

3.3 Cell Transport and Homeostasis

Lesson 3.3: True or False

Name _____ Class _____ Date _____

Write true if the statement is true or false if the statement is false.

- _____ 1. Passive transport needs energy.
- _____ 2. Active transport needs energy.
- _____ 3. Carrier proteins change shape when they transport substances.
- _____ 4. Diffusion does not require any help from other molecules.
- _____ 5. Facilitated diffusion does not require any help from other molecules.
- _____ 6. Endocytosis removes large molecules from the cell.
- _____ 7. In diffusion, substances move from an area of lower concentration to an area of higher concentration.
- _____ 8. The sodium-potassium pump is a type of channel protein.
- _____ 9. Ions can easily flow through a carrier protein.
- _____ 10. Diffusion is the osmosis of water.
- _____ 11. Endocytosis and exocytosis are types of vesicle transport.
- _____ 12. Channel proteins form small “holes” in the plasma membrane.
- _____ 13. Transport of substances across the cell membrane helps maintain homeostasis by keeping the cell’s conditions within normal ranges.
- _____ 14. Channel proteins and carrier proteins are both transport proteins.
- _____ 15. The plasma membrane controls what enters and leaves the cell.

Lesson 3.3: Critical Reading

Name _____ Class _____ Date _____

Read these passages from the text and answer the questions that follow.

Passive Transport

Passive transport occurs when substances cross the plasma membrane without any input of energy from the cell. No energy is needed because the substances are moving from an area where they have a higher concentration to an area where they have a lower concentration. Concentration refers to the number of particles of a substance per unit of volume. The more particles of a substance in a given volume, the higher the concentration. A substance always moves from an area where it is more concentrated to an area where it is less concentrated. It’s a little like a ball rolling down a hill. It goes by itself without any input of extra energy.

Simple Diffusion

Diffusion is the movement of a substance across a membrane, due to a difference in concentration, without any help from other molecules. The substance simply moves from the side of the membrane where it is more concentrated to the side where it is less concentrated. Substances that can squeeze between the lipid molecules in the plasma membrane by simple diffusion are generally very small, hydrophobic molecules, such as molecules of oxygen and carbon dioxide.

Osmosis

Osmosis is a special type of diffusion—the diffusion of water molecules across a membrane. Like other molecules, water moves from an area of higher concentration to an area of lower concentration. Water moves in or out of a cell until its concentration is the same on both sides of the plasma membrane.

Facilitated Diffusion

Water and many other substances cannot simply diffuse across a membrane. Hydrophilic molecules, charged ions, and relatively large molecules, such as glucose, all need help with diffusion. The help comes from special proteins in the membrane known as **transport proteins**. Diffusion with the help of transport proteins is called **facilitated diffusion**. There are several types of transport proteins, including channel proteins and carrier proteins.

- Channel proteins form pores, or tiny holes, in the membrane. This allows water molecules and small ions to pass through the membrane without coming into contact with the hydrophobic tails of the lipid molecules in the interior of the membrane.
- Carrier proteins bind with specific ions or molecules, and in doing so, they change shape. As carrier proteins change shape, they carry the ions or molecules across the membrane.

Questions

1. Explain why passive transport does not require energy.
2. What is a main difference between diffusion and facilitated diffusion?
3. Describe how simple diffusion proceeds. What kind of molecules can move across the membrane by simple diffusion?

4. How is water transported across the membrane?

5. What are the two types of transport proteins? Describe how they function.

Lesson 3.3: Multiple Choice

Name _____ Class _____ Date _____

Circle the letter of the correct choice.

1. Controlling what enters and leaves the cell is an important function of the
 - a. nucleus.
 - b. vesicle.
 - c. plasma membrane.
 - d. Golgi apparatus.
2. During diffusion, substances move from an area of _____ concentration to an area of _____ -
_ concentration.
 - a. higher, lower
 - b. lower, higher
 - c. higher, equal

- d. lower, equal
3. A channel protein does which of the following?
- Carries ions or molecules across the membrane.
 - Forms tiny holes in the membrane.
 - Changes shape as it transports molecules.
 - all of the above
4. The sodium-potassium pump
- uses energy to move sodium ions out of the cell and potassium ions into the cell.
 - uses energy to move potassium ions out of the cell and sodium ions into the cell.
 - moves sodium ions out of the cell and potassium ions into the cell without using energy.
 - moves potassium ions out of the cell and sodium ions into the cell without using energy.
5. Osmosis
- is the diffusion of water.
 - is the diffusion of water and other small molecules.
 - is the diffusion of water and small ions.
 - is the diffusion of small molecules and ions.
6. Types of passive transport include which of the following? (1) simple diffusion, (2) osmosis, (3) facilitated diffusion, (4) active transport, and (5) vesicle transport.
- 1 and 2
 - 1, 2, and 3
 - 4 and 5
 - 1, 2, 3, 4, and 5
7. Endocytosis and exocytosis
- are both a type of vesicle transport.
 - move very large molecules either in or out of the cell.
 - are both a form of active transport.
 - all of the above
8. Which of the following needs energy? (1) passive transport, (2) active transport, (3) exocytosis, and (4) osmosis.
- 1 only
 - 2 only
 - 2 and 3
 - 2, 3, and 4

Lesson 3.3: Vocabulary I

Name _____ Class _____ Date _____

Match the vocabulary word with the proper definition.

Definitions

- _____ 1. transport across a membrane without any additional energy requirement
- _____ 2. the diffusion of water
- _____ 3. type of vesicle transport that moves a substance into the cell
- _____ 4. type of vesicle transport that moves a substance out of the cell