



a place of mind

FACULTY OF EDUCATION

Department of
Curriculum and Pedagogy

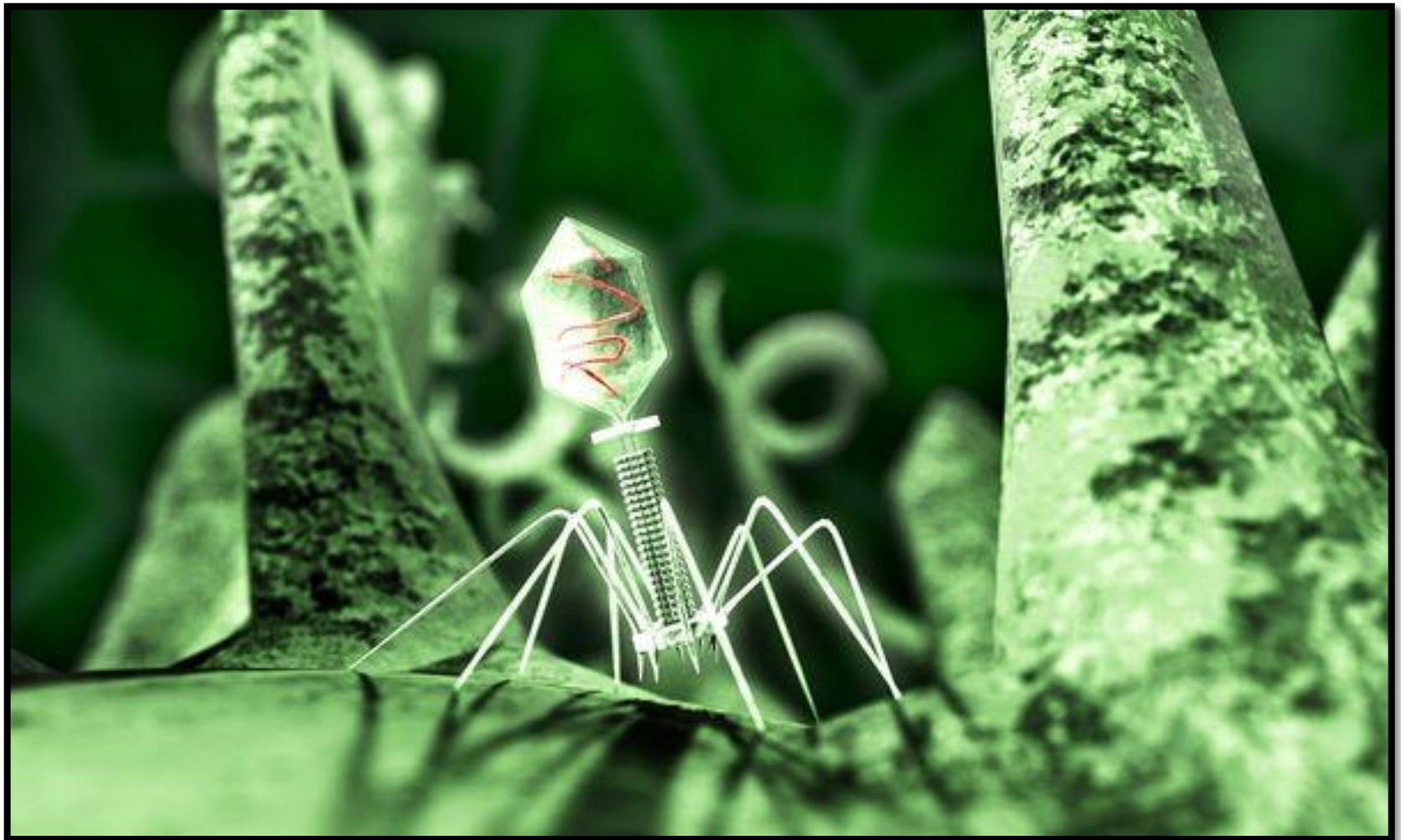
Biology

Microbiology:

Viruses I

Science and Mathematics
Education Research Group

Viruses I



Viruses I

Information regarding previous slide:

The image represents:

Common shape of infectious viruses.

Credit: iStockphoto/Sebastian Kaulitzki

For more information,

visit the “**Viruses helped shape human genetic variability**”

<http://www.sciencedaily.com/releases/2010/02/100218203053.htm>

Journal Reference:

Fumagalli M, Pozzoli U, Cagliani R, Comi GP, Bresolin N, et al. **Genome-Wide Identification of Susceptibility Alleles for Viral Infections through a Population Genetics Approach.** *PLoS Genetics*, 2010; 6 (2): e1000849

DOI: [10.1371/journal.pgen.1000849](https://doi.org/10.1371/journal.pgen.1000849)

Question 1

Viruses are considered to be neither prokaryotic nor eukaryotic cells. Which of the following is **not** considered a characteristic of viruses?

- A. Non-living organisms.
- B. Have a nucleus to store genetic information.
- C. Cant reproduce on their own, need a host to reproduce.
- D. Made of proteins and nucleic acids (DNA & RNA).
- E. Adapt to changing conditions by mutation.

Solution I

Answer: B

Justification:

Viruses are non-cellular organisms made up of genetic material and protein that can invade living cells. Viruses don't have a nucleus to enclose their genetic information, but they have a nucleic acid core containing DNA or RNA. Also, viruses can not reproduce on their own, they need a living host to reproduce. Interestingly, viruses can adapt to changing conditions by mutation.

Question II

Infectious diseases can be caused by viruses and are transmitted in different ways. How can viruses be transmitted?

- A. Through the bite of an infected animal.
- B. Through contaminated food and water.
- C. Through contact with blood or other body fluids.
- D. Through sexual contact.
- E. All of the above.

Solution II

Answer: E

Justification:

Viruses can be transmitted through the bites of infected animals, contaminated food, water, blood or other body fluids or hypodermic needles, airborne, and sexual contact.

Question III

Influenza is an infectious disease caused by the influenza virus. Just like influenza, diseases caused by viruses have symptoms. Which of the following is **not** considered a common symptom of virus infection?

- A. Mild to severe rashes.
- B. Fever and aches.
- C. Paralysis.
- D. Bleeding.
- E. Swollen glands and other body parts.

Solution III

Answer: D

Justification:

Disease can be defined as a disorder, virus infection or malfunction of the cells, tissues, and organs. The common symptoms of infectious (or non-infectious) diseases caused by viruses are mild to severe rashes, fever, paralysis, headache, aches, swollen glands, and congestion. While bleeding may be a symptom of some viruses (e.g. Ebola), it is not common and usually presents late in the virus infection stage.

Question IV

Using very advanced microscopy techniques such as transmission electron microscopy, you can obtain images of the inside of a virus. What would you find?

- A. Spikes.
- B. A nucleic acid core surrounded by a capsid.
- C. A protective envelope.
- D. Ribosomes.
- E. A flagellum.

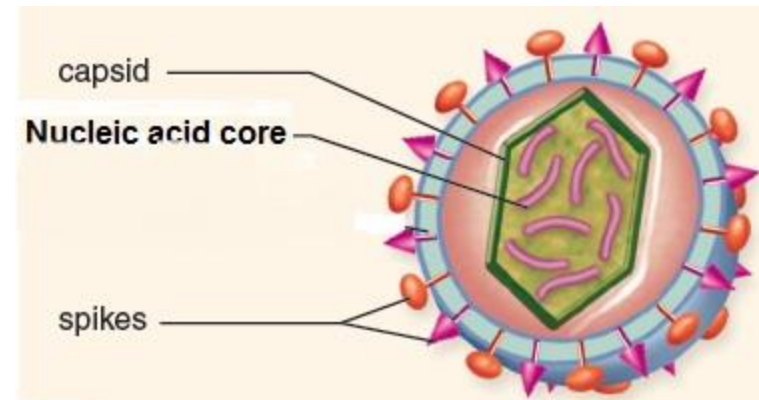


Solution IV

Answer: B

Justification:

Unlike the prokaryotic cells, viruses do not have ribosomes, enzymes, or organelles. The only structure that viruses have is a nucleic acid core surrounded by a protein coat called the capsid. A flagellum is a lash-like appendage that protrudes from the cell body of certain prokaryotic and eukaryotic cells (usually found in bacteria). Viruses do contain 'spikes', which help the virus invade host cells. However, these are found on the **outside** of the cell, not the inside.



Question V

Viruses are generally considered non-living organisms. However, some scientists consider viruses both as living and non-living. Which of the following is the most correct reason?

- A. They need a host cell to reproduce.
- B. They do not respire and do not grow.
- C. They are active inside their host cells and are inactive when they are outside of their host cells.
- D. They cannot metabolize nutrients.
- E. They are enclosed in a protective envelope.

Solution V

Answer: C

Justification:

Viruses are considered both as living and non-living organisms, as viruses are active inside their host cells (host organisms) and are inactive when they are outside their host cells.

The other choices are the characteristics of viruses, but they cannot support why viruses are considered both as living and non-living organisms. These choices do not represent both characteristics of 'living' and 'non-living'.

Extra information on Virus

Ted-Ed Video:

Cell vs. Virus: A battle for health.

<https://www.youtube.com/watch?v=oqGuJhOeMek>