

Understanding mRNA COVID-19 Vaccines

The Pfizer-BioNTech and Moderna COVID-19 vaccines are messenger RNA vaccines also called mRNA vaccines. mRNA vaccines are some of the first COVID-19 vaccines authorized and approved for use in the United States.

What You Need to Know

- Messenger RNA (mRNA) vaccines teach our cells how to make a protein that will trigger an immune response inside our bodies.
- Like all vaccines, mRNA vaccines benefit people who get vaccinated by giving them protection against diseases like COVID-19 without risking the potentially serious consequences of getting sick.
- mRNA vaccines are newly available to the public. However, researchers have been studying and working with mRNA vaccines for decades.
- CDC recommends that people who are starting their vaccine series or getting a booster dose get either Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines). The mRNA vaccines are preferred over Johnson & Johnson's Janssen COVID-19 vaccine in most circumstances, but the J&J/Janssen COVID-19 vaccine may be considered in some situations.
- The same COVID-19 mRNA vaccine product should be used for both doses of a two-dose primary series and for an additional primary dose, if needed. However, for a booster dose, the booster dose product does not need to match the product used for the primary series.

How mRNA Vaccines Work

To trigger an immune response, many vaccines put a weakened or inactivated germ into our bodies. Not mRNA vaccines. Instead, mRNA vaccines use mRNA created in a laboratory to teach our cells how to make a protein—or even just a piece of a protein—that triggers an immune response inside our bodies. That immune response, which produces antibodies, is what protects us from getting infected if the real virus enters our bodies.

1. First, COVID-19 mRNA vaccines are given in the upper arm muscle. The mRNA will enter the muscle cells and instruct the cells' machinery to produce a harmless piece of what is called the spike protein. The spike protein is found on the surface of the virus that causes COVID-19. After the protein piece is made, our cells break down the mRNA and remove it.
2. Next, our cells display the spike protein piece on their surface. Our immune system recognizes that the protein doesn't belong there. This triggers our immune system to produce antibodies and activate other immune cells to fight off what it thinks is an infection. This is what your body might do to fight off the infection if you got sick with COVID-19.
3. At the end of the process, our bodies have learned how to protect against future infection from the virus that causes COVID-19. The benefit of COVID-19 mRNA vaccines, like all vaccines, is that those vaccinated gain this protection without ever having to risk the potentially serious consequences of getting sick with COVID-19. Any temporary discomfort experienced after getting the vaccine is a natural part of the process and an indication that the vaccine is working.

Facts About COVID-19 mRNA Vaccines

- mRNA vaccines do not use the live virus that causes COVID-19 and cannot cause infection with the virus that causes COVID-19 or other viruses.
- They do not affect or interact with our DNA in any way. mRNA never enters the nucleus of the cell where our DNA (genetic material) is located, so it cannot change or influence our genes.
- The mRNA and the spike protein don't last long in the body.
- Our cells break down mRNA and get rid of it within a few days after vaccination. Scientists estimate that the spike protein, like other proteins our bodies create, may stay in the body up to a few weeks. COVID-19 mRNA vaccines cannot give someone the virus that causes COVID-19 or other viruses.