Cell Membrane and Transport

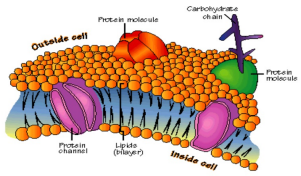
The cell membrane or plasma membrane controls what enters and leaves a cell, in order to maintain homeostasis. It is made of a selectively permeable lipid bilayer.

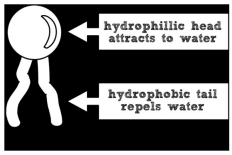
What does selectively permeable mean?
It means that some molecules can pass through while others can not.

In: glucose (food), oxygen, and water
Out: waste and carbon dioxide

*Small molecules can pass easily through the membrane

Phospholipid bilayer: two layers of phosholipids that make a flexible barrier. It is called fluid mosaic bc it is composed of many different organic macromolecules that can move.

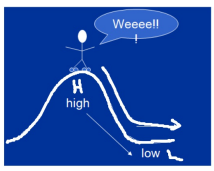




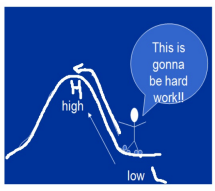
Lipids act as a barrier between the outside and inside of the cell.
Carbohydrates act as receptors. They decide if some materials can pass through or not.
Proteins act as channels or pumps for larger molecules.

Two categories of transport:

Passive Transport (H→L)
- cell doesn't use energy
1. Diffusion
2. Osmosis
3. Facilitated Diffusion



Active Transport (L→H)
- cell does use energy
1. Protein Pumps



Particles move in response to a concentration gradient:

Equilibrium

-When particles are evenly distributed over a given space. Particles still move!

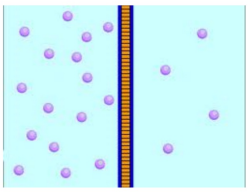
Concentration Gradient

-Difference between concentrations (# of molecules) in a space.

Diffusion

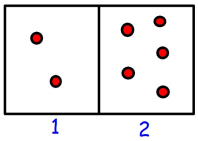
Diffusion is the movement of any molecule across the cell membrane. The movement is from high to low concentration (w/ concentration gradient). Does not require energy.

Example: Spraying air freshner or food coloring in a jar of water.



Diffusion Practice

1.



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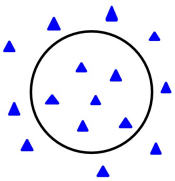

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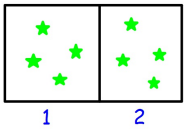
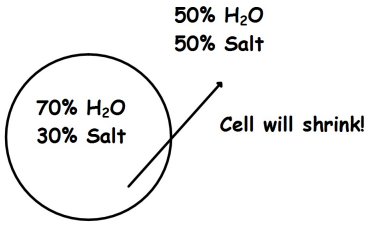


Osmosis

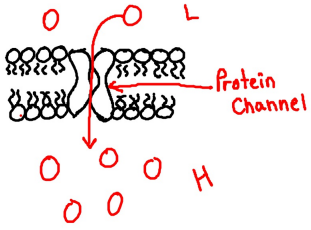
Osmosis is the movement of water molecules across the cell membrane. The movement is from high to low concentration (w/ concentration gradient). Does not require energy.

Example: Fingers wrinkling in the bath tub or egg swelling in water.



Active Transport

Active transport is the movement of molecules against a concentration gradient. It requires energy (ATP) since the molecules are moving from a low concentration to a high concentration.



Compare/Contrast:

1) Passive & Active Transport
2) Diffusion & Osmosis
3) Diffusion & Active Transport