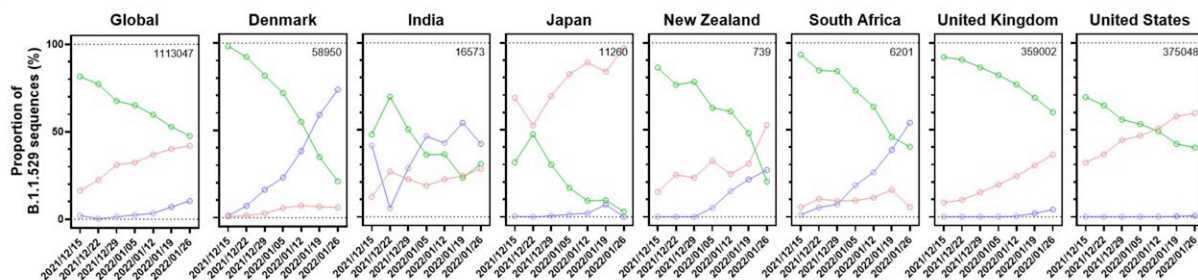


Vaccine and antibody treatment effectiveness blunted by all three Omicron subvariants

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Graphs showing the change in prevalence of each Omicron subvariant: BA.1 (green), BA.1.1 (red) and BA.2 (blue). Credit: Columbia University Irving Medical Center

Only one currently authorized antibody treatment retains its activity against all Omicron subvariants, according to new research by scientists at Columbia University and the University of Hong Kong. The study also shows that the effectiveness of mRNA vaccines is reduced against all three subvariants of Omicron.

The findings were published in *Nature* on March 2 by David D. 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.

Omicron is a highly transmissible variant of SARS-CoV-2 that has caused the biggest surge in COVID cases so far in many countries. Researchers have identified three subvariants of Omicron that share 21 mutations in the spike protein, and named them BA.1, BA.1.1 and BA.2.

When Omicron was first identified in November 2021, the dominant variant was BA.1. Since December, BA.1 cases have declined, while BA.1.1 cases have risen and now make up around 40% of all Omicron cases sequenced globally. The BA.2 subvariant currently represents only 10% of all Omicron cases globally but is increasing in prevalence.

In laboratory experiments, Ho and his team studied the ability of 19 monoclonal antibodies and the sera from individuals immunized with one of two available mRNA vaccines to neutralize the three known subvariants of Omicron.

Consistent with their previous study on the BA.1 variant, the researchers observed a similar loss of neutralization activity against BA.1.1 and BA.2 in blood samples from individuals who had received two mRNA shots. However, the decline in neutralization was less prominent in [blood samples](#) from individuals who had received three mRNA shots, reinforcing the importance of booster shots for sustaining immunity.

In neutralization experiments, all three variants exhibited a strong resistance to most of the [monoclonal antibodies](#) tested. Of 19 [antibodies](#), 17 were ineffective against the BA.2 subvariant. The researchers found that bebtelovimab, the latest monoclonal antibody to receive FDA Emergency Use Authorization, is the only currently available antibody therapy that can adequately treat all three Omicron subvariants.

"The emergence of new variants is narrowing our [treatment options](#) and challenging the effectiveness of our current vaccines," says Ho. "It is critical that we don't relax prematurely and continue to devise novel

strategies to contain this ever-evolving pathogen."

More information: Sho Iketani et al, Antibody evasion properties of SARS-CoV-2 Omicron sublineages, *Nature* (2022). [DOI: 10.1038/s41586-022-04594-4](https://doi.org/10.1038/s41586-022-04594-4)

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