

CHOOSE THE SINGLE BEST ANSWER FOR QUESTION 1 - 56.

QUESTIONS 1-20 ARE TO BE ANSWERED IN CONJUNCTIONS WITH THE SLIDES THAT WILL BE PROJECTED DURING THE EXAMINATION.

1. Each statement about the area shown is TRUE, EXCEPT:
 - A. It is the site of the blood-thymus barrier.
 - B. It contains Hassall's corpuscles.
 - C. It lacks reticular fibers.
 - D. It is the site of T-cell maturation.
 - E. No afferent lymphatic vessels circulate lymph to this area.

2. Each of the following statements about the organ shown is TRUE, EXCEPT:
 - A. Contains T-cell dependent regions, the periarterial lymphatic sheaths associated with the central artery.
 - B. Sinuses are lined by endothelial cells which parallel the longitudinal axis of the vessel.
 - C. Sinuses have no basal lamina.
 - D. Germinal centers are B cell dependent regions.
 - E. In an open pattern of circulation, penicillar capillaries terminate in the red pulp cords.

3. The cells indicated are the source of production of:
 - A. Insulin
 - B. Glucagon
 - C. Somatostatin
 - D. Trypsinogen
 - E. Bicarbonate

4. All of the following statements about this structure are TRUE EXCEPT:
- A. It is characteristic of both small and large intestine.
 - B. It plays a key role in the reabsorption of ions and water.
 - C. A rich capillary plexus underlies the epithelium with lymphatic vessels more centrally located.
 - D. The lamina propria may be infiltrated with lymphocytes.
 - E. Enteroendocrine cells provide for both paracrine and endocrine regulation.
5. Each statement about the structure shown is TRUE, EXCEPT:
- A. Is found in the medulla of a lymph node.
 - B. Interacts with L-selectins on lymphocytes.
 - C. Is important in lymphocyte recirculation.
 - D. Provides a blood vascular pathway for lymphocytes to enter a lymph node.
 - E. It is a high endothelial vein.
6. Each statement about the structure indicated is TRUE, EXCEPT:
- A. Contains mesenchymal reticular cells and secreted fibers.
 - B. The periphery is composed of small densely stained lymphocytes.
 - C. Response to antigen results in formation of the lighter stained central region containing larger proliferating lymphoid cells.
 - D. It is B cell dependent.
 - E. Such structures are confined to lymph nodes and spleen.

7. Identify:
- A. Stomach - pyloric
 - B. Stomach - body
 - C. Duodenum
 - D. Ileum
 - E. Colon
8. These cells, located in the base of gastric glands, are responsible for the secretion of:
- A. Pepsinogen
 - B. Mucigen
 - C. Hydrochloric acid
 - D. Lysozyme
 - E. Gastrin
9. This congenital malformation is caused by which of the following defects?
- A. Failure of intestines to return to the abdominal cavity.
 - B. Failure of the yolk sac to regress.
 - C. Failure of the pleuroperitoneal membranes to fuse properly causing a defect in the body wall.
 - D. A vascular defect in the body wall causing the abdominal contents to herniate out through the weakened tissue.
 - E. Failure of the lower abdominal wall to form resulting in extrophy of the urinary bladder.

10. Identify this structure.
- A. Esophagus
 - B. Dorsal aorta
 - C. Laryngotracheal diverticulum
 - D. Hypobranchial eminence
 - E. Tracheoesophageal diverticulum
11. The layer of the heart wall indicated:
- A. Is thinner in the atrial wall compared to the ventricular wall
 - B. Contains a mesothelium which is the parietal layer of the pericardium
 - C. Will appear as a clear layer in histological sections due to an abundance of adipose tissue
 - D. Binds strongly to the myocardium by chordae tendinae
 - E. Is equivalent to the tunica intima of blood vessel walls
12. All of the following would be found in this section EXCEPT:
- A. Subendocardial connective tissue
 - B. Ventricular myocardium
 - C. Purkinje fibers
 - D. Pacemaker cells
 - E. Subendothelial connective tissue

13. Cells such as this:
- A. Act to lubricate air passageways at the level of bronchioles
 - B. Provide local regulation of smooth muscle
 - C. Can move freely within the alveolar air space
 - D. Release surfactant into the alveolar lumen
 - E. Are a major support element within interalveolar septae
14. This cell:
- A. Synthesizes bile
 - B. Stores fats and vitamin A
 - C. Phagocytizes aged red blood cells
 - D. Produces plasma proteins
 - E. Alternately stores and mobilizes glycogen
15. In comparison with other vessels in the liver, the blood flowing in this vessel is preferentially enriched in:
- A. Oxygen
 - B. Amino acids and simple sugars
 - C. Plasma proteins
 - D. Aged red blood cells
 - E. None of the above
16. Cells such as this play an important role in all of the following EXCEPT:
- A. Activation of pepsinogen
 - B. Regulation of peristalsis
 - C. Acidification of gastric contents
 - D. Buffering of tissue fluid in lamina propria
 - E. Uptake of vitamin B12

17. Close examination of this epithelium would likely reveal the presence of all of the following cell types EXCEPT:
- A. Ciliated cells
 - B. Goblet cells
 - C. Small granule cells
 - D. Brush cells
 - E. Clara cells
18. Identify:
- A. Trachea
 - B. Extrapulmonary bronchus
 - C. Intrapulmonary bronchus
 - D. Bronchiole
 - E. Respiratory bronchiole
19. The indicated cells are derived from:
- A. The neural crest
 - B. Splanchnic mesoderm
 - C. Paraxial mesoderm
 - D. Somatic mesoderm
 - E. Endoderm
20. This structure is in part derived from the embryonic:
- A. Bulbus cordis
 - B. Left anterior cardinal vein
 - C. Truncus arteriosus
 - D. Right vitelline vein
 - E. Left umbilical vein

END OF SLIDE QUESTIONS, PLEASE CONTINUE ON THE FOLLOWING PAGES!

21. The characteristic group of structures in a portal triad includes branches of:
- A. Portal vein, hepatic vein and bile duct
 - B. Hepatic artery, hepatic vein and bile duct
 - C. Portal vein, hepatic artery and bile duct
 - D. Hepatic artery, hepatic vein and lymphatic vessel
 - E. Hepatic artery, hepatic artery and portal vein
22. All of the following statements about bile production and storage are TRUE EXCEPT:
- A. Bile secretion increases when blood flow through the liver increases.
 - B. Bile flows through the space of Disse prior to entering bile ductules.
 - C. Bile production appears to involve the participation of Golgi complexes.
 - D. Bile is concentrated approximately tenfold within the gallbladder.
 - E. The production of bile is emphasized in the portal lobule model of liver function.
23. Fluid transport in the intestines and the gallbladder involves the presence of all of the following EXCEPT:
- A. A simple columnar epithelium
 - B. Luminal margins sealed with junctional complexes
 - C. Active transport of ions into intercellular compartments
 - D. Lateral interdigitations
 - E. Sinusoidal capillaries in the underlying lamina propria

24. Progression from the upper to the lower portion of the esophagus is evidenced by:
- A. A change in the muscularis externa from skeletal muscle to smooth muscle.
 - B. A transition in the mucosa from stratified squamous to simple columnar epithelium.
 - C. A loss of keratinization in the stratified squamous epithelium of the mucosa.
 - D. An increased thickness of the muscularis mucosae.
 - E. None of the above.
25. Enteroendocrine cells are widely distributed in the gastrointestinal tract and are involved in regulation of all of the following functions EXCEPT:
- A. Peristaltic contraction of smooth muscle
 - B. Production of secretory IgA
 - C. Secretion of gastric juice
 - D. Vasodilation of blood vessels
 - E. Secretion of pancreatic enzymes
26. As a result of foregut rotation, the following events occur. Which event is incorrectly described?
- A. The ventral mesogastrium forms the greater omentum and the gastrosplenic ligament.
 - B. The lesser sac forms behind the stomach as the left side of the stomach assumes a ventral position and the right side of the stomach assumes a dorsal position.
 - C. The liver swings to the right, taking with it the hepatogastric ligament, also known as the lesser omentum.
 - D. The spleen is repositioned to the left.
 - E. The ventral pancreatic bud comes to lie behind the dorsal pancreatic bud.

27. Which of the following congenital defects of the midgut is the most common?
- A. Gastroschisis
 - B. Nonrotation
 - C. Incomplete fixation
 - D. Duplication of the intestines
 - E. Meckel's diverticulum
28. In the digestion and absorption of lipids, enterocytes are directly involved in each of the following stages EXCEPT:
- A. Synthesis of triglycerides
 - B. Uptake of fatty acids and monoglycerides
 - C. Hydrolysis of triglycerides
 - D. Synthesis of chylomicra
 - E. Release of chylomicra
29. In comparison with bronchi, bronchioles exhibit a noteworthy increase in:
- A. Cartilage
 - B. Serous and mucous glands
 - C. Goblet cells
 - D. Smooth muscle
 - E. Ciliated cells

30. Bipolar cells of the olfactory epithelium:
- A. Extend unmyelinated axons which terminate within the olfactory bulb
 - B. Secrete a lipoprotein product which serves to dissolve odorant materials
 - C. Secrete a watery product which acts to cleanse the olfactory surface
 - D. Give rise to the other cell types within this epithelium
 - E. Possess cilia which transport mucus and other materials across the olfactory surface.
31. In the upper or conducting division of the respiratory tract, the typical "respiratory" epithelium is usually replaced by stratified squamous epithelium in all of the following sites EXCEPT:
- A. Vestibule of nostrils
 - B. Oropharynx
 - C. Laryngeal ventricle
 - D. True vocal folds
 - E. Epiglottis
32. Functional maturation of the lungs involves all of the following EXCEPT:
- A. Thinning of the epithelial lining to a simple squamous epithelium
 - B. Development of capillaries in close proximity to air spaces
 - C. Production of surfactant to lower the surface tension of alveolar fluid
 - D. Activation of macrophages to exit from the interalveolar septae

33. All of the following statements regarding the gas exchange barrier in the lung are TRUE EXCEPT:
- A. As air proceeds down the respiratory tree, the first site of gas exchange is at the level of respiratory bronchioles.
 - B. The barrier includes adjacent basal laminae which often appear fused.
 - C. Surfactant is required to maintain the patency of alveoli for gas exchange.
 - D. Gas exchange occurs through squamous alveolar cells but not through great alveolar cells.
 - E. The capillaries which participate in gas exchange are fenestrated to increase their permeability.
34. Which of the following fetal blood vessels conducts blood with the lowest oxygen content?
- A. Inferior vena cava
 - B. Ascending aorta
 - C. Superior vena cava
 - D. Coeliac artery
 - E. L. umbilical artery
35. Which of the following organs contains lymphoid nodules; is covered apically by pseudostratified ciliated columnar epithelium with goblet cells; basally is encapsulated; contains mucous glands associated with the basal surface.
- A. Palatine tonsils
 - B. Pharyngeal tonsils
 - C. Lingual tonsils
 - D. All of the above

36. Which of the following is the most abundant immunoglobulin in serum; crosses the placenta; binds to many cell types by Fc receptor and can activate complement.
- A. IgA
 - B. IgG
 - C. IgM
 - D. IgD
 - E. IgE
37. Each statement regarding the fetal circulation is CORRECT EXCEPT:
- A. The ductus venosus shunts blood from the left umbilical vein to the inferior vena cava.
 - B. Blood in the ductus arteriosus flows from the aorta to the pulmonary arteries.
 - C. Pressure in the right atrium is higher than in the left atrium.
 - D. The left umbilical vein contains highly oxygenated blood.
 - E. Patency of the ductus arteriosus is maintained by prostaglandin E.
38. Which of the following is a T-cell dependent region of a peripheral (secondary) lymphoid organ?
- A. Crypts of pharyngeal tonsils.
 - B. Hassall's corpuscles of the thymus.
 - C. Germinal centers of Peyer's patches.
 - D. Deep cortex of lymph nodes.
 - E. Red pulp of spleen.

39. All are TRUE concerning reticular cells of the thymus, EXCEPT:
- A. They are structural components of the blood-thymus barrier.
 - B. They are attached to each other by desmosomes.
 - C. They are derived from embryonic endoderm (epithelial).
 - D. They are structural components of Hassall's corpuscles.
 - E. They synthesize and secrete reticular fibers which stain with silver.
40. The following structures are matched with the embryonic tissues from which they are derived. Which pair is incorrectly matched?
- A. Lung epithelium - foregut endoderm
 - B. Smooth muscle of the ileum - hindgut endoderm
 - C. Myenteric plexus - ectoderm
 - D. Epithelium of the descending colon - hindgut endoderm
 - E. Pancreatic glands - foregut endoderm
41. The foramen (ostium) secundum of the embryonic heart is located:
- A. In septum secundum.
 - B. Between septum primum and the fused atrioventricular endocardial cushions.
 - C. In the bulbus cordis.
 - D. In septum primum.
 - E. Between septum secundum and the fused atrioventricular endocardial cushions.

42. Which of the following statements about lung development is INCORRECT?
- A. Lungs are first vascularized during the canalicular stage.
 - B. Stillborn infant lungs will sink in water because they are filled with fluid and not air.
 - C. Since most alveoli develop after birth, the lungs of a newborn will be denser on radiographs than adult lungs.
 - D. Surfactant appears during the pseudoglandular stage around week 14.
 - E. During fetal development, the lungs are inflated with amniotic fluid and breathing movements occur that are important for conditioning muscles and stimulating development.
43. A child is born with Down's Syndrome and an anular pancreas. The pregnancy has been characterized by polyhydramnios. Which of the following anomalies is the most likely cause of the polyhydramnios?
- A. Extrahepatic biliary atresia
 - B. Pyloric stenosis
 - C. Duodenal atresia
 - D. Anal agenesis
 - E. Omphalocele
44. Which of the following structures divides the cloaca?
- A. Tracheoesophageal septum
 - B. Septum transversum
 - C. Cloacal sphincter
 - D. Urorectal septum
 - E. Proctodeum

45. Each of the following statement regarding congenital heart defects is CORRECT EXCEPT:
- A. Teratogenic agents are more likely to induce defects if given during the 3rd- 7th weeks of development.
 - B. Ventricular septal defects are the most common type of heart defects.
 - C. Abnormal formation of the aortico-pulmonary septum leads to coarctation of the aorta.
 - D. Congenital heart defects are present in about 10 of 1,000 live-born infants.
 - E. Persistent patency of the ductus arteriosus is common in prematurely born infants.
46. All of the following matches of embryonic structure and adult derivative are CORRECT EXCEPT:
- A. Bulbis cordis - Infundibulum of R. ventricle
 - B. Right 4th aortic arch - Part of R. subclavian artery
 - C. Ductus arteriosus - Ligamentum arteriosus
 - D. Left umbilical artery - Ligamentum teres hepatis
 - E. Left horn of sinus - Coronary sinus venosus
47. Neural crest cells contribute to all of the following EXCEPT:
- A. The aorticopulmonary septum
 - B. Tunica media of the ascending aorta
 - C. Parasympathetic postganglionic neurons associated with the heart.
 - D. The sinoatrial node
 - E. Sympathetic postganglionic neurons innervating the heart.

48. All of the following are TRUE regarding the atrial wall of the heart EXCEPT:
- A. Atrial myocardial cells have a more elaborate t-tubule system and fewer gap junctions than ventricular myocardial cells
 - B. Sinoatrial and atrioventricular nodal cells are found in the right atrium
 - C. Atrial myocardial cells synthesize atrial natriuretic factor, a hormone which can function as a diuretic
 - D. The atrial musculature is separated from the ventricular musculature by the cardiac skeleton
 - E. Endothelial cells of the atrial endocardium are continuous with endothelium lining blood vessels associated with the heart

MATCHING ITEMS

In each of the following groups there are two numbered lists. Mark on the answer sheet in the line corresponding to each question number in the lower list (49-56) the letter of the related item of the upper list.

DIRECTIONS: Match the following functions with the cells which perform these functions:

- A. Transfer antigenic proteins from the intestinal lumen to the underlying lamina propria.
 - B. Produce the secretory component of secretory IgA
 - C. Produce dimeric form of IgA
 - D. Activate chymotrypsinogen
 - E. Produce lysozyme and release it into the intestinal lumen
 - F. Regulate pancreas and gallbladder function
-
- 49. Enterocytes
 - 50. M (microfold) cells
 - 51. Enteroendocrine cells

DIRECTIONS: Select the option (A-G below) which best fits the descriptions numbered 52-53.

- A. Baroreceptors
- B. Septum membranaceum
- C. Bundle of His
- D. Chemoreceptors
- E. Annuli fibrosi
- F. Sinoatrial node
- G. Impulse conduction system

52. Surround cardiac valves and give rise to valve leaflets

53. Detect alterations in oxygen and carbon dioxide tension and pH

DIRECTIONS: Select the option (A-F below) which best fits the descriptions numbered 54-56.

- A. Thymus
- B. Spleen
- C. Lymph nodes
- D. All
- E. A and C alone
- F. B and C alone

54. Contain(s) periarterial T-cell dependent lymphatic sheaths

55. Contains cords and sinuses.

56. Central (primary) lymphoid organ(s).