Introduction of
NASH Asset

JD BIOSCIENCE

March 2022

Vision

To be the leading small molecule company in the field of fibrotic related disease

Our Mission

"To discover drugs for the unmet needs related to fibrosis and fibrosis-related diseases such as Cancer, Cardiovascular, and Metabolism"

Our Goals/Accomplishments

2021-Present Expanding drug pipelines/ making global licensing deals

- Investigating novel biomarkers for unmet medical needs
- Initiating first-in-class drug development using novel biomarkers
- Making technology licensing deal

2018-2020 Initiating collaborative research with bio ventures

- Providing medicinal chemistry services to partners
- Accumulating knowhow and experience for novel drug development
- Creating a stable sales revenue

2017 Developing drug candidates for fibrotic diseases

- NAFLD/NASH
- Inflammatory bowel disease
- Heart disease

Company Timeline

- **July 2017** — JDB Founded
- **Aug 2017** — **Pre-A** led by Sunbo Angel Partners
- **Sept 2017** — JDB Trademarked
- **Oct 2017** — TIPS R&D business project by the Ministry of SMEs and Startups
- **Feb 2019** — **Series A** led by Mirae Asset Capital; Opened the Seoul office Established the R&D center at GIST, Gwangju
- **March 2019**
- **Jan 2021** — **Series B** led by Mirae Asset Capital
- **Nov 2021** — Tox study completed
- **Jun 2022** — NASH Phase I clinicals

Core Research

Research Collaborations

CELLTRION · INNOVO THERAPEUTICS · AVENTI BIOTECHNOLOGY · RaND Bioscience · cellus · RITECH Rice Technology · COWELL BIODIGM · KBlueBio · ENHANCEDBIO INC · SoVarGen Somatic Variations Genomics · 가천의대길병원 Gachon University Gil Hospital · 주식회사 휴엔켐 · 연세대학교 의과대학 YONSEI UNIVERSITY COLLEGE OF MEDICINE

Management Team

CEO & Founder | Jin Hee Ahn, Ph.D

- Professor, GIST
- 2Principal Researcher, KRICT
- Postdoc, Chemistry, UC Berkeley
- Ph.D., Chemistry Sogang Univ.

Executive Advisor| Doo Seop Kim, Ph.D.

- Vice president & CTO, Kainos Medicine
- Chief investigator, Merck & Co
- Postdoc, Bioorganic Chemistry, Columbia Univ
- Ph.D., Organic Chemistry, Univ. of Pittsburgh

Chemistry Director| Seongrim Byeon, Ph.D

- Director/Healthcare division/R&D, Kainos Medicine
- Research Scientist, KIST
- Postdoc, Chemistry, Duke Univ.
- Ph.D., Chemistry, Sogang Univ.

BD Director | Sungmin Song, Ph.D

- Technology licensing manager, GIST
- Researcher, KRIBB
- Ph.D./post-doc, Biology, Freiburg Univ.

Innovation Director | Peter Goughnour, Ph.D

- Curigin R&D Director
- Kyung Hee Univ. Research Professor
- Ph.D./Post-Doc, Pharmacology, Seoul Nat. Univ.

SAB Members

Chief Advisor| Rohit Loomba, M.D, MSHc

- Director, NAFLD Research Center, UCSD
- Professor of Medicine, Director of Hepatology, UCSD
- Vice Chief, Division of Gastroenterology
- Adjunct Professor, Division of Epidemiology, USCD

Cofounder| Hail Kim, M.D, Ph.D

- Medical science and engineering, KAIST, Professor,
- Postdoc, UCSF
- M.D., Ph.D., Yonsei University College of Medicine

Cofounder| Inkyu Lee, M.D, Ph.D

- School of medicine, KNU, Professor,
- M.D., Ph.D. School of medicine, KNU.

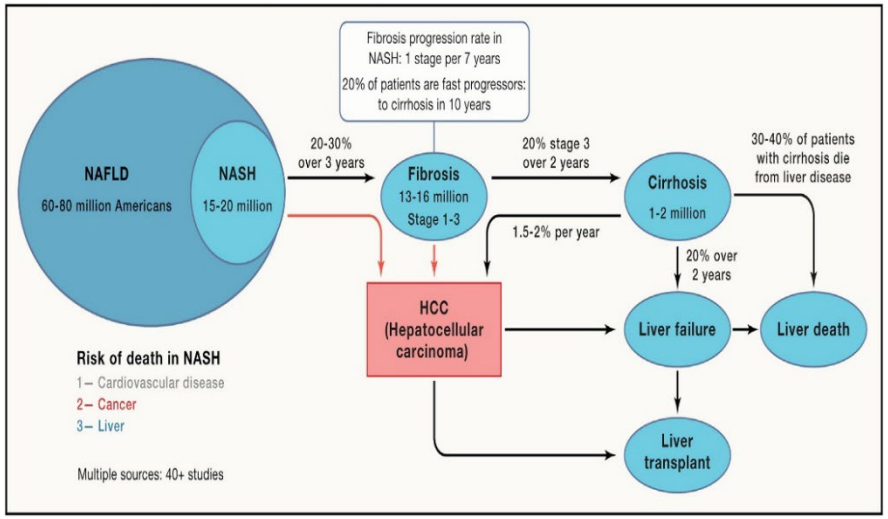
Cofounder| HMyung Ae Bae Ph.D

- Bio & Drug Discovery,KRICT, Principal Researcher
- Postdoc, NIH
- Ph.D., Kyungpook National University

NASH population

- Experts estimated that **24%** of U.S. adults have NAFLD
- **6.5%** of NAFLD have NASH
- **20~ 30%** of patients with NASH progress to liver fibrosis in **7** years
- **20%** of them progress to cirrhosis within two years

NIH report, 2021

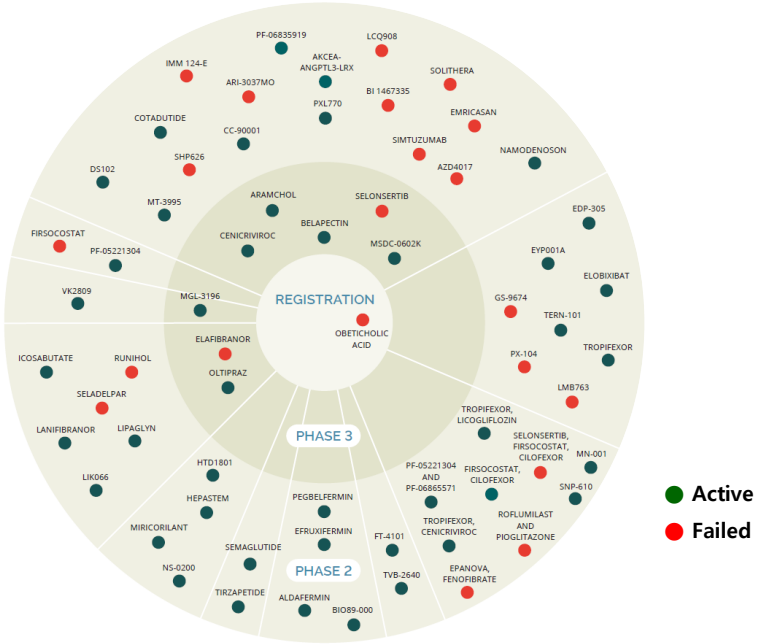


Loomba and Shulman, 2021

Unmet Need

More than 100 drug candidates are currently in clinical trials

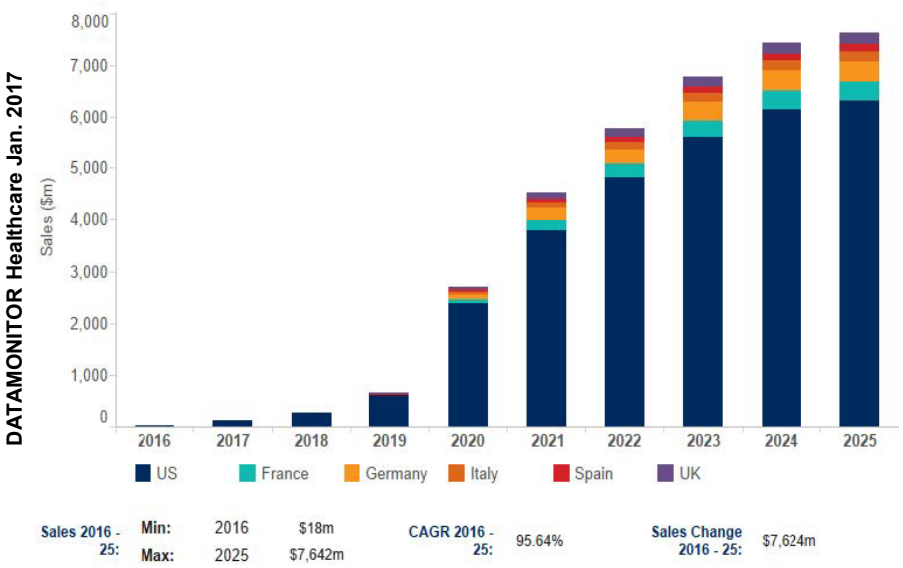
NO drugs for NASH are commercially available



Back Bay Life Science Advisors, 2020

NASH market overview

- Current market size of NASH treatment **<$1 billion** due to a lack of drug options
- The sale volume of NASH drugs is expected to **grow rapidly**



NASH drug sales (2016 to 2025)

Licensing Deals

- NASH assets **(> $100 million**)
- Majority of these assets are small molecules.

Year	Licensor	Licensee	Active ingredient	Stage	Licensing fees
2014. 12.	Phenex	Gilead	**FXR agonist**	P2	**$470M**
2015. 05.	Pharmaxis	B.I.	**SSAO/VAP-1**	P1	**$600M (upfront: $31M)**
2016. 09.	Akarna Therapeutics	Allergan	**FXR agonist**	P.C.	**Unknown (upfront: $50M)**
2016. 09.	Tobira Therapeutics	Allergan	**CCR2/5 antagonist**	P2	**$1.7B**
2019. 01.	Yuhan Corp.	Gilead	**Small molecules (undisclosed)**	P.C.	**$785M (upfront: $15M)**
2019. 07.	Yuhan Corp.	B.I.	GLP-1/FGF21 dual agonist	P.C.	**$870M (upfront: $40M**
2019.12.	Pliant Therapeutics	Novartis	**αVβ1 integrin agonist**	P.C.	**Undisclosed (upfront: $80M)**
2020. 08.	Thera Biosciences	LG Chem	**VAP-1 antagonist**	P.C.	**$350M**
2020. 08.	Hanmi Pharma	Merck & Co.	GLP-1/GCG dual agonist	P2	**$870M (upfront: $10M)**
2020. 11.	Enleofen	B.I.	IL-11 AB	P.C.	**$1B**
2020. 12.	Aligos Therapeutcis	Merck & Co.	Oligo nucleotide	P1	**$458M**

Licensing deals (2014 to 2020)

Mechanism of Action (MOA)

- In a mouse model, a high-fat diet (HFD) increases both serotonin (5-hydroxytryptophan, 5-HT) levels in the plasma levels (portal blood) and serotonin receptor (5-HT receptor 2a, Htr2a) expressions in the liver.
- Activation of the serotonin receptor induces lipogenic gene expression, which in turn enhances lipid storage in hepatocytes
- GM-60106 can effectively reduce lipogenesis, inflammation, and fibrosis in the liver and doesn't induce any BBB-mediated side effects.

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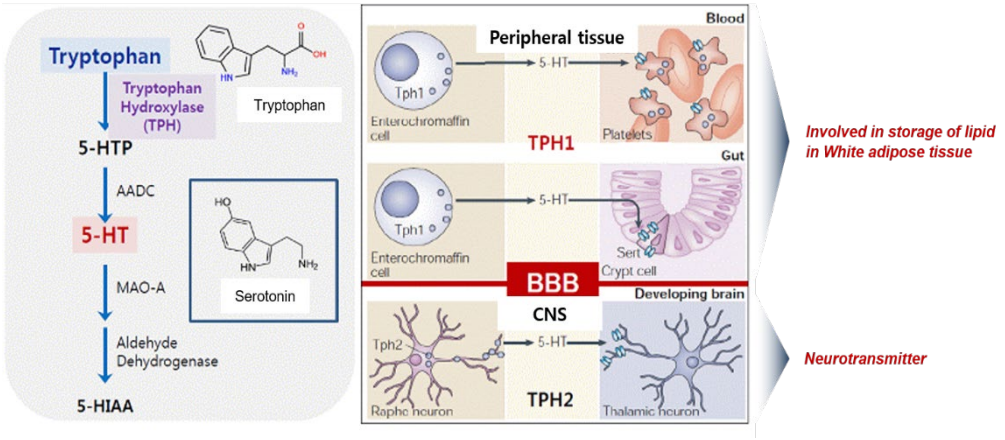
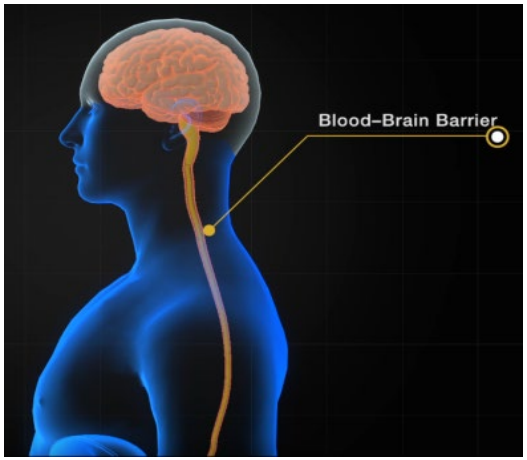
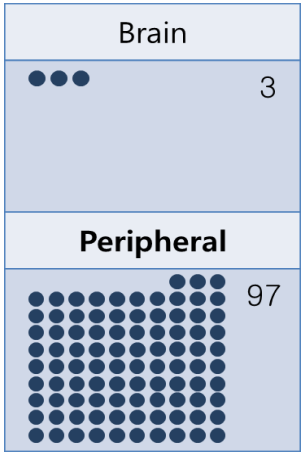
Serotonin signals through a gut-liver axis to regulate hepatic steatosis



Minimal Blood Brain barrier permeability





Assays	Results
Physicochemical Property studies	✓
In vitro assays	✓
Pharmacokinetic assays	✓
In vivo efficacy assays	✓
Metabolic stability assays	✓
CMC studies	✓
Preclinical toxicity studies	✓

Intellectual property management plan

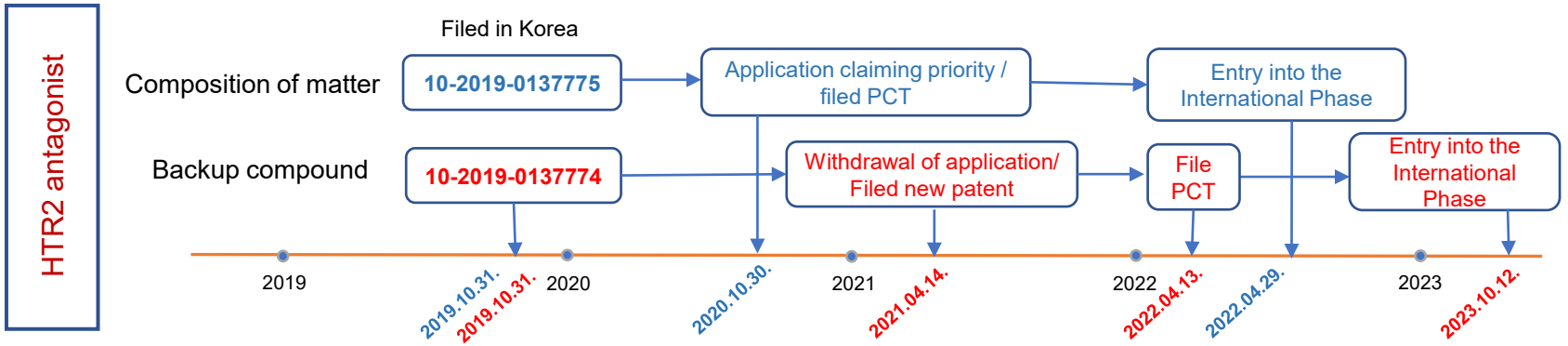
Patent for a composition of matter was filed in 2019

- Started filing international patents

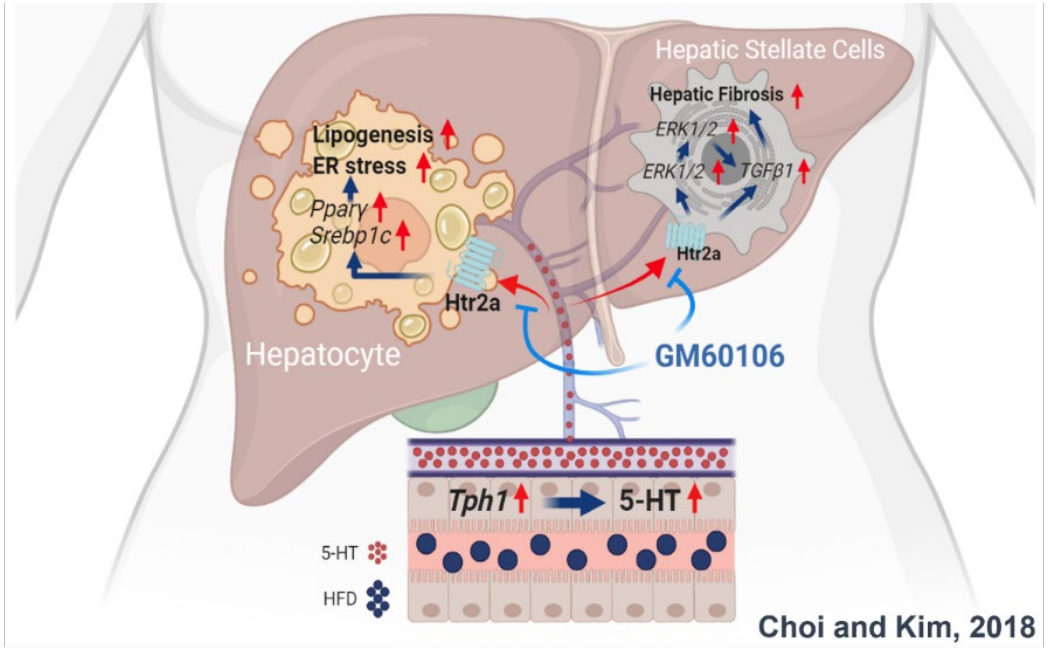
Backup compound was also prepared

- Patent was filed in 2021.

IP Country Filing

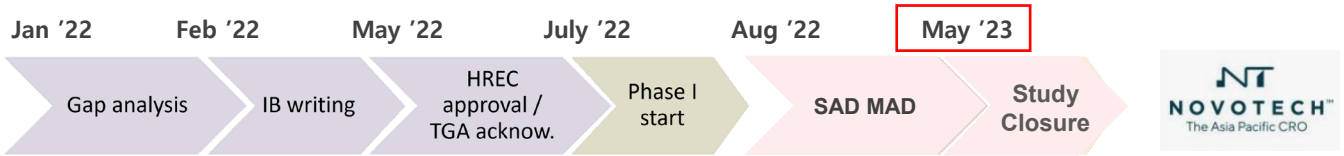


Summary



- **Discovered unknown roles for HTR receptor-mediated serotonin signaling in liver, which is related to the progression of NASH and liver fibrosis.**
- **GM-60106 compound was synthesized a chemical compound that directly inhibits HTR2a receptors on liver cells.**
- **GM-60106 preclinical studies were completed showing reduction in lipid accumulation in the liver, fibrosis, and steatosis.**
- **Proprietary compounds are IP protected**

Clinical Phase I Estimated Timeline



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- ✓ **Innovative First-in-Class Technology: HRT2a**
- ✓ **Direct mechanism for NASH-related fibrosis**
- ✓ **Superior efficacy, kinetics, and safety**
- ✓ **GM-60106 shows stronger efficacy for liver fibrosis and inflammation compared to other drug designs**
- ✓ **The compound shows optimal PK profiles for an oral administrative drugs**
- ✓ **Safe, NO CNS-mediated safety issues**

JDB's Strategic Alignment:

- **Licensing out GM-60106**
  - ➢ **Exclusive and/or Territorial rights**
- Partnership to lead metabolic disease market
  - ➢ Convergence of our small molecule with antibody/PROTAC to help with metabolic disorders and cancer
- JDB's chemical knowhow with partner's global development capabilities

THANK YOU

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For more information, please contact:

Sungmin Song, Ph.D
Phone:+82-62-974-9380
Email: seaflow@jdbiosci.com

Peter Goughnour, Ph.D
Phone:+82-2-406-9380
Email: petergoughnour@jdbiosci.com

801ho, TJS knowledge industrial center 17-23, Cheomdangwagi-ro, 208 beon-gil, Buk-gu, Gwangju, South Korea

www.JDBIOSCI.COM | +82-62-974-9380