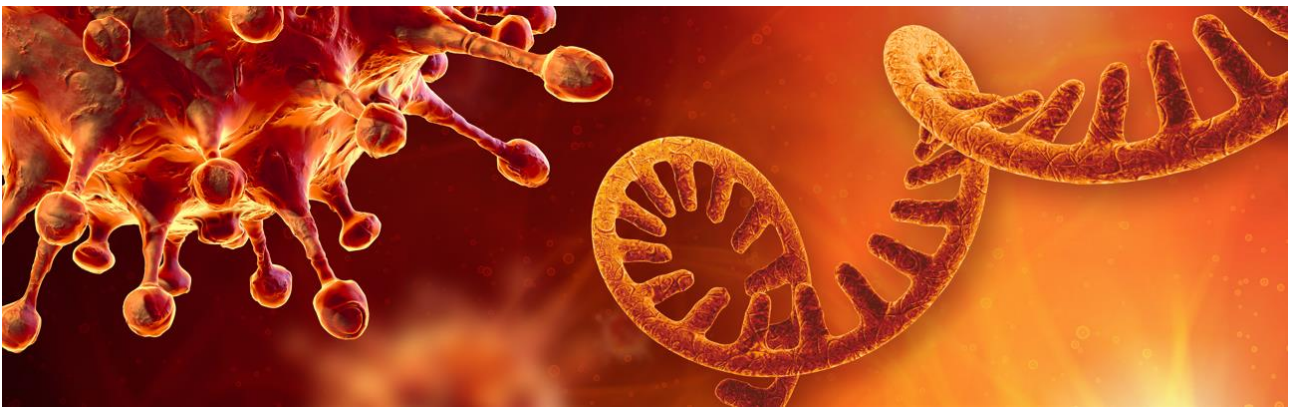


MEDIA RELEASE

4 January 2022

SINGAPORE SCIENTISTS AWARDED PRESTIGIOUS WELLCOME LEAP R3 PROGRAMME CONTRACT FOR DEVELOPMENT OF mRNA TECHNOLOGY

*Team led by Agency for Science, Technology and Research (A*STAR) awarded contract to join global network developing next generation of mRNA technology.*



Stock image of Single RNA strand. Microscopic view of an infectious SARS-CoV-2 virus cell. 3D rendering.

SINGAPORE – A team of researchers from A*STAR’s Genome Institute of Singapore (GIS) and Institute of Bioengineering and Bioimaging (IBB), together with the National University of Singapore Yong Loo Lin School of Medicine (NUS Medicine), was awarded a contract from the prestigious Wellcome Leap R3 Programme to build the next generation of mRNA technology.

The R3 programme has two goals: one, to increase exponentially the number of biologic products that can be designed, developed, and produced every year, reducing their costs and increasing equitable access; and two, to create a self-sustaining network of manufacturing facilities providing globally distributed, state-of-the-art surge capacity to meet future pandemic needs. The research will help to champion the team’s fight against COVID-19 and other pandemics in the future. The Singapore team is the only awardee from Asia, out of 17 teams worldwide to be awarded the contract this year.

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The recent development of mRNA vaccines has revolutionised our ability to protect against COVID-19 viruses, and opened the possibility of vaccinating us broadly from additional diseases including other viral, bacterial infections, and even cancer. While highly effective, current RNA vaccine designs carry several drawbacks, such as: the need for low temperatures for transport and storage; the need for high doses to be injected (30 to 100ug/dose); and high costs.

This project aims to address some of these shortcomings. Dr Wan Yue's lab has been studying RNA, and developing new technologies to study different aspects of RNA in disease and biological systems. In this research, her lab aims to leverage its expertise in RNA to come up with better designs for mRNA vaccines. The team is developing circular RNA versions of the vaccine, which involves increasing and stabilising the amount of proteins produced. This would allow the dose to be reduced, in turn lowering the cost of the vaccine.

Dr Wan, Group Leader of Laboratory of RNA Genomics and Structure, and Associate Director of Epigenetic and Epitranscriptomic Systems at GIS, said, "Understanding the basic biology of RNA is key to our ability to use it as therapeutics. Our team's work will deepen the understanding of RNA and its ability to be delivered into human cells, enhancing its promise as medicine towards infectious diseases".

Dr Yang Yi Yan, covering Executive Director, IBB, contributes her expertise in biodegradable nanoparticles-based nucleic acid delivery to enable delivery of RNA into the body. Dr Yang said, "Safe and effective delivery is the key for successful clinical applications of nucleic acid therapeutics. In this work, IBB will make lipid nanoparticles with controlled size and surface functionality so that they can be used to deliver the novel RNA vaccines effectively and safely to lymph nodes and immune cells."

Also part of the team are Associate Professor Sylvie Alonso, Group leader and Co-Director of the Infectious Diseases Translational Research Programme at NUS Yong Loo Lin School of Medicine, who will support the team with her vaccinology expertise; and Dr Kevin White, Senior Group Leader, Laboratory of Nucleic Acid Therapeutics, GIS, who is also working on developing stable, low-dose, and cost-effective strategies for generating RNA vaccines.

Prof Patrick Tan, Executive Director of GIS, said, "Singapore is deeply involved in the global effort to develop RNA vaccines to fight both current and future pandemics. Through team effort across various institutes, we hope to develop low cost, effective vaccines that do not need to be injected into the body. This is part of our GIS journey in developing world-class nucleic acid therapeutics capabilities in Singapore to build a fast and flexible system in our fight against different diseases."

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About A*STAR's Genome Institute of Singapore (GIS)

The Genome Institute of Singapore (GIS) is an institute of the Agency for Science, Technology and Research (A*STAR). It has a global vision that seeks to use genomic sciences to achieve extraordinary improvements in human health and public prosperity. Established in 2000 as a centre for genomic discovery, the GIS pursues the integration of technology, genetics and biology towards academic, economic and societal impact, with a mission to "read, reveal and write DNA for a better Singapore and world".

Key research areas at the GIS include Precision Medicine & Population Genomics, Genome Informatics, Spatial & Single Cell Systems, Epigenetic & Epitranscriptomic Regulation, Genome Architecture & Design, and Sequencing Platforms. The genomics infrastructure at the GIS is also utilised to train new scientific talent, to function as a bridge for academic and industrial research, and to explore scientific questions of high impact.

For more information about GIS, please visit www.a-star.edu.sg/gis.

About A*STAR's Institute of Bioengineering and Bioimaging (IBB)

The Institute of Bioengineering and Bioimaging (IBB) is a multi-disciplinary research institute under A*STAR that spearheads translational research at the interface of biology, chemistry, physics, engineering and medicine. IBB's mission is to develop new technologies and engineering solutions to address health, medical and sustainability challenges. IBB's research activities are focused on Bioengineering Systems, Biophotonics & Bioimaging, and Biomedical Devices & Diagnostics. The Institute has published numerous papers in leading scientific journals and has filed many patents for its inventions. IBB's technologies have been commercialised through the establishment of more than 10 spin-off companies.

For more information on IBB, please visit www.a-star.edu.sg/ibb.

About the Agency for Science, Technology and Research (A*STAR)

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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.

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