



CLASS ; 9.

CELLS

Question & Answers :

1. What would happen if the plasma membrane ruptures or breaks down?

Ans: Plasma membrane provides space for the cell organelles and cytoplasm. It protects the contents of a cell from external environment. The cell components would be exposed to the external environment in case the plasma membrane breaks down.

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

Ans: Golgi apparatus plays the important role of packaging various substances for further use. Absence of Golgi apparatus can hinder the formation of new cells during cell division because protein and lipid are important for the formation of Plasma Membrane. If there were no Golgi bodies, packaging and dispatching of materials synthesised by the cell will be stocked.

3. Which organelle is known as the powerhouse of the cell? Why?

Ans: Mitochondria is the powerhouse of the cell because respiration in cell takes place in mitochondria and the energy is stored in the form of ATP. It releases this energy required for different activities of life.

4. Where do the lipids and proteins constituting the cell membrane get synthesised?

Ans:

Lipids are synthesized in the SER and protein is synthesized in RER.

5. What is the correct sequence of events when preparing a temporary mount of onion peel for observation?

I. Put a drop of safranin solution.

II. Peel off the epidermis.

III. Place the peel on a slide with water.

IV. Cover with a cover slip.

(A) II, III, I, IV (B) III, II, IV, I

(C) II, I, III, IV (D) I, II, III, IV

Ans: (A) II, III, I, IV

First, the epidermis is peeled. Then, it is placed on a slide with water. Next, stain (safranin) is added. Finally, a cover slip is placed over it.

6. Which of the following correctly pairs a cell organelle with its primary function?

- (A) Ribosomes Energy production
- (B) Mitochondria - Protein synthesis
- (C) Lysosomes Waste disposal and digestion
- (D) Chloroplasts Storage of starch and oils

Ans: (C) Lysosomes Waste disposal and digestion Lysosomes contain digestive enzymes to break down waste materials and cellular debris. Ribosomes are for protein synthesis, mitochondria for energy production (ATP), and chloroplasts for photosynthesis (leucoplasts store starch/oils).

7. Which of the following incorrectly pairs a cell structure with its characteristic?

- (A) Plasma membrane - Selectively permeable
- (B) Nucleus Contains chromosomes
- (C) Cell wall (plant) Composed of lipids and proteins
- (D) Cytoplasm Fluid content inside plasma membrane

Ans: (C) Cell wall (plant) Composed of lipids and proteins

The plant cell wall is mainly composed of cellulose, which provides structural support. The plasma membrane is composed of lipids and proteins.

8 Which of the following cellular processes is correctly matched with its description?

- (A) Diffusion Movement of water across a selectively permeable membrane.
- (B) Osmosis Movement of substances from low to high concentration.
- (C) Endocytosis - Cell engulfing external material.

(D) Plasmolysis Swelling of a plant cell in hypotonic solution.

Ans: (C) Endocytosis - Cell engulfing external material.

Endocytosis is the process by which cells absorb external material by engulfing it with the cell membrane. Osmosis is the movement of water. Diffusion is high to low concentration. Plasmolysis is shrinkage.

9.. Identify the incorrect pair regarding cell types and their features.

(A) Prokaryotic cell Lacks nuclear membrane.

(B) Eukaryotic cell Contains membrane-bound organelles.

(C) Plant cell Has a cell wall and chloroplasts.

(D) Animal cell Has a large central vacuole.

Ans: (D) Animal cell Has a large central vacuole.

Animal cells typically have small, temporary vacuoles or may lack them. Plant cells usually have a large, permanent central vacuole that plays roles in storage and maintaining turgor pressure.

10.Consider the following statements about cell organelles:

I. Rough Endoplasmic Reticulum (RER) has ribosomes on its surface.

II. Smooth Endoplasmic Reticulum (SER) is involved in lipid synthesis.

III. The Golgi apparatus is involved in packaging and dispatching cellular products.

Which statements are correct?

(A) I and II only

(B) II and III only

(C) I and III only

(D) I, II, and III

Ans: (D) I, II, and III

All three statements accurately describe the structure and functions of RER (protein synthesis due to ribosomes), SER (lipid synthesis, detoxification), and the Golgi apparatus (modification, sorting, packaging)

11. What are 'cisterns' in the context of the Golgi apparatus?

- (A) The ribosomes attached to its surface.
- (B) The digestive enzymes it contains.
- (C) Membrane-bound vesicles (flattened sacs) arranged in stacks.
- (D) The pores found in its membrane structure.

Ans: (C) Membrane-bound vesicles (flattened sacs) arranged in stacks.

The Golgi apparatus is composed of a series of flattened, membrane-bound sacs called cisternae (singular: cisterna), which are typically arranged in parallel stacks.

12. Which part of the plant cell provides structural strength and is located outside the plasma membrane?

- (A) Nucleus (B) Cytoplasm (C) Cell wall (D) Vacuole

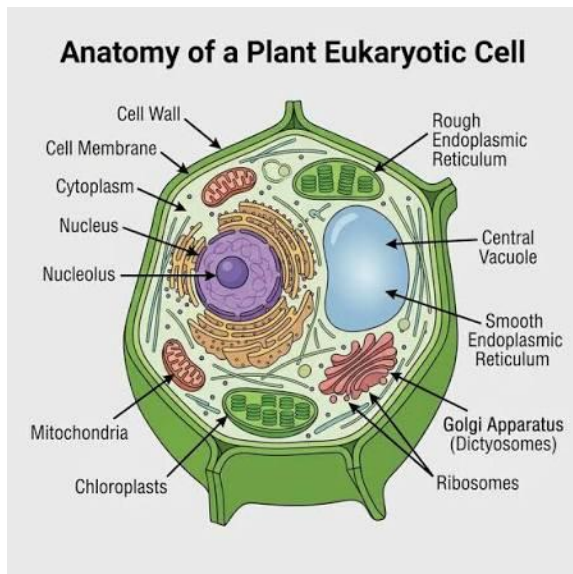
Ans: (C) Cell wall

The cell wall is a rigid outer layer found in plant cells (also in fungi and bacteria) that lies outside the plasma membrane. It provides structural support, protection, and shape to the cell

TWO MARKS QUESTIONS

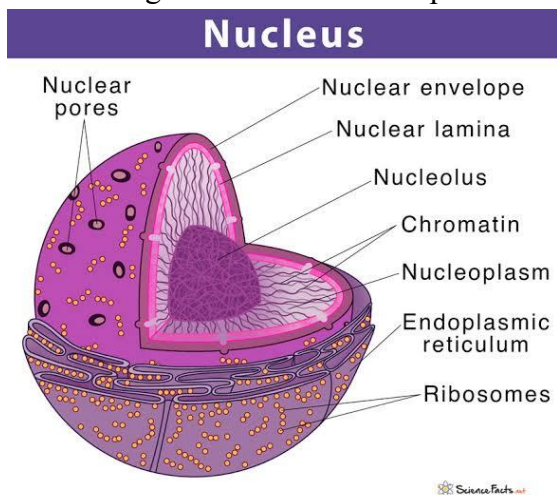
1 What is a eukaryotic cell?

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.



2. 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.



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

Ans: The functions of cell wall in plant cell are as follows:

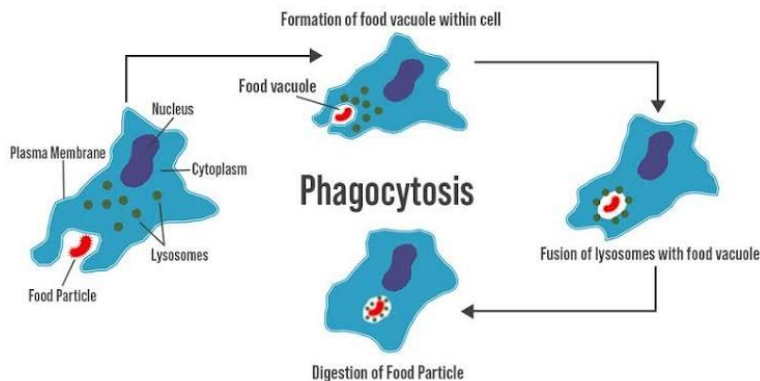
- i) It provides rigidity and strength to the cell.
- (ii) It gives a definite shape to the cell.
- (iii) It withstands the osmotic pressure which is developed by cell contents.
- (iv) It protects the inner cell organelles bounding the cell from outside.

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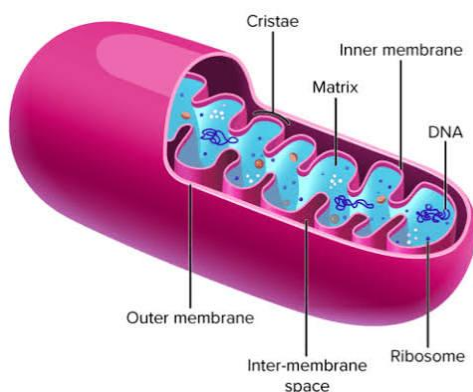
5. How does the flexibility of the cell membrane benefit an organism like Amoeba? Name the process involved.

Ans: The flexibility of the cell membrane allows Amoeba to engulf food particles and other materials from its external environment. This process, where the membrane extends and surrounds a food particle to form a food vacuole, is known as endocytosis (specifically phagocytosis for solid particles).



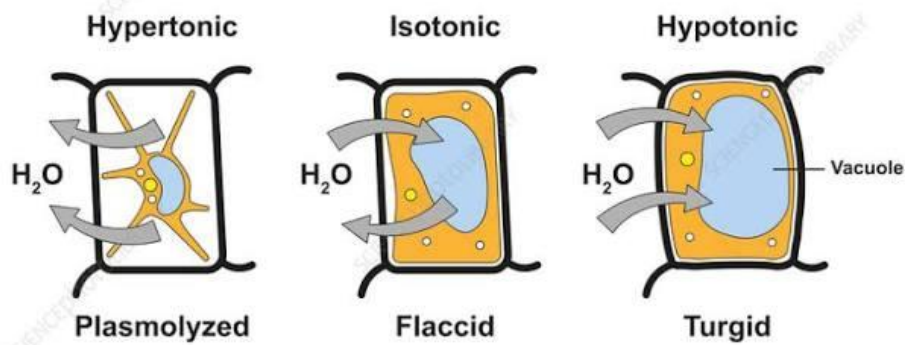
6. Why do mitochondria have a highly folded inner membrane?

Ans: Mitochondria have a highly folded inner membrane (forming cristae) to significantly increase the surface area available for ATP-generating chemical reactions. These reactions, part of cellular respiration, occur on the inner membrane, and a larger surface area allows for more efficient energy production.



7. A plant cell is placed in a solution and its contents shrink away from the cell wall. What type of solution was it placed in, and what process caused this?

Ans: The plant cell was placed in a hypertonic solution, meaning the solution had a lower water concentration (or higher solute concentration) than the cell sap. This caused water to move out of the cell by osmosis, leading to the shrinkage of the cell contents, a phenomenon called plasmolysis.



THREE MARKS QUESTIONS

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

Ans:

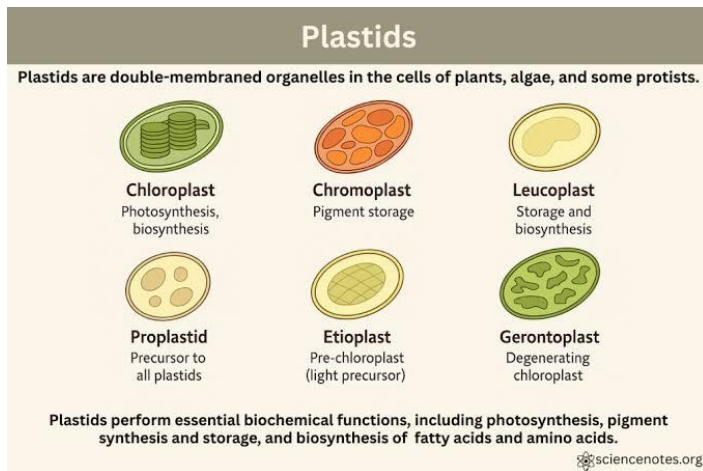
The cell wall present in fungi and bacteria permits these cells to resist very dilute external medium without bursting. Water is taken up by osmosis. Hence, cells swell and build the pressure against the cell wall. The wall exerts an equal pressure against the swollen cell. It is because of the cell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

2.. 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.

3 .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.



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

Ans: The difference in chromatin, chromosomes and gene are as follows:

Chromatin

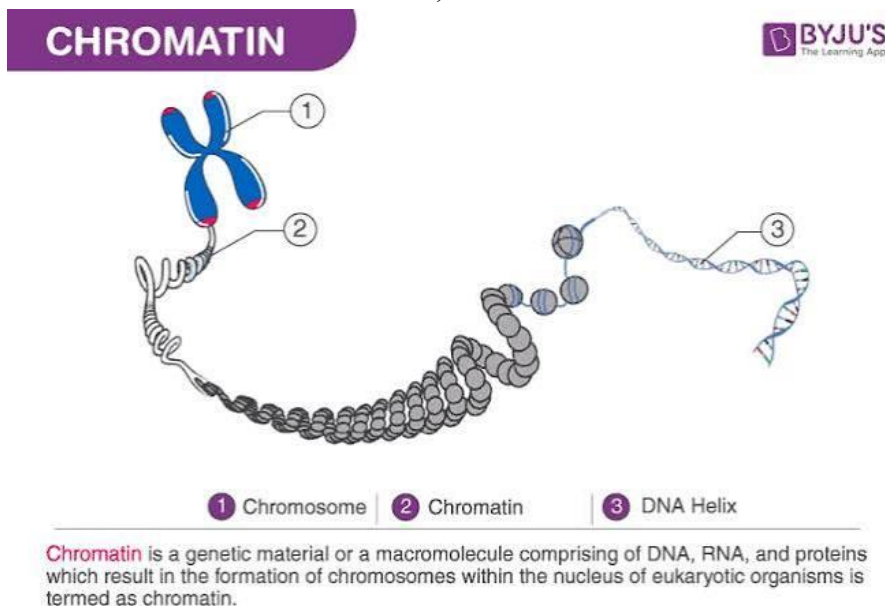
It is a fine network of thread-like structure made up of DNA or RNA. It gets condensed to form chromosomes.

Chromosomes

The chromosomes are made from chromatin material and are located in the cell.

Genes

Genes are found in chromosomes,



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

Ans: The functions of nucleus of a cell are as follows:

- (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.

6. 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

7. 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).

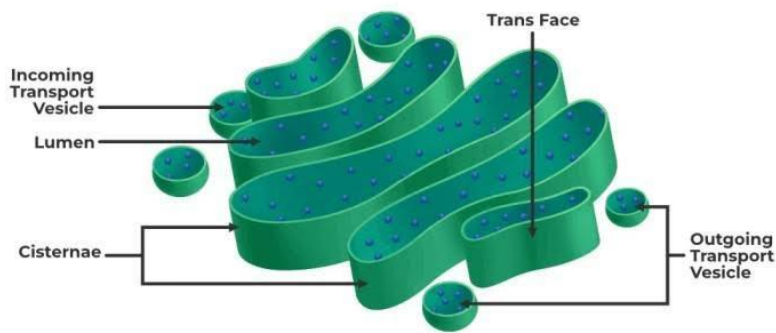
Functions:

(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.



9. 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

10. Explain the structure and functions of the endoplasmic reticulum (ER). Differentiate between RER and SER.

Ans:

The endoplasmic reticulum (ER) is a large network of interconnected membrane-bound tubes and sheets (cisternae) found in the cytoplasm of eukaryotic cells. It serves as a channel for intracellular transport and provides a surface for various biochemical activities.

There are two types:

1. **Rough Endoplasmic Reticulum (RER):** Appears rough due to ribosomes attached to its surface. Its main function is protein synthesis and modification, as ribosomes are sites of protein manufacture.

2. **Smooth Endoplasmic Reticulum (SER):** Lacks ribosomes, appearing smooth. It is involved in the synthesis of lipids (fats), steroids, detoxification of drugs and poisons, and storage of calcium ions.

11. Describe the structure and function of the nucleus in a eukaryotic cell.

Ans:

The nucleus is a prominent, usually spherical organelle in eukaryotic cells, enclosed by a double-layered nuclear membrane (nuclear envelope) that has pores. These pores regulate the movement of substances between the nucleus and cytoplasm. Inside, the nucleus contains chromosomes, which are made of DNA and proteins. DNA carries genetic information. The nucleus controls cell activities, including growth and reproduction (cell division), and directs

protein synthesis by sending instructions via RNA. It also contains a nucleolus, involved in ribosome synthesis.

FIVE MARKS QUESTIONS

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

Ans;The difference hypotonic solution, isotonic solution and hypertonic solution are following:

Hypotonic Solution

External solution having higher concentration of water than the cell cytoplasm is known as hypotonic solution.

Cell swells up in this solution

Isotonic Solution

External solution having exactly the same concentration of water as that of cell cytoplasm is called isotonic solution.

Cell size does not alter.

Hypertonic Solution

External solution having lower concentration of water than a cell cytoplasm is called hypertonic solution.

Cell shrinks in this solution

2. Write a note on the structure of cell.

Ans:(i) 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.

(ii) 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.

(iii) 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.

(iv) 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.

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

Differences between plant and animal cell

Plant cell	Animal cell
1. Plant cell has an outer rigid cell wall, made up of cellulose	Cell wall is absent. Plasma membrane is the outermost covering.
2. Plant cell has a distinct, definite shape because of the rigid cell wall. So, the shape of cell is permanent.	The shape of the animal cell is not so definite. It can change its shape.
3. Plant cell contains plastids. Most important of this is the green chloroplast.	Plastids are absent.
4. Vacuoles are fewer and larger.	Vacuoles are either absent or very small in number and size.
5. Centrosome is present only in the cells of some lower plants.	All the animal cells have centrosomes
6. Dictyosome (Golgi complex) is dispersed throughout the cytoplasm. It comprises stacks of single membranous lamellar discs.	Golgi complex is organized in the cytoplasm. It appears as shallow saucer shaped body or narrow neck bowl-like form. It consists of interconnecting tubules in distal region.
7. Lysosomes are found only in the eukaryotic plant cells.	Found in all cells.
8. Plant cell is larger than the animal cell.	Animal cell is small in size.
9. Mostly, starch is the storage material.	Glycogen is the storage material
10. During cytoplasmic division a cell plate is formed in the centre of the cell.	During cytoplasmic division a furrow appears from the periphery to the centre of the cell.

4. Write short notes on Golgi complex

Ans; GOLGI COMPLEX

Discovery: Identified by Camillo Golgi in 1898.

Other Names: Dictyosomes (in plants).

Golgi Apparatus

Structure:

The Golgi complex is made up of:

1. Cisternae: Flattened sacs arranged in stacks (4-8 layers).
2. Tubules: Branched tubes linked to the cisternae.
3. Vacuoles: Large, membrane-bound structures.
4. Vesicles: Small sacs containing materials for secretion.

Functions:

1. Modifies, stores, and packages cellular products like proteins and lipids.
2. Produces lysosomes and secretory vesicles.
3. Synthesizes glycoproteins and glycolipids.
4. Forms the acrosome in sperm cells.
5. Plays a role in forming the cell wall and cell plate during division.
6. Secretes egg membranes like the vitelline layer.

5. Write a detailed notes on mitochondria Dysfunction

Ans; . Mitochondrial Dysfunction

Leigh Syndrome is a severe neurological disorder caused by mitochondrial dysfunction, where the cell's "power plants" fail to produce enough energy (ATP) for the body to function.

The Defect: Mutations in mitochondrial or nuclear DNA disrupt the Respiratory Chain (the machinery that creates energy).

The Impact: The brain and muscles, which require the most energy, begin to fail. This leads to neurodegeneration and visible lesions in the brain's basal ganglia.

The Solution: Medical science has developed a way to prevent this through Mitochondrial Replacemtn Therapy (MRT), often called "Three-Parent IVF":

Nuclear Transfer: The mother's nucleus (carrying the parents' traits) is removed from her egg.

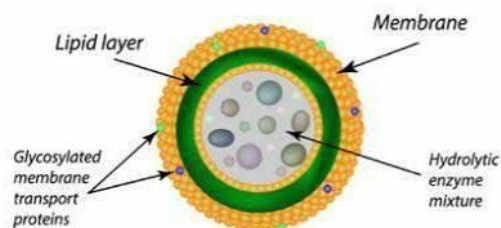
1. Healthy Donor: It is placed into a donor egg that has healthy mitochondria but has had its own nucleus removed.

2. Result: The child inherits the parents' physical characteristics but avoids the fatal mitochondrial disease.

6. Write notes on lysosomes ,its types and functions

Ans; LYSOSOME

Lysosome



It was first identified and named by Christian De Duve in 1955, are spherical, bag-like structures ranging in size from 0.1 to 0.8 μm . They are surrounded by a single membrane and are present in almost all cells, except mammalian red blood cells. These organelles contain around 50 types of digestive enzymes called acid hydrolases. Lysosomes are polymorphic, meaning they exist in different forms depending on their functional and physiological state.

Types of Lysosomes:

1. Primary Lysosomes (Storage Granules): These are newly formed lysosomes that store inactive acid hydrolase enzymes.

Rapid and uncontrolled division

Formation of a tumor (mass of abnormal cells)

Cells may invade nearby tissues

Can spread to other organs through blood or lymph (metastasis)

Causes of Cancer

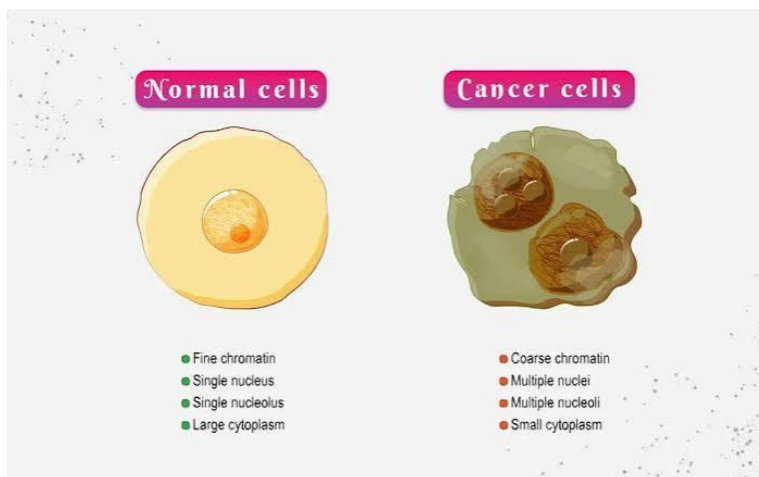
Cancer can be caused by factors that damage the DNA of cells. These include:

Smoking and tobacco

Radiation (UV rays, X-rays)

Harmful chemicals

Genetic mutations



Certain viruses

These factors can change the genes that control cell growth and division

Tumors; There are two types of tumors:

Benign Tumor

Non-cancerous

Grows slowly

Does not spread to other parts of the body

Malignant Tumor

Cancerous

- Grows rapidly

Can spread to other organs (metastasis)

Cancer cells can break away from the original tumor, travel through system, and form new tumors in other parts of the body.

Prevention of Cancer

Avoid tobacco and smoking

Eat a healthy diet

Protect skin from excess sunlight

Exercise regularly

Go for regular medical checkups

8. What are the recent advancements in Cell biology

Ans; **RECENT ADVANCEMENTS IN CELL BIOLOGY-**

Recent advancements in cell biology have helped scientists understand how cells work, grow, and interact. These discoveries are important for medicine, disease treatment, and biotechnology.

1. Stem Cell Research

Stem cells are special cells that can develop into different types of cells in the body.

They can divide many times and differentiate into specialized cells such as nerve cells, muscle cells, or blood cells.

Scientists use stem cells to repair damaged tissues and treat diseases like blood disorders and spinal injuries.

Modern research also creates patient-specific stem cells for studying diseases and developing treatments.

Example: Stem cell therapy is used in bone marrow transplants to treat blood cancers

2. Gene Editing Technology (CRISPR)

Gene editing allows scientists to change or correct DNA inside cells.

A powerful tool called CRISPR-Cas9 can cut and modify genes with high precision.

It helps researchers study gene functions, treat genetic diseases, and improve crops.

Scientists also use CRISPR screens to discover genes involved in cell growth and cancer.

3. Organoid Technology (Mini-Organs in the Lab)

Scientists can now grow tiny organ-like structures called organoids from stem cells in laboratories.

❖ Organoids mimic the structure and function of real human organs such as the brain, liver, intestine.

→ They help researchers study diseases and test new medicines without using animals
These 3-D cell models

4. Advanced Cell Imaging Techniques

Modern microscopes allow scientists to observe living cells in real time.

Techniques like live single-cell imaging track cell behavior, movement, and division.

Researchers can study cell signaling and cell interactions in detail.

5. Cell Culture and Tissue Engineering

Scientists grow cells in controlled laboratory environments called cell cultures.

Special methods allow cells to grow in ways that imitate natural tissues.

These cultures help in testing drugs, studying diseases, and developing artificial tissues.

Recent advancements in cell biology - such as stem cell research, gene editing, organoids,

advanced imaging, and cell culture techniques - have greatly improved our understanding of
These discoveries are helping scientists develop new treatments for diseases and improve human health.

