

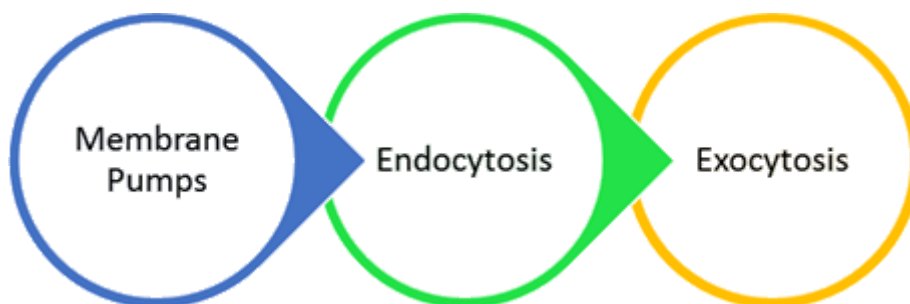
FlexiPrep

Movement of Molecules: Active Transport, Membrane Pumps, Exocytosis (For CBSE, ICSE, IAS, NET, NRA 2022)

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Active Transport

- Active Transport is the movement or transportation of molecules through the cell membrane.
- It needs energy molecules called ATP (Adenosine Triphosphate) .
- The molecular movement is that of the molecules like water and oxygen.
- From a region of lower concentration to a region of higher concentration.
- This movement is against the concentration channel with the help of enzymes.
- Molecules such as amino acids, glucose including the ions inside the cell in higher concentrations require active transportation process.
- Few examples of active transport are Sodium-potassium pump, uptake of mineral ions by the roots of the plants, etc.



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Membrane Pumps

- Carrier proteins.
- Moves substances from low concentration to high concentration.

Exocytosis

- Is responsible for forcing molecules out of the cell.
- A substance is released from a cell through a vesicle.
- Transports it to the cell surface and fuses with the cell membrane.

Endocytosis

- Cells ingest external fluid, macromolecules, or other large particles.
- In Phagocytosis large molecules or whole cells get ingested.
- In Pinocytosis solutes or fluids get ingested.

The Sodium Potassium Pump (Na⁺ /K⁺ ATPase)

Responsible for the movement of molecules from a region of high concentration to low concentration.

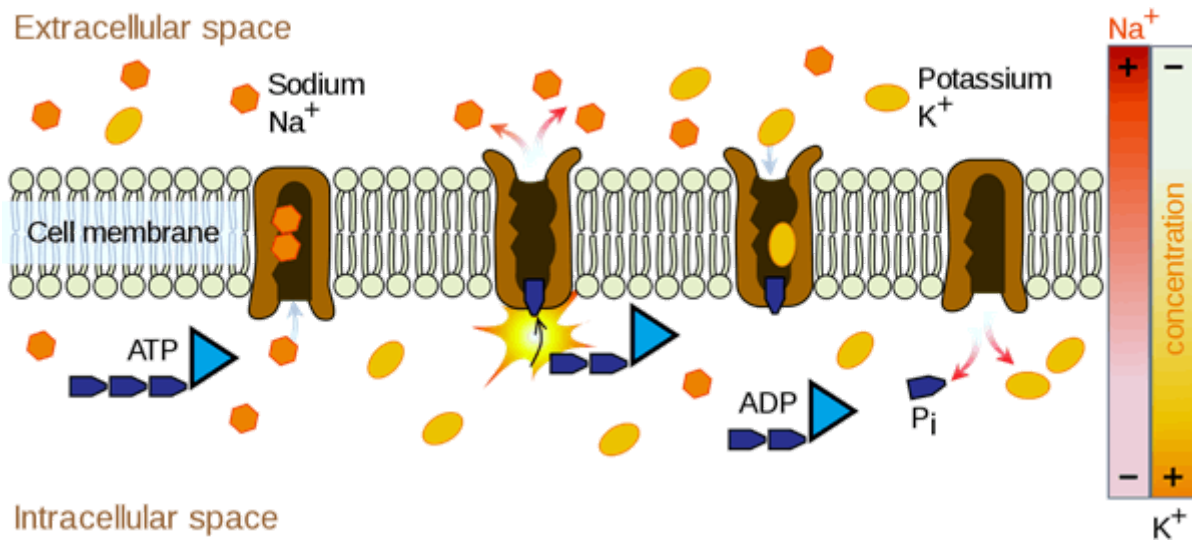
Importance of Active Transport

Essential for ensuring the entry of large, insoluble molecules into the cell.

Types of Active Transport

Primary Active Transport

- Also known as direct active transport.
- Chemical energy is used for pushing the molecules.
- This transport directly uses ATP (an energy molecule)
 - During hydrolysis it breaks down releasing energy that gets stored in chemical bonds.
 - Regulates the resting potential of the cell.
- Sodium ions shift from a lower concentration (11 mM) to a higher concentration (146 mM) .
- In case of potassium, the transfer of ions is from a higher (146 mM inside the cell) to a lower concentration (4 mM) of the extracellular fluid.
- The substances that get transported across the cell membrane are Na⁺ , K⁺ , Mg²⁺ , and Ca²⁺ .



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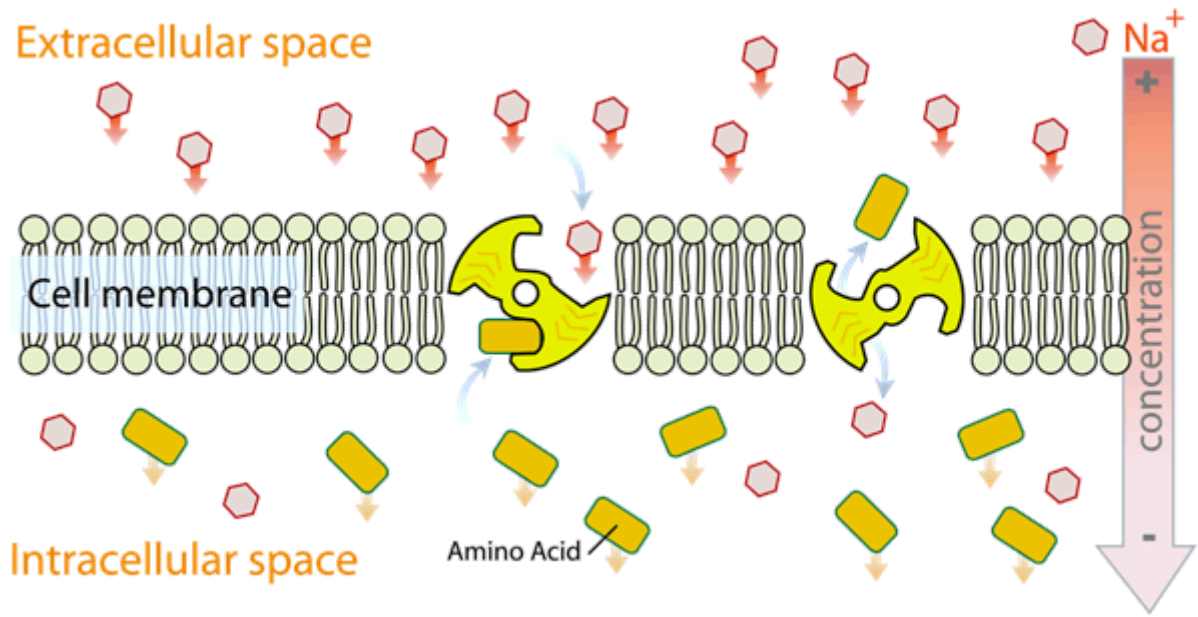
Secondary Active Transport

- Movement of multiple molecules across the membrane.
- Uphill movement of the molecules with the downhill movement of the other.
- Channel proteins can be recognized as co-transporters.

Co-transporters (types) :

- Symporters-SGL2 being a symporter co-transporter is responsible for transporting glucose into the cells along with the sodium ions.
- Antiporters are responsible for shifting specific ion and the solute along the opposite directions.

The most common example for antiporters co-transporter is the Calcium/Sodium exchanger.



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