More Than Antibodies

Our COVID-19 Immune Response Involves More Than Antibody Levels

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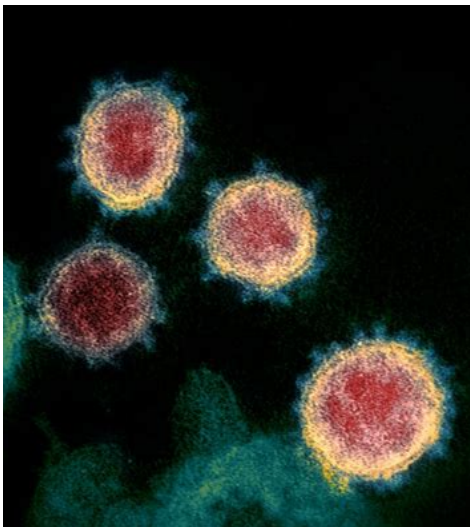
Are antibodies a good measure of immunity?

The human immune system is a complex interplay of many mechanisms, and antibodies are only one part of how we develop immunity to disease.

Our **innate immune system**—Macrophages, Natural Killer Cells, and many other mechanisms—can stop pathogens before disease sets in. This is our first line of defense. If your innate immune system is working well, you may not need to make antibodies to beat an infection. If you do get infected with a virus, the **adaptive immune system** goes into action. B-cells and T-cells work together to create a coordinated response, including antibodies, that can stop the virus from entering cells and destroy infected cells. The adaptive immune system uses the coordination of many parts to fight off a virus, not just antibodies.



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Are antibody levels proof of immunity?

Not necessarily. Once the immediate threat of an initial infection passes, antibody levels typically wane. But our immune system has the ability to remember our experience with pathogens like viruses. On the first exposure to a virus, our adaptive immune system has special cells—called B and T cells—that co-train to develop a targeted antibody response, which leads to recovery. Memory cells are then developed that can recognize the virus the next time around. On the second, or subsequent exposure, these memory cells enable us to quickly make the right antibodies. This response is much faster than during the initial infection. The result is often milder or no illness at all, if you're exposed to the same virus. These memory cells can be effective for years, decades, and even a lifetime. This is how the immune system learns and remembers how to protect us.

The important thing to remember is the antibodies aren't working alone—they're just one part of a complex system.

What about SARS-CoV-2 and the mRNA shots?

When we recover from an infection of the SARS-CoV-2 virus, we develop long-lasting, multi-protein specific immunity. Naturally acquired immunity can recognize many proteins common to virus variants. By contrast, the mRNA shots currently being used are targeted against just one part of the virus, the spike protein; further, this leads to antibodies specific to the spike protein of the original Wuhan virus, which is now virtually extinct. The spike protein is also one of the parts of the virus most likely to mutate. Boosters don't change this: antibodies after boosting continue to target the spike protein from the extinct virus, and may not neutralize mutant variants. It doesn't matter how many boosters you get, or how high or low antibody levels are, if the wrong protein is targeted.

Expecting everyone to repeatedly take a shot that does not prevent infection, does not prevent transmission, and does not prevent COVID-19 (the disease), goes against basic vaccine science.

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Take Away: Antibodies don't tell the full story of immunity and mislead the public on vaccine versus natural immunity

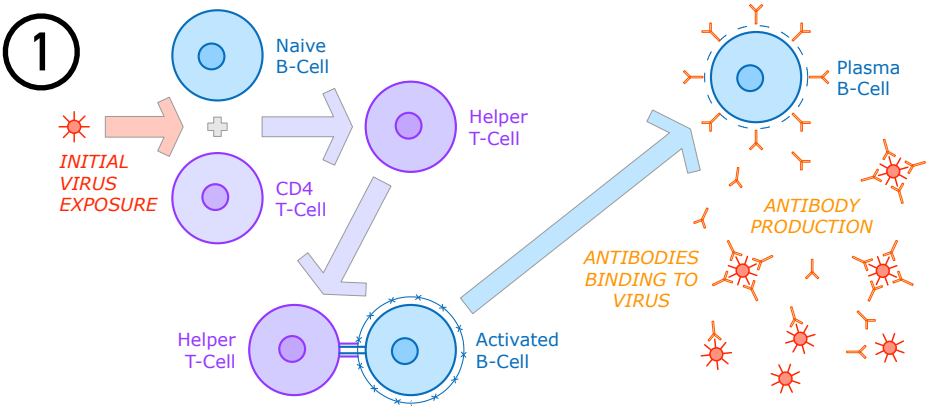
The Adaptive Immune System Response

Development of immunity to viruses involves two systems: the innate immune system, and the adaptive immune system. The innate immune system provides a general level of protection while the adaptive immune system targets the virus specifically.

Adaptive immunity targets specific parts of the virus and develops a memory of it. Two types of specialized cells play an essential role in adaptive immune memory: B cells and T cells. B cells are made in the bone marrow, T cells come from the Thymus. B cells make antibodies, which can either bind to the virus to neutralize it, or mark it for destruction. Killer T cells attack and kill marked infected cells.

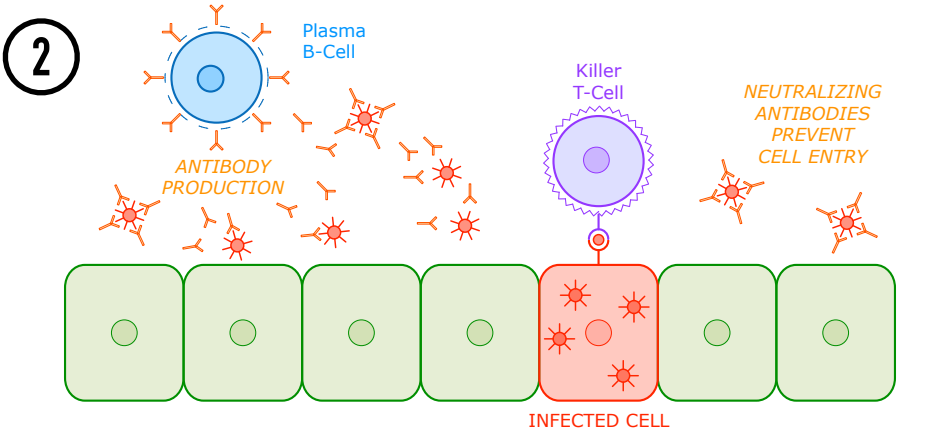
Step 1: Identify the Pathogen

B cells have special receptors that can recognize things that should not be in our bodies. When we are first exposed to bacteria, fungi, parasites or viruses, our body develops a specialized B cell that can recognize specific proteins from the invaders. These B cells can become activated by the virus and become a Plasma B cell, which can produce large amounts of antibodies, which are matched to the virus.



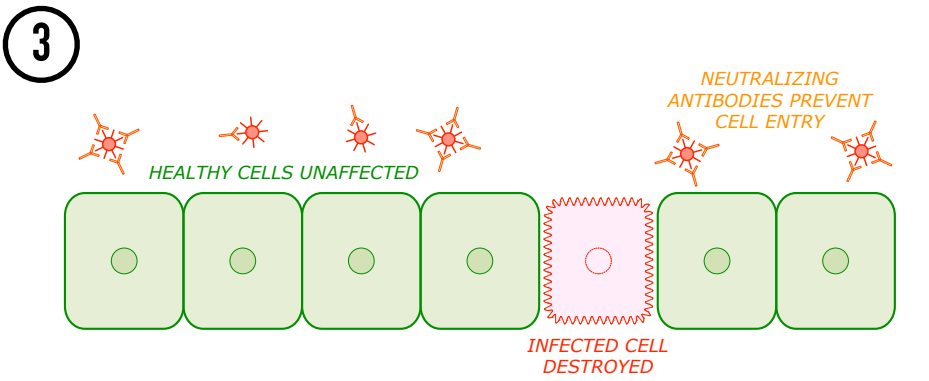
Step 2: Go on the Hunt

Once the antibodies are released, they hunt for their target. Antibodies are special Y-shaped proteins that can lock onto the virus as it tries to enter the cell, neutralizing it, or marking it for destruction. There are five different kinds of antibodies that operate in different areas of the body.



Step 3: Neutralize the Threat

B cells and antibodies hunt down the threat, but they rely on killer T cells to eliminate infected cells. Antibodies can bind to viruses to prevent them from entering cells, neutralizing them, but they aren't capable of destroying infected cells.



Step 4: Keep it in Memory

Some B cells, instead of becoming Plasma B cells (which make antibodies), become Memory B cells. These cells remember how to make the correct antibodies and live a long time and allow the body to respond quickly if the virus shows up again. When the virus invades again, Memory B and Memory T cells work together to rapidly destroy the virus, often before a full-blown infection can occur.