

## *Questions for oral exam from oral biochemistry*

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### *Dental Medicine*

1. Enzymes – general characteristics, structure, and function
2. Factors affecting the reaction rate of enzymatically catalyzed reactions
3. Inhibition of enzymatic reactions. Michaelis-Menten constant  $K_m$
4. Allosteric enzymes - effectors and inhibitors
5. Naming and classification of enzymes
6. Coenzymes and cofactors
7. Significance of enzyme specificity (e.g. isoenzymes)
8. Enzymatic activity and its determination
9. General mechanism of the regulation of catalytic activity in living systems
10. Activation and inactivation of enzymatic activity
11. Respiratory chain and its enzymes
12. Citric acid cycle
13. Anaplerotic reactions and energetic of citric acid cycle
14. Enzymes of the citric acid cycle - regulation
15. The cell and its intermediary metabolism
16. Endergonic and exergonic reactions in metabolism
17. ATP-ase - structure, inhibitors of oxidative phosphorylation
18. Biologic oxidation (e.g. oxidase, oxygenase, peroxidase and dehydrogenase)
19. Macroergic compounds and their roles in metabolism
20. Formation and metabolic role of acetyl-CoA
21. Glucose-6-P - its roles in metabolism
22. Synthesis and roles of glucuronic acid
23. Glycolysis and its energetic balance
24. Peculiarities in metabolism of glucose in erythrocytes
25. Gluconeogenesis and its regulation
26. Metabolism of monosaccharide's (e.g. galactose, fructose)
27. Disorders in saccharides metabolism
28. Metabolic pathways of pyruvic acid (e.g. pyruvate decarboxylase)
29. Cori cycle and glucose-alanine cycle
30. Biosynthesis and degradation of oligosaccharides
31. Pentose phosphate cycle
32. Glycogen synthesis and its regulation
33. Glycogenolysis and its regulation, disorders
34. Metabolism of aminosugars
35. Digestion and absorption of sugars
36. Degradation of triacylglycerols
37. Beta-oxidation of fatty acids
38. Other types of fatty acid oxidation
39. Biosynthesis of saturated fatty acids and triacylglycerols
40. Biosynthesis of unsaturated fatty acids and triacylglycerols
41. Phospholipids (e.g. classification, roles, biosynthesis)
42. Digestion, absorption and catabolism of complex lipids
43. Lipoproteins, mucoproteins and glycoproteins – metabolism, biological functions
44. Formation and degradation of ketone bodies
45. Biosynthesis of cholesterol and its roles
46. Bile acids, biosynthesis and importance
47. Biosynthesis of vitamin D, function and disorders
48. Disorders in lipid metabolism
49. Nitrogen sources (nitrogen balance, proteins)

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50. Main reactions of amino acid catabolism
51. Essential and nonessential amino acids and their importance in metabolism
52. Formation of ammonia in the organism and its fate. Transport and detoxification of ammonia
53. Urea synthesis (regulation, disorders)
54. Amino acids metabolized through pyruvate (synthesis, degradation, disturbances)
55. Amino acids metabolized through oxaloacetate (synthesis, degradation, disturbances)
56. Amino acids metabolized through acetyl-CoA (synthesis, degradation, disturbances)
57. Amino acids metabolized through 2-oxoglutarate (synthesis, degradation, disturbances)
58. Amino acids metabolized through succinyl-CoA (synthesis, degradation, disturbances)
59. Amino acids metabolized through fumarate (synthesis, degradation, disturbances)
60. Formation and function of NO
61. Transformation of carbon skeleton of amino acids
62. Catecholamines - formation, functions and degradation
63. Amino acids and peptides as precursors of neurotransmitters
64. Biogenic amines - formation and function
65. Glucogenic amino acids
66. Ketogenic amino acids
67. Role and importance of THF and SAM in metabolism
68. Significance of amino acids for formation of other compounds
69. Biosynthesis, degradation and regulation of pyrimidine nucleotides
70. Biosynthesis, degradation and regulation of purine nucleotides
71. Cyclic nucleotides and their importance in regulatory reactions
72. Degradation NA, nucleotides and nucleosides
73. Importance salvage reactions of nitrogen bases and nucleosides
74. Biosynthesis of deoxyribonucleotides (importance, regulation)
75. Disorders in nucleotide metabolism
76. Relationship between metabolism of saccharides and lipids
77. Relationship between metabolism of saccharides and aminoacids
78. Relationship between metabolism of lipids and amino acids
79. Relationship between metabolism of aminoacids and nucleotides
80. Structure of DNA, denaturation and renaturation of DNA
81. Structure of RNA (mRNA, rRNA, tRNA)
82. Arrangement of genetic material in DNA, genes, exons and introns, genetic code
83. Biosynthesis of DNA (e.g. regulation, mutation, correcting mechanisms)
84. Biosynthesis of RNA (mRNA, rRNA, tRNA)
85. Proteosynthesis in prokaryotic and eukaryotic cells (e.g. initiation, elongation and termination)
86. Inhibition of proteosynthesis by exogenic substances
87. Posttranslational corrections of peptide chains, signal peptides
88. Transcription of DNA (e.g. induction, repression, regulation)
89. Inhibitors in biosynthesis of nucleic acids
90. Biosynthesis of heme (regulation, disorders)
91. Formation of bile pigments, transport and conversion of bilirubin in the intestines
92. Proteins of blood plasma
93. Blood, its composition and biochemical function
94. Acid-base balance. Buffer systems
95. Role of water in metabolism and nutrition

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96. Transport of O<sub>2</sub> and CO<sub>2</sub>, role of blood in respiration
97. Disorders in ABB (kidney, liver, lungs role in ABB maintenance)
98. Metabolism of xenobiotics, types of biotransformation reactions
99. Biochemical characterization and classification of hormones
100. Receptors – characteristic and classification
101. Mechanisms of hormone action
102. Mediators – neurotransmitters
103. Fundamental components of food, their role and energetic value
104. Digestion of proteins in the GIT and reabsorption of cleaved products
105. Digestion in mouth
106. Biochemistry of muscle contractions
107. Biochemistry of skin
108. Biochemistry of neural tissue
109. Composition and metabolism of hard tissue (bones, teeth)
110. Extracellular matrix (connective tissue – collagen, GAG)
111. Metabolism of Ca, regulation and disorders
112. The influence of diet on the metabolism of teeth
113. Dietary requirements, basal metabolism, balanced diet
114. Enamel formation and properties
115. Pellicle, plaque and carries formation
116. Prevention of tooth carries
117. Role of saliva
118. Tongue and taste receptors
119. Factors affecting reliability of biochemical results and their interpretation
120. Clinical biochemistry (e.g. importance, biological material)