MEDIA RELEASE

Artificial super stool to bring hope for people with chronic gut disease

Melbourne, Tuesday, 27 April 2021: The urgent need for human stool donations to treat chronic gut infections could soon be eased with innovative research to develop artificial super stool.

The collaborative research aims to create a new generation of microbial therapies that can replace donor-derived faecal microbiota transplantation (FMT).

Technology that replicates the complex community of microbes in the human gut will be manufactured in Australia as part of the project.

Australian microbiome biotechnology company BiomeBank, in collaboration with RMIT University, has secured $100,000 in funding from the Innovative Manufacturing Cooperative Research Centre (IMCRC) to develop the new bioreactor technology.

Currently material for FMT can only be harvested from healthy human donors, which is time-consuming, expensive and difficult to scale-up for widespread clinical use.

The new innovation would provide significant advantages to the cost and scale of FMT, an established life-saving therapy for *Clostridioides difficile* infection that is also emerging as a clinically beneficial treatment for other gut conditions including *Ulcerative Colitis*.

BiomeBank CEO Thomas Mitchell said the IMCRC activate program funding was an exciting step forward in the collaborative development of advanced technologies to change the way gut disease is treated across the world.

“This will be a game-changer in the treatment of gut conditions, overcoming the current limitations of donor-derived FMT microbial therapies,” Mitchell said.

“An important outcome will be enabling microbial therapies to reach more patients around the world.

“We’re thrilled to partner with RMIT on this exciting project, connecting their manufacturing expertise to our company’s unique capabilities in the development of microbiome drug products.

“BiomeBank will use this new manufacturing technology to develop second generation therapies to treat multiple diseases for the broader market.”

Innovative manufacturing technology

RMIT School of Engineering researchers Professor Namita Choudhury, Professor Naba Dutta and Dr Srinivas Mettu will lead the project work.

Choudhury, Discipline Leader for Chemical Engineering at RMIT, said the collaborative project builds on the team’s previous success in developing technology to produce multiple strains of probiotic bacteria in a single bioreactor.

“The new FMT manufacturing technology will support the growth of many beneficial bacteria strains simultaneously,” she said.

“While individual probiotic bacteria can be cultivated commercially, we need multiple strains in order to restore the complex microbial diversity of the gut when this is lost due to illness, malnutrition or overuse of antibiotics – and we need to produce these varied strains efficiently and cost-effectively.

“We are excited to collaborate with BiomeBank to deliver innovative biomedical technology into the hands of clinicians to improve the health of millions of people globally who suffer from chronic gut conditions.”

New business and export opportunities

Dr Matthew Young, Manufacturing Innovation Manager at IMCRC, said the FMT manufacturing technology developed as part of the research collaboration would be the first of its kind and presented a significant opportunity for BiomeBank and Australia, by creating pathways towards a manufacturing industry for microbial therapies in this country.

“Australia is leading the way globally in developing and implementing new manufacturing and business models in the medical space,” Dr Young said.

“If successful, the manufacturing technology developed as part of the project will allow BiomeBank to manufacture synthetic FMT or defined microbial products in a controlled, standardised way – ensuring quality, safety and efficacy, and opening up new business and export opportunities for high-value medical treatments.”

The IMCRC funding, which is being matched by Biomebank, is enabling a $600,000 total project investment (cash and in-kind) from all partners into the development of the technology prototype.

The IMCRC-funded project draws on innovations in novel bioreactor development by Mettu and over 25 years of research in the formulation of hydrogels for biomedical and life science applications by Dutta and Choudhury.

These porous hydrogels are made from sustainable resources and can be precisely designed to support bacteria growth in the bioreactor, mimicking the levels of oxygen and acidity found in the human gut.

The new IMCRC Activate funding will advance the research to expand the diversity of microbial strains that can be cultivated simultaneously and cost-effectively.

Previously, RMIT’s novel hydrogel bioreactor platform technology research was supported by Bill and Melinda Gates Foundation GCE (Grand Challenges Exploration) funding to Mettu and Australian Research Council-funded Discovery projects to Choudhury and Dutta.