

Viruses are parasites that can only replicate inside live cells and do nothing else. The virus's nucleic acid includes the instructions that tell the infected host cell to make virus-specific macromolecules that are needed to make more viruses.

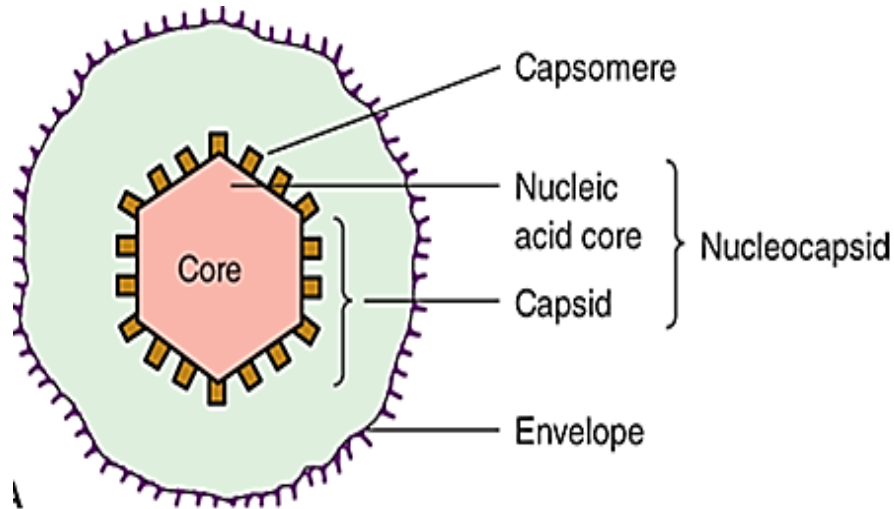
A lot of copies of the virus nucleic acid and coat proteins are made during the replicative cycle. When the coat proteins come together, they make the capsid. The capsid protects the viral nucleic acid from the outside world and makes it easier for the virus to connect to and enter new cells that are open to it. The virus invasion might not hurt the host cell much or at all, or it might hurt or kill the cell.

Capsid: A capsid is the protective protein coat that surrounds the genetic code of a virus. The structure is composed of several oligomeric protomers, which are repeating subunits comprised of protein.

Nucleocapsid: It is a part of viral structure that is made up of a capsid and nucleic acid inside it. It is usually found in the cytoplasm. Different viruses have different nucleocapsids, which can be a naked core or a shell made of membranes.

Envelope: Envelope: A membrane made of lipids that surround some virus particles. It is gained during viral replication by breaking through a cell membrane.

Capsomeres: They are the morphological units that are on the outside of virus particles.



Defective viruses: They are virus particles that aren't able to replicate properly in some way.

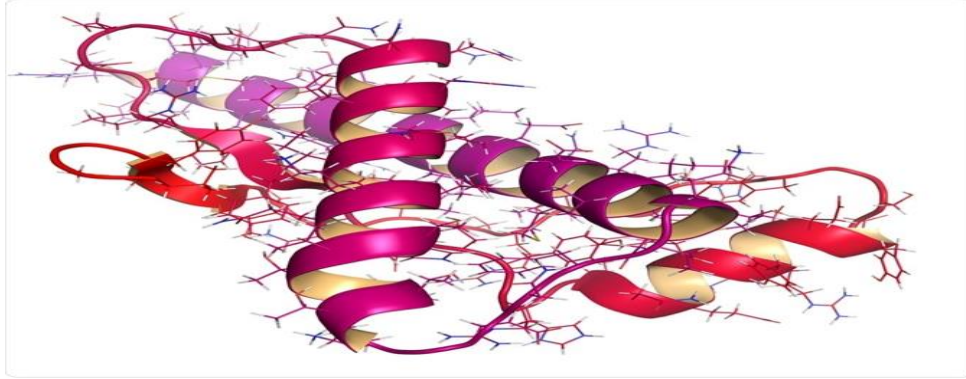
Structural units: The basic protein building blocks of the coat.

Virion: The complete virus particle.

Viriods: Small infectious agents that cause diseases of plants. They have nucleic acid without a protein coat.

Prions: They are infectious particles that are made up of only protein and **no Nucleic acid**. Highly resistant to being killed by heat, methanol, and UV light, they cause **Creutzfeldt-Jacob disease** in people.

Creutzfeldt-Jakob disease: (CJD) it is a very uncommon brain disease that causes **dementia**. It is a prion illness, which is a group of diseases that can happen to people or animals. Some of the signs of Creutzfeldt-Jakob disease can be mistaken for those of **Alzheimer's disease**.



Prions

The origins of viruses in the evolutionary history of life are unclear. However, some theories of viral origin can be summarized as follows:

- ❖ Viruses may have evolved from plasmids (pieces of DNA) that can move between cells.
- ❖ Viruses may be derived from **DNA** or **RNA** nucleic acid components of host cells that became able to replicate and evolve independently.
- ❖ Viruses may be degenerate forms of intracellular parasites, but there is no evidence that viruses evolve from bacteria.

STRUCTURE OF VIRUSES:

The following properties have been used as basic components as well as for the classification of viruses:

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1- Nucleic acid (the core):

According to the nucleic acid, viruses either DNA or RNA. It can be classified:

I: ds DNA viruses

II: ss DNA viruses

III: ds RNA viruses

IV: + ss RNA viruses

V: - ss RNA viruses

VI: ss RNA RT viruses

VII: ds DNA RT viruses

*+ve sense: mean has the same sequence

*-ve sense: mean opposite of mRNA

*DNA viruses.... circular, linear, ds or ss.

*RNA viruses.... segmented, non- segmented, ss, or ds.

COMPARISON BETWEEN VIRUSES & BACTERIA

Structure	Bacteria	Virus
Nucleus:	No	No
Reproduction:	(Fission) asexual reproduction	Make copies of the viral DNA/RNA.
Disease:	Yes	Yes
Ribosomes:	Present	Absent
Structures:	DNA and RNA floating in cytoplasm with cell wall and cell membrane	DNA or RNA enclosed inside a coat of protein
Living organisms:	Living organism	non-living
Infection:	Localized	Systemic
Enzymes:	Yes	Yes, in some
Size:	Larger (1000nm)	Smaller (20 - 300nm)
Beneficial:	Some are benefit	Viruses are not beneficial
Treatment:	Antibiotics	Vaccines prevent the spread and antiviral medications help to slow reproduction but cannot stop it completely.