**Osmosis and Concentration Gradients**

**Diffusion:** [The net movement of molecules down their](http://www.phschool.com/science/biology_place/glossary/d.html%23diffusion) [**concentration gradient.**](http://www.phschool.com/science/biology_place/glossary/c.html%23concentration%20gradient)

**Questions/Pictures/ Key Words**

**What Happened to the lettuce?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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

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



**Questions/Pictures/ Key Words**

 “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

1. **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

1. **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: