THARIMMUNE

Unlocking Immunology for a Better Tomorrow

Corporate Presentation

June 2025

Nasdaq: THAR | www.tharimmune.com

Forward-Looking Statements

Certain statements in this presentation are forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical facts, contained in this press release, including statements regarding the timing and design of Tharimmune's future Phase 2 trial, Tharimmune's strategy, future operations, future financial position, projected costs, prospects, plans and objectives of management, are forward-looking statements. The words "anticipate," "believe," "continue," "could," "depends," "estimate," "expect," "intend," "may," "ongoing," "plan," "potential," "predict," "project," "target," "should," "will," "would," and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. The Company may not actually achieve the plans, intentions, or expectations disclosed in these forward-looking statements, and you should not place undue reliance on these forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in these forward-looking statements. Factors that may cause such differences, include, but are not limited to, those discussed under Risk Factors set forth in our Annual Report on Form 10-K for the year ended December 31, 2024 and other periodic reports filed by the Company from time to time with the Securities and Exchange Commission. In addition, the forward-looking statements included in this press release represent the Company's views as of the date of this release. Subsequent events and developments may cause the Company's views to change; however, the Company does not undertake and specifically disclaims any obligation to update or revise any forward-looking statements to reflect new information, future events or circumstances or to reflect the occurrences of unanticipated events, except as may be required by applicable law. These forward-looking statements should not be relied upon as representing the Company's views as of any date subsequent to the date of this release.

Investment Highlights

Developing **novel treatments for unmet needs**, with lead program TH104:

Temporary prophylaxis of respiratory and/or nervous system depression in military personnel and chemical incident responders entering an area contaminated with high-potency opioids

Clinical-stage Pipeline

- TH104: First-in-class buccal film delivery of nalmefene for military use (NDA Fileable)
- TH023: Oral anti-TNFα monoclonal antibody targeting autoimmune diseases (Phase 1-ready)

Underserved Market Opportunities

- Military & chemical incident responder use for ultrapotent opioid exposure is an unmet need
- Oral anti-TNFα opportunity has potential to disrupt $50B+ global autoimmune biologics market

Proprietary Innovation

- TH104's buccal film potentially avoids first-pass metabolism while delivering rapid relief
- TH023's oral formulation offers a patient-friendly alternative to injectables

Strong Leadership & Clinical Expertise

- Management & Board has a proven track record
- Clinical team with extensive experience in drug development

Near-Term Clinical & Regulatory Milestones

- TH104: Received positive FDA feedback with path to NDA filing in 2026
- TH023: Phase 1 study to establish oral bioavailability planning underway

TH104 Development Pathway to a New Drug Application

Lead Program De-risked with Multiple Shots on Goal

Stage	Candidate	Modality & Indication	Phase 2	Phase 3	NDA Filing	Next Milestones
Clinical	***TH104*** *MOR/KOR*	Buccal Transmucosal Film **Temporary prophylaxis of respiratory and/or nervous system depression in military personnel and chemical incident responders entering an area contaminated with high-potency opioids**	*NDA Fileable* **No further clinical trials necessary†**			**2025: CMC Plan Completion** **2025/2026: Stability Data Completion** **2026: File NDA**
		Moderate-to-Severe Chronic Pruritus in PBC	***Phase 2 Ready****			2026: HI Study Initiation*

MOR = mu opioid receptor; KOR = kappa opioid receptor

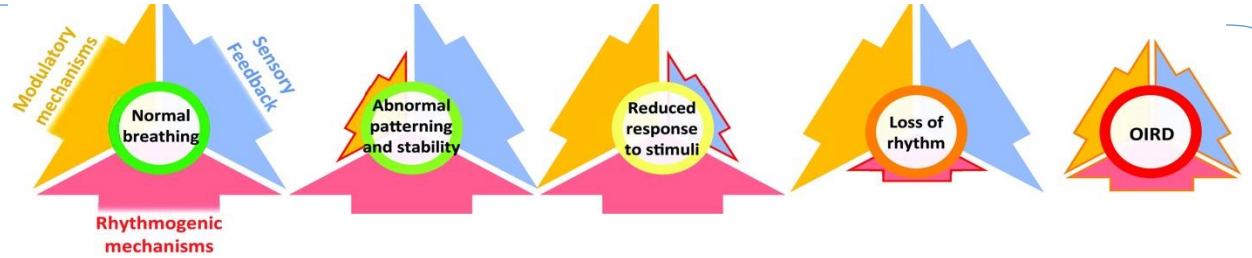
*Clinical CMC completed; HI – hepatic impairment; TH104 is Phase 2 ready in the EU and US with FDA and EMA feedback received

†**Tharimmune recently received positive feedback from the FDA regarding a regulatory pathway that will allow the Company to submit a 505(b)(2) New Drug Application (NDA) for TH104. Importantly, the FDA has confirmed that no additional clinical trials will be required prior to NDA submission for this indication.**

Exposure to High-Potency Opioids Can Rapidly Cause Respiratory Depression

High potency opioids (fentanyl, carfentanil) can cause opioid-induced respiratory depression (OIRD) in minutes if these agents *inhaled* in contaminated areas

Key areas of the Central Nervous System which operate the rhythmogenic, modulatory & sensory mechanisms of breathing are compromised in OIRD



Normal breathing requires the integration of rhythmogenic, modulatory, and sensory feedback mechanisms. Opioid overdose can suppress all of these important mechanisms of respiratory control, leading to OIRD.

High-Potency Opioid Exposure Causes Rapid OIRD

Current Treatment Gaps:

- Fentanyl & ultrapotent opioids half-life: ~ 7 h
  - High in vivo potency
  - Rapid onset respiratory depression (minutes)
  - Toxic compounds
- Opioid antagonist Naloxone half-life: ~ 2 h
  - Multiple doses may be required
- Longer half-life product (TH104) fills unmet need

Real-World Urgency:

- Ultra-potent synthetic opioids – designated high consequence chemicals of concern (CoC) by US Government
  - Concern stems from multiple factors: highly toxic, addictive, ease of synthesis, and wide availability
  - Due to high potency, rapid onset, and toxicity: considered public health risks
  - Deemed as chemical threats by military and civilian agencies in accidental exposure or dispersed intentionally (e.g. in weaponized aerosol form on a large-scale) as single or mixture of agents
    - Dubrovka theatre hostage crisis in Moscow 2002; 127 deaths
- Commercial off-the-shelf solution may require multiple doses
- Response presents challenges to emergency personnel in chemical protective gear

"Synthetic opioids, such as fentanyl and carfentanil, can pose a devastating threat to our service members," - Col. Ryan R. Eckmeier, the Joint Project Manager for CBRN Medical

1. https://www.jpeocbrnd.osd.mil/Media/News/Article/2969592/dod-supported-10mg-naloxone-autoinjector-receives-fda-approval-to-treat-known-o/
2. https://pmc.ncbi.nlm.nih.gov/articles/PMC8424565/figure/F0001/
3. https://www.history.com/articles/opioid-chemical-weapons-moscow-theater-hostage-crisis

Current Standard: High-Dose Naloxone Autoinjector (NAI)

Limited Duration & Convenience

Current treatment overview:

- FDA-approved rescue treatment for opioid poisoning
- 10 mg naloxone delivered via pre-filled autoinjector
- Administered intramuscularly directly into thigh (through clothing)
- FDA Indication: Temporary prophylaxis against respiratory/CNS depression from high-potency opioids (e.g., fentanyl) in military personnel

Critical limitations:

Short Duration: Approximately 2-hour protection vs. 7-hour fentanyl exposure

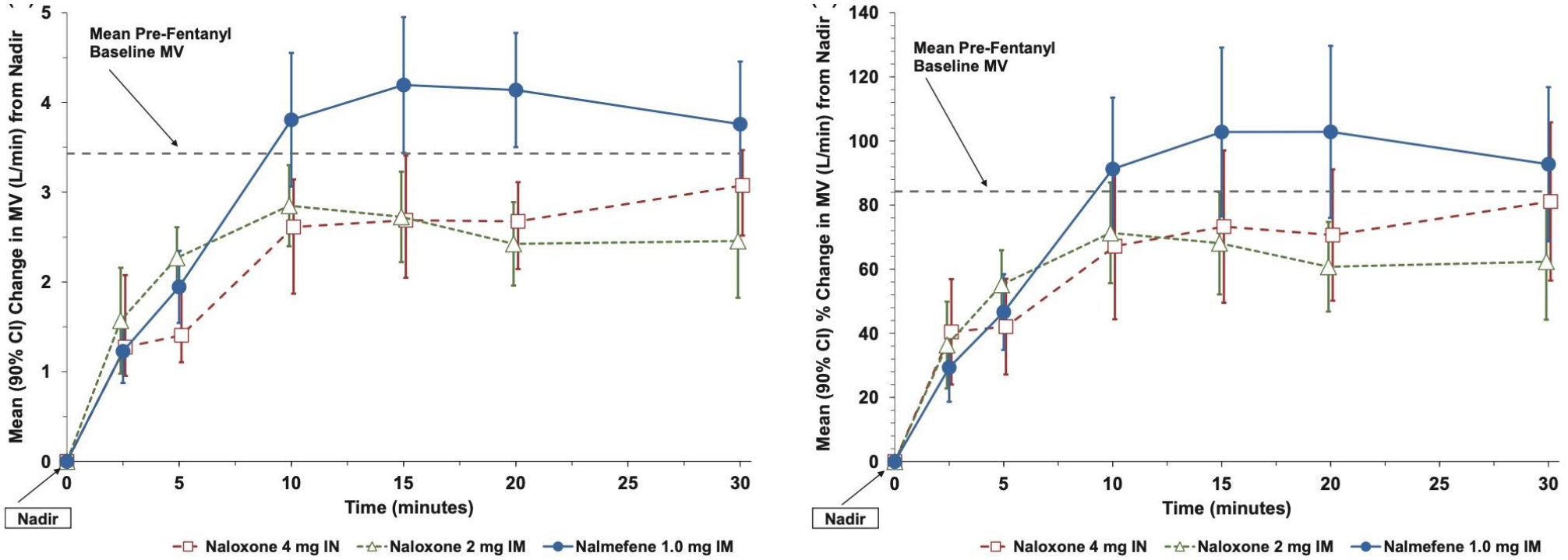
Frequent Re-dosing Required: Multiple doses essential

Operationally Difficult: Hard to administer repeatedly in chemical protective gear or active threat environments; bulky IM administration may reduce combat readiness (inj. pain, spasm)

Why a new solution is needed:

- ✓ Rapid fentanyl absorption demands prolonged opioid antagonist protection
- ✓ Current solution's short half-life complicates emergency response
- ✓ Repeated dosing impractical in hazardous environments

Nalmefene Provides Greater Respiratory Recovery vs. Naloxone



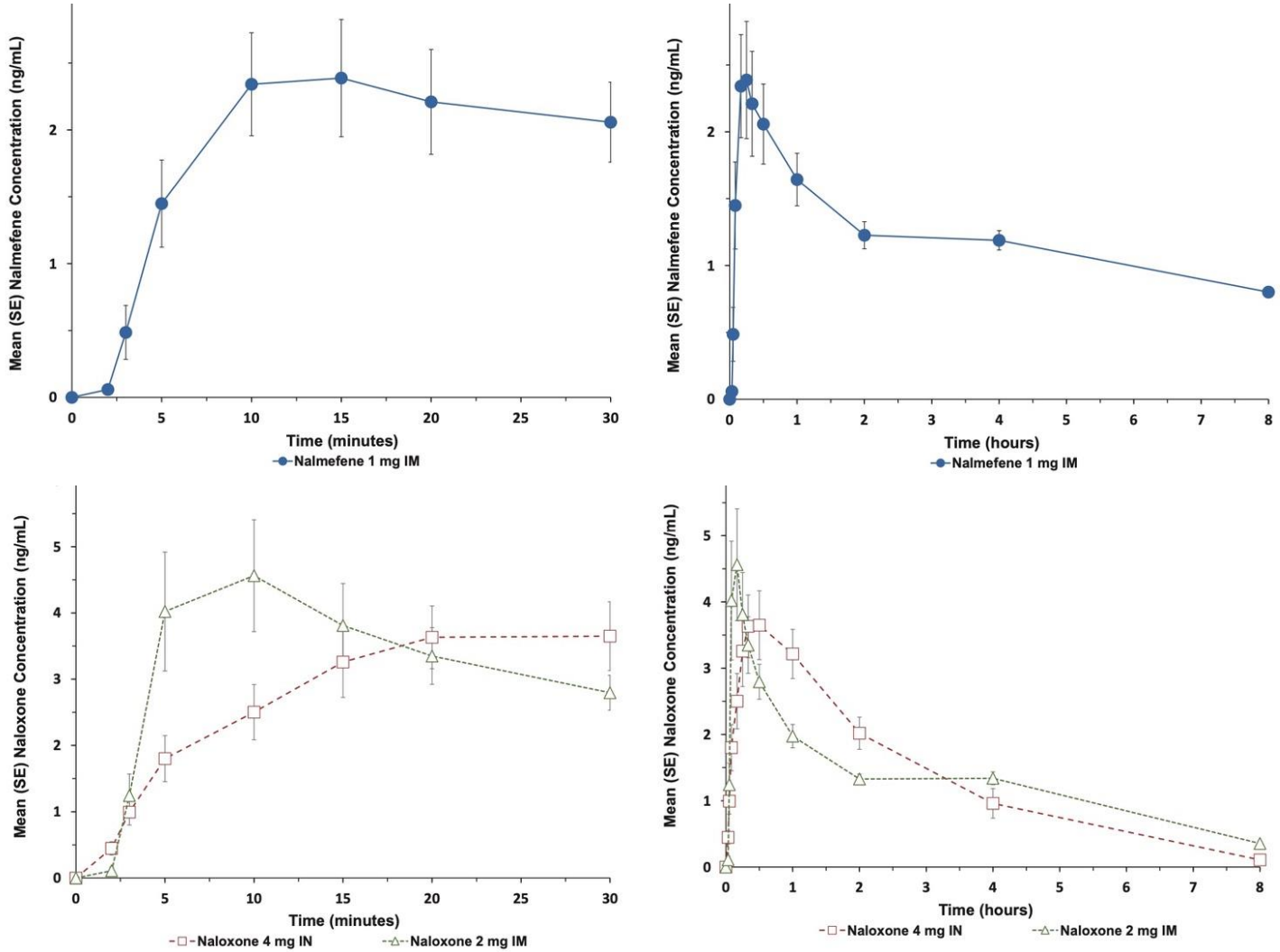
Key takeaways:

- ✓ Nalmefene rapidly restores breathing volume
- ✓ Clinically superior to naloxone, offering better emergency outcomes

Mean absolute and percentage change in minute volume from opioid-induced nadir. (left graph) Absolute change and (right graph) percentage change; CI, confidence interval; IM, intramuscular; IN, intranasal; MV, minute volume. Dashed lines represent the mean MV prior to fentanyl administration (mean pre-fentanyl baseline MV) 3.43 L/min in (left) and 84.3 L/min in (right).

Cipriano, et. al. The Journal of Clinical Pharmacology 2025,65(2) 206–216 DOI: 10.1002/jcph.6132

Nalmefene Maintains Longer Therapeutic Drug Levels vs. Naloxone



Mean plasma nalmefene concentrations from 0 to 30 min (left) and 0 to 8 h (right) after opioid antagonist administration.

Clinical benefit:

- ✓ Prolonged protection reduces need for frequent re-dosing in emergency situations
- ✓ Critical for prolonged exposure scenarios, enhancing responder safety and efficiency

Mean plasma naloxone concentrations from 0 to 30 min (left) and 0 to 8 h (right) after opioid antagonist administration.

Cipriano, et. al. The Journal of Clinical Pharmacology 2025,65(2) 206–216 DOI: 10.1002/jcph.6132

TH104 (buccal film) for Prophylaxis of Ultrapotent Opioid Exposure

TH104: proprietary transmucosal buccal film embedded with FDA-approved nalmefene, **designed to conveniently deliver a long-acting opioid antagonist**

Asset De-Risked by Improved Formulation

- Active ingredient, FDA-approved (nalmefene); delivery potentially avoids early liver metabolism
- Once-daily dosing, rapid onset, high absorption
- Half-life much longer than naloxone (autoinjector currently used for opioid exposure)

Positive Phase 1 Results

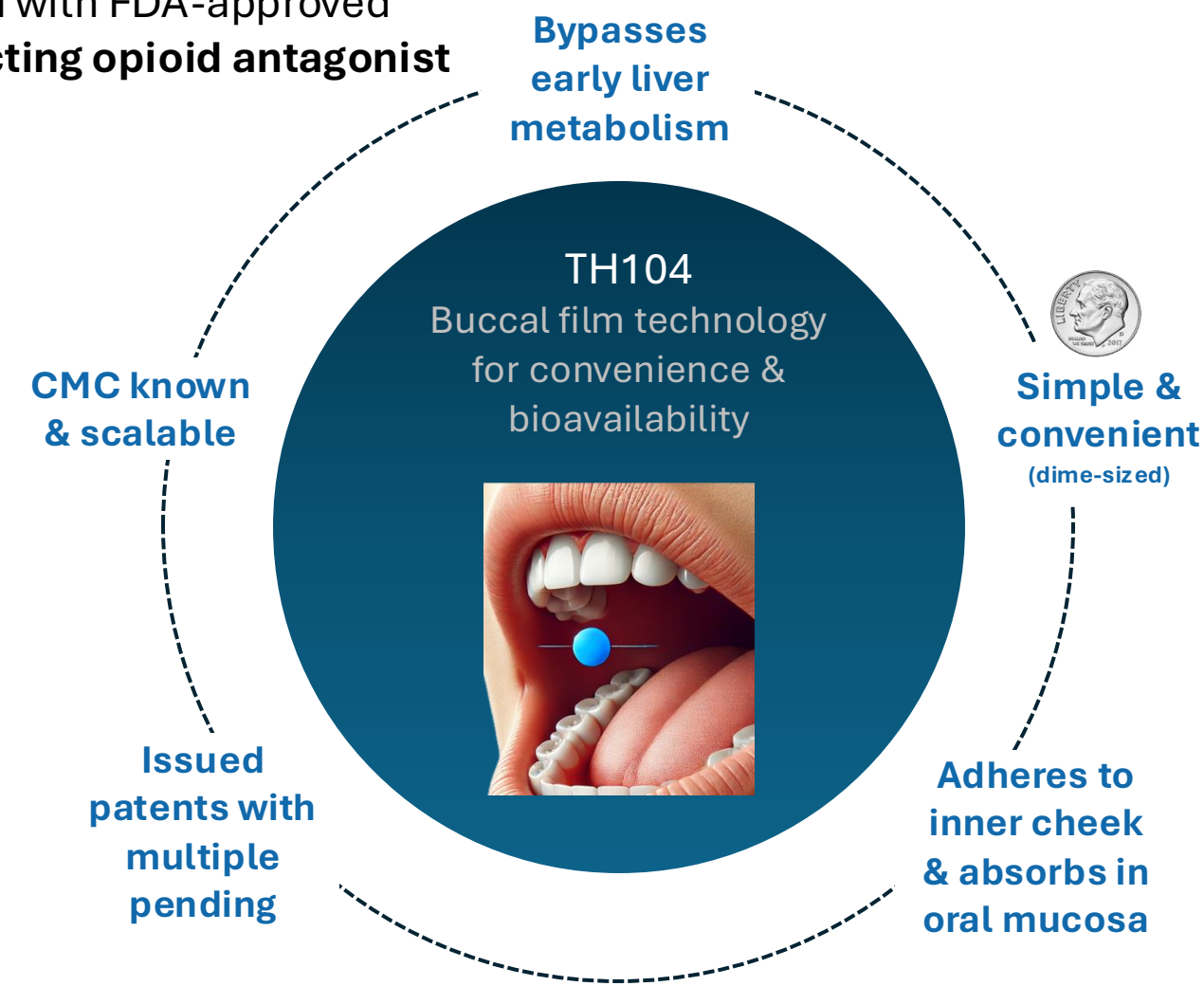
✓ Buccal delivery offers comparable bioavailability as IV and oral delivery of nalmefene

✓ Significant correlation between blood levels and symptom relief

Clinical Progress

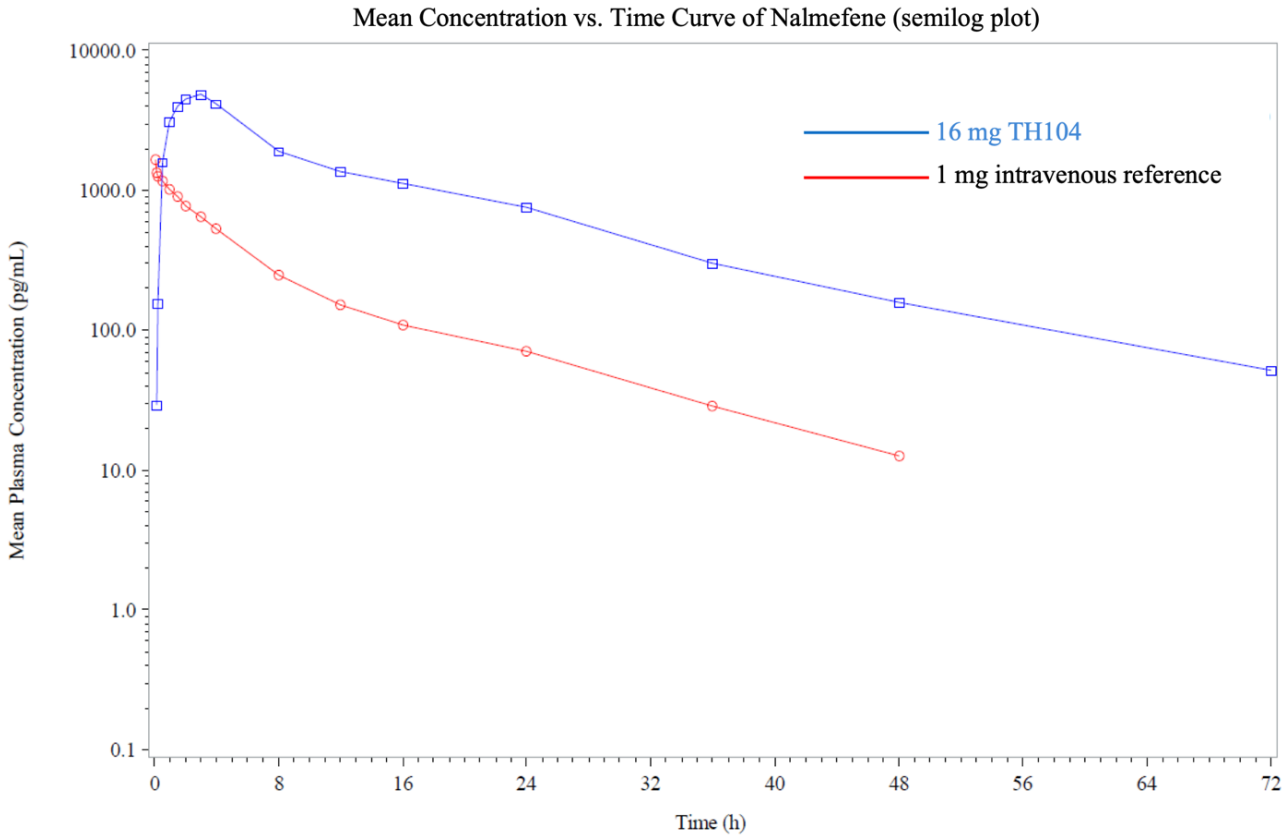
✓ Positive Phase 1 completed

✓ Positive FDA feedback for path to New Drug Application



TH104 is an investigational product and is not approved by US FDA

TH104 Offers Convenience, Fast Onset, and High Bioavailability



Summary

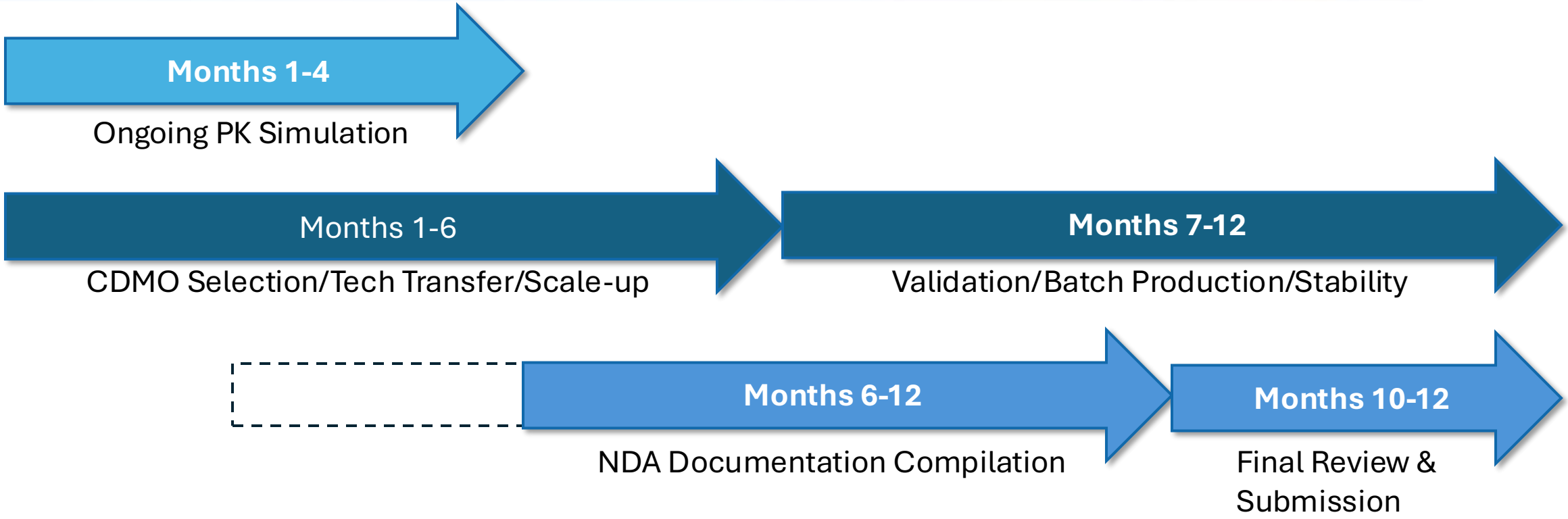
- ✓ Therapeutic levels reached quickly
- ✓ Reliable bioavailability supports predictable protection
- ✓ Buccal film dosing simplifies administration compared to naloxone

Clinical Significance of PK Analysis:

- ✓ Rapid onset essential for military & emergency response scenarios
- ✓ Single administration provides protection for an entire day
- ✓ Reduces operational complexity for responders in hazardous conditions
- ✓ Improves compliance and operational efficiency vs. naloxone (short-acting)
- ✓ **Supports regulatory pathway to FDA NDA submission**

Phase 1 Study Results - ClinicalTrials.gov ID NCT06198686

Anticipated Clear Pathway to NDA Submission Within 12 Months of CMC Initiation



- FDA feedback confirms 505(b)(2) eligibility
- *No additional clinical trials required pre-submission*
- Simulations and CMC prep form regulatory background

U.S. Strategic National Stockpile (SNS) as a Channel for TH104 Adoption

What is the SNS?

- Federal reserve of emergency medical supplies
- Supports crises like pandemics & chemical attacks

Why it matters now

- Surge in synthetic opioid threats
- Need for faster, longer-acting antagonists

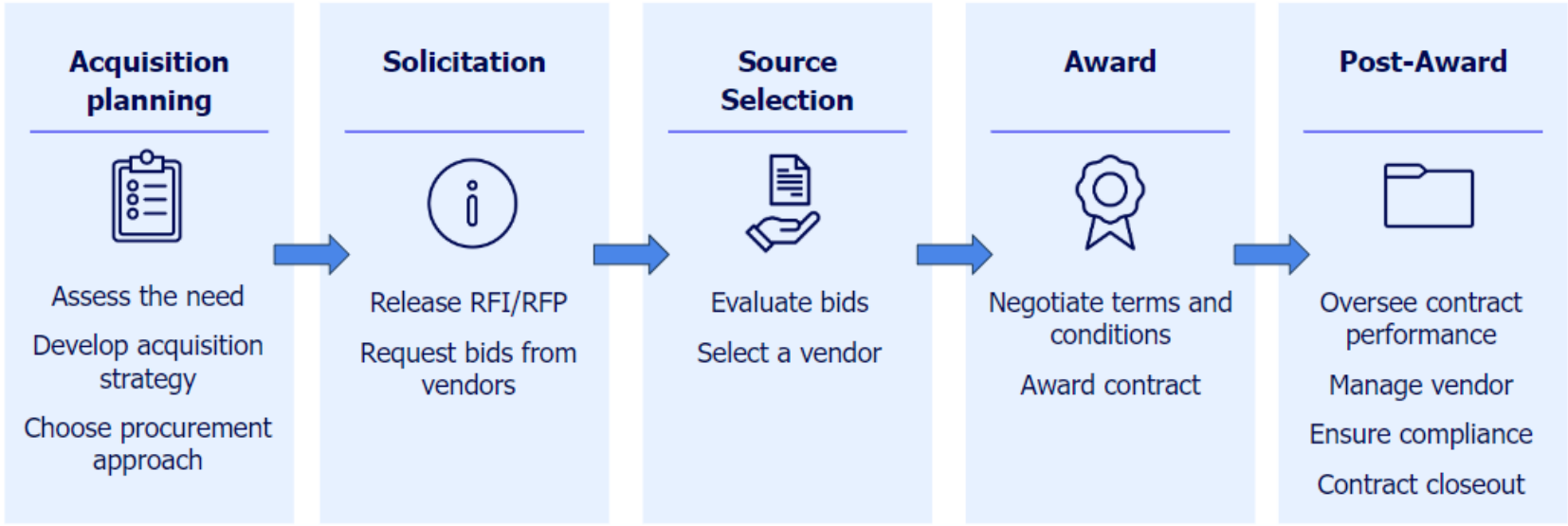
TH104 Fit & Function

- Buccal film ideal for rapid deployment
- Non-injectable, long duration, low complexity

TH104 aligns with SNS procurement patterns (e.g., CHEMPACK, Naloxone)

https://aspr.hhs.gov/sns/Pages/default.aspx
https://aspr.hhs.gov/SNS/Pages/CHEMPACK.aspx

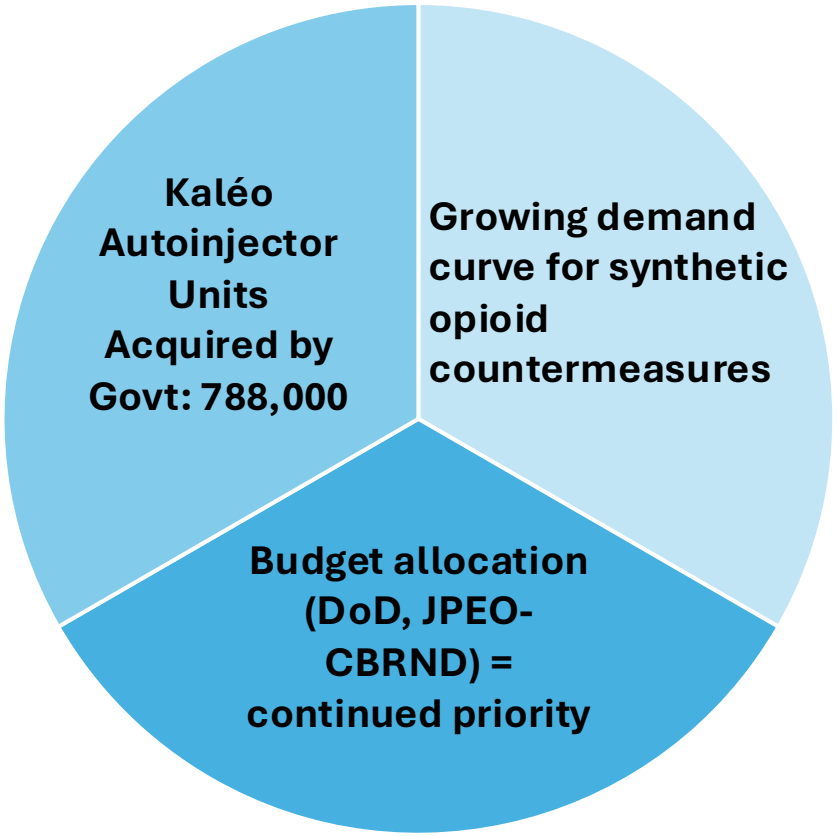
Government Procurement Pathway



Positive FDA feedback & continued discussions with Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense (JPEO-CBRND)

- Potential scenarios involving high-potency opioid exposure
- Identification of affected personnel (military, responders)

Projected Government Demand for TH104



America First Policy Institute (AFPI) Report: Combatting Deadly Fentanyl

Make Life-Saving Reversal Agents Readily Available to the Public

A Food and Drug Administration advisory panel unanimously recommended approval for Narcan, an opioid reversal treatment, to be sold over the counter at pharmacies. Policymakers should also consider requiring opioid reversal treatments to be stocked in first aid kits in public spaces, such as retail spaces, on public transportation, and in schools.

- Procurement contracts indicate sustained volume needs
- TH104's enhanced efficacy/duration positions it for next-gen stockpiling

Earlier-Stage Product Pipeline

Multiple Clinical & Development Stage Assets

Stage	Candidate	Modality & Indication	Preclinical	Phase 1	Phase 2	Next Milestones
Clinical	***TH023*** *Anti-TNFα*	**Oral Infliximab** Only approved as IV/SC **Multiple high-value autoimmune indications**	***Phase 1 Ready†***			**2H25:** CMC Optimization Ph1 Initiation
Development	***HS1940*** *PD-1/VEGF*	**EpiClick™ Technology** **Multiple high-value oncology indications**				**2025:** Preclinical studies

TNFα = tumor necrosis factor-alpha;

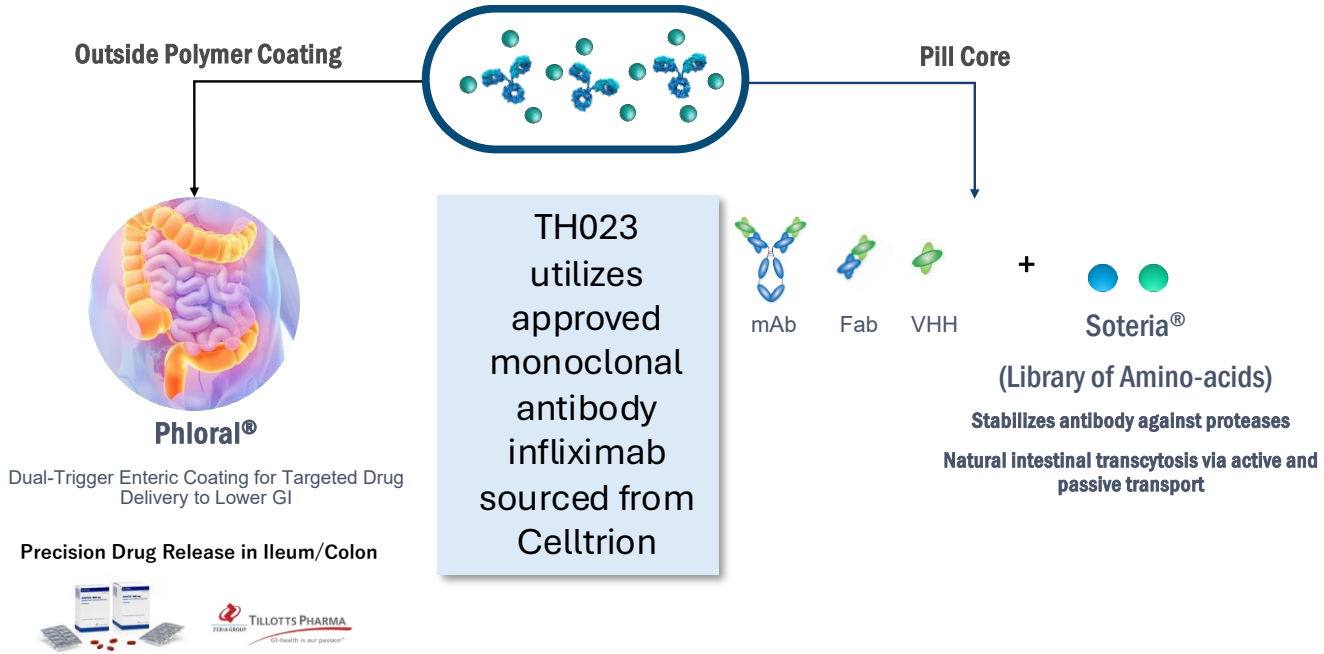
† trial initiation ex-US; Celltrion has right-of-first refusal post clinical study

TH023 - Oral Anti-TNFα for Autoimmune Diseases

Oral infliximab, a gold standard for multiple autoimmune diseases

What is it?

- TH023 is a first-in-class oral formulation of infliximab, an anti-TNFα monoclonal antibody targeting autoimmune diseases
- Designed to provide the **benefits of biologics without injections**
- Developed using proprietary oral antibody delivery platform licensed from Intract Pharma



How it works

- TNFα is a key driver of inflammation in autoimmune diseases
- TH023 blocks TNFα activity, reducing inflammation in conditions like RA and Crohn's
- Oral formulation offers a non-invasive alternative to IV or subcutaneous TNF inhibitors

Development Status

- ❑ CMC planning and finalization underway
- ❑ Phase 1 pharmacokinetic study to demonstrate oral bioavailability of infliximab, planning underway

TH023 – Market Opportunity

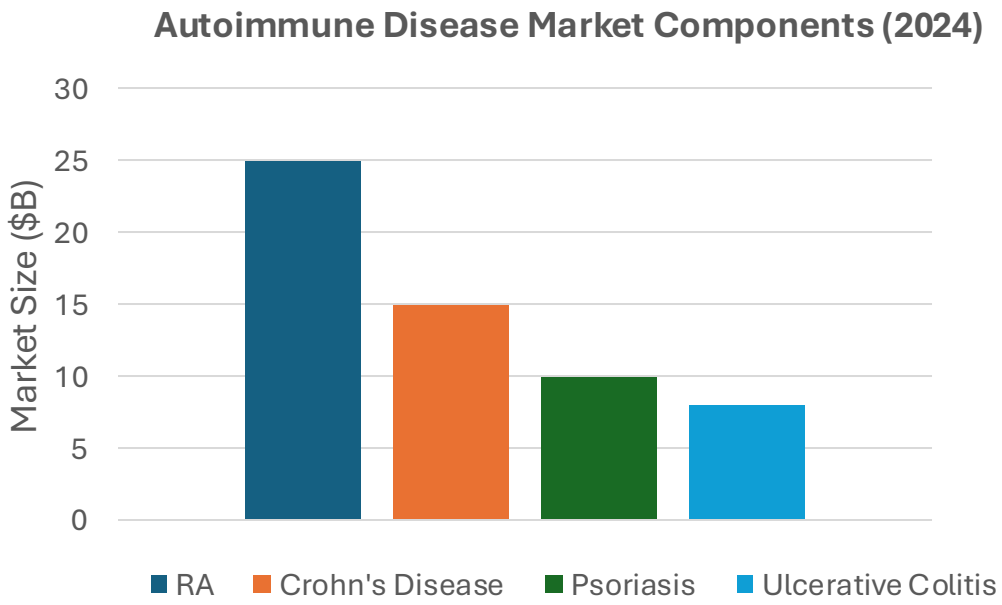
A $50B+ Market Ready for Innovation

Existing Market Size

~$47B

Generated annually by TNFα inhibitors (e.g., Humira, Remicade)

- Rheumatoid arthritis (RA), Crohn's disease, psoriasis, ulcerative colitis (UC) are primary indications



Unmet Need

- **High patient burden with injectables** (pain, needle phobia, side effects)
- **Biologic adoption barriers**: Cost, physician administration requirements
- **Oral therapy could increase patient compliance & accessibility**

Potential to Disrupt a Multibillion-Dollar Market

Market Shift to Oral Biologics: if TH023 proves efficacy and bioavailability, it could capture market share from injectables

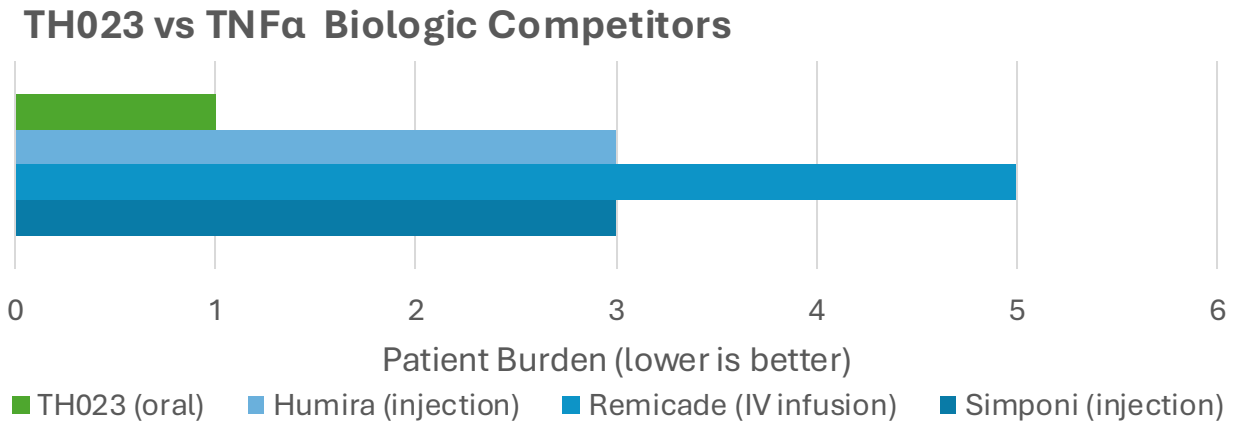
Potential Competitive Differentiation: A **daily oral anti-TNFα could**

- ✓ Enhance adherence
- ✓ Improve patient quality of life
- ✓ Lower costs for healthcare systems

TH023 – Market Opportunity

TNFα Competitive Comparison

Therapy	Delivery	Dosing Frequency	Patient Burden	Peak Sales
TH023 (Tharimmune)	**Oral**	**Daily / as needed**	**Low - no injections**	**High potential**
Humira® (AbbVie)	Injection	Every 2 weeks	Moderate – painful injections	$21B
Remicade® (Janssen)	IV infusion	Every 6-8 weeks	High – hospital visits required	$4B
Simponi® (Janssen)	Injection	Monthly	Moderate	$2.5B



Dosing & Administration Burden

- **Humira (Injection):** Biweekly or monthly self-administered injection
- **Remicade (IV):** Requires infusions administration every 6-8 weeks (high burden)
- **Simponi (Injection):** Monthly subcutaneous injection

✓ **TH023 (Oral): Daily pill**, offering a non-invasive alternative

Patient Burden Ranking

✓ **Lower burden = More convenience & better adherence**

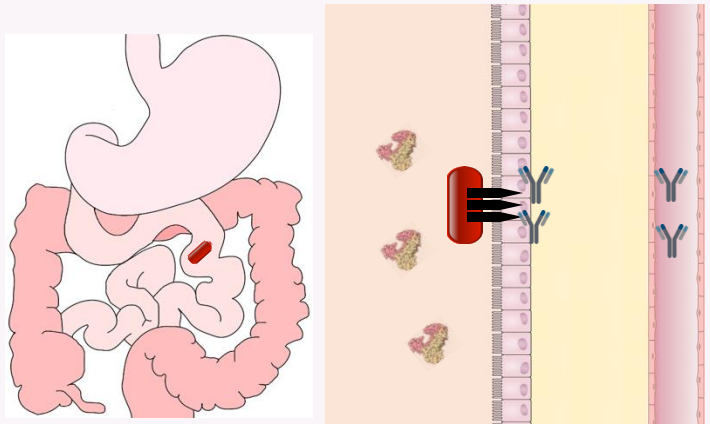
✓ Oral treatment (TH023) **minimizes administration barriers** vs. injections/IV infusions

TH023 – Market Opportunity

Oral Biologics Delivery Platform Compared to Other Technologies in Development

Orally Ingestible Devices

Rani THERAPEUTICS · BIORA Therapeutics · BIO-GRAIL

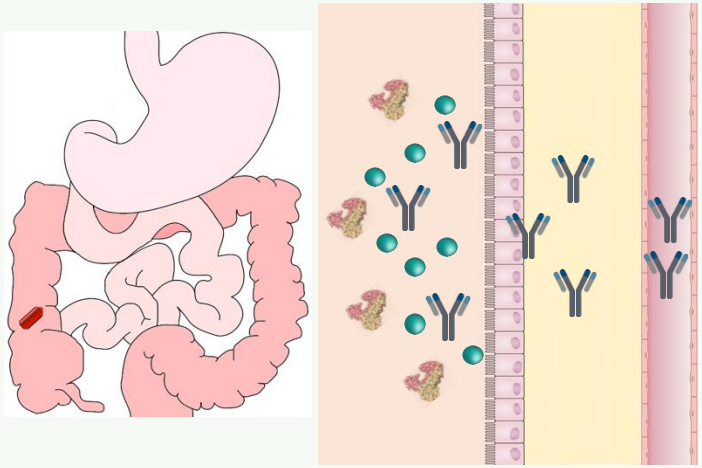


Drug Loaded Needles

- X — No enzyme protection if deployment fails
- X — CMC/COGS/safety challenges
- Injection into tissue for systemic delivery hampered by deployment failures

Oral Antibody Platform Technology

Intract Pharma + THARIMMUNE

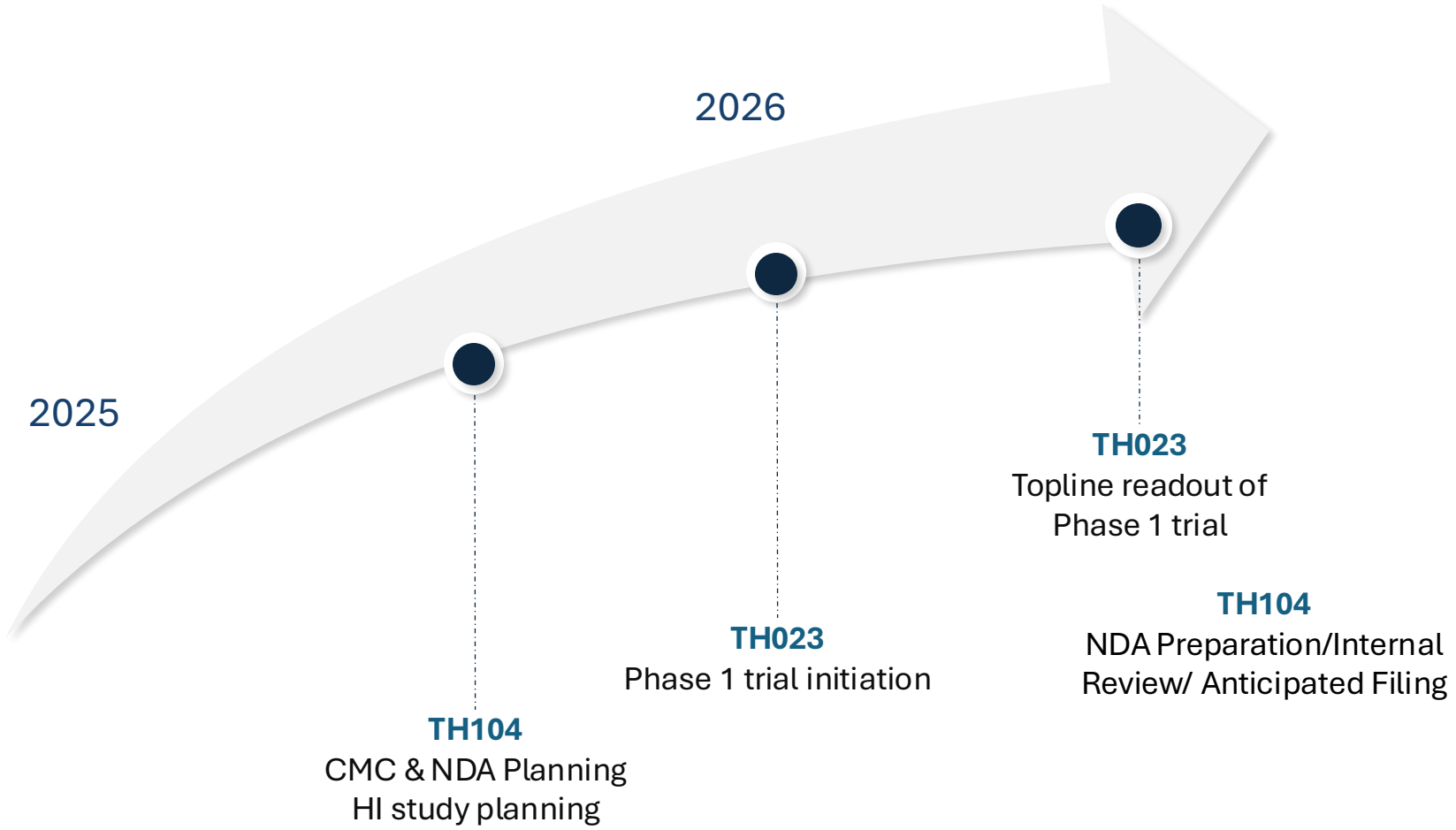


Enzyme Stabilizer + Amino Acids

- ✓ — Enzyme protection for high local tissue exposure
- ✓ — CMC/COGS
- Modest permeation enhancement

Anticipated Key Upcoming Milestones

Multiple clinical milestones in the **next 18 months**



Management Team & Board

Executive Team

Vincent LoPriore
Executive Chairman
of the Board

Sireesh Appajosyula
Chief Executive Officer
Board Director

Nir Barak, MD
Chief Medical Advisor

Board of Directors

Vincent Lopriore
Executive Chairman & Director

Gary Stetz
Independent Director

Clay Kahler
Independent Director

Sanam Parikh
Independent Director

James Gordon Liddy
Independent Director

Investment Highlights

Developing **novel treatments for unmet needs**, with lead program TH104:

Temporary prophylaxis of respiratory and/or nervous system depression in military personnel and chemical incident responders entering an area contaminated with high-potency opioids

Clinical-stage Pipeline

- TH104: First-in-class buccal film delivery of nalmefene for military use (NDA Fileable)
- TH023: Oral anti-TNFα monoclonal antibody targeting autoimmune diseases (Phase 1-ready)

Underserved Market Opportunities

- Military & chemical incident responder use for ultrapotent opioid exposure is an unmet need
- Oral anti-TNFα opportunity has potential to disrupt $50B+ global autoimmune biologics market

Proprietary Innovation

- TH104's buccal film potentially avoids first-pass metabolism while delivering rapid relief
- TH023's oral formulation offers a patient-friendly alternative to injectables

Strong Leadership & Clinical Expertise

- Management & Board has a proven track record
- Clinical team with extensive experience in drug development

Near-Term Clinical & Regulatory Milestones

- TH104: Received positive FDA feedback with path to NDA filing in 2026
- TH023: Phase 1 study to establish oral bioavailability planning underway

Appendix: Major Unmet Need for Chronic Pruritis (Severe Itching) in PBC

TH104

Primary Biliary Cholangitis (PBC) is a rare, chronic autoimmune liver disease that leads to bile duct damage and progressive liver failure

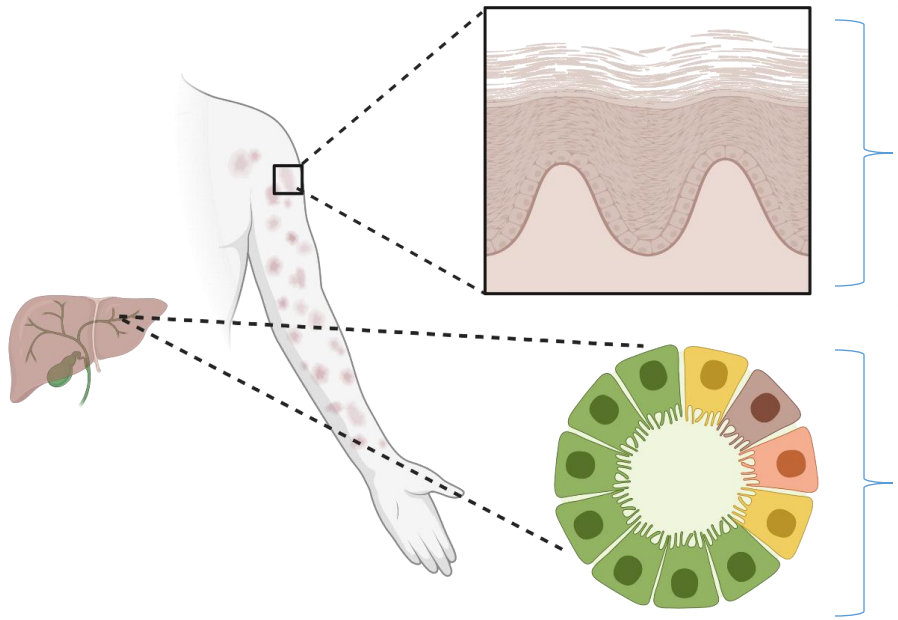
>150,000
US cases

Orphan Disease in US and EU

>200,000
Global cases

~90%
PBC cases are women

~65%
Have worse nocturnal pruritis



More than 70% of PBC patients affected by pruritus[1]

PBC is a chronic disease where bile ducts in the liver are eventually dysfunctional; the bile builds up and causes liver damage[4]

Current Treatment Gaps

- Limited options: No convenient FDA-approved therapies for PBC-related pruritus
- Existing treatments have suboptimal efficacy or cause significant side effects
- Significant QoL impact: leads to sleep disturbance, anxiety and depression

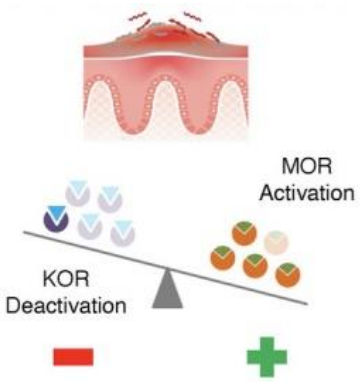
In patient testimonials, PBC itch is described as **"the worst, most unimaginable itch, like bugs crawling under the skin"**

Appendix: TH104 Mechanism of Action: Dual Modulation of Receptors

Growing Market Opportunity Unlocked by Addressing Root Causes

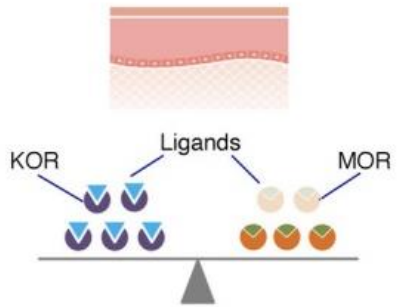
1 TH104 functions by **restoring the opioid receptor activation imbalance** implicated in promoting itch across many liver diseases

Pruritic Skin



Induction of itch from overactivation of MOR and/or KOR deactivation

Normal Skin



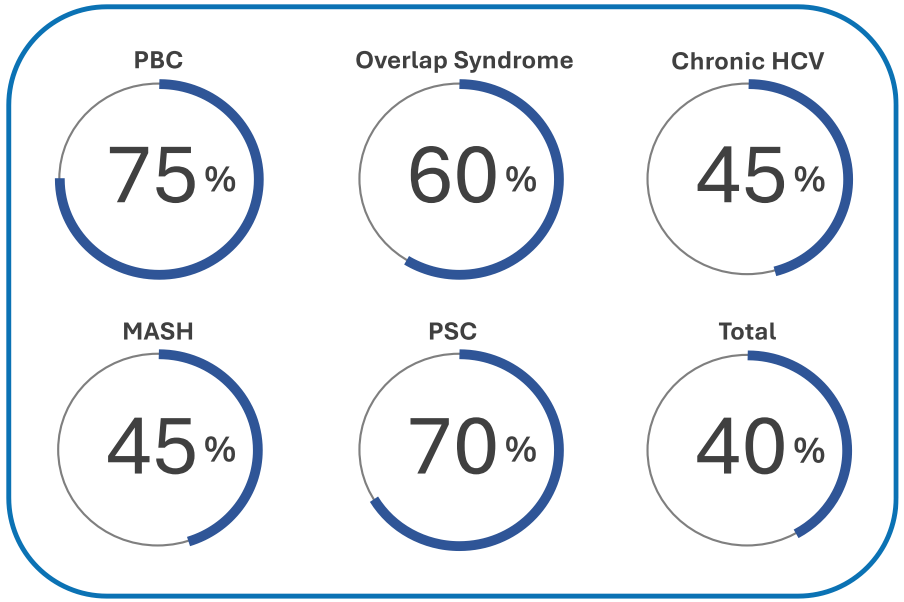
THAR104 looks to balance MOR and KOR activation to relieve pruritus

Kappa-opioid receptors (KORs) and mu-opioid receptors (MORs) are implicated in both the suppression and promotion of itch, respectively, and pronounced in conditions such as liver and atopic diseases

2 This unlocks **clinical potential across multiple indications** with PBC being the first

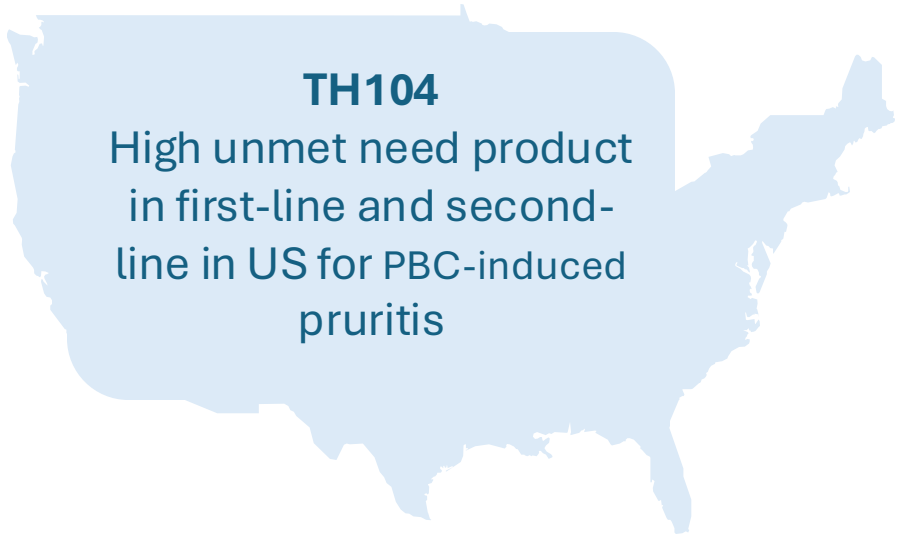
~1.7 million patients

Prevalence of pruritus in liver diseases[2,3,4]



Appendix: TH104 – Market Opportunity and Differentiation

TH104



Treatment	Mechanism	Limitations	TH104's Advantage
Bile acid binders (e.g., cholestyramine)	Reduce bile salts	Poor tolerability, GI side effects	Buccal film avoids GI issues
Rifampin	antibacterial, PXR agonist	Hepatoxicity concerns	Improved safety profile
Opioid antagonists (e.g., naltrexone)	Central opioid modulation	Liver metabolism	Lower systemic exposure
TH104	**Dual opioid receptor modulation**	**Targeted delivery, generally safe, non-invasive**	**Potential best-in-class therapy**

Global PBC treatment market valued at ~$2.5B and expected to grow

Global chronic pruritus treatment market projected to exceed $7B by 2030 (across multiple conditions, including liver disease)

Regulatory & Commercial Potential for TH104

- Regulatory pathway: FDA approval pathway under 505b2 path with de-risked active
- Physician & patient adoption: non-invasive, easy-to-administer therapy more compelling
- Improved formulation: first buccal delivery treatment targeting PBC pruritis specifically

Appendix: TH104

Phase 1 Chronic Liver Disease (CLD) Study Results

All Patients Responded to TH104

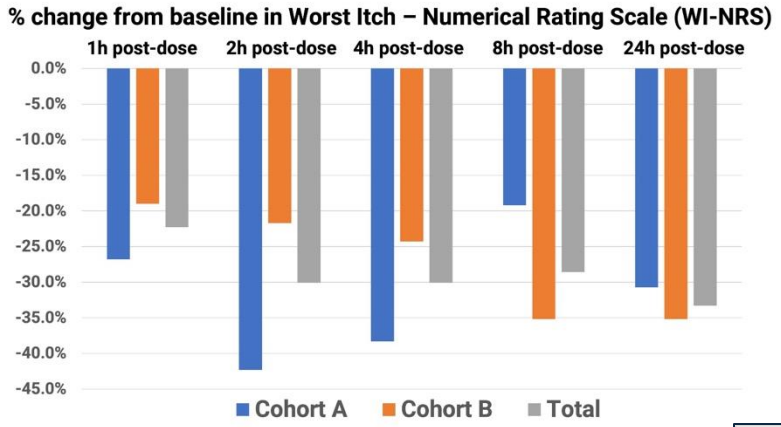
Single-dose, single-center, open-label, randomized, study conducted in India in two different cohorts

Primary outcome measure: safety and tolerability of a buccal dose in CLD patients

At 24-hours, Groups A & B had mean declines of 30.7% & 35.2%, respectively in pruritus scores. ***All 12 subjects had a mean decline of 33.3% in itch scores after a single dose at 24-hours*** post dosing

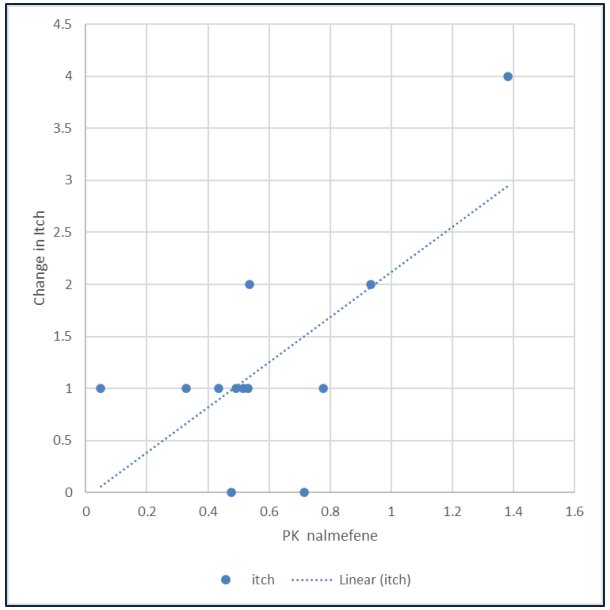
The correlation coefficient between TH104 AUC and change in itch, r, was 0.7060, with a p-value of 0.0103 and a 95% confidence interval for r of 0.2220 to 0.9108.

n=12; Cohort A (6); Cohort B (6)



The Worst Itch Numerical Rating Sale (WI-NRS) is a validated scale with 11 numbers - 0 representing "no itch" to 10 representing "worst imaginable itch"; patients are asked to pick the number corresponding to the intensity of their pruritus.

Significant correlation shown between blood levels and symptom relief*; TH104 was well tolerated with no unexpected treatment-emergent adverse events*



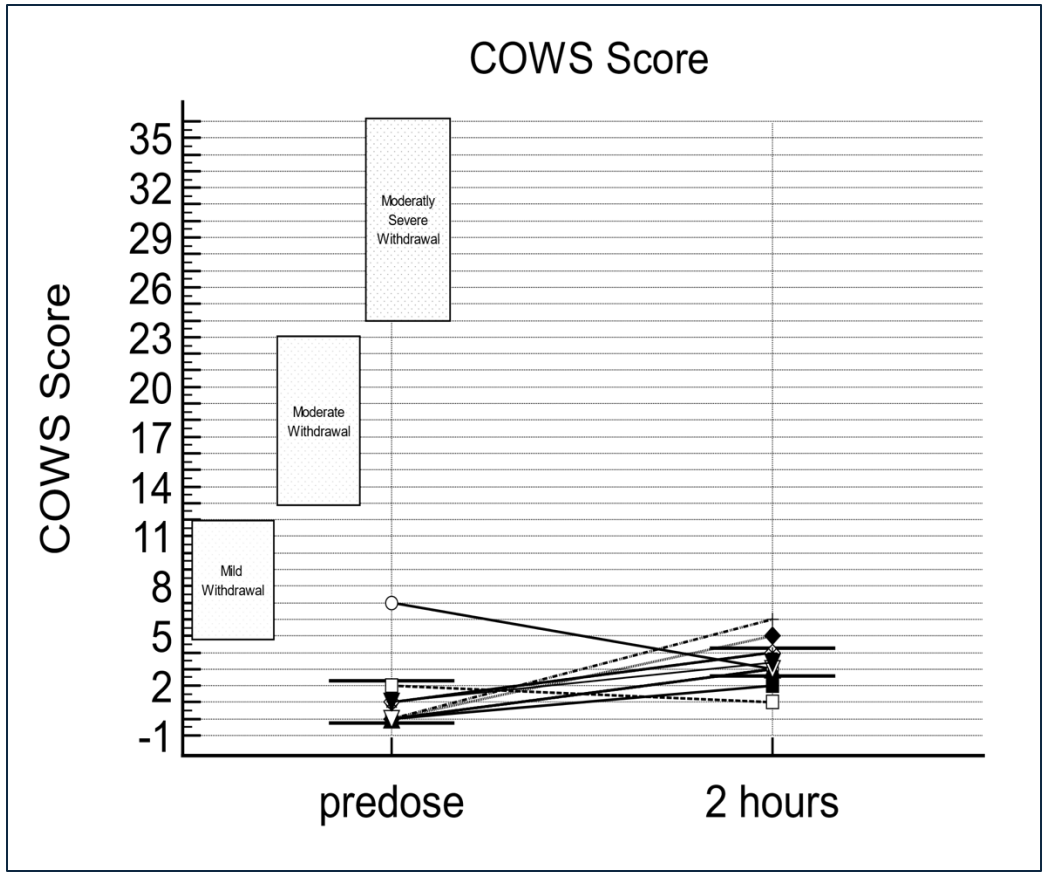
Poster titled "4348: Correlation Between the Pharmacokinetics of TH104 and Pruritus Relief in Patients with Cholestatic Pruritus," presented at the 75th American Association for the Study of Liver Diseases (AASLD) Annual Conference at The Liver Meeting® 2024, November 15-18 in San Diego

Appendix: TH104

Withdrawal Symptoms were not seen in CLD patients given TH104

TH104 did not induce withdrawal symptoms in CLD patients after a single low dose

- Assessment of patients for withdrawal symptoms used the Clinical Opiate Withdrawal Scale (COWS)
- The COWS is an 11-item clinician-administered scale for inpatient and outpatient settings to rate common signs and symptoms of opiate withdrawal and monitoring
- **Study results indicate the use of TH104 2 mg in patients with mild and moderate cholestatic liver disease is safe and tolerable and not associated with opioid withdrawal syndrome**



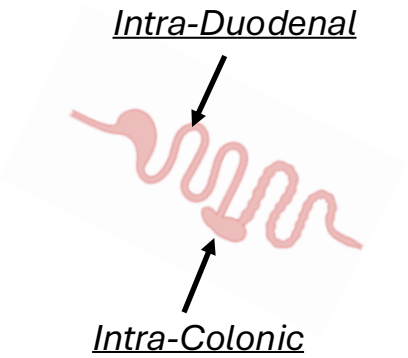
Poster titled "P1780: Safety and Tolerability of TH104, Buccal Nalmefene, in Patients with Cholestatic Liver Disease and Pruritus," presented at the American College of Gastroenterology (ACG) Annual Scientific Meeting October 25-30 in Philadelphia

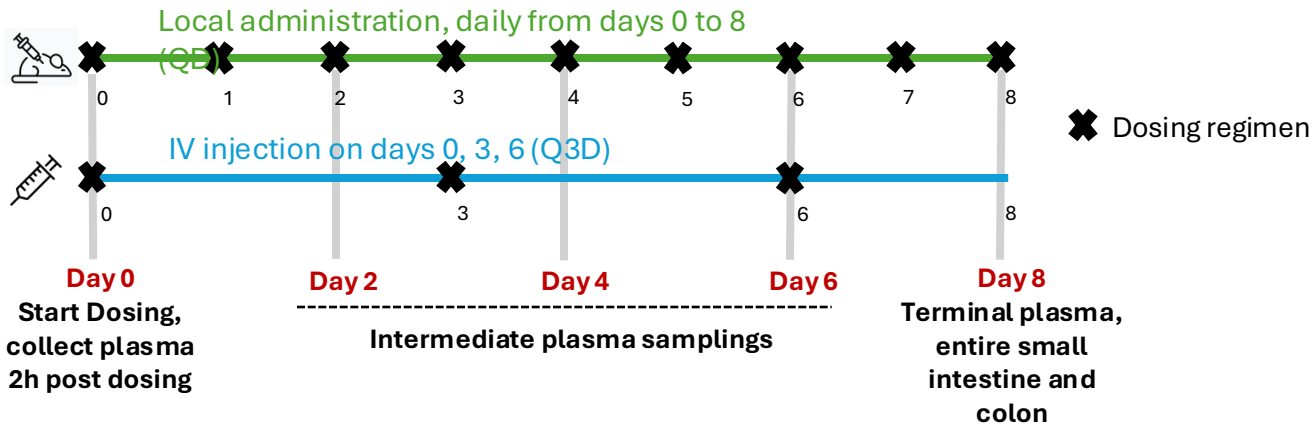
Appendix: TH023

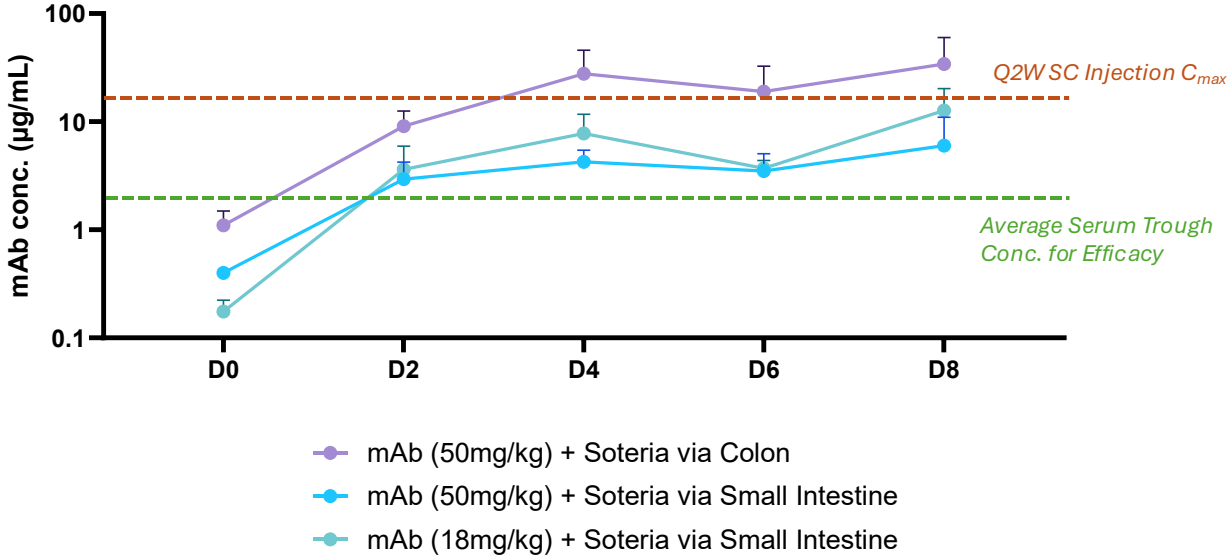
TH023 Exceeds Trough Concentration and Matches Subcutaneous Injection C_{max}

In-vivo PK in Healthy Mice Following QD Dosing for 1wk

Healthy C57BL/6 mice







Colon targeting of mAb showed higher systemic conc. vs **small intestine delivery**, potentially due to better enzymatic stability and active transport receptor engagement

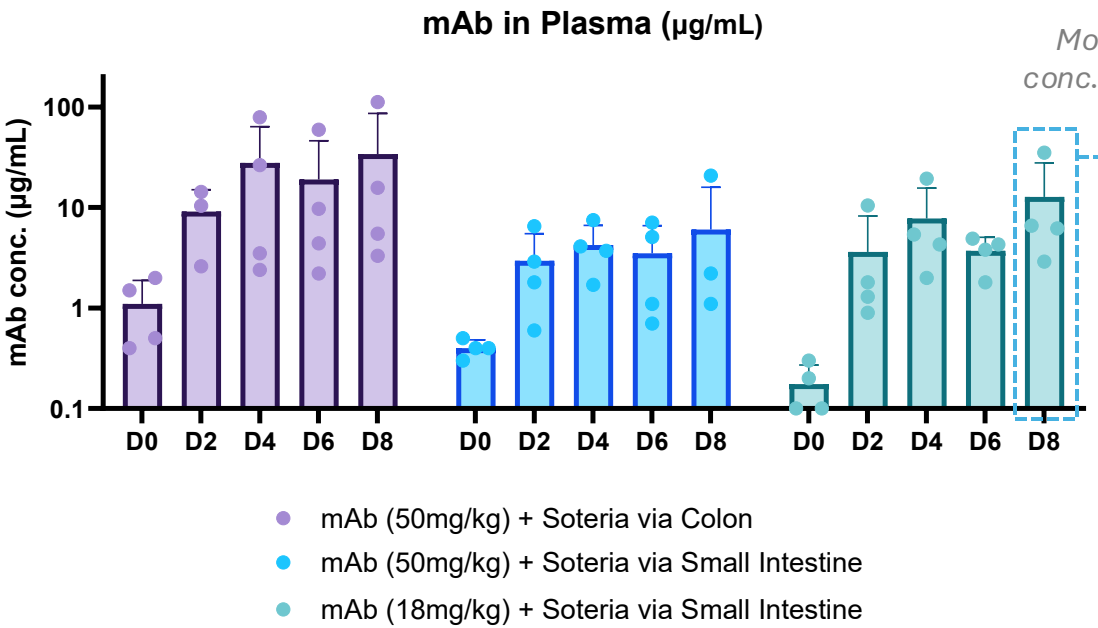
No dose effect observed between 50 and 18mg/kg, potentially due to intestinal epithelial transport saturation.

QD dosing of antibody enables build-up in plasma levels due to $t_{1/2}$ of ~3-4 days in mouse.

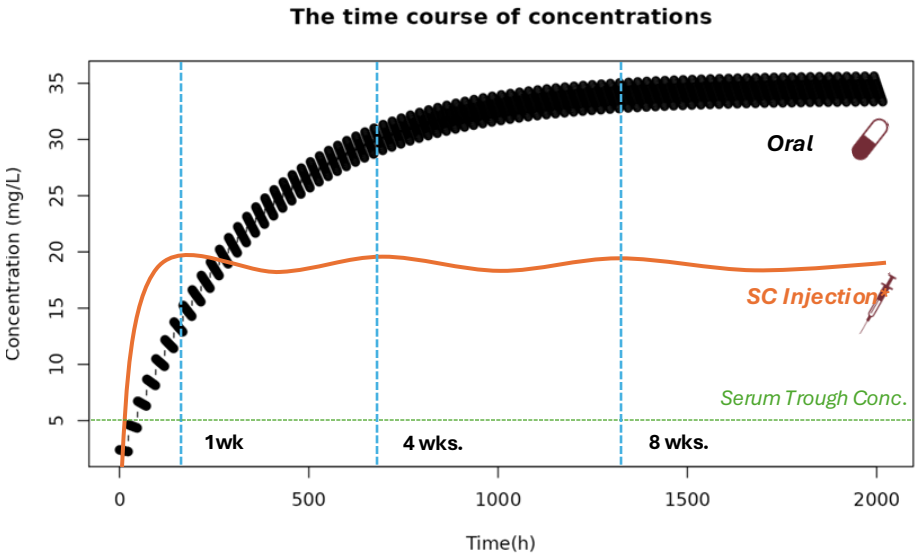
Appendix: TH023

TH023 Systemic Concentration May Exceed Injection Trough and C_{max}

PK Plot with Individual Mouse Data Points



Modelling 1wk mAb plasma conc. to 12 wks. in humans with $t_{1/2}$~10 days



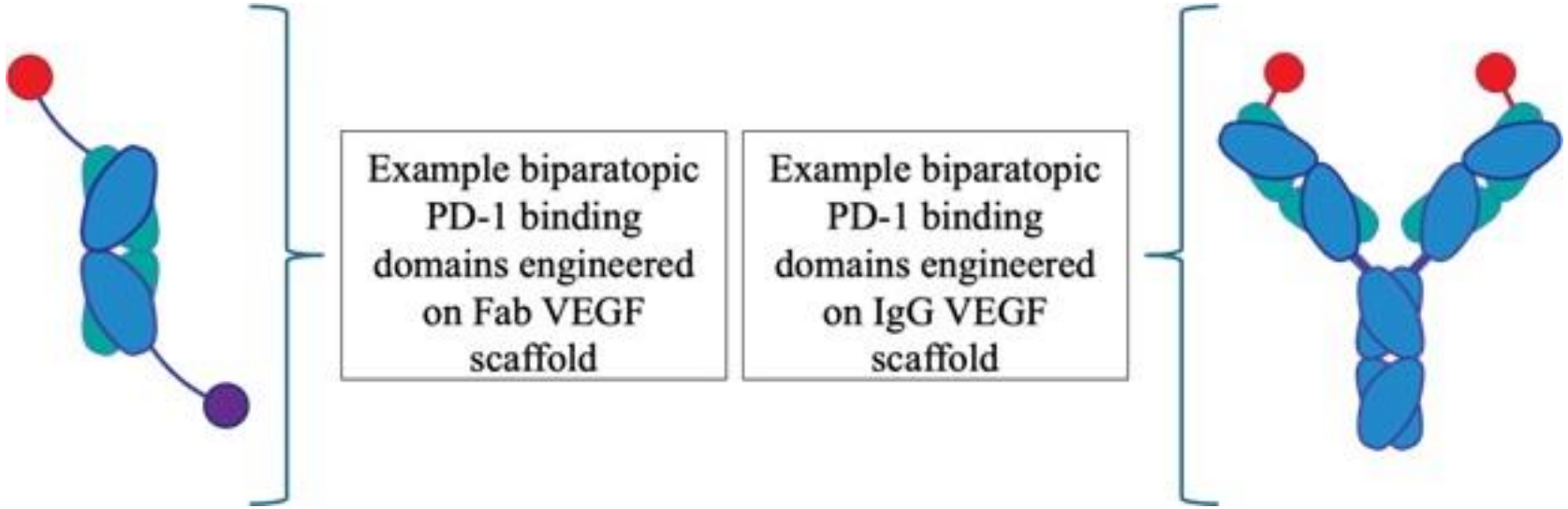
- ✓ All arms reached > therapeutic serum trough concentration for injectable mAbs in humans
- ✓ When 1wk plasma conc. is modelled in humans with a $t_{1/2}$ of 10days, the mAb concentration surpasses Q2W 240mg SC injection PK profile

*Schreiber et al., Gastroenterology, 2021; 160:2340-2353

Appendix: HS1940

EpiClick™ is a platform for customizing multispecific antibodies

HS1940 - multispecific biologic binds to both Programmed Death-1 (PD-1) and Vascular Endothelial Growth Factor (VEGF)



- EpiClick enables rapid and efficient creation of modular antibodies capable of high specificity and affinity toward multiple targets
- Anti-PD-1 components leverage novel design inspired by bovine antibodies enabling targeting of previously undruggable epitopes