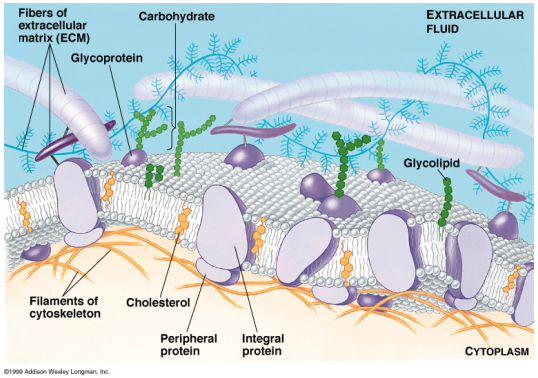
Biology – Chapters 2c & 7b

The Cell Membrane & Enzymes

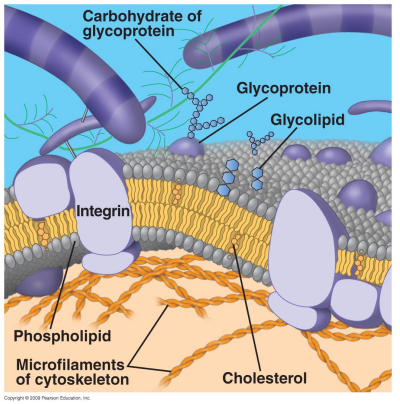
Honors Biology – Chapter 5a

The Working Cell

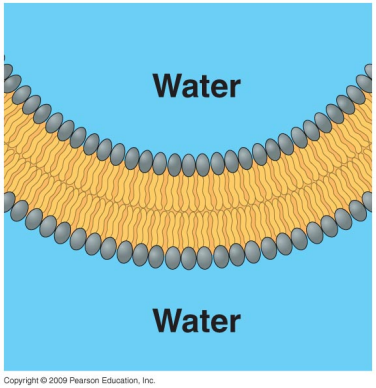
Ridgefield Memorial High School



The cell membrane is called a "fluid-mosaic" model. MOSAIC means that it is made up of many different items and FLUID means that they can move around.



The most important components of the cell membrane are the phospholipids, proteins, sugars, and cholesterol.



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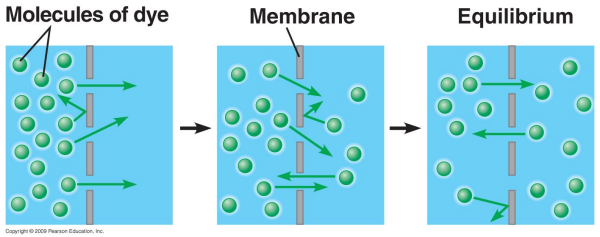
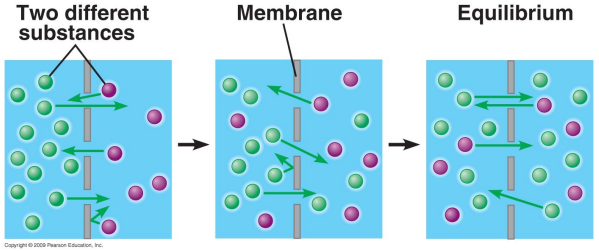
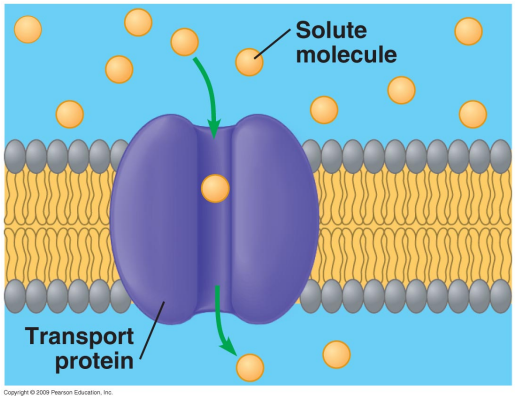
Phospholipids have polar (hydrophilic) heads and non-polar (hydrophobic) tails.



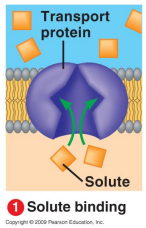
Diffusion occurs when particles move down their concentration gradient from an area of higher concentration to an area of lower concentration.



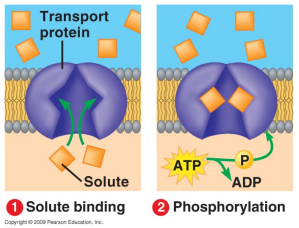
Two particles are diffusing, each down their OWN concentration gradient.



Large, charged, and polar molecules rely on facilitated diffusion for movement. Small, uncharged (neutral), and non-polar molecules can go directly through the phospholipid bilayer.



Active transport is when particles move up their gradient. Energy (ATP) is required. It doesn't matter if the molecule is large, small, polar, non-polar, etc.



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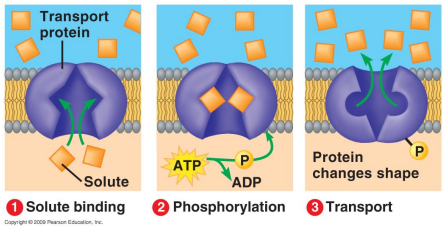

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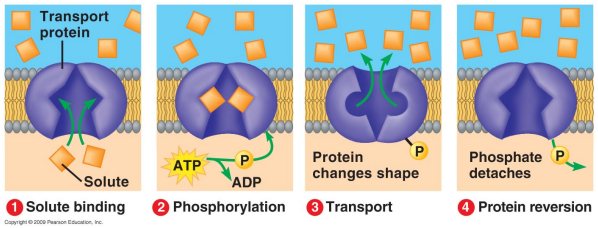

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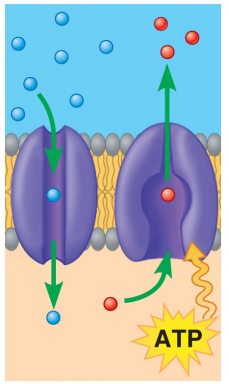
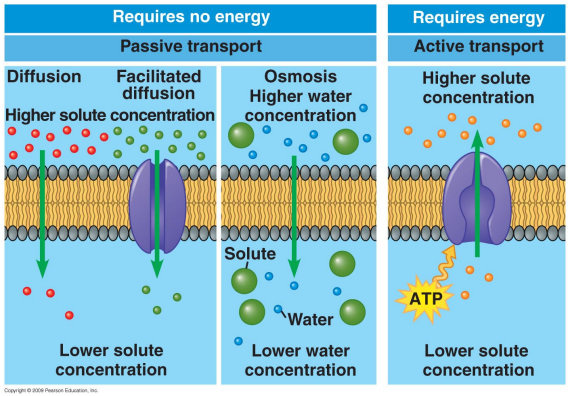
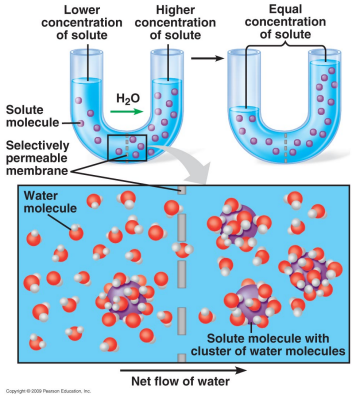


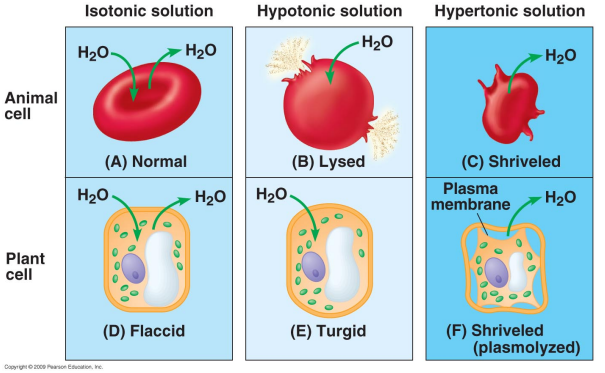
Transport proteins are required for facilitated diffusion and for active transport.



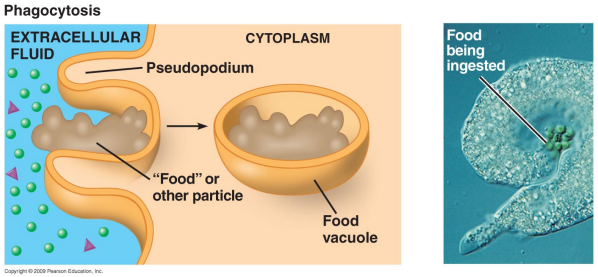
This is a review of the major types of transport across the cell membrane.



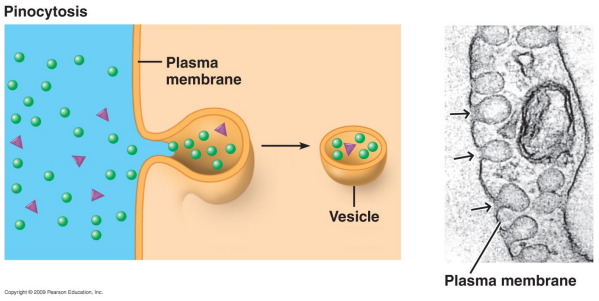
Osmosis is the transport of water molecules (ONLY) across the cell membrane.



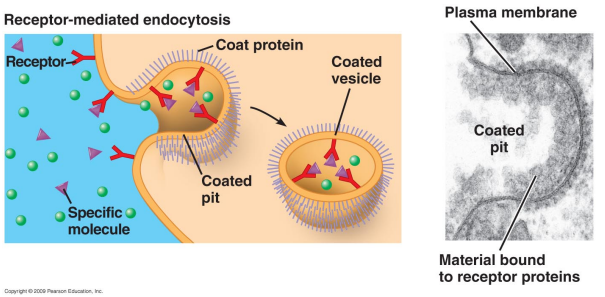
Osmosis is when WATER ALWAYS MOVES TO WHERE THERE'S MORE STUFF!



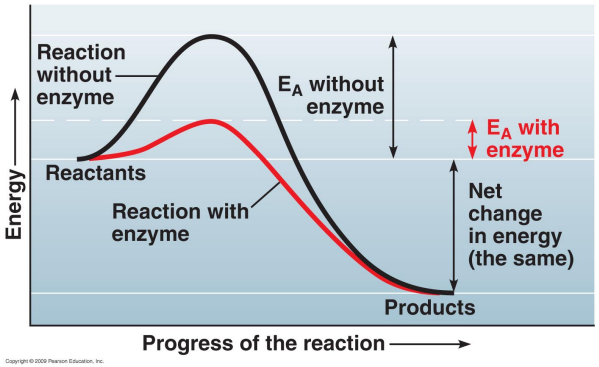
Phagocytosis is when a cell "eats" particles. The particles are engulfed by the cell membrane, forming a food vacuole. The food vacuole fuses with a lysosome and the food is digested.



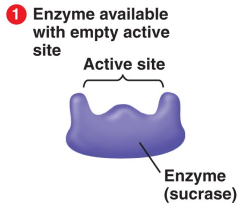
Pinocytosis is when a cell "drinks" liquid and solutes.
The particles are engulfed by the cell membrane, forming a vesicle.



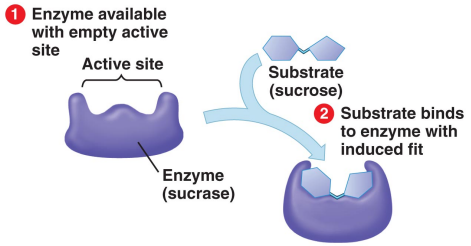
Endocytosis is similar to pinocytosis, except that is only absorbs certain molecules.



Enzymes work by lowering the activation energy of a chemical reaction. This causes the chemical reaction to occur more quickly.



Enzymes have an active site, which makes a lock-and-key fit with the substrate. The substrate is another term for the reactant(s).



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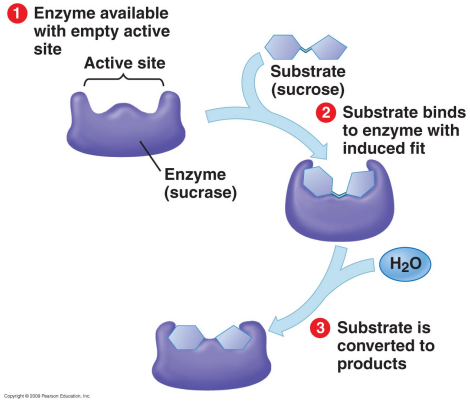

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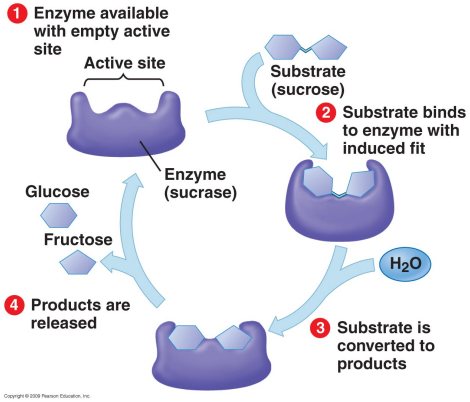

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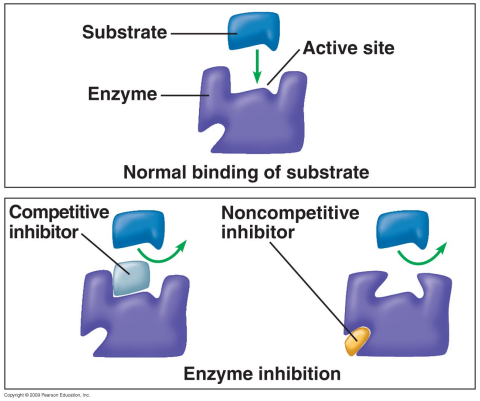
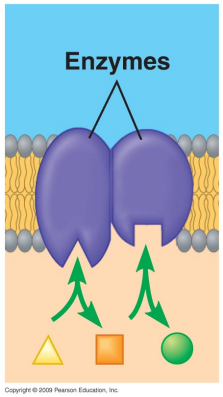


Enzymes can be blocked by competitive and non-competitive inhibitors. Competitive inhibitors block the active site. Non-competitive inhibitors block an alternate site.



Enzymes can be found in the cytoplasm, inside organelles, or along the cell membrane.

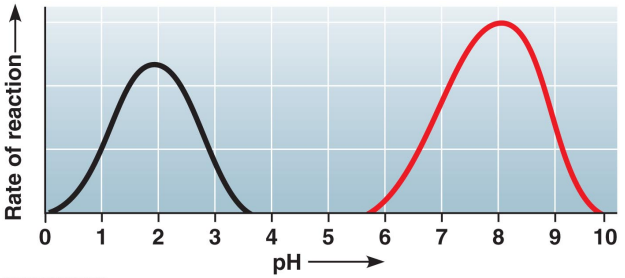
Table A: Rate and Enzyme Concentration

Lactose concentration	10%	10%	10%	10%	10%
Enzyme concentration	0%	1%	2%	4%	8%
Reaction rate	0	25	50	100	200

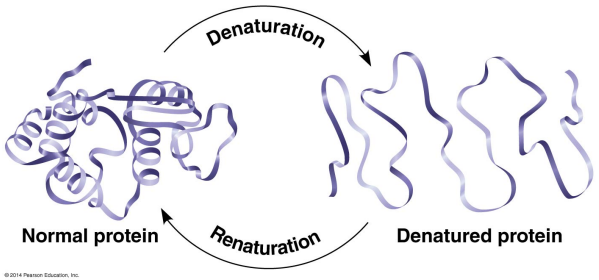
Table B: Rate and Substrate Concentration

Lactose concentration	0%	5%	10%	20%	30%
Enzyme concentration	2%	2%	2%	2%	2%
Reaction rate	0	25	50	65	65

Chemical reactions occur faster if there is either more enzyme or more substrate.



Every enzyme works best at an optimal pH, which isn't necessarily neutral (7). For example, stomach enzymes work best at pH 1 or 2. Intestinal enzymes work best at pH 8.



Changes in pH or temperature can cause a protein/enzyme to denature.
CHANGE THE STRUCTURE → CHANGE THE FUNCTION!