



SCIENCE CLASS IX

CHAPTER-5 THE FUNDAMENTAL UNIT OF LIFE

Q.1. Name two cell organelles that have their own genetic material.

Ans. Mitochondria and plastids are the two organelles that contain their own genetic material. Both these organelles have their own DNA and ribosomes.

Q.2. Name the cell organelle, which is able to destroy a damaged cell.

Ans. Lysosomes.

Q.3. Name the process in which diffusion takes place through a selective permeable membrane.

Ans. Osmosis

Q.4. State two important function of the nucleus of a cell.

Ans. (i) Control center of the cell.

(ii) Contains the cell's DNA (genetic information) in the form of genes to carry hereditary characters from one generation to another.

Q.5. Which organelles are called

(i) Power house of the cell

(ii) Suicidal bags

Ans. (i) Power house of the cell – Mitochondria.

(ii) Suicidal bags – Lysosomes.

Q.6. Explain the term ATP.



Ans. Adenosine Triphosphate (ATP) It is considered by biologists to be the energy currency of life.

Q.7. Give one word answer to the following

(i) Organelle containing chlorophyll.

(ii) An organelle with cristae.

(iii) An organelle with ribosome attached to its surface.

(iv) Living matter of the cell.

Ans. (i) Chloroplast

(ii) Mitochondria

(iii) Rough endoplasmic reticulum

(iv) Protoplasm

Q.8. Which organelle is called factory of ribosomes?

Ans. Nucleolus

Q.9. Which of the following are present in the animal cells?

Ans. Nucleus, vacuoles and mitochondria.

Q.10. Why are the ribosomes called 'protein factories'?

Ans. Ribosomes are called protein factories because these are sites of protein synthesis.

Q.11. Why is nucleus called controller of the cell?

Ans. The nucleus coordinates and direct all the metabolic functions of the cell.

Q.12. Which type of plastids help in photosynthesis?

Ans. Chloroplast



Q.13. What is the function of cellulose in plant cell?

Ans. The plant cell wall is mainly composed of cellulose. Cellulose is a complex substance and provides structural strength to plants.

Q.14. What is plasmolysis ?

Ans. Shrinkage of protoplast from the cell wall in presence of hypertonic solution due to exosmosis.

Q.15. What are genes? Where are they located?

Ans. A gene is a molecular unit of heredity of living organism. Genes are located in chromosomes, which are located in the nucleus of a cell.

Q.16. Is there any animal cell that lacks lysosomes?

Ans. Mammalian RBCs (Red Blood Corpuscles) lacks lysosomes.

Q.17. Nucleus is called as brain of the cell, why?

Ans. The nucleus control all metabolic activity of cell. Therefore, it is called brain of the cell.

Q.18. Cell wall is made up of which component?

Ans. Cell wall is made up of cellulose.

Q.19. Who proposed the cell theory?

Ans. Schleiden and Schwann proposed the cell theory.

Q.20. If the swollen raisin is put into salt solution, what will happen?

Ans. The water flows out from the raisin and goes into the solution medium. Consequently the raisin shrink in size.



Q.21. Name the cell organelle from which lysosome arise. State one function of lysosome.

Ans. Lysosomes arises from Golgi apparatus. It helps in removing dead and worn out cell organelle from our body by digesting them.

Q.22. Name the organelle present only in plants which have their own genome and ribosomes.

Ans. Plastids are found in plant cell only and contain DNA, RNA and ribosomes.

Q.23. Name the cell organelle which serve as a channel for transport of material between cytoplasm and nucleus.

Ans. Endoplasmic reticulum.

Q.24. What are chromosome made up of?

Ans. Chromosome is made up of DNA and protein.

Q.25. Which cell organelle is called the power house of a cell? Why?

Ans. Mitochondria are called power house of the cell because these are associated with cellular respiration and energy generation of the cell.

Q.26. What is endocytosis?

Ans. Endocytosis is the ingestion of material by folding of membrane around it for its engulfment as seen in Ameoba.

Q.27. What are dictyosomes?

Ans. In plants, Golgi bodies are called as distyosome.

Q.28. Where does the ATP synthesis occur in mitochondria?

Ans. ATP synthesis occur in inner membrane of mitochondria called cristae.



Q.29. Name two structures which are found in plant cell but not in animal cell.

Ans. Chloroplast and cell wall.

Q.30. Name two structure found only in animal cell but not in plant cell?

Ans. Lysosomes and centrioles.

Q.31. What is the role of iodine solution for a cell?

Ans. Iodine is used to test for the presence of starch in a cell.

Q.32. Which scientist coined the term cell?

Ans. Cell was discovered by Robert Hooke in 1665. He observed the cell in a cork slice with the help of a primitive microscope. The cork slice resembled the structure of a honey comb. Hooke called these boxes as cells.

Q.33. Name the process of selective movement of substances through semipermeable membrane.

Ans. Osmosis is the spontaneous net movement of water across a semipermeable membrane from a region of low solute concentration to a solution with a high solute concentration, against a solute concentration gradient.

Q.34. Mitochondria and plastids are able to synthesis some of their own proteins why?

Ans. They are considered to be semi-autonomous because mitochondria contain DNA and ribosomes and are able to make some of their own proteins.

Q.35. In which cell organelle, the complete breakdown of glucose in presence of oxygen takes place?



Ans. The complete breakdown of glucose in presence of oxygen in a cell is called aerobic respiration. It takes place in mitochondria.

Q.36. Who coined the term 'protoplasm' for the fluid substance of the cell?

Ans. Purkinje in 1839 coined the term 'protoplasm' for the fluid substance of a cell.

Q.37. Plant cell have large vacuoles each surround by a membrane. What is the name of this membrane?

Ans. The membrane that surrounds the vacuole is called tonoplast. The vacuole contains cell sap in it.

Q.38. Which molecules in a cell are known as the energy currency of the cell?

Ans. Adenosine Triphosphate (ATP) is considered by biologists to be the energy currency of life . It is the high energy molecule that stores the energy we need to do just about everything we do.

Q.39. What is the role of ribosomes in cell?

Ans. Ribosomes are the place, where protein synthesis takes place. On the ribosomes, the various types of RNA and amino acids meet to form a protein.

Q.40. Where stroma is present in a cell?

Ans. Stroma is present in the chloroplast of the cell.

Q.41. What is the functional segment of DNA?

Ans. Gene is segment of DNA, a unit of heredity that is transferred from parent offspring.

Q.42. Which structure is found in plant cells but absent in animal cell?



Ans. Plant cell have chloroplast and cellulose wall, which is absent in animal cell.

Q.43. Which is the most widely occurring plastid ?

Ans. The most widely occurring plastid is chloroplast.

Q.44. Name the pigment that imparts red and yellow colour to flowers.

Ans. Xanthophyll are coloured pigments just like chlorophyll. Chlorophyll imparts green colours to leafs and xanthophyll imparts red and yellow colour to flowers.

Q.43. What does the nucleus contain?

Ans. The chromatin material inside the nucleus is an organisation of DNA and protein. As a cell prepares to divide, the chromatin condenses, becomes thick enough to form specialised structures called chromosomes.

Q.44. Which solutions apart from iodine solution can be used to stain the cells?

Ans. Methylene blue and safranin solutions apart from iodine solution can be used to stain the cells.

Q.45. The nuclear membrane, which envelops the nucleus is selectively permeable, why?

Ans. Selective permeability means that the cell membrane has some control over what can cross it, so that only certain molecules either enter or leave the cell.

Q.46. Write an example of diffusion in a plant.

Ans. Excess of CO₂ presence in air as compare to leaf so according to process of diffusion plants take CO₂ from atmosphere.

Q.47. Categorise the cells on the basis of presence or absence of nuclear membrane.



Ans. Cells, which have nuclear membrane are called eukaryotic cells.

Cells, which do not have nuclear membrane are called prokaryotic cells.

Q.48. What does a chromosomes contain?

Ans. Chromosome contains genetic information from one generation to next generation in the form of DNA (Deoxyribonucleic Acid).

Q.49. Give scientific reason for the following

(i) Inner membrane of mitochondria is deeply folded.

(ii) Mitochondria are able to make some of their proteins.

Ans. (i) Inner membrane of mitochondria is deeply folded because these folds creates large surface area for ATP generating chemical reaction.

(ii) Mitochondria contains their own DNA and ribosomes and hence, make their own proteins.

Q.50. Illustrate the various functions performed by a cell.

Ans. Cells perform various function in our body like

- (i) Synthesis of substance like protein and lipids.
- (ii) Secretion of enzyme.
- (iii) Removal of dead material.
- (iv) Oxidation to generate energy.

Q.51. Name two nucleic acids present in cell. What is their function?

Ans. DNA and RNA are two nucleic acid present in cell. Function of DNA



It is responsible for storage and transmission of hereditary information, while RNA helps in synthesis of protein. RNA is genetic material in some viruses.

Q.52. Why is plasma membrane called a selectively permeable membrane? How do the substances like CO₂ and water move in and out of cell?

Ans. The plasma membrane permits the entry and exit of some material in and out of cell. It also prevent the movement of cell content outside the cell. Hence, it is called selectively permeable membrane.

Substance like CO₂ move in and out of cell by the process of diffusion and water moves in and out of the cell by the process of osmosis.

Q.53. Why plant cell contain large size vacuole, as compare to animal cell?

Ans. In plant cell, vacuole plays very important role as they store toxic metabolic byproduct or end product and provide turgidity and rigidity to plant cell. So, they are comparatively larger in size than animal cell.

Q.54. What do you mean by plasmolysis?

Ans. When a living plant cell loses water through osmosis, there is a shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is known as plasmolysis.

Q.55. State three difference between plasma membrane and cell wall.

Ans.

Plasma Membrane	Cell Wall
It provides support and give shape to the cell.	It gives strength and rigidity to the cell



It is semipermeable in nature and allows entry of selected molecules into the cell.	It is completely permeable in nature.
It is not elastic.	It is elastic and controls the cell turgidity preventing its bursting.

Q.56. The golgi apparatus also called the secretory organelle of the cell'. Why?

Ans. It is also called secretory organelle because secretion is the main function of Golgi apparatus. The secretory proteins and liquids are packed and released on the surface by exocytosis.

Q.57. Differentiate between diffusion and osmosis.

Ans.

Diffusion	Osmosis
It occurs in any medium	It occurs in liquid medium only.
Diffusing molecules may be solid, liquid or gaseous solutes.	It involves movements of solvent molecules only.
Semipermeable membrane is not required	Semipermeable membrane is required.

Q.58. What would happen if cell wall is not present in plant cell?

Ans. (i) Shape of cell does not remain definite because cell wall provide structural strength to plant cell.



(ii) Cell wall will not be able to withstand and burst if placed in very dilute media.

Q.59. A cell is a building block of an organism. Explain why?

Ans. The body of organism is made up of various organ system and these organ system are made up of various tissues and tissues are the group of cells performing same function. Hence, cell is a building blocks of an organism.

Q.60. Name the organelle of the cell, which has membrane bound sac filled with powerfull digestive enzymes. Write its any function in the cells.

Ans. Lysosomes is membrane bound sac filled with powerful digestive enzyme.

Functions of Cells

- (i) Lysosomes are a kind of waste disposal system of cell.
- (ii) During starvation, lysosomes act on their own cellular organelles and digest them. This results in cell death. Thus, lysosomes act as suicidal bags.
- (iii) They help in the destruction of other foreign food materials.
- (iv) They work in defence against bacteria and viruses.

Q.61. Shilpa is telling her 10 years old sister that cells were discovered by Robert Hook in 1665. Based on his observation, cell theory was developed. You do not have a microscope and hence, not able to show that structure of a cell to her sister. Her sister is too small to understand this and asked Shilpa to show her a cell.



(i) What will Shilpa show to her sister which can give her an idea of a cell?

(ii) What is the life of a cell?

(iii) What values are shown by shilpa and her sister?

Ans. (i) Shilpa can show her a beehive, each chamber of which looks like a cell.

(ii) Different cells have different life span. Some cells live for few days whereas few live upto a year.

(iii) The value shown by shilpa is adequate knowledge on the subject and scientific approach to find solution to a problem. The value shown by her sister is the attitude to go for detail.

Q.62. Where chromosomes located? What are they composed of? What is chromatin material and how does it change just before the cell divides?

Ans. Chromosomes are located in the nucleus of the cells.

Chromosomes are composed of DNA and protein.

Chromatin is a mass of thread-like structure that condense to form chromosomes just before the cell divides.

Q.63. (i) In which form does the mitochondria release energy? Write its full form.

(ii) The inner membrane of mitochondria is deeply folded. What is the advantage of these folds?

Ans. (i) Mitochondria release energy in the form of ATP (Adenosine Triphosphate).



(ii) The inner membrane of mitochondria is deeply folded, called the cristae that increase the surface area for the complexes are protein that aid in the production of ATP, the energy rich molecules.

Q.64. A plant cell is placed in a hypotonic solution. What will happen? Will the cell burst? Why or why not?

Ans. Hypotonic solution means that, there are more solutes in the cell as opposed to outside the cell. Therefore, water will rush into the cell equal to the osmolarity. In animal cells, the cell will eventually burst but plant cells have the traditional membrane (cell wall) that will prevent it from bursting.

Q.65. Write the one word of below sentences.

(i) An organelle, which has its own genetic material.

(ii) An organelle rich in digestive enzymes.

(iii) Nucleic acid present in nucleus of cell.

Ans. (i) Mitochondria

(ii) Lysosomes

(iii) DNA (Deoxyribonucleic Acid).

Q.66. What will happen to a plant cell if it is kept in sugar solution? Explain.

Ans. (i) If the sugar solution has higher water potential than the plant cell, water moves into the plant cell, causing the plant cell to be turgid.

(ii) If the sugar solution has lower water potential than the plant cell, water moves out from the plant cell, causing the plant cell to lose water and be plasmolysed.



Q.67. Name a cell organelle found only in a plant cell and name its type.

Ans. Plastids are found only in plant cells.

Types of Plastids

- (i) Chromoplasts (coloured plastids).
- (ii) Leucoplasts (white or colourless plastids).

Q.68. Give the differences between leucoplasts and chromoplasts.

Ans.

Leucoplasts	Chromoplasts
Colourless.	Coloured.
Found in underground oarts (roots, rhizomes, etc).	Found in aerial parts (leaves, flower, etc).
Store reserve food material.	Help in photosynthesis pollination, dispersal of seeds.

Q.69. Define membrane biogenesis?

Ans. The smooth endoplasmic reticulum helps in the manufacture of lipid or fat molecules, important for cell function. Some of these lipids and proteins help in building the cell membrane. This process is known as membrane biogenesis.

Q.70. Name the organelle of the cell, which is involved in the formation of lysosomes. Write its functions in the cells.

Ans. Golgi apparatus is also involved in the formation of lysosomes.



Functions of Golgi apparatus

- (i) Storage, modification and packaging of products in vesicles.
- (ii) Complex sugars may be made from simple sugars.
- (iii) Material synthesised near the ER is packaged and dispatched to various targets inside and outside the cell through Golgi apparatus.

Q.71. What happens to an animal cell when it is placed in a very dilute external medium? Why?

Ans. The animal cell will gain water and would swell up/may burst. Due to osmosis, water moves from the dilute external medium through the semipermeable cell membrane into cell with low water concentration.

Q.72. Explain the structure of nucleus.

Ans. Robert Brown discovered nucleus in the cell in 1831. The nucleus is the control center of a cell.

Structure of Nucleus

- (i) **Nuclear membrane** The nuclear membrane encloses the nucleus in eukaryotes. The nuclear membrane is penetrated by large nuclear pore complexes, which selectively transport molecules into or out of the nucleus.
- (ii) **Nucleoplasm** It is the protoplasm in the nucleus and contains genetic material chromosomes (DNA) and nucleolus.



- (iii) **Chromatin** The chromatin material inside the nucleus is an organization of DNA and protein. As a cell prepares to divide, the chromatin condenses, becomes thick enough to form specialized structure called chromosomes.
- (iv) **Nucleolus** It is the most important site of RNA synthesis. The nucleolus was first recognised by Fontana in 1874.

Q.73. What are the functions of Golgi apparatus?

Ans. Functions of Golgi apparatus

- (i) Golgi complex play an important role in secretion. Along with secretion, these are also involved in storage and packaging of different materials.
- (ii) Formation of complex sugars (polysaccharides) from simple sugars.
- (iii) Golgi complex helps in the formation of cell plate during cell division.

Q.74. What are the function of lysosomes?

Ans. Functions of lysosomes

- (i) Lysosomes are a kind of waste disposal system of a cell.
- (ii) During starvation, lysosomes act on their own cellular organelles and digest them. This results in cell death. Thus, lysosomes are called suicidal bags.
- (iii) They help in the destruction of other foreign food materials.
- (iv) They work in defence against bacteria and viruses.



Q.75. Name the following organelles

- (i) Power house of the cell**
- (ii) Kitchen of the cell**
- (iii) suicidal bags of the cell**
- (iv) controlling centre of the cell**
- (v) Export firms**
- (vi) Internal transport system**

Ans. (i) Mitochondria

- (ii) Chloroplast**
- (iii) Lysosomes**
- (iv) Nucleus**
- (v) Golgi bodies**
- (vi) Endoplasmic reticulum.**

Q.76. What do you mean by the following terms?

- (i) Protoplasm**
- (ii) Cytoplasm**
- (iii) Nucleoplasm**

(i) Protoplasm It is living substance presence in the cells consisting cytoplasm and nucleoplasm.

(ii) Cytoplasm It is a part of protoplasm filled with in space between nuclear membrane and cell organelle. It is homogenous containing water amino acids, oxygen, etc.



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- (iii) **Nucleoplasm** It is transparent semi-fluid substance filled between the space of nuclear membrane and nucleolus. It consists of nucleic acids, basic and acidic protein, lipids and minerals.

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