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KPK Class 11 Biology Conceptual Questions – Chapter 5 Acellular

Life

Q1: Give a brief status of viruses in classification.

Answer: Viruses are unique entities in biological classification. They are placed between living and non-living organisms. Unlike living cells, viruses lack cellular structures and metabolism. They cannot reproduce independently and need a host cell to replicate. Therefore, they are considered acellular and classified separately from prokaryotes and eukaryotes.

Q2: Differentiate between a retrovirus and a typical bacteriophage.

Answer:

-Retrovirus: A retrovirus, such as HIV, uses reverse transcriptase to convert its RNA into DNA after entering a host cell. This DNA integrates into the host's genome, allowing the virus to replicate.

- Typical Bacteriophage: A bacteriophage infects bacteria and injects its DNA directly into the bacterial cell, where it either replicates immediately (lytic cycle) or integrates into the bacterial genome (lysogenic cycle).

Q3: What are the consequences of a viral DNA becoming incorporated into a human egg or sperm cell?

Answer: If viral DNA becomes incorporated into a human egg or sperm cell, it can be passed on to the next generation, potentially leading to inherited viral diseases. This can result in genetic mutations or the activation of oncogenes, increasing the risk of cancer or other genetic disorders.

Q4: How do viruses suppress the immune system in the human body?

Answer: Viruses like HIV can suppress the immune system by attacking and destroying T-helper cells, which are crucial for immune response. By reducing the number of these cells, viruses weaken the body's ability to fight off infections and diseases, making the host vulnerable to other pathogens.

Q5: Why do viruses need a host cell?

Answer: Viruses need a host cell because they lack the necessary cellular machinery, such as ribosomes and enzymes, to replicate on their own. They hijack the host cell's machinery to produce viral components, assemble new viruses, and propagate.

Q6: List down the main steps in the life cycle of HIV.

Answer:

1. Attachment: HIV binds to CD4 receptors on T-helper cells.
 2. Fusion: The viral envelope fuses with the cell membrane, releasing RNA and enzymes into the host cell.
 3. Reverse Transcription: HIV's RNA is reverse-transcribed into DNA using reverse transcriptase.
 4. Integration: Viral DNA integrates into the host cell's genome.
 5. Replication: The host cell produces viral RNA and proteins.
 6. Assembly: New viral particles are assembled within the host cell.
 7. Budding: New HIV particles bud off from the host cell, ready to infect new cells.
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Q7: How do lymphocytes maintain a healthy immune system in the human body?

Answer:

- T-Lymphocytes: ☑ Attack and destroy infected cells or coordinate the immune response.
 - B-Lymphocytes: ☑ Produce antibodies that neutralize pathogens and mark them for destruction.
- Together, they maintain a robust defense system, ensuring the body can effectively combat infections.

