



**MONASH**  
University



## **Novel Cancer and Flu Vaccine Technology Adapted for COVID-19 Vaccine Candidate for Elderly**

Researchers from Monash University and the National University of Singapore have adapted new cancer and pan-influenza vaccine technology to developing a COVID-19 vaccine targeted for the elderly. Their proof of concept studies have triggered long term immunity in animal models. Importantly, once preclinical validation has been completed, this promising vaccine candidate could enter clinical trials rapidly as manufacturing capabilities are readily available in both Singapore and Australia.

Associate Professors [Mireille Lahoud](#) and [Irina Caminschi](#) from the Monash University Biomedicine Discovery Institute (BDI), together with Associate Professor Sylvie Alonso from the Yong Loo Lin School of Medicine, National University of Singapore (NUS), have spent 12 years developing a patented platform technology that triggers immunity against diseases ranging from cancer, influenza and other infectious diseases.

Now, the Monash BDI researchers in collaboration with colleagues at the National University of Singapore, are using the technology to target the spike protein in SARS-CoV-2, which is part of the outer layer of the virus and critical for entry into cells.

According to Associate Professor Lahoud, what is unique about this vaccine platform is that it harnesses a cell within the immune system – called the dendritic cell – which fast tracks the triggering of an immune response in important T and B cells.

Dendritic cells are responsible for monitoring (sampling) dead cells, and for presenting parts of these cells so that other immune cells can recognize the foreign invaders and respond.

Working in animal models, researchers have developed a protein that binds to a receptor on these dendritic cells – called Clec9A – that effectively presents part of the COVID spike protein to T and B cells, triggering an immune response. Importantly they have shown the vaccine stimulates both antibody responses and long-term memory in immune cells, which is the cornerstone of a successful vaccine.

The platform technology has already been shown to work in proof-of-concept experiments in pre-clinical studies targeting both cancer and influenza.

Importantly the study found that this vaccine stimulated a strong immune response against COVID-19 in both young and old mice. “Given the enormous impact that COVID-19 has had on aged care facilities globally, there is an urgent need for a vaccine that can work in older people, who often have weakened immunity and do not respond as effectively to vaccines,” Associate Professor Lahoud said.

The researchers have already developed a lead vaccine against COVID-19 which stimulates the dendritic cell pathway. According to Associate Professor Caminschi, the aim is to conduct further animal studies and then target clinical trials of the vaccine for older patients.

Further preclinical and clinical development will be carried out at Monash University and at the National University of Singapore.

The Monash-Singapore research team is working to raise funds to develop this COVID-19 vaccine platform. "The outcomes of this development would be critical for COVID-19, but would also advance the platform enabling a rapid response to future viral outbreaks and for improved cancer immunotherapy," Associate Professor Lahoud said.

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### **About the Monash Biomedicine Discovery Institute at Monash University**

Committed to making the discoveries that will relieve the future burden of disease, the newly established [Monash Biomedicine Discovery Institute](#) at Monash University brings together more than 120 internationally-renowned research teams. Our researchers are supported by world-class technology and infrastructure, and partner with industry, clinicians and researchers internationally to enhance lives through discovery.

### **About the 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 17 faculties across three campuses in Singapore, as well as 12 NUS Overseas Colleges across the world. Close to 40,000 students from 100 countries enrich our vibrant and diverse campus community.

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, 30 university-level research institutes, research centres of excellence and corporate labs focus on themes that include energy, environmental and urban sustainability; treatment and prevention of diseases common among Asians; active ageing; advanced materials; as well as risk management and resilience of financial systems. Our latest research focus is on the use of data science, operations research and cybersecurity to support Singapore's Smart Nation initiative.

For more information on NUS, please visit [www.nus.edu.sg](http://www.nus.edu.sg).

### **About the NUS Yong Loo Lin School of Medicine (NUS Medicine)**

The NUS Yong Loo Lin School of Medicine is Singapore's first and largest medical school. Our enduring mission centres on nurturing highly competent, values-driven and inspired healthcare professionals to transform the practice of medicine and improve health around the world.

Through a dynamic and future-oriented five-year curriculum that is inter-disciplinary and inter-professional in nature, our students undergo a holistic learning experience that exposes them to multiple facets of healthcare and prepares them to become visionary leaders and compassionate doctors and nurses of tomorrow. Since the School's founding in 1905, more than 12,000 graduates have passed through its doors.

In our pursuit of health for all, our strategic research programmes focus on innovative, cutting-edge biomedical research with collaborators around the world to deliver high impact solutions to benefit human lives.

The School is the oldest institution of higher learning in the National University of Singapore and a founding institutional member of the National University Health System. It is Asia's leading medical school and ranks among the best in the world (Times Higher Education World University Rankings 2019 by subject and the Quacquarelli Symonds (QS) World University Rankings by Subject 2019).

For more information about NUS Medicine, please visit <https://medicine.nus.edu.sg/>