

**Ministry of Education and Science of Ukraine
State Biotechnological University
Institute of Veterinary Medicine and Animal Husbandry
Faculty of Veterinary Medicine
Department of Normal and Pathological Morphology**



Album of histology

PART II SPECIAL HISTOLOGY

Course _____, group _____

Kharkiv-2022

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**Reviewer: professor of the department of normal and
pathological physiology of animals O. Bobrytska**

**Responsible for release: dean of veterinary medicine
faculty, associate professor O. Zimmerman**

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DEPARTMENT OF NORMAL AND PATHOLOGICAL MORPHOLOGY



ALBUM OF HISTOLOGY

PART II

SPECIAL HISTOLOGY

20 ____ / 20 ____ ACADEMIC YEAR

Topic: Nervous system.

SPECIAL HISTOLOGY

The preparation №1:

Spinal cord of a dog.

Look at the slide with the unaided eye. The spinal cord is oval on cross section. Dura matter and the dorsal and ventral roots of spinal nerve fragments can be observed on the slide. The spinal cord consists of two parts divided by median fissure ventrally and by median septum dorsally that can be observed with the unaided eye. The median septum is slightly defined. The cord is divided into two distinct regions: white matter at the periphery and gray matter in the centre. The gray matter is represented by dorsal, lateral and ventral horns (columns). The dorsal horns are elongated and ventral horns are wide and roundish. The lateral horns are located between the dorsal and ventral horns. They are present in thoracolumbar segments of the spinal cord only. The gray matter of both spinal cord parts is connected by gray commissure. Find out spinal canal in its centre. Define the white matter funiculi on the slide with the unaided eye. There are three pairs of funiculi: the dorsal, ventral and lateral. The dorsal funiculi occupy region between the dorsal horns and dorsal median septum; the ventral funiculi are between the ventral horns and ventral median fissure; the lateral funiculi are between the dorsal and ventral horns.

After that *draw* a scheme of the spinal cord structure and mark all above named structures in it.

Examine the slide using low power magnification. Find out subdural space under the dura matter (its fragments). Arachnoidea is destroyed on such slides. Define the pia matter directly on the spinal cord. The pia matter septa extend into the white matter. The white matter has reticular appearance. Find out white commissure connecting the white matter of both spinal cord parts above the ventral median fissure. Pay attention to the gray matter septa extending into the white matter. They are formed by neuroglia. Define the horns in the gray matter, and clusters of brown-black neurons forming the nuclei there. The dorsal horns contain the neuron nuclei of connector neurons. There are large nuclei of autonomic motor neurons in the ventral horn. Find out intermediate nuclei (lateral and medial) between the dorsal and ventral horns of the grey matter.

The preparation №2

Cortex of dog cerebellum.

Examine the slide with the unaided eye. Gyri separated by sulci and fissures can be observed on the slide. The gray matter forming cortex of cerebellum is the outer dark regions of gyri, and white matter comprising fiber tracts is the inner pale region. Examine the slide at low power magnification. Find out gyri there. The fissures containing pia matter (or its fragments) with blood vessels can be observed between the gyri. Define the gray matter (cortex) in the gyri. Find out the layer of large cells (or **Purkinje cells**) repeating gyrus boundary in the gray matter. Examine these cells at high power magnification. They are piriform, and their perikarya form the central layer of cerebellar cortex. The dendrites extend from the perikarya and branch out like a tree in the molecular layer of the cerebellar cortex. The latter is paler than the granular layer located underneath the Purkinje cells perikarya. Find out perikarya of basket and stellate neurons in the molecular layer. They appear as dark points of different shapes and sizes. The granular and stellar neurons are in the granular layer. They are similar to the basket and stellate neurons of the molecular layer.

Draw a cerebellar cortex part and mark it:

Topic: Nervous system.

SPECIAL HISTOLOGY

The preparation №1:

Spinal cord of a dog.
(silver impregnation)

Designations: 1 – median septum dorsally; 2 – median fissure ventrally;
I – gray matter: 3 - dorsal horns; 4 – ventral horns; 5 – lateral horns;
6 – gray commissure; 7 – spinal canal; 8 – motor neurons in the ventral horn;
II – white matter; 9 - white commissure; 10 – dorsal funiculi;
11 – lateral funiculi; 12 - ventral funiculi; 13 - dorsal root of a spinal nerve;
14 - ventral roots of a spinal nerve; 15 - spinal cord membranes.

The preparation № 2

Cortex of dog cerebellum.
(silver impregnation)

Designations:
I – gray matter (cortex);
1 – molecular layer (basket and stellate neurons);
2 – central layer (piriform cells, Purkinje cells);
3 – granular layer (granular and stellar neurons);
II – white matter.

Topic: Nervous system.

SPECIAL HISTOLOGY

The preparation № 3

Cerebral cortex of a dog. Giant- pyramidal cell.

Look at the slide with the unaided eye. Gyri separated by sulci and fissures can be observed on the slide. The gray matter (cerebral cortex) occupies the outer dark region of gyri, and white matter (fiber tracts) is in the inner pale region. At low power magnification find out pyramid-shaped neurons and examine them at high power magnification. These neurons have different sizes and functional significance. They form six indistinct layers in the effector part of cerebral cortex. The neuroglial elements, neuron processes (nerve fibers) and blood vessels are distributed among neurons.

The preparation № 4

Craniospinal ganglion of a dog.

Find out dorsal and ventral roots of a spinal nerve on the slide with the unaided eye. The globular craniospinal ganglion is located on dorsal root of spinal nerve. Examine it at low power magnification. The craniospinal ganglion is covered by capsule that continuing with the dorsal root envelope. Septa extend into the organ. The ganglion parenchyma is formed by neurons (pseudo-unipolar sensitive neurons). The neuron perikarya are located predominantly as clusters at the ganglia periphery whereas their processes (nerve fibers) are located in the ganglia central part. View a cluster of the neuron perikaryons at high power magnification. The perikarya are mainly round with big centrally located nuclei. The nucleolus and chromatin can be observed in a nucleus. Find out nuclei of oligodendrocytes surrounding perikarya. These flattened or cuboidal cells form peculiar capsule around cell bodies. Fine layers of the fibrous connective tissue are located between perikaryons. The nuclei of tissue cells are oval-shaped. The fibrous connective tissue layers surround the clusters of neuron perikaryons. The nerve fibers appearing as wavy cords are located between the clusters of perikaryons. The neurolemmal cell nuclei can be observed at the fibers periphery.

Draw a scheme of craniospinal ganglion structure and mark it:

Topic: Nervous system.

SPECIAL HISTOLOGY

The preparation № 3

Cerebral cortex of a dog. Giant- pyramidal cell.
(silver impregnation)

Designations:

- 1 – nucleus;
- 2 – pericarion;
- 3 – apical dendrite;
- 4 – side dendrites;
- 5 – axon.

The preparation № 4

Craniospinal ganglion of a dog.
(H&E).

Designations:

- 1 ganglion capsule; 2 - pericarions of pseudo-unipolar sensitive neurons;
- 3 - nuclei of oligodendrocytes (mantle cell); 4 - layers of connective tissue with nerve fibers; 5 - ventral roots of;
- 6 - spinal nerve.

Name student

Date

Signature of teacher

The preparation № 5**Cornea of a cow (H&E).**

Cornea is the forepart of fibrous tunic of an eye. It consists of five layers: the anterior epithelium, anterior limiting membrane, substantia propria, posterior limiting membrane, and posterior epithelium.

Examine the slide at low power magnification. Find out the anterior epithelium – a nonkeratinized stratified squamous epithelium. Below this layer there is the anterior limiting membrane resembling a thin pink stained line. The substantia propria is the thickest layer of cornea. Examine it at high power magnification. It consists of layers (lamellae) of collagenous fibers and fibroblasts arranged parallel to the corneal surface and oriented at right angles in adjacent layers. Underneath the substantia propria there is a posterior limiting membrane appearing as a pale-lilac line. The posterior epithelium is composed of the simple squamous epithelium located on the posterior surface of the cornea.

Draw a cornea and mark it:

The preparation № 6**Posterior wall of a canine eye (H&E).**

Posterior wall of an eye is composed of three layers (tunics): the outer fibrous tunic (sclera), middle vascular tunic, and pars optica retinae.

Examine the slide with low power magnification and orient it correctly. The sclera is the thickest layer. It is composed of the dense irregular connective tissue in which bundles of collagen fibers and few elastic fibers are arranged parallel to the surface of eyeball and pink-colored. Scattered black-brown-colored pigment cells are distributed in the innermost regions of the sclera. The episcleral tissue is formed by the loose connective tissue located above the sclera in separate sites. The vascular tunic looks like a black-pink line and contains numerous blood vessels. It is formed by the loose connective tissue with a plenty of pigment cells. The pars optica retinae is located underneath the vascular tunic. Examine it using medium or high power magnification. The pars optica retinae can be divided into 10 distinct layers: the pigment epithelium, photoreceptor cell layer (rods and cones), outer limiting membrane, outer nuclear layer, outer plexiform layer, inner nuclear layer, inner plexiform layer, ganglion cell layer, nerve fiber layer, and inner limiting membrane. The pigment epithelium is adjacent to the vascular tunic. It looks like a black thin continuous line. The pale-pink coloured photoreceptor layer, that has a cross striation, is adjacent to the pigment epithelium. The outer limiting membrane is almost indistinct and appears as a thin pink line adjacent to the outer nuclear layer. The photoreceptor cell nuclei stained violet and arranged into 7-8 rows can be observed in the outer nuclear layer. The outer plexiform layer is pale-pink coloured. The similar stained thin fiber can be observed in it. The inner nuclear layer is formed by the nuclei of bipolar neurons, comprising 3-4 rows. The inner plexiform layer looks like the outer plexiform layer, but is much wider. The ganglion cell layer contains ganglion cell nuclei. The latter are distributed separately. The nerve fiber layer fuses with the inner limiting membrane. Both of them are pale-pink and contain fine fibers. Examine the sclera and vascular tunic using high power magnification. Find out fibroblast nuclei between the laminae in the sclera and blood vessels – in the vascular tunic.

Draw a posterior wall of an eye and mark it:

Topic: Sensory organs.

SPECIAL HISTOLOGY

The preparation № 5

Cornea of a cow (H&E).

Designations:

- 1 – anterior epithelium;
- 2 – anterior limiting membrane;
- 3 – substantia propria;
 - a – nuclei of fibrocytes;
- 4 – posterior limiting membrane;
- 5 – posterior epithelium.

The preparation № 6

Posterior wall of a canine eye (H&E).

Designations:

- 1 – sclera; 2 – vascular tunic; 3 – pars optica retinae; 4 – pigment epithelium; 5 – photoreceptor cell layer; 6 – outer limiting membrane; 7 – outer nuclear layer; 8 – outer plexiform layer; 9 – inner nuclear layer; 10 – inner plexiform layer; 11 – ganglion cell layer; 12 – nerve fiber layer; 13 – inner limiting membrane.

Topic: Cardiovascular system.

SPECIAL HISTOLOGY

The preparation № 8

Muscular artery. Feline femoral artery (H&E).

Find out the inner (tunica intima), middle (tunica media), and outer (tunica adventitia) membrane of the artery wall using low power magnification. The tunica intima looks like a thin wavy pale-pink line. The cell nuclei (violet) can be noticed within. The tunica media is thick and pink-colored. The rod-shaped nuclei of myocytes are clearly visible. The thickness of tunica adventitia is the similar to the thickness of tunica media. Their pink-colored elastic fibers do not have definite direction. The sparse cell nuclei can be observed between fibers. The tunica adventitia may contain blood vessels (vasa vasorum). At high power magnification find out layers of the tunica intima: the endothelium, subendothelial coat, and internal elastic membrane. Pay attention to the spiral direction of myocytes and fibrous structures between them.

The preparation № 9

Muscular vein. Feline femoral vein (H&E).

The muscular vein's wall comprises the similar tunics to the artery walls: the tunica intima, tunica media, and tunica adventitia. The tunica adventitia is the best developed of the three layers. Define the vein wall at low power magnification. Pay attention that the mural elements are not distinct. The tunica intima looks like a thin line with the evident endotheliocyte nuclei. The tunica media is pale-pink-colored. The myocyte nuclei can be observed within it. The cells' nuclei are visible among the connective tissue fibers of the bright-pink-colored tunica adventitia. The tunica adventitia contains vasa vasorum. Find out the endothelium and subendothelial coat of the tunica intima using high power magnification. Examine connective tissue between the smooth muscle in tunica media, and bundles of the smooth muscle – within the tunica adventitia.

Topic: Cardiovascular system.

SPECIAL HISTOLOGY

The preparation № 8

Muscular artery. Feline femoral artery (H&E).

Designations:

- I – tunica intima;
- 1 - endothelium;
- 2 - subendothelial coat;
- 3 - internal elastic membrane.

- II - tunica media;
- 4 - nuclei of myocytes;
- 5 - elastic fibers.
- III - tunica adventitia;
- 6 - vasa vasorum.

The preparation № 9

Muscular vein. Feline femoral vein (H&E).

Designations:

- I - tunica intima;
- 1 - endothelium;
- 2 - - subendothelial coat;

- II - tunica media;
- 3 - nuclei of myocytes;
- 4 – - elastic fibers;
- III - tunica adventitia;
- 5 - vasa vasorum.

Name student

Date

Signature of teacher

Topic: Cardiovascular system.

SPECIAL HISTOLOGY

The preparation № 10

Arterioles, venules and capillaries of feline pia matter (membranous preparation) (H&E).

Examine the arterioles, venules and capillaries on the slide at high power magnification. The arterioles have sizeable diameter. The rod-shaped myocytes' nuclei locating across vessels and imparting the vessels cross striation can be noticed on the surface. The wall of the venules which diameter is bigger than arterioles is formed by the endothelium and the adventitia. The blood cells can be observed in it. The capillaries look like thin tubules grouped with each other and forming the network. The lumen of the capillaries is almost equal to the diameter of erythrocytes.

The preparation № 11

Purkinje fibers. Bovine heart (H&E).

Heart wall is composed of three coats: the inner – endocardium, middle – myocardium, and outer – epicardium. The endocardium and myocardium part can be observed in offered slide. Examine the slide using low power magnification. The endocardium looks like a well-defined pink line with nonuniform thickness. The myocardium is located above and consists of the cardiac muscle modified for contraction (typical) and conduction (atypical). Clusters of conductive cells forming Purkinje fibers are located just beneath the endocardium. They look like an oval pale-pink strands of different sizes. The contractive cardiac myocytes are located between and beneath Purkinje fibers. The clusters of adipocytes can be noticed between Purkinje fibers in some parts of the slide. The connective tissue fibers and blood vessels are visible inside the myocardium. Find out the coats of the endocardium using high power magnification: the endothelium, subendothelial coat, and subendocardial coat. Examine characteristic features of contractive and conductive cardiac myocytes.

Topic: Cardiovascular system.

SPECIAL HISTOLOGY

The preparation № 10

Arterioles, venules and capillaries of feline pia matter (membranous preparation) (H&E).

Designations:

I – arterioles; II – venules; III – capillaries;
1 – endothelium; 2 – nuclei of myocytes;
3 – nuclei of adventitious cells; 4 – pericyte nuclei; 5 - erythrocytes.

The preparation № 11

Purkinje fibers. Bovine heart (H&E).

Designations:

1 – endocardium: 1a – endothelium, 1b – subendothelial coat, 1c – subendocardial coat; 2 – myocardium; 3 – conductive cardiac cells (Purkinje fibers); 4 – adipocytes; 5 – contractive cardiac cells.

Name student _____

Date

Signature of teacher

<p><i>The preparation № 12</i></p> <p>Canine thymus (H&E).</p> <p>At low power magnification find out the capsule covering the thymus. Septa extend inward from the capsule and divide the thymus into lobules. Blood vessels and clusters of adipocytes can be mentioned in the capsule. Define cortex and medulla in the lobules that often fuse. The cortex is located at the periphery and is intensively stained. The pale-stained medulla is located centrally. It may contain the blood vessels and thymic corpuscles. The latter are oval-shaped and more intensively stained than other parts of the medulla. Examine the slide at high power magnification. Pay special attention to the density of lymphocytes distribution in the cortex and medulla.</p>	<p><i>The preparation № 13</i></p> <p>Feline lymph node (H&E).</p> <p>Find out capsule containing lymphatic and blood vessels using low power magnification. Trabeculae are projected inward from the capsule and can be observed as segments. Cortex constituting the lymphoid nodules (secondary) is located under the capsule. Medullary cords are projected inward from the cortex forming the medulla. Define paracortical zone between the cortex and medulla. The lymph node has a system of sinuses. Find out subcapsular (marginal) sinus located between the capsule and cortex. The cortical and medullar sinuses are also present in the lymph node. The lymph flows through medullar sinuses into efferent lymphatic vessels at hilus.</p>	<p><i>The preparation № 14</i></p> <p>Feline spleen (H&E).</p> <p>Find out capsule of the spleen covering this organ and blending with the spleen's serous membrane using low power magnification. The pink-colored capsule has uniform thickness. The same-colored trabeculae extend inward from the capsule. Some of them contain blood vessels. Parenchyma of the spleen consisting of white and red pulp is located between the trabeculae. The white pulp is represented by lymphoid nodules (splenic corpuscles). Examine the latter at high power magnification and define central artery, periarterial zone, germinal center, mantle layer, and marginal zone in the lymphoid nodule. Examine the cells and venous sinuses in the red pulp.</p>
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Topic: Hematopoietic and immune organs.***SPECIAL HISTOLOGY***

<p><i>The preparation № 12</i></p> <p align="center">Canine thymus (H&E).</p> <p>Designations: 1 – capsule; 2 – septa (interlobular layers of loose connective tissue); 3 – blood vessels; 4 – fat cells; 5 – lobula, a – cortex, b – medulla, c – thymic corpuscle.</p>	<p><i>The preparation № 13</i></p> <p align="center">Feline lymph node (H&E).</p> <p>Designations: 1 – capsule; 2 – trabeculae; 3 – lymphoid nodules of the cortex: a – primary, b – secondary; 4 – paracortical zone; 5 – medulla; 6 – subcapsular sinus; 7 – cortical sinuses; 8 – medullar sinuses; 9 – reticular tissue of sinuses.</p>	<p><i>The preparation № 14</i></p> <p align="center">Feline spleen (H&E).</p> <p>Designations: 1 – capsule: a – serous layer, б – fibrous layer; 2 – trabeculae: a – trabecular artery; b - trabecular vein; 3 – lymphoid nodules of white pulp: a – central artery, b – periarterial zone; c - germinal center, d – mantle zone, i – marginal zone; 4 – red pulp.</p>				
<p><u>Name student</u> </p>		<table border="1" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">Date</td> <td style="width: 50%; text-align: center;"><u>Signature of teacher</u></td> </tr> <tr> <td style="height: 30px;"></td> <td style="height: 30px;"></td> </tr> </table>	Date	<u>Signature of teacher</u>		
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The preparation № 15

Chicken bursa of Fabricius (H&E).

Start with studying the slide at low power magnification. The bursa of Fabricius is a tubular organ. Wall of the organ is composed of the three tunics: the outer (tunica serosa), middle (tunica muscularis), and inner (tunica mucosa). Special attention should be paid to the tunica mucosa. It forms many folds (plicae) of various sizes projecting into the lumen of the bursa.

Find out roundish lymphoid nodules are arranged in rows. Examine cortex and medulla in nodules. The darkly stained cortex is located at the periphery, whereas the paler medulla occupies central part. Examine structure of the bursa using high power magnification.

The preparation № 16

Palatine tonsil of the dog (H&E).

Studying the slide with the unaided eye, it can be seen that the palatine tonsil of the dog in the central part has a slit-like formation - a crypt, which is formed as a result of inflammation of the epithelium in its own plate of the mucous membrane. Some other animals (horses, pigs) palatine tonsils have several crypts.

Examine the slide at low power magnification, place the slide so that the cryptic hole is directed upwards. The surface of the tonsils is covered epithelium – a nonkeratinized stratified squamous epithelium. In some places of the tonsils, especially in the crypt, the epithelium is darker in color, due to the infiltration of its lymphocytes and neutrophilic leukocytes.

Under the epithelial layer there is an intrinsic layer of the mucous membrane, constructed of loose connective and reticular tissue. It contains well-visible lymphoid nodules and lymphocyte fields. In the central part secondary nodules have light centers. Lymphocytes are evacuated from the tonsils to the cavity through the entire surface of the tonsil, causing infiltration of the epithelium.

Deep from the proper layer of the mucous membrane is located submucosa. In this layer there are mucous salivary glands, the excretory ducts which open on the surface of the epithelium of the crypt. Nearby accumulation of fat cells, blood vessels there. Deeper submucosal layer can be seen fiber striated skeletal muscle tissue.

Topic: Hematopoietic and immune organs.

SPECIAL HISTOLOGY

The preparation № 15

Chicken bursa of Fabricius (H&E).

Designations:

I – tunica mucosa (mucosal folds);
 1 – single layer multi-row prismatic epithelium;
 2 - own layer of mucous membrane;
 3 – lymphoid nodules: a – cortex; b – medulla;
 4 – layers of loose connective tissue; 5 - blood vessels;
 II – tunica muscularis;
 III – tunica serosa.

The preparation № 16

Palatine tonsil of the dog (H&E).

Designations:

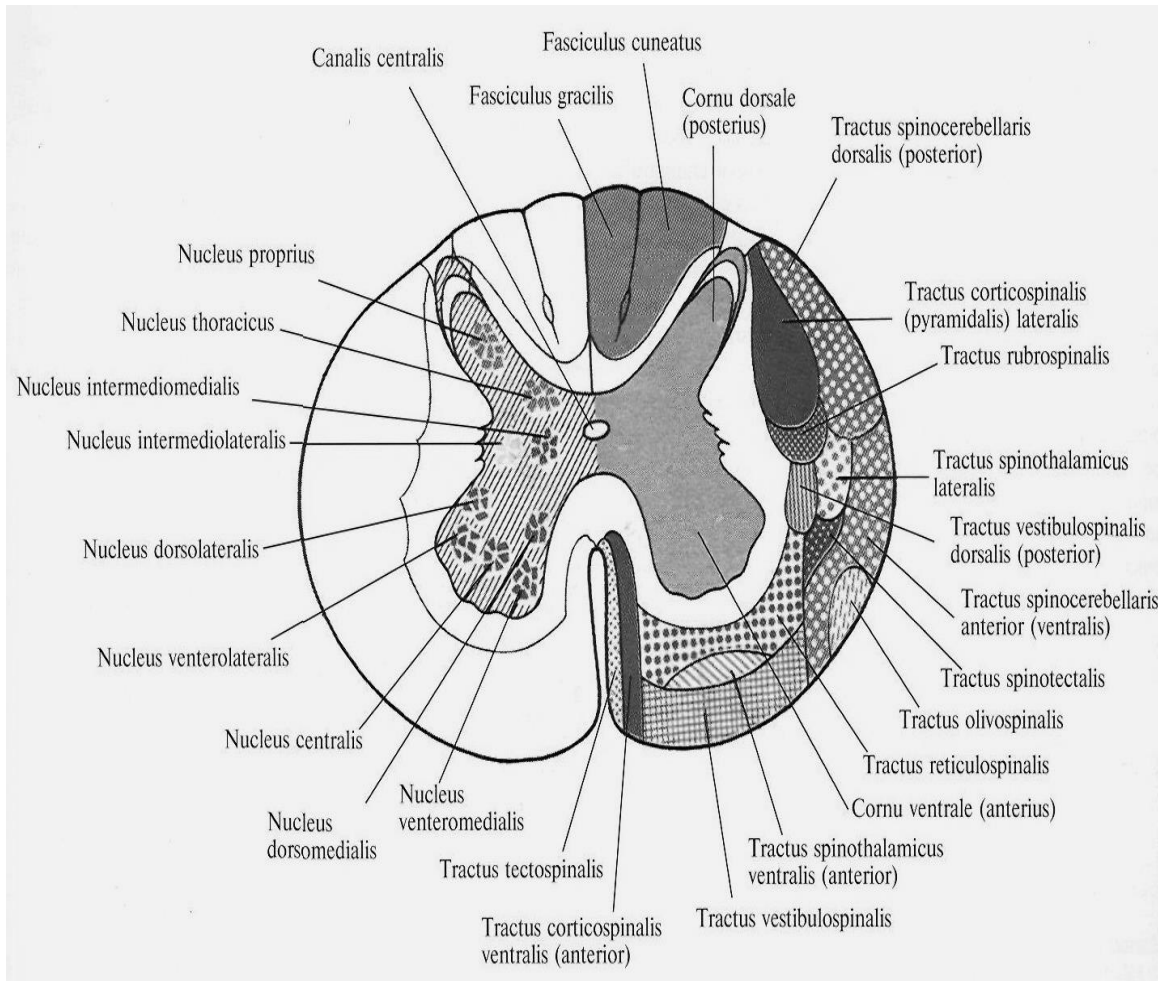
1 – crypt; 2 – nonkeratinized stratified squamous epithelium;
 3 – own layer of mucous membrane; 4 – lymphoid nodules:
 a – primary; b – secondary; 5 – diffuse field of lymphocytes;
 6 – submucosa; 7 – mucous salivary glands:
 c – secretory divisions, g - excretory ducts; 8 - fat cells;
 9 – blood vessels; 10 – fiber striated skeletal muscle tissue.

Name student

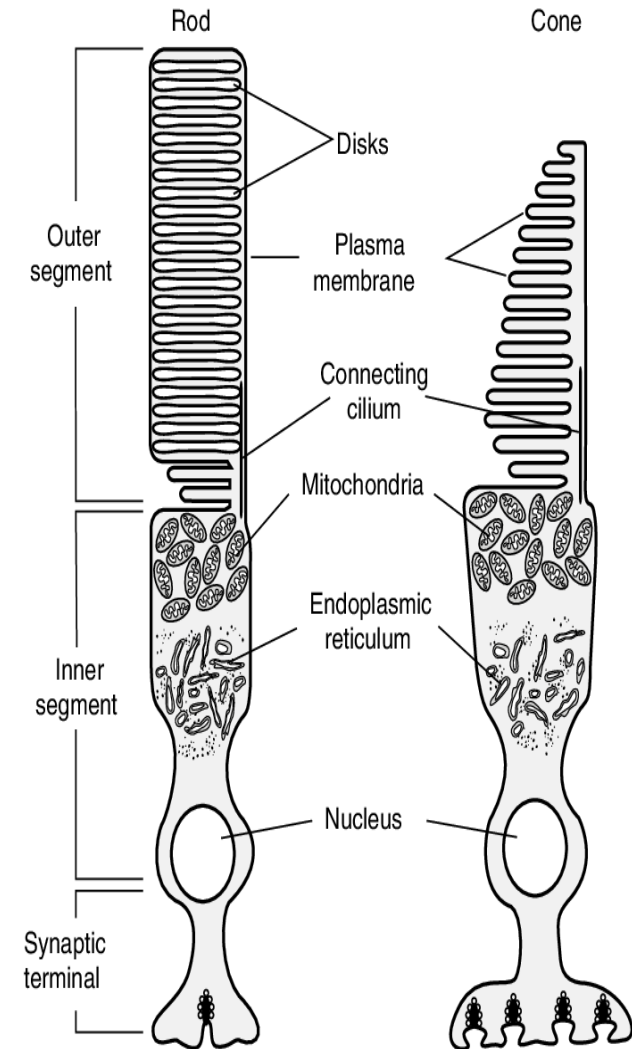
Date

Signature of teacher

Schematic section of the spinal cord: nuclei of the spinal cord.



Ultramicroscopic structure of rods and cones – retinal neurosensory cells.



Capillary Types

Locations :

Continuous
fat
muscle
nervous system
lungs
gonads
skin

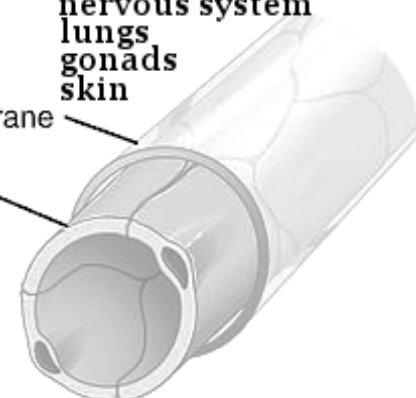
Basement membrane

Endothelial layer
(tunica intima)

Transporting :
Exchange :
(plasma ↔ ISF)

Intercellular cleft

Continuous



Fenestrated (larger)

intestinal villi
endocrine glands
kidney glomeruli
pancreas

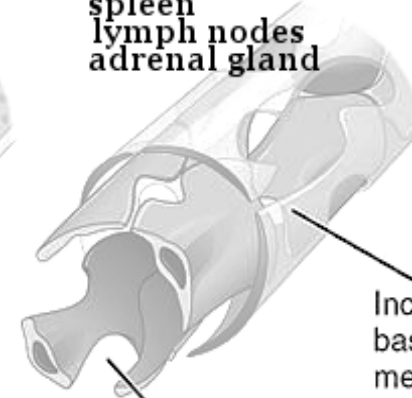


Fenestrations

+ proteins
by diffusion

**Sinusoid (largest)
(Discontinuous)**

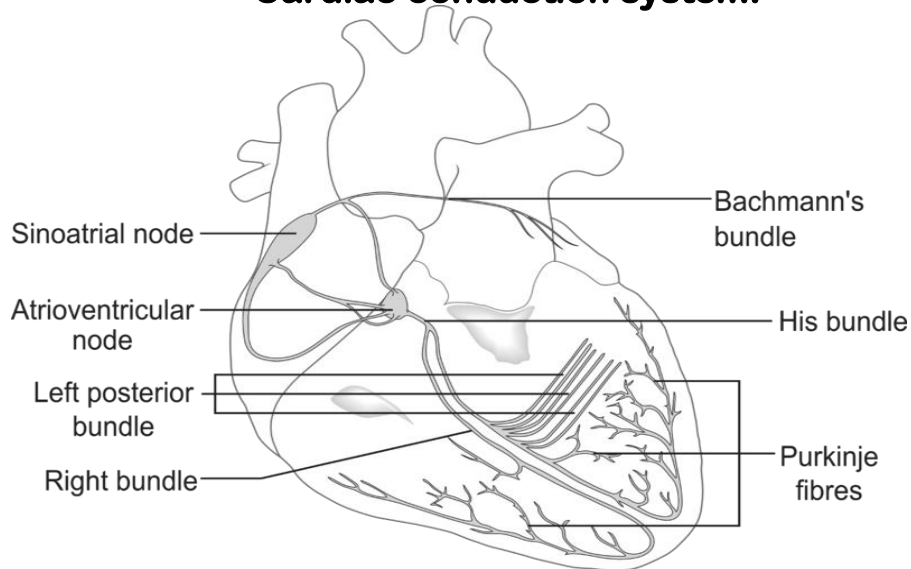
liver
bone marrow
spleen
lymph nodes
adrenal gland



Incomplete
basement
membrane

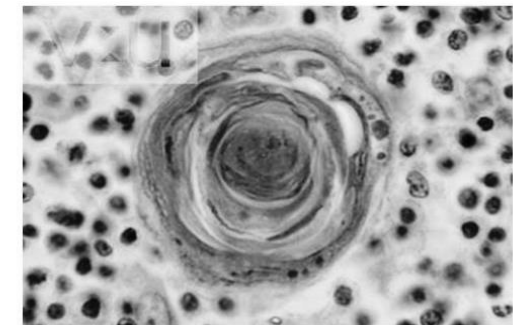
+ blood cells
through gaps
Intercellular gap

Cardiac conduction system.



Thymus: Hassall's corpuscle

- Unique to thymus
- Clusters of epithelial cells
- ? Remove apoptotic thymocytes



Small spherical bodies in the medulla, composed of epithelial cells arranged around clusters of degenerating lymphocytes and macrophages.

Topic: Endocrine organs.

SPECIAL HISTOLOGY

The preparation № 17

Hypophysis of a cat (H&E).

At low power magnification find out parts of the hypophysis: the adenohypophysis and neurohypophysis. The adenohypophysis structures are stained more intensively than the neurohypophysis ones. In the adenohypophysis define its pars: the pars distalis, pars intermedia, and pars tuberalis. The pars distalis resembles a crescent. The pars distalis and pars intermedia are separated by a small cleft. The pars intermedia resembles narrow stria surrounding the neurohypophysis and proceeds with the pars tuberalis.

Using high power magnification find out chromophilic and chromophobic cells in the adenohypophysis. Find out acidophilic and basophilic among the chromophilic cells. Examine the adenocytes of the pars intermedia and the pars tuberalis. Define blood vessels and neuroglial cells in the neurohypophysis.

The preparation № 18

Thyroid gland of a dog (H&E).

Using low power magnification find glands' capsule covering the organ. Trabeculae extend inward from the capsule and divide the gland into lobules. They can be often observed on the slides as isolated segments of pink colour. The trabeculae and capsule contain blood vessels. Find out follicles in the lobules. They appear as roundish structures filled in with colloid. The letter is stained pink-red. Between the follicles you can see groups of the parafollicular cells. Examine the follicle wall structure and groups of parafollicular cells at high power magnification.

The preparation № 19

Adrenal gland of a dog (H&E).

Examine the slide at low power magnification. Find out capsule with numerous blood vessels at the gland periphery. Fine layers of dense irregular connective tissue extend inward from the capsule between cords of cells. Define peripheral cortex and central medulla in the adrenal gland. The medulla contains loosely packed cells and many blood vessels (sinusoids). Find out zona glomerulosa, zona intermedia, zona fasciculata, and zona reticularis in the adrenal cortex. Examine the morphological features and cells in separate zones of the adrenal cortex and adrenal medulla.

Topic: Endocrine organs.

SPECIAL HISTOLOGY

<p><i>The preparation № 17</i> Hypophysis of a cat (H&E).</p> <p>Designations: 1 – adenohypophysis: 1a – pars distalis, 1b – pars intermedia, 1c – pars tuberalis, 1d – chromophobic cells, 1e – chromophilic cells; 1f – cleft; 2 – neurohypophysis: 2a – blood vessels, 2b – pituicytes.</p>	<p><i>The preparation № 18</i> Thyroid gland of a dog (H&E).</p> <p>Designations: 1 – capsule; 2 – trabeculae; 3 – blood vessels; 4 – lobules; 5 – follicles, 5a – follicle wall, 5b – colloid; 6 – groups of parafollicular cells.</p>	<p><i>The preparation № 19</i> Adrenal gland of a dog (H&E).</p> <p>Designations: 1 – capsule; 2 – adrenal cortex: 2a – zona glomerulosa, 2b – zona fasciculate, 2c – zona reticularis; 3 – adrenal medulla; 4 – blood vessels.</p>				
<p><u>Name student</u></p>	<table border="1"> <tr> <td data-bbox="1498 1278 1816 1316">Date</td> <td data-bbox="1816 1278 2141 1316"><u>Signature of teacher</u></td> </tr> <tr> <td data-bbox="1498 1316 1816 1382"></td> <td data-bbox="1816 1316 2141 1382"></td> </tr> </table>		Date	<u>Signature of teacher</u>		
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Topic: Integument.

SPECIAL HISTOLOGY

The preparation № 20

Skin with hairs/ thin skin (H&E).

At low power magnification define skin layers: the upper layer – epidermis, the middle layer – dermis, and the deepest layer – hypodermis (subcutaneous layer), connecting to the dermis to deep structures. Find out stratum germinativum, stratum spinosum, stratum granulosum, stratum lucidum, and stratum corneum in epidermis.

The dermis consists of papillary layer, resided directly beneath the epidermis, and reticular layer, continuing into the hypodermis.

Find out hair roots surrounded by hair follicles in the dermis. The hair roots terminate in hair bulbs surrounding dermal papillae. Define internal root sheath, external root sheath and connective tissue sheath. Find out sebaceous glands close to the hair roots. They resemble sacks, formed from big light cells. The ducts of these glands empty into hair follicles. Find out the tubular sweat glands in deep layers of the dermis. The ducts of these glands and their parts can be observed in the upper dermis layers and in the epidermis. Pay attention to numerous adipocytes in the hypodermis. The latter are present in the hypodermis as well. Examine morphological structure of the skin layers and hair follicles at high power magnification.

The preparation № 21

Lactating mammary gland (H&E).

Using low power magnification find trabeculae dividing the gland into lobules. There is no capsule on the slide. The blood vessels, interlobular ducts and adipose cells can be observed in the trabeculae. Define the alveoli and intralobular ducts in the lobules. It resembles crosscut tubules. Some alveoli are filled with blue-colored milk. Layers of the fibrous connective tissue with blood vessels are located between the alveoli and ducts. Examine morphological structure of the alveoli and ducts at high power magnification.

The preparation № 22

Nonlactating mammary gland (H&E).

Mentioned gland has the similar structure as the lactating one. Examine the slide at low power magnification. Pay attention to the increased content of trabeculae resulted in the decreased of lobule size. Parenchyma is reduced and replaced by loose collagenous and adipose tissue. Clusters of the adipose cells can be observed in the trabeculae.

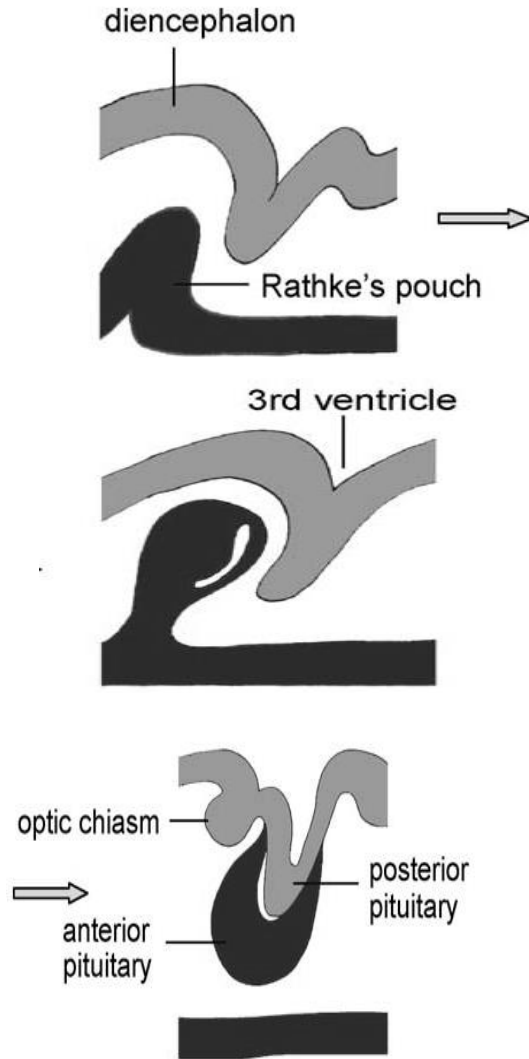
The task is free of drawing slide.

Topic: Integument.

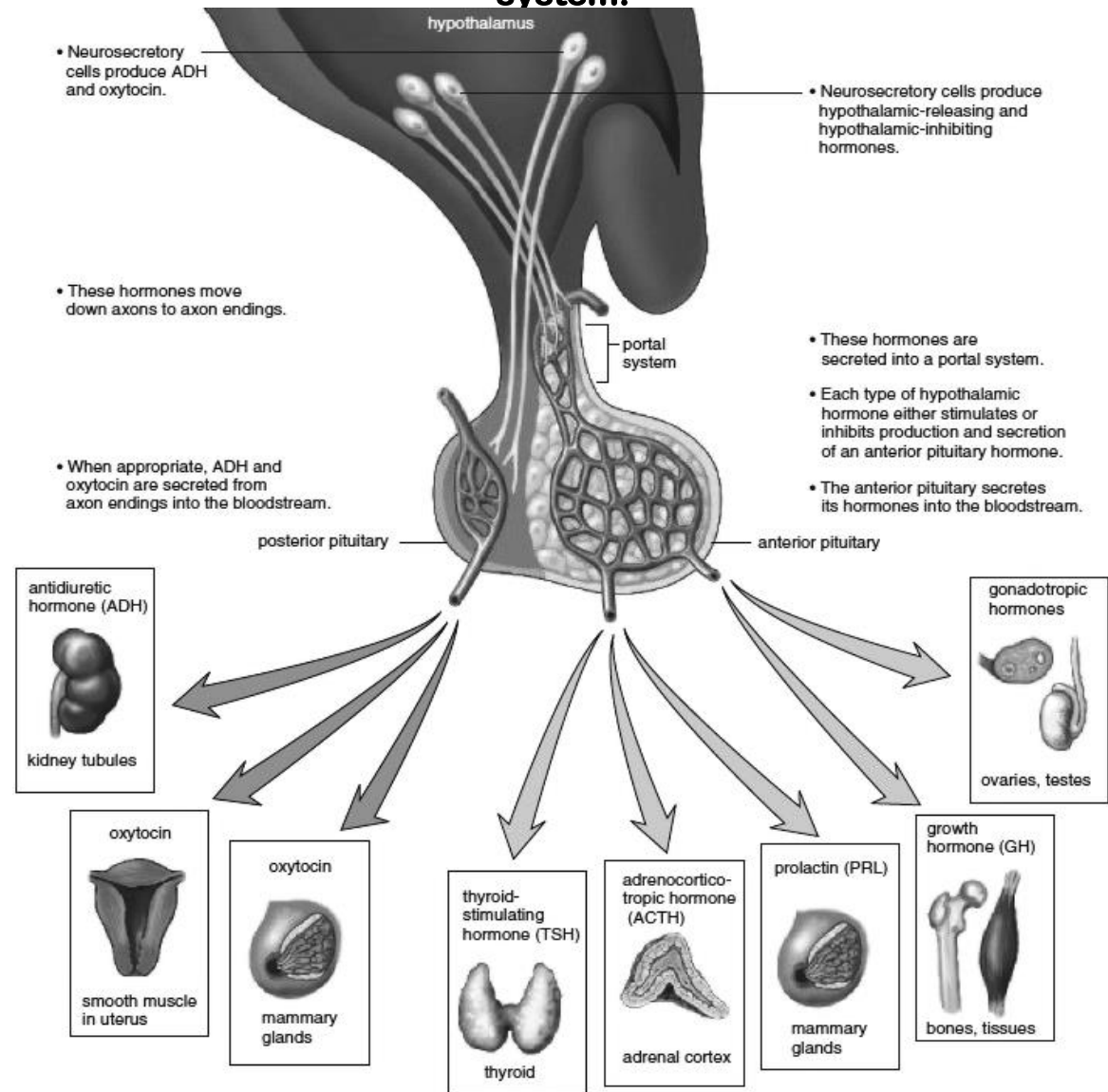
SPECIAL HISTOLOGY

<p><i>The preparation № 20</i> Skin with hairs/ thin skin (H&E).</p>	<p><i>The preparation № 21</i> Lactating mammary gland.</p>	<p><i>The preparation № 22</i> Nonlactating mammary gland.</p>	
<p>Designations: 1 – epidermis: 1a – stratum germinativum, 1b – stratum spinosum, 1c – stratum granulosum, 1d – stratum lucidum, 1e – stratum corneum; 2 – dermis: 2a – papillary layer, 2b – reticular layer, 3 – hair roots; 4 – hair bulb; 5 – hair follicle; 6 – sebaceous gland; 7 – sweat gland; 8 – hypodermis; 9 – adipose cells; 10 – blood vessels.</p>		<p>Designations: 1 – trabeculae; 2 – interlobular ducts; 3 – blood vessels; 4 – lobules; 5 – alveoli; 6 – intralobular ducts; 7 – adipose cells; 8 – blood vessels.</p>	
<p><u>Name student</u></p>		<p>Date</p>	<p><u>Signature of teacher</u></p>

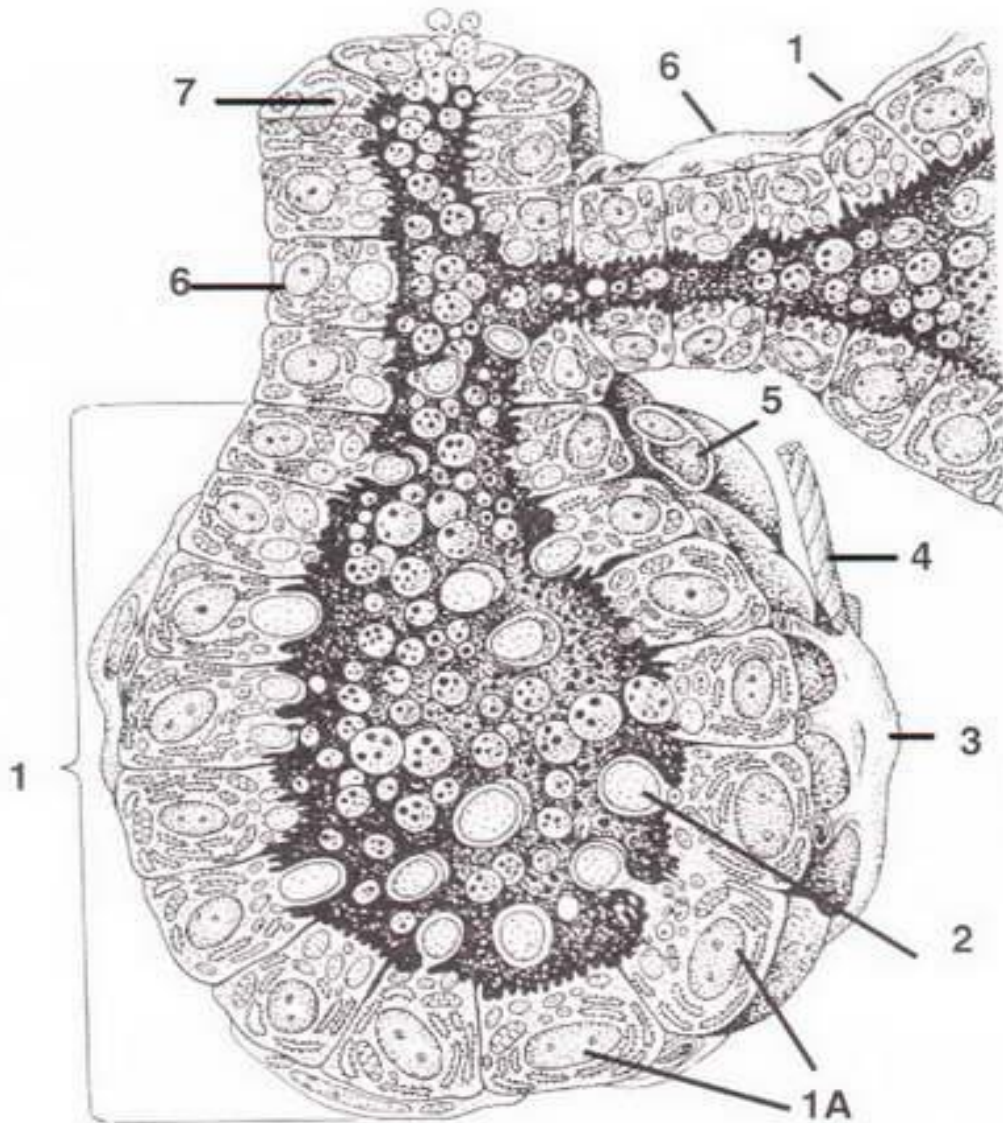
Scheme of development of the pituitary gland.



Scheme of neurosecretion of the hypothalamic-hypophyseal system.



Scheme: alveolus of the breast.



1 — alveoli and in them:

1A — lactocytes.

Water-soluble components of milk (proteins, carbohydrates, ions, water) are secreted according to the merocrine type.

Fat-soluble components of milk according to the apocrine: fat droplets capture fragments of the apical membrane, surrounded by them.

2 — Fat drops in the lumen of the alveoli: split into smaller droplets.

Structure of the alveoli::

3 - myoepithelial cells,

4 - nerve fiber,

5 - blood capillary,

6 - a mammary alveolar course,

7 - intralobular duct.

The secretion is regulated by prolactin, and its release by oxytocin.

The preparation № 23

Filiform papillae of feline tongue (H&E).

The slide is examined at low power magnification. The base of tongue is formed by the striated skeletal muscle and covered by the mucosa. The bundles of muscle fibers are arranged into three perpendicular directions. Many adipocytes are located between bundles of the muscle fibers. The tunica mucosa of tongue is represented by the stratified squamous epithelium and lamina propria. It forms filiform papillae projecting into buccal cavity on the upper surface of tongue. Pay attention to the upper epithelial layers. They are cornified, and appear as pale-yellow spines.

The preparation № 24

Foliate papillae of rabbit tongue (H&E).

Using low power magnification study the muscle base of tongue. Pay attention to the adipose cells and lingual salivary glands between the bundles of muscle fibers basing in the perpendicular planes. The ducts of these glands empty at the surface of tongue. The mucosa of tongue forms foliate papillae (in the definite sites). They appear as folds that do not project above the surface of tongue. The folds (papillae) are separated by invaginations. Find out taste buds on the lateral surfaces of papillae. They resemble pale roundish formations. Examine them at high power magnification.

Topic: Digestive system.

SPECIAL HISTOLOGY

The preparation № 23

Filiform papillae of feline tongue (H&E).

Designations:

- 1 – muscle base of tongue;
- 2 – mucosa;
- 3 – filiform papillae.

The preparation № 24

Foliate papillae of rabbit tongue (H&E).

Designations:

- 1 – muscle base of tongue;
- 2 – lingual salivary glands;
- 3 – mucosa;
- 4 – foliate papillae;
- 5 – taste buds.

Name student

Date

Signature of teacher

Structure of the wall of tubular organs. Scheme.

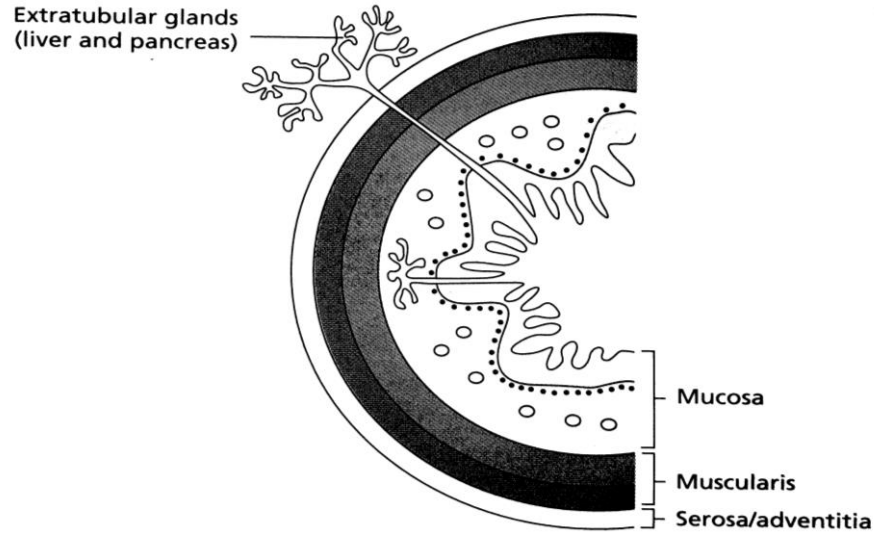
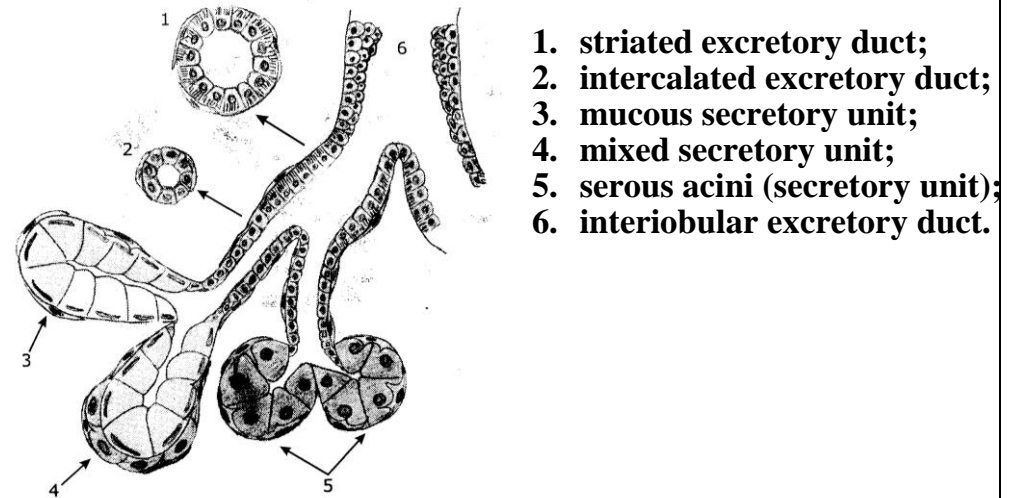


Diagram of the schematic of salivary glands.



Ultrastructure of the taste bulb.

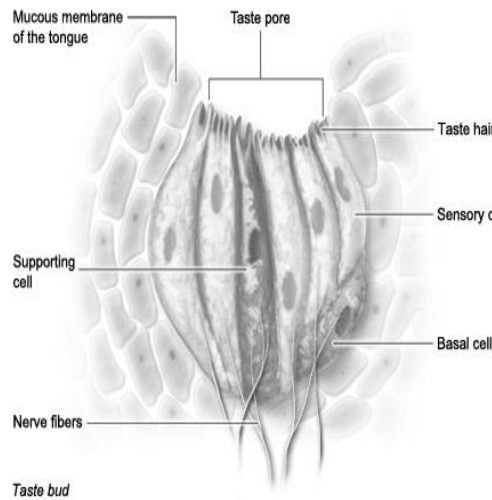
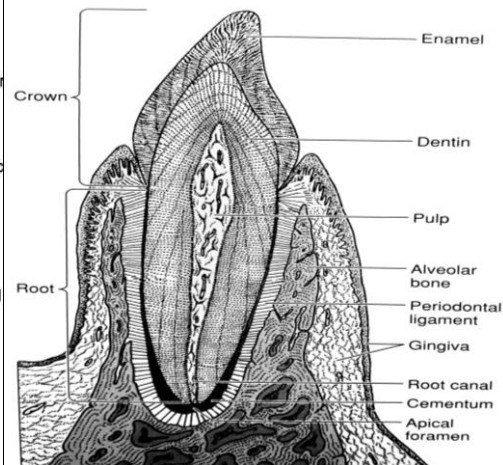
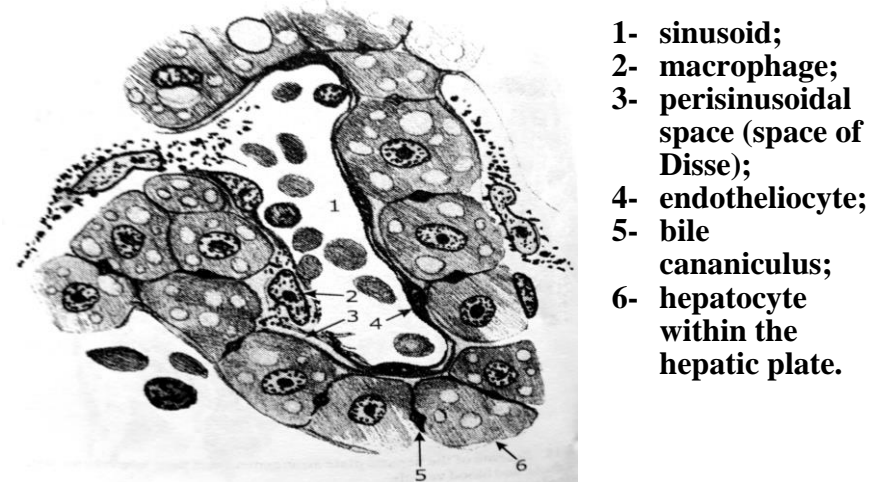


Diagram of a sagittal section from an incisor tooth in position in the mandibular bone.



Scheme of microscopic structure of the hepatic plate and sinusoid.



The preparation № 25

Mixed salivary gland (H&E).

Using low power magnification define the gland capsule and trabeculae with blood vessels and interlobular ducts dividing the gland into lobules. Pay attention to many adipose cells in the capsule and trabeculae. Examine the lobule at high power magnification. Find out adenomeres of two types: the serous adenomere and mixed adenomere (mucous adenomere with a serous demilune) in it. Define the serous cells and myoepithelial cells situated on the basement membrane. The mixed adenomeres are paler. Find out mucous cells in it. They are big, pale and based in the center. Serous demilunes cap mucous endpieces. Myoepithelial cells are intimately juxtaposed with the serous demilunes. If the slide is made of the sublingual salivary gland, their lobules contain mucous adenomeres formed by the mucous cells and myoepithelial cells. In the lobules examine structure of the interlobular ducts: intercalated duct and striated duct.

The preparation № 25

Mixed salivary gland (H&E).

Designations:

- 1 – capsule;
- 2 – trabeculae: 2a – blood vessels, 2b – interlobular duct;
- 3 – lobule:
 - 3a – serous adenomere,
 - 3b – mixed adenomere,
 - 3c – intercalated duct,
 - 3d – striated duct.

Topic: Digestive system.

SPECIAL HISTOLOGY

The preparation № 26

Esophagus transverse section of a dog (H&E).

Examine the slide with the unaided eye. Pay attention to the esophagus lumen. It looks like a star. At low power magnification find folded mucosa, muscularis and adventitia in the esophagus wall. Find out epithelial layer, lamina propria, lamina muscularis and submucosa in the mucosa. The latter contains mucous glands. Their ducts open at the surface of the mucosa. The muscularis consists of two layers of smooth muscle: the inner circular and outer longitudinal. The intermuscular plexus can be observed between these layers. There are many adipose cells and blood vessels in adventitia the outer layer of cervical region. Examine structure of esophagus layers at high power magnification as well.

The preparation № 27

Fundus of glandular stomach (H&E).

Examine the slide with the unaided eye and pay attention to the gastric folds. Using low power magnification define the tunics of stomach wall (not in fold). The inner tunica is mucosa. Find out its layers: the lamina epithelialis, lamina propria, lamina muscularis, and submucosa. The mucosa is lined by the simple columnar epithelium. It contains gastric pits. The lamina propria mucosa is penetrated by gastric glands. The lamina muscularis mucosae is located beneath the lamina propria. The submucosa with many blood vessels lies deeper. Tunica muscularis is the medium tunica of stomach wall. It consists of three laminae of smooth muscles: the inner lamina – oblique, medium lamina – circular and outer lamina – longitudinal. Pay attention to the smooth muscle fibers orientation in this tunica. The nervous plexus can be observed between laminae of smooth muscle in some places. The outer tunica of stomach wall is serosa. It looks like a pale-blue thin line. Examine gastric fold of the glandular stomach fundus. Pay attention that it is formed by all layers of mucosa. Examine structure of stomach wall at high power magnification.

Topic: Digestive system.

SPECIAL HISTOLOGY

The preparation № 26

Esophagus transverse section of a dog (H&E).

Designations:

1 – mucosa: 1a – epithelium, 1b – lamina propria,
1c – lamina muscularis, 1d – submucosa, 1e – mucous glands;
2 – muscularis: 2a – inner circular layer, 2b – outer
longitudinal layer;
3 – adventitia.

The preparation № 27

Fundus of glandular stomach (H&E).

Designations:

1 – mucosa: 1a – mucosal epithelium, 1b – gastric pits,
1c – lamina propria mucosae, 1d – gastric glands,
1e – lamina muscularis mucosae; 1f – submucosa;
2 – muscularis: 2a – oblique lamina, 2b – circular lamina,
2c – longitudinal lamina;
3 – serosa.

Name student

Date

Signature of teacher

Topic: Digestive system.

SPECIAL HISTOLOGY

The preparation № 28

Rumen of a cow (H&E).

The rumen wall like the stomach one is formed by three tunics: the mucosa, muscularis and serosa. During the examination of tunicae structure pay attention to their features. The rumen mucosa forms **papillae**. They are formed by the cornified stratified squamous epithelium, lamina propria and submucosa. There are no gastric glands in the lamina propria mucosae. The lamina muscularis mucosae is absent in papillae. The tunica muscularis consists of two laminae of smooth muscles: the inner – circular and outer – longitudinal.

The preparation № 29

Reticulum of a cow (H&E).

The reticulum wall is composed of the tunica mucosa, muscularis and serosa. Pay attention to typical features of tunica mucosa. It is associated into **folids**. The epithelium lining mucosa is stratified squamous. The lamina propria lacks gastric glands. The tunica muscularis has the inner circular lamina and outer longitudinal lamina.

The preparation № 30

Omasum of a cow (H&E).

The omasum's wall like the wall of rumen and reticulum is composed of mucosa, muscularis and serosa. While examining the slide pay special attention to the mucosa, consisting of the stratified squamous epithelium, lamina propria, lamina muscularis and submucosa. The omasum mucosa forms many **foliate primary folids** (laminae) of different height. Tunica muscularis includes two laminae of smooth muscle: the inner circular lamina and outer longitudinal lamina. The inner layer of the tunica muscularis interdigitates between the smooth muscle of the lamina muscularis mucosae within primary folds.

Topic: Digestive system.**SPECIAL HISTOLOGY**

<p><i>The preparation № 28</i></p> <p style="text-align: center;">Rumen of a cow (H&E).</p> <p> </p> <p>Designations: 1 – mucosa: 1a – mucosal epithelium, 1b – lamina propria mucosae, 1c – lamina muscularis mucosae, 1d – submucosa, 1e – papilla; 2 – muscularis: 2a – circular lamina, 2b – longitudinal lamina; 3 – serosa.</p>	<p><i>The preparation № 29</i></p> <p style="text-align: center;">Reticulum of a cow (H&E).</p> <p> </p> <p>Designations: 1 – mucosa: 1a – mucosal epithelium, 1b – lamina propria mucosae, 1c – submucosa, 1d – fold; 2 – muscularis: 2a – circular lamina, 2b – longitudinal lamina; 3 – serosa.</p>	<p><i>The preparation № 30</i></p> <p style="text-align: center;">Omasum of a cow (H&E).</p> <p> </p> <p>Designations: 1 – mucosa: 1a – mucosal epithelium, 1b – lamina propria mucosae, 1c – lamina muscularis mucosae, 1d – submucosa, 1e – leaf; 2 – muscularis: 2a – circular lamina, 2b – longitudinal lamina; 3 – serosa.</p>	
<p><u>Name student</u></p> <p>_____</p>		<p style="text-align: center;">Date</p>	<p style="text-align: center;">Signature of teacher</p>

Topic: Digestive system.

SPECIAL HISTOLOGY

The preparation № 31

Jejunum of a dog (H&E).

Using low power magnification find tunicae of the intestine wall and its laminae. The inner tunica mucosa forms villi and consist of the laminae epithelialis, lamina propria, lamina muscularis and submucosa. The crypts are located in the lamina propria, and the lymphoid nodules – in the submucosa. Pay attention that villi are made of the epithelium and lamina propria. Find out the inner circular layer and outer longitudinal layer in the tunica muscularis, and the nervous plexus between them. The tunica serosa is located outside of the tunica muscularis. Examine structure of intestine wall at high power magnification.

The preparation № 32

Duodenum of a rabbit (H&E).

The duodenum wall is arranged like the jejunum wall. Pay attention to the duodenal glands that occur within the submucosa.

The preparation № 33

Large intestine of a dog (H&E).

Examine the slide with the unaided eye. Find out folds of tunica mucosa in it. Examine the intestinal wall (between folds) at low power magnification. Define the tunica mucosa, tunica muscularis and tunica serosa in it. The tunica mucosa has no villi. Find out the laminae epithelialis, lamina propria, lamina muscularis and submucosa in it. Lymphoid nodules may occur in the submucosa. Pay attention to the mucosal folds formed by all layers of mucosa. Define the inner circular layer and outer longitudinal layer of smooth muscle in the tunica muscularis, and the nervous plexus between them. Find out tunica serosa on the outer longitudinal layer. Examine structure of the large intestine wall at high power magnification.

Topic: Digestive system.

SPECIAL HISTOLOGY

<p><i>The preparation № 31</i></p> <p>Jejunum of a dog (H&E).</p> <p>Designations: 1 – mucosa: 1a – villus, 1b – mucosal epithelium, 1c – lamina propria mucosae, 1d – crypts, 1e – lamina muscularis mucosae, 1f – submucosa; 2 – muscularis: 2a – circular lamina, 2b – longitudinal lamina, 2c – nervous plexus; 3 – serosa.</p>	<p><i>The preparation № 32</i></p> <p>Duodenum of a rabbit (H&E).</p> <p>Designations: 1 – mucosa: 1a – villus, 1b – mucosal epithelium, 1c – lamina propria mucosae, 1d – crypts, 1e – lamina muscularis mucosae, 1f – submucosa, 1g – duodenal glands 2 – muscularis: 2a – circular lamina, 2b – longitudinal lamina, 2c – nervous plexus; 3 – serosa.</p>	<p><i>The preparation № 33</i></p> <p>Large intestine of a dog (H&E).</p> <p>Designations: 1 – mucosa: 1a – mucosal fold, 1b – lamina epithelialis mucosae, 1c – lamina propria mucosae, 1d – crypts, 1e – lamina muscularis mucosae, 1f – submucosa, 1g – lymphatic nodules; 2 – muscularis: 2a – circular lamina, 2b – longitudinal lamina, 2c – nervous plexus; 3 – serosa.</p>
<p><u>Name student</u></p>	<p>Date</p>	<p><u>Signature of teacher</u></p>

Topic: Digestive system.

SPECIAL HISTOLOGY

The preparation № 34

Liver of a pig (Mallory staining).

Start studying the slide with the unaided eye. Liver lobules are bounded red-colored dense collagenous connective tissue. Examine the slide at low power magnification. Find out capsule of the liver. Trabeculae extend inward from the capsule and divide the liver into polygonal-shaped lobules. Place one lobule in the center of the field of view. Find out central vein in it. Anatomizing plates of hepatocytes radiate from a central vein. Define portal triads between liver lobules. Each portal triad consists of the interlobular branches of the bile duct, hepatic artery, and hepatic portal vein. Lymphatic vessels are also present. Examine the liver lobule at high power magnification. Pay special attention to the plates of parenchyma cells (hepatocytes), sinusoids, bile canaliculi and portal triad vessels.

The preparation № 35

Liver of a sheep (H&E).

Histologic organization of sheep liver is similar to that a pig has, but the trabeculae separating lobules are indistinct. It is typical for all domestic animals except for a pig. Examine the sheep liver structures like in the previous slide at low and high power magnifications.

The preparation № 36

Pancreas of a dog (H&E).

Using low power magnification find gland capsule. Trabeculae extend inward from the capsule and divide the gland into lobules. Blood vessels and interlobular ducts can be observed in the trabeculae. Define the exocrine secretory units, intercalated ducts and islets of Langerhans (endocrine portion) in the lobule. Exocrine secretory units look like crosscut tubules; its peripheral part is lilac-stained whereas central part is pink-stained. The intercalated ducts possess smaller diameter and are pale-pink stained. The islets of Langerhans are round- or oval-shaped pale-stained formation in the lobule. They are surrounded by a layer of connective tissue. Examine structure of the lobule components at high power magnification. Pay special attention to the secretory cells of exocrine units. Define the basophilic and acidophilic poles in it. Examine the cells and blood vessels in the islets of Langerhans.

Topic: Digestive system.

SPECIAL HISTOLOGY

The preparation № 34

Liver of a pig (Mallory staining).

The preparation № 35

Liver of a sheep (H&E).

The preparation № 36

Pancreas of a dog (H&E).

Designations:

1 – capsule; 2 – trabeculae; 3 – lobule: 3a – central vein, 3b – plates of hepatocytes, 3c – hepatocytes, 3d – sinusoids, 3e – bile canaliculi; 4 – portal triad: 4a – branch of the hepatic artery, 4b – branch of the portal vein, 4c – bile ductule.

Designations:

1 – capsule; 2 – trabeculae: 2a – blood vessels, 2b – interlobular duct; 3 – lobule: 3a – adenomere, 3b – intercalated duct, 3c – islet of Langerhans.

Name student

Date

Signature of teacher

Topic: Respiratory system.

SPECIAL HISTOLOGY

The preparation № 37

Trachea of a dog (H&E).

At low power magnification define layers of the trachea wall: the inner layer – tunica mucosa, medium layer – fibrocartilaginous tunica, and outer layer – tunica serosa.

Find out lamina epithelialis, lamina propria and tela submucosa in the tunica mucosa. Examine glands in the tela submucosa. Their ducts open on surface of the tunica mucosa.

The fibrocartilaginous tunica is made of C-shaped hyaline cartilage embedded in the dense connective tissue. Free ends of the cartilage are connected by mass of the smooth muscle (the trachealis).

The tunica adventitia lies outside the medium layer. It contains blood vessels. Examine the tunica mucosa at high power magnification. Pay special attention to the pseudostratified ciliated columnar epithelium.

The preparation № 38

Lungs of a cat (H&E).

At low power magnification you can see a lot of alveoli forming a reticular structure, bronchi of different caliber, and blood vessels. Start examine of the slide with the conductive components of lungs comprising secondary and tertiary bronchi and terminal bronchioles. Find out secondary bronchus. Its wall structure is almost similar to trachea's wall. But there are some differences: the tunica mucosa contains lamina muscularis mucosae and hyaline cartilage is represented by separate plates. Near the bronchus find big blood vessels. Then, find out tertiary bronchus. It differs from the secondary bronchus. It lacks cartilaginous plates and glands, and processes well-developed lamina muscularis mucosae. Big blood vessels can be observed near the tertiary bronchi. The tertiary bronchi branch into terminal bronchioles. Their wall structure is similar to the tertiary bronchi wall, but it is thinner.

The exchange component of lung consists of respiratory bronchioles, alveolar ducts, and alveolar sacs. Respiratory bronchiole's wall is similar to that of terminal bronchioles, but has alveoli. Alveolar ducts are much more wider than respiratory bronchioles and contain many alveoli. The walls of alveolar sacs consist of alveoli, appearing rosette-shaped in the slide. Find out pleura at the periphery of the slide. Examine the slide at high power magnification. Pay special attention to the lamina epithelialis mucosae of the bronchi and wall of alveoli.

Topic: Respiratory system.

SPECIAL HISTOLOGY

The preparation № 37

Trachea of a dog (H&E).

The preparation № 38

Lungs of a cat (H&E).

Designations:

1 – tunica mucosa: 1a – lamina epithelialis mucosae,
1b – lamina propria mucosae, 1c – tela submucosa, 1d – glands;
2 – fibrocartilaginous tunica; 3 – tunica adventitia.

Designations:

1 – secondary bronchus; 2 – tertiary bronchus; 3 – alveolar duct;
4 – alveolar sac; 5 – alveolus; 6 – blood vessels; 7 – pleura.

Name student

Date

Signature of teacher

Topic: Urinary system.

SPECIAL HISTOLOGY

The preparation № 39

Kidney of a rat (H&E).

At low power magnification find out capsule of the kidney, and cortex under it. Define the renal corpuscles and the convoluted tubules located between them in the cortex.

The renal corpuscles are round-shaped and violet-stained. Find out medullary rays formed by straight tubules arranged in bundles located in the cortex. Observe the medulla in the central part of the kidneys. It is formed by straight tubules and represented by renal pyramid with a well-defined tip – the renal papilla. Under the renal papilla you can see the fissure-like renal pelvis. Big blood vessels can be observed between the cortex and medulla. Examine structure of renal corpuscle and renal tubules at high power magnification.

The preparation № 40

Urinary bladder of a dog (H&E).

At low power magnification define the tunics of urinary bladder's wall at the transverse section. The inner membrane is tunica mucosa. It forms folds. Find out layers of the tunica mucosa: the lamina epithelialis, lamina propria and tela submucosa.

The tunica muscularis is located beneath the tunica mucosa. It consists of three muscle layers: the inner longitudinal, middle circular and outer longitudinal.

Bladder apex and body is covered by tunica serosa, whereas neck is covered by adventitia. The adventitia surrounds the tunica muscularis. The blood vessels and accumulations of adipocytes can be observed in it. Furthermore the bladder's wall is thicker than that of ureter. Examine structure of the urinary bladder wall at low and high power magnification.

Examine the lamina epithelialis mucosae at high power magnification.

Topic: Urinary system.

SPECIAL HISTOLOGY

The preparation № 39

Kidney of a rat (H&E).

Designations:

1 – capsule; 2 – cortex: 2a – renal corpuscles,
2b – convoluted tubules, 2c – medullary rays;
3 – medulla: 3a – straight tubules, 3b – renal pyramid,
3c – renal pelvis.

The preparation № 40

Urinary bladder of a dog (H&E).

Designations:

1 – tunica mucosa: 1a – epithelium, 1b – lamina propria,
1c – tela submucosa; 2 – tunica muscularis: 2a – inner layer,
2b – middle layer, 2c – outer layer; 3 – adventitia (serosa).

Name student

Date

Signature of teacher

Topic: Male reproductive system.

SPECIAL HISTOLOGY

<p><i>The preparation № 41</i> Testis of a rat (H&E).</p> <p>At low power magnification find out tunica albuginea of the testis that is covered by tunica serosa. Septa extend from the tunica albuginea into the testis dividing it into lobules. The septa are well defined near the tunica albuginea, but it can be observed as separate segments within the testis.</p> <p>Seminiferous tubules are separated by the connective tissue. Interstitial cells occur within the lobules and locate in clusters. Examine structure of convoluted seminiferous tubules at high power magnification.</p> <p>Find out spermatogenic epithelium and sustentacular (Sertoli) cells in its wall. Sustentacular cells are located with some intervals. These cells have big pale oval nuclei. Their cytoplasm is difficult to identify. The developing gametes engross into Sertoli cells cytoplasm. The spermatogenic epithelium is arranged in some layers. Spermatogonia lie adjacent basement membrane. The primary and secondary spermatocytes, spermatids and spermatozoa are located above them. Tails of developing spermatozoa protrude into the lumen of tubule.</p>	<p><i>The preparation № 42</i> Epididymis of a rat (H&E).</p> <p>On the slides at low power magnification you can observe numerous cross cuts of ductus epididymidis surrounded by the collagenous connective tissue. The ductus epididymidis contain many spermatozoa. Examine the ductus epididymidis at high power magnification. Find out epithelium and layer of connective tissue with smooth muscle. Define their structural peculiarity.</p>	<p><i>The preparation № 43</i> Canine prostate gland (H&E).</p> <p>Using low power magnification find out capsule of the gland. Trabeculae extending from the capsule divide the gland into lobules. Interlobular ducts are found in some trabeculae. There is a central cavity containing pink colored secretion in the lobule. Numerous glandules empty in a cavity. Examine their wall structure at high power magnification.</p>
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Topic: Female reproductive system.

SPECIAL HISTOLOGY

The preparation № 44

Ovary of a queen (H&E).

At low power magnification find tunica albuginea covering the ovary. Layer of cuboidal epithelial cells is located on it. Cortex is located under the tunica albuginea, and medulla – in the center of ovary. Many blood vessels can be observed in the medulla. Find out primordial, primary, secondary, tertiary and atretic follicles and corpus luteum in the cortex. Keep in mind all follicles except of the atretic contain oocytes at growing stage. The primordial follicles are very small and lie just beneath the tunica albuginea. Each of them consists of primary oocyte surrounded by a single layer of flattened follicular cells. Primary follicles consist of primary oocyte surrounded by one or more layers of cuboidal follicular cells (membrana granulosa). This sizable follicle has membrane (theca folliculi). Some spaces (the antrum) can be observed between the follicular cells in the secondary follicles. Tertiary follicles have large follicular antrum with liquor folliculi. Membrana granulosa and cumulus oophorus can be observed on the interior surface of its wall. Oocyte is located in the cumulus oophorus. The atretic follicles contain clusters of cells separated by layers of the collagenous connective tissue in the peripheral part and debris of oocyte and follicular cells – in the central part. The atretic follicles transform into corpus atreticum. Structure of the corpus luteum will be studied at another slide. At high power magnification examine the follicular epithelium and membrane.

The preparation № 45

Corpus luteum of a sow ovary (H&E).

At low power magnification define the membrane of the corpus luteum containing big blood vessels. Septa extend inward from the membrane and divide the corpus luteum into lobules. The latter consist of endocrine cells.

The preparation № 46

Uterus of a queen (H&E).

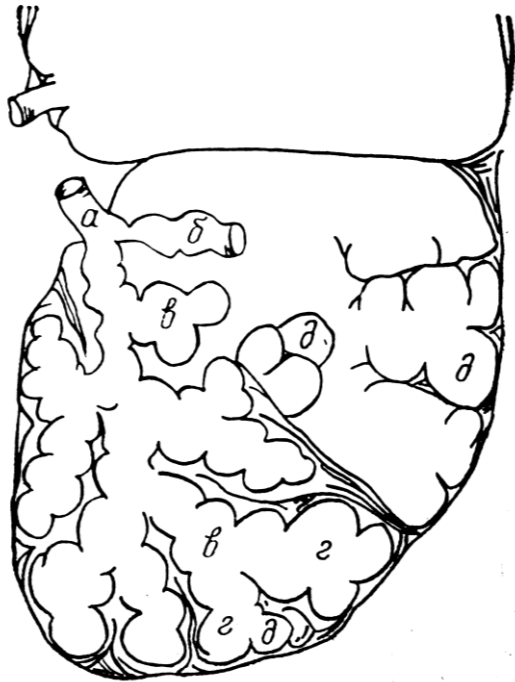
At low power magnification define a lumen of the organ. It resembles a branched fissure due to the folds of the mucosa (endometrium). Find out endometrium, myometrium and perimetrium in the wall of uterus.

The endometrium is thick blue-violet stained and forms folds. The endometrium consists of epithelium and lamina propria-submucosa. The epithelium deepens into the lamina propria-submucosa and forms simple tubular glands.

The myometrium is well developed. Find out inner circular layer, middle layer and outer longitudinal layer. The middle layer contains many blood vessels and therefore is called vascular layer.

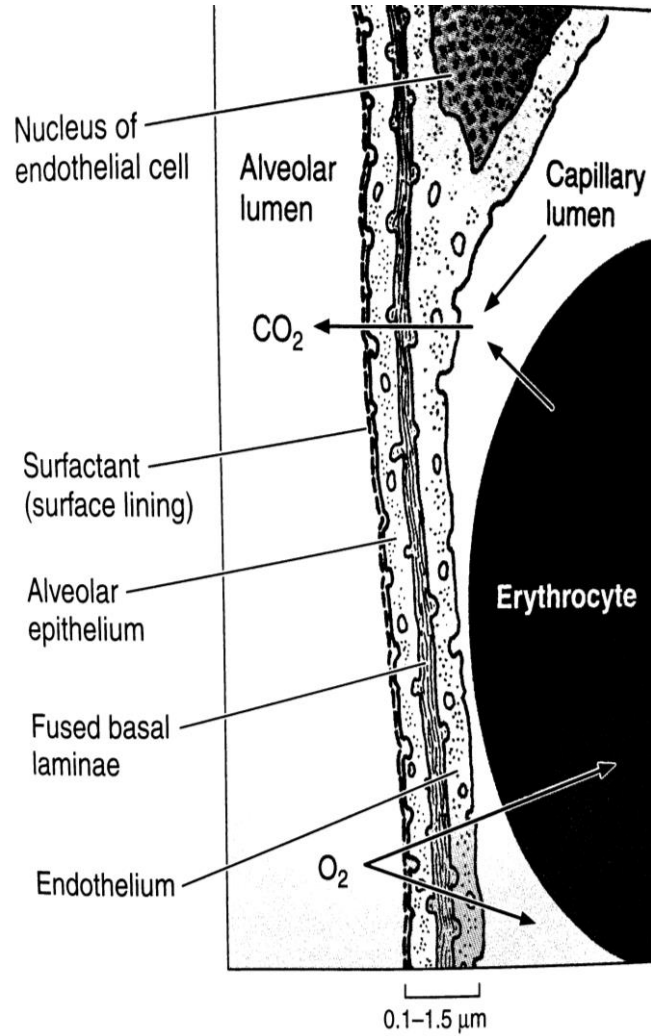
The perimetrium or the tunica serosa lies outside of the myometrium.

The structure of the alveoli.

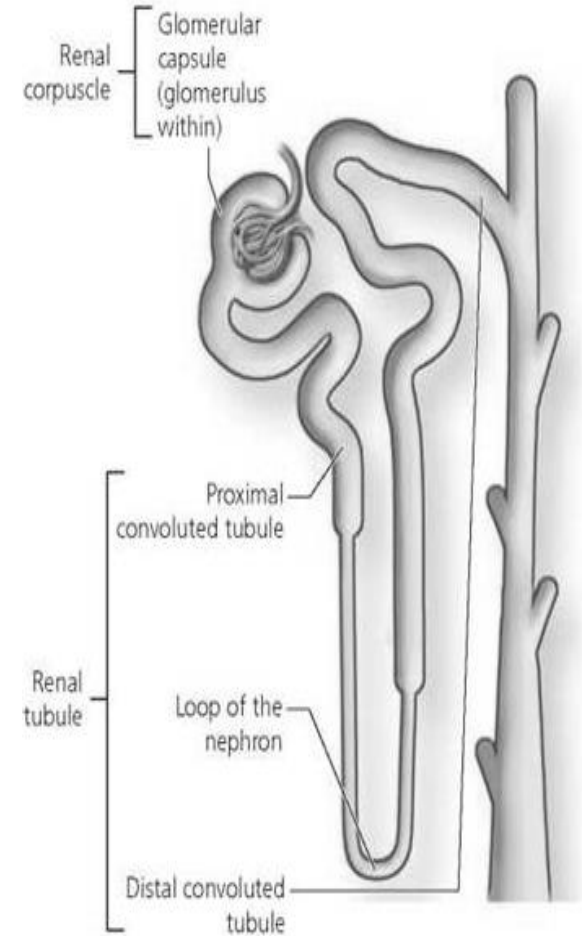


a-terminal bronchioles;
б-respiratory bronchioles;
в-alveolar course;
г-alveolar sac;
д-alveolus.

Lobe of the lung (according to Shter).

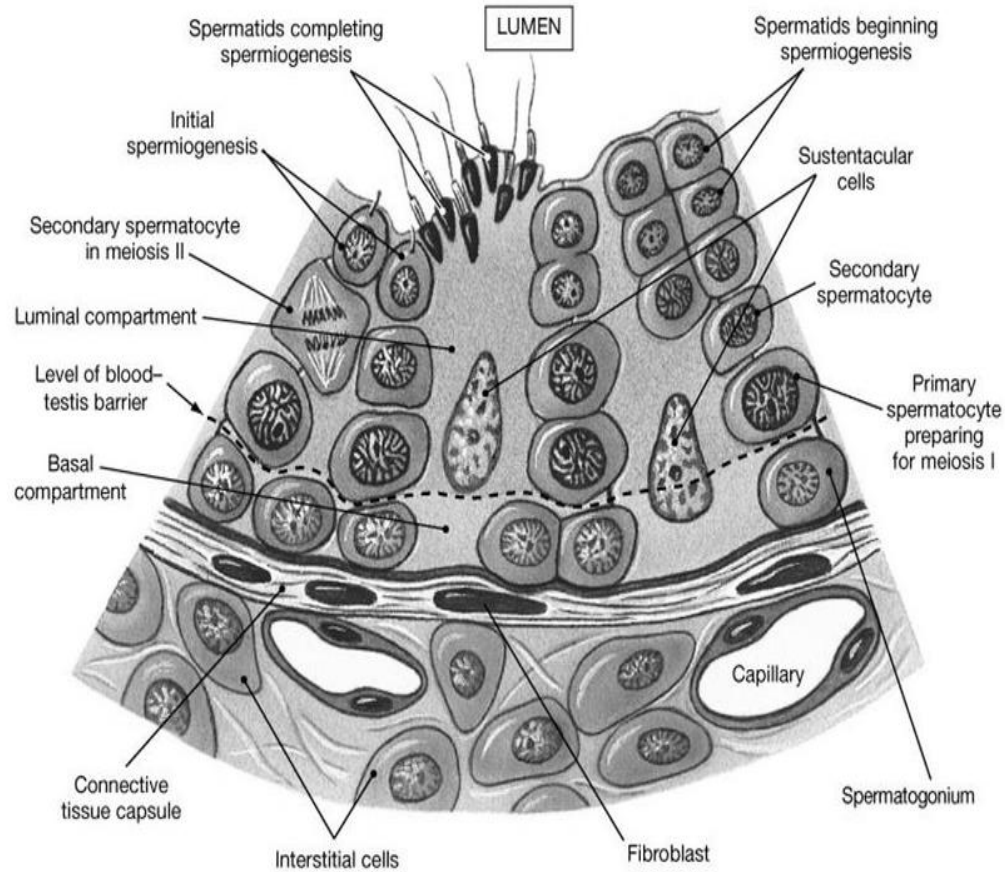


The structure of the nephron. Scheme.



(c) Simplified view of a nephron, showing the basic structural components but not the associated capillaries

The seminiferous tubule area, which shows the connection between the Sertoli cells and developing sperm. (The area of the epithelium of the convoluted tubule of the testis).



(c)

The scheme of connection between the pituitary hormones and ovary, which regulate the reproductive cycle of mammals.

