

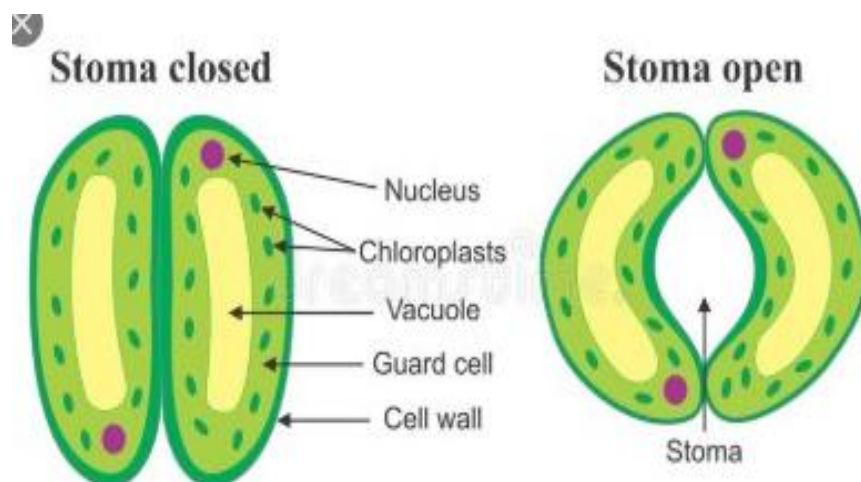


पुर्ना International School
Shree Swaminarayan Gurukul, Zundal

SCIENCE -X
(BIOLOGY)
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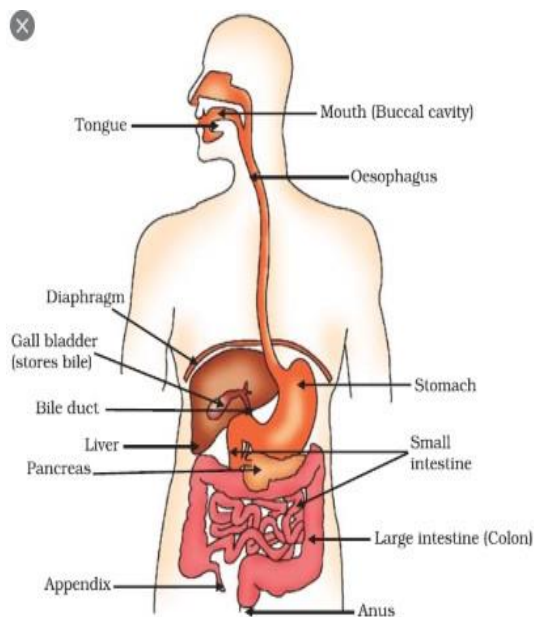
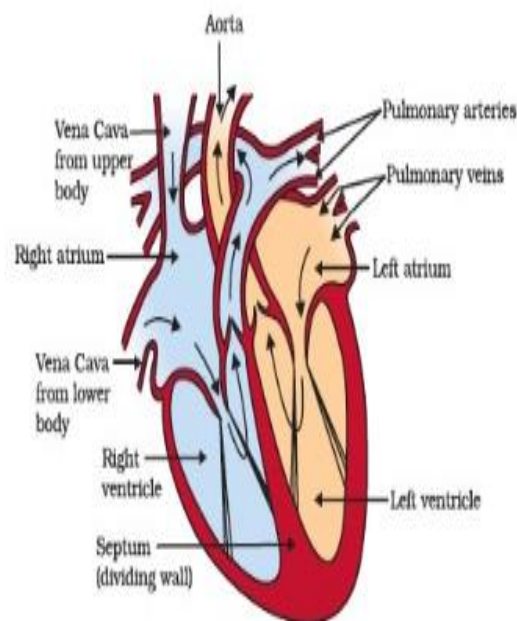


Figure 6.6 Human alimentary canal



Chapter - 6

Life Processes

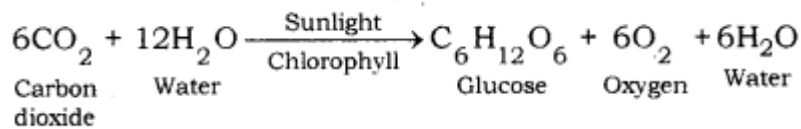
Nutrition in Plants and Animals – Life Processes

- **Nutrition:** The process by which an organism takes food and utilizes it, is called nutrition.
- **Need for Nutrition:** Organisms need the energy to perform various activities. The energy is supplied by the nutrients. Organisms need various raw materials for growth and repair. These raw materials are provided by nutrients.
- **Nutrients:** Materials which provide nutrition to organisms are called nutrients. Carbohydrates, proteins and fats are the main nutrients and are called macronutrients. Minerals and vitamins are required in small amounts and hence are called micronutrients.
- **Modes of Nutrition**
 1. Autotrophic Nutrition.
 2. Heterotrophic Nutrition.
- **Autotrophic Nutrition – Life Processes**
- The mode of nutrition in which an organism prepares its own food is called autotrophic nutrition. Green plants and blue-green algae follow the autotrophic mode of nutrition.
- The organisms which carry out autotrophic nutrition are called autotrophs (green plants).

Autotrophs $\xrightarrow{\text{Use}}$ Simple inorganic material $\xrightarrow[\text{into}]{\text{Convert}}$ Complex high energy molecules of carbohydrates

- Autotrophic nutrition is fulfilled by the process, by which autotrophs intake CO_2 and H_2O , and convert these into carbohydrates in the presence of chlorophyll, sunlight is called photosynthesis.

Nutrition in Plants: Green plants prepare their own food. They make food in the presence of sunlight. Sunlight provides energy, carbon dioxide and water are the raw materials and chloroplast is the site where food is made



Raw Materials for Photosynthesis:

- Sunlight
- Chlorophyll: Sunlight absorbed by chloroplast
- CO₂: Enters through stomata, and oxygen (O₂) is released as a byproduct through stomata on the leaf.
- Water: Water + dissolved minerals like nitrogen, phosphorous etc., are taken up by the roots from the soil.

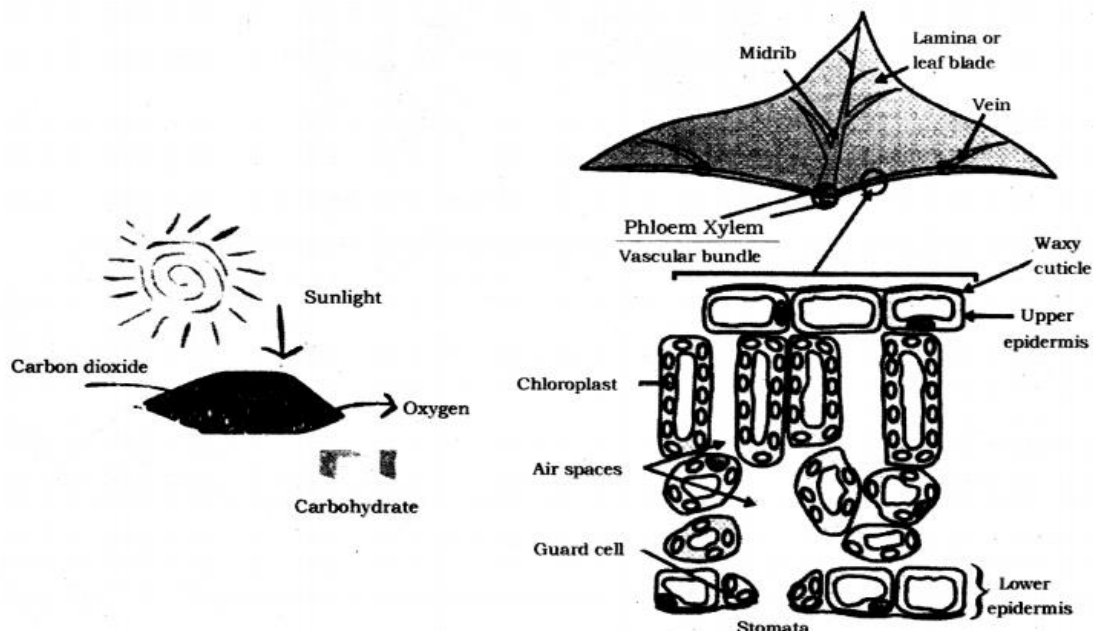
How do raw materials for photosynthesis become available to the plant?

- Water comes from the soil, through the xylem tissue in roots and stems.
- Carbon dioxide comes in the leaves through stomata.

Site of Photosynthesis: Chloroplast in the leaf. Chloroplast contains chlorophyll (green pigment)

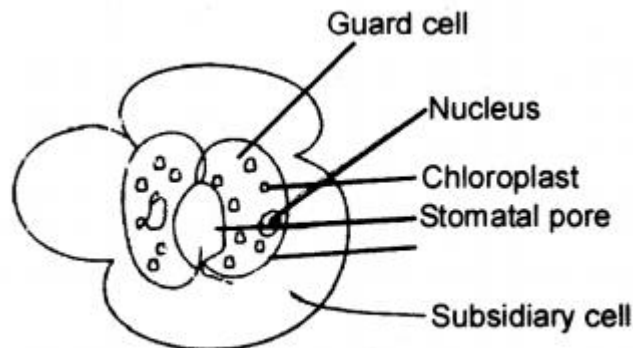
Main Events of Photosynthesis:

- Absorption of light energy by chlorophyll.
- Conversion of light energy into chemical energy + splitting (breaking) of water into hydrogen and oxygen.
- Reduction of CO₂ to carbohydrates.
- Sunlight activates chlorophyll, which leads to splitting of the water molecule.
- The hydrogen, released by the splitting of a water molecule is utilized for the reduction of carbon dioxide to produce carbohydrates.
- Oxygen is the by-product of photosynthesis.



Stomata: These are tiny pores present in the epidermis of leaf or stem through which gaseous exchange and transpiration occur

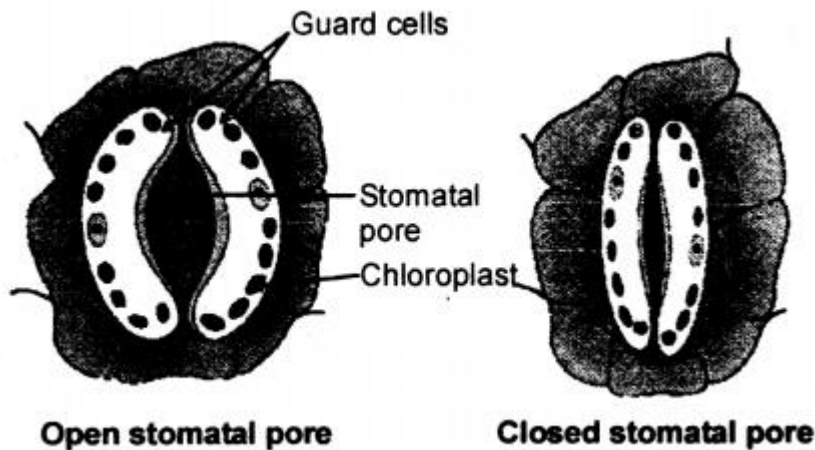
- Exchange of gases, O_2 and CO_2 .
- Loses a large amount of water (water vapour) during transpiration.



Structure of stomata

Opening and closing of stomatal pores:

- The opening and closing of stomatal pores are controlled by the turgidity of guard cells.
- When guard cells uptake water from surrounding cells, they swell to become a turgid body, which enlarges the pore in between (Stomatal Opening).
- While, when water is released, they become flaccid shrinking to close the pore (Stomatal Closing)



Significance of Photosynthesis:

- Photosynthesis is the main way through which solar energy is made available for different living beings.
- Green plants are the main producers of food in the ecosystem. All other organisms directly or indirectly depend on green plants for food.
- The process of photosynthesis also helps in maintaining the balance of carbon dioxide and oxygen in the air.

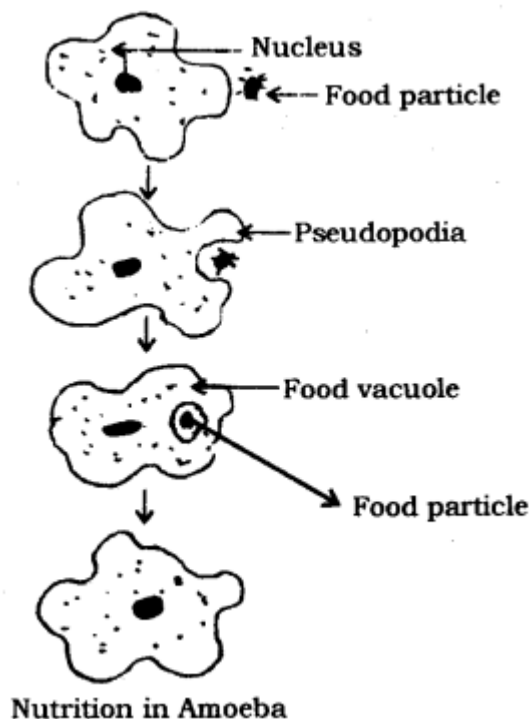
Heterotrophic Nutrition – Life Processes Class 10 Notes

The mode of nutrition in which an organism takes food from another organism is called heterotrophic nutrition. Organisms, other than green plants and blue-green algae follow the heterotrophic mode of nutrition. Heterotrophic nutrition can be further divided into three types, viz. saprophytic nutrition, holozoic nutrition, and parasitic.

- **Saprophytic Nutrition:** In saprophytic nutrition, the organism secretes the digestive juices on the food. The food is digested while it is still to be ingested. The digested food is then ingested by the organism. All the decomposers follow saprophytic nutrition. Some insects, like houseflies, also follow this mode of nutrition.
- **Holozoic Nutrition:** In holozoic nutrition, the digestion happens inside the body of the organism. i.e., after the food is ingested. Most of the animals follow this mode of nutrition.
- **Parasitic Nutrition:** The organism which lives inside or outside another organism (host) and derives nutrition from it is known as parasites and this type of mode of nutrition is called parasitic nutrition. For example Cuscuta, tick etc.

Nutrition in Amoeba

- Amoeba is a unicellular animal which follows the holozoic mode of nutrition.
- In holozoic nutrition, the digestion of food follows after the ingestion of food. Thus, digestion takes place inside the body of the organism.
- Holozoic nutrition happens in five steps, viz. ingestion, digestion, absorption, assimilation and egestion.



Steps of Holozoic Nutrition:

- **Ingestion:** The process of taking in the food is called ingestion.
- **Digestion:** The process of breaking complex food substances into simple molecules is called digestion. Simple molecules, thus obtained, can be absorbed by the body.
- **Absorption:** The process of absorption of digested food is called absorption.

- Assimilation: The process of utilization of digested food, for energy and for growth and repair is called assimilation.
- Egestion: The process of removing undigested food from the body is called egestion.

Nutrition in Human Beings – Life Processes

Human beings are complex animals, which have a complex digestive system. The human digestive system is composed of an alimentary canal and some accessory glands. The alimentary canal is divided into several parts, like oesophagus, stomach, small intestine, large intestine, rectum and anus. Salivary gland, liver and pancreas are the accessory glands which lie outside the alimentary canal.

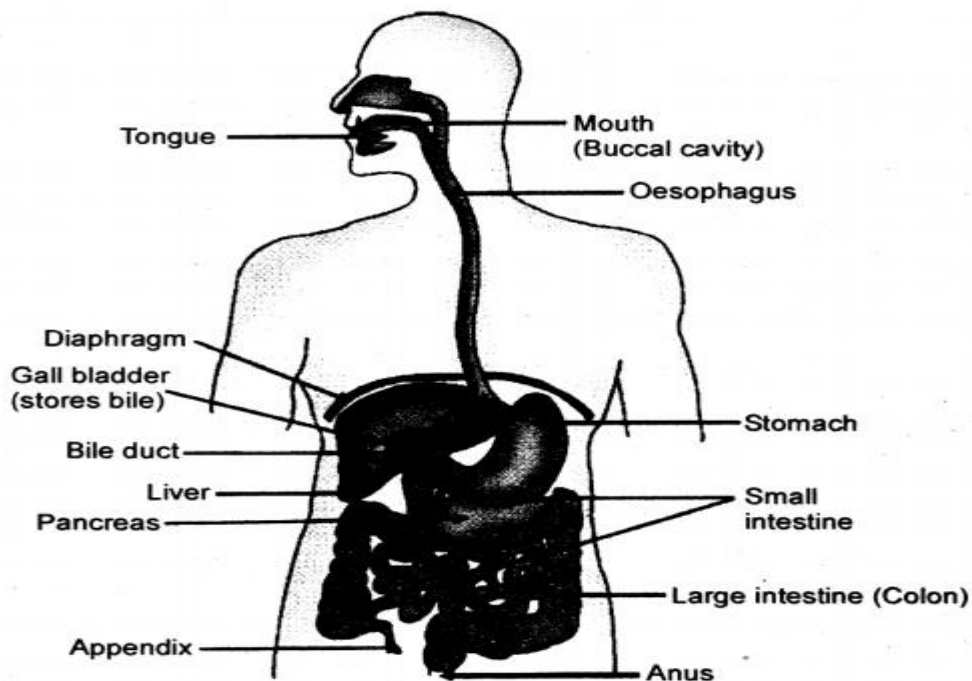
Structure of the Human Digestive System:

The human digestive system comprises of the alimentary canal and associated digestive glands.

- Alimentary Canal: It comprises of mouth, oesophagus, stomach, small intestine and large intestine.
- Associated Glands: Main associated glands are
 - Salivary gland
 - Gastric Glands
 - Liver
 - Pancreas

Mouth or Buccal Cavity:

- The mouth has teeth and tongue. Salivary glands are also present in the mouth.
- The tongue has gustatory receptors which perceive the sense of taste.
- The tongue helps in turning over the food so that saliva can be properly mixed in it.
- Teeth help in breaking down the food into smaller particles so that, swallowing of food becomes easier.
- There are four types of teeth in human beings. The incisor teeth are used for cutting the food.
- The canine teeth are used for tearing the food and for cracking hard substances.
- The premolars are used for the coarse grinding of food. The molars are used for fine grinding of food
-



Multiple choice questions

1. Which of the following is not a digestive enzyme contained in the pancreatic juice?

- i. Lipase
- ii. Hydrochloric acid
- iii. Mucus
- iv. Trypsin

- a) (i) and (ii)
- b) (i) and (iv)
- c) (ii) and (iii)
- d) (i) and (iii)

Answer: (c) (ii) and (iii)

Explanation: The enzymes lipase and trypsin are present in the pancreatic juice that breakdown emulsified fats and degrade proteins respectively.

2. The enzymes pepsin and trypsin are secreted respectively by

- a) Stomach and pancreas
- b) Salivary gland and stomach
- c) Liver and pancreas
- d) Liver and salivary gland

Answer: (a) Stomach and pancreas

Explanation: Stomach secretes the enzyme pepsin and pancreas produces trypsin. Both of them breakdown protein.

3. Among the following choose the correct option which includes the organisms that have a holozoic mode of nutrition:

- a) Plasmodium and Amoeba
- b) Parakeet and Amoeba
- c) Paramecium and Plasmodium
- d) Paramecium and Parasite

Answer: (b) Parakeet and Amoeba

Explanation: Holozoic nutrition involves the ingestion of organic food particles and later its assimilation for the purpose of supplying energy to the whole body.

4. Raw materials required in the autotrophic mode of nutrition involves:

- i. Carbon dioxide and water
 - ii. Chlorophyll
 - iii. Nitrogen
 - iv. Sunlight
- a) (i), (ii) and (iii)
 - b) (i) and (ii)
 - c) (i), (ii) and (iv)
 - d) All (i), (ii), (iii) and (iv)

Answer: (c) (i), (ii) and (iv)

Explanation: Autotrophic mode of nutrition involves the use of sunlight, chlorophyll, carbon dioxide and water to produce starch.

5. The enzymes contained in pancreatic juices help in the digestion of:

- a) Fats and carbohydrates

- b) Proteins and fats
- c) Proteins and carbohydrates
- d) Proteins, fats and carbohydrates

Answer: (d) Proteins, fats and carbohydrates

Explanation: The pancreas contains all kinds of enzymes that can digest proteins, fats and carbohydrates.

6. Which of the following help in protecting the inner lining of the stomach from the harmful effect of hydrochloric acid?

- a) Mucus
- b) Pepsin
- c) Trypsin
- d) Bile

Answer: (a) Mucus

Explanation: Mucus is a viscous secretion that protects the inner lining of the stomach from the action of HCl.

7. Sometimes we get painful cramps in our leg muscles after running for a long time due to the accumulation of:

- a) Hydrochloric acid
- b) Fat
- c) Carbon dioxide
- d) Lactic acid

Answer: (d) Lactic acid

Explanation: The build-up of lactic acid in our muscles while running (less oxygen conditions) causes cramps.

8. The vein which brings clean blood from the lungs into the heart is known as:

- a) Pulmonary vein
- b) Hepatic vein
- c) Superior vena cava
- d) Pulmonary artery

Answer: (a) Pulmonary vein

Explanation: The pulmonary vein is responsible for bringing oxygenated and pure blood into the heart.

9. Movement of the synthesized products from the leaves to the roots and other parts of a plant's body takes place through the phloem. This process is known as:

- a) Translocation
- b) Transpiration
- c) Transportation
- d) Excretion

Answer: (a) Translocation

Explanation: The transport of soluble products of photosynthesis through all parts of the plant by specialized structures called phloem is translocation.

10. The process of diffusion of solvent particles from the region of less solute concentration to a region of high solute concentration through semi-permeable membrane is known as

- a) Diffusion
- b) Osmosis
- c) Translocation
- d) Transpiration

Answer: (b) Osmosis

Explanation: The diffusion of solvent particles from a region of less concentration to high concentration (concentration gradient) through a semi permeable membrane is called osmosis.

11. Which among the following procedures is used for cleaning the blood of a person by separating the waste substance from it?

- a) Kidney transplant
- b) Blood transfusion
- c) Dialysis
- d) Hydrolysis

Answer: (c) Dialysis**Explanation:** Dialysis is the procedure of detoxifying the blood by isolating the waste and unwanted constituents in it.

12. The excretory unit of the human excretory system is known as:

- a) Nephridia
- b) Neuron
- c) Nephron
- d) kidneys

Answer: (c) Nephron

Explanation: Each kidney has large numbers of the filtration units called nephrons.

13. Plants use the energy stored in ATP to accomplish the process of transportation of:

- a) Water and minerals
- b) Oxygen
- c) Water, minerals and food
- d) Food

Answer: (d) Food

Explanation: Translocation of food by phloem is achieved by utilizing energy from ATP.

14. Which among the following is necessary to carry out the blood coagulation in a cut or wound?

- a) White Blood Cells
- b) Blood plasma
- c) Platelets
- d) Red blood cells

Answer: (c) Platelets

Explanation: Platelets coagulate blood whenever there is a cut or a wound. This stops excess flow of blood or hemorrhagic conditions.

15. Arteries and veins are connected by a network of extremely narrow tubes called:

- a) Sieve tubes
- b) Capillaries
- c) Vena cava
- d) Valves

Answer: (b) Capillaries

Explanation: Blood capillaries are vessels that connect arteries and veins and help in blood circulation.

1. Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?

Ans. As in multicellular organisms, all the cells are not in direct contact with environment, simple diffusion does not meet the requirement of all the body cells to get sufficient oxygen.

2. What criteria do we use to decide whether something is alive?

Ans. All the living organism must have movement at molecular levels along with respiration and other life process like nutrition, respiration, transportation and excretion to be called alive.

3. What are outside raw materials used for by an organism?

Ans. Outside raw materials used for by an organism includes:

- a. Food
- Water
oxygen

4. What processes would you consider essential for maintaining life?

Ans. The processes essential for maintaining life are

- a. Nutrition
- b. Respiration
- c. Transportation
- d. Excretion

1. What are difference between autotrophic and heterotrophic nutrition?

Ans. Differece between autotrophic and heterotrophic nutrition:

Autotrophic Nutrition	Heterotrophic Nutrition
The mode of nutrition in which an organism makes its own food from the simple inorganic materials like carbon dioxide and water present in the surroundings with the help of sunlight energy. All green plants.	The mode of nutrition in which an organism cannot makes its own food from the simple inorganic materials like carbon dioxide and water present in the surroundings and depends on other organisms for food. All non- green plants.

2. Where do plants get each of the raw materials required for photosynthesis?

Ans. (a) Carbon dioxide from atmosphere.

(b) Light from Sun

(c) Water from Soil

(d) Chlorophyll from chloroplast of green plants.

3. What is the role of the acids in our stomach?

Ans. HCl plays following role in our stomach:

(a) Make the medium acidic for action of enzyme pepsin.

(b) Kills the harmful bacteria present in food

(c) Prevents fermentation of food

4. What is the function of digestive enzymes?

Ans. Enzymes break-down the various complex components of food into simple and soluble components so that they can be absorbed easily.

5. How is small intestine deigned to absorb digested food?

Ans. The inner lining of small intestine has numerous finger-like projections called villi which increase the surface area for absorption. The villi are richly supplied with blood vessels which transport the absorbed food to each and every cells of the body. Where, it is utilized to obtaining energy and repair of old tissues.

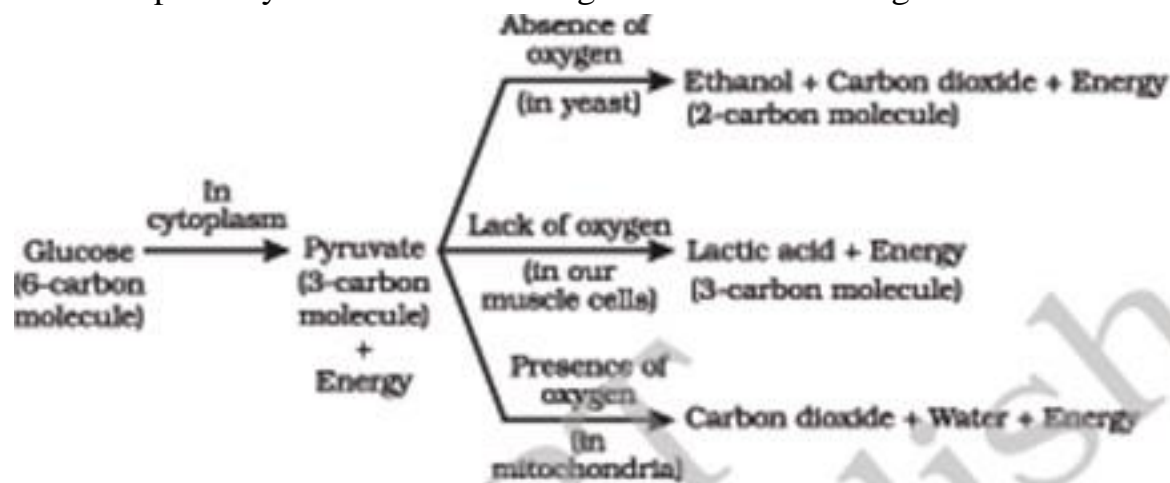
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1. What advantage over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?

Ans. The rate of breathing is slower in terrestrial organisms as compared to aquatic organisms. This is due to the fact that in water, the amount of oxygen is less as compared to air so, in aquatic organisms the rate of breathing is faster.

2. What are different ways in which glucose is oxidized to provide energy in various organisms?

Ans. The pathways of break-down of glucose in various organisms are as below:



3. How is oxygen and carbon dioxide transported in human beings?

Ans. In human beings, a pigment hemoglobin is present in RBC which has high affinity for oxygen. RBC takes up the oxygen from the air in the lungs and carry it to tissues which are deficient in oxygen. Some oxygen is carried in dissolved state in blood plasma. Carbon dioxide is more soluble in water than oxygen is mostly transported in the dissolved form in our blood.

4. How are the lungs designed in human beings to maximize the area for exchange of gases?

Ans. In lungs, the bronchioles terminate in balloon-like structures called alveoli. The alveoli contains network of blood capillaries that increase the surface area for exchange of gases.

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1. What are the components of the transport system in human beings? What are the functions of these components?

Ans. The components of human transport system include:

- (a) Heart- receives and pumps the blood.
- (b) Arteries- carry oxygenated blood away from the heart to various organs.
- (c) Veins- Bring back blood to heart.
- (d) Capillaries- exchange of various materials and gases between blood and tissues.

2. Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Ans. The separation of the right and left side of heart is useful to prevent oxygenated blood and deoxygenated blood from mixing. Such separation allows a highly efficient supply of oxygen to the body. This is useful in animals that have high energy needs, such as birds and mammals that constantly use the energy to maintain their body temperature.

3. What are the components of transport system in highly organized plants?

Ans. The transport system of higher plants consists of xylem and phloem. Xylems have vessels and trachieds to transport water and minerals from root to other part of the plants.

Phloem, which consists of sieve tubes and companion cells, transport food from leaves to storage organs and other parts of plant.

4. How are water and minerals transported in plants?

Ans. Water and minerals are transported in plants through xylem which consists of tracheids and vessels. Water and minerals absorbed by root hairs present in root by osmosis is passed to xylem tissues of root. From root xylem it passes to stem xylem and thus water reaches to leaves.

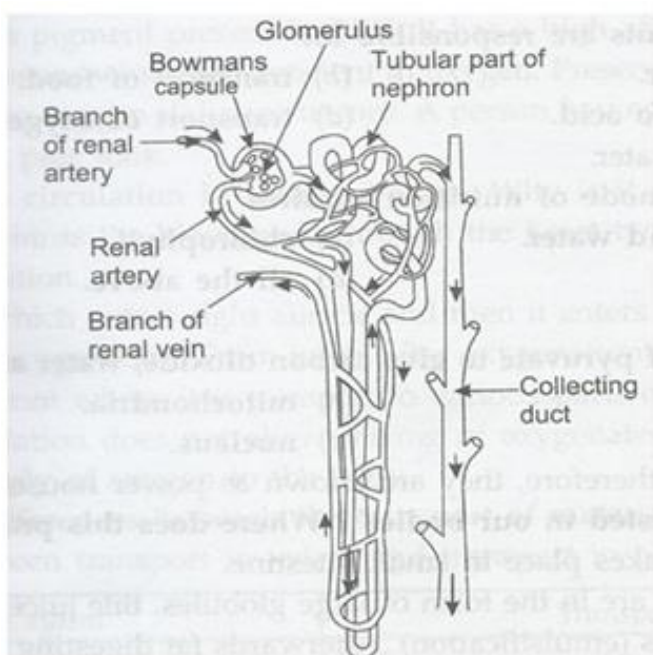
5. How is food transported in plants?

Ans. Food is transported in plants through phloem which consists of sieve tubes, sieve and companion cells. The food prepared in leaves in soluble form transported to leaves phloem. Active transport of food passes to all other parts of plants.

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1. Describe the structure and functioning of nephron.

ns. Each nephron is a cluster of very thin-walled blood capillaries. Each capillary cluster in the kidney called glomerulus is associated with the cup shaped Bowman's capsule that collects the filtered urine. Nephron filters the blood in order to remove nitrogenous waste. They also absorb some useful substance such as glucose, amino acids, minerals and major amount of water from filtrate.



2. What are the methods used by plants to get rid of excretory products?

Ans. (i) Plant produces carbon dioxide as wastes during respiration and oxygen as waste during photosynthesis.

(ii) Excess of water is removed through transpiration.

(iii) Some waste products like gums and resins are stored in older xylem tissue.

3. How is amount of urine produced regulated?

Ans. The amount of urine depends on how much excess of water is in the body and how much a water soluble waste is to be excreted. If the amount of water and dissolved wastes in boy are more than amount of urine will be more and if amount of wastes is less the amount of urine produced will be less.

TEXTBOOK EXERCISE

1. The kidneys in human beings are parts of the system for

- (a) nutrition
- (b) respiration
- (c) excretion
- (d) transpiration

Ans. (c) excretion

2. The xylem in plants are responsible for

- (a) transport of water
 - (b) transport of food
 - (c) transport of amino acids
 - (d) transport of oxygen
-

Ans. (a) transport of water

3. The autotrophic mode of nutrition requires

- (a) carbon dioxide and water**
- (b) chlorophyll**
- (c) sunlight**
- (d) all of the above**

Ans. (d) all of the above

4. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in

- (a) cytoplasm**
- (b) mitochondria**
- (c) chloroplast**
- (d) nucleus**

Ans. (b) mitochondria

5. How are fats digested in our bodies? Where does this process take place?

Ans. Digestion of fats takes place in small intestine. Fats entering in intestine are in the form of large globules. Bile juice breaks down these large globules into smaller globules. After that fat digesting enzyme lipase present in pancreatic juice and intestinal juice converts it into fatty acids and glycerol.

6. What is the role of saliva in the digestion of food?

Ans. The saliva contains an enzyme called salivary amylase that breaks down starch which is complex molecule into glucose.

7. What are the necessary conditions for autotrophic nutrition and what are its by-products.

Ans. Conditions necessary for autotrophic nutrition are:

- (i) Light
- (ii) Chlorophyll
- (iii) Water and
- (iv) Carbon dioxide

By-products are:

- (i) Oxygen and
- (ii) Water

8. What are differences between aerobic and anaerobic respiration? Name some organisms that use anaerobic mode of respiration.

Ans. Difference between aerobic and anaerobic respiration:

Aerobic respiration	Anaerobic respiration
(i) Takes place in presence of oxygen.	(i) Takes place in absence of oxygen
(ii) Complete oxidation of glucose occurs.	(ii) Incomplete oxidation of glucose occurs.
(iii) More energy is produced.	(iii) Less energy is produced

Anaerobic respiration takes place in yeast, some bacteria and some internal parasites like tapeworm.

9. How are the alveoli designed to maximize the exchange of gases?

Ans. The walls of the alveoli is folded and has large surface areas. It contain an extensive

network of blood vessels which provide a surface where the exchange of gases can take place.

10. What would be the consequence of a deficiency of hemoglobin in our bodies?

Ans. Haemoglobin is a pigment present in RBC. It has a high affinity for oxygen. It carries oxygen from lungs to various tissues which are deficient in oxygen. Presence of less hemoglobin will result in less supply of oxygen to tissues. A person having less hemoglobin will get tired soon and will have a pale look.

11. Describe double circulation in human beings. Why is it necessary?

Ans. In mammals and birds the blood goes through the heart twice during each cycle. This is known as double circulation. Deoxygenated blood which enters right auricle and then it enters the right ventricle from where it is pumped to lungs for oxygenation. From lungs after oxygenation it comes to left auricle and then enters left ventricle from where it is pumped to various parts of body.

Such system of circulation does not allow mixing of oxygenated and deoxygenated blood which allows efficient supply of oxygen to the body.

12. What are differences between the transport of materials in xylem and phloem?

Ans. Difference between transport in xylem and phloem:

Xylem	Phloem
a. Xylem transport minerals and water from root to leaves.	a. Phloem transport food from leaves to root and storage organs.
b. Transport is unidirectional.	b. Transport is bidirectional.
c. Xylem consists of trachieds and vessels.	c. Phloem consists of sieve tubes and companion cells.

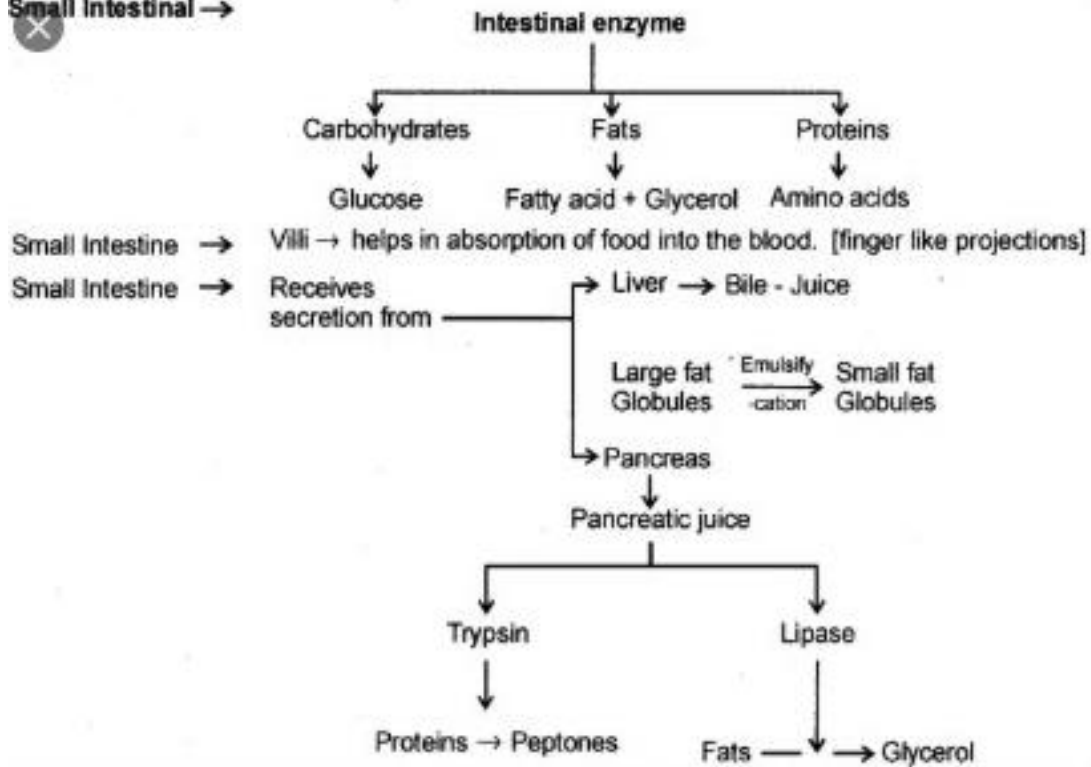
13. Compare the functioning of alveoli in the lungs and nephron in the kidneys with

respect to their structure and functioning.

Ans. Comparison between alveoli and nephron:

Alveoli	Nephron
They have thin-walled balloon-like structure. The alveoli provide a surface extensively supplied with blood capillaries for exchange of gases in lungs. Carbon dioxide released in the cavity of alveoli and oxygen is taken by hemoglobin present in RBC of blood.	Nephron is a cluster of very thin walled blood capillaries found in kidney. Each capillaries cluster remains associated with the cup-shaped end of a tube called Bowman's capsule that collects the filtered urine, at the same time the useful substance are reabsorbed.

Small Intestinal →



Chapter - 7

Control and Coordination

Control and Co-ordination in Animals: Nervous system and endocrine system.

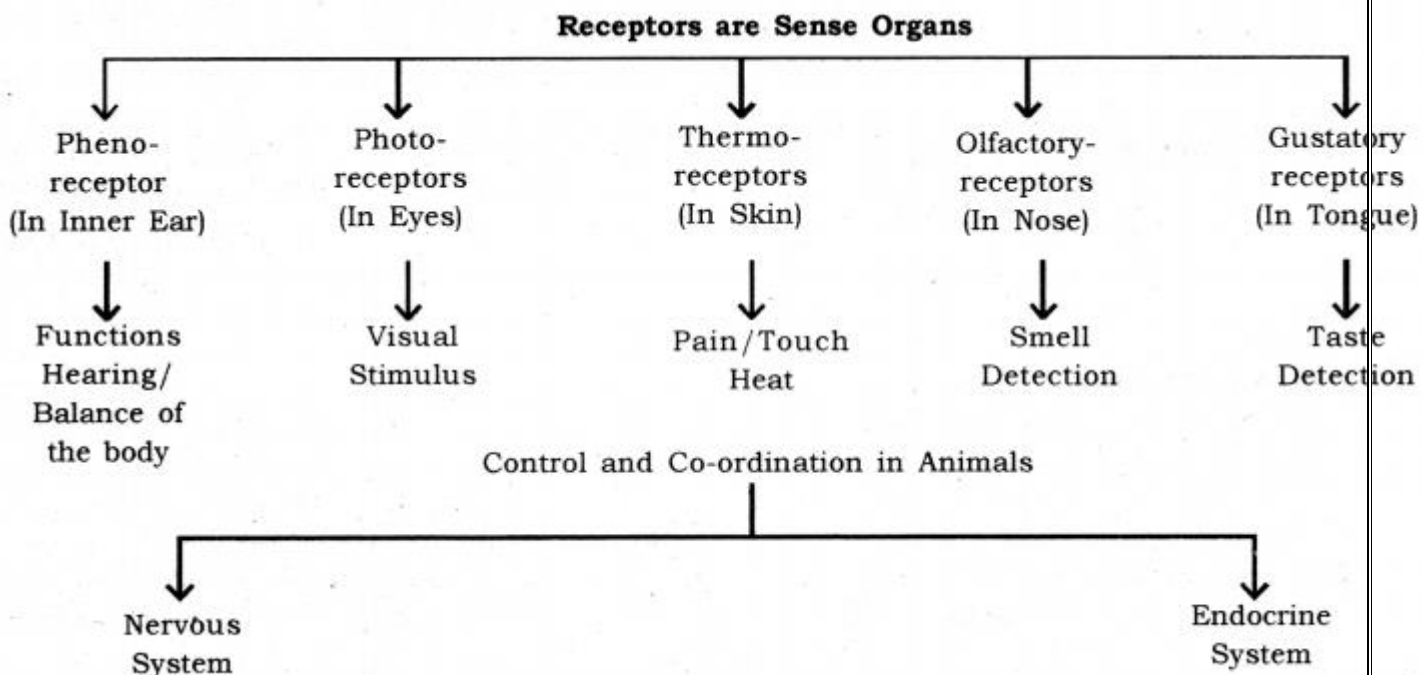
In animals, the nervous system and hormonal system are responsible for control and co-ordination.

Receptors: Receptors are the specialized tips of the nerve fibres that collect the information to be conducted by the nerves.

Receptors are in the sense organs of the animals.

These are classified as follows :

- **Phono-receptors:** These are present in inner ear.
Functions: The main functions are hearing and balance of the body.
- **Photo-receptors:** These are present in the eye.
Function: These are responsible for visual stimulus.
- **Thermo-receptors:** These are present in skin.
Functions: These receptors are responsible for pain, touch and heat stimuli.
These receptors are also known as thermoreceptors.
- **Olfactory-receptors:** These are present in nose.
Functions: These receptors receive smell.
- **Gustatory-receptors:** These are present in the tongue.
Functions: These helps in taste detection.



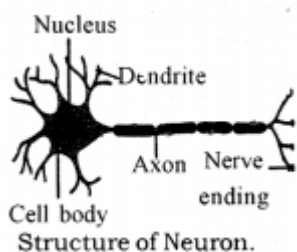
Functions of the nervous system

- Nervous system receives information from the environment.
- To receive the information from the various body.
- To act according to through muscles and glands.

A neuron is the structural and functional unit of the nervous system.

Neuron: Neuron is a highly specialized cell which is responsible for the transmission of nerve impulses. The neuron consists of the following parts

(i) **Cyton or cell body:** The cell body or cyton is somewhat star-shaped, with many hair like structures protruding out of the margin. These hair-like structures are called dendrites. Dendrites receive the nerve imps of neuron



pulses.

- Sensory neuron: These neurons receive signals from a sense organ.
- Motor neuron: These neurons send signals to a muscle or a gland.
- Association or relay neuron: These neurons relay the signals between sensory neuron and motor neuron.

Synapse: The point contact between the terminal branches of axon of one neuron with the dendrite of another neuron is called synapse.

Neuromuscular Junction (NMJ): NMJ is the point where a muscle fibre comes in contact with a motor neuron carrying nerve impulse from the control nervous system.

Transmission of nerve impulse: Nerve impulses travel in the following manner from one neuron to the next :

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1. What is the difference between a reflex action and walking?

Ans. Difference between reflex action and walking:

2.

Reflex action	Walking
(a) Take place without thought.	(a) Takes place after thought.
(b) Controlled by spinal cord.	(b) Controlled by cerebellum.
(c) It is involuntary action	(c) It is a voluntary action.

What happens at the synapse between two neurons?

Ans. At synapse, the electrical impulse generated at dendrite of a neuron is passed on to dendrite of another neuron in form of chemical impulses. The chemical present at synapse is called neurotransmitter.

3. Which part of the brain maintains posture and equilibrium of the body?

Ans. Cerebellum

4. How do we detect the smell of an agarbatti (incense stick)?

Ans. Smell of agarbatti is detected by olfactory receptors in the temporal lobe of fore-brain. It is first received by olfactory receptors in our nose.

5. What is the role of brain in reflex action?

Ans. Reflex actions are formed in the spinal cord itself although the information also goes on to brain where the encounter remains the memory and make us aware of our action.

Page No. 122

1. What are plant hormones?

Ans. They are chemicals which help to coordinate growth, development, flowering and response to the environment in plants.

2. How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?

Ans. Difference between movement of leaves of sensitive plants and movement of shoot towards light:

Movement of leaves of sensitive plant	Movement of shoot towards light
(i) Growth is not involved.	(i) Growth is involved.
(ii) Movement is away from the source of stimulus (touch).	(ii) Movement is towards the source of stimulus (light).

3. Give an example of a plant hormone that promote growth.

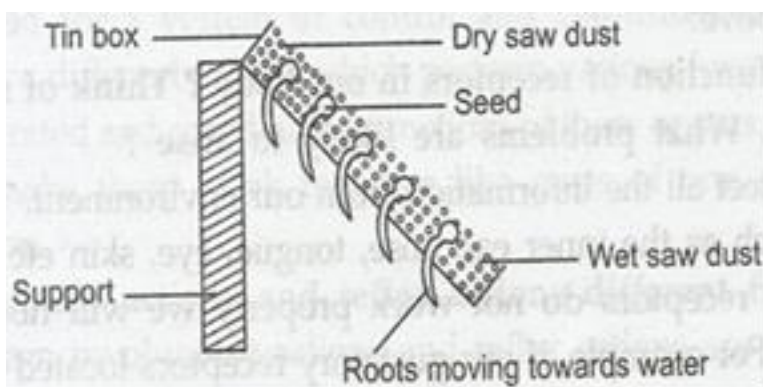
Ans. Auxin promotes growth.

4. How do auxins promote the growth of a tendril around a support?

Ans. When tendrils come in contact of any support, the part of the tendril in contact does not grow as rapidly as the part away from the object due to auxin secreted moves away from the object in contact. This rapid growth on one side causes tendril to circle around the object.

5. Design an experiment to demonstrate hydrotropism.

Ans. Take a tin box with hole at bottom. Fill it with moist saw dust. Sow some gram seeds in it. Keep the tin box in tilted position. When seeds start germinating, water the saw dust only in lower side of the tin box. You will observe that the radicle move towards the wet saw dust. This shows that root is positively hydrotropic.



Page No. 125

1. How does chemical coordination take place in animals?

Ans. The chemical coordination is maintained by hormones. These are secreted by

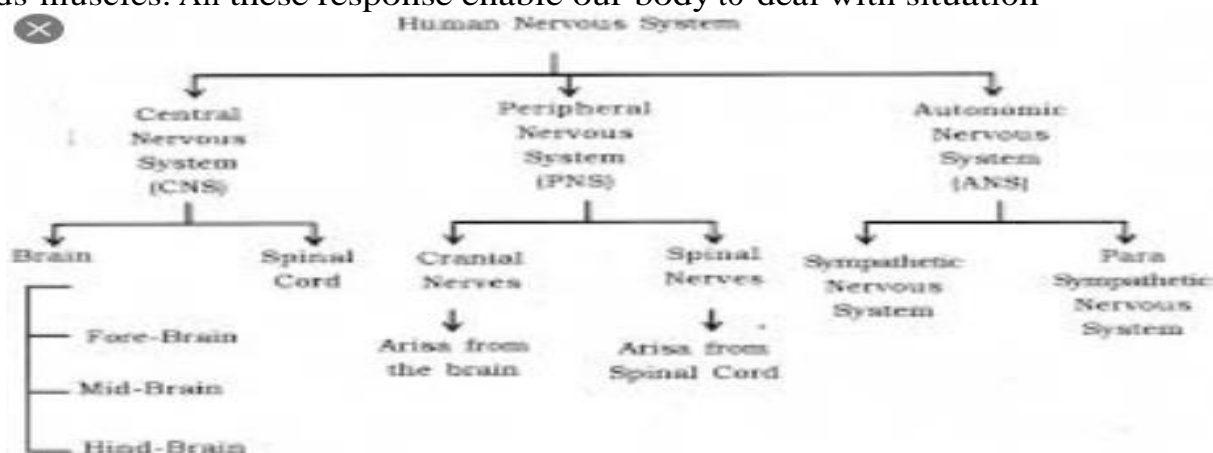
endocrine glands. These hormones are poured into blood through which they reach the target tissue or organ to act.

2. Why is the use of iodised salt advisable?

Ans. Iodine is necessary for the thyroid gland to make thyroxin hormone. In case, iodine is absent in our diet, there is a possibility of Goitre. Iodised common salt contains proper content of iodine. To avoid deficiency of iodine, iodised salt is recommended.

3. How does our body respond when adrenaline is secreted into the blood?

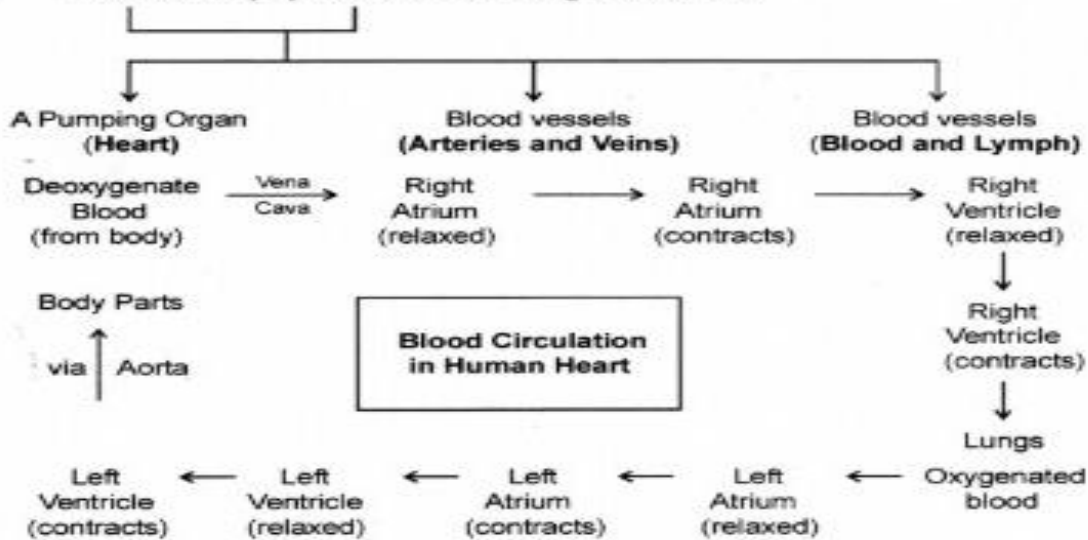
Ans. When adrenaline reaches the various target organ through blood. All these organs respond together to enable our body to deal with situation like running away from scary situation. When adrenaline reaches the heart, it beats faster to supply more oxygen to our muscles. The small arteries around digestive system and skins contracts to divert the blood towards muscles. All these response enable our body to deal with situation



(c) balancing the body

Ans. Diabetes is caused due to non or less secretion of hormone insulin by pancreas. In such person, the blood sugar level is high. Insulin converts extra sugar present in blood into glycogen. Patients suffering from diabetes are given insulin injection to control their blood sugar level.

The circulatory system in human beings consists of :



TEXTBOOK EXERCISES

1. Which of the following is a plant hormone?

- (a) **Insulin**
- (b) **Thyroxin**
- (c) **Oestrogen**
- (d) **Cytokinins**

Ans. (d) Cytokinin.

2. The gap between two neurons is called a

- (a) **Dendrite**
- (b) **synapse**
- (c) **axon**

- (c) **balancing the body**
- (d) **impulse**

Ans. (b) Synapse.

3. The brain is responsible for

- (a) **thinking**
- (b) **regulating the heartbeat.**
- (c) **controlling the body temperature.**
- (d) **all of above.**

Ans. (d) All the above.

4. What is the function of receptors in our body? Think of situation where receptors do not work properly. What problems are likely to arise?

Ans. Receptors detect all the information from our environment. These receptors are located in our sense organs.

In case any of the receptors do not work properly we will not be able to perceive that particular information.

5. Draw the structure of a neuron and explain its function.

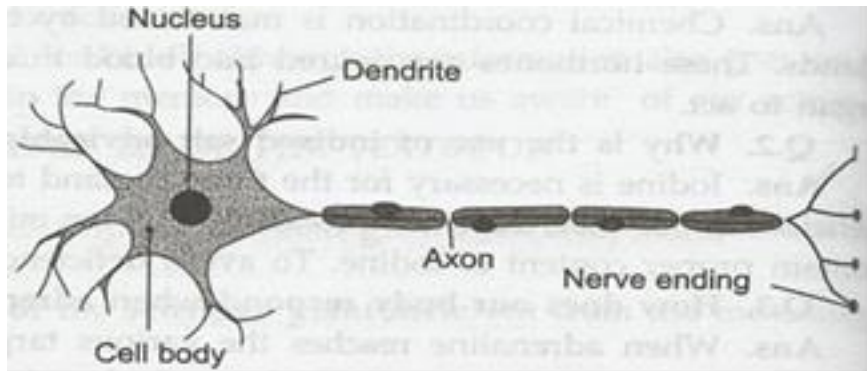
Ans. Neuron acquires particular information through dendrite located on its cell body. This information is then passed on to the axon. Finally, axon ending passes the information into next neuron at the synapse. As soon as the impulse reaches the dendrite, an electrical impulse is generated due to certain chemical changes in neuron. When the impulse reaches axon ending some chemicals released which pass on the impulse to next neuron. These chemicals are known as neurotransmitters.

6. How phototropism does occur in plants?

Ans. Movement of shoot towards light is called phototropism. This movement is caused due

(c) balancing the body

to more growth of cells towards the shaded side of the shoot as compared to the side of shoot



towards light. More growth of cells is due to secretion of auxin towards the shaded side.

7. Which signals will get disrupted in case of a spinal cord injury?

Ans. (i) Reflex action

(ii) Impulses from various body parts will not be conducted to brain.

(iii) Message from brain will not be conducted to various organs.

8. How does chemical coordination occur in plants?

Ans. Chemical coordination in plants is maintained by plant hormones also known as phytohormones. Some of these hormones promote growth while some inhibit it. Some hormones include auxin, Gibberellins, Cytokinin etc.

9. What is the need for a system of control and coordination in an organism?

Ans. An organism has different organs which perform various functions. The survival of an organism depends on integrated and coordinated functions of these organs. Nervous and endocrine system of an organism makes them work together like parts of one machine to accomplish homeostasis or coordination.

10. How are involuntary actions and reflex actions different from each other?

Ans. Difference between involuntary and reflex actions is as follows:

Involuntary actions	Reflex actions
It is a set of muscles movement over which we do not have control. Such actions are controlled by brain. For example- contraction of muscle of our digestive tract, beating of heart etc.	It is rapid, spontaneous and involuntary activity that is produced in response to a stimulus. It is controlled by spinal cord. Example- removal of hand with jerk when someone touches a hot object.

11. Compare and contrast nervous system and hormonal control and coordination in animals.

Ans. Difference between nervous control and hormonal control:

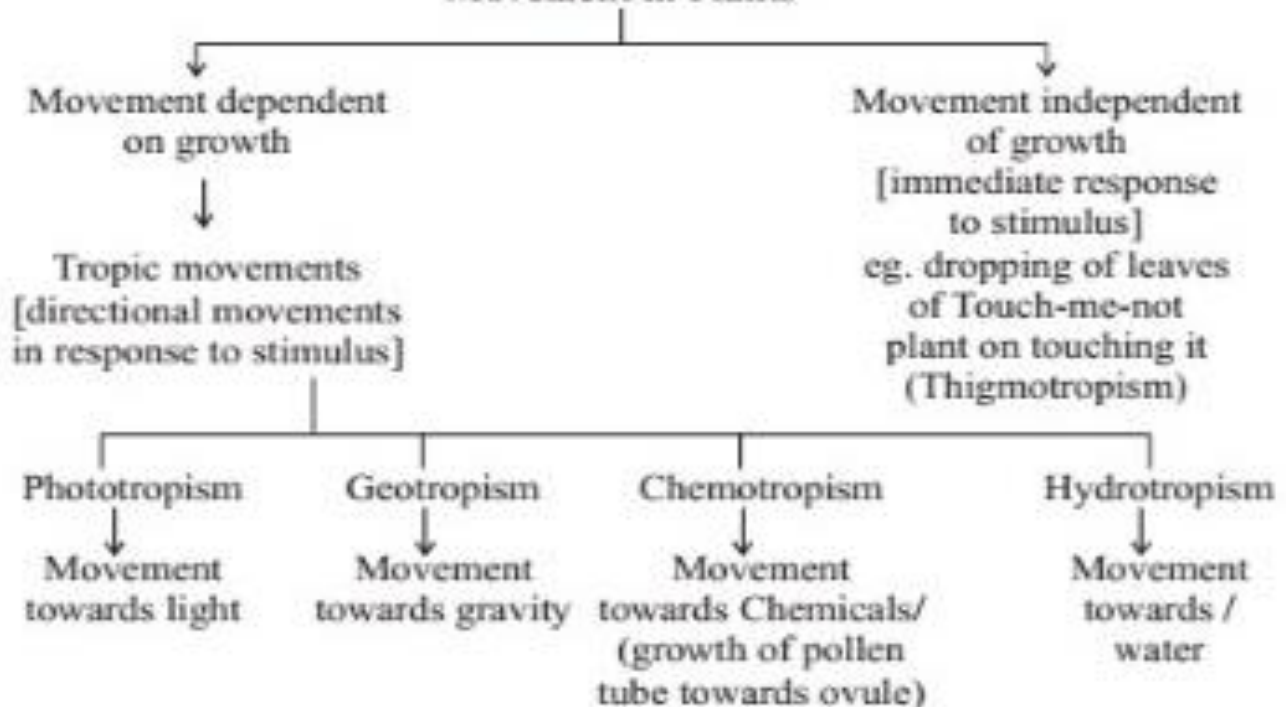
Nervous control	Hormonal control
(i) Consists of nerve impulses conducted by neurons from one organ to another organ.	(i) It consists of endocrine system which secretes chemical messenger's hormones secreted directly in blood.
(ii) Nervous impulses produce rapid short lasting responses.	(ii) Hormones produce longer lasting responses.
(iii) Nervous impulses are not specific in their action.	(iii) Action of hormones is highly Specific.

12. What is the difference between the manner in which movement's takes place in a sensitive plant and movement in our legs?

Ans. Difference between movement in a sensitive plant and movement in our legs:

Movement in sensitive plant	Movement in our legs
<p>(i) There is no specialized tissue in plants for conduction of information.</p> <p>(ii) Plant cells change shape by changing the amount of water in them.</p> <p>(iii) Plant cells do not have specialized proteins.</p>	<p>(i) There is specialized nervous tissue in animals for conduction of information and muscle cells to help in movement.</p> <p>(ii) Muscle cells contract or relax to effect movement.</p> <p>(iii) Muscle cells have specialized protein which help muscles to contract or relax.</p>

Coordination in Plants
Movement in Plants



Chapter - 9

Heredity and Evolution

Page No. 143

1. If a trait A exists in 10% of a population of an asexually reproducing species and a trait B exists in 60% of the same population, which trait is likely to have arisen earlier?

Ans. Trait B.

2. How does the creation of variations in a species promote survival?

Ans. Depending on the nature of variations different individuals would have different kinds of advantage to adjust in particular habitat. Variation helps the individual to have different traits that may develop the organisms more tolerable.

Page No. 147

1. How do Mendel's experiments show that traits may be dominant or recessive?

Ans. In a monohybrid cross of Mendel between tall and dwarf pea plants, all progeny in the F_1 generation are tall and in the F_2 generation, 75% of pea plants are tall but 25% are dwarf. This shows that traits are dominant or recessive.

2. How do Mendel's experiments show that traits are inherited independently?

Ans. When a pea plant having round green seeds is crossed with a pea plant having wrinkled yellow seeds in the F_1 generation all the plants have round yellow seeds. But in the F_2 generation two new traits that are round yellow and wrinkled green appear. This shows that traits are inherited independently.

3. A man with blood group A marries a woman with blood group O and their daughter has blood group O. Is this information enough to tell you which of the traits-blood

group A or O- is dominant? Why or why not?

Ans. No, the information is not enough because the blood group is determined by a pair of gene. One inherited from mother and other from father. In this case, the child inherited gene for O blood group from mother as well as father.

4. How is the sex of the child determined in human beings?

Ans. A child which inherits X chromosome from her father will be a girl and one who inherits Y chromosome from him will be a boy.

Page No. 150

1. What are the different ways in which individuals with a particular trait may increase in a population?

Ans. The different ways in which individual with a particular trait may increase are:

- (a) Natural selection- Certain variations give survival advantage to individuals in a population in a changed situation resulting in increase of their population.
- (b) Genetic drift- Accidents in small population even if they give no survival advantage also lead to increase to certain individual in population.

2. Why are traits acquired during the life-time of an individual not inherited?

Ans. Any change in non-reproductive tissues cannot be passed on to the DNA of the germ cells. Therefore, the traits acquired during life-time on an individual are not inherited.

3. Why are the small numbers of surviving tigers a cause of worry from the point of view of genetics?

Ans. Small number of surviving tigers will affect the frequency of selection which is essential for survival. For effective selection, the population must consist of an infinitely large number of individual in population.

Page No. 151

1. What factors could lead to the rise of a new species?

Ans. Following factors could lead to the rise of new species:

- (a) Changes in gene frequency in small breeding isolated populations.
- (b) Natural selection
- (c) Changes in number of chromosome.

2. Will geographical isolation be a major factor in the speciation of self-pollinating plant species? Why or why not?

Ans. No, because geographical barrier do not allow breeding between such individuals of a population which reproduce sexually. Moreover, asexually reproducing organism pass on the parental DNA to offspring which gives no chance of speciation.

3. Will geographical isolation be a major factor in the speciation of an organism that reproduces asexually? Why or why not?

Ans. Yes, due to geographical isolation, the two populations are separated. The levels of gene flow between them will decrease. The isolated population will breed with local population resulting in entry of isolated population into new population.

Page No. 156

1. Give an example of characteristics being used to determine how close two species are in evolutionary terms.

Ans. Analysis of the organ structure in fossils allows us to make estimates of how far evolutionary relationships go. For example, presence of feather in some fossils dinosaurs indicate the birds are closely related to reptiles.

2. Can the wing of a butterfly and the wing of the bat be considered homologous organs?

Ans. No, though the function of wing in both the cases is same but their structural plan and origin in different.

3. What are fossils? What do they tell us about the process of evolution?

Ans. Preserved traces of living organisms are called fossils found under the surface of earth the more recent in origin than the fossils we find in deeper layers.

Fossils also help us to find evolutionary relation between organisms.

Page No. 158

1. Why are human beings who look so different from each other in terms of size, colour and looks said to belong to the same species?

Ans. All humans are a single species *Homo sapiens* which originated in Africa. Some of our ancestors left Africa, while others stayed on. Those who migrated slowly spread across the planets.

2. In evolutionary terms, can we say which among bacteria, spiders, fish and chimpanzees have a 'better' body design? Why or why not?

Ans. Bacteria have better body design because it has so much variation to adjust in different climatic condition.

TEXTBOOK EXERCISES

1. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers but almost half of them were short. This suggests that the genetic make-up of the tall parent can be depicted as

- (a) TTWW
- (b) TTww
- (c) TtWW
- (d) TtWw

Ans. (c) TtWW

2. An example of homologous organs is

- (a) Our arm and a dog's fore-leg.
- (b) Our teeth and an elephant's tusks.
- (c) Potato and runners of grass.
- (d) All of the above.

Ans. (d) all of the above

3. In evolutionary terms, we have more in common with

- (a) A Chinese school-boy.
- (b) A chimpanzee
- (c) A spider
- (d) A bacterium

Ans. (a) a Chinese school boy.

4. A study found that children with light-coloured eyes are likely to have parents with light-coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not?

Ans. No, since two copies of traits are inherited from parents, one from mother and the other from father. Unless we know the nature of these two variants of traits we cannot tell which is dominant and which is recessive. Recessive traits appear when both the parents contribute recessive allele. From this statement we can only presume that both parents are contributing recessive allele.

5. How are the areas of study- evolution and classification interlinked?

Ans. When we classify organism we look for similarities among organism which allows us to group them. Based on these principles we can work out the evolutionary relationship of the species.

6. Explain the terms analogous and homologous organs with examples.

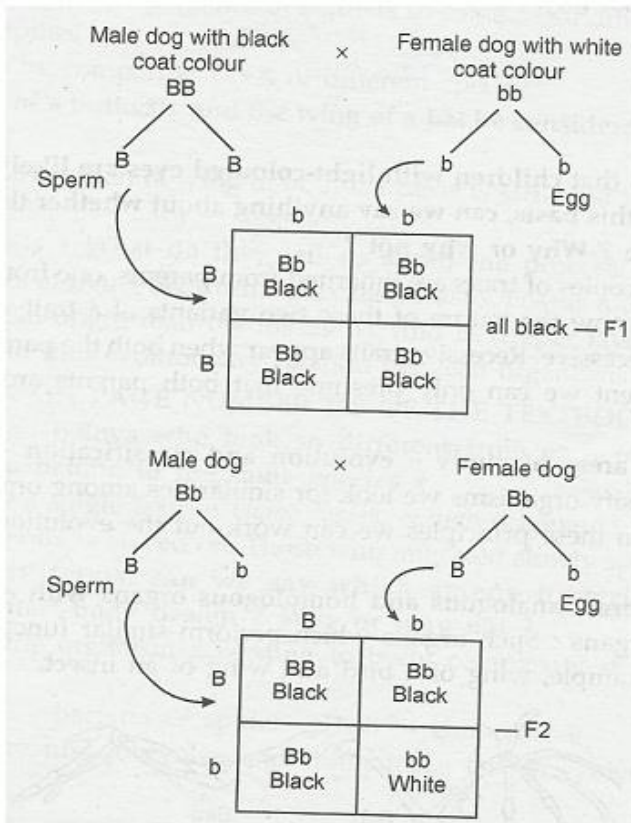
Ans. Analogous organs: Such organs which perform similar function but are different in

structure and origin are called analogous organs. Example- Wings of birds and wings of insects.

Homologous organs: Such organs which may have different functions but similar structure and origin are called homologous organs. Example- fore arm of frogs, lizards and birds.

7. Outline a project which aims to find the dominant coat colour in dogs.

Ans.



8. Explain the importance of fossils in deciding evolutionary relationship.

Ans. (i) Study of fossils allow us to make estimates of how far back evolutionary relationship go between organisms.

(ii) Study of age of fossils allows us to know which organisms evolved earlier and which later.

9. What evidence do we have for the origin of life from inanimate matter?

Ans. The evidence was given by Stanley L. Miller and Harold C. Urey in 1953. They assembled an atmosphere similar to that thought to exist on early earth over water. This was

maintained by them at a temperature just below 100 degree Celcius and sparks were passed through the mixture of gases to stimulus lightening. At the end of week, they found that 15% of the carbon had been converted to simple compounds of carbon including amino acids which make up protein molecules.

10. Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually?

Ans. Variations arise either because of errors in DNA copying or as a result of sexual reproduction. Due to sexual reproduction genetic variability increases in the population from one generation to another. This happens due to the fact that sexually reproducing organism inherits half the genes from each parent. These variations are very important for the process of evolution.

11. Only variations that confer an advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

Ans. No, depending on the nature of variations different individuals have been different kinds of advantages. However, when a drastic change occurs in environment, only those organisms in the population will survive which have an advantageous variation in that population to survive in changed environment.

12. How is the equal genetic contribution of male and female parents ensured in the progeny?

Ans. Equal contribution of male and female parents is ensured in progeny during sexual reproduction. Each trait of progeny is determined by a pair of alleles and gametes of male and female contain one allele. Each allele pairs during fertilisation combine together to determine traits. Thus, the traits of progeny are determined by equal genes from male and female.

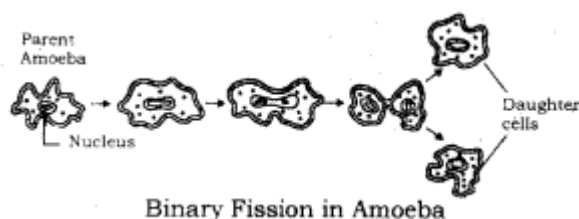
Chapter - 8

How Do Organisms Reproduce?

Asexual Reproduction

- It involves only one parent.
- There is no formation and fusion of gametes.
- The young ones formed are almost identical to each other as well as to the parent cell.
- Asexual reproduction generally occurs during favourable environmental conditions and when there is an abundance of food.
- It is a faster method of reproduction.
- Types of Asexual Reproduction is Unicellular Organism

(i) Binary Fission: Seen in bacteria, protozoa like Amoeba, Paramecium. (In these first pseudopodia withdrawn (karyokinesis) the nucleus of the parent cell divides and then the cytoplasm divides (cytokinesis) resulting in the formation of two daughter cells). It occurs during highly favourable conditions. The cell division can occur in any plane as in case of Amoeba. However, organisms like Leishmania. (cause Kala-azar), which have a whip like flagella at one end, binary fission occurs in a definite orientation in relation to the flagellum.

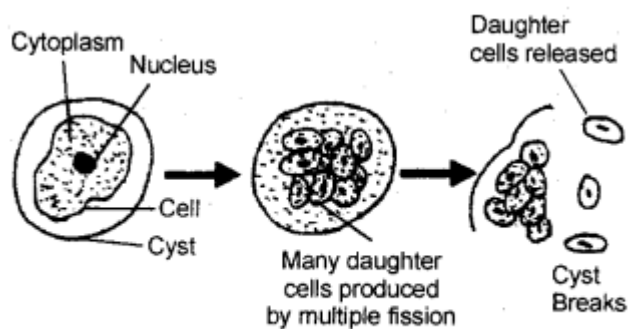


Binary Fission in Amoeba

Cytokinesis: Division of cytoplasm.

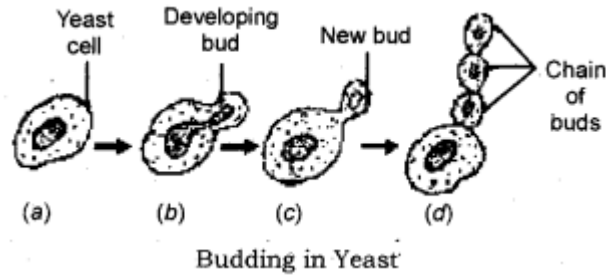
Karyokinesis: Division of Nucleus.

and the Plasmodium are released. **ii) Multiple Fission:** Seen in Plasmodium, (a malarial parasite). In this during unfavourable conditions, the parent cell develops a thick resistant wall around itself forming a cyst. Within the wall, the cytoplasm divides many times to form many plasmodia. When conditions become favourable, the cyst wall break



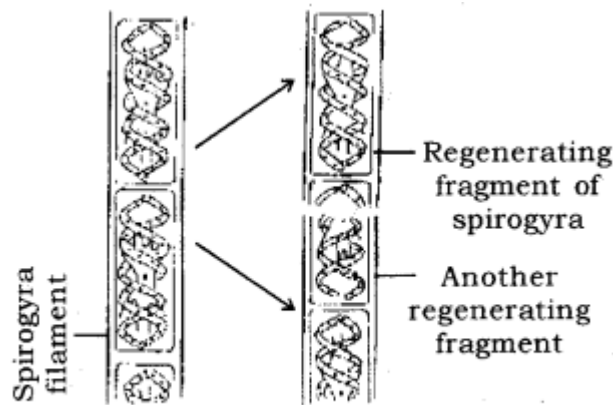
Multiple Fission in Plasmodium

ii) Budding: Seen in Yeast (a fungus). The parent yeast cell develops a protrusion or an outgrowth at its upper end. The nucleus of the parent cell divides and one of them moves into the outgrowth which grows bigger and finally separates from the parent cell to lead an independent existence. Very often if the conditions are highly favourable, a chain of buds is formed.



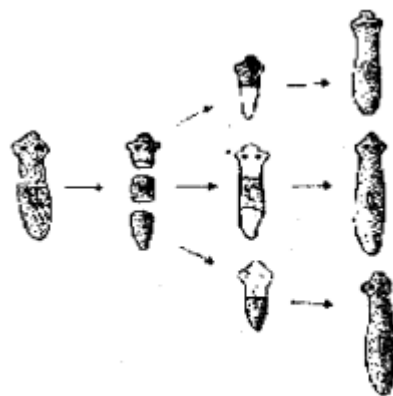
Budding in Yeast

(i) Fragmentation: Seen in multicellular organisms which have a relatively simple body organisation like Spirogyra. Spirogyra has a filamentous body. (If it breaks into smaller pieces or fragments). Each fragment has the capacity to form a new individual. However, all multicellular organisms cannot show cell-by-cell division as cells from tissues which form organs. These organs are placed at definite positions in the body. Hence, they need to use more complex methods of reproduction.



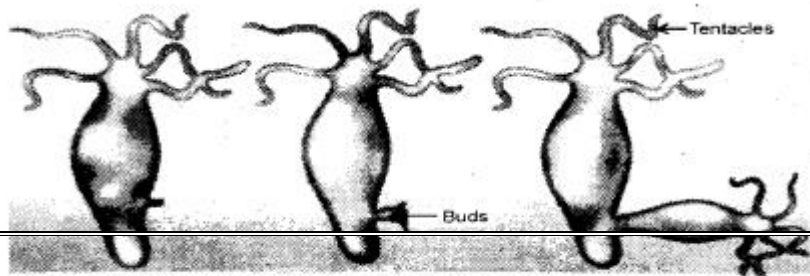
Fragmentation in Spirogyra

ii) Regeneration: It is the ability of organisms to develop their lost parts. Some organisms show have high regenerative capacity it is also a means of reproduction for example; Planaria. (Regeneration is carried out by specialized cells which redivide to form a mass of cells from which different cells undergo changes to become different cell types and tissues. These changes occur in an organized sequence known as development).

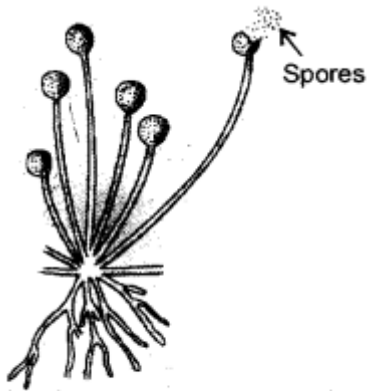


Regeneration in Planaria.

ii) Budding: Seen in Hydra. Parent Hydra develops a bud at its lower end. This grows in size and finally breaks off to live independently.



v) Spore Formation: Seen in Rhizopus (a fungus). Rhizopus body is made up of thread-like structures called hyphae. The erect hyphae bear sporangia inside which reproductive structures called spores are formed. Spores are asexually reproducing bodies having a thick protective wall. They are produced during unfavourable times and help to tide over the unfavourable environmental conditions. When the spores fall on a suitable medium, each one forms a new individual.



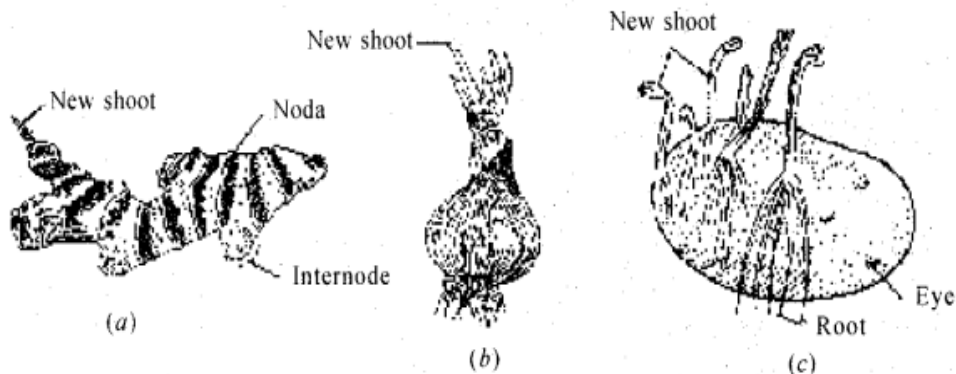
Spore formation in *Rhizopus*

v) Vegetative Propagation: Method by which plants reproduce by their vegetative parts such as roots, stems, and leaves.

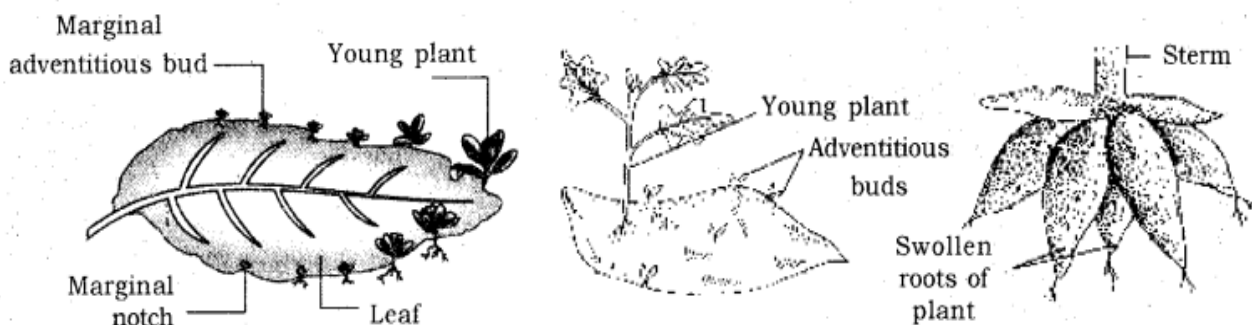
Types of Vegetative Propagation: It is two types

- Natural vegetative propagation.
- Artificial vegetative propagation (Tissue culture).

Mint reproduces naturally by roots. Sugarcane, jasmine by stems and Biyophyllum by leaves. In biyophyllum buds are produced in the notches along the leaf margins and when they fall on the soil, they develop into



Vegetative propagation by stem in— (a) ginger (rhizome) and (b) onion (bulb) and (c) potato (tuber).



Leaf of *Bryophyllum* with buds.

Vegetative propagation by roots in sweet potato.

Multiple choice question

1. During favourable conditions, Amoeba reproduces by

- (a) multiple fission
- (b) binary fission**
- (c) budding
- (d) fragmentation

2. A feature of reproduction that is common to Amoeba, Yeast and Spirogyra is that

- (a) they reproduce asexually**
- (b) they are all unicellular
- (c) they reproduce only sexually
- (d) they are all multicellular

3. The ability of a cell to divide into several cells during reproduction in Plasmodium is called

- (a) budding
- (b) multiple fission**
- (c) binary fission
- (d) reduction division

4. Bryophyllum can be propagated vegetatively by the

- (a) stem
- (b) leaf**
- (c) root
- (d) flower

5

Vegetative propagation refers to formation of new plants from

- (a) stem, flowers and fruits
- (b) stem, leaves and flowers
- (c) stem, roots and flowers
- (d) stem, roots and leaves**

Question answers

1. What is the importance of DNA copying in reproduction?

Ans. DNA contains information for the inheritance of features from parents to next generation. DNA presents in nucleus of cells are the information source for making protein. If information is different, different protein will be made that lead to altered body design.

2. Why is variation beneficial to the species but not necessarily for the individual?

Ans. Variations are useful for the survival of species in changed environmental situations. If a population of reproducing organism were suited to a particular niche and if the niche is drastically altered the population could be wiped out. However, if some variations are present some species will survive. Thus, variation is useful to species but not the individual.

Page No. 133

1. How does binary fission differ from multiple fissions?

Ans. Difference between binary fission and multiple fission:

Binary fission	Multiple fission
Splitting of unicellular organisms like amoeba into two equal halves during cell division is termed binary fission.	Division of single-celled organisms such as malarial parasites into many daughter cells simultaneously is termed multiple fission.

2. How will an organism be benefited if it reproduces through spores?

Ans. The spores are covered by thick walls that protect them until they come into contact with suitable moist surface and can begin to grow. Large number of spores also provide survival benefits.

3. Can you think of reasons why more complex organism cannot give rise to new individuals through regeneration?

Ans. Complex organisms are not merely random collection of cells. Specialized cells are organized in them as tissues are organized in n_2 ,

organs. These organs have to be placed at definite positions in the body. So, regeneration is not possible in multicellular organism.

4. Why is vegetative propagation practiced for growing some types of plants?

Ans. (i) Plants raised by vegetative propagation can bear flower and fruits earlier than those produced from seeds.

(ii) Such methods also make possible the propagation of plants such as banana, orange, rose and jasmine that have lost the capacity to produce seeds

(iii) All plants produced by this method are genetically similar enough to the parent plant to have its all characteristics.

5. Why is DNA copying essential part of the process of reproduction?

Ans. DNA contains information for the inheritance of features from parents to next generation. DNA presents in nucleus of cells are the information source for making protein. If information is different, different protein will be made that lead to altered body design.

Page No. 140

1. How is process of pollination different from fertilization?

Ans. Distinction between pollination and fertilisation:

Pollination	Fertilisation
Pollination refers to the process of transfer of pollen grains from anther to stigma of flower.	Fertilisation refers to fusion of male and female gamete to form a zygote.

2. What is the role of the seminal vesicles and the prostate gland?

Ans. Secretions of seminal vesicles and prostate gland provide fluid medium to sperm to move and also provide nutrition to them.

3. What are the changes seen in girls at the time of puberty?

Ans. During puberty breast size begins to increase with darkening of the skin of the nipples at the tip of breasts. Also, girls begin to menstruate at around this time.

4. How does the embryo get nourishment inside the mother's body?

Ans. The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. This is a disc which is embedded in the wall of uterus. It contains finger-like projections villi on the embryo's side of the tissue. On mother's sides are blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass the mother to the embryo and waste products from embryo to mother.

5. If a woman is using a Copper-T, will it help in protecting her from sexually transmitted diseases?

Ans. Copper-T cannot protect the woman from acquiring sexually transmitted disease. It will protect her from only unwanted pregnancy.

TEXTBOOK EXERCISE

1. Asexual reproduction takes place through budding in

- (a) Amoeba
- (b) Yeast
- (c) Plasmodium
- (d) Leishmania.

Ans. (b) Yeast

2. Which of the following is not a part of female reproductive system in human beings?

- (a) Ovary
- (b) Uterus
- (c) Vas deferens
- (d) Fallopian tube

Ans. (c) Vas deferens, it is a male reproductive part.

3. The anther contains

- (a) Sepals
- (b) Ovules
- (c) Carpel
- (d) Pollen grains.

Ans. (d) Pollen grains.

4. What are the advantages of sexual reproduction over asexual reproduction?

Ans. Sexual reproduction leads to variation due to recombination of genetic material DNA. These variations are essential for survival of species. On the contrary, asexual reproduction does not bring about variations.

5. What are the functions performed by the testis in human beings?

Ans. In human beings, testes perform dual function:

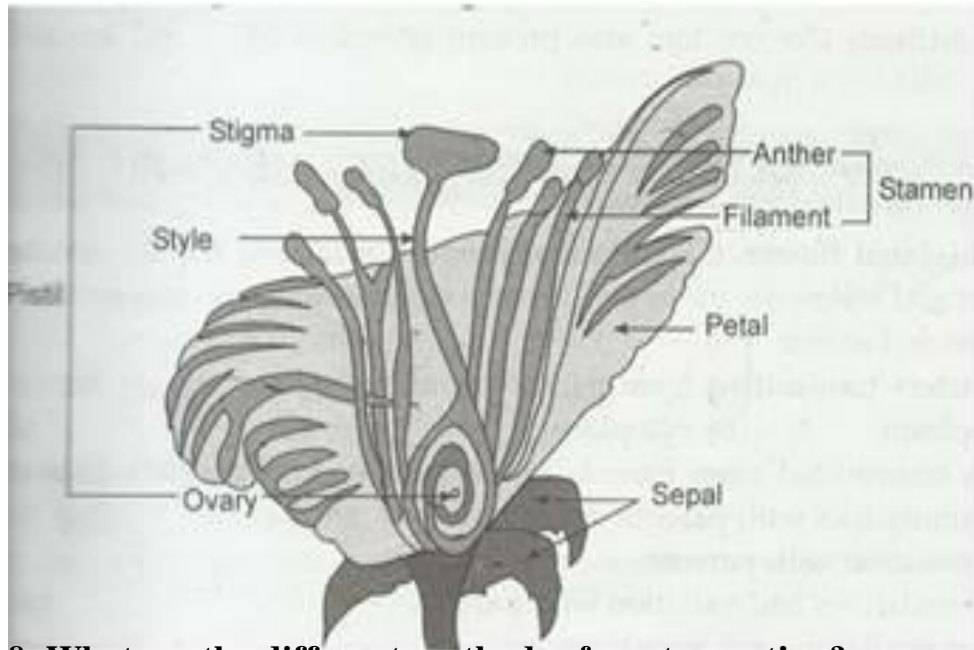
- (i) Production of sperms
- (ii) Secretion of male hormone testosterone.

6. Why does menstruation occurs.

Ans. When in human female, egg is not fertilized, it lives for about one day. Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilized egg. Thus, its lining becomes thick and spongy. This would be required for nourishing the embryo if had fertilized. However, this lining is not required any longer if fertilisation has not occurred. So, the lining slowly breaks and comes out through the vagina as blood and mucous. This cycle takes roughly every month and is known as menstruation.

7. Draw a labeled diagram of the longitudinal section of a flower.

Ans.



8. What are the different methods of contraception?

Ans. Various methods used for regulation of child birth can broadly categories as:

(i) **Barrier methods:** In this method, physical devices such as condom, diaphragm, cervical cap and Copper-T are used.

(ii) **Chemical method:** use of spermicidal jelly by woman, oral pills and vaginal pills.

(iii) **Surgical method:** In surgical method, a small portion of vas deferens in male and the oviduct of female, is surgically removed or ligated. It is called vasectomy in male and Tubectomy in females.

9. How are the modes of reproduction different in unicellular and multicellular organism?

Ans. In unicellular organisms, cell division, or fusion leads to the creation of new individuals. In multicellular organisms with simple body organization budding, fragmentation may work but in complex multicellular organisms only sexual reproduction takes place.

10. How does reproduction help in providing stability to populations of species?

Ans. The consistency of DNA copying during reproduction is important for the maintenance of body design and other features that allow the organism to use the particular niche. Reproduction is, therefore, linked to the stability to populations of species.

11. What could be the reasons for adopting contraceptive methods?

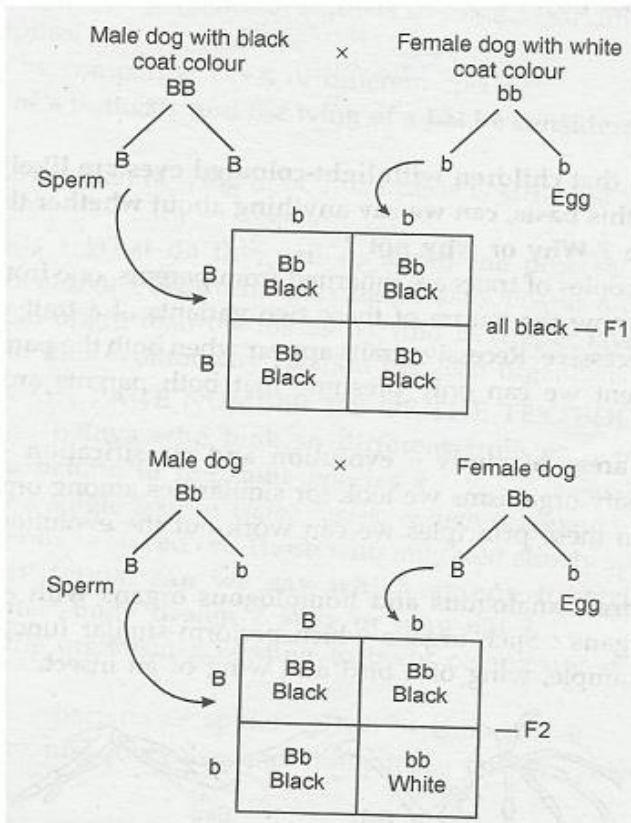
Ans. The sexual act always has the potential to lead to pregnancy. Pregnancy will make major demands on the body and the mind of the woman and if she is not ready for it, her health will be adversely affected. Therefore, adopting contraceptive methods are essential. Some contraceptive methods like condom also prevent spread of STDs and lethal diseases like HIV-AIDS.

structure and origin are called analogous organs. Example- Wings of birds and wings of insects.

Homologous organs: Such organs which may have different functions but similar structure and origin are called homologous organs. Example- fore arm of frogs, lizards and birds.

7. Outline a project which aims to find the dominant coat colour in dogs.

Ans.



8. Explain the importance of fossils in deciding evolutionary relationship.

Ans. (i) Study of fossils allow us to make estimates of how far back evolutionary relationship go between organisms.

(ii) Study of age of fossils allows us to know which organisms evolved earlier and which later.

9. What evidence do we have for the origin of life from inanimate matter? Ans.

The evidence was given by Stanley L. Miller and Harold C. Urey in 1953. They assembled an atmosphere similar to that thought to exist on early earth over water. This was

maintained by them at a temperature just below 100 degree Celcius and sparks were passed through the mixture of gases to stimulus lightening. At the end of week, they found that 15% of the carbon had been converted to simple compounds of carbon including amino acids which make up protein molecules.

10. Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually?

Ans. Variations arise either because of errors in DNA copying or as a result of sexual reproduction. Due to sexual reproduction genetic variability increases in the population from one generation to another. This happens due to the fact that sexually reproducing organism inherits half the genes from each parent. These variations are very important for the process of evolution.

11. Only variations that confer an advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

Ans. No, depending on the nature of variations different individuals have been different kinds of advantages. However, when a drastic change occurs in environment, only those organisms in the population will survive which have an advantageous variation in that population to survive in changed environment.

12. How is the equal genetic contribution of male and female parents ensured in the progeny?

Ans. Equal contribution of male and female parents is ensured in progeny during sexual reproduction. Each trait of progeny is determined by a pair of

alleles and gametes of male and female contain one allele. Each allele pairs during fertilisation combine together to determine traits. Thus, the traits of progeny are determined by equal genes from male and female.