

# One of the major mysteries of the pandemic is COVID super immunity.

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## Abstract

**If you are vaccinated after recovering from COVID-19, do you think your immune system will respond more strongly? People who have previously recovered from COVID-19 have a stronger immunological reaction to vaccination than those who have never been infected, according to findings from various regions. The researchers are trying to figure out why this is such a big enigma.**

**Keywords:** Vaccination, Immunity, Hybrid immunity, SARS-CoV-2, COVID-19

## Description

Researchers have investigated whether getting vaccinated after recovering from COVID-19 results in stronger immune reactions. The reports from various sections informed that in comparison to those who have never been infected, people who have previously recovered from COVID-19 have a greater immunological reaction to vaccination. This is a big mystery for the researchers which is being attempted to determine why.

According to Schmidt [1], a spike mutant with 20 alterations was totally resistant to neutralising antibodies produced by the majority of test subjects who had either been exposed to the disease or received a vaccination, but not to everyone's.

Before receiving their vaccinations, those who had recovered from COVID-19 months before had antibodies that could defan the mutant spike, which is far more immune resistant than any other known naturally occurring version. Even additional Coronavirus subtypes were stopped by these people's antibodies.

The origin of this "super-immunity" has emerged as one of the greatest mysteries of the epidemic as the world keeps an eye out for new Coronavirus variations. By charting the differences between the immune protections that results from infection compared with that from vaccination, researchers aim to find a less dangerous route to this greater level of immunity.

**Hybrid immunity:** Researchers soon began to notice distinctive characteristics of the vaccine responses of patients who had previously contracted and recovered from COVID-19. This was not long after governments started to distribute vaccines.

Initial research on people with hybrid immunity revealed that, in comparison to 'naive' vaccinated people who had never encountered SARS-CoV-2 [2], their serum, the antibody containing component of blood, was much better able to neutralise immune evading strains, such as the beta variant identified in South Africa and other Coronaviruses. It was

unclear whether this was caused by other factors, in addition to the high concentrations of neutralising antibodies.

Recent research suggests that immunological actors known as memory B cells are at least partially responsible for hybrid immunity. The majority of antibodies produced in response to infection or immunisation are produced by transient cells termed plasma blasts and antibody levels drop when these cells inevitably deplete themselves. After plasma blasts are gone, memory B cells, which are considerably more uncommon and are either activated by infection or vaccination, become the primary source of antibodies. Some of these long lived cells produce antibodies of greater calibre than plasma blasts. This is due to the fact that when they develop in tissues called lymph nodes, they acquire mutations that enable them to attach to the spike protein more firmly over time. People who have recovered from COVID-19 are more likely to develop more of these powerful antibodies when they are exposed to SARS spike.

**Dependable antibodies:** The heightened reactions of hybrid immunity may potentially be explained by variations between the memory B cells induced by infection and those triggered by vaccination, as well as the antibodies they produce. According to Nussenzweig, the immune system is exposed to the spike protein in quite different ways during infection and immunisation.

In several studies [3-5], antibody responses of infected and immunised individuals were compared. Both result in the development of memory B cells, which produce more potent antibodies as they have evolved, although the researchers believe this happens more frequently following infection.

**Not unexpected:** It's possible that naive vaccine recipients' B cells will produce antibodies that become more potent and broad with time, additional vaccination doses or both, according to researchers. A stable pool of memory B cells can take several months to mature and establish itself.

**Booster advantages:** People who haven't been infected may be able to benefit from hybrid immunity with a third dosage of the vaccination. Two months after receiving the vaccine, some memory B cells from naive vaccine recipients were discovered to be able to distinguish between beta and delta [6].

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