

INDIAN SCHOOL AL WADI AL KABIR



CLASS: IX	DEPARTMENT OF SCIENCE 2020 – 2021 SUBJECT : BIOLOGY	DATE OF COMPLETION: 28.05.2020
WORKSHEET NO: 2 WITH ANSWERS	TOPIC: THE FUNDAMENTAL UNIT OF LIFE	A4 FILE FORMAT (PORTFOLIO)
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

I OBJECTIVE TYPE QUESTIONS

Ia. Fill in the blanks: -

1. The term 'cell' was given by_____.
2. All living organisms are composed of tiny living units called _____.
3. Organisms which are composed of a single cell are called _____.
4. All cells arise from _____ cells.
5. Theis the fundamental unit of life.

Ib. State whether the following statements are true or false: -

6. Chlamydomonas is a multicellular organism. _____
7. Nerve cells are the longest cells. _____
8. Protoplasm is a living substance present outside the nucleus in a cell. _____
9. In eukaryotic cells, the genetic material is not surrounded by a nuclear membrane. _____
10. Well-defined organelles are found in prokaryotic cells.

Ic. Multiple choice Questions: -

11. The phenomenon by which protoplast of a cell shrinks from the wall is
(a) Osmosis (b) Plasmolysis (c) Diffusion (d) Glycolysis
12. An animal cell lacking nuclei would also lack in
(a) Lysosome (b) Ribosome (c) Endoplasmic reticulum (d) Chromosome
13. Which of the following is an example of a prokaryote?
(a) Fungi (b) Algae (c) Bacteria (d) Protozoa
14. The barrier between the protoplasm and the outer environment in an animal cell is
(a) Plasma membrane (b) Cell wall (c) Nuclear membrane (d) Cytoplasm
15. Which is the largest cell organelle present in plant cell?
(a) Mitochondria (b) Chloroplast (c) Endoplasmic reticulum (d) Nucleus

Id. 16. Match the statements in column A with those in column B:

Column A	Column B
1. Nucleus	(a) ATP production
2. Cell wall	(b) Digestive enzymes
3. Lysosome	(c) Secretory organelle
4. Mitochondria	(d) Contains genetic material
5. Golgi apparatus	(e) Cellulose

II. Assertion & Reasoning

- A) If both, Assertion and Reason are true and the Reason is the correct explanation of the Assertion.
- B) If both, Assertion and Reason are true but Reason is not a correct explanation of the Assertion.
- C) If Assertion is true but the Reason is false.
- D) If both, Assertion and Reason are false.

17. Assertion: The shape of the cells are different types ranging from circular, elongated, tubular, oval, cylindrical, etc.

Reason: The shape of the cells varies according to the specific function they perform.

18. Assertion: Mitochondria is called the Power House of the cell.

Reason: Mitochondria are strange organelles in the sense that they have their own DNA and ribosomes.

III. VERY SHORT ANSWER TYPE QUESTIONS CARRYING 1 MARK EACH

19. Do all cells look alike? Why?

Ans. No, because the shape and size of the cells are related to the function they perform.

20. Is plasma membrane permeable?

Ans. No, it is semipermeable.

21. What are the three most common features of animal and plant cell?

Ans. the three most common features of animal and plant cell are Plasma membrane, Nucleus and cytoplasm

22. What is common between mitochondria and plastid?

Ans. Both mitochondria and plastid have their own DNA and ribosomes.

23. Which organelle is called 'The digestive bags' of the cell?

Ans. Lysosomes are called the digestive bags of the cell because they contain powerful digestive enzymes, which are capable of digesting the very own cell in which they are present.

III. SHORT ANSWER TYPE QUESTIONS CARRYING 3 MARKS EACH

24. Differentiate between cytoplasm and nucleoplasm.

Ans.

Cytoplasm	Nucleoplasm
1. Present between the cell membrane and nuclear membrane.	1. Present between the nuclear membrane and nucleolus.
2. It is a jelly-like fluid general mass of the protoplasm excluding the nucleus.	2. It is a semifluid ground substance within the nucleus.
3. It contains many specialised cell organelles.	3. It contains nucleoli, chromosomes, etc.

25. What is the difference between plasma membrane and cell wall? Give the functions of each one.

Ans. Plasma membrane is a living membrane which is made up of proteins and lipids, whereas cell wall is non-living and made up of cellulose.

Function of plasma membrane: -It is a semipermeable membrane which allows selective substance to exit and enter into the cell.

Function of cell wall: - It provides rigidity and protection to the cell.

26. Describe the structure of nucleus.

Ans. The nucleus has a double layered covering called **nuclear membrane**. The nuclear membrane has pores which allow the transfer of material from inside the nucleus to its outside, that is, to the cytoplasm.

The nucleus contains **chromosomes**, which are visible as rod-shaped structures only when the cell is about to divide. Chromosomes contain information for inheritance of features from parents to next generation in the form of DNA (Deoxyribo Nucleic Acid). DNA molecules contain the information necessary for constructing and organising cells. **Functional segments of DNA are called genes.**

In a cell which is not dividing, this DNA is present as part of chromatin material. Chromatin material is visible as entangled mass of thread like structures. Whenever the cell is about to divide, the chromatin material gets organised into chromosomes.

The **nucleolus** is almost spherical structure found inside the nucleus. It contains RNA (ribonucleic acid) and proteins which help in protein synthesis in the cytoplasm.

27. Distinguish between hypotonic solution, isotonic and hypertonic solution.

Ans. If the medium surrounding the cell has a higher water concentration than the cell, meaning that the outside solution is very dilute, the cell will gain water by osmosis. Such a solution is known as a **hypotonic solution**.

If the medium has exactly the same water concentration as the cell, there will be no net movement of water across the cell membrane. Such a solution is known as an **isotonic solution**.

If the medium has a lower concentration of water than the cell, meaning that it is a very concentrated solution, the cell will lose water by osmosis. Such a solution is known as a **hypertonic solution**.

28. Differentiate between a prokaryotic cell and a eukaryotic cell.

Ans.

Prokaryotic Cell	Eukaryotic Cell
1. Size: generally small (1-10 μm) $1 \mu\text{m} = 10^{-6} \text{m}$	1. Size : generally large (5-100 μm)
2. Nuclear region: Not well defined and known as nucleoid.	2. Nuclear region: Well defined and surrounded by nuclear membrane.
3. Chromosome: single	3. Chromosome: More than one
4. Membrane-bound cell organelles absent	4. Membrane-bound cell organelles Present.

IV. LONG ANSWER TYPE QUESTIONS CARRYING 5 MARKS EACH

29. Illustrate only a plant cell as seen under electron microscope. How is it different from animal cell?

Ans.

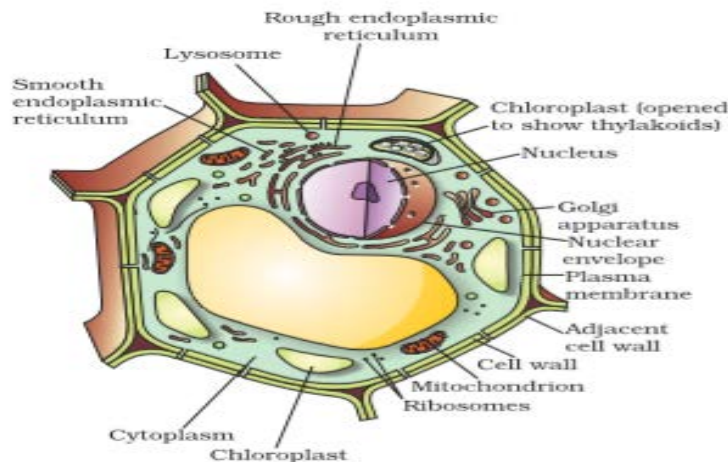


Fig. 5.6: Plant cell

Differences between Plant Cell and Animal Cell:

Plant Cell	Animal Cell
1. Cell wall is present. The cell membrane is surrounded by the cell wall.	1. Cell wall is absent.
2. Plastids are present.	2. Plastids are absent.
3. A large vacuole is present in the centre.	3. Vacuoles are absent; however, if present, they are small.
4. Cytoplasm is not so dense.	4. Cytoplasm is denser and more granular and almost fills the entire cell.
5. Golgi apparatus has smaller units called dictyosomes.	5. Golgi apparatus is highly complex and prominent.

30 Differentiate between rough and smooth endoplasmic reticulum. How is endoplasmic reticulum important for membrane biogenesis?

Ans.

Rough Endoplasmic Reticulum	Smooth Endoplasmic Reticulum
1. Ribosomes are attached to its surface.	1. Ribosomes are not attached to its surface.
2. Help in protein synthesis	2. Help in lipid synthesis
3. Usually present near the nucleus.	3. Usually present near the cell membrane.
4. Composed of Cisternae.	4. Composed of tubules.

Endoplasmic reticulum is important for membrane biogenesis as it helps in the formation of new cell membrane with the help of

31. In brief state what happens when

- (a) Dry apricots are left for some time in pure water and later transferred to sugar solution?
- (b) A Red Blood Cell is kept in concentrated saline solution?
- (c) The Plasma-membrane of a cell breaks down?
- (d) Rheo leaves are boiled in water first and then a drop of sugar syrup is put on it?
- (e) Golgi apparatus is removed from the cell?

Ans. (a) (i) Each apricot gains water and swells when placed in pure water.

(ii) However, when placed in the concentrated solution it loses water, and consequently shrinks.

(b) The Red Blood Cell will shrink when kept in concentrated saline solution.

(c) When kept in hypotonic solution the Plasma membrane of a cell will break down.

(d) No osmosis takes place as it only takes place in living cells, and not dead cells, are able to absorb water by osmosis.

(e) The Golgi apparatus is responsible for the transport of proteins and lipids and fatty materials to another cell organelles. Golgi apparatus helps in the formation of lysosomes. If Golgi apparatus is removed from the cell the formation of lysosomes will not occur. There are chances that the cell will die.

32. (a) What are the consequences of the following conditions?

- (i) A cell having higher water concentration than the surrounding medium.
- (ii) A cell having lower water concentration than the surrounding medium.
- (iii) A cell having equal water concentration than the surrounding medium.

(b) Name the materials of which the cell membrane and cell wall are composed of.

Ans. (a) (i) The water from the cell moves out of the cell due to exosmosis and so the cell shrinks.

(ii) The water from the cell moves into the cell due to exosmosis and so the cell shrinks.

(iii) Since the net water movement is the same in and out of the cell, no changes are seen in the cell.

(b) Cell wall is made of cellulose and cell membrane is made up of lipids and proteins.

33. (i) Explain the terms: (a) Endocytosis, (b) Plasmolysis.

(ii) What will happen if the organisation of a cell is damaged due to certain physical or chemical reasons?

(iii) How do substances like CO₂ and water move in and out of the cell?

Ans. (i) (a) Endocytosis: - The flexibility of the cell membrane also enables the cell to engulf in food and other material from its external environment. Such processes are known as endocytosis.

(b) Plasmolysis: - When a living plant cell loses water through osmosis there is shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is known as plasmolysis.

(ii) CO₂ accumulates in high concentrations inside the cell. In the cell's external environment, the concentration of CO₂ is low as compared to that inside the cell. As soon as there is a difference of concentration of CO₂ inside and outside a cell, CO₂ moves out of the cell, from a region of high concentration, to a region of low concentration outside the cell by the process of diffusion.

Water also obeys the law of diffusion. The movement of water molecules through such a selectively permeable membrane is called osmosis. The movement of water across the plasma membrane is also affected by the amount of substance dissolved in water.

V Board based questions

34. Name the cell organelle which you would associate with elimination of old and worn out cells. (Lysosomes) (1 mark)

35. List two types of plastids. State one function of each. (Refer Plastids in the text book) (3marks)

36. When a living plant cell loses water through of osmosis, there is contraction of the Contents of the cell away from the cell wall. What is this phenomenon called? (Plasmolysis) (1mark)

37. (a) Write two points of difference between nuclear region of a bacterial cell and nuclear region of an animal cell. (two difference between Prokaryotic and eukaryotic nucleus) (3 marks)

(b) Which structure present in the nuclear region of a living cell bear genes? (Chromosomes)

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