

Lesson at a Glance

- The basic structural units of an organism are the *cells*.
- Robert Hooke in 1665 observed a thin slice of cork under magnifying device. He observed partitioned compartments which he termed as '*cells*'.
- The cells are microscopic but some cells like egg of hen, duck or ostrich are single celled and are big enough to be seen by the unaided eye.
- **Organisms show variety of cell number, shape and size:**
 - The single celled organisms are called *unicellular*.
For example, amoeba and paramecium. They do all the functions necessary for life in the single cell. Organisms made of more than one cell are called *multicellular*.
 - **Pseudopodia:** Some unicellular organisms such as *amoeba* have cytoplasmic projections which help them in locomotion and feeding. These projections appear and disappear as *amoeba* moves or feeds. Like amoeba, White Blood Cells (WBC) of our body are also unicellular and can change their shapes.
 - The smallest cell is 0.1 to 0.5 micrometer in bacteria. 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. *The size of the cell is related to its functions.* However, large animals or plants may have more cells than smaller organisms. Nerve cell is the largest cell in humans and other animals.
- **Cell Structure and Function:**
 - **Tissue:** A tissue is a group of similar cells performing a specific function.

- **Organ:** An organ is a group of tissues which together perform a specific/specialised function/functions.
- **Organ system:** An organ system is a group of organs, in which each organ performs different functions. For example, digestion, assimilation and absorption in digestive system.
- A living multicellular organism may have several organ systems to perform multiple functions.
- A cell has cytoplasm, a jelly like substance which is bound by a cell membrane. The cell membrane is selective permeable that can allow certain substances but does not allow other substances to go out of the cell.
- In plant cells, there is another thick covering called cell wall that provides rigidity, protection against variation of temperature, high wind speed, atmospheric moisture, maintenance of the plant cell structure etc.
- The cytoplasm of a cell contains various cell **organelles** present between cell membrane and the nucleus, such as mitochondria, golgi bodies, ribosomes etc.
- **Nucleus:** It is generally spherical body located in the centre of the cell. Nucleus is separated from the cytoplasm by a membrane known as **nuclear membrane**. Nuclear membrane is porous and allows exchange of materials between cytoplasm and the nucleus. Cells may have or may not have nuclear membrane.
 - **Prokaryotes:** The organisms which contain cell/cells having nuclear material without nuclear membrane (**Prokaryotic cells**) are called as *prokaryotes*. For example, bacteria and blue green algae.
 - **Eukaryotes:** The organisms which have well organised nucleus with a nuclear membrane (eukaryotic cells) are eukaryotes.

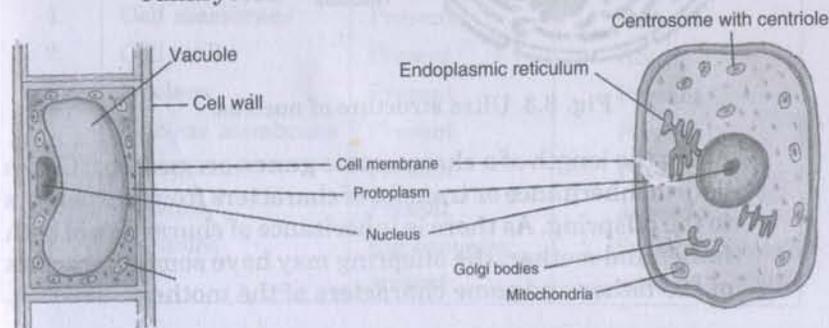


Fig. 8.1 Plant and animal cell (*Eukaryotic Cells*).

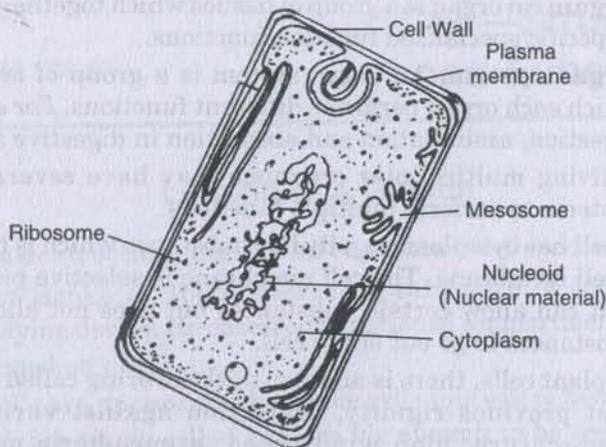


Fig. 8.2 A generalised prokaryotic cell of a bacterium.

Content of the Nucleus: Inside the nucleus, a spherical body is present, which can be seen under higher magnification of microscope, called **nucleus**. Nuclear material contains thread-like structures called **chromosomes**. The chromosomes can be seen only when the cell divides.

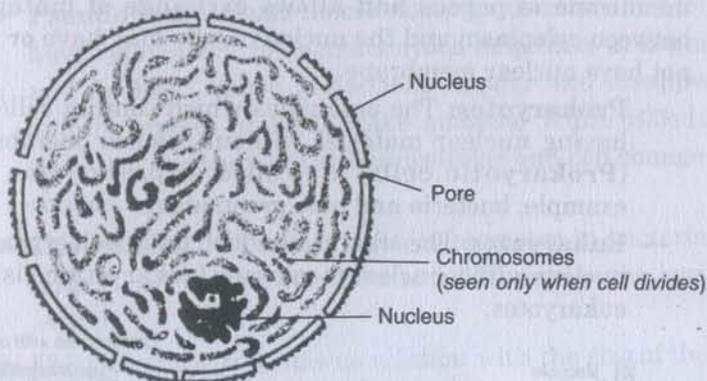


Fig. 8.3 Ultra structure of nucleus.

Along the length of a chromosome **genes** are present. Genes help in inheritance or transfer of characters from the parents to the offspring. As there is inheritance of characters of both father and mother, the offspring may have some characters of the father and some characters of the mother.

Functions of Nucleus:

- It acts as a control centre of all the activities of the cell.
- It helps in inheritance of character of parents (both father and mother) to the offspring.
- Protoplasm:** It is known as the living substance. The entire content of the living cell including the cytoplasm and the nucleus is known as *protoplasm*.
- Vacuole:** Vacuoles are fluid-filled structures surrounded by a membrane. Under the microscope they are blank-looking structures in the cytoplasm. Large vacuoles are common in plant cells. Vacuoles in animal cells are much smaller.
- Plastids:** *Plastids are found scattered in the cytoplasm of plant cells.* They are of different colours.

In plants green parts like leaves, plastids contain green pigment called **chlorophyll**. Chlorophyll containing plastids are called **chloroplasts**. They provide green colour to leaves or other parts of plants. Chlorophyll in the chloroplasts of leaves is essential for **photosynthesis** (that prepares food for the plant in presence of sunlight).

- **Comparison of Plant and Animal Cells:** Observe the Fig. 8.1. You will find some of the organelles in both the plant and the animal cells. But some organelles are present in plant cells but not in animal cells. See Table 8.1.

Table 8.1: Comparison of Plant Cell and Animal Cell

S. No.	Part	Plant Cell	Animal Cell
1.	Cell membrane	Present	Present
2.	Cell wall	Present	Absent
3.	Nucleus	Present	Present
4.	Nuclear membrane	Present	Present
5.	Cytoplasm	Present	Present
6.	Plastids	Present	Absent
7.	Vacuoles	Big vacuoles present	Small vacuoles present

TEXTBOOK QUESTIONS SOLVED

Q. 1. Indicate whether the following statements are True (T) or False (F).

- (a) Unicellular organisms have one-celled body. (T/F)
 (b) Muscle cells are branched. (T/F)
 (c) The basic living unit of an organism is an organ. (T/F)
 (d) Amoeba has irregular shape. (T/F)

Ans. (a) True (b) True
 (c) False (d) True.

Q. 2. Make a sketch of the human nerve cell. What function do nerve cells perform?

Ans.

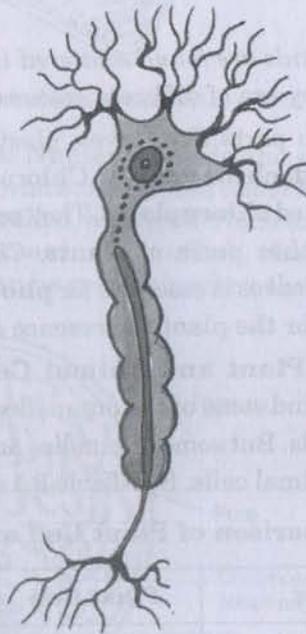


Fig. 8.4 Nerve cell.

Function:

- (i) Nerve cells help in the transfer of messages from various body parts to brain and from brain to various parts of the body.
 (ii) They help also in the coordination of the functions of the organs of the body.

Q. 3. Write short notes on the following:

- (a) Cytoplasm (b) Nucleus of a cell.

Ans. (a) Cytoplasm: It is a jellylike substance which is present between nucleus and cell membrane. There are various other organelles present in the cytoplasm. It is made up of carbohydrates, proteins and water.

(b) **Nucleus of a Cell:** Nucleus is spherical, dense structure situated commonly in the centre of the cell. Nuclear membrane separates the nucleus from cytoplasm. It contains genetic materials like RNA and DNA. Nuclear membrane allows the transfer of material in the nucleus and cytoplasm. It also contains the threadlike structure called chromosomes which are genetic material. Nucleus controls the various functions of the cell.

Q. 4. Which part of the cell contains organelles?

Ans. Cytoplasm.

Q. 5. Make sketches of animal and plant cell. State three differences between them.

Ans.

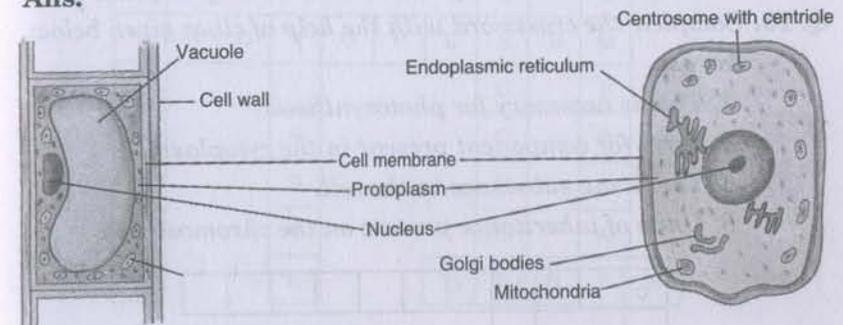


Fig. 8.5 Animal and plant cells.

Differences:

Animal Cell	Plant Cell
(i) Cell wall is absent.	Cell wall is present.
(ii) Chloroplasta is absent.	Chloroplast is present.
(iii) Centrosome is present near the nucleus	It has no centrosome.
(iv) Vacuoles are much smaller as in cheek cells.	Vacuoles are large or may be single and large as in an onion cell.

Q. 6. State the difference between eukaryotes and prokaryotes.

Ans. Eukaryotes have a well designed nucleus and organelles covered with membranes while prokaryotes do not have a well designed nuclear membrane.

Q. 7. Where are chromosomes found in a cell? State their function.

Ans. Chromosomes are situated in the nucleus of a cell. They carry characteristics of parent cells to the daughter cells.

Q. 8. Cells are the basic structural units of living organisms. Explain.

Ans. Many cell units form many tissues and tissues form an organ. The organs combine to form a complete body. In this way, cell is the structural unit of an organism. Cells perform all the basic functions of an organism. So they are also functional unit of living beings.

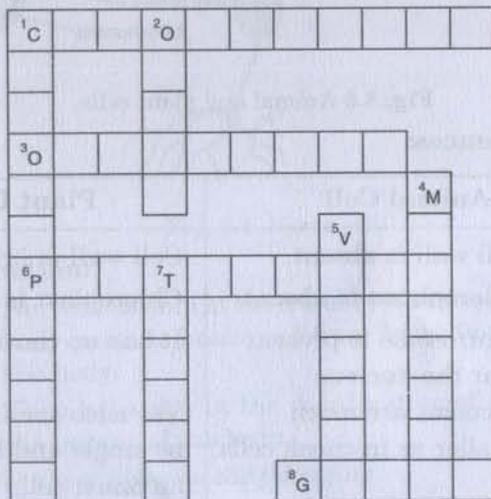
Q. 9. Explain why chloroplasts are found only in plant cells.

Ans. Photosynthesis is the main process in plants. Photosynthesis takes place in presence of chlorophyll which is found in chloroplasts. So chloroplasts are found only in plant cells.

Q. 10. Complete the crossword with the help of clues given below.

Across

1. This is necessary for photosynthesis.
3. Term for component present in the cytoplasm.
6. The living substance in the cell.
8. Units of inheritance present on the chromosomes.



Down

1. Green plastids.
2. Formed by collection of tissues.
4. It separates the contents of the cell from the surrounding medium.
5. Empty structure in the cytoplasm.
7. A group of cells.

Ans.

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H			R								
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