

Z-3601 & Z-3602

BIOCHEMISTRY-II & LAB

Cr. 3(2+1)

Theory

Bioenergetics: Concept of Free Energy; Standard Free Energy change: Energy rich compounds.

Metabolism: description of Glycolysis Regulation and Bioenergetics of Glycolysis. Anabolic role

of Glycolysis; Fate of Pyruvate; Gluconeogenesis, its Regulation and significance in tissues; Utilization of other carbohydrates Glycogen synthesis and degradation; Regulation of Glycogen metabolism;; Pentose phosphate pathway and its major role in the animal tissues.

Citric acid (TCA) cycle: Conversion of Pyruvate to Acetyl CoA, Pyruvate dehydrogenase, a multi-enzyme complex; description of citric acid cycle; Bioenergetics of the cycle. Anabolic or Biosynthetic role of citric acid cycle intermediates; Replenishing or Anaplerotic reactions and their role; Regulation of Citric acid cycle; Electron transport chain.

Lipid metabolism: Fate of dietary fat; Activation of Fatty acids and their transportation to mitochondria; Beta-Oxidation; Alpha oxidation; Bioenergetics of Beta-oxidation; Oxidation of unsaturated and Odd chain fatty acids; Omega oxidation pathway; Biosynthesis of Saturated Fatty acid; Biosynthesis of unsaturated Fatty acids. Ketone bodies their biosynthesis, utilization and role in the tissues; Cholesterol metabolism: Cholesterol biosynthesis and its Regulation.

Nitrogen Metabolism: Metabolic fate of amino acids; Catabolism of Amino acids; Deamination and Transamination; Nitrogen Excretion and Urea cycle; Regulation of Urea cycle; Decarboxylation of Amino acids to Biological Amines.; Purine and Pyrimidine synthesis showing the sources of various atoms in both molecules.

Recommended text book

1. David L. Nelson, and Michael M. Cox, 2000. Lehninger Principles of Biochemistry, 3rd Ed., Macmillan Worth Publishers, New York.
2. Murray, R.K., Granner, D.K., Mayer, P.A. and Rodwells, V.W., 2000. Voet. D., Voet, J.G., and Pratt, C.W., 1999. Fundamentals of Biochemistry, John Wiley and Sons, Inc., New York.
3. Zubay, G., 1995. Biochemistry, 4th Ed., Wm. C. Brown Publishers, Inc., Oxford, England.
4. Stryer, L., 1995. Biochemistry, 6th Ed., W.H. Freeman and Company, New York.

Practicals

Preparation of standard curve of proteins by Biuret method. Estimation of blood serum proteins or any unknown concentration of protein using Biuret technique. Biochemical tests for detection of different amino acids. Separation and identification of various amino acids by Paper/Thin layer chromatography. Demonstration of differential solubility of lipids in various solvents. Various Qualitative Tests for detection of Lipids.

Determination of Acid value of Fats. Preparation of standard curve and Estimation of DNA by colorimetric analysis using Diphenylamine method. Preparation of standard curve and Estimation of total RNA by colorimetric analysis using Bial's Orcinol method.

Quantitative analysis of Amylase activity from blood serum or liver. Effect of temperature on the enzymatic rate of reaction.

Books Recommended

1. Plummer, David T., 1990. *An Introduction to Practical Biochemistry*, 4th Ed. McGraw-Hill Book Company, London.
2. Wilson, K and Walker, J., 1994. *Practical Biochemistry: Principles and Techniques*, 4th Ed., Cambridge University Press.
3. Sawhney, S.K and Singh, R., 2008. *Introductory Practical Biochemistry*, Narosa Publishing House, New Delhi, India.