# The Fundamental Unit of Life Active and passive transport of materials in plasma membrane

## **Active and Passive Transport**

#### Active transport

the movement of molecules across a membrane from a region of lower concentration to a region of higher concentration against the concentration gradient, often assisted by enzymes and requires energy

## "Passive transport

the movement of ions and molecules across the cell membrane without requiring energy. Active and passive transport are the two main biological processes that play a crucial role in supplying nutrients, oxygen, water and other essential molecules to the cells along with the elimination of waste products. In essence, active and passive transport work for the same goals, but with different movement.

## Active Transport

This is the biological process in which molecules move against the concentration gradient and require chemical energy to move biochemical compounds from a lower region to the high region. Therefore, this process uses ATP – Adenosine triphosphate to pump molecules through a concentration gradient. Complex sugar, ions, large cells, proteins and other particles are transported in this process. There are two types of Active transport:

Primary Active transport

## Secondary Active transport

Exocytosis, endocytosis and sodium-potassium pump are a few examples of active transport. The process of endocytosis and exocytosis are utilized by all the cells for transportation of molecules which cannot passively permeate via the membrane.

Endocytosis is the process of active transportation of molecules into the cells by the action of engulfing it along with its membrane.

Exocytosis produces a counter function thereby forcing molecules out of the cell. The process of homeostasis facilitates an equal flow of molecules in and out of a cell which confers that the number of molecules that enter the cell through endocytosis equates to the number of molecules that exits a

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cell through the process of exocytosis. Both the processes assure that nutrients and wastes are balanced for the smooth functioning of the cells.

## **Passive Transport**

In this biological process, energy is not required for transporting the molecules, as the biochemicals move from a region of higher concentration to a region of lower concentration. All particles which are easily soluble are transported through passive transport. This process is carried out to maintain the balance and the equilibrium level in a cell. All the waste molecules including, water and carbon dioxide is separated and moved out of the cell using passive transport. Meanwhile, nutrients like oxygen that are functional for the cell are diffused in this process. Osmosis, diffusion and facilitated diffusion are some of the examples of passive transport.

## Active Transport Different From Passive Transport

Active transport moves molecules and ions from lower concentration to higher concentration with the help of energy in the form of ATP. On the other hand, passive transport moves molecules and ions from a higher concentration to lower concentration without any energy.

## Active And Passive Transport

Active and passive transport regulate the entry and exit of ions and molecules in a cell. These processes allow only specific materials to cross spontaneously through the cell membrane. Rest needs a carrier to pass through the membrane.



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# Types of passive transport

Passive transport can be of the following different types:

- Simple diffusion
- Osmosis
- Facilitated diffusion

# **Transport Across Cell Membrane**

Cell membrane is a phospholipid bilayer that regulates the entry and exit of molecules. Diffusion, osmosis and active transport are some forms of transport seen across the cell membrane. Here, let's learn about them in detail.

# Movement of Substances Across Cell Membrane

The contents of a cell are completely surrounded by its cell membrane or plasma membrane. Thus, any communication between the cell and the extracellular medium is mediated by the cell membranes. These cell membranes serve two important functions: It must retain the dissolved materials of the cell so that they do not simply leak out into the

environment.

It should also allow the necessary exchange of materials into and out of the cell.

There are two major methods for moving molecules across a membrane, and it is related to whether or not cell energy is used. Passive mechanisms, such as diffusion, require no energy to function, whereas active transport does. In passive transport, an ion or molecule crosses the membrane and moves down its concentration or electrochemical gradient.