UDAAN

2025

LIFE PROCESSES

Biology | Lecture - 05

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Topics to be covered

1. Breathing Vs Respiration
2. Types of Respiration
3. Exchange of gases in plants
4. MCQ practice and Homework

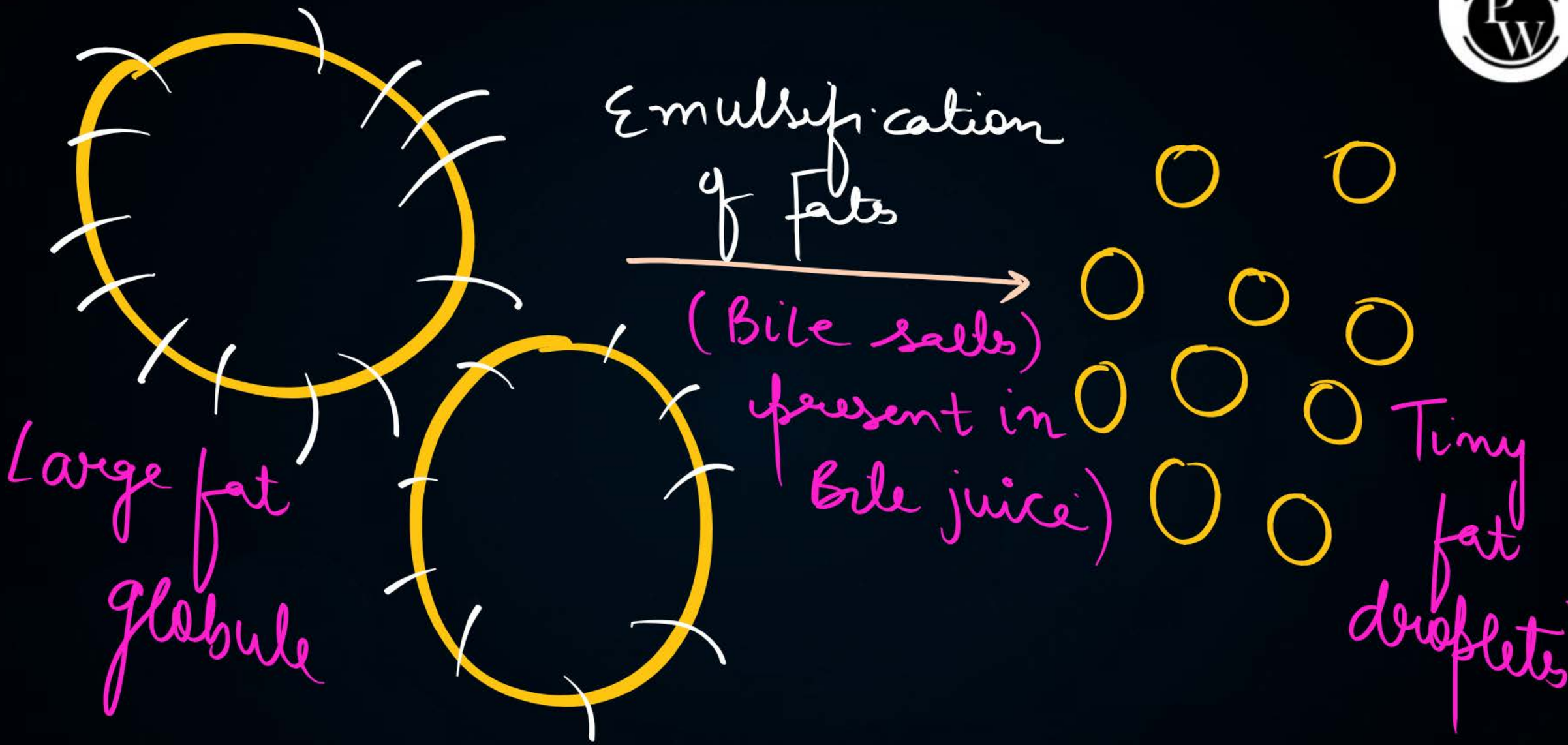
Question of the Day

storage of bile Juice

How a person will be affected if gall bladder is removed ?

Following will be affected if gallbladder is removed :

- **Storage of bile:** Bile will directly flow into the small intestine even in absence of food.
- **Digestion of fats:** As concentrated bile is not formed due to which fat emulsification process is affected, digestion of fat gets hampered.


Emulsification of Fats
(Bile salts present in Bile juice)
Large fat globule
Tiny fat droplets

QUESTION

#MQ

Gastric juice is released in

- Pepsin
- HCl
- Mucus

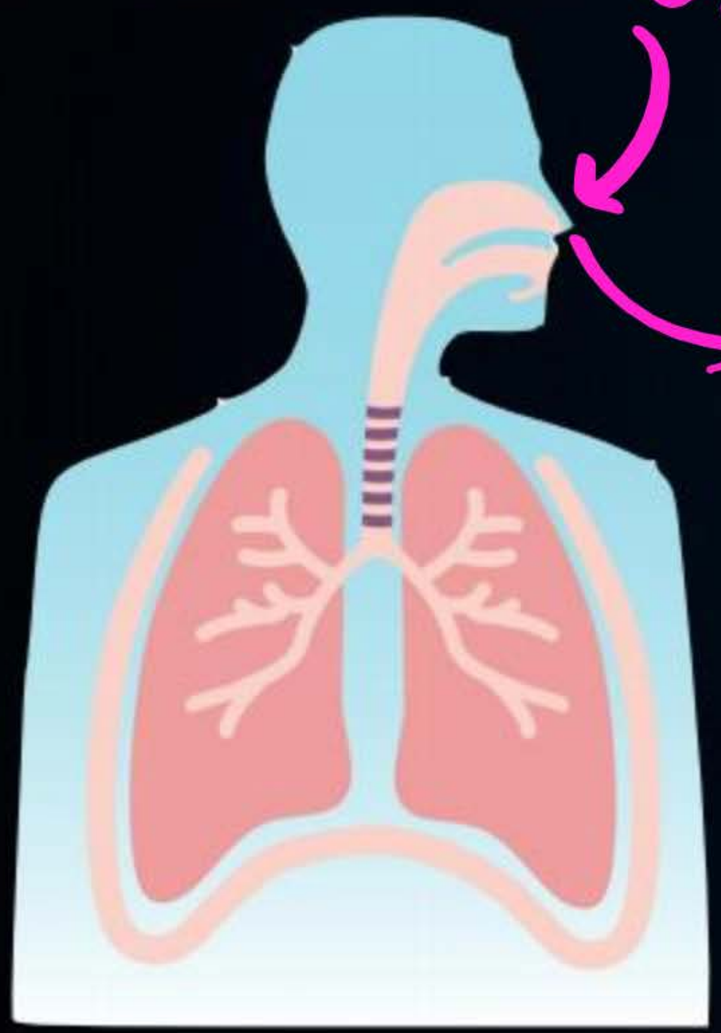
(A) Mouth → Saliva

(B) Small intestine → Intestinal Juice

(C) Pancreas → Pancreatic Juice

(D) Stomach → gastric Juice

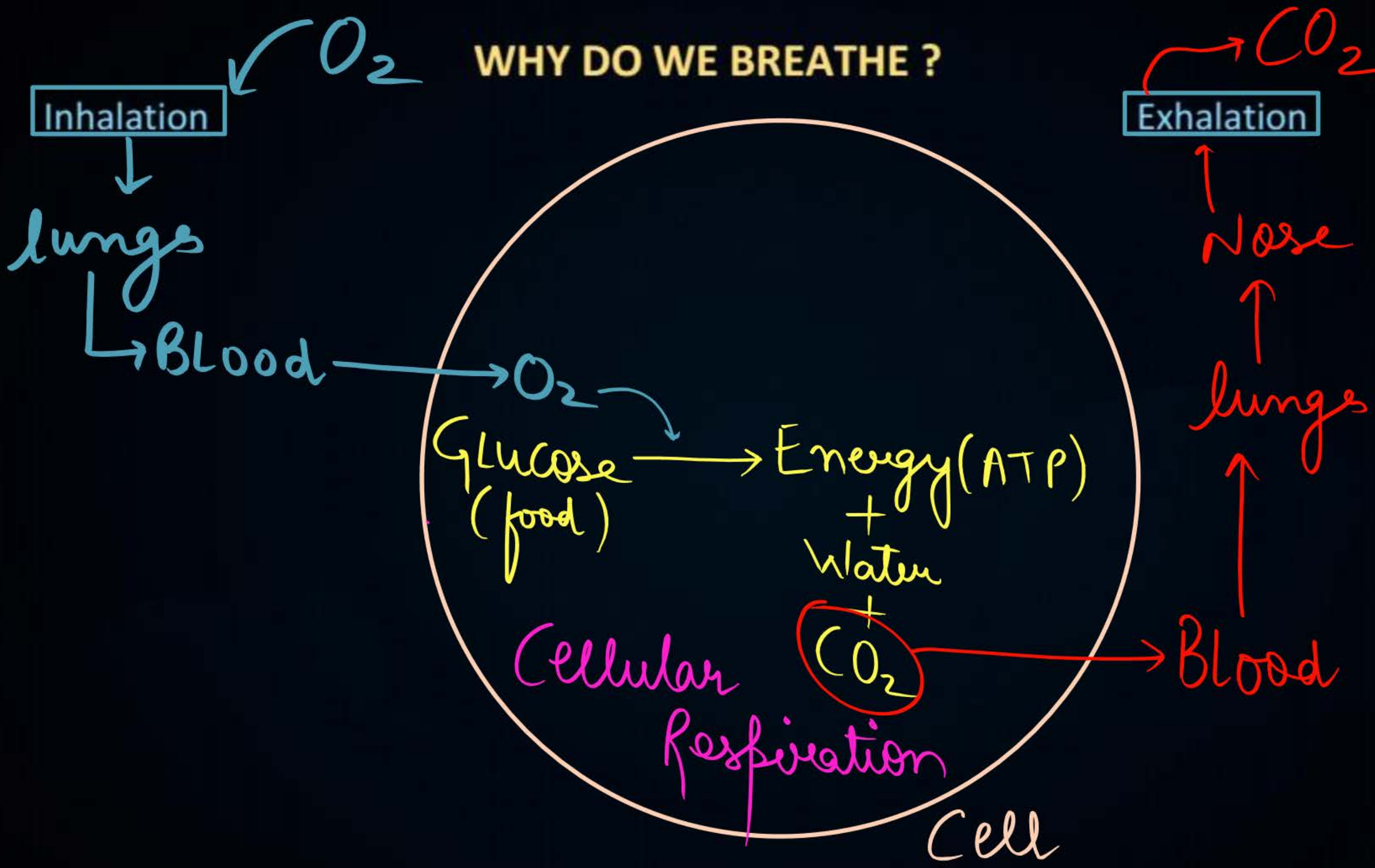
Breathing Vs Respiration



Exchange of gases

- Inhalation / Inspiration
  - In
- Exhalation / Expiration
  - Exit

WHY DO WE BREATHE ?



Respiration

Respiration is a process by which a living organism breakdown the food in order to produce Energy (ATP)

glucose + oxygen → carbon dioxide + water + energy → ATP

- glucose: from the Digestive system
- oxygen: from the breathing system (Inhalation)
- carbon dioxide: waste product exhaled
- water: waste product exhaled
- energy: useful

ATP: Adenosine Triphosphate

Breathing Vs Respiration

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

[Food ⟶ Energy]

Aerobic Respiration

In presence of Oxygen

Anaerobic Respiration

In absence of Oxygen

Types of Respiration

Important

Glucose (6-carbon molecule) → (in cytoplasm) Pyruvate (3-carbon molecule) + Energy

- Absence of oxygen (in yeast) → Ethanol + Carbon dioxide + Energy (2-carbon molecule)
- Lack of oxygen (in our Muscle cell) → Lactic acid + Energy (3-carbon molecule)
- Presence of oxygen (in mitochondrial) → Carbon dioxide + Water + Energy

Fig : Break-down of glucose by various pathways

Aerobic Respiration

→ in presence of O_2

Glycolysis

cytoplasm

Glucose (6-C) → Pyruvate (3-C) + Energy

Mitochondria

Pyruvate + O_2 → Carbondioxide + Water + Energy

↳ ATP

Cell

Glucose : $C_6H_{12}O_6$

Pyruvate : $C_3H_4O_3$

Ethanol : C_2H_5OH

Lactic Acid : $C_3H_6O_3$

Anaerobic Respiration (Fermentation)

Yeast cells

Alcoholic fermentation

→ alcohol is produced (Ethanol)

Human Skeletal Muscle cells

Lactic Acid fermentation

→ Lactic acid is produced.

Alcoholic Fermentation

(Uni-cellular fungi)
→ Yeast Cell
→ absence of O_2

Glucose (6C) —Cytoplasm→ Pyruvate (3C) + Energy —Cytoplasm, absence of O_2→ Ethanol (2C) (C_2H_5OH) + CO_2 + Energy.

Yeast Cell

Lactic Acid Fermentation

→ Human Skeletal Muscle Cells.
→ lack of O_2

Muscles attached to bones.

Glucose (6c) → Pyruvate (3c) + Energy

Cytoplasm — lack of oxygen

Cytoplasm → Lactic Acid ($C_3H_6O_3$) (3c) + Energy

↓↓↓↓ accumulate

→ Muscle Cramps

Aerobic vs Anaerobic Respiration

Aerobic Respiration	Anaerobic respiration
O_2 required	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
More energy is produced	Less energy is produced
End products are CO_2 and H_2O	End products are 1. CO_2 and Ethanol or 2. Lactic acid

QUESTION

Conversion of glucose into pyruvate occurs in

A Mitochondria

B Cytoplasm

C Chloroplast

D Vacuole

QUESTION

Lactic acid is formed in

A Skeletal muscles

B Cardiac muscles

C Both A and B

D Yeast cells

QUESTION

Conversion of pyruvate into carbon dioxide and water occurs in

A Mitochondria

B Cytoplasm

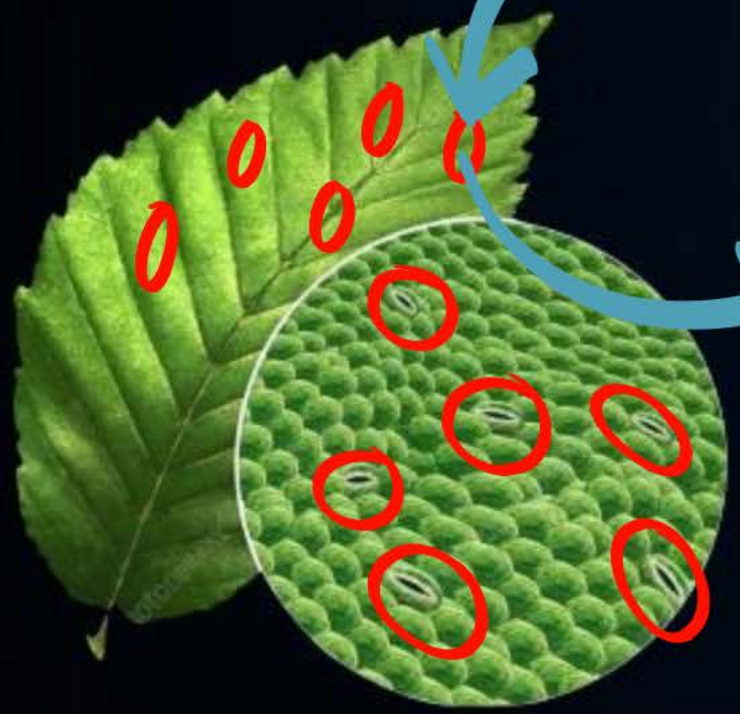
C Chloroplast

D Vacuole

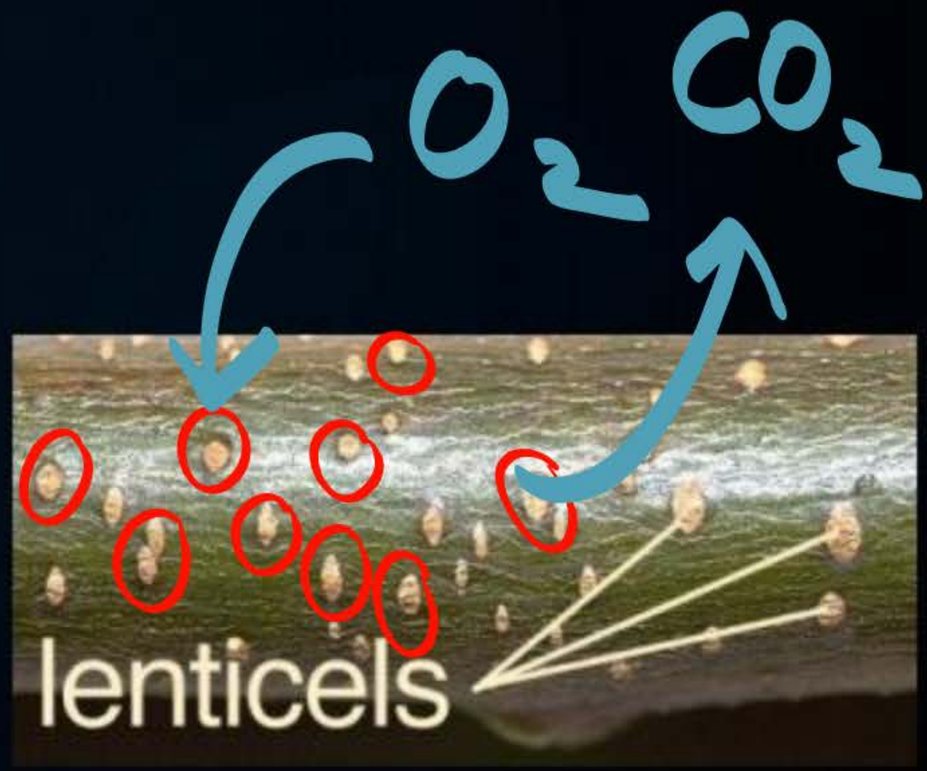
aerobic Respiration

Exchange of Gases in Plants

Leaf - Stomata



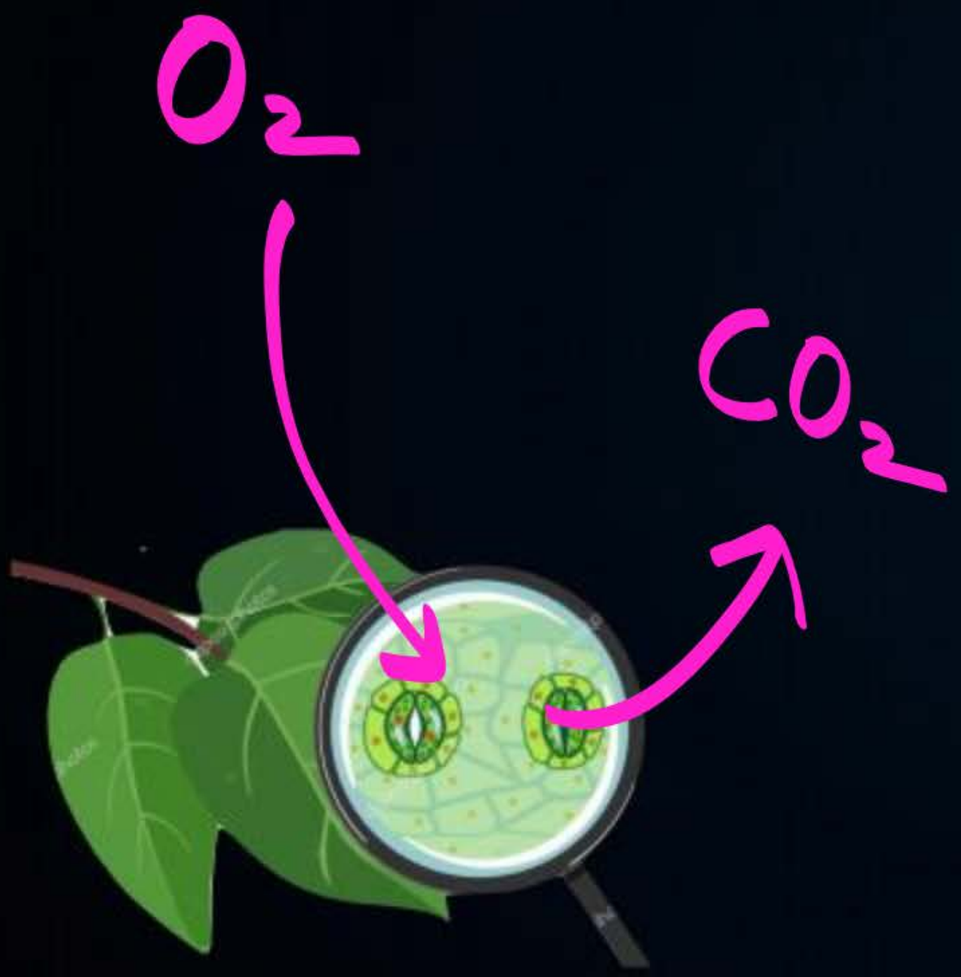
Woody Stems: Lenticels



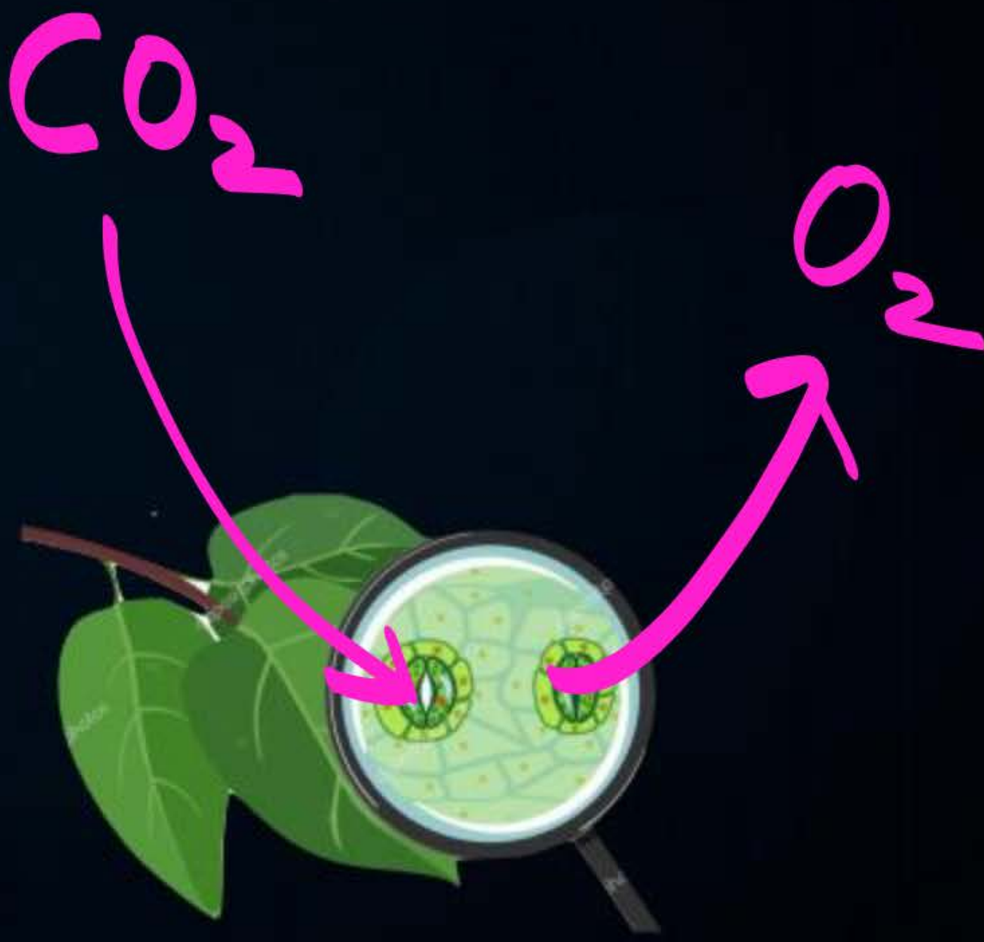
- Exchange gases through stomata and lenticels
- The large inter-cellular spaces ensure that all cells are in contact with air.
- Carbon dioxide and oxygen are exchanged by diffusion here.
- The direction of diffusion depends upon the environmental conditions and the requirements of the plant.

Two major processes which involves exchange of gases in plants are :

Respiration



Photosynthesis



Night time

Respiration ✓

Photosynthesis ✗

O_2

$CO_2 \uparrow\uparrow\uparrow$

Day time

Respiration ✓

Photosynthesis ✓

O_2

CO_2

O_2

QUESTION

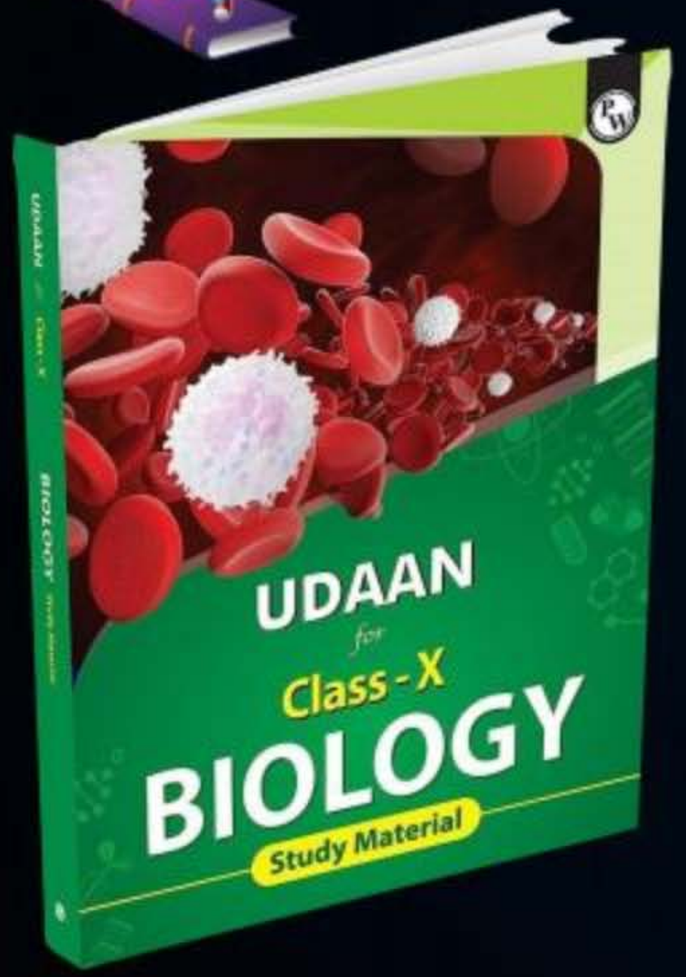
Lenticels are found in

A Leaf

B Woody stems

C Roots

D Amoeba



FROM PW MODULE
(Udaan - CLASS 10)

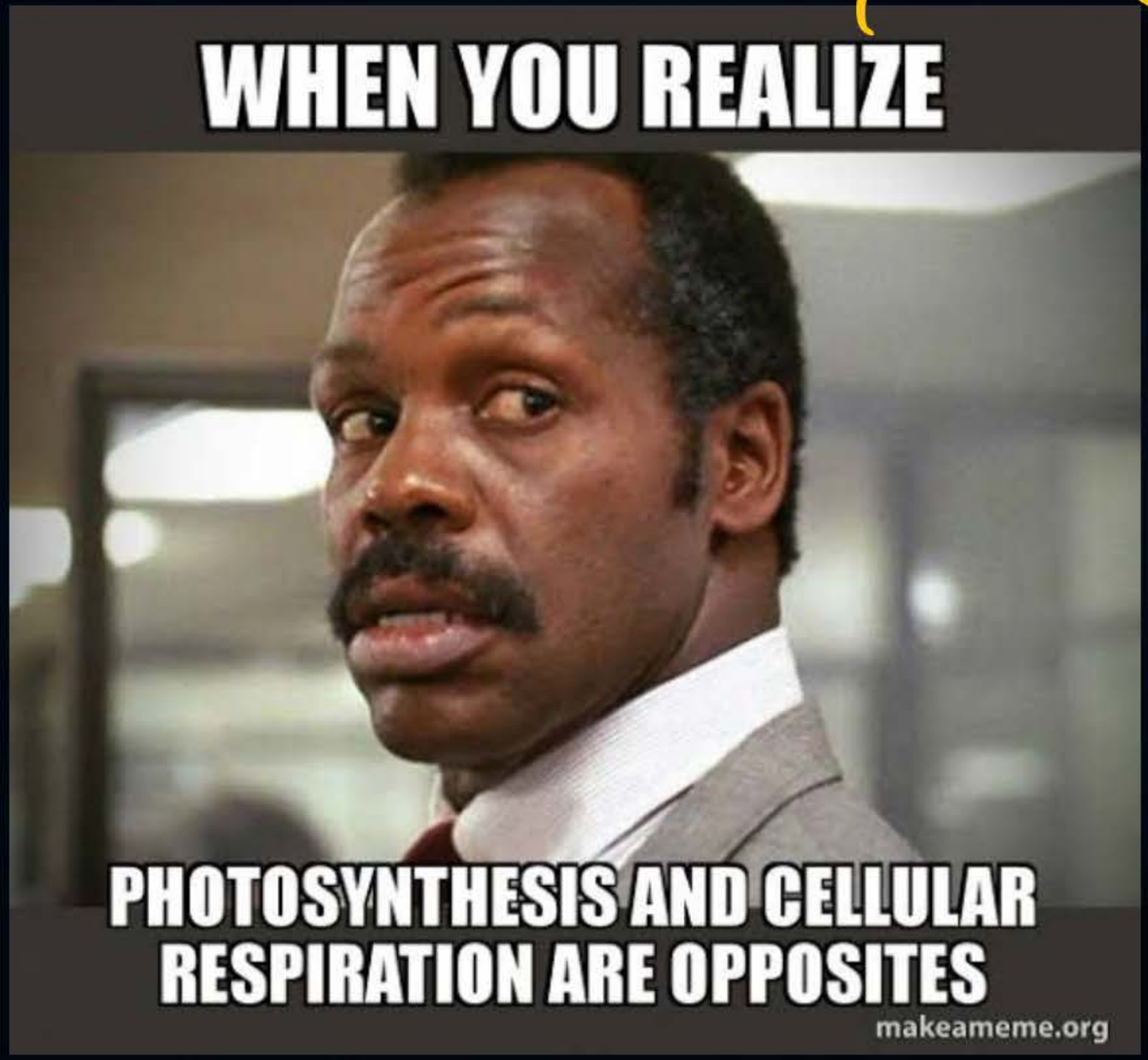
PAGE : 49 — Q- 1 , Q- 4

Question of the Day

Breathing rate of human beings (the number of breaths per minute) - ?

Joke/Meme of the Day

Think!



THANK YOU