

PRESS RELEASE

New S\$130 million national research initiative to enhance Singapore's strategic research capabilities in RNA biology and its applications

Singapore, 24 March 2025 — A new national programme that aims to position Singapore at the forefront of advancements in RNA science and applications was officially launched today. This new initiative – named *National Initiative for RNA Biology and Its Applications* (NIRBA) – is supported by the National Research Foundation (NRF) with total funding of S\$130 million over seven years. NIRBA will engage scientists and clinicians from leading institutions like the National University of Singapore (NUS), Nanyang Technological University, Singapore (NTU Singapore), Agency for Science, Technology and Research (A*STAR), and Duke-NUS Medical School.

RNA biology and its applications has been identified as a rapidly expanding field of critical importance to Singapore's future health and economic needs. Singapore Deputy Prime Minister Mr Heng Swee Keat, who is also Chairman of NRF, officiated at the inauguration of NIRBA at NUS.

NIRBA is led by Professor Ashok Venkitaraman, a Distinguished Professor of Medicine, NUS Yong Loo Lin School of Medicine, Director of the Cancer Science Institute of Singapore at NUS, and Research Director at the Institute of Molecular & Cell Biology, A*STAR. He will work closely with a team of leading local experts in the field, to establish globally leading foundational research in RNA science, with strong translational potential for diverse applications. While the primary focus will be on human health, the research will also have relevance to areas such as agriculture, food safety, veterinary medicine, and synthetic biology.

Unlocking the vast potential of RNA

Ribonucleic **a**cid (RNA) molecules are present in all living organisms and in many viruses. RNA molecules, transcribed from DNA, serve as vital messengers that translate genetic information into proteins, driving the biological processes essential to life.

Recent research has uncovered that structurally diverse RNA molecules perform a remarkable range of biological functions, with many more yet to be discovered. As a result, RNA has emerged as a vital macromolecule, with its pivotal role in human health and disease only starting to unfold.

The potential of RNA research was both validated and significantly accelerated by the COVID-19 pandemic, which offered compelling proof of the power and adaptability of RNA platforms in vaccine development and their capacity for rapid manufacturing scale-up. The pandemic also greatly advanced various aspects of RNA science and technology worldwide. Of note, this potential impact extends beyond human health to multiple fields, including agriculture, food safety, veterinary medicine, and synthetic biology.

To further strengthen Singapore's capabilities in RNA research and translation, NIRBA aims to achieve the following goals:

- Swiftly build world-leading foundational research peaks in differentiated challenge areas in RNA research where there are current global gaps, leveraging Singapore's competitive advantages.
- Develop an agile framework of 'Innovation Clusters' to create and sustain competitive research peaks, while drawing on relevant expertise from the local and global research community in a nimble and dynamic way.
- Operationalise innovative pathways to build an upstream pipeline that fuels the capabilities of Singapore's downstream units, to fully capitalise on their health and economic value for the nation and beyond.

Prof Venkitaraman said, "NIRBA will serve as a vital force-multiplier for Singapore's RNA research. It will integrate Singapore's existing strengths to build internationally competitive innovation in carefully chosen challenge areas, and synergise between academic and industrial partners, to create short-term and longer-term health and economic benefits. Groundbreaking scientific discoveries are a necessary foundation for translation into economic, health, and societal impact."

NIRBA's innovation clusters will draw on a dynamic pool of multidisciplinary researchers from different institutions to promote island-wide inter-organisational collaborations between NUS, NTU Singapore, A*STAR, public health institutions, and industry.

Cutting-edge, interdisciplinary research to address knowledge gaps

NIRBA aims to build four peaks of excellence that are of strategic importance to Singapore. It will differentiate its work by focusing on areas where Singapore has a competitive advantage, such as in the RNA biology of diseases prevalent amongst the Asian population.

Cluster 1 focuses on **how Asian genetic diversity impacts the RNA biology of diseases**, including cancer, heart disease, diabetes and other conditions relevant to Singapore. Scientists will examine whether Asian genomic variants affect RNA expression, modification and function in different cell types linked to these diseases.

Cluster 2 explores **how chemical modifications on RNA alter host immunity**. RNA modifications, or small chemical changes made to RNA molecules, play a crucial role in helping our body balance immune responses, enabling the body to fight off infections while protecting our own healthy cells.

Cluster 3 explores **how RNA molecules enter cells and are transported within them** to lay scientific foundations for effective RNA-based therapeutics that selectively target diseased tissues.

Cluster 4 focuses on **how RNA-based drugs exert their effects and are cleared from the body after administration**, a critical enabler for the development of RNA-based therapies and vaccines in Singapore.

Central hub to foster collaborations

To promote impactful and meaningful interactions, NIRBA will deploy a ‘hub and spoke’ model where new collaborative research programmes, international academic and industrial collaborations, as well as unique core research resources will be co-located in a central ‘hub’ based physically at NUS. This 2,000-sqm space will be equipped with state-of-the-art technologies and infrastructure to meet the biological, structural, chemical and computational needs of NIRBA. NIRBA will harness diverse research talents from different institutions across Singapore working at the central ‘hub’, enabling synergistic interdisciplinary collaborations with a broad range of partners. Other activities using existing research infrastructure will be performed in distributed ‘spokes’.

Over the next seven years with NRF funding support, NIRBA aims to add considerable value to the RNA research landscape across Singapore, through the training of researchers, recruitment of overseas talent, access to shared infrastructure and unique core resources, and exposure of local research staff to collaborative projects. The peaks of excellence in science, people and platforms established by NIRBA will help to future-proof Singapore’s investments in RNA research, advance precision health for Asian populations and diseases, and generate economic value through spinouts and industrial partnerships.

For media enquiries, please contact:

Fun YIP
Office of University Communications
National University of Singapore
DID: +65 6516 1374
Email: fun.yip@nus.edu.sg

Lyn LAI
Office of University Communications
National University of Singapore
DID: +65 6516 1526
Email: lyn.lai@nus.edu.sg

About National Research Foundation

The National Research Foundation, Singapore (NRF), set up on 1 January 2006, is a department within the Prime Minister’s Office. The NRF sets the national direction for research and development (R&D) by developing policies, plans and strategies for research, innovation and enterprise. It also funds strategic initiatives and builds up R&D capabilities by nurturing research talent.

Learn more about the NRF at www.nrf.gov.sg

About National University of Singapore (NUS)

The National University of Singapore (NUS) is Singapore’s flagship university, which offers a global approach to education, research and entrepreneurship, with a focus on Asian perspectives and expertise. We have 16 colleges, faculties and schools across three campuses in Singapore, with more than 40,000 students from 100 countries enriching our vibrant and diverse campus community. We have also established our NUS Overseas Colleges programme in more than 15 cities around the world.

Our multidisciplinary and real-world approach to education, research and entrepreneurship enables us to work closely with industry, governments and academia to address crucial and complex issues relevant to Asia and the world. Researchers in our faculties, research centres of excellence, corporate labs and more than 30 university-level research institutes focus on themes that include energy; environmental and urban sustainability; treatment and prevention of diseases; active ageing; advanced materials; risk management and resilience of financial

systems; Asian studies; and Smart Nation capabilities such as artificial intelligence, data science, operations research and cybersecurity.

For more information on NUS, please visit nus.edu.sg.

About Duke-NUS Medical School

Duke-NUS is Singapore's flagship graduate-entry medical school, established in 2005 with a strategic, government-led partnership between two world-class institutions: Duke University School of Medicine and the National University of Singapore (NUS). Through an innovative curriculum, students at Duke-NUS are nurtured to become multi-faceted 'Clinicians Plus' poised to steer the healthcare and biomedical ecosystem in Singapore and beyond. A leader in ground-breaking research and translational innovation, Duke-NUS has gained international renown through its five Signature Research Programmes and ten Centres. The enduring impact of its discoveries is amplified by its successful Academic Medicine partnership with Singapore Health Services (SingHealth), Singapore's largest healthcare group. This strategic alliance has led to the creation of 15 Academic Clinical Programmes, which harness multi-disciplinary research and education to transform medicine and improve lives.

For more information on Duke-NUS, please visit duke-nus.edu.sg.

About Nanyang Technological University

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 35,000 undergraduate and postgraduate students in the Business, Computing & Data Science, Engineering, Humanities, Arts, & Social Sciences, Medicine, Science, and Graduate colleges.

NTU is also home to world-renowned autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Earth Observatory of Singapore, Nanyang Environment & Water Research Institute and Energy Research Institute @ NTU (ERI@N).

Under the NTU Smart Campus vision, the University harnesses the power of digital technology and tech-enabled solutions to support better learning and living experiences, the discovery of new knowledge, and the sustainability of resources.

Ranked amongst the world's top universities, the University's main campus is also frequently listed among the world's most beautiful. Known for its sustainability, NTU has achieved 100% Green Mark Platinum certification for all its eligible building projects. Apart from its main campus, NTU also has a medical campus in Novena, Singapore's healthcare district.

For more information, visit www.ntu.edu.sg

About Agency for Science, Technology and Research

The Agency for Science, Technology and Research (A*STAR) is Singapore's lead public sector R&D agency. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit the economy and society. As a Science and Technology Organisation, A*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by improving societal outcomes in healthcare, urban living, and sustainability. A*STAR plays a key role in nurturing scientific talent and leaders for the wider research community and industry. A*STAR's R&D activities

span biomedical sciences to physical sciences and engineering, with research entities primarily located in Biopolis and Fusionopolis. For ongoing news, visit www.a-star.edu.sg.

Follow us on

[Facebook](#) | [LinkedIn](#) | [Instagram](#) | [YouTube](#) | [TikTok](#)