

[HOME COVID-19](#)

## COVID-19

[COVID-19 Home](#)

# Overview of COVID-19 Vaccines

Updated Oct. 16, 2023

### What You Need to Know

- Vaccine recommendations are based on age, time since last dose, and in some cases, the first vaccine received.
- People who are [moderately or severely immunocompromised](#) have specific recommendations for COVID-19 vaccines.
- Side effects after a COVID-19 vaccine are common, however [severe allergic reactions](#) after getting a COVID-19 vaccine are **rare**.

## Types of COVID-19 Vaccines Available

[Authorized or licensed](#) by the U.S. Food and Drug Administration (FDA) currently include:

- Pfizer-BioNTech and Moderna COVID-19 vaccines which are mRNA vaccines.
- Novavax COVID-19 vaccine which is a protein subunit vaccine.
- J&J/Janssen COVID-19 vaccine, a viral vector vaccine has expired and is [no longer available for use in the United States](#) [↗](#) as



of May 6, 2023.

These vaccines are given as a shot in the muscle of the upper arm or in the thigh of a young child. COVID-19 vaccine ingredients are considered safe for most people. Nearly all of the ingredients in COVID-19 vaccines are ingredients found in many foods—fats, sugar, and salts. **None of the COVID-19 vaccines affect or interact with our DNA** and the following are **not** included in the vaccines:

- **No preservatives** such as thimerosal or mercury or any other preservatives.
- **No antibiotics** such as sulfonamide or any other antibiotics.
- **No medicines or therapeutics** such as ivermectin or any other medications.
- **No tissues** such as aborted fetal cells, gelatin, or any materials from any animal.
- **No food proteins** such as eggs or egg products, gluten, peanuts, tree nuts, nut products, or any nut byproducts. (COVID-19 vaccines are not manufactured in facilities that produce food products).
- **No metals** such as iron, nickel, cobalt, titanium, or rare earth alloys. They also do not have any manufactured products like microelectronics, electrodes, carbon nanotubes or other nanostructures, or nanowire semiconductors.
- **No latex.** The vial stoppers used to hold the vaccine also do not contain latex.

After the body produces an immune response, it discards all of the vaccine ingredients, just as it would discard any substance that cells no longer need. This process is a part of normal body functioning.

**Dosage:** [COVID-19 vaccine dose amounts](#) can vary depending on the type of vaccine being given, or due to the recipient's age.



COVID-19 vaccine doses and timing are different for people who are moderately or severely immunocompromised.

[Vaccines for Immunocompromised](#)

## Pfizer-BioNTech and Moderna mRNA COVID-19 vaccines

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. The mRNA from the vaccines is broken down within a few days after vaccination and discarded from the body.

Pfizer-BioNTech



## Vaccine Schedule

Learn about the recommended timing for Pfizer-BioNTech updated COVID-19 vaccines for people:

Children Aged 6 Months—4 Years

Everyone Aged 5 Years and Older

## Ingredients in Vaccine Formula for Children

The Pfizer-BioNTech COVID-19 vaccine for children ages 6 months–11 years contains only the following ingredients:

Type	Ingredient	Purpose
Messenger ribonucleic acid (mRNA)	<ul style="list-style-type: none"> <li>Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2</li> </ul>	Provides instructions the body uses to build a harmless piece of a protein from the virus that causes COVID-19. This protein causes an immune response that helps protect the body from getting sick with COVID-19 in the future.
Lipids (fats)	<ul style="list-style-type: none"> <li>2[(polyethylene glycol (PEG))-2000]-N,N-ditetradecylacetamide</li> <li>1,2-distearoyl-sn-glycero-3-phosphocholine</li> <li>Cholesterol</li> <li>((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate)</li> </ul>	Work together to help the mRNA enter cells.
Sugar and acid stabilizers	<ul style="list-style-type: none"> <li>Sucrose (table sugar)</li> <li>Tromethamine</li> <li>Tromethamine hydrochloride</li> </ul>	Work together to help keep the vaccine molecules stable while the vaccine is manufactured, frozen, shipped, and stored until it is ready to be given to a vaccine recipient.

## Ingredients in Vaccine Formula for Teens and Adults

The Pfizer-BioNTech COVID-19 vaccine for teens and adults ages 12 years and older contains only the following ingredients:

Type	Ingredient	Purpose
Messenger ribonucleic acid (mRNA)	<ul style="list-style-type: none"> <li>Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2</li> </ul>	Provides instructions the body uses to build a harmless piece of a protein from the virus that causes COVID-19. This protein causes an immune response that helps protect the body from getting sick with COVID-19 in the future.
Lipids (fats)	<ul style="list-style-type: none"> <li>2[(polyethylene glycol (PEG))-2000]-N,N-ditetradecylacetamide</li> <li>1,2-distearoyl-sn-glycero-3-phosphocholine</li> <li>Cholesterol</li> <li>((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate)</li> </ul>	Work together to help the mRNA enter cells.
Sugar and acid stabilizers	<ul style="list-style-type: none"> <li>Sucrose (table sugar)</li> <li>Tromethamine</li> <li>Tromethamine hydrochloride</li> </ul>	Work together to help keep the vaccine in good condition (molecules remain stable) while the vaccine is manufactured, frozen, shipped, and stored until it is ready to be given to a vaccine recipient.

## Resources


Fact sheets for recipients and caregivers-Ingredients, how vaccine is administered, and other details from the FDA:

- [Pfizer Recipient Fact Sheet](#) 

Other clinical information:

- [Pfizer-BioNTech COVID-19 Vaccine Product Information](#)

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Moderna 

### Vaccine Schedule

Learn about the recommended timing for Moderna updated COVID-19 vaccines for people:

Children Aged 6 Months—4 Years

Everyone Aged 5 Years and Older

### Ingredients

The Moderna COVID-19 vaccine for everyone ages 6 months and older contains only the following ingredients:

Type	Ingredient	Purpose
Messenger ribonucleic acid (mRNA)	<ul style="list-style-type: none"> <li>Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2</li> </ul>	Provides instructions the body uses to build a harmless piece of a protein from the virus that causes COVID-19. This protein causes an immune response that helps protect the body from getting sick with COVID-19 in the future.

## Novavax protein subunit COVID-19 vaccine

Lipids (fats) and proteins are the spike protein. The Novavax COVID-19 vaccine contains another ingredient called an adjuvant. It helps the immune system respond to that spike protein. After learning how to respond to the spike protein, the immune system will be able to respond quickly to the actual virus spike protein and protect you against COVID-19.

Novavax ^

**Vaccine Schedule**

Learn about the recommended timing between the Novavax COVID-19 vaccines and boosters for people:

12 Years and Older	<ul style="list-style-type: none"> <li>Sodium acetate</li> <li>Sucrose (basic table sugar)</li> <li>Tromethamine</li> <li>Tromethamine hydrochloride</li> </ul>	Work together to help keep the vaccine in good condition (molecules remain stable) while the vaccine is manufactured, frozen, shipped, and stored until it is ready to be given to a
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Type	Ingredient	Purpose
Protein	<ul style="list-style-type: none"> <li>household vinegar)</li> <li>SARS-CoV-2 recombinant spike protein</li> </ul>	Causes an immune response that helps protect the body from getting sick with COVID-19 in the future.

**Resources**


Fact sheets for recipients and caregivers- Ingredients, and other details from the FDA:

Lipids (fats)	<ul style="list-style-type: none"> <li>Cholesterol</li> <li>Phosphatidylcholine</li> </ul>	Work together to help the recombinant spike protein enter cells.
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Other clinical information:

- [Moderna COVID-19 Vaccine Product Information](#)

Adjuvant	<ul style="list-style-type: none"> <li>Fraction-A and Fraction-C of <i>Quillaja saponaria</i> Molina extract</li> </ul>	Facilitates activation of the cells of the innate immune system.
Salts, sugar, and acid	<ul style="list-style-type: none"> <li>Disodium hydrogen phosphate heptahydrate</li> <li>Disodium hydrogen phosphate dihydrate</li> <li>Polysorbate-80</li> <li>Potassium chloride (common food salt)</li> <li>Potassium dihydrogen phosphate (common food salt)</li> <li>Sodium chloride (basic table salt)</li> <li>Sodium dihydrogen phosphate monohydrate</li> <li>Sodium hydroxide or hydrochloric acid</li> </ul>	Work together to help keep the vaccine molecules stable while the vaccine is manufactured, shipped, and stored until it is ready to be given to a vaccine recipient.


The vaccine may also contain very small amounts of ingredients from the manufacturing stage, which can be found in the [EUA Fact Sheet](#) .

## Resources

Factsheet for recipients- Ingredients, how vaccine is administered, and other details from the FDA:

- [Novavax Patients Fact Sheet](#) 


Other clinical information:

- [Novavax COVID-19 Vaccine Product Information](#)
- [Novavax COVID-19 Vaccine Fact Sheet for Healthcare Providers \[1 MB, 26 pages\]](#) 

## Johnson & Johnson's Janssen (J&J/Janssen) viral vector



# COVID-19 vaccine

[J&J/Janssen COVID-19 vaccine](#)  has expired and is no longer available for use in the United States as of May 6, 2023.

Viral vector vaccines use a harmless, modified version of a different virus (a vector virus), and not the virus that causes COVID-19. The vector virus delivers important instructions to our cells on how to recognize and fight the virus that causes COVID-19.

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J&J/Janssen



## Ingredients

The J&J/Janssen COVID-19 vaccine contains only the following ingredients:

Type	Ingredient	Purpose
A harmless version of a virus unrelated to the COVID-19 virus	<ul style="list-style-type: none"> <li>Recombinant, replication-incompetent Ad26 vector, encoding a stabilized variant of the SARS-CoV-2 Spike (S) protein</li> </ul>	Provides instructions the body uses to build a harmless piece of a protein from the virus that causes COVID-19. This protein causes an immune response that helps protect the body from getting sick with COVID-19 in the future.

## How Well COVID-19 Vaccines Work

- People who are up to date have a lower risk of severe illness, hospitalization and death from COVID-19 than people who are unvaccinated or who have not completed the doses recommended for them by CDC.
- Additional updated COVID-19 vaccine doses can help restore protection that has decreased since previous vaccination.
- CDC will continue to provide updates as we learn more.

## Safety of COVID-19 Vaccines

COVID-19 vaccines have undergone—and will continue to undergo—the most intensive safety monitoring in U.S. history. Evidence from the hundreds of millions of COVID-19 vaccines already administered globally, and other data from the FDA, demonstrate that the vaccines are **safe and effective**.

### Side Effects

- [Janssen COVID-19 Vaccine EUA Fact Sheet for Recipients and Caregivers](#)
- [Janssen COVID-19 Vaccine EUA Fact Sheet for Healthcare Providers](#)
- Side effects that happen within 7 days of getting vaccinated are common but are mostly mild. Sometimes they may affect a person's ability to do daily activities.
- Side effects throughout the body (such as fever, chills, tiredness, and headache) are more common after the second dose of a Pfizer-BioNTech, Moderna, or Novavax COVID-19 vaccine.

### Adverse Events

- Severe allergic reactions to vaccines are rare but can happen.
- There is a rare risk of **myocarditis and pericarditis** associated with mRNA COVID-19 vaccination, mostly among males ages 12–39 years. The rare risk may be further reduced with a longer interval between the first and second dose.
- Cases of myocarditis and pericarditis have also been reported in people who received Novavax COVID-19 vaccine.

- There was a potential cause-and-effect relationship between the J&J/Janssen COVID-19 vaccine and a rare and serious adverse event. It was blood clots with low platelets ([thrombosis with thrombocytopenia syndrome, or TTS](#)). TTS occurred at a rate of about 4 cases per million J&J/Janssen doses and resulted in a small number of deaths. The J&J/Janssen COVID-19 vaccine is no longer available in the U.S.

Learn more about vaccine safety monitoring after a vaccine is authorized or approved for use.

## If You Are Allergic to an Ingredient in a COVID-19 Vaccine or Had a Previous Severe Allergic Reaction

- If in the past you have had a severe allergic reaction to an ingredient in an COVID-19 vaccine or if you have a known allergy to an ingredient in a COVID-19 vaccine, **you should not get that COVID-19 vaccine**. Examples:
  - If you are allergic to polyethylene glycol (PEG), you should **not** get Pfizer-BioNTech or Moderna COVID-19 vaccines.
  - If you are allergic to polysorbate, you should **not** get Novavax COVID-19 vaccines.
- If you aren't able to get one type of COVID-19 vaccine, talk to your doctor about your options for getting **a different type of COVID-19 vaccine**.



## Learn About Getting Your Vaccine

- Do you need to wait to get vaccinated after getting COVID-19 or getting treatment for COVID-19?
- How can you prepare for vaccination?
- What can you expect during and after your vaccination?

[Getting Your COVID-19 Vaccine](#)

## Resources

### Related Pages

- › [Possible Side Effects](#)
- › [Safety of COVID-19 Vaccines](#)
- › [Benefits of Getting Vaccinated](#)



### For Healthcare Workers

[U.S. COVID-19 Vaccine Product Information](#)

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Source: [National Center for Immunization and Respiratory Diseases \(NCIRD\)](#), Division of Viral Diseases