

A chemical agent has influenced cell plasmolemma. Consequently, the cell changed its form. Which layer of plasmolemma takes part in this process?

- Cortical. *
- Glycocalyx.
- Bilipid.
- Hydrophilic.
- Hydrophobic.

Life cycle of a cell includes a process of DNA duplication. As a result of this process monochromatid chromosomes become bichromatid. This phenomenon is observed within the following period of the cell cycle:

- S *
- G₂
- G₁
- G₀
- M

In a specimen an oocyte at the moment of its fertilization by spermatozoon can be seen. What is the main result of fertilization?

- Formation of zygote. *
- Determining the child's sex.
- Meiosis completion with oocyte.
- Penetration of oolemma by spermatozoon.
- Cortical reaction.

During the process of a human embryo formation one can observe a cavity, light little blastomeres at the periphery, and dark big blastomeres at one of the poles. How is the embryo called at this stage of development?

- Blastocyst. *
- Morula.
- Zygote.
- Gastrula.
- Embryonic disk.

Clinical blood analysis of a patient with pneumonia has shown the increase of the leukocytes total amount. How is this phenomenon called?

- Leukocytosis. *
- Anemia.
- Leukopenia.
- Anisocytosis.
- Polikilocytosis.

In a peripheral blood smear some round cells with segmented nuclei prevail among leukocytes. Granules in their cytoplasm are stained with acid and basic coloring agents. How are these cells called?

- Segmented neutrophils. *
- Basophils.
- Eosinophils.
- Young neutrophils.
- Monocytes.

In blood of a patient there were discovered 14, 5% of erythrocytes of more than 8 micrometers in diameter, 15,5% of erythrocytes up to 6 micrometers, the other 7,1-7,9 micrometers in diameter. How is this phenomenon called?

- Anisocytosis. *
- Erythrocytosis.
- Erythropenia.
- Physiological poikilocytosis.
- Pathological poikilocytosis.

A plasma cell produces specific antibodies to a certain antigen. Due to what blood cells does the quantity of plasma cells increase during immune response?

- B-lymphocytes. *
- T-lymphocytes.
- Monocytes.
- Basophils.
- Eosinophils.

Histamine has a leading role in the development of the clinical presentations of allergy. Which cells produce histamine?

- Mast cells. *
- B-lymphocytes.
- T-lymphocytes.
- Macrophages.
- Plasma cells.

A histological specimen presents a tissue with spherical cells, each of them containing a large fat drop in its center and it is covered with thin cytoplasm layer. Nucleus is compressed and situated at the cell periphery. What tissue is it?

- White adipose tissue. *
- Brown adipose tissue.
- Pigment tissue.
- Mucous tissue.
- Reticular tissue.

A 66-year-old man has a malignant epithelial tumor originating from a bronchus of medium caliber diagnosed. What epithelium is a source of this tumor development?

- Simple pseudostratified ciliated. *
- Stratified keratinized.
- Stratified non-keratinized.
- Simple pseudostratified transitional.
- Simple columnar.

A histological specimen contains the section of a gland that is composed of several secretory sac-shaped parts opening in the common excretory duct. What gland is it?

- Simple branched alveolar gland. *
- Simple branched tubular gland.
- Compound unbranched alveolar gland.
- Simple unbranched alveolar gland.
- Compound branched alveolar gland.

Blood count of an athlete is as follows: erythrocytes – $5,5 \cdot 10^{12}/l$, Hb – 180 g/l, leukocytes – $7 \cdot 10^9/l$, neutrophils – 64%, basophils – 0,5%, eosinophils – 0,5%, monocytes – 8%, lymphocytes – 27%. First of all, such results indicate the stimulation of:

- Erythropoiesis. *
- Lymphopoiesis.
- Leukopoiesis.
- Granulocytopoiesis.
- Immunogenesis.

During postembryonic haemopoiesis in red bone marrow the cells of one of the cellular differons demonstrate gradual decrease in cytoplasmic basophilia as well as increase in oxyphilia, the nucleus is being forced out. Such morphological changes are typical for the following haemopoiesis type:

- Erythropoiesis. *
- Eosinophil cytopoiesis.
- Lymphopoiesis.
- Basophil cytopoiesis.
- Neutrophil cytopoiesis.

A histological specimen of heart shows rectangular cells from 50 to 120 micrometers large with central position of nucleus and developed myofibrils. The cells are connected each other by intercalated disks. These cells are responsible for the following function:

- Function of heart contractions. *
- Endocrine.
- Protective.
- Regeneration.
- Function of impulse conduction.

The main structural unit of the tissue on histological specimen is fiber consisting of myosymplast and satellite cells covered with common basement membrane. Which tissue is this structure characteristic of?

- Skeletal striated muscle tissue. *
- Smooth muscle tissue.
- Cardiac muscle tissue.

Loose connective tissue.
Reticular connective tissue.

In course of conditional experiment the development of mesenchymal cells was completely inhibited. Development of the following muscular tissue will be disturbed:

Smooth muscular tissue. *
Epidermal muscular tissue.
Cardiac muscular tissue.
Skeletal muscular tissue.
Neural muscular tissue.

A sensitive neural ganglion consists of roundish neurons with one extension that divides into axon and dendrite at some distance from the perikaryon. What are these cells called?

Pseudounipolar. *
Unipolar.
Multipolar.
Apolar.
Bipolar.

A patient with poliomyelitis has the damage of the spinal cord and the dysfunction of skeletal muscles. It may be explained by the destruction of some neurons. Name these neurons.

Motor. *
Associative.
Pseudounipolar.
Pseudounipolar and associative.
Associative and motor.

In a histological specimen an organ of nervous system is presented which consists of grey and white substances. Grey substance is located on the periphery. Neurons form three layers in it: molecular, ganglionic and granular. What organ is this?

Cerebellum. *
Spinal cord.
Pons cerebelli.
Cerebral cortex.
Medulla oblongata.

A part of the central nervous system has layer-by-layer allocation of neurons, among which there are cells of such forms stellate, fusiform, horizontal, pyramidal. What part of the CNS has this structure?

Cortex of large hemispheres. *
Cerebellum.
Hypothalamus.
Medulla oblongata.
Spinal cord.

A traumatic injury of nerve fibers is accompanied by axons damage, lysis of myelin. What nerve structures take part in myelin reconstruction during regeneration?

Neurolemmocytes. *
Perineurium.
Ependymocytes.
Endoneurium.
Astrocytes.

Twilight vision disorder occurs as a result of vitamin A deficit. Name the cells, which perform this photoreceptor function.

Rod neurosensory cells. *
Multipolar neurons.
Horizontal neurons.
Cones neurosensory cells.
Ganglionic nerve cells.

A patient has taken high doses of streptomycin and consequently became deaf. The function of what cells of the inner ear was damaged in this case?

Hair. *
Pillar.
Phalangeal.
Deiters'.
Connective tissue.

A boxer has disturbance in smell after a trauma of the nose. The damage of what cells may cause the loss of smell?

Neurosensory. *
Supporting epithelial cells.
Basal epithelial cells.
Ciliated epithelial cells.
Brushed epithelial cells.

In a red bone marrow specimen numerous capillaries are detected, though their wall mature blood elements enter blood circulation. What is the type of these capillaries?

Sinusoidal. *
Lymphatic.
Fenestrated.
Somatic.
Visceral.

In a histological specimen an organ parenchyma is represented by lymphoid tissue which forms lymph nodules. These nodules are diffusely arranged and have a central artery. What organ has such structure?

Spleen. *
Thymus.
Tonsil.
Lymph node.
Red bone marrow.

In a histological specimen a hematopoietic organ consisting of varying in the shape lobules is being researched. Each lobule has a cortical and medullary substance. Which organ has these morphologic characteristics?

Thymus. *
Lymph node.
Spleen.
Tonsils.
Vermiform appendix.

In a histological specimen of a blood vessel stained with orcein have been detected from 40 to 60 elastic fenestrated membranes in the tunica media. Name this blood vessel.

Artery of elastic type. *
Artery of mixed type.
Artery of muscular type.
Vein of muscular type.
Vein of unmuscular type.

Arterioles are playing an important role in supplying functional units of organs with blood. Which arteriole structures perform this function?

Smooth muscle cell. *
External elastic membrane.
Internal elastic membrane.
Special cells of connective tissue.
Endotheliocytes.

In a histological specimen of a vessel internal and external elastic membranes are well-expressed; numerous smooth muscle cells are found in the tunica media. What vessel is this?

Artery of muscular type. *
Artery of elastic type.
Artery of mixed type.
Vein with strong development of muscles.
Extraorganic lymphatic vessel.

In a histological specimen of endocrine gland epithelial cords containing chromophilic (acidophilic and basophilic) and

chromophobic cells are detected. What organ is presented in the specimen?

Adenohypophysis. *

Epiphysis.

Adrenal gland.

Neurohypophysis.

Thyroid gland.

There are cortical and medulla separated by connective tissue layer in the endocrine gland specimen. Parenchyma cells make up three zones in cortical substance, with rounded masses in the superficial zone, parallel cords in the middle one, reticular arrangement of cell cords in the deep one. What gland is it?

Adrenal gland. *

Pituitary gland.

Epiphysis.

Hypothalamus.

Thyroid gland.

There are round structures of different size in the histological specimen of an endocrine gland. These structures' wall is formed of one layer of epithelial cells on basement membrane, inside they contain homogeneous non-cellular mass. What gland is it?

Thyroid gland. *

Posterior lobe of pituitary gland.

Adrenal gland, cortical substance.

Parathyroid gland.

Anterior lobe of pituitary gland.

In skin biopsy material in epidermis cells with processes containing deep-brown granules in cytoplasm have been detected. What cells are these?

Melanocytes. *

Epidermal macrophages.

Keratinocytes.

Merkel's cells.

Lymphocytes.

Human skin has a high breaking strength. It is known that the skin consists of epithelial tissue and two kinds of connective tissue. What of the following tissues provides the skin strength?

Dense irregular connective tissue. *

Loose connective tissue.

Transitional epithelium.

Simple epithelium.

Stratified squamous epithelium.

In lungs alveoli there are special cells, which carry out gas exchange and form the barrier between air and blood. Name these cells.

Type I alveolocytes. *

Alveolar macrophages.

Clara's cells.

Type II alveolocytes.

Epithelial cells with microvilli.

A histological specimen represents an organ with wall comprised of mucosa, submucosa, fibrous-cartilagenous tunica and adventitia. Epithelium is pseudostratified and ciliated, muscularis mucosae is absent, submucosa contains serous-mucous glands, C-shaped hyaline cartilage. What organ has the described morphological features?

Trachea. *

Tertiary bronchi (segmental bronchi).

Larynx.

Terminal bronchiole.

Secondary bronchi (lobar bronchi).

An electron microphotography of fragment of proper gastric gland shows a big irregular round-shaped cell. There are a lot of intracellular canaliculi and mitochondria in the cytoplasm. Specify this cell:

Parietal cell. *

Endocrine cell.

Mucous cell.

Principal cell.
Undifferentiated cell.

A specimen of a parenchymal organ shows poorly delineated hexagonal lobules surrounding a central vein, and the interlobular connective tissue contains embedded triads (an artery, a vein and an excretory duct). What organ is it?

Liver. *
Spleen.
Thyroid.
Pancreas.
Thymus.

In a histological specimen of a small intestine wall at the bottom of crypts there have been found clustered cells. In the apical part of the cells there are large acidophilic secretory granules; cytoplasm is basophilic-colored. What cells are these?

Paneth. *
Goblet.
Columnar without brush border.
Endocrine.
Columnar with brush border.

In an electronic micrograph of a nephron part there are detected cells of cubic form, the apical surface of which contains brush border, and the basal – basal infoldings with mitochondria between invaginations of cytolemma. Name the part of nephron.

Proximal tubule. *
Distal tubule.
Collecting tubule.
Thin tubule.
Capsule of glomerulus.

Kidney endocrine complex cells are located under endothelium in the wall of afferent and efferent arterioles; in the cytoplasm these cells contain granules of rennin, which assist the rise of blood pressure. What cells are these?

Juxtaglomerular cells. *
Mesangial cells.
Hurmagtig's cells.
Dense macula cells.
Interstitial cells.

Histological specimen of a kidney demonstrates cells closely adjoined to the renal corpuscle in the distal convoluted tubule. Their basement membrane is extremely thin and has no folds. These cells sense the changes in sodium content of urine and influence rennin secretion occurring in juxtaglomerular cells. Name these cells:

Macula densa cells. *
Juxtaglomerular cells.
Glomerular capillary endotheliocyte.
Podocytes.
Mesangial cells.

The changes of nucleus and cytoplasm of spermatids are observed during one of the phases of spermatogenesis. These changes predetermine the formation of mature sex cells. What gametogenesis phase is meant?

Formation (spermiogenesis). *
Proliferation.
Maturation.
Growth.
Reproduction.

Parents of a 10 year old boy consulted a doctor about extensive hair-covering, growth of beard and moustache, low voice. Intensified secretion of which hormone must be assumed?

Of testosterone. *
Of oestrogen.
Of progesterone.
Of somatotropin.
Of cortisol.

In the pubertal period cells of the male sexual glands start producing the male sexual hormone testosterone that is responsible for formation of the secondary sexual characters. What cells of the male sexual glands produce this hormone?

Leydig cells. *

Spermatozoa.

Sertoli's cells.

Spermatids.

Sustentacular cells.

Histological specimen of an ovary demonstrates a spherical structure composed of large glandular cells containing lutein. What hormone is produced by the cells of this structure?

Progesterone *

Estrogens

Aldosterone

Corticosterone

Testosterone

A histological specimen demonstrates an organ with its wall consisting of three tunics. The inner tunica has tubular glands and undergoes cyclic changes. Name this organ:

Uterus *

Vagina

Ureter

Esophagus

Urinary bladder

Histological specimen of the ovary shows large hollow structures. Primary oocyte within these structures is surrounded with zona pellucida and corona radiata and is situated in the *cumulus oophorus*, the wall is made of *granulosa* and *theca*. What ovarian structure can be characterized by these morphological features?

Mature (tertiary) follicle *

Primordial follicle

Primary follicle

Corpus luteum

Corpus atreticum