



## Molecular Biology of Viruses

Syllabus designed by **Devendra Lingojar**, Director ATG Lab Pune

### Theory Course Description:

#### 1. Introduction to general virology:

- Discovery of viruses: contribution of Mayor, Beijerinck, Ivanofsky
- Virus structure: capsid structure, Electron microscopy
- Classification of viruses based on genome
- The viral replication cycle: General overview
- Detection and Enumeration of viruses:  
Biological assay- plaque assay,  
Direct particle count by EM; PCR, RT PCR, Real time PCR, ELISA
- Cultivation of animal viruses in lab:  
Chick embryo culture: Pock assay & primary culture for virus detection
- Subviral particles: Viroids and Prions
- Antiviral therapy: Interferons

#### 2. a. Studies on specific animal virus family members with reference to - virus structure; replication strategy; Major pathogenesis

- Single stranded DNA virus : Human Parvovirus B19 (Parvoviridae)
- Double stranded DNA virus : Herpes virus (general overview) (Herpesviridae)
- Single stranded positive sense RNA virus: Dengue virus (Flavivirus)
- Single stranded negative sense RNA virus: Rabies virus (Rhabdovirus)
- Single stranded ambisense RNA virus: Lassa fever virus (Arenaviridae)
- Double stranded RNA virus: Rotavirus (Reoviridae)

#### 2. b. Miscellaneous viruses

- Tumor viruses: RNA tumor viruses requiring DNA intermediate for synthesis
- Corona virus – eg. Causative agent of SARS

#### 3. Molecular biology of the virus:

(History and introduction, Virus structure, viral antigens, replication and viral life cycle, transmission route, Epidemiology and pathogenesis of AIDS and bird flu, swine flu, Spanish flu)

- Retroviruses e.g. HIV
- Influenza viruses: e.g. H1N1 & H5N1

#### 4. Bacteriophages:

- Morphology & Life cycle
- Reproduction of DNA phages
- Reproduction of RNA phages

#### 5. Introduction to Plant Viruses:

- Nomenclature and classification of plant viruses
- Families of viruses infecting known vegetables and fruits in India
  - Bhendi yellowvein mosaic virus
  - Caulimovirus

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