

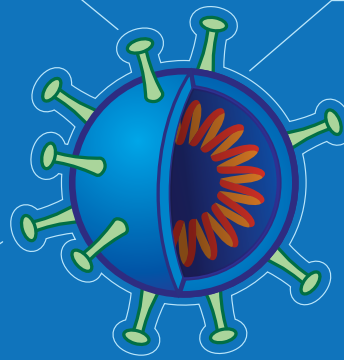
# Vaccines

## Defense Against Disease

Museum of Science.



A vaccine prepares your immune system to defend your body from a disease-causing agent. When you get a vaccine, your body is introduced to either parts or modified parts of the disease-causing agent. Next time your immune system sees that agent, it can respond quickly before serious disease occurs.



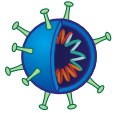
Vaccines were developed to prevent diseases. Because COVID-19 is a new disease, our immune systems have not seen it before, so it requires a new vaccine. **Explore the chart below to learn about different types of vaccines and which types are being developed for COVID-19.**

Viruses are made of genetic code (DNA or RNA) surrounded by a shell of proteins that trigger an immune response in the body. This response takes time, which means the virus can spread and grow in the body and cause disease.



### Types of Vaccines

#### Live Attenuated



#### Description

A disease-causing virus or bacteria, in modified or weakened form

#### Examples

- Smallpox
- Tuberculosis
- MMRV

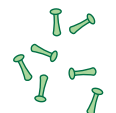
#### Inactivated (Killed)



A killed version of the disease-causing virus or bacteria

- Yearly influenza
- Polio

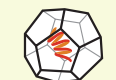
#### Recombinant Protein



Lab-produced proteins from a virus or bacteria that trigger an immune response

- HPV
- Pertussis

#### RNA



A packaged RNA strand that has instructions for your body to produce virus-specific proteins that trigger an immune response

- COVID-19 (approved: Pfizer, Moderna)

#### Viral Vector



A DNA strand that has instructions for your body to produce virus-specific proteins, packaged in a different, weakened delivery virus

- Ebola
- COVID-19 (in development: Johnson & Johnson and AstraZeneca)

### Benefits

Triggers strong immune response  
Can provide life-long protection

Stable in standard refrigeration storage

Quick development process  
Stable in standard refrigeration storage, easy to distribute

Quick development process  
Triggers a strong immune response

Strong immune response

### Limitation

- May cause mild symptoms
- Not recommended for the immunocompromised
- Requires colder storage, harder to distribute

- Triggers a less strong immune response, multiple doses needed

- Immune response varies
- Can be strong initially, may decrease over time

- Long-term immune response still being tested
- May require colder storage, harder to distribute

- Vaccine effectiveness could vary due to prior immunity to the delivery virus

