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New NUHS centre to expand genomics testing efforts

It will bring together health cluster's expertise across different specialities

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(From left) Adjunct Associate Professor Chin Hui-Lin, a geneticist with the National University Hospital, with Ms Ng Zhuang Shu and her husband Luis Teo, and the couple's five-month-old daughter Ellie – at the National University Health System's Scientific and Innovation Summit at Shangri-La Singapore on April 2. Ms Ng, who has insulin-dependent diabetes, underwent genetic testing before going for in-vitro fertilisation so her child would not inherit her condition. ST PHOTO: KEVIN LIM

Diagnosed with insulin-dependent diabetes at just three months old, Ms Ng Zhuang Shu has required daily insulin jabs since infancy and spent much of her childhood being rushed to the hospital due to hypoglycaemia, or dangerously low blood sugar.

When planning for a family as an adult, genetic testing showed that she carried a mutation in the INS gene, which causes her diabetes. The mutation has a 50 per cent chance of being passed on to her children.

Not wanting her child to suffer the way she had, Ms Ng, 32, a senior product development executive, and her husband, Mr Luis Teo, 33, a civil servant, underwent in-vitro fertilisation (IVF) with pre-implantation genetic testing.

She was implanted with an embryo without the mutation, and later prenatal genetic testing confirmed – with 99.9 per cent accuracy – that her baby would not inherit her condition.

In another case, immunologic and genetic testing revealed a new immune defect affecting a woman in her 30s, after she was admitted to the intensive care unit with a bacterial infection and was unresponsive to conventional treatments for more than five weeks.

This discovery allowed doctors to administer targeted immune-augmenting therapy, and the woman was able to come off life support within days.

These are just some examples of how genomics – a field of molecular biology focused on the mapping and editing of genomes – is being used across the National University Health System (NUHS), the public healthcare cluster said.

On April 2, NUHS launched a new centre focusing on genomics, as part of efforts to strengthen early diagnosis and allow for more tailored therapies and safer, more precise prescriptions.

NUHS said the National University Centre for Genomic Medicine (NUGEM) will expand genomics testing beyond rare paediatric conditions, bringing together the cluster's expertise across different specialities, such as oncology and cardiology.

Situated within the National University Hospital (NUH), NUGEM will be led by a multidisciplinary team comprising experts from various NUHS institutions – including the National University Cancer Institute and the National University Heart Centre, along with researchers from the National University of Singapore's Yong Loo Lin School of Medicine.

Supported by NUS researchers, NUGEM will develop new tests for patients who are undiagnosed or have ambiguous genetic results.

Even though genomics testing is already supporting care in various settings across NUHS, the use of the technology is still siloed, said NUGEM director Ng Kar Hui.

The new centre aims to make its use more systematic and bring it closer to patients, said Associate Professor Ng, noting that NUGEM is supported by a combination of institutional investment, partnerships and national research funding, where applicable.

"These investments are aligned with long-term goals to make precision medicine part of our care, to improve care quality and outcomes," she said.

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Centre can help grow global genomic data: WHO

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Prof Ng noted that among the new centre's facilities is a genomics laboratory, which will enable more genetic testing to be done in-house, allowing for greater collaboration in addressing complex cases.

NUGEM will also enhance NUHS' focus on pharmacogenomics, where a patient's genetic profile is used to guide the choice of medication and its dosage, enabling doctors to make safer and more effective prescriptions.

The centre will expand preemptive pharmacogenomics panel testing – where testing for genetic variants is used to determine if specific drugs are suitable for patients.

"More than 2,000 patients have undergone pharmacogenomics testing at NUHS, with plans to scale towards preventive, population-level use," said NUHS.

NUGEM was launched at the NUHS Scientific and Innovation Summit, held at the Shangri-La Singapore in Orange Grove Road.

National Research Foundation chairman Heng Swee Keat, who attended the event, noted that the new centre is in line with the goal of the $37 billion Research, Innovation and Enterprise 2030 plan, to enable healthy ageing while managing healthcare costs.

"The launch of NUGEM aligns with our Grand Challenge on maximising healthy and successful longevity, as genomic insights become increasingly vital for understanding and addressing age-related health conditions," he said.

In his keynote speech, World Health Organization (WHO) assistant director-general of health promotion and disease prevention and control Jeremy Farrar said the withdrawal of the United States from the WHO has resulted in an extraordinarily difficult time for the organisation.

Still, he said, science remains a driver of sustainable economic growth, with Singapore's investments in science critical to the country's success.

NUGEM can play an important role in growing the world's genomic knowledge, which is still largely dominated by data from Europe and North America.

"For Singapore to take a leadership role and diversify that genomic data is going to be hugely important," he said.

For Ms Ng, whose daughter Ellie was born healthy in November, going through genetic testing and IVF was a minor hassle that gave her peace of mind about her child's health.

"You just have to trust the process," she said.

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