Single vaccine dose may offer protection to those who have had COVID-19

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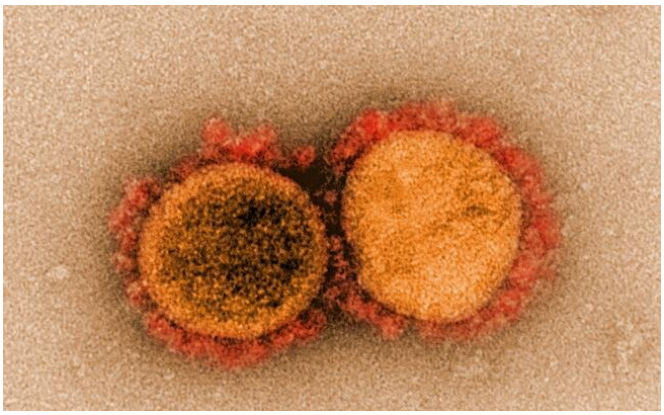

Transmission electron micrograph of SARS-CoV-2 virus particles, isolated from a patient. Image captured and color-enhanced at the NIAID Integrated Research Facility (IRF) in Fort Detrick, Maryland. Credit: NIAID

New research from UNC-Chapel Hill suggests that those who have previously experienced a SARS-CoV-2 infection develop a significant antibody response to the first dose of mRNA-based COVID-19 vaccine. In fact, one dose of the vaccine could give the same level of antibody protection to those who have had COVID-19 as two doses of vaccine provide to those who have not had COVID-19.

This is welcome news for many who have recovered from the virus and are now wondering whether they should receive a vaccine when they are eligible. Previous CDC guidance indicated that those with a history of SARS-CoV-2 infection may choose to temporarily delay vaccination while supplies are limited.

"We observed that the antibody response to one mRNA vaccine dose among individuals who had been previously infected was almost two-fold higher than that of individuals who had no signs of prior infection," said Allison Aiello, Ph.D., professor of epidemiology at the UNC Gillings School of Global Public Health. "Moreover, the response to the first vaccination among individuals with prior infection was of similar magnitude to the response to two vaccine doses among seronegative individuals. Our study is unique in that we were able to longitudinally follow SARS-CoV-2 antibody responses, in some cases for months prior to vaccination, and showed that the response to the first vaccine dose among seropositive individuals was robust for a range of different patterns in antibody response over time."

"These results support a new and growing body of research suggesting that prior SARS-CoV-2 infection may act as a primer for the immune response to the first dose of mRNA-based SARS-CoV-2 vaccine," said Emily Ciccone, MD, MHS, the study's first author, who is a clinical instructor and fellow in the Division of Infectious Diseases at the UNC School of Medicine. "If this immune response is shown to be durable and protective against subsequent SARS-CoV-2 infection in future studies, individuals with a history of infection may be able to forgo the second dose of an mRNA-based vaccine."

These findings, which are currently published as a preprint on medRxiv, came out of UNC's longitudinal COVID Health Care Personnel (HCP) study, a joint initiative between the School of Medicine, the Gillings School and the UNC Institute for Global Health and Infectious Diseases. The study followed a group of HCPs at UNC Health starting in July 2020 to examine their risk factors for infection and their change in SARS-CoV-2 antibody levels over time.

HCPs in the study had the opportunity to receive the Moderna or Pfizer-BioNtech SARS-CoV-2 vaccine through UNC Health's vaccination program starting in mid-December 2020. The study team compared antibody responses before and after vaccination between study participants who had

previously tested positive for COVID-19 at any time (seropositive) and those who did not have antibodies to SARS-CoV-2 (seronegative) prior to vaccination.

More than 27 million Americans have been infected with SARS-CoV-2 to-date. The preliminary results of this study provide potential hope that some individuals may be able to forgo a second vaccination, which could have a substantial impact on vaccine distribution strategies—both in the United States and across the globe.

The study authors from the Gillings School include corresponding author Aiello, doctoral students Deanna Zhu and Evans Lodge, research specialist Rawan Ajeen, and Assistant Professor of Biostatistics Bonnie Shook-Sa, DrPH. The authors from the School of Medicine include Ciccone and Ross Boyce, MD, MSc, assistant professor in the Division of Infectious Diseases. In addition, the co-author team includes a group of 12 individuals across the Gillings School and the School of Medicine that contributed to the study.

More information: Emily J. Ciccone et al. SARS-CoV-2 seropositivity after infection and antibody response to mRNA-based vaccination, *medRxiv* (2021). DOI: 10.1101/2021.02.09.21251319

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