

Understandings:

1. Explain how particles move across membranes by simple diffusion, facilitated diffusion, osmosis and active transport.

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Diffusion: A movement from higher concentration gradient to a lower concentration gradient. This process does not require ATP. For diffusion across membranes, smaller polar molecules are most easily diffused. Ions with complete charges are near impossible to simply diffuse.

Facilitated diffusion: Only specifically permeable to one type of atom/molecule. It still does not require ATP. It merely creates a channel that the atom/molecule can pass through.

Osmosis: The movement of water from low solute concentration to high solute concentration. Still does not require ATP.

Active transport: This requires ATP because it usually pumps against the concentration gradient.

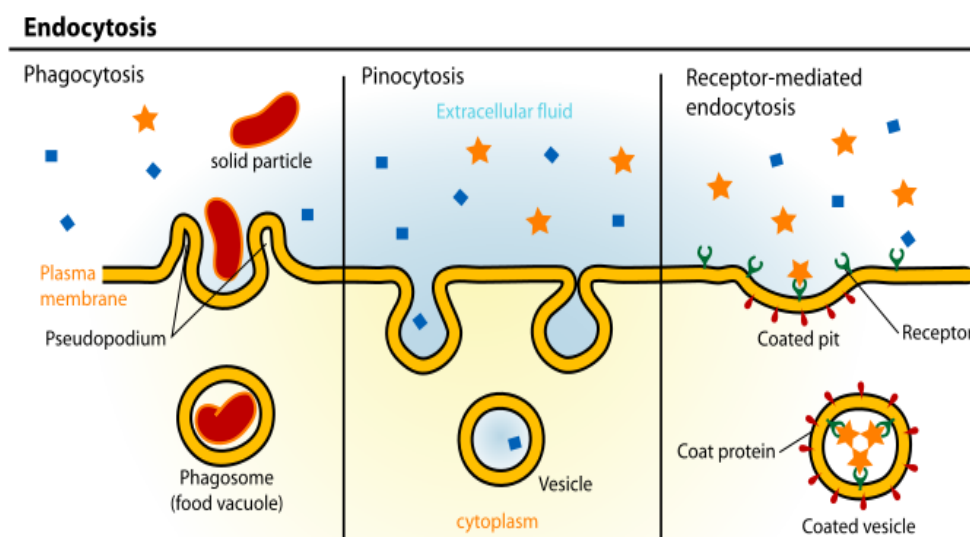
2. Explain how the fluidity of membranes allows materials to be taken into cells by endocytosis or released by exocytosis.

- The membrane is very malleable so it can fuse, reshape, move around etc. This enables endocytosis and exocytosis. Both processes require ATP.

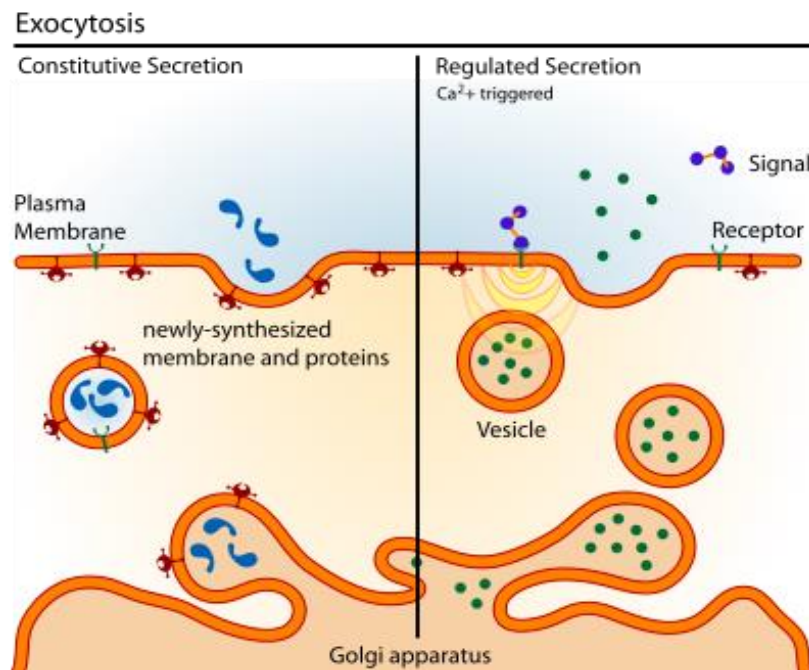
Endocytosis: This is when a material from outside enters the cell by pushing down the membrane to form its own little membrane. There are different types of endocytosis.

Pinocytosis (cell drinking) takes in solutions/liquids. It is when the membrane is stimulated to bulge inwards to form a vesicle, containing the substance. This is working due to the fluidity of the membrane. This process, when any other membrane is bulged inwards to form a cleavage, is called fission.

Phagocytosis (cell eating) takes in solids such as food to form food vacuoles. The membrane goes up to grab the large particle in and form a vesicle.



Exocytosis: This is when material from inside exits the cell.



3. Explain how vesicles move materials within cells.

- When proteins from rER need to be transported to Golgi apparatus, vesicles are used. In pre-synaptic cleft where neurotransmitters need to be released, vesicles are used. These are very efficient little workers.

Applications and skills:

1. Explain the structure and function of sodium–potassium pumps for active transport and potassium channels for facilitated diffusion in axons.

- This will be explained more in 6.5

2. Explain the use of osmolarity in medical procedures.

- Human cells don't have a cell wall that can regulate osmosis. Therefore it is crucial that the cells/tissues are bathed in the fluid of same osmolarity (isotonic) as the cells. It cannot have too low osmolarity (lower solutes, hypotonic) so it bursts. It cannot have too high osmolarity (higher solutes, hypertonic) so it shrinks and collapses.

The standard or normal saline is 300m Osmoles, and this is important for eye drops, skin moisturizers, rinse wounds, or any injection in human blood.

3. Be able to estimate osmolarity in tissues by bathing samples in hypotonic and hypertonic solutions.

- Yes.