



Ms Suzana Aboo Bakar, 56, who participated in the research carried out by the National University Health System Centre for Healthy Longevity, found out that she has the body of a 21-year-old. ST PHOTO: GIN TAY

Longevity clinic with lofty aims

New facility opening at Alexandra Hospital in 2023 seeks to add more disease-free years to lifespan of those aged 21 to 80



Chantal Sajjan

Ageing is a constant in life, but can one slow down the process? Living to a ripe old age sounds good, but not if you are wracked by illnesses. So how does one remain disease-free for as long as possible?

These are some of the issues a new diagnostic clinic by the National University Health System (NUHS) Centre for Healthy Longevity (CHL) aims to address. Expected to be up and running by early 2023, it will be at Alexandra Hospital, where the centre's main research facility is.

Since 2019, CHL has been laying the groundwork for the clinic, which it says is the first of its kind in the world, and drawing up plans for preventive ageing healthcare by conducting research on healthy participants at its main research facility.

The centre has a lofty mission: to add up to five disease-free years to those aged 21 to 80 in Singapore. It aims to find new biomarkers to measure ageing, as well as ways to disrupt the process in order to stave off diseases.

Its directors, Professor Andrea Maier and Professor Brian Keith Kennedy, have observed that South-east Asian populations, in particular, have been under-documented in clinical ageing research globally.

The three major races in this part of the world – Chinese, Malay and Indian – number about 2.5 billion people and make up about a quarter of the planet's total population, so the centre's research findings will have a significant impact in Asia.

When the clinic is ready, the referral criteria for patients is 30 years or older, without a chronic age-related disease; and 30 to 60 years old with one stable age-related disease. Innovative, evidence-based diagnostics will be applied, as well as personalised, evidence-based interventions.

The centre is equipped with a range of screening tools, such as a skin autofluorescence scanner to assess damaged molecules in the skin and platforms to measure arterial stiffness in the body.

Research for the 40- to 60-year-old group has been completed. Although the centre welcomes participants aged 21 to 80, the next stage of its studies is aimed specifically at those aged 30 to 60.

The studies are based on geroscience and longevity medicine, which are focused on boosting healthspans instead of lifespans.

Geroscience is a medical field centred on understanding the ageing process and age-related diseases.

Healthspan is determined by one's biological age, or the real age of the body, which may not be the same as one's chronological age. For instance, someone aged 50 may have a biological age of 40. Or a person aged 60 may notch up a biological age of 75.

The higher the biological age, the higher the risk of chronic, age-related diseases. The World Health Organisation says diseases such as osteoarthritis, heart ailments and dementia can severely chip away at the quality of life for the elderly.

And the clock is ticking even faster for rapidly ageing populations, including Singapore's. According to statistics by the Ministry of Health, life expectancy rates here are 88 years for women and 82 for men.

A recent Population In Brief report released by the Government, which gives a snapshot of Singapore's key population trends in the

past year, notes that one in five citizens are aged 65 years and above. By 2030, that proportion will be around one in four.

To intervene in the ageing process, it is crucial to assess the damage inside the body and how to repair it, says Prof Maier, 44. Preventing the damage from recurring is also key.

"Molecules, cells, tissues and organs in the body accumulate damage, which is often not repaired. This leads to age-related diseases. We often look in the mirror and see an increasing number of wrinkles as we age and the same is happening with the organs inside our bodies, as they accumulate scars," says the professor.

People age at different rates, she notes, which is why it is important to measure biological age. It can be determined by clinical tests – measuring cardiovascular fitness, cognition, lung function and oral health – as well as bloodwork to assess metabolic, immune, liver, kidney and other organ functions.

Genes from one's parents contribute about 20 per cent to a person's lifespan, she adds. Other factors are related to lifestyle aspects such as self-care, exercise, nutrition, sleep and exposure to the environment – weather, pollution and noise.

One of CHL's research participants is Ms Suzana Aboo Bakar, 56, who found the risk assessment tests for biomarkers that she completed in August "an eye-opener".

"I found out that my biological age is more than half my chronological age, so I have the body of a 21-year-old," says the operations supervisor in the healthcare industry. She exercises thrice-weekly, including brisk walking and running near her home in Eunos.

"But I was also told that the tests revealed I had a problem with my bone strength. I need to focus on building the muscle tissues close to my bones."

She spent two days at CHL for the tests. During a two-month observation period, she had to record her daily sitting and walking patterns, as well as sleep and diet. She also gave saliva and stool samples, and did bloodwork and a bone mineral density test.

The screening was conducted free of charge.

Another participant, Mr Kelvin Lee, 32, notes that the tests have made him more aware of his eating habits.

"I had to record my food intake over a two-week period and weigh everything," says the National University of Singapore microbiology student who is pursuing a master's degree.

He signed up for the programme because he wanted more insights into lifespans. His family history shows that most of his ancestors lived till their 50s or 60s, and there was a prevalence of diseases such as dementia, cancer and thyroid ailments at the end-of-life stage.

"This is a real concern for me as my parents are also not in the best of health," says Mr Lee, whose diet consists mainly of meat with side servings of vegetables and very little carbohydrates.

Mr Lee, who is single, hopes that his future children will adopt healthier lifestyle habits that will not only prolong but also improve the quality of their lives.

Another powerful weapon in the war against ageing are health supplements and repurposed medication, says Prof Kennedy. The 55-year-old is globally recognised for his research into the biology of ageing and his work in translating research discoveries into new ways of delaying, detecting and preventing human ageing and its associated diseases.

"It is already proven in humans that lifestyle interventions can not only slow the ageing process, but also reverse it, lowering the biological age. The most effective are physical activity and nutritional interventions."

The centre will be testing to find out if a daily intake of alpha-ketoglutarate over six months can slow the ageing process. The drug is available over the counter as Rejuvant, a supplement which studies have shown can help in slowing down ageing.

Other health products which can be found in stores include nicotinamide mononucleotide (NMN), which has been found to disrupt cell decay in the body. A recent study co-authored by Prof Maier showed a better physical function and quality of life for healthy mid-

Screening tools

Biomarkers such as blood vessel age, endurance capacity, skin age and blood ageing give a snapshot of what is going on inside an ageing body. Here are some of the ways NUHS CHL screens for these biomarkers.



FACIAL AGEING

A special camera takes photos of the face which has to be free of make-up or piercings. A 3D image is created and linked to a machine learning model developed to predict biological age.



AGE READER

The Advanced Glycation End (AGE) Reader is a non-invasive device that uses ultraviolet (UV) light to excite autofluorescence in human skin tissue.

Autofluorescence is the natural emission of light from biological structures, such as the

body, after absorbing light. By measuring the light emitted through the skin tissue, doctors can estimate an individual's biological age.

There is a 12-second exposure to UV rays on the arm during this procedure, which is less exposure than standing outdoors under the sun for a few minutes.



ARTERIAL STIFFNESS TEST

The participant, wearing a blood pressure cuff on the arm, lies on an examination bed for 15 minutes.

Another blood pressure cuff is placed on his or her thigh. Research staff measure the

distance from the neck to the thigh to see how fast the pulse travels in the participant's major blood vessels, which is related to how stiff the vessels are. The staff place a probe on the neck to detect the pulse.

This procedure takes less than half an hour.



HANDGRIP STRENGTH AND ARM CURL TESTS

The participant gets three attempts to squeeze as hard as possible on a handgrip device. He or she also holds a dumbbell (2.3kg for women, 3.6kg for men) in his or her dominant hand and curl the arm for as long as possible, up to 30 seconds.



REPETITIVE MAXIMAL-LEG EXTENSION TEST

The participant lifts weights with his or her legs. The weights are gradually increased until he or she is unable to continue. It is one of several functional tests to determine a person's muscle strength and endurance, which are necessary for daily functional ability, especially in middle-aged and older adults.

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PROFESSOR ANDREA MAIER (right), a director at the Centre for Healthy Longevity, who says it is crucial to assess the damage inside the body and how to repair it



de-aged men who take NMN for only 60 days.

Metformin, prescribed for patients suffering from Type 2 diabetes, has also been found to slow down ageing in seniors.

With the ongoing leaps and bounds in science and medicine, will the elixir of everlasting youth become a reality one day?

"I would not exclude it," says Prof Maier. "But what is most important now is to increase the healthspan of an individual where we add more disease-free years to the lifespan."

Prof Kennedy adds: "There are

other species that have shown to defy ageing, such as jellyfish, so in theory, it might be possible to live forever. But much more research needs to be conducted to answer that question definitively."

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• The NUHS CHL is looking for healthy participants aged 30 to 60 for its research studies, which comprise a range of free health screenings. To sign up, e-mail healthy_longevity@nus.edu.sg or call 8714-2730.