

## What Do You Know About Viruses?

### Some Germs Are Viruses

Any organism or particle that can get inside of you and make you sick is an **infectious agent**. Some, but not all, bacteria are infectious agents. A virus is another example of an infectious agent. Like bacteria, they are microbes. They cannot be seen by the unaided human eye. However, in many ways viruses are different from bacteria. Viruses are much smaller than bacteria. They cause different illnesses. They work differently. The illnesses caused by viruses are treated differently. You may have taken an antibiotic to treat an ear infection or strep throat. Antibiotics kill bacteria. Antibiotics don't kill viruses. Viruses, although very small, cause a lot of changes in your body. They can also affect other animals and plants.

**infectious agent:** something that can get inside your body, multiply, and cause disease.

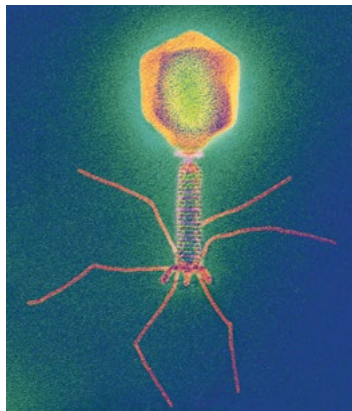
**host:** an organism (animal or plant) that harbors (provides food and a place to stay) for another organism, such as a virus.

### What Are Viruses?

Viruses are particles that can cause many different types of diseases in plants and animals. Unlike bacteria, viruses cannot survive on their own. They need a **host** to survive. Viruses can only reproduce inside cells. Each virus has a way to reproduce once it is inside an organism's cell.

Viruses cause many different diseases. Some, like the cold virus, make you uncomfortable. Others, like the polio virus, can stop your body from working as it should.

There are many different types of viruses. Some viruses are able to infect only certain types of plants and animals. Some viruses infect only plants, others infect only animals, and still others infect only bacteria. For example, the bacteriophage infects bacteria. The feline immunodeficiency virus infects only cats.



Viruses have many different shapes.

**droplet**

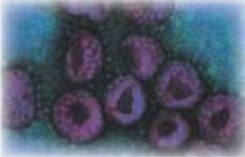
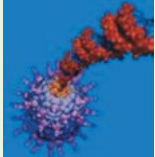
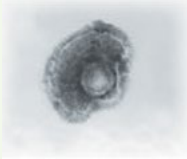
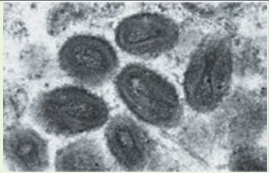
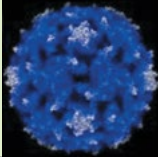
**transmission:**

a way that an infectious disease can be transmitted. Droplets containing an infectious agent (bacteria or viruses) are released into the air when an infected person sneezes, coughs, talks, or exhales. They then come into contact with another person's eye, nose, or mouth.

Because of the number of viruses and the ways they can change over time, it is difficult to treat illnesses caused by viruses (viral illnesses).

Treatment for illnesses caused by viruses depends on the illness. Some diseases, like the common cold and the flu, are hard to treat and impossible to cure. Viruses are very hard to remove from your body. You might take “cold medicine.” The medicine will make you *feel* better. It may relieve symptoms like a headache, stuffy nose, runny nose, or cough. However, cold medicine does not actually heal you. For colds and most viral illnesses, you just have to wait until the virus dies out. For a cold, this usually takes about seven days. This table gives you information about some common viral illnesses.

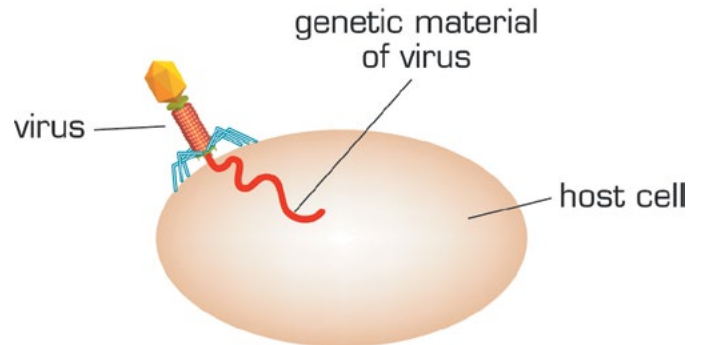
Viruses and bacteria are easily moved from one person to another. Washing your hands carefully, and covering sneezes and coughs are two very easy and very important ways to stop their spread. Many viruses infect other people by **droplet transmission**.

| Disease                           | Caused by and spread by  | Effect on body  | Cure or not?   | Picture   |
|-----------------------------------|--|---|--|---|
| influenza (also called “the flu”) | caused by: influenza virus spread by: person to person in droplets of coughs and sneezes, droplet spread | discomfort, high fever, can lead to other diseases              | no cure, treat the symptoms to make more comfortable; yearly immunization for prevention               |  |
| common cold                       | caused by: rhinovirus, adenovirus spread by: droplet spread  | discomfort but not as much as the flu, can cause other diseases | no cure  |  |
| chickenpox                        | caused by: varicella virus spread by: droplet spread   | scratchy itchy spots on body, fever, headache                   | no cure, immunization for prevention; becoming less common because of recent immunization requirements |  |
| smallpox                          | caused by: variola virus spread by: saliva droplet spread or direct contact with sores                   | small itchy spots, high fever, death                            | no cure, immunization for prevention; almost eradicated from the planet                                |  |
| polio                             | caused by: poliomyelitis virus spread by: feces, hand to mouth   | minor to severe muscle weakness and paralysis                   | no cure, immunization for prevention, almost eradicated from the planet                                |  |

## Are Viruses Alive?

What makes something alive? Viruses reproduce, use energy, and grow, but they can only do this inside another cell.

To reproduce, a virus attaches itself to the cell membrane of a host cell. It then either injects (inserts) its genetic material into the host cell or it enters the host cell. The genetic material contains all the information required to make new viruses. Inside the cell, the genetic material causes the host cell to produce the necessary components to make new viruses. The components made



by the host cell then assemble to make new viruses. The new viruses are released from the host cell. The exact way that the new viruses are made and released varies from virus to virus. However, they all follow this sequence. A virus must use the structures and metabolism of a host cell to reproduce.

Scientists have learned a lot about viruses. Very powerful microscopes, called electron microscopes, have made it possible for scientists to see viruses and observe how they work. Today's microscopes are so powerful that scientists can see viruses as they move. This has made it possible to develop new ways to prevent viral illnesses.

## Stop and Think

1. Explain one way that viruses can spread from person to person.

*Viruses and bacteria are easily moved from one person to another. Washing your hands carefully, and covering sneezes and coughs are two very easy and very important ways to stop their spread. Many viruses infect other people by droplet transmission.*

2. How do viruses compare to bacteria?

*Antibiotics kill bacteria. Antibiotics don't kill viruses. Unlike bacteria, viruses cannot survive on their own. They need a host to survive. Viruses can only reproduce inside cells.*

*Viruses are very hard to remove from your body. You might take "cold medicine." The medicine will make you feel better. It may relieve symptoms like a headache, stuffy nose, runny nose, or cough. However, cold medicine does not actually heal you. For colds and most viral illnesses, you just have to wait until the virus dies out. Viruses reproduce, use energy, and grow, but they can only do this inside another cell.*

3. Describe the sequence of events that take place when a virus reproduces.

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4. What are two ways you can stop a virus from spreading?

*Good Handwashing, covering sneezes and coughs.*

5. Extension: If you would like to learn more about interesting viruses, search the internet for *coronavirus* or *COVID-19*. You can learn more about viruses that the whole world began learning about in 2020.

*Answers may vary.*

## What's the Point?

Viruses are one type of microbe that cause illness. There are many different types of viruses. There is no cure for many viral illnesses. However, by learning about how viruses spread, you can prevent other people from getting sick.