

Characteristics Of Living Things

- **Can Move By Themselves.**
- **Require Food, Air & Water.**
- **Sensitive- Give response to external environment.**
- **Perform basic life functions like Respiration, Excretion & Reproduction.**

What are Life Processes?

Basic functions performed by living organisms to maintain their life.

For Example.

Nutrition & Respiration.

Transport & Excretion.

Control & Coordination.

Reproduction.

Growth.

Movement.

Nutrition & Respiration

- **Nutrition**- It is the Process of Intake and conversion of food into smaller molecules which can be absorbed by an Organisms.
- **Respiration**- It is the process which releases Energy from food molecules absorbed by an Organisms.

Food

#Important resource for living things to sustain life on Earth.

Nutrient - It is a substance which an organism intakes into body & utilises for energy & Biosynthesis.

Major Nutrients In plants:

Protein

Carbohydrates

Fats

Vitamins

Minerals



Mode of Nutrition

- **Autotrophic Nutrition** - In This mode of Nutrition, organisms makes own food from simple inorganic materials like carbon dioxide & air. Example - Plants.
- **Heterotrophic Nutrition** -In This mode of Nutrition, organisms can not make own food from simple inorganic materials like carbon dioxide & air. Example - Animals.

Types Of Heterotrophic Nutrition

- **Saprotrophic** - In this mode of Nutrition organisms obtain their food from dead & decaying matter. Eg. Mushrooms
- **Parasitic Nutrition** - In this mode of Nutrition organisms derive their food from the body of another organism without killing it. Eg. Roundworms
- **Holozoic Nutrition**- in this mode of Nutrition organism takes complex food by the process of Ingestion & then digestion & Finally absorption. Eg. Human, Animals.



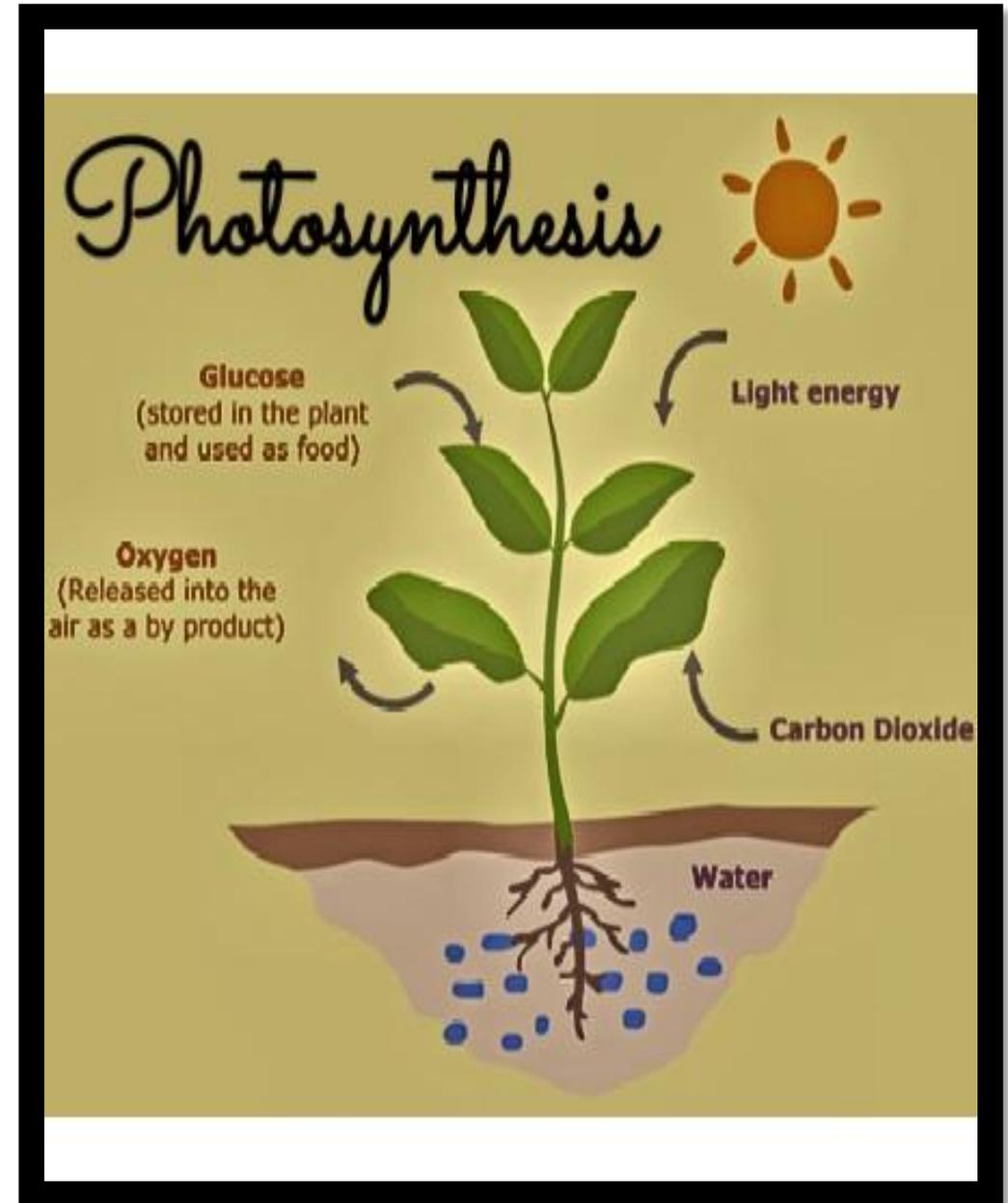
Nutrition In Plants

Plants obtain their food by the process of **Photosynthesis**.

Photo means light & **Synthesis** means build.

Site of photosynthesis - Chloroplasts (Chlorophyll)

Raw Materials - Sunlight, Carbon dioxide & water.



Autotrophic Nutrition

Important Steps In Photosynthesis

- **Absorption of the sunlight by chlorophyll.**
- **Conversion of light energy to chemical energy by splitting water into Hydrogen & Oxygen.**
- **Reduction of Carbon dioxide into Carbohydrates by hydrogen.**

Nutrition In Animals

- **Animals obtain their food from **Plants** & other **Animals**.**

- **Types of Animals Based on food Habbits-**

- Herbivores** - Only Eats plant. Eg.- Cow, goat, Giraffe etc.

- **Carnivores** - Only eats other animals. Eg.- Tiger, fox, lion etc.

- **Omnivores** - Eats Plants & Animals both. Eg.- Human, dog, crow etc.

Nutrition Process In Animals

- **Five Major Steps in the process of Nutrition in Animals are:**

- **Ingestion** - Intake of food.

- **Digestion** - Breakdown of food in to small molecules.

- **Absorption**- absorption of food molecules.

- **Assimilation**- using food molecules for energy.

- **Egestion** - Excretion.

Nutrition In Unicellular Organisms

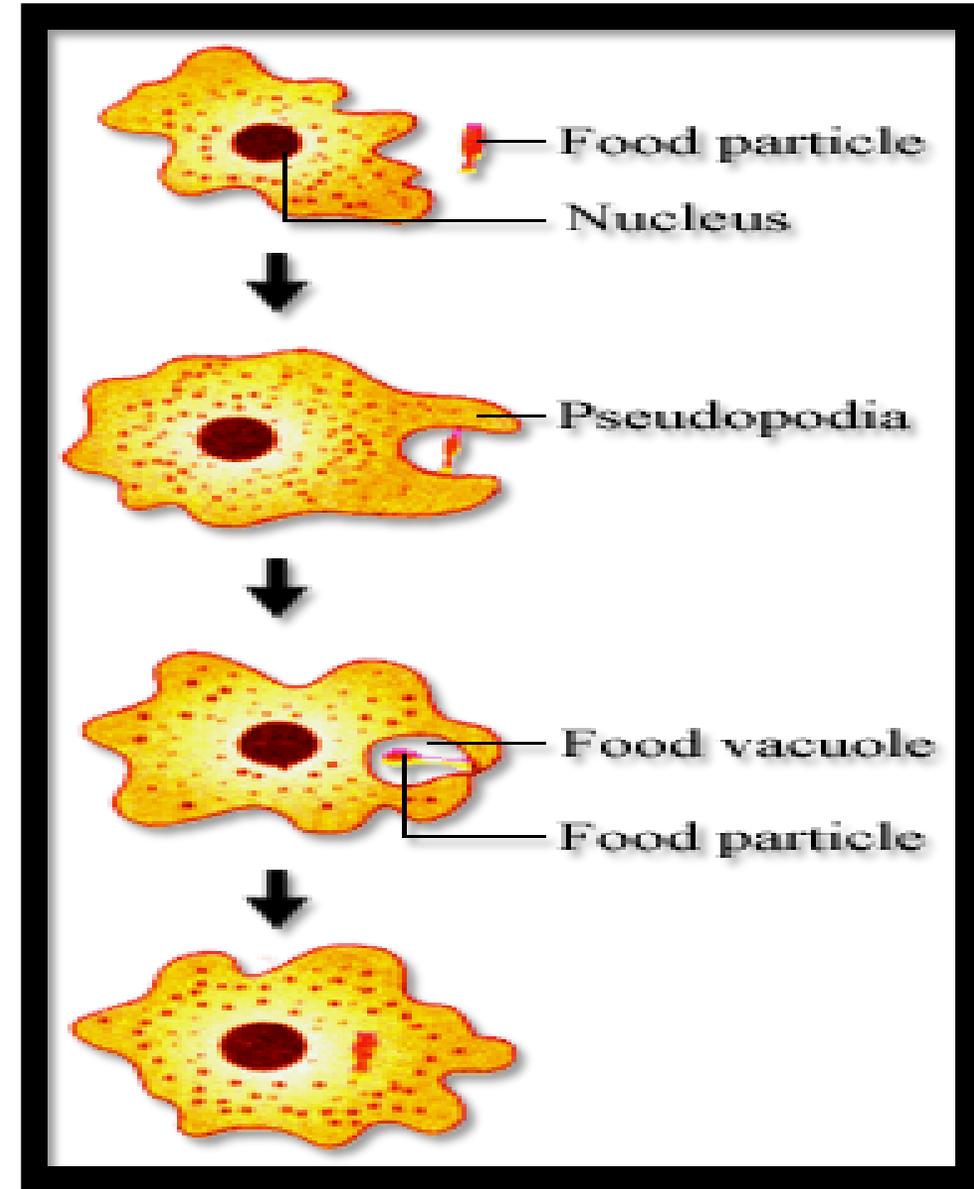
Ingestion- Intake of food by using Pseudopodia.

Digestion - Digesting the food in Food Vacuole by digestive enzymes.

Absorption - Digested food Absorbed into cytoplasm by Diffusion.

Assimilation- Obtain energy from absorbed food by Respiration.

Egestion - Excretion of waste.



Nutrition In Amoeba

Nutrition In Humans

Ingestion - Intake of food by mouth.

Digestion - Starts From
Mouth

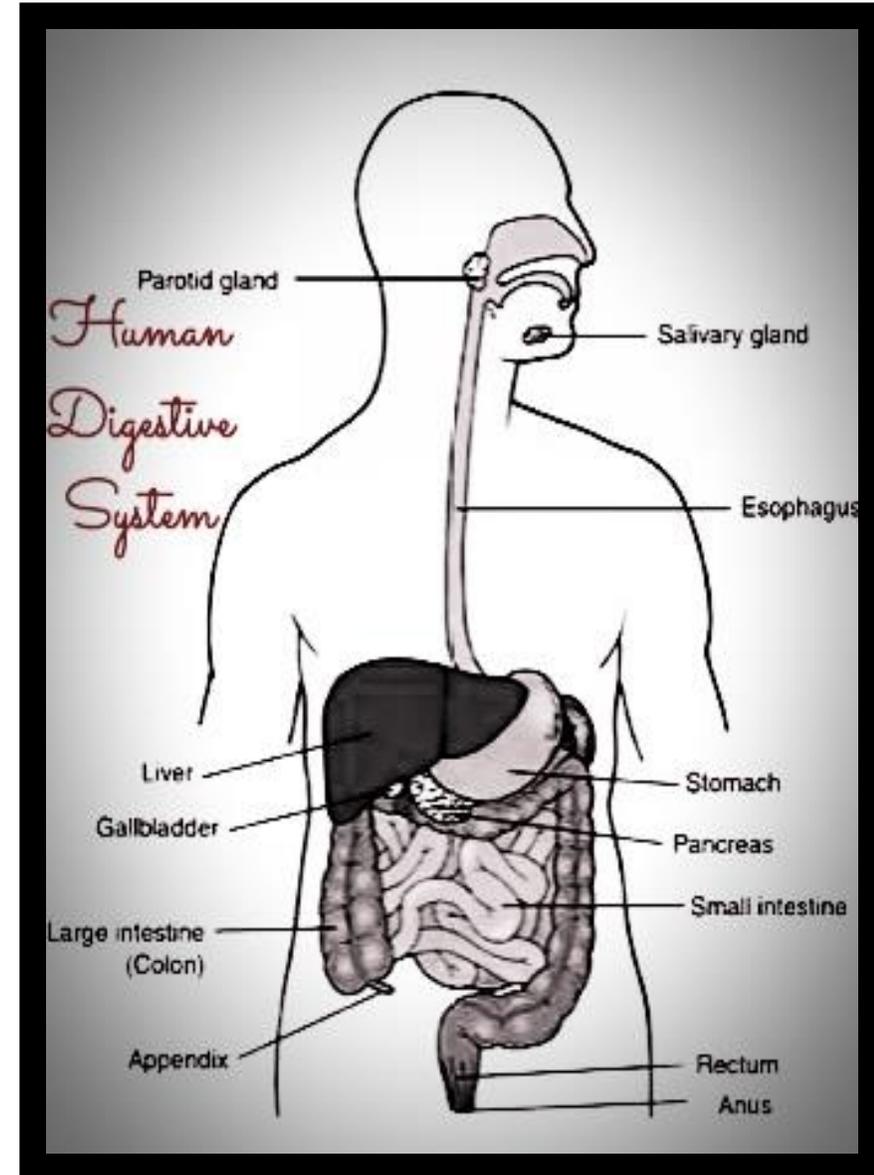
-It Contains Teeth, Tongue & Salivary Glands.

-**Teeth** - Breaks down food into small Particles.

-**Tongue** - Mixes the food with Saliva.

-**Salivary Glands** - Secrete saliva which softens the food.

Contain **Enzyme** called **Salivary Amylase** which digests **Starch (Carbohydrates)**.



Step-2 : Food Enters into Stomach Oesophagus

In Stomach-

- Breaks down food into semi solid paste.
- Contain 3 Secretion Glands (Tubular in Structure).
- These Glands secrets **“Gastric Juices”**.

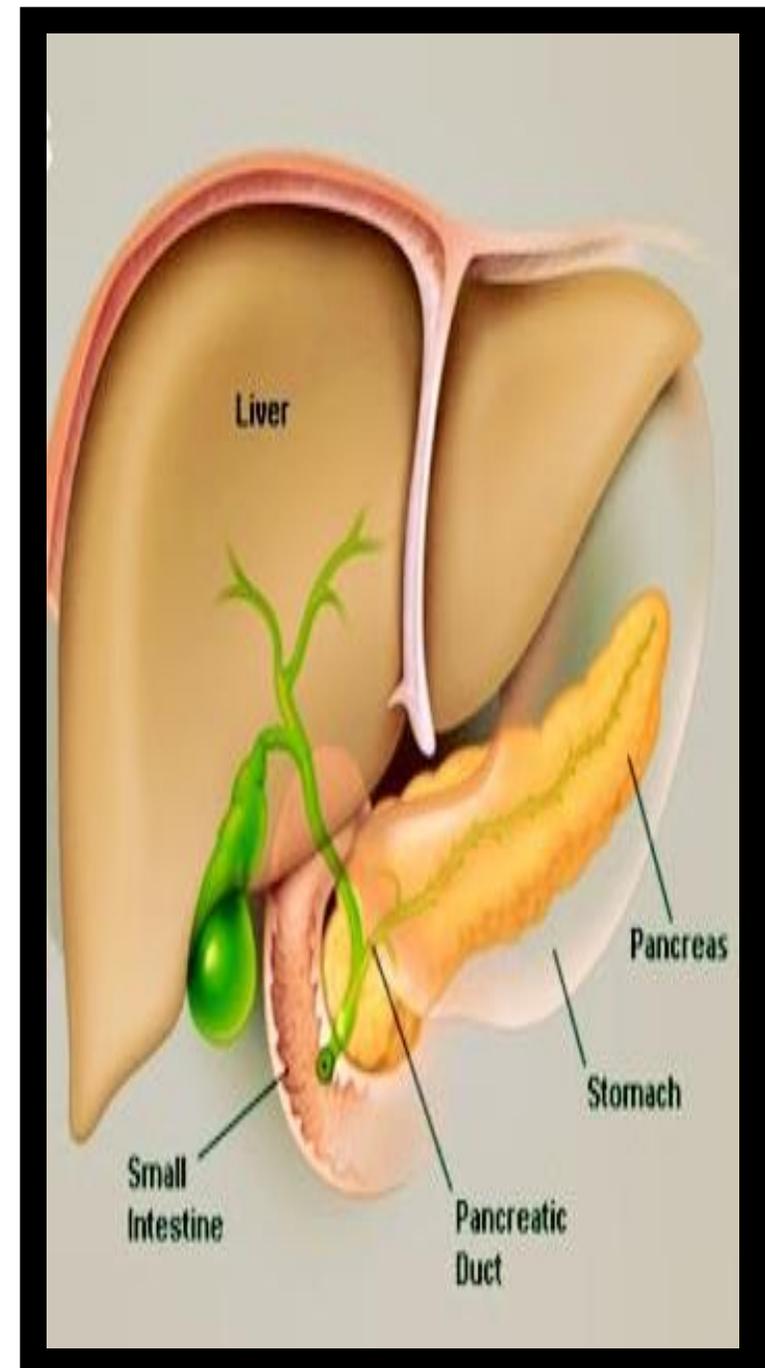
- **Composition of Gastric Juices:**
- **Hydrochloric Acid**
- Break down the food molecules.
- Makes Food medium Acidic for Pepsin.
- Kills the bacteria from food.
- **Digestive Enzymes (Pepsin)** – Digests the Protein from food.
- **Mucus** – Protects the wall of stomach from **Acid**.



Step-3 :Partially Digested food enters into Small Intestine.

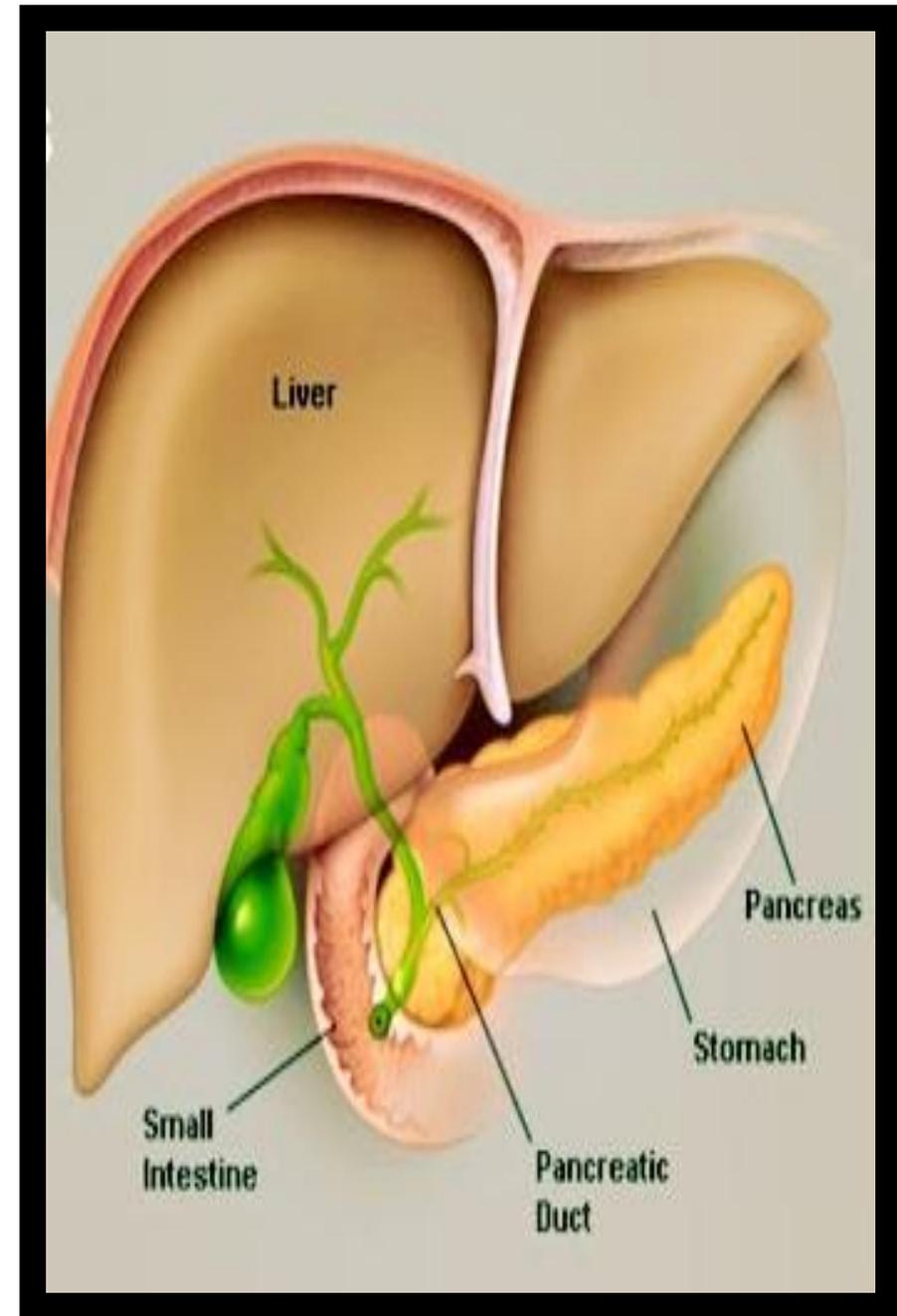
In Small Intestine-

- Receives Secretions from two Glands (Organs)- Liver , Pancreas.
- **Liver** – Secretes **Bile Salts**.
- It is yellow greenish liquid.
- It is stored in gall bladder.
- It is **Alkaline** in nature.
- It contains salts.
- **Function of Bile salt-**
- It Breaks down the Fat(lipids) From food.
- It makes food medium Alkaline so that **Pancreatic Enzymes can act**.



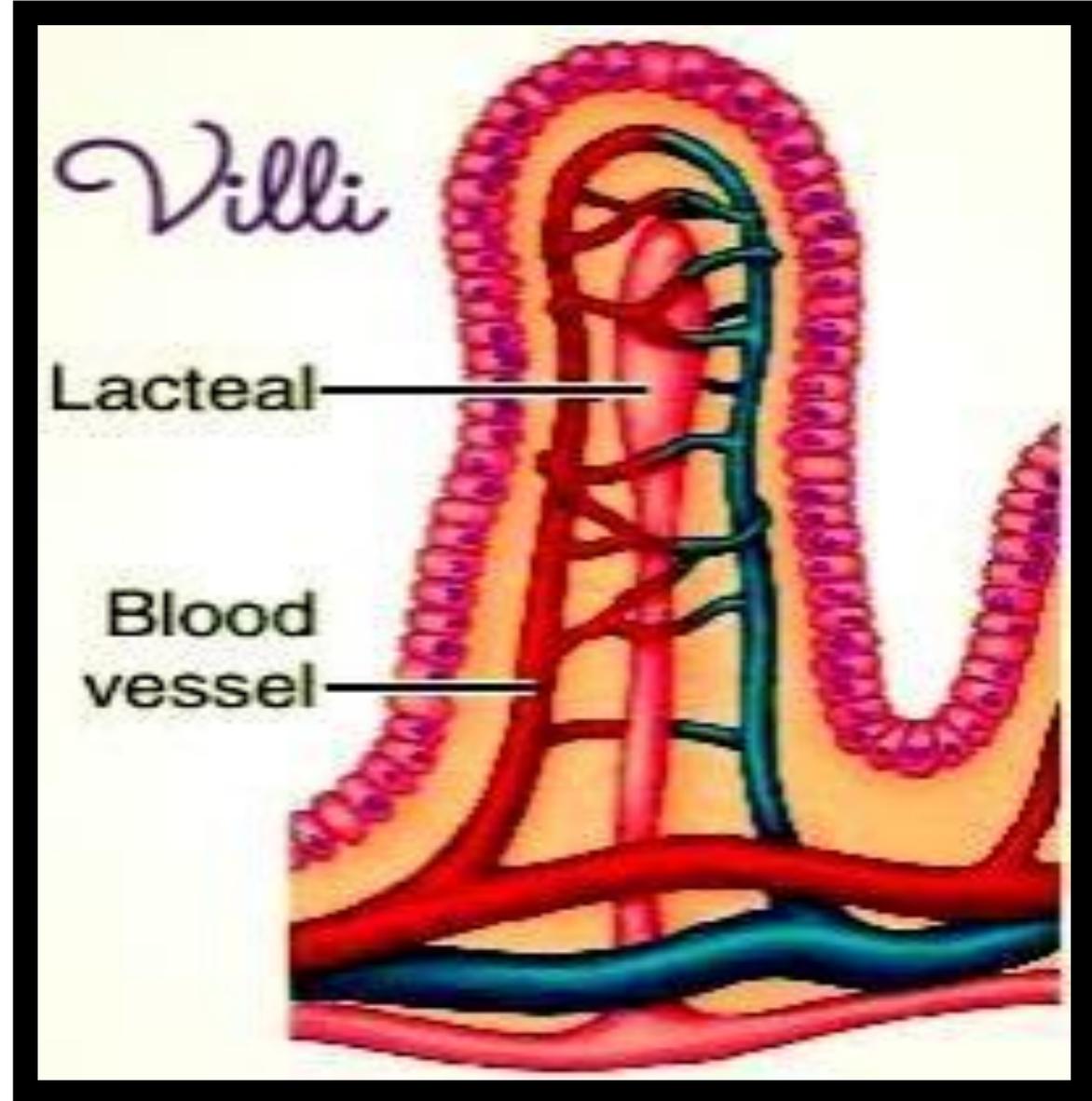
- **Pancreas:**
- Secretes Pancreatic Juice.
- Composition of Pancreatic Juice.

- **Digestive Enzymes:**
- **Pancreatic Amylase**- It Breaks down the starch.
- **Trypsin** – It Digests the Protein.
- **Lipase** – It Breaks down the Emulsified Fats.



Digestive System In Humans

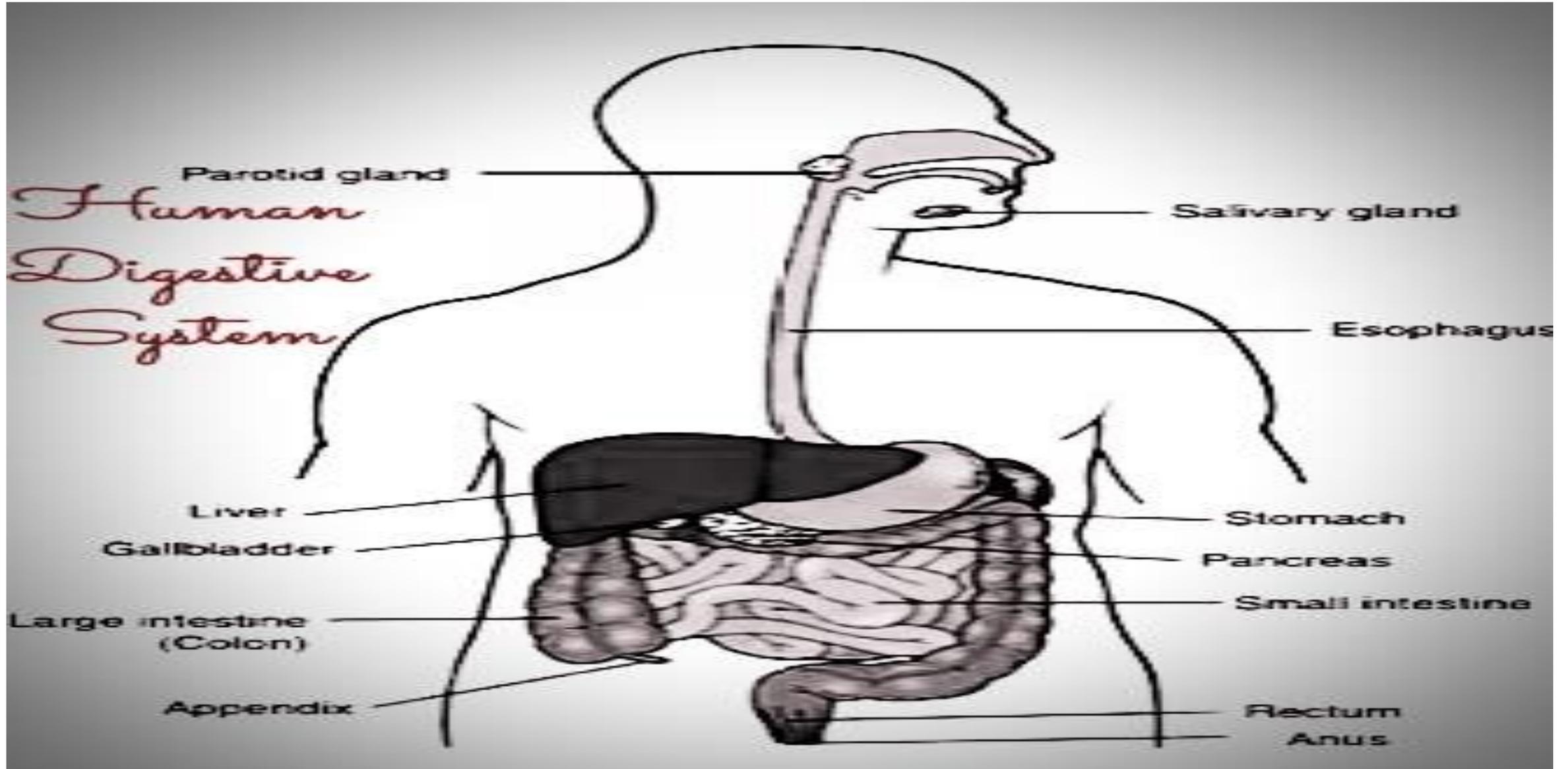
- **Absorption-** Digested food absorbed by thin finger like projections “Villi” in Small Intestine.
- Absorbed food goes into **Blood** through thin blood Capillaries.



- **Assimilation-** In assimilation, Blood transfers Digested & dissolved food to all the parts of the body.
- This Assimilated food is used by body cells to obtain energy, growth & repair of the body.
- Unused Digested food is stored in Liver in the form of **glycogen**.
- **In Large Intestine** – Water is absorbed from food.
- **Egestion-** It is the process in which undigested food is Excrete out from the body as “**Stool**”



Human Digestive System



Respiration

Respiration In Living Things

Types of Respiration

Aerobic Respiration

Works in the Presence of oxygen.

Complete breaks down of food.

Products Produced- Carbon dioxide & Water.

More Energy is produced.

Anaerobic Respiration

- Works In the absence of oxygen.

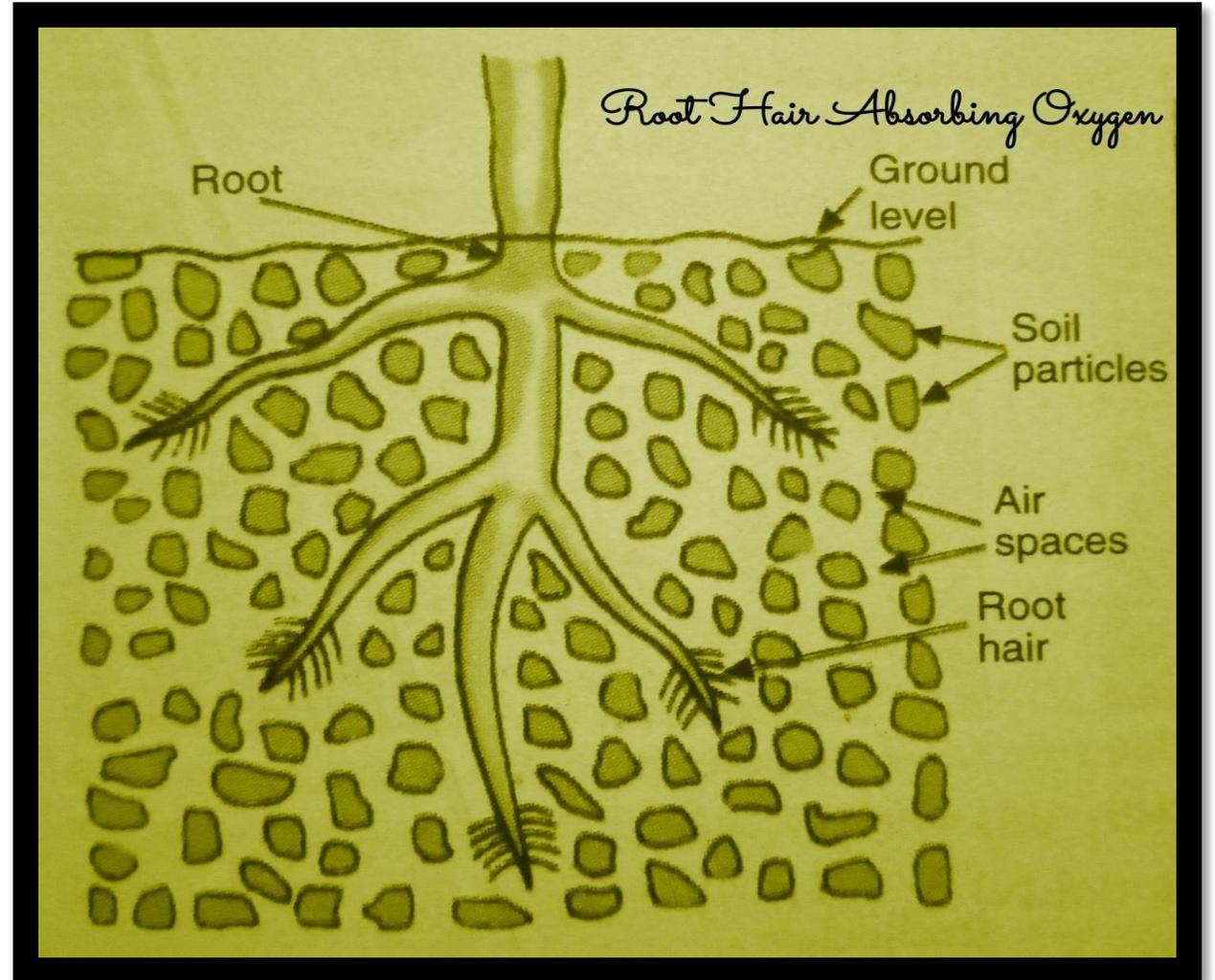
- Practical break down of food.

- Products Produced – Ethanol, Carbon dioxide, lactic acid.

- Less energy produced.

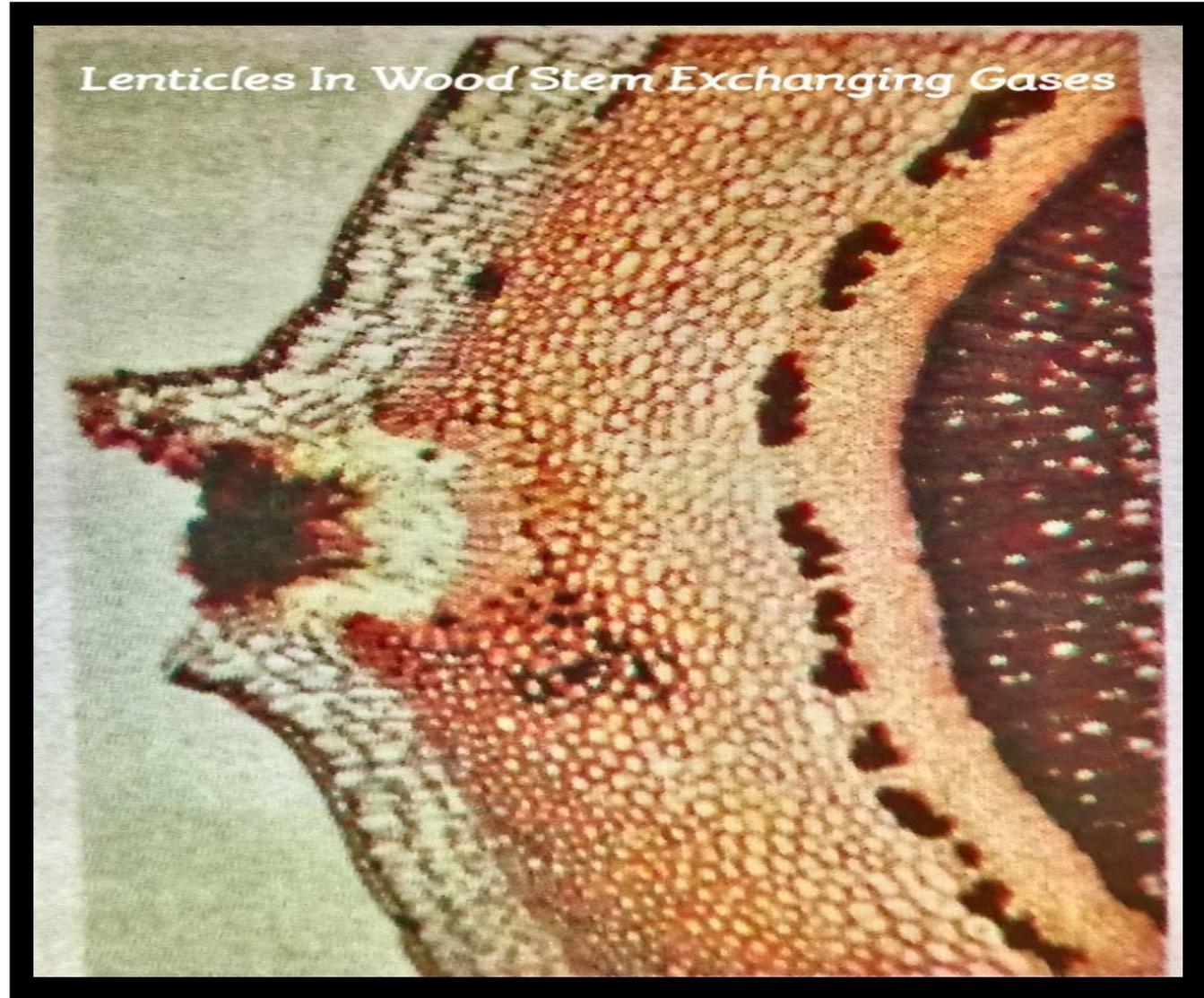
Respiration In Plants

- **Respiration Through Root Hairs.**



Respiration In Plants

- **Respiration in Trees through Lenticles.**



Respiration In Plants

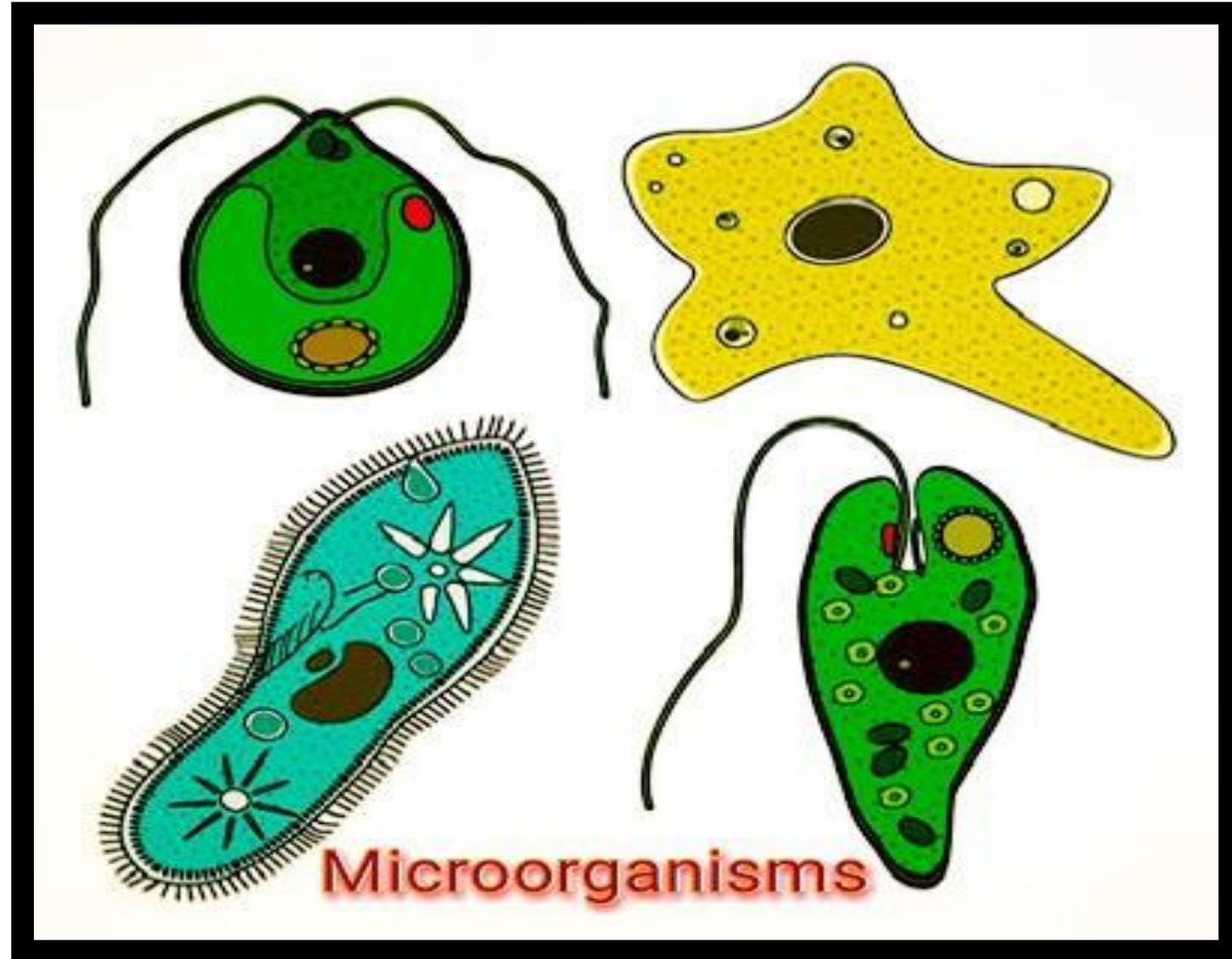
- **Respiration In leaves through Stomata.**



Respiration In Micro-organisms

Respiration in
Microorganisms – **By the
Process of Diffusion.**

Respiratory Organs – **Cell
wall or Cell Membrane.**



Respiration In Earthworm

**Respiratory Organ-
Skin.**



Respiration In Fish

- Respiratory Organ-
Gills.



Respiration In Insects

Respiratory

Organ:

Spiracles

Trachea



Common Characteristics Of Respiratory Organs(Skin, Gills, Trachea & Lungs).

- **All Respiratory Organs have Large Surface Area.**
- **Have Thin cell walls for easy diffusion & Exchange of Respiratory Gases**
- **Have a rich blood supply for Transporting Respiratory Gases.**

Human Respiratory System

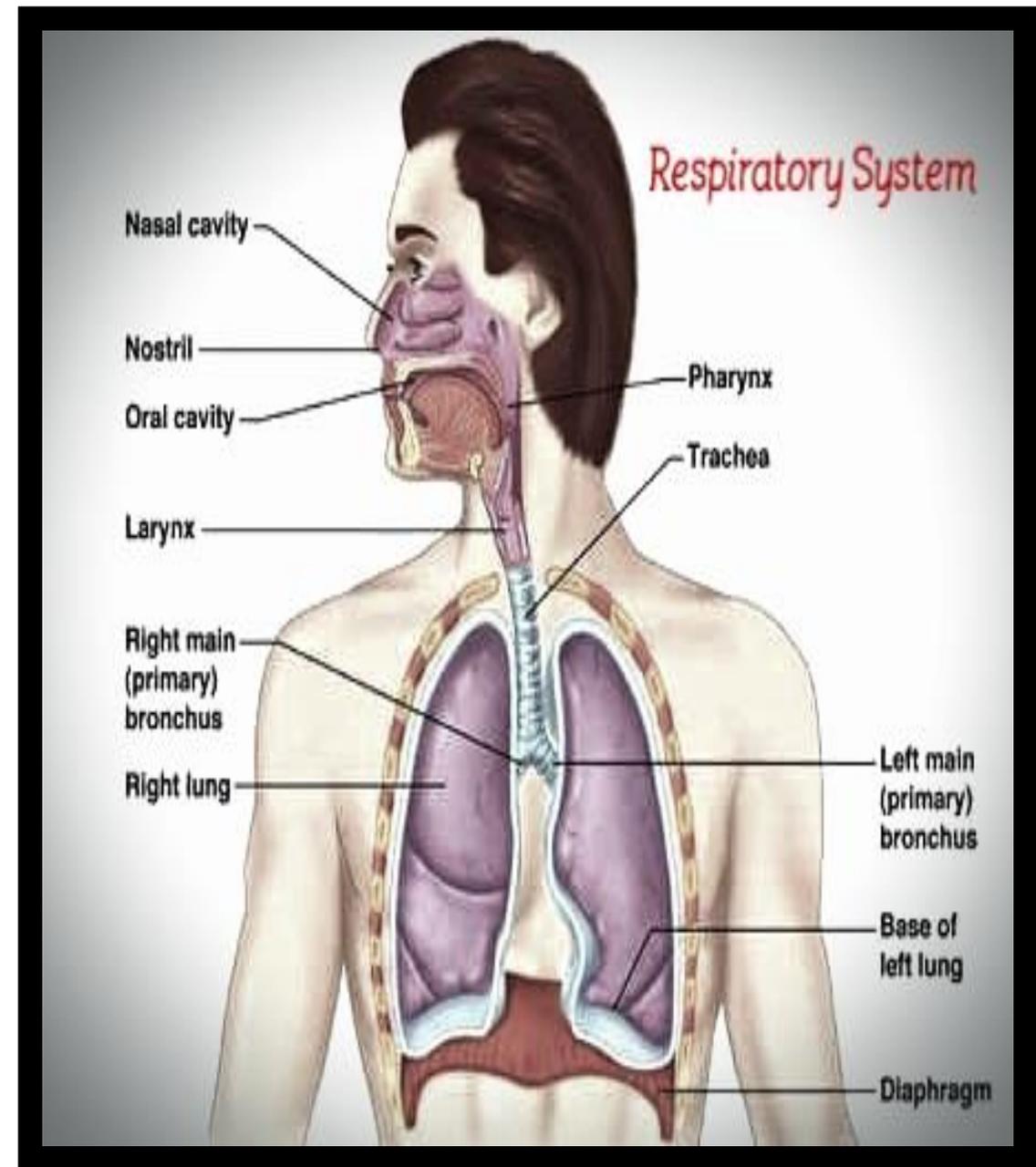
It is the Process of releasing energy from Assimilated Food. {**Oxidation**}

This released energy from food is stored in Mitochondria as ATP (**Adenosine Tri-Phosphate**).

ATP is used by body cells for various life functions.

Word Equation – For Respiration

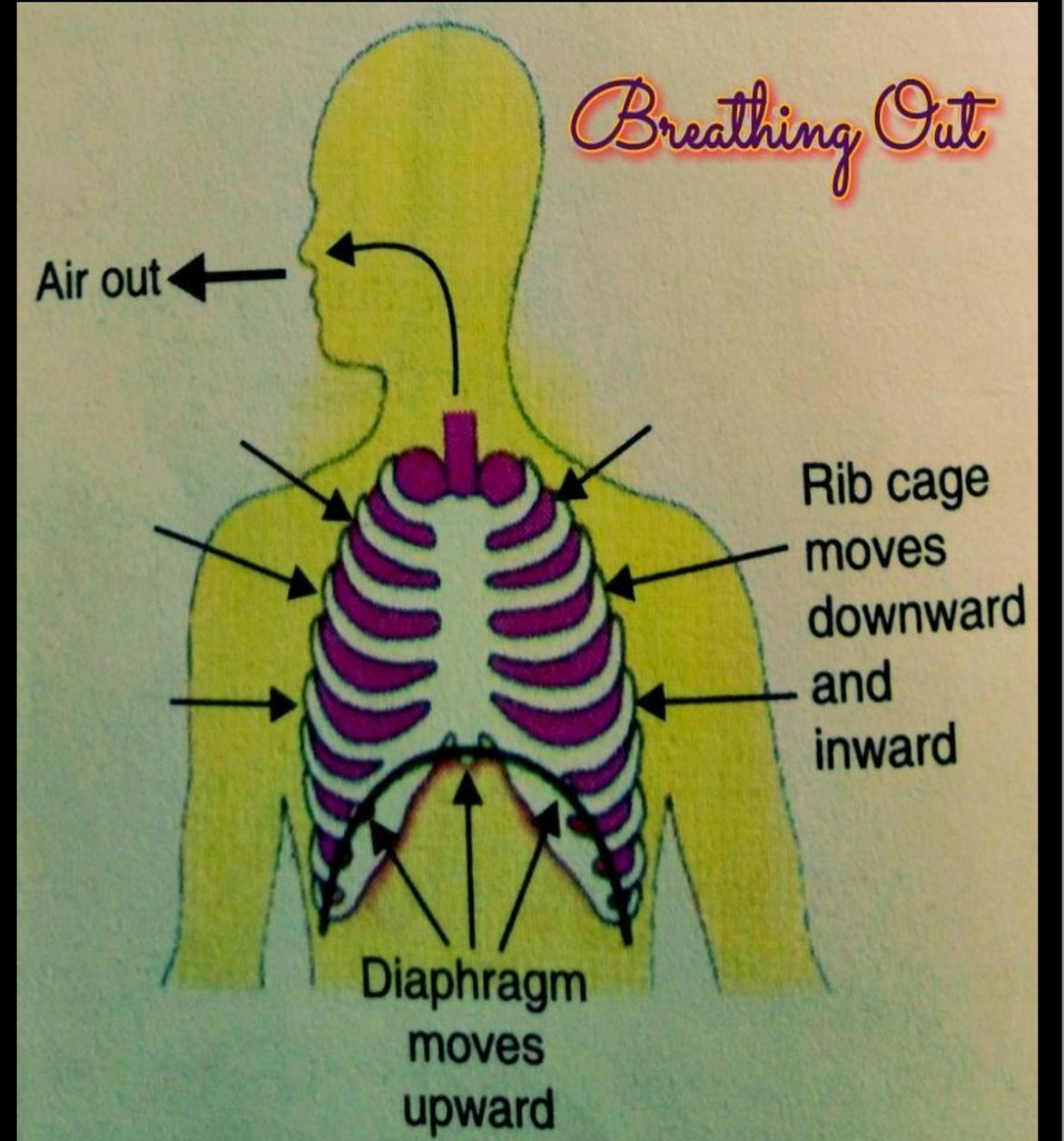
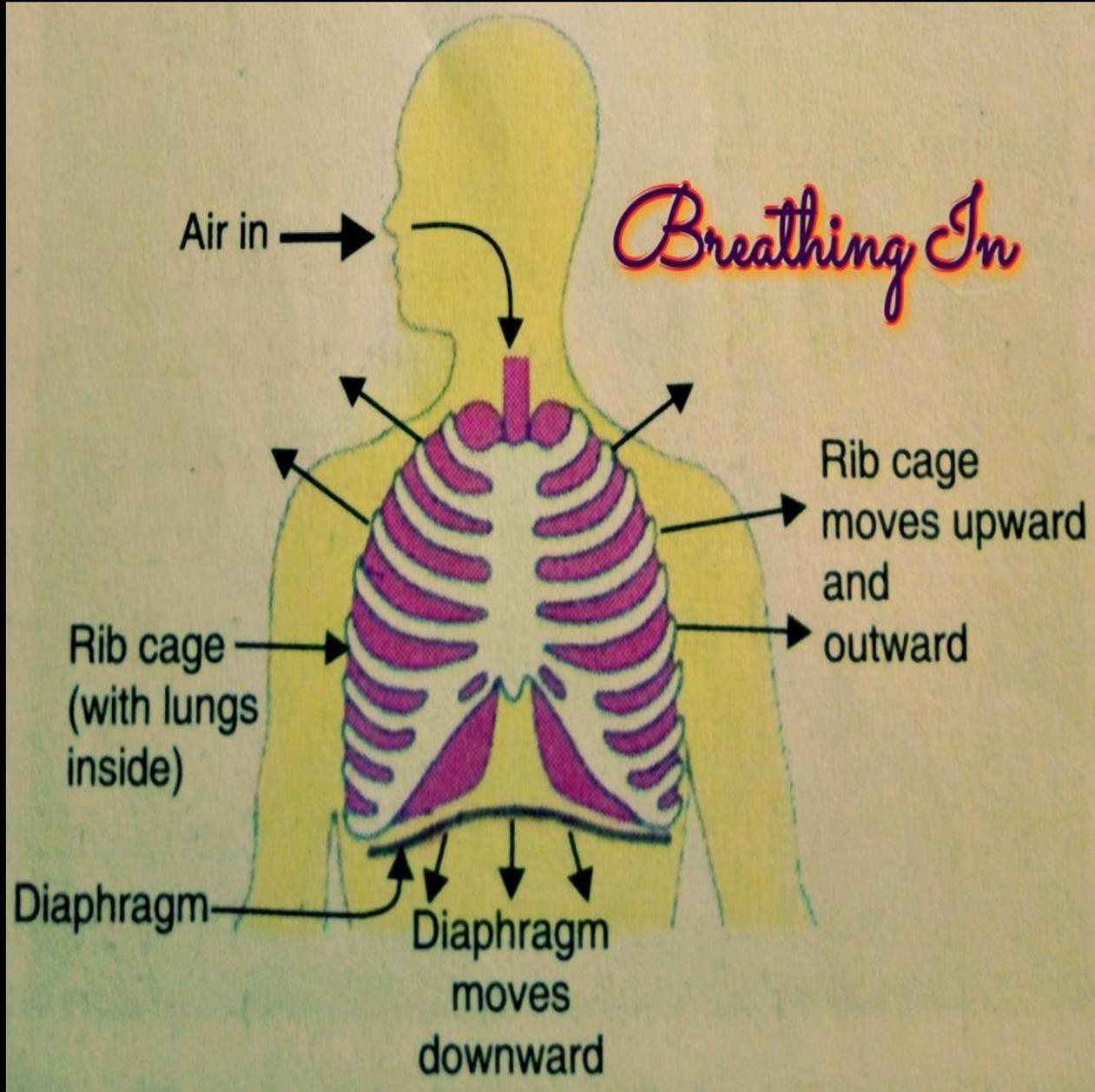
Food + **Oxygen** → Carbon Dioxide + **Water** + **Energy**



Respiration In Humans

RESPIRATION IN HUMANS

- Carbon dioxide and water are the two products of **respiration**.
- **Breathing** is the process by which oxygen is taken(**inhalation**) inside the lungs and giving out(**exhalation**) carbon dioxide in air.



Respiratory Organ In Human's

- **Main Organs of Human Respiratory System:**

- **Nose**

- **Nasal Passage(Nasal Cavity)**

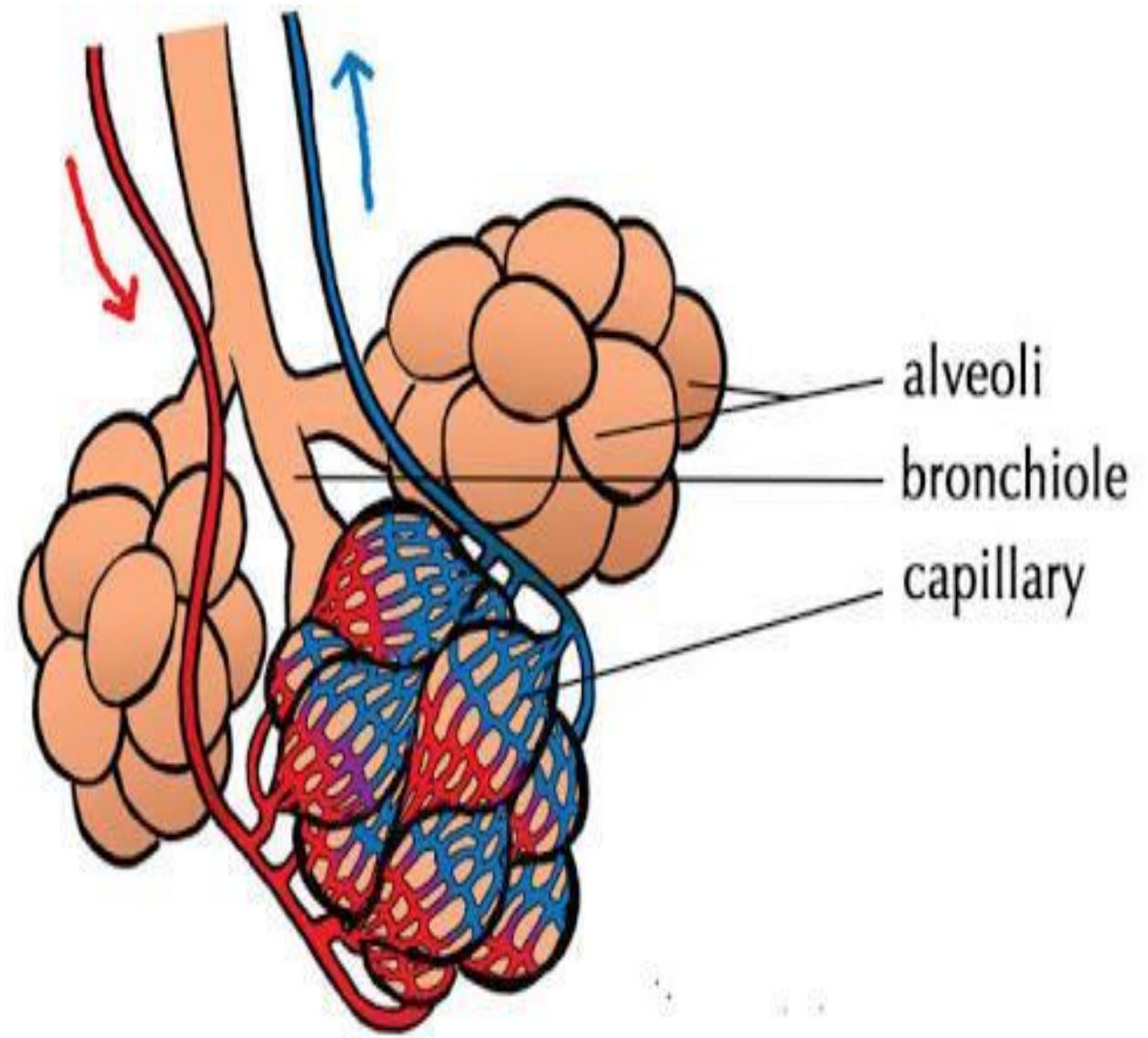
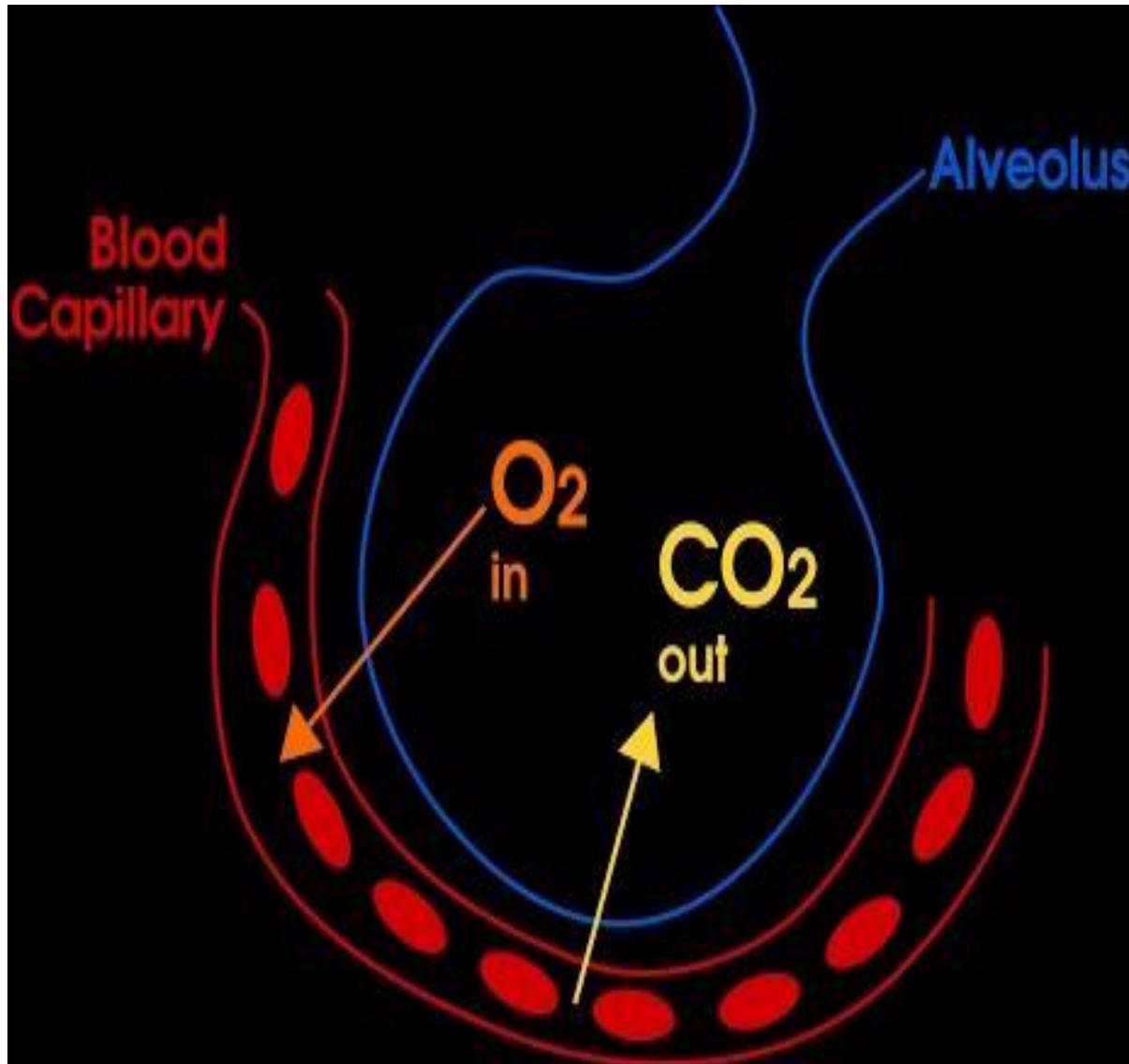
- **Trachea**

- **Bronchi**

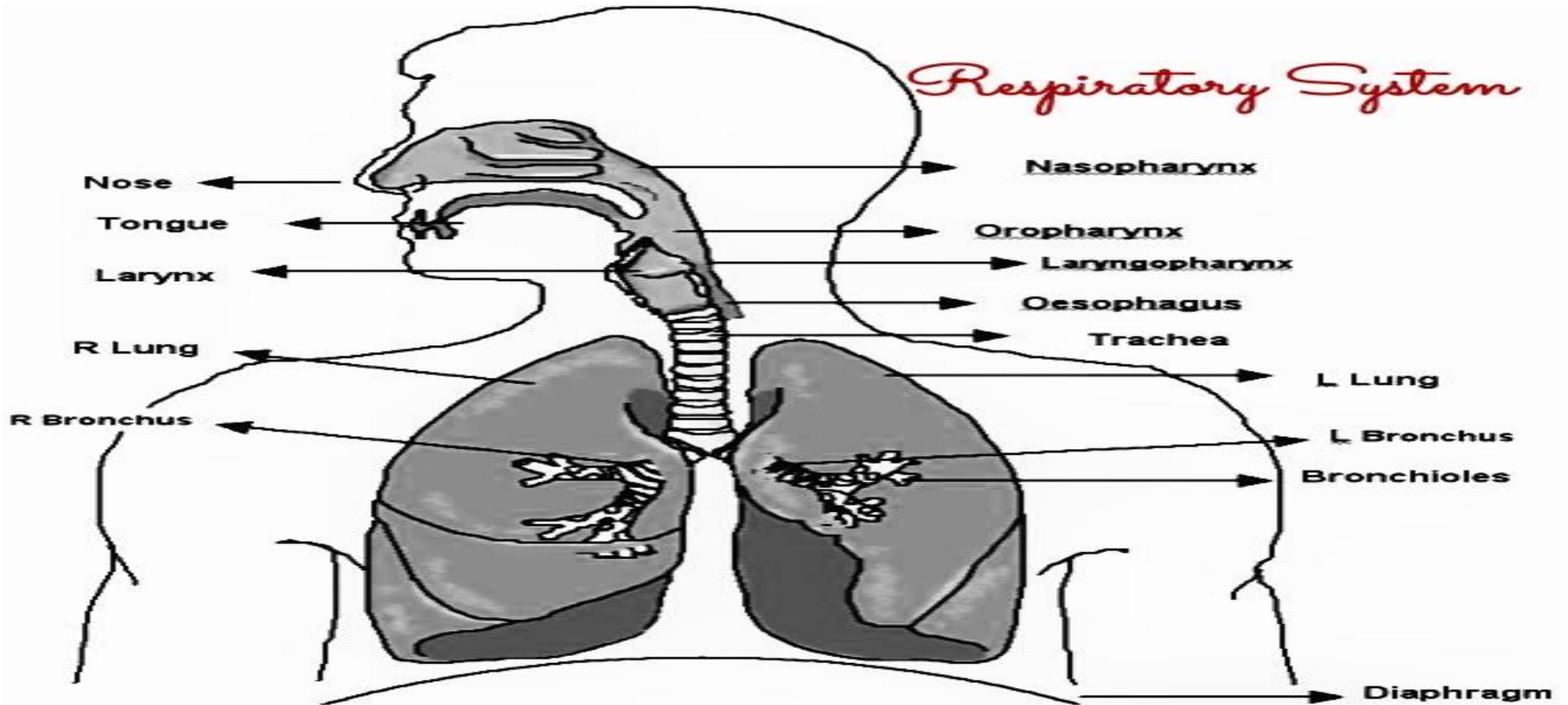
- **Lungs**

- **Diaphragm**

Function Of Alveoli



Respiration Process In Human's



Transportation

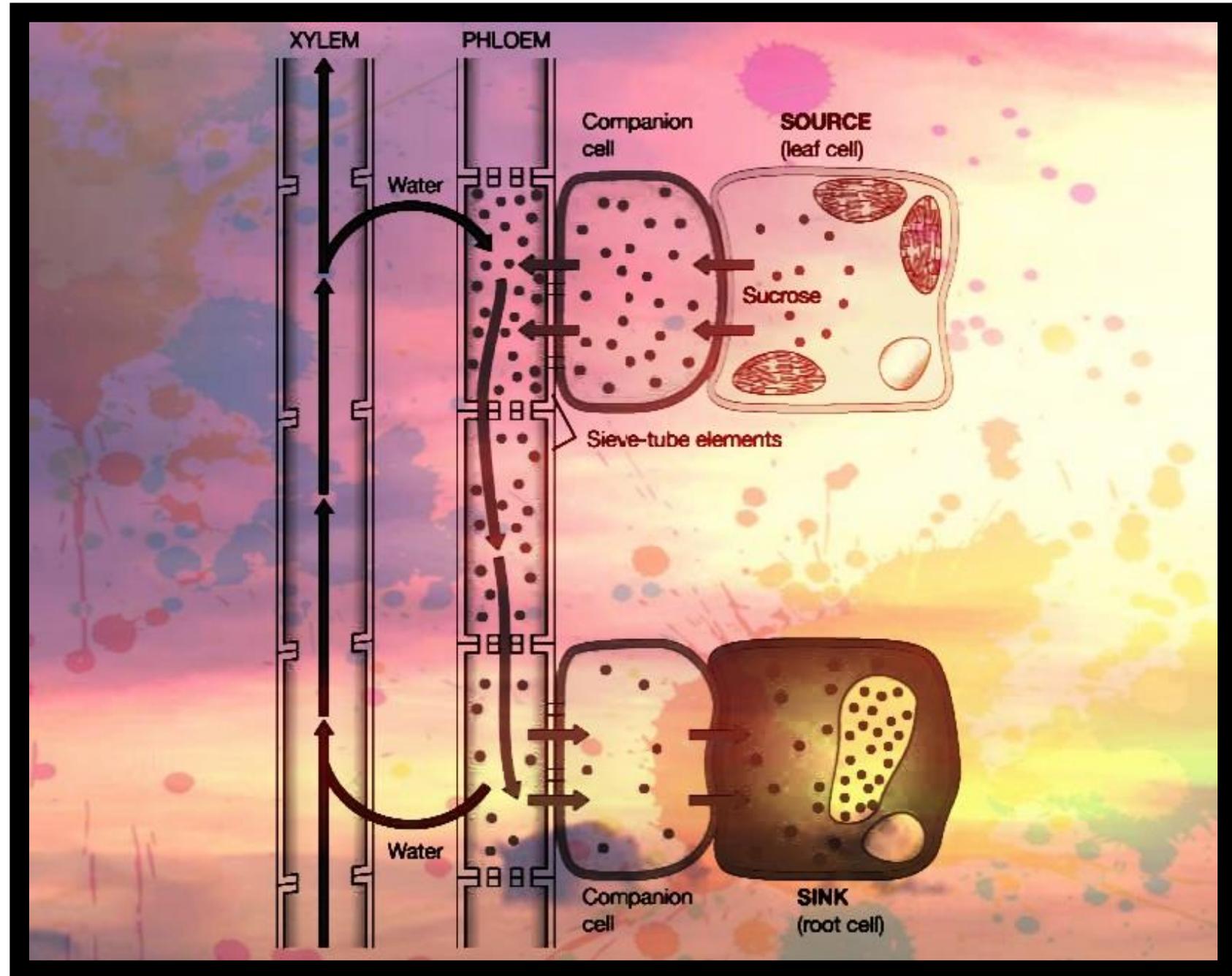
**Transportation In Living
Things**

Transportation In Plants

Plants Have Two
Transport system:

Xylem Tissue

Phloem Tissue



Xylem Tissues

- It is a Water conducting tissues.
- **Main Components:**
- Tracheids
- Vessels
- Xylem Parenchyma
- Xylem Fibres

Phloem Tissues

- It is a Food conducting tissues.
- **Main Components:**
- Sieve Tubes
- Companion cells
- Phloem Parenchyma
- Phloem fibres

Xylem Tissue

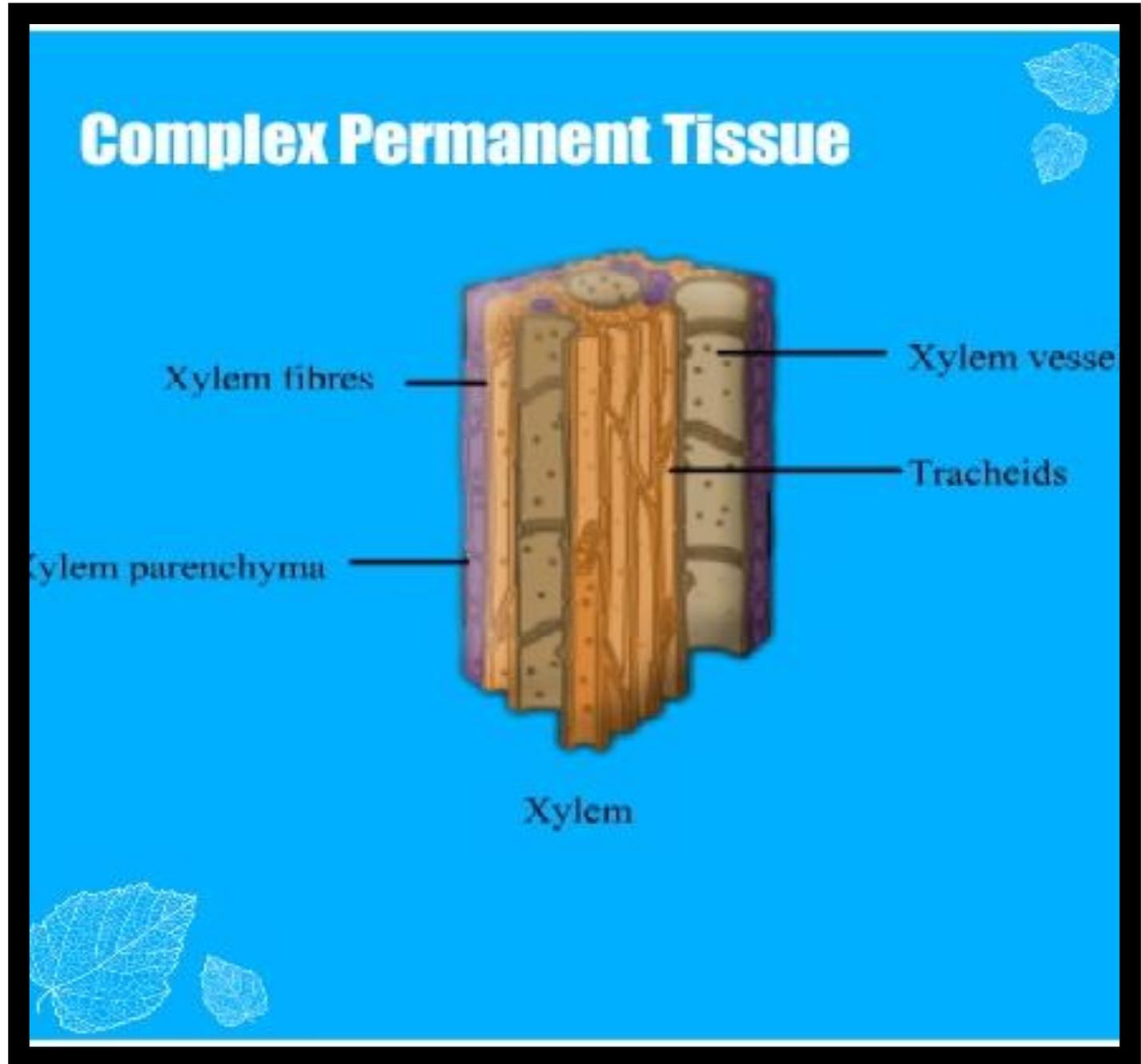
#Cell walls are thick.

#Mostly cells are dead.

#Tracheids & vessels are tubular structure -
Transports water & Minerals.

#Xylem Parenchyma stores food & sideways conduction of water.

#Fibres are for support.



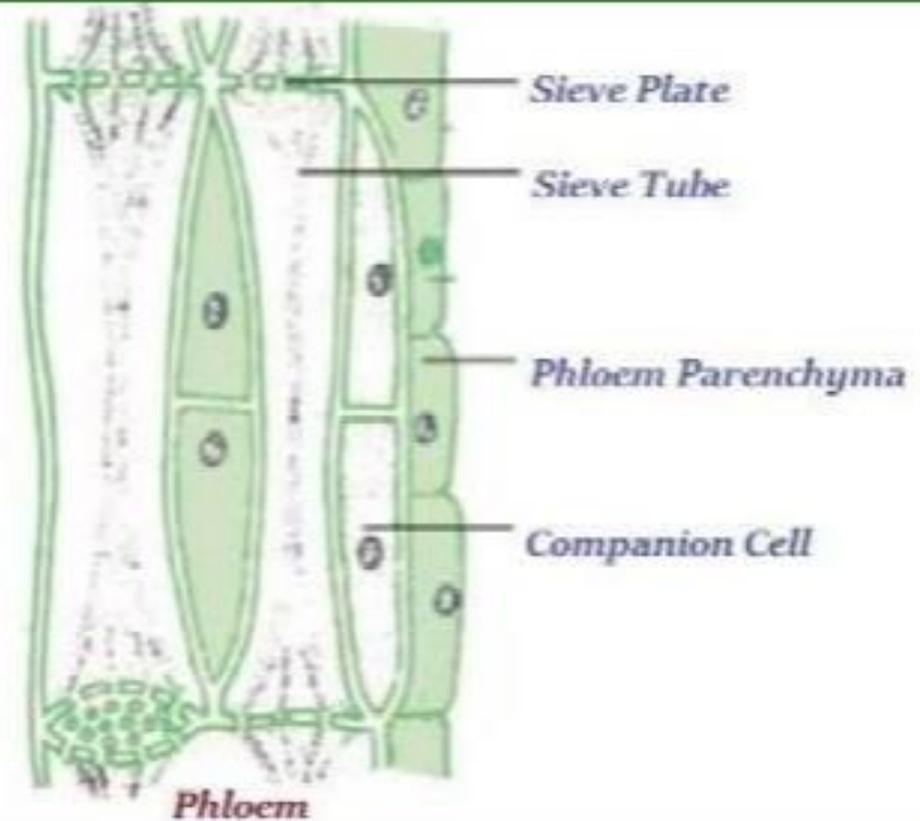
Phloem Tissue

Seive Tubes are conducting channel.

Mostly cells are live except **phloem fibres**.

Phloem only **conducts**, do not provide mechanical strength.

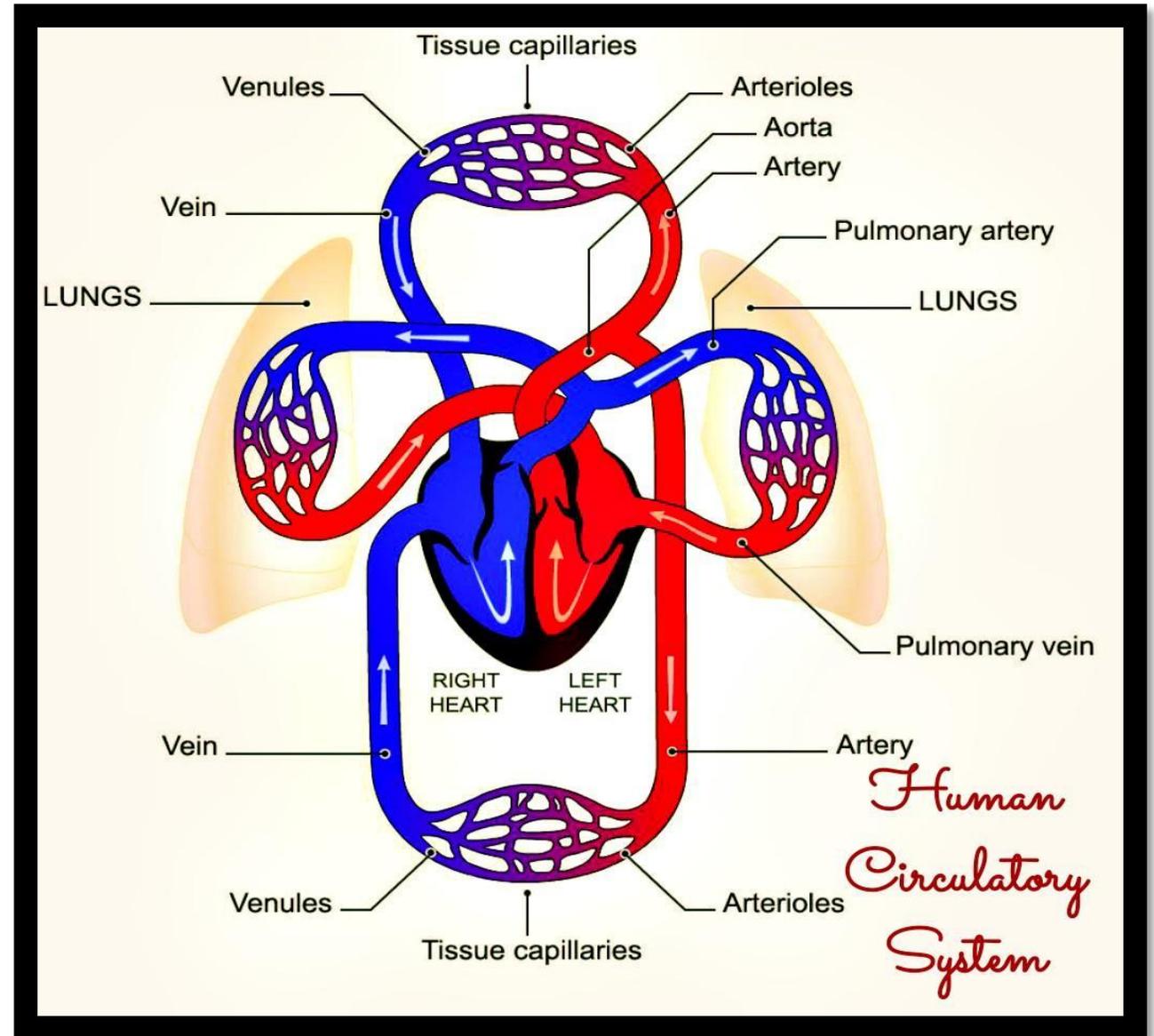
Conducts in two direction unlike **Xylem** which conducts in only one direction.



Complex Permanent Tissue

HUMAN CIRCULATORY SYSTEM

- **CIRCULATORY SYSTEM-** It is the complex system of Organs which are responsible for Transportation of the Materials inside the Human Body.



Types Of Blood Circulation In Human's

PULMONARY CIRCULATION- The route of movement of **blood** is from heart to the lungs and again back to the heart.

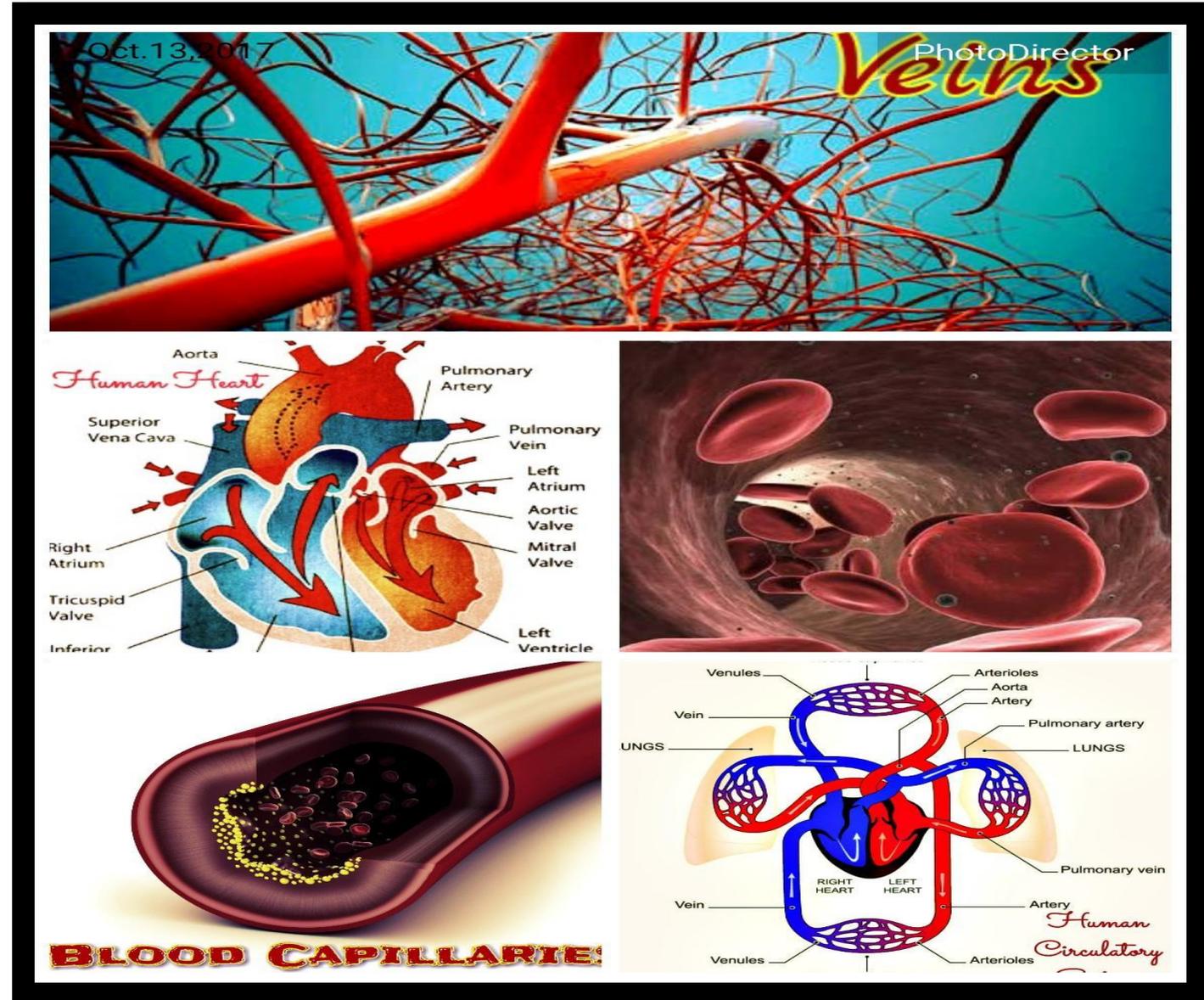
SYSTEMATIC CIRCULATION:-The route of movement of **blood** is from heart to the rest of the body and again back to the **heart**.

TWO TYPES OF CIRCULATION TOGETHER MAKE DOUBLE CIRCULATION:

DOUBLE CIRCULATION: A circulatory system in which blood travels twice through the heart in one complete cycle of the body.

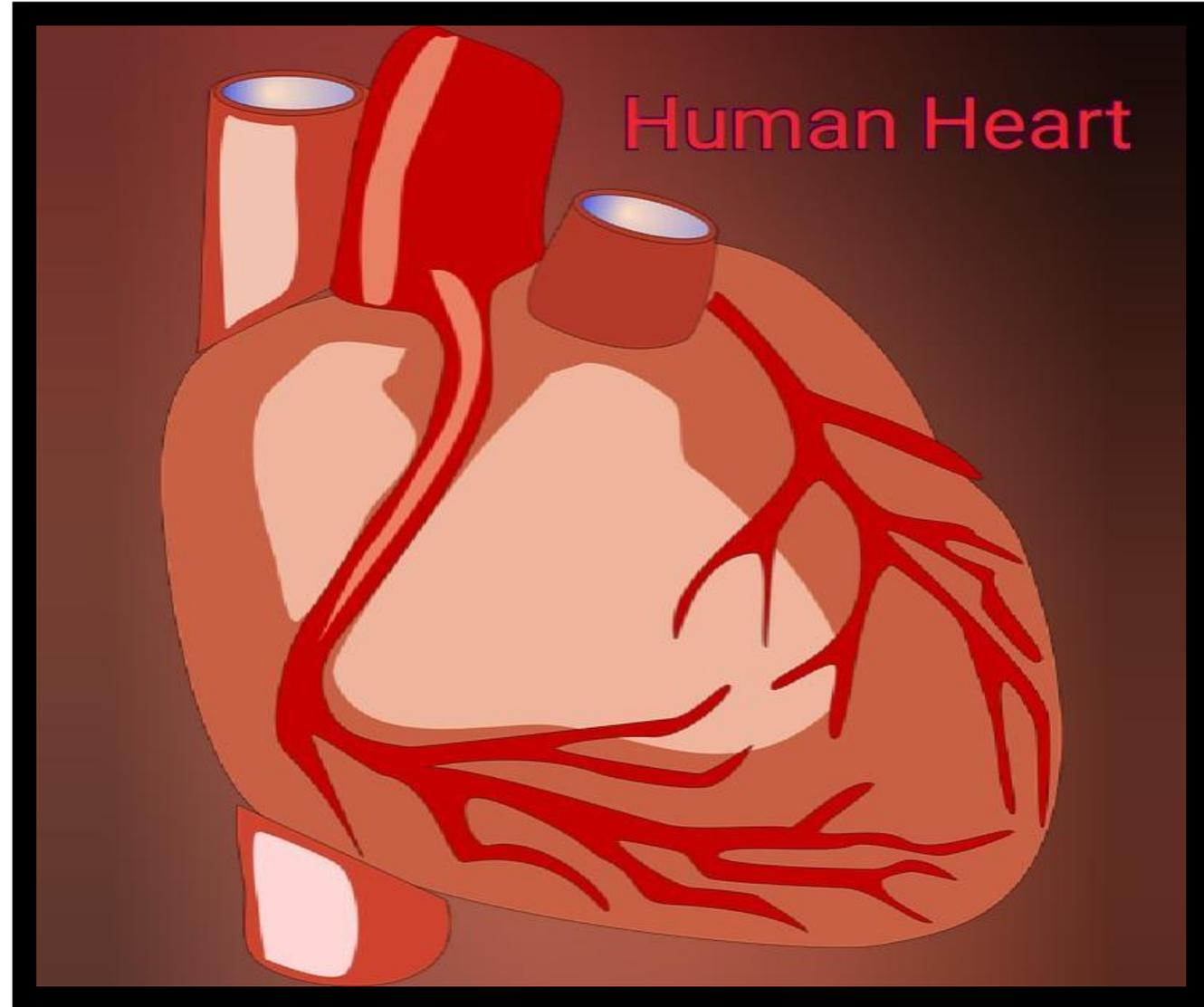
ORGAN OF THE CIRCULATORY SYSTEM

- **Heart** - Heart acts as a pump to push out blood.
- **Blood Vessels:** It is a Tubular structure (Pipes) through which blood flows.
- **Arteries**
- **Veins**
- **Blood Capillaries**
- **Blood** - Red blood cells



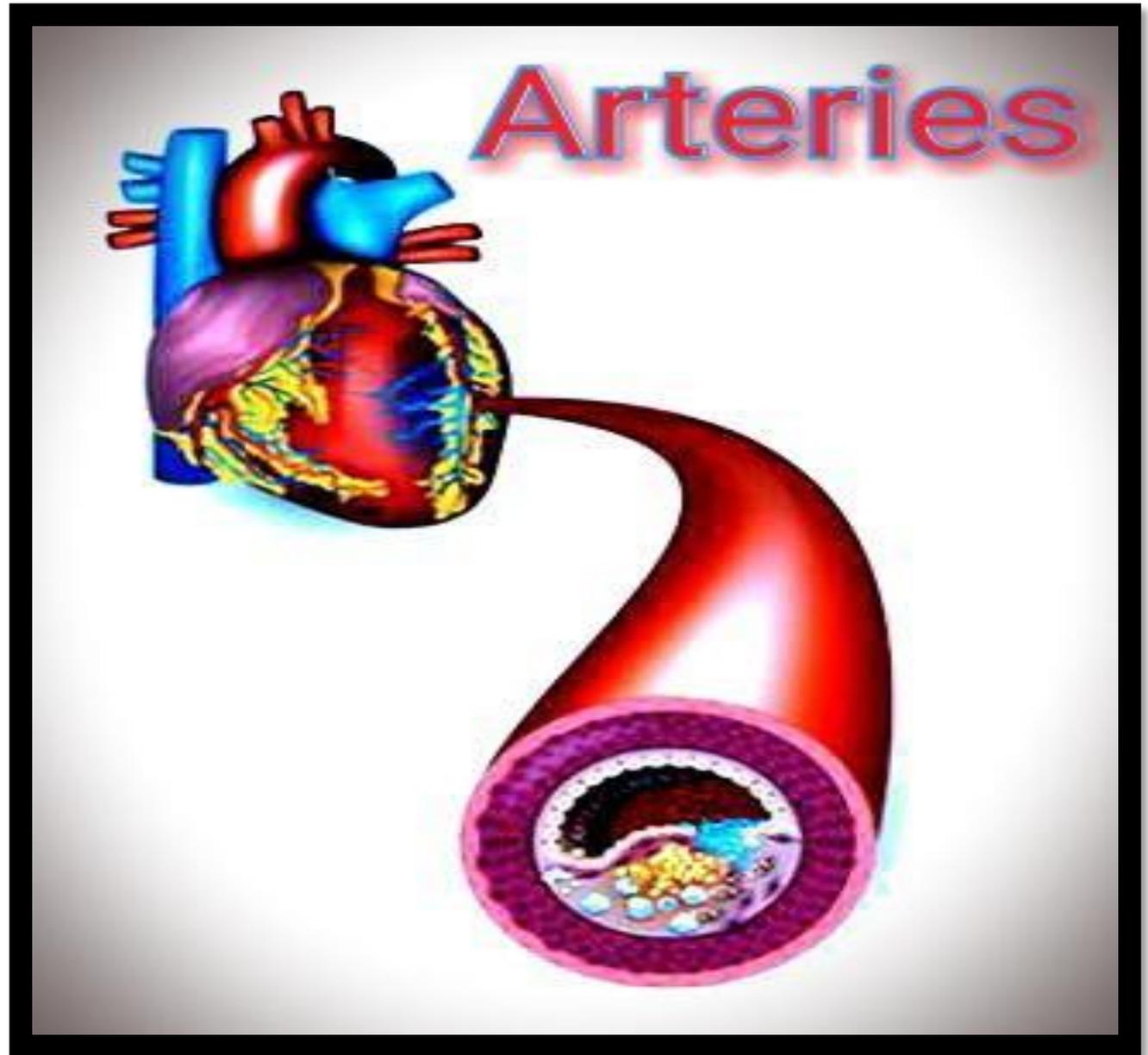
Characteristics Of Heart

- **Shape** - Roughly triangular.
- **Made of** Cardiac Muscles.
- **Size** - Clenched fist
- **Heart** has **Four** Chambers.
- **Right & Left atrium** – Receive blood from two veins.
- **Right & Left ventricle** - Transport blood to the entire body and lungs.



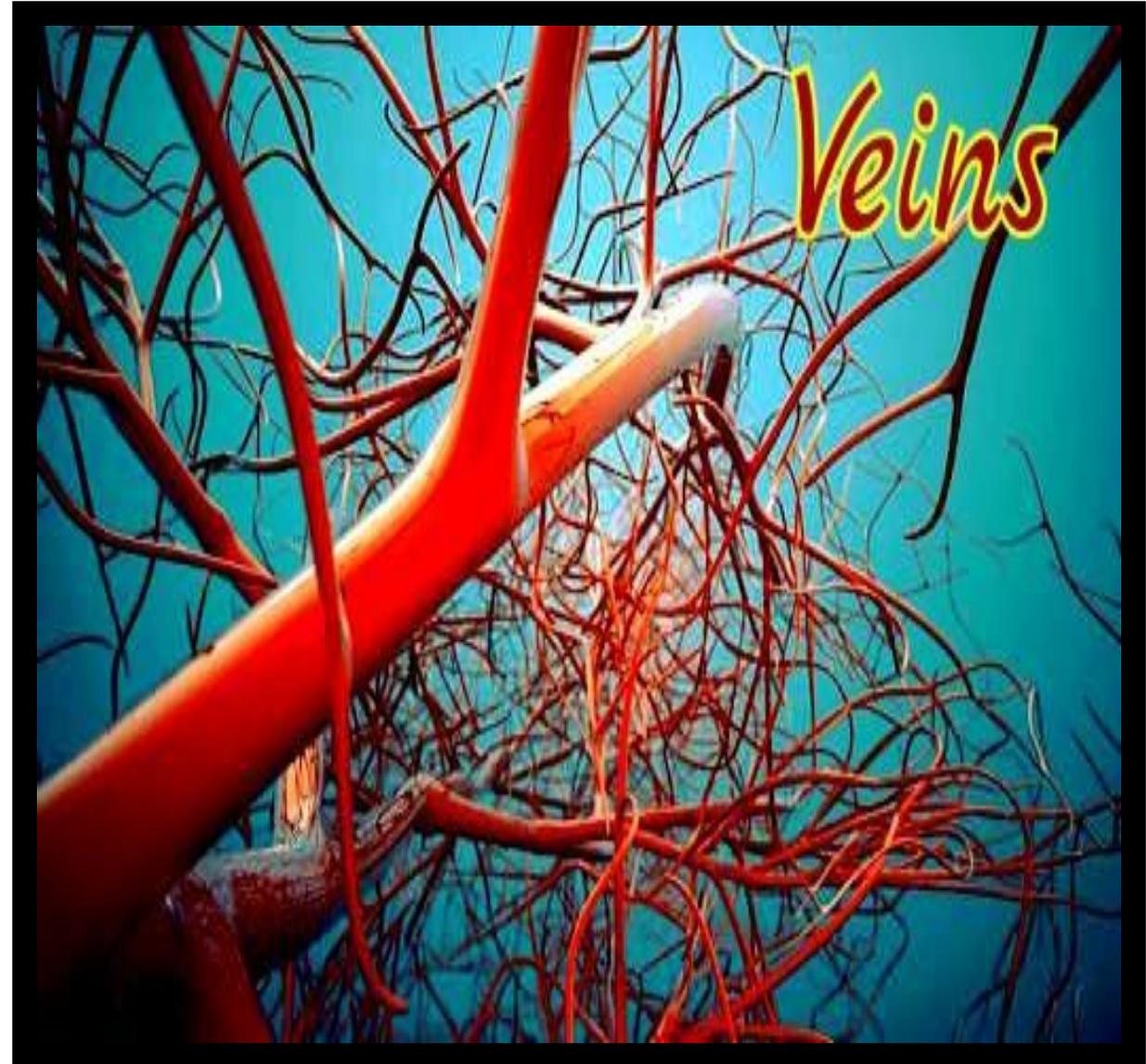
Characteristics Of Arteries

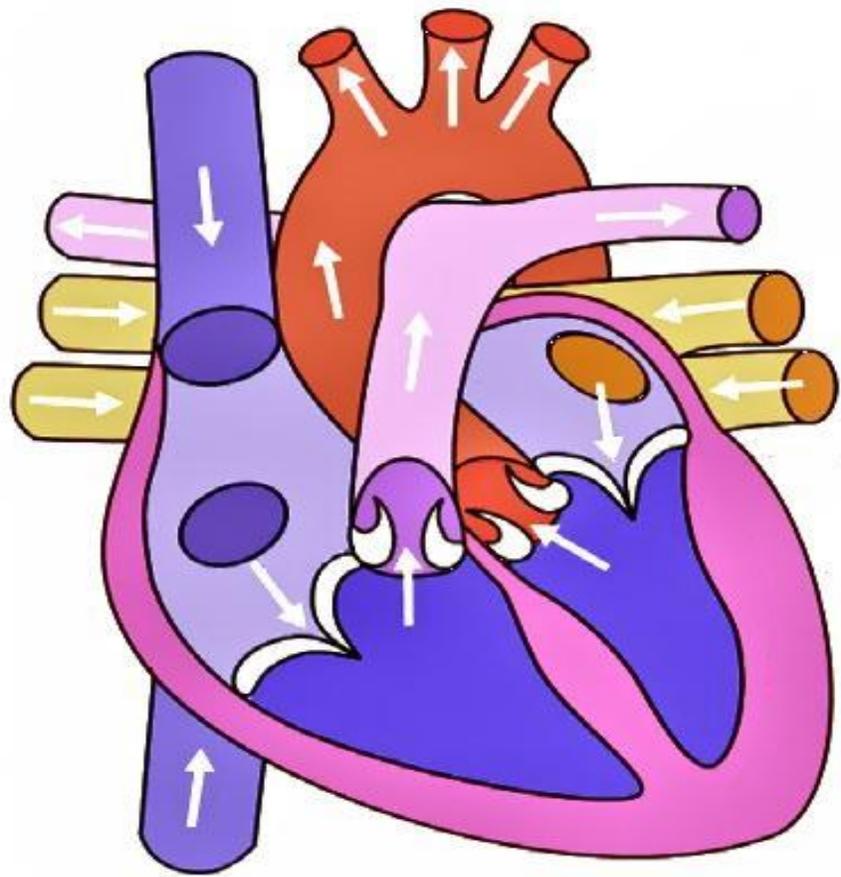
- **Structure-** Blood vessels have Thicker walls
- **Location-** Whole body.
- **Types Of Arteries:**
- **Aorta** linked with the Left Ventricle.
- **Aorta** carries oxygenated.
- **Pulmonary artery** linked with the Right Ventricle
- **Pulmonary artery** carries deoxygenated blood from heart to lungs.



Characteristics Of Veins

- **Structure-** Wider and thin blood vessels.
- **Location-** Whole body.
- **Types Of Veins:**
- **Pulmonary veins-** linked with the Left Atrium.
- **Pulmonary vein Oxygenated** blood from lungs.
- **Vena Cava-** linked to the Right Atrium.
- **Vena cava carries** deoxygenated blood from all the parts of body.(except lungs)





Excretion

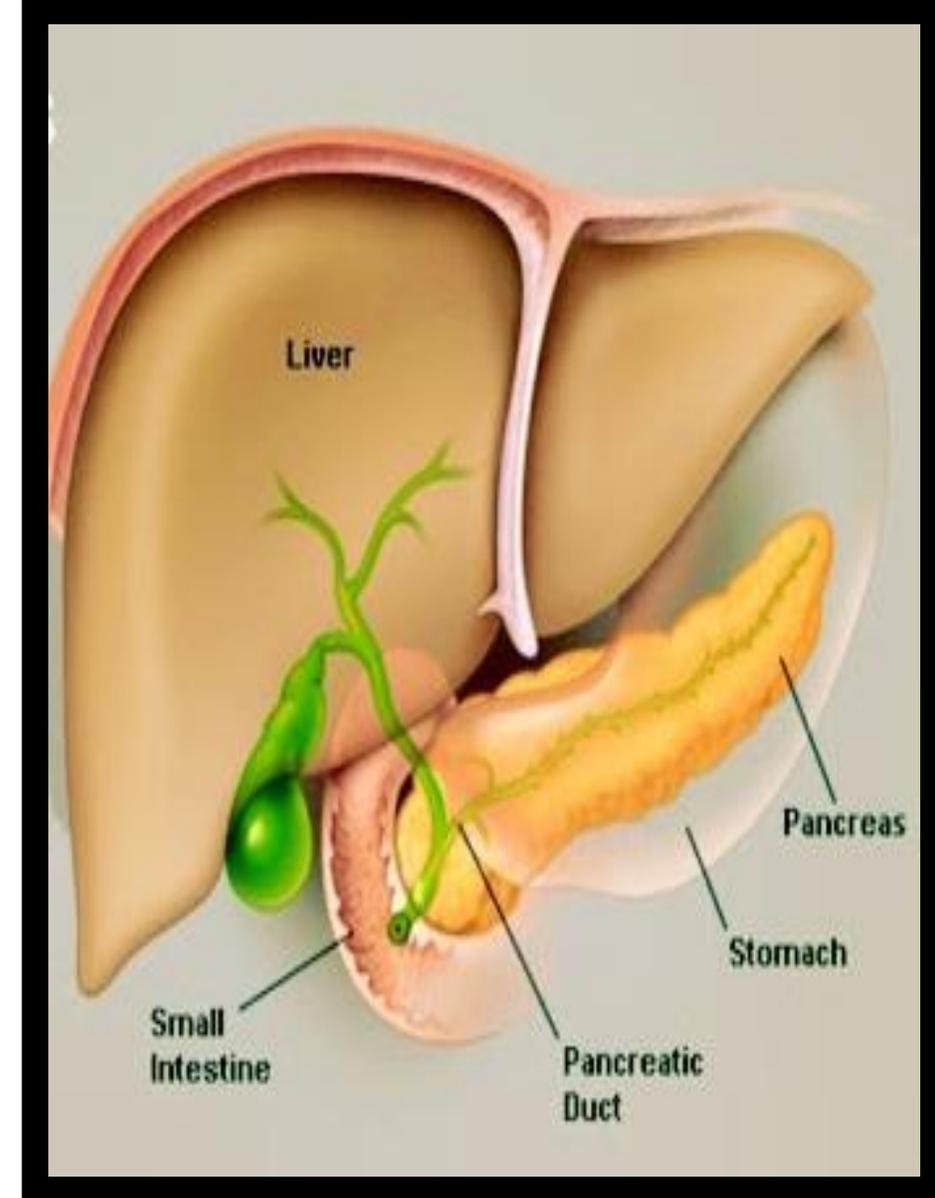
Excretion In Living Things

Excretion In Human's

- **Excretory system:-** Excretion removal of cellular waste.
- The process that collects & removes harmful and useless substances that are taken into the body from the blood, tissues, and cells.
- **Cellular waste**
- Heat, Water, Salts, CO₂, Urea
- Without excretion of poisonous wastes which build up in blood cells and tissues Could lead to serious illness & eventually DEATH!.

Functions Of Liver In Excretion

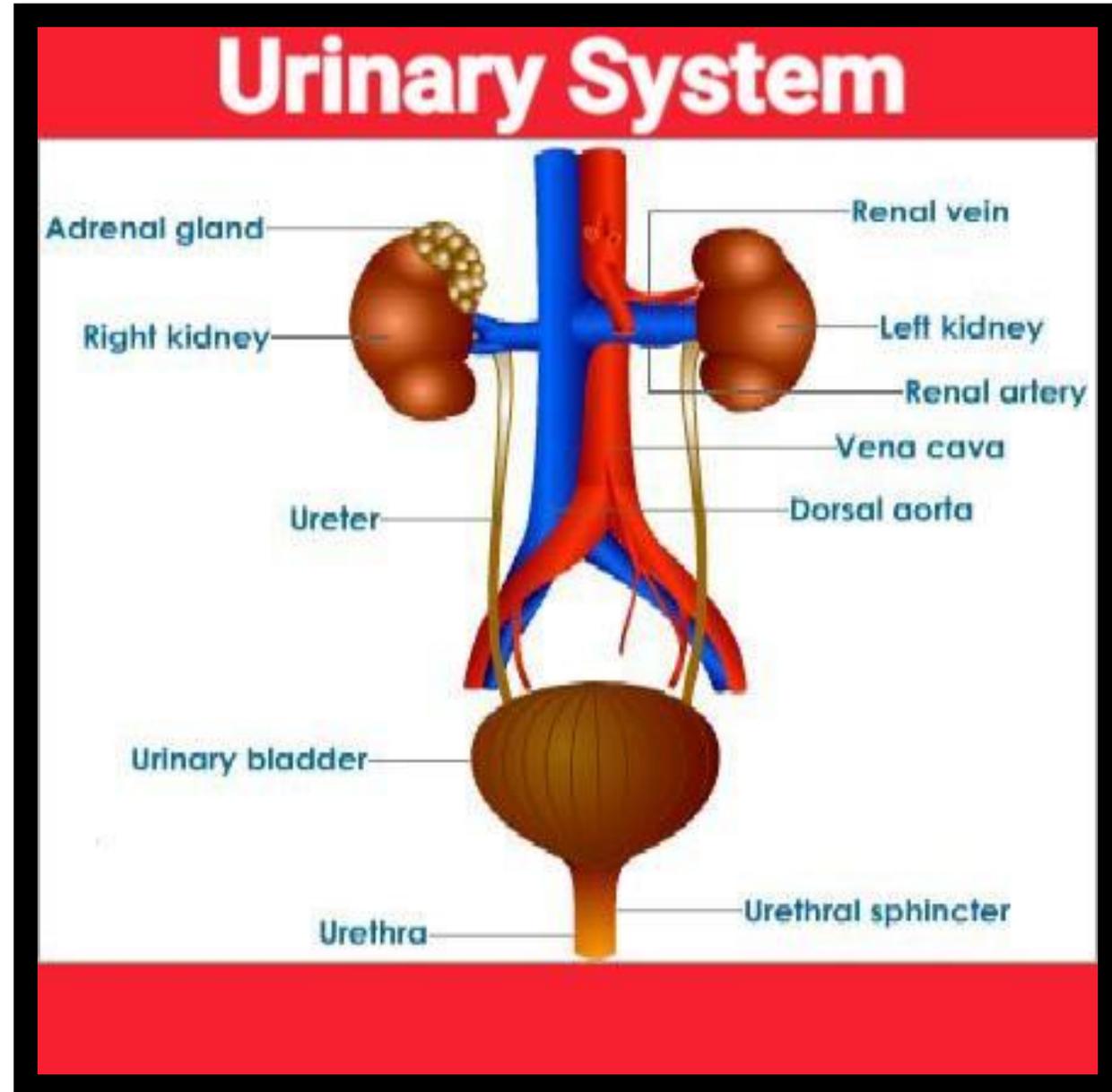
- **LIVER -**
- **Detoxifies Blood by**
- **Filtering :- Bacteria, alcohol, drugs, toxic substance &**
- **Changes them into inactive or less toxic forms.**
- **Excretes Bile- Contains , Worn-out RBC, Bile salts, Cholesterol**
- **Functions in Excretion:**
- **Changes toxic wastes (ammonia – from break down of amino acids) to Urea.**



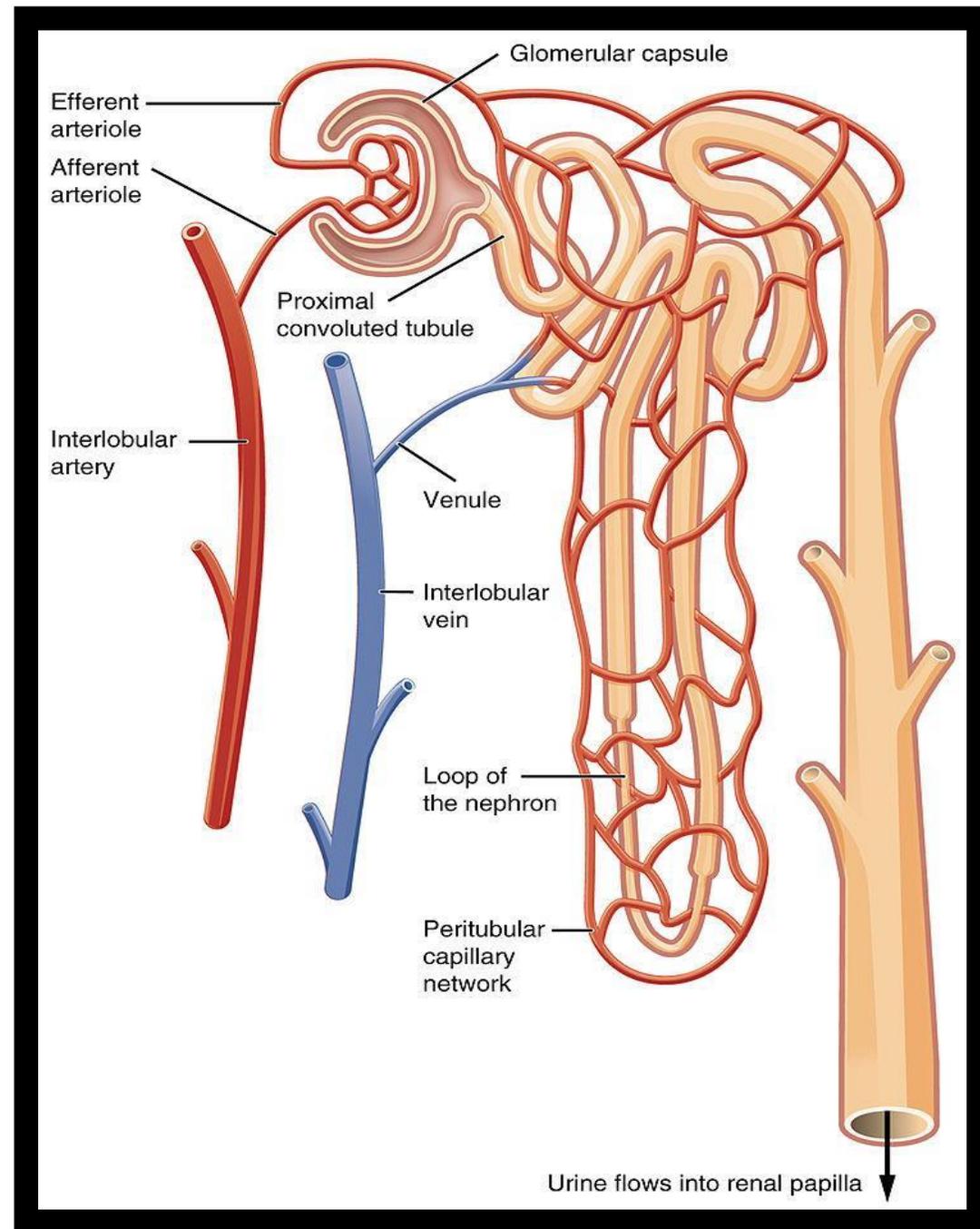
KIDNEY AND URINARY SYSTEM

- Urinary System – excretes waste and maintains homeostasis of body fluids.
- Kidneys (main organ of the system)
- Ureters
- Bladder
- Urethra

- **Kidneys**
- - Two
- - Fist sized
- - Bean shaped



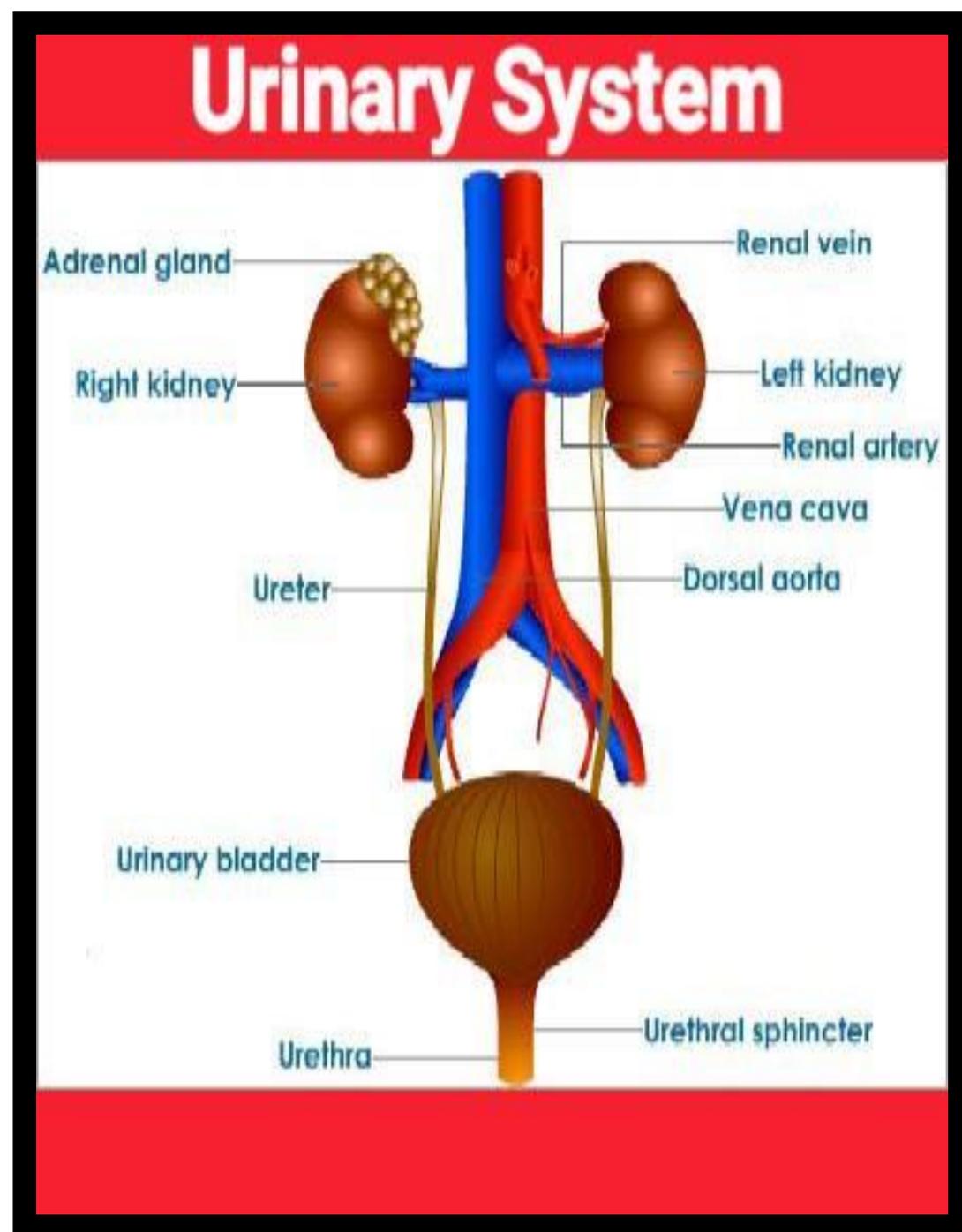
- **KIDNEY FUNCTIONS:**
 - **Nephron** (about one million per kidney)
 - Microscopic units that filter blood of wastes.
 - H₂O and waste taken from blood into nephron.
 - It Forms URINE.
 - **Glomerulus** (clump of capillaries)
- Location-At end of each nephron**
- Network of coiled tubes – diffusion of wastes - while useful substances & water are reabsorbed.



- **Urine**
- **Pale yellow solution**
- **Urea, H₂O, salts, other trace of Toxic substances.**

- **URINARY SYSTEM**

- **Ureters-** Narrow muscular tubes, Connect Kidney - Bladder
- **Bladder-** Muscular sac, Stores Urine
- **Urethra-** Tube leading from Bladder to outside of body.



Failures of Homeostasis

- **Bladder & Kidney Infections** caused by bacteria from colon/rectum entering urethra.
- **Kidney Stones** - crystallization of mineral salts & uric acid that block passage of urine
- **Kidney Disease** - caused by long term diabetes, infections, & chemical poisoning
- **Gout** – form of arthritis where excess production of uric acid leads to deposits of crystals in joints (esp. toes)