

10: Viruses

Key Terms

Capsid: Protein shell enclosing the nucleic acid.
Nucleocapsid: Composed of the nucleic acid and its surrounding proteins, forming the core of the virus.
Envelope: Glycoproteins embedded in bi-layer lipids surrounding the nucleocapsid (not all viruses have this layer).
Virion: A complete infectious viral particle.
Viroid: An infectious particle made of naked RNA molecules, no protein.
Prion: An infectious particle made of protein molecules, no nucleic acids; can be inherited.
Lytic Cycle: A virus infection cycle that results in virus multiplication and lysis of the host cell.
Lysogenic cycle: Bacteriophage DNA can be integrated into a host genome and replicated with host DNA; no cell lysis occurs.
Latent infection: Virus DNA is incorporated into host cell (usually higher organisms) and replicates with the host DNA. Infection results with no symptoms for a period of time.
Transformation: The modification of the genotype of a cell by introduction of DNA from another source.
Transduction: Transformation mediated by latent infection –the viral DNA becomes part of the host genome.
Cell transformation: The process during which a normal cell becomes cancerous.

Viral Structure and Classification

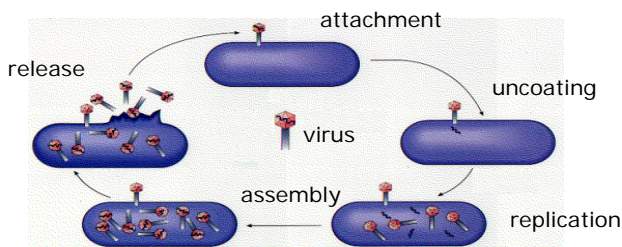
Two basic structures:
 Rod (helical) shape
 Isomeric shape

Classification based on the genome:
 DNA virus
 dsDNA
 ssDNA
 RNA virus
 dsRNA
 ssRNA(+)
 ssRNA(-)
 retrovirus

Virus Multiplication

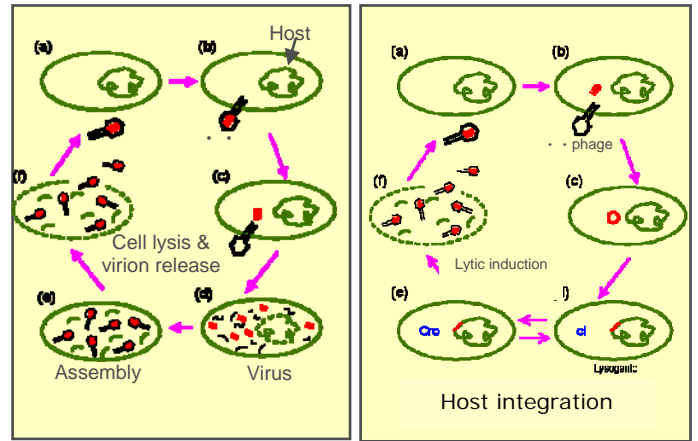
Based on the genome, virus multiplication requires:

1. replication of viral genome & synthesis of viral structure proteins.
2. utilizes host cell transcriptional and translational machinery.



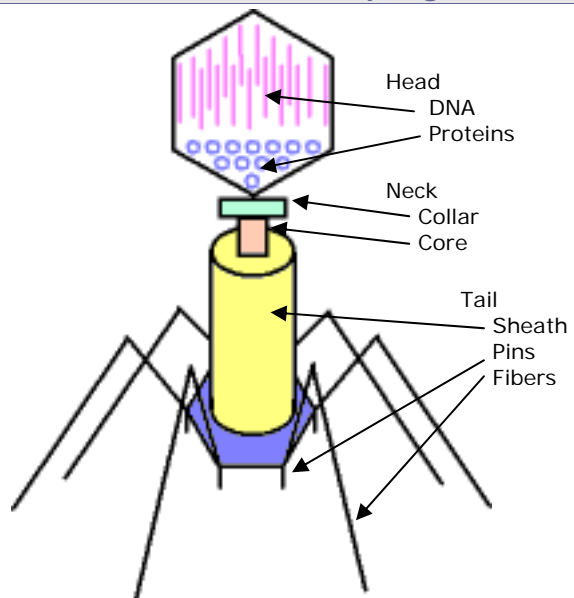
Virus Genetics & Pathogenesis

Lytic cycle Vs Latent cycle



- **Viral genetics:**
 - High mutation rate for RNA virus due to absence of proof-reading mechanism in genome replication.
 - Viral gene recombination due to simultaneous infection of different viruses.
- **Viral pathogenesis:**
 - Implantation of virus at the portal of entry
 - Local replication
 - Spread to target organs (disease sites)
 - Spread to sites or shedding virus into environment
- **Three factors:**
 - Accessibility of virus to tissue
 - Cell susceptibility to virus multiplication
 - Virus susceptibility to host defenses
 - Cellular pathogenesis
 - Direct cell damage or cell death
 - Indirect cell damage such as inflammation

Bacteriophage



How to Use This Cheat Sheet: These are the keys related to this topic. Try to read through it carefully twice then write it out on a blank sheet of paper. Review it again before the exam.