Active & Passive Transport

Cells have a need to move materials both into and out of the cell. Raw materials and other molecules necessary for metabolism must be accumulated from outside the cell. Some of these substances are scarce outside of the cell and some effort is required to accumulate them. Waste products and molecules for use in other parts of the body must be 'exported' out of the cell.

Some materials (e.g. gases and water) move into and out of the cell by **passive transport** processes, without the expenditure of energy on the part of the cell. Other molecules (e.g. sucrose) are moved into and out of the cell using **active transport**. Active transport processes involve the expenditure of energy in the form of ATP, and therefore use oxygen.

Passive Transport

Diffusion

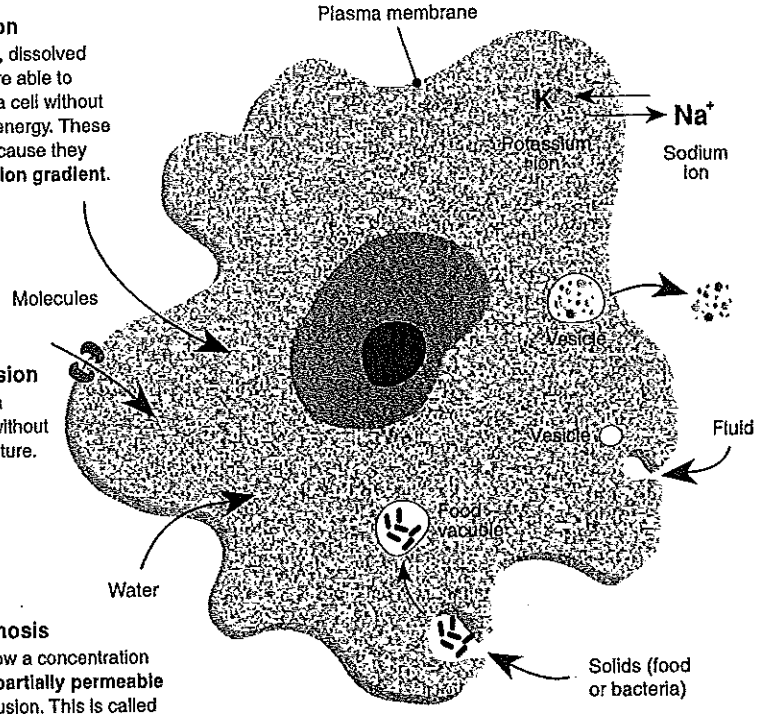
Molecules of liquids, dissolved solids, and gases are able to move into or out of a cell without any expenditure of energy. These molecules move because they follow a **concentration gradient.**

Facilitated diffusion

Diffusion involving a carrier system but without any energy expenditure.

Osmosis

Water can also follow a concentration gradient, across a **partially permeable membrane,** by diffusion. This is called **osmosis.** Osmosis causes cells in fresh water to puff up as water seeps in. This water must be continually expelled.



Active Transport

Ion pumps

Some cells need to control the amount of a certain ion inside the cell. Proteins in the plasma membrane can actively accumulate specific ions on one side of the membrane.

Exocytosis

Vesicles budded off from the Golgi apparatus or endoplasmic reticulum can fuse with the plasma membrane, expelling their contents. Common in secretory cells e.g. in glands.

Pinocytosis

Ingestion of a fluid or a suspension into the cell. The plasma membrane encloses some of the fluid and pinches off to form a vesicle.

Phagocytosis

Ingestion of solids from outside the cell. The plasma membrane encloses a particle and buds off to form a vacuole. Lysosomes will fuse with it to enable digestion of the contents.

Answer Questions on the Back & turn in for a grade

Name _____ Score _____/ 30 points

~Questions~

1) An example of an ion pump is the sodium/potassium pump. Explain how this pump functions in the human body. _____
_____
_____
_____(3 pts)

2) Endocytosis is when a _____
_____ (2 pts)

3) Two examples of Endocytosis are _____ & _____ (2 pts)

4) What is the difference between your answers from #3? _____
_____
_____ (4 pts)

5) Name three types of passive transport. _____
_____ (3 pts)

6) Name four types of active transport. _____
_____ (4 pts)

7) Name at least two differences between active and passive transport. _____
_____ (2 pts)

8) What is an ion pump? _____ (2 pts)

9) How does facilitated diffusion work? _____
_____ (2 pts)

10) What type of materials can move in and out of the cell during passive transport? (2 pts)
_____

11) What type of materials can move in and out of the cell during active transport? (2 pt)
_____

12) How is diffusion able to work? _____
_____ (2 pts)