**Exam 3 Study Guide**

**PART 1**: Diffusion through an Artificial Cell

**THE SET UP:**

* Glucose and starch were placed inside of a dialysis tube bag. The bag is the “cell”
  + The bag was WHITE
  + There was a high concentration of glucose and starch in the bag- both want to diffuse out!
* The “cell” was placed in a beaker with starch indicator (iodine).
  + The beaker was AMBER
  + There is was a high concentration of indicator in the beaker- it wants to move in!
* The beaker was left for 20 minutes

**THE RESULTS:**

* The “cell” turned BLACK/BLUE
  + This means that starch indicator diffused INTO the bag
* The beaker stayed AMBER!
  + This means that starch did NOT diffuse out of the bag
* The beaker water was tested for glucose using a glucose indicator test
  + Glucose indicator is blue, and must be heated!
    - The test tube turned yellow- the results for glucose were positive!
  + Glucose was able to diffuse OUT of the bag

**Part 2**: Osmosis in Onion Cells

**THE ONION CELL:**

* Onion cells were placed in salt water and distilled water environments.
* Osmosis will cause a change in volume (size of the cell)

**SALT WATER:**

* Salt water has a lower concentration of water than the **cytoplasm** inside the cell
* When the cells were placed in salt water, water diffused OUT of the cell.
  + Water left the cytoplasm and the **cell membrane** shriveled. The **cell wall** stayed the same!!!

**DISTILLED WATER (Fresh water):**

* Distilled water has a higher concentration of water than the **cytoplasm** inside the cell
* When the cells were placed in distilled water, water diffused INTO the cell
  + Water was added to the cytoplasm, and the **cell membrane** expanded.

**SELECTIVELY PERMEABLE:**

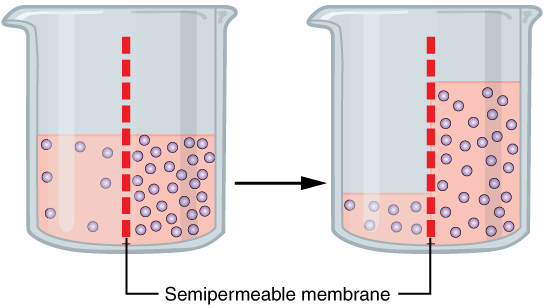
* The cell membrane is **selectively permeable**, meaning that *only some molecules can pass through*.
* Glucose, oxygen, carbon dioxide, simple sugars, glucose, amino acids, and monomers are **PERMEABLE** *because they are small.*
* Carbohydrates, Proteins, and Starch are **NOT permeable**. They are *TOO big* to pass through the membrane, and *MUST be digested first.*

**CHEMICAL INDICATORS:**

* A chemical indicator is a chemical that will test for the presence of a certain molecule.
* **Starch indicator** (iodine) tests for the presence of starch
  + Starch indicator is **AMBER BROWN**
  + In the presence of starch, starch indicator will turn **BLUE/BLACK**
* **Glucose indicator** tests for the presence of glucose
  + Glucose indicator is **CLEAR BLUE**
  + In a positive test for glucose, glucose indicator will turn **RED/YELLOW/ORANGE/GREEN**
  + Glucose indicator **MUST BE HEATED!**

**PASSIVE TRANSPORT:**

* **Passive transport** is the movement of any substance from a high concentration to a low concentration. Passive transport *does NOT require energy.*
* **Diffusion** is a type of passive transport. Diffusion is the movement of molecules from a high to low concentration without using energy.
* **Osmosis** is a type of passive transport. Osmosis is the **diffusion of water**. Osmosis is when water moves from a high to low concentration without using energy.
  + If osmosis has happened, the cell will SHRIVEL or EXPAND! There will be a change in the volume (size) of the cell!



*\*Molecules would move from B to A by the process of diffusion. No energy needed*

*\*Molecules moving from A to B would require energy. Moving from A to B would be active transport*

**ACTIVE TRANSPORT:**

* **Active transport** is the movement of molecules from a **LOW to HIGH** concentration. Active transport moves molecules against their concentration gradient, and **requires energy**!!!

**CELL MEMBRANE AND CYTOPLASM:**

* The movement of molecules is controlled by the cell membrane. **The concentration of water and molecules in the cytoplasm MUST be equal to the concentration of the water and molecules outside of the cell.**
* If the concentration of molecules changes inside or outside of the cell, diffusion must happen to restore *equilibrium* (**homeostasis**).
  + If the concentration becomes *higher outside*, molecules will move INTO the cell
  + If the concentration becomes *higher inside*, molecules will move OUT of the cell.