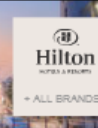


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NTU medical school to research on healthcare needs of Singapore's ageing population



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[The Straits Times \(/source/straitstimes\)](http://source/straitstimes)
 Tuesday, Feb 11, 2014

Jointly set up by NTU and Imperial College London, the school has identified four key areas of research: metabolic diseases, neuroscience and mental health, dermatology and skin biology, and infectious diseases such as dengue.

THE STRAITS TIMES (<http://www.straitstimes.com>)
 Get the full story from [The Straits Times \(http://www.straitstimes.com\)](http://www.straitstimes.com).

Here is the press release from NTU in full:

Nanyang Technological University (NTU) today unveiled the integrated research strategy of its Lee Kong Chian School of Medicine, aimed at addressing Singapore's key health challenges. Jointly set up by NTU and Imperial College London, the School welcomed its first intake of 54 students in August last year.

The medical school's research strategy, which draws on NTU's and Imperial's excellent track record of reaping synergies between medicine, science and technology, comprises four themes: Infectious Disease, Metabolic Disease, Neuroscience and Mental Health, and Dermatology and Skin Biology. These four research themes are underpinned by the cross-cutting technology platforms in Developmental Biology, Structural Biology, Metabolomics and Sequencing Technologies, and Translational Imaging and Health Services Outcome Research.

NTU President Professor Bertil Andersson today announced the school's integrated research strategy and introduced influential world-class scientist and scientific leader Professor Philip Ingham FRS as the school's Vice-Dean of Research. A Fellow of the Royal Society and the UK Academy of Medical Sciences, Professor Ingham is widely credited for his ground-breaking work in modelling human disease in the zebrafish. His research has provided fundamental insights into cell signalling in the developing embryo, in particular the Hedgehog signalling pathway, and has relevance both to regenerative medicine and cancer.

Professor Bertil Andersson says, "NTU now has a formidable life sciences cluster, with the medical school, the School of Biological Sciences, the Singapore Centre on Environmental Life Sciences Engineering (SCELSE) and a new structural biology research centre headed by Professor Daniela Rhodes FRS, formerly from Cambridge University. Promising inter-disciplinary research between our new medical school and other NTU schools has already started. With Professor Philip Ingham FRS leading a team of global experts and a research strategy focused on Singapore needs, we can expect NTU's research in healthcare to serve the population's needs well into the future."

Having a medical school with a world-class research strategy will further boost NTU's known strengths in biomedical engineering that has produced a number of breakthroughs and world's firsts over the years, such as the world's smallest piezoelectric heart pump in 2003 invented by NTU Provost, Professor Freddy Boey. His second invention in 2004 is a fully biodegradable coronary stent, co-developed with Professor Subbu Venkatraman from NTU, which has been successfully implanted in human patients. Another example of a world's first from NTU is a pair of endoscopy robotic arms used for removing stomach tumours without surgery developed by NTU's Associate Professor Louis Phee.

Research with Singaporeans in mind

The medical school has identified four research themes in which it could best achieve research excellence, against a backdrop of Singapore's ageing population and an understanding of the healthcare needs of Singaporeans accustomed to a modern lifestyle.

LKCMedicine Dean Professor Dermot Kelleher, who is also Dean of Imperial's Faculty of Medicine, says, "We aim to elucidate the cellular and molecular basis of human diseases through innovative research programmes and to develop new therapies based on this understanding."

Metabolic disease

Singapore's ageing population brings with it key health challenges related to metabolic and cardiovascular disease which also impacts healthcare costs.

"The medical school sees that an integrated and holistic approach, spanning bench and translational research to the delivery of care is required in the prevention and control of metabolic disease. Forming the school's core research in metabolic disease is the largely overlooked 'cross talk' between organs systems," said Professor Ingham.

This means the inclusion of pre-clinical as well as clinical studies on the bidirectional cross-talk or relationships between metabolic and vascular tissues, muscle, liver and fat cells, modulated by environmental factors - including the gut microbiome.

This research theme is anchored by an eminent group, including Professor Bernhard Boehm, a prominent clinician scientist who leads the interdisciplinary area of research in the regulation of cellular and systemic energy metabolism in health and diseases; Professor Per-Olof Berggren, a renowned experimental endocrinologist, who leads a research group focusing on pancreatic islet cell biology and Professor Michael Ferenczi who set up the first research lab in LKCMedicine, the Muscle and Cardiac Biophysics Laboratory, in line with his research expertise in biophysics and biochemistry.

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Infectious Disease

Despite a high standard of living and an excellent healthcare infrastructure, there remains a threat of infectious diseases in Singapore. This relates not only to global outbreaks of pathogens such as SARS or avian influenza, but also to more insidious and less publicised infections caused by hospital drug-resistant micro-organisms as well as regional diseases such as malaria and dengue fever.

The medical school will partner NTU's School of Biological Sciences and the Singapore Centre on Environmental Life Sciences Engineering (SCELSE), focussing its research on drug resistant bacterial infections, bacteriology including pulmonary tuberculosis; malaria and dengue, inflammation as well as global health.

Among those driving the research theme is Professor Annelies Wilder-Smith, a clinician scientist investigating vaccine preventable diseases and emerging infectious diseases.

Neuroscience and Mental Health

After heart disease and cancer, neurological diseases comprise the third largest health concern in the world. The nature and prevalence of mental illness in Singapore is comparable to developed countries. However, with one of the fastest ageing populations, Singapore is expected to face an increase in ageing-related issues such as dementia and stroke. As obesity and diabetes become more prevalent, the country is also likely to see much younger stroke victims.

NTU will focus on advancing our understanding of the brain function at the molecular, cellular, circuitry and systems level in health and disease, and developing novel pharmacological and behavioural approaches for therapeutic treatment for neurodegenerative disease, neuropsychiatric disorders and young strokes.

The research faculty driving this theme includes Professor Balázs Gulyás, a clinician scientist whose research focuses on translational neuroscience and Professor George Augustine who conducts research to develop molecular and cellular neuroscience with focus on synaptic communications and neurotransmission.

Dermatology and Skin Biology

Around the world, one in three people suffer from skin disorders, with significant differences between how skin diseases present themselves in Asian and Western populations, as well as in how these respond to treatment. There is thus a strong need for a better understanding of skin biology from the healthcare sector as well as a growing personal care market as companies look increasingly to skin biology to differentiate their products for consumers.

Translational skin research is a new strategic research thrust under the Singapore Biomedical Sciences Initiative and the medical school is already part of this national effort. In September last year, the Skin Research Institute of Singapore (SRIS), a collaboration between NTU/LKCMedicine, Agency for Science Technology and Research (A*STAR), and National Skin Centre (NSC) was announced. The SRIS aims to foster and conduct high impact, inter-disciplinary skin research designed to translate into improved health outcomes and quality of life.

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The medical school's research theme in Dermatology and Skin Biology is driven by skin biologists, bioengineers and clinician scientists, including Professor David Becker who focuses on tissue injury and repair, wound healing, with reduced inflammation and scar formation.

Cross cutting technology platforms underpins four research areas

Supporting the four key research themes are the cross cutting technology platforms in Developmental Biology, Structural Biology, Metabolomics and Sequencing Technologies, Translational Imaging and Health Services Outcome Research.

For example, Developmental Biology has been one of the fastest growing fields in biology over the past three decades, attracting multiple Nobel Prizes and underpinning the emerging field of Regenerative Medicine through the integration of molecular biology, genetics, physiology and cell biology. Professor Philip Ingham is a world authority in the developmental genetics of the fruit-fly Drosophila as well as the zebrafish and his pioneering studies of intercellular signalling pathways has paved the way for anti-cancer drug development as well as strategies for cell replacement therapies.

Structural Biology is the determination and understanding of the structures of macromolecules which forms the core of biological processes. The medical school's cross-cutting theme in structural biology was started through the joint appointment of Professor of Structural Biology Daniela Rhodes FRS, with NTU's School of Biological Sciences. Professor Rhodes, who is internationally renowned for her contributions in chromosome biology, will investigate telomeres (the structures that cap the ends of chromosomes) and genome function for their role in areas such as cancer development and ageing.

Research collaborations

LKCmedicine has already embarked on several research collaborations. While local tie-ups underpin its research, it is also driven by international collaborative links.

For example, following the simultaneous reports in April 2013 of travellers with dengue returning from Angola in South West Africa to six countries on four continents, an international research consortium on dengue called DengueTools sequenced the virus from Angola and investigated the interconnectivity via air travel between the affected countries. The study is led by Professor Wilder-Smith who is currently also the Lead Principal Investigator and Coordinator of DengueTools, which is funded by the European Commission.

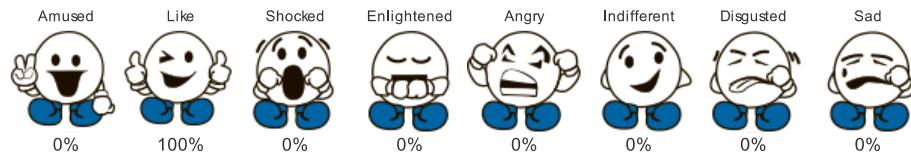
Professor Walter Wahli from LKCmedicine's Metabolic Disease theme has started a series of collaborations locally. The first is on skin health and disease on melanoma (skin cancer) progression and metastasis with LKCmedicine's Assistant Professor Wang Xiaomeng. He is also collaborating with faculty from NTU's School of Biological Sciences on the complex interactions that take place during wound healing and tumorigenesis (creation of cancer) with Assistant Professor Andrew Tan and on insulin resistance in muscle with Professor Ravi Kambadur.

Together with medical education which aims to produce excellent doctors for Singapore who will put patients at the centre of their exemplary medical care, research forms the medical school's twin pillars of academic excellence. In the long run, the School aims to redefine medicine and transform healthcare through equipping doctors with the knowledge and skills to advance the science and practice of medicine for the good of humanity.

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