

## - Virus / Immunity

# Big immune response boost for vaccinated people who get Covid-19

## Immune memory kicks in within a few days of being infected, local study of 150 people shows

The Straits Times · 3 Nov 2021 · A8 · Cheryl Tan tansuwen@sph.com.sg

Individuals vaccinated against Covid-19 but who still caught the virus showed an “excellent boost” in their immune response, a study by local researchers has found.

The findings are based on researchers checking the antibody levels of 150 people from Singapore who had breakthrough infections.

Dr Barnaby Young of the National Centre for Infectious Diseases (NCID) told The Straits Times the individuals’ immune memory had kicked in within a few days of being infected.

This meant they showed a strong immune response to the virus, said Dr Young, head of the Singapore Infectious Disease Clinical Research Network at NCID.

All 150, who were recruited in May this year, had mild Covid-19 disease.

The study, which is ongoing, is being conducted by NCID, the Agency for Science, Technology and Research’s Infectious Diseases Labs and Duke-NUS Medical School.

Further studies will be conducted to look at their T-cell response as well, he added.

The immune response is shaped by both the level of neutralising antibodies, which bind with the virus and prevent it from infecting one’s cells, and T-cells, which help to clear infected cells.

Dr Young explained that having immune memory means the immune system is able to recall the antigens, which are molecules on the surfaces of virus, that it was previously exposed to.

With immune memory, the body might rapidly produce antibodies to stimulate a stronger immune response when the same virus or pathogen is encountered again.

“While the neutralising antibodies may bind to the wild-type virus, the immune boost can help to neutralise the Delta variant, as the two are not drastically different,” said Dr Young, who led the study.

Some of the findings have been

published in a pre-print report, which has yet to be peer-reviewed.

“We expect the antibodies to help protect against infection for current circulating variants and probably future unknown ones, too, though this would depend on how dramatically they change from Delta,” he added.

Further studies will be needed to determine how quickly these antibodies wane later on, and whether the level of antibodies will be strong enough to protect against future reinfections, said Dr Young.

The immune boost does not necessarily mean breakthrough infections will not occur again.

Professor Paul Tambyah, president of the Asia Pacific Society of Clinical Microbiology and Infection, said having high antibody levels may not always correlate with greater protection against infection. “Many individuals who were doubly vaccinated had high titres of antibodies, yet developed symptomatic Covid-19 infection.

“The immune response is actually a lot more than just antibody levels,” he added. A titre is a measure of concentration. Aside from the T-cell response, the immune response also comprises the innate immune response, which is the body’s first line of defence against all antigens.

Antibodies can protect against most infections, such as hepatitis B and measles. But “not so good” antibodies, which may be produced following vaccinations against the respiratory syncytial virus and possibly dengue, could lead to severe infections, he noted.

As for Covid-19, it is unclear whether those who had breakthrough infections would be protected against reinfection, given that current vaccines do not protect against infection very well, said Prof Tambyah.

In the best-case scenario, with a high vaccination rate and as more of the population are infected with Covid-19, the risk of severe disease will be low, he said.

A previous Duke-NUS study done with NCID on survivors of the severe acute respiratory syndrome showed that they had a powerful antibody boost against a range of beta-coronaviruses when they were given a single dose of Covid-19 vaccine. Natural infection and vaccination may provide long-lasting immunity, noted Prof Tambyah.

He added that some scientists believe Covid-19 booster jabs will be needed to protect against reinfection, like with hepatitis B which requires three jabs.

Associate Professor Hsu Li Yang said certain vaccines require two

or more doses to repeatedly trigger immunological memory through rapid production of antibodies – for instance, tetanus shots and the hepatitis B vaccine, and the Covid-19 vaccines.

Even for single-dose inactivated vaccines, such as those for influenza, a second dose or infection will also boost antibody levels, noted Prof Hsu, who is vice-dean of global health and infectious diseases programme leader at the National University of Singapore's Saw Swee Hock School of Public Health.

“Infection following shortly after vaccination, or vice versa, serves as an antigen challenge to the immune system, triggering a stronger response than if there were no prior exposure to the vaccine or infection,” he said.