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COVID-19 reinfection

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In COVID-19 detection, serology testing is performed to identify the individuals who have been infected with SARS-CoV-2. Two antigens are used in serological assays, one is nucleoprotein and the other is structural protein to detect the targeted antibodies (antibodies that bind to SARS-CoV-2-specific antigens). In a serology survey, it was found that the prevalence of antibodies to COVID-19 reduced to 25% (in September 2020) from nearly 29% (in August 2020). The survey also found that, nearly one-third of the participants with the past history of COVID-19 infection did not have detectable IgG, which suggested that, immunity to the virus attack does not last beyond two months or so and it depletes over time, particularly in those with mild or no symptoms. IgM antibodies last for a shorter duration than IgG antibodies. As said by WHO, antibodies could not be the passport to immunity because even with healthy levels of antibodies, reinfection can not only happen but can cause more serious disease. A 33-year-old man was the first in the world to have confirmed coronavirus reinfection that was confirmed as reinfection and not the persistent infection of first exposure and this was confirmed by studying the genetic code of viruses of both infections using PCR. Although reinfected with the virus, his immune system swung into action fast and contained the virus without him knowing.

Most reinfections were less troublesome than the first but some reinfections were more severe. Reinfection seems uncommon as only two dozen reinfections were confirmed at the time of 30 million total cases. The neutralising antibodies that are induced by SARS-CoV-2 last for years protecting from reinfection. T- and B-cells which are the result of the adaptive immune response are stored in the body for years after the infection is beaten. Given the half-life of IgG antibodies as 21 days suggests that, sustained antibodies are likely produced by long-lived plasma cells in the bone marrow. Another possibility is a so-called antibody-dependent enhancement, a glitch in the immune system where antibodies help an invading virus rather than hindering it. This is seen in dengue fever where second infections can be far more dangerous than the first. Yet another possibility is that the virus harms T-cells in some patients at least. In a study of germinal centres present in the spleen and lymph nodes taken from dead COVID-19 patient tissues, no antibodies were found suggesting that some patients are unable to generate highly effective, long-lasting antibodies that would fight the virus for years. There are various possibilities and some questions are still unanswered regarding reinfection.

Keywords: COVID-19 reinfection, SARS-CoV-2, SARS-CoV-2-specific antigens, Antibodies, Immune system, Persistent infection, Reinfection, Plasma cells

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