A microscopic image showing various cells, likely from a tissue section, with different shapes and internal structures. The image is in shades of blue and green, with some cells appearing more prominent than others.

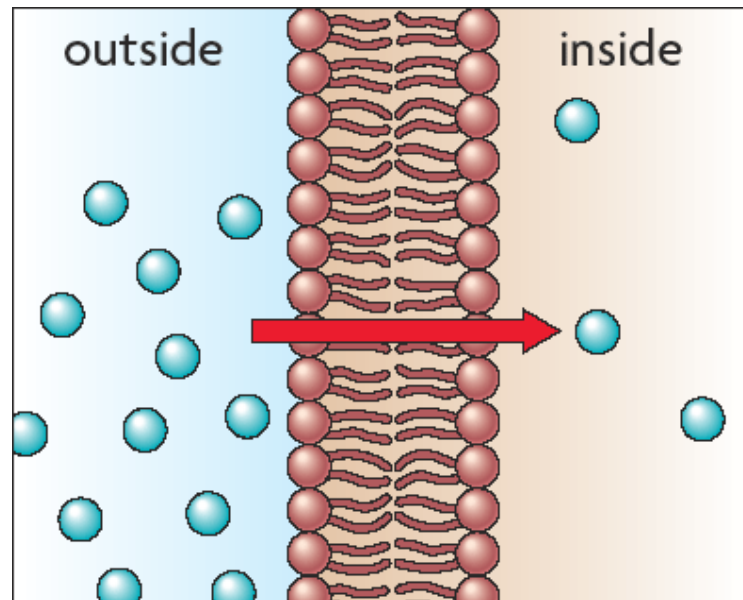
Homeostasis refers to the necessity of an organism to maintain constant or stable conditions.

In order to maintain homeostasis, all organisms have processes and structures which respond to stimuli in ways that keep conditions in their bodies conducive for life.

Homeostasis depends in part on appropriate movement of materials across the cell membrane.

## 3.4 Diffusion and Osmosis

Materials needed for cellular processes must pass into cells so they can be utilized. For example, oxygen and glucose are continuously needed for the process of cellular respiration.

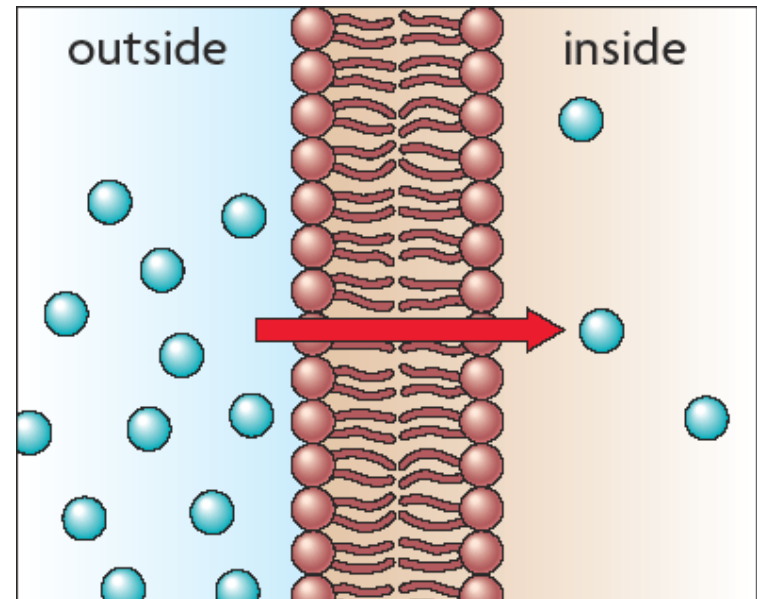


Materials move across membranes because of concentration differences.

## 3.4 Diffusion and Osmosis

**Passive transport does not require energy input from a cell.**

- Molecules can move across the cell membrane through passive transport.
- There are two types of passive transport.
  - diffusion
  - osmosis



## 3.4 Diffusion and Osmosis

**Diffusion and osmosis are types of passive transport.**

- Molecules diffuse down a concentration gradient.



## 3.4 Diffusion and Osmosis

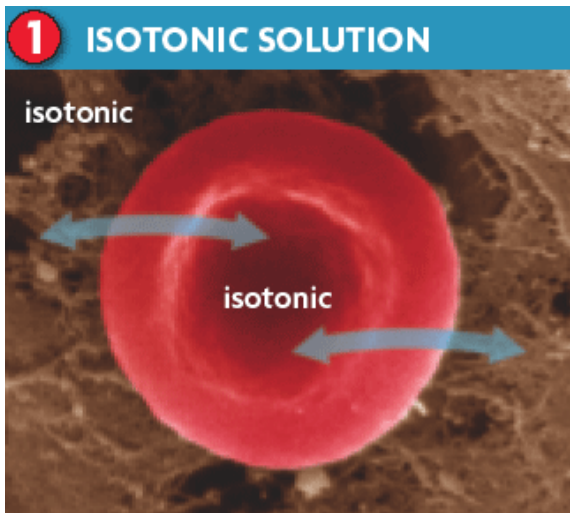
**Diffusion and osmosis are types of passive transport.**

- Osmosis is the diffusion of water molecules across a semi-permeable membrane.

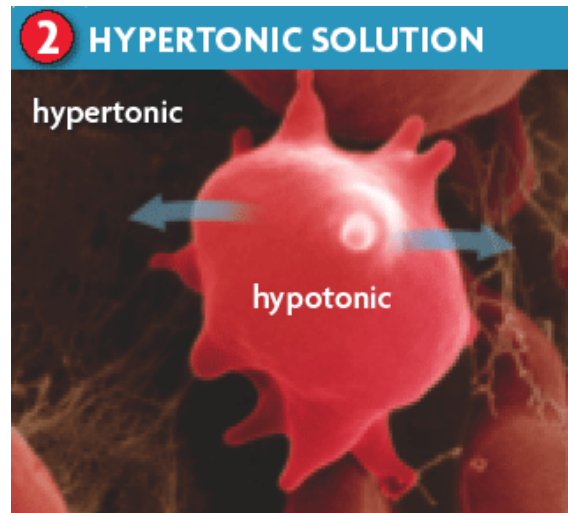
## 3.4 Diffusion and Osmosis

**Diffusion and osmosis are types of passive transport.**

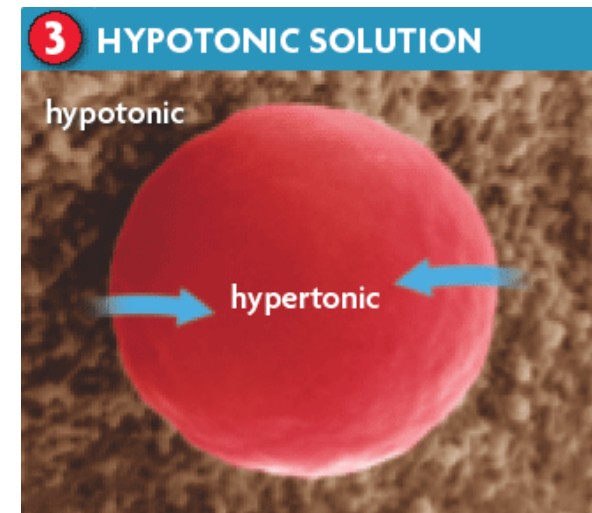
- There are three types of solutions.
  - isotonic
  - hypertonic
  - hypotonic



A solution is isotonic to a cell if it has the same concentration of solutes as the cell. Equal amounts of water enter and exit the cell, so its size stays constant.



A hypertonic solution has more solutes than a cell. Overall, more water exits a cell in hypertonic solution, causing the cell to shrivel or even die.

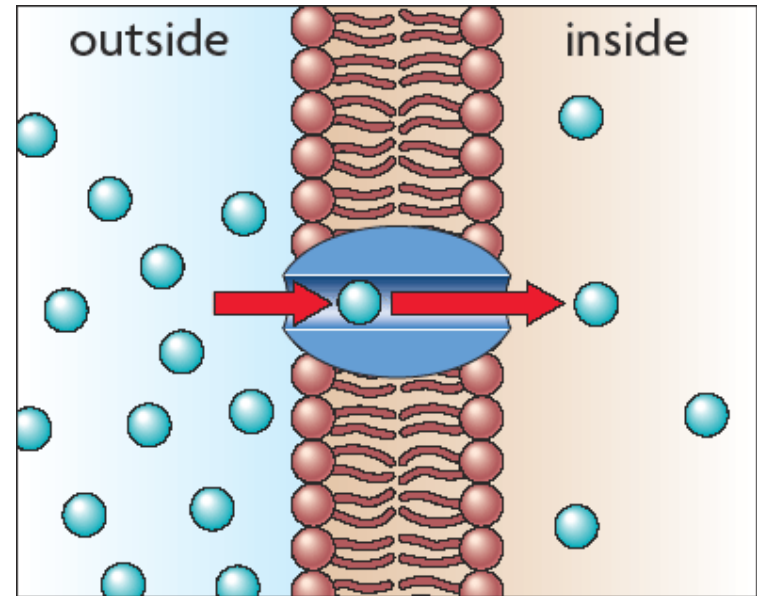


A hypotonic solution has fewer solutes than a cell. Overall, more water enters a cell in hypotonic solution, causing the cell to expand or even burst.

## 3.4 Diffusion and Osmosis

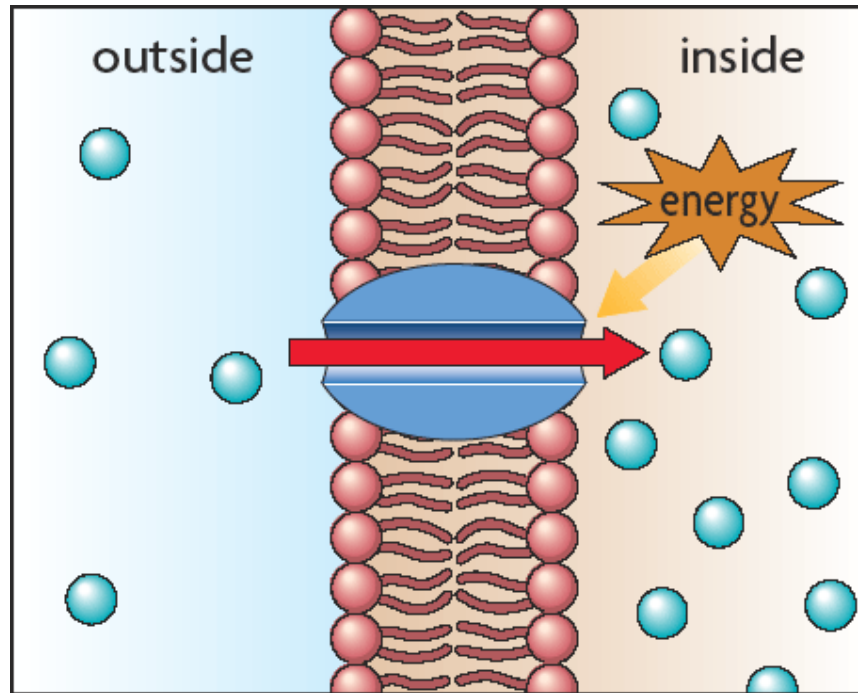
**Some molecules can only diffuse through transport proteins.**

- Some molecules cannot easily diffuse across the cell membrane.
- Facilitated diffusion is diffusion through transport proteins.



## 3.5 Active Transport, Endocytosis, and Exocytosis

**KEY CONCEPT** Cells use energy to transport materials that cannot diffuse across a membrane.

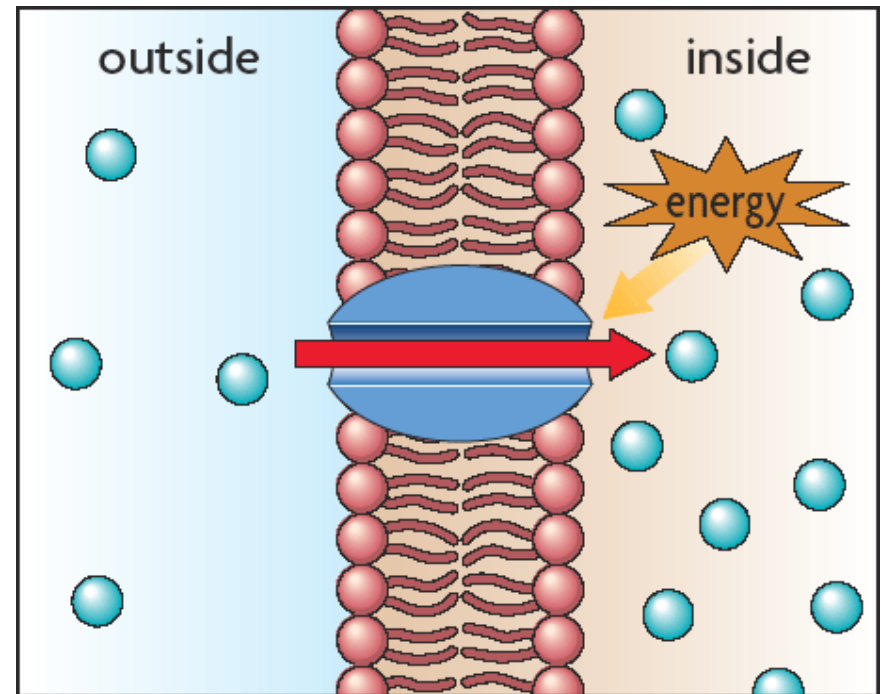




## 3.5 Active Transport, Endocytosis, and Exocytosis

**Active transport requires energy input from a cell and enables a cell to move a substance against its concentration gradient.**

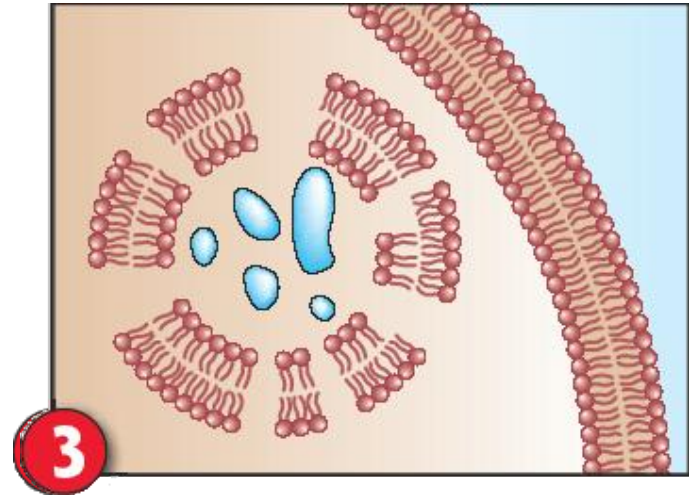
- Passive transport requires no energy from the cell.
- Active transport is powered by chemical energy (ATP).
- Active transport occurs through transport protein pumps.
- Cells use active transport to maintain homeostasis.



## 3.5 Active Transport, Endocytosis, and Exocytosis

**A cell can import and export large materials or large amounts of material in vesicles during the processes of endocytosis and exocytosis.**

- Cells use energy to transport material in vesicles.
- Endocytosis is the process of taking material into the cell.
- Phagocytosis is a type of endocytosis.



## 3.5 Active Transport, Endocytosis, and Exocytosis

**A cell can import and export large materials or large amounts of material in vesicles during the processes of endocytosis and exocytosis.**

- Cells use energy to transport material in vesicles.
- Exocytosis is the process of expelling material from the cell.

