Pathophysiology exam questions

1. **Pathophysiology of heart failure**
   Significance. Causes and precipitating factors. Classification and symptoms of heart failure. Compensatory mechanisms, neurohormonal changes. Outline of therapy.

2. **Pathophysiology of coronary circulation**
   Classification and differential diagnosis of acute coronary syndrome. Pathomechanism of angina pectoris syndrome and myocardial infarction. Complications of myocardial infarction. Outline of therapy and prevention.

3. **Pathophysiology of arrhythmias**
   Symptoms, clinical significance and classification of arrhythmias. Pathomechanism of tachy- and bradyarrhythmias. Arrhythmias caused by reentry: simple and complex forms. Vagal maneuvers, cardioversion. Non pharmacologic therapy of arrhythmias.

4. **Pathophysiology of circulatory shock. 1.**
   Importance, definition and causes of circulatory shock. Different forms of circulatory shock. Clinical signs. Compensatory mechanisms in shock. Mechanism of decompensation, role of immune system.

5. **Pathophysiology of circulatory shock. 2.**
   Pathomechanism of reperfusion. Shock organs, liver, kidney, intestine, lung, adipose tissue and skeletal muscle. Diagnostic and prognostic evaluation of circulatory shock. Therapeutic possibilities.

6. **Pathophysiology of essential hypertension**
   Role of hereditary and environmental factors in the development of essential hypertension. Role of vasoactive mediators and changes in cardiac output in the pathophysiology of essential hypertension. Connection between obesity and hypertension.

7. **Pathogenesis and hemodynamic characteristics of the different forms of secondary hypertension**
   Pathogenesis and hemodynamic characteristics of renovascular, renal parenchymal, and endocrine (adrenal, pituitary and thyroid) forms of hypertension.

8. **Disturbances of protein and amino acid metabolism**
   Causes of protein deficiency. Protein-calorie undernutrition: clinical patterns, consequences and diagnostic criteria. Abnormalities of plasma proteins. Disturbances of amino acid metabolism due to abnormal transport processes or metabolic blocks.

9. **Pathophysiology of starvation**
   Energy demand during physiological and pathological conditions. Feeding-fasting cycle and its regulation. Adaptive mechanisms in different stages of starvation. Consequences of starvation. Pathomechanism of cachexia associated with malignant diseases. Comparison of weight loss methods.

10. **Pathophysiology of obesity**
    Criteria for obesity. Indexes used to estimate obesity. Types, pathogenesis and consequences of obesity. Obesity induced comorbidities.

11. Disturbances of carbohydrate metabolism
Causes of hyperglycemia. Characteristics of the metabolic disorder associated with diabetes mellitus. Classification of diabetes syndrome. Diagnostic criteria. Types of hypoglycemia. Disorders of carbohydrate metabolism due to enzyme deficiencies. Glycogen storage diseases.

12. Complications of diabetes mellitus
Hypoglycemic, hyperglycemic ketoacidotic, and nonketotic hyperosmolar coma. Micro- and macroangiopathy, peripheral neuropathy.

13. Pathogenesis of type 1 diabetes mellitus
Genetic and environmental factors. The natural history of type 1 diabetes mellitus. Autoimmune and idiopathic types. Pathogenesis of insulitis. Detection of autoantibodies. LADA.

14. Pathogenesis of type 2 diabetes mellitus
Genetic and environmental factors. Insulin resistance and hyperinsulinemia. Type 2 cases with monogenic inheritance. The role of obesity and the "thrifty" gene.

15. Liver diseases 1.
Parenchymal lesions of the liver: toxins, viruses. Different types of viral hepatitis. Chronic hepatitis. Alcoholism. Metabolism of alcohol. Different forms of alcoholic liver disease: fatty liver, hepatitis, cirrhosis.

16. Liver diseases 2.
Disorders of protein, carbohydrate and lipid metabolism caused by hepatic insufficiency. Non alcoholic fatty liver, non alcoholic steatohepatitis. Hepatic encephalopathy: symptoms, risk factors, pathomechanism. Hepatorenal syndrome.

17. Liver diseases 3.
Classification and differential diagnosis of jaundice. Congenital liver diseases. Forms of biliary obstruction. The causes and pathomechanism of cirrhosis. Forms and consequences of portal hypertension. Pathomechanism of ascites production.

18. Pathophysiology of the gastrointestinal tract 1.
Most important diseases of the upper GI tract: importance of reflux disease, pathomechanism, symptoms, complications, therapy. Regulation of gastric acid secretion, balance theory. Ulcus pepticum, the role of Helicobacter pylori infection. Pathogenecity factors of Helicobacter pylori. Gastric ulceration induced by NSAID-therapy.

19. Pathophysiology of the gastrointestinal tract 2.
Diseases of the small intestine: malabsorption, lactose intolerance, inflammatory bowel diseases.

20. Pathophysiology of the gastrointestinal tract 3.
Colorectal carcinoma: importance, epidemiology, clinical signs, risk factors, diagnosis and therapy. Possible pathomechanisms (FAP, WNT, APC) of its development.

21. Pathophysiology of the gastrointestinal tract 4.

Acute and chronic pancreatitis: epidemiology, etiologic factors, patomechanism, diagnosis, complications and therapy. Pancreatic cancer: symptoms, diagnosis and prognosis.

22. General characteristics of inflammation. Role of biogenic amines, lipid mediators and cytokines

Local signs, forms, endogenous and exogenous causes of inflammation. Alterations of microcirculation. Role of histamine, serotonin, prostaglandins, leukotriens, PAF in inflammation.

23. Role of proteolytic systems in inflammation

The plasma contact activated system and its regulation. Role of complement system. Formation and regulation of cytokines in inflammation. Diseases of abnormal complement system function.

24. Inherited and acquired disorders of chemotaxis and phagocytosis

Mechanism of chemotaxis and chemokinesis. O2-dependent and O2-independent mechanisms of phagocytosis. Congenital and acquired dysfunction of phagocytes. Processes of chronic inflammation and wound healing.

25. Systemic reactions in inflammation

Mechanism of the development of fever, fever patterns. The biological significance of fever. Role of leukocytosis and thrombocyte aggregation. Alterations in the synthesis of serum proteins. Acute phase proteins.

26. Evolution of atherosclerosis – lipid theory of atherosclerosis

Process of the development of atherosclerosis. Different types of atherosclerotic plaques. Organ manifestations. Possible pathogenetic role of atherogenic lipoproteins. Lipid theory of atherosclerosis, lipid theory at the cellular level.

27. Non-lipid theories of atherosclerosis

Thrombogenic, mesenchymal, tumor, “response to injury” and unified theories of atherosclerosis.

28. Risk factors of atherosclerosis. Prevention.

Major risk factors of atherosclerosis. Possibilities for screening and concepts for prevention.

29. Pathophysiology of hyperlipidemias 1.

Classification and composition of lipoproteins. Transport of exogenous and endogenous lipids. Classification of primary hyperlipoproteinemias. Primary hyperlipoproteinemias.

30. Pathophysiology of hyperlipidemias 2.

“Reverse” cholesterol transport. Secondary hyperlipidemias. Hypolipidemias. Lipid storage diseases.

31. Disturbances in the function of hypophysis

Definition, etiology and pathophysiology of panhypopituitarism. Clinical forms of growth hormone hypo- and hypersecretion. Abnormalities of prolactin secretion, hyperprolactinemias.

32. Disturbances of thyroid function
Etiology and clinical forms of hypo- and hyperthyroidism. Pathophysiology and clinical symptoms of Graves' disease and Hashimoto's thyroiditis.

33. Hypofunction of the adrenal cortex and medulla
Acute and chronic forms of adrenal cortex hypofunction: Waterhouse-Friderichsen syndrome, Addison's disease, iatrogenic causes. Hypofunction of the adrenal medulla.

34. Pathophysiology of glucocorticoid excess. Pheochromocytoma.
Definition and pathophysiology of Cushing's syndrome. Clinical signs and diagnostic methods of pheochromocytoma.

35. Pathophysiology of mineralocorticoid excess. Adrenogenital syndrome.
Primary and secondary hyperaldosteronism. Adrenogenital syndrome.

36. Disturbances in female sexual function
Disturbances in sexual maturation. Menstruation abnormalities and infertility. Pathophysiology of polycystic ovary syndrome and endometriosis.

37. Disturbances in male sexual function
Disturbances in sexual differentiation. Precocious puberty. Forms of hypogonadism (pituitary, testicular, testicular feminization).

38. Disturbances of calcium and phosphate metabolism
Diseases with hyper- and hypocalcemia. Hypercalciurias. Hormonal regulation of bone turnover. Development of rickets and osteomalacia. Role of vitamin D in non skeletal diseases.

39. Pathophysiology of skeletal diseases
Metabolic bone diseases. Primary and secondary osteoporosis. Pathomechanism of renal osteodystrophy. Tumor associated bone diseases. Paget's disease of bone.