



Class- 6 Sub: Science – 03

Cellular Organization of Plants and Animals

Cell: Cell is the basic unit of life. The structural and functional unit of life is called cell.

Types of Cell: Cell is of two types:

- 1) **Proto cell:** The cell in which nucleus is not well developed and nuclear membrane is absent is called proto cell. Bacteria is a Proto cell.
- 2) **Eucell:** The cell which has well developed and surrounded by nuclear membrane is called eucell.
Eucell is of 2 types:
 - 1) Somatic cell
 - 2) Reproductive cell

Structure of cell: A cell's structure is described below:

Cell wall: It is only present in plant cells. Animal cells do not have any cell wall. It is made up of non-living materials. Some cell walls have pores in them. It also acts the inner part of the cell.

Protoplasm: It is a jelly like sticky, semi- liquid substance surrounded by cell wall. It is the basis of life. Protoplasm has three parts: cell membrane, cytoplasm and nucleus.

- 1) **Cell membrane:** The living soft membrane just below the cell wall surrounding the whole protoplasm is called cell membrane. It controls the flow of water, minerals and gases both into and out of the cell.
- 2) **Cytoplasm:** It is the part of the protoplasm that remains outside the nucleus and is surrounded by cell membrane. Its function is to hold many small organelles and performs few physiological functions, such as photosynthesis. A few organelles found in cytoplasm are shown below:

Plastids: Plastids are also known as colour bearers. Animal cells do not have plastids. Plastids are a unique characteristic of plant cell. The colours of plant leaves , flowers and fruits of different colours. Plastid is of three types: Chloroplast, chromoplast, leucoplast.

Chloroplast is of green colour. They help in manufacturing foods. Chromoplasts are the reasons behind various colours of fruits and flowers. Leucoplasts help in storing foods.

Vacuole: The open space inside the cell is known as vacuole. In a mature plant cell , vacuole size is bigger while in an animal cell it is absent or present in a very small size. The fluid present inside the vacuole is called cell sap.

- 3) **Nucleus:** The circular dense substance suspended on protoplasm is called nucleus. A nucleus usually consists of nuclear membrane, nucleoplasm, chromosome, and nucleolus.

Nuclear membrane: This membrane surrounds the nucleus. This membrane separates cytoplasm from the nucleus also controls the passage of materials in and out of the nucleus.

Nucleoplasm: The transparent, liquid material inside the nucleus is nucleoplasm. It contains Chromosomes and nucleolus.

Nucleolus: It is the small , dense round body that remains attached with the chromosomes.

Chromosomes: The thread like coiled structure that floats in the nucleoplasm is called chromosomes. It carries the characteristics of the organisms that it passes onto the next generation. It regulates cellular growth or any other activities.

Creative

1. **Dipty went to the botanical garden with her father. She saw plants of different colours. Alter that she went to a nearby zoo. There she saw different animals.**

- a. What is nucleus?
- b. What is the power house of cell? Describe it.
- c. Describe the cause of plants of different colours.
- d. Write the identifying characteristics of the organisms that Dipty saw.

Answer to the question no. 1

- a. The almost circular, mostly dense substance suspended on protoplasm which controls all the biological activities of cell is called nucleus.
- b. The rod shaped, gray colored globular cell organelle that is found in cytoplasm is the energy producing center of cells. It is called mitochondria i.e. Mitochondria is called the power house of



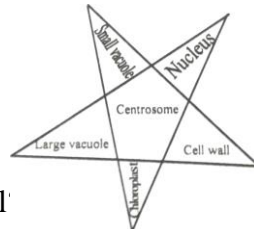
cell. It supplies all the necessary energy for regulating all biological activities in the body. So Mitochondria is called the power house of cell.

c. The plants take different colours due to the presence of different plastids. Green plastids are called chloroplast. When the quantity of chlorophyll is high in the cell, the plant looks green. The plastids bearing other colours than the green colour such as red, yellow, orange are called chromoplast. These are colorless plastids generally they are found in roots of the plants. Some plants looked green due to the presence of excess green pigment in plant cells that Dipty saw but some were found orange due to the presence of excess of chromoplast. Thus, the main reason for different colours of plants is the presence of different plastids.

d. Dipty saw different types of plants in botanical garden and different animals in the zoo. So, the organisms were plants and animals that Dipty saw. Identifying characteristics of plants and animal cell are-

- i. Cell wall is present in plant cells whereas the same is absent in animal cells.
- ii. Plastids are found in plant cells but not found in animal cells.
- iii. Large cell vacuole is present in plant cell whereas cell vacuole found in animal cell is small.
- iv. Nucleus lies at the edge of the cell wall in plant cell. In animal cells, nucleus is located at the center of the cell.
- v. Stored food in plant cell is starch and food stored in animal cell is known as glycogen.
- vi. Smooth and rough endoplasmic reticulum's are found in both animal and plant cells.
- vii. Centrosome is absent in plant cell but is present in animal cell.
- viii. Golgi body is present in both cells but more in animal cells and few in plant cells.

2.



- a. What is cell?
- b. What do you mean by reproductive cell?
- c. Draw a labelled diagram of animal cell using the organelles given in the star.
- d. Which of the small organs shown in the star is responsible for manufacturing food in a plant? Explain with diagram.

Answer to the question no. 2

- a. The structural and functional unit of life is called cell. '
- b. The cell that takes part in reproduction of living beings is called reproductive cell. Reproductive cells are two types. These are male and female reproductive cells. They produce new generations by mating with each other.
- c. The figure of an animal cell is drawn below using the necessary organelles from the figure marked as star:

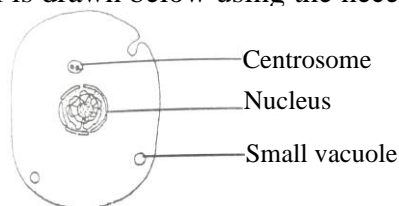


Fig: Animal Cell

- d. The small organelle termed as chloroplast in the star is responsible for manufacturing food in a plant.

Membrane: A bi-layered semi-permeable membrane surrounds the whole chloroplast. It is the most outer portion of chloroplast. It is composed of protein and lipid.

Stroma: A microscopic transparent matter that is surrounded by a membrane is called stroma. It is composed of lipoprotein.



Grana: In the stroma, many well-arranged thylakoid form a barrel shaped grana.

Stroma lamelli: Some thylakoid of two adjacent grana are connected by minute tubular bodies called stroma lamelli.

3. **The science teacher Mr. Tanvir Ahmed was teaching in the class on cellular structure. He said, just like a big building is built with numerous bricks, the human body is also built with many cells, he drew a figure of animal- cell and after identifying its different parts explained the functions of cell wall, Protoplasm, cell membrane, cytoplasm and vacuole.**

- What is cell?
- Write the name of an organelle of animal cell that does not exist in plant cell.
- Draw the figure of a cell that was drawn by the teacher and identify different parts of it.
- Analyze the functions of the organelles that have been mentioned by the teacher.

Answer to the question no. 3

- The structural and functional unit of life is called cell.
- Centrosome exists in animal cell and the same is absent in plant cell.
- The cell drawn by the teacher was plant cell. The figure of it with its different parts marked is as follows:

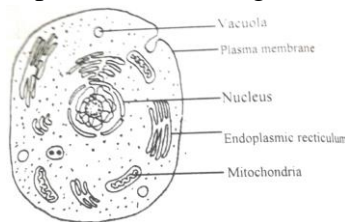


Figure: Animal cell

- The organelles mentioned by the teacher are: cell wall, protoplasm, cell membrane, cytoplasm and vacuole. Their functions are analyzed below:

Cell-wall gives the cell its shape, protects the inner part of the cells, provides necessary strength and regulates the passage of liquid materials into and out of the cells. The cell membrane and cytoplasm remaining in protoplasm control and absorb different elements like flow of water, minerals and gases both into and out of the cells. Besides, they contain different organelles and shape the body of the cell. The function of vacuole is to contain cell sap and maintain the balance of water.

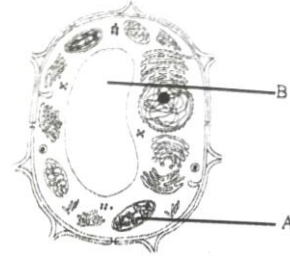
From the discussion stated above, it can be said that the organelles discussed by the teacher are very important for living organisms.

4. **If a cell of an onion is examined, a large open space is found in it. The sap remaining in the open space is called the cell sap.**

- What is the name of the open space mentioned in the stem?
- Why mitochondria is called the power house of the cell?
- Draw the figure of a cell for which the open space mentioned in the stem is an important characteristic and identify its different parts.
- Which is the heart of the cell? Why is it called the heart of cell?

Answer to the question no. 4

- Vacuole.
- Krebs cycle, fatty acid synthesis, electron transport process etc. happen in mitochondria. For this reason, mitochondria is called the "power house of the cell."
- Draw the figure of an animal cell and identify its different parts
- Why nucleus is called the heart of the cell?



- What is tissue?
- Write down the two characteristics of simple tissue.
- Explain the functions of the A marked portion of the figure.
- "B" marked portion of cell plays important roles - explain.

Answer to the question no. 5

- The aggregation of cells that are alike in origin and structure and collectively perform a special function is called tissue.
- Simple tissue makes the layer of body. There are different types of simple tissue on the basis of their structure and functions. Two characteristics of this tissue are given below:
 - It is the outermost layer of body
 - It protects the cell organelles from the injury.
- Describe the functions of plastids.
- Describe the functions of vacuole.

MCQ

- The onion cell is plant cell because it has --**
 - Cell wall ✓
 - No plastids
 - No cell vacuole
 - Mitochondrion
- Who discovered cell?**
 - Isaac Newton
 - Robert Hooke ✓
 - Lewin Hooke
 - Carolus Linius
- What is the function of nucleus?**
 - to maintain the size and shape of cell
 - to act as food reserve
 - to control all the function of cell ✓
 - to hold the protoplasm
- Which animals are made up of only one cell?**
 - Amoeba, hydra
 - Chlorella, Cockroach
 - Amoeba, Chlorella ✓
 - Cockroach
- Who discovered the cell at first?**
 - Robert Hooke ✓
 - James Watt
 - Darwin
 - Sprian
- In Which year, was the cell observed?**
 - 1865
 - 1765
 - 1665 ✓
 - 1565
- By which instrument is the cell observed?**
 - Telescope
 - Microscope ✓
 - Bioscope
 - Novoscope
- Robert Hooke was the scientist of which country?**
 - America
 - England ✓
 - Japan
 - China
- What was the nature of the cells that Robert Hooke found?**
 - Dead ✓
 - Moving
 - Living
 - Still
- How many types of cells are there on the basis of presence of absence of nucleus?**
 - 2 types ✓
 - 3 types
 - 4 types
 - 5 types
- The characteristics of eucell are----**
 - nucleus is well organized
 - found in higher animal
 - nuclear membrane is absent

which one of the following is correct?

 - i and ii ✓
 - i and iii
 - ii and iii
 - i, ii and iii
- What is called the basis of life?**
 - Nucleus
 - Protoplasm ✓
 - Cytoplasm
 - Mitochondria



13. How many parts of protoplasm are there?

- (a) 3 ✓ (b) 4 (c) 5 (d) 6

14. The characteristics of somatic cell are ----

- i. to increase growth of the body
ii. to take part in the development of body
iii. unable to take part in division

which one of the following is correct?

- (a) i and ii ✓ (b) i and iii (c) ii and iii (d) i, ii and iii

15. How does the protoplasm look like?

- (a) Solid (b) Semi-liquid ✓ (c) Liquid (d) Gaseous

16. What is called the jelly-like, sticky, semi-liquid substance surrounded by cell wall?

- (a) centrosome ✓ (b) Mitochondria (c) Protoplasm (d) Chloroplast

17. Cell wall is absent in which organism?

- (a) Plant (b) Animal ✓ (c) Protozoa (d) Micro-organism

18. What is the function of cell membrane?

- (a) Storage of food (b) Controlling the flow of minerals ✓
(c) Causes the growth of body (d) Controlling the excretion

19. The functions of cell wall are----

- i. to shape of the cell
ii. to hold several cell organelles
iii. to store food

which one of the following is correct?

- (a) i and ii ✓ (b) i and iii (c) ii and iii (d) i, ii and iii

20. The functions of cytoplasm are -----

- i. to hold small cell organelles
ii. to perform physiological activities
iii. to shape the cells

which one of the following is correct?

- (a) i and ii ✓ (b) i and iii (c) ii and iii (d) i, ii and iii

Read the passage given below and answer to the questions Nos. 21 and 22:

The Science Teacher was showing a part of an onion under microscope. Then a student asked that, What part was arranged like wall? Teacher replied that it is the structural element of body?

21. The characteristics of the substance that the student saw are ----

- i. has cell wall
ii. has nucleus and cytoplasm
iii. has no vacuole

Which one of the following is correct?

- (a) i and ii ✓ (b) i and iii (c) ii and iii (d) i, ii and iii

22. What type of the organ was shown by the teacher?

- (a) Precentric (b) Well centric ✓ (c) Mass centric (d) Whole centric

23. Where is the position of nucleus?

- (a) In protoplasm ✓ (b) In cytoplasm (c) In mitochondria (d) In ribosome

24. Which is called the heart of cell?

- (a) Nucleus ✓ (b) Ribosome (c) Chromosome (d) Mitochondria

25. How many parts are there mainly in a nucleus?

- (a) 3 (b) 4 ✓ (c) 5 (d) 6



26. Which is the most dense substance of a cell?
(a) Nucleus ✓ (b) Mitochondria (c) Chloroplast (d) Ribosome
27. What is the name of the circular shaped substance inside the nucleus?
(a) Golgi substance (b) Nucleolous ✓ (c) Lysosome (d) Plastid
28. What is called the liquid and stransparent material inside the nucleus?
(a) Nucleoplasm ✓ (b) Chromatin fibre (c) Nucleolus (d) Nuclear membrane
29. The functions of nuclear membrane are ----
i. to surround the nucleus
ii. to control the passage of fluid substances
iii. to control all activities
which one of the following is correct?
(a) i and ii ✓ (b) i and iii (c) ii and iii (d) i, ii and iii
30. The functions of chromatin fibre are ----
i. to control action-reactions
ii. to bear characteristic
iii. to produce food
which one of the following is correct?
(a) i and ii ✓ (b) i and iii (c) ii and iii (d) i, ii and iii
31. What is the formed by more than one cell?
(a) Tissue ✓ (b) Cytoplasm (c) Protoplasm (d) Nucleu
32. If a group of similar cells together carry out the same functions, what are they known as?
(a) Somatic cell (b) Tissue ✓ (c) Organ (d) System
33. By what substances are the different organs formed?
(a) Cell & tissue ✓ (b) Tissue & muscle (c) Cell & bone (d) Muscle & cell
34. What is the functions of chloroplast?
(a) Produce food ✓ (b) Respiration (c) Transportation (d) Diffusion
35. What is produced from the equation $CO_2 + H_2O \xrightarrow{\text{sunlight}}$?
(a) Protein (b) Carbohydrate ✓ (c) Fat (d) Vitamin
36. What is formed from food in the body?
i. light ii. energy iii. heat
which one of the following is correct?
(a) i and ii (b) i and iii (c) ii and iii ✓ (d) i, ii and iii
37. Which of the following store food and water?
i. fonimonosa ii. potato iii. padday
Which one of the following is correct?
(a) i and ii ✓ (b) i and iii (c) ii and iii (d) i, ii and iii