



Mirum Pharmaceuticals:

Transforming Lives in Rare Disease

A u g u s t 2 0 2 5





Forward-Looking Statements

This presentation contains "forward-looking" statements that are based on our management's beliefs and assumptions and on information currently available to management. Forward-looking statements include all statements other than statements of historical fact contained in this presentation, including information concerning our business strategy, objectives and opportunities, including the future opportunities for LIVMARLI, CHOLBAM, CTEXLI or Chenodiol, and Mirum's clinical candidates. Forward-looking statements are subject to known and unknown risks, uncertainties, assumptions and other factors that may cause our actual results, performance or achievements to differ materially and adversely from those anticipated or implied by our forward-looking statements, including, but not limited to: the results, enrollment, conduct and progress of our ongoing and planned studies for our product candidates, including newly in-licensed product candidates, and our plans and expectations for commercializing LIVMARLI, CHOLBAM and CTEXLI in the United States and rest of world; the costs of our business strategy, commercialization plans and development programs, the financial impact or revenues from any commercialization we undertake; estimates of the number of patients impacted by the diseases or related diseases that we seek to treat and who are appropriate for treatment with our commercial products; the potential clinical benefits of LIVMARLI, CHOLBAM and CTEXLI (or chenodiol tablets under other brand names) and any of our product candidates, including volixibat and MRM-3379; our expected growth; our ability to obtain necessary regulatory approvals for our product candidates or predictions of the outcome of any regulatory consideration and, if and when approved, market acceptance of our products; our dependence on third-party clinical research organizations, manufacturers, suppliers and distributors; the design, implementation, timelines and outcomes of our clinical trials; the impact of competitive products and therapies; our ability to obtain necessary additional capital; our ability to attract and retain key employees; our ability to manage the growth and complexity of our organization; our ability to maintain, protect and enhance our intellectual property; and our ability to continue to stay in compliance with applicable laws and regulations. You should refer to the section entitled "Risk Factors" set forth in our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q and other filings we make with the Securities and Exchange Commission (SEC) from time to time (available at <http://www.sec.gov>) for a discussion of important factors that may cause our actual results to differ materially from those expressed or implied by our forward-looking statements. You should not rely upon forward-looking statements as predictions of future events. Neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. We undertake no obligation to update any forward-looking statements after the date of this presentation except as may be required by law.

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Mirum Pharmaceuticals: High Growth Global Rare Disease Company



*3 Approved
Ultra-Rare Medicines*

*Advancing a Pipeline In
Larger Orphan Settings*

*Strong
Financial Position*

\$490-510M

2025 Net Product Sales Guidance

4

Clinical Programs

\$322M

*Cash Balance¹
Expect Positive Cash Flow in 2025*

Proven Track Record of Execution and Efficiency

¹Cash, Cash Equivalents and Investments; Mirum Pharmaceuticals Inc. Q2 2025 10-Q

Commercial Portfolio with Pipeline of Growth Opportunities



3 APPROVED RARE DISEASE PRODUCTS, 4 ADDITIONAL INDICATIONS IN DEVELOPMENT IN HIGH-NEED ORPHAN INDICATIONS

	Indication	Preclinical	Phase 1	Phase 2 and Phase 3	Approved
	Alagille Syndrome (ALGS) ¹	FDA and EMA approved			
	Progressive Familial Intrahepatic Cholestasis (PFIC) ²	FDA and EMA approved			
	Cholestatic Pruritus (Additional Settings) ³	EXPAND Phase 3, expect enrollment completion 2026			
	Cerebrotendinous Xanthomatosis (CTX) ⁴	FDA approved			
	Bile Acid Synthesis Disorders (BASD) ⁵	FDA approved			
volixibat	Primary Sclerosing Cholangitis (PSC)	VISTAS positive interim analysis, Confirmatory topline data expected Q2 2026			
	Primary Biliary Cholangitis (PBC)	VANTAGE positive interim analysis, expect enrollment completion 2026			Granted FDA Breakthrough Therapy Designation
MRM-3379	Fragile X Syndrome (FXS)	Phase 2, initiating Q4 2025			

¹Received U.S. FDA approval for cholestatic pruritus in patients with Alagille syndrome (ALGS) three months of age and older. European Commission has granted marketing authorization for LIVMARLI® (maralixibat) oral solution for the treatment of cholestatic pruritus in patients with Alagille syndrome (ALGS) two months of age and older

²Received U.S. FDA approval for cholestatic pruritus in patients with Progressive Familial Intrahepatic Cholestasis (PFIC) 12 months of age and older. European Commission has granted marketing authorization for LIVMARLI® (maralixibat) oral solution for the treatment of progressive familial intrahepatic cholestasis (PFIC) in patients 3 months of age and older

³Using liquid oral formulation for the EXPAND study looking at patients with additional settings of ultra rare cholestatic pruritus, excluding PSC, PBC, ICP, ALGS and PFIC

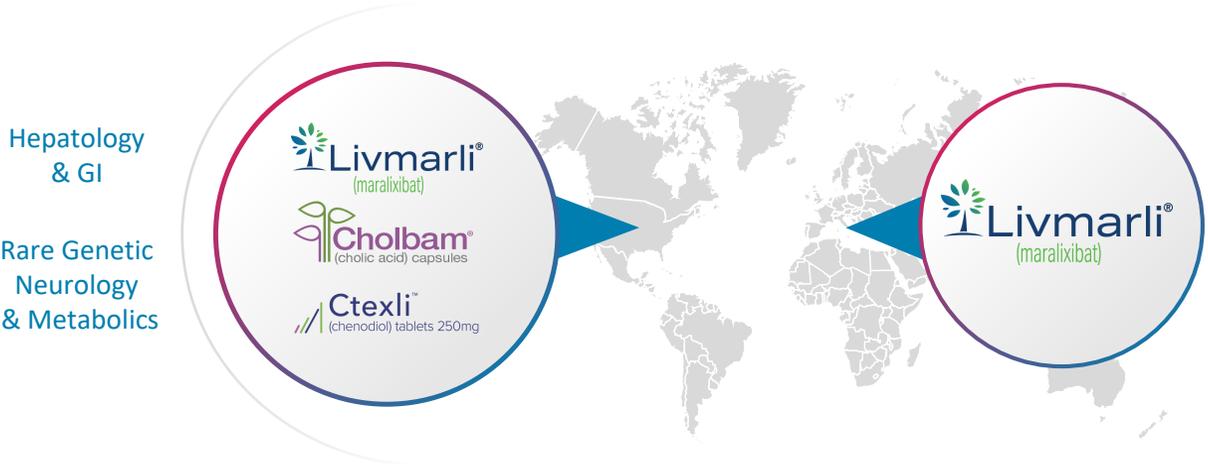
⁴Received U.S. FDA approval for the treatment of adults with cerebrotendinous xanthomatosis (CTX)

⁵Bile acid synthesis disorders include Peroxisome biogenesis disorder-Zellweger Spectrum Disorder (PBD-ZSD)

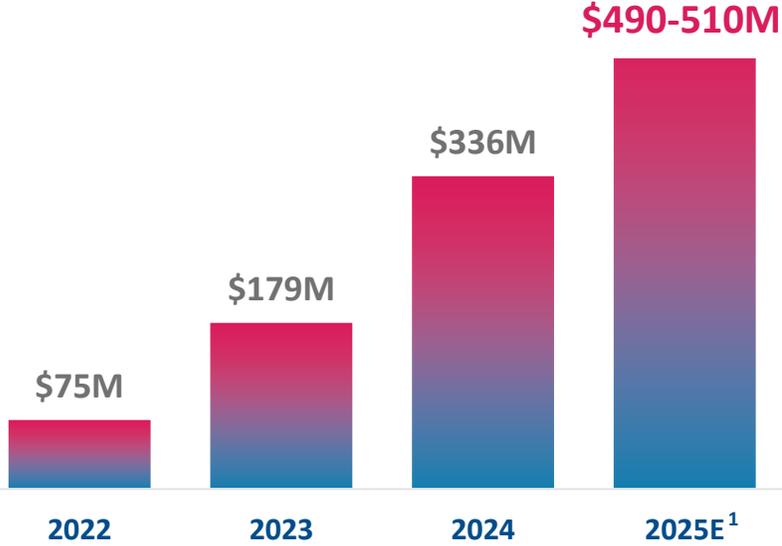
Strong Execution Positions Mirum as a High-Growth, Global Biotech



Global Commercial Reach



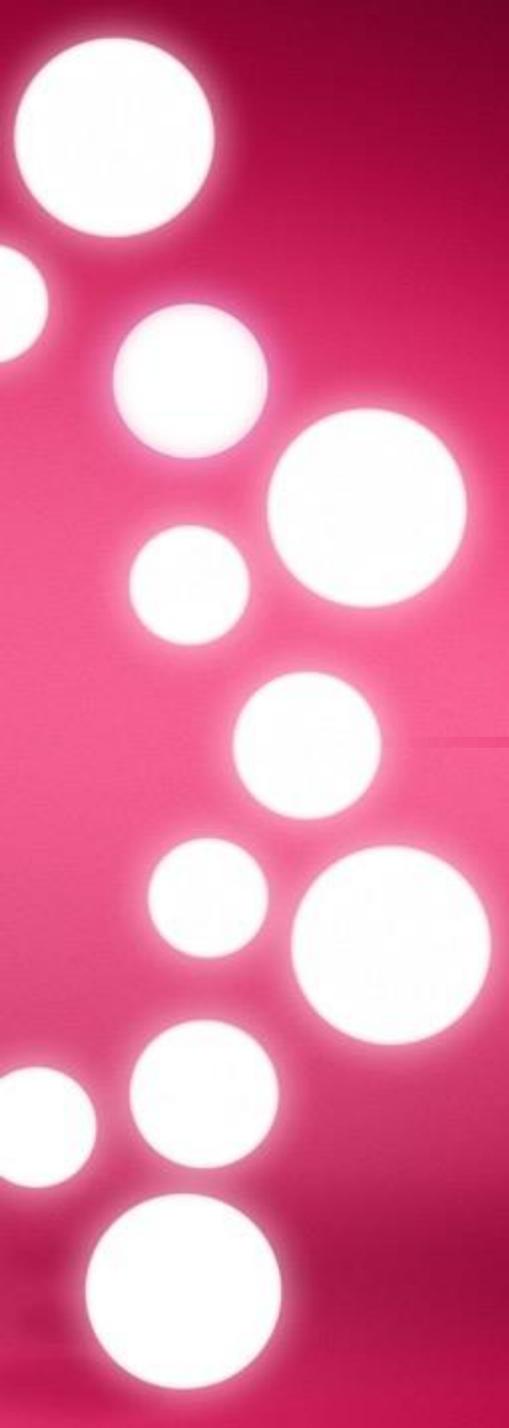
Annual Net Product Sales



Portfolio with Multi-Billion Dollar Revenue Potential²

<p>LIVMARLI</p> <p>ALGS, PFIC & Ultra Rare Cholestasis</p> <p>\$1Bn+</p>	<p>Volixibat</p> <p>PSC and PBC</p> <p>\$1Bn+</p>	<p>MRM-3379</p> <p>FXS</p> <p>\$1Bn+</p>
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¹ 2025 Net Product Sales Guidance
² Mirum Estimates



LIVMARLI®

Alagille Syndrome (ALGS)

Progressive Familial Intrahepatic Cholestasis (PFIC)

IBAT Inhibition In Cholestatic Liver Disease



Targeting IBAT Removes Circulating Bile Acids Addressing Toxic Bile Acid Accumulation

Cholestatic Liver Disease

Defined by impaired bile flow & hepatotoxic build-up of bile acids



Severe pruritus



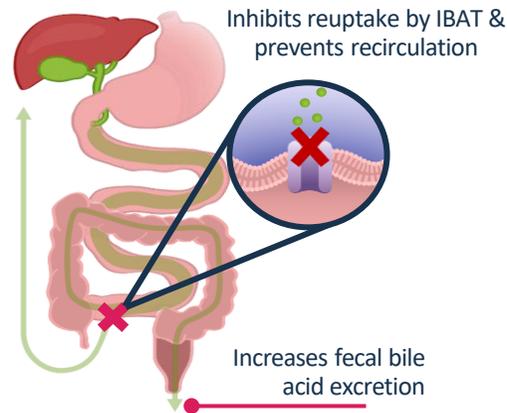
Cellular damage



Poor outcomes

Targeting IBAT Lowers Bile Acids

Mechanism directly addresses bile acid accumulation



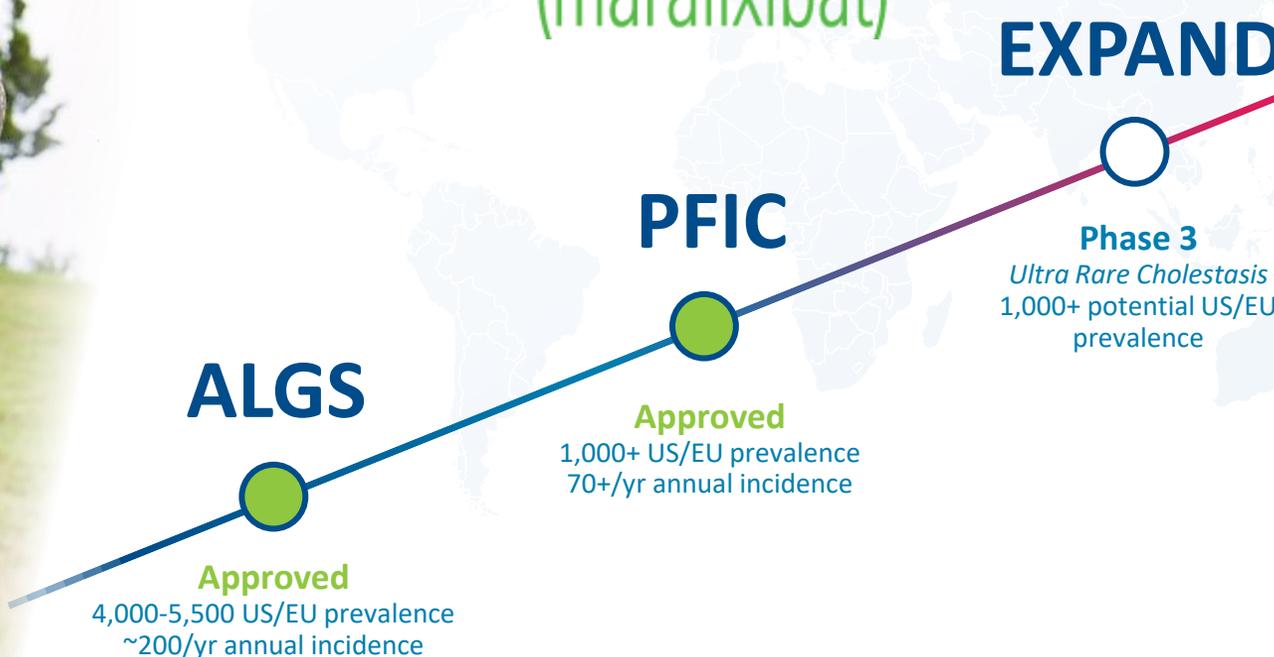
IBAT Inhibition Clinical Benefits¹⁻⁵

Transplant-free survival
Quality of life
Growth

Pruritus
Bilirubin (PFIC)
Xanthomas (ALGS)

1. Gonzales E et al. *Lancet*. 2021;398:1581-1592. 2. Loomes KM et al. *Hepatol Commun*. 2022;6(9):2379-2390. 3. Thompson R. Serum bile acid control in long-term maralixibat-treated patients is associated with native liver survival in children with progressive familial intrahepatic cholestasis due to bile salt export pump deficiency. Presented at: EASL 2020; August 2020. Accessed April 29, 2021. <https://linkinghub.elsevier.com/retrieve/pii/S0168827820307571> 4. van Wessel DBE et al. *J Hepatol*. 2021;73(1):84-93. 5. Sokol J, Gonzales E, Kamath BM, et al. Predictors of 6-year event-free survival in patients with Alagille syndrome treated with maralixibat, an IBAT inhibitor. Paper presented at: European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN): Annual Meeting; June 22-25, 2022; Copenhagen, Denmark.

LIVMARLI: A Leading Medicine for Ultra Rare Cholestatic Pruritus



Path to Sustained Long Term Growth

- ✓ Continued growth in new Rx
- ✓ Strong adherence & persistence
- ✓ Weight-based dosing
- ✓ Int'l market expansion
- ✓ IP Protection to 2040+

Well-Characterized Safety Profile of LIVMARLI



Safety Data
of LIVMARLI includes 5
Years of follow-up from 3
randomized studies in
ALGS, and 93-patient
randomized MARCH
study in PFIC



**Most common adverse
events** were diarrhea
and abdominal pain
(ALGS: 41.6 and 38.6 events per
100 person-years, respectively;
PFIC: 57.4% vs 19.6% pbo,
27.7% vs 15.2% pbo,
respectively)

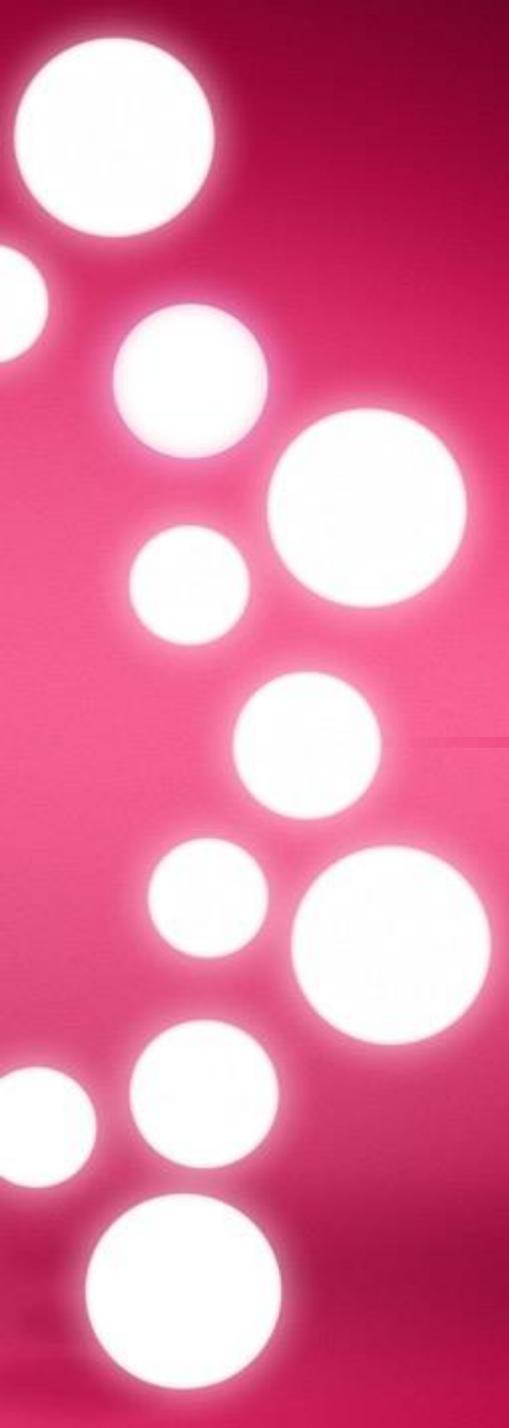


GI adverse reactions
were generally mild or
moderate severity
and self-limiting



**6% of patients
experienced** dose reductions
or interruptions due to
diarrhea, abdominal pain
(ALGS, PFIC)

LIVMARLI can cause serious side effects, including liver injury. Changes in certain liver tests are common in patients but may worsen during treatment and should therefore be monitored prior to and during treatment. These changes may be a sign of liver injury and, in PFIC, can be serious or may lead to transplant or death.



Bile Acid Portfolio

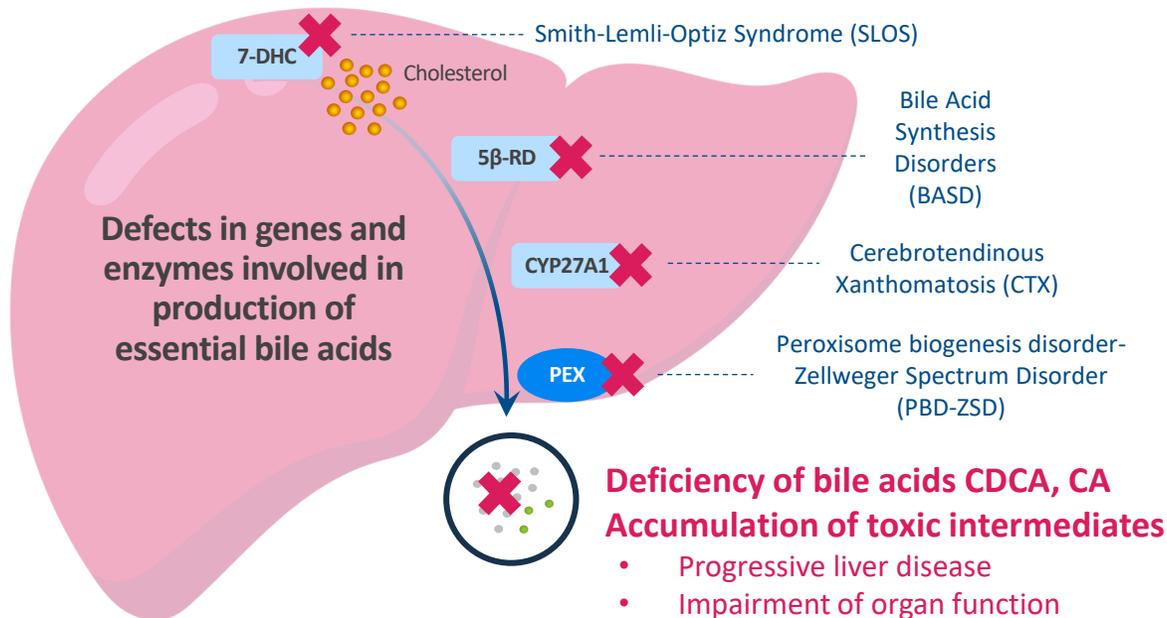
CHOLBAM & CTEXLI



Bile Acid Replacement Therapies Provide Bile Acids the Liver Cannot Produce

Impaired Bile Acid Synthesis

Driven by single-enzyme defects and peroxisomal (PEX) disorders



- Progressive liver disease
- Impairment of organ function
- Irreparable neurological damage
- Significant morbidity

Bile Acid Replacement Therapies

- ✓ Restoration of bile acid homeostasis
- ✓ Reduction of toxic intermediates
- ✓ Improvement and prevention of adverse clinical manifestations

Growing Business with Significant Commercial Synergies



Bile Acid Portfolio Addresses Multiple High Need Settings

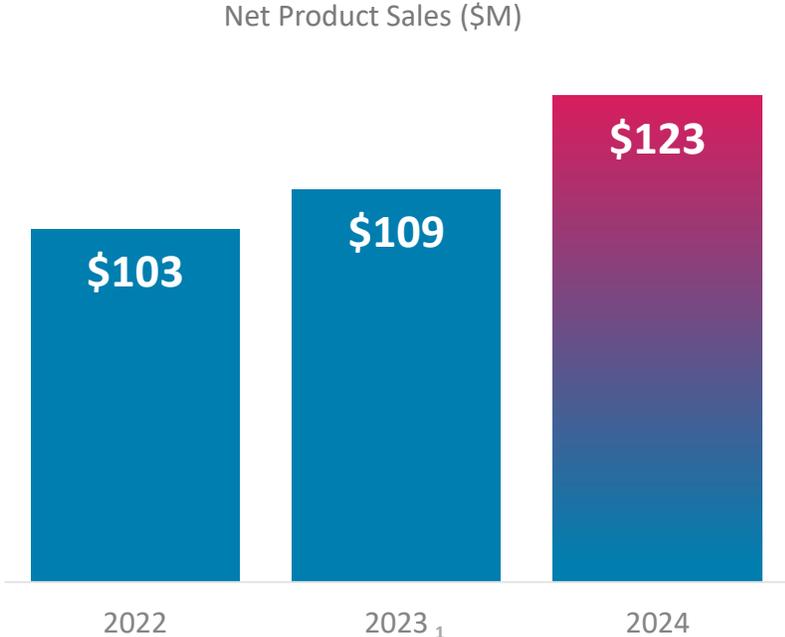
Ctexli™
(chenodiol) tablets 250mg

CTX
Approved

Cholbam®
(cholic acid) capsules

BASD
PBD-ZSD
Approved

Consistent Year-over-Year Growth

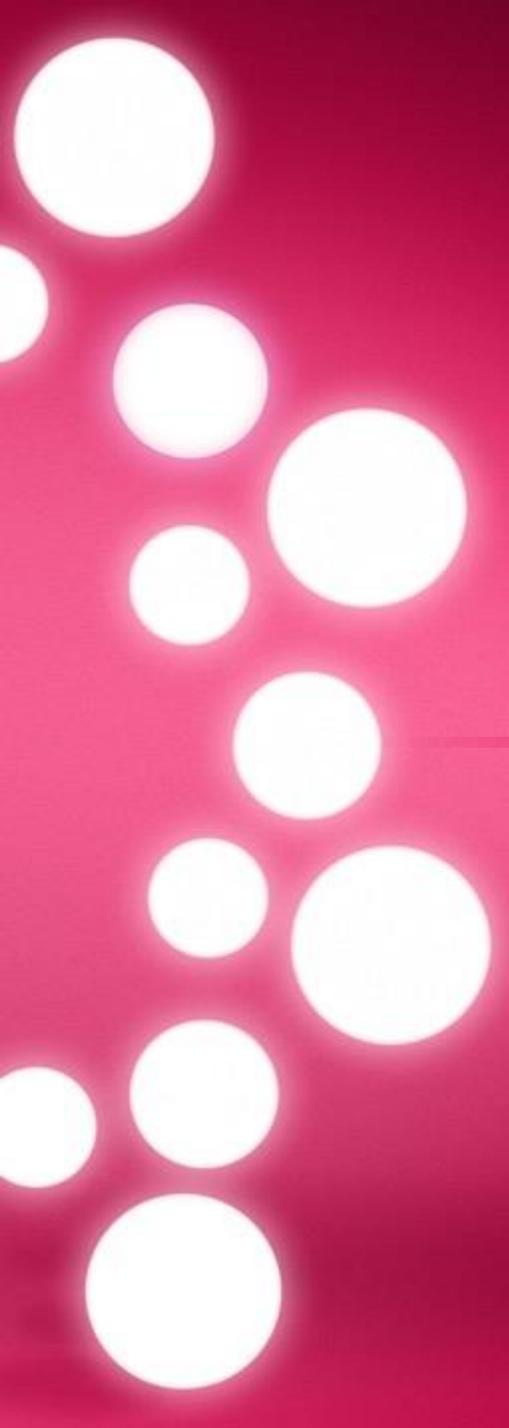


¹ Traverre Therapeutics, Inc. and Mirum Pharmaceuticals, Inc. 10-K filings; 2023 net product sales excludes an approximate ~\$5M reserve recorded by Traverre Therapeutics, Inc. for potential repayment obligations attributed to 2015-2020 net product sales in France



Pipeline

Significant Expansion Opportunities
within Pipeline Indications

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LIVMARLI



Broad Unmet Need in Multiple Ultra Rare Cholestatic Conditions

Pruritus in Ultra Rare Cholestatic Settings

e.g. Biliary Atresia, Secondary Sclerosing Cholangitis, Others

Characteristic Cholestatic Burden



Elevated sBA
Severe pruritus
Stunted growth
Impaired QoL

Estimated Addressable US/EU Patients

1,000+

with cholestatic pruritus¹

LIVMARLI Is Uniquely Positioned to Address the Burden of Cholestatic Pruritus

EXPAND Phase 3 Study Enrolling



EXPAND



Key Inclusion Criteria

- Diagnosis of cholestatic liver disease excluding ALGS, PFIC, PSC, PBC, and ICP
- Moderate to severe cholestatic pruritus
- Total sBA >2× ULN

Primary Endpoint

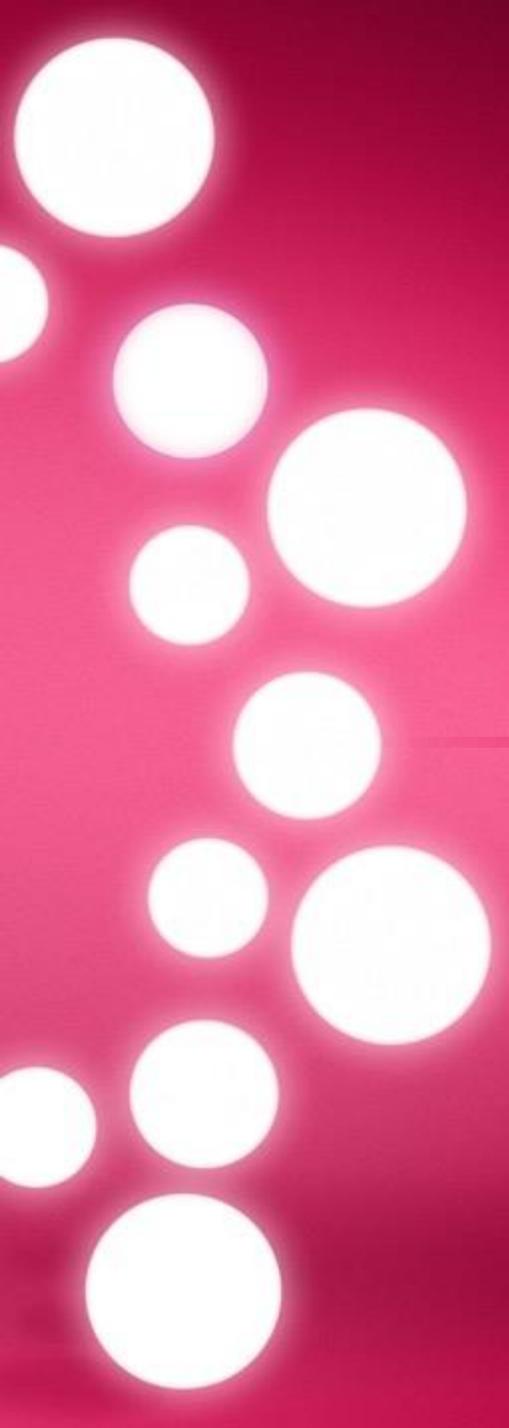
Change in pruritus from Baseline to 20wk

Secondary Endpoints

Safety & tolerability
Markers of disease and QoL

Enrollment Completion Expected 2026

¹ LIVMARLI 285ug/kg is equivalent to 300 ug/kg maralixibat chloride. BID, twice daily



Volixibat

IBAT Inhibitor for Cholestasis in Adults

PSC & PBC: Immuno-inflammatory Rare Liver Disease



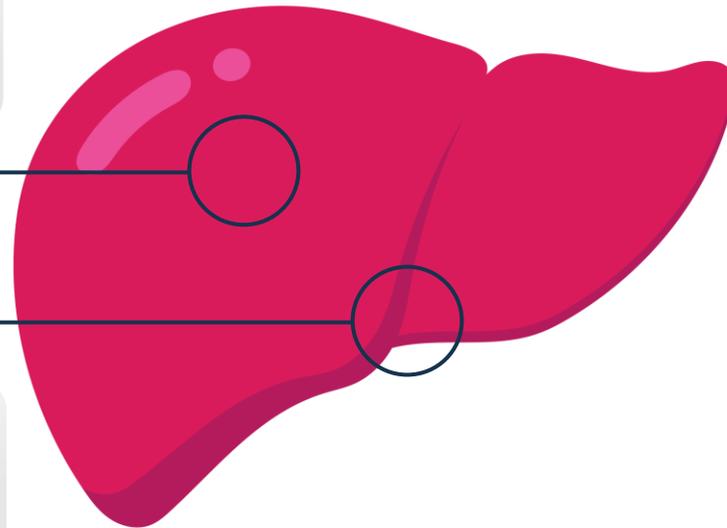
Elevated Bile Acid Levels Drive Severe Symptom Burden (Pruritus, Fatigue) and Progressive Liver Disease

Bile Acid Overload

Obstruction of bile flow via impairment of intrahepatic and extrahepatic bile ducts

PSC: fibrotic strictures of bile ducts
54,000 patients US/EU
65% of patients with active pruritus

PBC: inflammatory driven cholestasis
230,000 patients US/EU
60% of patients with active pruritus



Bile Acid Accumulation Associated with:

- Severe symptomatic burden
- Reduced bile acid synthesis
- Inflammation and fibrosis of bile ducts and liver
- Progressive liver damage

IBAT inhibition Reduces Pruritus and sBA in PSC & PBC

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Primary Sclerosing Cholangitis

PSC: Pruritus is Common and Often Moderate to Severe



Pruritus is a Registrational Endpoint

Pruritus Is a Significant Burden

8

Median worst itch score (0-10 NRS)
from last itching episode¹

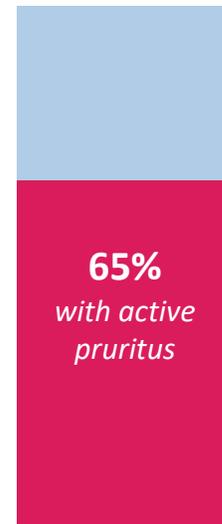
“ *This debilitating itch is merciless, all consuming, and overwhelming.* ”
- Kristina, patient with PSC¹

“ *It is...like your blood is itchy. The bile is in your blood...you can't reach the itch.* ”
- Nicola, patient with PSC¹

No Approved Therapies; Significant Opportunity in PSC



PSC Patients in the US²



PSC US Patients with Pruritus
Often Moderate to Severe



IBAT Inhibition Reduces Pruritus and Serum Bile Acids in PSC



CAMEO Study

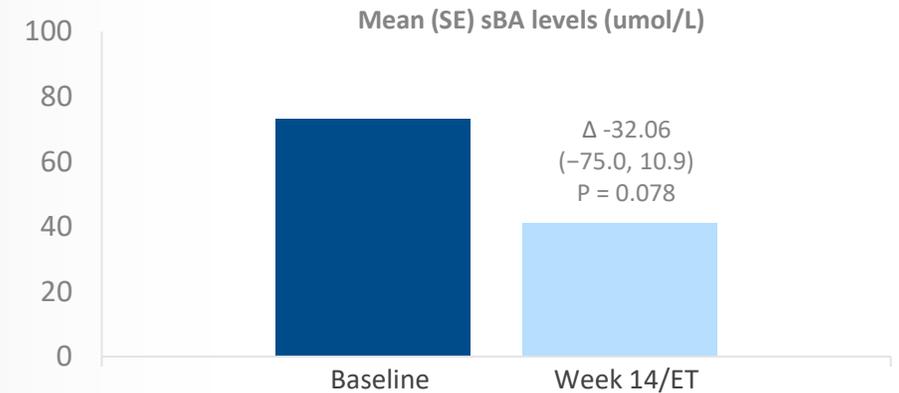
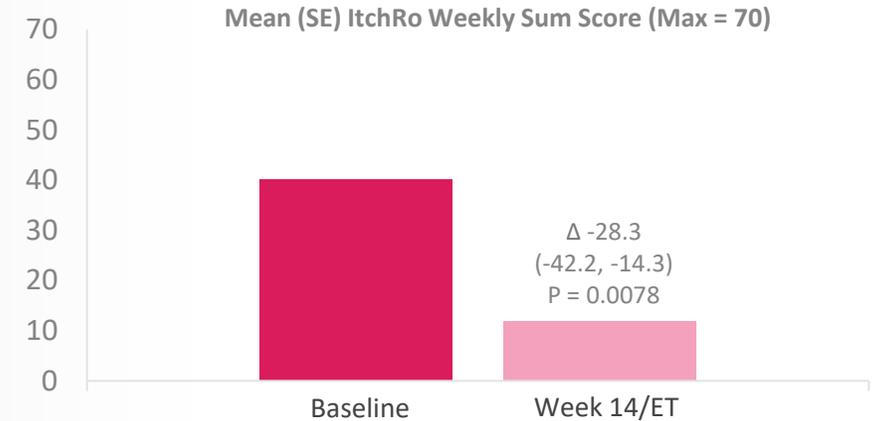
IBAT inhibitor Proof of Concept in PSC

Data from patients with ItchRO >3 at Baseline, n=8

**Significant Reductions
in Pruritus and Bile Acids**

**Pruritus
-70%**

**Bile Acids
-40%**



Volixibat: Highly Active on Bile Acid Pathway; 48-Week Safety Data in Prior Studies

Phase 2b Study of Volixibat in PSC Patients with Cholestatic Pruritus

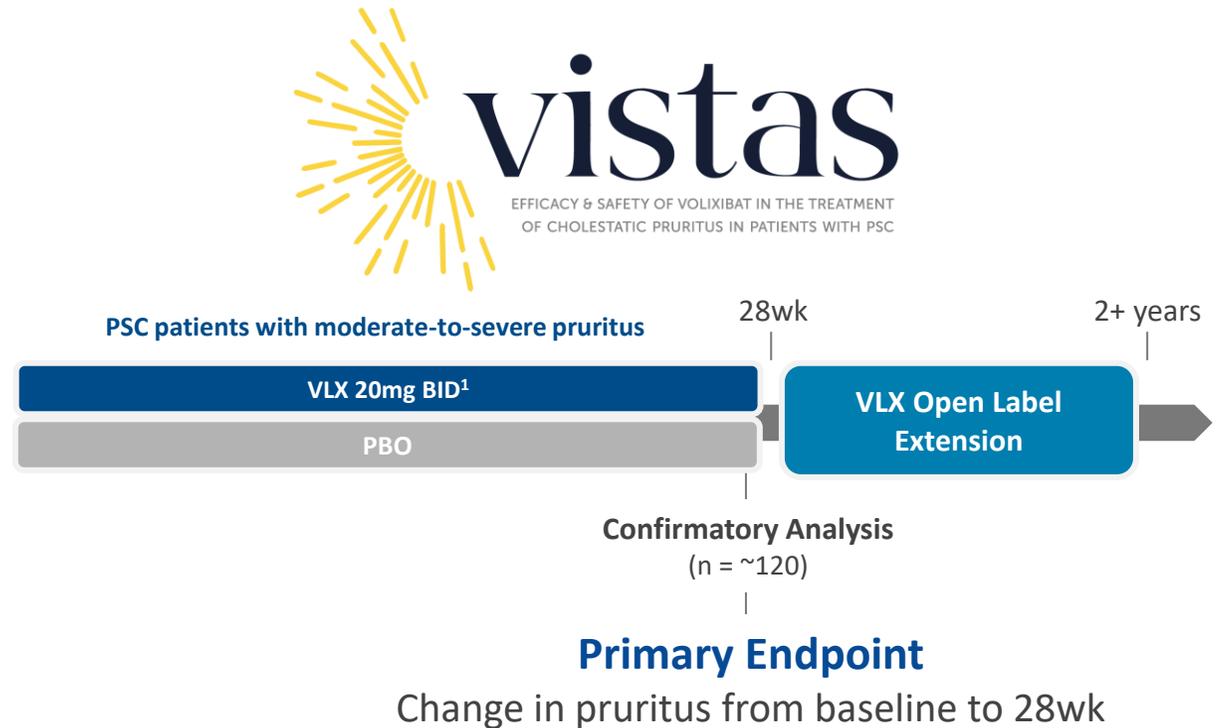


Positive Interim Analysis

Exceeded prespecified efficacy and safety thresholds for continuation

20 mg BID dose selected

VISTAS continues with no changes



Enrollment Completion Expected Q3 2025; Topline Data Q2 2026

¹ Participants are randomized 1:1 between Volixibat 20mg and Placebo. BID, twice daily

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Primary Biliary Cholangitis

PBC: Most Prevalent Cholestatic Liver Disease



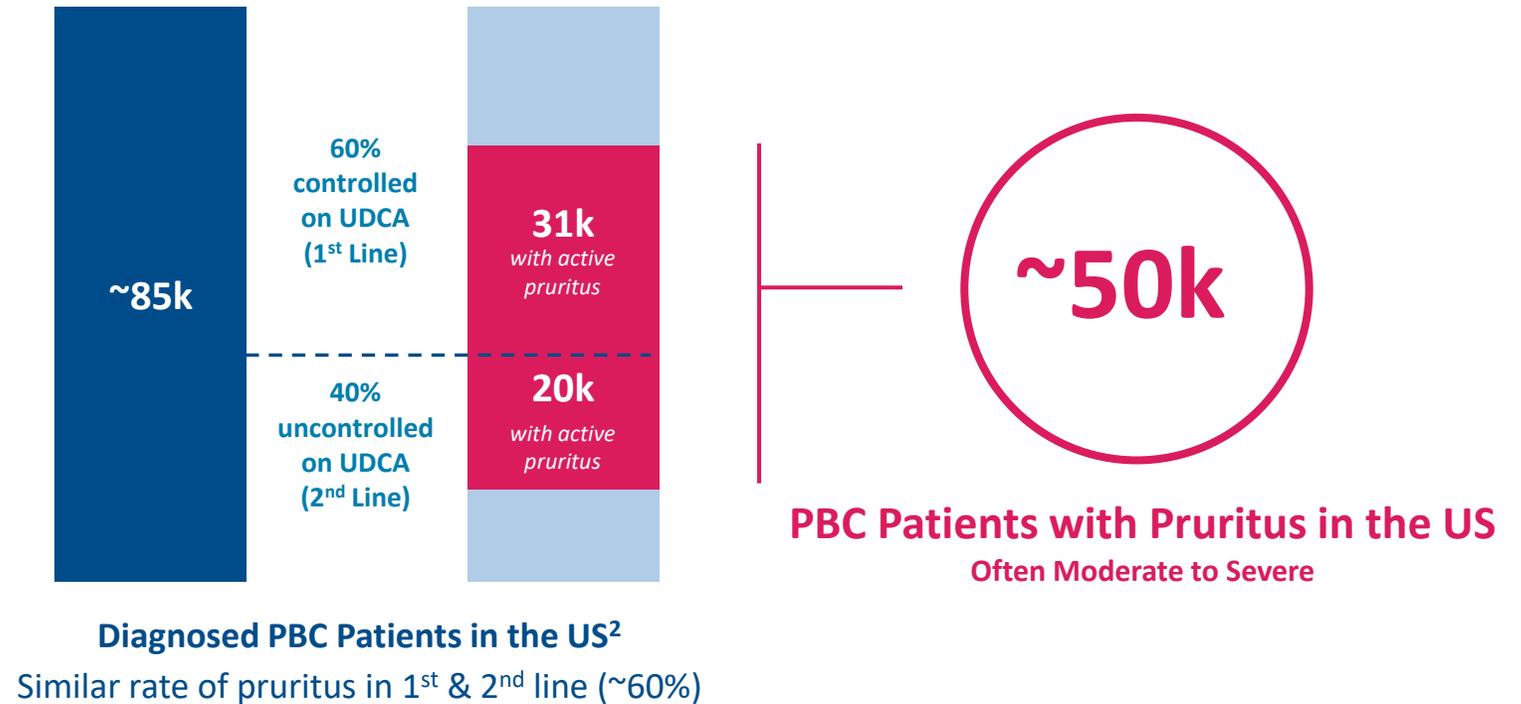
Significant Opportunity Across 1st & 2nd Line Settings



No approved therapies for pruritus

“ I found myself itching my arms so much that I had bruises on my arms...
- Rose, patient with PBC¹ ”

“ I began itching all over...It was unlike any itch I ever experienced. I scratched so much, my skin was raw.
- Donna, patient with PBC¹ ”



¹PBCers Organization. PBCers Stories. Retrieved from website <https://pbcers.org/stories/>. Accessed October 23, 2024.

²Mirum Market Research

Phase 2b Study of Volixibat in PBC Patients with Cholestatic Pruritus



Positive Interim Analysis

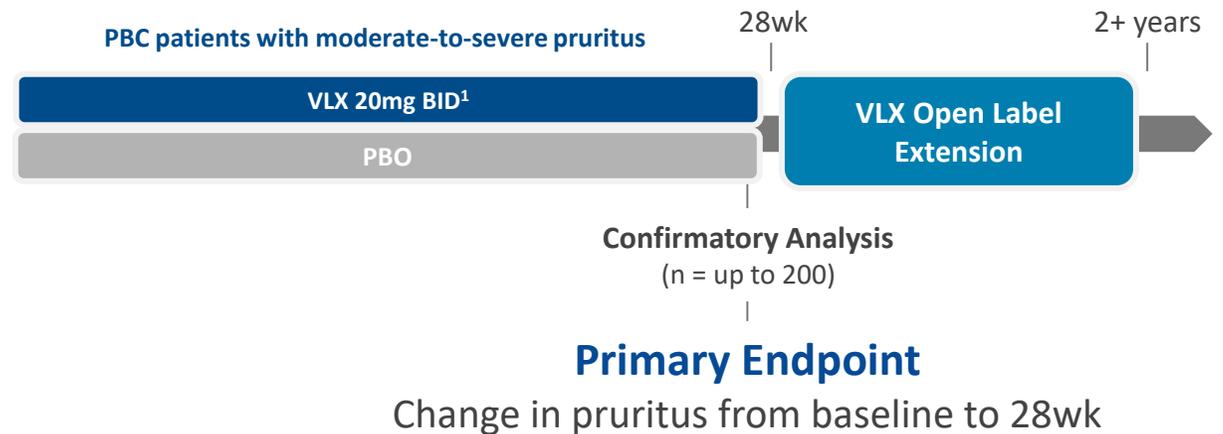
Rapid and statistically significant improvement in pruritus

Reductions in sBA and improvements in fatigue

20 mg BID dose selected

Granted FDA Breakthrough Therapy Designation

VANTAGE



Enrollment Completion Expected 2026

¹ Participants are randomized 1:1 between Volixibat 20mg and Placebo. BID, twice daily

VANTAGE Interim Analysis: Baseline Characteristics Well Balanced

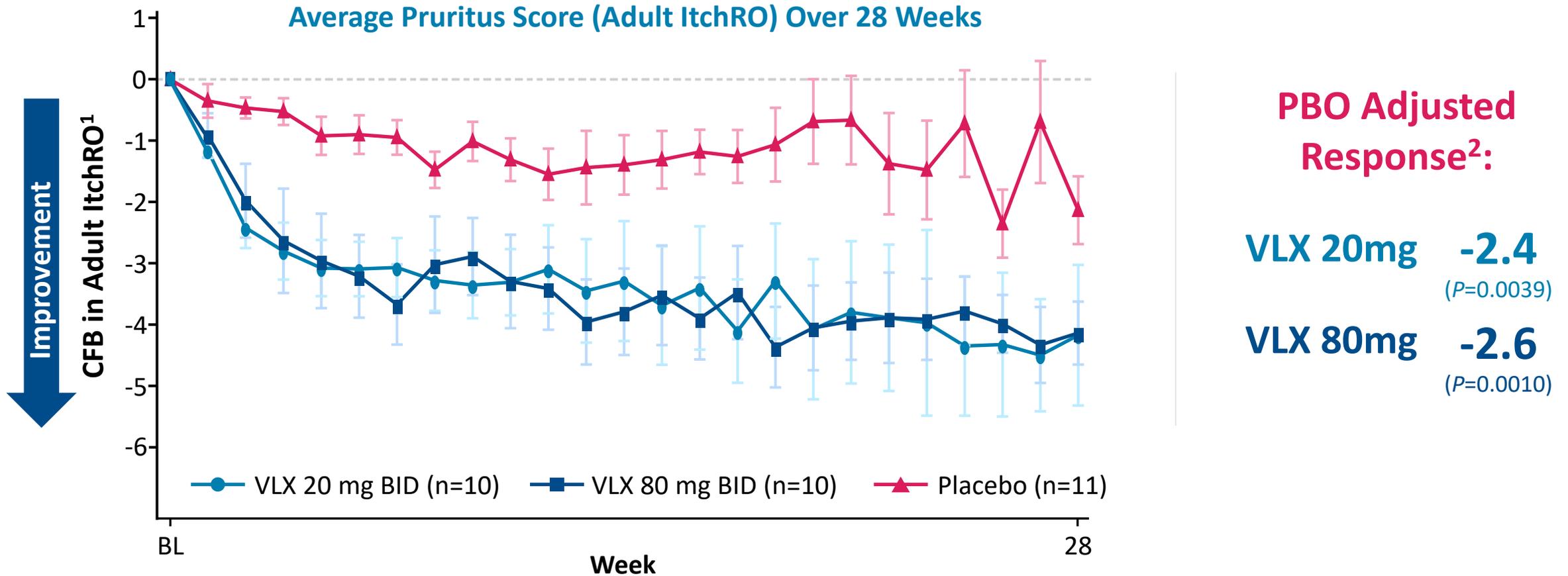


Characteristic	Volixibat BID 20mg (n=10)	Volixibat BID 80 mg (n=10)	Placebo (n=11)
Age (years), mean (SD)	53.9 (15.8)	52.3 (5.9)	62.1 (9.7)
Female, n (%)	8 (80)	9 (90)	10 (91)
Adult ItchRO Score, mean (SD)	6.8 (1.6)	6.3 (1.8)	6.2 (1.5)
sBA in umol/L, mean (SD)	53 (53)	44 (73)	31 (52)
ALP (U/L), mean (SD)	238 (134)	232 (107)	167 (114)

VANTAGE Interim Analysis: Reduction in Pruritus from Baseline



RAPID AND STATISTICALLY SIGNIFICANT REDUCTIONS IN PRURITUS



Heneghan et al, EASL 2025

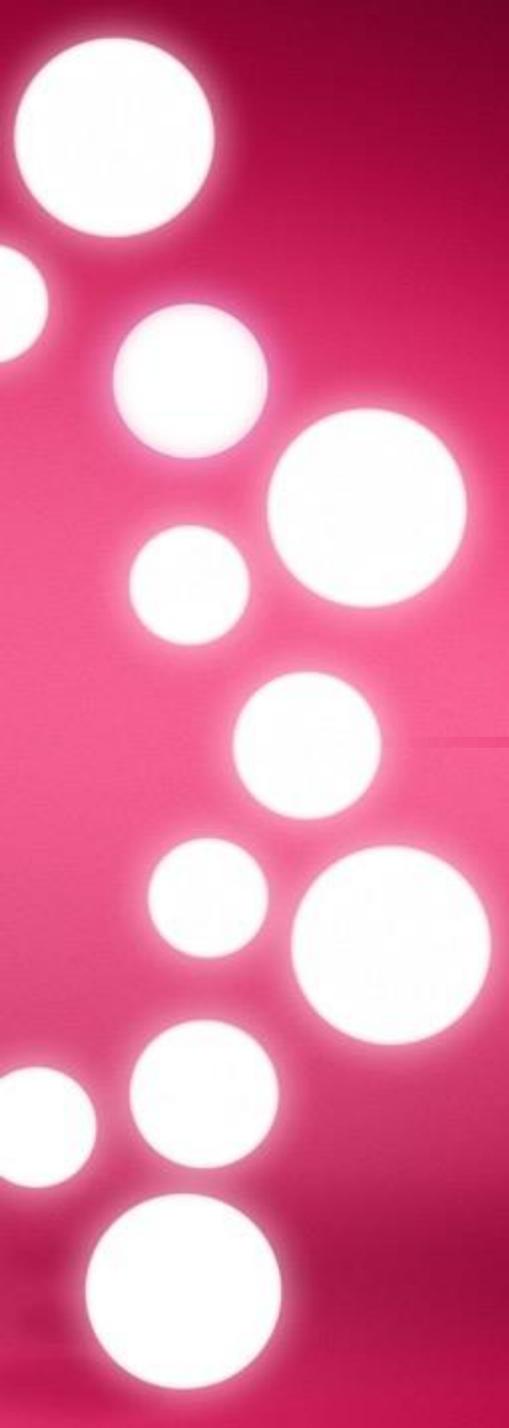
¹Adult ItchRO is a 0-10 worst itch numerical rating scale where 0 = no itch and 10 = worst possible itch

²LS mean (95% CI) change from Baseline to the average of the last 12 weeks of treatment. LS means and P values were calculated using an MMRM model.



VANTAGE Interim Analysis: Other Observations

- Significant reduction in pruritus as early as Week 1
- Significant improvements in fatigue at Week 16
- 70% of patients on volixibat achieved >50% reduction in sBA
- No new safety signals:
 - No clinically meaningful changes in liver laboratory tests for patients on volixibat
 - 77% of patients on volixibat experienced diarrhea which was mild in severity and led to 1 discontinuation
 - 3 patients experienced serious TEAEs, including one in the placebo arm; none related to study drug



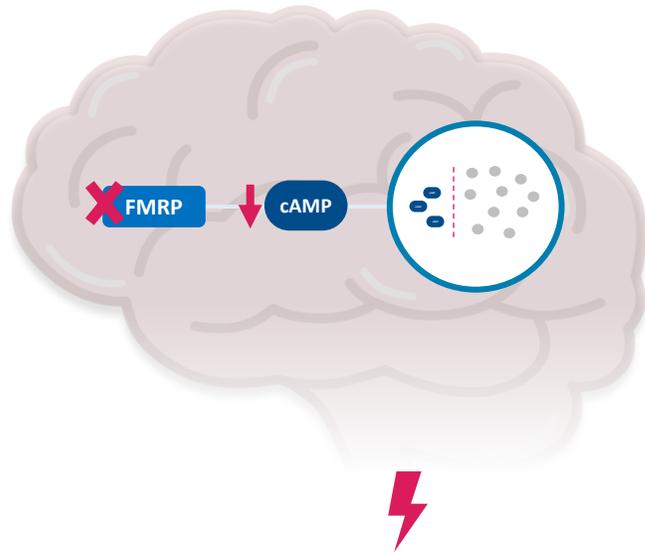
MRM-3379

PDE4D Inhibitor for FXS



Fragile X Syndrome (FXS): Rare X-Linked Genetic Disorder

Mutation in the X-linked FMR1 Gene Decreases cAMP



Impaired Cognition, Learning and Behavior

- Leading inherited form of intellectual disability and autism spectrum disorder
- Symptoms more pronounced in males
- Diagnosed by genetic testing

~50,000

*Males in the US/EU with FXS
~2/3 with full mutation of FMR1 gene¹*

No Approved Therapies for FXS



MRM-3379: Selective PDE4D inhibitor for FXS

PDE4D

Regulates cellular signaling by breaking down cAMP



Highly expressed in brain regions critical for learning, memory, emotional regulation

Inhibition



↑ cAMP levels

FXS

In FXS patients, PDE4D inhibition improves cognition and daily function¹

¹ Kravis et al., *Nature Medicine* 2021

MRM-3379

- Oral, selective PDE4D inhibitor
- 5:1 brain/plasma ratio, potentially increasing therapeutic window
- Efficacy in preclinical models of memory
- Well tolerated in SAD and MAD clinical trials

Initiating Phase 2 Dose Ranging Study in 2025

Phase 2 Study of MRM-3379 in Fragile X Syndrome



Phase 2 Study Design



Key Inclusion Criteria

- Males, 13-45 years of age
- Diagnosis of FXS with full mutation (≥ 200 CGG repetitions)

Primary Endpoint

Safety & tolerability

Key Secondary Endpoint

NIH-TCB Crystallized Cognition Composite (CCC)

Composed from the Picture Vocabulary Test (PVT) and Oral Reading Recognition Test (ORRT)

Phase 2 Study Initiation Expected Q4 2025



Mirum Pharmaceuticals

Dedicated to Transforming the Treatment of Rare Diseases

Well-Positioned to Execute on Our Strategy



Multiple Value-Creating Anticipated Milestones



2025 FY Guidance:

- **\$490-510M**
2025 Net Product Sales Guidance
- **Cash flow positive**

- ✓ CTEXLI FDA approved
- ✓ LIVMARLI tablet approved
- ☐ VISTAS (PSC) top line results in Q2
- ☐ EXPAND top line results in H1
- ☐ VISTAS (PSC) complete enrollment in Q3
- ☐ EXPAND complete enrollment
- ☐ VANTAGE (PBC) top line results in H1
- ☐ VANTAGE (PBC) complete enrollment
- ☐ Initiate MRM-3379 P2 study in FXS in Q4

\$322M Cash, Cash Equivalents and Investments¹

¹ Mirum Pharmaceuticals Inc. Q2 2025 10-Q



Thank You



Supplemental Materials



LIVMARLI Important Safety Information

IMPORTANT SAFETY INFORMATION

LIVMARLI can cause serious side effects, including:

Liver injury: Changes in certain liver tests are common in patients with Alagille syndrome and PFIC but can worsen during treatment. These changes may be a sign of liver injury. In PFIC, this can be serious or may lead to liver transplant or death. Your healthcare provider should do blood tests and physical exams before starting and during treatment to check your liver function.

Stomach and intestinal (gastrointestinal) problems: LIVMARLI can cause stomach and intestinal problems, including diarrhea and stomach pain during treatment.

Fat Soluble Vitamin Deficiency: A condition called Fat Soluble Vitamin (FSV) Deficiency caused by low levels of certain vitamins (vitamin A, D, E, and K) stored in body fat is common in patients with Alagille syndrome and PFIC but may worsen during treatment.



CHOLBAM Important Safety Information

LIMITATIONS OF USE

The safety and effectiveness of CHOLBAM on extrahepatic manifestations of bile acid synthesis disorders due to single enzyme defects or peroxisomal disorders, including Zellweger spectrum disorders, have not been established.

IMPORTANT SAFETY INFORMATION

WARNINGS AND PRECAUTIONS – Exacerbation of liver impairment

- Monitor liver function and discontinue CHOLBAM in patients who develop worsening of liver function while on treatment.
- Concurrent elevations of serum gamma glutamyltransferase (GGT) and alanine aminotransferase (ALT) may indicate CHOLBAM overdose.
- Discontinue treatment with CHOLBAM at any time if there are clinical or laboratory indicators of worsening liver function or cholestasis.

ADVERSE REACTIONS

- The most common adverse reactions ($\geq 1\%$) are diarrhea, reflux esophagitis, malaise, jaundice, skin lesion, nausea, abdominal pain, intestinal polyp, urinary tract infection, and peripheral neuropathy.

CTEXLI Important Safety Information



IMPORTANT SAFETY INFORMATION

CTEXLI can cause side effects, including:

Liver Injury: You will need to undergo laboratory testing before starting and while taking CTEXLI to check your liver function. Changes in certain liver tests may occur during treatment and may be a sign of liver injury. This can be serious. Stop taking CTEXLI immediately and tell your healthcare provider right away if you get any signs or symptoms of liver problems, including, stomach (abdomen) pain, bruising, dark-colored urine, feeling tired (fatigue), bleeding, yellowing of the skin and eyes, nausea, and itching.

Most Common Side Effects: Diarrhea, headache, stomach pain, constipation, high blood pressure, muscular weakness, and upper respiratory tract infection.

Tell your health care provider about all the medications that you take, as CTEXLI may interact with other medicines.

LIVMARLI Available in Both Oral Solution and Tablet Formulation



Flexible Dosing Options for Patients



One LIVMARLI Tablet Per Dose



ALGS: A Debilitating Disease with Severe Cholestasis

Alagille Syndrome

Genetic disease leading to severe cholestasis, unbearable pruritus and multi-system effects

88%

Affected by cholestatic pruritus

6 in 10

Progress to transplant or death by adulthood



Lowers Serum Bile Acids

83%

of patients experienced $\geq 20\%$ reduction in sBA levels

Significantly Reduces Pruritus

84%

of participants experienced ≥ 1 point reduction in ItchRO[Obs] in cholestatic pruritus

Pruritus Reduction Leads to Improved Transplant-Free Survival

93%

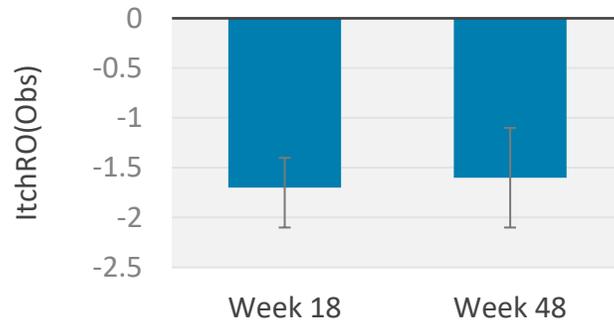
of patients with a >1 -point reduction in ItchRO[Obs] remained transplant-free 6 years after starting LIVMARLI*

ICONIC: ALGS Pivotal Study Shows Significant Long-term Benefit



Clinically Meaningful and Sustained Improvements in Pruritus, sBA, Growth, and QoL from Baseline.¹

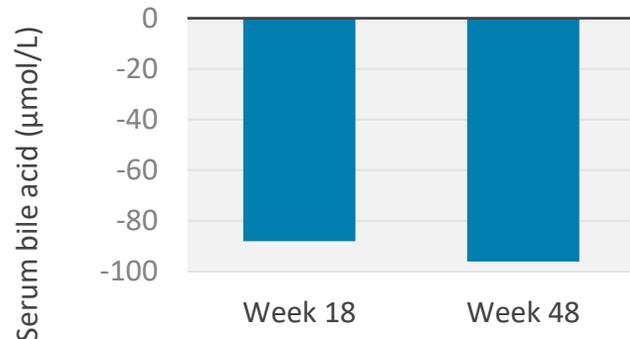
Reduced Pruritus



84%

of participants experienced clinically meaningful improvements (≥ 1 point reduction in ItchRO[Obs]) in cholestatic pruritus

Reduced sBA



83%

of patients experienced $\geq 20\%$ reduction in sBA levels



LIVMARLI also improved other key symptoms of ALGS including growth, quality of life, and fatigue.

View data [published in The Lancet](#)

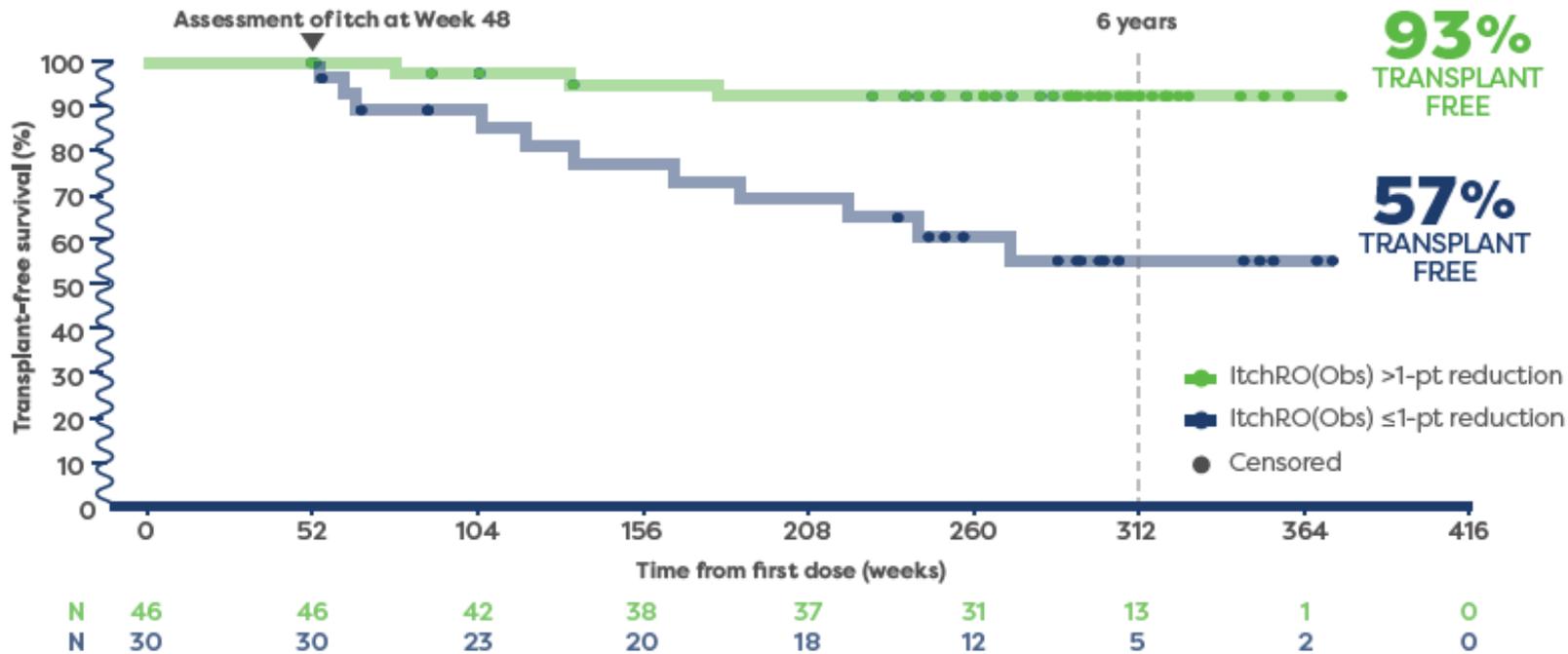
¹ Gonzales E et al. *Lancet*. 2021;398:1581-1592.

Significant Improvement in Transplant-Free Survival in Patients with ALGS Treated with LIVMARLI



Post-hoc Analysis of Long-Term Impact: >1-point Reduction in ItchRO[Obs] Was a Predictor of Transplant-Free Survival*

Transplant-Free Survival Over 6 Years of Treatment with LIVMARLI*



93%
TRANSPLANT FREE
of patients remained transplant-free 6 years after starting LIVMARLI

57%
TRANSPLANT FREE
of patients who had ≤1-point reduction in ItchRO(Obs) (n=30) remained transplant-free 6 years after starting LIVMARLI

*Transplant-free survival was defined as time to liver transplant or death; post-hoc analysis included data from 3 long-term studies (N=76)

Sokol J, Gonzales E, Kamath BM, et al. Predictors of 6-year event-free survival in patients with Alagille syndrome treated with maralixibat, an IBAT inhibitor. Paper presented at: European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN): Annual Meeting; June 22-25, 2022; Copenhagen, Denmark.

PFIC: Progressive Diseases of Bile-Related Transporters



PFIC

(Progressive Familial Intrahepatic Cholestasis)

Multiple genetic subtypes



Severe pruritus
Stunted growth
Impaired QoL

~80%

Require liver transplant by
18yrs of age



Significant Improvements in Pruritus, Serum Bile Acids, and Bilirubin

Improvements Consistent Across Multiple Subtypes

(PFIC1, PFIC2, PFIC3, PFIC4, PFIC6 and unidentified mutational status)*

62%

With Minimal to No Itch

(Proportion of pruritus score assessments ≤ 1 after 26wks of treatment)**

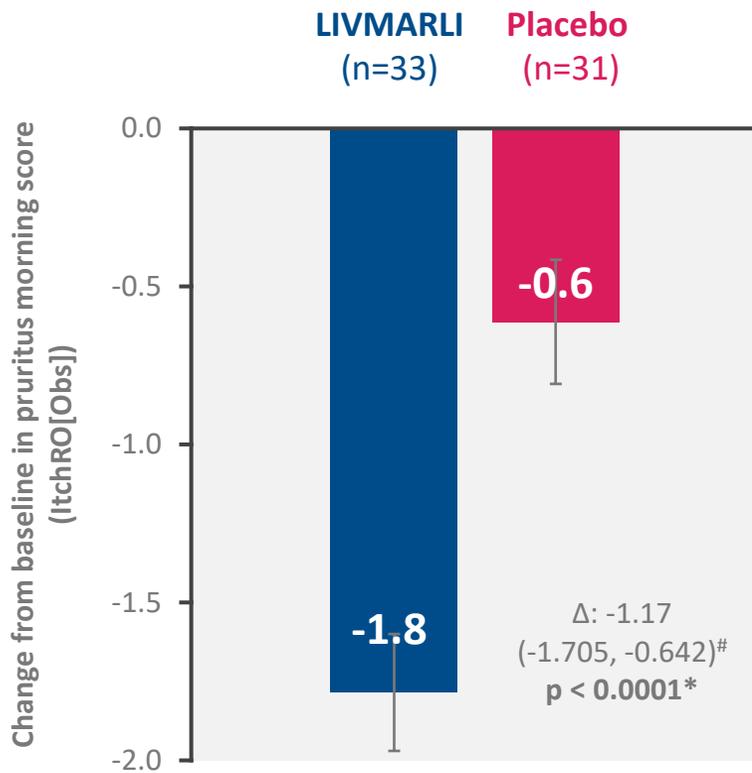
Karpen et al, JPGN 2021; Englert et al, Transplantation 2007;84: 1361–1363; Thompson, et al. Oral Presentation, AASLD 2022

*LIVMARLI is not recommended in a subgroup of PFIC type 2 patients with specific ABCB11 variants resulting in non-functional or complete absence of bile salt export pump (e.g. BSEP-3 variant which accounts for approximately 21% of PFIC type 2 patients)

** Proportion of pruritus score assessments recorded as a 0 or 1 on the 0-4 ItchRo[Obs]



Significant Pruritus Improvements in All-PFIC Patients



Proportion of pruritus score assessments ≤ 1 point:

62% LIVMARLI vs 28% placebo
($p < 0.0001$)



Data are LS Mean with standard error bars. Effect size compared the difference between LIVMARLI and placebo, averaged over the last 3 time periods using a repeated measures mixed effect model.

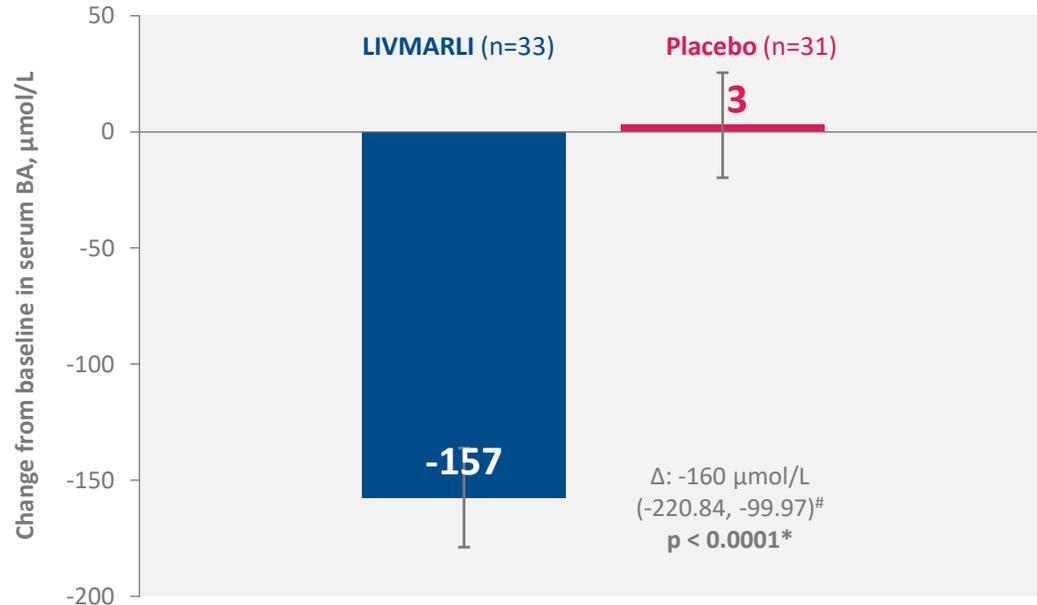
* LIVMARLI LS Mean = Placebo LS Mean; [#]LS Mean Delta with 95% CI
Thompson, et al. Oral Presentation, AASLD 2022

MARCH PFIC: Significant Improvements in Markers of Liver Disease

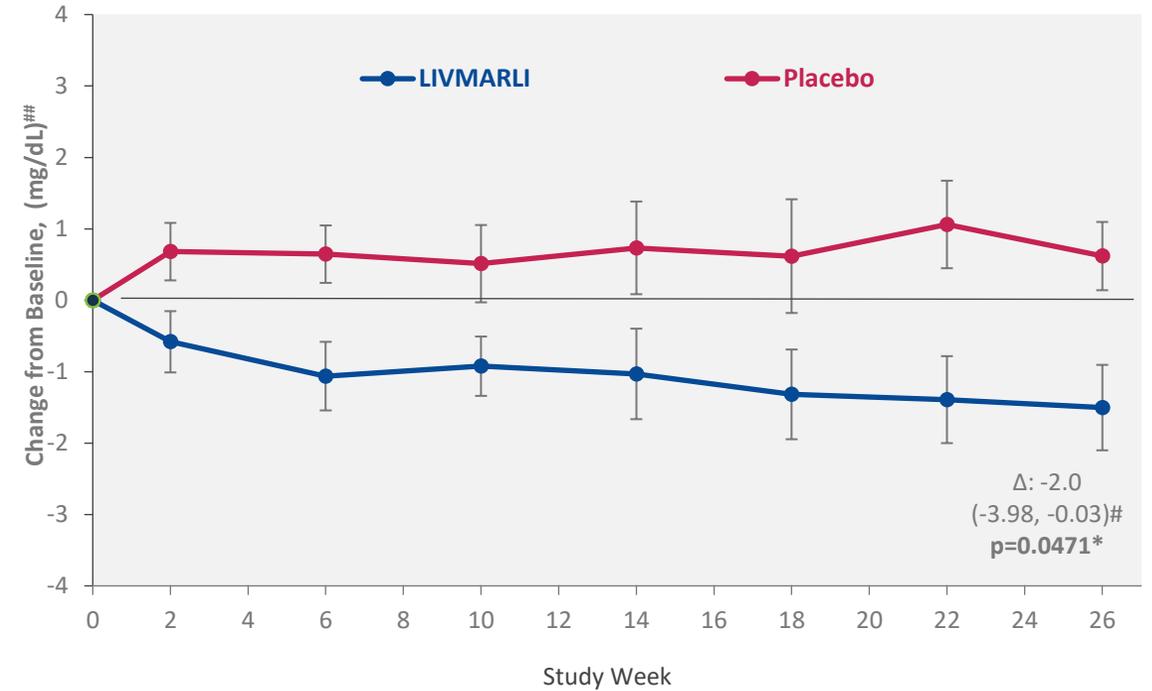


Significant Improvements in All-PFIC Patients (PFIC1, PFIC2, PFIC3, PFIC4, PFIC6)

Serum Bile Acid



Bilirubin¹



Data are LS Mean with standard error bars. Effect size compared the difference between LIVMARLI and placebo, averaged over the last 3 time periods using a repeated measures mixed effect model.

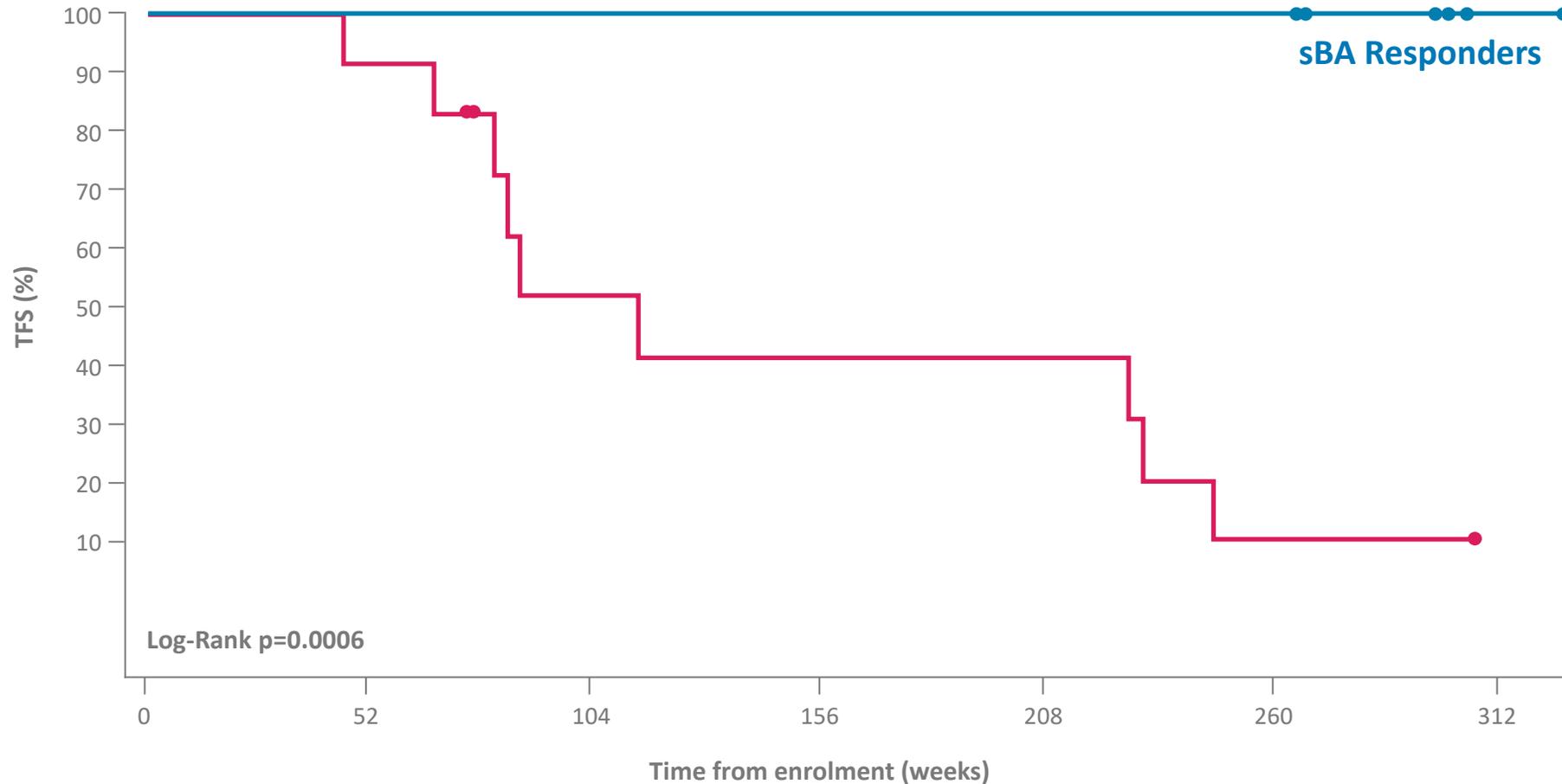
* LIVMARLI LS Mean = Placebo LS Mean; [#]LS Mean Delta with 95% CI; ^{##}Data are mean with standard error bars

Thompson, et al. Oral Presentation, AASLD 2022

1 Bilirubin was not a prespecified primary or secondary endpoint that was in hierarchical order

PFIC: sBA Response Associated with Transplant-Free Survival

INDIGO Phase 2: 100% 5-yr Transplant Free Survival in sBA Responders*



Loomes K et al. *Hepatol Commun.* 2022;6:2379-2390; n=19 (7 sBA responders, 12 sBA non-responders)

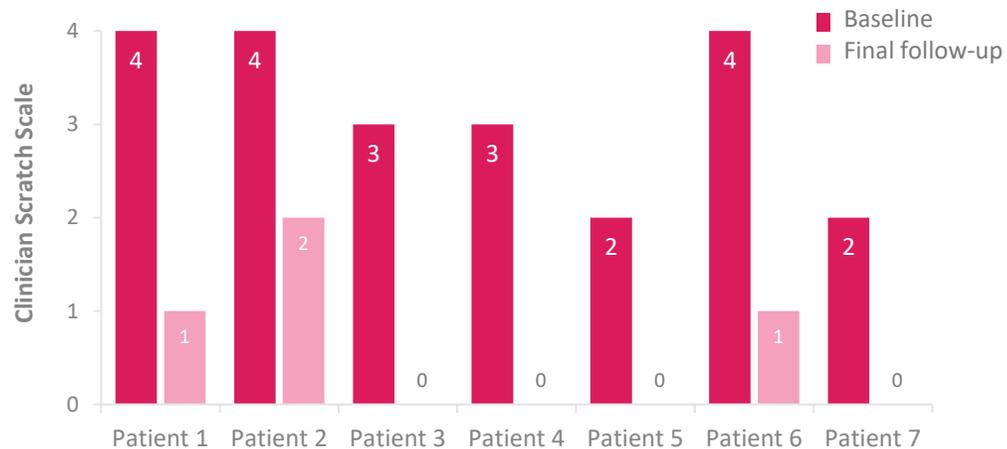
*NAPPED criteria (van Wessel et al, 2021): sBA responders defined as having an average sBA of <102 $\mu\text{mol/L}$ (if baseline sBA $\geq 102 \mu\text{mol/L}$), OR a $\leq 75\%$ average percent change from baseline



LIVMARLI Compassionate Use in PSC Patients with Pruritus n=7

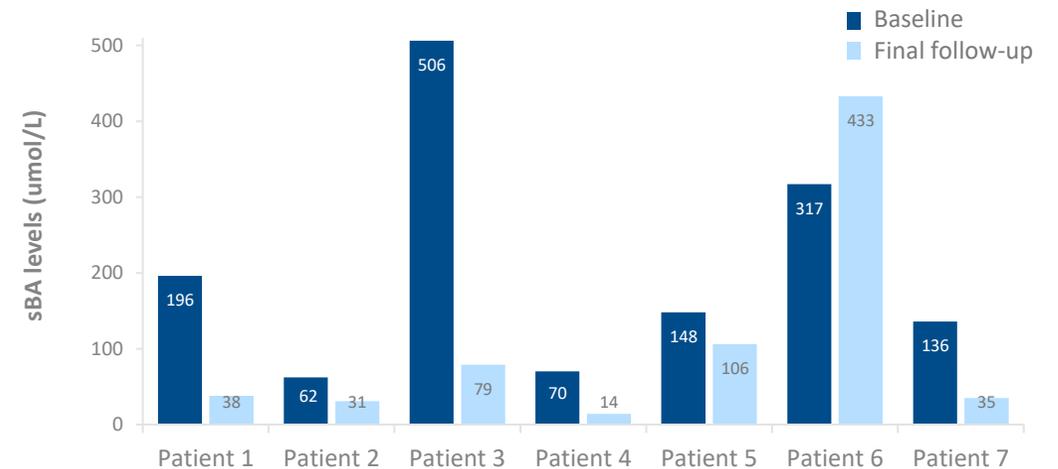
Pruritus

6 of 7 subjects with complete or near complete resolution



Bile Acids

Most patients showed reductions in sBA levels





Intellectual Property Overview

LIVMARLI IP Coverage in the United States to 2040+



Indication



ALGS	<p>Method of Treatment: Dosing (2031, 2040) Orange Book Listed – Patent No. 11,229,647 / 11,497,745 / 11,918,578 / 11,260,053</p>
	<p>Method of Treatment (2032, 2037) Orange Book Listed – Patent No. 11,376,251</p>
	<p>Orphan Designation (2030)</p>
<p>[Pending] Formulation, Manufacturing, Additional Dosing (2042, 2043)</p>	
PFIC	<p>Method of Treatment (2032) Orange Book Listed – Patent No. 10,512,657 / 11,229,661</p>
	<p>Orphan Designation (2031)</p>
	<p>[Pending] Formulation, Manufacturing, Additional Dosing (2042)</p>
	<p>[Pending] Method of Treatment: Dosing (2040, 2043)</p>
ALGS & PFIC	<p>Tablet Formulation – Method of Treatment: Dosing and Formulation (2043)¹</p>

¹Approved for grant

IP Coverage for Pipeline Indications in the United States



Indication

<p>Volixibat</p>	<p>PBC PSC</p>	<p>Composition of Matter (2027) Patent No. 7,956,085</p> <p>PBC Granted Orphan Designation, 7 years from approval</p> <p>PSC Eligible for Orphan Designation, 7 years from approval</p> <p>[Pending] Method of Treatment: Dosing (2032, 2040)</p> <p>[Pending] Additional Dosing (2042)</p>
	<p>CTX</p>	<p>Orphan Designation (2032)</p>
<p>MRM-3379</p>	<p>FXS</p>	<p>Composition of Matter (2039)¹ Patent No. 9,120,770</p>

¹Assumes standard patent term extension

LIVMARLI IP Coverage in Europe to 2040+



Indication



	ALGS¹	[Approved for Grant] Method of Treatment: Dosing (2040)
		Orphan Designation (2034)
		Method of Treatment (2032, Spain and France 2037) Patent No. 2,771,003
		[Pending] Formulation, Manufacturing, Additional Dosing (2042)
	PFIC²	[Approved for Grant] Method of Treatment: Dosing (2040)
		Method of Treatment (2032) Patent No. 2,771,003
		Orphan Designation (2034)
		[Pending] Formulation, Manufacturing, Additional Dosing (2042)

1. Orphan designation out to 2034 for ALGS
 2. CHMP positive opinion and COMP favorable opinion for PFIC

IP Coverage for Pipeline Indications in Europe



Indication

Volixibat	PBC PSC	Composition of Matter (2027) Patent No. 2,084,172
		PBC Granted Orphan Designation, 10 years from approval
		PSC Granted Orphan Designation, 10 years from approval
		[Pending] Method of Treatment: Dosing (2040)
		[Pending] Formulation, Manufacturing, Additional Dosing (2042)