

Overview of Viral Infections

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Viruses are very tiny germs. They are made of genetic material inside of a protein coating. Viruses cause familiar infectious diseases such as the common cold, flu and warts. They also cause severe illnesses such as HIV/AIDS, Ebola, and COVID-19.

Viruses are like hijackers. They invade living, normal cells and use those cells to multiply and produce other viruses like themselves. This can kill, damage, or change the cells and make you sick. Different viruses attack certain cells in your body such as your liver, respiratory system, or blood.

When you get a virus, you may not always get sick from it. Your immune system may be able to fight it off.

For most viral infections, treatments can only help with symptoms while you wait for your immune system to fight off the virus. Antibiotics do not work for viral infections. There are antiviral medicines to treat some viral infections. Vaccines can help prevent you from getting many viral diseases.

A virus is composed of nucleic acid, either DNA or RNA, surrounded by a protein coat. It requires a living cell in which to multiply. A viral infection can lead to a spectrum of symptoms from asymptomatic (no overt symptoms) to severe disease.

People may get viruses by swallowing or inhaling them, by being bitten by insects, or through sexual contact.

Most commonly, viral infections involve the nose, throat, and upper airways, or systems such as the nervous, gastrointestinal, and reproductive systems.

Doctors may base the diagnosis on symptoms, blood tests and cultures, or examination of infected tissues.

Antiviral drugs may interfere with the reproduction of viruses or strengthen the immune response to the viral infection.

A virus is a small infectious organism—much smaller than a fungus or bacterium—that must invade a living cell to reproduce (replicate). The virus attaches to a cell (called the host cell), enters the cell, and releases its DNA or RNA inside the cell. The virus's DNA or RNA is the genetic material containing the information needed to make copies of (replicate) the virus. The virus's genetic material takes control of the cell and forces it to replicate the virus. The infected cell usually dies because the virus keeps it from performing its normal functions. When it dies, the cell releases new viruses, which go on to infect other cells.

Viruses are classified as DNA viruses or RNA viruses, depending on whether they use DNA or RNA to replicate. RNA viruses include retroviruses, such as HIV (human immunodeficiency virus). RNA viruses, particularly retroviruses, are prone to mutate.

Some viruses do not kill the cells they infect but instead alter the cell's functions. Sometimes the infected cell loses control over normal cell division and becomes cancerous.

Some viruses, such as hepatitis B virus and hepatitis C virus, can cause chronic infections. Chronic hepatitis can last for years, even decades. In many people, chronic hepatitis is quite mild and causes little liver damage. However, in some people, it eventually results in cirrhosis (severe scarring of the liver), liver failure, and sometimes liver cancer.

Viruses usually infect one particular type of cell. For example, common cold viruses infect only cells of the upper respiratory tract. Additionally, most viruses infect only a few species of plants or animals. Some infect only people.

Many viruses commonly cause infections in infants and children and older adults.