

CHAPTER

4

DIRECTED READING

Cells and Their Environment

► Section 4-1: Passive Transport

Diffusion Is Caused by the Random Movement of Particles

Read each question, and write your answer in the space provided.

1. What is passive transport? Why is diffusion an example of passive transport?

2. How does the cell membrane help cells maintain homeostasis?

3. What determines the direction in which a substance diffuses across a membrane?

4. Describe the state of equilibrium.

Water Diffuses into and out of Cells by Osmosis

In the space provided, explain how the terms in each pair differ in meaning.

5. osmosis, diffusion

6. hypertonic solution, hypotonic solution

7. isotonic solution, equilibrium

Proteins Help Some Substances Cross the Cell Membrane

Mark each statement below T if it is true or F if it is false.

- _____ 8. Most polar molecules cannot cross cell membranes without the help of certain proteins.
- _____ 9. An ion channel is a selectively permeable protein with a pore.
- _____ 10. The pores of ion channels are always open.
- _____ 11. Carrier proteins require cells to expend energy when they transport substances across a cell membrane.
- _____ 12. Carrier proteins are used in a process called facilitated diffusion.
- _____ 13. Ion channels do not depend on concentration gradients to move ions and polar molecules across a cell membrane.
- _____ 14. Random motion causes the movement of ions through ion channels.

► Section 4-2: Active Transport

Some Substances Are Transported Against a Concentration Gradient

Complete each statement by writing the correct term or phrase in the space provided.

- 1. The transport of a substance across the cell membrane against its concentration gradient is called _____ .
- 2. Active transport requires the cell to use _____ .
- 3. The energy needed for active transport is usually supplied by _____ .
- 4. The sodium-potassium pump is a(n) _____ .

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5. The concentration of sodium ions inside the cell is usually _____ than the concentration of sodium ions outside the cell.
6. The concentration of potassium ions inside the cell is usually _____ than the concentration of potassium ions outside the cell.
7. The sodium-potassium pump picks up _____ ions outside the cell.
8. The sodium-potassium pump releases _____ ions inside the cell.

Vesicles Move Substances Across Membranes

Read each question, and write your answer in the space provided.

9. Explain why proteins and polysaccharides cannot enter and leave cells through membrane proteins.

10. What is the difference between endocytosis and exocytosis?

11. How is a vesicle formed in endocytosis?

12. What happens to a vesicle in exocytosis?

13. How do sodium-potassium pumps support the efficient functioning of cells?

Membrane Receptor Proteins Receive Information

In the space provided, write the letter of the description that best matches the term or phrase.

- | | |
|-----------------------------------|------------------------------------------------------------------------------------------------------|
| _____ 14. signal molecule | a. a large protein in the cell membrane that transports a specific ion |
| _____ 15. receptor protein | b. acts as a signal molecule in the cytoplasm |
| _____ 16. ion channel | c. a protein that binds to a specific signal molecule |
| _____ 17. second messenger | d. speeds up chemical reactions in the cell |
| _____ 18. enzyme action | e. a drug that interferes with the binding of signal molecules to receptor proteins in heart muscles |
| _____ 19. beta blocker | f. carries information throughout the body and to other cells |
| _____ 20. changes in permeability | g. occur when a receptor protein is coupled with an ion channel |

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