

**REMARKS BY DEPUTY PRIME MINISTER AND CHAIRMAN OF THE NATIONAL RESEARCH FOUNDATION HENG SWEE KEAT AT THE LAUNCH OF THE NATIONAL INITIATIVE FOR RNA BIOLOGY AND ITS APPLICATIONS (NIRBA), 24 MARCH 2025**

Professor Ashok Venkitaraman, Distinguished Professor of Medicine at the National University of Singapore and Director of the National Initiative for RNA Biology and its Applications,

Professor Aaron Thean, Deputy President and Provost of NUS,

Ladies and gentlemen,

Good morning.

I am delighted to join you today to launch this promising new National Initiative for RNA Biology and its Applications, or NIRBA.

We just heard from Ashok about the three-years that he has spent since 2022 working on his “baby” from conception to gestation and today, birth. Let me first congratulate Ashok and your team for conceiving and nurturing this baby, and let me also express my appreciation to the many “midwives” who supported this process.

Today’s launch is the latest chapter in a 25-year journey. Since 2000, when Mr Philip Yeo was Chairman of EDB, we have continually and steadily built up Singapore’s biomedical ecosystem and capabilities. We are today a vibrant pharmaceutical manufacturing centre and host a range of biomedical activities across the innovation and manufacturing value chain.

We made early investments by setting up the Biomedical Research Council under A\*STAR in 2000, followed by research institutes like the Genome Institute of Singapore and the A\*STAR Bioinformatics Institute. Today, 9 out of 17 A\*STAR research institutes are focused on biomedical research. Concurrently, EDB and other agencies worked to strengthen our partnerships with global biomedical leaders including Pfizer, Novartis, Thermo Fisher Scientific, MSD and Sanofi. More recently, we have strengthened our biomedical translational capabilities including by supporting innovative startups.

These efforts in the biomedical space reflect Singapore's longstanding conviction that harnessing science, technology and innovation will transform our future and improve the lives of our people and those around the world.

We are seeing promising results. Our universities and academic medical centres are well-regarded globally for their biomedical expertise. For example, NUS is the top-ranked Asian university on the 2025 QS World University rankings for biological sciences.

This research excellence has also translated into strong economic outcomes. The biomedical sector contributed 2.55% to Singapore's GDP in 2023, with manufacturing output growing steadily at 4.4% annually since 2015. Today, Singapore hosts more than 30 regional headquarters of the world's leading biomedical companies, including 9 of the top 10 global pharmaceutical companies.

In recent years, around 500 biomedical startups based in Singapore have attracted more than US\$3 billion in venture funding. An array of venture-builders, such as ClavystBio, also enables a strong ecosystem for startups to build cross-sector partnerships and expand their networks regionally and globally. We also have many major global venture funds that are looking to connect Singapore and Asia with the world, including Polaris Partners.

Importantly, deepening our biomedical research capabilities has had tangible impact on our people, including saving lives in moments of crisis. During the COVID-19 pandemic, for example, the Diagnostics and Development Hub that was launched back in 2014 was instrumental in developing the Fortitude diagnostic test kit. This was used to detect cases quickly and stem the spread of infections. Rolled out in February 2020, this test kit was especially useful in the early days of the pandemic when therapeutics were not yet widely available.

As we approach the last stretch of our Research, Innovation and Enterprise or RIE2025 masterplan, we are working on RIE2030 – the next bound of our strategy to harness science, technology and innovation. Even as we place great emphasis on Innovation and Enterprise, or I&E, we remain committed to advancing foundational research, which will expand our knowledge and understanding of scientific principles and

theories. These could be important nascent areas of science and technology that are emerging globally. They could also be potential peaks of excellence arising from capabilities we have already seeded, or areas where research is needed to fulfil Singapore's critical or long-term needs.

Pushing the envelope on foundational research can unlock new scientific pathways, including ones which sit at the intersection of different scientific disciplines. This, in turn, can catalyse impactful breakthroughs and deepen Singapore's global competitive edge in research. Foundational research is also a good avenue to foster cross-border science and technology linkages and collaborations. Our research capabilities strengthen our value proposition to like-minded partners from the region and around the world, to work together on new solutions that address real-world problems and challenges.

It is in this spirit that the National Research Foundation embarked on Foundational Research Capability or FRC studies four years ago, to better understand the opportunities in a number of emerging domains. We heard Ashok mention earlier his experience chairing one of the studies.

RNA biology and its applications is an important domain in foundational research. Our experience with COVID demonstrated this, with the rapid development and deployment of mRNA vaccines saving countless lives. Since then, the number of potential therapies and applications tapping on RNA technology has grown significantly.

Beyond COVID, RNA-based therapies are being tested to tackle a wider range of ailments including cancers and metabolic diseases. As of end-2023, at least 25 RNA-based therapies had been approved by the US Food and Drug Administration to target infectious disease, rare genetic diseases, and high cholesterol. More than 125 such therapies are also undergoing clinical trials, to target cardiometabolic and neurological diseases, as well as cancer.

It is still early days for RNA technology, but its potential is very promising. As populations in Singapore – and many parts of Asia and the world – age, demand for

these new therapies to increase health spans will rise. In other words, we can expect that the “A” in NIRBA – applications – will command increasing interest in the years ahead.

Today’s launch of NIRBA is therefore very timely to strengthen our RNA research and innovation capabilities. Let me highlight three areas in which we hope to achieve strong outcomes.

First, to create globally competitive peaks of excellence in RNA research centred around four clusters. These are the impact of Asian genetic diversity on RNA biology and disease, RNA modifications and host immunity, mechanisms and manipulation of RNA delivery and distribution, and cellular mechanisms underlying personalised RNA medicine. Building on these peaks of excellence, NIRBA will also generate nationally available resources to support advances in RNA research.

Second, to provide the scientific foundation for downstream translation and commercialisation of RNA-based products and services. Third, to establish new operational mechanisms that enable researchers in Singapore from across our diverse RIE ecosystem to work together effectively.

All three sets of outcomes are mutually reinforcing. While Singapore’s ecosystem is small, by aligning players with different capabilities around a common cause, we can achieve synergy and impact. By harnessing the synergies between the research that NIRBA undertakes with other capabilities, we can achieve better outcomes.

For example, our capabilities in genomics and precision medicine, anchored by programmes like PRECISE-SG100K, provide a good base for advancing RNA-based therapeutics. The work of PRECISE-SG100K, made possible by our earlier investments in genomics, has started to establish links between Asian genetic ancestry and different diseases such as cardiometabolic syndromes and cancer.

NIRBA now aims to deeply investigate how changes in RNA may link disease-associated genetic alterations to the mechanisms of how diseases initially onset and

progress. Deeper understanding of such mechanisms will pinpoint new targets for disease therapy in the future using RNA-based or small-molecule medicines. It will enable the precise identification of patients who are most likely to benefit from these therapies. Singapore, as a multiracial society with a diverse genetic base, can also enable the development of RNA therapeutics and solutions that can be scaled up to different parts of Asia.

The work done by NIRBA will also reinforce the downstream I&E capabilities that we are investing in. For example, last November, A\*STAR's Nucleic Acid Therapeutics Initiative or NATi launched a first-in-Asia mRNA BioFoundry to strengthen our capabilities in mRNA technologies and nucleic acid therapeutics. NIRBA will amplify these investments by creating powerful virtuous feedback loops across our ecosystem. When NATi researchers encounter challenges in RNA therapeutic development, NIRBA's foundational research can help solve these bottlenecks. Conversely, insights from NATi's translational work can guide NIRBA's research priorities.

This virtuous cycle will further extend across the landscape of Singapore's biomedical research. For example, NIRBA's discoveries in RNA biology can enhance the Singapore Translational Cancer Consortium's efforts in precision oncology. PREPARE's vaccine development work will also benefit from deeper understanding of RNA stability and delivery mechanisms.

So I am excited for what NIRBA represents beyond the immediate biomedical domain. In launching this initiative, we are also developing a new model of how we build and structure research platforms in Singapore to take us into the next phase of our RIE journey.

NIRBA has four Innovation Clusters, as I mentioned earlier, namely the impact of Asian genetic diversity on RNA biology and disease, RNA modifications and host immunity, mechanisms and manipulation of RNA delivery and distribution, and cellular mechanisms underlying personalised RNA medicine. By centering on these, NIRBA seeks to foster goal-oriented and agile interdisciplinary research, as Ashok said earlier.

We are building on existing strengths across institutional partners, focusing on key challenges, and generating outputs with rapid industry pre-positioning. In conjunction with NIRBA's launch today, NUS, NTU and A\*STAR are signing a Master Research Collaboration Agreement.

This agreement between the three partners embodies several new features that are designed to empower faster, easier routes for island-wide collaboration in scientific research. These include new shared mechanisms to accelerate IP management arising from collaborations, and to incentivise researchers and institutions to commercialise collaborative IP. These may provide a template to develop future island-wide research collaborations. I commend the teams for taking this approach from the outset.

In fact, bringing diverse stakeholders together to pool their expertise, talent and ideas, and to pursue research impact at scale is one of NRF's approaches in the RIE2030 masterplan. A few weeks ago, I announced in Parliament that we will develop RIE Flagships and Grand Challenges as part of RIE2030. These cross-cutting programmes will pull together relevant research and translational capabilities across our universities, A\*STAR research institutes, public sector agencies and industry partners to advance research, catalyse solutions and products and address real-world problems.

In fact, the first Grand Challenge we are launching will be centred on Healthy and Successful Longevity. I am confident that the coordinated, challenge-driven research approach pioneered by NIRBA will provide valuable insights as we scope and implement these Grand Challenges and Flagships. This, in turn, will strengthen Singapore's positioning as a Global-Asia node of technology, innovation and enterprise.

Let me once again congratulate Ashok and his team for this significant milestone and thank you for the hard work to reach this milestone today. It is an exciting new chapter that we are writing in our biomedical journey, and I look forward to the breakthroughs and achievements from this new initiative in the years ahead. Thank you.