DIFFUSION AND OSMOSIS
Bio 107 Lab – Week 4
OBSERVE BROWNIAN MOVEMENT

- Brownian motion – random movement of particles in a liquid or gas from the collision of atoms or molecules.
**DIFFUSION**

- Movement of molecules from a high concentration to a lower concentration.
- **Direction** of diffusion depends on the presence of a gradient of concentration, heat, and pressure.
- **Rate** of diffusion depends on steepness of the gradient and characteristics of the molecules.

![Food coloring diffusing in water](image)
Selective Permeable Membranes

Membranes made of phospholipids

Phospholipids: Polar region
SELECTIVELY PERMEABLE MEMBRANES

(B) Phospholipid bilayer
**Solute Diffusion across a Differentially Permeable Membrane**

- Phenolphthalein – indicates basic solutions (high pH).
- Iodine – indicates starch!
Solute Diffusion across a Differentially Permeable Membrane

- Bag: Glucose, Starch
- Beaker: Water, Iodine
Osmosis

- Diffusion of water across a selectively permeable membrane.

![Diagram of Osmosis](image)
Osmosis

- Osmosis is the diffusion of water across a differentially permeable membrane.
- Water is the principle solvent in cells
- Solution: homogeneous, liquid mixture of two or more kinds of molecules
  - Solvent = fluid that dissolves substances
  - Solute = substance dissolved in a solution
- Osmosis occurs at different rates depending on the difference in concentrations
Osmosis and Tonicity

- Where is the solute concentration higher?
- Which way should WATER move to even out concentrations?

Diagram showing a half-spherical boundary with 1% NaCl on one side and 10% NaCl on the other, indicating the direction of water movement to balance the osmotic pressure.
OSMOSIS AND TONICITY

- Where is the solute concentration higher?
- Which way should WATER move to even out concentrations?

![Diagram of osmosis with 1% NaCl and 10% NaCl solutions]
**Osmosis and Tonicity**

- Where is the solute concentration higher?
- Which way should WATER move to even out concentrations?
Osmosis and Tonicity

- Hypotonic solution
- Isotonic solution
- Hypertonic solution

5% NaCl  5% NaCl
Osmosis and Tonicity

Isotonic = no NET movement
**Water Potential and Cells**

- **A** dissolved particles
- **B** water
- **C** cell
WATER POTENTIAL AND CELLS
ACTIVITIES

- **Solute Diffusion Across the Plasma Membrane**
  - Determine which molecules permeate a differentially permeable membrane
  - Use only 4 pipets of glucose and starch to fill dialysis bags
  - Use regular cold tap water to fill beakers
  - Tie end like a balloon (NOT with string or rubberband) and rinse to make sure all solution is out of the end
  - Do not throw out beakers
  - Pipets and dialysis bags can go in the regular garbage

- **Tonicity and Red Blood Cells**
  - Observe text through red blood cells in solutions of three different tonicities

- **Tonicity and Elodea Cells**
  - Observe Elodea cells under the microscope in freshwater and 10% NaCl solution
BEFORE LEAVING

- Put away microscopes, slides, and keys!
  - Make sure to remove slides from microscopes
- Clean lab bench
- Turn in Lab