

# Cell structure

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# Cell

- The cell is the basic unit of all living things, and all organisms are composed of one or more cells.
- Organisms - bacteria, amoebae and yeasts, for example - may consist of as few as one cell, while a typical human body contains about a trillion cells.

# Cell Theory

- All life consists of cells.
- The theory also states that all cells come from previously living cells.
- All vital functions (chemical reactions) of organisms are carried out inside of cells.
- That cells contain necessary hereditary information to carry out necessary functions and replicate themselves.

**All cells contain**

- **Lipid bilayer boundary (plasma membrane)**
- **Cytoplasm**
- **DNA (hereditary information)**
- **Ribosomes for protein synthesis**

Eukaryotic cells  
also contain

- **At least one nucleus**
- **Mitochondria for cell respiration and energy**

Cells may also  
contain

- **Lysosomes**
- **Peroxisomes**
- **Vacuoles**
- **Cell walls**



Concepts

# Plasma Membrane

- Phospholipid bilayer, which contains great amount of proteins, the most important functions are the following:
  - 1. It selectively isolates the content of the cell of the external atmosphere.
  - 2. It regulates the interchange of substances between the cytoplasm and the environment.
  - 3. Communicates with other cells.



## Phospholipid bilayer

- Is in the plasma membrane and produces the fluid part of membranes.

# Proteins

- Long chains of amino acids.

## Glucose proteins

- **Proteins together with carbohydrates in the plasma membrane, mostly in the outer parts of the cell.**

# Protein Functions

- **Functions of proteins:** Transport oxygen, they are components of hair and nails, and allow the cell interact with its environment.
- **Transport Proteins:** Regulate the movement of soluble water molecules, through the plasma membrane. Some transport proteins called **channel proteins** form pores or channels in the membrane so that water soluble molecules pass.
- **Carrying proteins:** Have union sites that can hold specific molecules.
- **Reception proteins:** They activate **cellular responses** when specific molecules join.
- **Proteins of recognition:** They work as identifiers and as place of union to the cellular surface.

# Fluid

- It is any substance that can move or change of form.

## Concentration & Gradient

- **Concentration:** Number of molecules in a determined unit of volume.
- **Gradient:** Physical difference between two regions of space, in such a way that the molecules tend to move in response to the gradients.

# Diffusion

- **Diffusion:** Movement of the molecules in a fluid, from the regions of high concentration to those of low concentration.
- **Simple diffusion:** Diffusion of water, gases or molecules across the membrane.
- **Facilitated diffusion:** Diffusion of molecules across the membranes with the participation of proteins.

# Transport

- **Passive transport:** Movement of substances in a membrane that doesn't need to use energy.
- **Transport that needs energy:** Movement of substances across a membrane generally in opposition to a gradient of concentration with the requirement of energy.
- **Active transport:** Movement of small molecules using energy (ATP).



# Osmosis

- **Diffusion of the water across a membrane with differential permeability.**

## Engulfment

- **Endocytosis:** Movement of big particles towards the interior of the cell using energy. The cells enclose particles or liquids.
- **Pinocytosis:** (Literally cell drinking) Form in which the cell introduces liquids.
- **Phagocytosis:** Way of eating of the cells. It feeds in this case of big particles or entire microorganisms.

# Exocytosis

- **Movement of materials out of the cell with the use of energy. It throws waste material.**

## Solution Pressure

- **Isotonic:** The cytoplasm fluid of the interior of the cells is the same that the outer.
- **Hypertonic solution:** The solutions that have a higher concentration of dissolved particles than the cellular cytoplasm and that therefore water of the cells goes out with osmosis.
- **Hypotonic:** The solutions with a concentration of dissolved particles lower than the cytoplasm of a cell and that therefore do that water enters the cell with osmosis.