# Osmosis and Concentration Gradients

**Questions/Pictures/ Key Words**

**What Happened to the lettuce?**

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*—This is also why you get thirsty after eating something salty.*

**Diffusion:** The net movement of molecules down their **concentration gradient.**

-Molecules tend to move from regions where they are in higher concentration (more tightly packed) to regions where they are less concentrated (farther apart).

**OSMOSIS: Passive** (not energy needed) **diffusion of water through a Semipermeable membrane**:

Who has a semipermeable membrane? A cell!

—A simple rule to remember is: **SALT SUCKS!**

—Salt is a **solute**, when it is concentrated inside or outside the cell, it will draw the **solvent** (water) in its direction.

—Why doesn't the salt just move?

Why doesn't the salt just move?

**TRANSPORT: Moving things around and into/out of a cell.**

**Types:**

**1) PASSIVE TRANSPORT**

—WHAT: **No energy** is required for the molecules to move into or out of the cell.

—Diffusion and Osmosis are both examples

**2) ACTIVE TRANSPORT:**

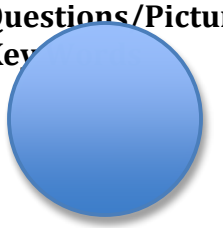
—WHAT: **Requires energy**- if carried out against the concentration gradient, is called,.

—WHY: Sometimes, large molecules cannot cross the plasma membrane, and are "helped" across by carrier proteins

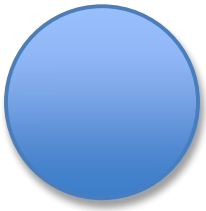
**Type of Solutions: Overview**

| **Solution** | |
|---|---|
| ISOTONIC<br>"**ISO**" means the same | If the concentration of solute (salt) is equal on both sides<br>-No net movement of water |
| HYPOTONIC<br>"**HYPO**" means less | In this case there are less solute (salt) molecules outside the cell<br>-The cell will gain water and grow larger |
| HYPERTONIC<br>**"HYPER"** means more | The word, in this case there are more solute (salt) molecules outside the cell<br>-The cell will lose water and shrink |

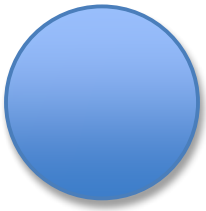
**Questions/Pictures/ Key**



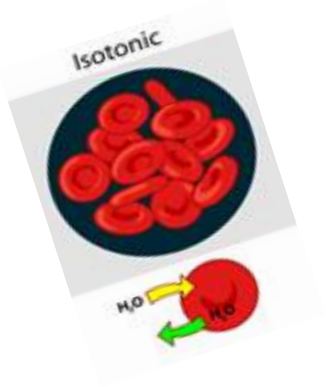
"Hypo = Hippo (big fat guy)"



—"Hyper", hyper people burn lots of energy and are skinny!"

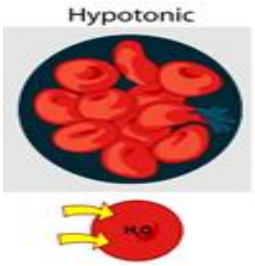


**Type of Solutions:**




1. **ISOTONIC**
   —**Same** solution on both sides
   —**Equal** movement in and out

2. **HYPOTONIC**




   —"HYPO" means less
   —**Less** solute (salt) molecules **outside** the cell, since salt sucks, water will move into the cell.
   —Water will move into the cell
   _ The cell will grow larger.

- **Strategies**

—How to deal with swelling up and not pop!

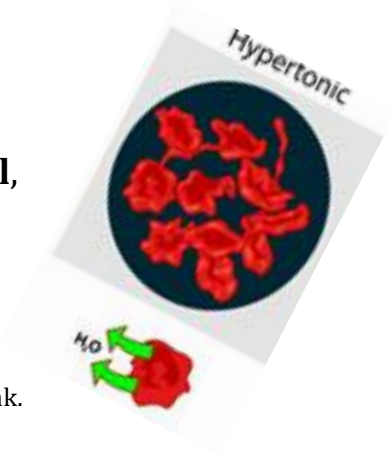
—ANIMAL CELL:

—The cell may be in danger of bursting, organelles called CONTRACTILE VACUOLES will pump water out of the cell to prevent this

—PLANT CELL:

—The central vacuoles will fill and the plant becomes stiff, the cell wall keeps the plant from bursting
—Contractile Vacuole

3. **HYPERTONIC**
   —"HYPER" means more
   —The word, in this case there are **more solute (salt) outside the cell**,
   —which causes the water to be sucked out of the cell
   —PLANT CELLS: the central vacuole loses water and the cells shrink, causing wilting.
   —ANIMAL CELLS: the cells also shrink.
   —In both cases, the cell may die.




Summary: