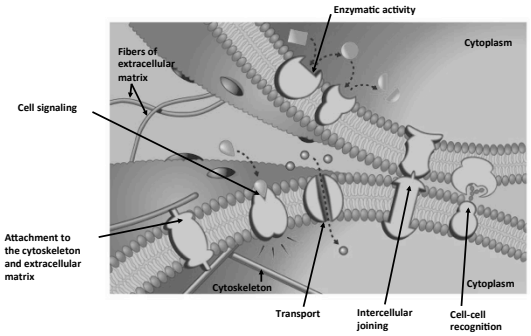


Figure 5.11

Cell MEMBRANE FUNCTION

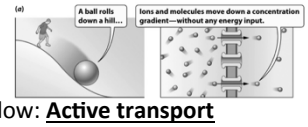
PLAY

- Cells must control flow of materials to and from the environment.
  - Semipermeable Membrane
    - Membrane proteins perform many functions.
- **Transport proteins**
  - Are located in membranes
  - Regulate the passage of materials into and out of the cell

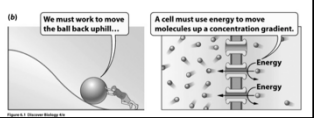
Passive and Active Transport Across the Membrane

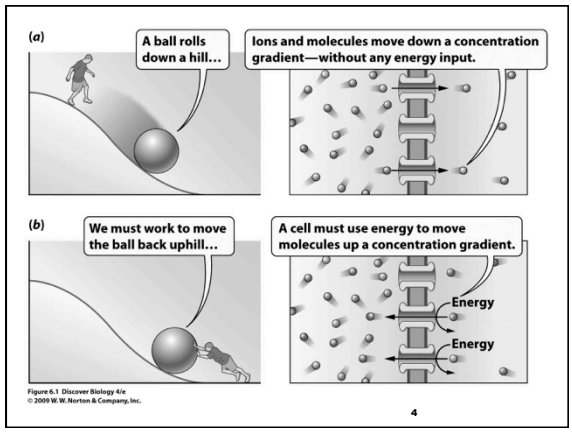
- Concentration gradients
  - Difference in concentration across the membrane

1. Going with the Flow: **Passive transport**
   - Movement from high concentration to low
   - No energy required from cell



2. Going Against the Flow: **Active transport**
   - Requires added energy
   - Movement from low concentration to high

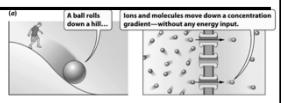


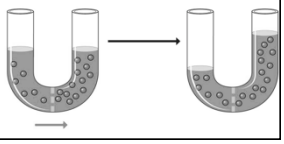


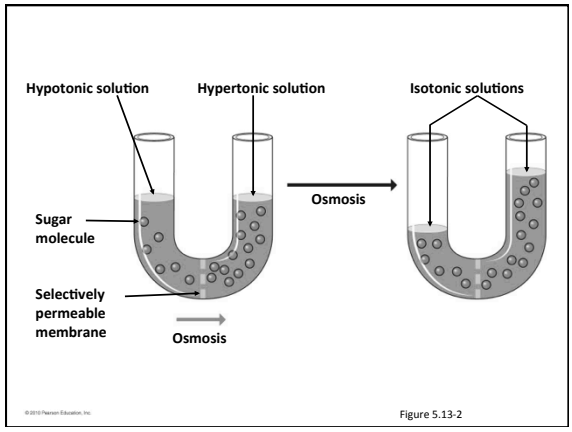
Passive Transport

TYPES OF PASSIVE TRANSPORT:

1. **Diffusion** is an example of passive transport.
   - Substances diffuse **with or down their concentration gradient**
2. **Facilitated Diffusion:** Some substances can't cross membranes on their own, even if going down concentration gradient.
   - Specific transport proteins act as selective corridors.
   - No energy input is needed.
3. **OSMOSIS** is the diffusion of **water** through a **semipermeable membrane**





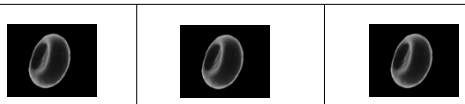


Solutions

If we only describe the solution OUTSIDE the cell

Has a higher concentration of solute.	Has an equal concentration of solute.	Has a lower concentration of solute.

Situation: Outside the Cell
Fact: Salt SUCKS



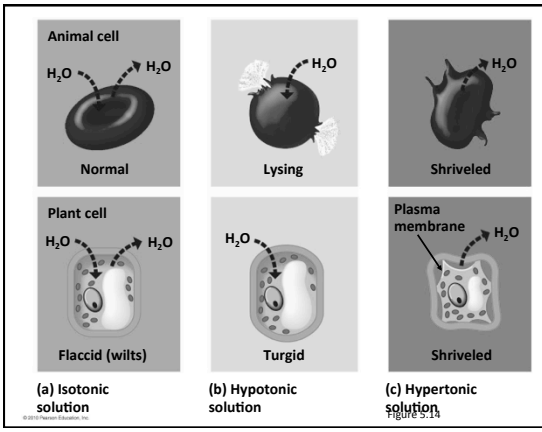
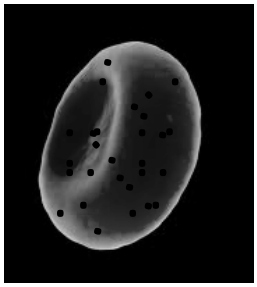


Figure 5.14

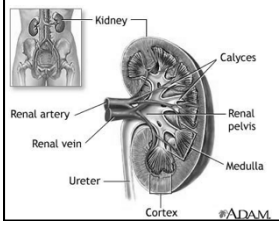
BBQ#8

1. *Explain osmosis and how it affects a salty (hypotonic) cell.*
   - *Is the movement of water passive or active transport? Explain.*

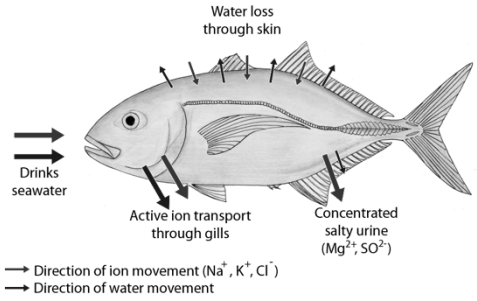


Water Balance in Animal Cells

- **Osmoregulation** is the control of water balance within a cell or organism.
  - Most animal cells require an isotonic environment.
  - Many multicellular animals use a kidney

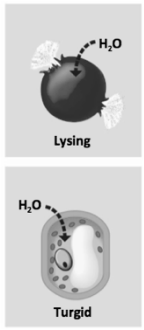


Example: Water Balance in Salt Water Fish



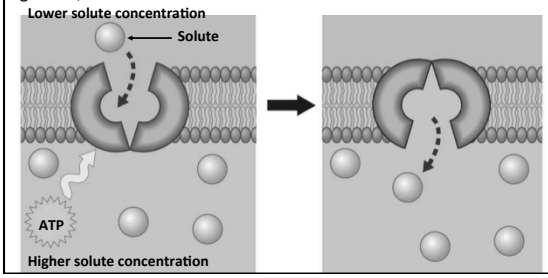
Water Balance in Plant Cells

- Plant have rigid cell walls.
- Plant cells require a hypotonic environment, which keeps these walled cells turgid.

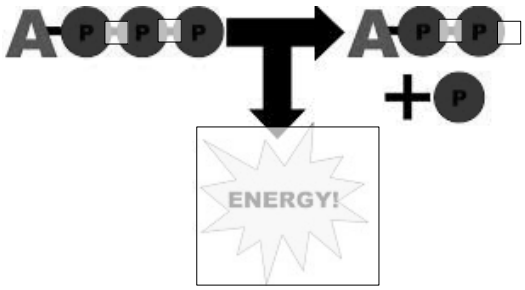


Active Transport = Moving molecules against/up concentration gradient

- Requires Energy
- Only for small molecules and ions: H+, Na+, amino acids, glucose, etc.



Energy used for ACTIVE TRANSPORT



Endo and Exocytosis - Moving big molecules

- Requires Energy no matter what direction materials are moving
- Used For:
  - Moving big molecules across the membrane like proteins or starch
  - Single celled organisms eating
  - White blood cells for killing bacteria

Exocytosis

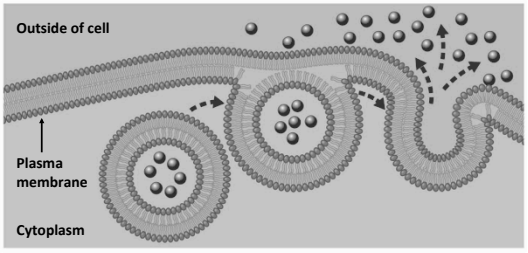


Figure 5.17

Endocytosis

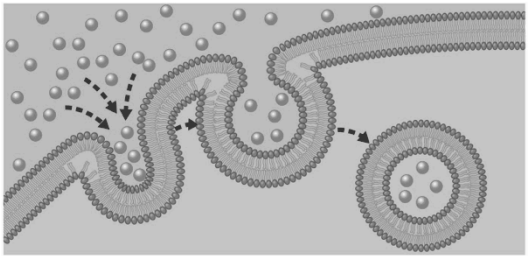


Figure 5.18

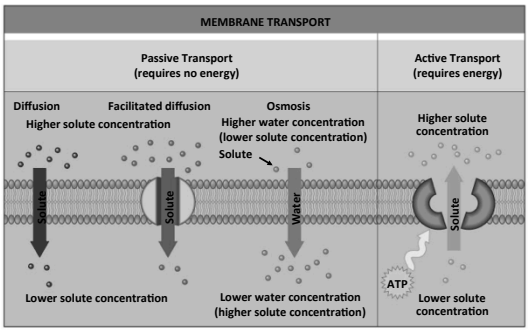
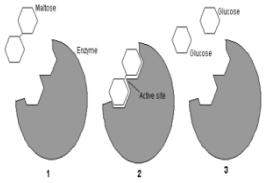


Figure 5.UN03

A Little more about ENZYMES



- **Metabolism** is the total of all chemical reactions in an organism.
- Most metabolic reactions require **enzymes**
- **What is food for you vs. what is poison to you is all about what enzymes you have**

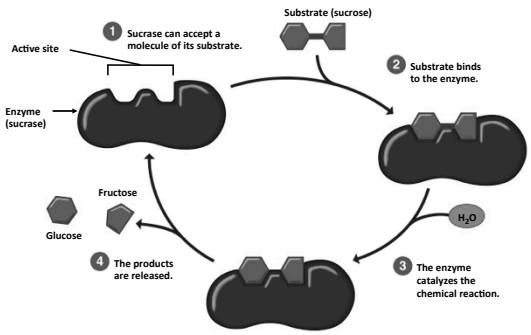
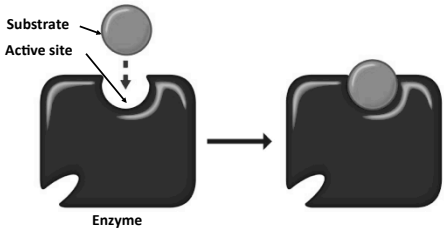


Figure 5.9-4

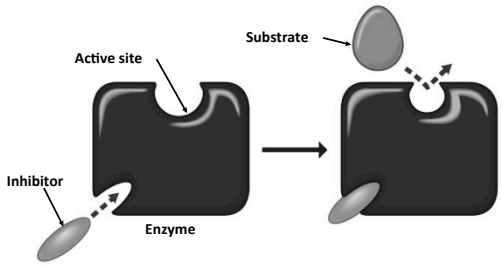
How can enzymes be controlled?? Enzyme Inhibitors

- Many antibiotics work by inhibiting enzymes of disease-causing bacteria.
- **Some Enzyme inhibitors** bind to the active site = competitive inhibition



(a) Enzyme and substrate binding normally

Figure 5.10a



(c) Enzyme inhibition by a molecule that causes the active site to change shape

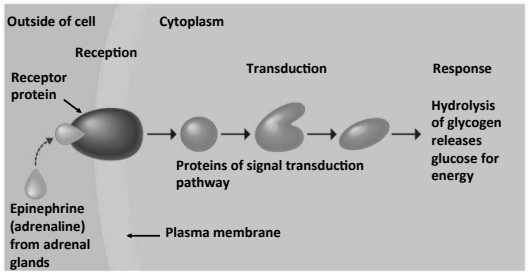
Figure 5.10c

Noncompetitive inhibition

- Bind at a remote site
- Change the enzyme's shape
- Prevent the enzyme from binding to its substrate
- Some reversible
- Some not: cyanide and carbon monoxide

Proteins used for Cell Signaling

– Receptors on a cell surface trigger **signal transduction pathways**



New Topics:

1. Energy: what is it?
2. Cell Respiration: how do we get energy from our food?
3. Photosynthesis: how do plants harness the energy from the sun?