

Advanced Anatomy Questions

1. Which of the following is a unicellular gland that is typically found in mucosal epithelium?
 - a. Neuroepithelial cell
 - b. Myoepithelial cell
 - c. Goblet cell
 - d. Friar cell
 - e. Merkel cell

2. Which of the following cells is primarily responsible for the production of collagen and the amorphous ground substance in loose connective tissue?
 - a. Adipocyte
 - b. Fibroblast
 - c. Mast cell
 - d. Plasma cell
 - e. Fibroepitheliocyte

3. Which of the following is/are used to classify epithelia?
 - a. Number of cell layers
 - b. Morphology of the cells comprising the apical layer
 - c. Morphology of the cells comprising the basal layer
 - d. Structure of the underlying connective tissue
 - e. The embryonic germ layer of origin
 - f. A and b are correct
 - g. A and c are correct
 - h. A, b, and d are correct

4. Which of the following connective tissue cells is derived from a B lymphocyte and is responsible for antibody production?
 - a. Adipocyte
 - b. Fibroblast
 - c. Macrophage
 - d. Mast cell

- e. Plasma cell
5. Which of the following describes a secretory process in which no cell membrane components or cytosolic contents are lost?
- a. Merocrine
 - b. Apocrine
 - c. Holocrine
 - d. Endocrine
6. Which of the following statements about adipocytes in normal adults is not true?
- a. They store lipid primarily in the form of triglyceride
 - b. The adipocytes lack nuclei
 - c. Each adipocyte has its own plasma membrane
 - d. When present in large numbers, the adipocytes make up adipose tissue
 - e. The nucleus lies in an eccentric position adjacent to the cell membrane
7. Which of the following statements is FALSE?
- a. All epithelia are lined with specialized connective tissue
 - b. The avascular nature of epithelia limits its size
 - c. Epithelial sheets contain little extracellular material at the lateral surfaces of the individual cells
 - d. 2 of the criteria for classifying epithelia are cell layer number and morphology of the cells at the free surface
8. The nuclei of columnar cells are positioned nearer to which of the following?
- a. Free surface
 - b. Microvilli
 - c. Underlying connective tissue
 - d. Glycocalyx

9. The most common type of exocrine gland is:

- a. Apocrine
- b. Merocrine
- c. Endocrine
- d. Holocrine

10. Epithelia that consist of more than one layer is termed _____.

11. The matrix of connective tissue is composed of:

- a. Cells, fibers, and ground substance
- b. Cells and fibers
- c. Fibers and ground substance
- d. Cells and ground substance

12. Small, hair-like structures (that are not extensions of the plasma membrane) on the surface of some epithelial cells are called:

- a. Flagella
- b. Cilia
- c. Villi
- d. Plicae
- e. Microvilli

13. Which of the following heals quickest after an injury?

- a. Bone
- b. Muscle
- c. Nerve
- d. Epithelium

14. Small depressions in which some connective tissue cells reside are known as:

- a. Lumina
- b. Foramina
- c. Calculi
- d. Lacunae
- e. Icosedrae

15. Which suffix implies formation?

- a. -blast
- b. -lemma
- c. -stasis
- d. -ante

16. Which of the following is the odd tissue type?

- a. Ligament
- b. Rib
- c. Biceps
- d. Blood

17. A photomicrograph of a tissue shows cells in little holes, densely packed fibers and no blood vessels. This tissue is:

- a. Dense regular connective tissue
- b. Hyaline cartilage
- c. Fibrocartilage
- d. Muscle
- e. Adipose tissue

18. The serous lining of the lung surface is the _____.

19. Which of the following is incorrect?

- a. Cartilage heals slower than skin because cartilage is a deeper tissue.
- b. The internal lining of the small intestine has a large surface area because of the presence of cilia

- c. Adipose tissue is a type of connective tissue because it stores fat
- d. 2 of the 3 statements are incorrect
- e. All of the statements are incorrect

20. In pseudostratified columnar epithelium:

- a. All nuclei lie at the same depth from the surface
- b. All cells border on the lumen
- c. All cells touch the basal lamina
- d. All cells produce collagen and elastin
- e. All of the above

21. Each of the following statements about the general features of epithelial tissues is correct, EXCEPT:

- a. Epithelial tissues rest on basal laminae
- b. Epithelial cells exhibit polarity
- c. Epithelia are avascular
- d. Epithelia lack nerve fibers
- e. Epithelial cells attach to one another by specialized junctions

22. Holocrine secretion:

- a. Occurs in sebaceous glands
- b. Occurs in endocrine glands
- c. Involves little or no loss of cytoplasm
- d. All of the above
- e. None of the above

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1. Which of the following is NOT a component of the epidermis of thin skin?
- a. Melanosomes
 - b. Keratinized cells
 - c. Capillaries
 - d. Keratin
 - e. All of the above

2. Keratohyalin granules are most apparent in which of the following layers of the epidermis?
- a. Stratum basale
 - b. Stratum spinosum
 - c. Stratum granulosum
 - d. Stratum lucidum
 - e. Stratum corneum

3. Mitotic activity in the epidermis can be observed in which of the following?
- a. Stratum basale only
 - b. Stratum spinosum only
 - c. Stratum basale and stratum spinosum
 - d. Stratum spinosum and stratum granulosum
 - e. Stratum basale and stratum granulosum

4. Which of the following cells has been implicated in playing a role in immunological reactions in the skin?

- a. Melanocyte
- b. Capillary epithelial cell
- c. Langerhans cell
- d. Hair follicle cell
- e. Arrector pili smooth muscle cell

5. Which of the following best describes sebaceous glands?

- a. Apocrine
- b. Holocrine
- c. Merocrine
- d. Endocrine

6. The basic tissue types found in the skin include:

- a. Muscle
- b. Nerve
- c. Connective
- d. Epithelium
- e. All of the above
- f. 2 of the above

*For the next 6 questions, use the following answer choices.
Answers can be used once, more than once, or not at all.*

- g. Epidermis
- h. Dermis
- i. Hypodermis
- j. A, b, and c
- k. A and b only
- l. B and c only

7. Part(s) of the skin

8. Contain(s) blood vessels

9. Contains the largest number of adipocytes

10. May contain hair bulbs

*For the next 7 questions, use the following 4 answer choices.
Answers may be used once, more than once, or not at all.*

- a. Papillary dermis
- b. Reticular dermis
- c. Both a and b
- d. Neither a nor b

11. Dense irregular connective tissue

12. Dense regular connective tissue

13. Location of Meissner's corpuscles

14. Contain(s) the capillaries that nourish the epidermis

15. Thicker layer

16. Contain(s) blood vessels

1. Which of the following cell types is responsible for synthesizing the organic component of cartilage matrix?
- a. Chondrocytes
 - b. Osteoblasts
 - c. Osteocytes
 - d. Chondroclasts
 - e. 2 of the above

2. Which of the following hormones acts to stimulate osteoclast activity and thus increase bone resorption?
- a. Growth Hormone
 - b. Parathyroid Hormone
 - c. Calcitonin
 - d. Insulin
 - e. Creatinine

3. Which of the following statements about bone is TRUE?
- a. Bone is the hardest tissue in the body
 - b. Bone is a dynamic tissue which changes in response to hormonal demands
 - c. Bone has an organic component of hydroxyapatite

- d. Bone contains 95% of the body's calcium in the form of hydroxyapatite crystals**

- 4. Which of the following is NOT a characteristic of bone tissue?**
- a. Periosteum**
 - b. Calcium phosphate crystals**
 - c. Lacunae that contain 2-4 cells each**
 - d. None of the above**

- 5. The matrix of hyaline cartilage consists of all of the following EXCEPT:**
- a. Collagen fibers**
 - b. Chondrocytes**
 - c. Proteoglycans**
 - d. Lacunae**
 - e. Perichondrium**

- 6. The organic component of bone matrix is produced by:**
- a. Chondrocytes**
 - b. Chondroblasts**
 - c. Osteoblasts**
 - d. Osteocytes**
 - e. Osteoclasts**

- 7. Which of the following statements about osteoblasts is TRUE?**
- a. Osteoblasts are quiescent, inactive bone cells**

- b. Osteoblasts secrete osteoid, which contains only the inorganic component of bone matrix**
- c. Osteoblasts respond to parathyroid hormone**
- d. Osteoblasts maintain contact with each other via cytoplasmic processes known as canaliculi**

- 8. Which of the following cells is primarily responsible for bone resorption?**
- a. Osteoblast**
 - b. Osteocyte**
 - c. Osteoclast**
 - d. Chondrocyte**
 - e. Chondroblast**

- 9. Which of the following cell types extend cytoplasmic processes through canaliculi?**
- a. Osteoclasts**
 - b. Osteocytes**
 - c. Osteoblasts**
 - d. Endothelial cells**
 - e. Fibroblasts**

- 10. Which of the following is absent in fibrocartilage?**
- a. Matrix**
 - b. Chondrocytes**
 - c. Collagenous fibers**
 - d. Lacunae**
 - e. Perichondrium**

11. Removal of the organic component of bone matrix makes the bone...

- a. Lose its shape
- b. Stretchable but not flexible
- c. Flexible but not stretchable
- d. Smaller
- e. More fragile and more readily breakable

12. Which of the following can be found in cartilage but not bone tissue?

- a. Lacunae
- b. Protein fibers
- c. Blood vessels
- d. Chondroitin

13. These cells are located in bone tissue:

- a. Chondroblasts
- b. Osteocytes
- c. Fibroblasts
- d. Chondrocytes
- e. More than one of the above

14. The dense connective tissue covering the outer surface of bone diaphyses is known as the:

- a. Perichondrium
- b. Periosteum
- c. Endosteum
- d. Epiosteum
- e. Exofibrium

15. Which of the following bones is considered a sesamoid bone?

- a. Clavicle
- b. Humerus
- c. Patella
- d. Femur
- e. Popliteal

16. These 2 components of bone are responsible for its hardness and pliability.

- a. Osteoclasts and collagen
- b. Mineralized salts and osteocytes
- c. Mineralized salts and collagen
- d. Collagen and elastin
- e. Collagen and metastatin

17. A fracture in the shaft of a long bone would be a break in the:

- a. Epiphysis
- b. Metaphysis
- c. Diaphysis
- d. Arthrosis
- e. Atalaphysis

18. Yellow marrow consists of _____ tissue.

19. Chondroblasts produce _____.

20. _____ carry blood vessels along the long axis of a bone.

- a. Volkmann's canals
- b. Canaliculi
- c. Lacunae
- d. Foramina
- e. Haversian canals

21. The cell type that maintains the previously formed bone matrix is the:

- a. Osteoclast
- b. Osteocyte
- c. Osteoblast
- d. Fibrocyte

22. Soft connective tissue membranes between the cranial bones at birth are:

- a. An indication of microcephaly
- b. Frontal sinuses
- c. Epiphyseal plates
- d. Cribiform plates
- e. Fontanelles

23. Endochondral and intramembranous are 2 mechanisms of:

- a. Bone remodeling
- b. Embryonic skeletal ossification
- c. Negative feedback
- d. Cartilage resorption

24. Which of the following is NOT a cranial suture?

- a. Epiphyseal
- b. Lambdoidal
- c. Coronal
- d. Sagittal
- e. Squamous

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Which of the following cell types is responsible for skeletal muscle regeneration?

- a. Myoepithelial cell
- b. Myofibril
- c. Satellite cell
- d. Myofibroblast
- e. Fibroblast

• How many T-tubules lie within a single skeletal muscle sarcomere?

- a. 1
- b. 2
- c. 3
- d. 4

• Sarcoplasmic reticulum is the name given to which of the following?

- a. Rough endoplasmic reticulum in smooth muscle cells
- b. Smooth endoplasmic reticulum in cells of the epimysium
- c. Smooth endoplasmic reticulum in all muscle cells

d. Rough endoplasmic reticulum in cardiac muscle cells

• **The connective tissue layer that bundles skeletal muscle fibers into fascicles is the:**

- a. **Perichondrium**
- b. **Perineurium**
- c. **Perimysium**
- d. **Epimysium**
- e. **Endomysium**

• **An overlap of actin and myosin filaments occurs in the:**

- a. **A Band**
- b. **I Band**
- c. **Z Line**
- d. **H Band**
- e. **M Line**

• **In skeletal muscle, a triad refers to which of the following?**

- a. **A T tubule sandwiched between 2 dilated cisternae of the sarcoplasmic reticulum**
- b. **A Z line flanked by 2 A bands**
- c. **An A band flanked by 2 I bands**
- d. **An H zone flanked by 2 A bands**
- e. **A Z line flanked by 2 sarcomeres**

• **Which of the following does not describe skeletal muscle fibers?**

- a. **Striated**
- b. **Typically voluntary**
- c. **Multinucleate**
- d. **Branched**

- **Intercalated disks:**
 - Are found only in smooth muscle
 - Are found in skeletal and cardiac muscle
 - Are part of the neuromuscular junction in bipennate muscles
 - Are located at the M line
 - Contain desmosomes and gap junctions

- **Motor units:**
 - Are found only in cardiac muscle
 - Are largest in muscles responsible for delicate movements
 - Consist of a muscle fiber and all the nerves that supply it
 - Consist of a motor neuron and all the muscle fibers it supplies
 - Are the same as neuromuscular junctions

- **The cell type least likely to contain more than one nucleus is a(n):**
 - Skeletal muscle fiber
 - Osteoclast
 - Cardiac muscle cell
 - Smooth muscle cell

*For the next 5 questions, use the following 4 choices.
Answers may be used once, more than once, or not at all.*

- Epimysium
- Perimysium
- Endomysium
- None of the above

- **Surrounds individual myofilaments**

- Surrounds whole named muscles

- Surrounds individual fascicles

- Surrounds individual muscle fibers

- The connective tissue wrapping around a muscle that is continuous with tendons is the:

- Perimysium
- Endomysium
- Epimysium
- Ectomysium

- In muscle tissue, neurotransmitter receptors are located:

- In synaptic vesicles
- On the motor neuron axon terminals
- In the synaptic cleft
- On the motor end plate

- An action potential is:

- A migrating region of membrane potential reversal
- A flow of electrons along the sarcolemma
- A nucleophilic reaction between Na and K ions
- Something that is only caused by acetylcholine

- Acetylcholinesterase:

- Produces acetylcholine
- Is the acetylcholine receptor in muscle tissue
- Is responsible for smooth but not skeletal muscle contraction
- Degrades the neurotransmitter which is found in the neuromuscular junction

- **Tetanus toxin causes convulsive paralysis by:**
 - Blocking acetylcholine from binding to the muscarinic acetylcholine receptor**
 - Inhibiting acetylcholinesterase**
 - Causing motor neurons to release massive amounts of acetylcholine**
 - Blocking acetylcholine from being released by motor neurons**

- **A person suffering from nerve gas exposure is given atropine to counter the effects because:**
 - Atropine will bind to and electrophilically inactivate the nerve gas**
 - Atropine blocks the nerve gas receptor**
 - Atropine blocks the acetylcholine receptor which prevents the lingering excess ACh from having adverse effects**
 - Atropine inactivates acetylcholinesterase**

- **Which of the following is NOT TRUE?**
 - All muscle tissue is contractile**
 - Skeletal muscle is voluntary but smooth muscle is not**
 - Superficial fascia holds skin to muscle**
 - Muscles use the skeleton as leverage points as they push against bones to produce body movement**

- **Skeletal muscle is described by all of the following EXCEPT:**
 - Striated**
 - Voluntary**
 - Multinucleate**
 - Autorhythmic**
 - Contractile**

- **The walls of hollow organs and some blood vessels contain this type of muscle tissue.**
 - Striated**
 - Skeletal**
 - Cardiac**
 - Voluntary**
 - Smooth**

- **Which of the following is unique to cardiac muscle tissue?**
 - Involuntary**
 - Striated**
 - Non-striated**
 - Contains actin AND myosin**
 - Contains intercalated disks**

- **Approximately, what percentage of heat is generated by muscle tissue?**
 - 15%**
 - 35%**
 - 65%**
 - 85%**
 - 95%**

- **A muscle fascicle is a bundle of:**
 - Myofibrils**
 - Sarcomeres**
 - Fibers**
 - Muscles**
 - Muscle cells**
 - 2 of the above**

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1. Which of the following statements is TRUE?
 - a. Peripheral nerve is similar to smooth muscle in terms of the connective tissue investment
 - b. Most nerves contain afferent and efferent fibers and thus carry both motor and sensory signals
 - c. Nodes of Ranvier are most easily seen in cross-section of peripheral nerve
 - d. None of the above

2. Which of the following cells is responsible for myelin formation in the peripheral nervous system?
 - a. Astrocyte
 - b. Oligodendrocyte
 - c. Schwann cell
 - d. Microglial cell
 - e. Satellite cell

3. The perineurium is the connective tissue layer:
 - a. Surrounding an entire nerve
 - b. Surrounding individual axons in the CNS
 - c. Surrounding individual axons in the PNS
 - d. Surrounding fascicles of axons in the CNS
 - e. Surrounding fascicles of axons in the PNS

4. The peripheral nervous system includes the:

- a. Somatic nervous system
- b. Brain
- c. Spinal cord
- d. Nuclei

5. The system that controls smooth muscle, cardiac muscle, and gland activity is the:
- a. Somatic nervous system
 - b. Autonomic nervous system
 - c. Skeletal division
 - d. Sensory nervous system

6. A neuron with many short dendrites and a single long axon is a:
- a. Multipolar neuron
 - b. Bipolar neuron
 - c. Unipolar neuron
 - d. None of the above

7. Most sensory neurons are _____ neurons.
- a. Unipolar
 - b. Bipolar
 - c. Multipolar
 - d. Efferent
 - e. A and b
 - f. A and c
 - g. B and c

8. Cells found in the choroid plexus that secrete cerebrospinal fluid are:
- a. Astrocytes
 - b. Microglia
 - c. Ependymal cells
 - d. Oligodendrocytes
 - e. Schwann cells

9. The most likely type of fiber that would carry the impulse for a withdrawal reflex would be a(n):
- a. A fiber because they carry the strongest action potentials
 - b. A fiber because they carry APs the fastest
 - c. B fiber because they carry APs the fastest
 - d. C fiber because they carry the strongest APs

10. Axons within nerves may have which of the following associated with them?
- a. Schwann cells
 - b. Nodes of Ranvier
 - c. Oligodendrocytes
 - d. A and b
 - e. All of the above

11. Action potentials are conducted more rapidly in:
- a. Small diameter axons than large diameter axons
 - b. Large diameter axons than small diameter axons
 - c. Unmyelinated axons than myelinated axons
 - d. Axons that lack a wrapping of Schwann cells

12. Clusters of nerve cell bodies within the PNS are called

_____.

13. Gray matter contains primarily:

- a. Myelinated fibers
- b. Neuron cell bodies
- c. Schwann cells
- d. All of the above

14. Arrange the following connective tissue structures from the outermost to the innermost.

- 1. Endoneurium
- 2. Epineurium
- 3. Perineurium

Neurotransmitters are stored in vesicles that are located primarily in specialized portions of the:

- . Soma
- a. Axon
- b. Dendrite
- c. Perikaryon

An inhibitory neuron could affect the neuron with which it synapses by:

- . Producing an IPSP within the neuron
- a. Hyperpolarizing the neuron
- b. Increasing K⁺ efflux from the neuron

- c. Increasing Cl⁻ influx into the neuron
- d. All of the above
- e. 2 of the above

Summation:

- . Is caused by a combining of several local potentials
- a. Can occur when 2 action potentials arrive simultaneously at 2 different presynaptic terminals
- b. Can occur when 2 action potentials arrive in very close succession at a single presynaptic terminals
- c. All of the above

Which of the following organelles is responsible for the appearance of Nissl bodies in the cell bodies of motor neurons?

- . Smooth endoplasmic reticulum
- a. Rough endoplasmic reticulum
- b. Golgi apparatus
- c. Mitochondria
- d. Basal bodies

Which of the following structures is a component of a reflex arc?

- . Afferent neuron
- a. Efferent neuron
- b. Sensory receptor
- c. Effector organ
- d. All of the above

A convergent circuit:

- . **Is a positive feedback system that produces many action potentials**
- a. **Is a negative feedback system that produces IPSPs**
- b. **Occurs when multiple neurons synapse onto few neurons**
- c. **Cannot be affected by a sodium channel blocker**
- d. **All of the above**

The output of a convergent circuit could be:

- . **An IPSP**
- a. **An EPSP**
- b. **An action potential**
- c. **All of the above**

Which of the following is TRUE of the perineurium?

- . **It's a fascia surrounding many bundles of nerve fibers**
- a. **It's a layer of connective tissue surrounding a single bundle (fascicle) of nerve fibers**
- b. **It's a thin layer of reticular fibers covering individual nerve fibers**
- c. **It's an artery-rich fascia covering the external coat of nerves**

Which of the following is TRUE of the sympathetic nervous system?

- . **It's voluntarily controlled via the forebrain**
- a. **It's voluntarily controlled via the reticular formation**
- b. **It uses different neurotransmitters at the ganglion and at the synaptic cleft**
- c. **It's a subdivision of the somatic nervous system**

Santiago Ramon y Cajal proposed that neurons were dynamically polarized. By this he meant that excitation only spread in one direction along a neuron. In which part of the neuron did he imagine that the excitation began and in which direction did it spread?

Can neuroglial cells transmit action potentials from one nerve cell to another?

What is the difference between grey and white matter of the CNS?

What are the events whose frequency is being modulated to transmit information through the nervous system?

1. The endocrine system:

- a. Releases chemicals into the bloodstream for distribution throughout the body
- b. Releases hormones that can alter the metabolic activities of many different tissues and organs
- c. Produces effects that can last for hours, days, or even longer
- d. Can alter the gene activity of cells
- e. All of the above

2. Each of the following is an amino acid derivative EXCEPT:

- a. Epinephrine
- b. Melatonin

- c. Thyroxine
- d. TSH

3. When adenyl cyclase is activated:
- a. cAMP is formed
 - b. cAMP is degraded
 - c. G proteins are replicated in a semiconservative fashion
 - d. Steroid hormones enter the cell via receptor-mediated endocytosis
 - e. None of the above

4. Which of the following hormones does not act via a second messenger system?
- a. Glucagon
 - b. Epinephrine
 - c. GH
 - d. Testosterone
 - e. ACTH

5. What hypophyseal structure receives signals from the hypothalamus via the hypophyseal portal system?
- a. Follicular medulla
 - b. Adenohypophysis
 - c. Neurohypophysis
 - d. Pars intermedia
 - e. Suprachiasmatic nucleus

6. Low blood glucose typically results in the secretion of all of the following EXCEPT:

- a. Glucagon**
- b. Thyroxine**
- c. hGH**
- d. PTH**
- e. 3 of the above**

7. Which of the following is a function of glucocorticoids?

- a. Increased inflammatory response**
- b. Increased blood [glucose]**
- c. Decreased lipolysis**
- d. Increased creatinine hydrolysis by osteocytes**
- e. Increased osteoclast activity**

8. What hormone increases intestinal calcium absorption?

- a. Calcitriol**
- b. Calcitonin**
- c. Parathormone**
- d. Pancreatic polypeptide**
- e. GnRH**

9. Which of the following is a function of TSH?

- a. Activation of thyroid follicular cells**
- b. Increase of iodine trapping in follicular cells**
- c. Increased thyroglobulin synthesis**
- d. Increased release of T_3**
- e. Increase release of T_4**
- f. All of the above**
- g. Only 4 of the above**

10. The _____ cells of the pancreas secrete insulin.

- a. F
- b. Chief
- c. Principal
- d. Alpha
- e. Beta
- f. Delta

11. The general adaptation syndrome is activated by the:

- a. Hypothalamus
- b. Adrenal gland
- c. Pituitary gland
- d. Thyroid gland
- e. Epinephrine release

12. Say you ate 25 sugar cubes and then drank a liter of Mountain Dew, which hormone might be secreted in large amounts as a result?

- a. Insulin
- b. Glucagon
- c. Prolactin
- d. GnRH
- e. Somastinin

13. Somatostatin is secreted by the:

- a. Pancreatic F cells
- b. Pancreatic delta cells

- c. Zona fasciculata
- d. Parafollicular cells
- e. Bronchial clara cells

14. A tumor in the adrenal zona glomerulosa may cause hypersecretion of the hormones in that region. Which of the following might you expect to find in a patient with such a tumor?

- a. Increased blood sodium levels
- b. Increased blood glucose levels
- c. Decreased blood calcium levels
- d. Increased dehydration
- e. Increased ketoacidosis

15. Oxytocin is secreted by the:

- a. Adenohypophysis
- b. Neurohypophysis
- c. Zona glomerulosa
- d. Pars intermedia
- e. Cervical stretch receptors

16. A lack or decrease in insulin hormone receptors on cells can result in:

- a. Diabetes insipidus
- b. Type I diabetes mellitus
- c. Type II diabetes mellitus
- d. Insulin-dependent diabetes mellitus
- e. Gestational diabetes

17. Vasopressin is the same hormone as _____.

18. The general adaptation syndrome:

- a. Is a mechanism to maintain homeostasis when under stress
- b. Resets the levels of controlled conditions in the body in response to stress
- c. Is part of the sympathetic response
- d. Reduces the amount of stress encountered
- e. None of the above

19. Which of the following characteristics is the same for the nervous and the endocrine systems

- a. Target cells affected
- b. Latent period for onset of actions
- c. Duration of actions
- d. Mechanism of signalling
- e. None of the above

20. Hyposecretion of cortisol can cause:

- a. Cretinism
- b. Diabetes mellitus
- c. Diabetes insipidus
- d. Addison's disease
- e. Grave's disease

21. During hyperglycemia, pituitary GH secretion will _____.

22. As blood [somatomedin] increases, pituitary GH secretion will _____.

23. As GH secretion increases, liver glycogenolysis will _____.

24. As GH secretion decreases, fat catabolism will _____.

25. As thyroid hormone levels increase, tissue O₂ consumption will _____.

26. As thyroid hormone levels increase, pituitary TSH secretion will _____.

27. As hypernatremia progresses, cortisol secretion will _____.

28. As hypoxia progresses, cortisol secretion will _____.

29. As cortisol secretion increases, blood [glucose] will _____.

30. As cortisol secretion increases, protein anabolism will _____.

31. As PTH levels increase, plasma [Ca²⁺] will _____.

32. As plasma $[Ca^{2+}]$ increases, calcitonin secretion will _____.

33. Stress causes the adrenal medulla to release:

- a. Norepinephrine and ANP
- b. Epinephrine and vasopressin
- c. Epinephrine and norepinephrine
- d. Epinephrine, norepinephrine and vasopressin

1. The term that refers to the percentage of packed erythrocytes per unit volume of blood is the:

- a. Differential Count
- b. Hemoglobin
- c. Hematocrit
- d. Hemopoiesis

2. Which of the following is a circulating blood cell that is capable of differentiating into a plasma cell?

- a. Neutrophil
- b. Basophil
- c. B lymphocyte
- d. T lymphocyte
- e. Monocyte

3. The component of plasma responsible for maintaining the osmotic pressure of blood is:

- a. Plasmin**
- b. Albumin**
- c. Fibrinogen**
- d. Gamma globulin**
- e. Plasminogen activator**

4. Erythrocytes:

- a. Enter the circulation only after becoming fully mature**
- b. Undergo mitosis in the circulation in response to erythropoietin**
- c. Are removed from the circulation after about 120 days by macrophages in the spleen, liver, and bone marrow**
- d. Have mitochondria and are capable of oxidative respiration**
- e. None of the above**

5. Plasma is:

- a. Blood that has no red blood cells**
- b. The liquid portion of blood including the clotting factors**
- c. The liquid portion of blood minus the clotting factors**
- d. The proteins of blood**

6. Excessive destruction of erythrocytes is characteristic of:

- a. Thalassemia**
- b. Aplastic anemia**
- c. Pernicious anemia**
- d. Hemolytic anemia**

7. A hematocrit of 80 would be considered:

- a. Polycythemia**
- b. Anemia**
- c. Thrombocytopenia**
- d. Leukemia**

8. During hemoglobin recycling in the spleen, heme is initially converted into:

- a. Bilirubin**
- b. Stercobilin**
- c. Urobilin**
- d. Urobilinogen**

9. The Fe^{3+} portion of the hemoglobin is eventually:

- a. Converted into transferrin in the large intestine**
- b. Converted into ferritin in the kidney**
- c. Excreted from the body**
- d. All of the above**
- e. None of the above**

10. An increased neutrophil count is typically associated with:

- a. An ongoing bacterial infection**
- b. Neutropenia**
- c. Allergic reactions**
- d. An ongoing parasitic infection**

11. _____ eventually become macrophages.

- a. Neutrophils
- b. Basophils
- c. Monocytes
- d. Macrocytes
- e. Lymphocytes

12. Hypoxia induces the kidneys to produce:

- a. Platelets
- b. Thrombopoietin
- c. Erythrocytes
- d. Erythropoietin
- e. Intrinsic Factor

13. The first phase of hemostasis is:

- a. Separation of globin and heme
- b. Activation of Prothrombin
- c. Platelet aggregation
- d. Vascular spasm

14. Which of the following activates platelets during hemostasis?

- a. Eosinophil degranulation
- b. Exposed collagen or endothelial basement membrane
- c. Fibrin thread formation
- d. Thromboplastin

15. The phase of coagulation that begins with exposed endothelial collagen is the:

- a. Extrinsic pathway**
- b. Intrinsic pathway**
- c. Common pathway**
- d. Fibrin stabilization phase**

16. An individual with type B+ blood has which of the following antibodies in their blood?

- a. anti-A and anti-O**
- b. anti-B and anti-Rh**
- c. anti-A**
- d. anti-B**
- e. anti-Rh**

17. Which of the following blood cells have some properties similar to connective tissue mast cells?

- a. Basophils**
- b. Neutrophils**
- c. Eosinophils**
- d. Lymphocytes**
- e. Monocytes**

18. Examples of erythrocytes can be found in almost all histological sections. Therefore, knowledge of the approximate diameter of a red blood cell is useful because it can serve as a built-in ruler on the tissue section. Which of the following best describes the diameter of red cells?

- a. 5-6um**
- b. 6-7um**
- c. 7-8um**

- d. 8-9um
- e. 9-10um

MATCHING. Select from the following terms. Some may be used more than once or not at all!

- f. Lymphocytes
- g. Monocytes
- h. Eosinophils
- i. Basophils
- j. Neutrophils
- k. All of the above

- 19. Leukocytes
- 20. Least numerous of the circulating leukocytes
- 21. First line of cellular defense against a bacterial invasion
- 22. Found in the buffy coat in a hematocrit tube
- 23. Most numerous of the circulating leukocytes
- 24. Specific granules contain heparin and histamine
- 25. Capable of diapedesis
- 26. May be found in loose connective tissue

- 27. Together, leukocytes and platelets comprise approximately _____ percent of total blood volume.
 - a. 1
 - b. 15
 - c. 23
 - d. 10

- 28. Which of the following might trigger erythropoiesis?

- a. Increased tissue demand for O₂
- b. Decreased tissue demand for O₂
- c. An increased number of RBCs
- d. Moving from a high altitude to a lower altitude

29. An individual who is bloo

•
The thickest layer of the wall of veins is the:

- a. Tunica media
- b. Tunica externa
- c. Subendothelial connective tissue
- d. Tunica interna
- e. Internal elastic lamina

• The basic tissue types found in large blood vessels include:

- a. Muscle
- b. Connective Tissue
- c. Nerve
- d. Epithelium
- e. All of the above

• Each of the following statements about sinusoidal capillaries is correct EXCEPT:

- a. They have unusually wide lumens
- b. They have abundant fenestrations
- c. They are not found in skeletal muscle
- d. They are the least permeable capillary type

- e. They often have phagocytic cells inserted between the endothelial cells of their lining

- When compared to arteries, veins generally:
 - a. Are thinner walled
 - b. Have more muscle in the tunica media
 - c. Carry faster moving blood
 - d. Have thicker endothelium
 - e. Are more elastic

- The blood vessels that play the most important role in the regulation of blood flow to a tissue and blood pressure are the:
 - a. Arterioles
 - b. Veins
 - c. Capillaries
 - d. Venules
 - e. Arteries

- As blood travels from the aorta to the capillaries:
 - a. Pressure Increases
 - b. Viscosity Increases
 - c. Resistance Increases
 - d. Velocity Increases
 - e. Flow Increases

- A patient with a hypothalamic tumor has hypersecretion of ADH. Which of the following BP readings would be most likely for this patient?
 - a. 95/65
 - b. 115/80
 - c. 120/60

d. 165/100

- The difference between the systolic and the diastolic pressures is known as the:
 - a. Blood Pressure
 - b. Pulse Pressure
 - c. Mean Arterial Pressure
 - d. End-ventricular Pressure

- The process by which leukocytes leave the circulation by passing between endothelial cells to enter the surrounding connective tissue is termed:
 - a. Margination
 - b. Diapedesis
 - c. Leukopoiesis
 - d. Endocytosis
 - e. None of the above

- The tunica interna:
 - a. Includes a layer of dense connective tissue
 - b. Contains some small capillaries
 - c. Contains some striated smooth muscle fibers
 - d. Includes a layer of simple squamous epithelium
 - e. None of the above

- Which of the following represents the primary kind of tissue found in the tunica media of blood vessels?
 - a. Skeletal muscle
 - b. Longitudinally arranged striated muscle
 - c. Concentric layers of smooth muscle
 - d. Reticular connective tissue
 - e. Loose connective tissue

• Large diameter capillaries found primarily in the liver, spleen, and bone marrow are called:

- a. Continuous capillaries
- b. Fenestrated capillaries
- c. Sinusoidal capillaries
- d. Metarterioles
- e. Megacapillaries

• As a subject's age increases, his/her arterial compliance _____.

• As depth of respiration increases, venous return _____.

• As plasma ADH decreases, blood volume _____.

• As plasma ANP increases, blood volume _____.

• As plasma histamine increases, venous return _____.

• As sympathetic stimulation increases, peripheral resistance _____.

• As blood flows from the arteries into capillaries, BP _____.

• As blood flows from the arteries into capillaries, velocity of flow _____.

• As venous BP increases, tissue edema _____.

• As cardiovascular shock progresses, sympathetic nervous system output _____.

• As right atrial diastolic pressure increases, VR _____.

• Which statement is true of arteries?

- a. All arteries carry oxygenated blood away from the heart

- b. All arteries carry blood low in carbon dioxide away from the heart
- c. Some elastic arteries release significant amounts of renin
- d. All arteries lack valves
- e. More than one of the above is correct

- **Peripheral resistance:**
 - a. Decreases with increasing blood vessel length
 - b. Decreases if blood vessel diameter is reduced by 50%
 - c. Decreases in cases of polycythemia
 - d. Is not a major factor in the determination of mean arterial pressure
 - e. 2 of the above are correct
 - f. None of the above correct

- **The arteries that directly feed into the capillary beds are called _____.**

- **A deficiency of albumin would result in:**
 - a. Increased blood volume
 - b. Increased blood oncotic pressure
 - c. Loss of water by osmosis from the bloodstream
 - d. 2 of the above
 - e. All of the above

- **As blood flows from the aorta to the capillaries of the gastrocnemius, its velocity of flow will:**
 - a. Increase
 - b. Decrease
 - c. Stay the same

- **Which of the following is true?**

- a. Arteries typically have thinner walls than veins
- b. Veins typically have a much wider tunica media than arteries
- c. Veins typically have much more elastin than conducting arteries
- d. You typically would find fewer valves in arteries than in veins

- Increasing blood vessel length will cause peripheral resistance to:
 - a. Increase
 - b. Decrease
 - c. Stay the same

- As you go from arteries to capillaries, the fluid pressure exerted by blood on the vessel walls:
 - a. Increases
 - b. Decreases
 - c. Stays the same

- Sinusoidal capillaries are found in the:
 - a. Cerebral cortex
 - b. Thyroid gland
 - c. Thymus
 - d. Bone marrow

- If MAP increased by 10mmHg, how much must the diastolic pressure have changed?
 - a. -10mmHg
 - b. +10mmHg
 - c. 0 mmHg
 - d. Cannot be determined from the information given

- As heart rate decreases, diastolic pressure will:
 - a. Increase
 - b. Decrease
 - c. Stay the same

- The volume of blood moving through a given area in a given time is the:
 - a. Blood velocity
 - b. Blood flow
 - c. Blood pressure
 - d. Blood resistance

- If MAP=100mmHg, and SBP=120, then what must DBP be?
 - a. 80mmHg
 - b. 90mmHg
 - c. 100mmHg
 - d. 120mmHg

- Histologically, the tunica _____ is squamous epithelium underlain by a sparse connective tissue layer.

- If the DBP increased by 30mmHg while the SBP remained the same, how much would the MAP change?

- Permitting the exchange of gases and nutrients between blood and tissue cells is the primary function of what blood vessel type?

- Arrange the following in the proper order for blood flow.
 1. Muscular arteries
 2. Arterioles
 3. Elastic arteries

- The femoral artery is an example of a(n) _____ artery.

- The typical diameter of a continuous capillary is:
 - a. 8 μm
 - b. 16 mm
 - c. 4 cm
 - d. 24 km

- 65% of the blood volume is contained within the _____.

-
- What type of epithelium would you expect to find lining the lumen of the nasal cavity?
 - a. Squamous ciliated epithelium without goblet cells
 - b. Transitional epithelium with goblet cells
 - c. Stratified squamous epithelium
 - d. Pseudostratified epithelium
 - e. None of the above

- The groove inferior to a nasal concha is known as a:
 - a. Meatus
 - b. Papilla
 - c. Eustachian groove
 - d. Lithysis
 - e. Suture

• Consider the following statement: *All laryngeal cartilages are made of hyaline cartilage.* Which of the following is correct?

- a. The statement is true
- b. The statement is false because the thyroid cartilage is elastic cartilage
- c. The statement is false because the cricoid cartilage is fibrocartilage
- d. The statement is false because the glottis is elastic cartilage
- e. The statement is false because the epiglottis is elastic cartilage

• The medial opening between the vocal cords through which air passes during speech is known as the _____.

• Which of the following is TRUE?

- a. The trachea is reinforced by 60-80 C-shaped rings of cartilage
- b. The trachealis is the ligament that connects the posterior open portion of the tracheal cartilaginous rings
- c. The trachea is part of the respiratory zone
- d. The trachea is part of the anatomical dead space

• As you proceed from primary bronchus to terminal bronchiole, the number of cilia present will _____ and the number of goblet cells present will _____.

• The smallest subdivision of the lung visible to the naked eye is the _____.

• Increased parasympathetic activity causes the resistance to airflow in the bronchioles to _____.

• Which of the following is TRUE?

- a. Intrapleural pressure is ALWAYS GREATER than intrapulmonary pressure

- b. Intrapulmonary pressure is **ALWAYS GREATER** than atmospheric pressure
- c. Intrapleural pressure is **ALWAYS LESS** than atmospheric pressure
- d. Intrapulmonary pressure is **ALWAYS LESS** than atmospheric pressure

- According to Boyle's Law, as volume _____, pressure will decrease.

- Contraction of the diaphragm and external intercostals causes thoracic volume to _____ which causes lung volume to _____ which causes intrapulmonary pressure to _____.

- The scalenes and sternocleidomastoids are predominantly involved in:
 - a. Active inspiration
 - b. Active expiration
 - c. Quiet inspiration
 - d. Quiet expiration

- As surfactant production decreases, lung compliance will _____.

- If John's vital capacity is 4.5L and his tidal volume is 525cc, then what is his inspiratory reserve volume?
 - a. 3975mL
 - b. 2075mL
 - c. 1050mL
 - d. Cannot be determined from the information given

- What test measures the amount of gas expelled when one takes a deep breath and exhales maximally and rapidly?
 - a. Forced expiratory volume test
 - b. Forced vital capacity test
 - c. Forced residual capacity test
 - d. Forced internal thoracic volume assessment

- Which of the following is NOT a component of the respiratory membrane?
 - a. Plasma membrane of the alveolar cell
 - b. Plasma membrane of the capillary endothelial cell
 - c. Fused basal laminae of the alveolar and the capillary endothelial cell
 - d. All of the above are members of the respiratory membrane

- If alveolar P_{CO_2} is high, the diameter of the bronchiole servicing that tissue will _____.

- The binding of oxygen to hemoglobin is characterized as:
 - a. Compliant
 - b. Irreversible
 - c. Reversible
 - d. Noncompliant

- When a bicarbonate ion exits a red blood cell, a chloride ion will enter in order to maintain charge balance. This is known as the _____

- The dorsal respiratory group of the medulla oblongata is active during:
 - a. Quiet inspiration
 - b. Forced inspiration
 - c. Forced expiration
 - d. a and b
 - e. b and c

- *True or False:* Lowered plasma oxygen levels are the most powerful respiratory stimulant.

- Air and food are routed into the proper channels by the:

- a. Trachea
- b. Pharynx
- c. Larynx
- d. Carina

• The site of production of cholecystokinin and secretin is the:

- a. Stomach
- b. Pancreas
- c. Small Intestine
- d. Large Intestine

• Alkaline mucous glands are found in the submucosa of the:

- a. Ileum
- b. Jejunum
- c. Duodenum
- d. Cardiac region of the stomach
- e. Fundic region of the stomach

• The _____ anchors the liver to the lesser curvature of the stomach.

• *True or False* Bile and blood flow in opposite directions in the liver lobule.

• Which of the following is not a function of the liver?

- a. Production of bile
- b. Detoxification of drugs
- c. Storage of glucose
- d. Storage of Vitamin C

- **The gallbladder:**
 - Produces bile**
 - Is attached to the pancreas**
 - Stores and concentrates bile**
 - Produces cholecystokinin**

- **The small fat-filled appendages of visceral peritoneum that hang from the surface of the large intestine are known as _____.**

- ***True or False:* All digestive organs are intraperitoneal.**

- **The majority of the absorption of digested nutrients occurs in the:**
 - Stomach**
 - Ileum**
 - Jejunum**
 - Cecum**

- **Which of the following sphincters is under voluntary control?**
 - Pyloric**
 - Cardiac**
 - Hepatopancreatic**
 - Internal anal**
 - External anal**

- **High doses of antibiotics can destroy the bacterial flora of the large intestine. This can result in impaired:**
 - Absorption of protein**
 - Blood coagulation**
 - Bone resorption**

d. Respiratory control

- Look at the following layers of the alimentary canal. Arrange them from closest to the lumen to farthest from the lumen.

1. Serosa
2. Mucosa
3. Muscularis externa
4. Submucosa

- During exercise, the percentage of the cardiac output received by the digestive organs will _____.

- Which structure thickens in certain regions of the alimentary canal in order to act as a sphincter?

- a. Circular layer of the muscularis mucosae
- b. Longitudinal layer of the muscularis mucosae
- c. Circular layer of the muscularis externa
- d. Longitudinal layer of the muscularis externa

- The internal lip is joined to the gum by the _____.

- The anterior 2/3 of the tongue is separated from the posterior 1/3 by the _____.

- The 3 pairs of extrinsic salivary glands are the:

- a. Parotid, sublingual, and ethmoidal
- b. Parotid, buccal, and submaxillary
- c. Parotid, submandibular, and buccal
- d. Parotid, submandibular, and sublingual

• Which of the following is correct?

- a. Adult incisors lack dentin
- b. Adult incisors lack enamel
- c. Adult premolars lack cementum
- d. Adult premolars lack enamel
- e. None of the above

• At the junction between the esophagus and the stomach, the epithelial lining changes abruptly from _____ to _____.

- a. Nonkeratinized stratified squamous; simple columnar
- b. Simple columnar; nonkeratinized stratified squamous
- c. Nonkeratinized simple squamous; stratified columnar
- d. Stratified columnar; nonkeratinized simple squamous

• In the stomach, food is turned into a paste called _____.

• The entire convex lateral surface of the stomach is the _____.

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• The main hormone released by the corpus luteum is _____.

• The hormone that acts on Leydig cells is _____.

• _____ is the main hormone produced by granulosa cells.

• *True or False:* The cremaster muscles actively regulate the number of sperm made on a daily basis.

• Human egg and sperm are similar in that:

- a. About the same number are produced per month
- b. They have the same degree of motility
- c. They have the same number of chromosomes
- d. They are about the same size

• The testosterone-producing cells of the testes are called:

- a. Sertoli cells
- b. Granulosa cells
- c. Spermatogonia
- d. Leydig cells

• The testicular cells most involved with the construction of the blood-testes barrier are the:

- a. Sertoli cells
- b. Granulosa cells
- c. Spermatogonia
- d. Leydig cells

- The soft mucosal lining of the uterus is the _____.

- The anterior pituitary hormone that triggers ovulation is:

- The fetus develops and grows in the _____.

- The external sac enclosing the testes is the _____.

- _____ is the release of the secondary oocyte from the ovary.

- The corpora cavernosa are(n):

- The female homologue of the scrotum is the _____.

- Ejaculation is a _____ response whereas erection is a _____ response.

- An oocyte surrounded by one layer of squamous follicle-like cells is most likely a:

- Primordial follicle
- Primary follicle
- Secondary follicle
- Graafian follicle

- An antrum is characteristic of _____ follicles.

- Secondary
- Graafian
- Primary
- Primary, secondary, and Graafian
- Secondary and Graafian

- **True or False:** An ectopic pregnancy occurs when a secondary oocyte is fertilized in and implants in the uterine tube.

- The rounded region of the uterus superior to the entrance of the uterine tubes is the:

- Ampulla
- Fundus
- Corpus
- Isthmus
- Superior flexure

- Primary oocytes are:

- Haploid
- Diploid
- Polyploid
- Aneuploid

- Consider the following 3 tubes. Which is the correct order sperm travels through them.

- Epididymis
- Oviduct
- Ejaculatory Duct

- 1,3,2
- 3,1,2
- 2,1,3
- 2,3,1

- During menstruation, the stratum _____ is sloughed off.

- **True or False: Days 1-5 of the menstrual cycle is the proliferative phase.**

- **The corpus luteum secretes progesterone which negatively feeds back and inhibits the release of:**

- ABP and ICSH**
- LH and ICSH**
- LH and FSH**
- FSH and TSH**

- **Which of the following is correct relative to the female anatomy?**

- The vaginal orifice is the most dorsal of the 3 openings in the perineum**
- The urethra is between the vaginal orifice and the anus**
- The anus is between vaginal orifice and the urethra**
- The urethra is the more ventral of the 2 openings in the vulva**

- **The normal diploid number of human chromosomes is _____.**

- **Sertoli cells produce:**

- Mucus**
- Androgen-binding protein**
- Testosterone**
- FSH**
- LH**

- **Spermatogenesis BEGINS in the:**

- Epididymis**
- Uterine horn**
- Rete testes**
- Seminiferous tubules**
- Seminal vesicles**

d

- **The site of oogenesis is the:**
 - Ovary**
 - Ovum**
 - Oocyte**
 - Oviduct**
 - Ovarian lacunae**

a

- **In the 1st phase of the menstrual cycle:**
 - Oogonia differentiate into primary oocytes**
 - The thickness of the stratum basalis decreases dramatically**
 - The Graafian follicle ruptures**
 - The dominant follicle is opsonized**
 - None of the above**
- **During ovulation, all of the following occur EXCEPT:**
 - Rupture of the Graafian follicle**
 - Estrogen production reaches its lowest point**
 - FSH and LH plasma levels surge**
 - Corpus luteum is formed**
- **Which of the following would be the most likely site of fertilization?**
 - Ovary**
 - Uterine tube**
 - Fundus of uterus**
 - Cervix**
 - Vagina**
- **Human chorionic gonadotropin:**
 - Begins to be produced 4 months after fertilization**
 - Is produced by the prostate gland**

- c. Is produced by the corpus luteum**
- d. Is present ONLY if a successful fertilization has occurred**
- e. Signals that endometriosis has begun**