

Educational Institution  
“GRODNO STATE MEDICAL UNIVERSITY”

CREDIT QUESTIONS on Biochemistry  
for the medical faculty for international students  
Specialty 1-79 01 01 Medical Affairs  
2022/2023 academic year

1. Major objectives, branches and research trends of biochemistry
2. Proteins as the major components of the body. Functions and shape of proteins.
3. Amino acid composition of proteins. Structure of peptides.
4. Physicochemical properties of proteins.
5. Colour reactions of amino acids and proteins, practical use.
6. Determination of total serum protein. Clinical and diagnostic value.
7. Primary structure of proteins. Determination of primary structure.
8. Secondary structure of proteins. Supersecondary structure.
9. Tertiary structure of proteins. Types of stabilizing bonds.
10. Denaturation of proteins, factors, practical use.
11. Changes of proteins in ontogenesis and disease.
12. Simple proteins; representatives, characteristics, biological functions.
13. Conjugated proteins; representatives, characteristics, biological functions.
14. Active and allosteric centers in enzymes.
15. Simple and conjugated enzymes. Co-enzymatic functions of vitamins.
16. Properties of enzymes. Specificity of enzymes.
17. Classification and nomenclature of enzymes.
18. Factors affecting enzymatic reaction rate (temperature, pH, substrate and enzyme concentration).
19. Inhibition of enzymes: reversible (competitive, non-competitive), irreversible.
20. Tissue-specific enzymes.
21. Serum enzymes used in clinical diagnosis. Origin of serum enzymes.
22. Change of enzyme activity in diseases (enzymopathies). Inherited and acquired enzyme deficiencies.
23. Sources of amino acids in the body and ways of their use.
24. Transamination of amino acids, enzymes, biological role. Mechanism of transamination.
25. Deamination of amino acids: types and biological role.
26. Transdeamination. Biological role.
27. Decarboxylation of amino acids. Types of decarboxylation, biological role.
28. Biogenic amines: synthesis, their functions.
29. Intracellular detoxification of ammonia: reductive amination, synthesis of glutamine and asparagine.
30. Biosynthesis of urea. Disorders of the urea synthesis and excretion.
31. Metabolism of phenylalanine and tyrosine. Disorders of phenylalanine and tyrosine metabolism (phenylketonuria, alcaptonuria, albinism).
32. Chemical composition of nucleic acids. Differences between DNA and RNA.

33. DNA: composition, biological role. Primary and secondary structure of DNA.
34. Types of RNA: their biological functions, structure, composition.
35. Biosynthesis of pyrimidine nucleotides: scheme.
36. Disorders of metabolism of nucleotides: xanthinuria, orotaciduria, gout.
37. Biosynthesis of DNA in eukaryotic cells: substrates, enzymes, scheme.
38. Biosynthesis of RNA in eukaryotic cells: substrates, enzymes, steps, scheme.
39. Eukaryotic translation: initiation, elongation, termination
40. The blot-analysis of DNA and RNA.
41. Polymerase chain reaction: stages and practical applications.
42. High-energy compounds: structure, biological role (ATP and other nucleoside triphosphates, 1,3-bisphosphoglycerate, phosphoenolpyruvate, creatine phosphate, acetyl CoA, succinyl CoA).
43. Electron transport chain (ETC), its structural organization and functioning. Electron transport chain complexes.
44. Oxidative phosphorylation, mechanisms. The chemiosmotic theory of oxidative phosphorylation.
45. The citric acid cycle: reactions, regulation and biological role.
46. General properties and functions of biological membranes.
47. Types of transport mechanisms across membranes.
48. General characteristics of oxidation processes. Types of oxidation: schemes, biological role.
49. Reactive oxygen species: their tissue-damaging effects.
50. The specific and common pathways of catabolism.

Head of Department of Biochemistry,  
professor

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Approved by the meeting  
of Department of Biochemistry  
protocol № 4 from 03.11. 2022