

## Virology Question Bank

**Q/ Fill the following blanks.**

1. Immunity to viral infection is caused by a variety of specific and nonspecific .....
2. All steps in lytic infection are ..... to all viruses; the steps do not always occur in the .....order and some viruses have an additional step.
3. Types of ..... of virus particles have made it possible to resolve fine differences in the basic morphology of viruses.
4. Characters of virus are ..... cellular organelles, such as mitochondria and ribosomes but they depend on infected cells to provide all their needed organelles.
5. Cell-mediated responses function to help eliminate virus at the end of the ..... phase, and subsequently to maintain specific resistance to reinfection.
6. The size of the viral DNA genome ranges from 3.2kbp (.....) to 375 kbp (.....).
7. Flexible cell membrane of the host is penetrated by three mechanisms:
  - a. ....; entire virus engulfed by the cell and enclosed in a vacuole or vesicle.
  - b. Fusion of virus envelope with .....
  - c. .... penetration (viropexis).
8. Mature virus particles are constructed from the growing pool of parts, progeny particles assembled by packaging the viral nucleic acid within the .....
9. The ..... symmetric nucleocapsid consists of a ..... and a multipartite genome of single-stranded antisense ..... in seven or eight segments.
10. In Lysogenic cycle, the ..... becomes incorporated into the host cell's DNA, it can remain this way for an extended period, the host cell .....

**Q/ Put (T) for true, (F) for false sentences, and correct the false sentences.**

1. Influenza viruses are spherical or filamentous enveloped particles 8.0-120 nm in diameter.
2. Viroid is single strand DNA genome and the smallest known pathogens affects plants much smaller than viruses, no protein coat.
3. In the later stages of replication several steps occur concurrently, for many viruses, transcription, translation, genome replication, virion assembly and exit can all be in progress at some time.
4. The early roles of immune functions during viral infections are nonspecific responses, which consist nonspecific inhibition, natural killer cell activity, and interaction.

5. Latent phase is the period following the eclipse phase from the time of disappearance of the infecting virus to the appearance of infectious virus in the surroundings virus are external and must be released.
6. Some virus particles do not exhibit helical or cubic symmetry but are more complicated in structure, for example, poxviruses are grape-shaped, with ridges on the external surface and a core and lateral bodies inside.
7. IgG antibodies are responsible for most antiviral activity in plasma, while IgA is the most important antibody when viruses infect mucosal surfaces.
8. Assembly of enveloped viruses needs interaction within plasma membrane which has been modified.
9. Helper T cells can recognize virus-infected cells and produce a number of important cytokines. Cytokines produced by monocytes (monokines), T cells, and NK cells (lymphokines) play important roles in regulating immune functions and developing antibacterial immune functions.

**Q/ Match the following items from column A to column B**

Answers	Column A	Column B
	1. cell death	A. Humoral Immunity
	2. specific immune	B. Biosynthesis
	3. viral proteins	C. Icosahedral
	4. Mimi viruses	D. Receptor sites
	5. ADCC	E. Structure of Viruses
	6. pentavalent	F. Lytic cycle
	7. lock and key	G. Cell-mediated responses
	8. 8-36 hours	H. Release
	9. envelope	I. Large virus
	10.usable mRNA	J. Viral Replication

**Q/ Discus of the following:**

Virus Growth Phases:

1. Eclipse phase
2. Latent virus phase

**Q/ Multiple Choice/ Choose the best answer.**

1. Growth of bacteria is diffuse in liquid media and they form colonies on **solid media**.
  - A. Transport Media
  - B. Broth Media
  - C. Semi-solid media
  - D. **None of them**
2. Tissue tropism is the cells and tissues of a host that support growth of a virus or bacteriome. **Streptococcus mutans**.
  - A. **Escherichia coli**
  - B. **Neisseria gonorrhoeae**
  - C. **Streptococcus mutans**.
  - D. Two of them



A	18. Probiotics	R. Group A streptococcal infections
G	19. Cfu/ml	S. Signs and Symptoms of Infection
E	20. <u>Mycobacterium tuberculosis</u>	T. Bacterial growth curve

Q/ Put (T) for true, (F) for false sentences, and Correct the false sentences.

1. **True pathogens**, are capable of causing infection and disease in healthy persons with normal immune defenses.
2. **Adhesins** are cell-surface components or appendages of bacteria that facilitate **adhesion** or adherence to other cells or to surfaces, usually in the host they are infecting or living in.
3. The lag phase varies considerably in **length with the species, nature of the medium, size of inoculum and environmental factors** such as temperature and nutrients present in the new medium.
4. Chemotaxis is the chemical process by which the Phagocytes are led to the site of infection, so that they can begin their task. Some bacteria, such as Staphylococcus aureus,
5. The type and severity of an infection depend on **numerous factors**, most of which are related to the **pathogenicity**.

Q/ Fill the following blanks.

1. Prions is infectious particles that are entirely protein no nucleic acid highly heat resistant in animal affects nervous tissue and results in:
  - a) Bovine spongiform encephalitis (BSE) (mad cow disease)
  - b) Scrapie in sheep
  - c) kuru & Creutzfeldt-Jakob Disease (CJD) in humans
2. Poxvirus particles contain about 100 proteins, including many with enzymatic activities, such as a DNA-dependent RNA polymerase. Its replication occurs entirely within the cell cytoplasm.
3. Slow virus disease is a disease that, after an extended period of latency, follows a slow, progressive course spanning months to years, frequently involving the central nervous system and ultimately leading to death.
4. Human herpesviruses include: -
  - a) Herpes simplex types 1 and 2 (oral and genital lesions)
  - b) Varicella-zoster virus (chickenpox and shingles)
  - c) Cytomegalovirus, Epstein-Barr virus (infectious mononucleosis)
  - d) Human herpesviruses 6 and 7 (T lymphotropic)
  - e) Human herpesvirus 8 (associated with Kaposi's sarcoma).
  - f) Other herpesviruses occur in many animals
5. There are four main schemes used for the classification of viruses are: -
  - a) The International Committee on Taxonomy of Viruses (ICTV) system

- b) Lwoff, Horne, and Tournier (the LHT system), LHT system of Virus Classification.
  - c) Baltimore Classification, 7 classes (Class VII viruses have a double-stranded DNA genome).
  - d) Holmes classification of viruses.
6. Types of Symmetry of Virus Particles, viral architecture can be grouped into three types based on the arrangement of capsomeres and the morphology of the nucleocapsid subunits with an example:
- a) Helical symmetry, e.g., Orthomyxoviruses
  - b) Cubic symmetry (Icosahedral), e.g., Adenoviruses
  - c) Complex structures, e.g., Poxviruses and Bacteriophage.
7. Types of Protein synthesis
- a) Structural protein
  - b) Nonstructural protein (Enzyme for replication)
8. Defective virus is a virus particle that is functionally deficient in some aspect of replication. Defective virus may interfere with the replication of normal virus.
9. Capsomer is morphologic units seen in the electron microscope on the surface of icosahedral virus particles. Capsomer represents clusters of polypeptides.
10. Viruses are infectious agents with both living and non-living characteristics:
- i. Living characteristics of viruses
    - a) They reproduce at a fantastic rate, but only in living host cells.
    - b) They can mutate.
  - ii. Non-living characteristics of viruses
    - a) They are acellular, that contain no cytoplasm or cellular organelles.
    - b) They carry out no metabolism on their own and must replicate using the host cell's metabolic machinery. Viruses don't grow and divide. Instead, new viral components are synthesized and assembled within the infected host cell.
    - c) The vast majority of viruses possess either DNA or RNA but not both.

**Q/ Put (T) for true, (F) for false sentences, and correct the false sentences.**

1. Hepadnaviruses cause acute and chronic hepatitis; persistent **(Temporary)** infections are associated with a high risk of developing liver cancer. Three viral types are known that infect mammals (humans, woodchucks, and ground squirrels) and another that infects ducks.
2. A special cell of the immune system called a T cell circulates looking for infections. One type of T cell is called a cytotoxic T cell because it kills cells that are infected with viruses with toxic mediators. Cytotoxic T cells have specialised proteins on their surface that help them to recognise virally-infected cells. These proteins are called T cell receptors (TCRs).
3. Acute viral infection is characterized by rapid onset of disease, a relatively brief **(detail)** period of symptoms, and resolution within days. It is usually

accompanied by early production of infectious virions and elimination of infection by the host immune system.

4. **Uncoating** can be defined as the complete or partial removal of the capsid to release the virus genome. Depending on the virus, the process can take place.
5. Some virus particles do not exhibit simple cubic or helical (**Icosahedral**) symmetry but are more complicated in structure. For example, poxviruses are brick-shaped, with ridges on the external surface and a core and lateral bodies inside.
6. Structural units are the basic protein building blocks of the coat, they are usually a collection of more than one non identical protein subunit. The structural unit is often referred to as a protomer (**apsomer**).
7. Viruses cannot (**can**) grow on artificial media, but only in living cells (specific host, Lab animals, chicken embryonated eggs & tissue culture).
8. Viral infected cells produce and release small (**large**) proteins called interferons, which play a role in immune protection against viruses.
9. Herpes Simplex Viruses (HSV-1) usually lesions on the oropharynx, cold sores, fever blisters. While HSV-2 lesions on the genitalia, possibly oral occurs in ages 14-29 and can be spread without (**with**) visible lesions.
10. The nucleocapsid of Herpesviruses (Persistent Human Viruses) is 100nm (**mm**) in diameter, with cubic symmetry and 162 capsomeres, surrounded by a lipid-containing envelope. It's the genome is linear, double-stranded DNA, 125–240kbp in size and the presence of terminal and internal reiterated sequences results in several isomeric forms of genomic DNA.
11. The virus growth cycle can be divided into stages which are sequential, although in many cases these stages tend to meld together (**alone**) almost taking place simultaneously. Range in time from minutes to hours depending on the virus and the host.
12. Gene vectors for protein production are viruses such as certain adenoviruses are used as vectors to take genes into animal (**human**) cells growing in culture.

**Q/ Match the following items from column A to column B, (only one correct answer)**

Answers	Column A	Column B
C	21. Chickenpox and shingles	U. Herpesviruses
E	22. Genital infections	V. Cytomegalovirus (CMV),
A	23. Persistent human viruses	W. Varicella-Zoster Virus (VZV)
G	24. Envelope	X. 26–45 kbp
H	25. Viral components	Y. Vesicle fluid or swab
I	26. Bacteriophage	Z. Replicate within the nucleus
J	27. 252 capsomeres.	AA. Peplomers

M	28. Erythema infectious	BB. Glycoprotein
L	29. Herpetic gingivostomatitis	CC. Virus that infects prokaryotic cells
B	30. Infection in utero	DD. Adenovirus
		EE. Large single-stranded gap
		FF. Oropharynx in young children
		GG. Parvoviruses

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- Types of symmetry of virus particles have made it possible to resolve fine differences in the basic morphology of viruses.
- Characters of virus are lack cellular organelles, such as mitochondria and ribosomes but they depend on infected cells to provide all their needed organelles.
- Cell-mediated responses function to help eliminate virus at the end of the acute phase, and subsequently to maintain specific resistance to reinfection.
- The size of the viral DNA genome ranges from 3.2kbp (hepadnaviruses) to 375 kbp (poxviruses).
- Flexible cell membrane of the host is penetrated by three mechanisms:
- Endocytosis; entire virus engulfed by the cell and enclosed in a vacuole or vesicle.
- Fusion of virus envelope with cell membrane.
- Direct Penetration (viropexis).
- Mature virus particles are constructed from the growing pool of parts, progeny particles assembled by packaging the viral nucleic acid within the capsid proteins.
- The helically symmetric nucleocapsid consists of a nucleoprotein and a multipartite genome of single-stranded antisense RNA in seven or eight segments.
- In Lysogenic cycle: The viral genome becomes incorporated into the host cell's DNA. It can remain this way for an extended period. The host cell remains lives.

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- 5 Latent phase is the period following the eclipse phase from the time of disappearance of the infecting virus to the appearance of infectious virus in the surroundings virus are internal and must be released.
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**Q/ Discus the of the following:**

Virus Growth Phases:

1. Eclipse phase

- Phase during which the virion has entered the cell and before progeny virus are made. No infectious virus is present during this phase. Period in which virus gains control of host synthetic machinery and produce components required to assemble into virus. Defined as the period between addition of virus and the appearance of assembled virus progeny inside the cell.

2. Latent phase



- The period following the eclipse phase from the time of disappearance of the infecting virus to the appearance of infectious virus in the surroundings virus are internal and must be released.