Classification of viruses

Viruses : Bacterial viruses- Bacteriophages ,Plant viruses, Animal viruses

Multiply in Hosts-bacteria, plants, animals-human beings. They posses either **DNA/RNA**

Replication steps: Adsorption, penetration, un-coating, biosynthesis, maturation & assembly, release

Bacterial viruses/Bacteriophages

DNA/RNA, **Single stranded/ Double stranded**, **Enveloped/ Non enveloped**

Taxonomy- ICTV-International Committee for Taxonomy of Viruses- subcommittee for bacterial viruses-Classification based on morphology & Chemical composition

Baltimore classification-pathway of m RNA synthesis

Class I- viruses have ds DNA. Different m RNA may be synthesized from either strand.

Class II a- viruses have ss DNA genome of the same sequence as m RNA.

Class II b- viruses have ss DNA complementary to mRNA, before m RNA synthesis DNA converted into ds form.

Class III -viruses have ds RNA, segmented genome, m RNA synthesized on only one strand of each segment.

Class IV- viruses have ss RNA of the same sequence as m RNA. Synthesis of a complementary strand before mRNA synthesis.

Class V- viruses have ss RNA complementary in base sequence to m RNA.

Class VI- viruses have ss RNA and have a DNA intermediate during replication.

DNA Viruses- (Bacterial)

Double stranded DNA

Non enveloped: Myoviridae (1. With Isometric head-P2 & 2. With Elongated head-T2), **Siphoviridae-Lamda(>1200)**

Podoviridae-T 7, P 22, **Corticoviridae- PM 2**, **Tectiviridae-PRD 1**, **Rudiviridae-SIRV 1, 2**, **Fuselloviridae - SSV 1**

Enveloped: Plasmaviridae-MV-L2, **Lipothixviridae-TTV 1**

Single stranded DNA

Non enveloped: **Inoviridae- (MV-L1 type)**, **Microviridae -(Phi X 174)**, **Inoviridae- (fd type)**

RNA Viruses- Bacterial

Double stranded RNA- **Enveloped**-**Cystoviridae-(Phi 6)**

Single stranded RNA -**Non enveloped**-**Leviviridae- (MS2)**

Plant viruses

Groups that share similar properties. **Name related to the most representative member(tobamo-TMV)/ prototype(first member identified)**

DNA viruses

ds **Non enveloped**: **1.Caulimovirus group**, **Eg: Cauliflower mosaic virus**

ss **Non enveloped**: **1.Geminivirus group** , **Eg: Maize streak virus**

ds **Non enveloped**: **1.Reoviridae**, **Eg: wound tumor virus**

ss -**Non enveloped-many groups**

ss Enveloped, **1.Rhabdoviridae**, **Eg: Lettuce necrotic yellows virus**

2. Tomato spotted wilt virus

SS RNA non enveloped viruses

1. **Alfalfa mosaic virus group**, **2. Bromovirus (brome mosaic)**, **3. Pea enation mosaic virus group**

3 a. Nepovirus- tobacco ring spot. **3 b. Comovirus-cow pea mosaic**

4. Dianthovirus (carnation ring spot), **5. Tymovirus (turnip yellow mosaic)**, **6. Tombusvirus (tomato bushy stunt)**, **7. Sobemovirus (southern bean mosaic)**, **8. Tobacco necrosis virus group**, **9. Maize chlorotic dwarf virus group**, **10. Luteovirus(barley yellow dwarf)**, 11. **Elarvirus(tobacco streak)**

12. Cucumovirus (cucumber mosaic), **13. Hordeivirus (barley stripe mosaic)**, **14. Tobravirus(tobacco rattle)**, **15. Tobamovirus(tobacco mosaic)**, **16. Potexvirus(potato X)**, **17. Carlavirus(carnation latent)**

18. Potyvirus(potato Y), **19. Closterovirus(beet yellow**)

Animal viruses

Criteria for classification: **Nature of host & specificity**, **Nucleic acid characteristics**, **Capsid characteristics**, **Presence of envelope**, **Immunological properties**, **Intracellular location of viral replication**, **Type of viral release**, **Diseases caused**

Nucleic acid characteristics: DNA / RNA, ss / ds , Arrangement-circular, linear, segmented

Sense of strand (for ss RNA): +ve / plus (as mRNA) -ve / minus (complementary)

Molecular Weight, **Segmentation**, **Presence / absence of a DNA intermediate.**

RNA viruses

ss RNA – 10 families

+ve sense – 4 families+2 families

1. **Picornaviridae** 2. **Togaviridae** 3. **Flaviviridae** 4. **Retroviridae** 5. **Caliciviridae** 6. **Coronaviridae**

-ve sense – 6 families

1. Paramyxoviridae 2. **Rhabdo viridae** 3. **Orthomyxoviridae (8 segments)**4. **Filoviridae**

5. Bunyaviridae (3 segments)6. **Arenaviridae (2 segments)**

ds RNA – 1 family **– Reoviridae (10-12 segments)**

DNA viruses

ds DNA – 5 families

1. **With Linear DNA – 3 families**-**Adenoviridae** , **Herpesviridae** , **Poxviridae**

2 . With Circular DNA – 2 families-**Papovaviridae , Hepadnaviridae**

ss DNA – 1 family- Parvoviridae (linearDNA)

Capsid symmetry	env	genome	size	Family-viridae	Sub family/genera	virus	Ass. site	Env site
Icosahedron	-	ds DNA	70-90	Adeno	Mastadeno	H. Adeno II	Cyt opl	-
Icosahedron	-	ds RNA	65-75	Reo	Reo Rota	Reo v Rota v	N	-
Icosahedron	-	ds DNA	45-55	Papova	Polyoma, Papilloma	SV 40 Wart v	C	-
Icosahedron	-	ss RNA	30-37	Calici	Calici	Calici v	C	-
Icosahedron	-	ss RNA	24-30	Picorna	Entero	Polio Coxsackie Heparna	N	-
Icosahedron	-	ss DNA	18-26	Parvo	Rhino, Parvo	Common cold	Cyt opl	-
Icosahedron	+	ss RNA	80-140	Retro	Onco, Lenti	HIV, RNA tumor viruses	C	PM &/ C
Icosahedron	+	ss RNA	40-70	Toga	Rubi	Rubella Arboviruses	C	PM &/ C
Icosahedron	+	ds DNA	42	Hepadna	Hepadna	HBV (Hepatitis B virus)	N	C

Helical	+	ssRNA	130-300x50-100	Rhabdo	Vesiculo/Lyssa	V.stomatitis,rbies	C	C&/CM
Helical	+	ss RNA	100-150	Paramyxo	Paramyxo	Mumps	C	PM
Helical	+	ss RNA	80-120	Orthomyxo	Influenza	Influenza	C	PM
Helical	+	ss RNA	75-160	Corona	Corona	Corona Murine hepatitis	C	C
Helical	+	ss RNA	90-120	Bunya	Bunya	Bunyamwera Arboviruses	C	C
Helical	+	ss RNA		Flavi	Group B Arboviruses	J.Encephalitis Dengue Yellow fever KFD		
Helical	+	ssRNA		Filo		Ebola, Marburg		

Complex/Uncertain	+	ds DNA	200-350 x 115-260	Pox	Ortho pox	Variola (small pox)	C	C
Complex/Uncertain	+	ss RNA	50-300	Arena	Arena	Lassa	C	PM/C