

# Five antibodies that fight Covid-19 discovered by Singapore's defence R&D organisation



The DSO National Laboratories team that worked on the development of the Covid-19 antibodies. PHOTO: DSO NATIONAL LABORATORIES

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SINGAPORE - Five antibodies which could potentially neutralise the virus that causes Covid-19 have been discovered by scientists at DSO National Laboratories, Singapore's defence research and development organisation.

Known as neutralising antibodies, they prevent the virus from infecting a patient's cells by binding with the part of the virus that is needed to enter the cells.

DSO announced on Wednesday (June 17) that since March, its researchers have screened hundreds of thousands of antibodies produced by cells of the human immune system in blood samples taken from recovered Covid-19 patients.

The samples were provided by the National Centre for Infectious Diseases and the Singapore General Hospital.

Dr Conrad Chan, principal research scientist and laboratory director (applied molecular technology) at DSO, said: "Administration of an antibody obtained from a recovered individual transfers that person's protection to the recipient, enabling any patient to better fight the infection and recover faster."

He added that as antibodies remain in the system for close to a month, they can also be used to prevent infection.

The first two neutralising antibodies were discovered on March 19 and 30 using a screening technique that had been developed in collaboration with the National University of Singapore's (NUS) Life Sciences Institute and the NUS Yong Loo Lin School of Medicine over the last five years.

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The technique, which involves the use of a live virus, is part of DSO's "Antibodies on Demand" strategy to counter novel infectious disease outbreaks. It allows for quick identification of neutralising antibodies and saves more time and manpower compared with conventional methods.

Dr Chan said: "The Ministry of Defence and DSO recognised that a novel pandemic would have a severe impact on Singapore and we wanted to, very early on, look for ways to protect the population... We narrowed in on antibodies from recovered patients as the best strategy to develop a therapeutic that would protect against a novel outbreak of disease."

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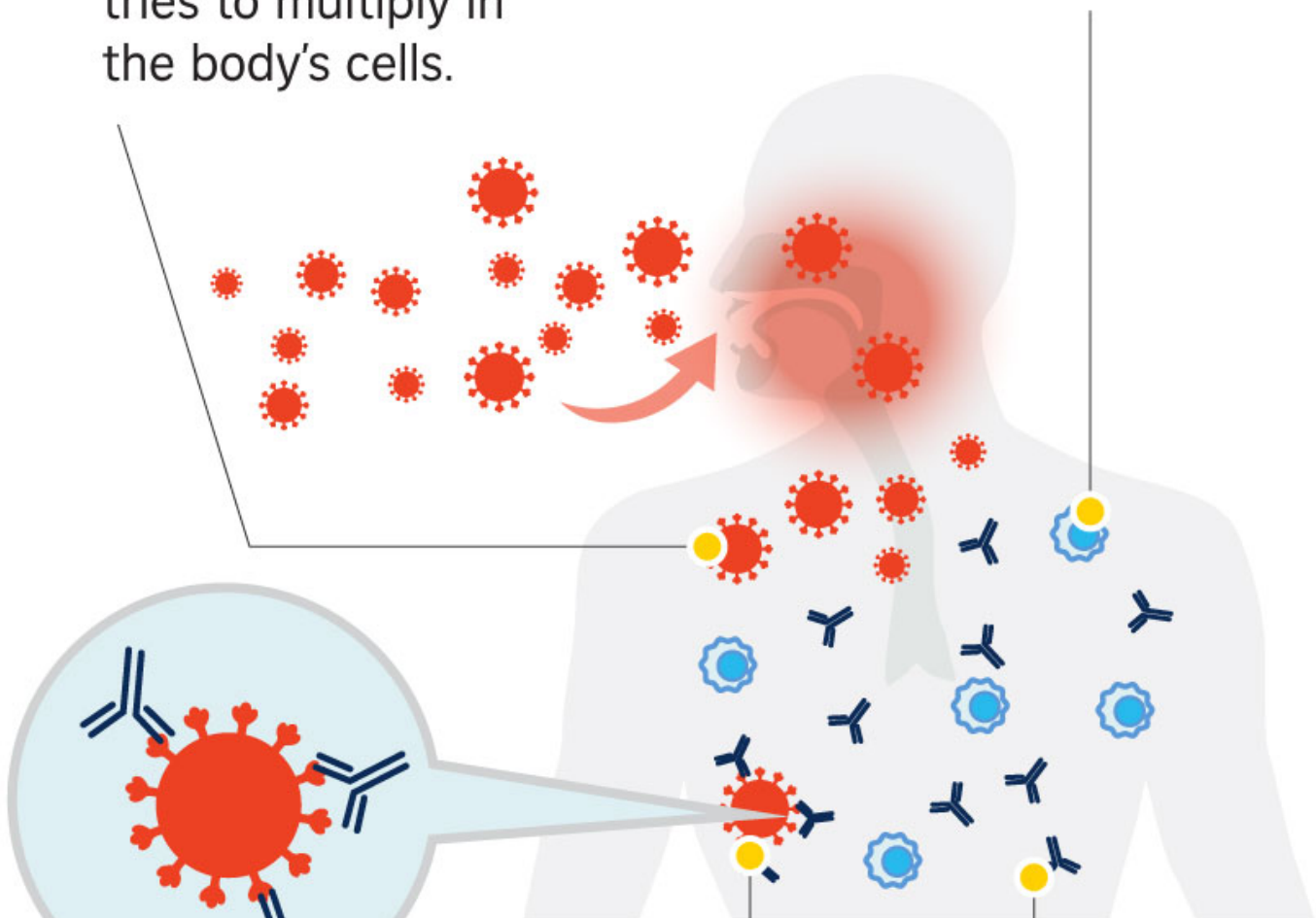
DSO will also be bringing together a Singapore-based consortium comprising government agencies, research institutes and biomedical companies to quickly advance the development of the antibodies.

Dr Brendon Hanson, principal research scientist and project lead, said: "We are trying to tap all the expertise that has been developed in Singapore over the last few years so we can have a completely in-Singapore capability to bring an antibody from the research phase into the clinical phase, to be able to treat Covid-19 infection (here)."


Human trials for the most promising antibody of the five, known as AOD01, will likely commence in the upcoming months, pending approval from the Health Sciences Authority.

# How do antibodies work

-  **Virus**       **B cell**       **Antibody**
- 1** When a person is infected with the virus that causes Covid-19, the virus tries to multiply in the body's cells.
  - 2** B cells in the human immune system produce antibodies to block the infection.





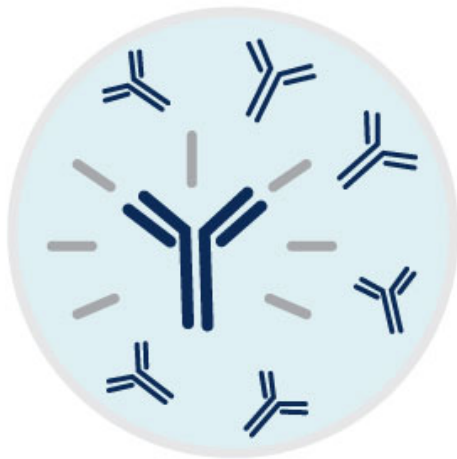


**3** Some antibodies bind themselves to the virus to prevent it from infecting healthy cells, and also signal other white blood cells to destroy it.

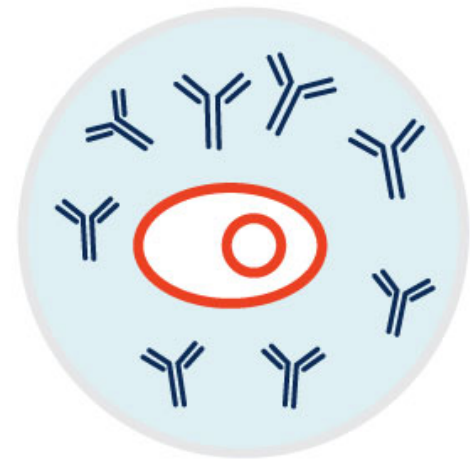
**4** The antibodies produced remain in the recovered patient's blood as protection from future infections.

## ANTIBODY TREATMENT FOR COVID-19 VIRUS STRAINS

**1** Antibody treatment begins with screening and taking the most potent antibodies from a recovered patient through blood samples.



**2** Special cells that are genetically engineered to produce large quantities of antibodies are cultured.



**3** The antibodies are then purified from the cell culture and prepared for injection in an infected patient for antibody therapy, or

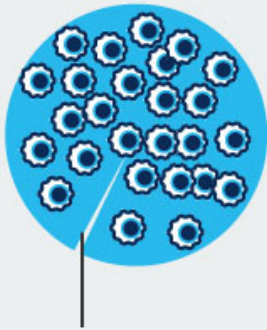
**4** This speeds up recovery for infected patients, and blocks new infections.



# Antibodies screening - A difficult process



Screening and isolating potent antibodies for therapy is both time consuming and requires a lot of manpower.



Only less than 0.01 per cent of the approximately 100,000 B cells in each blood sample produces the antibodies capable of effectively neutralising the virus.

**Less than 0.01%**



With DSO's screening technique, **ANTIBODIES ON DEMAND**, B cells can be quickly screened for the best antibodies. This technique reduces both the time and manpower required.



**More antibodies can thus be found and quickly translated into safe and effective treatments for Covid-19 patients in less time.**



## 2020 TIMELINE

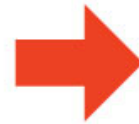
### March

DSO screens hundreds of thousands of B cells, isolating and testing the first two antibodies within a month. These antibodies can safely and efficiently combat the virus that causes Covid-19 and its key mutations.



### May

DSO identifies three more effective antibodies, bringing the total to five.



### June

Further testing is conducted on the lead antibody, AOD01, for clinical trials.

**Pending approval by the Health Sciences Authority, clinical trials for AOD01 will begin in the coming months.**

Source: DSO NATIONAL LABORATORIES  
STRAITS TIMES GRAPHICS

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