

Movement In and Out of Cells

Summary

Diffusion:

- Diffusion is the movement of particles from an area of higher concentration to an area of lower concentration down a concentration gradient due to random movement.
- Diffusion is essential for molecules moving in and out of cells through the cell membrane (e.g., nutrients entering a cell).
- Factors affecting the rate of diffusion:
 - **Surface area:** Larger surface area increases diffusion rate.
 - **Temperature:** Higher temperature increases kinetic energy, speeding up diffusion.
 - **Concentration gradient:** Higher gradient increases diffusion rate.
 - **Distance:** Shorter distance accelerates diffusion.

Osmosis:

- Osmosis is the movement of water molecules from a region of high water potential (dilute solution) to low water potential (concentrated solution) across a partially permeable membrane.
- Water potential replaces the term "concentration" when referring to water movement.
- In plant and animal cells, osmosis causes:
 - **In pure/dilute solutions:** Water enters the cell, making plant cells turgid and animal cells potentially burst.
 - **In concentrated solutions:** Water leaves the cell, making plant cells plasmolyzed and animal cells crenated.

Active Transport:

- Active transport is the movement of particles from a region of lower concentration to higher concentration using energy from respiration.
- It is used when diffusion or osmosis cannot function (e.g., absorbing nutrients against the concentration gradient).
- Active transport occurs via embedded proteins in cell membranes that use energy (ATP) to transport molecules across the membrane against the concentration gradient.



Sourced from: <https://freeexamacademy.com>