
LIFE PROCESSES

- **Life Processes** : All the basic functions which together keep the living organisms alive to maintain their life on this earth are called life processes.

The basic functions performed by living organisms to maintain their life are called life processes.

- The common characteristics of living organisms are as follows:

Movement : Living things move by themselves.

Nutrition : Living things need food, air and water.

Growth : Living things can grow.

Control and Co-ordination (Response to stimuli): Living things can respond to changes around them. They are sensitive.

Respiration : Living things respire (release energy from food).

Excretion : Living things excrete (get rid of waste materials from their body).

Reproduction : Living things can reproduce. They can have young one.

- **Nutrition**: The processes of intake of food and its utilization by the body is called nutrition.

Food contains nutrients (Carbohydrates, Proteins, fats, minerals and vitamins) which are substances that an organism takes in and uses for growth and maintenance.

Nutrient: Nutrient is any substance that nourishes a living being.

Modes of Nutrition:

Modes of nutrition means methods of procuring food or method of obtaining food by an organism.

Autotrophic

The mode of nutrition in which an organism synthesizes its own food by the utilisation of only the inorganic nutrients (CO_2 , H_2O) present in the surroundings is called Autotrophic.

Heterotrophic

The mode of nutrition in which organisms derive their food from other organisms (Plants/animals) is called heterotrophic nutrition

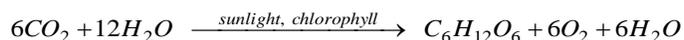
Autotrophic Mode of Nutrition :

(Auto = Self, Trophic = Nutrition)

The mode of nutrition in which an organism synthesizes its own food by the utilisation of the inorganic substances (CO₂, H₂O) or nutrients present in the surrounding is called autotrophic nutrition.

Photosynthesis :

Photosynthesis is a biochemical process by which the inorganic constituents like carbon dioxide and water are combined to form carbohydrates, by green plants and some bacteria in the presence of sunlight energy and chlorophyll, releasing oxygen as a byproduct.



glucose

Events occurring during photosynthesis :

- Absorption of light energy by chlorophyll.
- Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.
- Reduction of carbon dioxide to carbohydrates.

Site of photosynthesis

Photosynthesis takes place in the chloroplasts of green leaves which contains the green pigment called chlorophyll.

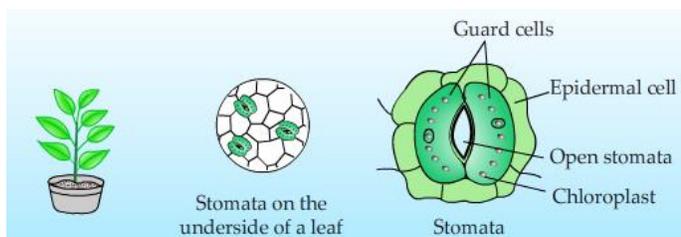
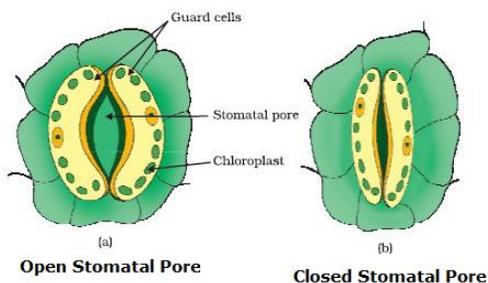
Stomata : Stomata are the tiny pores present on the surface of the leaves.

Functions of stomata:

- a) Massive amount of gaseous exchange takes place in the leaves through these pores for the purpose of photosynthesis.
- b) CO₂ enters into the leaves by diffusion through guard cells.

Guard cells – guard cells of the stomata is responsible for opening and closing of the pore.

The guard cells swell when water flows into them, causing the stomata pore to open and the plant closes these pores when it does not need carbon dioxide for photosynthesis and then guard cells shrink.



- **Heterotrophic nutrition :**

(Hetero = different, trophic = nutrition)

The mode of nutrition in which organisms derive their food from other organisms (plants/animals) is called heterotrophic nutrition.

All animals and non-green plants, bacteria and fungi cannot prepare their food by themselves. They depend upon autotrophs for their food. As autotrophs are producers, heterotrophs are consumers.

There are different modes of heterotrophic nutrition.

a) Saprophytic nutrition (Sapro = rotten, phyte = plant)

The mode of nutrition in which organisms decompose dead and decaying organic matter to obtain nutrients is called saprophytic nutrition.

Example – Fungi (e.g. bread moulds, mushroom, yeast) and many bacteria are saprophytes.

b) Parasitic nutrition (Para = feeding, sites = gains)

The mode of nutrition in which organisms live on or inside other organisms (host) and obtain food from the body of the host without killing them is called parasitic nutrition.

Example – Cuscuta (Amarbel)

Roundworm (Ascaris)



c) Holozoic nutrition (Holo = whole, Zoic = animal)

The mode of nutrition in which organisms feed on complex substances by ingestion and digest it with the help of enzymes is called holozoic nutrition.

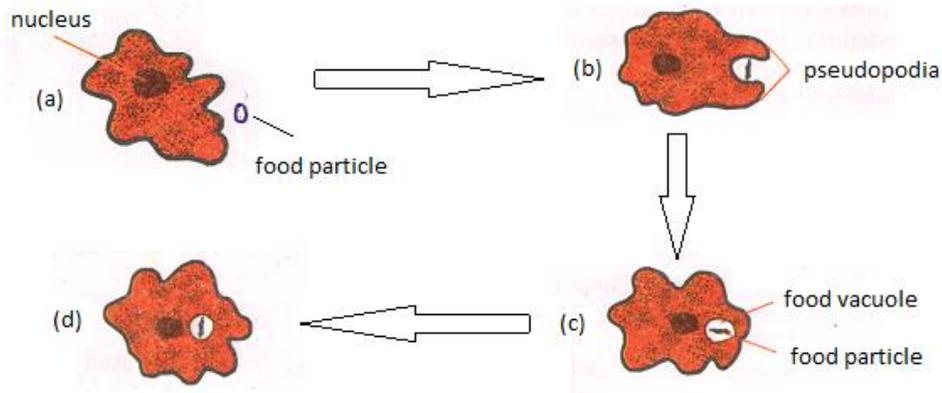
Example – Herbivores, Carnivores, Omnivores.

- **Nutrition in Amoeba**

a) Intracellular digestion takes place in Amoeba.

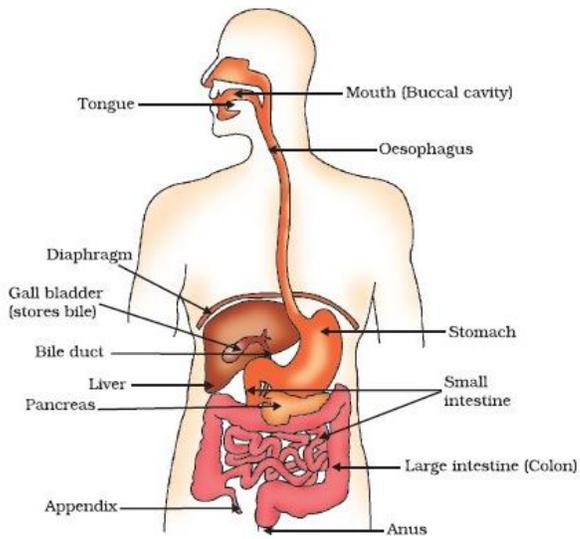
b) Holozoic mode of nutrition in Amoeba involves five steps –

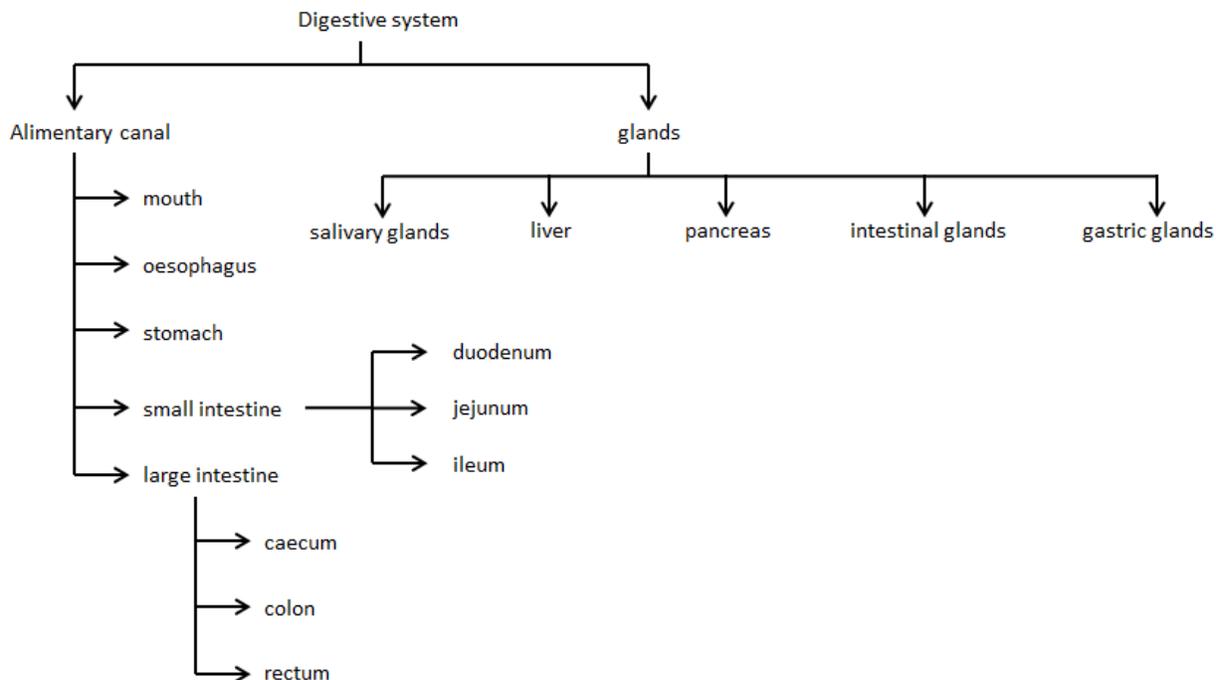
1. **Ingestion:** Ingestion involves taking in food. In amoeba since there is no mouth; intake of food may occur at any part of the body, but it usually takes place at the advancing end i.e. pseudopodia. This process is called phagocytosis.
2. **Digestion:** It involves break-down of food into simple soluble form in the food vacuole with the help of enzymes.
3. **Absorption:** The food vacuole moves in the endoplasm and the digested food gets diffused into the cytoplasm.
4. **Assimilation:** Use of absorbed food to form new protoplasm.
5. **Egestion:** The removal or elimination of undigested part of food outside the body by the vacuole.



• **Nutrition in Human Beings :**

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

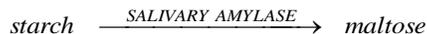




Mouth: The mouth is the first part of the alimentary canal. It opens into a large buccal cavity. Its main function is to receive food and start mechanical digestion by mastication of the food.

Important : Salivary glands – associated with mouth.

The salivary gland produces saliva. The saliva contains an enzyme called salivary amylase that breaks down starch into sugar.



Oesophagus: The masticated food is thrown into the funnel shaped pharynx which opens into a long food pipe i.e., oesophagus.

Important : The lining of canal has muscles which create rhythmic wavelike movements which push the food downward. This movement is called peristaltic movement.

Stomach: The stomach is J-shaped organ. The food is taken to the stomach through the food pipe or oesophagus. The muscular walls of the stomach help in mixing the food thoroughly with more digestive juices.

Important : The gastric glands are present in the wall of the stomach.

These release hydrochloric acid, a protein digesting enzyme called pepsin and mucus.

- Action of HCl :
 - (i) It is a germicide and kills bacteria to check purification.
 - (ii) It provides acidic medium for protein digestion.
 - (iii) It activates gastric enzymes.

- Action of Pepsin : It acts on proteins and convert them into peptones.



- Action of Mucus :
 - (i) Mucus keeps inner wall of stomach wet and smooth.
 - (ii) It protects the stomach lining from the action of the acid under normal conditions.

Small intestine: From the stomach, the food now enters the small intestine. This is the longest part of the alimentary canal. The small intestine is the site of the complete digestion of carbohydrates, proteins and fats.

Note: *Herbivores eating grass need a longer small intestine to allow cellulose to be digested.*

Important :

- (i) The intestine receives the secretion of the liver and pancreas for digestion of carbohydrates, proteins and fats.
- (ii) The food coming from the stomach is acidic and it has to be made alkaline for the pancreatic enzyme to act.

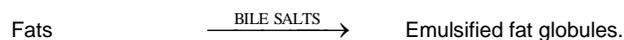
- **Action of Bile juice:**

Bile juice has bile salts and bile pigments. Bile juice has following functions:

- a) Provides alkaline medium for the action of pancreatic and intestinal juice.



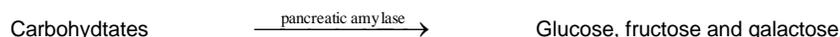
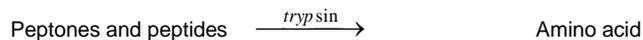
- b) Bile salts breakdown large fat droplets into very fine fat globules. This process is known as emulsification.



- c) **Bile pigments (Bilirubin and Biliverdin)** are formed in liver by breakdown of haemoglobin of worn out RBC's. They are waste and are passed out along with faecal matter.

- **Action of Pancreatic juice :**

The pancreas secretes pancreatic juice which contains enzymes like trypsin for digesting protein and lipase for breaking down emulsified fats.

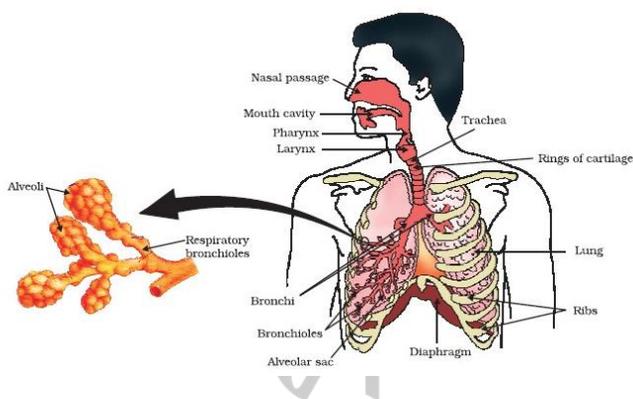


- The digested food is taken up by the walls of the intestine.
- The inner lining of small intestine has numerous finger-like projections called villi which increase the surface area for absorption of nutrients. The villi are richly supplied with blood vessels which take the absorbed food to each and every cell of the body.

Large Intestine: The unabsorbed food is sent into the large intestine where more villi absorb water from this material.

The rest of the material is removed from the body via the anus.

RESPIRATION

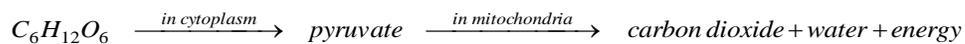


Respiration is a biological process in which glucose is oxidized to different products along with release of energy.

On the basis of respiration is of two types:

- Aerobic respiration
- Anaerobic respiration

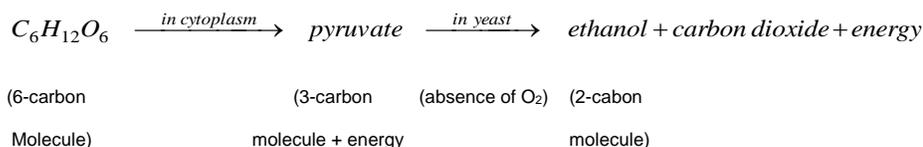
a) **Aerobic respiration:** The respiration in which organic food is completely oxidized with the help of oxygen into carbon dioxide and water is called Aerobic respiration.



(6-carbon Molecule) (3 carbon molecule + energy) (Presence of O₂)

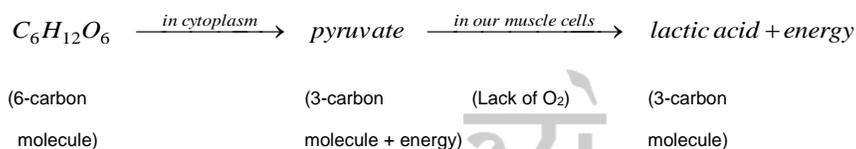
Note: Breakdown of pyruvate using oxygen takes place in mitochondria. This process breaks up three-carbon pyruvate molecule, to give three molecules of carbon dioxide and the other product is water. Since this reaction takes place in the presence of oxygen, it is called aerobic respiration.

- b) **Anaerobic respiration:** The respiration in which organic food is partially oxidized due to absence of oxygen is called Anaerobic respiration.



Note: Breakdown of glucose (6-carbon molecule) into a three carbon molecule called pyruvate (in cytoplasm) and then further the pyruvate is converted into Ethanol and Carbon dioxide. This process takes place in yeast during fermentation. Since this reaction takes place in the absence of oxygen, it is called anaerobic respiration.

Anaerobic respiration takes place in muscles.



When there is lack of oxygen in muscles, pyruvate is converted into lactic acid which causes cramps during sudden activity.

- **Process of Breathing:**

- Air is taken into the body through the nostrils.
- The air passing through nostrils are filtered by fine hairs and mucus which lining the passage.
- The air from nasal cavity enters into the lungs. (Each bronchus is connected to the lung)
- Rings of cartilage present in the throat. These ensure that the air passage does not collapse.
- In the lungs each bronchus divides into a large number of thin tube like structures called bronchioles.
- The bronchioles have tiny air sacs at their ends called alveoli.
- Alveoli are the site of exchange of gases.
- The walls of alveoli are the site of exchange of gases.

- **Mechanism of Breathing:**

Breathing exhibits inspiration and expiration of air between atmosphere and alveoli of the lungs. It is affected by the expansion and contraction of the lungs.

a) **Inspiration:** In the process of inspiration movement of fresh air into the lungs taken place as follows:

Nostrils → Nasal Cavities → Pharynx → Trachea → Bronchi → Bronchioles → Alveolar ducts → Alveoli

From the alveoli oxygen passes into the blood of the capillaries and carbon dioxide diffuses from the blood to the lumen of the alveoli.

During this process chest expands while diaphragm contracts.

b) **Expiration :** In the process of expiration air (CO₂) moves out of the lungs and volume of thoracic cavity decreases. The air (CO₂) comes out through following sequence.

Alveoli → Alveolar ducts → Bronchioles → Bronchi → Trachea → Pharynx → Nasal cavities → Nostrils

During this process chest contract and diaphragm relaxes.

Note : Haemoglobin is the respiratory pigment which is responsible for taking oxygen from the air in the lungs and carry it to the tissue which are deficient in oxygen before releasing it.

Haemoglobin has a very high affinity for oxygen and these pigments are present in RBC's (Red Blood Corpuscles)

Following steps are involved during respiration.

- Breathing is the inflow and outflow of air between atmosphere and alveoli of the lungs.
- Diffusion of gasses across alveolar membrane.
- Transport of gases by the blood (haemoglobin)
- Diffusion of oxygen and carbon dioxide between blood and tissues
- Utilization of oxygen by the cells and release of carbon dioxide.

• **Transportation :** Transportation is life process by which substances synthesized or absorbed by which substances synthesised or absorbed in one of the body are carried to other parts where they are consumed.

Transportation in Human Beings:

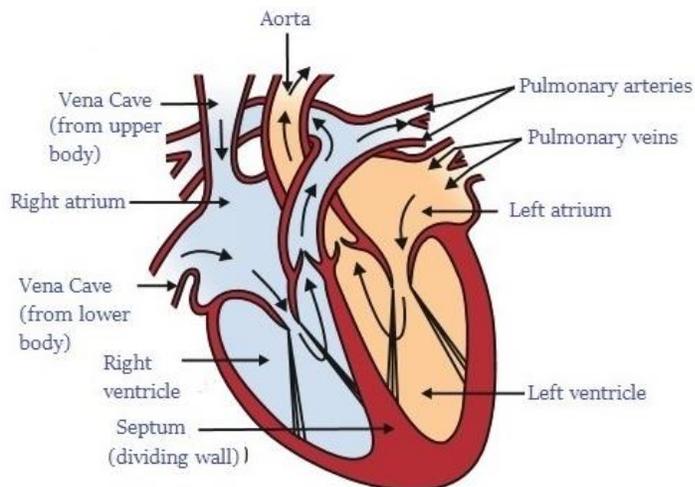
Blood is a fluid connective tissue that circulates in the body. It consists of the following components.

(a) Plasma (b) Red Blood Corpuscles (c) White Blood Corpuscles (d) Platelets

- Blood consists of fluid medium called plasma in which the cells are suspended.

- Plasma transports food, carbon dioxide and nitrogenous wastes in dissociated form.
- Oxygen is carried by the red blood cells.
- Other substances like salts, are also transported by the blood.

Human Heart:



Structure of the heart:

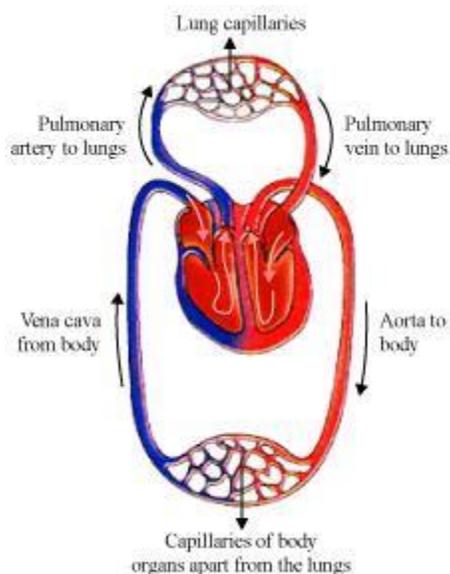
- Heart is a muscular organ.
- It is the main pumping organ which is as big as our fist.
- Heart is enclosed in a membrane called Pericardium which protects it from mechanical shocks.
- The heart has four chambers, two upper chambers (atria) and two lower chambers (ventricles).
- The right and left parts are separated by a septum to prevent oxygenated and deoxygenated blood from mixing.

Working of Heart:

- The rhythmic contraction and relaxation of these muscles result in heartbeat.
- When the muscles are relaxed, deoxygenated blood is passed into right atrium by large vein, Vena Cava.
- Now the right atrium contracts and right ventricle expands, the blood enters right atrium to right ventricles through a tricuspid valve which prevent backflow of blood at the time of contraction of ventricles.
- The right ventricle pumps this oxygenated blood to the lungs through pulmonary artery.
- The blood is carries by Pulmonary Vein which pours it into left atrium (when it expands).
- When the left atrium contracts, the oxygenated blood enters the left ventricles through a bicuspid valve.
- When it contracts, the blood is pumped into aorta, the largest artery and distributed to all body parts.

Note: The wall of ventricle is thicker than the wall of atria because ventricles have to pump blood into various organs while atria have to receive blood.

Double Circulation: Double circulation is the process by which the cardiovascular systems of many vertebrates such as mammals and birds circulate blood throughout their bodies. In this system, the heart pumps the blood twice to perform its function. The first pumping sends the blood to be circulated through the lungs, and the second pumping circulates the blood throughout the body.



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The Tube Vessel:

a) Arteries:

- Arteries are thick walled vessels which transport blood from the heart to all body parts.
- Heart pumps blood into arteries with great pressure (Thick walled).
- Arteries carry oxygenated blood (exception – pulmonary artery which carry deoxygenated blood from right atrium to the lungs).

b) Veins:

- Veins are thin walled vessels which transport blood from various body organs to the heart.
- Veins do not have pressure (thin walled).
- They have valves to prevent backflow of the blood.
- Veins carry deoxygenated blood (exception – pulmonary vein which carries oxygenated blood from the lungs to left atrium)

c) Capillaries:

- Capillaries are thin and narrow blood vessels which occur at the terminals of arteries and veins.

- Their walls are permeable so that exchange of food materials (dissolved nutrients), gases (O_2 and CO_2) and excretory products may take place with the tissues around the capillaries.
- The dense network of capillaries approaches each and every part of the body.
- The flows are very slow in capillaries.

Platelets:

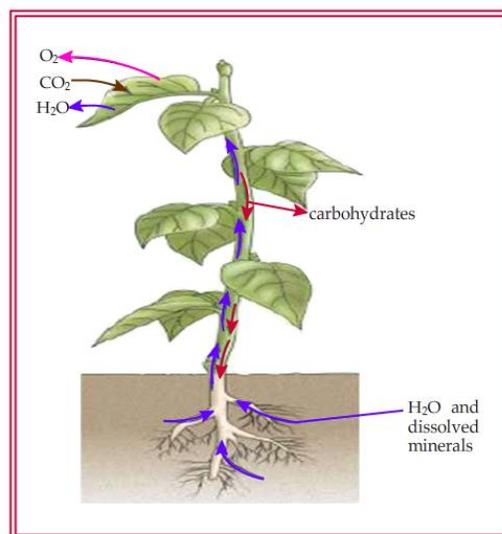
- Platelets are minute, spherical and non-nucleated corpuscles.
- When an injury is caused, the blood platelets release certain chemicals which are called platelet factors (Thromboplastin)
- These factors circulate around the body (in blood) and form a blood clot wherever there is a leakage in vessel due to injury to prevent blood loss.

Lymph:

- Lymph is a fluid connective tissue, colourless, consists of plasma and white blood cells.
- Through the pores present in the walls of capillaries some amount of plasma, proteins and blood cell escape into intercellular spaces in the tissues to form lymph (having no RBC's) and contains very less protein.
- Lymph is drained into lymphatic capillaries from intercellular spaces and join to form large lymph vessel.
- These lymph vessels open into larger veins finally.
- Lymph carries oxygen, food nutrients, waste products, digested and absorbed fat from intestine and drains excess fluid from extracellular fluid back to the blood.

Transportation in Plants:

- Xylem and phloem are called Vascular tissues in plants.
- Roots absorb water and minerals from the soil.
- They are transported upwards and distributed to all the parts of the plant through xylem.
- Leaves prepare carbohydrates by the process of photosynthesis and their food is distributed to all the parts of the plant through phloem.

**Transport of Water:**

- Water along with dissolved minerals in it, is conducted upwards by water conducting channels which are formed by xylem tracheids and vessels of roots, stem and leaves. These channels are interconnected. The absorption of water and dissolved minerals take place by roots through root hairs.
- These are in direct contact with the soil and they take up ions from the soil actively. The root hairs absorb water from the soil by the process of osmosis and take in minerals by the process of diffusion. This is how a difference in concentration of ions is created between the root and the soil which enables water into roots to compensate the difference in concentration. Water and minerals dissolve in it, move through root and reach the root xylem.
- The root xylem is interconnected with stem xylem and leaves. So, it reaches upto the leaves. Leaves utilize water and minerals to prepare food. Through requirement of water for the process of photosynthesis and other metabolic activities of plants is very less (about 1% to 2%), the rest of the water is expelled from the leaves.

Transpiration and Ascent of Sap

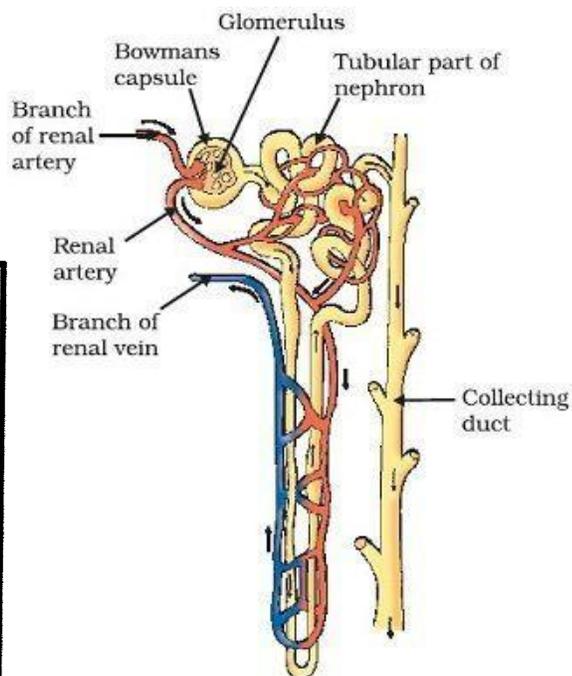
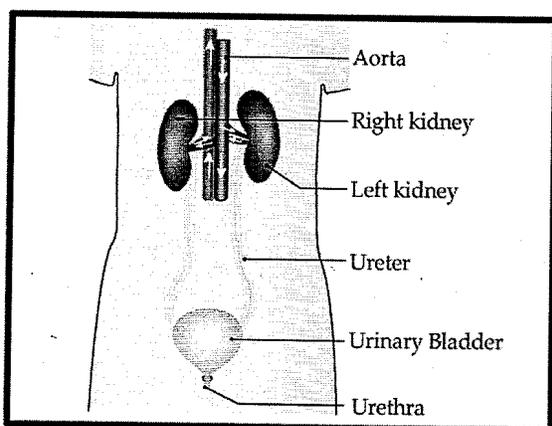
- Plant roots continuously absorb water, but the requirement is low.
- So, a lot of water evaporates through tiny openings present at the lower surface of leaves called stomata.
- The continuous loss of water in the form of water vapour through stomata is called transpiration.
- This continuous evaporation of water through stomata creates a suction force which pulls water from the xylem cells of roots and provides an upward movement of water and minerals dissolved in it.
- This upward movement of water and minerals from the plant roots to its leaves is called ascent of sap.
- Transpiration also helps in temperature regulation.

Transport of Food and Other Substances

- Food is prepared by the green leaves of the plant by the process of photosynthesis.
- The products of photosynthesis (food molecules) enter the phloem cells.
- These are in soluble form.
- The phloem elements transport this soluble food material to all parts of the plant.
- This transport of nutrients from the leaves to different parts of plant including roots is called translocation.
- The direction of translocation may be both upwards and downwards.
- Besides the food molecules, phloem also transports amino acids, other metabolites (synthesised in the leaf) and hormones (synthesised at the tips of root and shoot).
- These are transported to the storage organs of roots, fruits, seeds and to growing organs.
- Every part of a plant requires energy for building, growth and maintenance. Therefore, translocation is a very necessary and vital activity for plants.
- In this process the materials enter the phloem tissue using energy from ATP molecules.
- Soluble material is then transferred from the tissue of phloem to other tissues which have less pressure than in the phloem. According to the requirement of a plant, the material is translocated from higher osmotic pressure areas to the lower osmotic pressure areas.

Excretion in Human Beings:

The biological process involved in the removal of the harmful of the harmful metabolic wastes from the body is called excretion.



The whole process of urine formation can be divided into three steps:

(i) Ultrafiltration

(ii) Tubular reabsorption

(iii) Tubular secretion.

(i) Ultrafiltration:

- The walls of the glomerular capillaries and Bowman's capsule being very thin and semi-permeable, act as ultrafilters.
- Renal artery (afferent arteriole) brings the blood into glomerulus which contains urea wastes.
- Due to a capillary pressure exerted on the blood, it passes through glomerulus.
- A part of water, nitrogenous wastes, glucose, amino acids and minerals etc. are filtered out in the Bowman's capsule.

(ii) Tubular reabsorption:

When the glomerular filtrate containing useful substances as well as waste substances pass through the tubule, then useful substances are reabsorbed by the wall of tubule and returned to blood.

(iii) Tubular secretion:

The cells of renal tubule also remove wastes from blood and pass into the filtrate by secretion. This removes ammonia, urea, uric acid.

The liquid now flowing is urine which is collected in the pelvis. Ureters of either side carry urine from pelvis to the bladder.

When enough urine gets accumulated, then by the contraction and relaxation of muscles, the urine is released outside the body through urethra.

Excretion in animals play vital role to maintain the body normal.

- Excretion maintains water content to the body fluid.
- It eliminates metabolic waste.
- Osmoregulation regulates ionic and fluid volume.
- Excretion also controls pH of body fluid.
- Sweating from skin eliminates certain substance and provides cooling effect on the body surface.

Artificial Kidney:

An artificial kidney is a device to remove nitrogenous waste products from the blood, in the case of kidney malfunction.

This process is called dialysis.

- Dialysis machine works on the principle of osmosis and diffusion.
- It has a multiple layer of sheets of a cellophane material that allows small molecules to pass through.
- As blood passes between the sheets of the dialysis machine, the wastes from the blood pass into the dialyzing fluid by diffusion.

Excretion in Plants:

- Plants perform excretion but their methods are absolutely different than animals.
- Plants have various waste products like oxygen (photosynthetic waste), carbon-dioxide (respiratory waste), excess water and the metabolites.
- To get rid of O_2 and CO_2 , stomata play the most important role.
- The gases are expelled out through stomata by the process of diffusion.
- Through transpiration plants eliminate excess water continuously.
- Some other metabolites get accumulated in leaves or some dead cells. The leaves get yellow and detach (shed) from the twig at the point of petiole.
- Some plant wastes get stored in vacuoles of the cells. Resin, gum and latex are some of the waste products of plants.
- Some waste products are excreted into the soil by the plants.
- Some plant wastes accumulate in the bark. Shedding of bark in some trees is also a method of excretion in plants.

Differences

Breathing

- It is simply intake of oxygen & removal of carbon dioxide.
- No energy is released.
- No enzymes are involved.

Respiration

- It is an oxidation of food to form CO_2 , H_2O and energy
- Energy is released in the form of ATP.
- Enzymes are involved

Aerobic respiration

- Takes place in the presence of Oxygen
- Occurs in mitochondria
- End products are CO_2 and H_2O
- It shows complete breakdown of food
- It generates maximum energy (38 ATP)

Anaerobic respiration

- Takes place in the absence of oxygen
- Occurs in Cytoplasm
- End products are alcohol or lactic acid
- It shows partial breakdown of food
- it generates less energy (2 ATP)

Arteries

- Carry blood from the heart to various body parts
- Carry oxygenated blood (except pulmonary artery)
- Blood flow with high speed & under high pressure

Veins

- Carry blood from different body parts to the heart
- Carry deoxygenated blood (except pulmonary vein)
- Blood flow with low speed & under low pressure

Transportation of water

- Xylem to conduct water & dissolved minerals
- Transpiration promotes water and upward movement of water & minerals
- Conducts only one direction i.e., from roots to branches and leaves

Transportation of food

- Phloem transport soluble products of photosynthesis
- Transport of photosynthetic product is called translocation
- Conducts in both upward and downward directions

assignment

- 1) Why are plants green in colour?
- 2) What is nutrition? What are the different modes of nutrition?
- 3) What processes would you consider essential for maintaining life?
- 4) What are the living organisms called that cannot make their own food?
- 5) In which form, food is stored in the plants?

- 6) Name process performed by the green plants to obtain their foods.
- 7) What energy transformation takes place in photosynthesis?
- 8) Write balanced chemical equation to represent photosynthesis.
- 9) Where do plants get each of the raw materials required for photosynthesis?
- 10) Why all life would come to an end if there were no green plants?
- 11) How do the guard cells regulate opening and closing of stomata pores?
- 12) What is compensation point?
- 13) If a plant is releasing carbon dioxide and taking in oxygen during the day, does it mean that there is no photosynthesis occurring? Give reason.
- 14) Which is the first enzyme to mix with food in digestive tract?
- 15) What causes movement of food inside the elementary canal?
- 16) Why do ventricles have thicker wall than atria?
- 17) Name any two parasitic plants and two parasitic animals.
- 18) Name the process by which amoeba engulfs its food?
- 19) Where does digestion begun?
- 20) What is the role of saliva in the digestion of food?
- 21) Name the enzyme present in saliva.
- 22) What is the significance of emulsification of fats?
- 23) Which is the food constituent that bile helps to digest and absorb?
- 24) What do you mean by emulsification of fat?
- 25) Which part of bile juice is useful in digestion?
- 26) The gall bladder stores bile. A patient has had his gall bladder removed and needs a special diet. Which nutrient free diet would be suitable for this patient?
- 27) How is small intestine designed to absorb digested food?
- 28) Herbivores have longer small intestine than carnivores. Why?
- 29) What is villi? Write its function.
- 30) Name three different glands associated with the digestive system in humans. Also name their secretion.
- 31) How are fats digested in our body? Where does this process take place?
- 32) Which part of alimentary canal help in eliminating the unabsorbed food? How is the exit of waste material regulated?
- 33) Explain the process of digestion of food in mouth, stomach and small intestine in human body.
- 34) What is the name given to the process of using the absorbed food for producing energy?
- 35) What are the different ways in which glucose is oxidized to provide energy in various organisms?
- 36) Write the role of
 - (i) acid in our stomach.
 - (ii) digestive enzymes.

- (iii) saliva in digestion of food.
 - (iv) pancreatic enzymes in human body
- 37) Write differences between
- (i) autotrophic nutrition and heterotrophic nutrition
 - (ii) photosynthesis and respiration.
 - (iii) ingestion and egestion.
 - (iv) aerobic and anaerobic fermentation
 - (v) fermentation and lactic acid formation
- 38) What are the end products formed during respiration in yeast?
- 39) Why do aquatic animals breathe faster than the terrestrial animals?
- 40) Name the substance that is oxidized in the body during respiration.
- 41) Why are lungs divided into very small sac-like structures?
- 42) Which cells are the site of exchange of gasses?
- 43) Haemoglobin is a respiratory pigment in human beings. Justify this statement.
- 44) Why do the walls of trachea not collapse when there is less air in it?
- 45) How are the alveoli designed to maximize the exchange of gases?
- 46) How are the lungs designed in human beings to maximize the area for exchange of gases?
- 47) How is oxygen and carbon dioxide transported in human beings?
- 48) After long running, you may experience cramps in your leg muscles. What are the reason behind this?
- 49) What is the principle of exchange of gases?
- 50) Name the respiratory pigment in human beings.
- 51) Write the path travelled by a molecule of oxygen when it enters the body.
- 52) Plants have low energy levels as compared to animals. Explain.
- 53) What happens to breathing rate during vigorous exercise?
- 54) Give reasons:
- (i) Rings of cartilage are present in trachea.
 - (ii) Lungs always contain a residual volume of air.
- 55) List three characteristics of lungs which make them an efficient respiratory surface.
- 56) What is the fate of the glucose formed as a result of photosynthesis? Explain in detail.
- 57) Why is there extra air in our lungs after exhaling?
- 58) Why will simple diffusion not need the requirement of human beings?
- 59) What prevents the back flow of blood inside the heart during contraction?
- 60) Why do arteries have thick walls as compared to veins?
- 61) Why is it necessary to separate oxygenated and deoxygenated blood by mammals and birds?
- 62) What would be the consequences of a deficiency of haemoglobin in our bodies?

- 63) Describe double circulation in human beings. Why is it necessary?
- 64) Name the component of blood that helps in the formation of blood clot in the event of a cut.
- 65) What is blood pressure? How is it measured?
- 66) Write function of blood vessels and blood platelets.
- 67) What will happen if platelets are absent in the blood?
- 68) What is the other name of SA node?
- 69) In which form, iron is present in haemoglobin?
- 70) What is the role of transpiration pull in transportation?
- 71) From where do roots obtain water and minerals?
- 72) Which organ of plant body helps in osmo-regulation?
- 73) What are the components of transport system in highly organized plants?
- 74) What is translocation? How does it take place in plants?
- 75) The mode of excretion is completely different in unicellular and multicellular organisms. Justify.
- 76) What happens to glucose that enters the nephron among the filtrate?
- 77) Excretion is a vital life process. Explain.
- 78) Why is right kidney slightly lower in position as compared to the left kidney?
- 79) What will happen if there is sudden shortage of water in the body?
- 80) What do you mean by artificial kidney?
- 81) Give two point of differences between respiration in plants and that in animals.
- 82) A few drops of iodine solution were added to rice water. The solutions turns blue-black. What does it indicate?
- 83) When air is blown from mouth into a test tube containing lime water, the lime water turns milky due to presence of ____.
- 84) Draw a well labeled diagram of following:
- (i) Stomata
 - (ii) Human heart.
 - (iii) Human digestive system.
 - (iv) Respiratory system
 - (v) Nephron
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