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Breaking Through Barriers in Neurology and Gene Therapy

Corporate Deck | May 2023

Forward-looking statements

This presentation contains forward-looking statements for the purposes of the safe harbor provisions under The Private Securities Litigation Reform Act of 1995 and other federal securities laws. The use of words such as “may,” “might,” “will,” “should,” “expect,” “plan,” “anticipate,” “believe,” “estimate,” “target,” “project,” “intend,” “future,” “potential,” or “continue,” and other similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. These forward-looking statements include, among other things, statements about Voyager’s ability to continue to identify and develop proprietary capsids from its TRACER AAV capsid discovery platform and to leverage receptor identification to enable rational capsid design; Voyager’s ability to identify and develop proprietary capsids from its TRACER AAV capsid discovery platform with increased transgene expression, increased blood-brain barrier penetration and increased biodistribution compared to conventional AAV5 and AAV9 capsids and which are differentiated from capsids identified by other capsid developers; Voyager’s ability to utilize its novel proprietary capsids in its own product development programs and to progress its own product development programs; Voyager’s ability to attract parties to license its novel proprietary capsids or to participate with Voyager in research and development collaborations utilizing its novel proprietary capsids; Voyager’s ability to advance its AAV-based gene therapy and anti-tau antibody programs, including identifying a lead development candidate for each program; Voyager’s ability to perform its obligations under its license option agreements with Novartis and Pfizer; Voyager’s ability to generate near term and long term funding through upfront, milestone and royalty based fees license option agreements with Pfizer, Novartis and other parties; Voyager’s ability to maintain its current partnerships and collaborations and to enter into new partnerships or collaborations; the ability of newly appointed Board members and senior officers to join Voyager and to perform their roles successfully; and the sufficiency of Voyager’s cash resources. These forward-looking statements are only predictions, and Voyager may not actually achieve the plans, intentions, or expectations disclosed in the forward-looking statements. All forward-looking statements are subject to risks and uncertainties that may cause actual results to differ materially from those that Voyager expected. Such risks and uncertainties include, among others, the continued development of various technology platforms, including Voyager’s TRACER capsid discovery platform; Voyager’s scientific approach and program development progress, and the restricted supply of critical research components; the ability to attract and retain talented contractors and employees, including key scientists and business leaders; the ability to create and protect intellectual property; the sufficiency of cash resources; the possibility and the timing of the exercise of development, commercialization, license and other options under the Pfizer and Novartis license option agreements and other collaborations; the ability of Voyager to negotiate and complete other licensing or collaboration agreements on terms acceptable to Voyager and third parties; the success of programs controlled by third party collaboration parties in which Voyager retains a financial interest, and the success of Voyager’s product candidates. These statements are also subject to a number of material risks and uncertainties that are described in Voyager’s most recent Annual Report on Form 10-K filed with the Securities and Exchange Commission, as updated by its subsequent filings with the Securities and Exchange Commission. Any forward-looking statement speaks only as of the date on which this presentation was posted to Voyager’s website. Voyager undertakes no obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events or otherwise, except as required by law.

Voyager Therapeutics (Nasdaq: VYGR) Investment Thesis

Breaking Through Barriers in Neurology and Gene Therapy

CAPSID PLATFORM

Enabling CNS delivery

- TRACER™ AAV capsid discovery platform: superior BBB penetration at low doses
- IV delivery: leverages vasculature for broad CNS transduction, minimally invasive
- Capsid receptor identification supports potential for human translation

CNS PIPELINE

Capsids + Diverse Payloads

- Validated targets and biomarkers allow potential for rapid proof-of-biology
- Indications with high unmet need: ALS, Alzheimer's, Parkinson's, Friedreich's Ataxia
- Nominating lead candidates; IND filings expected 2024/2025

PARTNERSHIPS

Generating Non-Dilutive Revenue

- Capsid licenses with Pfizer and Novartis, exclusive to target NOT capsid
- Strategic partnership with Neurocrine on GBA1, FA, and five undisclosed targets
- Exploring additional partnerships

CNS pipeline focuses on validated targets with high potential value

Program (Mechanism)	Ownership	Early Research	Late Research	IND-Enabling
ALZHEIMER'S DISEASE Passive Tau Antibody	Wholly-Owned			
FRIEDREICH'S ATAXIA FXN Gene Therapy (Gene Replacement)	Neurocrine Collaboration (VYGR has 40% cost/profit split option)*			
ALS SOD1 Gene Therapy (Gene Silencing)	Wholly-Owned			
PARKINSON'S / OTHERS GBA1 Gene Therapy (Gene Replacement)	Neurocrine Collaboration (VYGR has 50% cost/profit split option)**			
EARLY RESEARCH PROGRAMS Allele-specific mHTT+MSH3 gene silencing for HD; Tau gene silencing for Alzheimer's; vHER2 antibody for brain mets	Wholly-Owned			

UNDISCLOSED DISEASES / Five Gene Therapy Programs	Neurocrine Collaboration
RARE NEUROLOGICAL DISEASE / Gene Therapy	Pfizer License
CNS DISEASES / Two Gene Therapy Programs	Novartis License

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* After the Phase 1 readout, Voyager has the option to either: (1) co-develop and co-commercialize with Neurocrine Biosciences in the U.S. under a 60/40 cost- and profit-sharing arrangement (Neurocrine/Voyager), or (2) grant Neurocrine Biosciences full U.S. commercial rights in exchange for milestone payments and royalties based on U.S. sales.
** After the Phase 1 readout, Voyager has the option to either: (1) co-develop and co-commercialize with Neurocrine Biosciences in the U.S. under a 50/50 cost- and profit-sharing arrangement, or (2) grant Neurocrine Biosciences full U.S. commercial rights in exchange for milestone payments and royalties based on U.S. sales.

TRACER™ AAV Capsid Platform

The TRACER™ AAV Difference

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Delivery will enable the future of neuro genetic medicine

DELIVERY *currently limits* **NEUROLOGY**

Difficult to deliver across blood-brain barrier (BBB)

DELIVERY *currently limits* **GENE THERAPY**

Narrow therapeutic windows with local or systemic delivery

NEURO DELIVERY *of* **GENETIC MEDICINES**
COMBINES THESE DELIVERY CHALLENGES

IV dosing: Low BBB penetration. Weak CNS transduction.
Local dosing (IT, IP*): Steep gradients. Restricted penetration within brain.

VOYAGER IS ENABLING DELIVERY *of* **NEURO-GENETIC MEDICINES**

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*IT: intrathecal, IP: intraparenchymal.

Voyager's novel TRACER™-derived capsids power next-gen gene therapy

TRACER™ capsid discovery platform derived from evaluation of 200M+ variants of AAV5 and AAV9

Minimally invasive **I.V. Delivery**

Customizable cell tropisms (neurons, glial cells) and levels of liver de-targeting

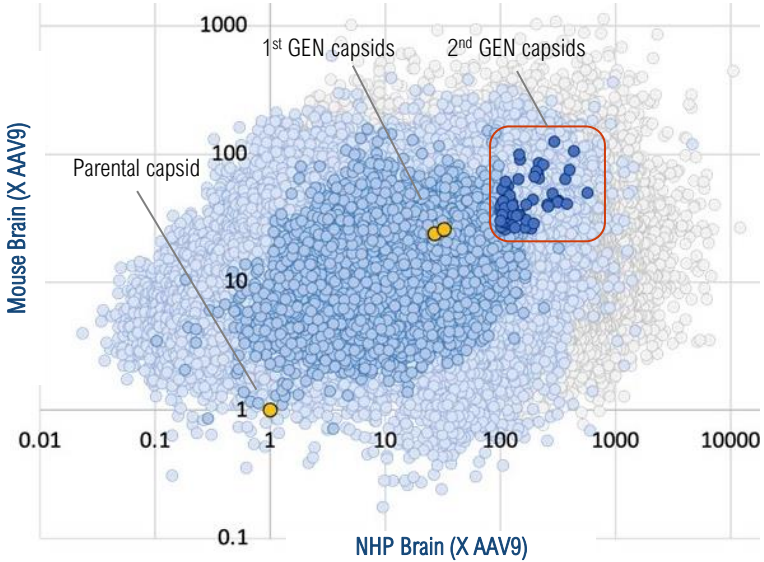
Receptor identification enables rational design

Multi-Species Validation

Improved, broad **CNS transduction**

Fully integrated: capsid engineering, NHP in vivo validation, scalable production (HEK, Sf9)

>100-fold improved CNS delivery across species

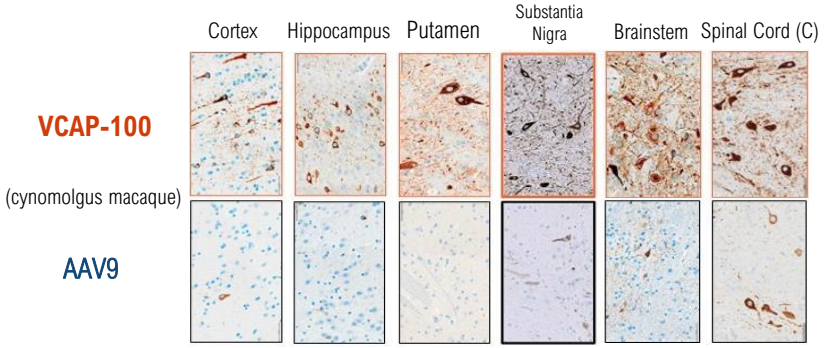


Data Presented at ASGCT 2022, Moyer et. al.

*Compared to conventional AAV9 dosed intravenously in non-human primates (NHPs)

Novel IV delivered capsids with potential to transform CNS treatment

Widespread CNS distribution



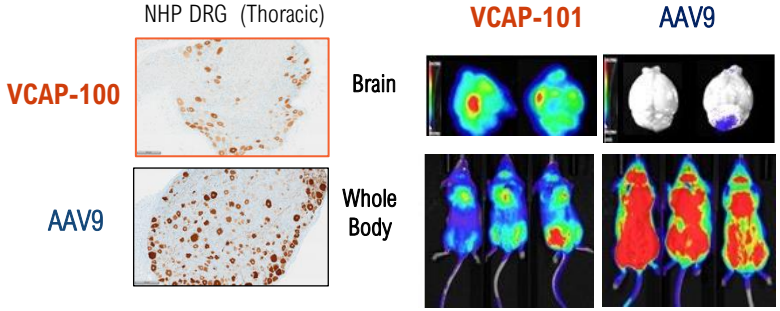
CNS neurons and glia transduced

9P801 capsid in NHP (cynomolgus macaque)

VCAP-102 capsid in mouse

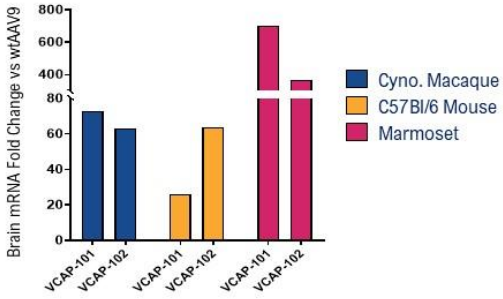
VCAP-100 capsid in NHP (macaque)

Detargeting of peripheral tissues

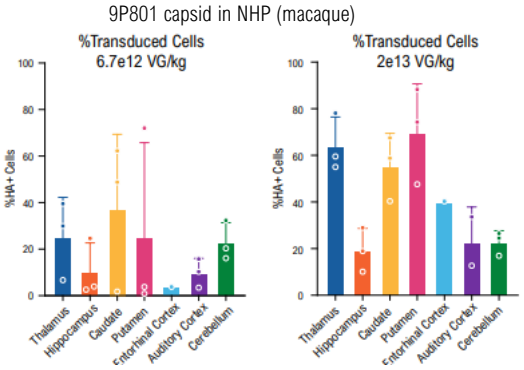


VCAP-101 capsid in mouse

Cross species transduction



Transduction at low doses



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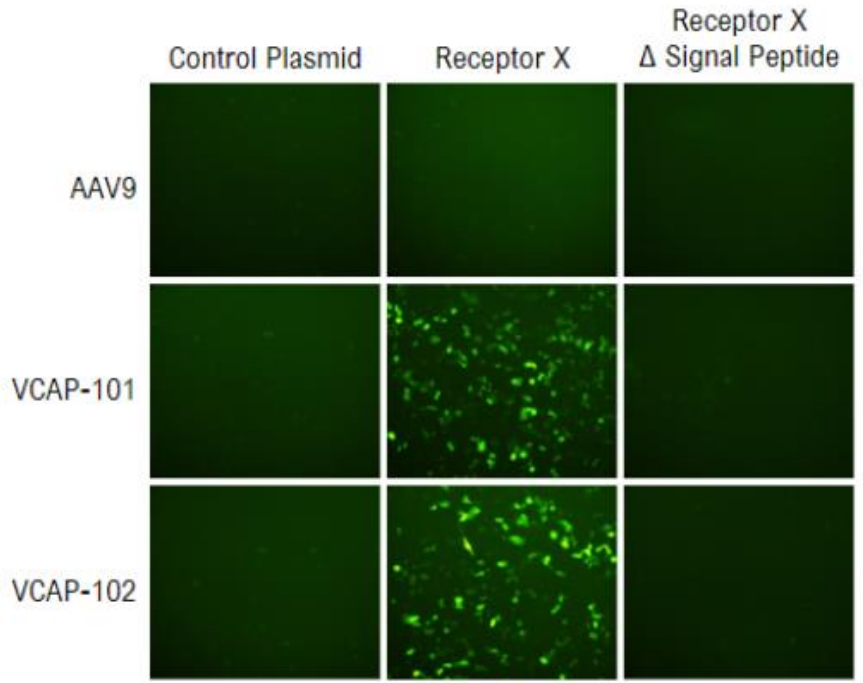
Receptor identified for TRACER™ capsid family

- ✓ Receptor identified for one of our most promising TRACER™ AAV capsids (ESGCT 2022)
- ✓ Expression confirmed in human endothelial cells and multiple CNS cell types

Characterizing the applicable receptor and confirming activity with the human orthologue increases probability that the related capsid will cross the BBB in humans

- Should facilitate rational design of AAV capsids for targeted IV delivery
- May enable IV delivery to CNS for diverse therapeutic modalities (preclinical experiments underway)



ESGCT 2022: Identification of a Cell Surface Receptor Utilized by an Engineered BBB-Penetrant Capsid Family with Enhanced Brain Tropism in Non-Human Primates and Mice

Transformative CNS Pipeline

Combining capsids with diverse payloads

Collaboration demonstrates how Voyager is enabling neuro genetic medicine

NOVEL CAPSIDS

- IV-delivered
- 100-1000X CNS transduction
- Multiple CNS cell tropisms (neurons, glial cells); liver/DRG de-targeting
- Capsid receptor identification

✓ **Pfizer license option exercised**

✓ **Novartis license option exercised**

✓ **Neurocrine collaborating on multiple targets**

+

DIVERSE PAYLOADS

- CNS diseases
- CNS targets
- Preclinical models
- Vectorizing payloads (siRNA, antibodies, gene replacement)

✓ **Neurocrine collaborating on GBA1 and FA programs plus five discovery programs**

✓ **Voyager advancing wholly-owned programs in gene replacement, silencing, antibodies**

=

ENABLING NEURO-GENETIC MEDICINES

OPTIMAL CAPSID

+

OPTIMAL PAYLOAD

=

PROGRAM VALUE CREATION

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Anti-tau antibody offers a new twist on an Alzheimer's target

HIGH UNMET NEED + COMMERCIAL POTENTIAL

~6 million people in U.S.*

Multiple approaches needed: Like oncology, combination treatment may improve outcomes (i.e. anti-amyloid + anti-tau)

VALIDATED TARGET

Tau

Pathology closely correlates with disease progression and cognitive decline

Targets C-terminal domain

Failed approaches targeted N-terminal; more consistent than mid-domain

EFFICIENT PATH TO PROOF-OF-BIOLOGY

New Tau PET tracers enable imaging for tau pathology and use as clinical trial biomarkers

ROBUST PRECLINICAL PHARMACOLOGY

Voyager IV-delivered antibody inhibited spread of pathological tau by >70% in mouse seeding model (AAIC 2022)

STATUS: Lead development candidate selected

MILESTONE: Expect to initiate GLP tox in 2023 to enable IND H1 2024

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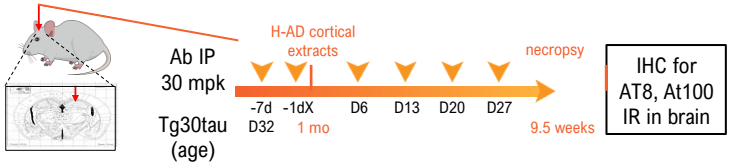
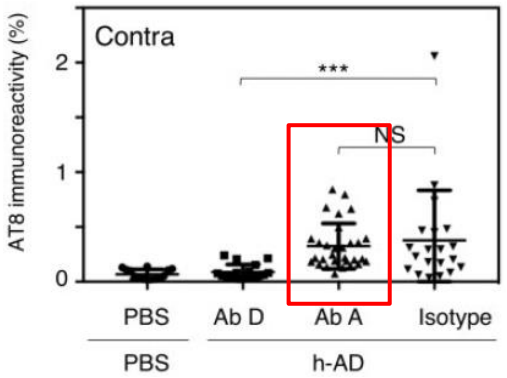
* Alzheimer's Facts and Figures Report | Alzheimer's Association

Voyager's anti-tau antibody is differentiated from other anti-tau antibodies

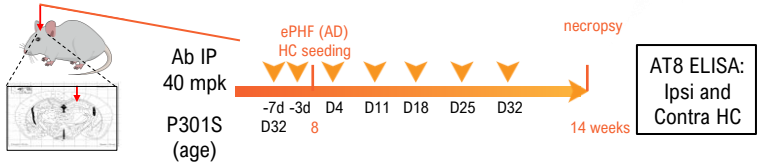


N-terminal Ab IPN002 is not effective in both mouse seeding model and clinic

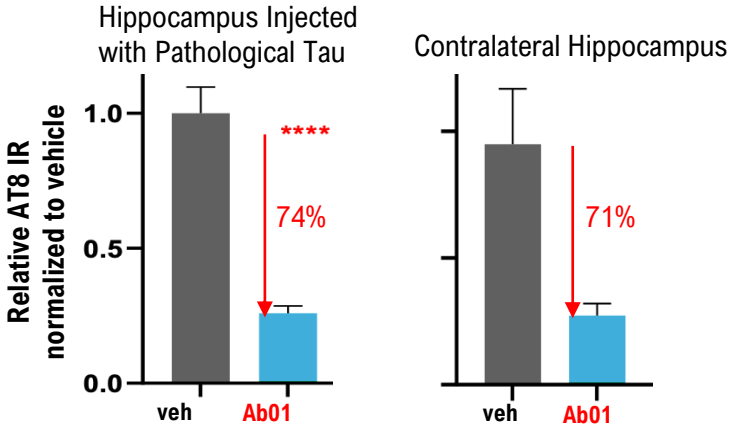


Note: Ab A targets N-terminus (aa15-24, IPN002)

Albert, *Brain*, 2019



Ab01 inhibits spread of pathological tau in mouse seeding model



Liu, *AAIC* 2022

Gene therapy approach to a validated target in ALS*

HIGH UNMET NEED + COMMERCIAL POTENTIAL

~20,000 people in U.S.**

~800 ALS patients have a SOD1 mutation

Incidence: 1 in 50,000**

Previous treatments have been minimally effective; disease is typically fatal within 3 years of diagnosis

VALIDATED TARGET

SOD1

SOD1 mutations cause toxic gain of function in forms of familial ALS

FDA approved tofersen is an ASO targeting SOD1 that has demonstrated clinical effect. Gene therapy approach could follow with more durable solution.

EFFICIENT PATH TO PROOF-OF-BIOLOGY

SOD1 measurable in CSF; plasma neurofilament light chain biomarkers measurable in plasma

ROBUST PRECLINICAL PHARMACOLOGY

Preclinical data showed robust SOD1 knockdown and significant improvements in motor performance and survival

STATUS: Lead optimization underway

MILESTONE: ID lead candidate projected in H2 2023

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* ALS: Amyotrophic Lateral Sclerosis

** FYI: Epidemiology of ALS and Suspected Clusters | The ALS Association

SOD1 knockdown approach shows preclinical survival benefit in mouse models

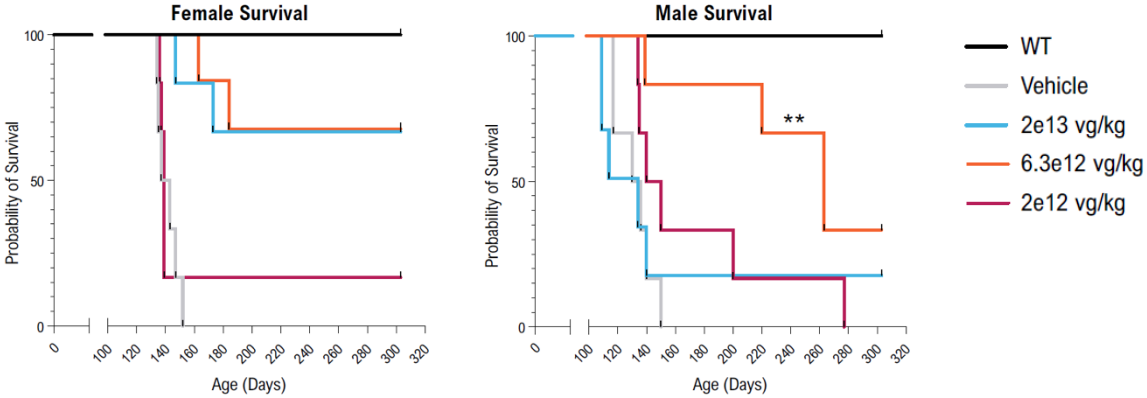
Strategy to combine highly potent siRNA construct with CNS-tropic, BBB penetrant TRACER capsid

- May enable broad CNS knockdown of SOD1, potentially addressing disease manifestations beyond the spinal cord

Promising preclinical results in mouse model

- Robust SOD1 knockdown in all levels of the spinal cord with IV dosing using a mouse BBB penetrant capsid
- Significant improvements in motor performance, body weight and survival

Increase in Survival



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GBA1 gene replacement; partnered with Neurocrine Jan 2023

HIGH UNMET NEED + COMMERCIAL POTENTIAL

~1 million people in U.S.*

>10% of PD patients have a GBA1 mutation

Potential to treat idiopathic PD

VALIDATED TARGET

GBA1

GBA1 mutations increase the risk of PD ~20-fold*

STATUS:

Lead optimization underway

EFFICIENT PATH TO PROOF-OF-BIOLOGY

GBA1 mutations decrease expression of GCase protein, leading to substrate elevation.

GCase and substrate measurable in CSF

ROBUST PRECLINICAL PHARMACOLOGY

Preclinical data demonstrate CNS target engagement and delivery of therapeutically relevant levels of GCase in GBA loss of function mouse model.

MILESTONE: Advancing in collaboration with Neurocrine

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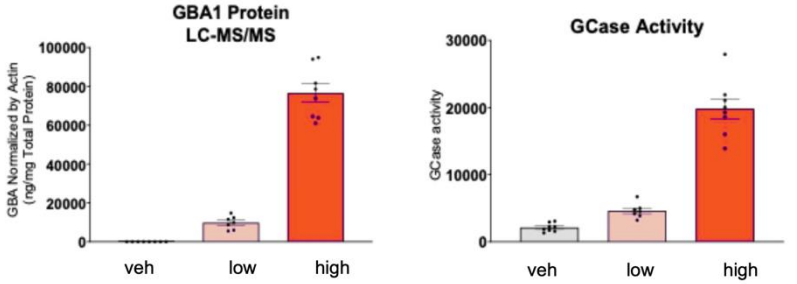
* Schapira et al., Mol Cell Neurosci, 2015; Sidransky et al., NEJM, 2009

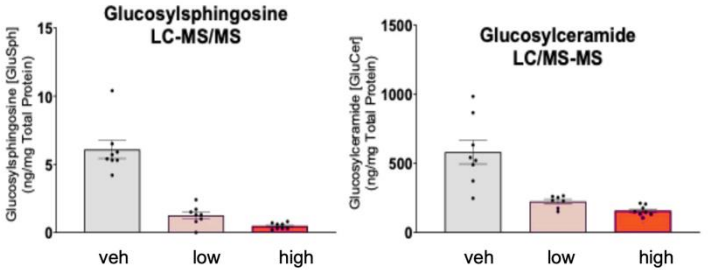
Restoration of GCase with IV-administered, BBB-penetrant AAV capsids

- BBB-penetrant AAV capsid provides *in vivo* proof-of-concept (POC) for increase in GCase with concomitant reduction of substrates
- Delivery of therapeutically relevant levels of GCase may disrupt disease process, and potentially slow neurodegeneration
- IV delivery with CNS-tropic capsid may enable widespread distribution to multiple affected brain regions and avoid need for more invasive approaches

GCase increased in GBA1 LOF mouse model



Substrate decreased in GBA1 LOF mouse model



Data shown reflects Day 0 IV dosing in GBA1 loss-of-function(LOF) mouse of 2E12, 2E13 vg/kg dosing of Voyager-optimized PHP.eB..GBA1, Day 28 necropsy with measures of GCase protein, activity, and substrate levels

HD gene therapy initiative leverages latest in disease biology

HIGH UNMET NEED + COMMERCIAL POTENTIAL

~41,000 people in U.S.*

Incidence: 0.7 in 100,000**

Currently no cure or treatment that can halt, slow or reverse HD*

VALIDATED TARGETS

Allele-specific mHTT

Target the mutant protein while preserving the healthy version, which may improve safety profile

MSH3

DNA repair enzyme potentially involved in harmful DNA expansions in the HTT gene

EFFICIENT PATH TO PROOF-OF-BIOLOGY

Leveraging emerging fluid-based biomarkers and imaging

ROBUST PRECLINICAL PHARMACOLOGY

First-in-class approach based on evolving research on the role of somatic expansion in HD

STATUS: Voyager is developing a vectorized siRNA approach to silence HTT allele-specifically and MSH3

MILESTONE: Early research initiative to determine if advancement warranted

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* Overview of Huntington's Disease - Huntington's Disease Society of America (hdsa.org)

** Modeling Manifest Huntington's Disease Prevalence Using Diagnosed Incidence and Survival Time - FullText - Neuroepidemiology 2021, Vol. 55, No. 5 - Karger Publishers

siRNA tau gene silencing approach for Alzheimer's disease

HIGH UNMET NEED + COMMERCIAL POTENTIAL

~6 million people in U.S.*

Multiple approaches needed: Like oncology, combination treatment may improve outcomes (i.e. anti-amyloid + anti-tau, or multiple anti-tau approaches)

VALIDATED TARGET

Tau

Pathology closely correlates with disease progression and cognitive decline

siRNA gene silencing approach to lower tau within neurons

EFFICIENT PATH TO PROOF-OF-BIOLOGY

New tau PET tracers enable imaging for tau pathology and use as clinical biomarkers

ROBUST PRECLINICAL PHARMACOLOGY

New initiative leverages Voyager's tau expertise to target tau; may complement extracellular tau antibody

STATUS:	Voyager is optimizing siRNA tau gene silencing payloads
MILESTONE:	Early research initiative to determine if advancement warranted

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* Alzheimer's Facts and Figures Report | Alzheimer's Association

Partnerships

Track Record of Non-Dilutive Revenue

Multiple partnership structures driving value

CAPSID LICENSES

PROVIDE:

- Validation (third-party buy-in, potential program use)
- Near-term funding (upfront and option exercise payments)
- Long-term funding (milestones and royalties)
- Multiple ‘shots on goal’ to prove human translation

Pfizer NOVARTIS

PROGRAM PARTNERSHIPS

PROVIDE:

- Significant long-term potential value (profit share or milestones and royalties)
- Cost savings (program funding)
- Validation (investment into program)
- Near-term funding (upfront, early development milestone payments)

NEUROCRINE BIOSCIENCES

CREATIVE COLLABORATIVE STRUCTURES

PROVIDE:

- Opportunities to combine TRACER capsids and receptor technology with cutting-edge payloads and biologics, placing Voyager at forefront of neurogenetic medicine
- Various deal structures with range of participation being explored

DISCUSSIONS ONGOING

Existing partnership highlights

	Disease/Target (Cells, Tissues, Transgenes)	Upfront Payment	Potential Option + Option Exercise Fees	Potential Milestone Payments	Tiered Royalties
NEUROCRINE BIOSCIENCES	GBA1 Program + 3 undisclosed targets	$175 million ($136 million cash; $39 million equity	N/A	$4.2 billion*	GBA, U.S. low double-digit to twenty; ex-U.S. high single-digit to mid-teen. Rare CNS targets, U.S. high single-digit to mid-teen; ex-U.S. mid single-digit to low double-digit*
NOVARTIS	2 undisclosed CNS targets (expandable to 2 additional rare CNS targets)	$54 million	$25 million – exercised, $61 million potential expansion	$600 million for exercised targets, $600 million potential expansion	Mid- to high-single-digit
Pfizer	1 undisclosed rare neurologic disease target	$30 million	$10 million – exercised	$290 million	Mid- to high-single-digit
NEUROCRINE BIOSCIENCES	Friedreich's Ataxia + 2 undisclosed targets	$165 million ($115 million cash; $50 million equity)	N/A	$1.3 billion**	High-single-digit to high-teens in the U.S. and mid-single-digit to mid-teens ex-U.S.**

* After the Phase 1 readout, Voyager has the option to either: (1) co-develop and co-commercialize with Neurocrine Biosciences in the U.S. under a 50/50 cost- and profit-sharing arrangement, or (2) grant Neurocrine Biosciences full U.S. commercial rights in exchange for milestone payments and royalties based on U.S. sales.
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$200 MILLION in 2023 payments extend anticipated cash runway into 2025

Summary

Management team brings neurology and gene therapy expertise

Al Sandrock, M.D., Ph.D.
Chief Executive Officer
Biogen

Robin Swartz
Chief Operating Officer
SANOFI GENZYME

Todd Carter, Ph.D.
Chief Scientific Officer
BROAD INSTITUTE

Peter Pfreundschuh
Chief Financial Officer
FREQUENCY THERAPEUTICS

Allen Nunnally
Acting Chief Business Officer
FOUNDATION MEDICINE

Michelle Quinn Smith
Chief Human Resources Officer
Flagship Pioneering

Trista Morrison
SVP Corporate Affairs
saniona

Recent highlights and upcoming milestones

Q1 2023 ✓	**Neurocrine collaboration** for GBA1 + 3 discovery programs; $175M payment, potential $4.4B deal
Q1 2023 ✓	**Novartis option exercised** on capsids for two CNS targets; $25M payment
Q1 2023 ✓	**Selected lead candidate** in anti-tau antibody program for Alzheimer's disease
Q1 2023 ✓	**Launched two early research initiatives** for Huntington's disease and Alzheimer's disease
Q2 2023 ✓	**Added George Scangos**, Ph.D., to Board of Directors
Q2 2023 ○	Expect to present additional data validating novel capsids at ASGCT 2023
H2 2023* ○	Expect to ID lead candidate for SOD1 ALS gene therapy
H1 2024 ○	Expect to file IND with anti-tau antibody program for Alzheimer's disease
2025 ○	Multiple additional opportunities for INDs from wholly-owned and partnered programs
ONGOING ○	Potential for additional value-creating partnerships; discussions ongoing

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* Voyager previously announced that it expected to identify a lead development candidate for this program in the first half of 2023. The Company now expects to identify a lead development candidate in the second half of 2023.

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