

NCERT Solutions for 11th Class Biology: Chapter 8-Cell : The Unit of Life



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Class 11: Biology Chapter 8 solutions. Complete Class 11 Biology Chapter 8 Notes.

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Exercises

1. Which of the following is not correct?

- (a) Robert Brown discovered the cell.
- (b) Schleiden and Schwann formulated the cell theory.
- (c) Virchow explained that cells are formed from pre-existing cells.
- (d) A unicellular organism carries out its life activities within a single cell.

► (a) Robert Brown discovered the cell.

2. New cells generate from

- (a) bacterial fermentation
- (b) regeneration of old cells
- (c) pre-existing cells
- (d) abiotic materials

► (c) pre-existing cells

3. Match the following:

Column I	Column II
(a) Cristae	(i) Flat membranous sacs in stroma
(b) Cisternae	(ii) Infoldings in mitochondria
(c) Thylakoids	(iii) Disc-shaped sacs in Golgi apparatus

Answer

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Column I	Column II
(a) Cristae	(i) Infoldings in mitochondria
(b) Cisternae	(ii) Disc-shaped sacs in Golgi apparatus
(c) Thylakoids	(iii) Flat membranous sacs in stroma

4. Which of the following is correct:

- (a) Cells of all living organisms have a nucleus.
 - (b) Both animal and plant cells have a well defined cell wall.
 - (c) In prokaryotes, there are no membrane bound organelles.
 - (d) Cells are formed de novo from abiotic materials.
- (c) In prokaryotes, there are no membrane bound organelles.

5. What is a mesosome in a prokaryotic cell? Mention the functions that it performs.

Answer

Mesosome is a convoluted membranous structure formed in a prokaryotic cell by the invagination of the plasma membrane. Its functions are:

→ These extensions help in cell wall formation, DNA replication and distribution to daughter cells.

→ They also help in respiration, secretion processes, to increase the surface area of the plasma membrane and enzymatic content.

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6. How do neutral solutes move across the plasma membrane? Can the polar molecules also move across it in the same way? If not, then how are these transported across the membrane?

Answer

Neutral solutes move across the plasma membrane through osmosis. On the other hand polar molecules cannot pass through the non-polar membrane. They require a carrier protein to help them transverse across the membrane. Such a transport requires energy and is called active transport.

7. Name two cell-organelles that are double membrane bound. What are the characteristics of these two organelles? State their functions and draw labelled diagrams of both.

Answer

Mitochondria and chloroplasts are the two organelles that are double-membrane-bound.

Characteristics of Mitochondria are:

- The mitochondria are sausage-shaped or cylindrical having a diameter of 0.2-1.0 μm and average 0.5 μm and length 1.0-4.1 μm .
- Each mitochondrion is a double membrane bound structure with the outer membrane and the inner membrane dividing its lumen distinctly into two aqueous compartments,- outer and inner compartments.
- The outer membrane forms the continuous limiting boundary of the organelle.
- The inner membrane forms a number of infoldings called the cristae towards the matrix.

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→ The two membranes have their own specific enzymes associated with the mitochondrial function. The matrix of mitochondria also possess single circular DNA molecule, a few RNA molecules, ribosomes (70 S) and the components required for the synthesis of proteins.

Functions of Mitochondria are:

- They are the sites for aerobic respiration.
- They provide energy in the form of ATP for all vital activities of living cells.
- They have their own DNA and ribosomes. Hence, they are regarded as semi-autonomous organelles.
- They have several enzymes, intermediately required for the synthesis of various chemicals such as fatty acids, steroids, and amino acids.

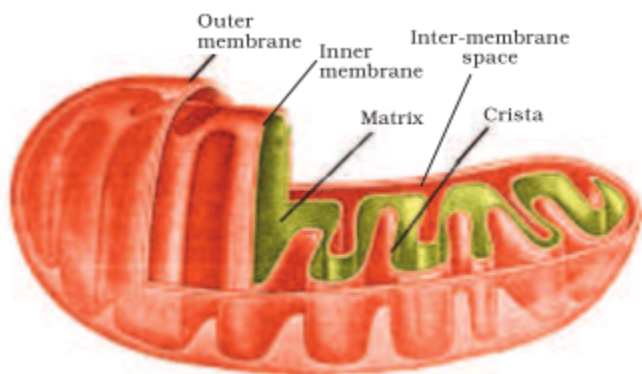


Diagram of Mitochondria

Characteristics of Chloroplast are:

- The Chloroplasts are also double membrane bound organelles.
- The space limited by the inner membrane of the chloroplast is called the stroma.

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→ A number of organized flattened membranous sacs called the thylakoids are present in the stroma.

→ Thylakoids are arranged in stacks like the piles of coins called grana. → In addition, there are flat membranous tubules called the stroma lamellae connecting the thylakoids of the different grana.

→ The membrane of the thylakoids enclose a space called a lumen.

Functions of Chloroplast are:

→ They trap solar energy and utilise it for manufacturing food for plants. Hence, they are involved in the process of photosynthesis.

→ They contain the enzymes required for the synthesis of carbohydrates and proteins.

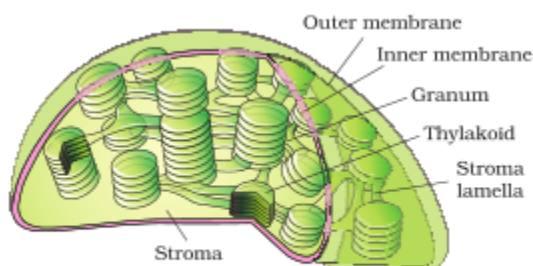


Diagram of Chloroplast

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8. What are the characteristics of prokaryotic cells?

Answer

Prokaryotic cell is a unicellular organism lacking membrane-bound organelles.

The characteristics of prokaryotic cells are as follows:

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- Most of them are unicellular.
- They are generally small in size. The size of a prokaryotic cell varies from 0.5 - 5 μm .
- The nuclear region of a prokaryotic cell is poorly-defined because of the absence of a nuclear membrane. Hence, a prokaryotic cell lacks a true nucleus.
- The genetic materials of prokaryotic cells are naked. They contain single, circular chromosomes. In addition to the genomic DNA, they have a small, circular plasmid DNA.
- They have specialised membranous structures called mesosomes. Mesosomes are formed by the invagination of the cell membrane. These extensions help in the synthesis of the cell wall, replication of DNA. They also help in the equal distribution of chromosomes into the daughter cells.
- Membrane-bound cell organelles such as mitochondria, plastids, and endoplasmic reticulum are absent from a prokaryotic cell.
- Most prokaryotic cells contain a three-layered structure - outermost glycocalyx, middle cell wall, and the innermost plasma membrane. This structure acts as a protective unit.

9. Multicellular organisms have division of labour. Explain.

Answer

The body of a multicellular organism has a cell as a basic structural unit. The cells organised to form tissues such as blood, bone, etc. The tissues organised to form organs such as heart, kidney, etc. The organs then organised to form organ systems such as digestive system, reproductive system and respiratory system, etc. The various organ systems of organisms get arranged to form a complete individual.

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10. Cell is the basic unit of life. Discuss in brief.

Answer

Every animal or plant is made of many systems. Every system is made of many organs. Organs are made of many types of tissues and tissues are made of many cells. A cell is an autonomous structure and is capable of carrying out various functions on its own. A cell can do all an organism can do. In a sense the cell is full of life at the minutest possible level. That is why a cell is called the basic unit of life.

11. What are nuclear pores? State their function.

Answer

Nuclear pores are tiny holes present in the nuclear membrane of the nucleus. They are formed by the fusion of two nuclear membranes.

These holes allow specific substances to be transferred into a cell and out from it. They allow molecules such as RNA and proteins to move in both directions, between the nucleus and the cytoplasm.

12. Both lysosomes and vacuoles are endomembrane structures, yet they differ in terms of their functions. Comment.

Answer

Both lysosomes and vacuoles are covered by a single membrane. Both of them perform different types of functions. Lysosomes contain hydrolysing enzymes and can hydrolyse all types of organic substances, except cellulose. They perform phagocytic function. Therefore, they are known as suicidal bags.

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The vacuoles are non-cytoplasmic sacs which are also covered by a membrane. The sap vacuoles store sap or water with dissolved organic and inorganic substances. They maintain osmotic pressure or turgidity. Some freshwater invertebrates such as Amoeba, Paramecium occur contractile vacuoles, which perform osmoregulation and excretion. There is another type of vacuole such as food vacuole which stores food and gas vacuoles which store metabolic gases and take part in buoyancy regulation.

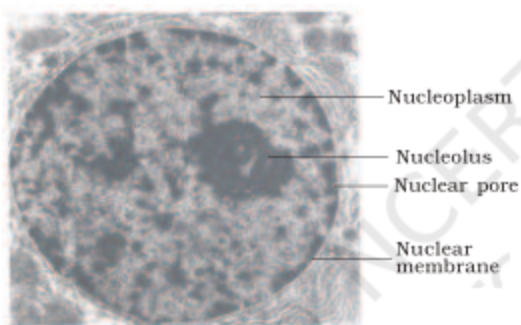
13. Describe the structure of the following with the help of labelled diagrams.

(i) Nucleus (ii) Centrosome

Answer

Nucleus controls all the cellular activities of the cell. It is spherical in shape. It is composed of the following structures:

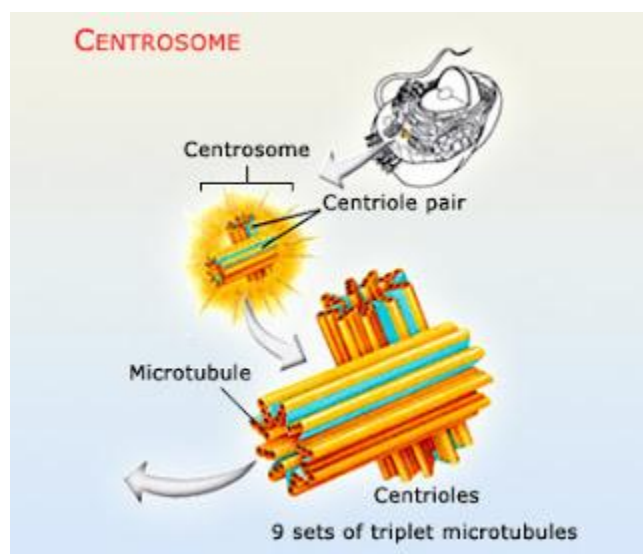
- **Nuclear membrane:** It is a double membrane separating the contents of the nucleus from the cytoplasm. The narrow space between the two membranes is called the perinuclear space. Nuclear membrane has tiny holes called nuclear pores. These holes allow specific substances to be transferred into a cell and out from it.
- **Nucleoplasm/Nuclear matrix:** It is a homogeneous granular fluid present inside the nucleus. It contains the nucleolus and chromatin. Nucleolus is a spherical structure that is not bound by any membrane. It is rich in protein and RNA molecules, and is the site for ribosome formation. Chromatin is an entangled mass of thread-like structures. It contains DNA and some basic proteins called histones.



Centrosome

Centrosomes consist of two cylindrical structures called centrioles. Centrioles lie perpendicular to each other. Each has a cartwheel-like organisation.

A centriole is made up of microtubule triplets that are evenly spaced in a ring. The adjacent triplets are linked together. There is a proteinaceous hub in the central part of a centriole. The hub is connected to the triplets via radial spokes. These centrioles help in organising the spindle fibres and astral rays during cell division. They form the basal body of cilia and flagella.



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14. What is a centromere? How does the position of centromere form the basis of classification of chromosomes. Support your answer with a diagram showing the position of centromere on different types of chromosomes.

Answer

Centromere is a narrow non-stainable area, which join two similar threads or chromatids of a late prophase or metaphase chromosome. The two parts of the chromosome on either side of the centromere are known as arms. They may be isobranched (equal) or heterobranched (unequal in length). Depending upon the position of the centromere, the chromosomes are classified as:

→ Acrocentric chromosome: Centromere sub-terminal, anaphasic stage J-shaped.

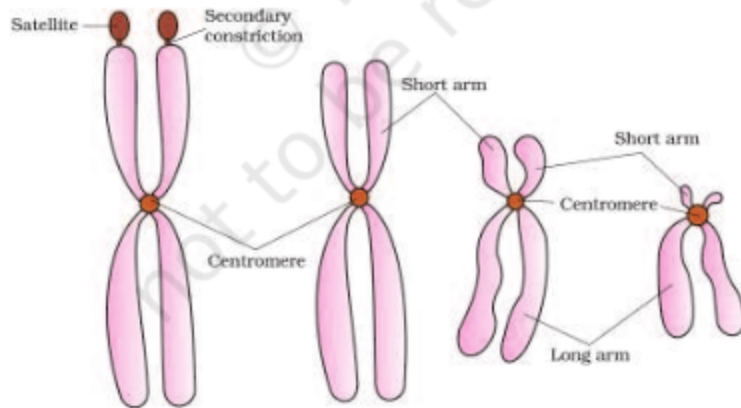
→ Sub-metacentric chromosome: The centromere is sub-median and the anaphasic chromosome appears L-shaped.

→ Metacentric chromosomes: The centromere is in the middle and the chromosome appears V-shaped.

→ Telocentric chromosome: Centromere is terminal, anaphasic stage is I-shaped.

Depending upon the number of centromeres a chromosome possesses, it may be monocentric, dicentric (two centromeres), polycentric (many centromeres), and acentric chromosome (having no centromere).

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Chapterwise NCERT Solutions for Class 11 Biology:

- Chapter 1: The Living World
- Chapter 2: Biological Classification
- Chapter 3: Plant Kingdom
- Chapter 4: Animal Kingdom
- Chapter 5: Morphology of Flowering Plants
- Chapter 6: Anatomy of Flowering Plants
- Chapter 7: Structural Organisation in Animals
- Chapter 8: Cell-The Unit of Life
- Chapter 9: Biomolecules
- Chapter 10: Cell Cycle and Cell Division
- Chapter 11: Transport in Plants
- Chapter 12: Mineral Nutrition
- Chapter 13: Photosynthesis in Higher Plants
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- Chapter 16: Digestion and Absorption
- Chapter 17: Breathing and Exchange of Gases
- Chapter 18: Body Fluids and Circulation
- Chapter 19: Excretory Products and Their Elimination
- Chapter 20: Locomotion and Movement
- Chapter 21: Neural Control and Coordination
- Chapter 22: Chemical Coordination and Integration

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