SPUR THERAPEUTICS

Toward More™

October 2024

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Toward the next generation of gene therapy

Our vision

To bring the transformative impact of genetic medicine to millions of patients around the world

Our mission

To redefine what gene therapy can do

Our approach

To optimize every component of our product candidates, improving genetic expression and targeted delivery to realize outsized clinical results

Shifting paradigm from modality as innovation toward gene therapies that set new standards of care

First-generation gene therapies
Natural serotype capsids and wild-type transgenes

Serious diseases with therapies

Focused on leveraging modality to free people from chronic therapy

Comparable outcomes to standard of care and/or safety and durability issues limit uptake

Serious diseases with no therapies

Focused on providing a disease-modifying therapy where nothing exists

Value driven by delivering life-changing clinical outcomes for patients

Next-generation of gene therapies
Optimized capsids and transgenes

Serious diseases with therapies

Focused on delivering better efficacy than SoC with acceptable safety

One-time treatment is key benefit, but value driven by delivering better clinical outcomes for patients

Serious diseases with no therapies

Focused on providing a disease-modifying therapy where none exists

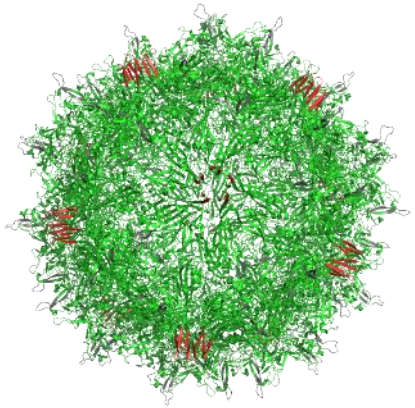
Value driven by delivering life-changing clinical outcomes for patients

Advancing the practice of genetic medicine

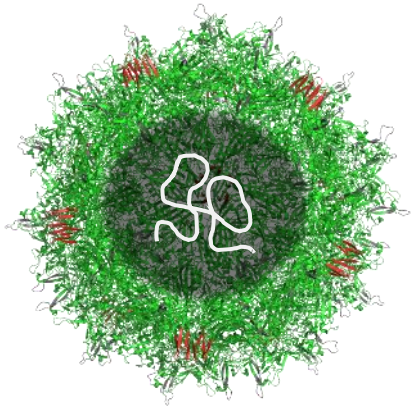
Targeting well-defined diseases

- Serious, chronic diseases
- High unmet need
- Right target with validated biology
- Consistent delivery of therapeutic protein highly likely to improve patient outcomes

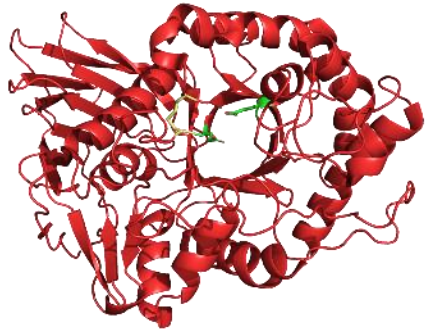
Optimizing every component of our product candidates



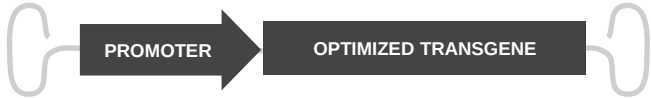
Selective Capsid
directed at
the right cells



Optimized Genome
through promoter design
and codon optimization



Engineered Therapeutic
for optimized
exposure and efficacy



Expanding our impact to more prevalent conditions

Disease Area	Program	Approximate Patient #	Research / Preclinical	Phase 1/2	Phase 3
LSDs	**Gaucher Disease Type 1** FLT201	**~18K** US, UK, EU4, Israel			
CNS	**Adrenomyeloneuropathy** SBT101	**~8K–10K** US, UK, EU4			
	GBA1 Parkinson's Disease	**~190K** US, UK, EU4			
	Lewy Body Dementia	**>1M** US			
Cardiovascular	**Severe Chronic Heart Failure Subset: HFrEF**	**10K–20K** Annually US, UK, Western Europe			

Indicates potential for expansion

LSDs = lysosomal storage diseases; CNS = central nervous system; HFrEF = heart failure with reduced ejection fraction

Estimated patient numbers for Gaucher disease Type 1 represent the total theoretical genetic prevalence of the indication. The seroprevalence of antibodies against the AAVS3 capsid renders some patients ineligible for AAVS3 gene therapy. Estimated adrenomyeloneuropathy (AMN) population from Turk et al *Int J Dev Neurosci* 2020: 80:52-72. Estimated GBA1-PD population is based on 5-15% of diagnosed PD patients, representing approximate number of patients with *GBA1* mutations. Lewy Body Dementia patient number from the Lewy Body Dementia Association. Estimated annual incidence of HFrEF based on company analysis.

Seasoned team to drive progress and execution

Michael Parini, Chief Executive Officer and Director

20+ years as a senior executive in leading biopharmaceutical companies

VERTEX · Pfizer

Pam Foulds, MD, Chief Medical Officer

20+ years of medical and clinical leadership

Auregen BioTherapeutics · Aegerion Pharmaceuticals · Biogen · genzyme

Henning Stennicke, PhD, Chief Scientific Officer

25+ years of scientific leadership experience

novo nordisk® · Sanford Burnham Prebys

Paul Schneider, Chief Financial Officer

25+ years of global financial, commercial and operational experience

EXO THERAPEUTICS · CASEBIA THERAPEUTICS · Aegerion Pharmaceuticals · Shire

Jay Bircher, Chief Technical Operations Officer

30 years of quality and technical operations experience

Abeona THERAPEUTICS · BD · gsk · AMGEN

Nicole Jones, Chief People Officer

25+ years of global human resources experience

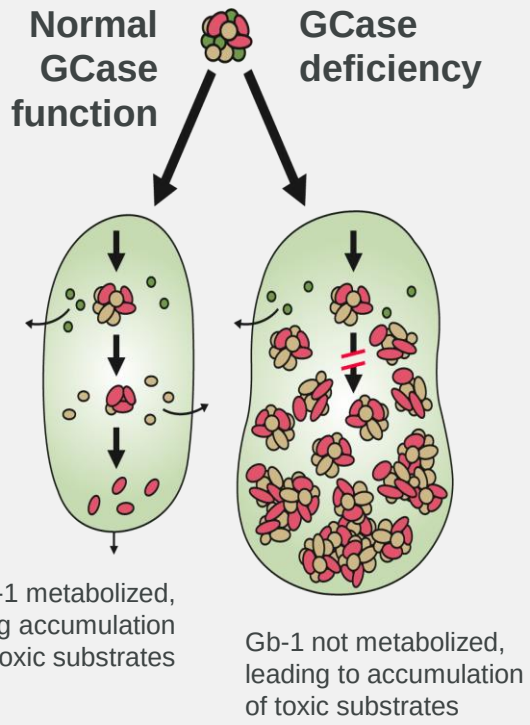
ALEXION · MERCK · Fidelity INVESTMENTS

Chip McCorkle, VP, GC & Corporate Secretary

10 years of experience advising leading biopharmaceutical companies

Toward a new standard of care

Targeting a chronic, progressive, and debilitating condition



Gaucher disease	• Mutations in *GBA* gene cause deficiency of GCase enzyme needed to metabolize Gb-1 in the lysosome, resulting in accumulation of toxic substrate lyso-Gb1 • Affects multiple organs, leading to enlarged organs, fatigue, bone pain, and lung dysfunction • Type 1 most common form of disease, affecting ~94% of Gaucher patients
High ongoing unmet need	• Many patients experience debilitating symptoms despite treatment • Physicians and patients cite fatigue and bone pain as top ongoing unmet medical needs • Approved therapies come with heavy life-long treatment burden • Significant burden and cost for patients as well as on healthcare system
Significant market opportunity	**~18K** patients in US, UK, EU4 & Israel **$2B** peak sales forecast for FLT201

GCase = glucocerebrosidase; Gb-1 = glucosylceramide; lyso-Gb1 = glucosylsphingosine

Current standard of care still means debilitating symptoms and diminished quality of life

- Short half-life of wildtype GCase limits ERT's ability to reach and penetrate deeper tissues
- Patients on biweekly ERT infusions are uncovered for most of their 2-week period

After 10+ years on ERT, up to **60%** still experience symptoms, including bone pain, lung dysfunction, enlarged organs, fatigue, and low platelet counts

enlarged liver

56%

still have severely enlarged livers †

enlarged spleen

61%

still have severely enlarged spleens †

low blood counts

43%

still have severely low platelet counts †

70%

Still have **severe bone marrow burden** after 2.5-5 years on ERT[2]

65%

report **fatigue** despite treatment with ERT/SRT[3]

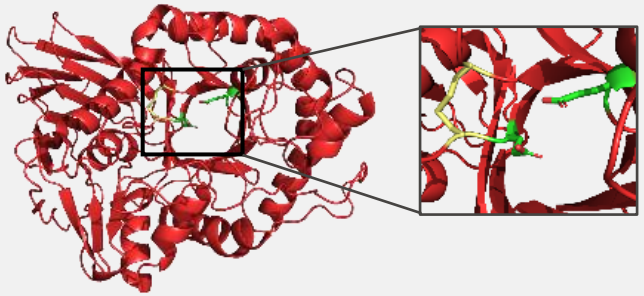
[1]Weinreb et al., † in those with these symptoms before ERT; [2]Robertson 2007; [3]Wagner 2018.

Our longer-acting GCase85 specifically designed to address the shortcomings of existing treatment

GCase85 structure

Two internal amino acid substitutions

- Does not impinge on the active site
- Minimizes 3D structural change



GCase85 dramatically increases half-life compared to wild type

	Lysosomal pH Half-life (minutes)	**Human serum** Half-life (minutes)
WT GCase	388	24
Variant 85	>8,639	143
Improvement	**>21X**	**6X**

In preclinical studies, FLT201 has shown:

- High and durable expression and favorable tolerability out past 3 years
- Uptake in all disease-affected tissues
- Greater residence time in disease-affected tissues and organs compared to ERT
- Greater reduction of lyso-Gb1, a disease-causing substrate and biomarker of response, versus ERT in all disease-affected tissues

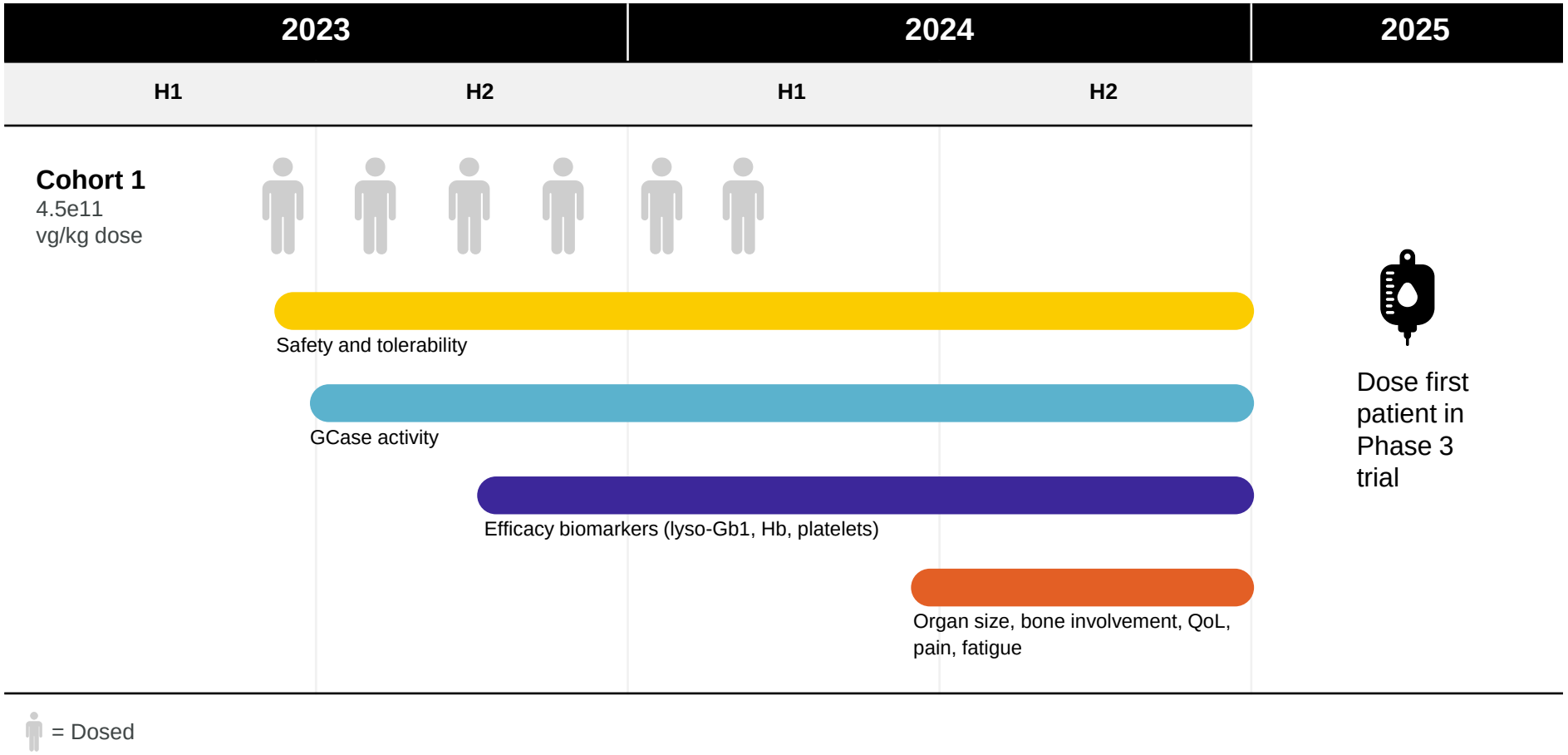
Completed dosing in Phase 1/2 dose-finding study

GALILEO-1 is a first-in-human, open-label, multicenter study of FLT201

Patient population

Adults with Gaucher Type 1 on ERT or SRT

- Patients come off prior therapy
- IM regimen begins 3 weeks post-infusion; 4 weeks of tacrolimus and 4 weeks of prednisone, followed by slow taper off prednisone
- Patients roll into long-term follow-up study



GALILEO-1 trial of FLT201: What have we learned?

Highly compelling efficacy and safety data support 4.5e11 vg/kg dose for Phase 3

Clean safety

6/6 Favorable safety and tolerability in all patients dosed

Well-defined population

- 1 patient with detectable NAbs to AAVS3 below protocol cut-off[1]
- Appears to be a non-responder; key insight informs Phase 3 trial
- Sizable Gaucher patient population of at least 50% NAb negative and available for treatment with FLT201

Compelling efficacy

5/5 Dramatic improvements in lyso-Gb1 levels in four patients with persistently high levels and maintenance of low levels in the one patient who entered trial with a well-controlled level

5/5 Improvement in bone marrow burden

5/5 Maintenance or improvement of hemoglobin and platelets

5/5 Maintenance or improvement of organ volume

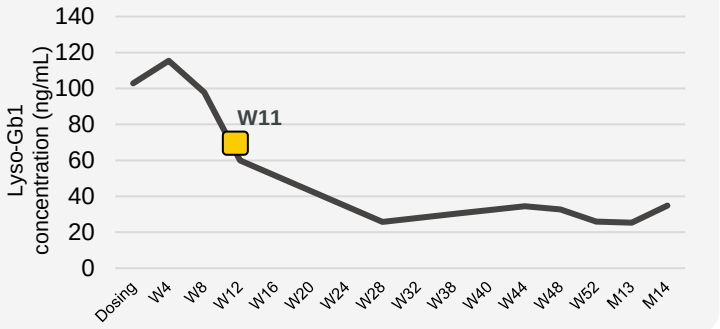
1/1 Clinically relevant improvement in patient-reported fatigue and pain in the one patient who entered trial with debilitating fatigue and pain

[1]Patient excluded from efficacy analysis.
NAbs = Neutralizing antibodies

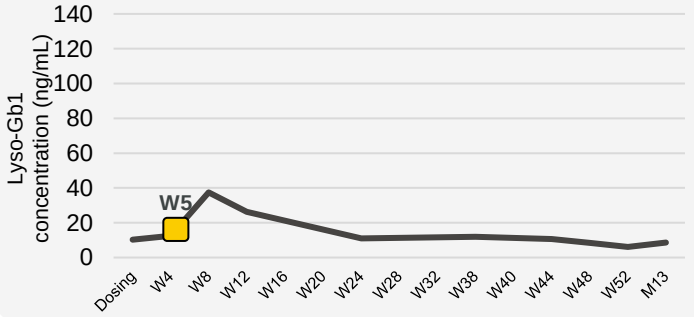
Dramatic reductions of toxic substrate in patients with persistently high levels despite prior treatment

Dried blood spot lyso-Gb1 concentration over time

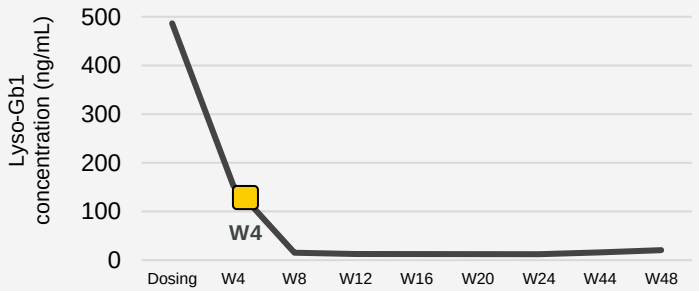
4001-1001 — **66% reduction**



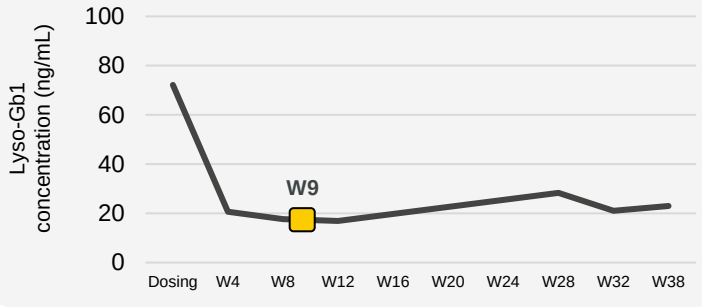
1404-1001 — **17% reduction**



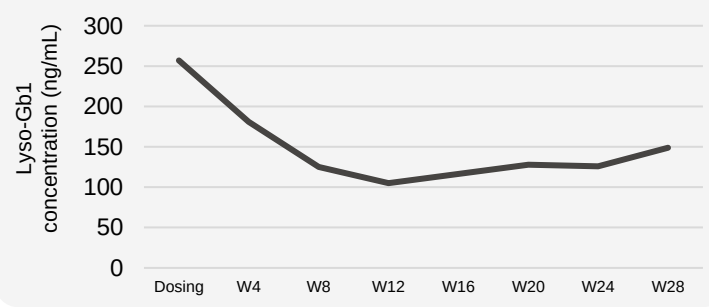
1003-1002 — **96% reduction**



2001-1006 — **68% reduction**



4001-1003 — **42% reduction**



Lyso-Gb1 is one of best predictors of disease severity and clinical response

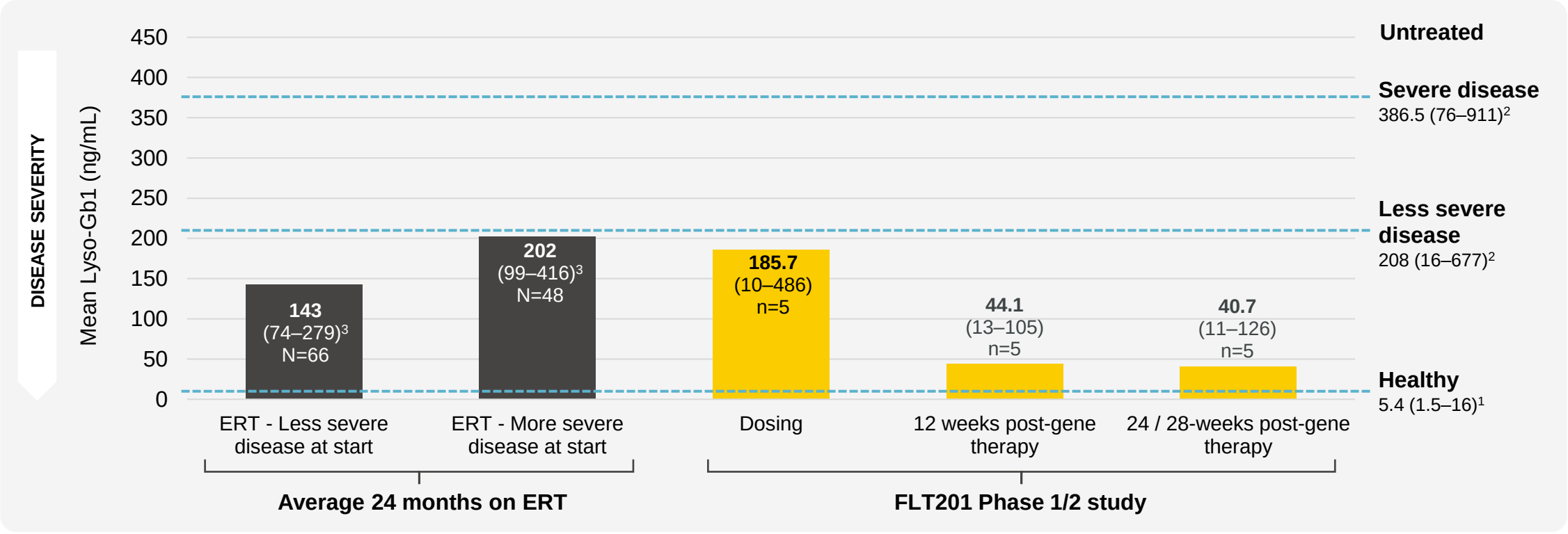
- Highly correlated with outcomes in hemoglobin, platelets, spleen and bone
- Gaucher-specific, highly sensitive

Last dose of ERT/SRT

Data cut off Sep. 27th, 2024

FLT201 reduces lyso-Gb1 to near-normal levels within three months of single infusion

FLT201 drives lyso-Gb1 lower relative to ERT



Mean DBS lyso-Gb1 concentration (range); measured in different populations at different timepoints

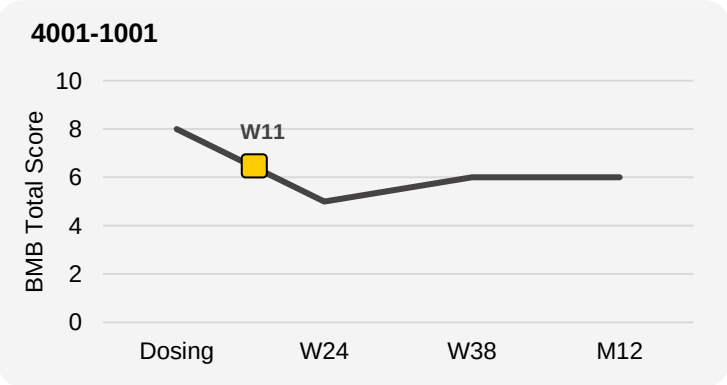
[1] Median value and range (Dinur 2022); [2] Curado 2023; [3] Dinur 2021

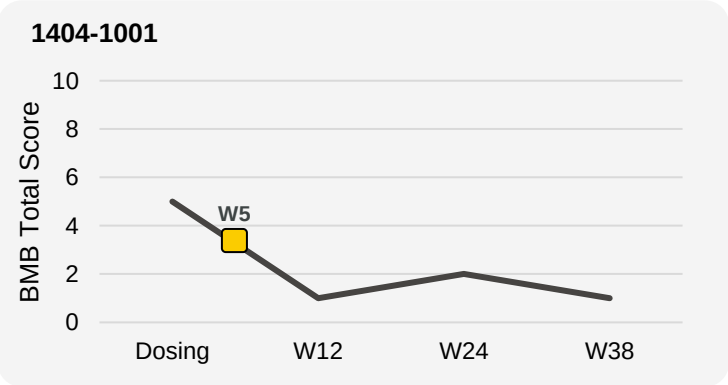
Data cut off Sep. 27th, 2024

Substantial decreases in bone marrow burden show FLT201 penetrating difficult-to-reach tissues

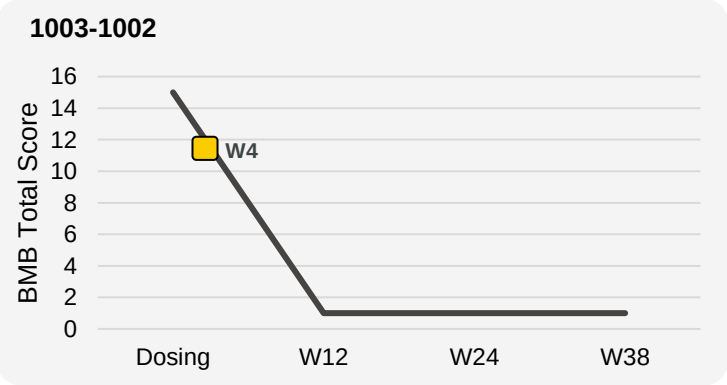
No meaningful improvement in **~80%** of those with severe BMB after 8 years on ERT[1,2]

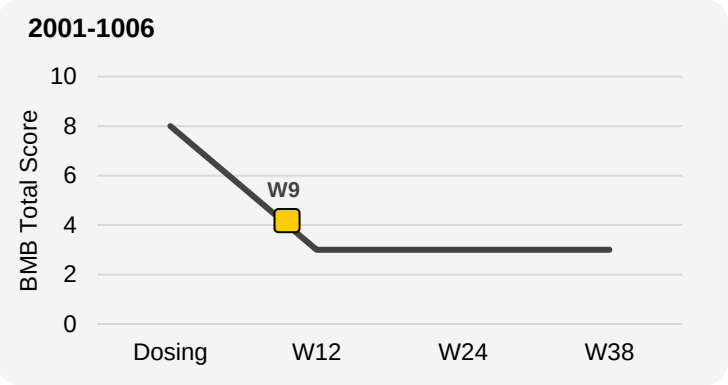
BMB score by MRI over time

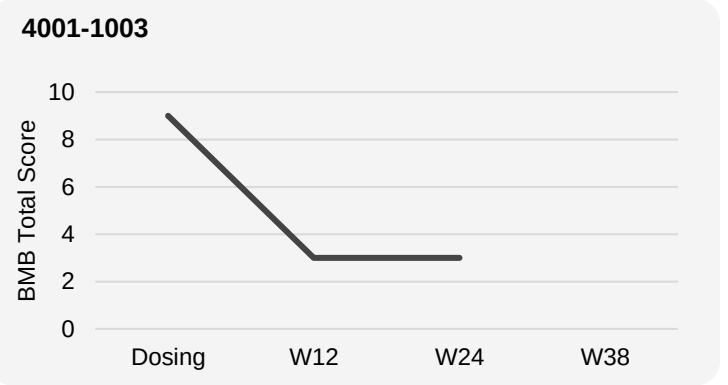




- Improvements even in patients with severe bone involvement[2]
- BMB correlated with bone cell death, fractures, bone pain and joint replacements





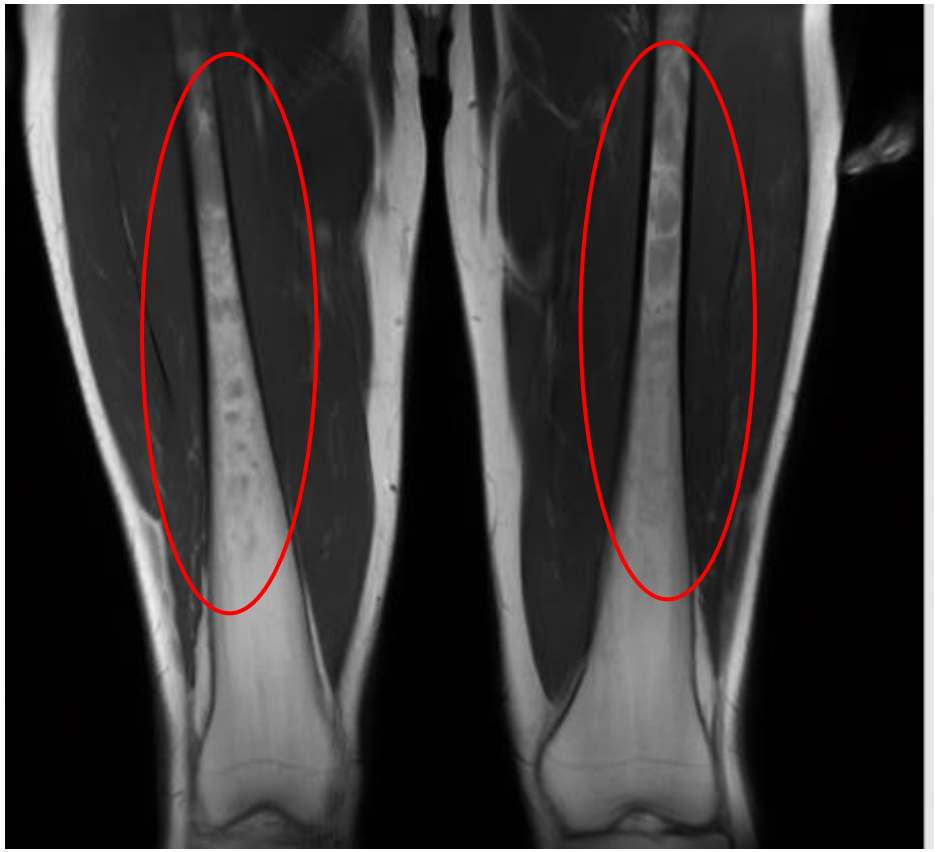


[1]Meaningful improvement defined as decrease in BMB score of at least 2 points; [2]De Fost 2006; score of 6 or higher defined as severe BMB
Data cut off Sep. 27th, 2024

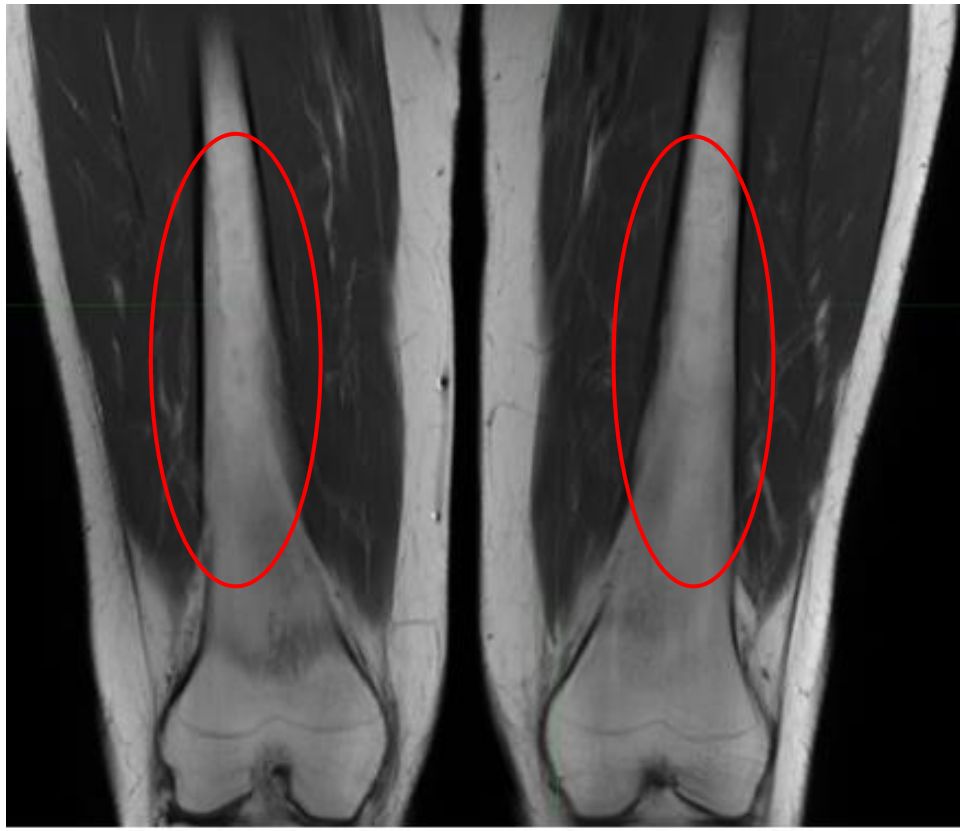
Last dose of ERT/SRT

BMB reaches near normal in patient with severe bone disease

BMB at baseline = 15



BMB at 24 weeks = 1

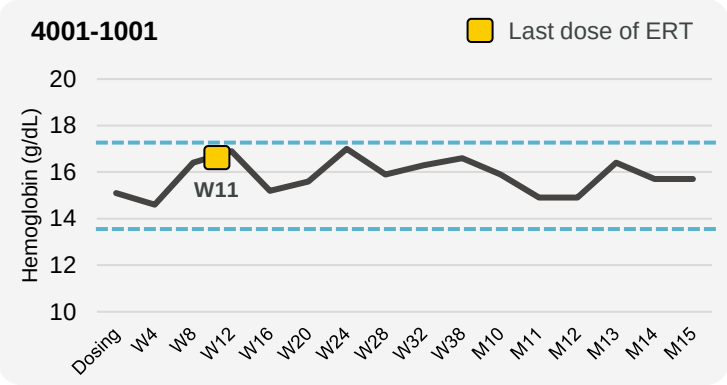


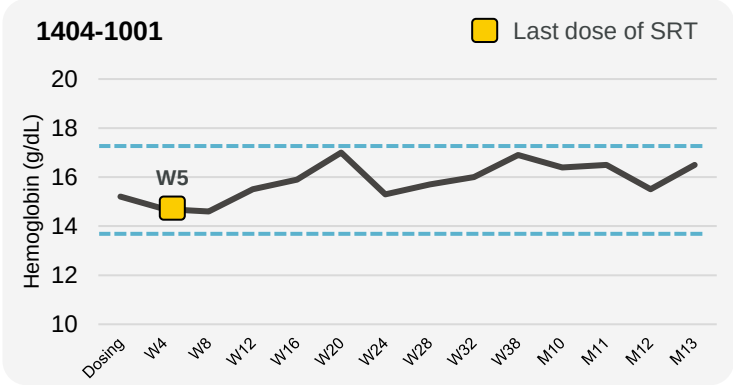
MRI shows:

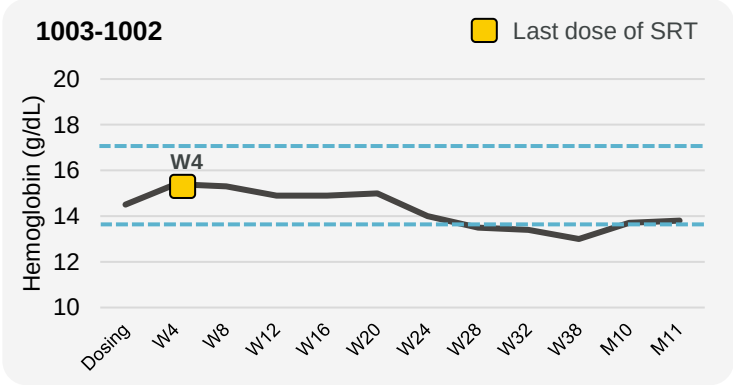
- Clearance of diseased Gaucher cells
- Reappearance of healthy fatty marrow

Sustained hemoglobin maintenance observed after withdrawal of ERT or SRT

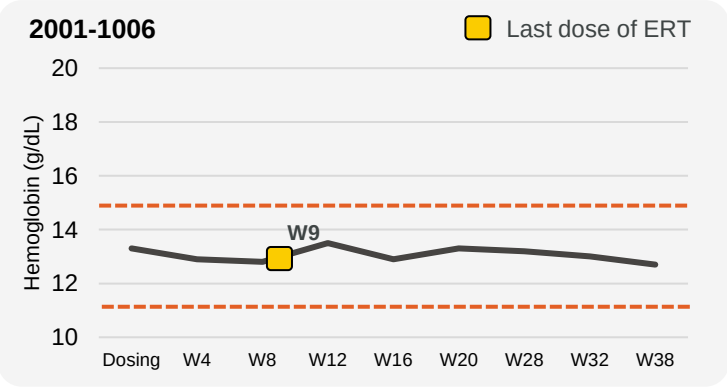
Hemoglobin concentration over time

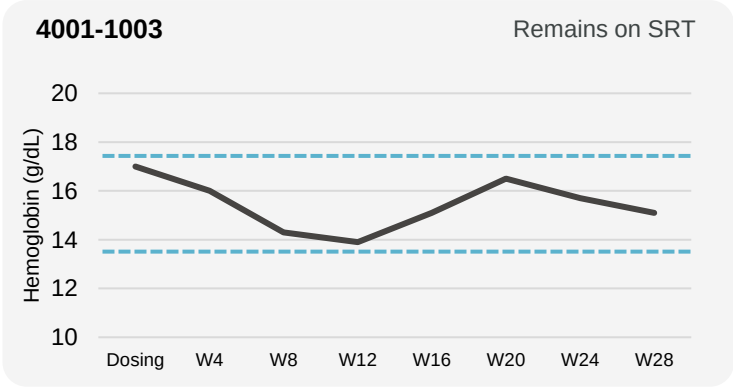






Patient recently diagnosed with iron deficiency unrelated to FLT201





Normal Hb [male] 13.8-17.2 g/dL

Normal Hb [female] 11.0-15.5 g/dL

Data cut off Sep. 27th, 2024

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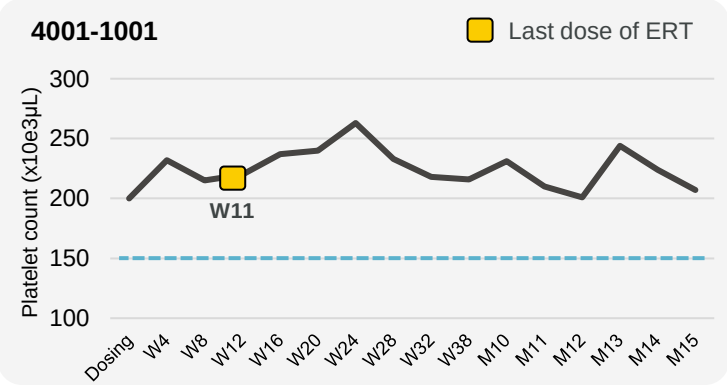
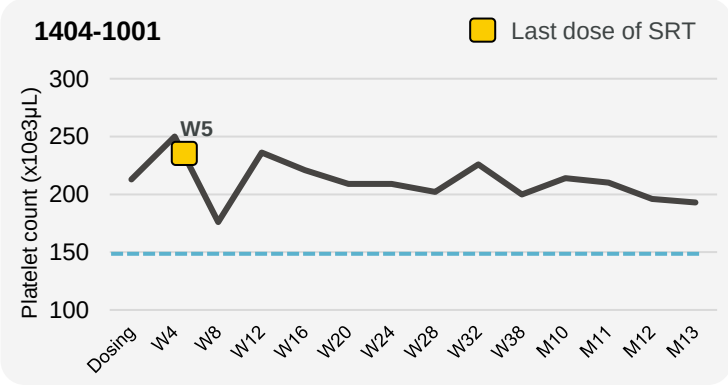
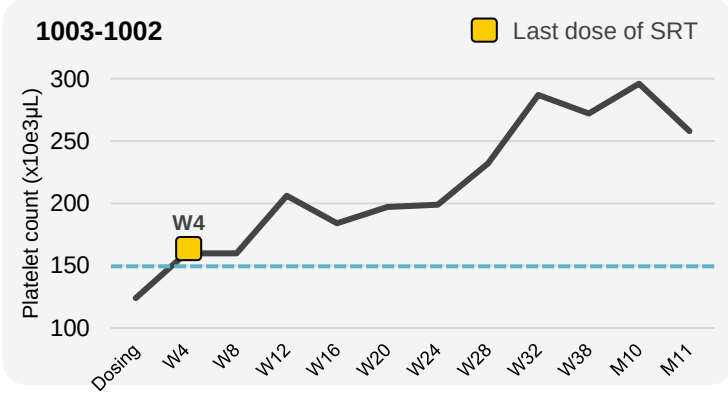
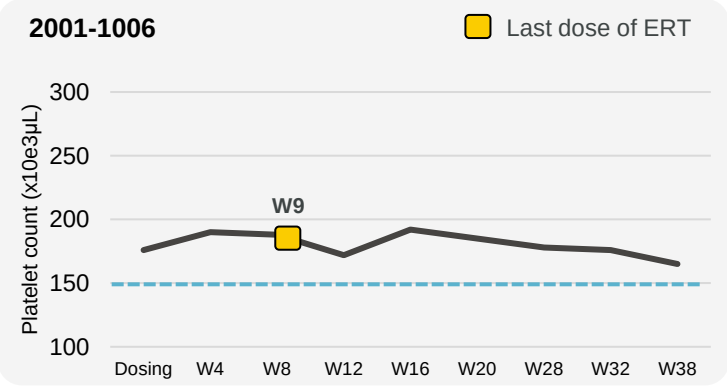
Sustained improvement or maintenance of platelets observed after withdrawal of ERT and SRT

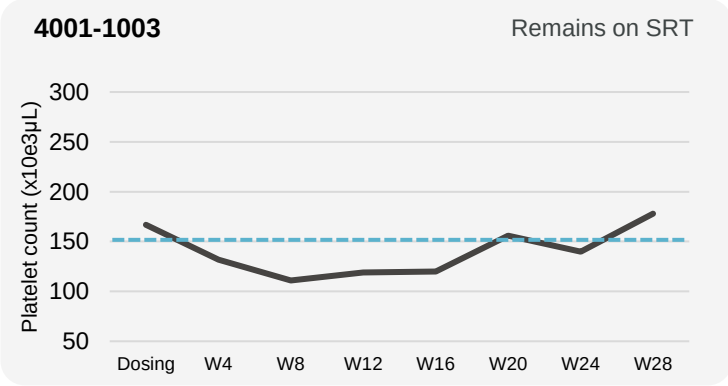
Platelet count over time











Normal platelet count 150-450 x 10^3/µL

Data cut off Sep. 27th, 2024

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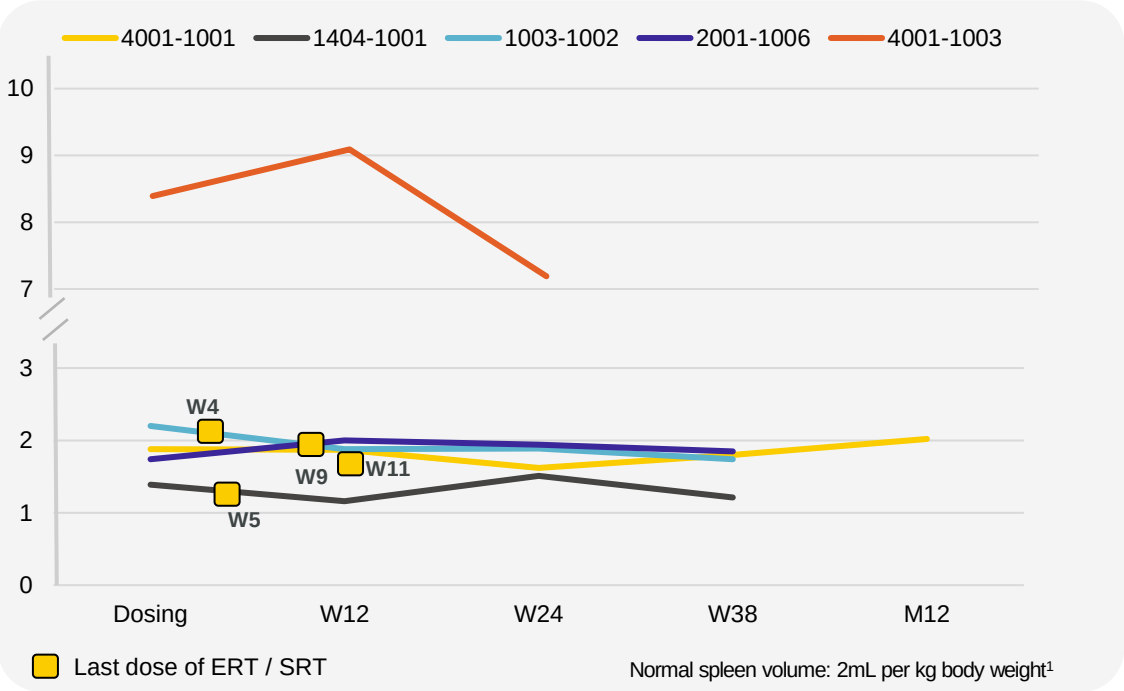
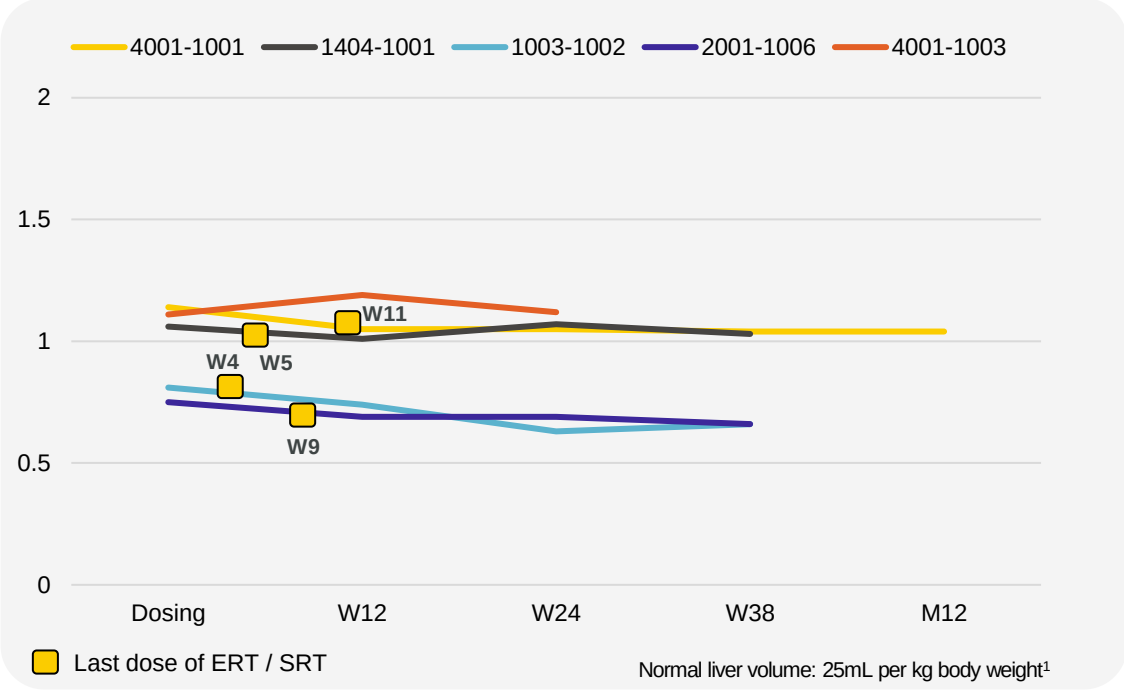
Spleen and liver volume maintenance or improvement observed after withdrawal of ERT and SRT

Spleen volume by MRI as a multiple of normal



Liver volume by MRI as a multiple of normal



[1]Pastores et al Blood Cells, Molecules and Diseases 2014;53: 253–260
Data cut off Sep. 27th, 2024

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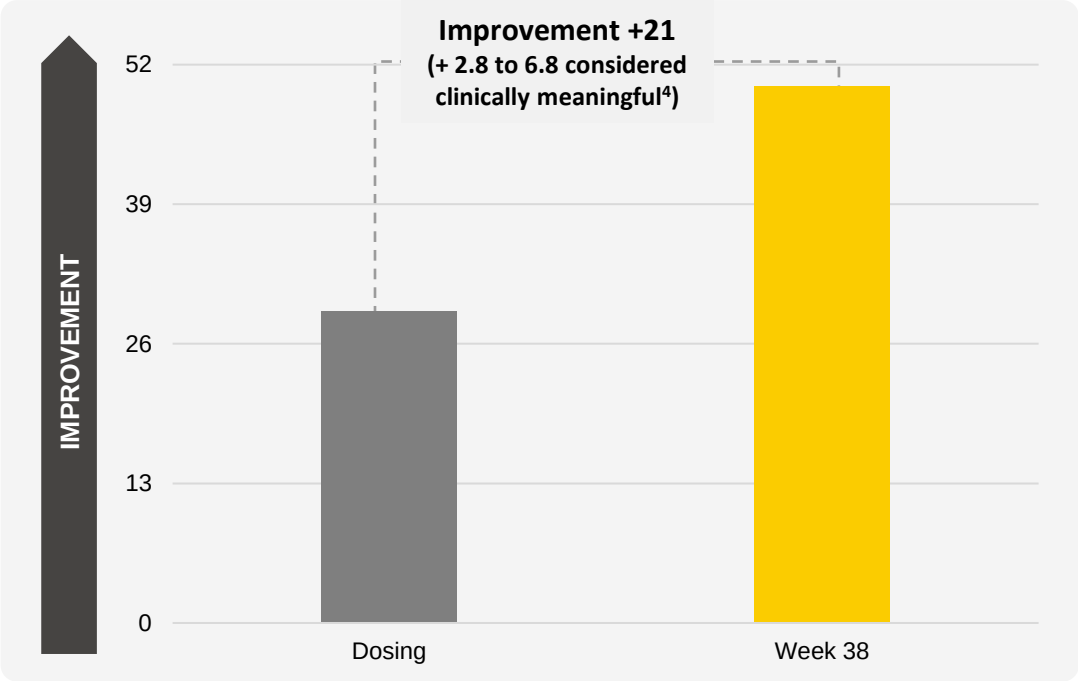
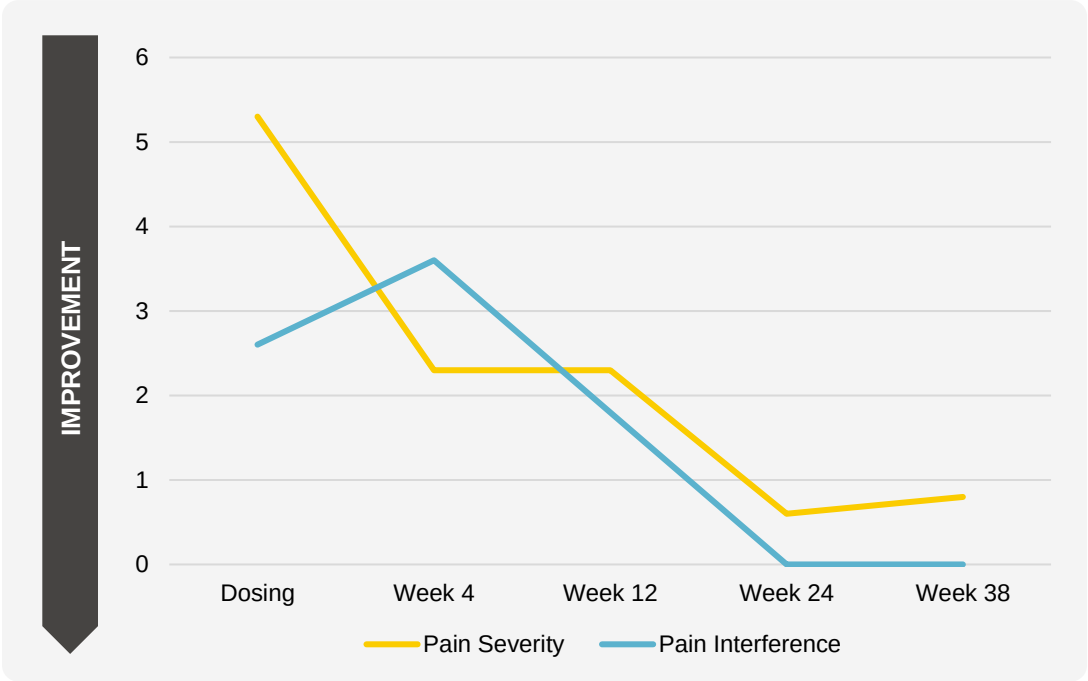
Clinically meaningful improvement in fatigue and pain leading to improved functioning

Patients ranked fatigue #1 and pain #2 as most important symptoms[1]

FACIT fatigue scale (0–52)[2]



Pain severity and interference (0-10)[3]



[1]Zion 2016; [2]FACIT = Functional Assessment of Chronic Illness Therapy; [3]Measured by Brief Pain Inventory Short Form; [4]Greenbaum 2020; clinically meaningful in cancer, lupus, HUS, RA
Data cut off Sep. 27th, 2024

FLT201 has been well tolerated, with clean safety profile to date

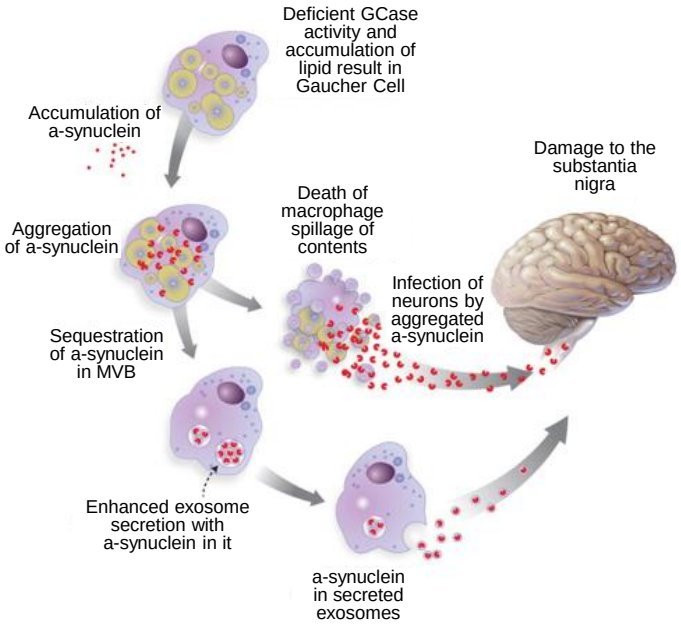
- Infusions well tolerated; no infusion-related reactions
- Treatment-related adverse events were mild to moderate
- No dose-limiting toxicities
- Any ALT elevations were mild and managed with immune therapy with no impact on efficacy
- AEs related to immune management consistent with known profile of prednisone and tacrolimus

Data cut off Sep. 27th, 2024

Toward a disease-modifying treatment

An opportunity for a best-in-class gene therapy for GBA1 Parkinson's disease

GCase deficiency leads to formation of Lewy bodies (alpha-synuclein aggregates) and death of dopaminergic neurons via multiple mechanisms

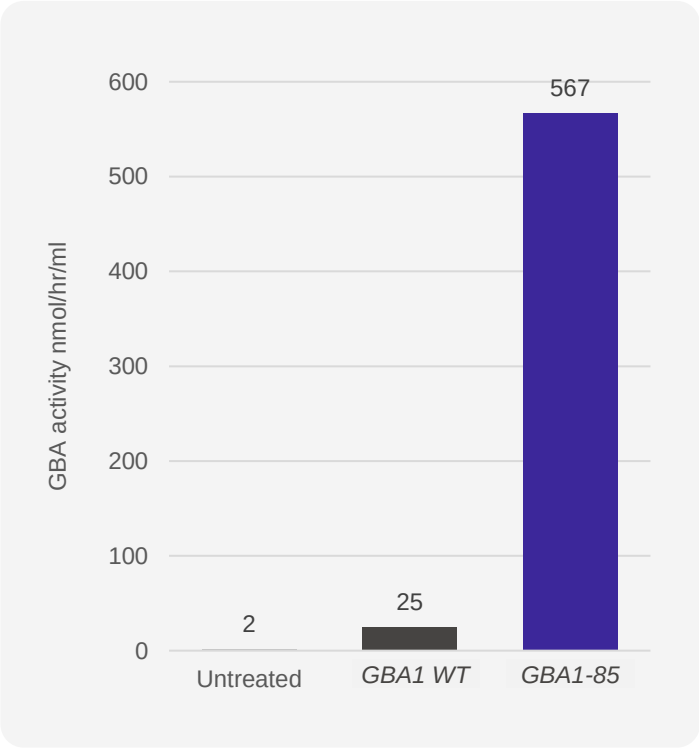


†*Cells* 2022, 11(8), 1261; https://doi.org/10.3390/cells11081261

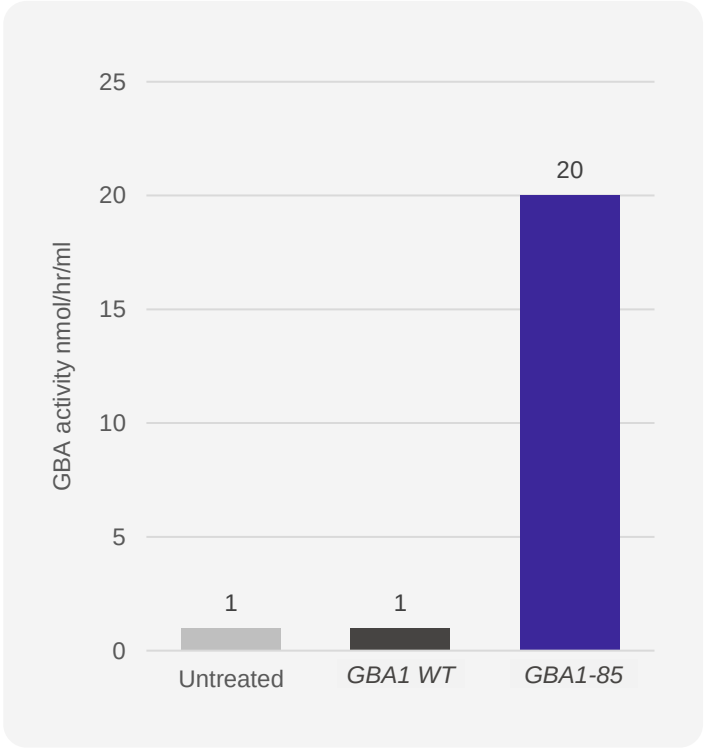
GBA1 Parkinson's disease	• *GBA* mutations are most common genetic risk factor for PD • Associated with earlier onset and more severe disease • Evidence of reduced GCase activity, even in patients without a known *GBA* mutation
High ongoing unmet need	• No disease-modifying therapies exist for PD • Symptomatic treatments become less effective over time
Substantial, well-defined patient population	**5-15%** of people with PD have *GBA1* mutations† **~190K** patients with GBA1-PD in US, UK, and EU4

GCase85 demonstrates up to 20x greater activity levels compared to wild-type GCase

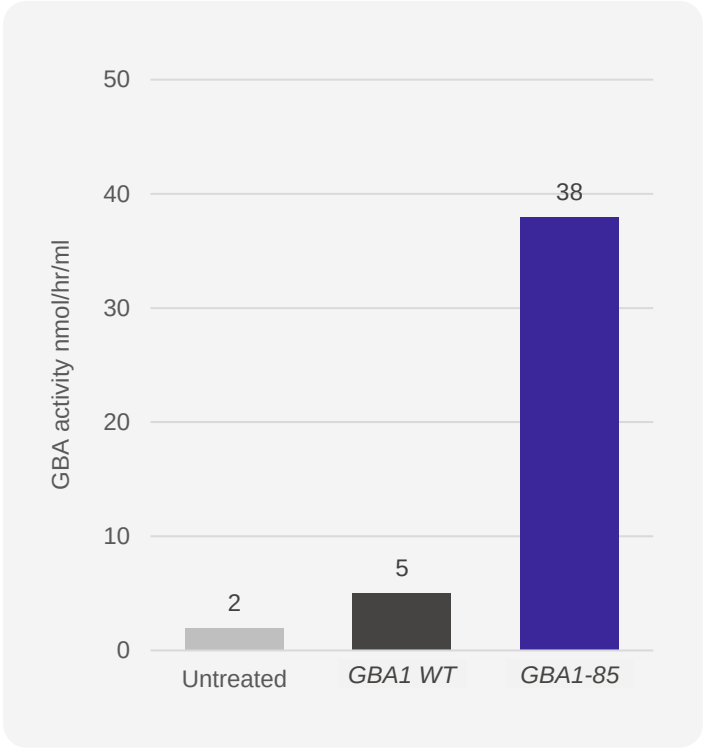
Brain epithelial cell line (H4)



Neuroblastoma cell line (NB1643)



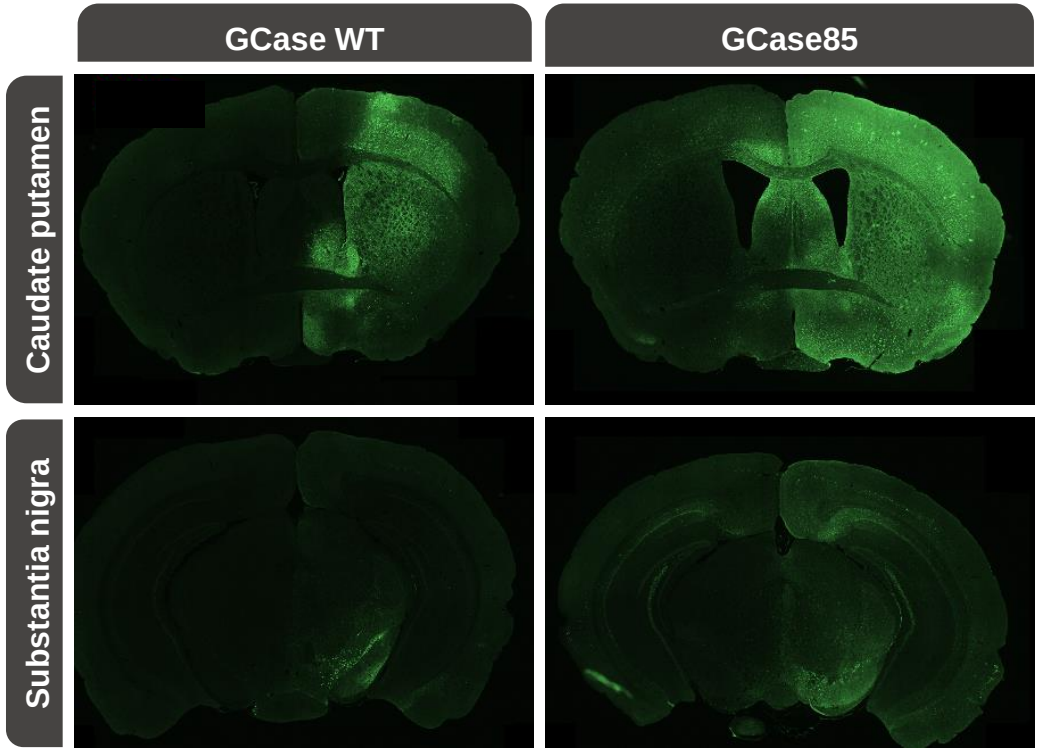
Neuronal cell line (SH-SY5Y)



AAV9 *in vitro* transduction & activity in supernatants; N=3; + SEM, t-test vs. GBA1-85
Data presented at ASGCT 2024

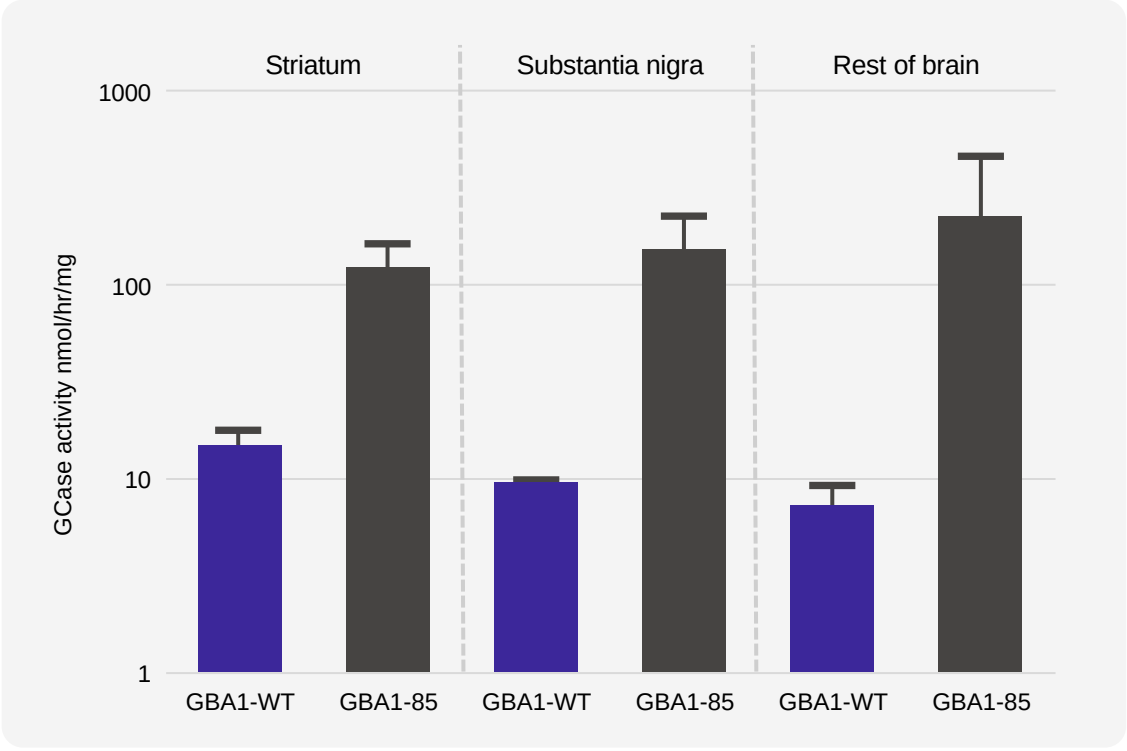
GCase85 shows greater brain distribution and higher enzyme levels than the wild type *in vivo*

GCase distribution in the brain



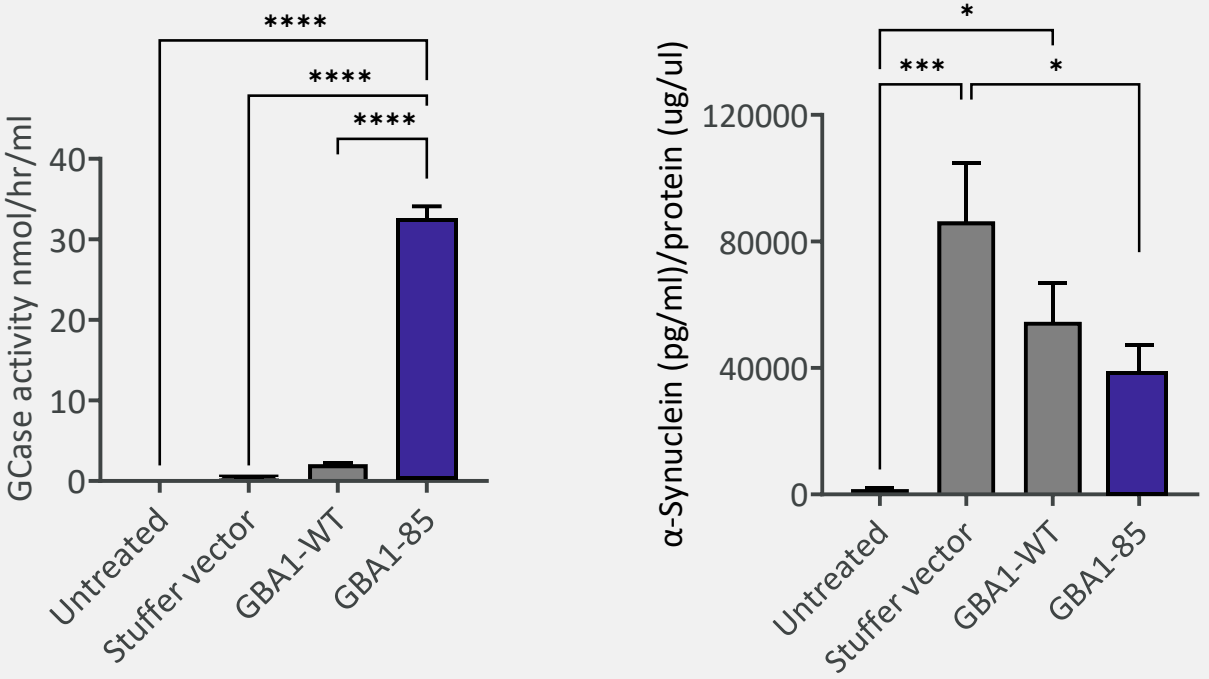
Representative coronal sections of animals injected with either AAV9-GBA1-WT or AAV9-GBA1-85 labelled for GCase, n=4. Dosed AAV9 at 1.3e10 vg per mouse by unilateral injection of the right hemisphere striatum.

GCase activity in brain regions



Injected with indicated AAVs, samples dissected from striatum, substantia nigra, or the rest of the brain. The GCase activity is normalized for VG, n=3, data denoted as mean ± SD.

GCase85 more effectively reduces α-Synuclein accumulation in neuronal cells than wildtype



GCase85 data indicates inverse correlation between GCase activity levels and α-Synuclein accumulation

SH-SY5Y cells were pre-treated with GBA gene therapy for 24h before challenging them for 24h with recombinant α-Synuclein aggregate (4ug/ml).

GCase activity in supernatant of stuffer vector (AAV9 control vector), AAV9-GBA1-WT or AAV9-GBA1-85 treated SH-SY5Y cells and α-Synuclein ELISA quantification to correlate enzyme activity and α-Synuclein clearance in the cells; n=7, data denoted as mean ± SEM. T-test analysis vs. stuffer vector; **p≤0.05, ***p<0.001, ****p<0.0001.*

Toward a first-in-class gene therapy

AMN is a devastating neurodegenerative disease with no current treatments

Adrenomyelo-neuropathy (AMN)	• Caused by mutations in single X-linked gene *ABCD1* • Default phenotype of X-ALD • Characterized by progressive muscle weakness and sensory loss, leading to loss of mobility, increased risk of falls, incontinence, and debilitating pain
High ongoing unmet need	• No approved treatments and few in development • Standard of care is symptom control with physical therapy and mobility aids • Patients become wheelchair dependent within 10-12 years of myelopathy onset
Well-defined and motivated patient population	**8-10K** Men diagnosed in US, UK, and EU4 **~28** Typical age of onset in men

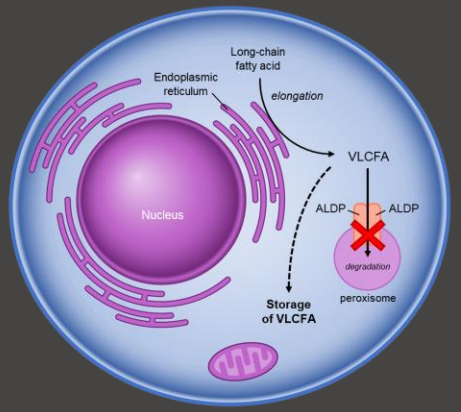
SBT101 alters underlying cause of disease in pre-clinical experiments supporting advancement to clinic

Disease mechanism of action

- Mutation in **ABCD1 gene** results in impaired peroxisomal β-oxidation and overproduction of Very Long-chain Fatty Acids (VLCFA)
- The ABCD1 gene on the X chromosome encodes the peroxisomal ALD protein.

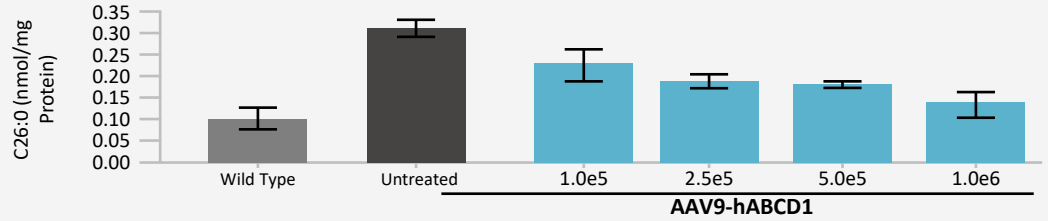
Mutation in this gene leads to:

1. Blockade of degradation of VLCFAs
2. Accumulation of VLCFA inside the cell
3. Cell stress and dysfunction
4. Disruption of the myelin/axon relationship
5. Dying back of axons



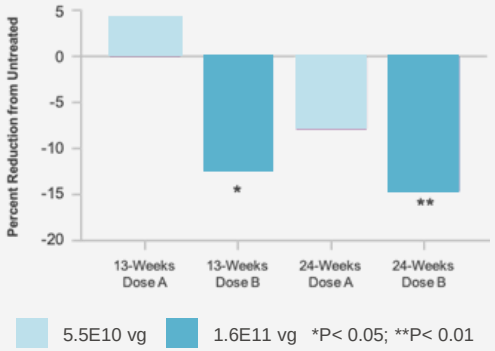
Pre-clinical proof-of-concept and safety demonstrated

AAV9-ABCD1 lowers VLCFA to wild-type levels *in vitro*



Dose-responsive ABCD1 expression and VLCFA lowering *in vivo*

Spinal cord levels

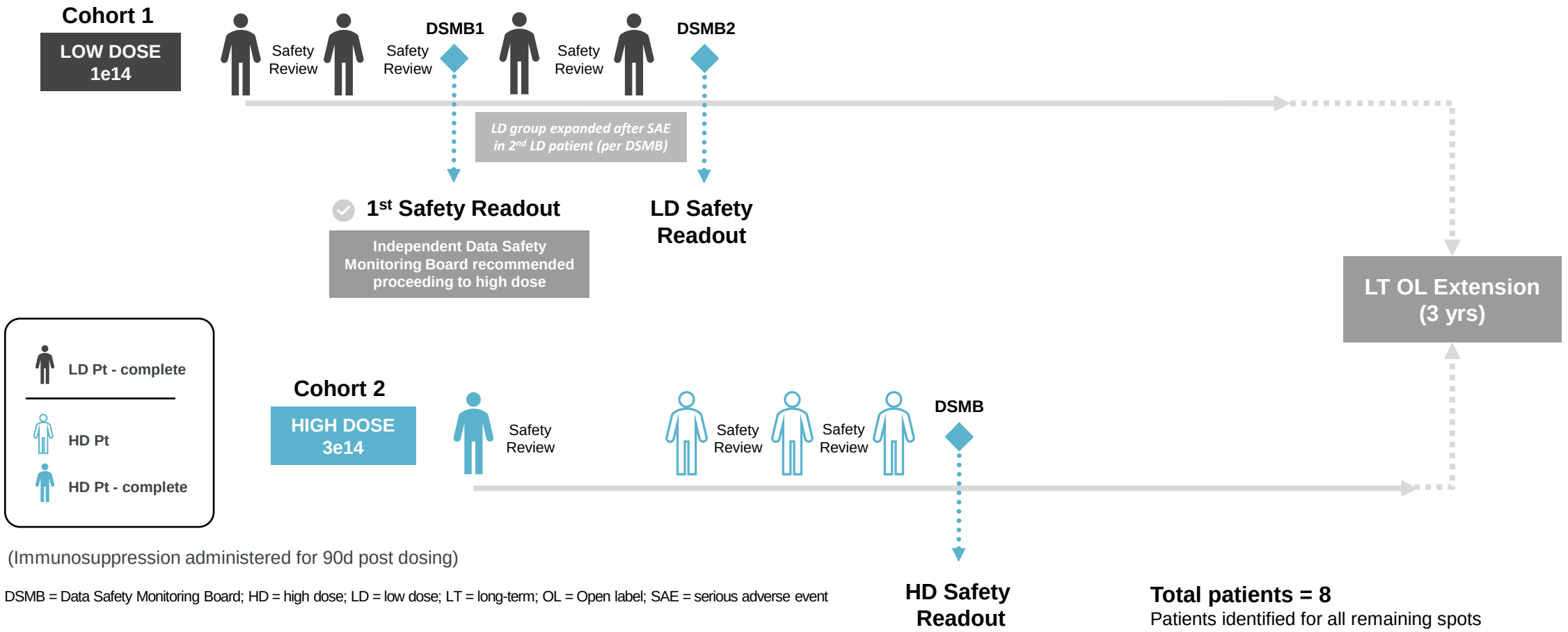


Biodistribution/safety *in vivo*

- Target biodistribution and expression (>50% neurons) achieved with delivery over 6 hours
- Distribution/expression throughout spinal cord and DRG
- Distribution persists 12M+
- Safety demonstrated through 12 months in pilot tox and GLP tox

Ongoing PROPEL Phase 1/2 trial in AMN

First-in-human, open-label study

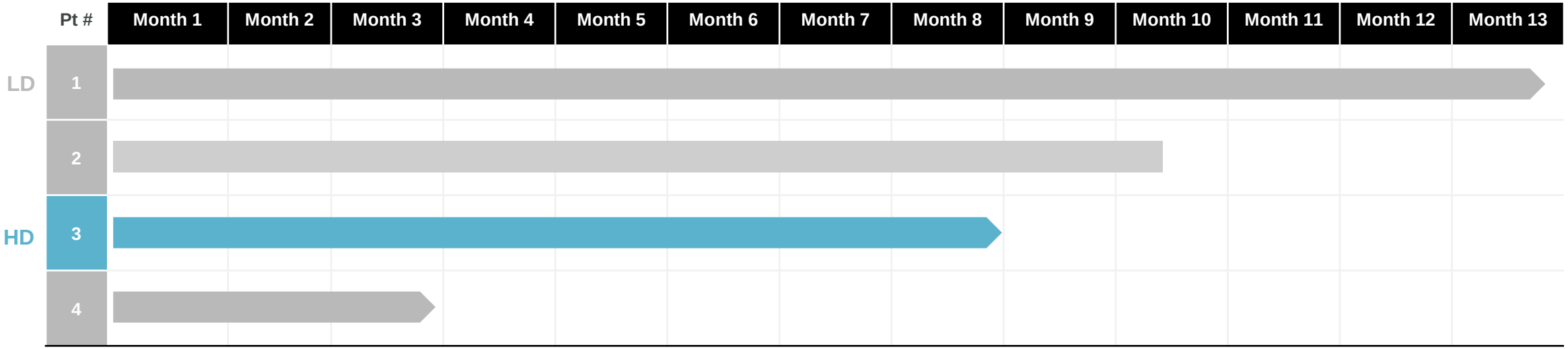


(Immunosuppression administered for 90d post dosing)

DSMB = Data Safety Monitoring Board; HD = high dose; LD = low dose; LT = long-term; OL = Open label; SAE = serious adverse event

Total patients = 8
Patients identified for all remaining spots

Preliminary safety update



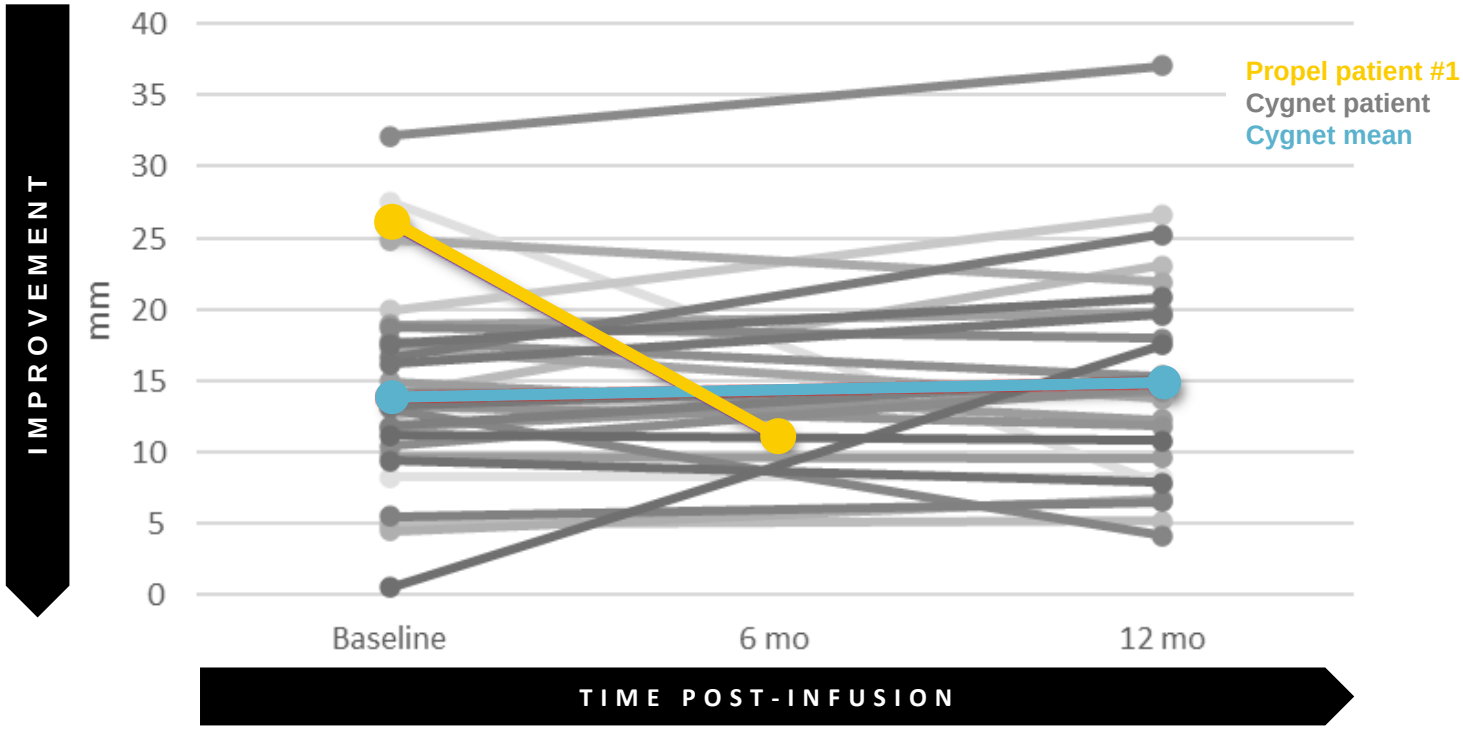
Safety

- Well tolerated in all patients
- Patient 2 died of causes unrelated to drug; no changes to trial protocol or safety monitoring per DSMB

Data cut off June 30, 2024

First patient in PROPEL trial shows improvement in body sway, an early predictor of disease progression

Sway Average Amplitude AP Eyes Closed Feet Together



- Average body sway amplitude in PROPEL patient 1 (yellow line) from baseline to month 6 versus patients in CYGNET natural history study from baseline to month 12
- Body sway is correlated to risk of falls, ability to ambulate, and is a top concern for AMN patients

N=29. Baseline assessments >50 mm excluded. Only patients with paired assessments shown
Low dose 1e14vg/pt. AP = anteroposterior; data as of January 2024

Advancing the next generation of gene therapies

A potential first- and best-in-class gene therapy for Gaucher disease backed by compelling clinical data

Extending the impact of our longer-acting GCase85 into GBA1 Parkinson's disease

A potential first-in-class gene therapy for AMN, a devastating CNS disorder with no approved treatments

Ambitious research strategy to move gene therapy into more prevalent conditions

Thank you

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