

EXAM QUESTIONS:

General physiology of excitable structures

1. Differences between the chemical composition of the extracellular fluid and intracellular environment. Mechanisms of transport of substances through cell membranes.
2. Resting Potential: definition, mechanisms of ionic origin, physical characteristics.
3. Active Potential: identification, structure, basic physical and physiological characteristics. Ion mechanisms of AP.
4. Excitability: identify options that determine it. Excitability change during stimulation. Excitability changes in conditions and diseases of pharmacological agents.
5. Parameter values constant electric current to cause excitation.
6. The mechanism of action potential spread of nerve and muscle fibers. Peculiarities of excitation of myelin fibers. Laws of the South on nerve and muscle fibers. Classification of nerve fibers by Erlanger-Gasser.
7. Structural and functional organization of neuromuscular synapses. Laws of excitement through the synapse.
8. Physiological characteristics of muscle movement: load, force, length, speed, work wear and tear.
9. Features smooth muscle contractile apparatus and their types. Steps to reduce smooth muscle.

Nervous control of body functions

1. Biological regulation, its types and importance of the body. The role of feedback in the regulation.
2. The concept of the reflex. Classification of reflexes (examples). Reflex arc structure and function of its parts.
3. Receptors and their classification, mechanisms of excitation.
4. Properties of the nerve centers: summation, the transformation rate, tone, fatigue, high sensitivity to oxygen.
5. The principles of integrative central nervous system: subordination, feedback, dominant, co-ordination.
6. Description exciting and brake postsynaptic potentials.
7. Classification of mediators, their overall performance.
8. Mechanisms and patterns of transmission of excitation in the central synapses.

9. Types of central inhibition. Mechanisms of presynaptic and postsynaptic braking.

The role of CNS in the regulation of motor functions

1. Functions of the spinal cord. Motor reflexes of the spinal cord, their reflex arcs, physiological significance.

2. Functions of back brain.

3. Functions of middle brain.

4. Cerebellum and its functions, symptoms.

5. Functions of thalamus.

6. Limbic system, hypothalamus, its functions.

7. Basal nucleus, their function, symptoms.

8. Sensory, associative and motor areas of cerebral cortex and their functions.

The role of the autonomous nervous system in the regulation of visceral functions

1. General plan structure of autonomous nervous system. Autonomic reflexes, their reflex arc.

2. Synapses autonomous nervous system and their mediators, Cyto-receptor and blockers transmission of excitation in synapses.

3. Influence of the sympathetic nervous system in visceral functions.

4. Influence of parasympathetic nervous system in visceral functions.

5. Role of metasympatyc system in the regulation of visceral functions.

Humoral regulation of visceral functions and role of the endocrine glands in regulation

1. Basic features of humoral regulation of functions. Regulation of humoral factors, their characterization and classification.

2. The concept of hormones. Properties hormones. Classification of hormones.

3. The concept of endocrine function of components: regulation of the endocrine glands.

The mechanism of secretion of hormones and forms of transport, machinery cyto-reception.

4. Hypothalamic- hypophysial system. Role of liberins and statins.

5. Neurohypophysis Hormones: chemical nature, the regulation of the selection mechanism of action and functional effects.

6. Adenohypophysis Hormones: chemical nature, the regulation of the selection mechanism

of action, functional, metabolic and structural effects.

7. Adrenal cortex hormones: chemical structure, regulation of the selection mechanisms of action, biological effects. Hypo- and hyper functions of adrenal cortex.

8. Catecholamines: chemical structure, regulation of the selection mechanisms of action, biological effects.

9. Thyroid hormones: chemical structure, regulation of the selection mechanisms of action, biological effects. Effects of hypo-and hypersecretion of thyroid hormones in childhood and adulthood.

10. The role of hormones in the regulation of phosphate-calcium metabolism.

11. Endocrine function of pancreas. Insulin and glucagon: chemical structure, regulation of the selection mechanisms of action, biological effects. Diabetes.

12. Hormones epiphysis: chemical structure, regulation of the selection mechanisms of action, biological effects.

13. Thymus hormones: chemical structure, regulation of the selection mechanisms of action, biological effects. Thymic-lymphatic status.

14. Male sex hormones: chemical structure, regulation of the selection mechanisms of action, biological effects.

15. Female sex hormones: chemical structure, regulation of the selection mechanisms of action, biological effects. Female sexual cycle. Characteristics of its individual periods.

Physiology of sensory systems

1. The concept of sensory systems (analyzers).

2. General principles of structure and basic functions of analysis.

3. Properties analyzers.

4. The notion of absolute and differential threshold of feeling. Weber-Fechner Law.

5. Functional organization analysis.

6. Classification of receptors and their function.

7. The functions of conduction and central departments analyzers.

8. Structural-functional organization of somato-sensory system (cutaneous and proprioceptive sensitivity).

9. Physiological bases of pain. Nociception, physiological characteristics and classification nociceptors.

10. Nociassociation or pain system, its structural and functional organization, leading

ways and levels of processing. Physiological significance of pain.

11. Antinociassociation system, its structural and functional organization opiate and non opiate mechanisms, physiological role. Physiological bases of anesthesia.
12. Structural-functional organization of taste sensory systems. Types of tastes mechanisms of their perception, physiological role.
13. Structural-functional organization of olfactory sensory system. Classification of smells, theory of perception.
14. Structural-functional organization of the visual analyzer.
15. The optical system of the eye. Mechanism of refraction and accommodation. Refractive errors eyes.
16. Pupillary reflex, its physiological significance.
17. Receptor apparatus visual analyzer. Structure and function of individual layers of the retina.
18. Photochemical and electrical phenomena in the retina.
19. Light and Contrast Sensitivity of view. The notion of adaptation view.
20. Modern understanding of the mechanisms of perception of color. Major violations perception of color.
21. Basic visual function and physiological basis of their research.
22. Overview of the hearing analyzer. Features external and middle ear.
23. Structural-functional organization of the inner ear. The mechanisms of perception of sounds.
24. Analyze frequency and strength of sounds. Characteristics of sound sensations.
25. Structural-functional organization of the vestibular analyzer. Vestibular reactions.

Physiological basis of behavior

1. General characteristics of congenital and acquired forms of behavior.
2. Comparison of conditional and unconditional reflexes.
3. Conditional reflexes: general characteristics, properties, conditions of formation and preservation. Mechanism of closure of the temporary connection.
4. Braking conditional reflexes, brake types, their physiological significance.
5. Memory. Types and mechanisms of memory.
6. Structure holistic act behavior (by P.K. Anokhin).
7. The role of motivation in the implementation of behavioral reactions.

8. The mechanism of formation and biological significance of emotions.
9. Sleep, its phase, the development of mechanisms and biological significance for the organism.

Higher nervous activity of man

1. Concept about first and second signal system.
2. Functions of new part of the brain and higher nervous activity of man.
3. Functional asymmetry using a large hemisphere of the brain, the concept of dominant hemisphere function non-dominant hemisphere interaction hemisphere.
4. Language. Functional language. Physiological bases of its formation. Age of higher nervous activity in man.
5. Types of higher nervous activity, their classification, physiological bases, methods. The role of education.
6. Types of nervous system in humans, methods of research.
7. Thinking. Role of brain structures in the process of thinking. Consciousness.

Blood System

1. The main physiological function of blood.
2. Functional significance of water and electrolytes of blood plasma.
3. Proteins of blood plasma. Their composition and basic functions.
4. General characteristics of erythrocytes. Their function.
5. Hemoglobin as a major component of erythrocytes. The structure of hemoglobin. Basic forms and compounds of hemoglobin.
6. Characteristic of blood group systems AB0.
7. Characteristic of Rh blood group system.
8. Blood transfusion (hemotransfusion), its stages.
9. The main functions of certain types of leukocytes.
10. The role of vascular wall and platelets in hemostasis.
11. Mechanisms of vascular-trombotsytic haemostasis: arterioles spasm, adhesion and aggregation of platelets, release reaction, consolidation thrombus.
12. Mechanisms of coagulation hemostasis. Blood coagulation system. Phases of blood coagulation, their essence.
13. Characteristic of anticoagulation blood system.
14. Characteristics of fibrinolysis system.

Circulation system

1. Leading system of heart, its value. Mechanisms of spontaneous generation of impulses are in the explorer system. Law —gradient of automatisml.
2. Functional properties of contractive muscles fibers of heart. Action potential of contractive myocardiocytes. Ionic mechanisms of origin of it basic phases.
3. A concept is about the cycle of cardiac activity. Phase structure of cardiac cycle.
4. Functional classification of blood vessels.
5. Pulse vibrations of blood motion, volumes and pressure in arterial vessels.
6. Laws of blood motion are in venous vessels. A concept is about venous pressure, venous pulse, venous returning.
7. Miogenic, metabolic and histomechanic mechanisms of adjusting of blood local circulation. A concept is about physiology arterial hyperemia.
8. Nervous regulation of local blood circulation. Humoral mechanisms regulation of local blood circulation.
9. Miogenic mechanisms regulation of heart work. Frank-Starling Law.
10. Immediately mechanisms of adaptation of heart to stress and resistance.
11. Character and mechanisms of influencing of the parasympathetic nervous system is to heart work.
12. Character and mechanisms of influencing of the sympathetic nervous system is to heart work.
13. Nervous mechanisms of hemodynamic system regulation. Characteristic of afferent central and efferent link regulation.
14. A role of reflexes is in circulation regulation.

Respiratory system

15. Breathing stages. General structure and basic functions of the external breathing system.
16. Elastic traction of lungs. Surphactants, their values.
17. Breathing biomechanics. Mechanisms of inspiration and expiration.
18. Static indexes of lungs ventilation. Concept about pulmonary volumes and capacities.
19. Dynamic indexes of lungs ventilation. Minute volume breathing, its determination.
20. Mechanisms of gas exchange between alveoli and blood through pulmonary capillaries.
21. Transport forms of oxygen through blood. Transport the physically dissolved oxygen in plasma of blood. Its functional value.

22. Transport the chemically dissolved oxygen. Functional characteristic of hemoglobin. A concept is about the Khyuffner's number and oxygen capacity of blood.
23. Curve of dissociation of oxihemoglobin. Functional value of form of this curve. Concept about the change of the curve dissociation of oxihemoglobin to the right and to the left. Factors which cause such changes. Bor Effect, its functional value.
24. Transport forms of carbon dioxide are from tissues to lungs. Binding curves of carbon dioxide. Holding Effect, its value.
25. Localization and functional characteristic of neurons groups which enter in the complement of respiratory center.
26. Mechanisms of autonomic rhythmic activity of respiratory center are in the conditions of the quiet and increased breathing.
27. Influence of mechanical factors is on respiratory center activity. Types of mechanoreceptors are in lungs. Hering-Brewer Reflex.
28. Influence of chemical factors is on respiratory center activity. Central and peripheral mechanisms of these influencing.

Energy metabolism

1. Physiological significance of protein, fats and carbohydrates. The concept of nitrogen balance.
2. Dissipation of energy in the body. Methods for studying energy metabolism: direct and indirect Calorimetry.
3. Caloric equivalent of oxygen and respiratory rate, their value in studies of metabolism.
4. The notion of primary metabolism. Factors that influence its value. Specific - dynamic action of food.
5. Energy costs organism during physical and mental activity.
6. Physiological bases of rational nutrition. Caloric coefficients of nutrients.

Thermoregulation

14. The concept of core and cover as the body temperature zones.
15. Periodic fluctuations in body temperature, body temperature changes in physiological conditions.
16. Mechanisms of heat formation. The notion of contractile and non-contractile thermogenesis.
17. Mechanisms of heat output. Environmental factors that affect the warmth returns.

18. Properties and physiological reactions of the organism, which means the intensity of heat output.

19. Center thermoregulation, its structure and basic principles of operation.

20. Afferent and efferent link of thermoregulation.

Digestive system

26. Common structural and functional characteristics of digestion. The concept of digestion types.

27. Overview of the mechanism of digestion. Gastrointestinal hormones.

28. Value of oral cavity as a primary division of the digestive system.

29. Composition, properties and importance of Saliva. Mechanisms of regulation of Salivation.

30. Mechanical processing of food. Mechanisms of mastication and swallowing.

31. Gustatory analyzers, its structure and values.

32. Value stomach during digestion.

33. Gastric juice, its composition, properties and values of major components. Mechanisms of gastric secretion.

34. Neural and humoral mechanisms of regulation of gastric secretion.

35. Phases of gastric secretion. Influence of different food regimes on gastric secretion.

36. Gastric motor function. Mechanisms of conversion of food to the stomach in the duodenum.

37. Vomiting reflex, causes and mechanisms.

38. Value enteritis in the process of digestion.

39. Pancreatic juice, its composition, properties and values of major components.

40. Influence of various food substances on secretion of pancreatic juice.

41. Neural and humoral mechanisms of regulation of pancreatic secretion.

42. Bile, its composition, properties and values of major components.

43. Mechanism of bile excretion and regulation this process.

44. Protective (barrier and antitoxic), metabolic and hemodynamic functions of the liver.

45. Intestinal secretion. Composition, properties and values of base components of intestinal juice.

46. Cavity and membrane hydrolysis of nutrients in the small intestine.

47. Motor activity of small intestine and its role in the digestion.

48. Digestion in the large intestine. Value of intestine's micro flora. Motor activity of the large intestine. Act of defecation.

49. Mechanisms of absorption in various departments of the digestive system.

50. Absorption of water, mineral salts, hydrolysis products, fats and carbohydrates.

Excretory system

1. General characteristics of the selection. Kidneys' function.

2. Nephron, as a functional unit of kidney. Features of renal blood flow.

3. Processes that ensure the formation of urine. Mechanism of glomerular filtration.

4. Tubular reabsorption, its mechanisms.

5. Tubular secretion. Its mechanism.

6. Regulation activities of the kidneys.

7. Diuresis. Composition of primary and secondary urine.

8. Methods excretory kidney function.

9. Inretorna kidney function. Renin-angiotensin system, mechanisms of activation, the physiological significance.

10. Role of kidney in regulation of water-salt metabolism and acid-base balance.