

Classification of Animal Viruses

Virus

Viruses are submicroscopic infectious agent, nucleoprotein i.e., protein coat *containing either RNA or DNA as their genetic material*, lacks the enzymatic system for self-replication, depends on host cell for replication, replicates only in living cells and causes various diseases in humans, animals, and plants including bacteria and archaea.

The term 'virus' was coined by the Dutch microbiologist **Martinus Beijerinck**.

Virion: A mature complete infectious virus particle.

Virus Taxonomy

Order: *Virales* e.g., *Mononegavirales*

Families have the suffix **viridae**

e.g., Poxviridae , Herpesviridae

Genera have the suffix **virus**.

Within the Picornaviridae there are 5 genera:

enterovirus (alimentary tract) **species** e.g. poliovirus 1, 2, 3

cardiovirus (neurotropic) species e.g. mengovirus

rhinovirus (nasopharyngeal region) species e.g. Rhinovirus 1a

apthovirus (cloven footed animals) species e.g. FMDV-C

hepatovirus (liver) species e.g. Hepatitis A virus

Virus Classification

1 . Viruses

1.1 DNA viruses

2.1.1 Group I - dsDNA viruses (double stranded DNA)

2.1.2 Group II - ssDNA viruses (single stranded DNA)

1.2 RNA viruses

2.2.1 Group III - dsRNA viruses (double stranded RNA)

2.2.2 Group IV - (+)ssRNA viruses (positive single stranded RNA or mRNA like)

2.2.3 Group V - (-)ssRNA viruses (negative single-stranded RNA)

1.3 DNA and RNA Reverse Transcribing viruses

2.3.1 Group VI - ssRNA-RT viruses (single stranded RNA)

2.3.2 Group VII - dsDNA-RT viruses (double stranded DNA)

2. Subviral agents

2.1 Viroids

2.2 Satellites

2.3 Prions

Classification by genome type

DNA viruses

Group I - dsDNA viruses (double stranded DNA)

Order Caudovirales (tailed bacteriophages).

- Family Myoviridae - e.g. Enterobacteria phage T4
- Family Podoviridae
- Family Siphoviridae - e.g. Enterobacteria phage λ

Unassigned

- Family Adenoviridae
- Family Asfiviridae
- Family Herpesviridae - e.g. Human herpesviruses
- Family Iridoviridae
- Family Papillomaviridae
- Family Polyomaviridae - e.g. Simian virus 40
- Family Poxviridae - e.g. Cowpox virus, Variola virus (smallpox)
- Unassigned genera
Mimivirus; type species: Acanthamoeba polyphaga mimivirus

Group II - ssDNA viruses (single stranded DNA)

Unassigned bacteriophages

- Family Inoviridae
- Family Microviridae

Unassigned viruses

- Family Circoviridae
- Family Parvoviridae - e.g. Parvovirus B19 (most depend on coinfection with adenoviruses for growth)
- Unassigned genera
Anellovirus; type species: Torque teno virus

RNA viruses

Group III - dsRNA viruses (double stranded RNA)

Family Birnaviridae

Family Reoviridae - e.g. Rotavirus

Group IV - (+)ssRNA viruses (positive single stranded RNA or mRNA like)

Order Nidovirales ("Nested" Viruses)

- Family Arteriviridae
- Family Coronaviridae - e.g. Coronavirus

Unassigned

- Family Astroviridae
- Family Caliciviridae - e.g. Norwalk virus
- Family Flaviviridae - e.g. Yellow fever virus, West Nile virus, Hepatitis C virus
- Family Picornaviridae - e.g. Poliovirus, Rhinovirus, Hepatitis A virus
- Family Togaviridae - e.g. Rubella virus

Group V - (-)ssRNA viruses (negative single-stranded RNA)

Order Mononegavirales

Non-segmented negative stranded viruses

- Family Bornaviridae - Borna disease virus
- Family Filoviridae - Ebola viruses, Marburg virus
- Family Paramyxoviridae - e.g. Measles virus, Mumps virus
- Family Rhabdoviridae - e.g. Rabies virus

Segmented negative stranded viruses

- Family Arenaviridae
- Family Bunyaviridae - e.g. Hantavirus
- Family Orthomyxoviridae - Influenza viruses

- Unassigned genera:
Genus Deltavirus; type species: Hepatitis delta virus

DNA and RNA Reverse Transcribing viruses

Group VI - ssRNA-RT viruses (single stranded RNA)

Family Retroviridae - Retroviruses, e.g. HIV 1

Group VII - dsDNA-RT viruses (double stranded DNA)

Family Hepadnaviridae - e.g. Hepatitis B virus

Subviral agents

The following agents are smaller than viruses but have some of their properties.

Viroids

Family Pospiviroidae

- Genus Pospiviroid; type species: Potato spindle tuber viroid
- Genus Hostuviroid; type species: Hop stunt viroid
- Genus Cocadviroid; type species: Coconut cadang-cadang viroid
- Genus Apscaviroid; type species: Apple scar skin viroid
- Genus Coleviroid; type species: Coleus blumei viroid 1

Family Avsunviroidae

- Genus Avsunviroid; type species: Avocado sunblotch viroid
- Genus Pelamoviroid; type species: Peach latent mosaic viroid

Satellites

Satellite viruses

- Single-stranded RNA satellite viruses
 - Subgroup 1: Chronic bee-paralysis satellite virus
 - Subgroup 2: Tobacco necrosis satellite virus

Satellite nucleic acids

- Single-stranded satellite DNAs
- Double-stranded satellite RNAs
- Single-stranded satellite RNAs
 - Subgroup 1: Large satellite RNAs
 - Subgroup 2: Small linear satellite RNAs
 - Subgroup 3: Circular satellite RNAs

Prions

Fungal prions

Mammalian prions

Terminology

Viroids: Smallest known nucleic acid containing infectious agents, consisting of a small circular RNA molecule only of 300-400 nucleotides in size.

Satellites: A Satellite is a subviral agent composed of nucleic acid that depends on the co-infection of a host cell with a helper or, master virus for their multiplication.

Prions: Short for **p**roteinaceous infectious particle (**-on** by analogy to virion) — is an infectious agent composed only of protein. Prions cause a number of diseases in a variety of mammals, including BSE / "mad cow disease" in cattle and CJD in humans.
