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IX-A, B, C

BIOLOGY NOTES FOR CLASS IX

Chapter-5 Fundamental unit of life

Cell is the structural and functional unit of our body and was first discovered by Robert Hooke in 1665.

Cell theory- 1. All the plants and animals are composed of cells.
2. Cell is the basic unit of life.
3. All the cells arise from pre-existing cell.

The law was proposed by two biologists, Schleiden (1838) and Schwann (1839).
The cell theory was further expanded by Virchow (1855).

Parts of cell- Plasma membrane, Nucleus and cytoplasm.

Plasma membrane (cell membrane)- It is the outer most covering of the cell and separates the cell content from external environment. It permits entry and exit of selected materials in and outside the cell (semipermeable membrane).

Diffusion- The spontaneous movement of the substances from a region of high concentration to a region of low concentration. Example- gaseous exchange of oxygen and carbon-di-oxide between cell and its environment.

Osmosis- The movement of water molecules in a diffusion through a semipermeable membrane is called as Osmosis.

Hypotonic solution- A solution which has higher concentration of water than the cell. In such cases the cell gains water and swells.

Hypertonic solution- A solution which has a lower concentration of water than the cell. In such cases the cell loses water and shrinks.

Isotonic solution- A solution which has exactly same water concentration as in cell. In such cases movement of water from both sides are equal and there is no change in shape of the cell.

Endocytosis- The flexibility of plasma membrane enables the cell to engulf in food and other materials from its external environment. This process is called as endocytosis. Amoeba acquires its food by this method.

Cell wall- The cell wall lies outside the cell membrane and is found only in plant cell. It is made of cellulose and provides structural strength to plants.

Plasmolysis- The process in which the living cell of plants lose water through osmosis and the contents of the cell contract away from the cell wall (shrinks).

Prokaryotes

1. The cell are small (1-10 μm)
2. An undefined nuclear region
With nucleic acids (nucleoid)

Eukaryotes

1. Generally the cells are large (5-100 μm)
2. The nuclear region is covered by a nuclear membrane

3. There is a single chromosome.
4. Membrane bound cell organelles
Absent.

Example-bacteria, blue-green algae

3. there are more than one chromosome.
4. membrane bound cell organelles present.

Example-cat, dog etc.



Nucleus- The nucleus is bound by a double layered membrane called nuclear membrane which has small pores called nuclear pore, allows transfer of material from inside nucleus to its outside. It has one or more spherical bodies called nucleolus. The thread like structures visible as entangled mass is called as chromatin network. The nucleus play a important role in cellular division and transfer of hereditary characters from one generation to another and also directs chemical activities of the cell.

Cell organelles- They are membranous structures spread in cytoplasm and are visible only through an electron microscope. They carry out very crucial functions in cells. Some examples are endoplasmic reticulum, golgi apparatus, mitochondria, Lysosomes, plastids.

Endoplasmic reticulum- It is a large network of membrane bound tubes or oblong bags called vesicles. There are two types of endoplasmic reticulum, they are
RER- They look rough under a microscope because it has ribosomes attached to it. They help in transport of proteins between various regions of the cytoplasm.

SER- They are smooth in nature and help in manufacture of fats molecules or lipids Important for cell functions. It plays a very important role in de-toxifying many poisons and drugs and brings about biochemical activities of the cell.

Membrane biogenesis- Some proteins and lipids formed by endoplasmic reticulum help in building cell membrane, this process is called as membrane biogenesis.

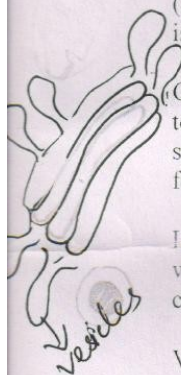
Mitochondria- They are saucer like structures made up of double layer, outer layer is porous and inner layer is folded. It has its own DNA and ribosomes. They oxidise food and release energy required for all activities and is stored in the form of ATP (Adenosine tri phosphate). ATP is called as energy currency of the cell. Mitochondria is also called as power house of the cell.



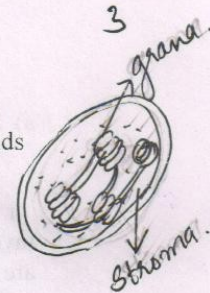
Golgi apparatus- It consists of a system of membrane bound vesicles arranged parallel to each other called as cisterns. They help in packing and dispatching the material synthesised by endoplasmic reticulum inside and outside the cell. Complex sugars are formed by simple sugars in golgi as well as involved in the formation of lysosomes.

Lysosomes- They are called as suicide bags since it bursts and digests its own cells with the help of enzymes present in it during cell damage. It helps to keep the cell clean by digesting any foreign materials as well as worn out cell organelles.

Vacuoles- They are storage sacs for solid or liquid contents. In animal cell it is small and in plant cell it is large, filled with cell-sap that provide turgidity to the cell and is covered by a membrane called as tonoplast. They consist amino acids, sugars, organic acids and some proteins. There are special vacuoles in case of amoeba for expelling water and removal of waste.



Plastids-They are present only in plant cells. The plastids containing chlorophyll are called as chloroplast. Chloroplast play an important role in photosynthesis. The plastids consists .They have their own DNA and ribosomes.



IMPROVEMENT IN FOOD RESOURCES CHAPTER-15

Nutrient contents in crops-Cereals such as wheat, rice, maize, millets provide carbohydrates. Pulses like grams provide proteins. Oil seeds provide fats. Vegetables, fruits and spices provide vitamins and minerals.

Kharif crops-They are grown in rainy season from June to October. Example- Paddy, soyabean, maize, cotton, pigeon pea, green gram, black gram.

Rabi crops-They are grown in winter season from November to April. Example- Wheat, grams, peas, mustard and linseed.

Hybridisation-The process of growing desirable variety of plants by crossing between genetically dissimilar plant.

Factors affecting crop production-The biotic factors such as diseases, insects and nematodes cause damage to crops. The abiotic factors such as heat, cold, frost, drought, salinity cause stresses under different situations.

Desirable agronomic characteristics for crop improvement-Tallness and profuse branching are desirable characters for fodder crops. Dwarfness is desired in cereals so that less nutrients are consumed by these plants. Thus growing variety of crops having desirable characters help in high productivity.

Source of nutrients for plants-Air, water and soil provide nutrients for plants. The nutrients in soil such as nitrogen, phosphorous, potassium, calcium, magnesium and sulphur are required in large quantity and are called as macro-nutrients. The nutrients such as iron, manganese, boron, zinc, copper, molybdenum and chlorine are required in very small quantities and are called as micro-nutrients.

Manure- They consist of large quantities of organic matter and provide very little nutrient to the soil. It is prepared by decomposition of animal excreta and plant waste. Manures are classified into groups based on their biological material.

Compost-Decomposition of animal excreta, plant waste, domestic waste, sewage waste, straw and eradicated weeds in a pit is called composting.

Vermi-compost:-Earthworms grind the coarse soil into fine paste and make it available in the form of their castings which enriches the fertility of the soil. This is done by introducing earthworm to the gardens.

Green manure:-The green plants like sun hemp and guar are grown and then mulched by ploughing them into soil. They turn into green manure enriching the soil with nitrogen and phosphorous.

Cropping methods:-

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a) Organic farming-It is a type of farming with minimal use of fertilizers,pesticides and maximum use of organic manure,recycled farm waste , biofertilizers and healthy cropping methods.

i.Mixed cropping- It is known as co-cultivation . It is a agricultural method that involves planting of 2 or more plants simultaneously. Advantages of this method are to balance input and out go of soil nutrients as well as to keep down weeds and insects. Example:-wheat+gram, wheat+mustard, groundnut+sunflower etc.

ii.Inter-cropping:- Two or more crops planted at the same time in the same field in a definite pattern i.e., a few rows of one crop alternate with a few rows of second crop.Example:- soya+maize, bajra+cowpea etc.

iii.Crop rotation:- The practice of growing different crops in same area in sequential seasons or pre-planned successions is known as crop rotation. It avoids diseases,pathogens pests etc and retains soil fertility.

Example:- cereals and pulses are grown alternately to balance requirement of nitrogenous compound.

Weeds :- The unwanted plants growing and competing for nutrients , water, sunlight with food crops are called as weeds.Example:-Parthenium,Xanthium etc.

The factors that are responsible for losses of grains during storage are:- action of insect,rodents ,fungi, bacteria (biotic factors) and abiotic factors such as inappropriate moisture and temperature.

The scientific management of animal live stock,producing their feeds ,breeding and disease control activities together is called as animal husbandry. It includes cattle farming,Poultry farming,Fish production,Apiculture etc.

Milching animals
Milk producing females are milc animals.
Its feed includes roughage and concentrates (low fibre and high proteins) to produce more Milk.

Draught animals
Animals used form labours.
Its food include roughage.

The method involved to improve cattle breed are cross-breeding,vaccinating farm animals against viral and bacterial diseases.

Broilers
The fowl grown for chicken meat.
They are fed with protein rich
And adequate fat.

Layers
The Hens rared for egg production.
Vitamin A and K is kept high.

Capture fishing:- Obtaining fish from natural resources is called as capture fishing.

Aquaculture:- The cultivation of fresh and salt water populations under controlled conditions.

Mariculture:- It is aquaculture practised in marine environment.

Composite fish culture:- The culturing of 5-6 selected species of local and imported varieties of fish species such that they do not compete for food since they have different habitat. Example- Catla and Silver carp are surface feeders, Rohu column feeder, Mrigal and common carp are bottom feeders and other fishes feed on excreta of common carp.

Tissues

A group of cells having common structure and function are called as tissues.

Plant tissues:- Meristematic, permanent tissues and epidermis.

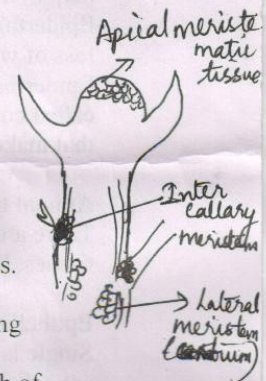
Meristematic tissues:- They consist embryonic cells and involved in growth process.

They are of three types depending on their position-

Apical meristem- They are present at the tip of stem and root and help in increasing the height of plant.

Lateral meristem- They are present on lateral sides and helps in increasing the girth of plants.

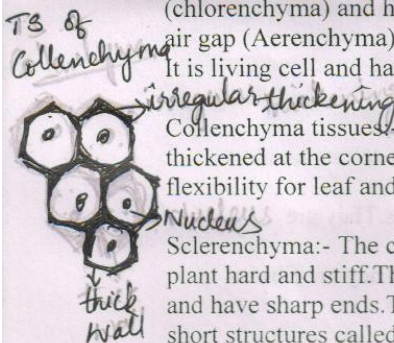
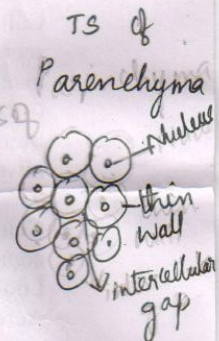
Intercalary meristem- They are present in between the branch and stem (nodal region) and help in increasing the number of branches.



Permanent tissues- They are of two types based on their functions and structure.

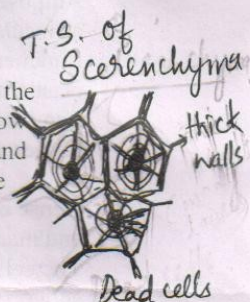
a) Simple permanent tissues- They help in diffusion, photosynthesis and mechanical support. There are three types of simple permanent tissues, they are-

Parenchyma- The cells are thin walled with lots of intercellular space. They are isometric and form the soft part of the plant. Some of them have chlorophyll (chlorenchyma) and help in photosynthesis. Parenchyma in aquatic plants have large air gap (Aerenchyma) and helps in floatation. Parenchyma help in storage of nutrients. It is living cell and has nucleus.



Collenchyma tissues- The cells of this tissue are living, elongated and irregularly thickened at the corners. There is very little intercellular space and it provides flexibility for leaf and stem. It provides mechanical strength to plants.

Sclerenchyma:- The cells of this tissue are dead do not possess nucleus. They make the plant hard and stiff. The cell wall is thickened with lignin and so they are long, narrow and have sharp ends. They are of two types elongated and flexible fibres and hard and short structures called sclerides (coconut fibre, hard seed cover of badam). They are present around vascular bundles.



b) Complex permanent tissues- Xylem and Phloem are the two types of complex permanent tissues.

Xylem is the water conducting tissue of the plant. It consists of tracheids, vessels, xylem parenchyma and xylem fibres. Tracheids and vessels are tubular and help in vertical transport of water and minerals. Fibres give support to all these tissues.

Phloem is the food conducting tissue of the plants. It consists of sieve tubes and sieve plates, companion cells, phloem fibres and phloem parenchyma. Sieve tubes are tubular in nature and has perforated walls and helps in conduction of food in all directions.

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Epidermis:- It is the outermost layer of cells.

Epidermis of leaves have specialized cells called stomata, helps in transpiration. It consist of two kidney shaped cells called guard cells which opens at the centre called stoma. Water in the form of vapour escapes from this stoma and creates a pressure that help in transporting water upwards from the root (ascent of sap).

Epidermis of some plants have waxy covering called cuticle which prevents excess loss of water from the plants.

Epidermal cells of trees are made up of many layers of dead cells compactly arranged called cork or bark of the tree. They also have a chemical called suberin in their walls that makes them impervious to gases and water.

Animal tissues:

There are different types of animal tissues. They are- Epithelial tissues, Connective tissues, Muscular tissue and Nervous tissue.

Epithelial tissue:- It forms the outer protective covering of the animal body.

Single layered flat tissues that are thin and forms the lining of mouth, oesophagus etc are called as simple squamous epithelium.

The skin epithelium is made of many layers and prevent wear and tear of cells called as stratified squamous epithelium.

Columnar epithelium are elongated and form inner lining of internal organs where secretions take place. In some places they have cilia which facilitates in movement of mucus forward such type of cells are called as Ciliated columnar epithelium.

Cuboidal epithelium are cube shaped and is involved in secretion. It forms the inner lining of salivary glands, tubules of kidney etc. Sometimes a part of this tissue folds inward and forms a gland and is called as glandular tissue.

Connective tissue:- They are of three types. They are loose connective, dense connective and fluid connective tissue.

Loose connective tissues are of two types :

Aerolar tissues:- They fill the gap inside the organs and help in repair of tissues. They are also found in between the muscles and skin.

Adipose tissue:- It is found below the skin and stores fat. The storage of fats let it acts as insulator.

Ligaments- The tissues that connect bone to bone are called ligaments. They are elastic in nature.

Tendons- The tissue that connect muscle to bone are called tendons. They are fibrous tissues made up of great strength and less flexibility.

Dense connective tissue:- They are of two types bone and cartilage. They are dense and made of hard matrix and give shape for the body.

The cells are calcified and arranged in concentric rings. It form frame work and supports the body. In case of cartilage the cells are elastic in nature and can be folded. Cartilage is present in tip of the nose, wind pipe etc.

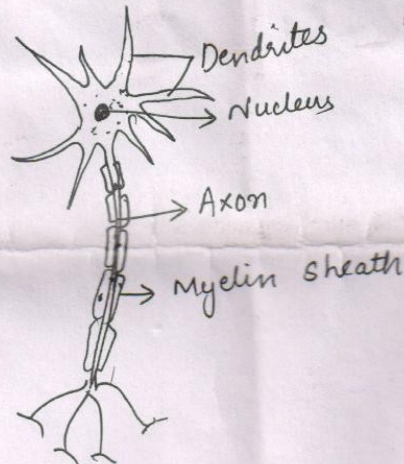
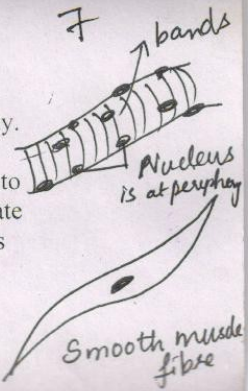
Fluid connective tissue:- Blood is one of the fluid connective tissue made of liquid matrix called plasma. Red blood cells, White blood cells and platelets are found suspended in the plasma. Blood transports absorbed nutrients, hormones, gases and waste materials to all parts of the body.

Muscular tissue:- They are made of muscle fibres which bring movement in the body.
 Voluntary \ striated muscles- Movement of some muscles in our body are under our control such type of muscles are called voluntary muscles. They are found attached to bones and are also called as skeletal muscles. They are long, cylindrical, multinucleate present at the periphery, un-branched and have light and dark bands called striations and thus called as striated muscles.

Involuntary muscles:- They are elongated with sharp ends, spindle shaped, uninucleate and have no striations and smooth in nature. They bring about involuntary actions such as movement in food in food pipe, contraction and relaxation of blood vessels etc.

Cardiac muscles:- They are heart muscles and bring about rhythmic contraction and relaxation. They are cylindrical, branched and uninucleate.

Nerve tissue:- The cells of this tissue are called as neuron. It consists of a cell body with a nucleus and cytoplasm from which long, thin, hair like parts arise called dendrites and one of them extended long is called axon.



Neuron