

OBJECTIVES: The students will be able to:

- Understand how the biomolecules are utilized in the body
- Gain knowledge about the various metabolic processes

COURSE:

UNIT I: INTRODUCTION TO METABOLISM – General features of metabolism, experimental approaches to study metabolism; use of intact organism, bacterial mutants, tissue slices, stable and radioactive isotopes.

BIOENERGETICS –energy transformation in living systems, free energy concept, exergonic and exergonic reaction, high energy compounds and their role.

UNIT II: BIOLOGICAL OXIDATION – Redox reactions, Redox potential Structure of mitochondria (review), mitochondrial electron transport chain components, sites of phosphorylation, inhibitors, oxidative phosphorylation – inhibitors, uncouplers chemiosmotic theory of ATP synthesis and transport of reducing potentials into mitochondria. Formation of reactive oxygen species and their disposal through enzymatic reactions.

UNIT III: CARBOHYDRATE METABOLISM – Reactions and energetics of glycolysis, TCA cycle, Gluconeogenesis, glycogenesis and glycogenolysis. Interconversion of monosaccharides. Reactions and physiological significance of Pentose Pathway. Alcoholic and lactic acid fermentations. Photosynthesis – a brief review. Calvin cycle, C₄ pathway of carbon dioxide fixation.

UNIT IV: LIPID METABOLISM – Hydrolysis of triacylglycerols, transport of fatty acids into mitochondria, β -oxidation of saturated fatty acids, ATP yield from fatty acids oxidation. Biosynthesis of saturated and unsaturated fatty acids. Metabolism of ketone bodies, oxidation of unsaturated and odd chain fatty acids. Biosynthesis of triglycerides and important phospholipids, glycolipids, sphingolipids and cholesterol. Regulation of cholesterol metabolism.

UNIT V : Inborn errors of carbohydrate and lipid metabolisms.

1. Rama Rao, A.V.S.S. (1989) Text Book of Biochemistry, L.K. & S Publishers, Visakhapatnam.
2. Comn, E.E. and Stump, P.K. (1989) Outline of Biochemistry. Wiley Eastern Ltd., New Delhi.
3. Kleiner, I.S. and Orten, J.M. (1979) Biochemistry. C.V. Mosby & Co., St. Louis.
4. Swaminathan, M (1981) Biochemistry For Medical Students, Geeta Book House Publishers, Mysore.
5. Kuchel, P.W. and Ralston, G.B. (1988) Theory And Problems Of Biochemistry, Mc Graw Hill Book Co., New York.

PRACTICALS

1. estimation of pyruvate
2. estimation of phosphorous by fiske subbarow method
3. estimation of alcohol by colorimetric method
4. estimation of glucose by nelson somogyi method
5. estimation of glucose by benedicts method
6. estimation of cholesterol

REFERENCES:

1. Plummer, D.T.(1979) An Introduction to Practical Biochemistry, Tata MC Graw Hill Book Co., Bombay.
2. Oser, B.L.(1961) Hawk's Physiological Chemistry, Tata MC Graw Hill Book Co. Bombay.