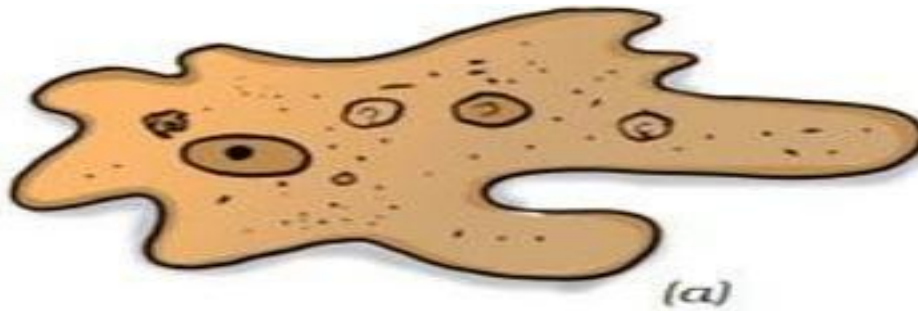


Cell- Structure and Function - Class 8



Amoeba

Cell:

- (i) In the living organisms, Cells are basic structural units.
- (ii) Cells may be compared to bricks. Bricks are assembled to make a building. Similarly, cells are assembled to make the body of every organism.
- (iii) It is the basic structural and functional unit of life. All organisms are made up of cells
- (iv) Sub cellular structures of cell include organelles, the plasma membrane, and, if present, the nucleus.
- (v) Size of the cell is 1 to 100 micrometer.
- (vi) Cells are produced by the division of pre-existing cell. Each cell contains genetic material that is passed down during reproduction process.
- (vii) Cells in the living organisms are complex living structures unlike non-living bricks.
- (viii) All basic chemical and physiological functions like repairing, growth, excretion movement, immunity, communication, and digestion - are happen inside of cells.

Discovery of the Cell:

In 1665, the English scientist Robert Hooke observed slices of cork which is part of bark of the tree, under a simple magnifying device. He noticed partitioned boxes or compartments in the cork slice.



Cork cells as observed by Robert Hooke

These boxes looked like a honeycomb. He also noticed that these boxes were separated from the other by a wall or partition. Hooke named them 'cell' for each box. Hooke observed as boxes or cells in the cork were actually dead cells.

Types of cell:

1. Prokaryotic Cells:

The cells having nuclear material without nuclear membrane are termed prokaryotic cells. The organisms with these kinds of cells are called prokaryotes (pro: primitive; karyon: nucleus). Examples: bacteria and blue green algae.

2. Eukaryotic cells:

The cells having well organised nucleus with a nuclear membrane are designated as eukaryotic cells. All organisms

other than bacteria and blue green algae are called Eukaryotes. (Eu : true; karyon: nucleus).

Organisms Show Variety in Cell Number, Shape and Size:

Millions of living organisms have cells with different shapes and sizes. Their organs also vary in shape, size and number of cells.

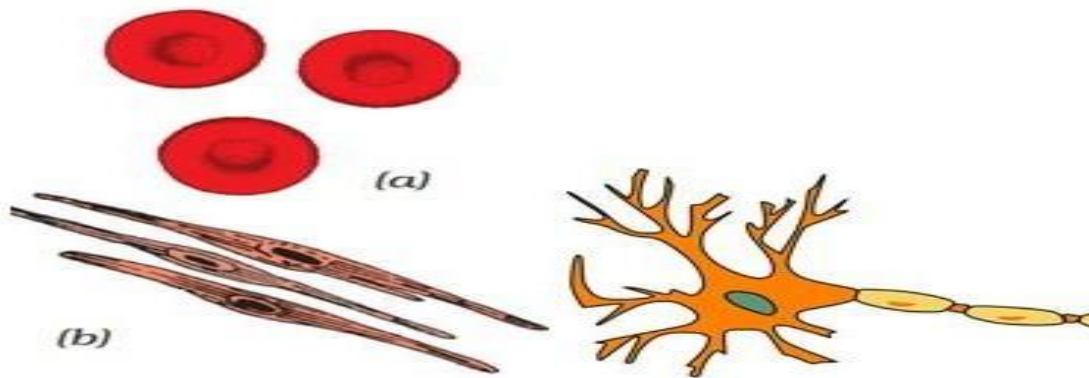
Human body has trillions of cells which vary in different size and shapes. Different groups of cells perform a variety of functions. Organisms made of more than one cell are called **multicellular organisms**. An organism with billions of cells starts life as a single fertilized egg cell. The fertilised egg cell multiplies by dividing process and the number of cells increases for development.

The single-celled organisms are made up of single cell called **unicellular organisms**. A single celled organism performs all the necessary functions that multicellular organisms perform.

A single-celled organism, like amoeba, captures and digests food, respire, excrete, grows and reproduces. Similar functions in multi-cellular organisms are carried out by groups of specialised cells forming different tissues. Tissues, in turn, form organs.

1. Shape of Cells:

(i) Generally, cell's shapes are rounding, spherical or elongated. Some types of cells are long and pointed at both ends. They exhibit spindle shape. Some types of cells are branched like the nerve cell or a neuron, which receives and transfers messages for helping to control and coordinate the working of different parts of the body.



Spherical red blood cells of humans, Spindle shaped muscle cells, long branched nerve cell

(ii) Components of the cell are enclosed in a membrane. This membrane provides shape to the cells of plants and animals. Cell wall is an additional covering over the cell membrane in plant cells. It gives shape and rigidity to these cells.

2. Size of Cells:

- (i) The cell's size in living organisms may be as small as a millionth of a metre (micrometre or micron) or may be as large as a few centimetres.
- (ii) Most of the cells are microscopic in size and are not visible to the naked eye. They need to be enlarged or magnified by a microscope for seeing.
- (iii) The smallest cell is 0.1 to 0.5 micrometre in bacteria. The largest cell measuring 170 mm × 130 mm, which is the egg of an ostrich.
- (iv) The size of the cells has no relation with the size of the body of the animal or plant.

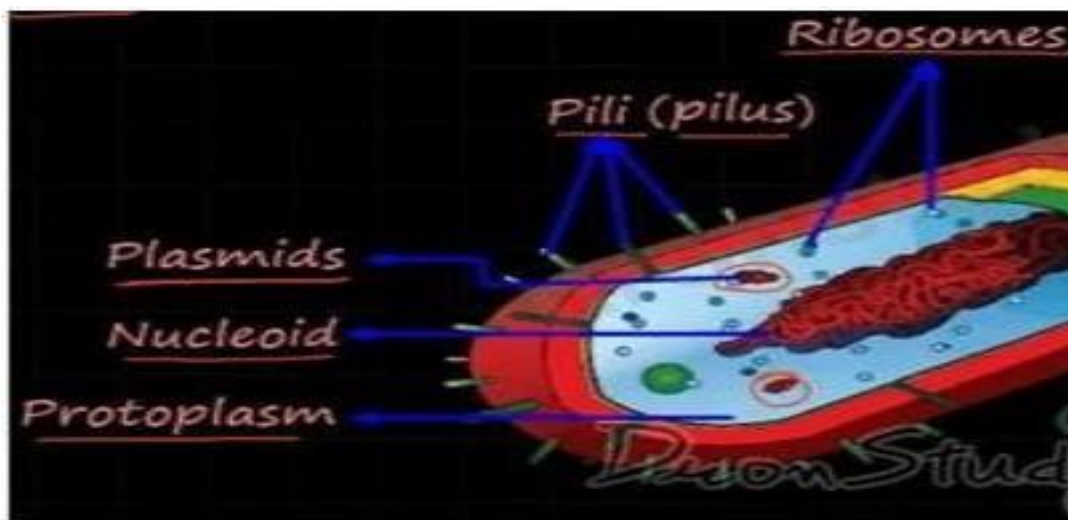
Cell Structure and Function:

(i) Each organ in the living organisms performs different functions such as digestion, assimilation and absorption. Similarly, different organs of a plant perform particular/specialized functions. Example: roots help in the absorption of water and minerals.

(ii) Each organ is further made up of smaller parts called tissues. A tissue is a group of similar type cells performing a particular function.

Parts of the Cell:

The basic components of a cell are cell membrane, cytoplasm and nucleus.



1. Cell Membrane:

- (i) The cytoplasm and nucleus are enclosed within the cell membrane, also called the plasma membrane.
- (ii) It is a living part of the cell, thin, delicate and elastic.
- (iii) This membrane separates cells from one another and also the cell from the surrounding medium.
- (iv) It is selectively permeable. It allows the flow of limited substances in and out of the cell.
- (v) This gives shape to the cell.
- (vi) In addition to the cell membrane, an outer thick layer in cells of plants, called cell wall.
- (vii) This additional cell wall surrounding the cell membrane is required by the plants for protection against variations in temperature, high wind speed, atmospheric moisture, etc. They are exposed to these variations because they cannot move.
- (viii) Cells can be observed in the leaf peel of Tradescantia, Elodea or Rhoeo.

2. Cytoplasm:

- (i) Cytoplasm is the jelly-like substance present between the cell membrane and the nucleus.
- (ii) Various other components or organelles of cells are present in the cytoplasm like mitochondria, golgi bodies, ribosomes, etc.

3. Nucleus:

- ✓ It is very important component of the living cell. It is generally dense and spherical organelle and located in the centre of the cell. It can be seen easily with the help of a microscope.
- ✓ Nucleus is separated from the cytoplasm by a membrane called the nuclear membrane. This membrane is also porous and allows the movement of materials between the cytoplasm and the inside of the nucleus.
- ✓ It consists of nucleolus, thread-like structures called chromosomes. These carry genes and help in inheritance or transfer of characters from the parents to the offspring. The chromosomes can be seen only when the cell divides.
- ✓ Genes contains genetic codes which are responsible for the unique physical character of an animal or a plant.
- ✓ Nucleus acts as control centre of the activities of the cell. The entire content of a living cell is known as protoplasm. It includes the cytoplasm and the nucleus. It controls all the metabolic activities of cell.
- ✓ Nucleus is the storehouse of genes. Without nucleus, cell can neither survive nor shows specialized activities.

