Viruses: On the Edge of Life

Oh, no: imagine you woke up this morning with a sore throat, an achy body, and skin that feels like it’s burning up. You might have influenza, also known as the flu. Influenza is caused by a virus—a tiny structure that infects the living cells of animals, plants, and all kinds of bacteria and microorganisms. Viruses are one of the leading causes of illness in the world.

Viruses are very simple, and they exist on a microscopic scale: they’re just tiny bundles of DNA covered in a coat of protein, sometimes with a layer of fat molecules for extra protection, and most of them are about 100 times smaller than the average cell—the largest are about 300 nanometers. Because viruses are so simple, scientists argue about whether they count as living organisms. On one hand, viruses aren’t made of cells, which scientists consider the basic unit of life.

On the other hand, they have DNA and are able to reproduce, and they evolve through natural selection—all of which are important qualities of living things. Some scientists say that viruses are “on the edge of life.” Viruses may be simple, but they’re good at what they do: reproducing. Because viruses don’t have cell bodies of their own, they use the living cells of host organisms in order to reproduce. When it’s time to reproduce, the virus latches onto a living cell and injects its own DNA into the body of the cell. The virus’s DNA takes over the cell and forces it to make more viruses. When the host cell is full of new viruses, they burst out, killing the cell. Each new virus then looks for a new cell to infect, and the cycle begins again. For some viruses, this happens quickly—but some viruses hide their DNA in the host’s cells for years, allowing the cells to copy the virus’s DNA over

Viruses are tiny biological structures that cause illness in plants, animals, and all kinds of bacteria and microorganisms. (Colors were added to the photo to make it easier to see.)

Viruses share some characteristics with living things, but not all. Some scientists say they’re “on the edge of life.”
and over as the cells reproduce, but not actually making the host sick. For example, people infected with HIV can have the virus in their cells for years before they develop AIDS, which is a collection of serious symptoms caused by the virus.

Because they infect living cells, viruses are hard to treat without killing the host cells as well. The antibiotic medicines used to treat bacterial infections kill bacteria, but antibiotics don’t have an effect on viruses. The best way to fight viruses is to prevent them with vaccines. A vaccine is a weakened version of a virus, which can be injected into a healthy patient. The weakened virus doesn’t make the patient sick, but it does prepare the patient’s immune system to fight the virus in the future.

Viruses are tiny bundles of DNA covered by layers of protein. (Colors were added to the photo to make it easier to see.)