



Lecture title: *Viruses*

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Summary: Viruses

Viruses: They are the smallest and simplest form of life on earth, which can replicate only in living susceptible cells.

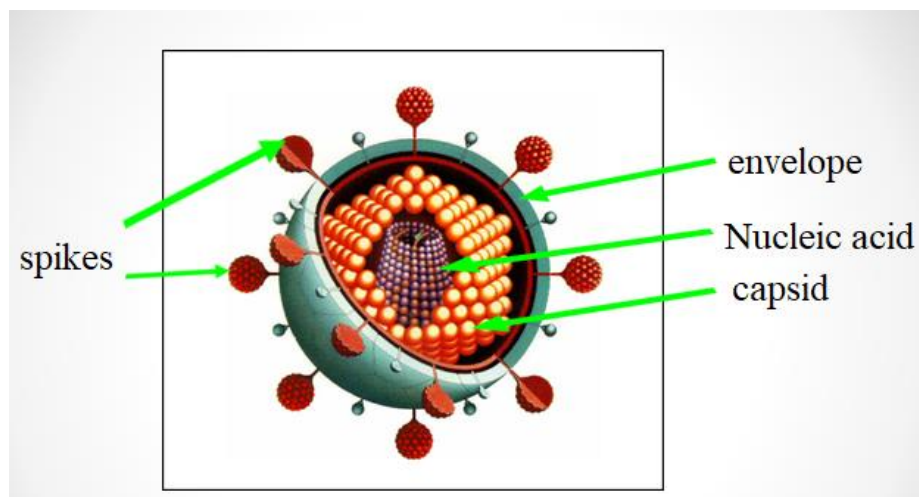
Viruses consist of :

A nucleic acid genome either DNA or RNA.

A protein coat (capsid) that enclosed the genome.

In some cases a lipid membrane (envelope).

- Virion: A complete infectious virus particle.



Chemical composition of viruses



General Characters of Virus

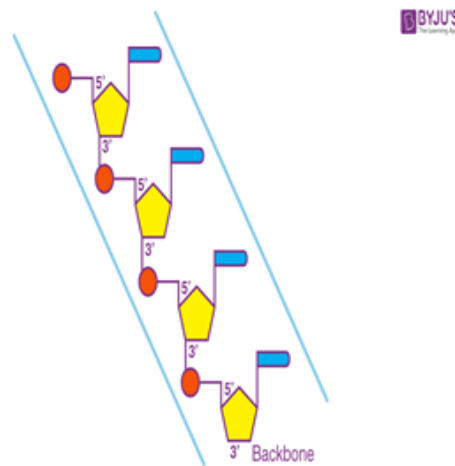
1. Virus particles are **very small in size**, they are between 20-500 nm (nanometers) in diameter. $1 \text{ nm} = 1/1000 \text{ }\mu\text{m}$, $1 \text{ }\mu\text{m} = 1/1000 \text{ mm}$.
2. Viruses are **obligatory intra cellular** microorganisms.
3. They **Multiply inside the cells** by replicating their genomes which either DNA or RNA, but not both.
4. The virus **dose not contain any organelles** (ribosomes, tRNA, metabolic enzymes, etc), but they depend on infected cells to provide all their needed organelles.
5. Virus **does not affected with antibiotics**.
6. Most viruses **sensitive to interferon**.
7. Viruses **can not grow on artificial media**, but only in living cells (specific host, Lab. Animals, CEE, TC).
8. Some viruses cause **latent infection**.
9. viruses **can not seen by ordinary microscope**, but only by EM.

Chemical composition of Nucleic Acid

1-Nitrogenous base: A ring compound containing nitrogen and carbon.

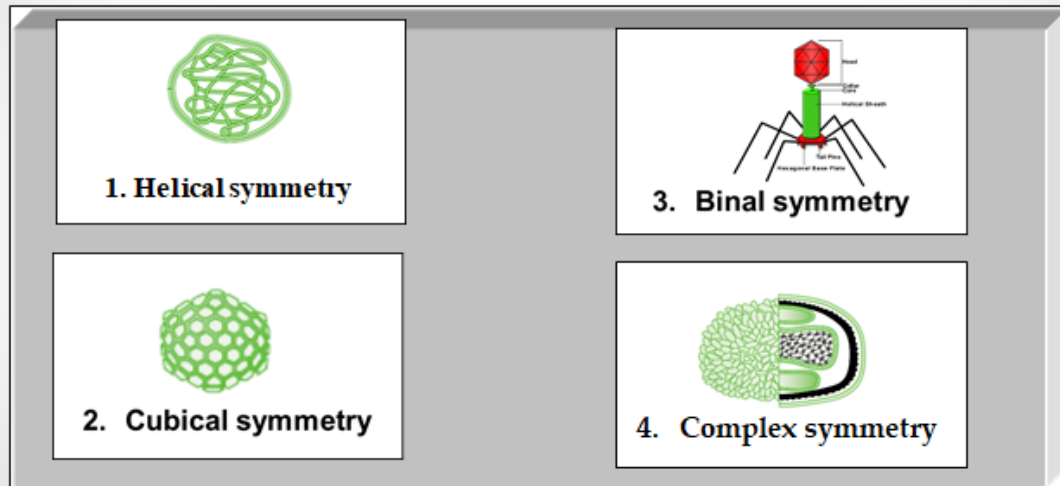
2-Molecule of a 5-carbon pentose sugar which is either **ribose (RNA)** or **deoxyribose (DNA)**.

3-Molecule of **phosphoric acid**.





Viral Capsid

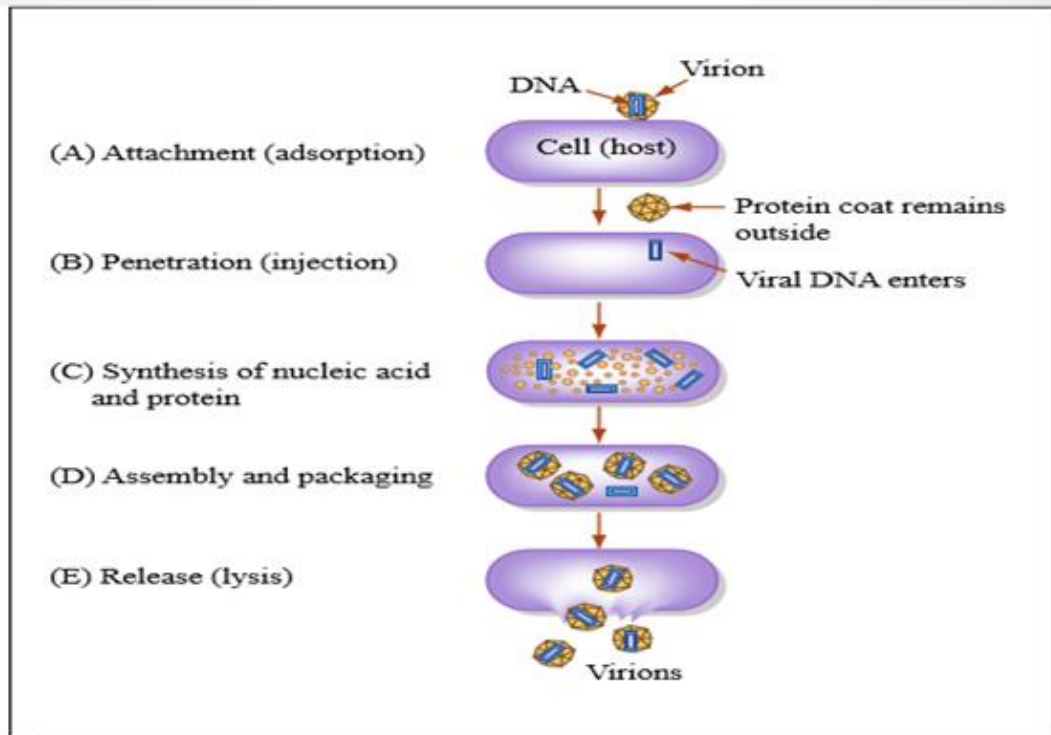


Viral Envelop

- Most viruses contain envelope or membrane surrounding the virus so they called **enveloped viruses**.
- Viral membrane contain glycolipids or glycoprotein which appears as projections from the envelope called **spikes**.
- Others have no envelope, they called **naked viruses**.

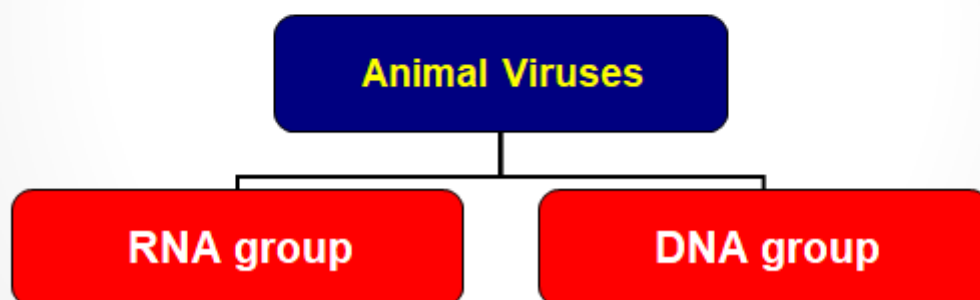


Viral replication



Classification of Animal Viruses

According to all above characters recently animal viruses classified into two major groups which are **RNA group** & **DNA group** as following:





Example of **RNA viruses** included:

- 1- Picornaviridae.
- 2- Reoviridae (double stranded).
- 3- Orthomyxoviridae.
- 4- Paramyxoviridae.
- 5- Rhabdoviridae.

Example of **DNA viruses** included

- 1- Parvoviridae
- 2- Papovaviridae
- 3- Adenoviridae
- 4- Herpesviridae
- 5- Poxviridae