

ZOH402: BIOLOGICAL CHEMISTRY

Teaching Hours 10/Unit

COURSE OUTCOME

1. The course introduces the students to different biomolecules their structure and classification.
2. Students are trained to understand the importance and biological synthesis of different biomolecules like proteins, lipids and carbohydrates.
3. Enzymes their kinetics, regulation, classification, inhibition clinical importance is studied.
4. Chemistry of nucleic acids their synthesis and breakdown are also dealt.
5. Metabolic pathways their importance, regulation and disorders associated with it are discussed.
6. On completion of the course student will have an overview of the biomolecules their importance, structure synthesis and breakdown and associated metabolic disorders.

UNIT I

Carbohydrates-Classification, structure and properties.

Monosaccharides – Glucose, Fructose and Galactose.

Disaccharides – Maltose, Lactose, Sucrose, Cellobiose and Trehalose

Polysaccharides – Glycogen, Starch, Cellulose and Inulin.

Heteropolysaccharides – Hyaluronic acid, chitin, heparin, chondroitin and keratin sulphate.

Physiologically important carbohydrates.

UNIT II

Lipids-Classification, structure and properties of fatty acids, triglycerides.

Oxidation of fatty acids – β oxidation, regulation and disorders.

Palmitate biosynthesis and its regulation.

Bile salts and bile pigments. Ketone bodies and their importance.

Prostaglandins and their significance.

UNIT III

Amino acids- classification, chemical nature and properties. Classification of proteins, physical-chemical properties, structure- primary, secondary, tertiary and quaternary. Methods for determining amino acid sequences – N-terminal, C- terminal and amino acid analysis of proteins. Protein synthesis and its inhibitors; Metabolism of aromatic amino acids. Laboratory synthesis of peptides. Protein Targeting and Degradation Protein folding - Diseases of protein mis-folding, Introduction to proteomics.

UNITIV

Classification of enzymes. Enzyme Kinetics, Factors affecting enzyme catalysed reactions. Enzyme inhibition. Allosteric regulations of enzyme activity Co-enzymes, metalloenzymes, iso-enzymes and Multienzyme complexes, Ribozymes. Clinical applications of enzymes. Blood clotting proteins, Plasma proteins and their importance

UNITV

Nucleic acids – Classification and chemistry.

Nucleosides, nucleotides, nucleoside analogs and polynucleotides.

Biosynthesis and break down of purines and pyrimidines.

Salvage pathway. Disorders of nucleic acid metabolism.

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