

「How long do coronavirus antibodies last? Can our immune system 'remember' the coronavirus?」

Updated 17 July, 2020. Cellspect Co., Ltd

One of the leading COVID-19-related questions concerns the issue of how long does immunity last after infection? With some diseases, like measles and hepatitis A, infection is a one-and-done deal. Once you get sick and recover, you're immune for life. However, for the novel coronaviruses, that seems not the case. Increasingly, researchers are starting to coalesce around an unfortunate picture of COVID-19 immunity: People who develop antibodies might not keep them for very long.

A study published in Nature Medicine in June, studied the immune response of 37 patients who were asymptomatic and 37 people who had symptoms. Both groups showed relatively similar immune responses at first, but two to three months later, over 90% of both groups experienced a significant reduction in COVID-19 specific IgG antibodies. A majority of both groups also experienced a drop in the antibodies that block the virus from infecting cells, which are called neutralizing antibodies. This decline in IgG and neutralizing antibodies was more severe for asymptomatic people, with around 40% becoming seronegative for IgG, meaning their levels had dropped past the point of detection (12% of the symptomatic group also became seronegative). [1]

On July 6, a population-based seroepidemiological study was done in Spain, indicating that only 5 percent of the population in the country has antibodies against COVID-19 and the antibodies could last only three to five weeks in some patients. The result was published on medical journal The Lancet and findings suggest that a so-called herd immunity to Covid-19 is "unachievable." [2]

Moreover, on July 11, a preliminary study from researchers at King's College London repeatedly tested 96 patients who were confirmed with COVID-19 and found that levels of virus-fighting antibodies peaked about three weeks after symptoms started and then rapidly fell away. Although 60% of participants produced a "potent" antibody response while they had COVID-19, only 17% had the same level of potency at the end of the three-month testing period. Antibody levels were higher and longer-lasting in people who had had more severe cases of COVID-19. For some milder cases, it was impossible to detect any antibodies at all at the end of the three months. The research is published in a preprint paper in medRxiv, which means the findings have yet to be subjected to peer review. [3]

These studies raise the prospect that, like other coronaviruses, COVID-19 could reinfect people repeatedly. If that's the case, "herd immunity" may never arrive, either through a one-shot vaccine or through community spread of the virus, as any protective antibodies would wane with time. However, we don't need to be panic either, because antibodies are not the only way people can fight off COVID-19.

Antibodies are a critical component of immunity—especially the ones that “neutralize” the virus by homing in on the proteins that comprise it. They glom onto their target and prevent the virus from infecting cells. But antibody levels are only part of the immunity story. While antibodies may wane past the limit of detection, that doesn’t mean they go away entirely. And even a very low level could be protective. The key point is when you’ve been exposed to the virus, how quickly you can ramp up those antibodies. That involves a whole army of cells, which store knowledge of each new pathogen they encounter. There are B cells, which help coax those virus-specific antibodies into existence, plus killer T cells, which can learn to obliterate infected cells. Helper T cells help orchestrate the whole process. It is so-called immunological memory known to reduce the symptoms of the next infection or to prevent the onset of the next infection.

In a new study, antibodies to one viral protein dropped below detectable levels. But a second set of antibodies needed to neutralize the virus and prevent reinfection which targets the spike protein of virus were still present. [4] Another paper, published in the journal Nature, suggests that even low levels of antibodies might be enough to thwart the virus. “It does appear that even low levels of certain antibodies have potent neutralizing capability,” said Dr. Rasmussen, the Columbia University virologist. “Low antibody titers don’t necessarily determine whether a patient will be protected from reinfection.” [5]

Regarding COVID-19, more research is needed to determine whether similar results would emerge among a larger group of patients and what data could show over longer periods of time when it comes to infection with the virus. Scientists are still struggling with this virus. The only one certain thing is that the strong vaccines are still in urgent needs because immunity that develops naturally during infection is suboptimal and short-lived in most people.

Reference:

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2. Marina Pollán et al. July 06, 2020 "Prevalence of SARS-CoV-2 in Spain (ENE-COVID): a nationwide, population-based seroepidemiological study" *The Lancet* . DOI: 10.1016/S0140-6736(20)31483-5
3. Jeffrey Seow et al. July 11, 2020 "Longitudinal evaluation and decline of antibody responses in SARS-CoV-2 infection" *medRxiv*.
4. Apoorva Mandavilli, June 18, 2020 "You May Have Antibodies After Coronavirus Infection. But Not for Long." *The New York Times press*.
5. Davide F. Robbiani et al. June 18, 2020. "Convergent antibody responses to SARS- CoV-2 in convalescent individuals" *Nature*. DOI:10.1038/s41586-020-2456-9

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