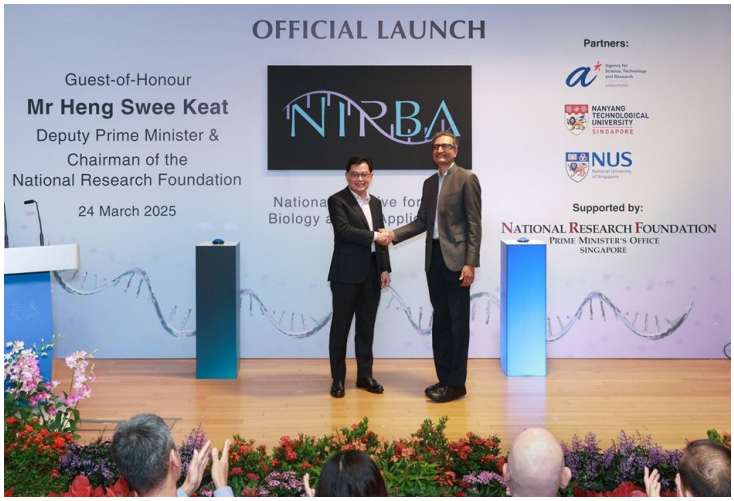
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Singapore invests S$130M to strengthen research capabilities in RNA biology and application

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*Deputy Prime Minister Mr **Heng Swee Keat** with **Professor Ashok Venkitaraman**, NIRBA , 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.*

Singapore has launched a new national programme aimed at advancing RNA science and applications. This new initiative – named the **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. The primary focus of NIRBA will be on human health, but the research will also have relevance to agriculture, food safety, veterinary medicine, and synthetic biology.

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.

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.

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.

Unlocking the vast potential of RNA

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.

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 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. Singapore Deputy Prime Minister Mr Heng Swee Keat, who is also Chairman of NRF, officiated at the inauguration of NIRBA at NUS.

Cutting-edge, interdisciplinary research to address knowledge gaps

The NIRBA will build four peaks of excellence that are strategic to Singapore. Among these is the RNA biology of diseases prevalent among Asians.

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. 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'.

RNA research is one of Singapore's biggest investments, and NIRBA's excellence in science, people, and platforms will help Singapore future-proof the investment, advance precision health for Asian populations and diseases, and create economic value through spinouts.

By Hithaishi Bhaskar