

Classification of Viruses

Principles of Classification:

The classification of viruses is based on chemical and morphologic criteria. The two major components of the virus used in classification are:

1. the nucleic acid (its molecular weight and structure).
2. the capsid (its size and symmetry and whether it is enveloped or naked).

Basis of Classification

The following properties have been used as a basis for the classification of viruses.

1. **Virion morphology:** including size, shape, type of symmetry, presence or absence of peplomers, and presence or absence of membranes.
2. **Virus genome properties:** including type of nucleic acid (DNA or RNA), size of the genome, strandedness (single or double), whether linear or circular.
3. **Genome organization and replication:** including gene order, number and position of open reading frames, strategy of replication (patterns of transcription, translation), and cellular sites (accumulation of proteins, virion assembly, virion release).
4. **Virus protein properties:** including number, size, amino acid sequence, modifications (glycosylation, phosphorylation, myristoylation).

5. **Antigenic properties:** particularly reactions to various antisera.
6. **Physicochemical properties of the virion:** including molecular mass,, pH stability, thermal stability, and susceptibility to physical and chemical agents, especially solubilizing agents and detergents.
7. **Biologic properties:** including natural host range, mode of transmission, vector relationships, pathogenicity, tissue tropisms, and pathology.

Universal System of Virus Taxonomy

A system has been established in which viruses are separated into major groupings—called **families**—on the basis of:

1. **virion morphology**
2. **genome structure**
3. **strategies of replication**

- ❖ **Virus family names** have the suffix **-viridae**.
- ❖ Within each family, subdivisions called **genera** are usually based on biological, genomic, physicochemical, or serologic differences. Criteria used to define genera vary from family to family.
- ❖ **Genus names** carry the suffix **-virus**. In several families (Herpesviridae, Paramyxoviridae, Parvoviridae, Poxviridae, Reoviridae, Retroviridae), a larger grouping called **subfamilies** has been defined, reflecting the complexity of relationships among member viruses.

- ❖ Virus orders may be used to group virus families that share common characteristics, orders ends with suffix - *virales* . For example, order Mononegavirales encompasses the Bornaviridae, Filoviridae, Paramyxoviridae, and Rhabdoviridae families.

❖ **DNA-Containing Virus Families:**

1. Parvoviridae
2. Polyomaviridae
3. Papillomaviridae
4. Adenoviridae
5. Hepadnaviridae
6. Herpesviridae
7. Poxviridae

❖ **RNA-Containing Virus Families:**

1. Picornaviridae
2. Caliciviridae
3. Flaviviridae
4. Retroviridae
5. Orthomyxoviridae
6. Paramyxoviridae
7. Rhabdoviridae

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