BIORA™ Therapeutics

# CORPORATE PRESENTATION

November 2022

# FORWARD-LOOKING STATEMENTS

This presentation contains “forward-looking statements” within the meaning of the federal securities laws, which statements are subject to substantial risks and uncertainties and are based on estimates and assumptions. All statements, other than statements of historical fact included in this presentation, including statements concerning our plans, objectives, goals, strategies, future events, plans or intentions relating to product candidates, estimates of market size, the anticipated timing, design and conduct of our planned pre-clinical and clinical trials, the anticipated timing for pre-clinical and clinical data, the development of our product candidates, the potential clinical benefits of our product candidates, including efficacy and safety benefits, the potential benefits of strategic partnerships and licensing arrangements and our intent to enter into any strategic partnerships or licensing arrangements, the timing and likelihood of success, plans and objectives of management for future operations and future results of anticipated product development efforts, are forward-looking statements. In some cases, you can identify forward-looking statements by terms such as “may,” “might,” “will,” “objective,” “intend,” “should,” “could,” “can,” “would,” “expect,” “believe,” “design,” “estimate,” “predict,” “potential,” “plan” or the negative of these terms, and similar expressions intended to identify forward-looking statements. These statements involve known and unknown risks, uncertainties and other factors that could cause our actual results to differ materially from the forward-looking statements expressed or implied in this presentation, including difficulties in managing changes to our organization due to our strategic transformation; competition from third parties with respect to our product candidates; risks related to the supply and manufacturing of and complexity of components in our devices; whether we will be able to develop our precision medicine products, and, if developed, that such product candidates will be authorized for marketing by regulatory authorities, or will be commercially successful; and those described in “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in our Annual Report on Form 10-K for the fiscal year ended December 31, 2021, and elsewhere in such filing and in other subsequent disclosure documents, including our Quarterly Reports on Form 10-Q, filed with the U.S. Securities and Exchange Commission.

We cannot assure you that we will realize the results, benefits or developments that we expect or anticipate or, even if substantially realized, that they will result in the consequences or affect us or our business in the way expected. Forward-looking statements are not historical facts and reflect our current views with respect to future events. Given the significant uncertainties, you should evaluate all forward-looking statements made in this presentation in the context of these risks and uncertainties and not place undue reliance on these forward-looking statements as predictions of future events. All forward-looking statements in this presentation apply only as of the date made and are expressly qualified in their entirety by the cautionary statements included in this presentation. We disclaim any intent to publicly update or revise any forward-looking statements to reflect subsequent events or circumstances, except as required by law.

Industry and Market Data: We obtained the industry, market, and competitive position data used throughout this presentation from our own internal estimates and research, as well as from industry and general publications, and research, surveys, and studies conducted by third parties. Internal estimates are derived from publicly available information released by industry analysts and third-party sources, our internal research and our industry experience, and are based on assumptions made by us based on such data and our knowledge of the industry and market, which we believe to be reasonable. In addition, while we believe the industry, market, and competitive position data included in this prospectus is reliable and based on reasonable assumptions, we have not independently verified any third-party information, and all such data involve risks and uncertainties and are subject to change based on various factors. These and other factors could cause results to differ materially from those expressed in the estimates made by the independent parties and by us.

# Our mission is to reimagine therapeutic delivery

*Innovating smart capsule technologies to deliver the right dose to the right place, safely*

BIORA™ Therapeutics

## TARGETED ORAL DELIVERY OF BIOTHERAPEUTICS

Treatment at the site of disease in the GI tract could improve outcomes for patients with inflammatory bowel disease

## SYSTEMIC ORAL DELIVERY OF BIOTHERAPEUTICS

Ingestible technology designed to enable needle-free, systemic delivery of large molecules for better management of chronic diseases

# THERAPEUTIC PIPELINE

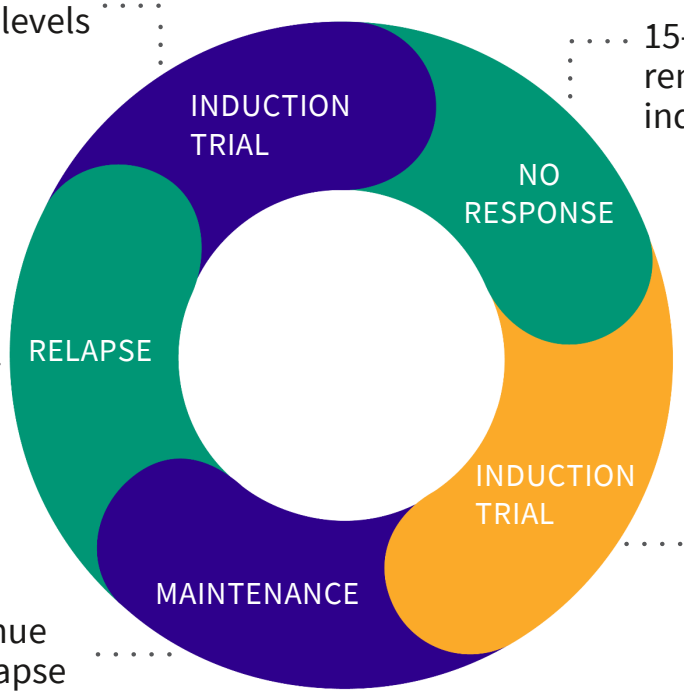
| | PROGRAM | INDICATION | DESIGN/FEASIBILITY | PRECLINICAL | CLINICAL |
|---|---|---|---|---|---|
| TARGETED THERAPEUTICS | **DDS**<br>Device | -- | | | |
| | **PGN-600**<br>Tofacitinib + Device | UC | | | |
| | **PGN-001**<br>Adalimumab variant + Device | UC | | | |
| SYSTEMIC THERAPEUTICS | **OBDS**<br>Device | -- | | | |
| | **PGN-OB2**<br>GLP-1 agonist + Device | Diabetes | | | |
| | **PGN-OB1**<br>Adalimumab variant + Device | Autoimmune | | | |
| | **Ionis Collaboration**<br>Antisense therapy + Device | Undisclosed | | | |
| | **Large Pharma 1 Collaboration**<br>Undisclosed drug + Device | Undisclosed | | | |
| | **Large Pharma 2 Collaboration**<br>Undisclosed drug + Device | Undisclosed | | | |

# TARGETED THERAPEUTICS

# *Despite therapeutics targeting different pathways, few patients achieve long-term remission*

## UC TREATMENT CYCLE

Treatment begins with 2-3 months of drug therapy to reach therapeutic levels




15-30% of patients achieve remission of symptoms after induction with any drug therapy[1,2]

60% of patients in remission relapse within 12 months[2]

Patients undergo induction (2-3 months) with different drug

Efficacy rate decreases with successive rounds of therapy[1]

Patients in remission continue drug therapy to prevent relapse

## ABOUT ULCERATIVE COLITIS

- Inflammatory bowel disease (IBD) includes Crohn's disease and ulcerative colitis (UC)
- UC causes inflammation and damage to the large intestine
- About 1 million people in the U.S. are affected with UC, and ~40,000 cases are diagnosed each year[3]

1. Alsoud D, Verstockt B, Fiocchi C, Vermeire S. Breaking the therapeutic ceiling in drug development in ulcerative colitis. Lancet Gastroenterol Hepatol. 2021;6(7):589-595.
2. Hirten RP, Sands BE. New Therapeutics for Ulcerative Colitis. Annu Rev Med. 2021;72:199-213.
3. Shivashankar R, Tremaine WJ, Harmsen WS, Loftus EV Jr. Incidence and Prevalence of Crohn's Disease and Ulcerative Colitis in Olmsted County, Minnesota From 1970 Through 2010. Clin Gastroenterol Hepatol. 2017;15(6):857-863.

TARGETED THERAPEUTICS

# *Targeted delivery could enable rapid induction and improve patient response*

| THERAPEUTIC CHALLENGES | POTENTIAL SOLUTION |
|---|---|
| 1 Difficulty of achieving sufficient drug levels at site of disease | Targeted delivery is designed to increase drug levels at the site of disease, which is correlated with improved outcomes[1] |
| 2 Systemic toxicity issues may limit daily dosage of UC drugs | Reduced systemic uptake is designed to reduce toxicity and adverse events |
| 3 Combination therapy is limited by toxicity | Reduced toxicity could enable combination therapy[2] |

Research in partnership with: CROHN'S & COLITIS FOUNDATION

1. Verstockt B, Alsoud D, van Oostrom J, et al. Tofacitinib tissue exposure correlates with endoscopic outcome. Poster presented at: *17th Congress of the European Crohn's and Colitis Organisation* (ECCO), February 18, 2022, virtual.
2. van Oostrom J, Verstockt B, Hanzel J, et al. Pharmacokinetic stratification of cytokine profiles during anti-TNF induction treatment in moderate-to-severe ulcerative colitis. Poster presented at: *17th Congress of the European Crohn's and Colitis Organisation* (ECCO), February 18, 2022, virtual.

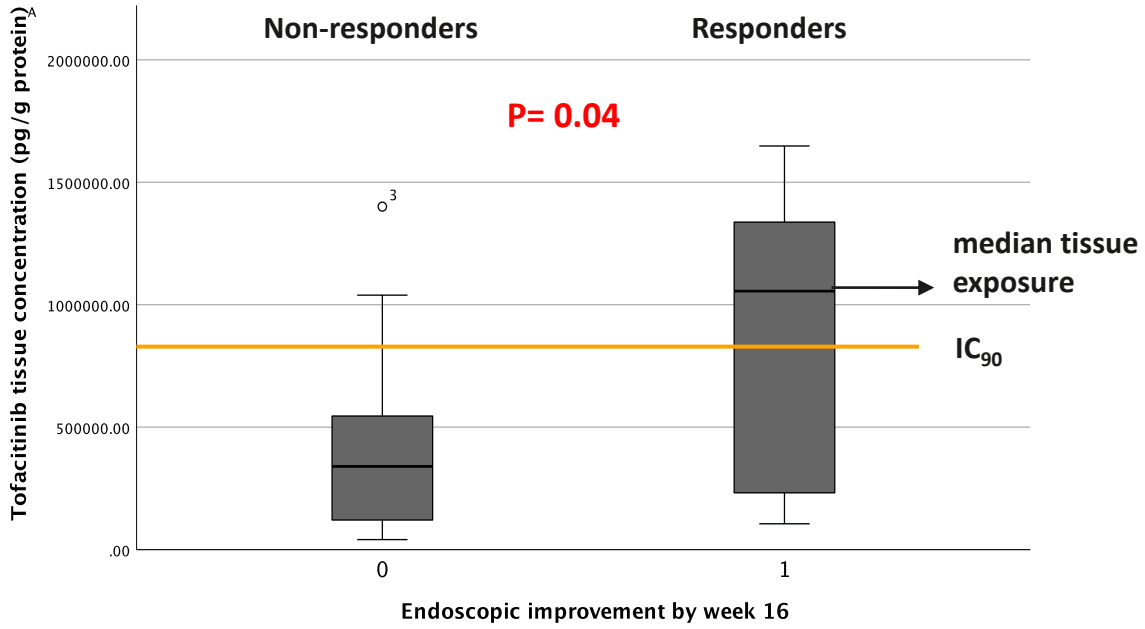
# *Tissue drug concentration correlates with endoscopic outcomes in UC*

30 consecutive UC patients with active endoscopic disease initiated treatment with tofacitinib and prospectively monitored

## RESULTS

- Tofacitinib tissue exposure at the end of induction was associated with endoscopic improvement by week 16 (p=0.04)
- In responders (n=14), median tofacitinib tissue exposure exceeded $IC_{90}$

## TOFACITINIB TISSUE EXPOSURE EXCEEDED $IC_{90}$ IN RESPONDERS




Research presented at ECCO 2022 and DDW 2022 in collaboration with:

KU LEUVEN · IBD Leuven · Amsterdam UMC University Medical Centers

Verstockt B, Alsoud D, van Oostrom J, et al. Tofacitinib tissue exposure correlates with endoscopic outcome. Poster presented at: *17th Congress of the European Crohn's and Colitis Organisation* (ECCO), February 18, 2022, virtual.

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TARGETED THERAPEUTICS

# *Needle-free, oral drug delivery to the colon*

## ORAL ADMINISTRATION

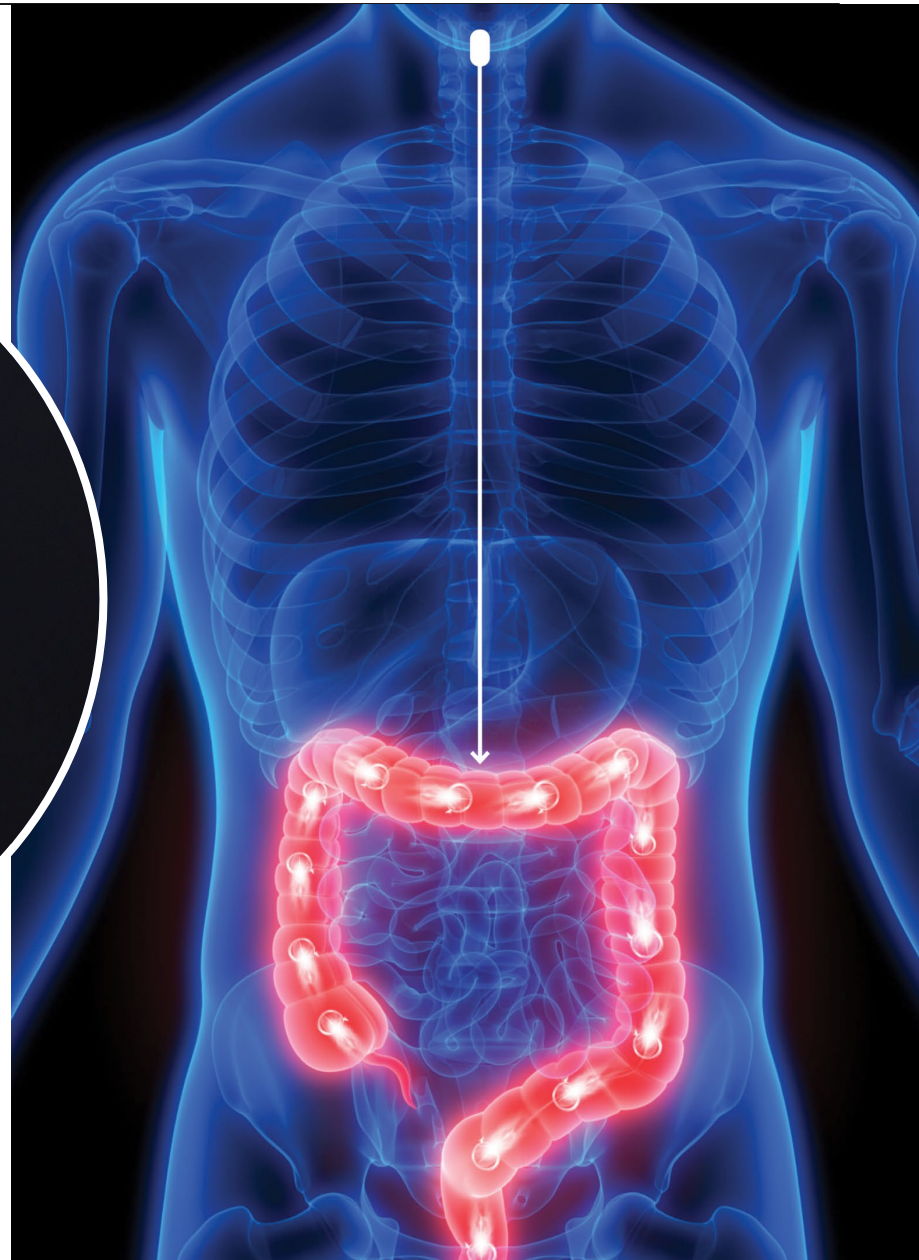
- Convenient oral capsule the size of a fish-oil pill

## AUTONOMOUS LOCATION

- Proprietary autolocation in the GI tract for accurate drug delivery regardless of fasted or fed state[1]

## TARGETED DRUG DELIVERY

- Method designed to coat the length of the colon with liquid formulation, minimizing systemic uptake

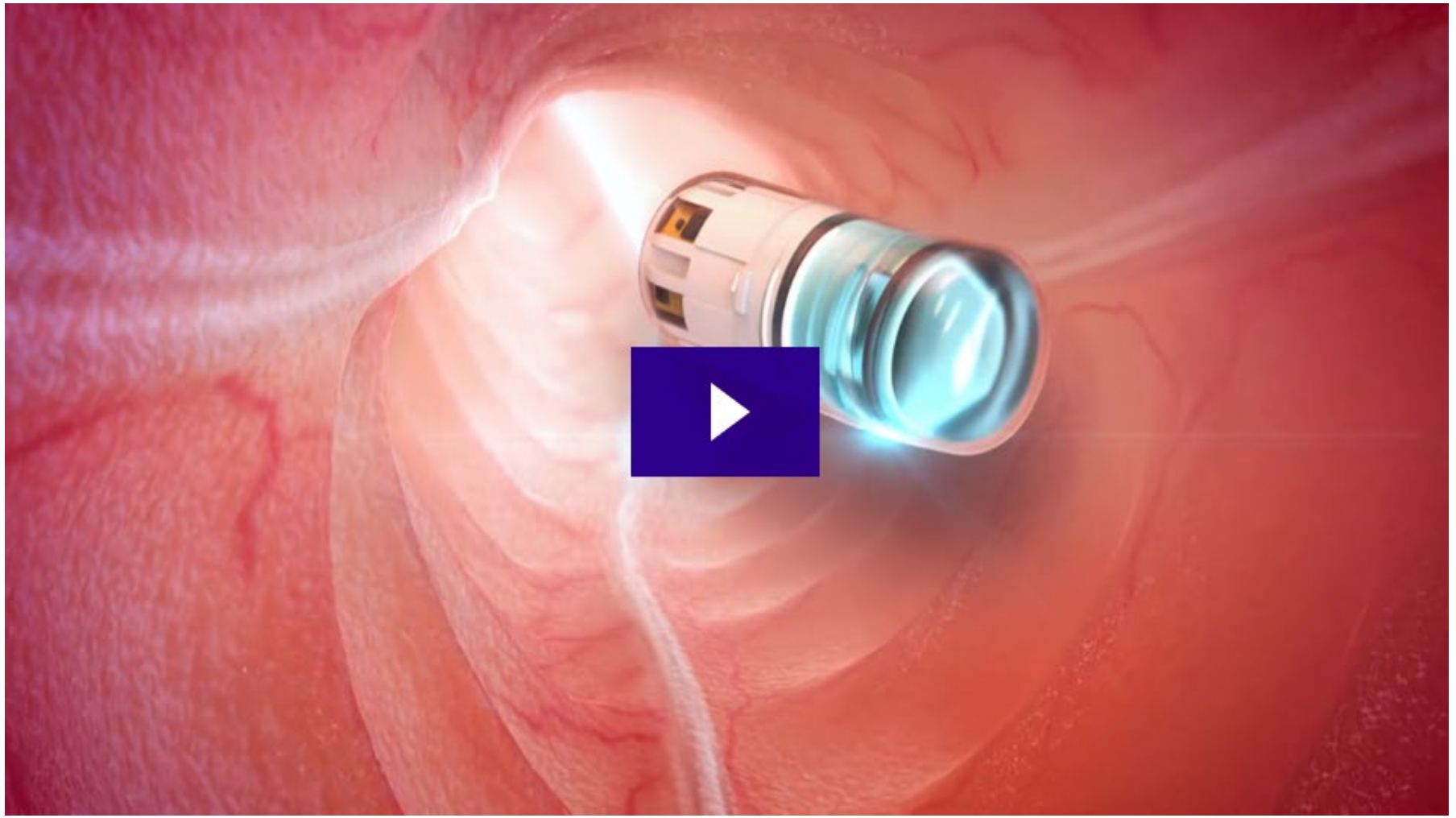


1. Biora Therapeutics internal data

# TARGETED THERAPEUTIC DELIVERY FOR IBD

TARGETED THERAPEUTICS

## *Autonomous location and delivery to the colon*



SCAN ME

https://biora.wistia.com/medias/r65935rbqs

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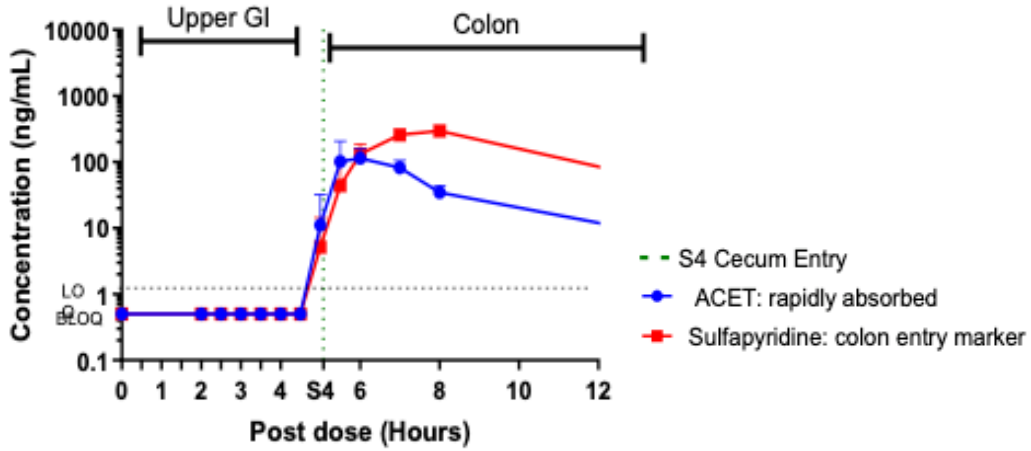
TARGETED THERAPEUTICS

# *Demonstrated accurate localization and delivery to colon*

## ACCURATE DELIVERY TO COLON IN CANINES

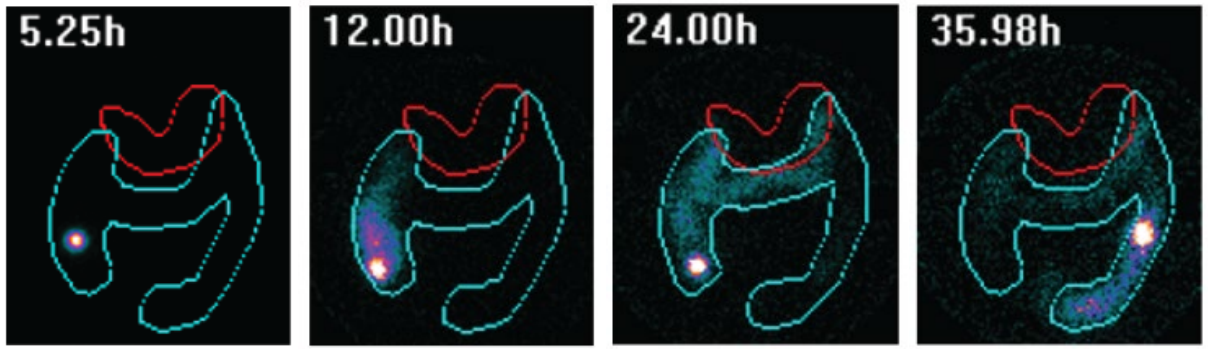
Pharmacokinetic data from two marker drugs administered in canine model




- Successful delivery to colon via DDS
- No early release of drug
- No drug absorption in upper GI tract

## ACCURATE LOCALIZATION AND DELIVERY TO HUMAN COLON

Clinical device validation for localization and delivery function using scintigraphic imaging in patients with active ulcerative colitis




- Achieved distribution across the entire colon

Biora Therapeutics internal data




BIORA Therapeutics

TARGETED THERAPEUTICS

# *Three successful studies demonstrating device function in humans*

| PM-601 Device Function Study in Healthy Volunteers – Fasted State | PM-611 Device Function Study in Healthy Volunteers – Fasted and Fed | PM-602 Device Function Study in Patients with Active UC |
|---|---|---|
| • 83% of devices accurately identified entry into the colon (10/12)[1]<br>• Achieved distribution of payload across the entire colon[1]<br>• No early deployment before colon detection[1] | • 100% of analyzed devices indicated entry to the colon, activation, and deployment, and were unaffected by food (39/39)[2]<br>• No failure modes observed in the analyzed devices[2]<br>• No serious adverse events reported[2] | • 100% of devices accurately identified entry into the colon, triggered release of a liquid payload, and achieved distribution across the entire colon (7/7)[3]<br>• Device was well tolerated and performed as intended in active ulcerative colitis patients[3] |
| **DEVICE FUNCTION IN HEALTHY VOLUNTEERS** ✓ | **DEVICE FUNCTION WITH / WITHOUT FOOD** ✓ | **DEVICE FUNCTION IN ACTIVE UC PATIENTS** ✓ |


1. Lee SN, Sandefer E, Doll W, et al. A Scintigraphic Study to Evaluate the Safety, Tolerability, and Functionality of a Drug Delivery System (DDS) Device in Healthy Volunteers in Fasted State. Poster presented at: *American College of Gastroenterology Annual Scientific Meeting*, October 21-26, 2022, Charlotte, NC.
2. Biora Therapeutics internal data
3. Martin K, Lee SN, Stork C, et al. A Scintigraphic Study to Evaluate the Localization and Delivery Function of a Drug Delivery System (DDS) Device in Patients with Active Ulcerative Colitis (UC) in Fasted State. Poster presented at: *American College of Gastroenterology Annual Scientific Meeting*, October 21-26, 2022, Charlotte, NC.





BIORA Therapeutics

TARGETED THERAPEUTICS

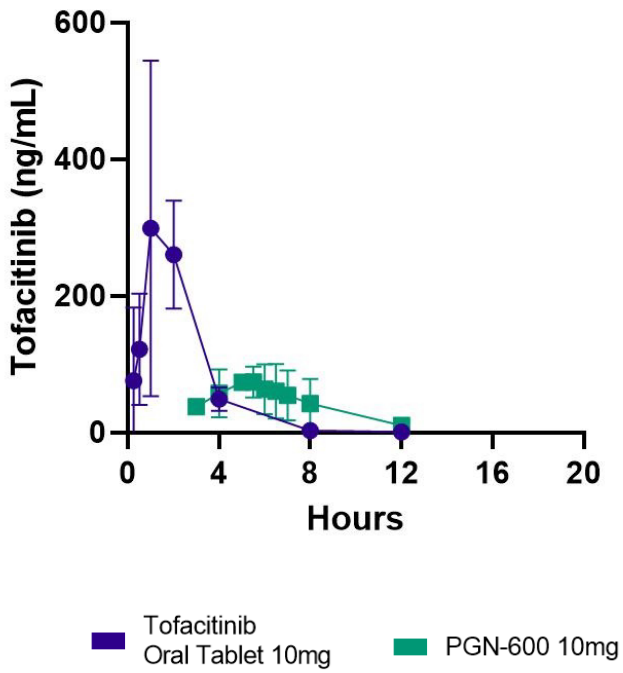
# *Reduced systemic uptake, better PK effect and coverage*

Non-GLP study; 7 days/QD in canine model compared PGN-600 (tofacitinib 10mg liquid formulation delivered via DDS capsule) vs. standard oral tablet (tofacitinib 10mg)

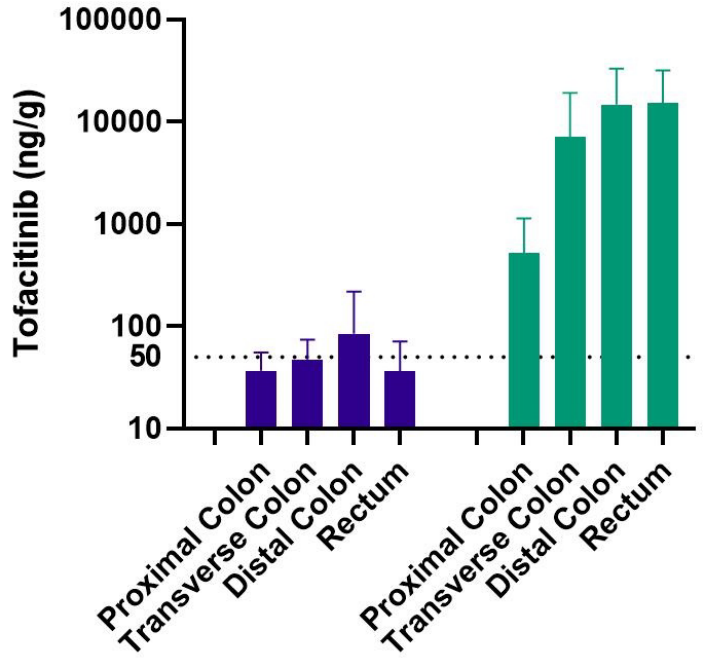
## RESULTS

- Reduced drug levels in blood vs. standard oral tablet
- Tissue drug levels at average ~100X higher along the length of the colon vs. standard oral tablet
- Data suggest that a dose lower than the standard 10mg tofacitinib may provide increased tissue levels while reducing systemic exposure

## PLASMA LEVEL CMAX 5X LOWER




## COLON TISSUE COVERAGE ~100X HIGHER




Biora Therapeutics internal data

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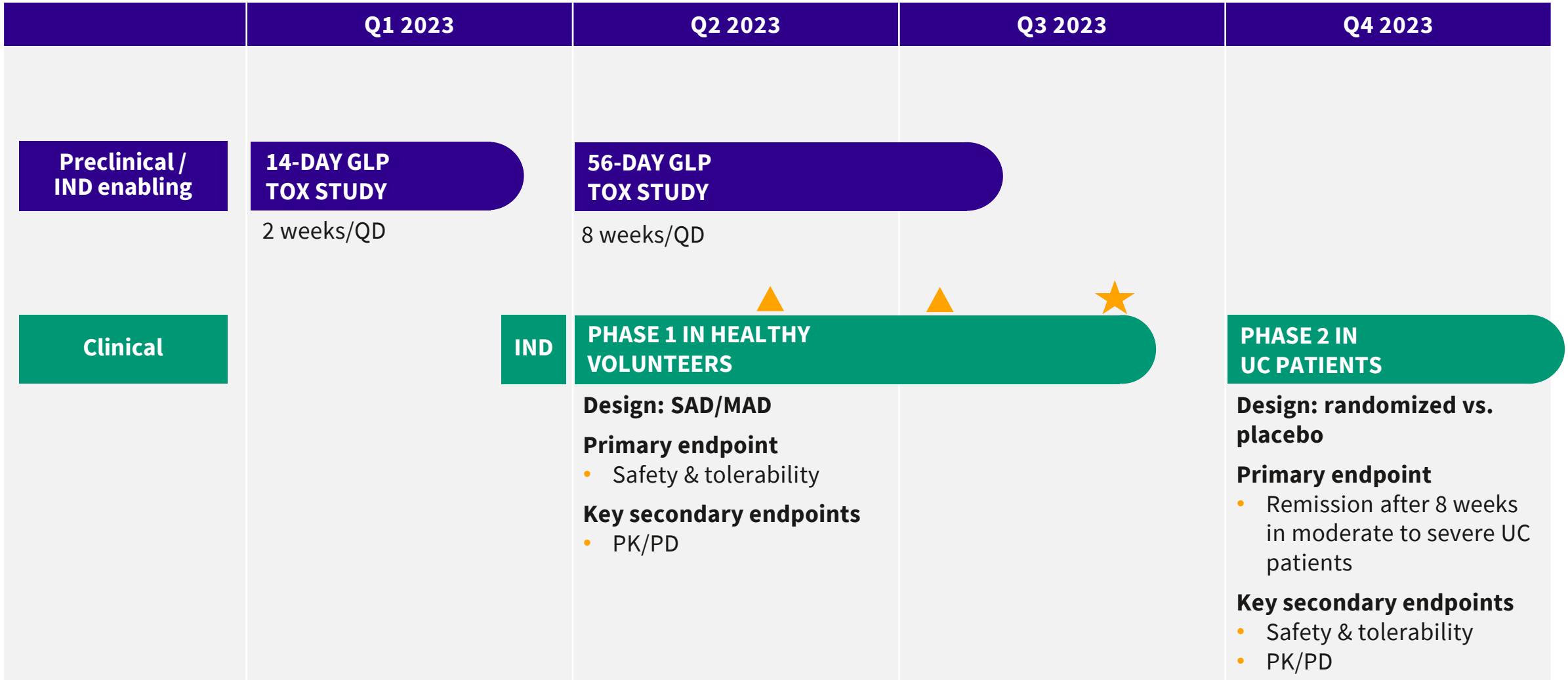
PGN-600 (TOFACITINIB + DDS DEVICE)

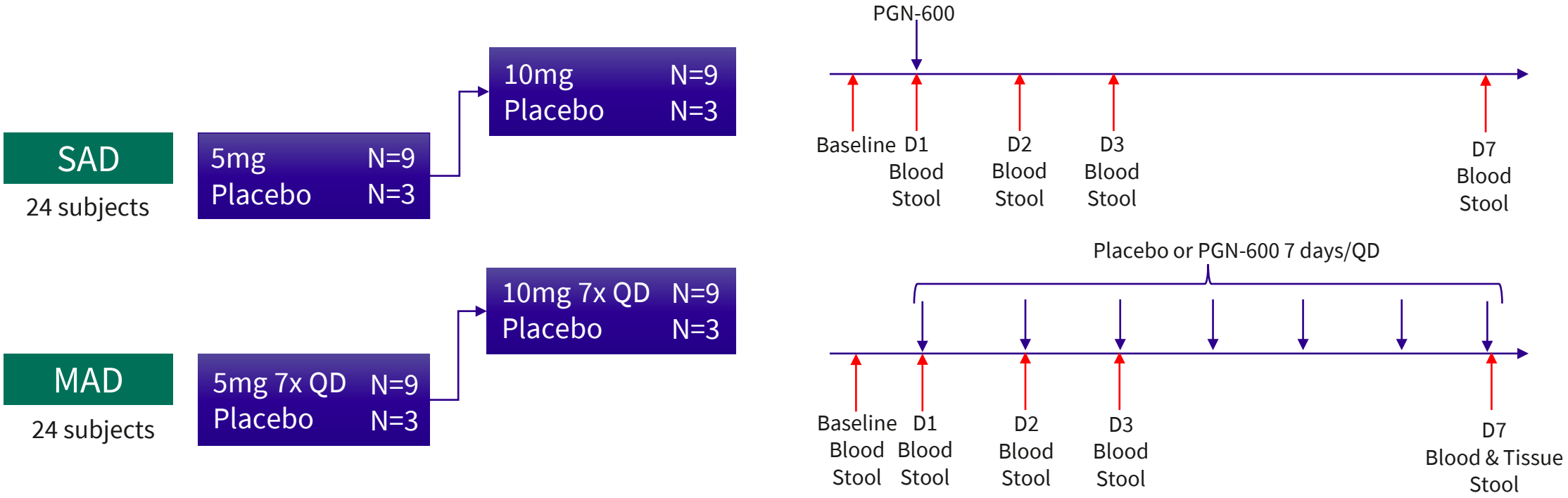
# *Clinical Development Plan*

TARGETED THERAPEUTICS



TARGETED THERAPEUTICS

# *Evaluate safety, tolerability, pharmacokinetics and pharmacodynamics of PGN-600 in healthy volunteers*




| | |
|---|---|
| **PATIENT POPULATION** | Normal healthy volunteers<br>Total of 48 subjects (24 SAD and 24 MAD subjects) |
| **STUDY DESIGN** | Randomized, double-blind (participant and site), placebo-controlled study to evaluate the safety, tolerability, and PK/PD of SAD and MAD doses of PGN-600 in healthy subjects |
| **OBJECTIVES** | Demonstrate safety and tolerability of PGN-600, assess PK and PD effects of tofacitinib released from PGN-600 over 8 days in NHV in blood and in tissue |

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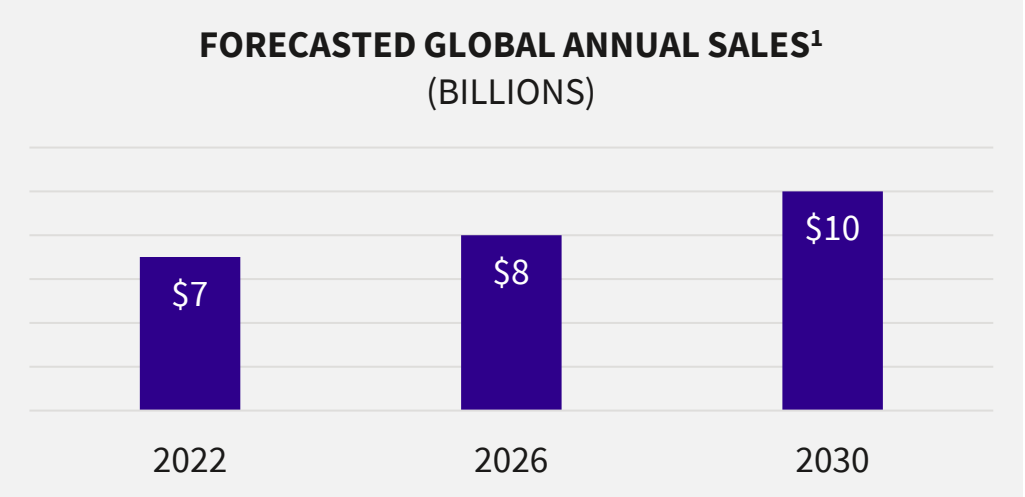
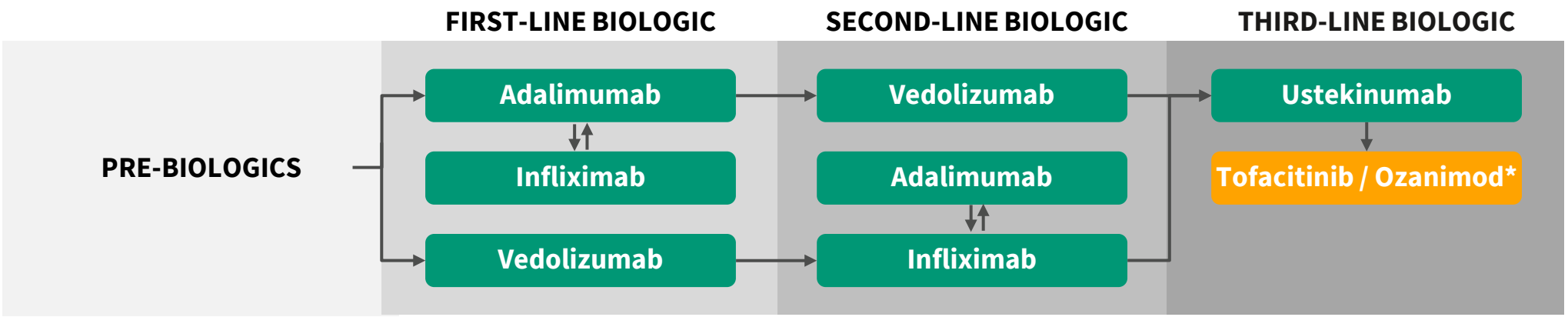
TARGETED THERAPEUTICS

# *Potential for market-leading efficacy in tofacitinib creates sizeable opportunity*

- Global annual sales forecast for ulcerative colitis therapeutics:
  - $7 billion in 2022[1]
- >10 FDA-approved drugs for UC




1. Source: Evaluate Pharma; GlobalData

*Non-biologic drug therapies

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# SYSTEMIC THERAPEUTICS

UNMET NEED

# *Needles are associated with poor disease management*

**38%** of diabetics miss 4+ injections per week[1]

**42%** of patients fail to maintain diabetes treatment due to injection concerns when using an injectable GLP-1 agonist[2]

**71%** higher discontinuation rate for diabetes patients initiating treatment with an injectable GLP-1 agonist vs. those starting oral therapy[2]


1. Frost & Sullivan research commissioned by Rani Therapeutics Holdings, Inc. https://ir.ranitherapeutics.com/static-files/b1f080bf-a860-4136-87cb-d6f7c49c1502
2. Spain CV, Wright JJ, Hahn RM, Wivel A, Martin AA. Self-reported Barriers to Adherence and Persistence to Treatment With Injectable Medications for Type 2 Diabetes. Clin Ther. 2016;38(7):1653-1664.e1. doi:10.1016/j.clinthera.2016.05.009

# *Needle-free, oral delivery to small intestine*

SYSTEMIC THERAPEUTICS

## ORAL CAPSULE

- Convenient oral capsule the size of a multivitamin for ease of swallowing

## PRECISE DELIVERY

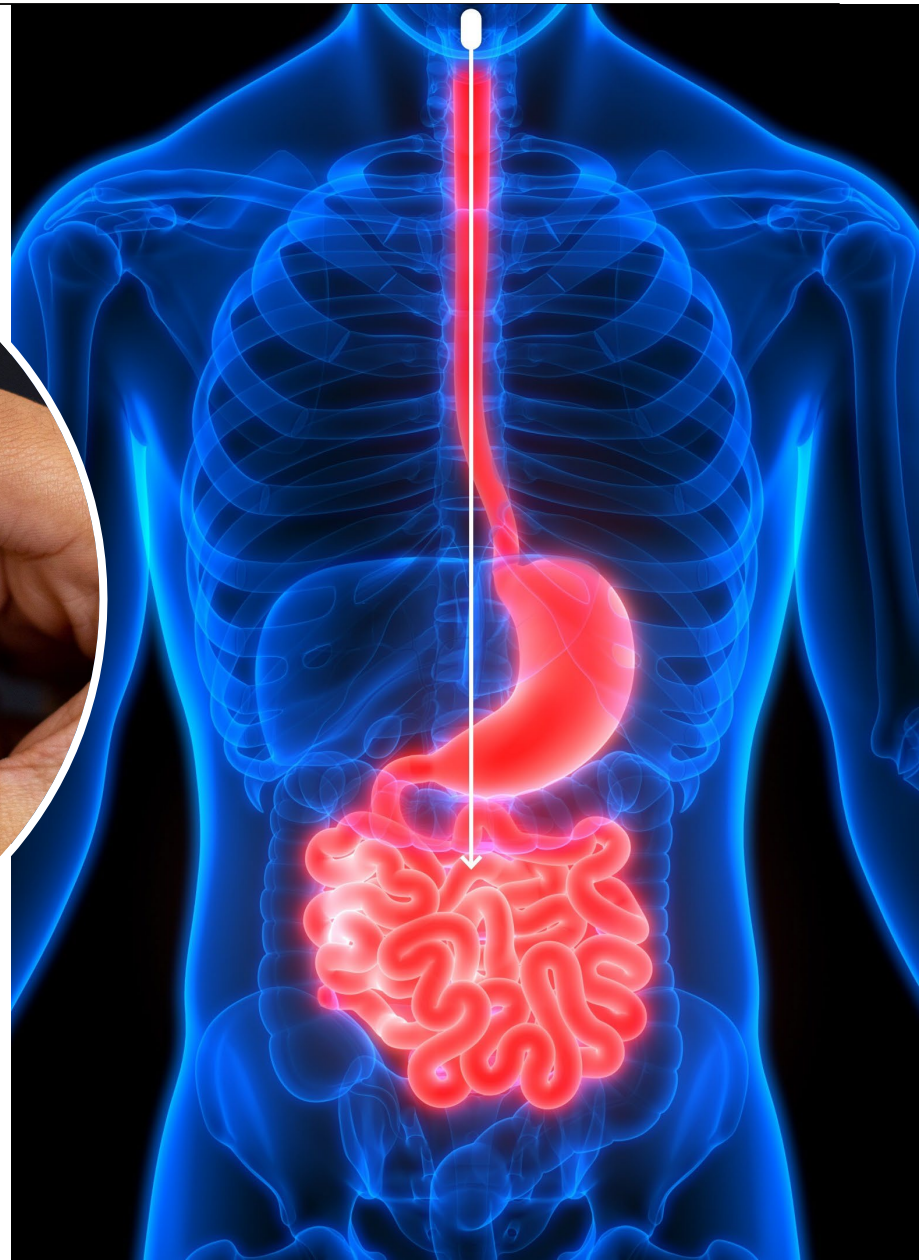
- Enteric trigger for precise timing of drug delivery to the small intestine

## NEEDLE-FREE ADMINISTRATION

- Liquid jet injection to the small intestine to maximize systemic uptake

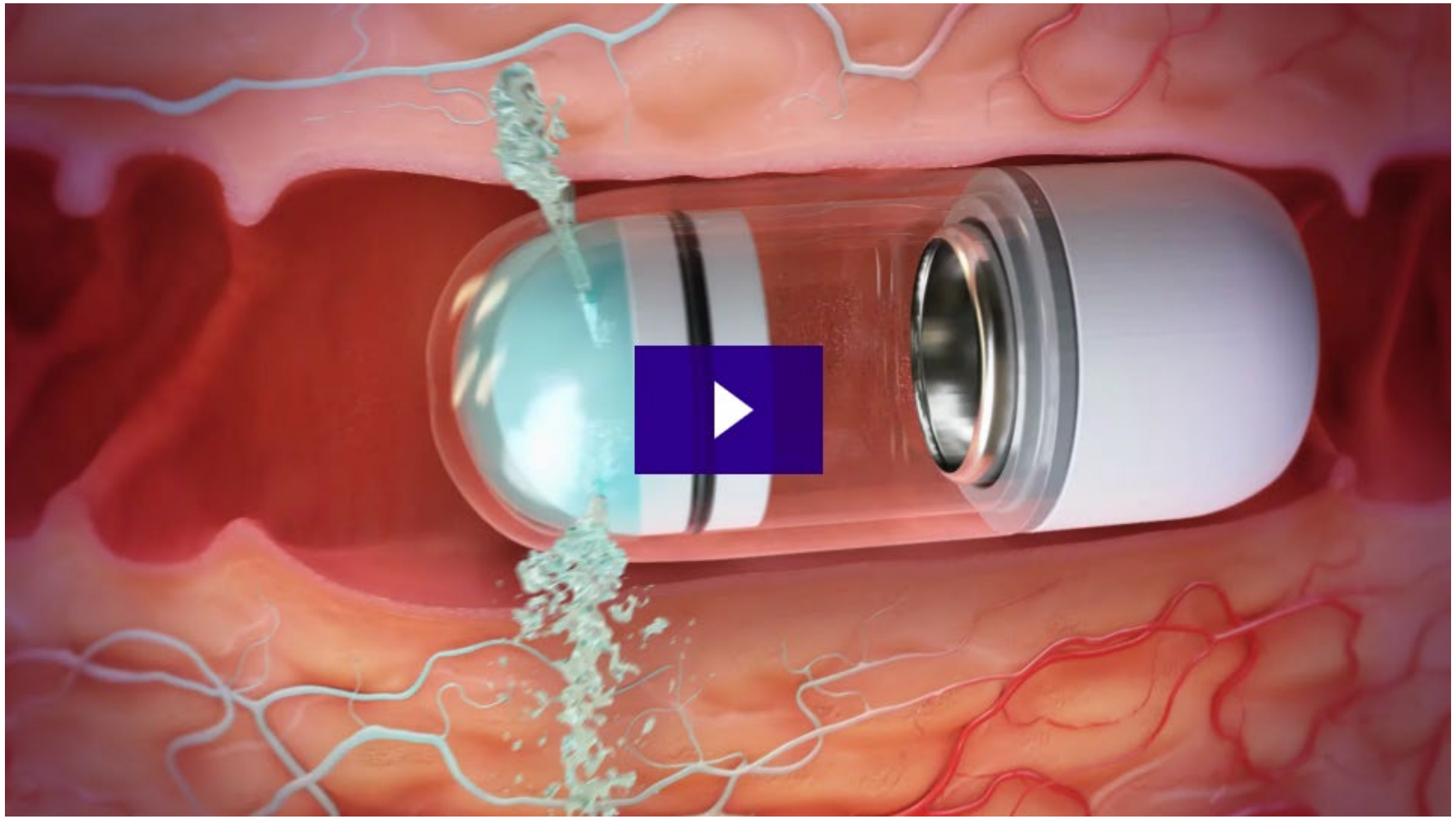
## RESEARCH COLLABORATIONS

- IONIS
- Large Pharma 1
- Large Pharma 2



# *Liquid jet delivery to the small intestine*

SYSTEMIC THERAPEUTICS



SCAN ME

https://biora.wistia.com/medias/embr15eh3a

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SYSTEMIC THERAPEUTICS

# *Excellent systemic uptake for orally delivered large molecules demonstrated in animals*

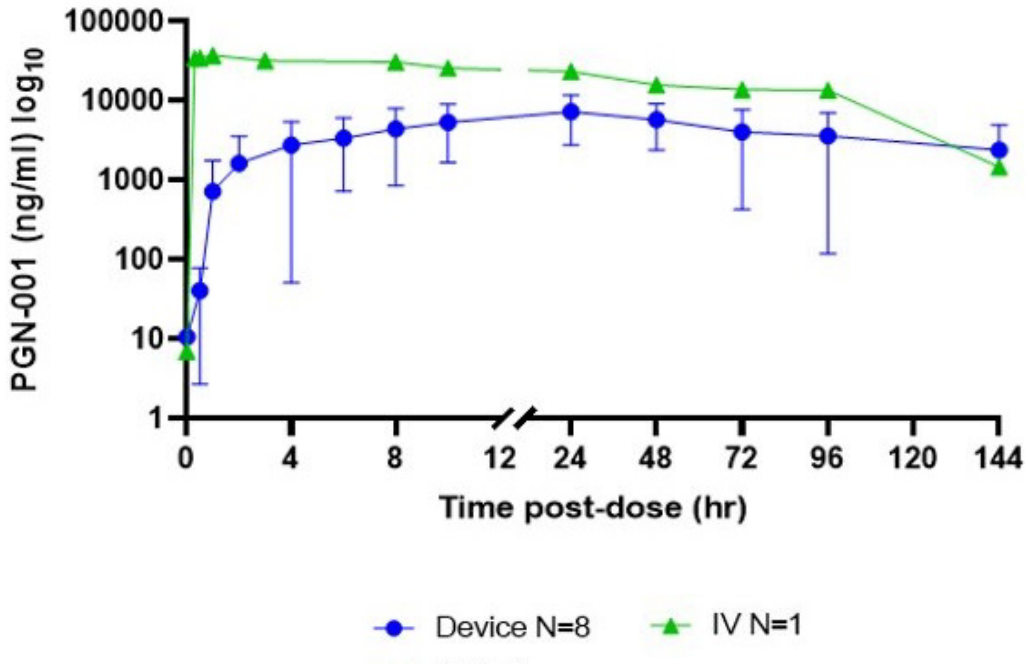
Preclinical studies in (1) swine model with endoscopically placed, autonomous device compared to IV administration of a variant of adalimumab (PGN-001) and (2) canine model with autonomous device to evaluate device function and safety

## RESULTS

Recently published data demonstrated:

- Average bioavailability of 22% (up to 55%) for PGN-001 in swine where drug was detected in blood[1]
  - *For comparison, commercially available oral large molecules achieve 1% or less bioavailability*[2]
- In canines, ≥ 83% deployment accuracy and consistent deployment time post gastric emptying in the small intestine, with no early deployment[1]
- No issues observed with safety or tolerability of the device[3]

**BIOAVAILABILITY COMPARABLE TO IV**




1. Lee SN, Stork C, Smith J, et al. Development of a submucosal injection device for an oral biotherapeutic delivery system. Poster presented at: *Parenteral Drug Association Universe of Pre-Filled Syringes and Injection Devices Conference*, October 18-19, 2022, Palm Springs, CA.
2. Rybelsus® oral Semaglutide delivered as an oral tablet.
3. Biora Therapeutics internal data

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DEVELOPMENT TIMELINE

# *Systemic Therapeutics Platform Milestones*

SYSTEMIC THERAPEUTICS

| H1 2022 | H2 2022 | H1 2023 | H2 2023 | MILESTONES/CATALYSTS |
|---|---|---|---|---|
| **Research-Grade Device Function** ✓ | | | | Successfully confirmed viability of platform with research-grade device |
| | **Next-Gen Device Development** | | | Incorporating updated medical-grade components |
| | | **Preclinical Data Generation** | | Intent to replicate data from research-grade device with next-generation device |
| | | **Expand Collaborations & Partnerships** | | Progress existing collaborations and develop additional agreements |




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# *Reimagining therapeutic delivery*

BIORA™ Therapeutics

## TARGETED THERAPEUTICS

- Clinical-ready device
- Entering the clinic

## SYSTEMIC THERAPEUTICS

- Refining preclinical models
- Data generation and partnership

# APPENDIX

# TARGETED THERAPEUTICS PUBLICATIONS

## *bioratherapeutics.com/publications*

TARGETED THERAPEUTICS

1. **Development of targeted therapeutic antibodies for the treatment of inflammatory bowel disease: A proof of concept**. Poster presented at DDW 2019.
2. **A comparison of systemic versus targeted anti-TNFα antibody in treatment of colitis induced by adoptive transfer of CD44-/CD62L+ T-cells into RAG2-/- mice recipients**. Presented at DDW 2019.
3. **Targeted delivery of soluble tofacitinib citrate to the site of inflammation to improve efficacy and safety**. Poster presented at DDW 2021.
4. **Development of a novel drug delivery system for treatment of Ulcerative Colitis**. Poster resented at DDW 2021.
5. **Development of a Novel Drug Delivery System to Deliver Drugs Directly to the Colonic Mucosa, Resulting in Improved Efficacy and Reduced Systemic Exposure for the Treatment of Ulcerative Colitis**. *Crohn's & Colitis 360.* 2021, 3, 1–5.
6. **Tofacitinib tissue exposure correlates with endoscopic outcome**. Oral presentation at DDW 2022 and BWG. Poster presented at ECCO 2022.
7. **Pharmacokinetic stratification of cytokine profiles during anti-TNF induction treatment in moderate-to-severe UC**. Poster presented at ECCO 2022 and DDW 2022.
8. **Pilot study to assess pharmacokinetic and pharmacodynamic markers following enema-dosing with adalimumab in patients with active ulcerative colitis.** Poster presented at ACG 2022.
9. **A scintigraphic study to evaluate the safety, tolerability, and functionality of a Drug Delivery System (DDS) device in healthy volunteers in fasted state.** Poster presented at ACG 2022.
10. **A scintigraphic study to evaluate the localization and delivery function of a Drug Delivery System (DDS) device in patients with active ulcerative colitis (UC) in fasted state.** Poster presented at ACG 2022.

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# SYSTEMIC THERAPEUTICS PUBLICATIONS

## *bioratherapeutics.com/publications*

SYSTEMIC THERAPEUTICS

1. **Development of *ex-vivo* and *in-vivo* models to assess the performance of an oral biotherapeutic delivery system (OBDS) capsule**. Poster presented at the *Controlled Release Society Annual Meeting*, July 13-14, 2022 and at the *American College of Gastroenterology Annual Scientific Meeting*, October 21-26, 2022.

2. **Assessing the performance of an oral biotherapeutic delivery system (OBDS) using intra-duodenal endoscopy delivery in *Yucatan* minipigs**. Poster presented at the *Controlled Release Society Annual Meeting*, July 13-14, 2022 and at the *American College of Gastroenterology Annual Scientific Meeting*, October 21-26, 2022.

3. **Development of preclinical models to assess the performance of the oral biotherapeutic delivery system (OBDS) capsule.** Poster presented at the *Parenteral Drug Association Universe of Pre-Filled Syringes and Injection Devices Conference*, October 18-19, 2022.




BIORA Therapeutics

# *Diverse patent portfolio with 74 distinct patent families[1]*

## DEVICES
## 39 patent families covering:

- Device designs, materials, components & manufacturing
- GI localization
- Devices for targeted delivery to GI tract
- Devices for targeted GI sampling systems
- Devices for jet delivery into GI tissue

## THERAPEUTICS
## 25 patent families covering:

- Treatment via ingestible device
- GI delivery PK/PD profiles
- GI delivery dosing regimens
- GI delivery drug combinations
- Liquid drug formulations

## SAMPLING & DIAGNOSTICS
## 10 patent families covering:

- GI sample preservation
- GI analyte detection & quantification systems
- Complementary diagnostic markers
- Protein and nucleic acid markers & assays

1. Approximately **144 issued patents and 160 pending applications** in major countries and regions around the world


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