

Inactivated vaccines may avert severe Covid-19: Study

They draw a broader immune response against different proteins on the virus

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Though often considered inferior due to their induction of a lower antibody response compared with their mRNA counterparts, inactivated virus vaccines can play a role in preventing the development of severe Covid-19, a recent study has found.

The study by the Duke-NUS Medical School found that inactivated virus vaccines such as Sinopharm and Sinovac, which were used extensively in Asia, and mRNA vaccines – which include Pfizer-BioNTech's Comirnaty and Moderna's Spikevax – trigger different T-cell responses in fighting the coronavirus.

While mRNA vaccines induce T-cells – a type of white blood cell – targeting the spike protein of the coronavirus, inactivated vaccines elicit a broader immune response against different proteins on the virus.

This means that while inactivated vaccines might not be as good at preventing Covid-19 infection, they can play a role in preventing the development of severe disease, said the study's senior co-author Anthony Tanoto Tan, a senior research fellow with the Duke-NUS' Emerging Infectious Diseases programme.

Earlier studies had shown that mRNA vaccines help patients produce a far greater number of antibodies, compared with their inactivated

virus counterparts. However, newer variants have proved to be more adept at evading the antibody response, Dr Tan said.

"This means that maybe we should stop thinking about preventing infection, and we should start thinking about (how) vaccines (can prevent) severe disease," he said.

The research team compared the T-cell immune response in about 500 blood samples from more than 130 people who received inactivated Sars-CoV-2 and spike mRNA vaccines.

The study, which was published in medical journal *Cell Reports Medicine* in October, found that mRNA vaccines can induce T-cells targeting SARS-CoV-2's spike protein, which contains numerous mutations in the Omicron variant.

However, inactivated vaccines stimulated a broad T-cell response not only against the virus' spike protein but also the membrane and nucleoprotein, which have much fewer mutations in the Omicron variant.

Unlike mRNA vaccines, the inactivated vaccines did not seem to generate cytotoxic CD8 cells – T-cells known for their ability to kill virus-infected cells. Instead, they stimulated a type of T-cell called CD4, or "helper" T-cells. When these helper cells recognise a viral antigen, they release cytokines – chemicals that help activate other types of immune cells.

The broader response provided by inactivated vaccines, in gener-



While inactivated vaccines such as Sinovac and Sinopharm might not be as good at preventing Covid-19 infection, they may help prevent the development of severe disease, says the study's senior co-author. PHOTO: REUTERS

ating T-cell responses towards other viral proteins, could be beneficial, said the study's senior author, Professor Antonio Bertoletti, from Duke-NUS' Emerging Infectious Diseases programme.

Larger studies are needed to clarify the impact of these T-cells' responses to better design vaccines for controlling severe Covid-19, he said.

This does not mean that inactivated vaccines are superior to mRNA or other vaccine technologies, Dr Tan told *The Straits Times*.

However, a different vaccination strategy may be required, Dr Tan said, suggesting that one possible approach could be that a person gets the primary series of vaccination with an mRNA vaccine and subsequently get a booster using an inactivated virus alternative to get the best of both worlds.

ST reported in October 2021 that private clinics here were seeing

significant demand for Sinopharm and Sinovac boosters among patients who had previously taken mRNA jabs, which was attributed to a fear of side effects.

The study adds important insight to our understanding of immunity against the coronavirus, said Dr Leong Hoe Nam, an infectious diseases expert at Mount Elizabeth Novena Specialist Centre.

However, it may not be beneficial for patients to take an inactivated vaccine as a booster, after taking an mRNA vaccine during their primary series, he said.

This is because the strong immune response conferred by an mRNA vaccine may negate any advantages from the inactivated vaccine, said Dr Leong, adding that there are no studies regarding the benefits of taking the vaccines in such an order.

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