

Chapter 2: Cell Physiology

MULTIPLE CHOICE

1. Which component is NOT always found in a typical human cell?

- a. cytosol
- b. DNA
- c. flagellum
- d. plasma membrane

ANS: C

PTS: 1

REF: 24

BLM: Remember

2. Which structure is NOT located in the cytosol of the cell?

- a. ER
- b. lysosome
- c. mitochondrion
- d. nucleolus

ANS: D

PTS: 1

REF: 25

BLM: Remember

3. Which organelle is NOT covered by a membrane?

- a. Golgi body
- b. lysosome
- c. mitochondrion
- d. ribosome

ANS: D

PTS: 1

REF: 25

BLM: Remember

4. Which statement concerning cells is NOT correct?

- a. Cells serve as the living building blocks of the body.
- b. The average human cell is about 100 times smaller than the smallest particle visible by the unaided eye.
- c. Inanimate chemical molecules are organized within each cell into a living entity.
- d. Cells are generally colourless and transparent so they must be stained for visualization under a microscope.

ANS: B

PTS: 1

REF: 23

BLM: Remember

5. Which statement regarding the plasma membrane is NOT correct?

- a. It serves as a mechanical barrier to hold in the contents of the cell.
- b. It selectively controls movement of molecules between the ECF and the ICF.
- c. It contains proteins that provide receptor sites for membrane functions.
- d. It has cholesterol to determine the fluidity of the membrane.

ANS: A

PTS: 1

REF: 32

BLM: Remember

6. Which statement is correct for the rough endoplasmic reticulum?
- It does not contain ribosomes.
 - It synthesizes proteins for export from the cell or for use in construction of a new cellular membrane.
 - It is abundant in cells that specialize in lipid metabolism.
 - It is abundant in liver cells.

ANS: B PTS: 1 REF: 25 BLM: Remember

7. The rough ER is a membranous system. With what is it associated?
- chromosomes
 - lysosomes
 - microfilaments
 - ribosomes

ANS: D PTS: 1 REF: 25 BLM: Remember

8. Of the organelles below, which occurs in the lowest numbers within a typical human cell?
- mitochondria
 - vaults
 - peroxisomes
 - nuclei

ANS: D PTS: 1 REF: 24 BLM: Remember

9. What can be found within the nucleus?
- deoxyribonucleic acid
 - cytosol
 - plasma membrane
 - endoplasmic reticulum

ANS: A PTS: 1 REF: 24 BLM: Remember

10. Which statement is NOT correct regarding ribosomes?
- They are composed of RNA.
 - They assemble polypeptides.
 - They may be bound to endoplasmic reticulum.
 - They are covered by a membrane.

ANS: D PTS: 1 REF: 25 BLM: Remember

11. Which statement is correct for smooth endoplasmic reticulum?
- It is most abundant in cells specialized for protein secretion.
 - It gives rise to transport vesicles containing newly synthesized molecules wrapped in a layer of smooth ER membrane.
 - It consists of stacks of relatively flattened sacs called cisternae.
 - It has many ribosomes.

ANS: B PTS: 1 REF: 25 BLM: Remember

12. Which structure is NOT associated with the secretion of proteins produced by ER?
- a. Golgi complex
 - b. smooth ER
 - c. transport vesicles
 - d. lysosomal membrane

ANS: D PTS: 1 REF: 25 BLM: Remember

13. Which statement is NOT correct regarding the Golgi complex?
- a. It sorts and directs products to their final destination.
 - b. It modifies proteins chemically.
 - c. It produces secretory vesicles.
 - d. It is responsible for protein synthesis.

ANS: D PTS: 1 REF: 53 BLM: Remember

14. Which of the following does NOT apply to lysosomes?
- a. They contain powerful hydrolytic enzymes.
 - b. They generate hydrogen peroxide.
 - c. They remove useless parts of the cell.
 - d. They attack foreign materials engulfed by the cell by means of endocytosis.

ANS: B PTS: 1 REF: 25 BLM: Remember

15. Which of the following refers to extrusion of materials to the exterior of the cell through the plasma membrane?
- a. endocytosis
 - b. exocytosis
 - c. phagocytosis
 - d. pinocytosis

ANS: B PTS: 1 REF: 53 BLM: Remember

16. Which of the following refers to the form of endocytosis in which whole cells such as bacteria are brought in?
- a. exocytosis
 - b. pinocytosis
 - c. receptor-mediated endocytosis
 - d. phagocytosis

ANS: D PTS: 1 REF: 51 BLM: Remember

17. What does the SNARE complex provide?
- a. recognition of foreign proteins in the cell
 - b. binding of correct enzyme with correct substrate
 - c. means to deliver vesicles to an appropriate site
 - d. receptor-mediated endocytosis

ANS: C PTS: 1 REF: 53 BLM: Higher Order

18. Which statement does NOT correctly characterize mitochondria?
- They have an inner fluid filled space called the cristae.
 - They possess their own DNA.
 - They are the site for cell respiration.
 - Their inner membranes possess electron carriers.

ANS: A PTS: 1 REF: 25 BLM: Remember

19. Where do the citric acid cycle reactions occur?
- cytoplasm
 - cytosol
 - inner-mitochondrial membrane
 - mitochondrial matrix

ANS: D PTS: 1 REF: 27 BLM: Remember

20. What accounts for the most ATP production?
- Kreb's cycle
 - citric acid cycle
 - NADH
 - electron transport and oxidative phosphorylation

ANS: D PTS: 1 REF: 26 BLM: Higher Order

21. In aerobic respiration process of the cells, where is CO₂ released?
- during glycolysis
 - in the electron transport chain
 - during Kreb's cycle
 - during fermentation

ANS: C PTS: 1 REF: 31 BLM: Higher Order

22. What might happen if you did NOT get enough niacin in your diet?
- Glucose would not be able to be cleaved.
 - Available FAD would decrease.
 - When the 3-carbon chain is oxidized in glycolysis, electrons would not be able to be captured.
 - Only fermentation would be possible.

ANS: C PTS: 1 REF: 27 BLM: Higher Order

23. What is the carbon-based end product (chain) of glycolysis?
- NADH
 - ATP
 - pyruvic acid
 - FADH₂

ANS: C PTS: 1 REF: 27 BLM: Higher Order

24. Why does anaerobic respiration take place when O₂ is unavailable?
- a. to continue releasing at least some energy from molecules and generate ATP
 - b. to prevent cell death
 - c. to make use of available glucose
 - d. to prevent protein breakdown

ANS: A

PTS: 1

REF: 31

BLM: Higher Order

25. What does chemiosmosis do?
- a. releases CO₂
 - b. extracts energy from an H⁺ concentration gradient
 - c. reduces NAD
 - d. ferments pyruvic acid to lactic acid

ANS: B

PTS: 1

REF: 30

BLM: Higher Order

26. Which statement is correct for the electron transport chains?
- a. They are “circuits” for small amounts of electricity to pass through.
 - b. They are made of proteins.
 - c. They deliver energy to cytochrome to pump H⁺ into the intermembrane space.
 - d. They do not need oxygen to be available.

ANS: C

PTS: 1

REF: 29

BLM: Higher Order

27. Where are cristae found?
- a. lysosome
 - b. mitochondrion
 - c. nucleolus
 - d. nucleus

ANS: B

PTS: 1

REF: 25

BLM: Remember

28. Which of the following is NOT a correct association?
- a. ATP/high-energy bonds
 - b. electron transport chain/mitochondrion
 - c. glycolysis/anaerobic
 - d. pyruvic acid/five-carbon molecule

ANS: D

PTS: 1

REF: 26

BLM: Higher Order

29. Which statement is correct for an anaerobic condition?
- a. Oxygen is plenty.
 - b. The degradation of glucose cannot proceed beyond glycolysis.
 - c. Mitochondrial processing of nutrient molecules takes place.
 - d. It produces a high yield of oxygen molecules.

ANS: B

PTS: 1

REF: 31

BLM: Remember

30. What is the universal energy currency in cells?

- a. ATP
- b. glucose
- c. glycogen
- d. insulin

ANS: A

PTS: 1

REF: 24

BLM: Remember

31. Which statement regarding the citric acid cycle is NOT correct?

- a. It occurs in the mitochondrial matrix.
- b. Carbon dioxide is released.
- c. Several ATP molecules are produced for each cycle.
- d. Acetyl CoA and oxaloacetic CoA acid initially react to form citric acid.

ANS: C

PTS: 1

REF: 27

BLM: Remember

32. Which molecule directly enters the citric acid cycle?

- a. acetyl CoA
- b. adenosine diphosphate
- c. citric acid
- d. oxaloacetic acid

ANS: A

PTS: 1

REF: 27

BLM: Remember

33. What is the function of ATP synthase?

- a. to act enzymatically
- b. to build membranes
- c. to carry hydrogen
- d. to synthesize ATP

ANS: D

PTS: 1

REF: 29

BLM: Remember

34. Which statement is correct for NADH?

- a. It is an energy carrier.
- b. It plays a role in cellular respiration.
- c. It is used in glycolysis.
- d. It is used in the citric acid cycle.

ANS: A

PTS: 1

REF: 29

BLM: Higher Order

35. What is the purpose of glycolysis?

- a. to produce citric acid
- b. to liberate energy from glucose
- c. to produce large numbers of ATP
- d. to trap energy in FADH₂

ANS: B

PTS: 1

REF: 26

BLM: Remember

36. What is the definition of *aerobic*?

- a. in the blood
- b. with carbon dioxide
- c. with oxygen
- d. without carbon dioxide

ANS: C PTS: 1 REF: 26 BLM: Remember

37. Which statement is NOT correct about vaults?

- a. They may play a role in drug resistance.
- b. Their shape resembles octagonal barrels.
- c. They are smaller than ribosomes.
- d. They are a type of organelle.

ANS: C PTS: 1 REF: 25 BLM: Remember

38. Which element is NOT a part of the cytoskeleton?

- a. inclusions
- b. intermediate filaments
- c. microfilaments
- d. microtubular lattice

ANS: A PTS: 1 REF: 25 BLM: Remember

39. Which statement is correct regarding the bending movements of cilia and flagella?

- a. They are accomplished by alternate solation and gelation of the cytosol.
- b. They involve the alternate assembly and disassembly of actin filaments.
- c. They are produced by the sliding of adjacent microtubule doublets past one another.
- d. They are important in providing motility for many organisms but are not of any use in humans.

ANS: C PTS: 1 REF: 25 BLM: Remember

40. Which organelles contain oxidative enzymes?

- a. peroxisomes and lysosomes
- b. mitochondria and nucleus
- c. lysosomes and vaults
- d. ribosomes and microtubules

ANS: A PTS: 1 REF: 25 BLM: Remember

41. Which statement is correct for glycolysis?

- a. It yields two molecules of ATP for each molecule of glucose processed.
- b. It always requires oxygen.
- c. It takes place in the mitochondrial matrix.
- d. It takes place in the mitochondrial inner membrane cristae.

ANS: A PTS: 1 REF: 26 BLM: Higher Order

42. Which statement is correct for ATP synthase?
- a. It transports hydrogen ions from the matrix to the intermembrane space of the mitochondrion.
 - b. It is activated by the flow of hydrogen ions from the intermembrane space to the matrix.
 - c. It enzymatically converts ATP to ADP.
 - d. It yields two molecules of ATP.

ANS: B PTS: 1 REF: 29 BLM: Remember

43. Which statement is correct for Nicotinamide adenine dinucleotide (NAD)?
- a. It converts ADP + Pi to ATP.
 - b. It is found in the cytosol.
 - c. It is a hydrogen carrier molecule.
 - d. It is found in the cytosol and is a hydrogen carrier molecule.

ANS: C PTS: 1 REF: 27 BLM: Remember

44. Which of the following is NOT an action of the cytosol?
- a. duplication of chromosomes
 - b. enzymatic regulation of intermediary metabolism
 - c. storage of fat and glycogen
 - d. synthesis of proteins for use in the cytosol

ANS: A PTS: 1 REF: 25 BLM: Remember

45. What is the function of the microtrabecular lattice?
- a. to maintain asymmetrical cell shapes
 - b. to suspend and functionally link the largest cytoskeletal elements and organelles
 - c. to provide cellular contractile systems
 - d. to serve as mechanical stiffeners

ANS: B PTS: 1 REF: 25 BLM: Remember

46. Which of the following is NOT true of the cytoskeleton?
- a. It supports the plasma membrane and is responsible for the particular shape, rigidity, and spatial geometry of each different cell type.
 - b. It probably plays a role in regulating cell growth and division.
 - c. Its elements are all rigid and permanent structures.
 - d. It is responsible for cell contraction and cell movements.

ANS: C PTS: 1 REF: 34 BLM: Remember

47. In which cells are actin and myosin filaments commonly found?
- a. epithelial cells
 - b. muscle cells
 - c. nerve cells
 - d. red blood cells

ANS: B PTS: 1 REF: 24 BLM: Remember

48. Which statement regarding microfilaments is NOT correct?
- a. They serve as mechanical stiffeners for microvilli.
 - b. They are composed of actin subunits.
 - c. They are the smallest elements of the cytoskeleton.
 - d. They form mitotic spindles.

ANS: D PTS: 1 REF: 25 BLM: Remember

49. Which of the following is correct about intermediate filaments?
- a. They comprise mitotic spindles.
 - b. They are important in cell regions subject to mechanical stress.
 - c. They comprise cilia.
 - d. They comprise flagella.

ANS: B PTS: 1 REF: 25 BLM: Remember

50. Which statement is FALSE?
- a. The number of mitochondria per cell varies depending on the energy needs of each particular cell type.
 - b. DNA is enclosed within the cell nucleus and mitochondria.
 - c. The mitochondria DNA in our cells are copies of our parent's.
 - d. Mitochondria DNA has a limited ability to repair.

ANS: C PTS: 1 REF: 25 BLM: Higher Order

51. Which of the following organelles is NOT membrane-bound?
- a. lysosome
 - b. ribosome
 - c. mitochondrion
 - d. peroxisomes

ANS: B PTS: 1 REF: 25 OBJ: Remember
BLM: Remember

TRUE/FALSE

1. Electron microscopes are about 100 times more powerful than light microscopes.

ANS: T PTS: 1

2. DNA's genetic code is transcribed into messenger RNA.

ANS: T PTS: 1

3. The cytosol is the gel-like mass of the cytoplasm.

ANS: T PTS: 1

4. DNA in the nucleus has the genetic instructions to make enzymatic proteins.

ANS: T PTS: 1

5. The nucleus indirectly governs most cellular activities by directing the kinds and amounts of various enzymes and other proteins that are produced by the cell.

ANS: T PTS: 1

6. The rough endoplasmic reticulum is most abundant in cells specialized for protein secretion, whereas smooth endoplasmic reticulum is abundant in cells that specialize in lipid metabolism.

ANS: T PTS: 1

7. Proteins synthesized by the endoplasmic reticulum become permanently separated from the cytosol as soon as they have been synthesized.

ANS: T PTS: 1

8. RER is most abundant in cells specialized for steroid production.

ANS: F PTS: 1

9. The Golgi complex is functionally connected to the ER.

ANS: T PTS: 1

10. The endoplasmic reticulum is one continuous organelle consisting of many tubules and cisternae.

ANS: T PTS: 1

11. The lysosomes are one site of protein synthesis.

ANS: F PTS: 1

12. The smooth ER specializes in protein metabolism.

ANS: F PTS: 1

13. Secretory vesicles are released to the exterior of the cell by means of the process of phagocytosis.

ANS: F PTS: 1

14. Secretory vesicles are about 200 times larger than transport vesicles.

ANS: T PTS: 1

15. Coated vesicles enclose a representative mixture of proteins present in the Golgi sac before budding off.

ANS: F PTS: 1

16. All cell organelles are renewable.

ANS: T PTS: 1

17. Mitochondria are presumably descendants of primitive bacterial cells.

ANS: T PTS: 1

18. Endocytosis can be accomplished by phagocytosis and pinocytosis.

ANS: T PTS: 1

19. Phagocytosis is a specialized form of endocytosis used for bringing in extracellular fluids.

ANS: F PTS: 1

20. The peroxisomes mainly generate hydrogen peroxide.

ANS: T PTS: 1

21. Glycolysis generates ATP from glucose with high efficiency.

ANS: F PTS: 1

22. ATP synthase is located in the inner mitochondrial membrane.

ANS: T PTS: 1

23. Most intermediary metabolism is accomplished in the cytosol.

ANS: T PTS: 1

24. Oxidative phosphorylation generates the most ATP per glucose molecule.

ANS: T PTS: 1

25. Dynein is a mitochondrial enzyme.

ANS: F PTS: 1

26. Cytokinesis is the division of the nucleus during mitosis.

ANS: F PTS: 1

27. Amoeboid movement is accomplished by transitions of the cytosol between a gel and a solid state as a result of alternate assembly and disassembly respectively of actin filaments.

ANS: T PTS: 1

28. The protective, waterproof outer layer of skin is formed by the tough skeleton of the micro trabecular lattice that persists after the surface skin cells die.

ANS: F PTS: 1

29. Cilia in the respiratory tract beat in the same direction to sweep inspired particles up and out of the airways.

ANS: T PTS: 1

30. Hockey is a winter sport that uses only aerobic energy supply.

ANS: F PTS: 1

31. Lack of aerobic exercise can have negative health implications, such as heart disease and high blood pressure.

ANS: T PTS: 1

COMPLETION

1. The three major subdivisions of a cell are the _____, the _____, and the _____.

ANS:

plasma membrane, nucleus, cytoplasm

nucleus, cytoplasm, plasma membrane

cytoplasm, plasma membrane, nucleus

PTS: 1

2. The fluid contained within all of the cells of the body is known collectively as _____, and the fluid outside the cells is referred to as _____.

ANS: intracellular fluid, extracellular fluid

PTS: 1

3. The two major parts of the cell's interior are the _____ and the _____.

ANS:

nucleus, cytoplasm

cytoplasm, nucleus

PTS: 1

4. _____ RNA carries amino acids to the sites of protein synthesis in the cell.

ANS: Messenger

PTS: 1

5. The _____ ER is the central packaging and discharge site for molecules to be transported from the ER.

ANS: smooth

PTS: 1

6. The signal-recognition protein recognizes both the _____ on the ribosome and the _____ on the ER then delivers the proper ribosome to the proper site on the rough ER for binding.

ANS: leader sequence, ribophorin

PTS: 1

7. Insulin is a long _____ chain.

ANS: polypeptide

PTS: 1

8. The ribosomes of the rough ER synthesize _____, whereas its membranous walls contain enzymes essential for the synthesis of _____.

ANS: proteins, lipids

PTS: 1

9. The sarcoplasmic reticulum stores _____ ions.

ANS: calcium

PTS: 1

10. Products destined for intracellular transport are packaged in _____, whereas products for export are packaged in _____.

ANS: coated vesicles, secretory vesicles

PTS: 1

11. _____ refers to the process of an intracellular vesicle fusing with the plasma membrane, then opening and emptying its contents to the exterior.

ANS: exocytosis

PTS: 1

12. _____ is a protein responsible for pinching off an endocytic vesicle.

ANS: Dynamin

PTS: 1

13. Foreign material to be attacked by lysosomal enzymes is brought into the cell by the process of _____.

ANS: endocytosis

PTS: 1

14. Lysosomes contain _____ enzymes that are capable of digesting and removing unwanted debris from the cell.

ANS: hydrolytic

PTS: 1

15. Lysosomes that have completed their digestive activities are known as _____.

ANS: residual bodies

PTS: 1

16. _____, an enzyme found in peroxisomes, decomposes potentially toxic hydrogen peroxide.

ANS: Catalase

PTS: 1

17. ADP and Pi are formed from the breakdown of the molecule _____.

ANS:
adenosine triphosphate
ATP

PTS: 1

18. _____ refers collectively to the large set of intracellular chemical reactions that involve the degradation, synthesis, and transformation of small organic molecules.

ANS: Intermediary metabolism

PTS: 1

19. The decomposition of hydrogen peroxide produces _____ and _____ molecules.

ANS:
water, oxygen
oxygen, water

PTS: 1

20. _____ is a peroxisomal enzyme that breaks down hydrogen peroxide.

ANS: Catalase

PTS: 1

21. One glucose molecule is converted into two molecules of _____ by the end of glycolysis.

ANS: pyruvic acid

PTS: 1

22. The metabolism of acetyl CoA into the citric acid cycle depends on the availability of _____ for the cell.

ANS: oxygen

PTS: 1

23. The chemiosmotic mechanism involves the transport of hydrogen across the membrane of the _____.

ANS: mitochondrion

PTS: 1

24. Adipose tissue stores _____.

ANS: fat

PTS: 1

25. _____ are the dominant structural and functional components of cilia and flagella.

ANS: Microtubules

PTS: 1

26. Microfilaments are composed of the protein _____.

ANS: actin

PTS: 1

27. One of the diseases caused by neurofilament abnormalities is _____.

ANS: amyotrophic lateral sclerosis

PTS: 1

28. A cilium or flagellum originates from the _____, a structure in the cell.

ANS: basal body

PTS: 1

MATCHING

Indicate which of the characteristics applies to each item by using the answer code (options may be used more than once or not at all).

- a. glycolysis
 - b. citric acid cycle
 - c. oxidative phosphorylation
-
- 1. directly uses inspired oxygen
 - 2. does not directly use inspired oxygen
 - 3. takes place in the cytosol
 - 4. takes place in the mitochondrial matrix
 - 5. takes place on the inner mitochondrial membrane
 - 6. low yield of ATP
 - 7. high yield of ATP

- | | |
|-----------|--------|
| 1. ANS: C | PTS: 1 |
| 2. ANS: A | PTS: 1 |
| 3. ANS: A | PTS: 1 |
| 4. ANS: B | PTS: 1 |
| 5. ANS: C | PTS: 1 |
| 6. ANS: A | PTS: 1 |
| 7. ANS: C | PTS: 1 |

Complete the sentences by matching the appropriate vesicle(s) by using the answer code (options may be used more than once or not at all).

- a. transport vesicles
 - b. coated vesicles
 - c. secretory vesicles
-
- 8. originate from the Golgi complex
 - 9. originate from the endoplasmic reticulum
 - 10. contain newly synthesized molecules
 - 11. contents emptied to the exterior by exocytosis
 - 12. enclosed in a clathrin framework
 - 13. fuse with and enter the Golgi complex
 - 14. contents become concentrated over time
 - 15. contents are unloaded at a specific intracellular compartment

- | | |
|------------|--------|
| 8. ANS: B | PTS: 1 |
| 9. ANS: A | PTS: 1 |
| 10. ANS: A | PTS: 1 |
| 11. ANS: C | PTS: 1 |
| 12. ANS: B | PTS: 1 |
| 13. ANS: A | PTS: 1 |
| 14. ANS: C | PTS: 1 |
| 15. ANS: B | PTS: 1 |

Match the term to its description by using the answer code (options may be used more than once or not at all).

- a. plasma membrane
 - b. nucleus
 - c. cytoplasm
 - d. cytosol
 - e. organelles
 - f. cytoskeleton
-
- 16. houses the cell's DNA
 - 17. responsible for cell shape and movement
 - 18. highly organized membrane-bound intracellular structures
 - 19. selectively controls movement of molecules between the intracellular fluid and the extracellular fluid
 - 20. consists of organelles and cytosol
 - 21. site of intermediary metabolism
 - 22. permit incompatible chemical reactions to occur simultaneously in the cell
 - 23. separates contents of the cell from its surroundings
 - 24. site of fat and glycogen storage

- | | |
|------------|--------|
| 16. ANS: B | PTS: 1 |
| 17. ANS: F | PTS: 1 |
| 18. ANS: E | PTS: 1 |
| 19. ANS: A | PTS: 1 |
| 20. ANS: C | PTS: 1 |
| 21. ANS: D | PTS: 1 |
| 22. ANS: E | PTS: 1 |
| 23. ANS: A | PTS: 1 |
| 24. ANS: D | PTS: 1 |

Match the term to its description by using the answer code (options may be used more than once or not at all).

- a. ER
- b. Golgi complex
- c. lysosome
- d. peroxisome
- e. mitochondrion
- f. vault
- g. free ribosome
- h. microtubule
- i. microfilament

- 25. contains powerful oxidative enzymes important in detoxifying various wastes
- 26. an important component of cilia and flagella
- 27. one continuous extensive organelle consisting of a network of tubules and flattened filament
- 28. removes unwanted cellular debris and foreign material
- 29. the powerhouse of the cell
- 30. acts as a mechanical stiffener
- 31. synthesizes proteins for use in the cytosol
- 32. consists of stacks of flattened sacs
- 33. shaped like an octagonal barrel

- | | |
|------------|--------|
| 25. ANS: D | PTS: 1 |
| 26. ANS: H | PTS: 1 |
| 27. ANS: A | PTS: 1 |
| 28. ANS: C | PTS: 1 |
| 29. ANS: E | PTS: 1 |
| 30. ANS: I | PTS: 1 |
| 31. ANS: G | PTS: 1 |
| 32. ANS: B | PTS: 1 |
| 33. ANS: F | PTS: 1 |

Match the term to its description by using the answer code (options may be used more than once or not at all).

- a. flagella
- b. cilia
- c. microvilli

- 34. hair-like motile protrusions
- 35. increase the surface area of the small intestine epithelium
- 36. sweep mucus and debris out of respiratory airways
- 37. increase the surface area of the kidney tubules
- 38. enable sperm to move
- 39. whip-like appendages
- 40. guide egg to oviduct

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- | | | |
|-----|--------|--------|
| 34. | ANS: B | PTS: 1 |
| 35. | ANS: C | PTS: 1 |
| 36. | ANS: B | PTS: 1 |
| 37. | ANS: C | PTS: 1 |
| 38. | ANS: A | PTS: 1 |
| 39. | ANS: A | PTS: 1 |
| 40. | ANS: B | PTS: 1 |

Match the term to its description by using the answer code (options may be used more than once or not at all).

- a. microtubules
 - b. microfilaments
 - c. intermediate filaments
 - d. microtrabecular lattice
-
- 41. the largest of the cytoskeletal elements
 - 42. present in parts of the cell subject to mechanical stress
 - 43. smallest element visible with a conventional electron microscope
 - 44. consist of actin
 - 45. organizes the glycolytic enzymes in a sequential alignment
 - 46. form the mitotic spindle
 - 47. essential for creating and maintaining an asymmetrical cell shape
 - 48. composed of tubulin
 - 49. provide a pathway for axonal transport
 - 50. visible only with a high-voltage electron microscope
 - 51. play(s) a key role in muscle contraction
 - 52. slide past each other to cause ciliary bending

- | | | |
|-----|--------|--------|
| 41. | ANS: A | PTS: 1 |
| 42. | ANS: C | PTS: 1 |
| 43. | ANS: B | PTS: 1 |
| 44. | ANS: B | PTS: 1 |
| 45. | ANS: D | PTS: 1 |
| 46. | ANS: A | PTS: 1 |
| 47. | ANS: A | PTS: 1 |
| 48. | ANS: A | PTS: 1 |
| 49. | ANS: A | PTS: 1 |
| 50. | ANS: D | PTS: 1 |
| 51. | ANS: B | PTS: 1 |
| 52. | ANS: A | PTS: 1 |

Match the cellular protein with the correct characteristic by using the answer code.

- a. dynamin
- b. tubulin
- c. kinesin
- d. actin
- e. ribophorin

- 53. causes pinching off of endocytic vesicles
- 54. serve as binding sites for ribosomes
- 55. comprises intermediate filaments
- 56. comprises microtubules
- 57. provides for transport of vesicles

- | | |
|------------|--------|
| 53. ANS: A | PTS: 1 |
| 54. ANS: E | PTS: 1 |
| 55. ANS: D | PTS: 1 |
| 56. ANS: B | PTS: 1 |
| 57. ANS: C | PTS: 1 |

ESSAY

1. Describe the pathway that newly synthesized polypeptides take en route for secretion.

ANS:

Student responses will vary.

PTS: 1

2. Describe aerobic cellular respiration from a mechanistic point of view.

ANS:

Student responses will vary.

PTS: 1

3. How is ATP synthesized via electron transport and oxidative phosphorylation?

ANS:

Student responses will vary.

PTS: 1

4. Describe the major aspects of the cytoskeleton.

ANS:

Student responses will vary.

PTS: 1

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5. Describe the structure and function of cilia and flagella.

ANS:

Student responses will vary.

PTS: 1

PROBLEM

1. Michael is using the electron microscope at the hospital to review the structures of skeletal muscle cells. He notices that the skeletal muscle cells have many nuclei and are loaded with mitochondria. Why is this so?

ANS:

Student responses will vary.

PTS: 1

SHORT ANSWER

1. Describe the differences between rough ER and smooth ER.

ANS:

Student responses will vary.

PTS: 1