QUESTIONS FROM PATHOLOGICAL PHYSIOLOGY

The oral exam in pathological physiology has a practical and theoretical part. In the practical part you will analyze one specific case report. You can find several examples of case reports in the study materials section on our institute's website. The case report also includes one question regarding examination methods. The list of questions focusing on examination methods can be found below.

In the theoretical part, you will choose tree questions from general and special pathophysiology. The questions highlighted in red are considered fundamental questions. We place the greatest emphasis on them, hence a significant lack of knowledge regarding the topics discussed in these questions will serve as a reason to immediately end the exam. Each triplet will always contain one fundamental question, which will be tested first.

The exam in pathological physiology is mainly focused on knowledge concerning the **etiology and pathogenetic mechanisms of diseases**. We also ask about the basic clinical symptoms and diagnostic procedures, but these should be interpreted in relation to the pathophysiology of specific pathological conditions. **For diseases and symptoms, focus on distinguishing between causes and consequences!** If the question asks you for examples, prepare at least two of them. For questions, which contains specific terms, prepare definitions of these terms. Use pathological-physiological descriptions, not pathological-anatomical descriptions.

I. Practical part: Examination methods - principle, use, interpretation of basic disorders

1. Examination of red blood cells
2. Examination of a blood smear
3. Examination of white blood cells
4. Bone marrow examination
5. Pre-transfusion testing
6. Examination of iron biomarkers
7. Laboratory indicators of hemolytic anemias
8. Examination of blood clotting
9. Examination of primary blood clotting disorders
10. Examination of secondary blood clotting disorders
11. Laboratory indicators and markers of inflammation

12. Examination of thromboembolic diseases
13. Blood pressure monitoring
14. Examination for myocardial infarctions
15. ECG - basic analysis of the curve, topography of leads
16. ECG - assessment of heart rate and rhythm
17. ECG - assessment of cardiac axis and intervals
18. ECG - manifestations of atrial and ventricular hypertrophy
19. Echocardiography
20. Right-sided cardiac catheterization
21. Left-sided cardiac catheterization, coronarography
22. Stress testing of the cardiovascular system
23. Examination of pulmonary embolisms
24. Examination of blood gases and monitoring of oxygenation
25. Acid-base examination
26. Spirometry (volume-time and flow-volume curves)
27. Examination of lung volumes and capacities (plethysmography, dilution and excretory method)
28. Examination of pulmonary diffusion
29. Examination of bronchial asthma
30. Chemical examination of urine
31. Examination of urinary sediment
32. Basic laboratory markers of kidney function
33. Examination of glomerular kidney functions
34. Examination of renal tubular functions
35. Examination of proteinuria, microalbuminuria vs macroalbuminuria
36. Examination of hematuria
37. Examination of liver enzymes and interpretation of their disorders
38. Laboratory indicators of liver functions
39. Examination of cholestasis
40. Examination of jaundice
41. Examination of the exocrine functions of the pancreas
42. Examination of gastroesophageal reflux
43. Examination of peptic ulcers and gastric acidity disorders
44. Laboratory indicators of malabsorption

45. Examinations distinguishing malabsorption states
46. Diabetes mellitus diagnostics, and examination of the compensation of the disease.
47. Examination of secondary hypertension
48. Examination of thyroid functions
49. Examination of parathyroid functions
50. Examination of adenohypophysis functions
51. Examination of neurohypophysis functions
52. Examination of adrenal insufficiency
53. Examination of hypercorticism states
54. Assessment of the state consciousness.

II. Theoretical part: questions from general and special pathophysiology

1. Definitions: disease, symptom, syndrome, etiology, pathogenesis - explain using examples.
2. Role of biological rhythms and time in the pathogenesis of diseases; Mechanisms of Compensation and Decompensation, Insufficiency and Failure of functions - explain on examples
3. Tissue damage due to mechanical forces, crush syndrome.
4. Consequences of immobilization: whole body(organism) vs. immobilization of its parts
5. Damage to the human body caused by ionizing and UV radiation.
6. Pathogenesis of poisoning: cyanides, organophosphates, carbon monoxide, nitrates
7. Pathogenesis of poisoning: methanol and ethylene glycol, paracetamol, Amanita phalloides.
8. Pathophysiology of smoking
9. The effect of ethanol on the organism
10. Inheritance of pathological conditions and diseases; pathological variants of genes in the etiology and pathogenesis of diseases, mosaicism
11. Multifactorial mechanisms in the development of pathological conditions, genetic polymorphism, penetration of genetic burden
12. **Stress reaction and its phases**
13. Cell damage in the pathogenesis of diseases: apoptosis, necrosis, autophagy, proteinopathies

14. Tumor growth and tumor spread, interactions between tumor and organism, paraneoplastic syndromes

15. Congenital and acquired immune deficiencies

16. Immune mechanisms in the pathogenesis of diseases, disorders of immune tolerance

17. Anaphylactic reaction, anaphylactic shock

18. Inflammation - local and systemic signs of inflammation, SIRS, CARS, MODS

19. Sepsis and septic shock

20. Healing of damaged tissues, healing disorders

21. Regulation of intravascular and extravascular volume and osmolarity - pathophysiological aspects

22. Dehydration of the organism

23. Hyperhydration of the organism, edema, ascites, hydrothorax

24. Disorders of sodium and chloride balance

25. Disorders of potassium balance, ECG manifestations

26. Disorders of calcium and phosphate balance

27. Overview of acid-base balance disorders, compensation mechanisms

28. Acidemia and acidosis - definitions and examples

29. Alkalemia and alkalosis - definitions and examples

30. Hypoxia - classification, compensation, examples

31. Tissue ischemia, reperfusion injury

32. Oxygen toxicity, princepals of oxygen therapy

33. Thermoregulation disorders, fever, hyperthermia, hypothermia, application of therapeutic hypothermia

34. Simple starvation vs stress starvation and selective protein malnutrition vs total caloric malnutrition. cachexia

35. Obesity and metabolic syndrome

36. Regulation of glycemia, causes of hypoglycemia and hyperglycemia

37. Acute complications of hypoglycemia and hyperglycemia

38. Chronic complications of hypoglycemia and hyperglycemia

39. Dyslipidemias and their main consequences

40. Hypoproteinemia, dysproteinemia, paraproteinemia

41. Hyperuricemia, Gout.

42. Disorders of iron balance and distribution, iron deficiency and iron excess in the human body

43. Disorders of fetal development, growth disorders

44. Pathophysiology of aging, death of the organism

Pathophysiology of blood

45. Acute and chronic bleeding

46. Anemia - definition and pathophysiological classifications

47. Anemia - functional consequences, compensatory mechanisms, anemic syndrome

48. Normocytic anemias

49. Microcytic anemias

50. Macrocytic anemias

51. Hemolytic disease of the newborn, common anemias in childhood, extramedullary hematopoiesis

52. Failure of hematopoiesis, aplastic crisis, aplastic anemia, myelophthisis, myelofibrosis

53. Polycythemia - classification by causes, hyper-viscosity syndrome

54. Acute and chronic leukemias, myelodysplastic syndrome

55. Lymphomas and lymphoproliferative diseases

56. Multiple myeloma and other plasma cell-derived proliferative syndromes (MGUS, Wahlstrom's hypergammaglobinemia)

57. Pathophysiology of posttransfusion complications and bone marrow transplantation, GvhD

58. Disorders of primary and secondary hemostasis

59. Thrombocytopenias and thrombocytopathies

60. Coagulopathies

61. Acute hematology - thrombotic thrombocytopenic purpura, hemolytic uremic syndrome, disseminated intravascular coagulopathy

62. Thrombophilias, risk factors for thrombosis

63. Pathophysiology of the spleen - splenomegaly, hypersplenism, consequences of splenectomy, anatomical v functional asplenia

Pathophysiology of the circulatory system

64. Primary and secondary hypertension

65. Acute and chronic consequences of systemic hypertension

66. Pulmonary hypertension

67. Portal hypertension

68. Increase in central, peripheral and pulmonary venous pressure

69. Collapse of circulation, circulatory shock - classification and phases of shock

70. Hypovolemic and distributional shock

71. Cardiogenic and obstructive shock

72. Thrombosis and thromboembolisms

73. Atherosclerosis

74. Venous insufficiency, disorders of lymphatic circulation

Pathophysiology of the heart

75. Ischemic heart disease - basic clasifications (acute coronary syndrome, stable angina pectoris)

76. Myocardial ischemia - causes, manifestations, consequences

77. Acute myocardial infarction - types, clinical manifestations, diagnosis

78. Acute and chronic complications of myocardial infarction

79. ECG changes and mechanisms of their formation during ischemia and myocardial infarction

80. Arrhythmias - classification, causes and mechanisms of origin, circulatory consequences

81. Supraventricular arrhythmias

82. Atrioventricular blocks

83. Ventricular arrhythmias

84. Causes and consequences of acute and chronic heart failure

85. Left-sided and right-side heart failure

86. Systolic and diastolic heart failure (with reduced and preserved ejection fraction)

87. Congenital heart defects

88. Acquired valve defects

89. Endocarditis, myocarditis, pericarditis

90. Cardiomyopathies

Pathophysiology of respiratory system

91. Ventilation - its regulation and disorders

92. Changes in the ventilation perfusion ratio, diffusion disorders

93. Obstructive vs restrictive lung disorders - comparison, causes, manifestations seen in spirometry

94. Dyspnoea - pathophysiological basis

95. Acute and chronic upper airway obstruction, sleep apnea syndrome

96. Atelectasis and collapse of the lungs, pneumothorax

97. Chronic obstructive pulmonary disease

98. Genetic diseases - cystic fibrosis, alpha1-antitrypsin deficiency, primary ciliary dyskinesia (Kartagener's syndrome)

99. Bronchial asthma

100. Restrictive pulmonary disorders

101. Causes and consequences of acute and chronic respiratory failure, classification

102. Respiratory Distress Syndrome (acute respiratory distress syndrome, Newborn Respiratory Distress Syndrome)

103. Pulmonary edema, pneumonias

104. Pulmonary embolisms

105. Pleural diseases, pleural effusions

Pathophysiology of kidneys and urinary tract

106. Definitions and examples of causes: oliguria, anuria, azotemia, uremia, polyuria, isostenuria, hypostenuria, hyperstenuria, dysuria

107. Disorders of glomerular functions, nephritic and nephrotic syndrome

108. Acute tubular necrosis (ATN), phases of ATN

109. Tubulointerstitial nephritis

110. Proteinuria and hematuria

111. Acute renal injury (AKI) - prerenal, intrarenal, postrenal causes

112. Chronic kidney disease, end-stage renal disease, principle of dialysis

113. Renal endocrine disorders and renal osteopathy

114. Urolithiasis, disorders of the urinary tract and bladder

Pathophysiology of the digestive tract, liver and pancreas

115. Diseases of the oral cavity - of teeth, periodontium, salivation; manifestations of systemic diseases in the oral cavity

116. Swallowing disorders and esophageal passage disorders

117. Gastroesophageal reflux disease, hiatal hernias

118. Disorders of gastric secretion and motility, post-gastrectomy syndromes, postprandial syndromes.

119. Acute and chronic gastritis

120. Gastric and duodenal ulcers

121. Maldigestion, malabsorption, malabsorption syndromes

122. Celiac disease

123. Nonspecific Inflammatory Bowel Diseases - Crohn's disease, Ulcerative colitis

124. Pathophysiological mechanisms of ileus, other causes of Acute Abdomen

125. Diarrhea, Irritable Bowel Syndrome, Pseudomembranous Colitis

126. Constipation, Diverticulosis, Megacolon

127. Colonic polyps, Colorectal cancer

128. Gastrointestinal bleeding

129. Acute and Chronic Pancreatitis, Disorders of the Exocrine Pancreas

130. Hepatitis, toxic and metabolic liver damage, liver steatosis, steatohepatitis

131. Liver Failure

132. Liver Cirrhosis

133. Jaundice

134. Cholestasis, Diseases of the Gallbladder and bile ducts

Pathophysiology of the endocrine system

135. The principle of negative feedback in endocrinology, Examples of glandular and receptor disorders

136. Disorders of the hypothalamic-pituitary axis, Hypothalamus and pituitary gland diseases

137. Thyroid disorders, differences in children and adults

138. Hyperthyroidism

139. Hypothyroidism, goiter

140. Parathyroid disorders

141. Hyperaldosteronism, Conn's syndrome

142. Pheochromocytoma, Paraganglioma, Multiple Endocrine Neoplasia Syndromes

143. Hypercortisolism, Cushing's syndrome

144. Hypofunction of the adrenal cortex, Addison's disease, Adrenogenital syndrome

145. Type 1 and type 2 Diabetes Mellitus

146. Ovulation Disorders and Menstrual Disorders, Causes of Female infertility, Hirsutism and Virilization

147. Causes of Male infertility, Erectile dysfunction, Gynecomastia

Pathophysiology of the nervous system

148. Quantitative and Qualitative Disorders of Consciousness, Evaluation of the state of consciousness in children and adults, Brainstem reflexes

149. Short-term loss of consciousness - syncopy and other causes

150. Coma, Vegetative state, Locked-in syndrome, Brain Death - comparison

151. Sleep Disorders: general classification, Obstructive sleep apnea

152. Stroke, Transient ischemic attack (TIA)

153. Pathophysiological mechanisms of Stroke (Cytotoxic Edema, Vasogenic Edema, Excitotoxicity, Vasospasm)

154. Ischemic stroke

155. Hemorrhagic stroke

156. CNS trauma (Commotion, Contusion, Epidural and Subdural hematoma)

157. Spinal Cord Injury, Lesions and Syndromes

158. Intracranial hypertension

159. Motor neuron Disorders, The Neuromuscular Junction Disorders

160. Peripheral neuropathy, Damage and Regeneration of peripheral nerves

161. Epilepsy - pathophysiological classification

162. Demyelination diseases, Multiple sclerosis

163. Basal ganglia diseases, Parkinson's disease

164. Disorders of the Vestibular system and cerebellum

165. Disorders of Cognitive functions, Dementia

166. Disorders of Hearing and Vision

167. Pain

Pathophysiology of connective tissues

168. Pathophysiology of bones - Osteoporosis, Osteomalacia, Rickets

169. Arthritis and Arthrosis

170. Systemic Autoimmune Diseases - Systemic Lupus Erythematosus, Systemic Scleroderma, Sjögren's Syndrome, Polymyositis, Dermatomyositis

171. Myopathies, Muscle atrophy and hypertrophy, Rhabdomyolysis