UNIVERSITATEA DE ŞTIINŢE AGRONOMICE ŞI MEDICINĂ VETERINARĂ BUCUREŞTI
FACULTATEA DE MEDICINĂ VETERINARĂ
Splaiul Independenţei Nr. 105, sector 5, 050097, BUCUREŞTI, ROMÂNIA
Tel.: + + 4021 318 0469; Fax:+ + 40 21 318 0498
www.fmvb.ro , e-mail: info@fmvb.ro

DEPARTMENT: PRECLINICAL SCIENCES

DISCIPLINE: HISTOLOGY AND EMBRYOLOGY

Course responsible teacher: Iuliana Cazimir, Lecturer, DVM, PhD

TOPICS AND REFERENCES

1. **The Cell:** Chapter 2 (pg. 11, 12, 17, 20, 21, 24-32) – **14 pg**. (together with one table and 14 figures);
2. Connective Tissue: Chapter 5 (pg. 72, 73, 76, 78, 83, 87, 91, 95) – **8 pg**. (together with 8 figures);
3. Blood and Hemopoiesis: Chapter 7 (pg. 130, 132, 135, 140, 142, 144, 147, 150) – **8 pg**. (together with one table and 4 figures);
4. Respiratory System: Chapter 11 (pg. 224, 225, 230, 231, 234-240, 243) - **12 pg**. (together with one table and 11 figures);
5. Immune System: Chapter 12 (pg. 250, 251, 254, 256-259, 264, 265, 268, 270) – **11 pg**. (together with one table and 8 figures);
6. 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);
7. Urinary system: Chapter 16 (pg. 371-376, 387, 395, 396) - **9 pg**. (together with 7 figures);
In total: **100 pages** (which includes 6 tables and 91 figures, representing the equivalent of about 53 text's pages).

Bibliography:

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

Questions with five possible answers, of which only one is correct.

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:
a. collagen fibers;
b. reticular fibers;
c. smooth muscle fibers;
d. skeletal muscle fibers;
e. elastic fibers.

4. The submucosal plexi is placed:
a. in tunica submucosa;
b. in lamina muscularis;
c. in tunica mucosa;
d. in tunica muscularis;
e. between tunica muscularis and tunica adventitia.

5. The myenteric plexus is located:
a. in tunica adventitia;
b. in tunica submucosa;
c. between the layers of the tunica muscularis;
d. in tunica mucosa;
e. between tunica mucosa and tunica muscularis.

6. From the external surface to the internal surface, list the components of the lips in order:
a. tunica mucosa;
b. epidermis and dermis with hair follicles;
c. skeletal muscle, epidermis and dermis;
d. epidermis and dermis, skeletal muscle, tunica submucosa and tunica mucosa;
e. tunica mucosa, epidermis and dermis with hair follicles.

7. What type of epithelium will have the lips' mucosa in herbivorous animals?
a. a stratified squamous epithelium, well keratinized or cornified;
b. a simple columnar epithelium,
c. a bistratified columnar epithelium;
d. a transitional epithelium;
e. a simple pseudostratified columnar epithelium.

8. Which component is missing from the soft palate structure?
a. the non-kerainized stratified squamous epithelium;
b. a core of skeletal muscle;
c. the lamina propria;
d. the submucosa;
e. a lamina muscularis.

9. What type of epithelium is lining the oropharyngeal surface of the soft palate?
a. a transitional epithelium;
b. a non-keratinized stratified squamous epithelium;

c. a bistratified columnar epithelium;
d. a simple columnar epithelium;
e. 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 fibers 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 fibers 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:
a. acinous;
b. tubular and branched;
c. folicular;
d. tubulo-alveolar, coiled;
e. tubulo-alveolar.

41. In the stomach's wall, the tunica muscularis has:
a. red fibers;
b. cardiac striated fibers;
c. skeletal striated fibers;
d. smooth muscle fibers;
e. white fibers.

42. The ruminant stomach's mucosa is lining by:
a. a simple squamous epithelium;
b. a stratified columnar epithelium;
c. a non-keratinized stratified squamous epithelium;
d. a simple columnar epithelium;
e. a keratinized stratified squamous epithelium.

43. In the ruminant stomach's mucosa, at the level of the reticular crests' structure are integrated:
a. tubular glands;
b. serous acini;
c. smooth muscle cells;
d. striated muscle cells;
e. mucous acini.

44. Commonly, the axis of the rumen papillae don't have:
a. a lamina muscularis;
b. collagen fibers;

c. connective tissue;
d. connective cells;
e. fibroblasts.

45. The omasum laminae contain:
a. skeletal muscle fibers;
b. internal extensions of the tunica muscularis;
c. a cluster of cardiac muscle cells;
d. striated muscle cells;
e. mucous acini.

46. The proper gastric glands contain the following cell types, with the exception of:
a. the parietal cells;
b. the chief cells;
c. the serous cells;
d. the enteroendocrine cells;
e. the mucous neck cells.

47. In birds, into the ventriculus or gizzard are integrated:
a. 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:
a. the ciliated epithelium;
b. the smooth muscle fibers;
c. the collagen fibers;
d. the skeletal muscle fibers;
e. the hyaline cartilage.

78. In the structure of the bronchioles is missing:
a. the epithelium;
b. the smooth muscle fibers;
c. the collagen fibers;
d. bronchiolar exocrine cells;
e. the hyaline cartilage.

79. In mammals, the respiratory portion of the lung is composed by:
a. the alveoli;

b. the alveolar sacs;
c. the terminal bronchioles;
d. the structures from a, b and e;
e. the alveolar ducts.

80. At the level of the respiratory system, the fixed alveolar cells are:
a. type I pneumocyte;
b. type II pneumocyte;
c. the septal macrophages;
d. the structures from a and b;
e. the structures from a, b and c.

81. At the level of the respiratory system, the moving alveolar cells are represented by:
a. the type I pneumocyte;
b. the type II pneumocyte;
c. the septal macrophages;
d. the structures from a and b;
e. the structures from a, b and c.

82. At the level of the respiratory system, the alveoli are lining by:
a. a squamous epithelium;
b. a ciliated epithelium;
c. a columnar epithelium;
d. a cuboidal epithelium;
e. a bistratified epithelium.

83. In the nephron's structure, the renal corpuscle contains:
a. the glomerular capsule;
b. the proximal convoluted tubule;
c. the glomerulus;
d. the thin tubule;
e. the structures from a and c.

84. In the glomerular capsule structure, the cells of the visceral layer are represented by:
a. 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 fibers;
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.

101. The goblet cells integrated in the intestine epithelium are:
a. contractile cells;
b. hormone-producing cells;
c. mucus-producing cells;
d. enzyme-producing cells;
e. serous cells.

102. In the intestinal mucosa, the lamina muscularis consists of:
a. a single layer of smooth muscle cells;
b. two layers of skeletal muscle cells;
c. three layers of skeletal muscle cells;
d. two layers of smooth muscle cells;
e. a single layer of skeletal muscle cells.

103. The omasum epithelium is:
a. a keratinized stratified squamous epithelium;
b. a ciliated epithelium;
c. a columnar epithelium;
d. a non-keratinized stratified squamous epithelium;
e. a bistratified cuboidal epithelium.

104. The trachea's epithelium contains the following cells, with the exception of:
a. ciliated columnar cells;
b. Clara cells;
c. parietal cells;
d. goblet cells;
e. neuroendocrine cells.

105. The epithelium at the level of the digestive tract is covered by:
a. a calcium hydroxyapatite layer;
b. the dentin;
c. a mucus-rich substance;
d. the elastic fibers;
e. epinephrine.

106. Each nephron has a glomerular basement membrane consists of:
a. three layers or laminae;
b. a simple cuboidal epithelium with brush border;
c. a simple squamous epithelium;
d. a simple cuboidal epithelium with cilia;
e. bistratified columnar epithelium.

107. In the digestive tract the mucosal glands:

a. contain serous acini;
b. may be housed in the lamina propria;
c. consist of connective tissue;
d. are lactiferous glands;
e. are lined by a transitional epithelium.

108. The abomasum epithelium is:
a. a squamous epithelium;
b. a ciliated epithelium;
c. a columnar epithelium;
d. a cuboidal epithelium;
e. a bistratified epithelium.

109. In the splenic structure, the venous sinusoids or sinuses are lined by:
a. a simple cuboidal epithelium with cilia;
b. an usually shaped endothelium;
c. elastic fibers;
d. podocytes;
e. serous cells.

110. The outer covering structure of the alimentary canal is:
a. lamina propria;
b. lamina muscularis;
c. tunica submucosa;
d. tunica adventitia;
e. tunica mucosa.

111. What statement about the endoplasmic reticulum is true?
a. it has the marker enzymes represented by acidic hydrolases;
b. it is closely associated with the nuclear envelope;
c. it transports molecules from the intracellular space towards extracellular space;
d. it produces starch;
e. it contains glyoxysomes.

112. Which cell of the connective tissue secretes heparin and histamine?
a. mast cell;
b. plasma cell;
c. fibrocyte;
d. pigment-producing cell;
e. fibroblast.

113. Which organelle holds a variety of lytic enzymes?
a. Golgi complex;
b. mitochondria;
c. lysosome;
d. rough endoplasmic reticulum;
e. ribosome.

114. What are the structures which contribute to the cell's cytoskeleton?

a. ribosomes;
b. collagen and elastic fibers;
c. filaments and microtubules;
d. connective fibers;
e. reticular and collagen fibers.

115. Which organelle is involved in detoxification and lipid complexing from fatty acids?
a. ribosomes;
b. smooth endoplasmic reticulum;
c. lysosome;
d. mitochondria;
e. proteasome.

116. What are the folds on the inner mitochondrial membrane called?
a. pseudopodia;
b. cristae;
c. glycocalyx;
d. tubules;
e. plicae.

117. Which of the following terms refers to cell death?
a. apoptosis;
b. cytokinesis;
c. resting stage;
d. pluripotency;
e. none of the aforementioned terms refers to cell death.

118. In the cytosol both ribosomal subunits become associated with:
a. microtubules;
b. lysosomes;
c. a strand of mRNA;
d. actin filaments;
e. reticular fibers.

119. Which of the following cell's component is an organelle?
a. pigment;
b. mitochondria;
c. glycogen;
d. myosin;
e. vesicle.

120. The plasmalemma's proteins which permit the movement of ions and small molecules are:
a. carrier proteins;
b. structural proteins;
c. receptor proteins;
d. channel proteins;
e. enzymes.

121. Which is the limiting membrane of each cell?
a. basal lamina;
b. plasmalemma;
c. cristae;
d. *Lamina rara*;
e. glycocalyx.

122. Which cells can have more than one nucleus?
a. goblet cells;
b. osteoclasts;
c. adipocytes;
d. neutrophils;
e. lymphocytes.

123. During the cell's cycle the nucleolus will be visible in:
a. later prophase;
b. prometaphase;
c. anaphase;
d. interphase;
e. metaphase.

124. The lipids of the plasma membrane are represented by:
a. simple lipids;
b. phospholipids;
c. sitosterols;
d. triglycerides;
e. polyunsaturated fatty acids.

125. Which of the following is not a fibre found in the connective tissue?
a. elastic fibre;
b. collagen type-I fibre;
c. Purkinje fibre;
d. collagen type-IX fibre;
e. reticular fibre.

126. Which cell produces the extracellular matrix of the connective tissue?
a. plasma cell;
b. myofibroblast;
c. lymphocyte;
d. fibroblast;
e. fibrocyte.

127. Which of the following is not a membranous organelle?
a. lysosome;
b. peroxisome;
c. Golgi complex;
d. microtubule;
e. mitochondria.

128. The rough endoplasmic reticulum extends from:
a. the inner layer of the plasmalemma;
b. the cytoskeleton;
c. the outer membrane of the nuclear envelope;
d. the Golgi complex sacs;
e. the outer membrane of the mitochondria.

129. Chains of ribosomes unassociated with the endoplasmic reticulum are called:
a. proteasomes;
b. polysomes;
c. cristae;
d. glyoxysomes;
e. peroxisomes.

130. The cis-face of the Golgi complex is directly connected to:
a. plasmalemma;
b. cristae;
c. lysosome;
d. endoplasmic reticulum;
e. nuclear envelope.

131. Which are the most abundant fibers in dense connective tissue?
a. reticular fibers;
b. muscle fibers;
c. collagen fibers;
d. elastic fibers;
e. nerve fibers.

132. Which cell is a phagocyte?
a. neutrophil;
b. keratinocyte;
c. fibroblast;
d. melanocyte;
e. erythrocyte.

133. Which of the following structure does not contain connective tissue?
a. ligament;
b. tendon;
c. mitochondria;
d. cartilage;
e. bone.

134. Which of the following structures stain in purple having affinity for basic dyes?
a. cytoplasm;
b. collagen fibers;
c. elastic fibers;
d. reticular fibers;
e. nucleus.

135. Contents of the eukaryotic cells are referred to as:
a. nucleoplasm;
b. extracellular matrix;
c. protoplasm;
d. cytoplasm;
e. ground substance.

136. The nucleolus is composed mostly of:
a. deoxyribonucleic acid;
b. collagen;
c. proteins and ribonucleic acid;
d. lytic enzymes;
e. carbohydrates.

137. The ribosomal subunits are constructed in:
a. Golgi complex;
b. mitochondria;
c. cytoplasm;
d. cytoskeleton;
e. nucleolus.

138. The inner membrane of the nuclear envelope is lined by:
a. ground substance;
b. basal lamina;
c. nuclear lamina;
d. plasmalemma;
e. glycocalyx.

139. The cytoplasmatic area disposed adjacent to the cell's plasmalemma called:
a. protoplasm;
b. ectoplasm;
c. endoplasm;
d. nucleoplasm;
e. sarcoplasm.

140. In the cell's cytoplasm, the secretory vesicles are formed by:
a. Golgi complex;
b. mitochondria;
c. lysosome;
d. rough endoplasmic reticulum;
e. ribosomes.

141. The lysosomes are extremely abundant in:
a. fibroblasts;
b. phagocytic cells;
c. muscle cells;
d. plasma cells;
e. anucleate cells.

142. From the cellular ingestion of fluid matter by endocytosis results:
a. some pigment;
b. a phagosome;
c. a pinosome;
d. glycogen;
e. an autophagosome.

143. The immature erythrocyte seen in the peripheral blood is called:
a. eosinophil;
b. reticulocyte;
c. plasmocyte;
d. megakaryocyte;
e. progenitor cell.

144. The female animals present the Barr body often visible attached on the nucleus in:
a. erythrocytes;
b. macrophages;
c. adipocytes;
d. neutrophils;
e. lymphocytes.

145. The azurophilic granules of the neutrophils are:
a. ribosomes;
b. primary lysosomes;
c. endosomes;
d. autophagosomes;
e. proteasomes.

146. The eosinophils are involved:
a. to defend against microbial infection;
b. to play a role in inflammatory activities;
c. in combating parasite infestation;
d. in immunological defence for the body;
e. in the immunoglobulin's secretion.

147. Phagocytosis by basophils is:
a. very active;
b. similar to neutrophils;
c. Associated with mucus secretion;
d. very limited;
e. concomitant with exocytosis.

148. Platelets are derived from:
a. mast cell;
b. megakaryocyte;
c. fibroblast
d. lymphocyte;
e. chondrocyte.

149. Dense regular connective tissue is the main component of the:

a. dermis;
b. perimysium;
c. tendons;
d. bone;
e. hyaline cartilage.

150. The brown coloration for the multilocular adipose tissue is due to numerous:

a. mitochondria;
b. ribosomes
c. vesicles;
d. lysosomes;
e. proteasomes.