

- 7) The depolarization phase of an action potential is punctuated by the closing of inactivation gates in the voltage gated sodium ion channels. All of the following are consequences of this inactivation except one. Choose the statement below that is not a consequence of the closing of inactivating gates. 7) _____
- A) This allows for the efflux (diffusion out) of potassium ions, resulting in the repolarization of the cell.
 - B) This allows for the one way transmission of action potential down the axon.
 - C) This stops the depolarization of the axon membrane.
 - D) This limits the frequency of action potentials down the axon.
- 8) A cell engulfing a relatively large particle will likely utilize _____. 8) _____
- A) phagocytosis
 - B) pinocytosis
 - C) receptor-mediated endocytosis
 - D) exocytosis

SHORT ANSWER. Choose the letter in the figure that indicates the structure described by the statement in each of the three questions below the figure.

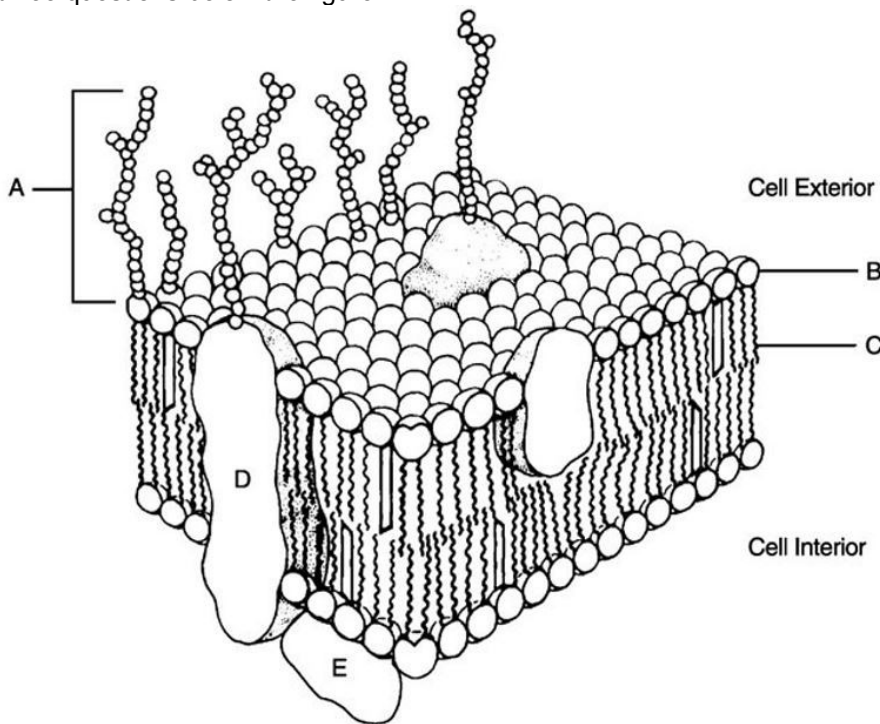


Figure 3.2

Using Figure 3.2, match the following:

- 9) Nonpolar region of phospholipid. 9) _____
- 10) Glycocalyx. 10) _____
- 11) Peripheral protein. 11) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 12) The movement of water across the plasma membrane can be described by all of the following EXCEPT _____. 12) _____
- A) carrier-mediated facilitated diffusion
 - B) facilitated diffusion through aquaporins
 - C) passive membrane transport
 - D) simple diffusion

- 13) In an isotonic contraction, the muscle _____. 13) _____
 A) never converts pyruvate to lactate
 B) rapidly resynthesizes creatine phosphate and ATP
 C) changes in length and moves the "load"
 D) does not change in length but increases tension
- 14) If a human cell were to increase the amount of cholesterol embedded within its plasma membrane, which of the following would most likely happen? 14) _____
 A) The plasma membrane would become more permeable to ions and less permeable to lipids.
 B) The cell would form a plaque that could potentially block a blood vessel.
 C) The plasma membrane would become more fluid and the phospholipids less stable.
 D) The plasma membrane would become more stable, less fluid, and less permeable.
- 15) _____ epithelium appears to have two or three layers of cells, but all the cells are in contact with the basement membrane. 15) _____
 A) Stratified cuboidal
 B) Stratified columnar
 C) Pseudostratified columnar
 D) Transitional
- 16) Select the correct statement regarding the stem cells of connective tissue. 16) _____
 A) Chondroblasts are the main cell type of connective tissue proper.
 B) Connective tissue does not contain cells.
 C) Connective tissue cells are nondividing.
 D) "Blast" cells are undifferentiated, actively dividing cells.
- 17) The mechanism of contraction in smooth muscle is different from skeletal muscle in that _____. 17) _____
 A) ATP energizes the sliding process
 B) the site of calcium binding site differs
 C) actin and myosin interact by the sliding filament mechanism
 D) the trigger for contraction is a rise in intracellular calcium
- 18) Which of the following statements is correct regarding net diffusion? 18) _____
 A) Molecular weight of a substance does not affect the rate.
 B) The greater the concentration gradient, the faster the rate.
 C) The rate is independent of temperature.
 D) The lower the temperature, the faster the rate.
- 19) Which of the following statements is true? 19) _____
 A) Striated muscle cells are long and cylindrical with many nuclei.
 B) Cardiac muscle cells are found in the heart and large blood vessels.
 C) Smooth muscle cells have T tubules.
 D) Cardiac muscle cells have many nuclei.
- 20) Select the correct statement regarding adipose tissue. 20) _____
 A) Its primary function is nutrient storage.
 B) Most of the cell volume is occupied by the nucleus.
 C) It is composed mostly of extracellular matrix.
 D) Mature adipose cells are highly mitotic.
- 21) During the relative refractory period of an action potential, a larger than normal stimulus is needed to cause another action potential. This is due to the fact that _____. 21) _____
 A) the sodium potassium pump will stop working during relative refractory
 B) the voltage gated potassium ion channels remain open long enough to hyperpolarize the axon membrane
 C) the membrane is now impermeable to all ions
 D) the inactivation gates on voltage gated sodium ion channels are closed

- 22) If a postsynaptic cell is stimulated to threshold by temporal summation this implies that _____ 22) _____
- A) the presynaptic neuron is sending frequent IPSP
 - B) a presynaptic neuron is sending frequent EPSP
 - C) the postsynaptic cell can be influenced by only one presynaptic cell
 - D) the postsynaptic cell is sending frequent action potential
- 23) Rigor mortis occurs because _____. 23) _____
- A) sodium ions leak into the muscle causing continued contractions
 - B) no ATP is available to release attached actin and myosin molecules
 - C) proteins are beginning to break down, thus preventing a flow of calcium ions
 - D) the cells are dead
- 24) An anaerobic metabolic pathway that results in the production of two net ATPs per glucose plus two pyruvic acid molecules is _____. 24) _____
- A) glycolysis
 - B) the electron transport chain
 - C) the citric acid cycle
 - D) hydrolysis
- 25) During development embryonic cells will fuse to form muscle fibers. This will result in _____. 25) _____
- A) interlocking of cells that can prevent the filaments from sliding
 - B) the coordination of nerve signals to muscle fibers
 - C) the striations that appear in skeletal and cardiac muscle tissues
 - D) multinucleated muscle fibers that can extend as long as 30 centimeters
- 26) Which of the following is FALSE regarding the membrane potential? 26) _____
- A) The resting membrane potential occurs due to active transport of ions across the membrane due to the sodium-potassium pump.
 - B) The resting membrane potential is determined mainly by the concentration gradients and differential permeability of the plasma membrane to K^+ and Na^+ ions.
 - C) The resting membrane potential is maintained solely by passive transport processes.
 - D) In their resting state, all body cells exhibit a resting membrane potential.
- 27) Hypothetically, if a muscle were stretched to the point where thick and thin filaments no longer overlapped, _____. 27) _____
- A) maximum force production would result because the muscle has a maximum range of travel
 - B) cross bridge attachment would be optimum because of all the free binding sites on actin
 - C) ATP consumption would increase because the sarcomere is "trying" to contract
 - D) no muscle tension could be generated
- 28) What structure in skeletal muscle cells functions in calcium storage? 28) _____
- A) mitochondria
 - B) intermediate filament network
 - C) myofibrillar network
 - D) sarcoplasmic reticulum
- 29) Which of the following is a function of a plasma membrane protein? 29) _____
- A) circulating antibody
 - B) forms a lipid bilayer
 - C) oxygen transport
 - D) molecular transport through the membrane

- 30) Which of the following is the correct sequence of events for muscle contractions? 30) _____
- A) neurotransmitter release, motor neuron action potential, muscle cell action potential, release of calcium ions from SR, ATP-driven power stroke
 - B) muscle cell action potential, neurotransmitter release, ATP-driven power stroke, calcium ion release from SR, sliding of myofilaments
 - C) neurotransmitter release, muscle cell action potential, motor neuron action potential, release of calcium ions from SR, sliding of myofilaments, ATP-driven power stroke
 - D) motor neuron action potential, neurotransmitter release, muscle cell action potential, release of calcium ions from SR, ATP-driven power stroke, sliding of myofilaments
- 31) What is the role of tropomyosin in skeletal muscles? 31) _____
- A) Tropomyosin serves as a contraction inhibitor by blocking the myosin binding sites on the actin molecules.
 - B) Tropomyosin is the chemical that activates the myosin heads.
 - C) Tropomyosin is the receptor for the motor neuron neurotransmitter.
 - D) Tropomyosin serves as a contraction inhibitor by blocking the actin binding sites on the myosin molecules.

SHORT ANSWER. Choose the letter in the figure that indicates the structure described by the statement in each of the three questions below the figure.

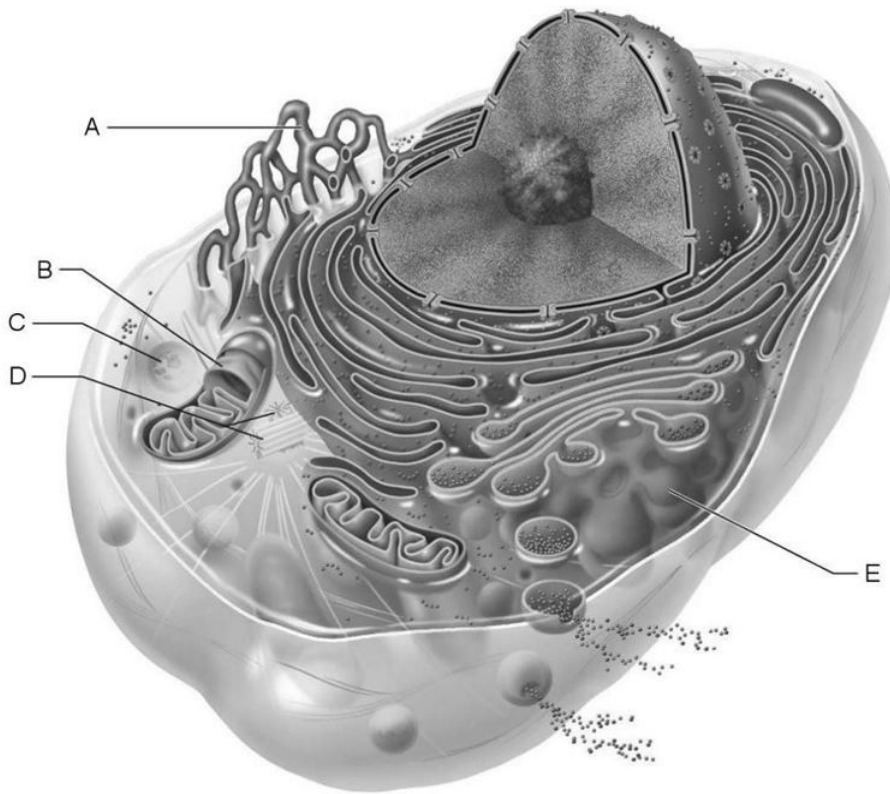


Figure 3.1

Using Figure 3.1, match the following:

- 32) Site of enzymatic breakdown of phagocytized material. 32) _____
- 33) Packages proteins for insertion in the cell membrane or for exocytosis. 33) _____
- 34) Forms the mitotic spindle. 34) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 35) Which tissue type is formed by many cells joining together, which are multinucleated? 35) _____
 A) dense regular B) smooth muscle
 C) skeletal muscle D) cardiac muscle
- 36) An action potential is regarded as an example of a positive feedback. Which of the following 36) _____
 examples below best illustrates the positive feedback aspect of an action potential?
 A) Voltage gated potassium ion channels open slowly and remain open long enough to
 cause hyperpolarization.
 B) Potassium permeability is about 25 times greater than sodium ions.
 C) A threshold stimulus will cause the opening of voltage gated sodium ion channels that will
 cause further depolarizing stimulus. This stimulus will open still more voltage gated
 sodium ion channels.
 D) The sodium potassium pump consistently moves ions as long as ATP is available, and
 regardless of membrane potential changes.
- 37) Peroxisomes _____. 37) _____
 A) are functionally the same as lysosomes
 B) sometimes function as secretory vesicles
 C) are able to detoxify substances by enzymatic action
 D) function to digest particles ingested by endocytosis
- 38) Select the correct statement regarding epithelia. 38) _____
 A) Stratified epithelia are present where protection from abrasion is important.
 B) Stratified epithelia are tall, narrow cells.
 C) Simple epithelia form impermeable barriers.
 D) Pseudostratified epithelia consist of at least two layers of cells stacked on top of one
 another.
- 39) Which of the following would be recruited later in muscle stimulation when contractile strength 39) _____
 increases?
 A) Motor units with the longest muscle fibers
 B) Large motor units with large diameter muscle fibers
 C) Many small motor units with the ability to stimulate other motor units
 D) Small motor units with small diameter muscle fibers
- 40) When a sarcomere contracts and thin filaments move over thick filaments you would expect to 40) _____
 see _____.
 A) the A band to appear darker B) the I bands to appear wider
 C) the I bands to appear smaller D) the H zone to appear wider
- 41) Oxygen starved tissues can release chemical signals into the blood that can change the 41) _____
 diameter of nearby blood vessels delivering oxygen and nutrients to the tissues. In doing so, the
 blood vessels will respond through vasodilation (widening of the vessel). Which muscle type is
 responsible for this vasodilation?
 A) smooth muscle B) skeletal muscle
 C) cardiac muscle D) striated muscle
- 42) What is the primary function of wave summation? 42) _____
 A) prevent muscle relaxation
 B) prevent muscle fatigue
 C) increase muscle tension
 D) produce smooth, continuous muscle contraction

- 43) The fiber type that gives connective tissue great tensile strength is _____. 43) _____
 A) elastic B) collagen C) reticular D) muscle
- 44) Which of the following describes the cells of unitary smooth muscle? 44) _____
 A) They exhibit spontaneous action potentials.
 B) They are used for vision and hair raising.
 C) They depend upon recruitment using the autonomic nervous system.
 D) They consist of muscle fibers that are structurally independent of each other.
- 45) The sliding filament model of contraction involves _____. 45) _____
 A) actin and myosin lengthening in order to slide past each other
 B) the Z discs sliding over the myofilaments
 C) actin and myosin sliding past each other and partially overlapping
 D) the shortening of thick filaments so that thin filaments slide past
- 46) A potential benefit of recruiting slow oxidative fibers for contraction before recruiting fast oxidative and fast glycolytic fibers might be _____. 46) _____
 A) recruiting slow oxidative fibers early helps to tire them out first so that they won't interfere with the more powerful contractions of fast glycolytic fibers
 B) because they are slower to respond, slow oxidative fibers must be stimulated first in order to contract simultaneously with the faster fibers
 C) to allow for fine control with delicate contractile force with a small stimulus
 D) There is little to no benefit from recruiting slow oxidative fibers first, and therefore it is in fact fast glycolytic fibers that will be recruited first.
- 47) A type of transport protein found in the plasma membrane of cells lining the inside of the intestine allows sodium ions to diffuse down their concentration gradient. The ions move through the transport protein, and into the cell. These transport proteins will use the kinetic energy of the diffusing sodium ions to bring glucose into the cells as well. This transport protein would best be described as _____. 47) _____
 A) a channel B) a symporter
 C) a carrier protein D) a pump
- 48) What does the central nervous system use to determine the strength of a stimulus? 48) _____
 A) frequency of action potentials B) size of action potentials
 C) origin of the stimulus D) type of stimulus receptor
- 49) Myoglobin _____. 49) _____
 A) produces the end plate potential
 B) stores oxygen in muscle cells
 C) breaks down glycogen
 D) is a protein involved in the direct phosphorylation of ADP
- 50) Which of the following surrounds an individual muscle cell? 50) _____
 A) perimysium B) epimysium C) fascicle D) endomysium
- 51) Creatine phosphate functions in the muscle cell by _____. 51) _____
 A) forming a chemical compound with actin
 B) inducing a conformational change in the myofilaments
 C) forming a temporary chemical compound with myosin
 D) storing energy that will be transferred to ADP to resynthesize ATP
- 52) Which of the following is NOT a function of dendrites? 52) _____
 A) generate nerve impulses and transmit them away from the cell body
 B) produce short-distance signals called graded potentials
 C) provide enormous surface area for receiving signals from other neurons
 D) convey incoming messages toward the cell body

- 53) What are the three main components of connective tissue? 53) _____
A) ground substance, fibers, and cells
B) collagen, elastin, and reticular fibers
C) fibroblasts, chondroblasts, and osteoblasts
D) alveoli, fibrous capsule, and secretory cells
- 54) Muscle tone is _____. 54) _____
A) a state of sustained partial contraction
B) the condition of athletes after intensive training
C) the ability of a muscle to efficiently cause skeletal movements
D) the feeling of well-being following exercise
- 55) Which of the following describes the plasma membrane? 55) _____
A) a membrane composed of tiny shelves or cristae
B) a single-layered membrane that surrounds the nucleus of the cell
C) a double layer of protein enclosing the plasma
D) a phospholipid bilayer surrounding the cell
- 56) A red blood cell placed in pure water would _____. 56) _____
A) swell initially, then shrink as equilibrium is reached
B) shrink
C) neither shrink nor swell
D) swell and burst
- 57) Which of the following is NOT found in cartilage but is found in bone? 57) _____
A) blood vessels B) organic fibers C) living cells D) lacunae

- 1) C
- 2) B
- 3) C
- 4) A
- 5) D
- 6) D
- 7) A
- 8) A
- 9) C
- 10) A
- 11) E
- 12) A
- 13) C
- 14) D
- 15) C
- 16) D
- 17) B
- 18) B
- 19) A
- 20) A
- 21) B
- 22) B
- 23) B
- 24) A
- 25) D
- 26) C
- 27) D
- 28) D
- 29) D
- 30) D
- 31) A
- 32) C
- 33) E
- 34) D
- 35) C
- 36) C
- 37) C
- 38) A
- 39) B
- 40) C
- 41) A
- 42) D
- 43) B
- 44) A
- 45) C
- 46) C
- 47) B
- 48) A
- 49) B
- 50) D
- 51) D
- 52) A
- 53) A
- 54) A
- 55) D
- 56) D
- 57) A