SARS-CoV-2 Variant Antibodies Wane 6 Months After Vaccination

In a recent study, binding and functional antibodies against SARS-CoV-2 variants persisted for at least 6 months for most adults who received both doses of Moderna’s mRNA vaccine. However, the antibodies waned over that period and some serum samples collected at 6 months no longer neutralized the variants, the researchers reported in Science.

A team that included scientists from the National Institute of Allergy and Infectious Diseases’ Vaccine Research Center (VRC) and Moderna used a variety of assays to test serum samples from 24 adults in 3 age groups against the Alpha (B.1.1.7), Beta (B.1.351), Gamma (P.1), Epsilon (B.1.429), Iota (B.1.526), and Delta (B.1.617.2) variants. Samples were collected about a month after the first dose and then 2 weeks, 3 months, and 6 months after the second dose.

Neutralizing activity was low after the first shot. It peaked 2 weeks after the second shot, when all the participants’ serum neutralized all variant pseudoviruses—nonreplicating lentiviruses engineered with the SARS-CoV-2 variants’ spike proteins. From there, activity against the variants declined moderately through the 6-month mark. At that point, 96% of participants’ serum neutralized the Delta variant but only 54% neutralized Beta. For the other 4 variants, 85% to 96% of participants’ serum samples were neutralizing.

Age-related differences in antibody levels were small, with a trend toward lower titers against variants among adults aged 71 years or older.

Although antibodies decreased over time, the finding that all participants neutralized all variants during the peak response bodes well for memory immune responses triggered by virus exposure or vaccine boosts, the study’s authors noted. Trials are underway to study antibody potency and breadth after a booster shot using the same mRNA formulation, the Beta variant spike protein, or a combination of the two.

“The immune responses that we expect to protect against Delta and other variants are still present 6 months after the vaccine second dose, even in older adults,” study author Nicole Doria-Rose, PhD, chief of the VRC’s Humoral Immunology Core, wrote in an email to JAMA. “We will keep measuring immune responses through the second year, to help determine if and when booster shots might be needed for the general population.”

Potential New Immune-Checkpoint Inhibitor Partner for Lung Cancer

There could be a new way to boost the response to immune-checkpoint inhibitors for patients with metastatic non–small-cell lung cancer.

A single-group phase 1 trial partnered nivolumab, a programmed cell death ligand 1 immune-checkpoint inhibitor, with an approach called adoptive cell therapy with tumor-infiltrating lymphocytes (TILs). Durable regressions with TILs have previously been reported in melanoma, cervical, breast, and other cancers.

Sixteen participants whose metastatic lung cancers progressed after surgery and nivolumab treatment received infusions of TILs and the cytokine interleukin 2 over 5 days. The TILs were isolated from their excised tumors and expanded before being transferred back to them after lymphodepleting chemotherapy. Patients continued nivolumab after the experimental treatments.

The pilot study, reported in Nature Medicine, achieved its prespecified primary end point of no more than 17% severe toxic reactions. Two patients died before their responses to the treatment were assessed, resulting in a severe toxic reaction rate of 12.5%. For the remaining patients, most treatment-related adverse events resolved within a month. Six patients had radiographic responses, including 2 who had complete responses that were ongoing at 1.5 years.

Point-of-Care SARS-CoV-2 Variant Diagnostic in Development

Researchers at Harvard’s Wyss Institute for Biologically Inspired Engineering recently described a low-cost, user-friendly point-of-care (POC) device that detects SARS-CoV-2 and several variants of concern in an hour using saliva samples.

The approach uses CRISPR (clustered regularly interspaced short palindromic repeats) gene-editing technology to target highly conserved regions of the novel coronavirus genome that are not present in other coronaviruses, as well as key spike protein mutations associated with variants of concern.

The device had 96% sensitivity and 95% specificity for SARS-CoV-2 in 27 saliva samples from patients with confirmed COVID-19 with a range of viral loads and from 21 healthy control samples, the researchers reported in Science Advances. It also had high sensitivity and specificity for detecting mutations associated with the Alpha (B.1.1.7), Beta (B.1.351), and Gamma (P.1) variants in tests using commercially available variant SARS-CoV-2 strains mixed with human saliva. The technology can be easily adapted to detect mutations in additional variants—or other pathogens altogether—as they arise, the researchers noted.

The testing process involves 3 simple steps, resulting in a fluorescent readout when the target viral sequence is detected. The self-contained battery-powered unit, which costs about $15 and can be 3D-printed, uses room temperature–stable reagents, requires no laboratory equipment or technical skills, and has an associated smartphone mobile application. It’s likely to be most useful as a POC diagnostic tool in low-resource settings, according to the authors. – Jennifer Abbasi

Note: Source references are available through embedded hyperlinks in the article text online.