

## Ch-1 life Process

\* The process that are essential for life are called life process.

• life process that ~~are~~ makes living organism different from non living object like

a) The living organism move and grow

b) living organism are organised

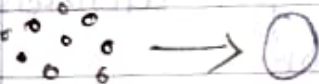
c)  $\text{Cell} \rightarrow \text{tissue} \rightarrow \text{organ} \rightarrow \text{organism system}$

d) living organism show metabolism

### Metabolism

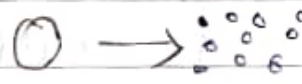
Anabolism

(constructive process)

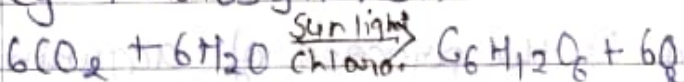


Catabolism

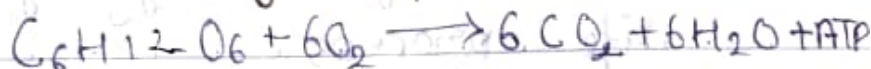
(destructive process)



eg:- Photosynthesis



eg:- Respiration



- \* living organism require food for growth and repair of body
- \* living organism respire
- \* living organism excrete metabolic waste
- \* Living organism need control and coordination
- \* living organism reproduce
- \* living organism show consciousness
- \* Living organism show healing wound

## Nutrition

The sum total of all the process starting from taking the food upto its availability to the body cells for utilization is called nutrition.

or

Nutrition is the process of acquiring nutrient from food and utilizing it to get energy for various life process.

Food A combination of various organic and inorganic substance in a definite proportion which is capable of providing matter and energy for various metabolic activities is called food of an organism

## Modes of Nutrition

↓  
Autotrophic

(Greek -> auto (self)  
trophic (nutrition))

↓  
Heterotrophic

(Greek - Hetero - other)  
trophic (nutrition)

\* Organism synthesize food from inorganic raw material

\* Organism obtain food synthesize by other organism

## Autotrophs

↓  
Phototrophs

\* Energy for food synthesis comes from sunlight

\* most plant, some algae and bacteria

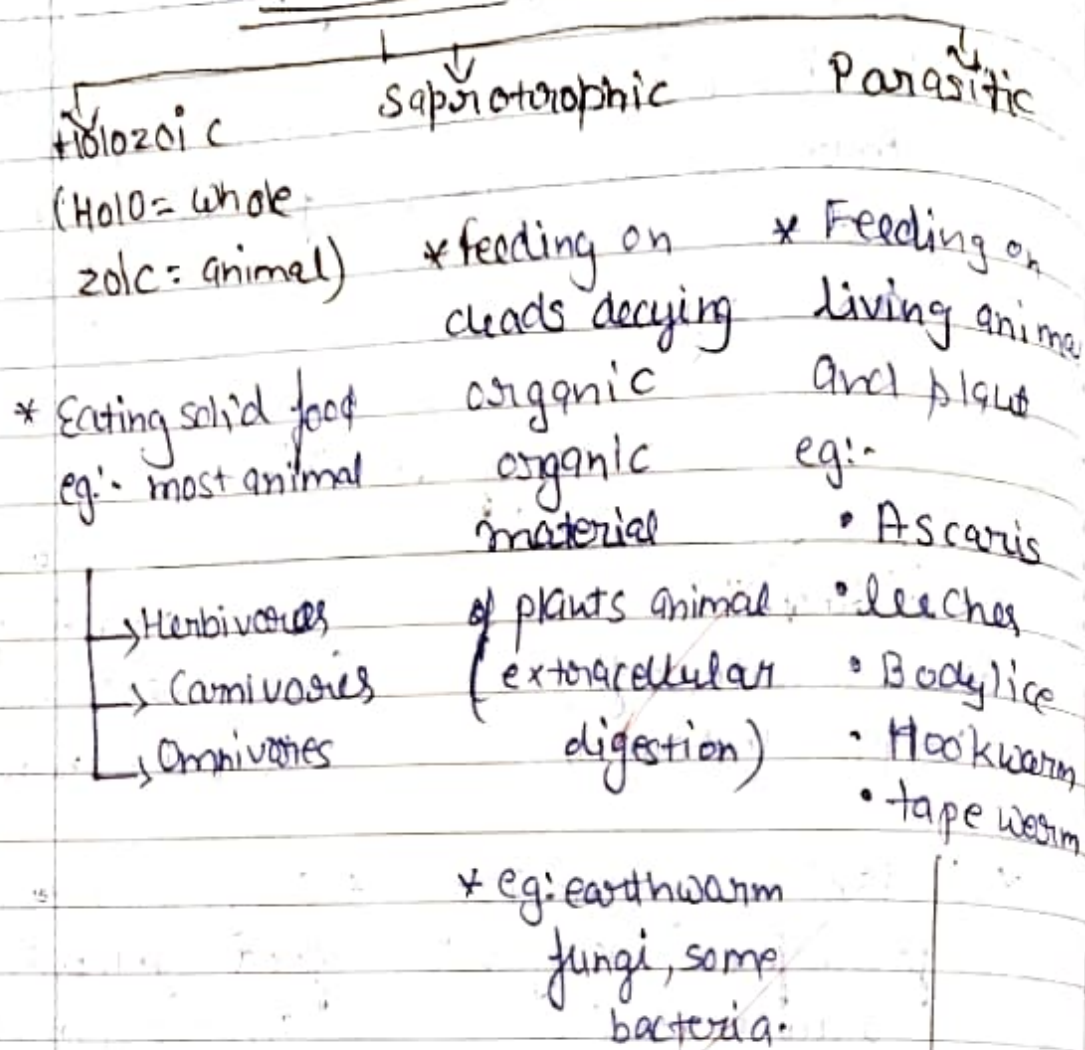
↓  
Chemoautotrophs

\* Energy for food synthesis come from special chemical process

\* Bacteria (hydrogen iron sulphur) and nitrifying bacteria



# Heterotrophic



Endoparasite  
(Inside body)

Ectoparasite  
(on the body)

Why do organism need food:-

All the organism need for

- \* Energy
- \* Repair / Replacement of wornout cells
- \* Growth
- \* Reproduction

- \* Formation of organism substances (Hormone)  
Enzyme
- \* Resistance against diseases

## Nutrients

Various component of food such as carbohydrate, protein, fat, vitamins, minerals that help the living organism, is carrying out their metabolic activities are called nutrients.

## Classification of Nutrients

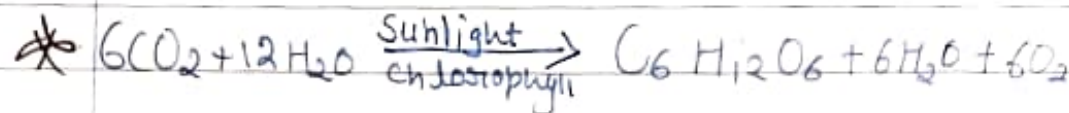
Made upon the function performed the various nutrients are categorized into three types:-

Food group according to function	Major nutrients	Food containing nutrients
⇒ Energy giving food	Carbohydrate	<ul style="list-style-type: none"> <li>• Cereals like rice &amp; wheat, starches like potato &amp; sugar</li> <li>• Oil &amp; ghee</li> </ul>

2) Body building food	Protein	<ul style="list-style-type: none"> <li>• Milk &amp; Egg white</li> <li>• Meat mutton, chicken, fish</li> <li>• pulses like, dal, gram, soyabean, etc.</li> </ul>
3) Protective food	Minerals and vitamins	<ul style="list-style-type: none"> <li>• Green leafy vegetable like palak, spinach, Cabbage &amp; dietary fibre such as brinjal, beans &amp; fruits</li> </ul>

## Modes of Nutrition in Plant

### : Photosynthesis



Incorporation of inorganic materials ( $\text{CO}_2$  and  $\text{H}_2\text{O}$ ) into organic materials (carbohydrate) in the presence of chlorophyll and solar energy by the green plant is called photosynthesis.

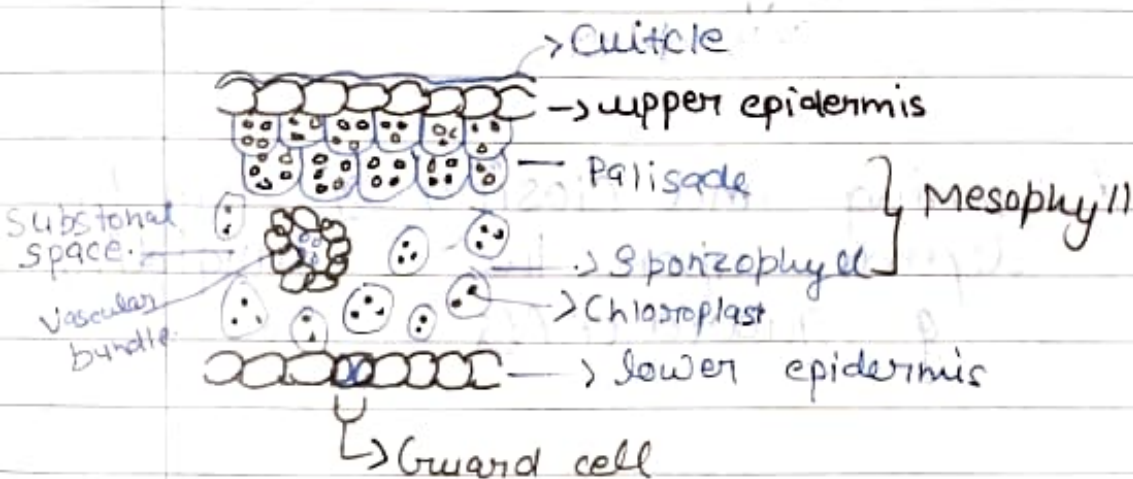


Oxygen is evolved and released in the atmosphere as a by product of photosynthesis

## Events occur during photosynthesis:

- \* Absorption of light energy by Chlorophyll
- \* Conversion of light energy to chemical energy
- \* Splitting of water molecule into hydrogen and oxygen
- \* Reduction of  $\text{CO}_2$  to carbohydrate

## Stomata

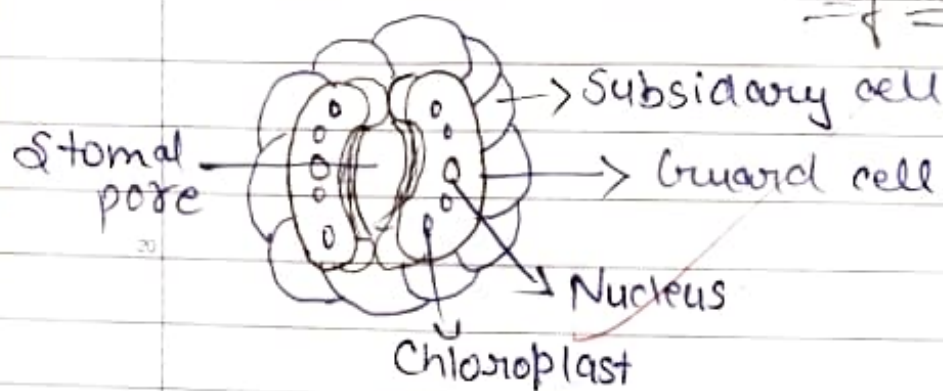


## • Stomata

\* A small pore surrounded by two bean shaped guard cells present on the surface of leaves is called stomata.

\* Stomata help in exchange of gases [ $\text{CO}_2$  and  $\text{O}_2$ ] and transpiration [the loss of water in the form of water vapour through aerial part of plant]

## • Mechanism of opening and closing of stomata



\* Opening and closing of stomata depends upon the turgidity of guard cells

\* When guard cells fill with water



it become turgid which caused opening of stomatal pores

\* When guard cell losses water it becomes flaccid (shrinked) which causing causes stomatal pores

• Essential raw material for photosynthesis

- 1)  $\text{CO}_2$  from Air
- 2)  $\text{H}_2\text{O}$  from Soil
- 3) Other material from soil N, P, K, Fe, Mg

• Condition necessary for Photosynthesis

1) Sunlight from Sun

2) Chlorophyll already present in leaves

Seen  
Sh

## Mechanism of photosynthesis

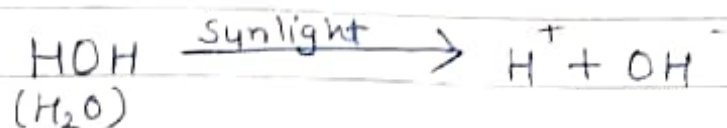
The process of photosynthesis is not a single step process rather it involves many steps. The various steps which are involved in photosynthesis are divided into two distinct but related phases. These are :-

- 1) Light reaction
- 2) Dark reaction

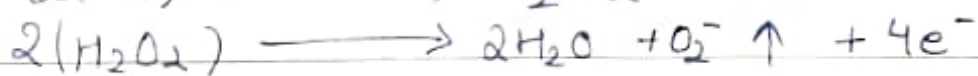
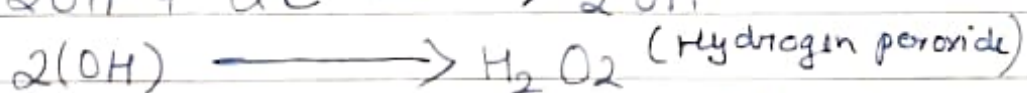
### \* Light reaction:- (Photochemical phase)

This process occurs in the grana of thylakoid of chloroplast in the presence of sunlight hence it is called light reaction.

- It mainly concerned with the formation of  $\text{NADPH}_2$  (Reducing power agent) and ATP (Adenosine Triphosphate)
- Oxygen is released as a by product
- Light reaction involves
  - 1) Photolysis of water

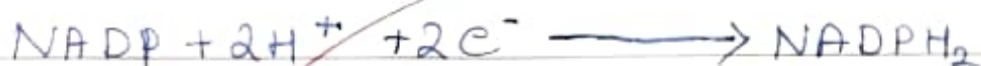


## 2) Production of Molecular O<sub>2</sub>

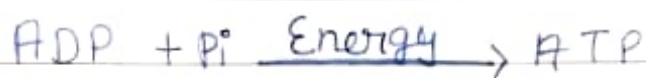


\* The whole oxygen released during photosynthesis come from water molecule. No molecule of O<sub>2</sub> is released from CO<sub>2</sub>

## 3) Production of reducing agent



## 4) Photophosphorylation



Note: P<sub>i</sub> = Inorganic phosphate

\* Dark reaction: (Bio-chemical phase)

It occurs in stroma part of



## Chloroplast.

- In dark reaction ( $\text{CO}_2$  is reduced to glucose by means of energy (ATP and Reducing power  $\text{NADPH}_2$ ) produced during light reaction)

\* To prove that sunlight is essential for photosynthesis

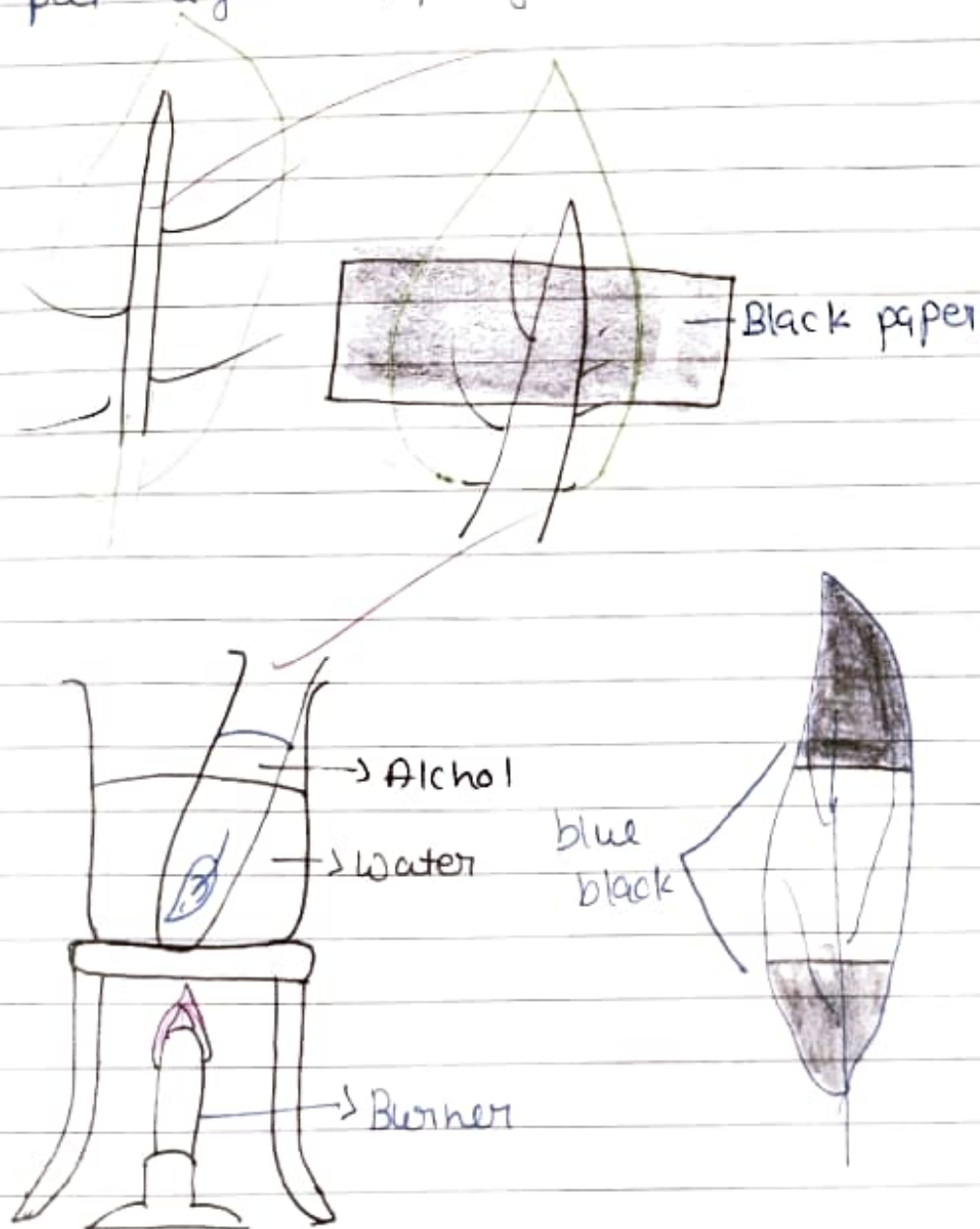
### Procedure:

- 1) Take a potted plant and keep in dark place for 2-3 days
- 2) Cover a part of one of its leaves with the black strip. cover both side of leaf
- 3) Now place the plant in sunlight for 3-4 hours
- 4) Pluck the selected covered leaf and remove black covering
- 5) Place this leaf in the beaker containing water and boil it for about 10 minutes.

6) Take out the leaf and now boil it in alcohol using the water bath for 10 minutes.

7) Take out the leaf and wash it under running water.

8) Place the leaf in the Petri dish and put a few drops of iodine solution.



Observation:-

The leaf turn black-blue except in the covered region. As this covered region did not receive light, photosynthesis did not occur. Hence no starch was formed there. The uncovered region received light and starch was formed there due to photosynthesis.

Result:

Light is essential for photosynthesis.

\* To prove that chlorophyll is essential for photosynthesis

Procedure:-

- 1) Destarch the plant: Place the plant in a dark room for 48 hours to ensure that all previously stored starch is used up.
- 2) Expose to sunlight: After destarching, place the plant in sunlight for 6-8 hours.
- 3) Mark Green Areas: Trace the green areas of a leaf on paper before starting the test.



- 4) Boil the leaf: pluck the leaf and boil it in water for a few minutes to soften it.
- 5) Decolorize the leaf: Immerse the boiled leaf in alcohol and heat it gently until it loses its green color.
- 6) Test of starch: Dip the decolorized leaf in iodine solution. The iodine reacts with starch turning it blue-black.

### Observation:

- The green areas (containing chlorophyll) turn blue-black, indicating the presence of starch.
- Non-green areas remain reddish-brown, showing no starch production.

### Conclusion:

The experiment demonstrates that chlorophyll is essential for photosynthesis.

\* To prove that  $\text{CO}_2$  is necessary for photosynthesis

Procedure:

1) Destarch the plant place the plant in a dark room for 48 hours to remove any starch from its leaves

2) Set Up the Experiment:

- Pour potassium hydroxide solution into the bottle.  $\text{KOH}$  absorbs  $\text{CO}_2$  from the air inside from its leaves. bottle

- Insert one leaf of the destarched plant into the bottle through the split cork, ensuring half of the leaf is inside the bottle and the other half is outside.

- Seal the bottle tightly with grease or wax to prevent  $\text{CO}_2$  from entering.

3) Expose to sunlight: place the plant in sunlight for 6-8 hours.

4) Test of Starch

- Boil the leaf in water to soften it

- Immerse the leaf in alcohol and heat gently to remove chlorophyll.
- Dip the decolorized leaf in iodine solution.

### Observation:

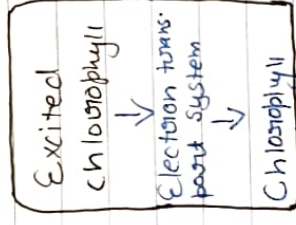
- The part of the leaf outside the bottle turns blue-black, indicating starch production due to photosynthesis.
- The part of the leaf inside the bottle remains reddish-brown, showing no starch production because  $\text{CO}_2$  was absent.

### Conclusion:-

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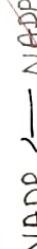
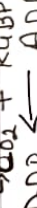
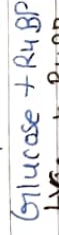


## Light reaction (Thylakoid)



## Dark reaction (stroma)

Starch  
↑



## \* Significance of photosynthesis:

- It synthesises food from inorganic substances. This food becomes the ultimate source of energy and life for all the living organisms.
- Hence it is very lightly said that "all flesh is grass" or all light is

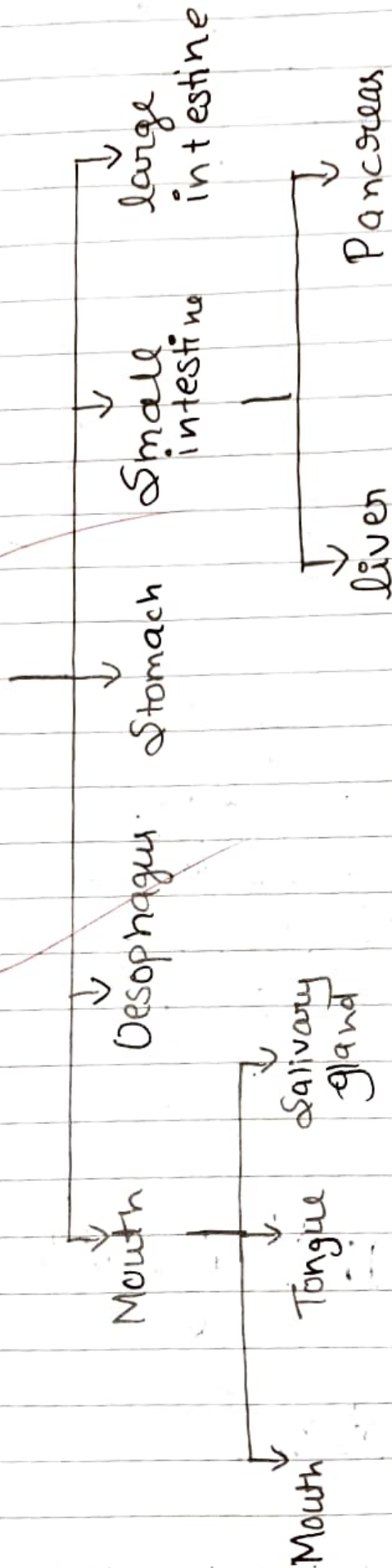
## bottled Sun Shine

- It is the only known method which releases oxygen in the atmosphere and keep the  $O_2$  concentration constant.
- It also help to keep the  $CO_2$  concentration in the atmosphere constant.
- All useful plant products such as rubber, timber, resins, drugs, oils, fibres etc. are derived from the process of photosynthesis.

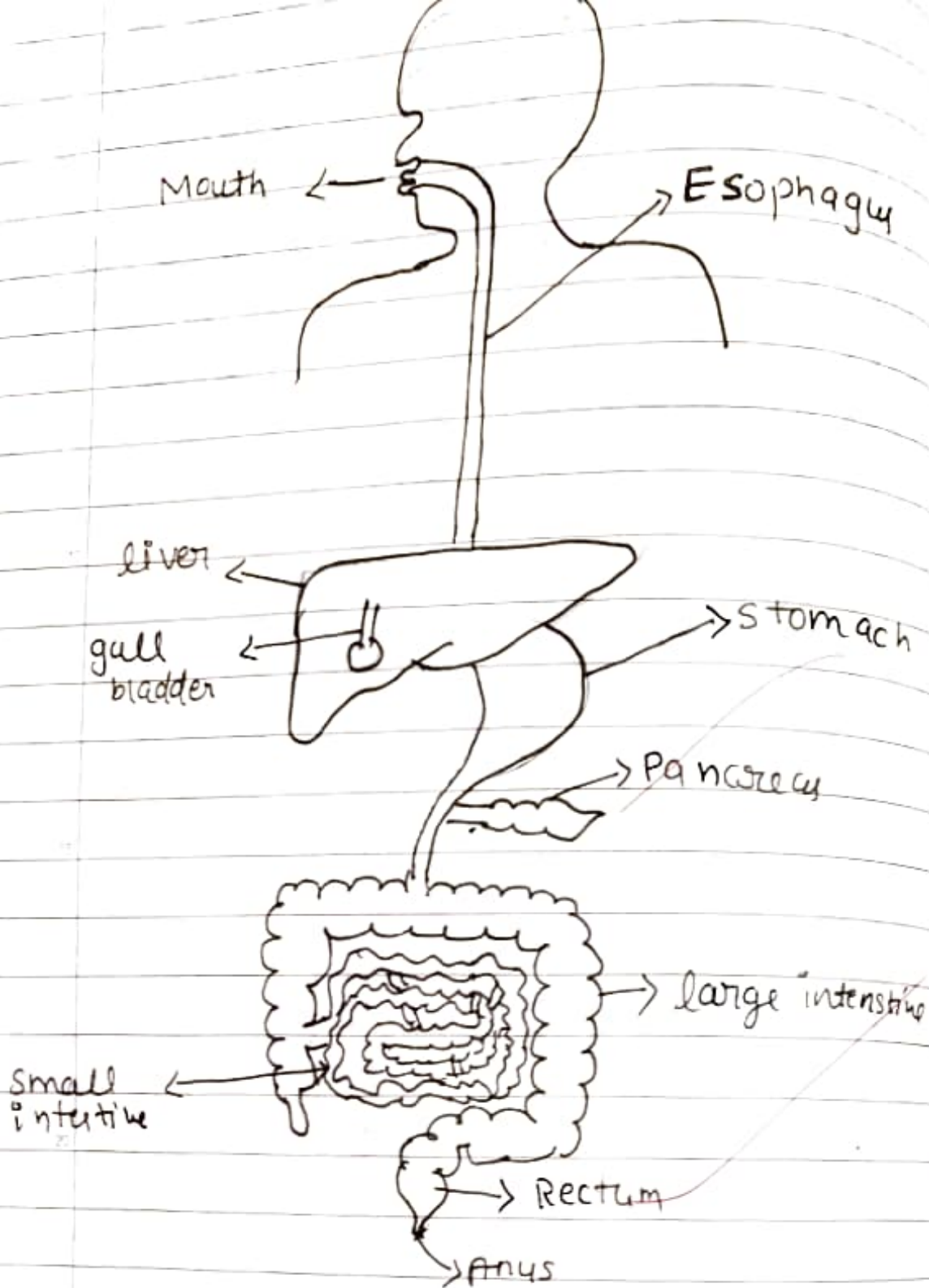
## Compensation Point

- \* At dawn (Early-morning) and dusk (Evening) when light is dim, the rate of photosynthesis is equal to that of respiration. This point is called compensation point.

# Parts of Human Digestive System







# Human Digestive System.

# Nutrition in Human being

Nutrition beings are heterotrophic omnivorous animals. They obtain their food from plant, animals and their product by holozoic mode of nutrition.

essential component of human diet are  
(i) water (ii) carbohydrate (iii) fats  
(iv) mineral (v) protein (vi) Vitamins

## Structure & function of main organs of Alimentary canal -

\* Alimentary canal: - is along tube with muscular walls, glandular epithelial lining and varying diameter. It extend from mouth to anus. When uncoiled, it measures nearly 9m long tube in which duct of several digestive glands open to secrete their respective digestive secretion. It composes

1) Mouth - It is uppermost opening of human digestive system which gives passage for ingestion of food. It is guarded by two soft movable lips which opens in buccal cavity.

21 Buccal cava or (oral) cavity - It is bounded above by palate below by throat and on side by jaws.

- In human, digestion begins in oral cavity where food is chewed.
- Saliva is secreted in large amount ( $1.5\text{ L/day}$ )
- \* Saliva contain digestive enzyme salivary amylase \* Ptyalin which split starch and glycogen into maltose.
- It also contain mucous which help soften of food into bolus.

Teeth are four types (Thecodont)  
↳ fit in socket of Jaw

- \* Incisors - Biting the food
- \* Canines - tearing and tearing the food
- \* Premolars - Crushing & grinding the food
- \* ~~Canines~~ Molars - Crushing & grinding the food
- \* A human adult has 32 permanent teeth.
- \* Diophodont → Haves two times  
↳ Temporary milky



3] Tongue - The floor of the mouth cavity is occupied by muscular, large mobile tongue. It is an organ of taste which has taste buds.

4] Pharynx - • The pharynx is about 12cm long funnel-shaped canal.

- It serves as a passage way for the food from buccal cavity to the oesophagus.

5] Oesophagus - • long tubular structure  
• carries food from pharynx to stomach

- not concentrated with digestion of food

- exhibit peristaltic movement

\* Peristaltic movement - Rhythmic contraction of muscles of the lining of the alimentary canal to push the food forward.

6] Stomach - It is C-shaped or J-shaped muscular sac, present in the left side of the abdomen. Partially digested food enters the stomach, now further digestion takes place in the stomach. It serves four main functions.



\* Storage of food - The food is stored in stomach for variable duration carbohydrate continue to get digested till the salivary enzyme ptyalin is destroyed by HCl.

\* Mechanical churning of food - wall of stomach undergoes periodic muscular contraction so that food is churned and mix thoroughly.

\* Partial digestion - It passes branched and tubular glands present on the inner surface of its wall. There are three types of gland which secrete HCl, pepsin, mucus.

- HCl -

- \* Kill bacteria

- \* makes medium acidic

- Mucus -

- \* Cover inner lining of stomach and protect it from HCl and pepsin

- Pepsin

- \* protein digesting enzyme.

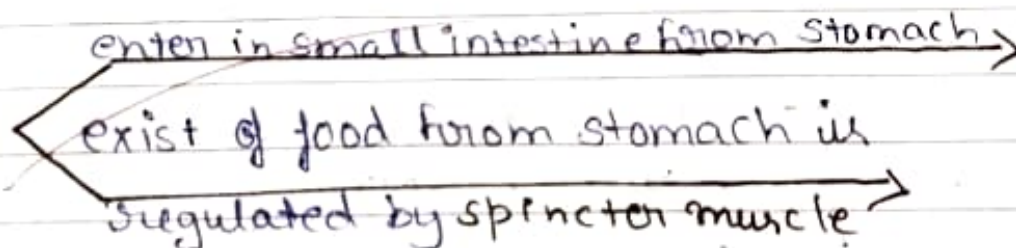
- \* It act in acidic medium

- \* Convert protein into peptides.

- \* It regulate flow of food (partially digested) into the small intestine.

## 7) Small Intestine

- longest part of alimentary canal
- narrow tube 6m long, coiled in the ~~abd~~ abdomen.
- longer in herbivorous, smaller in carnivores

\* food 

- food is acidic and has to made alkaline for further digestion.
- Small intestine receive bile & pancreatic - juice by bile pancreatic duct.

Bile: • Secreted by liver and stored in gall bladder

- bile contains bile pigment & bile salt
- bile salt emulsify the fat so that fat molecules breaks into small globules it facilitate the action of lipase

**Pancreatic Juice:-** • comes from pancreas which is elongated, yellowish gland beneath the stomach.

- pancreas secrete sodium bicarbonate to make medium alkaline.
- pancreas secrete three digestive enzyme.

- pancreatic amylase  
causes breakdown of starch
- pancreatic lipase  
causes breakdown of lipid (fat)
- trypsin  
causes digestion of protein.

- Small intestine also secrete intestinal juice (a mixture of several enzyme). The action of these enzyme causes conversion of protein into amino acid, carbohydrate into glucose and fat into fatty acid and glycerol.
- All these product are soluble in water and absorbed by walls of small intestine which contain blood capillaries.



- The walls of small intestine contain villi which enhances the capacity of absorption by walls of intestine.

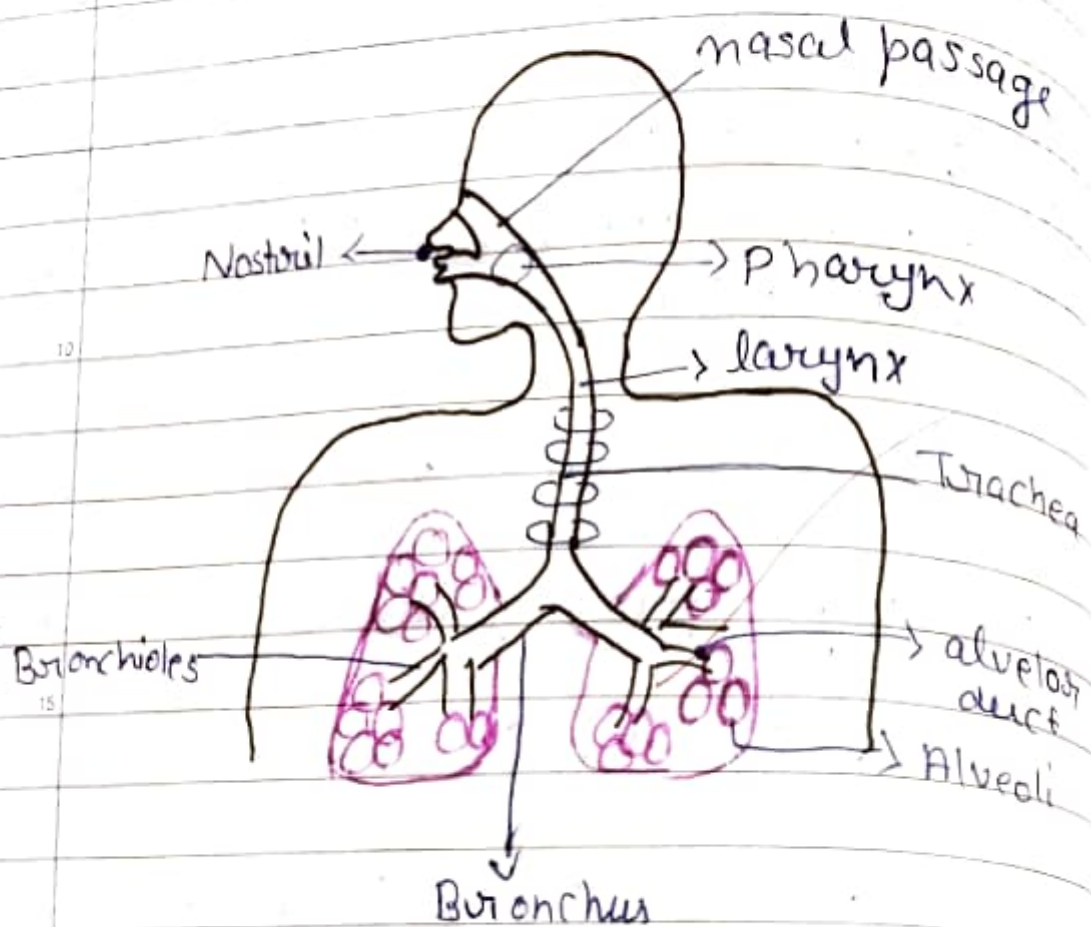
## 8] Large Intestine -

- The small intestine is followed by large intestine which is shorter but wider than small intestine.
- It lacks villi but secretes mucus.
- Larger part of it is called colon.
- Colon is followed by rectum.
- Rectal wall mainly absorbs water and also secretes mucus for lubrication.
- Undigested food is called in rectum called excreta (faeces) which is egested out through anal opening (anus).



# Respiratory system in Human being

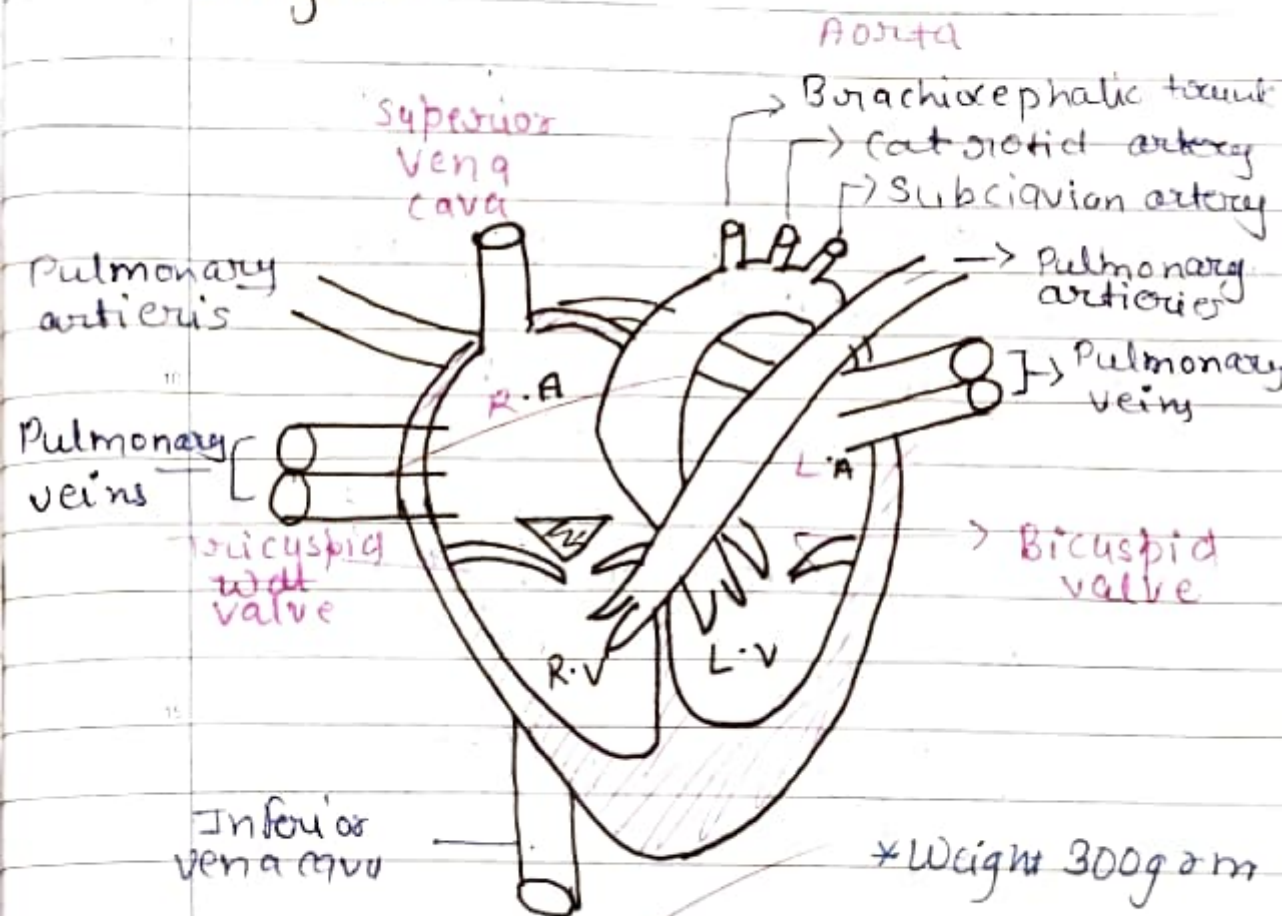
Diagram:



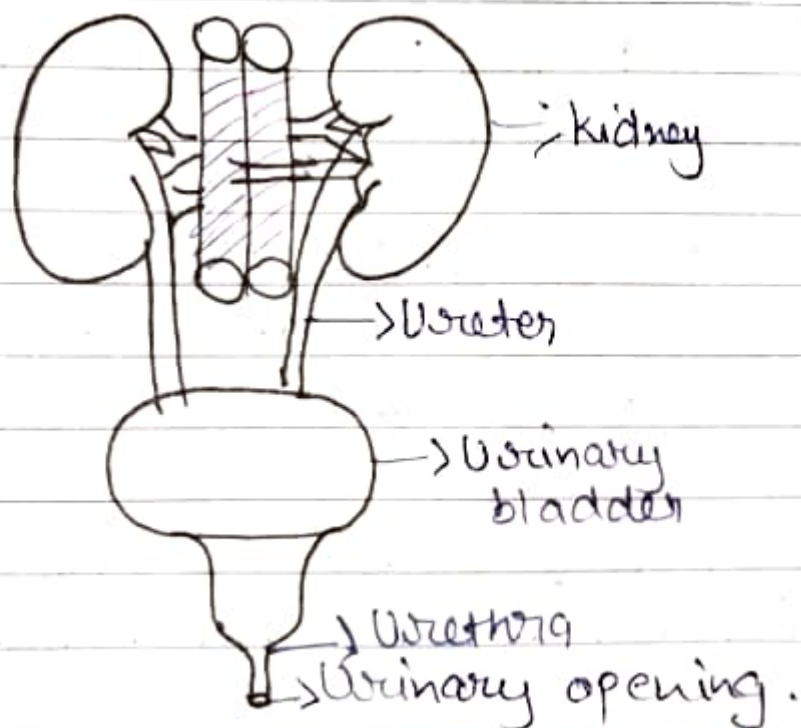
20  
Nose → Nasal passage → pharynx  
bronchioles ← bronchus ← trachea ← larynx  
└→ alveolar duct → alveoli → lungs

# Human Heart

Diagram:



## Human Excretory System: Diagram



**Respiration:-** Respiration is a complex process involving intake of oxygen from the atmosphere and release of  $\text{CO}_2$  and break down of simple food in order to release energy inside the cells.

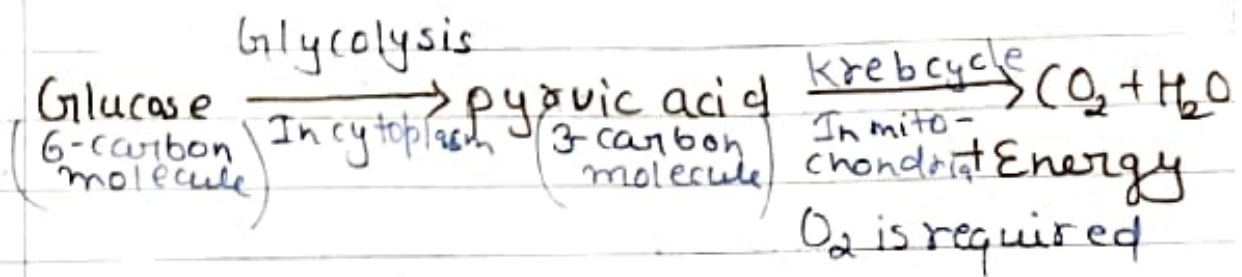
The two separate process may be termed

Breathing	Respiration
A kind of ventilation in which the organisms take oxygen from environment and release $\text{CO}_2$ .	A much more complex process that occurs inside the living cells. It is oxidation of respiratory substrate (glucose mainly) in cells resulting in release of $\text{CO}_2$ and energy in form of ATP.

### Types of cellular respiration

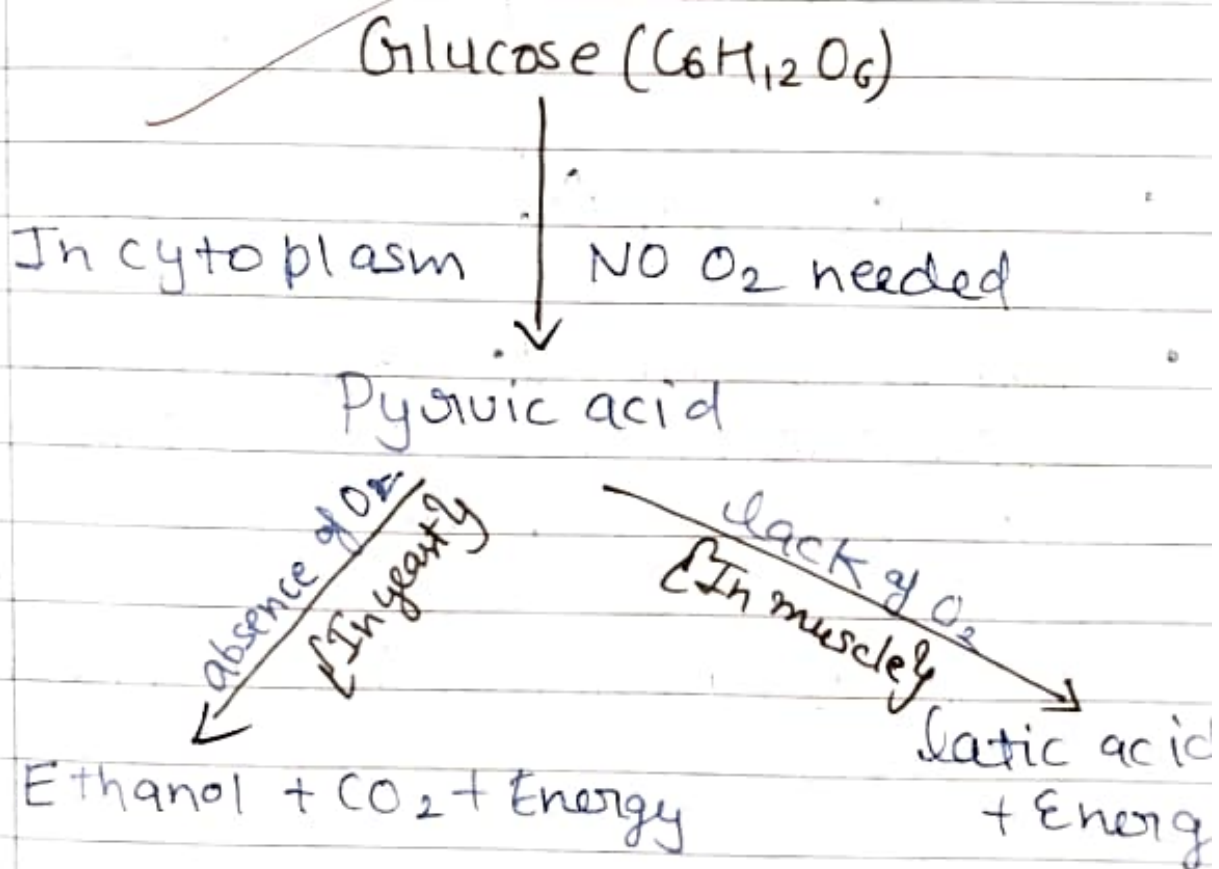
- (i) Aerobic Respiration - The oxidative breakdown of respiratory substrate (mainly glucose) with the help of atmospheric  $\text{O}_2$ .





\* In this process respiratory substrate (such as glucose) are completely broken down into  $\text{CO}_2$  and  $\text{H}_2\text{O}$  by the process of oxidation.

(ii) Anaerobic Respiration - Oxidation of respiratory substrate in absence of  $\text{O}_2$  is termed as anaerobic respiration.



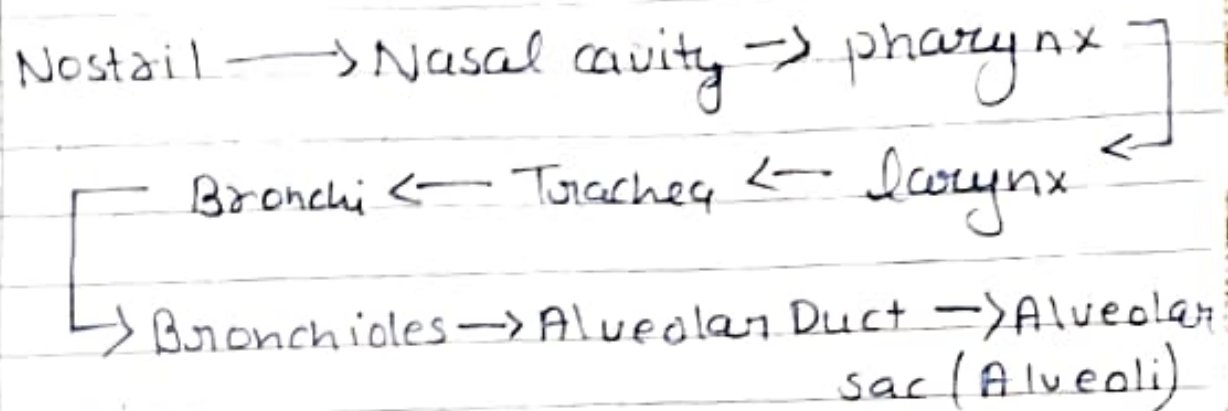


Fermentation - The anaerobic respiration carried out by microorganism (such as yeast) is called fermentation.

### Difference between-

Aerobic	Anaerobic
<ul style="list-style-type: none"><li>Occurs in presence of <math>O_2</math>, <math>O_2</math> utilized</li><li>Glucose completely oxidized</li><li>Form <math>CO_2 + H_2O + ATP</math></li><li>Energy release <math>\uparrow</math></li><li>takes place in mitochondria and cytoplasm</li></ul>	<ul style="list-style-type: none"><li>Occurs in absence of <math>O_2</math></li><li>Glucose incompletely oxidized.</li><li>Form ethanol + <math>CO_2</math> or lactic acid + Energy</li><li>Energy release <math>\downarrow</math></li><li>takes place in cytoplasm, mitochondria not involved</li></ul>

### Respiratory system in human being



1) Nostrils - The respiratory tract of human respiratory system begins from a pair of nostrils situated at lower end of nose. The air enters through nostrils and reaches the Nasal cavity.

2) Nasal cavity - • Nasal cavity are separated from buccal cavity by a bony palate.

- Nasal cavity are separated by Nasal septum.
- It is lined with ciliated epithelial cells so that inspired air get warmed, moistened and become dust free.
- Dust particles are entrapped by mucus cells that secrete mucus.

3) Pharynx - • Nasal cavity opens in the pharynx a portion of which is common passage for food and air.

- Pharynx continues into glottis. During swallowing, glottis gets covered by thin elastic cartilaginous flap called epiglottis to prevent entry of food into the larynx.

4) Larynx - • also called voice box  
• has several folds of elastic connective tissue called vocal cords.

- When air passes through larynx, these cords vibrate and produce sound.

• Adam's Apple is prominent cartilage of larynx.

5) Trachea - • straight tube called windpipe  
• held open with C-shaped cartilaginous rings.

- Cartilaginous ring prevents larynx and trachea from collapsing even when no air in them.



## 6) Bronchi and Bronchioles:-

- Trachea divides into two branches called bronchi
- Bronchus undergoes repeated division from bronchioles
- Bronchioles ending up very thin terminal called alveolar duct

## 7) Alveolar Duct and Alveoli (Alveolar sac)

- Each alveolar duct open into an alveolar sac
- Alveolar sac are also called alveoli
- Alveoli have very thin wall composed of non-ciliated epithelial cell.
- Alveoli is surrounded by blood capillaries

## Lungs -

- lie in thoracic cavity
- spongy and elastic org
- broad at the bottom & taper at top.
- Separated by abdominal cavity by diaphragm.
- consist of bronchioles, alveolar duct and alveoli



- enclosed by two membrane called inner and outer pleural membrane
- capable of expanding and contracting
- \* membrane encloses a space called pleural cavity that contain pleural fluid

## Mechanism of Breathing-

- \* The process of breathing is involuntary but its rate is under the control of respiratory centre of brain.

### 1) Inspiration (Inhalation)

Ribs pulled out

+

Diaphragm contract and moves downward

expand chest cavity

create low air pressure in chest cavity

Air rush into the lungs

### 2) Expiration (exhalation)

Ribs on their outer side relax

+

Diaphragm move upward and relax

decrease chest cavity

Increase air pressure in lungs

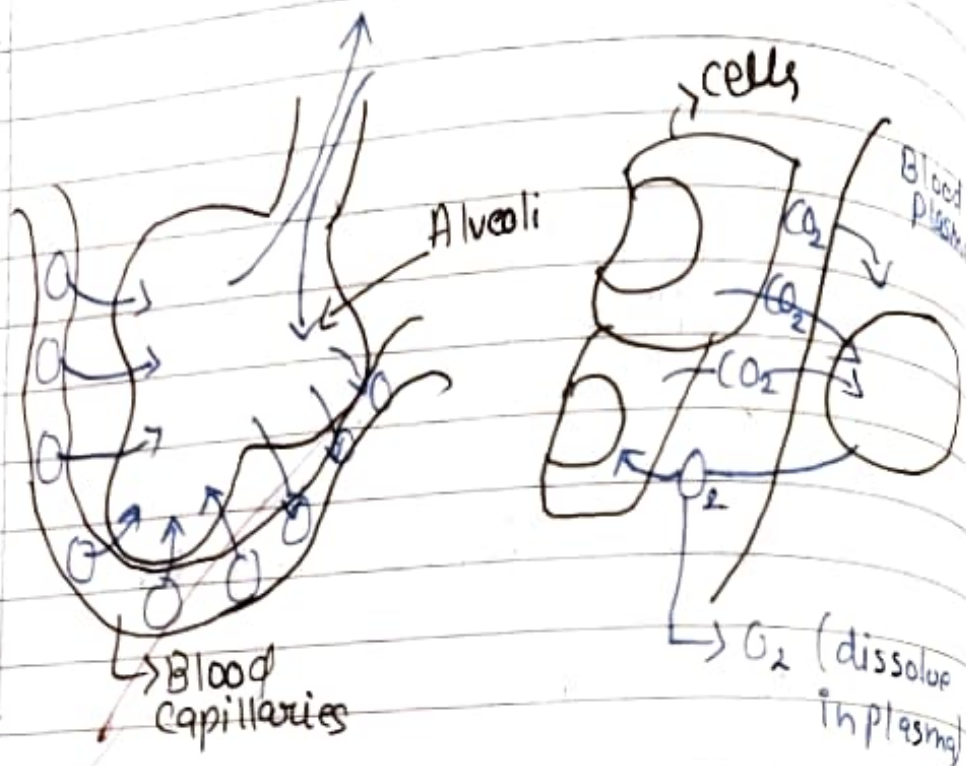
- Air in the lungs pushed out and it passes through nose.

### \* Exchange of $O_2$ and $CO_2$ across Alveolar membrane

- First step of respiration involves exchange of gases b/w alveoli and blood capillaries.
- $O_2$  and  $CO_2$  are exchanged in these sites by simple diffusion.
- Haemoglobin present in blood combines with  $O_2$  to form oxyhaemoglobin and remaining 3%  $O_2$  is carried in dissolved state through plasma.  
$$Hb + O_2 \longrightarrow HbO_2$$

(oxyhaemoglobin)
- The oxygenated blood returns to lungs by pulmonary veins to left side of heart supply oxygenated blood to the body tissue.
- Concentration of  $O_2$  is more in blood cells and less in tissue cells. So,  $O_2$  moves from blood to tissue by diffusion.

Similarly,  $\text{CO}_2$  is more in tissue and less in blood. So,  $\text{CO}_2$  move from tissue to blood by diffusion.



## Circulation / Transportation -

The process of transporting absorbed food, waste product & water and hormones from one place to another in body is called circulation.

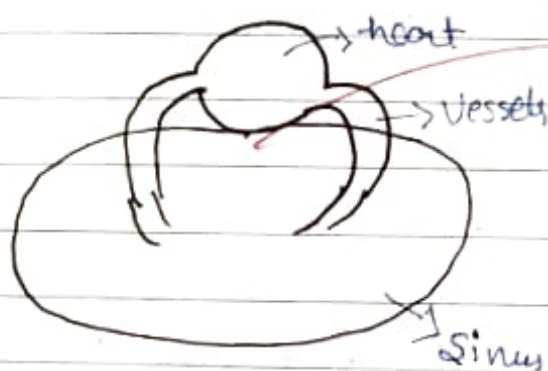
There are two types of circulation found in animals.

1) **Open circulatory system** - In this type of circulatory system the main blood vessels arising from heart and it

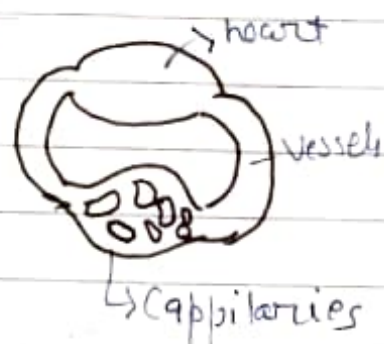


pour the blood into tissue spaces (sinus)  
eg- ~~Arthropoda~~ Arthropoda (cockroach)

3) Closed Circulatory System - In this type of circulatory system the blood remains only in blood vessels and carried to various organ through vessels and capillaries eg- human, Annelida (earthworm)



Open circulatory



Closed circulatory.

~~Transportation~~ in human being —

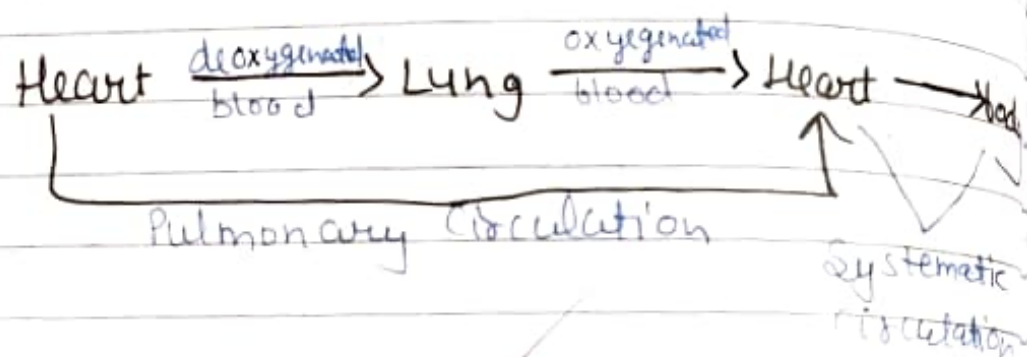
In human being there are two circulatory system through which material can transport to organ and tissue.

- (i) Blood ~~vascular~~ Vascular system
- (ii) Lymphatic system.

## \* Types of closed circulatory system -

(i) Single circulatory system - In this type of circulation, blood goes only one through the heart during one cycle of passage through the body. eg - Fish, amphibians, reptiles.

(ii) Double Circulatory system - In this type of circulation, blood passes through the heart twice for each circuit of body.



## (i) Blood Vascular System

Blood - Blood is connective tissue. It has two components (i) plasma (ii) corpuscle

(i) Plasma - \* It comprises 55% of blood  
\* It has 90-92% water and remaining 8-10% are other material

- \* It is faint yellow, viscous fluid
- \* contain some soluble protein, inorganic salt, food material, waste product

Serum = Plasma — Clotting factor

If we remove clotting factor from blood plasma, then blood will not clot

(ii) Blood corpuscles - They form 45% of blood

- Erythrocytes or Red blood corpuscles
- Leucocytes or white blood corpuscles
- Thrombocytes or platelets

Character	RBCs	WBCs	Platelets
Shape	Biconcave, Circular	Rounder, Irreg.	Oval
Size	7-8, smaller WBC	12-2	2-5, small
Colour	Red due to haemoglobin	Colourless	Colourless
Structure	At maturation they lost all cells organelle	They contain all cell organelle	Non-nucleated
Function	Transport $O_2$ is most abundant	Act as the soldiers	Help in clotting



### Notes:-

- Life span of RBC - 120 days
- Life span of WBC & platelets - 12 to 13 days
- Formation of RBC - Bone marrow
- Area of death of RBC - spleen

**Blood vessels** - The blood vessels are elastic muscular tubes which carry blood.

There are three kind of blood vessels in human body.

- (i) **Arteries** -
- It has thick, elastic, muscular wall
  - It has narrow lumen
  - Flow of blood is fast & jerky
  - It carries blood away from the heart to body.
  - It carries oxygenated blood (except pulmonary artery)



- (ii) **Veins** -
- It has thin, non elastic wall
  - It has wide lumen
  - Flow of blood is slow & smooth
  - It carries deoxygenated blood (except pulmonary vein)
- The veins have valves that allow the blood to flow only towards the heart.

and prevent backflow.

(iii) **Capillaries** - Capillaries are thin walled and extremely narrow blood vessels which occur at the terminals of artery & vein. They join artery & vein together.

- The join artery & vein together.
- The walls of capillaries are permeable to water and dissolve substance so that exchange of materials between blood & body cells take place.
- The blood in it flows slowly.

### Function of blood-

- (i) Blood carries hormones from the endocrine glands to target organs.
- (ii) Blood carries soluble excretory material such as urea, to organ of excretion.
- (iii) Circulation of blood is responsible for transportation of soluble digested food from small intestine to various parts of body.

(iv) It helps to clotting of blood which prevents excessive blood loss.

(v) The WBC of blood kills bacteria & other germs.

(vi) It carries  $\text{CO}_2$  produced by tissue to lungs for breathing out.

(vii) It helps to maintain a constant body temperature.

## Human heart

\* Hollow, muscular organ form of cardiac muscle

\* Weight about 300g in male and 250 in female

\* It contracts and relaxes regularly & continuously pumps blood to various parts of body.

\* Heart is enclosed by two membranes called pericardial membrane

\* Narrow space between pericardium called pericardial cavity in which pericardial fluid is present.

\* pericardial fluid reduces the friction between heart wall and surrounding



tissue when heart is beating

- \* Pulmonary artery - carry deoxygenated blood from heart to lung
- \* Pulmonary veins - carry oxygenated blood from lung to heart.

\* The human heart is divisible into four chambers:-

→ the upper two chambers are auricles (atria) while the lower two chambers are called ventricles.

### (a) Right Auricle (Atrium)

⇒ The right auricle has opening of superior vena cava, inferior vena cava and coronary sinus

⇒ Deoxygenated blood from veins of neck, head, and upper limbs enters the right auricle by superior vena cava and from rest of the body and lower limbs by inferior vena cava

⇒ The coronary sinus which drain deoxygenated blood from heart muscle

## (b) Right ventricle-

⇒ Blood leaves the right ventricle through the pulmonary artery. It is guarded by semi lunar valve.

⇒ Right & left pulmonary arteries enters into lungs.

## (c) Left Atricle (Atrium):-

⇒ Blood vessels the left ventricle by large main artery of the blood called aorta.

⇒ The opening from the left ventricle into aorta is guarded by aortic semi lunar valve.

⇒ A pair of coronary arteries also present which supply blood to heart muscles.

⇒ The blood is brought back to heart by coronary veins which join to form coronary sinus.

## Blood Pressure :-

Blood exerts a force against the wall of vessels. This force is called blood pressure.

- Normal systolic pressure - 120 mm Hg
- Normal Diastolic pressure - 80 mm Hg

Note:- Ventricular Systole and Diastole takes place simultaneously.

Note:- Atrial systole and diastole takes place simultaneously.

## Lymphatic System

It consists of following -

- (i) Lymph
- (ii) Lymph Capillaries
- (iii) Lymph vessels
- (iv) Lymph nodes or lymph glands

- (i) Lymph -
  - light yellow, coloured, fluid connective tissue,
  - Lymph drains into lymphatic capillaries from intercellular spaces
  - Lym



• Lymph consist of two parts

Plasma

- fluid matrix similar to blood plasma
- consist of protein molecule, digested food, fat, germs and fragment of dead cells

Lymphocytes

It is special type of WBC which fight against infection

\* The lymph is also called extracellular fluid because it bathes the cells and lies outside the cells.

(ii) & (iii) Lymph ~~cap~~ capillaries & Lymph vessels

- Lymph capillaries are meshwork of thin walled highly permeable tubes which join to form larger lymphatic vessels. They finally join with venous system, usually near the heart. Lymph vessels have non return valves.

(iv) Lymph nodes (or glands) -

\* These are situated at intervals through lymphatic system.

- \* Lymphocyte accumulate in the lymph node where they produce antibodies.
- They remove bacteria & other foreign particles from lymph

### Function of lymph -

- 1) It supplies nutrition and oxygen to those parts where blood cannot reach
- 2) It carries digested fat
- 3) It drains away excess tissue fluid
- 4) Lymph returns proteins to the blood from the tissue spaces.
- 5) Removes bacteria from tissue.

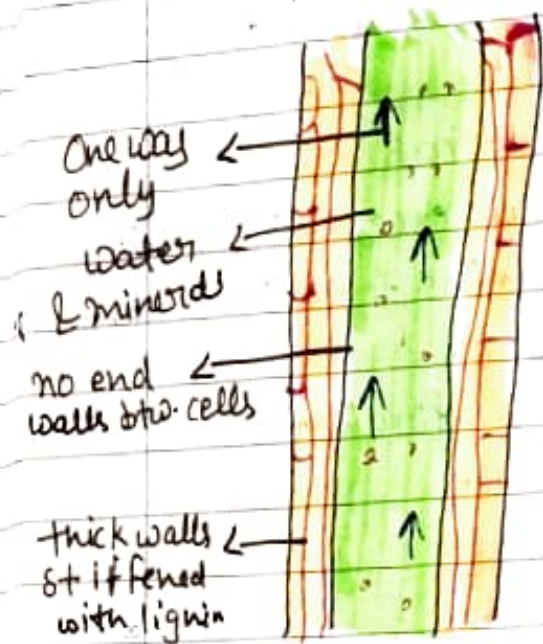
### Transportation in Plant

- \* Soil is the natural and richest source of raw material for plants
- \* Raw materials like nitrogen, phosphorus and other minerals are absorbed by plants from soil by roots.
- \* Plants absorb water and mineral from soil by roots and transport to the leaves

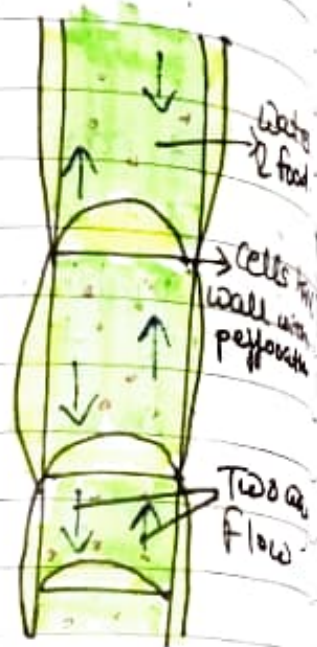
\* Two types of vascular tissue are xylem and phloem

\* Xylem transport water and mineral obtained from the soil.

\* Phloem transport product of photosynthesis from the leaves to other parts of the plants



Xylem vessel



phloem vessels

\* Vessels, tracheids of the roots, stems and leaves and leaves are connected to form a continuous system in xylem cells to transport water to all the parts of the plants



## \* Importance of Transpiration

- Regulates temperature
- Helps in absorption of water and upward movement of water and mineral.

\* When stomata are open during the day, large amount of water is lost and thus upward movement of water also becomes more

\* The transport of soluble products of photosynthesis is called translocation

\* Materials like sucrose move to phloem using energy, increasing the osmotic pressure of the tissue causing water to move and material in the phloem to tissue causing ~~water~~ according to the plant's needs.

## Excretion

\* Excretion is a biological process by which an organism gets rid of nitrogenous waste products from the body.

## Excretion In PLANTS

### \* Waste Product of a Plant!

→ Oxygen can be looked upon as a waste product of photosynthesis and carbon dioxide a waste product of respiration whereas water is a waste product of both.

### \* How is Water lost?

- Water will be lost through transpiration.
- Oxygen is a waste product of photosynthesis.
- Carbon dioxide is a waste product of respiration.
- Water is a waste product of transpiration.

### 20 Other products of excretion?

\* Gums, resins, rubber, latex are also removed from various parts of the plant body.

### → ~~Org~~ Organ of Excretion in Human

- |                   |           |
|-------------------|-----------|
| * Skin            | * Lungs   |
| * Liver           | * Kidneys |
| * Large intestine |           |

## \* Excretory system in human beings

- Human excretory system consists of a pair of kidneys, a pair of ureters, a urinary bladder, and a urethra forms the human excretory system.
- kidneys are present on either side of the backbone in the abdomen.
- Kidney produce urine and urine from kidney passes through the ureters into the urinary bladder and remains stored there until it is released through the urethra.

## NEPHRON

- \* Each structural and functional unit of kidney is known as Nephron

## Ultrafiltration

- \* Ultrafiltration begins with nephron in the kidney
- Blood travels through a coiled structure of capillaries called the glomerulus surrounded by the Bowman capsule.



## Selection Reabsorption

The absorption takes places selectively allowing substances useful to be reabsorbed excluding those not needed by the body.

~~Substance like glucose, amino acid,  $\text{Na}^+$ , etc. in the filtrate are reabsorbed actively~~

(X)

Checked

5/12/20