

DEPT. OF BIOMEDICAL SCIENCES
PART-A-CORE DISCIPLINE: BIOMEDICAL SCIENCES
SYLLABUS

Unit-I

Structure of bacteria, fungi, algae, protozoa and viruses. Classification of microbes (Genetic level) - Conventional and modern methods. Biology of micro-organisms used in Genetic Engineering. Methods of studying the microorganisms, methods of collection, enumeration (total and viable counts), isolation, culture and identification based on morphological, physiological and biochemical characteristics. Microbial nutrition - Microbial nitrogen fixation, carbon, nitrogen and phosphorus cycle-decomposition of organic matter - microbial biodegradation of natural and synthetic waste materials. Food microbiology - normal genera associated with fish, food spoilage, fish and human pathogens. Indicator of pollution - fecal coli forms - prevention and control.

Unit-II

Classification of carbohydrates, proteins, aminoacids, nucleic acids and lipids -Enzymes - nature, classification. Mechanism of enzyme action. Factors affecting enzyme activity. Metabolism of Carbohydrates - glycolysis and citric acid cycle. Metabolism of aminoacids-urea cycle. Brief account of fatty acid metabolism-oxidation and fatty acid biosynthesis. Synthesis and oxidative phosphorylation - ATP synthesis. Molecular Organization of cell membrane - membrane lipids and membrane proteins. The fluid mosaic model. Transport mechanisms: Diffusion (passive and facilitated)-Active transport. Endocytosis and exocytosis.

Unit-III

Cell-Structure of Cell - Function of each Components of the cell, cell cycle. Structure of nucleic acids: DNA double helix, types of RNA-mRNA, rRNA, and tRNA. Subunit structure of ribosomes in prokaryotes and eukaryotes. Properties of nucleic acids- denaturation. DNA supercoiling-DNA - binding proteins. Polytene chromosome-lamp brush chromosomes and β -chromosomes. The eukaryotic chromosome - centromere, telomere, chromatin, histones and nucleosomes. The eukaryotic genome -mitochondria and chloroplast. Replication-Semi conservative model. Enzymes involved in replication - helicases, topoisomerases, DNA polymerases, DNA ligase. Mechanism of DNA replication in bacteria and eukaryotes. DNA

damage, repair and recombination. Regulation of transcription in eukaryotes, post transcriptional processing of mRNA, rRNA and tRNA- splicing.

Unit-IV

Elements of immunology- Central and peripheral lymphoid organs, Thymus, Bone marrow, Bursa of Fabricus, lymph node and spleen. Immunoglobulins - structure, functions, classes, isotypes/allotypes and idiotypes. Types of immunity, innate and acquired immunity. Humoral immunity and cell mediated immunity. Lymphokines and cytokines. T-cell and B-cell receptors. Immunoprecipitation. Immunoelectrophoresis. Immunoblotting. Radio immunoassay. ELISA. MHC complex - gene organization. HLA genes class I & II antigens, structure and function - Histocompatibility testing. Transplantation-types, genetics of transplantation, Hypersensitivity - Types. Autoimmunity. Immunodeficiency disorders. B-cell and T-cell deficiencies. Blood Cell - Composition - Origin of RBC - Blood Groups - Estimation of RBC, WBC and platelet.

Unit-V

Drug administration, absorption, distribution, metabolism and excretion. Drug tolerance, drug resistance, drug dependence, drug habituation, synergism and antagonism in combination of drugs. General anaesthetics, narcotic analgesics, non-narcotic analgesics and anti-inflammatory agents, antidepressants, bronchodilators, diuretics, adrenergic blocking agents, neuromuscular blocking agents, drugs acting on eye. Cardiac glycosides, antihypertensive and antilipidemic drugs and anticoagulants. Chemotherapy of tuberculosis, leprosy, malaria, anticancer drugs, antifungal antiviral drugs. Vitamins in therapeutics. Antiseptics and disinfectants. Hypothalamo pituitary hormones, thyroid and anti-thyroids, Insulin, oral hypoglycemic agents, hormones of adrenal cortex, sex hormones, oral contraceptives and anabolic steroids.