HOPE SERIES

CLASS 10TH COMPLETE BACKLOG

Life Processes
&
Control & Coordination

Biology

By- Samridhi Ma'am

TOPICS to be covered

1. Life processes
   - Nutrition
   - Respiration
   - Transportation
   - Excretion
2. Control and Coordination
3. Question practice and Homework

Padhai nahi Kari, isliye Backlog hogya!

Backlog hogya, isliye Padhai nahi ki!

Mujhe God Ne Bnaya
Kis Liye
Tumhe Biology Padha Saku
Iss Liye

10th

→ Who? → Backlog / Start nahi Kiya
→ Revision

→ Notes → PW App

→ Duration → Mujhe bhi nahi pata (4-6 hour)

→ Break → Yes → When?

L.P ⟷ Break ⟷ C.C

Life Processes

Living

#Ch1

Survive

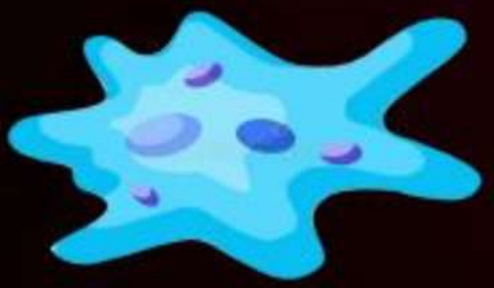
The basic and essential activities performed by a living organism to sustain and maintain life.

1. **Nutrition**
Process of obtaining and utilisation of Food

2. **Respiration**
Process of Breaking down the food to produces energy

3. **Transportation**
Process of transporting useful and non useful substances from part to another part of the organism

4. **Excretion**
Process of removal of metabolic waste



Types of Nutrition

Autotrophic Nutrition

- In autotrophic nutrition organisms prepare their own food [Autotrophs]
  - Photo autotrophic Nutrition
    - Light
    - → use light energy to prepare their own food. Ex: Green plants, Cyanobacteria
  - Chemo autotrophic Nutrition
    - Chemical
    - → use chemical energy to prepare food
    - Ex: Nitrosomonas, Nitrobacter

Heterotrophic Nutrition

- In [redacted] nutrition organisms do not prepare their own food [Heterotrophs]
  - Holozoic Nutrition ✓
  - Saprotrophic Nutrition ✓
  - Parasitic Nutrition ✓

Holozoic Nutrition

Whole

- Organism feed by ingesting whole food material.
- Food is digested and absorbed inside the animal body.

Saprotrophic Nutrition

(decomposer)

- Organism feed on dead and decaying matter
- Food is digested externally and then nutrients are absorbed.

Parasitic Nutrition

Parasite

- Organism derive nutrition from plants or animals without killing them.

Living

- Obtain nutrition by living on or inside the host.

Holozoic Nutrition

Examples : Human Being

ANIMALS

Herbivores [Plants]
Carnivores [Animals]
Omnivores [Both plant & Animal based diet]

Unicellular organisms

Amoeba
Paramecium

Saprotrophic Nutrition

Examples : decomposer.

Most of the fungi

Bread mould [Rhizopus]
Mushroom
Yeast [Unicellular fungi]

Some bacteria

E.coli

Parasitic Nutrition

Examples :

Tapeworm
Lice
Ticks
Leech
Ascaris

Cuscuta → Chlorophyll absent → Amar bel

QUESTION

Externally

An organism which breaks down the food material outside the body and then absorbs it is (Re) (CBSE, 2023)

Q-1

(A) a plant parasite, Cuscuta A

(B) an animal parasite, Tapeworm b

(C) a bacteria, Rhizobium C

(D) a fungi, Rhizopus D

1 ✓
2 ✓
3 ✓
4 ✓
5 ✓
6 ✓
7 ✓
8 ✓
9 ✓
10 ✓

QUESTION

Q2

Select the correct statement. (Re) (NCERT Exemplar)

(T)

A. Heterotrophs do not synthesise their own food

B. Heterotrophs utilise solar energy for photosynthesis (F)

C. Heterotrophs synthesise their own food (F)

D. Heterotrophs are capable of converting carbon dioxide and water into carbohydrates (F)

Photosynthetic Autotrophic Nutrition in Plants

Solar Energy → Chemical Energy (ATP)

Chlorophyll [green pigment]

Photolysis of Water

$$6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

(Glucose)

(Food)

→ Store → in form of "Starch"

H

O → Environment

Animals store glucose in form of "Glycogen"

Photosynthetic Autotrophic Nutrition in Plants

$$6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

[Glucose]

Mechanism of Photosynthesis

(i) Absorption of light energy by chlorophyll.

↓

(ii) Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen.

↓

(iii) Reduction of carbon dioxide to carbohydrates.

Requirement for Photosynthesis

A. Light: Sunlight (Solar energy)

B. Chlorophyll: green pigments present in chloroplast.

C. Water: Plant's root absorb water from the soil.

D. Carbon dioxide: Terrestrial plants obtain CO_2 from the atmosphere through the small opening present on leaves called stomata.

QUESTION

Q-3

Which of the following equations is the summary of photosynthesis?

(A) $6CO_2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$

(B) $6CO_2 + H_2O + \text{Sunlight} \rightarrow C_6H_{12}O_6 + O_2 + 6H_2O$

(C) $6CO_2 + 12H_2O + \text{Chlorophyll} + \text{Sunlight} \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$

(D) $6CO_2 + 12H_2O + \text{Chlorophyll} + \text{Sunlight} \rightarrow C_6H_{12}O_6 + 6CO_2 + 6H_2O$

QUESTION

#H.Q

Q.4

Oxygen gas, a by- product of photosynthesis is released by splitting of:

A. Carbon dioxide

B. Glucose

C. Water

D. None of the above

H_2O

H

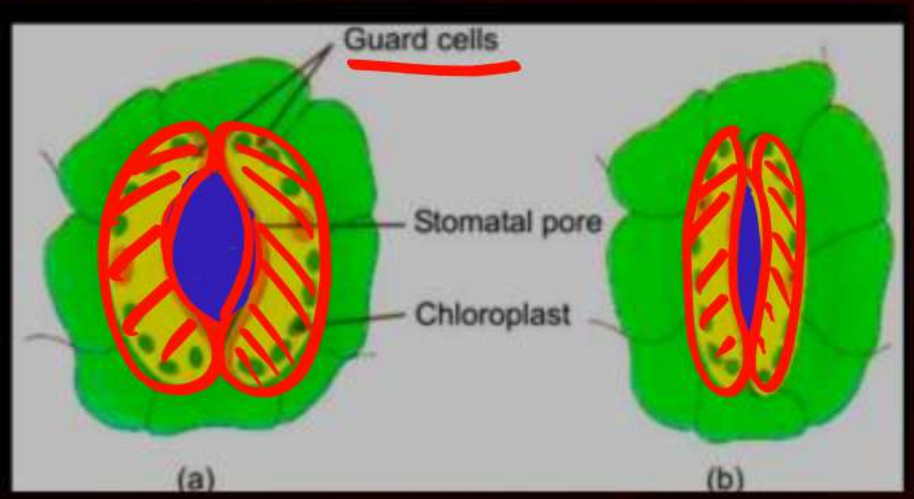
O

Stomata

Stomata are are tiny/microscopic pores like structure present on surface of leaves

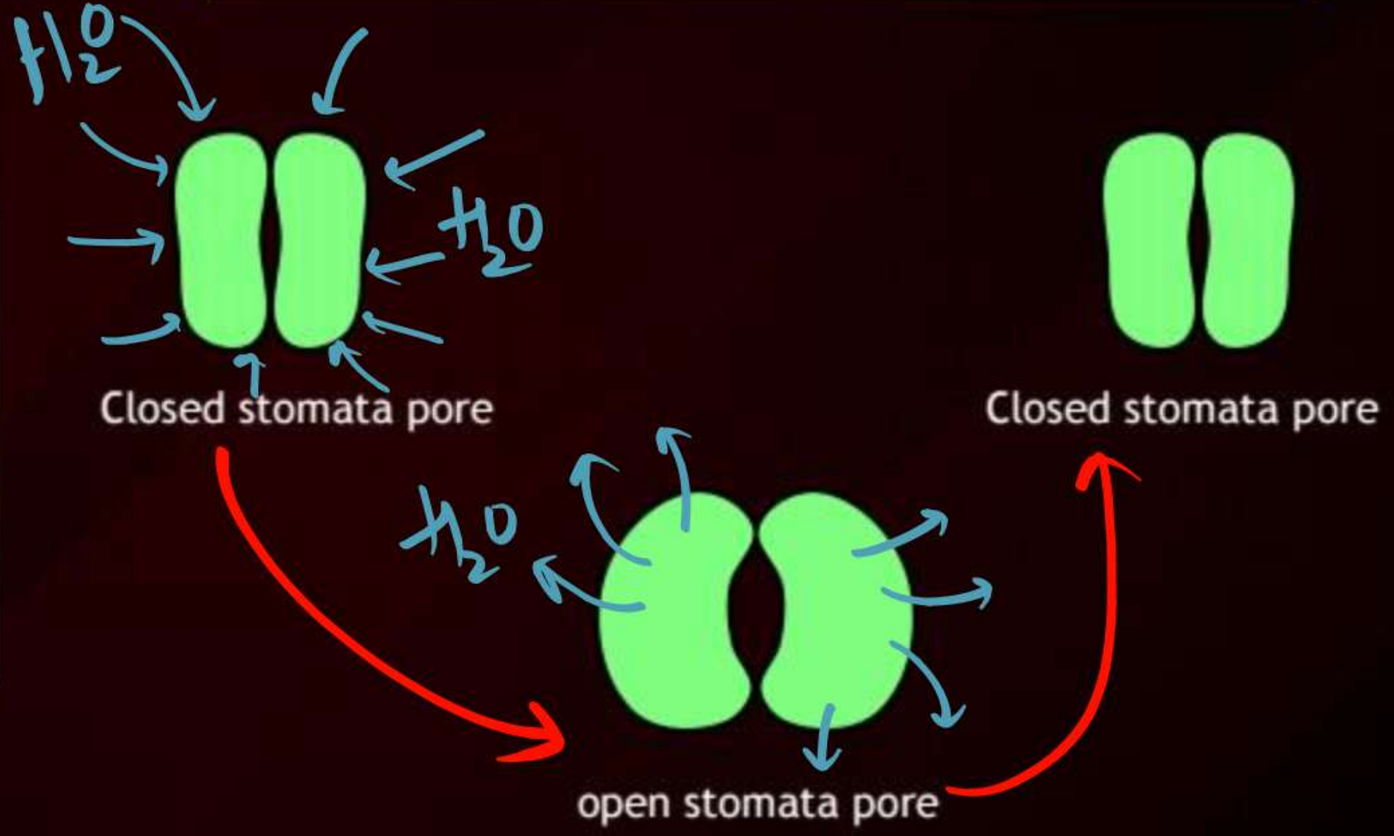
Role of Stomata

- Exchange of gases
- Transpiration

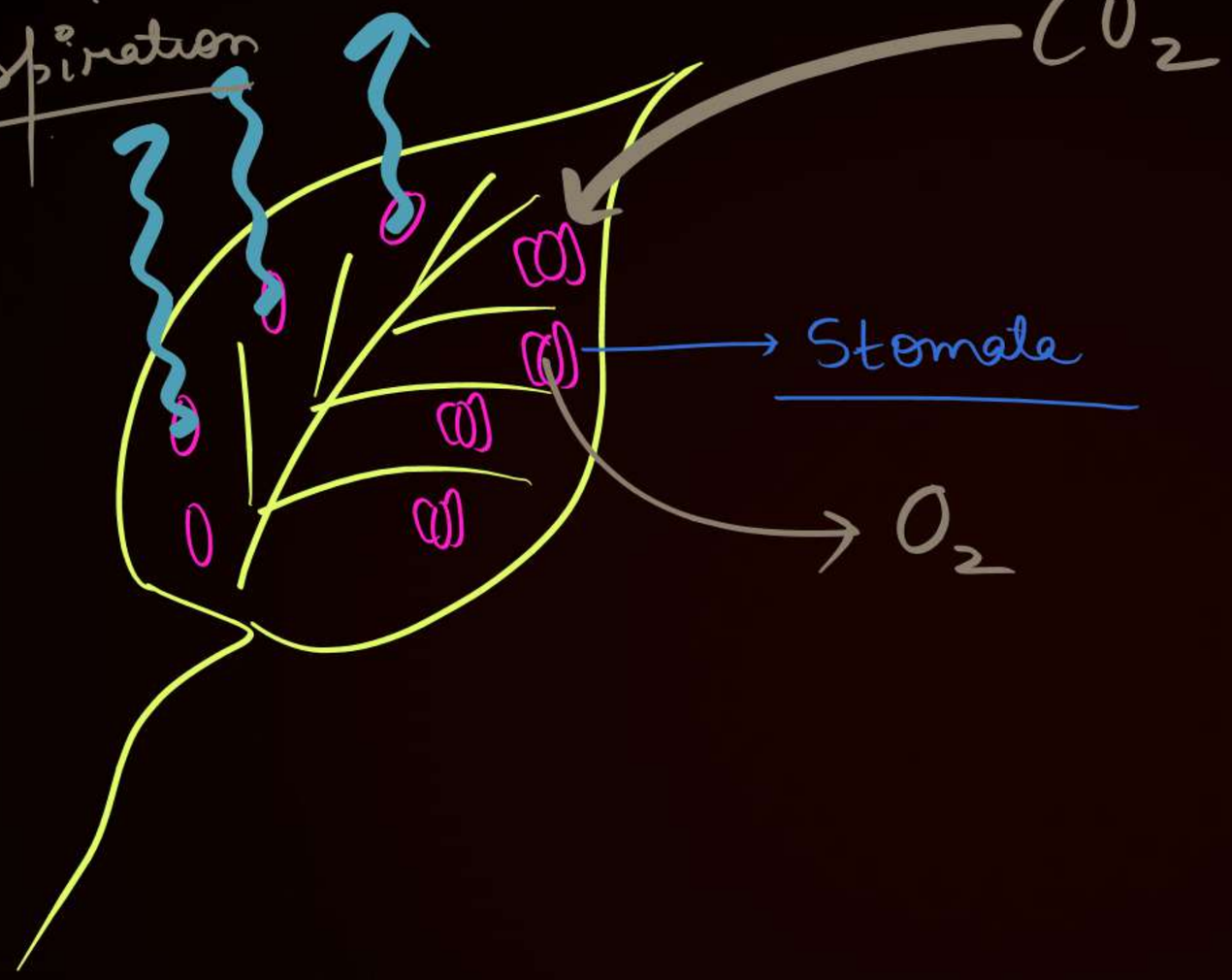


OPEN STOMATAL PORE CLOSED STOMATAL PORE

Opening and closing of stomata



Transpiration



QUESTION

Q-5

Opening and closing of stomata is due to: (Re) (CBSE, 2023)

A. High pressure of gases inside the cells.

B. Movement of water in and out of the guard cells.

C. Stimulus of light in the guard cells.

D. Diffusion of CO_2 in and out of the guard cells.

QUESTION

Q.6

Which one of the following conditions is true for the state of stomata of a green leaf shown in the given diagram? (An) (CBSE, 2022 Term I)

(A) Large amount of water flows into the guard cells.

(B) Gaseous exchange is occurring in large amount.

(C) Large amount of water flows out from the guard cells.

(D) Large amount of sugar collects in the guard cells.

Closed Stomata

Photosynthesis in Desert Plants

(Xerophytes)

NIGHT

Stomata open

CO_2

Chlorophyll

H_2O

Malic Acid

(Store in vacuole)

Glucose $[C_6H_{12}O_6]$ → food

DAY

Stomata closed

#Ch!

Holozoic Nutrition

Holozoic Nutrition

Nutrition in Amoeba

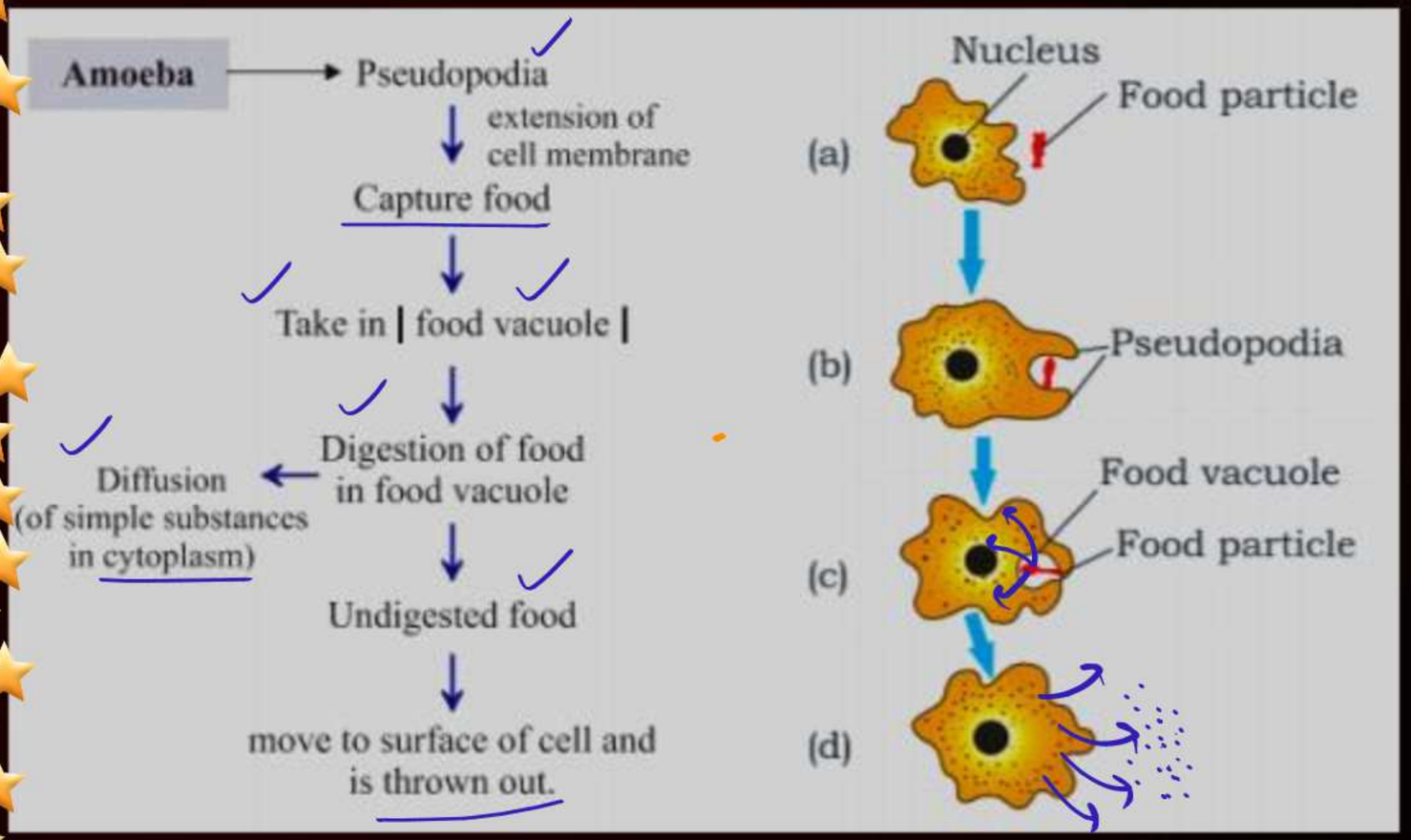
INGESTION

DIGESTION

ABSORPTION

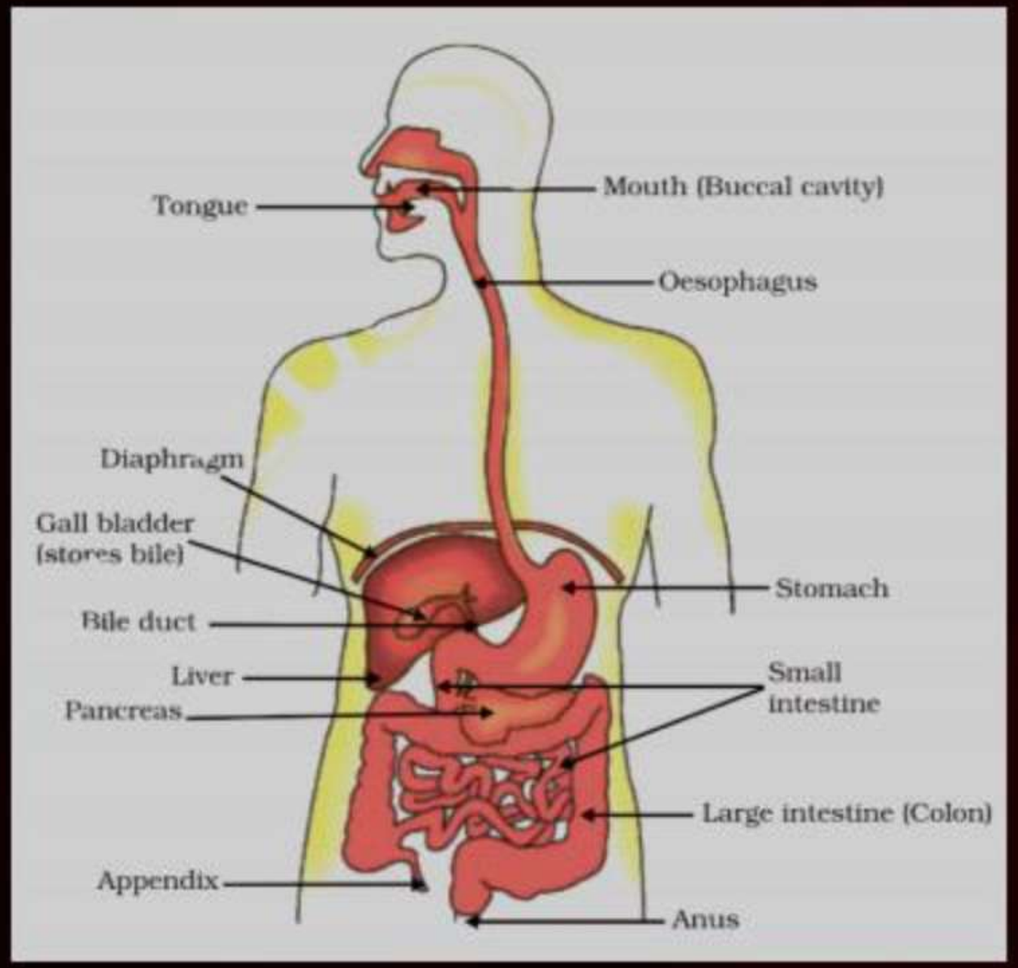
ASSIMILATION

EGESTION



Holozoic

Nutrition in Human Beings



Human digestive system

- **Alimentary Canal (Mouth to anus)**
  - Mouth
  - Buccal cavity
  - Oesophagus [Food pipe]
  - Stomach
  - Small Intestine
  - Large Intestine
  - Anus
- **Associated glands**
  - Salivary glands
  - Liver
  - Pancreas

notes

Mouth (Buccal/ oral cavity)	• Teeth • Tongue • Salivary gland → Saliva	• Chewing and crushing of food, • Rolling, tasting & Swallowing of food, • salivary amylase (Ptyalin) (Converts starch into maltose) Starch ⟶ Maltose
Oesophagus/ Food pipe	Peristaltic movement (Contraction and relaxation of muscles) pushes food towards stomach	Passage of food from mouth to stomach
Stomach (Gastric glands)	Gastric juice • Pepsin • Hydrochloric acid [HCl] • Mucus	• Pepsin help in Breakdown of protein • HCl provides acidic medium [acidic pH] • HCl kill bacteria and other germs in food. • Protects inner lining of stomach.

Stomach HCl

1 Liver → Bile juice

2 Pancreas → Pancreatic Juice

Small intestine

- Intestinal glands secrete intestinal juices.

Liver - Bile juice (stored in gall bladder)

Pancreas- Pancreatic juice

Intestinal Juice

Villi (Finger like projections in supplied with blood vessels)

Bile Juice :

- Emulsification of fats
- Makes food alkaline

Pancreatic Juice

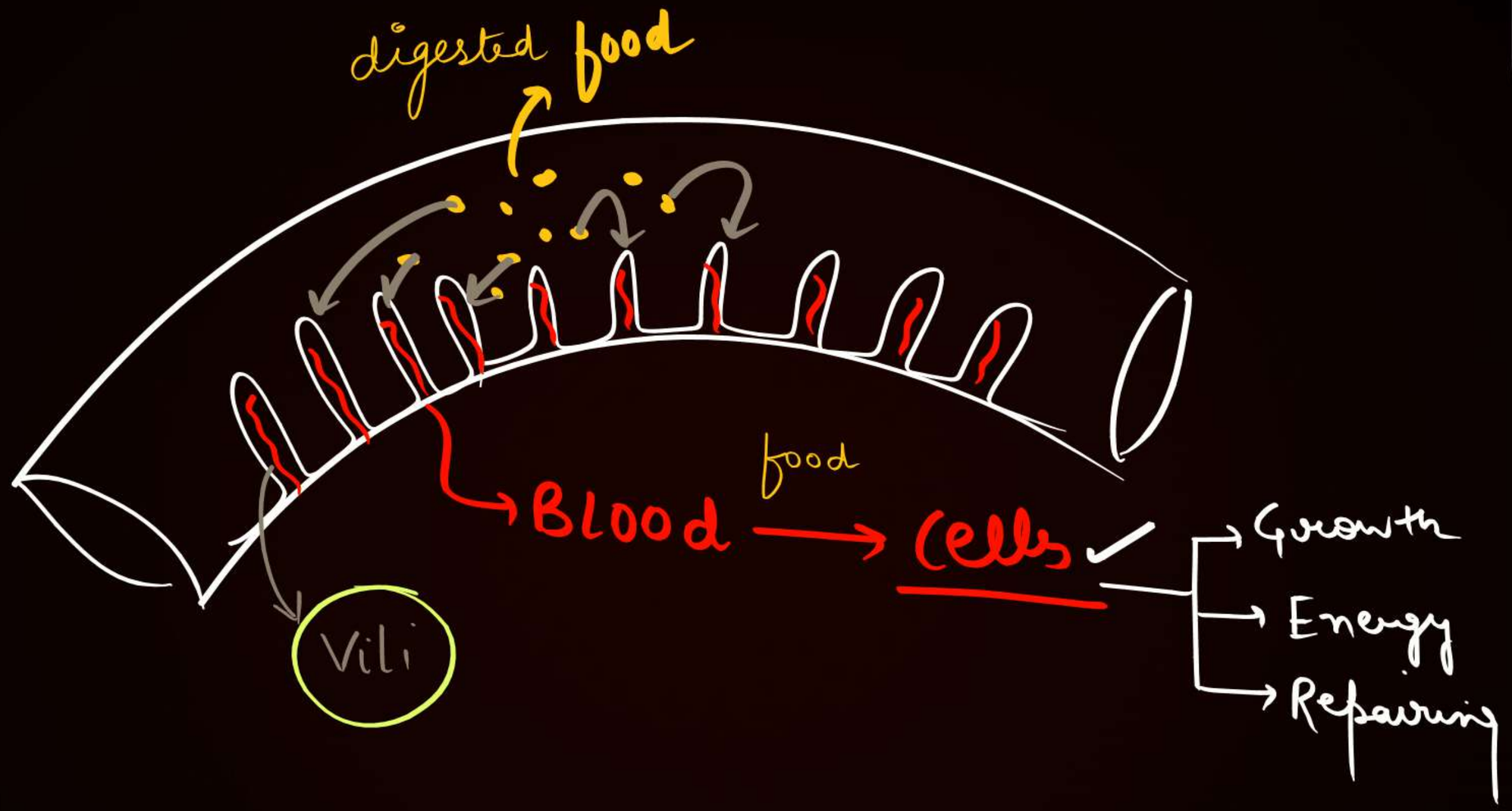
- P. Amylase helps in digestion of carbohydrates
- Trypsin helps in digestion of protein
- Lipase helps in digestion of emulsified fats

Intestinal Juice

- Final digestion of food

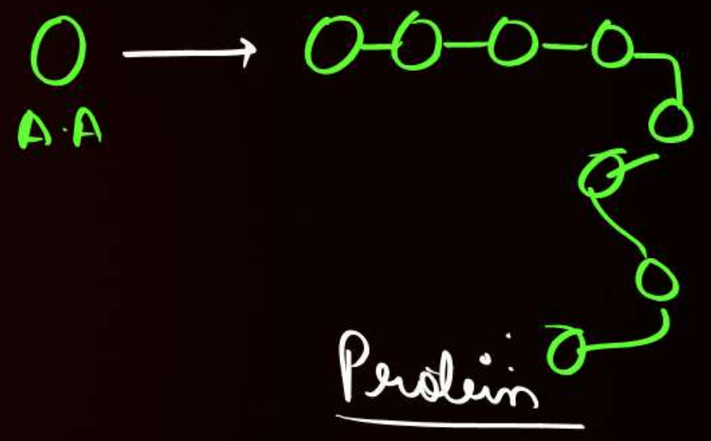
Villi

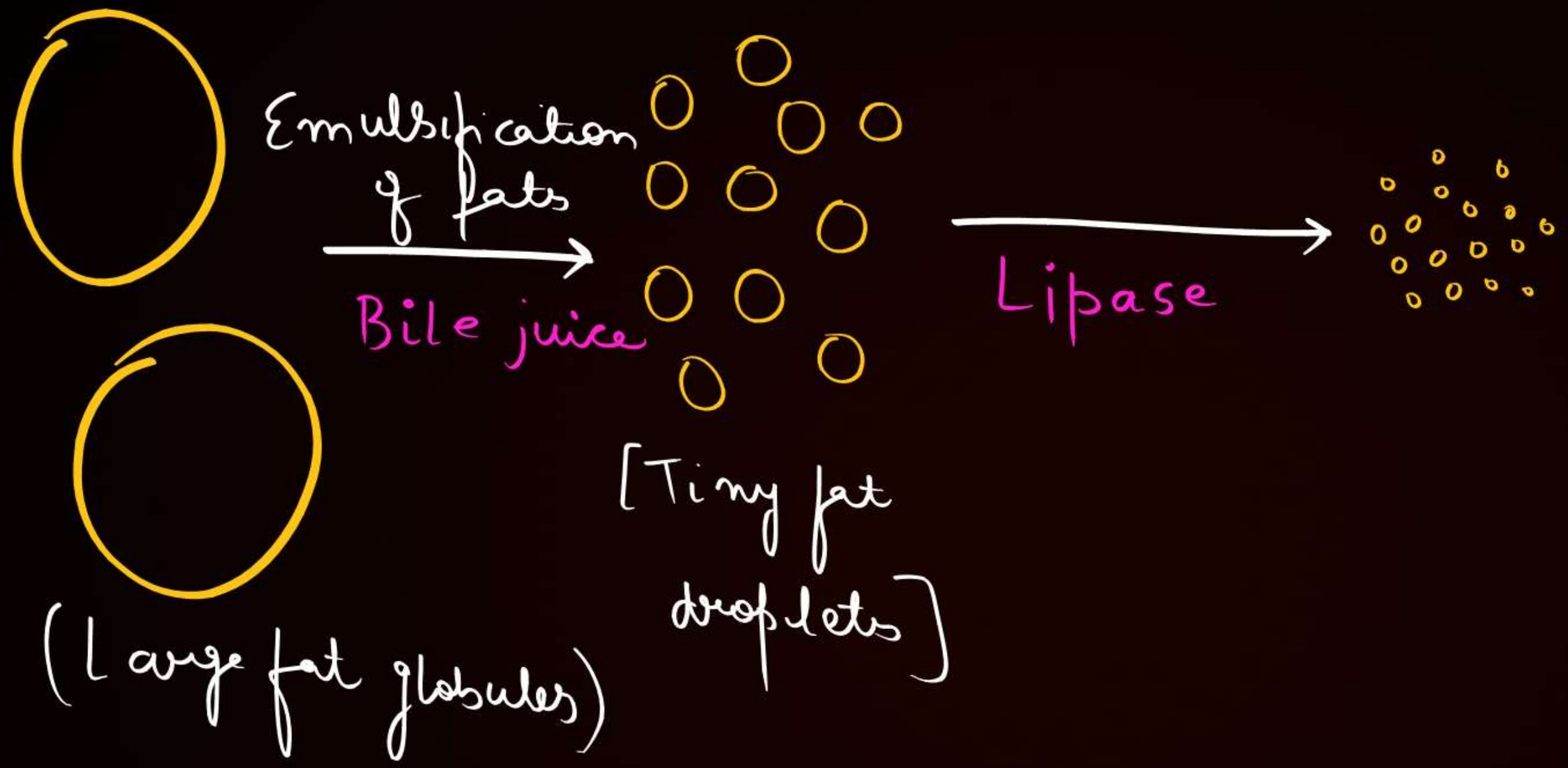
- Helps in absorption of digested food by increasing surface area.


digested food
Blood
food
Cells
Growth
Energy
Repairing
Vili

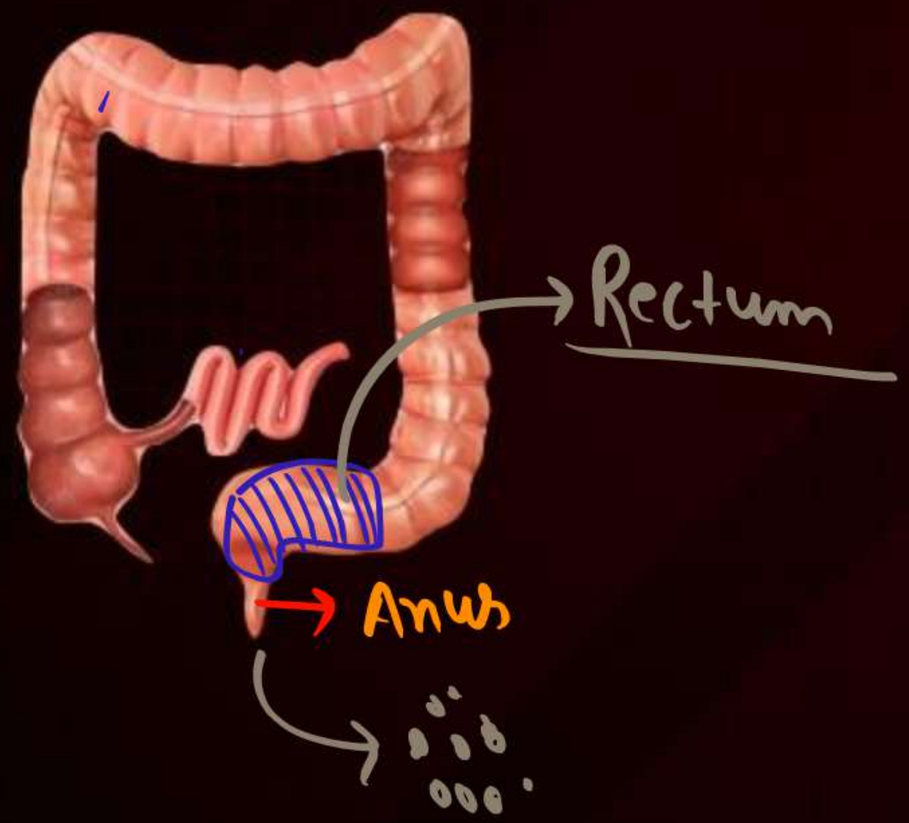
Final digestion of food {Small intestine}

* Carbohydrate ⟶ Glucose
* Proteins ⟶ Amino Acids
* Fats ⟶ Fatty acid + glycerol




Emulsification of fats
Bile juice
Lipase
[Tiny fat droplets]
(Large fat globules)

Large intestine (Colon)	Absorption of water
Rectum	Temporary collection of waste
Anus	Helps in Egestion (Removal if undigested and Unabsorbed food)



#Ch

QUESTION

Q.7

Which is the correct sequence of parts in human alimentary canal?

(Re) (NCERT Exemplar)

(A) Mouth → stomach → small intestine → oesophagus → large intestine

(B) Mouth → oesophagus → stomach → large intestine → small intestine

(C) Mouth → stomach → oesophagus → small intestine → large intestine

(D) Mouth → oesophagus → stomach → small intestine → Large intestine

QUESTION

Q. 8

Consider the following statements about small intestine and select the one which is NOT correct: (An) (CBSE 2023)

(F).

(A) The length of the small intestine in animals differs as it depends on the type of food they eat.

(B) The small intestine is the site of complete digestion of food.

(C) The small intestine receives secretions from liver and pancreas.

(D) The villi of the ~~small~~ Large intestine absorb water from the unabsorbed food before it gets removed -from the body via the anus.

Small intestine of herbivores is longer than Carnivores.

Human Digestive System

#notes

- Mouth
  - Teeth — Mechanical digestion (Chewing)
  - Tongue — Tasting food
  - Salivary gland — Saliva — Salivary amylase (Ptyalin)
- Oesophagus — Peristaltic movement
- Stomach — Gastric gland — Gastric juice
  - Pepsin
  - Hydrochloric acid
  - Mucus
- Small Intestine
  - Liver — Bile juice
  - Pancreas — Pancreatic juice
    - Pancreatic Amylase
    - Trypsin
    - Lipase
- Small Intestine — Intestinal glands — Intestinal juice
- Large intestine
- Rectum
- Anus

QUESTION

Q.9

Assertion (A): The inner walls of the small intestine have finger like projections called villi which are rich in blood. (T)

Reason (R): These villi have a large surface area to help the small intestine in completing the digestion of food. (F) → Absorption of food. (Re) (CBSE, 2023)

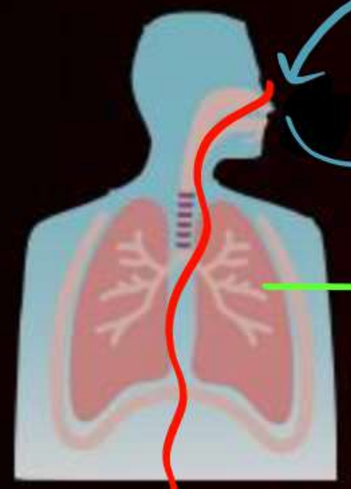
A. Both (A) and (R) are true and (R) is the correct explanation of (A).

B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Breathing Vs Respiration



O_2 (inhale)

CO_2 (exhale)

Lungs

CO_2

Blood

Blood

O_2

O_2

O_2 (ATP)

glucose → Energy + CO_2

cellular Respiration

food

Breathing	Respiration
• Process of Inhaling and exhaling the air in and out of the lungs.	• Process of breaking down of glucose to produce energy.
• It takes place in lungs	• It takes place in all cells.
• It is a physical process	• It is a chemical process.
• Energy is not produced.	• Energy is produced in the form of ATP.

Types of Respiration

#Ch

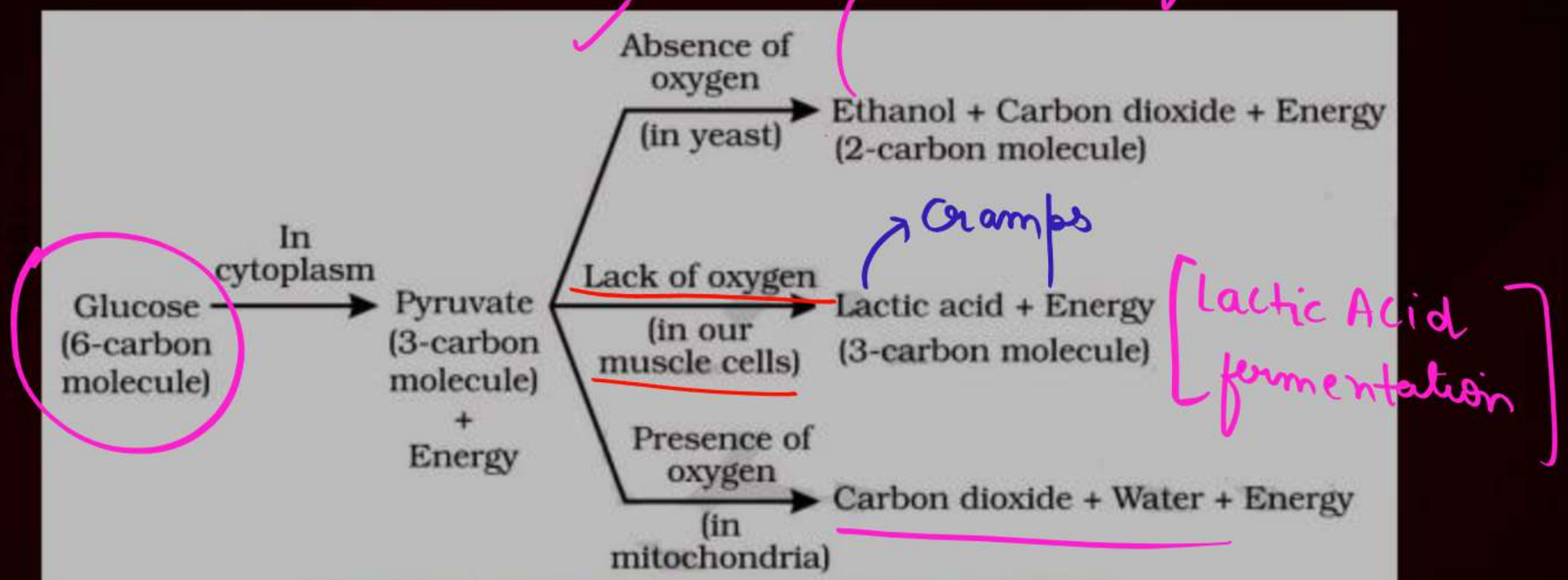


Fig: Break-down of glucose by various pathways

notes

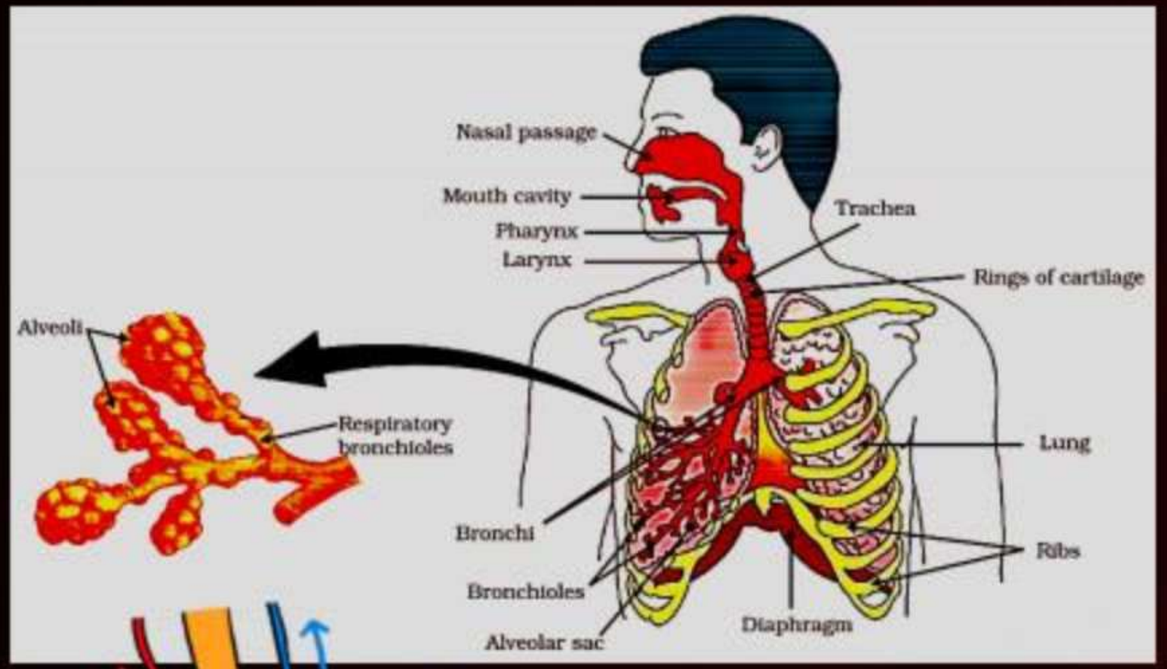
Respiration → Fermentation → Alcoholic fermentation (Yeast cell), Lactic Acid fermentation

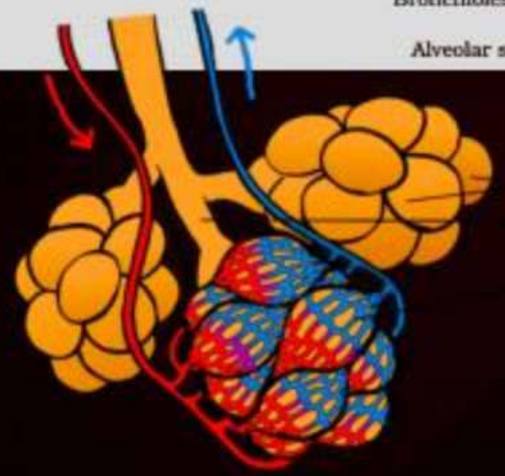
Aerobic Respiration	Anaerobic respiration
• O_2 required [Human being]	• O_2 not required
• It occurs in cytoplasm and mitochondria	• It occurs in Cytoplasm only
• Complete breakdown of glucose takes place	• Incomplete breakdown of glucose takes place (less energy)
• End products are CO_2 and H_2O + (ATP)	• End products are CO_2 and ethanol or lactic acid

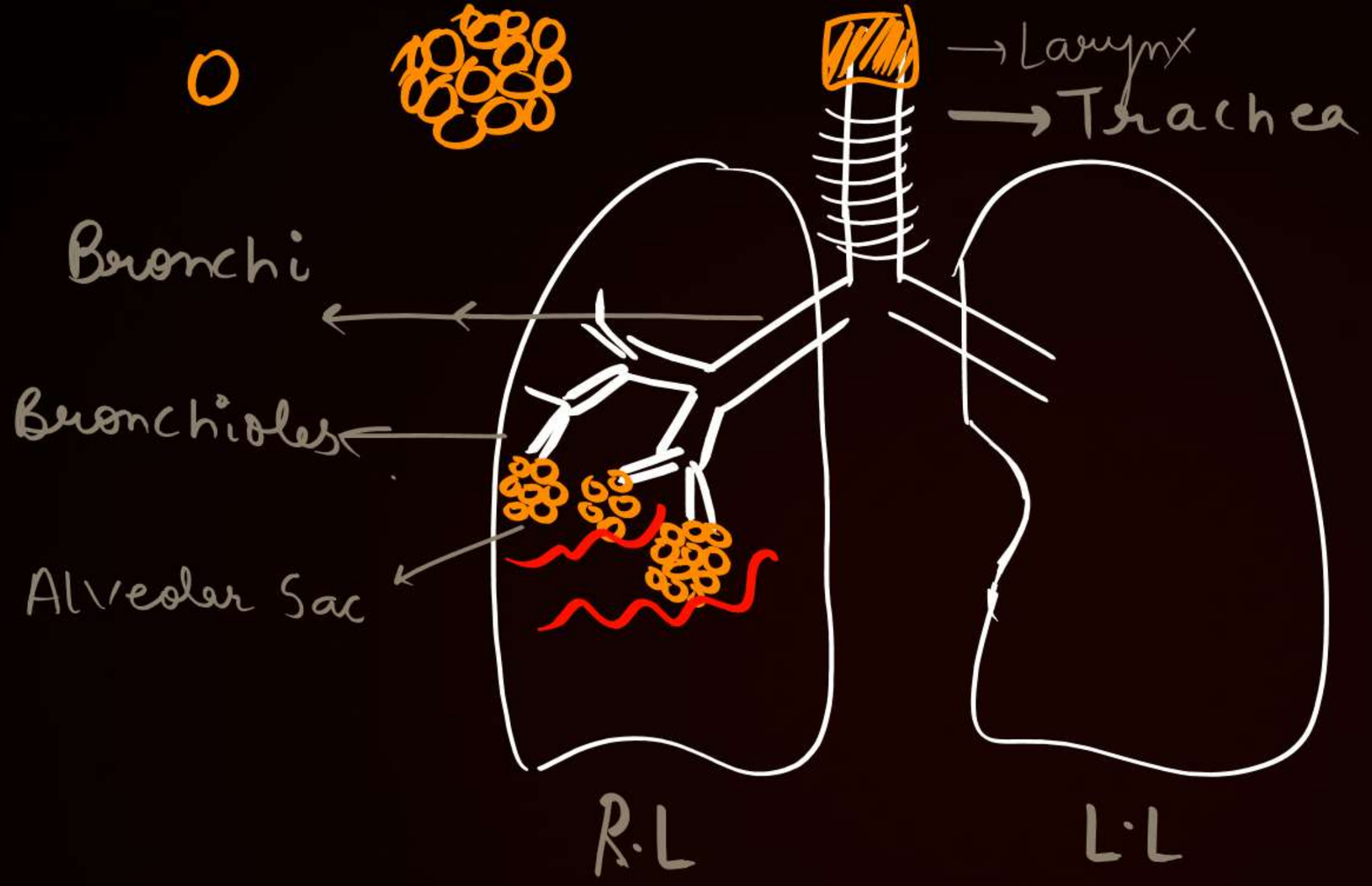
More Energy

Human Skeletal Muscle cells → Muscles attached to bone.

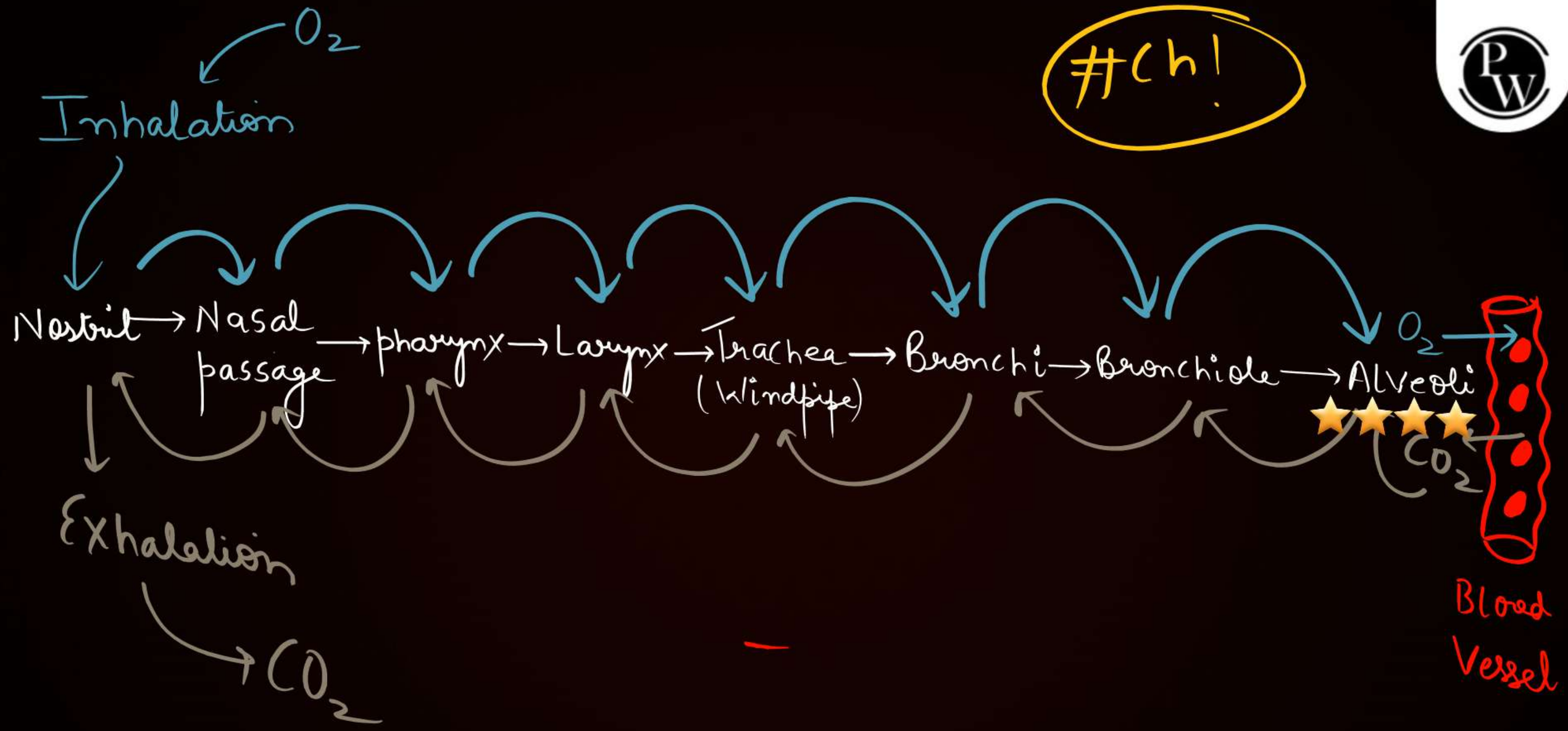
Breathing in Human beings

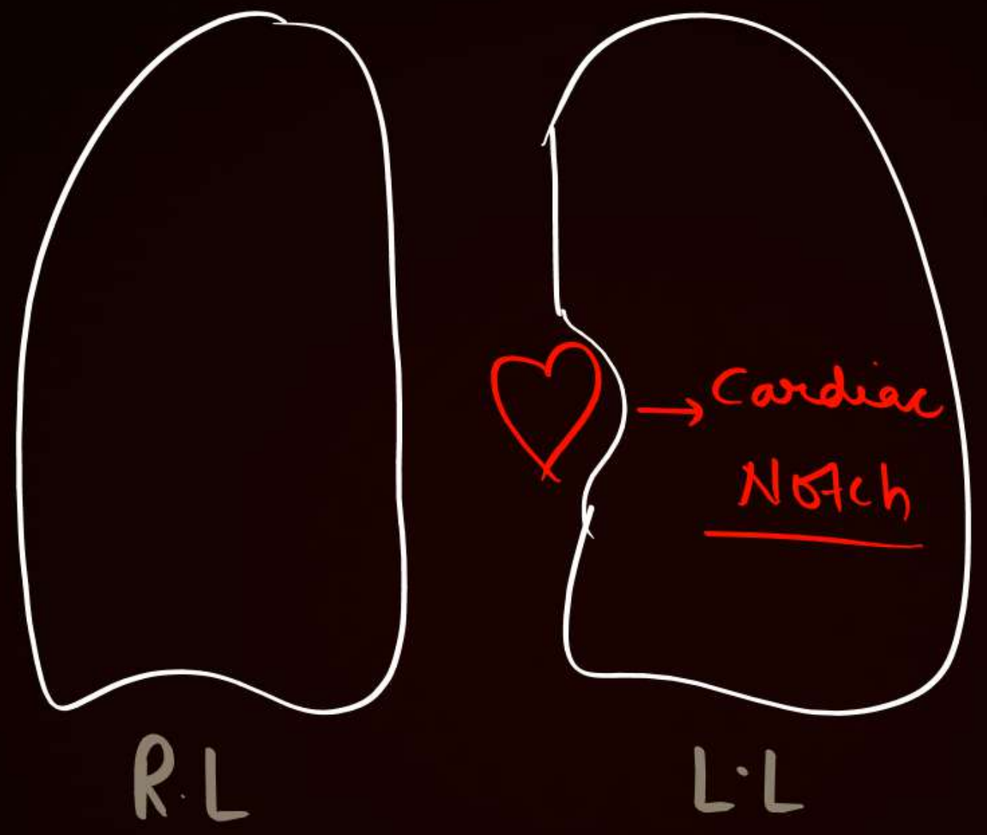





Larynx
Trachea
Bronchi
Bronchioles
Alveolar Sac
R.L
L.L

#Ch!


O_2
Inhalation
Nostril → Nasal passage → pharynx → Larynx → Trachea (Windpipe) → Bronchi → Bronchiole → Alveoli
O_2
CO_2
Blood Vessel
Exhalation
CO_2


Cardiac
Notch
R.L
L.L

please note

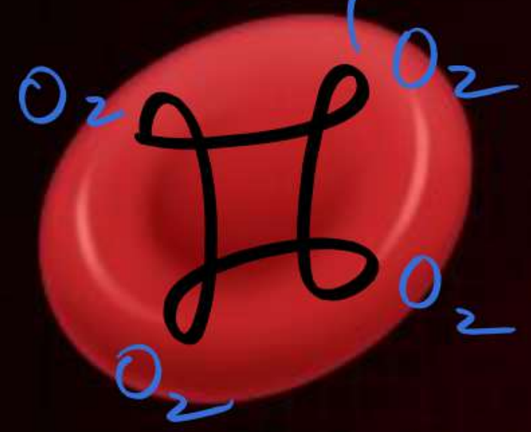
Iron

Hemoglobin → Transport of O_2

↓

Respiratory pigment

CO_2 is Transported in dissolved form

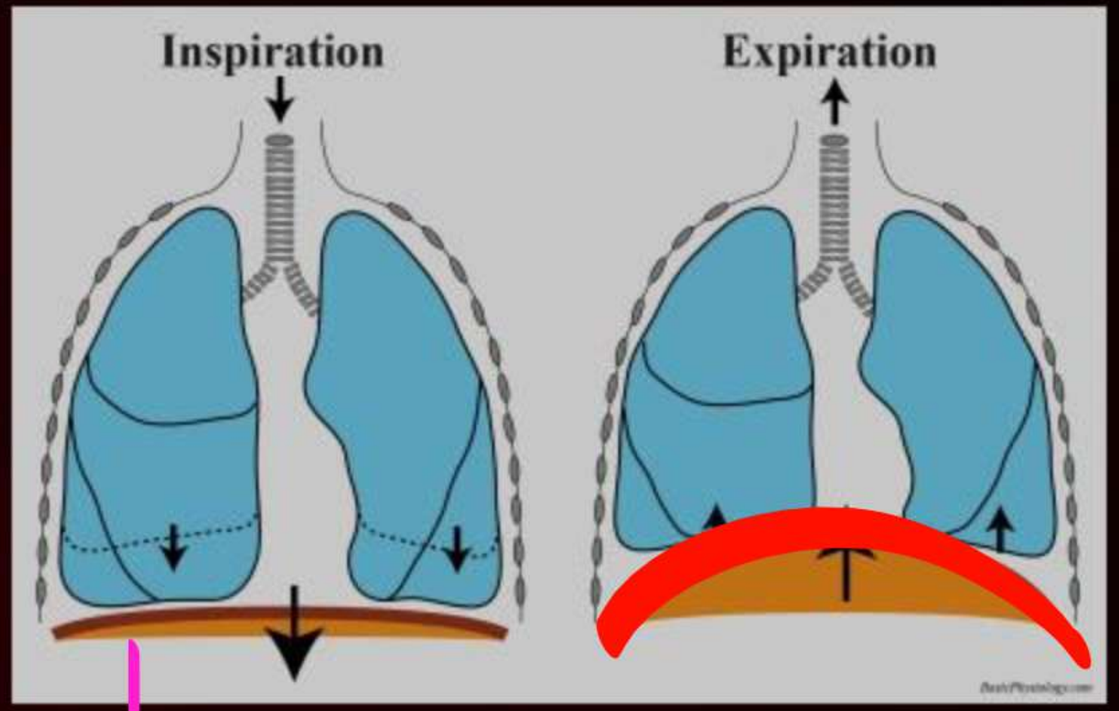


Erythrocyte (RBC)

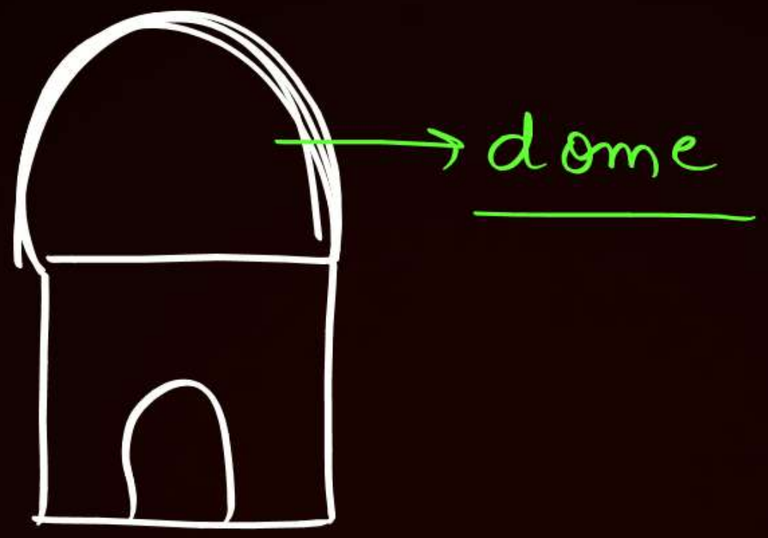
Affinity of haemoglobin for various gases

$CO > O_2 > CO_2$

Inhalation / Inspiration	Exhalation / Expiration
• The muscles of the diaphragm contract.	• The muscles of the diaphragm relax.
• The diaphragm goes downward and becomes flat.	• The diaphragm goes upward and becomes dome shaped
• The ribs move upwards and outwards.	• The ribs move downwards and inwards.
• Air enters the lungs through the nose.	• Air goes out the lungs through the nose.



Diaphragm [Dome Shape]

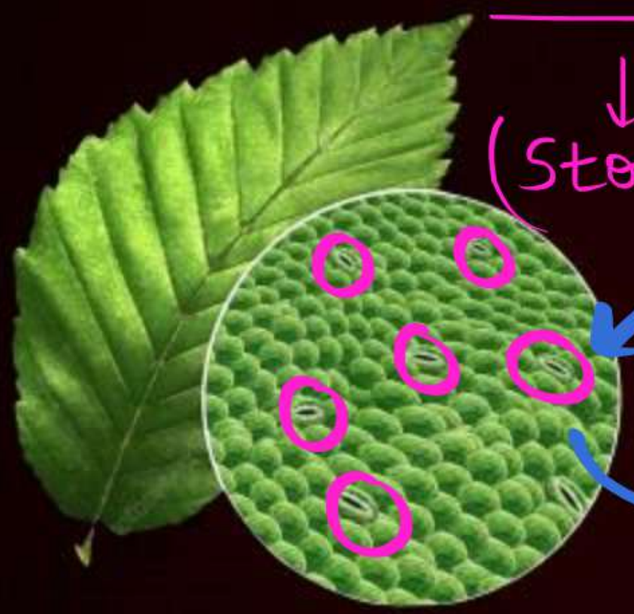

dome

Exchange of gases in plants

Leaves

↓

(Stomata)



CO_2

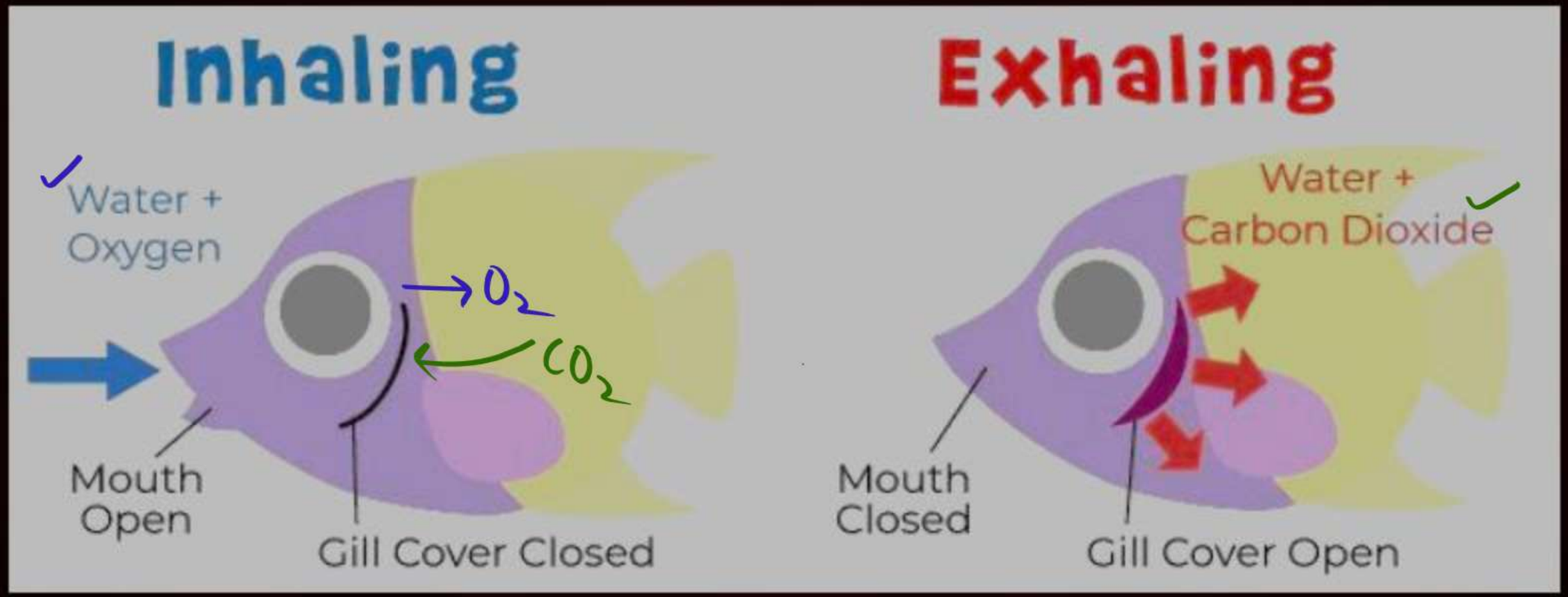
O_2

Woody Stems

↓

(Lenticels)

Gills


Inhaling
Water + Oxygen
O_2
CO_2
Mouth Open
Gill Cover Closed
Exhaling
Water + Carbon Dioxide
Mouth Closed
Gill Cover Open

QUESTION

Q-10

During deficiency of oxygen in tissues of human beings, pyruvic acid is converted into lactic acid in the: (PYQ)

A. cytoplasm

B. chloroplast

C. mitochondria

D. golgi body

QUESTION

Q-11

Which is the correct sequence of air passage during inhalation? (Re) (NCERT Exemplar)

(A) Nostrils → Larynx → Pharynx → Trachea → Lungs

(B) Nasal passage → Trachea → Pharynx → Larynx → Alveoli

(C) Larynx → Nostrils → Pharynx → Lungs → Alveoli

(D) Nostrils → Pharynx → Larynx → Trachea → Alveoli

Q-12

QUESTION

Which of the following is respiratory pigment for carrying oxygen in humans?

(A) Chlorophyll

(B) Hemoglobin

(C) Alveoli

(D) White blood cells

QUESTION

(F) Ethanol

Q-13

Assertion (A): The anaerobic respiration which takes place in yeast, has one of the end products as an acid. → alcohol

Reason (R): During anaerobic respiration, there is incomplete breakdown of glucose. (T)

(Un) (CBSE, 2023) (Re)

(PYQ).

A. Both (A) and (R) are true and (R) is the correct explanation of (A).

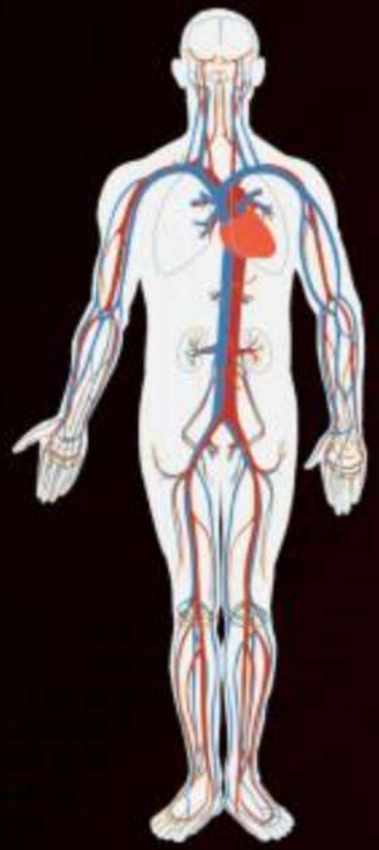
B. Both (A) and (R) are true but (R) is not the correct explanation of (A).

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Transportation

Blood ⇒ Plasma + Blood Cells

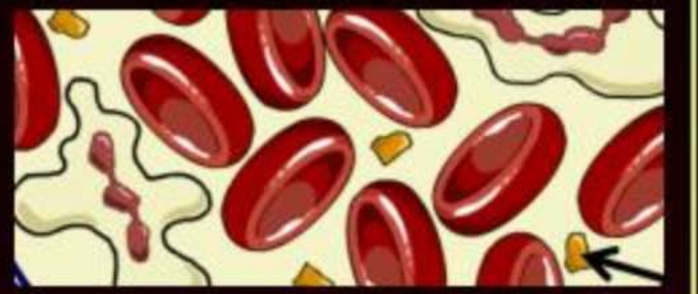


- **Blood**
  Red fluid connective tissue which helps to transport substances

- **Blood vessels**
  Tubes in which blood flows

- **Heart**
  Pumping organ

- Plasma (55%)
  - Fluid portion of blood contains :
  - 91-92% of water, proteins, hormones & clotting factors
- Blood cells (45%)
  - → RBC [44%]
  - → WBC
  - → Platlets [1%]

Plasma		Transportation of Digested food , CO_2 , Waste , Hormones
Red blood cells Erythrocytes		Hemoglobin in RBC helps in Oxygen transport
White blood cells Leukocytes		Produce antibody to kill pathogen Bacteria Virus.
Platelets Thrombocytes		Clotting of blood

QUESTION

Q-14

While gardening, Riya accidentally gets a deep cut on her hand. What is the primary function of platelets in that case? (Re)

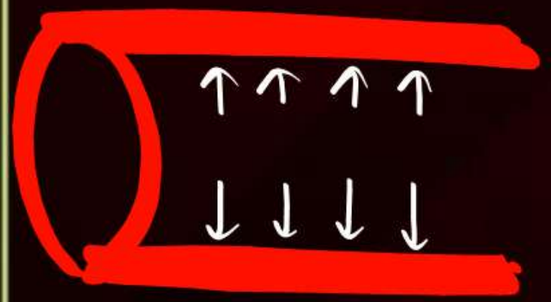
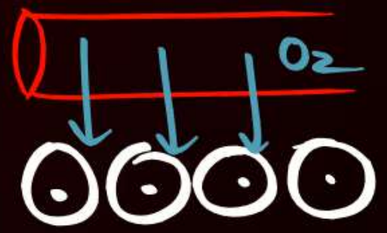
A. To fortify her immune response

B. To aid in oxygen delivery throughout her body

C. To encourage the generation of white blood cells

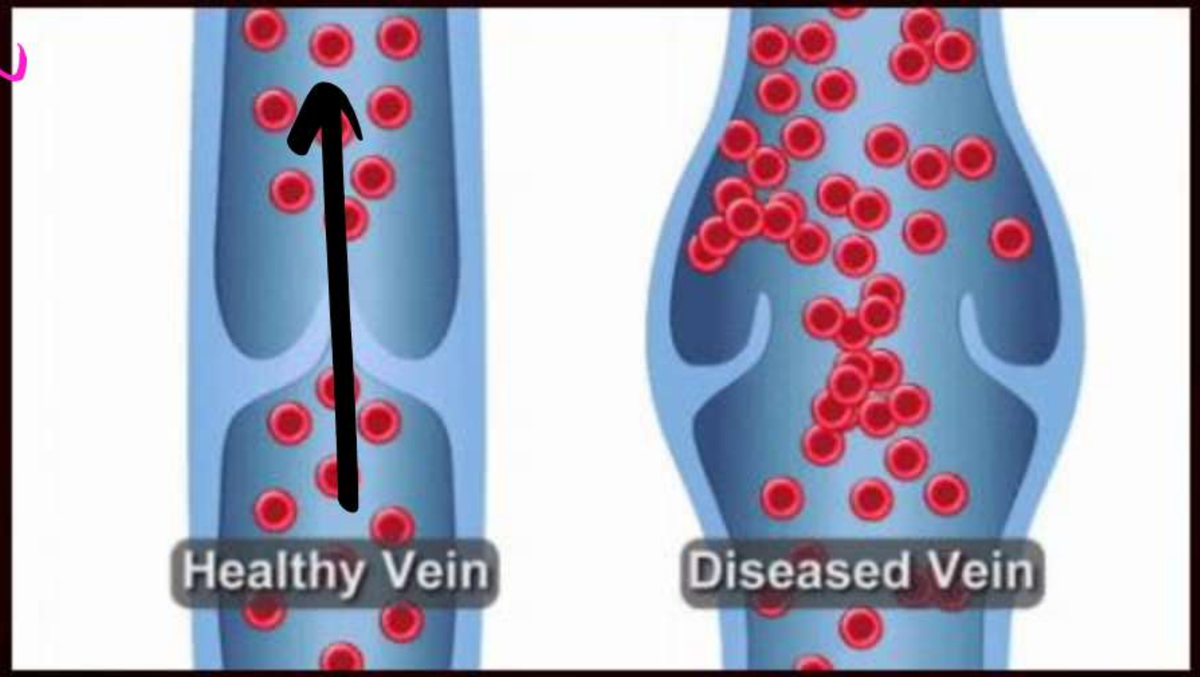
D. To commence the blood clotting process at the wound site

Sphygmomanometer → Measure blood pressure !

	Arteries	Veins	Capillaries
• Direction of blood flow	Away from the heart	Towards the heart	Helps in exchange of substances
• Oxygen	Oxygenated blood [O_2 high]	Deoxygenated blood [O_2 is low]	Both
• Pressure	High	Low	Medium
• Walls	Thick and elastic 	Thin and non elastic	Very thin (one cell thick) 

	Arteries	Veins	Capillaries
• Valves	Absent	Present	Absent

Prevent backflow of blood



PLEASE NOTE

- Largest artery

→ Aorta

- Largest Vein

→ Vena Cava

- Only artery which carries deoxygenated blood

→ Pulmonary artery

- Only vein which carries oxygenated blood

→ Pulmonary Vein

QUESTION

Q-15

An artery is a vessel that carries blood (PYQ)

(A) with high concentration of oxygen [oxygenated blood]

(B) with high concentration of CO_2

(C) away from the heart

(D) both (A) & (C)

QUESTION

Q-16

Veins

Assertion (A): Valves are present in the arteries. (F)

Reason (R): Arteries carry oxygenated blood from - heart to different body parts except pulmonary artery. (T)

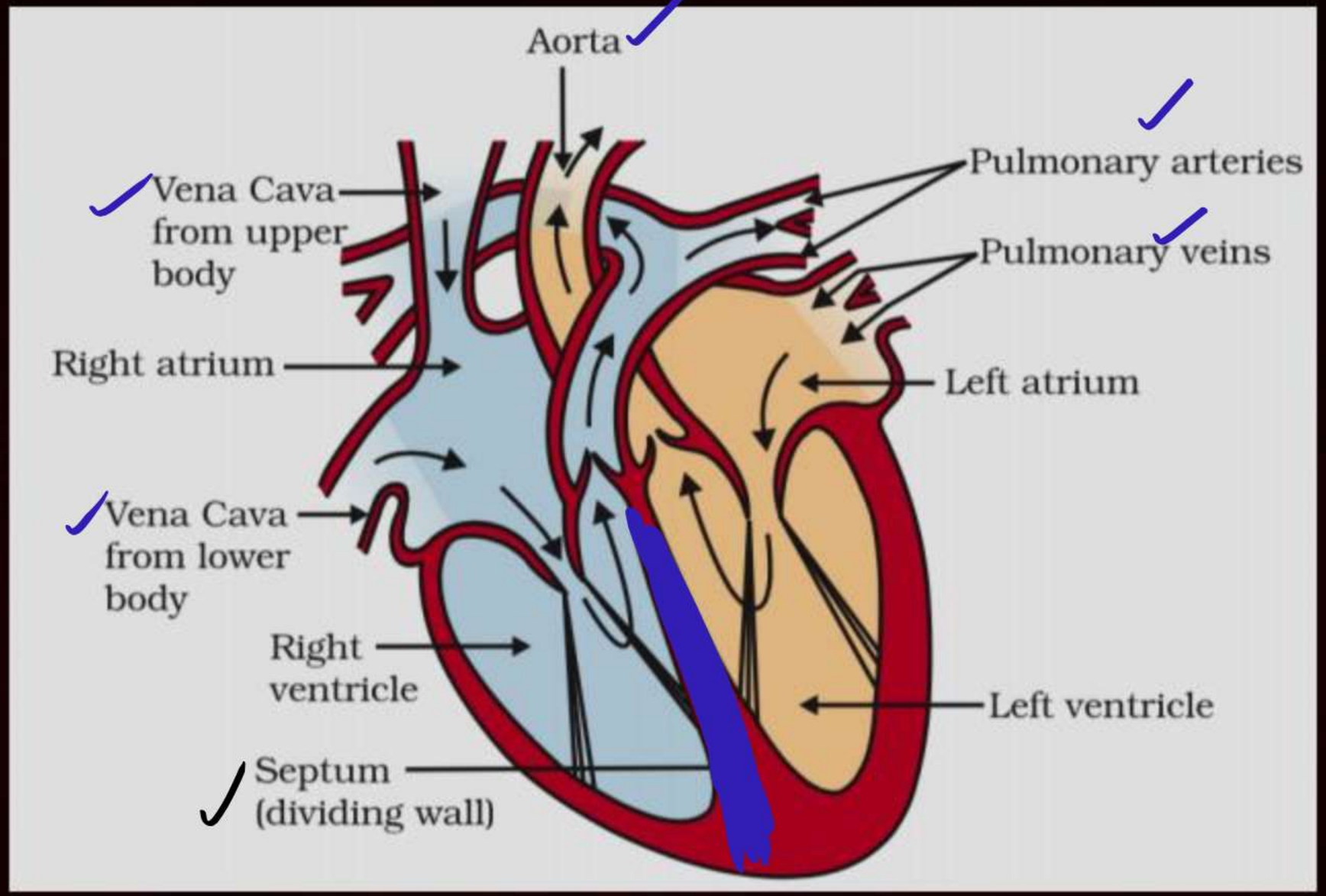
(PYQ)

A. Both A and R are true, and R is the correct explanation of A.

B. Both A and R are true, but R is not the correct explanation of A.

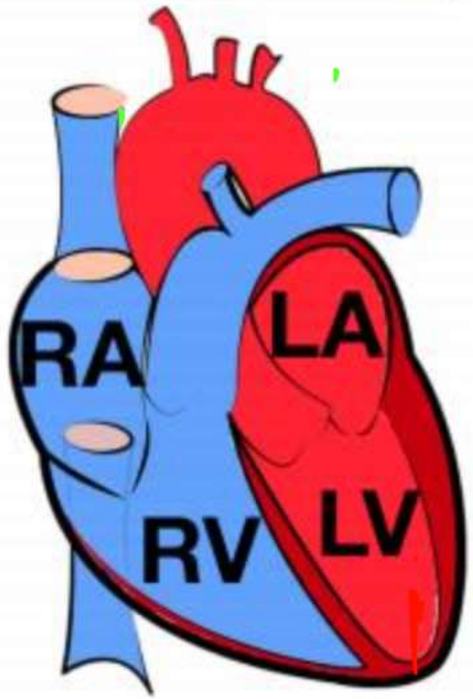
C. A is true, but R is false.

D. A is false, but R is true.


Aorta
Pulmonary arteries
Vena Cava from upper body
Pulmonary veins
Right atrium
Left atrium
Vena Cava from lower body
Right ventricle
Left ventricle
Septum (dividing wall)

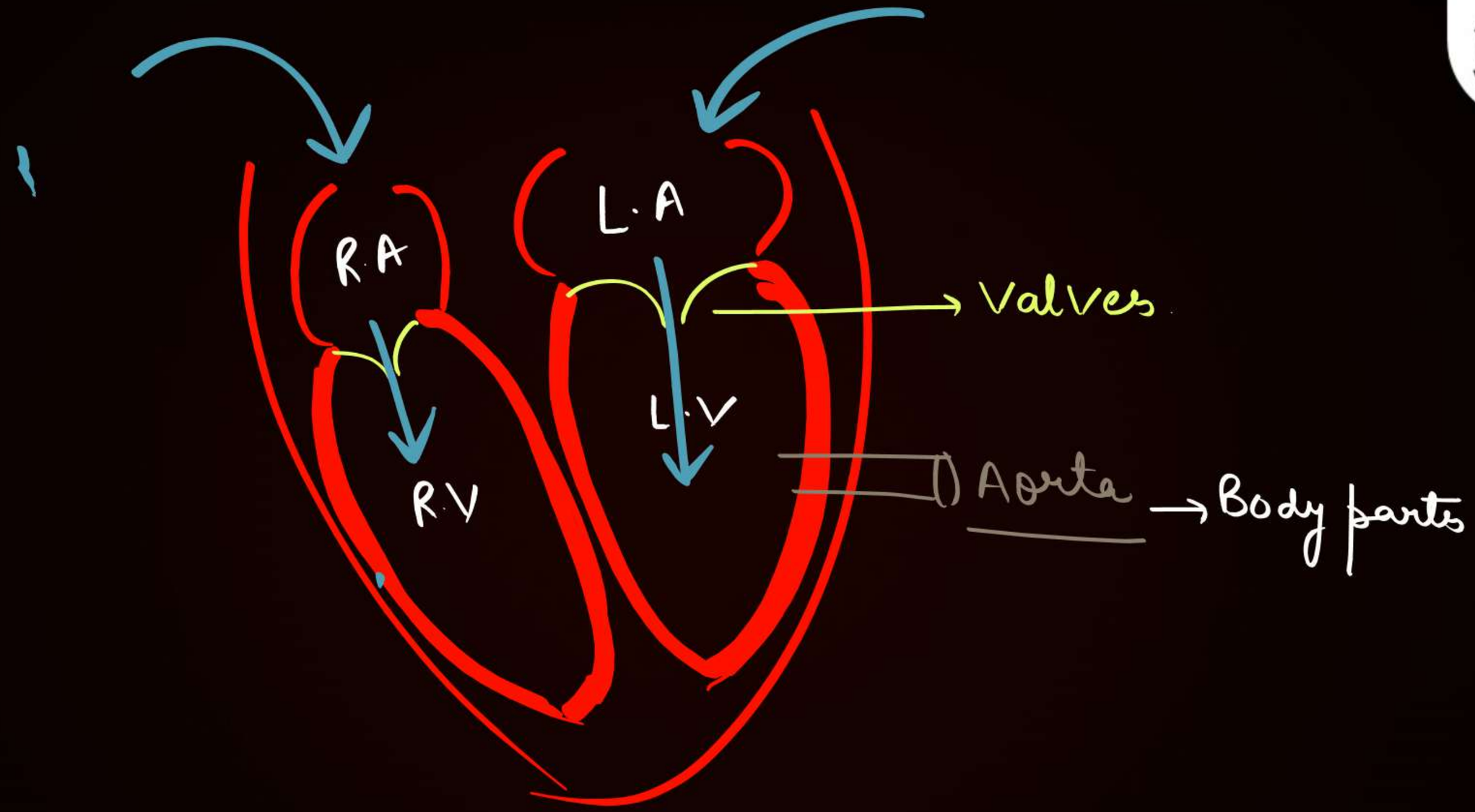
ATRIUM/AURICLE	VENTRICLES
Upper chambers	Lower chamber
Thin walled	Thick walled
Receives blood	Pumping of blood

	Right	Left
Atria	Right Atrium (RA)	Left Atrium (LA)
Ventricles	Right Ventricle (RV)	Left Ventricle (LV)

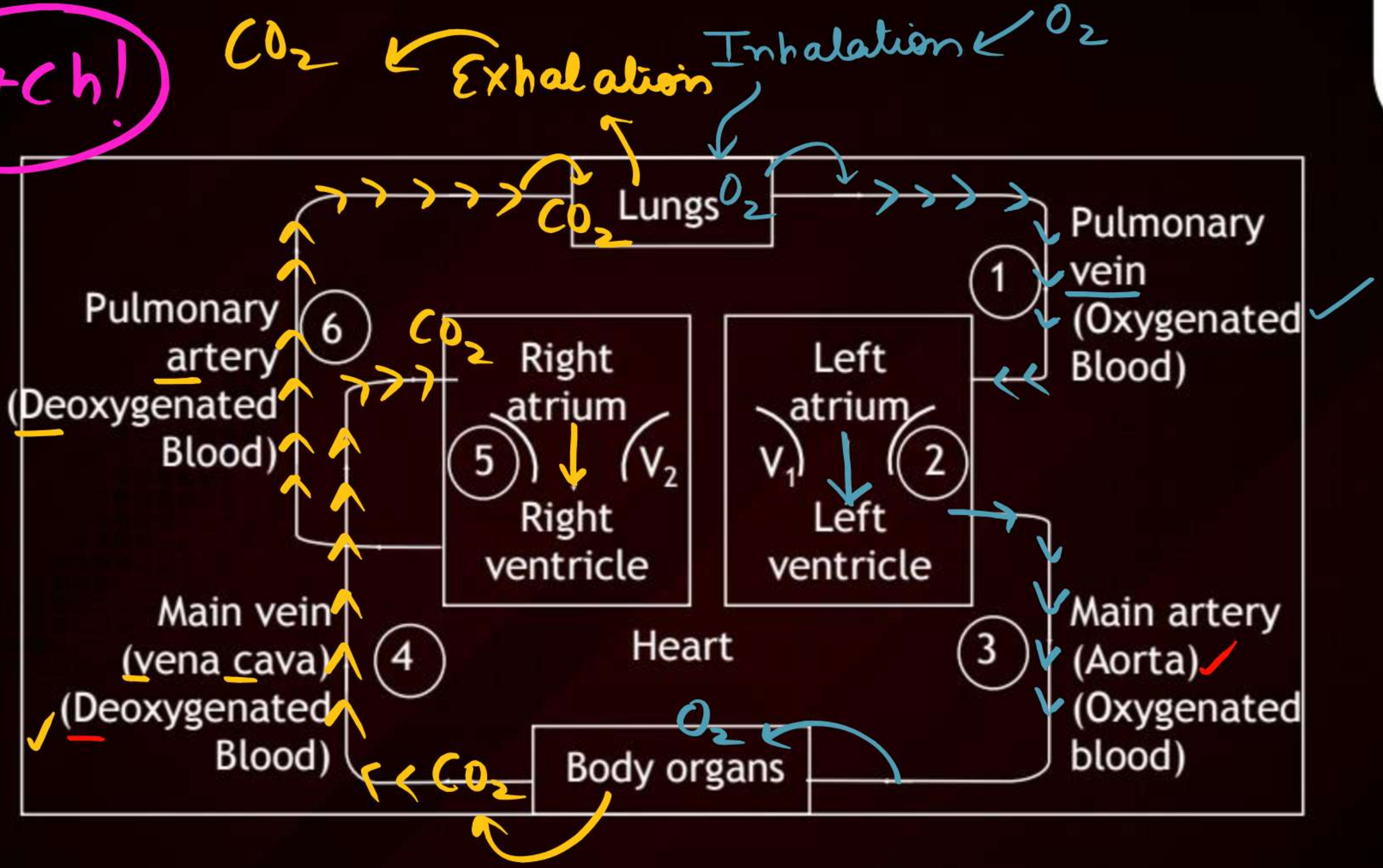


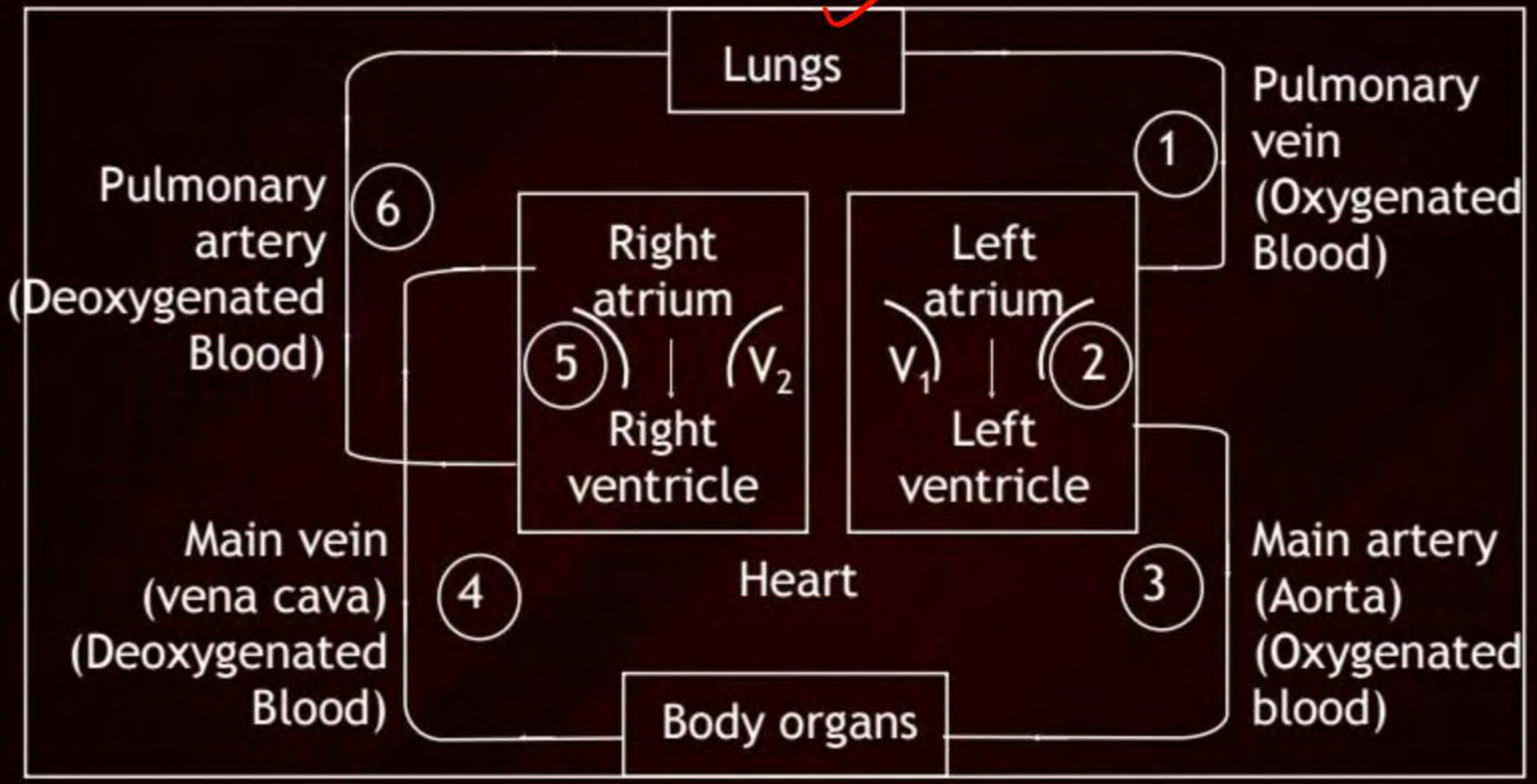
L O — Left Side → oxygenated blood

R D — Right Side → Deoxygenated blood


R.A
L.A
R.V
L.V
Valves
Aorta
Body parts

#ch!


CO_2
Exhalation
Inhalation
O_2
Lungs
O_2
CO_2
Pulmonary vein (Oxygenated Blood)
1
Pulmonary artery (Deoxygenated Blood)
6
CO_2
Right atrium
5
V_2
Right ventricle
Left atrium
V_1
2
Left ventricle
Main vein (vena cava) (Deoxygenated Blood)
4
Heart
3
Main artery (Aorta) (Oxygenated blood)
O_2
Body organs
CO_2


Lungs
Pulmonary vein (Oxygenated Blood)
1
Pulmonary artery (Deoxygenated Blood)
6
Right atrium
5
V_2
Right ventricle
Left atrium
V_1
2
Left ventricle
Main vein (vena cava) (Deoxygenated Blood)
4
Heart
3
Main artery (Aorta) (Oxygenated blood)
Body organs

QUESTION

Q-17

During contraction, what prevents the backflow of blood inside the heart?

A. Valves in heart

B. Thick muscular walls of ventricles

C. Thin walls of atria

D. Thick walls of atria

Double circulation

Blood enters TWICE into heart to complete the full circuit/cycle

Single circulation

Blood enters only ONCE in heart to complete the full circuit/cycle

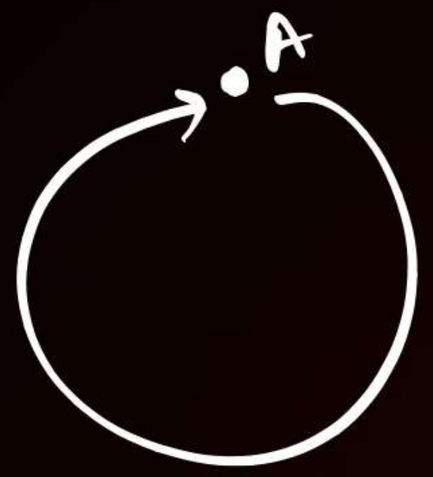
Class	Chambers in heart	Type of circulation	Temperature maintenance
Pisces (Fishes)	2	Single circulation	No (Cold blooded)
Amphibians	3	Incomplete Double circulation	No (Cold blooded)
Reptiles	3	Incomplete Double circulation	No (Cold blooded)
Aves (Birds)	4	Complete double circulation	Yes (Warm blooded)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

please note

[Crocodiles [Reptiles] → 4-Chambered heart ✓]

W.B

C.B


A

A
B

QUESTION

Q. 18

Select the wrong statement from the following:

(F)

[LORD]

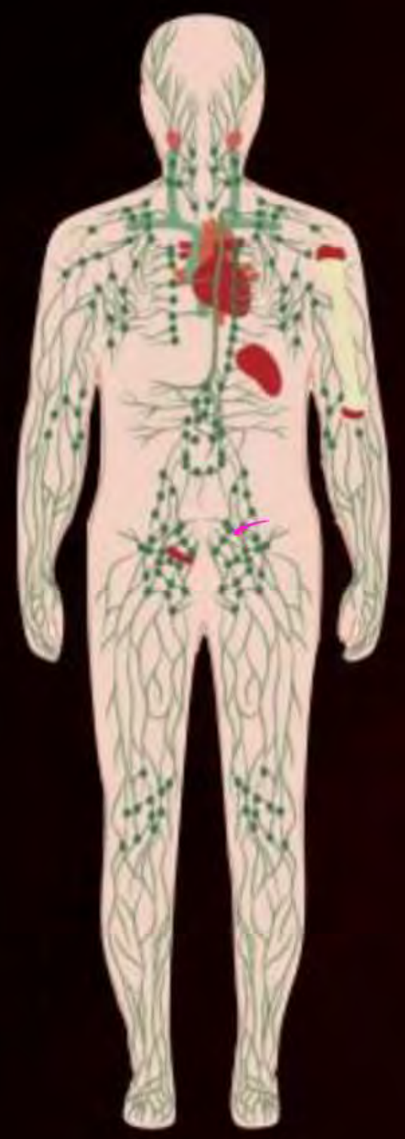
A. Upper right chamber of the heart carries deoxygenated blood. (T)

B. Pulmonary vein carries ~~de~~oxygenated blood. (F)

ox

C. Blood pressure is measured using a sphygmomanometer. (T)

D. All the reptiles except crocodiles have three chambered hearts. (T)



Lymph / Tissue fluid

A colourless fluid formed due to leakage of plasma, white blood cells and proteins from blood.

(Lymphocyte)

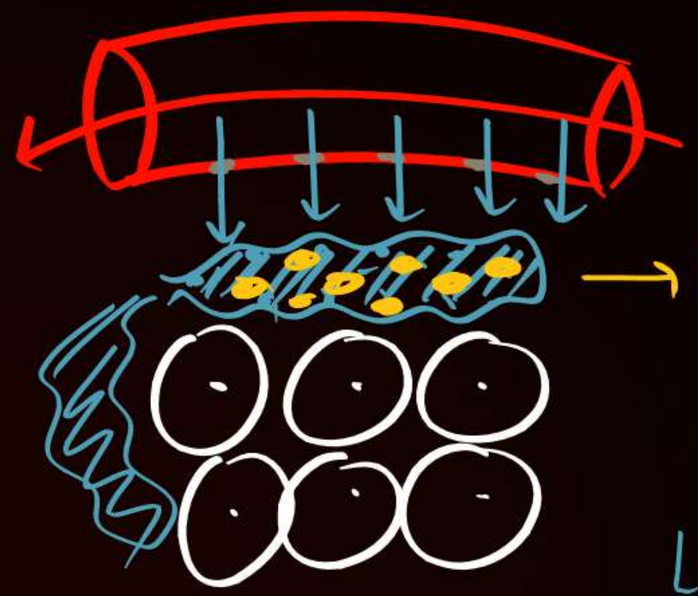
Functions of Lymphatic System:

a) Lymph facilitates absorption of fats and fat- soluble nutrients back to the circulatory system.

b) It removes excess fluids from body tissues and maintains the balance of fluid between the blood and tissues.

c) It helps to provide immunity against pathogens

WBC



→ Lymph/Tissue fluid

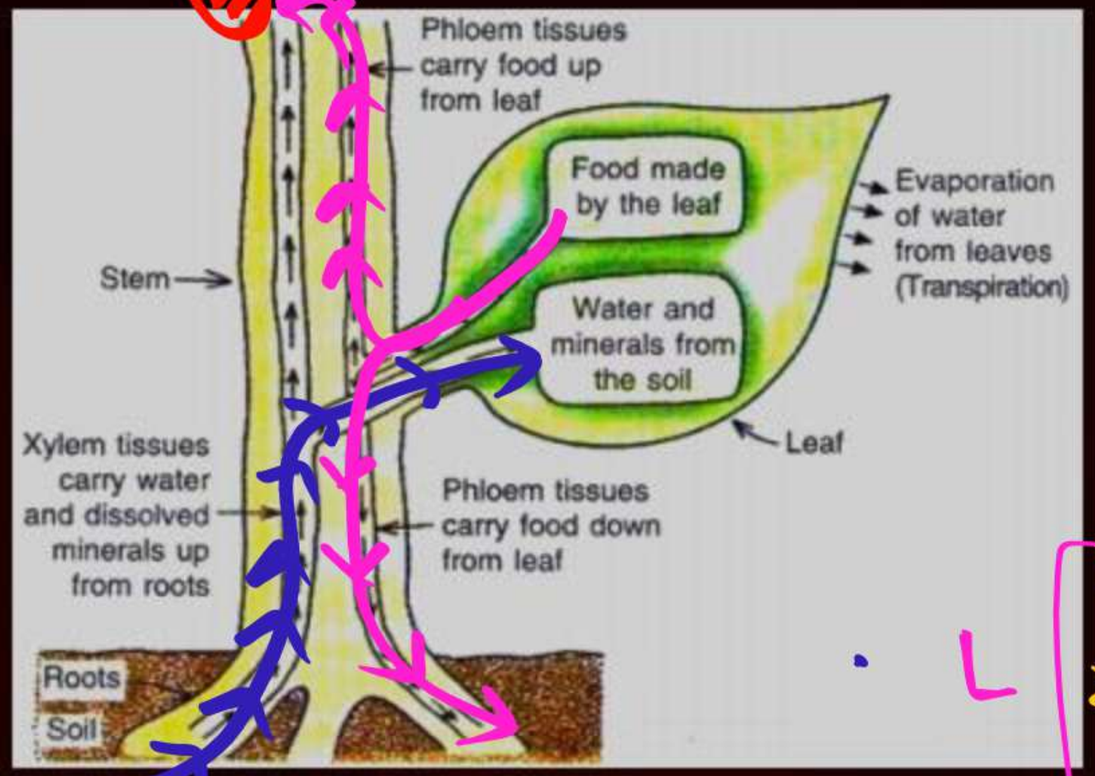
↓

Lymphocyte (WBC)

Transportation in Plants

Xylem → **Water and mineral salts** → **Ascent of sap**

Phloem → **Food** → **Translocation**



Xylem:

1. Tracheid
2. Vessel
3. Xylem fibre
4. Xylem parenchyma

Phloem:

1.) Sieve tubes
2.) Companion Cells
3.) Phloem parenchyma
4.) Phloem fibre

Transport of materials in xylem	Transport of materials in phloem
• Xylem tissue helps in the transport of water and minerals.	• Phloem tissue helps in the transport of food.
• Water is transported upwards from roots to aerial parts of plants.	• Food is transported in both upward and downward directions.
• Transport in xylem requires physical forces such as transpiration pull and root pressure.	• Transport of food in phloem requires energy in the form of ATP.

NO

ATP is used

QUESTION

#H.Q

Identify the two components of phloem tissue that help in transportation of food in plants.
(Re)(CBSE, 2022 Term I)

Q-19

(A) Phloem parenchyma & sieve tubes

(B) Sieve tubes & companion cells

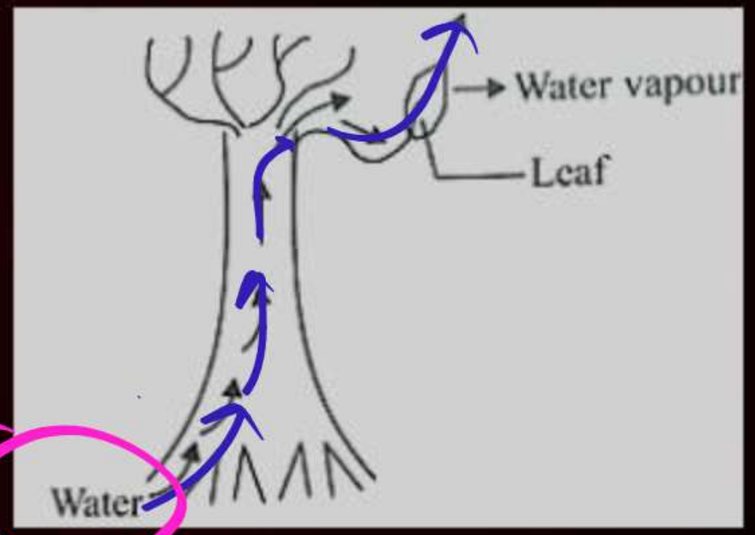
(C) Phloem parenchyma & companion cells

(D) Phloem fibres and sieve tubes

QUESTION

Q.20

Observe the following diagram and identify the process and its significance from the following options: (PYQ) 2020



(A) Evaporation: Maintains water contents in leaf cells.

(B) Ascent of sap: upward movement of water due to xylem

(C) Excretion: Helps in excreting out waste-water from the plant.

(D) Translocation: Helps in transporting water from one cell to another.

Excretion

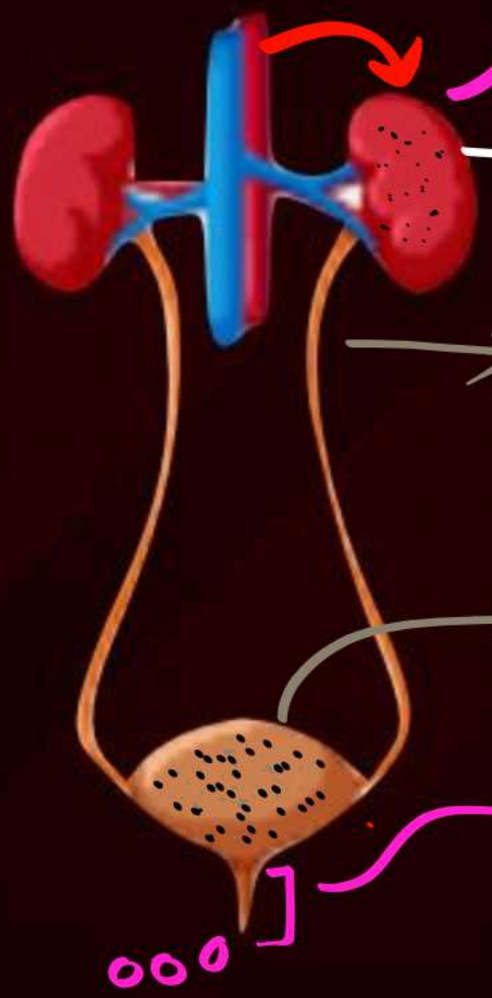
- The biological process involved in the removal of harmful metabolic wastes from the body is called Excretion.

Waste products

Nitrogenous waste products

- They are major waste products. Urea, Uric acid, Ammonia etc.
- CO_2
- Excess Water

- In simpler organisms like Amoeba, removal of wastes takes place by simple diffusion from the body surface into the surrounding water.



Urine Pathway

Kidney
Produce urine, water balance,

- **Ureter**
Transports urine towards urinary bladder

- **Urinary bladder**
Temporarily stores urine

- **Urethra**
Transport urine out of the body

Egestion ≠ Excretion

Ammonia
Urea
Uric Acid

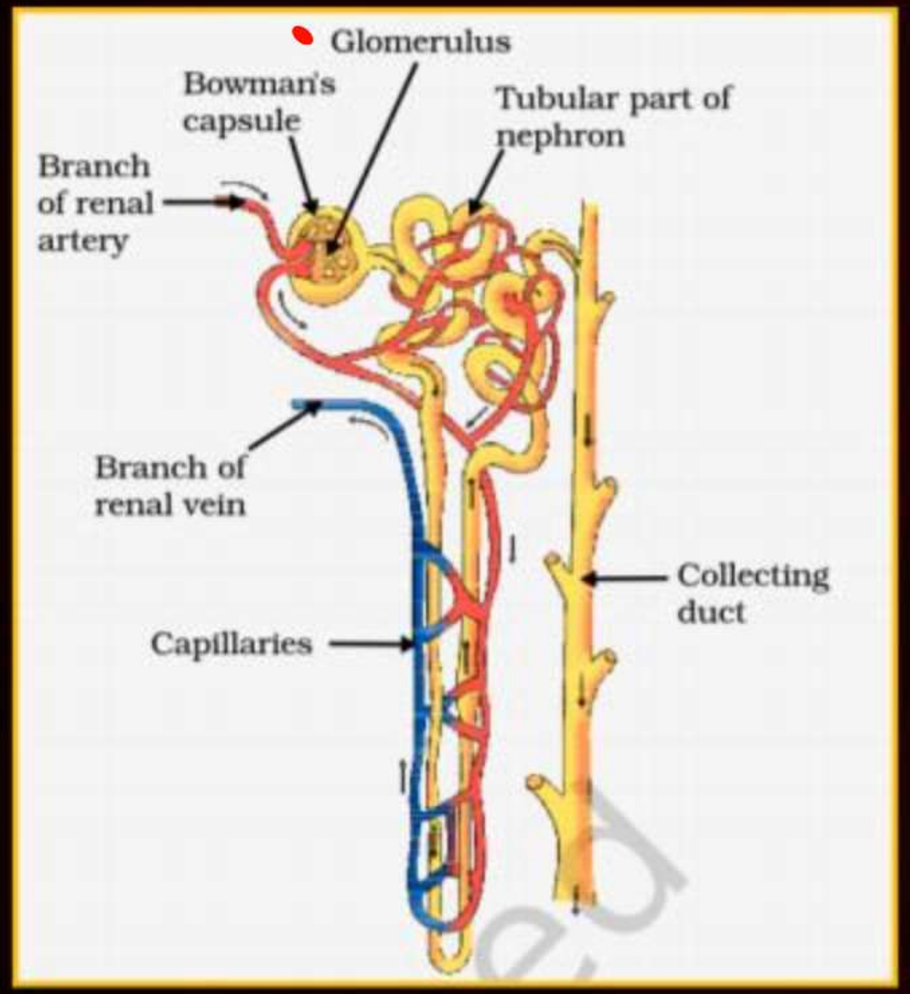
Chemical Rxn

$A + B \longrightarrow C + D$

Metabolic Waste

Kidney

Nephron



Structural and functional unit of kidney.

Helps in filtration of blood.

Millions of nephron in each kidney

Steps of Formation of urine

1

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.

2

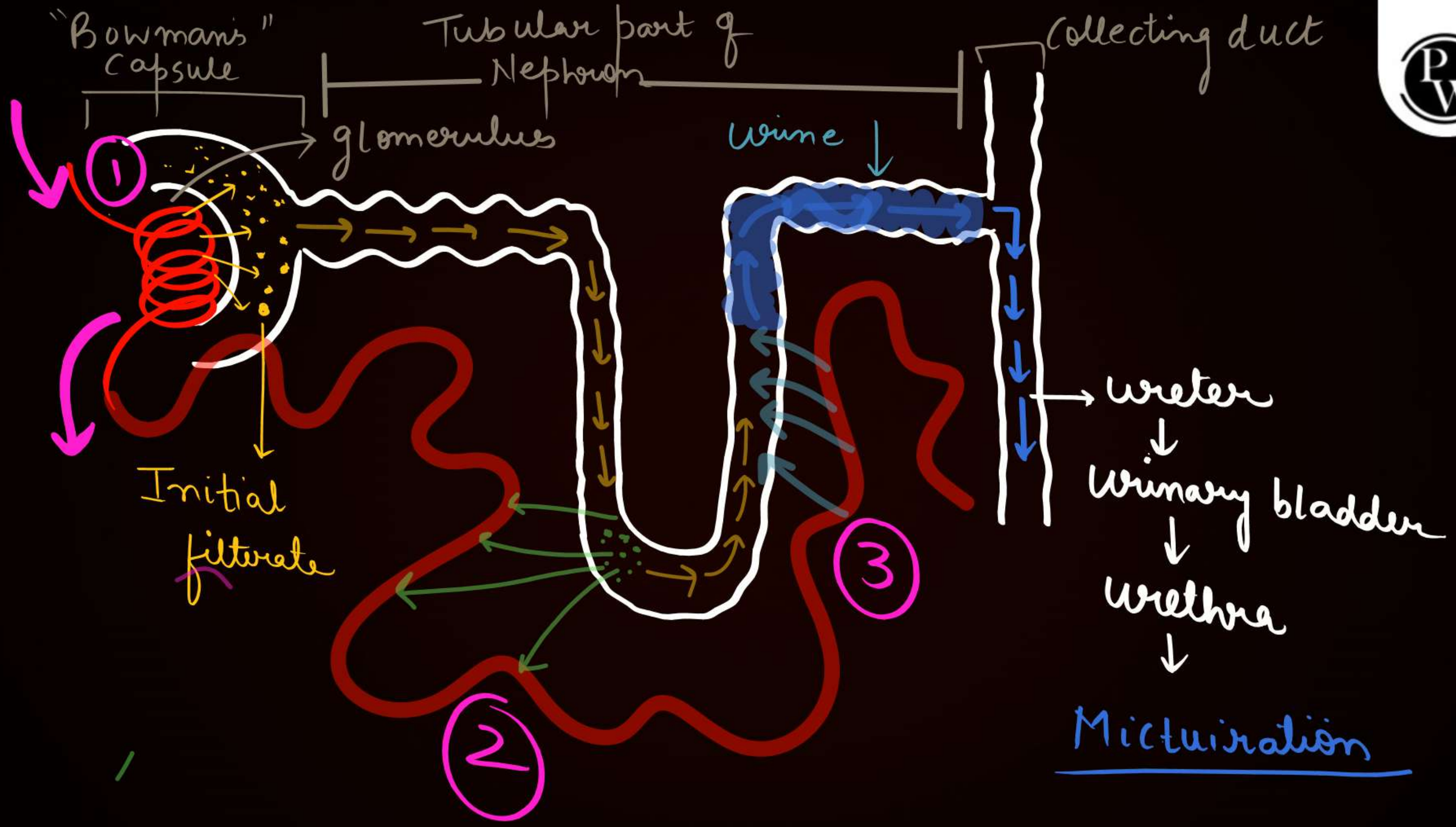
Selective Reabsorption

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

3

Tubular Secretion

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


"Bowmans" capsule
Tubular part of Nephron
Collecting duct
glomerulus
urine
1
2
3
Initial filtrate
ureter
urinary bladder
urethra
Micturition

Plants use different strategies for excretion of different products

- Oxygen and carbon dioxide is diffused through stomata.
- Excess water is removed by transpiration.
- Plants can even loose some of their old parts like old leaves and bark of tree.
- Many plant waste products are stored in cellular vacuoles.
- Other waste products like latex, ~~raisins~~ Resin and gums are stored in old xylem cells.
- Plants also secrete some waste substances into the soil around them.

QUESTION

#H.Q Q.21

The filtration units of kidneys are called (Re) (NCERT Exemplar)

A ureter

B urethra

C neurons

D nephrons

QUESTION

Q.22

Which part of the nephron in human kidney, serves the function of reabsorption of certain substances? (PYQ)

(A) Glomerulus

(B) Bowman's Capsule

(C) Tubules

(D) Collecting duct

QUESTION

Q.23

Identify the correct path of urine in the human body. (Re)

(A) Kidney → urinary bladder → urethra → ureter

(B) Urinary bladder → ureter → kidney → urethra

(C) Kidney → ureter → urethra → urinary bladder

(D) Kidney → ureter → urinary bladder → urethra

QUESTION

Q-24

What is the primary purpose of the Bowman's capsule in the human kidney? (Un)

A. Production of urine

B. Absorption of glucose

C. Collection of blood filtrate

D. Secretion of hormones

QUESTION

Q. 25

Which statement best describes the role of the urinary bladder in the excretory system?

A. Filters waste from the blood

B. Stores urine until expulsion

C. Reabsorbs essential nutrients

D. Produces urine

Samridhi = 25/25

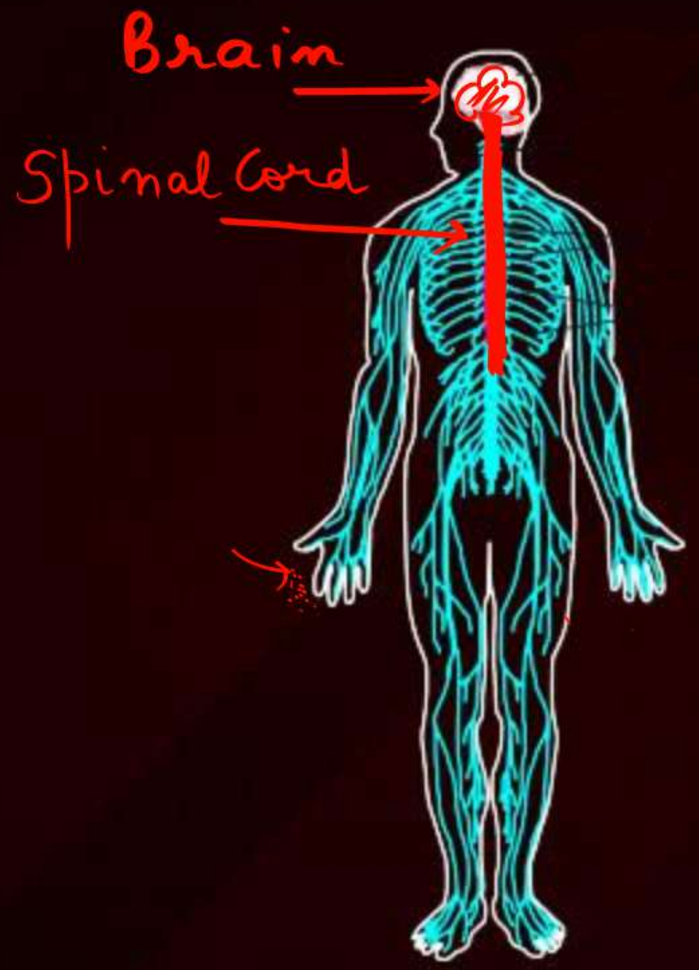
CONTROL AND COORDINATION

- **COORDINATION IN ANIMALS**
  - **(1) NERVOUS SYSTEM** (Associated with Neurons)
  - **(2) ENDOCRINE SYSTEM** (Associated with hormones)
- **COORDINATION IN PLANTS**
  - **PLANT MOVEMENTS**
  - **PLANT HORMONES**

NERVOUS SYSTEM

(CNS) CENTRAL NERVOUS SYSTEM

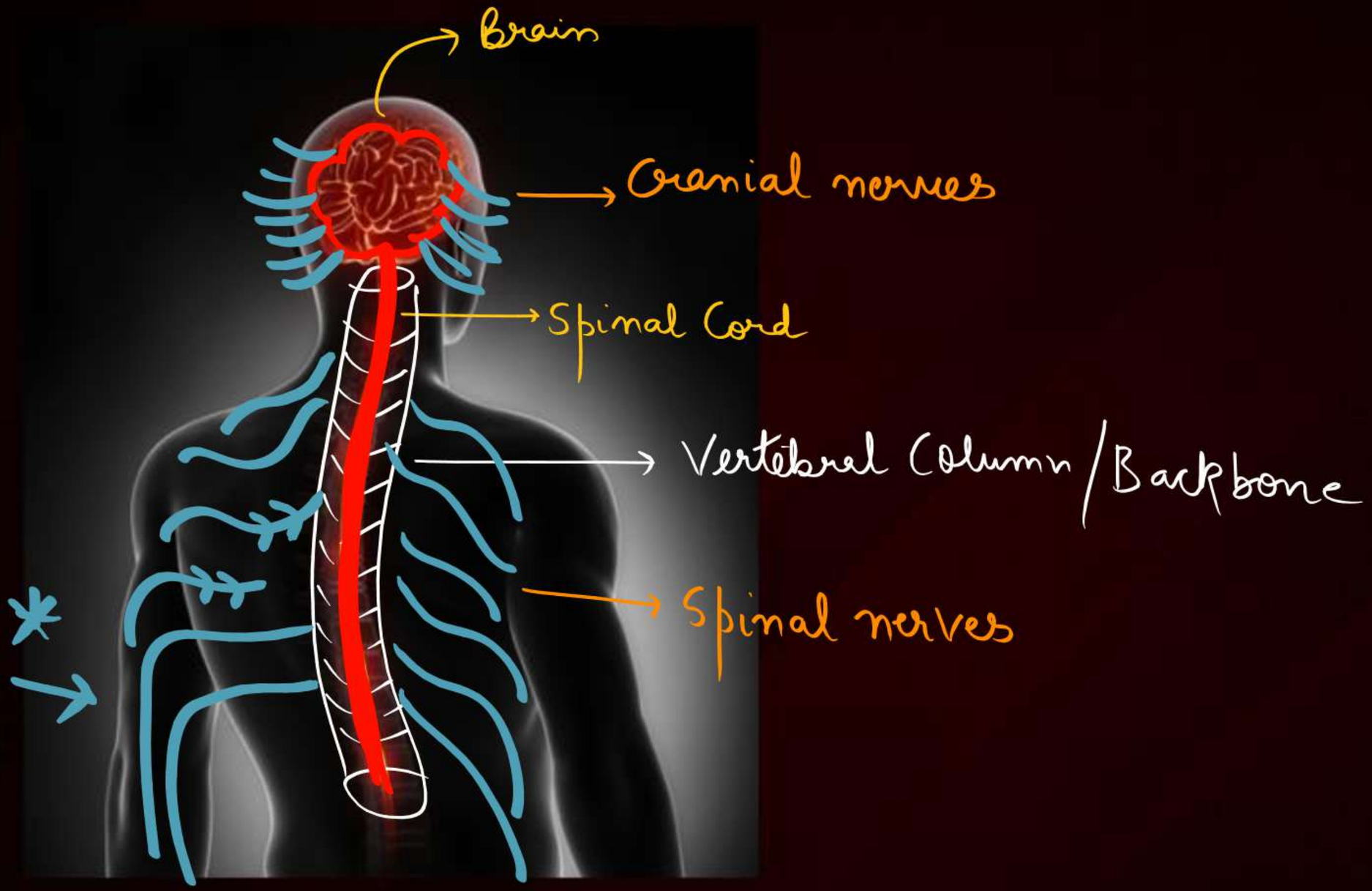
1. Brain
2. Spinal Cord



(PNS) PERIPHERAL NERVOUS SYSTEM

Nerves

1. Cranial Nerves
   - → arise from brain
   - → 12 pair
2. Spinal nerves
   - arise from spinal cord
   - → 31 pair


Brain
Cranial nerves
Spinal Cord
Vertebral Column/Backbone
Spinal nerves

#Ch

Q-1 C&C

QUESTION

Brain is a part of

(A) CNS

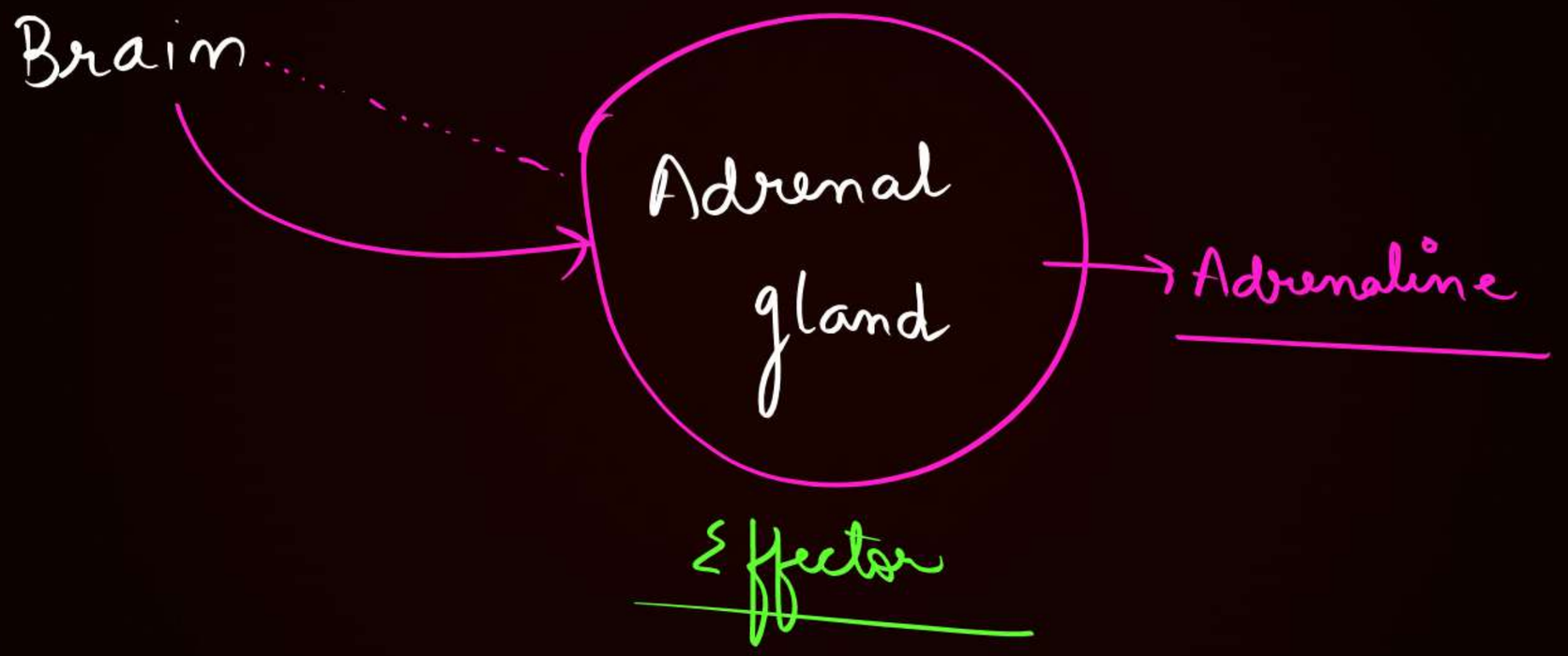
(B) PNS

(C) ~~Reflex action~~ Digestive System

(D) All of these

Key terms to understand the functioning of Nervous system:

Stimulus	• Any the change, factor or agent which causes a change in activity or behaviour of an organism.
Receptors	• Receptors are the cells, tissues or organs that receive the stimulus
Effector	• Effector are tissues, glands or muscles which act in response to stimulus received
Response	• Response is the reaction towards a stimulus by an organism.


Brain
Adrenal gland
Adrenaline
Effector

bitter
sour
salty
sweet

BASIC SENSORY RECEPTORS IN HUMAN

Receptor	Sense Organ	Stimuli
Photo receptors	Eyes	Light
Olfactory receptors	Nose	Smell
Gustatory receptors	Tongue	Taste
Phono receptors	Ear	Sound
Thermoreceptors	Skin	Heat/Cold
Nociceptors	Skin	Pain

QUESTION

Q.2 C&C

Which of the following statements is correct about receptors? (Re) (NCERT Exemplar)

(A) Gustatory receptors detect taste while olfactory receptors detect smell.

(B) Both gustatory and olfactory receptors detect smell.

(C) Auditory receptors detect smell and olfactory receptors detect taste.

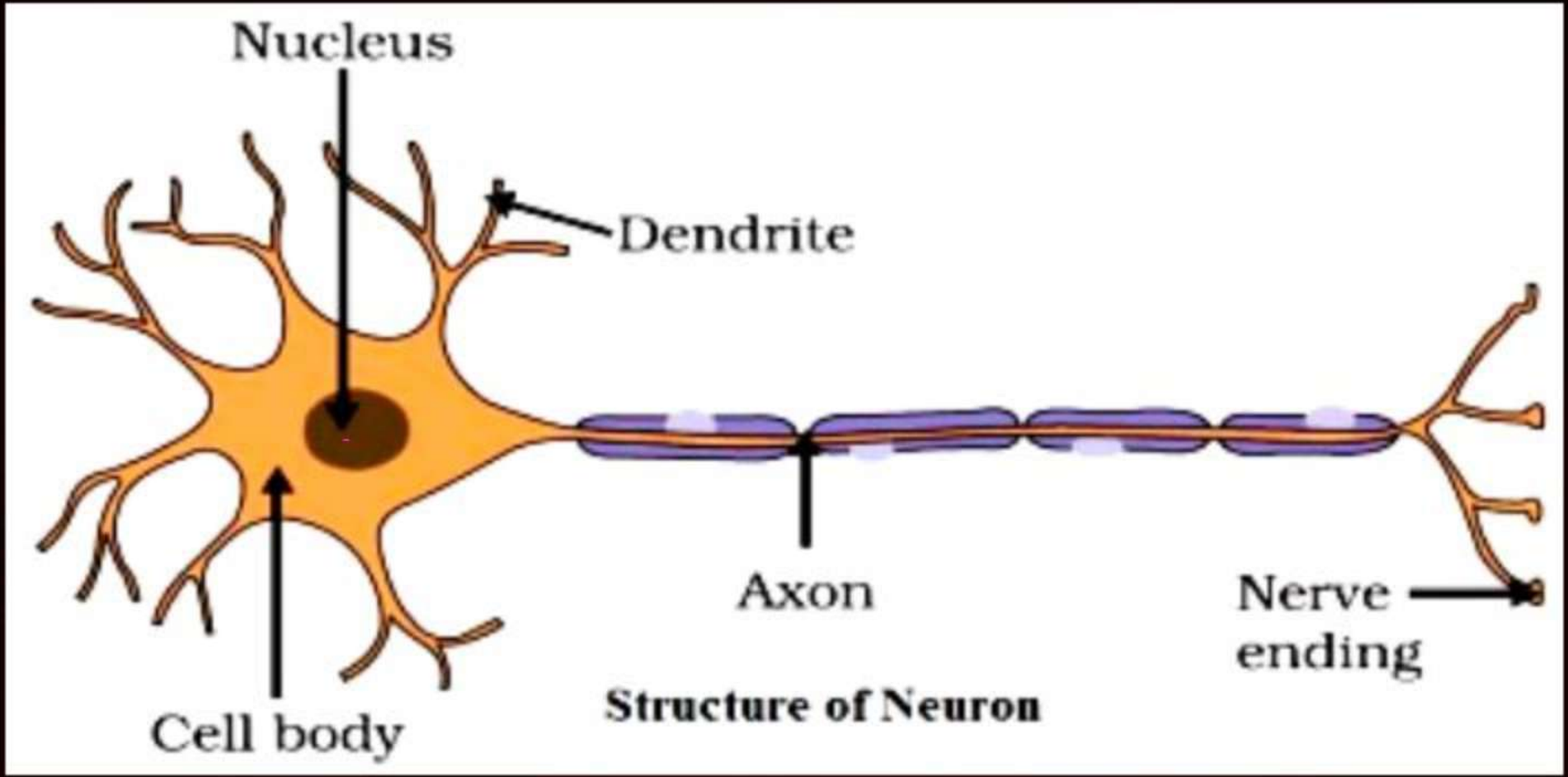
(D) Olfactory receptors detect taste and gustatory receptors smell.

Neuron / Nerve cell

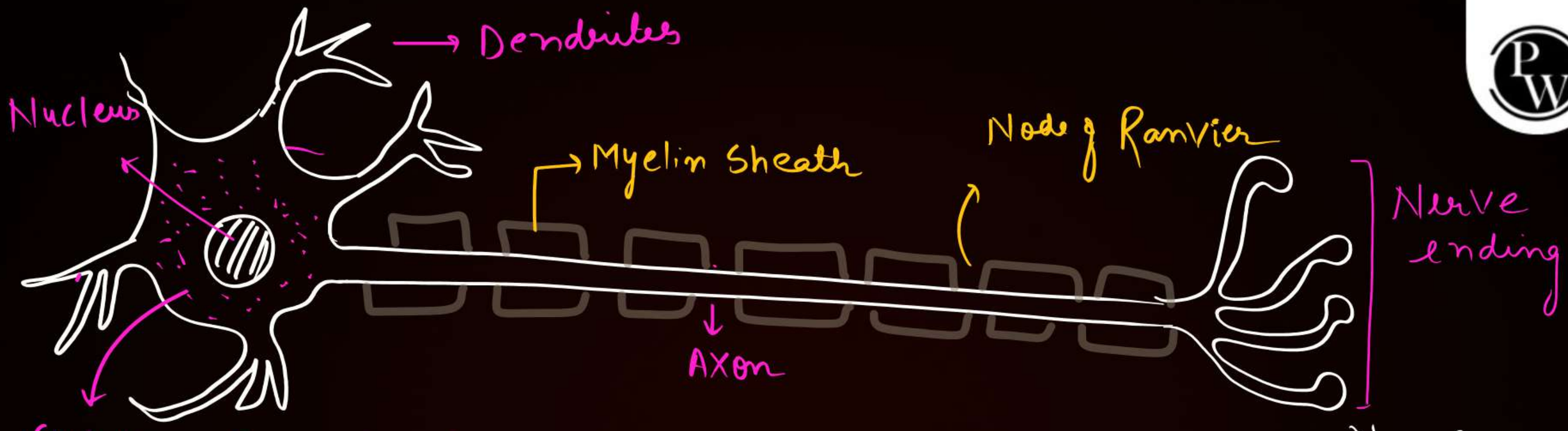
→ Nervous Tissue → Brain & Spinal

→ Single cell

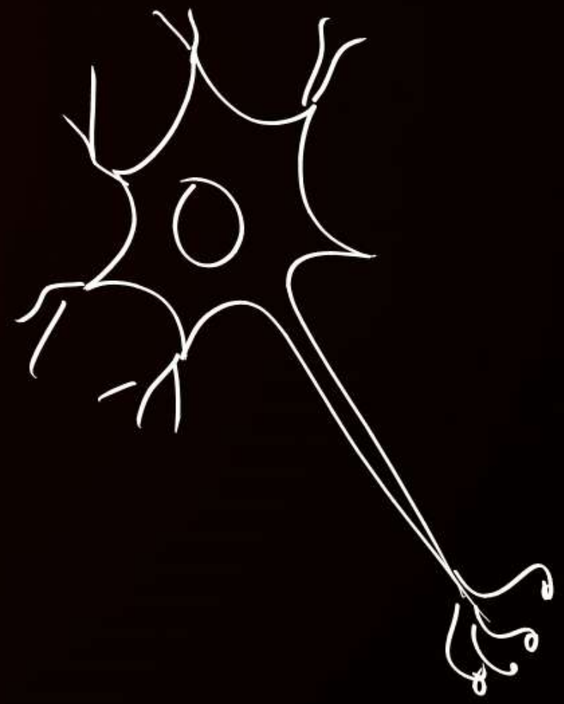
- Neuron is a highly specialized cell
- Responsible for the transmission of signals to and from the different parts of the body
- Structural and functional unit of nervous system
- Longest cell in human body ~1m

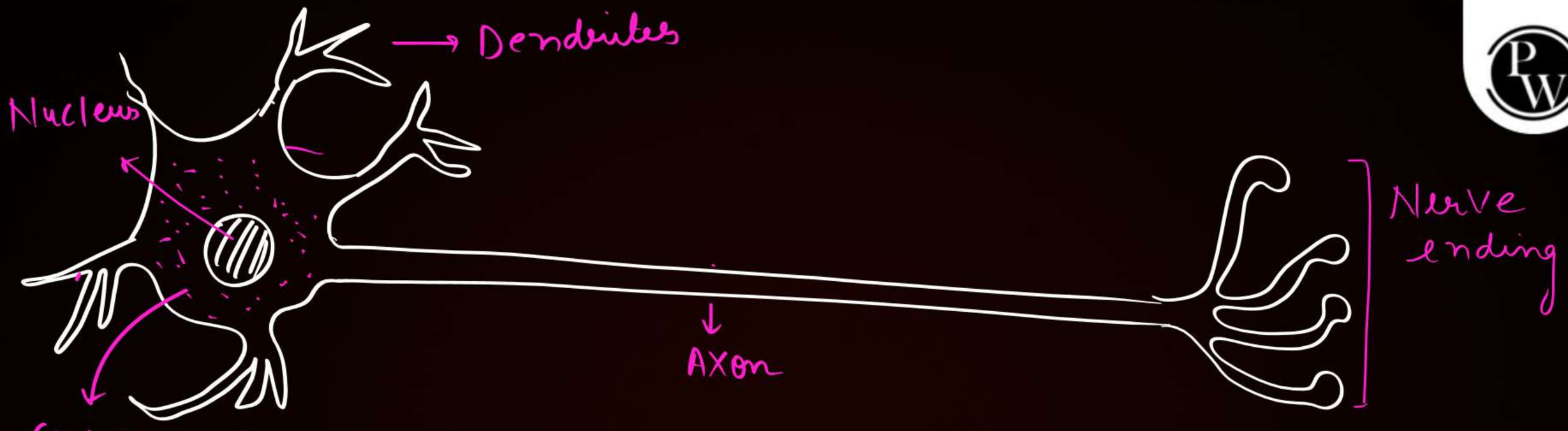


Structure of Neuron



Myelinated Neurons





Cytoplasm [Neuroplasm]

↓

Cyton / cell body / Soma

Non-Myelinated Neuron

Dendrite

↓

Cell body

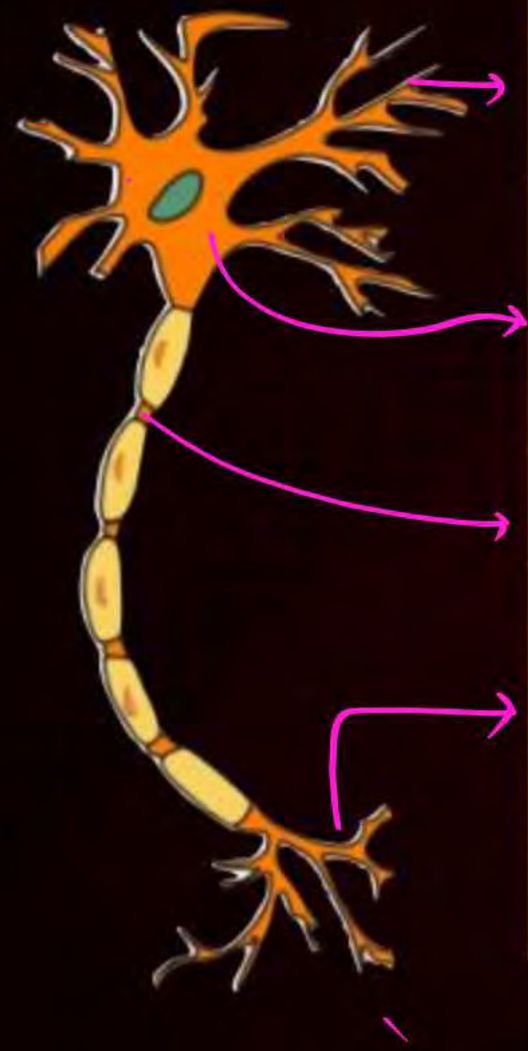
↓

Axon

↓

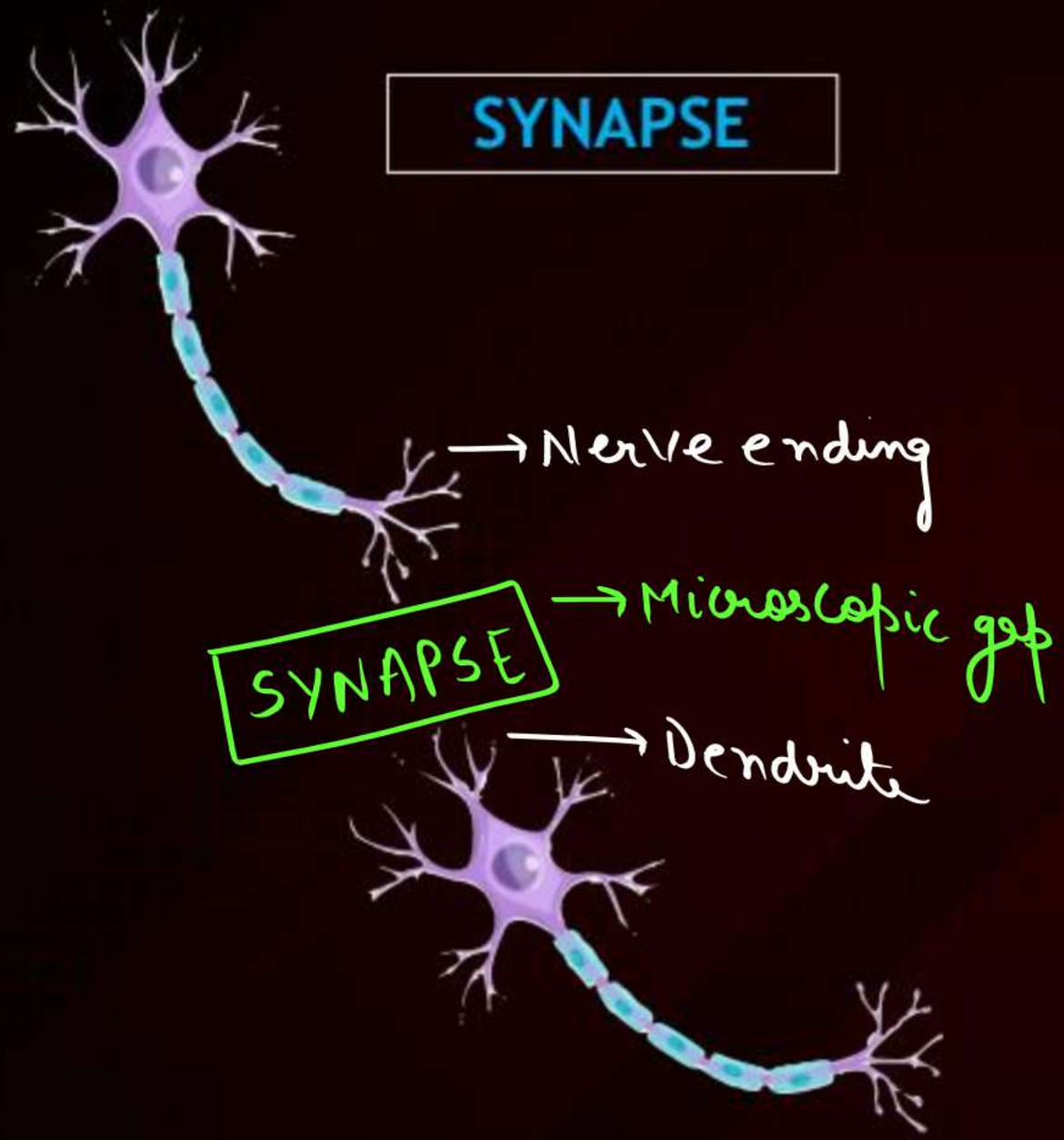
Nerve End

NEURON

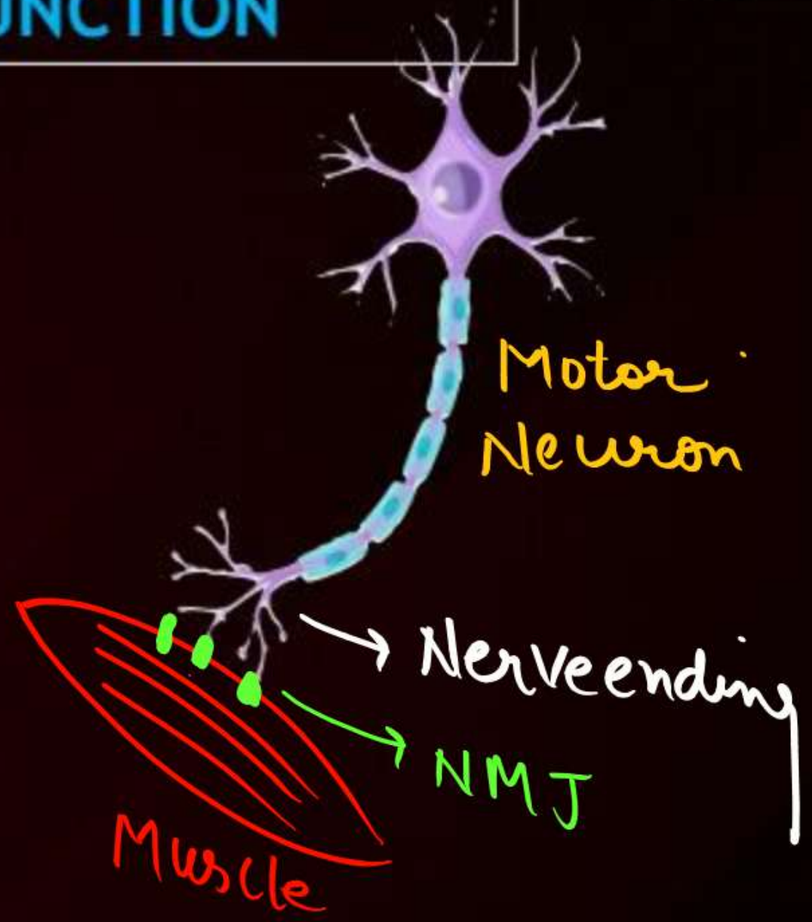


Part	Details
Dendrites	Branched structure that collects information from previous neuron and passes on to the cell body.
Cell body	It is the broad, rounded part of the neuron that contains the nucleus, abundant cytoplasm (neuroplasm) and other organelles like mitochondria, endoplasmic reticulum, Golgi body etc.
Axon	It is a long tube-like structure that carries information from the cell body to the nerve endings .
Nerve ending	Terminal branched part of axon
Synapse	There is a gap between the nerve endings of one neuron and dendrite of the following neuron where signals are transmitted as chemical signals called neurotransmitters.

SYNAPSE



NEUROMUSCULAR JUNCTION (NMJ)



QUESTION

Q.3

In a synapse chemical signal is transmitted from _____. PYQ

(A) dendrite of one neuron to axonal end of other neuron.

(B) axon to cell body of same neuron.

(C) cell body to axonal end of same neuron.

(D) axonal end of one neuron to dendrite of another neuron.

Types of neurons

Sensory neurons

They help in transmitting nerve impulse from receptor to central nervous system

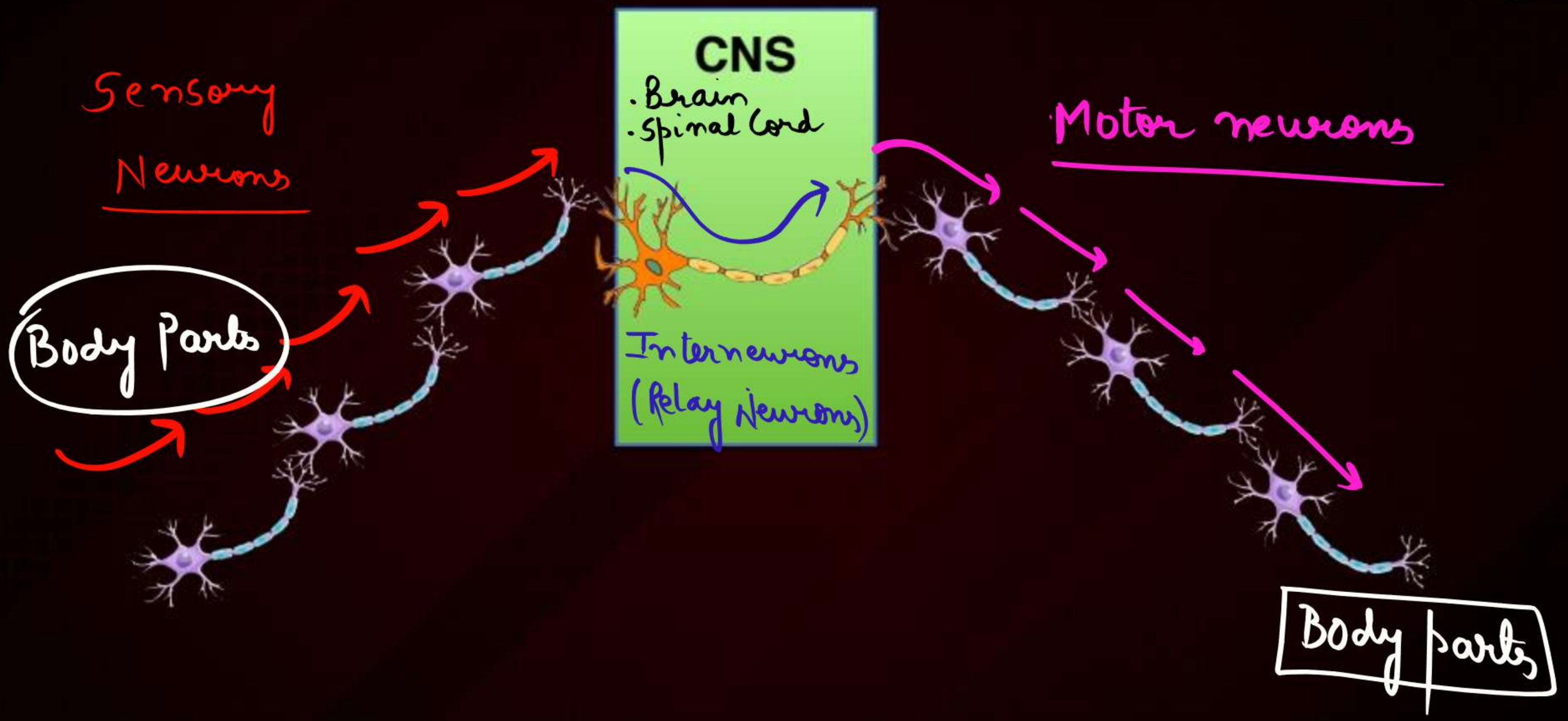
Motor neurons

They help in transmitting nerve impulse from central nervous system to a muscle or gland

Interneurons

They connect sensory and motor neuron

Stimulus → Receptor → Sensory nerve → Brain / Spinal cord → Response → Motor nerve → Effector



QUESTION

#H.Q Q.4

_____ is a microscopic gap between a pair of adjacent neurons.

A neurotransmitter

B dendrites

C axon

D synapse

NERVOUS ACTIONS

Voluntary actions/ movements

→ Controlled by our own Will

→ Thinking involved

→ Brain is involved

- Walking
- Writing
- Dancing
- Jumping

Involuntary actions/ movements

Can't Controll by our Own Will

→ Thinking not involved

→ Brain is involved

- Pumping of blood
- Peristaltic movements
- Contraction relaxation of blood vessels

Reflex actions / movements

→ Can't Control by our Own Will.

→ Thinking not involved

→ Spinal Cord involved

Brain not involved!!

- Withdrawal of hand when touch a hot object.
- Closing of eyelids when some particles enter the eye.
- Shivering when it is too cold.
- Sneezing

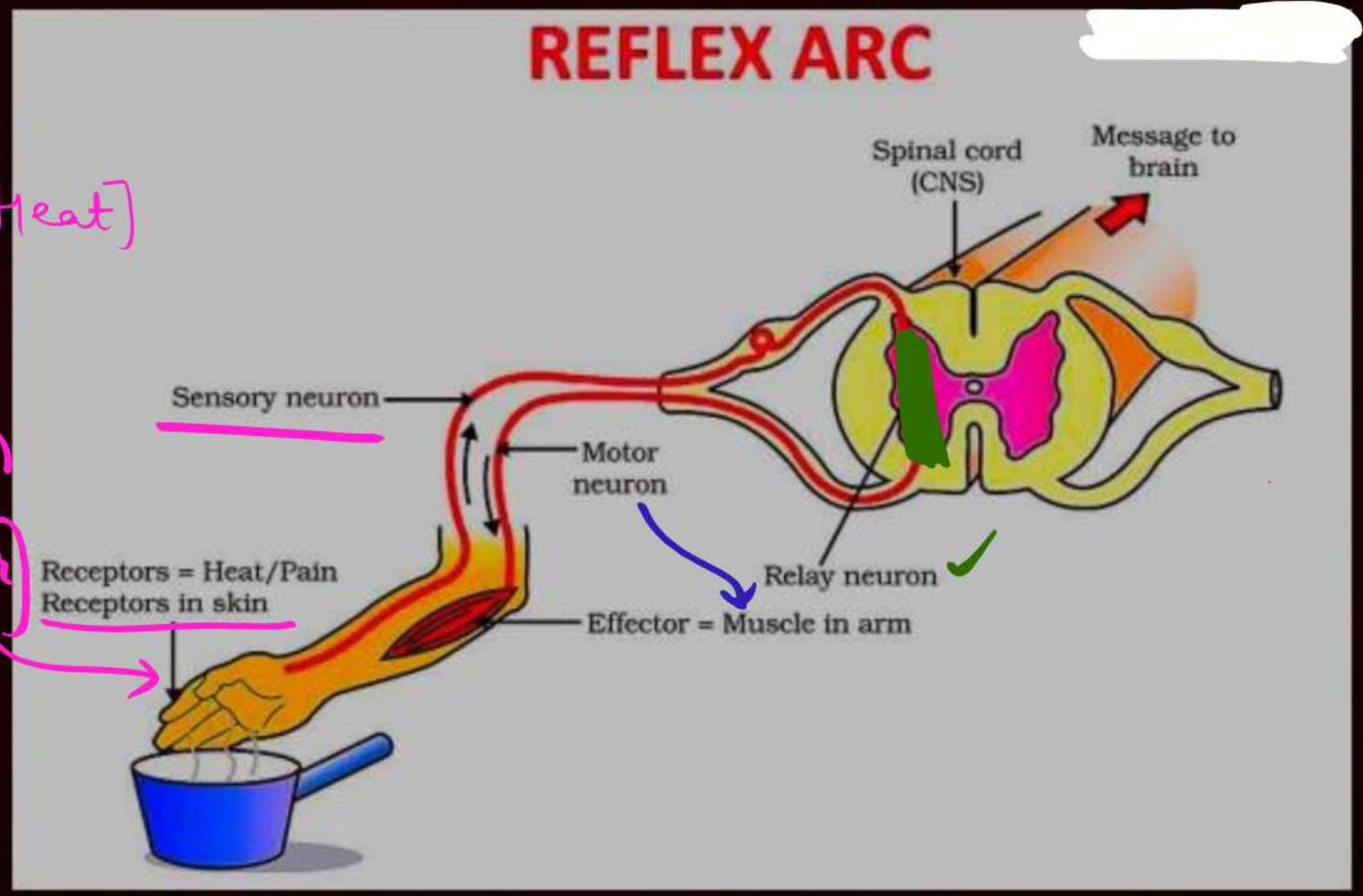
Note:

The pathway of the reflex action is called Reflex arc.

Stimulus → Receptor organ → Sensory nerve → Spinal cord → Effector organ → Response

Stimulus [Heat]

[Thermoreceptor]



QUESTION

Q.5

While walking, you accidentally stepped on a sharp stone. You quickly jumped away as a response. Examine the diagram showing the series of actions taking place in the body and identify the missing term? (An)

(A) Spinal cord

(B) Brain

(C) Cranial nerve

(D) PNS

QUESTION

Q-6

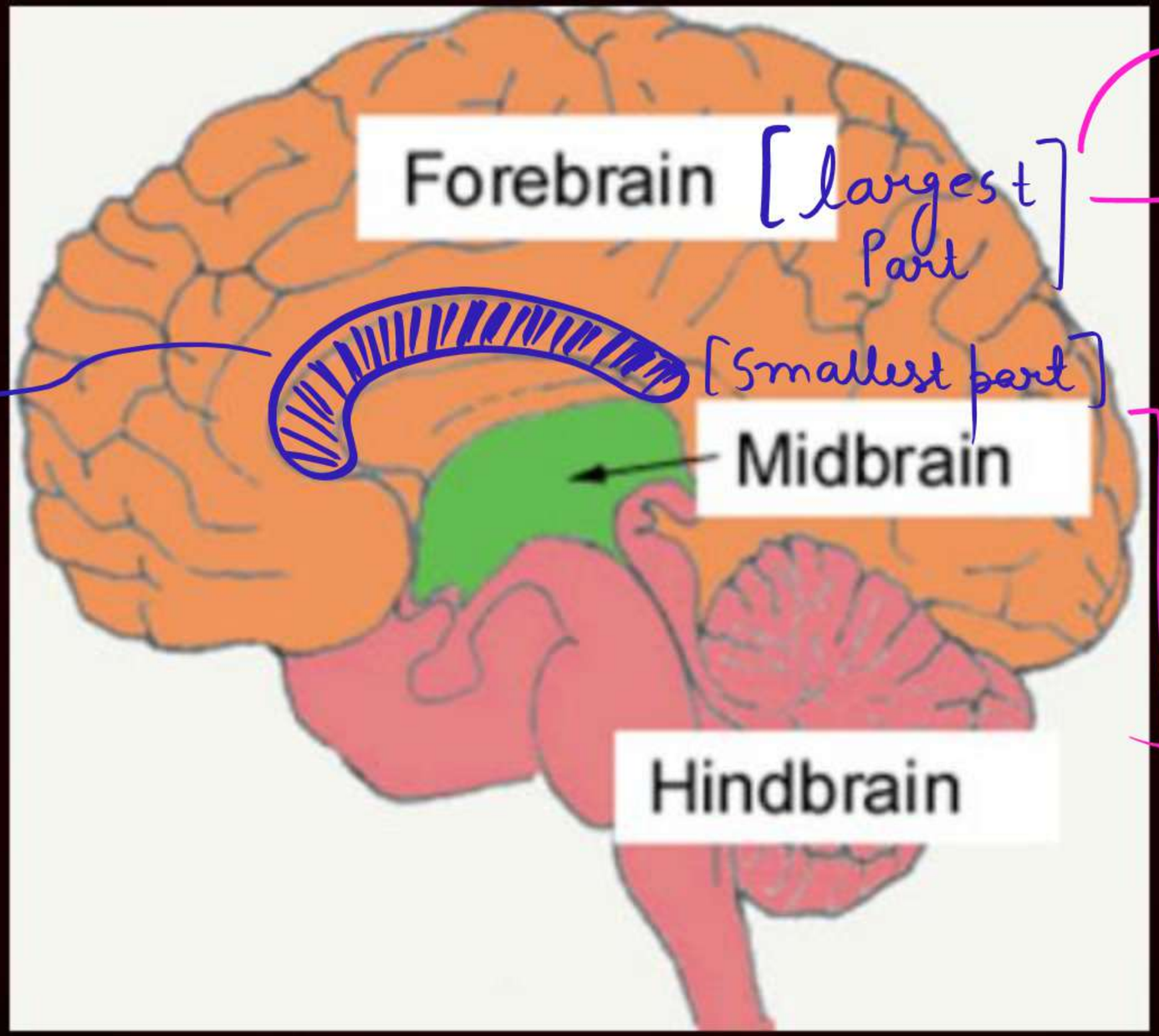
Assertion (A): Reflex action has a very fast response that takes place without thinking. (T)
Reason (R): Reflex action is controlled by the spinal cord. (T) (Un)

A. Both A and R are true, and R (6 is the correct explanation of A.

B. Both A and R are true, but R is not the correct explanation of A.

C. A is true, but R is false.

D. A is false, but R is true.



[largest Part]

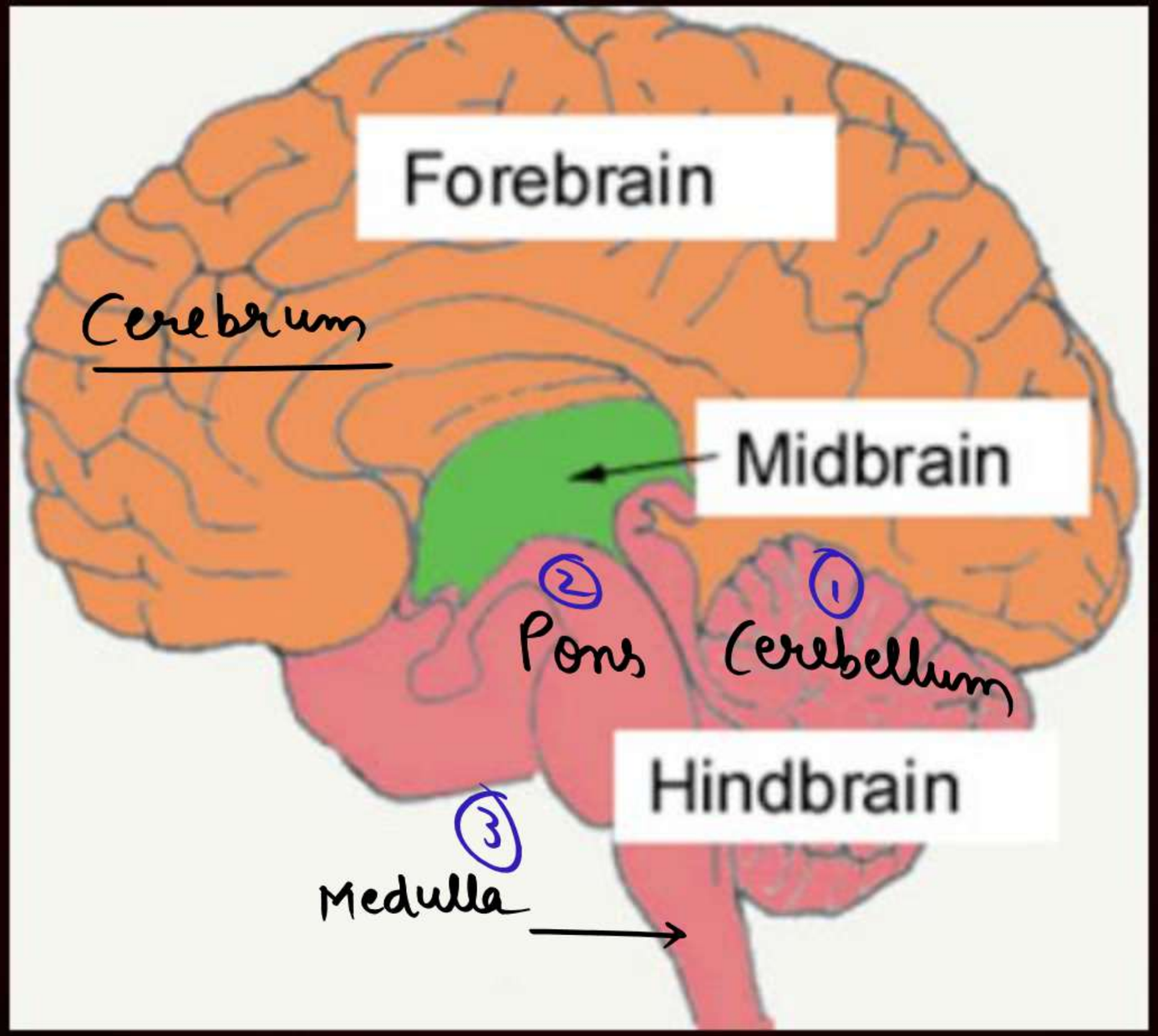
Voluntary action

(Thinking)

[Smallest part]

(Corpus Collusum)

Involuntary Actions


Forebrain
Cerebrum
Midbrain
2
Pons
1
Cerebellum
Hindbrain
3
Medulla

CENTRAL NERVOUS SYSTEM

(i) Brain (ii) Spinal cord

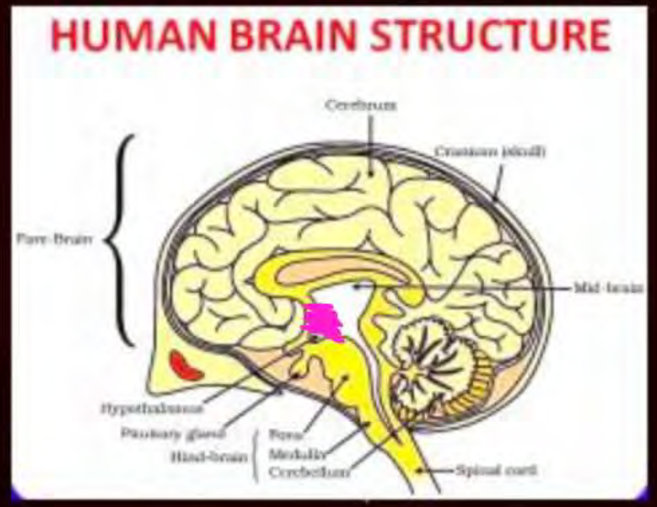
BRAIN

(i) Centre of coordination of all activities
(ii) Involved in thinking
(iii) Divided into three parts-

(1) FORE BRAIN

Cerebrum :
(i) Main thinking and largest part of the brain.
(ii) It has Seat of mental abilities, controls thinking, memory, reasoning, perception, emotions, and speech.

Thalamus: It relays sensory information to the Cerebrum.
Hypothalamus it controls sleep, hunger thirst etc. It forms the link between Nervous system & Endocrine system .



(2) MID BRAIN

- Connects Fore brain and Hind brain.
- Concerned with sense of sight and hearing.

(3) HIND BRAIN

Connects the Fore brain & Hind brain
Cerebellum: Controls & coordinates muscular movements, maintaining body balance and posture.

Pons: concerned with regulation of breathing rate, sleep cycle.

Medulla oblongata: Controls involuntary actions like blood pressure. salivation, vomiting, etc.

Spinal Cord

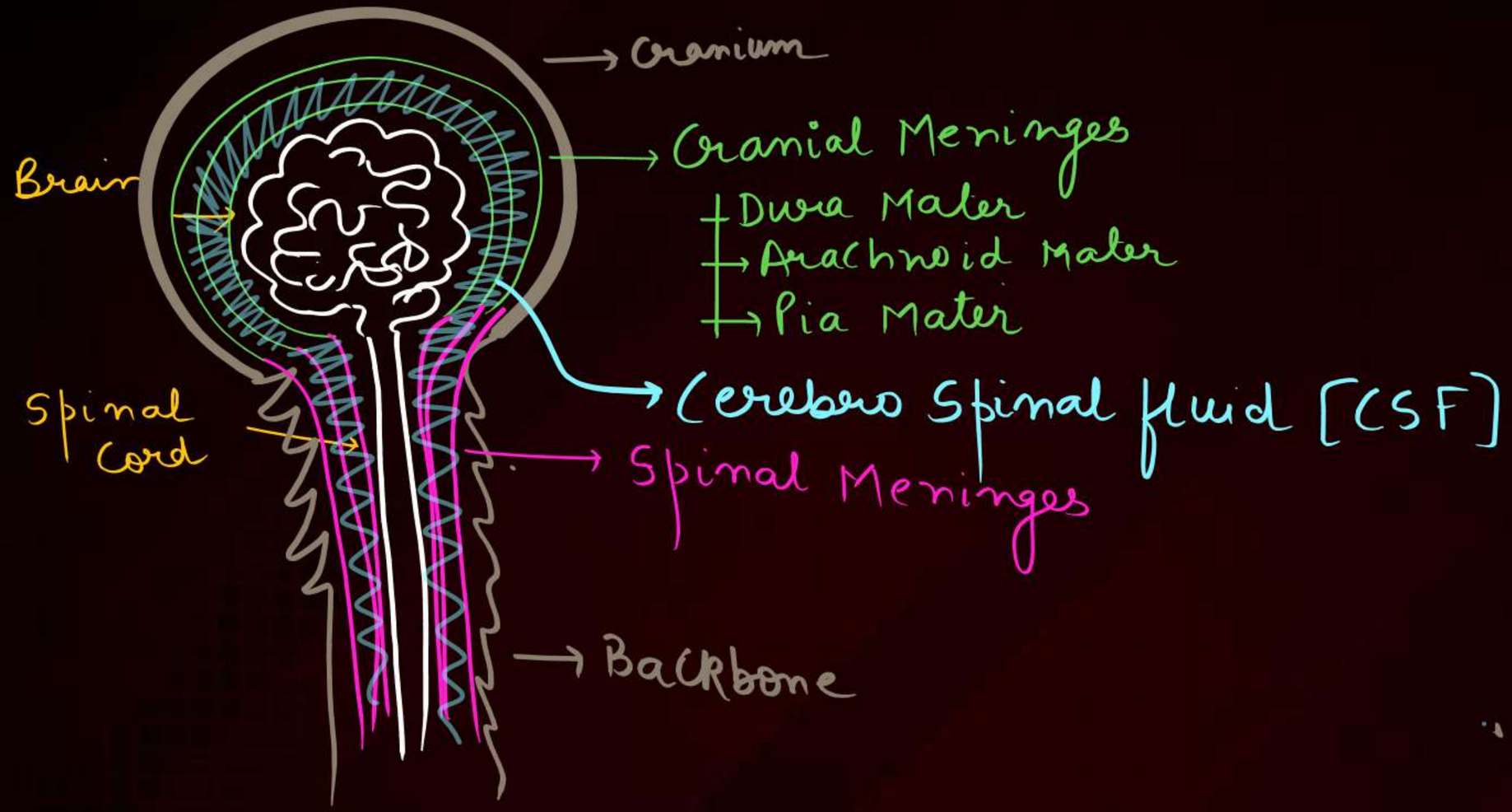
Cylindrical or tubular structure extending downwards from the Medulla oblongata and protected by backbone.

→ Protection of Brain:

- The brain is placed in a bony box called cranium and is a part of the skull.
- Brain is wrapped in three separate membranes called meninges.
- The space present between these layers is filled with cerebro-spinal fluid (CSF).
- This fluid-filled balloon acts as a shock absorber/ spring/ cushion
- and protects the brain from injuries and shocks.

→ Protection of Spinal Cord:

- Like brain, spinal cord is also wrapped in spinal meninges and consist of Cerebrospinal fluid .
- The spinal cord is protected by the vertebral column or backbone .
- The vertebral column is formed by 33 individual bones called vertebrae


Cranium
Cranial Meninges
Dura Mater
Arachnoid Mater
Pia Mater
Brain
Cerebro Spinal fluid [CSF]
Spinal Cord
Spinal Meninges
Backbone

QUESTION

Q.7

Which of the following part of human brain will help us to maintain posture while cycling ?

(A) Cerebrum

(B) Cerebellum → Balancing

(C) Medulla oblongata

(D) Pons

QUESTION

Q.8

Which of the following does not involve thinking ?

(A) Peristaltic movement

(B) Pumping of blood from heart

(C) Withdrawing hand after touching hot surface Reflex action

(D) All of these

QUESTION

Q-9

Which part of human brain control salivation ?

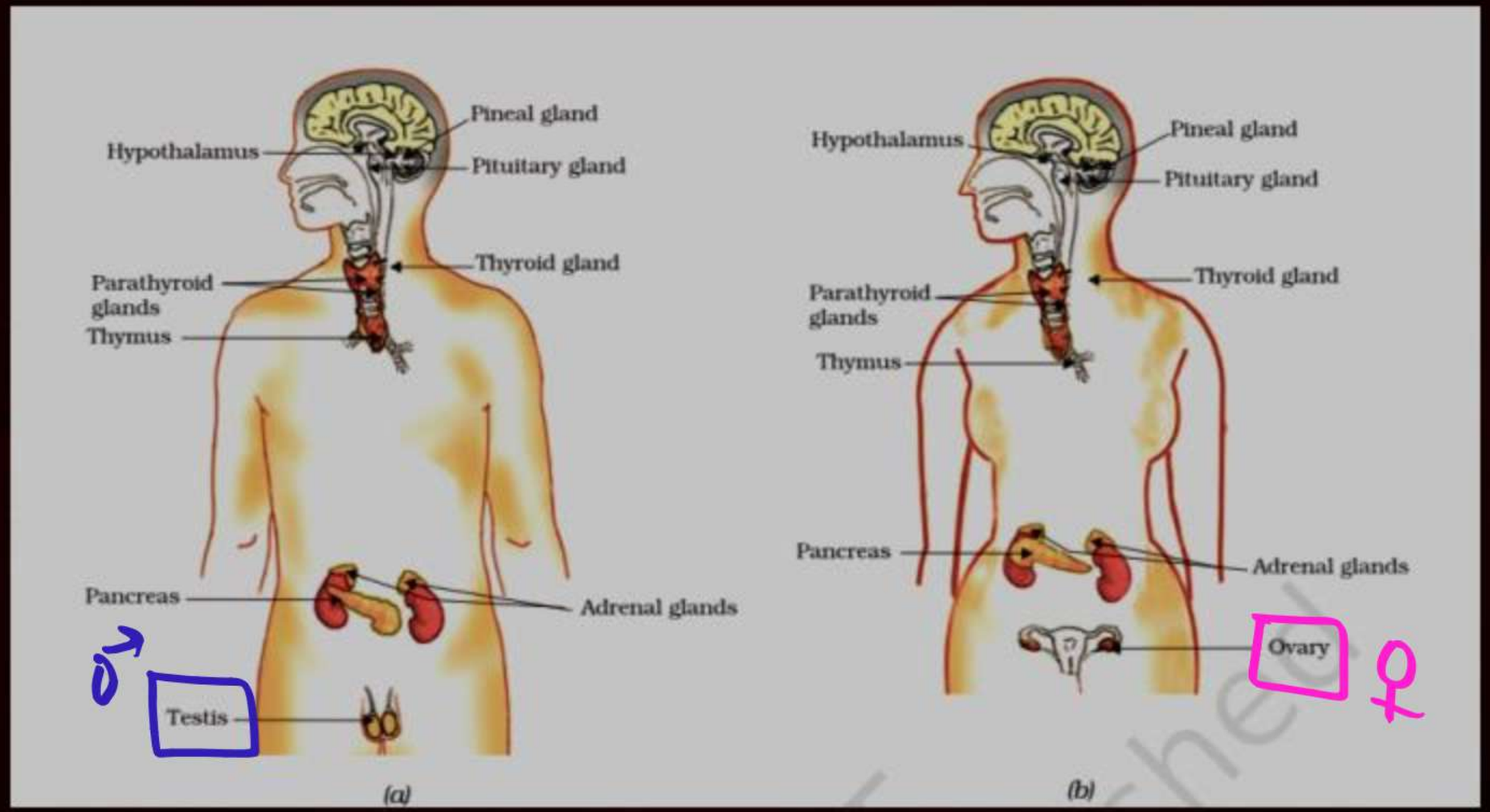
A. Medulla

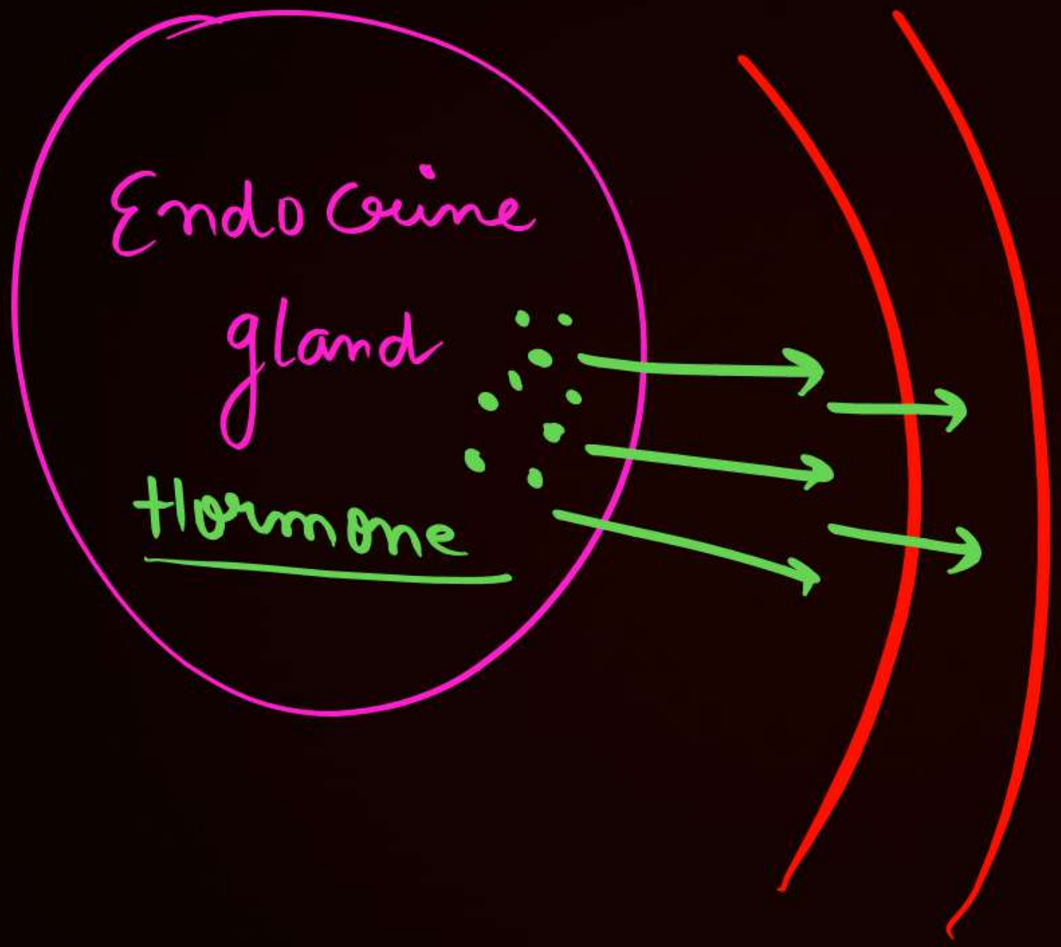
B. Cerebrum

C. Pons

D. Cerebellum

HUMAN ENDOCRINE SYSTEM




Endocrine
gland
Hormone

Gland	Hormone	Function
Hypothalamus	Releasing hormones	Stimulates pituitary gland to release hormones
Pituitary gland	Growth hormone (GH)	Body growth, development of bones & muscles (if excess -Gigantism) (if less- Dwarfism)
Thyroid gland	Thyroxine	Regulates carbohydrate, protein \ fat metabolism (if less iodine intake - Goitre)
Pancreas	Insulin & Glucagon	Control blood sugar levels (if less - diabetes is caused) Insulin
Adrenal gland	Adrenaline	Prepare body to cope with emergency situations.
Testes in males	Testosterone	Development of secondary male characters the deep voice, beard, and sex organs
Ovaries in females	Oestrogen and progesterone	Development of secondary female characters like mammary glands, menstrual cycle and sex organs. Maintenance of pregnancy

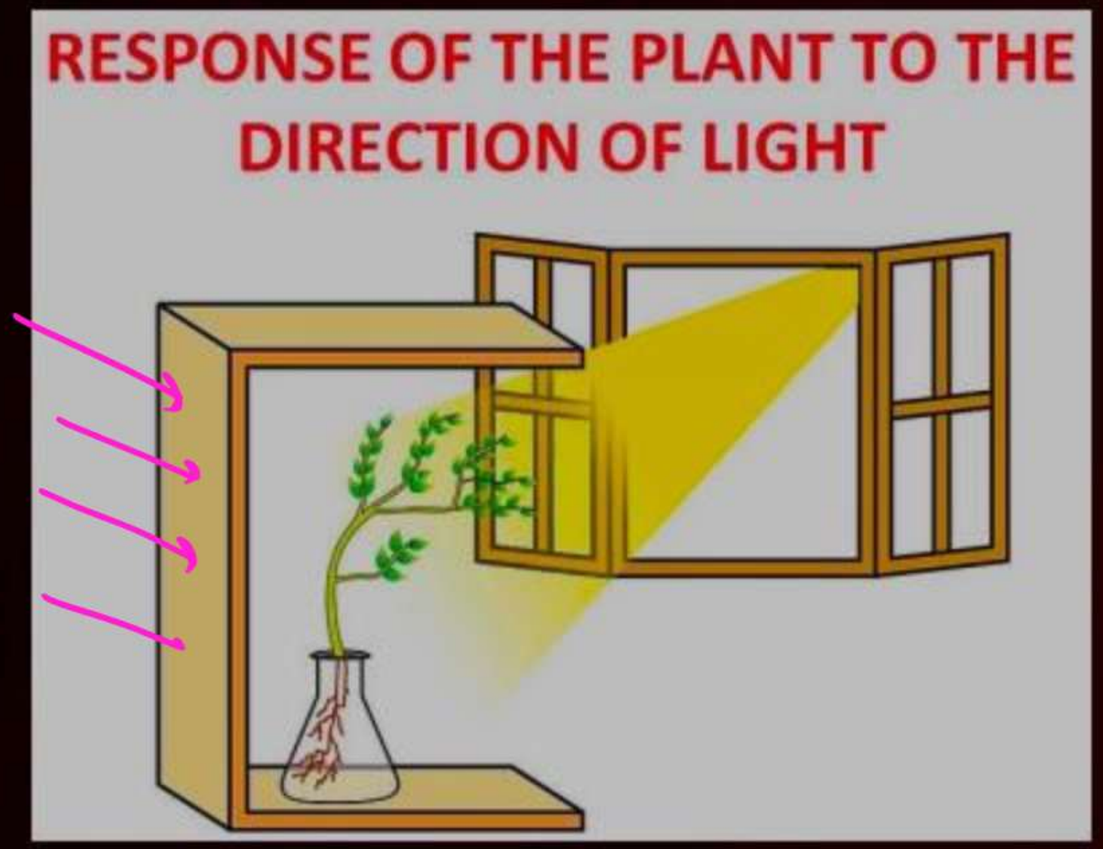
Adrenal gland

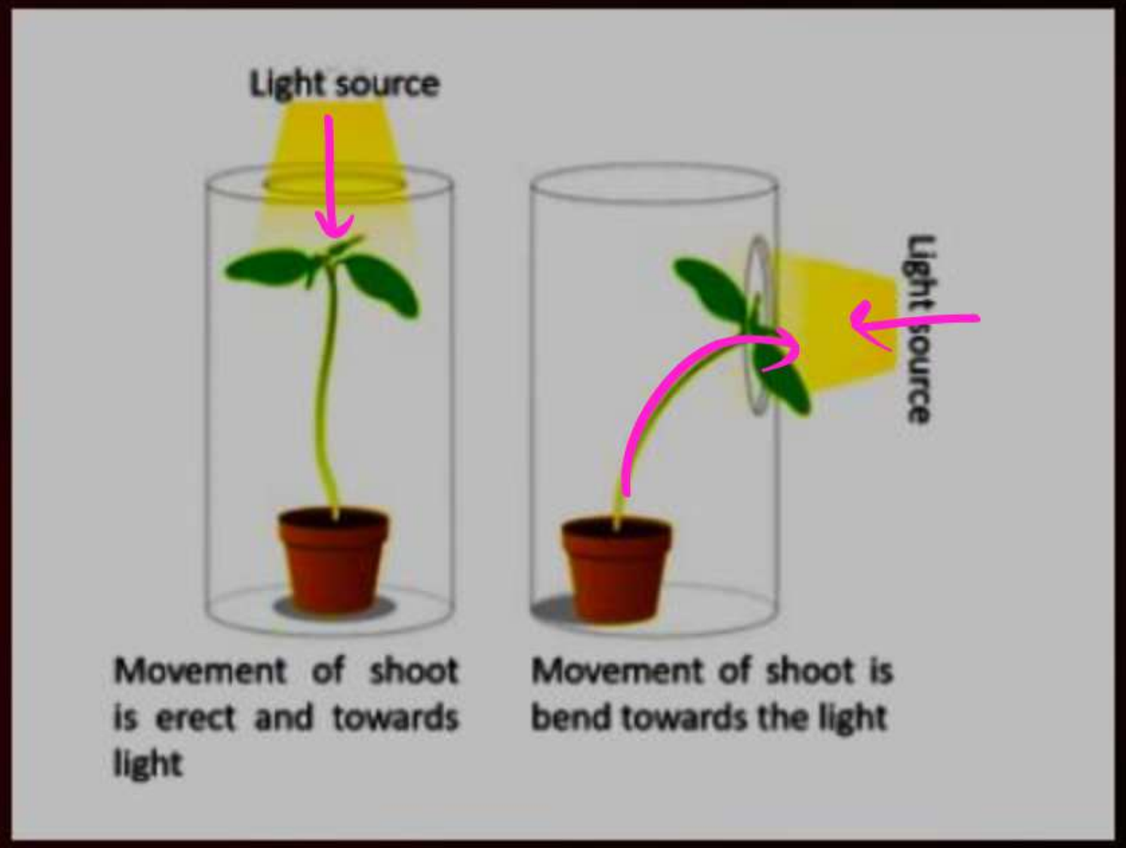
↓

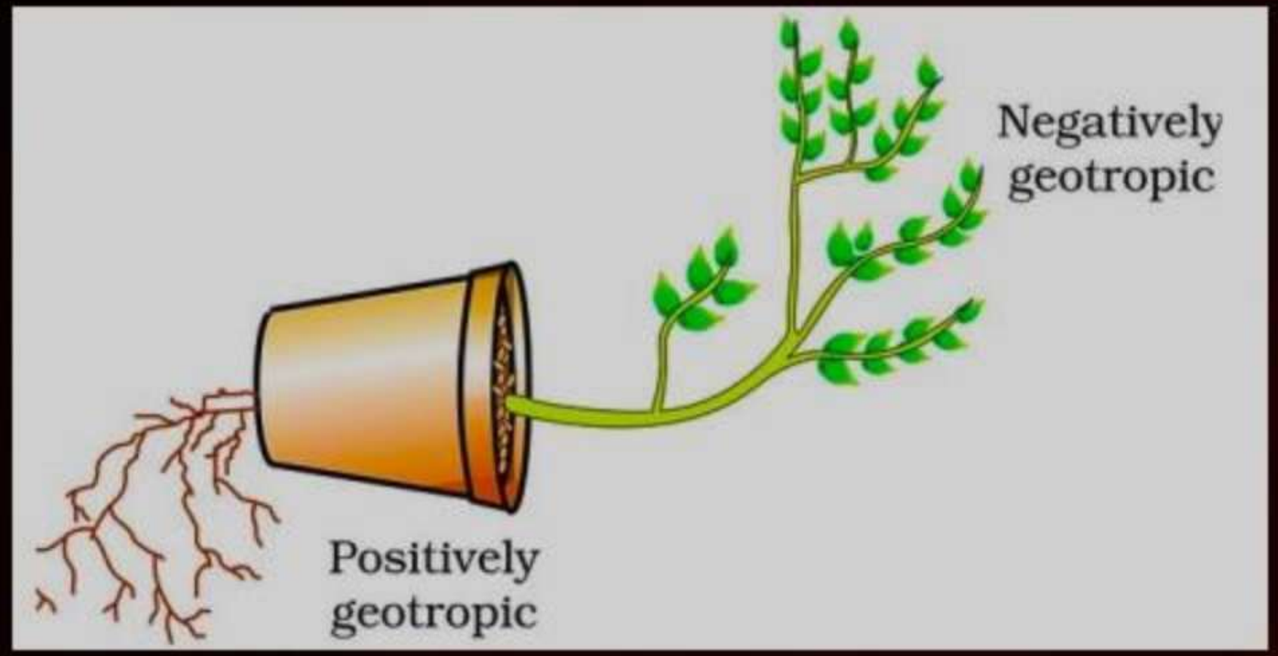
Adrenaline

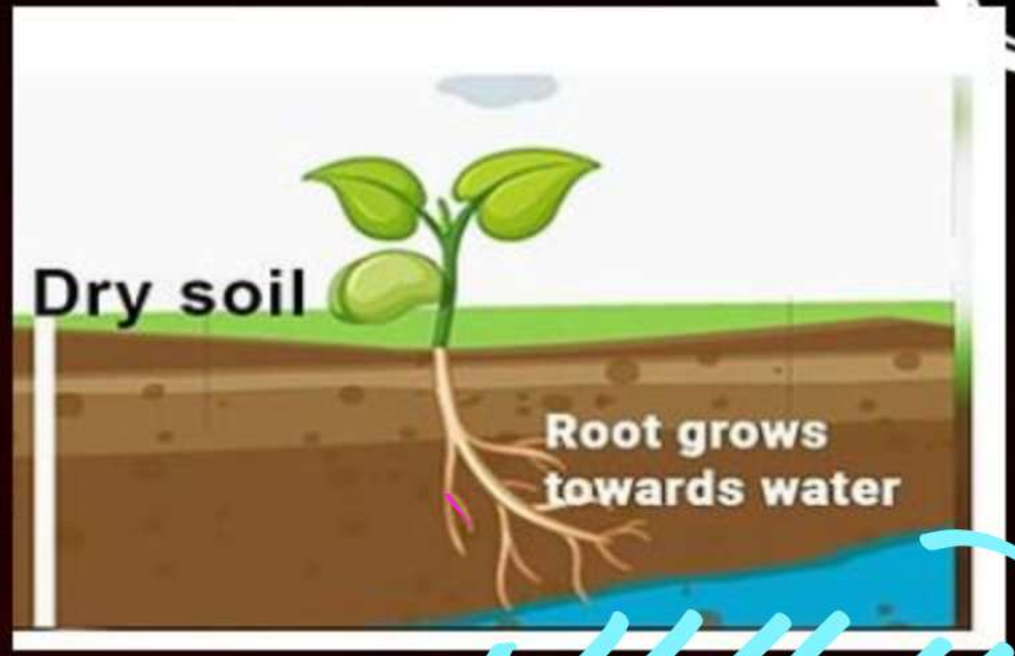
Coordination in Plants

Sense [Stimulus]
↓
Response [Movement]


RESPONSE OF THE PLANT TO THE DIRECTION OF LIGHT

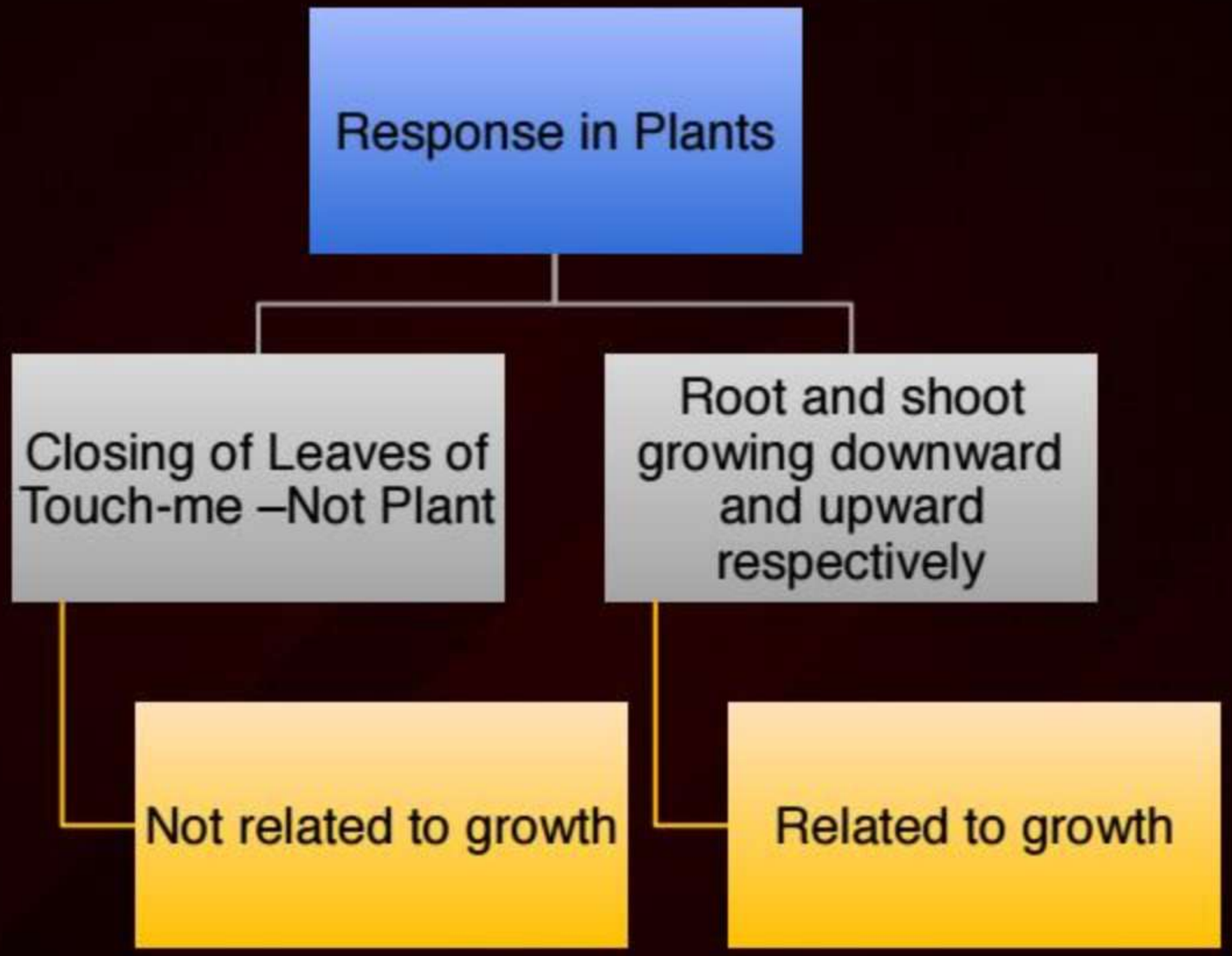

Light source
Light source
Movement of shoot is erect and towards light
Movement of shoot is bend towards the light





Hydrotropism

COORDINATION IN PLANTS



COORDINATION IN PLANTS

Movements

* Mimomsa pudica

Tropic movements	Nastic movements
• Growth dependent movements	• Growth independent movements
• directional movements with respect to stimulus	• Non directional movements
• More or less permanent and irreversible	• Temporary and reversible
• Found in all plants	• Found only in a few specialized plants
• Slow action	• Immediate action

Shoots

* Positive phototropism
* Negative Geotropism

Roots

* Negative phototropism
* Positive geotropism

Tropic movements / Tropism

Phototropism	• Growth of plant part towards or away from Light
• Geotropism / Gravitotropism	• Growth of plant part towards or away from Gravity
• Hydrotropism	• Growth of plant part towards or away from water
• Chemotropism	• Growth of plant part towards or away from chemicals
• Thigmotropism	• Growth of plant part towards or away from touch

PLANT HORMONES

- Plant Hormones (Plant Growth Regulators)
  - Plant Growth promoters
    - Auxins
    - Gibberellins
    - Cytokinin's
  - Plant Growth Inhibitors
    - Abscisic Acid
    - Ethylene

PLANT HORMONES

Plant Hormone	Function
• Auxin	•Promotes cell elongation in shoots •Controls phototropism / gravitotropism •Stimulates fruit development
• Gibberellins (GA)	•Stimulates stem elongation •Helps in seed germination, •fruit and flower development
• Cytokinin	•Promote cell division •Delays ageing of leaves flower
• Abscisic Acid [ABA] Stress hormone	•Causes stomata to close •Maintains dormancy in seeds
• Ethylene (Gaseous hormone)	•Stimulates ripening in fruits •Promotes fruit and leaf drop

QUESTION

Q-10

Which of the following plant hormone is involved in phototropism and fruit ripening respectively?

A

E

(A) Ethylene , gibberellin

(B) Auxin, gibberellin

(C) Auxin, ethylene

(D) Cytokinin,ABA

QUESTION

Q. 11

Which gland is not present in pair ?

(A) Testis [Pair]

(B) Ovaries "

(C) Thyroid gland

(D) Salivary gland [Pair]

QUESTION

Q. 12

Which of the following secretes thyroxine ?

A. Testis

B. Ovaries

C. Thyroid gland

D. Salivary gland

QUESTION

Q.13

A patient is being given an injection of insulin. Which of the organ is likely to be affected ?

(A) Ovaries

(B) Thyroid gland

(C) Hypothalamus

(D) Pancreas → Insulin

QUESTION

Q.14

Dwarfism results due to

(A) Excess secretion of thyroxin

(B) Less secretion of growth hormone

(C) Less secretion of adrenaline

(D) Excess secretion of growth hormone

QUESTION

Q.15

Closing of leaves of a sensitive plant is an example of

(A) Hydrotropism

(B) Phototropism

(C) Nastic movement

(D) Chemotropism

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