

Chap 4 (The Cell) F.Sc 1st Year Biology

Chapter 4: The Cell (Short Questions Answers)

What are chloroplasts?

In photosynthetic plant cells, there are membrane-bound structures containing a green pigment, called chloroplast.

What are the main components of chloroplasts seen under electron microscope?

Under electron microscope, a chloroplast shows three main components i.e.,

- the envelope
- the stroma
- the thylakoid

How grana are interconnected? or What do you know about intergranum?

Each granum is inter-connected with other by the non-green part called intergranum.

What is the shape of nucleus?

Nucleus may be irregular or spherical in shape.

What does nucleus contain?

Nucleus contains chromatin network and soluble sap called nucleoplasm.

What does nucleus consist of?

Nucleus consists of nuclear membrane, nucleoli, nucleoplasm and chromosomes.

What are thylakoids?

Thylakoids are the flattened vesicles which arrange themselves to form grana and intergrana.

When nucleus of the cell is visible?

Nucleus is only visible when the cell is in non-dividing stage.

What is the composition of primary wall?

The primary wall is composed of cellulose and some deposition of pectin and hemicelluloses.

What is the cause of Tay-Sach's disease?

Tay-Sachs disease is because of absence of a particular enzyme that is involved in the catabolism of lipids.

With which enzymes peroxisomes are enriched?

Peroxisomes are enriched with some oxidative enzymes such as peroxidase, catalase, glycolic acid oxidase and some other enzymes.

Name the organelle which is present only during a short period in the germination of the lipid-rich seed.

The organelle which is present only during a short period in the germination of the lipid-rich seed is glyoxisome.

How does the central atom of chlorophyll and haem differ?

Chlorophyll has Mg^{2+} while haem has Fe^{2+} as the central atom.

What do you mean by multinucleate cells?

Generally, the cells with more than two nuclei are called multinucleate.

What did Schwann and Schleiden find about the parts of cell?

Schwann and Schleiden found that the cell consisted of 3 basic parts, i.e., nucleus, the fluid (cytoplasm) surrounding the nucleus, and an outer thin covering or membrane (plasma membrane).

How Louis Pasteur (1862) supplied experimental proof for Virchow's hypothesis?

Louis Pasteur (1862) supplied experimental proof for Virchow's hypothesis by demonstrating that microorganisms (i.e., bacteria) could be formed only from existing microorganisms (bacteria).

What did August Weismann (1880) say about the cell?

August Weismann (1880) said that all presently living cells have a common origin because they have basic similarities in structure and molecules etc.

What is the function of muscle, nerve and gland cells?

Muscle cells contract and relax. Nerve cells transmit impulses. Gland cells secrete their hormones.

What is the function of red blood and stomach cells?

Red blood cells carry oxygen. Some stomach cells secrete gastric juice.

What is the function of xylem and phloem?

Xylem cells conduct water and mineral salts from soil to the aerial parts of the plant while phloem cells transport food.

What is the functional difference among sclerenchymatous, chlorenchymatous and parenchymatous cells?

Sclerenchymatous cells give support to the plant. Chlorenchymatous cells carry out photosynthesis. Parenchymatous cells store surplus food.

What are storage diseases? Name two storage diseases in man.

Several congenital diseases have been found to be due to accumulation within the cell of substances such as glycogen or various glycolipids. These are also called storage disease. Examples are Glycogenosis type II disease and Tay-Sach's disease.

How storage diseases are caused?

Storage diseases are produced by a mutation that affect one of the lysosomal enzymes involved in the catabolism of a certain substance.

What is cell fractionation?

It is the process by which various components of cells including their organelles are isolated. During cell fractionation, the tissues are homogenized or disrupted with special instruments and the various parts of the cells are separated by density gradient centrifugation.

How big could be the eukaryotic cell?

Eukaryotic cells could be as big as an Ostrich's egg.

How many metres are there in one μm ?

One μm is 0.000,001 metre or 1×10^6 of a metre.

Why cell membrane is called differentially permeable or selectively permeable membrane?

Cell membrane allows only selective substances to pass through it, thus it is known as differentially permeable or selectively permeable membrane.

What are chromosomes? Why they are important?

During cell division chromatin material is converted into darkly stained thread like structures known as chromosomes. Under a compound microscope, chromosomes appear to be made of arms and centromeres. All the information necessary to control

the activities of the cell is located on the chromosomes in the form of genes. Genes are transferred from one generation to the other.

What is centromere?

Each chromosome consists of two identical chromatids at the beginning of cell division which are held together at centromere. Centromere is the place on the chromosome where spindle fibres are attached during cell division.

How many chromosomes are present in man, frog, chimpanzee, fruit fly, Drosophila melanogaster, onion, potato and garden pea?

There are 46 chromosomes in man, 26 in frog, 48 in Chimpanzee, 8 in the fruit fly, Drosophila melanogaster, 16 in onion, 48 in potato and 14 in garden pea.

How does chromosome number vary in normal and germ cells?

The number of chromosomes in normal body cells are diploid ($2n$) but Haploid (half) chromosome number (n) is present in germ cells.

How many chromosomes are present in Human and Drosophila sperms and eggs?

Human sperms and eggs have 23 chromosomes while those of Drosophila have 4 chromosomes.

What are membrane bound structures or organelles?

Mitochondria, endoplasmic reticulum, Golgi bodies and chloroplasts etc., are known as membrane bound structures. They are present in eukaryotic cell but absent in prokaryotic cell.

Define endocytosis.

The inward movement of the materials by infolding of cell membrane in the form of vacuole is known as endocytosis.

Which part of the cell secrete cell wall?

Cell wall is secreted by the protoplasm of the cell.

What does show that cell wall is non-living?

When the cell dies, the cell wall persists which shows that cell wall is non living.

Name the different layers of cell wall.

Cell wall is composed of three main layers primary wall, secondary wall and the middle lamella.

Where does middle lamella be formed?

The middle lamella is first to be formed in between primary walls of the neighbouring cells.

What is the arrangement of cellulose in primary wall?

In primary wall cellulose molecules show a crisscross (zigzag) arrangement.

Which is the true wall in cell wall?

The primary wall is a true wall and develops in newly growing cells.

What is the chemical composition of secondary wall?

Chemically it is composed of inorganic salts, silica, waxes, cutin, lignin etc.

How does plant cell wall differ from those of prokaryotic and fungal cell walls?

Plant cell wall has cellulose while prokaryotic cell wall has peptidoglycan or murein and fungal cell wall contains chitin.

How do the free floating cell organelles e.g., mitochondria move about in cytoplasm?

The free floating cell organelles e.g., mitochondria move about in cytoplasm due to cytoplasmic streaming movements.

What is the difference between cristae and cisternae? or Compare cisternae with Cristae.

Cristae are the infoldings of the inner membrane of mitochondria into mitochondrial matrix while cisternae are spherical or tubular membranes which separate materials present in endoplasmic reticulum from the cytoplasmic materials. The term cisternae is also used in golgi apparatus for flattened, fluid filled membranous sacs.

Which endoplasmic reticulum is involved in the synthesis of proteins and lipids?

The rough endoplasmic reticulum is involved in the synthesis of proteins. The smooth endoplasmic reticulum helps in metabolism of a number of different types of molecules

particularly lipids.

What are Ribosomes?

Ribosomes are tiny Granules first studied by Palade in 1955. The ribosomes exist in two forms, either freely dispersed in cytoplasm or attached with rough endoplasmic reticulum as tiny granules. Eukaryotic ribosomes are composed of ribonucleoproteins.

Which ions control the attachment of two units of ribosome?

The attachment of two units of the ribosome is controlled by the presence of Mg^{++} ions.

Where the new ribosomes come from?

New ribosomes are assembled in the nucleolus of the nucleus from where they are transported to the cytoplasm via the pores in nuclear membrane.

Which is the factory of ribosome and protein synthesis?

The factory of ribosome is the nucleolus, while that of protein synthesis is the ribosomes.

Where glycolipids and glycoproteins are formed?

The carbohydrates, lipids and proteins. synthesized by the endoplasmic: reticulum are modified as glycolipid and glycoprotein within Golgi complex.

What does happen in Glycogenosis type II disease?

In Glycogenosis type II disease, liver and muscle appear filled with glycogen within membrane bound organelles.

What is the effect of accumulation of lipids in brain cells?

Accumulation of lipids in brain cells lead to mental retardation and even death.

Who isolated peroxisomes?

De-Duve and co-workers isolated peroxisomes in 1965 from liver cells and other tissues.

The enzymes of which cycle are located in the glyoxisomes?

The enzymes of glyoxylate cycle are located in the glyoxisomes.

What are the sites for breakdown of fatty acids to succinate in seeds rich in lipids?

In seeds rich in lipids such as castor bean and soya beans, glyoxisomes are the sites for breakdown of fatty acids to succinate.

In which cells vacuoles are large and abundant?

Vacuoles are particularly large and abundant in plant cells.

What are the main proteins that are present in cytoskeleton?

The main proteins that are present in cytoskeleton are tubulin (in microtubules), actin, myosin, tropomyosin and others which are also found in muscles.

Which cell organelles are derived from microtubules?

Several cell organelles are derived from special assemblies of microtubules, for example cilia, flagella, basal bodies and centrioles.

What is the location of centrioles in cell and what are their roles/functions?

The two centrioles are usually placed at right angle to each other. Centrioles play important role in the location of furrowing during cell division, and in the formation of cilia. Just before a cell divides, its centrioles duplicate and one pair migrates to the opposite side of the nucleus. The spindles then form between them.

What is the indication that some proteins are synthesized in mitochondria?

The presence of ribosomes and DNA in mitochondria indicates that some proteins are synthesized in them.

What are the main types of plastids?

There are three main types of plastids which are chloroplasts, chromoplasts and leucoplasts.

Which does allow the exchange of materials between the nucleus and the cytoplasm?

The nuclear pores allow the exchange of materials between the nucleus and the cytoplasm.

What is the number of nuclear pores in differentiated cell such as erythrocytes?

Differentiated cell such as erythrocytes have only 3 or 4 nuclear pores per nucleus.

How does cell divide in prokaryotes?

In prokaryotes, mitosis is missing and cell divides by fission.

What is the composition of cell wall of prokaryotic cell?

The cell wall of prokaryotic cell is composed of polysaccharide chains bounded covalently to shorter chains of amino acids forming peptidoglycan or murein.

What is unit membrane?

Plasma membrane is composed of lipid bilayer sandwiched between two protein layers. This basic structure is found in all the membranes such as those of mitochondria, chloroplasts etc, and is called unit membrane.

Give two functions of cell membrane.

It provides mechanical support and external form to the protoplasm. It is semi-permeable membrane that allows some molecules to pass through it and not others.

What is fluid mosaic model?

According to this model lipid bilayer is not sandwiched between two protein layers. Instead proteins are embedded in the lipid bilayer in a mosaic manner.

How does movement of materials take place through cell membrane?

Cell membrane contains charged pores through which movement of materials takes place both by active and passive transport.

What is the function of cell wall?

It gives a definite shape to the cell. It does not act as barrier to the materials passing through it.

What is cytoplasm? Give its functions.

Cytoplasm is the fluid portion of the cell lying outside the nucleus and inside the cell membrane. Cytoplasm serves as a store house of vital chemicals e.g., glycogen in liver cell. It is a site of certain metabolic pathways (e.g., Glycolysis).