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### HEALTH-TECH NEWS

## Rapid blood test by MIT's Smart and NTU can determine if person has immunity against Covid-19, variants

Source: <https://www.straitstimes.com/singapore/health/rapid-blood-test-kit-by-mit-ntu-team-can-determine-if-person-has-immunity-against-covid-19-variants>



The test takes just 10 minutes to show results, compared with the 24 to 72 hours needed for conventional laboratory testing. PHOTO: NTU

Using a drop of blood from a finger prick, a new rapid blood test developed by scientists in Singapore can determine if a person has immunity against Covid-19 and its variants. The test takes just 10 minutes to show results, compared with the 24 to 72 hours needed for conventional laboratory testing.

It was developed by a team of scientists from the Singapore-MIT Alliance for Research and Technology (Smart), MIT's research enterprise in Singapore, and Nanyang Technological University (NTU). It detects the levels of neutralising antibodies against Sars-CoV-2, the virus causing Covid-19, and its variants such as Delta and Omicron, said Smart and NTU.

The test, which uses a paper-based assay coated with chemicals that bind to antibodies in the blood sample, has up to 93 per cent accuracy, said the two institutions. It can be easily adapted for new variants of concern and other diseases in the future, they added. The development of this test kit is also expected to pave the way for personalised vaccination strategies, where people are given vaccinations and booster shots only when necessary, depending on their antibody levels and immune response. "This test kit will also prove integral to a more personalised vaccination approach that will benefit higher-risk individuals such as the elderly and healthcare workers," said a former post-doctoral associate at the Smart Antimicrobial Resistance (AMR) interdisciplinary research group. "Individuals from these communities can have their immuno-protective profile assessed on a regular basis via the (test), allowing them to know when a booster dose may be appropriate or necessary." The test can also be administered by someone without medical training as it does not require the use of any specialised laboratory equipment. Its development is also expected to address issues such as vaccine hesitancy.

"Our study proves that our new test kit can be a powerful tool, allowing healthcare organisations to screen people and determine their vaccination needs, especially against the current and upcoming variants," said the co-lead principal investigator at Smart AMR and associate vice-president for biomedical and life sciences studies at NTU. "This will help allay some people's fears that they will be 'over-vaccinated with a booster', since the results will inform them accurately if they are well protected against Covid-19 or not." Further development of the test kit is under way to meet necessary regulatory approvals and manufacturing standards for public use, said Smart and NTU.

## Research engineer develops rehab tools to help father's stroke recovery, wins James Dyson Award

Source: <https://www.straitstimes.com/singapore/son-who-developed-rehabilitation-equipment-for-fathers-stroke-recovery-named-national-winner-of-james-dyson-award>



*Rehabit, a set of four products focused on upper-limb rehabilitation, allows patients to perform exercises correctly and safely without caregiver assistance. PHOTO: THE JAMES DYSON AWARD*

After his 59-year-old father suffered a stroke Mr John Tay, 27, accompanied him on weekly visits for therapy and found there was little proper equipment for stroke patients for treatment. During the rehabilitation sessions, patients practise a series of motions with equipment ranging from hospital machines to smaller items such as balls and cones, all of which require the help of a nurse. Tools at the rehabilitation centres were limited and hard to replicate for practice at home. Patients were told to rely on towels and plastic bags to complete these motions.

HIGH COMMISSION OF INDIA, SINGAPORE

The struggles and frustrations at the therapy centres when they did not have proper equipment led the research engineer to develop Rehabit, a set of four products focused on upper-limb rehabilitation, which allows patients to perform exercises correctly and safely.

Rehabit was named the national winner of the annual James Dyson Award, an international design award that supports budding design engineers at the start of their careers.

## FOOD-TECH NEWS

### NUS scientists develop magnetic method to grow meat

Source: <https://www.straitstimes.com/singapore/nus-scientists-develop-magnetic-method-to-grow-meat>



*Associate Professor Alfredo Franco-Obregón (left) and Dr Alex Tai discovered that magnetic pulses could coax meat cells to release molecules that have regenerative properties. PHOTO: NUS*

Scientists from the National University of Singapore (NUS) have found a novel use for magnetic pulses to grow cell-cultured pork. This paves the way for a greener method to grow lab meat without the use of animal products. Their method joins a growing global movement that is shifting from the traditional way of growing cell-cultured meat with animal serum, which is derived from the blood of unborn calves of slaughtered pregnant cows.

By pulsing a magnetic field through animal cells, researchers from NUS' Institute for Health Innovation and Technology and NUS Yong Loo Lin School of Medicine observed that the cells release a myriad of molecules that have regenerative, metabolic, anti-inflammatory and

immunity-boosting properties. These substances are part of what is known as the muscle 'secretome' and are necessary for the growth, survival and development of cells into tissues.

"Instead of relying on animal blood to provide factors that stimulate the multiplication and development of muscle cells, an electro-magnetic field does so by directly causing the muscle cells themselves to secrete these same factors, which then similarly promotes muscle cell development - self-sufficiently," said the Prof, who has been researching the use of magnets to enhance muscle growth and function for a decade. A 10-minute exposure of these cells to pulsing magnetic fields can cause them to multiply better and survive longer than the outcome of adding animal serum to cells, he added. The technology has already been applied by NUS in regenerative medicine. Another team led by the Prof found that energy produced via magnetic stimulation can "trick" human muscle cells into thinking that they are exercising, hence activating them to adapt and improve at an accelerated speed. Responding to concerns over the impact that magnets might have, he said the non-ionising magnetic fields used to culture meat are of a low-energy range and, like gravity, are ever present and necessary for survival. He added: "The earth's electromagnetic field and gravity are always present, which is why we never notice them. But, both forces are absolutely essential for normal development and growth. "This is one of the principal reasons why astronauts lose muscle and bone while away from the earth."



*This new technique is a greener, cleaner, safer and more cost-effective way to produce cell-based meat. PHOTO: NUS*

Researchers would need to replicate magnetic-induced growth over a longer period as cultivated meat production takes more than a few hours to achieve sizeable muscle biomass, he said.

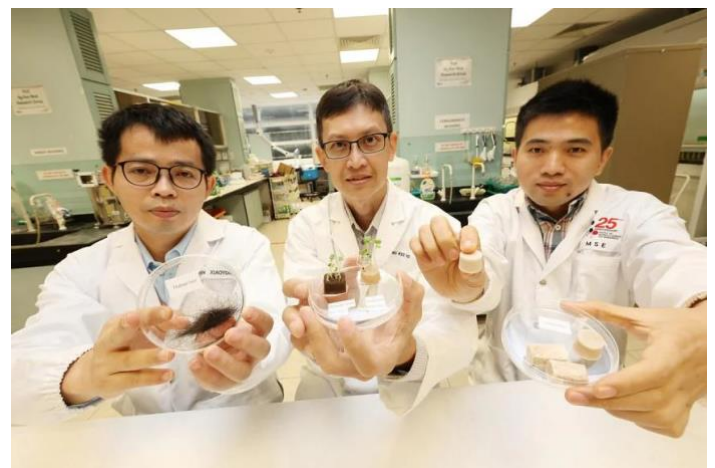
They would also need to understand the long-term impact of applying a pulsed magnetic field, he said, noting that if the cells are used for meat production and need to be regularly stimulated, changes to cell DNA may need to be monitored. So far, electro-magnetic fields in the non-ionising part of the electromagnetic spectrum cannot damage DNA or cells directly and studies of animals have not provided any indication that these fields are associated with cancer, according to the United States' National Cancer Institute.

A patent has since been filed for the NUS team's technology, and the university is currently in discussion with potential industry partners to commercialise it. Singapore became the first country to approve the sale of a cell-cultured meat product - chicken bites by start-up Eat Just - in December 2020, after the authorities determined that it was safe for consumption. Alternative proteins such as cultivated meat are considered by the Singapore Food Agency to be more sustainable than traditional meat options, as these can be produced using less land and labour in a climate-resilient manner.

## ENVIRO-TECH NEWS

### Hair used to make new material that helps grow vegetables through hydroponics

Source: <https://www.straittimes.com/singapore/environment/hair-used-to-make-new-material-that-helps-grow-vegetables-through-hydroponics>



*(From left) Researchers Zhao Zhitong, Ng Kee Woei and Pan Xiaoyong with sample bok choy seedlings growing on the keratin medium (white cubes) and regular medium. PHOTO: LIANHE ZAobao*





The new growth material has an advantage over traditional substrates as it is biodegradable and can become a source of nutrients for plants when they degrade. PHOTO: LIANHE ZAOBAO

Hair collected from local salons can be put to work in hydroponics farming, with scientists extracting keratin from it to make materials that have been used successfully to grow vegetables like bok choy and kale.

A Nanyang Technological University (NTU) team mixed the keratin with cellulose fibres to make substrates, which act as a support structure and reservoir for water and nutrients in hydroponics. It found that the crop yield from the keratin-based substrates was comparable to that from commercially available ones.

The Professor who led the research, said that the growth materials can also be made from other sources of keratin, such as feathers from slaughterhouses. "We were not trying to find the best protein in the world that can do this job, but we wanted to find a sustainable source that is abundant," said the associate chair for research at NTU's School of Materials Science and Engineering. He added that the new growth material has an advantage over traditional substrates - made from materials such as rock and foam - in that it is biodegradable and can become a source of nutrients for plants when they degrade. A research fellow at the same school, said the new material can absorb and retain large quantities of water, making it a "promising growth medium" to support seed germination and crop growth. The team is currently in talks with other organisations, including local urban farms, to perform large-scale field tests, one of which aims to tweak the composition of the substrate to

accommodate different vegetables, such as those with thicker roots.

The research lead Prof said that while the keratin-based substrates cost up to three times as much as existing ones, these figures could be reduced as its research scales up. He also addressed how some consumers may feel uncomfortable about food grown in products made from hair. "When I asked the farmers, their comment was that for as long as mankind has been practising agriculture, we've been using animal manure (as fertiliser) for plants, and we've had no problem with eating them," he said. "What's wrong with using something from hair?"

## DIGI-TECH NEWS

### New platform for trade associations and chambers launched to enable closer partnerships

Source: <https://www.straitstimes.com/business/companies-markets/new-platform-for-trade-associations-and-chambers-launched-to-enable-closer-partnerships>



Ms Low Yen Ling (centre) with Singapore Business Foundation chief executive officer Lam Yi Young (far right) showing the OneTAC SG app. ST PHOTO: MARK CHEONG

About 300 trade associations and chambers in Singapore will now have a way to establish closer partnerships with one another, with the launch of a new platform. The platform, OneTAC SG, was developed by the Singapore Business Federation (SBF) as a way to bring together the trade associations and chambers (TAC) community and build a strong business ecosystem in Singapore. There are more than 300 trade associations and chambers in

Singapore, representing a range of groups from various industries and professions. Apart from helping to facilitate better communication in the community, the platform will also help trade associations and chambers improve their capabilities.

OneTAC SG is open to all the trade associations and chambers and their secretariat staff in Singapore and is complimentary in the first year. Details on the pricing model for subsequent years are still being worked out. The platform can be accessed via the Web or through a mobile application. Features include sending and receiving electronic business cards, and getting access to reports, guides and advisories relevant to the association and its businesses. Trade associations and chambers can also view and search for other associations and chambers.

Executive director of the Association of Process Industry, said: "The platform will help to break down the silos we have, which have deepened during Covid-19. (With the app), you can also enable staff to see and understand what others are doing."

SBF also unveiled more details on three programmes targeted at trade associations and chambers. All three programmes will run for three years from August this year to July 2025. They are meant to increase trade associations and chambers' capabilities, especially in digital adoption and leadership development. The Digitalisation of TACs programme will provide funding support of 70 per cent on qualifying costs for eligible trade associations and chambers to adopt pre-approved digital solutions and training.

Lastly, the TAC Leadership Accelerator Programme will help trade associations and chambers attract and hone talent. It is targeted at mid-career professionals with industry experience who are new full-time employees in a trade association or chamber, and have not worked in any trade association or chamber previously.

## **SGX, MAS launch ESG reporting portal for corporates**

Source: <https://www.straitstimes.com/business/companies-markets/sgx-mas-launch-esg-reporting-portal-for-corporates>

Singapore Exchange (SGX) and the Monetary Authority of Singapore (MAS) have launched an online sustainability reporting portal aimed at streamlining disclosure for corporates and improving data quality.

Called ESGenome, the disclosure portal will be offered free to listed companies here on a voluntary basis, for now, said SGX and MAS. Investors and financial institutions will also have access to the environmental, social and governance (ESG) data of companies and compare them.

Companies can upload their ESG disclosures onto the platform based on the reporting frameworks they have adopted, including customised metrics. Because the platform has mapped out a number of different reporting frameworks, an input provided for one framework is automatically matched to similar requirements in other frameworks if the company needs to report in more than one format. The frameworks include the set of 27 core ESG metrics that SGX has recommended issuers use as a starting point for sustainability reporting.

Listed issuers can use the platform to generate sustainability reports that would meet disclosure requirements of the exchange. They can also allow external parties, including financial institutions, ESG rating agencies and investors, to access some or all of their data. "For investors and financial institutions, ESGenome provides access to relevant and comparable ESG data that allows for meaningful peer benchmarking and tracking of sustainability commitments and key performance indicators. This enables capital to be mobilised more efficiently towards sustainable companies and projects," said SGX and MAS. They said that the proliferation of multiple sustainability reporting frameworks and guidelines across jurisdictions, and the inconsistent manner in which data is being collected, verified and reported have created significant disclosure challenges and resulted in poor ESG data comparability.

As part of Project Greenprint, which refers to a collection of initiatives from MAS that aims to make use of technology and data to develop a more transparent ESG ecosystem, the financial regulator also said that it will utilise learnings from ESGenome to address the reporting needs of non-listed corporations, including small and medium-sized enterprises (SME). The platform has received early endorsements from both issuers and their stakeholders.