Name_____ **CHAPTER 4 STUDY GUIDE**

THE **CELL AND ITS** ENVIRONMENT

Section 4.1 Membrane Structure

In your textbook, read about the cell theory and properties of the. plasma membrane.

Use each of the terms below just once to complete the passage:

Virchow Schleiden Schwann Hooke cell theory living cork cells functions microscopes dead walls

The discovery of cells in 1665 was recorded by (1)_____. He saw that (2)_____is composed of many empty cubicles that he named (3)_____. The cork cells that he observed were (4)_____. He saw only their borders, which he named (5)_____. Limited by poor (6)_____, further discoveries were slow. It was not until 1838 that (7)_____concluded that all plants are composed of cells, the basic unit of a plant's (8)_____. In 1839, (9)_____concluded the same about animals. In 1858, (10)_____concluded that all cells arise from other (11)_____cells. The collective work of Hooke, Schleiden, Schwann, Virchow, and other scientists came to form the basis of the (12)_____.

Determine if the statement is true. If it is not, rewrite the italicized part to make it true.

13. Cells live in a *solid* environment._____
14. The *nuclear* membrane forms the outer boundary of a cell. _____
15. The *outside environment* regulates which particles can enter and leave the cell._____
16. *Glucose* produced during respiration passes from inside the cell, across the membrane, and out into the environment._____
17. *Carbon dioxide* molecules move across the membrane and into the cell, where they are used in respiration._____
18. The plasma membrane is *impermeable*._____
19. Particles that are soluble in *lipids* cross the membrane easily._____
20. Different types .of cells are permeable to *the same types* of particles._____

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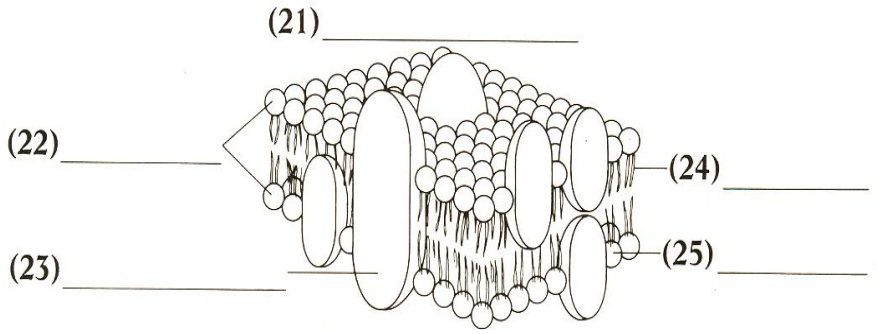
Section 4.1 Membrane Structure continued

In your textbook, read about the model of the plasma membrane.

Write a title for the diagram and then label its parts. Use these choices:

protein molecule lipid bilayer polar head fatty acid fluid mosaic model



Answer the following questions.

26. What is a lipid bilayer?

27. What are the functions of cholesterol molecules embedded in the lipid bilayer?

28. What are the bumps in the phospholipid bilayer? How are they arranged in the bilayer?

29. Why is the current model of membrane structure called fluid mosaic?

30. What component of the plasma membrane forms most of the cell's outer boundary?

31. What are three ways that membrane proteins function?

32. Why does each membrane have its own distinct permeability characteristics?

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Section 4.2 Membrane Function

In your textbook, read about diffusion and osmosis.

Circle the letter of the choice that is the best response or that best completes the statement.

1. In nature there is a tendency toward
   a. nonrandomness. b. randomness. c. order. d. organization.

2. Which substance when placed in water will diffuse?
   a. copper sulfate b. marbles c. iron d. gold

3. When copper sulfate ions are placed in water, what type of movement of the ions will result in uniform distribution?
   a. nonrandom b. random c. organized d. orderly

4. The random movement of ions and other particles is called
   a. osmosis. b. phagocytosis. c. diffusion. d. active transport.

5. Particles may diffuse through all of the following *except*
   a. air. b. solids. c. water. d. liquids.

6. Oxygen, carbon dioxide, and substances soluble in lipids can cross a cell membrane by a. osmosis. b. hydrolysis. c. diffusion. d. nonrandomness.

Write the word(s) that best completes each statement. Use these choices:
Elodea red blood cell osmosis shrink passive transport diffusion dynamic equilibrium

7. The diffusion of water into and out of cells across a selectively permeable membrane is called _____.

8. Osmotic balance occurs when _____ is established.

9. When a _____ is removed from plasma and placed in pure water, it will swell and burst.

10. _____ is a freshwater plant that has evolved ways of maintaining osmotic balance.

11. If a freshwater plant were placed in salt water, the cell would _____

12. Osmosis and _____ are processes by which water, lipids, and lipid-soluble particles permeate membranes.

13. Movement of particles across a membrane without the cell using energy is called _____.

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Section 4.2 Membrane Function continued

In your textbook, read about facilitated diffusion and active transport.

Answer the following questions.

14. What is the name of the proteins that aid ions and large, insoluble particles across the cell membrane? Are these proteins selective? Explain.

15. What is facilitated diffusion?

16. What are the two names that are given to the simplest type of transport protein?

17. What is the name of the transport proteins that change shape to allow certain molecules to cross the plasma membrane?

18. What are three types of passive transport and what is their distinguishing characteristic?

Complete the following table by checking the correct column for each example.

Example	**Passive Transport**	**Active Transport**
19. The random movement of ions		
20. Net movement of particles from a region of lesser concentration to a region of greater concentration		
21.The movement of oxygen and carbon dioxide across cell membranes		
22. Energy is needed to move particles through the membrane.		
23. Cells in the gills of marine fish actively pump out salts.		
24. Water molecules move across a membrane without any energy input from the cell.		

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Section 4.2 Membrane Function continued

In your textbook, read about endocytosis and exocytosis and cell walls.

Circle the letter of the choice that is the best response or that best completes the statement.

25. The process by which the plasma membrane engulfs and then takes in substances from the cell's environment is known as
    a. endocytosis. b. exocytosis. c. passive transport d. osmosis.

26. Endocytosis is common in
    a. nerve cells. b. plants. c. unicellular organisms. d. algae.

27. Which of the following is *not* endocytosis?
    a. phagocytosis
    b. pinocytosis
    c. passive transport
    d. the process by which cholesterol enters a cell

28. Which of the following molecules may be brought into the cell by receptor-aided endocytosis?
    a. liquid droplets b. cholesterol c. water d. oxygen

29. The reverse process of endocytosis is
    a. phagocytosis. b. pinocytosis. c. osmosis d. exocytosis.

30. Undigested particles can be eliminated by
    a. exocytosis. b. endocytosis. c. pinocytosis. d. phagocytosis

Complete the table. To answer Exercise 31 and 32, write yes or no in each column. To answer Exercise 33, write the correct word(s) in each column.

	Endocytosis			Exocytosis
	Phagocytosis	Pinocytosis	Receptor-aided	
Are substances taken into the cell?				
Are substances being expelled from the cell?				
What types of substance(s) are taken into or expelled from the cell?				

34. What types of organisms have a cell wall? What is a plant cell wall mostly composed of?

35. What are two functions of the cell wall?

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Chapter 4 Vocabulary

Review the new words in Chapter 4 of your textbook.

Use the terms below to complete the sentences. You will not use all the terms.

active transport	facilitated diffusion	plasma membrane
cell theory	fluid mosaic model	selectively permeable membrane
cell wall	middle lamella	
diffusion	osmosis	transport protein
dynamic equilibrium	passive transport	vesicle
endocytosis	phagocytosis	
exocytosis	pinocytosis	

1. The concept that forms the basis of modem biology is called the _____

2. In plants, between the two primary cell walls of adjacent cells there is an area called the _____

3. _____is the diffusion of water into and out of cells across a(n)

4. Solid chunks of material are taken in by the plasma membrane through a process called _____

5. The _____is the outer boundary of a cell that encloses its contents.

6. A small sac formed by a membrane is known as a(n)_____

7. In facilitated diffusion, _____ the plasma membrane. are used to aid the passage of particles across

8. Some cells rid themselves of wastes or secrete substances needed elsewhere through a process called _____

9. The name of the process by which liquid droplets are taken in by the plasma membrane is _____

10. Water, lipids, and lipid-soluble substances are moved across membranes by the process of _____

11. The movement of particles across a plasma membrane involving the use of cell energy is called _____.