

6th Science Lesson 11 Notes in English

11] The Cell

Introduction

- A single brick, of course. Like a brick wall, your body is composed of basic building blocks, and is named as "Cells".
- The cell is the basic structural and functional unit of every living organism.
- The cell is self-sufficient to carry out all the fundamental and essential functions of an organism.

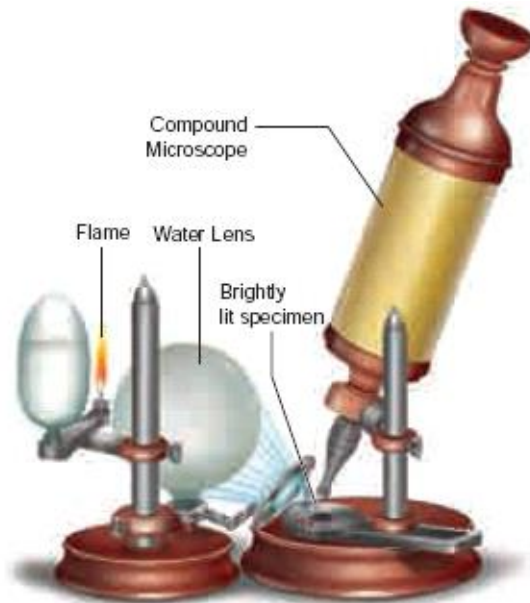
The Cell

- All living things are made of one or more cells. There is variety of cell types however; they all have some common characteristic features.

Discovery of the cell

- The **Englishman Robert Hooke was a scientist, mathematician, and inventor.**
- He improved microscope which was used in those days, and built a compound microscope.
- He placed water-lens beside the microscope to focus the light from an oil-lamp on specimens to illuminate them brightly. So that he able to see the minute parts of the objects clearly.





- One day Hooke made thin sections of the cork and observed them through his microscope.
- He observed many small identical chambers which were **hexagonal in shape**. He was surprised.
- After that he saw many objects like **Butterfly's wings, Bee's compound eyes etc.,**
- Based on this observations Hooke published a book named Micrographia in the year 1665, where he first used the term Cell. He describes the structure of tissue using the term cell.
- In Latin the word 'cellula' means a small chamber. The branch of science that deals with the study of cells is called 'Cell Biology'.

The Structural Organization of the Cell

A typical cell consists of three major parts:

1. An outer cell membrane.
 2. A liquid cytoplasm.
 3. A nucleus.
- Analogous to the body's internal organ, like eyes, heart, lungs organelles are specialized structures and perform valuable functions necessary for normal cellular operation.
 - Many of miniscule but distinct structures called Organelles lie within the cell.

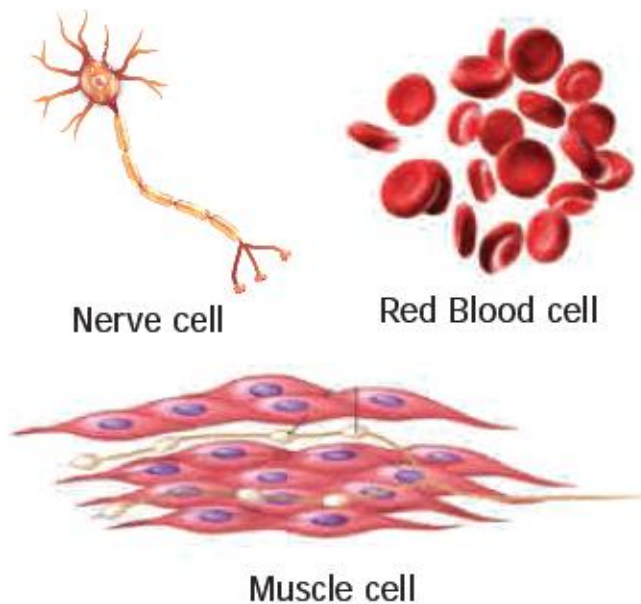
Size of the cell

- The size of cells may vary from a micrometer (a million of a meter) to a few centimeters. Most cells are microscopic and cannot be seen with the naked eye.
- They can be observed only through the Microscope.
- Smallest size of the cell is present in Bacteria. The size of the bacterial cell ranges from **0.01 micrometer to 0.5 micro meter**.

- On the other hand the largest cell is the egg of an ostrich with 170 millimeter width. We can see this with the naked eye.
- In Human body the nerve cells are believed to be the longest cells.

Shapes

- Cells are of different shapes. For example some shapes are given in the below pictures.



Number

- The number of cells present in different organisms may vary.
- Organisms may be either unicellular (single cell) or multicellular. **Organisms such as Bacteria, Amoeba, Chlamydomonas, and Yeast are unicellular.**
- On the other hand, organisms such as Spirogyra, Mango, and Human beings are multicellular. (i.e) made up of a few hundreds to million cells.

Types of Cell

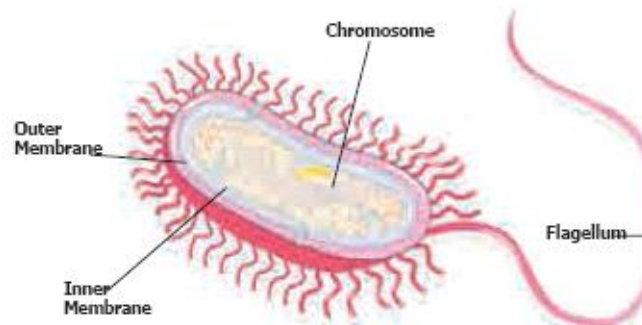
- Generally cells are classified into two types.
- First one is Prokaryotic cell .It has No true nucleus consisting of no nuclear membrane. Another one is Eukaryotic cell.
- It has True nucleus consisting of nuclear membrane.

Prokaryotic cell

- The unicellular organisms like Bacteria have Prokaryotic cells.
- It has No true nucleus. This type of nucleus is called as nucleiod. No nuclear membrane is around this nucleiod.

- These cells were the first form of life on earth. It is ranging from 0.003 to 2.0 micro meters in diameter. E.g. Escherichia coli bacteria.

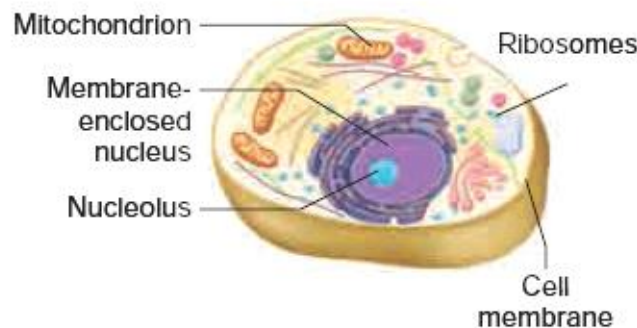
Structure of Prokaryotic cell Eg. Escherichia coli



Eukaryotic cell

- A cell which has true nucleus is called as eukaryotic cell. It is bigger than prokaryotic cells. Its organelles bounded by membrane. Ex. Plants, animals, most of the fungi and algae.

Eukaryote



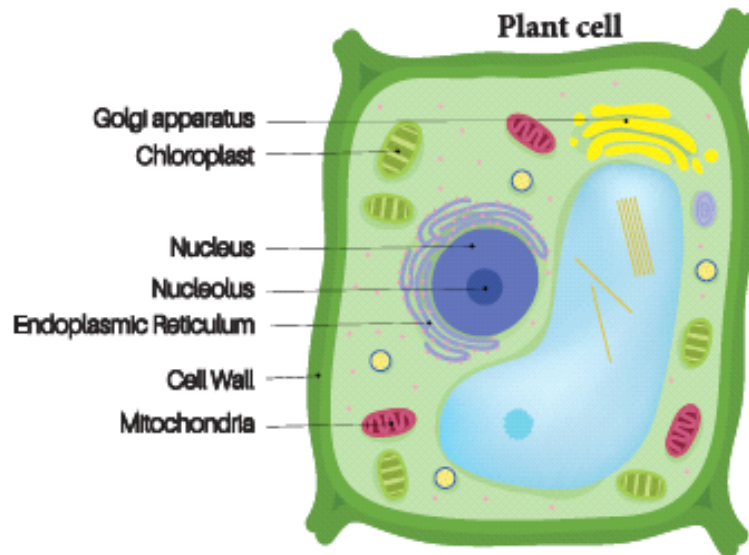
Prokaryotic cell	Eukaryotic cell
It's diameter ranges from 1 to 2 micron	It's diameter ranges from 10 to 100 micron
Absence of membrane bound organelles	Presence of membrane bound organelles
Nucleus consisting of no nuclear membrane	True nucleus consisting of nuclear membrane
Absence of nucleoli	Presence of nucleoli

Plant cell and Animal cell

- Both plant and animals are made up of cells. Both cells are eukaryotic in nature, having a well defined membrane – bound nucleus.

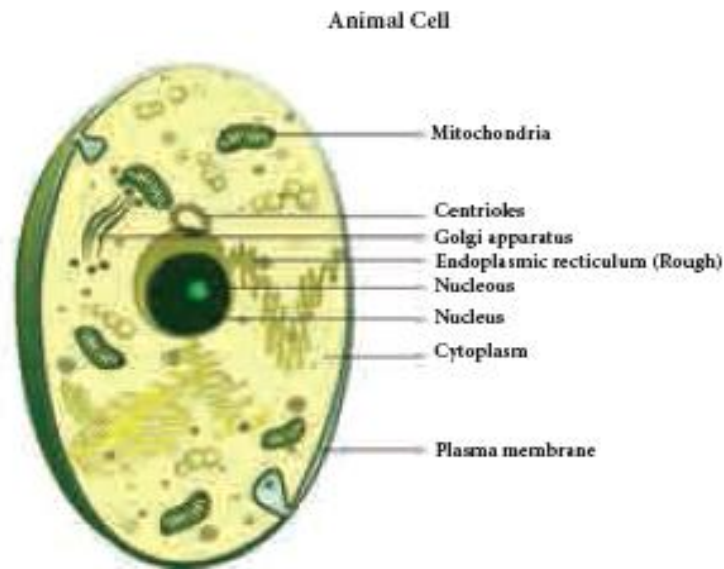
Plant cell

- It is usually larger in size. It is hard in nature.
- Plant cell have a cell wall in addition to their cell membrane.
- Plant cell have chloroplast which contain chlorophyll
- Plant cells have large vacuoles. Centrioles are absent.



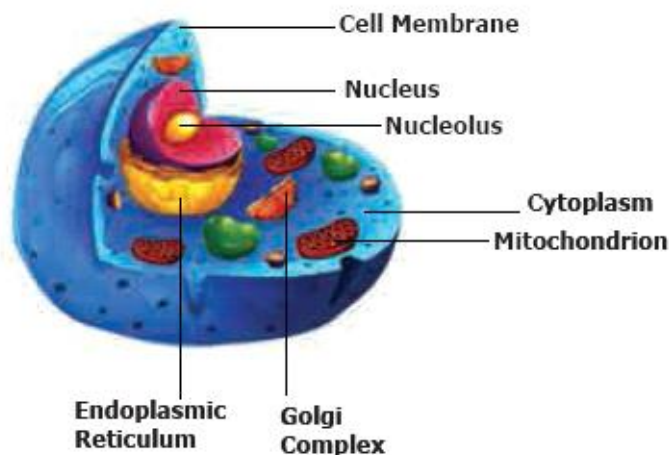
Animal cell

- Animal cells are generally smaller than plant cells. It is not so hard as plant cell.
- A cell wall is absent.
- Chloroplast is usually absent.
- An animal cell may have many small vacuoles.
- Centrioles are found in animal cells.



3 Dimension - cell structure

- The above cell has a three dimensional view. We can see the three sides of the cell structure. You can also view the size, shape and location on the organelles of the cell also.
- 3-D view is appealing because it is more like reality.
- In 3-D, we can see the entire view of the cell. It exposes the accurate size and shape and shows the correct location of the cell organelles.



More to know:

- Cell size has no relation to the size of an organism. It is not necessary that the cells of, say an elephant be much larger than those of a mouse.
- Approximate number of cells in the human body is 3.7×10^{13} or 37,000,000,000,000.