

SECTION 5-1 REVIEW

PASSIVE TRANSPORT

VOCABULARY REVIEW Explain the relationship between the terms in each of the following pairs of terms.

1. concentration gradient, diffusion _____

2. osmosis, turgor pressure _____

3. hypertonic, plasmolysis _____

MULTIPLE CHOICE Write the correct letter in the blank.

- _____ 1. Substances that can pass through cell membranes by diffusion include
 a. Na^+ ions. b. Cl^- ions. c. glucose. d. oxygen.

- _____ 2. The contractile vacuole of a paramecium should be active when the paramecium is in
 a. an isotonic environment. c. a hypertonic environment.
 b. a hypotonic environment. d. any environment.

- _____ 3. When a human red blood cell is placed in a hypotonic environment, it will
 a. undergo cytolysis. c. experience a decrease in turgor pressure.
 b. undergo plasmolysis. d. be at equilibrium.

- _____ 4. Facilitated diffusion is often used to transport
 a. ions. c. molecules that are not soluble in lipids.
 b. water. d. molecules that are too small to diffuse across the membrane.

- _____ 5. Na^+ ions enter cells by
 a. diffusing across the lipid bilayer without assistance. c. binding to Na^+ carrier proteins.
 b. diffusing through Na^+ ion channels. d. binding to Cl^- ions.

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SHORT ANSWER Answer the questions in the space provided.

1. What happens to the movement of molecules at equilibrium? _____

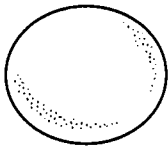
2. How do carrier proteins transport substances across cell membranes? _____

3. What types of stimuli can cause the gates on ion channels to open or close? _____

4. **Critical Thinking** How does the interaction between a carrier protein and the substance it transports resemble the interaction between an enzyme and its substrate? _____

STRUCTURES AND FUNCTIONS The drawings below show the appearance of a red blood cell and a plant cell in isotonic, hypotonic, and hypertonic environments. Label each environment in the spaces provided.

RED BLOOD CELL



a _____

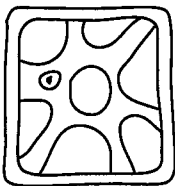


b _____

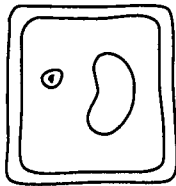


c _____

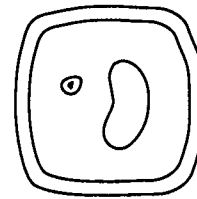
PLANT CELL



d _____



e _____



f _____

SECTION 5-2 REVIEW**ACTIVE TRANSPORT****VOCABULARY REVIEW** Define the following terms.

1. active transport _____

2. endocytosis _____

3. vesicle _____

4. phagocytosis _____

MULTIPLE CHOICE Write the correct letter in the blank.

- _____ 1. Facilitated-diffusion carrier proteins and cell-membrane pumps both
 - a. require an input of energy.
 - b. are specific for the kinds of substances they transport.
 - c. transport substances up their concentration gradients.
 - d. carry out active transport.
- _____ 2. The sodium-potassium pump transports
 - a. Na^+ out of the cell and K^+ into the cell.
 - b. Na^+ and K^+ in both directions across the cell membrane.
 - c. K^+ out of the cell and Na^+ into the cell.
 - d. Na^+ during some cycles and K^+ during other cycles.
- _____ 3. The energy needed to power the sodium-potassium pump is provided by the
 - a. binding of ATP to the pump.
 - b. transport of ATP by the pump.
 - c. removal of a phosphate group from ATP.
 - d. formation of ATP.
- _____ 4. Pinocytosis involves the transport of
 - a. large particles out of a cell.
 - b. fluids into a cell.
 - c. whole cells into another cell.
 - d. lysosomes out of a cell.
- _____ 5. Exocytosis is a
 - a. type of passive transport.
 - b. mechanism by which cells ingest other cells.
 - c. transport process in which vesicles are formed from pouches in the cell membrane.
 - d. way for cells to release large molecules, such as proteins.

SHORT ANSWER Answer the questions in the space provided.

1. Why is the sodium-potassium transport mechanism called a “pump”? _____

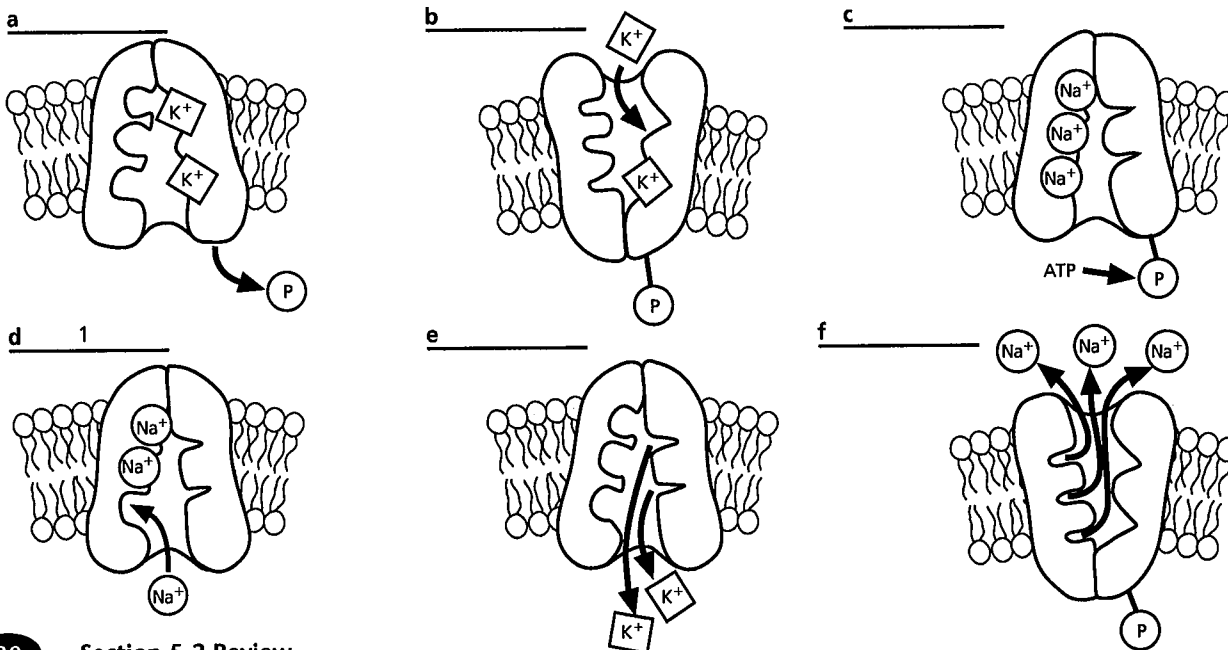
2. Explain how a phagocyte destroys bacteria. _____

3. Describe how a cell produces and releases proteins. _____

4. **Critical Thinking** Why is it important that ions being transported across a cell membrane be shielded from the interior of the lipid bilayer? _____

STRUCTURES AND FUNCTIONS Use the figure to answer the following questions.

1. The diagrams below represent the six steps in one cycle of the sodium-potassium pump. The order of the steps has been scrambled. Beginning with diagram *d* (numbered 1), sequence the remaining diagrams by writing the appropriate numeral in each blank.
2. On which side of the membrane are Na⁺ ions released from the pump? _____
3. On which side of the membrane are K⁺ ions released from the pump? _____



CHAPTER 5 ACTIVE READING WORKSHEETS**HOMEOSTASIS AND CELL TRANSPORT****Section 5-1: Passive Transport**

Read the passage below, which covers topics from your textbook.
Answer the questions that follow.

One type of passive transport is called **facilitated diffusion**. This process is used for molecules that cannot readily diffuse through cell membranes, even when there is a concentration gradient across the membrane. Such molecules may not be soluble in lipids, or they may be too large to pass through the pores in the membrane. In facilitated diffusion, the movement of these kinds of molecules across the cell membrane is assisted by specific proteins in the membrane. These proteins are known as **carrier proteins**.

In facilitated diffusion, a carrier protein binds to a specific molecule it transports. As soon as the molecule binds to the carrier protein, the carrier protein changes shape. This altered shape may shield the molecule from the hydrophobic interior of the lipid bilayer. Once shielded, the molecule can be transported across the cell membrane. On the other side of the membrane, the molecule is released from the carrier protein, which then returns to its original shape.

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

SKILL: Sequencing Information

1. Order the statements to show the steps of facilitated diffusion. Write "1" on the line in front of the statement that describes what happens first. Write "2" on the line in front of the statement that describes what happens next, and so on.
 - a. _____ The molecule is released from the carrier protein.
 - b. _____ The carrier protein changes shape.
 - c. _____ The molecule is transported across the cell membrane.
 - d. _____ The molecule binds to a carrier protein.
 - e. _____ The carrier protein returns to its original shape.
 - f. _____ The molecule is shielded from the hydrophobic interior of the lipid bilayer.

2. In order of occurrence, briefly describe what happens in each of the three main parts of facilitated diffusion.

a. _____

b. _____

c. _____

Write your answer in the space provided.

SKILL: Vocabulary Development

3. The term *diffusion* comes from a Latin word meaning "to spread apart." How is the term *diffusion* related to its Latin word of origin?

Circle the letter of the phrase that best answers the question.

4. What types of molecules diffuse through the cell membrane by facilitated diffusion?

- a. molecules that are not soluble in lipids
- b. molecules that are too large to pass through pores in the membrane
- c. molecules that can survive the hydrophobic interior of the lipid bilayer
- d. both (a) and (b)

CHAPTER 5 ACTIVE READING WORKSHEETS**HOMEOSTASIS AND TRANSPORT****Section 5-2: Active Transport**

Read the passage below, which covers topics from your textbook.
Answer the questions that follow.

Endocytosis is the process by which cells ingest external fluid, macromolecules, and large particles, including other cells. These external materials are enclosed by a portion of the cell's membrane, which folds into itself and forms a pouch. The pouch then pinches off from the cell membrane and becomes a membrane-bound organelle called a **vesicle**. Some of the vesicles fuse with lysosomes, and their contents are digested by lysosomal enzymes. Other vesicles that form during endocytosis fuse with other membrane-bound organelles.

Exocytosis is essentially the reverse of endocytosis. During exocytosis, vesicles in the cytoplasm fuse with the cell membrane, releasing their contents into the cell's external environment. Cells can use exocytosis to release large molecules such as proteins, waste products, or toxins that would damage the cell if they were released within the cytosol. Proteins are made on ribosomes and packaged into vesicles by the Golgi apparatus. The vesicles then move to the cell membrane and fuse with it, delivering the proteins outside the cell.

Fill in the blank to complete each sentence.

SKILL: Completing Sentences

1. Endocytosis is the process by which cells ingest large particles, external fluid, and _____.
2. During exocytosis, substances are released from the cell through a _____.
3. Through exocytosis, a cell releases large molecules such as _____.

Circle the letter of the phrase that best completes the statement.

4. Endocytosis and exocytosis are similar in that both processes involve the
 - a. ingestion of substances.
 - b. release of substances from a cell.
 - c. movement of large particles across a cell membrane.
 - d. Both (a) and (b)

Skills Worksheet

Homeostasis and Cell Transport

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

- | | |
|---------------------------------|---|
| _____ 1. passive transport | a. movement of a substance down the substance's concentration gradient |
| _____ 2. concentration gradient | b. causes a cell to shrink because of osmosis |
| _____ 3. equilibrium | c. movement of a substance by a vesicle to the outside of a cell |
| _____ 4. diffusion | d. an example of a cell membrane "pump" |
| _____ 5. osmosis | e. protein used to transport specific substances across a membrane |
| _____ 6. hypertonic solution | f. transport protein through which ions can pass |
| _____ 7. hypotonic solution | g. movement of a substance by a vesicle to the inside of a cell |
| _____ 8. isotonic solution | h. does not require energy from the cell |
| _____ 9. ion channel | i. concentration of molecules is equal throughout a space |
| _____ 10. carrier protein | j. difference in the concentration of molecules across a space |
| _____ 11. facilitated diffusion | k. diffusion of water through a membrane |
| _____ 12. active transport | l. organelle that pumps water out of the cell |
| _____ 13. sodium-potassium pump | m. passive transport using carrier proteins |
| _____ 14. endocytosis | n. concentration of both solutions is equal |
| _____ 15. exocytosis | o. movement of a substance against the substance's concentration gradient |
| _____ 16. vesicle | p. causes a cell to swell because of osmosis |
| _____ 17. contractile vacuole | q. organelle that fuses with lysosomes in order that contents can be digested |