

Membrane Permeability → Transport Across Membrane

*Selectively or Differentially permeable – some things can cross, not others

What things can pass?

What cannot pass?

Figure 5.6

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Passive Transport (no energy)

Simple Diffusion - water, oxygen and other molecules move from areas of high concentration to areas of low concentration, down a concentration gradient

a. Crystal of dye is placed in water

b. Diffusion of water and dye molecules

c. Equal distribution of molecules results

Facilitated Transport (Diffusion) - diffusion that is assisted by proteins (channel or carrier proteins)

Higher concentration

Lower concentration

Diffusion through the lipid layer

Lipid-soluble molecules such as O_2 and CO_2 diffuse freely through the plasma membrane.

Diffusion through channels

Some polar and charged molecules diffuse through protein channels that span the membrane. Water is a typical example.

Facilitated transport

Certain molecules bind to a protein, triggering a change in protein shape that transports the molecule across the membrane. Glucose typically enters cells by this method.

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Figure 5.10

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Inside

plasma membrane

carrier protein

solute

Outside

Diffusion is how oxygen enters our bloodstream.

alveolus

capillary

oxygen

bronchiole

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OSMOSIS

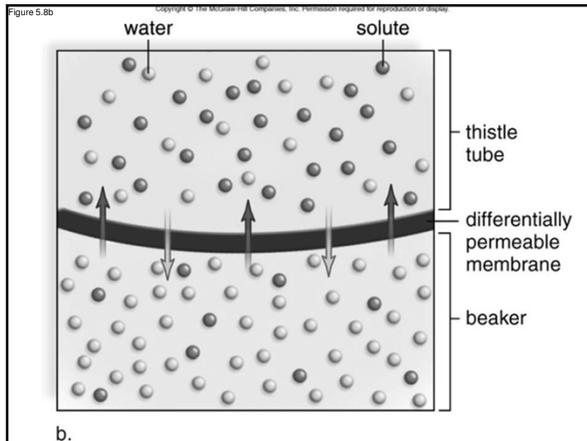
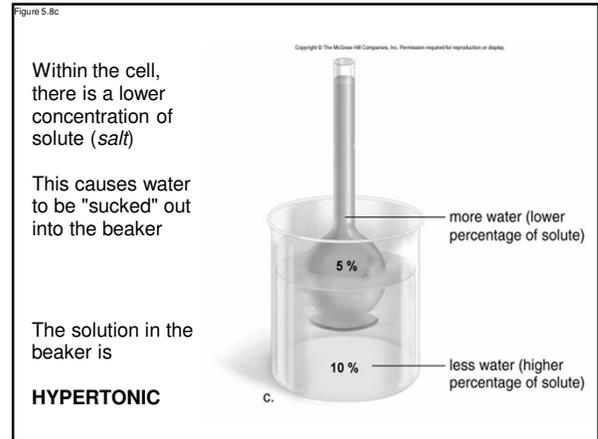
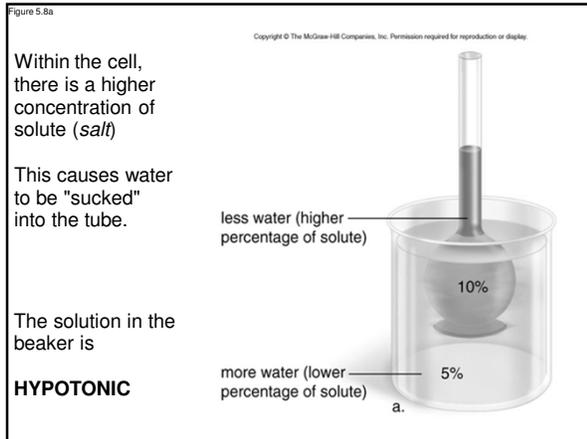
Osmosis - diffusion of water.

Osmosis affects the turgidity of cells, different solution can affect the cells internal water amounts

Contractile Vacuoles are found in freshwater microorganisms - they pump out excess water

Turgor pressure occurs in plants cells as their central vacuoles fill with water.

Simple rule of osmosis → **Salt Sucks!**



Isotonic - no net movement

Hypotonic - water moves into the cell, cell could burst

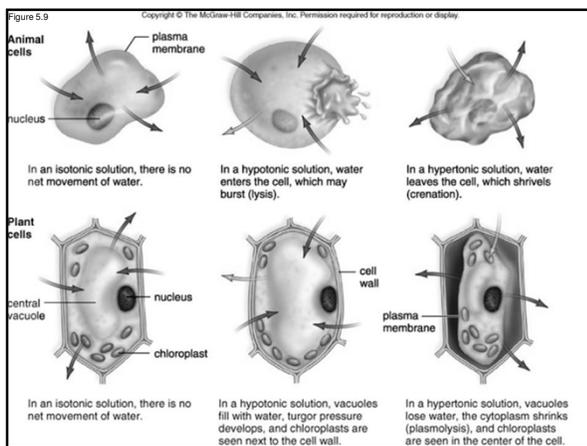
Hypertonic - water moves out of the cell, cell shrinks

plasmolysis

cytolysis

Isotonic Hypotonic Hypertonic

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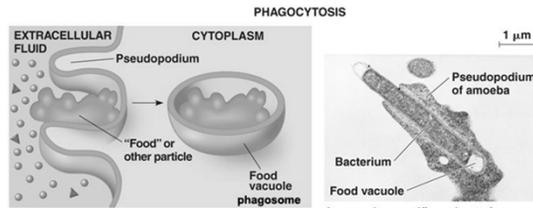
Passive Transport - requires no energy (diffusion, osmosis)

Active Transport - requires the cell to use energy (ATP)

Active Transport

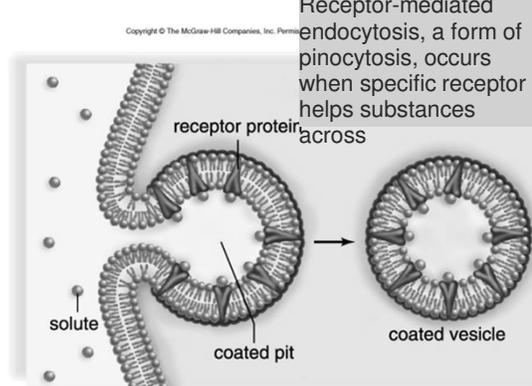
- involves moving molecules "uphill" against the concentration gradient, which requires energy

Endocytosis - taking substances into the cell (pinocytosis for water, phagocytosis for solids)



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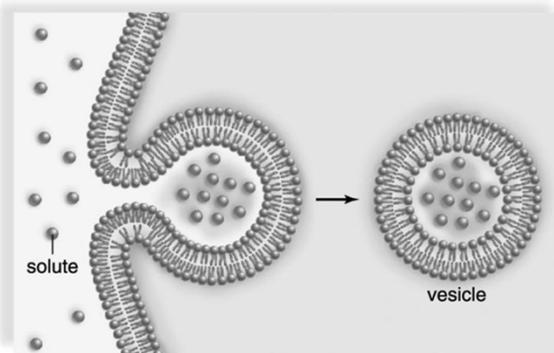
Figure 5.13ca



c. Receptor-mediated endocytosis

Figure 5.13ba

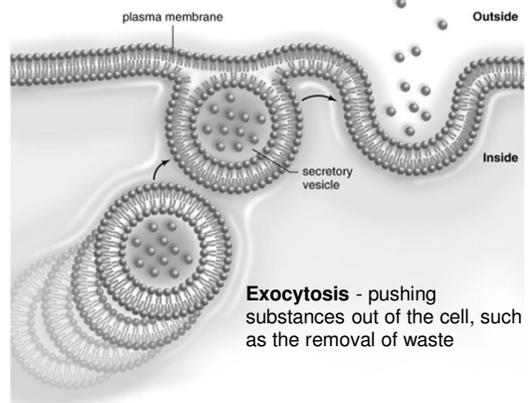
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b. Pinocytosis

Figure 5.12

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Sodium-Potassium Pump - pumps out 3 sodiums for every 2 potassiums taken in against gradient

A huge amount of energy in our bodies is used to power this pump and prevent sodium from building up within our cells.

What would happen if you had too much sodium in your cells?

SODIUM POTASSIUM PUMP

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