Chapter 3: Cells
Test Bank

MULTIPLE CHOICE

1. Which of the following is considered the control center of the cell?
   a. Mitochondrion
   b. Nucleus
   c. Lysosome
   d. Centriole

   ANS: B

2. The mitochondrion is called the *power plant* of the cell because _____ within the mitochondrion.
   a. most of the ATP is produced
   b. all protein synthesis occurs
   c. all DNA is located
   d. all ribosomes are located

   ANS: A

3. Which of the following is (are) found on the rough endoplasmic reticulum?
   a. Ribosomes
   b. Cilia
   c. Lysosomes
   d. DNA

   ANS: A

4. The rough ER is the site of
   a. fatty acid and steroid synthesis.
   b. Krebs cycle activity.
   c. protein synthesis.
   d. intracellular water storage.

   ANS: C

5. Which of the following is most associated with the ribosome?
   a. ATP production
   b. Intracellular housecleaning
   c. Glycogen storage
   d. Protein synthesis

   ANS: D

6. What is the transport mechanism in this description: A passive process that “pulls” water from an area where there is more water to an area where there is less water?
   a. Filtration
   b. Endocytosis
   c. An ATP-driven pump

d. Osmosis

ANS: D

7. What is the transport mechanism in this description: A passive process that uses a pressure difference as its driving force?
   a. Facilitated diffusion
   b. An ATP-driven pump
   c. Diffusion
   d. Filtration

   ANS: D

8. A beaker is divided into two compartments by a semipermeable membrane. Compartment A contains a 20% NaCl solution and compartment B contains a 50% NaCl solution. The membrane is permeable to water but not to Na^+ or Cl^-. Initially,
   a. water diffuses from compartment B to compartment A.
   b. Na^+ diffuses from compartment B to compartment A.
   c. Na^+ diffuses from compartment A to compartment B.
   d. water diffuses from compartment A to compartment B.

   ANS: D

9. A beaker is divided into two compartments by a semipermeable membrane. Compartment A contains a 20% NaCl solution and compartment B contains a 50% NaCl solution. The membrane is permeable to water but not to Na^+ or Cl^-. At equilibrium, the
   a. volume of water in compartment A will be greater than the volume in compartment B.
   b. volume in both compartments A and B will be equal.
   c. concentration of compartment A will decrease.
   d. volume in compartment B will be greater than the volume in compartment A.

   ANS: D

10. A beaker is divided into two compartments by a semipermeable membrane. Compartment A contains a 20% NaCl solution while compartment B contains a 50% NaCl solution. The membrane is permeable to both water and Na^+ and Cl^-. Initially,
    a. Na^+ and Cl^- diffuse from compartment B to compartment A.
    b. water diffuses from compartment B to compartment A.
    c. Na^+ and Cl^- diffuse from compartment A to compartment B.
    d. Na^+ diffuses from compartment A to compartment B and Cl^- diffuses from compartment B to compartment A.

    ANS: A

11. A beaker is divided into two compartments by a semipermeable membrane. Compartment A contains a 20% NaCl solution and compartment B contains a 50% NaCl solution. The membrane is permeable to both water and Na^+ and Cl^-. At equilibrium, the
    a. volume in compartment A will be greater than the volume in compartment B.
    b. volume in compartment B will be greater than the volume in compartment A.
    c. concentrations and volumes will be the same in both compartments.
    d. concentration of salt is greater in compartment A than in compartment B.

ANS: C

12. What are the hairlike structures located on the outer surface of the cell membrane?
    a. Mitochondria
    b. Ribosomes
    c. Cilia
    d. Centrioles

    ANS: C

13. What is the extensive internal membrane system that forms channels and is concerned with the synthesis of protein and steroids?
    a. Mitochondria
    b. Lysosomes
    c. Endoplasmic reticulum
    d. DNA

    ANS: C

14. Lysosomes are filled with
    a. powerful enzymes that destroy cellular debris and pathogens.
    b. cilia.
    c. DNA.
    d. blood.

    ANS: A

15. Which of the following best describes the power or driving force for active transport?
    a. ATP
    b. Pressure
    c. DNA
    d. H^+

    ANS: A

16. What is the transport mechanism in this description: A passive process that uses a carrier molecule to move a solute from an area of high concentration to an area of low concentration?
    a. Osmosis
    b. An ATP-driven pump
    c. Filtration
    d. Facilitated diffusion

    ANS: D

17. What is the name of the process in which an intracellular protein–containing vesicle fuses with the cell membrane and expels the protein to the outside of the cell?
    a. Endocytosis
    b. Pinocytosis
    c. Exocytosis
    d. Phagocytosis

    ANS: C

18. Which process describes phagocytosis and pinocytosis?
    a. Facilitated diffusion
    b. Endocytosis
    c. Filtration
    d. Exocytosis

    ANS: B

19. Which word means “the bursting of red blood cells”?
    a. Endocytosis
    b. Hemolysis
    c. Crenation
    d. Catalyst

    ANS: B

20. If a cell is placed in a hypotonic solution such as water, the cell will
    a. crenate.
    b. shrink.
    c. swell and burst.
    d. differentiate.

    ANS: C

21. Which type of solution causes crenation or shrinkage of submerged red blood cells?
    a. Hypotonic
    b. Isotonic
    c. Hypertonic
    d. Water

    ANS: C

22. Prophase, metaphase, anaphase, and telophase are phases of
    a. active transport.
    b. mitosis.
    c. differentiation.
    d. pinocytosis.

    ANS: B

23. G_1, G_2, the S phase, and the M phase are phases of
    a. the cell cycle.
    b. mitosis.
    c. protein synthesis.
    d. the cell cycle that is specific to cancer cells.

    ANS: A

24. Pinocytosis
    a. is a passive process.
    b. requires a pressure gradient as its driving force.
    c. refers to cellular drinking.

d. is a form of exocytosis.

ANS: C

25. Which of the following best describes normal saline?
    a. Radioactive
    b. Hemolytic to red blood cells
    c. Isotonic
    d. Crenating to red blood cells

    ANS: C

26. Which of the following best describes the eating of a bacterium by a lysosome?
    a. Differentiation
    b. Phagocytosis
    c. Meiosis
    d. Hemolysis

    ANS: B

27. In which structure is most DNA found?
    a. Nucleus
    b. Mitochondrion
    c. Lysosome
    d. Golgi apparatus

    ANS: A

28. Which structure is described as rough or smooth?
    a. Ribosome
    b. Mitochondrion
    c. Cilia
    d. Endoplasmic reticulum

    ANS: D

29. Which of the following is a gel-like substance located inside the cell but outside the nucleus?
    a. Nucleoplasm
    b. Isotonic saline
    c. Cytoplasm
    d. Lysosomal enzymes

    ANS: C

30. Which of the following most accurately describes diffusion?
    a. ATP-driven
    b. Passive transport
    c. Requires a pressure or pushing force
    d. Causes solute to move uphill

    ANS: B

31. The skunk makes his presence known by

a. filtration.
b. osmosis.
c. active transport.
d. diffusion.

ANS: D

32. Oxygen moves from the lungs (high concentration) into the blood (low concentration) in response to
a. filtration.
b. osmosis.
c. diffusion.
d. endocytosis.

ANS: C

33. Which process describes the pushing of water across the capillary (blood vessel) membrane?
a. Facilitated diffusion
b. Osmosis
c. Filtration
d. Pinocytosis

ANS: C

34. Which structure puts the finishing touches on and packages the protein for export from the cell?
a. Mitochondrion
b. Golgi apparatus
c. Lysosome
d. Nucleolus

ANS: B

35. Which of the following structures make the rough endoplasmic reticulum look like sandpaper?
a. Ribosomes
b. Globs of cytoplasm
c. ATP
d. Fragments of DNA

ANS: A

36. Which structure is described as a semipermeable lipid bilayer?
a. Lysosome
b. Mitochondrion
c. Ribosome
d. Cell membrane

ANS: D

37. The selectively permeable membrane
a. is a result of its composition; it is tough connective tissue, much like a ligament.
b. determines which substances enter and leave the cell.

c. allows for the unrestricted movement of water and electrolytes across the cell membrane.
d. permits diffusion but not osmosis.

ANS: B

38. Which of the following is least true of mitochondria?
a. Found only within liver cells
b. Make most of the body's ATP
c. Contain enzymes that function aerobically
d. Located within the cytoplasm

ANS: A

39. Which of the following is a correct statement?
a. Most ATP is produced in the mitochondria.
b. Mitochondria contain potent enzymes that digest cellular waste and debris.
c. Most DNA is located within the mitochondria.
d. The RER is concerned with phagocytosis.

ANS: A

40. A beaker contains two compartments. Compartment A (CA) contains a 10% salt solution and Compartment B (CB) contains a 20% salt solution. The membrane is permeable to the salt and water. At equilibrium,
a. the volume in CA is greater than the volume in CB.
b. the volume in CA is less than the volume in CB.
c. the volume is the same in both compartments.
d. all water accumulates in CB.

ANS: C

41. A beaker contains two compartments. Compartment A (CA) contains a 10% salt solution and Compartment B (CB) contains a 20% salt solution. The membrane is permeable only to water. At equilibrium, the volume in
a. CA is greater than the volume in CB.
b. CA is less than the volume in CB.
c. CB is less than the volume in CA.
d. CA is the same as the volume in CB.

ANS: B

42. Most K^+ is located in the cells, with little K^+ in the tissue spaces. What accounts for the movement of additional K^+ into the cells?
a. K^+ in the tissue fluid diffuses into the cell.
b. K^+ enters the cell in response to facilitated diffusion.
c. K^+ is actively pumped into the cell.
d. K^+ enters the cell because of pinocytosis.

ANS: C

43. A child has experienced a blow to the head causing a slow bleed. Although the bleeding has stopped, the blood clot continues to expand because

a. brain tissue grows into the blood clot.
b. plasma protein is used by the brain to make additional nerve tissue to replace what was damaged.
c. the particles of the blood clot are osmotically active and draw water into the clot.
d. pieces of the blood clot dissolve and are carried by the blood to the other side of the brain.

ANS: C

44. What is the primary difference between diffusion and facilitated diffusion?
a. One is active and the other is passive.
b. One requires ATP and the other doesn't.
c. Diffusion involves the movement of a substance from high concentration to a lower concentration. Facilitated diffusion moves a substance from a lower concentration to a higher concentration.
d. Facilitated diffusion uses a "helper" molecule to move a substance passively.

ANS: D

45. What is the effect of an intravenous infusion of pure water?
a. It is the same response as to the infusion of isotonic saline.
b. It is the same response as to the infusion of Ringer's solution.
c. The RBCs burst.
d. The RBCs shrink (crenation).

ANS: C

46. Which of the following describes the response of a red blood cell (RBC) to immersion in an isotonic solution?
a. The RBC swells and bursts.
b. The RBC undergoes hemolysis.
c. The RBC undergoes crenation; it shrinks.
d. There is no net movement of water between the RBC and solution.

ANS: D

47. Plasma proteins determine
a. plasma oncotic (osmotic) pressure.
b. capillary filtration pressure.
c. the rate of diffusion out of the capillary.
d. the size of the capillary pores.

ANS: A

48. If plasma protein leaks into the tissue spaces,
a. edema develops.
b. the tissue space becomes dehydrated as excess tissue fluid enters the capillaries.
c. blood volume expands as excess fluid is absorbed into the blood vessels (capillaries).
d. all of the above occur.

ANS: A

49. Mitosis
    a. occurs only within sex cells.
    b. produces two genetically identical cells.
    c. occurs only within red blood cells.
    d. causes a 50% reduction in chromosome number.

    ANS: B

50. The first gap phase (G_1), second gap phase (G_2), and synthesis phase (S)
    a. occur during interphase.
    b. include prophase, metaphase, anaphase, and telophase.
    c. are stages of mitosis.
    d. all of the above are true.

    ANS: A

51. An anticancer drug that interferes only with mitosis
    a. is described as cell cycle M phase–specific.
    b. is cell cycle phase–nonspecific.
    c. is nontoxic.
    d. stimulates neoplastic cell growth.

    ANS: A

52. With regard to the cell cycle,
    a. the M phase is the same as interphase.
    b. cells cannot enter phase G_0 when they complete the cycle.
    c. cell division occurs during the M phase.
    d. prophase, metaphase, anaphase, and telophase occur during phase G_1.

    ANS: C

53. A cell that "drops out" of the cell cycle
    a. enters G_0.
    b. splits into two genetically identical cells.
    c. reduces its chromosome number by 50%.
    d. becomes a stem cell.

    ANS: A

54. Which of the following best describes a cell that is necrotic?
    a. Dehydrated
    b. Stem cell
    c. Undifferentiated
    d. Dead

    ANS: D

55. Which of the following is true of a benign neoplasm?
    a. Metastatic lesion
    b. Secondary tumor site
    c. Cancerous
    d. Noncancerous tumor

ANS: D

56. A cervical Pap smear indicates well-differentiated cells. You would interpret this as
    a. a normal cellular appearance.
    b. evidence of edema.
    c. evidence of necrosis.
    d. evidence of cancer.

    ANS: A

57. This cytoplasmic organelle contains the enzymes of the Krebs cycle and electron transport chain and is primarily concerned with the formation of ATP:
    a. rough endoplasmic reticulum.
    b. smooth endoplasmic reticulum.
    c. mitochondrium.
    d. centriole.

    ANS: C

58. Krebs cycle and electron transport chain enzymes
    a. are located within the mitochondria.
    b. function anaerobically.
    c. produce most of the lactic acid in the body.
    d. account for the sandpaper-like appearance of the RER.

    ANS: A

59. Which of the following is common to the ribosomes, rough ER, and Golgi apparatus?
    a. ATP-producing organelles
    b. Protein synthesis
    c. Ammonia producing
    d. Glycogen storage

    ANS: B

60. Prophase, metaphase, anaphase, and telophase
    a. are stages of cytokinesis.
    b. occur during G_1.
    c. are concerned with the synthesis of DNA and the doubling of the chromosomes.
    d. are stages of mitosis.

    ANS: D

61. Telophase and cytokinesis
    a. mark the beginning of mitosis.
    b. complete the splitting of a single cell into two identical cells.
    c. are called the “resting” phases.
    d. occur only within sex cells.

    ANS: B

62. Methotrexate, an anticancer drug that interferes with cell replication, is most effective when the cancer cell is in the S phase of the cell cycle. Which of the following best describes methotrexate?
    a. Cell cycle phase specific
    b. Stem cell stimulator
    c. Anaplastic
    d. Keratinized

    ANS: A

63. A stem cell develops into a muscle cell. Which of the following most accurately describes this process?
    a. Differentiation
    b. Malignant
    c. Neoplastic
    d. Necrotic

    ANS: A

64. Compartment A contains a 5% glucose solution. Compartment B contains a 15% glucose solution. The membrane (dividing the beaker into compartments A and B) is permeable to both solute and solvent. Which of the following statements is true regarding the initial net flux?
    a. Water diffuses from compartment A to compartment B.
    b. Glucose diffuses from compartment A to compartment B.
    c. Solute diffuses from compartment A to compartment B.
    d. Solvent diffuses from compartment B to compartment A.

    ANS: A

65. Compartment A contains a 25% glucose solution. Compartment B contains a 15% glucose solution. The membrane (dividing the beaker into compartments A and B) is permeable to water but impermeable to glucose. Which of the following statements is true regarding the initial net flux?
    a. Water diffuses from compartment B to compartment A.
    b. Glucose diffuses from compartment A to compartment B.
    c. Solute diffuses from compartment A to compartment B.
    d. Solvent diffuses from compartment A to compartment B.

    ANS: A

66. At equilibrium the volume in compartment B is greater than the volume in compartment A. In which initial situation would this be achieved?
    a. There is a 5% glucose solution in compartment A and a 15% glucose solution in compartment B. The membrane (separating the beaker into compartments A and B) is impermeable to the solute and permeable to the solvent.
    b. There is a 15% glucose solution in compartment A and a 5% glucose solution in compartment B. The membrane (separating the beaker into compartments A and B) is permeable to water and impermeable to glucose.
    c. There is a 15% glucose solution in compartment A and a 15% glucose solution in compartment B. The membrane (separating the beaker into compartments A and

B) is permeable to both solute and solvent.

d. There is a 25% glucose solution in compartment A and a 5% glucose solution in compartment B. The membrane (separating the beaker into compartments A and B) is permeable to solvent but impermeable to glucose.

ANS: A

67. The capillary filtration pressure (arterial end of the capillary) is 30 mm Hg and 7 mm Hg at the venous end. The capillary oncotic pressure is 15 mm Hg. Which of the following is true?
    a. Most water is filtered out of the capillary into the interstitium at the arterial end of the capillary.
    b. The capillary oncotic pressure is responsible for the movement of water from the capillary into the interstitium.
    c. The capillary oncotic pressure is responsible for the flow of blood from the arterial end of the capillary to the venous end of the capillary.
    d. A decline in capillary oncotic pressure causes excess water to be reabsorbed from the interstitium.

    ANS: A

68. Most body potassium (K^+) is located intracellularly. Through what transport mechanism would additional K^+ move from the extracellular compartment to the intracellular compartment?
    a. Osmosis
    b. Active transport pump
    c. Facilitated diffusion
    d. Filtration

    ANS: B

69. A red blood cell (RBC) is immersed in hypertonic saline. Which of the following describes the consequence? The RBC will
    a. replicate by mitosis.
    b. actively pump water into the cell.
    c. undergo hemolysis and burst.
    d. shrink.

    ANS: D

70. Which of the following is not true of glycogen? Glycogen
    a. is a storage form of glucose.
    b. is an alcohol to which three fatty acids attach thereby forming a triglyceride.
    c. helps in the regulation of blood glucose.
    d. is stored within the liver and skeletal muscle.

    ANS: B

71. This substance is composed of glycerol and three fatty acids.
    a. Glycogen
    b. Polypeptide
    c. Steroid
    d. Triglyceride

ANS: D

72. Which of the following is not a lipid or lipoid substance?
    a. Steroids
    b. Vitamins A, D, E, and K
    c. Prostaglandins
    d. Ammonia

    ANS: D

73. Which group is correct?
    a. Lipids: triglycerides and urea
    b. Polysaccharides: glycogen and glucose
    c. Amino acids: ammonia and glycerol
    d. Nitrogen-containing waste: urea and creatinine

    ANS: D