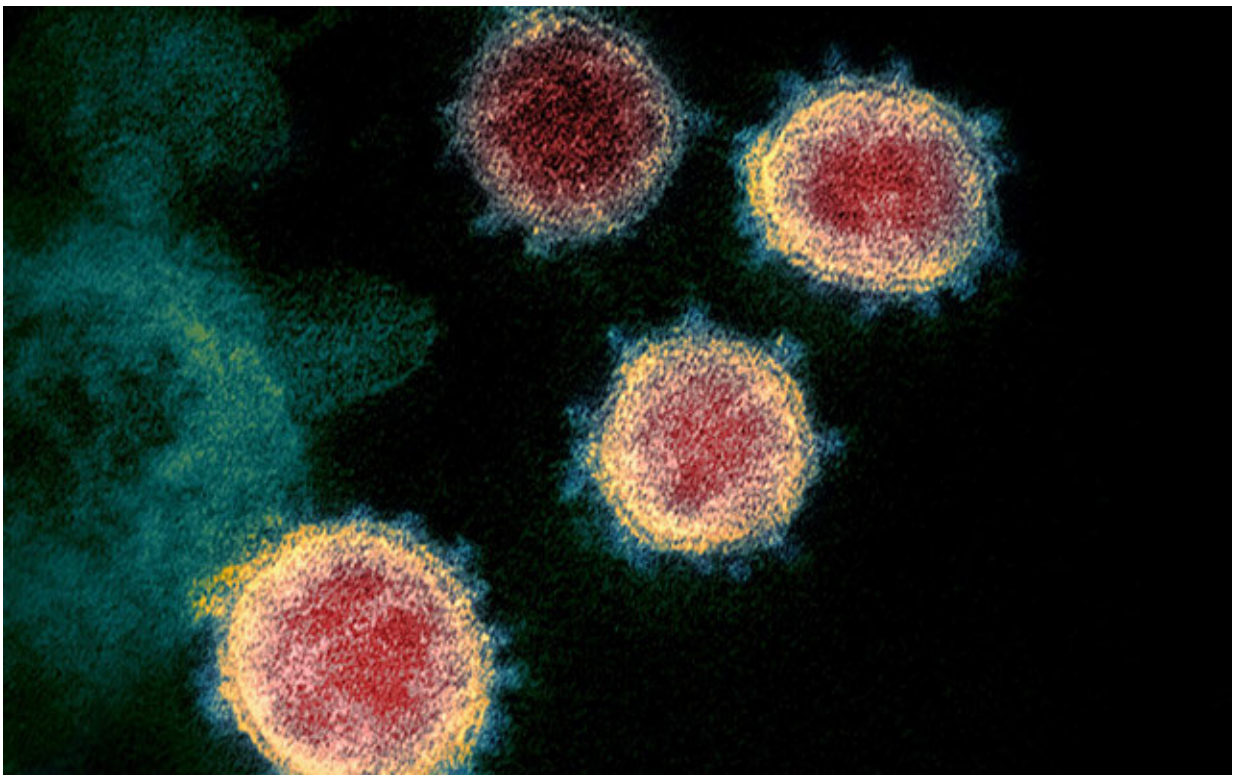
Previous infection with other types of coronaviruses may lessen severity of COVID-19

October 6 2020



A colorized scanning electron micrograph of the SARS-CoV-2 virus. Credit: NIAID

Being previously infected with coronaviruses that cause the 'common cold' may decrease the severity of severe acute respiratory syndrome

coronavirus (SARS-CoV-2) infections, according to results of a new study. Led by researchers at Boston Medical Center and Boston University School of Medicine, the study also demonstrates that the immunity built up from previous non-SARS-CoV-2 coronavirus infections does not prevent individuals from getting COVID-19. Published in the *Journal of Clinical Investigation*, the findings provide important insight into the immune response against SARS-CoV-2, which could have significant implications on COVID-19 vaccine development.

The COVID-19 pandemic has led to more than 200,000 deaths in the US, and more than one million globally. There is a growing body of research looking into specific ways that the SARS-CoV-2 virus impacts different populations, including why some people are infected and are asymptomatic, as well as what increases ones mortality as a result of infection. There are a number of vaccines under development in order to determine what type of vaccine (mRNA, viral vector) will be most effective at preventing SARS-CoV-2 infections.

While SARS-CoV-2 is a relatively new pathogen, there are many other types of coronaviruses that are endemic in humans and can cause the "common cold" and pneumonia. These coronaviruses share some genetic sequences with SARS-CoV-2, and the immune responses from these coronaviruses can cross-react against SARS-CoV-2.

In this study, the researchers looked at electronic medical record data from individuals who had a respiratory panel test (CRP-PCR) result between May 18, 2015 and March 11, 2020. The CRP-PCR detects diverse respiratory pathogens including the endemic "common cold" coronaviruses. They also examined data from individuals who were tested for SARS-CoV-2 between March 12, 2020 and June 12, 2020. After adjusting for age, gender, body mass index, and diabetes mellitus diagnosis, COVID-19 hospitalized patients who had a previous positive CRP-PCR test result for a coronoavirus had significantly lower odds of

being admitted to the intensive care unit (ICU), and lower trending odds of requiring mechanical ventilation during COVID. The probability of survival was also significantly higher in COVID-19 hospitalized patients with a previous positive test result for a "common cold" coronoavirus. However, a previous positive test result for a coronavirus did not prevent someone from getting infected with SARS-CoV-2.

"Our results show that people with evidence of a previous infection from a "common cold" coronavirus have less severe COVID-19 symptoms," said Manish Sagar, MD, an infectious diseases physician and researcher at Boston Medical Center, associate professor of medicine and microbiology at Boston University School of Medicine and the study's co-corresponding author. Another interesting finding, the authors note, is that immunity may prevent disease (COVID-19) in ways that are different from preventing infection by SARS-CoV-2. This is demonstrated by the fact that the patient groups had similar likelihoods of infection but differing likelihoods of ending up in the ICU or dying.

"People are routinely infected with coronaviruses that are different from SARS-CoV-2, and these study results could help identify patients at lower and greater risk of developing complications after being infected with SARS-CoV-2," said Joseph Mizgerd, ScD, professor of medicine, microbiology, and biochemistry at Boston University School of Medicine who is the study's co-corresponding author. "We hope that this study can be the springboard for identifying the types of immune responses for not necessarily preventing SARS-CoV-2 infection but rather limiting the damage from COVID-19."

More information: Manish Sagar et al, Recent endemic coronavirus infection is associated with less severe COVID-19, *Journal of Clinical Investigation* (2020). DOI: 10.1172/JCI143380

Provided by Boston Medical Center