SINGAPORE INSTITUTE OF TECHNOLOGY

Publication: The Straits Times
Date: 13 June 2022
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Researchers hope to find ways to manage diseases related to ageing and lifestyle

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To study how the bacteria residing in our gut affect health and ageing, and how they could be harnessed to delay the onset of age-related neurodegenerative diseases such as dementia, a new centre was launched in Singapore on June 3.

The Asean Microbiome and Nutrition Centre is a virtual centre based at the National Neuroscience Institute (NNI).

The centre is a partnership between NNI and Sunway University in Malaysia that will bring experimental microbiome research from the laboratory into a clinical setting.

The ecosystem of bacteria, fungi and other microbes found in the digestive system is referred to as the gut microbiome.

These microbes secrete chemicals called metabolites, which are absorbed into the bloodstream. The metabolites then travel to different parts of the body such as the brain, liver and bones, where they could be either beneficial or harmful to the tissue, depending on the type of metabolite and the location it travelled to.

The gut microbiome is therefore essential for human health and well-being since it plays a part in regulating immunity, metabolism, behaviour and organ function in various parts of the body.

Professor Sven Pettersson, director of the centre and a principal investigator at NNI's department of research, said that studying how gut microbes communicate with tissues such as those in the brain can pave the way for new treatments to prevent and manage age- and lifestyle-related diseases.

"In contrast to our genes, which are not easy to change, our gut microbes are malleable and respond to diet. That makes them very attractive to be targeted by food intervention," he said.

For instance, a high-fibre, low-processed diet rich in fruits, vegetables, nuts and seeds helps beneficial bacteria flourish in the gut, said Prof Pettersson.

The centre is also working closely with the local food industry to develop next-generation food products to help gut microbes better support human health and the ageing body.

Professor Louis Tan, senior consultant neurologist and director at NNI's department of research, said that the first research linking the gut microbiome to the brain was published less than 20 years ago.

It was found that microbes could either be beneficial or detrimental, depending on one's diet and lifestyle, which are the "master regulators" of human health, he said.

For instance, the microbes could secrete metabolites that reduce inflammation and improve memory or metabolites that accelerate inflammation and age-related disease symptoms in the body.

"There is still much we do not know. NNI is glad to collaborate with researchers from around the world to advance knowledge and care for our patients," said Prof Tan.

The centre is also engaging researchers in Europe, North America and Asia to identify how microbial mechanisms regulate ageing. It is supported by the UK Dementia Research Institute and was set up with funding from the Jeffrey Cheah Foundation.

Dr Anusha Jayaraman, executive director of the centre and a senior research fellow at NNI, said studies have also shown that urbanisation and human civilisation have led to decreased gut microbiome diversity compared with humans' hunter-gatherer ancestors.

"Human activity and modern lifestyle have not only affected planetary health but have had serious effects on microbial ecosystems, including the human microbiome. Thus, policies that are designed to tackle planetary health – such as more sustainable lifestyles – may be important for tackling microbiome health as well," said Dr Jayaraman.

She noted that the centre is currently in discussions with local chef school At-Sunrice to seek solutions that combine microbiome research with recycled food to improve human health.

Separately, the Singapore Institute of Technology (SIT) and Amili, which is South-east Asia's first precision gut microbiome research company, said on June 3 that they had formalised a three-year partnership to accelerate innovation in the field.

They will embark on a series of research and development programmes, staff upskilling initiatives, and work attachment opportunities for SIT students.

One of the initiatives includes looking at kale stems as prebiotics – types of fibre that feed the good bacteria found in the digestive system. These leftover farmed vegetables can be strong catalysts for the growth of *Bifidobacterium* and *Lactobacillus*, both of which are essential intestinal bacteria that aid in the maintenance of a healthy gut system.

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