

MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS  
Educational Institution  
"Belarusian State Medical University"

Questions for preparing for the course exam in  
"Pathological Physiology" for the specialty  
1-79 01 01 «General Medicine»

Minsk 2025

## EXAM QUESTIONS

For students of the **General Medicine Faculty**  
in the discipline "Pathological physiology"

1. The subject and tasks of pathological physiology. Its place in the system of the higher medical education. Pathological physiology as a theoretical basis of modern clinical medicine.
2. Modeling of diseases. Acute and chronic experiment (Claude Bernard, I. P. Pavlov). The requirements to the experiment and the researcher. The basic conditions of performing a biological experiment. Moral-ethical aspects of experimenting on animals.
3. The definition of the notion «disease». Evolution of the idea about the disease essence on different development stages of medicine. Development stages of the disease, outcomes of the disease.
4. The notion of a pathological process, pathological reaction, a pathological condition. Interrelation between «pathological process» and «disease».
5. Factors that determine specificity of pathological processes and selectivity of localization of basic structural-functional impairments.
6. Terminal condition, its stages, characteristic. Laws of vital functions fading. Main principles of an organism reanimating. Social-deontological aspects of reanimation. General laws of restoring vital functions. Post-reanimation disease.
7. The notion of etiology and pathogenesis. The significance of reasons and conditions of disease development. The essence of monocausenalism, conditionalism and constitutionalism.
8. The study about pathogenesis. The definition of «pathogenesis». Interrelation between etiology and pathogenesis. The notion of the main (initial) link in development of the disease. The role of vicious circles in the disease pathogenesis.
9. The principle of feedback in health organism and at disease (Pavlov, M. Zavadovsky, P. Anokhin). The concept of a pathological system. Differences between pathological and physiological system. Pathological dominant, its role in disease.
10. Relationship of soma and psyche in health and disease. The role of protective inhibition in pathology. Word as a pathogenic and therapeutic factor. The concept of iatrogenic.
11. Interrelation between the local and the general, the specific and the nonspecific in development of the disease.
12. The problem of the unity of structure and function; its current state. Structural and functional bases of compensation of disturbed functions.
13. The notion of a dual internally inconsistent nature of the disease. The driving force for its development.
14. The phenomenon of stress (Hans Selye). Stress-realizing and stress-limiting system. Adaptive and damaging effects of stress reaction. The role of stress in disease.
15. The definition of «adaptation» and «compensation». General characteristics, types of adaptive and compensatory responses. Structural basis and mechanisms of compensatory-adaptive processes.
16. The role of the genetic apparatus in developing compensatory reactions and adaptatory reactions; the «price» of adaptation and compensation.
17. The general characteristic of pathological and compensatory reactions of the organism, examples, pathogenic significance

18. The staging character of the disease. Dynamics and expressiveness of pathological and compensatory reactions of the organism in the process of the disease.

19. Definition of the notion's «reactivity». Classification of reactivity, forms of reactivity (normergy, hypoergy, hyperergy, dysergy), basic parameters of reactivity, the role in pathology. Peculiarities of reactivity depending on sex and age.

20. Nonspecific resistance of the organism. Definition of the notions. Factors lowering nonspecific resistance of the organism. Ways and methods of increasing nonspecific resistance

21. The doctrine of the constitution. Basic principles of constitutional type's classification. Constitutional role in pathology.

22. Immunologic reactivity. Understanding of immunopathological processes. Immunodeficient conditions. Classification, etiology, pathogenesis, manifestations.

23. Allergy, definition of this notion. Forms of allergic reactions (immediate and delayed-type), their characteristic. Anaphylactic shock

24. The concept of autoimmune diseases, their significance in human pathology, classification. Mechanisms of violation of immune tolerance and occurrence of immune autoaggression.

25. Diffuse diseases of connective tissue (collagenoses). Etiology, pathogenesis, basic forms.

26. Factors affecting injury severity for the organism exposed to electric current.

27. Hypothermia: etiology, pathogenesis, symptoms. Application of hypothermia in clinical practice.

28. Electric injury. Peculiarities of electric current as a damaging factor.

29. Kinds of electric current injuries (local and general, specific and nonspecific) and their characteristic. The pathogenesis of electric current injuries. The reasons of death from electrocutions. Rules of giving the first-aid on electrocution.

30. The influence of high and low barometric pressure on the body. Altitudinal and caisson disease. Dysbarrism.

31. Ionizing radiation. The general characteristic, classification, etiology, pathogenesis.

32. Acute radiation sickness. Its forms, course, outcome.

33. The characteristic of the formation period of a typical marrowy form of acute radiation sickness, basic clinical syndromes, outcomes.

34. The characteristic of the formation period of a typical digestion form of acute radiation sickness, basic clinical syndromes, outcomes.

35. The characteristic of the formation period of a typical toxemic and cerebral form of acute radiation sickness, basic clinical syndromes, outcomes

36. General characteristic of chronic radiation sickness; pathogenesis, basic clinical syndromes.

37. Distant consequences of exposure to ionizing radiation. The concept of the stochastic and non-stochastic effects of ionizing radiation.

38. Role of hereditary in pathology. The prevalence of hereditary and congenital forms of pathology. Principles of prophylaxis and treatment of hereditary diseases.

39. Classification of diseases taking into account the specificity of heredity and environment in their development. The concept of penetrance and expressivity. The role in pathology.

40. Hereditary and congenital forms of pathology. Classification principles of hereditary forms of pathology.

41. Etiology of hereditary forms of pathology. Mutagen. Mutation, the definition of the notion. Kinds of mutation. Antimutagenesis. The mechanisms of antimutagen factor action.

42. Gene diseases. Etiology. General peculiarity of pathogenesis. Hereditarily determinant metabolic diseases: alcaptonuria, phenylketonuria, hepatocerebral dystrophy, galactosemia.

43. Chromosomal disease. Trisomy: Down's syndrome, Patau syndrome, Edwards' syndrome, Klinefelter syndrome, a trisomy syndrome of X-chromosomes. Karyotype, clinical manifestations.

44. Chromosomal disease. Monosomy and deletions: Shereshevsky-Turner's syndrome, a syndrome of «the cat's shout», Wolf Hirshhorn's syndrome. Karyotype clinical manifestations.

45. Phenocopies. The definition, causes of development. Examples. Pathology of intra-uterine development. Gametopathies, blastopathies, embriopathies, phetopathies, still-birth rate.

46. Hereditary metabolic disturbances glycosaminoglycans. Mucopolysaccharidosis, their basic form (Hurler syndrome, Hunter syndrome).

47. The role of genetically determined disorders of collagen metabolism in the occurrence of connective tissue disease (osteogenesis imperfecta, etc.).

48. Cell injury. The etiology and the most common mechanisms of cell injury. Specific and nonspecific reactions at cells damage.

49. Types of cell death. Integrated mechanisms of cell injury and its death (apoptosis and necrosis).

50. The definition of the notion and general characteristic of components of inflammation. Inflammation as a typical pathological process. Local and systemic manifestations of inflammation.

51. Etiology of inflammation. Primary and secondary alteration in inflammation. The significance of inflammation mediators in the development of secondary alteration.

52. Basic mediators of inflammation, their origin, principles of classification. Endogenous pro- and anti-inflammatory factors.

53. Physical and chemical changes in the focus of inflammation, mechanisms of their development and significance.

54. Impairment stages of peripheral blood circulation in the focus of inflammation and mechanisms of their development.

55. The definition, mechanism and significance of exudation in inflammation. The reasons and mechanisms of increasing the permeability of a vascular wall in the focus of inflammation. Types of exudates, their distinctions from transsudate.

56. Stages, ways and mechanisms of leukocytes emigration in inflammation. Basic chemoattractants which cause migration of leukocytes.

57. The definition of the notion and biological significance of phagocytosis. Stages of phagocytosis and their mechanisms. The reasons and types of phagocytosis impairments. Hereditary defects of phagocytes.

58. The proliferation stage, its basic signs and development mechanisms. Rinds and outcomes of inflammation. The basic theories pathogenesis of inflammation.

59. Relationship of local and general phenomena in inflammation. The role of the nervous, endocrine and immune systems in the development of inflammation. General biological significance of inflammation. Positive and negative significance of inflammation for the organism.

60. The definition of the notion «fever». Fever as a typical pathological process. Etiology of fevers. Pyrogenic substances.

61. Pathogenesis of fever. Secondary pyrogens, their origins, central and systemic effects. Stage of fever. Change processes of thermoregulation in various stages of fever.

62. Change of functions of organs and systems in the development of fever. The biological significance of fever. The concept of the fever treatment.

63. I. I. Mechnikov's study about phagocytosis as protective reaction of the organism.

64. Arterial and venous hyperemias. The definition of the notion of arterial and venous hyperemias, classification, etiology, pathogenesis, manifestations and outcomes.

65. Ischemia. The definition of the notion, classification, etiology, pathogenesis, symptoms, and outcomes. Types of collateral vessels in various organs. Mechanisms of inclusion of collateral blood flow. Factors determining the effects of ischemia.

66. Thrombosis. The definition of the notion, etiology, pathogenesis of thrombosis, consequences and outcomes of thrombosis.

67. Embolism, the definition, classification, manifestations and consequences of embolism. Types of emboli.

68. Typical microcirculatory disorders: extravascular, intravascular, intramural. The definition of the notion's sludge and «capillarotrophic insufficiency». Etiology, pathogenesis, and outcomes.

69. Hypoxia. Definition, classification, pathogenetic characteristics of different types of hypoxia.

70. Term and long-term mechanisms of compensatory and adaptive responses during hypoxia. Adaptation to hypoxia, the stage of development. Systemic structural trace adaptation to hypoxia. Principles of pathogenetic therapy of hypoxic conditions.

71. Functional impairments of organs and systems in hypoxia.

72. Disturbance of acid-base status. Classification of acidosis and alkalosis. The main manifestations of acidosis and alkalosis.

73. Compensation mechanisms of disturbance of acid-base status. Laboratory criteria of violations and compensation of acid-base status

74. Etiology, pathogenesis and types of acidosis. Laboratory criteria of violations and compensation.

75. Etiology, pathogenesis and types of alkalosis. Laboratory criteria of violations and compensation.

76. Water balance. Types of violations of water balance. Etiology, pathogenesis and manifestations of hyper-and dehydration.

77. Edema. Definition of the concept. Classification. Main pathogenetic factors of development of edema. The pathogenesis of renal, cardiac, cachexia, toxic edema.

78. Tumor. Definition of the concept. Feature blastogenous growth, its differences from other types of tissue growth and non-malignant tumors. Distribution characteristics of tumors in phylogenesis and ontogenesis. The main reasons for the growth of cancer incidence.

79. The etiology of cancer. Classification of blastogenous agents. Carcinogenic substances of exogenous and endogenous origin. Methods for experimental reproduction of tumors.

80. Significance of heredity, age, sex, dietary habits, bad habits in the occurrence and development of tumors.

81. Basic biological features of tumors. Mechanisms of metastasis, stage. The concept of tumor progression.

82. Types and basic displays atypism tumor cells.

83. The pathogenesis of tumors. Modern views on the molecular and genetic mechanisms of neoplastic transformation. The modern interpretation of the concept of oncogene. The role of mutations, viruses and epigenomic violations in the mechanism of transformation in proto oncogene.

84. Types and functions of cellular oncogenes, the role of oncoproteins in violation of the functions of the transformed cells. The concept of antionkogen.

85. The relationship of disorders of the nervous system with the emergence and growth of tumors.

86. Interrelation of the endocrine system with the emergence and growth of tumors. Hormone-dependent tumors.

87. The relationship of disorders of the immune system with the emergence and growth of tumors. Features of antitumor immunity. The main causes and manifestations of immunosuppression in cancer.

88. Systemic effects of the tumor on the body. Paraneoplastic syndrome, its pathogenesis, the main manifestations. The pathogenesis of cancer cachexia.

89. The concept of pre-cancerous conditions. Obligate and facultative precancer. Stage of development of malignant tumors (LM Shabad.) Basic principles of treatment and prevention of tumors.

90. Notions of the extremal states. Shock. Definition of notion, types, stages, common mechanisms of development.

91. Traumatic shock. Theories. Etiology, pathogenesis, stages and manifestations.

92. Essence and mechanism of hemodynamics disturbances during shock. Centralization and shunting of blood flow, their evaluation.

93. Collapse, its types, pathogenesis, differences between shock and coma.

94. Coma, its types, common ways of comatose pathogenesis states.

95. Starvation, its types and periods of development.

96. Protein-calorie deficiency, its types. Pathogenesis, clinical manifestations. Alimentary marasmus. Kwashiorkor.

97. Hypo- and hyperglycemic states. Etiology, pathogenesis, clinical manifestations.

98. Hyper- and hypo-, disproteinemia, paraproteinemia. Etiology, pathogenesis, clinical manifestations.

99. Hyperlipidemias; primary and secondary dyslipoproteinemias. Etiology, pathogenesis, clinical manifestations.
100. Typical forms of pathology and reactive changes of the total blood volume. Normo-, hypo- and hypervolemias and their types depending on the relationship of corpuscular elements and blood plasma. The causes of their incidence, clinical manifestations.
101. Blood loss: acute and chronic. Their causes, characteristic. Courses and outcomes of post hemorrhagic conditions.
102. The definition of the notion's «anemia». Classification of anemia by etiopathogenesis and morphofunctional state. Impairments and compensatory-adaptive processes in the organism at anemia.
103. Quantitative and qualitative changes of erythron during anemia. Regenerative and Degenerative forms of erythrocytes.
104. Etiology, pathogenesis, general characteristic, blood slide at anemia due to blood loss.
105. Etiology, pathogenesis, general characteristic, blood slide at iron-deficiency and sideroachrestic anemias.
106. Etiology, pathogenesis, general characteristic, blood slide at B<sub>12</sub>-(folic acid) deficiency and B<sub>12</sub>-(folic acid)-achrestic anemias.
107. Etiology, pathogenesis, general characteristic, blood slide at hemolytic anemias.
108. Leucopenias and leucocytosis. The etiology, types and mechanisms of development.
109. Agranulocytosis. Etiology, pathogenesis, peripheral blood slide and clinical manifestations. Panmyelophthisis, blood slide.
110. Leukemia, the definition of the notion. Etiology and pathogenesis of leukemias. General characteristic and principles of classification. Leukemoid reactions.
111. Blood slide, clinical manifestations of acute and chronic leukemias.
112. Coagulation hemostasis impairments caused by hereditary deficiency of the blood coagulation factor. Hemophilia A and B. Their pathogenesis, clinical manifestations, laboratory diagnostic.
113. Acquired coagulopathy: DIC-syndrome (disseminated intravascular coagulation). Etiologic and pathogenetic factors of development, clinical manifestations, laboratory diagnostic, outcomes.
114. Thrombocytoses and thrombocytopenias. Etiology, pathogenesis, laboratory and clinical manifestations.
115. Thrombocytopathies. Classification, etiology, pathogenesis, laboratory and clinical manifestations.
116. Hereditary and acquired vasopathy: Osler-Weber-Rendu Disease, Henoch-Schonlein Purpura symptoms. Etiology, pathogenesis, and clinical manifestations.
117. Blood circulation insufficiency. The definition of the notion, its types. Cardiac insufficiency. The definition of the notion. Classification of cardiac insufficiency by pathogenesis, localization, course, severity degree. The notion of primary and secondary cardiac insufficiency.
118. The notion of systolic and diastolic dysfunctions. Etiology, pathogenesis, hemodynamics impairments and clinical manifestations of systolic and diastolic dysfunctions.
119. Etiology, pathogenesis and manifestations of acute left- and right-side ventricular cardiac insufficiency.

120. Compensation mechanisms of cardiac insufficiency. Their types, manifestations and pathogenetic characteristic. Pathogenetic therapeutic principles of cardiac insufficiency.
121. Remodeling of the myocardium. Outcomes of the myocardium remodeling depending on the type of hemodynamic overstrain and in the myocardium damage. Myocardium hypertrophy, causes and mechanisms of its development. Functional and metabolic peculiarities of a hypertrophied myocardium.
122. Characteristic of the cardiac compensatory hyperfunction (CCH) in acute experimental overstrain of the left ventricle with resistance. Development stages of the cardiac compensatory hyperfunction. Development mechanisms of decompensation in pathological myocardium hypertrophy.
123. Coronary insufficiency. The definition of the notion, clinical forms of ICD. Relative and absolute coronary insufficiency. Experimental methods of its inducing. Principal causes of non-coronary necroses of the myocardium.
124. Pathogenesis of ischemic and reperfusion syndromes at coronary insufficiency, their manifestations.
125. Cardiac arrhythmias. Their classification. Cardiac automatism impairment, types, causes, ECG-manifestations.
126. Impairments of cardiac excitability: types, causes and ECG-manifestations of extrasystole, paroxysmal tachycardia, atrial and ventricular flutter and fibrillation. Hemodynamic impairments.
127. Cardiac conduction impairments, types and ECG-manifestations of AV and ventricular blockades.
128. Arterial hypertension, classification. Experimental forms of induction. Symptomatic arterial hypertension.
129. Etiology and basic pathogenesis theories of hypertonic disease.
130. The role of hyperactivation of renine-angiotensine-aldosterone system in dysfunction of target organs and stabilization of arterial hypertension. Clinical manifestations of the impairment of target organs at arterial hypertension.
131. Arterial hypotensions. Classification. Vascular insufficiency of blood circulation: syncope, collapse. Etiology, pathogenesis, manifestations.
132. Regulation impairments of cerebral blood circulation. Etiology, pathogenesis, manifestations. Pathological reactions of cerebral arteries, their types, characteristic.
133. Syndromes of «robbing the brain», «Robin Hood», excessive cerebral perfusions; their characteristic, pathogenetic characteristic.
134. Cerebrovascular insufficiency, its types. Paroxysms, crises, strokes. Pathogenetic therapeutic principles of cerebrovascular insufficiency.
135. Atherosclerosis, its etiology and pathogenesis. The role of LPLD-impairments of receptor interaction at atherogenesis. The main experimental models of atherosclerosis.
136. Insufficiency of the external respiration system. The definition of the notion, classification. Causes and development mechanisms. Stages of chronic respiratory insufficiency, its clinical manifestations.

137. Impairments of pulmonary ventilation: obstructive, restrictive and mixed, principal causes and manifestations. Changes of alveolar air gas content and arterial blood at the impairment of ventilation.
138. Impairments of gas diffusion through the lung membrane, principal causes and manifestations. Changes of gas content of alveolar air and arterial blood in the impairment of diffusion of gases. Etiology and pathogenesis of respiratory distress-syndrome of adults.
139. Principal causes of the impairment of pulmonary perfusion. Forms and causes of pulmonary hypertension. Chronic pulmonary-cardiac insufficiency: pulmonary heart, etiology, pathogenesis, clinical manifestations.
140. Breathlessness, periodic and terminal respiration. Their forms, pathogenetic characteristic, development mechanisms.
141. Asphyxia. Etiology, pathogenesis, stages of development.
142. Digestion impairment in the oral cavity: principal causes and consequences of hypo- and hypersalivation, mastication impairments. Causes of dysphagia.
143. Basic manifestations of gastric dyspepsia: the impairment of appetite, nausea, eructation, vomiting, pain syndrome. Causes of their development.
144. Interrelation of secretory and motor functional impairments of the stomach. Manifestations of hyper- and hypochlorohydrria. Pathology of a pyloric reflex.
145. Gastric ulcer and duodenal ulcer. Theories of ulcer development. Modern conceptions of etiology and pathogenesis of gastric ulcer. The role of *H. pylori* in pathogenesis of the disease.
146. Impairments of intestinal secretory activity and absorption processes. Etiology, pathogenesis and clinical manifestations of syndromes of maldigestion and malabsorption.
147. Intestinal autointoxication. Etiology, pathogenesis, manifestations.
148. Experimental methods of studying functions of the liver (N.V. Ekk, E.S. London, I.P. Pavlov). Changes in the organism in the given interventions.
149. Basic syndromes in pathology of the liver and bile ducts. The definition of the notion, etiology and pathogenesis of mechanical, parenchymatous and hemolytic forms of jaundice.
150. Hepatic insufficiency. The definition, etiology, pathogenesis, laboratory and clinical manifestations. Hepatic coma. The definition, forms (bypass, hepatic-cellular). Pathogenesis.
151. The syndrome of portal hypertension. The definition, forms, clinical symptoms. Pathogenetic characteristic of collateral and portocaval blood circulation at portal hypertension.
152. Ascites. Pathogenesis of ascites at portal hypertension.
153. Renal and extrarenal factors of filtration and reabsorption impairments.
154. Glomerulopathies. Diffused glomerulonephritis (etiology, pathogenesis and clinical manifestations). Nephrotic syndrome.
155. A uric syndrome. Causes and mechanisms of his development. Clinical manifestations of renal functional impairments. Changes of diuresis and urine content.
156. Acute renal insufficiency. Its forms, etiology, pathogenesis, stages, clinical manifestations, outcomes. Changes of the volume and content of blood and urine.

157. Chronic renal insufficiency. Etiology, pathogenesis, stages, clinical manifestations. Azotemias and uraemias.
158. Etiology and pathogenesis of endocrinopathies. Principles of their classification. Main principles of treatment.
159. Total (Simmonds disease) and partial hypofunction of adenohipophysis (Hypophyseal nannism, infantilism), clinical manifestations.
160. Hyperfunction of the adenohipophysis: hypophyseal giantism, acromegally, disease of Itsenko–Kushing, clinical manifestations.
161. The pathology of a posterior lobe of the hypophysis: signs of hypo- and hypersecretions of vasopressin.
162. The thyroid gland pathology, its forms, pathogenesis, clinical manifestations.
163. The parathyroid glands pathology, its forms, pathogenesis, clinical manifestations.
164. Hypofunction of the cortical substance of adrenal glands. Acute and chronic insufficiency of adrenal glands, etiology, pathogenesis, clinical manifestations.
165. Hyper- and dysfunction of the cortical and medulla substance of adrenal glands. Syndrome of Itsenko-Kushing, primary and secondary hyperaldosteronism, adreno-genital syndrome, pheochromocytoma, clinical manifestations.
166. Diabetes of the I<sup>st</sup> and II<sup>nd</sup> type, their etiology, pathogenesis, clinical manifestations. Mechanisms of hyperglycemia and glycosuria.
167. Neurogenic disturbances of the locomotor function. Hypokinetic conditions: pareses and paralyses, their mechanisms and characteristic. Hyperkinesis. The definition of the notion. Types of hyperkinesis.
168. Disordered motor function of nervous system. Paralysis, paresis. Pathophysiological characteristic and clinical manifestations of central and peripheral paralysis and paresis.
169. Convulsive conditions, types of spasms and their pathogenesis.
170. Functional impairments of the vegetative nervous system, their types and mechanisms.
171. Neurogenic impairments of sensitivity, their types, mechanisms and clinical manifestations. Syndrome of Brown-Sekar. The mechanism of its origin and manifestation.
172. Pain. The definition of the notion, its biological significance. Pathogenesis of a pain syndrome. The antinociceptive system and its characteristic.
173. Experimental models of neuroses (I.P. Pavlov, M.K. Petrov). Therapeutic principles of neuroses.
174. The study of the nervous trophics and neurogenic dystrophies. The standard form of neurogenic dystrophies (A.D. Speransky). The role of neurogenic dystrophies in pathogenesis of diseases.
175. The main treatment principles in medicine: revulsive, allopathic, homoeopathic, etiological, pathogenetic, symptomatic. Short characteristic.

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