

503. Biochemistry

Unit - I

BIOCHEMICAL METHODOLOGY

Principles and applications of light, phase contrast and electron microscopy, flow cytometry, gel filtration ion exchange affinity high pressure liquid and gas chromatography, Electrophoresis: Electrofocussing, centrifugation. Biophysical methods for biopolymer structure determination: X ray diffraction, fluorescence. UV – VS, ORD, CD, IR, NMR & ESR spectroscopy. Tracer techniques in biology methods of determination of structure of proteins and Nucleic acids. Immuno analytical methods, determination of the structure and conformation of proteins and polypeptides, MALDI TOFF LCMS/MS, Nucleic acid hybridization and Cot curves, Sequencing of proteins and Nucleic acids. Blotting techniques, PCR, DNA foot printing Screening of genomic and cDNA libraries. Principles, methodology and applications of genetic engineering, Chemical synthesis of genes, Molecular diagnosis and gene therapy.

Unit – II

METABOLISM

Enzyme kinetics, regulation of enzyme activity, allosteric enzymes and cofactors active sites and mechanism of action of enzymes, Isoenzymes. Energy metabolism. Electron transport. Oxidative phosphorylation and photosynthesis. Carbohydrate Metabolism : Glycolysis, Glycogen break down and synthesis. Gluconeogenesis. Amino acid metabolism, Nitrogen fixation, Purines and Pyrimidines metabolism. Lipid oxidation and biosynthesis. Metabolism of steroid and phospholipids.

Unit - III

CELL BIOLOGY AND ENDOCRINOLOGY

Biomembranes, Membrane transport, Cytoskeleton, Extracellular matrix, Signal transduction mechanism. Cell cycle and apoptosis. Hormones, Receptors and mechanism of action of hormones.

Unit - IV

IMMUNOLOGY

Classification of Immunoglobulins, Immunity, Immune response, Humoral and cell mediated immunity, Immunological memory, Adjuvants, Lymphokines, T cells receptor. Hypersensitivity, HLA, Autoimmunity, Complement, antibody diversity.

Unit - V

MOLECULAR BIOLOGY

DNA replication, DNA damage and repair. Mechanism of transcription and translation in prokaryotes and eukaryotes. Regulation of gene expression. Operon concept. Lytic cascade and lysogenic regression. DNA Methylation, Heterochromation. Antisense RNA. Protein targeting post transitional and post transcription modification, signal hypothesis. Molecular chaperones. Oncogenes and molecular basis of cancer. Tumor suppressor genes. Viruses. RNA and DNA viruses and life cycles of T – even phages, TMV, ϕ X174, SV40 and retroviruses.
