Longitudinal kinetics of RBD+ antibodies in COVID-19 recovered patients over 14 months

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Abstract

The fundamental idea guiding vaccine science is that an ideal vaccine should induce immunity similar to the immunity produced by natural infection. A vaccine is designed to “train” the immune system in a way that it will mimic the stimulation necessary for immune development, yet not produce active disease. Understanding the persistence of antibodies in patients following recovery from natural infection with SARS-CoV-2 will help to highlight the differences between the breadth of the antibody responses following natural infection and vaccination and may inform us whether the vaccine “training” will effectively stimulate the immune system to provide long-lasting immunity. Using samples collected from recovered COVID-19 patients over an extended period of 14 months, we followed the persistence of antibodies and found an association between the antibody levels in proximity to recovery and the rate of decay. In addition, we found that the decay rate of antibodies in BNT162b2 vaccinees was significantly faster than that in recovered patients, suggesting that there are fundamental differences between the mechanisms of activation of the adaptive arm of the immune response following vaccine and natural infection. While natural infection involves full systemic activation, this activation may be incomplete with an mRNA vaccination, thereby affecting the capacity of the immune system to maintain an antibody reservoir over time. Our data highlighting the differences between serological memory induced by natural infection vs. vaccination contributed to the decision-making process in Israel regarding the necessity for a third vaccination dose.