



HISTOLOGY

TEST BANK

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1. Which of the following statements characterizes osteoclasts?

- (A) They are enucleated cells.
- (B) They produce collagen.
- (C) They secrete osteoid.
- (D) They are derived from osteoprogenitor cells.
- (E) They occupy Howship lacunae

ANSWER: E

2. Which one of the following statements is correct concerning the periosteum?

- (A) It is devoid of a blood supply.
- (B) It produces osteoclasts.
- (C) It is responsible for interstitial bone growth.
- (D) Its inner layer contains osteoprogenitor cells.
- (E) Its outer layer is devoid of fibers.

ANSWER:D

3. Which one of the following statements is characteristic of osteocytes?

- (A) They communicate via gap junctions

between

their processes.

(B) They contain large amounts of RER.

(C) They are immature bone cells.

(D) They are housed as isogenous groups in lacunae.

(E) They give rise to osteoclasts.

ANSWER:A

4. Which one of the following statements concerning hyaline cartilage is correct?

(A) It is vascular.

(B) It contains type IV collagen.

(C) It undergoes appositional growth only.

(D) It is located at the articular ends of long bones.

(E) Its chondrocytes are aligned in rows.

ANSWER: D

5. A 7-year-old boy is seen by his pediatrician because the child broke his humerus as he tripped and fell while walking. The pediatrician asked about the child's diet and learned that he might have a dietary deficiency. Which of the

following may be lacking in his diet?

- (A) Potassium
- (B) Calcium
- (C) Iron
- (D) Carbohydrates
- (E) Protein

ANSWER: B

6. Which of the following statements is characteristic of bone?

- (A) Bone matrix contains primarily type II collagen.
- (B) About 65% of the dry weight of bone is organic.
- (C) Haversian canals are interconnected via Volkmann canals.
- (D) Bone growth occurs via interstitial growth only.
- (E) Bone growth occurs via appositional growth only

ANSWER: C

7. Which of the following is true for mammalian

skeletal muscle?

- (A) T tubules are located at the Z disk.
- (B) T tubules are absent.
- (C) Troponin is absent.
- (D) It possesses triads.
- (E) It possesses caveolae

ANSWER: D

8. Which of the following is true for smooth muscle?

- (A) T tubules are located at the Z disk.
- (B) It possesses dyads.
- (C) Caveolae store and release calcium ions.
- (D) It possesses triads.
- (E) T tubules are located at the A–I interface.

ANSWER: C

9. Contraction in all types of muscle requires calcium ions. Which of the following muscle components can bind or sequester calcium ions?

- (A) Rough endoplasmic reticulum
- (B) Tropomyosin
- (C) Troponin

(D) Active sites on actin

(E) Titin

ANSWER: C

10. Each smooth muscle cell

(A) has triads associated with its contraction.

(B) has dyads associated with its contraction.

(C) possesses a single central nucleus.

(D) is characterized by the absence of sarcolemmal vesicles.

(E) contains troponin

ANSWER: C

11. Thick filaments are anchored to Z disks by

(A) C protein.

(B) nebulin.

(C) titin.

(D) myomesin.

(E) α -actinin

ANSWER: C

12. The endomysium is a connective tissue

investment

that surrounds

(A) individual muscle fibers.

- (B) muscle fascicles.
- (C) individual myofibrils.
- (D) an entire muscle.
- (E) small bundles of muscle cells

ANSWER: A

13. Which of the following statements concerning triads in mammalian skeletal muscle is true?

- (A) They are located in the Z disk.
- (B) They consist of two terminal cisternae of the SR separated by a T tubule.
- (C) They can be observed with the light microscope.
- (D) They are characterized by a T tubule that sequesters calcium ions.
- (E) They consist of two T tubules separated by a central terminal cisterna.

ANSWER: B

14. Which one of the following statements concerning cardiac muscle cells is true?

- (A) They are spindle shaped.
- (B) They require an external stimulus to Undergo contraction.

(C) They are multinuclear cells.

(D) They are joined together end to end by intercalated disks.

(E) They possess numerous caveolae.

ANSWER: D

15. Which one of the following neurotransmitters functions to increase cardiac output?

(A) Dopamine

(B) Serotonin

(C) Norepinephrine

(D) Glutamate

(E) GABA

ANSWER: C

16. Which of the following statements is characteristic of the perineurium?

(A) It is a fascia surrounding many bundles of nerve fibers.

(B) It is the fascia surrounding a single nerve fiber.

(C) It is a thin layer of reticular fibers covering individual nerve fibers.

(D) It is a fascia that excludes macromolecules and forms the external coat of nerves.

(E) It consists in part of epithelioid cells that surround a bundle (fascicle) of nerve fibers.

ANSWER: E

17. Nissl bodies are composed of

(A) synaptic vesicles and acetylcholine.

(B) polyribosomes and rough endoplasmic reticulum.

(C) lipoprotein and melanin.

(D) neurofilaments and microtubules.

(E) SER and mitochondria.

ANSWER: B

18. Myelination of peripheral nerves is accomplished

By:

(A) astrocytes.

(B) oligodendrocytes.

(C) Schwann cells.

(D) neural crest cells.

(E) basket cells

ANSWER: C

19. The molecular basis for the shock absorbing properties of cartilage involves which of the following?

- a. Electrostatic interaction of proteoglycans with type IV collagen
- b. Ability of glycosaminoglycans to bind anions
- c. Noncovalent binding of glycosaminoglycans to protein cores
- d. Sialic acid residues in the glycoproteins
- e. Hydration of glycosaminoglycans

ANSWER: E

20. What distinguishes cartilage from most other connective tissues?

- a. Its extracellular matrix is rich in collagen.
- b. Its predominant cell type is a mesenchymal derivative.
- c. Its predominant cell type secretes both fibers and proteoglycans.
- d. It lacks blood vessels.
- e. It functions in mechanical support

ANSWER: D

21. Which feature is typical of elastic cartilage?

- a. Primary skeletal tissue in the fetus
- b. No identifiable perichondrium
- c. Found in intervertebral discs
- d. Most widely distributed cartilage type in the body
- e. Collagen is mainly type II

ANSWER: E

22. Which area in cartilage is relatively collagen-poor and proteoglycan-rich?

- a. Fibrocartilage
- b. Territorial matrix
- c. Epiphyseal plate
- d. Interterritorial matrix
- e. Perichondrium

ANSWER : B

23. What is the source of the mesenchymal progenitor cells activated for the repair of hyaline cartilage of accident-damaged costal cartilages?

- a. Perichondrium
- b. Adjacent loose connective tissue
- c. Bone of the adjacent rib(s) and sternum
- d. Chondrocytes of the injured cartilage
- e. Stem cells circulating with blood

ANSWER : A

24. How does articular cartilage differ from most other hyaline cartilage?

- a. It undergoes mainly appositional growth.
- b. It contains isogenous groups of chondrocytes.
- c. It lacks a perichondrium.

- d. Its matrix contains aggrecan.
- e. It is derived from embryonic mesenchyme

ANSWER: C

25. Which step occurs first in chondrogenesis?

- a. Appositional growth
- b. Conversion of chondroblasts to chondrocytes
- c. Formation of mesenchymal condensations
- d. Interstitial growth
- e. Secretion of collagen-rich and proteoglycan-rich matrix

ANSWER : C

26. Which component of bone impedes the distribution of nutrients and oxygen to osteocytes?

- a. Extracellular matrix
- b. Canaliculi
- c. Periosteum
- d. Cell processes
- e. Haversian canals

ANSWER: A

27. Which if the following most accurately describes compact bone?

- a. Predominant bone type in the epiphyses of adult long bones
- b. Also known as cancellous bone
- c. Characterized by the presence of osteons

- d. Lines the medullary (marrow) cavity
- e. Forms the diploë in cranial bones

ANSWER : C

28. In healthy bone canaliculi are likely to contain which one of the following?

- a. Capillaries
- b. Nerve axons
- c. Osteocytic processes
- d. Osteoid
- e. Osteoclasts in resorption lacunae

ANSWER: C

29: Which of the following most accurately describes the endosteum?

- a. Composed of two layers: osteogenic and fibrous
- b. Continuous with the joint capsule
- c. Attached to the bone surface by collagen bundles called Sharpey fibers
- d. Lines the medullary cavity
- e. Contains mature osteocytes

ANSWER : D

30: In the diaphysis of a typical long bone which of the following structures is in closest proximity to the trabeculae of cancellous bone?

- a. Interstitial lamellae

- b. Osteons
- c. Sharpey fibers
- d. Outer circumferential lamellae
- e. Inner circumferential lamellae

ANSWER: E

31: Which “zone” of endochondral ossification in the growing femur of an adolescent is the farthest from that bone’s secondary ossification center?

- a. Zone of hypertrophy
- b. Zone of reserve cartilage
- c. Zone of calcified cartilage
- d. Zone of ossification
- e. Zone of proliferation

ANSWER: D

32: The basal lamina of a muscle fiber is part of which structure?

- a. Perimysium
- b. Epimysium
- c. Fascia
- d. Endomysium
- e. Sarcoplasmic reticulum

ANSWER: D

33. With the transmission electron microscope skeletal muscle fibers

can be seen to contain structures called triads. What do the two lateral components of a triad represent?

- a. Attachment sites for thick myofilaments
- b. Sites for calcium sequestration and release
- c. Sites for impulse conduction into the fiber
- d. Sites for ATP production
- e. Sites for synthesis of proteins to be secreted outside the cell

ANSWER: B

34: Which characteristic is unique to cardiac muscle?

- a. Contain centrally located nuclei
- b. Striated
- c. Often branched
- d. Multinucleated
- e. Lack T-tubules

ANSWER: C

35 : In smooth muscle calcium released by the smooth ER initiates contraction by binding to what protein?

- a. Actin
- b. Calmodulin
- c. Desmin
- d. Myosin light chain kinase
- e. Tropomyosin

ANSWER: B

36. Which feature typifies T-tubules?

- a. Evaginations of the sarcoplasmic reticulum
- b. Sequester calcium during muscle relaxation, releasing it during contraction
- c. Carry depolarization to the muscle fiber interior
- d. Overlie the A-I junction in cardiac muscle cells
- e. Rich supply of acetylcholine receptors

ANSWER: C

37. Which characteristic is unique to smooth muscle?

- a. T-tubules lie across Z lines
- b. Each thick filament is surrounded by six thin filaments
- c. Thin filaments attach to dense bodies
- d. Cells are multinucleated
- e. Cells have centrally located nuclei

ANSWER: C

38: In one type of muscle, numerous gap junctions, desmosomes, and adherens junctions are specifically localized in which structures?

- a. Myofilaments
- b. Dense bodies
- c. Sarcomeres
- d. Neuromuscular spindles

e. Intercalated discs

ANSWER: E

39: A 66-year-old man who lives alone has a severe myocardial infarction and dies during the night. The medical examiner's office is called the following morning and describes the man's body as being in rigor mortis. This state of rigor mortis is due to which one of the following?

- a. Inhibition of Ca^{2+} leakage from the extracellular fluid and sarcoplasmic reticulum
- b. Enhanced retrieval of Ca^{2+} by the sarcoplasmic reticulum
- c. Failure to disengage tropomyosin and troponin from the myosin active sites
- d. Absence of ATP preventing detachment of the myosin heads from actin
- e. Increased lactic acid production

ANSWER: D

40. A 5-year-old boy sustains a small tear in his gastrocnemius muscle when he is involved in a bicycle accident. Regeneration of the muscle will occur through which of the following mechanisms?

- a. Dedifferentiation of muscle cells into myoblasts
- b. Differentiation of muscle satellite cells
- c. Fusion of damaged myofibers to form new myotubes
- d. Hyperplasia of existing muscle fibers

e. Differentiation of fibroblasts to form myoblasts

ANSWER: B

41. A healthy 32-year-old man lifts weights regularly as part of his workout.

In one of his biceps muscle fibers at rest, the length of the I band is $1.0\ \mu\text{m}$ and the A band is $1.5\ \mu\text{m}$. Contraction of that muscle fiber results in a 10% shortening of the length of the sarcomere. What is the length of the A band after the shortening produced by muscle contraction?

a. $1.50\ \mu\text{m}$

b. $1.35\ \mu\text{m}$

c. $1.00\ \mu\text{m}$

d. $1.90\ \mu\text{m}$

e. $0.45\ \mu\text{m}$

ANSWER: A

42. Which of the following is characteristic of the chromatophilic material called Nissl substance in neural tissue?

a. Found throughout neurons

b. Site of mRNA translation for proteins of the axolemma

c. Most abundant in unipolar neurons

d. Becomes more abundant as an individual gets older

e. An example of intermediate filament proteins

ANSWER: B

43: Which of the following events occurs immediately after an action potential reaches a synapse at an axon terminal?

- a. Vesicle fusion with the presynaptic terminal membrane
- b. Calcium ion influx at the presynaptic terminal
- c. Neurotransmitter binding to receptors on the postsynaptic membrane
- d. Neurotransmitter release into the synaptic cleft
- e. Binding of the neurotransmitter at the presynaptic terminal

ANSWER: B

44: What term applies to collections of neuronal cell bodies (somata) in the central nervous system?

- a. Ganglia
- b. Neuroglia
- c. Nodes
- d. White matter
- e. Nuclei

ANSWER: E

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