# UNITED STATES
# SECURITIES AND EXCHANGE COMMISSION
**WASHINGTON, D.C. 20549**

# FORM 8-K

**CURRENT REPORT**

**Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934**

**Date of Report (Date of earliest event reported): November 29, 2023**

# Longboard Pharmaceuticals, Inc.
**(Exact name of Registrant as Specified in Its Charter)**

| **Delaware** | **1-40192** | **84-5009619** |
|---|---|---|
| **(State or Other Jurisdiction of Incorporation)** | **(Commission File Number)** | **(IRS Employer Identification No.)** |
| **4275 Executive Square, Suite 950 La Jolla, CA** | | **92037** |
| **(Address of Principal Executive Offices)** | | **(Zip Code)** |

**Registrant's Telephone Number, Including Area Code: (858) 789-9283**

**N/A**
**(Former Name or Former Address, if Changed Since Last Report)**

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Securities registered pursuant to Section 12(b) of the Act:

| Title of each class | Trading Symbol(s) | Name of each exchange on which registered |
|---|---|---|
| Common stock, par value $0.0001 per share | LBPH | The Nasdaq Global Market |

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§ 230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§ 240.12b-2 of this chapter).

Emerging growth company ☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

In this report, “we” and “our” refer to Longboard Pharmaceuticals, Inc.

**Item 7.01 Regulation FD Disclosure.**

Included as Exhibit 99.1 to this Form 8-K is a corporate presentation dated November 29, 2023, that is incorporated herein by reference. We intend to utilize this presentation and its contents in various meetings with securities analysts, investors and others.

The information in this Item 7.01 of this Current Report on Form 8-K, including Exhibit 99.1, shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liabilities of that section or Sections 11 and 12(a)(2) of the Securities Act of 1933, as amended. The information contained in this Item 7.01, including Exhibit 99.1, shall not be incorporated by reference into any filing we make with the U.S. Securities and Exchange Commission (“SEC”), whether before or after the date hereof, regardless of any general incorporation language in such filing.

**Item 9.01 Financial Statements and Exhibits. (d) Exhibits.**

| Exhibit No. | Description |
|---|---|
| 99.1 | Longboard Pharmaceuticals corporate presentation dated November 29, 2023 |
| 104 | Cover Page Interactive Data File (embedded within the Inline XBRL document) |

**SIGNATURES**

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

Longboard Pharmaceuticals, Inc.

Date: November 29, 2023

By: */s/ Kevin R. Lind*
Kevin R. Lind
President and Chief Executive Officer

Exhibit 99.1

LONGBOARD PHARMACEUTICALS

# Corporate Presentation

NOVEMBER 29, 2023

# Forward-Looking Statements

This presentation contains forward-looking statements about Longboard Pharmaceuticals, Inc. ("we," "Longboard" or the "Company"), including statements regarding: our vision; commercial opportunities and analogs; our development approach and position to have best-in-class drug candidates; anticipated milestones; the prevalence of, unmet need associated with, and market opportunity for, DEEs; the potential of a broad-spectrum ASM; the potential of LP352 (including to be best-in-class, to satisfy unmet need, to be a safer, efficacious, and less burdensome therapy, to have differentiated selectivity and specificity, to expand the market to a broader population, to limit adverse events, including those associated with currently available non-selective ASMs, to be indicated across a range of DEEs, to avoid drug-drug interactions, including through optimized dosing, to be desired or preferred by physicians, patients and caregivers, to expand, broaden or capture market share, and to set a new standard in the treatment of DEEs); the LP352 sampled product profile; expectations regarding our PACIFIC Study for LP352 (including regarding the timing of topline data, safety and tolerability, seizure reduction, dosing, OLE participation, and the potential for PACIFIC data to create value); plans regarding a global Phase 3 program for LP352; the potential of LP659 (including to be best-in-class or a market leader, to address multiple neurological disorders, to have strong scientific rationale and to be commercially attractive); expectations and objectives regarding the Phase 1 SAD study for LP659 (including regarding the timing of topline data, the number of participants, safety and tolerability, pharmacokinetics and pharmacodynamics); our intellectual property; our ability to obtain regulatory approval and commercialize our drug candidates (in the manner we may propose or at all); and other statements that are not historical facts, including statements that may include words such as "will", "may", "can", "would", "intend", "plan", "expect", "believe", "potential", "goal", "opportunity" and similar words.

For such statements, we claim the protection of the Private Securities Litigation Reform Act of 1995. These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including, but not limited to: our limited operating history; our history of incurring net losses and expectation that we will continue to incur net losses for the foreseeable future, and that we may never be profitable; our need for additional funding and related risks for our business, product development programs and future commercialization activities; the timing and success of clinical trials and preclinical studies we conduct; preliminary, interim and topline data may not reflect the complete or final results of a particular study or trial, and are subject to change; the ability to obtain and maintain regulatory approval to conduct our clinical trials (in the manner we propose or at all) and, ultimately, to market our product candidates; the ability to commercialize our product candidates; our ability to compete in the marketplace; risks regarding our license and dependencies on others; our ability to obtain and maintain intellectual property protection and freedom to operate for our product candidates; our ability to manage our growth; and other risks and factors disclosed in our filings with the U.S. Securities and Exchange Commission (the "SEC"). We operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. The forward-looking events and circumstances discussed in this presentation may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. Except as required by law, we assume no responsibility for the accuracy and completeness of the forward-looking statements, and we undertake no obligation to update any forward-looking statements after the date of this presentation to conform these statements to actual results or to changes in our expectations.

Certain information contained in this presentation and statements made orally during this presentation relate to or are based on studies, research, publications, surveys and other data obtained from third-party sources and Longboard's own internal estimates and research. While Longboard believes these third-party studies, research, publications, surveys and other data to be reliable as of the date of this presentation, they have not been independently verified, and Longboard makes no representations as to the adequacy, fairness, accuracy or completeness of any information obtained from third-party sources.

This presentation discusses product candidates that have not yet been approved for marketing by the U.S. Food and Drug Administration (the "FDA").


Differentiated & innovative clinical approaches
CNS programs with significant commercial opportunities
Bold & experienced leadership with expertise in CNS and rare disorders
LONGBOARD THESIS
Our Vision is Backed by 20+ Years of World Class GPCR Research
VISION
A world where devastating neurological conditions are no longer devastating
Pipeline with differentiated PK / PD and target engagement
Relevant M&A analogs
JAZZ - GW $7.2B
PFE - ARNA $6.7B
UCB - ZGNX $1.9B
Well understood mechanisms of action

# Longboard's Best-in-Class Product Candidates

| Program | MOA | Therapeutic Area | Preclinical | Ph I | Ph II | Ph III | Anticipated Milestones |
|---|---|---|---|---|---|---|---|
| **LP352** | 5-HT2C Superagonist | DEEs and other refractory epilepsies | | | | | ✓ Ph 1b/2a PACIFIC Study Enrollment Completed – August 2023<br>• PACIFIC Study Topline Data – January 2024 |
| **LP659** | S1P Receptor Modulator | Multiple neurological diseases | | | | | ✓ Ph 1 Initiation – Q4 2023<br>• Ph 1 Single-Ascending Dose Data – H1 2024 |

- We hold rights to other product candidates*
- We are eligible to receive royalties of 9.5% - 18.5% on sales of lorcaserin if approved for commercialization**

* Through a License Agreement with Arena
** Through a Royalty Purchase Agreement with Arena
Definitions: DEEs=developmental and epileptic encephalopathies; S1P = sphingosine 1-phosphate; PK=pharmacokinetics; PD=pharmacodynamics; EEG = electroencephalogram

# Developmental & Epileptic Encephalopathies (DEE) Landscape

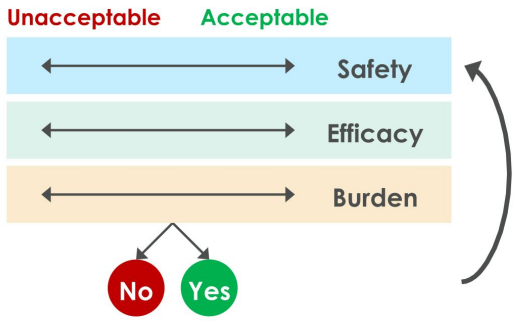
# Impact of Developmental and Epileptic Encephalopathies (DEEs)

**DEEs commonly begin in infancy or childhood and are associated with frequent seizures of multiple different types, intellectual disability, and significant delay or regression.**

## Reach Extends Far Beyond Seizure Burden

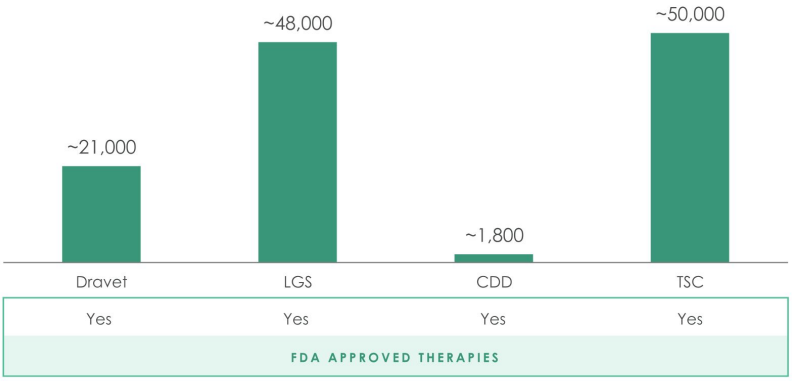
- Intellectual disability
- Sleep issues
- Risk of mortality including SUDEP
- Behavioral problems
- Motor and movement disorders
- Psychiatric problems

## Decision-Making Tree for Therapeutics



# 4 DEE Syndromes Have Approved Therapies; 20+ Have None

**"Approved 4" DEE Prevalence (US)**




**Other DEEs**

- DUP15q
- SCN2A related epilepsies
- SCN8A related epilepsies
- KCNQ2 related epilepsies
- KCNQ3 related epilepsies
- Angelman syndrome
- Landau-Kleffner Syndrome
- Early Myoclonic Encephalopathy
- KCNT1 related epilepsies
- SynGAP1 related epilepsies
- Rett Syndrome
- Ohtahara Syndrome
- PCDH19
- EE w/ Continuous Spike-Wave
- West Syndrome
- Myoclonic Atonic Epilepsy
- Ring14
- Ring20
- Others

**NO SPECIFICALLY APPROVED THERAPIES**

**The prevalence of all "Other DEEs" could exceed the total of the "Approved 4" combined**

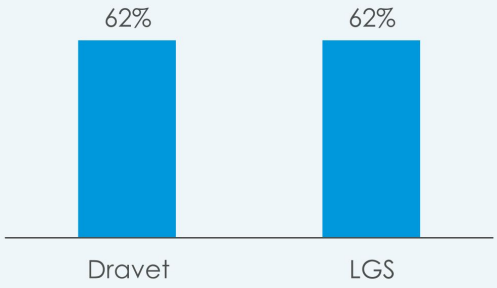
Sources: Dravet Syndrome Foundation, LGS Foundation
Definitions: LGS = Lennox-Gastaut Syndrome, CDD = CDKL5 Deficiency Disorder, TSC = Tuberous Sclerosis Complex; DEE = Developmental and Epileptic Encephalopathy

# HCPs Report a Need for More Effective and Safer Anti-Seizure Medications

| | Mean # of Seizures Per Week | Mean # of ASMs Per Patient |
|---|---|---|
| Dravet | 12 | 3.4 |
| LGS | 19 | 3.5 |
| TSC | 6 | 3.0 |
| CDD | 13 | 2.9 |

**% Frustrated with Lack of Available New Treatment Options for DEE Type**

Among those who treat any patients with DEE type




% Rated 7-Extremely Frustrated, 6, 5



Longboard and third-party market research analysis

# DEE Indications Represent a **$6B** Total US + EU Market Opportunity[1]

**A vast majority of the treatment options currently used are generic.**

**Fintepla**
Peak Sales Estimate[4]
(2027)

**€800M**

**Fintepla**
2022 Sales[2]
(Mar-Dec)

**$122M**

**Epidiolex**
Sales Estimate[5]
(2025)

**>$1B**

**Epidiolex**
2022 Sales[3]

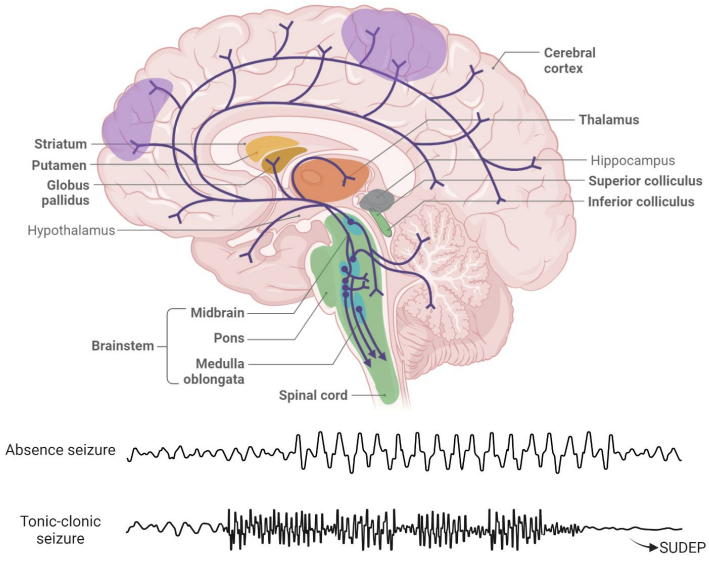
**$736M**

1) Longboard and third-party research 2022 – projections for 2040 for US + EU4/UK, 2) UCB Annual Report 2022, 3) Jazz Pharmaceuticals Annual Report 2022, 4) UCB press release dated January 9, 2023, 5) Jazz Corporate Overview August 2023

# The Importance of 5-HT2C in Epilepsy

# Brain Regions Involved in Multiple Types of Seizures

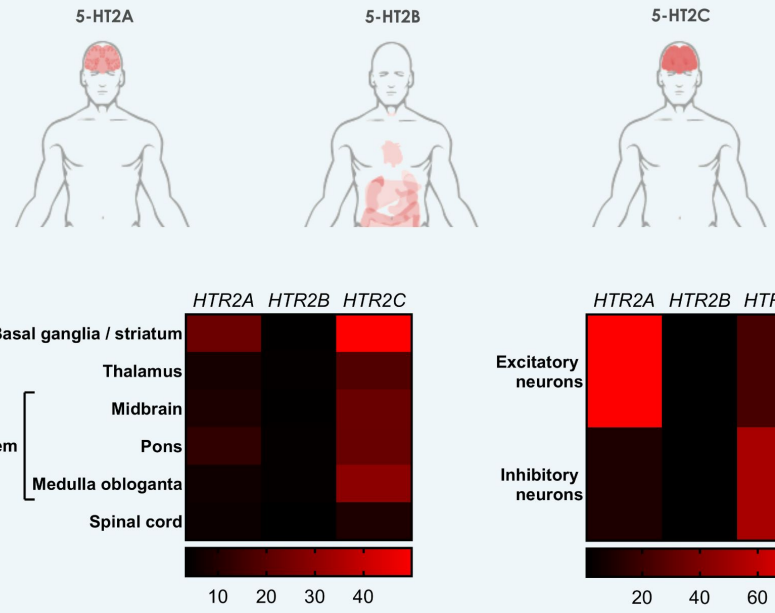
- Dysfunction of the circuits involving the cortex **(in purple)**, striatum **(in yellow)** and/or thalamus **(in orange)** underly absence and/or tonic-clonic seizures
- The brainstem, among others, **(in green)** are involved in SUDEP and induced seizures
  - Cardiorespiratory function is regulated by the brainstem and its failure leads to SUDEP




LGS = Lennox Gastaut syndrome; DS = Dravet syndrome; SUDEP = sudden unexpected death in epilepsy
Source: Lindquist et. al. 2023; Burke et. al. 2014; Bosco et. al. 2023; Created with BioRender.com

# 5-HT2C Receptors are Expressed in Seizure-Related Brain Regions

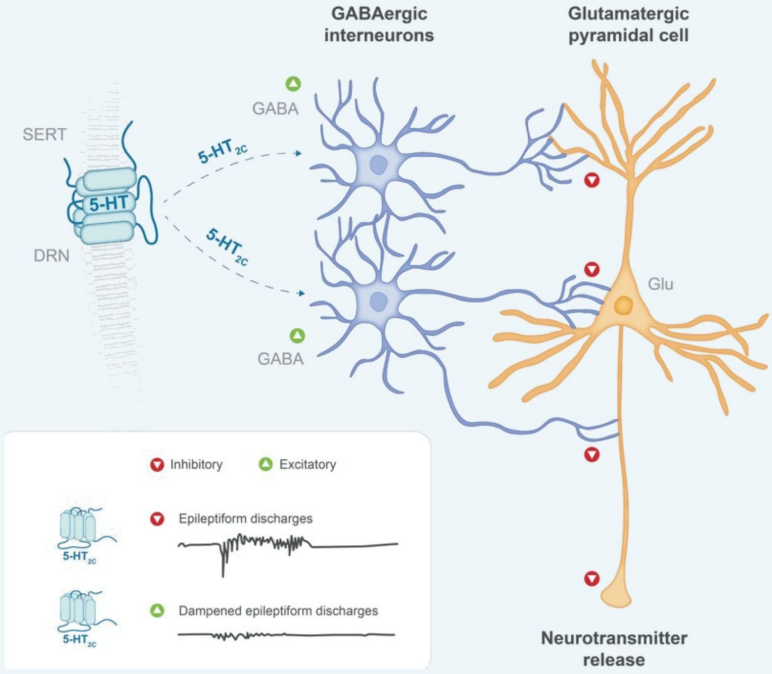
- 5-HT2C receptor expression is restricted to the brain
- 5-HT2C receptors are highly expressed in the brainstem, and in inhibitory neurons in the striatum and thalamus
  - Expression is consistent in human and mouse




Source: (1) The Human Protein Atlas; (2) NeuroSeq; (3) Massey et. al. 2021; (4) Simonsson et. al. 2022; (5) Blond et. al. 2023

# Role of 5-HT2C Receptors in Epilepsy

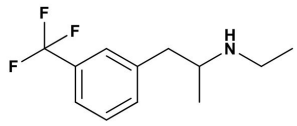
- 5-HT2C modulation of hippocampal pyramidal GABAergic neurons suppresses hyperexcitability
- 5-HT2C KO mice display spontaneous seizures and decreased threshold for proconvulsant stimuli
- m-CPP (5-HT2C) increases threshold for PTZ- and electroshock induced myoclonic and tonic seizures; effect blocked by 5-HT2C antagonist
- In a genetic model of DS, 5-HT2C agonist decreased seizure-like behavior and epileptiform electrical activity in scn1Lab-/- mutant zebrafish

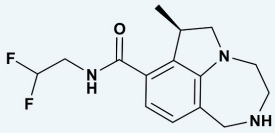



Sources: Gharedaghi MH et al., Exp Brain Res. 2014; Bagdy G et al., J Neurochemistry. 2007; Strac DS et al., Front Neurosci. 2016; Sourbron J et al., ACS Chem Neuroscience. 2016; Tecott LH et al, Nature. 1995; Upton N et al, Eur J Pharmacol. 1998; Orban G et al., CNS Neurosci Ther. 2014; Schoonjans A et al., Eur J Neurol. 2017; GABA=gamma aminobutyric acid; mCPP=m-chlorophenyl-piperazine; PTZ=pentylenetetrazole; TLE=temporal lobe epilepsy

# 5-HT2 Evolution in Rare Epilepsies

| | Weight Loss Drug Repurposed for Dravet | Designed & Being Dose-Optimized for DEEs |
|---|---|---|
| Compound | **FINTEPLA®**<br>(fenfluramine, ZX008) | **LP352** |
| History | • Approved for weight loss in 1973, became popular in 1990s in Fen-Phen (never approved in combo)<br>• Withdrawn due to significant cardiac toxicity (1997)<br>• Repurposed for certain DEEs at lower dose | • Designed to be a next-generation selective 5-HT2C superagonist<br>• Dose optimization for DEEs<br>• BID formulation work ongoing, expected for Ph 3 |
| Current Status | • Approved for the treatment of seizures with Dravet & LGS<br>• **REMS required with frequent echocardiograms** | • Ph 1b/2a clinical trial in multiple DEEs<br>• **No echocardiograms in PACIFIC study**<br>• 20+ years of GPCR research and optimization of the 5-HT2 pathway |



# LP352

## First-in-Class 5-HT2C Superagonist with Next-Generation Selectivity, Being Dose-Optimized to Treat a Broad Range of DEEs Effectively and Safely

# The Potential of LP352

## Greater Selectivity and Specificity

- 5-HT2 agonist designed to only bind to the 5-HT2C receptor*
- 5-HT2 agonist - no detected activity at receptors associated with significant adverse side effects: 5-HT2B (valvular heart disease and PAH) & 5-HT2A (psychiatric: insomnia, hallucinations, euphoria)

## Preclinical Validation

- Reduced seizure activity in model of neuronal hyperexcitability in zebrafish
- Reduced epileptiform activity in fish and rodent models of disinhibition
- Reduced duration and number of epileptiform events in zebrafish model of Dravet Syndrome

## Clinical Validation SAD/MAD

- In general, favorable safety & tolerability observed. AEs generally consistent with expected effects of serotonergic meds
- No observed food effect
- Potential prolactin biomarker which increased in a dose dependent and transient manner

## Clinical Validation CSF/EEG **

- Favorable safety & tolerability results observed, AEs generally consistent with previous studies
- Plasma & CSF PK concentration increased in a dose dependent & consistent manner
- Effects on qEEG activity within first few dose(s)
- Sustained dose-dependent effects on qEEG activity after continuous dosing, thus indicating receptor engagement

**IP protection on Composition of Matter through 2041*** provides the opportunity to maximize the full potential of LP352**



*Radioligand binding assays assessing >150 targets showed significant affinity only to 5-HT2C receptors
** Based on first two cohorts
***Composition of matter through 2036 with potential for PTE / PTA (2041)
Definitions: PAH = pulmonary arterial hypertension; AEs = adverse events

# LP352 Designed to be a Next-Generation 5-HT2C with Greater Selectivity and Specificity

| | Serotonin Receptor Subtype | $EC_{50}$, nM | Ki, nM | Selectivity 5-HT2C vs 5-HT2B | Selectivity 5-HT2C vs 5-HT2A | Potential Adverse Events Per Receptor Subtype |
|---|---|---|---|---|---|---|
| **LP352 5-HT2C Superagonist** | **5-HT2C** | **~120** | **~50** | **>200x** | **>200x** | CNS, GI |
| | 5-HT2B | Not detectable | Not detectable | | | n/a |
| | 5-HT2A | Not detectable | Not detectable | | | n/a |
| **Nordexfenfluramine (an active metabolite of fenfluramine)** [1] | 5-HT2C | 72.4 | 10.4 | 0.94x | 11.5x | CNS, GI |
| | 5-HT2B | 25.7 | 9.8 | | | Cardiac, Pulmonary |
| | 5-HT2A | 1778 | 120.2 | | | Psychiatric |
| **Lorcaserin**[2] | 5-HT2C | 39 | 13 | 11.3x | 7.1x | CNS, GI |
| | 5-HT2B | 2380 | 147 | | | n/a |
| | 5-HT2A | 553 | 92 | | | Psychiatric |

**LP352 selectivity may limit off-target effects associated with currently available non-selective ASMs**

1 Third party study previously commissioned by Arena, 2 BELVIQ FDA approved prescribing information 06/2012; Note: The above table is for illustrative purposes only and is not a head-to-head comparison. Differences exist between in vitro study designs and methodologies, and caution should be exercised when comparing data across studies
Definitions: CNS= Central nervous system ; GI = Gastrointestinal; ASM = anti-seizure medication

# LP352 Inhibited Seizure Activity in Multiple Preclinical Models

| | **Corneal Kindling** | **Pentylenetetrazol (PTZ) (i.v.)** | **Scn1a$^{A1783V/WT}$ Transgene** | ***scn1lab* Transgene** | **Ethyl ketopentenoate (EKP)** | **Kainic acid (KA)** |
|---|---|---|---|---|---|---|
| Model | Partial (focal) limbic seizures | Acute seizure | Genetic model of Dravet Syndrome | Genetic model of Dravet Syndrome | Generalized seizure | Acute and chronic seizure |
| Species | mouse | mouse | mouse | zebrafish | zebrafish | zebrafish |
| Activity | - | + | - | + | + | + |
| Results | n/a | **Statistically** elevates seizure threshold | n/a | **~85%** reduction in epileptiform events & duration | **~69%** reduction in seizure activity | **~82%** reduction of seizure activity |

Potential ASMs are assayed in multiple relevant preclinical models based on the compound's MOA. Models are conducted utilizing wide range panels that typically produce a mix of positive and negative results. The above are a subset of preclinical assays conducted with LP352. Preclinical models are not necessarily predictive of clinical efficacy or regulatory approval.

Definitions: ASM = anti-seizure medication; MOA = mechanism of action

# LP352 Ph 1 Results – Favorable Safety, Tolerability, Pharmacokinetics and Pharmacodynamics Observed

***Randomized, double-blind, placebo-controlled, 4-part trial in healthy adult males and females (N=83)***

**Single Ascending Dose & Single-Dose Food Effect**

**(N=40)**

**Pharmacokinetics & Pharmacodynamics**

- Target plasma exposure ($C_{min}$) based on prolactin PK/PD
- No clinically meaningful effect of food on $AUC_{0\text{-}inf}$ and $C_{max}$

**Safety & Tolerability**

- Majority of AEs were mild to moderate (most common was headache)
- AEs generally consistent with expected CNS effects and expected effects of serotonergic drugs
- No SAEs reported

**Multiple Ascending Dose & Dose Titration**

**(N=43)**

**Pharmacokinetics**

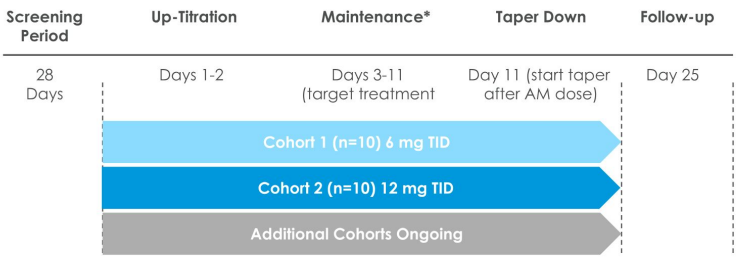
- Central 5-HT2C receptor engagement demonstrated by dose- and exposure-dependent increases of prolactin
- Dose-dependent increases in exposure ($C_{max}$ and $AUC_{tau}$)

**Safety & Tolerability**

- Majority of AEs were mild to moderate (most common was headache)
- AEs generally consistent with expected CNS effects and expected effects of serotonergic drugs
- At maximum planned dose, a single SAE of anxiety was reported two days after last dose of study drug & subsequently resolved

*Evaluated doses ranging from 1 mg to 24 mg*

# LP352 102: Ph 1 PK/PD CNS Study in Adult Healthy Volunteers




**Plasma:**

- Samples Days 1-11 (and taper)
- PK parameters: Cmax, Tmax and AUCtau

**CSF:**

- Samples Day 11
- PK parameters: Cmax, Tmax and AUCtau

**EEG:**

- Serial EEGs Days -1, 1, 3 & 10 (trough Day 16)
- EEG parameters: Five-minute resting EEG with eyes closed and five-minute resting EEG with eyes open performed with the participant seated comfortably in a sound-attenuated room
- Resting EEG evaluated by spectral and coherence analysis, including spectral amplitudes and coherences in clinical frequency bands

Topline data

## Open-label Study to Assess Central Nervous System Pharmacokinetics (PK) and Pharmacodynamics (PD) of Orally Administered LP352

**Key Study Objectives:**

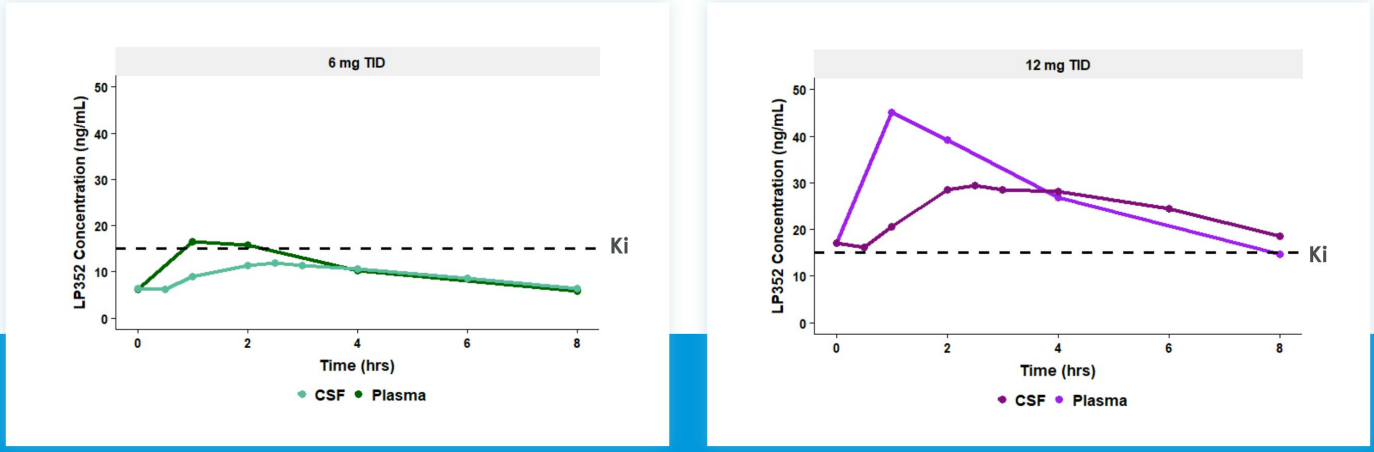
Characterize the plasma and CSF PK

Characterize the safety and tolerability of the doses with titration and taper

Assess the PK-PD relationships between plasma and CSF exposure and PD endpoints of safety and efficacy, including qEEG endpoints as indicators of CNS target engagement

# Steady State Plasma & CSF Concentrations for LP352 (6mg & 12mg)

## 12 mg TID Exceeded Ki Value for 5-HT2C Activity throughout Dosing Interval*




**LP352 selectivity may limit off-target effects associated with currently available non-selective ASMs**

*Topline data

# LP352 Has Low Potential for Drug-Drug Interactions (DDI)

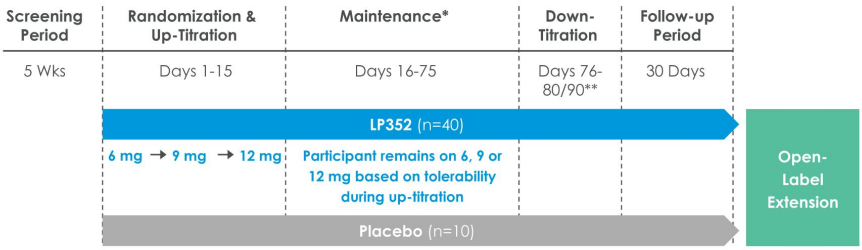
**DDIs are 4th most important criteria (12%)* in HCP's selection of an ASM**

- Given the common nature of complex polypharmacy in patients with DEEs, avoiding DDIs is of particular importance
- Many ASMs are affected by CYP enzyme inhibitors, notably CYP2D6 (fenfluramine, carbamazepine), CYP3A4 (clobazam, cannabidiol, felbamate, carbamazepine), and CYP2C19 (fenfluramine, cannabidiol, phenobarbital, phenytoin)
- LP352 was structurally designed to minimize the dependency on CYP metabolism, but rather promote it as a substrate for metabolism via UDP-glucuronosyltransferase (UGTs)
- Confirmatory victim evaluation potential for LP352 included both in vitro and in vivo work:
  - **In vitro work**: Standard in vitro metabolism screen to determine the intrinsic clearance of LP352 for various CYP enzymes
  - **In vivo work**: A unique clinical study was designed & conducted in two parts in healthy volunteers

Cerny (2016) Drug Metabolism and Disposition 44:1246
*From Longboard HCP Survey 2023

# LP352 Ph 1b/2a PACIFIC study in patients with DEEs

## Enrollment completed – August 2023




**Key Inclusion Criteria:**

- DEEs with ≥ 4 motor seizures per month in 3 mos. prior to screening and ≥ 4 motor seizures in the month of screening
- DEEs (multiple syndromes) including LGS, Dravet syndrome, SCN2A-related epilepsies, CDD, among others

**Key Exclusion Criteria:**

- Use of fenfluramine & lorcaserin

**Basic Information:**

- **Sites:** ~30 sites
- **Ages:** > 12 to <65 yrs old

**No Echocardiograms Required in PACIFIC**

PACIFIC
Developmental and Epileptic Encephalopathies Study

**Double-blind, placebo-controlled study to assess the safety, tolerability and pharmacokinetics of LP352**

**Key Efficacy Signals:**

**Evaluate** reduction in seizures across a broad group of epilepsies

**Identify** potential indications for pivotal studies

**Analyze** concentration response to understand dosing in different seizure types and disorders



* Maintenance Dose of LP352 (TID): 6 mg, 9 mg, 12 mg or placebo TID
** Up to a 15-day down-titration/taper period (reducing dose every 5 days) depending on the last maintenance dose

# PACIFIC Study Enrollment Summary

PACIFIC
Developmental and Epileptic Encephalopathies Study

**52**
Participants randomized

**42** US

**10** AUS

**Adult/Pediatric participants**
Range: 12-55
Mean: 24.2 / Median: 23.0

**40** Adult (18+)

**12** Peds (12-17)

**Diagnosis***

**Dravet:** 4

**LGS:** 29

**Other DEE:** 19

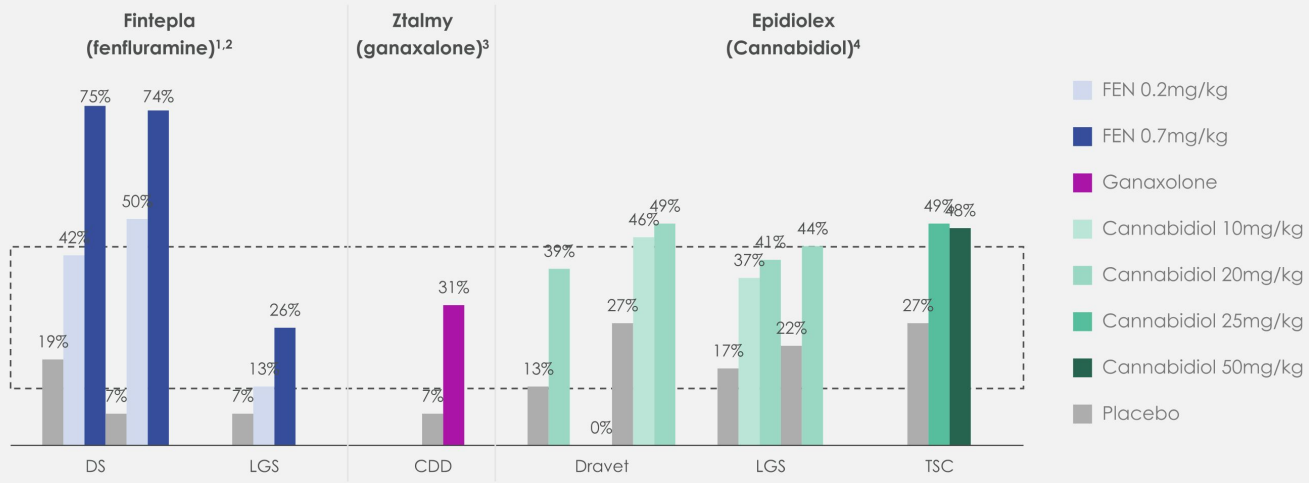
**Vast majority** of eligible participants who complete PACIFIC expected to enter Open-Label Extension

**100%**
have entered to date**

*The diagnosis was at time of screening for PACIFIC and is subject to further refinement
** OLE data as of 10/11/2023

# Seizure Reduction for Approved Drugs in DEEs

PACIFIC
Developmental and Epileptic Encephalopathies Study




1. Lagae, et al The Lancet 2019; 2. Knupp, et al JAMA Neurology 2022; 3. Knight,et al, The Lancet Neurology 2022; 4. Epidiolex HCP websiteDravet & LGS & TSC



*FOR ILLUSTRATIVE PURPOSES ONLY: Not a head-to-head comparison. Differences exist between trial designs and subject characteristics, and caution should be exercised when comparing data across studies.*

# Key Areas of Focus in PACIFIC Topline Readout

PACIFIC
Developmental and Epileptic Encephalopathies Study

1

## Safety

Favorable safety & tolerability in line with previous Longboard studies to date

2

## Seizure Reduction

Clinically meaningful seizure reductions across the DEE landscape and consistent with approved treatments

3

## Dosing

Titration data across three doses that allows optimized dosing in the Phase 3 program

4

## OLE Participation

Vast majority of eligible participants enter OLE thus enabling long-term data

**Global Phase 3 Readiness In Process**

# Commercial Opportunity for LP352

# Multiple Potential "Ways to Win"


- **Broaden market in "Approved 4" DEE's with preferred safety and burden profile**
- **Capture market share in "Approved 4" with best-in-class profile (safety, efficacy, burden)**

# Validating Continued Unmet Need In DEEs And Potential Of LP352

**Background & Methodology**

### Quantitative HCP Research
### 100 Physicians

**Objective:** Validating Unmet Needs And LP352 Potential

**Criteria:**

- Board Certified HCPs specializing in **Neurology** or **Epileptology**
- Treat at least **20 patients with DEEs** in the past 12 months
- Familiar with **Fintepla** and **Epidiolex**
- **Note:** Most participants have some clinical experience with **Epidiolex** (92%) & **Fintepla** (68%)

### Qualitative HCP Research
### 20 Physicians

**Objective:** Deeper Understanding Of Quantitative Findings (How & Why)

**Criteria:**

- Board Certified HCPs specializing in **Neurology** or **Epileptology**
- Treat at least **25 patients with DE**Es in the past 12 months
- Familiar with **Fintepla** and **Epidiolex**

Epileptologists = 5 (4 peds, 1 adult)

Neurologists = 15 (13 peds, 3 adult)

### Quantitative Caregiver Research
### 30 Caregivers

**Objective:** Understanding Unmet Needs Of DEE Patients (Not "Approved 4")

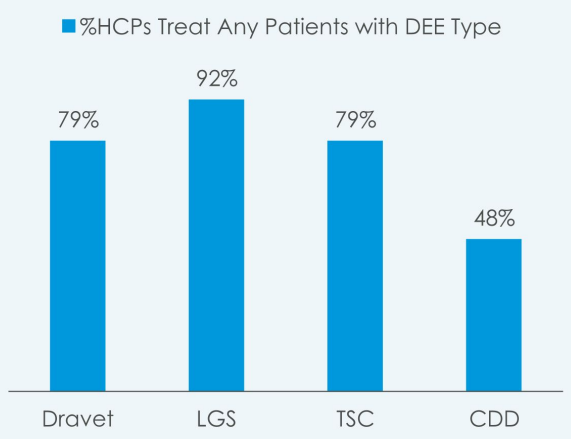
**Criteria:**

- Primary or joint caregiver (non-paid)* to a loved one with a DEE (**not** LGS, Dravet Syndrome, TSC, or CDKL5 Disorder)
- Provide assistance with physician visits or administer medications and have input into medical care
- Loved one has experience with prescription ASMs
- Attended at least 2 medical appointments in the past 12 months

Participation was open to all non-paid caregivers with any relationship to their loved one with a DEE. All respondents in the survey are mothers caring for their child.
HCP = Health care providers
Longboard and third-party market research analysis
Survey sampled product profile for LP352 case reviewed in this presentation: efficacy of 37-44% reduction in countable motor seizure frequency and generally well tolerated with BID dosing

# Nearly All HCPs Treat Patients with the "Approved 4"

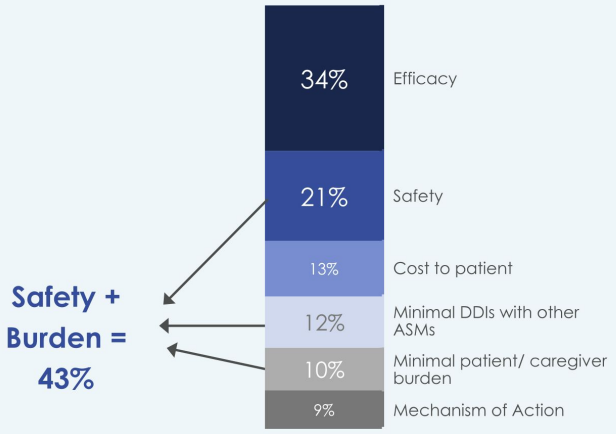
**DEE Types Treated in the Past 12 Months**
Total Respondents




**DEE Type Treated in Past 12 Months**
Total Respondents

# HCPs Evaluate ASMs by Balancing Efficacy, Safety & Burden

**Influence on ASM Decisions**
When allocating 100 points across factors

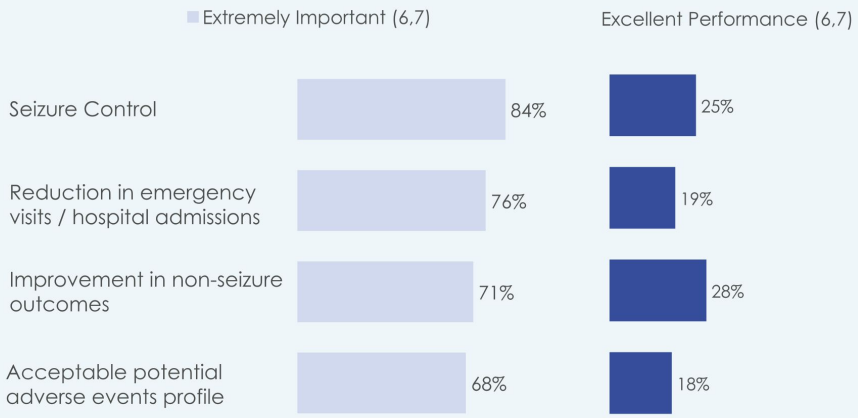



"If I see a patient with epilepsy and give them enough valium, **they'll be seizure free, but then they'll be sleeping all day. That's not quality of life.** So, we must find the cocktail that gives them the **best seizure control with the least amount of side effects."**

*– Epileptologist, Primarily Pediatric*

# Fintepla Profile Does Not Satisfy Most Important Treatment Criteria

**Fintepla Performance on Most Important Criteria**

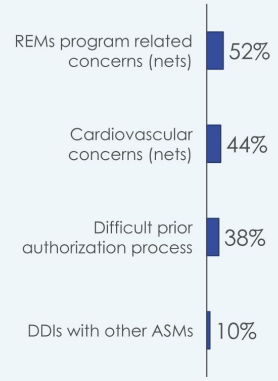



"The clinical trial in Dravet was amazing, really impressive efficacy. I would say **Fintepla is comparable to other medications in reality**. Now these are very difficult patients so it makes sense, but most people would say Fintepla is not as robust in its efficacy."

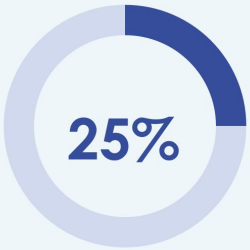
*– Epileptologist, Primarily Pediatric*

# Fintepla Safety & Burden are Hard to Overcome; Physicians Unlikely to Recommend and Caregivers Decline Somewhat Regularly

**Top Reasons Why Unlikely to Prescribe Fintepla***




**Mean % Caregivers Decline Fintepla Despite HCP Recommendation**

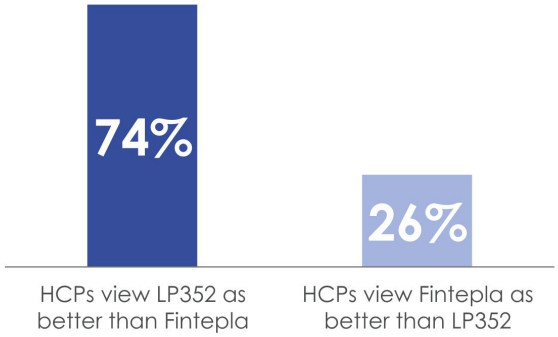



"I think of Fintepla as a fourth-line agent and lots of patients do not go that far. **It freaks caregivers out that we have to check the patient's heart every six months.** They say, 'My kid has seizures, now you want to give them a heart problem?' No one likes to endanger the heart, so **it makes Fintepla a hard sell.**"

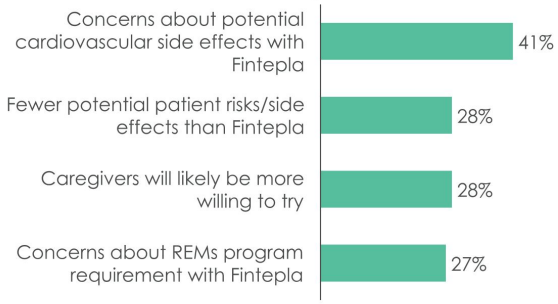
*– Epileptologist, Primarily Adult*

*Among those who don't currently or are unlikely to prescribe Fintepla

# HCPs Prefer LP352* Over Fintepla and Are More Likely to Prescribe it Because of the Superior Safety Profile




**Top Reasons for Prescribing LP352 Sampled Product Profile Over Fintepla***

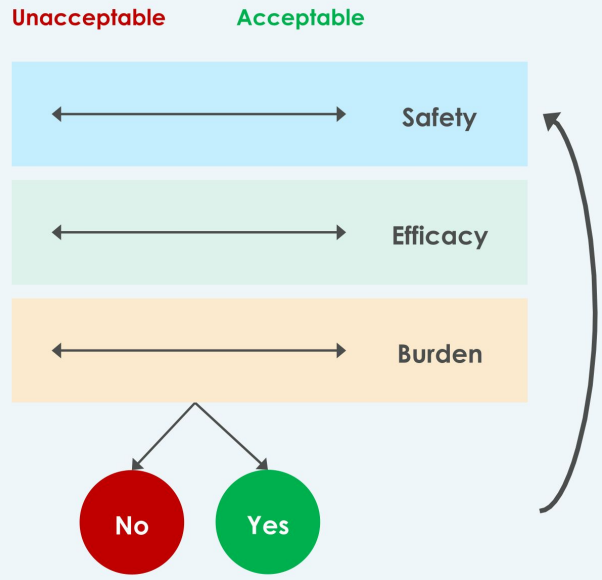



**HCPs prefer LP352* mainly because of the superior safety profile**

*Those who would prescribe LP352 sampled product profile over Fintepla

# Reality of the Treatment Paradigm: Balancing of Safety, Efficacy and Burden

**Polytherapy Approach: DEE patients are highly refractory and on an average of 3.5 medications simultaneously**




The combination of these criteria impact utilization

AND

**FINTEPLA is re-assessed every six months**

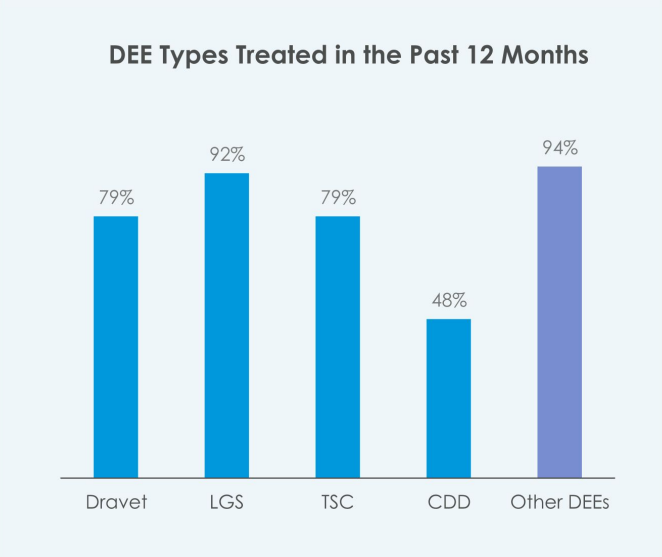
**No echocardiograms required in the PACIFIC Study**

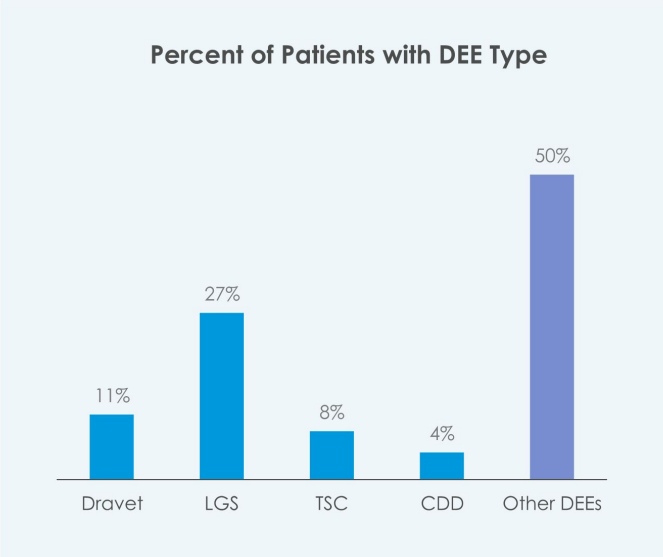
# Commercial Opportunity for Broad DEE Indication

# Multiple Potential "Ways to Win"


- Expand market to address significant unmet need across "Other DEE" patients
- Broaden market in "Approved 4" DEE's with preferred safety and burden profile
- Capture market share in "Approved 4" with best-in-class profile (safety, efficacy, burden)

# Nearly All HCPs Treat Patients with All DEE Diagnoses; Collectively, the Number of "Other DEEs" is Significant



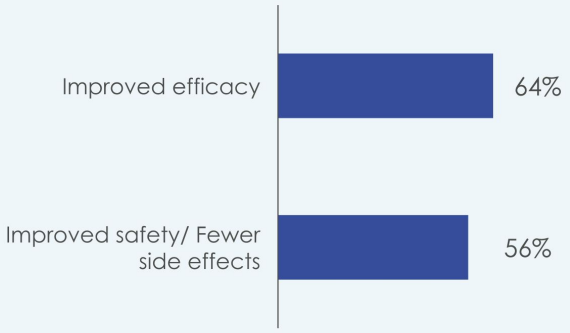



# HCPs Report a Need for More Effective and Safer Anti-Seizure Medications for Other DEEs

| | Mean # of Seizures Per Week | Mean # of ASMs Per Patient |
|---|---|---|
| Dravet | 12 | 3.4 |
| LGS | 19 | 3.5 |
| TSC | 6 | 3.0 |
| CDD | 13 | 2.9 |
| **Other DEEs** | **13** | **3.2** |

**Unmet Needs for Patients with Other DEEs**

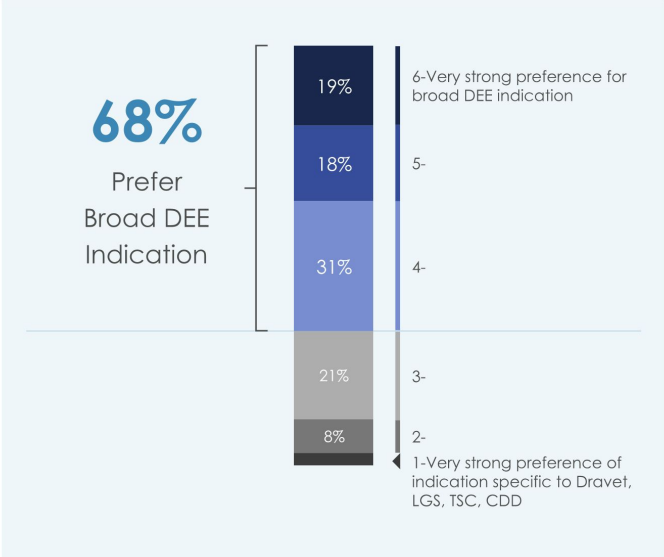
Among those who treat patients with other DEEs (not "Approved 4")

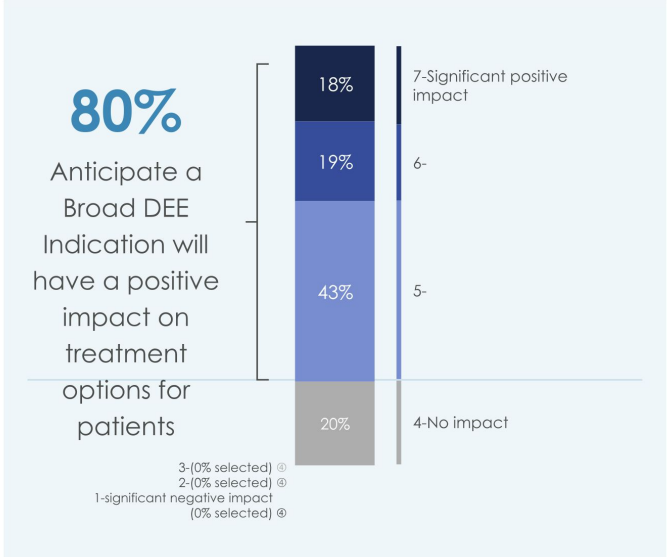





Longboard and third-party market research analysis

# HCPs Prefer LP352 with a Broad DEE Indication, and Anticipate This Will Positively Impact DEE Patients' Treatment Options



# LP659

## Centrally Acting, Highly Selective Sphingosine-1-Phosphate (S1P) Receptor Modulator Targeting Multiple Neurological Diseases

# LP659 Potential Best-in-Class S1P Receptor Modulator with Broad Applicability

## STRONG SCIENTIFIC RATIONALE

- ✓ Centrally acting S1P receptor modulator
- ✓ Rapid onset & offset of action
- ✓ Highly selective to S1PR1,5
- ✓ No impact on S1PR2,3 in preclinical models
- ✓ High oral bioavailability with direct impact on CNS glial cell S1P receptors

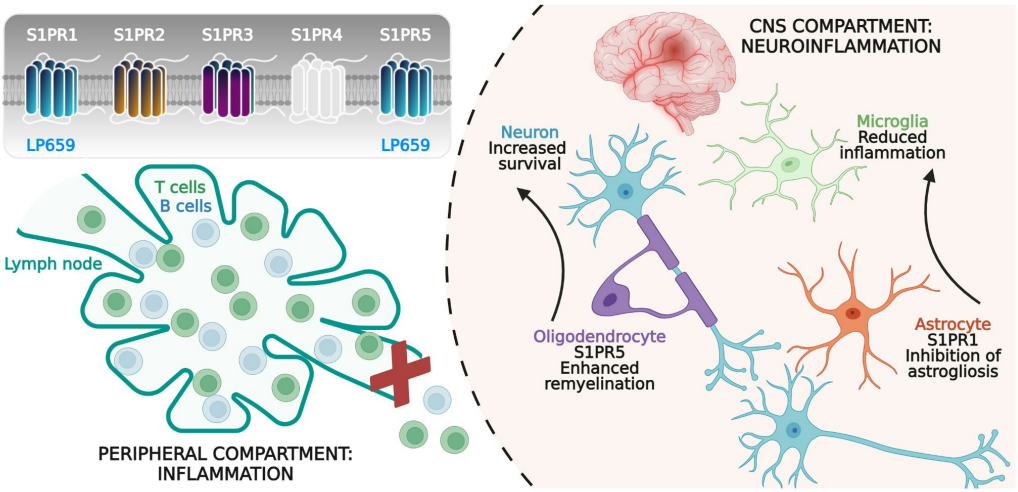
## COMMERCIALLY ATTRACTIVE

- ✓ S1P receptor modulators have generated billions of dollars of revenues in CNS indications
- ✓ Designed to address multiple neurological disorders
- ✓ Opportunity for market leadership in S1P receptor modulation in CNS

# S1PR1 Modulation Selectively Reduces Migration of Lymphocytes From Lymph Nodes

## Treatment with S1P Receptor Modulator

- Functionally antagonizes S1PR1 by inducing receptor internalization and degradation, disrupting normal lymphocyte subset egress
- Decreases release of inflammatory cytokines and reduce organ/tissue damage
- Maintains immune surveillance
- Functional antagonism of S1PR1 receptor in astrocytes expected to attenuate neuroinflammation

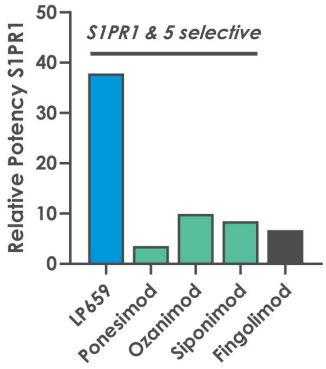




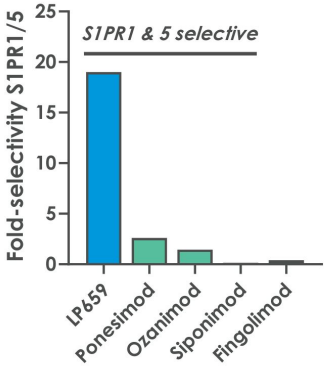

Sources: Chun, Drugs 2021 (81:207–231) https://doi.org/10.1007/s40265-020-01431-8; Appel, www.co-neurology.com Wolters Kluwer Health, Inc. 2021(Volume 34, Number 5)
Created with BioRender.com

# LP659 Designed to be a Next Generation Centrally-Acting S1PR1 Agonist with Greater Selectivity and Internalization-Biased Signaling

**Most potent at S1PR1 internalization**



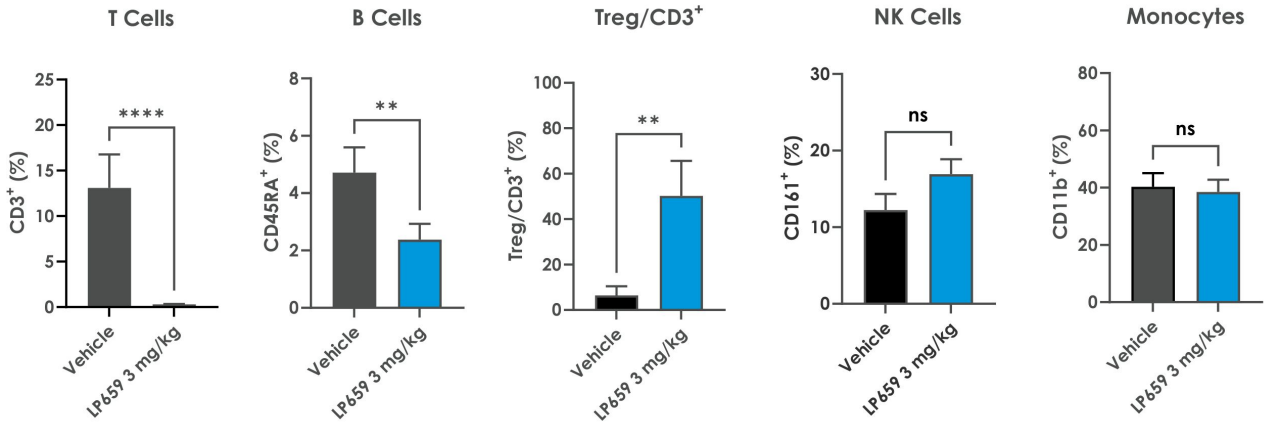

**Greatest selectivity towards S1PR1 over S1PR5**




**LP659 selectivity may limit off-target effects associated with currently approved S1P receptor modulators**

# Modulation of Immune Tolerance Drives Efficacy by LP659

- LP659 potency in vivo parallels T and B cell lowering potential
- Proportion of Tregs over total $CD3^+$ cells is significantly increased by LP659
- No significant effects on NK and monocyte frequencies



# LP659 Ameliorated Disease Phenotypes in Multiple Preclinical Models

| Disease / MoA | Autoimmune, CNS involvement | Autoimmune, CNS involvement | Autoimmune, PNS involvement | Autoimmune, PNS involvement | Neuro Degenerative |
|---|---|---|---|---|---|
| Model | Induced | Induced | Induced | Induced | Genetic |
| Species | Rat | Mouse | Rat | Rat | Human iPSC |
| Dosing | Prophylactic | Prophylactic | Prophylactic | Therapeutic | Therapeutic |
| Activity | + | + | + | + | + |
| Results | Dose-dependent amelioration of disease severity with parallel reduction of circulating T lymphocytes | Dose-dependent amelioration of disease severity with reduction of T and B cell infiltration, inflammatory markers, and loss of myelin in the spinal cord | Dose-dependent halting of disease progression with reduction of inflammatory cell infiltration and loss of myelin in the sciatic nerve | Blunting of disease severity with corresponding reduction of inflammatory cell infiltration in the sciatic nerve | Dose-dependent rescue of hyperexcitability in control neurons co-cultured with diseased astrocytes |

 Internal data on file

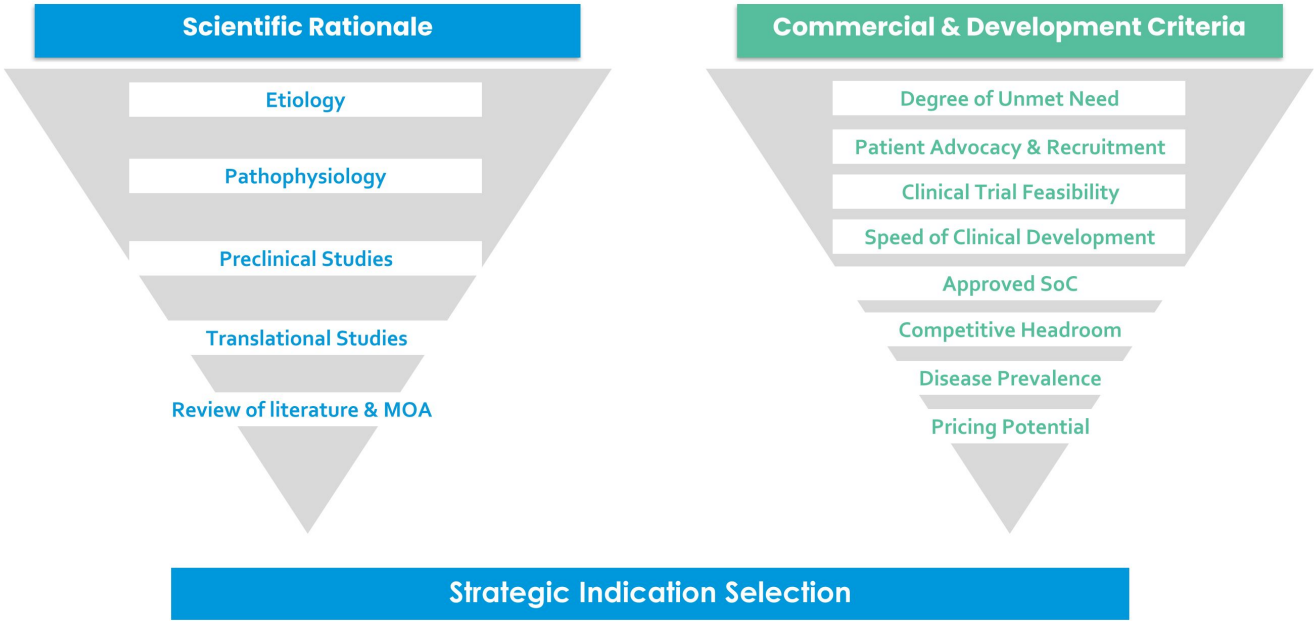
# LP659: Phase 1 Single-Ascending Dose (SAD) Study Objectives

## First-In-Human, Randomized, Double Blind, Placebo Controlled, SAD Study to Assess the Safety, Tolerability, Pharmacokinetics & Pharmacodynamics of LP659 in up to 48 Adult Healthy Volunteers

**Key Study Objectives:**

- Assess the safety and tolerability of single ascending doses of LP659
- Determine the PK profile of LP659, and its metabolite(s), in single ascending doses
- Determine PD profile of single ascending doses of LP659

# Longboard Indication Assessment Process



# Financial Summary* & Upcoming Milestones

**Cash, Cash Equivalents & Investments**
$56.0 million
*As of September 30, 2023*

**Shares Outstanding**
23.9 million
*As of October 31, 2023*

**Third Quarter 2023 Operating Expenses**
$13.6 million
- R&D - $10.5 million
- G&A - $3.1 million

*As of September 30, 2023*

| | Key Milestones | Anticipated Timing |
|---|---|---|
| **LP352** | PACIFIC Enrollment Completion | ✓ COMPLETED August 2023 |
| | PACIFIC Ph 1b/2a Topline Data in DEE Study | January 2024 |
| **LP659** | Ph 1 Initiation | ✓ Q4 2023 |
| | Topline SAD Data | H1 2024 |

***Multiple clinical and preclinical studies in process to further support the development of LP352 & LP659***

*Unaudited

# Thank you

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IR@LONGBOARDPHARMA.COM