#1-#120 MULTIPLE CHOICE QUESTIONS: CHOOSE THE ONE BEST ANSWER AND MARK IT ON THE ANSWER SHEET

1. Which structures can be resolved (ie. visualized as individual structures) using a light microscope:
a) ribosomes
b) chromosomes
c) nuclear membranes
d) plasma membranes
e) plasma proteins

2. Regarding tissue 'fixation', which of the following is CORRECT:
a) required for tissue staining
b) required for tissue sectioning
c) required to maintain tissue architecture
d) part of the embedding process
e) used for electron microscopic processing only

3. Which of the following is NOT readily stained by the basic dye hematoxylin:
a) rough endoplasmic reticulum
b) smooth endoplasmic reticulum
c) DNA
d) heterochromatin
e) nuclei

4. Which of the following binds luteinizing hormone (LH) on the surface of Leydig cells:
a) integral membrane protein
b) protein linked to the membrane by a fatty acid tail
c) protein linked to the membrane with a specialized phospholipid (ie. GPI) linkage
d) peripheral membrane protein
e) clathrin

5. Which of the following has the most prominent and polarized trans-golgi network (TGN):
a) smooth muscle cells
b) skeletal muscle cells
c) spermatogonia
d) spermatozoa
e) secretory cells of uterine glands

6. Isoform-specific immunostaining for which of the following can delineate between epidermal-derived and dermal-derived cells in the integument:
a) microfilaments
b) intermediate filaments
c) microtubules
d) all of the above
e) none of the above

7. Which of the following are derived from endoderm:
a) macrophages of the spleen
b) parasympathetic neurons of the small intestine
c) goblet cells of the large intestine
d) all of the above
e) none of the above

8. Which of the following occurs where a mucosa meets the integument at a body orifice:
a) transition from a squamous epithelium to a cuboidal epithelium
b) transition from a pseudostratified columnar epithelium to a simple cuboidal epithelium
c) transition from a non-keratinized epithelium to a keratinized epithelium
d) all of the above
e) none of the above

9. Which of the following is CORRECT:
a) epithelia have considerable extracellular matrix between their cells
b) dense regular connective tissue has little or no collagen fibers
c) hyaline cartilage has little or no ground substance
d) all of the above
e) none of the above

10. Which of the following is NOT one of the four 'basic' tissues (this is not a 'staining' question):
a) epithelial tissue
b) nervous tissue
c) connective tissue
d) lymphoid tissue
e) muscle

11. In a smear of normal peripheral blood, which of the following is the LEAST abundant
a) erythrocytes
b) neutrophils
c) basophils
d) lymphocytes
e) platelets

12. When normal peripheral blood is centrifuged, the great majority of the iron located in the:
a) plasma
b) serum
c) buffy coat
d) hematocrit
e) erythroblasts

13. Regarding granulocytes, which of the following is FALSE:
a) develop from a multipotent blast cell
b) function in the lumen of capillaries
c) involved in the innate immune response
d) contribute to the inflammatory response
e) numbers in peripheral blood smears can be altered during chronic infections

14. Which of the following contain cytoskeletal elements:
a) erythrocytes
b) platelets
c) megakaryocytes
d) all of the above
e) none of the above

15. Which of the following is part of the ECM of normal blood:
a) albumin
b) collagen
c) elastin
d) all of the above
e) none of the above

16. Which of the following contains blood in which the hemoglobin has the lowest amount of bound carbon dioxide:

a) arteries going to the lungs
b) veins leaving the lungs
c) veins going to the liver
d) veins leaving the liver
e) venous sinusoids

17. In a blood vessel, which of the following is closest to the lumen:

a) tunica adventitia
b) tunica media
c) smooth muscle
d) vasa vasorum
e) subendothelium

18. Which of the following is NOT a characteristic of a muscular artery:

a) smooth muscle
b) internal elastic lamina
c) fenestrated elastic membranes
d) external elastic lamina
e) the absence of valves

19. Which of the following DECREASES blood flow into a capillary bed:

a) contraction of smooth muscle in tunica media of metarterioles
b) contraction of smooth muscle in tunica adventitia of arterioles
c) contraction of smooth muscle in tunica intima of capillaries
d) all of the above
e) none of the above

20. Which of the following is a characteristic of vascular endothelia

a) mesodermally derived
b) simple epithelia
c) site of diapedesis
d) all of the above
e) none of the above

21. Which of the following is a normal characteristic of pericytes:

a) are contractile
b) are totipotent
c) are post-mitotic
d) all of the above
e) none of the above

22. Which of the following is INCORRECT:

a) large molecules freely diffuse across the endothelium of fenestrated capillaries
b) occluding junctions are prominent between endothelial cells of continuous capillaries
c) the diameter of sinusoidal capillaries allows for the passage of more than one RBC at a time
d) there is no capillary bed in an arteriovenous anastamosis
e) all capillaries have a basal lamina

23. Which of the following contributes to venous valves:
a) tunica intima
b) tunica media
c) tunica adventitia
d) tunica albuginea
e) serosa

24. Which of the following is NOT a characteristic of the large, superior vena cava:
a) a prominent subendothelium in the tunica intima
b) a prominent layer of circular smooth muscle in the tunica media
c) collagen fibers in the tunica adventitia
d) elastic fibers in the tunica adventitia
e) vasa vasorum in the tunica adventitia

25. Which of the following is a characteristic of the myocardium:
a) smooth muscle cells
b) skeletal muscle cells
c) peripherally localized nuclei in cardiomyocytes
d sarcomeres in cardiomyocytes
e) somatic motor nerves synapsing on cardiomyocytes

26. Regarding myelination, which of the following is FALSE:
a) increases the speed of transmission
b) decreases ion leakage along axon
c) decreases energy requirement per impulse
d) is discontinuous along the axon
e) only occurs in the peripheral nervous system (PNS)

27. Which of the following is characterized by a high concentration of synaptic vesicles:
a) pre-synaptic terminal
b) post-synaptic terminal
c) synaptic cleft
d) nissl substance (bodies)
e) soma

28. Regarding the Parasympathetic Nervous System, which of the following is TRUE:
a) responsible for mobilization of energy stores
b) first synapse occurs proximal to the target organ
c) initiates the contraction of peripheral skeletal muscle
d) initiates the relaxation of peripheral skeletal muscle
e) nerve cell bodies arise in the thoracic and lumbar portions of the spinal cord

29. Which of the following statements is CORRECT:
a) nerves contain neurons and supportive cells
b) somatic nerves have a single connection between the central nervous system and the target
c) visceral nerves have 2 connections between the central nervous system and the target
d) somatic and visceral nerves contribute to the peripheral nervous system
e) somatic and visceral nerves contribute to the sympathetic nervous system

30. In neuroanotomical terms, a ganglion is defined as a cluster of:
a) nerve terminals in the PNS
b) nerve cell bodies in the PNS
c) nerve terminals in the CNS
d) nerve cell bodies in the CNS
e) nerve cell bodies in the brain only

31. Which layer of connective tissue forms the outermost covering of nerves in the PNS:

REMOVED DUE TO AMBIGUITY

32. Acute pain is transmitted to the CNS by:

a) myelinated motor neurons
b) myelinated sensory neurons
c) un-myelinated motor neurons
d) un-myelinated sensory neurons
e) efferent neurons

33. Regarding synaptic transmission, which of the following is CORRECT:

REMOVED DUE TO AMBIGUITY

34. Which of the following contribute to immune function:

a) microglial cells
b) oligodendrocytes
c) ependymal cells
d) fibrous astrocytes
e) protoplasmic astrocytes

35. Regarding cerebral spinal fluid, which of the following statements is CORRECT:

a) drains through the choroid plexus
b) circulates in the subarachnoid space
c) produced by the cells of the arachnoid villi
d) recycled back into general circulation via lymphatic vessels
e) contains plasma proteins

36. Regarding the pituitary gland, which of the following is FALSE:

a) the anterior pituitary is derived from oral ectoderm
b) the posterior pituitary is derived from neural ectoderm
c) the anterior pituitary contains Herring bodies
d) the posterior pituitary produces peptide hormones
e) the hypophoseal veins distribute released hormones into the systemic circulation

37. In the indirect pathway, which of the following is the PRIMARY target:

a) paraventricular nucleus
b) supraoptic nucleus
c) posterior pituitary
d) anterior pituitary
e) median eminence

38. Which of the following is generated in the supraoptic nucleus:

a) corticosteroid-releasing hormone (CRH)
b) thyroid-releasing hormone (TRH)
c) oxytocin (OT)
d) A and B
e) A, B and C

39. Which of the following cells of the anterior pituitary are acidophilic:
a) somatotrophs
b) lactotrophs
c) gonadotrophs
d) A and B
e) A, B and C

40. Which of the following cells responds to changes in blood calcium levels:
a) chief cells of the parathyroid
b) parafollicular cells of the thyroid
c) follicular cells of the thyroid
d) A & B
e) A, B and C

41. Which of the following synthesize thyroglobulin protein:
a) thyrotropes of the pituitary
b) follicular cells of the thyroid
c) parafollicular cells of the thyroid
d) A and B
e) A, B and C

42. Regarding thyroid hormone, which of the following is CORRECT:

REMOVED DUE TO AMBIGUITY

43. Dietary iodine deficiency results in:

REMOVED DUE TO AMBIGUITY

44. Which component of the adrenal gland is regulated by sympathetic innervation:
a) zona fasciculata
b) adrenal medulla
c) adrenal cortex
d) all of the above
e) none of the above

45. Which of the following statements is CORRECT:
a) the adrenal cortex secretes peptide hormones
b) the adrenal medulla is stimulated by ACTH
c) a lack of negative feedback by cortisol results in enlargement of the anterior pituitary
d) all of the above
e) none of the above

46. Which of the following statements is CORRECT:
a) peptide hormones bind to plasma membrane receptors
b) steroid hormones bind to nuclear receptors
c) nuclear receptor activation results in direct changes in gene expression
d) all of the above
e) none of the above

47. Regarding calcium homeostasis, which of the following is FALSE:
a) parathyroid hormone increases calcium release from bone
b) parathyroid hormone increases calcium absorption in the intestine
c) parathyroid hormone increases calcium release in the urine
d) calcitonin inhibits calcium release from bone
e) calcitonin decreases circulating blood calcium levels

48. Which of the following is the common precursor for the synthesis of all steroid hormones:
a) cortisol
b) calcitonin
c) cholesterol
d) aldosterone
e) androgen

49. Which of the following glands has an exocrine component:
a) anterior pituitary
b) posterior pituitary
c) pancreas
d) parathyroid
e) adrenal cortex

50. Regarding cells of the adrenal gland, which of the following is CORRECT:
a) adrenocortical cells have a well developed RER
b) adrenal medullary cells have prominent secretory granules
c) adrenocortical cells have very few mitochondria
d) adrenal medullary cells are often multinucleate
e) adrenocortical cells often have no nucleus

51. Which of the following is NOT part of the innate immune response:
a) cytotoxic T-cells
b) cytokines
c) toll-like receptors
d) complement
e) phagocytic cells

52. Which of the following is a characteristic of the adaptive immune response:
a) occurs within minutes to hours
b) high specificity
c) no memory component
d) initiated by neutrophils
e) mediated by natural killer cells

53. Which of the following is NOT a characteristic of dendritic cells:
a. present antigens to lymphocytes
b. release cytokines
c. derived from monocytes
d. located in the periphery
e. form synapses with axons of PNS sensory nerves

54. Which of the following does NOT take place in the bone marrow:
a) initial B-cell development
b) initial T-cell development
c) development of B-cell tolerance
d) development of T-cell tolerance
e) development of platelets

55. Which of the following is inserted into the membrane of B-cells during their differentiation:
a) IgG molecules
b) IgA molecules
c) IgM molecules
d) IgE molecules
e) foreign antigens

56. Which of the following MOST contributes to the 'blood-thymus barrier':
a) Hassall's corpuscles
b) epithelial reticular cells
c) connective tissue septa
d) CD8-positive T-cells
e) CD4-positive T-cells

57. What type of connective tissue predominates in the parenchyma of a lymph node:
a) loose connective tissue
b) dense regular connective tissue
c) dense irregular connective tissue
d) reticular connective tissue
e) adipose tissue

58. Where are B-cells most often 'activated' in a lymph node:
a) in afferent lymph vessels
b) in efferent lymph vessels
c) in the medulla
d) in the paracortex
e) in cortical nodules

59. Which of the following contribute to the activation of a CD8-positive T-cells:
a) CD4-positive T-cells
b) antigen-presenting cells
c) major histocompatibility complexes
d) all of the above
e) none of the above

60. Which of the following is FULLY encapsulated by connective tissue:
a) tonsil
b) bronchiole-associated lymphoid tissue nodule
c) spleen
d) all of the above
e) none of the above

61. In the spleen, where is bilirubin produced:
a) white pulp
b) P.A.L.S.
c) red pulp
d) all of the above
e) none of the above

62. Which of the following is a component of the conducting portion of the respiratory system:
a) posterior portion of nasal cavity
b) vestibule of nasal cavity
c) terminal bronchiole
d) all of the above
e) none of the above

63. Which of the following contains both elastic AND reticular fibers in the lamina propria:
a. pharynx
b. primary bronchus
c. alveolus
d. all of the above
e. none of the above

64. In the superior portion of the nasal cavity, where are the nuclei of olfactory neurons located:
a) in the epithelium
b) in the lamina propria
c) in the submucosa
d) all of the above
e) none of the above

65. Which of the following has serous secreting exocrine glands in the lamina propria:
a) the portion of the nasal cavity with a respiratory mucosa
b) the portion of the nasal cavity with an olfactory mucosa
c) the superior (ie. nasal) portion of the pharynx
d) all of the above
e) none of the above

66. Which of the following has at least some lining epithelium that is NOT ciliated:
a) inferior (ie. laryngeal) portion of the pharynx
b) epiglottis
c) larynx
d) all of the above
e) none of the above

67. In the larynx, where are the skeletal muscle fibers located:
a) epithelium
b) lamina propria
c) submucosa
d) adventitia
e) serosa

68. Which of the following is NOT found in the walls of the trachea AND bronchii:
a) goblet cells
b) neuroendocrine cells
c) seromucous glands
d) smooth muscle
e) elastic cartilage

69. Which of the following is present in the walls of primary bronchioles:
a) elastic fibers
b) skeletal muscle
c) hyaline cartilage
d) fibrocartilage
e) multicellular exocrine glands

70. Which of the following is NOT a characteristic of Clara cells:
a) equivalent to goblet cells
b) have numerous cilia
c) have abundant RER
d) have abundant SER
e) have a polarized secretory apparatus

71. In the respiratory portion of the respiratory system, where does gas exchange occur:
a) across the pseudostratified respiratory epithelium
b) across Clara cells
c) across Type I pneumocytes
d) across Type II pneumocytes
e) through alveolar pores

72. What is present in the lamellar bodies of a sub-population of alveolar epithelial cells:
a) nitrous oxide
b) oxygen
c) surfactant
d) hydrolytic enzymes
e) hemoglobin

73. Which of the following is the MAJOR function of dust cells in respiratory alveoli:
a) secrete mucous to trap debris
b) prominent cilia beat upward to clear debris
c) release histamine to dilute debris in alveolar fluid
d) produce IgG to neutralize debris
e) phagocytose debris

74. Which of the following is lined by a stratified squamous non-keratinizing epithelium:
a) vermilion zone of the lip
b) filiform papillae of the tongue
c) hard palate
d) all of the above
e) none of the above

75. Which portion of the gingiva contains collagen I fibers that mingle with the periodontal ligament:
a) junctional epithelium
b) non-junctional epithelium
c) lamina propria
d) all of the above
e) none of the above

76. Odontoblasts produce:
a) dentin
b) enamel
c) alveolar bone
d) all of the above
e) none of the above

77. Dental pulp contains:
a. neurovascular bundles
b. adipocytes
c. cementum
d. all of the above
e. none of the above

78. Which of the following contains the LEAST amount of mineralization:
a. enamel of the anatomical crown
b) enamel of the clinical crown
c) dentin
d) periodontal ligament
e) cementum

79. Which of the following is NOT a characteristic of taste buds:
a) taste buds are intraepithelial
b) serous fluid that acts as a solvent for tastant chemicals is produced in the lamina propria
c) receptors for tastants are located on apical microvilli
d) receptors for tastants are linked to G protein-coupled receptors
e) G protein-mediated signals initiate an axon potential within spindle-shaped sensory cells of taste bud

80. What type of epithelial transition occurs at the junction of the esophagus and the stomach:
a) stratified squamous to simple squamous
b) stratified squamous to simple cuboidal
c) stratified squamous to simple columnar
d) stratified squamous to pseudostratified columnar
e) stratified squamous to stratified columnar

81. Regarding epithelial cell types of the stomach, which of the following is TRUE:
a) cells that secrete large amounts of lubricating mucous are located in the neck of gastric glands
b) cells with the greatest stem-like potential are located in the deepest portion of gastric glands
c) cells that secrete hormones are located in the surface portion of the epithelium
d) zymogenic cells secrete large amounts of hydrochloric acid
e) parietal cells secrete large amounts of neutralizing bicarbonate

82. Which of the following is derived from endoderm:
a) gall bladder
b) liver
c) pancreas
d) all of the above
e) none of the above

83. Which of the following is a characteristic of basal acinar cells of the pancreas:
a) produce bile
b) release bicarbonate into ducts
c) secrete insulin into interstitial spaces
d) all of the above
e) none of the above

84. Which of the following junctions contains a true anatomical sphincter:
a) between the esophagus and the stomach
b) between the stomach and the duodenum
b) between the large duodenum and jejunum
d) all of the above
e) none of the above

85. Which of the following occurs at the lateral domains of hepatocytes:
a) endocrine secretion
b) exocrine secretion
c) nutrient uptake
d) all of the above
e) none of the above

86. Resident macrophages of the liver are most often associated with:
a) the hepatic portal vein
b) hepatic veins
c) hepatic sinusoids
d) porta hepatis
e) bile canaliculi

87. In the adult, which of the following is NOT a function of the liver:
a) production of bile
b) production of glycogen
c) production of albumin
d) production of hemoglobin
e) detoxification

88. Which of the following is part of the portal triad:
a) branch of hepatic artery
b) central vein
c) hepatocytes
d) Kuppfer cells
e) bilirubin

89. Which of the following is a characteristic of the kidney:
a) ectodermally derived
b) loose connective tissue capsule
c) the outer cortex contains the renal pelvis
d) the inner medulla contains the majority of the renal corpuscles
e) uriniferous tubules are the organ's functional unit

90. Regarding the renal corpuscle, which of the following is CORRECT:
a) the parietal layer of Bowman's capsule is composed of podocytes
b) the visceral layer of Bowman's capsule is composed of juxtaglomerular cells
c) the endothelium of the capillaries within the corpuscle is the 'continuous' type
d) the intraglomerular mesangial cells are phagocytic
e) arterioles enter and exit at the urinary pole

91. Which of the following contributes to the glomerular filtration barrier:
a) slit diaphragms
b) fenestrations
c) basal lamina
d) all of the above
e) none of the above

92. Regarding the proximal tubule of the nephron, which of the following is CORRECT:
a) consists of a simple squamous epithelium
b) resorbs sodium ions by simple diffusion
c) numerous microvilli increase the luminal surface area
d) all of the above
e) none of the above

93. Regarding the loop of Henle, which of the following is CORRECT:
a) descending limb is impermeable to water
b) ascending layer is permeable to water
c) both limbs resorb sodium and chloride ions
d) all of the above
e) none of the above

94. Which of the following is a function of the juxtaglomerular cells:
a) secrete renin
b) secrete aldosterone
c) secrete antidiuretic hormone (ADH/Vasopressin)
d) all of the above
e) none of the above

95. Which of the following DIRECTLY regulates aquaporin expression:
a) renin
b) aldosterone
c) anti-diuretic hormone (ADH/Vasopressin)
d) all of the above
e) none of the above

96. Which of the following distinguishes the ureter from the urinary bladder:
a) the ureter has a greater number of cell layers in the transitional epithelium
b) the bladder has a thicker and more pliable lamina propria
c) only the ureter has a muscularis externa
d) only the bladder is innervated by the autonomic nervous system
e) only the lumen of the bladder contains urine

97. Regarding the epidermis, which of the following is CORRECT:
a) it is non-keratinized
b) it arises from the mesoderm
c) keratinocytes are the major cell type
d) all the cells reach the free surface
e) all the cells are attached to the basement membrane

98. Which layer of epidermis contains the LEAST differentiated cells:
a) stratum corneum
b) stratum granulosum
c) stratum spinosum
d) stratum basale
e) the most apical layer, which is not present in thin skin

99. Regarding Merkel cells, which of the following is FALSE:
a) differentiate from epidermal epithelial cells
b) act as sensory receptors in the epidermis
c) migrate to the reticular layer of the dermis
d) present in thin skin
e) present in thick skin

100. Regarding eccrine sweat glands, which of the following is CORRECT:
a) simple coiled acinar glands
b) secretion is merocrine in nature
c) secretion is apocrine in nature
d) secretion is holocrine in nature
e) is a major site of acne formation after puberty

101. Prior to birth, which of the following is a characteristic of the developing oogonia:
a) they undergo multiple mitotic divisions
b) they arrest in the first meiotic division
c) they arrest in the second meiotic division
d) they secrete progresterone
e) they secrete estrogen

102. Regarding a post-pubertal primordial follicle, which of the following is correct:
a) contains a secondary oocyte
b) has a zona pellucida
c) matures into a primary follicle during the follicular phase of the ovarian cycle
d) all of the above
e) none of the above

103. Which of the following occurs during the follicular phase of the ovarian cycle:
a) theca interna cells produce androstenedione
b) granulosa cells produce estrogen
c) zonal pellucida forms
d) all of the above
e) none of the above

104. Which of the following occurs just prior to ovulation:
a) a surge of follicle stimulating hormone
b) a surge of luteinizing hormone
c) a surge of human chorionic gonadotropin
d) all of the above
e) none of the above

105. Which of the following BEST describes the corpus albicans:
a) precursor of the corpus luteum
b) corpus luteum of pregnancy
c) degenerating corpus luteum
d) is part of the tunica albuginea
e) is part of the ovarian surface (germinal) epithelium

106. Regarding the the oviduct, which of the following is CORRECT:
a) the oviductal epithelium is directly connected to the ovarian surface (germinal) epithelium
b) oviductal cilia are non-motile
c) peg cells secrete nutritive material for the oocyte
d) the muscularis consists of skeletal muscleß
e) the serosa is lined by a stratified squamous epithelium

107. Regarding the proliferative phase of the uterine cycle, which of the following is CORRECT:
a) occurs during days 1- 4 of the menstrual cycle
b) occurs during days 4-14 of the menstrual cycle
c) occurs during days 14-28 of the menstrual cycle
d) occurs in the first few days after fertilization
e) occurs during the last trimester of pregnancy

108. Which of the following is MOST responsible for initiating the LOSS of the functional layer of the uterine endometrium during menstruation:
a) constriction of the straight arteries
b) constriction of helical arteries
c) increased estrogen production
d) increased progresterone production
e) fertilization of the oocyte

109. Regarding the uterine myometrium, which of the following occurs during pregnancy:
a) increase in the number of skeletal muscle fibers
b) increase in the size of skeletal muscle fibers
c) increase in the number of smooth muscle fibers
d) all of the above
e) none of the above

110. Regarding the cervix, which of the following is CORRECT:
a) lined completely by stratified squamous epithelium
b) produces and secretes large amounts of glycogen
c) mucosa is shed during the menstrual cycle
d) all of the above
e) none of the above

111. Regarding the secretory portion of the lactating breast, which of the following is CORRECT:
a) prolactin stimulates the synthesis of casein
b) apical microvilli are prominent
c) myoepithelial cells contain myofibrils that are contractile
d) all of the above
e) none of the above

112. Which of the following is NOT a characteristic of Sertoli cells
a) polarized
b) columnar
c) form a stratified epithelium
d) produce androgen binding protein
e) form cell-cell junctions with developing germ cells

113. Regarding male germ cell development, which of the following is CORRECT:
a) spermatogonia are exposed to mediators of the adaptive immune system
b) primary spermatocytes have stem cell activity
d) early spermatids are released into the lumen of the seminiferous tubule
d) spermatozoa have a 4n complement of DNA
e) the process occurs most efficiently at 39°C (ie. slightly higher than core body temperature)

114. Which of the following is present in the acrosome:
a) mitochondria
b) proteases
c) centrioles
d) chromatin
e) microtubules

115. Which of the following produces the majority of the semen (in terms of the fluid volume):
a) ejaculatory ducts
b) seminal vesicles
c) prostate
d) bulbourethral glands
e) urinary bladder

116. Which of the following is a compound tubuloalveolar gland:
a) seminal vescicle
b) prostate
c) bulbourethral gland
d) all of the above
e) none of the above

117. Which of the following contributes to the flaccid state of erectile tissue:
a) the parasympathetic nervous system
b) increased blood flow through arteriovenous anastamoses
c) relaxation of the smooth muscle in the walls of arteries that supply the venous sinuses
d) all of the above
e) none of the above

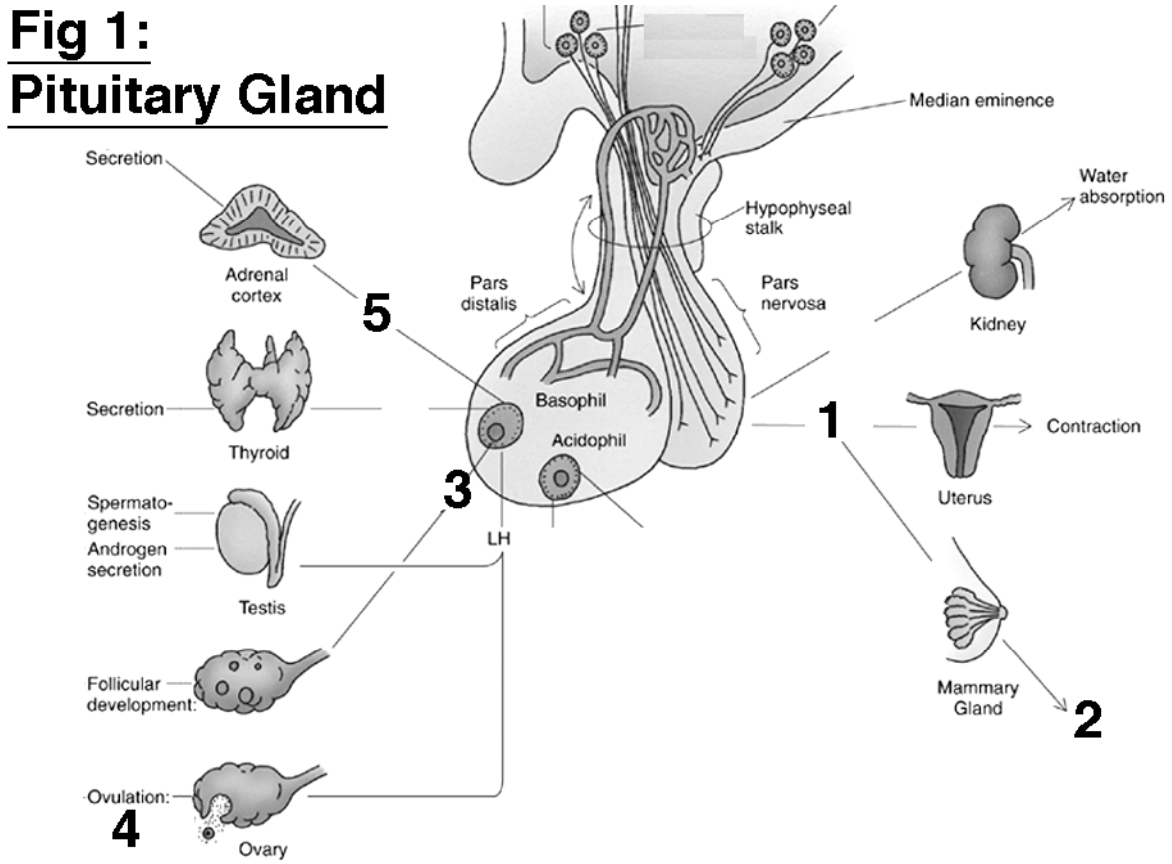
118. Which of the following is derived from ectoderm:
a) ductal epithelium of the female breast
b) ejaculatory duct epithelium of the male reproductive system
c) transitional epithelium of the male and female genitourinary tracts
d) all of the above
e) none of the above

119. Which of the following is regulated by hormones produced by the anterior pituitary gland:
a) Leydig cells
b) granulosa cells
c) secretory breast epithelial cells
d) all of the above
e) none of the above

120. Which of the following can be resolved with the light microscope:
a) individual hormone receptors on the surface of Leydig cells
b) individual hormone molecules in the cytoplasm of granulosa cells
c) individual actin monomers in the sarcoplasm of smooth muscle cells
d) all of the above
e) none of the above

End of Multiple Choice Questions - Please Proceed to Short Answer Questions

#121-#150 SHORT ANSWER QUESTIONS; PLEASE ANSWER DIRECTLY ON EXAM



121. Based on its target organs, what hormone is represented by #1 in Fig 1:
(name the hormone)

122. In Fig 1, what cell type in the mammary gland (represented by #2) responds to the hormone represented by #1:
(name the cell type)

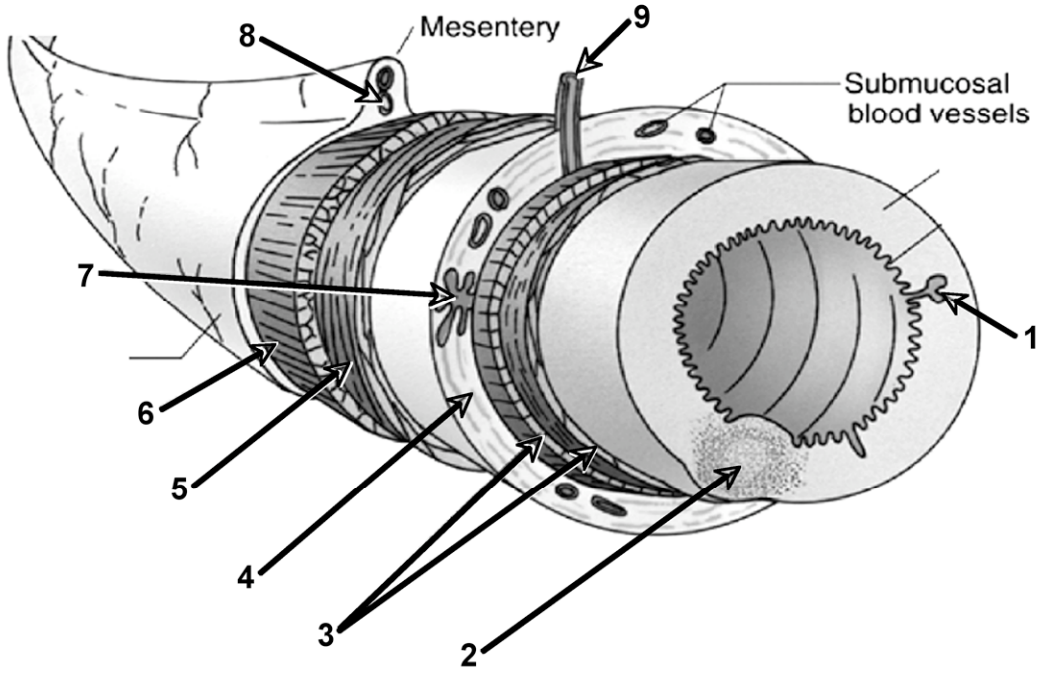
123. Based on its target and function, what is the hormone is represented by #3 in Fig 1:
(name the hormone)

124. What kind of receptors does the hormone that is secreted by the ovary represented by #4 in Fig 1 bind to in its target cells
(name the type of receptors)

125. How are signals generated within target cells after the hormone represented by #5 in Fig 1 binds to its receptor in the named target organ:
(name the mode of signaling)

End of Questions Related to Fig 1

Fig 2: Intestines



126. Which part of the small intestine has the greatest number of structures represnted by #2 in Fig 2:
(name the part of the small intestine)

127. In Fig 2, the Auerbach's plexus, which regulates intestinal peristalsis, is located between which two numbered structures:
(write the structure #'s)

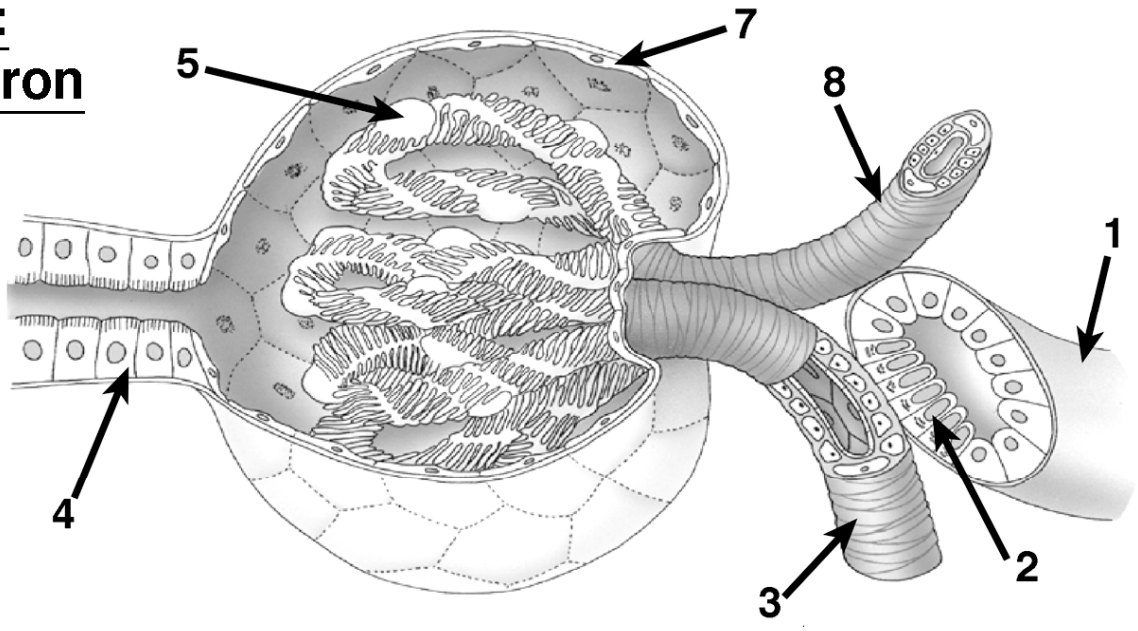
128. In Fig 2, which numbered structure would represent the Brunner's glands of the duodenum, which secrete an alkaline mucous:
(write the structure #)

129. In Fig 2, which numbered structure would contain Paneth cells which contribute to the innate immune response:
(write the structure #)

130. If structure #8 in Fig 2 represents a tributory of a major vein that drains the large intestine, what would the name of the major vein be:
(name the vein)

End of Questions Related to Fig 2

Fig 3: Nephron



131. In Fig 3, which numbered structure represents the afferent arteriole:
(write the structure #)

132. In Fig 3, what is a major secretory product of the cells that make up structure #2:
(name the secretory product)

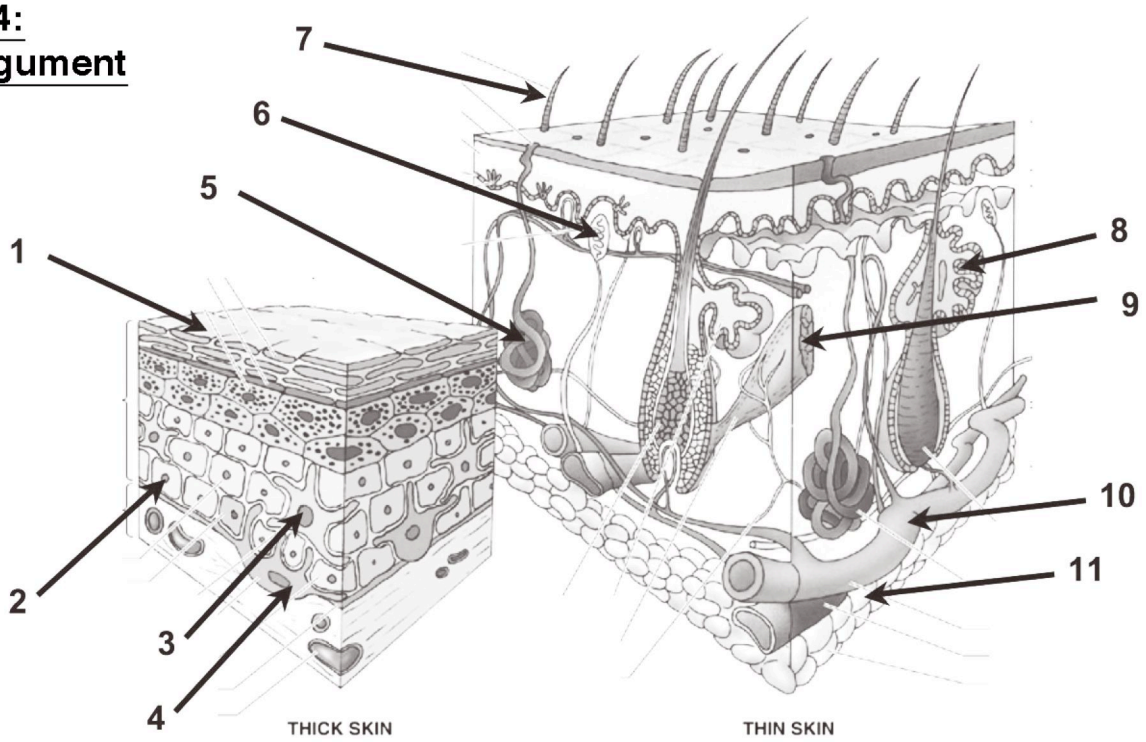
133. In Fig 3, which numbered structure represents a podocyte:
(write the structure #)

134. In Fig 3, what is the major function of structure #4:
(name the function)

135. In Fig 3, the urinary space is located between what two numbered structures:
(write the two structure #s)

End of Questions Related to Fig 3

Fig 4: Integument



136. In Fig 4, what type of gland (eg. 'compound tubuloalveolar' is a 'type' of gland) is represented by structure #5:
(name the 'type' of gland)

137. In Fig 4, which numbered structure represents a cell with the greatest mitotic potential:
(write the structure #)

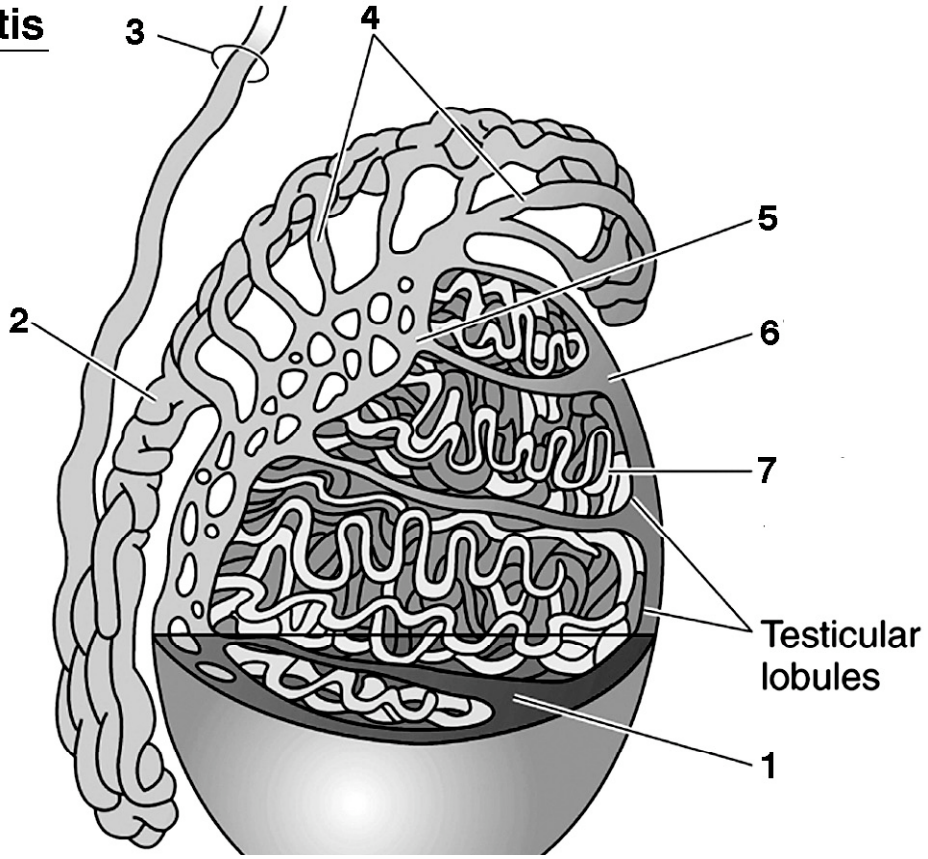
138. In Fig 4, name the secretory product produced by structure #8:
(name the secretory product)

139. In Fig 4, what is the major protein found in structure #1:
(name the protein)

140. In Fig 4, what type cell type predominates in structure #4, which has been 'cut' in the section:
(name the cell type)

End of Questions Related to Fig 4

Fig 5: Testis



141. In Fig 5, what is the major tissue present in structure #1 (please be precise):
(name the tissue)

142. Which numbered structure in Fig 5 is the site where spermatozoa first become motile:
(write the structure #)

143. In Fig 5, what is the name of structure #5:
(name the structure)

144. In Fig 5, describe the two cell types present in the epithelium of structure #4:
(describe the cell types)

145. In Fig 5, which numbered structure is surgically altered by a vasectomy:
(write the structure #)

End of Questions Related to Fig 5

Please Proceed To Last Five Questions On Next Page

146. Due to her excellent knowledge of histology a mythical ANAT390 student was hired to carry out a summer research project with a patholgist. Her first assignment was to count lobules in cirrhottic liver sections. She was surprised, however, to find that she had a hard time identifying hepatocytes on the sections, which were stained with Masson's trichrome to highlight collagen. **Why was it hard for her to find hepatocytes on the section?**

147. After severely injuing his knee playing ultimate, another mythical ANAT390 student was told that he had torn his anterior cruciate ligament. **What type of tissue was 'torn'?**

148. A mythical ANAT390 teaching assistant stayed up very late monitoring the course's Web-CT message board and ended up drinking more than a liter of de-caffeinated coffee which she always drinks at night so that she can sleep. While she was able to get to sleep, she soon woke up with full bladder. **Describe the state of the T.A.'s collecting tubules that led to this state of diuresis.**

149. Another mythical ANAT390 teaching assistant went to Hawaii for the December holidays. While she was careful not to get a sunburn she did get a bit of a suntan. **Describe, in histological terms, what happened in the T.A's epidermis that caused her skin to darken.**

150. A not-so mythical ANAT390 instructor started practicing like crazy after his daughters gave him an electric guitar for his birthday. After a few weeks he noticed that his left index finger (the 'barre chord' digit) was sore and tender. When he mentioned this to his doctor she examined the digit and found no evidence of swelling or tendon/ligament damage. As a result, particularly given his advancing age, she told the instructor that he might have osteoarthritis. **Why might this become a chronic (ie. never-ending) problem?**

End of Exam