



جامعة المستقبل  
AL MUSTAQBAL UNIVERSITY

**Chemistry sciences**

**Cell biology**

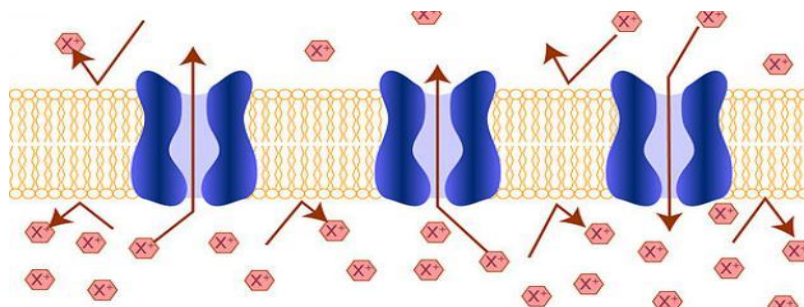
**Stage1**

**Lab . 2 and Lab .3**

**mode of transportations**

**and**

**active and passive transport**



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## Transfer methods in the cell

Transport in cells helps maintain balance by maintaining conditions within normal ranges within all cells of the organism, and the main role of the plasma membrane is to transport substances to and from the cell, and there are two main types of transport methods in the cell, which are passive transport and active transport.

## Transfer methods in the cell

### Membrane transport

**Moving objects in and out of the cell is an important role in the plasma membrane.**

**It controls everything that enters and leaves the cell.**

**There are **two basic** ways in which substances can cross the plasma membrane:**

### 1-Passive transport

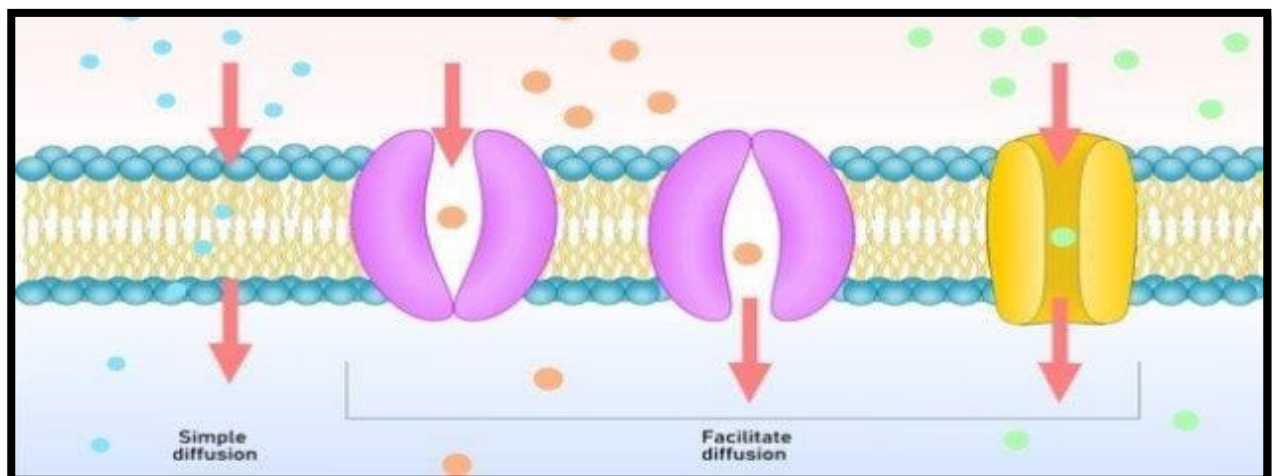
Passive transport occurs when substances cross the plasma membrane without any energy input from the cell.

Energy is not needed because materials move from an area with a higher concentration to an area with a lower concentration.

Concentration refers to the number of molecules of a substance per unit volume.

The more molecules of a substance in a certain size, the greater the concentration.

A substance always moves from an area where it is more concentrated to an area where it is less concentrated.





- No energy required
- Move due to gradient
  - differences in concentration, pressure, charge
  - Move to equalize gradient
  - High moves toward low

## Types of Passive Transport

1. **Simple** Diffusion
2. Osmosis
3. Facilitated diffusion

### Simple Diffusion

Diffusion is the movement of a substance across a membrane, due to a difference in concentration, without any help from other molecules.

Diffusion across the cell membrane. The molecules diffuse across a membrane from an area of higher concentration to an area of low concentration until the concentration is the same on both sides of the membrane.

Substances that can be compressed between lipid molecules in the plasma membrane by simple diffusion are generally very small molecules, such as oxygen and carbon dioxide molecules.

### Osmosis

It is a special type of diffusion – the diffusion of water molecules across the membrane.

Like other molecules, water moves from an area of higher concentration to an area of low concentration.

Water moves in or out of the cell until its focus is focused on both sides of the plasma membrane.



## Facilitated Diffusion

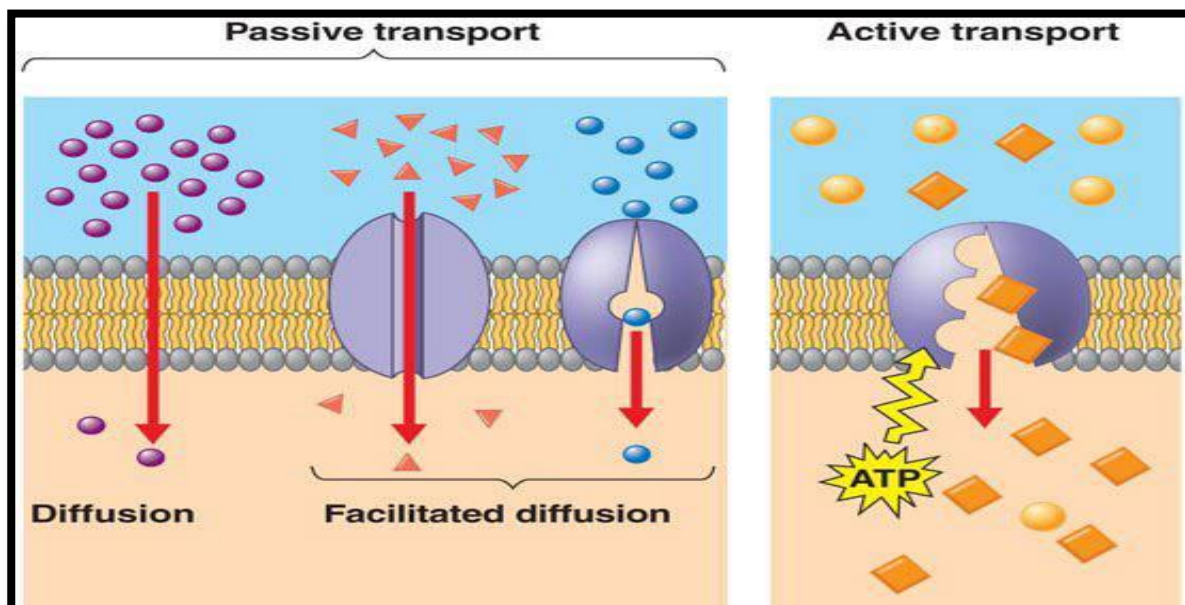
- Differentially permeable membrane
- Channels (are specific) help molecule or ions enter or leave the cell
- Channels usually are transport proteins

(aquaporins facilitate the movement of water)

- No energy is used
- There are several types of transport proteins, including channel proteins and carrier proteins.
- Channel proteins form small pores or holes in the membrane.
- This allows water molecules and small ions to pass through the membrane without the hydrophobic tails coming into contact with fat molecules on the inside of the membrane.
- Carrier proteins bind to certain ions or molecules, thereby changing their shape.
- As carrier proteins change shape, they carry ions or molecules across the membrane.

## Process of Facilitated Transport

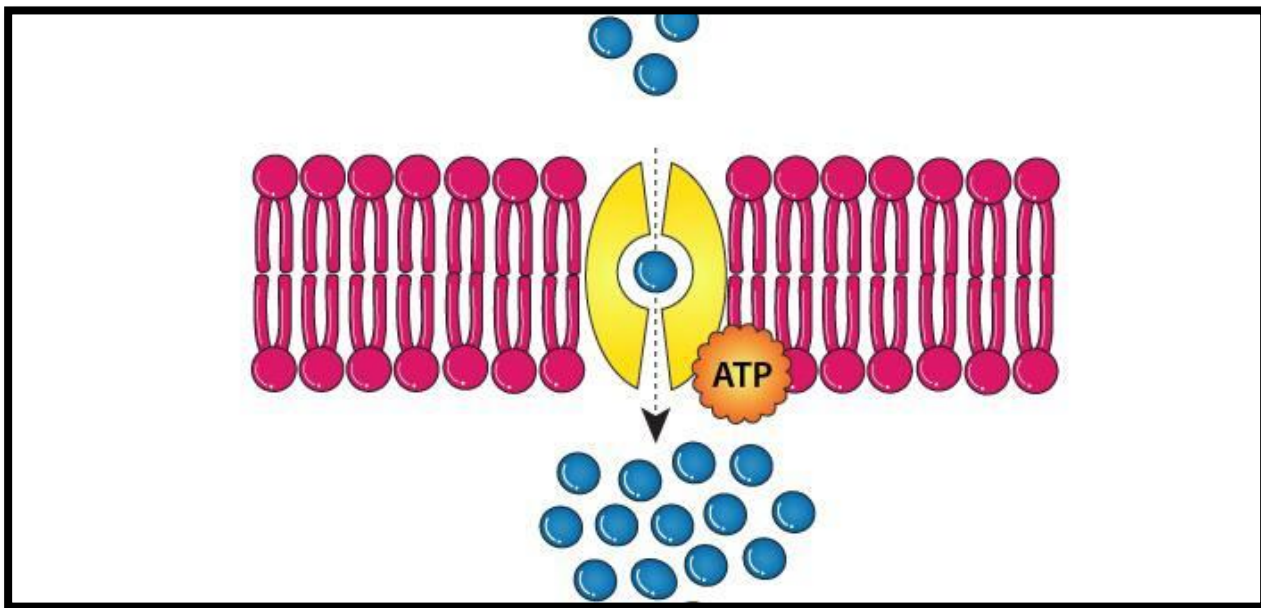
- Protein binds with molecule
- Shape of protein changes
- Molecule moves across membrane





## Active Transport

- Molecular movement
- Requires energy (against gradient)
- Example is sodium-potassium pump
- Active transport occurs when energy is needed to transport a substance through a plasma membrane.
- Energy is required because the material moves from an area of low concentration to an area of higher concentration.
- The energy of active transport comes from an energy-carrying molecule called ATP.
- Like passive transport, active transport may also include transport proteins.



## Vesicle transfer

Some molecules, such as proteins, are too large to pass through the plasma membrane, regardless of their concentration inside and outside the cell.

Very large molecules cross the plasma membrane with a different type of aid, called follicle transport.

Follicle transport requires energy, so it is also a form of active transfer.



## Types of vesicle transfer

There are two types of vesicle transfusion: blood poisoning and cell secretion

Self-poisoning is the type of vesicle transfer that transports a substance to the cell.

Exit cells are the type of follicle transport that transports material from the cell.

## Intracellular balance

For the cell to function normally, a stable state must be maintained within the cell.

For example, the concentration of salts, nutrients, and other substances must remain within a certain range.

The process of maintaining stable conditions inside the cell is equilibrium.

Leveling requires constant adjustment, because conditions always change inside and outside the cell

