

## Chapter 8: Cell Structure and function

- The basic structural unit of an organ, which is the cell. Cells are the building blocks of the body which assemble to make an organism.
- **Discovery of cell**
  - The 1<sup>st</sup> cell was observed by Robert hook in 1665 in cork using simple magnifying glass.
  - The cell resembled honey comb boxes which were separated by a wall or a partition.
  - Cells have different shapes and sizes. Cells are usually microscopic
  - The egg in a hen represents a single cell and is big enough to be seen by the unaided eye.
    1. **Number of cells:**
      - Human body has trillions of cells which vary in shapes and sizes. Different groups of cells perform a variety of functions.
      - Unicellular organisms: The single-celled organisms are called unicellular organisms. The word root is *uni*: one; *cellular*: cell.
      - Multicellular organisms: Organisms in which are made up of multiple cells are called multicellular organism
    2. **Shape of cells:**
      - Cells can be round, spherical or elongated, quite long, branched like the nerve cell, long and pointed at both ends, spindle shaped etc.
      - The different shape account different functions.
      - The cell membrane is responsible for the shape of the cell.
      - Apart from this plant cell wall also helps it gives shape and rigidity.
    3. **Size of Cells:**
      - Size can vary from millionth of a meter or may be as large as a few centimeters.
      - Cells are microscopic in size and are not visible to eyes and is observed by a microscope.
      - Bacterial cell size is 0.1 to 0.5 micrometers
      - The largest cell measuring 170 mm × 130 mm, is the egg of an ostrich.
      - The size of the cells has no relation with the size of the body of the animal or plant.
- **Cell Structure and Function:**
  - Living things are made of cells. These cells can function together as organs.
  - Each organ in turn performs different functions.
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- **Parts of cells**
  - 1) Cell Membrane:
    - It is also called plasma membrane and encloses the cytoplasm and the nucleus.
    - It is of porous nature so as to allow the movement of substance inside and outside the cell.
  - 2) Cell wall:
    - Plants have an extra membrane outside the cell membrane for protection against variations in temperature, high wind speed, atmospheric moisture etc.
  - 3) Gene:
    - It is a unit of inheritance in living organisms.

- The transfer of a hereditary characters from parents to offspring is through genes.
- 4) Cytoplasm:
- The fluid component of the cell between the cell membrane and the nucleus.
  - Organelles of cells are present in the cytoplasm E.g., Mitochondria, Golgi bodies, ribosomes, etc.
- 5) Nucleus:
- It is spherical in shape and located in the center of the cell.
  - It can be stained and seen easily with the help of a microscope.
  - The nuclear membrane: Nucleus is separated from the cytoplasm by this membrane
  - The nucleolus is located inside the nucleus.
  - Chromosomes: Compacted strands of DNA which carry genes are called the chromosomes.
  - Nucleus is the control center of the activities of the cell.
  - Prokaryotic cells: Cells having nuclear material without nuclear membrane.
  - Eukaryotic cells: Cells having well-organized nucleus with a nuclear membrane is a eukaryotic cell.
- 6) Protoplasm:
- The entire content of a living cell is known as protoplasm. Protoplasm is called the living substance of the cell.
- 7) Vacuole:
- Cells have smaller vacuoles as well as large vacuoles are common in plant cells.
  - Vacuoles in animal cells are much smaller.
- 8) Plastids:
- Plastids contain green pigment called chlorophyll; it may have different colors. Green colored plastids are called chloroplasts.
  - They provide green color to the leaves which is essential for photosynthesis.