

LIFE PROCESSES

INTRODUCTION

Living organisms perform certain activities in their daily life for their survival and maintenance. All these activities together are known as life processes.

1. Most living organisms show some sort of movement, either growth related or processes occurring in the body. E.g. respiration, circulation, excretion, etc.
2. But some organisms like plants do not show motion but they show growth.
3. Micro-organisms cannot be seen by our naked eyes but still they show sort of movement and perform several life activities. Viruses do not show any molecular movement in them until they find a host cell, therefore it is still controversy that they are alive or not.

NUTRITION:

Nutrition is a process to transfer a source of energy from outside the body of the organism which we call food to the inside.

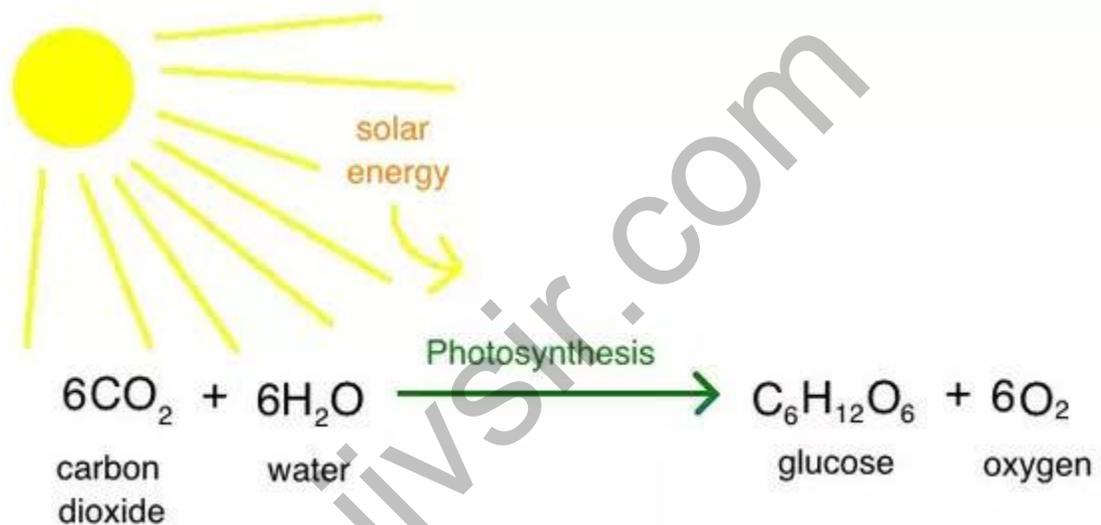
There are two kinds of nutrition:

1. **Autotrophic nutrition**- A kind of nutrition in which organisms can make their own food. E.g. Green plants.

2. **Heterotrophic nutrition**- A kind of nutrition in which organisms do not have ability to make their own food, rather they are dependent directly or indirectly on autotrophs. E.g. animals, fungi, etc.

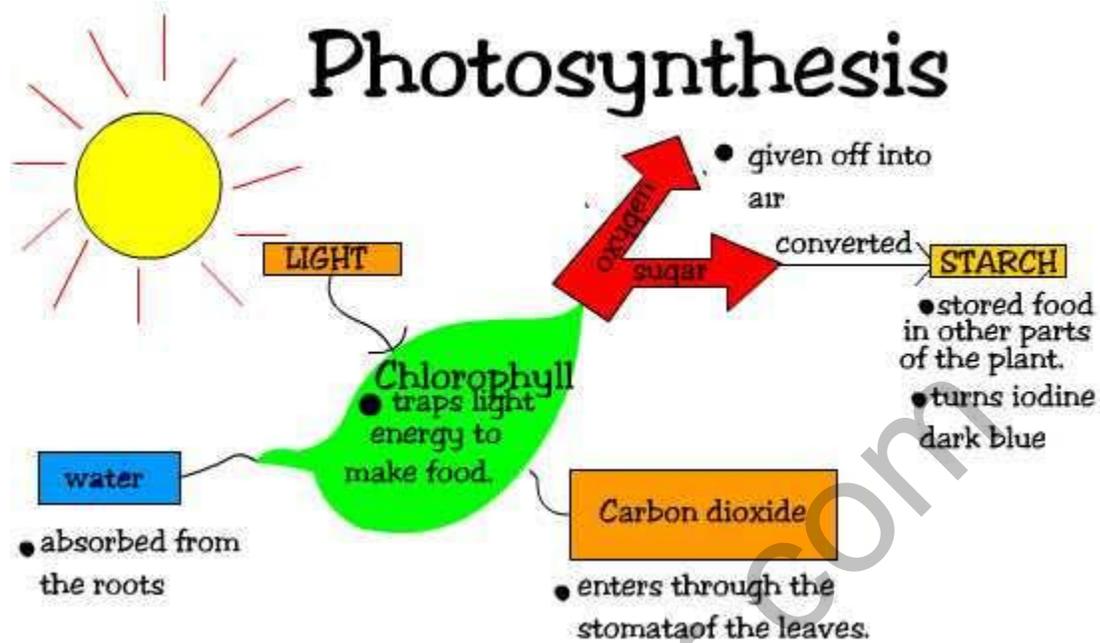
1. Autotrophic nutrition-

Photosynthesis:



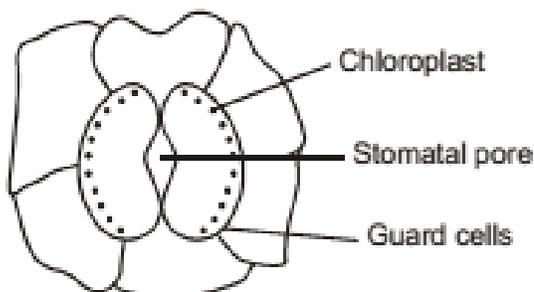
It is process by which green plants make their own food with the help of carbon dioxide and water in the presence of chlorophyll (green pigment) and sunlight. Chlorophyll is present in chloroplast.

The following steps performed by plants during photosynthesis are-



- (i) The chlorophyll absorbs light energy.
- (ii) Then the light energy gets converted into chemical energy and the water molecule gets split into hydrogen and oxygen.
- (iii) Reduction of carbon dioxide to carbohydrates.

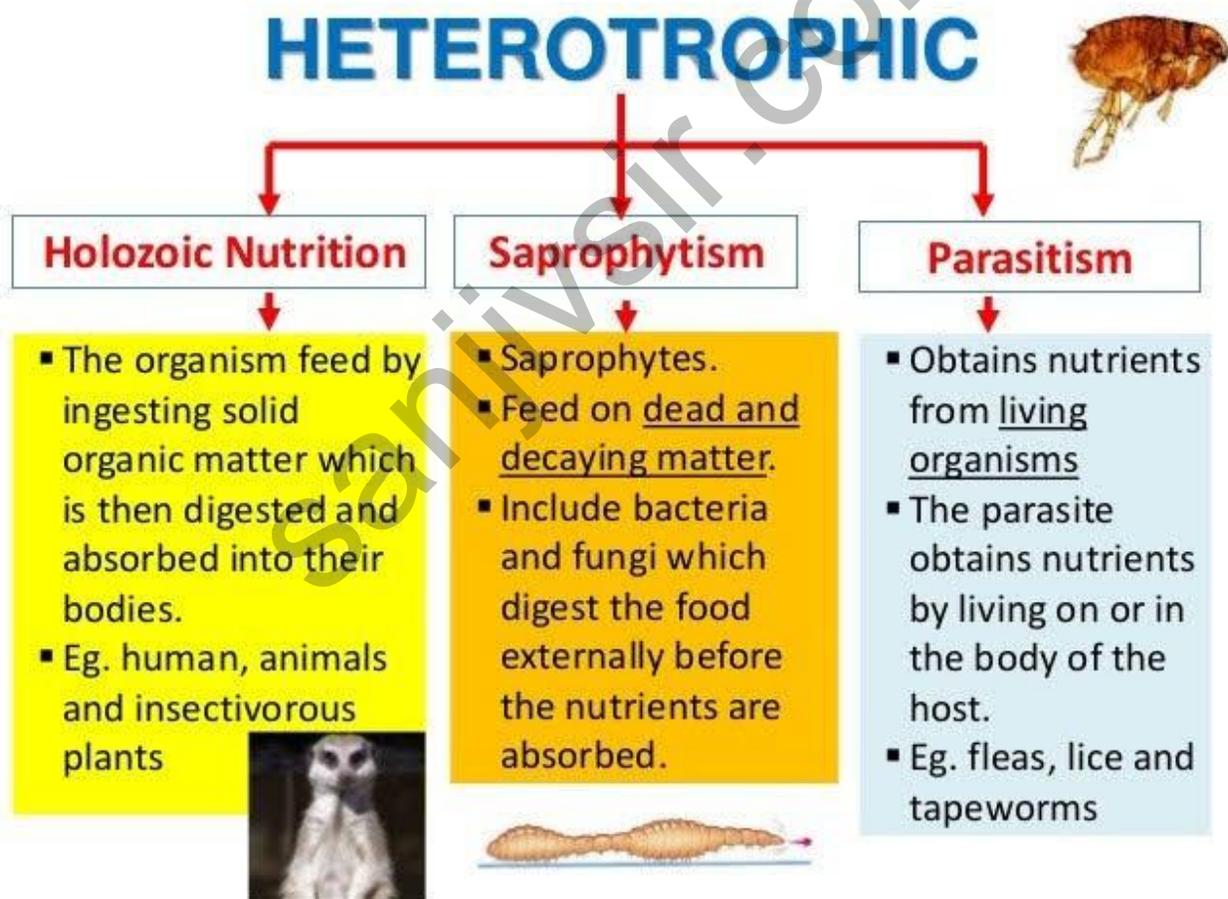
Stomata



Stomata are tiny pores present on the surface of the leaves. Massive amount of gaseous exchange takes place in the leaves

through these pores for the purpose of photosynthesis. Exchange of gases occurs across the surface of stems, roots, and leaves as well. Stomata contains guard cells which is responsible for closing and opening of pores, since large amount of water can also be lost through these stomata. When water flows through guard cells, causing it to open and swells and shrinks when the cell closes.

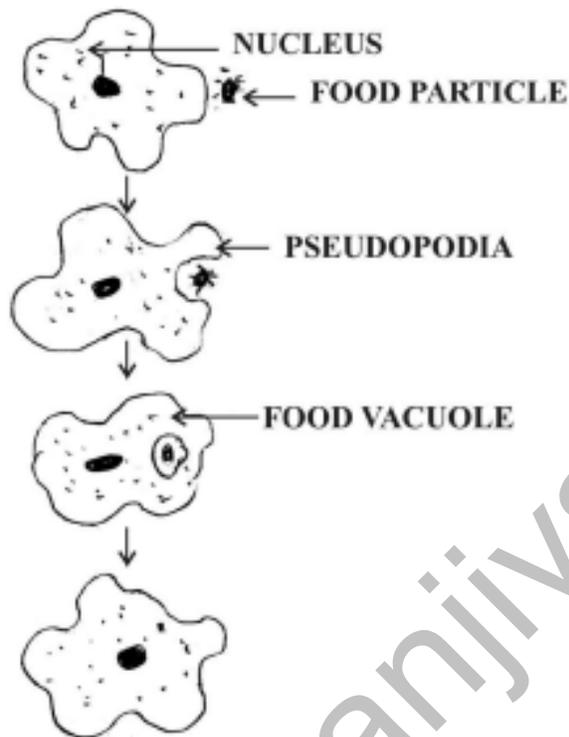
Heterotrophic nutrition



There is a range of strategies by which the food is taken in and used by the organism. Some organisms break-down the food

material outside the body and then absorb it. Examples are fungi like bread moulds, yeast and mushrooms. Others take in whole material and breaks down in their bodies.

Nutrition in Amoeba

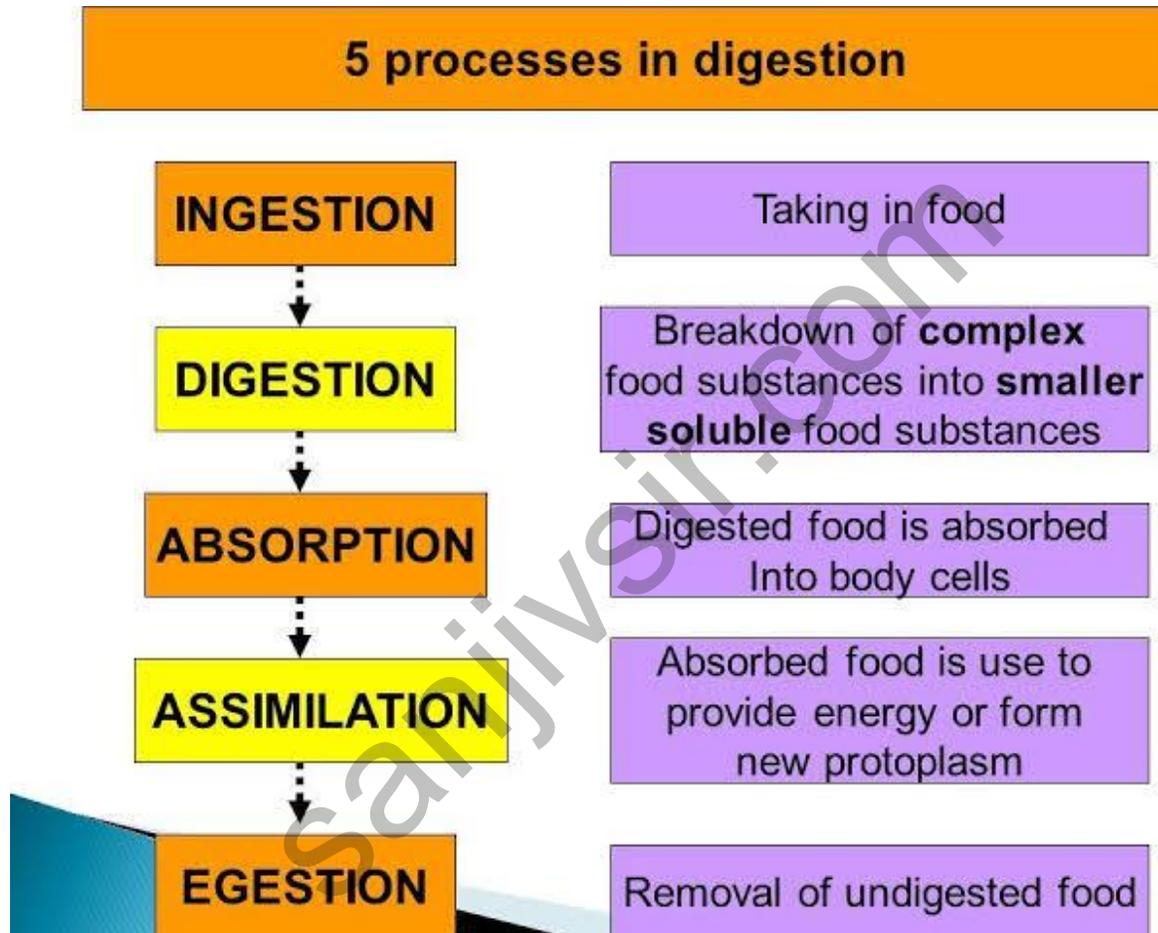


Amoeba ingests solid food particles which reacts with enzymes and are digested.

1. Amoeba move with the help of pseudopodia (extension of cell membrane)
2. Food vacuole is formed.
3. Undigested food is thrown out.

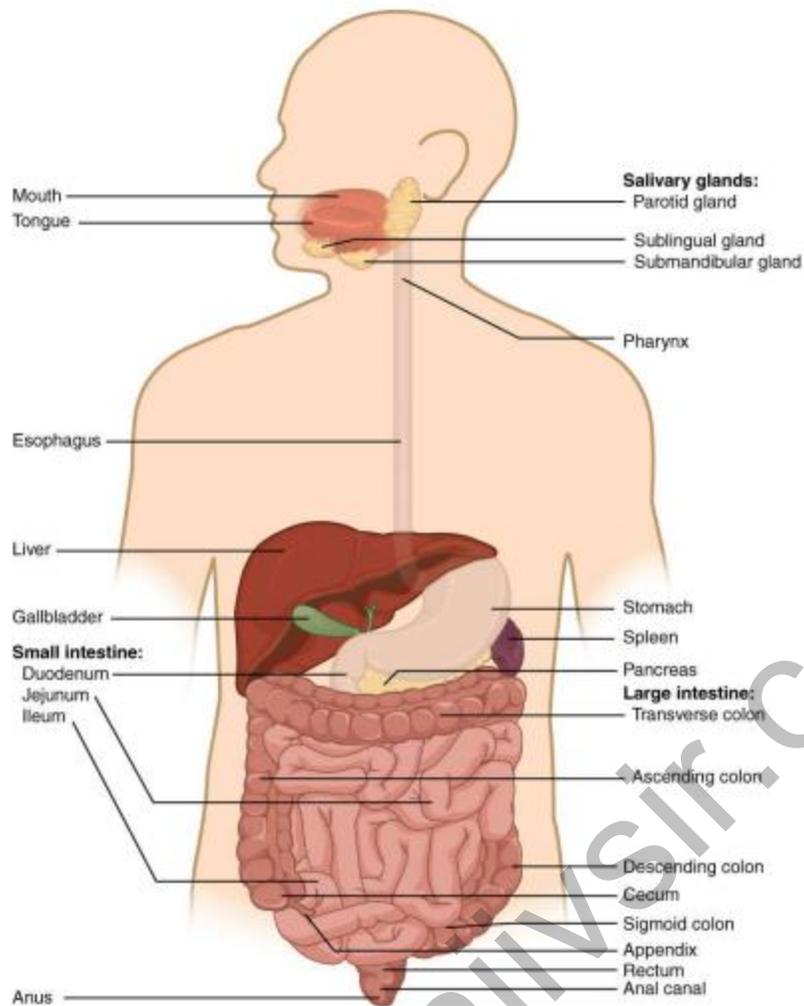
In Paramecium the food is taken in a specific spot. Food is moved to this spot by the movement of cilia which cover the entire surface of the cell.

Nutrition in Human beings



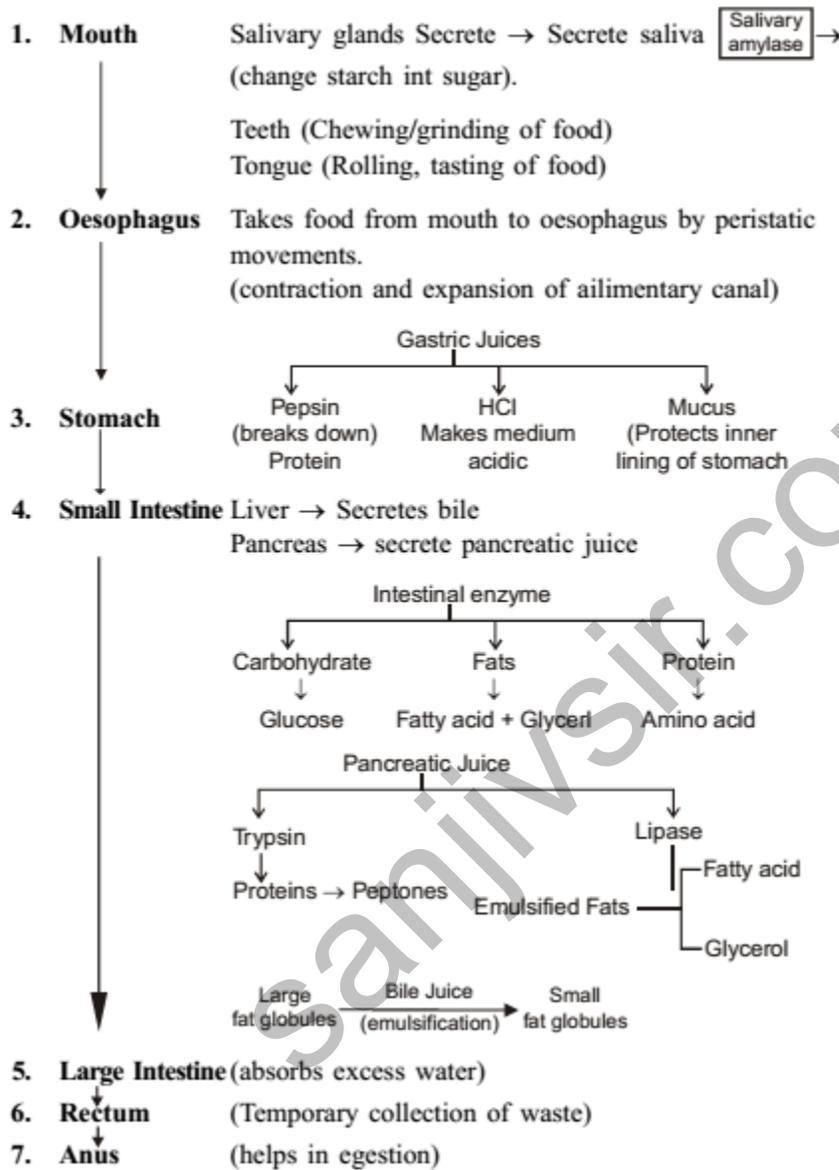
The human digestive system comprises of alimentary canal and associated digestive glands.

Human digestive system

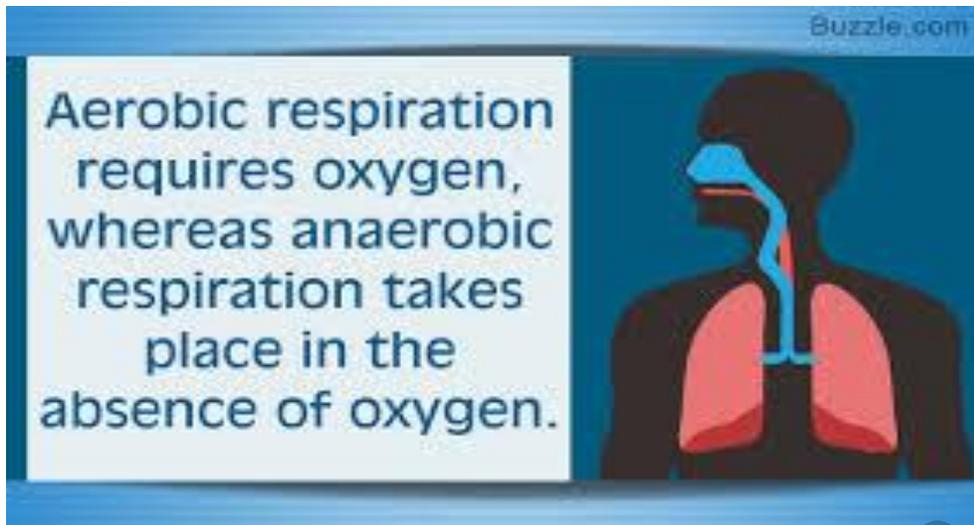


Digestion begins from the mouth. In the mouth it is broken down by salivary amylase which break downs starch to give sugar. The food moves to the stomach through the oesophagus which performs peristaltic movement (lining of the canal has muscles that contract rhythmically in order to push the food forward). Enzymes and various digestive juices from liver, gall bladder and pancreas act on the chunks from the stomach in the small intestine, the remaining nutrients are absorbed and

leftover is removed from the body through the rectum and anus.



Respiration

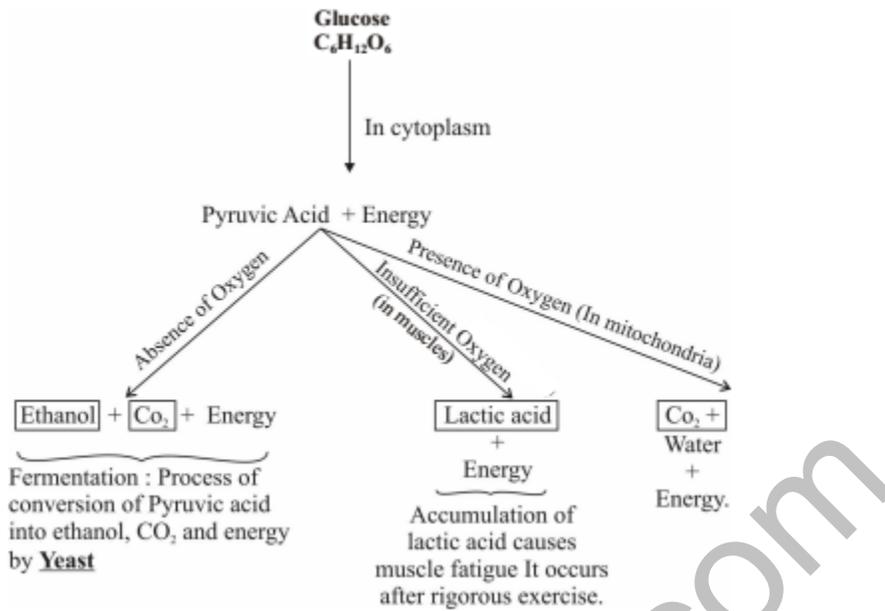


It is a process in living organisms involving the production of energy, typically with the intake of oxygen and the release of carbon dioxide from the oxidation of complex organic substances.

(1) Gaseous exchange: intake of oxygen from the atmosphere and release of carbon dioxide.

(2) Breakdown of simple food in order to release energy inside the cellular respiration.

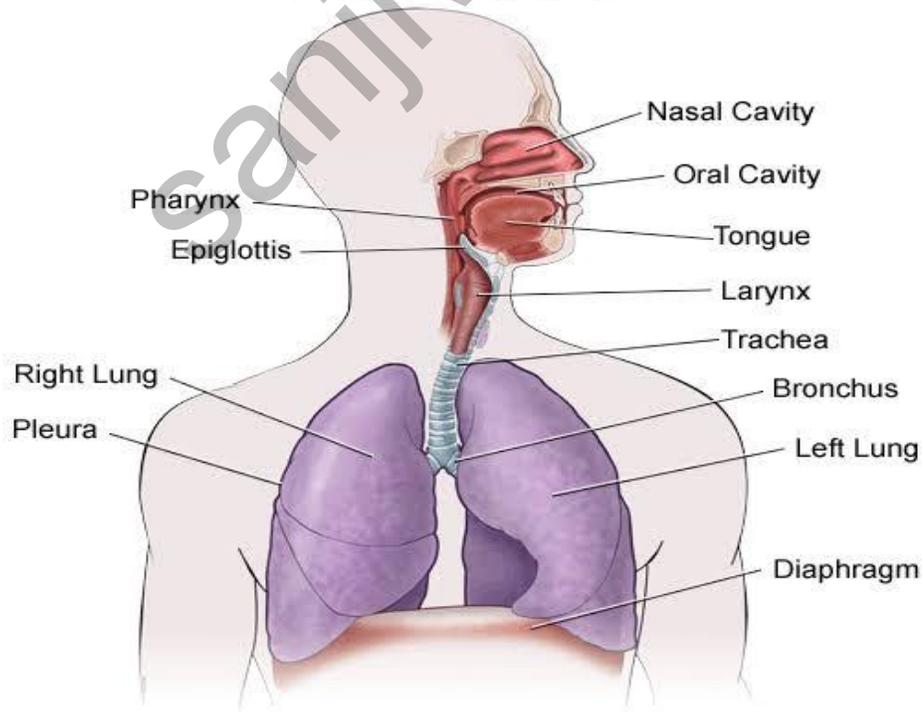
- Breakdown of Glucose by various pathways



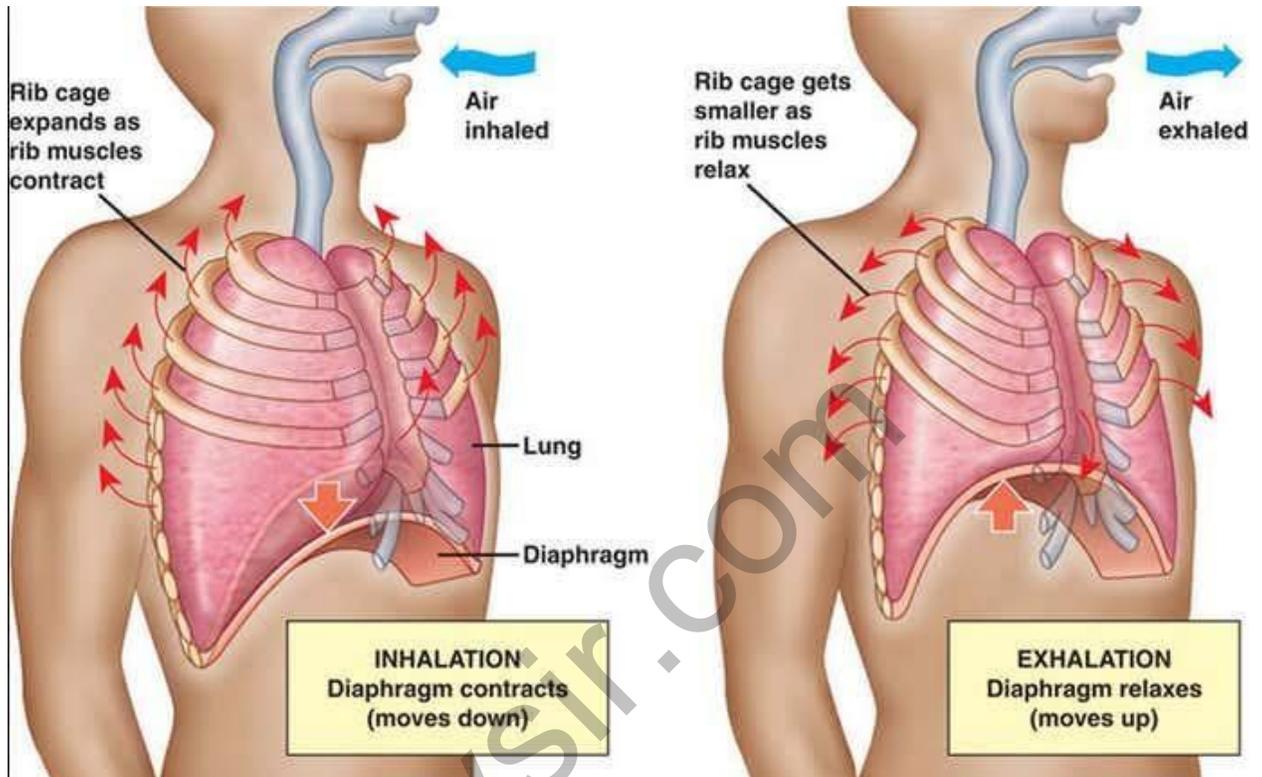
- Respiration

- Human Respiratory System:

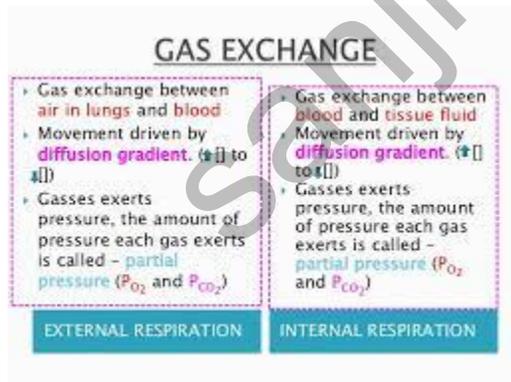
The Respiratory System



- **Mechanism of Breathing**



- **Exchange of gases between alveolus, blood and tissues.**

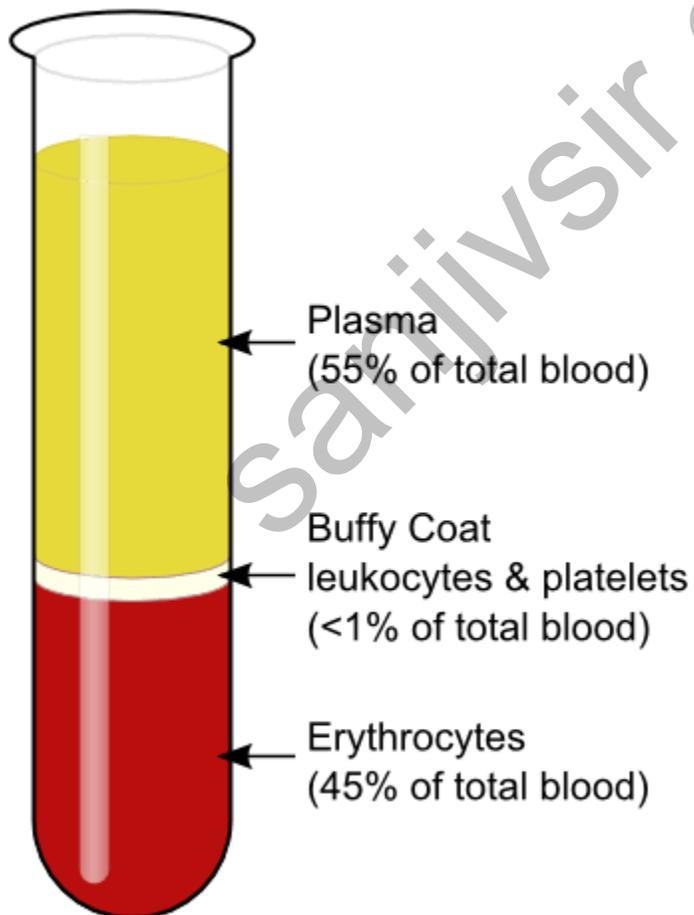


- **Terrestrial organism-** use atmospheric oxygen for respiration
- **Aquatic organism-** use oxygen dissolved in water.
- **Respiration in plants:** Gaseous exchange occur through

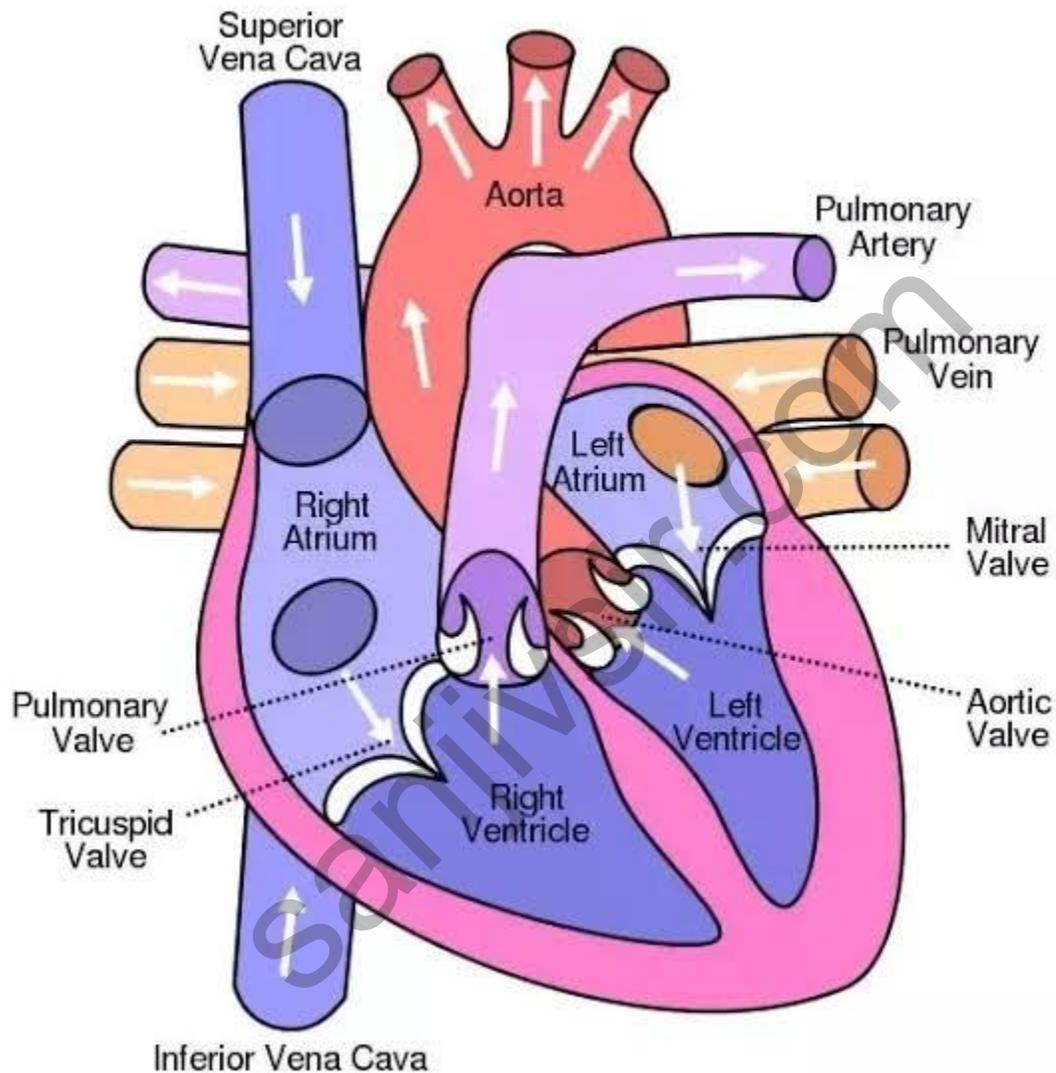
- (1) Stomata in leaves
- (2) Lenticels in stems
- (3) General surface of the roots.

Transportation

Blood transports food, oxygen and waste material in our bodies. It is a fluid connective tissue. The fluid medium it consists is called plasma. Plasma transports food, carbon dioxide and nitrogenous wastes in dissolved form.

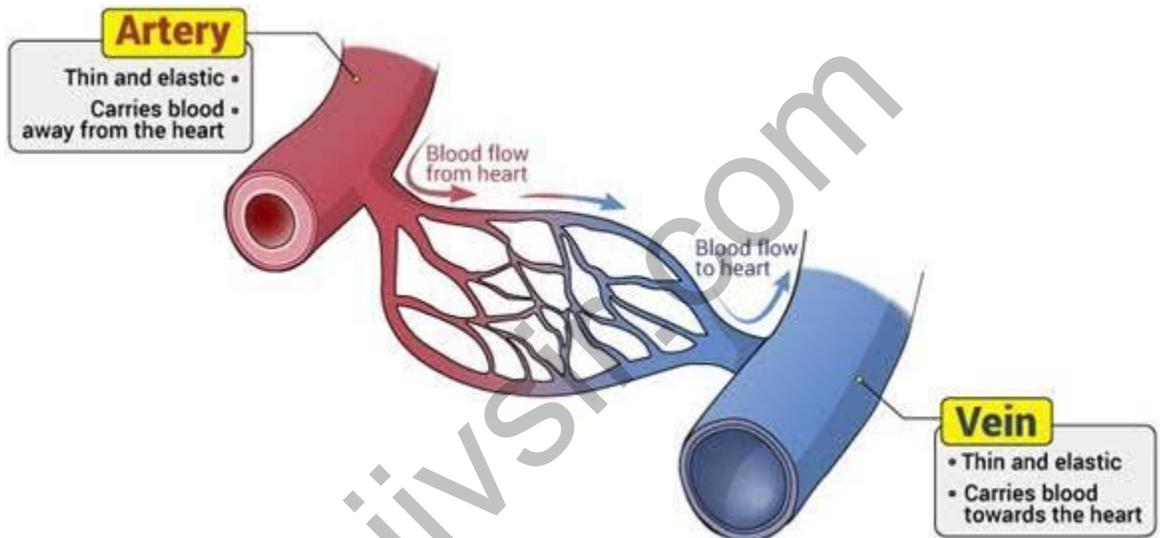
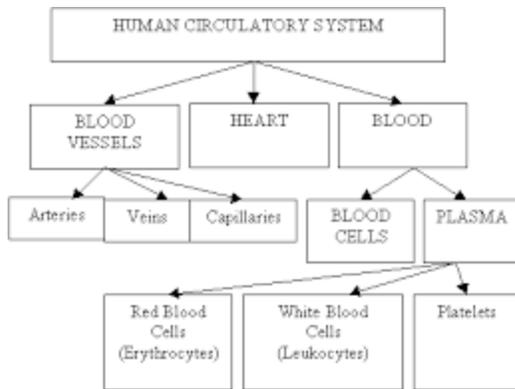


The heart is a muscular organ having four chambers to prevent the oxygen-rich blood from mixing with blood containing carbon dioxide.

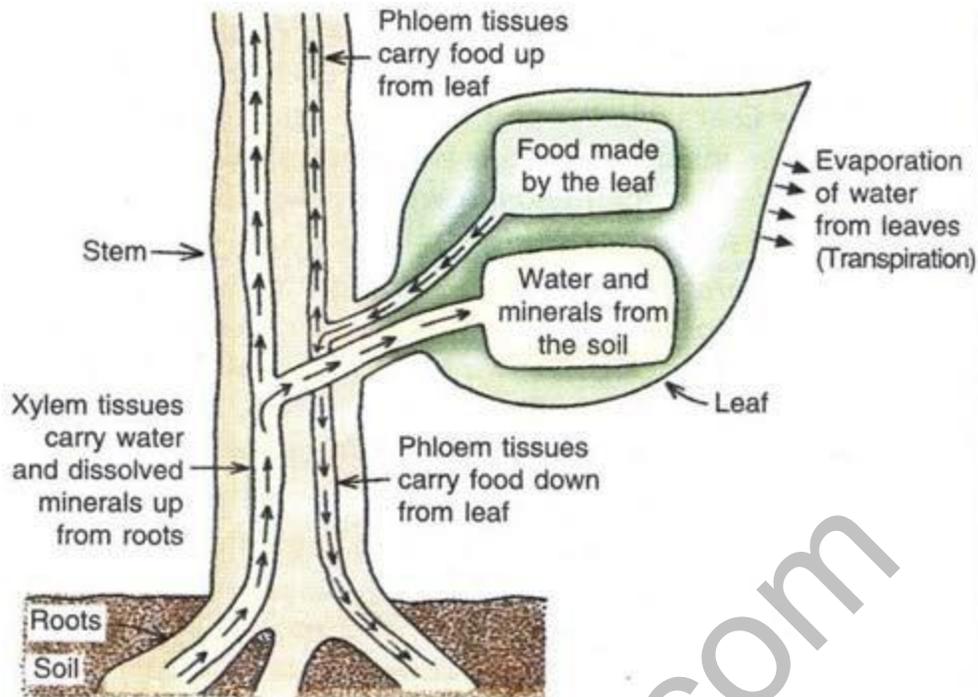


Section view of human heart

- **Double circulation:** blood flows twice through the heart in one complete cycle of the body.



- **Pulmonary circulation:** blood moves from heart to the lung and back the heart.
- **Systematic circulation:** blood flows from the heart to rest of the body and back to heart.
- **Lymph-** a yellowish fluid that escapes from the blood capillaries into the intercellular spaces. It flows from the tissues to the heart assisting in transportation and destroying germs.
- **Transportation in plants:** there are two main tissues.



a) Xylem

b) Phloem.

- Transpiration is the process by which plants lose water in the form of vapours.
- Role of transpiration
 1. Absorption and upward movement of water and minerals by creating PULL.
 2. Helps in temperature regulation in plant.
- **Translocation:** Transport of food from leaves to different part of the plant is called Translocation.

Excretion in human beings:

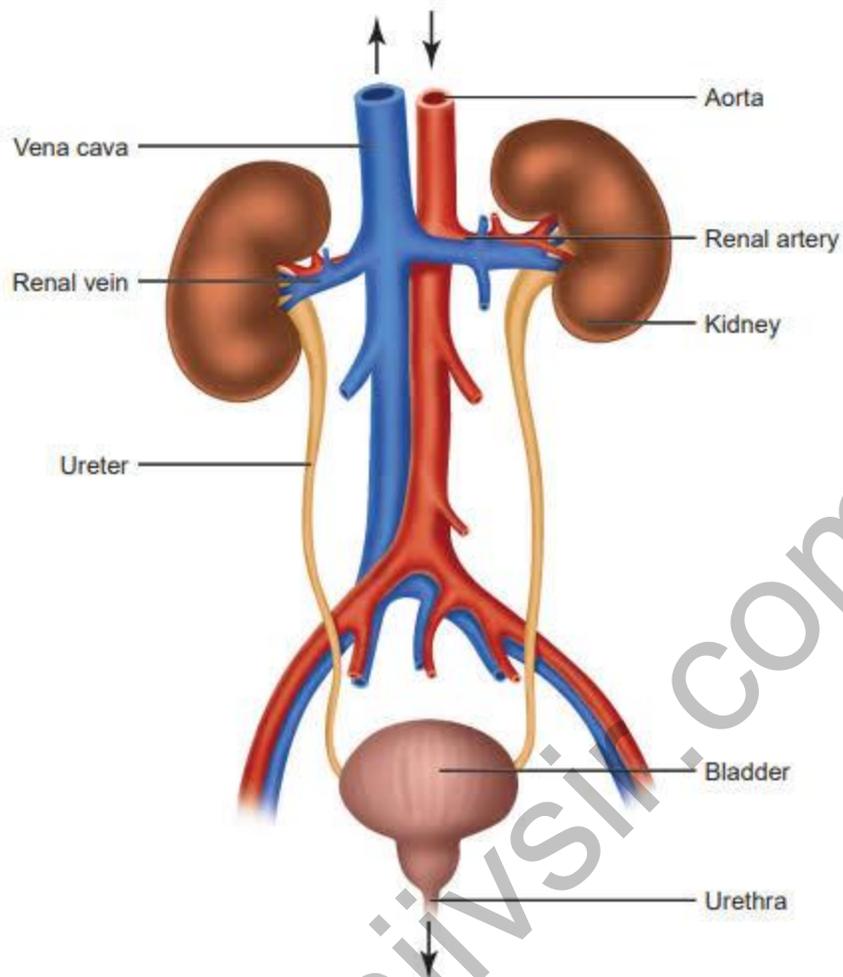


Figure 8.2 Human excretory system

The process of removal of the metabolic wastes from the body is excretion. Excretory system consists of-

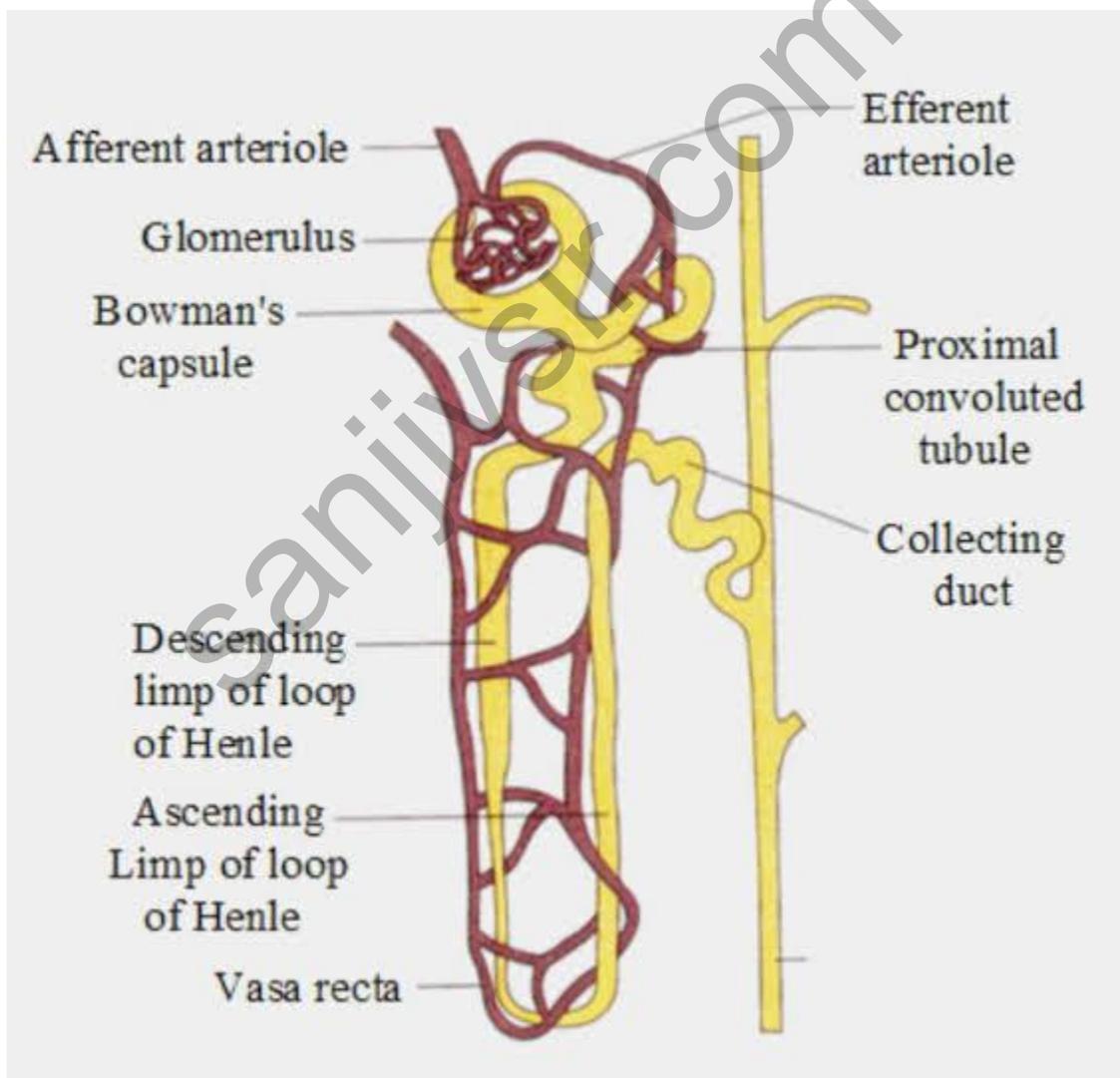
1. A pair of kidney
2. A Urinary Bladder
3. A pair of Ureter
4. A Urethra

- **Process of excretion**

Renal artery brings in blood containing waste substances to the kidneys. Kidney filters blood.

Urine produced in the kidneys passes through ureters into urinary bladder where it is stored until it is released through the urethra.

- **Functions of kidney:** It removes waste product from blood i.e., urea which is produced in liver.
- **Nephron:**



Each kidney has a large number of filtration units called nephrons.

It is a structural and functional unit of kidney.

- **Mechanism of Urine Formation:** The Urine formation involves the following steps:
- **Glomerular Filtration:** Blood is filtered from the glomerulus into Bowman Capsule of the nephron. This filtration passes through the tubules of the nephron.
- **Tubular re-absorption:** useful substances from the filtrate like Na^+ , K^+ , glucose, amino acids etc. are reabsorbed by the capillaries surrounding the nephron into the blood.
- **Secretion:** Urea, extra water and salts are secreted into the tubule which open up into the collecting duct and then into the ureter.
- **Haemodialysis:** The process of purifying blood by an artificial kidney. It is meant for kidney failure patient.

Excretion in Plants

1. Oxygen released during photosynthesis.
2. H_2O by transpiration
3. Wastes may be stored in leaves, bark etc. which fall off from the plant.
4. Waste products stored as gums, resin in old xylem
5. Plants excrete some waste into the soil around them.

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