

# NEW DRUGS & HEALTH TECH AT HKBU

Translating Innovation &  
Creativity for Impact

# Contents

Introduction	4-5
About IIT	6-7
Strategic Alliance and Entrepreneurship	8-9
Platform and Infrastructure	10-19
Our Innovative Endeavours and Start-ups	20-57

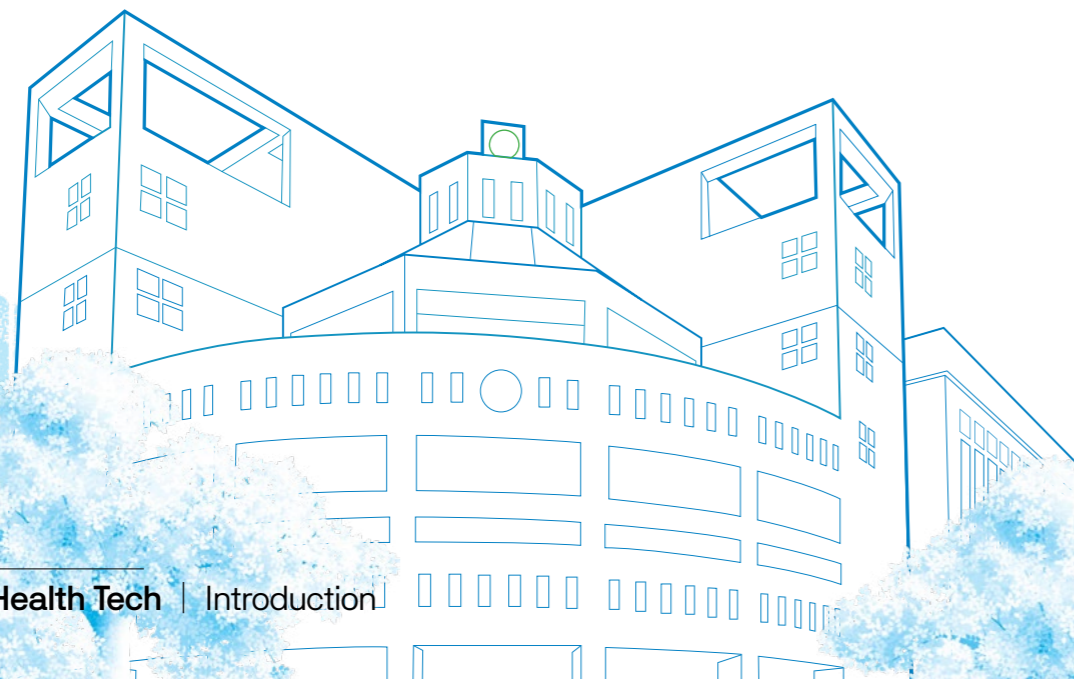
## NEW DRUGS AND HEALTH TECH

enable us to explore the intricate mechanisms of living organisms and unlock groundbreaking biological insights that pave the way for advancements in health and medicine.

# HONG KONG BAPTIST UNIVERSITY

Hong Kong Baptist University (HKBU) is committed to the pursuit of excellence in education, research and service to the community. As one of Asia's finest institutions of higher learning, HKBU is dedicated to nurturing future generations of civically engaged community members, and it provides them with a broad-based, transdisciplinary and creative education. Its seven faculties/schools offer a wide array of programmes across a diverse range of disciplines, from the arts, business, communication, and social sciences to science and technology, Chinese medicine and sport.

HKBU offers an education and research environment that fosters technological progress with a focus on the human dimensions. At the same time, the University is using technology to push the envelope of human imagination in the arts and cultural sphere. Coupled with our unceasing efforts to achieve breakthroughs in science and Chinese medicine, HKBU strives to contribute to the building of a better world and a more compassionate society.



# OUR STRATEGIC CLUSTERS

## Art, Culture and Creative Media

Film, Literary Arts, Music, Visual/Media Arts



## Data Analytics and AI

Enabler for applications such as journalism, business and finance, science and art

## Health, Chinese Medicine and Drug Discovery

Chinese medicine, Chemistry, Microbiology, Ageing, Physical Education



## Humanities and Cultures

Philosophy, Literature, Geography, History, Political Science, Communication, Economics and the like

# TRANSLATING INNOVATION & CREATIVITY FOR IMPACT

## The Institute for Innovation and Translation (IIT)

at HKBU is dedicated to driving innovations, research and development, technology translation, and applications to enable HKBU to respond to emerging challenges and opportunities at the global and national levels, and under the aegis of the Hong Kong Special Administrative Region of the People's Republic of China (HKSAR), where innovation and technology development remain a top policy priority.

We strive to bridge the gap in technology readiness between academic innovation and industry applications for the well-being of society.

IIT comprises

### **Innovation and Entrepreneurship** **Technology Translation**

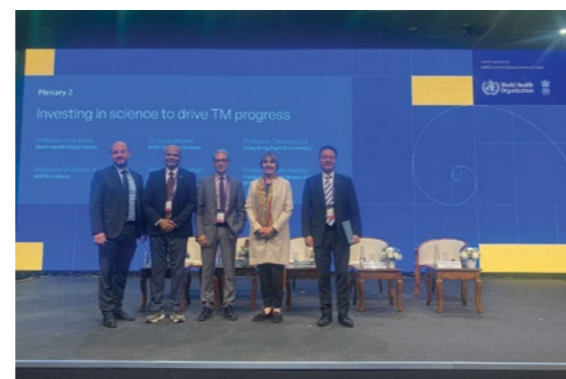
each being instrumental in fostering a vibrant ecosystem at HKBU conducive to technology translation and collaborations.

The all-round business development, scientific, and policy research support will anchor HKBU's robust and sustainable development.

# STRATEGIC ALLIANCE AND ENTREPRENEURSHIP

## Accelerating Technology Translation and Application

To bridge the gap in technology readiness between academia and industry in technology development, IIT strives to enhance HKBU's innovation capacity and improve our research and technology development capabilities through proactive outreach and engagement with strategic partners and investors. We achieve this by establishing collaborative platforms, engaging stakeholders, facilitating high-impact innovation, and conducting multidisciplinary R&D.



IIT offers support and resources to mature technology and startups of HKBU in realizing their potential to generate social, economic, and cultural impacts. To showcase the potential of technology, IIT identifies anchor events in different industries to participate and demonstrate technology applications to industry players and investors.

# PLATFORM AND INFRASTRUCTURE

Building collaborations and having state-of-the-art infrastructure play crucial roles in driving successful research and development (R&D) and technology translation for universities. Collaborations enable researchers to tap into a diverse pool of expertise, resources, and funding, fostering innovation and accelerating the pace of discovery all the way through to application. By partnering with industry, government, and other stakeholders, universities can leverage complementary strengths, share knowledge, and tackle complex challenges collectively.

Additionally, having well-equipped lab infrastructure is essential for conducting cutting-edge research. Advanced laboratories provide researchers with the necessary tools, equipment, and technologies to explore new frontiers and push the boundaries of knowledge. They create an environment that fosters creativity, collaboration, and interdisciplinary research.



## China Resources Enterprise, Limited

A joint centre in smart Chinese medicine with China Resources Enterprise



## Hong Kong-Shenzhen Innovation and Technology Park Limited

Supporting HKBU's translational R&D and gaining market access needs for HKBU's start-ups and entrepreneurs



## Kowloon Hospital

Strategic partnership to advance AI healthcare research and development



## National Eastern Tech-Transfer Center

Bridging academic excellence with industrial innovation to create a cross-regional technology transfer powerhouse



## SCGC

Jointly promoting the commercialisation of HKBU's research and cultivate entrepreneurial talent through resource sharing and collaborative initiatives



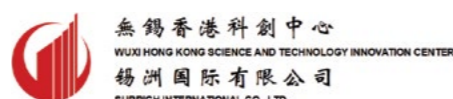
## Shanghai Industrial Investment (Holdings) Co Ltd

Establishing strategic partnership to advance translational medicine research and application



## SPH-Inno

Facilitating development of HKBU's start-ups, entrepreneurship and collaborative research empowered by Shanghai Pharma for innovative life science ventures, featured with state-of-the-art facilities and a tailored ecosystem



## Surrich International Co., Ltd.

Promoting cooperation on technological innovation, incubation programme, project investments and talent exchanges



# WU JIEH YEE INSTITUTE OF TRANSLATIONAL CHINESE MEDICINE RESEARCH (WJY ITCMR)

伍絮宜中醫藥轉化研究所  
WU JIEH YEE INSTITUTE OF  
TRANSLATIONAL CHINESE MEDICINE RESEARCH

Funded by the Wu Jieh Yee Charitable Foundation, the WJY ITCMR is envisioned as a modern platform for the advancement of Chinese medicine, leveraging state-of-the-art research infrastructure to support innovation, technology development, and product commercialisation. The Institute is committed to **translating scientific discoveries into clinical applications and driving the standardisation and internationalisation of Chinese medicine** through cutting-edge research, interdisciplinary collaboration, and the integration of innovative technologies.



With its comprehensive research capabilities, WJY ITCMR provides an ideal environment for pioneering research and development. The Institute empowers researchers to pursue transformative studies and fosters the creation of novel technologies and data-driven solutions that bridge laboratory findings with real-world healthcare needs.

WJY ITCMR is rapidly emerging as a vibrant hub for research and collaboration in Chinese medicine. Currently, the Institute supports a dynamic and expanding community of over 100 researchers and is actively engaged in more than 30 ongoing projects spanning a broad spectrum of topics, from evidence-based Chinese medicine and smart diagnostics to tele-healthcare solutions and beyond. Through these efforts, the Institute continues to advance the frontiers of translational Chinese medicine research, contributing significantly to healthcare innovation and societal well-being.



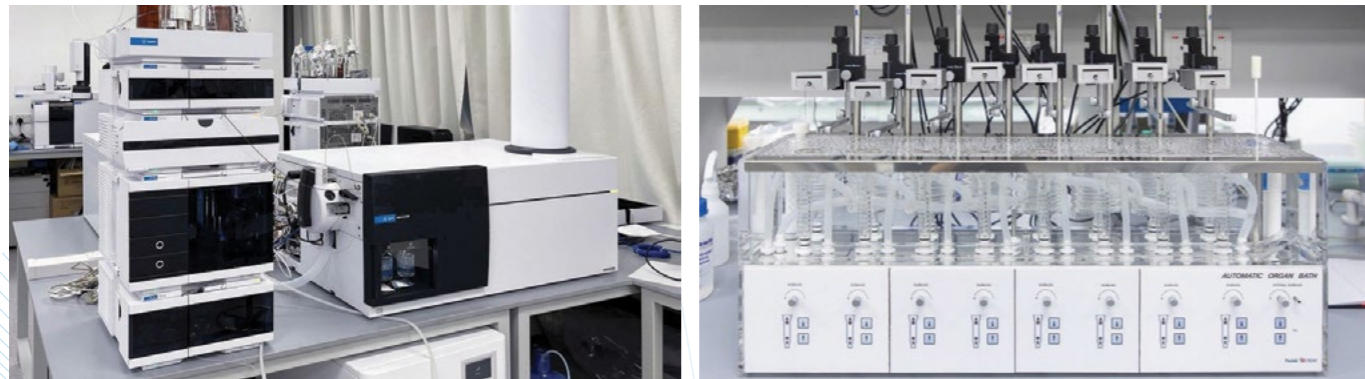
## Exemplary Project: Development of Highly Absorbed Oral Berberine for Metabolic Diseases

Berberine (黃連素) is renowned for its efficacy in managing metabolic syndrome, including blood sugar, lipid, and pressure regulation, as well as fatty liver disease. However, its poor absorption (0.3–0.7%) due to gastrointestinal P-glycoprotein (P-gp) leads to side effects such as diarrhea and abdominal pain. This project employs a patented, non-absorbable P-gp inhibitor, encequidar, which enhances berberine absorption by 30-fold in rat models. This improvement allows for lower doses, reducing side effects while maintaining efficacy, and offers new potential for metabolic disorder treatment.

# CENTRE FOR CHINESE HERBAL MEDICINE DRUG DEVELOPMENT

## An InnoHK R&D Centre

Funded by the InnoHK initiative of the Innovation and Technology Commission of the Government of the HKSAR, Centre for Chinese Herbal Medicine Drug Development (the Centre) was established in September 2020, aims to improve pre-clinical and clinical Chinese Herbal Medicine (CHM) research, translating it into international pharmaceutical products. It focuses on developing treatments for ulcerative colitis and chronic constipation, supporting CHM-based start-ups targeting global markets, and nurturing CHM research talent in Hong Kong.



## Novel Chinese medicine for constipation CDD-2101

- Chronic constipation is affecting approximately 14% of the global population
- Based on the traditional Chinese herbal formulation “MaZiRenWan” (麻子仁丸)
- The first new botanical drug developed in Hong Kong that was authorised to conduct a clinical trial in the US
- Phase I clinical trial was completed in the US in 2025

## Novel Chinese medicine for ulcerative colitis remission CDD-2103

- Ulcerative colitis (UC) is a colonic disease causing severe deterioration of patients' quality of life
- Pre-clinical studies have been completed and that an Investigational New Drug (IND) application was submitted to the NMPA in mid-June 2024, and clinical trial authorisation was received in late August 2024

## Novel Chinese medicine for treating myofibrillar myopathy CDD-2107

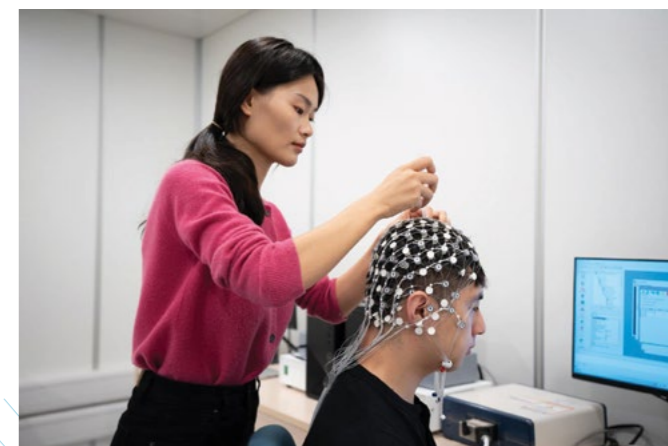
- Myofibrillar myopathy is a rare genetic neuromuscular disorder causing muscle weakness, atrophy, and other symptoms
- CDD-2107 was developed by using CHM components and showed promising results in improving muscle strength, mobility, and independence in clinical cases
- Granted orphan drug (a drug used for treating rare diseases) designation by the US FDA. Plan to submit IND application to the China NMPA and US FDA in 2027

More about CDD





# LIFE SCIENCE IMAGING CENTRE



The Life Science Imaging Centre is equipped with state-of-the-art brain imaging facilities, including a 3T Magnetic Resonance Imaging (MRI) scanner, Electroencephalogram (EEG), functional Near-Infrared Spectroscopy (fNIRS), and Transcranial Magnetic Stimulation (TMS) system. These advanced technologies enable us to support academics from diverse disciplines in conducting impactful research projects that address a wide range of emerging global issues.

Leveraging the advanced facilities provided by our centre, scholars at HKBU have undertaken a multitude of innovative and groundbreaking research projects. These projects encompass a wide range of topics, including the exploration of the neural architecture of leadership, the examination of the correlation between the human gut microbiome, food preferences, consumption, and brain activity, the investigation of collaborative inter-brain behaviours in music ensembles and the development of brain network strategies for modulating neurocognition and treating neuropsychiatric disorders.

Through these studies, our scientists are pushing the boundaries of knowledge and making significant contributions to their respective fields.



[Learn More](#)





# CENTRE FOR EXERCISE SCIENCE AND MEDICINE

The Centre for Exercise Science and Medicine (CESAME) is a flagship, transdisciplinary research hub dedicated to advancing sports science, sports medicine, and human health. It represents Hong Kong Baptist University's strategic commitment to translating research into measurable impact for elite sport and public health.

CESAME serves as a bridge between elite sport and public health. It is Hong Kong's first Collaborating Centre of Sports Medicine (CCSM) recognised by the International Federation of Sports Medicine (FIMS), the third in China, and one of only 29 centres worldwide to hold this designation. This recognition positions Hong Kong as a significant global contributor to sports medicine and exercise-based health research.

Backed by an investment exceeding HKD 50 million, CESAME provides a state-of-the-art research platform supporting high-impact translational science. The Centre houses advanced, fully integrated multi-omics and genomics laboratories, alongside biomechanics and performance testing facilities, a DEXA body composition suite, and specialised environmental and hypoxic chambers. This infrastructure enables comprehensive investigation across health, performance, and disease prevention.

Through its integrated capabilities, CESAME delivers direct translational and societal impact, advancing anti-doping science, real-time athlete monitoring technologies, and evidence-based public health strategies. The Centre accelerates the translation of elite sport insights into scalable health solutions, benefiting both high-performance athletes and the wider community.



## Key Advancements

- **Global recognition**
  - ◇ First FIMS-CCSM in Hong Kong; among only 29 worldwide
- **State-of-the-art research infrastructure**
  - ◇ World-leading integrated **multi-omics and genomics laboratories**
  - ◇ Advanced **biomechanics & performance testing, DEXA body composition suite, and environmental & hypoxic chambers**
- **Unique global biobank**
  - ◇ Over **3,000 biological samples** from elite athletes and international cohorts, enabling longitudinal and rare-sample research
- **Direct translational and societal impact**
  - ◇ Advancing anti-doping science, real-time athlete monitoring, and evidence-based public health policy



# OUR INNOVATIVE ENDEAVOURS AND START-UPS



## Advancing New Drug Development and Healthcare through Research and Innovation

Research and development (R&D) in new drug and healthcare innovation stands at the very heart of progress in improving human health and well-being. Every breakthrough, every innovation, is the result of dedicated scientific exploration—opening doors to treatments that can transform and save lives across the globe.

At the forefront of our mission is an unwavering commitment to R&D, propelling healthcare into an era where diseases are better understood, more effectively prevented, and precisely treated. By pioneering advanced technologies and novel therapeutic approaches, our researchers are addressing some of humanity's greatest medical challenges, including cancer, Alzheimer's disease, and antimicrobial resistance. These efforts not only advance the frontiers of science but also unlock hope for patients and families worldwide.

As the legendary scientist Louis Pasteur once said, **“Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world.”**

R&D in drug and healthcare innovation exemplifies this spirit, driving global collaborations that lead to shared solutions and greater health equity.

We believe that every step forward in laboratory and clinical research brings us closer to a future where suffering is diminished and the quality of life is vastly improved.

### Technology Readiness Level (TRL)



# ADVANCED POINT-OF-CARE MOLECULAR SYSTEMS FOR CLINICAL AND NON-CLINICAL APPLICATIONS

Inaugural RAISE+ Scheme Awarded Project

## Key Highlights

Our innovative, fully automated multiplex molecular diagnostic system enables the simultaneous detection of over 40 pathogens and has been recognised as a recipient of the inaugural RAISE+ Scheme. Already admitted for clinical use in both private and public hospitals and clinics across Hong Kong, we are now expanding into broader clinical, environmental, and veterinary applications, with ongoing enhancements to our system platforms to address unmet needs and advance global health resilience.

## Challenges

- The absence of multiplex point-of-care diagnostics hinders rapid detection of infectious diseases
- Existing methods are constrained by limited throughput, multiplexing capability, and/or accessibility
- Comprehensive real-time surveillance solutions are lacking, impeding timely public health response

## Breakthrough Technology

- **Simultaneous, multiplex detection** of over 40 pathogens in a single run
- **Fully automated workflow** from sample extraction to result interpretation
- **Innovative and proprietary biochemical and engineering technologies**
- **Exceptional sensitivity and specificity** for reliable diagnostic outcomes
- **Real-time surveillance and data-driven alert capabilities** support public health response

## Industry Applications

- Clinical diagnostics for hospitals, clinics, laboratories
- Public health surveillance and border controls
- Outbreak response and pandemic preparedness
- Other applications include environmental and veterinary testing



## Business Benefits

- Targeting the rapidly expanding global diagnostic market, facilitating efficient point-of-care testing
- Versatile platform technology applicable to early cancer detection, antimicrobial resistance detection and additional areas
- Deliver rapid results to enhance clinical decision-making and improve patient experience
- Support decentralised testing, increasing accessibility in low-resource environments



**PROJECT-IN-CHARGE**  
**Professor Terence LT Lau**  
 Interim Chief Innovation Officer  
 Director  
 Wu Jieh Yee Institute of  
 Translational Chinese Medicine  
 Research

Technology Readiness Level (TRL)

System Test, Launch & Operations

8-9

# SEQUENTIAL MEASUREMENT BASED MULTI-PARAMETER MICROFLUIDIC FLOW CYTOMOLECULAR ANALYSER

RAISE+ Scheme Awarded Project

## Key Highlights

This project integrates microfluidic chip technology with flow cytometry and our proprietary MSTs Transfer™ Technology to create a groundbreaking single-laser, 96+ parameter microfluidic flow cytometer. Utilising one laser, it efficiently performs multi-parameter measurements, surpassing traditional flow cytometers while incorporating the essential functions of immune analysers.

## Challenges

The market is dominated by costly, complex flow cytometers from American and European brands, limiting access to small medical institutions. High costs and the requirement for a highly trained operator hinder advanced diagnostic adoption, especially in resource-limited settings.

## Breakthrough Technology

- Multi-effect lysis combining ultrasonic oscillation, thermal gradients, and chemical reactions
- Precise volume partitioning within complex microfluidic channel-microcavity arrays
- Independent sample incubation with embedded reagents and temperature control
- Three-coordinate pipetting system with anti-contamination and rinse-free release
- Single-line focusing of microparticle swarms via ultrasonic coupling with dual inertial flows



Figure 1. Prototype appearance of the microfluidic flow cytometer analyser

## Industry Applications

- Hematological disease diagnosis and monitoring
- Infectious disease assessment
- Population health screening and physical examinations
- Research and translational medicine

## Business Benefits

- Disruptive cost advantage via single-laser microfluidics and ultra-low reagent use
- Mass market expansion to primary/secondary healthcare institutions
- One-platform integration of cell/protein/nucleic acid testing, cutting costs & time by 50%+
- Unique MSTs Transfer™ technology with high replication barriers
- Platform level growth with modular assays and long-term reagent revenue

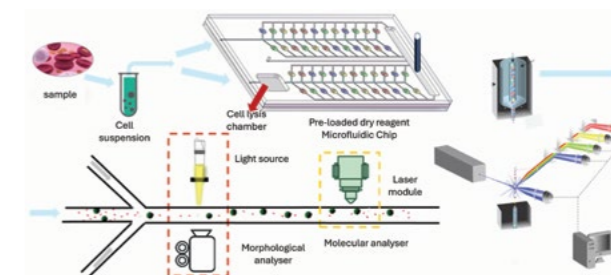


Figure 2. Schematic diagram of the detection workflow of the microfluidic flow cytometer analyser

Technology Readiness Level (TRL)

Technology Demonstration

5-6



**PROJECT-IN-CHARGE**  
**Professor Lei Bo**  
 Adjunct Professor  
 Department of Chemistry

# JCM-16021: A NOVEL MULTI-TARGET CHINESE MEDICINE FOR DURABLE MANAGEMENT OF IRRITABLE BOWEL SYNDROME

## Key Highlights

- Novel Chinese medicine formula **JCM-16021** developed for **prevention and treatment of Diarrhea-Predominant Irritable Bowel Syndrome (IBS-D)**
- Demonstrated efficacy in alleviating **diarrhea and abdominal pain**
- Supported by **preclinical studies and Phase II clinical trials**
- Addresses unmet clinical needs in IBS-D treatment with **lower recurrence and fewer side effects**



## Challenges

- IBS-D affects **10–20% of the global population** and significantly reduces the quality of life
- Conventional Western treatments focus on transient symptom control, often resulting in **limited efficacy and high recurrence**
- Long-term pharmacological management is associated with **side effects and poor patient compliance**

## Breakthrough Technology

- Optimised from a classical Chinese medicine prescription using **evidence-based pharmacological and clinical research**
- Multi-target, multi-pathway mechanism regulating **intestinal motility and inflammation**, while alleviating **visceral hypersensitivity** via a novel butyrate-producing pathway
- Proven symptom improvement after **8 weeks of treatment with sustained effects remaining even after discontinuation**
- Patented formulation with **regulatory approval for clinical trials** in both Hong Kong and the Chinese Mainland



## Industry Applications

- Gastrointestinal therapeutics
- Preventive and integrative medicine
- Chinese medicine based drug development
- Hospital, outpatient and primary care IBS management

## Business Benefits

- Large and growing **IBS patient market** with unmet clinical needs
- Patented formulation** with strong IP protection
- Lower recurrence enhances **long term patient retention**
- Strong commercialisation potential via **licensing to pharmaceutical companies**



### PROJECT-IN-CHARGE

**Professor Bian Zhaoxiang**  
Associate Vice-President (Clinical Chinese Medicine)  
Chair Professor  
Tsang Shiu Tim Endowed Professor  
in Chinese Medicine Clinical Studies  
School of Chinese Medicine  
Director, Centre for Chinese Herbal Medicine  
Drug Development Limited

Technology Readiness Level (TRL)

8-9

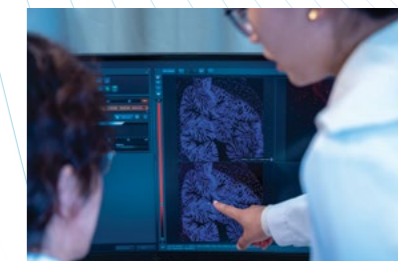
System Test, Launch & Operations

# SCD-2101: A NOVEL CHINESE HERBAL MEDICINE DEVELOPED FOR FUNCTIONAL CONSTIPATION WITH YANG DEFICIENCY

Inaugural RAISe+ Scheme Awarded Project

## Key Highlights

SCD-2101 is a novel Chinese herbal medicine developed for functional constipation with Yang deficiency. It combines traditional prescriptions with modern pharmaceutical technologies to deliver improved efficacy, safety, patient compliance, and clear modern clinical indications, supporting FDA and NMPA new drug applications.



## Challenges

- High prevalence of functional constipation with Yang deficiency (~10%)
- Limited efficacy and frequent adverse events of existing single-target agents
- No approved Chinese medicine specifically for constipation with Yang deficiency
- Poor adherence to conventional large-dose herbal formulations

## Breakthrough Technology

- Multi-component Chinese herbal formulation targeting multi-pathway constipation mechanisms
- Traditional granules and direct-swallow dosage form tailored to different age population to improve compliance
- Development aligned with both NMPA and FDA standards to enable dual IND submissions
- Clear modern disease indication specifically for functional constipation with Yang deficiency
- Real-world clinical evidence generation to accelerate development and market access

## Industry Applications

- Botanical drug development and regulatory submissions (IND/NDA)
- Pharmaceutical licensing and technology transfer
- International market entry for modernised Chinese medicine products

## Business Benefits

- Targets a large and growing population with functional constipation of Yang deficiency
- Differentiated product with clear clinical positioning
- Strong IP and licensing potential with industry partners
- Accelerated path to market via a regulatory-ready development strategy
- Scalable across China, the US, and global markets

### PROJECT-IN-CHARGE

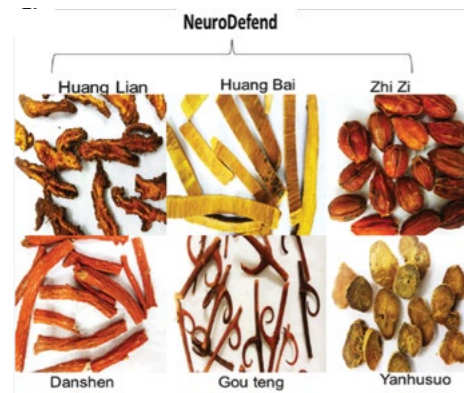
**Professor Bian Zhaoxiang**  
Associate Vice-President (Clinical Chinese Medicine)  
Chair Professor  
Tsang Shiu Tim Endowed Professor  
in Chinese Medicine Clinical Studies  
School of Chinese Medicine  
Director, Centre for Chinese Herbal Medicine  
Drug Development Limited

Technology Readiness Level (TRL)

3-5

Technology Development

# A MODIFIED CHINESE MEDICINE FORMULATION FOR TREATING ALZHEIMER'S DISEASE



## Key Highlights

NeuroDefend is a modified Chinese medicine formulation derived from Huang-Lian-Jie-Du-Tang, optimised to treat Alzheimer's disease (AD) and related neurodegenerative disorders by simultaneously targeting amyloid- $\beta$  and tau-associated neurofibrillary tangles, while enhancing memory retention. It is orally bioavailable, non-toxic in long-term studies, and suitable for chronic administration.

## Challenges

Clinical translation required: Efficacy thus far demonstrated in transgenic AD mouse models; human clinical trials are still needed to confirm dosing, safety, and cognitive benefits.

## Breakthrough Technology

- First disease-modifying TCM formula: Builds on a classical prescription and systematically optimised (ND1/ND15/ND23) to target both amyloid- $\beta$  and tau pathology rather than only symptoms
- Dual-target, multi-component mechanism: Reduces APP C-terminal fragments, A $\beta$  burden, insoluble phospho-tau and plaques, and improves cognition in 3xTg-AD and 5xFAD mice
- Well-characterised, brain-permeable actives: UHPLC-QTOF defines key constituents (e.g. berberine, coptisine, geniposide), pharmacokinetics confirm oral bioavailability and brain penetration
- High safety margin: Oral LD50 around 76–80 g/kg; repeated-dose studies show no major organ toxicity, supporting long-term use

Technology Readiness Level (TRL) **3-5**  
Technology Development



**PROJECT-IN-CHARGE**  
**Professor Li Min**  
Dean and Chair Professor,  
Teaching and Research Division  
Ma Pak Leung Endowed Professor  
in Innovative Neuromedicine  
School of Chinese Medicine

## Industry Applications

- Prescription phytomedicine for AD: Development as an oral disease-modifying therapy for mild-to-moderate Alzheimer's disease and mixed dementias driven by A $\beta$  and tau pathology
- Adjunct to standard of care: Combination with cholinesterase inhibitors or other agents to enhance cognitive outcomes and slow progression

## Business Benefits

- Large, underserved market: Addresses the growing global AD population projected to exceed 114 million by 2050, where current drugs are mainly symptomatic
- Differentiated multi-target profile: Simultaneous A $\beta$ -tau-neuroinflammation modulation offers a unique value proposition versus single-target therapies

# NOVEL DRUG DELIVERY SYSTEM FOR GOUTENG COMPOUND FOR ALZHEIMER'S DISEASE TREATMENT



## Key Highlights

This project develops Fe65-engineered exosomes to deliver Corynoxine-B, a Gouteng-derived autophagy inducer, to APP-overexpressing neurons for Alzheimer's disease treatment. The platform improves brain delivery, reduces amyloid-beta and phospho-tau pathology, enhances cognition in AD models, and is supported by Chinese and US patent filings.

## Challenges

Clinical validation needed: Current efficacy data are preclinical, so human safety and therapeutic benefit remain to be confirmed.

## Breakthrough Technology

- Precision brain targeting: Fe65 displayed on exosome surfaces binds APP-enriched Alzheimer's neurons, enabling disease-site delivery of Corynoxine-B
- Pathology-modifying mechanism: Activates BECN1/ATG5/ATG7-dependent autophagy, lowering A $\beta$ , APP-CTFs, phospho-tau, and neuroinflammatory markers
- Superior brain exposure: Exosomal delivery markedly increases Corynoxine-B brain and plasma exposure versus free drug in pharmacokinetic studies
- Platform innovation: Combines TCM-derived actives with engineered exosome nanocarriers, creating a versatile CNS drug-delivery platform



Technology Readiness Level (TRL) **3-5**  
Technology Development

## Industry Applications

- Alzheimer's therapeutics: Targeted treatment for amyloid- and tau-driven Alzheimer's disease
- CNS delivery platform: Adaptable for Parkinson's disease, glioma, ALS, and other brain disorders requiring BBB-crossing delivery
- Precision nanomedicine: Expandable to other natural products, small molecules, or combination payloads for neurodegeneration

## PROJECT-IN-CHARGE

**Professor Li Min**  
Dean and Chair Professor,  
Teaching and Research Division  
Ma Pak Leung Endowed Professor  
in Innovative Neuromedicine  
School of Chinese Medicine

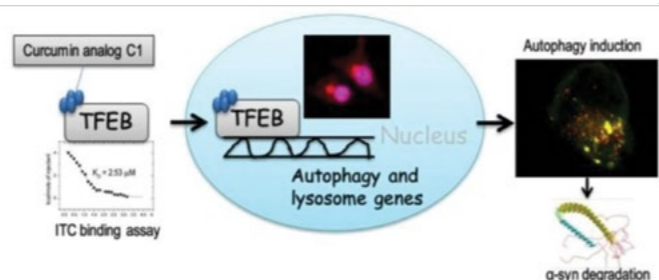
# MTOR-INDEPENDENT ACTIVATOR OF TFEB FOR AUTOPHAGY ENHANCEMENT AND USES THEREOF

## Key Highlights

An orally active curcumin analog C1 directly binds and activates TFEB, enhancing autophagy and lysosomal biogenesis without MTOR inhibition, to clear toxic protein aggregates in neuronal and non-neuronal cells and in vivo brain models for neurodegenerative disease therapy.

## Challenges

Requires clinical validation of long-term safety, dosing and efficacy in diverse neurodegenerative patient populations.



## Breakthrough Technology

- Direct small-molecule TFEB activator C1 that binds the N-terminal TFEB domain, triggering nuclear translocation independent of MTOR and MAPK pathways
- Enhances autophagy flux and lysosomal biogenesis, promoting degradation of SQSTM1/p62,  $\alpha$ -synuclein, phospho-tau and other aggregate-prone proteins in vitro and in animal brains
- Chemically simple, brain-penetrant mono-carbonyl curcumin analog with improved stability, bioavailability and scalable synthesis suitable for chronic CNS use

## Industry Applications

- Combination partner to improve efficacy of existing neuroprotective or gene therapies by boosting cellular clearance pathways
- Disease-modifying therapeutics for Parkinson's, Alzheimer's, Huntington's and tauopathies via aggregate clearance



**PROJECT-IN-CHARGE**  
**Professor Li Min**  
 Dean and Chair Professor,  
 Teaching and Research Division  
 Ma Pak Leung Endowed Professor  
 in Innovative Neuromedicine  
 School of Chinese Medicine

Technology Readiness Level (TRL)

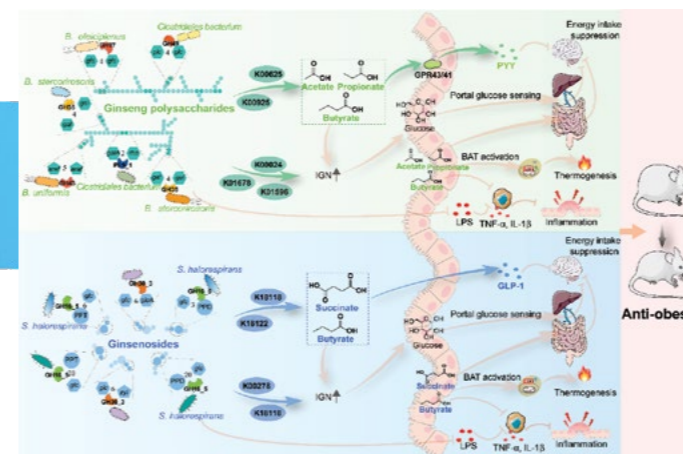
Feasibility Research

2-3

# DISSECTING THE ANTI-OBESITY COMPONENTS OF GINSENG

## Key Highlights

This project shows that ginseng polysaccharides (GP) and ginsenosides (GS) prevent obesity in high-fat diet-fed mice by promoting specific gut bacteria and activating metabolic pathways, providing new insight for microbiota-targeted, ginseng-based obesity therapies.



## Challenges

- Current microbiome interventions often lack precision, limiting the identification of polysaccharides that selectively enrich beneficial bacteria
- The structure-activity relationships of plant glycans, and their mechanistic links to microbial metabolism and host metabolic benefits, remain insufficiently understood

## Breakthrough Technology

- Chemo-metagenomics platform:** a unique discovery engine that maps interactions between complex plant glycans and microbial genes, enabling targeted modulation of the microbiome
- Validated mechanism:** traces the precise biological pathway—from specific bacteria to short-chain fatty acid production to hormone activation—showing exactly how and why it works
- Precision targeting capability:** leverages the structural diversity of glycosyl groups as selective “keys” to promote beneficial bacteria

## Industry Applications

- Precision prebiotics:** Developing the next generation of prebiotic supplements that selectively target obesity-linked gut bacteria
- Pharmaceutical leads:** A pipeline of novel ginseng polysaccharides or ginsenoside analogs for metabolic disease drug development
- Functional ingredients:** Bioactive extracts for major food & beverage brands to create weight-management products

## Business Benefits

- Enables mechanism-driven development of targeted microbiome therapeutics, nutraceuticals, and functional foods
- Clarifies glycan-microbe-host interactions, reduces translational risk, and supports differentiated product development with stronger scientific validation and commercialisation potential



**PROJECT-IN-CHARGE**  
**Professor Xu Jun**  
 Assistant Professor  
 School of Chinese Medicine  
 Associate Director  
 Research Centre for Standardization of  
 Chinese Medicines

Technology Readiness Level (TRL)

Technology Demonstration

5-6

# HEALTH PRODUCTS FOR ANTI-FIBROSIS (DR2-TYPE STILBENOIDS)

## Key Highlights

DR2 stilbenoids show anti-fibrotic properties, especially in liver fibrosis. They can be used in health products for fibrogenesis-related conditions (pulmonary fibrosis, liver cirrhosis, skin aging), impacting billions of people.

## Challenges

- With an estimated 1.7 billion people affected by fibrosis-induced health conditions, the need for effective treatment options has never been more critical
- Lack of targeted pharmaceutical interventions makes early intervention a key strategy

## Breakthrough Technology

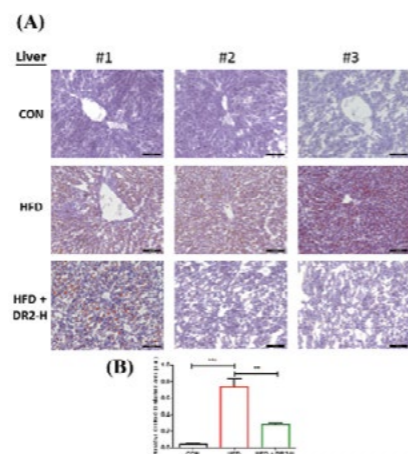
- Dendrobium* plants contain significant dihydro-resveratrol (DR2)-type stilbenoids
- DR2 preserves pulmonary architecture by reducing distortion, hemorrhage, and alveolar thickening caused by severe acute pancreatitis
- Evidence supports anti-fibrotic effects in metabolic dysfunction-associated fatty liver disease (MAFLD) and hepatic fibrosis, reducing liver lipid accumulation and improving insulin sensitivity.

## Industry Applications

- DR2 stilbenoids have the potential to be developed into a nutritional supplement or a therapeutic drug for management of MASH and liver fibrosis
- Orally administered products enable early intervention in fibrotic conditions, slowing progression of pulmonary fibrosis and fatty liver fibrosis

## Business Benefits

- Our vision for bringing the invention to the market is to provide effective solutions for fibrosis intervention and management to a global population of billions.
- With billions of potential users in the world, we believe this project has enormous market potential and alleviates the overall burden on global healthcare system



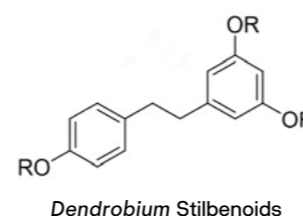
**Figure 1. Effects of DR2 stilbenoids treatment on lipid aggregation and adipogenesis of HFD-treated C57/BL6 mice.** (A) Hepatic Oil Red O staining images with (B) quantifications (200 $\times$ ). Scale bar = 100  $\mu$ m. Mice fed with commercially available high fat diet for 6 weeks and treated with *Dendrobium* stilbenoids by oral gavage for another 3 weeks for tissue sectioning.



### PROJECT-IN-CHARGE

**Professor Zhang Hongjie**  
Associate Dean (Teaching and Learning) of Chinese Medicine  
Chair Professor  
Cheung On Tak Endowed Professor in Chinese Medicine  
School of Chinese Medicine

# NATURAL PRODUCT, DIHYDRO-RESVERATROL FOR TREATING COLORECTAL CANCER AND MELANOMA



## Key Highlights

This project focuses on the development of a novel anticancer therapeutic based on potent stilbenoids from Chinese Medicine *Dendrobium*, offering a scalable, chemically stable treatment for colorectal cancer and melanoma.

## Challenges

- Melanoma and colorectal cancers often develop genetic mutations that render standard therapies ineffective
- Many natural compounds have efficacy with complex structures
- Most of the anticancer drugs have high toxicity and side effects. A high efficacy with low toxicity anticancer drug is urgently needed

## Breakthrough Technology

- Dihydro-resveratrol stilbenoids are potential therapeutic agents for various cancers
- Their antioxidant and anti-inflammatory mechanisms may help prevent cancer progression
- This natural product from edible plants has a favorable safety profile (no observed toxicity), supporting its use as an oral dietary supplement for oncology

## Industry Applications

- Oncology (primary):** Small-molecule inhibitor for systemic or targeted cancer treatment
- Premium cosmeceuticals:** Regulates melanin production, useful for skin-whitening and anti-hyperpigmentation
- Biotechnology:** Chemical precursor for drug discovery targeting pigment disorders

## Business Benefits

- An efficient production method for stilbenoids eliminates costly, inconsistent biomass harvesting, ensuring a stable, cost-effective supply
- Targets two distinct markets: oncology (long clinical path) and cosmeceuticals (faster route to commercialisation and revenue)



### Technology Readiness Level (TRL)

Feasibility Research

2-3

### Technology Readiness Level (TRL)

Basic Research

(For anticancer drug)

1-2

System Test, Launch & Operations

(For skin care product)

8-9

### PROJECT-IN-CHARGE

**Professor Zhang Hongjie**  
Associate Dean (Teaching and Learning) of Chinese Medicine  
Chair Professor  
Cheung On Tak Endowed Professor in Chinese Medicine  
School of Chinese Medicine

# A COMPOSITION FOR TREATING RHEUMATOID ARTHRITIS



## Key Highlights

This invention provides a compound combination (luteolin + scoparone) used for treating rheumatoid arthritis (RA). This novel combination exhibits significant anti-arthritic effects in experimental models without overt toxicity. It can be developed as an effective, low-toxicity, and affordable anti-RA agent.

## Challenges

Conventional anti-RA drugs often face challenges such as unsatisfactory therapeutic efficacy, severe side effects, and high costs, which limit their clinical use. Therefore, there is a need for effective, safe and affordable agents for treating RA.

## Breakthrough Technology

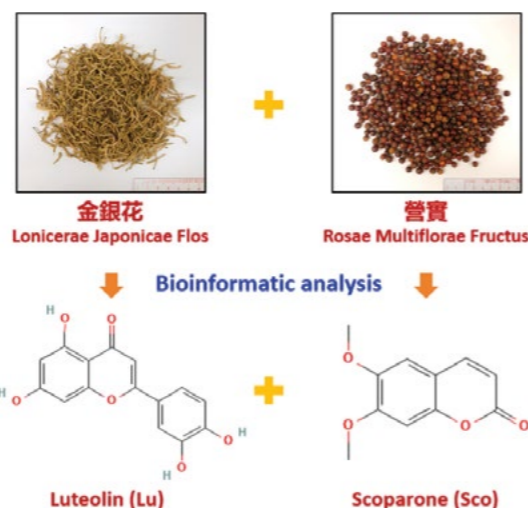
- A traditional two-herb TCM formula composed of Yingshi and Jinyinhua is recorded in the 1,300-year-old classic *Qian Jin Fang*
- Using chemical composition analysis and network pharmacology, we identified the main anti-RA components from this formula
- For the first time, we discovered that the combination of luteolin and scoparone can be applied to the development of anti-RA drugs

## Industry Applications

- The luteolin-scoparone combination demonstrates effective anti-RA activity with no observed toxicity in experimental models
- Luteolin is available as a supplement, and scoparone is considered safe
- Both compounds can be inexpensively sourced from peanut shells and *Artemisia scoparia*, supporting cost-effective large-scale production

## Business Benefits

- RA impacts 1% of the global population, with annual treatment costs per patient ranging from US\$1,500 to US\$36,000
- This new anti-RA drug addresses high market demand and offers significant economic potential through affordable, effective treatment options



### PROJECT-IN-CHARGE

**Professor Yu Zhiling**  
Professor,  
Teaching and Research Division  
School of Chinese Medicine

# NOVEL ANTI-EBV DRUG

## Key Highlights

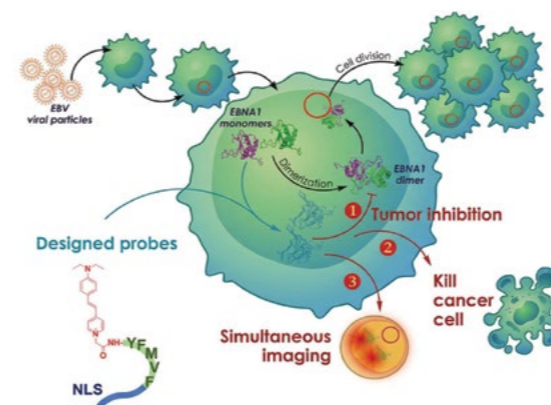
Peptide-based fluorescent agents that target an Epstein–Barr virus (EBV) protein to both illuminate and destroy EBV-positive cancer cells, showing potent tumour clearance in animal models of nasopharyngeal carcinoma with low expected toxicity—a first-in-class virus-specific cancer therapy and imaging probe.

## Challenges

- Nasopharyngeal carcinoma and other EBV-linked cancers lack approved EBV-specific therapies or imaging agents
- Late-stage diagnosis is common and current treatments (e.g. cisplatin, radiotherapy) cause significant side effects and non-specific damage to healthy tissue

## Breakthrough Technology

- Targets EBV unclear antigen 1 (EBNA1), the only viral protein consistently present in EBV-associated cancers, giving high specificity for infected tumour cells
- Dual-function “theranostic” design: fluorescently labels EBV-positive cells for imaging and simultaneously blocks EBNA1 to kill tumours
- Peptide-based, non-metal scaffolds and nanoparticle conjugates improve safety, stability and imaging signal



## Industry Applications

- Clinical oncology: targeted therapy for EBV-associated cancers (nasopharyngeal carcinoma, some lymphomas)
- Diagnostic imaging: EBV-specific probes for tumour visualisation
- Research tools for tumour and viral biology studies

## Business Benefits

- First-mover, high-value niche targeting EBV-positive tumours with potential >US\$1B market
- Reduced off-target toxicity and improved patient outcomes vs. conventional chemo-radiotherapy
- Attractive for licensing or partnership after Investigational New Drug (IND)/Phase I, with dual revenue streams from therapeutic and imaging applications

### Technology Readiness Level (TRL)

Basic Research

1-2



### PROJECT-IN-CHARGE

**Professor Lung Hong Lok**  
Associate Professor  
Department of Chemistry

### Technology Readiness Level (TRL)

Technology Development

3-5

# DEP-2306: A CHINESE HERBAL MEDICINE FORMULA FOR DEPRESSION, ANXIETY, AND INSOMNIA

## Key Highlights

A research team led by Professor Yu Jucheng, Professor Yang Junjun, and Professor Bian Zhaoxiang, has discovered a Chinese herbal medicine formula, **DEP-2306**, can effectively **treat depression, anxiety, and insomnia in just four weeks**.

## Challenges

A significant challenge is enhancing community awareness that sleep and mental health disorders are treatable and should not be stigmatised, while communicating that traditional Chinese medicine may provide holistic, effective, and safe care.

## Breakthrough Technology

- **Centralised EMR:** Secure, multi-site integration of TCM and clinical data with role-based access, supporting coordinated care and analytics
- **Standardised outcomes:** Validated pre- and post-treatment measures to quantify effectiveness and safety, informing protocol refinement
- **Mechanistic profiling:** Wearables and biospecimens provide objective physiological and molecular readouts to elucidate mechanisms and biomarkers of response

## Industry Applications

By implementing evidence-based, protocol-driven Chinese medicine interventions with standardised assessments of clinical effectiveness and safety, our project produces replicable clinical protocols and care pathways applicable across diverse clinical settings.

## Business Benefits

- **Alternative modality:** Provides a clear TCM-driven pathway for treating common mental disorders, offering a viable alternative to conventional psychiatric/psychological care, with stepped referral to counselling for non-responders
- **Stigma reduction and help-seeking:** Culturally accepted TCM services delivered free in community settings (with ambassador outreach) reduce stigma and practical barriers, encouraging earlier engagement



DEP-2306's core ingredients include Curcumae Radix (薑金), Paeoniae Radix Alba (白芍), Triticum aestivum (浮小麦), and Acanthopanax Senticosum Radix et Rhizoma (刺五加).



### PROJECT-IN-CHARGE

**Professor Bian Zhaoxiang**  
Associate Vice-President (Clinical Chinese Medicine)  
Chair Professor  
Tsang Shiu Tim Endowed Professor in Chinese Medicine Clinical Studies  
School of Chinese Medicine  
Director, Centre for Chinese Herbal Medicine Drug Development Limited



**Professor Yang Junjun**  
Professor of Practice  
Executive Associate Director, Clinical Division  
School of Chinese Medicine



**Professor Yu Jucheng**  
Assistant Professor  
School of Chinese Medicine

### Technology Readiness Level (TRL)

Feasibility Research

2-3

# METABOLIC MODULATION OF INTRATUMORAL CHOLESTEROL WITH ENGINEERED BACTERIA FOR COLORECTAL CANCER

## Key Highlights

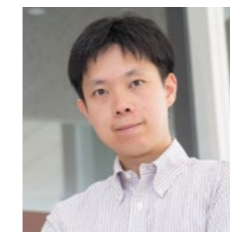
Colorectal cancer (CRC) is the third most common cancer worldwide, with few effective treatments for drug-resistant cases. Our **innovative microbial therapy targets excess tumor cholesterol**, converting it into **4-cholesten-3-one (4-C-3)**, a natural anticancer compound. 4-C-3 **blocks two key pathways that drive CRC**, overcoming resistance to current treatments. The laboratory models showed that it has strong anti-cancer effects and excellent safety, offering a new option when conventional treatments fail.

## Challenges

- EGFR inhibitors are central in CRC treatment, but KRAS mutations confer resistance
- In KRAS-mutant CRC, EGFR-driven signalling undermines KRAS-targeted therapies
- Combined EGFR/KRAS inhibition is limited by high toxicity and narrow therapeutic windows
- Our first-in-class EGFR-KRAS co-targeter overcomes resistance and enables microbiome-inspired EGFR-KRAS strategies

## Breakthrough Technology

- Excess cholesterol drives CRC progression, but current tumour cholesterol control is limited
- Our study is the first demonstration that beneficial gut bacteria convert intestinal cholesterol into 4-C-3, a natural cancer-fighting molecule
- Delivered via natural or engineered microbes, this approach safely lowers tumour cholesterol, boosts anti-tumour immunity, and shrinks tumours
- Blocks EGFR and mutant KRAS—two key drivers and treatment targets in CRC—overcoming primary resistance to anti-EGFR therapies



### PROJECT-IN-CHARGE

**Professor Wong Hoi Leong Xavier**  
Professor,  
Teaching and Research Division  
School of Chinese Medicine



## Industry Applications

- Provides a blueprint for microbiome-based or 4-C-3-inspired strategies to co-target EGFR-KRAS in CRC and other EGFR/KRAS-driven malignancies
- Offers actionable insights for personalised therapies that modulate gut bacteria to improve cancer care

## Business Benefits

- To our knowledge, no comparable products or approaches currently available
- First-in-class dual EGFR/KRAS approach expands the treatable CRC population
- Dual modality (4-C-3 and engineered/probiotic) supports strong IP, diversified revenue, and partnerships
- Platform extendable to other EGFR/KRAS malignancies; scalable, low-cost manufacturing

### Technology Readiness Level (TRL)

Technology Development

3-5

# A STRUCTURE-INFORMED EVOLUTIONARY MODEL FOR PREDICTING VIRAL IMMUNE ESCAPE AND EVOLUTION

## Key Highlights

Persistent emergence of viral variants capable of evading host immunity constitutes a significant threat to public health. To enable early warning and guide vaccine developments, we propose EvoScape, a deep learning model designed to predict viral immune escape and evolution by integrating evolutionary context with protein structures.

## Challenges

- Label imbalance issue: Most of samples in the datasets are negative samples, which raises challenges in training and evaluation
- Insufficient support for multiple mutations: There are no effective strategies to model effects of multiple mutations
- Limited protein structure predictive performance: ESMFold (650M) performs poor in some protein

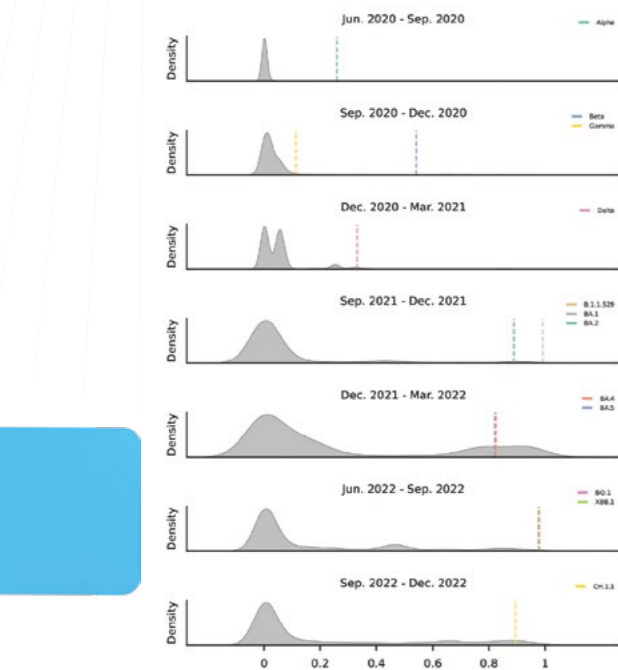


## Breakthrough Technology

- Comprehensive data integration: Aggregating extensive deep mutational scanning (DMS) datasets across a diverse range of viral proteins
- Evolution-structure fusion framework: Developing cross-attention modules to facilitate structure-informed evolutionary modeling
- Residue-residue dependency identification: Leveraging self-attention mechanisms to detect complex inter-residue dependencies within viral proteins
- Large-impact mutation prioritisation: Implementing a top-K  $L_2$ -differential pooling framework to identify and prioritise mutations with significant functional impact

## Industry Applications

- Public health decision support: Providing real-time surveillance and early warning to inform public health interventions
- Vaccine development guidance: Identifying viral variants with high immune escape potential to assist manufacturers in selecting optimal target virus strains



**PROJECT-IN-CHARGE**  
**Professor Zhang Lu**  
 Associate Professor  
 Department of Computer Science

Technology Readiness Level (TRL)

Basic Research

1-2

# EXPLORING DIFFERENCES IN THE HUMAN GUT MICROBIOME BETWEEN HAN CHINESE AND NON-CHINESE POPULATIONS

## Key Highlights

By integrating 9,320 publicly available metagenomic samples from 22 countries with 3,584 newly sequenced samples from 29 Chinese provinces, Professor Zhang's team constructed the Human Gut Microbiome Reference Genome Catalog (HGMRGC). The HGMRGC provided a comprehensive and diverse resource for microbial genomic variation detection and downstream analyses.



## Challenges

- Previous gut microbiome studies focused mainly on species-level taxonomic abundance, leaving microbial genomic variation largely underexplored
- Current human gut reference genome catalogs are biased toward Western populations, limiting their ability to support studies on microbial genomic variation across diverse populations

## Breakthrough Technology

- Constructs a comprehensive and diverse HGMRGC, comprising 271,480 non-redundant genomes across 5,785 prokaryotic species
- Integrates 9,320 publicly available metagenomic samples from 22 countries with 3,584 newly sequenced metagenomic samples from 29 Chinese provinces into the HGMRGC
- Enables gut microbial genomic variation detection and strain-level association analyses, moving beyond traditional species-level abundance analyses

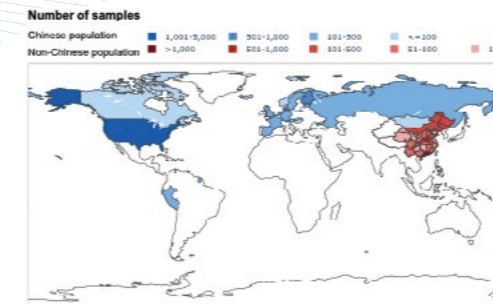


Figure 1. Geographic distribution of metagenomic samples collected from 22 countries and 29 provinces or regions across Chinese Mainland.

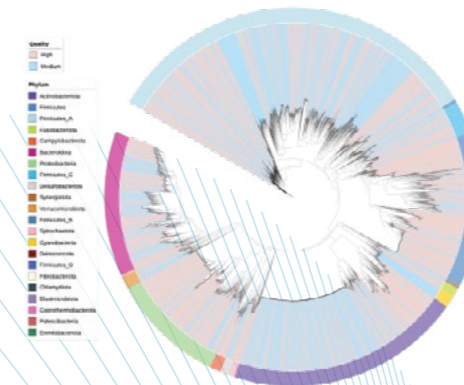


Figure 2. Maximum-likelihood phylogenetic tree of the HGMRGC. Clades are coloured based on genome quality (high-quality genomes (completeness > 90% and contamination < 5%) in pink, medium-quality genomes (completeness ≥ 50%, contamination < 10%, and QS > 50) in blue), and the outside circle shows the phylum annotation.

**PROJECT-IN-CHARGE**

**Professor Zhang Lu**  
 Associate Professor  
 Department of Computer Science

Technology Readiness Level (TRL)

Basic Research

1-2

# YAOBAO: AN EVIDENCE-BASED CHINESE PATENT MEDICINE ASSISTANT BASED ON LARGE LANGUAGE MODELS AND MULTI-SOURCE DATASETS

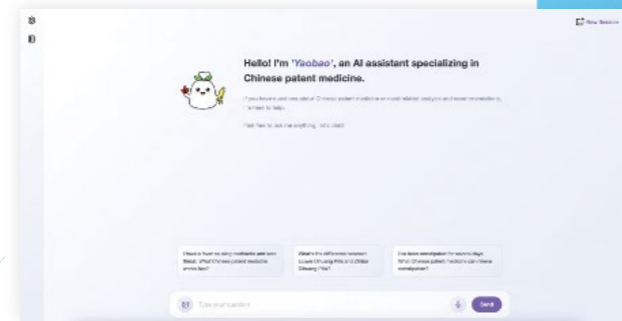


## Key Highlights

Yaobao is an evidence-based AI assistant for Chinese patent medicine (CPM). It uses a RAG framework with a multi-source authoritative database to provide accurate, verifiable information. It supports both clinical decision-making and public use, significantly outperforming general LLMs in evaluations.

## Challenges

- Knowledge fragmentation: CPM data is scarce, scattered, and lacks systematic digital integration
- High risk of misuse: 70% of CPMs are prescribed by Western physicians unfamiliar with TCM syndrome differentiation
- Model limitations: General LLMs lack specialised CPM accuracy, while training domain-specific models is highly resource-intensive



## Breakthrough Technology

- Advanced RAG framework: Utilises a dual-level vector database for efficient, training-free knowledge retrieval
- Comprehensive data integration: Consolidates six authoritative sources, including the Chinese Pharmacopoeia and clinical guidelines
- Multimodal & multilingual support: Processes text, image, and audio inputs in simplified/traditional Chinese and English
- Verifiable outputs: Features interactive doctor-patient simulations, external tool invocation, and verifiable knowledge citations

## Industry Applications

- Clinical decision support: Assists medical practitioners in making evidence-based, standardised CPM prescriptions
- Intelligent healthcare integration: Embeds traditional therapies seamlessly into modern digital health systems
- Consumer health companion: Provides general users with accessible, safe, and reliable guidance for over-the-counter CPMs

## Business Benefits

- Cost-effective deployment: Leverages a training-free RAG approach, avoiding the high costs of LLM fine-tuning
- Enhanced medication safety: Reduces inappropriate prescriptions by focusing strictly on standardised, regulated CPMs
- Market scalability: Promotes the broader adoption and distribution of traditional medicine within modern healthcare markets

### PROJECT-IN-CHARGE



**Professor Lyu Aiping**  
Vice-President (Research and Development) cum Dean of Graduate School



**Professor Zhang Lu**  
Associate Professor  
Department of Computer Science

Technology Readiness Level (TRL)

System Test, Launch & Operations



# ARTIFICIAL INTELLIGENCE AND FUNCTIONAL METABOLOMICS COMBINATIONAL STRATEGY FACILITATES THE CONSTRUCTION OF MOLECULAR PROFILES FOR DIAGNOSING PATHOLOGICAL EVOLUTION OF LIVER DISEASES

## Key Highlights

We pioneered integrate macromolecular knowledge graphs, functional metabolomics, and iterative artificial intelligence technologies to advance early-stage diagnosis and facilitate the discovery of novel therapeutic targets for liver diseases across different pathological stages.

## Challenges

Integrating multi-level molecular data from knowledge graphs and functional metabolomics with iterative artificial intelligence technologies.

## Breakthrough Technology

- The innovative integration of macromolecular knowledge graphs, functional metabolomics, and iterative artificial intelligence strategies
- Development of prognostic and predictive models to advance diagnostic kit development and support clinical testing for a variety of liver conditions

## Industry Applications

- Development of molecular kits to support clinical diagnosis across various liver diseases
- Identification of novel therapeutic targets to facilitate new drug discovery for different liver conditions

## Business Benefits

The successful implementation of this project will lead to the development of clinical diagnostic kits for liver diseases and potential innovative drug candidates. Through commercial translation, these advancements are expected to generate significant economic benefits.



### PROJECT-IN-CHARGE

**Professor Lyu Haitao**  
Associate Professor  
School of Chinese Medicine  
Associate Director  
Hong Kong Traditional Chinese Medicine  
Phenome Research Centre

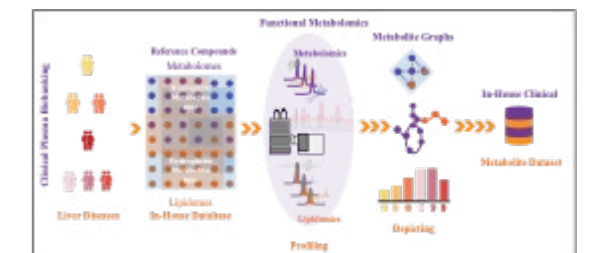


Figure 1. Development of in-house clinical plasma metabolite dataset for decoding pathological evolution of liver diseases

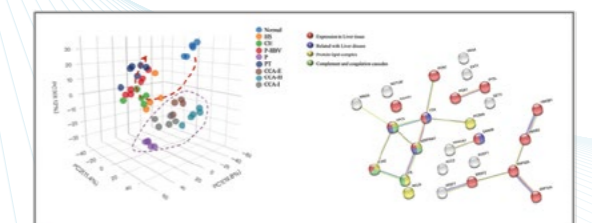


Figure 2. Proteomic signature for differentiating the patients with different liver diseases

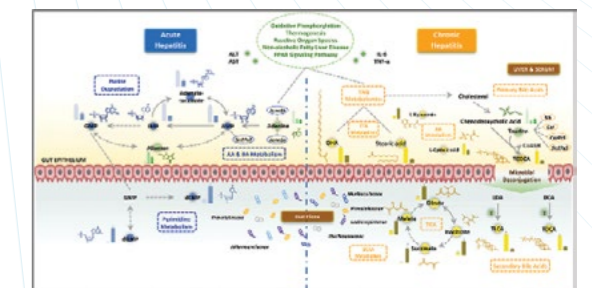


Figure 3. A multimodal molecular network for differentiating patients with chronic hepatitis from those with acute hepatitis

Technology Readiness Level (TRL)

Technology Development



# EXPLAINABLE AI FOR LIVER CANCER (EHR SCREENING/PROGNOSIS)

## Key Highlights

This project develops explainable AI models for liver cancer early screening and prognosis prediction using routinely collected electronic health records (EHR). By integrating computational phenotyping and causal graph modelling, it identifies high-risk individuals and provides transparent, clinician-interpretable predictions to support Hong Kong's Cancer Strategy.

## Challenges

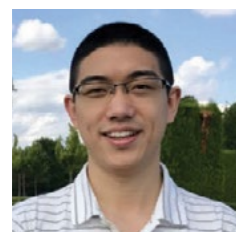
- Current liver cancer screening uses a one-size-fits-all approach limited to high-risk populations with CVH or cirrhosis
- Existing AI methods rely on advanced imaging and genomic data not routinely available in clinical settings
- AI "black box" models lack explainability, undermining clinician trust and hindering clinical adoption

## Breakthrough Technology

- Computational phenotyping framework to extract interpretable pre-diagnosis phenotypes from EHR data
- Causal graph modelling (static and dynamic) to discover causal relationships among phenotypes, cancer onset, and patient outcomes
- Transformer-based deep learning with causal regularisation for explainable risk prediction
- Robust handling of data complexity, temporal irregularity, and informative missing data in EHR

## Industry Applications

- Clinical decision support for liver cancer early screening in Hong Kong's public healthcare system
- Risk stratification tool for personalised cancer surveillance programmes



**PROJECT-IN-CHARGE**  
**Dr Yin Kejing**  
 Research Assistant Professor  
 Department of Computer Science

**Technology Readiness Level (TRL)**  
 Technology Development 3-5

# MACHINE LEARNING MODELS BASED ON EPIDEMIOLOGICAL KNOWLEDGE EMBEDDING AND THEIR APPLICATION IN PREDICTING THE RISK OF INFECTIOUS DISEASE TRANSMISSION

## Key Highlights

This project develops novel AI-driven models embedding epidemiological knowledge for predicting risks of emerging infectious diseases, improving accuracy, interpretability, and public health responses.

## Challenges

- Scarce data limits training of data-driven models, especially in early outbreaks
- Pure ML lacks interpretability, failing to support health decisions
- Modelling nonlinear, multi-factor disease dynamics with spatial-temporal complexities

## Breakthrough Technology

- Builds complex dynamic networks fusing human-animal-environment spatio-temporal data to model multi-agent interactions and disease transmission paths
- Introduces deep spatio-temporal neural networks with embedded epidemiology via next-generation matrices for enhanced prediction and dynamics constraint
- Includes theoretical analyses on model generalisation, optimality, complexity, and sensitivity for robustness

## Industry Applications

- Public health surveillance for early detection and warning of outbreaks
- Healthcare resource allocation in epidemic control
- Policy support in government and international health organisations

## Business Benefits

- Enables precise, timely interventions reducing outbreak impacts and costs
- Improves decision-making with interpretable predictions for efficient resource use
- Enhances overall public health efficiency and societal safety



**PROJECT-IN-CHARGE**  
**Professor Liu Yang**  
 Assistant Professor  
 Department of Computer Science

**Technology Readiness Level (TRL)**  
 Basic Research 1-2

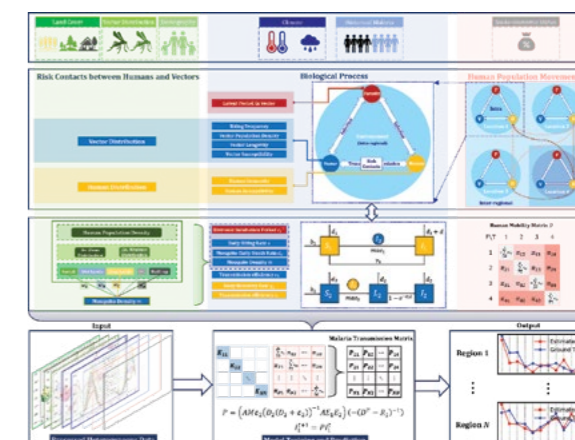


Figure 1. The framework of the project

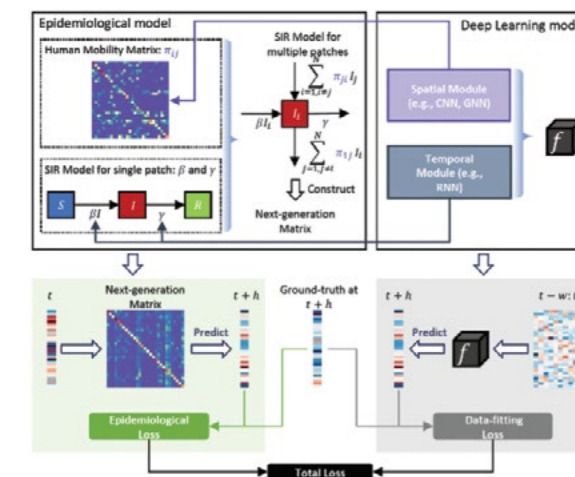


Figure 2. Epidemiology-informed deep spatio-temporal neural networks

# NPC PLASMA PREDICTOR

## Key Highlights

- Patients with nasopharyngeal carcinoma (NPC) exhibit distinct alterations in blood plasma metal (Sn, Mg, Mn, Fe, Zn, Ni, P, Co, Sr, Mo, Sb, Ba, Ti, and Pb) levels compared to healthy individuals
- This pilot study demonstrates the effective use of blood plasma metallomics analysis combined with machine learning (ML) to enable early diagnosis of NPC

## Challenges

- NPC is often diagnosed late because its early phases present few, if any, noticeable symptoms
- Current diagnostic methods, such as plasma EBV DNA testing and nasal endoscopy, either miss some early cases or involve invasive procedures
- Late diagnosis increases the likelihood of cancer metastasis and reduces survival rates

## Breakthrough Technology

- Pioneering integration of comprehensive blood plasma metallomics profiling, using simple alkali dilution preparation and ICP-MS quantification, with advanced ML algorithms and SHAP-based interpretability, marking the first such application for NPC detection
- Optimised ML ensemble model provides near-perfect discrimination and excels in early NPC detection by identifying subtle elemental signatures in a minimally invasive manner



## Industry Applications

- Suitable for large-scale screening in high-risk regions, such as Southeast Asia
- Can be integrated into routine blood testing and standard clinical workflows
- Can be complemented existing diagnostic methods to enhance early detection

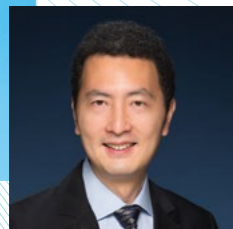
## Business Benefits

A fast, cost-effective blood test enabling earlier NPC diagnosis and intervention, improving survival while reducing treatment costs, with strong potential for commercialisation across diagnostic platforms and healthcare systems.

Technology Readiness Level (TRL)

Feasibility Research

2-3



### PROJECT-IN-CHARGE

**Professor Kelvin Leung**  
Head and Professor  
Department of Chemistry

# BIO-INSPIRED GOAT BEZOAR (HOUZAO)

## Key Highlights

Natural goat bezoar (Houzao) is scarce and expensive. A market surveillance study of goat bezoar-containing products found that more than 50% contained no authentic goat bezoar and that overall quality varied widely. Our invention provides a low-cost solution that consistently matches 99% of the chemical profile of natural goat bezoar extract.



## Challenges

- Expensive material with limited resources
- Lack of quality standard
- >50% poor quality products in the market

## Breakthrough Technology

The core technology employs a proprietary process that addresses the high cost and inconsistency of natural goat bezoar, ensuring a stable, affordable alternative.

## Industry Applications

Stable, affordable bio-inspired goat bezoar as alternative

## Business Benefits

Stable quality across batches



### PROJECT-IN-CHARGE

**Professor Han Quanbin Simon**  
Associate Dean  
(Engagement and Development) of  
Chinese Medicine  
Professor  
School of Chinese Medicine

Technology Readiness Level (TRL)

Technology Development

3-5

# QUALITY CONTROL MARKER FOR AUTHENTICATION OF EDIBLE BIRD'S NEST

## Key Highlights

A novel authentication technology for Edible Bird's Nest (EBN or Yanwo in Chinese) utilises specific peptide markers for precise qualitative and quantitative analysis. For the first time, it can differentiate between high-value white EBN and grass EBN, significantly improving quality control and combating market adulteration.

## Challenges

Conventional EBN authentication relies on sialic acid, a marker that lacks specificity and cannot distinguish between different EBN types (e.g. white vs grass). This has led to widespread adulteration and low-quality products being sold at high prices, eroding consumer trust and damaging the industry's reputation.

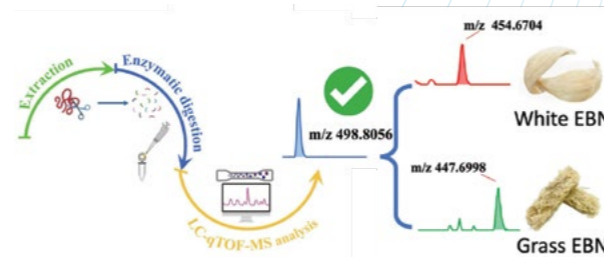
## Breakthrough Technology

They serve as definitive markers not only for accurate EBN authentication and quantification but also for distinguishing between white and less expensive grass EBN, solving a critical industry challenge.

- **Identifies unique peptide markers:** This technology identifies a series of unique peptide markers from EBN hydrolysate
- **High specificity:** Unlike conventional methods that rely on non-specific sialic acid, these peptide markers are highly specific
- **Definitive authentication:** The markers serve as definitive tools for accurate EBN authentication
- **Accurate quantification:** They also enable precise quantification of EBN in samples
- **Distinguishes EBN types:** The technology solves a critical industry challenge by distinguishing between white EBN and less expensive grass EBN



Edible bird's nest commercial products



The flowchart for white and grass EBN identification based on peptide markers

## Industry Applications

- Quality control in raw material sourcing and product manufacturing
- Authentication by third-party testing labs
- Provide a reliable quality assurance tool for the industry

## Business Benefits

Adopting this technology significantly enhances brand reputation by offering verifiable, high-quality products, thereby building consumer trust.



**PROJECT-IN-CHARGE**  
**Professor Han Quanbin Simon**  
 Associate Dean  
 (Engagement and Development) of  
 Chinese Medicine  
 Professor  
 School of Chinese Medicine

Technology Readiness Level (TRL)

Technology Development

3-5

# TRYPTOPHAN SULFONATE MARKER FOR INSPECTION OF SULFUR-TREATED FOOD & CHINESE HERBAL MEDICINAL PRODUCTS

## Key Highlights

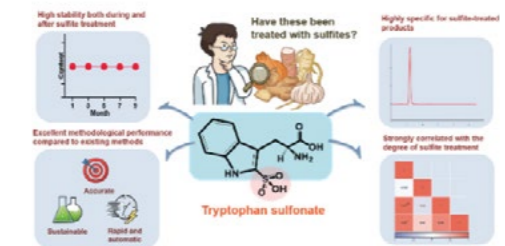
This project focuses on tryptophan sulfonate, a novel chemical marker for sulfite-treated food and herbal medicinal products that offers greater specificity and stability than current markers. By utilising this marker, rapid and high-throughput inspection of sulfite-treated products can be achieved with LC-MS technology.

## Challenges

- Existing detection methods for sulfite-treated food and herbal medicinal products mainly measure residual sulfites
- They often produce inaccurate results:
  - ◊ False positives can occur due to interference from garlic and onion in the food matrix
  - ◊ False negatives may result from samples stored or heated for extended periods
- Procedures are often complex and labour-intensive, requiring various chemical reagents

## Breakthrough Technology

- Identifies a novel marker called tryptophan sulfonate with high specificity and stability
- Achieves rapid, accurate, and automated analysis based on this marker
- Requires less sample and fewer solvents to improve environmental sustainability

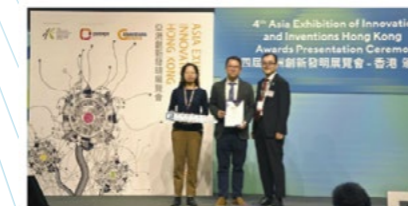


## Industry Applications

- Enables rapid and accurate detection of sulfur-treated foods, beverages, and herbal medicines
- Supports routine food safety inspections and herbal medicine quality control
- Ideal for high-throughput industrial testing due to its simplicity, automation, and specificity

## Business Benefits

- Achieves rapid high-throughput screening inspection for a large-scale sample
- Reduces operational costs and supports sustainable practices by minimal reagent and solvent use
- Ensures accurate product labelling
- Enhances consumer safety by reliably detecting sulfite-treated products



Technology Readiness Level (TRL)

Technology Development

3-5



**PROJECT-IN-CHARGE**  
**Professor Xu Jun**  
 Assistant Professor  
 School of Chinese Medicine  
 Associate Director  
 Research Centre for Standardization of  
 Chinese Medicines

# A.I. SAFE FOOD LIMITED

## Key Highlights

An AI-enabled, non-targeted anomaly detection platform providing scalable, cost-efficient surveillance of known and unknown contaminants across manufacturing and supply chains, without additional laboratory testing. It mitigates risks from unknown adulterants, helping prevent public-health crises and industry losses.

## Challenges

- Food manufacturers often face unknown adulterants, but existing tests rely on targeted approaches that cannot reliably detect them
- This creates surveillance gaps that let emerging fraud evade detection, increasing the risk of public-health crises and causing heavy losses for the industry

## Breakthrough Technology

- AI-enabled, non-targeted anomaly detection to enhance food safety without additional laboratory testing
- Provides a scalable, cost-efficient surveillance architecture for detecting both known and unknown contaminants across the supply chain



## Market Competitiveness

A first-of-its-kind AI-powered, non-targeted adulterant alerting system—validated in trials with leading industry partners and proven highly accurate.

## Development Plan

- Commercialisation: Explore licensing and service opportunities with food industry and establish strategic partnerships for future expansion
- Further development to cover other high-risk commodities to expand market coverage



**PROJECT-IN-CHARGE**  
**Professor Terence LT Lau**  
 Interim Chief Innovation Officer  
 Director  
 Wu Jieh Yee Institute of  
 Translational Chinese Medicine  
 Research

# APTACURE THERAPEUTICS LIMITED



## Key Highlights

Developed Apc001, the world's first oligonucleotide aptamer targeting sclerostin loop3. A first-in-class drug candidate that simultaneously promotes bone formation and improves glucose-lipid metabolism, with a unique cardiovascular safety profile. Completed pilot-scale production.

## Challenges

- Overcoming safety hurdles: Existing sclerostin antibody Romosozumab showed cardiovascular risks. Apc001 addresses this by selectively targeting the disease-causing domain (loop3) while preserving the cardiovascular protection domain (loop2)
- Broad disease application: Validating its therapeutic potential across multiple bone and metabolic disorders

## Breakthrough Technology

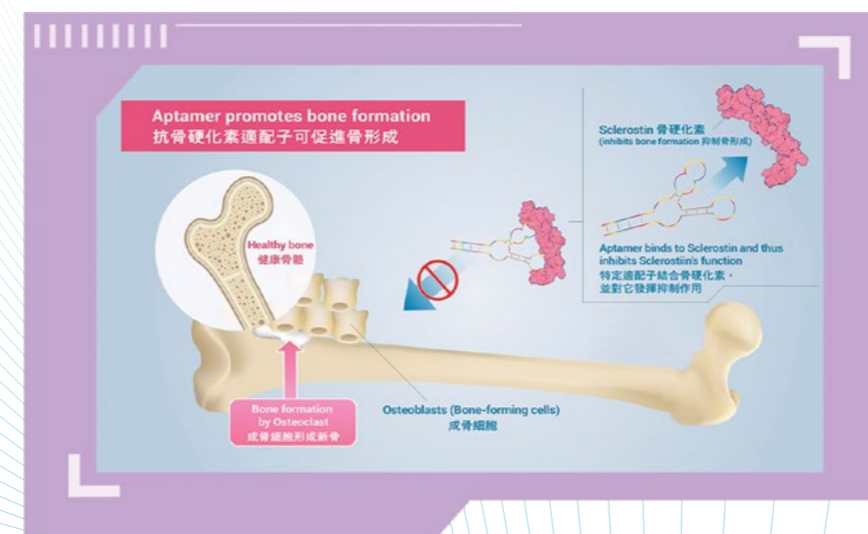
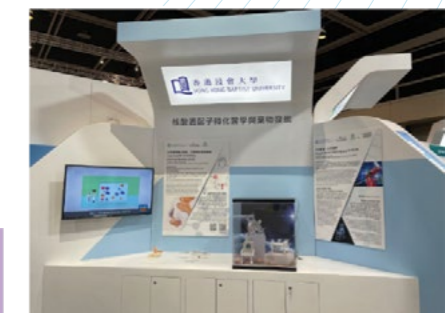
- First-in-class aptamer candidate: Apc001 is the world's first oligonucleotide aptamer targeting sclerostin loop3, representing a novel class of therapeutics
- Dual therapeutic efficacy: Designed to simultaneously promote bone formation and improve glucose-lipid metabolism through a single drug candidate
- Built-in cardiovascular safety: Uniquely designed to avoid the cardiovascular risks associated with existing sclerostin-targeting therapy (Romosozumab)
- Manufacturing-ready: Successfully completed pilot-scale production, a critical milestone for clinical translation

## Market Competitiveness

- Unmet medical need: A first-in-class drug candidate Apc001 that combines bone anabolic efficacy with cardiovascular safety—a critical advantage over existing antibody drug (Romosozumab)
- Broad application potential: An aptamer drug candidate with potential to treat osteoporosis, osteogenesis imperfecta, and osteoporosis with Type 2 diabetes

## Development Plan

- IND-enabling studies: Complete systematic preclinical PK/PD and safety studies
- Regulatory filing: Prepare Investigational New Drug (IND) application for clinical trial initiation
- Clinical development: Advance Apc001 into Phase I clinical trials



**PROJECT-IN-CHARGE**  
**Professor Zhang Ge**  
 Associate Dean (Research) of  
 Chinese Medicine; Director,  
 Technology Development  
 Division and Chair Professor  
 School of Chinese Medicine

# HYDROVERSE COMPANY LIMITED



## Key Highlights

Hydroverse's AuraMist is a revolutionary portable misting shower that provides dignified, accessible bathing for mobility-impaired users. Its patented technology reduces water consumption by over 75% compared to traditional methods, enhancing user independence, well-being, sustainability, and reducing caregivers' burden.

## Challenges

- **Global aging population:** Addresses the urgent need for safe, dignified in-home care solutions for a rapidly growing elderly demographic
- **Caregiver burnout:** Reduces the physical and emotional strain on caregivers by simplifying the bathing process
- **Water and infection:** Provides a highly sustainable bathing method which improves hygiene to reduce skin infections

## Breakthrough Technology

- **Water-saving misting:** Dual-intensity nozzles reduce water use by over 75% while ensuring thorough cleaning
- **Portable & accessible:** A zero-installation, mobile design allows for bedside or wheelchair-accessible bathing, eliminating risky bathroom transfers
- **AI-powered control:** Voice commands for hands-free operation, maximising user autonomy, and safety
- **Enhanced comfort:** An integrated digital water-mixer maintains precise temperature for a consistently comfortable and therapeutic experience

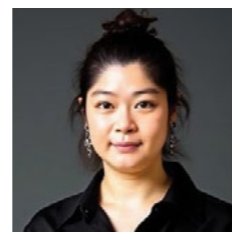


## Market Competitiveness

- **Unmatched water efficiency:** Achieves over 75% water savings, a critical advantage over all existing products
- **Superior accessibility:** The only truly portable, zero-installation solution eliminating dangerous bathroom transfers
- **Award-winning innovation:** Silver Medal at the 50<sup>th</sup> Geneva International Exhibition of Inventions (2025) for R&D on independence

## Development Plan

- **Clinical validation:** Large-scale clinical trials in hospitals and nursing homes efficacy and safety data
- **Regulatory approval:** Secure necessary medical device certifications (e.g. FDA, CE) for international market entry
- **Manufacturing, scale-up production, and market penetration**



### PROJECT-IN-CHARGE

**Professor Anna Qin**  
Assistant Dean, (Teaching and Learning)  
School of Creative Arts  
Assistant Professor  
Academy of Visual Arts

# E-FORMULA LIMITED

## Key Highlights

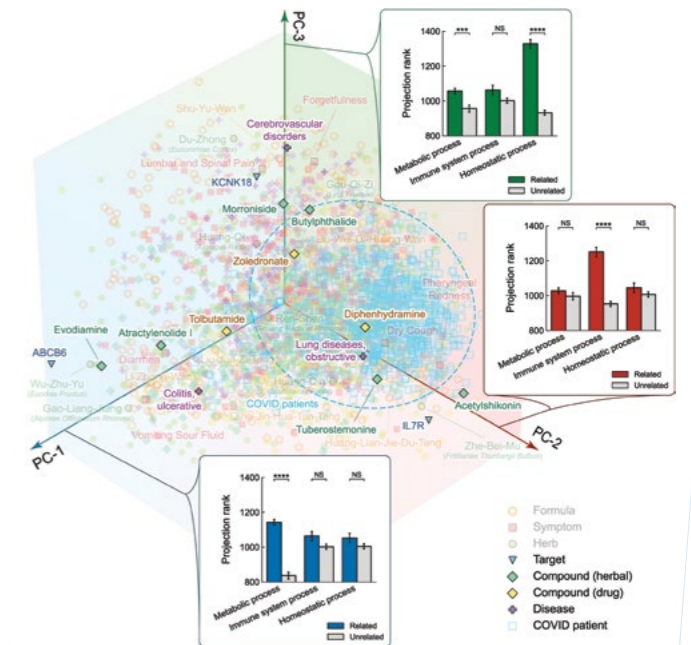
E-Formula Limited integrates AI with Traditional Chinese Medicine (TCM) via the proprietary TCM Embedding Space (TCM-ES). We offer formula optimisation, herb-drug interaction prediction, and integrated prescription support. Backed by HKBU experts, we quantify health states and interventions to revolutionise integrative medicine and drug development.

## Challenges

- Mechanisms of Chinese patent medicines often lack clarity, leading to the inclusion of redundant components
- Integrative medicine relies on empirical co-prescription without systematic synergy evaluation
- Lack of tools to quantify safety risks and efficacy in clinical Chinese-Western medicine combinations

## Breakthrough Technology

- **TCM-ES:** Maps health states and interventions in the same low-dimensional, interpretable space
- **Quantifiable synergy:** Predicts herb and drug synergies and their therapeutic effects using deep learning based on the TCM-ES
- **Integrative framework:** Unifies TCM with modern precision medicine for computable integrative medicine

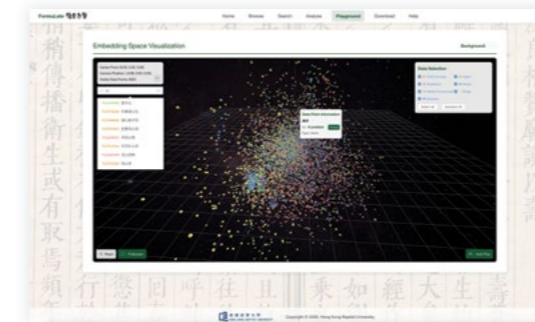


## Market Competitiveness

- Optimising formulas of Chinese patent medicines to reduce manufacturing costs and enhance safety
- Unique capability to quantitatively predict herb-drug synergies, providing valuable support for drug development and clinical medication
- Strong academic backing with cross-disciplinary expertise in AI and TCM from HKBU

## Development Plan

- The 1<sup>st</sup> year: Complete engineering implementation and knowledge base expansion of the TCM-ES. Initiate collaborations with 1–2 pharmaceutical companies
- The 2<sup>nd</sup> year: Launch the Intelligent TCM Formula Optimisation Platform



### PROJECT-IN-CHARGE

**Professor Tian Liang**  
Associate Head and  
Associate Professor  
Department of Physics

# GASTROEASE BIOTECH LIMITED

## Key Highlights

A dual-target therapy (GAD-1205) for serotonin-related diarrhea using gut metabolites OEA and HDCA to inhibit serotonin over-synthesis and accelerate clearance. Also developing OEA as a health supplement (GAF-1201) to support metabolic health, appetite control, and gut function.

## Challenges

- Regulatory pathway: Advancing a combination therapy through clinical development to address the unmet needs of current TPH1 inhibitors. Designed to mitigate common side effects like depression and severe constipation while delivering high-safety data
- Consumer education: Clearly communicating the distinct applications of OEA as both a supplement (wellness) and part of a drug therapy (disease treatment)

## Breakthrough Technology

- Dual-target synergy: Combines OEA and HDCA for "synthesis inhibition + clearance acceleration," restoring serotonin (5-HT) balance in IBS-D and carcinoid syndrome
- Root-cause intervention: Inhibits serotonin synthesis enzyme (TPH1) while enhancing serotonin transporter (SERT) function
- Dual-application platform: Core molecule (OEA) developed as both a combination therapy and a standalone health supplement for metabolic and digestive wellness
- Good safety: Utilises endogenous human metabolites with excellent biocompatibility, minimising the risk of depression and constipation side effects of traditional inhibitors



## Market Competitiveness

- Dual market reach: Addresses both the pharmaceutical market (IBS-D, carcinoid syndrome) and the health supplement market (metabolic/gut health)
- Novel mechanism: Targets both synthesis and clearance of serotonin
- Strong IP position: Protected by PCT, US, and China patents

## Development Plan

- Health supplement track (2026-2027): Launch OEA (GAF-1201) functional food supplement for metabolic health and gut wellness in Asian markets
- Pharmaceutical track (2027-2030): Complete IND-enabling studies for GAD-1205; initiate Phase 1/2a trial in IBS-D patients and carcinoid syndrome patients
- Partnership (2030+): Secure strategic partners for late-stage development and global commercialisation



### PROJECT-IN-CHARGE

**Professor Zhai Lixiang**  
Assistant Professor  
Centre for Chinese Herbal Medicine  
Drug Development Limited

# GIHON BIOTECH LIMITED



## Key Highlights

Gihon Biotech launched to develop skin and health care products enriched with natural ingredients. Our specialty ingredients are formulated for skin protection and whitening, and are also applicable to the preparation of anti-aging, anti-microbial and anti-inflammatory supplements.

## Challenges

- Many whitening and anti-aging products fail to deliver the promised effects or may harm the skin
- Ensuring high safety and efficacy is essential to protect consumers and maintain market trust

## Breakthrough Technology

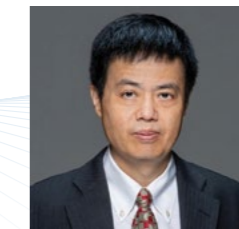
- DR2-type stilbenoids from *Dendrobium* can reduce the production of ROS and free radicals by inhibiting malondialdehyde (MDA), protein carbonylation, and NADPH oxidase activity
- DR2 stilbenoids also significantly inhibit tyrosinase activity, reducing the melanin production for skin whitening

## Market Competitiveness

- First Hong Kong entity to receive NMPA approval for new cosmetic ingredient under new registration system
- Human skin test and *in vitro* test proved the efficacy better than vitamin C
- Product R&D executed by R&D experts with 25+ years of experience in phytomedicine in natural product chemistry

## Development Plan

- With the success in receiving NMPA approval, we will extend our product sale to Chinese Mainland and other countries
- Develop new series of cosmeceutical products by incorporating our discovered new active skin care ingredients
- Widen the application of our ingredient to orally intake products such as supplements



### PROJECT-IN-CHARGE

**Professor Zhang Hongjie**  
Associate Dean (Teaching and Learning) of Chinese Medicine  
Chair Professor  
Cheung On Tak Endowed Professor in Chinese Medicine  
School of Chinese Medicine

# PISHON BIOTECH LIMITED



## Key Highlights

Developing pet supplements, feed additives and veterinary drugs leveraging the broad-spectrum antiviral properties of *Justicia* medicinal plants. Targeting the global farming and pet markets to mitigate economic losses from over 87 viruses affecting animal health, thus benefiting local and global economies and society.

## Challenges

- Antibiotics increasingly ineffective due to antimicrobial resistance
- Chemical-based disinfectants and vaccines struggle with viral mutations
- Lack of safe, affordable, and sustainable alternatives undermines food security, economic stability, and the "One Health" approach to zoonotic spillovers

## Breakthrough Technology

- Justicia* extracts exhibit potent antiviral effects against H5N1
- Active lignans inhibit multiple viruses: H5N1, Japanese encephalitis, Zika, HIV, SARS-CoV-2, Ebola
- Mechanism:** block viral fusion by preventing endosomal acidification
- Over 160 analogs have been synthesised, some with EC50 values below 5 nM and high selectivity indices



## Market Competitiveness

- Current feed additives target bacteria, not viruses—a significant market gap
- Our innovative products provide comprehensive antiviral protection
- Unlike repeated, incompletely protective vaccines, our oral solutions are cost-effective and reduce risk of drug-resistant mutations



## Development Plan

- Extensive R&D to optimise extraction and synthesis, followed by market introduction of feed additives and pet supplements
- Preclinical trials of veterinary drugs will assess safety and efficacy, leading to phased clinical trials and regulatory compliance
- Upon approval, imply scalable production methods and launch strategies to ensure widespread availability



### PROJECT-IN-CHARGE

**Professor Zhang Hongjie**  
Associate Dean (Teaching and Learning) of Chinese Medicine  
Chair Professor  
Cheung On Tak Endowed Professor in Chinese Medicine  
School of Chinese Medicine

# HONG KONG AUTHENTICATION CENTRE OF VALUABLE CHINESE MEDICINES LIMITED



## Key Highlights

With solely granted patent technology by HKBU, as well as a financial support from the Government of the HKSAR via Technology Start-up Support Scheme for Universities, Hong Kong Authentication Centre of Valuable Chinese Medicines Limited aims to resolve the customers' insecurity in the Chinese medicine market and to facilitate the upgrading of industry with support of innovative technologies.

## Challenges

- The current methods for authentication/quality analysis of the concerned valuable Chinese medicines and polysaccharide-rich herbal products are not specific and efficient
- There are obvious gaps in the quality control of the concerned Chinese medicines

## Breakthrough Technology

- Patented methods for authentication and grading of Dendrobii, Cordyceps, Ejiao, Edible Birds' Nest, Houzao, etc
- Patented methods for quality analysis of polysaccharide-rich herbal products

## Market Competitiveness

- No other solution to these quality concerns
- The company provides third-party, membership-only, QC-based business promotion platform to clients

## Development Plan

- Develop more patented technology to extend authentication service range
- Develop tailor-made QC methods for clients
- Build social media-based platform for business promotion



### PROJECT-IN-CHARGE

**Professor Han Quanbin Simon**  
Associate Dean  
(Engagement and Development) and  
Professor  
School of Chinese Medicine



# HONG KONG SHEMINFU LIMITED



## Key Highlights

Sheminfu's Neuro Vital is a pioneering brain health supplement using a natural lemon peel extract. It enhances memory and cognitive function by activating autophagy to clear toxic brain aggregates and reduce inflammation. Designed for aging adults, it offers a safe, food-derived, and scientifically backed solution.

## Challenges

- Aging demographics: Inevitable cognitive decline and memory loss among older adults
- Market gaps: Existing brain health supplements are often ineffective, overly expensive, have confusing ingredients, or cause side effects

## Breakthrough Technology

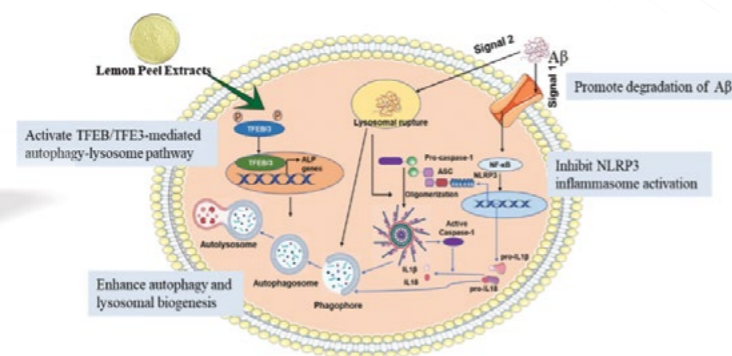
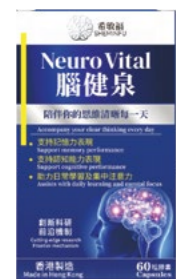
- Autophagy activation: Utilises TFEB-mediated autophagy induction to effectively clear toxic brain aggregates like A $\beta$  and P-Tau
- Dual-action mechanism: Simultaneously degrades harmful substances and significantly reduces neuroinflammation
- Food-derived ingredient: Uses a natural lemon peel extract, ensuring high safety with no side effects
- Formulation versatility: Maintains efficacy across multiple dosage forms like capsules, effervescent tablets, and gummies

## Market Competitiveness

- Pioneer ingredient: First brain supplement to utilise natural lemon extract as a powerful autophagy inducer
- Superior efficacy: Outperforms current market competitors by more effectively reducing neuroinflammation and harmful brain aggregates

## Development Plan

- IP & production: Finalise patent applications in Chinese Mainland/Hong Kong and establish reliable supply chains
- Commercial launch: Initiate B2C and D2C sales in 2026



### PROJECT-IN-CHARGE

**Professor Li Min**  
Dean and Chair Professor,  
Teaching and Research Division  
Ma Pak Leung Endowed Professor  
in Innovative Neuromedicine  
School of Chinese Medicine

# MICROFLOW INNOVATION LIMITED



## Key Highlights

A suite of innovative microfluidic antimicrobial susceptibility testing (AST) technologies, including a barcode cell sensor platform and a hydrogel-based platform, enabling rapid phenotypic AST within 2 hours at a low per-test cost (<USD 5) to support timely clinical decision-making, guide targeted antibiotic therapy, and help combat the global challenge of antimicrobial resistance.

## Challenges

- Conventional AST requires 24–72 hours, delaying treatment decisions
- Existing rapid phenotypic AST methods are costly and require sophisticated instrumentation, limiting accessibility
- Current methods cannot easily access polymicrobial infections and combination therapies

## Breakthrough Technology

- **Barcode cell sensor:** Rapid optical detection of bacterial growth and antibiotic responses in <2 hours; results read via mobile phone image capture, suitable for low-resource settings
- **Hydrogel-based platform:** World-first multidimensional AST system for polymicrobial infections and simultaneous evaluation of antibiotic combinations and synergies
- **Cost-effective & user-friendly:** Minimal sample/reagent volumes, and simple operation with <USD 5 per test
- **Scalable cartridge-based design:** Suitable for clinical diagnostics, antimicrobial research, and drug development



## Market Competitiveness

- Results in <2 hrs (~20 $\times$  faster than conventional methods)
- <USD 5 per test enables wider access and routine clinical implementation
- Mobile-phone-based readout works in low-resource and decentralised settings
- World-first multidimensional AST for polymicrobial and antibiotic combinations and their synergistic interactions

## Development Plan

- Conduct clinical validation studies for diagnostic accuracy and clinical utility
- Develop AI-assisted imaging/analysis systems for <1 hr automated interpretation
- Establish scalable, automated manufacturing for large-scale clinical validation and commercialisation



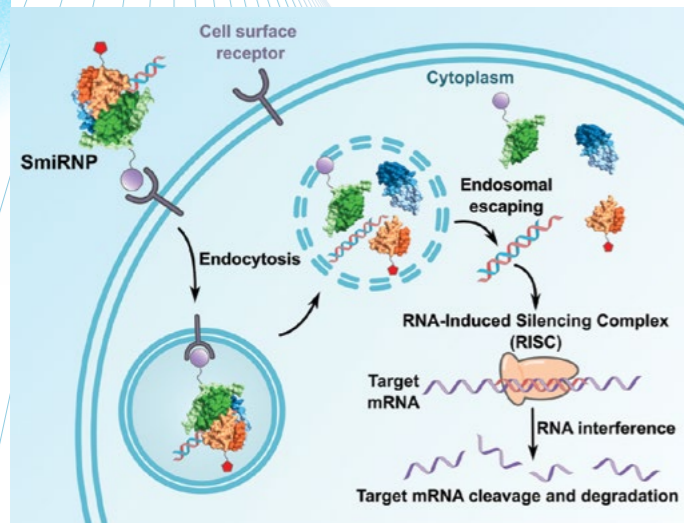
### PROJECT-IN-CHARGE

**Professor Ren Kangning**  
Associate Head (Research)  
and Professor  
Department of Chemistry

# NUPLEX LIMITED

## Key Highlights

- To develop a universal RNAi therapeutic delivery system
- Based on naturally occurring human protein-RNA complexes
- An in vitro reconstituted protein-RNA complex
- Deliver RNAi therapeutics to silence genes for disease treatment
- Biocompatible, modular and customisable



## Challenges

Traditional chemotherapies and newly developed targeted therapies are unable to cope with cancer drug resistance. Certain drug targets are also difficult to be drugged with small molecules.

## Breakthrough Technology

- RNAi therapeutics—new generation of medicine
- High specificity, low off-target side effects
- Our delivery system is a platform technology that can be customised to target different cell types and diseases
- The combination gives us precision and versatility for broad application

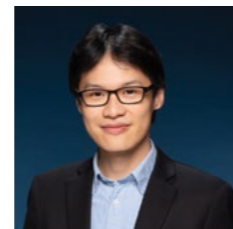
## Market Competitiveness

- Our delivery platform is highly modular and customisable
- Our delivery platform is built using human proteins—biocompatible for clinical use. It is expected to be nonimmunogenic and nontoxic
- Another advantage of our platform is that it is simple to manufacture without the need for chemical conjugations



## Development Plan

- Prototype development prototype for pre-clinical (IND) studies for colon cancer treatment (Seed funding and Series A, 3 years)
- Phase I and II clinical trials in Stage 2, estimated to take (Series B and C funding, 5 years)
- Phase III clinical trials and market approval (IPO, 3 years)






### PROJECT-IN-CHARGE

**Professor Aik Wei Shen**  
Associate Professor  
Department of Chemistry



**INNOVATE  
TRANSLATE  
TRANSFER**

Institute for Innovation and Translation  
創新及轉化研究院

 (852) 3411 8319  
 [iit@hkbu.edu.hk](mailto:iit@hkbu.edu.hk)  
 <https://iit.hkbu.edu.hk/>



IIT Website



@hkbuiit



浸大科创



@hkbuiit