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Lesson - 1

The fundamental unit
of life : Cell

- Cell is the structural and functional unit of life. It can exist independently and can perform all the life process.
- Cells have certain characteristics. These are -
- Cells are the building block of plants and animals.
 - Every organism starts his life as a single cell. Each cell has its own life span.
 - The old cells are replaced by new cells.

→ Discovery of cell

In 1665, Robert Hooke discovered cell. He examined a thin slice of bottle cork under a self-made microscope. Cork is obtained from bark of a tree its section was made up of

large number of boxes forming a honey-comb like structure. He called these components as cells.

The term 'cell' is derived from a latin word 'cellula' which means a little room.

In 1694, Anton Van Leeuwenhoek observed RBC, bacteria, sperm cells of fish and frog. He used a home-made microscope with improved magnification.

In 1831, Robert Brown described nucleus in a cell of orchid roots.

*) Cell theory

In 1858, Schleiden and Schwann collectively formulated cell theory for plants and animals respectively.

In 1858, a German, physiologist, Rudolf Virchow gave the phrase *omnicellula; ecellula* it means that all cells derived from pre-existing cell.

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Q) Features of cell theory

- Cell is the basic unit of all plants and animals.
- Cell is the basic unit of function as all the metabolic reactions takes place inside the cell.
- Cell is the unit of heredity as it contains hereditary material called nucleus.
- All living cells arises only from pre-existing cell.

Q) Cell number, shape and size

Depending upon the number of cells organisms may be multicellular // unicellular.

Unicellular - organism are made up of only one cell such as bacteria, paramecium and yeast.

Multicellular organism are made up of single to several cell such as human being.

⇒ Cell Shape

In order to perform different function the cell exhibit different shape in different part of body and also in different organelle.

- × The size of cell are visible to the naked eye. Most cells, however are visible only a microscope. ×

⇒ Cell size - The size of different cell ranges between broad limits. Some plants and animal cells are visible to the naked eyes. Most cells, however, are visible only with a microscope, since they are only a few micrometer in diameter.

⇒ Prokaryotic cells and eukaryotic cell -
All living organisms present on the earth can be classified into following two types -

1. Non-cellular organism - that do not contain any cell in their body organisation.
 2. Cellular organism - that contain either one or many cells in their bodies. Ex - bacteria, plant etc.
- Cellular organism are again divided into following two main types :-
- Prokaryotes - These organism have primitive cell and incomplete cells. Thus, they contain prokaryotic cells in their body structure. Prokaryotic cell have all three basic structure of a typical cell but lack nuclear membrane around their genetic ~~xxxx~~ substance (DNA).
Ex - Archaeobacteria, bacteria and cyanobacteria.

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→ Eukaryotes - These have advanced and complete cells. Such cells are found in unicellular and multicellular plants and animals and contain nucleus, DNA, plasma membrane. The size of eukaryotic cell is generally 5 to 100 μm .

→ Differences between prokaryotic and eukaryotic cell :-

→ Prokaryotic cell

- Size of cell is generally small (1 - 10 μm).
- Nucleus is absent (nuclear region or nucleoid is not surrounded by nuclear membrane)
- It contains single chromosome.
- Nucleolus is absent membrane bound cell organelles are absent

- Cell division takes place by fission or budding.

Eukaryotic cell -

- Size of cell is generally large (5-100 μ m).
- Nucleus is present (nuclear material is surrounded by a nuclear membrane).
- It contains more than one chromosome.
- Nucleolus is present.
- Membrane bound cell - organelles such as mitochondria, ER, lysosomes etc are present.
- Cell division occurs by mitotic or meiotic cell division.