



Wave Life Sciences  
PRECISION-HD clinical  
trial results and business  
update

March 29, 2021

# Forward-looking statements

This document contains forward-looking statements. All statements other than statements of historical facts contained in this document, including statements regarding possible or assumed future results of operations, preclinical and clinical studies, business strategies, research and development plans, collaborations and partnerships, regulatory activities and timing thereof, competitive position, potential growth opportunities, use of proceeds and the effects of competition are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important factors that may cause the actual results, performance or achievements of Wave Life Sciences Ltd. (the "Company") to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements. In some cases, you can identify forward-looking statements by terms such as "may," "will," "should," "expect," "plan," "aim," "anticipate," "could," "intend," "target," "project," "contemplate," "believe," "estimate," "predict," "potential" or "continue" or the negative of these terms or other similar expressions. The forward-looking statements in this presentation are only predictions. The Company has based these forward-looking statements largely on its current expectations and projections about future events and financial trends that it believes may affect the Company's business, financial condition and results of operations. These forward-looking statements speak only as of the date of this presentation and are subject to a number of risks, uncertainties and assumptions, including those listed under Risk Factors in the Company's Form 10-K and other filings with the SEC, some of which cannot be predicted or quantified and some of which are beyond the Company's control. The events and circumstances reflected in the Company's forward-looking statements may not be achieved or occur, and actual results could differ materially from those projected in the forward-looking statements. Moreover, the Company operates in a dynamic industry and economy. New risk factors and uncertainties may emerge from time to time, and it is not possible for management to predict all risk factors and uncertainties that the Company may face. Except as required by applicable law, the Company does not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise.

# Agenda

Topic	Speaker
<b>Opening remarks</b>	<b>Paul Bolno, MD, MBA</b> President & CEO
<b>PRECISION-HD and OLE trial results</b>	<b>Michael Panzara, MD, MPH</b> Chief Medical Officer, Head of Therapeutics Discovery and Development
<b>Evolution of Wave</b>	<b>Paul Bolno, MD, MBA</b> President & CEO
<b>WVE-003 (SNP3) and clinical pipeline</b>	<b>Michael Panzara, MD, MPH</b> Chief Medical Officer, Head of Therapeutics Discovery and Development

**Q&A**

# Wave's commitment to innovation in HD

**Scientific vision** around biology of Huntington's disease including the role of wild-type HTT

**Committed to novel approach** to selectively reduce mutant HTT while sparing wild-type HTT

**Innovative approaches** – SNP phasing, wild-type HTT assay

**Collaborations** with academia, clinicians, industry and the community



# WVE-003: Highly differentiated program supported by Wave's next generation chemistry

First generation chemistry

WVE-120101 SNP1

WVE-120102 SNP2

WVE-003  
SNP3

- ✓ **Differentiated wild-type sparing approach**  
Only allele-selective clinical program
- ✓ **First HD clinical candidate containing PN chemistry**  
PN chemistry has demonstrated enhanced potency, exposure, durability in CNS
- ✓ **Clinical starting dose informed by preclinical *in vivo* model**  
Insight into PK / PD relationships
- ✓ **Clinical trial efficiencies**  
Adaptive trial design may enable rapid POC

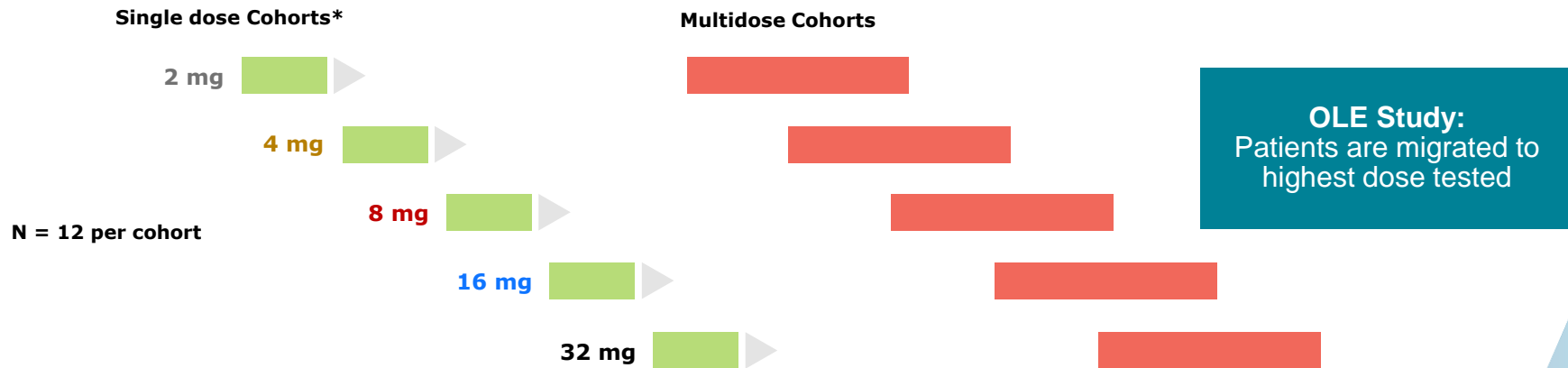
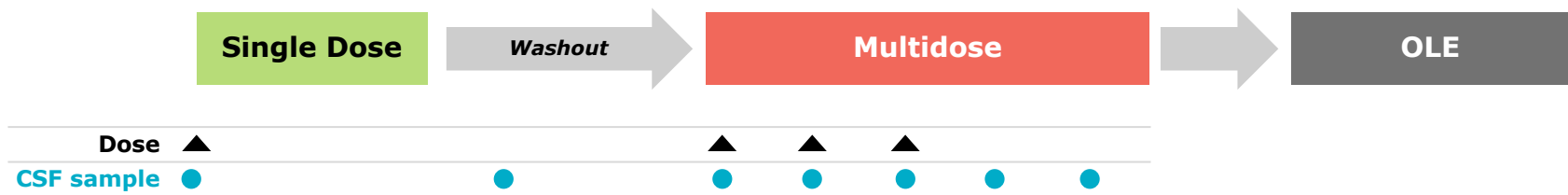


Mike Panzara, MD, MPH  
Chief Medical Officer,  
Head of Therapeutics  
Discovery and Development

# mHTT results from PRECISION-HD trials do not support further development of WVE-120102 and WVE-120101

- **PRECISION-HD2: Core Study**
  - No statistically significant reductions of mHTT after single or multiple doses of WVE-120102 (doses 2-32mg)
  - No dose response
- **PRECISION-HD2: Open Label Extension (OLE)**
  - Modest and inconsistent reductions in mHTT over course of study
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  - No correlation between >20% mHTT reduction and wtHTT change, suggesting allele selectivity
- **PRECISION-HD1: Core and OLE**
  - Results consistent with PRECISION-HD2 up to 16 mg; 32 mg core and OLE results pending
- **Additional observations from all studies**
  - No changes in neurofilament light-chain (NfL) over time
  - No worsening of disease progression in treated participants versus expected based on natural history
  - Biomarker assays (mHTT, wtHTT, and NfL) performed reliably
- **Next-Generation Compound, WVE-003, in Phase 1b/2a**
  - New PN backbone modifications have potential to address limitations of first-generation chemistry
  - WVE-003, incorporating PN backbone chemistry, demonstrates improved preclinical *in vivo* pharmacology
  - Sites being activated, dosing expected in 2021

# PRECISION-HD study design





# PRECISION-HD2: Patient Disposition

	Pooled Placebo	WVE-120102						Total
		2 mg	4 mg	8 mg	12 mg	16 mg	32 mg	
Randomized patients	22	9	12	15	8	9	13	88
Number of doses per patient								
1	6	3	4	7	8	0	6	28
2	0	0	0	0	0	0	0	0
3	3	0	3	6	0	0	3	12
4	13	6	5	2	0	9	4	26
Mean	3.0	3.0	2.8	2.2	1.0	4.0	2.4	2.5
Patients who prematurely discontinued treatment	0	2 ( 22.2)	1 ( 8.3)	0	0	0	7 ( 53.8)	10 ( 11.4)
Adverse Event	0	0	0	0	0	0	6 ( 46.2)	6 ( 6.8)

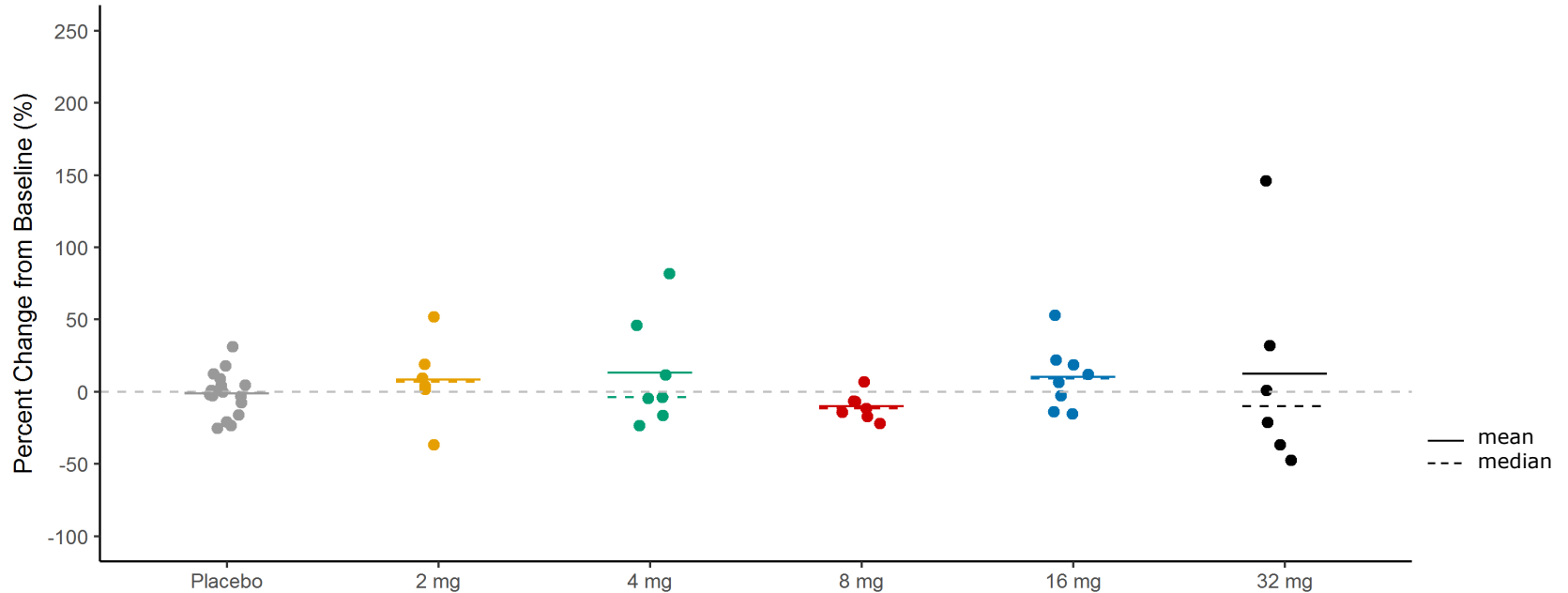
Note: Numbers in parentheses are percentages.

# PRECISION-HD2: Patient Demographics and HD Disease History

	Pooled Placebo (N=22)	WVE-120102						Active Total (N=66)
		2 mg (N=9)	4 mg (N=12)	8 mg (N=15)	12 mg (N=8)	16 mg (N=9)	32 mg (N=13)	
Time since initial diagnosis (years)								
Mean	6.1	9.9	3.8	5.6	3.9	3.2	5.6	5.3
Age at HD onset (years)								
Mean	40.18	42.00	41.75	43.33	42.50	49.00	48.08	44.47
Diagnosis stage								
1	9 ( 40.9)	5 ( 55.6)	6 ( 50.0)	8 ( 53.3)	1 ( 12.5)	5 ( 55.6)	11 ( 84.6)	36 ( 54.5)
2	13 ( 59.1)	4 ( 44.4)	6 ( 50.0)	7 ( 46.7)	7 ( 87.5)	4 ( 44.4)	2 ( 15.4)	30 ( 45.5)
CAG repeat length								
Mean	45.00	44.22	44.00	43.73	45.13	43.44	42.62	43.76
CAP score								
Mean	502.36	533.72	459.89	475.51	519.65	504.84	473.92	489.64

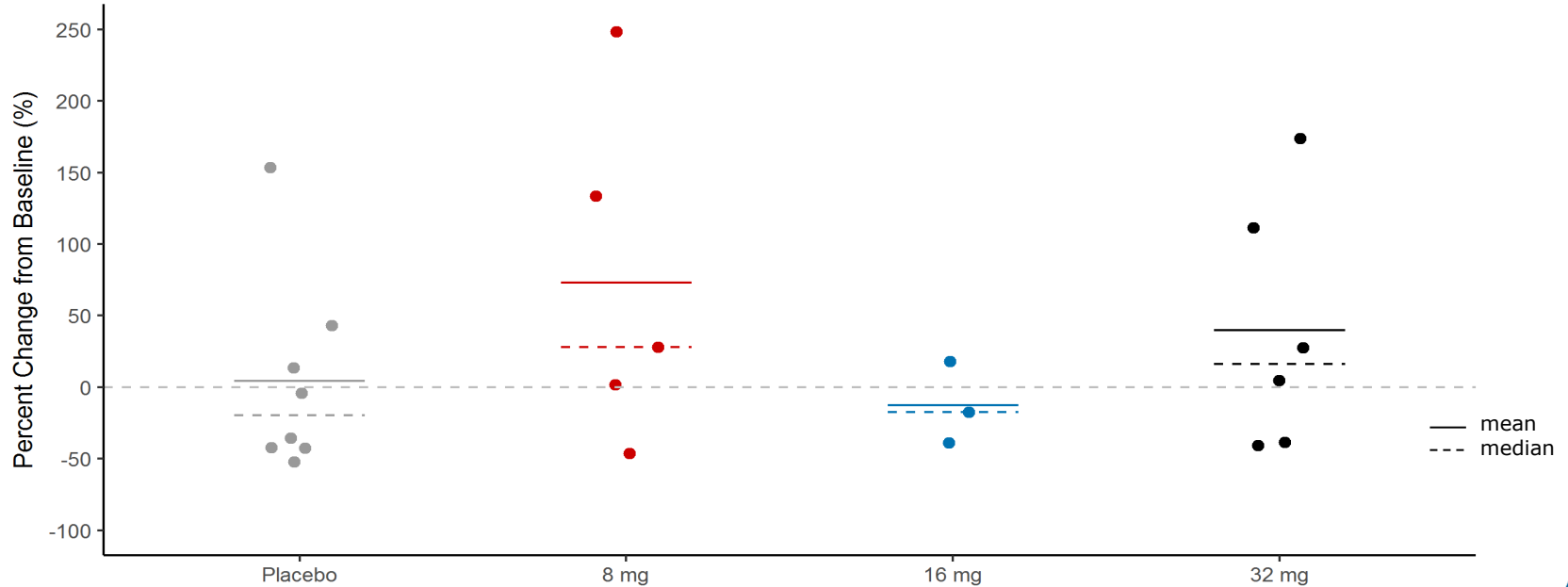
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# PRECISION-HD2 core: No statistically significant reduction of mHTT detected after 3 or 4 doses of WVE-120102

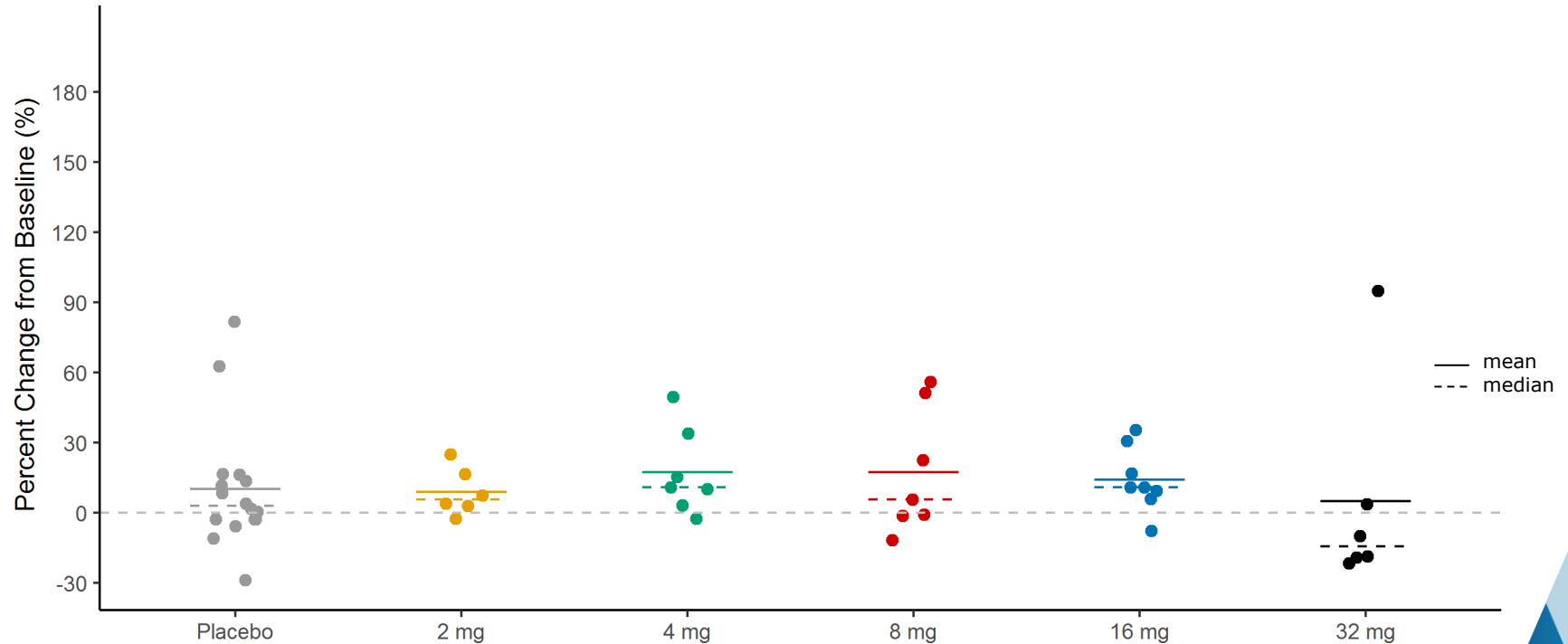


- Loss of small, statistically significant effect seen at December 2019 interim analysis
  - Incomplete follow-up after 3<sup>rd</sup> and 4<sup>th</sup> dose visits previously
  - Additional patients added to analysis
  - Placebo results changed with additional analyses and new patients

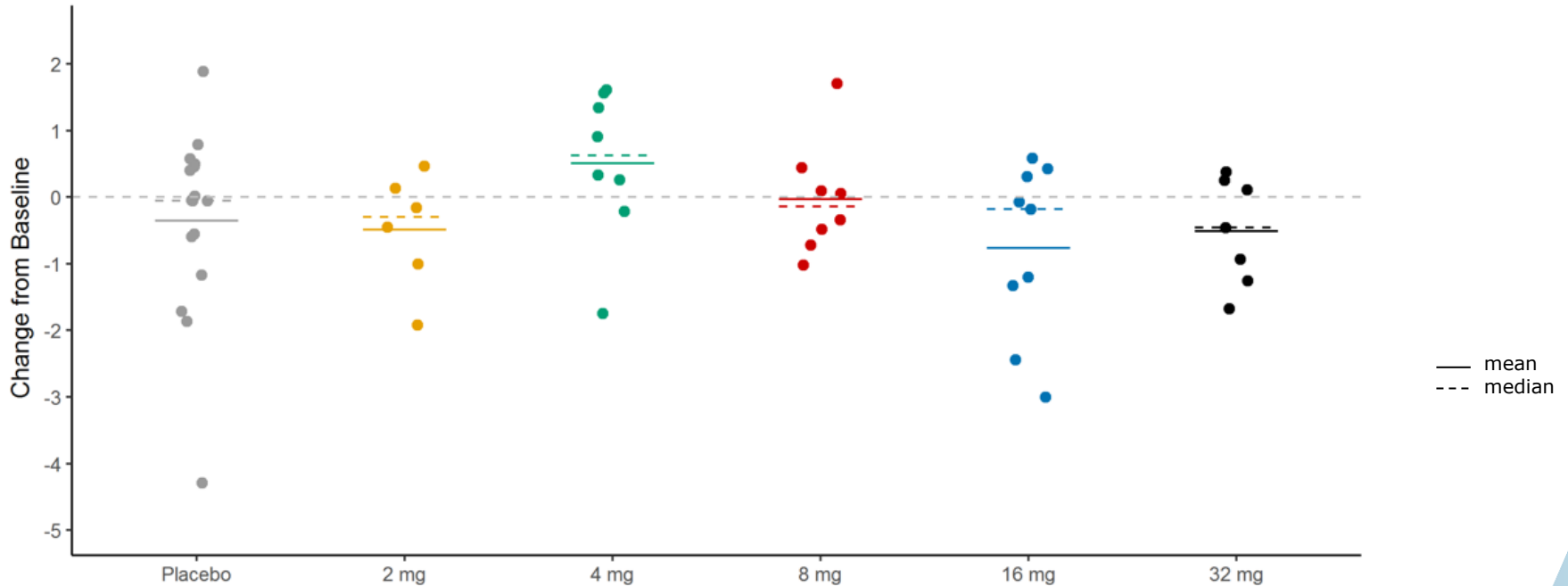
# PRECISION-HD2 core: No statistically significant changes in wtHTT detected after 3 or 4 doses of WVE-120102



# PRECISION-HD2 core: No statistically significant changes in NfL detected after 3 or 4 doses of WVE-120102



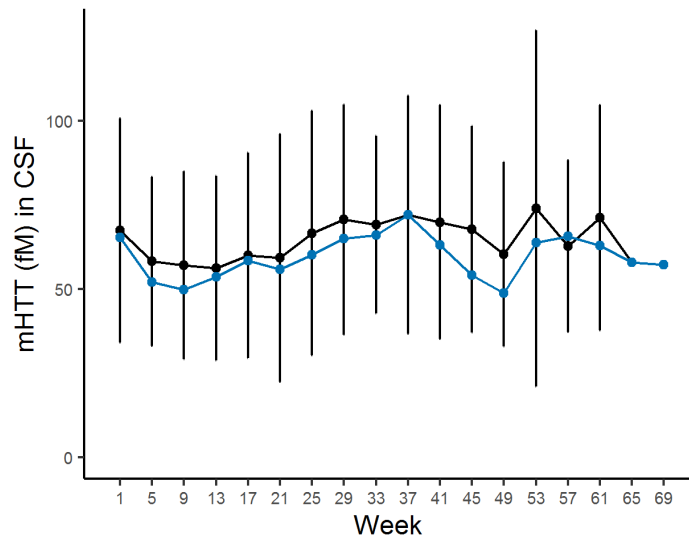
# PRECISION-HD2 core: No change in UHDRS based clinical outcomes after 3 or 4 doses of WVE-120102



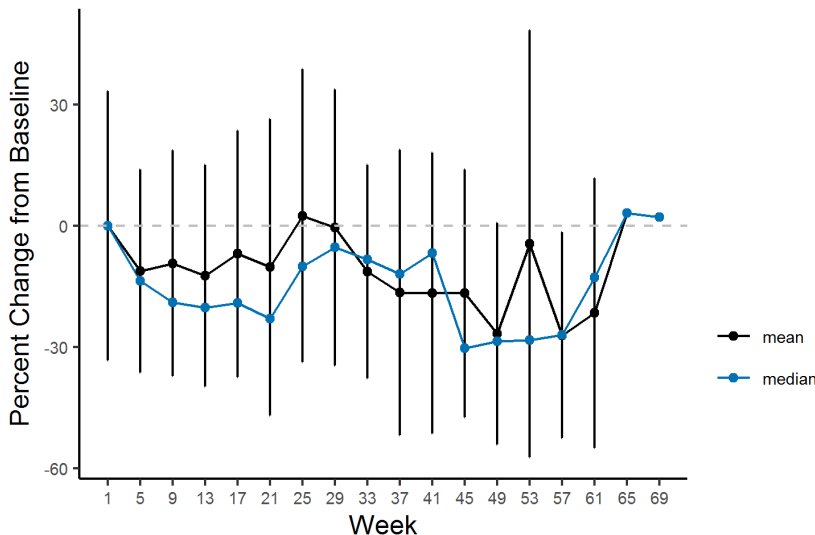
Similar results observed for the TMS and TFC

# PRECISION-HD2 OLE: Modest reductions of mHTT at some timepoints

Overall Mean +/- SD and Median



N 28 27 26 25 25 18 20 20 15 9 9 9 9 9 8 4 1 1

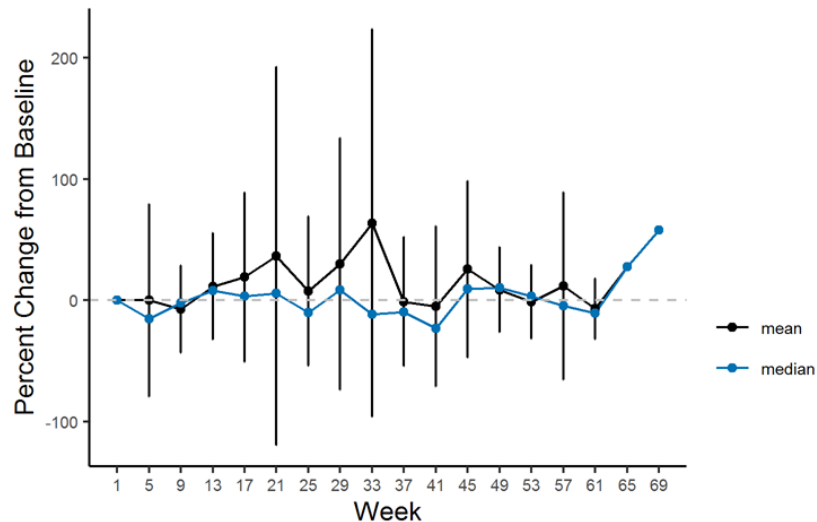
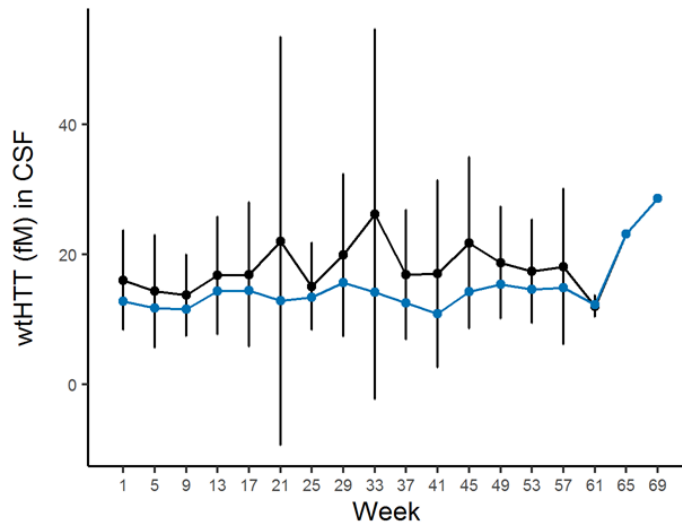


28 27 26 25 25 18 20 20 15 9 9 9 9 9 8 4 1 1

- 36 patients were receiving active treatment in the PRECISION-HD2 OLE and were included in the safety assessment, mean = 9.3 monthly doses, range = (1,19)
- 28 patients were included in the biomarker analysis, mean = 8.1 monthly doses, range = (1, 17)
- Multiple pre-specified and ad hoc sensitivity analyses confirmed no consistent effects

# PRECISION-HD2 OLE: No reductions in wtHTT over time

Overall Mean +/- SD and Median



N 25 24 25 24 24 18 20 20 14 9 9 9 9 9 8 4 1 1

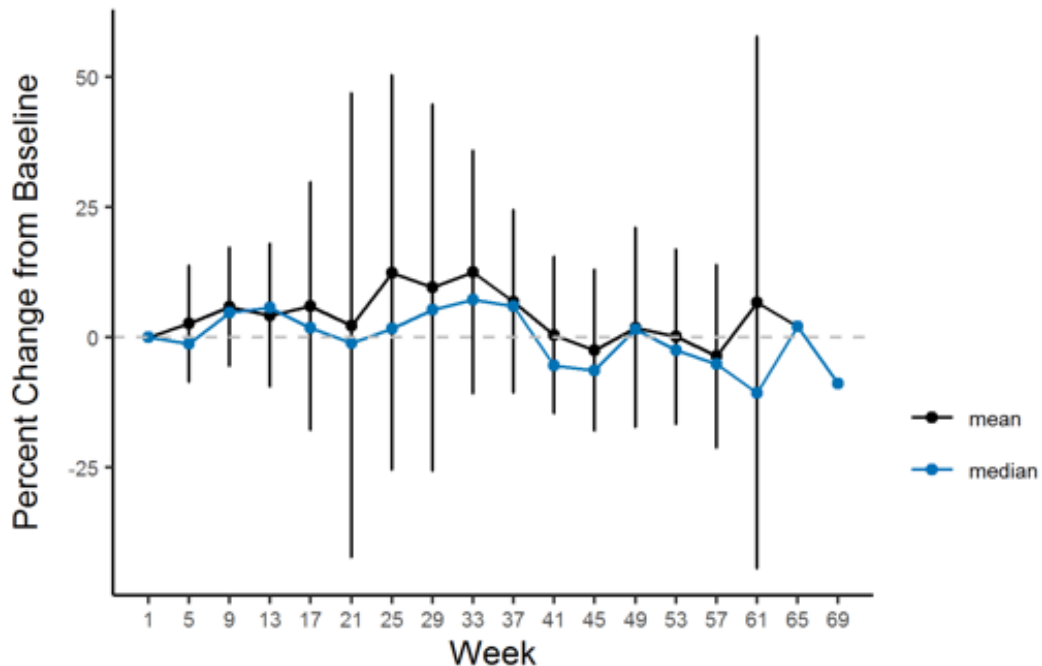
25 24 25 24 24 18 20 20 14 9 9 9 9 9 8 4 1 1

- No correlation between greater than 20% reduction in mHTT and wtHTT change (Correlation coefficient = 0.04, 95% CI: -0.22, 0.19)
- Suggests allele-selectivity; Lack of robust reduction in mHTT limits ability to be definitive



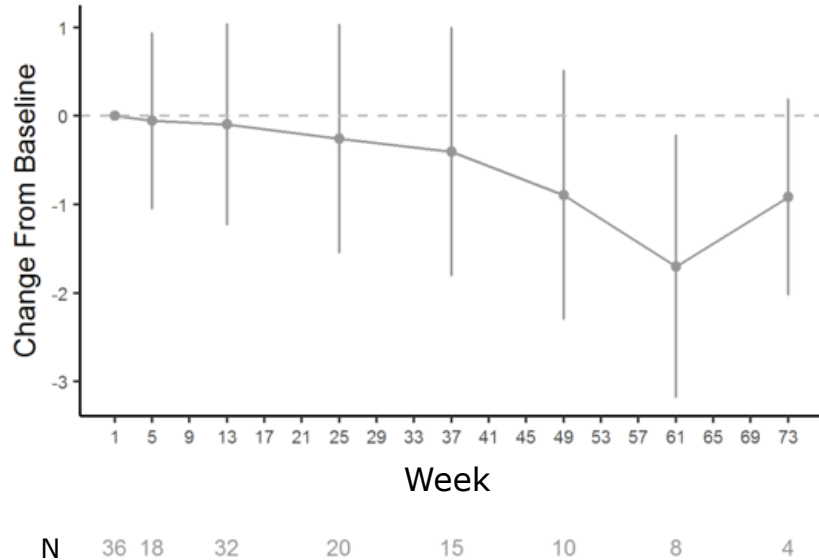
# PRECISION-HD2 OLE: No changes in NfL over time

Overall mean +/- SD and median

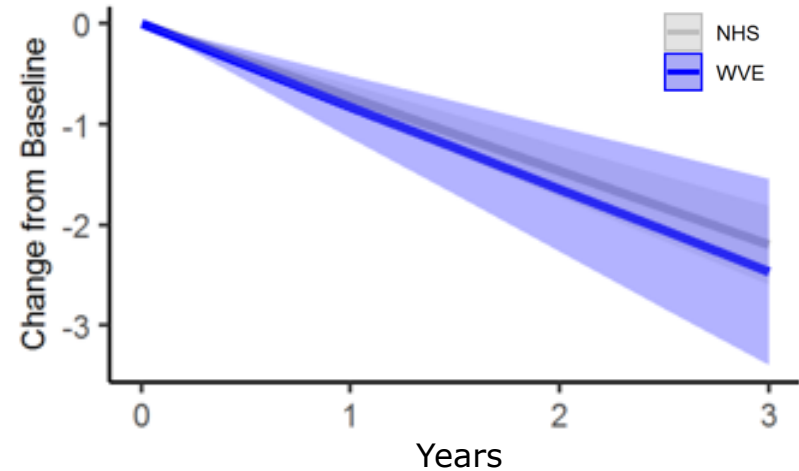


# Progression on UHDRS-based endpoints matched that expected from natural history studies (NHS)

PRECISION-HD2 OLE: cUHDRS



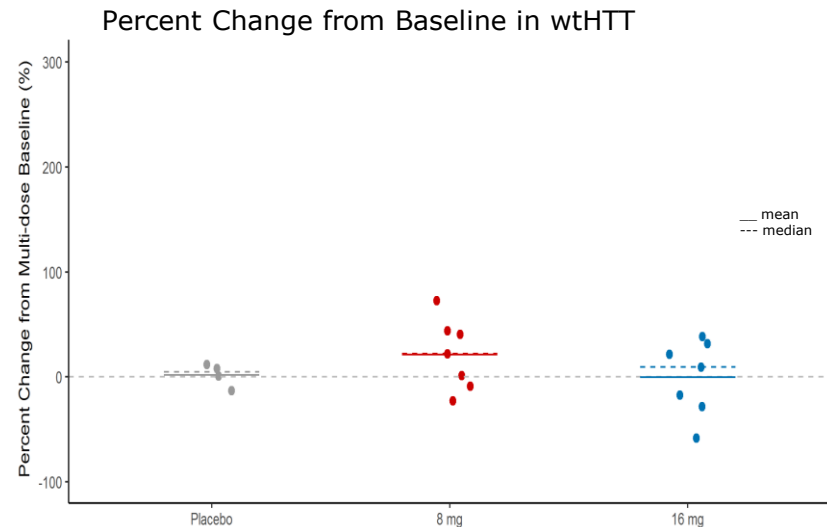
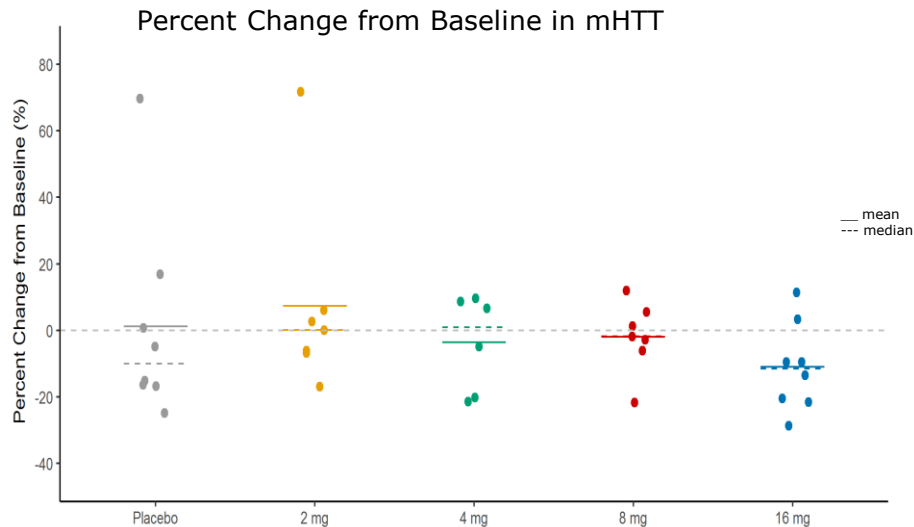
PRECISION-HD2 Core and OLE: cUHDRS vs. NHS



# PRECISION-HD2 Core and OLE Safety

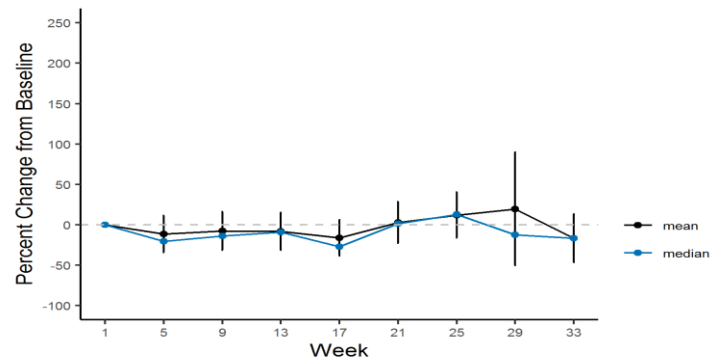
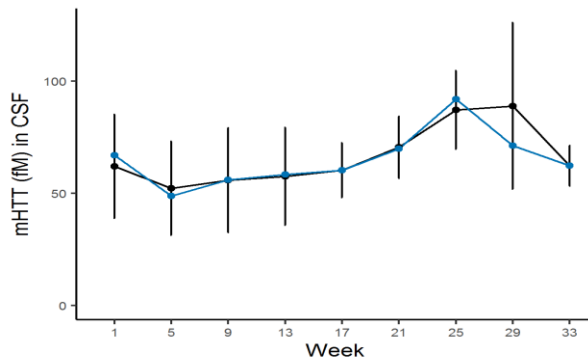
- Adverse events reported in 83% of WVE-120102-treated participants in the PRECISION-HD2 core study versus 90% on placebo, most mild to moderate in intensity
  - Most common (reported in  $\geq 10\%$  receiving WVE-120102): Headache, procedural pain, back pain, falls, viral upper respiratory tract infection, dizziness, and post-lumbar puncture syndrome
  - Serious adverse events (SAEs) increased in the 32 mg group as compared to lower doses
    - 7 of 13 patients were reported with an SAE related to treatment
    - 6 discontinued treatment due to AE
    - SAEs were transient and included disorientation, delirium, ataxia, slurred speech, amnesia, meningitis, fever and vertigo
- Adverse events reported in the PRECISION-HD2 OLE were similar
  - 36 patients reported with an event over 327 person/months of exposure
  - Incidence of SAEs related to treatment with 32 mg WVE-120102 was lower than in the core study
    - 3 patients discontinued treatment due to AEs (2 receiving 16 mg, 1 receiving 32 mg).
- No clinically meaningful trends in clinical laboratory values including no CSF white blood cell and protein elevations in either study

# PRECISION-HD1 Core: No statistically significant reductions in mHTT and no change in wtHTT



# PRECISION-HD1 OLE: No statistically significant reductions in mHTT and no change in wtHTT

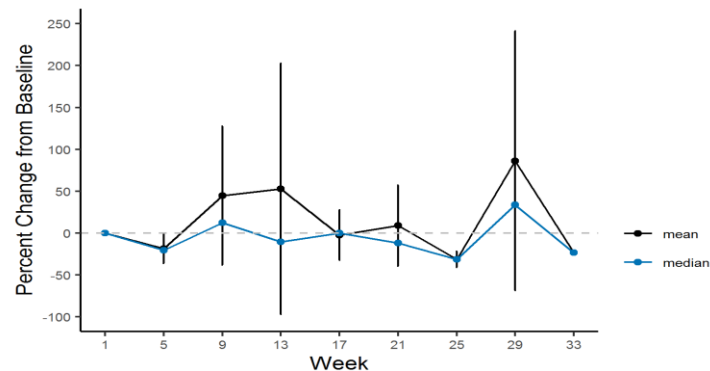
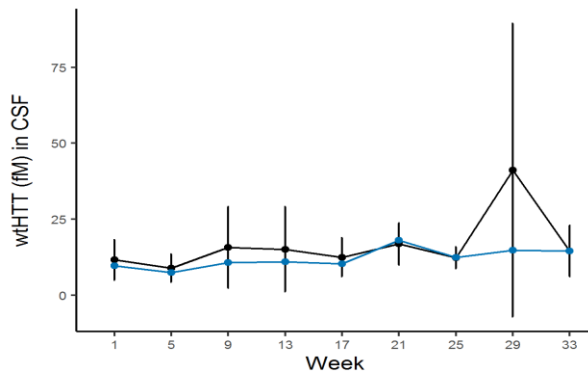
mHTT



N 13 12 13 10 6 4 3 3 2

13 12 13 10 6 4 3 3 2

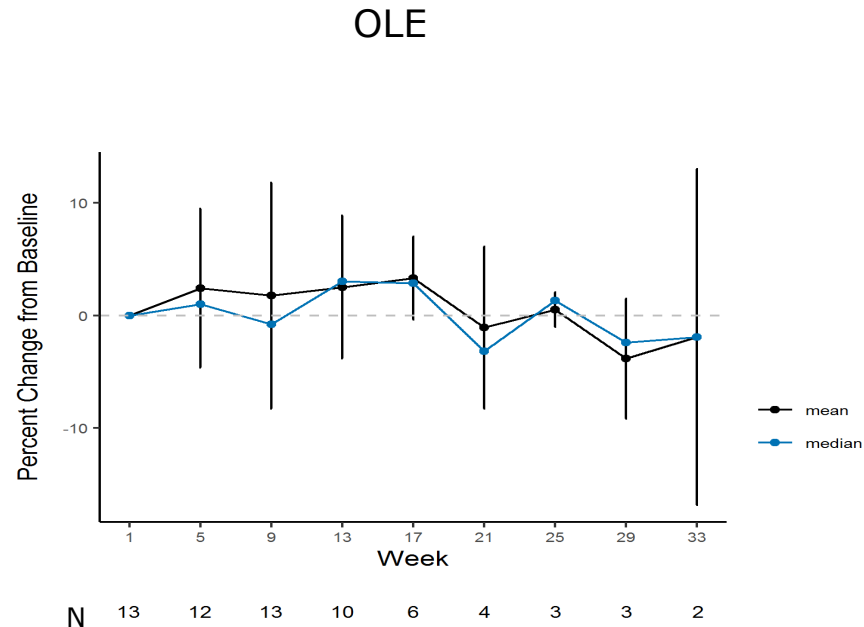
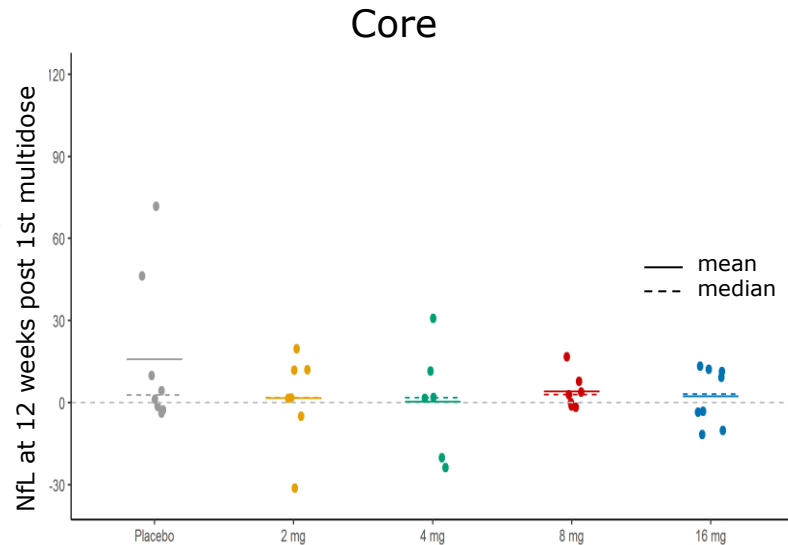
wtHTT



N 10 10 10 10 6 4 3 3 2

10 10 10 10 6 4 3 3 2

# PRECISION-HD1 Core and OLE: No statistically significant changes in NfL over time



# PRECISION-HD1: AE incidence balanced between groups up to 16mg

- Adverse events reported in 91% of WVE-120101-treated patients who received up to 16 mg in the core study versus 75% who received placebo, most of which were mild to moderate in intensity
  - Most common (reported in  $\geq 10\%$  receiving WVE-120101): Headache, procedural pain, dizziness, back pain, falls and viral upper respiratory infection
  - No patients were reported with SAEs related to WVE-120101 up through 16 mg, 2 patients discontinued treatment due to AEs, one patient each in the 2 mg and 4 mg groups.
- Adverse events reported in the PRECISION-HD1 OLE were similar
  - 25 patients reported with an event over 95 person/months of exposure with no discontinuations due to AE
  - 1 patient reported an SAE of gait disturbance related to treatment
- No clinically meaningful trends in clinical laboratory values including CSF white blood cell and protein elevations in either study

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- **Next-Generation Compound, WVE-003, in Phase 1b/2a**
  - New PN backbone modifications have potential to address limitations of first-generation chemistry
  - WVE-003, incorporating PN backbone chemistry, demonstrates improved preclinical *in vivo* pharmacology
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Paul Bolno, MD, MBA  
President and CEO

# Pipeline reflects company's evolution

THERAPEUTIC AREA / TARGET



DISCOVERY

PRECLINICAL

CLINICAL

PARTNER

## NEUROLOGY

Huntington's disease  
mHTT SNP1



Huntington's disease  
mHTT SNP2



Huntington's disease  
mHTT SNP3



ALS and FTD  
C9orf72



SCA3  
ATXN3



CNS diseases  
Multiple†



DMD  
Exon 53



ADAR editing  
Multiple



## HEPATIC

AATD (ADAR editing)  
SERPINA1



## OPHTHALMOLOGY

Retinal diseases  
USH2A and RhoP23H



Takeda  
50:50 option

Takeda milestones  
& royalties

100% global

100% global

100% global



◆ Stereopure

◆ PN chemistry

†During a four-year term, Wave and Takeda may collaborate on up to six preclinical targets at any one time.  
ALS: Amyotrophic lateral sclerosis; FTD: Frontotemporal dementia; SCA3: Spinocerebellar ataxia 3; CNS: Central nervous system;  
DMD: Duchenne muscular dystrophy; AATD: Alpha-1 antitrypsin deficiency

# Foundation for next generation programs



## **Oligonucleotide innovation and optimization**

- PN backbone chemistry modifications
- Interactions between sequence, chemistry and stereochemistry



## ***In vivo* models**

- Insight into PK / PD relationships
- Novel model generation



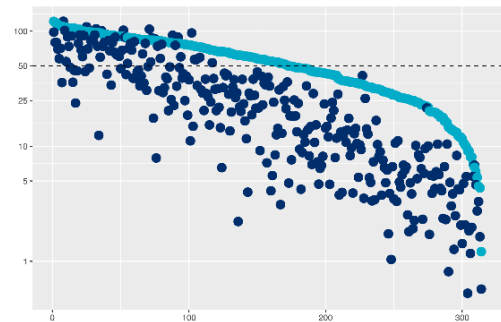
## **Leverage learnings of first-generation programs**

- Translational pharmacology
- Adaptive clinical trial design

# PN chemistry increases potency in silencing, splicing, and editing preclinical studies

## Silencing

Target knockdown (% remaining)

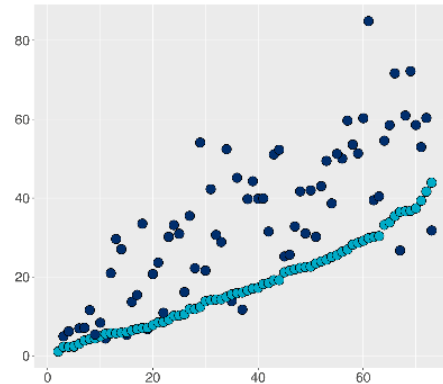


Ranked by potency of reference PS/PO compound

● PS/PO reference compound

## Splicing

% Skipping

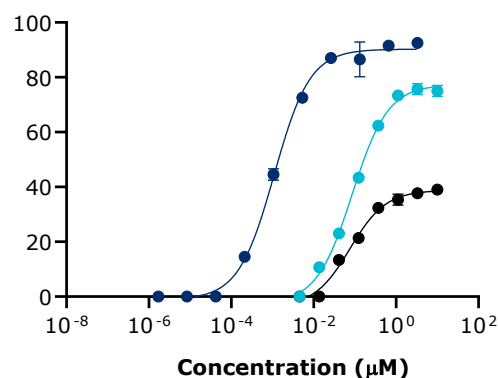


Ranked by potency of reference PS/PO compound

● PS/PN modified compound

## Editing

% Editing



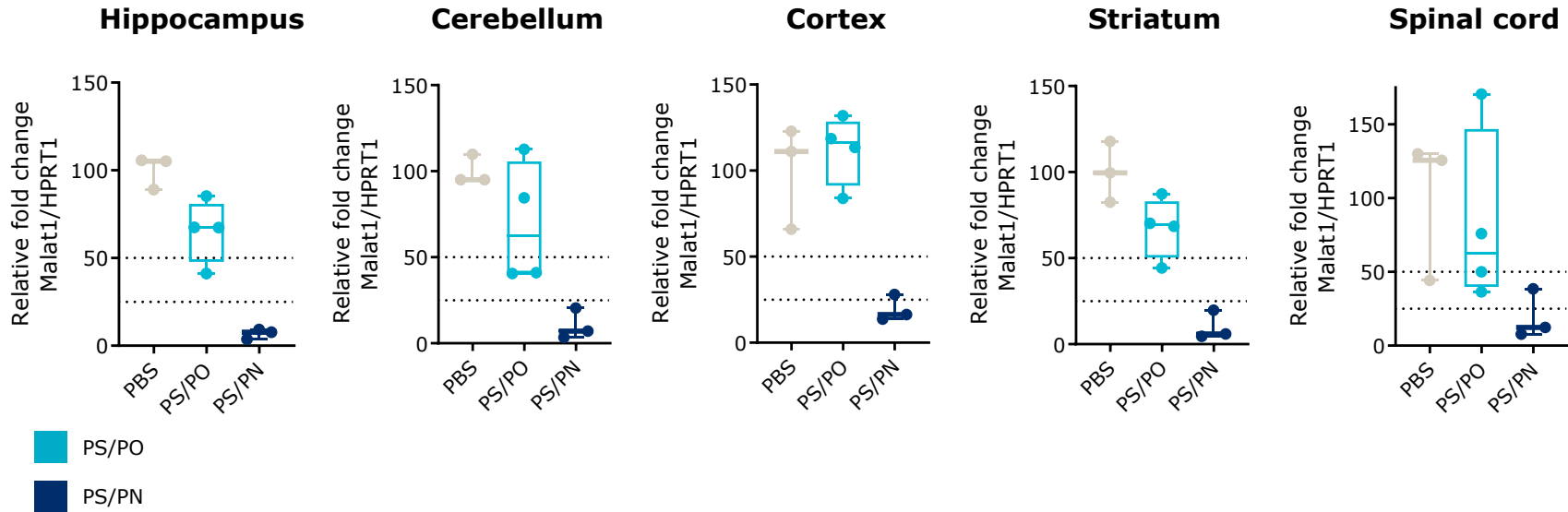
● PS/PO/PN

■ PS/PO (Stereopure)

● PS/PO (Stereorandom)

# PN chemistry increases durability across key CNS tissues *in vivo*

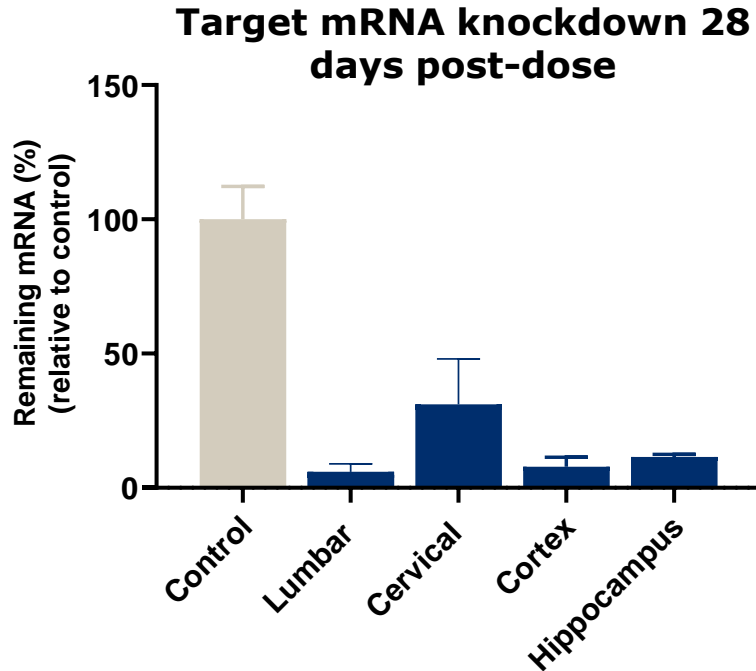
Malat1 knockdown at 10 weeks in CNS (100 µg)



**WAVE**™ Mice received a single 100 µg ICV injection (n=3 per group). Relative fold-change in Malat1 expression is shown for the indicated tissues 10-weeks post-dose. Malat1 expression normalized to Hprt1. PBS, phosphate buffered saline; PS phosphorothioate; PO phosphodiester; PN Nitrogen-containing backbone; Hprt1, hypoxanthine-guanine phosphoribosyl transferase  
**LIFE SCIENCES**

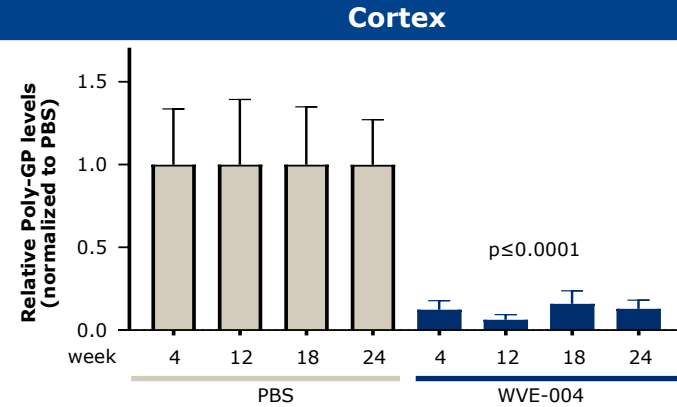
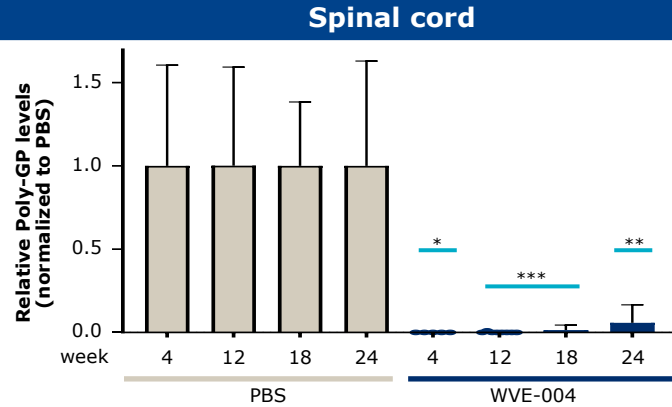
# Potential of PN chemistry demonstrated in NHP CNS

Substantial and widespread target mRNA reduction following single intrathecal dose in NHPs

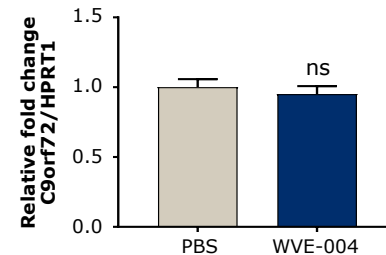
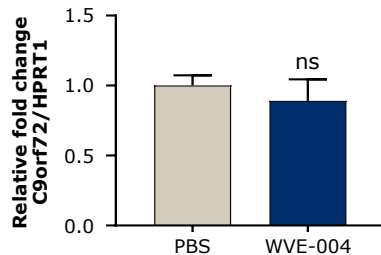


- Single IT dose of 12 mg (n=3)
- Therapeutic candidate widely distributed across brain and spinal cord
- ~90% mRNA knockdown one-month following single dose

# WVE-004 (C9orf72) demonstrates durable reduction of DPRs *in vivo* after 6 months in spinal cord and cortex

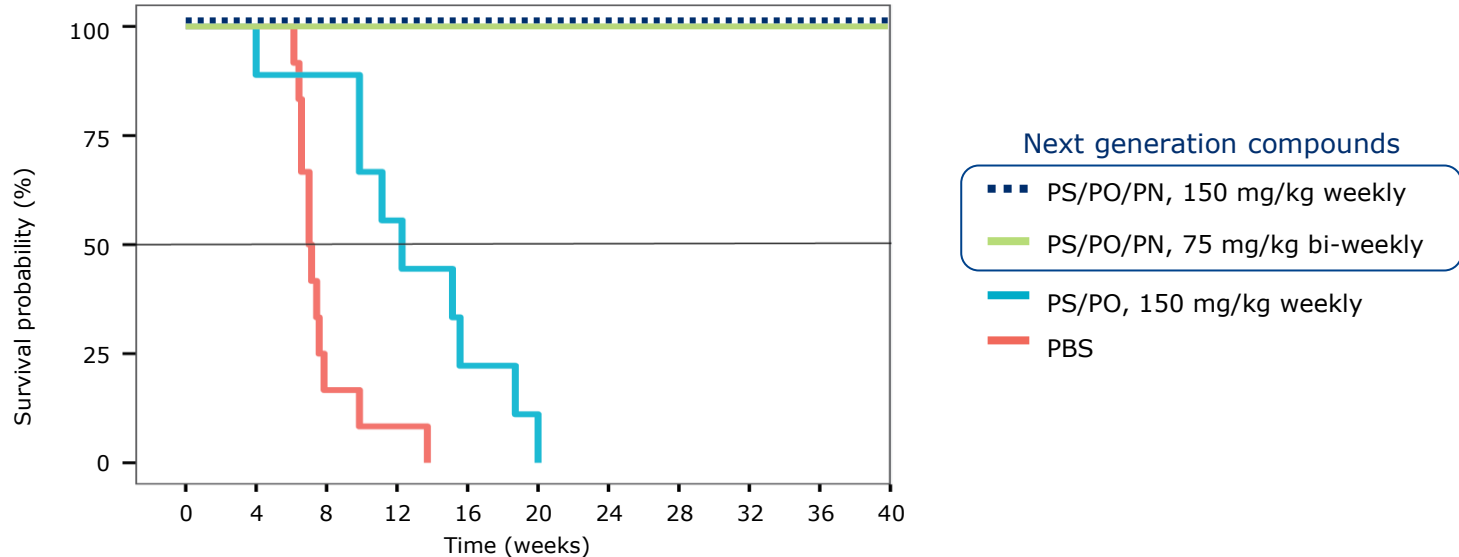


## Healthy C9orf72 protein relatively unchanged ~6 months after WVE-004 administration



# PN chemistry led to overall survival benefit in dKO model

**PN-containing molecules led to 100% dKO survival at time of study termination**



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

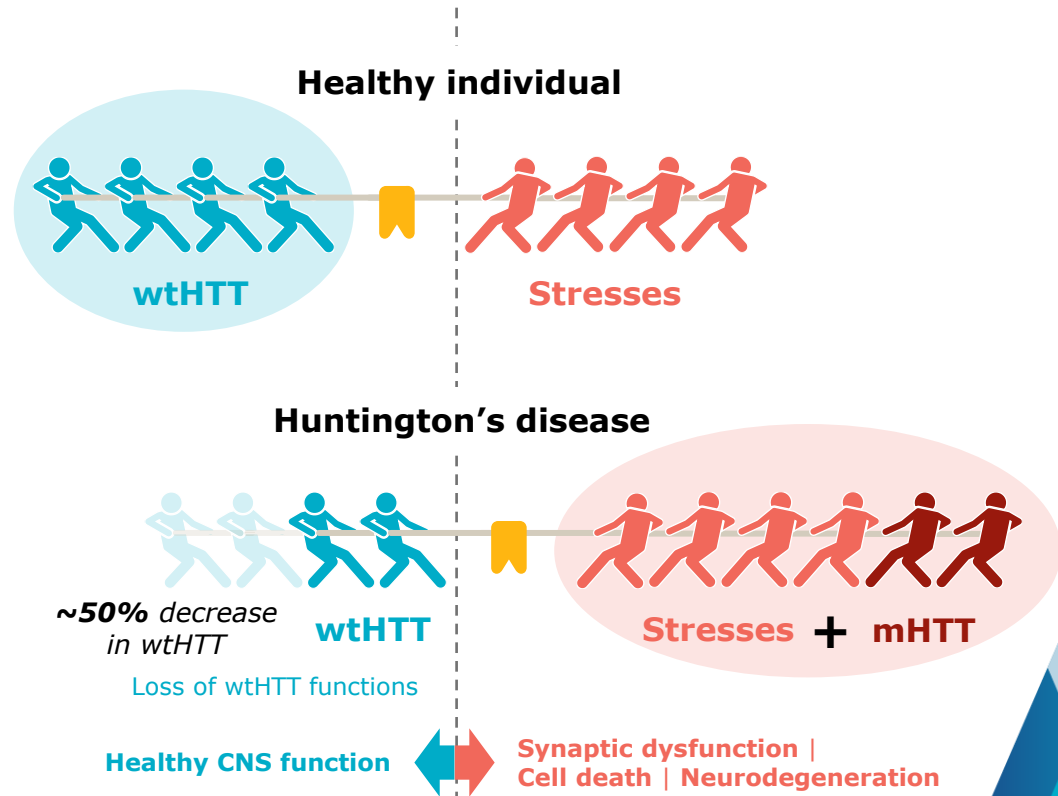




Mike Panzara, MD, MPH  
Chief Medical Officer,  
Head of Therapeutics  
Discovery and Development

# HD: mHTT toxic effects lead to neurodegeneration, loss of wtHTT functions may also contribute to HD

- Wild-type HTT is critical for normal neuronal function
- Expanded CAG triplet repeat in HTT gene results in production of mutant huntingtin protein
- Huntington's disease affects entire brain
- Monogenic autosomal dominant genetic disease; fully penetrant
- Characterized by cognitive decline, psychiatric illness, and chorea; fatal disease



# Wild-type HTT is a critical protein for important functions in the central nervous system



## NEURON

Promotes neuronal survival by protecting against stress



## SYNAPSE

Plays essential role in transport of synaptic proteins to their correct location at synapses



## BRAIN CIRCUITS

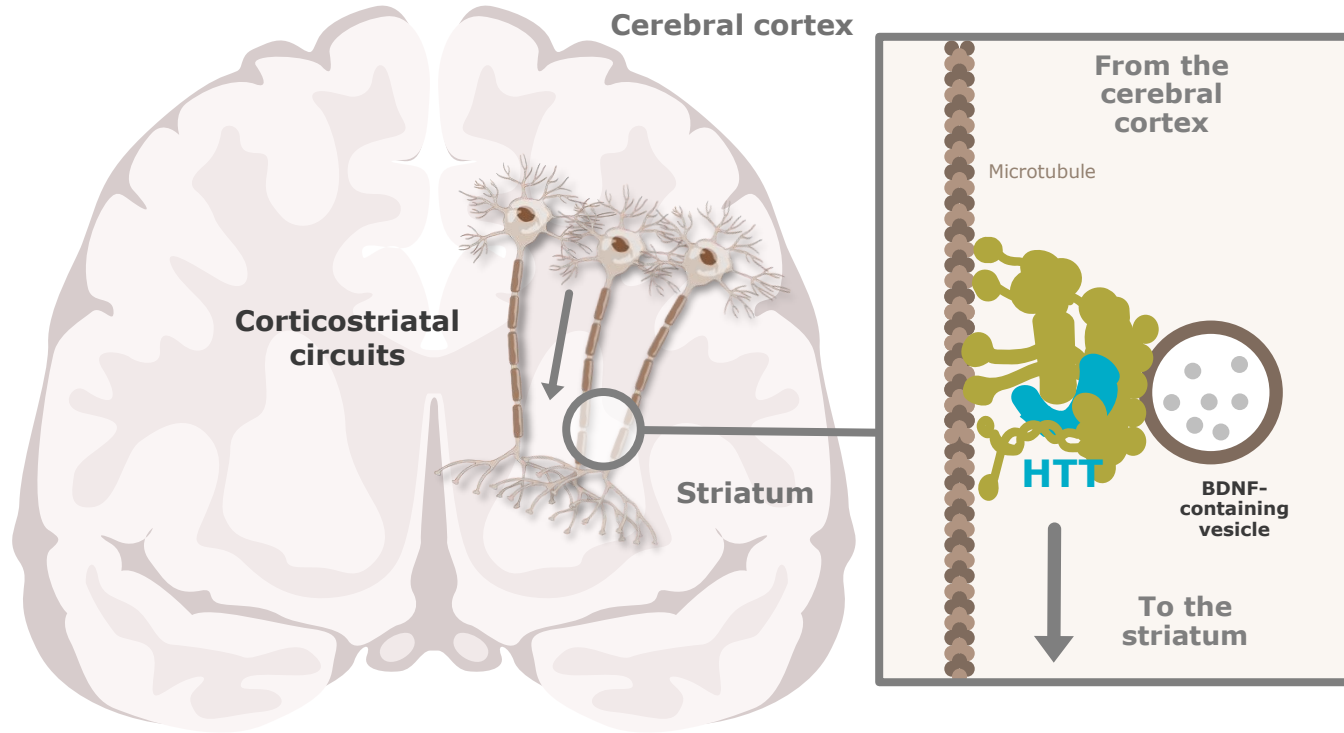
Supplies BDNF to striatum to ensure neuronal survival and regulates synaptic plasticity, which underlies learning and memory



## CSF CIRCULATION

Plays critical role in formation / function of cilia, which are needed to clear catabolites and maintain homeostasis

# HTT provides BDNF, a growth factor critical for the survival of striatal neurons



Striatal neurons do not produce BDNF, but they need it to survive<sup>1</sup>

HTT promotes the production of BDNF and transports BDNF from the **cortex** to the striatum<sup>2,3</sup>

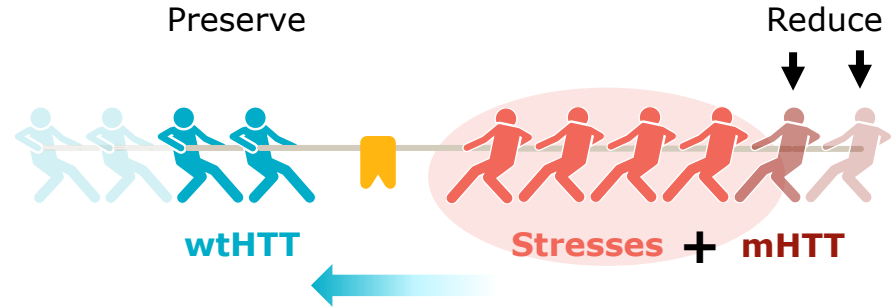
In HD, decreased levels of BDNF contribute to degeneration of corticostriatal circuits<sup>2,4,5</sup>

**Reduction of wtHTT may decrease the availability of BDNF and accelerate corticostriatal degeneration<sup>6</sup>**

# Allele-selective approach to treating HD

Wave has only allele-selective clinical program in Huntington's disease

- ✓ Target mutant mRNA HTT transcript to reduce mutant HTT protein
- ✓ Preserve wild-type HTT protein reservoir in brain



**Only an allele-selective approach is designed to address both toxic gain of function and toxic loss of function drivers of HD**

# Highly differentiated program supported by Wave's next generation chemistry

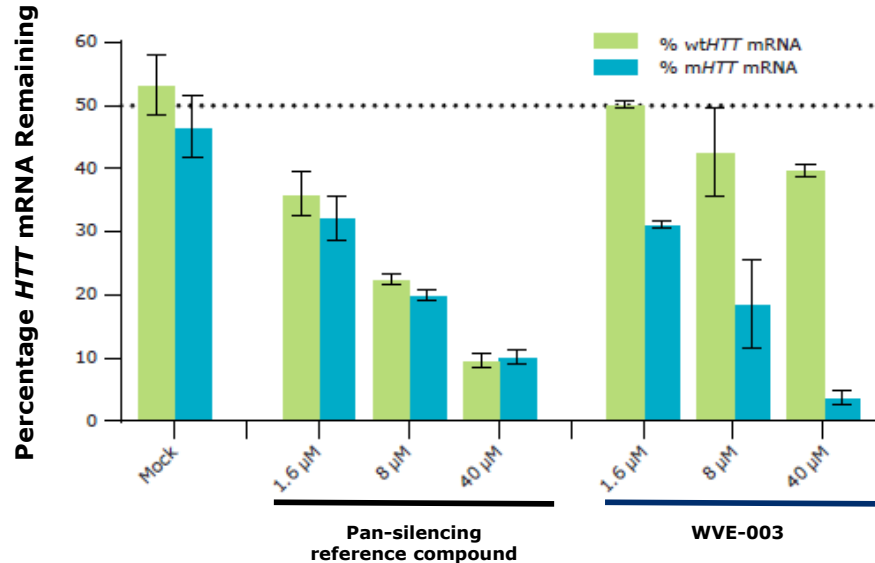
WVE-003  
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Only allele-selective clinical program
- ✓ **First HD clinical candidate containing PN chemistry**  
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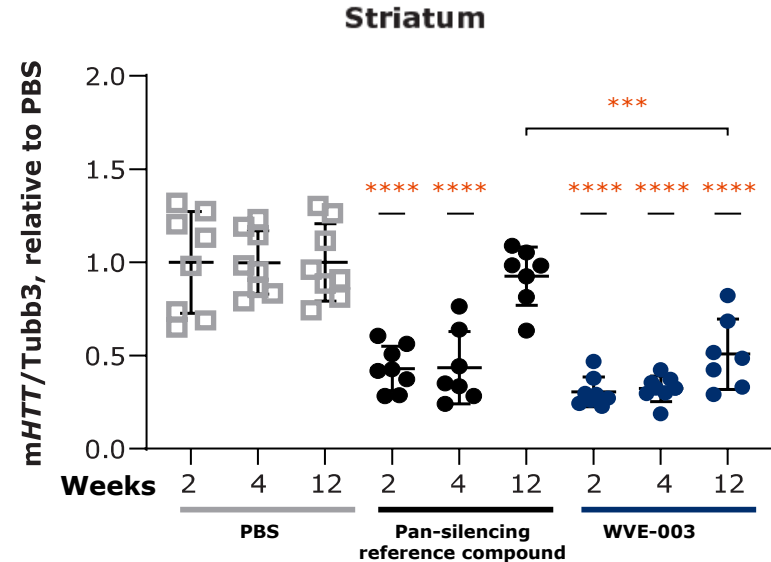
# WVE-003 demonstrates selective, potent, and durable reduction of mHTT in preclinical models

Incorporates PN backbone chemistry modifications

Selectively reduces mHTT mRNA in HD iPSC neurons in vitro



Durable striatal mHTT knockdown for 12 weeks in BACHD mouse model



# PK-PD modeling to guide dosing in clinical trial



## *Ascending dose studies*

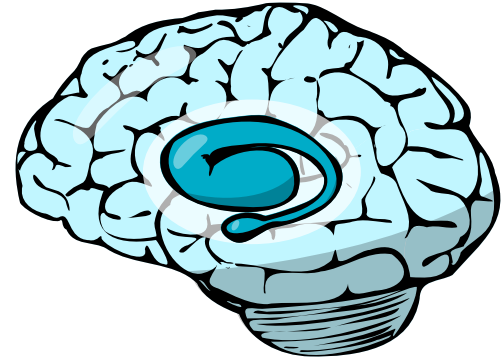
- PK & mHTT knockdown data
- IC<sub>50</sub> determination

**NHP**



Concentrations in **cortex** and **striatum** sufficient for target engagement

**Human**  
(cortex, striatum)



Anticipated mHTT knockdown in **cortex** and **striatum**



# Clinical trial incorporates adaptive design

## Adaptive SAD/MAD design

- Patients with confirmed manifest HD diagnosis with SNP3 mutation (up to 40 patients planned); Participants from PRECISION-HD trial to be offered screening for SNP3 trial
- Dose escalation and dosing interval guided by independent safety committee
- Safety and tolerability
- Biomarkers
  - mHTT
  - NfL
  - wtHTT
- Clinical trial site activation ongoing

**Dosing in Phase 1b/2a trial expected to initiate in 2021**

# WVE-004 (C9orf72) and WVE-N531 (Exon 53) clinical programs also supported by next generation chemistry

## ✓ **Oligonucleotide innovation and optimization**

- PN backbone chemistry modifications
- Interactions between sequence, chemistry and stereochemistry

## ✓ ***In vivo* models**

- Insight into PK / PD relationships
- Novel model generation

## ✓ **Leverage learnings of first generation programs**

- Translational pharmacology
- Adaptive clinical trial design



SNP3

**WVE-003**

Allele-selective silencing candidate  
in HD

C9orf72

**WVE-004**

Variant-selective silencing candidate  
in ALS and FTD

Exon 53

**WVE-N531**

Exon skipping candidate in DMD

# Expected upcoming milestones

Therapeutic Area / Target



Milestone

## NEUROLOGY

**Huntington's disease**  
mHTT SNP3



**2021:** Dosing of first patient in clinical trial of WVE-003

**ALS and FTD**  
C9orf72



**2021:** Dosing of first patient in clinical trial of WVE-004

**DMD**  
Exon 53



**2021:** Dosing of first patient in clinical trial of WVE-N531

**ADAR editing**  
Multiple



**1H 2021:** Humanized mouse model validation

## HEPATIC

**AATD (ADAR editing)**  
SERPINA1



**1H 2021:** *in vivo* AATD data



Stereopure

PN chemistry

WAVE™  
LIFE SCIENCES

Q&A



# Realizing a brighter future for people affected by genetic diseases

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