Biology 10

Chapter 7-3
"Cell Transport"
p 208-213

Objectives

- Identify the main functions of the cell membrane
- Describe what happens during diffusion.
- Explain the processes of osmosis, facilitated diffusion, and active transport.

Diffusion

- All molecules are in constant motion
- Molecules move in a straight line and rebound when they hit something
- Net effect is to spread out
- **diffusion**- _____

_____

Diffusion

- **concentration gradient**- the _____

_____

  - molecules move down the concentration gradient until they are spread out evenly
- **equilibrium**- the concentration of molecules is _____ throughout a space
  - molecules continue to move, but the overall concentrations remain stable

Diffusion

- cell membranes can limit diffusion, as molecules may be too big, or may be improperly charged to pass through
  - In general, _____ molecules unable to pass between lipid molecules
  - In general, _____, or highly polar molecules cannot pass through the hydrophobic region of the lipid bilayer either
- **semipermeable**- membrane _____

_____

Diagram of the Cell Membrane

Osmosis

osmosis- the diffusion of _____ from areas of high concentration to areas of low water concentration

Direction of osmosis

- Water, like all molecules, moves to low concentrations
  - If water concentration is greater outside the cell than inside, water moves **into** the cell
    = **hypotonic solution** (cell _____!)
  - If water concentration is less outside the cell than inside, water moves **out of** the cell
    = **hypertonic solution** (cell _____)
  - If water concentration is the same outside and inside the cell, water is in equilibrium
    = **isotonic solution** (_____ cell volume)

Blood Cell Images

Plant Cells in Solution

Role of osmosis

- In a hypotonic solution, water flows in the cell, increases the pressure (= **turgor pressure**)
  - in animal cells, the cell may burst (= _____)
    - Aquatic animals must constantly deal with osmosis
    - ex: freshwater fish excrete high volumes of urine, with low solute concentrations to get rid of excess water
    - ex: saltwater fish excrete highly concentrated urine, to get rid of extra salt
  - in plants, cell wall keeps cell from bursting
  - in freshwater protists, the water is pumped out by a _____
- In a hypertonic solution, the water flows out of the cell, decreases turgor pressure
  - = _____
  - ex: when you don't water your plants they wilt!
  - Ex 2: when you put salad dressing on lettuce, it eventually gets wilted and limp

Active vs. Passive Transport

- **active transport-** the cell _____ moving the molecules across a membrane
- **passive transport-** the cell _____ moving substances across a membrane

Carrier Transport

- **carrier transport**- cell _____ (**carrier molecules,** or **permeases**) in the cell membrane to allow transportation of substances through the membrane
- May be active or passive

Facilitated Diffusion

- **facilitated diffusion**- carrier molecules transport molecules through the membrane _____
  - form of passive transport (no energy required) used to transport glucose into/out of cell
  - These passages are always open to the cell

Facilitated Diffusion Graphic

Types of Active Transport

- **sodium-potassium pump**- transports _____ of the cell and _ _____ the cell
- the sodium-potassium pump is a case of **active transport**, it requires ATP to function
  - movement in each case is **against** the concentration gradient!
  - Both Na and K have a positive charge, thus, a buildup of positive charges develops outside the cell

Endocytosis

- **endocytosis**- the _____ by enclosing them in the cell membrane
- cell membrane forms a pouch around the molecules, and then pinches off to release them inside the cell
  two types:
- **pinocytosis**- "_____", movement of solutes or fluids into the cell via endocytosis
- **phagocytosis**- "_____", movement of large food particles via endocytosis

Phagocytosis

Pinocytosis

Exocytosis

- **exocytosis**- the _____ through the cell membrane
- accomplished by the fusion of vesicles from the Golgi body
- contents of vesicle then dumped outside the cell

Exocytosis