QUESTIONNAIRE IN BIOCHEMISTRY

FOR STUDENTS OF DENTAL MEDICINE


4. Enzyme kinetics – changes in the rate of enzyme catalyzed reaction caused by changes in the concentration of the enzyme or its substrate. Principles for determination of the enzyme activity. Temperature and pH influence on the rate of an enzyme catalyzed reaction.


7. Water-soluble vitamins. Biological functions. Avitaminoses (diseases caused vitamin deficiencies)


9. Bioenergetics – Features of organisms as open chemical systems. The first and the second laws of thermodynamics and their application in living organisms. Coupling of endergonic with exergonic processes using macroergic compounds. Types of macroergic bonds and compounds. Central role of the system ATP/ADP.


15. Carbohydrate metabolism – digestion and absorption in the intestinal tract and glucose transport systems. Major metabolic pathways.


21. Regulation of the glucose metabolism – maintaining the blood glucose concentration. Biologic processes and tissues involved in maintenance of the blood glucose concentration, hormonal effects. Biochemical changes in diabetes type 1 and type 2.


23. Oxidation of fatty acids with odd- and even number of carbon atoms – energy balance. Enzyme defects of the oxidation


30. Cholesterol derivatives (steroid hormones, vitamin D, bile acids) – structure and biological role.


34. Metabolism of Serine, Tryptophan and Arginine – derivatives of biologic significance of – serine (ethanolamine, choline, phospholipids), tryptophan (NAD+, serotonin, melatonin), arginine (creatine phosphate, citrulline, nitric oxide, polyamines).

35. Ammonia production, detoxification and excretion. Urea cycle. Ammonia detoxification by glutamate dehydrogenase reaction, glutamine synthesis, urea cycle and ammoniagenesis. Role of the liver, muscles and kidneys in the detoxification of ammonia.

36. Integrity of the metabolism. Interrelationships between metabolism of carbohydrates, lipids and proteins. Role of different tissues and organs in the maintenance of those interrelationships.


40. Biosynthesis of porphyrins Cellular localization and regulation of the biosynthesis pathway. Types of porphyrias.


32. DNA and RNA – structure and composition.

44. Translation of the genetic information – protein biosynthesis, stages and regulation.


46. Signal transduction – Different types of signal molecules. Classification of hormones according to their chemical structure. Receptors – classification.

47. Molecular mechanisms of action of hormones binding intracellular receptors.

48. Molecular mechanisms of action of hormones binding cell membrane receptors associated with G-proteins. Intercellular signal transduction cascades: second messengers (cAMP, cGMP, ITP, DAG, Ca^{2+})


60. Biochemical features and specifications of metabolism in muscles. Biochemical considerations in muscle contraction.

LITERATURE FOR SELF-STUDY

1. Lecture course in Medical Biochemistry for students of dental medicine in Medical University of Plovdiv by Prof. T. Vlaykova, PhD (in English)
4. Liberman, M., Marks, A. – Mark’s Basic Medical Biochemistry, third edition – Lappincott Williams & Wilkins, 2009
5. Devlin, T. M. – Textbook of Biochemistry with Clinical Correlations, seventh edition – Josh Wiley and Sons Ltd., 2010