



## Chapter 5 life process

The process which maintains body function and necessary for survival are called life processes.

All the processes which together keep the living organisms alive and perform task to maintain the body are called life processes. Examples

1. Nutrition
2. Respiration
3. Transportation
4. Excretion

### Nutrition

The process of taking nutrients from food is called nutrition.

- Nutrients are the substance required for proper growth and maintenance of a living body. Ex - Carbohydrates, fats, proteins, water, vitamins, minerals etc.

#### Modes of nutrition

##### Autotrophic nutrition

It is a process in which Organism produces their food from Simple inorganic material (Water, Carbon dioxide) in the presence of sunlight. Ex – plant

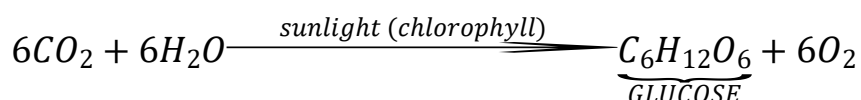
##### Heterotrophic nutrition

In this process organism depend upon other organism for food to survive. Ex – human being, amoeba etc.

#### Nutrition in plant

##### Photosynthesis

The process in which green plants convert simple inorganic material (water, carbon dioxide) into complex organic food material (glucose) in the presence of chlorophyll and sunlight.



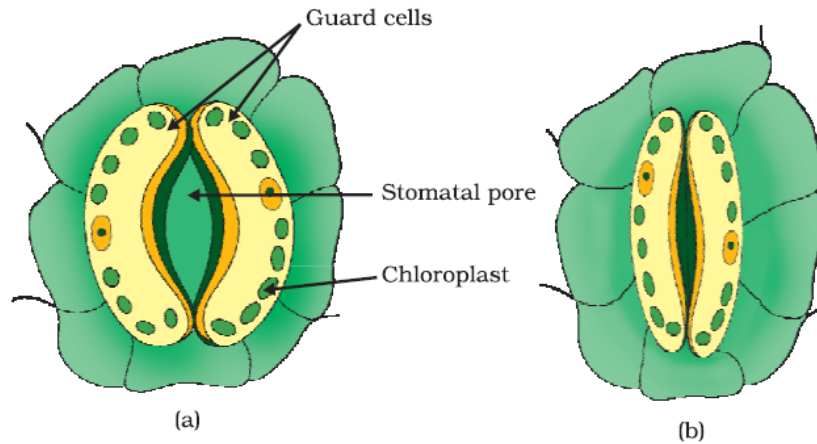
##### Event occurs during photosynthesis

- Absorption of light energy by chlorophyll.
- Conversion light energy to chemical energy.

- Splitting of water molecules into hydrogen gas and oxygen gas.
- Reduction of carbon dioxide to carbohydrates.

### Chloroplasts

These are the small organelles found in plant cell. It contains chlorophyll, which absorb sunlight for photosynthesis.



### Stomata

Some other structures are also present such as stomata (tiny pores present on the surface of the leaf) that participate in gaseous exchange during photosynthesis, but it is also responsible for large amount of water loss.

### Heterotrophic nutrition

These are of three types

#### Saprotrophic nutrition

The mode of nutrition in which organism obtain food from dead and decaying organic matter. Ex- bacteria, fungi, yeast etc.

#### Parasitic nutrition

The mode of nutrition in which organism obtain food from another organism without killing them. Ex – mosquito, tapeworm etc.

#### Holozoic nutrition

The mode of nutrition in which herbivores, carnivores and omnivores take complex molecules which are then broken down into simple and soluble molecules. Ex – animal, human etc.

### Nutrition in amoeba

- Amoeba is a unicellular organism with holozoic mode of nutrition. It takes place with the help of temporary finger-like extensions called pseudopodia.

- Different stages of nutrition in Amoeba include **ingestion**, **digestion**, **absorption** and **egestion**.

### Nutrition in human being

The digestive system of humans constitutes a long tubular **alimentary canal** and **digestive glands**.

### Alimentary Canal

It is a long tube where the entire process of digestion takes place. It is an internal coiled tube, which runs from anterior mouth to the posterior anus.

### Mouth

It acts as the first part of the digestive system from where the food enters into the alimentary canal. Mouth mainly included of two major parts.

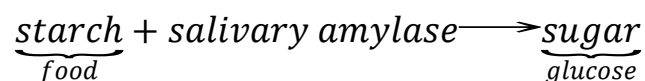
### Tongue

- It is a highly muscular sensory organ present at floor of buccal cavity.
- It bears several taste buds for basic taste such as sweet, bitter, salty, sour.
- Tongue also helps in mixing food with saliva.

### Teeth

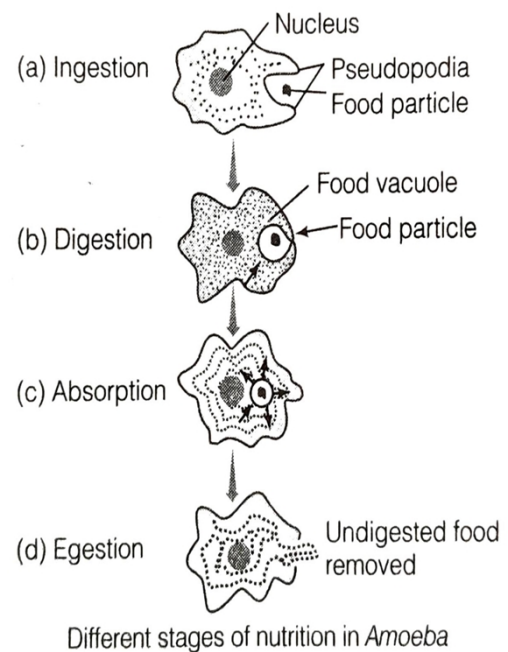
These are hard structures present on the bones of both lower and upper jaw. Humans have 20 milk teeth and 32 permanent teeth. Four different types of teeth, are incisors (for cutting the food), canines (for tearing of food), premolars and molars (for crushing, chewing and grinding of food).

Salivary glands – produce saliva, saliva contain enzyme salivary amylase that break down starch (food) to simple sugar.



### Pharynx

Is small and funnel-shaped. It is located behind the oral cavity. it communicates with both oesophagus and trachea.



## Oesophagus

It is a thin, long muscular tube that leads into stomach. Taking food from mouth to stomach by **peristaltic movements**.

## Stomach

It is the most dilated shaped part of the alimentary canal. This serves as a store house of food where partial digestion takes place through the secretion of gastric glands.

## Gastric glands

It releases gastric juice contain HCl, pepsin and mucus.

- HCl- make medium acidic, kill the harmful bacteria of food.
- Pepsin- break down the proteins into amino acid.
- Mucus- protect inner lining of stomach.

## Small Intestine

It is the longest part of alimentary canal which is the site of complete digestion of food into different components.

Secretions from liver and pancreas enter the intestine to help in the digestion process.

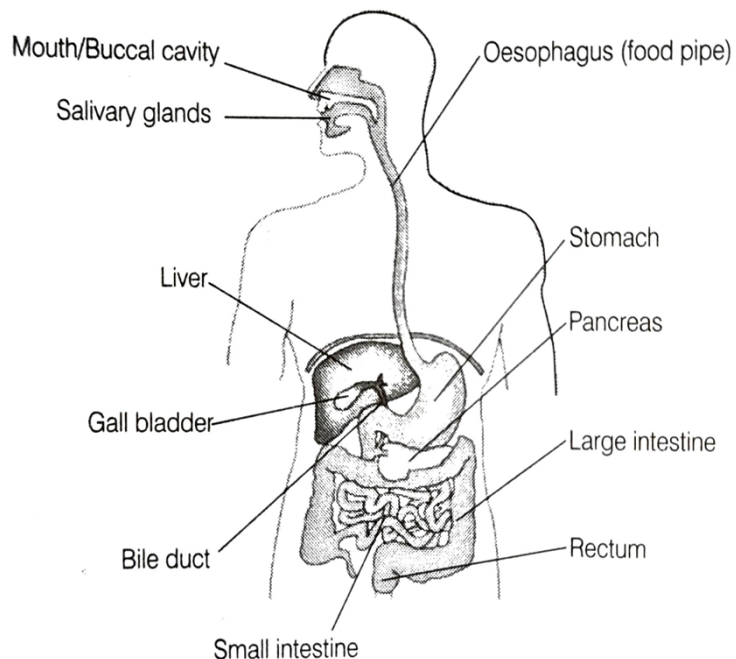
**Liver** produces bill juice and bile salt. Bile juice makes the food alkaline and bile salt break the large fat globules. This is called emulsification.

Gall bladder- it stores bile juice and salt.

**Pancreas** – trypsin, lipase

**Trypsin** - break down protein into amino acid.

**Lipase** - it breaks down emulsified fat into fatty acid and glycerol



Human digestive system

<i>starch (carbohydred)</i>	→	<i>sugar (glucose)</i>
<i>fat</i>	→	<i>fatty acid and glycerol</i>
<i>proteins</i>	→	<i>amino acid</i>



Small finger-like projections called Villi are present and help in nutrient absorption. Herbivores have longer small intestine as plants have cellulose that takes time to digest.

### Large Intestine

Although shorter, but is called large intestine because it is wider in diameter than small intestine.

The unabsorbed food sent to long intestine where its wall absorbs more water from this material and rest of the material removed from the body via anus.

### Mechanism of Digestion of Food

Various steps involved in digestion of these nutrients are given below

- (i) **Ingestion** it is the process of food intake by mouth. Food moistened by saliva, before swallowing is masticated into smaller particles by teeth.
- (ii) **Digestion** Process of breaking down large organic molecules into smaller ones is called digestion. It is done with the help of enzymes.
- (iii) **Absorption of Food** Protein, carbohydrates, and nucleotides are absorbed by blood capillaries present in villi, while fats are absorbed by lymph ducts.
- (iv) **Assimilation** it is the distribution of digested food to various cells of the body. The food absorbed by villi reaches every cell of the body and is used to build /repair tissues.
- (v) **Egestion** it is involve elimination of undigested food through anus.

### Respiration

The process in which the cells of an organism obtain energy by combining oxygen and glucose is called respiration. It involves breathing.

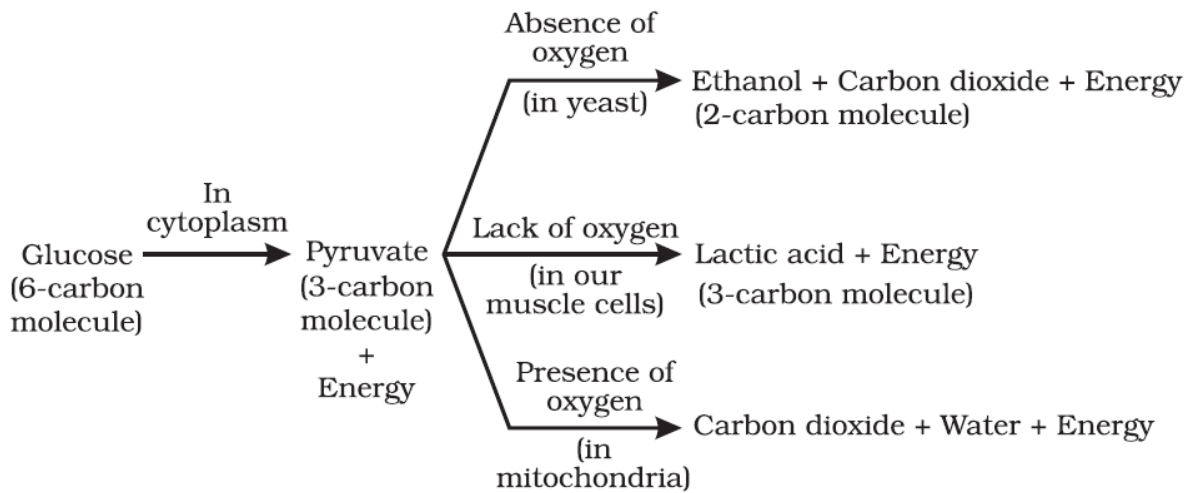
There are two types of respiration

#### Aerobic respiration

It is the process of producing energy in the presence of oxygen.

#### Anaerobic respiration

It is the process of producing energy in the absence or lack of oxygen.



The energy released during cellular respiration is used to synthesise molecule called ATP (adenosine triphosphate) (energy currency of life).

### Human respiratory system

Oxygen rich air is taken into the body through the nose. The air is filtered by fine hairs present in nose. From nose the air passes through the throat to lungs.

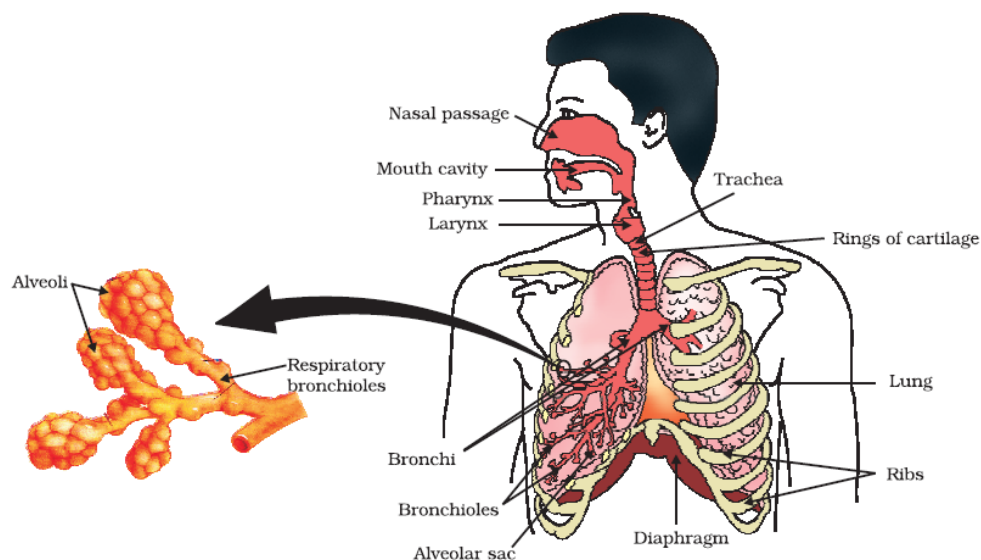
### In lungs

The air passage divides into smaller and smaller tubes and finally reach in alveoli.

### Alveoli

It is a balloon like structure which provide a surface for exchange of gases. The walls of the alveoli connect with blood vessels. Then, oxygen dissolve in haemoglobin from alveoli and carried from lungs to cells in all body part.

The blood brings carbon dioxide from the cells release into alveoli.



## Respiration in plants

Gaseous exchange occurs in plant through.

- Stomata in leaves
- Lenticels in stem
- Surface of roots

During respiration plant absorbs oxygen and use them with glucose to create carbon dioxide, water and energy.



## **Transportation**

The transportation is a life process in which a substance adsorbed (or made) in one part of the body of an organism is carried to other part of the body through the circulating fluids like blood and lymph.

### Transportation in human

Blood is a connective tissue in humans. It transports necessary substances to cells and transport metabolic waste product away from those same cells.

The main component of blood

### Plasma

It is yellow colour fluid. It transports food, carbon dioxide, waste product etc.

### Red blood cells

It contains haemoglobin which transport oxygen.

### Platelets

These help in blood clotting

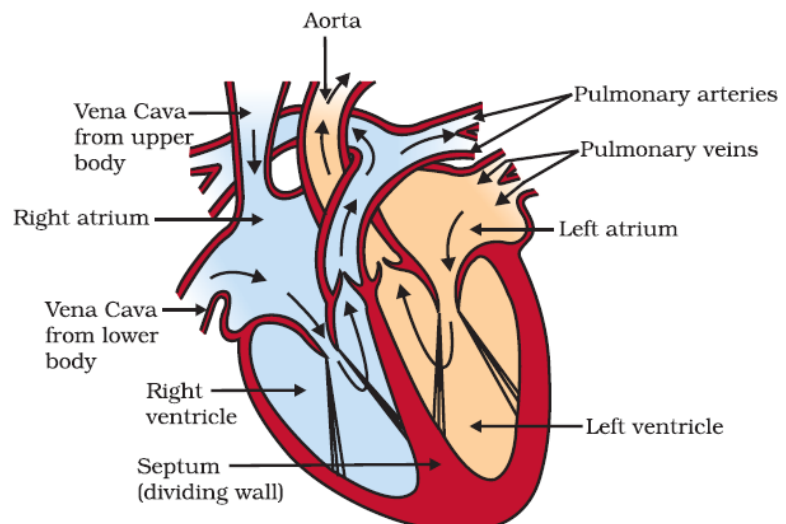
### White blood cells

These cells fight against harmful bacteria, viruses and germs.

The heart pumps the blood through the blood vessels.

### Heart

Heart is a muscular organ. It has two side separated by muscular wall. It has four chambers left atrium, right atrium, left ventricle and right ventricle.



## How heart works

De oxygenated blood comes from body to right atrium, which then pumped to your lungs by right ventricle through arteries, where it drops carbon dioxide and carry oxygen. Then oxygenated blood comes to left atrium through veins, which then pumped to body part by left ventricle through aorta.

## Blood vessels

### Arteries

These carry oxygenated blood from heart to body part except pulmonary artery. These are thick and elastic. The smallest vessels which are one cell thick are called capillaries.

### Veins

Veins carry deoxygenated blood from body part to heart except pulmonary vein. These are thin and less elastic.

### Lymph

This is also a transporter fluid. The pores present in the walls of capillaries some amount of plasma, proteins and blood cells escape into intercellular space in the tissue to form the lymph.

- It is colourless
- Lymph absorbs and transported fat from intestine
- It drains away the excess tissue metabolism

## Transportation in plants

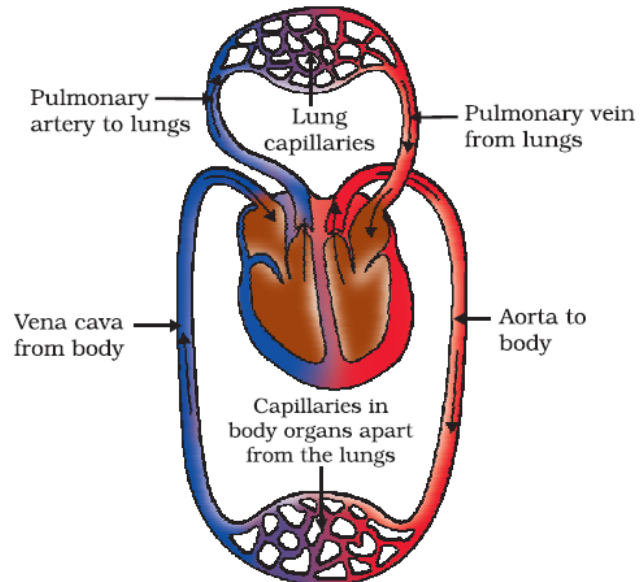
There are two transport tissue in plant

### Xylem

- It transports water and minerals in upward direction from roots to highest point of the plant.
- It only transports upward.
- It works on the principal of transpiration.

### Phloem

- It transports food from leaves to other part of the plant.
- It can transport upward as well as downward.





- Transport of food from leaves to other part of plant is called translocation.

## Transpiration

It is the process of loss of water as vapour from aerial part of the plant.

## Excretion

It is the biological process by which an organism removes the metabolic waste from the body.

### Metabolic wastes

- Digestive waste
- Respiratory waste
- Nitrogenous waste – urea, uric acid, water, etc.

### Human excretory system

It consists of two kidneys, ureters, urinary bladder and urethra.

#### Kidneys

It filters the blood and remove wastes.

#### Ureters

It drains out urine from kidney to urinary bladder.

#### Urinary bladder

Transmit urine outside body.

Kidney has filtration unit called nephrons.

#### Nephrons

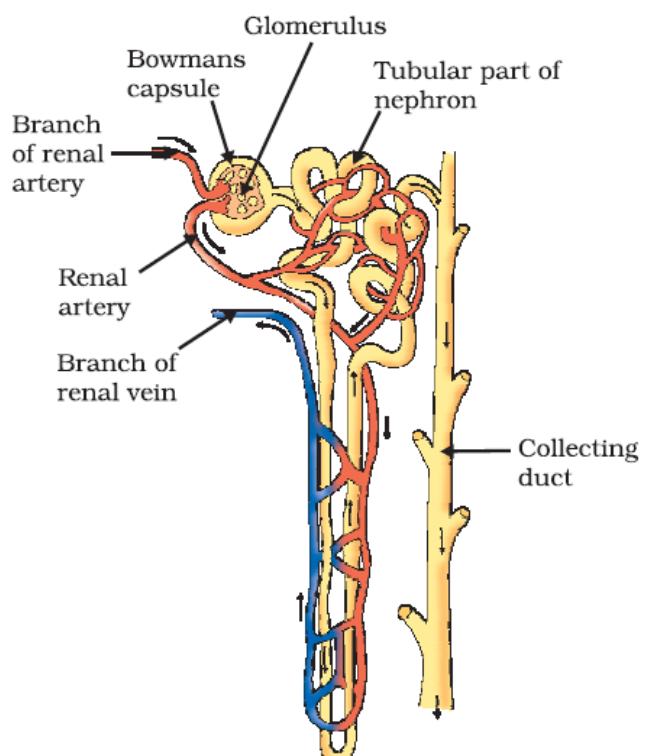
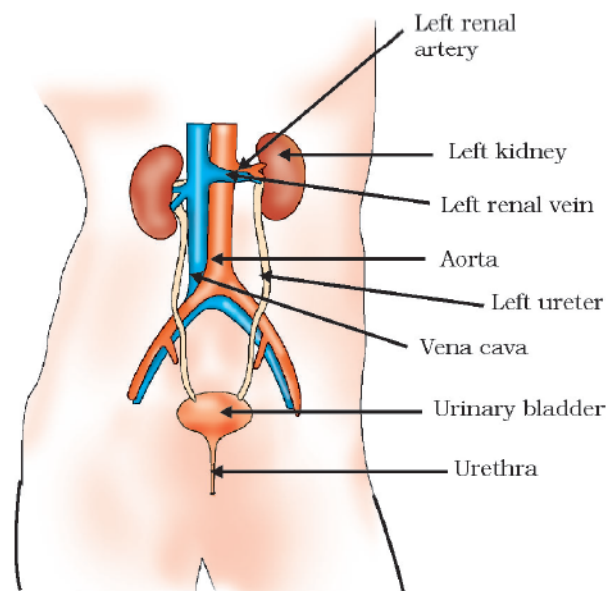
Nephrons are filtration units of kidney. It consists of a tube which is connected to duct and a cup shaped structure that is Bowman's capsule.

#### Bowman's capsule

It filters blood and collect urine.

#### Henle's loop

Reabsorption of glucose, amino acid and water.





Then urine enters into ureters through duct and collected in urinary bladder.

### Excretion in plant

- Plant remove oxygen through stomata.
- Excess water removed through stomata by transpiration process.
- Plant also loses some old leaves and barks.

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