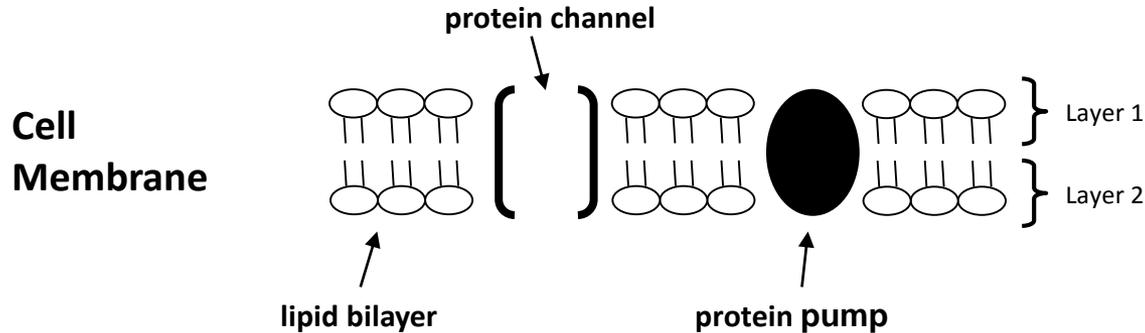


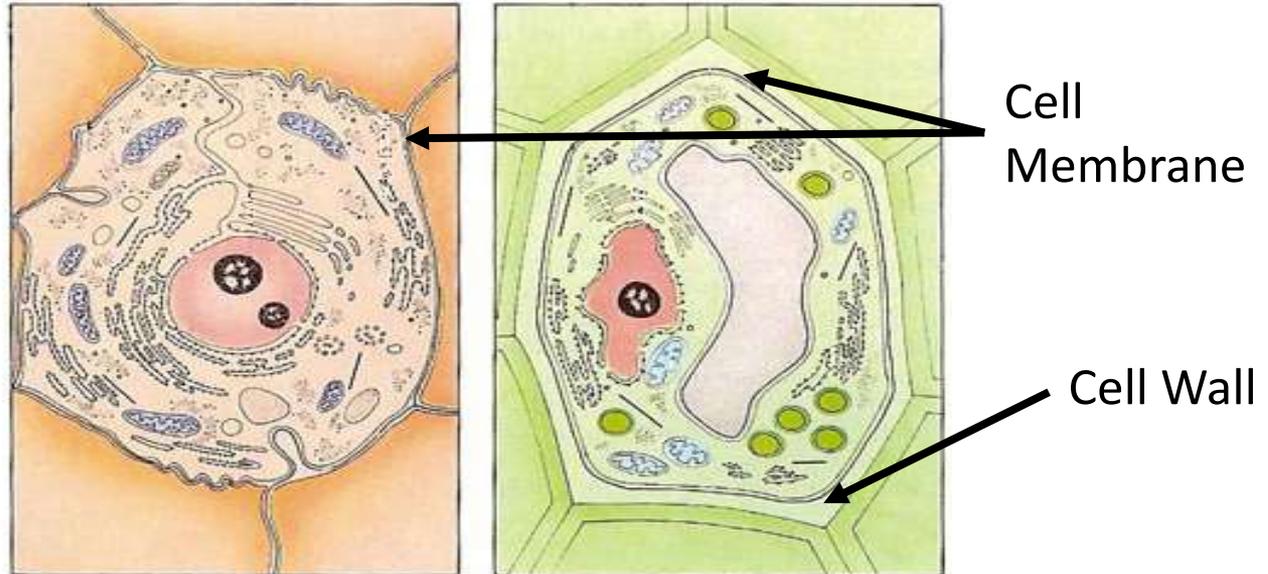
Cell Membrane (Transport) Notes

Cell Membrane and Cell Wall:

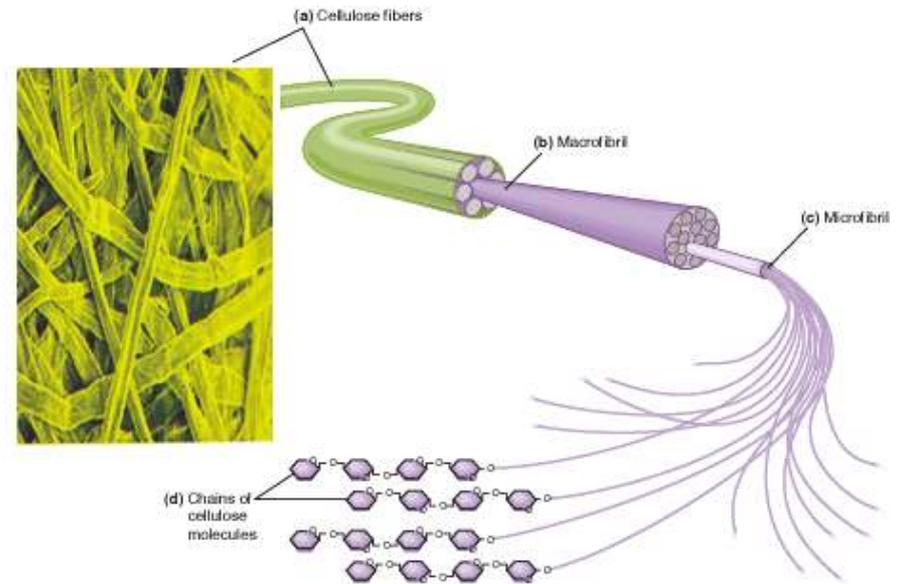
- **ALL** cells have a **cell membrane** made of **proteins** and **lipids**



- **SOME** cells have cell membranes and **cell walls** – ex: plants, fungi and bacteria

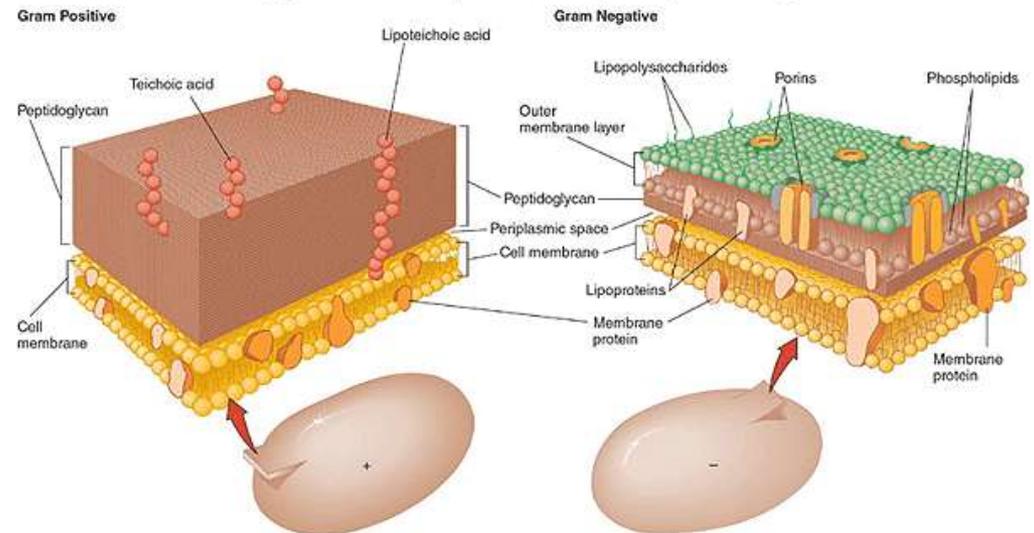


- Plant cells have a cell wall made of **cellulose** – that cellulose is **fiber** in our diet



- Bacteria and fungi also have **cell walls**, but they do **not** contain cellulose

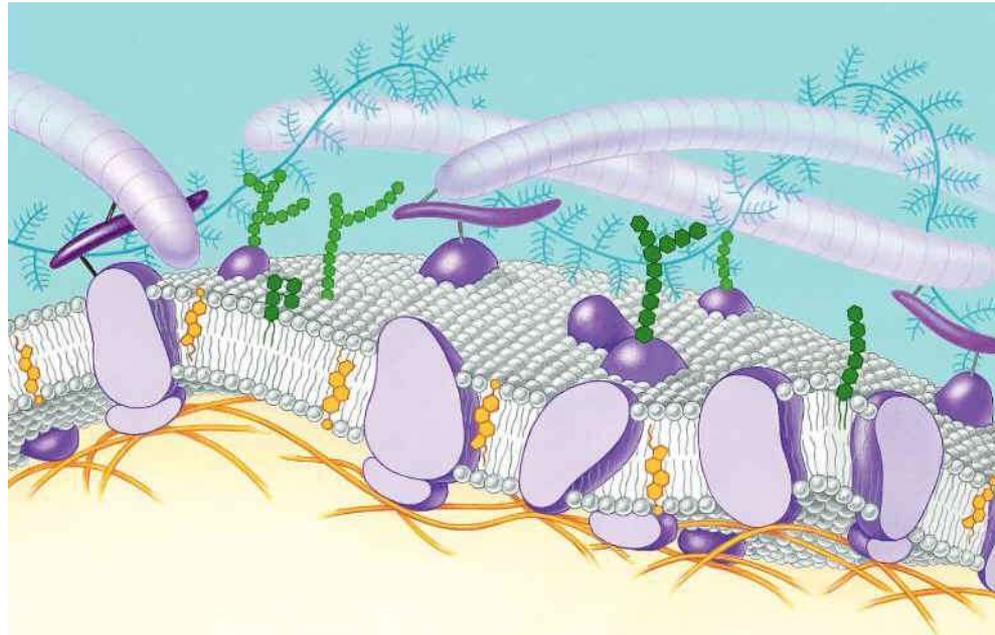
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- Cell membranes and cell walls are **porous** allowing water, carbon dioxide, oxygen and **nutrients** to pass through easily

Function of the Cell Membrane:

- Cell membrane separates the components of a cell from its environment—surrounds the cell
- “Gatekeeper” of the cell—regulates the flow of materials into and out of cell—selectively permeable
- Cell membrane helps cells maintain homeostasis—stable internal balance



Passive Transport

A process that does not require energy to move molecules from a **HIGH to LOW** concentration

- Diffusion
- Facilitated Diffusion
- Osmosis

Transport
Concepts

Passive
vs.
Active



Passive

No energy needed

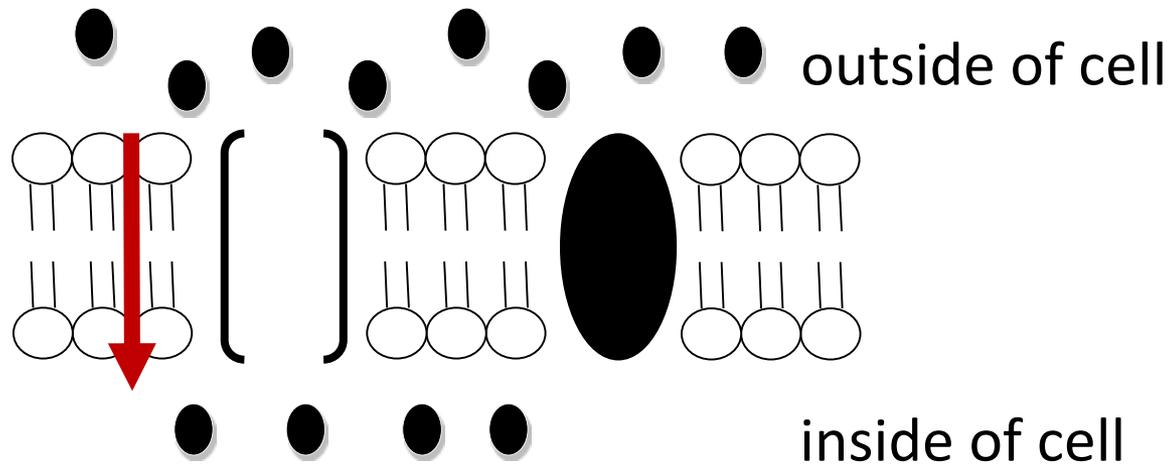


Active

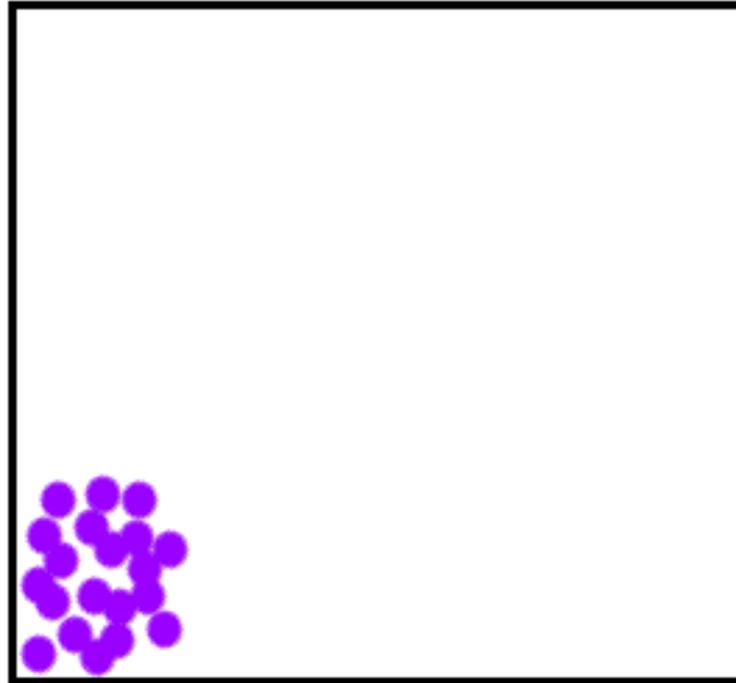
Energy needed

- **Diffusion** is the movement of **small** particles across a **selectively permeable** membrane like the cell membrane until **equilibrium** is reached.

These particles move from an area of **high concentration** to an area of **low concentration**.



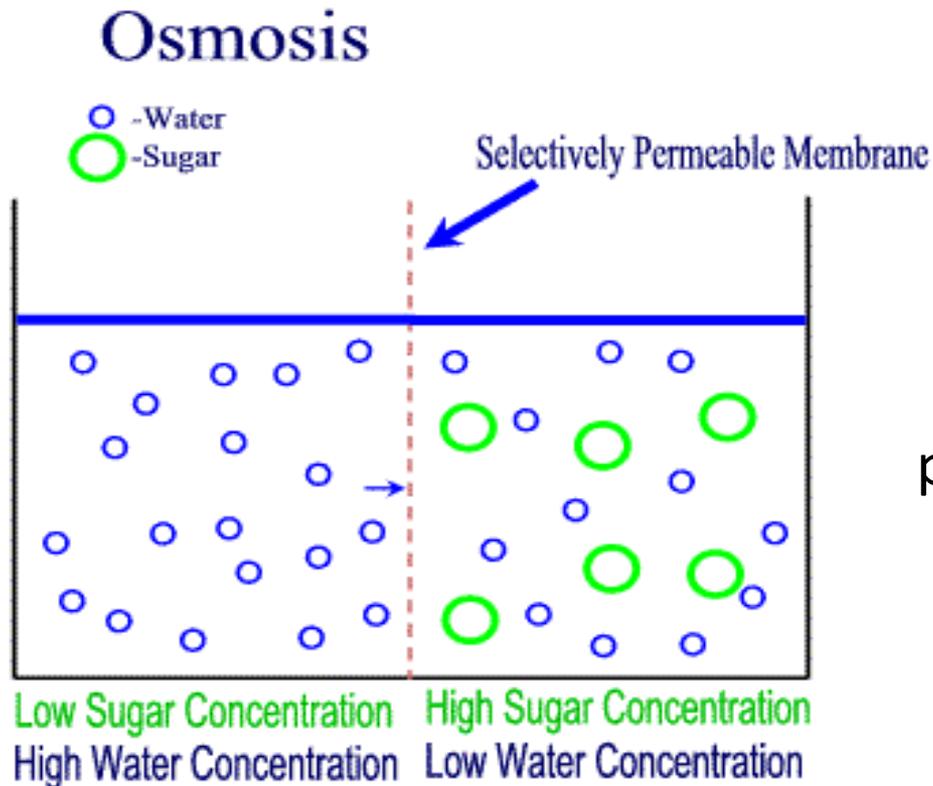
DIFFUSION



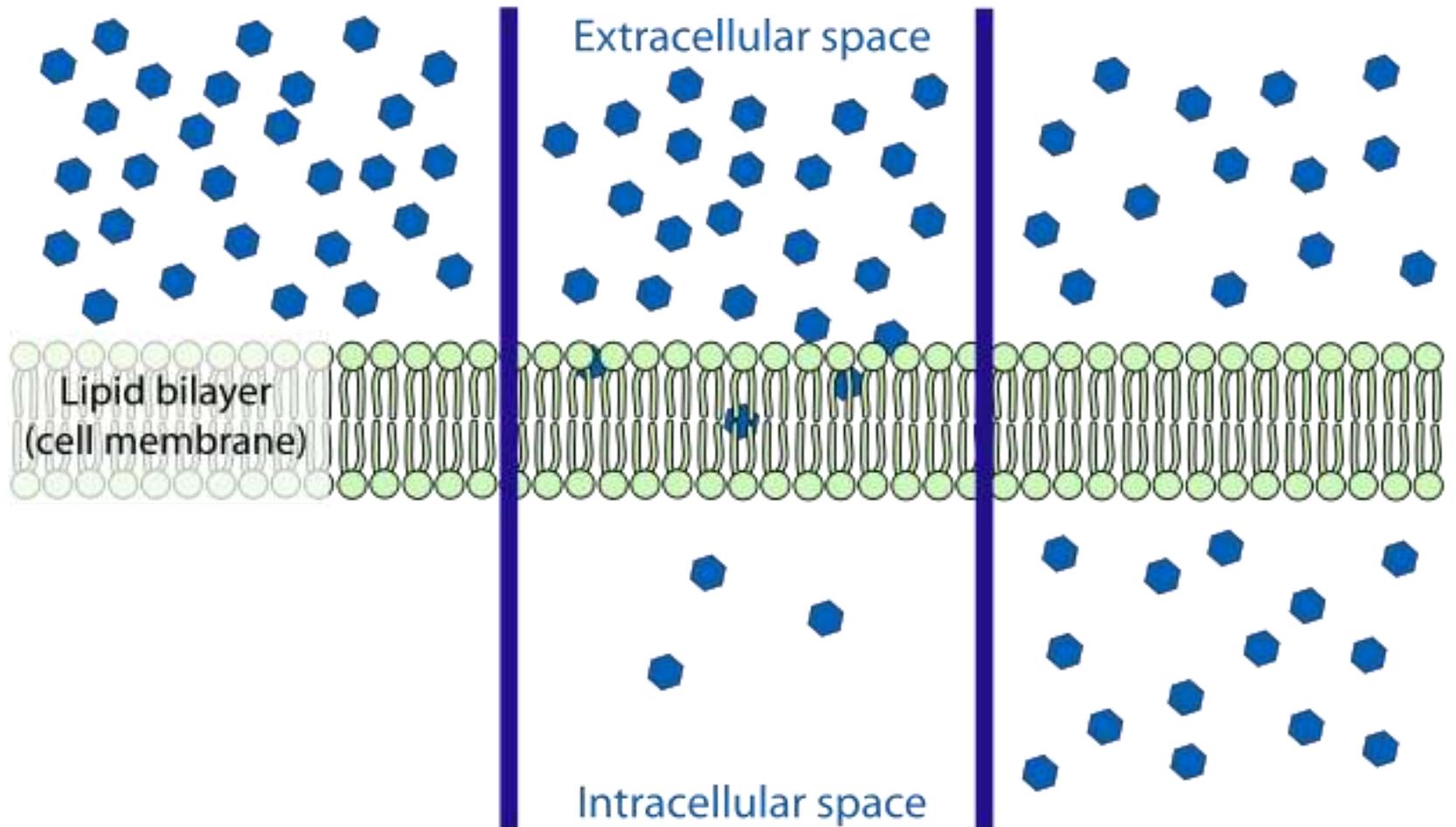
HIGH to LOW concentration

- **Osmosis** is the **diffusion** of **water** through a selectively permeable membrane like the cell membrane

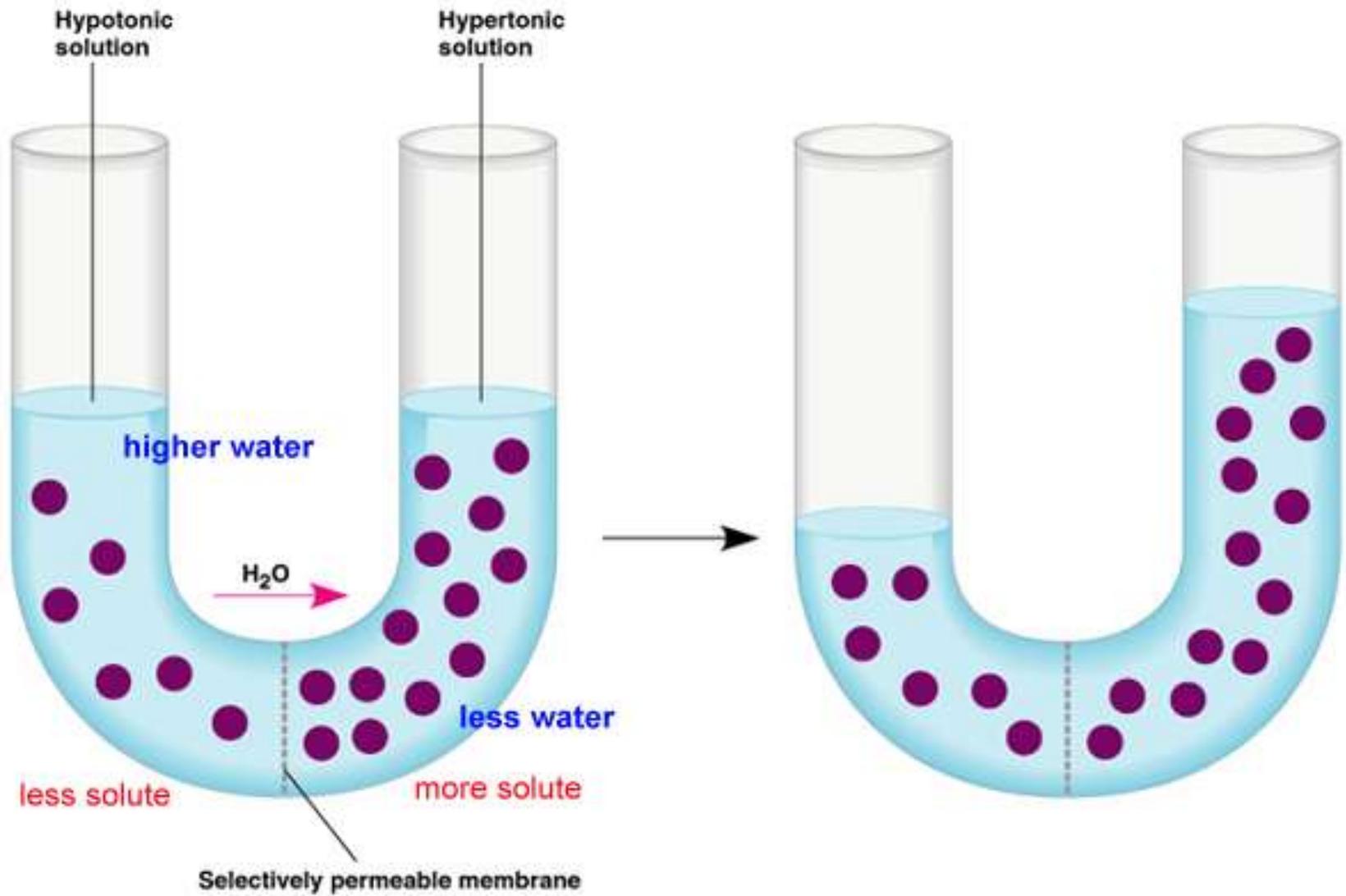
Water diffuses across a membrane from an area of **high concentration** to an area of **low concentration**.



Semi-permeable membrane is permeable to water, but not to sugar



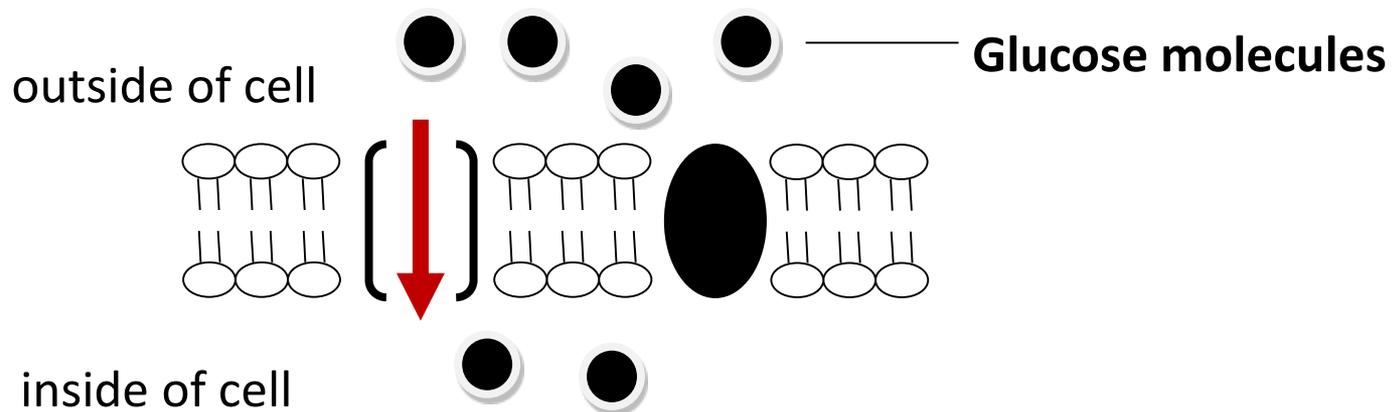
TIME

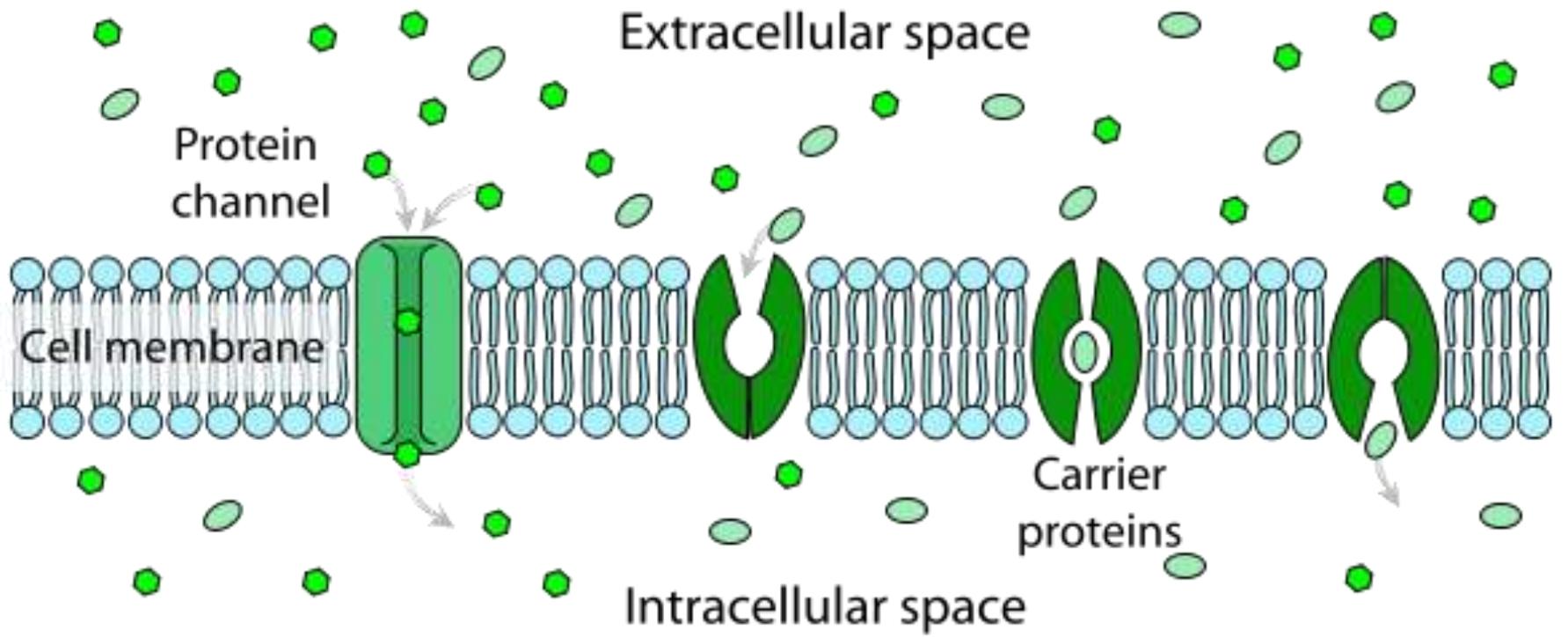


- **Facilitated Diffusion** is the movement of **larger molecules** like glucose through the cell membrane – larger molecules must be “helped”

Proteins in the cell membrane form **channels** for **large molecules** to pass through

Proteins that form channels (pores) are called **protein channels**





↑
Click

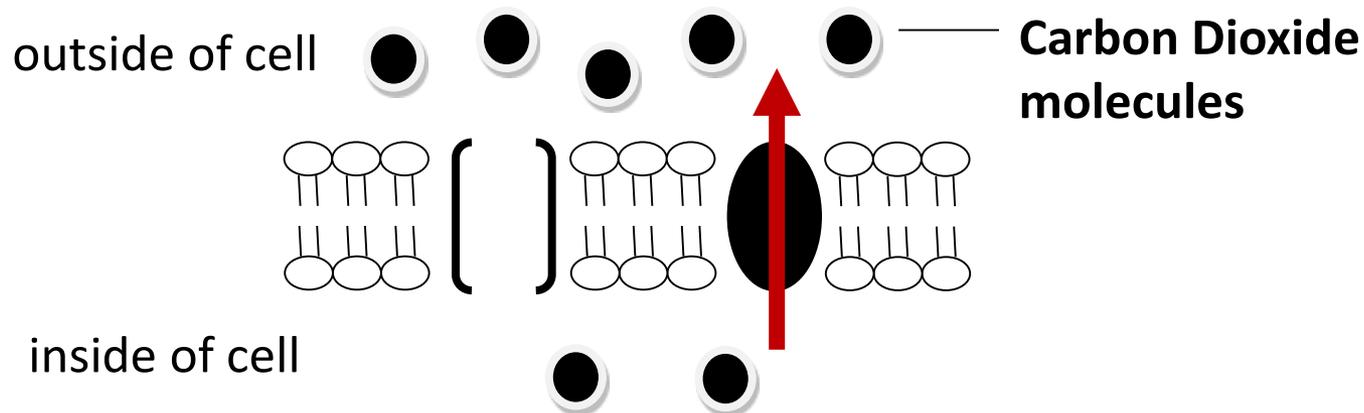
Active Transport

Active transport is the movement of molecules from LOW to HIGH concentration.

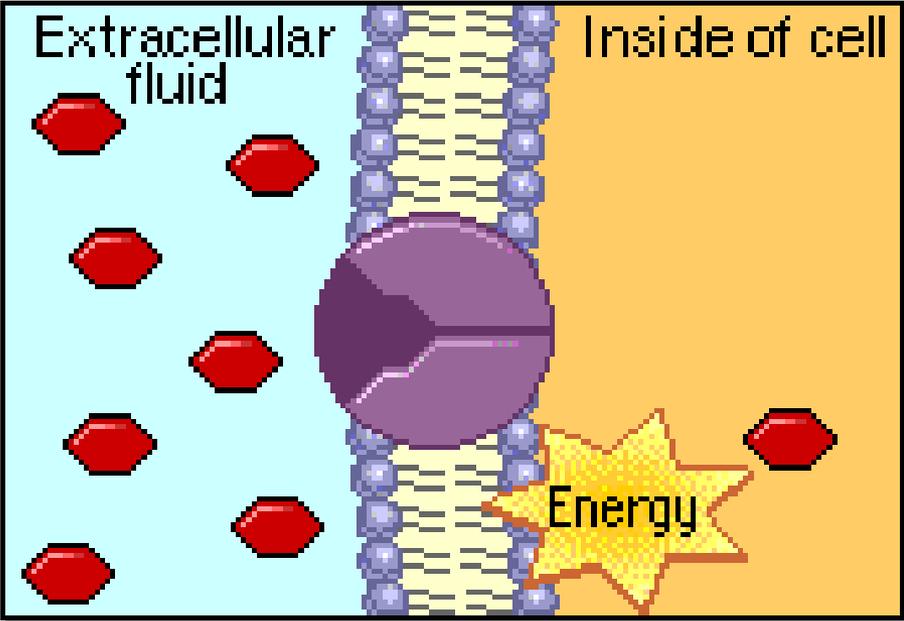
Energy is required as molecules must be pumped against the concentration gradient.

Proteins that work as pumps are called protein pumps.

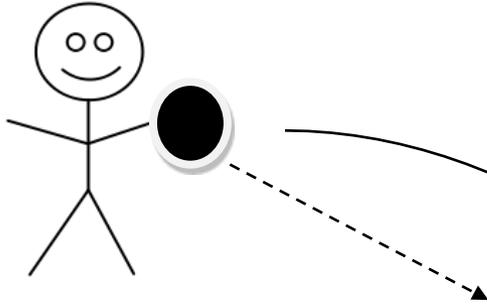
Ex: Body cells must pump carbon dioxide out into the surrounding blood vessels to be carried to the lungs for exhale. Blood vessels are high in carbon dioxide compared to the cells, so energy is required to move the carbon dioxide across the cell membrane from LOW to HIGH concentration.



Active Transport



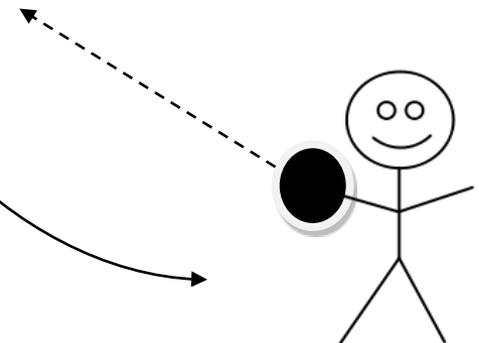
ANALOGY:



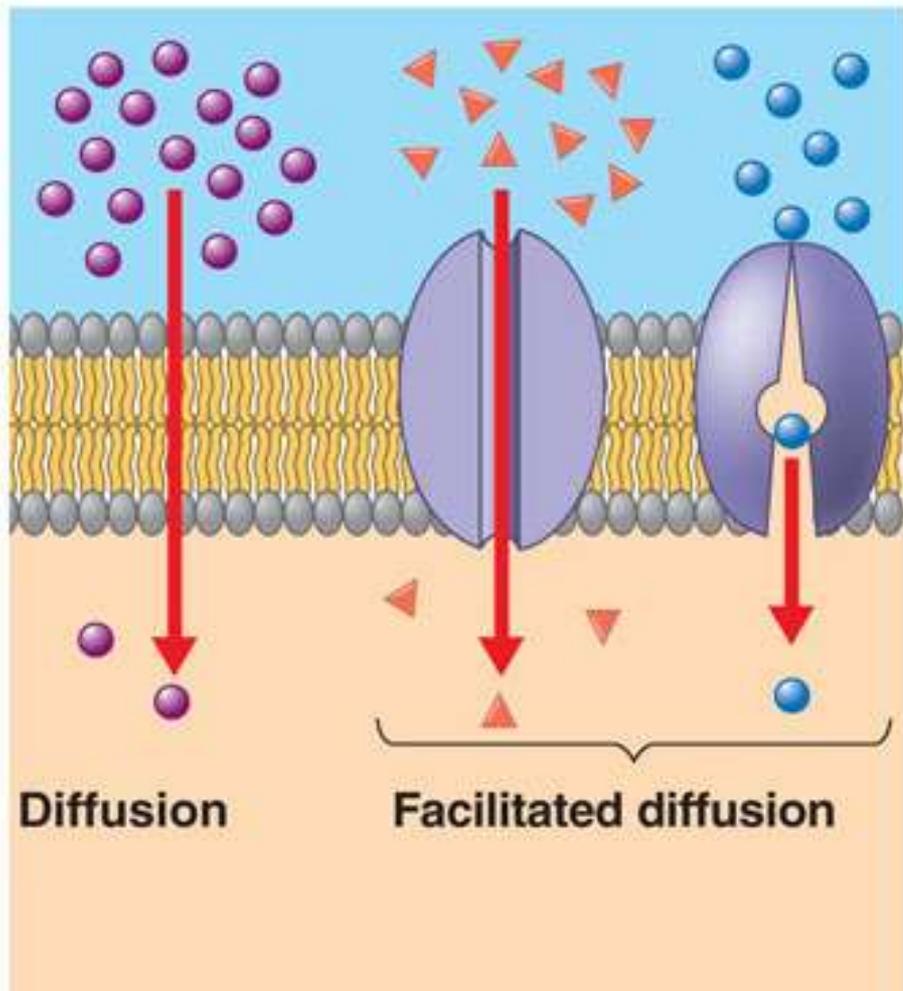
NO ENERGY NEEDED:

Diffusion
Osmosis
Facilitated Diffusion

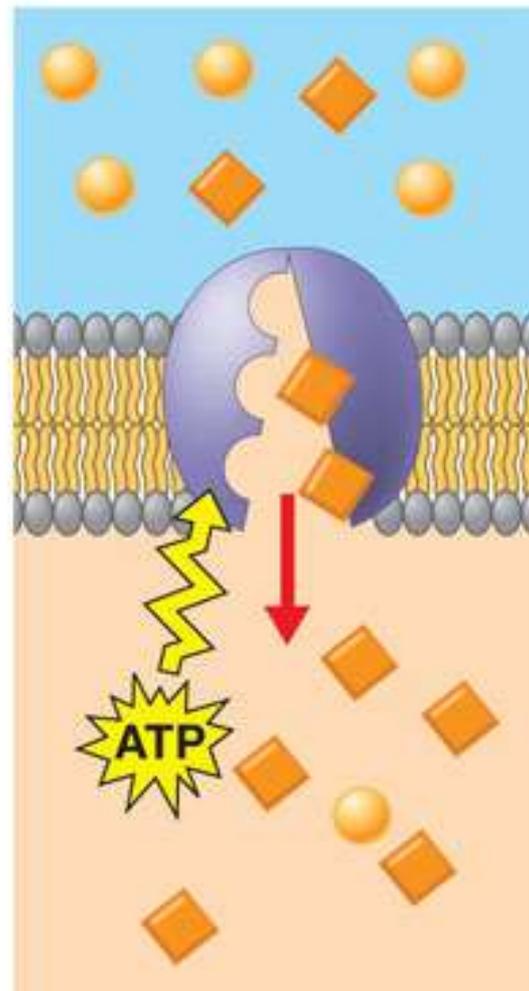
ENERGY NEEDED:
Active Transport



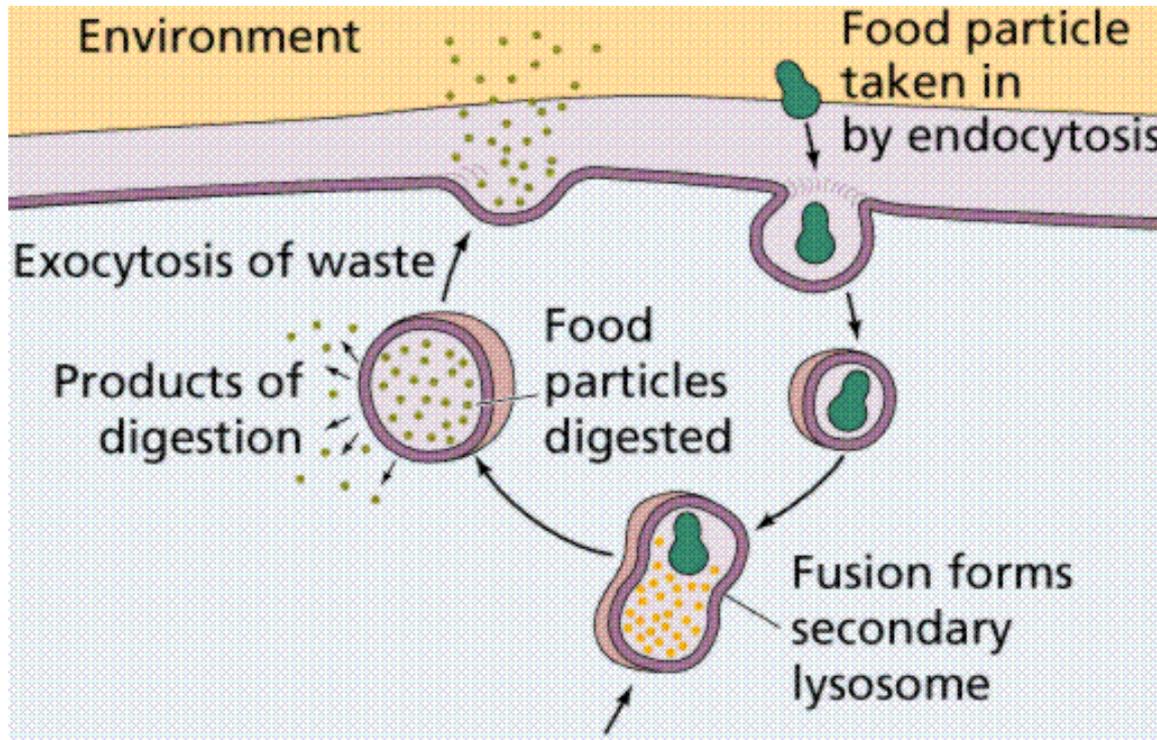
Passive transport



Active transport

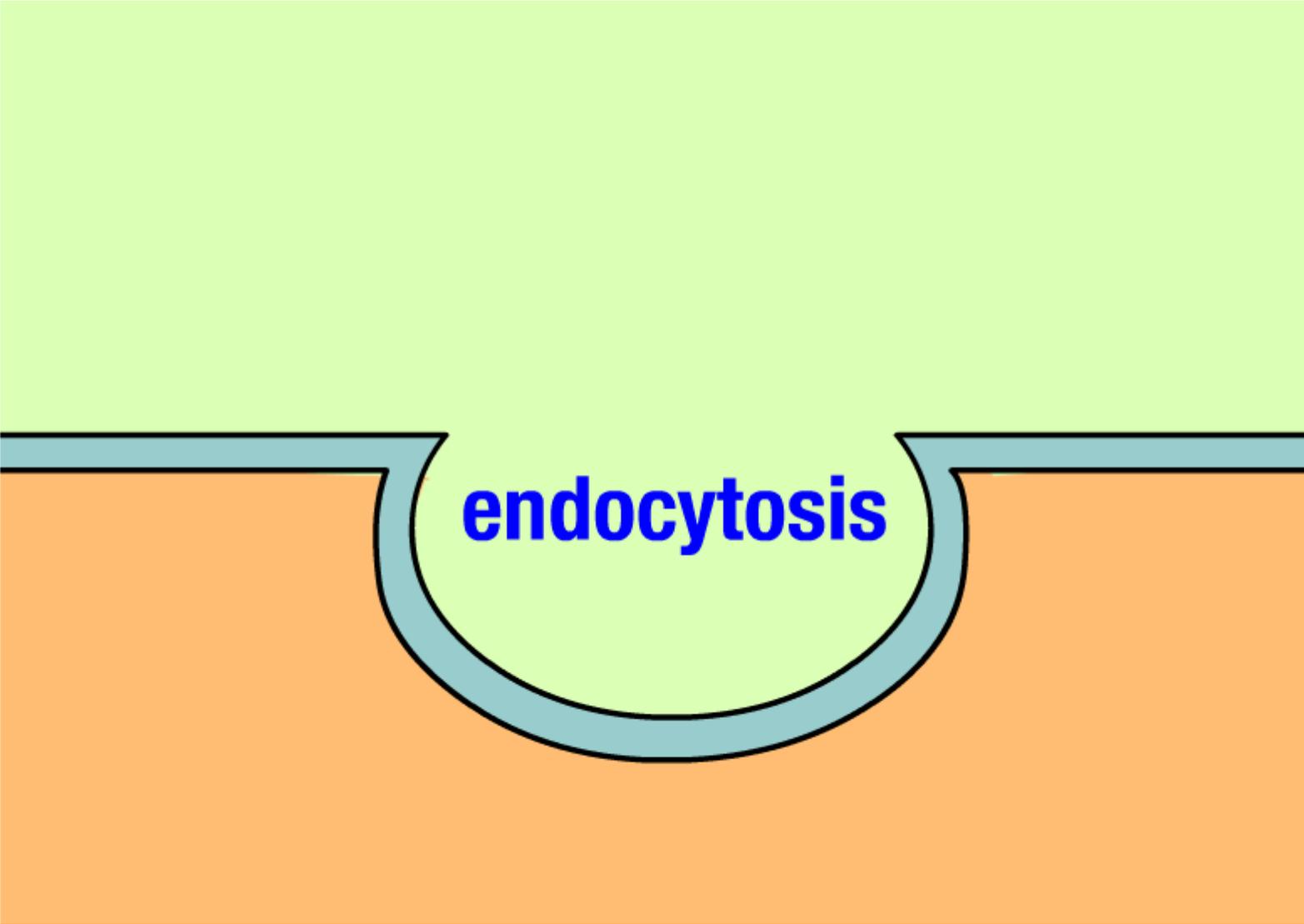


- **Endocytosis and Exocytosis** is the mechanism by which **very large molecules** (such as food and wastes) get into and out of the cell



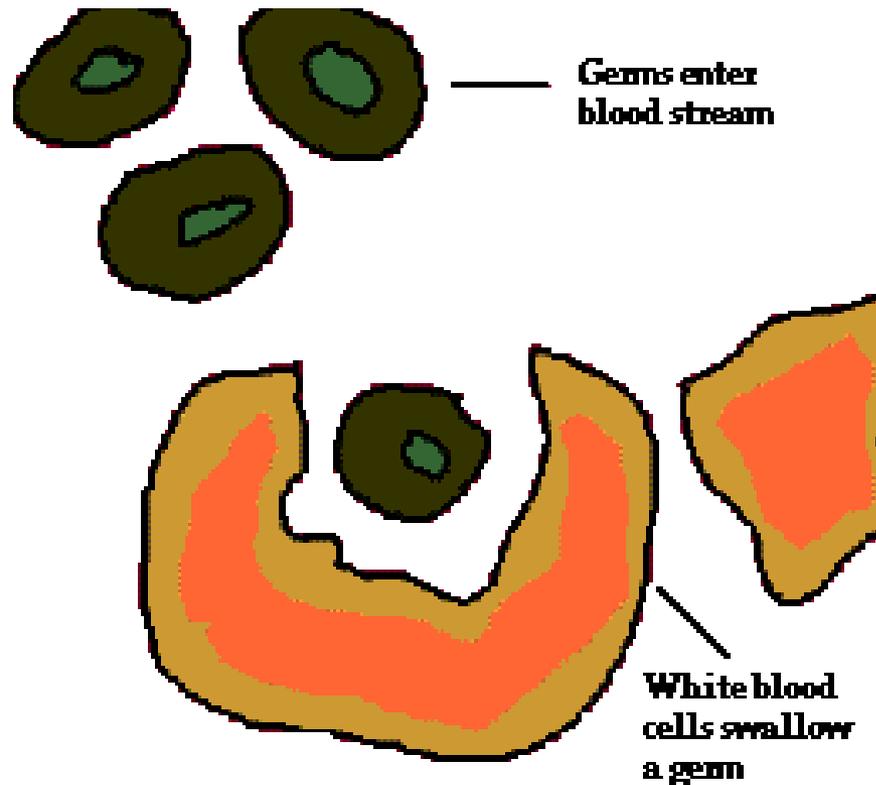
Food is moved into the cell by Endocytosis

Wastes are moved out of the cell by Exocytosis

A diagram illustrating the process of endocytosis. It shows a cross-section of a cell membrane. The top half is light green, representing the extracellular space, and the bottom half is orange, representing the intracellular space. A blue, U-shaped structure is shown pinching the membrane to form a vesicle. The word "endocytosis" is written in blue text inside the forming vesicle.

endocytosis

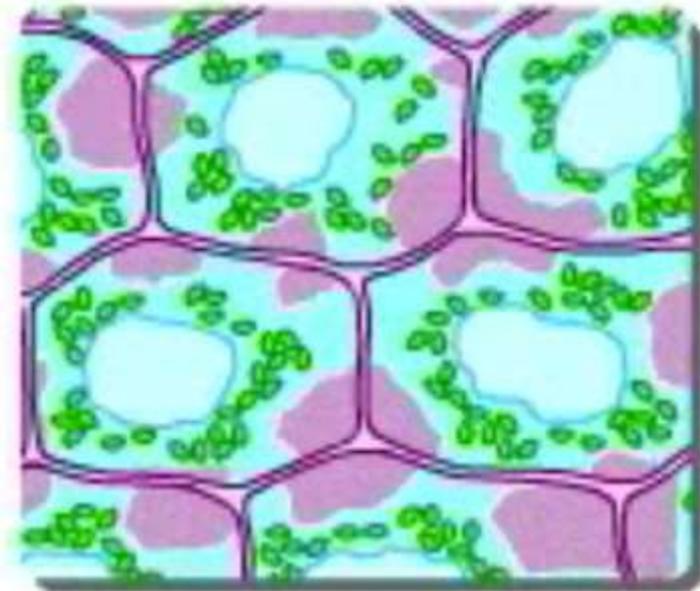
Ex: White Blood Cells, which are part of the immune system, surround and engulf bacteria by endocytosis.



Osmosis—Elodea Leaf



Salt solution



Cells in a leaf