MMB - C102
VIROLOGY

L T Credit
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Learning objectives:

- To acquire knowledge on history, how viral nomenclature will be done, general characters of viruses and how viruses are classified on basis of structure and genetic material.
- To know the different culture techniques of virus cultivation and also different techniques to diagnose viral disease.
- To enhance the knowledge on some important plant and animal diseases caused by different viruses, viruses transmission and control.
- To acquire knowledge of different types bacteriophage and their life cycle

Learning outcomes:

At the end of course student will be able

- To explain the chronology of viral history and able to classify/identify the virus on the basis genetic material and structure
- To isolate and cultivate virus in embryonatedegg , cell culture and cell lines.
- To detect virus on the basis of different serological techniues.
- To correctly differentiate between plant and animal viruses.

UNIT – I

General features –Discovery of viruses, nomenclature and classification, distinctive properties, morphology, ultrastructure, capsid and its arrangements, types of envelops and its composition; viral genomes; viroids– host range, genome and origin of viroids; cynophages- morphology, growth cycle, mycoviruses- types of mycoviruses, replication, example of mycoviruses (mycoviruses of mushrooms and pathogenic fungi); prions- spread of prions and diseases. **(15 Lectures)**

UNIT – II

Diagnostic microbiology – Isolation and cultivation of viruses- in embryonated eggs, cell cultures and cell lines, isolation and cultivation of bacteriophages and cyanophages; serological methods– haemagglutination, complement fixation, immunofluorescent method, ELISA and Radioimmunoassay (RIA); RT-PCR, assay of viruses- infectivity assay (plaque method, end point method); diagnostic techniques used for identification of viruses in seeds, seed stocks and diseased plants (e.g. seed symptomology, serological methods, histochemical tests and fluorescent microscopy) **(15 Lectures)**

UNIT – III

Bacteriophages- Structural organization, multiplication cycle; one step growth curve; DNA replication, eclipse phase, phage production, burst size, lysogenic cycle, bacteriophage typing, M13, Mu, T4, Φx174, phage λ;application of bacteriophages in health- bacteriophage therapy. **(10 Lectures)**

UNIT – IV

Plant Viruses– Classification and nomenclature of plant viruses; disease symptoms- histology, physiology and cytology of plants; common virus disease of paddy, tomato and sugarcane; type species of plant viruses (e.g. TMV, cauliflower mosaic virus, potato virus X, potato virus Y), transmission of plant viruses, indicator plants, prevention of crop-loss using virus-free planting material. **(10 Lectures)**

UNIT – V

Animal Viruses- Classification, nomenclature, multiplication of animal and human viruses; *RNA viruses*- SARS-CoV2, picornaviruses, orthomixoviruses, paramyxoviruses, arthropod- borne viruses, rhabdoviruses, rotaviruses, HIV and other oncogenic viruses; *DNA viruses* – poxviruses, herpesviruses, adenoviruses, SV40, hepatitis B virus. **(10 Lectures)**

Suggested Reading

1. Mackie and McCartney. Practical Medical Microbiology, Elsevier
2. S. Rajan. Virology, Saras Publication.
3. CKJ Paniker. Test Book of Microbiology, Orient Longman

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