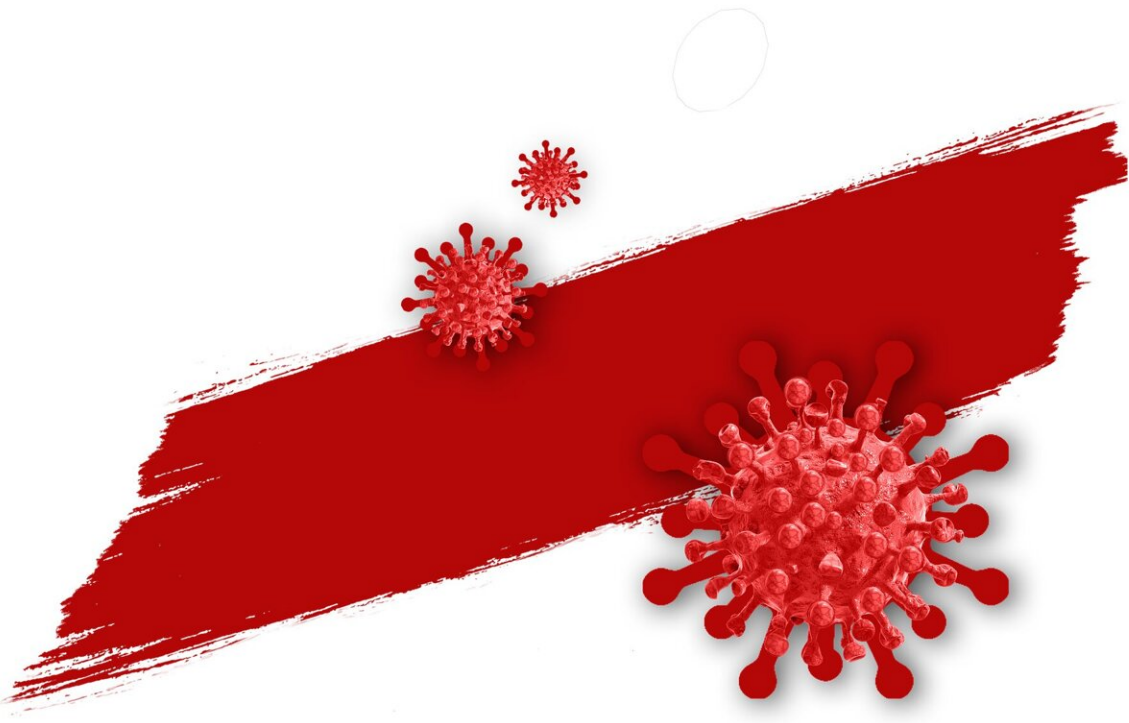


New study adds more evidence for Omicron immune evasion

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A new study from Columbia researchers, in collaboration with scientists at the University of Hong Kong, adds more evidence that the omicron variant can evade the immune protection conferred by vaccines and

natural infection and suggests the need for new vaccines and treatments that anticipate how the virus may soon evolve.

The findings, which are not yet peer-reviewed, were posted on *bioRxiv* by David Ho, MD, director of the Aaron Diamond AIDS Research Center and the Clyde'56 and Helen Wu Professor of Medicine at Columbia University Vagelos College of Physicians and Surgeons.

A striking feature of the [omicron variant](#) is the alarming number of changes in the virus's spike protein that could pose a threat to the effectiveness of current vaccines and [therapeutic antibodies](#).

Large drop in Omicron neutralization by antibodies from vaccines

The new study tested the ability of antibodies generated by vaccination to neutralize the omicron variant in laboratory assays that pitted antibodies against live viruses and against pseudoviruses constructed in the lab to mimic omicron.

Antibodies from people double-vaccinated with any of the four most widely used vaccines—Moderna, Pfizer, AstraZeneca, Johnson & Johnson—were significantly less effective at neutralizing the omicron variant compared to the ancestral virus. Antibodies from previously infected individuals were even less likely to neutralize omicron.

Individuals who received a booster shot of either of the two mRNA vaccines are likely to be better protected, although even their antibodies exhibited diminished neutralizing activity against omicron.

"The new results suggest that previously infected individuals and fully vaccinated individuals are at risk for infection with the omicron variant,"

says Ho. "Even a third [booster shot](#) may not adequately protect against omicron infection, but of course it is advisable to get one, as you'll still benefit from some immunity."

The results are consistent with other neutralization studies, as well as early epidemiological data from South Africa and the U.K., which show efficacy of two doses of the vaccines against symptomatic disease is significantly reduced against the omicron variant.

Most monoclonal antibodies are unable to neutralize Omicron

When administered early in the course of infection, monoclonal antibodies can prevent many individuals from developing severe COVID. But the new study suggests that all of the therapies currently in use and most in development are much less effective against omicron, if they work at all.

In neutralization studies with monoclonal antibodies, only one (Brii198 approved in China) maintained notable activity against omicron. A minor form of omicron is completely resistant to all antibodies in clinical use today. The authors note that omicron is now the most complete "escapee" from neutralization that scientists have seen.

In this study Ho's lab also identified four new spike mutations in [omicron](#) that help the virus evade antibodies. This information should inform the design of new approaches to combat the new variant.

Future directions

Ho suggests that scientists will need to develop vaccines and treatments that can better anticipate how the virus is evolving.

"It is not too far-fetched to think that SARS-CoV-2 is now only a mutation or two away from being completely resistant to current antibodies, either the [monoclonal antibodies](#) used as therapies or the antibodies generated by vaccination or infection with previous variants," says Ho.

More information: Lihong Liu et al, Striking Antibody Evasion Manifested by the Omicron Variant of SARS-CoV-2, *bioRxiv* (2021).
[DOI: 10.1101/2021.12.14.472719](https://doi.org/10.1101/2021.12.14.472719)

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