CHAPTER 2—The Cell: An Overview

MULTIPLE CHOICE

1. Which plant tissue did the first observed cells come from?
   a. cork
   b. pollen
   c. a maple leaf
   d. human skin

   ANS: A PTS: 1 DIF: Easy REF: p. 25
   TOP: 2.0 WHY IT MATTERS BLM: Knowledge

2. Which scientist was credited with first observing the cell nucleus?
   a. Theodor Schwann
   b. Anton van Leeuwenhoek
   c. Matthias Schleiden
   d. Robert Brown

   ANS: D PTS: 1 DIF: Easy REF: p. 25
   TOP: 2.0 WHY IT MATTERS BLM: Knowledge

3. Which of the following is synonymous with cellulae?
   a. “small rooms”
   b. “small compartments”
   c. “small spaces”
   d. “small particles”

   ANS: A PTS: 1 DIF: Moderate REF: p. 25
   TOP: 2.0 WHY IT MATTERS BLM: Understanding

4. Who played the most influential role in the discovery of the cell?
   a. Matthias Schleiden
   b. Theodor Schwann
   c. Rudolf Virchow
   d. Robert Hooke

   ANS: D PTS: 1 DIF: Moderate REF: p. 25
   TOP: 2.0 WHY IT MATTERS BLM: Analysis

5. Who played the most influential role in discovering the protists?
   a. Rudolf Virchow
   b. Anton van Leeuwenhoek
   c. Theodor Schwann
   d. Matthias Schleiden

   ANS: B PTS: 1 DIF: Moderate REF: p. 25
   TOP: 2.0 WHY IT MATTERS BLM: Analysis

6. Who played the most influential role in discovering the nucleus?
   a. Matthias Schleiden
   b. Theodor Schwann

c. Robert Hooke
d. Rudolf Virchow

ANS: A PTS: 1 DIF: Moderate REF: p. 25
TOP: 2.0 WHY IT MATTERS BLM: Analysis

7. Which early scientist proposed that cells arise only from pre-existing cells?
a. Theodor Schwann
b. Robert Brown
c. Matthias Schleiden
d. Rudolf Virchow

ANS: D PTS: 1 DIF: Easy REF: p. 26
TOP: 2.0 WHY IT MATTERS BLM: Knowledge

8. Who played the most influential role in proposing that all animals and plants consist of cells that contain a nucleus?
a. Matthias Schleiden
b. Rudolf Virchow
c. Theodor Schwann
d. Anton van Leeuwenhoek

ANS: C PTS: 1 DIF: Moderate REF: p. 26
TOP: 2.0 WHY IT MATTERS BLM: Analysis

9. Who played the most influential role in proposing that all cells come from other cells?
a. Anton van Leeuwenhoek
b. Matthias Schleiden
c. Theodor Schwann
d. Rudolf Virchow

ANS: D PTS: 1 DIF: Moderate REF: p. 26
TOP: 2.0 WHY IT MATTERS BLM: Analysis

10. Which statement correctly describes living cells?
a. None of the cells is derived from pre-existing cells.
b. None of the cells contains a nucleus.
c. Some of the cells utilize organic fuel molecules as energy sources for their activities.
d. Some of the cells respond to outside stimulation.

ANS: C PTS: 1 DIF: Difficult REF: p. 26
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Comprehension

11. Which unit of measure is most commonly used for expressing cell size?
a. centimetre (cm)
b. decimetre (dm)
c. micrometre (μm)
d. millimetre (mm)

ANS: C PTS: 1 DIF: Moderate REF: p. 27
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION

BLM: Knowledge

12. A human egg is approximately 100 µm in size. What is this equal to?
    a. to 10.0 mm
    b. to 0.010 mm
    c. to 0.10 mm
    d. to 0.0010 mm

    ANS: C PTS: 1 DIF: Moderate REF: p. 27
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Application

13. Staining with dye is a technique typically used to enhance contrast and visualization of cellular structures. Which microscope magnifies passing light directly through a specimen?
    a. a fluorescence microscope
    b. a bright field microscope
    c. a confocal laser scanning microscope
    d. a phase-contrast microscope

    ANS: B PTS: 1 DIF: Moderate REF: p. 27
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Comprehension

14. Why can the human eye NOT see cells?
    a. because cells are only about 1 mm in diameter
    b. because cells are only about 0.1 mm in diameter
    c. because cells are only about 5 mm in diameter
    d. because cells are only about 0.5 mm in diameter

    ANS: C PTS: 1 DIF: Moderate REF: p. 27
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Analysis

15. Where is the cell's hereditary information stored?
    a. in RNA
    b. in genes
    c. in glucose
    d. in protein

    ANS: B PTS: 1 DIF: Easy REF: p. 28
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Knowledge

16. Which cell organelle regulates the movement of molecules in and out of the cell?
    a. the nucleus
    b. the ribosomes
    c. the plasma membrane
    d. the cytoplasm

    ANS: C PTS: 1 DIF: Moderate REF: p. 28
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Knowledge

17. Which of the following is an organelle that distinguishes between prokaryotic and eukaryotic cells?
    a. the ribosomes
    b. the nucleus
    c. the cell wall
    d. the plasma membrane

    ANS: B PTS: 1 DIF: Moderate REF: p. 29
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Knowledge

18. In what way are prokaryotic and eukaryotic cells different?
    a. A prokaryotic cell has a cell wall, and a eukaryotic cell does not.
    b. A prokaryotic cell does not have a cell wall, and a eukaryotic cell does.
    c. A prokaryotic cell has a capsule, and a eukaryotic cell does not.
    d. A prokaryotic cell does not have a capsule, and a eukaryotic cell does.

    ANS: C PTS: 1 DIF: Moderate REF: p. 29
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

19. In what way are prokaryotic and eukaryotic cells different?
    a. A prokaryotic cell does not have cytoplasm, and a eukaryotic cell does.
    b. A prokaryotic cell does not have a nucleus, and a eukaryotic cell does.
    c. A prokaryotic cell does not have genetic material, and a eukaryotic cell does.
    d. A prokaryotic cell does not have a flagellum, and a eukaryotic cell does.

    ANS: B PTS: 1 DIF: Moderate REF: p. 29
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

20. Which of the following is synonymous with organelles?
    a. “little cells”
    b. “little organisms”
    c. “little organs”
    d. “little particles”

    ANS: C PTS: 1 DIF: Moderate REF: p. 29
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

21. If organs are analogous to the body, which of the following are organelles analogous to?
    a. an eukaryote
    b. a prokaryote
    c. a cell
    d. an animal

    ANS: C PTS: 1 DIF: Easy REF: p. 29
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

22. What would a comparison of prokaryotic and eukaryotic cells reveal?
    a. That they both have a cell wall.

b. That they both have a nucleus.
c. That they both have an endomembrane system.
d. That they both have DNA.

ANS: D PTS: 1 DIF: Difficult REF: p. 29
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Comprehension

23. Which organism group is found in the greatest abundance on the Earth's surface?
a. plants
b. prokaryotes
c. protists
d. fungi

ANS: B PTS: 1 DIF: Moderate REF: p. 30
TOP: 2.2 PROKARYOTIC CELLS BLM: Knowledge

24. Which group belongs to the domain of the prokaryotes?
a. bacteria
b. protists
c. fungi
d. animals

ANS: A PTS: 1 DIF: Moderate REF: p. 31
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

25. What does chromatin consist of?
a. RNA only
b. only DNA
c. DNA and RNA
d. DNA and associated proteins

ANS: D PTS: 1 DIF: Moderate REF: p. 31
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

26. If a cell contains centrioles, what type of cell must it be?
a. an animal cell
b. a prokaryotic cell
c. a plant cell
d. a fungal cell

ANS: A PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Understanding

27. If a cell contains lysosomes, what type of cell must it be?
a. a fungal cell
b. a prokaryotic cell
c. an animal cell
d. a plant cell

ANS: C PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION

BLM: Understanding

28. If a cell contains chloroplasts, what type of cell must it be?
    a. a prokaryotic cell
    b. a fungal cell
    c. a plant cell
    d. an animal cell

    ANS: C PTS: 1 DIF: Easy REF: p. 32
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

29. If a cell contains tonoplast, what type of cell must it be?
    a. an animal cell
    b. a fungal cell
    c. a prokaryotic cell
    d. a plant cell

    ANS: D PTS: 1 DIF: Easy REF: p. 32
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

30. Which network of protein filaments reinforces the inner surface of the nuclear envelope in animal cells?
    a. actins
    b. tubulins
    c. lamins
    d. chromatins

    ANS: C PTS: 1 DIF: Moderate REF: p. 33
    TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

31. What is the eukaryotic chromosome composed of?
    a. DNA and carbohydrate
    b. DNA only
    c. DNA and protein
    d. RNA only

    ANS: C PTS: 1 DIF: Moderate REF: p. 33
    TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

32. What is the semi-liquid substance within the nucleus called?
    a. chromatin
    b. nuclear gel
    c. cytoplasm
    d. nucleoplasm

    ANS: D PTS: 1 DIF: Moderate REF: p. 33
    TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

33. What is synthesized by the nucleoli found within the nucleus?
    a. mRNA
    b. ribosomal subunits

c. chromatin
d. proteins

ANS: B PTS: 1 DIF: Moderate REF: p. 34
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

34. What can we find in cells that are making large quantities of proteins?
a. numerous cilia
b. numerous ribosomes
c. numerous centrioles
d. numerous chromosomes

ANS: B PTS: 1 DIF: Moderate REF: p. 34
TOP: 2.3 EUKARYOTIC CELLS BLM: Application

35. Which organelle is NOT a part of the endomembrane system?
a. the endoplasmic reticulum
b. the lysosome
c. the nucleolus
d. the Golgi complex

ANS: C PTS: 1 DIF: Moderate REF: p. 34
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

36. What do mitochondria and chloroplasts have in common?
a. Both contain chlorophyll.
b. DNA is present in both.
c. Both are found in animal cells.
d. A nucleus is present in both.

ANS: B PTS: 1 DIF: Moderate REF: p. 34
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Knowledge

37. Which organelle is involved in the synthesis of lipids?
a. the ribosomes
b. the smooth endoplasmic reticulum
c. the Golgi complex
d. the rough endoplasmic reticulum

ANS: B PTS: 1 DIF: Moderate REF: p. 35
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

38. What is the function of the Golgi complex?
a. It synthesizes lipids.
b. It stores nucleic acids.
c. It receives proteins made in the rough ER and chemically modifies them.
d. It synthesizes proteins for export from the cell.

ANS: C PTS: 1 DIF: Moderate REF: p. 36
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

39. Which of the following is the correct path in the endomembrane system, for a protein synthesized on a ribosome attached to the rough ER?
    a. rough ER → smooth ER → Golgi complex → plasma membrane
    b. rough ER → vesicle → smooth ER → plasma membrane
    c. rough ER → vesicle → lysosome → plasma membrane
    d. rough ER → Golgi complex → vesicle → plasma membrane

    ANS: D PTS: 1 DIF: Moderate REF: p. 36
    TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

40. Which cellular component is capable of digestion?
    a. the rough endoplasmic reticulum
    b. the Golgi complex
    c. the ribosomes
    d. a lysosome

    ANS: D PTS: 1 DIF: Difficult REF: p. 37
    TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

41. Cells that are more active in secreting enzymes would most likely exhibit one of the following. Which one?
    a. exocytosis
    b. diffusion
    c. endocytosis
    d. osmosis

    ANS: A PTS: 1 DIF: Moderate REF: p. 37
    TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

42. When molecules are brought into the cell from the exterior, they need to be placed onto one of the following organelles for further routing to other locations. Which of the following organelles serves the purpose of further routing?
    a. the nucleus
    b. lysosomes
    c. mitochondria
    d. ribosomes

    ANS: B PTS: 1 DIF: Moderate REF: p. 37
    TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

43. At one point in human development tissue connects the fingers and the hand appears to be "webbed." Enzymes eventually destroy the cells of the webbing and the fingers separate. Where are these enzymes probably liberated from?
    a. from the nucleus
    b. from the smooth endoplasmic reticulum
    c. from the chromosomes
    d. from the lysosomes

    ANS: D PTS: 1 DIF: Moderate REF: p. 37
    TOP: 2.3 EUKARYOTIC CELLS BLM: Application

44. At which pH do lysosomes function best?

a. 5.0
b. 7.4
c. 6.5
d. 3.2

ANS: A PTS: 1 DIF: Moderate REF: p. 37
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

45. Which organelle contains hydrolytic enzymes for the digestion of proteins, lipids, nucleic acids, and polysaccharides?
a. the Golgi complex
b. the rough endoplasmic reticulum
c. the nucleus
d. the lysosomes

ANS: D PTS: 1 DIF: Moderate REF: p. 37
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

46. If a lysosome is analogous to the animal cell, which of the following is analogous to the plant cell?
a. a chloroplast
b. a cell wall
c. a tonoplast
d. a vacuole

ANS: D PTS: 1 DIF: Difficult REF: p. 37
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Understanding

47. If a lysosome is analogous to the cell, which of the following is analogous to the animal body?
a. a digestive system
b. a muscle system
c. a nervous system
d. a reproductive system

ANS: A PTS: 1 DIF: Difficult REF: p. 37
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Understanding

48. Where does cellular respiration occur?
a. in lysosomes
b. in mitochondria
c. in chloroplasts
d. in peroxisomes

ANS: B PTS: 1 DIF: Easy REF: p. 38
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

49. In the process of cellular respiration, what is converted to water and carbon dioxide during the formation of cellular energy?
a. O_2 and CO_2
b. CO_2 and glucose
c. CO_2 and fats

d. O_2 and glucose

ANS: D PTS: 1 DIF: Moderate REF: p. 38
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

50. What greatly increases the interior surface area of mitochondria?
a. centrioles
b. microfilaments
c. cristae
d. the matrix

ANS: C PTS: 1 DIF: Difficult REF: p. 38
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

51. Which organelles contain DNA?
a. mitochondria and ribosomes
b. mitochondria and lysosomes
c. mitochondria and chloroplasts
d. chloroplasts and ribosomes

ANS: C PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

52. What are cytoskeletal elements assembled from?
a. proteins
b. triglycerides
c. phospholipids
d. glycogen

ANS: A PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

53. What are microfilaments assembled from?
a. keratin
b. tubulin
c. actin
d. myosin

ANS: C PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

54. Which protein are microtubules assembled from?
a. tubulin
b. actin
c. myosin
d. keratin

ANS: A PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

55. Which of the following radiate from the center of the cell and anchor the ER, Golgi complex, lysosomes, and secretory vesicles in place?
a. microfilaments

b. microtubules
c. actins
d. laminins

ANS: B PTS: 1 DIF: Moderate REF: p. 40
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

56. In what way are cilia and flagella similar?
a. They both propel a cell in a same way.
b. They both occur in greater number.
c. They are identical in structure.
d. They are both of the same length.

ANS: C PTS: 1 DIF: Moderate REF: p. 41
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Understanding

57. If a cell is propelled through a medium in a whip-like motion, what does it most likely possesses?
a. a capsule
b. cilia
c. a cell wall
d. a flagellum

ANS: D PTS: 1 DIF: Moderate REF: p. 41
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Understanding

58. If a cell moves through water by moving the fluid over its surface, what does the cell mostly likely possess?
a. a capsule
b. a cell wall
c. cilia
d. a flagellum

ANS: C PTS: 1 DIF: Moderate REF: p. 41
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Understanding

59. From which cellular components do cilia and flagella arise?
a. the chromosomes
b. the centrioles
c. the nucleus
d. the Golgi complex

ANS: B PTS: 1 DIF: Moderate REF: p. 42
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

60. What does the 9 + 2 complex refer to?
a. both the Golgi complex and the endoplasmic reticulum
b. both the cilia and the nucleus
c. both the flagella and the plasma membrane
d. both the flagella and the cilia

ANS: D PTS: 1 DIF: Moderate REF: p. 42
TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

61. What are the principal structural components of cilia and flagella?
    a. intermediate filaments
    b. myosin microfilaments
    c. actin microfilaments
    d. microtubules

    ANS: D PTS: 1 DIF: Easy REF: p. 42
    TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

62. If a flagellum is analogous to the cell, which of the following is analogous to the animal body?
    a. a muscle system
    b. a nervous system
    c. a reproductive system
    d. a digestive system

    ANS: A PTS: 1 DIF: Difficult REF: p. 42
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

63. If a plasma membrane is analogous to the cell, which of the following is analogous to the animal body?
    a. a reproductive system
    b. a muscle system
    c. the skin
    d. a digestive system

    ANS: C PTS: 1 DIF: Moderate REF: p. 42
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

64. Which of the following extends as a bundle from the base to the tip of a flagellum or cilium?
    a. microfilaments
    b. intermediate filaments
    c. actin
    d. microtubules

    ANS: D PTS: 1 DIF: Moderate REF: p. 43
    TOP: 2.3 EUKARYOTIC CELLS BLM: Knowledge

65. Where are cell walls found?
    a. in plant and fungal cells
    b. in plant cells only
    c. in fungal cells only
    d. in animal cells only

    ANS: A PTS: 1 DIF: Moderate REF: p. 43
    TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

66. Which organelles store starch in plants?
    a. amyloplasts
    b. chromoplasts
    c. vacuoles
    d. chloroplasts

    ANS: A PTS: 1 DIF: Moderate REF: p. 43
    TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

67. If a cell wall is analogous to the plant cell, which of the following is analogous to the animal cell?
    a. the cytoskeleton
    b. the capsule
    c. the plasma membrane
    d. the extracellular matrix

    ANS: D PTS: 1 DIF: Difficult REF: p. 43
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Understanding

68. Which pair is mismatched?
    a. plant cell wall : cellulose
    b. intermediate filaments : tubulin
    c. microfilaments : actin
    d. cell membrane : phospholipid bilayer

    ANS: B PTS: 1 DIF: Difficult REF: p. 43
    TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
    BLM: Application

69. Why do scientists believe that mitochondria may have evolved from ancient bacteria?
    a. because both have their own DNA and ribosomes
    b. because both have five chromosomes
    c. because both are surrounded by a cell wall
    d. because the shapes and size of both are exactly the same

    ANS: A PTS: 1 DIF: Difficult REF: p. 44
    TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

70. With which one of the following organelles do chloroplasts share many similarities?
    a. the lysosome
    b. the rough endoplasmic reticulum
    c. the mitochondria
    d. the nucleus

    ANS: C PTS: 1 DIF: Moderate REF: p. 44
    TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

71. Which of the following occurs at chloroplasts?
    a. DNA synthesis
    b. photosynthesis
    c. protein synthesis
    d. cellular digestion

ANS: B PTS: 1 DIF: Easy REF: p. 44
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

72. What do chloroplasts utilize light energy for?
    a. to make carbohydrates
    b. to make proteins
    c. to make nucleic acids
    d. to make fats

ANS: A PTS: 1 DIF: Moderate REF: p. 44
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

73. In which organelle can grana and thylakoids be found as structural components?
    a. ribosomes
    b. mitochondria
    c. chloroplasts
    d. chromoplasts

ANS: C PTS: 1 DIF: Moderate REF: p. 44
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

74. Which of the following may occupy more than 90% of a mature plant cell's volume?
    a. chromoplasts
    b. the rough endoplasmic reticulum
    c. the central vacuole
    d. the nucleus

ANS: C PTS: 1 DIF: Moderate REF: p. 44
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

75. What is another name for the membrane that surrounds the central vacuole?
    a. tonoplast
    b. chloroplast
    c. ionoplast
    d. chromoplast

ANS: A PTS: 1 DIF: Moderate REF: p. 44
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

76. In plant cells, what provides cellular support and protects cells from pathogens?
    a. the cell wall
    b. the cell membrane
    c. the cytoplasm
    d. the plasmodesmata

ANS: A PTS: 1 DIF: Moderate REF: p. 44
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

77. In what way are lysosomes and plant vacuoles similar to each other?
    a. They are both involved in cell movement.
    b. They are both involved in cell digestion.
    c. They are both involved in cell sensitivity.

d. They are both involved in cell reproduction.

ANS: B PTS: 1 DIF: Moderate REF: p. 44
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Understanding

78. The cell wall is composed primarily of cellulose. What is the cellulose composed of?
a. carbohydrates
b. proteins
c. phospholipids
d. steroids

ANS: A PTS: 1 DIF: Moderate REF: p. 45
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

79. What holds the walls of adjacent plant cells together?
a. the secondary cell wall
b. the middle lamella
c. the primary cell wall
d. the cell membrane

ANS: B PTS: 1 DIF: Moderate REF: p. 45
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

80. What is the correct sequence of plant cell wall layers, beginning with the outermost layer and progressing inward to the plasma membrane?
a. middle lamella, primary cell wall, secondary cell wall
b. middle lamella, secondary cell wall, primary cell wall
c. secondary cell wall, primary cell wall, middle lamella
d. secondary cell wall, middle lamella, primary cell wall

ANS: A PTS: 1 DIF: Difficult REF: p. 45
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Comprehension

81. Plant cells permit ions and small molecules to move between adjacent cells by means of cytoplasmic channels in their cell walls. What are these channels called?
a. plasmodesmata
b. cell junctions
c. desmosomes
d. gap junctions

ANS: A PTS: 1 DIF: Moderate REF: p. 45
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Knowledge

82. Over time, cancerous cells typically lose the cell adhesion molecules embedded in their plasma membrane. Loss of these molecules is best associated with which of the following traits of cancer cells?
a. production of new proteins
b. angiogenesis
c. increased rate of cell division
d. migration to new locations in the body

ANS: D PTS: 1 DIF: Difficult REF: p. 45

TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge

83. What are cell adhesion molecules in normal cells partially responsible for?
    a. the ability of cells to migrate to new locations in the body
    b. the ability of cells to do endocytosis
    c. the ability of cells to recognize other cells as "self"
    d. the ability of cells to do exocytosis

    ANS: C PTS: 1 DIF: Moderate REF: p. 45
    TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge

84. What are desmosomes?
    a. a type of anchoring junction
    b. a type of gap junction
    c. a type of tight junction
    d. a type of cell adhesion molecule

    ANS: A PTS: 1 DIF: Moderate REF: p. 46
    TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge

85. What is the function of tight junctions?
    a. to seal the spaces between cells
    b. to give the cell its shape
    c. to allow ions and small molecules to pass between cells
    d. to allow cells to communicate with each other

    ANS: A PTS: 1 DIF: Moderate REF: p. 46
    TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge

86. What is the function of gap junctions?
    a. to allow plant cells to communicate with each other
    b. to allow ions and small molecules to pass between cells
    c. to give the cell its shape
    d. to seal the spaces between cells

    ANS: B PTS: 1 DIF: Moderate REF: p. 46
    TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge

87. Which of the following allow communication between the cells of the heart muscle tissue, resulting in the coordinated beating of the heart?
    a. tight junctions
    b. anchoring junctions
    c. desmosomes
    d. gap junctions

    ANS: D PTS: 1 DIF: Difficult REF: p. 46
    TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Comprehension

88. If a cell contains intermediate filaments, to which organism must the cell then belong?
    a. to a unicellular organism
    b. to a multicellular organism
    c. to a protist
    d. to a bacterium

ANS: B PTS: 1 DIF: Moderate REF: p. 46
TOP: 2.1 BASIC FEATURES OF CELL STRUCTURE AND FUNCTION
BLM: Understanding

89. What are the main components of the extracellular matrix?
    a. glycoproteins
    b. phospholipids
    c. cellulose
    d. glycolipids

ANS: A PTS: 1 DIF: Moderate REF: p. 47
TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge

MATCHING

Match each type of microscopy with the best description.
a. utilizes a thin beam of electrons to examine structures within a cell
b. utilizes lasers to scan a fluorescently stained specimen; a computer focuses the laser to show a single plane through a cell
c. utilizes differences in the way light is bent (refraction) in areas of various cellular density to visualize living cells
d. requires light passing through the specimen; typically involves staining with dye to enhance contrast; usually "fixes" and kills the cell
e. a beam of electrons scanned over a whole cell allows visualization of surface structures; gives a 3D-appearing image

1. phase-contrast microscopy
2. confocal laser scanning microscopy
3. bright field microscopy
4. transmission electron microscopy (TEM)
5. scanning electron microscopy (SEM)

1. ANS: C PTS: 1 DIF: Moderate REF: p. 28
   TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge
2. ANS: B PTS: 1 DIF: Moderate REF: p. 30
   TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge
3. ANS: D PTS: 1 DIF: Moderate REF: p. 29
   TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge
4. ANS: A PTS: 1 DIF: Moderate REF: p. 31
   TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge
5. ANS: E PTS: 1 DIF: Moderate REF: p. 27
   TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Knowledge

Match each description with the cellular structure that corresponds best.
a. contain enzymes for intracellular digestion
b. location of genetic material
c. synthesize subunits that will be used to assemble ribosomes
d. site of protein synthesis
e. composed of cellulose; provides support and protection
f. synthesis of lipids

g. conversion of fuel molecules into energy
h. conversion of light energy into chemical energy
i. storage site in plant cells
j. synthesis of proteins for secretion
k. chemically modifies proteins
l. membrane-bound transport structure

6. smooth ER
7. mitochondria
8. ribosomes
9. chloroplast
10. nucleus
11. lysosomes
12. nucleoli
13. central vacuole
14. Golgi complex
15. cell wall
16. rough ER
17. vesicle

6. ANS: F PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
7. ANS: G PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
8. ANS: D PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
9. ANS: H PTS: 0 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
10. ANS: B PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
11. ANS: A PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
12. ANS: C PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
13. ANS: I PTS: 0 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
14. ANS: K PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
15. ANS: E PTS: 0 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension

16. ANS: J PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
17. ANS: L PTS: 0 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension

Match each description of a cellular structure to the cell type it would be found in. A cell type may be used once, more than once, or not at all.

a. a feature of all living cells
b. found in prokaryotic cells only
c. found in eukaryotic cells only
d. found in plant cells only
e. found in animal cells only

18. nucleus
19. chloroplast
20. ribosome
21. mitocondria
22. nucleoid
23. cell membrane

18. ANS: C PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
19. ANS: D PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
20. ANS: A PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
21. ANS: C PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
22. ANS: B PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension
23. ANS: A PTS: 1 DIF: Moderate REF: p. 31-47
TOP: 2.3 EUKARYOTIC CELLS | 2.5 THE ANIMAL CELL SURFACE
BLM: Comprehension

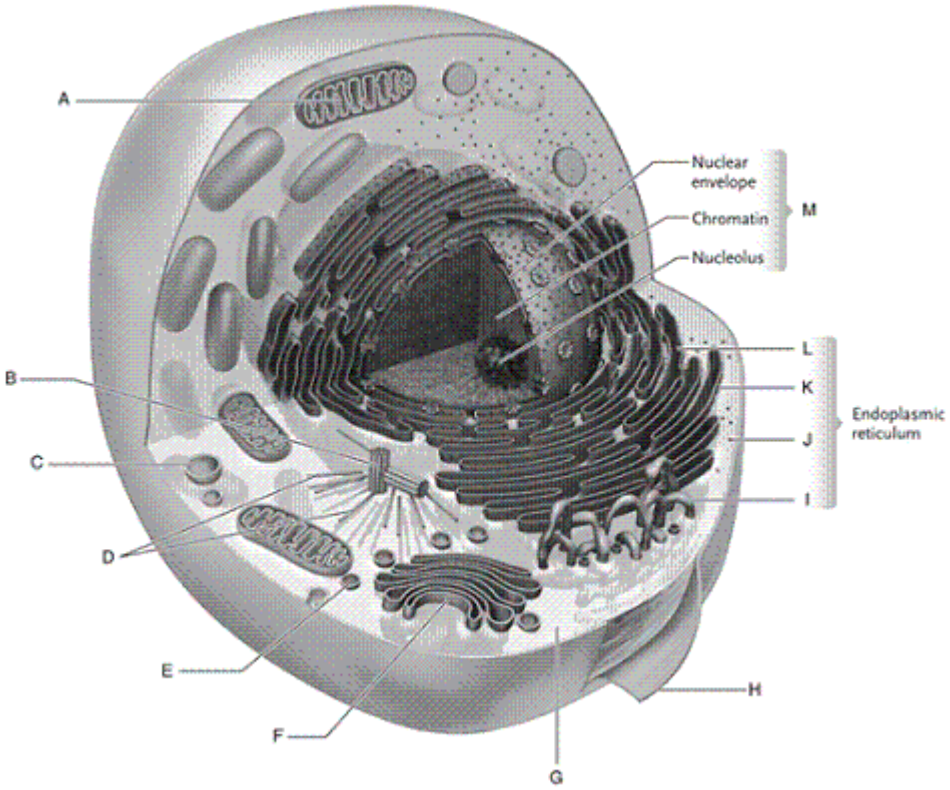
For each descriptive phrase, choose the most appropriate structure of the cytoskeleton from the list of terms. A term may be used once, more than once, or not at all.

a. microfilaments
b. microtubules
c. intermediate filaments

24. comprised of the hollow cylinders of tubulin monomers
25. involved in the process of cytoplasmic streaming
26. involved in moving chromosomes during cell division
27. comprised of two helically coiled actin monomers

24. ANS: B PTS: 1 DIF: Moderate REF: p. 47
TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Comprehension
25. ANS: A PTS: 1 DIF: Moderate REF: p. 47
TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Comprehension
26. ANS: B PTS: 1 DIF: Moderate REF: p. 47
TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Comprehension
27. ANS: A PTS: 1 DIF: Moderate REF: p. 47
TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Comprehension

In this drawing of a eukaryotic animal cell, identify the cellular structures indicated.

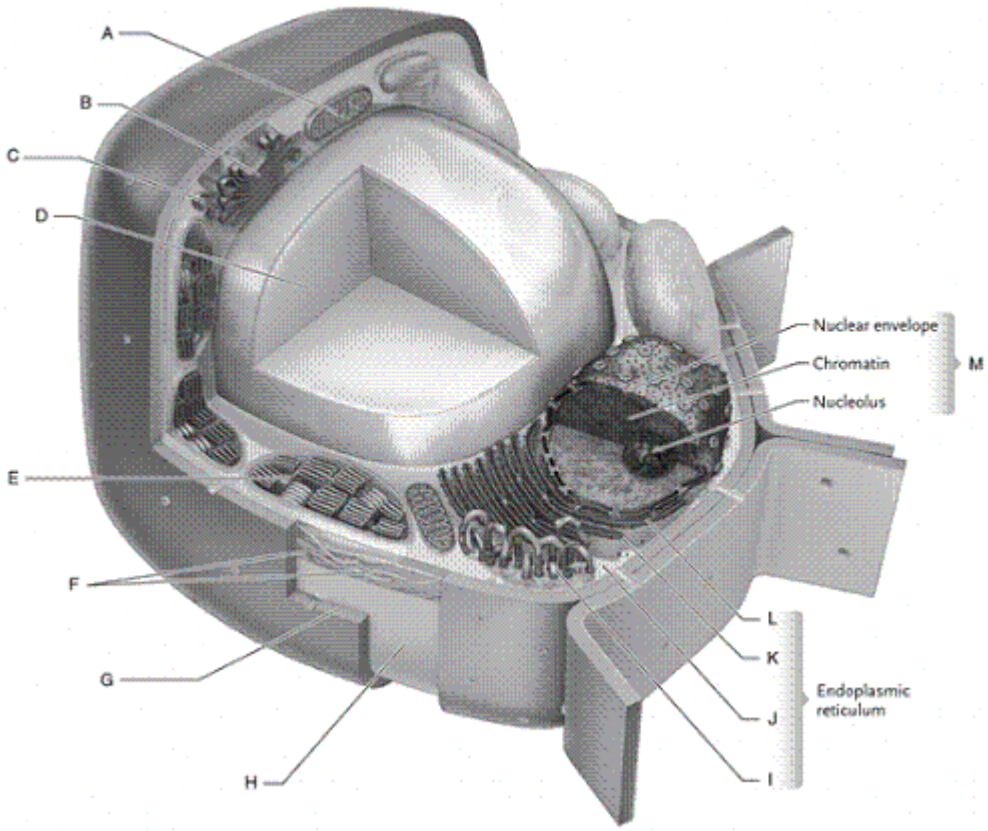


28. cytosol
29. microtubules
30. lysosome
31. attached ribosomes
32. plasma membrane
33. Golgi complex
34. vesicle
35. pair of centrioles
36. free ribosome
37. rough ER
38. mitochondrion
39. nucleus

28. ANS: G PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

29. ANS: D PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
30. ANS: C PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
31. ANS: K PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
32. ANS: H PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
33. ANS: F PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
34. ANS: E PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
35. ANS: B PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
36. ANS: J PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
37. ANS: L PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
38. ANS: A PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
39. ANS: M PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

In this drawing of a eukaryotic plant cell, identify the cellular structures indicated.

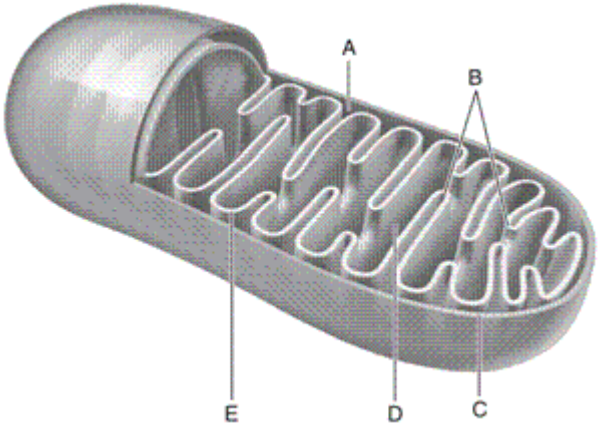


40. chloroplast
41. mitochondrion

42. plasma membrane
43. vesicle
44. free ribosomes
45. Golgi complex
46. microtubules
47. cell wall
48. central vacuole
49. nucleus
50. smooth ER

40. ANS: E PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
41. ANS: A PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
42. ANS: H PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
43. ANS: C PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
44. ANS: J PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
45. ANS: B PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
46. ANS: F PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
47. ANS: G PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
48. ANS: D PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
49. ANS: M PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
50. ANS: I PTS: 1 DIF: Moderate REF: p. 32
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

In this drawing of a mitochondrion, identify the structures indicated.

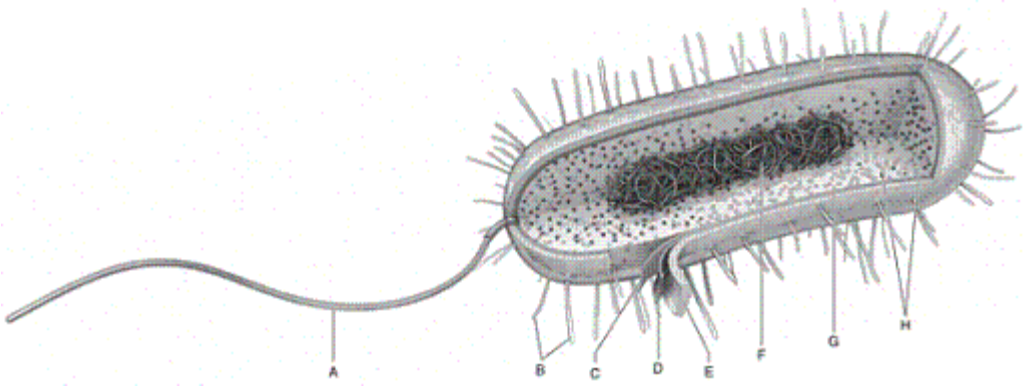


51. cristae
52. outer mitochondrial membrane

53. intermembrane compartment
54. inner mitochondrial membrane
55. matrix

51. ANS: B PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
52. ANS: C PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
53. ANS: A PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
54. ANS: E PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
55. ANS: D PTS: 1 DIF: Moderate REF: p. 39
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

In this drawing of a prokaryotic cell, identify the cellular structures indicated.



56. flagellum
57. cell wall
58. cytoplasm
59. ribosomes
60. capsule
61. plasma membrane
62. nucleoid
63. pili

56. ANS: A PTS: 1 DIF: Moderate REF: p. 30
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
57. ANS: D PTS: 1 DIF: Moderate REF: p. 30
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
58. ANS: G PTS: 1 DIF: Moderate REF: p. 30
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
59. ANS: H PTS: 1 DIF: Moderate REF: p. 30
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
60. ANS: E PTS: 1 DIF: Moderate REF: p. 30
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
61. ANS: C PTS: 1 DIF: Moderate REF: p. 30
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension
62. ANS: F PTS: 1 DIF: Moderate REF: p. 30

TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

63. ANS: B PTS: 1 DIF: Moderate REF: p. 30
TOP: 2.3 EUKARYOTIC CELLS BLM: Comprehension

SHORT ANSWER

1. Why are viruses not considered to be living organisms?

   ANS:
   Viruses consist only of a nucleic acid molecule surrounded by a protein coat. They are not capable of carrying out all the activities of life such as reproduction, response to external stimuli, growth, etc.

   PTS: 1 DIF: Moderate REF: p. 45
   TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Comprehension

2. Explain how a cell isolated from the pancreas would be the same as a muscle cell. How would the two cell types be different?

   ANS:
   Both cell types would contain the same organelles; however, due to the very different functions of the two cells, the proportion of certain organelles would be different. For example, the pancreatic cell which is involved in the production of digestive enzymes would have an extensive rough ER network while a muscle cell would have a large proportion of mitochondria to make the large amount of energy necessary for muscle contraction.

   PTS: 1 DIF: Difficult REF: p. 39
   TOP: 2.5 THE ANIMAL CELL SURFACE BLM: Application

3. If prokaryotic cells do not have mitochondria, where do they produce their cellular energy?

   ANS:
   The cell membrane contains most of the molecular systems needed to metabolize food molecules to ATP.

   PTS: 1 DIF: Moderate REF: p. 30
   TOP: 2.2 PROKARYOTIC CELLS BLM: Knowledge

4. In general, how are prokaryotic and eukaryotic cells different and how are they similar?

   ANS:
   Both mitochondria and chloroplasts contain DNA, RNA, and ribosomes that resemble those found in bacteria. In prokaryotic cells, the genetic material is found in a central region called the nucleoid, while in eukaryotic cells it is contained in the membrane-bound nucleus. Also, eukaryotic cells contain membrane systems that form organelles, while prokaryotic cells do not. A plasma membrane surrounds both prokaryotic and eukaryotic cells.

   PTS: 1 DIF: Moderate REF: p. 32 TOP: 2.3 EUKARYOTIC CELLS
   BLM: Comprehension

5. Why are chloroplasts and mitochondria believed to have originated from ancient prokaryotes?

ANS:
Both mitochondria and chloroplasts contain DNA, RNA, and ribosomes that resemble those found in bacteria.

PTS: 1 DIF: Moderate REF: p. 44
TOP: 2.4 SPECIALIZED STRUCTURES OF PLANT CELLS BLM: Comprehension

6. Compare animal and plant cells; how are they different? How are they the same?

ANS:
Both animal cells and plant cells have a plasma membrane, nucleus, mitochondria, endoplasmic reticulum, ribosomes, and Golgi complex. Animal cells, however, do not have a cell wall, central vacuole, or chloroplasts.

PTS: 1 DIF: Moderate REF: p. 32 TOP: 2.3 EUKARYOTIC CELLS
BLM: Application