Health

A bug is making you miserable — is it alive?

Most of the sniffles plaguing you and your friends are thanks to viruses. But what is a virus? Is it alive?

Some illnesses are caused by bacteria. Bacteria are alive: They're very small — you can't see them without a microscope — but they take in nutrients, reproduce and die. Viruses can make copies of themselves only by hijacking the cells of the creatures they infect. When the flu virus is outside of your body — lurking on a doorknob, for instance — it's dead by any definition. But once inside your body, it shows many of the characteristics of life. Viruses might even be the descendants of living organisms

that shed seemingly necessary traits to live more efficiently (with a little help from our cells).

"Most viruses have molecules — genes and proteins — like us and other live beings. However, they need another living being to make these proteins," says Jordi Paps. He's an evolutionary biologist at the University of Essex in England.

Some researchers point out that many organisms — including such parasites as tapeworms that can live in your gut — need hosts to feed them and help them reproduce. Viruses aren't so different.

"However, others say that all organisms, parasites or not, can make proteins by themselves, but viruses can't, so this is why they do not consider them alive," Paps says.

Other scientists see it differently.

"Viruses can be regarded similar to 'seeds' of plants," says Gustavo Caetano-Anollés of the University of Illinois. "Some seeds appear dead, and you can keep them for years without anything happening to them until [the plant starts growing]."

Scientists debate this mostly because it's interesting, not because they're desperate for an answer. But there are very good reasons to try to understand how viruses work and how they fit into the ecosystem.

Image 2. An influenza vaccination is prepared for a patient at the CVS Pharmacy store's MinuteClinic on October 4, 2018, in Miami, Florida. Photo by Joe Raedle/Getty Images Photo by: Mark Kolbe/Getty Images for AOC [click to expand]

David Bhella is a researcher at the University of Glasgow in Scotland. He explains that some researchers worry that eliminating a virus will leave another one in its place. We see this with animals, too. Our mammalian ancestors got the chance to evolve only because big dinosaur predators died in a mass extinction event.

Bhella says we see this happening constantly with the flu.

"Each year a handful of strains circulate, and in the face of increasing immunity in the population they are eventually replaced with different strains that occupy the same niche," he says.

We know how this works with animals: If humans killed off all the lions in the world, for example, there would suddenly be a lot more hyenas, because both predators eat

the same sorts of animals. Fewer lions mean more food for hungry hyenas. But since we know less about how viruses fit into the world around them, it's hard to know what would happen if the flu disappeared, Bhella says. "What defines an evolutionary opportunity for a virus? If we eradicate a virus, will something else take its place?"

We don't need to decide whether viruses are alive to answer that question, but we do need to study them a lot more. And in coming to understand them, we might realize we don't want to get rid of most of them. Scientists have recently come to understand that viruses exist pretty much everywhere — including inside our guts — and mostly don't cause trouble. Some may even help us out.

"Viruses are cool, and may accidentally move genes from one group of organisms to another," Paps says.

One example is a protein in the placenta, the organ that transfers nutrients from a mother to her unborn baby, Paps says. "This protein comes from a virus. Maybe without viruses there wouldn't be mammals or they would look very different!"