

Life Processes

Science-10

CLASS-X



CLASS NOTES

BY

**ARBIND SINGH
ACADEMY**

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Life Process

Life Processes : . The Process which maintain body functions and necessary for survival of living organisms is called life processes.

Life Process includes .

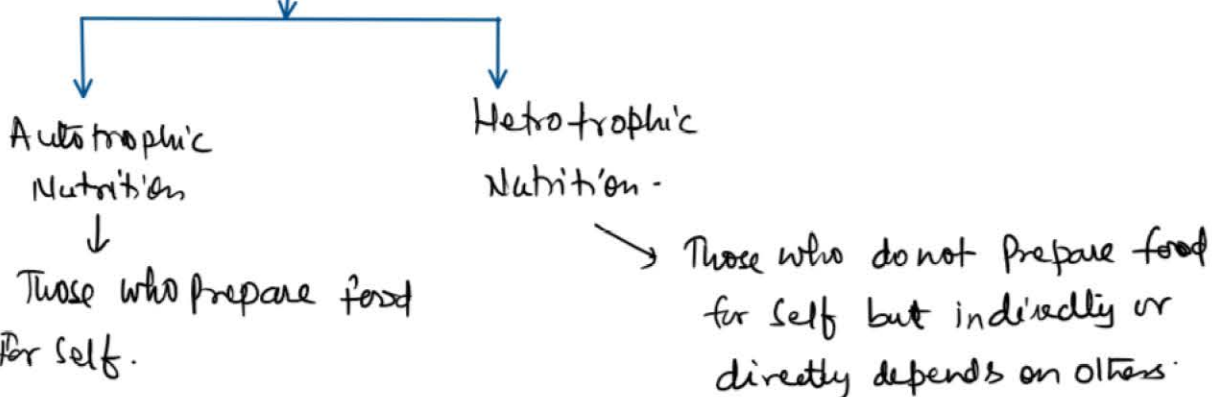
- (i) Nutrition (ii) Respiration (iii) transportation
(iv) excretion.

Nutrition : - The process of taking **nutrients** from outside environment is called nutrition.

Nutrients includes → fats, carbohydrates, minerals, vitamins, water, proteins etc.

Food -

Mode of Nutrition -





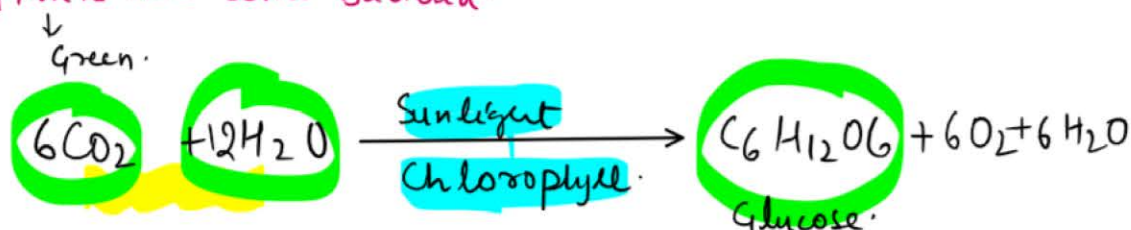
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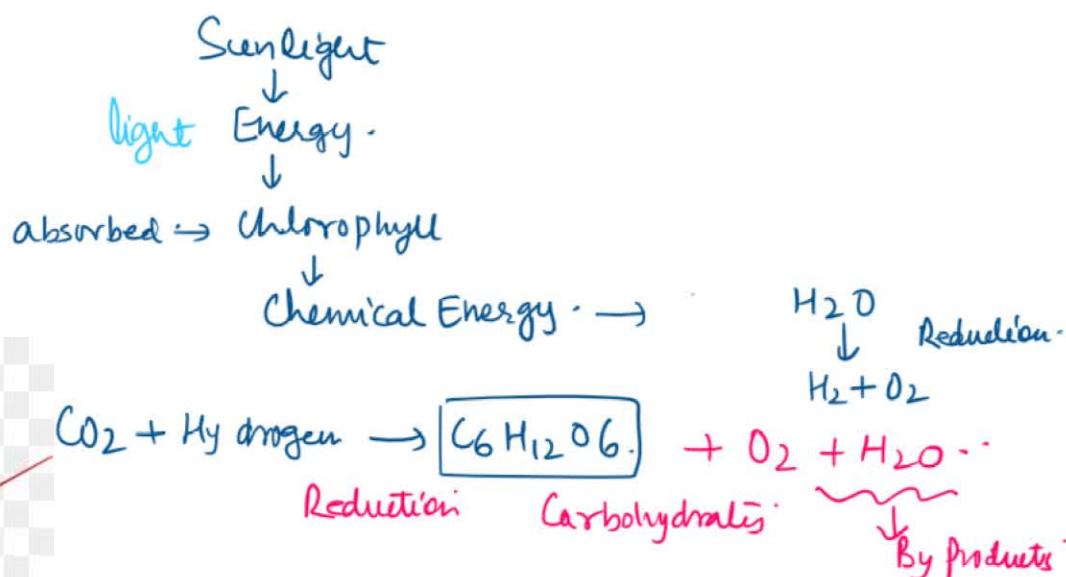
Autotrophic Nutrition:- In this mode of Nutrition Food is being prepared from inorganic materials like CO₂ and water taken from environment in presence of sunlight.

eg. Plants and some bacteria.



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Photosynthesis: The process in which autotrophs take inorganic material from environment and convert them into carbohydrates a complex organic compound in presence of Sunlight and chlorophyll.



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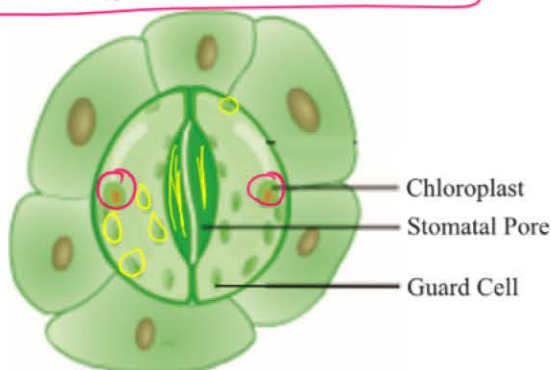
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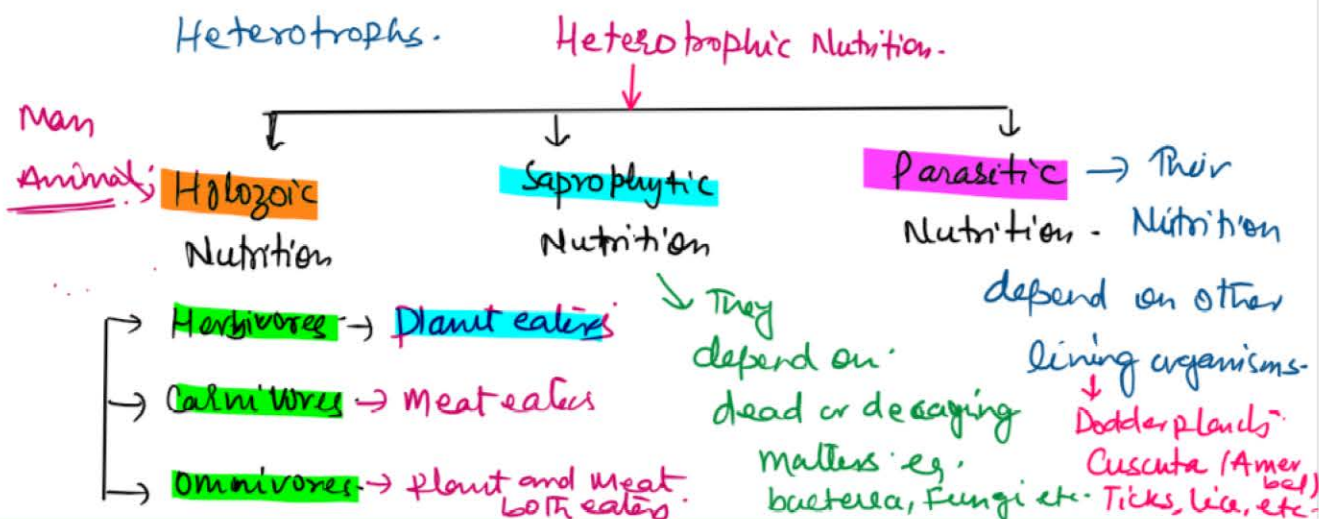
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Heterotrophic Nutrition.

In Heterotrophic Nutrition Organisms take food in complex organic compounds and break them into simpler form in their inside body. eg. Animal (goat, cow, man, tiger etc) The solid intake is taken by Heterotrophs.



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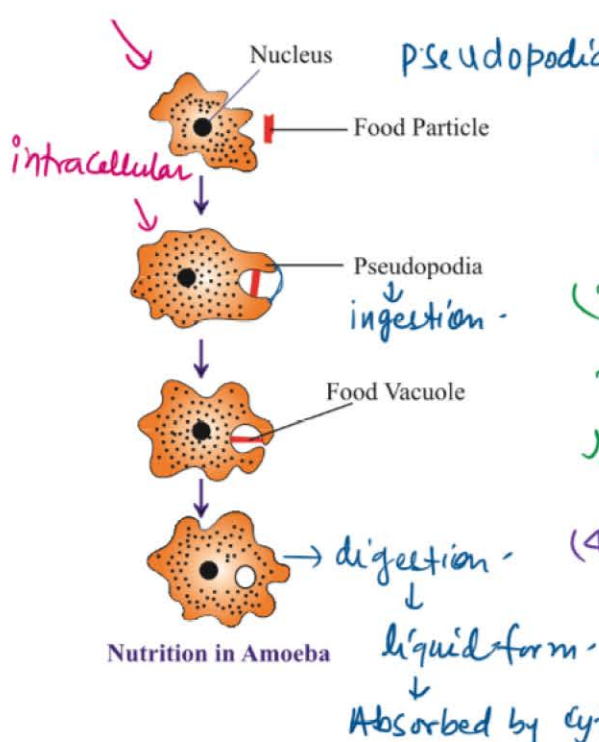
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Nutrition Amoeba -

↓
Holozoic Nutrition

↓
Pseudopodia → Finger like structure developed by amoeba while taking the food. The process is called **ingestion**.



(2) **Digestion** :- Digestion in amoeba is intracellular. The food is broken down in liquid form.

(3) **Absorption** :- The liquid formed after digestion is readily absorbed by cytoplasm.

(4) **Assimilation** :- The absorbed food by amoeba is taken and used in form of energy.

(5) **Egestion** :- The unused/waste material is taken out from the surface of cell for ejection and removed from the body. The process is called **egestion**.



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Nutrition in Human beings.

Nutrition in human being is the Complete Process from Food intake to conversion in form of energy after complete digestion of food materials.

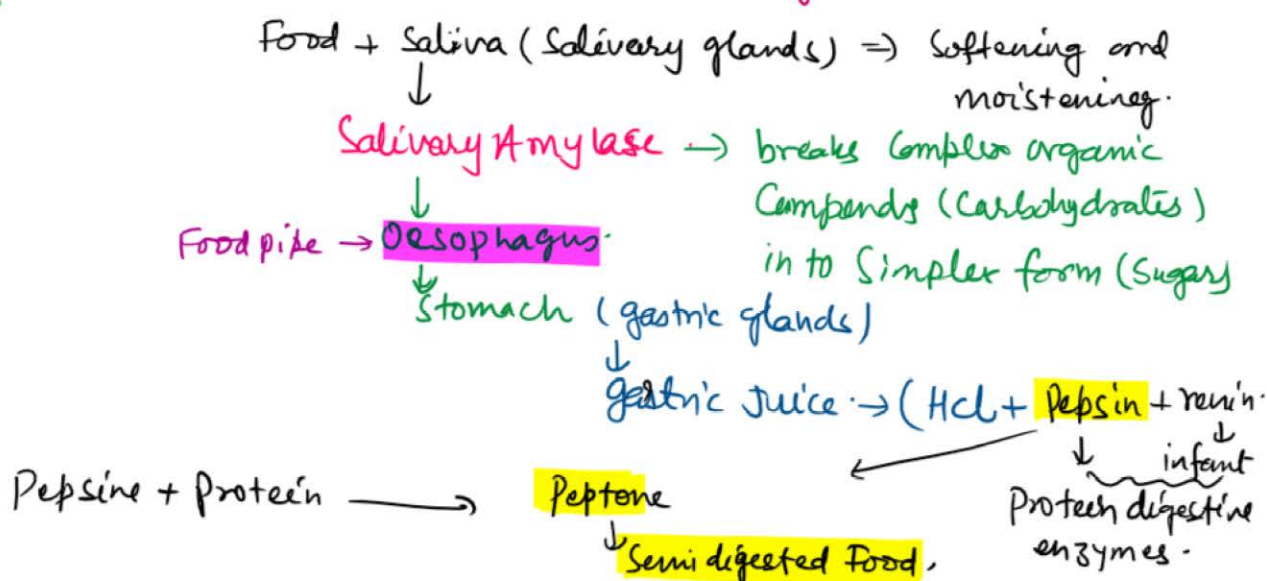
Mechanisms of digestion of food.

↓ Ingestion ↓ digestion ↓ Absorption ↓ Assimilation ↓ egestion.

Ingestion: - The process of taking food in buccal cavity or mouth and from **Mouth** to small intestine.

Digestion: - The complete process in which complex food material is converted into **simpler form** by **various biological catalyst** called enzymes.

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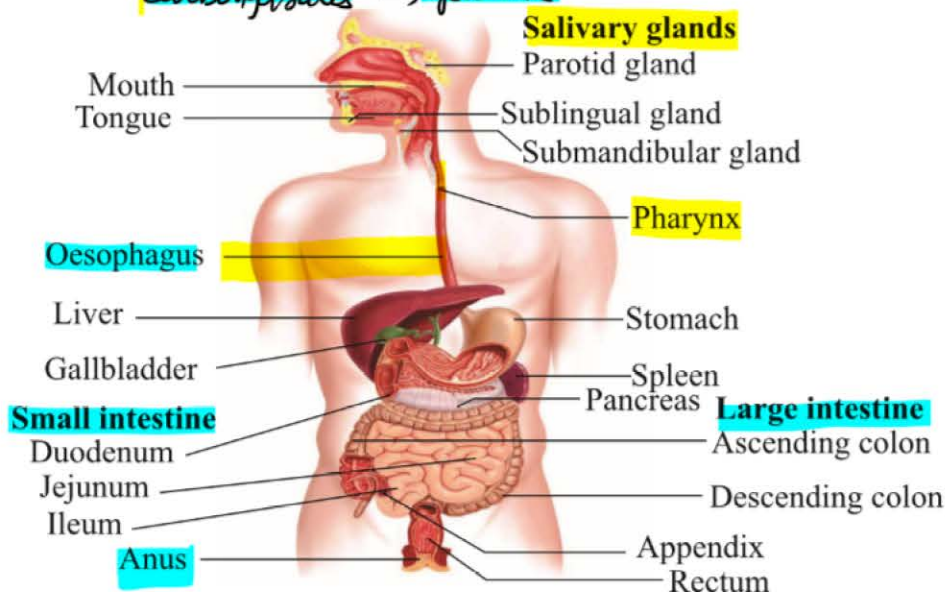
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Small intestine
↓
Intestinal juice
(bile juice + pancreatic juice)
↓
emulsification of fat globules -
↓
Acidic Medium -
Protein → Amino Acid
Carbohydrates → glucose
fats → Fatty Acid -

Trypsin
Lipase
fats emulsification

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Absorption - The process in which digested food passes through alimentary canal into blood or other body fluids.

Small Intestine
↓
Intestinal Villi
↓
Blood

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(IV) **Assimilation** - The process of distribution of digested food materials to different cells of the body. where energy is required for various metabolic process.

(V) **egestion** - The process of removal of undigested food materials from large intestine through anus is called egestion.

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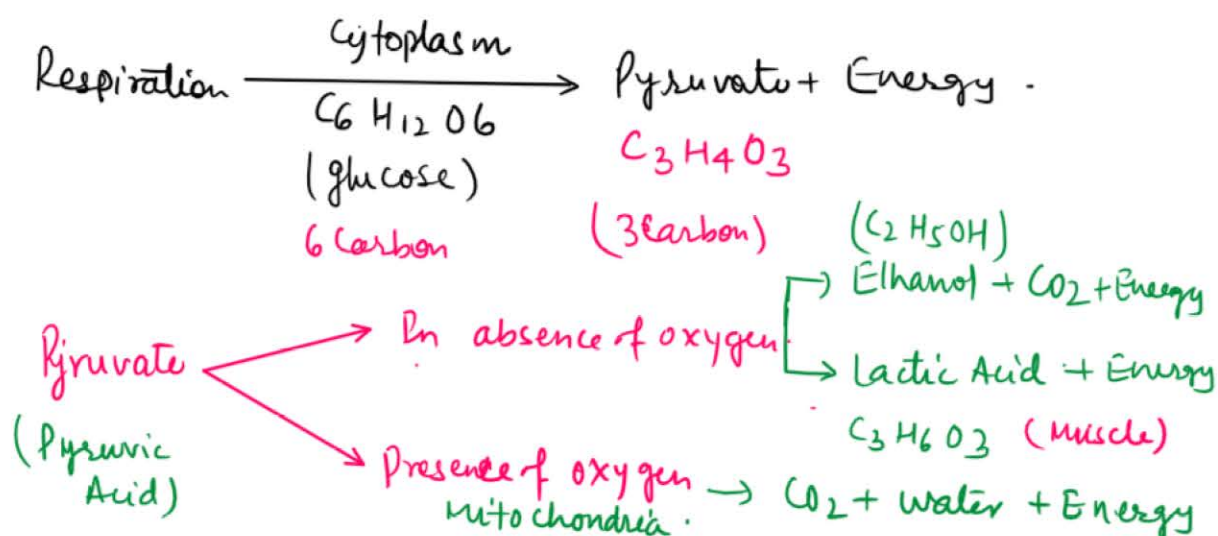
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Respiration

Respiration is process in which food is oxidized to provide energy. It involves breathing in which oxygen is taken from atmosphere and Carbon dioxide is released as output. In this process organisms exchange gases from body to environment.

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The **respiration** is **biochemical oxidation** of **nutrients** in presence of specific enzymes at optimum temperature in cell to provide energy for various **metabolic process**.

Types of Respiration

- ① **Aerobic Respiration**:- The respiration takes place in presence of oxygen called aerobic respiration. In this huge amount of energy is released.
- Glucose $\rightarrow$ Pyruvic Acid $\rightarrow$ $\text{CO}_2 + \text{Water} + 38 \text{ ATP (Energy)}$

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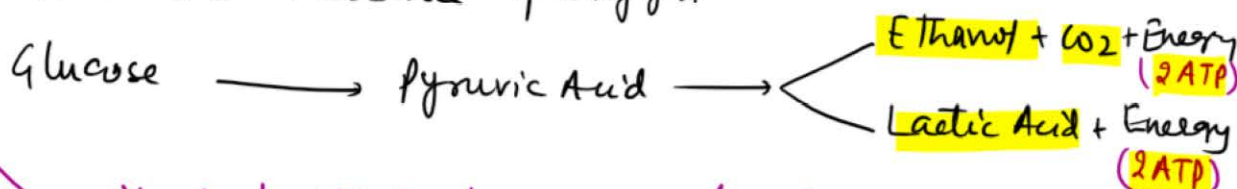


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2) Anaerobic Respiration:- This type of respiration provide very less amount of energy. It takes place to breakdown the food items in absence of oxygen.



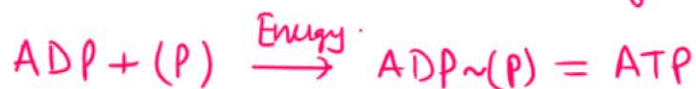
Yeast, bacteria, human muscles etc.

$\xrightarrow{\text{Fermentation}}$
 $\begin{cases} \text{Alcoholic Fermentation} \\ \text{Lactic Acid Fermentation} \end{cases}$

ATP $\rightarrow$ Adenosine triphosphate

$\downarrow$
Energy Currency of the Cell.

The Energy released during respiration form ATP molecule from ADP and Inorganic phosphate:



Endothermic processes use this ATP

to drive reactions.

When terminal phosphate linkage with ATP is broken using water, then Energy **30.5 kJ/mole** is released.

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Respiration in Animals

Aquatic Animals

↓
 dissolve oxygen from water
 ↓
 oxygen amount is very low in water
 ↓
 Respiration in aquatic animal is higher rate i.e. faster

Terrestrial Animals -

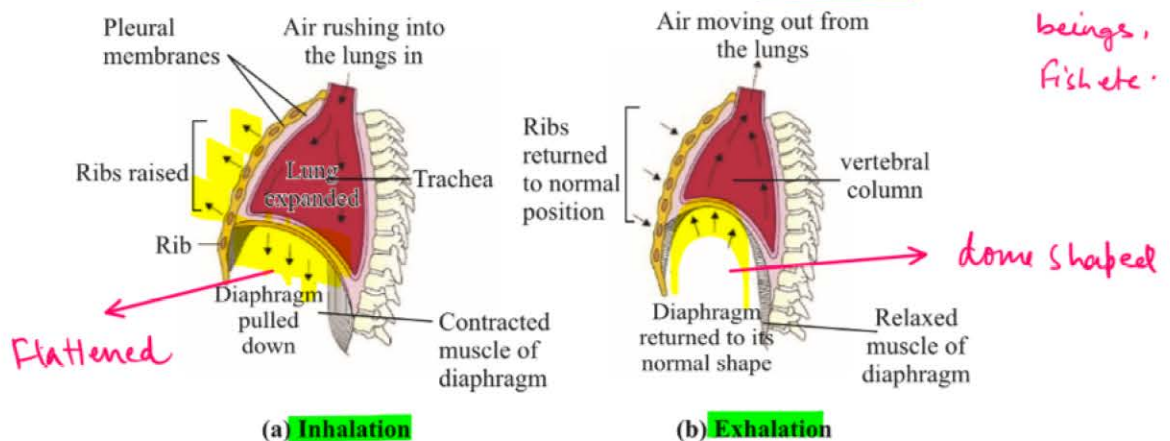
↓
 oxygen is taken from atmosphere

↓
 Through
 Skin

i.e. Amoeba
 planaria etc.

↓
 Through
 Respiratory
 organs

i.e. human
 beings,
 fish etc.



Respiration in human beings.

The Process in which human takes oxygen from atmosphere and releases Carbon dioxide to atmosphere is called respiration.

The process of taking oxygen from air is called **Inspiration**.

The process of giving out Carbon dioxide in air is called **expiration**.

In human beings there is a mechanism for moving the oxygen in and Carbon dioxide out which is termed as gaseous exchange.

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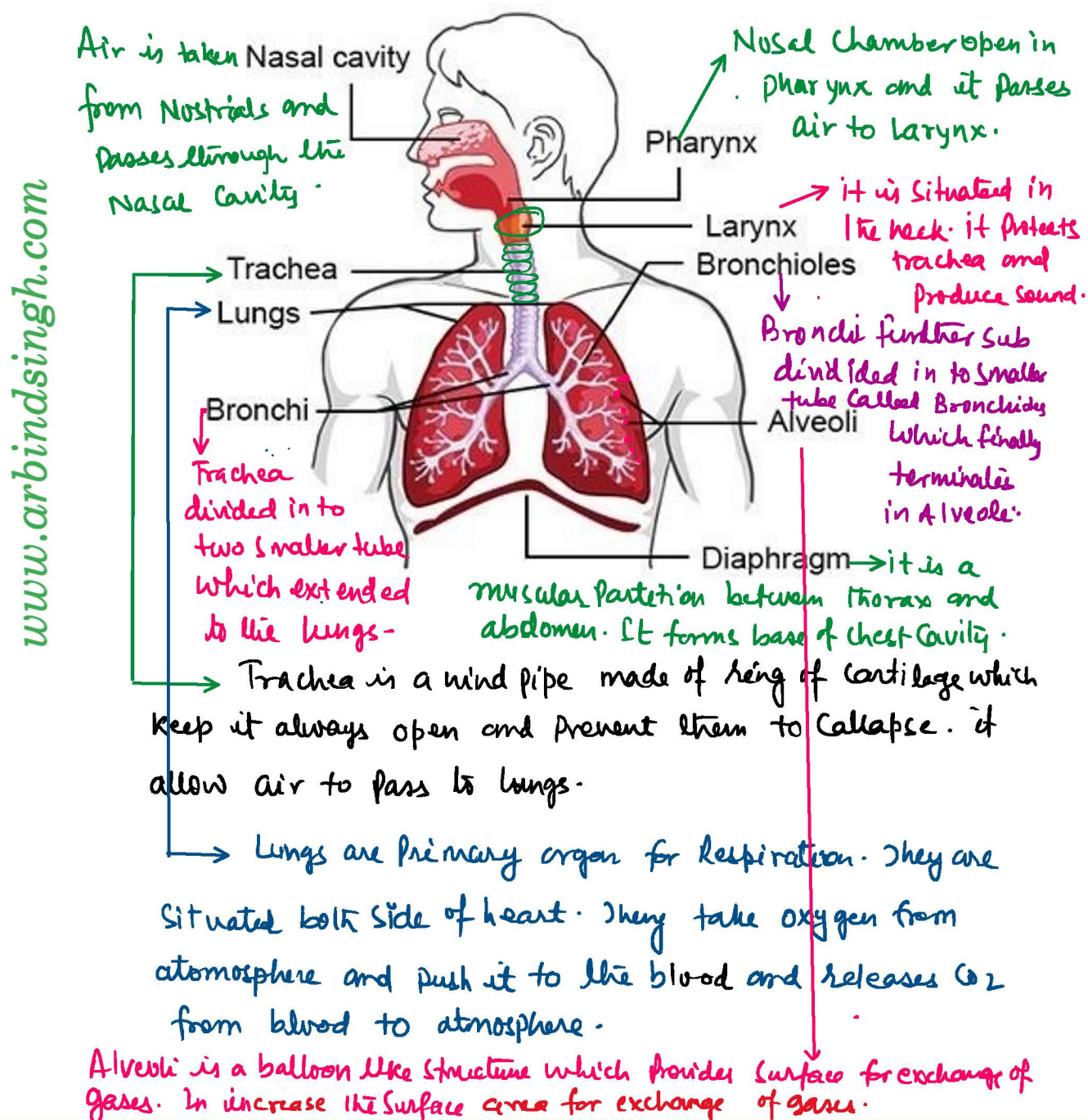


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Respiratory System in human being like other animals provides fresh oxygen to the body and exel harmful Carbon dioxide out of the body.



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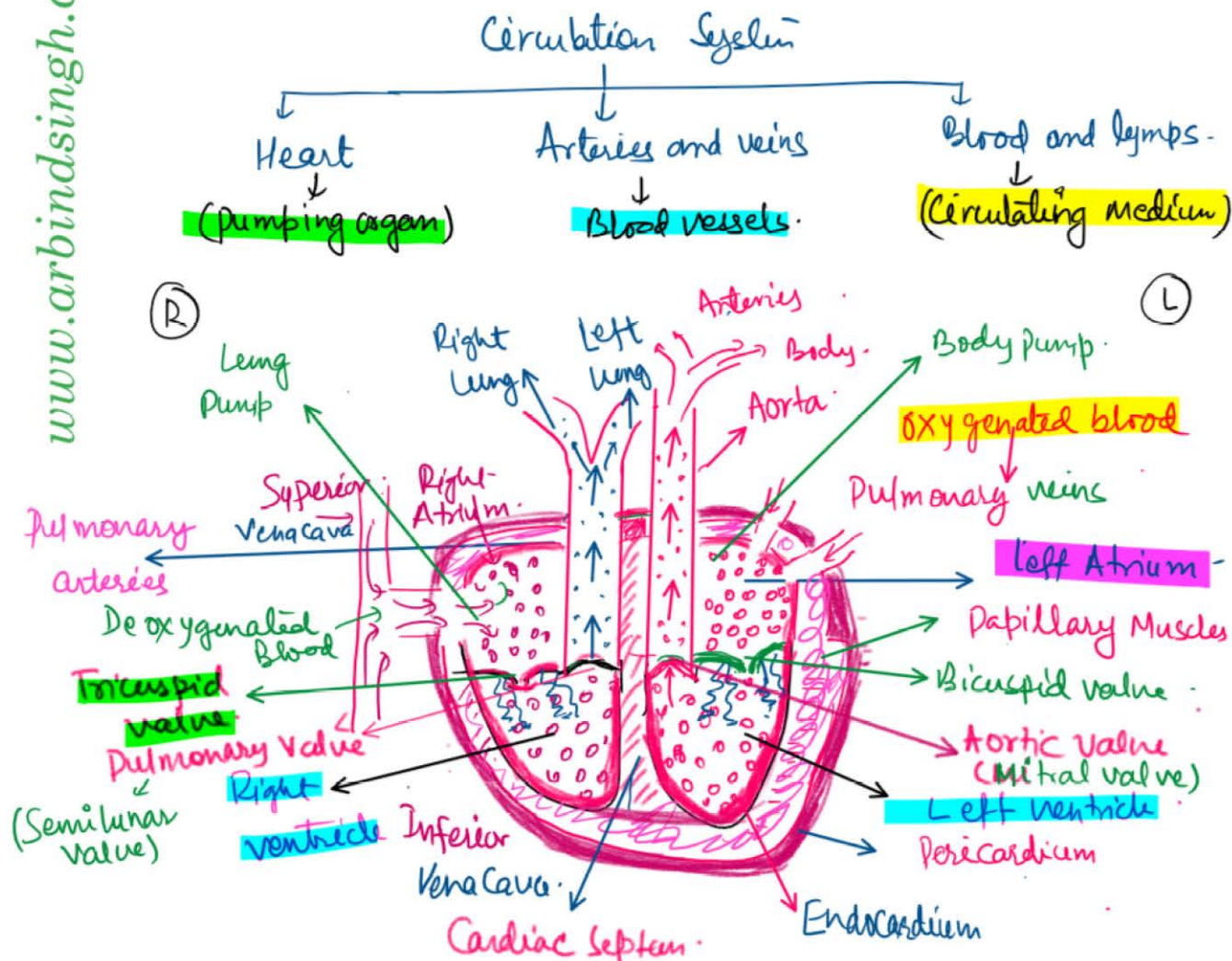
Transportation

Transportation is the life process in which substance is absorbed or made in one part of the body and carried to other part of the body through circulating medium.

The process of transportation of food, oxygen, water etc. is called Circulation.

The Circulation System consists of the following parts or organs of the body.

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Types of Blood in Circulation

Oxygenated Blood

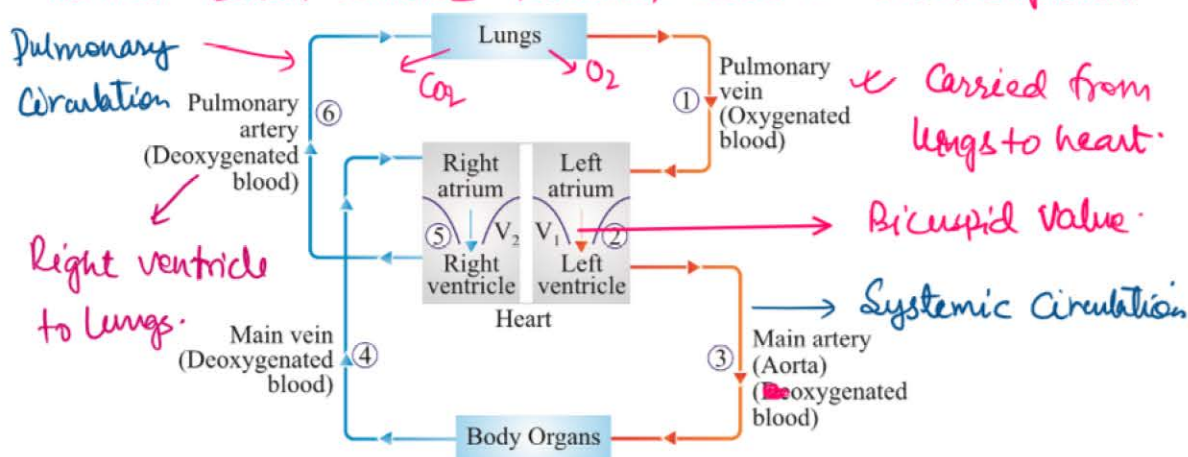
(Oxygen is attracted to haemoglobin of the blood.)

Deoxygenated Blood

(CO₂ and little O₂ is attracted to haemoglobin of blood)

Blood is fluid connective tissue which form 30-32% of total extracellular fluid. In adult blood volume is 5-5.5 litres. Blood contains Plasma, Cells or Blood Corpuscles -

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These are two types of Circulation

- Pulmonary Circulation** :- In this Circulation oxygenated blood Carried from lungs to left atrium of heart and deoxygenated Blood Carried from Right ventricle of heart to lungs. i.e. Circulation between heart and lungs is called Pulmonary Circulation.



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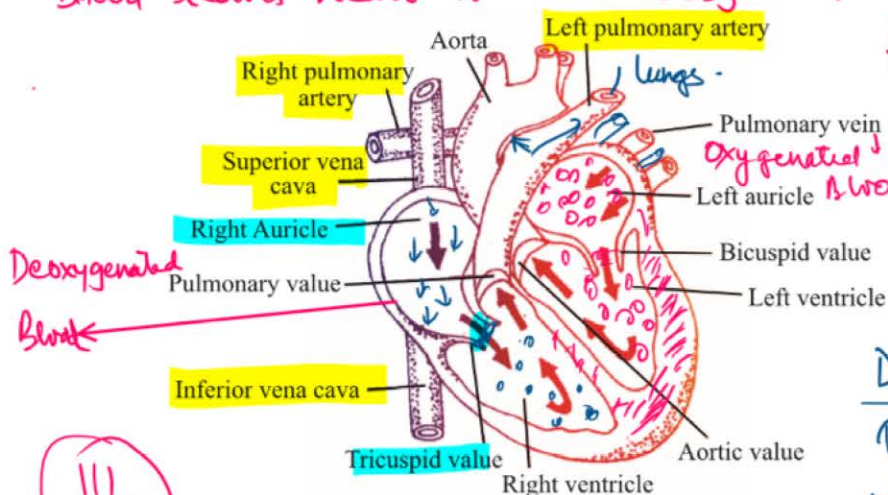
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(11) Systemic Circulation:- The Circulation between heart and all other part of the body except lungs is called Systemic Circulation.

Blood pressure:- The pressure at which blood is pumped around the body by Heart is called blood pressure.

Systolic pressure:- The maximum pressure through which blood leaves heart to main artery Aorta during contraction phase is called Systolic pressure.

The normal Systolic pressure is 120 mm of Hg.



Direction of blood flow through human heart

Diastolic pressure:-

The pressure through which blood is carried out in different arteries during relaxation phase of heart is called diastolic pressure.

The normal range of diastolic pressure is 80 mm of Hg.

Hypertension:- The high blood pressure is called hypertension, it cause the rupture of arteries, which may leads to internal bleeding.

Hypertension increases the resistance of flow of blood in arteries.

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Sphygmomanometer: - The instrument through which blood pressure is measured.

narrow
(Constriction of arterioles)

Blood vessels**Arteries**

↓
Thick muscular and elastic wall, which carry blood from Heart to all other parts of the body.

- (2) Arteries has **no valve**, So the flow of blood is one directional.
- (3) Flow of blood in arteries is at high pressure.

Veins

↓
Thin muscular wall which carry blood from all parts of the body **towards** Heart.

- (2) The vein has **valve** which prevent the flow of blood in reverse direction.
- (3) The flow of blood in veins is at low pressure.

Capillaries

They are fine one cell thick tube which flow blood from arteries to cell.

- (2) The Capillaries has also **valve**.
- (3) The exchange of material takes place from thick wall of surrounding to thin wall of capillaries.

Platelets: - To minimise the loss of blood and pressure during injury the platelets are circulating in the body to help in **clotting of blood**. The normal range of platelets is **150000 to 400000 per microlitre**.

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Lymph :- Lymph is another type of Circulating medium which forms when some amount of Plasma protein and blood cells escape into intercellular spaces in the tissues through the pores present in walls of capillaries.

Function: Lymph carries absorbed and digested fat from intestine and drains excess fluid from intercellular spaces back to the blood.

Lymphatic Capillaries :- Lymphatic capillaries are thin walled capillaries which form network in every organ apart from nervous system.

Lymph drains into lymphatic capillaries from intercellular spaces, which join to form large lymph vessels that finally open into larger veins.

Lymphatic vessels :- These are the secondary pathway for fluid returning from tissues to heart. These vessels are wider than blood capillaries and are meant to carry lymph.

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Transportation in plants:

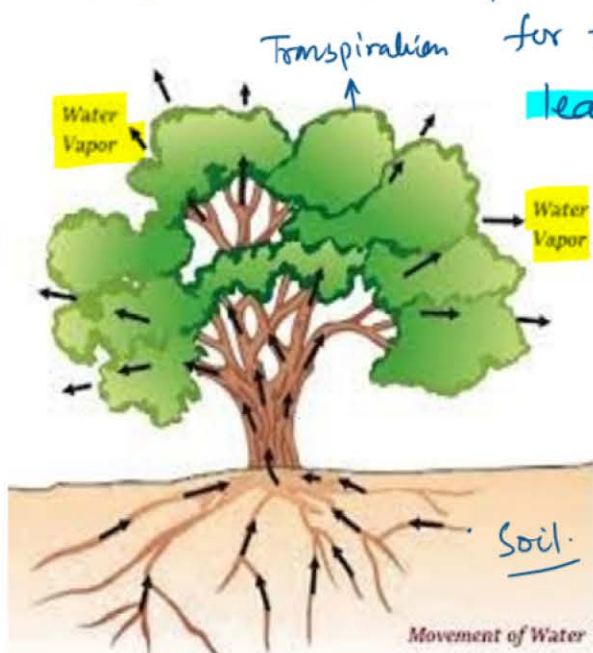
As, we know, plants are autotrophs. They prepare their food in presence of sunlight and chlorophyll from inorganic substances like CO_2 and water.

They store their food in leaves and they supply to other parts of the tree. There is a specialised tissue for transportation of food energy from leaves to other parts of the body.

That tissue is called phloem.

There is another specialised tissue called xylem which transports water and minerals etc. from root of the plant to upper parts of the plant. It absorbs water and mineral (Nitrogen

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phosphorus etc.) from soil and transport them to other parts of the plant. Xylem has dead long hollow vessels. It has lignified cell wall thickening which prevents vessels from collapsing. -

Transpiration: - It is defined as loss of water from aerial parts (stem, leaves etc.) of the plants. It takes place through stomata. It helps in upward movement of water. Also, it helps in releasing excess of water. It helps in temperature regulation.

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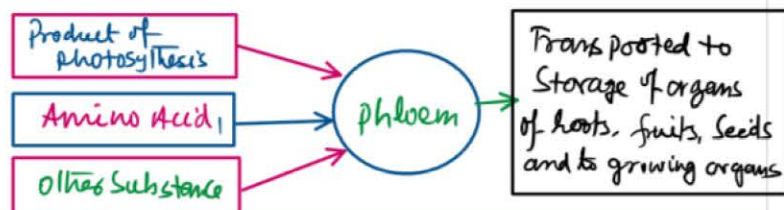
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Transport of Food and Other Substance

The transport of Soluble Product made during photosynthesis to other parts of plant is called translocation. It occurs through vascular tissue known as phloem. Apart from Soluble Product, phloem also transport amino acid and other Substance.

These substances are especially delivered to storage organ like root, fruit, seeds and to growing organs. The translocation of food and other substances takes place in the sieve tube with the help of companion cells both in upward and downward direction.

Transportation in xylem is only in upward direction by physical driving force but translocation of food material by phloem from leaves to other part of body including amino acid and other substances using energy in form of ATP. This increases osmotic pressure of the tissue causing water to move into it. This pressure moves the material in the phloem to tissues which has less pressure.



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Excretion:

Excretion is a biological process of organisms in which the waste material produced during metabolic process is removed.

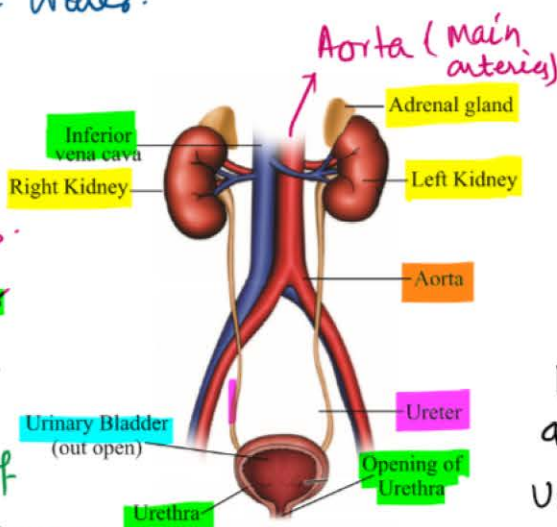
Unicellular organism: - They remove metabolic waste by diffusion through body surface as soon as it is produced. They diffuse their waste material through body surface in surrounding water.

There are two kidney in human beings. located either side in back of abdomen.

The phenomenon of discharge of urine is

Excretion.

In Multicellular Organisms, there are specialised organs for excretion of waste materials. eg.



The Nitrogenous waste material like urea, uric acid and Ammonical salt is removed from blood by each kidney and sent down to the urinary bladder through ureter.

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Organisms	Excretory organ
Planaria	Flame cells.
Earth worm.	Nephridia.
Cockroach	Malpighian tubules

Human beings

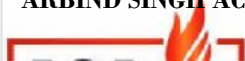
Kidney. (Main excretory organ)



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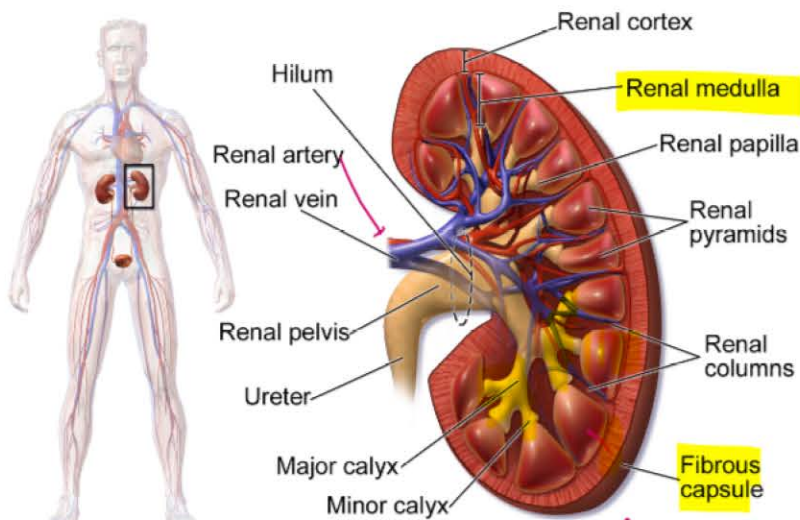




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Kidney Anatomy

Bowman's Capsule

It is a reddish brown bean shaped structure. Left kidney is little higher than right kidney.

Renal arteries carries clean blood to the kidney.

Renal veins carries out dirty blood from the kidney.

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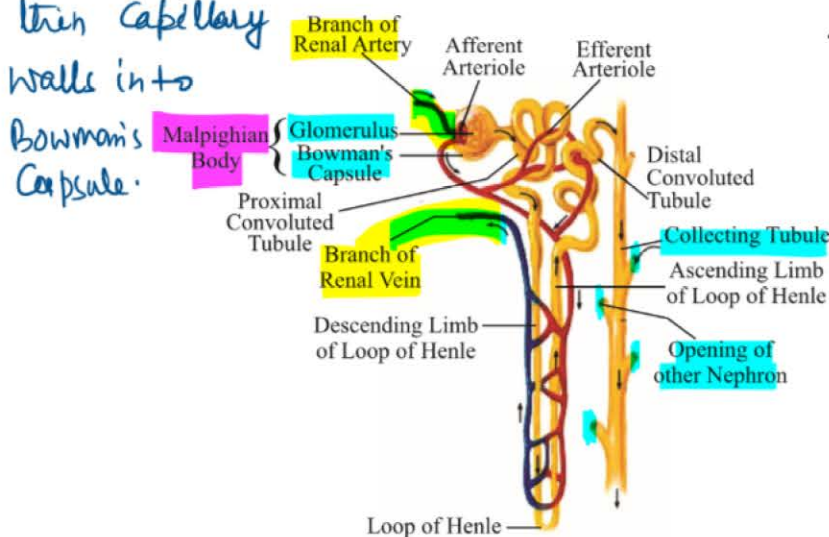
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Nephron: - It is a structural and functional unit of kidney. Blood at high pressure travel into tubules by blood capillaries called glomerulus surrounded by cup like capsule called Bowman's Capsule.

Formation of Urine: - Ultrafiltration occurs in glomerulus. forced many of the substance dissolved in blood through thin capillary walls into



Then blood passes through tubular part of nephron, where the important substance like amino acid, fats, glucose and major part of water is reabsorbed and the rest of them are flow through ureter.

Function of kidney:-

- (i) Removing excess water and nitrogenous wastes (like urea, uric acid, etc.) from blood as urine.
- (ii) Maintaining the constant concentration of blood plasma.
- (iii) Regulating pH of the blood.

pH of blood is between 7.35 to 7.45, normal 7.40.



Excretion in plants

Plants have metabolic waste during their life processes. These wastes are in different forms and excreted by different parts of the plants.

- (i) Gaseous waste: - Plants give off their gaseous waste oxygen and carbon dioxide through stomata and lenticels during respiration and photosynthesis.

Plants release oxygen in day time and carbon dioxide in night.

- (ii) Liquid waste products: - Plants get rid of excess of water in the respiration. While some species of plants exude water through stomata.

Some plants store their liquid waste in old xylem in form of resins and gums.

Rubber plant is an example, which excretes latex as waste product. Plants also excrete some useful oil.
e.g. clove oil.

- (iii) Solid waste product → Some plants store their waste product in cell vacuoles and release them in form of fall of leaves. Some plants leave their solid waste in soil.



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Some use full waste of plants

- Natural rubber obtained from rubber plants which is used as raw material for tyre industry.
- The Resins which we obtained as liquid waste by plants are used as varnishes, glazing agents etc.
- Gums obtained from plants are used as adhesives.
- Plants like oak store their excretory product as tannin in their trunk which is used in treatment of leather.
- Essential oil excreted by plants like Sandalwood oil, olive oil, eucalyptus oil etc are widely used in household purposes.

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