

## Questions for concluding session by the theme: “ Functional biochemistry”.

1. History of development of vitaminology.
2. Primary conception of vitaminology: vitamins, pro-vitamins, non-vitamins, vitamin like compounds.
3. Avitaminosis, hypovitaminosis, hypervitaminosis: definition, factors.
4. Nomenclature and classification of vitamins.
5. Vitamins B-group, C and P: daily requirement, sources, functions, imbalances, medical uses.
6. Lipid soluble vitamins A, D, E, K: daily requirement, sources, functions, imbalances, medical uses.
7. Vitamin like compounds: ubiquinone, orotic acid, carnitine, choline etc.: significance, medical uses.
8. Notion about hormones. History of development of endocrinology.
9. Classification of hormones: by action mechanism, chemical nature, place of synthesis.
10. Structural organization of endocrine system. Concept about APUD-system, apudocytes.
11. True hormones: main sign and representatives.
12. The signs of hormone-like substances (histohormones). Varieties of isocrinic (local) action. The representatives of hormone-like substances.
13. Regulation of hormones secretion. Cascade amplification of hormonal signal.
14. Types of the intercellular communications and types of mechanisms of regulatory signals transmission.
15. Action mechanism of hormones of protein-peptide nature and catecholamins (through cell membrane receptors):
  - types of cell membrane receptors and their structure;
  - role of G-proteins (transducers);
  - secondary mediators (messengers): cAMP, cGMP, Ca<sup>2+</sup>-CaM, I<sub>3</sub>P, DAG.
16. Active forms of oxygen and gases as the messengers of cellular signals.
17. The mechanisms of action of lipid nature (steroids) hormones (through cytosol receptors).
18. Signal systems of apoptosis.
19. Regulation of metabolism and physiological function of cells:
  - by hormones of central endocrine glands;
  - by hormones of peripheral endocrine glands;
  - by hormones of mixed function glands (sexual glands and pancreas).
20. Hormones as medicines.
21. Blood as a biological liquid. Kinds of blood, blood preparations as medicines. Functions of blood. Blood cells, plasma and serum, pathological changes.
22. General physico-chemical constants of blood, their regulation.
23. Chemical composition of blood: proteins (physiological and pathological), rest [nonprotein] nitrogen, its clinical significance, anazotic organic components of blood, electrolyte composition of blood. Enzymes of blood serum.
24. Conception of xenobiotics. Significance of xenobiology for medicine and pharmacy.

25. Common pathway of xenobiotic's biotransformation in organism.
26. Conception of pharmacokinetics: administration, absorption, distribution and elimination of drugs.
27. Drug biotransformations, its kinds.
28. The influence of exogenous and endogenous factors on drug metabolisms.
29. Microsomal oxidation. Microsomal electron-transport chains, their structure and functions.
30. Characteristics, functions, isozymes forms of cytochrome P 450, induction.
31. Conception of metabolic activation. Formation of electrophilic metabolites.
32. Reactions of xenobiotic's biotransformation: hydroxylation, dealkylation, conjugation and hydrolysis.
33. The pathway of ethanol's biotransformation, its oxidation to final products.
34. Mechanisms of ethanol's biological action (reactions of acetic aldehyde interaction with different connections and effects of their products). The role of endogenous ethanol.
35. Water: kinds, biological functions, the maintenance in an organism. Neuroendocrinal regulation of water-salt metabolism.
36. Mineral substances: classification and a biological role.
37. Roles of Na, Ca, K, Mg, P, Fe, Cl in metabolism. Biological significance value of the normal level Ca in blood.
38. Biological significance trace substances (microelement): I, Br, F, Mn, Cu, Co, Se et al.
39. Physico-chemical properties and chemical compound of urine in norm and at a pathology.
40. Biochemistry of muscular tissue. Energy supply of contraction. Creatine, phosphocreatine, creatinine - formation, significance.
41. Biochemistry of connective tissue: cellular structure, fibrous structures, the basic intercellular substance, their significance. Synthesis and chemical compound of collagen and elastin.
42. Biochemistry of nervous tissue and cerebrospinal fluid. Features of a chemical compound and metabolism in a brain tissue.