LIFE PROCESSES

Life processes :- The Basic and essential activities performed by a living organism to sustain and maintain life.

Nutrition :- process of obtaining and utilisation of food.

Respiration :- process of breaking down of food to produces energy.

Transportation :- process of transporting useful and non-useful substances from part to another part of the organism.

Excretion :- The process of removal of waste materials produced in the cells of the body.

Autotrophic Nutrition :-

- Organism prepare their own food.

photo Autotrophic :- prepare their own food with the help of light energy.
Ex - Green plants , Cyanobacteria

chemoautotrophic :- prepare their own food with the help of chemical energy.

Heterotrophic Nutrition :-

- organism dependent on others for food.

Holozoic nutrition :- whole food is ingested. food is digested inside the animal body.

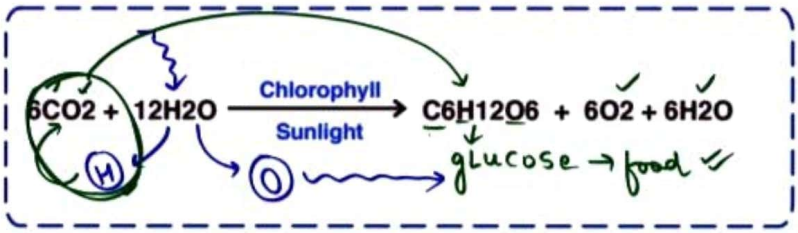
saprotrophic nutrition :-
organisms feed on dead and decaying matter. food digested outside the Body.

parasitic nutrition :-
Derive nutrition from other living organism.

Nutrition in plants :-

Mechanism of photosynthesis :-

1. Absorption of light energy by chlorophyll.
2. conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.
3. Reduction of carbon dioxide to carbohydrates.



Photosynthesis :-

Required :-
1. CO_2 (atmosphere)
2. Water (soil via roots)
3. light energy (sunlight)
4. chlorophyll (inside chloroplast)

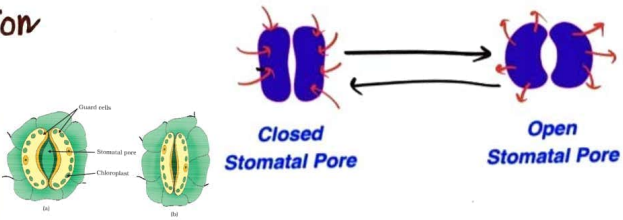
Product :-
1. oxygen
2. water
3. food - Glucose (carbohydrates)

stored as:
- In plants - starch
- In animals - Glycogen

stomata :-
stomata are tiny pores like structure present on surface of leaves.

Role of stomata
- Exchange of gases
- Transpiration

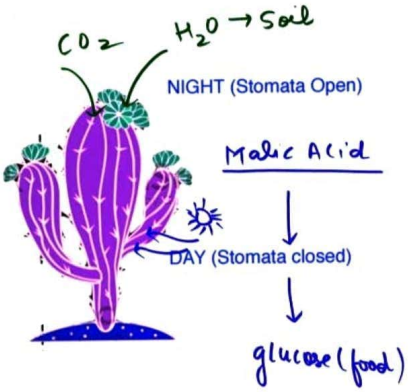
Opening and closing of stomata



Photosynthesis in Desert plant :-

NIGHT (stomata open) :
(i) CO_2 enters
(ii) water absorbed by roots
(iii) formation of intermediate (Malic acid)

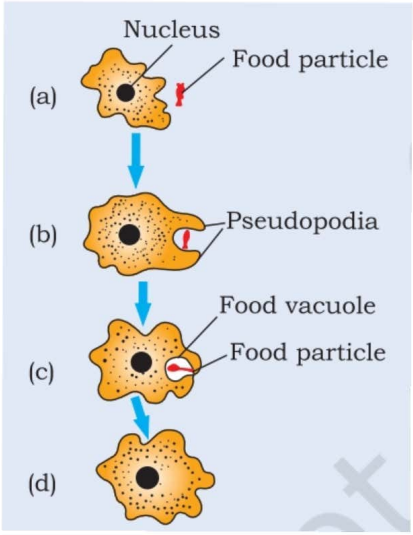
DAY (stomata closed) :
(i) Absorption of light energy.
(ii) conversion of malic acid into glucose (final product).



Nutrition in Amoeba :-

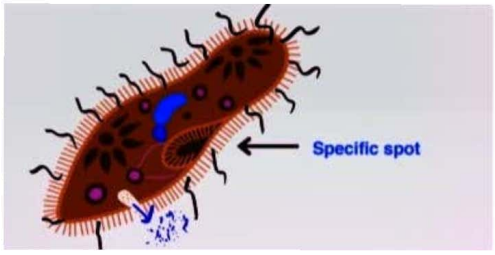
Amoeba → Pseudopodia
↓
capture food
↓
Take in [food Vacuole]
↓
Digestion of food in Food in food vacuole
↓
Undigested food
↓
move to surface of cell and is thrown out

Diffusion (of simply substances in cytoplasm) ←

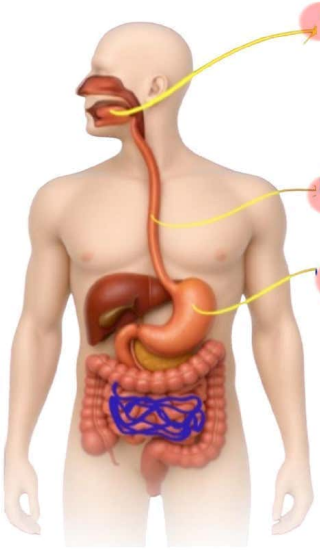


Nutrition in paramecium:-

- fixed shape and contain many hair like structure cilia on its surface.
- cillia push food material to oral groove.
- food get digested in food vacuole and absorbed into cytoplasm.
- Undigested and unabsorbed food is removed via anal pore.



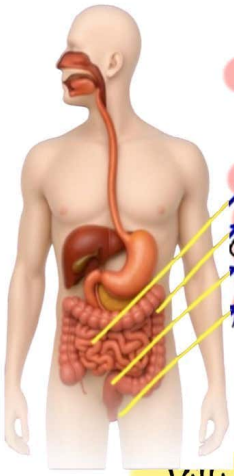
HUMAN DIGESTIVE SYSTEM:-



Mouth → Teeth → Mechanical digestion (chewing) ✓
Mouth → Tongue → Tasting food ✓
Mouth → Salivary gland → Saliva → Salivary amylase (Ptyalin)
Starch → Maltose

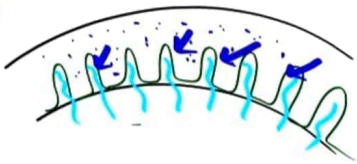
Esophagus → Peristaltic movement

Stomach → Gastric gland → Gastric juice
- Pepsin (Protein digestion)
- Hydrochloric acid (acidic pH)
- Mucus (Protect inner lining of stomach)



Small intestine → Liver → Bile juice (Emulsification of fats & alkaline food)
Small intestine → Pancreas → Pancreatic juice
- Pancreatic Amylase (Carbohydrate digestion)
- Trypsin (Protein digestion)
- Lipase (Digestion of emulsified fats)

Small intestine → Intestinal juice (Final digestion of food)
Small intestine → Villi → Absorption of food
Large intestine → Absorption of water
Rectum
Anus → Egestion



Villi

- finger like projection
- large surface area
- Rich supply of Blood Vessels.

Final digestion of food

- carbohydrates → glucose
- Proteins → Amino Acids
- Fats → Glycerol + fatty acid

RESPIRATION :-

BREATHING

- Process of inhaling and exhaling the air in and out of the lungs.
- it takes place in lungs.
- it is a physical process
- Energy is not produced

RESPIRATION

- process of breaking down of glucose to produce energy. (ATP)
- it takes place in all cells
- it is a chemical process.
- Energy is produced in the form of ATP

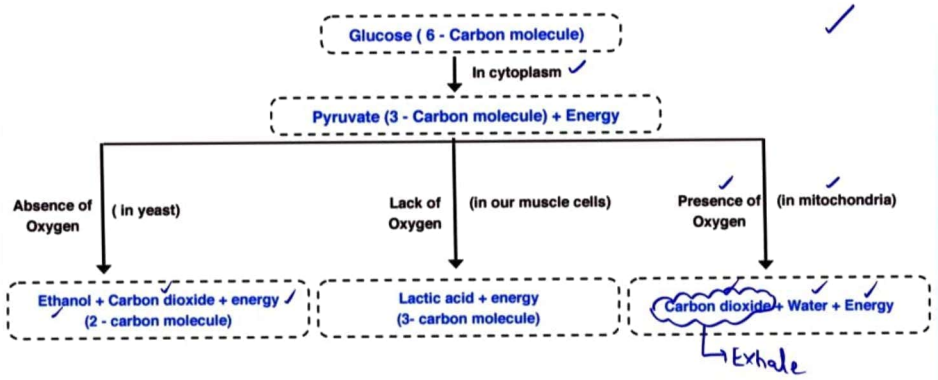
Aerobic Respiration

- O_2 required
- it occurs in cytoplasm and mitochondria.
- complete breakdown of glucose takes place.
- More energy is produced
- End products are CO_2 & H_2O

Anaerobic Respiration

- O_2 not required.
- it occurs in cytoplasm only.
- incomplete breakdown of glucose takes place (less energy).
- less energy is produced.
- End products are CO_2 and ethanol or lactic acid.

Respiration and its types :-



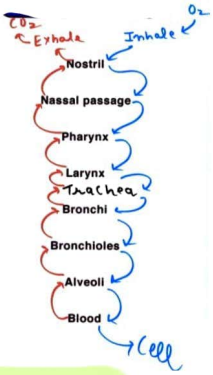
Inhalation / Inspiration

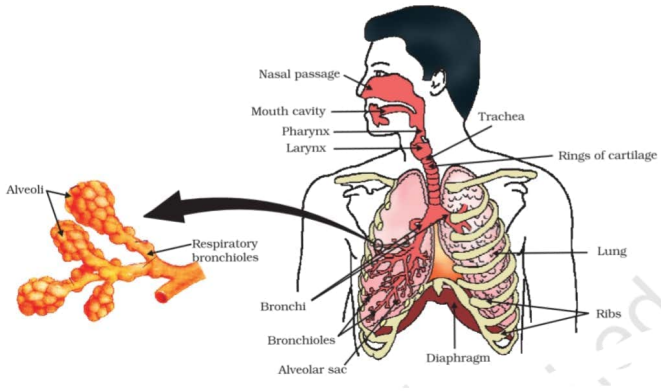
- The muscles of the diaphragm contract.
- The diaphragm goes downward and becomes flat.
- Air enters the lungs through the nose

Exhalation / Expiration

- The muscles of the diaphragm relax
- The diaphragm goes upward and becomes dome shaped.
- Air goes out the lungs through the nose.

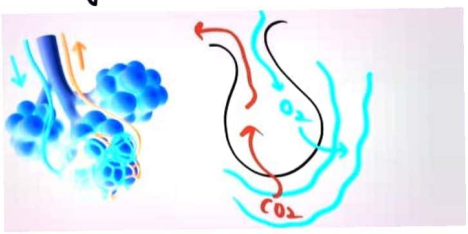
Air passage during Breathing





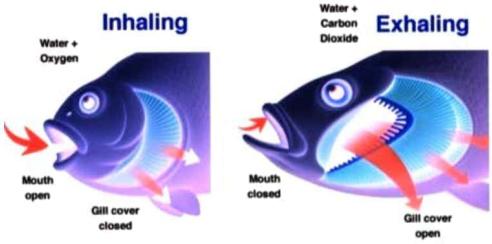
Alveoli :-

- site of exchange of gases.
- Ballon like expands when air enters ; large surface area.
- Thin walled and moist surface.
- Richly supplied with network of blood Vessels.

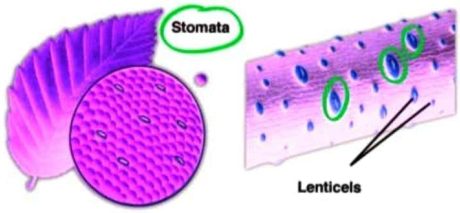


O_2 transport - Haemoglobin in RBC
CO_2 transport - Dissolved from through plasma.

Breathing in Aquatic Organisms :-



- Breathe through gills
- Rate of breathing is faster as compared to terrestial animals as they use oxygen dissolved in water which is less as compared to CO_2 present in atmosphere.



- Direction of diffusion of gases in plant depend upon environmental conditions (concentration of CO_2 & O_2, light, temperature, etc.)

Transportation :-

Components of Blood :-

Plasma :- Transportation of Digested food. CO_2, waste, Hormones.

Red blood Cells :- Hemoglobin in RBC helps in oxygen transport.

White blood cells :- produce antibody to kill.

Platelets :-
- clotting of blood
- prevent loss of blood.

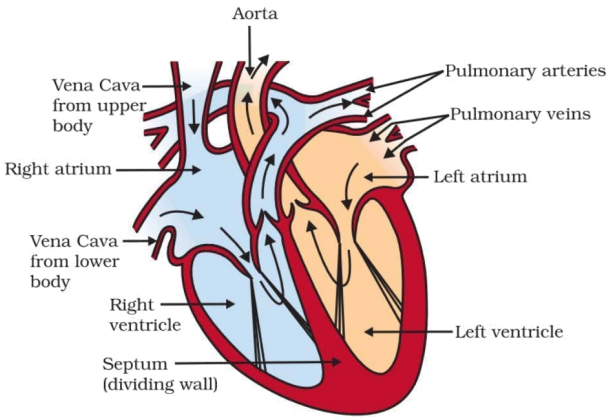
Types of Blood Vessels :-

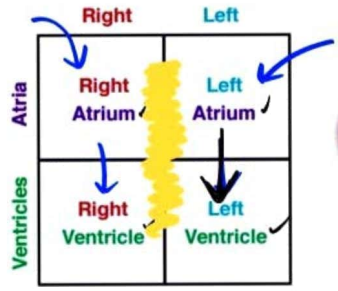
	Arteries	Veins	Capillaries
Direction of blood flow	Away from the heart	Towards the heart	Helps in exchange of substances
Oxygen	Oxygenated blood	Deoxygenated blood	Both
Pressure	High	Low	Medium
Walls	Thick and elastic	Thin and non-elastic	Very thin (one cell thickness)
Valves	Absent	Present	Absent

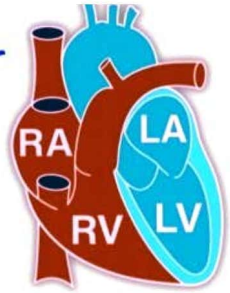
Pulmonary artery - deoxygenated blood
pulmonary vein - oxygenated blood

Aorta - largest artery
Vena cava - largest Vein

Structure of Human Heart :-

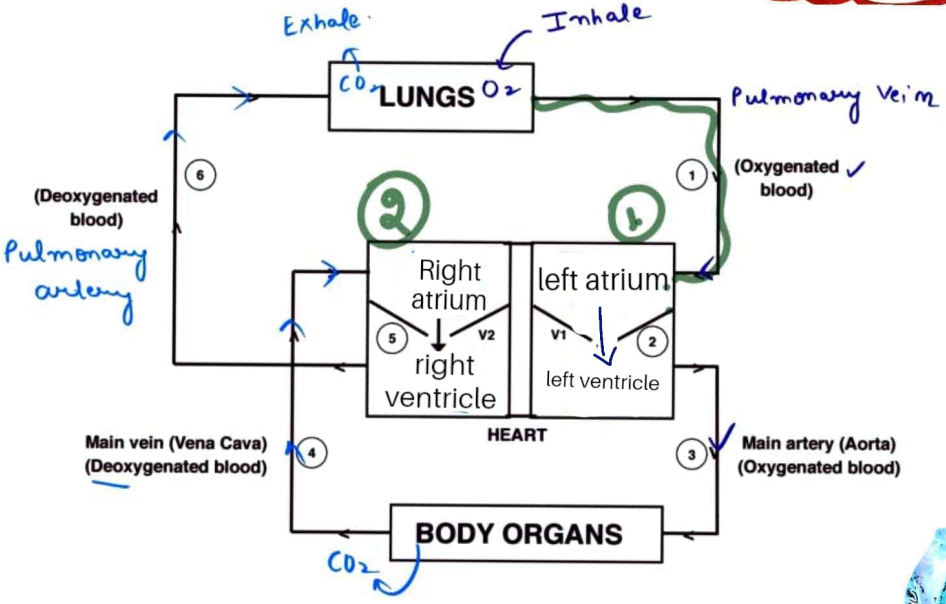


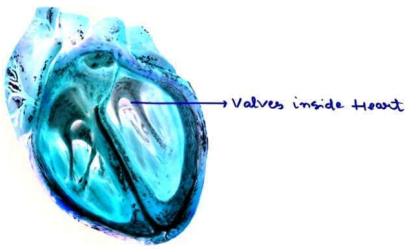




L O R D

ATRIUM/AURICLE	VENTRICLES
upper chambers	lower chamber
Thin walled	Thick walled
Receives blood	Pumping of blood





Double Circulation :-

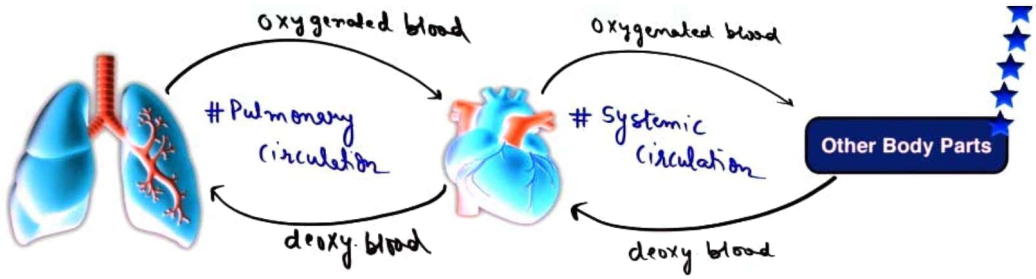
Blood enters twice into heart to complete the full circuit / cycle.

pulmonary circulation

- Circulation of blood between heart and lungs.
- Deoxygenated blood becomes oxygenated.

Systematic circulation

- circulation of blood between heart and body parts.
- Oxygenated blood becomes Deoxygenated.

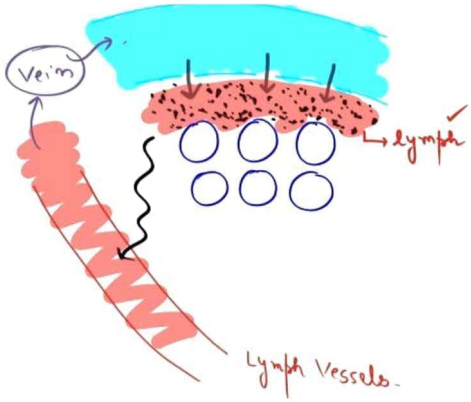


Class	Chambers in Heart	Type of circulation	Temperature maintenance
Pisces (Fishes)	2	Single circulation	No (Cold blooded)
Amphibians	3	Incomplete Double circulation	No (Cold blooded)
Reptiles	3	Incomplete Double circulation	No (Cold blooded)
Aves (Birds)	4	Complete Double circulation	Yes (Warm blooded)
Mammals	4	Complete Double circulation	Yes (Warm blooded)

More chambers
↓
Better separation of oxygenated and deoxygenated blood
↓
More oxygen reach to cell
↓
More respiration
↓
More ATP (energy) produced
↓
That energy used for temperature regulation.

lymph / tissue fluid

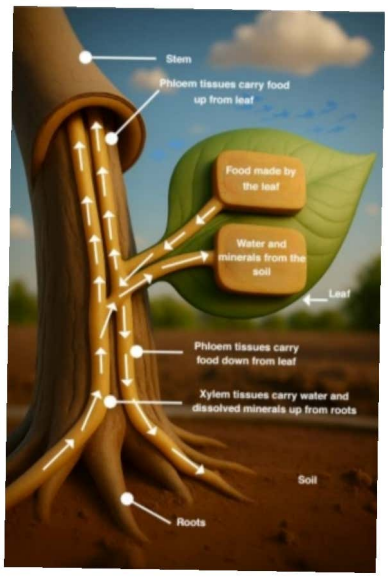
- Formed due to leakage of plasma from blood
- Colourless fluid (RBC absent)
- WBC present, proteins present
- Help in fat absorption and its transportation
- Provide immunity
- Help in fluid balance



Transportation in plants :-

XYLEM :
- vessel
- Tracheid
- X- fibre
- X. parenchyma

- Transport of water and minerals salts (Ascent of sap)
- Water is transported only upwards from roots to aerial parts of plants (unidirectional).
- Transport in xylem requires physical forces such as transpiration pull and root pressure.



PHLOEM :-
- Sieve tubes
- Companion Cell
- P. parenchyma
- P. Fibre

- Transport of food (Translocation)
- Food is transported in both upward and downward directions (bidirectional)
- Transport of food of phloem requires energy in the form of ATP.

Functions of Transpiration :-

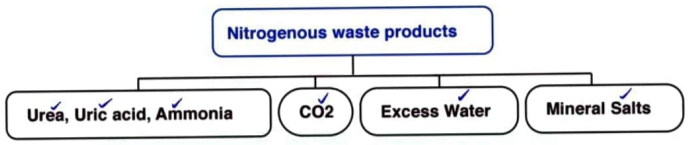
- Transpiration helps in the absorption and upward movement of water and minerals dissolved in it from roots to the leaves.
- it also helps in temperature regulation.
- Transpiration helps to get rid of excess water.

stomata closed	less transpiration
Transpirational pull	: less
Root pressure	: More

stomata open	More transpiration
Transpirational pull	: More
Root pressure	: less

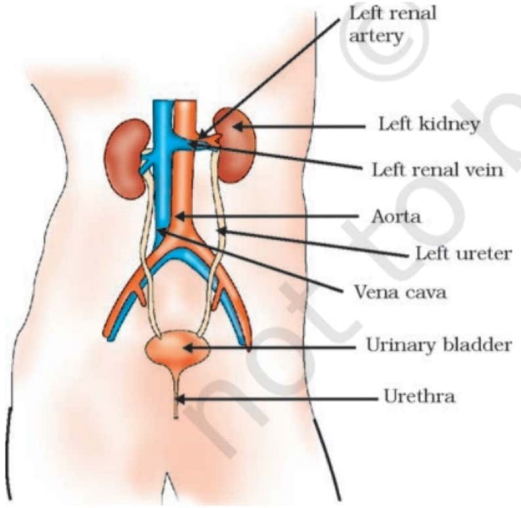
EXCRETION :-

Excretion - Removal of harmful metabolic wastes from the body.
Egestion - Removal of undigested and unabsorbed food.



Nephron -
- ✓Nephron is the structural and Functional unit of the kidney.
- ✓filters blood and remove metabolic waste from blood in form of urine.

HUMAN EXCRETORY SYSTEM :-



URINE PATHWAY

KIDNEY - Produce urine, maintain water balance, eliminate toxic chemicals.
URETER - Transports urine towards urinary bladder.
URINARY BLADDER - Temporarily stores urine.
URETHRA - Transports urine out of the body.

NEPHRON :-

steps of Urine formation

Glomerular filtration

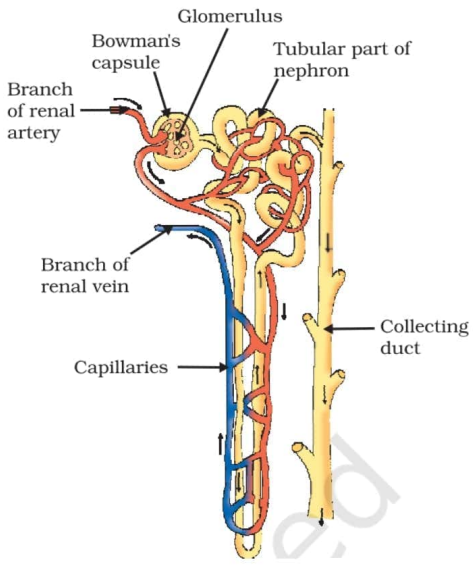
Nitrogenous wastes, glucose, water, amino acid, excessive salts from the blood are filtered and initial filtrate enters into Bowman capsule of the nephron.

Selective Reabsorption

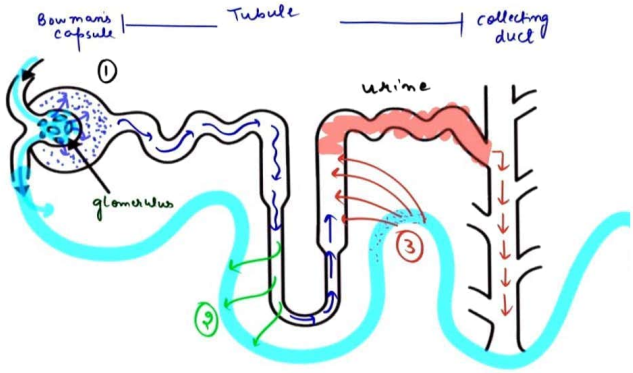
Useful substance like glucose, amino acids, salts and a major amount of water from the filterate are reabsorbed back by capillaries surrounding the nephron.

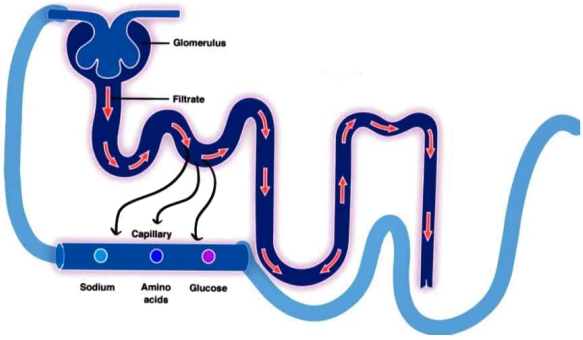
Tubular Secretion

Urea, extra water and salts are secreted into the tubule which open up into the collecting duct and into the ureter.



- In selective reabsorption, sodium, amino acids & glucose are reabsorbed from the filterate back into the blood.





Excretion in Plants :-

- Oxygen and carbon dioxide is diffused through stomata.
- Excess water is removed by transpiration.
- shedding of old leaves and bark.
- Many plant waste products are stored in cellular vacuoles.
- other waste products like latex, Resins and gums are stored in old xylem cells.
- Plants also secrete some waste substances into the soil around them.