

How Do mRNA Vaccines Work?



The goal of any vaccine is to help your body fight something harmful—like a virus—by training your immune system to recognize it and prepare tools (like antibodies) in advance. The mRNA vaccine helps the body build immunity to a virus without using any live virus.

These vaccines work by giving the body messenger RNA (mRNA) which is a short genetic instruction that tells your cells how to make a harmless piece of the virus like the spike protein from COVID-19. Once your immune system sees this protein, it starts building defenses, like antibodies, to fight the actual virus if you're exposed to it later.

You might feel mild symptoms like a fever, headache, or chills—this is normal and simply means your immune system is getting to work.

Let's look at mRNA vaccines another way

Think of it like practicing a recipe before a big family dinner.

If you're planning to host Thanksgiving but have never baked a pie, you might do a trial run—gather the ingredients, follow the steps, and bake it once to make sure it turns out right. Then, when the big day comes, you're ready. You've already practiced, and while the practice may not be perfect, the final pie is more likely to be a success.

mRNA vaccines work similarly. They help your body “practice” fighting the virus by providing instructions so if you're exposed to the actual virus, your immune system is ready. It remembers what it learned during practice and starts fighting right away using the antibodies it already built.

Just like baking a pie still takes effort on the big day, fighting off a virus still takes work and you may experience a few symptoms like fever, headache or chills. But because your immune system is prepared, you're more likely to have a better outcome.

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FAQs

1. What exactly is mRNA?

mRNA stands for “messengers RNA.” It is a type of natural molecule that gives your cells instructions to make proteins. For the vaccine, mRNA tells your body how to make a harmless piece of a virus so your immune system can recognize and fight it later.

2. Does the mRNA vaccine affect my DNA?

No, mRNA never enters the part of the cell where your DNA lives. It doesn't affect your genes or change your body in any permanent way.

3. Does the mRNA from the vaccine stay in my body permanently?

No, after your cells use the instructions to make the protein, the mRNA breaks down quickly, and your body gets rid of it.

4. Can the vaccine give me the disease?

No, mRNA vaccines do not contain any live virus, so they cannot give you the disease they are meant to protect against.

5. Why do I feel sick after getting a shot?

You might feel tired, have a headache, fever, or chills. These are normal signs that your immune system is responding and building protection.

6. Is the vaccine safe in the long term?

Yes. mRNA vaccines have been tested in large studies and are closely monitored for safety. Scientists have been studying this type of vaccine for decades before it was used during the COVID-19 pandemic.

7. How long does the protection last?

Protection may decrease over time, and viruses can change. That is why boosters are sometimes recommended to keep your immune system ready.

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8. How are mRNA vaccines different than traditional vaccines?

Traditional vaccines such as MMR, influenza or shingles use a weakened, killed or a partial virus to create an immune response (antibodies). mRNA vaccines use instructions to make a harmless piece of the virus (a protein) to create an immune response (antibodies).

9. Who can get an mRNA vaccine?

Most people can safely get mRNA vaccines, including people who are pregnant, but if you have specific health concerns it's best to talk with your health care provider and use shared decision making.