Cellular Transport Processes

The plasma membrane is the barrier that separates the intracellular and extra cellular environments.

The main component of the plasma membrane is the lipid bilayer. Other structures making up the plasma membrane are cholesterol, carbohydrates and proteins.



In order to survive and function properly, cells need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ substances across the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

For example, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is necessary for aerobic cellular \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and must move into a cell from the blood.

Carbon dioxide ,a by-product of aerobic cellular respiration must move from inside the cell to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Oxygen and carbon dioxide move into/out of a cell by simple \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This defined as the movement of a gas/liquid from an area of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to an area of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Diffusion is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form of transport meaning it does not require energy, and relies on a c\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on either side of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ membrane.

Oxygen and carbon dioxide are able to cross the plasma membrane in this way because…

Add symbols and text to the image below to create a diagram that represents diffusion.



Some substances required by the cell cannot pass through the plasma membrane by simple diffusion, but their movement into or out of a cell is still driven by a c\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ g\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

For example, glucose, which is required for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ respiration cannot simply diffuse into a cell because it is to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

In order to move glucose into a cell, an integral t\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ protein which is embedded in the plasma membrane acts as a tunnel/gate to allow glucose in. Glucose can move into a cell by travelling through these p\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ channels. This type of transport is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ diffusion, as the protein facilitates or guides the glucose into or out of a cell. Because this does not require energy, and glucose still moves down it’s concentration \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, this is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ process.

Glucose is not able to easily cross the plasma membrane because…

Add symbols and text to the image below to create a diagram that represents facilitated diffusion



Water is essential for all life and cells need a mechanism to absorb water. A special kind of diffusion called o\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, is a process that drives the movement of water. The movement of water is determined by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ gradient of solutes on either side of a membrane (the difference between the inside and outside of a cell).

O\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the movement of water from an area of \_\_\_\_\_\_\_\_\_\_\_ solute concentration to an area of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ solute concentration across a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If the extracellular environment in which a cell is in has a higher solute concentration than the int\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environment, we say the cell is in a h\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environment. Water will leave the cell. The cell will lose m\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, perhaps lose s\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and in the case of a plant cell it may p\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Plasmolysis occurs when a plant cell membrane detaches from the cell wall and the interior of the cell collapses. This occurs as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is integral in maintaining the shape of a cell. Plants lacking water are seen to be fl\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If the ex\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environment in which a cell is in has a lower s\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ concentration than the intracellular environment, we say the cell is in a h\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environment. Water will enter the cell. The cell will gain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. If too much water enters, a cell may lyse, which means to b\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When plant cells absorb water they become t\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

When the solute concentration of the e\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ environment is equal to the intracellular solute concentration, the environment is said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. In this case, there will be movement of water in and out of the cell, but no overall net m\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

For every water molecule that exits the cell, one will e\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the cell.

Water is able to cross the plasma membrane because…

 Add symbols and text to the images below to create diagrams that represents osmosis







Active Transport

Often cells need to expend energy to move substances across the plasma membrane. **Active transport** is the term used to describe the movement of substances across the plasma membrane using energy (in the form of ATP, as opposed to passive transport which does not require energy). Cells often use active transport to move substance up a concentration gradient. That is, moving substances from an area of low concentration to an area of high concentration.

Types of active transport.

1. The protein pump (e.g: the Sodium – Potassium pump)
2. Endocytosis
3. Exocytosis

For each of the types of active transport, write a definition, explanation of how it functions and a short list of the types of substances that are transported in this way.