



Life Processes



Topics

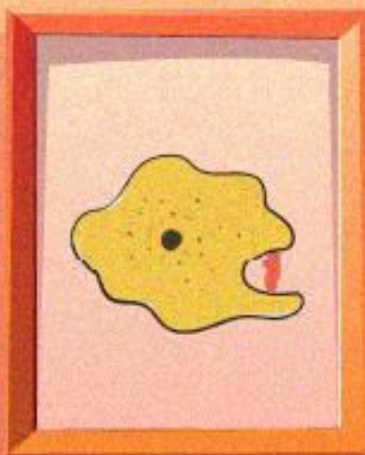
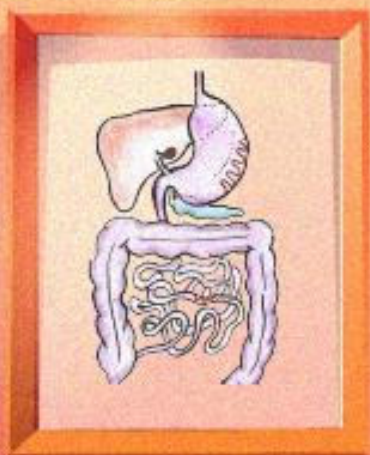


1. Nutrition

2. Respiration

3. Transportation

4. Excretion



1. Nutrition

Nutrients

Organic or inorganic chemical substances required for survival

- ★ Carbohydrates
- ★ Proteins
- ★ Fats
- ★ Vitamins
- ★ Minerals

1.1 TYPES OF NUTRITION

Autotrophic Nutrition

Auto - Self, Trophic - Feeding

Prepare their own food

★ Chemosynthesis

Preparing food using **chemical energy**
e.g., Sulphur Oxidising Bacteria

★ Photosynthesis

Preparing food using **light energy**
e.g., Plants, Algae



*Sunlight - Main source of energy for all organisms

O₂ - By product, Used for respiration

Heterotrophic Nutrition

Hetero - Other/Different

Depend on others for food

★ Saprophytic

Absorption of nutrients from **dead** and **decaying** matter e.g., Fungi

★ Parasitic

Absorb nutrients from the **host** organism
e.g., Leech, Cuscuta

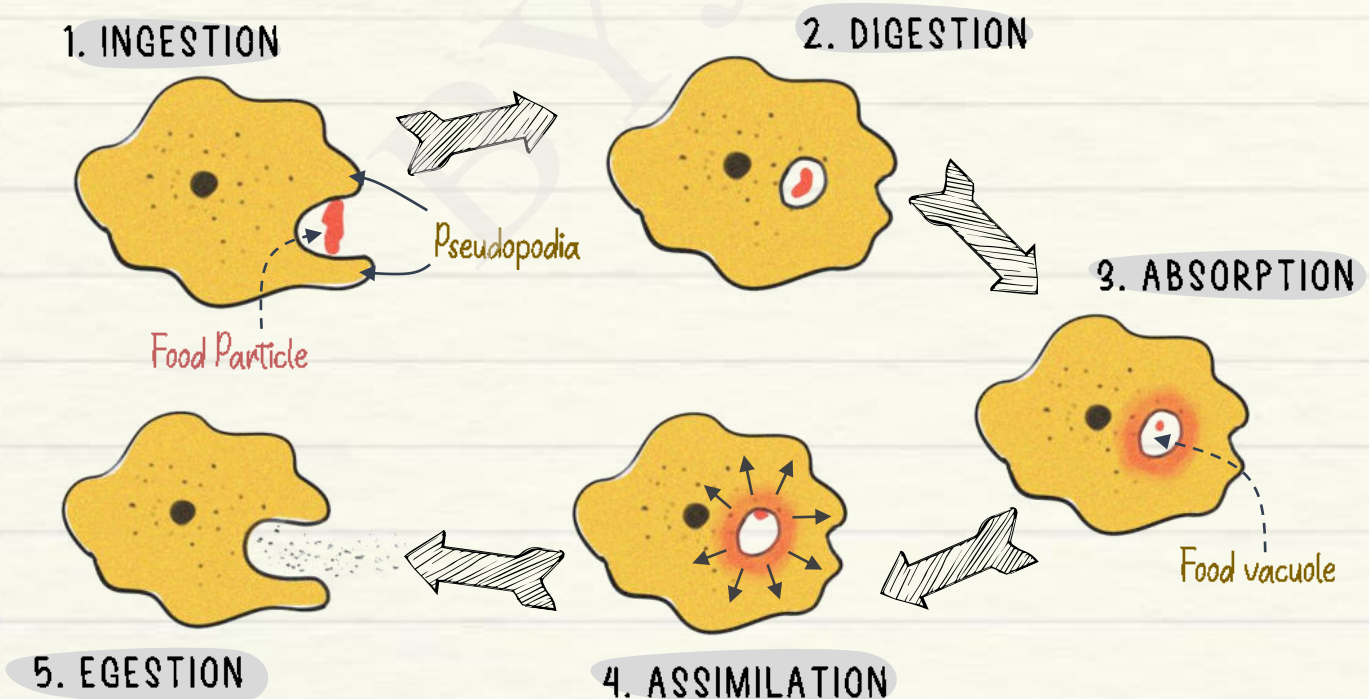
★ Holozoic

Food is taken in solid or liquid form from the outside and is **digested inside** the body e.g., Humans, Amoeba

1.2 Holozoic Nutrition Involves 5 stages

1. **Ingestion:** Process of intake of solid or liquid food
2. **Digestion:** Conversion of complex food particles into simple and absorbable form
3. **Absorption:** Process of taking up of digested food or nutrients by the body
4. **Assimilation:** Utilisation of absorbed nutrients for body functions
5. **Egestion:** Removal of undigested food through anus

1.2. a) Nutrition in Amoeba



Phagocytosis: Processes of engulfing food, other particles or entire cell

1.2. b) Human Digestive System

i) Digestive Tract

- Alimentary canal

Mouth: Site of ingestion

Pharynx: Common passage for food and air

Oesophagus or Food pipe: Part which connects mouth to stomach

Stomach: Churning of food occurs by stomach muscles

Small intestine

- ★ Has 3 parts - duodenum, jejunum & ileum
- ★ Digestion is completed and site for absorption

Large intestine

- ★ Has 3 parts - caecum, colon & rectum
- ★ Absorption of water and minerals

Anus: Exit point of faeces

ii) Digestive Glands

- Associated glands

Salivary glands: Secrete saliva which contain Salivary amylase

Liver

- ★ Secretes bile juice
- ★ Bile helps in emulsification of fat

Gastric glands: Secrete gastric juice which contains - HCl, mucus and pepsinogen

Gallbladder: Stores and releases bile juice into the duodenum

Pancreas: Secrete pancreatic juice which contains - trypsin, lipase & amylase

Intestinal glands: Secrete intestinal juice



Note: Peristalsis is the series of wave-like muscle contractions that helps the food to move through the digestive tract.

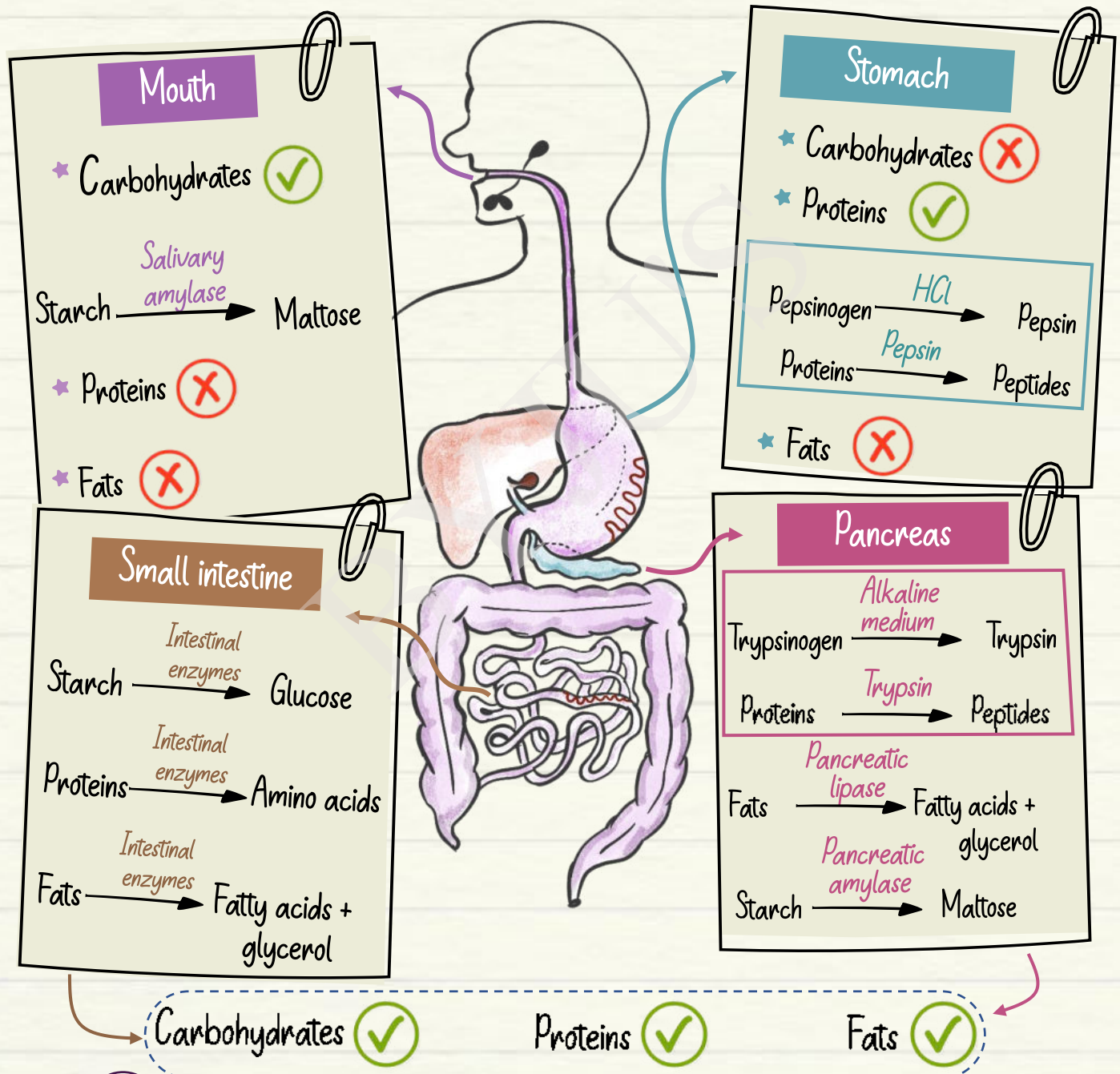
1. Ingestion

Food is ingested into the mouth where teeth and tongue break it into smaller parts

2. Digestion

Begins in mouth and ends in small intestine

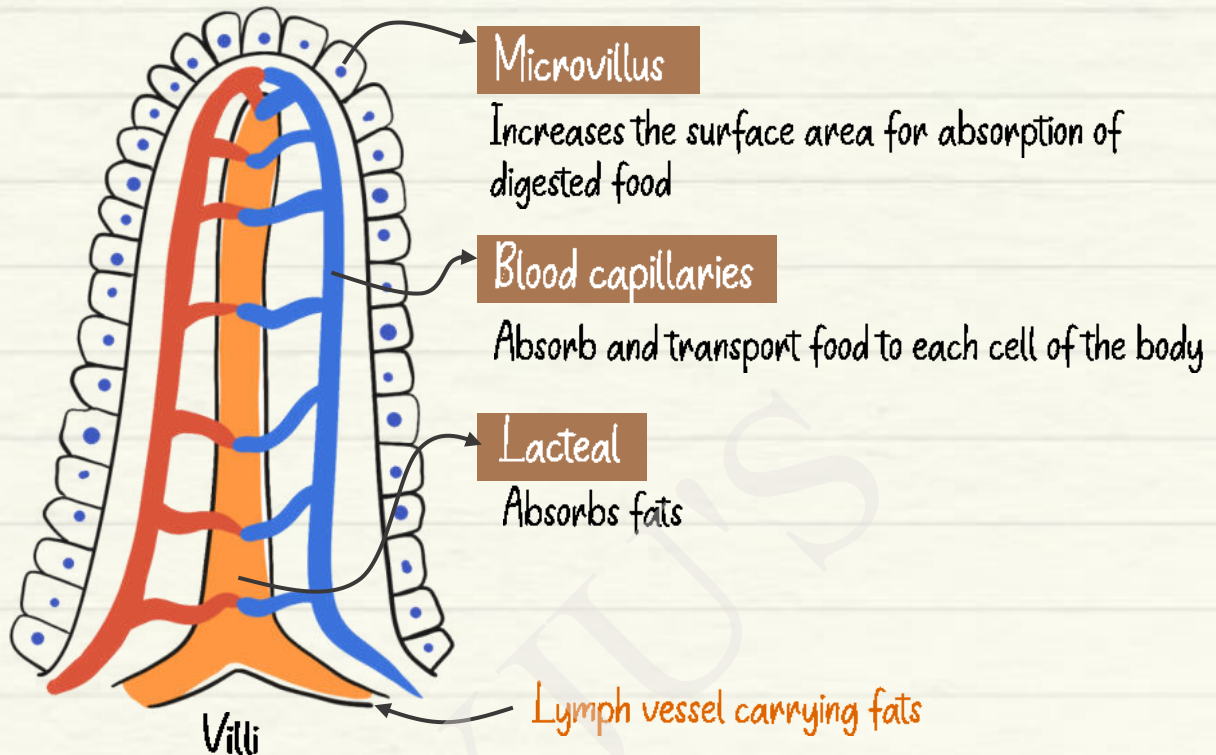
Enzymes in Digestion



Note: Pancreatic secretions are released into the small intestine.

3. Absorption

- ★ Occurs in small intestine



4. Assimilation

Assimilation is utilisation of absorbed nutrients for:

- ★ Growth and repair
- ★ Energy production
- ★ Storage
- ★ Production of complex molecules

5. Egestion

Removal of undigested food through the anus

Mind Map

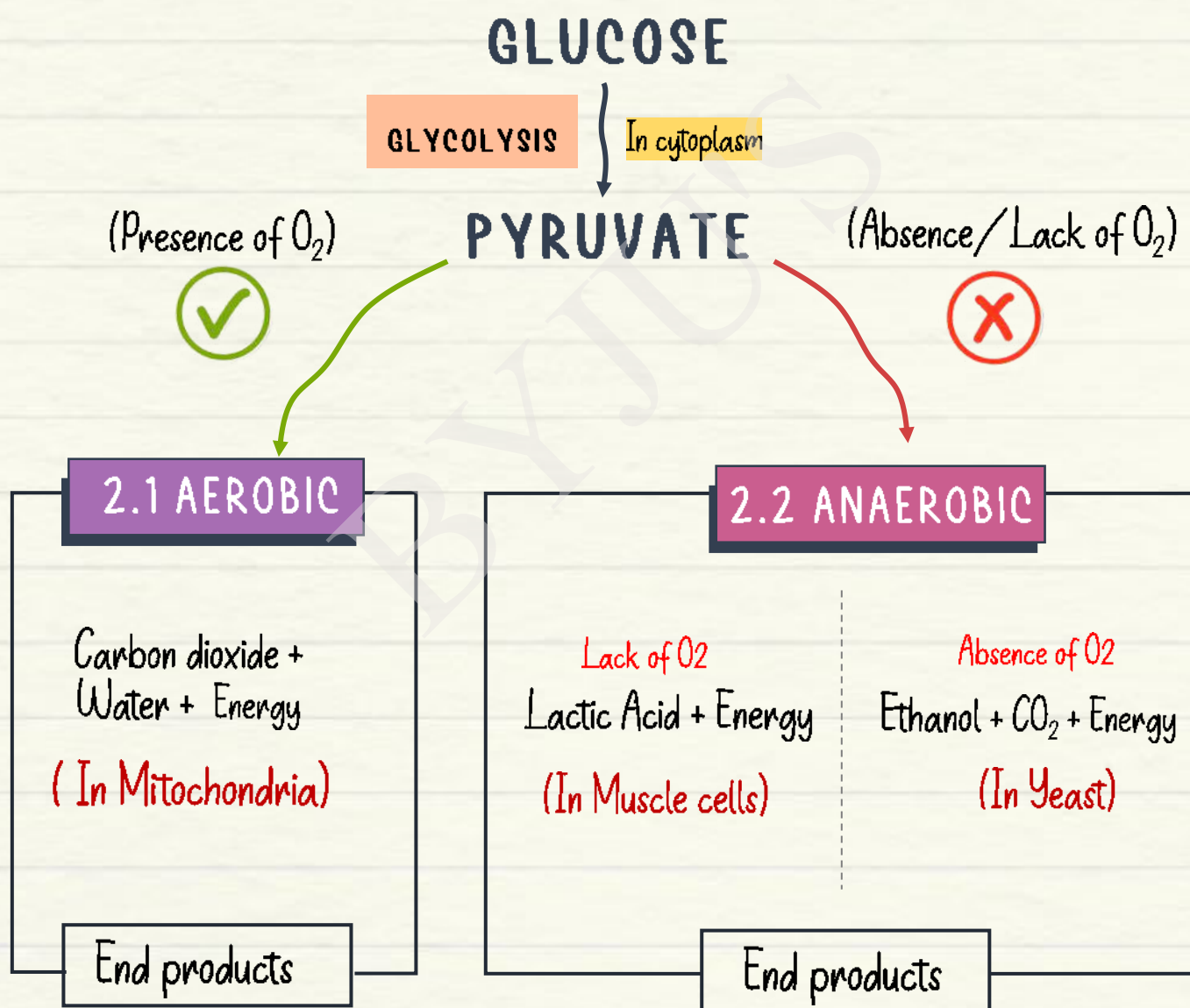


2. Respiration

Respiration

It is the process in which complex organic material is oxidised (broken down) to release energy in the form of **ATP**.

ATP
(Adenosine triphosphate)
– Energy currency of cells



- a) Complete oxidation of glucose
- b) Energy = up to 38 ATP (more)
- c) Occurs in cytoplasm and mitochondria

- a) Partial oxidation of glucose
- b) Energy = 2 ATP (lesser)
- c) Occurs in cytoplasm of cell.

2.3 Human Respiratory System

NOSTRILS

Opening through which air enters and leaves the body



NASAL CHAMBER

Filters and warms air, senses smell



PHARYNX

Common passage for air and food



LARYNX

- Voice box
- Guarded by epiglottis while swallowing



TRACHEA

Windpipe supported by C-shaped cartilage



BRONCHI

Respiratory tube with cartilage.



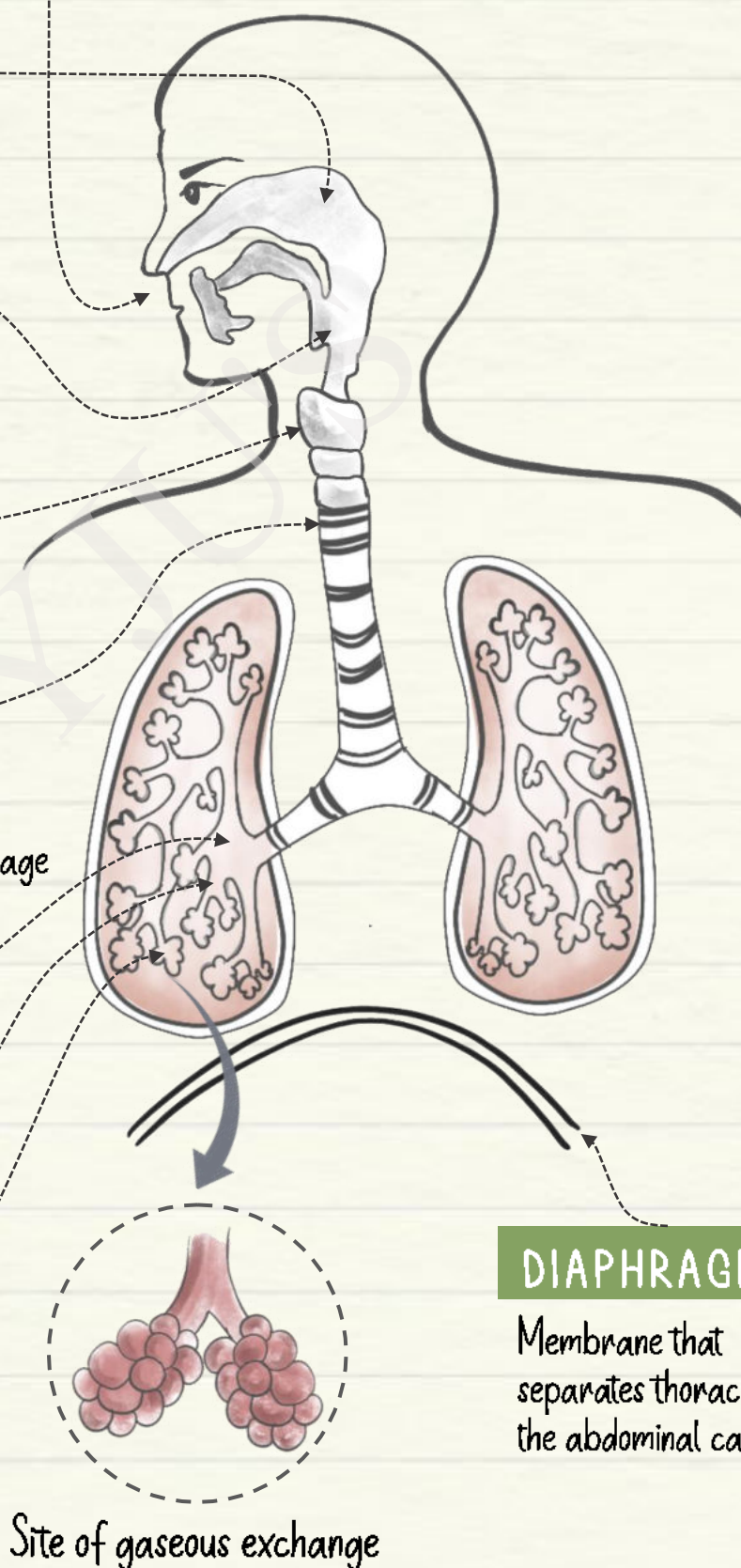
BRONCHIOLES

Terminal branch of bronchi



ALVEOLI

Air sac



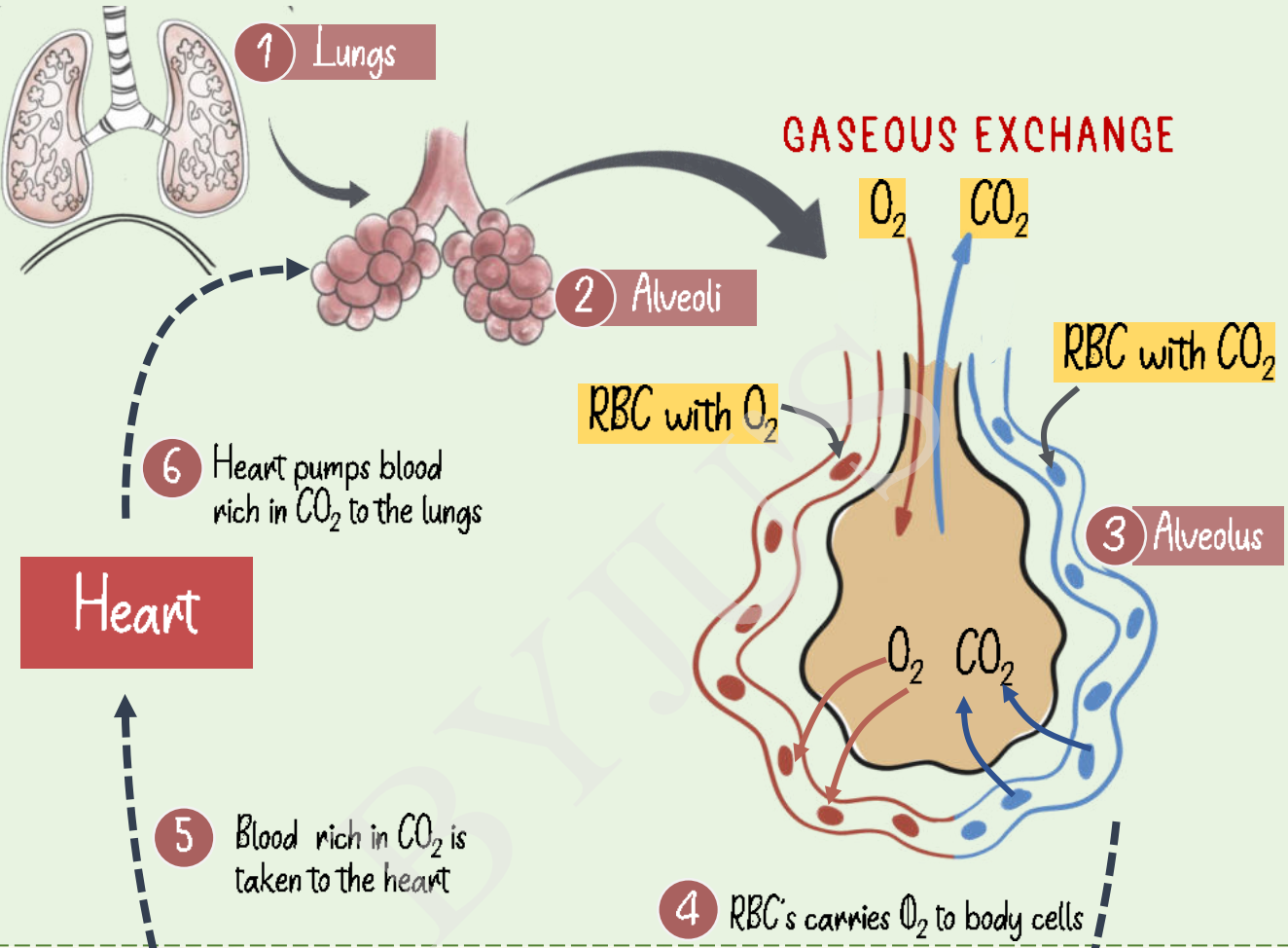
DIAPHRAGM

Membrane that separates thoracic and the abdominal cavity

Site of gaseous exchange

External Respiration (Breathing)

Involves breathing in air rich in oxygen into the lungs and breathing out air rich in carbon dioxide



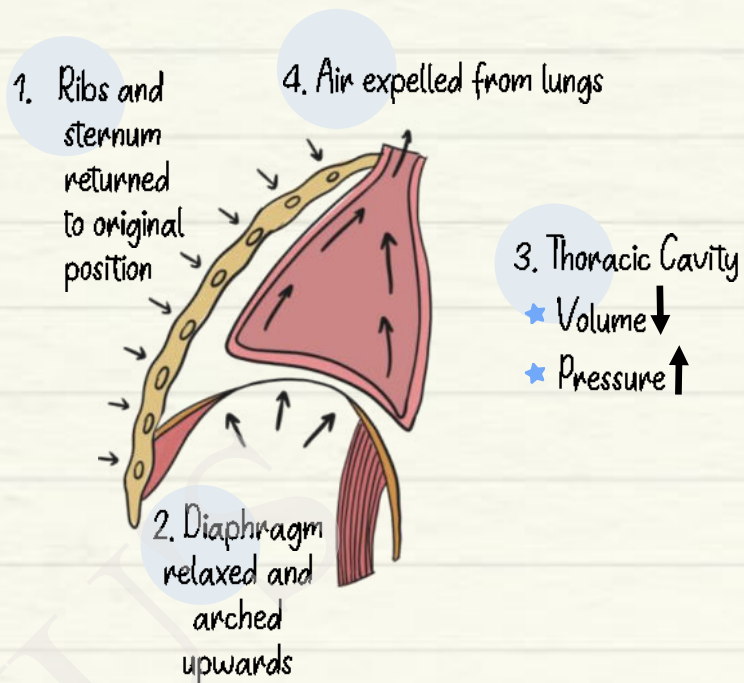
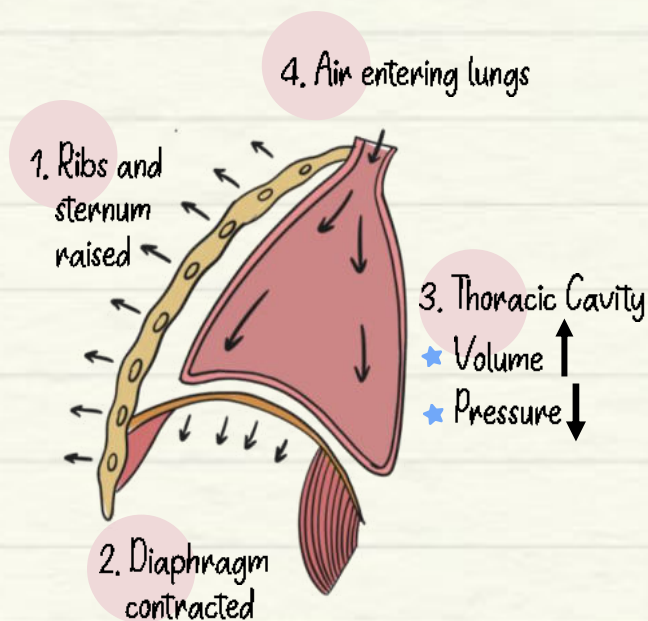
CELLULAR RESPIRATION
Cell use O₂ to generate energy

Internal Respiration
The exchange of gases between the bloodstream and cells

2.4 Mechanism of Breathing

2.4 (a) Inhalation

2.4 (b) Exhalation

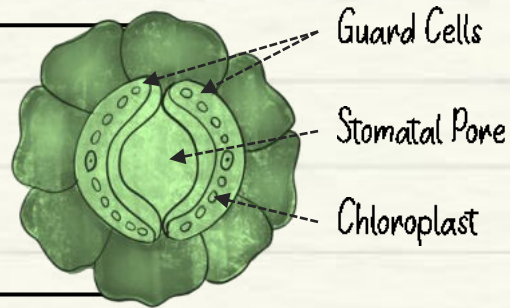


	INHALATION	EXHALATION
★ Type of Process	Active	Passive
★ Diaphragm and intercostal muscles	Contracts	Relaxes
★ Ribs	Moves upward and outward	Moves downward and inward
★ Diaphragm	Moves downward	Moves upward
★ Thoracic cavity	Volume ↑ Pressure ↓	Volume ↓ Pressure ↑
★ Effect	Air moves in	Air moves out

2.5 Respiratory Organs in Other Organisms

2.5.a In Plants

Special pores → stomata - on leaf
→ lenticels - on stem, root

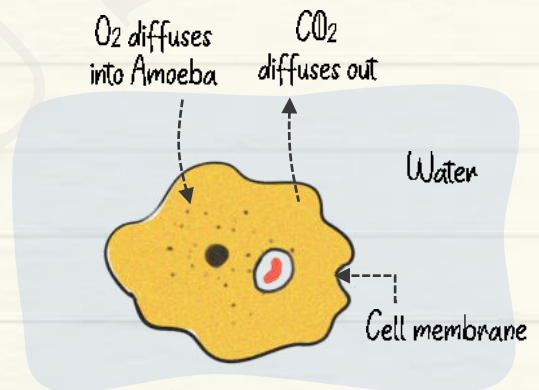


2.5.b In Animals

- Respiratory organs
 - Moist Skin/Lungs → Frog
 - Moist Skin → Earthworm
 - Gills → Fish
 - Trachea → Insects
 - Lungs → Mammals

2.5.c In Unicellular organisms

- Via, cell membrane (direct diffusion)



Note: Breathing and Respiration are NOT same

Breathing

- Physical process
- No release of energy
- Modes of breathing differ among organisms

Respiration

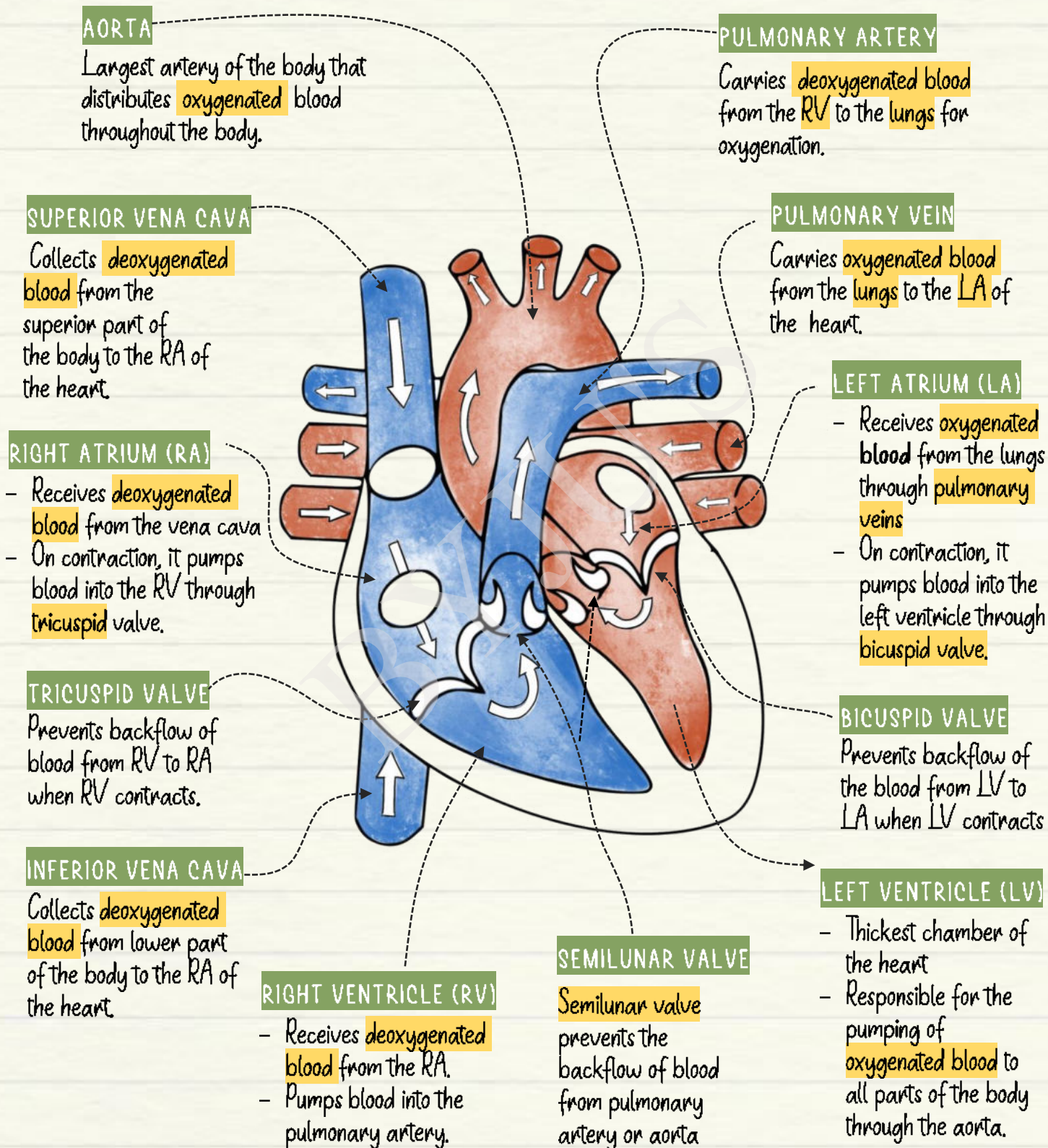
- Chemical process
- Energy is released
- Process of respiration is same in all

Mind Map



3.1. The Heart

(The pumping organ)

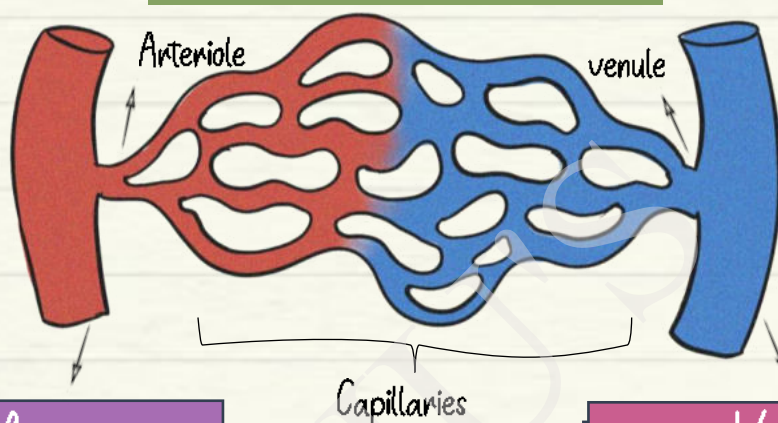


- ★ Part of the body that lies above heart - Superior
- ★ Part of the body that lies below heart - Inferior

3.2. Blood Vessels



ARTERIES V/S VEINS



Artery

- ★ Carries blood **away from heart**
- ★ Blood flows under high pressure
- ★ Has thick elastic wall
- ★ Does not have valves.
- ★ Carries **oxygenated blood** except **pulmonary artery**.

Vein

- ★ Carries blood **towards the heart**
- ★ Blood flows under low pressure
- ★ Has thin inelastic wall.
- ★ Has valves to prevent backflow of blood
- ★ Carries **deoxygenated blood** except **pulmonary vein**.

Blood pressure

- ★ The pressure exerted by blood on the **walls of the blood vessels**.
- ★ Normal blood pressure

120

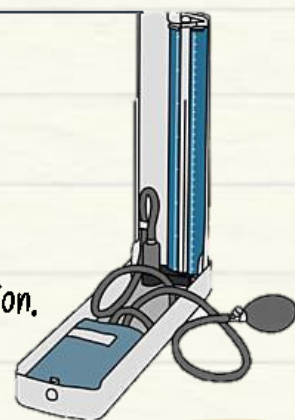
Systolic pressure:

Pressure of blood on walls of artery during ventricular contraction.

80

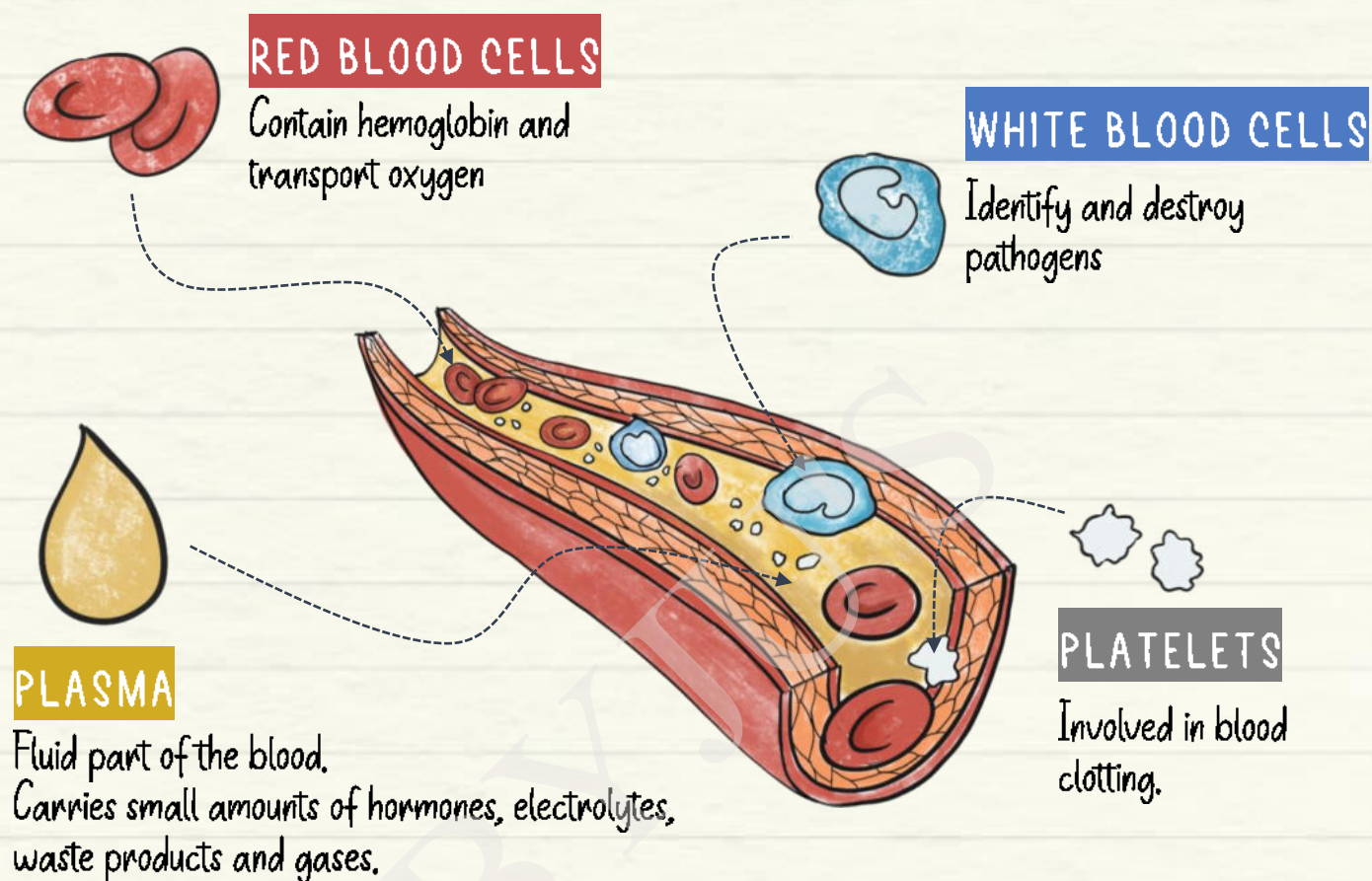
Diastolic pressure:

The pressure of blood on walls of artery during ventricular relaxation.



Sphygmomanometer

3.3. Blood components



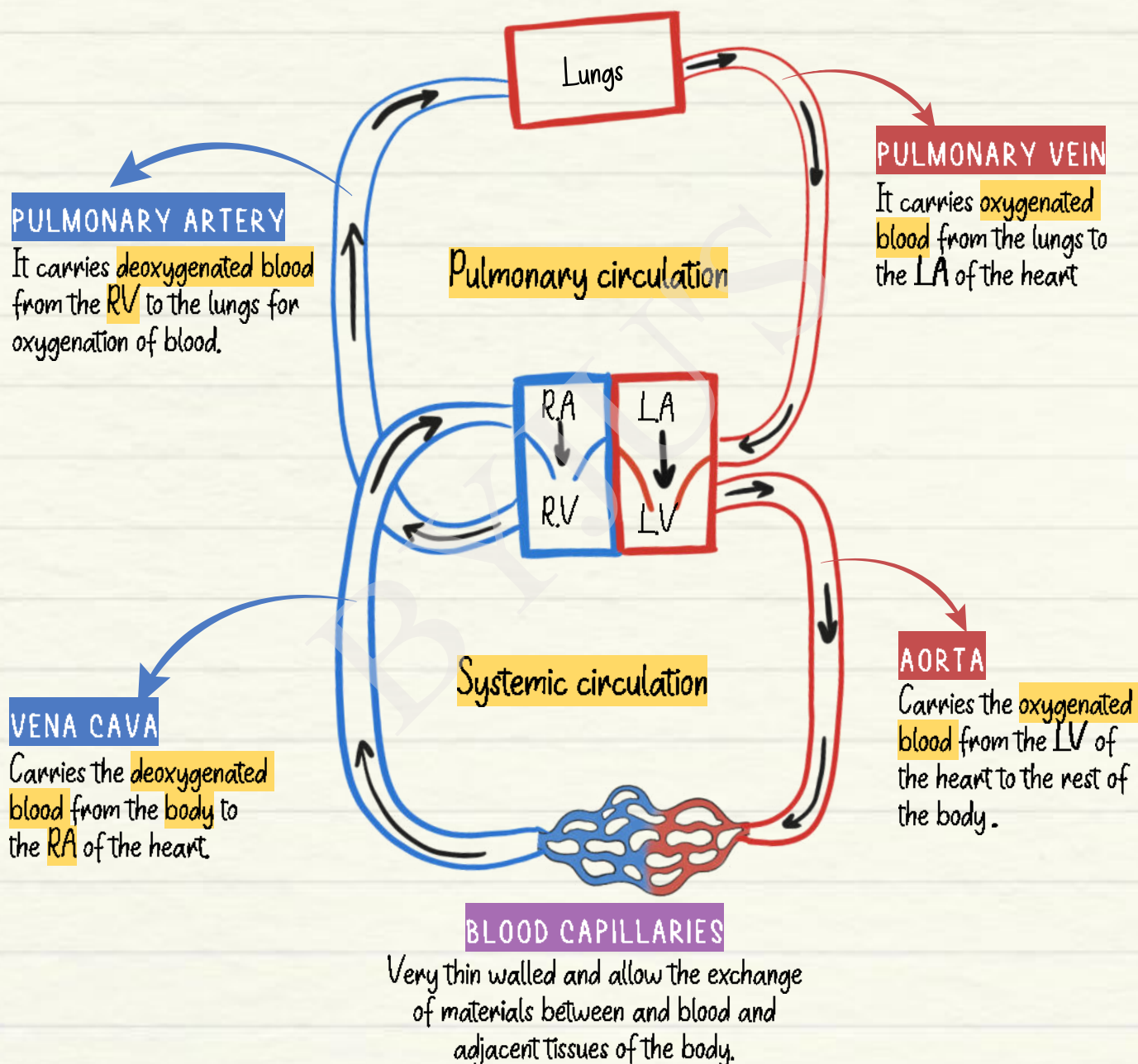
Lymph

- ★ Colorless tissue fluid that mostly consists of white blood cells.
- ★ Functions – Carries digested and absorbed fat from intestine into the blood.
 - Drains excess fluid from extra cellular spaces back into the blood.

3.4. Double Circulatory System

Double Circulation

Blood passes through the heart twice during each cycle.



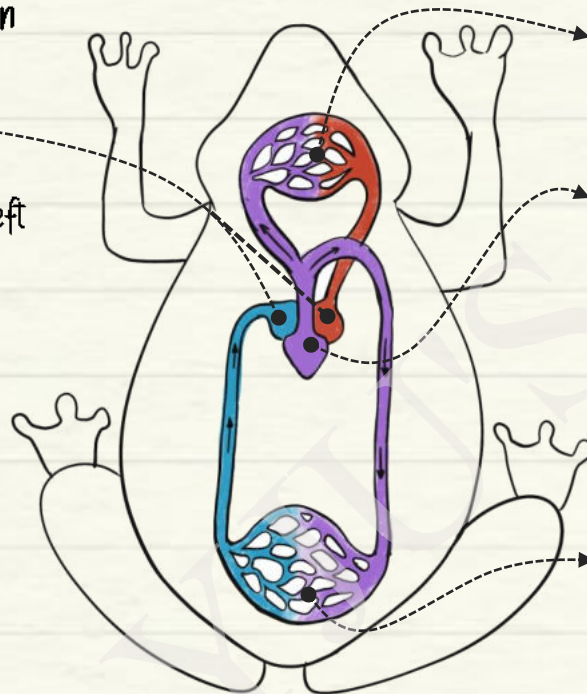
3.5. Transport in other animals

Circulatory system of amphibians and reptiles

- ★ Three chambered heart
- ★ Double circulation

TWO ATRIUMS:

Right atrium receives deoxygenated blood while left atrium receives oxygenated blood



blood capillaries in lungs

VENTRICLE

Mixing of oxygenated and deoxygenated blood occurs in ventricles.

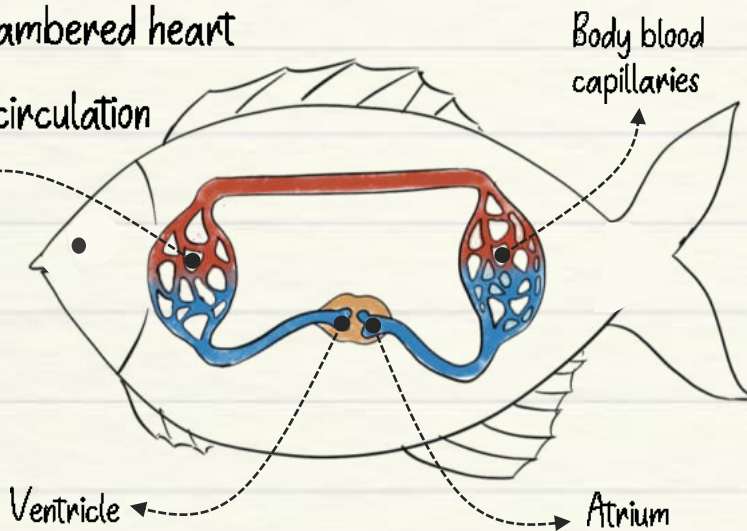
Blood capillaries for rest of the body

These animals does not use energy to maintain body temperature.

Circulatory System of fish

- ★ Two chambered heart
- ★ Single circulation

Gills blood capillaries

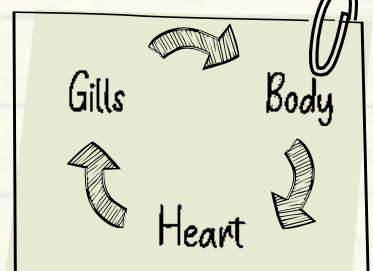


Body blood capillaries

Ventricle

Atrium

BLOOD CIRCULATION



3.6. Transportation in Plants

- ★ Transportation of food and water takes place separately in plants.

Xylem

- ★ Transports water and minerals from root to all other parts of the plant.
- ★ The flow is unidirectional.

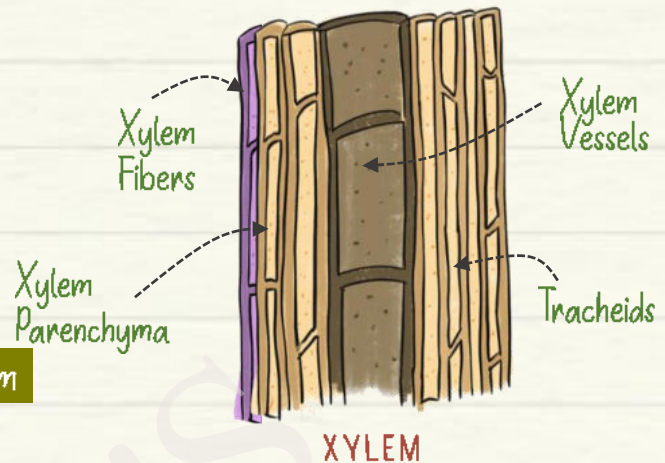
Forces responsible for transportation in xylem

ROOT PRESSURE

Osmotic pressure in roots which causes sap to rise in the plant.

TRANSPIRATIONAL PULL

It pulls the water column upwards as there is a continuous loss of water from leaves.



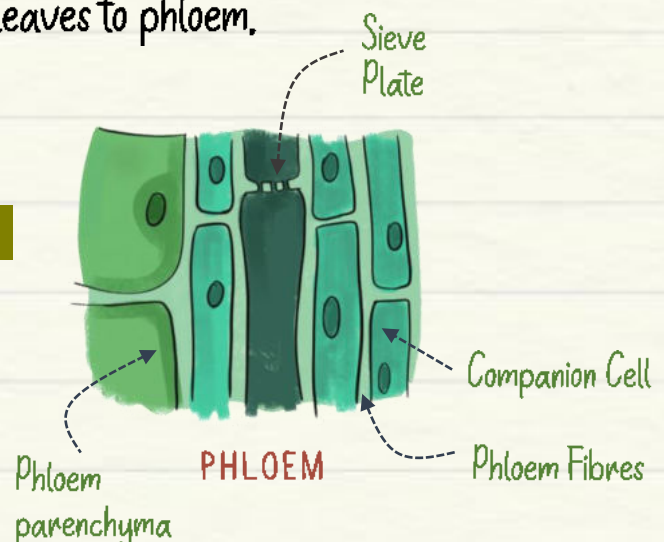
Phloem

- ★ Transport of food through phloem is called translocation.
- ★ Translocate sugar, amino acids, proteins and other ions.
- ★ ATP is used to transport sugar from leaves to phloem.
- ★ The flow is bidirectional.

Forces responsible for translocation in phloem

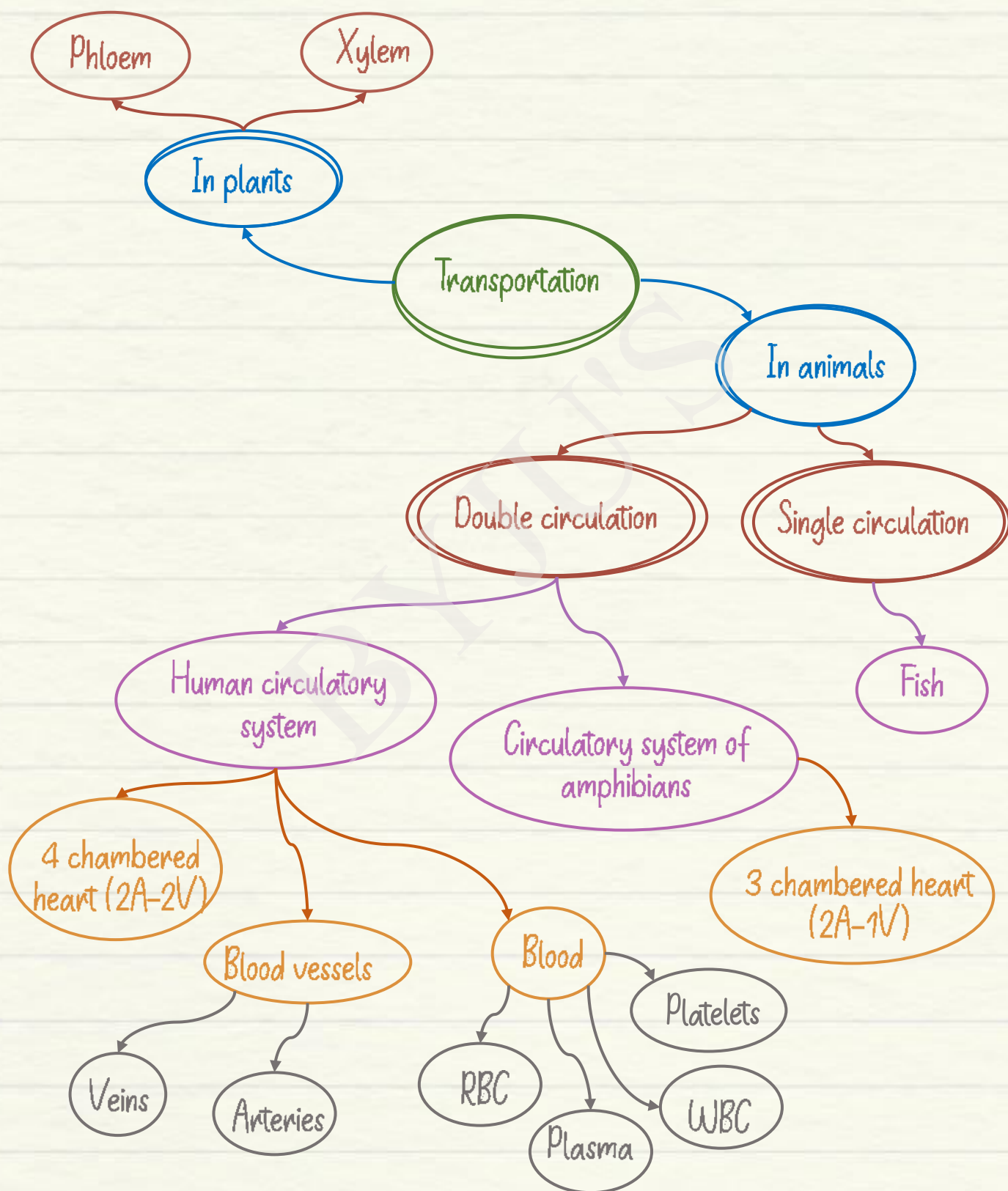
Osmotic Pressure

Osmotic pressure is responsible for the transfer of substances from phloem to tissues where food is required.





Mind Map



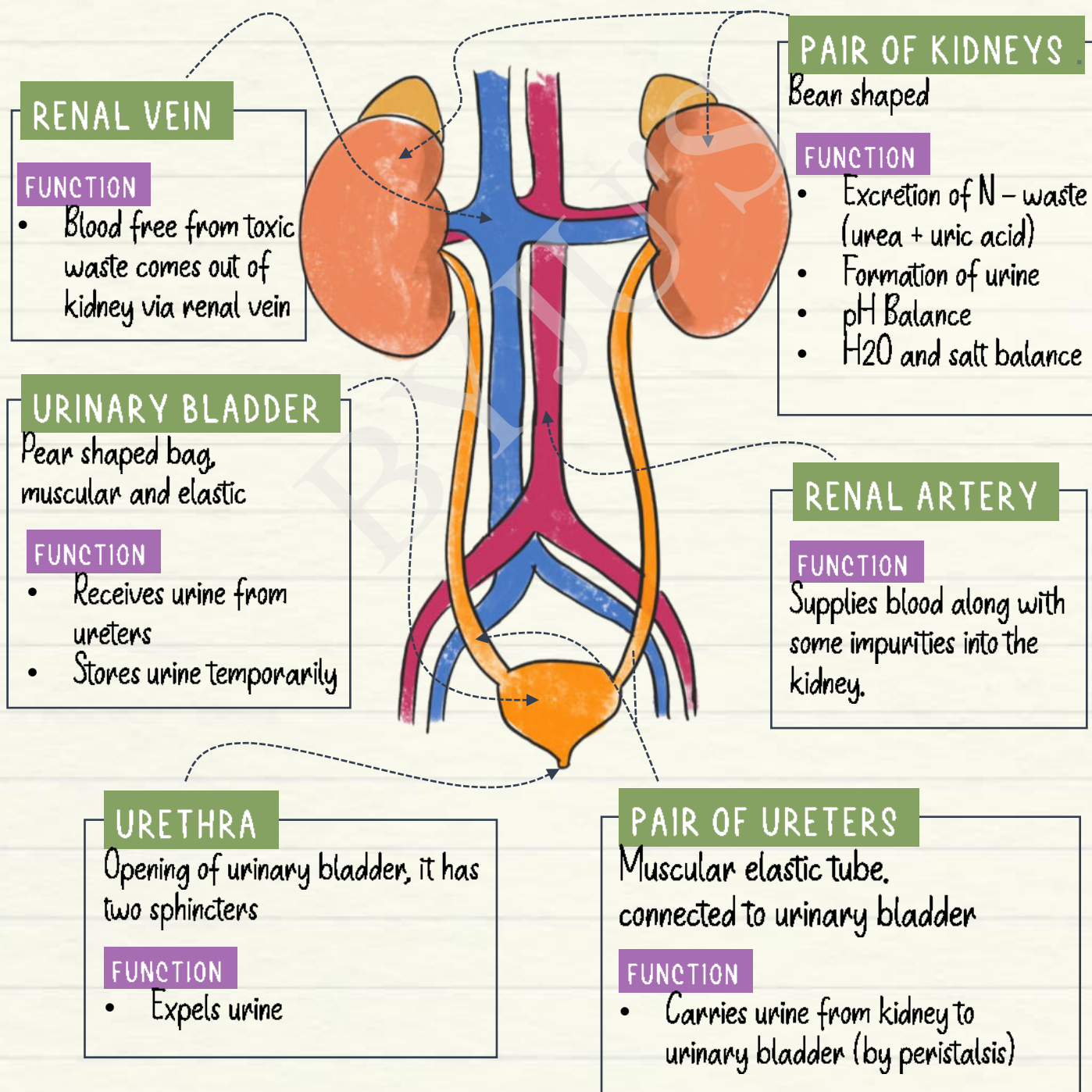
4. Excretion

4.1 Human Excretory System

Process of removing **metabolic waste** from the body.

Metabolic Waste

- ★ Nitrogenous waste (Ammonia → urea, uric acid) → Kidney
- ★ CO₂ → Lungs
- ★ H₂O → Skin



RENAL VEIN

FUNCTION

- Blood free from toxic waste comes out of kidney via renal vein

URINARY BLADDER

Pear shaped bag, muscular and elastic

FUNCTION

- Receives urine from ureters
- Stores urine temporarily

URETHRA

Opening of urinary bladder, it has two sphincters

FUNCTION

- Expels urine

PAIR OF KIDNEYS

Bean shaped

FUNCTION

- Excretion of N - waste (urea + uric acid)
- Formation of urine
- pH Balance
- H₂O and salt balance

RENAL ARTERY

FUNCTION

Supplies blood along with some impurities into the kidney.

PAIR OF URETERS

Muscular elastic tube, connected to urinary bladder

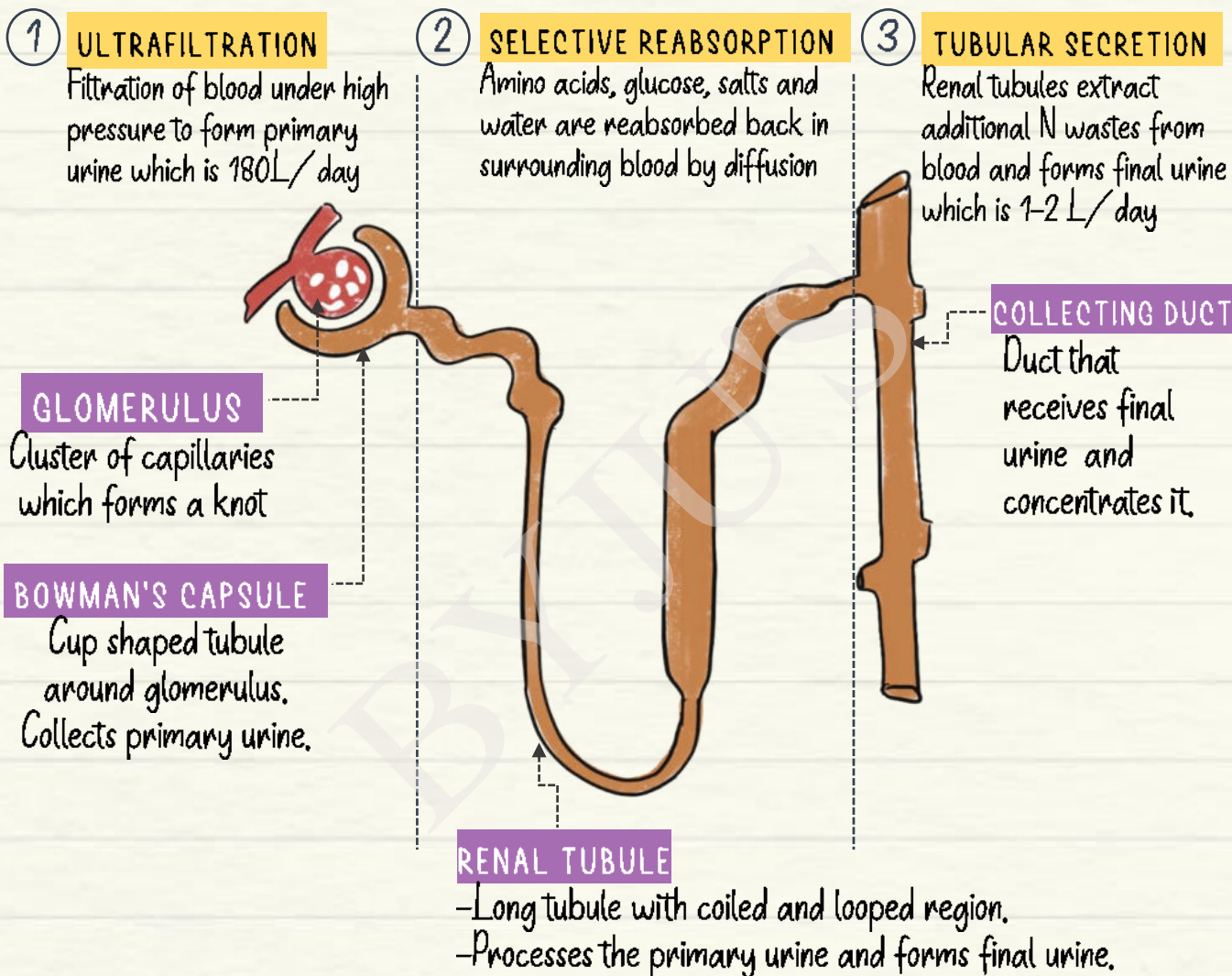
FUNCTION

- Carries urine from kidney to urinary bladder (by peristalsis)

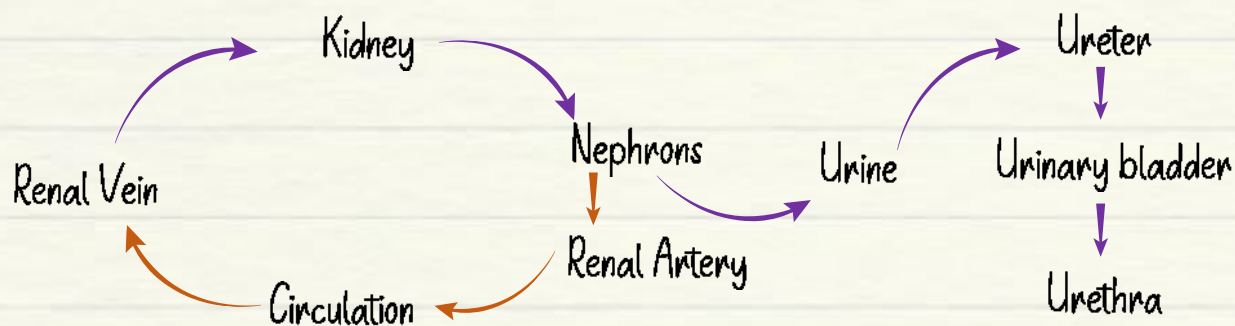
4.2 Structure of Nephrons

- Each kidney has about 1 million nephrons.
- Functional unit of Kidney

Steps of Urine Formation

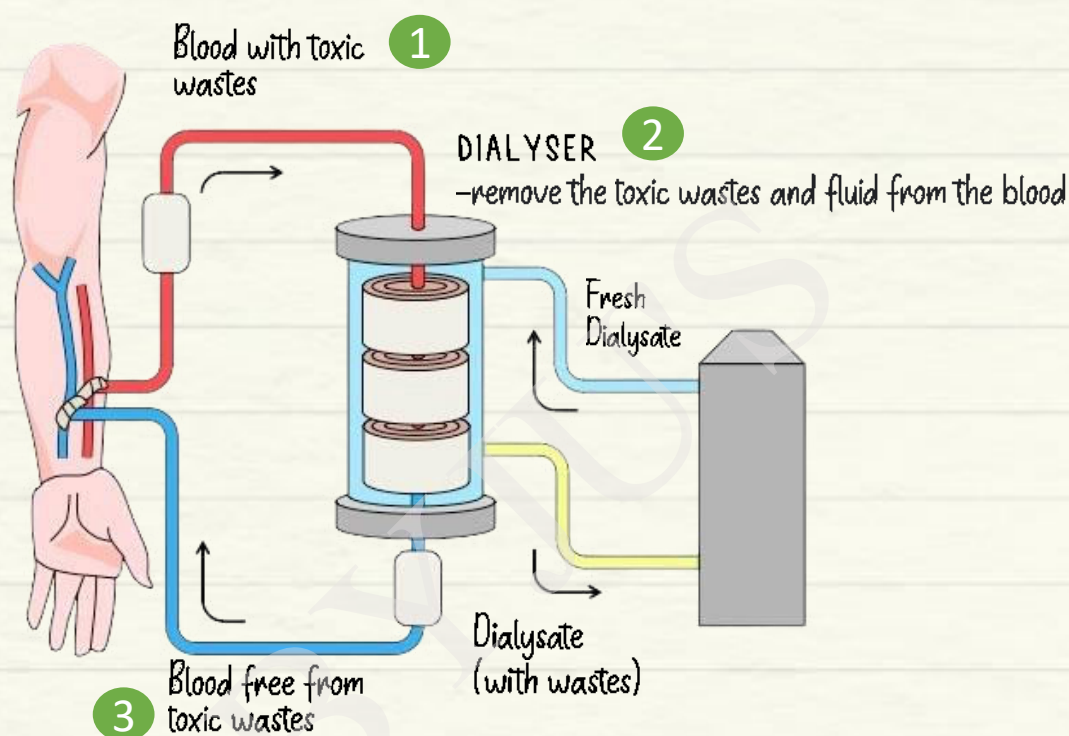


Excretory Pathway



4.3 Artificial kidney

- ★ Used during kidney failure
- ★ Filters blood via dialysing fluid
- ★ Only removes wastes like urea and uric acid by diffusion
- ★ No tubular reabsorption



Excretion in Plants

Plants do not possess special excretory organs, but they excrete either by eliminating wastes from their body or by storing them

GASEOUS EXCHANGE

- CO_2 and H_2O - released during respiration
- O_2 released during photosynthesis

STORAGE

- Converted in gum, resins or latex and stored in old xylem (wood)
- Waste products stored in the leaves, bark and fruits are removed by shedding of leaves, peeling of bark and felling of fruits.

TRANSPIRATION - Excess water is eliminated

 **Mind Map**

