1. In 1665 who discovered the cell

(a) Robert Hook

(b) AG Lowey

(c) Robert brown

(d) Huxley

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(d) Huxley

Discoverer of Cell

- In 1665, Robert Hooke, an English scientist, discovered cells by observing a slice of cork under a microscope he designed himself.
- He noticed honeycomb-like compartments and named them cells, remarking that they looked similar to cellula, or small rooms inhabited by monks.
- Hooke illustrated and described the cells in his 1665 book Micrographia, which was a bestseller at the time.
- He also described the cell as the basic unit of life.

2. Nematocyst is a

(a) Cell

(b) Group of cells

(c) Organ

(d) Part of a cell

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(a) Cell

(b) Group of cells

(c) Organ

(d) Part of a cell

Nematocyst

- It is a minute, elongated capsule produced in the cells called cnidoblasts of members of Phylum Cnidaria such as jellyfishes, and sea anemones.
- A cnidocyte is an explosive cell containing one large secretory organelle called a cnidocyst that can deliver a sting to other organisms.

3. Cell wall consists of

(a) Lignin, Hemi cellulose, Pectin and Lipid

(b) Lignin, Hemi cellulose, Pectin and cellulose

(c) Lignin Hemi cellulose, Protein and Lipid

(d) Hemi cellulose, Cellulose, Tubulin and lignin

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Cell Wall

- The plant cell wall is generally arranged in three layers and composed of carbohydrates, such as pectin, ligmon, cellulose, hemicellulose, and other smaller amounts of minerals, which form a network along with structural proteins to form the cell wall.

4. Which of the following diffuses most rapidly across the cell membrane

(a) CO

(b) Glucose

(c) Urea

(d) Amino acid

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(a) CO

(b) Glucose

(c) Urea

(d) Amino acid

Cell Wall

- They are semi-permeable, which means that some molecules can diffuse across the lipid bilayer but others cannot. Small hydrophobic molecules and gases like oxygen and carbon dioxide cross membranes rapidly. Small polar molecules, such as water and ethanol, can also pass through membranes, but they do so more slowly.

5. The powerhouse of the cell is

(a) Golgi bodies

(b) Mitochondria

(c) Ribosomes

(d) Nucleus

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(a) Golgi bodies

(b) Mitochondria

(c) Ribosomes

(d) Nucleus

Cell Organelle

Organelles	Description
Nucleus	• It is the largest structure present almost at the center of a cell. The nucleus contains. • Nucleus: it is a highly coiled filamentous structure present in the nucleus • Chromatin: these are fibrous threads present in the nucleus
Mitochondria	• The mitochondria are made up of proteins, phospholipids and some ribonucleic acid. • Also known as the “power house” of a cell because “Adenosine tri phosphate” (ATP) is produced in mitochondria.

6. The modifying, sorting and packaging of proteins for secretion in cell is carried out by

(a) Lysosomes
(b) Golgi bodies
(c) Ribosomes
(d) RNA

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(a) Lysosomes

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Golgi Body

- Its main function is the packaging and secretion of proteins. It receives proteins from Endoplasmic Reticulum. It packages it into membrane-bound vesicles, which are then transported to various destinations, such as lysosomes, plasma membrane or secretion. They also take part in the transport of lipids and the formation of lysosomes.
- Post-translational modification and enzymatic processing occur near the membrane surface in Golgi bodies, e.g. phosphorylation, glycosylation, etc.
- Golgi apparatus is the site for the synthesis of various glycolipids, sphingomyelin, etc.

7. Cells are enclosed by a plasma membrane composed mainly of

(a) Proteins and emulsified fats
(b) Lipids and emulsified fats
(c) Fats and carbohydrates
(d) Lipids and proteins

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(b) Lipids and emulsified fats

(c) Fats and carbohydrates

(d) Lipids and proteins

Plasma Membrane

- The plasma membrane is composed of lipids (phospholipids and cholesterol), proteins, and carbohydrates attached to lipids and proteins. The fluid mosaic model of the plasma membrane describes the plasma membrane as a fluid combination of phospholipids, cholesterol, and proteins.

8. Glycolysis occurs in

(a) Mitochondria

(b) Cytoplasm

(c) SER

(d) Nucleus

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(a) Mitochondria

(b) Cytoplasm

(c) SER

(d) Nucleus

Cytoplasm

- The enzymes required for Glycolysis process are found in Cytoplasm. Glycolysis is an anaerobic & aerobic process in which glucose is broken down to extract energy for cellular metabolism.

9. Which of the following having fast cell division

(a) Epithelial tissue
(b) Connective tissue
(c) Muscular tissue
(d) Nervous tissue

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(a) Epithelial tissue

(b) Connective tissue

(c) Muscular tissue

(d) Nervous tissue

Epithelial Cells

- Epithelial cells comprise the skin and skin-like linings that coat internal organs, giving organs a protective barrier so they can function properly. Cells turn over very quickly in epithelia. To maintain healthy cell densities, an equal number of cells must divide and die.

10. Function of Golgi apparatus is

(a) Synthesis of ribosomes

(b) Synthesis of proteins

(c) Breakdown of toxic substances

(d) Transport of proteins

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(b) Synthesis of proteins

(c) Breakdown of toxic substances

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11. Site of degradation of unneeded damaged or faulty proteins is

(a) Mitochondria

(b) Ribosomes

(c) Lysosomes

(d) Proteasome

11. Site of degradation of unneeded damaged or faulty proteins is

(a) Mitochondria

(b) Ribosomes

(c) Lysosomes

(d) Proteasome

Proteasome

- Proteasomes are multisubunit complexes that catalyze the majority of protein degradation in mammalian cells to maintain protein homeostasis and influence the regulation of most cellular processes.

12. Ribosome is a site for production of

(a) Nucleic acids
(b) Vitamins
(c) Chromosomes
(d) Proteins

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(a) Nucleic acids

(b) Vitamins

(c) Chromosomes

(d) Proteins

Ribosome

- A ribosome is an intercellular structure made of both RNA and protein, and it is the site of protein synthesis in the cell. The ribosome reads the messenger RNA (mRNA) sequence and translates that genetic code into a specified string of amino acids, which grow into long chains that fold to form proteins.

13. Which of the following microorganisms is prokaryotic

(a) Protozoa

(b) Algae

(c) Bacteria

(d) Fungi

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(a) Protozoa

(b) Algae

(c) Bacteria

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DIFFERENCE BETWEEN EUKARYOTIC AND PROKARYOTIC CELLS

Definitions / description	Eukaryotic cell	Prokaryotic cell
Organisms:	Plants, animals and fungi have eukaryotic cells.	Only bacteria and Cyanobacteria have prokaryotic cells.
Cell wall:	No (animals); Yes (plants)	Yes
Centrioles:	Yes (all animals and some lower plant forms)	NO
Cilia and Flagella:	Yes, simple	Yes, complex
Golgi Complex:	Yes	NO
Lysosomes:	Common in animals; Not present in plants	NO
Peroxisomes:	Yes	NO
Nucleus:	Yes	NO
Plasma membrane:	Yes	Yes
Chromosomes:	Several chromosomes	One long DNA strand
Ribosomes:	Yes	Yes
Endoplasmic Reticulum	Present	Absent

14. Depending upon the capacity to divide, the cells of the body can be divided into 3 groups. Identify the CORRECT description

(a) Stable cells decrease or lose their ability to proliferate after adolescence but retain capacity to multiply throughout adult life

(b) Permanent cell lose their ability to proliferate but keeps on multiplying through out the life span

(c) Stable cells continue to multiply throughout life under normal physiologic conditions

(d) Labile cells decrease or lose their ability to proliferate after adolescence but retain capacity to multiply throughout adult life

14. Depending upon the capacity to divide, the cells of the body can be divided into 3 groups. Identify the CORRECT description

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(c) Stable cells continue to multiply throughout life under normal physiologic conditions

(d) Labile cells decrease or lose their ability to proliferate after adolescence but retain capacity to multiply throughout adult life

- Stable cells, also known as quiescent cells, are cells that do not normally proliferate frequently but can re-enter the cell cycle to divide if needed.
- These cells have a low level of replication under normal conditions. They can be stimulated to proliferate by external factors, such as tissue injury.
- It's not entirely accurate to say that stable cells decrease or lose their ability to proliferate after adolescence. Stable cells are inherently low in proliferation activity throughout life but retain the capacity to divide when needed.
- It is correct that stable cells retain the capacity to multiply throughout adult life. This proliferative response can be triggered by specific stimuli, such as tissue damage or increased demand for cell function.

15. How many chromosomes are there in the human beings

(a) 46
(b) 48
(c) 40
(d) 44

15. How many chromosomes are there in the human beings

(a) 46

(b) 48

(c) 40

(d) 44

Chromosomes

- Humans typically have 23 pairs of chromosomes, or 46 chromosomes in total. Chromosomes are made up of long strands of DNA, which contain all the body's genes.

16. DNA Replication and Transcription is the function of which subcellular organelle

(a) Endoplasmic Reticulum
(b) Nucleus
(c) Golgi body
(d) Lysosome

16. DNA Replication and Transcription is the function of which subcellular organelle

(a) Endoplasmic Reticulum

(b) Nucleus

(c) Golgi body

(d) Lysosome

Nucleus

- It is the largest structure present almost at the center of a cell. The nucleus contains.
- Nucleus: it is a highly coiled filamentous structure present in the nucleus.
- Chromatin: these are fibrous threads present in the nucleus.
- DNA replication, transcription, and RNA processing all take place within the nucleus, with only the final stage of gene expression (translation) localized to the cytoplasm.

17. Chromosome are presents

(a) Nucleolus

(b) Nucleus

(c) Cytoplasm

(d) Lysosome

17. Chromosome are presents

(a) Nucleolus

(b) Nucleus

(c) Cytoplasm

(d) Lysosome

Chromosome

- Chromosomes are thread-like structures located inside the nucleus of animal and plant cells. Each chromosome is made of protein and a single molecule of deoxyribonucleic acid (DNA). Passed from parents to offspring, DNA contains the specific instructions that make each type of living creature unique.
- Chromosomes are structures found in the center (nucleus) of cells that carry long pieces of DNA.

18. The suicidal bags of the cell are

(a) Ribosomes

(b) Golgi bodies

(c) Mitochondria

(d) Lysosomes

18. The suicidal bags of the cell are

(a) Ribosomes

(b) Golgi bodies

(c) Mitochondria

(d) Lysosomes

Lysosome

- They are small, spherical or oval bodies surrounded by a single membrane.
- They damaged intracellular organelles are also broken down and digested by the lysosomes.
- Therefore, lysosomes are also called as “Suicidal bag of the cell”.

19. Engulfment of membranous organ is done with

(a) Lysosome
(b) Endoplasmic reticulum
(c) Mesosome
(d) Golgi apparatus

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(a) Lysosome

(b) Endoplasmic reticulum

(c) Mesosome

(d) Golgi apparatus

Lysosome

- Lysosomes contain a variety of enzymes, enabling the cell to break down various biomolecules it engulfs, including peptides, nucleic acids, carbohydrates, and lipids (lysosomal lipase). The enzymes responsible for this hydrolysis require an acidic environment for optimal activity.

20. The condensation of chromatin and shrinkage of the nucleus leading to cell death termed as

(a) Autophagy
(b) Karyolysis
(c) Karyorrhexis
(d) Pyknosis

20. The condensation of chromatin and shrinkage of the nucleus leading to cell death termed as

(a) Autophagy

(b) Karyolysis

(c) Karyorrhexis

(d) Pyknosis

- **“Pyknosis”** refers to the condensation of nuclei and chromatin, which is often observed in cells undergoing apoptosis.
- **Autophagy** is the natural, conserved degradation of the cell that removes unnecessary or dysfunctional components through a lysosome-dependent regulated mechanism.
- **Karyolysis** is the complete dissolution of the chromatin of a dying cell due to the enzymatic degradation by endonucleases.
- **Karyorrhexis** is the destructive fragmentation of the nucleus of a dying cell whereby its chromatin is distributed irregularly throughout the cytoplasm.

21. DNA is mainly present in

(a) Ribosome

(b) Nucleus

(c) Plasma membrane

(d) None of these

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(a) Ribosome

(b) Nucleus

(c) Plasma membrane

(d) None of these

Nucleus

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- Nucleus: it is a highly coiled filamentous structure present in the nucleus.
- Chromatin: these are fibrous threads present in the nucleus.
- Chromosome, DNA are present.
- DNA replication, transcription, and RNA processing all take place within the nucleus, with only the final stage of gene expression (translation) localized to the cytoplasm.

22. Acid phosphatase is the marker enzyme for which subcellular fraction

(a) Cytosol

(b) Peroxisomes

(c) Lysosomes

(d) Microsomes

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(a) Cytosol

(b) Peroxisomes

(c) Lysosomes

(d) Microsomes

Lysosome

- Acid phosphatase is a marker enzyme for lysosomes in subcellular fractionation studies. It's a hydrolytic enzyme that cleaves terminal phosphate groups and works best in acidic conditions. It's found in high levels in erythrocytes and prostatic tissue.

23. Ribosomes helps in

(a) Protein synthesis

(b) Photosynthesis

(c) Lipid synthesis

(d) Respiration

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(a) Protein synthesis

(b) Photosynthesis

(c) Lipid synthesis

(d) Respiration

Ribosome

- A ribosome is an intercellular structure made of both RNA and protein, and it is the site of protein synthesis in the cell. The ribosome reads the messenger RNA (mRNA) sequence and translates that genetic code into a specified string of amino acids, which grow into long chains that fold to form proteins.

24. All of the following post translational modifications are occur within the Golgi EXCEPT

(a) Acetylation of Histones
(b) Sulphation of Secretory proteins
(c) Phosphorylation of Casein
(d) N-Glycosylation of Extra Cellular Matrix proteins

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(a) Acetylation of Histones

(b) Sulphation of Secretory proteins

(c) Phosphorylation of Casein

(d) N-Glycosylation of Extra Cellular Matrix proteins

Posttranslational Modification

- Before sending to the target sites, proteins get modified. This modification is called a post-translational modification. These modifications like phosphorylation, methylation, glycosylation, etc are done in the ER and Golgi apparatus.

25. Protein subunit found within microtubules is

(a) Collagen

(b) Tubulin

(c) Myosin

(d) DNA

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(a) Collagen

(b) Tubulin

(c) Myosin

(d) DNA

Microtubules

- The protein subunit found within microtubules is tubulin, which is made up of two globular proteins called alpha and beta tubulin. These proteins are arranged into linear protofilaments, which then associate laterally to form a hollow tube called a microtubule.

26. Select the CORRECT match for tissue macrophages

(a) Epithelioid cells are modified macrophages seen in granulomatous inflammation

(b) Kupffer cells are the macrophages of the kidney

(c) Histiocytes are macrophages which are absent in connective tissues

(d) Reticulum cells are the macrophages of connective tissues

26. Select the CORRECT match for tissue macrophages

(a) Epithelioid cells are modified macrophages seen in granulomatous inflammation

(b) Kupffer cells are the macrophages of the kidney

(c) Histiocytes are macrophages which are absent in connective tissues

(d) Reticulum cells are the macrophages of connective tissues

Macrophage

- Epithelioid cells are modified macrophages that form during granulomatous inflammation. Granulomatous inflammation is a response to an irritant that's hard to digest, and it's characterized by the accumulation of activated macrophages that form epithelioid cells around the irritant.

27. Adipose tissue is an example of tissue

(a) Connective
(b) Muscle
(c) Epithelial
(d) Nervous

27. Adipose tissue is an example of tissue

(a) Connective

(b) Muscle

(c) Epithelial

(d) Nervous

Connective Tissue

- Adipose tissue, also known as body fat, is a loose connective tissue that stores energy in the form of lipids. It's made up of fat cells, called adipocytes, which contain large globules of fat called lipid droplets.
- Adipose tissue also contains other types of cells, including preadipocytes, fibroblasts, vascular endothelial cells, and immune cells.

28. Which of the following protects and supports the body and its organs

(a) Epithelial tissue
(b) Connective tissue
(c) Muscular tissue
(d) Nervous tissue

28. Which of the following protects and supports the body and its organs

(a) Epithelial tissue

(b) Connective tissue

(c) Muscular tissue

(d) Nervous tissue

Connective Tissue

- Connective tissue is the most abundant, widely distributed, and varied type of tissue in humans and animals. As the name implies, connective tissues often bind other organs together, hold organs in place, cushion them, and fill space.

Loose connective tissues	• Areolar and adipose tissues
Dense connective tissues	• White fibrous connective tissue. • Yellow elastic connective
Reticular connective tissue	• Present in the liver, spleen, lymph nodes, thymus and tonsils etc.
Pigmented connective tissue	• Cells are irregular in shape and are called pigment cell. • Skeletal tissue is a specialized connective tissue. • It includes cartilage and bone.

29. The adipose tissue in new born is called

(a) Brown fat
(b) White fat
(c) Yellow fat
(d) Black fat

29. The adipose tissue in new born is called

(a) Brown fat

(b) White fat

(c) Yellow fat

(d) Black fat

Adipose Tissue

- Brown adipose tissue (BAT), also known as brown fat, is the type of adipose tissue found in newborns. BAT is essential for helping newborns adapt to life outside the womb and maintain their body temperature, especially when they can't shiver to generate heat.

30. During the cell division _____ is produced

(a) White blood cells

(b) Red blood cells

(c) Deoxyribose nucleic acid

(d) Bacteriophages

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(a) White blood cells

(b) Red blood cells

(c) Deoxyribose nucleic acid

(d) Bacteriophages

- DNA synthesis takes place during the S phase of interphase. S phase (synthesis phase) is the part of the cell cycle in which DNA is replicated, occurring between G1 phase and G2 phase.

31. Nuclear envelope reappears at

(a) Metaphase
(b) Anaphase
(c) Cytokinesis
(d) Telophase

31. Nuclear envelope reappears at

(a) Metaphase

(b) Anaphase

(c) Cytokinesis

(d) Telophase

Phases of Cell Division

Phase	Description
Prophase	• Chromosomes contract spiral and become visible even light microscope and nucleoli become smaller (material to chromosomes.) • Chromosomes split lengthwise to from chromatids connected by centromeres. • Nuclear membrane disappears. • Centrosomes, containing rod-like controls, divide and from ends of spindle (probably animal cells only).
Metaphase	• Chromosomes move to spindle equator, centromeres attached to spindle fibres. • Centromeres split to separating the chromatids.

Phase	Description
Anaphase	• Spindle fibres attached to centromeres contract, pulling, chromatids towards chromosomes). • Nuclear membrane form round the daughter nuclei. • Cell membrane pinches in to form dawn across spindle equator (plants) • Nucleus divides into two and division of cytoplasm starts.
Telophase	• Chromatids elongate, become invisible, (replication at this stage to become chromosomes). • Nuclear membrane form round the daughter nuclei. • Cell membrane pinches in to from dawn across spindle equator (plants) • Nucleus divides into two and division of cytoplasm starts.

32. The phase of the cell cycle during which the cell may leave the cell cycle is

(a) G_0

(b) S

(c) M

(d) G_1

32. The phase of the cell cycle during which the cell may leave the cell cycle is

(a) G_0

(b) S

(c) M

(d) G_1

Cell Cycle

- G1 phase (Gap 1) – G1 phase is the phase of the cell between mitosis and initiation of replication of the genetic material of the cell. During this phase, the cell is metabolically active and continues to grow without replicating its DNA.
- S phase (Synthesis) – DNA replication takes place during this phase. If the initial quantity of DNA in the cell is denoted as 2N, then after replication it becomes 4N. However the number of chromosomes does not vary, viz., if the number of chromosomes during G1 phase was 2n, it will remain 2n at the end of S phase. The centriole also divides into two centriole pairs in the cells which contain centriole.
- G2 phase (Gap 2) –During this phase, the RNA, proteins, other macromolecules required for multiplication of cell organelles, spindle formation, and cell growth are produced as the cell prepares to go into the mitotic phase.
- M phase - This is the mitotic phase or the phase of the equational division as the cell undergoes a complete reorganization to give birth to a progeny that has the same number of chromosomes as the parent cell.

33. In which of the following step of mitosis, 46 chromosomes present as complementary

(a) Anaphase
(b) Prophase
(c) Telophase
(d) Metaphase

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(a) Anaphase

(b) Prophase

(c) Telophase

(d) Metaphase

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34. Meiosis occurs for the human female in

(a) Pancreas

(b) Liver

(c) Ovaries

(d) Kidney

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(a) Pancreas

(b) Liver

(c) Ovaries

(d) Kidney

Meiosis in Female

- In human females, meiosis occurs in the ovaries during gametogenesis. Meiosis is a two-step process that involves a diploid cell (46 chromosomes) dividing to form two haploid cells (23 chromosomes). This process is vital for reproduction and ensures that the fertilized egg has the correct amount of genetic material.

35. Which of the following is a jellylike substance found floating inside the plasma membrane

(a) Cell sap
(b) Cytoplasm
(c) Karyoplasm
(d) Mitochondria

35. Which of the following is a jellylike substance found floating inside the plasma membrane

(a) Cell sap

(b) Cytoplasm

(c) Karyoplasm

(d) Mitochondria

Cytoplasm

- Cytoplasm is the jelly-like substance present between the cell membrane and the nucleus. It is mainly composed of water, salts, and proteins. All the membrane bound cell organelles like endoplasmic reticulum, golgi complex, etc are present in the cytoplasm.

36. Which of the following cell organelles is present in plant cells and absent in animal cells

(a) Nucleus
(b) Vacuole
(c) Chloroplast
(d) Cytoplasm

36. Which of the following cell organelles is present in plant cells and absent in animal cells

(a) Nucleus

(b) Vacuole

(c) Chloroplast

(d) Cytoplasm

Plant Cell

- Plastids, glyoxysomes, plasmodesmata, Chloroplast (for the preparation of food) are found in the Plant cells but not present in Animal cells.

37. The function of the centrosome is

(a) Formation of spindle fibres

(b) Osmoregulation

(c) Secretion

(d) Protein synthesis

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(a) Formation of spindle fibres

(b) Osmoregulation

(c) Secretion

(d) Protein synthesis

Centrosomes

- The centrosomes help in cell division. They maintain the chromosome number during cell division. They also stimulate the changes in the shape of the cell membrane by phagocytosis. In mitosis, it helps in organizing the microtubules ensuring that the centrosomes are distributed to each daughter cell.

38. Which of the following cell organelles is involved in the storage of food, and other nutrients, required for a cell to survive

(a) Vacuoles
(b) Lysosomes
(c) Mitochondria
(d) Cell membrane

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(a) Vacuoles

(b) Lysosomes

(c) Mitochondria

(d) Cell membrane

Vacuoles

- The term “vacuole” means “empty space”. They help in the storage and disposal of various substances. They can store food or other nutrients required by a cell to survive. They also store waste products and prevent the entire cell from contamination.

39. What structure of the cell is responsible for packaging DNA, reinforcing mitosis, preventing DNA damage, and controlling DNA replication

(a) Chromatin
(b) Glycosome
(c) Nucleus
(d) Plasma membrane

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(a) Chromatin

(b) Glycosome

(c) Nucleus

(d) Plasma membrane

Chromatin

- Chromatin is a complex of macromolecules found in cells, consisting of DNA, protein and RNA. The primary functions of chromatin are to pack DNA into a smaller volume to fit in the cell, to reinforce the DNA macromolecule to allow mitosis, to prevent DNA damage, and to control gene expression and DNA replication.

40. Which cell organelle is involved in apoptosis?

(a) Lysosome
(b) ER
(c) Golgi
(d) Mitochondria

40. Which cell organelle is involved in apoptosis?

(a) Lysosome

(b) ER

(c) Golgi

(d) Mitochondria

Mitochondria

- Mitochondria play a pivotal role in apoptosis. Apoptosis or programmed cell death can be initiated by both intracellular and extracellular signals. Mitochondria are responsible for mediating apoptosis initiated by intracellular signals. These are membrane-bound, rod-shaped organelles found in most eukaryotic organisms.