

SARDAR PATEL UNIVERSITY
B. Sc. (Biochemistry) Semester IV
US04CBCH21 : Biochemistry of Biomolecules II

UNIT I: Amino acids

- ❖ Proteins are polymers of amino acids, standard amino acids
- ❖ Classification of amino acids – Based on structure.
 - Aminoacids with aliphatic side chains.
 - Hydroxyl group containing aminoacids.
 - Sulphur containing amino acids.
 - Acidic amino acids and theirs amids.
 - Basic amino acids.
 - Aromatic amino acids and Imino acids.
 - Nutritional classification of amino acids.
 - Classification based on metabolic fate.
 - Classification based on their solubility.
- ❖ Non standard or uncommon or rare amino acids – Non protein amino acids
- ❖ Physical Properties – Isomerism, Isoelectric pH, Zwitter ion, Isoelectric point (IEP), Sorenson's titration curve.
- ❖ Chemical properties – Reactions involving (-COOH) group, Reaction involving (-NH₂) group, Reactions involving side chains.

UNIT II: Proteins

- ❖ Function and classifications.
- ❖ An overview of protein structure, peptide bond, primary,secondary,tertiary and quaternary structure.
- ❖ Forces stabilizing the tertiary structure – Hydrophobic interaction, hydrogen bonds,ionic interactions, Van der Wals interactions and covalent cross linkages.
- ❖ Biological Important peptides.
- ❖ Protein denaturation.
- ❖ Precipitations reactions of proteins.

UNIT III : Chemistry of Lipids

- Definition,classification and functions of Lipids
- Simple ,compound, derived and miscellaneous lipids.
- Fatty acids – free and esterified fatty acids, length of hydrocarbon chain, straight and branched chain fatty acids, hydroxyl and cyclic fatty acids, saturated and unsaturated fatty acids , nomenclature of fatty acids, omega classification of fatty acids, essential fatty acids, dietary sources and functions of fatty acids.
- Introduction to:
 - Triacylglycerols,phospholipids,sphingophospholipids,glycolipids ,lipoproteins,cholesterol.

UNIT IV: (A) Enzymes

- ✚ Definitions
 - ✚ Classification with examples
 - ✚ General Functions
- (B) Hormone (Human)
- ✚ Definition
 - ✚ Classification with examples
 - ✚ General Functions
 - ✚ Brief account on Hormonal imbalance

REFERENCE BOOKS:

1. Biochemistry Mathews –Van Holde.
2. Fundamentals of biochemistry Dr. J.L Jain, Dr.Sanjay Jain. Nitin Jain.
3. Textbook of biochemistry for medical students DM. Vasudevan, Sreekumari S. Kannan Vaidyanathan.
4. Zubay's Principles of biochemistry VeerBala Rastogi K.R. Aneja.
5. Textbook of Biochemistry for medical students RAFI MD.
6. Biochemistry U.Satayanarayana, U Chakrapani.
- 7 Outlines of Biochemistry Eric E. Conn, Paul k. Stumpf, George Bruening , Roy H. Doi
8. Textbook of medical biochemistry Dinesh Puri.
9. Textbook of medical biochemistry: 7th Edition – Rana Shinde, M.N. Chatterjea

SARDAR PATEL UNIVERSITY
B. Sc. (Biochemistry) Semester IV
US04CBCH22 : CELL BIOLOGY

UNIT-1 CELL STRUCTURE AND FUNCTION:-

- Structural Organization of Plant Cell and Animal Cell,
- Difference between Plant Cell and Animal Cell.
- Origin and Evolution of life from a single cell.
- General features and Biochemical Composition for following Organelles: -Plasma membrane / Cell wall, Mitochondria, Golgi complex, Ribosomes, Lysosomes, Peroxisome, Chloroplast, ER (Endoplasmic Reticulum), Cytoplasm.

UNIT-2 Cytoskeleton:-

- Actin filament: -Structure and Function, Polymerization and De Polymerization.
- Microtubule:-Symmetric -Assembly and Dynamic instability and microtubule.

- Centrosome: - location and Function, chromosome segregation. Tread milling, intermediate filament Polymerization mechanism.
- Centrioles: - Structure and Function

UNIT-3 Cell Cycle:-

- Cell Cycle- Phases of cell cycle,
- Molecular events during cell cycle phases.
- Cell Cycle Regulation,
- cyclin Dependent kinases,
- Mitosis and meiosis.

UNIT-4 Apoptosis and Stem cell:-

- Types of Apoptosis,
- Mechanism of apoptosis,
- Stem cell types,
- Significance and Application.

REFERENCE Books:-

5. The Cell- A molecular Approach Geoffrey and cooper.
6. Cell Biology – C.b. Pawar Himalaya Publication.
7. Cytology – varma and Agrawal.
8. Cell and Molecular Biology –De Roberti's -8th edition.
9. Cell and Molecular Biology John wiley and sons.
10. Mol.biology and the cell-Albert.
11. Plant Physiology by Salisbury & Ross.
12. Plant Biochemistry by Hans-walter Heldt.

SARDAR PATEL UNIVERSITY
B. Sc. (Biochemistry) Semester IV
COURSE : US04CBCH23(P)
(BIOCHEMISTRY PRACTICAL)

- Study of Protein (amino acids) colour reaction.
- Study of protein precipitation.
- Estimation of protein by Biuret method.
- Quantitative analysis of Lipid.
- Identification of Amino Acid by Paper Chromatography.
- Estimation of fatty acid by titrametic analysis.
- Study of salivary amylase.

REFERENCE BOOK:-

- Standard methods of biochemical analysis – s.r. thimmaiah.
- Practical clinical biochemistry methods & interpretations – ranjana chawla.
- Practical biochemistry by harold varley.

SARDAR PATEL UNIVERSITY
B. Sc. (Biochemistry) Semester IV
(BIOCHEMISTRY PRACTICAL)

- ❖ Study of compound microscope.
- ❖ Vital staining by Evan's Blue.
- ❖ Demonstration of mitochondria by staining.
- ❖ Study of different stages of mitosis.
- ❖ Study of nucleus.
- ❖ Study of plant cell

REFERENCE BOOK:-

- Standard methods of biochemical analysis – s.r. thimmaiah.
- Practical clinical biochemistry methods & interpretations – ranjana chawla.
- Practical biochemistry by harold varley.
- Laboratory manual in biochemistry – by j.jayaraman
- Lab manual in biochemistry, immunology & biotech – by Arti Nigam, Archana Ayyagiri
- Laboratory manual in biochemistry – By Subrayaman