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DEPARTMENT: PRECLINICAL SCIENCES

DISCIPLINE: HISTOLOGY AND EMBRYOLOGY

Course responsible teacher: Associate Professor Georgescu Bogdan, DVM PhD

TOPICS AND REFERENCES:

- 1. Digestive System I and II:** Chapters 14 and 15 (pg. 303-306, 308-310, 312, 314, 315, 320-326, 329, 333-342, 346, 349, 352, 353, 355, 358, 361, 364-366) - **38 pg.** (together with two tables and 39 figures);
- 2. Respiratory System:** Chapter 11 (pg. 224, 225, 230, 231, 234-240, 243) - **12 pg.** (together with one table and 11 figures);
- 3. Urinary system:** Chapter 16 (pg. 371-376, 387, 395, 396) - **9 pg.** (together with 7 figures);
- 4. Immune System:** Chapter 12 (pg. 250, 251, 254, 256-259, 264, 265, 268, 270) – **11 pg.** (together with one table and 8 figures);

In total: **70 pages** (which includes four tables and 65 figures, representing the equivalent of about 29 text's pages).

References:

Samuelson, A.D. (2007) *Textbook of Veterinary Histology*. W.B. Saunders Company and imprint of Elsevier Inc. ISBN-13: 978-0-7216-8174-0.

QUESTIONNAIRE

**This questionnaire contains 100 questions, all of them having five answer variants.
(Each question will have only one correct answer variant).**

1. From the lumen outward, the four tunics that form the wall of the alimentary canal are arranged in the following correct order:
 - a. tunica adventitia, tunica submucosa, tunica mucosa, tunica muscularis;
 - b. tunica mucosa, tunica submucosa, tunica muscularis, tunica adventitia (or serosa);
 - c. tunica submucosa, tunica muscularis, tunica adventitia, tunica mucosa;
 - d. tunica mucosa, tunica muscularis, tunica submucosa, tunica adventitia (or serosa);
 - e. tunica muscularis, tunica mucosa, tunica adventitia, tunica submucosa.
2. The tunica mucosa is composed by:
 - a. lamina muscularis;
 - b. tunica muscularis;
 - c. epithelium, lamina propria, lamina muscularis;
 - d. epithelium;

- e. lamina propria.
3. The lamina muscularis consists in a small layer of:
- collagen fibers;
 - reticular fibers;
 - smooth muscle fibers;
 - skeletal muscle fibers;
 - elastic fibers.
4. The submucosal plexi is placed:
- in tunica submucosa;
 - in lamina muscularis;
 - in tunica mucosa;
 - in tunica muscularis;
 - between tunica muscularis and tunica adventitia.
5. The myenteric plexus is located:
- in tunica adventitia;
 - in tunica submucosa;
 - between the layers of the tunica muscularis;
 - in tunica mucosa;
 - between tunica mucosa and tunica muscularis.
6. From the external surface to the internal surface, list the components of the lips in order:
- tunica mucosa;
 - epidermis and dermis with hair follicles;
 - skeletal muscle, epidermis and dermis;
 - epidermis and dermis, skeletal muscle, tunica submucosa and tunica mucosa;
 - tunica mucosa, epidermis and dermis with hair follicles.
7. What type of epithelium will have the lips' mucosa in herbivorous animals?
- a stratified squamous epithelium, well keratinized or cornified;
 - a simple columnar epithelium,
 - a bistratified columnar epithelium;
 - a transitional epithelium;
 - a simple pseudostratified columnar epithelium.
8. Which component is missing from the soft palate structure?
- the non-keratinized stratified squamous epithelium;
 - a core of skeletal muscle;
 - the lamina propria;
 - the submucosa;
 - a lamina muscularis.
9. What type of epithelium is lining the oropharyngeal surface of the soft palate?
- a transitional epithelium;
 - a non-keratinized stratified squamous epithelium;
 - a bistratified columnar epithelium;
 - a simple columnar epithelium;
 - a pseudostratified columnar epithelium.
10. Rostrally, the nasopharyngeal surface of the soft palate is lining by a:

- a. transitional epithelium;
 - b. non-keratinized stratified squamous epithelium;
 - c. bistratified columnar epithelium;
 - d. simple columnar epithelium;
 - e. pseudostratified columnar epithelium.
- 11.** Among domestic species the epithelium of the tongue's mucosa is dorsally:
- a. keratinized stratified squamous;
 - b. simple columnar;
 - c. bistratified columnar;
 - d. transitional;
 - e. pseudostratified columnar.
- 12.** In the tongue structure, the muscle tissue is represented by:
- a. smooth muscle cells;
 - b. reticular fibers;
 - c. skeletal muscle fibers;
 - d. collagen fibers;
 - e. striated cardiac muscle fibers.
- 13.** In birds, the tongue is lined by a:
- a. pseudostratified columnar epithelium;
 - b. simple columnar epithelium;
 - c. transitional epithelium;
 - d. keratinized stratified squamous epithelium;
 - e. bistratified columnar epithelium.
- 14.** Among different components, the dentin is composed of:
- a. calcium hydroxyapatite and collagen;
 - b. loose connective tissue;
 - c. blood vessels;
 - d. nervous tissue;
 - e. lymphatic tissue.
- 15.** The odontoblastic processes are integrated in:
- a. the cementum;
 - b. the skeletal muscle fiber;
 - c. the dentin;
 - d. sarcomere;
 - e. the smooth muscle cell.
- 16.** The enamel is consisting of:
- a. collagen fibers;
 - b. different cells;
 - c. nervous fibers;
 - d. calcium hydroxyapatite arranged in large crystals;
 - e. muscle fibers.
- 17.** The enamel is located:
- a. along the external surface of the tooth;
 - b. in cementum;
 - c. in sarcomere;

- d. in dentin;
 - e. along the skeletal muscle fiber.
- 18.** The enamel is produced by:
- a. the ameloblasts;
 - b. the chondrocytes;
 - c. the odontoblasts;
 - d. the osteoblasts;
 - e. the osteocytes.
- 19.** The dentin is produced by:
- a. the osteoblasts;
 - b. the chondrocytes;
 - c. the odontoblasts;
 - d. the osteocytes.
 - e. the ameloblasts;
- 20.** The cementum is produced by:
- a. the osteocytes;
 - b. the cementocytes;
 - c. the odontoblasts;
 - d. the ameloblasts;
 - e. the cementoblasts.
- 21.** The innermost zone of the tooth pulp contains:
- a. ameloblasts;
 - b. osteocytes;
 - c. skeletal muscle fibers;
 - d. mesenchymal cells;
 - e. smooth muscle cells.
- 22.** The material produced by the odontoblasts is:
- a. the enamel;
 - b. the blood;
 - c. the elastin;
 - d. the dentin;
 - e. the cementum.
- 23.** During embryogenesis, the teeth primordia are developed from:
- a. the endoderm;
 - b. the nervous tissue;
 - c. the connective fibrous tissue;
 - d. the oral ectoderm and its subjacent mesenchyme;
 - e. the blood vessels.
- 24.** Each adult tooth is attached to the alveolar bone using:
- a. smooth muscle fibers;
 - b. nervous fibers;
 - c. the periodontal ligament;
 - d. reticular fibers;
 - e. an aponeurosis.
- 25.** The dentin is structured by different components except:

- a. the elastic fibers;
 - b. water;
 - c. calcium hydroxyapatite;
 - d. proteoglycans;
 - e. glycoproteins.
- 26.** The apical foramen represents:
- a. the odontoblastic zone;
 - b. the fibers free zone;
 - c. a small orifice;
 - d. the tooth pulp;
 - e. the external surface of the tooth.
- 27.** During embryogenesis, the enamel organs are developed from:
- a. the oral ectoderm;
 - b. the mesenchymal cells;
 - c. the odontoblasts;
 - d. the reticular cells;
 - e. the oligodendrocytes.
- 28.** The salivary glands are:
- a. endocrine glands;
 - b. mixed glands;
 - c. holocrine glands;
 - d. tubulo-alveolar glands;
 - e. lactiferous glands.
- 29.** The salivary glands are organised in lobules which contain:
- a. follicles;
 - b. cells' cords;
 - c. cells' islets;
 - d. skeletal fibres bundles;
 - e. numerous adenomeres.
- 30.** In the structure of the salivary glands, each adenomere is bounded by:
- a. some neuroglia cells;
 - b. myoepithelial cells;
 - c. the oligodendrocytes;
 - d. the elastic fibers;
 - e. skeletal muscle fibers.
- 31.** Components of the salivary glands, the striated ducts are lined by:
- a. mast cells;
 - b. a simple squamous epithelium;
 - c. plasma cells;
 - d. a single layer of epithelial cells;
 - e. a bistratified epithelium.
- 32.** In the oropharynx, the tunica mucosa consists mostly of:
- a. an endothelium;
 - b. a stratified squamous epithelium;
 - c. a transitional epithelium;

- d. a pseudostratified columnar epithelium;
 - e. a simple cuboidal epithelium.
- 33.** In the nasopharynx and the laryngopharynx, the tunica mucosa consists of:
- a. a bistratified columnar epithelium;
 - b. an endothelium;
 - c. a stratified squamous epithelium;
 - d. a transitional epithelium;
 - e. a pseudostratified columnar epithelium.
- 34.** The esophageal mucosa in ruminant species possess:
- a. a transitional epithelium;
 - b. an endothelium;
 - c. a keratinized epithelium;
 - d. a simple squamous epithelium;
 - e. a non-keratinized epithelium.
- 35.** The esophageal mucosa in carnivores is:
- a. a keratinized epithelium;
 - b. a non-keratinized epithelium;
 - c. a simple squamous epithelium;
 - d. a bistratified epithelium;
 - e. a transitional epithelium.
- 36.** Histologically, the crop or ingluvies is similar to:
- a. the larinx;
 - b. the proventriculus;
 - c. the stomach;
 - d. the gizzard;
 - e. the esophagus.
- 37.** The stomach's mucosa is lining by:
- a. a simple squamous epithelium;
 - b. a stratified columnar epithelium;
 - c. a stratified squamous epithelium;
 - d. a simple columnar epithelium;
 - e. a bistratified cuboidal epithelium.
- 38.** The stomach's mucosa contains:
- a. skeletal fibres bundles;
 - b. mixed acini;
 - c. serous acini;
 - d. cardiac, proper and pyloric gastric glands;
 - e. sebaceous glands.
- 39.** Integrated in the proper gastric glands, the parietal cells produce:
- a. calcitonin;
 - b. epinephrine;
 - c. hydrochloric acid;
 - d. insulin;
 - e. renin and angiotensin I.

- 40.** Histostructurally, the proper gastric glands are:
- acinous;
 - tubular and branched;
 - folicular;
 - tubulo-alveolar, coiled;
 - tubulo-alveolar.
- 41.** In the stomach's wall, the tunica muscularis has:
- red fibers;
 - cardiac striated fibers;
 - skeletal striated fibers;
 - smooth muscle fibers;
 - white fibers.
- 42.** The ruminant stomach's mucosa is lining by:
- a simple squamous epithelium;
 - a stratified columnar epithelium;
 - a non-keratinized stratified squamous epithelium;
 - a simple columnar epithelium;
 - a keratinized stratified squamous epithelium.
- 43.** In the ruminant stomach's mucosa, at the level of the reticular crests' structure are integrated:
- tubular glands;
 - serous acini;
 - smooth muscle cells;
 - striated muscle cells;
 - mucous acini.
- 44.** Commonly, the axis of the rumen papillae don't have:
- a lamina muscularis;
 - collagen fibers;
 - connective tissue;
 - connective cells;
 - fibroblasts.
- 45.** The omasum laminae contain:
- skeletal muscle fibers;
 - internal extensions of the tunica muscularis;
 - a cluster of cardiac muscle cells;
 - striated muscle cells;
 - mucous acini.
- 46.** The proper gastric glands contain the following cell types, with the exception of:
- the parietal cells;
 - the chief cells;
 - the serous cells;
 - the enteroendocrine cells;
 - the mucous neck cells.
- 47.** In birds, into the ventriculus or gizzard are integrated:
- red fibers;

- b. cardiac striated fibers;
 - c. smooth muscle fibers;
 - d. skeletal striated fibers;
 - e. white fibers.
- 48.** The small intestine villi are lined by:
- a. a pseudostratified epithelium;
 - b. enterocytes;
 - c. cuboidal cells;
 - d. squamous cells;
 - e. ciliated cells.
- 49.** The presence of the intestine villi is noticed in:
- a. duodenum;
 - b. ileum;
 - c. jejunum;
 - d. cecum;
 - e. the structures from a, b and c.
- 50.** The intestine villi are missing in:
- a. the teniae coli;
 - b. ileum;
 - c. rectum;
 - d. the teniae ceci;
 - e. the structures from a, c and d.
- 51.** In the intestinal crypts are missing:
- a. the enterocyte;
 - b. the goblet cells;
 - c. the endothelial cells;
 - d. the Paneth cells;
 - e. the enteroendocrine cells.
- 52.** One of these references about the Paneth cells is not correct:
- a. they are hormones producing cells;
 - b. they are not found in all mammals;
 - c. they are typically pyramidal;
 - d. their cytoplasm is filled with acidophilic granules;
 - e. they have antimicrobial capabilities.
- 53.** The submucosal glands of the small intestine are:
- a. represent by acini;
 - b. mucous in porcine;
 - c. branched tubulo-alveolar;
 - d. serous in dogs;
 - e. the most prominent within the cecum region.
- 54.** In the large intestine, the simple tubular glands:
- a. contain chief cells;
 - b. contain numerous mucus secreting cells;
 - c. are lack in mucus secreting cells;
 - d. contain ciliated cells;

- e. integrate striated muscle cells.
- 55.** The intermediate zone of the anal canal presents:
- a. a simple squamous epithelium;
 - b. an endothelium;
 - c. a non-keratinized stratified squamous epithelium;
 - d. a transitional epithelium;
 - e. a ciliated epithelium.
- 56.** In the salivary glands' structure, the intercalated duct is lined by:
- a. a simple cuboidal epithelium;
 - b. a bistratified cuboidal epithelium;
 - c. a bistratified columnar epithelium;
 - d. a simple columnar epithelium with striated border;
 - e. a simple columnar epithelium with brush border.
- 57.** In the salivary glands' structure are integrated the following cells, with the exception of:
- a. the serous cells;
 - b. the mucous cells;
 - c. the chondrocytes;
 - d. the mucus producing cells;
 - e. the enzyme producing cells.
- 58.** Within the liver of domestic animals, each hepatic lobule contains:
- a. hepatocyte;
 - b. hepatic sinusoids;
 - c. serous acini;
 - d. bile canaliculi;
 - e. the structures from a, b and d.
- 59.** Within the hepatic acinus structure, it can be observed:
- a. three zone of vascular influence;
 - b. serous acini;
 - c. mucous acini;
 - d. mixed acini;
 - e. the structures from b, c and d.
- 60.** The liver parenchyma is geometrically organized in repetitive structures, which have:
- a. a spherical view;
 - b. a cylindrical view;
 - c. a polygonal view;
 - d. a circular view;
 - e. a stellate view.
- 61.** In the liver structure, the bile duct, portal vein, and hepatic artery collectively form:
- a. the portal lobule;
 - b. the portal acinus;
 - c. the portal triad;
 - d. the classical lobule
 - e. the hepatic sinusoids.
- 62.** In the portal lobule, the focal point is directed to:

- a. a sinusoid;
 - b. a bile duct;
 - c. a central vein;
 - d. an endothelium;
 - e. a row of hepatocytes.
- 63.** The focal points for the hepatic acinus are:
- a. two adjacent central veins and nearby portal triads;
 - b. two bile ducts;
 - c. two adjacent rows of hepatocytes;
 - d. two different central veins;
 - e. the portal vein and hepatic artery.
- 64.** The sinusoids are covered by:
- a. a continuous endothelium;
 - b. a porous and fenestrated endothelium;
 - c. a cuboidal epithelium;
 - d. a fenestrated endothelium with a brush border;
 - e. a fenestrated endothelium with a striated border.
- 65.** The sinusoidal lining cells are separated from the hepatocytes by:
- a. the portal vein;
 - b. the hepatic artery;
 - c. the bile canaliculi;
 - d. the portal triad;
 - e. a perisinusoidal space.
- 66.** Considering an exception, the sinusoids have a continuous basal laminae in the liver parenchyma in:
- a. pigs;
 - b. dogs;
 - c. ruminants;
 - d. birds;
 - e. horses.
- 67.** The hepatocytes are lining by a plasmalemma which form:
- a. cilia;
 - b. pseudopodia;
 - c. microvilli;
 - d. lamellipodia;
 - e. villi.
- 68.** The hepatic sinusoids are:
- a. ducts;
 - b. channels;
 - c. veins;
 - d. capillaries;
 - e. spaces.
- 69.** The sinusoidal capillaries connect:
- a. two intralobular bile canaliculi;
 - b. the interlobular arteries and the bile ductules;

- c. the central vein and the intralobular bile canaliculi;
 - d. the central vein and the interlobular biliary ducts;
 - e. the interlobular vessels to the central vein.
- 70.** The bile canaliculi are formed by:
- a. the endothelial cells;
 - b. the adjacent hepatocytes plasmalemma;
 - c. the adipocytes;
 - d. the serous cells;
 - e. the macrophages.
- 71.** The bile canaliculi conduct bile from hepatocytes to:
- a. sinusoids;
 - b. the perisinusoidal space;
 - c. the bile ductules;
 - d. the central vein;
 - e. the monocyte-macrophage system.
- 72.** The interlobular biliary ducts are lined by:
- a. a simple columnar or cuboidal epithelium;
 - b. a simple squamous epithelium,
 - c. a ciliated epithelium;
 - d. a bistratified columnar epithelium;
 - e. an endothelium.
- 73.** The exocrine pancreas contains secretory cells, very similar with:
- a. the liver cells;
 - b. the spleen cells;
 - c. the kidney cells;
 - d. the salivary glands cells;
 - e. the lung cells.
- 74.** The structure of the larynx cartilages is:
- a. fibrous;
 - b. serous;
 - c. hyaline and elastic;
 - d. striated;
 - e. smooth.
- 75.** The larynx muscles are formed by:
- a. elastic fibers;
 - b. striated cardiac fibers;
 - c. smooth fibers;
 - d. skeletal fibers;
 - e. reticular fibers.
- 76.** The trachealis muscle contains:
- a. striated skeletal muscle fibers;
 - b. white muscle fibers;
 - c. smooth muscle fibers;
 - d. red muscle fibers;
 - e. striated cardiac muscle fibers.

- 77.** The intrapulmonary bronchi contain the following structures, with the exception of:
- the ciliated epithelium;
 - the smooth muscle fibers;
 - the collagen fibers;
 - the skeletal muscle fibers;
 - the hyaline cartilage.
- 78.** In the structure of the bronchioles is missing:
- the epithelium;
 - the smooth muscle fibers;
 - the collagen fibers;
 - bronchiolar exocrine cells;
 - the hyaline cartilage.
- 79.** In mammals, the respiratory portion of the lung is composed by:
- the alveoli;
 - the alveolar sacs;
 - the terminal bronchioles;
 - the structures from a, b and e;
 - the alveolar ducts.
- 80.** At the level of the respiratory system, the fixed alveolar cells are:
- type I pneumocyte;
 - type II pneumocyte;
 - the septal macrophages;
 - the structures from a and b;
 - the structures from a, b and c.
- 81.** At the level of the respiratory system, the moving alveolar cells are represented by:
- the type I pneumocyte;
 - the type II pneumocyte;
 - the septal macrophages;
 - the structures from a and b;
 - the structures from a, b and c.
- 82.** At the level of the respiratory system, the alveoli are lining by:
- a squamous epithelium;
 - a ciliated epithelium;
 - a columnar epithelium;
 - a cuboidal epithelium;
 - a bistratified epithelium.
- 83.** In the nephron's structure, the renal corpuscle contains:
- the glomerular capsule;
 - the proximal convoluted tubule;
 - the glomerulus;
 - the thin tubule;
 - the structures from a and c.
- 84.** In the glomerular capsule structure, the cells of the visceral layer are represented by:
- the mesangial cells;

- b. the podocytes;
 - c. the endothelial cells;
 - d. the cuboidal cells;
 - e. the fibroblasts.
- 85.** In the kidney parenchyma, the juxtaglomerular apparatus contains:
- a. the podocytes;
 - b. the juxtaglomerular cells;
 - c. the macula densa;
 - d. the structures from a and b.
 - e. the structures from b and c.
- 86.** The mucosal lining of the calyces and pelvis consist of:
- a. a simple squamous epithelium;
 - b. a non-cornified stratified squamous epithelium;
 - c. a pseudostratified columnar epithelium;
 - d. a transitional epithelium;
 - e. a bistratified columnar epithelium.
- 87.** The tunica muscularis of the urinary bladder is:
- a. more oblique and interwoven and lacks specific circular layers;
 - b. a single layer of smooth muscle cells;
 - c. two layers of smooth muscle cells;
 - d. a single layer of skeletal muscle cells;
 - e. three layers of skeletal muscle cells.
- 88.** The main component of the lymphoid organs, the lymphoid tissue is formed by:
- a. reticular cells and fibres;
 - b. immunocompetent cells;
 - c. serous cells;
 - d. a and b;
 - e. glial cells.
- 89.** The primary lymphoid organs are represented by:
- a. thymus and lymph node;
 - b. bone marrow and the thymus;
 - c. thymus and the spleen;
 - d. lymph node and the spleen;
 - e. the structures from c and d.
- 90.** The secondary lymphoid organs are represented by:
- a. thymus and lymph node;
 - b. bone marrow and the thymus;
 - c. thymus and the spleen;
 - d. lymph node and the spleen;
 - e. the structures from b and d.
- 91.** The main cells involve in immunity are the following, with the exception of:
- a. lymphocytes T and B;
 - b. plasma cells;
 - c. antigen-presenting cells;
 - d. macrophages;

- e. chondrocytes.
- 92.** In the thymus cortex, the main important cells are:
- a. the thymocytes and the epithelial reticular cells;
 - b. the thymocytes and the lymphocytes T;
 - c. the thymocytes and the plasma cells;
 - d. the lymphocytes T and the plasma cells;
 - e. the thymocytes and the chondrocytes.
- 93.** The thymic corpuscles contain:
- a. fibroblasts;
 - b. epithelial reticular cells;
 - c. epithelial cuboidal cells;
 - d. chondroblasts;
 - e. adipocytes.
- 94.** In birds, the cloacal bursa possesses a lymphoepithelial parenchyma comparable with that of:
- a. the spleen;
 - b. the thymus;
 - c. the liver;
 - d. the lung;
 - e. the salivary glands.
- 95.** The structure of the lymph nodules consist of concentrated areas of:
- a. macrophages;
 - b. fibroblasts;
 - c. lymphocytes;
 - d. chondrocytes;
 - e. mast cells.
- 96.** In the lymph nodes structure, the paracortex is placed:
- a. between the capsule and the cortex;
 - b. at a hilum;
 - c. along the periphery;
 - d. in medulla;
 - e. between the cortex and the medulla.
- 97.** The red pulp of the spleen's parenchyma is constructed by:
- a. connective tissue's trabeculae;
 - b. the structures from c and e;
 - c. venous sinusoids;
 - d. smooth muscle cells;
 - e. splenic cords.
- 98.** The white pulp of the spleen's parenchyma is constructed by:
- a. sheaths of lymphocytes surrounding arteries;
 - b. the structures from a and c;
 - c. lymphoid nodules;
 - d. venous sinusoids;
 - e. splenic cords.

99. The splenic cords are integrated in:

- a. the white pulp;
- b. the red pulp;
- c. the trabeculae;
- d. the lymphoid nodules;
- e. the capsule.

100. The lymphatic structures associated with the tunica mucosa are represented by:

- a. the oral cavity and pharynx tonsils;
- b. the structures from a,c and e;
- c. the Peyer's patches;
- d. the muscle tissues;
- e. the cecal tonsils.