

Osmosis LR

Osmosis. Objective, to learn about the process of osmosis and its role in the functioning of the cell. The cell membrane protects the contents of the cell from its surroundings.

In order to keep the cell alive and functioning, the cell membrane must allow certain materials to enter and leave the cell. The cell membrane acts as a selectively permeable membrane, which means that it allows only some substances to cross it. This is how it happens.

As the cytoplasm of the cell is composed of various solutes, the water moves across the selectively permeable membrane from the region where it's in higher concentration to the region where it's in lower concentration, that is, inside the cell. This process continues till the equilibrium in the concentration of water on both sides of the membrane is reached. Let's now understand how this is possible.

The cell membrane contains some special proteins which provide a channel for the movement of the water molecules across the cell membrane. When water moves across the cell membrane, either into or out of the cell, then the process is called osmosis. The movement of the water molecules does not require the cell to use any of its energy, so this process is a passive form of transport.

Osmosis can have important effects on the cells and the entire organism. When plants absorb water, the water molecules enter the cells. Sometimes under certain conditions, osmosis can cause the water to move out of the cells more quickly than it can move in.

This process is called exosmosis. When this happens, the cytoplasm shrinks and the cell membrane pulls away from the cell wall. If this condition does not change soon enough, the cells as well as the plant can die.

Therefore, osmosis is a very important process that helps in the proper functioning of the cells. To summarize, the cell membrane acts as a selectively permeable

membrane. When the substance moving across the membrane is water, the process is called osmosis.

Sometimes osmosis can cause the water to move out of the cells much faster than it can move in, and such a process is called exosmosis.

Summary: Osmosis

Osmosis is the process where **water molecules** move across a **selectively permeable membrane** from an area of higher concentration to an area of lower concentration.

- The **cell membrane** allows only specific substances to pass in and out of the cell, ensuring balance inside the cell.
- Water moves **without using the cell's energy**, making osmosis a **passive transport** process.
- **Osmosis plays a crucial role in plants** as they absorb water through their cells.
- If water **leaves the cell more quickly than it enters**, it results in **exosmosis**, causing the **cytoplasm to shrink** and the **cell membrane to pull away from the cell wall**.
- If **exosmosis continues**, the **cell and the plant** can die.

Conclusion:

- Osmosis is essential for **cell survival and function**.
- It regulates **water movement in and out of cells**.
- **Exosmosis** can harm cells if water loss is too fast.

Quiz: Osmosis

1. What is osmosis?

- ☒ a) Movement of water across a selectively permeable membrane
- ☐ b) Movement of air into the lungs
- ☐ c) Transport of food inside a cell
- ☐ d) A process that requires energy from the cell

2. Why is osmosis important for plants?

- ☒ a) It helps them absorb water
- ☐ b) It produces energy like sunlight
- ☐ c) It helps them make food
- ☐ d) It removes carbon dioxide

3. What happens during exosmosis?

- ☒ a) Water leaves the cell faster than it enters, causing the cytoplasm to shrink

- ✗ b) Water enters the cell, making it swell
- ✗ c) The cell produces more energy
- ✗ d) The plant grows taller

4. What type of transport is osmosis?

- ☒ a) Passive transport
- ✗ b) Active transport
- ✗ c) Chemical transport
- ✗ d) Mechanical transport