

[Precision Vaccinations](#)

- [Clinical Trials](#)
- [Deals](#)
- [Lab Tests](#)
- [Subscribe](#)

[Trials](#) [Deals](#) [Labs](#) [Subscribe](#)

- [Home](#)
- [Covid-19](#)

Natural Immunity After COVID-19 Found Durable and Robust

- [Flu](#)
- [Hepatitis](#)
- [Herpes](#)
- [HPV](#)
- [Pneumococcal](#)
- [RSV](#)

Fact checked by [Robert Carlson, MD](#)

+ 1

Published

July 26, 2021

Fact checked

August 2, 2021

Most recovered COVID-19 patients mount broad, durable immunity after coronavirus infection researcher looking at blood samples from covid patients

Coronavirus Vaccines

(Precision Vaccinations)

Ending the COVID-19 pandemic will require long-lived immunity to SARS-CoV-2, wrote researchers who published a new study in the journal *Cell* on July 14, 2021.

“To end the COVID-19 pandemic, it is critical to know how long immunity against SARS-CoV-2 will persist after infection and whether it will be sufficient to prevent new infections and severe disease in years to come, continued this study,” which is excerpted below.

“Identifying, in-depth, the adaptive immune components leading to recovery and modeling the trends of each response was enabled by the longitudinal sampling of a large number of COVID-19 patients.”

This new study shows that most convalescent COVID-19 patients mount durable antibodies, B cells, and T cells specific for SARS-CoV-2 up to 250 days. The kinetics of these responses provide an early indication for a favorable course ahead to achieve long-lived immunity.

Because the cohort will be followed for 2–3 more years, they can build on these results to define the progression to long-lived immunity against this novel human coronavirus, which can guide rational responses when future virus outbreaks occur.

The hallmark of the initial immune defense against SARS-CoV-2 is the emergence of antibodies recognizing the SARS-CoV-2 spike protein, including the RBD and NTD components of the S1 subunit, during the early phase of viral replication.

These antibodies are likely secreted from plasmablasts rapidly generated from B cells activated upon their first encounter with the pathogen spike antigen.

The swift rise over the first month of infection, followed by a fast decline of the circulating spike IgG and IgA antibodies, is a consistent finding and likely explained by the disappearance of the short-lived plasmablasts.

These events occur even sooner for the spike IgM and nucleocapsid antibodies.

Some antibodies that bind to specific epitopes on the spike RBD and NTD can block SARS-CoV-2 infection of respiratory epithelial cells by inhibiting the interactions of the viral spike with the ACE2 receptor.

Thus, as expected, the early rise and decline of antibodies neutralizing live SARS-CoV-2 were similar to the kinetics of antibodies binding the spike and RBD protein.

The striking finding is the bi-phasic curve of the spike-specific binding and neutralizing antibody responses when analyzed with the power-law model, which provides a better fit for the antibody kinetics after the peak response.

This bi-phasic decline accords with other recently published observations on SARS-CoV-2 serological kinetics.

With sampling data extended to 250 days, these researchers detected a slowing of the decay of these functional antibodies toward a plateau level, suggestive of the generation of longer-lived plasma cells and durable antibody responses.

The importance of these observations is that following recovery, neutralizing antibodies may persist, albeit at low levels, and may act as the first line of defense against future encounters of SARS-CoV-2 and possibly related human coronaviruses.

Another interesting finding of this investigation is the remarkably stable antibody responses among the pre-pandemic and COVID-19 patients to the common human coronaviruses acquired in children and adults.

These data are most consistent with the generation of long-lived plasma cells and refute the current notion that these antibody responses to human coronaviruses are short-lived.

Moreover, the COVID-19 patients mounted increased IgG antibody responses to SARS-CoV-1, a related pathogen that none likely had experienced previous exposure to.

This finding is consistent with the booster response of SARS-CoV-1 neutralizing antibodies that we recently observed following SARS-CoV-2 mRNA vaccination.

Taken together, these results may have implications for a broader strategy for vaccines targeting multiple beta [coronaviruses](#).

The durable antibody responses in the COVID-19 recovery period are further substantiated by the ongoing rise in both the spike and RBD memory B cell responses after over 3–5 months before entering a plateau phase over 6–8 months.

The persistence of RBD memory B cells has been noted.

These researchers presume this may be explained by sustained production of memory B cells in germinal centers of lymph nodes draining the respiratory tract in the early months, followed by the memory B cell redistribution into the circulation as the germinal centers begin to recede.

Thus, the induction and maintenance of memory B cells and, over time, long-lived plasma cells will continue to furnish higher affinity antibodies if re-exposures occur.

In contrast to spike memory B cell kinetics, SARS-CoV-2-specific CD4+, and CD8+ memory T cells each peak early, within the first month, but then slowly decline over the next 6–7 months.

Central memory Th1-type CD4+ T cells dominate throughout the early infection and recovery period.

However, the CD8+ T cells exhibit a predominant effector memory phenotype early that transitions to those effector memory cells re-expressing CD45RA, maintaining expression of antiviral cytokines and effector functions that have been shown to provide protective immunity against other viral pathogens.

Sponsored Links:

[\\$Discounts](#) [📅Appointments](#) [👤Clinical Trials](#) [🔬Lab Tests](#)

These researchers also provide clear evidence that the CD4+ T cells mount a broader antigen-specific response across the structural and accessory gene products. In contrast, the CD8+ T cells are predominantly nucleocapsid-specific, and spike-specific responses are substantially lower in frequency.

In summary, they wrote ‘Our study demonstrates the considerable immune heterogeneity in the generation of a potentially protective response against SARS-CoV-2, and by focusing on the dynamics and maintenance of B and T cell memory responses, we were able to identify features of these early cellular responses that can forecast the durability of a potentially effective antibody response.’

‘The ability to mount higher frequencies of RBD-specific memory IgG+ B cells early in infection was the best indicator for a durable RBD-specific IgG antibody and neutralizing antibody response.’

‘In addition, higher frequency CD4+ T cells were associated with stronger spike IgG and neutralizing antibody responses.’

‘However, the induction and peak response of SARS-CoV-2-specific CD8+ T cells occurs independently to these antibody responses.’

‘Interestingly, while it has been widely reported that age correlates with COVID-19 disease severity, we found that age and disease severity were independent co-variables associated with the magnitude of both SARS-CoV-2-specific CD4+ T cell and humoral SARS-CoV-2 immunity, but not with the magnitude of CD8+ T cell responses.’

‘In the case of T cells, whether the T cell differences are related to the frequencies or specificities of pre-existing coronavirus CD4+ and CD8+ T cell immunity will require additional future analysis.’

‘Overcoming the challenges to end the pandemic is accentuated by the recognition that SARS-CoV-2 can undergo rapid antigenic variation that may lower vaccine effectiveness in preventing new cases and progression to severe disease.’

‘Our findings show that most COVID-19 patients induce a wide-ranging immune defense against SARS-CoV-2 infection, encompassing antibodies and memory B cells recognizing both the RBD and other regions of the spike, broadly-specific and polyfunctional CD4+ T cells, and polyfunctional CD8+ T cells.’

‘The immune response to natural infection is likely to provide some degree of protective immunity even against SARS-CoV-2 variants because the CD4+ and CD8+ T cell epitopes will likely be conserved.’

‘Thus, vaccine induction of CD8+ T cells to more conserved antigens such as the nucleocapsid, rather than just to SARS-CoV-2 spike antigens, may add benefit to more rapid containment of infection as SARS-CoV-2 variants overtake the prevailing strains.’

Limitations of this study: This study evaluates COVID-19 patients only up to 8 months and requires models to estimate immune response half-lives after that. However, because this longitudinal study will extend beyond two years, these researchers can corroborate models with subsequent experimental data on the persistence of immune memory.

Funding: The research was supported in part by COVID supplements from the National Institute of Allergy and Infectious Diseases and the Office of the Director of the National Institutes of Health, and other funders. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funders. The researchers did not disclose industry-related conflicts of interest.

The full study: Longitudinal analysis shows durable and broad immune memory after SARS-CoV-2 infection with persisting antibody responses and memory B and T cells

PrecisionVaccinations publishes fact-check, research-based vaccine news.

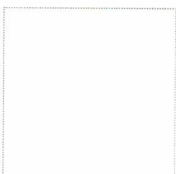
Share

Article by

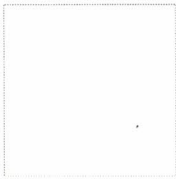
Don Ward Hackett

References:

- [Longitudinal analysis shows durable and broad immune memory after SARS-CoV-2 infection with persisting antibody responses and me](#)
- [Lasting immunity found after recovery from COVID-19](#)
- [Study Suggests Lasting Immunity After COVID-19](#)
- [Had COVID? You'll probably make antibodies for a lifetime](#)



Fact checked by [Robert Carlson, MD](#)



Fact checked by [Holly Lutmer PharmD](#)

+ 1

Relevant Links:

- [CDC Vaccination Schedules](#)
- [Vaccine Price List](#)
- [Vaccines for Children](#)
- [Report Vaccine Side Effects](#)

Big Stories

[person being wheeled out of the hospital after recovering from COVID-19](#)
[Monoclonal Antibody Combo Effective Against Delta Variant](#)
[cheerleaders showing sign for victory](#)
[Can Double COVID-19 Immunity Defeat the Delta Variant?](#)
[people celebrating good news](#)
[First COVID-19 Vaccine Approved in the USA](#)
[blood donated for transfusion](#)
[Convalescent Plasma Failed to Deliver Significant Benefits for High-Risk COVID-19 Outpatients](#)
[Washington DC buildings](#)
[Experts Support COVID-19 Vaccine Booster Shots](#)
[young african children playing in a yard](#)
[drMonoclonal Antibodies May Prevent Malaria](#)
[young boys arm wrestling on the beach](#)
[COVID-19 Natural Immunity Debate Continues](#)
[finish line of a track meet](#)
[Heart Inflammation Risk Following mRNA COVID-19 Vaccination Could Be Common](#)
[woman taking a nasal spray for the flu](#)
[Flu Vaccine Candidate Demonstrated Multi-Seasonal, Seven-Year Drifted Influenza Strain Protection](#)

New Vax Data

[COVID-19 Vaccines in the USA](#)
[Lyme Disease Vaccine \(VLA-15\)](#)
[Comirnaty COVID-19 Vaccine \(BioNTech - Pfizer BNT162b2\)](#)
[Influenza Vaccines](#)
[CoviShield COVID-19 Vaccine](#)
[MVA-BN RSV Vaccine](#)
[RSV Vaccines](#)
[Molnupiravir \(MK-4482, EIDD-2801\) Antiviral](#)
[Dengvaxia Dengue Vaccine](#)
[Afluria Quadrivalent Influenza Vaccine](#)
[Sputnik V Vaccine](#)
[Convidicea Vaccine CanSino](#)
[person being wheeled out of the hospital after recovering from COVID-19](#)
[Monoclonal Antibody Combo Effective Against Delta Variant](#)
[cheerleaders showing sign for victory](#)
[Can Double COVID-19 Immunity Defeat the Delta Variant?](#)
[people celebrating good news](#)
[First COVID-19 Vaccine Approved in the USA](#)
[blood donated for transfusion](#)
[Convalescent Plasma Failed to Deliver Significant Benefits for High-Risk COVID-19 Outpatients](#)
[Washington DC buildings](#)
[Experts Support COVID-19 Vaccine Booster Shots](#)
[young boys arm wrestling on the beach](#)
[COVID-19 Natural Immunity Debate Continues](#)
[finish line of a track meet](#)
[Heart Inflammation Risk Following mRNA COVID-19 Vaccination Could Be Common](#)
[older man with his walker](#)
[Do COVID-19 Vaccines Wane?](#)
[man researching on laptop](#)
[Your Genetics May Indicate Severe COVID-19](#)
[CDC building in atlanta](#)
[COVID-19 Vaccine Related Fatalities Updated](#)
[two young children looking at the city of london](#)
[The UK Advises Which Young People Should Receive COVID-19 Vaccination](#)
[pharmacist mixing drugs](#)
[Mixing COVID-19 Vaccines Discouraged](#)
[EU FLAG](#)
[European Agency Confirms COVID-19 Vaccine Fatalities](#)
[karate student high in the air, kicking](#)
[U.S. NIH Turbo Charges India's COVID-19 Vaccine](#)
[dna genetic code](#)
[Can Genetics Tackle COVID-19 with Drug Repurposing](#)

[cancer cells](#)
[Variable Antibody Response Found Following mRNA COVID-19 Vaccination](#)
[people wearing masks crossing the road](#)
[U.S. Invests \\$3 Billion to Accelerate Antiviral Medicines](#)
[young boy sneezing into a tissue](#)
[Common Cold Virus May Prevent COVID-19](#)
[three people jumping up in the sun set happy](#)
[Flu Shots and COVID-19 Vaccine Mix Very Well](#)
[vaccine vials lined up ready for shipment](#)
[J&J COVID-19 Vaccines Authorized for Worldwide Deployment](#)
[little girl getting a vaccine](#)
[Immunization Rates Decreased During the COVID-19 Pandemic](#)
[scientist testing different vaccines](#)
[Mixed COVID-19 Vaccine Study Launches](#)
[dentist and patient](#)
[Dental Professionals Need SARS-CoV-2 Virus Protections](#)
[nurse holding syringe with covid-19 vaccine](#)
[China COVID-19 Vaccine Authorized by the WHO](#)

Site Links

- [Contact](#)
- [Terms](#)
- [Privacy](#)
- [About](#)
- [Advisory](#)

Disclaimer

Precision Vax LLC websites do not provide medical advice, diagnosis, treatment, or prescriptions. Read our terms of use for more info.

Copyright ©2021 Precision Vaccinations