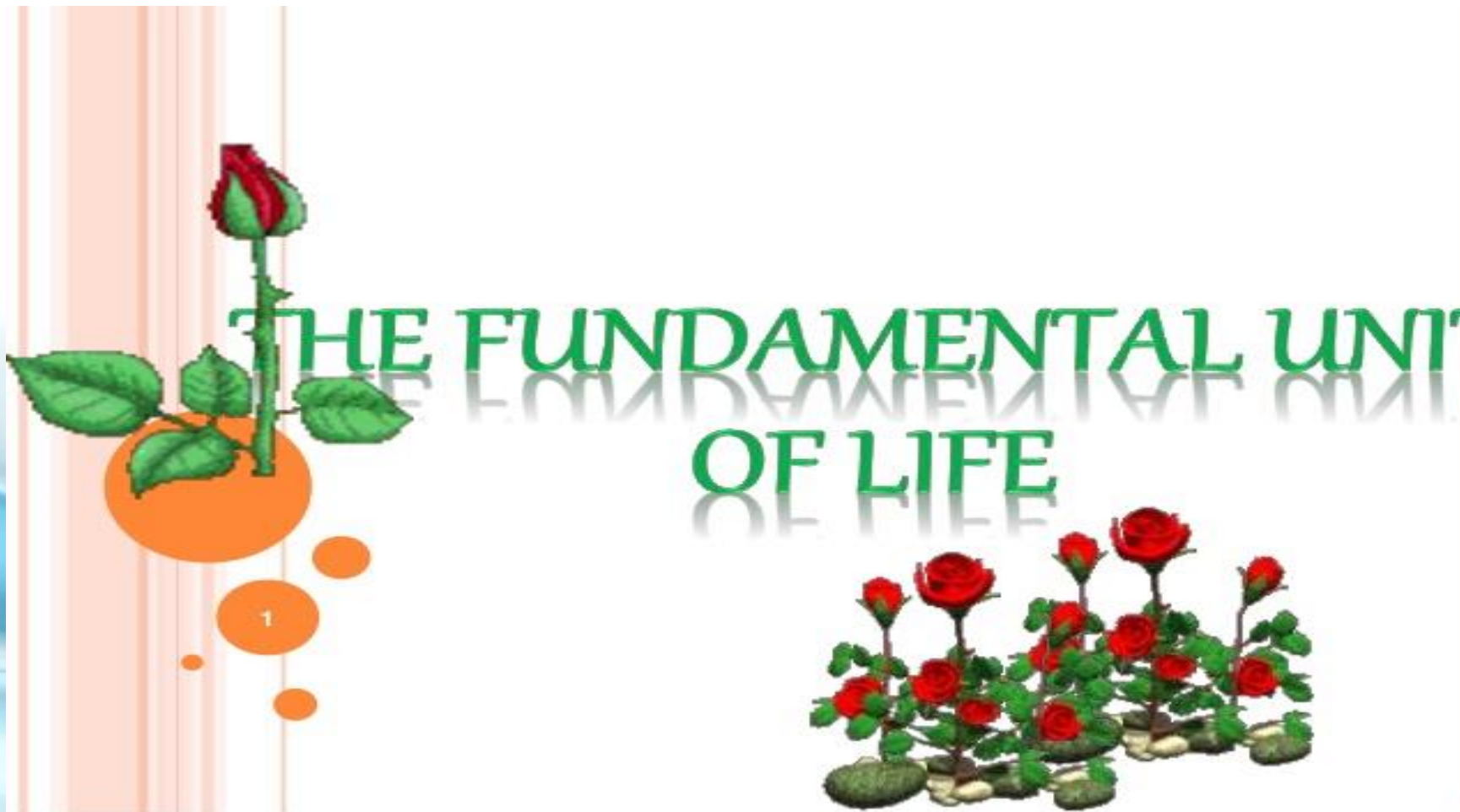
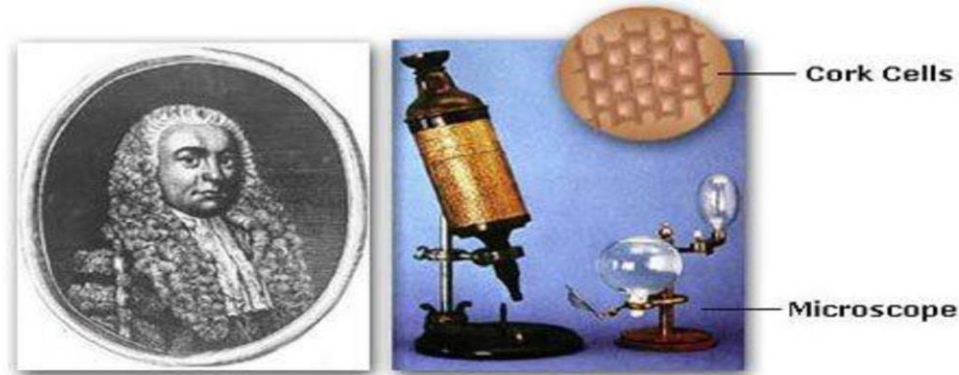




# Chapter -5



# Cell

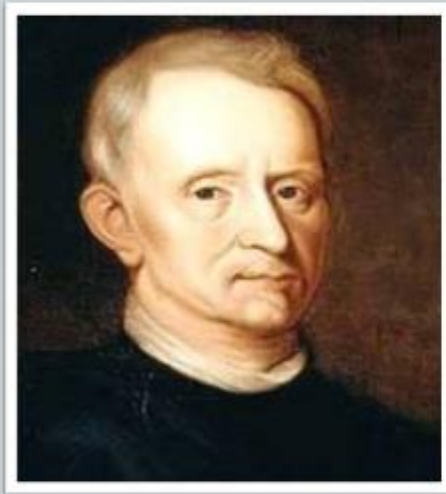


- ▶ Cell is the fundamental unit of life
- ▶ All the living organisms are made up of cell
- ▶ It is the structural and functional unit of life because whole body is made up of cells
- ▶ It is known as the fundamental unit of life because it regulates all the functions inside an organisms
- ▶ The cell is a Latin word for "a little room".
- ▶ Robert Hook (1665) discovered **Cell**.

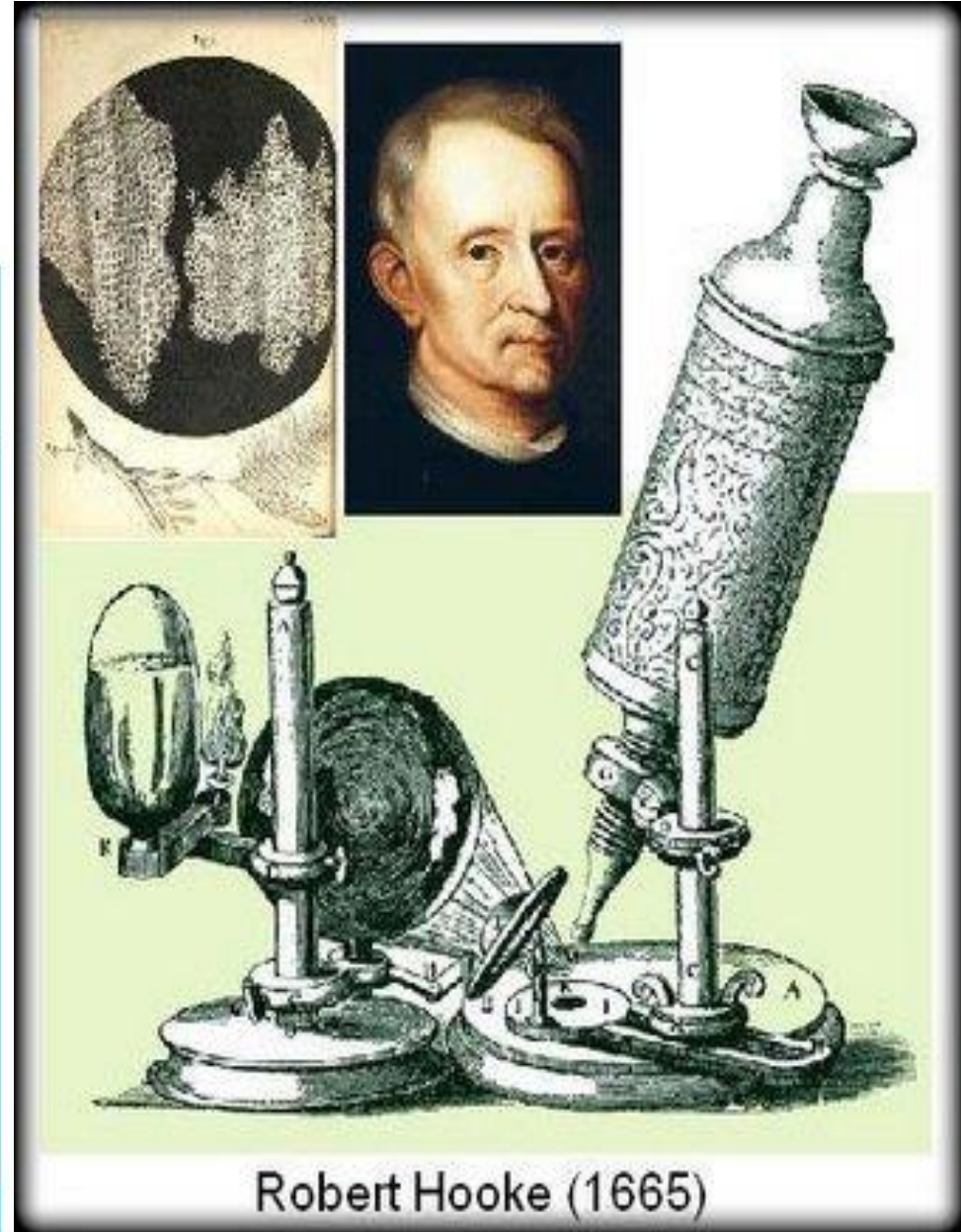


# DISCOVERY OF CELL

## ROBERT HOOKE



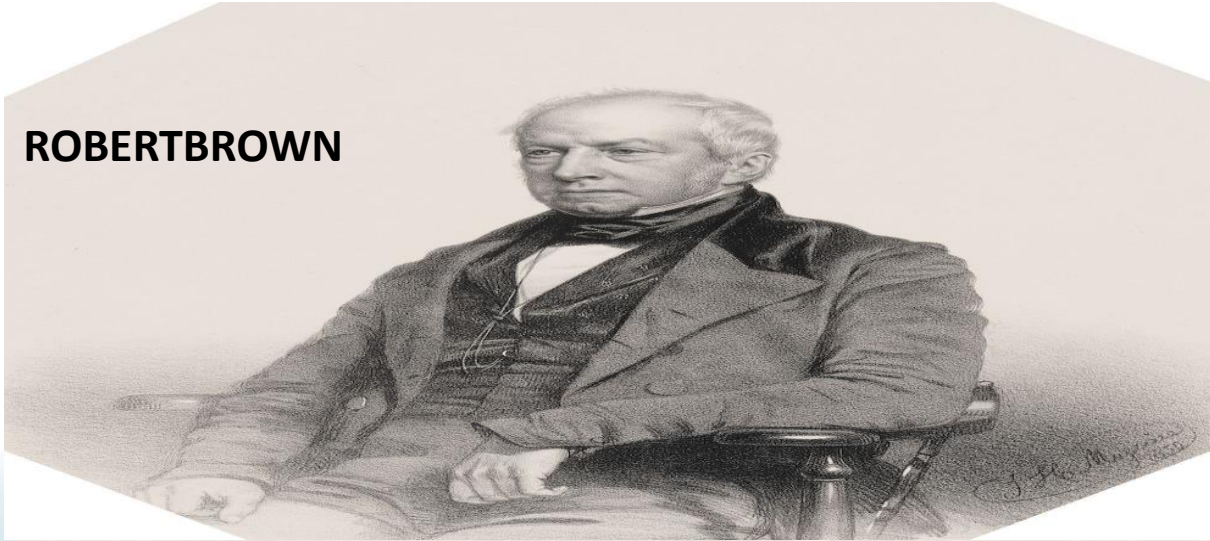
Cells were first discovered by Robert Hooke, in 1665. He observed a thin slice of cork under his self designed microscope. This slice of cork resembled the structure of the honeycomb consisting of small compartments. He named these small compartments as cells.



# MAJOR DISCOVERIES



**ROBERT BROWN**



## Cell Theory

**Matthias Schleiden**



all plants are made of cells

**Theodore Schwann**



all animals are made of cells

**Rudolf Virchow**



all cells came from pre-existing cells

## Cell Theory

Cells were first discovered by **Robert Hooke in 1665**. He observed the cells in a cork slice with the help of a primitive microscope.

**Leeuwenhoek (1674)**, with the improved microscope, discovered the free living cells in pond water for the first time. It was **Robert Brown in 1831** who discovered the nucleus in the cell. **Purkinje in 1839** coined the term 'protoplasm' for the fluid substance of the cell.

The cell theory, that all the plants and animals are composed of cells and that the cell is the basic unit of life, was presented by two biologists, **Schleiden (1838)** and **Schwann (1839)**. The cell theory was further expanded by **Virchow (1855)** by suggesting that all cells arise from pre-existing cells. With the discovery of the electron microscope in 1940, it was possible to observe and understand the complex structure of the cell and its various organelles.

## UNICELLULAR AN MULTICELLULAR ORGANISMS

We know that there is a division of labour in multicellular organisms such as human beings. This means that different parts of the human body perform different functions. The human body has a heart to pump blood, a stomach to digest food and so on.

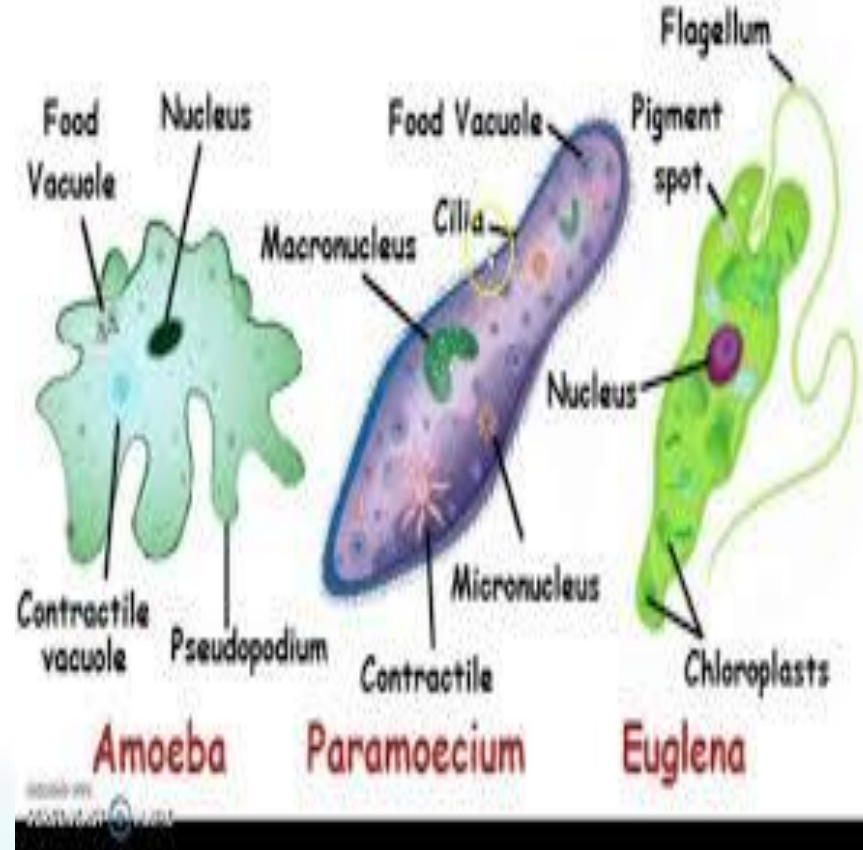
Similarly, division of labour is also seen within a single cell in many cases.

Each such cell has got certain specific components within it known as cell organelles.

A cell is able to live and perform all its functions because of these organelles. These organelles together constitute the basic unit called the cell.

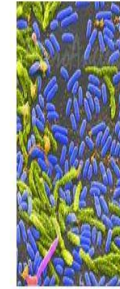
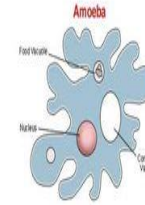


Organisms  
?



## Types of cells...

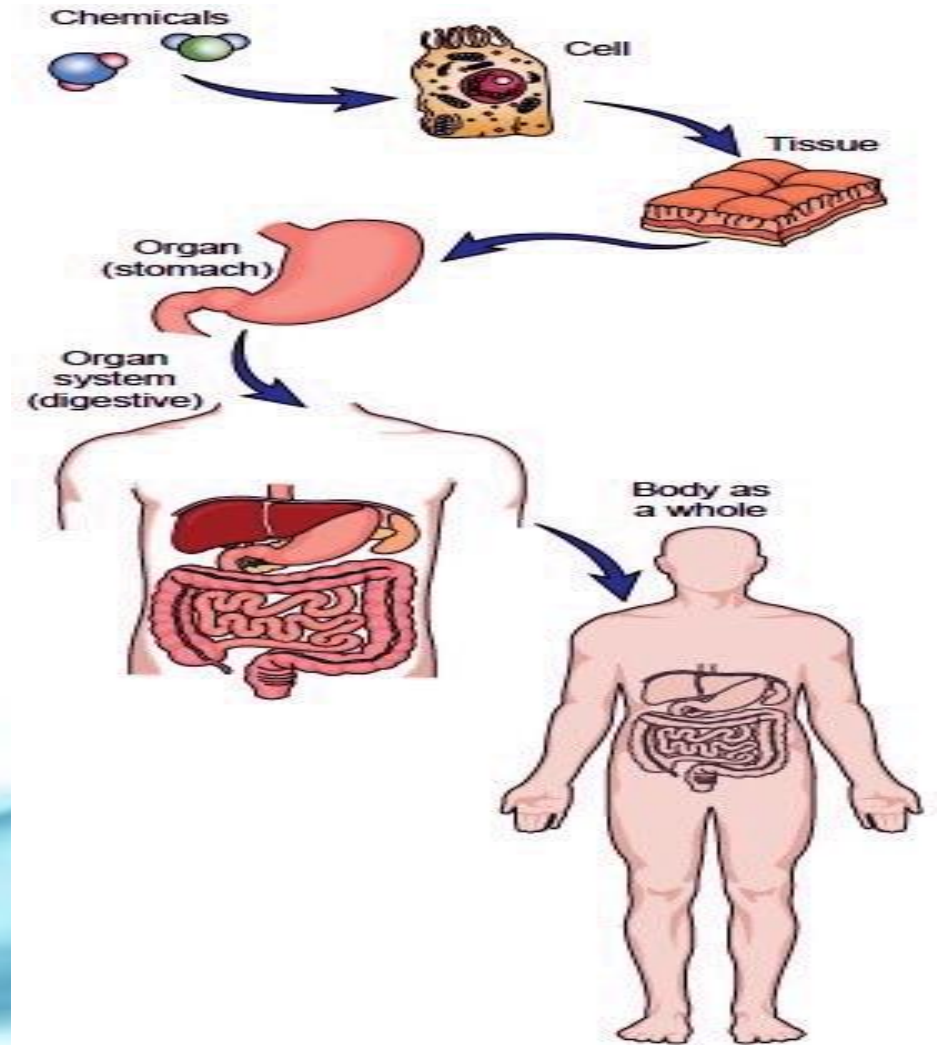
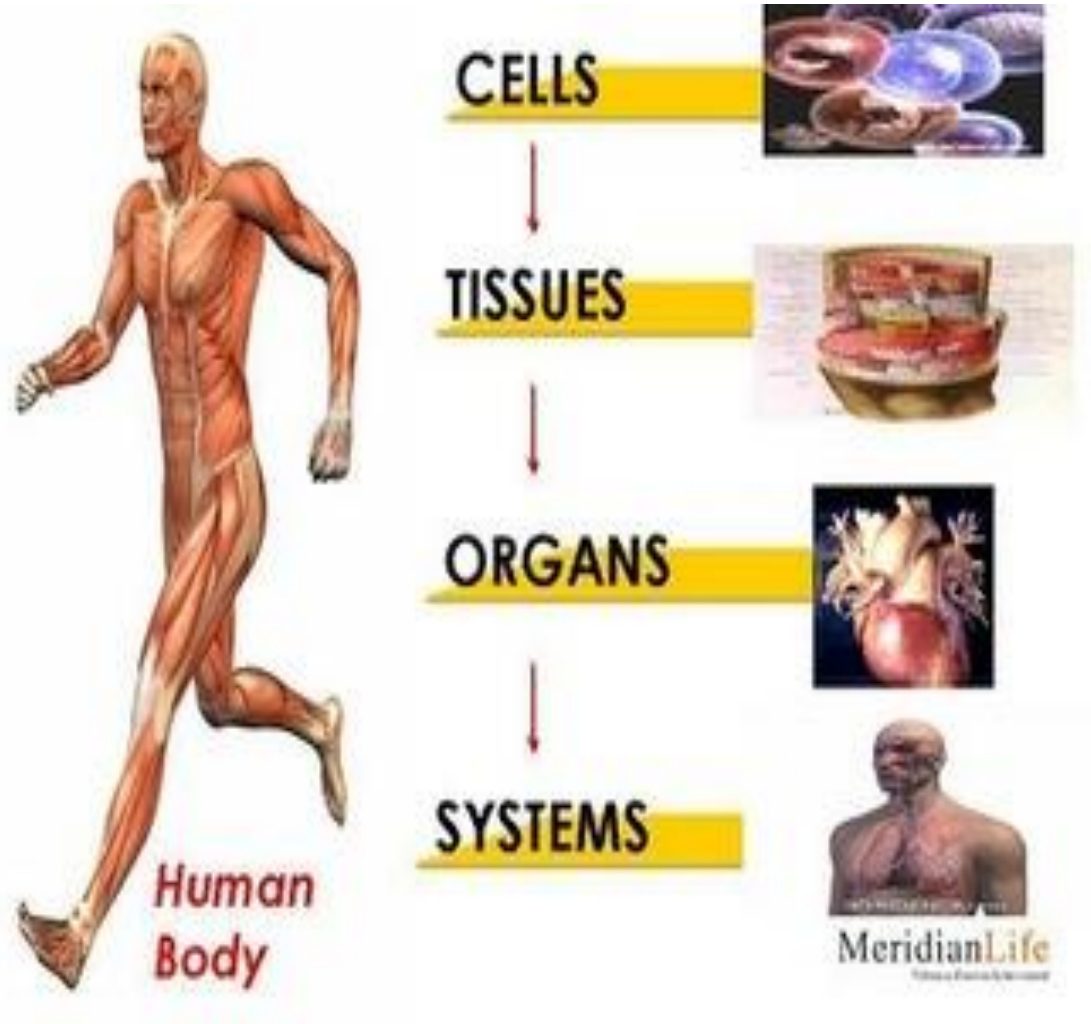
**Unicellular** - organisms that are made of only one cell.



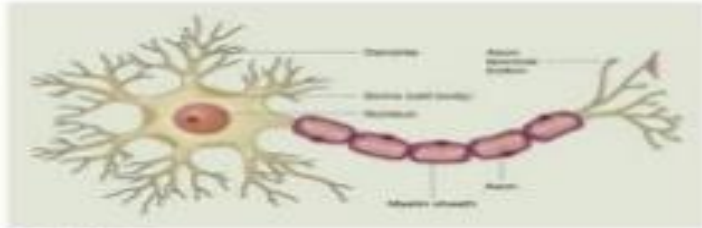
**Multicellular** - organisms that are made of more than one cell.



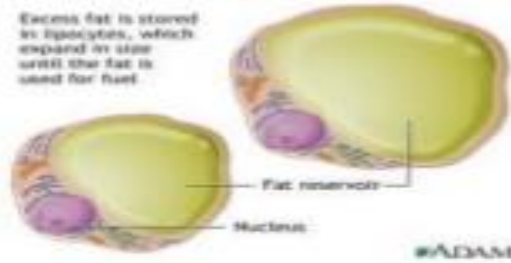
# LEVEL OF ORGANISATION



# DIFFERENT CELLS IN HUMAN BODY



**NERVE CELL**

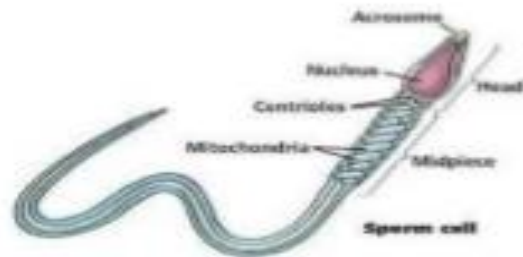


**FAT CELL**

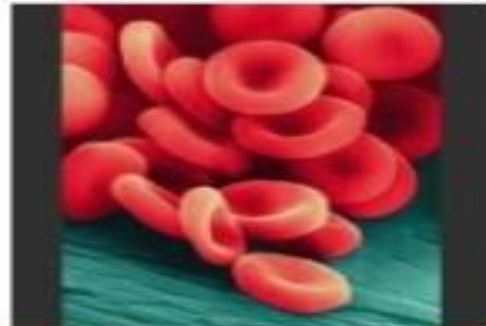


**BONE CELL**

**SPERM**



**BLOOD CELL**

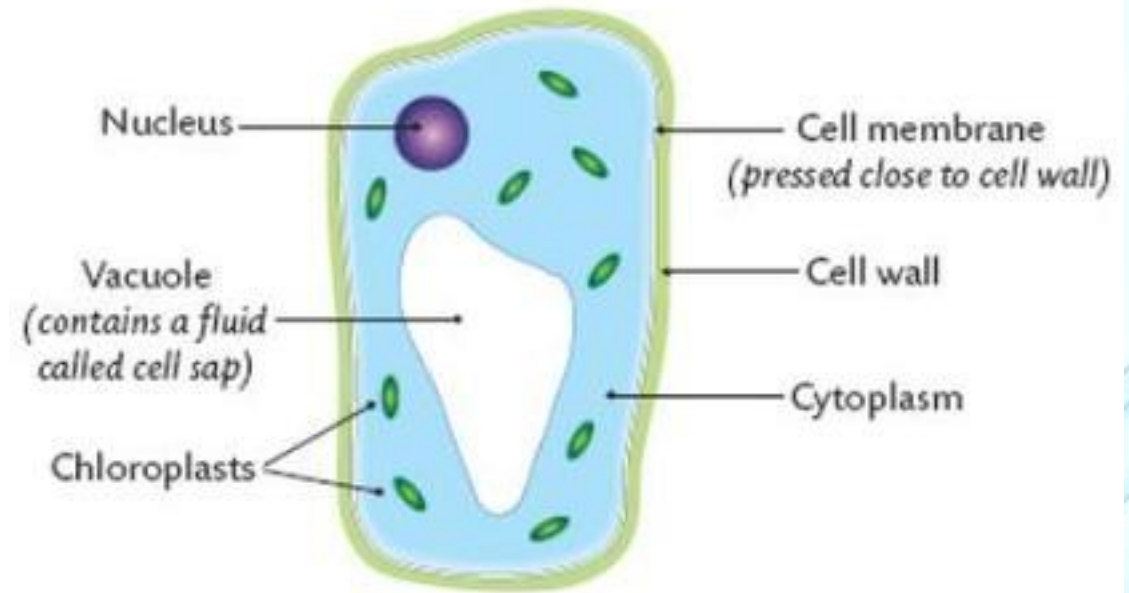
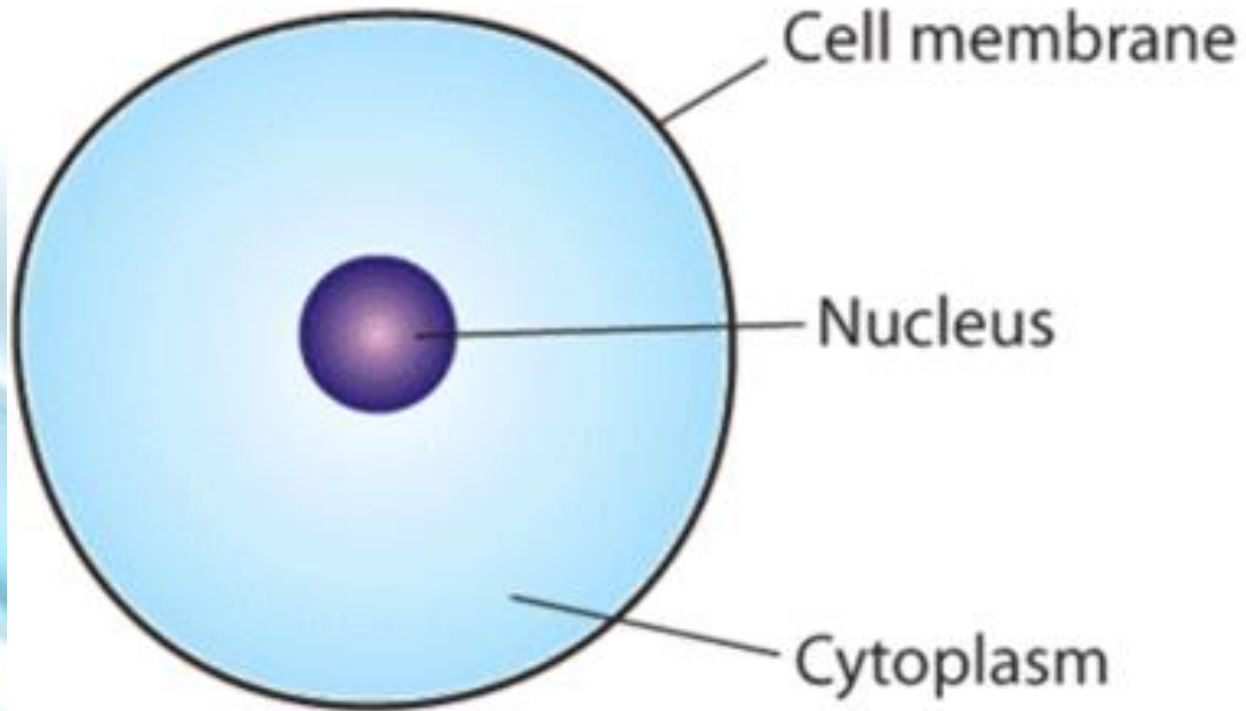


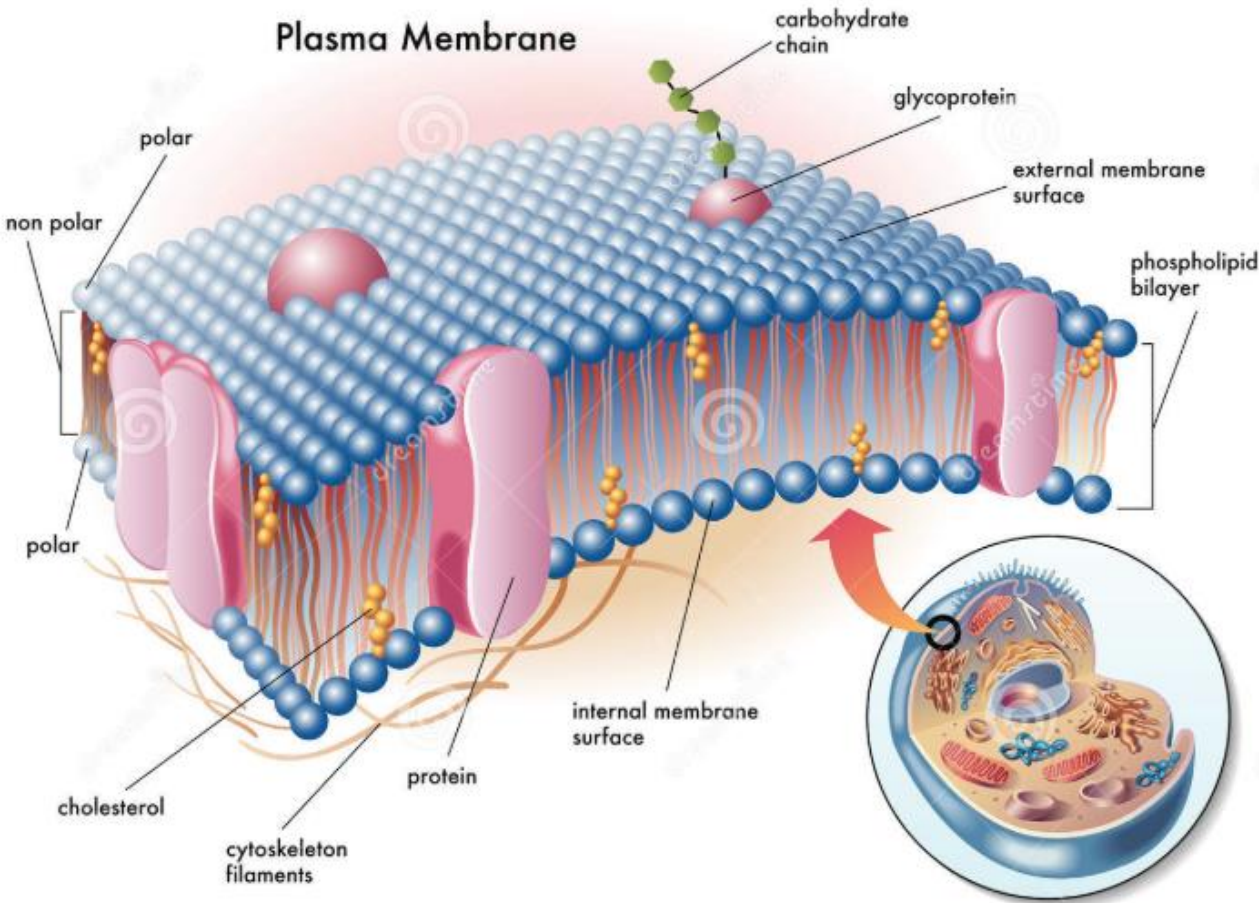
**OVUM**





# THREE IMPORTANT PARTS OF CELL





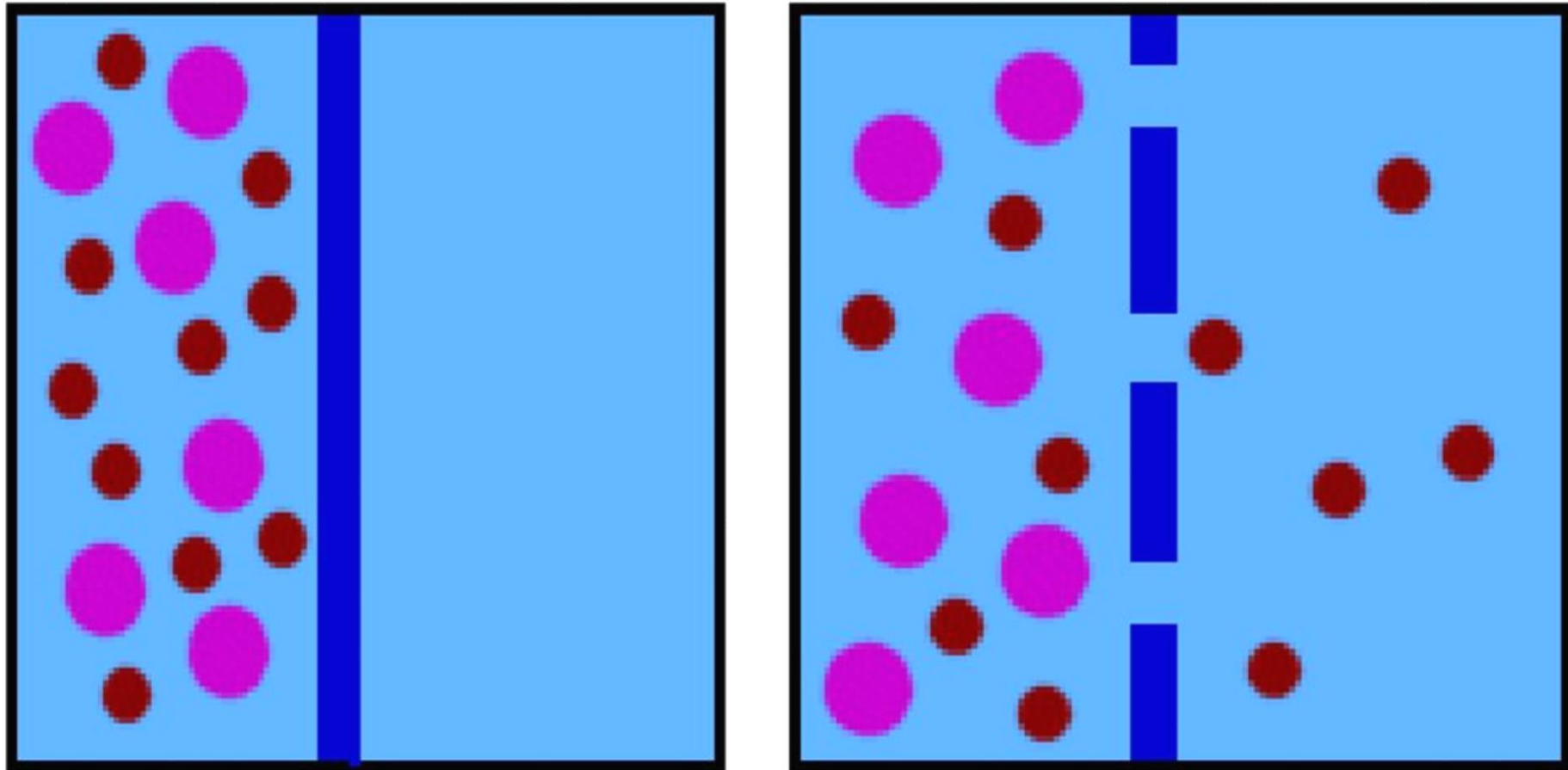
The plasma membrane is flexible and is made up of organic molecules called **lipids and proteins**

The flexibility of the cell membrane also enables the cell to engulf in food and other material from its external environment. Such processes are known as **endocytosis**. *Amoeba* acquires its food through such processes

The plasma membrane allows or permits the entry and exit of some materials in and out of the cell. It also prevents movement of some other materials.

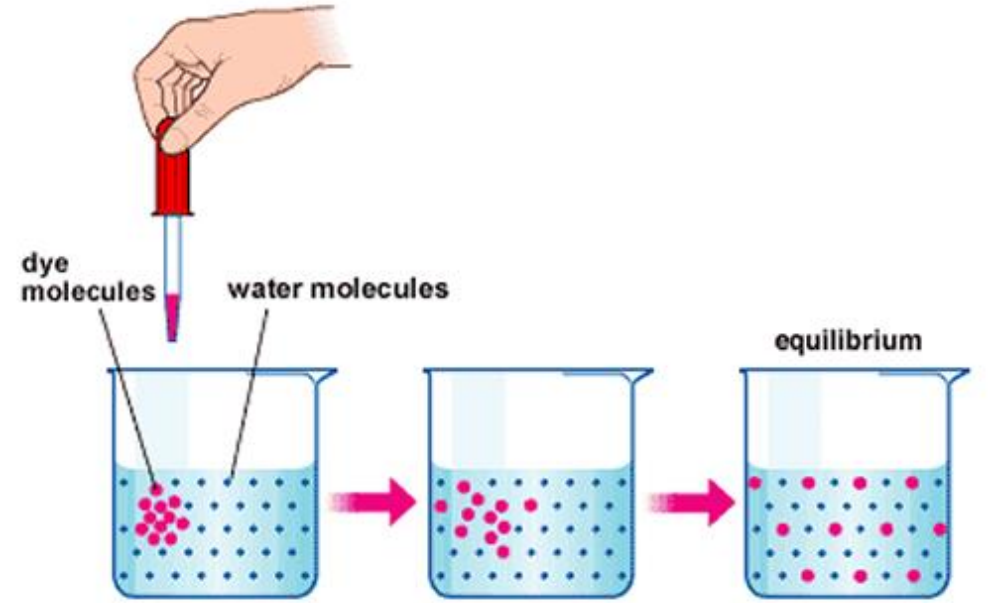
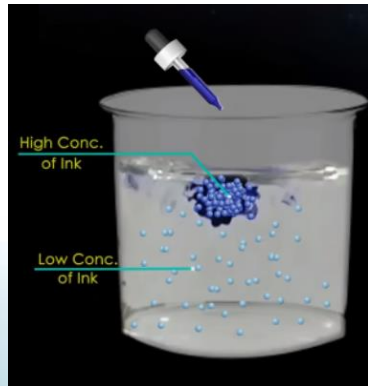
The cell membrane, therefore, is called a selectively permeable membrane.

# SEMIPERMEABLE MEMBRANE



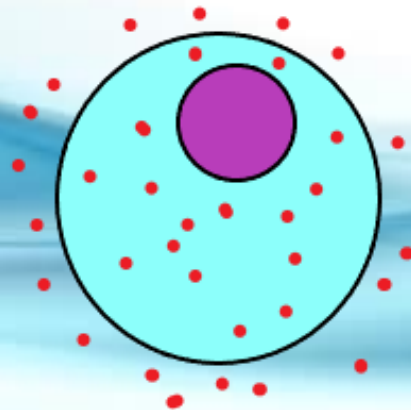
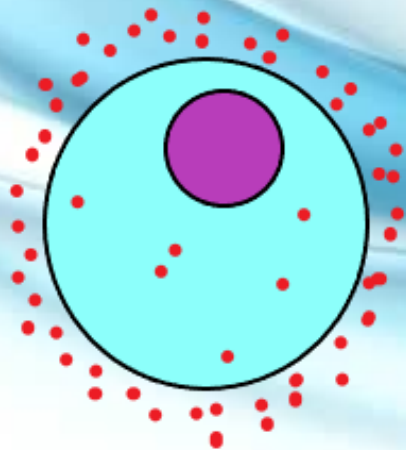
How does the movement of substances take place into the cell? How do substances move out of the cell?

**1. DIFFUSION 2. OSMOSIS 3. ACTIVE TRANSPORT 4. ENDOCYTOSIS**



BEFORE

AFTER



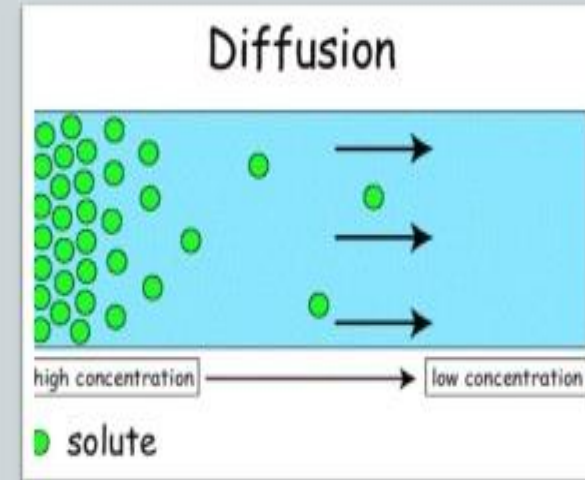
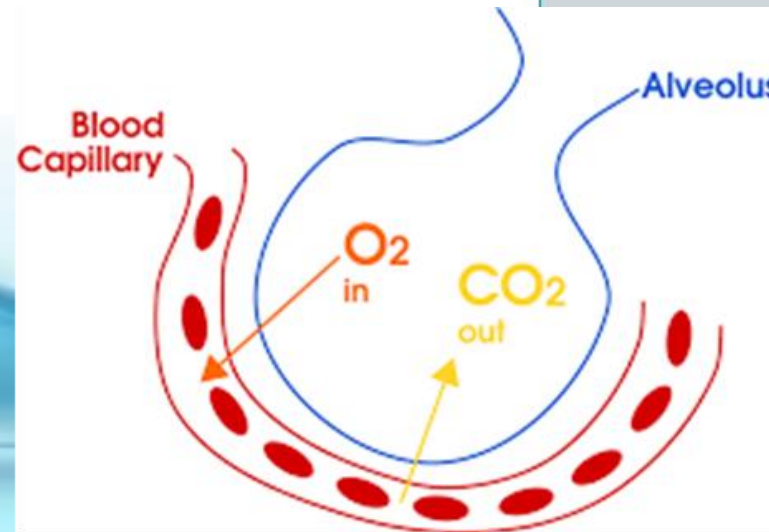
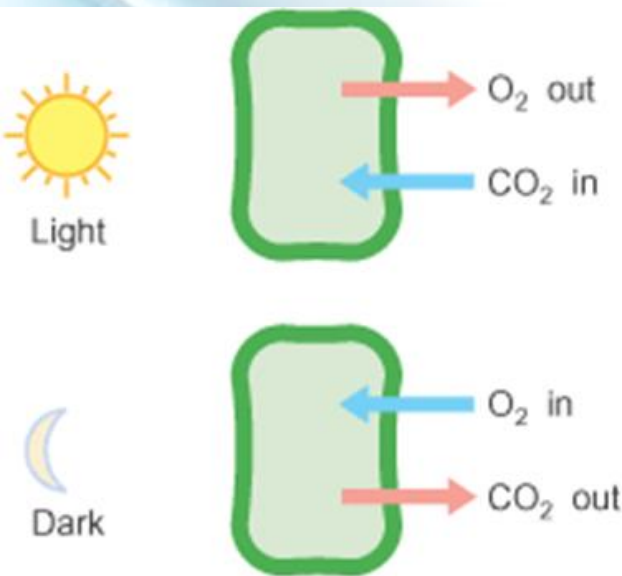


Some substances like carbon dioxide or oxygen can move across the cell membrane by a process called diffusion

# DIFFUSION

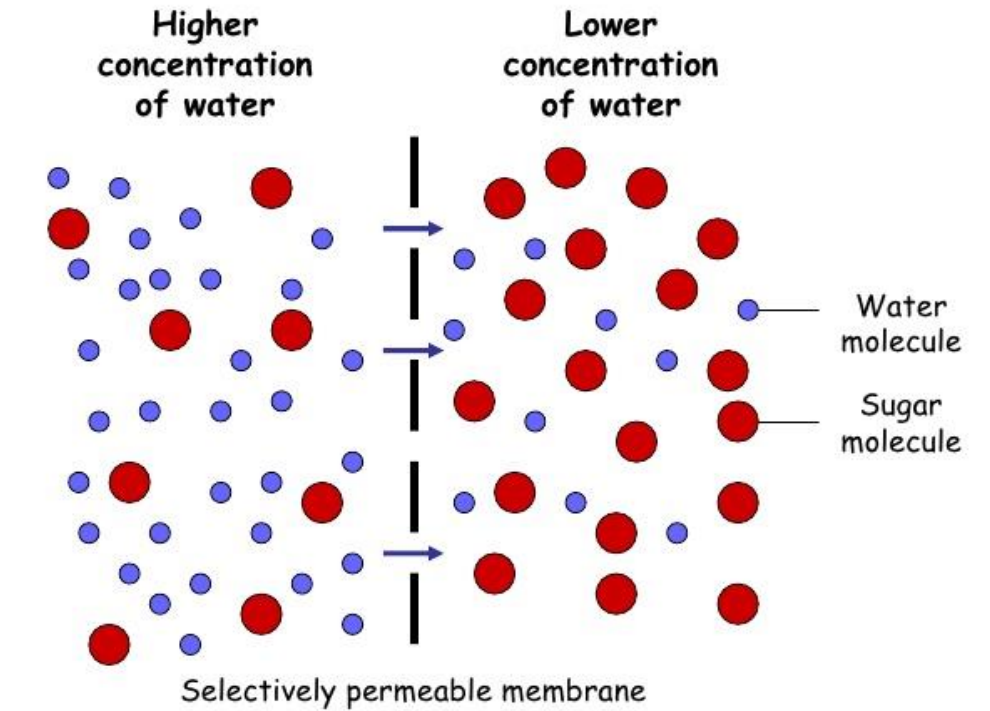


- ❑ Gaseous exchange takes place from a region of higher concentration to a region of low concentration.

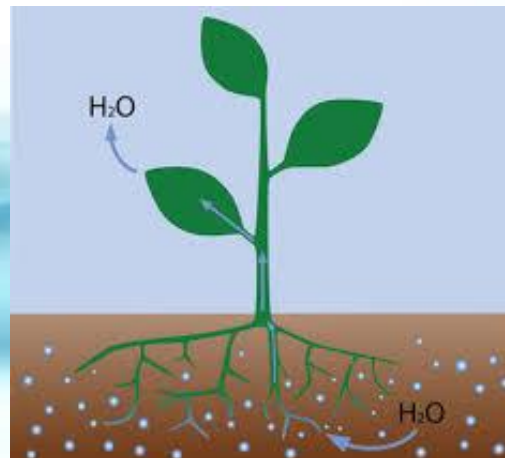


# OSMOSIS

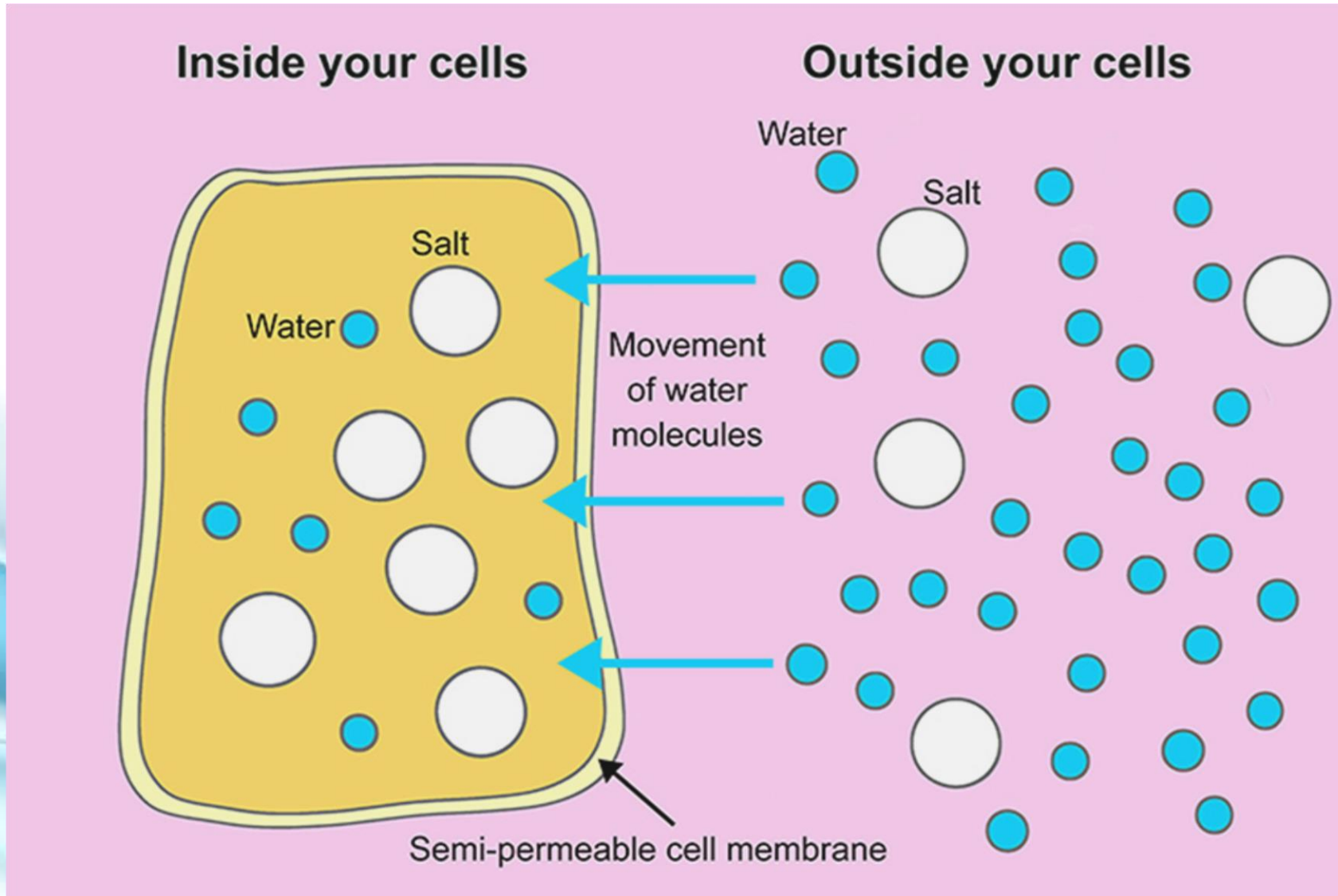
Water also obeys the law of diffusion. The movement of water molecules through such a selectively permeable membrane is called osmosis.



Water moves down a concentration gradient by **OSMOSIS** from **high** to **low** concentration



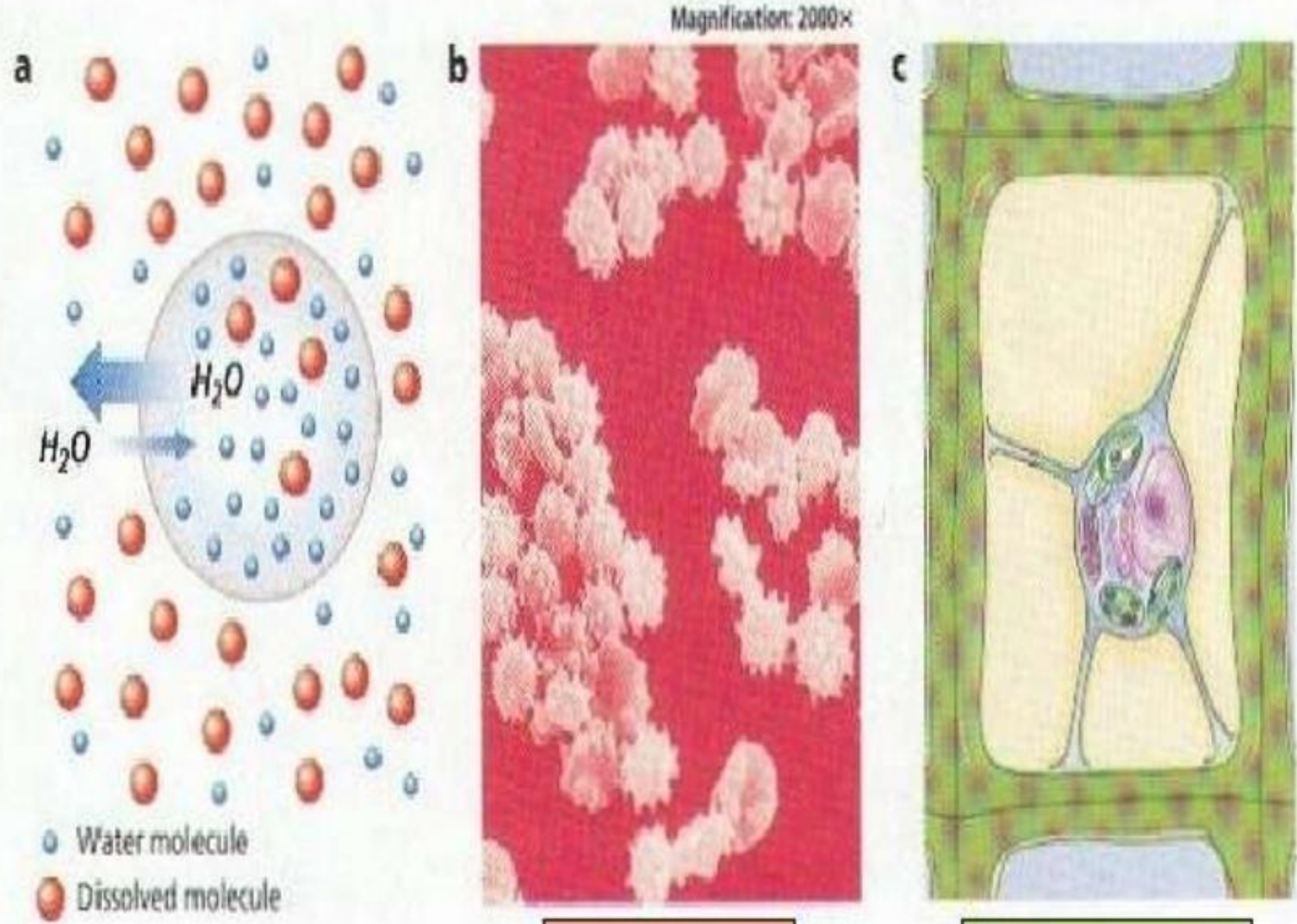
# OSMOSIS



# Hypertonic solution + cells



In a hypertonic solution, water leaves a cell by osmosis, causing the cell to shrink (a). Animal cells like these red blood cells shrivel up as they lose water (b). Plant cells lose pressure as the plasma membrane shrinks away from the cell wall (c).



Crenation

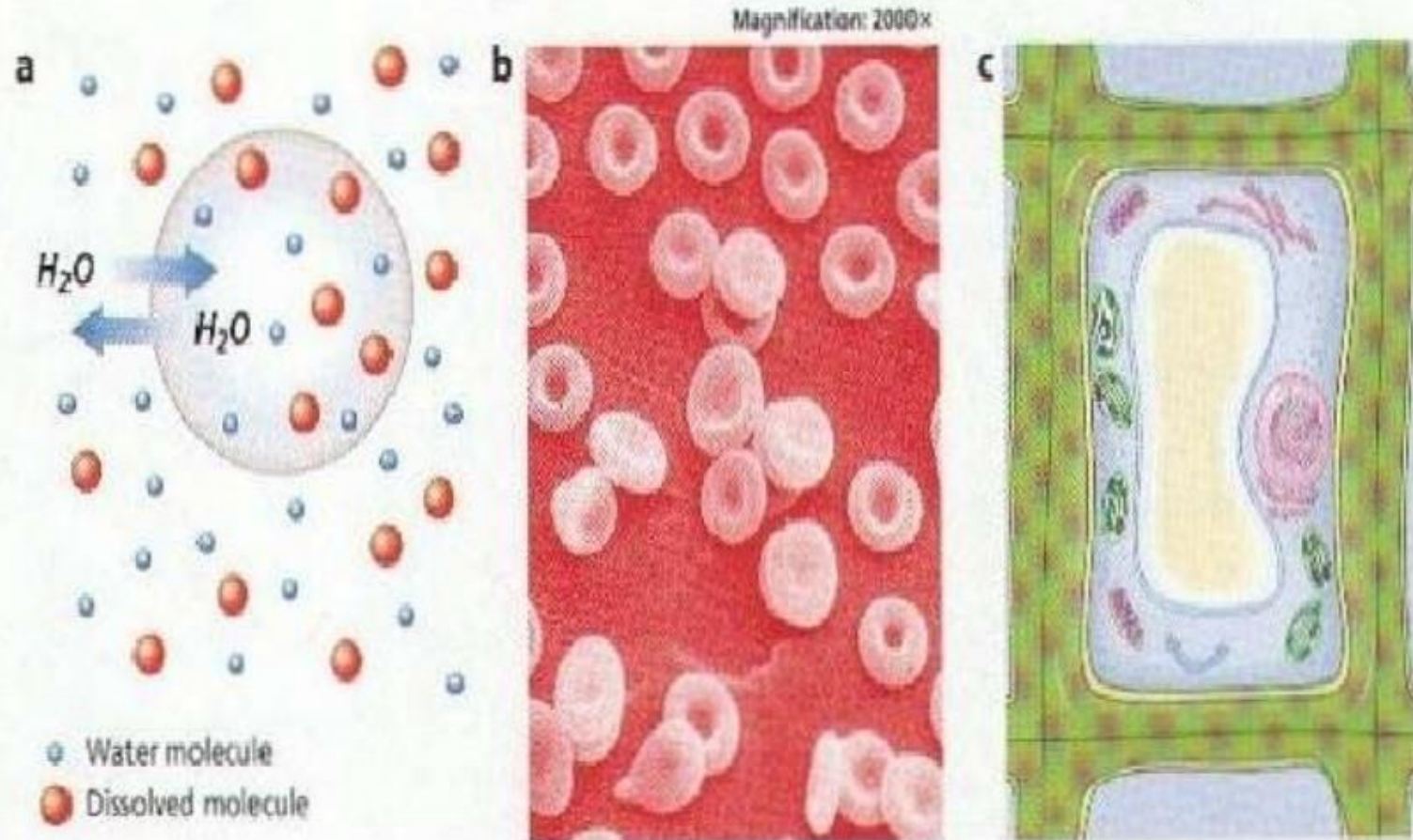
Plasmolysis



# Isotonic solution + cells



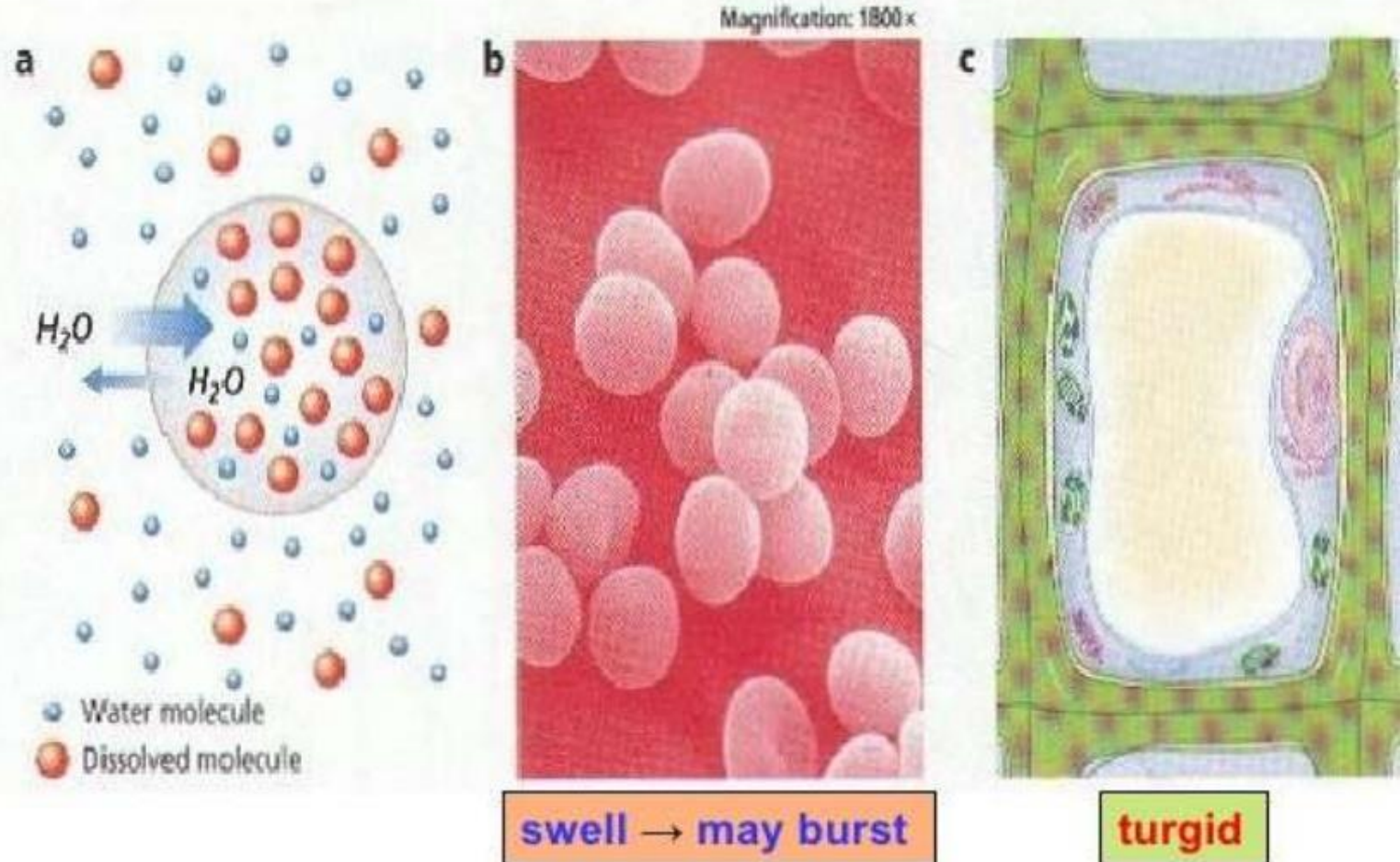
In an isotonic solution, water molecules move into and out of the cell at the same rate, and cells retain their normal shape (a). Notice the concave disc shape of a red blood cell (b). A plant cell has its normal shape and pressure in an isotonic solution (c).

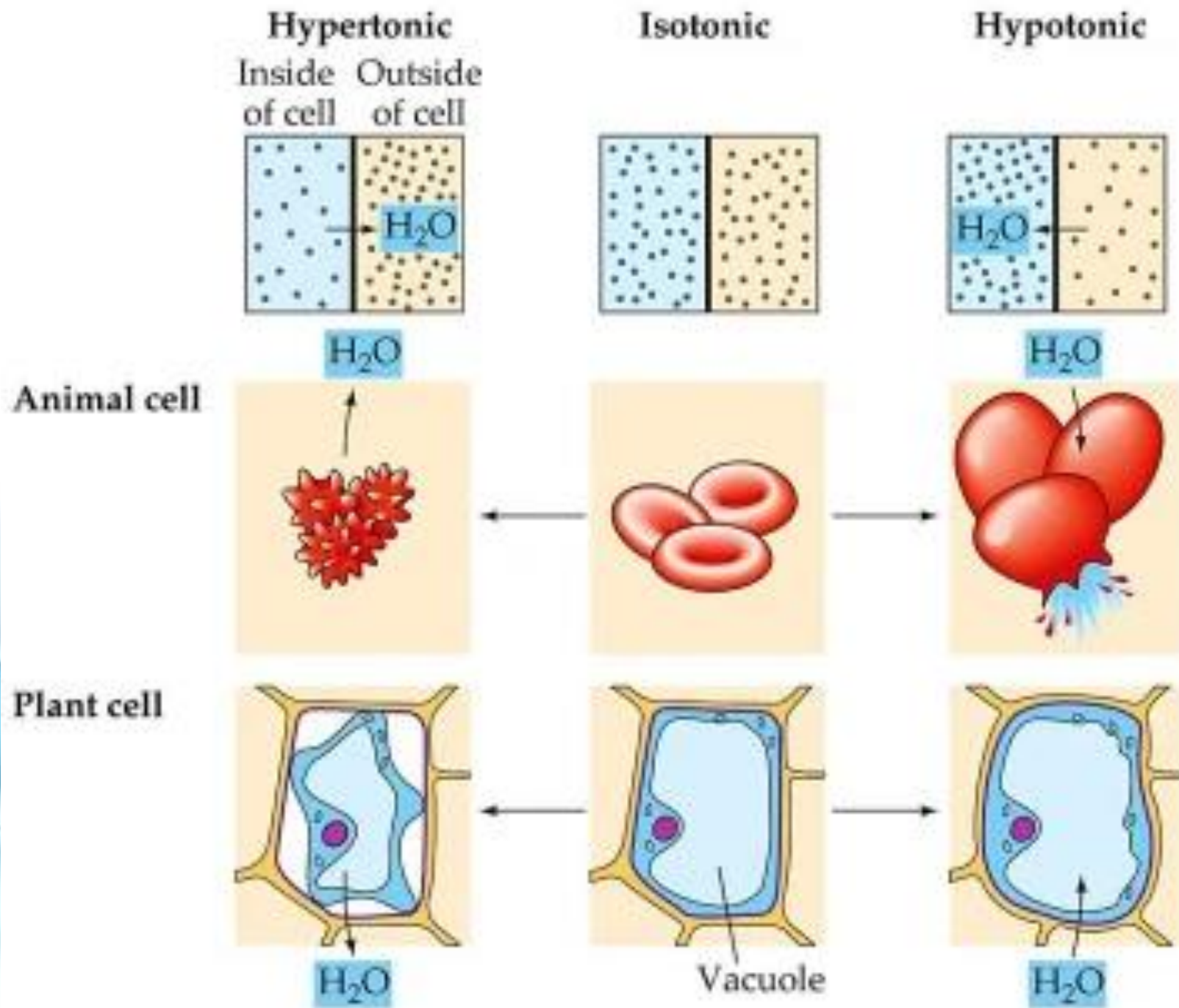


# Hypotonic solution + cells



In a hypotonic solution, water enters a cell by osmosis, causing the cell to swell (a). Animal cells, like these red blood cells, may continue to swell until they burst (b). Plant cells swell beyond their normal size as pressure increases (c).

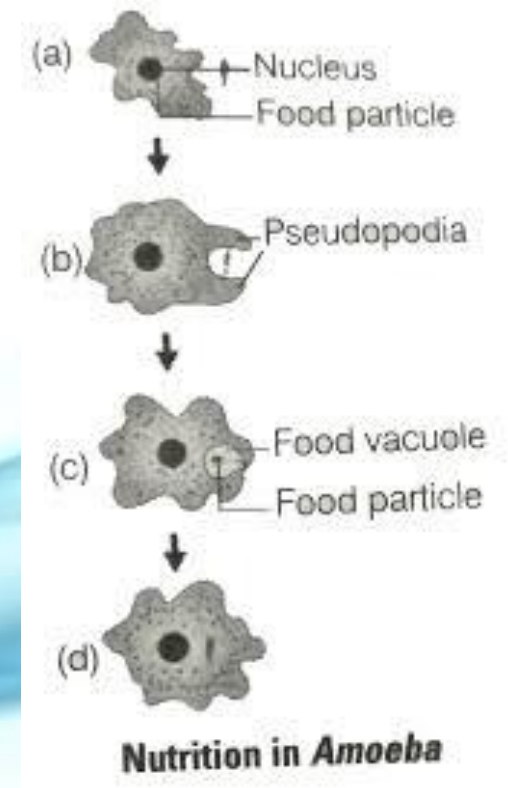
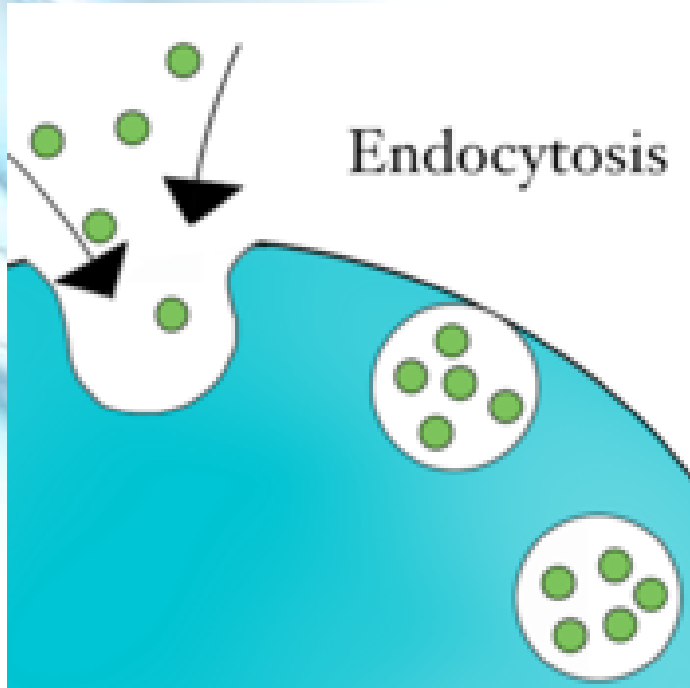


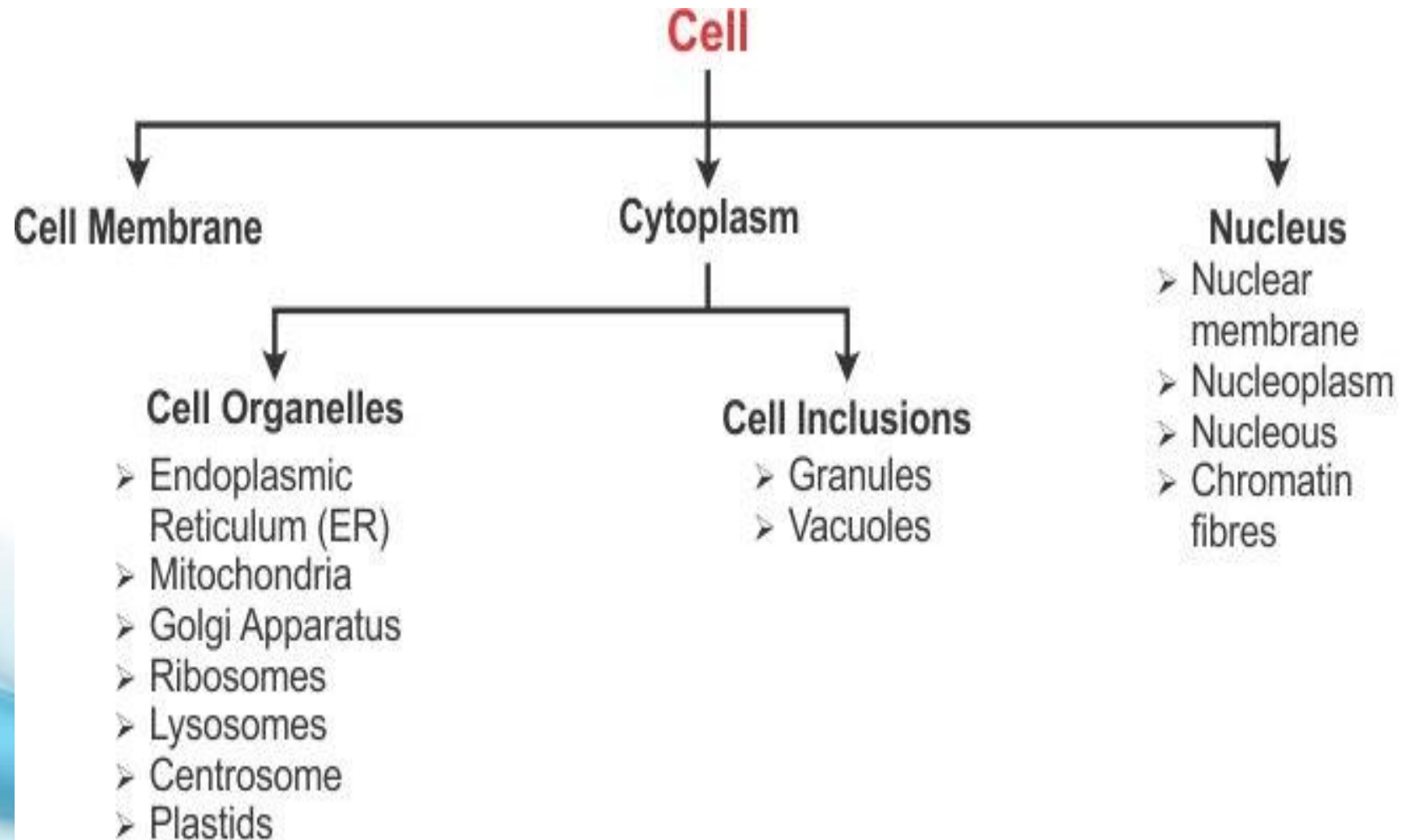


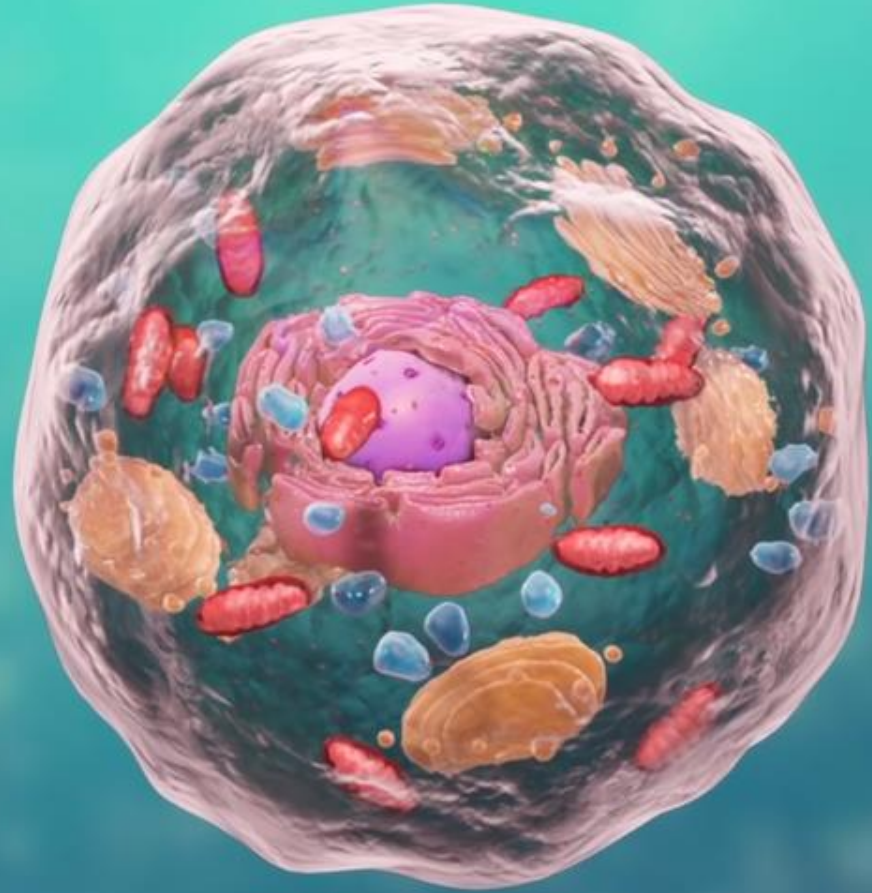
# ENDOCYTOSIS

- The plasma membrane is flexible and is made up of organic molecules called lipids and proteins
- The flexibility of the cell membrane enables the cell to engulf in food and other material from its external environment and is known as endocytosis

**Example:** *Amoeba* acquires its food through such processes.







Organelles are the specialized parts of a cell that have unique jobs to perform.



1. Who proposed the Cell theory ?

2. New cells are formed from \_\_\_\_\_.

3. The functional components of cell are \_\_\_\_\_, \_\_\_\_\_ & \_\_\_\_\_.

4. The largest cell in the human body is -

(a) Nerve cell

(b) Muscle cell

(c) Liver cell

(d) Kidney cell

5. The smallest cell is

(a) muscle cell

(b) Ostrich egg

(c) Mycoplasma

(d) a Liver cell

## Assignment Questions

1. Name the three basic parts of a cell
2. Write the level of organization of cell specifying an organ system
3. Name few cells present in human body
4. Define diffusion
5. How water enters and exit the cell?
6. Why plasma membrane is called selectively permeable membrane?





# INDIAN SCHOOL MUSCAT

**THANK YOU**