Subject Code : N2O5

VI – ENZYMOLOGY AND METABOLISM

UNIT – I

Nomenclature and classification of enzymes according to IUB. Homogenization techniques, isolation and purification of enzymes, concept in enzyme assay. Criteria of purity determination of enzyme activity, active site of enzymes, enzyme –substrate complex formation and mechanism of bisubstrate reactions.

UNIT – II

Kinetics of enzyme catalysed reaction : Michalis and Mentom equation, Lineweaver and Burk plot, and effect of change of temperature and pH on the rate of reaction. Enzyme inhibition : Competitive, non-competitive and uncompetitive inhibitors. Allosteric inhibition.

UNIT – III

Carbohydrate metabolism : Glycolysis, glycogenolysis, TCA cycle, HMP shunt, glycogenesis and glyconeogenesis. Energy production glucose degradation.

Lipid metabolism: Oxidation of fatty acids and biosynthesis of fatty acids. Biosynthesis of triglycerides, phospholipids and steroids. Metabolism of cholesterol, bile acids, lipoprotein and glycolipids. Lipids as a nutrient.

Regulation of enzyme activity, availability of substrates and coenzymes, interrelationship of TCA cycle and fatty acid synthesis: regulation of gluconeogenesis by compartmentalization, regulation of the activity of glycogen synthetase, glycogen phosphorylase, glutamine synthetase and hexokinase. Km value and blood sugar regulation, regulation of gluconeogenesis.

UNIT –IV

Bioenergetics: Thermodynamic principles, chemical eqibria, free energy change in biological transformation in living systems, high energy compounds, energy change, oxidation – reduction reactions, organization of electron carriers and enzymes in mitochondira, classes of electron transferring enzymes, inhibitors of electron transport, oxidative phosphorylation, uncouplers and inhibitors of oxidative phosphorylation, mechanism of oxidative phosphorylation, mitochondrial transport system, microsomal electron transport.

UNIT – V

Nitrogen metabolism : Oxidative and non-oxidative deamination, transminatin and urea cycle. Ketogenic and glycogenic amino acids, essential and non-essential amino acids, nitrogen balance.

Biosynthsis and degradation of purine and pyrimidine ring and nucleotides. Ribozymes and their function. Detoxification of xenobiotics.

Text Books:

1. The enzymes (Vol. I & II) :PD Boyer, H Lardy and Myrback (Academic Press, 1973).
2. Enzymes catalysed reactions:CH Gray (Van Nostrand Reinhold, 1971).
3. Enzymes : M Dixon and JF Webb.

Reference Books:

1. Enzymes and metabolic inhibitors (Vol.I & II) : JF Webb (Academic Press).
2. Biochemistry : Lehninger (Kalyani Publ. 1991).
3. Harper's Review of Biochemistry : Martin, Mayes and Raywell
4. An Introduction to the study of Enzyme : GH Guttfreund (Blackwell)