otherwise required by Applicable Law to pursue such action. Wave will have a period of [***] after its receipt or delivery of notice and evidence pursuant to Section 8.8.1 (Notification) to elect to so enforce such Wave CP Specific Patents in the applicable jurisdiction to remedy the Competitive Infringement (or to settle or otherwise secure the abatement of such Competitive Infringement), provided, however, that such period will be more than [***] to the extent Applicable Law prevents earlier enforcement of such Wave CP Specific Patents (such as the enforcement process set forth in 42 U.S.C. § 262(l)) and such period will be less than [***] days to the extent that a delay in bringing an action to enforce the applicable Wave CP Specific Patents against such alleged Third Party infringer would limit or compromise the remedies (including monetary and injunctive relief) available against such alleged Third Party infringer. In the event Wave does not so elect to remedy the Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement) within the aforementioned period of time or [***] before the time limit, if any, for the filing of a Wave CP Infringement Action, whichever is sooner, it will so notify GSK in writing and in the case where GSK then desires to commence a suit or take action to enforce the applicable Wave CP Specific Patents with respect to such Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement) in the applicable jurisdiction, the Parties will confer and, upon Wave's prior written consent (not to be unreasonably withheld, conditioned or delayed), GSK will have the right to commence such a suit or take such action to enforce the applicable Wave CP Specific Patents with respect to such Competitive Infringement (or settle or otherwise secure the abatement of such Competitive Infringement), at GSK's cost and expense. Each Party will provide to the Party enforcing any such rights under this Section 8.8.4.1 reasonable assistance in such enforcement, at such enforcing Party's request and cost and expense, including joining such action as a party plaintiff if required by Applicable Law to pursue such action. The enforcing Party will keep the other Party regularly informed of the status and progress of such enforcement efforts, and will reasonably consider the other Party's comments on any such efforts.

8.8.4.2 Without the prior written consent of the other Party (not to be unreasonably withheld, conditioned or delayed), neither Party will settle any Wave CP Infringement Action in any manner that would adversely affect a Wave CP Specific Patent; provided, that Wave will have the right to grant (sub)licenses under the Wave CP Specific Patents in its sole discretion and GSK will reasonably cooperate with such efforts (including by granting any license to Wave to effect the same) or that would limit or restrict the ability of Wave (or its Affiliates or its or their Sublicensees, as applicable) to sell Wave Collaboration Products anywhere in the Territory.

8.8.4.3 A Party bringing a Wave CP Infringement Action under this Section 8.8.4 (Wave CP Specific Patents) against any Third Party engaged in Competitive Infringement of the Wave CP Specific Patents will be solely responsible for any costs and expenses incurred by such Party as a result of such Wave CP Infringement Action. If such Party recovers monetary damages from such Third Party in such Wave CP Infringement Action, such recovery will [***].

8.8.5 Wave Platform Technology Patents. As between the Parties, Wave will have the sole right and authority, at its sole cost and expense, to enforce all Wave Platform Technology Patents.

8.8.6 GSK Other Patents. As between the Parties, GSK will have the sole right and authority, at its sole cost and expense, to enforce all GSK Other Patents.

8.8.7 Wave Other Patents. As between the Parties, Wave will have the sole right and authority, at its sole cost and expense, to enforce all Wave Other Patents.

8.8.8 Assistance. A party shall have the right to request assistance from the other Party with an enforcement in this Section. If a Party requests assistance from the other Party, it shall pay all the cost and expenses incurred by the other Party for providing the requested assistance, which assistance shall not be unreasonably withheld, conditioned or delayed.

8.8.9 Consent for Characterization. Notwithstanding anything to the contrary set forth in this Agreement, for any enforcement in this Section (including defense of any claims that is or is to be enforced) (i) a Party or its Affiliates shall not characterize any disclosures, actions or inactions, e.g., publications, Patents, sale, offer for sale, etc., of the other Party without prior written consent from the other Party, which consent shall not be unreasonably withheld, conditioned or delayed; (ii) GSK or its Affiliates shall not characterize any Wave Technology without prior written consent from Wave, which consent shall not be unreasonably withheld, conditioned or delayed; and (iii) Wave or its Affiliates shall not characterize any GSK Technology without prior written consent from GSK, which consent shall not be unreasonably withheld, conditioned or delayed.

8.9 Third Party Rights.

8.9.1 Notification. For a given Collaboration Program, the Parties will promptly notify each other of any written allegation that any activity pursuant to this Agreement relating to such Collaboration Program infringes or misappropriates the Patent rights of any Third Party. In addition, the Parties will notify each other if either Party desires to challenge, obtain a license or otherwise pursue a defense or settlement with respect to any Third Party Patent that may be considered to Cover Collaboration Compounds or Collaboration Products or their Manufacture or use for such Collaboration Program.

8.9.2 SERPINA1 Program. [***] Wave will have the sole right to seek a license with respect to any Patent or Know-How owned or controlled by a Third Party that Covers any SERPINA1 Compound or SERPINA1 Product or their Manufacture or use.

8.9.3 GSK CP Programs. As between the Parties, GSK will have the sole right to seek a license, at its cost and expense, with respect to any Patent owned or controlled by a Third Party that Covers any GSK Collaboration Compound or GSK Collaboration Product or their Manufacture or use.

8.9.4 Wave CP Programs. As between the Parties, Wave will have the sole right to seek a license, at its cost and expense, with respect to any Patent owned or controlled by a Third Party that Covers any Wave Collaboration Compound or Wave Collaboration Product or their Manufacture or use.

8.9.5 Defense. Notwithstanding the foregoing, in the case a claim of infringement of a Patent is brought against a Party in a suit or other action or proceeding with respect to any Third Party Patent under Section 8.9.1 (Notification), such Party will have the right, at its own cost and expense and by counsel of its own choice, to prosecute and defend any such claim in such suit or other action or proceeding. If both Parties are named, the Parties will meet and determine who is best situated to lead any such suit or other action or proceeding.

8.9.6 Settlement. Without the prior written consent of the other Party (not to be unreasonably withheld, conditioned or delayed), neither Party will settle any claim under this Section 8.9 (Third Party Rights) in any manner that would impose any material obligations, restriction or limitation on the other Party.

8.9.7 Challenge. Should either Party identify any Third Party Patent that it considers potentially relevant to a Collaboration Compound or Collaboration Product, or any Exploitation thereof, then that Party shall promptly notify the other Party of such Third Party Patent. As between the Parties, the Party (the **"Challenging Party**") that has the right and responsibility of Commercialization for the relevant Collaboration Compound or Collaboration Product shall have the first right to bring a Patent Challenge against such Third Party Patent outside of an enforcement action by the Third Party against the Challenging Party, using counsel of its choice and at its own cost and expenses. Should a Challenging Party initiate such a Patent Challenge, then the other Party shall have a right, upon request, to review and provide input on any written submissions in the Patent Challenge, which input shall be considered in good faith by the Challenging Party. Should the Challenging Party request other assistance from the other Party, then the Challenging Party shall pay the cost and expenses incurred by the other Party for providing the requested assistance, which assistance shall not be unreasonably withheld, conditioned or delayed. The Parties agree that in any actions related to a Third Party right including challenging Third Party Patents, (i) a Party or its Affiliates shall not characterize any disclosures, actions or inactions, e.g., publications, Patents, sale, offer for sale, etc., of the other Party without prior written consent from the other Party, which consent shall not be unreasonably withheld, conditioned or delayed; (ii) GSK or its Affiliates shall not characterize any Wave Technology without prior written consent from Wave, which consent shall not be unreasonably withheld, conditioned or delayed; and (iii) Wave or its Affiliates shall not characterize any GSK Technology without prior written consent from GSK, which consent shall not be unreasonably withheld, conditioned or delayed.

8.9.8 Cooperation. The Parties will reasonably cooperate with one another in prosecuting or defending any action pursuant to this Section 8.9 (Third Party Rights).

8.10 Patent Challenges by Third Parties.

8.10.1 Notification. The Parties will promptly notify each other in the event that any Third Party files, or threatens to file, any Third Party Patent Challenge against any Patent within the GSK Technology or Wave Technology.

8.10.2 Responsibility. In the event of a Third Party Patent Challenge against any Patent within the GSK Technology or Wave Technology, as between the Parties:

8.10.2.1 if such a Patent Challenge is brought by a Third Party defendant and is related to an enforcement action, the Parties shall defend against such a Patent Challenge in accordance with Section 8.8 (Enforcement);

8.10.2.2 if such a Patent Challenge is brought by a Third Party in front of a forum other than a patent office, the Parties shall defend against such a Patent Challenge in accordance with Section 8.8 (Enforcement); and

8.10.2.3 if such a Patent Challenge is brought by a Third Party in front of a patent office and is not related to an enforcement action, or is brought by a Third Party anonymously, the Parties shall defend against such a Patent Challenge in accordance with Section 8.7 (Prosecution and Maintenance).

8.11 Personnel Obligations. Prior to receiving any Confidential Information or beginning work under a Collaboration Program, each employee, agent or independent contractor of GSK or Wave or of either Party's respective Affiliates will be bound in writing by non-disclosure and invention assignment obligations which are consistent with the obligations of GSK or Wave under this Agreement (provided that where necessary in the case of a Third Party (i) such Third Party will agree to grant GSK or Wave, as the case may be, an exclusive license with the right to grant sublicenses with respect to resulting inventions and Patents; provided that such obligation to obtain ownership or an exclusive license will not apply to any improvements to the proprietary core or platform technology owned or in-licensed by such Third Party unless such improvements are necessary or reasonably useful to Develop, Manufacture or Commercialize Collaboration Compounds or Collaboration Products with respect to which such Third Party conducted its activities under such contract; and (ii) the period of time with respect to non-disclosure obligations may be shorter, if customary).

8.12 Further Action. Each Party will, upon the reasonable request of the other Party, provide such assistance and execute such documents as are reasonably necessary for such Party to exercise its rights and perform its obligations pursuant to this Section 8 (Intellectual Property); provided, however, that neither Party will be required to take any action pursuant to this Section 8 (Intellectual Property) that such Party reasonably determines in its sole judgment and discretion conflicts with or violates any applicable court or government order or decree or Applicable Law.

9. PAYMENTS

9.1 Upfront Payment. In partial consideration of Wave's grant of the rights and licenses to GSK hereunder, GSK will pay a total of One Hundred Twenty Million Dollars ($120,000,000), consisting of [***] (the proportionate allocation of this payment between Wave UK and Wave US, the "**Wave Ratio**"), such payment to be made within [***] following GSK's receipt of an invoice from each of Wave US and Wave UK (which invoice may be delivered on or after the Effective Date). Each such payment will be non-refundable, non-creditable, and not subject to set-off.

9.2 Equity Investment. Glaxo Group Limited and Wave Singapore will enter into the Equity Agreements as of the Execution Date. Both Parties acknowledge that in partial consideration of the rights granted to GSK under this Agreement, pursuant to and in accordance with the terms of the Share Purchase Agreement, an Affiliate of GSK will purchase ordinary shares of Wave Singapore at a premium for an aggregate price of Fifty Million Dollars ($50,000,000).

9.3 Target Validation Programs.

9.3.1 Research Term Extension Fees. In the event GSK elects to extend the Research Term for the First Research Term Extension Period, GSK will pay a fee of [***] (the "**First Research Term Extension Fee**") to Wave no later than [***] after providing written notice of such election pursuant to Section 3.2.2(a) (First Research Term Extension Period)

and after receipt of an invoice from Wave UK and Wave US. In the event the Parties [***] the Research Term for the Second Research Term Extension Period, GSK will pay a fee of [***] (the "**Second Research Term Extension Fee**") to Wave no later than [***] after the date [***] to extend the Research Term for the Second Research Term Extension Period pursuant to Section 3.2.3(a) (Second Research Term Extension Period) after receipt of an invoice from Wave UK and Wave US. The First Research Term Extension Fee and the Second Research Term Extension Fee will be allocated between Wave UK and Wave US in accordance with the Wave Ratio.

9.3.2 **Prepaid Research**. GSK will pay Wave US and Wave UK, in accordance with the Wave Ratio, a total of [***] to fund an account (the "**Prepaid Research Account**") as a prepayment for Wave's costs and expenses to conduct its activities with respect to Target Validation Programs, such payment to be made [***] following the Effective Date and GSK's receipt of an invoice from each of Wave US and Wave UK. [***] during the Research Term, the Parties will meet to determine the amount needed to replenish the Prepaid Research Account [***]. After the Parties determine the amount needed to replenish the Prepaid Research Account, Wave UK and Wave US will submit an invoice to GSK and GSK will pay the applicable Wave Parties within [***] after receipt of such invoice. [***].

9.4 GSK Collaboration Program Initiation Fee. On a Target Validation Program-by-Target Validation Program basis, GSK will pay a fee of [***] to convert such Target Validation Program to a GSK Collaboration Program (each, a "**GSK Collaboration Program Initiation Fee**"). Upon the occurrence of an event under either Section 3.4.9.4 or 3.4.9.5 giving rise to a payment of a GSK Collaboration Program Initiation Fee, Wave UK and Wave US will submit an invoice to GSK for such GSK Collaboration Program Initiation Fee. GSK will pay the GSK Collaboration Program Initiation Fee with respect to a given Target Validation Program no later than [***] after receipt of an invoice from Wave UK and Wave US for such GSK Collaboration Program Initiation Fee. Each GSK Collaboration Program Initiation Fee payment will be non-refundable, non-creditable, and not subject to set-off.

9.5 Development Expenses.

9.5.1 **SERPINA1 Program Expenses**. Wave will be responsible for [***].

9.5.2 **GSK Collaboration Program Expenses**. Wave will be responsible for [***]. GSK will be responsible for [***]. [***] in accordance with Section 9.9 (Other Amounts Payable) for all such costs and expenses, if any, [***].

9.5.3 **Wave Collaboration Program Expenses**. Wave will be responsible for one hundred percent (100%) of all costs and expenses incurred by Wave for the performance of the Wave CPs.

9.6 Development Milestones.

9.6.1 **SERPINA1 Development Milestone Payments**. GSK will make the one-time (except as provided below) milestone payments set forth in Table 9.6.1 below (each, a "**SERPINA1 Development Milestone Payment**") to Wave in accordance with Section 9.6.3.3 upon the first achievement of each development or regulatory milestone event set forth in Table 9.6.1 (each, a "**SERPINA1 Development Milestone Event**") by a SERPINA1 Product.

Table 9.6.1 – SERPINA1 Development Milestones	
SERPINA1 Development Milestone Event	***SERPINA1 Development Milestone Payment***
[***]	[***]

9.6.2 **GSK Collaboration Products Development Milestone Payments**. On a GSK Collaboration Target-by-GSK Collaboration Target basis, GSK will make the one-time (except as provided below) milestone payments in Table 9.6.2 below (each, a "**GSK Collaboration Development Milestone Payment**," and together with SERPINA1 Development Milestone Payments, a "**Development Milestone Payment**") to Wave in accordance with Section 9.6.3.6 upon the first achievement of each development and regulatory milestone event (each, a "**GSK Collaboration Development Milestone Event**" and together with the SERPINA1 Development Milestone Events, a "**Development Milestone Event**") by a GSK Collaboration Product directed to each GSK Collaboration Target.

Table 9.6.2 **– GSK Collaboration Development Milestones**		
GSK Collaboration Development Milestone Event	***Development Milestone Payment for GSK Collaboration Program [***]***	***Development Milestone Payment for GSK Collaboration Program [***]***
[***]	[***]	[***]

9.6.3 **Additional Development Milestone Terms**. Notwithstanding the foregoing, for the purpose of construing the Development Milestone Payments specified in Table 9.6.1 or Table 9.6.2 above:

9.6.3.1 Each SERPINA1 Development Milestone Payment will be payable only once on the first achievement of the applicable SERPINA1 Development Milestone Event by a SERPINA1 Product, notwithstanding the number of times one or more SERPINA1 Products may achieve any such SERPINA1 Development Milestone Event.

9.6.3.2 If any given SERPINA1 Development Milestone Payment is due with respect to a SERPINA1 Product and one or more previous SERPINA1 Development Milestone Payments with respect to such SERPINA1 Product that would reasonably have been anticipated to precede such SERPINA1 Development Milestone Payment for the achievement of SERPINA1 Development Milestone Events have not been paid for any reason, then payment of all such preceding unpaid SERPINA1 Development Milestone Payments with respect to such SERPINA1 Product will be due at such time as well.

9.6.3.3 Wave will provide written notice to GSK of the achievement of [***] after such achievement. After receipt of such notice, Wave UK and

Wave US will submit an invoice to GSK for the corresponding Development Milestone Payment; *provided that* unless otherwise determined by Wave in its sole discretion, [***]. GSK will make the corresponding Development Milestone Payment to the applicable Wave Party or Wave Parties within [***] after receipt of such invoice.

9.6.3.4 Each GSK Collaboration Development Milestone Payment will be payable only once with respect to a specified GSK Collaboration Target, on the first achievement of the applicable GSK Collaboration Development Milestone Event by a GSK Collaboration Product directed to such GSK Collaboration Target, notwithstanding the number of times one or more GSK Collaboration Products directed to the same such GSK Collaboration Target may achieve any such GSK Collaboration Development Milestone Event.

9.6.3.5 If, for a GSK Collaboration Target, any given GSK Collaboration Development Milestone Payment is due with respect to such GSK Collaboration Target and one or more previous GSK Collaboration Development Milestone Payments with respect to such GSK Collaboration Target that would reasonably have been anticipated to precede such GSK Collaboration Development Milestone Payment for the achievement of GSK Collaboration Development Milestone Events have not been paid for any reason, then payment of all such preceding unpaid GSK Collaboration Development Milestone Payments with respect to such GSK Collaboration Target will be due at such time as well.

9.6.3.6 GSK will provide Wave with written notice of its achievement of each GSK Collaboration Development Milestone Event within [***] after such achievement. After receipt of such notice, Wave UK and Wave US will submit an invoice to GSK for the corresponding GSK Collaboration Development Milestone Payment; *provided that* unless otherwise determined by Wave in its sole discretion, (a) [***]. GSK will make the corresponding Development Milestone Payment to the applicable Wave Party or Wave Parties within [***] after receipt of such invoice.

9.7 Sales Milestones.

9.7.1 GSK Sales Milestones.

9.7.1.1 SERPINA1 Product Sales Milestone Payments. GSK will make the following one-time payments set forth in Table 9.7.1.1 below (each, a "**SERPINA1 Product Sales Milestone Payment**") to Wave in accordance with Section 9.7.1.3 when aggregate annual Net Sales in the Territory in a given Calendar Year of all SERPINA1 Products first reach the dollar thresholds indicated in Table 9.7.1.1 (each, a "**SERPINA1 Product Sales Milestone Event**"):

Table 9.7.1.1 – SERPINA1 Product Sales Milestones	
Annual Net Sales in a Given Calendar Year for all SERPINA1 Products	***SERPINA1 Product Sales Milestone Payment***
[***]	[***]

9.7.1.2 GSK Collaboration Product Sales Milestone Payments. On a GSK Collaboration Target-by-GSK Collaboration Target basis, GSK will make the following one-time payments set forth in Table 9.7.1.2 below (each, a "**GSK Collaboration Product Sales Milestone Payment**" and together with the SERPINA1 Product Sales Milestone Payments, the "**GSK Sales Milestone Payments**") to Wave in accordance with Section 9.7.1.3 when aggregate annual Net Sales in the Territory in a given Calendar Year of all GSK Collaboration Products directed to a given GSK Collaboration Target first reach the dollar thresholds indicated in Table 9.7.1.2 (each, a "**GSK Collaboration Product Sales Milestone Event**" and together with the SERPINA1 Product Sales Milestone Events, the "**GSK Sales Milestone Events**"):

Table 9.7.1.2 – GSK Collaboration Product Sales Milestones	
Annual Net Sales in a Given Calendar Year for all GSK Collaboration Products directed to a Particular GSK Collaboration Target	***GSK Collaboration Product Sales Milestone Payment***
[***]	[***]

9.7.1.3 Additional GSK Sales Milestone Payment Terms.

(a) Each SERPINA1 Product Sales Milestone Payment will be payable only once, the first time worldwide annual Net Sales in a given Calendar Year for all SERPINA1 Products achieve the SERPINA1 Product Sales Milestone Event set forth in Table 9.7.1.1 above, notwithstanding the number of times one or more SERPINA1 Products may achieve any such SERPINA1 Product Sales Milestone Event.

(b) The SERPINA1 Product Sales Milestone Payments in Section 9.7.1.1 (SERPINA1 Product Sales Milestone Payments) are additive, such that if more than one SERPINA1 Product Sales Milestone Event specified above is achieved in the same Calendar Year, then each corresponding SERPINA1 Product Sales Milestone Payment for such SERPINA1 Product Sales Milestone Event will be payable in the same Calendar Year.

(c) Each GSK Collaboration Product Sales Milestone Payment will be payable only once per GSK Collaboration Target, the first time

worldwide annual Net Sales in a given Calendar Year for all GSK Collaboration Products directed to such GSK Collaboration Target achieve the GSK Collaboration Product Sales Milestone Event set forth in Table 9.7.1.2 above, notwithstanding the number of times one or more GSK Collaboration Products directed to such same GSK Collaboration Target may achieve any such GSK Collaboration Product Sales Milestone Event.

(d) The GSK Collaboration Product Sales Milestone Payments in Section 9.7.1.2 (GSK Collaboration Product Sales Milestone Payments) are additive, such that if more than one GSK Collaboration Product Sales Milestone Event specified above is achieved in the same Calendar Year, then each corresponding GSK Collaboration Sales Milestone Payment for such GSK Collaboration Sales Milestone Event will be payable in the same Calendar Year.

(e) Each GSK Sales Milestone Payment will be deemed earned upon achievement of the corresponding GSK Sales Milestone Event, taking into account total sales of all SERPINA1 Products or GSK Collaboration Products directed to a particular GSK Collaboration Target, as applicable, and GSK will notify Wave within [***] after achievement of such GSK Sales Milestone Event. After receipt of such notice, Wave will submit one or more invoices to GSK for the corresponding GSK Sales Milestone Payment. GSK will make the corresponding GSK Sales Milestone Payment within [***] after receipt of such invoice.

9.7.2 Wave Sales Milestone Payments. On a Wave Collaboration Target-by-Wave Collaboration Target basis, Wave will make the following one-time payments set forth in Table 9.7.2 below (each, a "**Wave Sales Milestone Payment**") to GSK in accordance with Section 9.7.2.1 (Additional Wave Sales Milestone Payment Terms) when aggregate annual Net Sales in the Territory in a given Calendar Year of all Wave Collaboration Products directed to a Wave Collaboration Target first reach the dollar thresholds indicated in Table 9.7.2 (each, a "**Wave Sales Milestone Event**"):

Table 9.7.2 – Wave Sales Milestones

Annual Net Sales in a Given Calendar Year for all Wave Collaboration Products directed to a Particular Wave Collaboration Target	***Sales Milestone Payment for Wave Collaboration Products [***]***	***Sales Milestone Payment for Wave Collaboration Products [***]***
[***]	[***]	[***]

9.7.2.1 Additional Wave Sales Milestone Payment Terms.

(a) Each Wave Sales Milestone Payment will be payable only once per Wave Collaboration Target, the first time worldwide annual Net Sales in a given Calendar Year for all Wave Collaboration Products directed to such Wave Collaboration Target achieve the Wave Sales Milestone Event set forth in Table 9.7.2 above, notwithstanding the number of times one or more Wave Collaboration Products directed to such same Wave Collaboration Target may achieve any such Wave Sales Milestone Event.

(b) The Wave Sales Milestone Payments in Section 9.7.2 (Wave Sales Milestone Payments) are additive, such that if more than one Wave Sales Milestone Event specified above is achieved in the same Calendar Year, then each corresponding Wave Sales Milestone Payment for such Wave Sales Milestone Event will be payable in the same Calendar Year.

(c) Each Wave Sales Milestone Payment will be deemed earned upon achievement of the corresponding Wave Sales Milestone Event, taking into account total sales of Wave Collaboration Products directed to a particular Wave Collaboration Target and Wave will notify GSK within [***] after achievement of such Wave Sales Milestone Event. After receipt of such notice, GSK will submit an invoice to Wave for the corresponding Wave Sales Milestone Payment. Wave will make the corresponding Wave Sales Milestone Payment within [***] after receipt of such invoice.

9.8 Royalties.

9.8.1 SERPINA1 Product Royalties. During the applicable Royalty Term for a SERPINA1 Product, GSK will make royalty payments to Wave based on worldwide aggregate annual Net Sales made for such SERPINA1 Product in the Field in the Territory by GSK and its Related Parties in a given Calendar Year at the Royalty Rates set forth in Table 9.8.1 below (the "**SERPINA1 Product Royalty**").

Table 9.8.1 – Royalty Rates

Annual Net Sales in a Given Calendar Year of each SERPINA1 Product (for clarity, not aggregated across multiple SERPINA1 Products)	***Royalty Rate Paid on the Portion of Annual Net Sales in the Territory***
[***]	[***]

[***].

9.8.2 GSK Collaboration Product Royalties. On a GSK Collaboration Product-by-GSK Collaboration Product basis, during the applicable Royalty Term for a GSK Collaboration Product, GSK will make royalty payments to Wave based on worldwide aggregate annual Net Sales made for each GSK Collaboration Product in the Field in the Territory by GSK

and its Related Parties in a given Calendar Year at the Royalty Rates set forth in Table 9.8.2 below (the "**GSK Collaboration Product Royalty**").

Table 9.8.2 – Royalty Rates	
Annual Net Sales in a Given Calendar Year of each GSK Collaboration Product (for clarity, not aggregated across multiple GSK Collaboration Products)	***Royalty Rate Paid on the Portion of Annual Net Sales in the Territory***
[***]	[***]

[***].

9.8.3 Wave Collaboration Product Royalties. On a Wave Collaboration Product-by-Wave Collaboration Product basis, during the applicable Royalty Term for a Wave Collaboration Product, Wave will make royalty payments to GSK based on worldwide aggregate annual Net Sales made for each Wave Collaboration Product directed to such Wave Collaboration Target in the Field in the Territory by Wave and its Related Parties in a given Calendar Year at the Royalty Rates set forth in Table 9.8.3 below (the "**Wave Collaboration Product Royalty**").

Table 9.8.3 – Royalty Rates		
Annual Net Sales in a Given Calendar Year of each Wave Collaboration Product directed to a particular Wave Collaboration Target (for clarity, not aggregated across multiple Wave Collaboration Products)	***Royalty Rate Paid on the Portion of Annual Net Sales in the Territory for Wave Collaboration Products [***]***	***Royalty Rate Paid on the Portion of Annual Net Sales in the Territory for Wave Collaboration Products [***]***
[***]	[***]	[***]

[***].

9.8.4 Royalty Payments and Reductions.

9.8.4.1 Royalty Term. Subject to the terms of this Agreement, on a Collaboration Product-by-Collaboration Product and country-by-country basis, the Royalties due under this Section 9.8 (Royalties) will be payable on aggregate annual Net Sales of a Collaboration Product in a country during the period commencing on the First Commercial Sale of such Collaboration Product in such country until the [***]. For purposes of determining whether a royalty threshold above has been attained, Net Sales that are generated by sales of a Collaboration Product in a country for which the Royalty Term has expired shall be excluded from the total amount of Net Sales.

9.8.4.2 Only One Royalty. Only one royalty will be due with respect to the sale of the same unit of Collaboration Product. Only one royalty will be due hereunder on the sale of a Collaboration Product even if the manufacture, use, sale, offer for sale, or importation of such Collaboration Product infringes more than one claim of the Royalty Patents.

9.8.4.3 Royalty Reductions.

(a) **Royalty Reduction upon Patent Expiration**. Subject to Section 9.8.4.3(e) (Cumulative Reductions Floor), on a Collaboration Product-by-Collaboration Product and country-by-country basis, if during the Royalty Term for a given Collaboration Product in a particular country, [***].

(b) **Reduction for Generic Competition**. Subject to Section 9.8.4.3(e) (Cumulative Reductions Floor), on a Collaboration Product-by-Collaboration Product and country-by-country basis, [***].

(c) **Royalty Stacking**. Subject to Section 9.8.4.3(e) (Cumulative Reductions Floor), on a Collaboration Product-by-Collaboration Product and country-by-country basis, under any Collaboration In-License [***].

(d) [***]. Subject to Section 9.8.4.3(e) (Cumulative Reductions Floor), on a GSK Collaboration Product-by-GSK Collaboration Product basis, in the event that [***].

(e) **Cumulative Reductions Floor**. In no event will the application of the reductions set forth in [***].

9.8.4.4 Wave Royalty Payments to GSK. The Royalty provisions in this Section 9.8.4 (Royalty Payments and Reductions) will apply to payments made by Wave to GSK on Wave Collaboration Products, *mutatis mutandis*.

9.9 Other Amounts Payable. With respect to any amounts owed under this Agreement by one Party to the other for which no other invoicing and payment procedure is specified in this Agreement, within [***] after the end of each Calendar Quarter each Party will provide an invoice, together with reasonable supporting documentation, to the other Party for such amounts owed in respect of such Calendar Quarter. The owing Party will pay any undisputed amounts within [***] after receipt of the invoice, and will pay any disputed amounts owed by such Party within [***] of resolution of the Dispute.

9.10 Payment Terms.

9.10.1 Manner of Payment. All payments to be made by a Party hereunder will be made in Dollars by wire transfer to such bank account as the other Party may designate. Invoices to GSK will be sent in accordance with Schedule 9.10.1.

9.10.2 Reports and Royalty Payments. Commencing upon the First Commercial Sale of a Collaboration Product and continuing for as long as Royalties are due under Section 9.8 (Royalties), within [***] after each Calendar Quarter ending on March 31, June 30, September 30 or December 31, GSK will furnish to Wave a written report that includes the following information for such Calendar Quarter on a Collaboration Product-by-Collaboration Product and country-by-country basis: (a) [***] (each, a "**Royalty Report**"). All such reports will be treated as Confidential Information of GSK. GSK shall pay to Wave the royalties payable under this Section with respect to a given Calendar Quarter within [***] following the end of each Calendar Quarter together with delivery of the applicable Royalty Report.

9.10.3 Records; Audits.

9.10.3.1 GSK will, and will ensure that its Related Parties (as applicable), keep complete and accurate records in accordance with its record retention policies applicable to such books and records, but in any event for a period of at least [***] after the end of the Calendar Year in which any such payment becomes payable, in sufficient detail to confirm the accuracy of the calculations hereunder and in accordance with the applicable Accounting Standard that is normally applied by such Party with respect to the filing of its reporting.

9.10.3.2 During the Term and for [***] thereafter, GSK will permit, and will cause its Related Parties to permit, an independent certified public accounting firm of nationally recognized standing selected by Wave, and reasonably acceptable to GSK or such Related Party to have access to and to review, during normal business hours and under obligations of confidentiality at least as protective of GSK Confidential Information as the confidentiality provisions of Section 10 (Confidentiality) and upon [***] prior written notice, no more frequently than [***] period (except in the case of fraud), to verify the accuracy of the Royalty Reports and payments under this Section 9 (Payments) with respect to any Calendar Year ending not more than [***] prior to such audit request. The accounting firm will disclose to GSK and Wave only whether the Royalty Reports are correct or incorrect and the specific details concerning any discrepancies. If such accounting firm concludes that additional amounts were owed during such period, and GSK agrees with such calculation, GSK will promptly pay the additional undisputed amount. If such accounting firm concludes that an overpayment was made, such overpayment will be fully creditable against amounts payable in subsequent payment periods. Wave will pay for the cost of any audit, unless GSK has underpaid Wave by [***] or more for the audited period. Each Party will treat all information that it receives under this Section 9.10.3.2 in accordance with the confidentiality provisions of Section 10 (Confidentiality), and will cause its accounting firm to enter into an acceptable, reasonable confidentiality agreement with the other Party obligating such firm to retain all such financial information in confidence pursuant to such confidentiality agreement, except to the extent necessary for such Party to enforce its rights under this Agreement.

9.10.4 Currency Exchange. With respect to Net Sales of Collaboration Products invoiced in Dollars, the Net Sales, Royalties, and other amounts due to Wave hereunder will be expressed in Dollars. When conversion of payments from any foreign currency is required to be undertaken by GSK, the Dollar equivalent will be calculated using [***] for the conversion of foreign currency sales into Dollars.

9.10.5 Taxes.

9.10.5.1 VAT. It is understood and agreed between the Parties that any payments made under this Agreement are exclusive of VAT. Where VAT is properly added to a payment made under this Agreement, the Party making the payment will pay the amount of such VAT only on receipt of a valid Tax invoice (or, where there is no provision in the legislation for the jurisdiction concerned that a VAT invoice is required to be issued, a written demand containing such information as is customary in that jurisdiction) issued in accordance with the Applicable Laws and regulations of the country in which the VAT is chargeable.

9.10.5.2 Withholding Taxes. In the event any payments made pursuant to this Agreement become subject to withholding Taxes under the Applicable Law or regulations of any jurisdiction, the Party making such payment will deduct and withhold the amount of such Taxes for the account of the payee to the extent required by Applicable Law and such amounts payable to the payee will be reduced by the amount of Taxes deducted and withheld. Any such withholding Taxes required under Applicable Law to be paid or withheld will be an expense of, and borne solely by, the payee, and the payee will indemnify and hold harmless the Party making any payment pursuant to this Agreement for any such withholding Taxes (including, for the avoidance of doubt, any additional amounts of Taxes later determined by a Tax Authority to have been required to be withheld); provided, however, that the Party making such payment will not be entitled to indemnification for any penalties or other additions to Tax arising solely as a result of such Party's failure to timely remit the applicable Taxes in accordance with the Tax forms provided by the payee pursuant to Section 9.10.5.5 (Tax Cooperation).

9.10.5.3 No Other Reductions. Apart from any such permitted withholding and those deductions expressly included in the definition of Net Sales, the amounts payable hereunder will not be reduced on account of any Taxes, unless required by Applicable Law.

9.10.5.4 Tax Exemptions and Credits. The Parties will cooperate with each other in seeking any tax exemption or credits that may be available with respect to any Collaboration Product, including the tax credit available under Section 45C of the Internal Revenue Code by reason of a Party's research and development expenditures contributing to the Collaboration Product being granted orphan drug status by the FDA, or equivalent foreign Applicable Law.

9.10.5.5 Tax Cooperation. To the extent that the Party making a payment is required to deduct and withhold Taxes on any payments under this

Agreement, the Party making such payment will pay the amounts of such Taxes to the proper Tax Authority in a timely manner and promptly transmit to the payee an official Tax certificate or other evidence of such withholding sufficient to enable the payee to claim such payments of Taxes. To the extent that the Party making a payment under this Agreement is required to deduct and withhold Taxes on any such payment, such Party will provide the payee with written notice of the required withholding as promptly as reasonably practical (and in any event, no later than [***] prior to making such payment and will cooperate with the payee as provided in this Section 9.10.5.5 (Tax Cooperation) in order to mitigate the imposition of such withholding Taxes, and the payee will provide any Tax forms to the Party making such payment that may be reasonably necessary in order for such Party not to withhold Tax or to withhold Tax at a reduced rate under an applicable bilateral income Tax treaty. The payee will use reasonable efforts to provide any such Tax forms to the Party making the payment at least [***] prior to the due date for any payments for which the payee desires that the Party making the payment apply a reduced withholding rate. Each Party will provide the other with reasonable assistance to enable the recovery, as permitted by Applicable Law, of withholding Taxes, VAT, or similar obligations resulting from payments made under this Agreement, such recovery to be for the benefit of the Party bearing such withholding Tax or VAT.

9.10.5.6 Withholding Indemnification and Reimbursement. Notwithstanding anything in this Agreement to the contrary, if an action (including any assignment or sublicense of its rights or obligations under this Agreement to any Person that is tax resident in a jurisdiction other than the jurisdiction of the Party taking such action, or any failure to comply with Applicable Laws or filing or record retention requirements) by a Party leads to the imposition of withholding Tax liability or VAT on the other Party that would not have been imposed in the absence of such action or in an increase in such liability above the liability that would have been imposed in the absence of such action, such Party will indemnify and hold harmless the other Party from any such additional or increased withholding Tax liability or VAT (except to the extent that the other Party can reclaim it, provided that such other Party will be reimbursed for any reasonable Out-of-Pocket costs incurred in the reclaim).

9.10.5.7 Wave US Treaty Eligibility:

(a) Wave US warrants that Wave US is resident for tax purposes in the United States of America and that Wave US is entitled to relief from United Kingdom income Tax under the terms of the double tax agreement between the United Kingdom and the United States of America. Wave US shall notify GSK immediately in writing in the event that Wave US ceases to be entitled to such relief.

(b) Pending receipt of formal certification from the UK Tax Authority, GSK may pay royalty income and any other payments under this Agreement to

Wave US by deducting tax at a rate specified in the double tax treaty between the United Kingdom and the United States of America.

9.10.6 Blocked Payments. In the event that, by reason of Applicable Law in any country, it becomes impossible or illegal for a Party to transfer, or have transferred on its behalf, payments owed the other Party hereunder, such Party will promptly notify the other Party of the conditions preventing such transfer and such payments will be deposited in local currency in the relevant country to the credit of the other Party in a recognized banking institution designated by the other Party or, if none is designated by the other Party within a period of [***], in a recognized banking institution selected by the transferring Party, as the case may be, and identified in a written notice given to the other Party.

9.10.7 Interest Due. Each paying Party will pay the other Party interest on any undisputed payments that are not paid on or before the date such payments are due under this Agreement at the per annum rate of [***] over the then current secured overnight financing rate for the payment currency published by the [***] on the date it falls due or the maximum rate allowable by Applicable Law, whichever is lower.

9.10.8 Wave Payments to GSK. The payment terms in this Section 9.10 (Payment Terms) will apply to payments made by Wave to GSK on Wave Collaboration Products, *mutatis mutandis*.

10. CONFIDENTIALITY

10.1 Confidentiality Obligations. Except as expressly permitted by this Agreement, each Party agrees that during the Term and for ten (10) years thereafter, such Party will, and will ensure that its Affiliates and its and their respective Personnel ("**Representatives**"), hold in confidence all Confidential Information disclosed to it by the other Party pursuant to this Agreement (or the Existing Confidentiality Agreement, as applicable). The Receiving Party will not disclose any of the Confidential Information, except to its Representatives who need to know the Confidential Information for the purpose of performing the Receiving Party's obligations, or exercising its rights, under this Agreement and who are bound by obligations of non-use and non-disclosure substantially similar to those set forth herein. The Receiving Party will be responsible for any disclosure or use of the Confidential Information in breach of its obligations hereunder by such Representatives. The Receiving Party will protect Confidential Information using not less than the same care with which it treats its own confidential information, but at all times will use at least reasonable care. Each Party will: (i) implement and maintain appropriate security measures to prevent unauthorized access, disclosure or use of the other Party's Confidential Information; (ii) promptly notify the other Party of any unauthorized access or disclosure of such other Party's Confidential Information (and, in the case of Wave as the Receiving Party, will send an e-mail to csir@gsk.com); and (iii) cooperate with such other Party in good faith in connection with the investigation and remediation of any such unauthorized access or disclosure. The existence and terms of this Agreement and the Equity Agreements are the Confidential Information of each Party. All information exchanged between the Parties regarding the Prosecution and Maintenance and enforcement and defense of the Patents under Section 8 (Intellectual Property) will be the Confidential Information of the Disclosing Party.

10.2 Exceptions to Confidentiality. The obligations of nondisclosure and non-use set forth in Section 10.1 (Confidentiality Obligations) will not apply to the extent that such Confidential Information:

10.2.1 is or becomes generally available to the public other than as a result of improper disclosure by the Receiving Party;

10.2.2 is already known by or in the possession of the Receiving Party at the time of disclosure by the Disclosing Party, and not through a prior disclosure by the Disclosing Party as documented by the Receiving Party's contemporaneously dated written business records;

10.2.3 is independently developed by the Receiving Party without use of or reference to the Disclosing Party's Confidential Information, as documented by the Receiving Party's contemporaneously dated written business records; or

10.2.4 is obtained by the Receiving Party from a Third Party that the Receiving Party believes, acting reasonably and in good faith, after due inquiry, has not breached any obligations of confidentiality as documented by the Receiving Party's contemporaneously dated written business records.

10.3 Permitted Disclosures.

10.3.1 Notwithstanding the obligations of confidentiality and non-use set forth above, a Receiving Party may provide Confidential Information disclosed to it, and disclose the existence and terms of this Agreement or the Equity Agreements as may be reasonably required in order to perform its obligations and to exploit its licenses and other rights under this Agreement, and specifically to (a) Related Parties, and their employees, directors, agents, consultants, or advisors to the extent necessary for the potential or actual performance of its obligations or exercise of its licenses and other rights under this Agreement in each case who are under an obligation of confidentiality with respect to such information that is no less stringent than the terms of this Section 10.3 (Permitted Disclosures); (b) Governmental Authorities or other Regulatory Authorities in order to obtain patents or perform its obligations or exploit its rights under this Agreement, provided that such Confidential Information will be disclosed only to the extent reasonably necessary to do so, and where permitted, subject to confidential treatment; (c) the extent required by Applicable Law, including by the rules or regulations of the United States Securities and Exchange Commission or similar regulatory agency in a country other than the United States or of any stock exchange or listing entity; (d) with respect to the terms of this Agreement and the Equity Agreements only, any bona fide actual or prospective acquirers, underwriters, investors, lenders, or other financing sources and any bona fide actual or prospective collaborators, licensors, Sublicensees, licensees, or strategic partners and to employees, directors, agents, consultants, and advisers of any such Third Party, in each case, who are under obligations of confidentiality and non-use with respect to such information that is no less stringent than the terms of this Section 10.3 (Permitted Disclosures) (but of duration customary in confidentiality agreements entered into for a similar purpose); and (e) to Third Parties to the extent a Party is required to do so pursuant to the terms of a Third Party Agreement.

10.3.2 In making any disclosures set forth in this Section 10.3 (Permitted Disclosures), the Receiving Party will, where reasonably practicable, give such advance notice to the Disclosing Party of such disclosure requirement as is reasonable under the circumstances and will use its reasonable efforts to cooperate with the Disclosing

Party in order to secure confidential treatment of such Confidential Information required to be disclosed. In addition, in connection with any permitted filing by either Party of this Agreement with any Governmental Authority the Receiving Party will (i) endeavor to obtain confidential treatment of economic, trade secret and such other information as may be requested by the Disclosing Party, (ii) provide the Disclosing Party with the proposed confidential treatment request within a reasonable time for the Disclosing Party to provide comments, and the Receiving Party will consider and incorporate such comments in good faith in connection with its submission of its confidential treatment request, and (iii) submit the proposed disclosure in writing to the Disclosing Party as far in advance as reasonably practicable so as to provide a reasonable opportunity to comment thereon and the Receiving Party will incorporate such comments in good faith.

10.3.3 Notwithstanding Section 10.1 (Confidentiality Obligations) and Section 10.4 (Publications and Publicity), without limiting this Section 10.3 (Permitted Disclosures), (i) the Receiving Party may disclose the Confidential Information of the Disclosing Party to the extent required by Applicable Law or court order; provided, however, that the Receiving Party will first provide the Disclosing Party prior notice of such disclosure and give the Disclosing Party a reasonable opportunity to quash such order or to obtain a protective order or confidential treatment requiring that the Confidential Information and documents that are the subject of such order or required to be disclosed be held in confidence by such court or Governmental Authority or, if disclosed, be used only for the purposes for which the order was issued or such disclosure was required by Applicable Law; provided, further, that the Confidential Information disclosed in response to such order or as required by Applicable Law will be limited to the information that is legally required to be disclosed in response to such order or by such Applicable Law; and (ii) the Receiving Party may disclose Confidential Information of the Disclosing Party to the extent any such disclosure is, in the opinion of the Receiving Party's counsel, required by Applicable Law or the rules of a stock exchange on which the securities of the Receiving Party are listed (or to which an application for listing has been submitted); provided that, in the event the Receiving Party is, in the opinion of its counsel, required by Applicable Law or the rules of a stock exchange on which its securities are listed (or to which an application for listing has been submitted) to make such a public disclosure, such Receiving Party will submit the proposed disclosure to the Disclosing Party as far in advance as reasonably practicable so as to provide a reasonable opportunity to comment thereon.

10.4 Publications and Publicity.

10.4.1 Publications.

10.4.1.1 Clinical Trials. Subject to Section 10.4.1.3, GSK shall have the right to (a) publish the results or summaries of results of all GSK-sponsored or supported clinical trials, observational studies, and other studies such as meta analyses, in each case conducted with respect to a SERPINA1 Compound, SERPINA1 Product, GSK Collaboration Compound or GSK Collaboration Product in any clinical trial register maintained by GSK or its Affiliates and the protocols of clinical trials relating to such Collaboration Products on www.ClinicalTrials.gov and in each case publish the results, summaries, and protocols of such clinical

trials or studies on such other websites and repositories and at scientific congresses and in a peer-reviewed journal within such timescales as required by Applicable Law or GSK's or its Affiliates' standard operating procedures, irrespective of the outcome of such clinical trials or studies; (b) make information from clinical trials and studies conducted with respect to a SERPINA1 Compound, SERPINA1 Product, GSK Collaboration Compound or GSK Collaboration Product available under GSK's data sharing initiative; and (c) publish the status of each SERPINA1 Compound, SERPINA1 Product, GSK Collaboration Compound or GSK Collaboration Product in its annual and quarterly reports and updates regarding GSK's research and development pipeline. Each such publication or disclosure made in accordance with this Section 10.4.1.1 (Clinical Trials) shall not be a breach of the confidentiality obligations provided in this Section 10 (Confidentiality)and GSK shall be entitled to maintain such publication or disclosure even following any termination of GSK's rights in respect of the relevant SERPINA1 Compound, SERPINA1 Product, GSK Collaboration Compound or GSK Collaboration Product.

10.4.1.2 Other Publications . Subject to Section 10.4.1.1 (Clinical Trials), except for disclosures permitted in accordance with Section 10.3 (Permitted Disclosures), either Party wishing to make a publication or public presentation that contains the Confidential Information of the other Party will deliver to the other Party a copy of the proposed written publication or presentation within a reasonable time prior to submission for publication or an outline for the planned presentation to allow the reviewing Party to review such proposed publication or presentation and a copy of the proposed presentation within a reasonable time prior to submission and the publishing Party will (a) implement any reasonable comment provided by the reviewing Party with respect to such proposed publication or presentation; (b) at the reviewing Party's request, remove any Confidential Information of the reviewing Party from such proposed publication or presentation and (c) delay the submission or publication of such proposed publication or presentation for a period of up to [***] to permit the preparation and filing of a patent application as needed to preserve the patentability of any Confidential Information of the reviewing Party. With respect to any proposed publications or disclosures by investigators or academic or non-profit collaborators, such materials will be subject to review under this Section 10.4 (Publications and Publicity) to the extent that GSK or Wave, as the case may be, has the right and ability to do so (after using Commercially Reasonable Efforts to obtain such right and ability). The publishing Party will ascribe authorship of any proposed publication or presentation under this Section 10.4.1 (Publications) using accepted standards used in peer-reviewed, academic journals at the time of the publication or presentation, and any such publication or presentation relating to any Collaboration Target, Collaboration Compound or Collaboration Product directed to any Collaboration Target, in each case, will contain appropriate acknowledgements of the contribution of the reviewing Party to the activities that are the subject of such publication or presentation, in accordance with generally accepted academic practice.

10.4.1.3 Notwithstanding anything herein to the contrary: (a) with respect to the SERPINA1 Program, (i) Wave will have the right to publicly present or publish results relating to the SERPINA1 Phase 1/2 Program; and (ii) GSK will have the

right to publicly present or publish results relating to the SERPINA1 Program from and after the commencement of the SERPINA1 Late Development Term, provided that, in each case ((i)-(ii)), the Parties will provide each such proposed publication or presentation to each other for review and comment as set forth in Section 10.4.1.2 (Other Publications); (b) GSK will have the right to publicly present or publish results of studies with respect to any GSK CP in its sole discretion; provided that in the event the proposed publication or presentation contains any discussion of the Wave Platform, GSK will provide such proposed publication or presentation to Wave for review and comment as set forth in Section 10.4.1.2 (Other Publications); (c) Wave will have the right to publicly present or publish results of studies with respect to any Wave CP in its sole discretion; provided that in the event the proposed publication or presentation contains any discussion of the GSK Technology, Wave will provide such proposed publication or presentation to GSK for review and comment as set forth in Section 10.4.1.2 (Other Publications); and (d) with respect to each Target Validation Program, (i) Wave will have the right to publicly present or publish results related to any Target Validation Program [***] in its sole discretion; (ii) GSK will have the right to publicly present or publish results related to any Target Validation Program for [***] in its sole discretion and (iii) neither Party will have the right to publicly present or publish results relating to any Target Validation Program for [***] without the other Party's prior written consent.

10.4.2 Publicity. Except as set forth in Section 10.2 (Exceptions to Confidentiality), 10.4 (Publications and Publicity) or 10.5 (Press Release), the terms of this Agreement and the Equity Agreements, respectively, may not be disclosed by either Party. Neither Party will use the name, Trademark, trade name or logo of the other Party or its employees in any publicity, news release or disclosure relating to this Agreement, the Equity Agreements, such agreements' subject matter, or the activities of the Parties hereunder, in each case, without the prior express written permission of the other Party, except (a) as may be required by Applicable Law, including by the rules or regulations of the United States Securities and Exchange Commission or similar regulatory agency in any country other than the United States or of any stock exchange or listing entity, p*rovided that* the Party making such disclosure or use of the name, Trademark, trade name, or logo of the other Party or its employees, gives the other Party reasonable prior written notice and otherwise complies with Section 10.3 (Permitted Disclosures), or (b) as expressly permitted by the terms hereof.

10.5 Press Release.

10.5.1 By Either Party. The Parties will make a joint public announcement in the form as the press release attached hereto as Schedule 10.5.1. Following such initial press release, except as provided in Section 10.4.2 (Publicity) or this Section 10.5.1 (By Either Party), neither Party will issue any press release or public announcement relating to the terms and conditions of this Agreement without the prior written approval of the other Party (such approval not to be unreasonably withheld), except that a Party may (a) once a press release or other public statement is approved in writing by both Parties, make subsequent public disclosure of the information contained in such press release or other written statement without the further approval of the other Party (so long as such information remains true and correct), and (b) issue a press release or public announcement as required by

Applicable Law (including a press release corresponding to any securities disclosure, such as pursuant to a Form 8-K), including by the rules or regulations of the United States Securities and Exchange Commission or similar regulatory agency in a country other than the United States or of any stock exchange or listing entity, *provided that* the Party issuing such press release gives reasonable prior notice to the other Party of and the opportunity to comment on the press release or public announcement, and otherwise complies with this Section 10 (Confidentiality).

10.5.2 Activities under this Agreement. Notwithstanding anything in this Section 10.5 (Press Release) to the contrary, (a) GSK may issue a press release or make a public disclosure relating to its (i) Development or Manufacture (if GSK is Manufacturing Lead) of any SERPINA1 Compound or SERPINA1 Product (in each case from and after the commencement of the SERPINA1 Late Development Term), GSK Collaboration Compound or GSK Collaboration Product under this Agreement (as applicable) and (ii) Commercialization of any SERPINA1 Product or GSK Collaboration Product; *provided that* such press release or public disclosure does not disclose Confidential Information of Wave, and (b) Wave may issue a press release or make a public disclosure relating to its activities for any SERPINA1 Compound or SERPINA1 Product (in each case related to its activities under the SERPINA1 Phase 1/2 Program), Wave Collaboration Compound or Wave Collaboration Product; *provided that* such press release or public disclosure does not disclose Confidential Information of GSK. Prior to making any such disclosure under this Section 10.5.2 (Activities under this Agreement), however, the disclosing Party will provide the reviewing Party with a draft of such proposed disclosure within a reasonable time prior to disclosure for the reviewing Party's review and comment, and the disclosing Party will consider in good faith any timely comments provided by the reviewing Party (and will remove all Confidential Information of the reviewing Party if requested by the reviewing Party). Notwithstanding the foregoing, Wave will have the right to publicly disclose the achievement of any milestone event under this Agreement (including the nature of any such milestone event) or any milestone or other material payment (including dollar amount) pursuant to a press release, SEC filing (where applicable) or other similar disclosure, provided that (x) Wave will provide prior written notice and a draft of such disclosure to GSK as soon as practicable in advance of such disclosure and consider in good faith any timely comments provided by GSK, (y) for GSK CPs, prior to the Initiation of the first Phase 1 Study of the first GSK Collaboration Product for a GSK CP, Wave will not issue any press release or similar public disclosure that discloses the specific identity (except modality and therapeutic area) of the applicable GSK Collaboration Target without GSK's prior written consent, unless the identity of such Target has already been disclosed publicly by or on behalf of GSK or its Affiliates or Sublicensees; and (z) for GSK CPs and the SERPINA1 Program, Wave will have the right to disclose the program stage, the therapeutic area and modality of the Collaboration Target without identifying specific GSK Collaboration Targets, and Wave's collaboration with GSK on its website or in connection with a non-confidential investor presentation or similar public disclosure.

11. REPRESENTATIONS, WARRANTIES AND COVENANTS

11.1 Mutual Representations and Warranties. Each Party represents and warrants to the other Party, as of the Execution Date that:

11.1.1 such Party is a corporation duly organized, validly existing, and in good standing under the Applicable Laws of its jurisdiction of incorporation or formation;

11.1.2 such Party has all requisite corporate power and corporate authority to enter into this Agreement and to carry out its obligations under this Agreement;

11.1.3 all requisite corporate action on the part of such Party, its directors and stockholders required by Applicable Law for the authorization, execution and delivery by such Party of this Agreement, and the performance of all obligations of such Party under this Agreement, has been taken;

11.1.4 the execution, delivery and performance of this Agreement, and compliance with the provisions of this Agreement, by such Party do not and will not: (a) violate any provision of Applicable Law or any ruling, writ, injunction, order, permit, judgment or decree of any Governmental Authority, (b) constitute a breach of, or default under (or an event which, with notice or lapse of time or both, would become a default under) or conflict with, or give rise to any right of termination, cancellation or acceleration of, any agreement, arrangement or instrument, whether written or oral, by which such Party or any of its assets are bound, or (c) violate or conflict with any of the provisions of such Party's organizational documents (including any articles or memoranda of organization or association, charter, bylaws or similar documents); and

11.1.5 no consent, approval, authorization or other order of, or filing with, or notice to, any Governmental Authority or other Third Party is required to be obtained or made by such Party in connection with the authorization, execution and delivery by such Party of this Agreement, except as required pursuant to the HSR Act.

11.2 Representations and Warranties of Wave. Wave represents and warrants to GSK, as of the Execution Date, that:

11.2.1 **Wave Patents and In-Licenses**. Schedule 11.2 sets forth a complete and accurate list of (a) all Wave Background Patents issued or pending as of the Execution Date, including (i) for each such Patent that is owned by Wave or its Affiliates, whether it is solely or jointly owned, and, further if jointly owned, the identity of the Third Party joint-owner(s), and (ii) for each such Patent that is in-licensed by Wave or its Affiliates, the identity of the Third Party owner, the corresponding Existing Wave Third Party Agreements or SERPINA1 Collaboration In-License, as applicable pursuant to which such Patent is Controlled by Wave, and whether such Patent is licensed to Wave exclusively or non-exclusively; and (b) all license, assignment, distribution, or other agreements pursuant to which Wave or its Affiliates Control (or has the right to obtain Control of), or otherwise is granted rights to, any Wave Background Technology, including all Existing Wave Third Party Agreements. Wave has provided GSK with true and correct copies of all such agreements (subject to Wave's right to redact Confidential Information of Wave or its counterparty from such copies, except to the extent that such information is required in order for GSK to identify the obligations with which it or its Related Parties will be required to comply).

11.2.2 **Wave Technology**. Wave (itself or through its Affiliates) has (a) full legal or beneficial title and ownership of, or sufficient license rights under, or has a valid option to obtain

sufficient license rights under, all Wave Background Technology; and (b) has full legal or beneficial title and ownership of, or sufficient license rights under, or an option to obtain sufficient rights, and authority to (i) grant to GSK and its Related Parties, the licenses, and other rights set forth in this Agreement under the Wave Background Technology; and (ii) use, disclose, and commercially exploit, and to enable GSK and its Related Parties to use, disclose, and commercially exploit (in each case under appropriate conditions of confidentiality) the Wave Background Technology in accordance with this Agreement. Without limiting the generality of the foregoing, Wave or its Affiliate has obtained all necessary consents and fulfilled all necessary conditions applicable to Wave (and other than those conditions required to be flowed through to GSK), if any, to grant to GSK the license and sublicense rights provided in the present Agreement.

11.2.3 **Conflicting Agreements**. Wave has not granted its Affiliates or any Third Party, including any academic organization or agency, rights that would otherwise interfere or be inconsistent with GSK's rights hereunder, and there are no agreements or arrangements to which Wave or any of its Affiliates is a party relating to Wave Technology or Collaboration Compounds or Collaboration Products directed to any Collaboration Target, that would (a) limit the rights granted to GSK under this Agreement or (b) restrict or result in a restriction on GSK's ability to Exploit the Collaboration Compounds or Collaboration Products directed to any Collaboration Target in accordance with this Agreement in the Territory.

11.2.4 **Breach of Existing Wave Third Party Agreement**. Neither Wave nor its Affiliates are in material breach or default under any agreements pursuant to which Wave Controls any Wave Technology, and neither Wave nor its Affiliates have received any written notice of material breach or default with respect to any such agreement.

11.2.5 **Ownership of Wave Technology**. With respect to any Wave Background Technology owned by Wave or its Affiliates, (a) Wave or its Affiliates have obtained from all employees and independent contractors who participated in any respect in the invention or authorship thereof, valid and enforceable assignments of all ownership rights of such employees and independent contractors in such Wave Background Technology, either pursuant to written agreement or by operation of Applicable Law; and (b) all of its employees, officers, contractors and consultants have executed agreements or have existing obligations under Applicable Law requiring assignment to Wave or its Affiliate, as applicable, of all rights, title, and interests in and to inventions made during the course of and as the result of this Agreement; and, no officer or employee of Wave or its Affiliate is subject to any agreement with any other Third Party that requires such officer or employee to assign any interest in any Wave Background Technology to any Third Party. Except as otherwise provided in Schedule 11.2, Wave is the sole owner of the Wave Background Patents and no Third Party has challenged or is challenging Wave's ownership thereof. The Wave Background Patents are free and clear of any liens, charges, and encumbrances that would conflict with the rights granted under this Agreement.

11.2.6 **Wave Confidential Information**. All employees, officers, and consultants of Wave and its Affiliates have executed agreements or have existing obligations under Applicable Law and obligating the individual to maintain as confidential Wave's Confidential Information as well as confidential information of other parties (including of GSK and its Affiliates) that such individual may receive in the conduct of this Agreement, to the extent required to support Wave's obligations under this Agreement; and Wave and its Affiliates have taken all reasonable precautions to preserve the confidentiality of the Wave Background Know-How.

11.2.7 **Government Funding**. Neither Wave nor its Affiliates have entered into a government funding relationship that would result in rights to any Collaboration Compound or Collaboration Product directed to any Collaboration Target residing in the US Government, National Institutes of Health, National Institute for Drug Abuse or other agency, and the licenses granted hereunder are not subject to overriding obligations to the US Government as set forth in Public Law 96 517 (35 U.S.C. 200 204), as amended, or any similar obligations under the laws of any other country.

11.2.8 **Validity and Enforceability**. The issued patents within the Wave Background Patents are valid and enforceable and have been diligently prosecuted and maintained. There are no oppositions, nullity actions, interferences, inter partes reexaminations, inter partes reviews, post grant reviews, derivation proceedings, or other proceedings pending or threatened (but excluding office actions or similar communications issued by any Patent Offices in the ordinary course of prosecution of any patent application) that challenge the scope, validity, or enforceability of the Wave Background Patents. Wave has filed and prosecuted patent applications within the Wave Background Patents in good faith and, has complied with all duties of disclosure with respect thereto. Other than through filing of terminal disclaimers in the ordinary course of patent prosecution, Wave has not committed any act, or omitted to commit any act, that may cause the Wave Background Patents to expire prematurely or be declared invalid or unenforceable. Wave or its Affiliates have timely paid all application, registration, maintenance, and renewal fees in respect of the Wave Background Patents and have filed with the United States Patent and Trademark Office or any analogous foreign Governmental Authority (collectively, "**Patent Offices**") all necessary documents and certificates for the purpose of maintaining such Wave Background Patents.

11.2.9 **No Claims**. The owned Wave Technology and, to Wave's knowledge, the in-licensed Wave Technology is not subject to, any judgment or settlement that would reasonably be expected to materially restrict the use thereof or otherwise would reasonably be expected to adversely affect the validity or enforceability thereof. To Wave's knowledge, no Third Party has infringed upon or misappropriated any Wave Technology.

11.2.10 **Non-Infringement**. To Wave's knowledge, the Exploitation of any Collaboration Compound or Collaboration Product directed to any Collaboration Target, in each case, as contemplated hereunder does not infringe any valid patent rights of any Third Party. There are no claims, demands, suits, proceedings, arbitrations, or other legal actions of any nature, civil, criminal, regulatory or otherwise, pending or, to Wave's knowledge, threatened against Wave or any of its Related Parties alleging or asserting any of the foregoing.

11.2.11 **Regulatory**.

11.2.11.1 All Development of the SERPINA1 Compound or SERPINA1 Product conducted by or on behalf of Wave or any of its Affiliates has been conducted in compliance with all Applicable Laws, including (i) all data protection laws; (ii) all privacy policies and other related policies, or program of Wave (or its Affiliates, as applicable) relating to the privacy, protection and security of personal information; and (iii) all other legal requirements and material contractual requirements to which Wave (or its Affiliates, as applicable) is subject with respect to the privacy, protection, and security of personal information, in each case of (i) through (iii), as applicable to Wave's (or its Affiliate's, as applicable) operations and activities directly related to this

Agreement or otherwise in connection with the Exploitation of the SERPINA1 Compound or SERPINA1 Product.

11.2.11.2 Wave has made available to GSK complete and accurate copies of all Regulatory Documents relating to the SERPINA1 Compound or SERPINA1 Product. All Regulatory Documents filed by Wave with respect to the SERPINA1 Compound or SERPINA1 Product were, at the time of filing, true, complete, and accurate in all material respects.

11.2.11.3 Wave holds, and in all material respects is operating in compliance with, such Regulatory Approvals and other exceptions, permits, licenses, franchises, authorizations and clearances of the FDA or any other Regulatory Authority required in connection with the Development to date of the SERPINA1 Compound and SERPINA1 Product.

11.2.11.4 To the knowledge of Wave, there is no material safety or toxicity issue with respect to the SERPINA1 Compound or SERPINA1 Product. Wave has provided or made available to GSK, prior to the Effective Date, true, complete and correct copies of all material Data and other information in Wave's or any of its Affiliates' control regarding the quality, efficacy or safety of the SERPINA1 Compound or SERPINA1 Product, and all quality, efficacy and safety data and information provided or otherwise made available to GSK (or any of its Affiliates) is true, correct and complete in all material respects, and such information, documents and materials do not (i) contain any untrue statement of a material fact or (ii) omit any fact that would cause the statements or facts or information contained therein, in light of the circumstances under which they were made, to be misleading in any material respect.

The Parties agree that any disclosure in any section of **Schedule 11.2** will only be deemed to be an exception to the representations and warranties of Wave that are contained in the corresponding Section of this Agreement.

11.3 Representations and Warranties of GSK. GSK represents and warrants to Wave, as of the Execution Date, that:

11.3.1 No Encumbrances. There are no Encumbrances on any of the Targets [***].

11.3.2 Non-Infringement. To GSK's knowledge, the Exploitation of any [***] does not infringe any valid patent right of any Third Party. There are no claims, demands, suits, proceedings, arbitrations, or other legal actions of any nature, civil, criminal, regulatory or otherwise, pending or, to GSK's knowledge, threatened against GSK or any of its Related Parties alleging or asserting any of the foregoing.

11.4 Additional Covenants.

11.4.1 No Debarment. Neither Party nor any of its Affiliates will employ or otherwise use in any capacity, the services of any Person debarred under Applicable Law, including under 21 U.S.C. § 335a or any foreign equivalent thereof, or any Person who is the subject of an FDA debarment investigation or proceeding (or similar proceeding of EMA or foreign equivalent); including with respect to any

Exploitation of Collaboration Compound or Collaboration Product directed to any Collaboration Target.

11.4.2 Retention of Title. On a Collaboration Target-by-Collaboration Target basis, commencing upon the Execution Date and continuing until the end of the Royalty Term for any Collaboration Products directed to such Collaboration Target, Wave or its Affiliates will retain Control of and will not assign, transfer, convey, encumber or dispose of, or enter into any agreement with any Third Party to assign, transfer, convey, encumber or dispose of any Wave Technology related to such Collaboration Target or to grant a security interest or lien in or to any such Wave Technology as part of a secured financing transaction, unless such security interest or lien is subordinate to this Agreement and the licenses granted herein, except with GSK's prior written consent or as and to the extent expressly permitted by this Agreement.

11.4.3 Compliance. Each Party and its Related Parties will conduct the Exploitation of the Collaboration Compounds and Collaboration Products directed to any Collaboration Target in a good scientific manner and in accordance with all Applicable Laws, including governmental regulations concerning GLP, GCP, and cGMP and any applicable anti-corruption or anti-bribery laws or regulations of any Governmental Authority with jurisdiction over the activities performed by such Party or its Related Parties in furtherance of such obligations.

11.4.4 Conflicting Transactions. Commencing on the Execution Date and continuing until the end of the Term, Wave will not, and will cause its Affiliates not to, enter into any agreement granting a license or other right under the Wave Technology that is inconsistent with the rights granted to GSK under this Agreement. Commencing on the Execution Date and continuing until the end of the Term, GSK will not, and will cause its respective Affiliates not to, enter into any agreement granting a license or other right under the GSK Technology that is inconsistent with the rights granted to Wave under this Agreement.

11.5 Disclaimer. EXCEPT AS OTHERWISE EXPRESSLY SET FORTH IN THIS AGREEMENT, INCLUDING AS SET FORTH IN THIS SECTION 11 (REPRESENTATIONS, WARRANTIES AND COVENANTS), NEITHER PARTY NOR ANY OF ITS AFFILIATES MAKES ANY REPRESENTATION OR EXTENDS ANY WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, TO THE OTHER PARTY OR ANY OF ITS AFFILIATES WITH RESPECT TO ANY PATENTS, KNOW-HOW, MATERIALS, COMPOUND, PRODUCT, COLLABORATION COMPOUND, COLLABORATION PRODUCT, GOODS, SERVICES, RIGHTS OR OTHER SUBJECT MATTER OF THIS AGREEMENT AND HEREBY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE OR NONINFRINGEMENT WITH RESPECT TO ANY AND ALL OF THE FOREGOING. EACH PARTY HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY THAT THE EXPLOITATION OF ANY COLLABORATION COMPOUND OR COLLABORATION PRODUCT DIRECTED TO ANY COLLABORATION TARGET PURSUANT TO THIS AGREEMENT WILL BE SUCCESSFUL.

12. INDEMNIFICATION

12.1 Indemnification by GSK. Subject to the other provisions of this Section 12 (Indemnification), GSK will indemnify, defend and hold harmless Wave and its Affiliates and each of their respective

Personnel (collectively, the "**Wave Indemnitees**") from and against any and all liability, damage, loss, fines, penalties, cost or expense (including reasonable attorneys' fees) ("**Losses**") incurred by or rendered against such Wave Indemnitee in connection with Third Party claims, investigations, demands or suits ("**Third Party Claims**") to the extent arising out of or resulting from: (a) GSK's or any of its GSK Indemnitees' gross negligence, reckless conduct or willful misconduct; (b) any breach by GSK of this Agreement of its representations and warranties, covenants or obligations set forth in this Agreement; or (c) to the extent such Losses arise out of the Exploitation of Collaboration Compounds or Collaboration Products directed to any Collaboration Target by or on behalf of GSK or any of its Related Parties; provided, however, that GSK's obligations pursuant to this Section 12.1 (Indemnification by GSK) will not apply to the extent such Losses are covered by Wave's obligations under Section 12.2 (Indemnification by Wave).

12.2 Indemnification by Wave. Subject to the other provisions of this Section 12 (Indemnification), Wave will indemnify, defend and hold harmless GSK, its Affiliates and each of their respective Personnel (collectively, the "**GSK Indemnitees**") from and against any and all Losses incurred by or rendered against such GSK Indemnitee in connection with Third Party Claims to the extent arising out of or resulting from: (a) Wave's or any of Wave Indemnitee's gross negligence, reckless conduct or willful misconduct; (b) any breach by Wave of this Agreement of its representations and warranties, covenants or obligations set forth in this Agreement; or (c) to the extent such Losses arise out of the Exploitation of Collaboration Compounds or Collaboration Products directed to any Collaboration Target by or on behalf of Wave or any of its Related Parties; provided, however, that Wave's obligations pursuant to this Section 12.2 (Indemnification by Wave) will not apply to the extent that such Losses are covered by GSK's obligations under Section 12.1 (Indemnification by GSK).

12.3 Notification of Claims; Conditions to Indemnification Obligations.

12.3.1 As a condition to a Party's right to receive indemnification under this Section 12 (Indemnification) with respect to any Third Party Claim, it will: (i) promptly notify the other Party as soon as it becomes aware of a Third Party Claim for which indemnification may be sought pursuant hereto, provided that the failure to give such notice will not relieve the indemnifying Party of its indemnity obligation hereunder except to the extent that such failure materially prejudices the indemnifying Party; (ii) cooperate, and cause the individual indemnitees to cooperate, with the indemnifying Party in the defense, settlement or compromise of such Third Party Claim; and (iii) permit the indemnifying Party to control the defense, settlement or compromise of such Third Party Claim, including the right to select defense counsel. In no event, however, may the indemnifying Party compromise or settle any Third Party Claim in a manner which admits fault or negligence on the part of the indemnified Party or any indemnitee without the prior consent of the indemnified Party. Each Party will reasonably cooperate with the other Party and its counsel in the course of the defense of any such Third Party Claim, such cooperation to include using reasonable efforts to provide or make available documents, information and witnesses. In any such proceeding, the indemnified Party will have the right to retain its own counsel, but the fees and expenses of such counsel will be at the expense of the indemnifying Party unless (A) the indemnifying Party and the indemnified Party will have agreed to the retention of such counsel or (B) the named parties to any such proceeding (including any impleaded parties) include both the indemnifying Party and the indemnified Party and representation of both Parties by the same counsel would be inappropriate due to actual or potential differing interests between them. All

such fees and expenses of the indemnified Party by application of the foregoing clause (A) or (B) will be reimbursed by the indemnifying Party as they are incurred. The indemnifying Party will have no liability under this Section 12 (Indemnification) with respect to any such Third Party Claims settled or compromised without its prior written consent.

12.3.2 In the event that notice of any Third Party Claim for indemnification under this Section 12 (Indemnification) has been timely given within the applicable survival period, the representations, warranties, covenants and agreements that are the subject of such indemnification will survive with respect to Third Party Claim until such time as such Third Party Claim is finally resolved.

12.4 Certain Limitations.

12.4.1 In any case where an indemnified Party recovers from Third Parties any amount in respect of a matter with respect to which an indemnifying Party has indemnified it pursuant to this Section 12 (Indemnification), such indemnified Party will promptly pay over to the indemnifying Party the amount so recovered (after deducting therefrom the full amount of the expenses incurred by it in procuring such recovery), but not in excess of the sum of (a) any amount previously so paid by the indemnifying Party to or on behalf of the indemnified Party in respect of such matter and (b) any amount expended by the indemnifying Party in pursuing or defending any claim arising out of such matter.

12.4.2 In calculating any Losses, there will be deducted any insurance recovery in respect thereof (and no right of subrogation will accrue hereunder to any insurer), less any current or prospective costs associated with such insurance recovery, and the Party seeking indemnification hereunder may pursue in its sole discretion, and will not be obligated to pursue, an insurance recovery to the extent available.

12.4.3 Each Party agrees to take all reasonable steps to mitigate their respective Losses upon and after becoming aware of any event or condition which could reasonably be expected to give rise to any liability, damage, loss, cost or expense that is indemnifiable hereunder.

12.5 Limitation of Liability. NOTWITHSTANDING ANYTHING TO THE CONTRARY IN THIS AGREEMENT, TO THE MAXIMUM EXTENT PERMITTED BY LAW, EXCEPT WITH RESPECT TO (A) EACH PARTY'S RESPECTIVE INDEMNIFICATION OBLIGATIONS FOR LOSSES CAUSED BY OR ARISING OUT OF THIRD PARTY CLAIMS UNDER SECTION 12.1 (INDEMNIFICATION BY GSK) OR SECTION 12.2 (INDEMNIFICATION BY WAVE), AS APPLICABLE; (B) EITHER PARTY'S BREACH OF ITS OBLIGATIONS UNDER SECTION 7.8 (EXCLUSIVITY; COMPETING PROGRAMS); OR (C) EITHER PARTY'S BREACH OF ITS CONFIDENTIALITY AND NON-USE OBLIGATIONS UNDER SECTION 10 (CONFIDENTIALITY), IN NO EVENT SHALL EITHER PARTY OR ANY OF ITS AFFILIATES BE LIABLE TO THE OTHER PARTY OR ANY OF ITS AFFILIATES FOR ANY INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES (INCLUDING FOR LOST REVENUES AND LOST PROFITS (WHETHER DIRECT OR INDIRECT)), REGARDLESS OF THE THEORY OF LIABILITY (INCLUDING CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE), IN EACH CASE, ARISING OUT OF OR RELATING TO THIS AGREEMENT, THE TRANSACTIONS CONTEMPLATED HEREIN OR ANY BREACH HEREOF, IRRESPECTIVE OF WHETHER

SUCH PARTY OR ANY REPRESENTATIVE OF SUCH PARTY HAS BEEN ADVISED OF, OR OTHERWISE MIGHT HAVE ANTICIPATED THE POSSIBILITY OF, ANY SUCH LOSS OR DAMAGE OR WHETHER SUCH LOSS OR DAMAGE WAS REASONABLY FORESEEABLE.

12.6 Insurance. Each Party will maintain, at its cost, reasonable insurance (or in the case of GSK, self-insurance) against liability and other risks associated with its activities contemplated by this Agreement, including its indemnification obligations under this Section 12 (Indemnification), and will furnish to the other Party evidence of such insurance upon request; provided that if, at any time during the Term, a Party ceases to maintain the same level of insurance coverage with respect to such Party's obligations under this Agreement, such Party will promptly notify the other Party thereof.

13. TERM AND TERMINATION

13.1 Term and Expiration. Subject to Section 14 (Effectiveness), the term of this Agreement (the "**Term**") will commence on the Effective Date and, unless earlier terminated as provided in this Section 13 (Term and Termination), will continue in full force and effect on a Validation Target-by-Validation Target or Collaboration Target-by-Collaboration Target basis and Collaboration Product-by-Collaboration Product basis until:

13.1.1 with respect to a Validation Target, the date on which such Validation Target becomes a Declined Target; and

13.1.2 with respect to a Collaboration Target, the Royalty Term has expired for all Collaboration Products directed to the applicable Collaboration Target in each country in the Territory.

13.2 Termination for Convenience by GSK. At any time during the Term, GSK may, at its convenience, terminate this Agreement:

13.2.1 in its entirety upon [***] prior written notice to Wave;

13.2.2 on a Validation Target-by-Validation Target or Collaboration Target-by-Collaboration Target basis:

13.2.2.1 with respect to a Validation Target on [***] prior written notice to Wave;

13.2.2.2 with respect to a Validation Target [***] prior written notice to Wave;

13.2.2.3 with respect to the SERPINA1 Target, [***] or

13.2.2.4 with respect to a GSK Collaboration Target, [***]; or

13.2.3 on a Target-by-Target basis, with respect to any Target [***] prior notice to Wave.

13.3 Termination of Wave CPs.

13.3.1 At any time during the Term, Wave may, at its convenience, terminate this Agreement with respect to a Wave Collaboration Target, (i) upon [***] directed to such Wave Collaboration Target.

13.3.2 For clarity, (a) GSK will have no right to terminate this Agreement with respect to a Wave Collaboration Target under Section 13.2 (Termination for Convenience by GSK) and (b) a termination of this Agreement in its entirety by GSK will not result in a termination with respect to any Wave Collaboration Targets or Wave CPs for such Wave Collaboration Targets.

13.4 Termination for Patent Challenge. Either Party has the right to terminate this Agreement on a Collaboration Target-by-Collaboration Target basis, upon written notice to the other Party if such other Party or its Affiliates or Sublicensees with respect to such Collaboration Target directly or indirectly challenges in a legal or administrative proceeding the patentability, enforceability or validity of any Patents within the Wave Technology (with respect to a challenge brought by GSK or its Affiliates or Sublicensees with respect to such Collaboration Target), any Patents within the GSK Technology (with respect to a challenge brought by Wave or its Affiliates or Sublicensees with respect to such Collaboration Target), or any Patents within the Joint Technology (with respect to a challenge brought by either Party or such Party's Affiliates or Sublicensees with respect to such Collaboration Target), as the case may be, that Cover any Collaboration Compound or Collaboration Product directed to such Collaboration Target (each, a "**Patent Challenge**"); *provided that* (a) this Section 13.4 (Termination for Patent Challenge) will not apply to any such Patent Challenge that is first made by a Party or one of its Related Parties in defense of a claim of patent infringement brought by the other Party under the applicable Patent, (b) this Section 13.4 (Termination for Patent Challenge) will not apply in the event that an Affiliate of a Party that first become an Affiliate of a Party after the Effective Date in connection with a merger or acquisition event, where such an Affiliate of a Party was already engaged in a Patent Challenge prior to the signing of a definitive agreement in connection with such merger or acquisition event, so long as the Party causes such Patent Challenge to terminate within [***] after the closing of such merger or acquisition event, and (c) with respect to any non-Affiliate Sublicensee, a Party will not have the right to terminate this Agreement under this Section 13.4 (Termination for Patent Challenge) with respect to any Collaboration Target if the other Party (i) causes such Patent Challenge to be terminated or dismissed (or in the case of ex-parte proceedings, multi-party proceedings, or other Patent Challenges in which the challenging party does not have the power to unilaterally cause the Patent Challenge to be withdrawn, causes such Sublicensee to withdraw as a party from such Patent Challenge and to cease actively assisting any other party to such Patent Challenge) or (ii) terminates such Sublicensee's sublicense to the Patents being challenged by the Sublicensee, in each case, within [***] days of the terminating Party's notice to the other Party under this Section 13.4 (Termination for Patent Challenge).

13.5 Termination for Cause.

13.5.1 **Right to Terminate for Material Breach**. Each Party (the "**Non-Breaching Party**") will have the right, but not the obligation, to terminate this Agreement upon delivery of written notice to the other Party (the "**Breaching Party**") on a Validation Target-by-Validation Target or Collaboration Target-by-Collaboration Target basis in the event of any material breach of this Agreement by the Breaching Party with respect to such Validation Target or Collaboration Target or in its entirety in the event of any material breach of this Agreement that relates to all Validation Targets and Collaboration Targets, provided that such termination will not be effective if such breach has been cured [***] after written notice thereof is

given by the Non-Breaching Party to the Breaching Party specifying the nature of the alleged breach (or, if such default cannot be cured within such first [***] such termination will not be effective if such breach has been cured within [***] (or such longer period of time as the Parties may mutually agree) after such notice if the Breaching Party commences actions to cure such default within such [***] and thereafter diligently continues such actions); provided, however, that to the extent such material breach involves the failure to make an undisputed payment when due, such breach must be cured within [***] after written notice thereof is given by the Non-Breaching Party to the Breaching Party.

13.5.2 **Disputed Breach**. If the Breaching Party disputes in good faith the existence or materiality of a breach specified in a notice provided by the Non-Breaching Party in accordance with Section 13.5.1 (Right to Terminate for Material Breach) and such Breaching Party provides the Non-Breaching Party notice of such Dispute within such [***], then the cure periods set forth in Section 13.5 (Termination for Cause) will be tolled during the pendency of the dispute resolution process as set forth in Section 15 (Dispute Resolution) and the Non-Breaching Party will not have the right to terminate this Agreement under Section 13.5.1 (Right to Terminate for Material Breach) unless and until such dispute resolution process has been completed (including the tolling and cure periods set forth therein).

13.5.3 **[***]**.

13.5.3.1 If GSK does not conduct, or cause to be conducted, [***] with respect to any SERPINA1 Product for a period of [***] at any time during the Term (the "**[***]**"), then, Wave will have the right to terminate this Agreement with respect to the SERPINA1 Target with [***] written notice to GSK, unless GSK ends such [***] during such notice period by [***]; provided, that if there is a good faith dispute with respect to the existence of the [***] or whether such [***] has ended prior to the expiry of such notice period, and if such matter is disputed by GSK in writing [***] of the delivery of the notice thereof, then the dispute resolution procedure set forth in [***] may be initiated by either Party to resolve such matter. If either Party so initiates such dispute resolution procedure, then [***] (and the corresponding termination of this Agreement), will be tolled until such time as the dispute is resolved pursuant to [***]. Notwithstanding the foregoing, the [***] will be extended on a day-for-day basis to the extent that any time period of inactivity in [***] is caused by any one or more of the following: (a) if Wave is the Manufacturing Lead, [***] in the manner contemplated by this Agreement and any subsequent agreement entered into by the Parties relating thereto; (b) a breach of this Agreement by Wave with respect to [***] having a material impact on the conduct of the [***]; (c) a clinical hold or other action by, or delay in receiving or withholding of the consent or approval of, a Regulatory Authority that delays, prevents the conduct of, or materially changes the conduct of [***] activities with respect to such [***], including as compared to what had been previously contemplated by either Party; (d) a Force Majeure Event that affects the conduct of [***] activities with respect to such [***]; or (e) injunction or other operation of law with respect to such [***].

13.5.3.2 For each GSK CP, if GSK does not conduct, or cause to be conducted, any [***] activities with respect to any GSK Collaboration Products for a given GSK CP for a period of [***] (the "**[***]**"), then, Wave will have the right to terminate

this Agreement with respect to such GSK CP with [***] written notice to GSK, unless GSK ends such [***] during such notice period by conducting, or cause to be conducted, any [***] activities with respect to any [***] of any GSK Collaboration Products for such GSK CP; provided, that if there is a good faith dispute with respect to the existence of the [***] or whether such [***] has ended prior to the expiry of such notice period, and if such matter is disputed by GSK in writing within [***] of the delivery of the notice thereof, then the dispute resolution procedure set forth in [***], may be initiated by either Party to resolve such matter. If either Party so initiates such dispute resolution procedure, then the [***] (and the corresponding termination of this Agreement), will be tolled until such time as the dispute is resolved pursuant to [***]. Notwithstanding the foregoing, the [***] period will be extended on a day-for-day basis to the extent that any time period of inactivity in [***] is caused by any one or more of the following: (a) if Wave is the Manufacturing Lead, [***] in the manner contemplated by this Agreement and any subsequent agreement entered into by the Parties relating thereto; (b) a breach of this Agreement by Wave with respect to such GSK CP having a material impact on the conduct of the [***]; (c) a clinical hold or other action by, or delay in receiving or withholding of the consent or approval of, a Regulatory Authority that delays, prevents the conduct of, or materially changes the conduct of [***] activities with respect to such [***], including as compared to what had been previously contemplated by either Party; (d) a Force Majeure Event that affects the conduct of [***] activities with respect to such [***]; or (e) injunction or other operation of law with respect to such [***].

13.6 Termination for Insolvency. In the event that either Party (a) files for protection under bankruptcy or insolvency laws; (b) makes an assignment for the benefit of creditors; (c) appoints or suffers appointment of a receiver or trustee over substantially all of its property that is not discharged within [***] after such filing; (d) proposes a written agreement of composition or extension of its debts; (e) proposes or is a party to any dissolution or liquidation of such Party; (f) files a petition under any bankruptcy or insolvency act or has any such petition filed against that is not discharged or dismissed within [***] of the filing thereof; or (g) admits in writing its inability generally to meet its obligations as they fall due in the general course, then the other Party may terminate this Agreement in its entirety effective immediately upon notice to such Party.

13.7 Effects of Expiration or Termination; Survival.

13.7.1 In addition to the consequences set forth in this Section 13.7 (Effects of Expiration or Termination; Survival) (and any other Sections that expressly survive pursuant to the terms herein or therein, as applicable), the following provisions will survive expiration or termination of this Agreement in its entirety for any reason: Section 1, 4.4.2 (Records) to the extent consistent with the applicable Party's record retention policies, 4.4.3.2 to 4.4.3.4 (inclusive) (Transfer of Materials), 7.5.4 (Liability of the Sublicensing Party), 7.5.5 (Continued Rights of a Sublicensee), 7.7 (Bankruptcy), 8.2 (Ownership of Wave Platform Collaboration Technology, GSK Novel Target Collaboration Technology and GSK CMC Platform Collaboration Technology), 8.3 (Ownership of Collaboration Program Technology; Joint Technology), 8.4 (Inventorship), 8.5 (Exploitation of Joint Technology), 8.6 (No Implied Rights), 8.12 (Further Action), 9 (Payments) (solely with respect to amounts accrued prior to termination but not paid and the reporting and information sharing procedures associated therewith), 10 (Confidentiality), 12

(Indemnification), 13.7 (Effects of Expiration or Termination; Survival), 15 (Dispute Resolution), and 16 (Miscellaneous Provisions); provided that, for clarity, the foregoing will not survive in the event of a termination prior to the Effective Date pursuant to Section 14.3 (Outside Date), except as otherwise provided therein.

13.7.2 Expiration or termination of this Agreement will not relieve the Parties of any obligation, including any payment obligation (in each case, solely with respect to any payment obligations that accrued prior to the effective date of such expiration or termination) or any liability that accrued hereunder prior to the effective date of such expiration or termination. In addition, termination of this Agreement will not preclude either Party from pursuing all rights and remedies it may have hereunder or at law or in equity with respect to any breach of this Agreement nor prejudice either Party's right to obtain performance of any obligation.

13.7.3 Upon expiration of the Royalty Term for a Collaboration Product in a country, the licenses granted from each Party to the other Party in Section 7 (Licenses) with respect to such Collaboration Product in such country will become fully-paid, irrevocable, and perpetual.

13.7.4 Upon any termination (but not expiration) of this Agreement, the terms in this Section 13.7.4 will apply; provided that, (a) with respect to any termination of this Agreement with respect to a given Validation Target or Collaboration Target but not in its entirety, then the following terms and conditions will apply only with respect to each applicable Validation Target or Collaboration Target that is the subject of such termination and (b) the terms in this Section 13.7.4 will only apply with respect to a Wave Collaboration Target in the event of a termination by GSK for cause with respect to such Wave Collaboration Target (not in the event of a termination of this Agreement in its entirety).

13.7.4.1 Within [***] following the receipt of the applicable notice of such termination of this Agreement, the Parties would jointly prepare a termination and wind-down plan that will include, at a minimum, a plan for accomplishing the activities described in this Section 13.7 (Effects of Expiration or Termination; Survival) ("**Termination and Wind-Down Plan**"), which Termination and Wind-Down Plan (including any amendments thereto) will be subject to the mutual agreement of both Parties.

13.7.4.2 If this Agreement is terminated in its entirety, then, except as set forth in Section 13.7.4.4 or 13.7.5 (Reversion Rights), all licenses granted under Section 7 (Licenses) under this Agreement will terminate. If this Agreement is terminated with respect to a Validation Target or Collaboration Target, then, except as set forth in Section 13.7.4.4 or 13.7.5 (Reversion Rights), all such licenses will terminate only with respect to such Validation Target or Collaboration Target.

13.7.4.3 Except as set forth in this Section 13.7 (Effects of Expiration or Termination; Survival), as of the effective date of such termination all rights and obligations of the Parties under this Agreement (a) will terminate if this Agreement is terminated in its entirety, and (b) with

respect to applicable Validation Target or Collaboration Target (and the Terminated Products that are directed to such Collaboration Target), if this Agreement is terminated with respect to a Validation Target or Collaboration Target.

13.7.4.4 Target Lists. In the event of termination of the Agreement in its entirety during the Research Term other than termination by GSK under Section 13.5.1 (Right to Terminate for Material Breach) due to a breach by Wave, Wave will have [***]. For any such [***] with the applicable terms and conditions in this Agreement set forth [***] after the effective date of termination.

13.7.4.5 Return of Confidential Information. Each Party will promptly destroy or return to the other Party all of such other Party's Confidential Information that relates to a Terminated Target and that was provided by or on behalf of such other Party hereunder that is in the possession or control of such Party (or any of its Affiliates), except that such Party will have the right to retain one (1) copy of intangible Confidential Information of such other Party for legal and archival purposes under the Party's record retention policy. For clarity, the foregoing sentence will not apply in the case of Wave for any Confidential Information of GSK that is Reversion Technology.

13.7.4.6 Dissolution of the JSC, JDC, JRC and JPC and Subcommittees. If this Agreement is terminated in its entirety, then the JSC, JDC, JRC and JPC and all Subcommittees will be dissolved as of the effective date of such termination.

13.7.5 Reversion Rights. In the event of termination of the Agreement in its entirety other than termination by GSK under Section 13.5.1 (Right to Terminate for Material Breach) due to a material breach by Wave, in addition to Section 13.7.4, (a) if this Agreement is terminated with respect to the SERPINA1 Target, then the provisions of this Section 13.7.5 (Reversion Rights) will apply with respect to the then-existing SERPINA1 Compounds and SERPINA1 Products. or (b) if this Agreement is terminated with respect to a GSK Collaboration Target for which Wave elects to continue Development and Commercialization and the Parties reach agreement on terms pursuant to Section 13.7.5.1(a), the agreed terms will apply with respect to the then existing Terminated Products directed to the applicable Terminated Target.

13.7.5.1 [***].

(a) In the event of any termination of this Agreement with respect to a GSK Collaboration Target other than in the event of termination by GSK under Section 13.5.1 (Right to Terminate for Material Breach) due to breach by Wave, Wave may elect to continue Development and Commercialization of all Terminated Products directed to such GSK Collaboration Target by providing written notice of such election to GSK within [***] after the date such GSK Collaboration Target becomes a Terminated Target. If Wave makes such an election, the Parties shall [***].

(b) In the event of any termination of this Agreement with respect to the SERPINA1 Target, the Reversion License set forth in Section 13.7.5.2 will [***], and the other provisions of this Section 13.7.5 (Reversion Rights) will apply with respect to then existing Terminated Products directed to the SERPINA1 Target [***].

(c) For clarity, in the event of any termination of this Agreement with respect to a Wave Collaboration Target, Wave will have no obligations to GSK with respect to Collaboration Compounds or Collaboration Products directed to such Wave Collaboration Target under this Agreement so long as Wave or its Affiliates or any sublicensees or assignees of the Collaboration Compounds or Collaboration Products directed to such Wave Collaboration Target do not develop, make or commercialize any such Collaboration Compounds or Collaboration Products directed to such Wave Collaboration Target. If such Collaboration Compounds or Collaboration Products directed to such Wave Collaboration Target are later developed, made or commercialized by or on behalf of, or under license from, Wave or its Affiliates or any sublicensees or assignees, then the royalty obligations, royalty reporting and auditing, indemnification and compliance with laws provisions of this Agreement will still apply to such development, making or commercialization of any such Collaboration Compounds or Collaboration Products directed to such Wave Collaboration Target.

13.7.5.2 Reversion License. Subject to Section 13.7.5.1 [***] where the Terminated Target is the SERPINA1 Target, effective upon the effective date of termination of this Agreement or the SERPINA1 Target, GSK will grant and hereby does grant (without any further action required on the part of Wave) to Wave and its Affiliates, an exclusive, royalty-bearing, worldwide, irrevocable, perpetual license, with the right to grant sublicenses through multiple tiers, under the Reversion Technology, solely to the extent necessary to Exploit the then existing SERPINA1 Compounds and SERPINA1 Products in the Field in the Territory (the "**Reversion License**").

13.7.5.3 Royalties for SERPINA1 Products. Where the SERPINA1 Target is a Terminated Target, Wave will pay GSK royalties based on the aggregate Net Sales (*mutatis mutandis*) of the then existing SERPINA1 Products sold by Wave or its Related Parties during a Calendar Year falling within the period of time that is [***].

13.7.5.4 Regulatory Approvals and Regulatory Materials for SERPINA1 Products. Subject to Section 13.7.5.1 [***] where the Terminated Target is the SERPINA1 Target, effective upon the effective date of termination of this Agreement or the SERPINA1 Target, GSK will as promptly as practicable, at GSK's cost, (a) assign to Wave or Wave's designee possession and ownership of all Regulatory Approvals and other Regulatory Documents relating exclusively to the Exploitation of the SERPINA1 Compounds or SERPINA1 Products in the Territory; provided that (i) [***] and (b) transfer to Wave or Wave's designee copies of all material correspondence with Regulatory Authorities in GSK's possession or Control related to the SERPINA1 Compounds or SERPINA1 Products in the Territory, including all non-clinical and clinical data relating to

the SERPINA1 Compounds or SERPINA1 Products and all adverse event data related to the SERPINA1 Compounds or SERPINA1 Products, in each case, in the Territory and in GSK's possession and Control.

13.7.5.5 Continuation of Supply for SERPINA1 Products. Subject to Section 13.7.5.1 [***], where the Terminated Target is the SERPINA1 Target, effective upon the effective date of termination of this Agreement or the SERPINA1 Target, if GSK or its Related Parties are Manufacturing finished product with respect to SERPINA1 Compounds or SERPINA1 Products on the effective date of termination of this Agreement, then at Wave's request, GSK or its Related Parties will negotiate in good faith to enter into a commercially reasonable supply agreement pursuant to which GSK or such Related Party would supply such finished product to Wave under customary supply terms (including reasonable commercial supply price markup), until the earlier of (a) such time as all Regulatory Approvals related to the SERPINA1 Compounds or SERPINA1 Products have been assigned to Wave or its designee, Wave has obtained all necessary manufacturing approvals, and Wave has procured or developed its own source of such finished product supply, or (b) [***] following the effective date of such termination; provided that in the event the Manufacture of the SERPINA1 Compounds or SERPINA1 Products [***].

13.7.5.6 GSK Trademarks for SERPINA1 Products. Subject to Section 13.7.5.1 [***] where the Terminated Target is the SERPINA1 Target, effective upon the effective date of termination of this Agreement or the SERPINA1 Target, GSK will grant a royalty-free, fully paid, license to Wave under any Trademarks exclusively used in connection with the SERPINA1 Compounds or SERPINA1 Products (but not any GSK house marks or any Trademark containing the word "GSK") owned by GSK and used for the SERPINA1 Products in the Field in the Territory.

13.7.5.7 Inventory Transfer for SERPINA1 Products. Subject to Section 13.7.5.1 [***] where the Terminated Target is the SERPINA1 Target, effective upon the effective date of termination of this Agreement or the SERPINA1 Target, GSK will transfer [***].

14. EFFECTIVENESS

14.1 Effective Date. Notwithstanding anything to the contrary set forth herein, except for the Parties' obligations under Section 10 **(Confidentiality)** and this Section 14 (Effectiveness), which will be effective as of the Execution Date, this Agreement will not become effective until the first Business Day after the later to occur of: (a) the HSR Conditions are met and (b) the Closing of the Share Purchase Agreement (where "Closing" will have the meaning set forth in the Share Purchase Agreement) (such date the "**Effective Date**"). Notwithstanding the foregoing clause (a), the Effective Date will not occur (i) if a Party exercises its termination right pursuant to Section 14.3 (Outside Date) and (ii) for so long as there is in force any Applicable Law or order from a Governmental Authority enjoining or prohibiting the consummation of the transactions contemplated by this Agreement, or imposing any conditions in connection with such effectiveness.

14.2 Antitrust Filings. If any applicable waiting periods and approvals are required under Antitrust Laws with respect to the transactions contemplated under this Agreement, then each Party (or its Affiliate) will file the appropriate notices under the HSR Act or similar notices or filings under

Applicable Laws in any other jurisdiction ("**Antitrust Filings**") within [***] after the Execution Date. The Parties shall use reasonable best efforts to seek to obtain the expiration or early termination of the applicable waiting period under the HSR Act, and will keep each other apprised of the status of any communications with, and any inquiries or requests for additional information from, the United States' Federal Trade Commission ("**FTC**"), the Antitrust Division of the United States Department of Justice ("**DOJ**") and any other Governmental Authority with which an Antitrust Filing is made and will comply promptly with any reasonable FTC, DOJ or other Governmental Authority inquiry or request of this nature; provided that neither Party will be required to consent to the divestiture or other disposition of any of its assets (or the assets of its Affiliates) or to consent to any other structural or conduct remedy, and each Party and its Affiliates will have no obligation to contest, administratively or in court, any ruling, order or other action of the FTC, DOJ, other Governmental Authority or any Third Party with respect to the transactions contemplated by this Agreement. GSK will (i) control the strategy for obtaining any consents, approvals of, or registrations, declarations or filings from any Governmental Authority in connection with the transaction and (ii) coordinate the overall development of the positions to be taken and the regulatory actions to be requested in any filing or submission with a Governmental Authority in connection with the transactions contemplated hereby. [***]. Each of the Parties hereto will furnish to the other such necessary information and reasonable assistance as the other may request in connection with the preparation of any required filings or submissions and will cooperate in responding to any inquiry from the FTC or DOJ and to any requests for additional information at the earliest practicable date, including promptly informing the other Party of such inquiry, consulting in advance before making any presentations or submissions to the FTC or DOJ, and supplying each other with copies of all material correspondence, filings or communications between either party and either the FTC or DOJ with respect to this Agreement. Such information can be shared on an outside counsel basis or subject to other restrictions to the extent deemed necessary or advisable by counsel for the disclosing Party. To the extent practicable and as permitted by the FTC or DOJ, each Party hereto shall permit representatives of the other Party to participate in material substantive meetings (whether by telephone or in person) with the FTC or DOJ. Neither Party shall commit to or agree with the FTC or DOJ to withdraw its filing and refile under the HSR Act without the prior written consent of the other (such consent not to be unreasonably withheld, conditioned or delayed).

14.3 Outside Date. If, any applicable waiting periods and approvals are required under Antitrust Laws with respect to the transactions contemplated under this Agreement, this Agreement will terminate, at the election of either Party, immediately upon written notice to the other Party, in the event that: (a) the FTC, the DOJ or an equivalent other Governmental Authority in any jurisdiction outside the U.S., seeks a permanent injunction under applicable antitrust and non-competition Applicable Laws against the parties to enjoin the transactions contemplated by this Agreement; or (b) the Antitrust Clearance Date has not occurred on or prior to [***] after the effective date of any Antitrust Filing (or such later date as may be mutually agreed by the Parties). In the event of such termination, without any further action on the part of either Party, this Agreement will be of no further force and effect and no Party will have any further obligations under this Agreement, except for the Parties' obligations under Section 10 **(Confidentiality)** which survive.

15. DISPUTE RESOLUTION

15.1 Disputes. Except as otherwise expressly set forth in this Agreement, including Section 2.8 (Resolution of Committee Disputes), any controversy, claims or disputes of any nature arising under, relating to, or in connection with this Agreement or the breach of its terms ("**Disputes**"), will be resolved pursuant to this Section 15 (Dispute Resolution). It is the objective of the Parties to facilitate the resolution of disputes arising under this Agreement in an expedient manner by

mutual cooperation and without resort to arbitration or litigation. Accordingly, it is the Parties' expectation that most Disputes related to the strategy or operation of the Collaboration Programs will first be escalated to the JSC and will be resolved in accordance with Section 2.8 (Resolution of Committee Disputes).

15.2 Resolution by Executive Officers. For any Dispute that is [***].

15.3 Mediation. Subject to Section 15.6 (Injunctive Relief) and Section 15.7 (Intellectual Property Disputes), for (a) [***], the Parties agree that they will try in good faith to resolve such Dispute by referring it for confidential mediation under the CPR Mediation Procedure in effect at the start of mediation. If the Parties cannot agree on a mediator within [***] after the Dispute was referred to mediation, the mediator will, upon request by either Party, be appointed by CPR pursuant to CPR Mediation Procedure. The cost of mediator will be borne equally by the Parties. Any [***] referred to mediation under this Section 15.3 (Mediation) that is not resolved within [***] (or within such other time period as may be agreed to by Parties in writing) after appointment of the mediator will be resolved [***].

15.4 Arbitration. [***] will be determined by arbitration administered by the American Arbitration Association (the "**AAA**") in accordance with its Commercial Arbitration Rules and the Final Offer Supplementary Arbitration Rules (the "**AAA Rules**").

15.4.1 Any [***] concerning the propriety of the commencement of the arbitration or the scope or applicability of this agreement to arbitrate will be finally settled by the arbitrator.

15.4.2 There will be a single arbitrator appointed in accordance with the AAA Rules; provided that, if the Parties are unable to mutually agree on the selection of a single arbitrator, then the tribunal will select a single arbitrator in accordance with AAA Rules; provided that such arbitrator will have reasonably sufficient pharmaceutical industry experience relevant to the subject matter of such dispute.

15.4.3 The governing law in Section 16.9 (Governing Law) will govern such proceedings. The place of arbitration will be New York, New York, unless otherwise agreed to by the Parties, and the language of the arbitration will be English.

15.4.4 The arbitrator will use their best efforts to rule on the dispute [***] after appointment of the arbitrator. The arbitrator will issue appropriate protective orders to safeguard each Party's Confidential Information. The decision by the arbitrator will be final and binding on the Parties and not subject to appeal of any kind, except in the case of fraud, willful misconduct or gross negligence or manifest error. All rulings of the arbitrator will be in writing and will be delivered to the Parties as soon as is reasonably possible. Nothing contained herein will be construed to permit the arbitrator to award punitive, exemplary or any similar damages. Any arbitration award may be entered in and enforced by a court in accordance with Section 15.4.5, Section 15.6 (Injunctive Relief) and Section 15.7 (Intellectual Property Disputes), as applicable.

15.4.5 Any award to be paid by one Party to the other Party as determined by the arbitrator as set forth above under Section 15.4.4 will be promptly paid in Dollars free of any tax, deduction or offset; and any costs, fees or taxes incident to enforcing the award will, to the maximum extent permitted by Applicable Law, be charged against the Party resisting enforcement. Each Party agrees to abide by the award rendered in any arbitration conducted pursuant to this Section 15.4 (Arbitration) and that judgment may be entered upon the final award in a

court of competent jurisdiction and that other courts may award full faith and credit to such judgment in order to enforce such award.

15.4.6 The arbitrator may award to the prevailing Party, if any, as determined by the arbitrator as set forth above under Section 15.4.4, the prevailing Party's cost, fees and expenses incurred in connection with such arbitration.

15.5 [***]. Notwithstanding the foregoing, any [***] will be resolved by [***] as follows:

15.5.1 The Parties will discuss in good faith and agree [***] shall be [***] for the [***].

15.5.2 Each Party will prepare and submit a written summary of such Party's position with respect to such disputed matter and any relevant evidence in support thereof to the [***] of selection of the [***]. Such [***] will be responsible for setting reasonable procedural limitations for the Parties' submissions (e.g., length, format, style).

15.5.3 Upon receipt of such summaries and evidence from both Parties, the [***]. The [***] will make a final decision with respect to such disputed matter within [***] following receipt of summaries and evidence from both Parties. The [***] will provide the Parties with a written statement briefly setting forth the [***] decision and the basis of such decision. The [***] decision will [***].

15.5.4 The decision by the [***] will be final and binding on the Parties and not subject to appeal of any kind, except in the case of fraud, willful misconduct or gross negligence or manifest error.

15.6 Injunctive Relief. Nothing in this Agreement will be construed as precluding a Party from bringing an action for injunctive relief or other equitable relief, including prior to the initiation or completion of the dispute resolution mechanisms contemplated by this Agreement.

15.7 Intellectual Property Disputes. Notwithstanding any provision to the contrary set forth in this Agreement, if a Dispute arises under this Agreement with respect to the validity, scope, enforceability or ownership of any Patent, Know-How or other intellectual property rights, and such Dispute is not resolved through [***]then such Dispute will be submitted to a court of competent jurisdiction in the jurisdiction in which such Patent, Know-How or other intellectual property right was granted or arose.

15.8 Confidentiality. All dispute resolution proceedings undertaken by the Parties pursuant to this Section 15 (Dispute Resolution) will be confidential and the Parties' will take appropriate measures to safeguard each Party's Confidential Information. Except as required by Applicable Law, no Party will make (or instruct any Third Party, including any mediator or arbitrator, to make) any public announcement with respect to the dispute resolution proceedings or any final resolution of any Dispute hereunder, in each case, without prior written consent of the other Party. The existence of any Dispute under this Section 15 (Dispute Resolution), and any final resolution, decision or award reached or granted pursuant to this Section 15 (Dispute Resolution), will be kept in confidence by the Parties (in each case, except to the extent disclosure is required under Applicable Law or to the extent necessary to enforce the rights arising out of the award) and any mediator or arbitrator, as applicable, except as required in connection with the enforcement of such final resolution, decision or award or as otherwise required by Applicable Law.

15.9 Tolling. The Parties agree that all applicable statutes of limitation and time-based defenses (such as estoppel and laches), as well as all time periods in which a Party must exercise rights or perform obligations hereunder, will be tolled once the dispute resolution procedures set forth in this Section 15 (Dispute Resolution) have been initiated and for so long as they are pending, and the Parties will cooperate in taking all actions reasonably necessary to achieve such a result. In addition, during the pendency of any Dispute under this Agreement initiated before the end of any applicable cure period, including under Section 13.5 (Termination for Cause), (a) this Agreement will remain in full force and effect, (b) the provisions of this Agreement relating to termination for material breach with respect to such Dispute will not be effective, (c) the time periods for cure under Section 13.5 (Termination for Cause) as to any termination notice given prior to the initiation of arbitration will be tolled, (d) any time periods to exercise rights or perform obligations will be tolled; and (e) neither Party will issue a notice of termination pursuant to this Agreement based on the subject matter of the arbitration, in each case ((a) – (e)), until the arbitral tribunal has confirmed the material breach and the existence of the facts claimed by a Party to be the basis for the asserted material breach; *provided that* if such breach can be cured by (i) the payment of money, then the defaulting Party will have an additional [***] after its receipt of the arbitral tribunal's decision to pay such amount, or (ii) the taking of specific remedial actions, the defaulting Party will have a reasonably necessary period to diligently undertake and complete such remedial actions within such reasonably necessary period or any specific timeframe established by such arbitral tribunal's decision before any such notice of termination can be issued. Further, with respect to any time periods that have run during the pendency of the Dispute, the applicable Party will have a reasonable period of time or any specific timeframe established by such arbitral tribunal's decision to exercise any rights or perform any obligations affected by the running of such time periods.

16. MISCELLANEOUS PROVISIONS

16.1 Relationship of the Parties. Nothing in this Agreement is intended or will be deemed, for financial, Tax, legal or other purposes, to constitute a partnership, agency, joint venture or employer-employee relationship between the Parties.

16.2 Assignment. Except as expressly provided herein, neither this Agreement nor any right or obligation hereunder will be assignable or transferable, whether voluntarily or by operation of law, without the prior written consent of the other Party (not to be unreasonably withheld or delayed).

16.2.1 Each Party may assign or transfer this Agreement or any of its rights and obligations hereunder to any Affiliate, or to any Third Party that acquires all, or substantially all, of such Party's assets or business, relating to all, or substantially all, of the business of the assigning Party to which the subject matter of this Agreement relates (whether by sale of assets or stock, merger, consolidation, reorganization or otherwise), without the consent of the other Party. Each Party may assign its rights and obligations under this Agreement with respect to the SERPINA1 Program to any Third Party that acquires all, or substantially all, of such Party's assets or business, relating to the SERPINA1 Program, without the consent of the other Party. GSK may assign its rights and obligations under this Agreement with respect to any GSK CP to any Third Party that acquires all, or substantially all, of GSK's assets or business, relating to such GSK CP, without the consent of Wave. Wave may assign its rights and obligations under this Agreement with respect to a given Wave CP to any Third Party that acquires all, or substantially all, of Wave's assets or business, relating to such Wave CP, without the consent of GSK; [***]. An assignment to an Affiliate will terminate, and all rights so assigned will revert to the assigning Party, if and when such Affiliate ceases to be an Affiliate of the assigning Party. Each assigning Party will give written notice to the other Party promptly following any such assignment or transfer.

16.2.2 No assignment under this Section 16.2 (Assignment) will relieve the assigning Party of any of its responsibilities or obligations hereunder and, as a condition of such assignment, the assignee will agree in writing to be bound by all obligations of the assigning Party hereunder. This Agreement will be binding upon the successors and permitted assigns of the Parties.

16.2.3 Any assignment or other transfer not in accordance with this Section 16.2 (Assignment) will be null and void.

16.3 Performance and Exercise by Affiliates. Each Party will have the right to have any of its obligations hereunder performed, or its rights or licenses hereunder exercised, by any of its Affiliates and the performance of such obligations by any such Affiliate will be deemed to be performance by such Party; provided, however, that such Party will be responsible for ensuring the performance of its obligations under this Agreement and that any failure of any Affiliate performing obligations of such Party hereunder will be deemed to be a failure by such Party to perform such obligations. For clarity, the foregoing means that each Party may designate or subcontract to an Affiliate to perform its obligations hereunder or to be the recipient of the other Party's performance obligations hereunder.

16.4 Further Actions. Each Party agrees to execute, acknowledge and deliver such further instruments and to do all such other acts as may be necessary or appropriate in order to carry out the purposes and intent of this Agreement.

16.5 Accounting Procedures . Each Party will calculate all amounts, and perform other accounting procedures required, under this Agreement and applicable to it in accordance with such Party's then-current Accounting Standards, consistently applied. All terms of an accounting or financial nature in this Agreement will be construed in accordance with the foregoing Accounting Standard.

16.6 Force Majeure.

16.6.1 Neither Party will be liable to the other Party or be deemed to have breached or defaulted under this Agreement for failure or delay in the performance of any of its obligations under this Agreement for the time and to the extent such failure or delay is caused by or results from any condition, the occurrence and continuation of which is beyond the reasonable control of the affected Party, which may include (a) fire, floods, earthquakes or other acts of nature; (b) epidemics, pandemics, the spread of infectious diseases, quarantines or disease outbreaks (including, to the extent permitted by Section 16.6.2, COVID-19 or other ongoing events); (c) sanctions and embargoes; (d) war or acts of war, terrorism, sabotage, nuclear threat or activity, insurrections, riots or civil unrest; (e) strikes, lockouts or other labor disputes; (f) acts, omissions or delays in acting by a Governmental Authority, including acts of any agency thereof, judicial orders or decrees; (g) delay or impossibility to obtain materials, intermediates, components, active pharmaceutical ingredient, utilities, equipment, supplies, fuel or other required materials, or failure or delay of transportation (in each case, due to reasons other than the affected Party's negligence, willful misconduct or any other cause within the reasonable control of the affected Party); (h) failure of plant or machinery (provided that such failure could not have been prevented by the exercise of skill, diligence or prudence that would be reasonably and ordinarily expected from a skilled and experienced person engaged in the same type of undertaking under the same or similar circumstances or restrictions); or (i) any other reason or circumstance that is beyond the reasonable control of the affected Party ("**Force Majeure Events**"). The Party affected by a Force Majeure Event will (i) provide the other Party with full particulars thereof as soon

as it becomes aware of the same (including its best estimate of the likely extent and duration of the interference with its activities) and (ii) use Commercially Reasonable Efforts to overcome the difficulties created thereby and to resume performance of its obligations hereunder as soon as practicable.

16.6.2 For clarity, GSK and Wave acknowledge and agree that either Party's ability to perform its obligations under this Agreement after the Execution Date may be affected by certain known ongoing Force Majeure Events, including, for example, COVID-19 or other pandemics and war in Europe. As such, both Parties understand and acknowledge and agree that any change in circumstances related to such ongoing events by a Governmental Authority or Regulatory Authority (e.g., another mandatory shelter in place or stay at home order or changes to essential business rules) may constitute a Force Majeure Event even if the change in circumstances itself is foreseeable. If a Party is prevented from performing any of its obligations under this Agreement due to a change in circumstances as a result of such ongoing events after the Execution Date, such non-performing Party will provide written notice to the other Party of such change in circumstances, and from and after such notice, will not be liable for breach of this Agreement with respect to such non-performance during the period of such Force Majeure Event. Without limiting the foregoing, through the JSC, the Parties will agree on extensions to timeframes set forth in this Agreement to account for delays in carrying out activities and obligations hereunder to the extent such delays are a result of disruptions to business caused by the aforementioned ongoing events or related laws or regulations.

16.7 Entire Agreement; Amendments. This Agreement, and the Schedules and Exhibits hereto, and the Equity Agreements will constitute and contain the entire understanding and agreement of the Parties respecting the subject matter hereof and cancel and supersede any and all prior negotiations, correspondence, understandings and agreements between the Parties, whether oral or written, regarding such subject matter, including the Existing Confidentiality Agreement. Except as specified herein, no waiver, modification or amendment of any provision of this Agreement will be valid or effective unless made in writing referencing this Agreement and signed by a duly authorized officer of each Party.

16.8 Headings. The headings to this Agreement are for convenience only and are to be of no force or effect in construing or interpreting any of the provisions of this Agreement.

16.9 Governing Law. This Agreement, and all claims or causes of action (whether in contract, tort or statute) that may be based upon, arise out of or relate to this Agreement, or the negotiation, execution or performance of this Agreement (including any claim or cause of action based upon, arising out of or related to any representation or warranty made in or in connection with this Agreement or as an inducement to enter into this Agreement), will be governed by and interpreted in accordance with the internal Applicable Laws of the State of New York, including its statutes of limitations but excluding application of any conflict of laws principles that would require application of the Applicable Law of a jurisdiction outside of the State of New York. The United Nations Convention on Contracts for the International Sale of Goods will not apply to this Agreement.

16.10 Notices. Any notice required or permitted to be given under this Agreement will be in writing and will be deemed to have been sufficiently given if delivered by express courier service (signature required) to the Party to which it is directed at its address shown below or such other address as such Party will have last given by notice to the other Party; provided that any notice to Wave must include a copy delivered to the email address(es) set forth for Wave. Notices will be deemed

effective the next day if sent by express courier service. Either Party may change its address for purposes hereof by written notice to the other in accordance with the provisions of this Section 16.10 (Notices).

If to GSK, addressed to:

GlaxoSmithKline
259 E Grand Ave Fifth Floor, Suite 1
San Francisco, CA 94080
Attn: VP, Alliance Management

With a copy, which will not constitute notice, to:

GlaxoSmithKline
980 Great West Road
Brentford, Middlesex TW8 9GS
United Kingdom
Attn: VP & Head of Legal Business Development & Corporate

If to Wave, addressed to:

Wave Life Sciences
733 Concord Avenue
Cambridge, Massachusetts 02138
Attention: General Counsel
Email: [***]

With a copy, which will not constitute notice, to:

Goodwin Procter LLP
100 Northern Avenue
Boston, Massachusetts 02210
[***]
[***]

16.11 Language; Waiver of Rule of Construction . The official language of this Agreement and between the Parties for all correspondence will be the English language. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this Agreement. Accordingly, the rule of construction that any ambiguity in this Agreement will be construed against the drafting Party will not apply.

16.12 Waiver. A waiver by either Party of any of the terms and conditions of this Agreement in any instance will not be deemed or construed to be a waiver of such term or condition for the future, or of any other term or condition hereof. All rights, remedies, undertakings, obligations and agreements contained in this Agreement will be cumulative and none of them will be in limitation of any other remedy, right, undertaking, obligation or agreement of either Party.

16.13 Severability. When possible, each provision of this Agreement will be interpreted in such manner as to be effective and valid under Applicable Law, but if any provision of this Agreement is held to be prohibited by or invalid under Applicable Law, such provision will be ineffective only to the extent of such prohibition or invalidity, without invalidating the remainder of this Agreement. The

Parties will make a good faith effort to replace the invalid or unenforceable provision with a valid one which in its effect including economic effect is most consistent with the invalid or unenforceable provision.

16.14 **Interpretation**. All references herein to Articles, Sections, Exhibits and Schedules will be deemed references to Articles and Sections of, and Exhibits and Schedules to, this Agreement unless the context will otherwise require. Except where the context otherwise requires, wherever used, (a) the singular will include the plural, the plural the singular; (b) the use of any gender will be applicable to all genders; (c) the word "or" is used in the inclusive sense (and/or); (d) the words "include," "includes" and "including" will be deemed to be followed by the phrase "without limitation"; (e) the word "shall" will be construed to have the same meaning and effect as the word "will"; (f) any definition of or reference to any agreement, instrument or other document herein will be construed as referring to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein); (g) any reference herein to any Person will be construed to include the Person's successors and assigns; (h) the words "herein," "hereof" and "hereunder," and words of similar import, will be construed to refer to this Agreement in its entirety and not to any particular provision hereof; (i) the word "notice" will mean notice in writing (whether or not specifically stated), will include any written instrument or communication delivered in accordance with Section 16.10 (Notices), unless otherwise specified herein; (j) provisions that require that a Party, the Parties or any committee hereunder "agree," "consent" or "approve" or words of similar import will require that such agreement, consent or approval be specific and in writing, whether by written agreement, letter, approved minutes, email or otherwise; (k) any reference to a "sublicensee" of under this Agreement will be construed to include Sublicensees; and (l) references to any specific law, rule or regulation, or article, section or other division thereof, will be deemed to include the then-current amendments thereto or any replacement or successor law, rule or regulation thereof. Unless the context otherwise requires, countries will include territories.

16.15 **Expenses**. Except as otherwise provided herein, all fees, costs and expenses (including any legal, accounting and banking fees) incurred in connection with the preparation, negotiation, execution and delivery of this Agreement and to consummate the transactions contemplated hereby will be paid by the Party hereto incurring such fees, costs and expenses.

16.16 **Binding Effect; No Third Party Beneficiaries**. As of the Execution Date, this Agreement will be binding upon and inure to the benefit of the Parties and their respective permitted successors and permitted assigns. Except as expressly set forth in this Agreement, no Person other than the Parties and their respective Affiliates and permitted assignees hereunder will be deemed an intended beneficiary hereunder or have any right to enforce any obligation of this Agreement.

16.17 **Counterparts**. This Agreement may be executed in counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. A DocuSign, or other electronically signed, or portable document format (PDF) copy of this Agreement, including the signature pages, will be deemed an original.

[SIGNATURE PAGE FOLLOWS]

[THE REMAINDER OF THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized representatives as of the Execution Date.

WAVE LIFE SCIENCES USA, INC.

BY: /s/ Chris Francis

NAME: Chris Francis

TITLE: SVP, Corporate Development

WAVE LIFE SCIENCES UK LIMITED

BY: /s/ Kate Burt

NAME: Kate Burt

TITLE: VP, Corporate Development

GLAXOSMITHKLINE INTELLECTUAL PROPERTY (NO. 3) LIMITED

BY: /s/ John J. Lepore, MD

NAME: John J. Lepore, MD

TITLE: SVP, Head of Research, GSK

Schedule 1.71

Existing GSK Third Party Agreements

[***]

Schedule 1.178

[***]

[***]

Schedule 1.233
SERPINA1

NAME OF TARGET	GENE ID NUMBER
SERPINA1	5265

Schedule 3.3.1
Target List

[***]

Schedule 3.4.3

Target Validation Research Programs

[***]

Schedule 4.1.1

SERPINA1 Phase 1/2 Program Plan

[***]

Schedule 4.1.3.1

SERPINA1 Program Technology Transfer

[***]

Schedule 4.2

[***]

[***]

Schedule 4.4.4

Additional Compliance Terms

[***].

Schedule 7.5

GSK Sublicensing Rights

[***]

Schedule 9.10.1

Invoicing and Bank Details Instructions

A. All invoices shall include, at a minimum, the following information:

A copy of all invoices in PDF format should be sent via email **[***]**.
Invoice must include the following details:

a. Wave letterhead.
b. Bank details – see format below
c. Contact name and contact number.
d. Invoice date and invoice number.
e. Reference stating the contractual clause invoice relates to.
f. Payment terms and currency, with reference to the relevant clause
g. Invoice must be addressed to the following company and address:

GLAXOSMITHKLINE INTELLECTUAL PROPERTY (NO. 3) LIMITED
980 Great West Road,
Brentford,
Middlesex,
TW8 9GS
United Kingdom
GB239820839

For any queries in relation to invoicing, **[***]**.

B. Bank information details format

[***].

Schedule 10.5.1

Press Release

Wave Life Sciences and GSK Announce Collaboration to Drive Discovery and Development of Oligonucleotide Therapeutics Focusing on Novel Genetic Targets

Wave receives upfront payment of $170 million in cash and equity, also eligible to receive milestone payments and royalties

Collaboration brings together Wave's PRISM™ oligonucleotide platform and GSK's expertise in genetics and genomics

GSK to advance up to eight preclinical programs

Additionally, GSK receives exclusive global license to Wave's preclinical, potential first-in-class RNA editing program, WVE-006, to treat alpha-1 antitrypsin deficiency, a disease that impacts the lungs and liver

Wave to advance up to three preclinical programs for targets informed by GSK's novel insights

Wave to host investor conference call and webcast at 8:30 a.m. ET today

CAMBRIDGE, Mass., and LONDON, December 13, 2022 – Wave Life Sciences Ltd. (Nasdaq: WVE), a clinical-stage genetic medicines company committed to delivering life-changing treatments for people battling devastating diseases, and GSK plc (LSE/NYSE: GSK) today announced a strategic collaboration to advance oligonucleotide therapeutics, including Wave's preclinical RNA editing program targeting alpha-1 antitrypsin deficiency (AATD), WVE-006. The discovery collaboration has an initial four-year research term. It combines GSK's unique insights from human genetics, as well as its global development and commercial capabilities, with Wave's proprietary discovery and drug development platform, PRISM™.

Oligonucleotides are short strands of DNA or RNA that can reduce, restore, or modulate RNA through several different mechanisms. The unique capability of oligonucleotides to address a wide range of genomic targets in multiple therapeutic areas is enabling new opportunities to treat a range of human diseases, including diseases where no medicines currently exist or that have historically been difficult to treat with small molecules or biologics.

Wave's PRISM platform is the only oligonucleotide platform offering three RNA-targeting modalities (editing, splicing, and silencing, including siRNA and antisense). Importantly, these modalities incorporate novel chemistry, including PN backbone chemistry and control of stereochemistry, to optimize the pharmacological properties of therapeutic oligonucleotides.

The collaboration includes two main components. The first is a discovery collaboration which enables GSK to advance up to eight programs and Wave to advance up to three programs, leveraging Wave's PRISM platform and GSK's expertise in genetics and genomics. In addition to these programs, GSK receives the exclusive global license for Wave's preclinical program for AATD called WVE-006, which uses Wave's proprietary "AIMer" technology (A-to-I(G) RNA editing). AATD is an inherited genetic disease that affects both the lungs and liver with limited treatment options. Wave's WVE-006 is a first-in-class RNA editing therapeutic that is designed to address both liver and lung manifestations of the disease.

Paul Bolno, MD, MBA, President and Chief Executive Officer, Wave Life Sciences, said: "For the past decade, Wave has been building a unique oligonucleotide platform that combines novel chemistry with the means to optimally address disease biology through multiple therapeutic modalities. In 2022, we started to deliver on the promise of our platform with the first data showing translation in the clinic for our next-generation stereopure PN-chemistry containing candidates. Now with our GSK collaboration, we are excited to leverage their expertise in genetics to continue building a differentiated oligonucleotide pipeline, with a focus on our best-in-class RNA editing and upregulation capability. Additionally, GSK is the ideal partner for our WVE-006 program, due to their longstanding history and global reach in respiratory diseases. The collaboration meaningfully extends our cash runway into 2025 and offers the potential for significant future milestones, providing new resources to deliver life-changing medicines to patients."

Tony Wood, President and Chief Scientific Officer, GSK, said: "Oligonucleotide therapeutics are becoming a mainstream modality, and this collaboration will enable us to use our leading position in human genetics and genomics to advance novel oligonucleotide therapies. Pairing GSK's genetic expertise with the best-in-class PRISM™ platform enables us to accelerate drug discovery for newly-identified targets, by matching target to modality. The addition of WVE-006 complements more advanced, clinical-phase oligonucleotides in our pipeline, including bepirovirsen for chronic hepatitis B and GSK4532990 for non-alcoholic steatohepatitis (NASH)."

Bepirovirsen, an investigational antisense oligonucleotide for the potential treatment of chronic hepatitis B infection, is now entering Phase III trials, and GSK4532990, a siRNA oligonucleotide, is progressing to Phase II for NASH. WVE-006 brings a third oligonucleotide into GSK's portfolio that has the potential to be a first-in-class AATD treatment for both lung and liver disease and is a well-understood genetic target, contributing to GSK's pipeline that is now more than 70% genetically validated.

The companies expect to pursue targets across multiple disease areas, given preclinical data indicating Wave oligonucleotides can distribute to various tissues and cells without complex delivery vehicles.

Terms of the Collaboration
Under the terms of the agreement, Wave will receive an upfront payment of $170 million, which includes a cash payment of $120 million and a $50 million equity investment.

For the WVE-006 program, Wave is eligible to receive up to $225 million in development and launch milestone payments and up to $300 million in sales-related milestone payments, as well as tiered sales royalties. Development and commercialization responsibilities will transfer to GSK after Wave completes the first-in-patient study.

For each of GSK's eight collaboration programs, Wave will be eligible to receive up to $130-$175 million in development and launch milestones and $200 million in sales-related milestones, along with tiered sales royalties. Wave will lead all preclinical research for GSK and Wave programs up to investigational new drug (IND) enabling studies. GSK collaboration programs will transfer to GSK for IND-enabling studies, clinical development, and commercialization. The collaboration includes an option to extend the research term for up to three additional years, expanding the number of programs available to both parties.

The equity investment and collaboration agreement will complete at the same time and are conditional upon customary conditions including regulatory review by the appropriate regulatory agencies under the Hart-Scott-Rodino Act.

Investor Conference Call and Webcast
Wave management will host an investor conference call today at 8:30 a.m. ET to discuss the strategic collaboration announcement. The webcast of the conference call and corresponding slide presentation may be accessed by visiting "Events" on the investor relations section of the Wave Life Sciences corporate website: ir.wavelifesciences.com/events-and-presentations.

Analysts planning to participate during the Q&A portion of the live call can join the conference call at the audio conferencing link available here. Once registered, participants will receive the dial-in information. Following the live event, an archived version of the webcast will be available on the Wave Life Sciences website.

About Oligonucleotides
Oligonucleotide mechanisms that can reduce, increase or modify RNA include silencing (oligonucleotides that promote degradation of the target RNA, including antisense and siRNA); splicing (oligonucleotides that involve binding to the target RNA and modulating its function by promoting exon skipping); and ADAR-mediated RNA editing (oligonucleotides that edit adenosines in target RNAs to correct RNA or modulate protein function or production). GSK's investments in genetics have revealed that a significant number of genetic associations point to proteins where modulation of RNA function and/or expression would likely be the most effective mechanism for therapeutic intervention versus more traditional small molecules and biologic-based therapeutics. Oligonucleotide therapeutics represent a modality that addresses this gap by regulating target expression rather than function.

About AIMers
Wave's AIMers are designed to correct mutations in an RNA transcript, thereby avoiding permanent changes to the genome that occur with DNA-targeting approaches. Rather than using an exogenous editing enzyme, AIMers recruit normal proteins that exist in the body, called ADAR enzymes, which naturally edit certain adenine (A) bases to inosine (I). Because I is read as G (guanine) by the cellular translational machinery, sequence-directed editing with ADAR has the potential to revert transcripts with single G-to-A point mutations that cause genetic diseases. This approach redirects a natural system for therapeutic purposes, enables simplified delivery without viral particles or liposomes, and avoids the risk of irreversible off-target effects of DNA-targeting approaches. AIMers are short in length, fully chemically modified, and use novel chemistry, including proprietary PN backbone modifications and chiral control, that make them distinct from other ADAR-mediated editing approaches.

About Alpha-1 Antitrypsin Deficiency

Alpha-1 antitrypsin deficiency (AATD) is an inherited genetic disorder that is commonly caused by a G-to-A point mutation ("Z allele") in the *SERPINA1* gene. This mutation leads to lung disease due to lack of wild-type alpha-1 antitrypsin (M-AAT) function in lungs, and it leads to liver disease due to aggregation of misfolded Z-AAT protein in hepatocytes. There are approximately 200,000 patients in the United States and Europe who have Z mutations on both alleles, known as the PiZZ genotype. Augmentation therapy via delivery of AAT protein is the only treatment option for AATD lung disease and requires weekly intravenous infusions. There are no treatments for AATD liver disease, other than liver transplantation.

About WVE-006
WVE-006 is a PN chemistry-modified GalNAc-conjugated investigational development candidate for the treatment of alpha-1 antitrypsin deficiency (AATD), designed to correct the mutant SERPINA1 Z allele transcript to address both liver and lung manifestations of disease. WVE-006 is a potential first-in-class RNA editing candidate (AIMer) and the most advanced program currently in development using an oligonucleotide to harness an endogenous enzyme for editing. Wave expects to submit clinical trial applications for WVE-006 in 2023.

About Wave Life Sciences
Wave Life Sciences (Nasdaq: WVE) is a clinical-stage genetic medicines company committed to delivering life-changing treatments for people battling devastating diseases. Wave aspires to develop best-in-class medicines across multiple therapeutic modalities using PRISM, the company's proprietary discovery and drug development platform that enables the precise design, optimization, and production of stereopure oligonucleotides. Driven by a resolute sense of urgency, the Wave team is targeting a broad range of genetically defined diseases so that patients and families may realize a brighter future. To find out more, please visit www.wavelifesciences.com and follow Wave on Twitter @WaveLifeSci.

Forward-Looking Statements
This press release contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including, without limitation, statements regarding the collaboration and license agreement between Wave and GSK, including anticipated payments, as well as the discovery, development, manufacture and commercialization of potential oligonucleotide therapeutics under the agreement, and Wave's strategy and business plans. The words "may," "will," "could," "would," "should," "expect," "plan," "anticipate," "intend," "believe," "estimate," "predict," "project," "potential," "continue," "target" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Any forward-looking statements in this press release are based on management's current expectations and beliefs and are subject to a number of risks, uncertainties and important factors that may cause actual events or results to differ materially from those expressed or implied by any forward-looking statements contained in this press release, including, without limitation, risks and uncertainties related to Wave's ability to successfully advance multiple potential programs simultaneously; the delay of any current or planned clinical trials or the other development activities for WVE-006; the effectiveness of PRISM, including our novel PN backbone chemistry modifications; the effectiveness of our novel ADAR-mediated RNA editing platform capability and our AIMers; our dependence on third parties, including contract research organizations, contract manufacturing organizations, collaborators and partners; our ability to obtain, maintain and protect our intellectual property; competition from others developing therapies for similar indications; and the severity and duration of the COVID-19 pandemic and variants thereof, and its negative impact on the conduct of, and the timing of enrollment, completion and reporting with respect to our clinical trials. These and other risks and uncertainties are described in

greater detail in the section entitled “Risk Factors” in Wave’s Annual Report on Form 10-K for the year ended December 31, 2021, as filed with the Securities and Exchange Commission (SEC) on March 3, 2022, and other filings that Wave may make with the SEC from time to time. Any forward-looking statements contained in this press release represent Wave’s views only as of the date hereof and should not be relied upon as representing its views as of any subsequent date. Wave explicitly disclaims any obligation to update any forward-looking statements.

Investor Contact:
Kate Rausch
617-949-4827
InvestorRelations@wavelifesci.com

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Alicia Suter
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asuter@wavelifesci.com

GSK

Press release

For media and investors only

EMBARGOED until 7:30 a.m. ET: 13 December 2022, London UK

GSK and Wave Life Sciences announce collaboration to drive discovery and development of oligonucleotide therapeutics focusing on novel genetic targets

- Collaboration brings together Wave's PRISM™ oligonucleotide platform and GSK's expertise in genetics and genomics
- GSK to advance up to eight preclinical programmes
- Additionally, GSK receives exclusive global license to Wave's preclinical, potential first-in-class RNA editing programme, WVE-006, to treat alpha-1 antitrypsin deficiency, a disease that impacts the lungs and liver
- Wave to advance up to three preclinical programmes for targets informed by GSK's novel insights
- Wave receives upfront payment of $170 million in cash and equity, also eligible to receive milestone payments and royalties

GSK plc (LSE/NYSE: GSK) and Wave Life Sciences Ltd. (Nasdaq: WVE), a clinical-stage genetic medicines company committed to delivering life-changing treatments for people battling devastating diseases, today announced a strategic collaboration to advance oligonucleotide therapeutics, including Wave's preclinical RNA editing programme targeting alpha-1 antitrypsin deficiency (AATD), WVE-006. The discovery collaboration has an initial four-year research term. It combines GSK's unique insights from human genetics, as well as its global development and commercial capabilities, with Wave's proprietary discovery and drug development platform, PRISM™.

Oligonucleotides are short strands of DNA or RNA that can reduce, restore, or modulate RNA through several different mechanisms. The unique capability of oligonucleotides to address a wide range of genomic targets in multiple therapeutic areas is enabling new opportunities to treat a range of human diseases, including diseases where no medicines currently exist or that have historically been difficult to treat with small molecules or biologics.

Wave's PRISM platform is the only oligonucleotide platform offering three RNA-targeting modalities (editing, splicing, and silencing, including siRNA and antisense). Importantly, these modalities incorporate novel chemistry, including PN backbone chemistry and control of stereochemistry, to optimise the pharmacological properties of therapeutic oligonucleotides.

The collaboration includes two main components. The first is a discovery collaboration which enables GSK to advance up to eight programmes and Wave to advance up to three programmes, leveraging Wave's PRISM platform and GSK's expertise in genetics and genomics. In addition to these programmes, GSK receives the exclusive global license for Wave's preclinical programme for AATD called WVE-006,

which uses Wave's proprietary "AIMer" technology (A-to-I(G) RNA editing). AATD is an inherited genetic disease that affects both the lungs and liver with limited treatment options. Wave's WVE-006 is a first-in-class RNA editing therapeutic that is designed to address both liver and lung manifestations of the disease.

Tony Wood, President and Chief Scientific Officer, GSK, said: "Oligonucleotide therapeutics are becoming a mainstream modality, and this collaboration will enable us to use our leading position in human genetics and genomics to advance novel oligonucleotide therapies. Pairing GSK's genetic expertise with the best-in-class PRISM™ platform enables us to accelerate drug discovery for newly-identified targets, by matching target to modality. The addition of WVE-006 complements more advanced, clinical-phase oligonucleotides in our pipeline, including bepirovirsen for chronic hepatitis B and GSK4532990 for non-alcoholic steatohepatitis (NASH)."

Bepirovirsen, an investigational antisense oligonucleotide for the potential treatment of chronic hepatitis B infection, is now entering Phase III trials, and GSK4532990, a siRNA oligonucleotide, is progressing to Phase II for NASH. WVE-006 brings a third oligonucleotide into GSK's portfolio that has the potential to be a first-in-class AATD treatment for both lung and liver disease and is a well-understood genetic target, contributing to GSK's pipeline that is now more than 70% genetically validated.

Paul Bolno, MD, MBA, President and CEO of Wave Life Sciences, said: "For the past decade, Wave has been building a unique oligonucleotide platform that combines novel chemistry with the means to optimally address disease biology through multiple therapeutic modalities. In 2022, we started to deliver on the promise of our platform with the first data showing translation in the clinic for our next-generation stereopure PN-chemistry containing candidates. Now with our GSK collaboration, we are excited to leverage their expertise in genetics to continue building a differentiated oligonucleotide pipeline, with a focus on our best-in-class RNA editing and upregulation capability. Additionally, GSK is the ideal partner for our WVE-006 programme, due to their longstanding history and global reach in respiratory diseases. The collaboration meaningfully extends our cash runway into 2025 and offers the potential for significant future milestones, providing new resources to deliver life-changing medicines to patients."

The companies expect to pursue targets across multiple disease areas, given preclinical data indicating Wave oligonucleotides can distribute to various tissues and cells without complex delivery vehicles.

Terms of the Collaboration
Under the terms of the agreement, Wave will receive an upfront payment of $170 million, which includes a cash payment of $120 million and a $50 million equity investment.

For the WVE-006 programme, Wave is eligible to receive up to $225 million in development and launch milestone payments and up to $300 million in sales-related milestone payments, as well as tiered sales royalties. Development and commercialisation responsibilities will transfer to GSK after Wave completes the first-in-patient study.

For each of GSK's eight collaboration programmes, Wave will be eligible to receive up to $130-$175 million in development and launch milestones and $200 million in sales-related milestones, along with tiered sales royalties. Wave will lead all preclinical research for GSK and Wave programmes up to investigational new drug (IND) enabling studies. GSK collaboration programmes will transfer to GSK for IND-enabling studies, clinical development, and commercialisation. The collaboration includes an option to extend the research term for up to three additional years, expanding the number of programmes available to both parties.

GSK

Press release

For media and investors only

The equity investment and collaboration agreement will complete at the same time and are conditional upon customary conditions including regulatory review by the appropriate regulatory agencies under the Hart-Scott-Rodino Act.

About Oligonucleotides
Oligonucleotide mechanisms that can reduce, increase or modify RNA include silencing (oligonucleotides that promote degradation of the target RNA, including antisense and siRNA); splicing (oligonucleotides that involve binding to the target RNA and modulating its function by promoting exon skipping); and ADAR-mediated RNA editing (oligonucleotides that edit adenosines in target RNAs to correct RNA or modulate protein function or production). GSK's investments in genetics have revealed that a significant number of genetic associations point to proteins where modulation of RNA function and/or expression would likely be the most effective mechanism for therapeutic intervention versus more traditional small molecules and biologic-based therapeutics. Oligonucleotide therapeutics represent a modality that addresses this gap by regulating target expression rather than function.

About AIMers
Wave's AIMers are designed to correct mutations in an RNA transcript, thereby avoiding permanent changes to the genome that occur with DNA-targeting approaches. Rather than using an exogenous editing enzyme, AIMers recruit normal proteins that exist in the body, called ADAR enzymes, which naturally edit certain adenine (A) bases to inosine (I). Because I is read as G (guanine) by the cellular translational machinery, sequence-directed editing with ADAR has the potential to revert transcripts with single G-to-A point mutations that cause genetic diseases. This approach redirects a natural system for therapeutic purposes, enables simplified delivery without viral particles or liposomes, and avoids the risk of irreversible off-target effects of DNA-targeting approaches. AIMers are short in length, fully chemically modified, and use novel chemistry, including proprietary PN backbone modifications and chiral control, that make them distinct from other ADAR-mediated editing approaches.

About Alpha-1 Antitrypsin Deficiency
Alpha-1 antitrypsin deficiency (AATD) is an inherited genetic disorder that is commonly caused by a G-to-A point mutation ("Z allele") in the *SERPINA1* gene. This mutation leads to lung disease due to lack of wild-type alpha-1 antitrypsin (M-AAT) function in lungs, and it leads to liver disease due to aggregation of misfolded Z-AAT protein in hepatocytes. There are approximately 200,000 patients in the United States and Europe who have Z mutations on both alleles, known as the PiZZ genotype. Augmentation therapy via delivery of AAT protein is the only treatment option for AATD lung disease and requires weekly intravenous infusions. There are no treatments for AATD liver disease, other than liver transplantation.

About WVE-006
WVE-006 is a PN-chemistry modified GalNAc-conjugated investigational development candidate for the treatment of alpha-1 antitrypsin deficiency (AATD), designed to correct the mutant SERPINA1 Z allele transcript to address both liver and lung manifestations of disease. WVE-006 is a potential first-in-class RNA editing candidate (AIMer) and the most advanced program currently in development using an oligonucleotide to harness an endogenous enzyme for editing. Wave expects to submit clinical trial applications for WVE-006 in 2023.

About Wave Life Sciences
Wave Life Sciences (Nasdaq: WVE) is a clinical-stage genetic medicines company committed to delivering life-changing treatments for people battling devastating diseases. Wave aspires to develop best-in-class medicines across multiple therapeutic modalities using PRISM, the company's proprietary discovery and drug development platform that enables the precise design, optimization, and production of stereopure oligonucleotides. Driven by a resolute sense of urgency, the Wave team is targeting a broad

range of genetically defined diseases so that patients and families may realize a brighter future. To find out more, please visit www.wavelifesciences.com and follow Wave on Twitter @WaveLifeSci.

About GSK
GSK is a global biopharma company with a purpose to unite science, technology, and talent to get ahead of disease together. Find out more at gsk.com/company

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Registered in England & Wales:
No. 3888792

Registered Office:
980 Great West Road
Brentford, Middlesex
TW8 9GS

Schedule 11.2

Wave Patents and In-Licenses; Disclosures

[***]

Exhibit 10.4

SHARE PURCHASE AGREEMENT

By and Between

GLAXO GROUP LIMITED

AND

WAVE LIFE SCIENCES LTD.

Dated as of December 13, 2022

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SHARE PURCHASE AGREEMENT

THIS SHARE PURCHASE AGREEMENT (this "**Agreement**"), dated as of December 13, 2022, by and between Glaxo Group Limited, a company organized under the laws of England and Wales (the "**Investor**"), and Wave Life Sciences Ltd., a Singapore public limited company (the "**Company**" or "**Wave**").

WHEREAS, pursuant to the terms and subject to the conditions set forth in this Agreement, the Company desires to issue and sell to the Investor, and the Investor desires to subscribe for and purchase from the Company, ordinary shares, fully-paid up, no par value, of the Company (the "**Ordinary Shares**"); and

WHEREAS, in partial consideration of the rights granted to GlaxoSmithKline Intellectual Property (No. 3) Limited ("**GSK IP3**" or "**GSK**") (an Affiliate of the Investor) under the Collaboration Agreement (as defined below), the Investor will purchase Shares (as defined below) of the Company.

NOW, THEREFORE, in consideration of the following mutual promises and obligations, and for good and valuable consideration, the adequacy and sufficiency of which are hereby acknowledged, the Investor and the Company agree as follows:

1. Definitions.

1.1 Defined Terms. When used in this Agreement, the following terms shall have the respective meanings specified therefor below:

"**Affiliate**" shall mean, with respect to any Person, another Person which controls, is controlled by or is under common control with such Person. A Person shall be deemed to "**control**" another Person if any of the following conditions is met: (i) in the case of corporate entities, direct or indirect ownership of more than fifty percent (50%) of the shares having the right to vote for the election of directors or otherwise having the power to control or direct the affairs of such Person; and (ii) in the case of non-corporate entities, direct or indirect ownership of more than fifty percent (50%) of the equity interest or the power to direct the management and policies of such non-corporate entities. For the purposes of this Agreement, in no event shall the Investor or any of its Affiliates be deemed Affiliates of the Company or any of its Affiliates, nor shall the Company or any of its Affiliates be deemed Affiliates of the Investor or any of its Affiliates.

"**Agreement**" shall have the meaning set forth in the Preamble, including all Exhibits attached hereto.

"**Business Day**" shall mean a calendar day other than a Saturday, Sunday, or a bank or other public holiday in Massachusetts or New York in the United States or in London, United Kingdom and excludes the continuous period between December 24 to January 2 each year when the offices of the Investor and the Company are closed.

"**Collaboration Agreement**" shall mean the Collaboration and License Agreement by and among Wave Life Sciences USA, Inc., Wave Life Sciences UK Limited and GlaxoSmithKline Intellectual Property (No. 3) Limited, dated as of December 13, 2022.

"**Cross Receipt**" shall mean an executed document signed by each of the Company and the Investor, in substantially the form of Exhibit A attached hereto.

"**Effect**" shall have the meaning set forth in the definition of "Material Adverse Effect."

"**Governmental Authority**" shall mean any court, agency, authority, department, regulatory body, including but not limited to the U.S. Food and Drug Administration, or other instrumentality of any government or country or of any national, federal, state, provincial, regional, county, city or other political subdivision of any such government or country or any supranational organization of which any such country is a member.

"**Intellectual Property**" shall mean all inventions, Patents, Trademarks, trade names, service names, copyrights, trade secrets, Know-How and all other intellectual property.

"**Intellectual Property License**" shall mean any license, permit, authorization, approval, contract or consent granted, issued by or with any Person relating to the use of Intellectual Property.

"**Investor Agreement**" shall mean that certain Investor Agreement between the Investor and the Company, to be dated as of the Closing Date, in the form of Exhibit B attached hereto, as the same may be amended from time to time.

"**Know-How**" shall mean all commercial, technical, scientific, CMC, and other know-how and information, inventions, discoveries, trade secrets, knowledge, technology, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, ideas, technical assistance, designs, drawings, assembly procedures, computer programs, specifications, data and results (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, preclinical, clinical, safety, manufacturing (including batch records for any relevant historic manufacturing campaigns), stability and quality control data and know-how, including, regulatory data, study designs and protocols), and Materials, in all cases, whether or not confidential, proprietary, patentable, in written, electronic or any other form now known or hereafter developed, but excluding all Patents.

"**Law**" or "**Laws**" shall mean all laws, statutes, rules, regulations, orders, judgments, injunctions and/or ordinances of any Governmental Authority.

"**Material Adverse Effect**" shall mean any change, event or occurrence (each, an "**Effect**") that, individually or when taken together with all other Effects, has (i) a material adverse effect on the business, financial condition, earnings, assets, liabilities, results of operations or prospects of the Company and its subsidiaries, taken as a whole, or (ii) a material adverse effect on the Company's ability to perform its obligations, or consummate the Transaction, in accordance with the terms of this Agreement, except in the case of (i) or (ii) to the extent that any such Effect results from or arises out of: (A) changes in conditions in the United States or global economy or capital or financial markets generally, including changes in interest or exchange rates, (B) changes in general legal, regulatory, political, economic or business conditions or changes in generally accepted accounting principles in the United States or interpretations thereof that, in each case, generally affect the biotechnology or biopharmaceutical industries, (C) the announcement,

pendency or performance of this Agreement or the Collaboration Agreement or the identity of the Investor, (D) any change in the trading prices or trading volume of the Ordinary Shares (it being understood that the facts giving rise to or contributing to any such change may be deemed to constitute, or be taken into account when determining whether there has been or will be, a Material Adverse Effect, except to the extent any of such facts is an Effect referred in clauses (A) through (H) of this definition), (E) acts of war, sabotage or terrorism, or any escalation or worsening of any such acts of war, sabotage or terrorism, (F) earthquakes, hurricanes, floods or other natural disasters, (G) any action taken by the Company required by this Agreement or the Collaboration Agreement or with the Investor's written consent, (H) any breach, violation or non-performance by the Investor or any of its Affiliates under the Collaboration Agreement, or (I) shareholder litigation arising out of or in connection with the execution, delivery or performance of the Transaction Agreements; *provided*, that, with respect to clauses (A), (B), (E) and (F), such Effect does not have a materially disproportionate and adverse effect on the Company relative to other companies in the biotechnology or biopharmaceutical industries.

"**Organizational Documents**" shall mean the constitution of Wave Life Sciences Ltd., dated as of July 23, 2012, as may be amended and/or restated from time to time.

"**Patent**" shall mean all patents and patent applications (including all continuations, continuations-in-part, divisionals, and substitutions), or other filings claiming priority thereto or sharing any common priority therewith, as well as any patents issued with respect to any such patent applications, reissues, re-examinations, renewals, or extensions (including patent term adjustments, patent term extensions, supplemental protection certificates, or the equivalents thereof), registration or confirmation patents, patents resulting from post-grant proceedings, patents of addition, restorations and extensions thereof, and any inventor's certificates, and all equivalents and counterparts thereof in any country. For clarity, a patent filing (a patent or a patent application) is considered to have been made (or to be pending or in force) within a selected time period if the filing itself, or any other filing to which it claims priority or with which it shares any common priority, was made within (or was pending or in force within) the time period.

"**Person**" shall mean any individual, partnership, firm, corporation, limited liability company, association, trust, unincorporated organization, government or any department or agency thereof or other entity, as well as any syndicate or group that would be deemed to be a Person under Section 13(d)(3) of the Exchange Act.

"**Third Party**" shall mean any Person other than the Investor, the Company or any Affiliate of the Investor or the Company.

"**Trademark**" shall mean any trademark, trade name, service mark, service name, brand, domain name, trade dress, logo, slogan, or other indicia of origin or ownership, including the goodwill and activities associated with each of the foregoing.

"**Transaction**" means the issuance and sale of the Shares by the Company, and the purchase of the Shares by the Investor, in accordance with the terms hereof.

"**Transaction Agreements**" shall mean this Agreement, the Investor Agreement and the Collaboration Agreement.

1.2 Additional Defined Terms. In addition to the terms defined in Section 1.1, capitalized defined terms used in Section 4.13 and in the definition of "Know-How" but not otherwise defined in this Agreement shall have the respective meanings assigned thereto in the Collaboration Agreement, and the following terms shall have the respective meanings assigned thereto in the sections indicated below:

Defined Term	Section
Aggregate Purchase Price	Section 2
Closing	Section 3.1
Closing Date	Section 3.1
Company	Preamble
Company Intellectual Property	Section 4.13(a)
Company SEC Documents	Section 4.11(a)
Exchange Act	Section 4.11(a)
HSR Act	Section 4.7
Investor	Preamble
Modified Clause	Section 11.7
Ordinary Shares	Preamble
Patent Offices	Section 4.13(k)
Permits	Section 4.10
SEC	Section 4.7
Securities Act	Section 4.11(a)
Shares	Section 2

2. Purchase and Sale of Shares. Subject to the terms and conditions of this Agreement, at the Closing, the Company shall issue and sell to the Investor, free and clear of all liens, other than any liens arising as a result of any action by the Investor, and the Investor shall purchase from the Company, 10,683,761 Ordinary Shares (the "**Shares**"), for $4.68 per share, or $50,000,001.48 in the aggregate (the "**Aggregate Purchase Price**"), *provided*, that if the number of Ordinary Shares issuable at the Closing would be greater than 19.99% of the Ordinary Shares outstanding immediately prior to Closing, the number of Shares and the Aggregate Purchase Price shall be reduced such that, immediately following the Closing, the Investor holds 19.99% of outstanding

Ordinary Shares (calculated immediately prior to the Closing). In the event of any share dividend, share split, combination of shares, recapitalization or other similar change in the capital structure of the Company after the date hereof and on or prior to the Closing which affects or relates to the Ordinary Shares, the number of Shares shall be adjusted proportionately.

3. Closing Date; Deliveries.

3.1 Closing Date. Subject to the satisfaction or waiver of all the conditions to the Closing set forth in Sections 6, 7 and 8 hereof, the closing of the purchase and sale of the Shares hereunder (the "**Closing**") shall be held on the third (3rd) Business Day after the satisfaction or waiver of the conditions to Closing set forth in Sections 6, 7 and 8 (other than those conditions that by their nature are to be satisfied at the Closing), at 10 a.m. Boston time, at the offices of Goodwin Procter LLP, 100 Northern Avenue, Boston, Massachusetts 02210, or at such other time, date and location as the parties may agree. The date the Closing occurs is hereinafter referred to as the "**Closing Date**."

3.2 Deliveries.

(a) Deliveries by the Company. At the Closing, the Company shall instruct its transfer agent to register the Shares in book-entry form. The Company will cause the relevant returns of allotment of the Shares to be filed with all relevant authorities in Singapore or elsewhere (if required) and updated in the registers of the Company. The Company shall also deliver at the Closing: (i) a duly executed Cross Receipt; (ii) a certificate in form and substance reasonably satisfactory to the Investor and duly executed on behalf of the Company by an authorized executive officer of the Company, certifying that the conditions to Closing set forth in Section 6 of this Agreement have been fulfilled; (iii) a duly executed Investor Agreement; (iv) legal opinions of the Company's Singapore and U.S. counsels in form and substance reasonably satisfactory to the Investor; and (v) a certificate of the secretary of the Company dated as of the Closing Date certifying (A) that attached thereto are true and complete copies of the Organizational Documents in effect on the Closing Date; (B) that attached thereto is a true and complete copy of all resolutions adopted by the Board of Directors of the Company authorizing the execution, delivery and performance of the Transaction Agreements and the Transaction and that all such resolutions are in full force and effect and are all the resolutions adopted in connection with the transactions contemplated hereby as of the Closing Date; and (C) as to the incumbency and specimen signature of any officer of the Company executing a Transaction Agreement on behalf of the Company.

(b) Deliveries by the Investor. At the Closing, the Investor shall deliver to the Company the Aggregate Purchase Price by wire transfer of immediately available United States funds to an account designated by the Company. The Company shall notify the Investor in writing of the wiring instructions for such account not less than five (5) Business Days before the Closing Date. The Investor shall also deliver, or cause to be delivered, at the Closing: (i) a duly executed Cross Receipt; (ii) a certificate in form and substance reasonably satisfactory to the Company duly executed by an authorized executive officer of the Investor certifying that the conditions to Closing set forth in Section 7 of this Agreement have been fulfilled; (iii) a duly executed Investor Agreement; and (iv) a certificate of the secretary of the Investor dated as of the Closing Date

certifying as to the incumbency and specimen signature of any officer executing a Transaction Agreement on behalf of the Investor.

4. Representations and Warranties of the Company. The Company hereby represents and warrants to the Investor that:

4.1 Organization, Good Standing and Qualification.

(a) The Company is a public company duly organized and validly existing under the laws of Singapore. The Company has all requisite corporate power and corporate authority to own, lease and operate its properties and assets, to carry on its business as now conducted, and as proposed to be conducted as described in the Company SEC Documents, to enter into the Transaction Agreements, to allot, issue and sell the Shares, and to perform its obligations under and to carry out the other transactions contemplated by the Transaction Agreements.

(b) The Company is qualified to transact business as a foreign entity and is in good standing in each jurisdiction in which the type of properties owned, leased or operated by the Company or the nature of the business conducted by the Company makes such qualification necessary, except where the failure to be so qualified would not have or be reasonably likely to have a Material Adverse Effect.

4.2 Capitalization and Voting Rights.

(a) As of September 30, 2022, the share capital, which has been authorized for issuance by the Board of Directors and shareholders of the Company, consists of (1) 104,218,716 Ordinary Shares, of which (i) 86,841,523 Ordinary Shares are issued and outstanding, (ii) 6,306,514 Ordinary Shares are reserved for issuance pursuant to the Company's equity incentive plans, (iii) 716,413 Ordinary Shares are reserved for issuance pursuant to the Company's employee share purchase plan and (iv) 10,354,266 Ordinary Shares are issuable upon the exercise of share options outstanding and vesting of restricted share units and awards outstanding, and (2) 7,093,656 vested and exercisable Pre-Funded Warrants outstanding to purchase Ordinary Shares, and (3) 3,901,348 preferred shares of the Company, of which 3,901,348 of the Company's Series A preferred shares are issued and outstanding. Since September 30, 2022, there has not been any material change to the Company's share capital. The issued and outstanding share capital of the Company has been duly authorized and validly issued and is fully paid and non-assessable. None of the outstanding share capital of the Company was issued in violation of the preemptive or other similar rights of any shareholder of the Company. There are no authorized or outstanding options, warrants, preemptive rights, rights of first refusal or other rights to purchase, or equity or debt securities convertible into or exchangeable or exercisable for, any share capital of the Company or any of its subsidiaries other than those described or reflected above or in the Company SEC Documents, or pursuant to reservations, agreements or employee benefit plans or the exercise of convertible securities or options, in each case described or reflected in the Company SEC Documents.

(b) All of the Ordinary Shares are entitled to one (1) vote per share.

(c) Except as described or referred to in Section 4.2(a) above or the Company SEC Documents or as provided in the Investor Agreement, as of the date hereof, there are not: (i) any outstanding equity securities, options, warrants, rights (including conversion or preemptive or registration rights) or other agreements pursuant to which the Company is or may become obligated to issue, sell or repurchase any of its share capital or any other securities of the Company or (ii) except as set forth in the Investor Agreement, any restrictions on the transfer of share capital of the Company other than pursuant to state and federal securities Laws.

(d) Except as provided in the Investor Agreement or the Organizational Documents, the Company is not a party to or subject to any agreement or understanding relating to the voting of share capital of the Company or the giving of written consents by a shareholder or director of the Company.

4.3 Subsidiaries. The Company has disclosed all of its "subsidiaries" (for purposes of this Agreement, as defined in Rule 405 under the Securities Act) required to be disclosed pursuant to Item 601(b)(21) of Regulation S-K in an exhibit to its Annual Report on Form 10-K. Each of the Company's subsidiaries has been duly incorporated or organized, as the case may be, and is validly existing as a corporation or company in good standing under the Laws of the jurisdiction of its incorporation or organization and has the power and authority (corporate or other) to own, lease and operate its properties and to conduct its businesses as presently conducted. Each of the Company's subsidiaries is duly qualified as a foreign corporation or company to transact business and is in good standing in each jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property or the conduct of business, except where the failure to so qualify or to be in good standing would not reasonably be expected to have a Material Adverse Effect. All of the issued and outstanding share capital or other equity or ownership interests of each of the Company's subsidiaries have been duly authorized and validly issued, are fully paid and non-assessable and are owned by the Company, directly or through subsidiaries, free and clear of any security interest, mortgage, pledge, lien, encumbrance or adverse claim. The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Company SEC Documents.

4.4 Authorization.

(a) All requisite corporate action on the part of the Company and its subsidiaries, and their respective directors and shareholders required by applicable Law for the authorization, execution and delivery by the Company and its subsidiaries of the Transaction Agreements and the performance of all obligations of the Company and its subsidiaries hereunder and thereunder, including the authorization, allotment, issuance and delivery of the Shares, has been taken.

(b) This Agreement and the Collaboration Agreement have been, and upon the execution and delivery of the Investor Agreement by the Company at the Closing, the Investor Agreement will be, duly executed and delivered by the Company or its subsidiaries (as applicable), and upon the due execution and delivery of this Agreement by the Investor, this Agreement and the Collaboration Agreement will constitute, and upon the due execution and delivery of the Investor Agreement by the Investor, the Investor Agreement will constitute, valid and legally

binding obligations of the Company and its subsidiaries (as applicable), enforceable against such entities in accordance with their respective terms (except as such enforceability may be limited by (i) applicable bankruptcy, insolvency, reorganization, moratorium or other Laws of general application relating to or affecting enforcement of creditors' rights and (ii) rules of Law governing specific performance, injunctive relief or other equitable remedies and limitations of public policy).

(c) No stop order or suspension of trading of the Ordinary Shares has been imposed by The Nasdaq Stock Market LLC, the SEC or any other Governmental Authority and remains in effect.

4.5 No Defaults. Neither the Company nor any of its subsidiaries is in default under or in violation of (a) the Organizational Documents or a subsidiary's organizational documents, (b) any provision of applicable Law or any ruling, writ, injunction, order, Permit, judgment or decree of any Governmental Authority or (c) any agreement, arrangement or instrument, whether written or oral, by which the Company, its subsidiaries or any of the Company's or subsidiaries' assets are bound, except, in the case of subsections (b) and (c), as would not have or be reasonably likely to have a Material Adverse Effect. To the knowledge of the Company, there exists no condition, event or act which after notice, lapse of time, or both, would constitute a default or violation by the Company under any of the foregoing, except, in the case of subsections (b) and (c), as would not have or be reasonably likely to have a Material Adverse Effect.

4.6 No Conflicts. The execution, delivery and performance of the Transaction Agreements, and compliance with the provisions hereof and thereof by the Company and its subsidiaries do not and shall not: (a) conflict with or violate any provision of applicable Law or any ruling, writ, injunction, order, permit, judgment or decree of any Governmental Authority, (b) constitute a breach of, or default under (or an event which, with notice or lapse of time or both, would become a default under) or conflict with, or give rise to any right of termination, cancellation or acceleration of, any agreement, arrangement or instrument, whether written or oral, by which the Company, any of its subsidiaries or any of its assets are bound, (c) result in any encumbrance upon any of the Shares, other than restrictions on resale pursuant to securities Laws, or (d) violate or conflict with any of the provisions of the Organizational Documents or any subsidiary's organizational documents, except, in the case of subsections (a) and (b), as would not have or be reasonably likely to have a Material Adverse Effect.

4.7 No Governmental Authority or Third Party Consents. No consent, approval, authorization, qualification, designation, declaration or other order of, or filing with, or notice to, any Governmental Authority or other Third Party is required to be obtained or made by the Company or its subsidiaries in connection with the authorization, execution and delivery by the Company and its subsidiaries of any of the Transaction Agreements, or with the authorization, allotment, issuance and sale by the Company of the Shares, except (i) such filings as may be required to be made with the Securities and Exchange Commission (the "**SEC**") and with any state blue sky or securities regulatory authority, which filings shall be made in a timely manner in accordance with all applicable Laws, (ii) as required pursuant to the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended (the "**HSR Act**") and (iii) such filings as may

be required to be made with the Accounting and Corporate Regulatory Authority of Singapore in connection with the allotment and issuance by the Company of the Shares.

4.8 Valid Issuance of Shares. When allotted, issued, sold and delivered at the Closing in accordance with the terms hereof for the Aggregate Purchase Price, the Shares shall be validly issued, fully paid, non-assessable, and free from any liens, encumbrances or restrictions on transfer, including preemptive rights, rights of first refusal or other similar rights, other than as arising pursuant to the Investor Agreement and the Organizational Documents, as a result of any action by the Investor or under federal or state securities Laws.

4.9 Litigation. Except as set forth in the Company SEC Documents filed prior to the date of this Agreement, there is no action, suit, proceeding or investigation pending (of which the Company or its subsidiaries have received notice or otherwise have knowledge) or, to the Company's knowledge, threatened against the Company or its subsidiaries or which the Company or its subsidiaries intends to initiate which has had or is reasonably likely to have a Material Adverse Effect.

4.10 Licenses and Other Rights; Compliance with Laws. The Company and its subsidiaries (as applicable) have all franchises, permits, licenses and other rights and privileges ("**Permits**") necessary to permit them to own their properties and to conduct their business as presently conducted and are in compliance thereunder, except where the failure to be in compliance does not and would not have or be reasonably likely to have a Material Adverse Effect. To the Company's knowledge, neither the Company nor its subsidiaries have not taken any action that would interfere with the Company's or its subsidiaries' ability to renew all such Permit(s), except where the failure to renew such Permit(s) would not have or be reasonably likely to have a Material Adverse Effect. The Company and its subsidiaries are and have been in compliance with all Laws applicable to their business, properties and assets, and to the products and services sold by them, except where the failure to be in compliance does not and would not have or be reasonably likely to have a Material Adverse Effect.

4.11 Company SEC Documents; Liabilities; Nasdaq Stock Market.

(a) Since January 1, 2018, the Company has timely filed all required reports, schedules, forms, statements and other documents (including exhibits and all other information incorporated therein), and any required amendments to any of the foregoing, with the SEC (the "**Company SEC Documents**"). As of their respective filing dates, each of the Company SEC Documents complied in all material respects with the requirements of the Securities Act of 1933, as amended (the "**Securities Act**"), and the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), and the rules and regulations of the SEC promulgated thereunder applicable to such Company SEC Documents, and no Company SEC Documents when filed, declared effective or mailed, as applicable, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading.

(b) As of the date of this Agreement, other than as has been disclosed to the Investor, there are no outstanding or unresolved comments in comment letters received from the SEC or its staff.

(c) The financial statements of the Company included in its Annual Report on Form 10-K for the fiscal year ended December 31, 2021 and in its quarterly reports on Form 10-Q for the quarterly periods ended September 30, 2022, June 30, 2022 and March 31, 2022 comply as to form in all material respects with applicable accounting requirements and the published rules and regulations of the SEC with respect thereto, have been prepared in accordance with U.S. generally accepted accounting principles applied on a consistent basis during the periods involved (except as may be indicated in the notes thereto) and fairly present in all material respects the financial position of the Company as of the dates thereof and the results of its operations and cash flows for the periods then ended. Except (i) as set forth in the Company SEC Documents or (ii) for liabilities incurred in the ordinary course of business consistent with past practice since September 30, 2022, the Company has no liabilities, whether absolute or accrued, contingent or otherwise, other than those that would not, individually or in the aggregate, have or be reasonably likely to have a Material Adverse Effect.

(d) As of the date of this Agreement, the Ordinary Shares are listed on The Nasdaq Global Market, and the Company has taken no action designed to, or which to its knowledge is likely to have the effect of, terminating the registration of the Ordinary Shares under the Exchange Act or delisting the Ordinary Shares from The Nasdaq Global Market. As of the date of this Agreement, the Company has not received any adverse correspondence from the SEC, The Nasdaq Stock Market LLC, the staffs thereof or any Governmental Authority or any notification that, and has no knowledge that, the SEC or The Nasdaq Stock Market LLC is contemplating terminating such listing or registration.

4.12 Absence of Certain Changes.

(a) Except as disclosed in the Company SEC Documents, since September 30, 2022, there has not been any change in the assets liabilities, financial condition or operating results of the Company from that reflected in the financial statements, except changes or events in the ordinary course of business that have not caused a Material Adverse Effect.

(b) Except as disclosed in the Company SEC Documents, since December 31, 2021, there has not occurred any event that has caused or would reasonably be expected to cause a Material Adverse Effect.

(c) Except as set forth in the Company SEC Documents filed prior to the date of this Agreement, since December 31, 2021, the Company has not (i) declared or paid any dividends, or authorized or made any distribution upon or with respect to any class or series of its share capital, or (ii) sold, exchanged or otherwise disposed of any of its material assets or rights.

(d) Since December 31, 2021, the Company has not admitted in writing its inability to pay its debts generally as they become due, filed or consented to the filing against it of a petition in bankruptcy or a petition to take advantage of any insolvency act, made an assignment for the benefit of creditors, consented to the appointment of a receiver for itself or for the whole or any substantial part of its property, or had a petition in bankruptcy filed against it, been adjudicated a bankrupt, or filed a petition or answer seeking reorganization or arrangement under the federal bankruptcy Laws or any other Laws of the United States or any other jurisdiction.

4.13 Intellectual Property.

(a) "**Company Intellectual Property**" means all Intellectual Property owned (or purported to be owned) by the Company and/or its Affiliates in the operation of its business as presently conducted or reasonably expected to be conducted. Schedule 11.2 of the Collaboration Agreement sets forth a complete and accurate list of (a) all Wave Background Patents issued or pending as of the Execution Date, including (i) for each such Patent that is owned by Wave or its Affiliates, whether it is solely or jointly owned, and, further if jointly owned, the identity of the Third Party joint owner(s), and (ii) for each such Patent that is in licensed by Wave or its Affiliates, the identity of the Third Party owner, the corresponding Existing Wave Third Party Agreements or SERPINA1 Collaboration In License, as applicable pursuant to which such Patent is Controlled by Wave, and whether such Patent is licensed to Wave exclusively or non exclusively; and (b) all license, assignment, distribution, or other agreements pursuant to which Wave or its Affiliates Control (or has the right to obtain Control of), or otherwise is granted rights to, any Wave Background Technology, including all Existing Wave Third Party Agreements. Wave has provided GSK with true and correct copies of all such agreements (subject to Wave's right to redact Confidential Information of Wave or its counterparty from such copies, except to the extent that such information is required in order for GSK to identify the obligations with which it or its Related Parties will be required to comply). For clarity, Schedule 11.2 of the Collaboration Agreement does not necessarily include all Company Intellectual Property. The Company Intellectual Property is owned free from any material liens, charges, encumbrances or restrictions. All of the Company's material Intellectual Property Licenses are in full force and effect in accordance with their terms, are free of any material liens or restrictions, and neither the Company nor to the Company's knowledge any other party thereto, is in material breach of any such material Intellectual Property License, and to the Company's knowledge no event has occurred that with notice or lapse of time or both would constitute such a material breach thereunder or would result in the termination thereof or would cause or permit the acceleration or other change of any material right or obligation of the loss of any material benefit thereunder by the Company. Neither the execution, delivery nor performance of this Agreement or the other agreements and documents contemplated hereby to be executed and delivered by the Company, as applicable, nor the consummation of the transactions contemplated hereby or thereby, shall adversely impact (or require the payment or grant of additional amounts of consideration), result in the loss, forfeiture, cancellation, suspension, limitation, termination or other impairment of, or give rise to any right of any Third Party or other person to cancel, suspend, limit, terminate or otherwise impair the right of the Company or any of its Affiliates to own or use or otherwise exercise any other rights that the Company or any of its Affiliates currently has with respect to, any of the Intellectual Property currently used in their businesses, or require the consent or authorization of any Person in respect of the right of the Company or any of its Affiliates to own or use otherwise exercise any other rights that the Company or any of its Affiliates currently has with respect to any such Intellectual Property.

(b) The Company and its Affiliates have taken reasonable measures to protect and maintain such Company Intellectual Property, consistent with prudent commercial practices in the biotechnology industry. The Company and its Affiliates have taken reasonable precautions to preserve the confidentiality of any confidential Know-How included in the Company Intellectual Property.

(c) To the Company's knowledge, no employee of the Company or any of its Affiliates is in violation of any patent disclosure agreement or invention assignment agreement with a former employer where the basis of such violation relates to such employee's employment with the Company and its Affiliates.

(d) To the Company's knowledge, none of the Company Intellectual Property or technology (including information technology and outsourced arrangements) employed by the Company or any of its Affiliates has been obtained or is being used by the Company or any of its Affiliates in violation of any contractual obligation binding on the Company or its Affiliates or any of their respective officers, directors or employees or otherwise in violation of the rights of any Persons. The product candidates that are under development by the Company or any Affiliates fall within the scope of the claims of one or more Patents within the Company Intellectual Property.

(e) Wave (itself or through its Affiliates) has (a) full legal or beneficial title and ownership of, or sufficient license rights under, or has a valid option to obtain sufficient license rights under, all Wave Background Technology; and (b) has full legal or beneficial title and ownership of, or sufficient license rights under, or an option to obtain sufficient rights, and authority to (i) grant to GSK and its Related Parties, the licenses, and other rights set forth in this Agreement under the Wave Background Technology; and (ii) use, disclose, and commercially exploit, and to enable GSK and its Related Parties to use, disclose, and commercially exploit (in each case under appropriate conditions of confidentiality) the Wave Background Technology in accordance with this Agreement. Without limiting the generality of the foregoing, Wave or its Affiliate has obtained all necessary consents and fulfilled all necessary conditions applicable to Wave (and other than those conditions required to be flowed through to GSK), if any, to grant to GSK the license and sublicense rights provided in the present Agreement.

(f) Wave has not granted its Affiliates or any Third Party, including any academic organization or agency, rights that would otherwise interfere or be inconsistent with GSK's rights hereunder, and there are no agreements or arrangements to which Wave or any of its Affiliates is a party relating to Wave Technology or Collaboration Compounds or Collaboration Products directed to any Collaboration Target, that would (a) limit the rights granted to GSK under this Agreement or (b) restrict or result in a restriction on GSK's ability to Exploit the Collaboration Compounds or Collaboration Products directed to any Collaboration Target in accordance with this Agreement in the Territory.

(g) Neither Wave nor its Affiliates are in material breach or default under any agreements pursuant to which Wave Controls any Wave Technology, and neither Wave nor its Affiliates have received any written notice of material breach or default with respect to any such agreement.

(h) With respect to any Wave Background Technology owned by Wave or its Affiliates, (a) Wave or its Affiliates have obtained from all employees and independent contractors who participated in any respect in the invention or authorship thereof, valid and enforceable assignments of all ownership rights of such employees and independent contractors in such Wave Background Technology, either pursuant to written agreement or by operation of Applicable Law; and (b) all of its employees, officers, contractors and consultants have executed

agreements or have existing obligations under Applicable Law requiring assignment to Wave or its Affiliate, as applicable, of all rights, title, and interests in and to inventions made during the course of and as the result of this Agreement; and, no officer or employee of Wave or its Affiliate is subject to any agreement with any other Third Party that requires such officer or employee to assign any interest in any Wave Background Technology to any Third Party. Except as otherwise provided in Schedule 11.2 of the Collaboration Agreement, Wave is the sole owner of the Wave Background Patents and no Third Party has challenged or is challenging Wave's ownership thereof. The Wave Background Patents are free and clear of any liens, charges, and encumbrances that would conflict with the rights granted under this Agreement.

(i) All employees, officers, and consultants of Wave and its Affiliates have executed agreements or have existing obligations under Applicable Law and obligating the individual to maintain as confidential Wave's Confidential Information as well as confidential information of other parties (including of GSK and its Affiliates) that such individual may receive in the conduct of this Agreement, to the extent required to support Wave's obligations under this Agreement; and Wave and its Affiliates have taken all reasonable precautions to preserve the confidentiality of the Wave Background Know How.

(j) Neither Wave nor its Affiliates have entered into a government funding relationship that would result in rights to any Collaboration Compound or Collaboration Product directed to any Collaboration Target residing in the US Government, National Institutes of Health, National Institute for Drug Abuse or other agency, and the licenses granted hereunder are not subject to overriding obligations to the US Government as set forth in Public Law 96 517 (35 U.S.C. 200 204), as amended, or any similar obligations under the laws of any other country.

(k) The issued patents within the Wave Background Patents are valid and enforceable and have been diligently prosecuted and maintained. There are no oppositions, nullity actions, interferences, inter partes reexaminations, inter partes reviews, post grant reviews, derivation proceedings, or other proceedings pending or threatened (but excluding office actions or similar communications issued by any Patent Offices in the ordinary course of prosecution of any patent application) that challenge the scope, validity, or enforceability of the Wave Background Patents. Wave has filed and prosecuted patent applications within the Wave Background Patents in good faith and, has complied with all duties of disclosure with respect thereto. Other than through filing of terminal disclaimers in the ordinary course of patent prosecution, Wave has not committed any act, or omitted to commit any act, that may cause the Wave Background Patents to expire prematurely or be declared invalid or unenforceable. Wave or its Affiliates have timely paid all application, registration, maintenance, and renewal fees in respect of the Wave Background Patents and have filed with the United States Patent and Trademark Office or any analogous foreign Governmental Authority (collectively, "**Patent Offices**") all necessary documents and certificates for the purpose of maintaining such Wave Background Patents.

(l) The owned Wave Technology and, to Wave's knowledge, the in licensed Wave Technology is not subject to, any judgment or settlement that would reasonably be expected to materially restrict the use thereof or otherwise would reasonably be expected to adversely affect the validity or enforceability thereof. To Wave's knowledge, no Third Party has infringed upon or misappropriated any Wave Technology.

(m) To Wave's knowledge, the Exploitation of any Collaboration Compound or Collaboration Product directed to any Collaboration Target, in each case, as contemplated hereunder does not infringe any valid patent rights of any Third Party. There are no claims, demands, suits, proceedings, arbitrations, or other legal actions of any nature, civil, criminal, regulatory or otherwise, pending or, to Wave's knowledge, threatened against Wave or any of its Related Parties alleging or asserting any of the foregoing.

4.14 Tax Returns, Payments and Elections. The Company has filed all tax returns and reports as required, and within the time prescribed, by applicable Law and has paid or made provision for the payment of all accrued and unpaid taxes to which the Company is subject and which are not currently due and payable, except in each case where any failure would not have a Material Adverse Effect.

4.15 Offering. Subject to the accuracy of the Investor's representations set forth in Sections 5.5, 5.6, 5.7, 5.9 and 5.10, the offer, sale and issuance of the Shares to be issued in conformity with the terms of this Agreement constitute transactions which are exempt from the registration requirements of the Securities Act and from all applicable state registration or qualification requirements. Neither the Company, its subsidiaries nor any Person acting on behalf of the Company or its subsidiaries will take any action that would cause the loss of such exemption.

4.16 No Integration. The Company and its subsidiaries have not, directly or through any agent, sold, offered for sale, solicited offers to buy or otherwise negotiated in respect of, any security (as defined in the Securities Act) which is or will be integrated with the Shares sold pursuant to this Agreement in a manner that would require the registration of the Shares under the Securities Act.

4.17 Brokers' or Finders' Fees. No broker, finder, investment banker or other Person is entitled to any brokerage, finder's or other fee or commission from the Company in connection with the transactions contemplated by the Transaction Agreements.

4.18 Not Investment Company. The Company is not, and upon receipt of the Aggregate Purchase Price, will not be, an "investment company" as defined in the Investment Company Act of 1940, as amended.

4.19 Internal Controls; Disclosure Controls and Procedures. The Company and its subsidiaries are in compliance in all material respects with applicable requirements of the Sarbanes-Oxley Act of 2002, as amended, and all applicable rules and regulations promulgated by the SEC thereunder. The Company and its subsidiaries maintain internal control over financial reporting as defined in Rule 13a-15(f) under the Exchange Act. The Company and its subsidiaries have established the "disclosure controls and procedures" (as such term is defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) required in order for the principal executive officers and principal financial officers of the Company and its subsidiaries to engage in the review and evaluation process mandated by the Exchange Act, and are in compliance with such disclosure controls and procedures in all material respects. The Company and its subsidiaries designed such disclosure controls and procedures to ensure that information required to be disclosed by the Company in the reports it files or submits under the Exchange Act is

recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Each of the principal executive officers and principal financial officers of the Company and its subsidiaries have made all certifications required by Sections 302 and 906 of the Sarbanes-Oxley Act of 2002, as amended, with respect to all reports, schedules, forms, statements and other documents required to be filed by the Company and its subsidiaries with the SEC.

5. Representations and Warranties of the Investor. The Investor hereby represents and warrants to the Company that:

5.1 Organization; Good Standing. The Investor is a corporation duly organized, validly existing and in good standing under the laws of England and Wales. The Investor has or will have all requisite power and authority to enter into the Transaction Agreements, to purchase the Shares and to perform its obligations under and to carry out the other transactions contemplated by the Transaction Agreements.

5.2 Authorization. All requisite action on the part of the Investor and its directors and shareholders, required by applicable Law for the authorization, execution and delivery by the Investor of the Transaction Agreements and the performance of all of its obligations thereunder, including the subscription for and purchase of the Shares, has been taken. This Agreement and the Collaboration Agreement have been, and upon the execution and delivery of the Investor Agreement at the Closing by the Investor, the Investor Agreement will be, duly executed and delivered by the Investor or GSK IP3 (as applicable) and upon the due execution and delivery thereof by the Company, will constitute valid and legally binding obligations of the Investor, enforceable against the Investor and GSK IP3 (as applicable) in accordance with their respective terms (except as such enforceability may be limited by (a) applicable bankruptcy, insolvency, reorganization, moratorium or other Laws of general application relating to or affecting enforcement of creditors' rights and (b) rules of Law governing specific performance, injunctive relief or other equitable remedies and limitations of public policy).

5.3 No Conflicts. The execution, delivery and performance of the Transaction Agreements and compliance with the provisions thereof by the Investor do not and shall not: (a) violate any provision of applicable Law or any ruling, writ, injunction, order, permit, judgment or decree of any Governmental Authority, (b) constitute a breach of, or default under (or an event which, with notice or lapse of time or both, would become a default under) or conflict with, or give rise to any right of termination, cancellation or acceleration of, any agreement, arrangement or instrument, whether written or oral, by which the Investor or any of its assets, are bound, or (c) violate or conflict with any of the provisions of the Investor's organizational documents (including any articles or memoranda of organization or association, charter, bylaws or similar documents), except, in the case of subsections (a) or (b), as would not materially impair or adversely affect the ability of the Investor to consummate the Transaction and perform its obligations under the Transaction Agreements.

5.4 No Governmental Authority or Third Party Consents. No consent, approval, authorization or other order of any Governmental Authority or other Third Party is required to be obtained by the Investor in connection with the authorization, execution and delivery of any

of the Transaction Agreements or with the subscription for and purchase of the Shares, except as required pursuant to the HSR Act.

5.5 Purchase Entirely for Own Account. The Shares shall be acquired for investment for the Investor's own account, not as a nominee or agent, and not with a view to the resale or distribution of any part thereof, and the Investor has no present intention of selling, granting any participation or otherwise distributing the Shares. The Investor does not have and will not have as of the Closing any contract, undertaking, agreement or arrangement with any Person to sell, transfer or grant participation to a Person any of the Shares.

5.6 Disclosure of Information. The Investor has had the opportunity to review the Company SEC Documents and has received all the information from the Company and its management that the Investor considers necessary or appropriate for deciding whether to purchase the Shares hereunder. The Investor further represents that it has had an opportunity to ask questions and receive answers from the Company regarding the Company, its financial condition, results of operations and prospects and the terms and conditions of the offering of the Shares sufficient to enable it to evaluate its investment.

5.7 Investment Experience and Accredited Investor Status. The Investor is an "accredited investor" (as defined in Regulation D under the Securities Act). The Investor has such knowledge and experience in financial or business matters that it is capable of evaluating the merits and risks of the investment in the Shares to be purchased hereunder.

5.8 Acquiring Person. As of the date of this Agreement and immediately prior to the Closing, neither the Investor nor any of its Affiliates beneficially owns, or will beneficially own (as determined pursuant to Rule 13d-3 under the Exchange Act without regard for the number of days in which a Person has the right to acquire such beneficial ownership, and without regard to the Investor's rights under this Agreement), any securities of the Company.

5.9 Restricted Securities. The Investor understands that the Shares, when issued, shall be "restricted securities" under the federal securities Laws inasmuch as they are being acquired from the Company in a transaction not involving a public offering and that under such Laws the Shares may be resold without registration under the Securities Act only in certain limited circumstances. The Investor represents that it is familiar with Rule 144 of the Securities Act, as presently in effect.

5.10 Legends. The Investor understands that the Shares in book-entry form shall be subject to the following legends:

(a) "These securities have not been registered under the Securities Act of 1933. They may not be sold, offered for sale, pledged or hypothecated in the absence of a registration statement in effect with respect to the securities under the Securities Act or an opinion of counsel (which counsel shall be reasonably satisfactory to Wave Life Sciences Ltd.) that such registration is not required or unless sold pursuant to Rule 144 of the Securities Act."; and

(b) "These securities are subject to and shall be transferable only upon the terms and conditions of an Investor Agreement by and between Wave Life Sciences Ltd. and Glaxo Group Limited, a copy of which is on file with the Secretary of Wave Life Sciences Ltd."

5.11 Financial Assurances. As of the date hereof and as of the Closing Date, the Investor has and will have access to cash in an amount sufficient to pay to the Company the Aggregate Purchase Price.

6. Investor's Conditions to Closing. The Investor's obligation to purchase the Shares at the Closing is subject to the fulfillment as of the Closing of the following conditions (unless waived in writing by the Investor):

6.1 Representations and Warranties. The representations and warranties made by the Company in Section 4 hereof shall be true and correct as of the date of this Agreement and as of the Closing Date as though made on and as of the Closing Date, except to the extent such representations and warranties are specifically made as of a particular date, in which case such representations and warranties shall be true and correct as of such date; provided, however, that for purposes of this Section 6.1, all such representations and warranties of the Company (other than Sections 4.1(a), 4.2, 4.3, 4.4, 4.5(a), 4.6(d), 4.8, 4.12(d) and 4.17 of this Agreement) shall be deemed to be true and correct for purposes of this Section 6.1 unless the failure or failures of such representations and warranties to be so true and correct, without regard to any "material," "materiality" or "Material Adverse Effect" qualifiers set forth therein, individually or in the aggregate, has had or would reasonably be expected to have a Material Adverse Effect.

6.2 Covenants. All covenants and agreements contained in this Agreement to be performed or complied with by the Company on or prior to the Closing Date shall have been performed or complied with in all material respects.

6.3 Investor Agreement. The Company shall have duly executed and delivered to the Investor, pursuant to Section 3.2(a) of this Agreement, the Investor Agreement.

6.4 Collaboration Agreement. The Company shall have duly executed and delivered to GSK IP3 the Collaboration Agreement, and there shall have been no termination of the Collaboration Agreement that, as of the Closing, has been delivered or is effective.

6.5 Agreements, Certificates, Etc. The Company shall have duly executed and delivered to the Investor the documents referenced in Section 3.2(a) of this Agreement.

6.6 Nasdaq Notification. The Company shall have submitted a listing of additional shares notification to the Nasdaq Global Market in connection with the consummation of the transactions contemplated by this Agreement.

6.7 No Material Adverse Effect. From and after the date of this Agreement until the Closing Date, there shall have occurred no event that has caused or would reasonably be expected to cause a Material Adverse Effect.

7. Company's Conditions to Closing. The Company's obligation to issue and sell the Shares at the Closing is subject to the fulfillment as of the Closing of the following conditions (unless waived in writing by the Company):

7.1 Representations and Warranties. The representations and warranties made by the Investor in Section 5 hereof shall be true and correct as of the date of this Agreement and as of the Closing Date as though made on and as of the Closing Date, except to the extent such representations and warranties are specifically made as of a particular date, in which case such representations and warranties shall be true and correct as of such date.

7.2 Covenants. All covenants and agreements contained in this Agreement to be performed or complied with by the Investor on or prior to the Closing Date shall have been performed or complied with in all material respects.

7.3 Investor Agreement. The Investor shall have duly executed and delivered to the Company, pursuant to Section 3.2(b) of this Agreement, the Investor Agreement.

7.4 Collaboration Agreement. GSK IP3 shall have duly executed and delivered to the Company the Collaboration Agreement, and there shall have been no termination of the Collaboration Agreement that, as of the Closing, has been delivered or is effective.

8. Mutual Conditions to Closing. The obligations of the Investor and the Company to consummate the Closing are subject to the fulfillment as of the Closing Date of the following conditions:

8.1 HSR Act and Other Qualifications. The filings required under the HSR Act in connection with the Transaction Agreements shall have been made and the required waiting period shall have expired or been terminated as of the Closing Date, and all other authorizations, consents, waivers, permits, approvals, qualifications and registrations to be obtained or effected with any Governmental Authority, including, without limitation, necessary blue sky permits and qualifications required by any state for the offer and sale to the Investor of the Shares, shall have been obtained and shall be in effect as of the Closing Date.

8.2 Absence of Litigation. There shall be no action, suit, proceeding or investigation by a Governmental Authority pending or currently threatened in writing against the Company or the Investor that questions the validity of any of the Transaction Agreements, the right of the Company or the Investor to enter into any Transaction Agreement or to consummate the transactions contemplated hereby or thereby or which, if determined adversely, would impose substantial monetary damages on the Company or the Investor as a result of the consummation of the transactions contemplated by any Transaction Agreement.

8.3 No Prohibition. No provision of any applicable Law and no judgment, injunction (preliminary or permanent), order or decree that prohibits, makes illegal or enjoins the consummation of the Transaction shall be in effect.

9. Termination.

9.1 Ability to Terminate. This Agreement may be terminated at any time prior to the Closing by:

(a) mutual written consent of the Company and the Investor;

(b) either the Company or the Investor, upon written notice to the other, if any of the mutual conditions to the Closing set forth in Section 8 shall have become incapable of fulfillment by the Closing Date and shall not have been waived in writing by the other party; provided, however, that the right to terminate this Agreement under this Section 9.1(b) shall not be available to any party whose failure to fulfill any obligation under this Agreement has been the cause of, or resulted in, the failure to consummate the transactions contemplated hereby prior to the Closing Date;

(c) the Company, if (i) any of the representations and warranties of the Investor contained in Section 5 of this Agreement shall fail to be true and correct or (ii) there shall be a breach by the Investor of any covenant of the Investor in this Agreement that, in either case, (A) would result in the failure of a condition set forth in Section 6 or 8, and (B) which is not curable or, if curable, is not cured on or prior to the twentieth (20th) day after written notice thereof is given by the Company to the Investor;

(d) the Investor, if (i) any of the representations and warranties of the Company contained in Section 4 of this Agreement shall fail to be true and correct or (ii) there shall be a breach by the Company of any covenant of the Company in this Agreement that, in either case, (A) would result in the failure of a condition set forth in Section 7 or 8, and (B) which is not curable or, if curable, is not cured on or prior to the twentieth (20th) day after written notice thereof is given by the Investor to the Company.

9.2 Automatic Termination. This Agreement shall terminate immediately upon termination of the Collaboration Agreement pursuant to Section 14.3 thereof.

9.3 Effect of Termination. In the event of the termination of this Agreement pursuant to Section 9.1 or 9.2 hereof, (a) this Agreement (except for this Section 9.3 and Section 11 hereof (other than Section 11.13), and any definitions set forth in this Agreement and used in such sections) shall forthwith become void and have no effect, without any liability on the part of any party hereto or its Affiliates, and (b) all filings, applications and other submissions made pursuant to this Agreement, to the extent practicable, shall be withdrawn from the agency or other Person to which they were made or appropriately amended to reflect the termination of the transactions contemplated hereby; provided, however, that nothing contained in this Section 9.3 shall relieve any party from liability for fraud or any intentional or willful breach of this Agreement.

10. Additional Covenants and Agreements.

10.1 Market Listing. From the date hereof through the Closing Date, the Company shall use all reasonable efforts to (a) maintain the listing and trading of the Ordinary Shares on The Nasdaq Global Market and (b) effect the listing of the Shares on The Nasdaq Global Market.

10.2 Assistance and Cooperation. Prior to the Closing, upon the terms and subject to the conditions set forth in this Agreement, each of the parties agrees to use all reasonable efforts to take, or cause to be taken, all actions and to do, or cause to be done, and to assist and cooperate with the other party in doing, all things necessary, proper or advisable to consummate and make effective, in the most expeditious manner practicable, the transactions contemplated by this Agreement, including using all reasonable efforts to accomplish the following: (a) taking all reasonable acts necessary to cause the conditions precedent set forth in Sections 6, 7 and 8 to be satisfied; (b) obtaining all necessary actions or non-actions, waivers, consents, approvals, orders and authorizations from Governmental Authorities and the making of all necessary registrations, declarations and filings (including registrations, declarations and filings with Governmental Authorities, if any) and taking all reasonable steps as may be necessary to avoid any suit, claim, action, investigation or proceeding by any Governmental Authority; (c) taking all reasonable steps to obtain all necessary consents, approvals or waivers from Third Parties; and (d) defending any suits, claims, actions, investigations or proceedings, whether judicial or administrative, challenging this Agreement or the consummation of the transactions contemplated hereby, including seeking to have any stay or temporary restraining order entered by any court or other Governmental Authority vacated or reversed. In addition, each of the Company and the Investor will promptly take any and all steps necessary to obtain any consent or to vacate or lift any order, writ, judgment, injunction, decree, stipulation, determination or award entered by or with any Governmental Authority relating to antitrust matters that would have the effect of making any of the transactions contemplated by this Agreement illegal or otherwise prohibiting or materially delaying their consummation.

10.3 Effect of Waiver of Condition to Closing. In the event that, as of the Closing, the Investor waives the condition regarding a Material Adverse Effect set forth in Section 6.7 of this Agreement, the Investor shall be deemed to have waived any right of recourse against the Company for, and agreed not to sue the Company in respect of, any and all events or inaccuracies in any representations or warranties of the Company (a) that, as of the Closing, have caused or would reasonably be expected to cause such Material Adverse Effect and (b) of which the Investor had notice in writing from the Company immediately prior to the Closing.

10.4 Share Issuance and Legend Removal. The Company will deliver to Investor an updated shareholder register reflecting the Investor as holder of the Shares and evidence of the issuance of the Shares promptly following the Closing. The legend set forth in Section 5.10 hereof shall be removed from any certificate evidencing the Shares (or if the Shares are held in book-entry form, any restrictions on transfer noted with respect thereto shall be removed) and the Company shall, or shall cause its transfer agent to, issue, no later than five (5) Business Days from receipt of a request from the Investor pursuant to this Section 10.4 following the expiration of the Restricted Period (as defined in the Investor Agreement) or such earlier date on which the restrictions on dispositions of the Shares terminates in accordance with Section 6.3 of the Investor Agreement, a certificate or certificates evidencing all or a portion of the Shares (if any), as requested by the Investor, without such legend if such legend removal is in compliance with Sections 4 and 5 of the Investor Agreement and: (i) such securities have been resold under an effective registration statement under the Securities Act, (ii) such securities have been or will be transferred in compliance with Rule 144 under the Securities Act, (iii) such securities are eligible for resale pursuant to Rule 144(b)(1)(i) under the Securities Act or (iv) the Investor shall have provided the Company with an opinion of

counsel, reasonably satisfactory to the Company, stating that such securities may lawfully be transferred without registration under the Securities Act.

11. Miscellaneous.

11.1 Governing Law; Jurisdiction. This Agreement shall be governed by, and construed in accordance with, the Laws of the State of New York without regard to the conflict of laws principles thereof that would require the application of the Law of any other jurisdiction. The parties irrevocably and unconditionally submit to the exclusive jurisdiction of the United States District Court for the Southern District of New York solely and specifically for the purposes of any action or proceeding arising out of or in connection with this Agreement.

11.2 Waiver. Waiver by a party of a breach hereunder by the other party shall not be construed as a waiver of any subsequent breach of the same or any other provision. No delay or omission by a party in exercising or availing itself of any right, power or privilege hereunder shall preclude the later exercise of any such right, power or privilege by such party. No waiver shall be effective unless made in writing with specific reference to the relevant provision(s) of this Agreement and signed by a duly authorized representative of the party granting the waiver.

11.3 Notices. Any notice required or permitted to be given under this Agreement will be in writing and will be deemed to have been sufficiently given if delivered in person, sent by email or delivered by express courier service (signature required) to the party to which it is directed at its address set forth on Exhibit C attached hereto or such other address as such party will have last given by notice to the other party. Notices will be deemed effective (a) the next day if sent by express courier service, or (b) on the date sent if sent by email and no delivery failure notification has been received, except any notice sent after 5:00 p.m. (Eastern Time) on a Business Day or on a non-Business Day will be deemed to have been received on the next Business Day. Either Party may change its address for purposes hereof by written notice to the other in accordance with the provisions of this Section 11.3.

11.4 Entire Agreement. This Agreement and the Investor Agreement (once executed), contain the entire agreement among the parties with respect to the subject matter hereof and thereof and supersede all prior and contemporaneous arrangements or understandings, whether written or oral, with respect hereto and thereto.

11.5 Amendments. No provision in this Agreement shall be supplemented, deleted or amended except in a writing executed by an authorized representative of each of the Investor and the Company.

11.6 Headings; Nouns and Pronouns; Section References. Headings in this Agreement are for convenience of reference only and shall not be considered in construing this Agreement. Whenever the context may require, any pronouns used herein shall include the corresponding masculine, feminine or neuter forms, and the singular form of names and pronouns shall include the plural and vice-versa. References in this Agreement to a section or subsection shall be deemed to refer to a section or subsection of this Agreement unless otherwise expressly stated.

11.7 Severability. If, under applicable Laws, any provision hereof is invalid or unenforceable, or otherwise directly or indirectly affects the validity of any other material provision(s) of this Agreement in any jurisdiction ("**Modified Clause**"), then, it is mutually agreed that this Agreement shall endure and that the Modified Clause shall be enforced in such jurisdiction to the maximum extent permitted under applicable Laws in such jurisdiction; provided that the parties shall consult and use all reasonable efforts to agree upon, and hereby consent to, any valid and enforceable modification of this Agreement as may be necessary to avoid any unjust enrichment of either party and to match the intent of this Agreement as closely as possible, including the economic benefits and rights contemplated herein.

11.8 Assignment. Except for an assignment by the Investor of this Agreement or any rights hereunder to an Affiliate (which assignment shall not relieve the Investor of any obligation hereunder), neither this Agreement nor any of the rights or obligations hereunder may be assigned by either the Investor or the Company without (a) the prior written consent of the Company in the case of any assignment by the Investor or (b) the prior written consent of the Investor in the case of an assignment by the Company.

11.9 Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns.

11.10 Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original but which together shall constitute one and the same instrument.

11.11 Third Party Beneficiaries. None of the provisions of this Agreement shall be for the benefit of or enforceable by any Third Party, including any creditor of any party hereto. No Third Party shall obtain any right under any provision of this Agreement or shall by reason of any such provision make any claim in respect of any debt, liability or obligation (or otherwise) against any party hereto.

11.12 No Strict Construction. This Agreement has been prepared jointly and will not be construed against either party.

11.13 Survival of Warranties. The representations and warranties of the Company and the Investor contained in this Agreement shall survive the Closing for twelve (12) months, except for (a) the representations and warranties set forth in Sections 4.1, 4.2, 4.4, 4.5(a), 4.6(d), 4.8, 4.12, 4.15, 4.16, 4.17, 5.1, 5.2, 5.5, 5.7, 5.8, 5.9 and 5.10, which shall survive the Closing and (b) the representation and warranty of the Investor in Section 5.11, which shall not survive the Closing. The parties hereby acknowledge and agree that the rights of the parties hereunder are special, unique and of extraordinary character, and that if any party refuses or otherwise fails to act, or to cause its Affiliates to act, in accordance with the provisions of this Agreement, such refusal or failure would result in irreparable injury to the Company or the Investor as the case may be, the exact amount of which would be difficult to ascertain or estimate and the remedies at law for which would not be reasonable or adequate compensation. Accordingly, if any party refuses or otherwise fails to act, or to cause its Affiliates to act, in accordance with the provisions of this Agreement, then, in addition to any other remedy which may be available to any damaged party at law or in equity, such damaged party will be entitled

to seek specific performance and injunctive relief, without posting bond or other security, and without the necessity of proving actual or threatened damages, which remedy such damaged party will be entitled to seek in any court of competent jurisdiction.

11.14 Remedies. The rights, powers and remedies of the parties under this Agreement are cumulative and not exclusive of any other right, power or remedy which such parties may have under any other agreement or Law. No single or partial assertion or exercise of any right, power or remedy of a party hereunder shall preclude any other or further assertion or exercise thereof.

11.15 Expenses. Each party shall pay its own fees and expenses in connection with the preparation, negotiation, execution and delivery of this Agreement and the Investor Agreement.

(*Signature Page Follows*)

IN WITNESS WHEREOF, the parties have executed and delivered this Agreement as of the date first above written.

WAVE LIFE SCIENCES LTD.

By: /s/ Paul B. Bolno, M.D., MBA
Name: Paul B. Bolno, M.D., MBA
Title: President and Chief Executive Officer

GLAXO GROUP LIMITED

By: /s/ John J. Lepore, M.D.
Name: John J. Lepore, M.D.
Title: SVP, Head of Research, GSK

[*Signature Page to Share Purchase Agreement*]

EXHIBIT A

FORM OF CROSS RECEIPT

CROSS RECEIPT

Wave Life Sciences Ltd. hereby acknowledges receipt from Glaxo Group Limited on [__], 2023 of $50,000,001.48, representing the purchase price for 10,683,761 Ordinary Shares, no par value, of Wave Life Sciences Ltd., pursuant to that certain Share Purchase Agreement, dated as of December 13, 2022, by and between Glaxo Group Limited and Wave Life Sciences Ltd.

WAVE LIFE SCIENCES LTD.

By: ____
Name:
Title:

Glaxo Group Limited hereby acknowledges receipt from Wave Life Sciences Ltd. on [__], 2023 of 10,683,761 Ordinary Shares, no par value, of Wave Life Sciences Ltd., delivered pursuant to that certain Share Purchase Agreement, dated as of December 13, 2022, by and between Glaxo Group Limited and Wave Life Sciences Ltd.

GLAXO GROUP LIMITED

By: ____
Name:
Title:

EXHIBIT B

FORM OF INVESTOR AGREEMENT

EXHIBIT C

NOTICES

(a) If to the Investor:

Corporate Secretariat
Glaxo Group Limited
980 Great West Road
Brentford, Middlesex TW8 9GS
United Kingdom

with copies, which will not constitute notice, to:

VP and Head of Legal Business Development & Corporate
Corporate Secretariat
Glaxo Group Limited
980 Great West Road
Brentford, Middlesex TW8 9GS
United Kingdom

VP and Head of Corporate Development
Corporate Seretariat
Glaxo Group Limited
980 Great West Road
Brentford, Middlesex TW8 9GS
United Kingdom

White & Case LLP
1221 Avenue of the Americas
New York, NY 10020
Attention: Andres Liivak, Esq.
Email: Andres.Liivak@whitecase.com

(b) If to the Company:

Wave Life Sciences Ltd.
733 Concord Avenue
Cambridge, MA 02138
Attention: General Counsel
Email: legalnotices@wavelifesci.com

with a copy, which will not constitute notice, to:

Goodwin Procter LLP
100 Northern Avenue

Boston, MA 02210
Attention: Sarah A. Solomon, Esq.
Gregg L. Katz, Esq.
Email: SSolomon@goodwinlaw.com; GKatz@goodwinlaw.com

Exhibit 10.5

INVESTOR AGREEMENT

By and Between

GLAXO GROUP LIMITED

AND

WAVE LIFE SCIENCES LTD.

Dated as of January 26, 2023

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INVESTOR AGREEMENT

THIS INVESTOR AGREEMENT (this "**Agreement**") is made as of January 26, 2023, by and between Glaxo Group Limited, a company organized under the laws of England and Wales (the "**Investor**"), and Wave Life Sciences Ltd., a Singapore public limited company (the "**Company**").

WHEREAS, the Share Purchase Agreement, dated as of December 13, 2022, by and between the Investor and the Company (the "**Purchase Agreement**") provides for the issuance and sale by the Company to the Investor, and the purchase by the Investor, of 10,683,761 Ordinary Shares (the "**Purchased Shares**"); and

WHEREAS, as a condition to consummating the transactions contemplated by the Purchase Agreement, the Investor and the Company have agreed upon certain rights and restrictions as set forth herein with respect to the Purchased Shares and other securities of the Company beneficially owned by the Investor and its Affiliates, and it is a condition to the closing under the Purchase Agreement that this Agreement be executed and delivered by the Investor and the Company.

NOW, THEREFORE, in consideration of the premises and mutual agreements hereinafter set forth, and for other valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. Definitions. As used in this Agreement, the following terms shall have the following meanings:

(a) "**Acquisition Proposal**" shall have the meaning set forth in Section 3.1(c).

(b) "**Affiliate**" shall mean, with respect to any Person, another Person which controls, is controlled by or is under common control with such Person. A Person shall be deemed to "**control**" another Person if any of the following conditions is met: (i) in the case of corporate entities, direct or indirect ownership of more than fifty percent (50%) of the shares having the right to vote for the election of directors or otherwise having the power to control or direct the affairs of such Person; and (ii) in the case of non-corporate entities, direct or indirect ownership of more than fifty percent (50%) of the equity interest or the power to direct the management and policies of such non-corporate entities. For the purposes of this Agreement, in no event shall the Investor or any of its Affiliates be deemed Affiliates of the Company or any of its Affiliates, nor shall the Company or any of its Affiliates be deemed Affiliates of the Investor or any of its Affiliates.

(c) "**Agreement**" shall have the meaning set forth in the Preamble, including all Exhibits attached hereto.

(d) "**beneficial owner**," "**beneficially owns**," "**beneficial ownership**" and terms of similar import used in this Agreement shall, with respect to a Person, have the meaning set forth in Rule 13d-3 under the Exchange Act (i) assuming the full conversion into, and exercise and exchange for, Ordinary Shares of all Ordinary Share Equivalents beneficially

owned by such Person and (ii) determined without regard for the number of days in which such Person has the right to acquire such beneficial ownership.

(e) "**Business Day**" shall mean a calendar day other than a Saturday, Sunday, or a bank or other public holiday in Massachusetts or New York in the United States or in London, United Kingdom and excludes the continuous period between December 24 to January 2 each year when the offices of the Investor and the Company are closed.

(f) "**Change of Control**" shall mean, with respect to the Company, any of the following events: (i) any Person becomes the beneficial owner (except that a Person shall be deemed to have beneficial ownership of all Ordinary Shares that any such Person has the right to acquire, whether such right which may be exercised immediately or only after the passage of time), directly or indirectly, of a majority of the total voting power represented by all Then Outstanding Ordinary Shares; (ii) the Company consolidates with or merges into another corporation or entity, or any corporation or entity consolidates with or merges into the Company, other than (A) a merger or consolidation which would result in the voting securities of the Company outstanding immediately prior to such merger or consolidation continuing to represent (either by remaining outstanding or by being converted into voting securities of the surviving entity or any parent thereof) a majority of the combined voting power of the voting securities of the Company or such surviving entity or any parent thereof outstanding immediately after such merger or consolidation, or (B) a merger or consolidation effected to implement a recapitalization of the Company (or similar transaction) in which no Person becomes the beneficial owner, directly or indirectly, of a majority of the total voting power of all Then Outstanding Ordinary Shares or (iii) the Company conveys, transfers or leases all or substantially all of its assets to any Person other than a wholly owned Affiliate of the Company.

(g) "**Collaboration Agreement**" shall mean the Collaboration and License Agreement by and among Wave Life Sciences USA, Inc., Wave Life Sciences UK Limited and the Investor, dated as of December 13, 2022.

(h) "**Company**" shall have the meaning set forth in the Preamble to this Agreement.

(i) "**Controlling Person**" shall have the meaning set forth in Section 2.7(a).

(j) "**Damages**" shall have the meaning set forth in Section 2.7(a).

(k) "**Demand Registration**" shall have the meaning set forth in Section 2.1(a).

(l) "**Disposition**" or "**Dispose of**" shall mean any (i) offer, pledge, sale, contract to sell, sale of any option or contract to purchase, purchase of any option or contract to sell, grant of any option, right or warrant for the sale of, or other disposition of or transfer of any Ordinary Shares, or any Ordinary Share Equivalents, including, without limitation, any "short sale" or similar arrangement, or (ii) swap or any other agreement or any transaction that transfers, in whole or in part, directly or indirectly, the economic consequence of ownership of

Ordinary Shares, whether any such swap or transaction is to be settled by delivery of securities, in cash or otherwise.

(m) "**Exchange Act**" shall mean the Securities Exchange Act of 1934, as amended, and the rules and regulations of the SEC promulgated thereunder.

(n) "**Extraordinary Matter**" shall have the meaning set forth in Section 3.1(f).

(o) "**Filing Date**" shall mean (i) with respect to any Registration Statement to be filed on Form S-1 (or any applicable successor form), sixty (60) days after receipt by the Company of a Demand Request for such Registration Statement and (ii) with respect to any Registration Statement to be filed on Form S-3 (or any applicable successor form), forty-five (45) days after receipt by the Company of a Demand Request for such Registration Statement.

(p) "**Governmental Authority**" shall mean any court, agency, authority, department, regulatory body or other instrumentality of any government or country or of any national, federal, state, provincial, regional, county, city or other political subdivision of any such government or country or any supranational organization of which any such country is a member.

(q) "**Holder**" shall have the meaning set forth in Section 2.1(a).

(r) "**Holders' Counsel**" shall have the meaning set forth in Section 2.3.

(s) "**Indemnified Party**" shall have the meaning set forth in Section 2.7(c).

(t) "**Indemnifying Party**" shall have the meaning set forth in Section 2.7(c).

(u) "**Interference**" shall have the meaning set forth in Section 2.1(d).

(v) "**Investor**" shall have the meaning set forth in the Preamble to this Agreement.

(w) "**Law**" or "**Laws**" shall mean all laws, statutes, rules, regulations, orders, judgments, injunctions and/or ordinances of any Governmental Authority.

(x) "**Modified Clause**" shall have the meaning set forth in Section 6.7.

(y) "**Offeror**" shall have the meaning set forth in Section 3.1(c).

(z) "**Ordinary Share Equivalents**" shall mean any options, warrants or other securities or rights convertible into or exercisable or exchangeable for, whether directly or following conversion into or exercise or exchange for other options, warrants or other securities or rights, Ordinary Shares.

(aa) "**Ordinary Shares**" means the ordinary shares, fully-paid up, no par value, of the Company.

(bb) "**Permitted Transferee**" shall mean a controlled Affiliate of the Investor that is wholly owned, directly or indirectly, by the Investor; it being understood that for purposes of this definition "wholly owned" shall mean an Affiliate in which the Investor owns, directly or indirectly, at least ninety-nine percent (99%) of the outstanding capital stock or share capital of such Affiliate; provided, however, that no such Person shall be deemed a Permitted Transferee for any purpose under this Agreement unless: (a) the Investor shall have, within five (5) days prior to such transfer, furnished to the Company written notice of the name and address of such Permitted Transferee, details of its status as a Permitted Transferee and details of the Then Outstanding Ordinary Shares and/or Ordinary Share Equivalents to be transferred, (b) the Permitted Transferee, prior to or simultaneously with such transfer, shall have agreed in writing to be subject to and bound by all restrictions and obligations set forth in this Agreement as though it were the Investor hereunder, and (c) the Investor acknowledges that it continues to be bound by all restrictions and obligations set forth in this Agreement.

(cc) "**Person**" shall mean any individual, partnership, firm, corporation, limited liability company, association, trust, unincorporated organization, government or any department or agency thereof or other entity, as well as any syndicate or group that would be deemed to be a Person under Section 13(d)(3) of the Exchange Act.

(dd) "**Piggyback Registration**" shall have the meaning set forth in Section 2.2(a).

(ee) "**Pfizer Holders**" shall have the meaning set forth in Section 2.1(c).

(ff) "**Prospectus**" shall mean the prospectus forming a part of any Registration Statement, as supplemented by any and all prospectus supplements and as amended by any and all amendments (including post-effective amendments) and including all material incorporated by reference or explicitly deemed to be incorporated by reference in such prospectus.

(gg) "**Purchase Agreement**" shall have the meaning set forth in the Recitals to this Agreement, and shall include all Exhibits attached thereto.

(hh) "**Purchased Shares**" shall have the meaning set forth in the Recitals to this Agreement, and shall be adjusted for (i) any share split, share dividend, share exchange, merger, consolidation or similar recapitalization and (ii) any Ordinary Shares issued as (or issuable upon the exercise of any warrant, right or other security that is issued as) a dividend or other distribution with respect to, or in exchange or in replacement of, the Purchased Shares.

(ii) "**registers**," "**registered**," and "**registration**" refer to a registration effected by preparing and filing a Registration Statement or similar document in compliance with the Securities Act, and the declaration or ordering of effectiveness of such Registration Statement or document by the SEC.

(jj) "**Registrable Securities**" shall mean (i) the Purchased Shares, together with any Ordinary Shares issued in respect thereof as a result of any share split, share dividend, share exchange, merger, consolidation or similar recapitalization and (ii) any Ordinary Shares issued as (or issuable upon the exercise of any warrant, right or other security that is issued as) a dividend or other distribution with respect to, or in exchange or in replacement of, the Ordinary Shares described in clause (i) of this definition, excluding in all cases, however, (A) any Registrable Securities if and after they have been transferred to a Permitted Transferee in a transaction in connection with which registration rights granted hereunder are not assigned or (B) any Registrable Securities sold to or through a broker or dealer or underwriter in a public distribution or a public securities transaction.

(kk) "**Registration Expenses**" shall have the meaning set forth in Section 2.3.

(ll) "**Registration Statement**" shall mean any registration statement of the Company under the Securities Act that covers any of the Registrable Securities pursuant to the provisions of this Agreement, including the related Prospectus, all amendments and supplements to such registration statement (including post-effective amendments), and all exhibits and all materials incorporated by reference or explicitly deemed to be incorporated by reference in such Registration Statement.

(mm) "**Restricted Term**" shall have the meaning set forth in Section 3.1.

(nn) "**SEC**" shall mean the United States Securities and Exchange Commission.

(oo) "**Securities Act**" shall mean the Securities Act of 1933, as amended, and the rules and regulations of the SEC promulgated thereunder.

(pp) "**Standstill Parties**" shall have the meaning set forth in Section 3.1.

(qq) "**Suspension Notice**" shall have the meaning set forth in Section 2.6.

(rr) "**Takeda Holders**" shall have the meaning set forth in Section 2.1(c).

(ss) "**Then Outstanding Ordinary Shares**" shall mean, at any time, the issued and outstanding Ordinary Shares at such time, as well as all share capital issued and outstanding as a result of any share split, share dividend, or reclassification of Ordinary Shares distributable, on a pro rata basis, to all holders of Ordinary Shares.

(tt) "**Third Party**" shall mean any Person other than the Investor, the Company or any Affiliate of the Investor or the Company.

(uu) "**Underwriters' Maximum Number**" shall have the meaning set forth in Section 2.1(c).

(vv) "**Underwritten Offering**" shall have the meaning set forth in Section 2.1(a).

2. Registration Rights.

2.1 Demand Registration.

(a) Subject to the provisions hereof, after the Restricted Term, the Investor and any Permitted Transferee of the Investor (each a "**Holder**") holding, collectively, a majority of the Registrable Securities then outstanding shall have the right to require the Company to file a Registration Statement registering for sale all or part of the Shares held by or issuable to them (collectively, the "**Registrable Securities**") under the Securities Act (a "**Demand Registration**") by delivering a written request therefor to the Company (i) specifying the number of Registrable Securities to be included in such registration by such Holder or Holders, (ii) specifying whether the intended method of disposition thereof is pursuant to an underwritten public offering of Ordinary Shares by the Company (an "**Underwritten Offering**"), and (iii) containing all information about such Holder required to be included in such Registration Statement in accordance with applicable Law. The Company shall use commercially reasonable efforts to effect such registration (including, without limitation, appropriate qualification under applicable blue sky or other state securities Laws and appropriate compliance with applicable regulations issued under the Securities Act and any other governmental requirements or regulations) of the Registrable Securities that the Company has been so requested to register as soon as practicable (and in any case by the applicable Filing Date); provided, however, that the Holders shall not make a request for a Demand Registration under this Section 2.1(a) for Registrable Securities having an anticipated aggregate offering price of less than $25,000,000. The Holders shall be entitled to require the Company to effect two (2) Demand Registrations under this Agreement.

(b) If the offering of the Registrable Securities pursuant to such Demand Registration is an Underwritten Offering, (i) the Company shall select the underwriter(s) of the Underwritten Offering, subject to the approval of the Holders of a majority of the Registrable Securities to be sold in the Underwritten Offering, such approval not to be unreasonably withheld, conditioned or delayed, and (ii) the Company shall (together with the Holders proposing to distribute their securities through such underwriting) enter into an underwriting agreement in customary form for underwriting agreements for firm commitment offerings by a selling holder of equity securities with the managing underwriter(s) proposing to distribute their securities through such Underwritten Offering; provided, that (i) the representations and warranties by, and the other agreements on the part of, the Company to and for the benefit of the underwriter(s) shall also be made to and for the benefit of the Holders proposing to distribute their securities through the Underwritten Offering, (ii) no Holder shall be required to make any representations and warranties to, or agreements with, any underwriter in a registration other than customary representations, warranties and agreements and (iii) the liability of each Holder in respect of any indemnification, contribution or other obligation of such Holder arising under such underwriting agreement (a) shall be limited to losses arising out of or based upon an untrue

statement or alleged untrue statement or omission or alleged omission made in such Registration Statement, any such preliminary Prospectus, final Prospectus, summary Prospectus, amendment or supplement, incorporated document or other such disclosure document or other document or report, in reliance upon and in conformity with written information furnished to the Company by or on behalf of such Holder expressly for inclusion therein and (b) shall not in any event, absent fraud or intentional misrepresentation, exceed an amount equal to the net proceeds to such Holder (after deduction of all underwriters' discounts and commissions) from the disposition of the Registrable Securities disposed of by such Holder pursuant to such Underwritten Offering.

(c) If, in connection with a Demand Registration in the form of an Underwritten Offering, the managing underwriter(s) give written advice to the Company of the number of securities to which such registration should, in the opinion of the managing underwriter(s) of such registration, in light of marketing factors, be limited (an "**Underwriters' Maximum Number**"), then the Company shall (i) so advise all Holders of Registrable Securities to be included in such Underwritten Offering and (ii) include in such registration the number of securities requested to be included in such registration by all Holders of Registrable Securities to be included in such Underwritten Offering, pro rata on the basis of the aggregate number of Registrable Securities requested to be included by each such Holder, and, subject to the conditions set forth in Section 2.8 hereto, on a *pari passu* basis with the holders of contractual registration rights provided under (i) the Investor Agreement, dated as of April 2, 2018, by and between the Company and Takeda Pharmaceutical Company Limited (the "**Takeda Holders**") and (ii) the Share Purchase Agreement by and between the Company and C.P. Pharmaceuticals International C.V. dated as of May 6, 2016 (the "**Pfizer Holders**").

(d) A registration will not be deemed to have been effected as a Demand Registration unless the Registration Statement relating thereto has been declared effective by the SEC, at least seventy five percent (75%) of the Registrable Securities requested to be included in the registration by the Holders are included in such registration, and the Company has complied in all material respects with its obligations under this Agreement with respect thereto; provided, however, that if, after it has become effective, (i) such Registration Statement or the related offer, sale or distribution of Registrable Securities thereunder is or becomes the subject of any stop order, injunction or other order or requirement of the SEC or any other governmental or administrative agency, or if any court prevents or otherwise limits the sale of the Registrable Securities pursuant to the registration (each, an "**Interference**"), which Interference does not result from any act or omission of any Holder whose Registrable Securities are registered pursuant to such Registration Statement and is not cured within forty five (45) days thereof, and (ii) in each case less than seventy five percent (75%) of the Registrable Securities covered by the effective Registration Statement are actually sold by the selling Holder or Holders pursuant to the Registration Statement, then such registration will be deemed not to have been effected for purposes of the last sentence of Section 2.1(a). If (i) a registration requested pursuant to this Section 2.1 is deemed not to have been effected as a Demand Registration or (ii) the registration requested pursuant to this Section 2.1 does not remain continuously effective until the completion of the distribution by the Holders of the Registrable Securities covered by such registration, then the Company shall continue to be obligated to effect a Demand Registration pursuant to this Section 2.1 of the Registrable Securities included in such registration. In circumstances not including the events described in the immediately two preceding sentences of this Section 2.1(d), each Holder of Registrable Securities shall be permitted voluntarily to

withdraw all or any part of its Registrable Securities from a Demand Registration at any time prior to the commencement of marketing of such Demand Registration, provided that such registration nonetheless shall count as a Demand Registration for purposes of the last sentence of Section 2.1(a).

2.2 Piggyback Registration.

(a) After the Restricted Term, if (and on each occasion that) the Company proposes to register any of its securities under the Securities Act, including if the Company qualifies as a well-known seasoned issuer (within the meaning of Rule 405 under the Securities Act) (a "**WKSI**") (other than (i) pursuant to Section 2.1, (ii) in connection with registrations on Form S-4 or S-8 promulgated by the SEC or any successor or similar forms, (iii) in connection with a transaction conducted pursuant to Rule 145 of the Securities Act, (iv) in connection with registrations on any registration form that does not permit secondary sales or does not include substantially the same information as would be required to be included in a registration statement covering the sale of Registrable Securities or (v) in connection with a shelf registration statement for the sale of ordinary shares for its own account in a "registered direct" offering or at-the-market ("ATM") offering program), whether for its own account or the account of any of its security holders (each such registration not withdrawn or abandoned prior to the effective date thereof being herein referred to as a "**Piggyback Registration**"), the Company shall give written notice to the Holders of such proposal promptly, but in no event later than ten (10) Business Days prior to the anticipated filing date. Each Holder shall keep confidential and not disclose to any Third Party its receipt of any such notice and any information regarding such proposed offering.

(b) Subject to the provisions contained in paragraphs (a) and (c) of this Section 2.2 and the last sentence of this paragraph (b), the Company will be obligated and required to include in each Piggyback Registration such Registrable Securities as requested in a written notice from any Holder delivered to the Company no later than ten (10) Business Days following delivery of the notice from the Company specified in Section 2.2(a). If a Piggyback Registration is an Underwritten Offering, the Company shall (together with the Holders proposing to distribute their securities through such underwriting) enter into an underwriting agreement with the managing underwriter(s) in customary form for underwriting agreements for such an offering. The Company may terminate or withdraw any Piggyback Registration prior to the effectiveness of such registration, whether or not the Holders have elected to include Registrable Securities in such registration.

(c) If a Piggyback Registration is an Underwritten Offering on behalf of a holder of Company securities other than Holders (including, for the avoidance of doubt, the Takeda Holders or the Pfizer Holders), and the managing underwriter(s) advise the Company that in their reasonable opinion the number of securities proposed to be included in such registration exceeds the Underwriters' Maximum Number, then the Company shall include in such registration (i) first, the number of securities to be sold by the Company (if any), (ii) second, the number of securities requested to be included therein by such holder(s) requesting such registration, (iii) third, the number of securities requested to be included therein by all Holders who have requested registration of Registrable Securities in accordance with Section 2.2(a), pro rata on the basis of the aggregate number of Registrable Securities requested to be

included by each such Holder, and, subject to the conditions set forth in Section 2.8 hereto, on a *pari passu* basis with the Takeda Holders and the Pfizer Holders, and (iv) fourth, any other securities that have been requested to be so included by any other Person. If a Piggyback Registration is an Underwritten Offering on behalf of the Company, and the managing underwriter(s) advise the Company that in their reasonable opinion the number of securities proposed to be included in such registration exceeds the Underwriters' Maximum Number, then the Company shall include in such registration (i) first, the number of securities to be sold by the Company, (ii) second, the number of securities requested to be included therein by holder(s) with priority over the Holders with respect to such registration, (iii) third, the number of securities requested to be included therein by all Holders who have requested registration of Registrable Securities in accordance with Section 2.2(a), pro rata on the basis of the aggregate number of Registrable Securities requested to be included by each such Holder, and, subject to the conditions set forth in Section 2.8 hereto, on a *pari passu* basis with the Takeda Holder and the Pfizer Holders, and (iv) fourth, any other securities that have been requested to be so included by any other Person.

(d) In any Piggyback Registration that is an Underwritten Offering, the Company shall have the right to select the managing underwriter(s) for such registration.

2.3 Registration Expenses. In connection with registrations pursuant to Section 2.1 or Section 2.2 hereof, the Company shall pay all of the costs and expenses incurred in connection with the registrations thereunder (the "**Registration Expenses**"), including all (i) registration and filing fees and expenses, including, without limitation, those related to filings with the SEC, (ii) fees and expenses of compliance with state securities or blue sky Laws (including reasonable fees and disbursements of counsel in connection with blue sky qualifications of the Registrable Securities), (iii) reasonable processing, duplicating and printing expenses, including expenses of printing Prospectuses reasonably requested by any Holder, (iv) the Company's internal expenses (including, without limitation, all salaries and expenses of its officers and employees performing legal or accounting duties, the expense of any liability insurance and the expense of any annual audit or quarterly review), (v) fees and expenses incurred in connection with listing the Registrable Securities for trading on a national securities exchange, (vi) fees and expenses in connection with the preparation of the registration statement and related documents covering the Registrable Securities, (vii) fees and expenses, if any, incurred with respect to any filing with FINRA, (viii) any documented out-of-pocket expenses of the underwriter(s) incurred with the approval of the Company, (ix) the cost of providing any CUSIP or other identification numbers for the Registrable Securities, (x) fees and expenses and disbursements of counsel for the Company and fees and expenses for independent certified public accountants retained by the Company (including, without limitation, the expenses of any comfort letters or costs associated with the delivery by independent certified public accountants of a comfort letter or comfort letters requested), (xi) fees and expenses of any special experts retained by the Company in connection with such registration, and (xii) reasonable and documented fees and expenses of one firm of counsel for the Holders to be selected by the Holders of a majority of the Registrable Securities to be included in such registration ("**Holders' Counsel**") not to exceed $75,000 per registration. Notwithstanding the foregoing, the Holders shall be responsible, on a pro rata basis based on the number of Registrable Securities included in the applicable registered offering by each such Holder, for any underwriting discounts, commissions and share transfer fees attributable

to the sale of Registrable Securities pursuant to a Registration Statement and any other out-of-pocket expenses of the Holders not required to be paid by the Company pursuant to this Section 2.3. The obligation of the Company to bear the expenses described in this Section 2.3 and to pay or reimburse the Holders for the expenses described in this Section 2.3 shall apply irrespective of whether any sales of Registrable Securities ultimately take place; provided, however, that the Company shall not be required to pay any expenses of any Demand Registration if the registration request is subsequently withdrawn at the request of the Holders of a majority of the Registrable Securities to be registered (in which case all selling Holders shall bear such expenses on a pro rata basis based on the number of Registrable Securities included in the applicable registered offering by each such Holder).

2.4 Registration Procedures. In the case of each registration effected by the Company pursuant to this Agreement, the Company shall keep each Holder advised in writing as to the initiation of each registration and as to the completion thereof. In connection with any such registration:

(a) The Company will, within forty-five (45) days (or sixty (60) days if the Company is required to file a Form S-1) after its receipt of the request for registration under Section 2.1(a), prepare and file with the SEC a Registration Statement on Form S-3 or another appropriate Securities Act form reasonably acceptable to the Holders, and use commercially reasonable efforts to cause such Registration Statement to become and remain effective until the completion of the distribution contemplated thereby.

(b) The Company will (i) promptly prepare and file with the SEC such amendments to each Registration Statement as may be necessary to keep such Registration Statement effective for as long as such registration is required to remain effective pursuant to the terms hereof, (ii) cause the Prospectus to be supplemented by any required Prospectus supplement, and, as so supplemented, to be filed pursuant to Rule 424 under the Securities Act, and (iii) comply with the provisions of the Securities Act applicable to it with respect to the disposition of all Registrable Securities covered by such Registration Statement during the applicable period in accordance with the intended methods of disposition by the Holders set forth in such Registration Statement or supplement to the Prospectus.

(c) The Company will, at least five (5) Business Days prior to filing a Registration Statement or Prospectus or any amendment or supplement to such Registration Statement or Prospectus, furnish to (i) each Holder of Registrable Securities covered by such Registration Statement, (ii) Holders' Counsel and (iii) each underwriter of the Registrable Securities covered by such Registration Statement, copies of such Registration Statement and each amendment or supplement as proposed to be filed, together with any exhibits thereto, which documents will be subject to reasonable review and comment by each of the foregoing Persons, and thereafter, furnish to such Holders, Holders' Counsel and the underwriter(s), if any, such number of copies of such Registration Statement, each amendment and supplement thereto (in each case including all exhibits thereto and documents incorporated by reference therein), the Prospectus included in such Registration Statement (including each preliminary Prospectus) and such other documents or information as such Holder, Holders' Counsel or the underwriter(s) may reasonably request in order to facilitate the disposition of the Registrable Securities in

accordance with the plan of distribution set forth in the Prospectus included in the Registration Statement.

(d) The Company shall furnish to each Holder a copy of all documents filed with and all correspondence from or to the SEC in connection with the offering of Registrable Securities.

(e) The Company will promptly notify each Holder of any stop order issued or threatened by the SEC and, if entered, use commercially reasonable efforts to prevent the entry of such stop order or to remove it as soon as reasonably possible.

(f) On or prior to the date on which the Registration Statement is declared effective, the Company shall use commercially reasonable efforts to register or qualify such Registrable Securities under such other securities or blue sky Laws of such jurisdictions as any Holder reasonably requests and use commercially reasonable efforts to keep each such registration or qualification (or exemption therefrom) effective during the period which the Registration Statement is required to be kept effective pursuant to the terms hereof; provided that the Company will not be required to (i) qualify generally to do business in any jurisdiction where it would not otherwise be required to qualify but for this paragraph (f), (ii) subject itself to taxation in any such jurisdiction or (iii) consent to general service of process in any such jurisdiction.

(g) The Company will notify each Holder, Holders' Counsel and the underwriter(s) promptly and (if requested by any such Person) confirm such notice in writing, (i) when a Prospectus or any Prospectus supplement or post-effective amendment has been filed and, with respect to a Registration Statement or any post-effective amendment, when the same has become effective, (ii) of any request by the SEC or any other federal or state governmental authority for amendments or supplements to a Registration Statement or Prospectus or for additional information to be included in any Registration Statement or Prospectus or otherwise, (iii) of the issuance by any state securities commission or other regulatory authority of any order suspending the qualification or exemption from qualification of any of the Registrable Securities under state securities or blue sky Laws or the initiation of any proceedings for that purpose, and (iv) of the happening of any event that requires the making of any changes in a Registration Statement or related Prospectus or any document incorporated or deemed to be incorporated by reference therein so that they will not contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements in the Registration Statement and Prospectus not misleading in the light of the circumstances in which they were made; and, as promptly as practicable thereafter, prepare and file with the SEC and furnish a supplement or amendment to such Prospectus so that, as thereafter deliverable to the purchasers of such Registrable Securities, such Prospectus will not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading.

(h) The Company and the Holders will furnish customary closing certificates and other deliverables to the underwriter(s) (including, if applicable, an underwriting agreement in customary form, including customary representations and warranties to the underwriter(s) regarding the offering documents, the Company's business operations and other

customary matters, and customary provisions with respect to indemnification and contribution) and take such other actions as are reasonably required in order to expedite or facilitate the disposition of the Registrable Securities; provided, however, that no Holder (or any of their assignees) shall be required to make any representations, warranties or indemnities except as they relate to such Holder's ownership of ordinary shares and authority to enter into the underwriting agreement and to such Holder's intended method of distribution, and the liability of such Holder shall be several and not joint, and limited to an amount equal to the net proceeds from the offering received by such Holder.

(i) The Company will, if necessary, appoint a transfer agent and registrar for all Registrable Securities covered by a registration statement not later than the effective date of such registration statement.

(j) Subject to each Holder to whom the comfort letter is addressed providing a customary representation letter to the independent registered public accounting firm of the Company inform and substance reasonably satisfactory to such accountants, the Company shall (i) use its commercially reasonable efforts to obtain customary "comfort" letters from such accountants (to the extent deliverable in accordance with their professional standards) addressed to the Holders (to the extent consistent with the Statement on Auditing Standards No. 72 of the American Institute of Certified Public Accountants) and the managing underwriter(s), if any, in customary form and covering matters of the type customarily covered in "comfort" letters in connection with underwritten offerings and (ii) use its commercially reasonable efforts to obtain opinions of counsel to the Company and updates thereof covering matters customarily covered in opinions of counsel in connection with underwritten offerings, addressed to the Holders and the managing underwriter(s), if any, provided that the delivery of any "10b-5 statement" and opinion may be conditioned on the prior or concurrent delivery of a comfort letter pursuant to subsection (i) above.

(k) The Company shall use its commercially reasonable efforts to make available its appropriate employees and personnel for participation in "road shows" and other marketing efforts and otherwise provide reasonable assistance to the underwriters (taking into account the reasonable needs of the Company's businesses and the reasonable requirements of the marketing process) in the marketing of any Registrable Securities in any underwritten offering.

(l) The Company shall use commercially reasonable efforts to cause all Registrable Securities registered pursuant to the terms hereof to be listed on each national securities exchange on which the Ordinary Shares are then listed.

(m) The Company shall use commercially reasonable efforts to cooperate and assist in obtaining of all necessary approvals from FINRA, if any.

(n) The Company otherwise shall use its commercially reasonable efforts to comply with all applicable rules and regulations of the SEC.

(o) To the extent the Company is a WKSI at the time any request for registration pursuant to Section 2.1 is submitted to the Company, which requests that the

Company file an automatic shelf registration statement (as defined in Rule 405 under the Securities Act) (an "**automatic shelf registration statement**") on Form S-3, the Company shall file an automatic shelf registration statement that covers those Registrable Securities which are requested to be registered. If the Company does not pay the filing fee covering the Registrable Securities at the time the automatic shelf registration statement is filed, the Company agrees to pay such fee at such time or times as the Registrable Securities are sold.

(p) If at any time when the Company is required to re-evaluate its WKSI status for purposes of an outstanding automatic shelf registration statement used to effect a request for registration in accordance with Section 2.2 the Company determines that it is not a WKSI and (i) the registration statement is required to be kept effective in accordance with this Agreement and (ii) the registration rights of the applicable Holders have not terminated, use reasonable best efforts to promptly amend the registration statement on a form the Company is then eligible to use or file a new registration statement on such form, and keep such registration statement effective in accordance with the requirements otherwise applicable under this Agreement.

2.5 Holders' Obligations. The Company may require each Holder to promptly furnish in writing to the Company such information as the Company may from time to time reasonably request in connection with the distribution of the Registrable Securities and such other information as may be legally required in connection with such registration, including all such information as may be requested by the SEC. Each Holder agrees that, notwithstanding the provisions of Section 2.6 hereof, upon receipt of any notice from the Company of the happening of any event of the kind described in Section 2.4(g) hereof, such Holder will forthwith discontinue disposition of Registrable Securities pursuant to the Registration Statement covering such Registrable Securities until such Holder's receipt of the copies of the supplemented or amended Prospectus contemplated by Section 2.4(g) hereof, and, if so directed by the Company, such Holder will deliver to the Company all copies, other than permanent file copies then in such Holder's possession and retained solely in accordance with record retention policies then-applicable to such Holder, of the most recent Prospectus covering such Registrable Securities at the time of receipt of such notice.

2.6 Blackout Provisions. Notwithstanding anything in this Agreement to the contrary, by delivery of written notice to the participating Holders (a "**Suspension Notice**") stating which one or more of the following limitations shall apply to the addressee of such Suspension Notice, the Company may (i) postpone effecting a registration under this Agreement, or (ii) require such addressee to refrain from disposing of Registrable Securities under the registration, in either case for a period of no more than ninety (90) consecutive days from the delivery of such Suspension Notice (which period may not be extended or renewed). The Company may postpone effecting a registration or apply the limitations on dispositions specified in clause (ii) of this Section 2.6 if (x) within ninety (90) days of receipt of a request for Demand Registration under Section 2.1(a), the Company has a good faith expectation to file a registration statement for the public offering of securities for the account of the Company, provided, that the Company is actively employing good faith efforts to cause such registration statement to become effective, (y) the Company's Board of Directors, in good faith, determines that such registration or disposition would materially impede, delay or interfere with any material transaction then pending or proposed to be undertaken by the

Company or any of its subsidiaries, or (z) the Company in good faith determines that the Company is in possession of material non-public information the disclosure of which during the period specified in such notice the Company's Board of Directors, in good faith, reasonably believes would be materially detrimental to the Company; *provided*, that the Company may not take any actions pursuant to this Section 2.6 more than twice in any twelve (12)-month period. Furthermore, the Company shall not be required to effect any registration of Registrable Securities at any time during the period any Holder is in breach of or has failed to cause its Affiliates to comply with the obligations and restrictions of Sections 3 or 4 of this Agreement, the Company has provided notice of such breach to such Holder, and such breach or failure is ongoing and has not been remedied.

2.7 Indemnification.

(a) Indemnification by the Company. The Company agrees to indemnify and hold harmless each Holder including Registrable Securities in any registration statement filed pursuant to this Section 2 and each of its officers, directors, employees and agents, and each Person, if any, who controls such Holder within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, together with the officers, directors, employees and agents of such controlling Person (each, a "**Controlling Person**"), from and against any and all losses, claims, damages, settlement amounts (only if the Company consented in writing to the settlement, which consent shall not be unreasonably withheld), liabilities, reasonable attorneys' fees, costs and expenses of investigating and defending any such claim (collectively, "**Damages**") and any action in respect thereof to which such Holder, its Controlling Persons and their respective officers, directors, employees and agents may become subject to under the Securities Act or otherwise, insofar as such Damages (or proceedings in respect thereof) arise out of, or are based upon, any untrue statement or alleged untrue statement of a material fact contained in any Registration Statement or Prospectus (or any amendment or supplement thereto) or any preliminary Prospectus of the Company, or arise out of, or are based upon, any omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading in the light of the circumstances in which they were made, except insofar as (i) the same are based upon information furnished in writing to the Company by such Holder, any of its Controlling Persons, or any of their respective officers, directors, employees and agents expressly for use therein, and (ii) any Damages are caused by such Holder's disposition of Registrable Securities during any period during which such Holder is obligated to discontinue any disposition of Registrable Securities as a result of any stop order suspending the effectiveness of any Registration Statement or Prospectus with respect to Registrable Securities of which such Holder has received written notice from the Company. The Company shall reimburse such Holder for any legal and other expenses reasonably incurred in investigating or defending or preparing to defend against any such Damages or proceedings. In addition to the indemnity contained herein, the Company will reimburse each such Person for its reasonable out-of-pocket legal and other expenses (including the reasonable out-of-pocket cost of any investigation, preparation and travel in connection therewith) as incurred in connection therewith, as promptly as practicable after such expenses are incurred and invoiced.

(b) Indemnification by the Holders. Each Holder agrees, severally and not jointly, to indemnify and hold harmless the Company, its officers, directors, employees and agents and each Person, if any, who controls the Company within the meaning of Section 15 of

the Securities Act or Section 20 of the Exchange Act, together with the officers, directors, employees and agents of such Controlling Person, to the same extent as the foregoing indemnity from the Company to each Holder, but only with respect to information related to such Holder, its Controlling Persons or its plan of distribution, furnished in writing by such Holder, its Controlling Persons or any of their respective officers, directors, employees and agents to the Company expressly for use in any Registration Statement or Prospectus, or any amendment or supplement thereto, or any preliminary Prospectus. In addition to the indemnity contained herein, such Holder will reimburse the Company for its reasonable out-of-pocket legal and other expenses (including the reasonable out-of-pocket cost of any investigation, preparation and travel in connection therewith) as incurred in connection therewith, as promptly as practicable after such expenses are incurred and invoiced.

(c) Conduct of Indemnification Proceedings. Promptly after receipt by any Person entitled to indemnification pursuant to Section 2.7(a) or Section 2.7(b) (an "**Indemnified Party**") of notice of any claim or the commencement of any action in respect of which indemnity may be sought pursuant to Section 2.7(a) or Section 2.7(b), the Indemnified Party shall, if a claim in respect thereof is to be made against the Person against whom such indemnity may be sought (an "**Indemnifying Party**"), notify the Indemnifying Party in writing of the claim or the commencement of such action; provided, that the failure to notify the Indemnifying Party shall not relieve it from any liability that it may have to an Indemnified Party other than under Section 2.7(a) or Section 2.7(b) except to the extent of any actual prejudice resulting therefrom. If any such claim or action shall be brought against an Indemnified Party, and it shall notify the Indemnifying Party thereof, the Indemnifying Party shall be entitled to participate therein, and, to the extent that it wishes, jointly with any other similarly notified Indemnifying Party, to assume the defense thereof with counsel reasonably satisfactory to the Indemnified Party. After notice from the Indemnifying Party to the Indemnified Party of its election to assume the defense of such claim or action, the Indemnifying Party shall not be liable to the Indemnified Party for any legal or other expenses subsequently incurred by the Indemnified Party in connection with the defense thereof other than reasonable costs of investigation; provided, that the Indemnified Party shall have the right to employ separate counsel to represent the Indemnified Party and its Controlling Persons who may be subject to liability arising out of any claim in respect of which indemnity may be sought by the Indemnified Party against the Indemnifying Party, but the fees and expenses of such counsel shall be for the account of such Indemnified Party unless (i) the Indemnifying Party and the Indemnified Party shall have mutually agreed to the retention of, and reimbursement of fees for, such counsel or (ii) in the reasonable opinion of counsel to such Indemnified Party representation of both parties by the same counsel would be inappropriate due to actual or potential conflicts of interest between them, it being understood, however, that the Indemnifying Party shall not, in connection with any one such claim or action or separate but substantially similar or related claims or actions in the same jurisdiction arising out of the same general allegations or circumstances, be liable for the fees and expenses of more than one separate firm of attorneys (together with appropriate local counsel) at any time for all Indemnified Parties. No Indemnifying Party shall, without the prior written consent of the Indemnified Party, effect any settlement of any claim or pending or threatened proceeding in respect of which the Indemnified Party is or would reasonably have been a party and indemnity would reasonably have been sought hereunder by such Indemnified Party, unless such settlement includes an unconditional release of such Indemnified Party from all liability arising out of such claim or proceeding. Whether or not the defense of any claim or action is assumed by the

Indemnifying Party, such Indemnifying Party will not be subject to any liability for any settlement made without its written consent.

2.8 Limitations on Subsequent Registration Rights. From and after the date of this Agreement, the Company shall not enter into any agreement granting any holder or prospective holder of any Company securities (i) registration rights in the nature or substantially in the nature of those set forth in Sections 2.1 and 2.2 that would have priority over the Registrable Securities with respect to inclusion of such securities in any Demand Registration or Piggyback Registration or (ii) demand registration rights or piggyback registration rights in the nature or substantially in the nature of those set forth in Sections 2.1 and 2.2, respectively, that are exercisable earlier than 30 months from the date the Company securities are issued to the prospective holder.

2.9 Assignment of Registration Rights. The rights to cause the Company to register any Registrable Securities pursuant to this Agreement may be assigned in whole or in part (but only with all restrictions and obligations set forth in this Agreement) by a Holder to a Permitted Transferee which acquires Registrable Securities from such Holder; provided, however, (a) such Holder shall, within five (5) days prior to such transfer, furnish to the Company written notice of the name and address of such Permitted Transferee, details of its status as a Permitted Transferee and details of the Registrable Securities with respect to which such registration rights are being assigned, (b) the Permitted Transferee, prior to or simultaneously with such transfer or assignment, shall agree in writing to be subject to and bound by all restrictions and obligations set forth in this Agreement, (c) the Investor shall continue to be bound by all restrictions and obligations set forth in this Agreement and (d) such transfer or assignment shall be effective only if immediately following such transfer or assignment the further disposition of such Registrable Securities by the Permitted Transferee is restricted under the Securities Act and other applicable securities Law.

3. Restrictions on Beneficial Ownership.

3.1 Standstill. During the 30-month period after the date of this Agreement (such period, the "**Restricted Term**"), neither the Investor nor any of its Affiliates (collectively, the "**Standstill Parties**") shall (and the Investor shall cause its Affiliates not to), except as expressly approved or invited in writing by the Company:

(a) directly or indirectly, acquire beneficial ownership of Then Outstanding Ordinary Shares and/or Ordinary Shares Equivalents (or any instrument that gives the Investor or any of its Affiliates the economic equivalent of ownership of an amount of Ordinary Shares or Ordinary Shares Equivalents), or make a tender, exchange or other offer to acquire Then Outstanding Ordinary Shares and/or Ordinary Shares Equivalents;

(b) directly or indirectly, seek to have called any meeting of the shareholders of the Company, propose or nominate for election to the Company's Board of Directors any person whose nomination has not been approved by a majority of the Company's Board of Directors or cause to be voted in favor of such person for election to the Company's Board of Directors any Then Outstanding Ordinary Shares;

(c) directly or indirectly, encourage or support a tender, exchange or other offer or proposal by any other Person (an "**Offeror**") the consummation of which would result in a Change of Control of the Company (an "**Acquisition Proposal**"); provided, however, that from and after the filing of a Schedule 14D-9 (or successor form of Tender Offer Solicitation/Recommendation Statement under Rule 14d-9 of the Exchange Act) by the Company recommending that shareholders accept any such offer, Investor shall not be prohibited from taking any of the actions with respect to such offer otherwise prohibited by this Section 3.1(c) for so long as the Company maintains and does not withdraw such recommendation;

(d) directly or indirectly, solicit proxies or consents or become a participant in a solicitation (as such terms are defined in Regulation 14A under the Exchange Act) in opposition to the recommendation of a majority of the Company's Board of Directors with respect to any matter, or seek to advise or influence any Person, with respect to voting of any Then Outstanding Ordinary Shares;

(e) deposit any Then Outstanding Ordinary Shares in a voting trust or subject any Then Outstanding Ordinary Shares to any arrangement or agreement with respect to the voting of such Then Outstanding Ordinary Shares;

(f) propose (i) any merger, consolidation, business combination, tender or exchange offer, purchase of the Company's assets or businesses, or similar transaction involving the Company or (ii) any recapitalization, restructuring, liquidation or other extraordinary transaction with respect to the Company (each of the foregoing actions referred to in clause (ii), an "**Extraordinary Matter**");

(g) act in concert with any Third Party to take any action in clauses (a) through (e) above, or form, join or in any way participate in a "partnership, limited partnership, syndicate, or other group" within the meaning of Section 13(d)(3) of the Exchange Act;

(h) enter into discussions, negotiations, arrangements or agreements with any Person relating to the foregoing actions referred to in (a) through (f) above; or

(i) request or propose to the Company's Board of Directors, any member(s) thereof or any officer of the Company that the Company amend, waive, or consider the amendment or waiver of, any provisions set forth in this Section 3.1 (including this clause (i)); provided, however, that the Investor may make such requests or proposals privately to the Company's directors, officers or advisors if the Company executes, or publicly announces its intention to execute, a collaboration and licensing agreement, strategic alliance or similar transaction with a third party so long as, in each case, such requests or proposals are not intended to, and would not reasonably be expected to, require any public disclosure by the Company or the Investor of such requests or proposals, as applicable;

Notwithstanding anything to the contrary in this Section 3.1, the Investor may at any time communicate privately with the Company's directors, officers or advisors or submit to the Company's Board of Directors one or more confidential proposals or offers for a transaction (including a transaction that, if consummated, would result in a Change of Control), so long as, in each case, such communications and submissions are not intended to, and would not

reasonably be expected to, require any public disclosure by the Company or the Investor of such communications or submissions, as applicable.

4. Restrictions on Dispositions.

4.1 Lock-Up. During the Restricted Term, without the prior approval of a majority of the Company's Board of Directors, the Investor shall not, and shall cause its Affiliates not to, Dispose of (x) any of the Purchased Shares or any Ordinary Shares beneficially owned by any Standstill Party as of the date of this Agreement, together with any Ordinary Shares issued in respect thereof as a result of any share split, share dividend, share exchange, merger, consolidation or similar recapitalization, and (y) any Ordinary Shares issued as (or issuable upon the exercise of any warrant, right or other security that is issued as) a dividend or other distribution with respect to, or in exchange or in replacement of, the Ordinary Shares described in clause (x) of this sentence; provided, however, that the foregoing shall not prohibit the Investor from transferring Registrable Securities to a Permitted Transferee in accordance with and subject to the terms of Section 2.9.

4.2 Certain Tender Offers. Notwithstanding any other provision of this Section 4, this Section 4 shall not prohibit or restrict any Disposition of Then Outstanding Ordinary Shares and/or Ordinary Share Equivalents by the Standstill Parties into (a) a tender offer by a Third Party which is not opposed by the Company's Board of Directors (but only after the Company's filing of a Schedule 14D-9, or any amendment thereto, with the SEC disclosing the recommendation of the Company's Board of Directors with respect to such tender offer) or (b) an issuer tender offer by the Company.

5. Termination of Certain Rights and Obligations.

5.1 Termination of Registration Rights. Except for Section 2.7, which shall survive until the expiration of any applicable statutes of limitation, Section 2 shall terminate automatically and have no further force or effect upon the earliest to occur of:

(a) the earlier of (i) such date when the Investor, together with its Affiliates, holds less than four percent (4%) of the outstanding share capital of the Company or (ii) the tenth anniversary of the expiration or earlier termination of the Restricted Term;

(b) the date on which the Ordinary Shares cease to be registered pursuant to Section 12 of the Exchange Act; and

(c) any Extraordinary Matter.

5.2 Termination of Standstill Agreement. Provided that none of the Standstill Parties has violated Section 3.1(c), (d) or (f) with respect to the Offeror referred to in this Section 5.2, Section 3 shall terminate and have no further force or effect, upon the earliest to occur of:

(a) the public announcement by the Company or any Offeror of any definitive agreement between the Company and such Offeror and/or any of its Affiliates providing for a Change of Control of the Company;

(b) the filing of a Tender Offer Statement on Schedule TO (or a successor form of Tender Offer Statement under Rule 14d-100 of the Exchange Act) with the SEC by a Third Party offering to acquire all or substantially all of the Ordinary Shares;

(c) the expiration or earlier termination of the Restricted Term;

(d) the date on which the Ordinary Shares cease to be registered pursuant to Section 12 of the Exchange Act; and

(e) the Company entering into a definitive agreement for, or consummating, any Extraordinary Matter that results in a Change of Control;

provided, however, that if any of the transactions referred to in (a)-(e) above is abandoned or terminates and no other similar transaction has been announced and not abandoned or terminates within ninety (90) days thereafter, the restrictions contained in Section 3 shall again be applicable.

5.3 Termination of Restrictions on Dispositions. Section 4 shall terminate and have no further force or effect upon the earliest to occur of:

(a) the consummation by an Offeror of a Change of Control of the Company;

(b) the Company entering into a definitive agreement for, or consummating, any Extraordinary Matter that results in a Change of Control; and

(c) the date on which the Ordinary Shares cease to be registered pursuant to Section 12 of the Exchange Act.

5.4 Effect of Termination. No termination pursuant to any of Sections 5.1, 5.2 or 5.3 shall relieve any of the parties (or the Permitted Transferee, if any) for liability for breach of or default under any of their respective obligations or restrictions under any terminated provision of this Agreement, which breach or default arose out of events or circumstances occurring or existing prior to the date of such termination.

6. Miscellaneous.

6.1 Governing Law; Jurisdiction. This Agreement shall be governed by, and construed in accordance with, the Laws of the State of New York, without regard to the conflict of laws principles thereof that would require the application of the Law of any other jurisdiction. The parties irrevocably and unconditionally submit to the exclusive jurisdiction of the United States District Court for the Southern District of New York solely and specifically for the purposes of any action or proceeding arising out of or in connection with this Agreement.

6.2 Waiver. Waiver by a party of a breach hereunder by the other party shall not be construed as a waiver of any subsequent breach of the same or any other provision. No delay or omission by a party in exercising or availing itself of any right, power or privilege hereunder shall preclude the later exercise of any such right, power or privilege by such party. No waiver

shall be effective unless made in writing with specific reference to the relevant provision(s) of this Agreement and signed by a duly authorized representative of the party granting the waiver.

6.3 Notices. Any notice required or permitted to be given under this Agreement will be in writing and will be deemed to have been sufficiently given if delivered in person, sent by email or delivered by express courier service (signature required) to the party to which it is directed at its address set forth on Exhibit A attached hereto or such other address as such party will have last given by notice to the other party. Notices will be deemed effective (a) the next day if sent by express courier service, or (b) on the date sent if sent by email and no delivery failure notification has been received, except any notice sent after 5:00 p.m. (Eastern Time) on a Business Day or on a non-Business Day will be deemed to have been received on the next Business Day. Either Party may change its address for purposes hereof by written notice to the other in accordance with the provisions of this Section 6.3.

6.4 Entire Agreement. This Agreement and the Purchase Agreement contain the entire agreement among the parties with respect to the subject matter hereof and thereof and supersede all prior and contemporaneous arrangements or understandings, whether written or oral, with respect hereto and thereto.

6.5 Amendments. No provision in this Agreement shall be supplemented, deleted or amended except in a writing executed by an authorized representative of each of the parties hereto.

6.6 Headings; Nouns and Pronouns; Section References. Headings in this Agreement are for convenience of reference only and shall not be considered in construing this Agreement. Whenever the context may require, any pronouns used herein shall include the corresponding masculine, feminine or neuter forms, and the singular form of names and pronouns shall include the plural and vice-versa. References in this Agreement to a section or subsection shall be deemed to refer to a section or subsection of this Agreement unless otherwise expressly stated.

6.7 Severability. If, under applicable Laws, any provision hereof is invalid or unenforceable, or otherwise directly or indirectly affects the validity of any other material provision(s) of this Agreement in any jurisdiction ("**Modified Clause**"), then, it is mutually agreed that this Agreement shall endure and that the Modified Clause shall be enforced in such jurisdiction to the maximum extent permitted under applicable Laws in such jurisdiction; provided that the parties shall consult and use all reasonable efforts to agree upon, and hereby consent to, any valid and enforceable modification of this Agreement as may be necessary to avoid any unjust enrichment of either party and to match the intent of this Agreement as closely as possible, including the economic benefits and rights contemplated herein.

6.8 Assignment. Neither this Agreement nor any rights or duties of a party hereto may be assigned by such party, in whole or in part, without (a) the prior written consent of the Company in the case of any assignment by the Investor, except as provided by Section 2.9 with respect to the Investor's assignment to a Permitted Transferee; or (b) the prior written consent of the Investor in the case of an assignment by the Company.

6.9 Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns.

6.10 Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original but which together shall constitute one and the same instrument.

6.11 Third Party Beneficiaries. None of the provisions of this Agreement shall be for the benefit of or enforceable by any Third Party. No Third Party shall obtain any right under any provision of this Agreement or shall by reason of any such provision make any claim in respect of any debt, liability or obligation (or otherwise) against any party hereto.

6.12 No Strict Construction. This Agreement has been prepared jointly and will not be construed against either party.

6.13 Remedies. The rights, powers and remedies of the parties under this Agreement are cumulative and not exclusive of any other right, power or remedy which such parties may have under any other agreement or Law. No single or partial assertion or exercise of any right, power or remedy of a party hereunder shall preclude any other or further assertion or exercise thereof.

6.14 Specific Performance. The Company and the Investor hereby acknowledge and agree that the rights of the parties hereunder are special, unique and of extraordinary character, and that if any party refuses or otherwise fails to act, or to cause its Affiliates to act, in accordance with the provisions of this Agreement, such refusal or failure would result in irreparable injury to the Company or the Investor, as the case may be, the exact amount of which would be difficult to ascertain or estimate and the remedies at law for which would not be reasonable or adequate compensation. Accordingly, if any party refuses or otherwise fails to act, or to cause its Affiliates to act, in accordance with the provisions of this Agreement, then, in addition to any other remedy which may be available to any damaged party at law or in equity, such damaged party will be entitled to seek specific performance and injunctive relief, without posting bond or other security, and without the necessity of proving actual or threatened damages, which remedy such damaged party will be entitled to seek in any court of competent jurisdiction.

6.15 No Conflicting Agreements. The Investor hereby represents and warrants to the Company that neither it nor any of its Affiliates is, as of the date of this Agreement, a party to, and agrees that neither it nor any of its Affiliates shall, on or after the date of this Agreement, enter into any agreement that conflicts with the rights granted to the Company in this Agreement. The Company hereby represents and warrants to each Holder that it is not, as of the date of this Agreement, a party to, and agrees that it shall not, on or after the date of this Agreement, enter into, any agreement or approve any amendment to its Organizational Documents (as defined in the Purchase Agreement) with respect to its securities that conflicts with the rights granted to the Holders in this Agreement. The Company further represents and warrants that the rights granted to the Holders hereunder do not in any way conflict with the rights granted to any other holder of the Company's securities under any other agreements.

(Signature Page Follows)

IN WITNESS WHEREOF, the parties have executed and delivered this Agreement as of the date first above written.

GLAXO GROUP LIMITED

By: /s/ John J. Lepore, M.D.
Name: John J. Lepore, M.D.
Title: SVP, Head of Research, GSK

WAVE LIFE SCIENCES LTD.

By: /s/ Paul B. Bolno, M.D., MBA
Name: Paul B. Bolno, M.D., MBA
Title: President and Chief Executive Officer

[*Signature Page to Investor Agreement*]

EXHIBIT A

NOTICES

(a) If to the Investor:

Corporate Secretariat
Glaxo Group Limited
980 Great West Road
Brentford, Middlesex TW8 9GS
United Kingdom

with copies, which will not constitute notice, to:

VP and Head of Legal Business Development & Corporate
Corporate Secretariat
Glaxo Group Limited
980 Great West Road
Brentford, Middlesex TW8 9GS
United Kingdom

VP and Head of Corporate Development
Corporate Seretariat
Glaxo Group Limited
980 Great West Road
Brentford, Middlesex TW8 9GS
United Kingdom

White & Case LLP
1221 Avenue of the Americas
New York, NY 10020
Attention: Andres Liivak, Esq.
Email: Andres.Liivak@whitecase.com

(b) If to the Company:

Wave Life Sciences Ltd.
733 Concord Avenue
Cambridge, MA 02138
Attention: General Counsel
Email: legalnotices@wavelifesci.com

with a copy, which will not constitute notice, to:

Goodwin Procter LLP
100 Northern Avenue

Boston, MA 02210
Attention: Sarah A. Solomon, Esq.
Gregg L. Katz, Esq.
Email: SSolomon@goodwinlaw.com; GKatz@goodwinlaw.com

EXECUTIVE EMPLOYMENT AGREEMENT

This Employment Agreement (the "Agreement"), made and entered into as of November 8, 2022, by and between Wave Life Sciences USA, Inc., a Delaware corporation ("Company") and a wholly owned subsidiary of Wave Life Sciences Ltd., a Singapore corporation (the "Parent Company"), and Chris Francis ("Executive").

WHEREAS, Company wishes to continue to employ Executive as SVP, Corporate Development and Head of Emerging Areas;

WHEREAS, Executive represents that Executive possesses the necessary skills to perform the duties of this position and that Executive has no obligation to any other person or entity which would prevent, limit or interfere with Executive's ability to do so;

WHEREAS, Executive and Company desire to enter into an Employment Agreement, which, except as specifically set forth herein, supersedes and replaces the current employment arrangement dated as of March 10, 2014, between Executive and Company (the "Prior Employment Agreement"), to assure the harmonious performance of the affairs of Company.

NOW, THEREFORE, in consideration of the mutual promises, terms, provisions, and conditions contained herein, the parties agree as follows:

1. Roles and Duties.

(a) Executive Role. Subject to the terms and conditions of this Agreement, Company shall employ Executive as its SVP, Corporate Development and Head of Emerging Areas reporting to Company's President and Chief Executive Officer. Executive accepts such employment upon the terms and conditions set forth herein, and agrees to perform to the best of Executive's ability the duties normally associated with such position and as determined by Company in its sole discretion. During Executive's employment, Executive shall devote all of Executive's business time and energies to the business and affairs of Company, provided that nothing contained in this Agreement shall prevent or limit Executive's right to manage Executive's personal investments on Executive's own personal time, including, without limitation the right to make passive investments in the securities of: (a) any entity which Executive does not control, directly or indirectly, and which does not compete with Company or the Parent Company, or (b) any publicly held entity so long as Executive's aggregate direct and indirect interest does not exceed two percent (2%) of the issued and outstanding securities of any class of securities of such publicly held entity. Nothing contained herein shall prevent any family member of Executive from contracting with, being employed by or obtaining an ownership interest in any entity, whether or not such entity competes with the Company or the Parent Company; provided, however, that such contract, employment, or ownership interest does not extend to or involve Executive. In addition, nothing in this Agreement shall require Executive to transfer, sell or otherwise divest himself of any investments Executive or Executive's family members hold as of the date hereof. During Executive's employment, Executive shall not engage in any other non-Company related business activities of any nature whatsoever (including board memberships) without the Company's prior written consent, which consent shall not be unreasonably withheld. In addition, and so long as such activities do not interfere with Executive's performance of Executive's duties hereunder (including Executive's full devotion of business time and energies to the business and affairs of Company, as described above), Executive also may participate in civic, charitable and professional activities, but shall not serve in any official capacity, including as a member of a board, without the prior written consent of the Company.

2. Term of Employment.

(a) Term. Subject to the terms hereof, Executive's employment hereunder shall commence as of the date hereof and shall continue until terminated hereunder by either party.

(b) Termination. Notwithstanding anything else contained in this Agreement, Executive's employment hereunder shall terminate upon the earliest to occur of the following:

(i) Death. Immediately upon Executive's death;

(ii) Termination by Company.

(A) If because of Executive's Disability (as defined below in Section 2(c)), written notice by Company to Executive that Executive's employment is being terminated as a result of Executive's Disability, which termination shall be effective on the date of such notice or such later date as specified in writing by Company;

(B) If for Cause (as defined below in Section 2(d)), written notice by Company to Executive that Executive's employment is being terminated for Cause, which termination shall be effective on the date of such notice or such later date as specified in writing by Company (subject to any applicable "cure" rights as provided in Section 2(d) below);

(C) If by Company for reasons other than under Sections 2(b)(ii)(A) or (B), written notice by Company to Executive that Executive's employment is being terminated, which termination shall be effective immediately after the date of such notice or such later date as specified in writing by Company.

(iii) Termination by Executive.

(A) If for Good Reason (as defined below in Section 2(e)), written notice by Executive to Company that Executive is terminating Executive's employment for Good Reason and that sets forth the factual basis supporting the alleged Good Reason, which termination shall be effective thirty (30) days after the date of such notice; provided that if Company has cured the circumstances giving rise to the Good Reason, then such termination shall not be effective; or

(B) If without Good Reason, written notice by Executive to Company that Executive is terminating Executive's employment, which termination shall be effective at least thirty (30) days after the date of such notice.

Notwithstanding anything in this Section 2(b), Company may at any point terminate Executive's employment for Cause prior to the effective date of any other termination contemplated hereunder.

(c) Definition of "Disability". For purposes of this Agreement, "Disability" shall mean Executive's incapacity or inability to perform Executive's duties and responsibilities as contemplated herein for one hundred twenty (120) days or more (cumulative or consecutive) within any rolling twelve (12) month period, because Executive's physical or mental health has become so impaired as to make it impossible or impractical for Executive to perform the duties and responsibilities contemplated hereunder. Determination of Executive's physical or mental health shall be determined by Company after consultation with a medical expert appointed by mutual agreement between Company and Executive who has examined Executive. Executive hereby consents to such examination and consultation regarding Executive's health and ability to perform as aforesaid.

(d) Definition of "Cause". As used herein, "Cause" shall include: (i) Executive's willful engagement in dishonesty, illegal conduct or gross misconduct, which is, in each case, materially injurious to the Company or any affiliate; (ii) Executive's significant insubordination; (iii) Executive's substantial malfeasance or nonfeasance of duty; (iv) Executive's repeated failure, inability or refusal to perform his duties hereunder in a manner that is materially injurious to the Company or any affiliate (other than by reason of Executive's Disability); (v) Executive's unauthorized disclosure of confidential information; (vi) Executive's embezzlement, misappropriation or fraud, whether or not related Executive's employment with the Company; or (vii) Executive's breach of a material provision of any employment, non-disclosure, invention assignment, non-competition, or similar agreement between Executive and Company; provided that "Cause" shall not be deemed to have occurred pursuant to subsections (ii), (iii) or (iv) hereof unless Executive has first received written notice specifying in reasonable detail the particulars of such grounds and that Company intends to terminate Executive's employment hereunder for such grounds, and if such grounds are reasonably capable of being cured within thirty (30) days, Executive has failed to cure such grounds within a period of thirty (30) days from the date of such notice (the "Cure Period"). During any such Cure Period, and in connection with Executive's ability to cure a for Cause termination as specifically set forth herein, Executive shall have an opportunity to make a presentation to the Company's Board of Directors in response to the asserted grounds for Cause termination. "Cause" is not limited to events which have occurred prior to the termination of Executive's service to Company, nor is it necessary that Company's finding of "Cause" occur prior to such termination. If Company determines, subsequent to Executive's termination of service but only after the notice, related process and Cure Period described above have been exhausted (if the applicable "Cause" sub-section is invoked), that either prior or subsequent to Executive's termination, Executive engaged in conduct which would constitute "Cause," then Executive shall be deemed to have been terminated for "Cause" and he shall have no right to any benefit or compensation under this Agreement, including, without limitation, any payments or benefits under Section 4(c) or Section 4(d) hereof (as applicable).

(e) Definition of "Good Reason". As used herein, a "Good Reason" shall mean the occurrence of any of the following events without Executive's written consent: (i) relocation of Executive's principal business location to a location more than fifty (50) miles from Executive's then-current business location; (ii) a material diminution in Executive's duties, authority or responsibilities; (iii) a material reduction in the Executive's Base Salary (other than as a result of a broad based reduction of salary similarly affecting other Company executives having comparable rank, authority and seniority); or (iv) any material breach of this Agreement by the Company; provided that (A) Executive provides Company with written notice that Executive intends to terminate Executive's employment hereunder for one of the grounds set forth in this Section 2(e) within thirty (30) days of such ground occurring, (B) if such ground is capable of being cured, the Company has failed to cure such ground within a period of thirty (30) days from the date of such written notice, and (C) Executive terminates Executive's employment within sixty-five days from the date that Good Reason first occurs. For purposes of clarification, the above-listed conditions shall apply separately to each occurrence of Good Reason and failure to adhere to such conditions in the event of Good Reason shall not disqualify Executive from asserting Good Reason for any subsequent occurrence of Good Reason. For purposes of this Agreement, "Good Reason" shall be interpreted in a manner, and limited to the extent necessary, so that it shall not cause adverse tax consequences for either party with respect to Section 409A ("Section 409A") of the Internal Revenue Code of 1986, as amended (the "Code") and any successor statute, regulation and guidance thereto.

3. Compensation.

(a) Base Salary. Company shall pay Executive a base salary (the "Base Salary") at the annual rate of $407,800. The Base Salary shall be payable in substantially equal periodic installments in accordance with Company's payroll practices as in effect from time to time. Company shall deduct from each such installment all amounts required to be deducted or withheld under applicable law or under any employee benefit plan in which Executive participates. The Base Salary will be reviewed annually and may be increased.

(b) Annual Performance Bonus. Executive shall be eligible to receive an annual cash bonus (the "Annual Performance Bonus"), with the target amount of such Annual Performance Bonus equal to forty-five percent (45%) of Executive's Base Salary in the year to which the Annual Performance Bonus relates, provided that the actual amount of the Annual Performance Bonus may be greater or less than such target amount. The Annual Performance Bonus shall be based on both corporate and individual performance objectives to be established by the Board of Directors of the Parent Company or an appropriate committee thereof by no later than March 1st of the applicable bonus year (the "Performance Objectives"). Whether and to what extent the Performance Objectives have been achieved and the amount of any Annual Performance Bonus payable hereunder shall be determined by the Board of Directors of the Parent Company (or an appropriate committee thereof) in its sole and absolute discretion. Executive must be employed by Company on the date on which the Annual Performance Bonus is paid in order to be eligible for, and to be deemed as having earned, such Annual Performance Bonus. The Company shall deduct from the Annual Performance Bonus all amounts required to be deducted or withheld under applicable law or under any employee benefit plan in which Executive participates.

(c) Equity. Executive may be eligible to receive equity awards under the applicable equity incentive plan of the Parent Company then in effect, as determined by the Board of Directors of the Parent Company or an appropriate committee thereof.

(d) Open Time Off. Executive is eligible to take paid time off for vacation and personal reasons in accordance with Company's Open Time Off policies as in effect from time to time. The guideline for such time off is 3-4 weeks per calendar year. This guideline excludes time off for illness, company-paid holidays, year-end shutdown and emergencies. Time off is to be scheduled to minimize disruption to Company's operations, pursuant to the terms and conditions of Company Open Time Off policy and practices as applied to senior executives of the Company. Time off is not earned or accrued, therefore there are no rollover of days from year to year, nor is payment made for unused time off upon separation from employment.

(e) Fringe Benefits. Executive shall be entitled to participate in all benefit/welfare plans, long-term incentive programs, and other fringe benefits provided to Company senior executives at comparable levels. The terms of any such programs and benefits will be governed by the applicable plan documents and Company policies in effect from time to time. Executive understands that, except when prohibited by applicable law, Company's benefit plans and fringe benefits may be changed, replaced, terminated, modified or amended by Company from time to time in its sole discretion.

(f) Reimbursement of Expenses. Company shall reimburse Executive for all ordinary and reasonable out-of-pocket business expenses incurred by Executive in furtherance of Company's business in accordance with Company's policies with respect thereto as in effect from time to time. Executive must submit any request for reimbursement no later than thirty (30) days following the date that such business expense is incurred. All reimbursements provided under this Agreement shall be made or provided in accordance with the requirements of Section 409A including, where applicable, the requirement that (i) any reimbursement is for expenses incurred during Executive's lifetime (or during a shorter period of time specified in this Agreement); (ii) the amount of expenses eligible for reimbursement during a calendar year may not affect the expenses eligible for reimbursement in any other calendar year; (iii) the reimbursement of an eligible expense shall be made no later than the last day of the calendar year following the year in which the expense is incurred; and (iv) the right to reimbursement or in kind benefits is not subject to liquidation or exchange for another benefit.

(g) Indemnification. Executive shall be entitled to indemnification with respect to Executive's services provided hereunder pursuant to applicable law, the terms and conditions of Company's organizational and governing documents, Company's directors and officers ("D&O") liability insurance policy, and Company's standard indemnification agreement for directors and officers as executed by Company and Executive.

4. Payments Upon Termination.

(a) Definition of Accrued Obligations. For purposes of this Agreement, "Accrued Obligations" means: (i) the portion of Executive's Base Salary that has accrued prior to any termination of Executive's employment with Company and has not yet been paid; and (ii) the amount of any expenses properly incurred by Executive on behalf of Company prior to any such termination and not yet reimbursed. Executive's entitlement to any other compensation or benefit under any plan of Company shall be governed by and determined in accordance with the terms of such plans, except as otherwise specified in this Agreement.

(b) Termination by Company for Cause, or by Executive Without Good Reason, or as a Result of Executive's Disability or Death. If Executive's employment hereunder is terminated by Company for Cause, by Executive without Good Reason, or as a result of Executive's Disability or Death, then Company shall pay the Accrued Obligations to Executive on or before the time required by applicable law following the effective date of such termination and shall have no further obligations to Executive.

(c) Termination by Company Without Cause or by Executive For Good Reason. In the event that Executive's employment is terminated by Company without Cause or Executive terminates Executive's employment for Good Reason, then, in addition to the Accrued Obligations, Executive shall receive the following, subject to the terms and conditions described in Section 4(e) (including Executive's execution of a release of claims):

(i) Severance Payments. Continuation of payments in an amount equal to (x) Executive's then-current Base Salary for a period of twelve (12) months, and (y) an amount equal to the target Annual Performance Bonus to which Executive may have been entitled for the year in which Executive's employment terminates, prorated to reflect that portion of the year in which Executive was employed, less all customary and required taxes and employment-related deductions, which amounts shall be paid over time in accordance with Company's normal payroll practices (provided such payments shall be made at least monthly), commencing on the first payroll date following the date on which the release of claims required by Section 4(e) becomes effective and non-revocable, but not after seventy (70) days following the effective date of termination from employment; provided, that if the 70th day falls in the calendar year following the year during which the termination or separation from service occurred, then the payments will commence in such subsequent calendar year; provided further that if such payments commence in such subsequent year, the first such payment shall be a lump sum in an amount equal to the payments that would have come due since Employee's separation from service.

(ii) Benefits Payments. Upon completion of appropriate forms and subject to applicable terms and conditions under the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended ("COBRA"), the Company shall continue to pay its share of the costs for Employee's coverage under the Company's group health insurance plan, until the earlier to occur of twelve (12) months following Executive's termination date or the date Executive begins employment with another employer; provided that such Company-paid premiums may be recorded as additional income pursuant to Section 6041 of the Code and not entitled to any tax qualified treatment to the extent necessary to comply with or avoid the discriminatory treatment prohibited by the Patient Protection and Affordable Care Act of 2010 and the Health Care and Education Reconciliation Act of 2010 or Section 105(h) of the Code. Executive shall bear full responsibility for applying for COBRA continuation coverage and Company shall have no obligation to provide Executive such coverage if Executive fails to elect COBRA benefits in a timely fashion.

Payment of the above described severance payments and benefits are expressly conditioned on Executive's execution without revocation of the release of claims under Section 4(e) and return of Company property under Section 6. In the event that Executive is eligible for the severance payments and benefits under

this Section 4(c), Executive shall not be eligible for and shall not receive any of the severance payments and benefits as provided in Section 4(d).

(d) Termination by Company Without Cause or by Executive For Good Reason Following a Change of Control. In the event that a Change of Control (as defined below) occurs and within a period of one (1) year following the Change of Control, either Executive's employment is terminated by Company without Cause, or Executive terminates Executive's employment for Good Reason, then, in addition to the Accrued Obligations, Executive shall receive the following, subject to the terms and conditions described in Section 4(e) (including Executive's execution of a release of claims):

(i) Lump Sum Severance Payment. Payment of a lump sum amount equal to twelve (12) months of Executive's then-current Base Salary, less all customary and required taxes and employment-related deductions, paid on the first payroll date following the date on which the release of claims required by Section 4(e) becomes effective and non-revocable, but not after seventy (70) days following the effective date of termination from employment.

(ii) Separation Bonus. Payment of a separation bonus in an amount equal to the target Annual Performance Bonus to which Executive may have been entitled for the year in which Executive's employment terminates less all customary and required taxes and employment-related deductions, paid on the first payroll date following the date on which the release of claims required by Section 4(e) becomes effective and non-revocable, but not after seventy (70) days following the effective date of termination from employment.

(iii) Benefit Payments. Upon completion of appropriate forms and subject to applicable terms and conditions under the COBRA, the Company shall continue to pay its share of the costs for Employee's coverage under the Company's group health insurance plan, until the earlier to occur of twelve (12) months following Executive's termination date or the date Executive begins employment with another employer; provided that such Company-paid premiums may be recorded as additional income pursuant to Section 6041 of the Code and not entitled to any tax qualified treatment to the extent necessary to comply with or avoid the discriminatory treatment prohibited by the Patient Protection and Affordable Care Act of 2010 and the Health Care and Education Reconciliation Act of 2010 or Section 105(h) of the Code. Executive shall bear full responsibility for applying for COBRA continuation coverage and Company shall have no obligation to provide Executive such coverage if Executive fails to elect COBRA benefits in a timely fashion.

Payment of the above described severance payments and benefits are expressly conditioned on Executive's execution without revocation of the release of claims under Section 4(e) and return of Company property under Section 6. In the event that Executive is eligible for the severance payments and benefits under this Section 4(d), Executive shall not be eligible for and shall not receive any of the severance payments and benefits as provided in Section 4(c).

As used herein, a "Change of Control" shall mean (A) a merger or consolidation of the Parent Company whether or not approved by the Board of Directors, other than a merger or consolidation which would result in the voting securities of the Parent Company outstanding immediately prior thereto continuing to represent (either by remaining outstanding or by being converted into voting securities of the surviving entity or the parent of such corporation) more than 50% of the total voting power represented by the voting securities of the Parent Company or such surviving entity or parent of such corporation, as the case may be, outstanding immediately after such merger or consolidation; or (B) the sale or disposition by the Parent Company of all or substantially all of the Parent Company's assets in a transaction requiring shareholder approval; or (C) the transfer, sale or disposition by the Parent Company of 50% or more of its interest in Company.

(e) Execution of Release of Claims. Company shall not be obligated to pay Executive any of the severance payments or benefits described in this Section 4 unless and until Executive has executed (without revocation) a timely release of claims in a form acceptable to Company, which shall include a general release of claims against Company and Parent Company (including its and their affiliated entities, and its and their officers, directors, employees and others associated with such entities), a reaffirmation of Executive's covenants under the terms of the Agreement to Protect Confidential Information, Inventions and Business (as referenced in Section 5 below), as well as standard and reasonable terms regarding items such as mutual non-disparagement, confidentiality, cooperation and the like (the "Release Agreement"). The Release Agreement must be provided to Executive within fifteen (15) days following Executive's separation from service, and signed by Executive and returned to Company no later than sixty (60) days following Executive's separation from service (the "Review Period"). If Executive fails or refuses to return the Release Agreement within the Review Period, Executive's severance payments and benefits hereunder shall be forfeited.

(f) No Other Payments or Benefits Owing. The payments and benefits set forth in this Section 4 shall be the sole amounts owing to Executive upon termination of Executive's employment for the reasons set forth above and Executive shall not be eligible for any other payments or other forms of compensation or benefits. The payments and benefits set forth in Section 4 shall be the sole remedy, if any, available to Executive in the event that Executive brings any claim against Company relating to the termination of Executive's employment under this Agreement.

5. Prohibited Competition, Solicitation, and Non-Disclosure.

(a) Executive expressly acknowledges that: (i) there are competitive and proprietary aspects of the business of Company and its affiliates; (ii) during the course of Executive's employment, Company and/or its affiliates shall furnish, disclose or make available to Executive confidential and proprietary information and may provide Executive with unique and specialized training; (iii) such Confidential Information and training have been developed and shall be developed by Company and/or its affiliates through the expenditure of substantial time, effort and money, and could be used by Executive to compete with Company and/or its affiliates; and (iv) in the course of Executive's employment, Executive shall be introduced to customers and others with important relationships to Company and/or its affiliates, and any and all "goodwill" created through such introductions belongs exclusively to Company and its affiliates, including, but not limited to, any goodwill created as a result of direct or indirect contacts or relationships between Executive and any customers of Company and its affiliates. In light of the foregoing acknowledgements, Executive hereby (x) acknowledges that Executive previously executed and agrees to abide by the terms and conditions set forth in the Company's Agreement to Protect Confidential Information, Inventions and Business (attached hereto as Exhibit A) and the Company's Confidentiality and Information Systems Usage Agreement (attached hereto as Exhibit B), (y) reaffirms Executive's obligations under the terms of the previously executed Agreement to Protect Confidential Information, Inventions and Business and Confidentiality and Information Systems Usage Agreement, and (z) acknowledges and agrees that nothing herein shall impact or affect the continued validity of the previously executed Agreement to Protect Confidential Information, Inventions and Business and Confidentiality and Information Systems Usage Agreement.

(b) Executive hereby acknowledges and agrees that in consideration for Executive's non-competition covenant as set forth in Agreement to Protect Confidential Information, Inventions and Business, the Company is providing the Executive with eligibility to receive the certaion severance payments and benefits under the conditions set forth in Section 4 hereof. Executive further acknowledges and agrees that the aforementioned

consideration is fair and reasonable consideration independent of the Executive's employment with the Company for purposes of Executive's non-competition covenant.

(c) Executive hereby expressly acknowledges and agrees that if Executive breaches any of the terms and/or conditions set forth in the Agreement to Protect Confidential Information, Inventions and Business following a termination of Executive's employment either by Company without Cause or by Executive for Good Reason, then, in addition to the relief described in the Agreement to Protect Confidential Information, Inventions and Business, (i) Company shall cease providing the Executive with any further payments under Section 4(c) or 4(d) (as applicable) as of the date of such breach, (ii) Company shall not be obligated to provide Executive with, and Executive shall not be eligible or otherwise entitled to receive, any further payments or benefits from Company, (iii) Company's obligation to provide Executive with any further such payments or benefits shall be null and void, and of no further force or effect, and (iv) Company shall be entitled to recover, and Executive shall be obligated to repay to Company, any payments and the value of any benefits previously provided to Executive by Company under Section 4(c) or 4(d) (as applicable) prior to the date of Executive's breach of the Agreement to Protect Confidential Information, Inventions and Business.

6. Property and Records. Upon the termination of Executive's employment hereunder for any reason or for no reason, or if Company otherwise requests, Executive shall: (a) return to Company all tangible business information and copies thereof (regardless how such Confidential Information or copies are maintained), and (b) deliver to Company any property of Company which may be in Executive's possession, including, but not limited to, Blackberry-type devices, smart phones, laptops, cell phones, products, materials, memoranda, notes, records, reports or other documents or photocopies of the same.

7. Code Sections 409A and 280G.

(a) In the event that the payments or benefits set forth in Section 4 of this Agreement constitute "non-qualified deferred compensation" subject to Section 409A, then the following conditions apply to such payments or benefits:

(i) Any termination of Executive's employment triggering payment of benefits under Section 4 must constitute a "separation from service" under Section 409A(a)(2)(A)(i) of the Code and Treas. Reg. §1.409A-1(h) before distribution of such benefits can commence. To the extent that the termination of Executive's employment does not constitute a separation of service under Section 409A(a)(2)(A)(i) of the Code and Treas. Reg. §1.409A-1(h) (as the result of further services that are reasonably anticipated to be provided by Executive to Company at the time Executive's employment terminates), any such payments under Section 4 that constitute deferred compensation under Section 409A shall be delayed until after the date of a subsequent event constituting a separation of service under Section 409A(a)(2)(A)(i) of the Code and Treas. Reg. §1.409A-1(h). For purposes of clarification, this Section 7(a) shall not cause any forfeiture of benefits on Executive's part, but shall only act as a delay until such time as a "separation from service" occurs.

(ii) Notwithstanding any other provision with respect to the timing of payments under Section 4 if, at the time of Executive's termination, Executive is deemed to be a "specified employee" (within the meaning of Section 409A(a)(2)(B)(i) of the Code), then limited only to the extent necessary to comply with the requirements of Section 409A, any payments to which Executive may become entitled under Section 4 which are subject to Section 409A (and not otherwise exempt from its application) shall be withheld until the first (1st) business day of the seventh (7th) month following the termination of Executive's employment, at which time Executive shall be paid an aggregate amount equal to the accumulated, but unpaid, payments otherwise due to Executive under the terms of Section 4.

(b) It is intended that each installment of the payments and benefits provided under Section 4 of this Agreement shall be treated as a separate "payment" for purposes of Section 409A. Neither Company nor Executive shall have the right to accelerate or defer the delivery of any such payments or benefits except to the extent specifically permitted or required by Section 409A.

(c) Notwithstanding any other provision of this Agreement to the contrary, this Agreement shall be interpreted and at all times administered in a manner that avoids the inclusion of compensation in income under Section 409A, or the payment of increased taxes, excise taxes or other penalties under Section 409A. The parties intend this Agreement to be in compliance with Section 409A. Executive acknowledges and agrees that Company does not guarantee the tax treatment or tax consequences associated with any payment or benefit arising under this Agreement, including but not limited to consequences related to Section 409A.

(d) If any payment or benefit Executive would receive under this Agreement, when combined with any other payment or benefit Executive receives pursuant to a Change of Control (for purposes of this section, a "Payment") would: (i) constitute a "parachute payment" within the meaning of Section 280G the Code; and (ii) but for this sentence, be subject to the excise tax imposed by Section 4999 of the Code (the "Excise Tax"), then such Payment shall be either: (A) the full amount of such Payment; or (B) such lesser amount (with cash payments being reduced before stock option compensation) as would result in no portion of the Payment being subject to the Excise Tax, whichever of the foregoing amounts, taking into account the applicable federal, state and local employments taxes, income taxes, and the Excise Tax, results in Executive's receipt, on an after-tax basis, of the greater amount of the Payment notwithstanding that all or some portion of the Payment may be subject to the Excise Tax.

8. General.

(a) Notices. Except as otherwise specifically provided herein, any notice required or permitted by this Agreement shall be in writing and shall be delivered as follows with notice deemed given as indicated: (i) by personal delivery when delivered personally; (ii) by overnight courier upon written verification of receipt; (iii) by telecopy or facsimile transmission upon acknowledgment of receipt of electronic transmission; or (iv) by certified or registered mail, return receipt requested, upon verification of receipt.

Notices to Executive shall be sent to the last known address in Company's records or such other address as Executive may specify in writing.

Notices to Company shall be sent to:

Wave Life Sciences USA, Inc.

733 Concord Avenue

Cambridge, MA 02138

Tel: (617) 949-2900

Attn: Chief Executive Officer

With a copy to:

Wave Life Sciences USA, Inc.

733 Concord Avenue

Cambridge, MA 02138

Tel: (617) 949-2900

Attn: General Counsel

(b) Modifications and Amendments. The terms and provisions of this Agreement may be modified or amended only by written agreement executed by the parties hereto.

(c) Waivers and Consents. The terms and provisions of this Agreement may be waived, or consent for the departure therefrom granted, only by written document executed by the party entitled to the benefits of such terms or provisions. No such waiver or consent shall be deemed to be or shall constitute a waiver or consent with respect to any other terms or provisions of this Agreement, whether or not similar. Each such waiver or consent shall be effective only in the specific instance and for the purpose for which it was given, and shall not constitute a continuing waiver or consent.

(d) Assignment. Company may assign its rights and obligations hereunder to any person or entity that succeeds to all or substantially all of Company's business or that aspect of Company's business in which Executive is principally involved. Executive may not assign Executive's rights and obligations under this Agreement without the prior written consent of Company.

(e) Governing Law/Dispute Resolution. This Agreement and the rights and obligations of the parties hereunder shall be construed in accordance with and governed by the law of the Commonwealth of Massachusetts, without giving effect to the conflict of law principles thereof. Any legal action or proceeding with respect to this Agreement shall be brought in the courts of the Commonwealth of Massachusetts or of the United States of America for the District of Massachusetts. By execution and delivery of this Agreement, each of the parties hereto accepts for itself and in respect of its property, generally and unconditionally, the non-exclusive jurisdiction of the aforesaid courts.

(f) Jury Waiver. ANY, ACTION, DEMAND, CLAIM, OR COUNTERCLAIM ARISING UNDER OR RELATING TO THIS AGREEMENT SHALL BE RESOLVED BY A JUDGE ALONE AND EACH OF COMPANY AND EXECUTIVE WAIVES ANY RIGHT TO A JURY TRIAL THEREOF.

(g) Headings and Captions. The headings and captions of the various subdivisions of this Agreement are for convenience of reference only and shall in no way modify or affect the meaning or construction of any of the terms or provisions hereof.

(h) Entire Agreement. This Agreement, together with the other agreements specifically referenced herein and the Exhibits attached hereto, embodies the entire agreement and understanding between the parties hereto with respect to the subject matter hereof and supersedes all prior oral or written agreements and understandings relating to the subject matter hereof, including, but not limited to, the Prior Employment Agreement. Notwithstanding the foregoing, nothing herein shall impact, affect, supersede, change, or modify the terms of the Agreement to Protect Confidential Information, Inventions and Business and/or the Confidentiality and Information Systems Usage Agreement that Exeutive previously executed with Company. No statement, representation, warranty, covenant or agreement of any kind not expressly set forth in this Agreement shall affect, or be used to interpret, change or restrict, the express terms and provisions of this Agreement.

(i) Counterparts. This Agreement may be executed in two or more counterparts, and by different parties hereto on separate counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. For all purposes a signature by fax shall be treated as an original.

[Signature Page to Follow]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

CHRIS FRANCIS	**WAVE LIFE SCIENCES USA, INC.**
/s/ Chris Francis_____	By: /s/ Paul B. Bolno_ _____
Signature	Name: Paul B. Bolno_ _____
Address: [Address]	Title: Chief Executive Officer_ __

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the registration statements (Nos. 333-208598, 333-221480, 333-228308, 333-233054, 333-234519, 333-243491, 333-243515, 333-259196, 333-260948, and 333-268286) on Form S-8 and (Nos. 333-233052 and 333-263251) on Form S-3, of our report dated March 23, 2023, with respect to the consolidated financial statements of Wave Life Sciences Ltd. and subsidiaries.

/s/ KPMG LLP

Boston, Massachusetts
March 23, 2023

Exhibit 31.1

CERTIFICATIONS UNDER SECTION 302

I, Paul B. Bolno, M.D., certify that:

1. I have reviewed this annual report on Form 10-K of Wave Life Sciences Ltd.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 23, 2023

/s/ Paul B. Bolno, M.D.

Paul B. Bolno, M.D.
President and Chief Executive Officer
Principal Executive Officer

Exhibit 31.2

CERTIFICATIONS UNDER SECTION 302

I, Kyle Moran, certify that:

1. I have reviewed this annual report on Form 10-K of Wave Life Sciences Ltd.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 23, 2023

/s/ Kyle Moran

Kyle Moran
Chief Financial Officer
Principal Financial Officer

Exhibit 32

CERTIFICATIONS UNDER SECTION 906

Pursuant to section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of section 1350, chapter 63 of title 18, United States Code), each of the undersigned officers of Wave Life Sciences Ltd., a Singapore corporation (the "Company"), does hereby certify, to such officer's knowledge, that:

The Annual Report for the year ended December 31, 2022 (the "Form 10-K") of the Company fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and the information contained in the Form 10-K fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: March 23, 2023

/s/ Paul B. Bolno, M.D.

Paul B. Bolno, M.D.
President and Chief Executive Officer
Principal Executive Officer

Dated: March 23, 2023

/s/ Kyle Moran

Kyle Moran
Chief Financial Officer
Principal Financial Officer