

MB-102: ADVANCES IN VIROLOGY (Four Credits)

Unit I: Classification, Cultivation and Detection of Viruses (12)

Definitive properties of viruses, Cataloging of Viruses-International Committee on Taxonomy of viruses (ICTV), Structure based classification, Baltimore classification and Homes classification, LHT system of classification, Morphology and Ultra structure of Viruses.

Cultivation of Viruses: Introduction, Cell culture, Embryonated egg and Laboratory animals.

Detection of viruses in the host, Measurement of infectious units, Measurement of virus particles and their components, One step growth cycle, Assay of viruses, Physical (Electron microscopy) and Chemical methods (Protein and Nucleic acid studies), Infectivity assay.

Unit II: Multiplication of Viruses (11)

Introduction, Architecture of cell surfaces, Interaction of viruses with cell receptors, Uptake of macromolecules by cells, Mechanism of virus entry into cells, Transport of viral genome into the cell nucleus.

Genomic replication of Viruses (DNA/RNA), mRNA production by animal viruses, Mechanism of RNA synthesis, Transcription mechanism and Post transcriptional processing, Translation of viral protein, Assembly, Exit and Maturation of progeny virions.

Multiplication of bacteriophages.

Unit III: Viral Pathogenesis (11)

Host and virus factors involved in pathogenesis, Patterns of infection, Pathogenesis of animal viruses (Adenovirus, Herpes virus, Hepatitis virus, Picorna virus, Poxivirus and Orthomyxovirus), Pathogenesis of plant viruses (TMV) and Insect viruses (NPV).

Host cell transformation by viruses and oncogenesis of DNA and RNA viruses.

Unit IV: Prevention and Control of Viruses (11)

Introduction, Viral vaccines, Preparation of viral vaccines, New vaccine technology, Antiviral drugs, Virus evolution and Emergence of new viruses.

PRACTICAL LAB-I MB-102: ADVANCES IN VIROLOGY (Two Credits)

1. Isolation of coliphage by plaque formation assay.
2. One-step growth curve for determination of virus titre.
3. Induction of lambda lysogen by UV radiations.
4. Studies on Specialized transduction.
5. Isolation of lambda DNA and their characterization.
6. Amplification of lambda DNA by PCR.
7. Cultivation and assay of virus using embryonated eggs and tissue culture Technique.
8. Study of symptoms of plant viruses by simple detached leaf technique.

REFERENCE:

1. *An Introduction to Viruses* by S. B. Biswas & Amita Biswas (2009), Vikas Publishing House PVT LTD.
2. *Applied Virology Research: New Diagnostic Procedures* by Edouard Kurstak, R. G. Marusyk, F. A. Murphy (1984), Academic press Inc.
3. *Brocks Biology of Microorganisms* (Eleventh Edition) by Michael T. Madigan, John M. Martinko (2006), Pearson Prentice Hall.
4. *Clinical Virology Manual* by Steven C. Specter, Richard L. Hodinka, Danny L. Wiedbrauk, Stephen A. Young (2009), ASM Press.
5. *Introduction to Modern Virology 4th Edition* by N. J. Dimmock & S. B. Primrose (1994), Blackwell Scientific publications, Oxford.
6. *Notes on Medical Virology, 10th Edition* by Morag C. Timbury (1994).
7. *Principles of Virology: Molecular Biology, Pathogenesis and Control* by S. J. Flint, L. W. Enquist, V. R. Racaniello, A. M. Skalkaj (2009), ASM Press, Washington.
8. *Principles of Molecular Virology* (4th edn.), Edward Arnold & A. J. Cann (2005). Academic Press, London.
9. *Text Book on principles of bacteriology, Virology and Immunology* by Topley and Wilsons (1995).
10. *Virology 3rd Edition* by H. F. Conrat, P.C. Kimball and J.A. Levy (1994). Prentice Hall, Englewood Cliff, New Jersey.
11. *Compendium of Immunology and Virology* by A.B. Solunke, S.C. Aithal, V.S. Hamde, R.S. Awasthi (2018) Published by Notion Press, India, ISBN 978-1-64249-611-0 Pages 360