

MB - 101 Cell Biology and Genetics

Section - I

Unit 1 Cell Biology - I 15 hours

- 1.1. The Origin and evolution of cell, cell theory, Cell as experimental model
- 1.2. Ultra-structure and function of Bacteria : Bacterial Nucleoids, Nucleosomes, Mitochondria, Microbial Cell Surfaces, Cytoplasmic Membranes, Capsules, Organs of Locomotion , Pili or Fimbriae
- 1.3. Major structural and functional features of eukaryotic cell: Cell membrane and transport across the cell membrane, Plasma membrane , Cell wall, Extracellular matrix and cell interaction, Nucleus, Endoplasmic reticulum, Golgi complex, Lysosome, Mitochondria, Chloroplast, Peroxisome, Plastids, Vacuoles, Cyto skeleton and Cell movement,
- 1.4. Cell singling : Singling at cell surface, Singling pathway

Unit 2 Cell Biology – II 15 hours

- 2.1. Cell death and Cell renewal : Programmed cell death, Stem cell and maintenance of adult tissue, Embryonic stem cell and therapeutic cloning
- 2.2. Eukaryotic and prokaryotic cell division and cell cycle
- 2.3. Host Parasite Relationship : Structures and Functions involved in Host–Parasite interaction, pathogenesis of viral diseases, pathogenesis of bacterial diseases, Microbial mechanism for escaping host defense by bacteria or pathogens
- 2.4. Cancer : the development and cause of cancer, Tumor viruses, Onco genes, Tumor suppressor genes, Molecular approach to cancer treatment

Section - II

Unit - 3 Genetics - I 15 hours

- 3.1. The organization and sequence of cellular Genomes
- 3.2. Mendel's Principles, Concept of gene, Extensions and Modifications of Basic Principles, Sex Determination and Sex-Linked Characteristics
- 3.3. Linkage and Mapping in Eukaryotes, Prokaryotes and Bacterial viruses
- 3.4. DNA replication in prokaryotes and eukaryotes; DNA amplification and rearrangement

Unit - 4 Genetics – II 15 hours

- 4.1. Gene transcription in prokaryotes and eukaryotes; post transcriptional modification
- 4.2. Translation in prokaryotes and eukaryotes; post translational modifications; protein processing
- 4.3. Gene Expression control in Eukaryotes
- 4.4. Population and Evolutionary Genetics, Pedigree Analysis and Applications, Chromosome Variation

List of Experiments

1. Simple staining and Negative staining,
2. Gram's staining and Acid fast staining
3. Special staining : Cell wall staining, Capsule staining, Spore staining, Flagella staining, Metachromatic granule staining, Nucleus staining
4. Polytene chromosome
5. Mitosis and Meiosis
6. Study of plant cell and animal cell
7. Demonstration of Bar body and drum stick
8. Isolation of mitochondria
9. Isolation of chloroplast
10. Isolation of DNA from plant animal and microbial cell
11. Enzyme Induction
12. Determination of G+C ratio

List of Reference Books

1. Alexoplous, Introductory mycology
2. Biswas, Viruses
3. Dubey, Introduction to Fungi
4. Flint, Virology
5. Luria, Virology
6. Prescott, Microbiology
7. R. M. Atlas, Principles of Microbiology
8. Tortora, Microbiology
9. Perry, Microbial life
- 10. Carter, Virology Principle and application**