



## 7.3 Cell Transport

### Lesson Objectives

-  Describe passive transport.
-  Describe active transport.

### Lesson Summary

**Passive Transport** The movement of materials across the cell membrane without using cellular energy is called passive transport.

- ▶ **Diffusion** is the process by which particles move from an area of high concentration to an area of lower concentration.
- ▶ **Facilitated diffusion** is the process by which molecules that cannot directly diffuse across the membrane pass through special protein channels.
- ▶ **Osmosis** is the facilitated diffusion of water through a selectively permeable membrane.
  - **Aquaporins** are water channel proteins that allow water to pass through cell membranes.
  - Two adjacent solutions are **isotonic** if they have the same concentrations of solute.
  - **Hypertonic** solutions have a higher concentration of solute compared to another solution.
  - **Hypotonic** solutions have a lower concentration of solute compared to another solution.
- ▶ **Osmotic pressure** is the force caused by the net movement of water by osmosis.

**Active Transport** The movement of materials against a concentration difference is called active transport. Active transport requires energy.

- ▶ Transport proteins that act like pumps use energy to move small molecules and ions across cell membranes.
- ▶ The bulk transport of large molecules and clumps of materials into and out of cells occurs by movements of the cell membrane, which require energy.

## Passive Transport

*For Questions 1–4, write the letter of the correct answer on the line at the left.*

- \_\_\_\_\_ 1. Which of the following must be true for diffusion to occur?
- A. Molecules or particles must have different sizes.
  - B. Special protein channels must always be available.
  - C. There must be areas of different concentrations.
  - D. Energy must be available.

- \_\_\_\_\_ 2. Which term refers to the condition that exists when *no* net change in concentration results from diffusion?  
 A. concentration                      C. osmosis  
 B. equilibrium                          D. randomness
- \_\_\_\_\_ 3. Air has a higher concentration of oxygen molecules than does the cytoplasm of your lung cells. Where in your lungs will there be a net increase of oxygen?  
 A. in the air breathed in              C. outside of the lung cells  
 B. in the air breathed out              D. inside of the lung cells
- \_\_\_\_\_ 4. Which of the following statements tells how facilitated diffusion differs from simple diffusion?  
 A. Particles move through cell membranes without the use of energy by cells.  
 B. Particles tend to move from high concentration to lower concentration.  
 C. Particles move within channel proteins that pass through cell membranes.  
 D. Particles tend to move more slowly than they would be expected to move.

*For Questions 5–7, match the situation with the result. Write the letter of the correct answer on the line at the left.*

**Situation**

**Result**

- |  |                             |
|--|-----------------------------|
| _____ 5. Cells are in an isotonic solution.  | A. The cells lose water.    |
| _____ 6. Cells are in a hypertonic solution. | B. The cells gain water.    |
| _____ 7. Cells are in a hypotonic solution.  | C. The cells stay the same. |

8. **THINK VISUALLY** In the table below, draw how each type of cell will look after being placed in a hypertonic solution.

Appearance of Cells in a Hypertonic Solution	
Animal Cells	Plant Cells

## Active Transport

9. What is the function of active transport in moving small molecules and ions across cell membranes? Give an example.

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10. How does ATP enable transport proteins to move ions across a cell membrane?

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11. What are the proteins used in active transport called? \_\_\_\_\_

12. Complete the table to summarize the types of bulk transport.

Types of Bulk Transport	
Type	Description
Endocytosis	
Phagocytosis	
Exocytosis	

### Apply the Big idea

13. Most sports drinks are isotonic in relation to human body fluids. Explain why athletes should drink solutions that are isotonic to body fluids when they exercise rather than ones that are hypotonic to body fluids (contain a greater proportion of water in comparison to the fluids in and around human body cells).

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