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Breaking Through Barriers in Neurology and Gene Therapy

Corporate Deck | January 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; 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.

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Voyager Therapeutics (Nasdaq: VYGR) Investment Thesis

Breaking Through Barriers in Neurology and Gene Therapy

CAPSID PLATFORM

The TRACER™ AAV Difference

- Potential to address gene therapy's narrow therapeutic window: superior BBB penetration at low doses
- Receptor identification supports potential for human translation
- Alliances with gene therapy leaders: Pfizer, Novartis

CNS PIPELINE

Capsids Plus 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 license structure exclusive to target, NOT capsid – enables multiple licenses
- Pfizer exercised option; Novartis decision expected Mar 2023
- Neurocrine: Collaboration on GBA1, FA, and five undisclosed targets
- Exploring additional partnerships

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Breaking News: Voyager strategic collaboration with Neurocrine for GBA1+

VOYAGER RECEIVES:

Strengthens balance sheet	**Up-front consideration of $175M** ($136M cash, $39M equity purchase at 50% premium)
Secures program funding	**Program costs fully reimbursed***
Transformational downstream value	**Up to $4.2B in potential milestones** ($1.5B development, $2.7B commercial) **+ royalties [%]** • 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 **Option to elect 50/50 cost/profit sharing in U.S.** for GBA1 program following Phase 1

NEUROCRINE RECEIVES:

Worldwide rights to Voyager's GBA1 gene therapy program for Parkinson's disease and other GBA1-mediated diseases* and three gene therapy programs directed to rare CNS targets, each enabled by Voyager's next-generation TRACER™ capsids, as well as a Board seat.

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*Subject to potential for Voyager to opt into 50/50 cost/profit share in U.S. for GBA1 program

Collaboration has compelling strategic and financial rationale for Voyager

Recognizes Pipeline Value	Underscores the value of a Voyager prioritized pipeline program; powerful combination of novel TRACER™ capsid and novel payload
Progress for Patients	Leverages Neurocrine's neuroscience R&D and commercial capabilities to improve the likelihood of reaching and helping patients
Partnership Momentum	Demonstrates Voyager's continuing success in capsid licensing, co-development collaborations and other partnerships
Attractive Financials	Provides transformational value; strengthens balance sheet capacity by providing near-term cash and maintains long-term value
Enables Voyager Growth	Provides resources to further advance Voyager's platform, prioritized pipeline programs, and additional cutting-edge research

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 detargeting
- Capsid receptor identification

✓ **Pfizer license option exercised**

✓ **Novartis license option election March 2023**

✓ **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 MEDICINE

OPTIMAL CAPSID

+

OPTIMAL PAYLOAD

=

PROGRAM VALUE CREATION

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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 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

I.V., CNS-tropic capsids → high potency at low doses

Receptor ID → rational design; may enable transport

Expertise vectorizing payloads (antibodies, siRNA, etc.)

Neuropharmacology expertise (diseases, targets, models)

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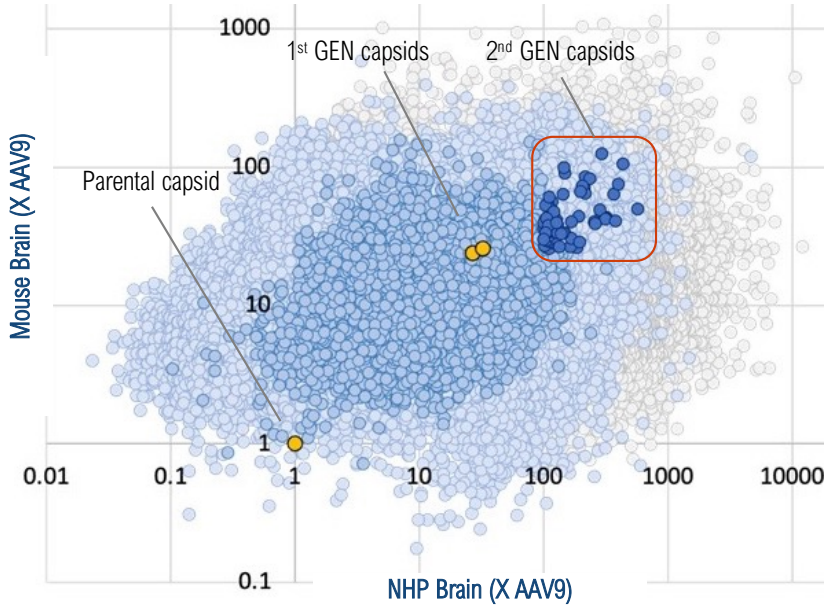
*IT: intrathecal, IP: intraparenchymal.

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

- ✓ Superior BBB penetration across multiple species (mice and NHPs)*
- ✓ Enhanced neuronal and glial cell tropisms*
- ✓ Cross species transduction and receptor identification support human translation potential
- ✓ Broader therapeutic windows and de-targeting of undesired tissues (liver, DRG)*
- ✓ Selected by large pharma partners; enabling other external development opportunities
- ✓ TRACER™-derived capsids support internal pipeline programs

>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)

Voyager stands out in crowded CNS gene therapy space

Minimally invasive
I.V. Delivery

Receptor identification
enables rational design

Improved, broad
CNS transduction

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

Multi-Species Validation

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

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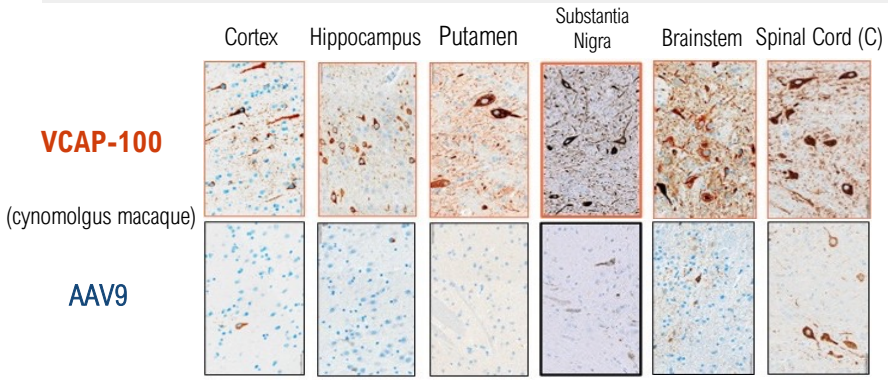
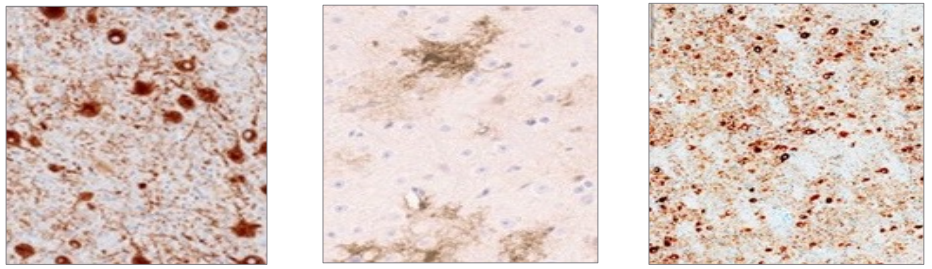
Novel IV delivered capsids with potential to transform CNS treatment

Widespread CNS distribution



CNS neurons and glia transduced

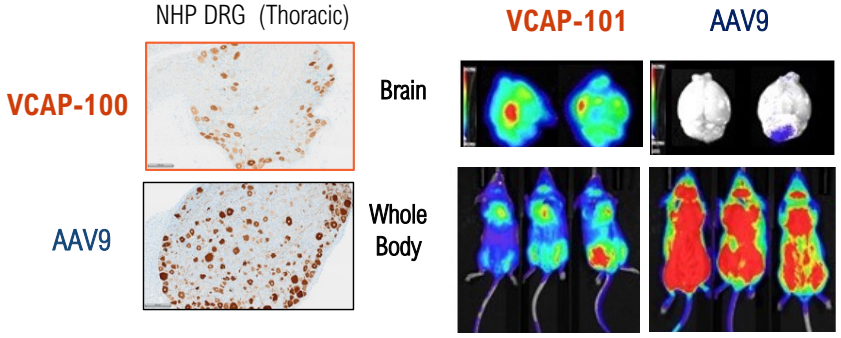


9P801 capsid in NHP (cynomolgus macaque)

VCAP-102 capsid in mouse

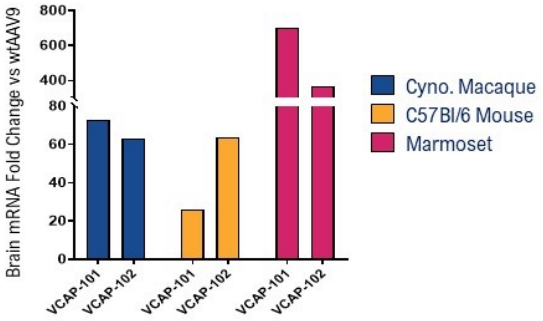
VCAP-100 capsid in NHP (macaque)

Detargeting of peripheral tissues



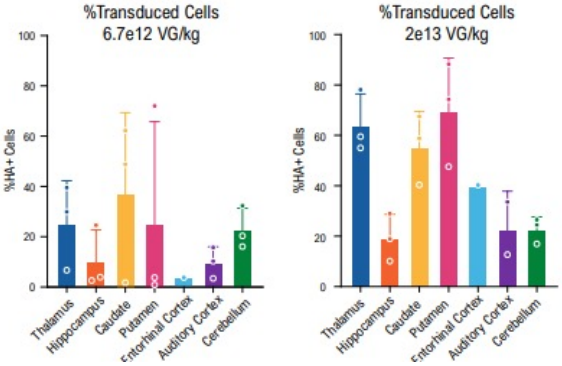
VCAP-101 capsid in mouse

Cross species transduction



Transduction at low doses

9P801 capsid in NHP (macaque)



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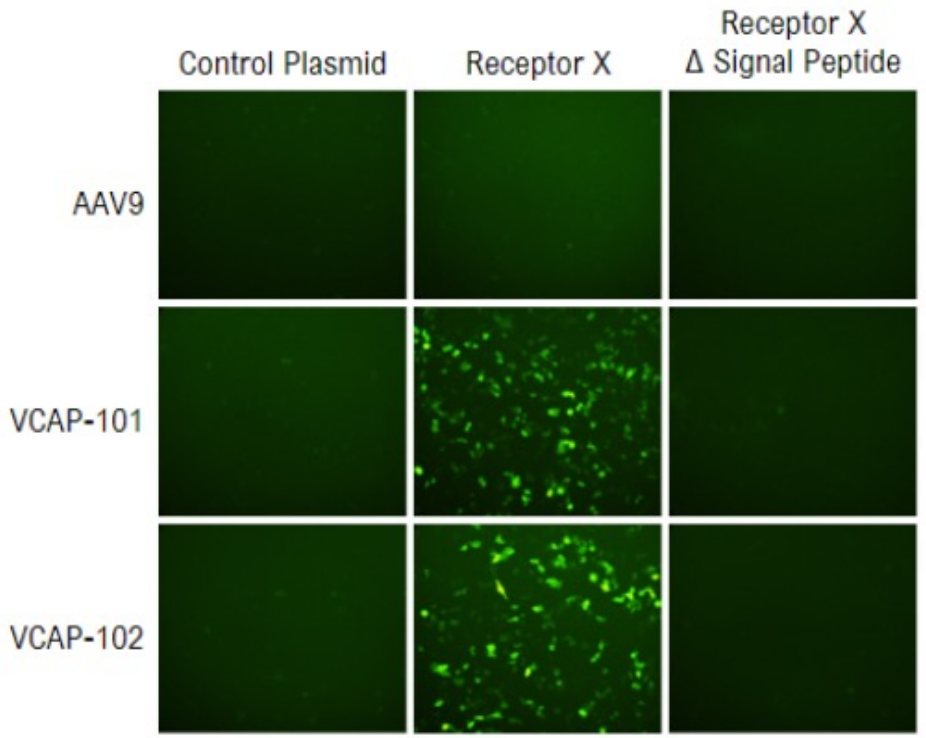
Receptor identified for TRACER™ capsid family

- ✓ 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

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Transformative CNS Pipeline

Combining capsids with diverse payloads

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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			
PARKINSON'S / OTHERS GBA1 Gene Therapy (Gene Replacement)	Neurocrine Collaboration (VYGR has 50% cost/profit split option)*			
ALS SOD1 Gene Therapy (Gene Silencing)	Wholly-Owned			
EARLY RESEARCH PROGRAMS Allele-specific mHtt + MSH3 gene silencing for HD; vHER2 antibody for brain mets	Wholly-Owned			
FRIEDREICH'S ATAXIA FXN Gene Therapy (Gene Replacement)	Neurocrine Collaboration (VYGR has 40% cost/profit split option)**			

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

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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 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.
**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.

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 optimization underway

MILESTONE: ID lead candidate projected in H1 2023

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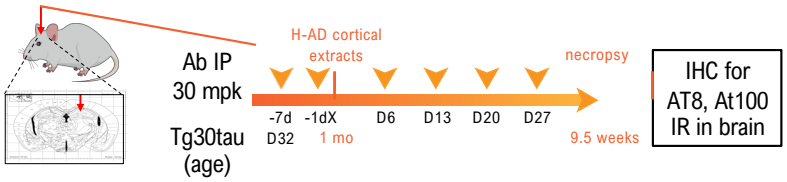
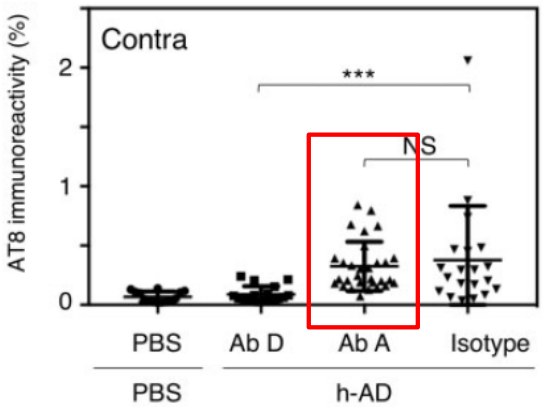
*Alzheimer's Facts and Figures Report | Alzheimer's Association

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

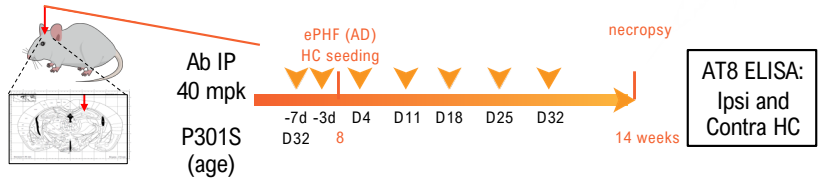


N-terminal Ab IPN002 is not effective in both mouse seeding model and clinic

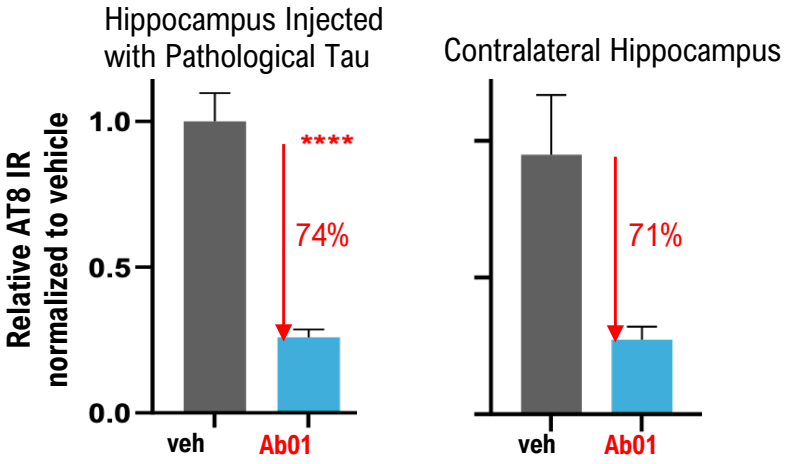


Note: Ab A targets N-terminus (aa15-24, IPN002)

Albert, *Brain*, 2019



Ab01 inhibits spread of pathological tau in mouse seeding model



Liu, *AAIC* 2022

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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: ID lead candidate projected in H1 2023

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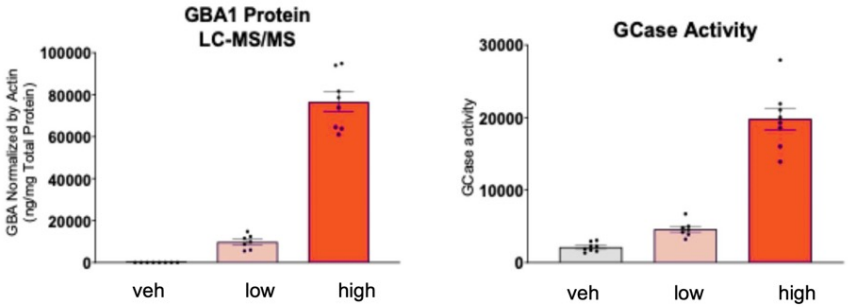
*Schapira et al., Mol Cell Neurosci, 2015; Sidransky et al., NEJM, 2009

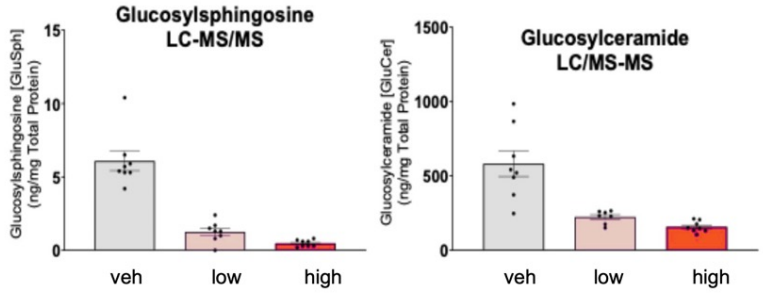
Restoration of GCase with IV-administered, BBB-penetrant AAV capsids

- 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

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**

Existing treatments are 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

Tofersen, under FDA review, 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 H1 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

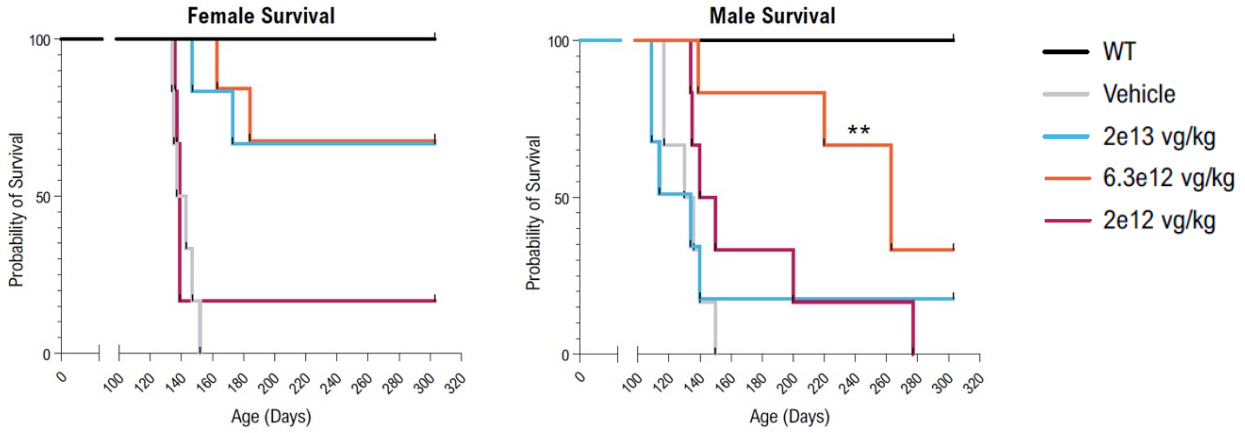
Strategy to combine highly potent siRNA construct with CNS-tropic, BBB penetrant TRACER capsid

- 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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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

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 Development + Commercial Milestone Payments	Tiered Royalties
NEUROCRINE BIOSCIENCES	GBA1 Program + 3 undisclosed targets (subject to HSR clearance)	$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	3 undisclosed CNS targets (expandable to 2 additional rare CNS targets)	$54 million	$98.5 million	$1.5 billion	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.

$64 MILLION in 2022 payments extended cash runway into 2024;
Initial Novartis option exercise decision March 2023

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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
Chief Business Officer
FOUNDATION MEDICINE

Michelle Quinn Smith
Chief Human Resources Officer
Flagship Pioneering

Robert Hesslein
General Counsel
FOUNDATION MEDICINE

Trista Morrison
SVP Corporate Affairs
saniona

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Recent Highlights and Upcoming Milestones

H2 2022 ✓	**Expanded team and BOD:** CFO, CSO, SVP Corporate Affairs, BOD
H2 2022 ✓	**Data at AAIC and ESGCT:** novel tau-antibodies inhibit spread; low dose capsid/receptor data
Q3 2022 ✓	**Pfizer option exercised** on rare neurology target; $10M payment
Q1 2023 ✓	**Novartis strategic collaboration:** potential $4.4B for GBA1+ 3 discovery-stage programs
Q1 2023 ○	Novartis option exercise decision expected (potential for up to $37.5M payment)
H1 2023	Expect to ID lead candidates for all three priority pipeline programs:
○	• Tau antibody for Alzheimer's disease
○	• GBA1 Parkinson's disease gene therapy
○	• SOD1 ALS gene therapy
ONGOING ○	Potential for additional value-creating partnerships; discussions ongoing

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voyagertherapeutics.com
in