Lakhmir Singh Solutions of Class 9 Biology Chapter 2 Fundamental Unit Of Life – Cell

1. Distinguish between prokaryotic and eukaryotic cells.

Answer

Prokaryotic	**Eukaryotic**
Organisms are always unicellular	Organisms are always unicellular and multicellular
Nucleus is absent	Nucleus is present
Cell division takes place through binary fission	Cell division takes place through mitosis
DNA arrangement is circular	DNA arrangement is linear
Example: Bacteria, Blue-green algae	Example: Plant and animal cell

2. Write down the differences between organ and organelle.

Answer

Organ	**Organelle**
These are the parts of a body	These are the parts of a cell
These are found in multicellular organisms	These are found in unicellular organisms
These are macroscopic in nature	These are microscopic in nature
Example: Brain, Heart, Lungs	Example: Cytoplasm, mitochondria

3. Write down the differences between the nucleus and nucleoid.

Answer

Nucleus	**Nucleoid**
A nucleus is a membrane-bound structure in which eukaryotes store their genetic materials.	Nucleoid is a particular area in which prokaryotes store their genetic materials.

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Contains many chromosomes.	Contains one chromosomes
It is a spherically shaped organelle.	It is an irregularly shaped organelle.
Nucleoplasm and Nucleolus are present in the nucleus.	Nucleoplasm and Nucleolus are absent in the nucleoid.

4. Mention differences between light microscope and electron microscope.

Answer

Light microscope	**Electron microscope**
Uses light as an illuminating source	Uses electrons beam as an illuminating source
Both live and dead specimen can be seen	Only dead and the dried specimen can be seen
It has low resolution	It has high resolution

5. Give a brief account of the discovery of the cell.

Answer

Cells are the basic structural and functional unit of life. The term cells was first coined in 1665 by a British scientist Robert Hooke. He was the first person to study living things under a microscope and examined a thin slice of cork under a microscope and observed honeycomb-like structures. Robert Hooke called these structures as cells.

6. Describe the proteins of the plasma membrane.

Answer

There are two types of proteins molecules are found in the plasma membrane:

(i) Intrinsic proteins -They completely cover the lipid bilayer.

(ii) Extrinsic proteins – These occur either on the outer surface or on the inner surface of the lipid layer.

7. Enumerate functions of the plasma membrane.

Answer

- The plasma membrane forms a barrier between the cell organelles from the outside environment.
- It allows only certain molecules to pass through it.
- It facilitates communication and signaling between the cells.

8. Give an example of diffusion across the plasma membrane.

Answer

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In unicellular organisms like Amoeba, gaseous exchange takes place through the process of diffusion.

9. Set up an experiment to demonstrate osmosis.

Answer

1. Take three raisins and weigh them on the common balance. Let this value be W1.

2. Keep these raisins in a bowl containing water for 2 hours.

3. Take the raisins out of the water and gently dry them with the help of blotting paper.

4. Weigh the soaked swollen raisins again on the common balance. Let this value be W2.

The soaked swollen raisins (W2) weigh more than the dry raisins (W1). This is because the raisins absorbed water by the process of endosmosis.

10. Write down the differences between diffusion and osmosis.

Answer

Diffusion	**Osmosis**
This occurs in all mediums – Solid, Liquid and gas.	This occurs only in the liquid medium.
Do not require a semipermeable membrane.	Requires a semipermeable membrane.
The flow of particles occurs in all the directions.	The flow of particles occurs only in one direction.

11. Write a note on endocytosis.

Answer

Endocytosis is defined as the process of trapping a particle or substance from the external environment by engulfing it. Endocytosis is of two types viz phagocytosis, also known as cellular eating and pinocytosis, also referred to as cellular drinking. There are three types of endocytosis:

1. Phagocytosis, 2. Pinocytosis and 3. Receptor-mediated endocytosis.

12. What would happen when eukaryotic cells are placed in hypotonic, hypertonic and isotonic solutions?

Answer

When eukaryotic cells are placed in the following solutions the changes observed are as follows:

- Hypotonic Solution: The water moves from a region of low osmolarity to a region of high osmolarity. In this case, since the extracellular fluid has low osmolarity, the water would rush into the cell. The cell would then expand and eventually lyse or burst.
- Hypertonic Solution: In this case, water will leave the cell since the cell has a lower osmolarity than the extracellular fluid. As a result the cell would shrink in what is called plasmolysis.
- Isotonic Solution: The osmolarity of both fluids is equal. As such, though water diffuses in and out, there is no net change in the volume of the cell.

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13. Name the following:
(a) Smallest cell organelle
(b) Largest cell organelle;
(c) ER studded with ribosomes
(d) Functional segments of the DNA molecule.

Answer :

(a) Ribosome

(b) Plastid in plants and Nucleus in animal cell

(c) Rough endoplasmic reticulum contains a ribosome attached to its surface

(d) Genes

14. Distinguish between the following:

(a) Chromoplast and chloroplast
(b) Ribosome and centrosome

Answer

(a)

Chromoplast	**Chloroplast**
Chromoplasts are plastids and contain carotenoids	Chromoplasts– is a name given to an area for all the pigments to be kept and synthesized in the plant.
They lack in chlorophyll	They have a high concentration of chlorophyll
Chromoplasts may develop from green chloroplasts. Chlorophyll and thylakoid membranes disappear and carotenoids are accumulated, e.g. during ripening of fruits	Chloroplast has a structure called chlorophyll which functions by trapping the solar energy and used for the synthesis of food in all green plants.

(b)

Ribosome	Centrosome
Helps in protein synthesis	Plays major role in cell division
Found in both plants and animals	Found in only plants
Ribosomes are scattered everywhere inside the cell	Centrosome found inside nucleus only

15. Write the main differences between plant and animal cells.

Answer

Plant cell	Animal cell

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Cell wall is present	Cell wall is absent
Nucleus lies on one side of the cell	Nucleus lies on one center of the cell

16. What will happen in a cell if its nucleus is removed? Give reasons in support of your answer.

Answer

If the nucleus of a cell is removed the cell will not be able to carry out its vital functions and will die.

17. Explain why do spinach looks green, papaya yellow and edible part of watermelon red?

Answer

Spinach is green because of the presence of green pigment chlorophyll. Papaya is yellow because of the presence of caricaxanthin. The edible part of a watermelon is red in color because of the presence of lycopene which is a red pigment.

18. Write down two main functions of

(a) Endoplasmic reticulum
(b) Lysosome

Answer

(a) Endoplasmic reticulum

- It plays a major role in the production, processing, and transport of proteins and lipids.
- It produces transmembrane proteins and lipids for its membrane and for many other cell components including lysosomes, secretory vesicles, the Golgi apparatus, the cell membrane, and plant cell vacuoles.

(b) Lysosomes

- Intracellular digestion
- Removal of dead cells

19. Name the following

(a) The cell organelle which synthesizes protein.
(b) The type of plastid which stores food.

Answer:

(a) Ribosome

(b) Leucoplasts

20. **Lysosomes are known as suicide bags." Why?**

Answer:

Lysosomes are known as suicide bags of the cell because they contain lytic enzymes capable of digesting cells and unwanted materials. When lysosomes burst, the lytic enzymes within the organelle spill all over the cell, rupturing the cell membrane or cell wall, inducing the death of the cell.

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