where science meets humanity™

First Quarter 2022

Financial Results and Business Update

May 3, 2022

Biogen

Non-GAAP financial information

This presentation and the discussions during this conference call include certain financial measures that were not prepared in accordance with accounting principles generally accepted in the U.S. (GAAP), including adjusted net income, adjusted diluted earnings per share, revenue growth at constant currency, which excludes the impact of changes in foreign exchange rates and hedging gains or losses, and free cash flow, which is defined as net cash flow from operations less capital expenditures. Additional information regarding the GAAP and Non-GAAP financial measures and a reconciliation of the GAAP to Non-GAAP financial measures can be found on slides 53-57 of this presentation and in the Q1 2022 earnings release and related financial tables posted on the *Investors* section of Biogen.com. We believe that these and other Non-GAAP financial measures provide additional insight into the ongoing economics of our business and reflect how we manage our business internally, set operational goals, and form the basis of our management incentive programs. Non-GAAP financial measures are in addition to, not a substitute for, or superior to, measures of financial performance prepared in accordance with GAAP.

We do not provide guidance for GAAP reported financial measures (other than revenue) or a reconciliation of forward-looking Non-GAAP financial measures to the most directly comparable GAAP reported financial measures because we are unable to predict with reasonable certainty the financial impact of items such as the transaction, integration, and certain other costs related to acquisitions or large business development transactions; unusual gains and losses; potential future asset impairments; gains and losses from our equity security investments; and the ultimate outcome of pending significant litigation without unreasonable effort. These items are uncertain, depend on various factors, and could have a material impact on GAAP reported results for the guidance period. For the same reasons, we are unable to address the significance of the unavailable information, which could be material to future results.

Forward-looking statements

This presentation and the discussions during this conference call contain forward-looking statements, including statements made pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, relating to: our strategy and plans; potential of, and expectations for, our commercial business and pipeline programs; capital allocation and investment strategy; clinical development programs, clinical trials, and data readouts and presentations; risks and uncertainties associated with drug development and commercialization; regulatory discussions, submissions, filings, and approvals and the timing thereof; the potential benefits, safety, and efficacy of our and our collaboration partners' products and investigational therapies; the anticipated benefits and potential of investments, collaborations, and business development activities; our future financial and operating results; 2022 financial guidance; plans relating to share repurchases. These forward-looking statements may be accompanied by such words as "aim," "anticipate," "believe," "could," "estimate," "expect," "forecast," "goal," "intend," "may," "plan," "potential," "possible," "prospect," "will," "would," and other words and terms of similar meaning. Drug development and commercialization involve a high degree of risk, and only a small number of research and development programs result in commercialization of a product. Results in early-stage clinical trials may not be indicative of full results or results from later stage or larger scale clinical trials and do not ensure regulatory approval. You should not place undue reliance on these statements or the scientific data presented.

These statements involve risks and uncertainties that could cause actual results to differ materially from those reflected in such statements, including: our dependence on sales from our products; the impact of the final NCD; uncertainty of long-term success in developing, licensing, or acquiring other product candidates or additional indications for existing products; risks that uncertainty as to whether the anticipated benefits of the transaction with Samsung Biologics can be achieved; uncertainty as to whether the anticipated benefits of the cost-reduction and productivity measures can be achieved; failure to compete effectively due to significant product competition in the markets for our products; failure to successfully execute or realize the anticipated benefits of our strategic and growth initiatives; difficulties in obtaining and maintaining adequate coverage, pricing, and reimbursement for our products; our dependence on collaborators, joint venture partners, and other third parties for the development, regulatory approval, and commercialization of products and other aspects of our business, which are outside of our full control; the potential impact of the conflict in Ukraine; risks associated with current and potential future healthcare reforms; risks related to commercialization of biosimilars; failure to obtain, protect, and enforce our data, intellectual property, and other proprietary rights and the risks and uncertainties relating to intellectual property claims and challenges; the risk that positive results in a clinical trial may not be replicated in subsequent or confirmatory trials or success in early stage clinical trials may not be predictive of results in later stage or large scale clinical trials or trials in other potential indications; risks associated with clinical trials, including our ability to adequately manage clinical activities, unexpected concerns that may arise from additional data or analysis obtained during clinical trials, regulatory authorities may require additional information or further studies, or may fail to approve or may delay approval of our drug candidates; the occurrence of adverse safety events, restrictions on use with our products, or product liability claims; risks relating to the distribution and sale by third parties of counterfeit or unfit versions of our products; risks relating to the use of social media for our business; risks relating to technology failures or breaches; risks relating to management and key personnel changes, including attracting and retaining key personnel; failure to comply with legal and regulatory requirements; the risks of doing business internationally, including currency exchange rate fluctuations; risks relating to investment in our manufacturing capacity; problems with our manufacturing processes; fluctuations in our effective tax rate; the direct and indirect impacts of the ongoing COVID-19 pandemic on our business, results of operations, and financial condition; fluctuations in our operating results; risks related to investment in properties; the market, interest, and credit risks associated with our investment portfolio; risks relating to share repurchase programs; risks relating to access to capital and credit markets; risks related to indebtedness; change in control provisions in certain of our collaboration agreements; environmental risks; and any other risks and uncertainties that are described in other reports we have filed with the U.S. Securities and Exchange Commission.

These statements are based on our current beliefs and expectations and speak only as of the date of this news release. We do not undertake any obligation to publicly update any forward-looking statements.

Biogen

Q1 2022 earnings call agenda

Introduction	**Michael Hencke** Head of Investor Relations
Overview	**Michel Vounatsos** Chief Executive Officer
R&D Update	**Priya Singhal, M.D., M.P.H.** Interim Head of Research & Development
Financial Update	**Michael McDonnell** Chief Financial Officer

Overview

Michel Vounatsos

Chief Executive Officer

Alzheimer's disease update

ADUHELM

- Substantially eliminating commercial infrastructure supporting ADUHELM as a result of the final NCD
  - Retaining minimal resources to manage patient access programs, including a continued free drug program for patients currently on treatment in the U.S.
- Expect to continue funding certain regulatory and R&D activities, including the continuation of the EMBARK re-dosing study and the initiation of the Phase 4 post-marketing requirement study, ENVISION

Lecanemab

- Rolling submission for U.S. accelerated approval* expected to be completed Q2 2022
- Phase 3 readout for Clarity AD study expected in the fall of 2022
- Based on Phase 3 results, Eisai plans to submit for full FDA approval* by Q1 2023
- Potential to become the first anti-amyloid antibody to obtain FDA full approval
- Committed to working closely with Eisai on the potential launch of lecanemab

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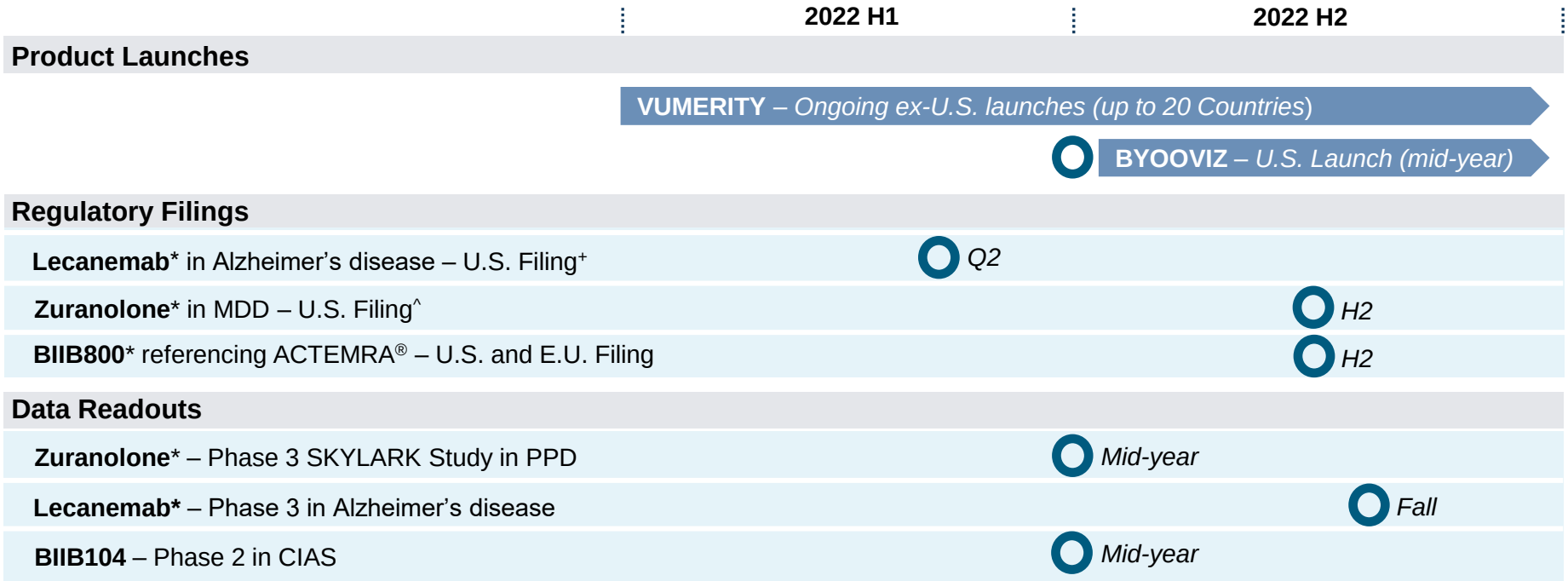
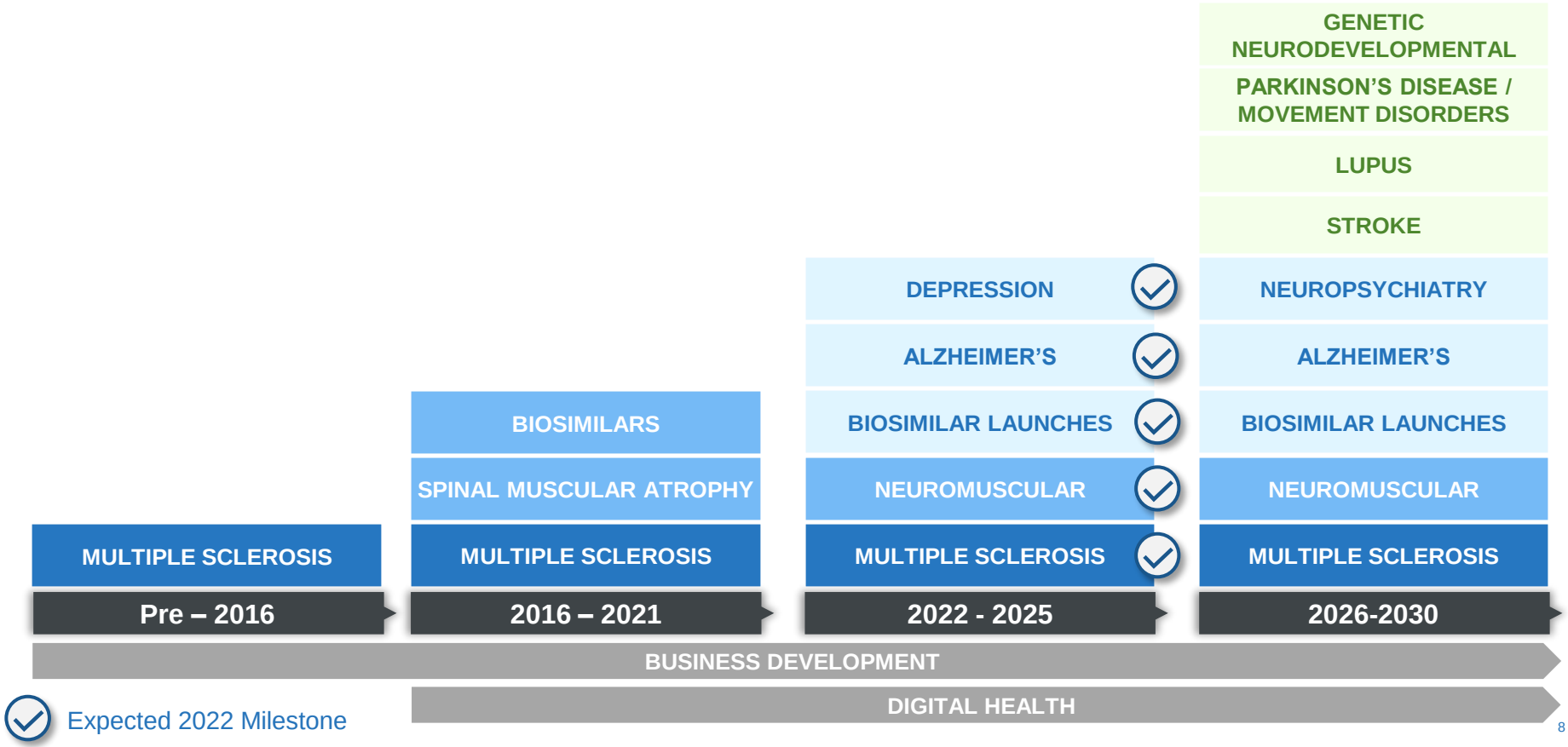
Note: lecanemab is being developed in collaboration with Eisai Co., Ltd.
NCD = national coverage determination; * Eisai responsible for lecanemab regulatory filing

Key expected milestones for late-stage pipeline in 2022



Note: lecanemab is being developed in collaboration with Eisai Co., Ltd.; zuranolone is being developed in collaboration with Sage Therapeutics, Inc.
* Collaboration program; + Eisai responsible for lecanemab regulatory filing; ^ Sage responsible for zuranolone regulatory filing
PPD = postpartum depression; CIAS = cognitive impairment associated with schizophrenia; Note: timeline is for illustrative purposes only

Potential for renewed growth and value creation over time



Near-term operational priorities

Five priority actions intended to drive renewed revenue growth and value creation over time

Increasing Focus on R&D Prioritization

Goal of maximizing the probability of success of R&D portfolio

Will be informed in part by key data readouts for lecanemab, zuranolone, and BIIB104 expected in 2022

Additional Cost-Reduction and Productivity Measures

Beyond previously communicated initiatives to further align costs with revenue base, while continuing to fund promising pipeline and commercial opportunities

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Note: lecanemab is being developed in collaboration with Eisai Co., Ltd.; zuranolone is being developed in collaboration with Sage Therapeutics, Inc.

Near-term operational priorities

Executing on International Growth Opportunities	*Focus on key emerging markets, such as China and certain markets in both Latin America and the Middle East* *Continued launch of SPINRAZA and pursuing potential local business development opportunities*
Potential Return to Growth in Biosimilars	*Four programs currently in development* *Planning to launch BYOOVIZ in the U.S. in the coming months*
Capital Allocation	*Continue to focus deployment of cash towards incremental revenue growth opportunities* *Continue to return cash to shareholders through share repurchases*

R&D Update

Priya Singhal, M.D., M.P.H.
Interim Head of Research & Development

R&D actions to deliver a multi-franchise portfolio

Prioritizing investments within neuroscience and adjacencies

Goal to maximize the probability of success of the Biogen R&D portfolio

May include accelerating, terminating, divesting, or partnering certain programs

Advancing key capabilities

Designed to potentially reduce risk, accelerate clinical development and increase probability of success in achieving proof-of-concept

Aim to build upon current strengths in functional genomics, novel modalities, clinical outcome measures and other key capabilities

Pursue new treatments for Alzheimer's disease

ALZHEIMER'S DISEASE

NEURO-PSYCHIATRY

OTHER KEY AREAS OF FOCUS

Advancing the Mid- to Late-stage Pipeline

Lecanemab regulatory filing for accelerated approval in the U.S. expected to complete in Q2+

Lecanemab Clarity AD Phase 3 study **on-track** for a Fall 2022 primary readout

Lecanemab presentations at AD/PD:

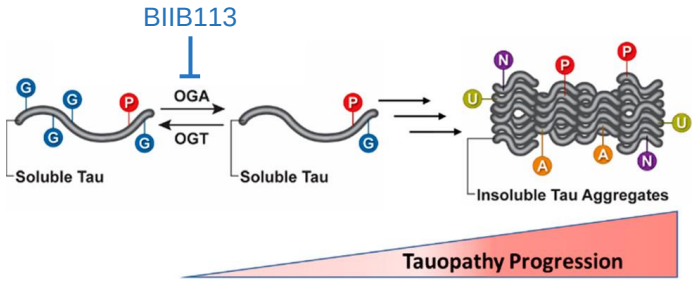
- Data from the Phase 2b Core and OLE studies showing correlation between AD biomarker results and clinical outcomes
- ARIA-E rates in the Phase 2b OLE^:
  - Total population (69% *APOE4*+): 7.8% (14/180)
  - Newly treated Core Placebo (70% *APOE4*+): 8.9% (4/45)

Evaluation of subcutaneous formulation of lecanemab in the Clarity AD OLE

Planning to initiate a Phase 2 study of BIIB080 (tau ASO) in Alzheimer's disease this year

Adding New Programs and Modalities

Phase 1 study initiated for **BIIB113**, a small molecule inhibitor of O-GlcNAcase (OGA)



Adapted from Selnick, et al., J. Med. Chem. 2019

Inhibition of OGA has the potential to inhibit the aggregation of tau and slow clinical decline

Biogen

Note: lecanemab is being developed in collaboration with Eisai Co., Ltd.
+ Eisai responsible for lecanemab regulatory filing; ^ Patients in the OLE were treated with 10 mg/kg lecanemab bi-weekly
AD = Alzheimer's disease; AD/PD = International Conference on Alzheimer's and Parkinson's Diseases; ARIA-E = Amyloid related imaging abnormalities – edema; ASO = antisense oligonucleotide; APOE4 = apolipoprotein E4; OGT = O-GlcNAc transferase; OLE = open label extension

Zuranolone clinical development program provides multiple opportunities across the depression landscape

ALZHEIMER'S DISEASE

NEURO-PSYCHIATRY

OTHER KEY AREAS OF FOCUS

Phase 3 CORAL Study: Zuranolone when co-initiated with ADT in MDD

- **Study met primary endpoint and key secondary endpoint:** Significant reduction in depressive symptoms at Day 3 and over the full 2-week treatment period vs. placebo co-initiated with ADT
- Zuranolone 50 mg co-initiated with ADT was generally well-tolerated with **most TEAEs reported as mild or moderate**

Zuranolone as a monotherapy or adjunctive to stable ADT in MDD

- **3 positive randomized clinical studies** – rapid improvement in depressive symptoms and a consistent safety profile
- **Phase 3 SHORELINE Study:** ~ 80% of patients who responded to the initial 50mg course needed at most one additional treatment during their time in the one-year study

Initiated the rolling submission of zuranolone in MDD in the U.S^ – expected completion in H2 2022

Zuranolone as a monotherapy or adjunctive to stable ADT in PPD

- Positive Phase 3 ROBIN Study
- Phase 3 SKYLARK Study expected to readout in mid-2022 with associated regulatory filing in PPD anticipated in early 2023

Zuranolone was generally well tolerated in clinical studies to date. The most common treatment-emergent adverse events observed with zuranolone across the program were somnolence, dizziness, headache, and sedation.

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Note: zuranolone is being developed in collaboration with Sage Therapeutics, Inc.; ^ Sage responsible for zuranolone regulatory filing
ADT = antidepressant therapy; MDD = major depressive disorder; PPD = postpartum depression; TEAE = treatment emergent adverse event

Continuing to advance a diversified pipeline

ALZHEIMER'S DISEASE

NEURO-PSYCHIATRY

OTHER KEY AREAS OF FOCUS

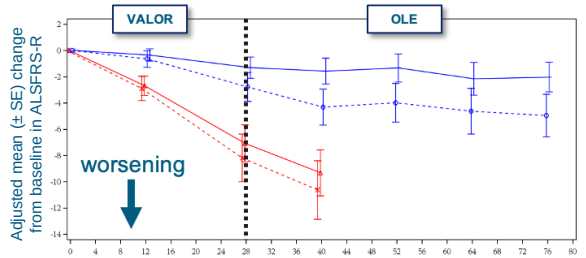
Tofersen in *SOD1*-ALS

- While statistical significance was not achieved on the primary endpoint of ALSFRS-R at week 28 in VALOR, consistent trends favoring tofersen were seen across secondary measures including CSF SOD1 (a marker of target engagement), plasma NfL (a potential marker of neuronal degeneration), SVC (respiratory function) and HHD (muscle strength), as well as exploratory quality of life measures
- Integrated analyses of VALOR and its OLE show sustained biological effects and slowing of clinical decline with earlier initiation of tofersen
- The most common AEs in participants receiving tofersen were procedural pain, headache, pain in extremity, fall and back pain. Serious neurologic events were reported in 4.8% of patients, including 2 cases of myelitis (2.0%)

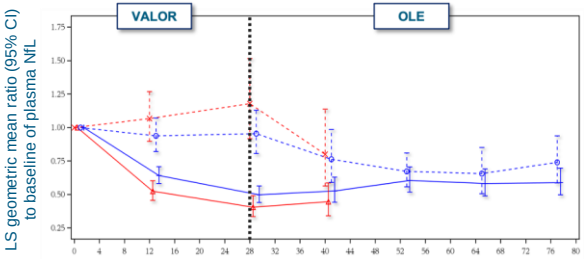
Planned and Ongoing Activities:

- Presentation of integrated data from VALOR and a new interim analysis of its ongoing OLE at ENCALS meeting
- Actively recruiting for ATLAS, the tofersen presymptomatic study
- Continuing to support the tofersen early access program
- Remain engaged with regulators on potential next steps for tofersen

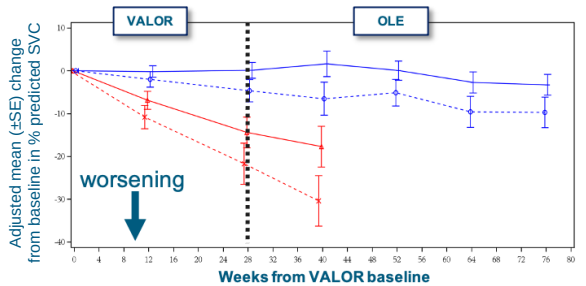
Clinical Function (Primary Endpoint)

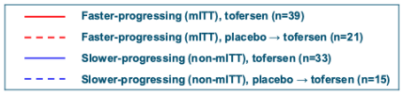


Neurofilament (Secondary Endpoint)



Respiratory Function (Secondary Endpoint)





AE = adverse event; ALS = amyotrophic lateral sclerosis; ALSFRS-R = Revised ALS functional rating scale; CSF = cerebrospinal fluid; ENCALS = European Network to Cure ALS; HHD = handheld dynamometry; NfL = neurofilament light chain; OLE = open label extension; SVC = slow vital capacity

Biogen continues to execute against 2022 R&D objectives

Regulatory Filings

- ○ Rolling submission for zuranolone NDA in MDD to FDA (*Initiated in Q2; Expected to complete in H2 2022*)+
- ○ Rolling submission for lecanemab BLA to FDA under the accelerated approval pathway in U.S. (*Expected to complete in Q2*)++

Data Readouts

- ● Phase 3 CORAL study readout of zuranolone when co-initiated with a standard of care ADT
- X Phase 1 readout of BIIB078 in C9orf72-associated ALS
  - *BIIB078 did not show clinical benefit; program discontinued*
- ○ Presentation of integrated data from tofersen Phase 3 and a new interim analysis of its ongoing OLE at ENCALS *(June 1st – 3rd)*
- ○ Zuranolone Phase 3 SKYLARK Study in PPD *(Mid-year)*
- ○ BIIB104 Phase 2 TALLY Study in CIAS *(Mid-year)*
- ○ Lecanemab Phase 3 Clarity AD Study in Alzheimer's *(Fall)*

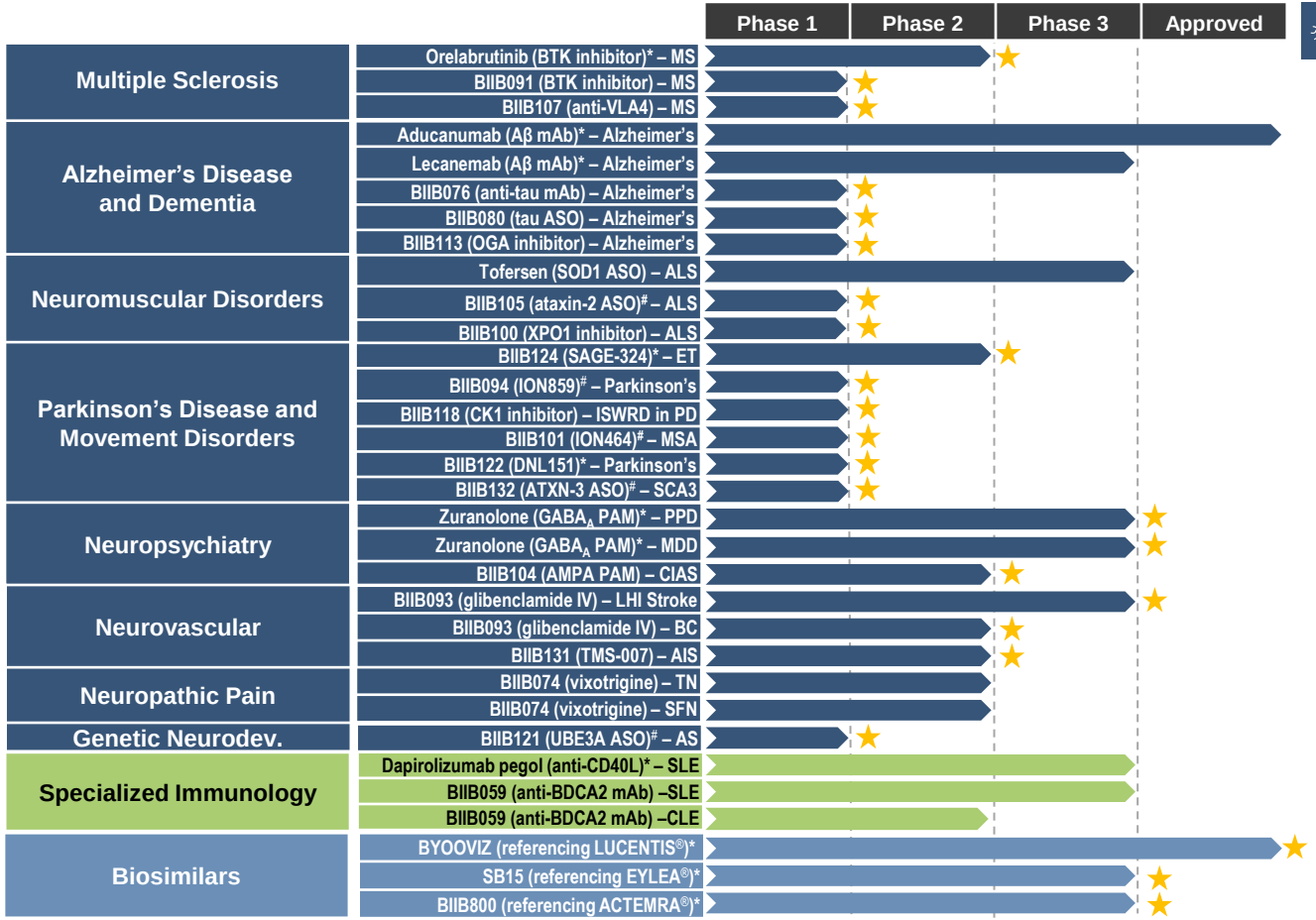
New Programs and Clinical Studies

- ● Phase 1 study of BIIB113 (OGA small molecule inhibitor) in Alzheimer's disease
- ● Phase 1 study of BIIB132 (ATXN3 ASO) in spinocerebellar ataxia type 3
- ● Phase 3 ASCEND Study of SPINRAZA following Evrysdi® (risdiplam) treatment
- ● Phase 2b KINETIC 2 Study of BIIB124 / SAGE-324 ($GABA_A$ PAM) in essential tremor
- ○ Phase 2 of BIIB080 (tau ASO) in Alzheimer's disease
- ○ Pivotal study of BIIB059 (anti-BDCA2 mAb) in cutaneous lupus erythematosus
- ○ Phase 2b LUMA Study of BIIB122 / DNL151 in Parkinson's disease without LRRK2 mutation
- ○ Phase 3 LIGHTHOUSE Study of BIIB122 / DNL151 in Parkinson's disease with confirmed LRRK2 mutation

● Completed ○ Anticipated

+ Sage Therapeutics, Inc. responsible for zuranolone filing; ++ Eisai Co., Ltd responsible for lecanemab regulatory filing
Note: lecanemab is being developed in collaboration with Eisai Co., Ltd; Zuranolone is being developed in collaboration with Sage Therapeutics, Inc.; BIIB122 is being developed with Denali Therapeutics
ADT = antidepressant therapy; ALS = amyotrophic lateral sclerosis; ASO = antisense oligonucleotide; BDCA2 = blood DC antigen 2; BLA = biologics license application; CIAS = cognitive impairment associated with schizophrenia; ENCALS = European Network to Cure ALS; $GABA_A$ = γ-aminobutyric acid type A receptor; LRRK2 = Leucine-rich repeat kinase 2; mAb = monoclonal antibodies; MDD = major depressive disorder; NDA = new drug application; OGA = O-GlcNAcase; OLE = open label extension; PAM = positive allosteric modulator; PD = Parkinson's disease; PPD = postpartum depression

Advancing a robust and diversified portfolio



Neuroscience | Specialized Immunology | Biosimilars

32
Clinical programs today

10
Programs in Phase 3 or filed today

24
★ New clinical programs since 2017

> 30
Business development deals since 2017

* Collaboration program; # Option agreement; MS = multiple sclerosis; ASO = antisense oligonucleotide; OGA = O-GlcNAcase; ALS = amyotrophic lateral sclerosis; SCA3 = spinocerebellar ataxia type 3; ET = essential tremor; ISWRD = irregular sleep wake rhythm disorder; PD = Parkinson's disease; MSA = Multiple System Atrophy; PPD = postpartum depression; MDD = major depressive disorder; CIAS = cognitive impairment associated with schizophrenia; LHI = large hemispheric infarction; BC = brain contusion; AIS = acute ischemic stroke; TN = trigeminal neuralgia; SFN = small fiber neuropathy; Genetic Neurodev. = genetic neurodevelopmental disorders; AS = Angelman syndrome; SLE = systemic lupus erythematosus; CLE = cutaneous lupus erythematosus

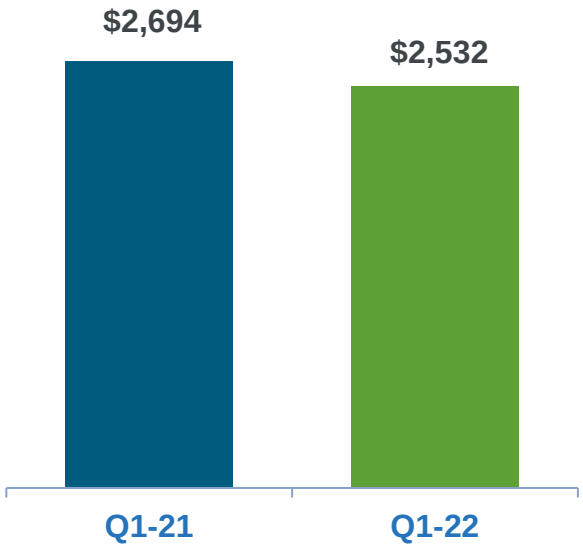
Financial Update

Michael McDonnell

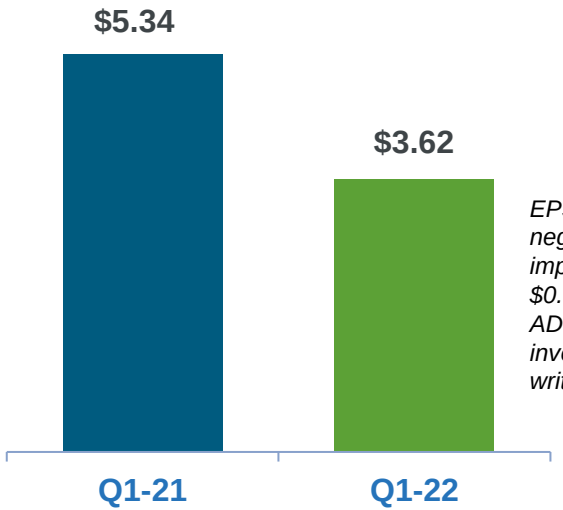
Chief Financial Officer

Q1 2022 financial results

Total Revenue ($M)



Non-GAAP Diluted EPS ($)



EPS negatively impacted by $0.76 due to ADUHELM inventory write-offs

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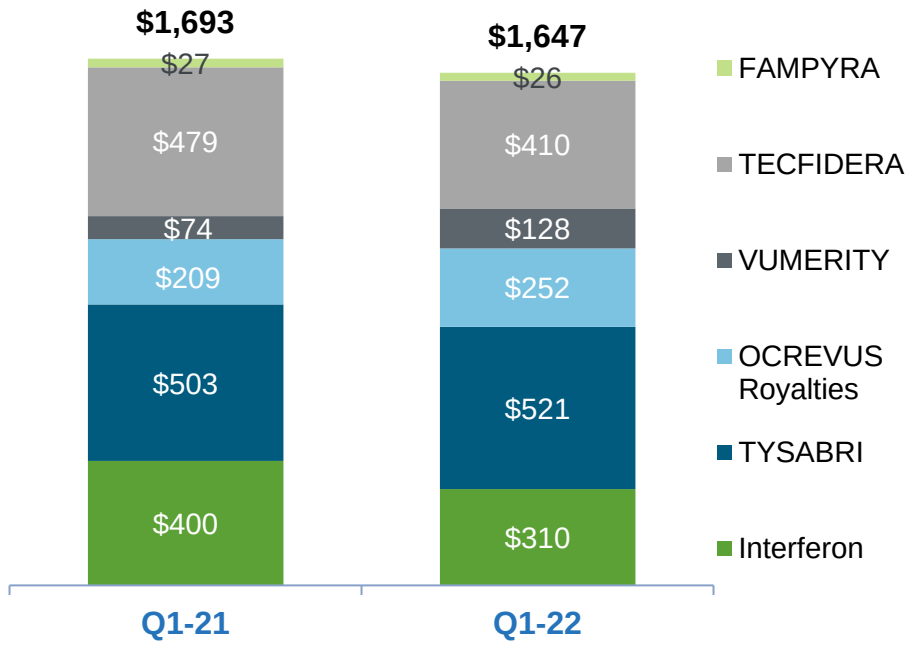
Our GAAP financial measures and a reconciliation of GAAP to Non-GAAP financial results are at the end of this presentation.

Global multiple sclerosis revenue

MS Revenue ($M)



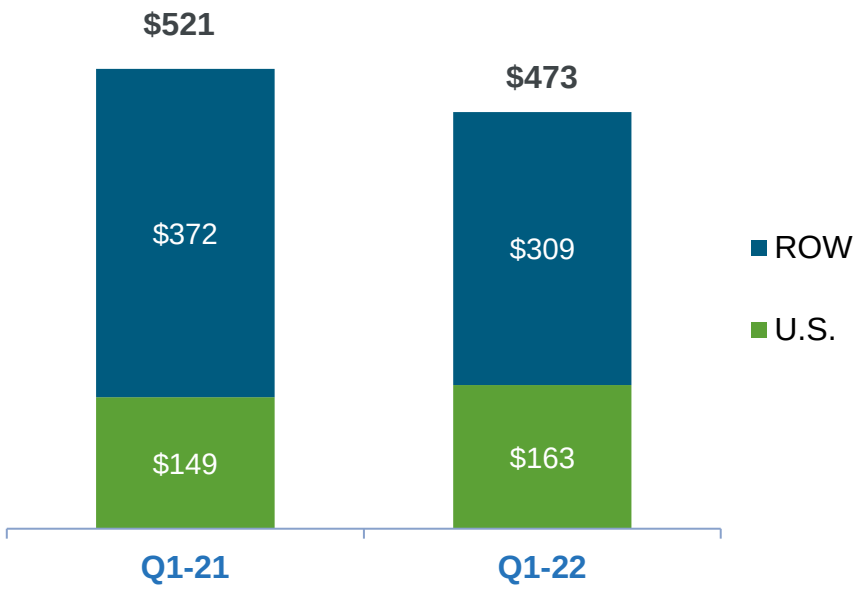
Numbers may not foot or recalculate due to rounding.

Highlights

- **TECFIDERA** decreased vs. prior year; impacted by the entrance of generics in the U.S., and pricing pressure outside the U.S.
- **VUMERITY** continued to grow vs. prior year
  - Up to 20 planned international launches in 2022
- **TYSABRI** increased 3% vs. prior year
  - Continued patient growth outside the U.S.
- **Interferon** decreased 23% vs. prior year

Global SPINRAZA revenue

SPINRAZA Revenue ($M)



Highlights

- **Global SPINRAZA** revenue decreased 9% vs. prior year
- **U.S. SPINRAZA** revenue increased 10% vs. prior year driven by positive channel dynamics
  - New patient starts at highest levels in over two years with a continued slowdown of discontinuations vs. Q4 2021
- **ROW SPINRAZA** revenue decreased 17% vs. prior year driven primarily by timing of shipments in certain markets, competition, and negative currency impacts, partially offset by initial uptake in China

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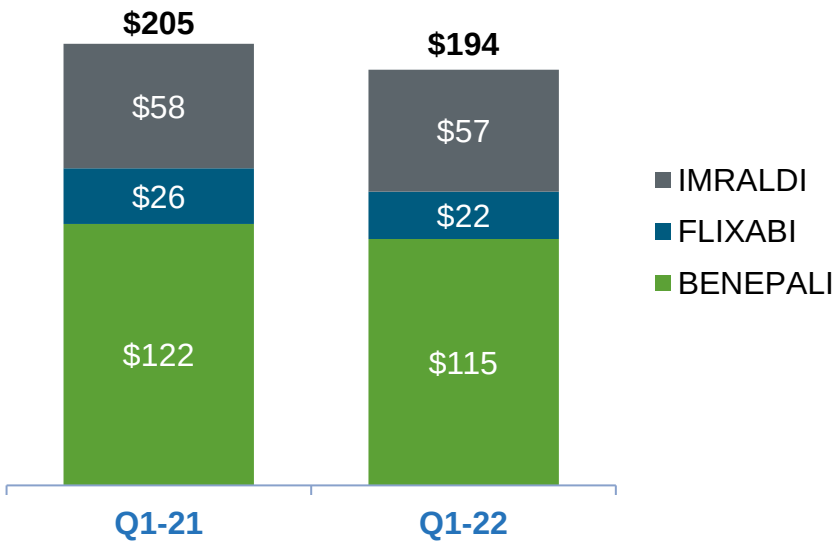
Numbers may not foot or recalculate due to rounding.

Biosimilars revenue

Biosimilars Revenue ($M)



Highlights

- Q1 Biosimilars revenue decreased 5% vs. prior year with increased volume more than offset by pricing pressure and negative currency impacts
- Maturation of anti-TNF portfolio coupled with pricing pressure is expected to result in a slight decline of full year biosimilars revenue versus the prior year
- ~ 247,000 patients on Biogen biosimilar products at end of Q1 2022[1]

Pursuing potential new biosimilars

- BYOOVIZ (LUCENTIS® biosimilar) approved in U.S., E.U., U.K., and Canada, with U.S. launch planned mid-2022
- BIIB800 (referencing ACTEMRA®) expected regulatory filing in the U.S. and E.U. in 2H22
- SB15 (EYLEA® biosimilar) currently in Phase 3
- Announced collaboration to expand biosimilars pipeline with new preclinical asset BIIB801 (referencing CIMZIA®)
- Completed sale of equity in Samsung Bioepis joint venture

Biogen. Numbers may not foot or recalculate due to rounding.

[1]Includes ~113,000 patients on BENEPALI, ~98,000 patients on IMRALDI, and ~36,000 patients on FLIXABI.

BYOOVIZ is being developed with Samsung Bioepis Co., Ltd.; BIIB800 is being developed with Bio-Thera Solutions, Ltd.; BIIB801 is being developed with Xbrane Biopharma AB

Q1 2022 revenue highlights

$ in Millions	Q1 2022	Q1 2021	Δ Y/Y
Total Product Revenues*	**$2,066**	**$2,212**	**(7%)**
RITUXAN/GAZYVA Revenues	$147	$180	(18%)
OCREVUS Royalties	$252	$209	21%
Revenues from Anti-CD20 Therapeutic Programs	**$399**	**$389**	**3%**
Other Revenues	$66	$93	(29%)
Total Revenues*	**$2,532**	**$2,694**	**(6%)**

Numbers may not foot or recalculate due to rounding. Percent changes represented as favorable/(unfavorable).
* Net of hedge

Q1 2022 financial results highlights

($ in Millions except EPS, Shares in Millions)	Q1 2022	Q1 2021	Δ Y/Y
Revenue	**$2,532**	**$2,694**	**(6%)**
Cost of Sales	$754	$478	(58%)
Gross Profit	**$1,778**	**$2,216**	**(20%)**
% of revenue	70%	82%	
R&D Expense	$552	$514	(7%)
SG&A Expense	$635	$595	(7%)
Collaboration Profit (Loss) Sharing	($117)	$68	271%
Non-GAAP Amortization	$8	$0	NMF
Non-GAAP Operating Income	**$701**	**$1,038**	**(33%)**
Non-GAAP Other Income (Expense)	($73)	($61)	(18%)
Non-GAAP Profit Before Taxes and JV Equity	**$628**	**$977**	**(36%)**
Non-GAAP Taxes	$98	$153	36%
Non-GAAP Taxes %	15.5%	15.7%	
Non-GAAP JV Equity Income (Loss)	$4	($11)	136%
Non-GAAP Net Income	**$535**	**$813**	**(34%)**
Non-GAAP Net Income (Loss) Attributable to Noncontrolling Interests	$0	($0)	NMF
Non-GAAP Net Income Attributable to Biogen Inc.	**$535**	**$813**	**(34%)**
Weighted average diluted shares used in calculating diluted EPS	148	152	3%
Non-GAAP Diluted EPS	**$3.62**	**$5.34**	**(32%)**

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Numbers may not foot or recalculate due to rounding. Percent changes represented as favorable/(unfavorable).
Our GAAP financial measures and a reconciliation of GAAP to Non-GAAP financial results are at the end of this presentation.

Balance sheet and cash flow

Balance Sheet
(as of March 31, 2022)

$4.8B	Cash and marketable securities
$7.3B	Debt
$2.5B	Net debt

Cash Flow
(Q1 2022)

$162M	Cash flow from operations
$58M	Capital expenditures
$104M	Free cash flow*

*Free cash flow is defined as net cash flow from operations less capital expenditures.

Reaffirming 2022 full year financial guidance

	FY 2022 Guidance
Revenue	$9.7 billion to $10.0 billion
Non-GAAP Diluted EPS	$14.25 to $16.00

Please see Biogen's Q1 2022 earnings release, available at the Investors section of Biogen's website at investors.biogen.com, for additional 2022 financial guidance assumptions.

Biogen may incur charges, realize gains or losses, or experience other events or circumstances in 2022 that could cause any of these assumptions to change and/or actual results to vary from this financial guidance.

Please see slide 2 of this presentation for additional information on our use of Non-GAAP measures, including forward-looking Non-GAAP financial measures.

Questions & Answers

Appendix

Continuing to advance our ESG priorities

Progress Highlights

ENVIRONMENT

- Completed **1st life cycle assessment (LCA) for 3 Biosimilars**, identifying ways to reduce product water, land and carbon footprints
- Led on green chemistry as **14 labs achieved My Green Lab certification**, driving sustainability in scientific research
- Set more ambitious goal for **net zero supply chain by 2045** and submitted for approval by the Science Based Target initiative

SOCIAL

- **100%** of clinical trial studies initiated in 2021^ included a plan to **recruit underrepresented patients**
- Contributing more than **$1.5 million** in grants, in-kind materials, volunteering and other support for **Ukraine humanitarian efforts**
- Engaged more than **61,000 students**[1], with focus on under-represented children, since the inception of the Community Lab

GOVERNANCE

- Formalized **Board of Directors responsibility for ESG**
- Became **early adopter of the new UN Global Compact** reporting framework
- Bolstered DE&I transparency with our 2021 DE&I report

Transparency via Reporting

Publishing 2021 Year in Review report in May, detailing ongoing leadership on material ESG issues.

Recognition for ESG leadership

JUST 100
#36 on JUST Capital's annual analysis of corporate ESG performance

Bloomberg Gender-Equality Index
Member of 2021 GEI, committed to driving accountability through data transparency

100 Most Sustainable Corporations
Named to Corporate Knights' 2022 list

Best Places to Work for LGBTQ+ Equality
Named to Human Rights Campaign's list for 8th year in a row

Biogen

^ U.S. clinical trials in phases 1-4 led by Biogen's Global Clinical Operations | [1] Total Community Lab students since inception in 2002

Lecanemab (Aβ mAb)

Neuroscience

PORTFOLIO

AD PIPELINE

- ❖ Aducanumab (ADUHELM) – Aβ mAb
- ❖ **Lecanemab (Ph3) – Aβ mAb**
- ❖ BIIB080 (Ph1) – tau ASO
- ❖ BIIB076 (Ph1) – tau mAb

PROPOSED MECHANISM OF ACTION

- Lecanemab is humanized immunoglobulin G1 (IgG1) monoclonal antibody that targets Aβ
- Lecanemab selectively binds to soluble Aβ aggregate species with preferential activity for Aβ protofibrils over fibrils (>10x)

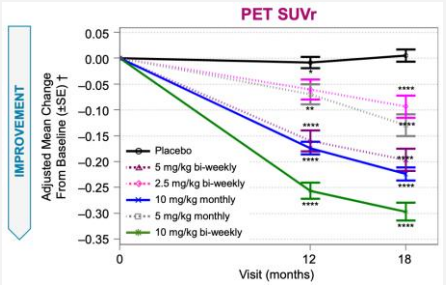
CLINICAL STUDY OVERVIEW

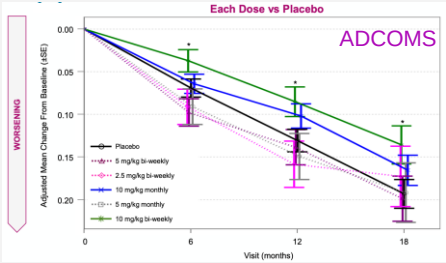
- Study 201 Phase 2b: is a global, placebo-controlled, double-blind, parallel-group, randomized trial with open-label extension
  - Core randomization phase (n=856) with primary endpoint ADCOMS at 12 Months and key secondary endpoints (amyloid PET, ADCOMS, CDR-SB, ADAS-cog, and fluid biomarkers) at 18 months
  - GAP period of 9-59 months (average 24 months) off treatment from end of core phase and initiation of OLE
  - OLE for up to 60 months (ongoing) with 10 mg/kg IV biweekly treatment
- Clarity AD Phase 3: A Phase 3 Placebo-Controlled, Double-Blind, Parallel-Group, 18-Month Study Evaluating Lecanemab (BAN2401) in Early Alzheimer's Disease (n=1766)
  - Primary endpoint CDR-SB at 18 months; Enrollment complete, follow-up ongoing
  - **Phase 3 readout anticipated in H2 2022** with potential to be the first anti-amyloid antibody with full approval in Alzheimer's disease

Current Status:

- AHEAD 3-45 Phase III study in preclinical AD ongoing (n=1400)
- Breakthrough designation in the U.S. with a rolling **submission for accelerated approval expected to complete in Q2 2022**

PHASE 2 CLINICAL DATA[1]





- Dose dependent reduction in amyloid PET values (Florbetapir tracer)
- At 18 months, 10-mg/kg biweekly lecanemab reduced brain amyloid (-0.306 SUVr units)
- Lecanemab significantly reduced amyloid PET values across all doses and converted subjects from amyloid positive to negative across most doses based on visual read
- >80% amyloid negative by visual read for 10 mg/kg IV biweekly at 18 months (Swanson, 2018)
- Dose and time dependent reduction in decline on ADCOMS; starting at 6 months of lecanemab treatment showing a drug-placebo difference in favor of active treatment by 30% at 18 months in the 10 mg/kg biweekly cohort
- The rate of amyloid-related imaging abnormalities-edema/effusion (ARIA-E), an adverse event associated with amyloid targeted therapies, for the 10 mg/kg biweekly dosing was 9.9%.

1 Swanson et al., AAIC 2018

Note: lecanemab is being developed in collaboration with Eisai Co., Ltd

Tofersen (SOD1-ALS ASO)

Neuroscience

PORTFOLIO

ALS PIPELINE

- ❖ Genetic ALS:
  - ▪ **Tofersen (Ph3) – SOD1 ASO**
- ❖ Broad ALS:
  - ▪ BIIB105 (Ph1) – Ataxin2 ASO
  - ▪ BIIB100 (Ph1) – XPO1 small molecule inhibitor

PROPOSED MECHANISM OF ACTION

- Mutations in the SOD1 gene lead to accumulation of toxic SOD1 protein
- Tofersen mediates RNase H-dependent degradation of SOD1 mRNA to reduce synthesis of SOD1 protein

CLINICAL STUDY OVERVIEW

- Phase 1/2 multiple-ascending-dose study data, demonstrating target engagement and suggesting clinical effect, published in NEJM in Jul 2020
- Phase 3 VALOR study in symptomatic SOD1-ALS read out in October 2021 [NCT02623699]
- Open-label extension (OLE) [NCT03070119] study designed to evaluate the long-term benefit/risk of tofersen is ongoing.
- ATLAS study initiated in June 2021; designed to evaluate if initiation of tofersen in pre-symptomatic SOD1 mutation carriers with biomarker evidence of disease activity can delay onset of clinical symptoms or signs of ALS [NCT04856982]

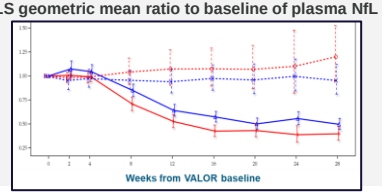
Current Status:

- New integrated data from VALOR and a January 2022 interim data cut of the OLE to be presented at the ENCALS meeting in early June
- Remain engaged with regulators on potential next steps for tofersen

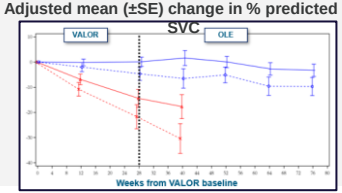
PHASE 3 VALOR DATA

- While statistical significance was not achieved on the primary endpoint of ALSFRS-R at 6 months in VALOR, trends favoring tofersen were seen across secondary measures including CSF SOD1 (a marker of target engagement), plasma NfL (a potential marker of neuronal degeneration), SVC (respiratory function), HHD (muscle strength), as well as exploratory quality of life measures
- Integrated analyses of VALOR and its OLE show sustained biological effects and slowing of clinical decline with earlier initiation of tofersen
- The most common adverse events (AEs) in participants receiving tofersen were procedural pain, headache, pain in extremity, fall and back pain. In tofersen group, 5.6% discontinued treatment due to AEs vs 0% in placebo. Serious neurologic events were reported in 4.8% of patients, including 2 cases of myelitis (2.0%).

LS geometric mean ratio to baseline of plasma NfL



Adjusted mean (±SE) change in % predicted SVC



Miller and Cudkowicz, ANA 2021

Note: Tofersen is licensed from Ionis Pharmaceuticals
ALSFRS-R = revised ALS Functional Rating Scale; ENCALS = European Network to Cure ALS; OLE = open label extension; SAE = serious adverse event; SOD1 = superoxide dismutase 1

Zuranolone ($GABA_A$ PAM) – Major Depressive Disorder

Neuroscience

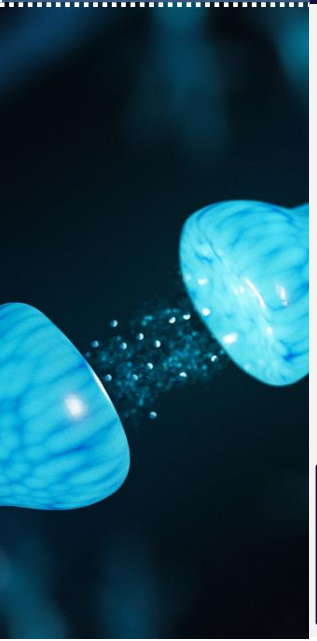
PORTFOLIO

NEUROPSYCHIATRY PIPELINE

- **Zuranolone (Ph3) – MDD**
- Zuranolone (Ph3) – PPD
- BIIB104 (Ph2) – CIAS

PROPOSED MECHANISM OF ACTION

- Zuranolone is a synthetic neuroactive steroid $GABA_A$ receptor positive allosteric modulator with a novel MOA
- Zuranolone modulates both synaptic and extrasynaptic $GABA_A$ receptors and is hypothesized to impact dysregulated neural networks with the aim of providing clinical benefit in depression



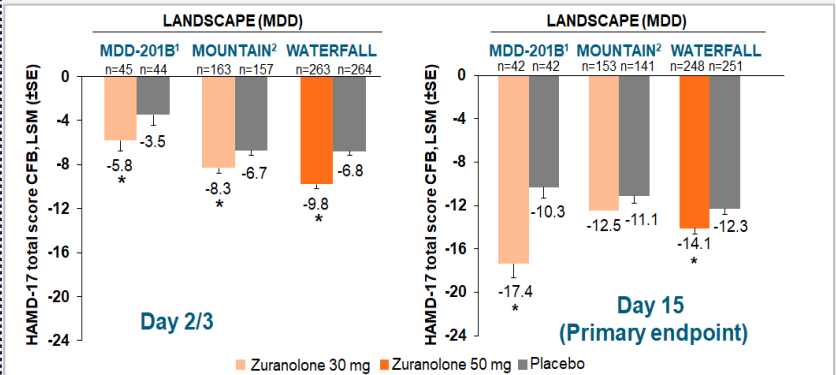
CLINICAL STUDY OVERVIEW

- The LANDSCAPE Program includes 1 Phase 2 study and 4 Phase 3 studies of zuranolone in patients with MDD
- MDD-201B:(102 patients) A Phase 2, double-blind, placebo-controlled study evaluating the safety, tolerability, PK and efficacy of zuranolone 30 mg in the treatment of adults with moderate to severe MDD. Study met its primary endpoint [NCT03000530]
- MDD-301A (MOUNTAIN): (581 patients) A Phase 3, double-blind, placebo-controlled study evaluating the efficacy of zuranolone 30 mg and 20 mg in the treatment of adults with MDD. Study missed the primary endpoint at Day 15, but demonstrated sig. improvements at every earlier timepoint (Days 3, 8 and 12) and provides supportive information [NCT03672175]
- MDD-301B (WATERFALL): (542 patients) a Phase 3, double-blind, placebo-controlled study evaluating the efficacy of zuranolone 50 mg in treatment of adults with MDD. Study met its primary endpoint [NCT04442490]
- MDD-305 (CORAL): (440 patients) a Phase 3 double-blind, placebo-controlled study comparing the efficacy and safety of zuranolone 50 mg co-initiated with an antidepressant versus placebo co-initiated with an antidepressant in adults with MDD. Study met its primary endpoint. [NCT04476030]

Current Status:

- **Ongoing:** MDD-303 (SHORELINE): (target 1550 patients) a Phase 3 open-label study evaluating repeat treatments of zuranolone (up to 50 mg) over the course of one year in adults with MDD. In Q4-2021, an interim readout of a cohort of 199 patients receiving 50 mg showed no new safety findings. [NCT03864614]
- ***NDA filing for zuranolone in MDD expected to complete in H2 2022***

CLINICAL DATA



The clinical trials above differ in sample size, patient population, entry criteria, study sites as well as other design elements. No direct comparison can be made across these clinical trials based on the graph above. MDD-201B, MOUNTAIN, and WATERFALL enrolled patients with MDD. Studies with Day 3 data: MOUNTAIN, WATERFALL; Study with Day 2 data: MDD-201B.

*p<0.05 vs placebo. p values for Day2/3 LSM treatment difference are not adjusted for multiplicity and for WATERFALL is nominal.
CFB = change from baseline; HAMD-17 = 17-item Hamilton Rating Scale for Depression total score; LSM = least squares mean; MDD = major depressive disorder; n = number of patients at that visit; PPD = postpartum depression.
1. Gunduz-Bruce H et al. *N Engl J Med*. 2019;381(10):903-911. 1. Mittal A, et al. Poster presented at the American Academy of Neurology Annual Meeting. Toronto, Canada. April 25-May 1, 2020.

Zuranolone was generally well tolerated in clinical studies to date. The most common treatment-emergent adverse events observed with zuranolone across the program were somnolence, dizziness, headache, and sedation. Among patients with MDD and PPD treated with zuranolone <5% discontinued treatment due to AEs

Note: zuranolone is being developed in collaboration with Sage Therapeutics, Inc.
CIAS = cognitive impairment associated with schizophrenia; $GABA_A$ = γ-Aminobutyric acid type A receptor ; MDD = major depressive disorder; PAM = positive allosteric modulator; PPD = postpartum depression; AE = adverse event

Sage Therapeutics Biogen

Zuranolone ($GABA_A$ PAM) – Postpartum Depression

Neuroscience

PORTFOLIO

NEUROPSYCHIATRY PIPELINE

- Zuranolone (Ph3) – MDD
- **Zuranolone (Ph3) – PPD**
- BIIB104 (Ph2) – CIAS

PROPOSED MECHANISM OF ACTION

- Zuranolone is a synthetic neuroactive steroid $GABA_A$ receptor positive allosteric modulator with novel MOA profile
- Zuranolone modulates both synaptic and extrasynaptic $GABA_A$ and is hypothesized to impact dysregulated neural networks with the aim of providing clinical benefit in depression

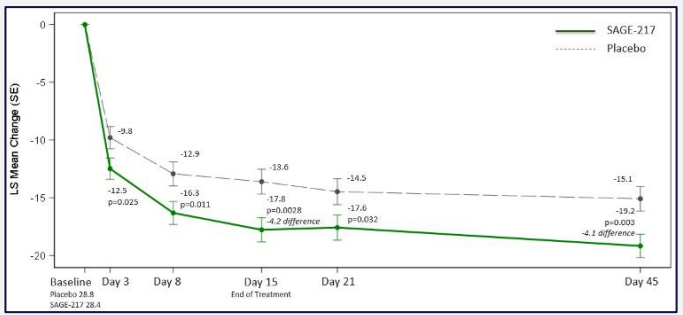
CLINICAL STUDY OVERVIEW

- The NEST Program includes two Phase 3 studies of zuranolone in patients with PPD.
- PPD-201B (ROBIN): (153 patients randomized) a Phase 3 double blind, placebo-controlled study of the efficacy, safety and pharmacokinetics of zuranolone 30 mg in adult females diagnosed with severe PPD. Study completed in 2018 and met its primary endpoint, demonstrating improvement in core symptoms and supporting further development [NCT02978326]

Current Status:

- **Ongoing:** PDD-301 (SKYLARK) - (200 patients enrolled) a Phase 3 double-blind, placebo-controlled study evaluating the efficacy and safety of zuranolone 50 mg in adult females diagnosed with severe PPD. [NCT04442503] ***Readout expected in mid-2022***
- ***NDA filing anticipated in early 2023***

PHASE 3 ROBIN Data[1]



LS mean change from baseline in HAMD-17 total score. Placebo n=74, Zuranolone 30 mg n=76. p values provided for secondary endpoints were not adjusted for multiplicity. HAMD-17 = 17-item Hamilton Depression Rating Scale; LS = least squares; SE = standard error.

Adult patients with PPD who received treatment with zuranolone 30 mg had statistically significant improvement in depressive symptoms compared with placebo as assessed by CFB in HAMD-17 total score at Day 15.

- Improvements in depressive symptoms were observed as early as Day 3.
- Improvements in depressive symptoms were observed to be maintained at Day 45.

The most common adverse events (≥5%) with zuranolone were somnolence (15.4% vs 11.0%, zuranolone vs placebo), headache (9.0% vs 12.3%), dizziness (7.7% vs 5.5%), upper respiratory tract infection (7.7% vs 1.4%), diarrhea (6.4% vs 2.7%), and sedation (5.1% vs 0%). One participant in the zuranolone group had an AE of intermittent sedation leading to drug discontinuation; no other participant discontinued study drug.

Note: Zuranolone is being developed in collaboration with Sage Therapeutics, Inc.;

1 Deligiannidis et al. JAMA Psych 2021; 78(9):951-959

CIAS = cognitive impairment associated with schizophrenia; $GABA_A$ = γ-Aminobutyric acid type A receptor; MDD = major depressive disorder; PAM = positive allosteric modulator; PPD = postpartum depression; CFB = change from baseline; AE = adverse event

Sage Therapeutics Biogen

BIIB104 (AMPAR PAM) – Cognitive Impairment Associated with Schizophrenia (CIAS)

Neuroscience

PORTFOLIO

NEUROPSYCHIATRY PIPELINE

- ❖ Zuranolone (Ph3) – MDD
- ❖ Zuranolone (Ph3) – PPD
- ❖ **BIIB104 (Ph2) – CIAS**

PROPOSED MECHANISM OF ACTION

- BIIB104 is a high-impact AMPAR PAM ("potentiator"), a novel MOA for CIAS
- Glutamatergic dysregulation / NMDAR hypofunction may underlie CIAS, thus BIIB104-mediated increased AMPAR activity may augment NMDAR activity and synaptic function to potentially ameliorate CIAS

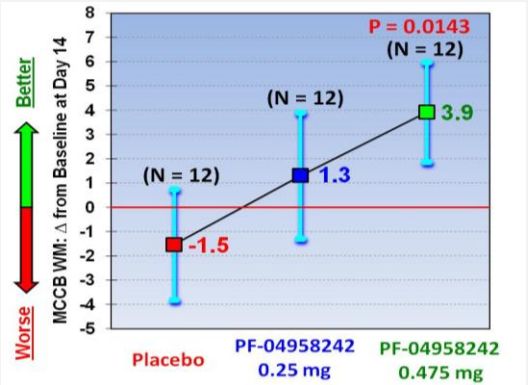
CLINICAL STUDY OVERVIEW

- In Ph1, BIIB104 attenuated ketamine-induced cognitive impairment in verbal learning and working memory in healthy volunteers [NCT01749098][1] and demonstrated a statistically significant improvement in the MCCB-Working Memory domain T-score at Day 14 in patients with stable schizophrenia [NCT02332798, see **CLINICAL DATA**][2]. BIIB104 was generally well-tolerated.
- A Ph2b randomized, double-blind, multiple-dose, placebo-controlled study to evaluate BIIB104 safety and efficacy in subjects with CIAS [NCT03745820, TALLY].
  - Population: subjects diagnosed with schizophrenia for ≥2 y, stabilized on background antipsychotics; N=195 participants.
  - Treatment Regimen: 12-wk; 0.15 or 0.5 mg, BID.
  - Primary Endpoint: Change from baseline in MCCB-Working Memory domain score at Week 12; additional assessments of cognition, functioning and psychiatric symptoms conducted.

Current Status:

- Ph2b study (TALLY) readout expected by mid-2022

CLINICAL DATA (Ph1b [NCT02332798], completed)[2]



- BIIB104 (0.475 mg, BID) showed a statistically significant (p = 0.0143) improvement on MCCB-Working Memory Domain T-Score at Day 14.
- BIIB104 showed a statistically significant (p <0.05) exposure-response relationship (slope = 0.872 (CI: 0.154 – 1.604)) at Day 14.

AMPAR = α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid receptor; PAM = positive allosteric modulator; CIAS = cognitive impairment associated with schizophrenia; MDD = major depressive disorder; PPD = postpartum depression; MOA = mechanism of action; NMDAR = *N*-methyl-D-aspartate receptor; MCCB = MATRICS Consensus Cognitive Battery.

[1]Ranganathan *et al.*, *Mol Psychiatry* **2017**, *22*, 1633–1640; N=29 participants in NCT01749098. [2]Evans *et al.*, *Neuropsychopharmacology* **2016**, *41*, S289–S454, T207; N=39 participants in NCT02332798.

BIIB093 (IV glibenclamide)

Neuroscience

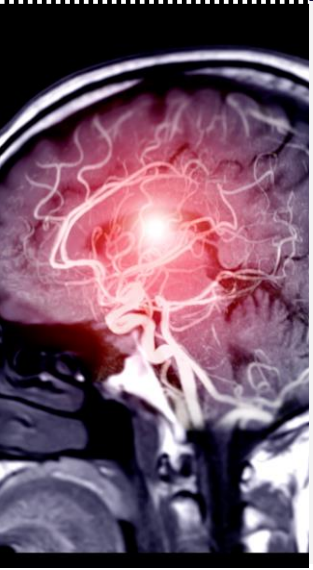
PORTFOLIO

NEUROVASCULAR PIPELINE

- **BIIB093 (Ph3) – Large Hemispheric Infarction (LHI)**
- BIIB093 (Ph2) – Brain Contusion (BCN)
- BIIB131 (Ph2) – Acute Ischemic Stroke (AIS)

PROPOSED MECHANISM OF ACTION

- BIIB093 inhibits the SUR1-TRPM4 non-selective cation channel which is upregulated in the CNS during ischemia and reduces cerebral edema
- Data from Phase 2 in patients suffering from LHI demonstrated improvements in mortality at 30 days and reduction of midline shift within 96 hours



CLINICAL STUDY OVERVIEW

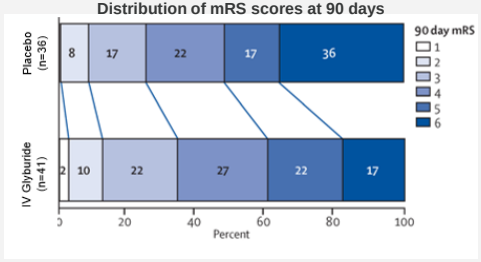
- A first of its kind, randomized, double-blind, placebo-controlled, parallel-group, global, Phase 3 study to evaluate BIIB093's safety and efficacy in LHI patients
- Study population: Acute ischemic stroke patients aged 18 to ≤ 85 years (N=768 of which n=80 are aged 70-85) at risk of severe cerebral edema due to LHI
- BIIB093 or placebo administered as intravenous (IV) infusion over 72 hours with dosing started within 10 hours of last known normal
- Primary endpoint is 90 Day mRS

Current Status:

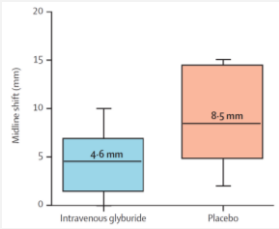
- Phase 3 CHARM study ongoing [NCT02864953]

PHASE 2 CLINICAL DATA

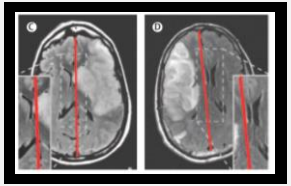
Distribution of mRS scores at 90 days



Reduction in Midline Shift- at 72-96 hours (Tertiary Endpoint)



- Primary endpoint: mRS score of 0–4 at 90 days without decompressive craniectomy; OR = 1.91 did not meet statistical significance.
- 31 subjects (70.5%) in the BIIB093 group and 28 subjects (71.8%) in the placebo group experienced SAEs. 4 SAEs of hypoglycemia (all asymptomatic) occurred in the BIIB093 group vs. 0 in the placebo group - all resolved on the same day with glucose supplementation and/or reduction in study drug dose.
- Mortality at 90 days was 17% and 36% for BIIB093 and placebo groups, respectively



SUR1-TRPM4 = sulfonylurea receptor 1-transient receptor potential melastatin 4

BIIB131 (formerly TMS-007)

Neuroscience

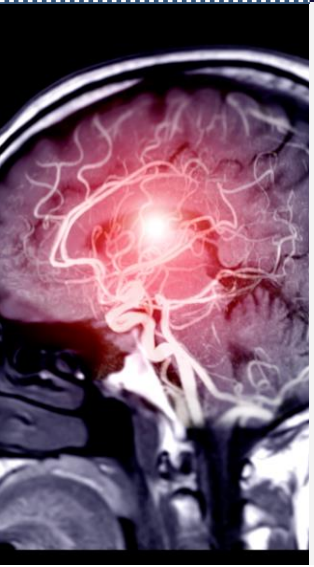
PORTFOLIO

NEUROVASCULAR PIPELINE

- ❖ BIIB093 (Ph3) – Large Hemispheric Infarction (LHI)
- ❖ BIIB093 (Ph2) – Brain Contusion (BCN)
- ❖ **BIIB131 (Ph2) – Acute Ischemic Stroke (AIS)**

PROPOSED MECHANISM OF ACTION

- BIIB131 is a novel thrombolytic small molecule with putative dual clot-dissolving and anti-inflammatory properties, by enhancing plasminogen-fibrin binding and soluble epoxide hydrolase inhibition
- Data from Phase 2a in patients with AIS demonstrated radiographic evidence of vessel recanalization, improvement in patient functional outcomes as measured by modified Rankin Scale, and no symptomatic intracranial hemorrhage



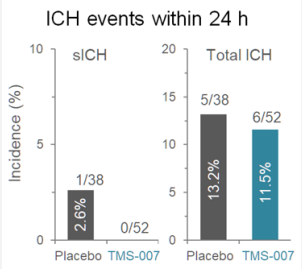
CLINICAL STUDY OVERVIEW

- Phase 2a, randomized, double-blind, placebo-controlled, dose escalation study to evaluate the safety, efficacy, PK, PD, and mechanisms of action of BIIB131 [JapicCTI-183842]
- Study population: Acute Ischemic Stroke adult patients (N=90) within 12 hours of symptom onset and <88 years old
- BIIB131 or placebo was administered as a single IV infusion over 30 minutes; dose cohorts of 1, 3 and 6mg/kg with maximum dose of 360mg
- The primary endpoint was the incidence of symptomatic intracranial hemorrhage with NIHSS deterioration of ≥4-point at 24 hours

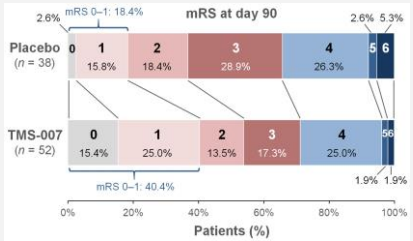
Current Status:

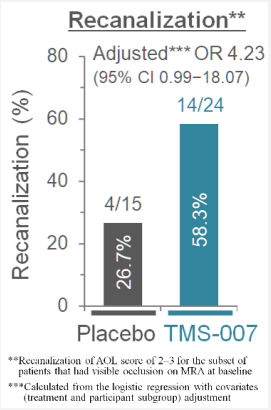
- Ph 2a study completed; further clinical studies to confirm safety and efficacy up to 24 hours of symptom onset are under development

PHASE 2a* CLINICAL DATA



sICH with worsening of NIHSS ≥4 points: zero (0%) in BIIB131 groups and one (2.6%) in the placebo group



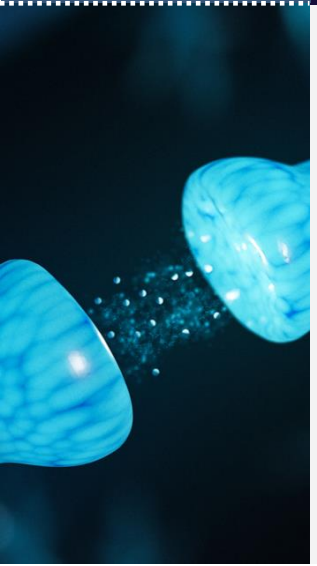


* Study conducted by TMS Co., LTD

mRS = modified Rankin Scale; sICH = symptomatic intracranial hemorrhage; NIHSS = National Institutes of Health Stroke Scale; OR = odds ratio

BIIB124/SAGE 324 ($GABA_A$ PAM)

Neuroscience



PORTFOLIO

PARKINSON'S DISEASE AND MOVEMENT DISORDERS PIPELINE

- **BIIB124 (Ph2b) – Essential Tremor (ET)**
- BIIB122 (Ph1b) – Parkinson's disease
- BIIB094 (Ph1) – Parkinson's disease
- BIIB118 (Ph1) – Irregular Sleep Wake Rhythm Disorder in Parkinson's
- BIIB101 (Ph1) – Multiple System Atrophy
- BIIB132 (Ph1) – Spinocerebellar Ataxia Type 3

PROPOSED MECHANISM OF ACTION

- SAGE-324/BIIB124 is an investigational oral neuroactive steroid $GABA_A$ receptor positive allosteric modulator (PAM)
- $GABA_A$ receptor positive PAM have the potential to enhance inhibitory activity of the GABAergic system, the major inhibitory neurotransmission system in the brain
- Because deficits in inhibitory signaling may play a role in the pathophysiology of ET, $GABA_A$ PAMs may have utility in treating ET

CLINICAL STUDY OVERVIEW

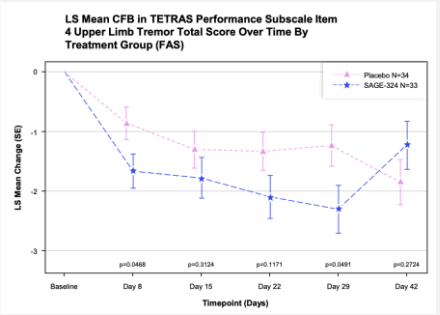
- Phase 2a, randomized, double-blind, placebo-controlled study to evaluate the efficacy, safety, and tolerability of BIIB124 [NCT04305275]
- The inclusion criteria were 18-80 years with ET diagnosis: isolated action tremor bilateral upper limb at least 3 years duration, with or without tremors in other locations and absence of other neurological signs, and willing to discontinue ET medications
- BIIB124 60 mg or placebo was administered orally in the morning for 28 days (n=69)
- The primary efficacy endpoint was change from baseline compared to placebo in the TETRAS Performance Subscale Item 4 upper limb tremor score on Day 29

Current Status:

- Ph 2b dose finding study is recruiting [NCT05173012]

PHASE 2a CLINICAL DATA

BIIB124 showed a statistically significant reduction from baseline in Upper Limb Tremor Score as measured by Item 4 of TETRAS Performance Subscale on Day 29 compared to placebo



The most common TEAEs that occurred in ≥10% of patients in the BIIB124 treatment group and at a rate at least twice as high as that of patients in the placebo group were: somnolence 68%; dizziness 38%; balance disorder 15%; diplopia 12%; dysarthria 12%; and gait disturbance 12%

Note: BIIB124 / SAGE-324 is being developed in collaboration with Sage Therapeutics, Inc.
CFB = change from baseline; ET = essential tremor; FAS = full analysis set; TEAE = treatment emergent adverse events; TETRAS = The Essential Tremor Rating Assessment Scale

BIIB135 Orelabrutinib (BTKi) – Multiple Sclerosis

Neuroscience

PORTFOLIO

MS PIPELINE

- ❖ **Orelabrutinib BIIB135 (Ph2)**
- ❖ BIIB091 (Ph1)
- ❖ BIIB107 (Ph1)

PROPOSED MECHANISM OF ACTION

- Orelabrutinib is a covalent, irreversible, small molecule, CNS-penetrant Bruton's tyrosine kinase inhibitor (BTKi) with high kinase selectivity. Orelabrutinib has the potential to be a best-in-class BTK inhibitor for relapsing and progressive forms of MS.

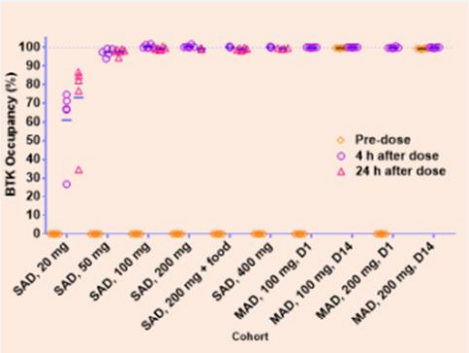
CLINICAL STUDY OVERVIEW

- Study ICP-CL-00112 Phase 2 in relapsing and remitting MS: is a global, placebo-controlled, double-blind, randomized trial with open-label extension
- Core randomization phase (n=160) with primary endpoint of cumulative number of new gadolinium-enhancing (GdE) T1 magnetic resonance (MRI) brain lesions versus placebo over 12 weeks of treatment.
- Key secondary endpoints: Incidence of treatment-emergency adverse events and annualized relapse rate
- The OLE part is an open-label, single treatment arm study to enroll patients who have completed the Week 24 visit in the Core Part for continued treatment and collect additional long-term safety and efficacy data. All patients will receive the low dose of Orelabrutinib from the Core part of the study.

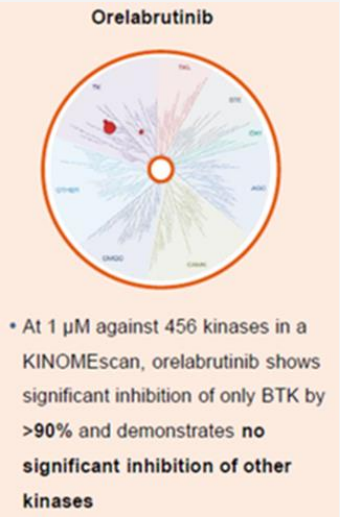
Current Status:
Recruitment of the phase 2 study is ongoing with FPI July 16, 2021

Orelabrutinib has received regulatory approval in China for several oncology indications; and received FDA breakthrough designation June 2021 for relapsed/refractory mantle cell lymphoma.

PHASE 1 CLINICAL DATA[1]



- Favorable PK/PD profile in healthy volunteers
- Near 100% occupancy for 24hrs at > 50mg
- No decrease in BTK occupancy between 4 and 24hrs post-dosing



1. Zhang et al. AACR 2020 Virtual Meeting/April 27, 2020 Beijing InnoCare Pharma Tech. Co. Ltd., Beijing, China
Note: Orelabrutinib is being developed in collaboration with InnoCare Pharma

BIIB059 (Anti-BDCA2 mAb) – Systemic Lupus Erythematosus

Specialized Immunology

PORTFOLIO

LUPUS PIPELINE

- Dapirolizumab Pegol (Ph3) – Systemic Lupus Erythematosus
- **BIIB059 (Ph3) – Systemic Lupus Erythematosus**
- BIIB059 (Ph2) – Cutaneous Lupus Erythematosus

PROPOSED MECHANISM OF ACTION

- BIIB059 is a humanized monoclonal antibody that binds to BDCA2, a protein uniquely expressed on plasmacytoid dendritic cells (pDCs), thereby inhibiting the production of inflammatory mediators such as Type-I interferons (IFN-I).
- As elevated levels of IFN-I have been observed in people with SLE and CLE, inhibiting pDC production of IFN-I as well as other cytokines and chemokines may have the potential to decrease inflammation and reduce tissue damage.
- BIIB059, which selectively targets pDC production of IFN-I via BDCA2, is not expected to affect the IFN-I response to viral infection mediated by other immune cells.

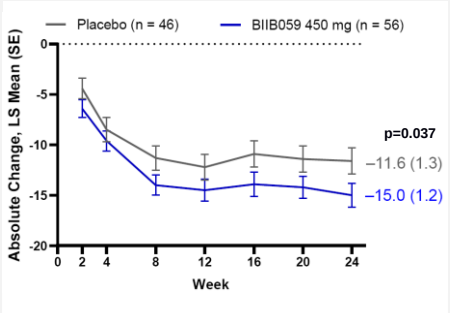
CLINICAL STUDY OVERVIEW

- Ph2 LILAC study met its primary endpoints, demonstrating a statistically significant reduction of disease activity in patients with SLE and CLE.
- Global Phase 3 TOPAZ-1 and TOPAZ-2 studies will evaluate the efficacy and safety of BIIB059, as compared to placebo, in active systemic lupus erythematosus (SLE).
- BIIB059 enrollment targets are set to reflect the prevalence of SLE in black / African American and Hispanic communities with the aim to achieve appropriate representation in the TOPAZ-1 and -2 studies.

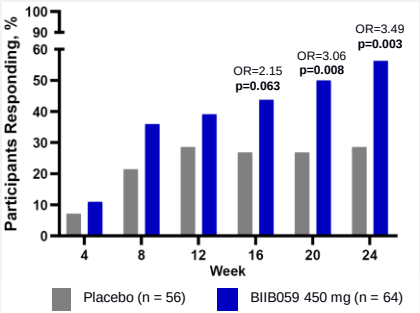
Current Status:

- TOPAZ-1 achieved FPI in June 2021; TOPAZ-2 achieved FPI in August 2021 [NCT04895241 NCT04961567]

PHASE 2: CHANGE IN TOTAL ACTIVE JOINT COUNT AT WEEK 24 (Primary Endpoint)



PHASE 2: SLE RESPONDER INDEX-4 RESPONSE RATE AT WEEK 24



Furie et al., ACR 2020

- Rates of adverse events in LILAC part A were similar in placebo (67.9%) and BIIB059 (59.2%) treatment groups
- AEs in the Infections and Infestations System Organ Class occurred in 39.3% and 35.5% of participants receiving placebo and BIIB059, respectively

SLE = systemic lupus erythematosus; CLE = Cutaneous Lupus Erythematosus; IgG1 = Immunoglobulin G1; pDC = plasmacytoid dendritic cell; BDCA2 = blood dendritic cell antigen 2; FPI = first patient in; IFN = Interferon

BIIB059 (Anti-BDCA2 mAb) – Cutaneous Lupus Erythematosus

Specialized Immunology

PORTFOLIO

LUPUS PIPELINE

- Dapirolizumab Pegol (Ph3) – Systemic Lupus Erythematosus
- BIIB059 (Ph3) – Systemic Lupus Erythematosus
- **BIIB059 (Ph2) – Cutaneous Lupus Erythematosus**

PROPOSED MECHANISM OF ACTION

- BIIB059 is a humanized monoclonal antibody that binds to BDCA2, a protein uniquely expressed on plasmacytoid dendritic cells (pDCs), thereby inhibiting the production of inflammatory mediators such as Type-I interferons (IFN-I).
- As elevated levels of IFN-I have been observed in people with SLE and CLE, inhibiting pDC production of IFN-I as well as other cytokines and chemokines may have the potential to decrease inflammation and reduce tissue damage.
- BIIB059, which selectively targets pDC production of IFN-I via BDCA2, is not expected to affect the IFN-I response to viral infection mediated by other immune cells.

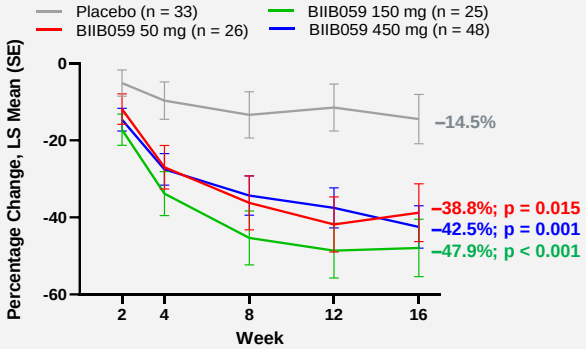
CLINICAL STUDY OVERVIEW

- Ph2 LILAC study met its primary endpoints, demonstrating a statistically significant reduction of disease activity in patients with SLE and CLE.
  - BIIB059 demonstrated a dose response on the percent change from baseline in the Cutaneous Lupus Erythematosus Disease Area and Severity Index Activity (CLASI-A) score at week 16 in people with CLE.
- Safety and tolerability data further support the continued development of BIIB059
  - Rates of adverse events in LILAC part B were similar in the placebo (66.7%) and pooled BIIB059 (71.7%) treatment groups
  - AEs in the Infections and Infestations System Organ Class occurred in 30.3% and 34.3% of participants receiving placebo and BIIB059, respectively

Current Status:

- Currently planned pivotal study start in CLE in 2022.

PHASE 2: CHANGES IN CLASI-A SCORES FROM BASELINE TO WEEK 16



Werth et al., ACR 2020

SLE = systemic lupus erythematosus; CLE = Cutaneous Lupus Erythematosus; IgG1 = Immunoglobulin G1; pDC = plasmacytoid dendritic cell; BDCA2 = blood dendritic cell antigen 2; FPI = first patient in; CLASI-A = Cutaneous Lupus Erythematosus Disease Area and Severity Index – Activity; IFN = Interferon

Dapirolizumab Pegol (anti-CD40L)

Specialized Immunology

PORTFOLIO

LUPUS PIPELINE

- **Dapirolizumab Pegol (Ph3) – Systemic Lupus Erythematosus**
- BIIB059 (Ph3) – Systemic Lupus Erythematosus
- BIIB059 (Ph2) – Cutaneous Lupus Erythematosus

PROPOSED MECHANISM OF ACTION

- Dapirolizumab pegol (DZP) is a polyethylene glycol (PEG)-conjugated anti-CD40L Fab' fragment, lacking a functional Fc domain
- The inhibition of CD40-CD40L interactions suppresses inflammation by reducing B cell, T-cell and APC activation, the production of pathogenic autoantibodies, and inflammatory events that can lead to organ damage accrual[1,2]

[1] Ramanujam et al. Autoimmun Rev. 2020; 19(11): 102668. [2] Karnell et al. Adv Drug Deliv Rev. 2019; 141: 92-103.

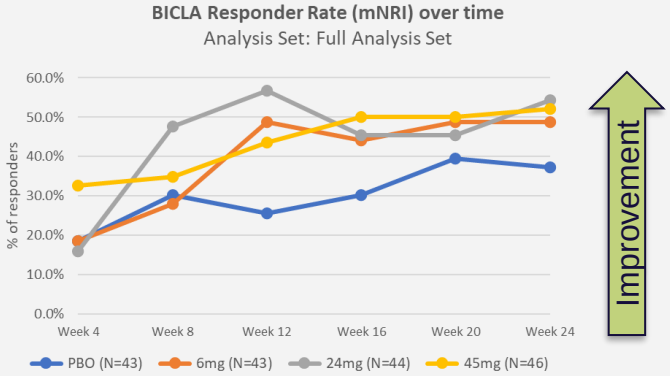
CLINICAL STUDY OVERVIEW

- Ph3 double-blind, multi-center, randomized, placebo-controlled, parallel group, global study, to evaluate the efficacy and safety of DZP in patients (N=450) with moderately to severely active SLE despite standard of care treatment. (NCT04294667)
- Primary endpoint is achievement of BICLA response at Week 48.
- In the Ph2 SLE study[3], although the primary endpoint (on dose response) was not met, DZP exhibited improvements across multiple clinical and immunological measures of disease activity after 24-weeks compared with placebo
  - TEAEs and serious TEAEs were generally balanced across treatment groups during the 24-week double-blind period; more upper respiratory tract infections were observed with DZP compared with placebo (e.g. nasopharyngitis 10.2% vs 4.4% and pharyngitis 8.0% vs 2.2% of patients for DZP and placebo, respectively).
- UCB/Biogen are reinforcing their commitment to the inclusion of under-represented groups in our clinical trials. Enrollment targets have been set to reflect the prevalence of SLE in Black / African American and Hispanic communities.

Current Status:

- Ph3 ongoing; first patient dosed August 2020

BICLA RESULTS FROM PHASE 2 STUDY[3]



[3] Furie et al. EULAR 2019. Furie et al. Rheumatology 2021; 60: 5397 – 5407.

Note: Dapirolizumab is being developed in collaboration with UCB; SLE = systemic lupus erythematosus; TEAE = treatment emergent adverse events; BICLA = BILAG-based composite lupus assessment

Biogen Digital Health Portfolio

Digital Health

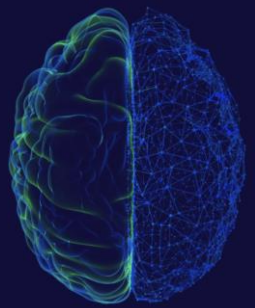
PORTFOLIO FOCUS

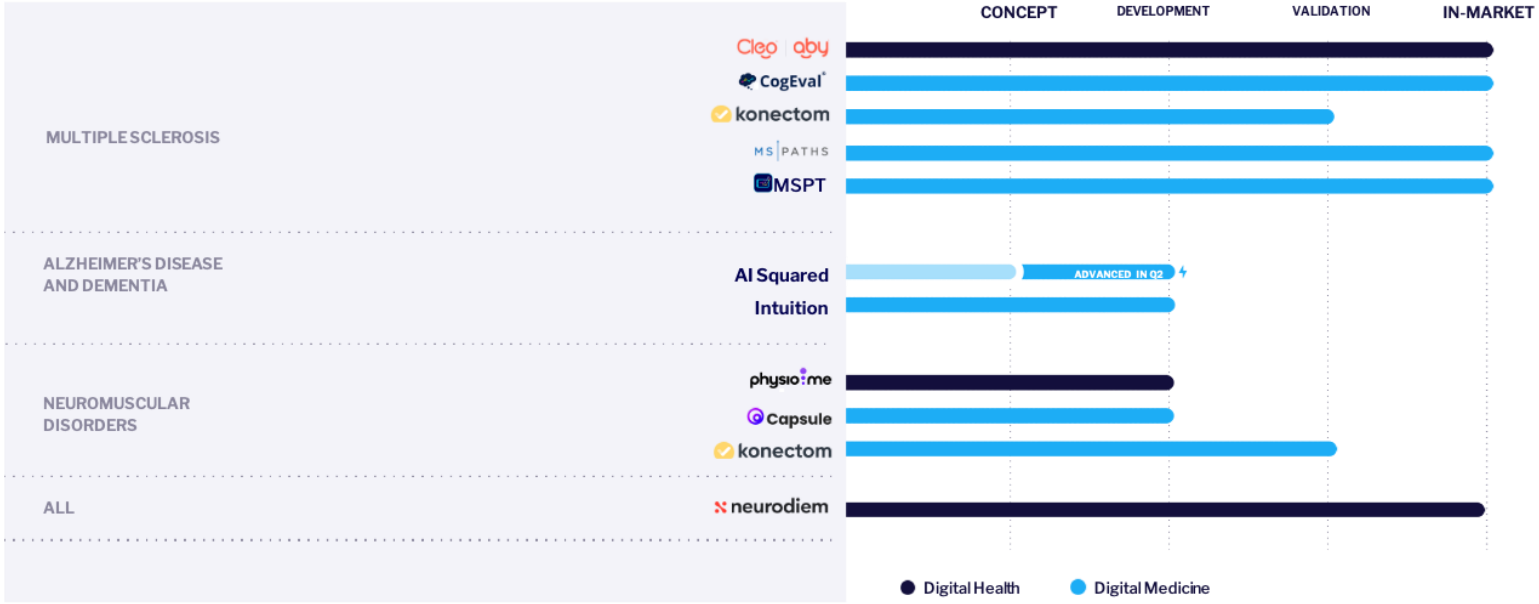
- ❖ Digital Biomarkers
- ❖ Personalized Medicine
- ❖ Patient Pathway Improvement
- ❖ Digital Therapeutics

- **11** disclosed initiatives focused across clinical development and real-world settings
- **5** initiatives in market with **6** initiatives in development or validation stages across disease areas

VALUE CREATION OBJECTIVES

- Potentially improve efficiency of clinical development
- Evidence and companion technologies that may enhance risk/benefit profile of Biogen therapies
- Aim to expand market opportunities (screening, diagnosis, adherence, compliance)
- Potential adjacent source of revenue (prescription digital therapeutics, software as a service – imaging, digital biomarkers etc.)





Biogen Digital Health

Digital Health

PORTFOLIO FOCUS

- ❖ Digital Biomarkers
- ❖ Personalized Medicine
- ❖ Patient Pathway Improvement
- ❖ Digital Therapeutics

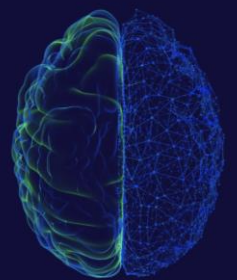
Disease Area: Multiple Sclerosis

Initiative	Stage	Focus	Description
Cleo/Aby – *Digital Companion*	In-Market	Patient Pathway Improvement	Cleo (Aby in North America) is a digital care companion app to help people live with Multiple Sclerosis. It provides information, tips, symptoms tracking, reminders, tailored programs for self-care such as nutrition, mindfulness, and a nurse chat.
CogEval – *Cognitive Assessment*	In-Market	Digital Biomarkers/ Personalized Medicine	CogEval is an iPad-based assessment designed to evaluate cognitive function in-clinic for patients with multiple sclerosis.
Konectom MS – *Digital Biomarkers*	Validation	Digital Biomarkers/ Personalized Medicine	Smartphone-based digital measurement platform that aims to assess key neurological functions such as cognition, fine and gross motor control, walk, quality of life and mobility in clinical studies, in-clinic or remotely. [DigiTOMS KONECT-MS]
MS PATHS – *Research Network*	In-Market	Digital Biomarkers/ Personalized Medicine	Uses advanced technologies to generate & collect standardized patient data during routine office visits potentially resulting in a large, high definition and diverse real-world MS cohort.
MS Performance Test – *Digital Biomarkers*	In-Market	Digital Biomarkers/ Personalized Medicine	In-clinic assessment tool that aims to objectively quantify the major motor, visual, and cognitive systems, as well as quality of life and disease history for patients with MS. HCPs can access patient results at the point of care.

HCP = healthcare provider; MS = multiple sclerosis; RWE = real-world evidence; T&D = treatment and decision; MRI = magnetic resonance imaging; AI = artificial intelligence

Biogen Digital Health

Digital Health



PORTFOLIO FOCUS

- ❖ Digital Biomarkers
- ❖ Personalized Medicine
- ❖ Patient Pathway Improvement
- ❖ Digital Therapeutics

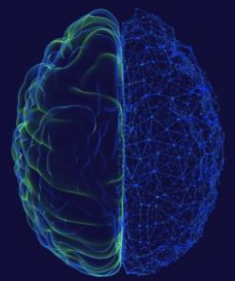
Disease Area: Alzheimer's Disease and Dementia

Initiative	Stage	Focus	Description
AI^2 ARIA Identification – *Imaging AI*	Development	Personalized Medicine	AI-squared may be integrated in radiologist workflow/PACS and aims to provide validated, automated MRI assessment report of quantification, severity status and location of ARIA-H and ARIA-E events.
Intuition – *Digital Biomarkers*	Validation	Digital Biomarkers	[INTUITION Study]: Virtual, observational study leveraging the Apple Watch, iPhone, and CANTAB battery to potentially discover digital biomarkers for MCI screening and potentially track cognitive changes in adults.

ARIA – E/H = amyloid related imaging abnormality – edema / hemorrhage; MCI = mild cognitive impairment; HCP = healthcare provider; RWE = real-world evidence; AI = artificial intelligence

Biogen Digital Health

Digital Health



PORTFOLIO FOCUS

- ❖ Digital Biomarkers
- ❖ Personalized Medicine
- ❖ Patient Pathway Improvement
- ❖ Digital Therapeutics

Disease Area: Neuromuscular Disorders

Initiative	Stage	Focus	Description
Physio.me – *Digital Companion*	Development	Patient Pathway Improvement Personalized Medicine	Digital physiotherapy companion that offers to perform at-home, tailored, secure exercise so NMD patients can potentially achieve their goals, measure progress and share progress with their care team.
Capsule – *VR solution*	Development	Patient Pathway Improvement	Evidence-based medical device that combines immersion through virtual reality technology and medical hypnosis to potentially alleviate anxiety related to intrathecal injection procedures.
Konectom NMD – *Digital Biomarkers*	Validation	Digital Biomarkers/ Personalized Medicine	Smartphone app that aims to assess key neurological functions such as cognition, fine and gross motor control, walk, quality of life and mobility in clinical studies, in-clinic, or remotely.

Disease Area: All

Initiative	Stage	Focus	Description
Neurodiem – *Digital Portal*	In-Market	Patient Pathway Improvement	Independent information & education portal for HCPs specialized in the care of patients with neurological diseases. Allows HCPs to access scientifically-validated, independent content to help them remain at the forefront of their practice and deliver the best care to their patients.

NMD = neuromuscular diseases; RWE = real world evidence; VR = virtual reality

BYOOVIZ™ (referencing LUCENTIS®)

Biosimilars

Reference Molecule

BIOSIMILARS PIPELINE

- ❖ BYOOVIZ™ (SB11[i]) Approved – referencing LUCENTIS®
- ❖ Approved in US, EU, UK, and Canada

[i] SB11 refers to the Samsung Bioepis product candidate name

ORIGINATOR 2021 Revenue (US/ROW), $M:

- ❖ Lucentis: $1,481M US / $2,160M ROW[1]

MECHANISM OF ACTION

BYOOVIZ™ binds with high affinity to vascular endothelial growth factor (VEGF)-A isoforms (e.g. VEGF110, VEGF121 and VEGF165), thereby preventing binding of VEGF-A to its receptors VEGFR-1 and VEGFR-2. Binding of VEGF-A to its receptors leads to endothelial cell proliferation and neovascularisation, as well as vascular leakage, all of which are thought to contribute to the progression of the neovascular form of age-related macular degeneration, pathologic myopia and CNV secondary to pathologic myopia or to visual impairment caused by either diabetic macular oedema or macular oedema secondary to retinal vein occlusion in adults.

CLINICAL STUDY OVERVIEW

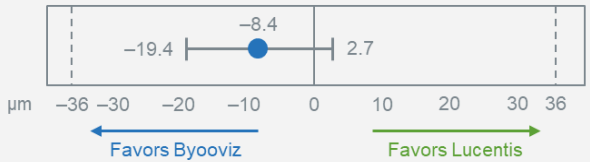
- A randomized, double-blind, parallel-group, phase III study trial conducted in 75 centers in 9 countries globally from March 2018 to December 2019
- Patients with nAMD were randomized (1:1) to receive either SB11 (n=351) or ranibizumab (Lucentis®) (n=354)
- Primary endpoints were:
  - Change from baseline in BCVA at Week 8 in the FAS (for US FDA)
  - change from baseline in CST at Week 4 in the PPS-CST (for EMA)
- Secondary endpoints included change from baseline in BCVA, CST, CRLT, CNV size, proportion of subjects with active CNV leakage up to week 52, in addition to safety (ocular and non-ocular adverse events), immunogenicity and pharmacokinetics.
- Primary endpoint was met with 95% CI of LS mean difference contained within pre-defined equivalence margin. The secondary endpoint also supported similarity in efficacy.
- The safety, PK, and immunogenicity profiles were comparable between treatment groups. Observed treatment-emergent adverse events (TEAEs) were consistent with ranibizumab's safety profile, with "intraocular pressure increased" as the only ocular TEAE occurring in ≥5% of participants for both treatment groups. The most common non-ocular TEAEs were nasopharyngitis and hypertension. The most frequently reported AEs of special interest were increased intraocular pressure (SB11, 1 [0.3%]; ranibizumab, 6 [1.7%]) and iridocyclitis (SB11, 3 [0.9%]).

CLINICAL DATA OVERVIEW[2]

Difference of mean change in BCVA at Week 8

Whiskers represent the 90% CI. Dashed lines represent the predefined equivalence margins of [-3 to 3 letters],

Difference of mean change in CST at week 4



Whiskers represent the 95% CI. Dashed lines represent the predefined equivalence margin of [-36 to 36 µm],

nAMD neovascular age-related macular degeneration; BCVA, best corrected visual acuity; FAS, full analysis set; MFDS, Ministry of Food and Drug Safety; CST, central subfield thickness; PPS-CST, per-protocol set –CST; CNV, choroidal neovascularization; CRLT, central retinal lesion thickness; CI, confidence interval. Note: Biosimilar indications may vary by product or region;

Source: [1]Evaluate pharma 2021;
[2] *Se Joon Woo et al. JAMA Ophthalmol* 2021;139:68–76

Biogen

SB15 (referencing EYLEA®)

Biosimilars

Reference Molecule

BIOSIMILARS PIPELINE

- SB15[i] (Ph3) – referencing EYLEA®

[i] SB15 refers to the Samsung Bioepis product candidate name

ORIGINATOR 2021 Revenue (US/ROW), $M:

- **Eylea® $5,792 M US / $4,035M ROW[1]**

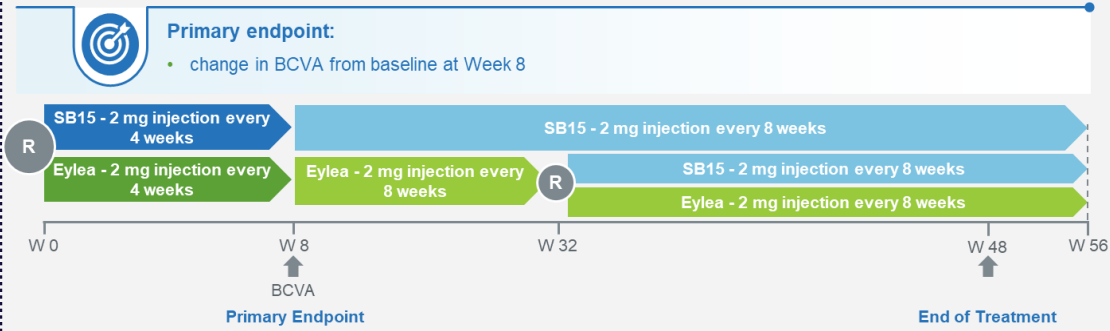
MECHANISM OF ACTION

Vascular endothelial growth factor-A (VEGF-A) and placental growth factor (PlGF) are members of the VEGF family of angiogenic factors that can act as potent mitogenic, chemotactic, and vascular permeability factors for endothelial cells. VEGF acts via two receptor tyrosine kinases; VEGFR-1 and VEGFR-2, present on the surface of endothelial cells. PlGF binds only to VEGFR-1, which is also present on the surface of leucocytes. Excessive activation of these receptors by VEGF-A can result in pathological neovascularisation and excessive vascular permeability. PlGF can synergize with VEGF-A in these processes, and is also known to promote leucocyte infiltration and vascular inflammation.

CLINICAL STUDY OVERVIEW

- Randomized, double-blind, parallel group, phase-III study trial conducted in 57 centers across 10 countries. Study start July 2020; expected completion H1 2022
- Patients (n=449) with nAMD randomized (1:1) to receive either SB15 or aflibercept (Eylea)
- Primary endpoints:
  - change from baseline BCVA to BCVA at Week 8
- Secondary endpoints include efficacy, safety, immunogenicity and pharmacokinetics up to week 56.

CLINICAL DATA OVERVIEW



Data readout for SB15 expected not before Q4 2022

BCVA, best corrected visual acuity. Note: Biosimilar indications my vary by product or region.

Source: [1]Evaluate pharma 2021

Biogen

BIIB800 (referencing ACTEMRA®)

Biosimilars

Reference Molecule

BIOSIMILARS PIPELINE

- **BIIB800 (BAT1806[i]) Ph3 completed**

[i] BAT1806 refers to the Bio-Thera Solutions product candidate name

ORIGINATOR 2021 Revenue (US/ROW), $M:

- **Actemra $1,927M US / $1,971M ROW[1]**

MECHANISM OF ACTION

- IL-6 receptor signaling activates intracellular JAK MAPK and JAK-STAT3 signaling pathways involved in several inflammatory diseases, including Rheumatoid Arthritis.
- Tocilizumab binds to membrane-bound and soluble IL-6 receptor (IL-6R) thereby preventing IL-6 from binding to IL-6R, inhibiting IL-6 signaling.

CLINICAL STUDY OVERVIEW

- Phase I: A randomized, double-blind, three-arm (reference products RoActemra® (EU) (n=42) or Actemra® (US) (n=42), or BIIB800 [BAT1806] n=45)), parallel-group study of a single 4 mg/kg dose administered intravenously. Healthy volunteers were followed for 57 days for PK, immunogenicity and safety
- Phase III[3]:
  - A multicenter, multinational, randomized, double-blind, parallel-group, active-control study to compare efficacy, safety, immunogenicity, and PK of BIIB800 [BAT1806] compared with RoActemra® in 621 subjects with moderate to severe Rheumatoid Arthritis (RA) inadequately controlled by MTX
  - The study comprised a ≤ 28-day screening period, a 48-week randomized treatment period, and a 4-week safety follow-up

CLINICAL DATA

- Phase I:
  - Bioequivalence study concluded that the PK, immunogenicity and safety profile of BIIB800 [BAT1806] was similar to that of the EU/US reference products[2]
- Phase III:
  - The study met its primary endpoints of American College of Rheumatology 20 percent response criteria (ACR20) at Week 12 (EMA) and at Week 24 (FDA, NMPA)
  - Biogen believes that BIIB800 [BAT1806] demonstrated equivalence in efficacy and pharmacokinetics and has a comparable safety and immunogenicity profile to the reference product[4]
  - Primary results abstract has been accepted for poster presentation at EULAR 2022 congress; results under embargo until late May 2022 according to EULAR rules[5]

Note: Biosimilar indications my vary by product or region.

[1] Source: Evaluate pharma 2021

[2] Zhang H et al. Front Pharmacol. 2021;11:609522. doi: 10.3389/fphar.2020.609522

[3] www.clinicaltrialsregister.eu/ctr-search/trial/2018-002202-31/BG.

[4] https://investors.biogen.com/news-releases/news-release-details/biogen-and-bio-thera-announce-positive-results-phase-3-study

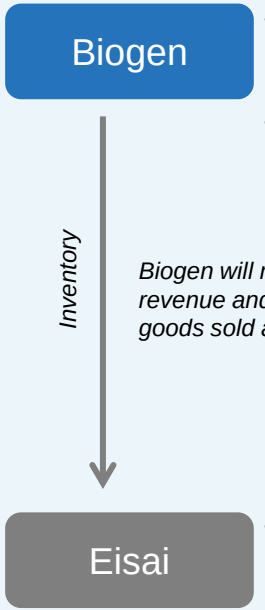
[5] https://congress.eular.org/myUploadData/files/embargo_policy_2022.pdf

Biogen

Lecanemab collaboration accounting

Collaboration Economics	• Both companies share collaboration profits and losses equally
Revenue	• Eisai will record 100% of product revenue • After regulatory approval, Biogen's 50% share of profits and losses will be reflected as a component of Other Revenue
Royalties	• Eisai will pay BioArctic AB royalties in the high single-digits • Biogen's 50% share these royalties will be reflected as a net reduction of Other Revenue
SG&A Expense	• Prior to regulatory approval: The net reimbursement to Eisai will be recorded as an expense within SG&A • After regulatory approval: The net reimbursement to Eisai will be recorded as a net reduction of Other Revenue
R&D Expense	• Biogen's share of expenditures are recorded within R&D expense, both before and after regulatory approval

Accounting for the manufacturing and sale of lecanemab inventory to Eisai:



- Biogen will manufacture the lecanemab drug substance in its Solothurn, Switzerland facility
- As product is manufactured, Biogen will capitalize as inventory until sold to Eisai

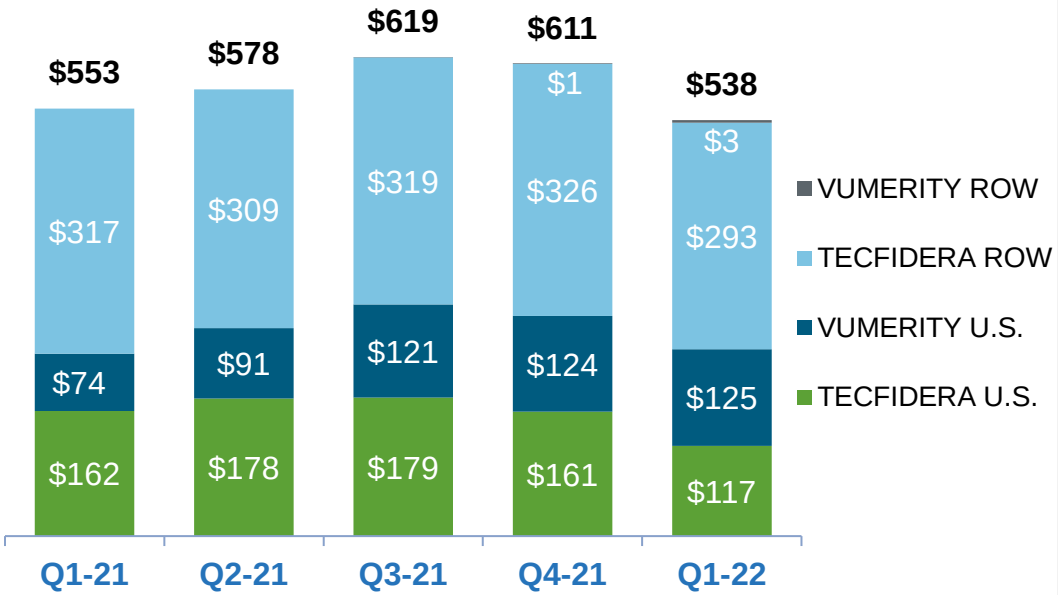
Biogen will recognize contract manufacturing revenue and contract manufacturing cost of goods sold at a minimal gross margin

- As Eisai sells lecanemab inventory to customers, Biogen will record its 50% share of cost of goods sold, which will be reflected as a reduction of Other Revenue

Biogen

Global fumarate revenue

Fumarate Revenue ($M)



Numbers may not foot or recalculate due to rounding.

Q1 2022 Highlights

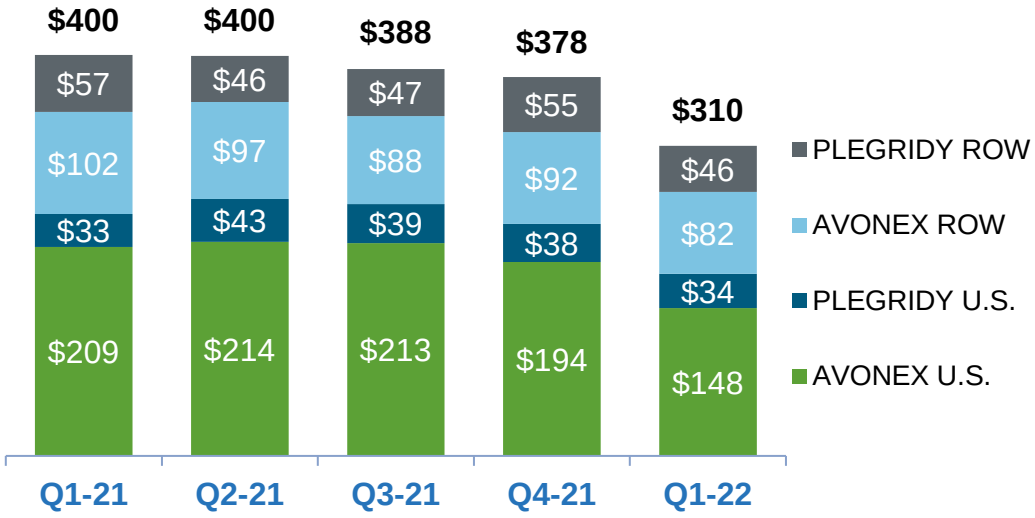
Revenue vs. Q1 2021 and Q4 2021

	ΔY/Y		ΔQ/Q
WW	- 3%	and	- 12%
ROW	- 7%	and	- 10%
U.S.	+ 3%	and	- 15%

Global interferon revenue

AVONEX (interferon beta-1a) plegridy (peginterferon beta-1a)

Interferon Revenue ($M)



Numbers may not foot or recalculate due to rounding.

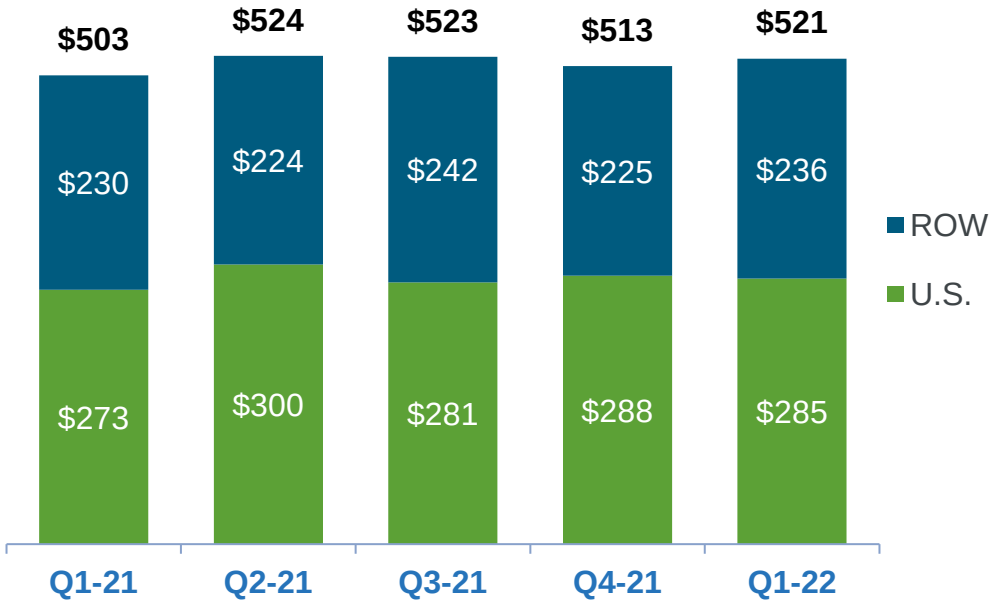
Q1 2022 Highlights

Revenue vs. Q1 2021 and Q4 2021

	ΔY/Y		ΔQ/Q
WW	- 23%	and	- 18%
ROW	- 20%	and	- 13%
U.S.	- 25%	and	- 21%

Global TYSABRI revenue

TYSABRI Revenue ($M)



Numbers may not foot or recalculate due to rounding.

Q1 2022 Highlights

Revenue vs. Q1 2021 and Q4 2021

	ΔY/Y		ΔQ/Q
WW	+ 3%	and	+ 2%
ROW	+ 3%	and	+ 5%
U.S.	+ 4%	and	- 1%

Consolidated Statement of Income

(unaudited, in millions, except per share amounts)

	For the Three Months Ended March 31,	
	2022	2021
Revenue:		
Product, net	$ 2,066.3	$ 2,211.7
Revenue from anti-CD20 therapeutic programs	399.4	389.0
Other	66.1	93.3
Total revenue	2,531.8	2,694.0
Cost and expense:		
Cost of sales, excluding amortization and impairment of acquired intangible assets	753.9	478.1
Research and development	551.7	514.2
Selling, general and administrative	634.9	595.0
Amortization and impairment of acquired intangible assets	66.9	98.1
Collaboration profit sharing	(117.3)	68.5
(Gain) loss on fair value remeasurement of contingent consideration	(7.1)	(33.8)
Restructuring charges	38.1	—
Total cost and expense	1,921.1	1,720.1
Income from operations	610.7	973.9
Other income (expense), net	(263.3)	(506.9)
Income before income tax expense and equity in loss of investee, net of tax	347.4	467.0
Income tax (benefit) expense	125.6	44.2
Equity in (income) loss of investee, net of tax	3.3	18.2
Net income	218.5	404.6
Net income (loss) attributable to noncontrolling interests, net of tax	(85.3)	(5.6)
Net income attributable to Biogen Inc.	$ 303.8	$ 410.2
Net income per share:		
Basic earnings per share attributable to Biogen Inc.	$ 2.06	$ 2.70
Diluted earnings per share attributable to Biogen Inc.	$ 2.06	$ 2.69
Weighted-average shares used in calculating:		
Basic earnings per share attributable to Biogen Inc.	147.1	151.9
Diluted earnings per share attributable to Biogen Inc.	147.6	152.3

Biogen

GAAP to Non-GAAP Reconciliation

Operating Expense, Other Income (Expense), net and Income Tax (unaudited, in millions, except per share amounts)

(In millions, except per share amounts)	For the Three Months Ended March 31, 2022[1]	2021[2,3]
Selling, General and Administrative Expense:		
Total selling, general and administrative, GAAP	$ 634.9	$ 595.0
Less: other	(0.1)	0.1
Total selling, general and administrative, Non-GAAP	$ 635.0	$ 594.9
Amortization and Impairment of Acquired Intangible Assets:		
Total amortization and impairment of acquired intangible assets, GAAP	$ 66.9	$ 98.1
Less: impairment charges [A]	—	44.3
Less: amortization of acquired intangible assets	59.3	53.8
Total amortization and impairment of acquired intangible assets, Non-GAAP	$ 7.6	$ —
(Gain) Loss on Fair Value Remeasurement of Contingent Consideration:		
Total (gain) loss on fair value remeasurement of contingent consideration, GAAP	$ (7.1)	$ (33.8)
Less: (gain) loss on fair value remeasurement of contingent consideration	(7.1)	(33.8)
Total (gain) loss on fair value remeasurement of contingent consideration, Non-GAAP	$ —	$ —
Other Income (Expense), net:		
Total other income (expense), net, GAAP	$ (263.3)	$ (506.9)
Less: gain (loss) on equity security investments	(190.7)	(436.1)
Less: premium paid on debt exchange or early debt redemption	—	(9.4)
Total other income (expense), net, Non-GAAP	$ (72.6)	$ (61.4)
Income Tax (Benefit) Expense:		
Total income tax (benefit) expense, GAAP	$ 125.6	$ 44.2
Less: Neurimmune step-up tax basis [B]	83.9	—
Less: valuation allowance associated with TECFIDERA IP court decision	—	—
Less: income tax effect related to Non-GAAP reconciling items	(55.9)	(109.2)
Total income tax expense, Non-GAAP	$ 97.6	$ 153.4
Effective Tax Rate:		
Total effective tax rate, GAAP	36.2 %	9.5 %
Less: Neurimmune step-up tax basis [B]	24.2	—
Less: valuation allowance associated with TECFIDERA IP court decision	—	—
Less: impact of GAAP to Non-GAAP adjustments	(3.5)	(6.2)
Total effective tax rate, Non-GAAP	15.5 %	15.7 %

Use of Non-GAAP Financial Measures

We supplement our GAAP consolidated financial statements and GAAP financial measures with other financial measures, such as adjusted net income, adjusted diluted earnings per share, revenue growth at constant currency, which excludes the impact of changes in foreign exchange rates and hedging gains or losses, and free cash flow, which is defined as net flow from operations less capital expenditures. We believe that these and other Non-GAAP financial measures provide additional insight into the ongoing economics of our business and reflect how we manage our business internally, set operational goals and form the basis of our management incentive programs. Non-GAAP financial measures are in addition to, not a substitute for, or superior to, measures of financial performance prepared in accordance with GAAP.

Our "Non-GAAP net income attributable to Biogen Inc." and "Non-GAAP earnings per share - Diluted" financial measures exclude the following items from "GAAP net income attributable to Biogen Inc." and "GAAP earnings per share - Diluted":

1. Acquisitions and divestitures

We exclude transaction, integration and certain other costs related to the acquisition and divestiture of businesses and items associated with the initial consolidation or deconsolidation of variable interest entities. These adjustments include, but are not limited to, the amortization and impairment of intangible assets, charges or credits from the fair value remeasurement of our contingent consideration obligations and losses on assets and liabilities held for sale.

2. Restructuring, business transformation and other cost saving initiatives

We exclude costs associated with our execution of certain strategies and initiatives to streamline operations, achieve targeted cost reductions, rationalize manufacturing facilities or refocus research and development activities. These costs may include employee separation costs, retention bonuses, facility closing and exit costs, asset impairment charges or additional depreciation when the expected useful life of certain assets have been shortened due to changes in anticipated usage and other costs or credits that management believes do not have a direct correlation to our ongoing or future business operations.

3. (Gain) loss on equity security investments

We exclude unrealized and realized gains and losses and discounts or premiums on our equity security investments as we do not believe that these components of income or expense have a direct correlation to our ongoing or future business operations.

4. Other items

We evaluate other items of income and expense on an individual basis and consider both the quantitative and qualitative aspects of the item, including (i) its size and nature, (ii) whether or not it relates to our ongoing business operations and (iii) whether or not we expect it to occur as part of our normal business on a regular basis. We also include an adjustment to reflect the related tax effect of all reconciling items within our reconciliation of our GAAP to Non-GAAP net income attributable to Biogen Inc. and earnings per share - diluted.

Biogen. Footnotes referenced in the tables above are included at the end of this presentation.

GAAP to Non-GAAP Reconciliation

Equity Income/Loss of Investee, Noncontrolling Interests, Net Income & Diluted EPS
(unaudited, in millions, except per share amounts)

(In millions, except per share amounts)	For the Three Months Ended March 31, 2022[1]	2021[1,2]
Equity in (Income) Loss of Investee, Net of Tax:		
Total equity in (income) loss of investee, GAAP	$ 3.3	$ 18.2
Less: amortization of equity in (income) loss of investee	7.3	7.2
Total equity in (income) loss of investee, Non-GAAP	$ (4.0)	$ 11.0
Net Income (Loss) Attributable to Noncontrolling Interests, Net of Tax:		
Total net income (loss) attributable to noncontrolling interests, GAAP	$ (85.3)	$ (5.6)
Less: Neurimmune step-up tax basis [B]	(83.9)	–
Less: other	(1.5)	(5.3)
Total net income (loss) attributable to noncontrolling interests, Non-GAAP	$ 0.1	$ (0.3)
Net Income Attributable to Biogen Inc.:		
Total net income attributable to Biogen Inc., GAAP	$ 303.8	$ 410.2
Plus: impairment charges [A]	–	44.3
Plus: amortization of acquired intangible assets	59.3	53.8
Plus: Restructuring charges	38.1	–
Plus: (gain) loss on fair value remeasurement of contingent consideration	(7.1)	(33.8)
Plus: (gain) loss on equity security investments	190.7	436.1
Plus: noncontrolling interests, amortization of equity in (income) loss of investee & other	5.8	1.9
Plus: income tax effect related to Non-GAAP reconciling items	(55.9)	(109.2)
Plus: other	(0.1)	9.5
Total net income attributable to Biogen Inc., Non-GAAP	$ 534.6	$ 812.8
Diluted Earnings Per Share		
Total diluted earnings per share, GAAP	$ 2.06	$ 2.69
Plus: adjustments to GAAP net income attributable to Biogen Inc. (as detailed above)	1.56	2.65
Total diluted earnings per share, Non-GAAP	$ 3.62	$ 5.34

[1] Beginning in the second quarter of 2021 material upfront payments and premiums paid on the acquisition of common stock associated with significant collaboration and licensing arrangements along with the related transaction costs incurred are no longer excluded from Non-GAAP research and development expense and selling, general and administrative expense. Beginning in the first quarter of 2022 material payments paid on the acquisition of in-process research and development assets are no longer excluded in the determination of Non-GAAP net income. Prior period Non-GAAP results have been updated to reflect these changes.

[2] Beginning in the third quarter of 2021 amortization expense recorded in intangible assets that arose from collaboration and licensing arrangements is no longer excluded from our Non-GAAP results on a prospective basis. Non-GAAP financial results prior to the third quarter of 2021 have not been updated to reflect this change.

Footnotes referenced in the tables above are included at the end of this presentation.

GAAP to Non-GAAP Reconciliation

Constant Currency & Free Cash Flow
(unaudited, in millions)

Revenue growth at constant currency

Percentage changes in revenue growth at constant currency are presented excluding the impact of changes in foreign currency exchange rates and hedging gains or losses. The current period's foreign currency revenue values are converted into U.S. dollars using the average exchange rates from the prior period.

	For the Three Months Ended March 31, 2022
Total Revenue	
Revenue change, as reported	(6.0)%
Less: impact of foreign currency translation and hedging (gains) losses	(1.3)
Revenue change at constant currency	(4.7)%
Total MS Revenue (including OCREVUS royalties)	
Revenue change, as reported	(2.7)%
Less: impact of foreign currency translation and hedging (gains) losses	(0.5)
Revenue change at constant currency	(2.2)%
Total SPINRAZA Revenue	
Revenue change, as reported	(9.2)%
Less: impact of foreign currency translation and hedging (gains) losses	(3.1)
Revenue change at constant currency	(6.1)%
Total Biosimilars Revenue	
Revenue change, as reported	(5.2)%
Less: impact of foreign currency translation and hedging (gains) losses	(4.7)
Revenue change at constant currency	(0.5)%
Total Other Revenue	
Revenue change, as reported	(29.1)%
Less: impact of foreign currency translation and hedging (gains) losses	(0.4)
Revenue change at constant currency	(28.7)%

Free cash flow

We define free cash flow as net cash provided by (used in) operating activities in the period less capital expenditures made in the period. The following table reconciles net cash provided by (used in) operating activities, a GAAP measure, to free cash flow, a Non-GAAP measure.

	For the Three Months Ended March 31,	
	2022	2021
Cash Flow:		
Net cash provided by (used in) operating activities	$ 161.8	$ 769.0
Net cash provided by (used in) investing activities	(648.0)	(64.7)
Net cash provided by (used in) financing activities	(16.5)	(785.0)
Net increase (decrease) in cash and cash equivalents	$ (502.7)	$ (80.7)
Net cash provided by (used in) operating activities	$ 161.8	$ 769.0
Less: Purchases of property, plant and equipment	57.9	92.6
Free cash flow	$ 103.9	$ 676.4

Notes to GAAP to Non-GAAP Reconciliation

Operating Expense & Net Income Attributable to Biogen Inc.

[A] Amortization and impairment of acquired intangible assets for the three months ended March 31, 2022, compared to the same period in 2021, decreased primarily due to a $44.3 million impairment charge recorded during the first quarter of 2021 related to vixotrigine (BIIB074) for the potential treatment of trigeminal neuralgia (TGN).

In the periods since we acquired vixotrigine, there have been numerous delays in the initiation of Phase 3 studies for the potential treatment of TGN and for the potential treatment of diabetic painful neuropathy (DPN), another form of neuropathic pain. We have engaged with the FDA regarding the design of the Phase 3 studies of vixotrigine for the potential treatment of TGN and DPN and are now performing an additional clinical trial of vixotrigine, which is expected to be completed by the end of 2022.

The performance of this additional clinical trial delayed the initiation of the Phase 3 studies of vixotrigine for the potential treatment of TGN, and, as a result, we recognized an impairment charge of $44.3 million related to vixotrigine for the potential treatment of TGN during the first quarter of 2021.

[B] For the three months ended March 31, 2022, compared to the same period in 2021, the increase in our GAAP effective tax rate was primarily due to a deferred tax expense related to a valuation allowance, as discussed below, and the non-cash tax effects of changes in the value of our equity investments. The tax effects of this change in value of our equity investments were recorded discretely, since changes in value of equity investments cannot be forecasted.

During the second quarter of 2021 we recorded a net deferred tax asset in Switzerland of approximately $490.0 million on Neurimmune SubOne AG's (Neurimmune) tax basis in ADUHELM, the realization of which is dependent on future sales of ADUHELM. During the fourth quarter of 2021, due to reduced future expected revenue associated with ADUHELM, we recorded a valuation allowance of approximately $390.0 million.

During the first quarter of 2022, upon issuance of the final NCD related to ADUHELM, we recorded an additional valuation allowance of approximately $85.0 million to reduce the net value of this deferred tax asset to zero. These adjustments to our deferred tax assets and their valuation allowances are each recorded with an equal and offsetting amount assigned to net income (loss) attributable to noncontrolling interests, net of tax in our condensed consolidated statements of income, resulting in a zero net impact to net income attributable to Biogen Inc.