

Amicus Therapeutics Analyst Day 2019



October 10, 2019

Forward-Looking Statements

This presentation contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995 relating to preclinical and clinical development of our product candidates, the timing and reporting of results from preclinical studies and clinical trials, the prospects and timing of the potential regulatory approval of our product candidates, commercialization plans, manufacturing and supply plans, financing plans, business development plans and the projected revenues, sales, expenses and cash position for the Company. The inclusion of forwardlooking statements should not be regarded as a representation by us that any of our plans or projections will be achieved. Any or all of the forward-looking statements in this presentation may turn out to be wrong and can be affected by inaccurate assumptions we might make or by known or unknown risks and uncertainties. For example, with respect to statements regarding the goals, progress, timing, and outcomes of discussions with regulatory authorities, and in particular the potential goals, progress, timing, and results of preclinical studies and clinical trials, actual results may differ materially from those set forth in this presentation due to the risks and uncertainties inherent in our business, including, without limitation: the potential that results of clinical or preclinical studies indicate that the product candidates are unsafe or ineffective; the potential that it may be difficult to enroll patients in our clinical trials; the potential that regulatory authorities, including the FDA, EMA, and PMDA, may not grant or may delay approval for our product candidates; the potential that we may not be successful in commercializing Galafold in Europe, Japan, the US and other geographies or our other product candidates if and when approved; the potential that preclinical and clinical studies could be delayed because we identify serious side effects or other safety issues; the potential that we may not be able to manufacture or supply sufficient clinical or commercial products; and the potential that we will need additional funding to complete all of our studies and manufacturing. Further, the results of earlier preclinical studies and/or clinical trials may not be predictive of future results. With respect to statements regarding projections of the Company's revenue, sales, expenses and cash position, actual results may differ based on market factors and the Company's ability to execute its operational and budget plans and strategies. In addition, all forward-looking statements are subject to other risks detailed in our Annual Report on Form 10-K for the year ended December 31, 2018. You are cautioned not to place undue reliance on these forward-looking statements, which speak only as of the date hereof. All forward-looking statements are qualified in their entirety by this cautionary statement, and we undertake no obligation to revise or update this presentation to reflect events or circumstances after the date hereof.

Non-GAAP Financial Measures

In addition to financial information prepared in accordance with U.S. GAAP, this presentation also contains adjusted financial measures that we believe provide investors and management with supplemental information relating to operating performance and trends that facilitate comparisons between periods and with respect to projected information. These adjusted financial measures are non-GAAP measures and should be considered in addition to, but not as a substitute for, the information prepared in accordance with U.S. GAAP. We typically exclude certain GAAP items that management does not believe affect our basic operations and that do not meet the GAAP definition of unusual or non-recurring items. Other companies may define these measures in different ways. When we provide our expectation for non-GAAP operating expenses on a forward-looking basis, a reconciliation of the differences between the non-GAAP expectation and the corresponding GAAP measure generally is not available without unreasonable effort due to potentially high variability, complexity and low visibility as to the items that would be excluded from the GAAP measure in the relevant future period, such as unusual gains or losses. The variability of the excluded items may have a significant, and potentially unpredictable, impact on our future GAAP results.



Agenda

8:30 a.m. – 8:35 a.m.	WELCOME & INTRODUCTIONS	Sara Pellegrino, Vice President, Investor Relations
8:35 a.m. – 8:45 a.m.	VISION, MISSION AND STRATEGY	John F. Crowley, Chairman and Chief Executive Officer
8:45 a.m. – 9:00 a.m.	FINANCIAL AND OPERATIONAL STRATEGY	Daphne Quimi, Chief Financial Officer
0.45 a.m. – 9.00 a.m.	FINANCIAL AND OPERATIONAL STRATEGY	Bradley Campbell, President and Chief Operating Officer
		Bradley Campbell, President and Chief Operating Officer
9:00 a.m. – 9:30 a.m.	GALAFOLD: ROADMAP TO \$1B IN SALES AND PATIENT PERSPECTIVES	Simon Jordan, SVP, Head of International
		Mike Keavany, SVP, Head of US
9:30 a.m. – 9:50 a.m.	AT-GAA – POTENTIAL TO SHIFT THE TREATMENT PARADIGM IN POMPE DISEASE	Jayne Gershkowitz, Chief Patient Advocate with Alex Dencker and Sabina Kineen
		Jay Barth, M.D., Chief Medical Officer
		John F. Crowley, Chairman and Chief Executive Officer
9:50 a.m 10:00 a.m.	Q&A SESSION	
10:00 a.m 10:10 a.m.	BREAK	
10:10 a.m. – 10:50 a.m.	NEXT GENERATION GENE THERAPY PLATFORM &	Hung Do, Ph.D., Chief Science Officer
		Jeff Castelli, Ph.D., Chief Portfolio Officer and Head of Gene Therapy
	RESEARCH PROGRAM	Jim Wilson, M.D., Ph.D., Rose H Weiss Professor and Director, Orphan Disease Center, Perelman School of Medicine at the University of Pennsylvania
10:50 a.m. – 11:00 a.m.	Q&A SESSION	
11:00 a.m. – 11:30 a.m.	BATTEN DISEASE GENE THERAPY PORTFOLIO AND PATIENT PERSPECTIVES	Jill Weimer, Ph.D., SVP of Discovery Research & Gene Therapy Science
		Jayne Gershkowitz, Chief Patient Advocate with the Kahn Family
		Jeff Castelli, Ph.D., Chief Portfolio Officer and Head of Gene Therapy
11:30 a.m. – 11:50 a.m.	CLOSING REMARKS	John F. Crowley, Chairman and Chief Executive Officer
11:50 a.m. – 12:00 p.m.	Q&A SESSION	Therapeutics



Vision, Mission & Strategy

John F. Crowley

Chairman and Chief Executive Officer

2019 Analyst Day | October 10, 2019 | New York, NY

A RARE COMPANY

A leading fully-integrated, global rare disease biotechnology company

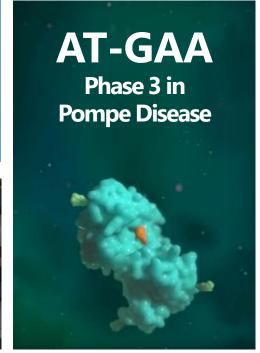


First Oral Precision Medicine for Fabry Disease



EMPLOYEES in 27 Countries

~\$575M Cash as of 6/30/19 Two Clinical-Stage Gene Therapies





GLOBAL COMMERCIAL ORGANIZATION World Class
BIOLOGICS
Capabilities



Robust R&D Engine

Nearly 50+ Lysosomal Disorders and More Prevalent Rare Diseases

A RARE OPPORTUNITY

A broad and patient focused portfolio to drive value creation

Galafold
\$1B+
Opportunity

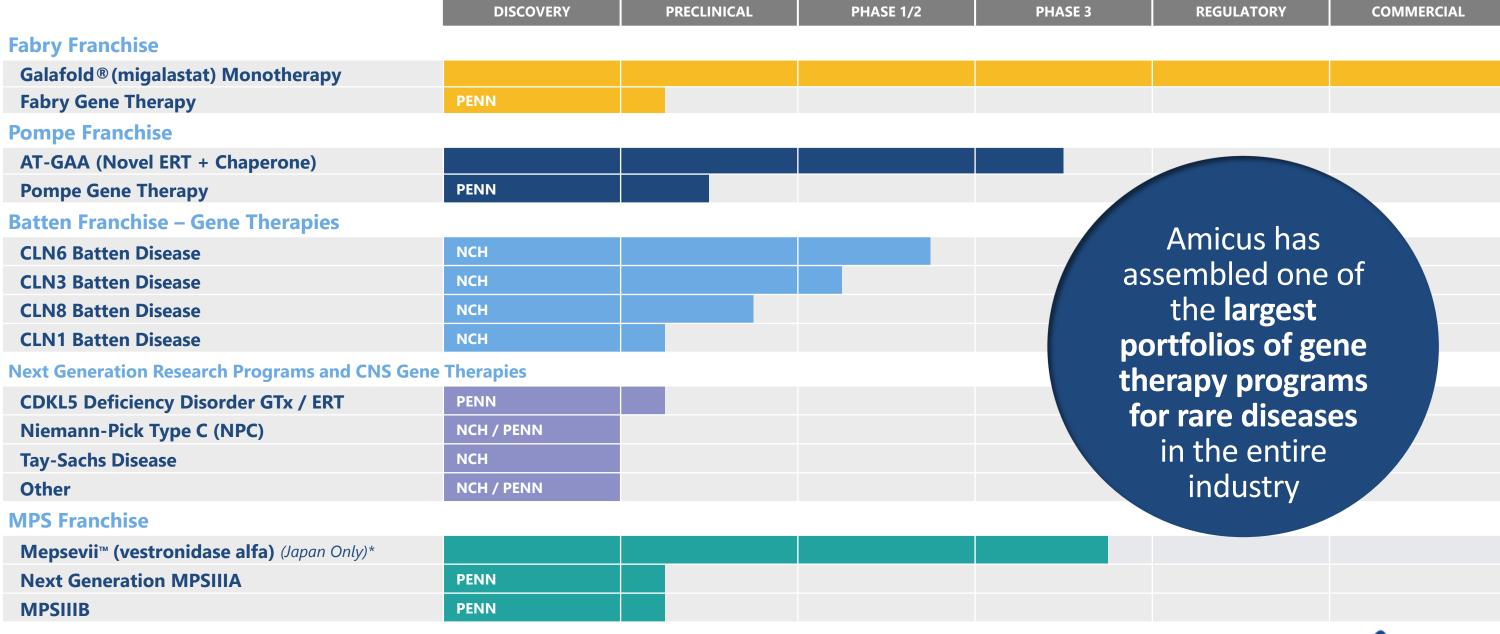
Pompe
ERT
\$1B-2B+
Opportunity

Gene
Therapy
Portfolio
\$1B+
Opportunity

Opportunity

Transform the Lives of Thousands of Patients

A RARE PORTFOLIO

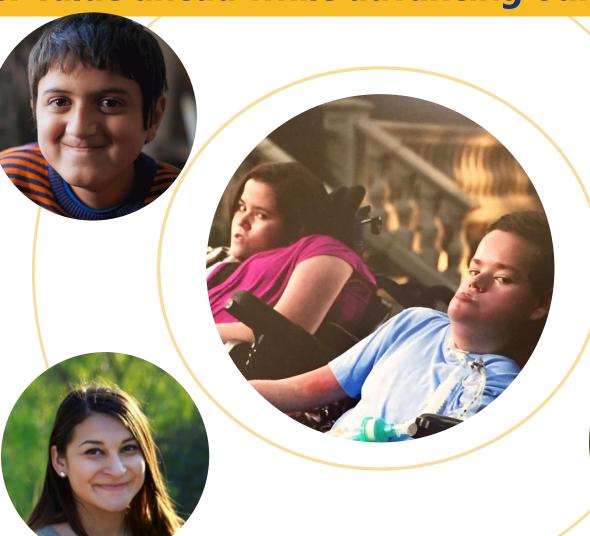




Our Passion for Making a Difference Unites Us

Amicus is now at a major inflection point and positioned to create significant shareholder value ahead while advancing our mission for patients













What's New at Amicus Analyst Day 2019

- ☐ Galafold Q3 Preliminary Revenue and Upwardly Revised 2019 Guidance
- ☐ Galafold Patient Number Update
- Updated Cash Runway Guidance and Path to Profitability
- ☐ Pompe Natural History Published Literature Comparison to AT-GAA
- ☐ Propel Study Enrollment Update
- Data and Path Forward For Amicus/Penn Pompe Gene Therapy
- ☐ Initial Preclinical Fabry Gene Therapy Results
- Additional Data from CLN6 Batten study, including Matched Natural History



Key Takeaways from Amicus Analyst Day 2019

Today's Analyst Day highlights our recent success and outlook across our science, clinical, regulatory and commercial efforts



Galafold Continues
Strong Launch
Performance &
Cornerstone of
Amicus Success



Amicus Financial Outlook Strengthened with Current Cash Revised Now to 1H2022



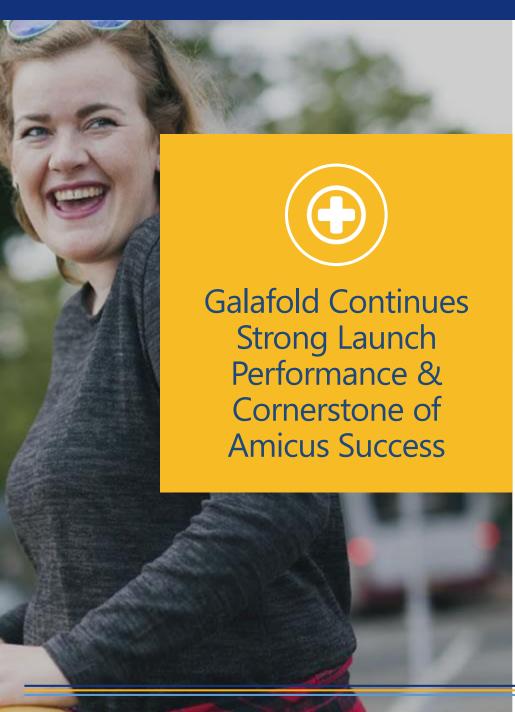
AT-GAA for Pompe Advances Toward Approval as "Crown Jewel" of Amicus Portfolio



Portfolio of Gene Therapy Programs and Technologies Provides Foundation for Future



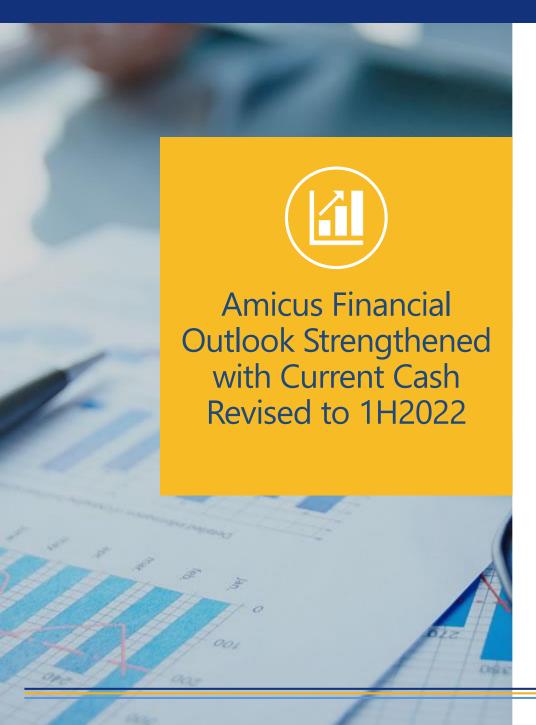
Galafold: Key Takeaways from Amicus Analyst Day 2019



- Preliminary unaudited 3Q19 Galafold revenue of \$48.0M+ exceeds expectations
- Achieved 1,000+ net global Galafold patients by end of Q3
- FY19 Galafold guidance upwardly revised to \$170M-\$180M range
- On clear path to \$500M+ in 2023 revenue and \$1B+ peak



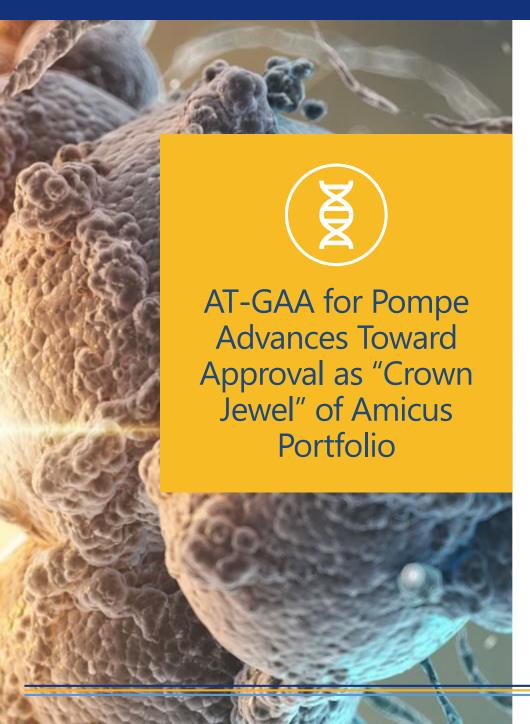
Financial Outlook: Key Takeaways from Amicus Analyst Day 2019



- Company now fully funded through major milestones in portfolio and continued global growth
- Cumulative Galafold projected revenues of \$1B+ in 2020-2022 offset significant majority of company spend/investments
- Achieved through OpEx savings, CapEx phasing, program prioritization and increased Galafold revenue projections
- Under current operating plan, 2019 is peak year for non-GAAP operating expense on path to profitability
- No material business development planned or needed in next several years
- Only modest additional capital required to extend runway into profitability with multiple non-equity sources available as/when needed



AT-GAA: Key Takeaways from Amicus Analyst Day 2019



- PROPEL pivotal study 80%+ enrolled and expected now to over-enroll (~120 Patients) by YE 2019
- Pediatric study underway
- Manufacturing PPQ runs at WuXi biologics on track to start this month
- New phase 2 data and natural history published literature comparison continue to support potential to become Pompe standard of care
- Peak revenue potential of \$1B-\$2B, with exclusivity well into 2030s



Gene Therapy: Key Takeaways from Amicus Analyst Day 2019



- CLN6 data shows profound impact as compared to natural history now matched for age and baseline. Potential to become first ever approved gene therapy for fatal brain disease in children
- CLN3 additional patients to be dosed and AAV intrathecal platform increasingly gives confidence in CLN3 program (largest cause of childhood neurodegeneration, 5,000+ children)
- Penn Collaboration is R&D engine, with rights to 50+ diseases
- 8 preclinical gene therapies in development and one clinical candidate now generated (Pompe)





Financial & Operational Strategy

Daphne Quimi, Chief Financial Officer
Bradley Campbell, President and Chief Operating Officer

2019 Analyst Day | October 10, 2019 | New York, NY

A RARE COMPANY

Our strategy continues to be "Go it Alone" because we believe it is the best way to deliver our medicines to patients and maximize long term shareholder value



First Oral Precision Medicine for Fabry Disease



EMPLOYEES in 27 Countries

~\$575M Cash as of 6/30/19 Two Clinical-Stage Gene Therapies





GLOBAL COMMERCIAL ORGANIZATION World Class
BIOLOGICS
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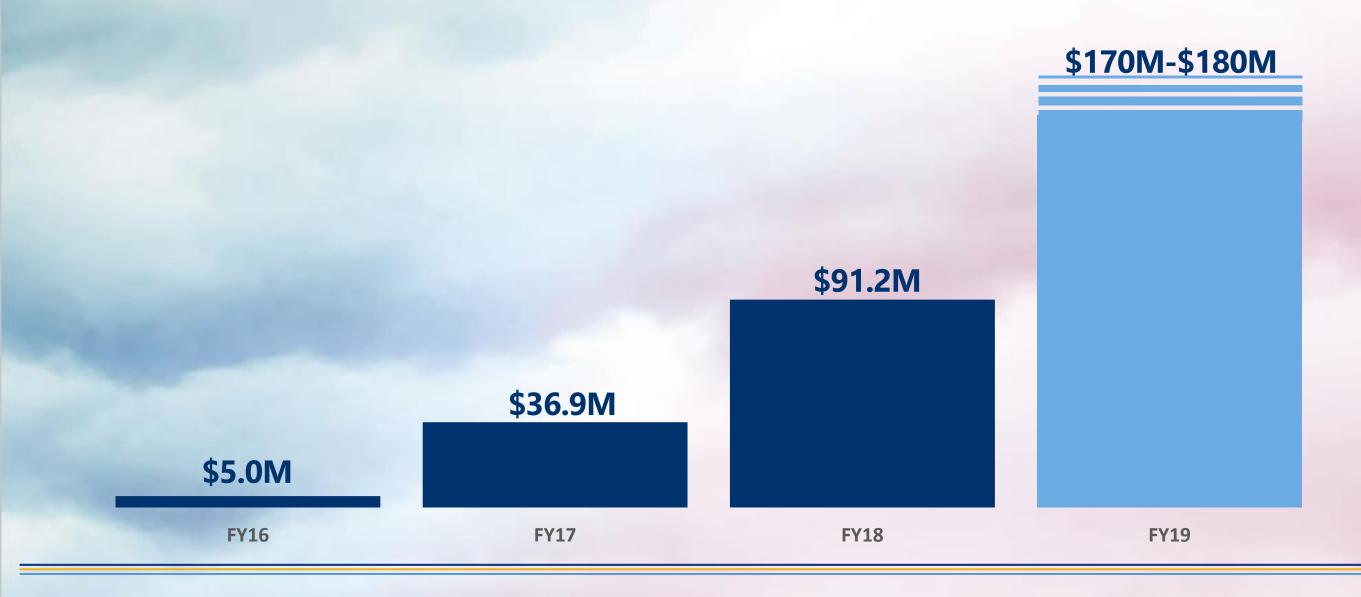


Robust R&D Engine

Nearly 50+ Lysosomal Disorders and More Prevalent Rare Diseases

Galafold Success and FY19 Galafold Revenue Guidance

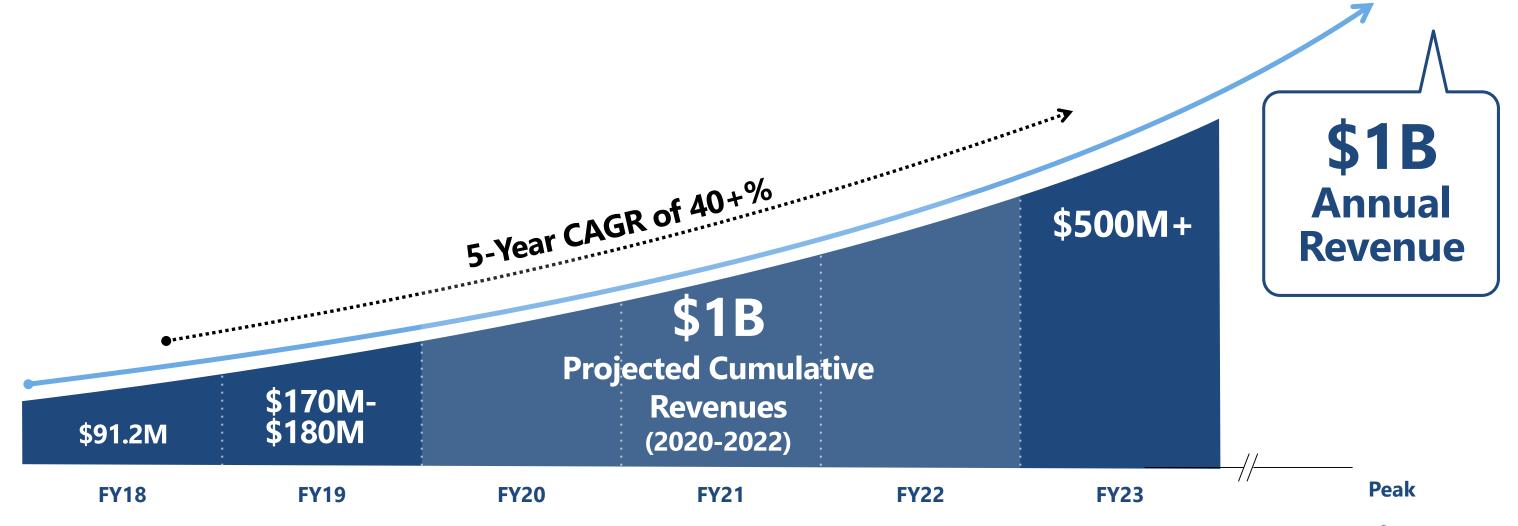
Strong Q3 performance of ~\$48M+ (preliminary/unaudited) gives confidence in upwardly revised guidance of \$170-\$180M. We expect to fall in the midpoint of this revised guidance, inclusive of FX





Galafold Growth Trajectory

Galafold is on track to generate \$1B+ in projected cumulative revenues from 2020-2022 and is on an anticipated path to \$500M+ in annual sales in 2023 and \$1B+ annual sales at peak





Building the Foundation: 2016-2018

Amicus has invested substantially over the past several years to build world class global commercial capabilities and to develop/advance AT-GAA for Pompe

SG&A: Global Commercialization

- ☑ Established 200+ person team
- ☑ Strong access and reimbursement expertise
- ✓ Presence in 27 countries, 5 continents
- ☑ Cover most major global metabolic centers
- ☑ Experienced team to support entire Amicus portfolio

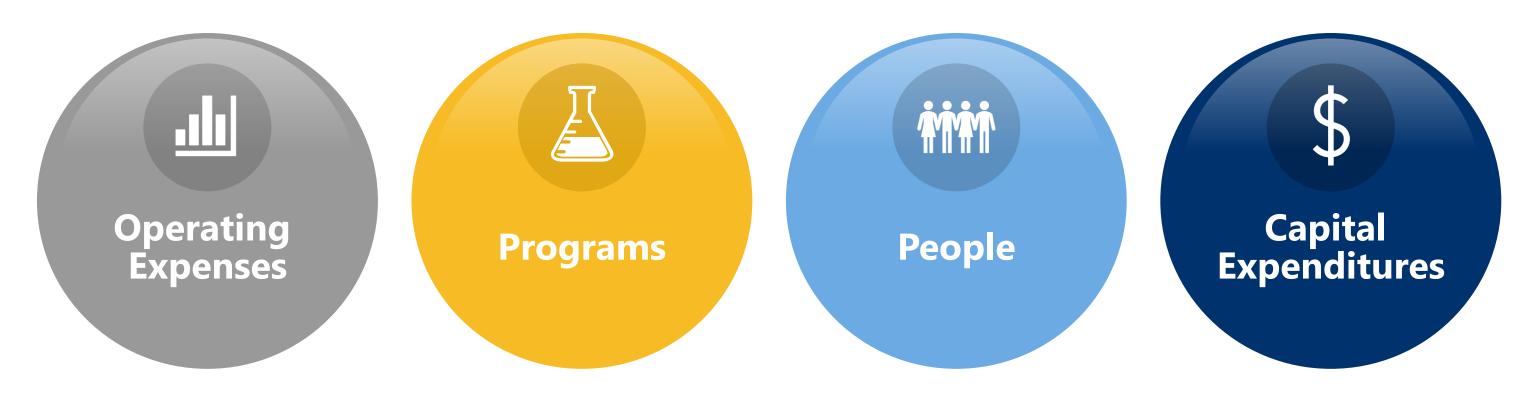
R&D: Develop/Advance AT-GAA

- ☑ Conducted multicenter global Phase 1/2 studies
- ✓ Largest pivotal study ever in lysosomal disorders (PROPEL)
- Advance manufacturing to commercial scale and quality
- ☑ Begin early commercial inventory build



Extension of Cash Runway to Well into 1H2022

Completion of strategic business review and strategy has driven efficiencies and cost savings while advancing all key programs forward





Non-GAAP Operating Expense Guidance

With these major investments in SG&A and R&D poised to yield results, 2019 is peak year for non-GAAP operating expense on path to profitability

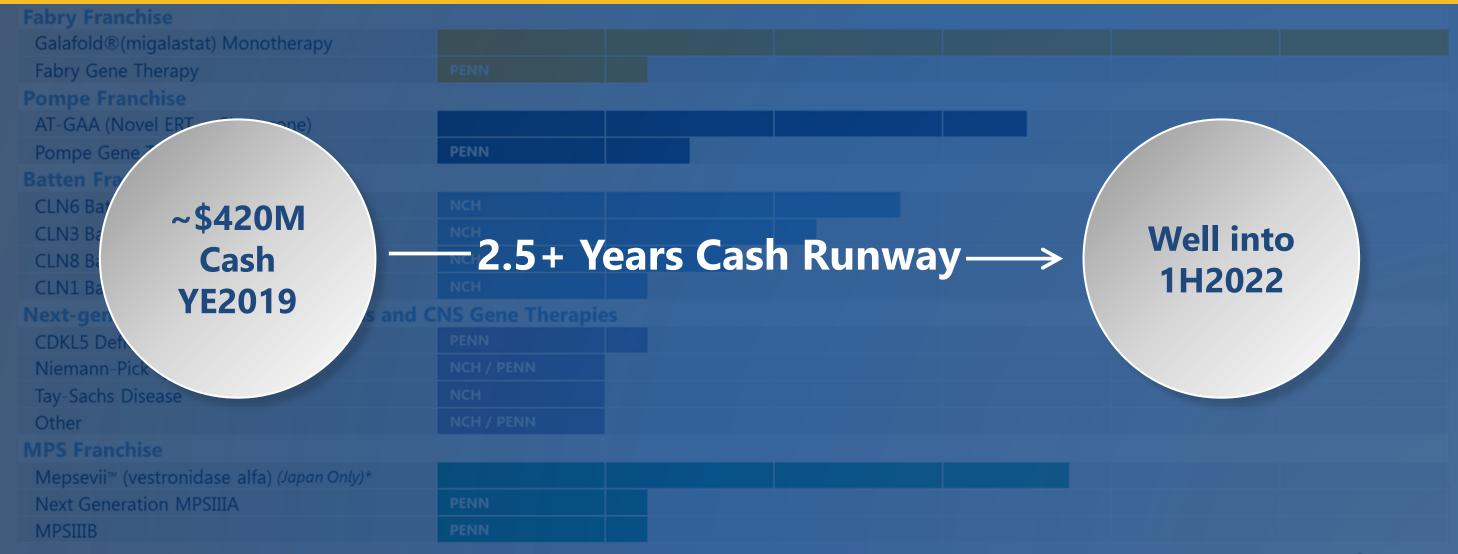
- FY19 anticipated non-GAAP operating expense of \$410M-\$420M
- Strong operating support organization in place to maximize value of future program advancements and products
- Expected non-GAAP operating expense to remain relatively flat in 2020-2022
- Minimal further investment in global commercial infrastructure and team needed to launch AT-GAA

Non-GAAP operating expense excludes share-based compensation expense, changes in fair value of contingent consideration, and depreciation



Cash Runway Now to Well into 1H2022 (2.5+ years)

Fully funded through major milestones in portfolio and continued global growth





At Major Inflection Point: Path to Profitability

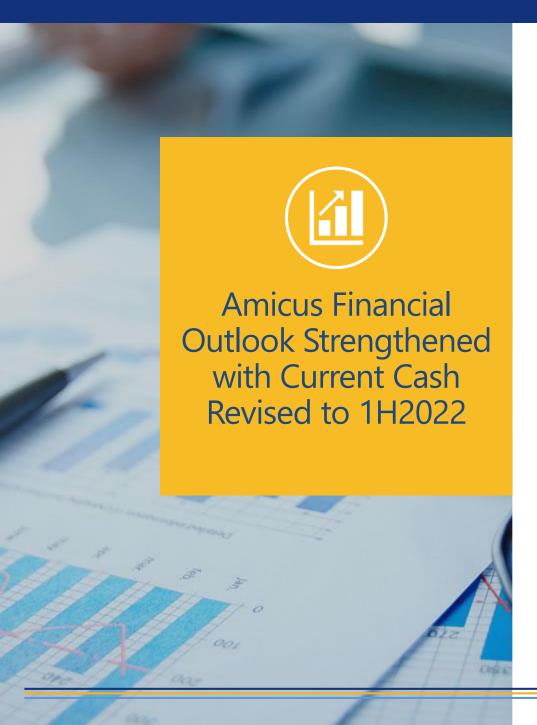
Clear strategy to build our business, advance our portfolio, and achieve profitability with the following key priorities

- Grow Galafold
- AT-GAA to pivotal data, global approvals and launch
- CLN6, CLN3 and Pompe gene therapies into and through the clinic
- 1-2 gene therapy INDs every year starting in 2021
- Discover and develop next generation protein engineering and gene therapy technologies with Penn

Only modest additional capital required in outer years to extend runway into profitability with multiple non-equity sources available as/when needed



Financial Outlook: Key Takeaways from Amicus Analyst Day 2019



- Company now fully funded through major milestones in portfolio and continued global growth
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Galafold[®] (migalastat) Global Launch...

...taking a leadership role in the treatment of Fabry disease

Bradley Campbell, President and Chief Operating Officer
Simon Jordan, Senior Vice President and Head of International
Mike Keavany, Senior Vice President and Head of US

"We push ideas as far and as fast as possible" - Amicus Belief Statement

Galafold Snapshot (as of September 30, 2019)

Galafold is the cornerstone of Amicus' success. It is an orally delivered small molecule precision medicine with a unique mechanism of action for Fabry patients with <u>amenable</u> variants that replaces the need for intravenously delivered enzyme replacement therapy.

One of the Most Successful Rare Disease Launches



\$48.0M+ \$170-180M 3019 Galafold FY19 Global **Revenue (preliminary** Galafold unaudited) Rev. Guidance Geographic **Expansion in** Countries with 2019 **Pricing &** Reimbursement 348 Regulatory Approvals*: **Amenable** Argentina, Australia, Canada, EU, Israel, Japan, S. Korea, Variants in U.S. Switzerland, U.S. Label

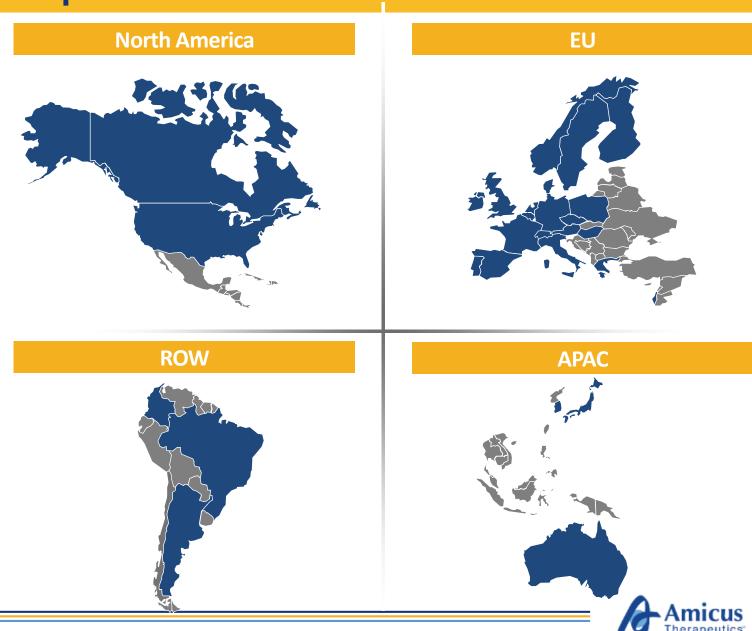
Galafold is indicated for adults with a confirmed diagnosis of Fabry Disease and an amenable mutation/variant. The most common adverse reactions reported with Galafold (>10%) were headache, nasopharyngitis, urinary tract infection, nausea and pyrexia. For additional information about Galafold, including the full U.S. Prescribing Information, please visit https://www.amicusrx.com/pi/Galafold.pdf. For further important safety information for Galafold, including posology and method of administration, special warnings, drug interactions and adverse drug reactions, please see the European SmPC for Galafold available from the EMA website at www.ema.europa.eu.



Global Commercial Team

World class global commercial leadership team to drive Galafold's success

- countries with offices, including US, EU5, Japan
- countries with direct presence (Amicus personnel)
- 27 markets with reimbursement



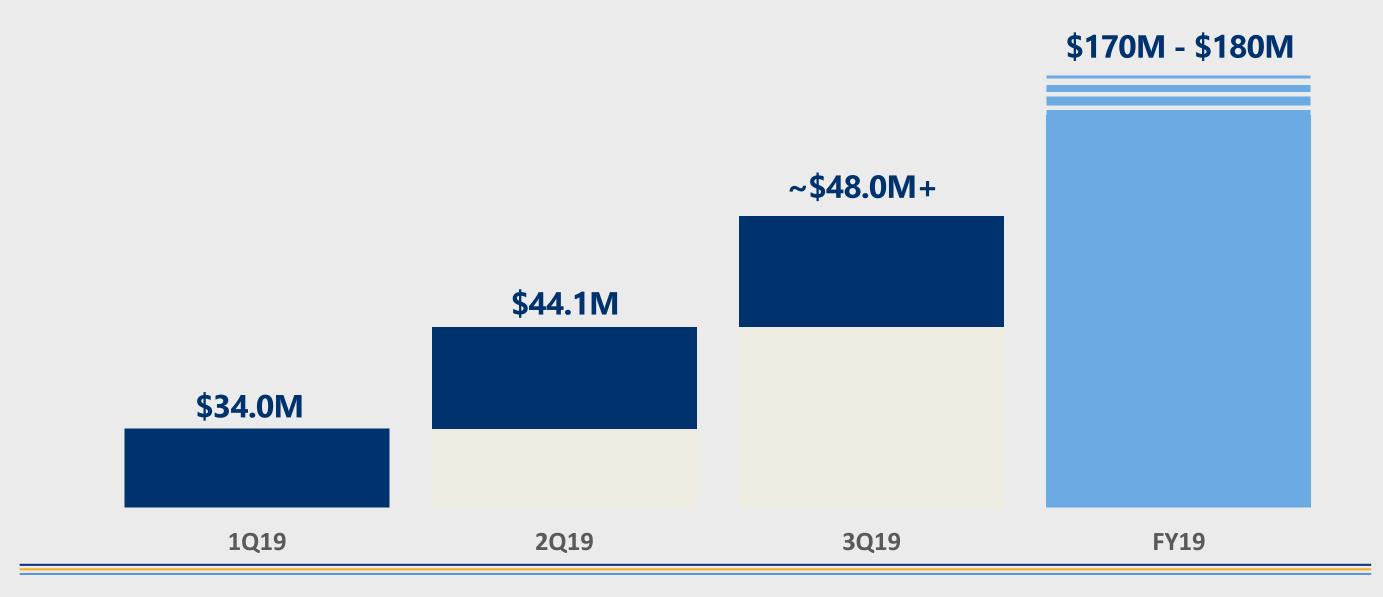
Galafold Performance





Galafold Success and FY19 Galafold Revenue Guidance

Strong Q3 performance of ~\$48M+ (preliminary/unaudited) gives confidence in upwardly revised guidance of \$170-\$180M. We expect to fall in the midpoint of this revised guidance, inclusive of FX



Galafold Global Launch Momentum (as of September 30, 2019)

Global commercial metrics continue to be very strong with >90% compliance and adherence, 24% global market share of treated amenable patients and continued broad market access.

3Q19 Strength Continues to Reflects Positive Momentum Across All Key Global Commercial Metrics and 1,000+ Treated Patients

- Global: 24%+ estimated global market share of treated amenable patients (as of 6/30/19)*
- U.S.: Steady growth in adoption from 100+ prescribers and broad reimbursement coverage
- International: Growing contribution from previously untreated patients
- Japan: On track to deliver full year objectives
- Demographics: Global mix of switch (66%) and previously untreated patients (34%)



Integrity Leadership

A culture of driving performance with the highest business integrity

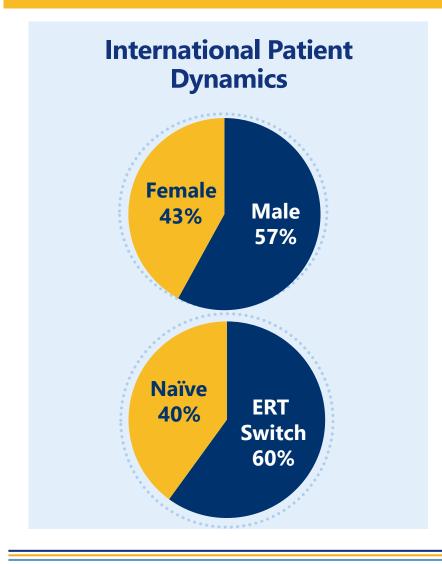
A high integrity mission for patients and shareholders





International Update (as of September 30, 2019)

Galafold international launch continues to show robust uptake across the more mature countries and in newly launched countries with further geographic expansion underway





Interactions with over 500 Fabry specialists across 26 countries ex-US and 2,500 other healthcare professionals



Over 170
Galafold
prescribing
centers ex-US



Amicus
International
Affiliate team
members ~77%
customer facing



Fabry Connections
Global meeting
with ~200 Fabry
thought leaders,
prescribers and
healthcare
professionals



US Launch Update (as of September 30, 2019)

Galafold U.S. launch continues to outperform on new patient starts, broad prescriber base and strong metrics

Patient Route to Galafold:

Decision to initiate Galafold



Fax/Email to Amicus Assist

Amicus Case Manager Patient Intake

Preliminary Benefits Investigation (BI) for in-network specialty pharmacy (SP)

Oversee SP process

Track PA requirements/timing

Patient on Therapy

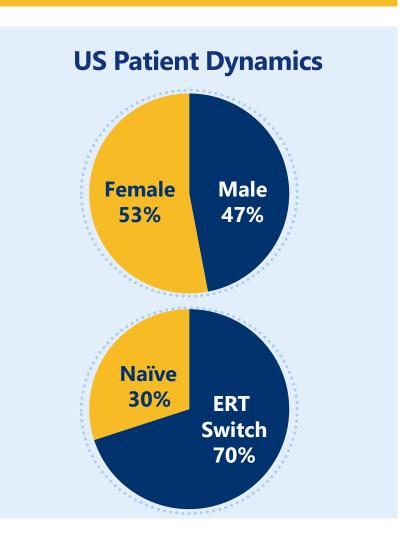
SP obtains prior authorization (PA)
SP ships directly to patient
Coordinated with Case Manager

100+
Unique Prescribers

43 Days

Average Days to 1st Shipment
(24 Days in the last 6 months)

94%Adherence Rate





U.S. Momentum in First Year of Launch

Reaching the Fabry community through patient education initiatives

- Patient meetings across the US with one of 4 patient ambassadors
 - YTD: 9 meetings with 5 additional planned
 - 150 patients/family in attendance
 - Positive interactions and great interest
- Introduction of new patient education materials
 & digital campaign
- Formal adherence campaign began in Q3



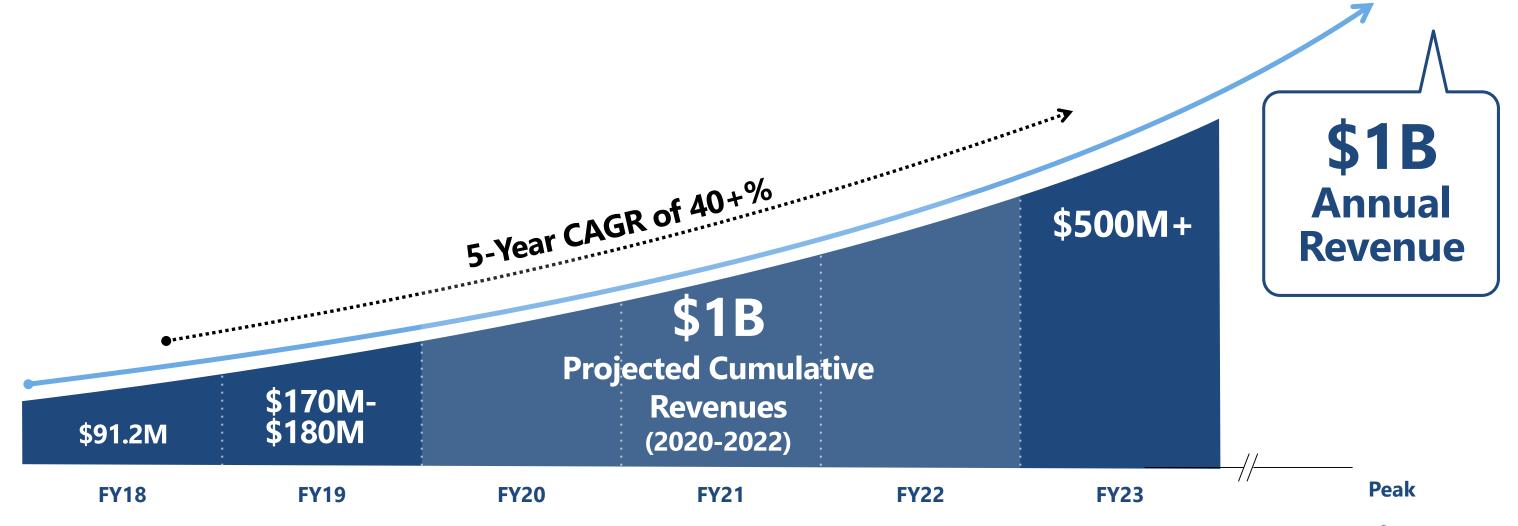






Galafold Growth Trajectory

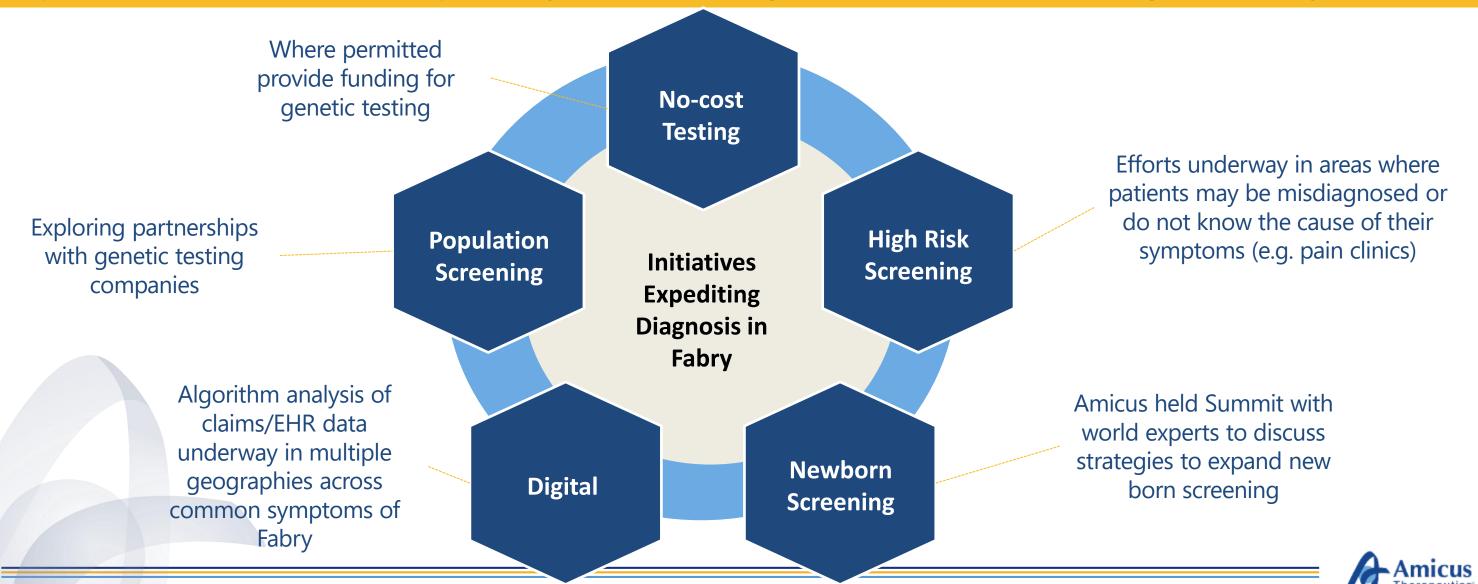
Galafold is on track to generate \$1B+ in projected cumulative revenues from 2020-2022 and is on an anticipated path to \$500M+ in annual sales in 2023 and \$1B+ annual sales at peak





Fabry Disease Diagnostic and Growth Drivers

Fabry disease is both underdiagnosed and misdiagnosed. Expanded screening initiatives have the potential to drive a shorter pathway to correct diagnosis for individuals living with Fabry disease.



Galafold Opportunity

With inherent Fabry market growth and our work to improve diagnosis and screening, Galafold has the potential to drive \$1B+ annual revenue at peak. \$500M+

\$170M-\$180M

2019

1st full-year launch in major geographies

2023

Projected

Revenue

Driven by:

Market penetration in existing and new markets

Continued uptake into diagnosed, untreated market

\$1B+ Opportunity

2028+

Durable growth in underlying Fabry disease diagnosis drives longer term projections

Strong IP protection through orphan drug acts in US and EU, as well as multiple patents



Fabry Patient Perspectives

Perspectives of two people living with Fabry disease who also have extended family members living with Fabry





Sabina





AT-GAA: Next Potential Standard of Care for Pompe Disease

Jay Barth M.D., Chief Medical Officer
John F. Crowley, Chairman and Chief Executive Officer

Pompe Disease Overview

Pompe disease is a severe and fatal muscular dystrophy and one of the most prevalent lysosomal disorders with very high unmet medical need



5,000 – 10,000+ patients diagnosed WW¹; newborn screening suggests underdiagnosis

Age of onset ranges from infancy to adulthood

Respiratory and cardiac failure are leading causes of morbidity and mortality

Deficiency of GAA leading to glycogen accumulation and cellular dysfunction

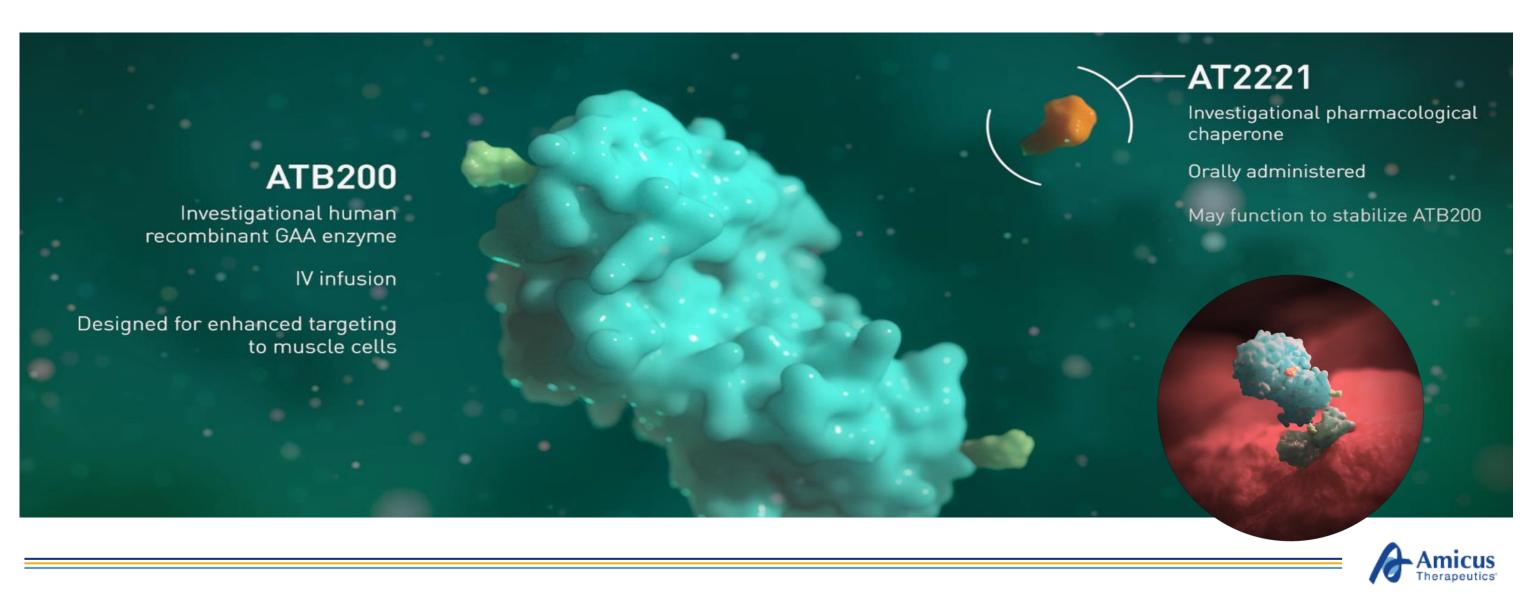
Symptoms include muscle weakness, respiratory failure, and cardiomyopathy

~\$900M+ global Pompe ERT sales in FY18²



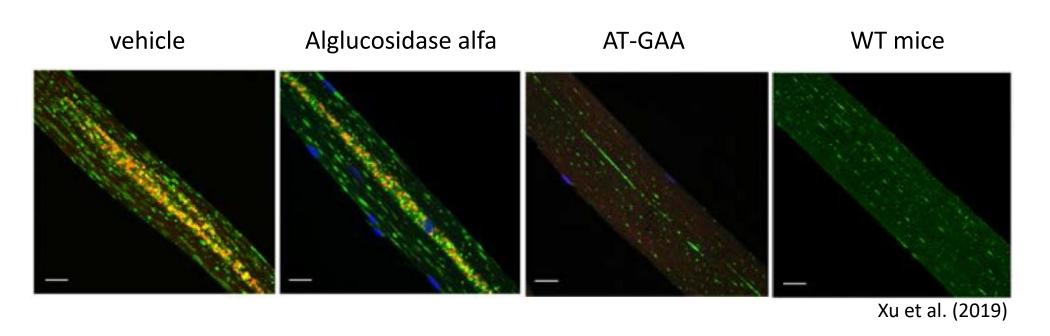
AT-GAA: Foundation in Protein Engineering

Amicus scientists specializing in protein engineering and glycobiology created a uniquely glycosylated and highly phosphorylated ERT (AT-GAA) that significantly enhances targeting to key muscles affected in patients.

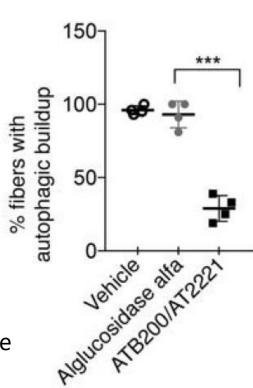


Preclinical Proof-of-Concept

Preclinical data for AT-GAA demonstrate a distinct profile for targeting and uptake into key tissues, substrate reduction, restoring cellular health and muscle integrity



- GAA deficiency leads to substantial muscle damage as evidenced by autophagic buildup in *Gaa* KO mice
- Alglucosidase alfa does not reverse damage
- AT-GAA significantly clears autophagic buildup in vast majority of muscle fibers
- First treatment to demonstrate reversal of defective autophagy and muscle damage



Following 2 doses of 20mg/kg alglucosidase alfa or ATB200 + AT2221 in Gaa KO mice



Breakthrough Therapy Designation

AT-GAA is the first ever second-generation product for <u>any</u> lysosomal disorder to earn FDA Breakthrough Therapy Designation ("BTD")



AT-GAA BTD Based on Ph 1/2 Clinical Efficacy

- Improvements in 6-minute walk distance
- Comparison to natural history of treated patients



BTD Features

- Intensive guidance on an efficient drug development program
- Organizational commitment involving senior agency staff
- All Fast Track program features



BTD Criteria

- Intended to treat a serious or life-threatening disease or condition
- Preliminary clinical evidence indicates drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints



Pompe Patient Experience in Phase 1/2 Clinical Study (ATB200-02)

Phase 1/2 results showed strong and durable effects in patients out to two years, leading to dramatic improvements in muscle strength and function, as well as significant improvements in key biomarkers of disease

	(E)	Cohort	Baseline (n=10)	Change at Month 6 (n=10°) Mean (SD)	Change at Month 12 (n=10ª) Mean (SD)	Change at Month 24 (n=9 ^{a,b}) Mean (SD)
	Test	Cohort 1 ERT-Switch Ambulatory	397.2 (96.8)	+23.9 (52.2)	+42.2 (46.5)	+36.4 (60.5)
	n Walk	Cohort	Baseline (n=5)	Change at Month 6 (n=5) Mean (SD)	Change at Month 12 (n=5) Mean (SD)	Change at Month 24 (n=5) Mean (SD)
	6-Min	Cohort 3 ERT-Naïve	399.5 (83.5)	+41.8 (29.4)	+63.1 (29.1)	+60.7 (36.5)
			4 (6)			
	ਉ	Cohort	Baseline (n=9°)	Change at Month 6 (n=9°) Mean (SD)	Change at Month 12 (n=9°) Mean (SD)	Change at Month 24 (n=8 ^{b,c}) Mean (SD)
	Predicted)	Cohort 1 ERT-Switch Ambulatory*	52.6 (14.7)	-1.2 (4.0)	-3.0 (6.0)	+0.9 (4.9)
	FVC (% P	Cohort	Baseline (n=5)	Change at Month 6 (n=5) Mean (SD)	Change at Month 12 (n=5) Mean (SD)	Change at Month 24 (n=5) Mean (SD)
		Cohort 3 ERT-Naïve	53.4 (20.3)	+4.4 (5.6)	+4.6 (8.8)	+6.8 (6.8)
Data from interim analysis 8.	L					Amicus

Initial 6-month data in Cohort 4 (ERT-Switch Patients)

Data in additional ERT-switch patients in a decline phase support consistent, sustained and durable effects on functional outcomes and biomarkers after switching to AT-GAA

Cohort 4	Baseline		CFBL to 6M		CFBL to LOCF	
	mean (SD)	n	mean (SD)	n ^a	mean (SD)	n
6MWD	387.3 (161.3)	6	+24.3 (60.5)	5	+19.3 (53.3)	6
% predicted sitting FVC	65.3 (21.1)	6	+6.6 (4.2)	5	+5.2 (6.0)	6
MMT (max 80)	59.7 (6.0)	6	+ 4.0 (2.0)	5	+3.8 (3.8)	6
Timed up and go	9.1 (4.2)	6	0.3 (1.6)	5	+0.6 (1.4)	5 ^b
GSGC	17.2 (5.0)	6	-2.8 (4.0)	5	-2.2 (3.9)	6
FSS (max 63)	42.8 (14.0)	6	-3.3 (4.6)	5	-3.0 (7.2)	5 ^b

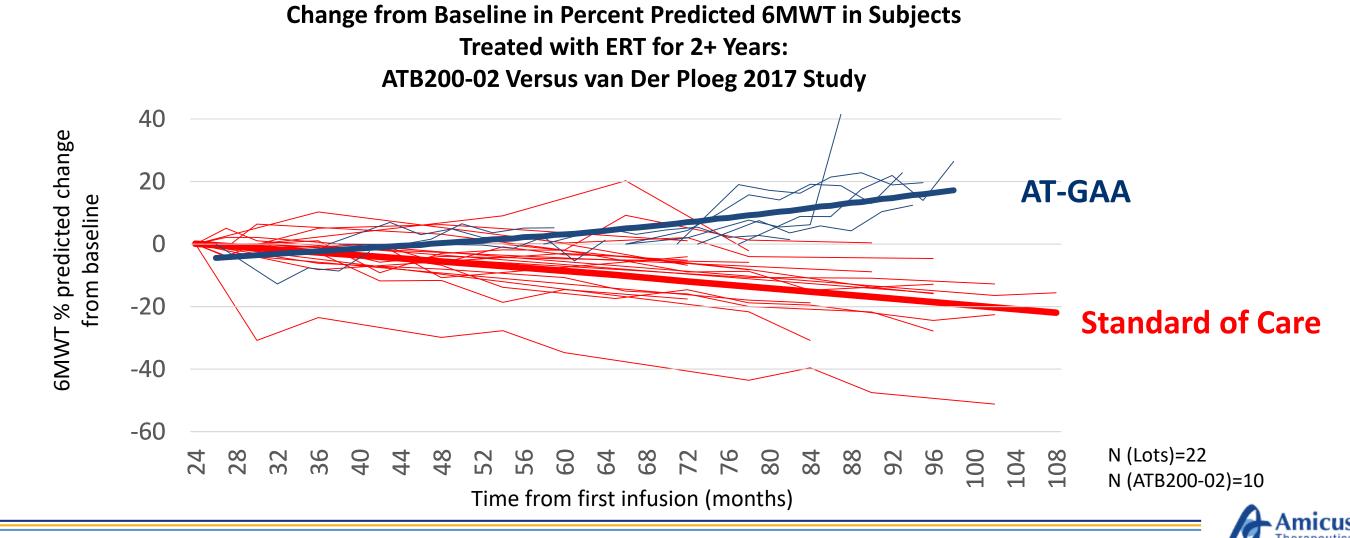
- 6MWT increased in 2/5 patients at Month 6 and 4/6 patients at last available time point (3-15 months of treatment)
- FVC increased in 5/5 patients at Month 6 and 5/6 at last available time point; MIP and MEP both increased
- Last available time point includes 1 subjects at Month 3, 2 subjects at Month 6, 2 subjects at Month 12 and 1 subject at Month 15

Historical data on 6MWT showed an average decline of ~7 meters per year while on standard of care ERT prior to switching to AT-GAA (n=6), with 5/6 patients declining.



6MWT Natural History: Phase 1/2 AT-GAA Data vs. Medical Literature van Der Ploeg 2017

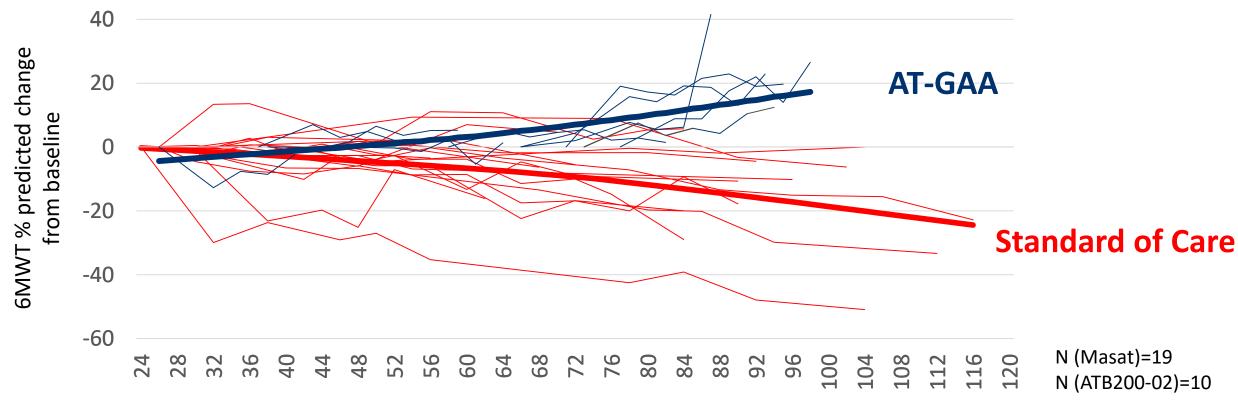
Natural history comparisons show large treatment effect of AT-GAA on 6MWD in Phase 1/2 which supported statistical power of PROPEL pivotal study



6MWT Natural History: Phase 1/2 AT-GAA Data vs. Medical Literature Masat 2016

Second natural history data set confirms the large treatment effect of AT-GAA





Time from first infusion (months)



PROPEL (ATB200-03) Study Design



Phase 3 enrollment is expected to complete in 2019 with data in 1H2021. The study is highly powered for success and supports a broad label, with FDA and EMA agreement on study design and primary endpoint (6MWT).

52-Week Primary Treatment Period (Double-Blind)

2:1 Randomization

Participants with Late-Onset Pompe Disease

~120 Patients
78 WW Clinical Sites

ERT-Switch ERT-Naïve

AT-GAA Bi-Weekly

Standard of Care Bi-Weekly

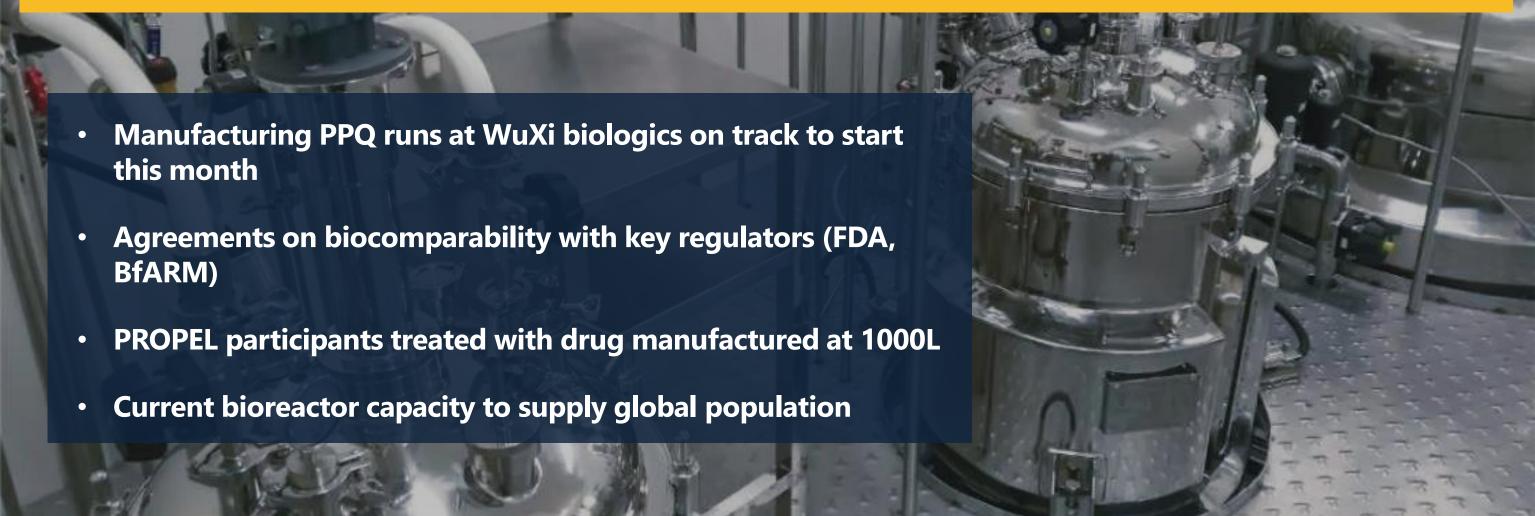
Primary Endpoint: 6-Minute Walk Test at Week 52; Multiple Secondary Endpoints Well Powered for Superiority Long-Term Extension (Open-Label)

PROPEL Pivotal Study
80%+ Enrolled and
Expected Now to Overenroll By YE2019 with data
in 1H2021



Pompe Biologics Manufacturing

Amicus and partner WuXi Biologics have successfully produced AT-GAA at 1,000L commercial scale, demonstrating unique capabilities in Amicus biologics process science, manufacturing and quality control



AT-GAA Treatment Opportunity

Potential to become the standard of care for all persons living with Pompe with \$1B+ to \$2B in annual sales at peak

- Phase 1/2 study data on AT-GAA demonstrated profound improvement in functional outcomes for Pompe patients
- PROPEL pivotal study 80%+ enrolled and expected now to over-enroll (~120 patients) By YE 2019
- Ongoing and planned studies intended to support approval in all patients
- Breakthrough therapy designation provides advantages toward approval
- Strong IP exclusivity protections well into the 2030s



Pompe Disease Overview

A perspective of Pompe disease demonstrates the unmet medical need

Video:







Q&A Session

2019 Analyst Day | October 10, 2019 | New York, NY



Next Generation Gene Therapy Platform

Hung Do, Ph.D.



A Natural Evolution: Chaperones to Optimized ERT to Gene Therapy

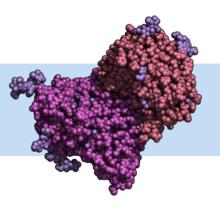
Amicus' shift towards gene therapy is built upon years of experience in developing genetic medicines designed to deliver deficient proteins to target cells and organelles

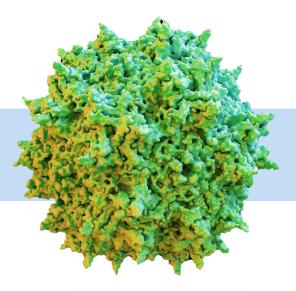
Pharmacological Chaperones

Next-Generation ERTs

Gene Therapies







Stabilize "naturally produced" enzymes

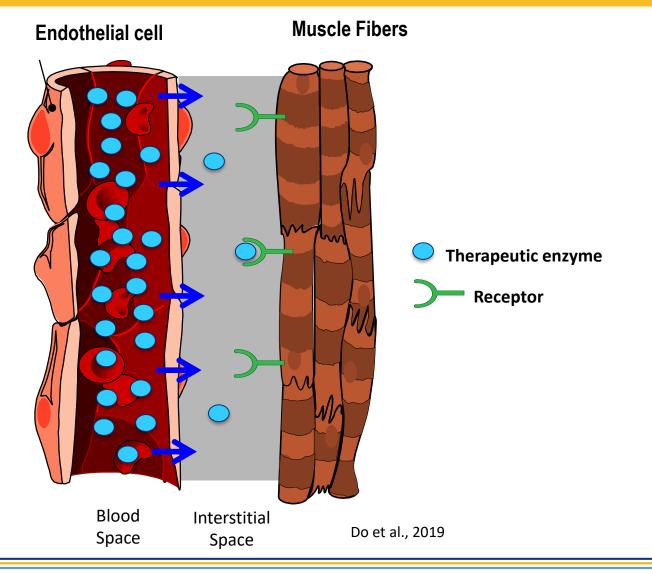
Stabilize and target "externally produced" enzymes

Stabilize and target "internally produced" enzymes



Challenges of Protein Delivery Today

Therapeutic enzymes have similar challenges whether delivered exogenously by ERT or via gene therapy



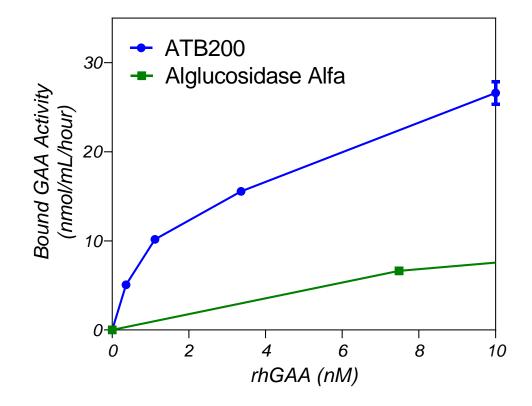
- Biodistribution of therapeutic proteins from circulation to intended cells is poor
- These challenges necessitate highly efficient uptake and trafficking mechanisms
- Only therapeutic enzymes with optimal characteristics for cellular uptake can be efficiently internalized in target cells at low enzyme levels



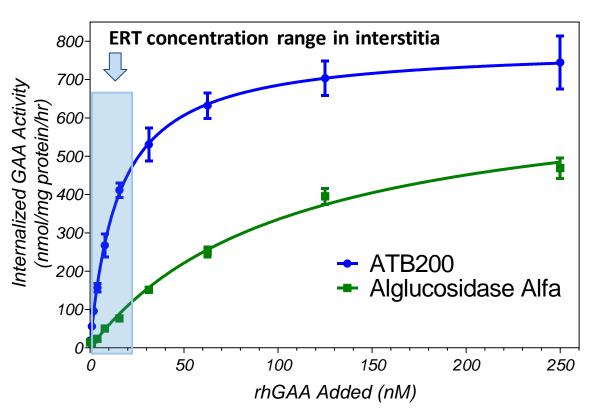
Importance of Cell Surface Receptor Binding

Therapeutic enzymes must have high affinity for cell surface receptors to enable efficient cellular uptake

Binding Affinity for M6P Receptor: Alglucosidase alfa vs ATB200



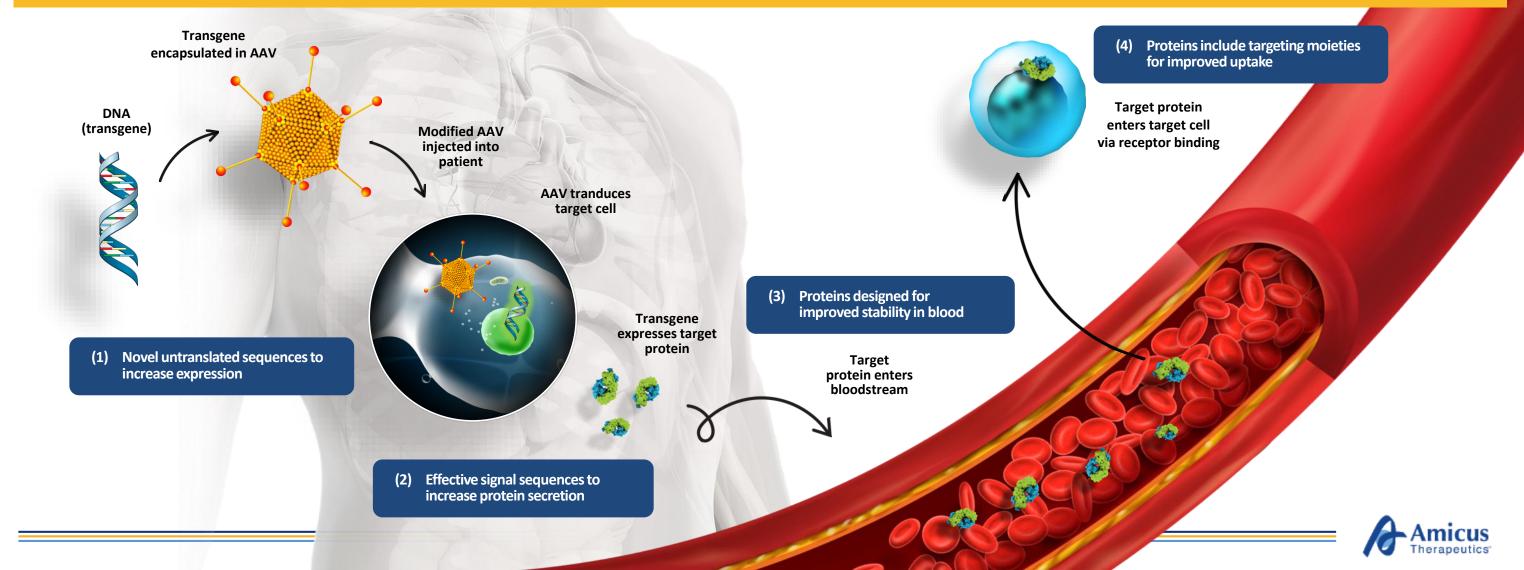
rhGAA Uptake in Skeletal Muscle Myoblasts: Alglucosidase alfa vs ATB200





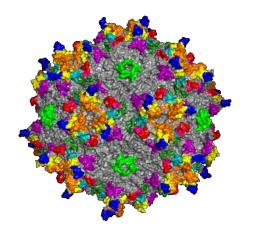
Amicus Approach: Engineered Transgenes for Optimal Cross-Correction

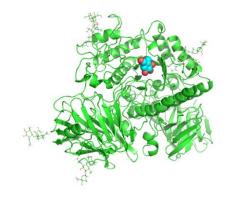
Unique Amicus technologies for protein engineering in gene therapy represent a new platform and groundbreaking advancement for developing differentiated gene therapies designed to optimize expression, secretion, stabilization and targeting.

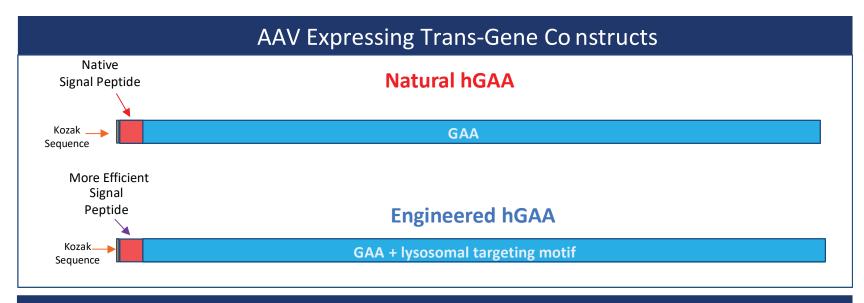


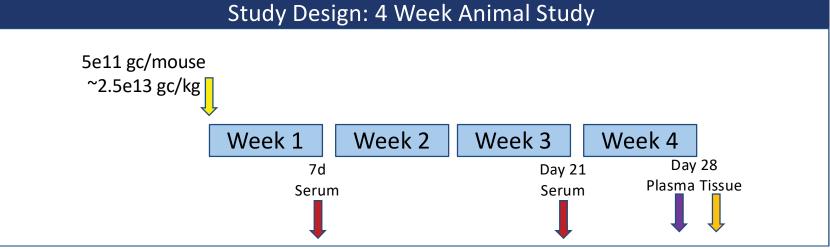
Pompe AAV Gene Therapy Initial High-Dose Preclinical POC Study

- AAV Transgene:
 - Natural-hGAA (AAV.hGAA nat)
 - Engineered-hGAA (AAV.hGAA eng)
- Dose\Route:
 - 5e11 gc/mouse (~2.5e13 gc/kg)
 - Tail Vein IV
- Animal Model:
 - Pompe Model Gaa -/- B6:129-GAAtm1Rabn/J (aka 6neo)
 - Wild-type Gaa +/+ (Pompe model litter-mates)
- Gender:
 - Male
 - Female
- Age: 4-6 weeks at AAV dosing







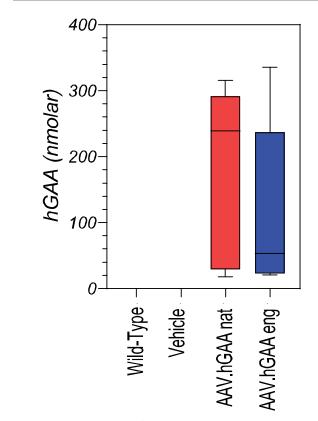




Initial Preclinical Pompe Gene Therapy Results: Plasma

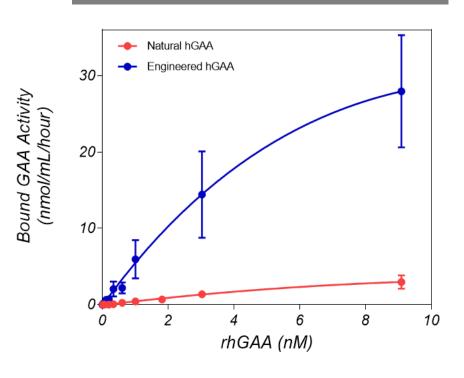
AAV with the Amicus engineered hGAA transgene was expressed at similar levels in plasma and had significantly enhanced binding for cell uptake receptors compared to the unmodified natural GAA transgene

Plasma Expression



 High levels of engineered and natural hGAA were measured in plasma at day 28

Receptor Binding



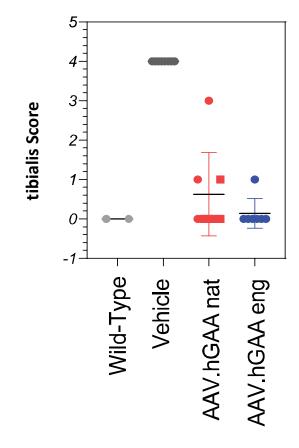
 Only engineered hGAA was able to efficiently bind the intended cell uptake receptor



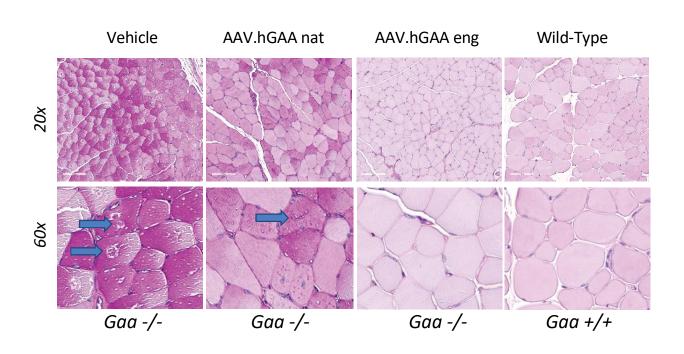
Initial Preclinical Pompe Gene Therapy Results: Muscle

AAV with the Amicus engineered hGAA transgene had a more uniform and complete impact on cell pathology and glycogen reduction in muscle compared to the unmodified natural GAA transgene

Tibialis: Histopath



Tibialis: Glycogen PAS



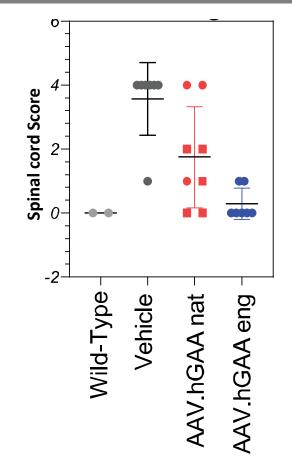
Similar results observed in other muscle groups



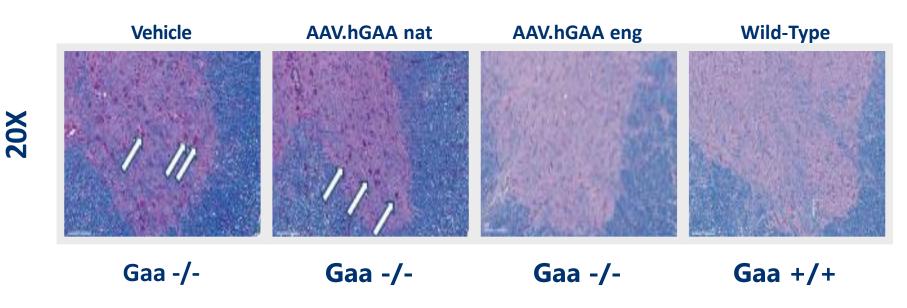
Initial Preclinical Pompe Gene Therapy Results: CNS

Only the AAV with the Amicus engineered hGAA transgene was able to significantly impact cell pathology and glycogen reduction in the CNS

Spinal Cord: Histopath



Spinal Cord: Glycogen PAS



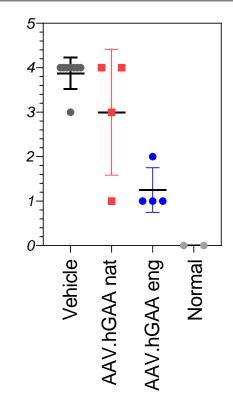
Similar results observed in brain



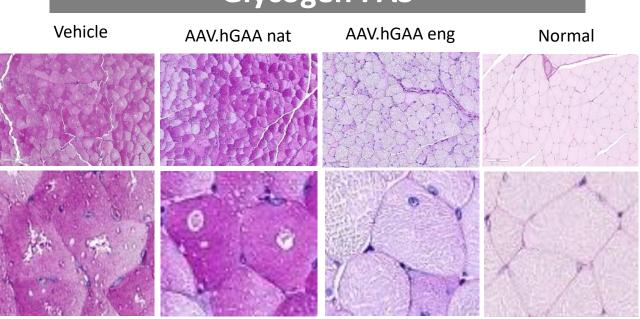
New Pompe Gene Therapy Low Dose Preclinical Data

Results from the low dose (2.5e12 gc/kg) study of engineered AAV-hGAA also showed improved cell pathology and glycogen reduction of the engineered construct versus natural GAA

Quadriceps: Histopath Scoring



Quadriceps: Glycogen PAS

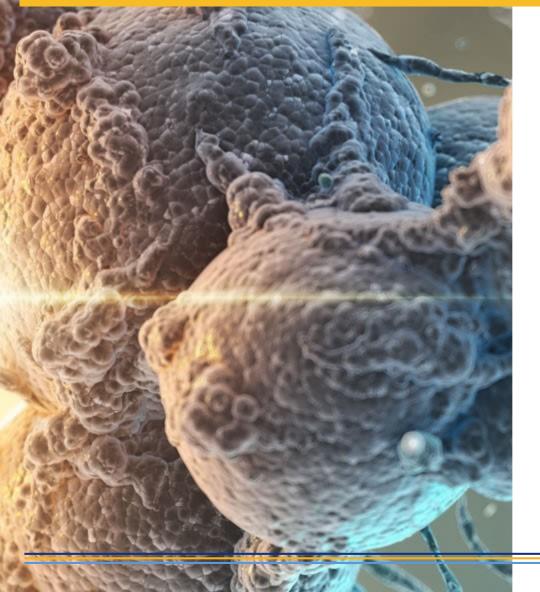


Similar design as high dose preclinical study



Pompe Gene Therapy Summary and Next Steps

Initial Pompe preclinical gene therapy data at ASGCT and NEW preclinical data demonstrate differentiated profile and clear pathway toward the clinic

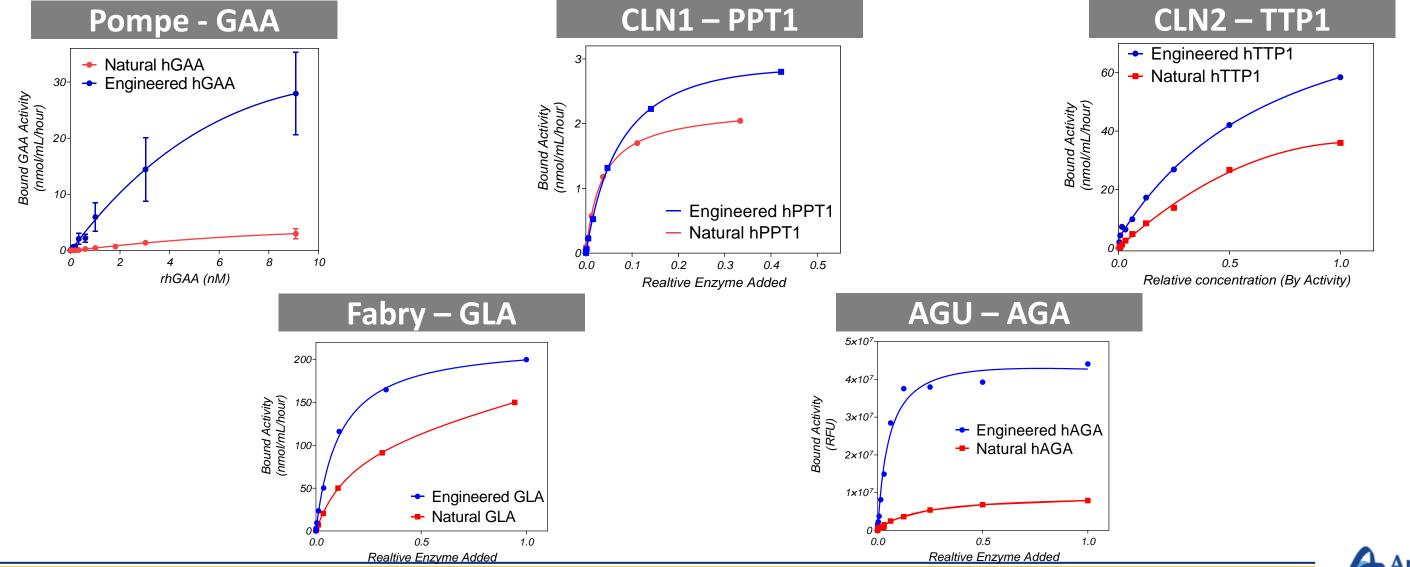


- Clinical candidate selected
- Toxicology batch manufacturing and GMP tech transfer to Paragon underway
- IND enabling toxicology studies to begin shortly
- Potential to enter clinic in 1H2021



Protein Engineering Platform Has Potential To Be Broadly Applicable to Gene Therapies For Majority of LSDs

Amicus has repeatedly validated the protein engineering platform approach in multiple indications to design transgenes with improved cellular uptake





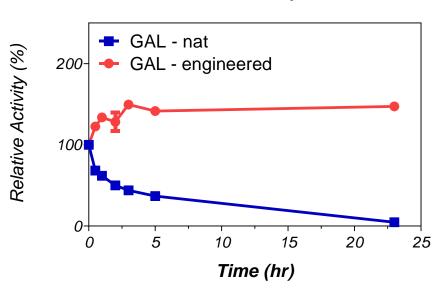
Source: Data on file

Initial Preclinical Fabry Gene Therapy Results

Engineered GLA transgene increased enzyme activity in kidney > 7 fold higher than wildtype and lowered GL-3 substrate levels comparable to wildtype

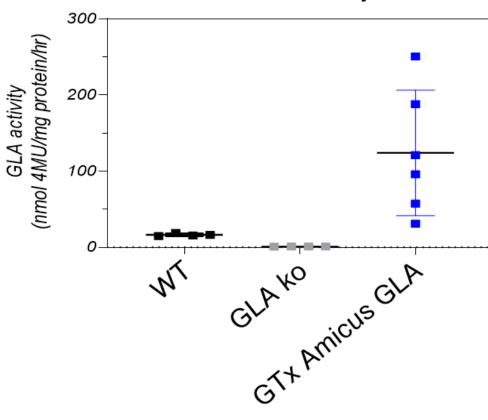


GLA activity



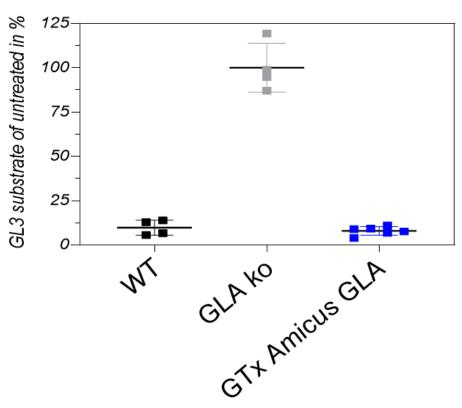
Increased Enzyme Activity

Kidney: GLA Enzyme Activity



Robust Substrate Clearance

Kidney: GL3 Substrate Levels





GTx Manufacturing Strategy for Initial Penn Programs at Catalent

Catalent to leverage Penn's AAV manufacturing expertise and Amicus experience in complex biologics manufacturing and quality control as a competitive advantage.



OPARAGON°

Technologies and capabilities related to Penn collaboration are being transferred to and developed at Catalent

Initial focus on Amicus Pompe AAV gene therapy program



Penn is supporting technology transfer of existing manufacturing process to Catalent





Long-term supply agreements established for research and GMP quality plasmids





Next Generation Research Program

Jeff Castelli, Ph.D., Chief Portfolio Officer and Head of Gene Therapy Jim Wilson, M.D., Ph.D., Rose H Weiss Professor and Director, Orphan Disease Center, Perelman School of Medicine at the University of Pennsylvania

Amicus and Penn Gene Therapy Collaboration

Combines Amicus Expertise in Protein Engineering with Penn's AAV Vector Technology, Manufacturing and Immunology Capabilities to Improve Safety and Efficacy and Speed Development







Worldwide Rights to Penn's Next Generation Gene Therapy Technologies for the Majority of Lysosomal Disorders

Current Collaboration Includes Pompe, Fabry, CDD, Niemann-Pick Type C, Next Generation MPS IIIA, and MPS IIIB

Partnership Encompasses 12 Additional Rare Diseases, including Rett Syndrome, Angelman Syndrome, Myotonic Dystrophy and Select Other Muscular Dystrophies

Amicus to Invest \$10M / Year for 5 Years for Research to Improve Safety, Efficacy and Manufacturability of Next Generation Vectors with Option to Extend



Discovery Program to Improve in vivo AAV Gene Therapy

James M. Wilson, MD, PhD

Rose H. Weiss Professor and Director, Orphan Disease Center Professor of Medicine and Pediatrics Director, Gene Therapy Program Perelman School of Medicine at the University of Pennsylvania



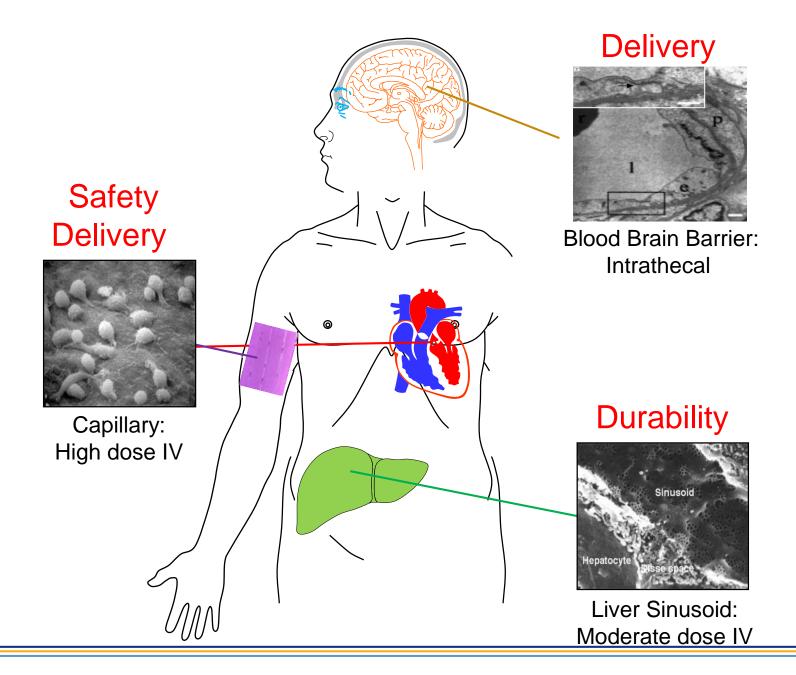
October 10, 2019

Passage Bio and Scout Bio: stock, grant and consulting





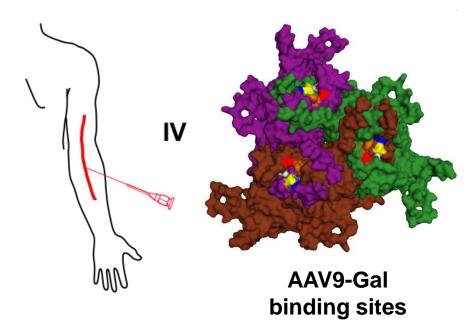
Strategies to Improve Gene Therapy for Targets Relevant to Amicus/Penn Programs: It's not all about the capsid

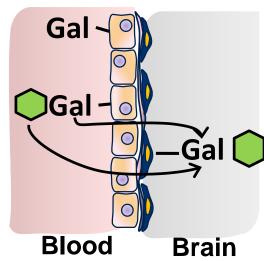




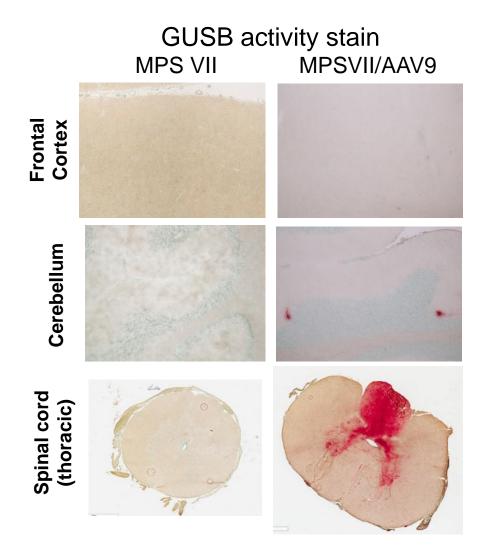


High Dose IV AAV9 Targets Motor Neurons of Spinal Cord but Not Brain in MPSVII Dogs





J Clin Invest (2011)



Histochemical stain for GUSB following high dose IV AAV9
In canine model of MPSVII

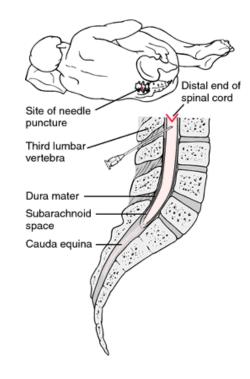
Mol Ther. 24:206 (2016)



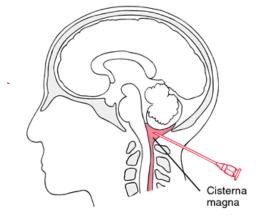


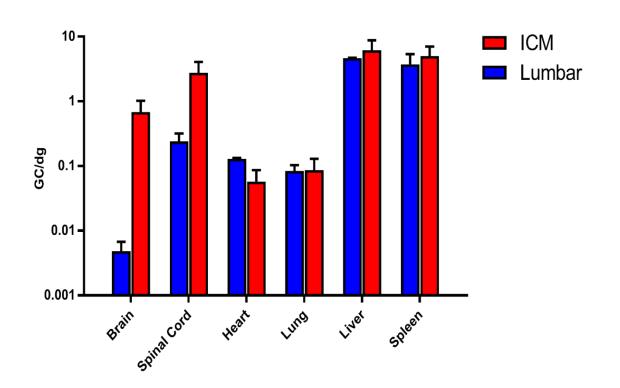
Broader Distribution of AAV9 Gene Transfer in CNS Following Injection into the Cisterna Magna (ICM)

Lumbar Puncture



Cisterna Magna



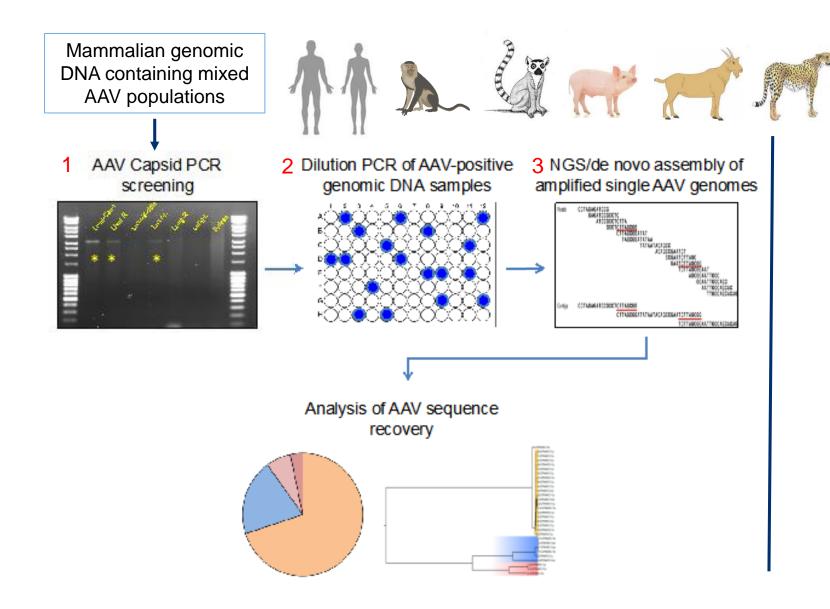


Adult cynomologus macaques were injected with 1 to 2xE11 GC/gm brain in 1ml via LP or ICM. Animals were necropsied 14 days later and brain tissue analyzed for vector GC per diploid genome. This is close to the maximal dose that can be delivered.





Methods for AAV Natural Isolate Detection and Sequencing: Single Genome Amplification and Bioprospecting Techniques



Primate and exotic species

Other methods for Bioprospecting for novel AAV:

- Expansive high-throughput PCR using clade-specific and unbiased primer approaches
- Metagenomic dataset fishing for AAV-like sequences
 - Shotgun sequencing datasets from human and other mammals
- Database mining for AAV reads



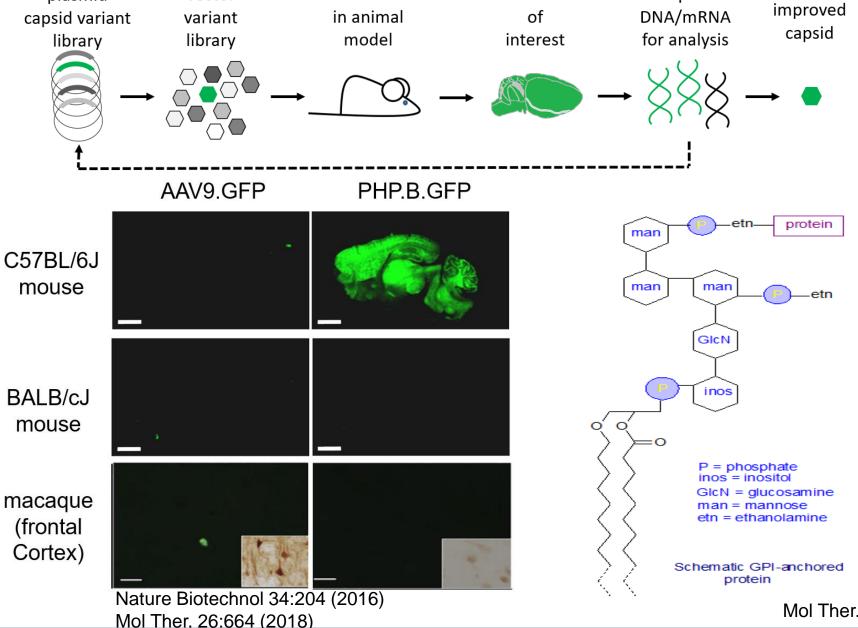


Directed Evolution for Improved Brain Transduction from IV Delivery

selection

plasmid

vector



AAV9 insert library

capsid

tissue

- directed evolution in C57BL/6 mice
- yielded PHP.B: AAV9 + 7aa insert (TLAVPFK)
- ~50-fold improvement in brain transduction

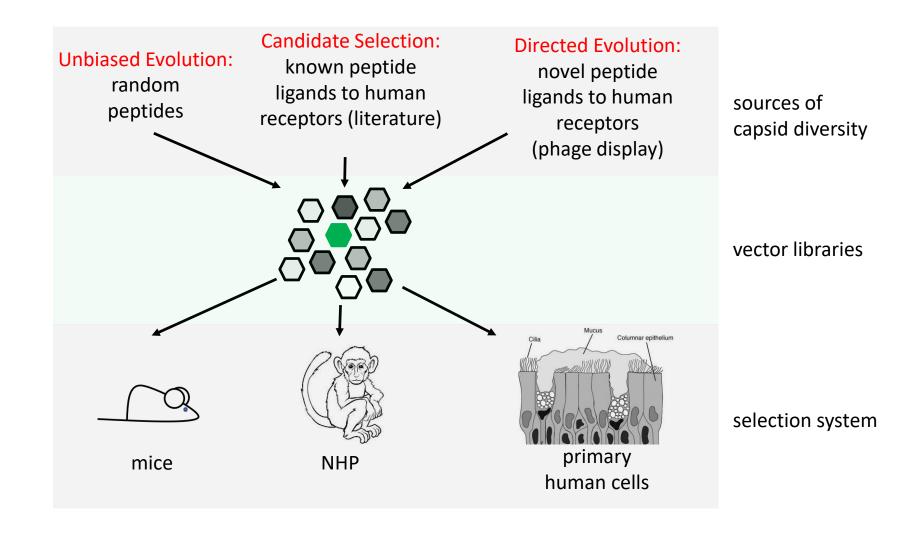
- BBB permeability mapped to Ly6a
- GPI-anchored protein (Sca I)
- Located on brain endothelial cells
- Binds specifically to PHP.B



Mol Ther. 27:912 (2019)



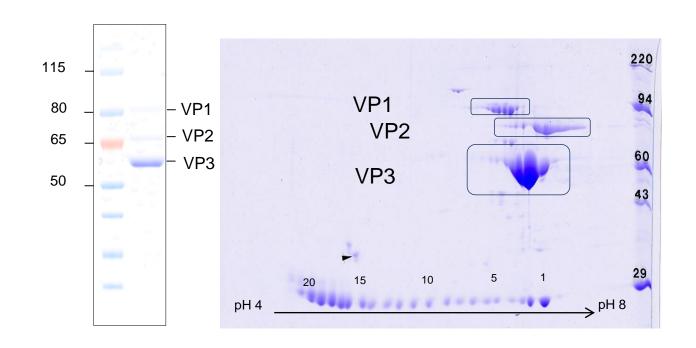
Work Streams for Identifying Novel Capsids with Improved CNS Delivery

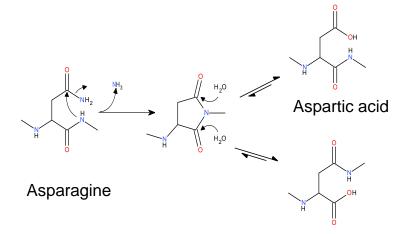




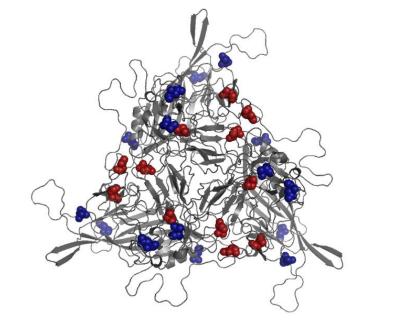


Manufacturing Process Improvements Can Improve Vector Potency: the Case for AAV Deamidation





Isoaspartic acid

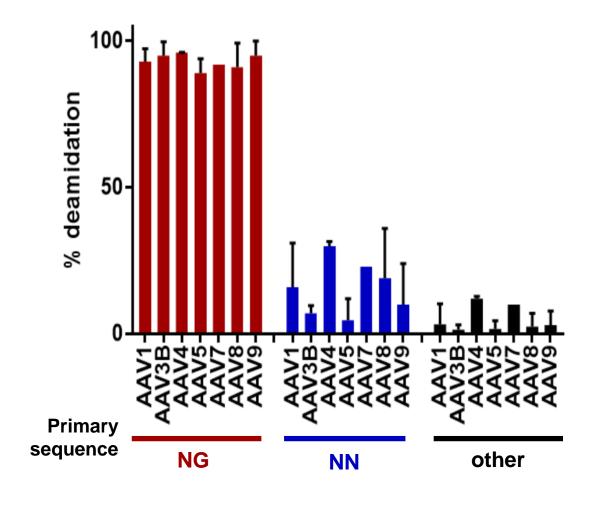


Molecular Therapy (2018)

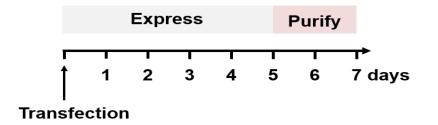


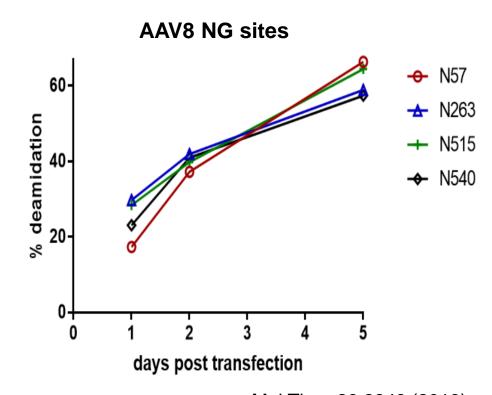


Deamidation Occurs Across All Serotypes During Production of Vector





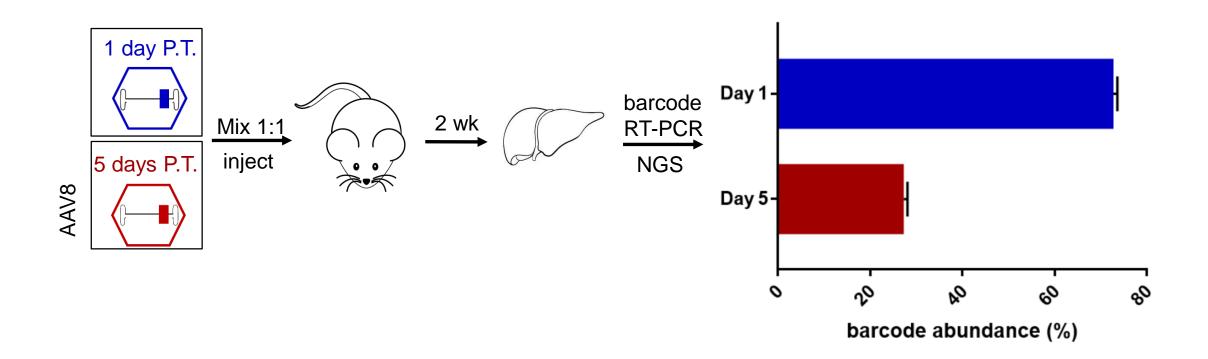








Rapid Deamidation of AAV8 Is Correlated with Potency Loss in vivo



AAV8 vectors harvested at day 1 or day 2 were produced using 2 sets of bar codes for each capsid harvest. Day 1 harvest had 20% NG deamidation while Day 2 harvest had 90% NG deamidation. Vectors were mixed and injected 1:1 IV into C57BL/6 mice. Liver harvested 2 weeks later were subjected to NGS to evaluate the abundance barcoded mRNAs which was shown to be approximately 3.5-fold higher for the Day 1 harvest indicating increased potency.





AAV-Mediated Transgene Expression Is Not Stable in Primate Liver

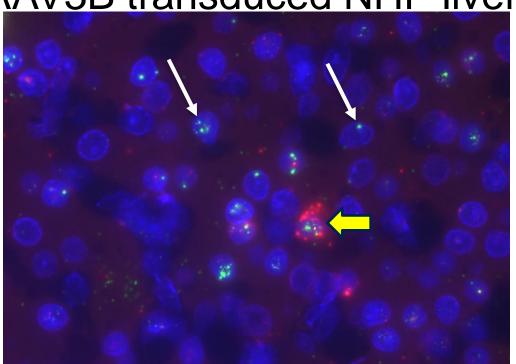
Late phase **LFTs** Early phase d98 WNL NHP self protein d129 NHP non-mammalian **Elevated** protein d120 Mouse non-mammalian **WNL** protein **Unpublished Data**



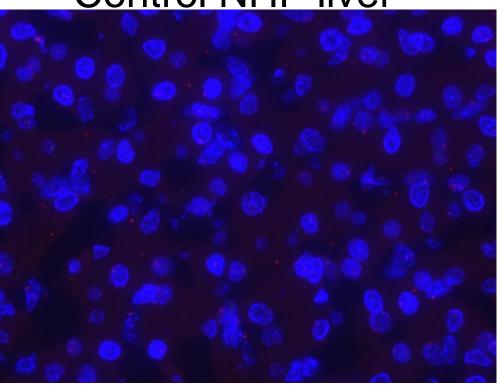


Extensive Vector DNA with Limited Expression in Nonhuman Primate Liver

AAV3B transduced NHP liver



Control NHP liver

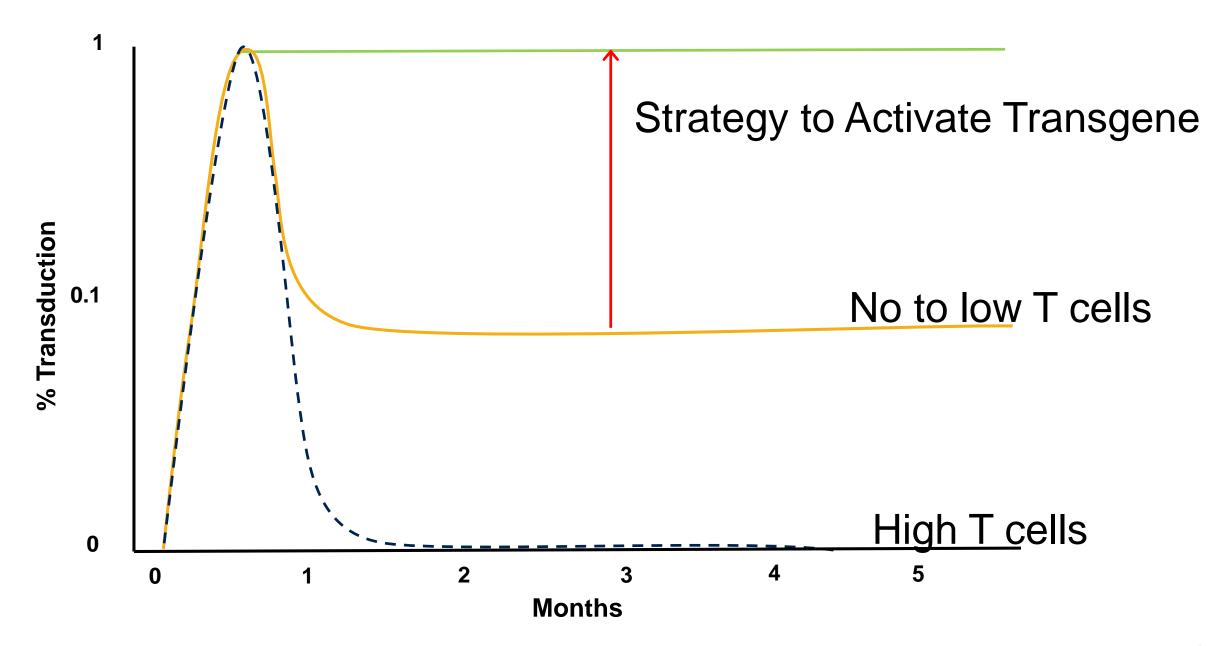


Rhesus macaques were injected with AAV3B vector at 3E12 GC/kg and tissue was harvested at week 35 for *in situ* hybridization analysis. Left panel: tissues were analyzed with probes to the mRNA (red) and to DNA (green) that are complementary to the transgene. White arrows indicate punctate signals in nuclei that are specific to DNA while yellow arrowhead points out a cell with extensive cytoplasmic mRNA staining. Right panel: similar in situ Hybridization from liver tissue of an animal that received AAV3B vector at same dose but expressing a different Transgene with a notable absence of staining.





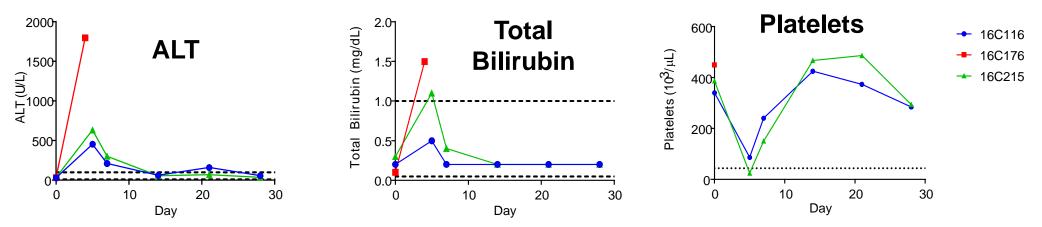
Model for Efficiency and Durability of AAV Liver Gene Therapy





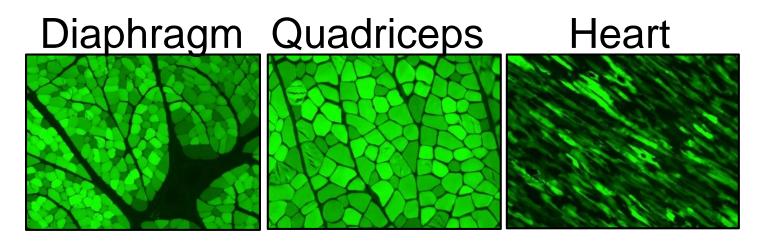


Gene Transfer and Toxicity of Systemic High Dose AAV9 in Rhesus Macaques



Rhesus macaques 12-14 months of age dosed with IV AAVhu68.CB7.hSMN at 2xE14 GC/kg. 16C176 was euthanized on Day 4. Dotted lines indicate laboratory reference range.

Human Gene Ther. 29:285 (2018)



Rhesus macaques were dosed with AAV9.CB7.GFP at 7.5E13 GC/kg and necropsied at 21 days for analysis of GFP expression.



Amicus

Acute Systemic Toxicity to High Dose IV AAV: Mechanisms, Factors and Remedies

- Data
 - Occurs in NHPs and humans
 - Occurs at doses > 7.5e13 GC/kg
 - Non-linear relationship between dose and gene transfer/acute toxicity
 - Prodrome is low platelets and high transaminases
- Mechanism(s) unknown
 - Systemic Inflammation e.g., CAR-T and Adenovirus
 - Activation of Complement
 - Injury to endothelial cells
 - Direct affect on platelets

Factors

- Capsid
- Residuals
- Method of purification
- Age of recipient
- Co-morbid conditions

Remedies

- Decrease dose; improved delivery
- Modify biodistribution
- Pharmacology to prevent inciting event or dampen host responses







Batten Disease Gene Therapy Franchise

Jill Weimer, SVP of Discovery Research & Gene Therapy Science Jeff Castelli, Ph.D., Chief Portfolio Officer and Head of Gene Therapy

2019 Analyst Day | October 10, 2019 | New York, NY

Validated Gene Therapy Platform for CNS

The Amicus Batten programs leverage AAV technologies and platforms utilized in the neuromuscular space at Nationwide Children's Hospital/Sanford and have robust preclinical and now clinical proof of concept

Clinically validated AAV gene therapy approach at NCH and Sanford

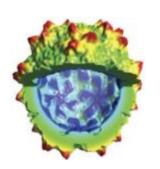
- Nationwide Children's Hospital Center for Gene Therapy (NCH)
- Intrathecal delivery with robust expression throughout CNS

Preclinical safety and efficacy studies replicated across multiple diseases at NCH

- SMA, CLN6, CLN3, CLN8

Amicus applying platform to multiple types of Batten disease and other Neurologic LSDs

- Two clinical programs in CLN6 and CLN3 Batten disease show initial safety in 15 patients; promising efficacy results in first 8 patients in CLN6
- Active preclinical programs in CLN8 and CLN1 Batten disease with other neurologic LSDs in earlier preclinical development









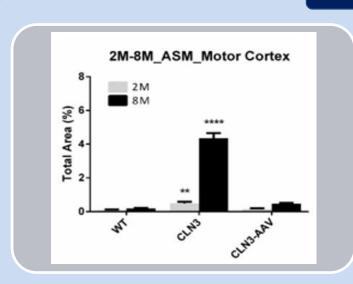
Foust, Kaspar et al, 2009

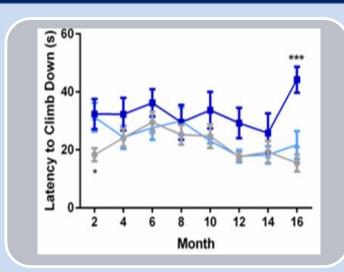


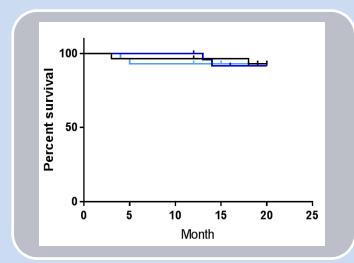
CLN3 Batten Disease: Preclinical and Clinical Summary

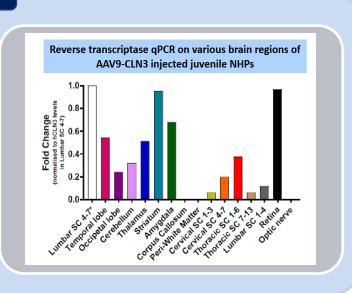
Amicus' second clinical stage gene therapy in CLN3 Batten disease has successfully completed dosing in three children in Cohort 1 (low dose) with dosing of additional Cohort 2 (high dose) patients in 2H 2019

Preclinical Data in KO Mice









Reduction of storage material in mouse model

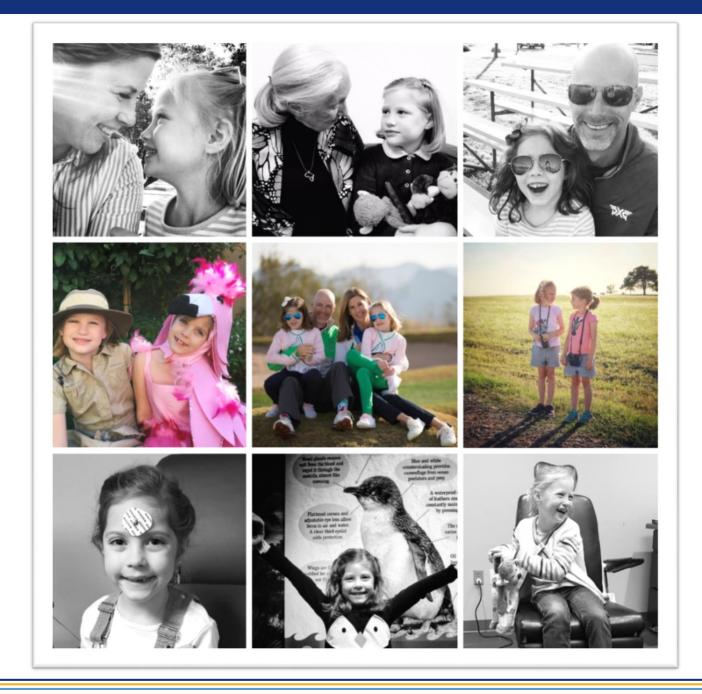
Improvement of motor function and cognitive behavior in mouse model

Comparable survival in mouse model

Widespread gene expression in brain of NHPs



The Kahn Family – Life with CLN3 Batten Disease





The Kahn Family – Life with CLN3 Batten Disease

Video:

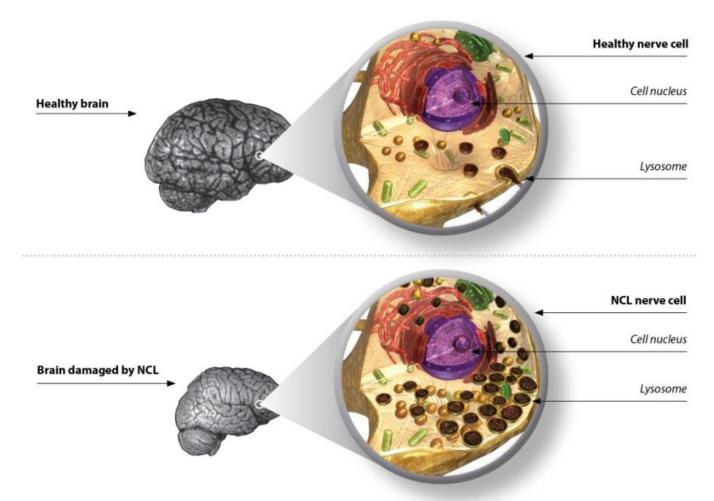




CLN6 Batten Disease Overview

Batten disease is a devastating early childhood disease that is 100% fatal in children. CLN6 is a neurologic disease that rapidly robs children of their ability to walk, speak, think, see, and often ends in death during childhood.

- Mutation in CLN6 gene leads to lysosomal dysfunction
- Usually presents at 2-3 years of age after typical childhood development
- Rapidly robs children of their ability to walk, speak, think, and see
- No approved therapy and urgent need for treatment
- Early intervention is critical
- Estimated population is ~1,000 globally





Hamburg Motor and Language Scale

Following symptom onset, natural history indicates rapid degradation of motor and language ability, on the Hamburg scale, with each point decline representing significant impairment

Hamburg Motor & Language Scale

Motor Function	Language Function
3 Normal	3 Normal
2 Clumsy, falls	2 Abnormal
1 Non-walking	1 Minimal
0 Immobile	Unintelligible or no vocalization

In each domain, the rating is structured so that a score of:

3 = normal condition

2 = slight or just noticeable abnormality

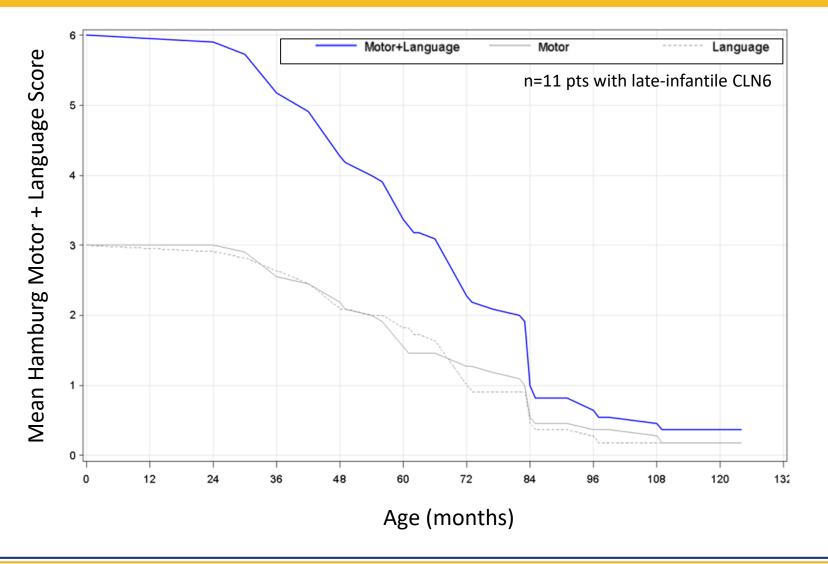
1 = severe abnormality

0 = complete loss of function



CLN6 Natural History

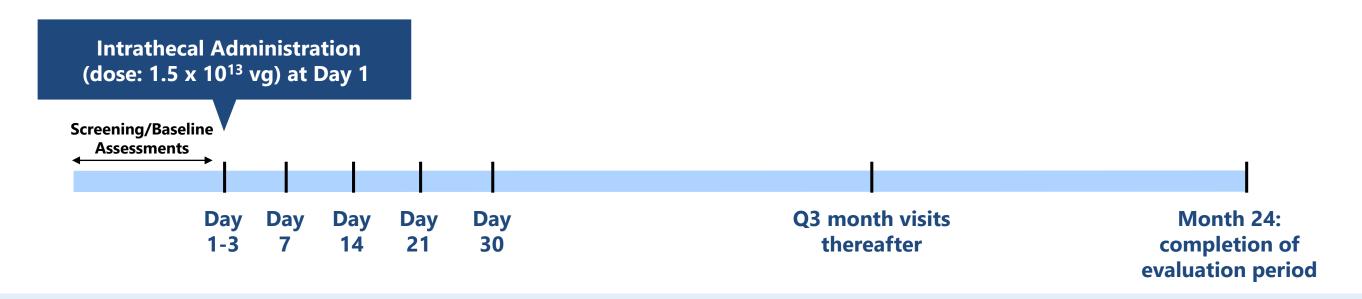
CLN6 natural history shows a progressive decline of approximately one point per year in the Hamburg score from age two onwards with similar decline in motor and language





Clinical Study Design

Safety and efficacy of a single administration of intrathecally delivered AAV-CLN6 gene therapy evaluated for a number of key parameters including Hamburg Motor + Language score



Key Eligibility Criteria

- Diagnosis of CLN6 determined by genotyping
- Hamburg motor and language score ≥3
- Age ≥1 year

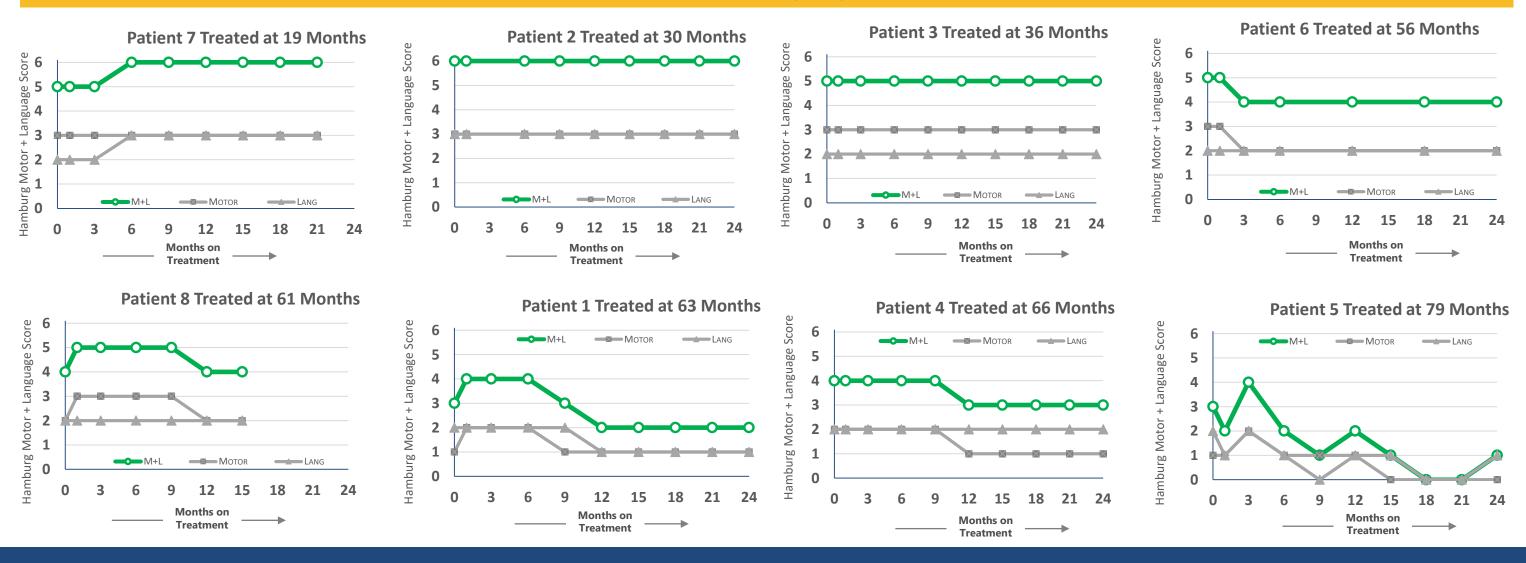
Efficacy Evaluations

- Hamburg scale
- Additional measures include: UBDRS, Cognitive and Language Ability, Vision, QOL, Ophthalmologic Assessments, Brain MRI



Clinical Efficacy: Combined and Individual Hamburg Scores (n=8)

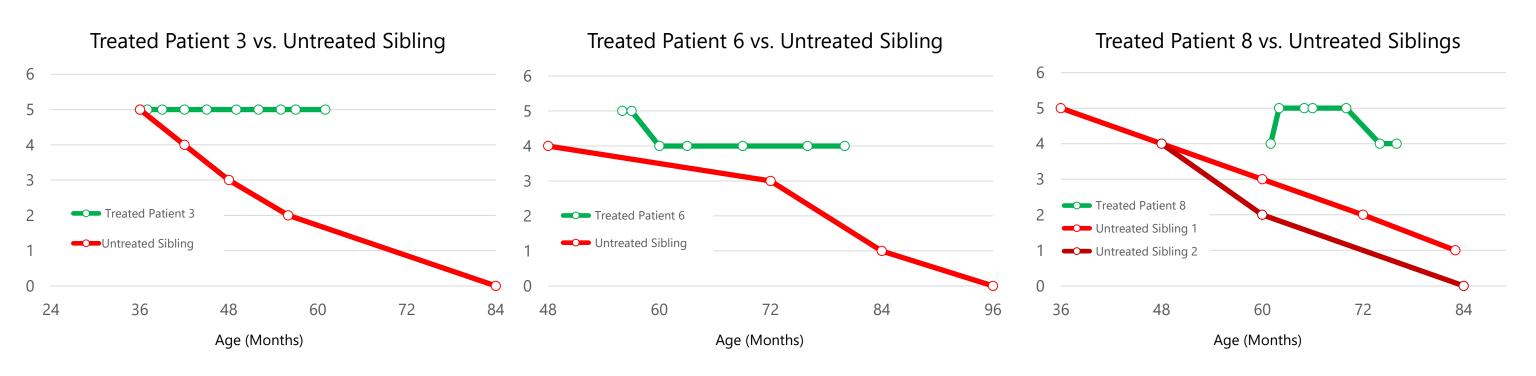
CLN6 gene therapy halts or substantially slows progression of disease with a positive impact on motor and language function in 7 out of 8 patients



CLN6 Clinical Efficacy Data: Sibling Comparisons (Natural History)

Treated patients demonstrated stabilization relative to untreated siblings in the natural history data set who experienced substantial declines in motor and language ability

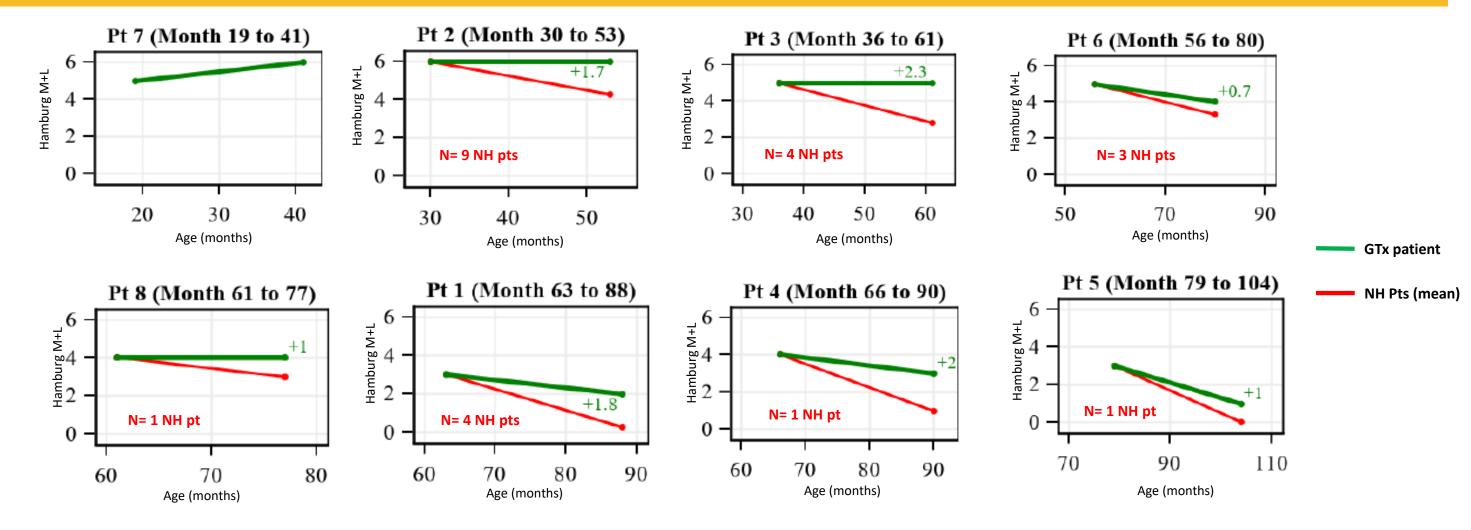
Treated AAV-CLN6 Patients vs Natural History Sibling with CLN6 (Hamburg Score: Motor + Language over time)





CLN6 Clinical Efficacy Data: Natural History Matched Comparisons

New analysis of treated patients demonstrate improvement compared to natural history patients matched for age and baseline Hamburg M+L score*



^{*}Matched for age and exact baseline Hamburg score. No current match (for age and exact M+L score at baseline) for youngest patient (pt. 7)



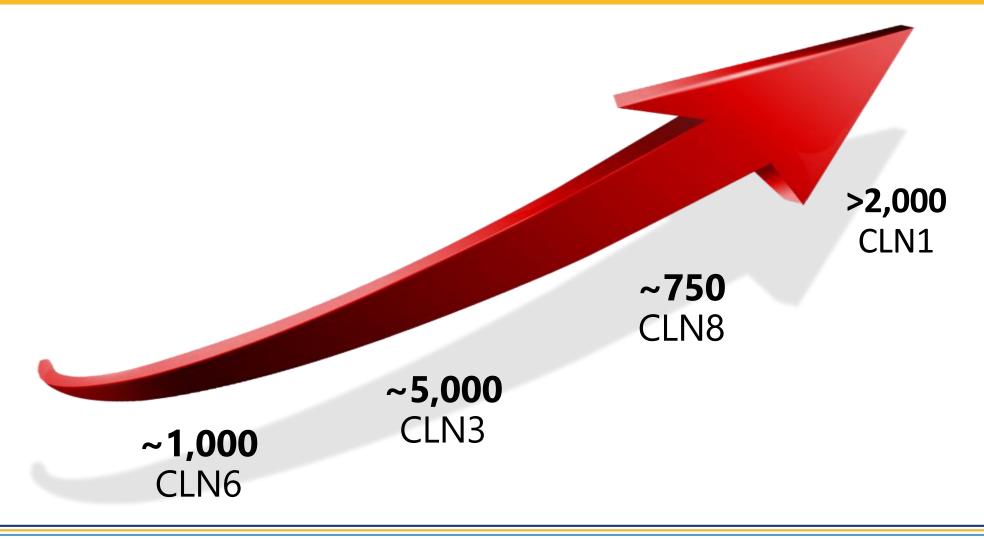
5 Key Takeaways for AAV-CLN6 Gene Therapy

Interim safety and efficacy data demonstrate the potential for AAV-CLN6 gene therapy to stabilize progression of a devastating disease

- Meaningful impact on motor and language function in children with a fatal neurologic disease that destroys brain function
- Evidence of disease stabilization in seven out of the eight children following AAV-CLN6 gene transfer
- Natural history cohort shows progressive loss of language and motor function in untreated patients
- Sibling comparisons (in-study and natural history) and matched natural history comparisons provide further support for AAV-CLN6 gene therapy and early intervention
- Favorable safety profile with intrathecal administration of AAV in all study participants

Batten Disease Franchise

CLN6 results validate the broad potential of the intrathecal AAV platform to build a valuable and significant franchise to save thousands of children suffering from multiple types of Batten diseases with potential for \$1B+ in recurring peak revenue





CLN6 Disease Overview

The perspectives of people living with CLN6 demonstrate the urgent need for treatment

Video:

CLN6 from a Parent Perspective





Q&A

2019 Analyst Day | October 10, 2019 | New York, NY



Closing Remarks

John F. Crowley

Chairman and Chief Executive Officer

2019 Analyst Day | October 10, 2019 | New York, NY

Thank You

