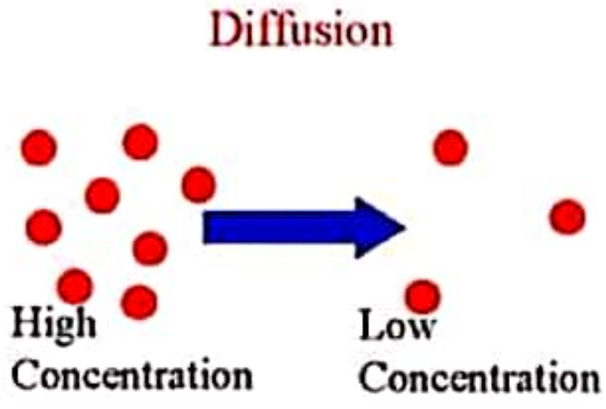
1. All the living organisms are made up of fundamental unit of life called**" cell"**.
2. The cell is a Latin word for **"a little room"**.
3. The scientist Robert Hooke saw a little room in the cork (the bark of a tree) resembled the structure of a honeycomb. The use of the word "Cell" to describe these units is used till this day in Biology as**" Cell Biology"**.
4. The **Compound Microscope** consist eye piece,objective lens and condenser to observe a cell after putting a drop of **Safranin** (for plant cell) and methylene blue (for animal cell). ( Please refer to Fig. 5.1: Compound Microscope NCERT Book Page-57)
5. The scientist **Leeuwenhoek saw free living cells** in the pond water for the first time. ( father of microbiology)
6. The scientist **Robert Brown discovered the nucleus** in the cell.
7. The **cell theory** states that all the plants and animals are composed of cells, it was **proposed by Schleiden and Schwann.**
8. The **cell theory** was further expanded by Virchow by suggesting that **"all cells arise from the pre-existing cells".**
9. The cells differ in size, shape, structure (Please refer to Fig. 5.2/5.3: Onion peel/Various cells in Human body, NCERT Book Page-57/58):**Types of cells: Onion cells, Smooth muscle cell, Blood cells, Bone cell, Fat cell, Nerve cell, Ovum, Sperm etc. Each kind of cell performs specific function.**

10. A single cell may constitute a whole organism as in **Amoeba, Chlamydomonas, Paramecium and Bacteria;** these are called as **unicellular organisms**. Whereas in multi-cellular organisms (Human beings) division of labor is seen.
11. **The feature in almost every cell is same: Plasma membrane, nucleus and cytoplasm.**
12. **Plasma membrane**: It is the outermost covering of the cell.

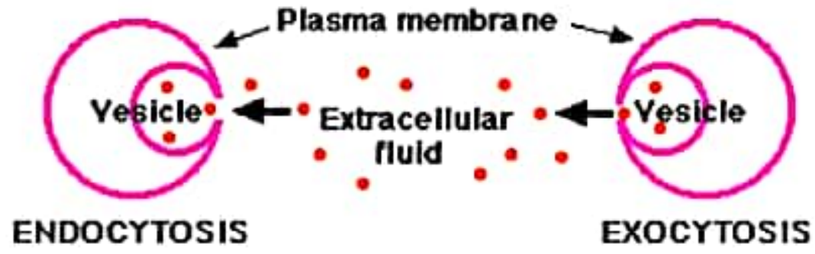
    - It is called as **selective permeable membrane** (because it prevents movement of some materials).
    - It helps in **diffusion** and osmosis
    - Diffusion: movement of substance from high concentration to low concentration.
      Eg; exchange of carbon dioxide or oxygen with external environment.



c)The cell loses water, if the medium has lower water concentration (**Hypertonic solution**) than the cell.

Note - The cell drinking is endosmosis;

- omission of water is called ex-osmosis.




13. The cell engulfs food is called endocytosis and ejects solid is called **exocytosis.** Amoeba acquires food through endocytosis and excretion of solid is called exocytosis.
14. **The cell wall** is a rigid outer covering composed of cellulose. It provides structural strength to plant cells. When a living cell loses water, there is shrinkage of contents of a cell away from the cell wall. This phenomenon is called as **plasmolysis**. The cell walls permit the cells of plants, fungi and bacteria to withstand very dilute (Hypotonic) external media without bursting.
15. **The Nucleus:** It is a dark colored, spherical or oval, dot-like structure near the center of a cell called Nucleus. The nucleus plays a central role in cellular activities/ reproduction. The chromatin material gets organized into chromosomes. The chromosomes contain information for inheritance of features from parents to next generations in the form of **DNA**( Deoxyribo Nucleic Acid ) and protein molecules. The functional segments of DNA are called genes.
16. In some organisms like Bacteria nucleus is not covered by nuclear membrane. Hence it is called as **prokaryote.** (Pro= primitive; karyote = karyon = nucleus.) The organisms with cells having a nuclear membrane are called **eukaryotes.**
17. **Differences between prokaryotes and eukaryotes(** Please refer to Fig. 5.4: Prokaryotic cell NCERT Book Page-62)

| Prokaryotes | Eukaryotes |
|---|---|
| Size: generally small (1-10 µm) | Size: generally large. (5-500 µm) |

| | |
|---|---|
| Nuclear region: Not well defined and not surrounded by a nuclear membrane & known as nucleoids. | Nuclear region: Well defined and surrounded by a nuclear membrane |
| Chromosome: Single | Chromosome: More than one chromosome |
| Membrane-bound cell organelles absent | Membrane-bound cell organelles present |
| Eg- bacteria, blue green algae | Eg fungi, plant cell and animal cell. |