

The Fundamental Unit of Life

ONE MARK QUESTIONS

1. What is plasma membrane made up of?

Ans :

Plasma membrane is made up of proteins and lipids.

2. Name the autonomous organelles in the cell.

Ans :

Chloroplast and mitochondria are the autonomous organelles in the cells.

3. Name the smallest cell and the longest cell in human body.

Ans :

The smallest cell is the red blood cell or sperm cell in male. The longest cell is the nerve cell.

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4. What is diffusion?

Ans :

The process when gases like CO₂ and O₂, move across the cell membrane, is called diffusion.

5. What is osmosis?

Ans :

The movement of water molecules through a selectively permeable membrane is called osmosis. This takes place from higher water concentration to lower water concentration.

6. What is the full form of DNA?

Ans :

DNA (Deoxyribose Nucleic Acid).

7. Name the cell organelle that helps in packaging?

Ans :

Golgi apparatus.

8. Why does mitochondria have largely folded inner membrane?

Ans :

Mitochondria have largely folded inner membrane which provides the increased surface area for ATP-generating chemical reactions. Mitochondria is the site for cellular respiration and provides energy to the cell.

9. Which organelle makes the digestive enzyme of lysosome?

Ans :

Rough endoplasmic reticulum makes the digestive enzyme of lysosomes.

10. What are cisterns?

Ans :

The Golgi bodies consist of a system of membrane-bound vesicles arranged in stacks called cisterns.

11. Name the cell organelles that have their own DNA and ribosomes. Name the autonomous organelles in the cell.

Ans :

The cell organelles with their own DNA and ribosomes are mitochondria and plastids. Chloroplast and mitochondria are the autonomous organelles in the cells.

12. What is the role of cell organelles in the cell?

Ans :

Each kind of cell organelles performs a specific function such as making new material, clearing of the waste, transporting material, etc.

13. What is the energy currency of the cell?

Ans :

ATP—Adenosine Triphosphate.

14. What is the function of ribosome?

Ans :

Ribosome helps in protein synthesis.

15. Where are genes located in the cell?

Ans :

Genes are located in the chromosomes in the nucleus of the cell.

16. Name the cell organelle which helps in the transportation of material.

Ans :

Endoplasmic reticulum.

17. Name the cell organelle due to which leaves, flowers and fruits get their colour.

Ans :

Chromoplast.

18. Name the cell organelle which helps in the formation of lysosome.

Ans :

Golgi apparatus.

19. Name the cleaning organelle in the cell.

Ans :

Lysosomes.

20. List two similarities between mitochondria and plastids.

Ans :

Plastids are similar to mitochondria in external structure. Like the mitochondria, plastids also have their own DNA and ribosome.

21. (i) Name the largest animal cell.

(ii) Name the smallest cell.

Ans :

(i) An ostrich egg.

(ii) Pleuro pneumonia bacterium.

22. What is cell wall?

Ans :

Cell wall is the rigid outer covering of plasma membrane in plant cells.

23. What is the cell wall composed of ?

Ans :

The cell wall is composed of cellulose.

24. Name the type of organism in which a single cell constitutes the whole organism.

Ans :

Organism in which a single cell constitutes the whole organism is unicellular organism.

25. Where are proteins synthesized inside the cell?

Ans :

The proteins are synthesised in the ribosomes, known as protein factories too.

26. What is the function of cell wall and plasma membrane?

Ans :

Cell Wall : Gives rigidity, shape and protection to plant cell.

Cell Membrane : Allows only selected materials to move in and out of the cell.

27. What would happen if the plasma membrane breaks down?

Ans :

If plasma membrane breaks down then molecules of some substances will freely move in and out.

28. Name two cells with cell wall.

Ans :

Onion cell (plant cell) and fungi are two cells with cell wall.

29. State two conditions required for osmosis.

Ans :

(i) The difference in the concentration of water, one should have higher concentration than the other.

(ii) Semi-permeable membrane is also required through which water will flow.

30. What is plasmolysis?

Ans :

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.

31. What is the function of vacuoles?

Ans :

Vacuoles are the storage sacs for solid or liquid content. In plant cells, it provides turgidity and rigidity to the cell. In single-celled organisms, vacuoles store food, e.g. amoeba.

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32. What is nucleoid?

Ans :

The nuclear region in some cells are poorly defined due to the absence of a nuclear membrane, it contains only nucleic acid. This undefined nuclear region with nucleic acid in it is called nucleoid.

33. Why are plasma membrane called selectively permeable membrane?

Ans :

Plasma membrane allows to go in and out some materials to and from the cell. It also prevents movement of some other materials. So, it is called selectively permeable membrane.

34. What would happen to the life of a cell if there was no Golgi apparatus?

Ans :

Golgi apparatus plays an important fusion of storage, modification and packaging of the products in vesicles. If there were no Golgi bodies, packaging and dispatching of materials synthesised by the cell will be stopped.

35. What is the function of chromosome?

Ans :

Chromosomes contain information for the hereditary pattern of features from parents to next generation in the form of DNA molecules.

36. Name the organelles present in liver of animals which detoxifies many poisons and drugs.

Ans :

In the liver of animal cells, smooth endoplasmic reticulum helps in detoxifying many poisons and drugs.

37. What are genes?

Ans :

Gene is a part of DNA. They are located on chromosomes in linear fashions. One gene may perform one or more function. Genes are carrier of genetic character.

38. Give the function of nuclear membrane.

Ans :

The nuclear membrane present as outer covering of nucleus allows transfer of material inside and also out of the nucleus to cytoplasm.

39. Do vacuoles store material? If so, name them.

Ans :

Yes, vacuoles store some important substances required in life of the plant cell. These are amino acids, sugars, various organic acids and also some proteins.
Example : Amoeba, vacuoles also store food.

40. What are ribosomes? Where are ribosomes located in the cell? What is their function?

Ans :

Ribosomes are spherical organelles present in the cell which are either freely distributed in the cytoplasm or may be attached to the endoplasmic reticulum. It has ribosomal RNA (Ribonucleic acid) and proteins. It helps in protein synthesis.

41. Which cell organelle is known as the 'suicidal bags' of a cell? Why?

Ans :

Lysosomes are known as suicidal bag of cell. During the disturbance in cellular metabolism, lysosome may burst and the enzymes digest their own cell. Hence, lysosome are called 'suicide bags' of a cell.

42. Write the functions of cell wall in plant cell.

Ans :

- (i) It provides rigidity and strength to the cell.
- (ii) It gives a definite shape to the cell.
- (iii) It withstands the osmotic pressure which is developed by cell contents.
- (iv) It protects the inner cell organelles bounding the cell from outside.

43. What are chromosomes? What are they made of?

Ans :

The compact rod-like bodies inside the nucleus are called chromosomes. These are seen at the time of cell division. They are made up of deoxyribonucleic acid or DNA and proteins.

44. What is the function of DNA?

Ans :

They are responsible for storing and transmitting hereditary information from one generation to another. They contain the information necessary for constructing and organizing cells.

45. How are new cells reproduced?

Ans :

Cells multiply by dividing themselves again and again. Cells divide to produce cells of their own kind.

46. How do substances like CO₂ and water move in and out of the cell?

Ans :

The substances like CO₂ move in and out of a cell by diffusion from the region of high concentration to low concentration. Water also obey the law of diffusion. The movement of water molecule through such a selective permeable membrane is called osmosis.

47. What is a prokaryotic cell?

Ans :

A cell in which there is absence of a defined nuclear region and a nuclear membrane is called a prokaryotic cell. Prokaryotic cells are generally small in size. They lack membrane bound cell organelles. They have a single chromosome.

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48. What is a eukaryotic cell?

Ans :

Eukaryotic cells are much larger and more complex than prokaryotic cells. Their complexity is reflected in their DNA content. These cells contain a membrane bound nucleus containing nucleolus. A eukaryotic cell contains many membrane bound cell organelles like the mitochondria, the endoplasmic reticulum and the Golgi bodies. These cells have more than one chromosome and the cell division is by meiotic mode.

49. How does a living cell perform basic functions?

Ans :

A living cell perform basic functions by division of labour among specific components within it is known as cell organelles.

50. How many types of proteins are present in cell structure?

Ans :

There are two types of protein molecules : intrinsic proteins, which completely covers the lipid bilayer and extrinsic proteins, which occur either on the outer surface or on the inner surface of the lipid membrane.

51. Write a function of cell membrane.

Ans :

Its major function is to hold cellular contents and control passage of materials in and out of the cell.

52. What could happen if nucleus is removed from the cell?

Ans :

If nucleus is removed from a cell, the protoplasm will ultimately dry up and the cell will die because the nucleus controls all the metabolic activities of a cell.

53. Give example of working of chromoplasts.

Ans :

Spinach looks green due to the presence of chloroplasts, papaya is yellow and edible part of watermelon is red due to the presence of chromoplasts.

54. Name various cell organelles.

Ans :

The cell organelles are : Endoplasmic Reticulum, Ribosomes, Golgi apparatus, Lysosomes, Mitochondria, Plastids, Vacuoles, Peroxisomes and Centrosome.

55. Which cell organelle transmits the heredity information from parents to offspring?

Ans :

Genes are the functional units of chromosomes which transmit the heredity information from parents to offspring. These are located on chromosomes.

56. What are vacuoles?

Ans :

Vacuoles are fluid-filled structures surrounded by a membrane. The fluid in the vacuoles is called cell sap. In animal cells, either they are absent or are very small in size.

57. Where do lipids and proteins get synthesized?

Ans :

Lipids get synthesized in the smooth endoplasmic reticulum and proteins get synthesised in the ribosome and rough endoplasmic reticulum.

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THREE MARKS QUESTIONS

58. How does fungi and bacteria can withstand much greater changes in the surrounding medium than animal cells?

Ans :

The cell wall present in fungi and bacteria permits these cells to resist very dilute external medium without bursting. Water is taken up by osmosis. Hence, cells swell and build the pressure against the cell wall. The wall exerts an equal pressure against the swollen cell. It is because of the cell wall, such cells can resist much greater changes in the surrounding medium than animal cells.

59. State the difference between smooth endoplasmic

reticulum and rough endoplasmic reticulum.

Ans :

	Smooth endoplasmic reticulum	Rough endoplasmic reticulum
(i)	It looks smooth.	It looks rough.
(ii)	SER helps in the manufacturing of fat molecules or lipids.	Ribosomes are attached to RER which synthesize proteins.

60. All cells come from pre-existing cells. Justify?

Ans :

All organisms around are made up of one or more cells. There are single cells organism called unicellular like amoeba whereas some single body are made up of many cells called multicellular organism. Cells divide to produce cells of their own kind. Hence, all cells come from pre-existing cells.

61. What is the function of nucleus in a cell?

Ans :

The nucleus plays a very important role in the reproduction of cells. It also helps the single cell to divide and form two new daughter cells. It also helps in an important role in determining how cell will develop.

62. What is the function of plastids?

Ans :

Plastids are present only in plant cells. There are two types of plastids chromoplasts (coloured plastids) and leucoplasts (white or colourless).

Chromoplast : Consists of coloured pigments and given different colours to flowers, fruits and leaves. The green colour pigment present in leaf is called chlorophyll which helps in the photosynthesis and a plastid with chlorophyll is called chloroplast.

Leucoplast : It stores starch, oil and protein granules in it.

63. What is the difference in chromatin, chromosomes and gene?

Ans :

Chromatin	Chromosomes	Genes
It is a fine network of thread-like structure made up of DNA or RNA. It gets condensed to form chromosomes.	The chromosomes are made from chromatin material and are located in the cell.	Genes are found in chromosomes.

64. List any six functions of nucleus of a cell.

Ans :

- (i) Nucleus plays a central role in cellular reproduction.
- (ii) It plays an important role in determining the way the cell will develop.
- (iii) It also determines what form the cell will exhibit at maturity.
- (iv) It contains chromosome thus inherits characters.
- (v) It is the control centre of the cell.
- (vi) It directs chemical activities of the cell.

65. How does amoeba obtain its food?

Ans :

Amoeba take its food by the cell membrane which forms the food vacuole.

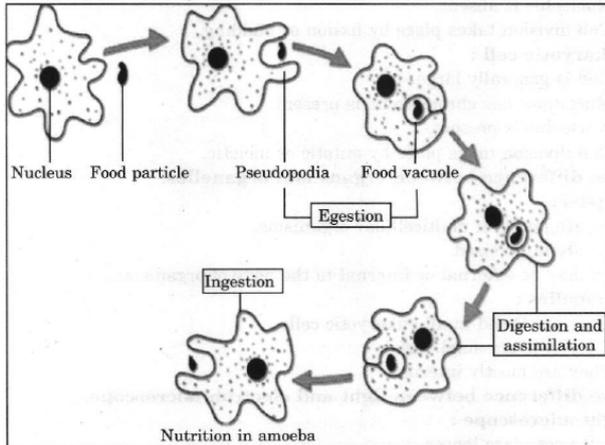


Figure: Food engulf process of amoeba

66. Who discovered cells in living organisms? Give an example of unicellular organism.

Ans :

Leeuwenhoek (1674) was the first to observe the free living cells in pond water. Example of unicellular organisms : Amoeba, Chlamydomonas, Paramoecium, Bacteria, etc.

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67. Explain the structure and function of Golgi bodies.

Ans :

Structures : Golgi bodies consist of a system of membrane-bound vesicles arranged in stacks parallel to each other called cisterns. These membranes have connections with the membrane of endoplasmic reticulum (ER).

Functions :

- (i) The material synthesized near the ER is packaged and dispatched to various targets inside and outside the cell through Golgi apparatus.
- (ii) It also stores, modifies and helps in the packaging of products in vesicles.
- (iii) In some cases, complex sugars may be made from simple sugars in it.
- (iv) It also helps in the formation of lysosomes.

68. Name some organelles which are found only in animal cells and those which occur only in plant cells.

Ans :

- (i) Structures found only in animal cells : centrosomes, lysosome.
- (ii) Structures found only in plant cells : cell wall, plastids and big vacuoles.

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69. Give brief introduction of Prokaryotic and Eukaryotic cell.

Ans :

Prokaryotic cell :

- 1. Cell size is generally small.
- 2. Only a single chromosome is present.
- 3. Nucleolus is absent.
- 4. Cell division takes place by fission or budding.

Eukaryotic cell :

- 1. Cell is generally large.
- 2. More than one chromosome is present.
- 3. Nucleolus is present.
- 4. Cell division takes place by mitotic or meiotic.

70. Give difference between organs and organelles.

Ans :

Organs :

They are found in multicellular organisms.

They are large sized.

They may be external or internal to the body of organisms.

Organelles :

- 1. They are found in all eukaryotic cells.
- 2. They are very small sized.
- 3. They are mostly internal.

71. Give difference between light and electron microscope.

Ans :

Light microscope :

- (i) It uses glass lenses.
- (ii) It uses a beam of light to illuminate the object.
- (iii) Internal vacuum is not required.

Electron microscope :

- (i) It uses electromagnets.
- (ii) It uses a beam of electrons instead of light.
- (iii) Internal vacuum is essential.

72. Give difference between diffusion and osmosis.

Ans :

Diffusion :

- 1. Diffusion can occur in any medium.
- 2. The diffusing molecules may be solids, liquids or gases.
- 3. Semipermeable membrane is not required.
- 4. An equilibrium in the free energy of diffusion molecules is achieved in the system.

Osmosis :

- 1. It occurs only in liquid medium.
- 2. It involves movement of solvent molecules only.
- 3. Semipermeable membrane is required.
- 4. Equilibrium in the free energy of solvent molecules is never achieved.

73. Explain endocytosis.

Ans :

Endocytosis is the ingestion of material by the cells through the plasma membrane. It is a collective term that describes three similar processes : phagocytosis (cell eating), potocytosis (cell drinking) and receptor-mediated endocytosis. These processes are pathways to specifically internalize solid particles, small molecules and macromolecules, respectively.

74. Why do plant cells have more in number and big-sized vacuoles as compared to the animal cells?

Ans :

Plants cells attain turgidity and rigidity due to the more number of vacuoles as well as large-sized vacuoles help the plant cells to withstand the wear and tear, external environmental conditions. They also help in the storage of essential material required by plants for their growth like amino acids, sugar and various organic substances.

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75. What is membrane biogenesis?

Ans :

The endoplasmic reticulum helps in the manufacture of proteins and fat molecules or lipids which are important for the cell function. These proteins and lipids helps in the building of the cell membrane. This process is known as membrane biogenesis.

76. Expand the term ATP. What is use of ATP?

Ans :

ATP stands for Adenosine Tri-phosphate

Application : ATP molecules are rich in chemical energy. The body cells use this energy for synthesis of new chemical compounds, and for mechanical work done by cells.

77. Name the cell organelle which are known as :

1. Control centre of the cell
2. Demolition squads/suicidal bags of the cell
3. Export firms
4. Powerhouse of the cell
5. Kitchen of the cell
6. Internal transport system

Ans :

1. Nucleus
2. Lysosomes
3. Golgi bodies
4. Mitochondria
5. Chloroplast
6. Endoplasmic reticulum

78. (i) What will happen when eukaryotic cells are placed in hypotonic solution?

(ii) What will happen if eukaryotic cells are placed in hypertonic solution?

(iii) What will happen if eukaryotic cells are placed in isotonic solution?

Ans :

(i) When eukaryotic cells are placed in hypotonic solution, the water molecules will enter into the cell and the cell will swell up.

(ii) If eukaryotic cells are placed in hypertonic solution, the water molecules will come out of the cell and the cell will shrink.

(iii) If the eukaryotic cell is placed in isotonic solution, the amount of water molecule will remain the same; it will neither move out nor will go inside. The cell will remain same sized.

79. What is lacking in a virus which makes it dependant on a living cell to multiply?

Ans :

Viruses do not have a basic structural organization to perform various life processes in their own as they look selectively permeable process membrane. After entering in a living cell, a virus utilizes its own genetic material and machinery of host cell to multiply.

80. What are the types of cell on the basis of type of organization?

Ans :

(i) **Prokaryotic cells :** Cells which have less developed nucleus and without nuclear membrane and nucleolus. These are primitive and incomplete cells. E.g. bacteria.

(ii) **Eukaryotic cells :** Cells which have well developed nucleus with nuclear membrane and nucleolus. E.g. plants and animals.

81. Who gave the cell theory? What does it state? Which organism is an exception of cell theory?

Ans :

Two biologists; "Schleiden and Schwann" gave the "Cell theory" which expanded by "Rudolf Virchow". Cell theory states that :

(i) All plants and animals are composed of cells.

(ii) Cell is the basic unit of life.

(iii) All cells arise from pre-existing cells.

Viruses are the exceptions of cell theory.

82. Give difference between Chloroplasts and Chromoplasts.

Ans :

Chloroplasts :

(i) They are green plastids.

(ii) They contain chlorophylls and carotenoids.

(iii) Lamellae are present.

(iv) Chloroplasts are sites of photosynthesis.

Chromoplasts :

(i) They are non-green coloured plastids.

(ii) Chlorophylls are absent.

(iii) Lamellae are absent.

(iv) They add colour to the organs for attracting animals to perform pollination and fruit dispersal.

83. Give difference between ribosome and centrosome.

Ans :

Ribosome :

- (i) It is found in both animal cell and plant cell.
- (ii) These are dense, spherical and granular particles which occur freely in the matrix or remain attached to the endoplasmic reticulum.

Centrosome :

- (i) Centrosome is found only in animal cells.
- (ii) It consists of two granules like centrioles.

84. What are the function of endoplasmic reticulum and lysosome.

Ans :

(a) Functions of endoplasmic reticulum :

- (i) It forms supporting skeletal framework of the cell.
- (ii) ER provides a pathway for the distribution of nuclear material from one cell to the other.

(b) Functions of lysosomes :

- (i) Lysosomes serve as intracellular digestive system. They destroy any foreign material which enters the cells such as bacteria and virus.
- (ii) Lysosomes also remove the worn out and poorly working cellular organelles by digesting them to make way for their new replacements.

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85. Distinguish between plasma membrane and cell wall.

Ans :

	Plasma Membrane	Cell Wall
1.	It is consisted of proteins and lipids. It is living.	It is made up of complex carbohydrate called cellulose. It is dead or non-living.
2.	It is found in both plant and animal cells.	It is found in plant cells only.
3.	It is semipermeable.	It is permeable.
4.	It is soft and elastic.	It is hard and rigid.

86. What is lacking in a virus which makes it dependant on a living cell to multiply?

Ans :

Viruses look selectively permeable process membrane and cell organelles. Thus, they lack a basic structural organization to perform various life processes effectively and in their own way. After entering in a living cell, a virus utilizes its own genetic material and machinery of host cell to multiply.

87. What is endoplasmic reticulum? Write its main functions.

Ans :

Endoplasmic reticulum is a network, enclosing a fluid-filled lumen. Its main functions are :

- (i) Synthesis of proteins (rough ER).
- (ii) Synthesis of lipids and other metabolic products and their secretion (SER).

- (iii) Helps in formation of cell plate and nuclear membrane during cell division.
- (iv) ER also produces substance for new cellular parts (especially cell membrane).
- (v) ER provides internal support to the colloidal cytoplasmic matrix of the cell.

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FIVE MARKS QUESTIONS

88. Give difference between hypotonic solution, isotonic solution and hypertonic solution.

Ans :

Hypotonic Solution	Isotonic Solution	Hypertonic Solution
External solution having higher concentration of water than the cell cytoplasm is known as hypotonic solution.	External solution having exactly the same concentration of water as that of cell cytoplasm is called isotonic solution.	External solution having lower concentration of water than a cell cytoplasm is called hypertonic solution.
Cell swells up in this solution.	Cell size does not alter.	Cell shrinks in this solution.

89. (a) Name the organelle which provides turgidity and rigidity to the plant cell. Name any two substances which are present in it.

(b) How are they useful in unicellular organisms?

Ans :

- (a) Plant cells have big vacuoles that provide them turgidity and rigidity. Plant vacuoles store amino acids, sugars, various organic acids and some proteins.
- (b) In unicellular organism they can serve the following works :

- (i) Forming food vacuoles : In single celled organisms like amoeba, the food vacuole contains the food items that the amoeba has engulfed. After that the food items are digested by the enzymes.
- (ii) Removal of excess water and wastes : In some unicellular organisms, vacuoles play important roles in egesting excess water and some wastes from the cell.

90. Write a note on the structure of cell.

Ans :

- (a) Cell is the basic unit of all living organisms. It is surrounded by an outer selectively permeable Plasma Membrane. Plant cells have an additional covering called "cell wall" outer to the Plasma Membrane.
- (b) Inside the plasma membrane there is a translucent viscous substance the cytoplasm in

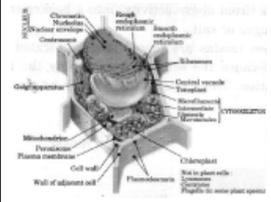
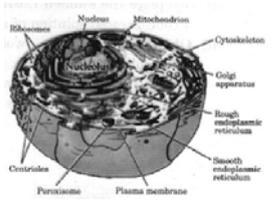
which the organelles are embedded. The control centre of the cell is the nucleus; it contains all the information necessary for the cell to function and to reproduce. Surrounding the nucleus is the endoplasmic reticulum (ER) on which ribosomes may be embedded. Ribosomes are granular structures which are the site of protein synthesis.

- (c) The powerhouse of cell is the mitochondria. It helps in releasing energy by the oxidation of food in cell. There are flat membranous secretory structures in the cell called the Golgi bodies. In plant cells, an additional structure located near the nucleus called the chloroplast, is also present. They are the site of photosynthesis.
- (d) Cells also contain lysosomes which are also called suicide bags. They digest and remove the unwanted debris of the cell. Centriole located near the nucleus helps in cell division. Cytoplasm also contains vacuoles filled with the cell sap. In plant cells, vacuole is large and centrally placed.

91. Give the difference between plant cell and animal cell.

Ans :

	Plant Cell	Animal Cell
1.	A plant cell is usually larger in size.	An animal cell is comparatively smaller in size.
2.	It is enclosed by a rigid cellulose cell wall in addition to plasma membrane.	It is enclosed by a thin, flexible plasma membrane only.
3.	It cannot change its shape.	An animal cell can often change its shape.
4.	Plastids are present. Plant cells exposed to sunlight contain chloroplast.	Plastids are usually absent.
5.	A mature plant cell contains a large central vacuole.	An animal cell often possesses many small vacuoles.
6.	Nucleus lies on one side in the peripheral cytoplasm.	Nucleus usually lies in the centre.
7.	Centrioles are usually absent.	Centrioles are practically present.
8.	Lysosomes are rare.	Lysosome always present in animal cells.
9.	Plasmodesmata are present.	Plasmodesmata are usually absent.
10.	Reserve food is generally in the form of starch.	Reserve food is usually glycogen.

11.	Plant cell synthesise all amino acids, coenzymes and vitamins required by them.	Animal cell cannot synthesise all the amino acids, coenzymes and vitamins required by them.
12.	Plant cell does not burst if placed in hypotonic solution due to the presence of the cell wall.	Animal cell vacuoles usually burst, if placed in hypertonic solution.
13.		

92. Draw a neat labelled diagram of plant cell.

Ans :

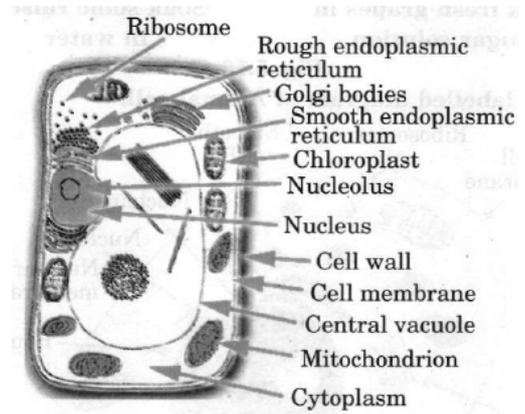


Figure: Plant cell

93. (i) Name the organelle which provides turgidity and rigidity to the plant cell. Name any two substances which are present in it.

(ii) How are they useful in unicellular organisms?

Ans :

(i) Plant cells have big vacuoles full of cell sap that provide them turgidity and rigidity. Plant vacuoles store amino acids, sugars, various organic acids and some proteins.

(ii) In unicellular organism they may serve the following purposes :

1. **Forming food vacuoles :** In single celled organisms like amoeba, the food vacuole contains the food items that the amoeba has ingested. The food items are digested by the enzymes later on.
2. **Removal of excess water and wastes :** In some unicellular organisms, specialized vacuoles play important roles in expelling excess water and some wastes from the cell.

94. Describe the role played by the lysosomes. Why are these termed as suicidal bags? How do they perform

their functions?

Ans :

Functions of lysosomes :

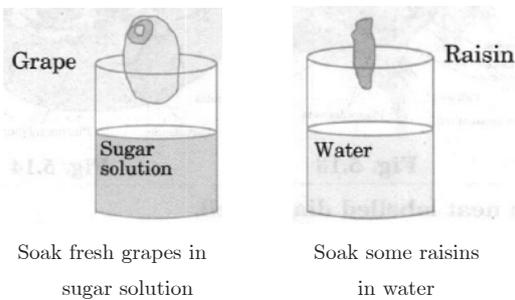
1. Extracellular digestion. Sometimes lysosome enzymes are released outside the cell to break down extracellular material.
2. Digestion of foreign material. Lysosome also destroys any foreign material which enters inside the cell such as bacteria.
3. Cellular digestion. In damaged cells, ageing cells or dead cells lysosomes get ruptured and enzymes are released. These enzymes digest their own cell.

Lysosomes contain about 40 hydrolytic enzymes. When the cell gets damaged, lysosomes burst and their enzymes digest their own cell. So, lysosomes are called 'suicide bags'.

95. Describe an activity to demonstrate endosmosis and exosmosis. Draw a diagram also.

Ans :

1. **Endosmosis :** The movement of water in the cell or a body through a semipermeable membrane is called endosmosis. It can be demonstrated as follows :
 - (i) Take some raisins with stalks and put them in plain water in a beaker.
 - (ii) **Observation :** Raisins absorb water and swell. Raisins have high concentration of sugar than surrounding plain water. Because of this, water from the outside passing through semipermeable membrane enters into the cell. This is endosmosis.
2. **Exosmosis :** The movement of water out from a cell or a body through a semipermeable membrane is called exosmosis. This can be demonstrated as follows :
 - (i) We place the swollen raisins (from above activity) into a beaker containing a concentrated solution of sugar or salt.
 - (ii) **Observation :** When swollen raisins are placed in concentrated sugar or salt solution, they shrink because the solution surrounding the raisins is having low water concentration. Thus, raisins lose water by osmosis, this process is called exosmosis.



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96. Draw a neat labelled diagram of Animal cell.

Ans :

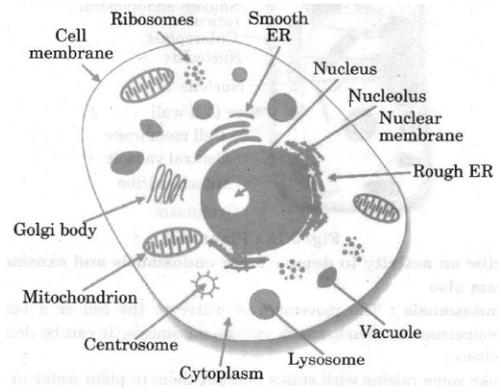


Figure: Animal cell

97. Explain the structure and function of Golgi bodies.

Ans :

Golgi bodies consist of a system of membrane-bound vesicles arranged in stacks parallel to each other called cisterns. These membranes are connected with the membrane of endoplasmic reticulum (ER).

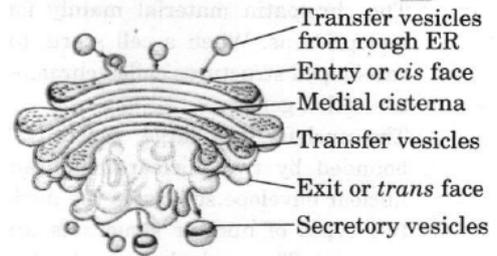


Figure: Golgi apparatus

Functions of Golgi apparatus :

- (i) Golgi apparatus packages and dispatches the material synthesized in the cell.
- (ii) Golgi complex is also involved in the formation of lysosomes.
- (iii) Golgi apparatus is also involved in the synthesis of many substances such as polysaccharides, glycoprotein, etc.

98. Give difference between plasma membrane and cell wall.

Ans :

Plasma Membrane	Cell Wall
It is consisted of proteins and lipids. It is living.	It is made up of complex carbohydrate called cellulose. It is dead or non-living.
It is found in plant cells only.	It is found in both plant and animal cells.
It is semipermeable.	It is permeable.
It is soft and elastic.	It is hard and rigid.

99. Explain the structure of nucleus. Give a neat labelled diagram of a nucleus of cell. Give brief information

about nucleus.

Ans :

Nucleus is the control centre of the cell. It is covered by a double layered envelope called nuclear membrane. The nuclear membrane has some pores which allow the transfer of material from inside the nucleus to cytoplasm. Inside the nuclear membrane some thread like structures are present. This is known as chromatin material.

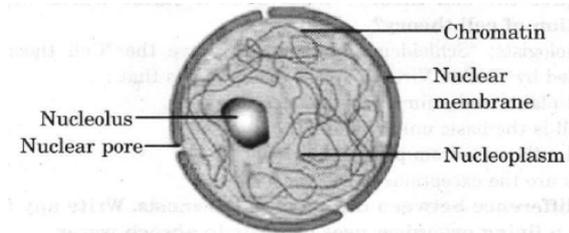


Figure: Structure of a nucleus

The chromatin material mainly formed through DNA (deoxyribonucleic acid) and proteins. When a cell starts to divide, chromatin material condenses into rat-shaped structures called chromosomes. The chromosomes contain DNA which are called genes.

The nucleus is a large, centrally located spherical cellular component. It is bounded by two nuclear membranes, both forming a nuclear envelope. The nuclear envelope separates the nucleus from the cytoplasm. Within nucleoplasm two types of nuclear structures are embedded : the nucleolus and chromatin material. The nucleolus may be one or more in number and is not bounded by any membrane. It is rich in protein and RNA molecules and acts as the site for ribosome formation.

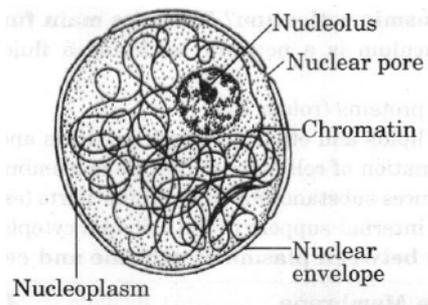


Figure: Nucleus

100.Explain the following terms : (a) Plasma membrane, (b) Cytoplasm, (c) Nucleus.

Ans :

- (a) **Plasma membrane** : It is a thin membrane which controls the passage of materials in and out of the cell. It is also called selectively permeable membrane. It makes the outer boundary of the cell and is made up of protein.
- (b) **Cytoplasm** : It is transparent jelly-like thick substance present in the cell. It makes the ground of the cell in which all the cell organelles are suspended.
- (c) **Nucleus** : It is a double-layered membrane structure which contains chromosomes required

for the inheritance of characteristics from one generation to the other.

101.Give difference between diffusion and osmosis. Write any two examples where a living organism uses osmosis to absorb water.

Ans :

Osmosis	Diffusion
Osmosis is the passage of water from a region of high water concentration through a semipermeable membrane to a region of low water concentration.	The process of spontaneous movement of a substance from a region of its high concentration to the region where its concentration is low is called diffusion.

Example of Osmosis :

- (i) Plant roots absorb water.
- (ii) Unicellular organisms such as amoeba absorb water from freshwater.

102.What would happen if when we put an animal cell into a solution of sugar or salt in water?

Ans :

The following three things could happen :

- (i) If the solution surrounding the cell is very dilute than cytoplasm, the water will move into the cell, i.e., the cell will gain water.
- (ii) If the solution has exactly similar water concentration as that of cytoplasm of cell, there will be no net movement of water across the cell membrane, i.e., no gain or loss of water from the cell.
- (iii) If the medium (solution) has a lower concentration of water than the cell, i.e., the solution is concentrated, the cell will lose water by osmosis. How do all cells look alike in terms of shape and size?

Ans :

Cells vary in shapes and sizes according to the fusion. Generally, cells are spherical but they may be long and branched as in nerve cell, Kidney shaped as guard cell in plant's leaves, discoid as RBC, spindle shaped as muscle cell, etc. Size of cell varies from 0.2 mm to 18 cm in diameter. Some are microscopic while some are visible with naked eyes.

For example :

- (i) Size of a typical cell in a multicellular organism ranges from 20-30 mn.
- (ii) The largest cell is ostrich egg (15 cm in diameter with shell and 8 cm in diameter without shell).
- (iii) The longest cell is nerve cell (up to 1 m. or more) and red blood cells are the smallest cell in our body.
- (iv) Smallest cells so far known are PPLOs, e.g. mycoplasma (0.1 mm in diameter).
- (v) Human egg is 0.1 mm in diameter.

103.How do lysosomes perform their function?

Ans :

Functions of lysosomes :

- (i) **Extracellular digestion** : Sometimes lysosome enzymes are released outside the cell to break down extracellular material.
- (ii) **Destruction of foreign material** : Lysosome also destroys any foreign material which enters inside the cell such as bacteria.
- (iii) **Cellular digestion** : Enzymes are released in damaged cells, ageing cells or dead cells. These enzymes digest their own cell.

Lysosomes contain about 40 hydrolytic enzymes. Lysosomes burst and their enzymes digest their own cell when the cell gets damaged. So, lysosomes are called 'suicide bags'.

Foreign materials entering the cell, such as bacteria or food, as well as dead old organelles in the lysosomes break up into small pieces.

104. What types of enzymes are present in the lysosomes? What is their function? Which organelle manufactures these enzymes?

Ans :

Lysosomes contain powerful digestive enzymes capable of breaking down all organic material.

Lysosomes help to keep the cell clean by digesting worn out cell organelles and foreign material such as bacteria or food.

RER (Rough Endoplasmic Reticulum) makes the digestive enzymes present in the lysosomes.

105. Explain fluid mosaic model of plasma membrane.

Ans :

According to fluid mosaic model, plasma membrane is made up of a bilayer of phospholipids. There are two types of protein molecules : Intrinsic proteins, which completely covers the lipid bilayer and Extrinsic proteins, which occur either on the outer surface or on the inner surface of the lipid membrane. The fluid mosaic membrane has been described as "a number of protein icebergs floating in the sea of lipids".

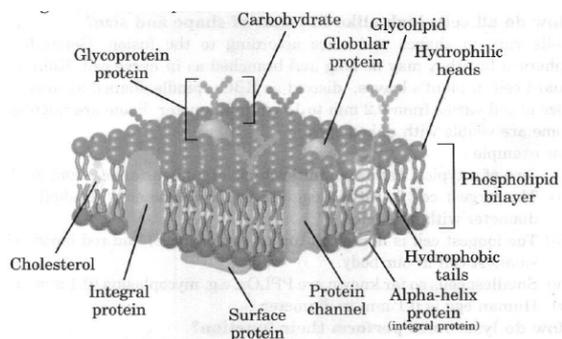


Figure: Plasma membrane

106. Explain the functions of various cell organelles.

Ans :

Functions of cell organelles :

- (i) **Endoplasmic Reticulum** : It forms the supporting skeletal framework of the cell.
- (ii) **Ribosomes** : It synthesises proteins.

- (iii) **Golgi Apparatus** : It produces vacuoles which contain cellular secretion.
- (iv) **Lysosomes** : It serves as intracellular digestive system as it digests the foreign materials which enter the cell.
- (v) **Mitochondria** : These are the sites of cellular respirations.
- (vi) **Plastids** : These are present only in plants and trap solar energy to manufacture food for plants.
- (vii) **Vacuoles** : They help to maintain the osmotic pressure in a cell.
- (viii) **Peroxisomes** : They carry-out some oxidative reactions.
- (ix) **Centrosome** : It helps in cell division in the animal cell.

107. Give brief information about the mitochondria. Describe the structure of mitochondria.

Ans :

The mitochondria are tiny bodies of varying shapes and size. Each mitochondria is bounded by a double membrane envelope. Outer membrane is porous. The inner membrane is thrown into folds. These folds are called cristae and are studded with small rounded bodies known as oxysomes. The interior cavity of the mitochondria is filled with a protein matrix which contains a few small-sized ribosomes, a circular DNA molecule and phosphate granules. Mitochondria are sites of cellular respiration.

Mitochondria are membrane bound cell organelle found in the cytoplasm. Each mitochondria is a double membrane bounded structure. The outer membrane of mitochondrion is smooth. But, the inner membrane of the mitochondrion is folded inwardly, into the matrix of mitochondrion forming finger like projections. The inward finger like projections of inner membrane is called cristae. Cristae greatly increase the surface area of inner membrane. Mitochondria contain extra nuclear DNA.



Figure: Mitochondria

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Science IX

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