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INVESTOR PRESENTATION

May 2024

NASDAQ: ONVO

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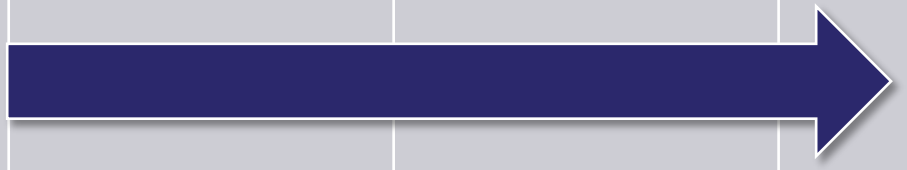
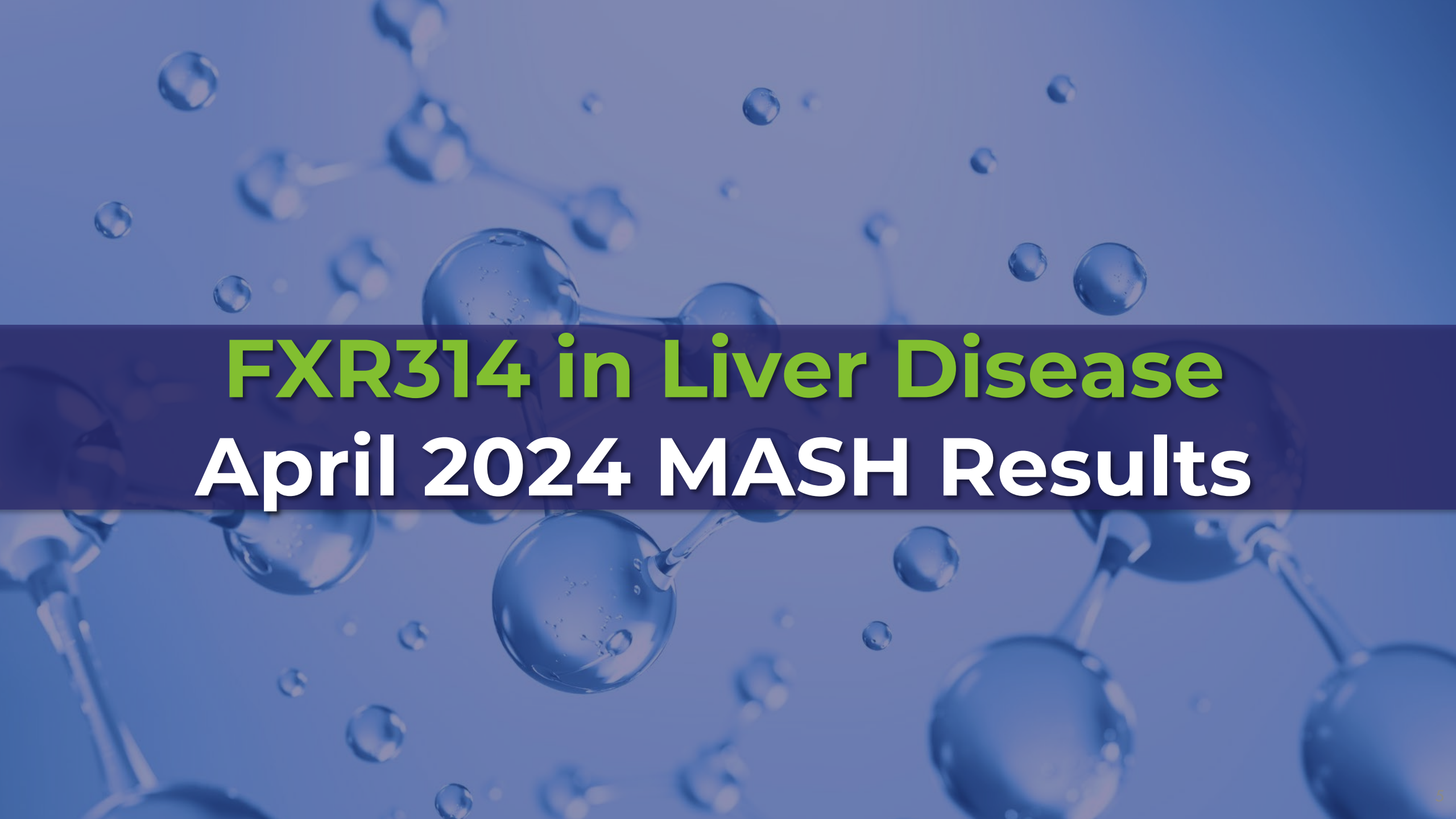
Investment Highlights

- **Lead asset with strong support for target**
  - Direct evidence for role in humans in IBD (variant form of gene -> greater disease)
  - Literature support for mechanism in IBD in preclinical models (PNAS 2022)
- **Drug preclinical support – FXR314 works similarly to approved IBD drugs**
- **Recent strong data in MASH, high liver fat reduction & very low pruritis among FXR agonists**
- **Strong differentiation within IBD, where substantial unmet need persists**
  - New mechanism is complementary to approved therapies
  - High potency oral therapeutic delivery which is dosed once daily
- **Ulcerative colitis Phase 2a POC result is expected in 2H 2025**
- **FXR314 is effective in 3D human models**, showing improvement of intestinal epithelium in cells of UC for its lead therapeutic molecule FXR314. Phase 2a POC results expected in 2H 2025
- **FXR agonism:** Organovo is also advancing FXR314 for the treatment of other Inflammatory Bowel Diseases including Crohn's Disease as well as diseases of the Liver including NASH and Primary Biliary Cholangitis
- **2nd target:** Organovo began medicinal chemistry in 2023 to create a novel drug for another, as yet undisclosed, target. The target was validated in our 3D tissue models of Crohn's disease. IND expected by the end of 2025

Pipeline Summary

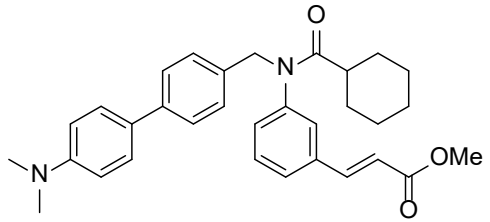
Program	Indication	Discovery	Phase 1	Phase 2	Areas of Clinical Focus
FXR314	Inflammatory Bowel Disease				Ulcerative Colitis
FXR314	Liver Fibrosis				MASH
Novel Drug to Undisclosed Target	Inflammatory Bowel Disease				Inflammatory Bowel Disease




FXR314 in Liver Disease
April 2024 MASH Results

Organovo FXRs Have Distinct Structure and Profile That Can Provide Superior Therapeutic Benefit

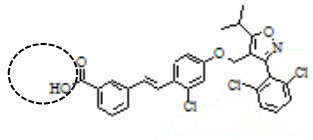
Unique Chemical Scaffold



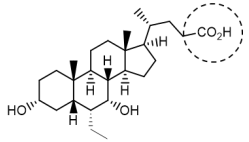
Fexaramine Scaffold

- Proprietary, non-steroidal, non-bile acid scaffold
- In contrast to other chemotypes, activates FXR without carboxylic group (dotted circle)
- >2,500 compounds generated through rational SAR design

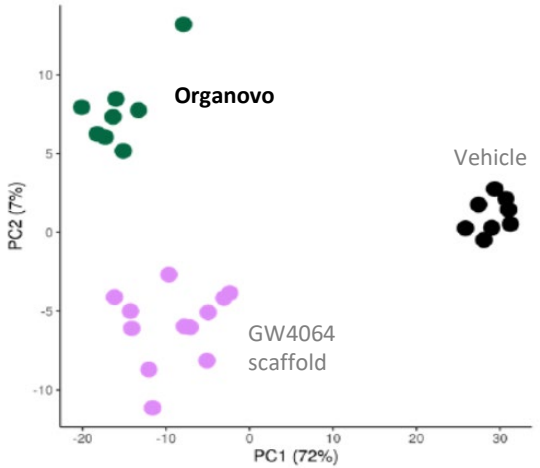
GW4064 scaffold



Bile acid scaffold



Differentiated Gene Regulation



- Distinct signature relative to other agonists as shown in Principal Component Analysis plot
- Potential for translating into a differentiated clinical profile

Source: Smith et al, AASLD Emerging Trends in NAFLD Conference, 2017

FXR314 Has Excellent Efficacy and Tolerability Profile Within FXR Agonists – Phase 2 Results

	FXR314 3 mg	Ocaliva 25 mg	EDP-305 2.5 mg	Cilofexor 100 mg	Tropifexor 0.2 mg
Liver Fat Reduction (using Std DEV)	**22.8 ± 3.6%** p=0.0010 v. placebo	17%	16%	15%	21%
Subjects with ≥30% Liver Fat Reduction	**29%** p=0.0023 v. placebo	NR	45%	39%	64%
Overall pruritus rate	**3%**	51% (72 wk)	47%	>14% (24 wk)	53%
Pruritus-related treatment discontinuation	**0%**	9% (72 wk)	21%	2% (24 wk)	6%
Potency EC50 (nM)	2-5	99	8	43	0.2

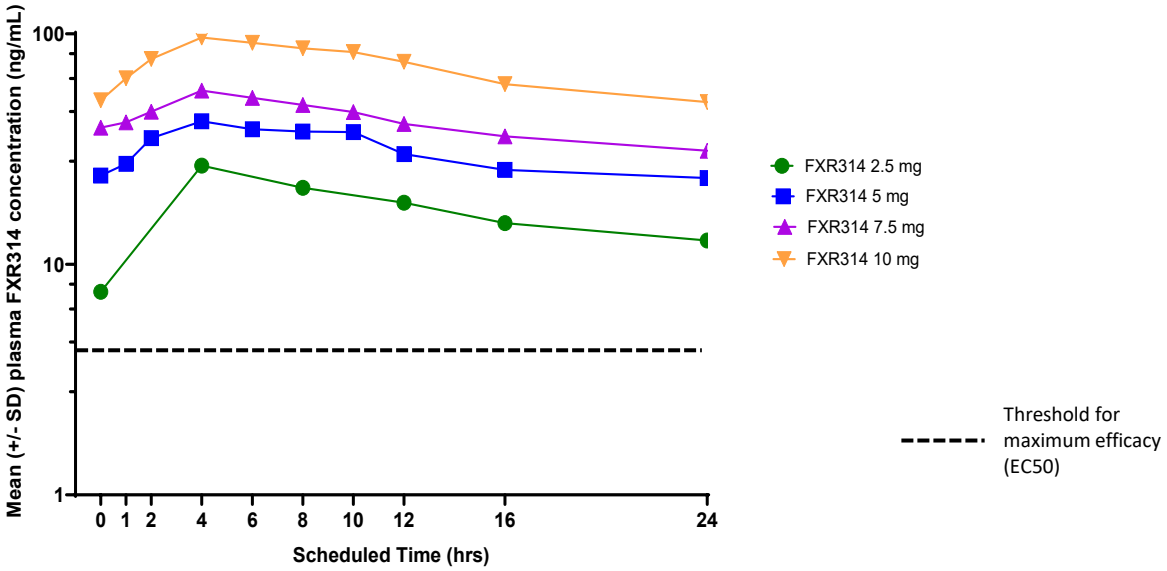
	Placebo	FXR314 3 mg	FXR314 6 mg
Pharmacological activity			
Relative liver fat reduction	**6.1% ± 3.5%**	**22.8 ± 3.6%** p=0.0010	**17.5 ± 3.7%** p=0.0267
Subj. with ≥30% relative liver fat reduction	**9.5%**	**29%** p=0.0023	**32%** p=0.0020
Tolerability			
LDL-C change (PBO corrected)	**-3.6%**	**+1.5%**	**+4.5%**
Overall pruritus rate	**2.8%**	**2.8%**	**4.2%**
# of Patients Placebo = 72	**72**	**71**	**71**

Sources:
FXR314: Organovo press release 15Apr2024
Ocaliva: Sanyal, J Hep, 2023
EDP-305: Ratziu, J Hep, 2023
Cilofexor: Patel, Hep, 2020
Tropifexor: NCT02855164, EASL 2019

- FXR314 has demonstrated excellent potency and specificity, limiting safety and liver tox concerns;
- Unlike Ocaliva (OCA) and some others, FXR314 is a non-steroidal non-bile-acid FXR agonist, has demonstrated top tier fat reduction with encouraging safety profile – very low pruritis and no liver tox signals

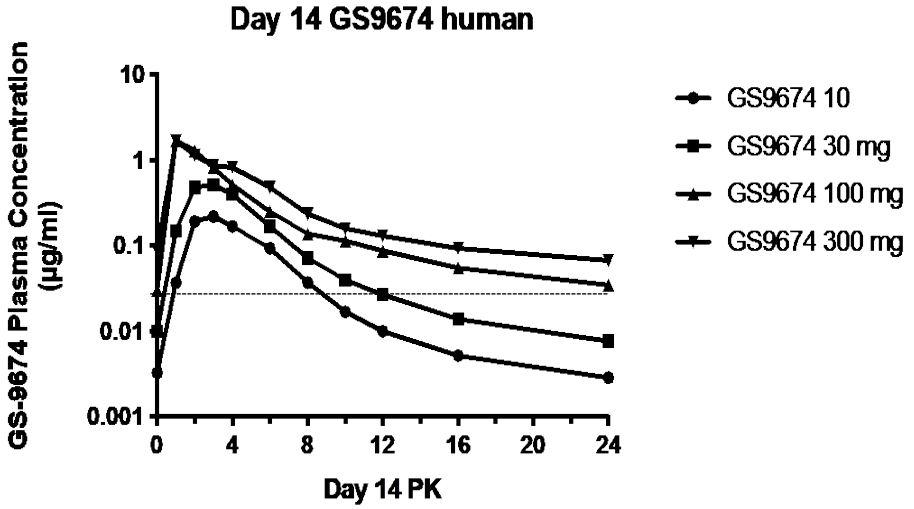
FXR314 Demonstrates a Strong Case for Superiority Over Cilofexor and Other FXR Agonists

FXR314 Sustained Exposure



Source: internal

Cilofexor Phase 1 Exposure

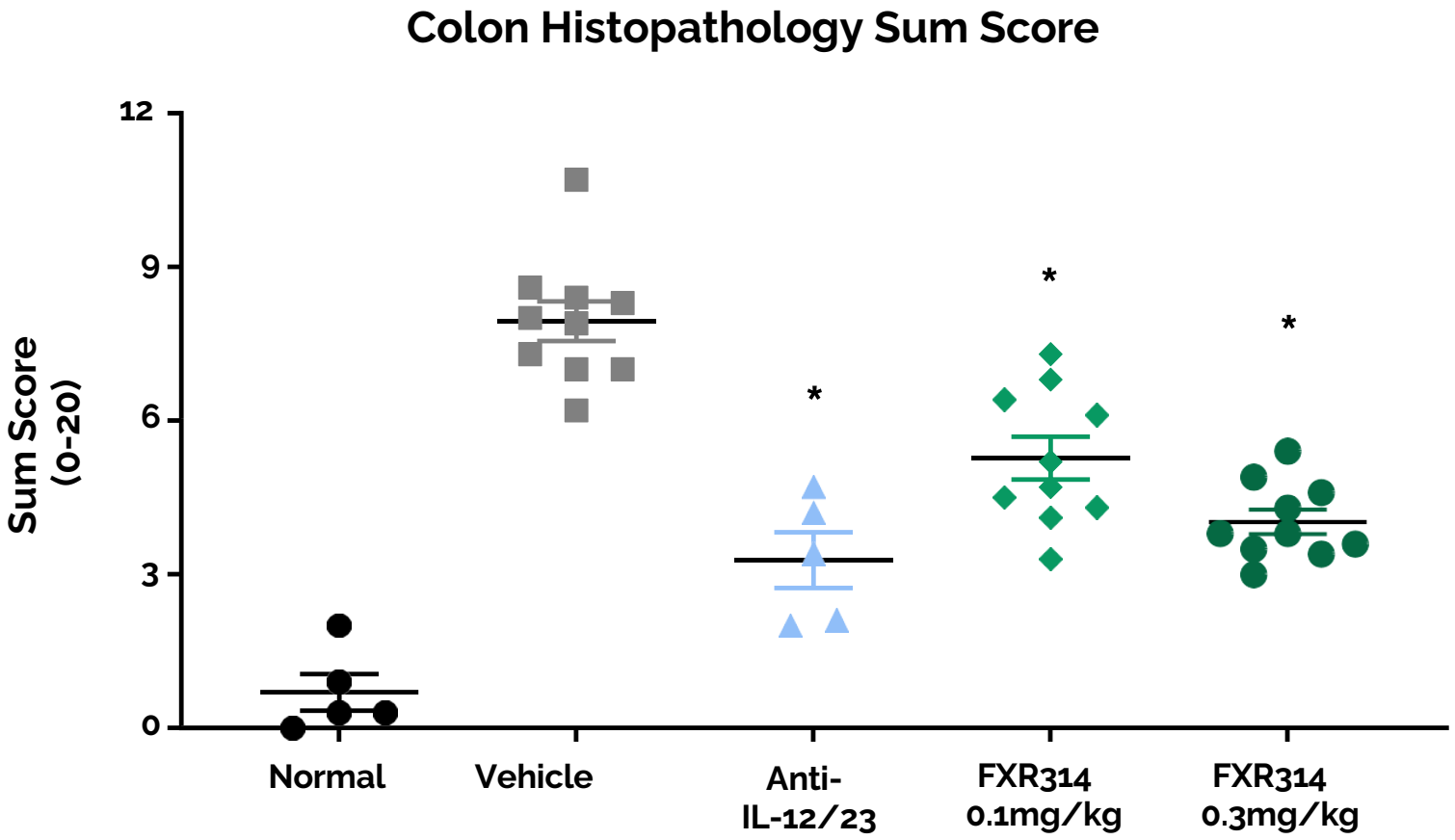


Source: Younis et al, Clin Transl, 2022

- Cilofexor (GS9674) exhibits transient PK, short Tmax, with levels above EC50 for ~ 12-24 hrs
- Cilofexor required twice daily dosing for significant efficacy in preclinical models, once daily insufficient
- FXR314 displays slower accumulation, with levels above EC50 for >> 24 hrs


FXR314 in Inflammatory Bowel Disease

FXR314 Improves Colitis Similarly to Approved IBD Therapies



*p<0.0001, vs Vehicle,
One-Way ANOVA with Dunnett's post test

- FXR314 dose-dependently improves measures of ulcerative colitis in an adoptive T- Cell transfer preclinical model
- Effects are similar to approved drug treatments that are current market leaders

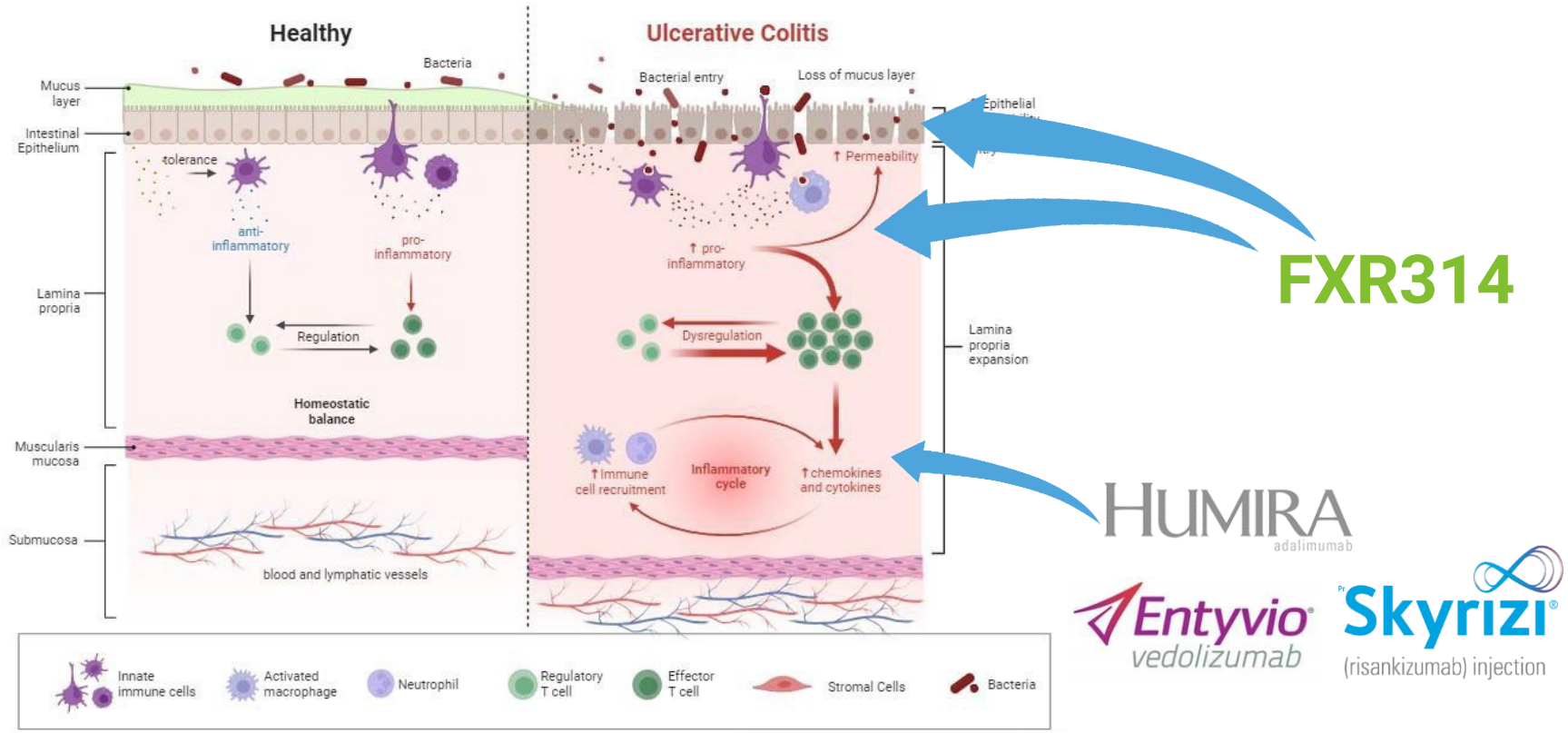
FXR314 Phase 2a Trial in Ulcerative Colitis

Phase 2a RCT Study to Demonstrate POC

- Target enrollment of 75 patients, 2:1 drug:placebo
- FXR314 6mg vs. placebo
- 12 weeks of treatment, oral once daily
- Diagnosis of moderate to severe UC > 3 months prior to screening defined by clinical and endoscopic evidence, supported by histopathology report
- Primary objective: improvement in UC severity and symptoms via the modified Mayo score (mMS). Secondary objectives include: to evaluate the safety and tolerability of FXR314 in subjects with moderate to severe UC
- Enrollment expected to begin 3Q 2024
- Study readout expected 2H 2025

FXR314 MoA Linked to Epithelial Repair, Upstream of Anti-inflammatory Treatments

- Potential to achieve priority utilization over anti-inflammatory therapies
- Epithelial repair would negate cytokine release
- Preference for safety (no immunosuppression) & convenience (oral once daily)



FXR314

HUMIRA adalimumab

Entyvio vedolizumab

Skyrizi (risankizumab) injection

FXR314 Next Steps In Liver Fibrosis / MASH

Drug Successful in Phase 2 Studies; Opportunity for Development

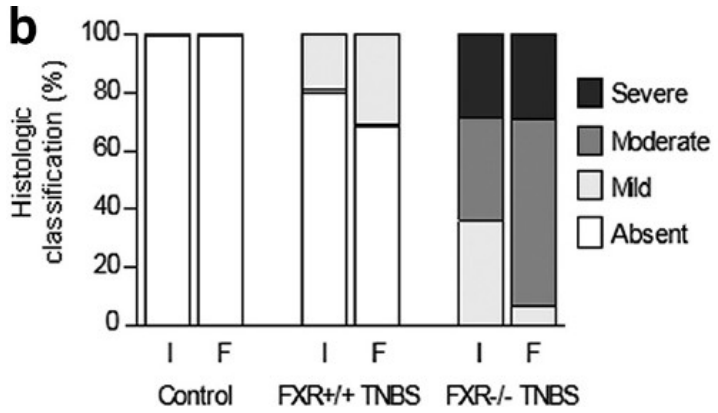
- Supportive Data for Superiority to Cilofexor, which is in Development in Combination in MASH
- Next Step: Preclinical evaluation of combination opportunities to complete in 2024
- Likely combination therapy with GLP-1, especially oral
- Combination study with GLP-1 in preclinical setting will be run, with results expected by end of calendar 2024
- Results will indicate potential dose and clinical phase 3 opportunity for MASH development
- Will engage in partnering discussions; regarding development of FXR314 in MASH as well

FXR314 Preclinical Support

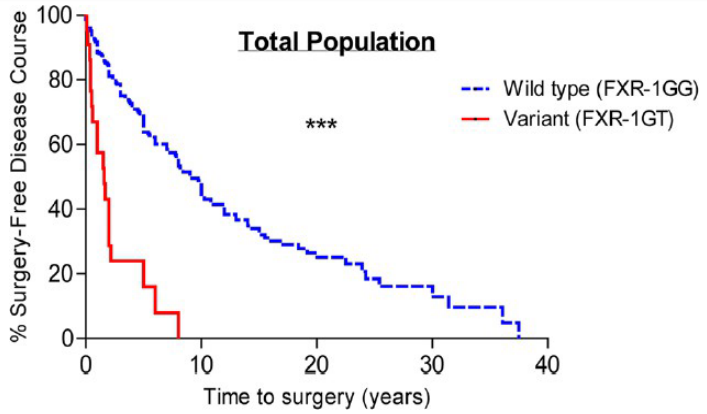
Evidence For A Role Of FXR Agonism In Inflammatory Bowel Disease (IBD)

- FXR is a nuclear hormone receptor critical for maintaining bile acid, lipid and intestinal homeostasis
- Studies in null mice demonstrate a protective role of FXR in IBD
- FXR SNP associated with IBD
  - FXR SNP rs56163822 (FXR-1G->T) leads to reduced protein expression
  - Patients with Crohn's disease (CD) carrying the FXR-1G->T variant exhibit greater disease severity and earlier progression to surgery
- The biomarker of intestinal FXR activity, FGF-19, is reduced in CD patients

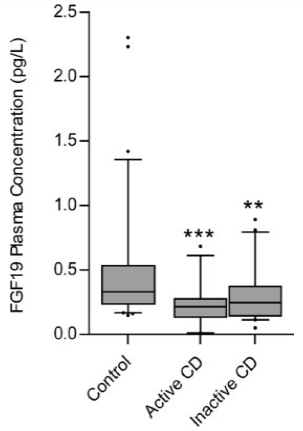
FXR Protects Mice From TNBS-induced Colonic Inflammation



FXR Variant Causes Increased Disease Severity

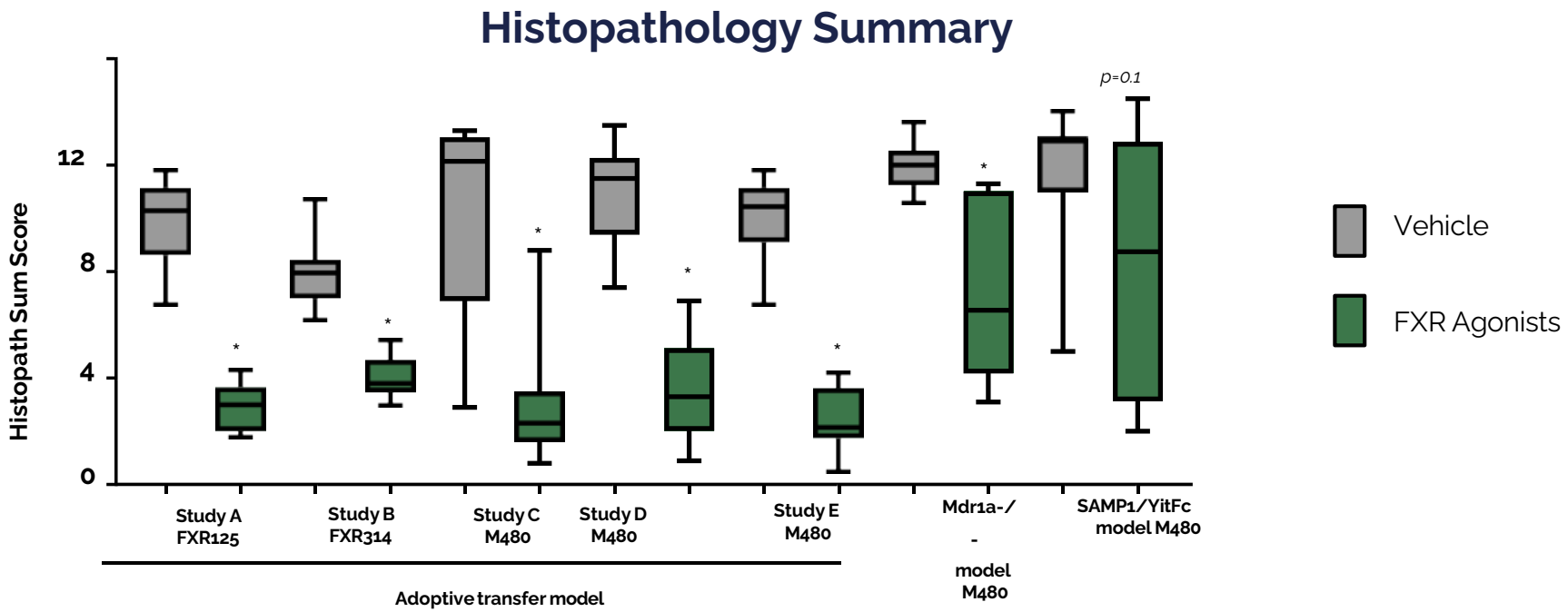


Biomarker Of FXR Activity Reduced In CD Patients



FXR314 And Analogs Improve Colitis In Multiple Chronic IBD Models

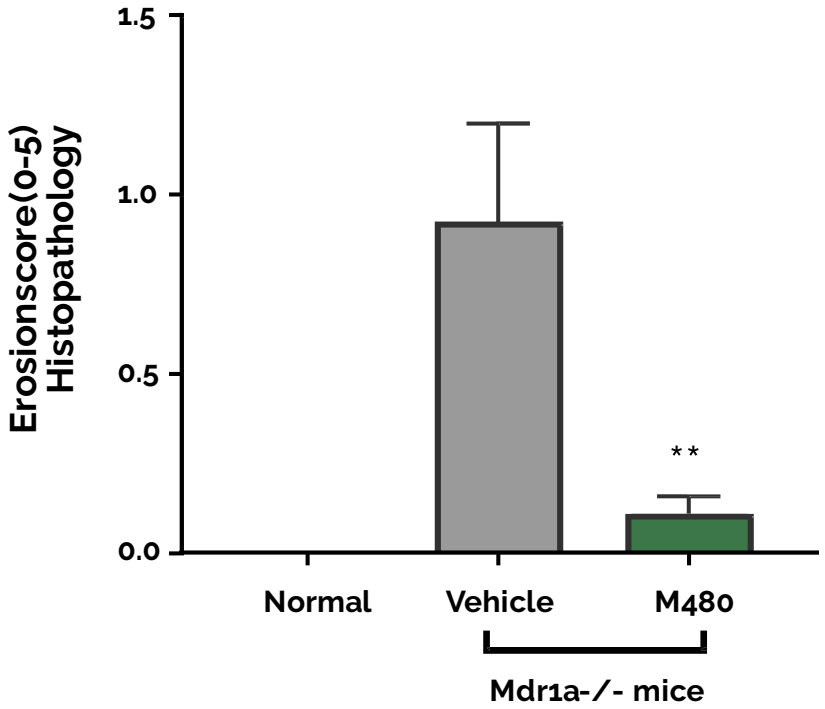
- Efficacy demonstrated in various chronic IBD models of different modalities
- All studies conducted in treatment mode
- Adoptive transfer model: colitis triggered by abnormal T-cell activation
- Mdr1a null model: colitis triggered by disrupted gut barrier function
- SAMP1/YitFc model: spontaneous Crohn's disease-like ileitis



FXR Agonists Improve Intestinal Lining

Protection of Intestinal Barrier

Colon Epithelium Erosion

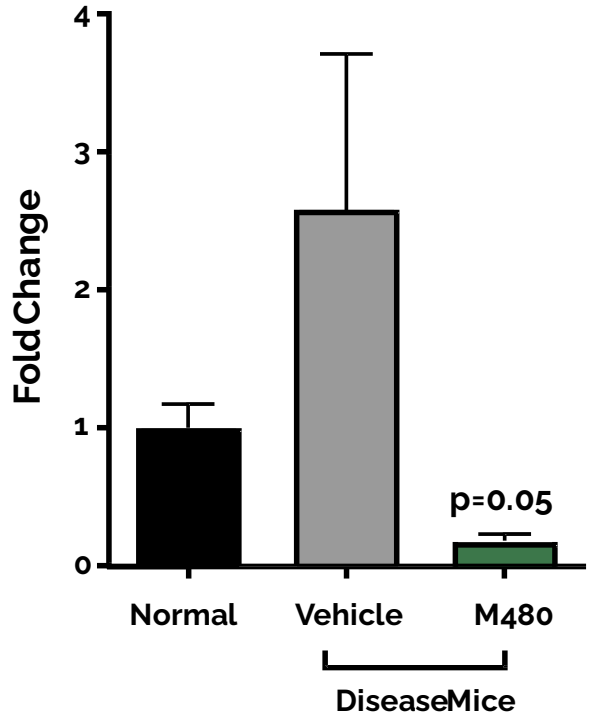


* p<0.01 vs Vehicle, ANOVA

Mdr1 Null Colitis Model

Direct Anti-bacteria Effects

Reduced Bacterial Load in Intestine (16s rRNA)

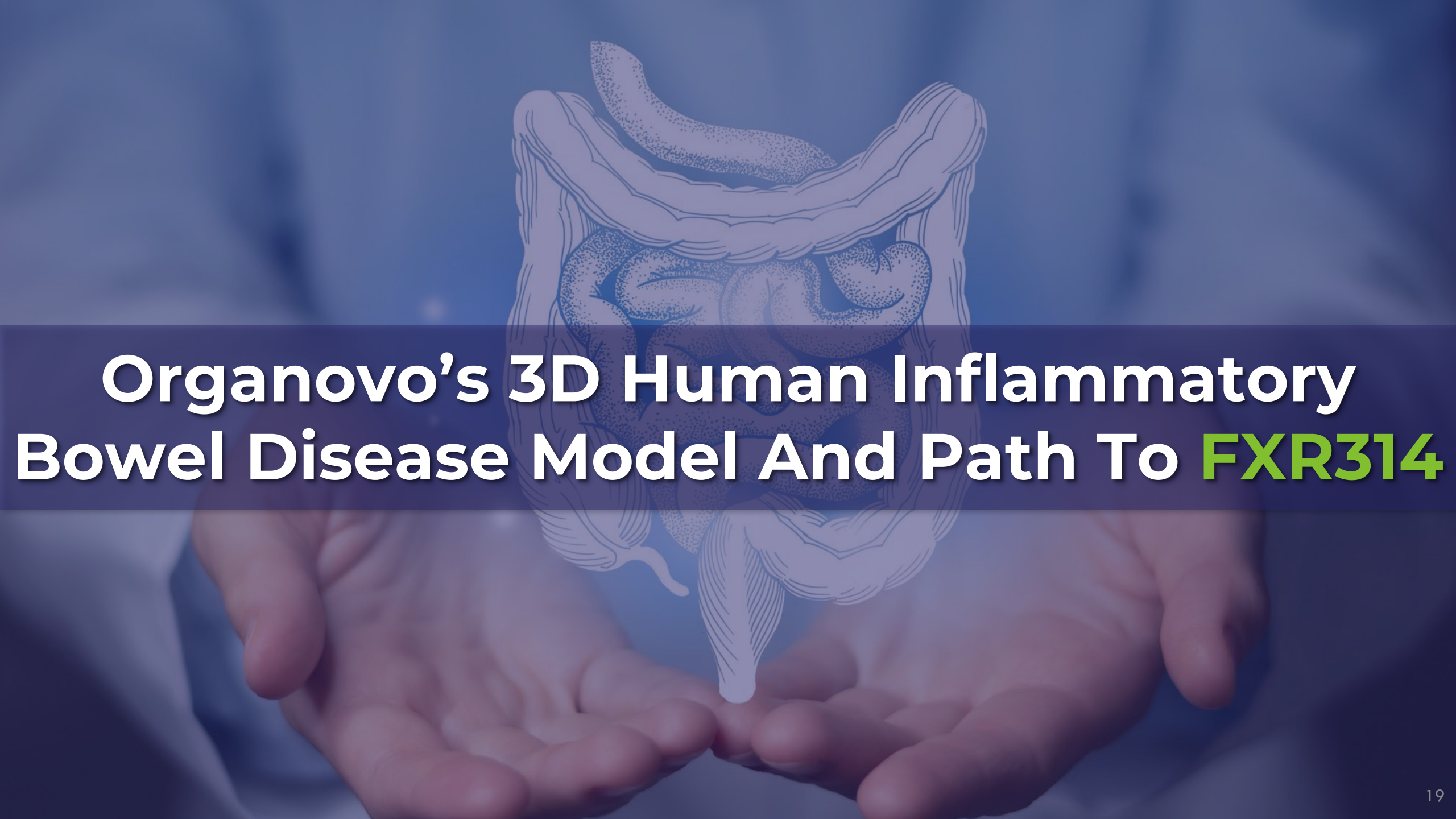


Adoptive T-Cell Transfer model

Market Opportunities For FXR314

- 13mm prevalent cases of ulcerative colitis globally in 2022
- 2.1mm in North America[1]
- Global market size of $6.6 billion[2] in 2021
- Anticipated to reach $122 billion by 2032
- Growing steadily at a CAGR of 6.0%[2]
- Driven by the increasing prevalence of ulcerative colitis, and introduction of several new therapies

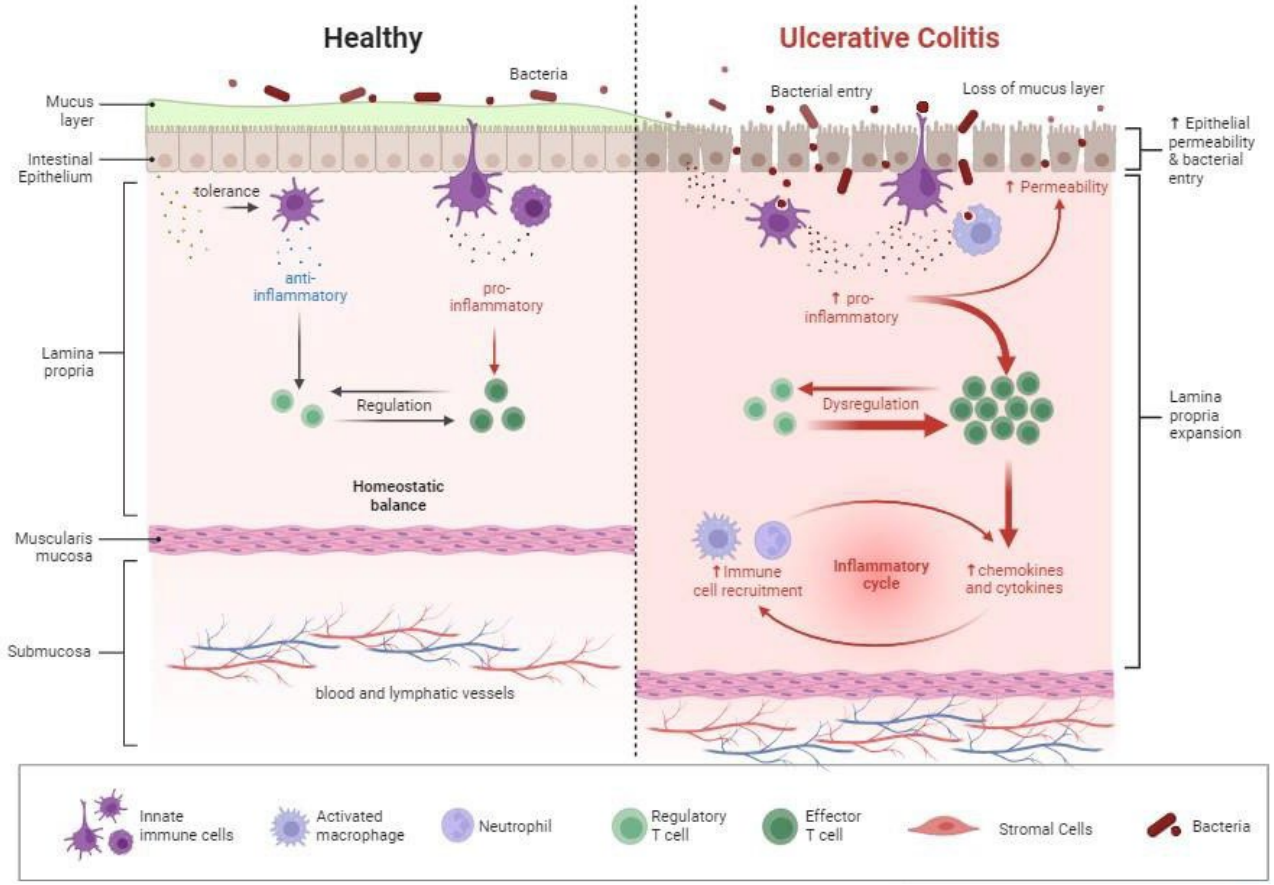
NOTES:
1. iHealthcareAnalyst, Inc., "Global Inflammatory Bowel Disease Market Landscape and Future Outlook"
2. Future Market Insights, "Ulcerative Colitis Treatment Market Overview (2022 to 2032)"



Organovo's 3D Human Inflammatory Bowel Disease Model And Path To FXR314

IBD Is Characterized By Epithelial Barrier Breakdown And Inflammatory Response

- Intestinal epithelium damage
- Disruption of epithelial layer
- Bacterial ingress into tissue
- Inflammatory response
- Cytokine release, T-cell recruitment



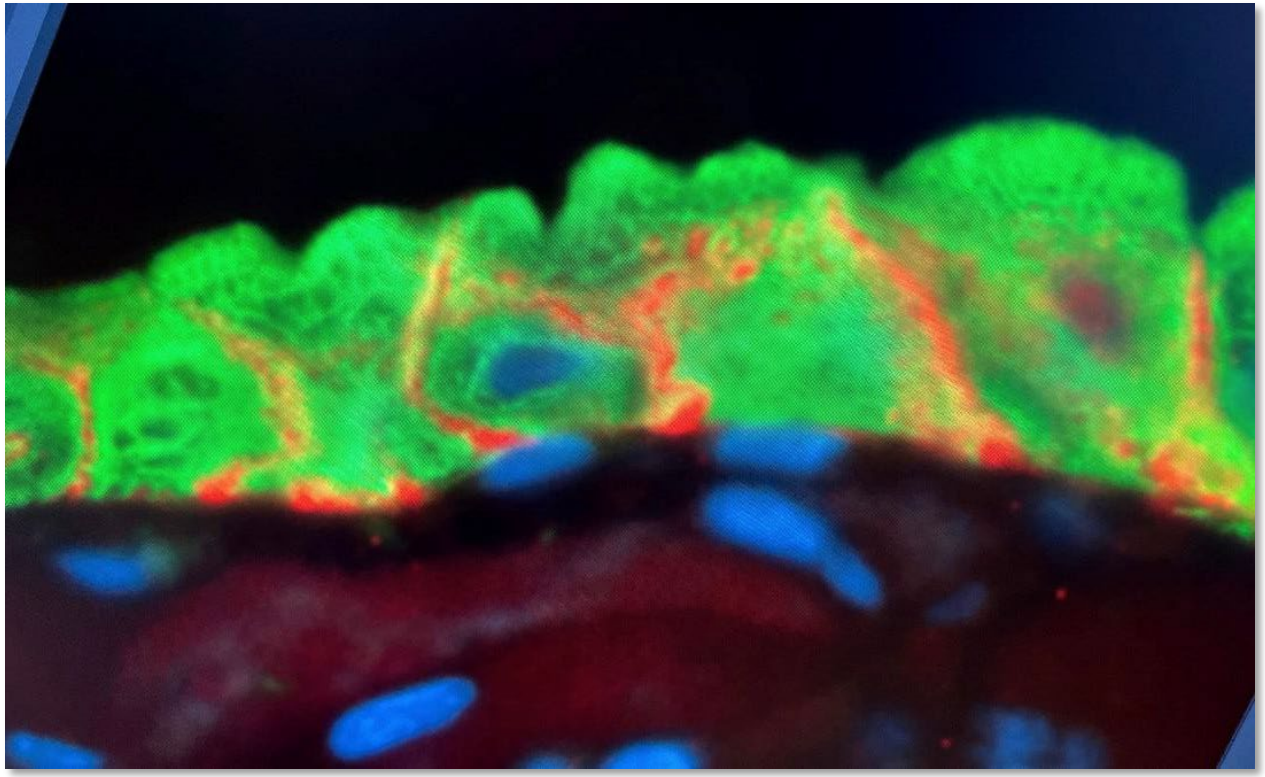
Approved treatments address the inflammatory response, but Organovo seeks to avoid epithelial damage, work earlier in disease

Organovo 3D Disease Models Can Enable Better Clinical Outcomes

- Organovo creates exceptional 3D models using bioprinting and other 3D tissue technologies
- 3D tissue models created with cells taken directly from patients (UC or CD patients, biologic naïve or exposed, varying disease severity)
- Models can be used to test compounds, siRNA, etc. to validate targets or study drug effects
- Testing broad donor sets from a biobank allows us to understand population response to a drug or to target modulation

3D Tissue Intestinal Wall Model Has Accurate Structure With Intact Epithelium

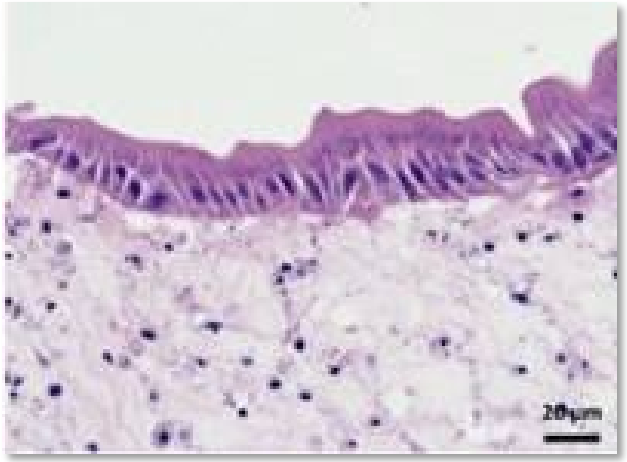
- Polarized epithelium
- Interstitial layer with smooth muscle, fibroblast, capillaries
- Tight junctions – cadherin (orange)
- Specialized epithelial cell types
- Expresses functional, inducible CYP450 enzymes
- Physiological barrier function
- Functional P-gp and BCRP transporters



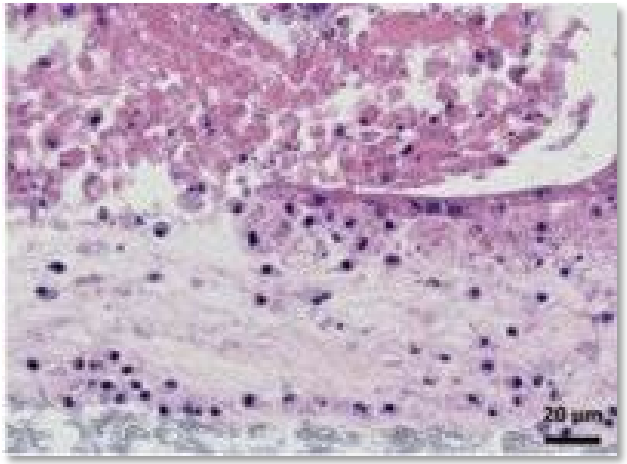
Tissue consists of human primary epithelial, sm. muscle, fibroblast, endothelial cells, either from healthy donor (shown) or diseased

3D Tissue From Diseased Donor Cells Correctly Demonstrates Disease Phenotype

- Our ability to see the earliest changes in the intestinal epithelial lining in the model led us to see value of FXR agonism in our tests
- FXR314 significantly reduces epithelial disruption in 3D disease donor model
- FXR314 similarly reduces epithelial disruption in preclinical animal models (slide 10)
- Prevention of bacterial ingress and cytokine release, acts earlier in disease course
- May prevent need for inflammatory cytokine blockade, resulting in superior safety



Healthy donor cells



Diseased cells

Investment Summary

- Strong human genetics and preclinical support for target, FXR agonist
- Drug preclinical support – FXR314 works similarly to approved IBD drugs
- Strong differentiation within IBD, where substantial unmet need persists
  - New mechanism is complementary to approved therapies
  - High potency oral therapeutic delivery which is dosed once daily
- Ulcerative colitis Phase 2a POC result is expected in 2H 2025
- FXR314 is effective in 3D human models, showing improvement of intestinal epithelium in cells of UC for its lead therapeutic molecule FXR314
- FXR agonism: Organovo is also advancing FXR314 for the treatment of other Inflammatory Bowel Diseases including Crohn's Disease as well as diseases of the Liver including NASH and Primary Biliary Cholangitis
- 2nd target: Organovo began medicinal chemistry in 2023 to create a novel drug for another, as yet undisclosed, target. The target was validated in our 3D tissue models of Crohn's disease. IND expected by the end of 2025

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