The Adaptive Immune System

VS

COVID-19

How different adaptive immune cells fight the novel coronavirus

	T Cells	B Cells
Role in Fighting COVID-19	T cells are the first responders to any infection and signal to B cells to produce antibodies.[1]	B cells produce anti-bodies that attack the virus.[2]
Time from Infection to Appearance	T cells typically appear 3-5 days after a new infection.[3]	It can take 2-3 weeks to develop enough antibodies to be detected in an antibody test.[4]
Persistence	T cells can persist in the body for several months.[5,6]	Antibodies may wane over time.[7]
Testing Method	T cells specific to the virus can be detected and quantified from a small sample of blood— clinical tests are under development.[8]	Using a sample of blood, antibody levels are measured.[9]
What Test Results Mean	A positive test result indicates past infection with the virus.[10]	A positive test result indicates likely past infection with the virus. However, since some people never develop antibodies and antibodies fade over time, past infections can be missed.[8]

T Cell Takeaways

T-cell testing adds a critical dimension to how we measure immunity of an individual or population and has shown to be more sensitive than antibody testing in a real-world setting.[9]

T cells can provide insight into which specific parts of the virus induce an immune response, which could contribute to the next generation of vaccines or therapeutics.[5]

Adaptive biotechnologies™

Copyright © 2020
Adaptive Biotechnologies
Corp. All rights reserved.

[1]Crotty S, et al. A brief history of T cell help to B cells. Nat Rev Immunol. 2015 Mar;15(3):185-9. doi: https://doi.org/10.1038/nri3803.

[2]Yanaba K, et al. B-lymphocyte contributions to human autoimmune disease. Immunol Rev. 2008 Jun;223:284-99. doi: https://doi.org/10.1111/j.1600-065X.2008.00646.x.

[3]Funk C, et al. A Snapshot of the Global Race for Vaccines Targeting SARS-CoV-2 and the COVID-19 Pandemic. Frontiers in Pharmacology, 2020. doi: https://doi.org/10.3389/fphar.2020.00937.

[4]Mayo Clinic – COVID-19 antibody testing. https://www.mayoclinic.org/tests-procedures/covid-19-antibody-testing/about/pac-20489696#:~:text=After%20infection%20with%20the%20COVID,you%20recover%20from%20COVID%2D19%20.

[5]Dan JM, et al. Immunological memory to SARS-CoV-2 assessed for greater than six months after infection. bioRxiv. doi: https://doi.org/10.1101/2020.11.15.383323.

[6]Ziwei L, et al. SARS-CoV-2-specific T cell memory is long-lasting in the majority of convalsecent COVID-19 individuals. bioRxiv. doi: https://doi.org/10.1101/2020.11.15.383463.

[7]Ibarrondo FJ, et al. Rapid Decay of Anti-SARS-Cov-2 Antibodies in Persons with Mild Covid-19, N Engl J Med 2020. doi: https://doi.org/10.1056/NEJMc2025179.

[8]Le Bert N, Tan AT, Kunasegaran K, et al. SARS-CoV-2-specific T cell immunity in cases of COVID-19 and SARS, and uninfected controls. Nature 584, 457–462 (2020). doi: https://doi.org/10.1038/s41586-020-2550-z.

[9]CDC – Interim Guidelines for COVID-19 Antibody testing. https://www.cdc.gov/coronavirus/2019-ncov/lab/resources/antibody-tests-guidelines.html.

[10]Gittelman RM, et al. Diagnosis and Tracking of Past SARS-CoV-2 Infection in a Large Study of Vo', Italy Through T-Cell Receptor Sequencing medRxiv. doi: https://doi.org/10.1101/2020.11.09.20228023.