

# General Virology:

- viruses are not classified in the 5 kingdom classification
- no well-defined cellular organisation
- obligate intracellular parasite
- replicate in the host cell

Size: 20nm - 300nm (ultramicroscopic except largest  $\Rightarrow$  Poxviruses  $\Rightarrow$  300nm)

- largest pathogenic viruses: Poxviruses (200 - 300 nm)
- smallest " " : Parvoviruses (18 - 20 nm)

## Estimation of Size of Viruses:

- done by one of the following mechanisms:
  - i. passing them through gradocol filters (pore size is known)
  - ii. Ultracentrifuge  $\Rightarrow$  depending on rate of sedimentation  
 $\Rightarrow$  using Stoke's Law
  - iii. Electron microscope  $\Rightarrow$  comparing their size with known objects

## Shape:

Reoviruses (rotav.)	wheel shaped	double-shelled capsid
Ebola, Marburg	filament shaped	$\Rightarrow$ Filoviruses
Rhabdovirus (rabies)	bullet "	
Poxviruses	brick shaped	
Corona virus	solar corona	
Adenovirus	spaceship/vehicle	
Astroviruses	star shaped	

Genome: either DNA or RNA (never both)

→ DNA ⇒ ds

⇒ ss — parvovirus

⇒ partially ds — hep. B

→ RNA ⇒ ss

↙ ↘  
+ve sense   -ve sense

⇒ ds — Reoviruses

DNA viruses: H<sup>2</sup> A P<sup>4</sup> y

H — Hepadna (ds)

H — Herpes "

A — Adeno "

P — Pox "

P — Polyoma "

P — Papilloma "

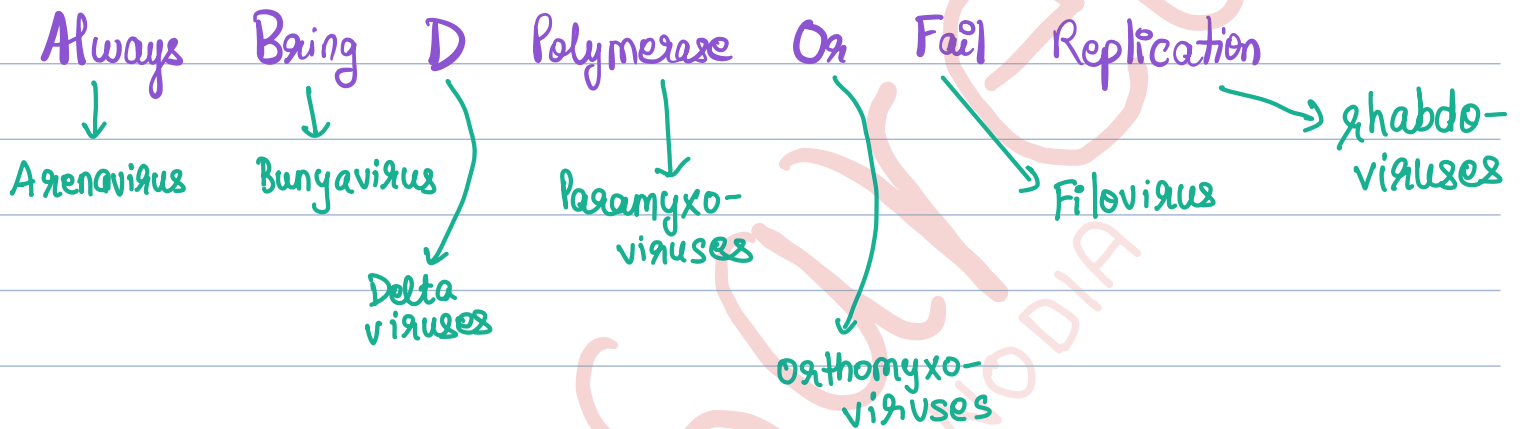
P — Parvo (ss)

y

## RNA viruses:

-ve sense/ Ambisense: (cannot be directly translated into proteins by ribosomes)

∴ inside the host, ambisense viruses have to synthesize +ve sense RNA for protein formation [RdRp - RNA dependent RNA polymerase  $\Rightarrow$  required for synthesis of +ve sense RNA which is carried by the virus itself]



+ve Sense: (can directly synthesize proteins from +ve sense RNA)

Astrovirus  
Calicivirus  
Coronavirus  
Fluvivirus  
Hepatitis virus  
Matona virus  
Reovirus  
Retrovirus  
Togavirus

## Segmented Genome RNA viruses:

- Reoviruses → 10-12 segments
- Orthomyxoviruses → 7-8 "
- Bunyaviruses → 3 "
- Arenaviruses → 2 "

→ presence of segments  $\Rightarrow$  these viruses can show genetic reassortment.

## Protein Coat [Capsid]:

- covers the nucleic acid  
[nucleic acid + protein coat = nucleocapsid]
- made of capsomeres (protein subunits)
- arrangement of capsomeres determines  $\Rightarrow$  Capsid Symmetry

## Capsid Symmetry: < helical icosahedral

Icosahedral: All DNA viruses

Except: Poxviruses  $\Rightarrow$  complex symmetry

Helical: some RNA viruses

Rest all RNA viruses

Always	—	Adenovirus
Bong	—	Bunyavirus
C	—	Corona
Polymerase	—	Paramyxo
Or	—	Orthomyxo
Fall	—	Filo
Replication	—	Rhabdo

$\Downarrow$   
icosahedral  
Symmetry

Lipid Envelope: may or may not be present

→ viruses without envelope: Naked viruses

→ viruses with envelope: Enveloped viruses

→ Lipid envelope makes the virus soluble in lipid solvents  
∴ enveloped viruses are easier to kill

Enveloped DNA Viruses:

- Pox
- Hepadna
- Herpes

Naked DNA viruses:

- P - Parvo
- A - Adeno
- P - Polyoma
- P - Papilloma