

Question Bank

The cell

1. Name the scientist who observed the honeycomb-like structures in a thin section of cork under simple microscope. What did he mean by these structures?

Ans. Robert Hooke

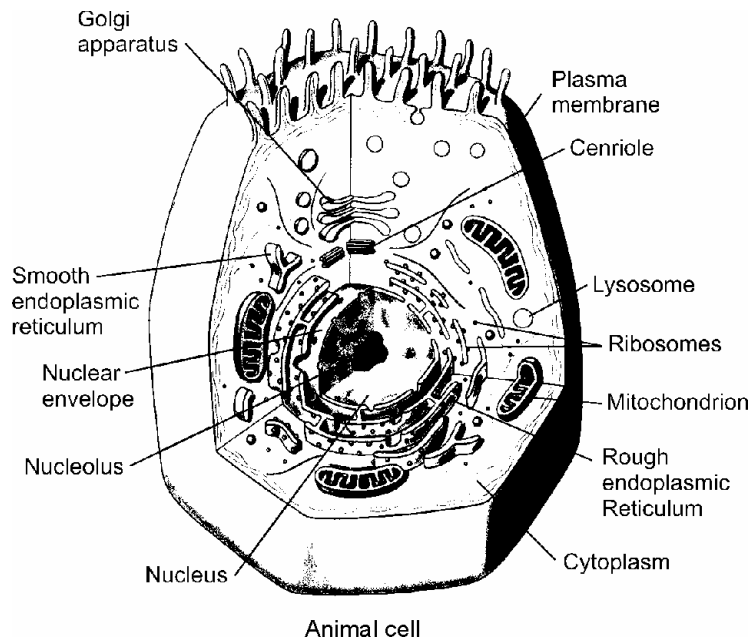
He observed that cork consisted of box-like compartments which formed a honey-comb structure. The compartments were named as cells by him.

2. Define a cell.

Ans. A cell is the structural and functional unit of all living organisms.

3. Draw labelled diagrams to show various structures found in animal cells.

Ans.



4. What is cell theory? Name the scientists who formulated it.

Ans. The cell theory states as follows :

- (i) All living organisms are composed of one or more cells.
- (ii) The cell is the unit of structure and function.
- (iii) New cells arise from pre-existing cells.
- (iv) The cell theory was formulated by two scientists – M.J. Schleiden and Theodor Schwann.

5. When was the cell theory propounded?

Ans. Cell theory was proposed in 1839.

6. Give three differences between cell wall and cell membrane.

Ans. Differences between Cell wall and Cell membrane

Cell wall	Cell membrane
(i) It is the non-living boundary wall.	(i) It is a living membrane.
(ii) It is present outside the cell membrane.	(ii) It is a thin outer boundary of cytoplasm.
(iii) It is mainly composed of cellulose.	(iii) It is composed of lipids and proteins.
(iv) It is permeable.	(iv) It is semi-permeable.
(v) Present only in plant cells.	(v) Present both in plant and animal cells.

7. The following diagram represents cells from cheek lining

(Fig. I) and plant cells (Fig. II). Label the parts against the indicated alphabets / numbers.

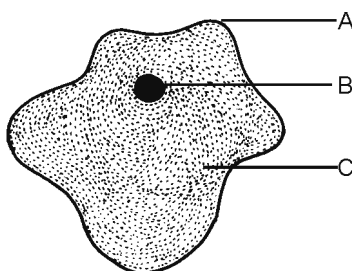


Fig. I

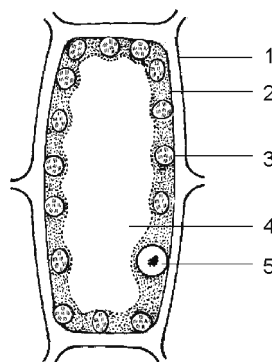


Fig. II

Ans. Fig. I. A – Cell membrane
B – Nucleus
C – Cytoplasm

Fig. II. 1. Cell wall 2. Cell membrane
3. Chloroplast 4. Vacuole 5. Nucleus.

8. Give the location and the function of the following parts of the cell :

- | | |
|---------------------------|------------------|
| (a) Plasma membrane | (b) Chromosomes |
| (c) Endoplasmic reticulum | (d) Ribosome |
| (e) Mitochondria | (f) Golgi bodies |
| (g) Cell wall | (h) Centriole |
| (i) Nucleolus | (j) Chloroplast |

Ans.

Structure	Location	Functions
(a) Plasma membrane	Outer boundary of cytoplasm	Allows passage of only certain molecules in and out of the cell.
(b) Chromosomes	In the nucleus	Transmission of hereditary characters from one generation to another.
(c) Endoplasmic reticulum	In the cytoplasm	Intracellular transport of substances.
(d) Ribosome	(i) In the cytoplasm (ii) Attached to ER	Protein synthesis.
(e) Mitochondria	In the cytoplasm	Produce energy through respiration.
(f) Golgi bodies	In the cytoplasm	Synthesis and secretion of materials.
(g) Cell wall	Outside the plasma membrane in plant cells	Provides rigidity and support to the cell.
(h) Centriole	Near the nucleus in the cytoplasm in animal cells	(i) Spindle formation. (ii) Formation of cilia and flagella.
(i) Nucleolus	Inside the nucleus	Formation of ribosomes.
(j) Chloroplast	In the cytoplasm in plant cells	Food manufacture (photosynthesis).

9. What are plastids? Give different kinds of plastids and their functions.

Ans. Plastids are the cytoplasmic organelles found only in plant cells and photosynthetic micro-organisms.

Plastids are of following three types based on the pigments present.

(a) **Chromoplasts** : Coloured plastids other than green responsible for brightly coloured flowers, serve to attract insects, birds and other animals for pollination.

(b) **Leucoplasts** : Colourless plastids lacking pigments; perform function of food storage.

(c) **Chloroplasts** : Green plastids containing chlorophyll and carotenoid pigments; capture light energy and carry out photosynthesis.

10. Differentiate between the following :

(a) Cytoplasm and Protoplasm

(b) Cell organelles and Cell inclusions

(c) Prokaryotic and Eukaryotic cell

(d) Nucleus and Nucleolus

(e) Chloroplast and Leucoplast

(f) Chromatin and Chromosomes

Ans. (a) Cytoplasm and Protoplasm

Protoplasm consists of nucleus and cytoplasm together.

Protoplasm minus nucleus is the cytoplasm.

(b) Cell organelles and Cell inclusions

The living structures present in the cytoplasm which are associated with specific functions are called cell organelles. Cell inclusions are the non-living substances found in cell cytoplasm. These are produced as a result of metabolic activities.

(c) Prokaryotic and Eukaryotic Cell

Prokaryotic cell	Eukaryotic cell
<ul style="list-style-type: none"> (1) Cells generally are small. (2) No definite nucleus is present. (3) Well defined cell organelles are absent in the cytoplasm. (4) Found in bacteria and blue-green algae. 	<ul style="list-style-type: none"> (1) Cells are comparatively larger. (2) Distinct nucleus bounded by a membrane is present. (3) Well defined organelles such as mitochondria, endoplasmic reticulum, golgi bodies, lysosomes are present. (4) Found in all other living organisms.

(d) Nucleus and Nucleolus

Nucleus	Nucleolus
<ul style="list-style-type: none"> (1) Embedded in the cytoplasm. (2) Contains hereditary material – chromosomes. (3) Surrounded by a membrane. (4) Controls transmission of hereditary characters from one generation to another and metabolic activities in the cell. 	<ul style="list-style-type: none"> (1) Present inside the nucleus. (2) Does not contain chromosomes. (3) Lacks a membrane. (4) Involved in synthesis of ribosomes.

(e) Chloroplast and Leucoplast

Chloroplast	Leucoplast
<ul style="list-style-type: none"> (1) Green plastid. (2) Contains chlorophyll and carotenoids. (3) Takes part in photosynthesis. 	<ul style="list-style-type: none"> (1) Colourless plastid. (2) Lacks pigments. (3) Takes part in food storage.

(f) Chromatin and Chromosomes

Chromatin	Chromosomes
<ul style="list-style-type: none"> (1) It is the material making up the chromosomes, and consists of nucleic acid and proteins. 	<ul style="list-style-type: none"> (1) These are structures found in the nucleus of a cell and contain genes.

11. State four differences between a plant cell and an animal cell.

Ans. Differences between a Plant cell and an Animal cell

Plant Cell	Animal Cell
(1) Cell wall - present.	Cell wall – absent.
(2) Plastids - present.	Plastids - absent.
(3) Vacuoles - generally only one large vacuole.	Vacuoles - generally absent, if present, they are more in number but small in size.
(4) Lysosomes - either absent or very few in number.	Lysosomes - more in number.
(5) Centrioles - present in lower plants but absent from flowering plants.	Centrioles-present.

12. Lysosomes are said to be ‘suicidal bags’. Comment.

Ans. Lysosomes contain a number of hydrolytic enzymes. The enzymes are capable of destroying the cell, if liberated from the lysosomes. For this reason, lysosomes are termed as ‘suicidal bags’.

13. Give structure of the nucleus. What is the importance of nucleus?

Ans. Structure of Nucleus

A nucleus shows following components :

- (i) Nuclear membrane
- (ii) Nuclear sap or nucleoplasm
- (iii) Nucleolus, and
- (iv) Chromatin

- (i) **Nuclear membrane** : Nuclear membrane separates the nucleus from the cytoplasm. It is mainly made up of proteins and lipids. It is a double membrane with a space between the outer and inner membrane. The membrane is perforated by several **nuclear pores**, which allow exchange of materials between the nucleus and cytoplasm.
- (ii) **Nuclear sap** : Nuclear sap is the protoplasm within nuclear membrane in which chromatin and nucleoli are suspended.

(iii) Nucleolus : Usually one spherical body called nucleolus is present inside the nucleus.

Nucleolus lacks a membrane. It is rich in proteins and RNA (ribonucleic acid), and is concerned with the formation of ribosomes.

(iv) Chromatin : A nucleus contains a network of threads which constitute the **chromatin**. During cell division, chromatin becomes more distinctly visible into a definite number of chromosomes. Chromosomes bear **genes**.

Chemically, genes are composed of **DNA** (deoxyribonucleic acid).

Functions of Nucleus :

- (i)** Nucleus is the chief controlling centre of the cell. It contains chromosomes which carry the genes. The genes are responsible for transmission of hereditary characters from one generation to another.
- (ii)** Nucleus controls metabolic activities taking place in the cell. Cellular metabolic activities are controlled by enzymes. Synthesis and regulation of the activity of enzymes are controlled by the nucleus.

14. Answer the following :

- (a)** Cellular digestion is associated with which organelle?
- (b)** Name two cell organelles which are enclosed by double membrane walls.
- (c)** A plastid containing coloured pigments.
- (d)** What is the term used to describe the nucleus lacking the nuclear membrane?
- (e)** Name the membrane system connecting the nucleus with the plasma membrane.

Ans. **(a)** Lysosome **(b)** Chloroplast, Mitochondria
(c) Chromoplast **(d)** Nucleoid
(e) Endoplasmic reticulum

15. Name the features possessed

(a) by plant cells only, and (b) by animal cell only.

Ans. (a) Cell wall, plastids. (b) Centriole, lysosome.

16. Where are genes present in a cell and what is their chemical nature?

Ans. Genes are present in chromosomes which are located inside the nucleus of a cell. Chemically, genes are composed of deoxyribonucleic acid (DNA).

17. Expand the following abbreviations :

(i) DNA (ii) RNA (iii) ER

Ans. (i) DNA – Deoxyribonucleic acid.

(ii) RNA – Ribonucleic acid.

(iii) ER – Endoplasmic reticulum.

18. Fill in the blanks :

(i) Ribosomes are rich in _____ and _____.

(ii) RNA stands for _____.

(iii) Virchow stated _____
_____.

(iv) Plasma membrane is made up of _____ and
_____.

(v) Membraneless nuclear area found in prokaryotic cells is called _____.

Ans. (i) RNA, proteins. (ii) Ribonucleic acid.

(iii) Omnis cellula e cellula (iv) Lipids, proteins

(v) Nucleoid

19. State whether the following statements are True (T) or False (F) :

(i) Animal cells contain a cell wall.

(ii) Chemically, cell wall is made of proteins.

(iii) Plant cells contain a large vacuole.

(iv) The matrix which surrounds the nucleus is called protoplasm.

(v) Genes are made of proteins.

(vi) Genes are located in chromosomes.

Ans. (i) F (ii) F (iii) T (iv) F (v) F (vi) T

20. Match each of the structures in Column A with its function in Column B.

Column A (Structures)	Column B (Functions)
(a) Mitochondrion	(i) partially permeable to substances in solution
(b) Cell membrane	(ii) energy is released from the oxidation of glucose
(c) Chloroplast	(iii) fully permeable to substances in solution
(d) Cell wall	(iv) contains the chromosomes
(e) Nucleus	(v) light energy is captured

Ans. (a) ii (b) i (c) v (d) iii (e) iv

21. Complete the following by selecting the correct word :

- (i) Genes are made up of _____.
(RNA / DNA / protein)
- (ii) In plants, cell wall is mainly composed of _____.
(chitin / cellulose / protein)
- (iii) Nucleus was discovered by _____.
(Robert Hooke / Robert Brown / M. J. Schleiden)
- (iv) Oxysomes are found in _____.
(chloroplast / mitochondria / golgi body)
- (v) Frests occur in _____.
(mitochondria / chloroplast / nucleus).

Ans. (i) DNA (ii) Cellulose (iii) Robert Brown
(iv) Mitochondria (v) Chloroplast.

22. Write the odd one out and give reason in support of your answer.

- (i) Nucleus, chloroplast, golgi body, muramic acid.
- (ii) Prokaryotic cell, nucleoid, chitin, muramic acid.
- (iii) Cristae, oxysomes, grana, power house.
- (iv) Cell theory, Schleiden, Schwann, Brown.

Ans. (i) **Muramic acid** : muramic acid is present in the cell wall of prokaryotic cells.

(ii) **Chitin** : chitin is found in fungal cell wall, all other terms refer to prokaryotic cells.

(iii) **Grana** : grana are found in chloroplasts, all other terms refer to mitochondria.

(iv) **Brown** : Brown is not associated with cell theory.