New Biodiversity Medicine Institute launched at SingHealth Duke-NUS Scientific Congress 2021

- *The Institute makes a foray into an exciting area of medical research that leverages biodiversity to promote human health and wellness*
- *Verdant Foundation makes a S$5 million founding gift to support the Institute and its research programmes*

Singapore, 17 September 2021 – Deputy Prime Minister Heng Swee Keat opened the sixth SingHealth Duke-NUS Scientific Congress 2021 today. At the opening ceremony, he launched the SingHealth Duke-NUS Institute of Biodiversity Medicine (BD-MED), a new research institute that will leverage biodiversity such as natural ecosystems and flora to advance biological, health and pharmacological sciences. Verdant Foundation also presented a S$5 million cheque in support of the Institute.

Biodiversity medicine to promote human health and wellness

Biodiversity, or the variety and variability of all lifeforms in their ecological environments, has a deep impact on human health and wellness. According to the World Health Organization, people depend on biodiversity in their daily lives, and the biodiversity of microorganisms, flora and fauna provide extensive knowledge which carry important benefits for biological, health and pharmacological sciences[1].

The Southeast Asian region has a rich biodiversity landscape. Singapore alone has more than 4,000 local flora species and cultivars, making it an ideal hub for research into biodiversity medicine. BD-MED will study local and regional plant biodiversity – from their genetic make-up to nutritional and medicinal value – and harness the insights and knowledge for applications in medicine and the sciences.

“The application of botany knowledge to treat disease and promote health has existed for thousands of years, and there is much potential for us to advance health and wellness through biodiversity medicine. BD-MED will leverage our rich local and regional biodiversity and cutting-edge research capabilities to drive biodiversity studies to positively impact medicine and health, such as identifying plant components that could accelerate drug discovery or manipulating plant biology to enhance their nutritional values. I am excited to see how the Institute’s work will benefit not only our patients, but the population for generations to come,” said Professor Ivy Ng, Group CEO, SingHealth.

BD-MED will focus on three signature research programmes that are underpinned by strategic partnerships with local and regional scientific, innovation and environmental agencies. The **Herbal Biodiversity and Medicine programme** will use innovative

technologies to extract and study plant components that may have promising nutraceutical benefits to fight common diseases. This includes identifying molecular pathways and novel phytochemicals for drug discovery and to create alternative therapeutic and nutritional options.

The **Food Biodiversity and Nutrition programme** will look into "food as medicine", using food to potentially manage diseases alongside conventional treatment. This programme will also examine the use of nutrient-dense and sustainable food alternatives to boost food security for the future.

The **Urban Biodiversity and Wellness programme** will study how natural flora and their biodiversity can enhance our living environment and have "healing" effects that promote wellness, including mental health. It will look into plant components that make up their biology, appearance, colour and smell, and examine their applications on health. For example, essential oils distilled from local plants could be used to offer symptomatic relief for patients suffering from anxiety and insomnia.

[Duke-NUS to insert quote from Professor Thomas Coffman, Dean, Duke-NUS]

To support its work, BD-MED will develop 12,000 square metres of garden space spread across four SingHealth's hospitals to grow and study different regional plant species. The gardens are partially funded by the Ministry of Sustainability and the Environment's SG Eco Fund.

To commemorate the launching of the Institute, the BD-MED team and scientists from the Agency for Science, Technology and Research (A*STAR)'s Genome Institute of Singapore (GIS) also unveiled, for the first time, the genomic make-up of Singapore's national flower, the *Papilionanthe* Miss Joaquim (commonly known as the Vanda Miss Joaquim). It is made up of around 33,000 genes, and one of the plant extracts called vandaterosides is known to have biological activities that slow down the skin ageing process. Please refer to Annex A for more information.

"Progression in science and medicine is often tied back to the environment and ecosystems we live in, and biodiversity medicine research will have a far-reaching impact on society. Tapping on the wealth of biodiversity in Southeast Asia and Singapore, my team and I hope to delve deep into studying the genetic make-up, nutritional and medicinal benefits of local and regional plants to better understand, prevent and fight diseases, and even contribute to environmental and food sustainability," said Prof Teh Bin Tean, Director, BD-MED.

Verdant Foundation's S$5 million gift to support biodiversity medicine

The Scientific Congress opening ceremony also recognised Verdant Foundation's generous lead gift of S$5 million to BD-MED, which will support the Institute's research programmes.

"Biodiversity medicine is an exciting field of research that can open up many possibilities for mankind. I hope that this gift will help bridge the local biodiversity and the research into nutrition, medicine and human health," said Mr Vincent Cheng, Founder, Verdant Capital Group and Chairman, Verdant Foundation.

The SingHealth Duke-NUS Scientific Congress 2021 is one of the largest and most distinguished healthcare related scientific events that brings together thought leaders and healthcare professionals to share insights in care improvement, research and education to improve patients' outcomes. Themed ""Revolutionising Medicine – The New Frontier", the two-day virtual event covers a wide range of research and education-related topics that reflect the evolving healthcare concerns brought about by changing disease patterns.

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[1]World Health Organization, Biodiversity and Health, 3 June 2015

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About SingHealth Duke-NUS Academic Medical Centre

The SingHealth Duke-NUS Academic Medical Centre (AMC) draws on the collective strengths of SingHealth and Duke-NUS Medical School to provide our patients and community with the best outcomes and experience.

By leveraging the synergies in clinical care, research and education created through our Academic Clinical Programmes, Disease Centres and Joint Institutes, the SingHealth Duke-NUS AMC fosters the exchange of scientific knowledge and clinical perspectives to accelerate innovation and new discoveries, advance the practice of medicine as well as nurture the next generation of healthcare professionals.

SingHealth delivers comprehensive, multi-disciplinary and integrated care across a network of acute hospitals, national specialty centres, polyclinics and community hospitals. Offering over 40 clinical specialties, SingHealth is Singapore's largest public healthcare cluster.

Duke-NUS, Singapore's flagship graduate-entry medical school, nurtures 'Clinician Plus' graduates to become leaders in the global healthcare and biomedical ecosystem, while scientists from its five Signature Research Programmes and nine Centres transform medicine and improve lives in Asia and beyond.

For more information, please visit:

www.singhealthdukenus.com.sg
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MEDIA FACT SHEET

Singapore scientists uncover genomic make-up of Singapore's national flower

To commemorate the launch of the SingHealth Duke-NUS Institute of Biodiversity Medicine (BD-MED), scientists from BD-MED and A*STAR's Genome Institute of Singapore (GIS) have uncovered the genomic make-up of Singapore's national flower, the *Papilionanthe* Miss Joaquim, commonly known as the Vanda Miss Joaquim (VMJ).

Research Motivation

- *Papilionanthe* Miss Joaquim is an orchid hybrid with magnificent blooms. Prior to VMJ being designated as Singapore's National Flower in 1981, it was already widely popular in the United States and Hawaii, and was used in floral garlands.
- Knowing the VMJ's DNA contents will help orchid breeders understand its biological traits and more efficiently breed orchid hybrids with a wider choice of colours and attractive floral features.
- Vanda family of orchids has been traditionally used in folk medicine remedies for inflammation and infection. By uncovering the VMJ's genomic make-up, the BD-MED and GIS teams also aim to uncover compounds that support such uses for human health and well-being.

About the *Papilionanthe* Miss Joaquim

- The orchid family (*orchidaceae*) is a diverse collection of about 25,000 different species.
- The *Papilionanthe* Miss Joaquim is a hybrid between *Papilionanthe Hookeriana* and *Papilionanthe Teres* which was first documented in a Journal called The Gardeners' Chronicle by Sir Henry Ridley in 24th June 1893. It was subsequently displayed in Royal Horticultural Society, London and registered as a hybrid.

Study Findings

Using advanced genetic sequencing technologies, the BD-MED and GIS team reconstructed the genome of *Papilionanthe* Miss Joaquim and found:

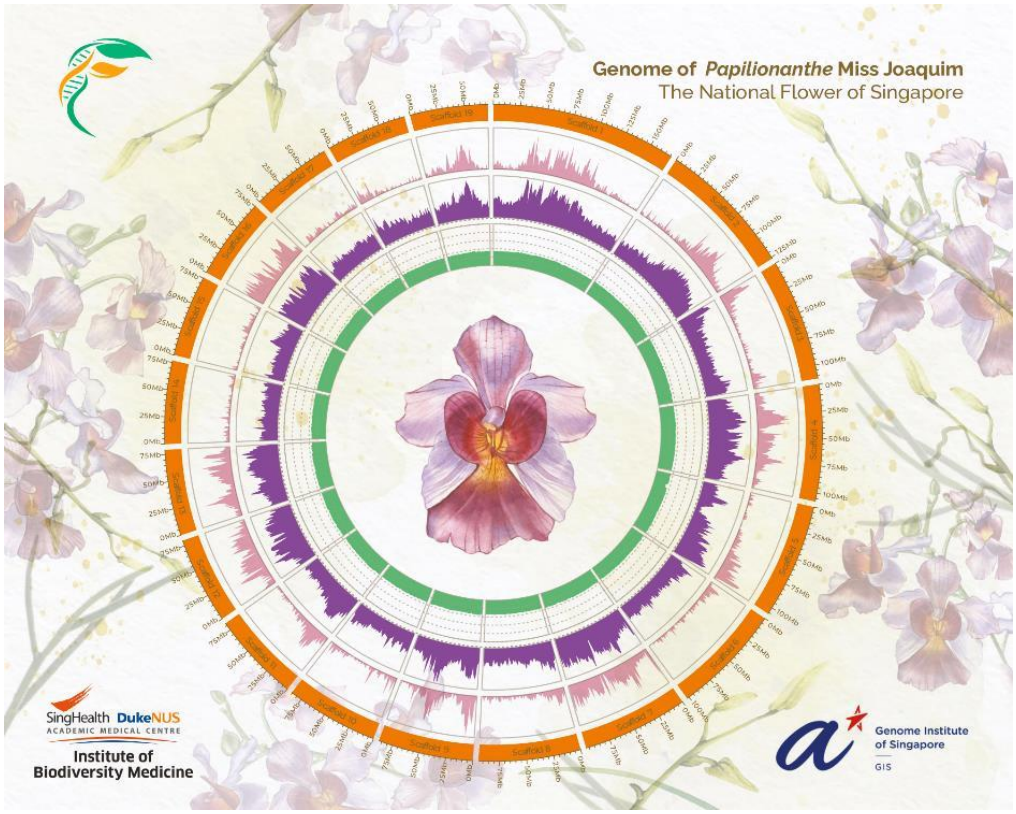
- The entire genome of VMJ comprises of total of 19 chromosomes spanning 2.4 billion nucleic acid base pairs.
- The genome is composed of around 33,000 genes which provides instructions to manufacture proteins that impact the orchid's traits and cellular processes.
- Though known to be unscented, the orchid harbour several oxygenated hydrocarbons that gives a mellow leafy odour.
- Chemical profiling also uncovered flavonols and anthocyanins, which are notable for their antioxidant properties and distinctive colour pattern.
- It also contains vandaterosides, a bioactive compound capable of slowing skin aging process which was previously discovered in *Papilionanthe Teres*, the seed parent of VMJ.

Quotes

"We are honoured to be able to map the genetic data of Singapore's national flower, the Papilionanthe Miss Joaquim. Understanding its genomic make-up could help in the more efficient breeding of other orchid hybrids, and pave the way for further studies on its use as complementary therapeutic options for health and wellness. More importantly, this study shows the possibilities of harnessing the insights and knowledge from local and regional plant biodiversity studies for applications in science and medicine," said Professor Teh Bin Tean, Director, SingHealth Duke-NUS Biodiversity Medicine.

"It's been an absolute privilege working with BD-MED to decode the genome of our national flower. Using newly available sequencing technologies and analytics, the team mapped the complex Vanda Miss Joaquim genome at unprecedented accuracy and speed. We look forward to working with BD-MED on future projects contributing to Singapore's biodiversity, sustainability, and food security," said Professor Patrick Tan, Executive Director, Genome Institute of Singapore.

Photo of the whole genome sequencing of the *Papilionanthe* Miss Joaquim


Genome of *Papilionanthe* Miss Joaquim
The National Flower of Singapore
SingHealth DukeNUS
ACADEMIC MEDICAL CENTRE
Institute of
Biodiversity Medicine
Genome Institute
of Singapore
GIS