Subject Code : P8BC1

SEMESTER – I : CORE COURSE I –Chemistry of Biomolecules

Unit 1

Classification of amino acids and general properties. The peptide bond– the Ramachandran plot. Chemical synthesis of peptides– Merrifield method. Proteins– classification, denaturation and renaturation. Orders of protein structure. Secondary structure– the α-helix, β- pleated sheet. Pauling and Corey model for fibrous proteins. Collagen triple helix. Protein sequencing.

Unit 2

Super secondary structure– helix– loop helix, the hairpin β -motif and the β-α-β-motif. Forces stabilizing tertiary and quaternary structure. Structure of haemoglobin– oxygen binding and changes in conformation. Structure of myoglobin- Methods of isolation, characterization and purification of proteins.

Unit 3

Polysaccharides: structure and biological functions of Homo polysaccharides structure and biological functions of chitin, fructans, mannans, xylans, and galactans. Hetero polysaccharides. Structure and biological importance of sugar derivatives-glycosaminoglycans, proteoglycans. Glycoprotein – Blood group and bacterial cell wall polysaccharides, O- linked and N- linked oligosaccharides and Lectins.

Unit 4

Definition and classification of lipids. Biological significance of fat. Types of Fatty acids-Essential, Non essential. Structure and biological functions of phospholipids, sphingolipids, glycolipids. Steroids–functions of cholesterol, bile acids, sex hormones, ergosterol. Fatty acids as inflammatory mediators. Structure and biological role of prostaglandins, thromboxanes and leukotrienes.

Unit 5

Structure of purines, pyrimidines, nucleosides and nucleotides. DNA double helical structure. A, B and Z forms of DNA. Triple and quadruple structures. DNA supercoiling and linking number. Properties of DNA: buoyant density, viscosity, hypochromicity, denaturation and renaturation– the cot curve. DNA sequencing– chemical and enzymatic methods. Chemical synthesis of DNA. RNA– types and biological role. Secondary, tertiary structures of RNA. Minerals in Biological systems and its importance –Iron, calcium, Phosphorous, Iodine, Copper, Zinc. Fat and water soluble Vitamins – properties and function. Role of Vitamin as Antioxidant.

Books recommended

1. Biochemistry Zubay 4th edition 1998 William C.Brown Publication.
2. Harper's Biochemistry 25th edition McGraw Hill.
3. Biochemistry Stryer 4th edition Freeman.
4. Principles of Biochemistry. Lehninger Nelson Cox Macmillan worth Publishers, 2000.
5. Biochemistry. Davidson and Sittmann, NMS 4th ed. Lippincott Williams and Wilkins, 1999
6. Biochemistry – Voet and Voet.
7. Biochemistry – David Rawn.