

III. 2. Organització cel·lular

Chapter Questions

20) Under which of the following conditions would you expect to find a cell with a predominance of free ribosomes?

- A) a cell that is secreting proteins
- B) a cell that is producing cytoplasmic enzymes
- C) a cell that is constructing its cell wall or extracellular matrix
- D) a cell that is digesting food particles
- E) a cell that is enlarging its vacuole

Topic: Concepts 6.3, 6.4

Skill: Application

21) Which type of organelle is primarily involved in the synthesis of oils, phospholipids, and steroids?

- A) ribosome
- B) lysosome
- C) smooth endoplasmic reticulum
- D) mitochondrion
- E) contractile vacuole

Topic: Concept 6.4

Skill: Knowledge

22) Which structure is the site of the synthesis of proteins that may be exported from the cell?

- A) rough ER
- B) lysosomes
- C) plasmodesmata
- D) Golgi vesicles
- E) tight junctions

Topic: Concept 6.4

Skill: Knowledge

23) Which of the following structures is most directly associated with the secretion of compounds that will become part of the plant cell wall?

- A) smooth ER
- B) rough ER
- C) plasmodesmata
- D) Golgi-derived vesicles
- E) Golgi apparatus

Topic: Concept 6.4

Skill: Comprehension

24) The Golgi apparatus has a polarity or sidedness to its structure and function. Which of the following statements *correctly* describes this polarity?

- A) Transport vesicles fuse with one side of the Golgi and leave from the opposite side.
- B) Proteins in the membrane of the Golgi may be sorted and modified as they move from one side of the Golgi to the other.
- C) Lipids in the membrane of the Golgi may be sorted and modified as they move from one side of the Golgi to the other.
- D) Soluble proteins in the cisternae (interior) of the Golgi may be sorted and modified as they move from one side of the Golgi to the other.
- E) All of the above correctly describe polar characteristics of the Golgi function.

Topic: Concept 6.4

Skill: Comprehension

25) Of the following, which is probably the most common route for membrane flow in the endomembrane system?

- A) Golgi → lysosome → ER → plasma membrane
- B) tonoplast → plasma membrane → nuclear envelope → smooth ER
- C) nuclear envelope → lysosome → Golgi → plasma membrane
- D) rough ER → vesicles → Golgi → plasma membrane
- E) ER → chloroplasts → mitochondrion → cell membrane

Topic: Concept 6.4

Skill: Knowledge

26) Which of the following cell components is *not directly involved in synthesis or secretion*?

- A) ribosome
- B) rough endoplasmic reticulum
- C) Golgi body
- D) smooth endoplasmic reticulum
- E) lysosome

Topic: Concept 6.4

Skill: Comprehension

27) The fact that the outer membrane of the nuclear envelope has bound ribosomes allows one to *most reliably* conclude that

- A) at least some of the proteins that function in the nuclear envelope are made by the ribosomes on the nuclear envelope.
- B) the nuclear envelope is not part of the endomembrane system.
- C) the nuclear envelope is physically continuous with the endoplasmic reticulum.
- D) small vesicles from the Golgi fuse with the nuclear envelope.
- E) nuclear pore complexes contain proteins.

Topic: Concept 6.4

Skill: Comprehension

28) The difference in lipid and protein composition between the membranes of the endomembrane system is largely determined by

- A) the physical separation of most membranes from each other.
- B) the transportation of membrane among the endomembrane system by small membrane vesicles.
- C) the function of the Golgi apparatus in sorting membrane components.
- D) the modification of the membrane components once they reach their final destination.
- E) the synthesis of lipids and proteins in each of the organelles of the endomembrane system.

Topic: Concept 6.4

Skill: Comprehension

29) In animal cells, hydrolytic enzymes are packaged to prevent general destruction of cellular components. Which of the following organelles functions in this compartmentalization?

- A) chloroplast
- B) lysosome
- C) central vacuole
- D) peroxisome
- E) glyoxysome

Topic: Concept 6.4

Skill: Knowledge

- 30) Which of the following statements *correctly* describes some aspect of protein excretion in prokaryotic cells?
- A) Prokaryotes are unlikely to be able to excrete proteins because they lack an endomembrane system.
 - B) The mechanism of protein excretion in prokaryotes is probably the same as that in eukaryotes.
 - C) Proteins that are excreted by prokaryotes are synthesized on ribosomes that are bound to the cytoplasmic surface of the plasma membrane.
 - D) In prokaryotes, the ribosomes that are used for the synthesis of secreted proteins are located outside of the cell.
 - E) Prokaryotes contain large pores in their plasma membrane that permit the movement of proteins out of the cell.

Topic: Concept 6.4

Skill: Application

Refer to the following five terms to answer the following questions. Choose the most appropriate term for each phrase. Each term may be used once, more than once, or not at all.

- A. lysosome
- B. vacuole
- C. mitochondrion
- D. Golgi apparatus
- E. peroxisome

- 31) produces and modifies polysaccharides that will be secreted

Topic: Concept 6.4

Skill: Knowledge

- 32) contains hydrolytic enzymes

Topic: Concept 6.4

Skill: Knowledge

- 33) helps to recycle the cell's organic material

Topic: Concept 6.4

Skill: Knowledge

- 34) one of the main energy transformers of cells

Topic: Concept 6.5

Skill: Knowledge

- 35) contains its own DNA and ribosomes

Topic: Concept 6.5

Skill: Knowledge

- 36) a compartment that often takes up much of the volume of a plant cell

Topic: Concept 6.4

Skill: Knowledge

37) contains enzymes that transfer hydrogen from various substrates to oxygen, producing   

Topic: Concept 6.5

Skill: Knowledge

38) a versatile plant compartment that may hold reserves of organic compounds or inorganic ions

Topic: Concept 6.4

Skill: Knowledge

39) Of the following, what do both mitochondria and chloroplasts have in common?

A) ATP is produced.

B) DNA is present.

C) Ribosomes are present.

D) B and C only

E) A, B, and C are correct.

Topic: Concept 6.5

Skill: Knowledge

40) Grana, thylakoids, and stroma are all components found in

A) vacuoles.

B) chloroplasts.

C) mitochondria.

D) lysosomes.

E) nuclei.

Topic: Concept 6.5

Skill: Knowledge

41) Organelles other than the nucleus that contain DNA include

A) ribosomes.

B) mitochondria.

C) chloroplasts.

D) B and C only

E) A, B, and C

Topic: Concept 6.5

Skill: Knowledge

42) Which of the following statements *incorrectly* describes common structural features of an animal secretory cell and a photosynthetic plant cell?

A) Both cells have Golgi apparatus.

B) Both cells have mitochondria.

C) Both cells have chloroplasts.

D) Both cells have a plasma membrane.

E) Both cells have a nucleus.

Topic: Concept 6.5

Skill: Comprehension

43) The chemical reactions involved in respiration are virtually identical between prokaryotic and eukaryotic cells. In eukaryotic cells, ATP is synthesized primarily on the inner membrane of the mitochondria. Where are the corresponding reactions likely to occur in prokaryotic respiration?

- A) in the cytoplasm
- B) on the inner mitochondrial membrane
- C) on the endoplasmic reticulum
- D) on the plasma membrane
- E) on the nuclear envelope

Topic: Concept 6.5
Skill: Comprehension

44) A biologist ground up some plant leaf cells and then centrifuged the mixture to fractionate the organelles. Organelles in one of the heavier fractions could produce ATP in the light, while organelles in the lighter fraction could produce ATP in the dark. The heavier and lighter fractions are most likely to contain, respectively,

- A) mitochondria and chloroplasts.
- B) chloroplasts and peroxisomes.
- C) peroxisomes and chloroplasts.
- D) chloroplasts and mitochondria.
- E) mitochondria and peroxisomes.

Topic: Concept 6.5
Skill: Comprehension

45) Which of the following is a place where both DNA and ribosomes are *unlikely* to be found in *any* type of cell?

- A) stroma of chloroplasts
- B) mitochondrial matrix
- C) nucleus
- D) cytoplasm
- E) Golgi apparatus

Topic: Concept 6.5
Skill: Comprehension

46) All of the following are correct matches of the location of a protein and the location of its synthesis *except*

- A) plasma membrane protein-rough ER.
- B) mitochondrial membrane protein-free cytoplasmic ribosomes.
- C) cytoplasmic proteins-free cytoplasmic ribosomes.
- D) chloroplast stromal protein-chloroplast ribosomes.
- E) mitochondrial matrix protein-rough ER.

Topic: Concept 6.5
Skill: Application

47) Which of the following are capable of converting light energy to chemical energy?

- A) chloroplasts
- B) mitochondria
- C) leucoplasts
- D) peroxisomes
- E) Golgi bodies

Topic: Concept 6.5

Skill: Knowledge

48) A cell has the following molecules and structures: enzymes, DNA, ribosomes, plasma membrane, and mitochondria. It could be a cell from

- A) a bacterium.
- B) an animal, but not a plant.
- C) a plant, but not an animal.
- D) a plant or an animal.
- E) any kind of organism.

Topic: Concept 6.5

Skill: Comprehension

49) Which of the following is *not* a known function of the cytoskeleton?

- A) to maintain a critical limit on cell size
- B) to provide mechanical support to the cell
- C) to maintain the characteristic shape of the cell
- D) to hold mitochondria and other organelles in place within the cytosol
- E) to assist in cell motility by interacting with specialized motor proteins

Topic: Concept 6.6

Skill: Comprehension

50) Motor proteins provide for molecular motion in cells by interacting with what types of cellular structures?

- A) sites of energy production in cellular respiration
- B) membrane proteins
- C) ribosomes
- D) cytoskeletons
- E) cellulose fibers in the cell wall

Topic: Concept 6.6

Skill: Knowledge

51) Cells can be described as having a cytoskeleton of internal structures that contribute to the shape, organization, and movement of the cell. All of the following are part of the cytoskeleton *except*

- A) the nuclear envelope.
- B) microtubules.
- C) microfilaments.
- D) intermediate filaments.
- E) actin.

Topic: Concept 6.6

Skill: Knowledge

52) Which of the following pairs is mismatched?

- A) nucleolus-ribosomal RNA
- B) nucleus-DNA replication
- C) lysosome-protein synthesis
- D) cell membrane-lipid bilayer
- E) cytoskeleton-microtubul

Topic: Concept 6.6

Skill: Comprehension

53) Of the following, which cell structure would most likely be visible with a light microscope that has been manufactured to the maximum resolving power possible?

- A) mitochondrion
- B) microtubule
- C) ribosome
- D) largest microfilament
- E) nuclear pore

Topic: Concept 6.6
Skill: Comprehension

54) Which of the following contain the 9 + 2 arrangement of microtubules?

- A) cilia
- B) centrioles
- C) flagella
- D) A and C only
- E) A, B, and C

Topic: Concept 6.6
Skill: Knowledge

55) Cells would be unable to form cilia or flagella if they did not have

- A) centrosomes.
- B) ribosomes.
- C) actin.
- D) A and B only
- E) A, B, and C

Topic: Concept 6.7
Skill: Comprehension

56) Which of the following possesses a microtubular structure similar to a basal body?

- A) centriole
- B) lysosome
- C) nucleolus
- D) peroxisome
- E) ribosome

Topic: Concept 6.6
Skill: Knowledge

57) Microfilaments are well known for their role in which of the following?

- A) amoeboid movement
- B) formation of cleavage furrows
- C) contracting of muscle cells
- D) A and B only
- E) A, B, and C

Topic: Concept 6.6
Skill: Comprehension

58) Which of the following statements about the cytoskeleton is *incorrect*?

- A) The dynamic aspect of cytoskeletal function is made possible by the assembly and disassembly of a few simple types of proteins into large aggregates.
- B) Microfilaments are structurally rigid and resist compression, while microtubules resist tension (stretching).
- C) Movement of cilia and flagella is the result of motor proteins causing microtubules to move relative to each other.
- D) Chemicals that block the assembly of the cytoskeleton would prevent many different processes in cells.
- E) Transport vesicles among the membranes of the endomembrane system depend on the function of the cytoskeleton.

Topic: Concept 6.6

Skill: Application

59) All of the following structures and proteins are directly associated with movement in cells or by cells *except*

- A) cilia.
- B) dynein.
- C) actin.
- D) flagella.
- E) centrosomes.

Topic: Concept 6.6

Skill: Knowledge

60) All of the following serve an important role in determining or maintaining the structure of plant cells. Which of the following are distinct from the others in terms of composition?

- A) microtubules
- B) microfilaments
- C) plant cell walls
- D) intermediate filaments
- E) nuclear lamina

Topic: Concept 6.7

Skill: Comprehension

61) Which of the following relationships between cell structures and their respective functions is *not* correct?

- A) cell wall: support, protection
- B) chloroplasts: chief sites of cellular respiration
- C) chromosomes: genetic control information
- D) ribosomes: site of protein synthesis
- E) mitochondria: formation of ATP

Topic: Concept 6.7

Skill: Comprehension

62) The cell walls of bacteria, fungi, and plant cells and the extracellular matrix of animal cells are all external to the plasma membrane. Which of the following is *not* a characteristic of all of these extracellular structures?

- A) They must be highly permeable to water and small molecules in order to allow cells to exchange matter and energy with their environment.
- B) They must permit information transfer between the cell's external environment and the cytoplasm.
- C) They must provide a rigid structure that maintains an appropriate ratio of cell surface area to volume.
- D) They are constructed of materials that are largely synthesized in the cytoplasm and then transported out of the cell.
- E) They are composed of a mixture of proteins and carbohydrates.

Topic: Concept 6.7

Skill: Application

63) When a potassium ion (K^+) moves from the soil into the vacuole of a cell on the surface of a root, it must pass through several cellular structures. Which of the following correctly describes the order in which these structures will be encountered by the ion?

- A) plasma membrane → primary cell wall → cytoplasm → tonoplast
- B) secondary cell wall → plasma membrane → primary cell wall → cytoplasm → tonoplast
- C) primary cell wall → plasma membrane → cytoplasm → tonoplast
- D) primary cell wall → plasma membrane → tonoplast → cytoplasm → vacuole
- E) tonoplast → primary cell wall → plasma membrane → cytoplasm

Topic: Concept 6.7

Skill: Comprehension

64) A cell lacking the ability to make and secrete glycoproteins would most likely be deficient in its

- A) nuclear DNA.
- B) extracellular matrix.
- C) Golgi apparatus.
- D) B and C only
- E) A, B, and C

Topic: Concept 6.7

Skill: Comprehension

65) The extracellular matrix is thought to participate in the regulation of animal cell behavior by communicating information from the outside to the inside of the cell via

- A) gap junctions.
- B) the nucleus.
- C) DNA and RNA.
- D) integrins.
- E) plasmodesmata.

Topic: Concept 6.7

Skill: Knowledge

66) Plasmodesmata in plant cells are *most* similar in function to which of the following structures in animal cells?

- A) peroxisomes
- B) desmosomes
- C) gap junctions
- D) extracellular matrix
- E) tight junctions

Topic: Concept 6.7
Skill: Comprehension

67) Ions can travel directly from the cytoplasm of one animal cell to the cytoplasm of an adjacent cell through

- A) plasmodesmata.
- B) intermediate filaments.
- C) tight junctions.
- D) desmosomes.
- E) gap junctions.

Topic: Concept 6.7
Skill: Knowledge

Self-Quiz Questions

73) The symptoms of a certain inherited disorder in humans include breathing problems and, in males, sterility. Which of the following is a reasonable hypothesis for the molecular basis of this disorder?

- A) a defective enzyme in the mitochondria
- B) defective actin molecules in cellular microfilaments
- C) defective dynein molecules in cilia and flagella
- D) abnormal hydrolytic enzymes in the lysosomes
- E) defective ribosome assembly in the nucleolus

74) Choose the statement that correctly characterizes bound ribosomes.

- A) Bound ribosomes are enclosed in their own membrane.
- B) Bound and free ribosomes are structurally different.
- C) Bound ribosomes generally synthesize membrane proteins and secretory proteins.
- D) The most common location for bound ribosomes is the cytoplasmic surface of the plasma membrane.
- E) All of the above.

75) Which of the following is not considered part of the endomembrane system?

- A) nuclear envelope
- B) chloroplast
- C) Golgi apparatus
- D) plasma membrane
- E) ER

76) Cells of the pancreas will incorporate radioactively labeled amino acids into proteins. This "tagging" of newly synthesized proteins enables a researcher to track the location of these proteins in a cell. In this case, we are tracking an enzyme that is eventually secreted by pancreatic cells. Which of the following is the most likely pathway for movement of this protein in the cell?

- A) ER → Golgi → nucleus
- B) Golgi → ER → lysosome
- C) nucleus → ER → Golgi
- D) ER → Golgi → vesicles that fuse with plasma membrane
- E) ER → lysosomes → vesicles that fuse with plasma membrane

77) Which of the following structures is common to plant *and* animal cells?

- A) chloroplast
- B) wall made of cellulose
- C) tonoplast
- D) mitochondrion
- E) centriole

78) Which of the following is present in a prokaryotic cell?

- A) mitochondrion
- B) ribosome
- C) nuclear envelope
- D) chloroplast
- E) ER

79) Which type of cell would probably provide the best opportunity to study lysosomes?

- A) muscle cell
- B) nerve cell
- C) phagocytic white blood cell
- D) leaf cell of a plant
- E) bacterial cell

80) Which of the following statements is a correct distinction between prokaryotic and eukaryotic cells attributable to the absence of a prokaryotic cytoskeleton?

- A) Organelles are found only in eukaryotic cells.
- B) Cytoplasmic streaming is not observed in prokaryotes.
- C) Only eukaryotic cells are capable of movement.
- D) Prokaryotic cells have cell walls.
- E) Only the eukaryotic cell concentrates its genetic material in a region separate from the rest of the cell.

81) Which of the following structure-function pairs is *mismatched*?

- A) nucleolus-ribosome production
- B) lysosome-intracellular digestion
- C) ribosome-protein synthesis
- D) Golgi-protein trafficking
- E) microtubule-muscle contraction

- 82) Cyanide binds with at least one of the molecules involved in the production of ATP. Following exposure of a cell to cyanide, most of the cyanide could be expected to be found within the
- A) mitochondria.
 - B) ribosomes.
 - C) peroxisomes.
 - D) lysosomes.
 - E) endoplasmic reticulum.

Key

20 B	30 C	40 B	50 D	60 C	75 B
21 C	31 D	41 D	51 A	61 B	76 D
22 A	32 A	42 C	52 C	62 C	77 D
23 D	33 A	43 D	53 A	63 C	78 B
24 E	34 C	44 D	54 D	64 D	79 C
25 D	35 C	45 E	55 D	65 D	80 B
26 E	36 B	46 E	56 A	66 C	81 E
27 A	37 E	47 A	57 E	67 E	82 A
28 C	38 B	48 D	58 B	73 C	
29 B	39 E	49 D	59 E	74 C	