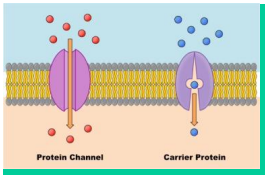
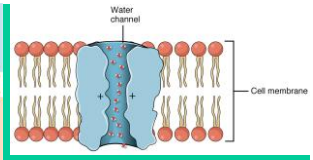
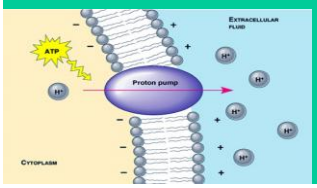
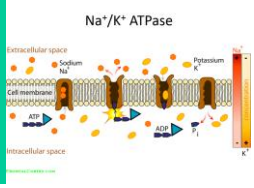




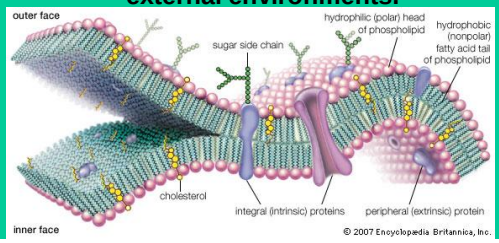
2.7 Facilitated Diffusion





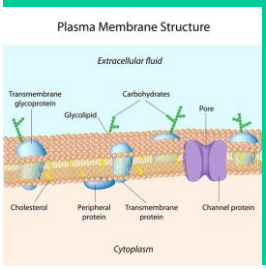
ENDURING UNDERSTANDING

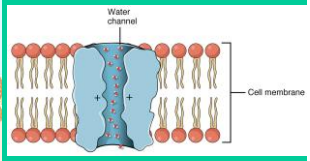
ENE-2 Cells have membranes that allow them to establish and maintain internal environments that are different from their external environments.



ENE-2.G Explain how the structure of a molecule affects its ability to pass through the plasma membrane.

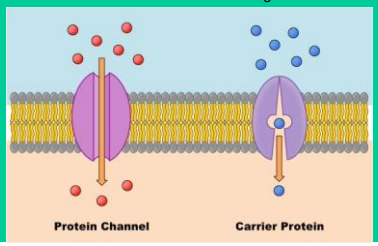
- ❑ Membrane proteins are required for facilitated diffusion of charged and large polar molecules through a membrane
  - Large quantities of water pass through aquaporins.





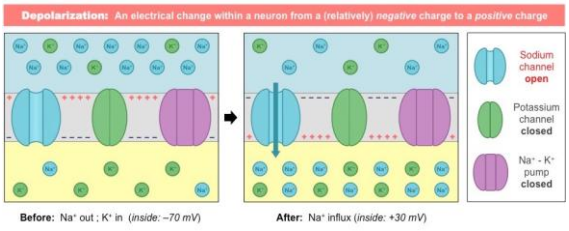
ENE-2.G Explain how the structure of a molecule affects its ability to pass through the plasma membrane.

- Proteins may act as selective channels.
- Carrier/Transport Proteins
  - Carrier proteins transport only one type of molecule.
  - Undergo a change in shape to move molecule across.
  - Movement is down the concentration gradient.



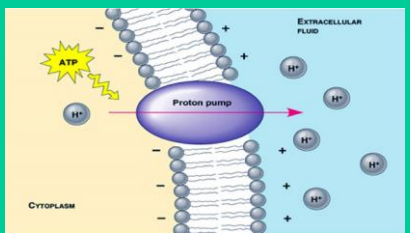
ENE-2.G Explain how the structure of a molecule affects its ability to pass through the plasma membrane.

- Charged ions, including Na+ and K+, require channel proteins to move through the membrane.
- Membranes may become polarized by movement of ions across the membrane.



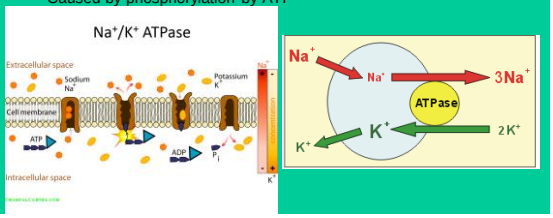
ENE-2.G Explain how the structure of a molecule affects its ability to pass through the plasma membrane.

- ❑ Membrane proteins are necessary for active transport
- ❑ Metabolic energy (such as from ATP) is required for active transport of molecules and/or ions across the membrane and to establish and maintain concentration gradients.



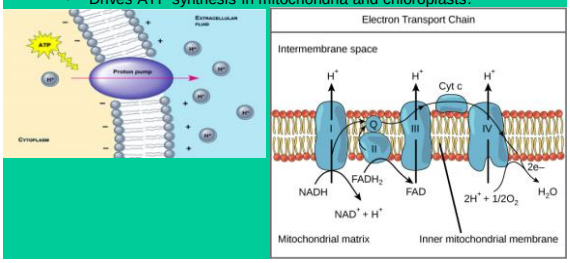
ENE-2.G Explain how the structure of a molecule affects its ability to pass through the plasma membrane.

- The Na+/K+ ATPase (Sodium-potassium pump) contributes to the maintenance of the membrane potential.
  - Major electrogenic pump in animal cells.
  - Transport Protein changes shape, pumping three Na+ out for every two K+ pumped in.
  - Caused by phosphorylation by ATP



ENE-2.G Explain how the structure of a molecule affects its ability to pass through the plasma membrane.

- Proton pump
  - Hydrogen ions pumped out against its gradient.
  - Major electrogenetic pump in plants, bacteria, and fungi.
  - Drives ATP synthesis in mitochondria and chloroplasts.



ENE-2.G Explain how the structure of a molecule affects its ability to pass through the plasma membrane.

- Ion Pumps are Electrogenic Pumps
  - All cells have voltages across their membranes.
  - Transport proteins generate an electrochemical gradient
  - Due to unequal distribution of anions(-) and cations(+).
  - Source of potential energy (Think battery!!!).