CELL REPRODUCTION. Types of cell division. Morphological characteristics of the main types of cell division. Changes in the structure of the nucleus during cell division. Endomitosis. Formation of multinucleated cells. The value of cell division.

STRIATED MUSCLE TISSUE. The source of development. The structure of the muscle fiber. Types of muscle fibers. The structure of myofibrils. The mechanism of muscle fiber contraction.

CYTOSKELETON AND CELL MOVEMENT APPARATUS. Structural components of the cytoskeleton, its significance. Tissue and cellular features of the composition of cytoskeletal structures. Microtubules and microfilaments, their structure and functions in cells.

FIBROBLASTS. Varieties of fibroblasts (fibroblastic differon). Microscopic structure of various types of fibroblasts. Submicroscopic structure. Specialized forms of fibroblasts. Functions of fibroblasts. Stages of formation of collagen fibers.

THE MAIN STRUCTURAL COMPONENTS OF THE CELL NUCLEUS. Submicroscopic structure of the nuclear envelope. Nuclear pores, their composition. Chromatin, its

types. The nucleolus, its structures. Nucleoplasm, its composition.

EMBRYONIC HEMATOPOIESIS. The main stages, their time. Localization of foci of embryonic hematopoiesis. Features of embryonic erythropoiesis. Stem hematopoietic cell, its morphofunctional features. Ways of stem cell differentiation.

THE CELL CYCLE. Definition of the concept of "cell cycle". G1-period, its characteristic. S-period, its characteristic. G2-period, its characteristic. Varieties of cells with different types of cell cycle.

MUSCLE TISSUE. Sources of development. Classification of muscle tissues. General morphological characteristics: supporting, trophic and contractile apparatus. Muscle-like contractile cells, their localization, structure and functions. Regeneration of various types of muscle tissue.

CYTOPLASM. Cytoplasmic matrix (hyaloplasm). Cytoplasmic structures (morphoplasm). Classification of structures. Definition of the term "organelle". Classification of organelles.

MONOCYTOPOIESIS. Stem cells and progenitor cells of monocytopoiesis. Nuclear changes. Changes in the

cytoplasm. Monocyte differentiation lines. The concept of the phagocytic (macrophage) system. Regulation of monocytopoiesis and macrophage differentiation.

THE CELL WALL (cytolemma). Submicroscopic structure and chemical composition. Supramembrane and submembrane apparatus, their composition. Functional significance of cytolemma components. Intercellular connections, their types, structure. Functional significance of various intercellular connections.

GRANULOCYTOPOIESIS. Characteristics of pre- and postnatal granulocytopoiesis. Stem cells and progenitor cells. Changes in the structure of cells during granulocytopoiesis. Regulation of granulocytopoiesis. Distribution of granulocytes in the body.

INTERACTION OF THE NUCLEUS AND CYTOPLASM. The role of the nucleus in the regulation of metabolism. Types of RNA. Localization of RNA synthesis in the cell. The role of the nucleolus in RNA synthesis. Transport of RNA into the cytoplasm.

NERVE ENDINGS. Classification of nerve endings. Effector nerve endings. Their types and structure. Motor plaques, their structure. Fundamentals of the mechanism of neuromuscular

transmission. Receptors. Their classification and structure. The structure and functions of neuromuscular spindles.

THE CELL CENTER (centriols). Localization in the cell. Microscopic and submicroscopic structure. Chemical composition of structures. Significance in the process of cell division. The value in the apparatus of cell movement. Significance in cytoplasmic transport and secretion.

THE STRUCTURE OF THE MUSCLE AS AN ORGAN. Types of muscle fibers, their morphological and histochemical characteristics. The outer shells of the muscle, their meaning. Inner shells, their meaning. The connection of the muscle with the tendon. Histogenesis of muscles.

THE NUCLEUS. Significance in the vital activity of the cell. Forms of cell nuclei. Basic nucleus structures. The most important chemical components of the nucleus. The concept of the nuclear-cytoplasmic relationship.

CONNECTIVE TISSUES WITH SPECIAL PROPERTIES. Classification. Features of the structure. Localization in the body. Types, structure and functions of adipose tissue. Structure and functions of reticular tissue. Protective mechanisms of connective tissues.

INCLUSIONS. Definition of the concept of "inclusion". Classification of inclusions by origin and function (examples). The structure of various types of inclusions and localization in cells. Pigment inclusions, their types and functions. Functional value (examples).

BONE TISSUE. Types of bone tissue. Functional value. Structural components: cells, features of the intercellular substance. The structure of reticulofibrous bone tissue. Localization of reticulofibrous bone tissue in the body.

LYSOSOMES. The origin of lysosomes (connection with the Golgi complex). Typical enzymes (markers). Types of lysosomes. Functional value.

DENSE CONNECTIVE TISSUE. Classification. Localization in the body. Features of the intercellular substance. Morphofunctional features of cells. Functional value.

DETERMINATION AND DIFFERENTIATION. The concept of "determination". Determination factors. The concept of "differentiation". Morphological indicators of differentiation. The concept of cellular differons.

BLOOD AS TISSUE. Sources of embryonic blood development. Blood plasma, its composition. Blood cells.

Their classification. Non-cellular elements of blood. Blood functions.

GOLGI COMPLEX. Methods of detection in the cell. Microscopic structure. Submicroscopic structure, its variants. Localization in the cell, connection with other organelles. Functions of the Golgi complex. Examples of cells with different structures of the Golgi complex.

NEUROGLIA. Classification. Sources of development. Localization of various types of glial cells. Formation of blood-liquor and blood-brain barriers. The structure of various gliocytes. Functions of neuroglia.

CLEAVAGE AND GASTRULATION. Characteristics and terms of crushing of the human zygote. The structure of the human blastula. Mechanisms and timing of gastrulation in humans. The structure of a two-layer germ disk. The structure of the three-layer germ disk.

CARTILAGE TISSUE Types of cartilage (classification). The structure of cartilage tissue. Features of the intercellular substance. Cell types. Functional value.

SPERMATOZOA. The structure of spermatozoa. Arrangement of organelles. Functional properties.

LOOSE CONNECTIVE TISSUE. Localization in the body. Cellular elements, sources of their formation. The composition of the intercellular substance. Connective tissue fibers, their formation. Functions of loose connective tissue. Barrier and protective mechanisms of loose connective tissue.

BIOLOGICAL CELL MEMBRANES. Submicroscopic structure. Chemical composition. Functions. Membrane structures of the cell. Non-membrane cell structures.

CARDIAC MUSCLE TISSUE. The source of development. Features of the structure. Types of cardiomyocytes. Structure and functions of various types of cardiomyocytes. Regeneration of cardiac muscle tissue.

LYSOSOMES. Microscopic appearance and submicroscopic structure. Typical enzymes (markers). Types of lysosomes.

MACROPHAGES. The origin of macrophages. Microscopic structure. Submicroscopic structure. Dependence of the structure on functional activity. Functions. Specialized types of macrophages.

ENDOCHONDRAL OSSIFICATION. Stages. Formation of the primary ossification center. Formation of secondary ossification centers. Remodeling of the bone structure.

Mechanisms of regulation of ossification and bone tissue restructuring.

GERM LAYERES AND AXIAL ORGANS. Formation and structure of ectoderm. Formation and structure of the endoderm. Formation, structure and location of the mesoderm. Axial organs of the embryo. Embryonic induction in the formation of germ layers and axial organs.

MONOCYTES. Structure. The percentage of peripheral blood. Monocyte differentiation lines. Structure and functions of macrophages of loose connective tissue. Organ varieties of macrophages.

DIFFERENTIATION OF THE MESODERM. The names of the primary rudiments. Localization of rudiments. Parts and derivatives of somites. Somite legs, their derivatives. Parts and derivatives of splanchnotomes.

THROMBOCYTOPOIESIS. Stem cells and progenitor cells. Changes in the nucleus and cytoplasm of thrombocytopoietic cells. Morphological characteristics of megakaryocytes. Platelet formation. Their types. Platelet lifespan.

THE CELL AS THE MAIN STRUCTURAL AND FUNCTIONAL UNIT OF TISSUES. The main parts of the cell. Cell forms in humans. The relationship of the shape of

cells with their function. Nucleus structures. Cytoplasmic structures.

SMOOTH MUSCLE TISSUE. Localization in the body. Functional properties. The structure of a smooth myocyte. The mechanism of smooth myocyte contraction. Sources of development.

GRANULOCYTES (granular leukocytes). Varieties. The percentage of different types. The structure of each type. Features depending on maturity. Functions. Lifespan.

OOCYTE. Types of oocytes. The structure of the human oocyte. Periods of oogenesis, their morphological and karyotypic characteristics.

LAMELLAR BONE TISSUE. The structure of the bone plate. The structure of osteon. Types of bone plates. Features of the compact and spongy bone tissue. The structure and significance of the periosteum.

ENDOPLASMIC RETICULUM. Types and submicroscopic structure. The structure of the granular endoplasmic reticulum in various cells (examples). Ribosomes, their structure and relationship with endoplasmic reticulum. The main stages of protein synthesis. The structure of agranular endoplasmic

reticulum in various cells (examples). Functions of granular and agranular endoplasmic reticulum.

RED BLOOD CELLS. The number in men and women. Structure. Lifespan. Functional value. Erythropoiesis in an adult organism, a characteristic of morphologically recognizable cells. Regulation of erythropoiesis.

MITOCHONDRIA. Microscopic and submicroscopic structure. Structural features and their localization in cells with different functions (examples). Typical enzymes (markers). Functional significance of mitochondria.

BLOOD PLATELETS. The source of development. Quantitative composition of platelets. The structure of the platelet. Types of platelets. Platelet functions.

FERTILIZATION. Stages of fertilization. Changes in the sperm during fertilization. Changes in the oocyte during fertilization. The structure of the zygote. The significance of the fertilization process.

LEUKOCYTES. The number of white blood cells in a liter of blood. Classification. Leukocyte formula. Her indicators. The importance of the leukocyte formula in the diagnosis of diseases. The main functions of leukocytes.

ENDOPLASMIC RETICULUM. Types and submicroscopic structure. The structure of the granular endoplasmic reticulum in various cells (examples). Ribosomes, their structure and relationship with endoplasmic reticulum. The main stages of protein synthesis. The structure of agranular endoplasmic reticulum in various cells (examples). Functions of granular and agranular endoplasmic reticulum.

EPITHELIAL TISSUES. Sources of epithelia development. General morphological properties of epithelia. Barrier functions of epithelia. Morphological classification of epithelia (examples). Functional classification of epithelia (examples). Genetic classification of epithelia (examples).

INTRAMEMBRANOUS OSSIFICATION. Stages of intramembranous ossification. Osteogenic cells. Their structure. Formation and mineralization of intercellular substance. Reconstruction of bone tissue. Mechanisms of regulation of osteogenesis.

TISSUES AS A LEVEL OF ORGANIZATION OF THE LIVING. Definition of the concept of "tissue". The most important components of tissues. Sources of tissue development. Morphofunctional classification of tissues. Genetic classification of tissues.

COVERING EPITHELIA. Localization and types of covering epithelia. Special cytoplasmic organelles and cytolemma derivatives. Intercellular contacts. Structure and functions of the basement membrane. Functional features of the covering epithelia.

THE CONNECTION OF THE EMBRYO WITH THE MATERNAL ORGANISM. The concept of implantation. The timing of implantation in humans, its stages. Implantation factors. Changes and the role of the trophoblast. Endometrial changes during implantation. Types of mammalian placentas.

STRATIFIED EPITHELIA. Sources of development. Classification. Localization in the body. Structure, cellular composition of layers. Functional features. Epithelial cells of stratified epithelia.

INTERCELLULAR SUBSTANCE OF LOOSE CONNECTIVE TISSUE. Functional value. Structured and amorphous parts of the intercellular matrix. Types of fibers, their morphological characteristics. Physical properties of fibers.

NERVE TISSUE. Sources of development. Structural components, their classification. The general structure of

neurons. Submicroscopic structure of neurons. Morphological and functional classification of neurons (examples).