PEER Life Science Cells Are Us Gateway to the Cell Notes Outline Key

**Introduction**

* Cell membranes keep bulky materials inside the cell and allow some substances to pass from the outside to the inside of the cell and other substances to pass in the opposite direction.

**What We Know**

* The cell membrane, or plasma membrane, separates the world outside of the cell, or extracellular space, from the world inside the cell, or intracellular space.
* Both/neither plant and animal cells have a cell membrane.
* Functions of the cell membrane include:
  + Holding the cell together, keeping its parts in place
  + Mediating cellular processes by regulating materials that enter and exit the cell by being semipermeable or porous.
  + Carrying markers that allow cells to recognize each other and transmit signals.
* Lipid is another word for “fat.”
* Phospholipids are what make up the cell membrane.
  + The hydrophilic “head” interacts with water.
  + The hydrophobic “tails” do not interact with water.
* In the presence of water, lipids line up parallel to each other so that the heads are touching the water and the tails are in between. This makes up the phospholipid bilayer.
* Hypothesize what would happen to a cell that is put in a solution of water and salt where there is a higher concentration of salt outside the cell than inside.
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* Name two things that proteins embedded in cell membranes do.
  + Send signals
  + Transport molecules
  + Separate chemicals
  + Generate electricity
* The electric field generated by negatively charged proteins being trapped inside cells influences the movement of electrically charged ions across the membrane. The negative proteins inside the cell attract positive/negative ions.
* This separation of electrical charges creates a form of stored energy. Changing the permeability of a membrane causes movement of ions because:
  + Charged atoms move from areas of high/low concentration to areas of high/low concentration. This falls under the laws of diffusion.
  + Charged atoms are attracted to regions of opposite/similar charge.

**How We Know**

* Scientists were able to conclude the existence of membranes because:
  + Something was regulating how water and other chemicals were getting into and out of cells.
  + When the surface of a cell was punctured, materials inside the cell leaked out.
* One of the clues to knowing that membranes are made up of lipids is that fatty substances easily entered cells while other kinds of chemicals passed slowly or not at all.
* The bilayer nature of membranes discussed earlier was discovered because the total surface area of a lipid was exactly double the surface area needed to completely surround the cell.
* Membrane proteins are classified into two groups:
  + Peripheral proteins are anchored on the side of the membrane and do not go completely through the membrane.
  + Integral proteins pass completely through the membrane with parts of the protein hanging out of either side.

**Common Hazards**

* Alcohol is attracted to and concentrates in cell membranes.
* Alcohol can change the function of nerve cells and thus affect behavior. This change in behavior is called intoxication.
* Alcohol orients itself in the cell membrane so that the carbon portion of the molecule aligns with the phosphate heads/ carbon tails of lipids and the OH group aligns with the phosphate heads/carbon tails.
  + The resulting change in the membrane changes the shape and function of the proteins embedded in the membrane.