

## Singapore scientists uncover SARS-CoV-2-specific T cell immunity in recovered COVID-19 & SARS patients, and in uninfected individuals

- *Singapore study shows that SARS-CoV-2-specific T cells are present in all recovered COVID-19 patients.*
- *These T cells were also found in all subjects who recovered from SARS 17 years ago, and in over 50% of both SARS-CoV-1 and SARS-CoV-2 uninfected individuals tested, suggesting that a level of pre-existing SARS-CoV-2 immunity is present in the general population.*
- *Infection and exposure to coronaviruses induces long-lasting memory T cells, which could help in the management of the current pandemic.*

**SINGAPORE, 16 July 2020** – The T cells, along with antibodies, are an integral part of the human immune response against viral infections due to their ability to directly target and kill infected cells. A Singapore study has uncovered the presence of virus-specific T cell immunity in people who recovered from COVID-19 and SARS, as well as some healthy study subjects who had never been infected by either virus.

The study by scientists from Duke-NUS Medical School, in close collaboration with the National University of Singapore (NUS) Yong Loo Lin School of Medicine, Singapore General Hospital (SGH) and National Centre for Infectious Diseases (NCID) was published in *Nature*. The findings suggest infection and exposure to coronaviruses induces long-lasting memory T cells, which could help in the management of the current pandemic and in vaccine development against COVID-19.

The team tested subjects who recovered from COVID-19 and found the presence of SARS-CoV-2-specific T cells in all of them, which suggests that T cells play an important role in this infection. Importantly, the team showed that patients who recovered from SARS 17 years ago after the 2003 outbreak, still possess virus-specific memory T cells and displayed cross-immunity to SARS-CoV-2.

“Our team also tested uninfected healthy individuals and found SARS-CoV-2-specific T cells in more than 50 percent of them. This could be due to cross-reactive immunity obtained from exposure to other coronaviruses, such as those causing the common cold, or presently unknown animal coronaviruses. It is important to understand if this could explain why some individuals are able to better control the infection,” said Professor Antonio Bertoletti, from Duke-NUS’ Emerging Infectious Diseases (EID) programme, who is the corresponding author of this study.

Associate Professor Tan Yee Joo from the Department of Microbiology and Immunology at NUS Yong Loo Lin School of Medicine and Joint Senior Principal Investigator, Institute of Molecular and Cell Biology, A\*STAR added, “We have also initiated follow-up studies on the COVID-19 recovered patients, to determine if their immunity as shown in their T cells persists over an

extended period of time. This is very important for vaccine development and to answer the question about reinfection.”

“While there have been many studies about SARS-CoV-2, there is still a lot we don’t understand about the virus yet. What we do know is that T cells play an important role in the immune response against viral infections and should be assessed for their role in combating SARS-CoV-2, which has affected many people worldwide. Hopefully, our discovery will bring us a step closer to creating an effective vaccine,” said Associate Professor Jenny Low, Senior Consultant, Department of Infectious Diseases, SGH, and Duke-NUS’ EID programme.

“NCID was heartened by the tremendous support we received from many previous SARS patients for this study. Their contributions, 17 years after they were originally infected, helped us understand mechanisms for lasting immunity to SARS-like viruses, and their implications for developing better vaccines against COVID-19 and related viruses,” said Dr Mark Chen I-Cheng, Head of the NCID Research Office.

The team will be conducting a larger study of exposed, uninfected subjects to examine whether T cells can protect against COVID-19 infection or alter the course of infection. They will also be exploring the potential therapeutic use of SARS-CoV-2-specific T cells.

**Reference:** *Nina Le Bert, Anthony T Tan, Kamini Kunasegaran, Christine Y L Tham, Morteza Hafezi , Adeline Chia, Melissa Chng, Meiyin Lin, Nicole Tan, Martin Linster, Wan Ni Chia, Mark I-Cheng Chen , Lin-Fa Wang, Eng Eong Ooi, Shirin Kalimuddin, Paul Anantharajal Tambyah, Jenny GuekHong Low, Yee-Joo Tan and Antonio Bertoletti (2020). SARS-CoV-2-specific T cell immunity in cases of COVID-19 and SARS, and uninfected controls. Nature.*

**Complete research paper available at this link:**

<https://www.nature.com/articles/s41586-020-2550-z>

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### **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 eight 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 spawned 15 Academic Clinical Programmes, which harness multi-disciplinary research and education to transform medicine and improve lives.

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

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

Established in 1905, the NUS Yong Loo Lin School of Medicine is the first institution of higher learning in Singapore and the genesis of the National University of Singapore.

The School offers one of the finest undergraduate medical programmes in the Asia Pacific region and enjoys international recognition and respect. The Times Higher Education World University Rankings 2019 by subject and Quacquarelli Symonds (QS) World University Rankings by Subject 2019 list NUS Medicine as the leading medical school in Asia.

It admits 300 students to the MBBS degree programme annually and its principal missions are to educate and train the next generation of healthcare professionals, and foster research that will help to advance the practice of medicine.

The 18 NUS Medicine departments in the basic sciences and clinical specialties work closely with the Centre for Medical Education, the Centre for Biomedical Ethics, the Centre for Healthcare Simulation as well as the restructured public hospitals to ensure that teaching and research are aligned and relevant to Singapore's healthcare needs. The School is a founding institutional member of the National University Health System.

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

### **About Singapore General Hospital**

Singapore General Hospital, a member of Singapore Health Services, is the public sector's flagship hospital. Established in 1821, SGH is Singapore's largest acute tertiary hospital with 1,700 beds and national referral centre offering a comprehensive range of more than 40 clinical specialties on its campus. Every year, about 1 million Singaporeans benefit from medical care delivered by its 800 specialists. As an academic healthcare institution and the bedrock of medical education, SGH plays a key role in nurturing doctors, nurses and allied health professionals, and is committed to innovative translational and clinical research in her continual strive to provide the best care and outcomes to her patients. [www.sgh.com.sg](http://www.sgh.com.sg)

### **About the National Centre for Infectious Diseases**

The National Centre for Infectious Diseases (NCID) is a purpose-built facility designed to strengthen Singapore's capabilities in infectious disease management and prevention. NCID houses clinical services, public health, research, training and education and community engagement functions under one overarching structure. In addition to the clinical treatment of infectious diseases and outbreak management, the expanded roles and functional units of NCID include the National Public Health and Epidemiology Unit, the National Public Health Laboratory, the Infectious Disease Research and Training Office, the Antimicrobial Resistance Coordinating Office, and the National Public Health programmes for HIV and Tuberculosis. Benchmarked to international standards and best practices for treatment and safety, NCID will better enhance



Singapore's ability to respond effectively to infectious outbreaks. Visit [www.ncid.sg](http://www.ncid.sg) for more information.

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