

Ch-5 Life Processes

1. Life processes –

- Constantly exhibit the functions of maintenance and repair in living organisms.
- Some Examples – Digestion, Respiration, Circulation, etc.

2. Nutrition –

- Process of obtaining nutrients from the environment i.e., intake of food and then its digestion in the body.
- Two types – Autotrophic (self-sufficient for food) and Heterotrophic (dependent on others for food).

3. Autotrophic nutrition –

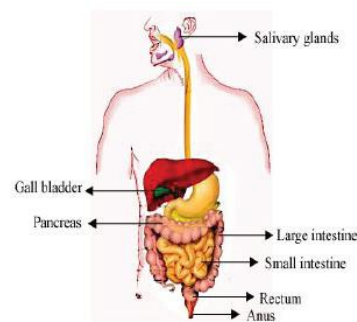
- Synthesis of food by photosynthesis – ‘photo’ means light and ‘synthesis’ means production. It is the production of food with the help of sunlight.
- Photosynthesis equation – $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- Events of photosynthesis are as follows – Absorption of light energy chlorophyll which is the green pigment and gives energy for activation of reaction. Then the splitting of water into its constituent’s hydrogen and oxygen leading to the Synthesis of ATP and NADPH₂ and finally reduction of CO₂ to carbohydrates.

4. Heterotrophic nutrition –

- Generally, take up energy from plants and animals by using them as food.
- Mostly of three types – holozoic, parasitic, and saprophytic.
- Digestion – mechanical and chemical reduction of ingested nutrients which can be then converted to energy for use.
- Human digestive system – consists of the long alimentary canal that includes mouth, pharynx, oesophagus, stomach, small intestine, large intestine, rectum and anus.
- Organs for assistance – pancreas, liver.

5. Nutrition in humans –

- Saliva is secreted by salivary glands located under the tongue which contains digestive enzymes like salivary amylase, which break down starch into sugar. So, digestion of carbohydrates starts in the mouth itself.
- Tongue helps in chewing, moistening, rolling and swallowing of food.
- The food from mouth then goes down the oesophagus, which is the food pipe to the stomach, through the movement of walls of oesophagus (peristalsis).
- Stomach mixes the food hence received with various digestive juices.
- Inner lining of stomach secretes –
 - Mucus – protects the lining of stomach from being corroded by the acid.
 - Hydrochloric acid – creates an acidic medium and dissolves bits of food.
 - Digestive juices – break down protein into simpler substances.
- The food from stomach eventually moves into the small intestine.



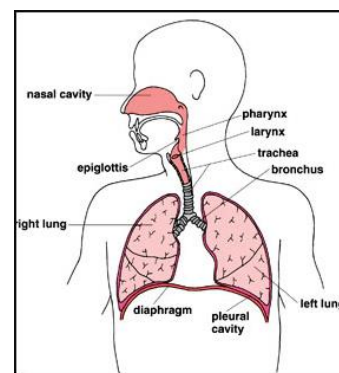
- g. Digestion in small intestine – It is the longest part (about 7.5 m long) of alimentary canal. It is the site where complete digestion of carbohydrates, proteins, and fats takes place. It gets intestinal juices from two different glands – liver and pancreas that help in the further digestion of food.
- h. Liver is the largest gland of the body and secretes bile juice. Bile juice is stored in the gall bladder and has a significant role in the digestion of fats.
- i. Pancreas has enzymes that help in total digestion of all food components.
- j. The digestive tract and associated glands together constitute the digestive system.

6. Respiration –

- a. It is controlled by enzymes and energy is released from the breakdown of organic substances. It is of two types that are aerobic and anaerobic.
- b. **Aerobic respiration –**
 - i. Oxidation of food materials by oxygen.
 - ii. Produces 36 ATP.
 - iii. Steps involved –
 - 1. breakdown of glucose (6C) into pyruvates (3C) in the cytoplasm.
 - 2. Pyruvate is then broken down to CO_2 and water and it takes place in the mitochondria where energy is produced in ATP form.
- c. **Anaerobic respiration –**
 - i. It is the Oxidation of nutrients without using up the molecular oxygen.
 - ii. It gives 2 ATPs.
 - iii. Steps involved –
 - 1. glycolysis in cytoplasm, 2 pyruvate produced.
 - 2. break down of pyruvic acid into ethanol and water and energy (in yeast) and lactic acid and energy (in muscle cells).

7. Human respiration –

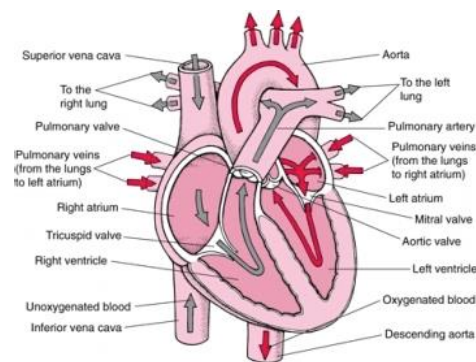
- a. It consists of the nose, pharynx, trachea, bronchi, bronchioles and alveoli.
- b. Bronchioles then divide into many alveoli which are sites of gaseous exchange.
- c. O_2 present in alveolar blood vessels is then transported to various cells of the body.
- d. Hemoglobin pigment present in blood is majorly responsible for transportation of carbon dioxide and oxygen.



8. Transportation –

- a. First and foremost, a liquid medium is required always for transportation.
- b. **Transportation in humans –**
 - i. Double circulation occurs in human beings i.e., the blood goes through the heart twice during each cardiac cycle.
 - ii. Blood and lymph are both involved in transportation.
 - iii. Components of blood are RBCs, WBCs, platelets, and plasma.
 - iv. Three types of blood vessels are arteries, veins and capillaries.
 - v. Arteries carry oxygenated blood in them, except one that is pulmonary artery.
 - vi. Veins carry deoxygenated blood in them, except pulmonary vein.

- vii. The Human heart is divided into four chambers – right auricle, right ventricle, left auricle, and left ventricle.
- viii. The Right side of the heart gets deoxygenated blood from different cells of the body.
- ix. The Left side of the heart receives oxygenated blood from lungs.



c. **Transportation in plants –**

- i. Transportation of water is through xylem tissues.
- ii. Transport of water occurs due to transpiration pull, root pressure and difference in pressure gradient.
- iii. Transport of food or translocation takes place through phloem and it requires energy.

9. **Excretion –**

- a. It involves the removal of harmful metabolic wastes from the body of organisms by various processes.

b. **Excretion in humans –**

- i. The excretory system consists of – a pair of kidneys, a pair of ureters, a urinary bladder, and a urethra.
- ii. Nitrogenous wastes such as urea and uric acid are removed.
- iii. Nephron – basic filtration unit.
- iv. Main components of the nephron – glomerulus, Bowman's capsule, renal tube.
- v. The process of Removing of nitrogenous wastes through artificial kidney is called **dialysis**.

