INDIAN SCHOOL AL WADI AL KABIR		
Class: IX	**DEPARTMENT OF SCIENCE -2023-24** **SUBJECT: BIOLOGY**	DATE OF COMPLETION: 11.08.23
WORKSHEET NO:2 WITH ANSWERS	**TOPIC: THE FUNDAMENTAL UNIT OF LIFE-PART II**	**A4 FILE FORMAT (PORTFOLIO)**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

I. OBJECTIVE TYPE QUESTIONS:

1. An organism has a poorly defined nuclear membrane in its cells. This organism could be a/an:
 (a) bacteria
 (b) animal
 (c) fungi
 (d) bird

2. X is a double membrane organelle that oxidises food present in the cell to release energy. X is:
 (a) nucleus
 (b) endoplasmic reticulum
 (c) mitochondrion
 (d) chloroplast

3. Which of the following function is performed by smooth endoplasmic reticulum?
 (a) It helps expel excess water and waste out of the cell.
 (b) It helps produce ATP molecules.
 (c) It helps digest small foreign particles.
 (d) It helps detoxify the drugs.

4. How does endoplasmic reticulum help in transporting protein between various regions of the cytoplasm?
 (a) By forming a network of membrane-bound tubes in the cytoplasm.
 (b) By occupying most of the space in the cytoplasm.
 (c) By generating small transport vesicles throughout the cell.
 (d) By directing all cell organelles to perform the same biochemical activity.

5. In summer, the leaves of a potted plant droop when the soil becomes dry. Which cell organelle makes the leaves droop?
(a) Nucleus, as it stops making DNA.
(b)Cell wall, as it starts to shrink.
(c)Lysosome, as it is releasing the digestive enzymes.
(d)Vacuole, as it loses all the water.

6. Which part of the cell serves as the intracellular highway?
(a) Endoplasmic reticulum
(b) Golgi apparatus
(c) Cell membrane
(d) Mitochondria

For questions 7 to 10, two statements are given-one labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the options (i), (ii), (iii) and (iv)as given below:
(i)Both A and R are true and R is the correct explanation of the assertion.
(ii)Both A and R are true but R is not the correct explanation of the assertion.
(iii)A is true but R is false.
(iv)A is false but R is true.

7. **Assertion (A)**: Mitochondria and chloroplasts are semiautonomous organelles.
Reason (R): They contain their own DNA but lack protein-synthesizing machinery.
8**. Assertion (A):** Mitochondria are known as the powerhouse of the cell.
Reason(R): Mitochondria produce cellular energy in the form of ATP.
9. **Assertion (A):** Vacuoles are storage sacs for solid or liquid contents.
Reason(R): In amoeba, the vacuoles do not help in expelling excess water from the cell.
10. **Assertion (A):** The endoplasmic reticulum which lacks ribosomes is called smooth endoplasmic reticulum (SER).
Reason(R): SER is mainly involved in protein synthesis.

II. VERY SHORT ANSWERS: (2M)

11**.** What is the significance of pores present on the nuclear membrane?
12.Which organelle is called the 'digestive bags' of the cell?
13. Write the key functions of:
i) Golgi apparatus
ii) Ribosomes present in active cells.

III.SHORT ANSWER TYPE QUESTIONS (3M):

14. What are the similarities and dissimilarities between mitochondria and plastids?
15. Differentiate between rough and smooth endoplasmic reticulum. How is the endoplasmic reticulum important for membrane biogenesis?
16. Describe the structure of plastids with special reference to their types.

IV.LONG ANSWER TYPE QUESTIONS (5M):

18. Draw a neat labelled diagram of an animal cell.
19. Illustrate a plant cell as seen under an electron microscope. How is it different from animal cells?
20. a) What is cell division?
    b) Why is cell division necessary?
    c) State the differences between mitosis and meiosis.

VI. SOURCE BASED/CASE-BASED QUESTION (4 MARKS):

All living organisms are made up of cells. Depending on the function performed by an organ, it is made up of different types of cells. Eg: the cells which communicate messages across the body, called the nerve cells, have a different design and internal structure when compared to the elastic muscle cells which make up parts, like the arm biceps or the pumping machine, our heart. One of the organelles of a cell is mitochondria (singular: mitochondrion), which use oxygen to burn glucose and produce the energy required by the cells. This is why they are also called the powerhouse of the cell. A study was conducted to find a correlation between the number of mitochondria present in a cell and the cell type. The graph shown in Fig. 2.6 captures this data for five different cell types.

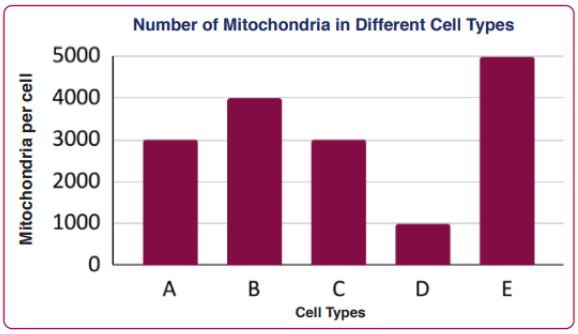


Fig. 2.6, Bar chart showing number of mitochondria per cell for different cell types.

a) State the role of mitochondria.
b) Explain the structure of mitochondria.
c) What can you infer about the energy requirement of cell type E when compared to other cell types? How do you relate to the number of mitochondria? Justify your answer.

V. BOARD BASED QUESTIONS:

21. Name two cell organelles having double-membrane envelopes. (1m)
22. Grass looks green, and papaya appears yellow. Which is the cell organelle responsible for this? Write the structural features of this organelle.

ANSWERS

	I. OBJECTIVE TYPE QUESTIONS:
1.	(a) bacteria
2.	(c) mitochondrion
3.	(d) It helps detoxify the drugs.
4.	(c) By generating small transport vesicles throughout the cell.

5.	(d) Vacuole, as it loses all the water.
6.	(a) Endoplasmic reticulum
7.	(iii)A is true but R is false.
8.	(ii)Both A and R are true but R is the correct explanation of the assertion.
9.	(iii)A is true but R is false.
10.	(iii)A is true but R is false.
	II. VERY SHORT ANSWERS: (2M)
11.	The pores present on the nuclear membrane allow the transport of water-soluble molecules across the nuclear envelope. RNA and ribosomes move out of the nucleus, whereas carbohydrates, lipids and proteins move into the nucleus.
12.	Lysosomes are cell organelles found in eukaryotic cells. They are also called suicidal bags. They contain digestive enzymes and lysozymes which break down the waste material and foreign particles. They also destroy the cell after it has died.
13.	The functions are: - (i) The material synthesised near the ER is packaged and dispatched to various targets inside and outside the cell through the Golgi apparatus/ Its functions include the storage, modification and packaging of products in vesicles/ In some cases, complex sugars may be made from simple sugars in the Golgi apparatus/The Golgi apparatus is also involved in the formation of lysosomes. (ii) Ribosomes present in active cells are the sites for protein synthesis.
	III.SHORT ANSWER TYPE QUESTIONS (3 M):
14.	Similarities between mitochondria and plastid are: -Mitochondria and plastids are double membrane-bound organelles. -Mitochondria and plastids have their own DNA and ribosomes for protein synthesis hence they are called semi-autonomous cell organelles.

Mitochondria	Plastid
Found in all eukaryotic cells	Found in only plant cells
Produces ATP	Produces glucose and stores it as starch
The main function is cell respiration	Main organelle for photosynthesis
Smaller in size	Comparatively larger in size
Pigments are absent	Pigments are present

15.

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.

Proteins and lipids synthesised in ER are used for producing new cell membrane during cell division and this process is termed as membrane biogenesis.

16. Plastids are only found in plant cells. They are of two types: -

a) Chromoplasts (coloured plastids) and leucoplasts (white or colourless plastids)

Chromoplasts containing chlorophyll are called chloroplast –It is green coloured plastids. Chloroplasts are double membrane organelles containing two distinct regions

1. Grana are stacks of membrane-bounded flattened sacs called thylakoids containing chlorophyll.
2. Stroma is the homogenous matrix in which grana are embedded. Chlorophyll actually helps in capturing solar energy and converting it to the chemical energy of food.

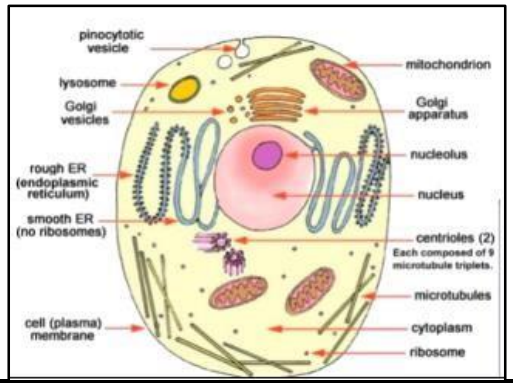
The functions of plastids are as follows: -

a) Chloroplast helps in photosynthesis. Chloroplast also contains various yellow or orange pigments in addition to chlorophyll. These coloured plastids impart colour to flowers. Plastids contain their own DNA and ribosomes i.e.; they have their own protein-synthesising machinery. They are also self-replicating organelles.

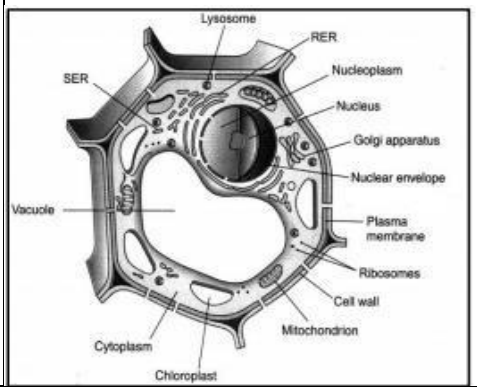
b) Leucoplast – is a colourless plastid and stores starch, oils and protein granules.

IV.LONG ANSWER TYPE QUESTIONS (5M):

17.



18. a & b



Plant cell	Animal wall
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.

19

a) Cell division is a process by which a parent cell divides into two or more daughter cells.
b) Cell division is necessary because of the following reason:-
-A cell has to divide to maintain continuity from one generation to another generation.
-In multicellular organisms, it plays an important role in the formation of gametes.
-Old and worn-out cells are regularly repaired by means of cell division.
-In unicellular organisms like amoeba, cell division is the means of reproduction whereas in multicellular organisms; it is the means of tissue growth and maintenance.
c)

Mitosis	Meiosis
It takes place in somatic cells.	It takes place in germ cells at the time of gamete formation.
Two daughter cells are formed.	Four daughter cells are formed.
The daughter cells have the same number of chromosomes as the mother cell.	The new cells only have half the number of chromosomes than that of the mother cells.
It helps in the growth and repair of tissues in organisms.	It is necessary for sexual reproduction.

VI. SOURCE BASED/CASE BASED QUESTION (4 MARKS):

a) The energy required for various chemical activities needed for life is released by mitochondria in the form of ATP (Adenosine triphosphate) molecules.
b) Mitochondria have two membrane coverings. The outer membrane is porous while the inner membrane is deeply folded. These folds increase the surface area for ATP-generating chemical reactions.
c) The energy requirement of cell type E is higher when compared to other cells. The number of mitochondria per cell varies widely. The number depends upon the amount of energy needed by the cell to carry out its functions.

VI. BOARD BASED QUESTIONS:

20 Nucleus, mitochondria (1m)

21 Plastids - Chromoplasts – chloroplast (3m)
Structure:-Each chloroplast has a double membrane. The inner matrix called stroma has a flattened stack of thylakoids called grana. Chloroplast has their own DNA and ribosomes.

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