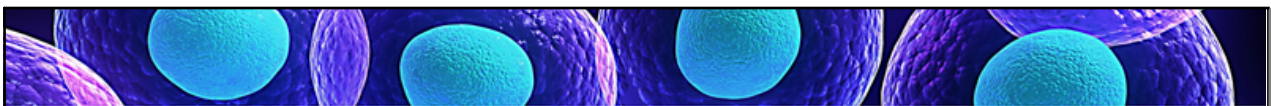


Grade 8 Science

Unit 2: Cells



Cell Membranes

Please take out your completed Cell Membrane Note. We will be reading through this and discussing it today. I will be looking for volunteers to read the paragraphs.

Cell Membrane

The cell membrane controls the movement of materials into and out of the cell. The membrane only lets substances through that are needed by the cell, and it keeps out anything that would harm the cell. This is called selective permeability. All cells have a cell membrane.

Structure of the Cell Membrane

The cell membrane is made of a phospholipid bilayer. Each phospholipid has a hydrophilic (water-loving) head and a hydrophobic (water-fearing) tail. The heads of one layer of phospholipids are facing the outside of the cell, and the heads of the other layer are facing the inside. The tails of both layers are facing each other, creating a hydrophobic core.

Transport of Materials

Small molecules and ions can pass through the cell membrane. Some pass directly through the phospholipid bilayer, while others pass through transport proteins. These proteins are called channels, carriers, and pumps. Channels and carriers are passive transport, meaning they do not require energy. Pumps are active transport, meaning they do require energy.

Cell Membrane and Homeostasis

The cell membrane helps maintain the cell's internal environment. It keeps the cell's internal temperature, pH, and salt concentration stable. This is called homeostasis. The cell membrane also helps the cell communicate with other cells.

Figure 1: Cell Membrane Structure and Function

NAME: _____ DATE: _____

CELL MEMBRANES

Answer each of the questions below in full sentences. You may use the notes or research you did on the cell membrane. Use a blue or black pen.

1. How are water and other small molecules able to pass through the cell membrane?
2. Why do some molecules need transport proteins to pass through the cell membrane?
3. Why do some molecules need energy to pass through the cell membrane?
4. How does the cell membrane help maintain the cell's internal environment?

Those of you who do not have your note with you, you have not completed your homework. As consequence, you are to come get a copy of the "Cell Membranes" worksheet, it is due next class.

Cell Membranes

The cell membrane controls what enters and leaves a cell. The membrane only lets certain substances cross into the cell, and therefore it can be said that the cell membrane is **selectively permeable**. Refer to the definitions below:

Selectively Permeable	Allowing only certain materials to pass through.
Permeable	Allowing materials to pass through.
Impermeable	Allowing no material to pass through.

To understand this, imagine pouring water and sand into a plastic bag, neither would pass through (Impermeable). Now imagine pouring the water and sand through a pair of nylons, the water would pass, but the sand would be caught (Selectively Permeable). Finally, imagine pouring the water and sand through a mesh screen, both materials would pass through (Permeable).

Permeability

Discuss the permeability of these products:



Furnace Filter



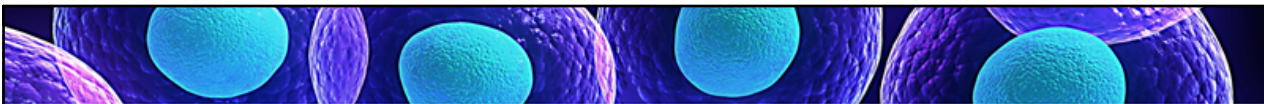
LifeProof Phone Case

Cell Membranes

To explain how materials move into and out of a cell, one must first understand **diffusion**. As you know particles in liquids and gases are always in motion. As they move, particles tend to spread out. If there is a large concentration of one type of particle in an area, they will tend to move away from that area. This movement of particles, from an area of high concentration to an area of low concentration, is called diffusion. For an example of diffusion visit the following web address:

<http://www.indiana.edu/~phys215/lecture/lecnotes/lecgraphics/diffusion2.gif>

This image shows how when there are more particles on the left, more particles are moving to the right, but when the particles are equal, then the movement from right to left is equal. This is the same with cells. When there is a lot of oxygen outside of a cell, more oxygen will move into the cell than leave the cell. When there are equal amounts of oxygen inside the cell and outside the cell, then there is equal movement.



Diffusion

Discuss how these images relate to diffusion:



Water-Logged Foot



Food Colouring in Water

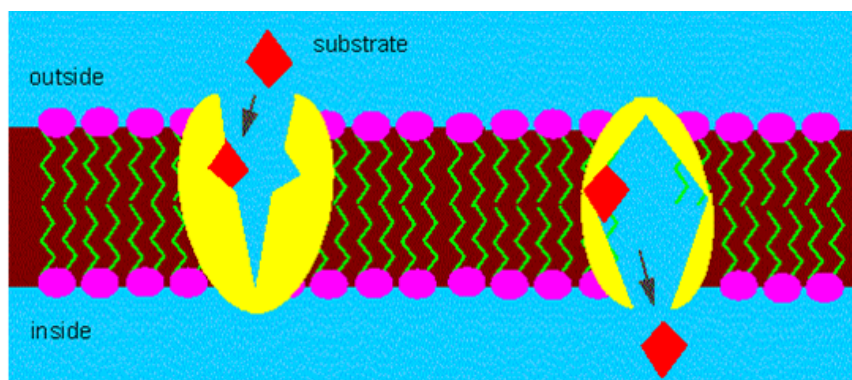
Cell Membranes

When the substance diffusing through a cell is water, the process is called **osmosis**. Water composes approximately 70% of a cell, so the control of water in a cell is very important. When you exercise, you sweat, removing water from your body. This in turn draws water from your cells. That is why it is important to remain hydrated.



Some particles, such as glucose, are needed in higher concentrations, and thus the natural movement of diffusion will not work. For these particles the cell needs to use energy to pull particles into its interior (similar to pushing a car up a hill, instead of letting it roll down the hill as it naturally would). To carry out this action the cell membrane has special parts called **carrier proteins**, which are like revolving gates that trap certain particles and pull them inside. The process carried out by these carrier proteins is called **active transport**. The following picture shows the carrier proteins at work:

Active Transport



How is playing "Chubby Bunny" like active transport?



Osmosis Experiment

At the back of the room you will find an experiment that I have started. Currently there are some eggs soaking in vinegar. This is to remove their shell. Throughout this week we will use these eggs to show how osmosis works. This will be done by placing one egg in water and the other in a salt water solution. What do you think will happen?



For those of you who did not do today's homework, remember that you have homework due next class.

Everyone is to please bring a calculator next class.

Attachments

2-15 Cell Membrane Note.pdf

2-15 Cell Membrane Questions.pdf