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Different types of COVID-19 vaccines: How they work

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Different types of COVID-19 vaccines: How they work

Curious about how mRNA vaccines and other types of COVID-19 vaccines can help you develop immunity to the COVID-19 virus? Understand how different technologies work with the immune system to provide protection.

[By Mayo Clinic Staff](#)

A coronavirus disease 2019 (COVID-19) vaccine can prevent you from getting COVID-19 or from becoming seriously ill or dying due to COVID-19. But how do the different types of COVID-19 vaccines work?

Each COVID-19 vaccine causes the immune system to create antibodies to fight COVID-19. COVID-19 vaccines use a harmless version of a spikelike structure on the surface of the COVID-19 virus called an S protein.

The main types of COVID-19 vaccines currently available in the U.S. or being studied include:

- Messenger RNA (mRNA) vaccine.** This type of vaccine uses genetically engineered mRNA to give your cells instructions for how to make the S protein found on the surface of the COVID-19 virus. After vaccination, your muscle cells begin making the S protein pieces and displaying them on cell surfaces. This causes your body to create antibodies. If you later become infected with the COVID-19 virus, these antibodies will fight the virus.

After delivering instructions, the mRNA is immediately broken down. It never enters the nucleus of your cells, where your DNA is kept. Both the Pfizer-BioNTech and the Moderna COVID-19 vaccines use mRNA.

- Vector vaccine.** In this type of vaccine, genetic material from the COVID-19 virus is placed in a modified version of a different virus (viral vector). When the viral vector gets into

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your cells, it delivers genetic material from the COVID-19 virus that gives your cells instructions to make copies of the S protein. Once your cells display the S proteins on their surfaces, your immune system responds by creating antibodies and defensive white blood cells. If you later become infected with the COVID-19 virus, the antibodies will fight the virus.

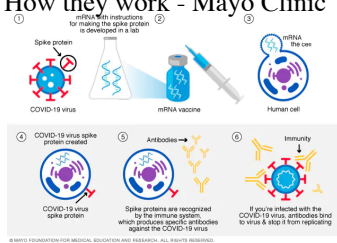
Viral vector vaccines can't cause you to become infected with the COVID-19 virus or the viral vector virus. Also, the genetic material that's delivered doesn't become part of your DNA. The Janssen/Johnson & Johnson COVID-19 vaccine is a vector vaccine. AstraZeneca and the University of Oxford also have a vector COVID-19 vaccine.

• **Protein subunit vaccine.**

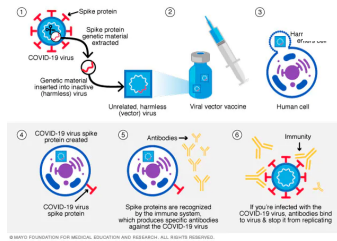
Subunit vaccines include only the parts of a virus that best stimulate your immune system. This type of COVID-19 vaccine contains harmless S proteins. Once your immune system recognizes the S proteins, it creates antibodies and defensive white blood cells. If you later become infected with the COVID-19 virus, the antibodies will fight the virus.

Novavax is working on a protein subunit COVID-19 vaccine.

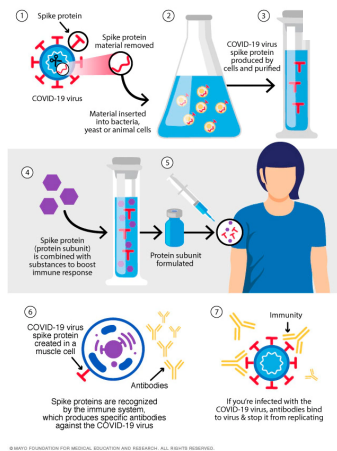
The U.S. Food and Drug Administration (FDA) has approved the Pfizer-BioNTech COVID-19 vaccine, now called Comirnaty, to prevent COVID-19 in people age 16 and older. The vaccine is under an emergency use authorization for children age 6 months through age 15. The FDA has also approved the Moderna vaccine, now called Spikevax, to prevent COVID-19 in people age 18 and older. The FDA has given emergency use authorization to Moderna COVID-19 vaccines for age 6 months to age 17. The FDA has also given emergency use authorization to the Janssen/Johnson & Johnson COVID-19 vaccine for certain people age 18 and older.



mRNA vaccine



Viral vector vaccine



Protein subunit vaccine

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