Topics for the exam from PATHOPHYSIOLOGY course for General Medicine students

GENERAL PATHOPHYSIOLOGY

1. Definition of disease and health - etiology, pathogenesis, symptoms, syndromes, types, course and outcomes of diseases.
2. The role of internal and external factors in the onset and development of diseases. Monofactorial and multifactorial diseases - examples.
3. Pathophysiology of hereditary diseases. Epigenetic aspects in the process of transmission of genetic information.
4. Pathophysiology of inflammation. Inflammatory response systems, local and systemic inflammatory response. Multi-organ dysfunction in systemic inflammation.
5. Fever - etiology, pathogenesis, classification. Effects of mediators on body functions.
6. Innate immune system of the organism - disorders of regulation and function.
7. Adaptive immune system of the organism - disorders of regulation and function.
8. Primary and secondary immune disorders - pathophysiology, examples.
9. Pathophysiology of hypersensitivity. Allergies - types and examples.
10. Autoimmune diseases. Transplant immunity - H-v-G and G-v-H response mechanisms.
11. External factors of the origin and development of disease - radiation, effects of light, ultrasound, laser, electric current, pressure and crush syndrome.
12. External factors of disease origin and development - cold, heat, sound, xenobiotics, biologic factors (viruses, bacteria, prions).
13. Pathophysiological aspects of the harmful effect of tobacco smoking and alcohol consumption on human organism.
14. Receptors and intracellular signaling cascades - examples of clinically significant diseases, disorders.
15. Cell damage and death - reversible and irreversible, cellular stress response, chaperons, ubiquitin, necrosis, apoptosis, autophagy – causes and mechanisms.
16. Repair of tissue damage - bleeding, inflammation, proliferation and maturation and remodeling. Pathological course of wound healing.
17. Tumor growth - cell cycle, positive and negative oncogenes, clonal theory of tumor formation. Tumor and immune system.
18. Genetic predisposition for the development of tumor states and disorders (tumors of the intestines, breast cancer, pancreatic cancer, retinoblastoma, xeroderma pigmentosum).
19. Clinically significant tumor markers, paraneoplastic syndrome, tumor growth, metastasis, causes of death in cancer.
20. The role of oxygen radicals in pathogenesis of diseases. Oxidative stress. The role of calcium ions in the cell damage mechanism.

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21. Role of arachidonic acid metabolites in the pathogenesis of diseases - examples, use of their properties and effects in clinical practice.
22. Water and osmotic balance disorders - mechanisms, regulation, clinically significant examples.
23. Ion balance and disorders - Na +, K +, causes, consequences, clinically relevant examples.
24. Pathogenesis of swelling - causes, examples, clinical manifestations, consequences.
25. Acid-base balance disorders - classification and diagnosis of disorders, laboratory parameters, principles of compensation and correction. Simple and combined ABB disorders.
26. Acute and chronic acidosis in patients with renal, endocrine and respiratory disorders.
27. Clinical symptoms and causes of death in acid-base disorders.
28. Infusion therapy - principles, complications, risks.
29. Pathophysiology of aging.

DISORDERS OF METABOLISM

30. Pathophysiology of regulation of food intake and body weight. Mental anorexia. Bulimia.
31. Lipoprotein metabolism disorders - hyperlipoproteinemia, primary and secondary hypolipoproteinemia, lipidosis.
32. Deficiencies in protein and amino acid metabolism - nitrogen balance, detoxification and nitrogen excretion disorders, blood protein deficiency disorders (albumin, prealbumin, transferin), phenylketonuria, albinism, ochronosis, homocystinuria - causes, examples, consequences.
33. Disorders of the metabolism of purines, pyrimidines and sugars - hyperuricemia and gout, glycogenosis, galactosemia - causes, clinical stage, prevention, consequences.
34. Disorders of vitamin metabolism – examples and consequences.
35. Disorders of micronutrients' and trace elements' metabolism - examples, consequences.

PATHOPHYSIOLOGY OF GIT

36. Esophageal pathophysiology – etiology, pathogenesis. GERD, motility disorders etc.
37. Gastritis - acute, chronic, special forms. Etiology, pathogenesis, examples, consequences.
38. Etiopathogenesis of gastric secretion disorders. Ulcer disease. Pathophysiology of conditions after resection of the stomach.
39. Dyspepsia, nausea, vomiting - types, causes, consequences.
40. Disorders of motility of the small and large intestine; diarrhea, obstipation - types, causes, consequences.
41. Pathophysiology of immune and hormonal disorders of the intestine (Crohn's disease, ulcerative colitis). Diverticulosis, polyposis – pathogenesis and complications.
42. Maldigestion, malabsorption - primary, secondary.

43. Ileus - definitions, types, mechanisms, consequences.
44. Bleeding from GIT - forms, causes, localization, consequences. Principles of therapy.
45. Abdominal pain - types, characteristics, symptoms.
46. Disorders of exocrine pancreatic activity - etiology, examples, and consequences.

PATOPHYSIOLOGY OF THE LIVER

47. Pathophysiology of acute and chronic liver failure.
48. Subicterus, icterus, pseudoicterus. Porphyria. Significant clinical and laboratory findings in different types of jaundice.
49. Acute and chronic viral hepatitis. Autoimmune hepatitis. Classification, laboratory and clinical manifestations, consequences.
50. Alcoholic and non-alcoholic steatosis. Liver cirrhosis. Portal circulation disorders. Ascites.
51. Hepatic encephalopathy. Hepatorenal syndrome.
52. Cholelithiasis, cholecystitis - causes, pathogenesis, complications, consequences.

PATOPHYSIOLOGY OF BLOOD

53. Anemias due increased red blood cell loss.
54. Anemias due to reduced red blood cell production.
55. Polycythemia - relative, primary, familial and secondary.
56. Leucopenia, leukocytosis, granulocyte function disorders - non-tumorous changes.
57. Myeloproliferative and lymphoproliferative syndromes and diseases. Aplastic (hypoplastic) syndromes.
58. Spleen pathophysiology - splenomegaly, hypersplenism, consequences of splenectomy.
59. Pathophysiological aspects of blood transfusion and blood derivatives - complications, risks, consequences. Incompatibility reactions. Pathophysiological aspects of hematopoietic stem cell transplantation.
60. Disorders of primary hemostasis - vasculopathies, thrombocytopenia, thrombocytopathy.
61. Disorders of secondary hemostasis – coagulopathies.
62. Thrombophilia - congenital, acquired hypercoagulable states, fibrinolysis disorders.
63. Pathophysiology of thrombosis and embolism. DIC.
64. Patophysiological interpretation of basic investigation methods for haemostasis disorders.

PATHOPHYSIOLOGY OF THE NERVOUS SYSTEM

65. Pain - pathogenesis, meaning, classification, examples of pain perception, mediators, principles of pharmacological influence. Pain and stress.

66. Central paralysis - characteristics, symptoms according to the level of injury, brain stem syndromes.
67. Peripheral paralysis - characteristics of disorders and symptoms according to the level of injury.
68. Spinal cord syndrome, transversal spinal lesions. Spinal hemisection syndrome. Anterior and posterior spinal cord injury.
69. Disorders of extrapyramidal system.
70. Autonomous (vegetative) and limbic system disorders.
71. Ataxia - types, clinical differentiation, manifestations. Pathophysiology of walking disorders.
72. Quantitative and qualitative disorders of cognitive functions (memory, thinking). Dementia. Speech disorders. Pathophysiology of sleep disorders.
73. Pathophysiology of cerebral ischemia, cerebral infarction, cerebral edema.
74. Epilepsy - types, causes, pathogenesis, differential diagnosis.

PATHOPHYSIOLOGY OF CARDIOVASCULAR SYSTEM

75. Pathophysiology of changes in blood pressure - arterial hypertension and hypotension. Principles of classification.
76. Pathophysiology of primary arterial hypertension - etiopathogenesis, course, principles of classification. Remodeling of heart and circulatory system due to hypertension.
77. Pathophysiology of secondary arterial hypertension.
78. Acute circulatory failure - basic classification (syncope, shock, sudden death), examples.
79. Circulatory shock - causes, classification, stages, clinical monitoring, pathophysiological basics of therapy.
80. Pathophysiology of hypovolemic shock - etiology, pathogenesis, mechanisms of compensation.
81. Pathophysiology of sepsis and septic shock. Multiply organ dysfunction syndrome - MODS.
82. Pathophysiology of tissue ischemia on examples of disorders of different organs.
83. Venostasis - causes, pathogenesis, compensatory reactions, consequences. Increased venous pressure - central, peripheral, pulmonary.
84. Arteriosclerosis - risk factors, endothelial dysfunction, origin and types of AS plaques, consequences, degenerative changes of AS deposits, AS relationship to haemocoagulation, inflammation.
85. Pathophysiology of acute and chronic left-sided heart failure. Consequences and clinical symptoms of "forward" and "backwards" failure.
86. Pathophysiology of acute and chronic right-sided heart failure. Consequences and clinical symptoms of "forward" and "backwards" failure.
87. Compensation mechanisms for the heart failure.

88. Pathophysiology of cardiac arrhythmias due to disorders of formation excitation. Etiology, pathogenesis, ECG picture, clinical manifestations.

89. Pathophysiology of cardiac arrhythmias due to disorders of conduction. Etiology, pathogenesis, ECG picture, clinical manifestations.

90. Major congenital heart defects - causes, symptoms, consequences, compensatory mechanisms.

91. Acquired heart defects - causes, symptoms, consequences, compensatory mechanisms.

92. Manifestations of atrial and ventricular hypertrophy, body position changes, cardiomyopathy, pregnancy, ionic dysbalances, myocarditis, toxic, drug effects on ECG.

93. Endocarditis. Myocarditis. Cardiomyopathy. Types, causes, clinical manifestations, compensation. Pathophysiology of pericardium, cardiac tamponade.

94. Myocardial ischemia - risk factors, pathogenesis, local manifestations and consequences, mechanism of adaptation to increase of O2 consumption, causes and consequences of coronary artery narrowing.

95. Clinical forms of ischemic heart disease - acute coronary syndrome, angina pectoris.

96. Acute myocardial infarction - mechanism of onset, stages, consequences and complications, dysfunction and remodeling of the heart, basic therapeutic approaches.

97. Pathophysiological principles of ECG and laboratory diagnosis of myocardial infarction.

PATHOPHYSIOLOGY OF THE RESPIRATORY SYSTEM

98. Overview of the most common and most severe respiratory diseases. Risk factors.

99. Hypoxia of the organism and oxygen transport disorders.

100. Conditions of acute and chronic hypoxia of individual organs - compensatory reaction in hypoxic conditions - clinical signs, cell reactions to hypoxia. Pathophysiology of oxygen therapy.

101. Pathophysiology of respiratory insufficiency. Respiratory disorders of acid-base balance.

102. Pathophysiology of hypoxemia in diseases of the respiratory tract - effects on the organism (acute and chronic).

103. Pathophysiology of hypo- and hyperventilation, hypo- and hypercapnia - effects on the organism (acute and chronic).

104. Significance of changes in blood gas parameters for the diagnosis of respiratory and cardiovascular disorders: gas concentration, arteriovenous differences, hemoglobin saturation, erythrocytes, acid-base balance, tissue intoxication.

105. Alveolo-capillary membrane disorders, changes in its properties. Surface reduction, thickening, increased permeability.

106. Pulmonary perfusion disorders - causes, examples, consequences. Hepatopulmonary syndrome.

107. Changes in breathing mechanics - increase and decrease of respiratory muscles work. Examinations aimed at assessment of changes in pulmonary mechanics - flow, physiological, pathological, effect of the reduction of respiratory pathways on flow, volume, pressure. Comparison of the results of the pulmonary volumes examination in restrictive and obstructive lung diseases.
108. Types of breathing, breathing disorders – pathophysiology, clinical manifestation, compensation, consequences.
109. Acute respiratory disturbances - airway closure, O2-free gas mixtures, sudden drop in atmospheric pressure, sleep apnea, pneumothorax, embolization of pulmonary vessels, drowning, aspiration of stomach contents.
110. ARDS and RDS - etiology, pathogenesis, consequences.
111. Pathophysiology of pulmonary edema.
112. Pathophysiology of pneumonia and pulmonary fibrosis.
113. Pathophysiology of COPD - chronic bronchitis, bronchial asthma, emphysema, cystic fibrosis.
114. Pathophysiology of pleural cavity and lung cancer.

PATOPHYSIOLOGY OF KIDNEYS

115. Nephrotic and nephritic syndrome - pathogenesis, manifestations, consequences.
116. Pathophysiology of tubules.
117. Pathophysiology of acute renal failure - causes, phases, symptoms, metabolic consequences.
118. Pathophysiology of chronic renal failure - causes, symptoms, metabolic and clinical consequences. Pathophysiology of renal anemia and hormonal disorders.
119. Proteinuria and hematuria - types, causes, diagnostic criteria, examples, consequences.
120. Pathophysiology of tubulointerstitial kidney diseases - urinary tract infections, allergic, toxic and drug-induced reactions, intratubular and post-renal obstruction, cyst formation.
121. Urolithiasis - pathogenesis, types of stones, complications.
122. Pathogenesis of kidney disease from extrarenal causes.
123. Pathophysiological interpretation of basic investigation methods in kidney disorders.

PATHOPHYSIOLOGY OF ENDOCRINE GLANDS

124. Pathophysiology of the hypothalamic system - disorders of the regulatory mechanisms, neuroendocrine disorders of the hypothalamus interfering with lipid, energy metabolism and regulation of food intake.
125. Pathophysiology of the pituitary system - disorders at the level of neuro - and adenohypophysis.
126. Pathophysiology of hyperthyroidism.
127. Pathophysiology of hypothyroidism.

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128. Disorders of secretion and action of parathyroid hormone. Calcium and phosphorus balance disorders - Clinically relevant examples.

129. Acute and chronic insufficiency of the adrenal cortex. Cushing's disease and syndrome.

130. Primary and secondary hyperaldosteronism, pseudohyperaldosteronism.

131. Pathophysiology of gastrointestinal hormonal system.

132. Pathophysiology of the menstrual cycle. Amenorrhea, galactorrhea. Pathophysiology of puberty, climacterium.

133. Pathophysiology of female and male hypogonadism.

134. Obesity - etiology, types, body weight and its evaluation, insulin resistance and other endocrine metabolic changes, Pickwick's syndrome. Metabolic syndrome.

135. Diabetes mellitus - etiopathogenesis of type I and type II.

136. Hyperglycaemia and hypoglycemia - causes, parameters, regulation, clinical symptoms, complications.

137. Diabetes mellitus - acute complications - hyperglycemic, hypoglycemic comas. Causes, pathogenesis, clinical manifestations, regulatory mechanisms, consequences.

138. Diabetes mellitus - chronic complications. Pathophysiology of disorders of metabolism, examples, clinical manifestations, consequences.

139. Insulin resistance - main target tissues of insulin, primary and secondary resistance, causes, consequences, candidate genes. Insulin resistance diagnosis, obesity and insulin resistance, hypertension and insulin resistance.

140. Stress and general adaptation syndrome - characteristics, phases, regulatory mechanisms, metabolic, cardiovascular and other stress-related changes. Eustress. Distress.

141. Psychosomatic disorders. Role of stress, diet, lifestyle in the origins of civilization diseases. Iatrogenic diseases.

142. Emergency conditions arising from endocrine causes - disorders of the hypothalamus, adrenal gland, thyroid gland, parathyroid gland, pancreas, liver.

143. Pathophysiology of coma - causes, development, compensation, consequences.

144. Pathophysiology of osteoporosis and rheumatic diseases.