



Kent

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Covid-19: Omicron infection is poor booster to immunity, study finds

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People infected with the omicron variant show poor immunity boosting against future covid-19 infection, researchers have found.¹

This may explain why breakthrough and repeat infections have been a common feature of the omicron wave of the pandemic, even among people who have been triple vaccinated, said the research team.

Omicron is “an especially stealthy immune evader” said Danny Altmann, study coauthor from Imperial College London. “Not only can it break through vaccine defences, it looks to leave very few of the hallmarks we’d expect on the immune system,” he said. “It’s more stealthy than previous variants and flies under the radar, so the immune system is unable to remember it.”

The research team analysed blood samples from 731 UK healthcare workers who received three doses of mRNA vaccine and had different SARS-CoV-2 infection histories, to investigate antibody, T cell, and B cell immunity against omicron.

The study, published in *Science*,¹ found that people with no prior SARS-CoV-2 infection who then had omicron showed enhanced cross reactive immunity to previous variants—with enhanced B and T cell immunity against the alpha, beta, gamma, and delta variants—but they showed reduced boosting against the omicron spike protein itself.

Immune imprinting

Healthcare workers who had previously been infected with the alpha variant showed a less sustained antibody response against omicron. People infected during the first wave of the pandemic and then again with omicron lacked any immune boosting, the study found.

This effect is called hybrid immune damping, explained Joseph Gibbons, study coauthor from Queen Mary University of London. “For example, infection with the ancestral virus strain impairs the boosting effect of a subsequent omicron infection,” he said. “The broad diversity of infection history in our population means that further exposure to the current vaccine has different implications for different people.”

The lead author, Rosemary Boyton of Imperial College’s Department of Infectious Disease, said, “Getting infected with omicron does not provide a potent boost to immunity against reinfection with omicron in the future. Previous SARS-CoV-2 infection impacts on the ability to boost immunity against subsequent SARS-CoV-2 infection through a process called ‘immune imprinting,’ and this may apply to subvariants of omicron including BA.4 and BA.5.

“A concern is that omicron could potentially mutate further into a more pathogenic strain or become better able to overcome vaccine protection. In this scenario, people who have had omicron infection would be poorly boosted against future infection depending on their immune imprinting.”

The authors have emphasised that vaccination remains effective against severe disease but warn that the impact of multiple reinfections on long term health, including long covid, is not known.

¹ Reynolds C, Pade C, Gibbons J, et al. Immune boosting by B.1.1.529 (Omicron) depends on previous SARS-CoV-2 exposure. *Science* 2022 (published online 14 Jun). doi: 10.1126/science.abq1841

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