

7.1 Hip & Hop Catch Up on Viruses

It's 7:30 p.m. on a Saturday night and Hip and Hop have been out enjoying themselves going for a bite to eat and a movie. Our pair of perky protagonists are excited for the movie—about the spread of a bioengineered virus that slowly turns its victims into angry, blood-thirsty parsnips. Unfortunately, Hip is feeling a bit nauseous (probably withdrawal symptoms from not being in biology class for so long). We join our duo as they are waiting around for the movie to begin.

Hip: *[groaning and doubled over]* Ohhhhh...I'm not feeling very well. Don't get too close, Hop...I think I've got a virus!

Hop: You don't have a virus, Hip! I would suspect the 3 double cheeseburgers, 2 orders of fries, pitcher of soda, large pizza, and 2 ice cream cones that you had for dinner! How can you possibly eat that much and not explode??!

Hip: *[protesting]* That wasn't that much!!! I mean, it wasn't unusual for a weekend. Maybe you're right—I probably didn't need that second ice cream cone for dessert. I just need something to keep my mind off of it...I know, how about something from biology!!! Talking about biology always cheers me up!

Hop: Good idea, Hip. It IS awfully tough to go the whole weekend without some stimulating conversation about biology. As long as you brought up the subject of viruses—and since it is, coincidentally, the topic of our movie—let's talk about viruses!

Hip: OK...So what do we know about viruses? Are they living things?

Hop: Great question, Hip! Do you remember when we talked about the characteristics of living things?

Hip: Sure...I always remember our interesting biology discussions! Basically, all living things:

- Are made of cells
- Reproduce
- Are based on a universal genetic code
- Grow and develop
- Obtain and use materials and energy
- Respond to their environment
- Maintain homeostasis
- (as a group) change and adapt over time



Hop: Wow, I'm impressed! You do remember our conversations! Well, viruses have some of those characteristics but not all of them. Viruses obtain and use materials and energy, and change and adapt over time.

Hip: And they reproduce! But only by using the cell parts of an appropriate type of cell. So I'm not sure whether that counts as reproduction or not...

Hop: Yeah...that's part of the reason that it's a difficult question. Because there are a lot of parasitic critters out there that depend on other organisms for survival and, often, reproduction, it's argued that they do have reproduction.

Hip: It is important to remember that the 8 characteristics of living things were based on the things that we decided were living. Since all of the living critters we knew about had cells, we decided that all living things must be made of cells. But if we found something that was clearly alive and it did not have cells...

Hop: ...we would have to change our definition of what it is to be living! So it really is kind of an important question as to whether or not viruses are living organisms—it may direct our acceptance of what may or may not be living!

Hip: Exactly! Viruses also are based on the same genetic code as everything else. In fact, a virus is simply a piece of DNA or RNA surrounded by a protein. That's it!!

Hop: If viruses are so simple, how can they DO anything? They don't have ribosomes or cytoplasm or any of the cell parts you need to make proteins.

Hip: It's been argued that viruses are the very minimum of what's needed for life. A parasitic living thing stripped down to only what is needed to survive.

Hop: Oh...so that's why viruses need cells! The virus contains the instructions (the genetic material) but the cell has all of the equipment for producing what's necessary.

Hip: That's right. When a virus (like a cold virus) finds the right type of cell—the correct cell type in the appropriate organism—it invades the cell then directs it to make lots of copies of the virus. The cell just keeps making copies until it bursts and releases the new viruses into its surroundings.

Hop: Then those new viruses invade new cells and the cycle continues. That accomplishes the virus's goal of spreading its genetic code to new generations.

Hip: Sure sounds like a living thing to me!

Hop: It does. However, viruses are still generally not accepted as living things—they are not found in any of the kingdoms or domains in the classification system and don't have typical scientific names with a genus and specific epithet.

Hip: No wonder the virus in our movie turns people into angry vegetables. It just wants to be noticed!

Hop: [unconvinced] Uh huh. Just so you know...viruses don't have brains or conscious thought and they don't plan for our ultimate demise. However, they do make for good movie plots.

Hip: Speaking of which, the movie is about to start! I still have time to go back for a refill on my bucket of popcorn!

Author - Greg Bisbee