Viruses differ in shape and in ways of entering host cells.

Not all viruses are the same. They can be simple or complex in structure, and they have different ways of getting into host cells. Host cells are cells that are infected by a virus. Viruses can only reproduce after they have infected host cells.

**The Structure of Viruses**

Viruses are made up of two main parts: a piece of genetic material, and a protein covering, or coat, called a **capsid**. Unlike eukaryotes and prokaryotes, the genetic material of viruses may be either DNA or RNA.

The shape of a virus plays an important role in how it works. The proteins on the surface of a viral capsid match a particular host—like a key fits a lock. Each type of virus can infect only certain hosts. Some viruses can infect several species. Others can infect only a single species.

**VIRAL SHAPES**

The different proteins that make up a viral capsid give viruses a variety of shapes.

- Some viruses are shaped like a ball.
- Some viruses have a long twisted or coiled shape.
- Some viruses are many-sided.
Viruses that Infect Bacteria

**Bacteriophages** (bak-TEER-euh-uh-FAYJ-ihz) are a group of viruses that infect bacteria. Bacteriophages are often called “phages” for short. Phages attach to the outside of a bacterium, and inject their DNA into the cell.

Viruses that Infect Eukaryotes

Viruses that infect eukaryotes enter a host cell differently than phages enter host bacterial cells. For example, viruses that infect eukaryotes may get taken into a cell through endocytosis. Once inside the eukaryotic cell, the virus finds the nucleus, where the host cell’s DNA is located.

**What are the two main structural parts of a virus?**

**Viruses cause two types of infections.**

Once inside a host cell, there are two basic pathways of infection that are similar for all viruses. A virus may end up destroying the host cell, or it may add its genetic material to the host cell without destroying it. These two pathways are shown for bacteriophages on the next page.

**Lytic Infection**

A **lytic infection** (LIHT-ihkh) results in the host cell bursting open and releasing new viral offspring into the host’s system. First, the virus enters the host cell. Then, the viral DNA directs the host cell to copy the viral DNA and produce more capsids. The capsids and viral DNA come together to make new virus particles. The host cell is destroyed and the viral offspring are released. They can then infect other cells.

**Lysogenic Infection**

A **lysogenic infection** (ly-suH-JEHN-ihkh) results in the viral DNA combining with the host cell’s DNA. The phage DNA inserted into the host cell’s DNA is called a **prophage**. When the host cell goes through mitosis, the prophage gets copied and passed on to daughter cells along with the host cell’s DNA. The prophage can remain a permanent part of the host cell’s DNA. Or, it can enter the lytic cycle and produce new viruses.
An infected cell may stay in the lysogenic cycle for a long time. A trigger, such as stress, can push the virus into the lytic cycle. The virus will then use the cell to produce new viruses.

**In which cycle of infection are new viral particles released—lytic or lysogenic?**
Circle the correct term from each pair to complete the sentences below.

1. Viral DNA combined with the host cell’s DNA is called a **prophage** / **bacteriophage**.

2. A virus is made of two main parts, genetic material and a **bacteriophage** / **capsid**.

3. In a **lysogenic infection** / **lytic infection** the viral DNA becomes part of the host cell’s DNA and the host cell is not destroyed.

4. In a **lysogenic infection** / **lytic infection** the host cell bursts, releasing new viral offspring into the host’s system.

5. What do viruses need to reproduce? ____________________________

6. What is a main difference between the lytic and lysogenic cycles of infection? ____________________________
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