Plasma (cell) membrane- the boundary between the cell and its environment, controls entry of nutrients and removal of wastes- maintains homeostasis

***Homeostasis**- balance; an ideal internal environment ***

Selective permeability- the cell membrane is picky- some molecules are allowed to enter a cell while others are kept out
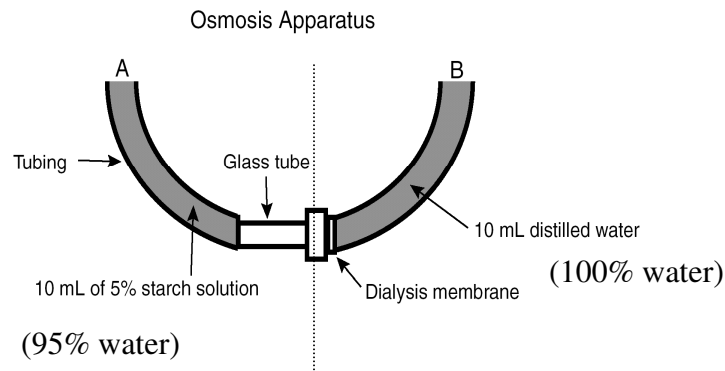
Phospholipid bilayer- The plasma (cell) membrane is made up of two layers, each layer contains phosphate groups and lipids (fats) that allow the membrane to be flexible and picky about what enters and what exits. There are also proteins in the membrane that can help substances move through.

Membrane protein
(transport channel)

Phospholipid bilayer
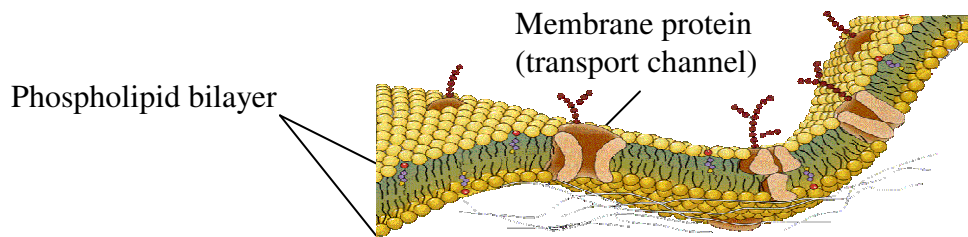
Passive Transport

      Some substances can move without using energy. This is called passive transport. If you place a drop of ink in a beaker, the ink will soon spread farther and farther out until it is evenly distributed. The ink did <u>not</u> have to use energy to spread out. Instead, the random movement of particles caused the crowded (highly concentrated) ink molecules to move to less crowded (less concentrated) areas. This movement of solute (dissolved substance) from an area of greater concentration to an area of less concentration is called **diffusion.**

      Water molecules can also diffuse. Diffusion of water is called **osmosis**. Water also moves from where there is more water to where there is less water. Look at the diagram below. The dialysis membrane is similar to a plasma membrane in that it is selectively permeable. Water molecules are small enough to pass through, but starch molecule are too large. Because there is a greater concentration of water in side B (100%) than in side A (95%), water will move from side B to side A, and the water level in side A will rise.

Osmosis Apparatus

A

B

Tubing

Glass tube

10 mL distilled water

(100% water)

10 mL of 5% starch solution

Dialysis membrane

(95% water)

Active Transport

Some molecules are too large to enter or exit the cell, or their charges prohibit them from passing through the plasma membrane. If this is the case, the cell can still move them, but it must use energy. Movement of substances that requires energy is called **active transport.**
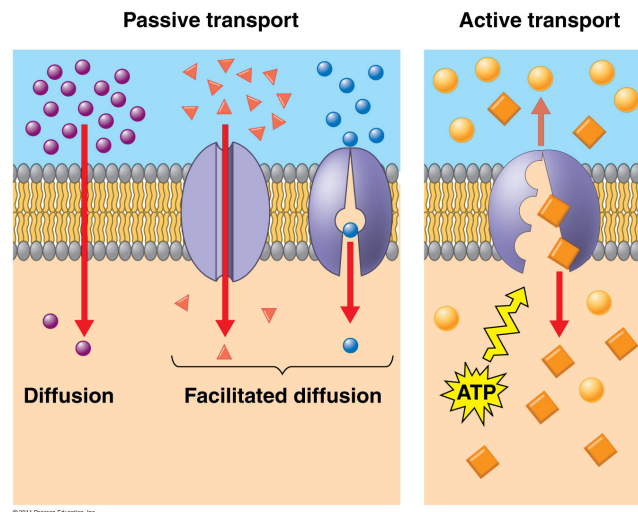
Sometimes proteins in the plasma membrane are used to pump materials out. Sometimes, materials enter and exit the cell using vesicles (pockets of the cell membrane).

Endocytosis uses vesicles to bring materials (like nutrients) into the cell.

Exocytosis uses vesicles to move materials (like waste products) out of the cell.

Summary:

-----
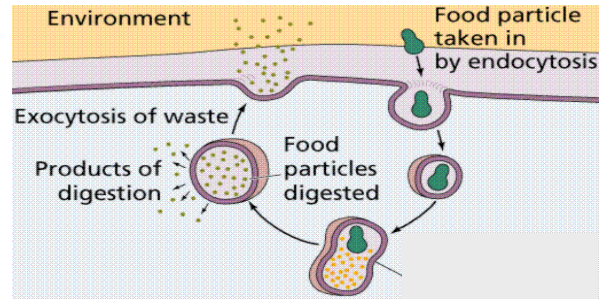
1. A thermostat maintains an ideal temperature of a room. What cell process is similar to this?
   A. Food storage
   B. Protein synthesis
   C. Active transport
   D. Homeostasis

2. If a saltwater fish (90% water) is placed in fresh water (100% water), water will likely move into the fish cells and kill the fish. This is most likely due to _____.
   A. facilitated transport
   B. osmosis
   C. endocytosis
   D. exocytosis

3. Passive transport requires energy / does not require energy *(circle one),* while active transport requires energy / does not require energy *(circle one).*

4. Which process allows large molecules to enter a cell?
   A. endocytosis
   B. exocytosis
   C. osmosis
   D. facilitated diffusion
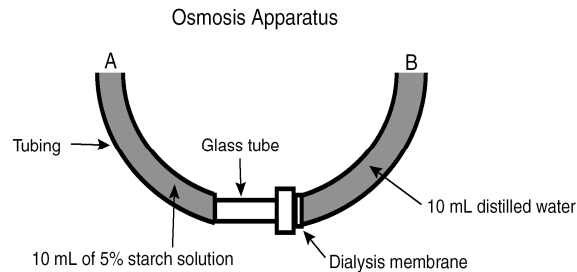
5. What does it mean that the plasma (cell) membrane is selectively permeable?

6. The cell membrane maintains homeostasis by controlling
_____
_____.

Osmosis Apparatus


7. Which would most likely cause the liquid in Tube A to rise?
   A. Starch concentrations being equal on each side of the membrane
   B. Water passing from a region of lower starch concentration to one of higher starch concentration
   C. Water and starch volumes being the same
   D. Solute in the tubes changing from a higher temperature to a lower temperature

8. If the cell in the beaker is permeable to only water, the cell will probably_____.
   A. grow and possibly explode
   B. shrink
   C. stay the same

Cell:
98% water

Solution:
75% water
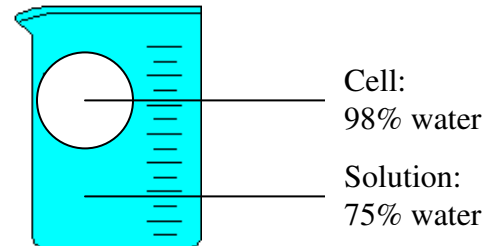
9. Facilitated diffusion is
   A. the same as endocytosis
   B. a special kind of osmosis
   C. a process that requires the cell's energy
   D. a type of passive transport

10. Which of the following is not a part of a prokaryotic cell?
    A. Cytoplasm
    B. Cell membrane
    C. DNA
    D. Organelle