

Snapshot: Immunity and COVID-19 Vaccines

Back to Basics

Immunity is the body's ability to protect itself against infections.

The **immune system** is designed to identify disease-causing substances, such as bacteria and viruses, and get rid of them.

How the Immune System Works

The immune system is a large network of organs, white blood cells, proteins, and chemicals. It can tell which cells are yours and which are not, and when foreign substances are detected, the immune system attacks and kills them. It also remembers the germs you've been exposed to and builds antibodies to protect you from them in the future.

Types of Immunity

- Active – exposure to disease triggers immune system to produce antibodies
 - Natural: acquired from exposure to the actual disease
 - Vaccine-induced: acquired through introduction of killed, weakened, or engineered form of the disease organism through vaccination
- Passive – occurs when a person is given antibodies to a disease rather than produce them through his/her own immune system

SARS-CoV-2 and COVID-19 Infection

The SARS-CoV2 virus can invade cells, produce proteins and cause COVID-19 infection throughout the body, especially in the lungs. As with other infections, the immune system responds by recognizing the proteins as a foreign substance and producing antibodies to fight against them. In addition to killing off the virus, the antibodies may also offer protection from reinfection for a brief time.

Facts

- ✓ A person can be infected with COVID-19 more than once
- ✓ Natural immunity from COVID-19 infection is not guaranteed
- ✓ COVID-19 has killed more than 1M people in the U.S. and 6M people worldwide (July 2022)

COVID-19, long-term immunity and vaccines

Vaccines train your immune system using a harmless form of the virus.

The **vaccine** activates your **adaptive immune response**.

The adaptive immune response involves:

- **B cells** that make highly specific **antibodies** to stop the virus getting into your cells.
- **T cells** that can help stimulate the B cells and kill any infected cells.

These cells remember the virus and remain in the body. This is **immune memory**.

If you encounter the real virus in the future, your immune system responds faster and more effectively to prevent infection. This is **long-term immunity**.

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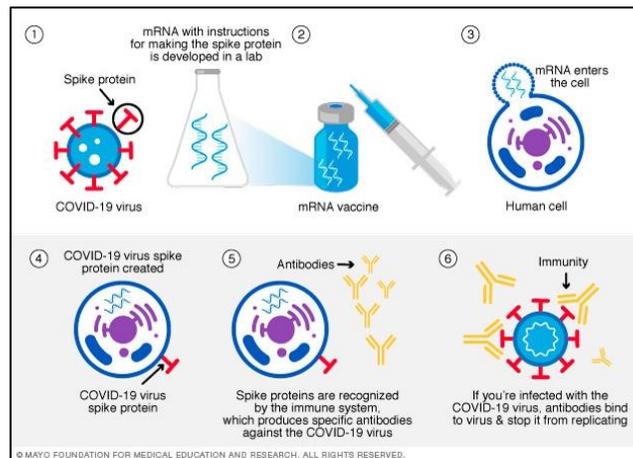
An effective COVID-19 vaccine will produce a strong, long-term, adaptive immune response. It might stimulate B cells and specific antibodies or T cells or a combination of both.

The COVID-19 Vaccines

The [Centers for Disease Control and Prevention](#) (CDC) recommends COVID-19 primary series vaccines for everyone ages 6 months and older, and COVID-19 boosters for everyone ages 5 years and older, if eligible. Some people may be eligible for [additional boosters](#).

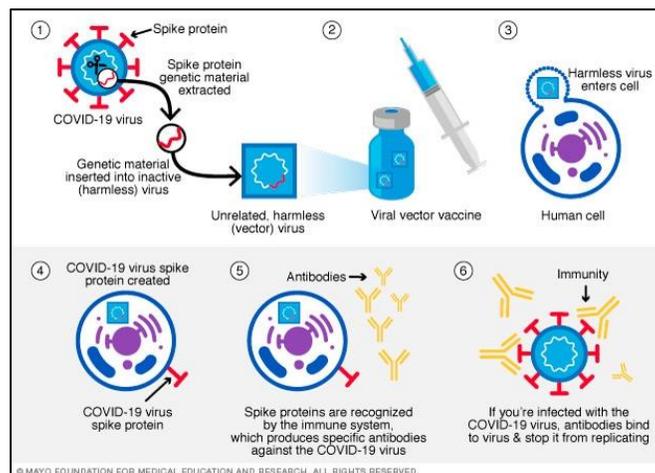
mRNA Vaccines (Pfizer-BioNTech, Moderna)

Messenger RNA (mRNA) vaccines use genetic material created in a laboratory to teach our cells how to make a protein, or piece of protein, that will trigger an immune response inside our bodies. Once the immune system is activated it will begin producing antibodies, which protect us from getting infected in the future if we are exposed to the real virus.



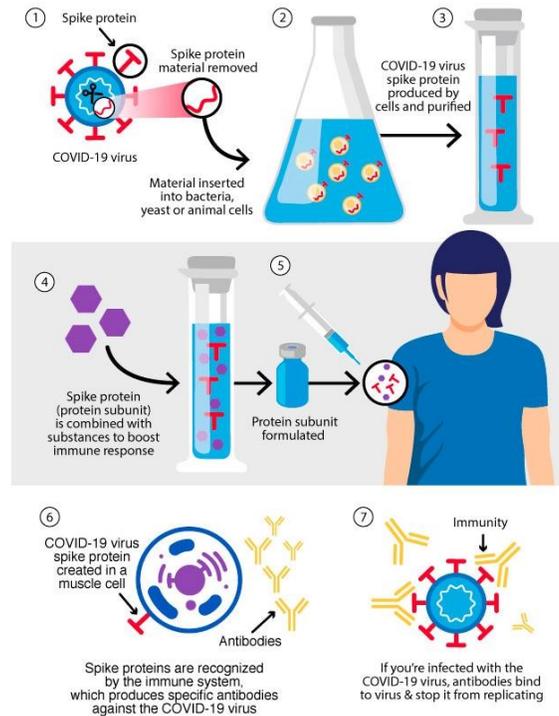
Vector Vaccines (Johnson & Johnson/Janssen)

The vector vaccine uses a modified version of a different virus (which is harmless) to deliver genetic material from the COVID-19 virus into the body. When injected, the body does not recognize it and the immune response is triggered to begin producing antibodies. The body fights off the invasion of foreign cells from the vaccine just as it would if it were a real viral infection.



Protein Subunit Vaccines (Novavax)

The protein subunit vaccine includes harmless pieces (proteins) of the virus that causes COVID-19 instead of the entire germ. Once vaccinated, our bodies recognize that the protein should not be there and build antibodies that will remember how to fight the virus that causes COVID-19 if we are infected in the future.



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