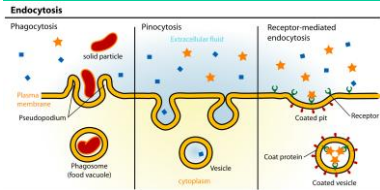


2.6 Membrane Transport



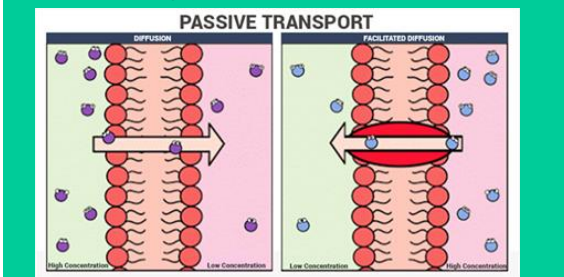
ENDURING UNDERSTANDING

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

outer face
inner face
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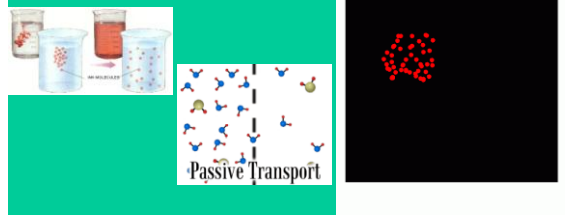
ENE-2.E Describe the mechanisms that organisms use to maintain solute and water balance.

- Passive transport is the net movement of molecules from high concentration to low concentration without the direct input of metabolic energy.



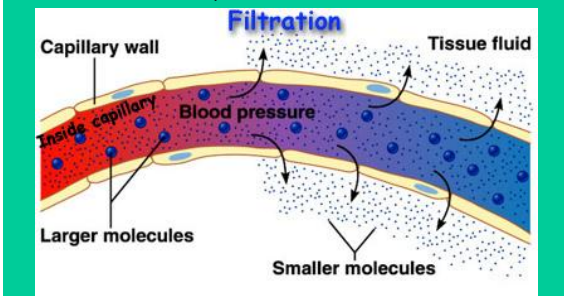
Passive Transport

- Molecules move without expenditure of energy.
- Diffusion
 - Movement from higher to lower concentration (down their concentration gradient).
 - Due to random molecular motion.
 - Membrane properties allow only a few types of molecules to cross by diffusion.



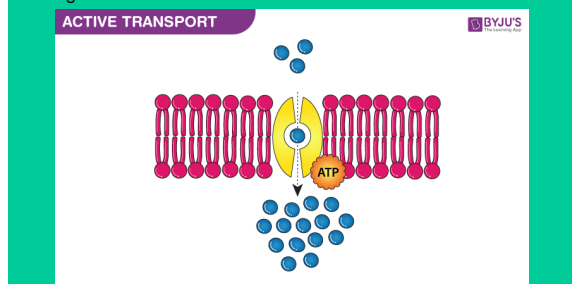
ENE-2.E Describe the mechanisms that organisms use to maintain solute and water balance.

- Passive transport plays a primary role in the import of materials and the export of wastes.



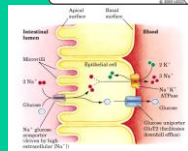
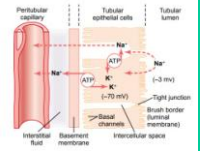
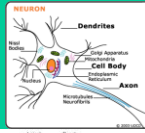
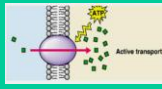
ENE-2.E Describe the mechanisms that organisms use to maintain solute and water balance.

- Active transport requires the direct input of energy to move molecules from regions of low concentration to regions of high concentration.



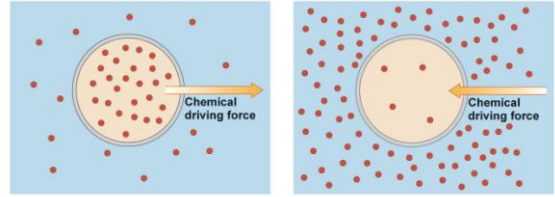
Active Transport

- Establishes and maintains concentration gradients.
- High number of mitochondria near membranes.
- Movement of solutes is against the concentration gradient.
 - Iodine is concentrated in cells of thyroid gland
 - Glucose is completely absorbed into lining of digestive tract.
 - Sodium is mostly reabsorbed by kidney tubule lining.



ENE-2.F Describe the mechanisms that organisms use to transport large molecules across the plasma membrane.

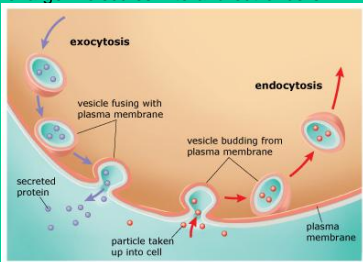
- The selective permeability of membranes allows for the formation of concentration gradients of solutes across the membrane.



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ENE-2.F Describe the mechanisms that organisms use to transport large molecules across the plasma membrane.

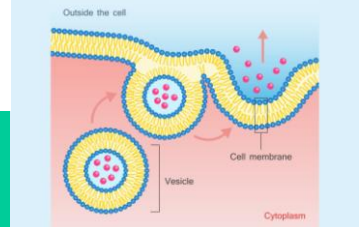
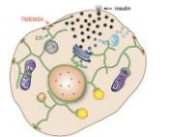
- The processes of endocytosis and exocytosis require energy to move large molecules into and out of cells



Adapted from Biology by Campbell and Reece © 2008 Pearson Education, Inc.

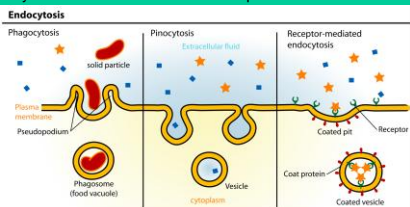
ENE-2.F Describe the mechanisms that organisms use to transport large molecules across the plasma membrane.

- In exocytosis, internal vesicles fuse with the plasma membrane and secrete large macromolecules out of the cell.
 - Method by which insulin leaves insulin-secreting cells.



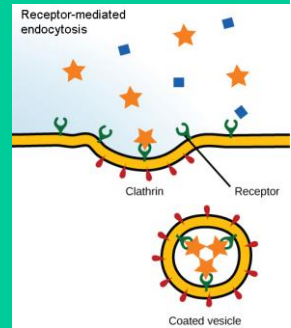
ENE-2.F Describe the mechanisms that organisms use to transport large molecules across the plasma membrane.

- In endocytosis, the cell takes in macromolecules and particulate matter by forming new vesicles derived from the plasma membrane.
 - Phagocytosis (cell eating)
 1. Cells engulf large particles forming a food vacuole.
 2. Vacuole fuses with a lysosome, digestion occurs.
 - Pinocytosis- vesicles form around a liquid.



ENE-2.F Describe the mechanisms that organisms use to transport large molecules across the plasma membrane.

- Receptor-mediated endocytosis
 1. Allows cells to receive molecules that are in low concentrations.
 2. Specific macromolecules (ligand) bind to plasma membrane receptors in coated pits (clathrin).
 3. Coated pit pinches in forming a vesicle inside a clathrin coated vesicle



ENE-2.F Describe the mechanisms that organisms use to transport large molecules across the plasma membrane.

- Hypercholesterolemia
 - Receptor sites for LDLs are defective.
 - Low-density lipoproteins(LDLs) are cholesterol and protein.
 - Cholesterol accumulates in the blood contributing to

