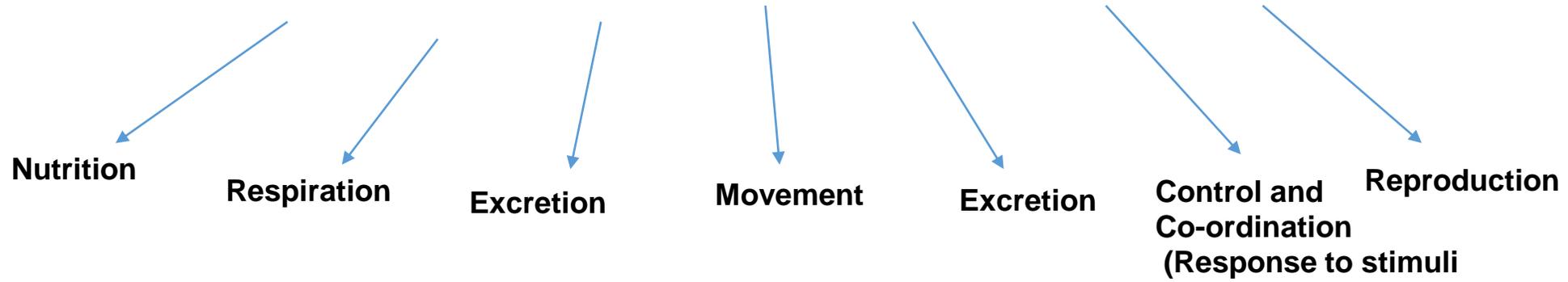
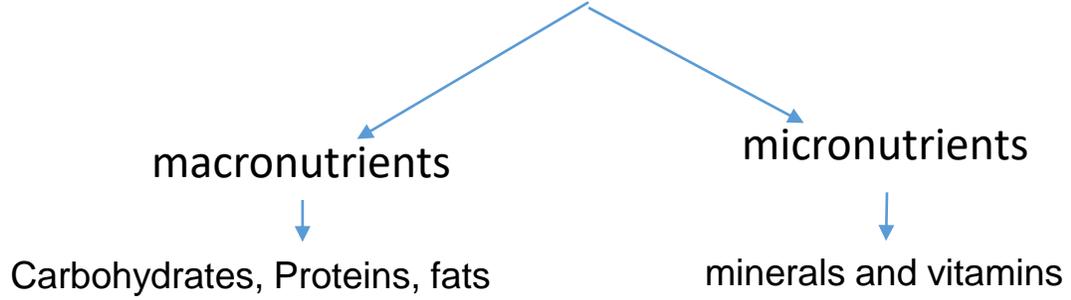


LIFE PROCESSES

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



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



Nutrient: Nutrient is any substance that nourishes a living being

Modes of Nutrition:

Autotrophic
(Auto = Self, Trophic = Nutrition)
↓

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

Eg. Green plants (photosynthesis) autotrophs are producers

Heterotrophic
(Hetero = different, trophic = nutrition)
↓

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

heterotrophs are consumers.

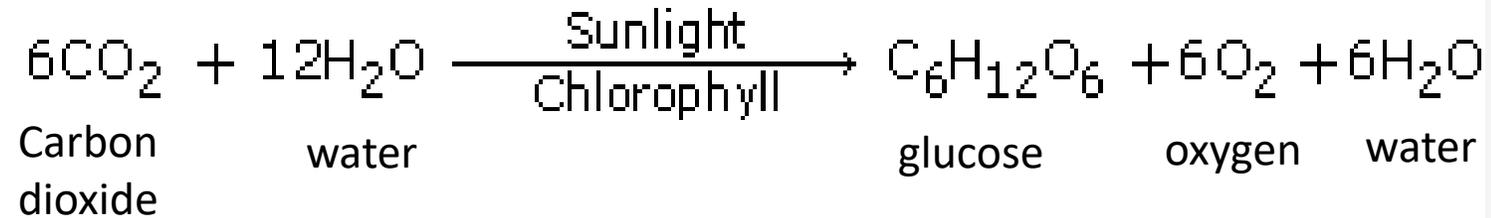
- **Autotrophic Mode of Nutrition :**

(Auto = Self, Trophic = Nutrition)

The mode of nutrition in which an organism synthesizes its own food by the utilization 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.





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.

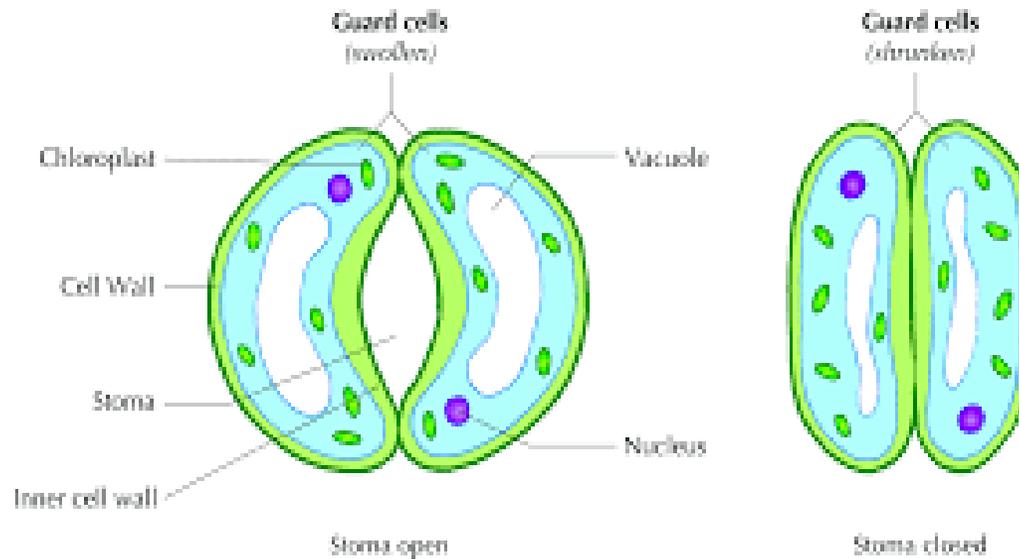
Stomata : Stomata are the tiny pores present on the surface of the leaves.

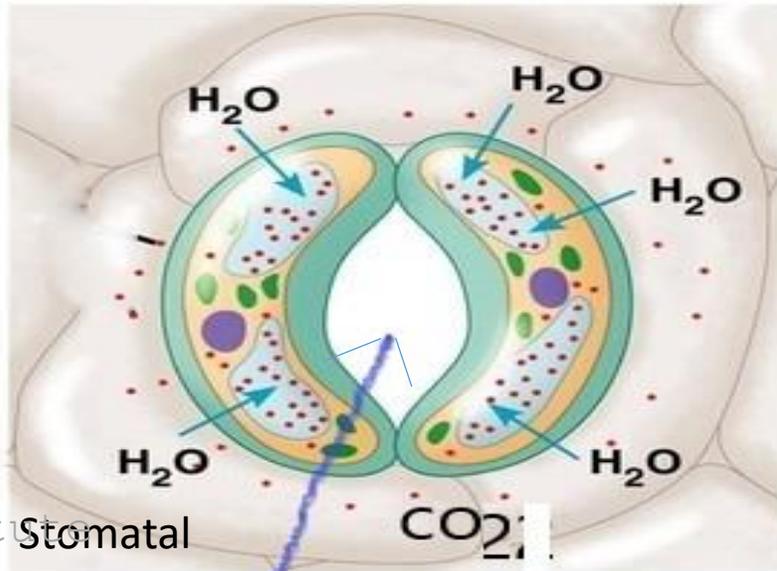
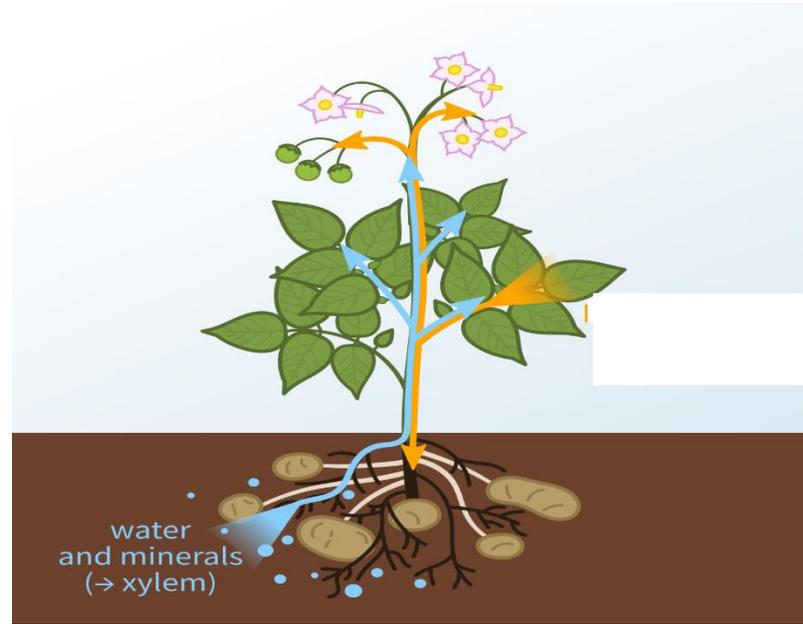
Functions of stomata:

- 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.

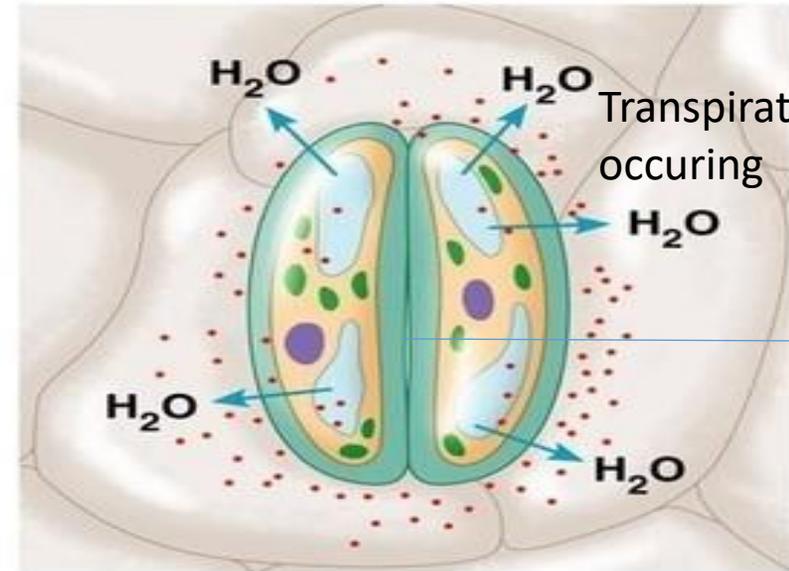
Guard cells – guard cells of the stomata is responsible for opening and closing of the pore.

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.

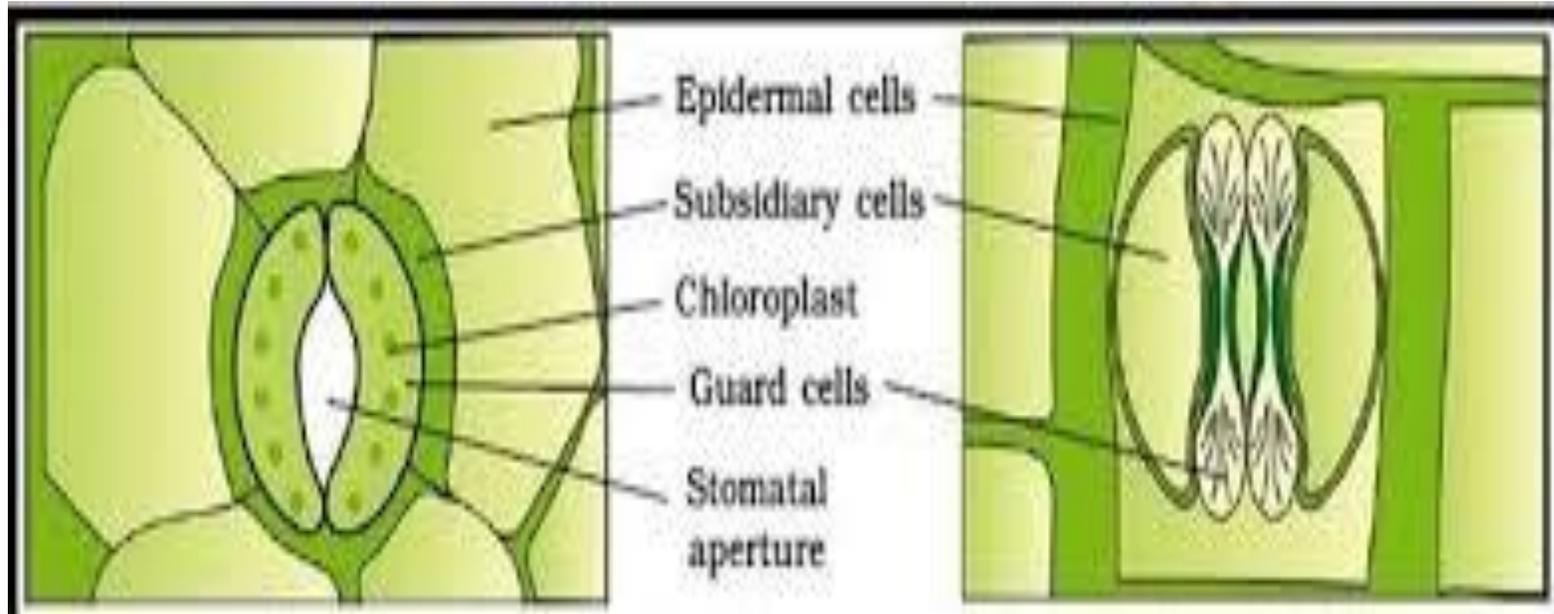




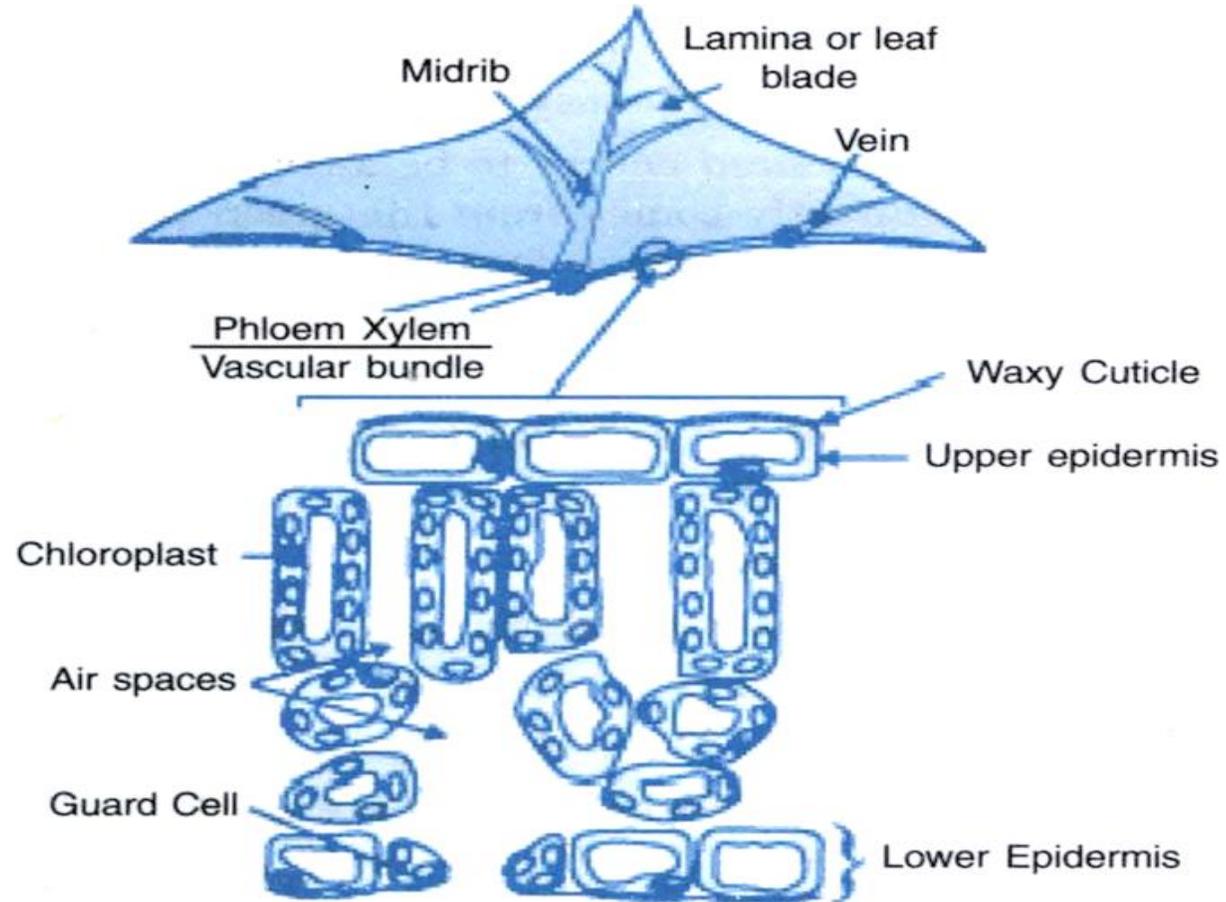
Stomatal pore opens
 CO_2 enters



Stomatal pore closed



Cross-section of a leaf



- **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

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.

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)

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.

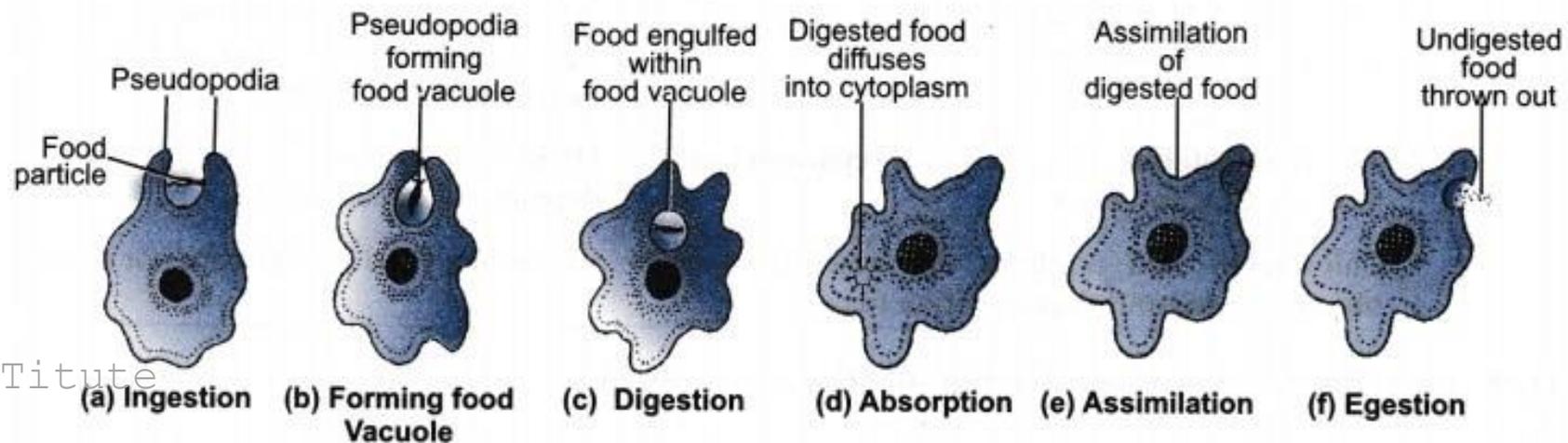
Example – Herbivores, Carnivores, Omnivores.

- **Nutrition in Amoeba**

Intracellular digestion takes place in Amoeba.

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.

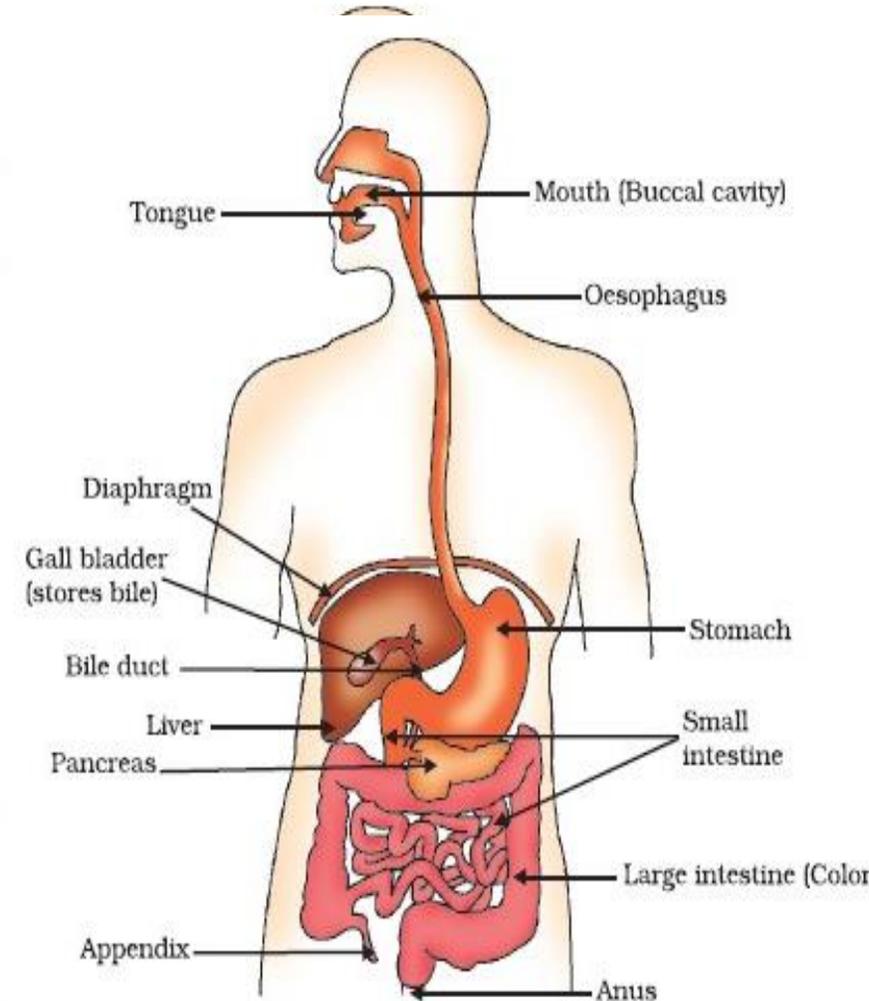
Important : Salivary glands – associated with mouth.

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 : Mucus keeps inner wall of stomach wet and smooth.
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:**

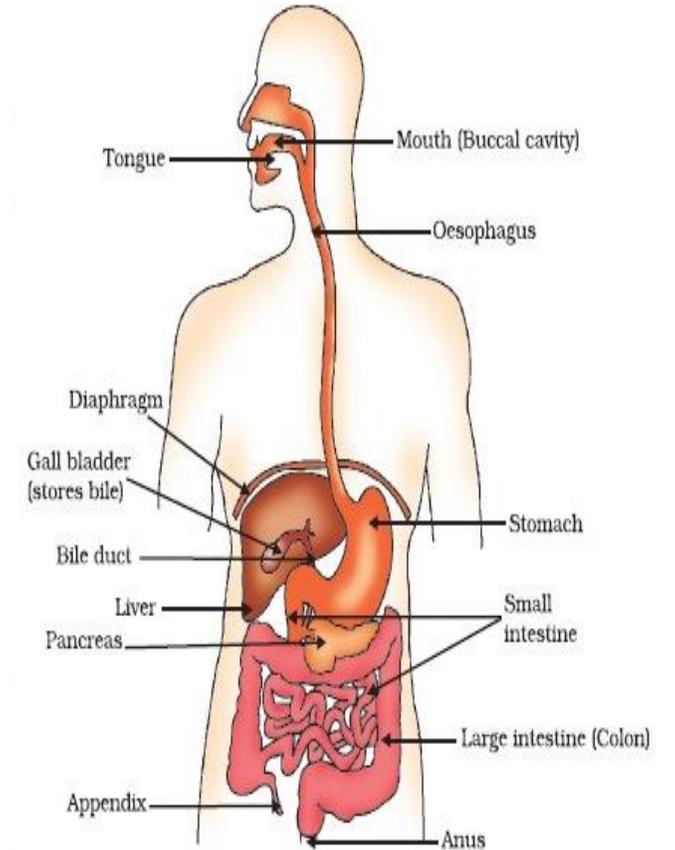
Bile juice has bile salts and bile pigments. Bile juice has following functions:

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

Acidity of foods $\xrightarrow{\text{BILE SALTS}}$ Neutralised due to alkalinity.

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

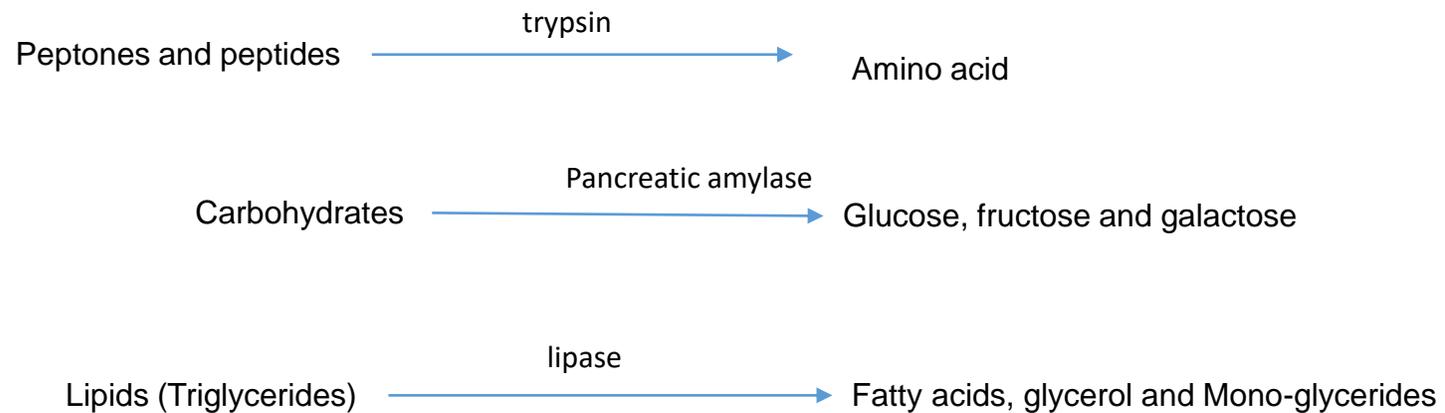
fats $\xrightarrow{\text{BILE SALTS}}$ Emulsified fat globules.



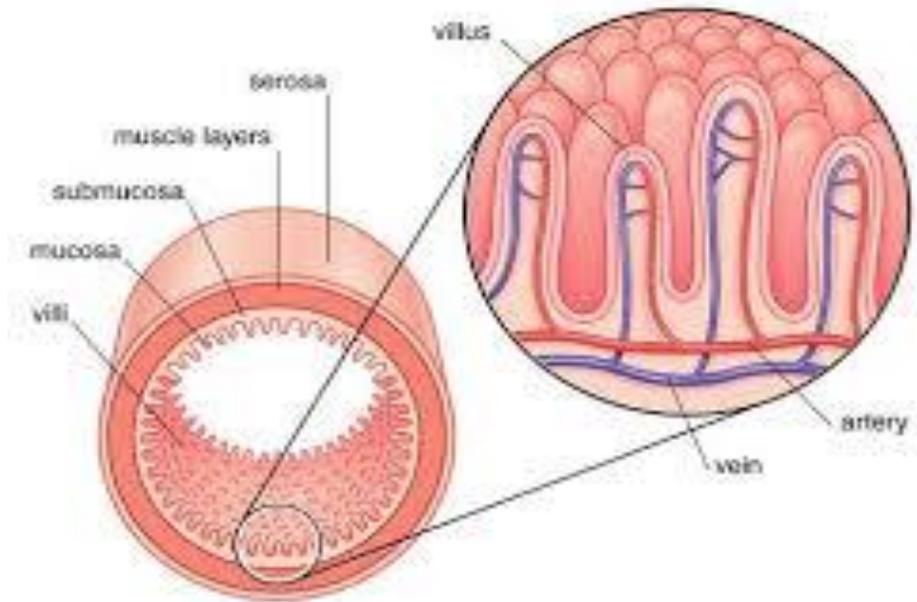
a) **Bile pigments (Bilirubin and Biliverdin)** are formed in liver by breakdown of haemoglobin of worn out RBC's. They are waste and are passed out along with faecal matter.

- **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.

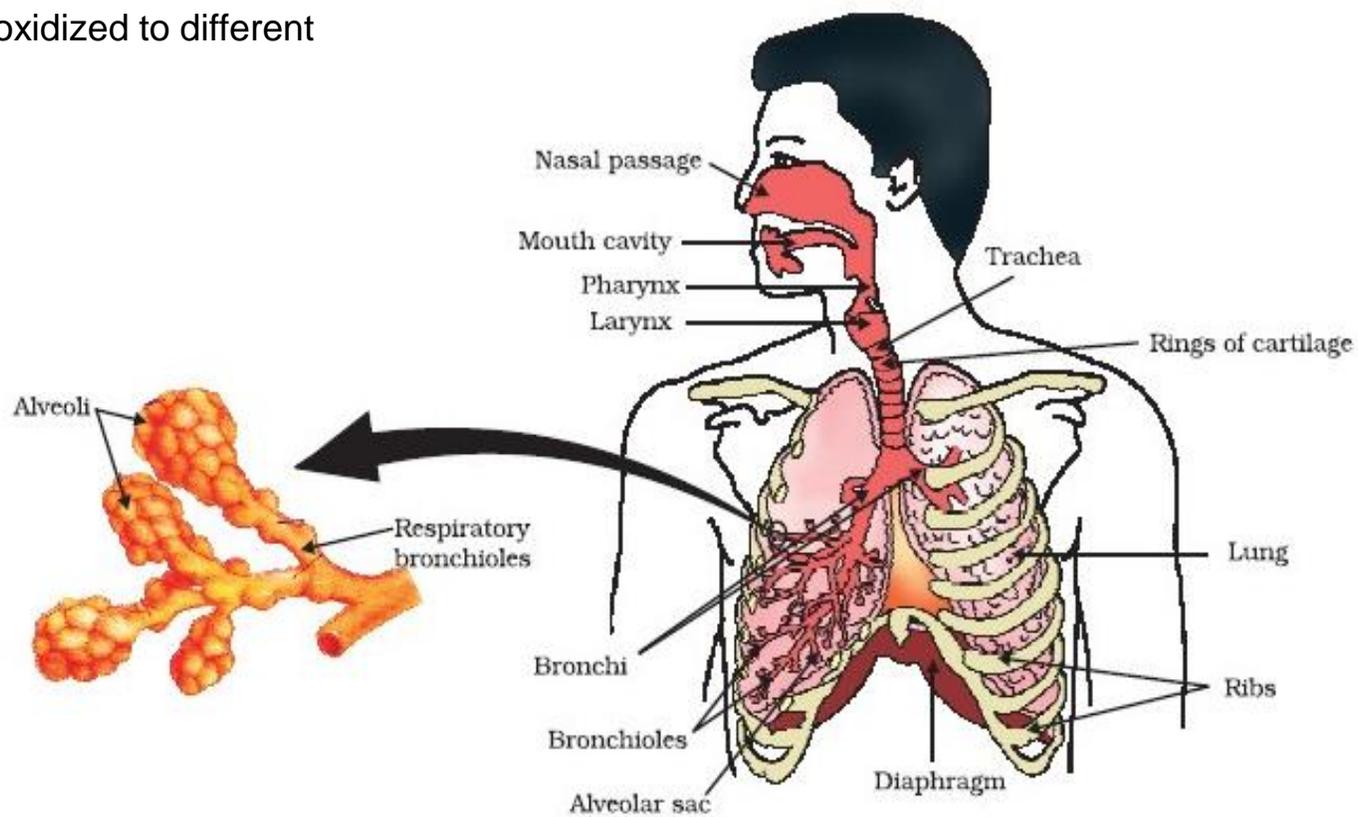
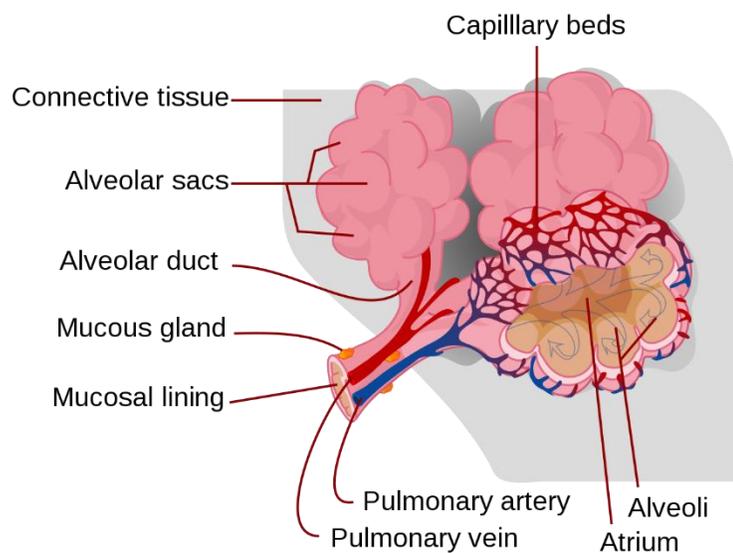
The rest of the material is removed from the body via the anus.

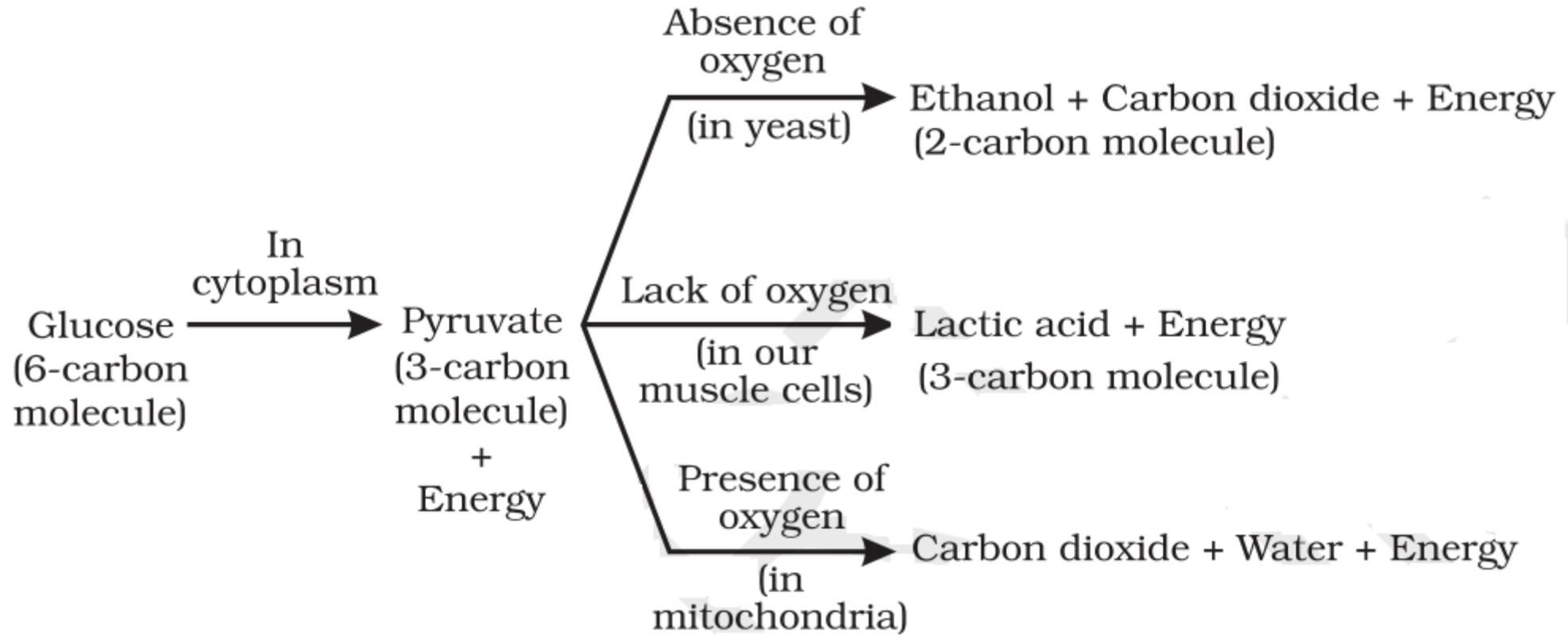
RESPIRATION

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:

- a) Aerobic respiration
- b) Anaerobic respiration





- **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.

a) **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.

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

During this process chest contract and diaphragm relaxes.

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)

- 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.

