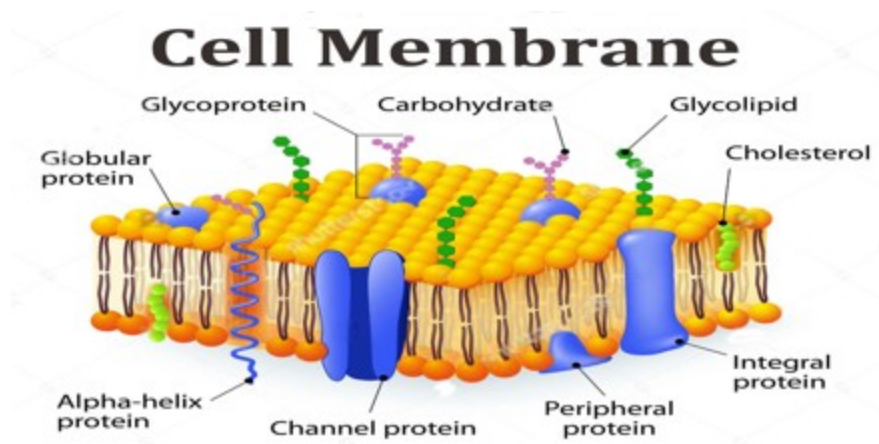


~UNIT 1 CELLS TEST STUDY GUIDE ~

Cellular Membrane Functions:

- **Cell Membrane**- Also known as the plasma membrane and is flexible and allows single cells to move.
- acts as a protective barrier.
- regulates transport in and out of cell (selectively permeable)
- allows cell recognition.
- provides anchoring sites for filaments of cytoskeleton.
- Provides binding for enzymes.
- Interlocking surfaces bind cells together (Junctions).
- Contains the cytoplasm (a fluid inside a cell that holds organelles).

Cell Membrane Structure:



- **Phospholipid bilayer**- Is made up of 2 layers of phospholipids which is why it's called the lipid bilayer. This makes up the structure and boundaries of a cell. The phospholipid contain two parts:
 - Heads- hydrophilic (loves water)
 - Tails- hydrophobic (hates water)
- **Glycolipid**- A phospholipid with a carbohydrate chain attached to it. It's also a recognition site for specific chemicals.

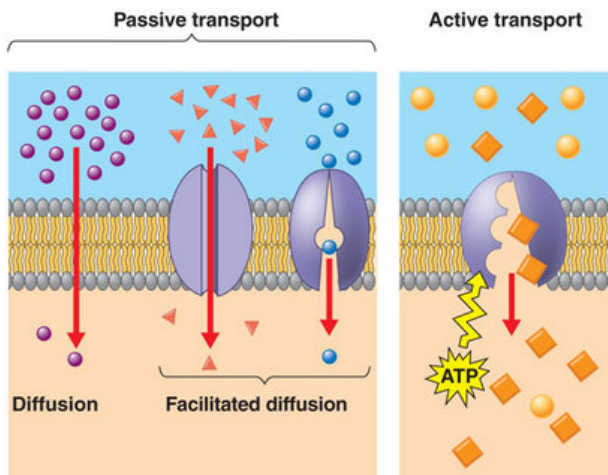
- **Glycoprotein**- Structural, enzymatic, cell attachment, and recognition receptors, regulators, etc, - Big portion is the protein tail is the carbohydrate protein.
- **Cholesterol**- increases fluidity in the membrane
- **Integral protein** - Penetrate the lipid bilayer and control the entry and removal of molecules
- **Peripheral Proteins**- are on the exterior of the membrane and work with ionic bonds.
- **Carbohydrate**- acts as an adhesion and address location for cells.
- **Transport protein**- This helps bring molecules large and charged into the cell.

Types of Solutions

- **Hypotonic**- a solution in which the solute on the inside of the cell is higher than the outside. So, water moves into the cell causing it to expand.
- **Hypertonic**- a solution in which the solute on the outside of the cell is higher than the inside. So, the water moves out of the cell causing it to shrivel.
- **Isotonic**- The solute is both equal inside and outside the cell, so the water moves in equal amounts. (equilibrium)

Passive and Active Transport

- **Passive Transport**- molecules move from high to low concentration without ATP.
- **Active Transport**- molecules move from low to high concentration with ATP.



(Make sure you can label and draw the diagrams)

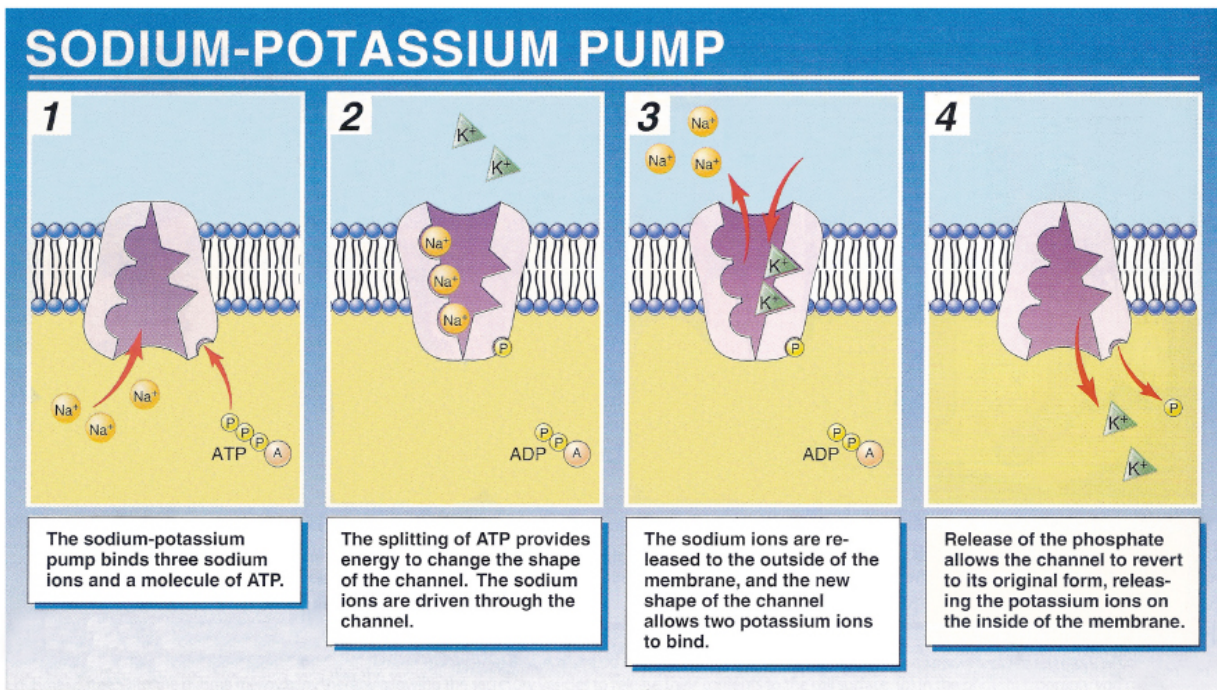
Passive Transport Type

- **Diffusion**- Movement of small uncharged molecules from high to low concentration.
 - Ex: Oxygen

- **Facilitated Diffusion**- Movement of large uncharged molecules from high to low concentration with the help of a protein channel.
 - Ex: Glucose
- **Osmosis**- Movement of water molecules from a low to high concentration of solute
 - Ex: Water

Active Transport

- **Active Transport**- The movement of molecules from low concentration to high concentration (against the concentration gradient) using energy.
 - Requires the use of a protein pump (or transport protein)
 - Example is the Sodium Potassium Pump



Please note that the movement of **BOTH sodium (Na^+) and potassium (K^+)** are moving from **low to high concentration**. Pump moves 3 Na^+ ions outside and 2 K^+ ions inside the cellular membrane. This is possible because **ATP is used as energy**. When bonds are broken in Biological organisms energy is released and when they are formed it is stored. The attachment of a phosphate (P) molecule to the pump by ATP allows the protein to shift form and release Na^+ ions on the outside of the membrane at the same time attaching K^+ ions. The removal of the phosphate (P) returns the protein to its original shape allowing it to attach Na^+ ions again. The process repeats.

The goal of passive transport is equilibrium, but if your body/cell actually reaches equilibrium you/it are basically dead. SOOO... **the goal of active transport is to maintain the concentration gradients** within the body/ cells in order for passive transport to continue working. Without energy the concentration gradients naturally move toward equilibrium which stop there unless active transport is occurring to create the gradients.

This is really important for things like cellular respiration (breathing) and your nervous system.