

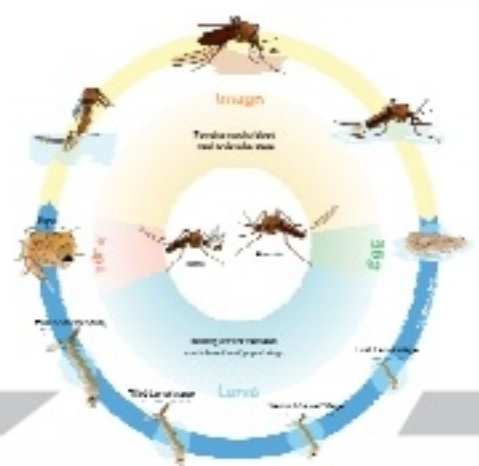
LIFE PROCESS



NUTRITION & RESPIRATION

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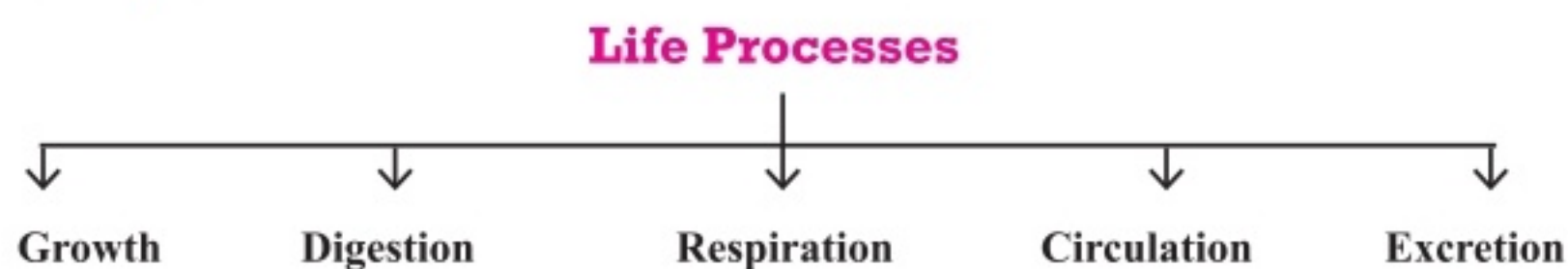
Chapter - 6

Life Processes

All living things perform certain life processes like growth, excretion, respiration, circulation etc.

All the processes like respiration, digestion, which together keep the living organisms alive and perform the job of body maintenance are called life processes.

Examples :



I. Nutrition

(The whole process by which an organism obtain its food)

Nutrition in Plants

↓
Plants are autotrophs.
↓
Can make their own food.

Nutrition in Animals

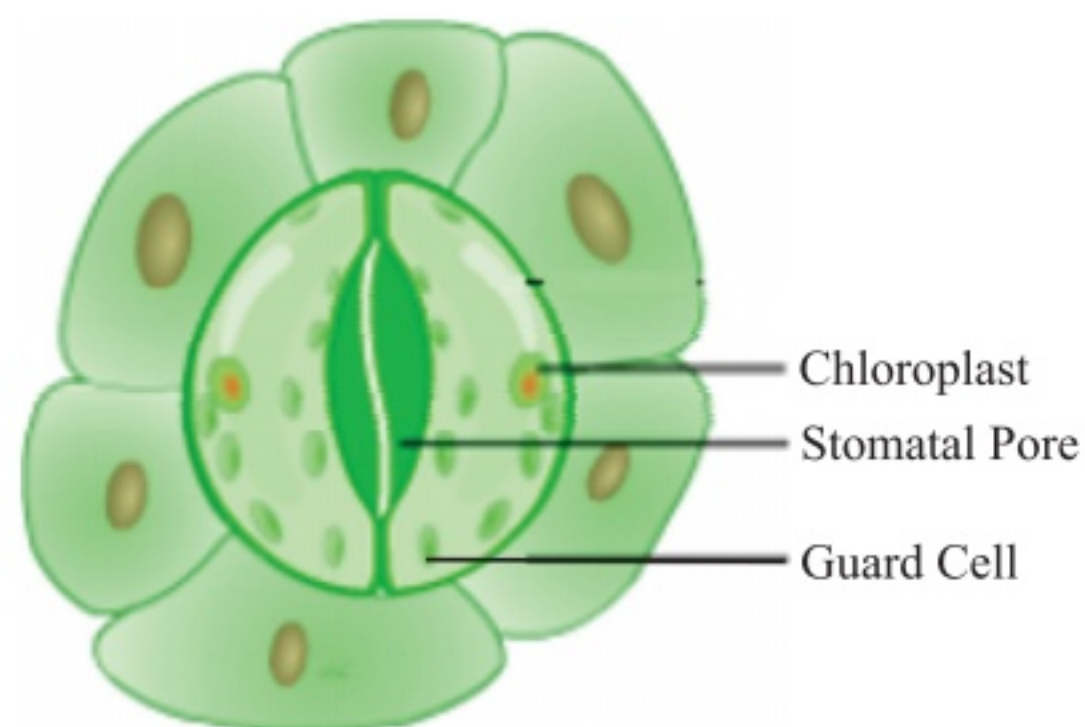
↓
Animals are hetrotrophs.
↓
Depends on plants or other animals for their food.

- Conversion of light energy into chemical energy + splitting (breaking) of water into hydrogen and oxygen
- Reduction of CO_2 to carbohydrates

Stomata : Tiny pores present on the surface of the leaves.

Functions :

- Exchange of gases O_2/CO_2 .
- Loses large amount of water (water vapour) during transpiration.



Heterotrophic Nutrition

Holozoic	Saprophytic	Parasitic
Animals take in solid food and breakdown inside the body. <i>E.g.</i> , Amoeba, animals.	Organisms feed on dead, decaying matter. <i>E.g.</i> , Fungi.	Parasites live inside or outside other organism (host) and derive nutrition from it. <i>E.g.</i> , Cuscuta (plant parasites), Ticks leech etc

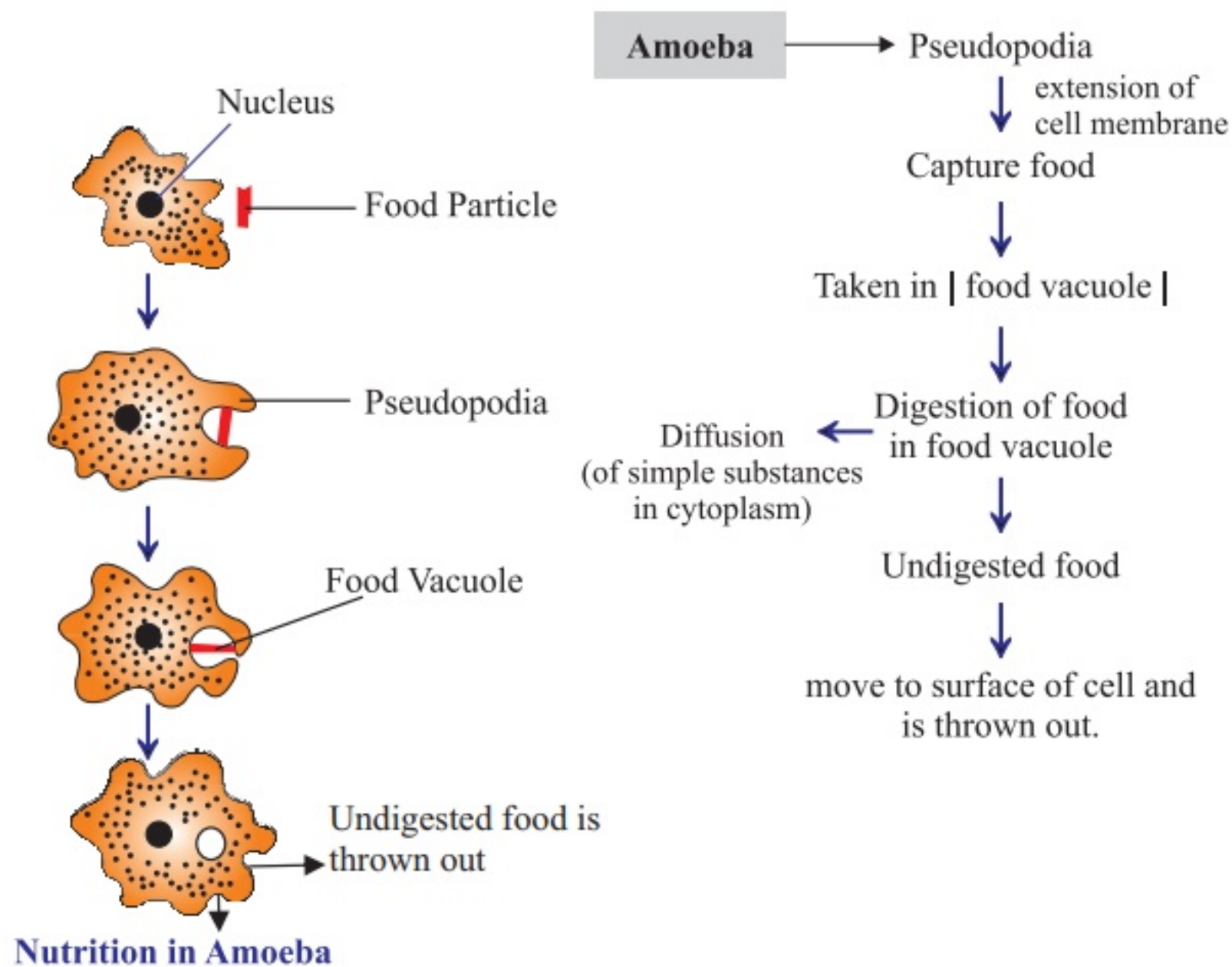
How do organisms obtain their food

Unicellular/Single celled organisms : Food is taken up through entire surface.

Example : (i) Amoeba

(ii) Paramecium

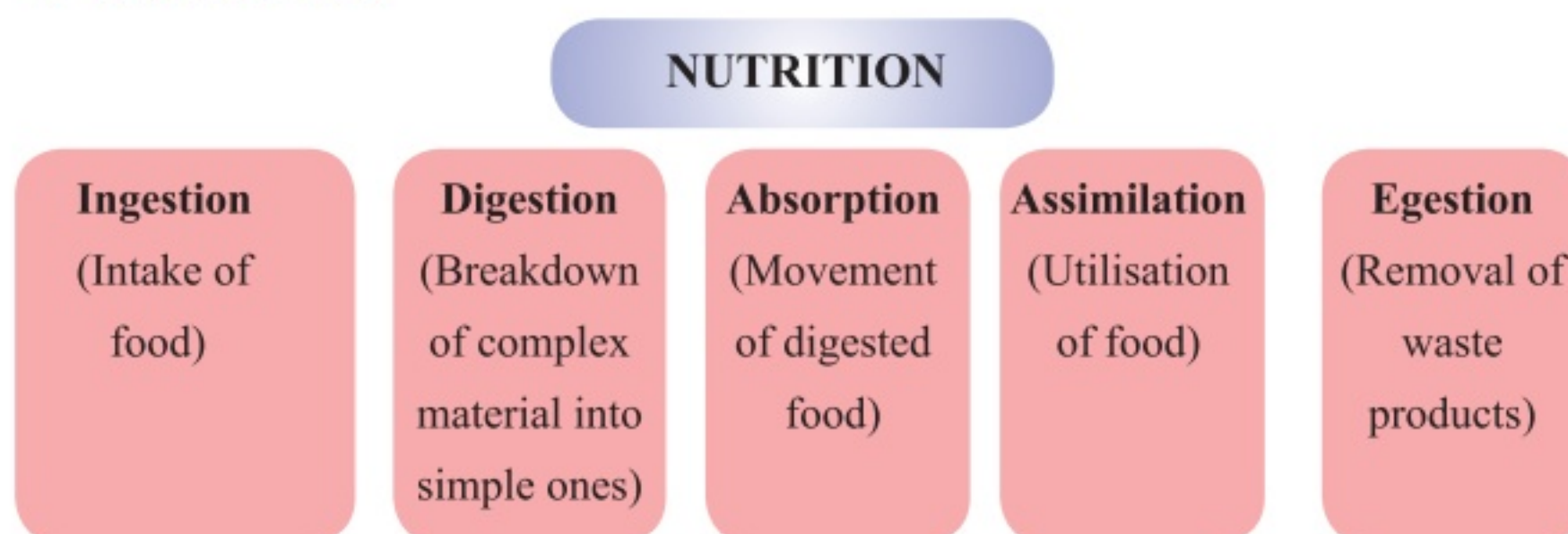
(i) Amoeba



(ii) Paramecium

Paramecium → Cilia → Take in food → At a specific spot
(Present all over the body)

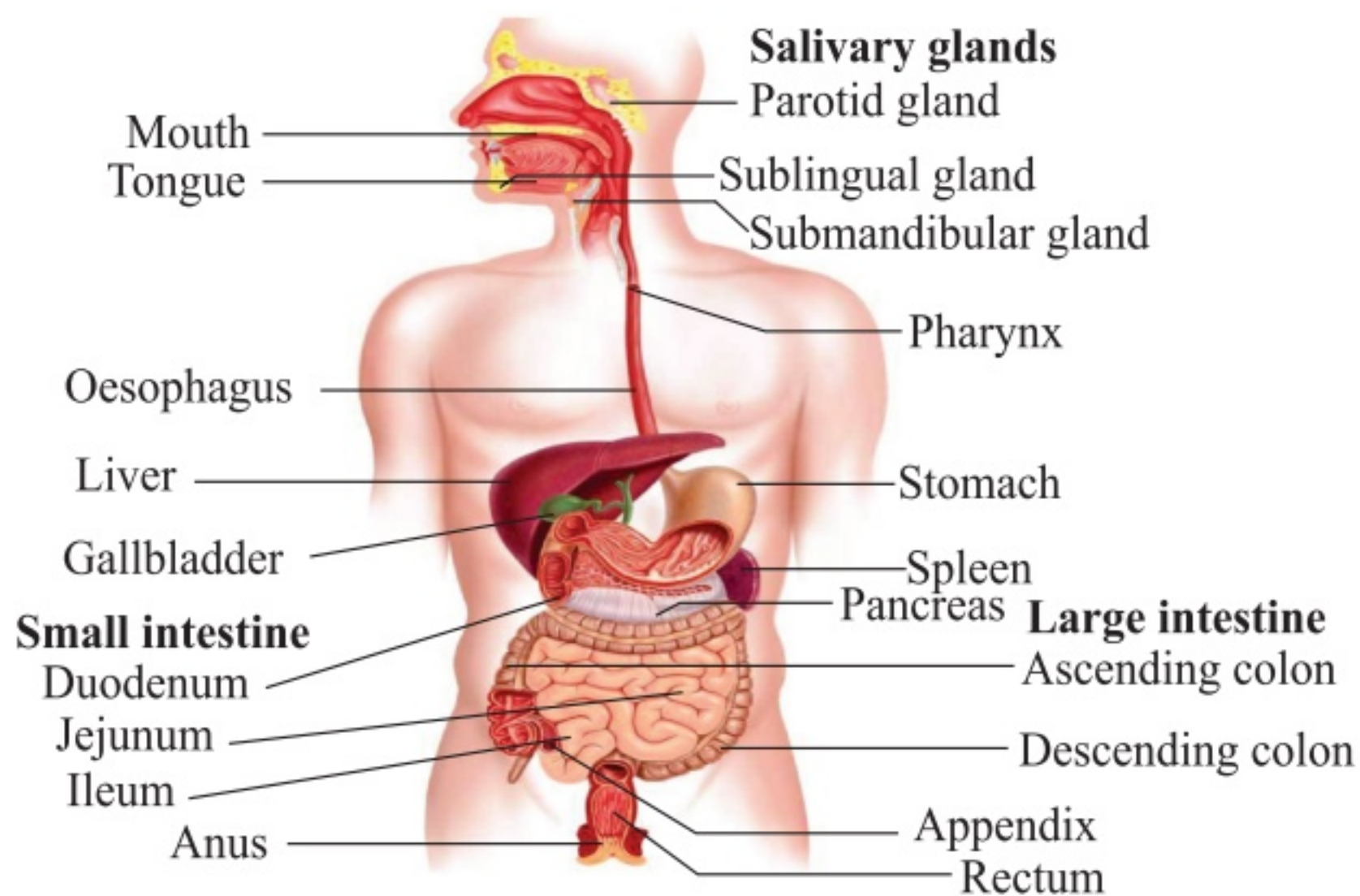
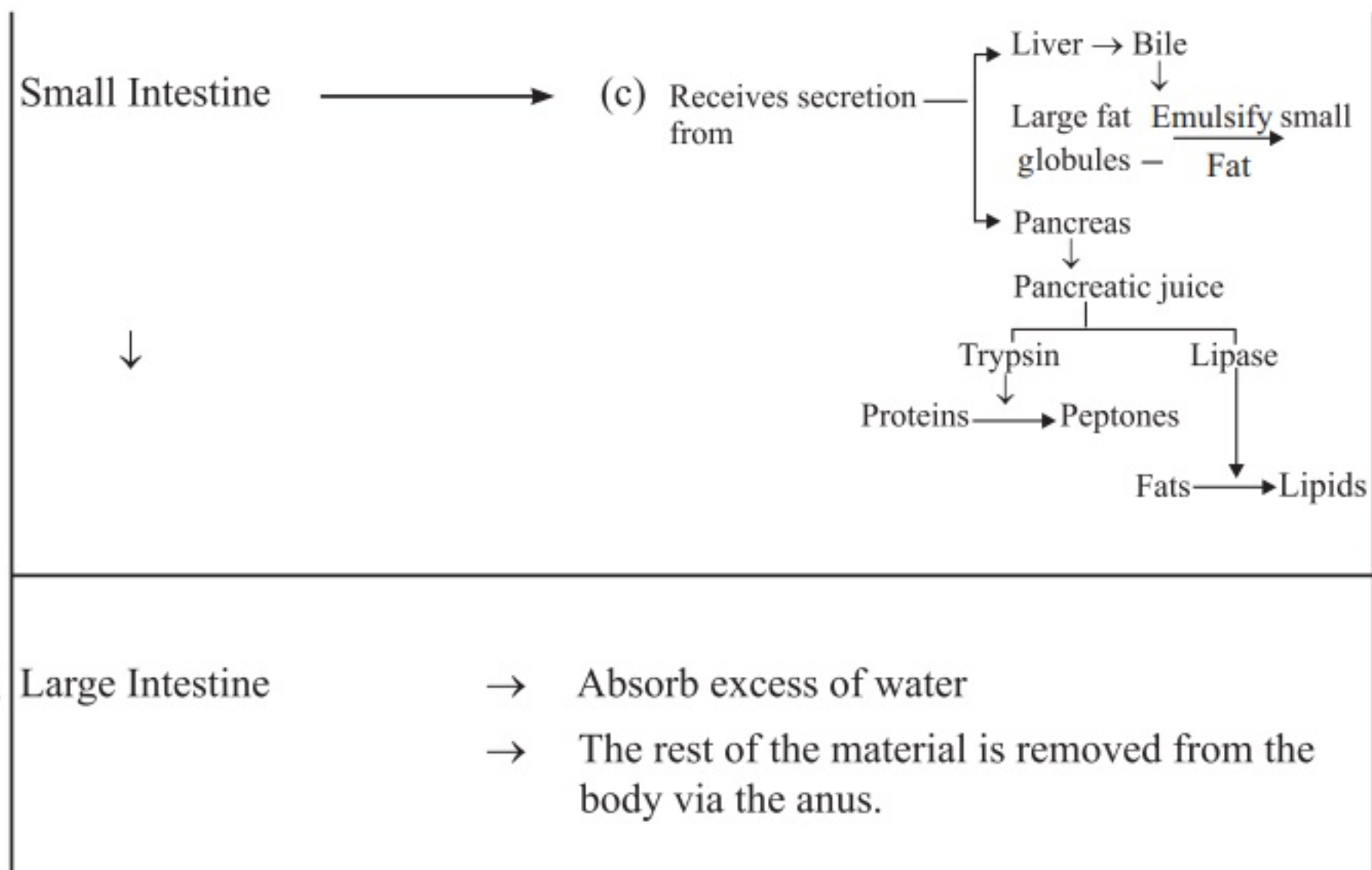
I. NUTRITION



Different organisms utilize different nutritional processes as it depends upon the source of carbon from where the food is taken.

Nutrition in Human Beings

1.	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> Mouth ↓ Teeth ↓ Tongue ↓ Salivary Glands ↓ </div> <div style="margin-right: 20px;"> → → → → → </div> <div> Intake of whole food. Chewing/grinding of food. Rolling of food + Tasting of food + Swallowing/Pushing down of the food. Secrete saliva + Mucus </div> </div> <div style="margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">↓</div> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Starch</div> <div style="text-align: center;"> $\xrightarrow[\text{[Saliva]}]{\text{Salivay amylase}}$ </div> <div>Sugar</div> </div> </div> </div>	
2.	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> Oesophagus ↓ </div> <div style="margin-right: 20px;">→</div> <div> Taking food from mouth to stomach by Peristaltic movements. [Contraction and expansion of muscles of the oesophagus] </div> </div>	
3.	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> Stomach ↓ </div> <div style="margin-right: 20px;">→</div> <div> Gastric glands $\xrightarrow{\text{Secrete}}$ Gastric juice <div style="text-align: center;"> Gastric Juice <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> PEPSIN (Enzyme that breaks down proteins) </div> <div style="text-align: center;"> HCl (Makes medium acidic) </div> <div style="text-align: center;"> MUCUS (Protects inner lining of the stomach) </div> </div> </div> </div> </div>	
4.	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> Small Intestine </div> <div style="margin-right: 20px;">→</div> <div> (a) Intestinal enzyme ↓ convert <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> Carbohydrate ↓ Glucose </div> <div style="text-align: center;"> Fats ↓ Fatty acid + Glycerol </div> <div style="text-align: center;"> Proteins ↓ Amino acids </div> </div> </div> </div>	
5.	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> Small Intestine </div> <div style="margin-right: 20px;">→</div> <div> (b) Villi (finger like projections) → Helps in absorption of food into the blood </div> </div>	

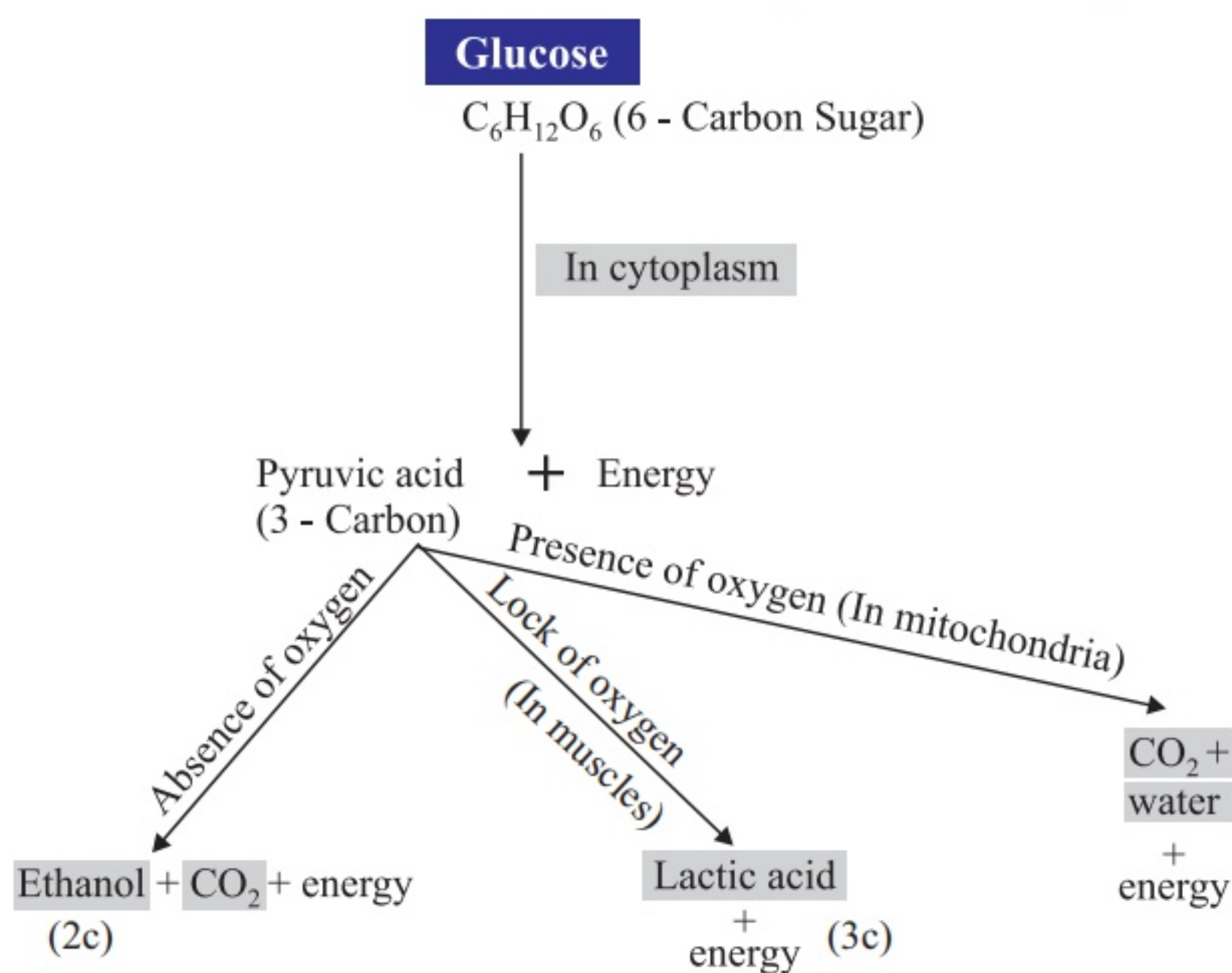


Human Digestive System

RESPIRATION

- Respiration involves :
- (i) Gaseous exchange : Intake of oxygen from the atmosphere and release of CO_2 → **Breathing**
 - (ii) Breakdown of simple food in order to release energy inside the cell → **Cellular respiration**

Breakdown of Glucose by Various Pathways



Respiration

Aerobic

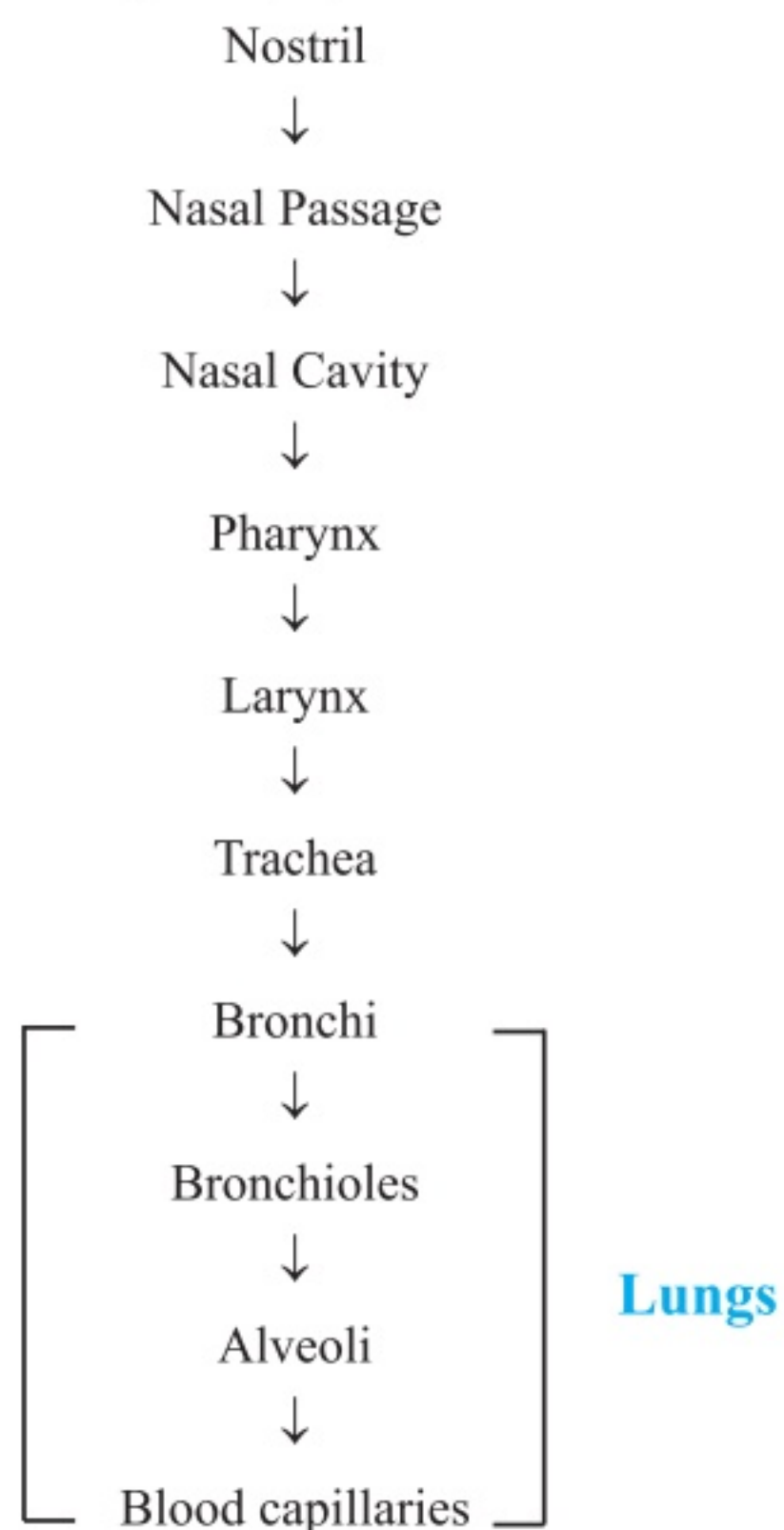
- Takes place in the presence of oxygen
- Occurs in mitochondria
- End products are CO_2 and H_2O
- More amount of energy is released

Anaerobic

- Takes place in the absence of oxygen
- Occurs in cytoplasm
- End products are alcohol or lactic acid
- Less amount of energy is released

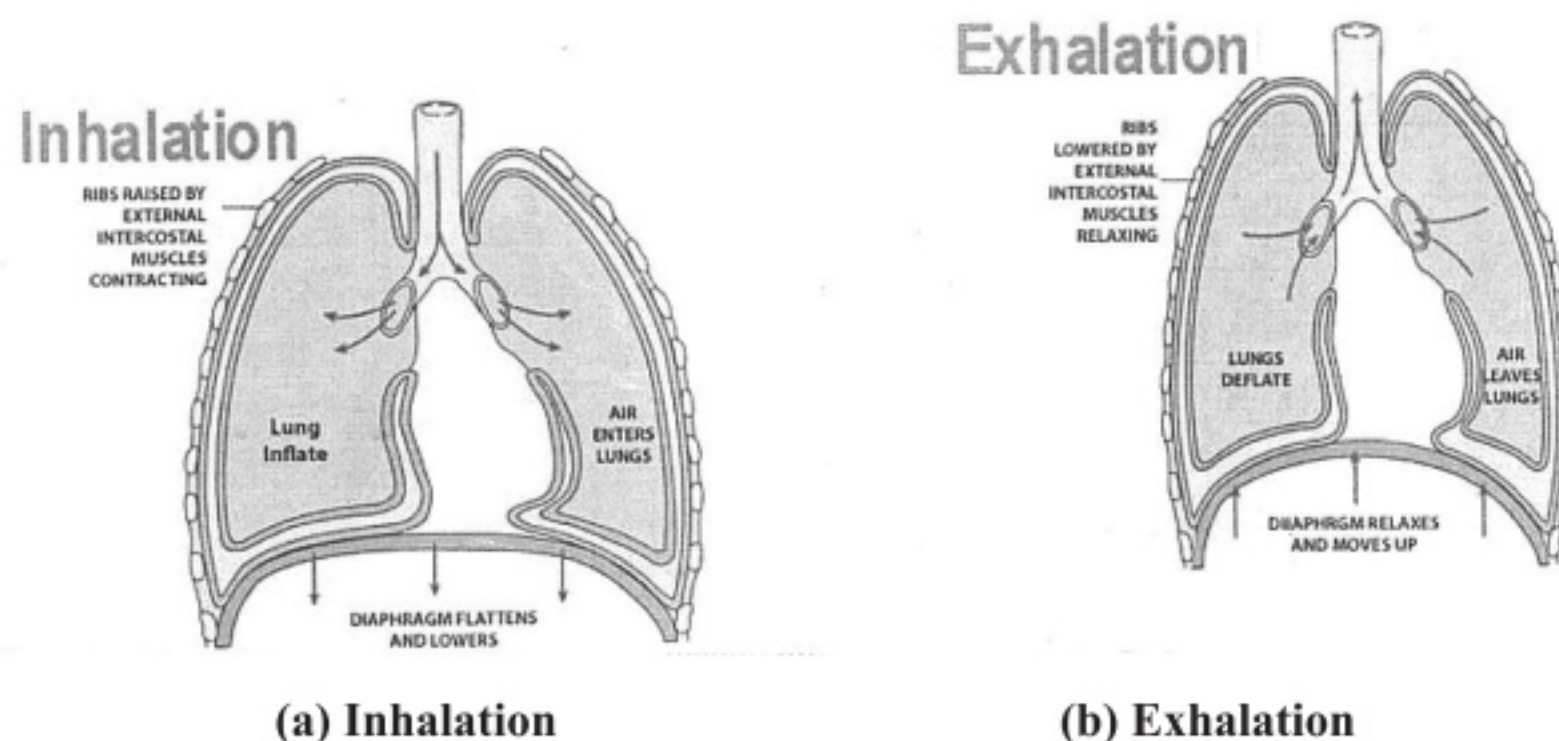
Human Respiratory System

Passage of air through the respiratory system :



Mechanism of Breathing

Inhalation	Exhalation
<ul style="list-style-type: none">• During inhalation the thoracic cavity (chest cavity) expands.• Ribs lift up.• Diaphragm become flat in shape.• Volume of lungs increases and air enters the lungs	<ul style="list-style-type: none">• Thoracic cavity contracts.• Ribs move downwards.• Diaphragm becomes dome shaped.• Volume of lungs decreases and air exits from the lungs.



Exchange of gases between alveolus, blood and tissues

- (i) Air (rich in O_2) → Blood → Binds with haemoglobin in RBC → O_2 is released in (in alveolus) (through blood vessels) tissues
 - (ii) CO_2 → Released in blood → Dissolved in blood → Blood vessels → Released in alveolar sac → Sent out through nostrils
- (from tissue) (in alveoli)

Terrestrial organisms : Use atmospheric oxygen for respiration

Aquatic organisms : Use dissolved oxygen for respiration

Respiration in plants

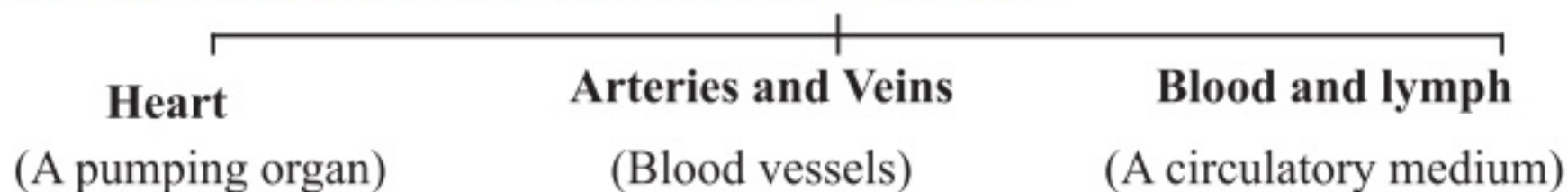
Respiration in plants is simpler than the respiration in animals. Gaseous exchange occur through :

- (a) Stomata in leaves
- (b) Lenticels in stems
- (c) General surface of the root

Transportation

Human beings like other multicellular organism need regular supply of food, oxygen etc. This function is performed by circulatory system.

The circulatory system in human beings consists of



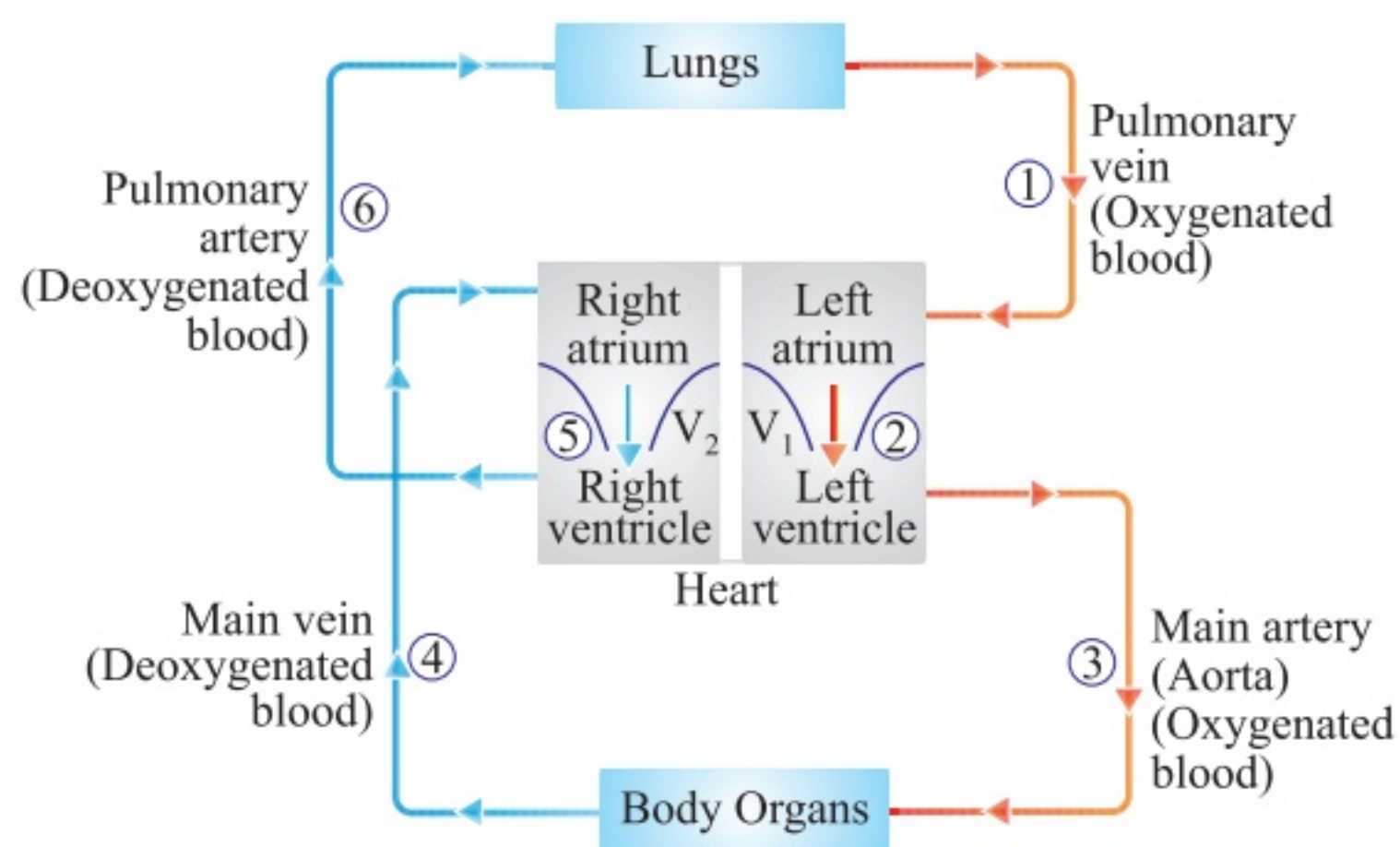
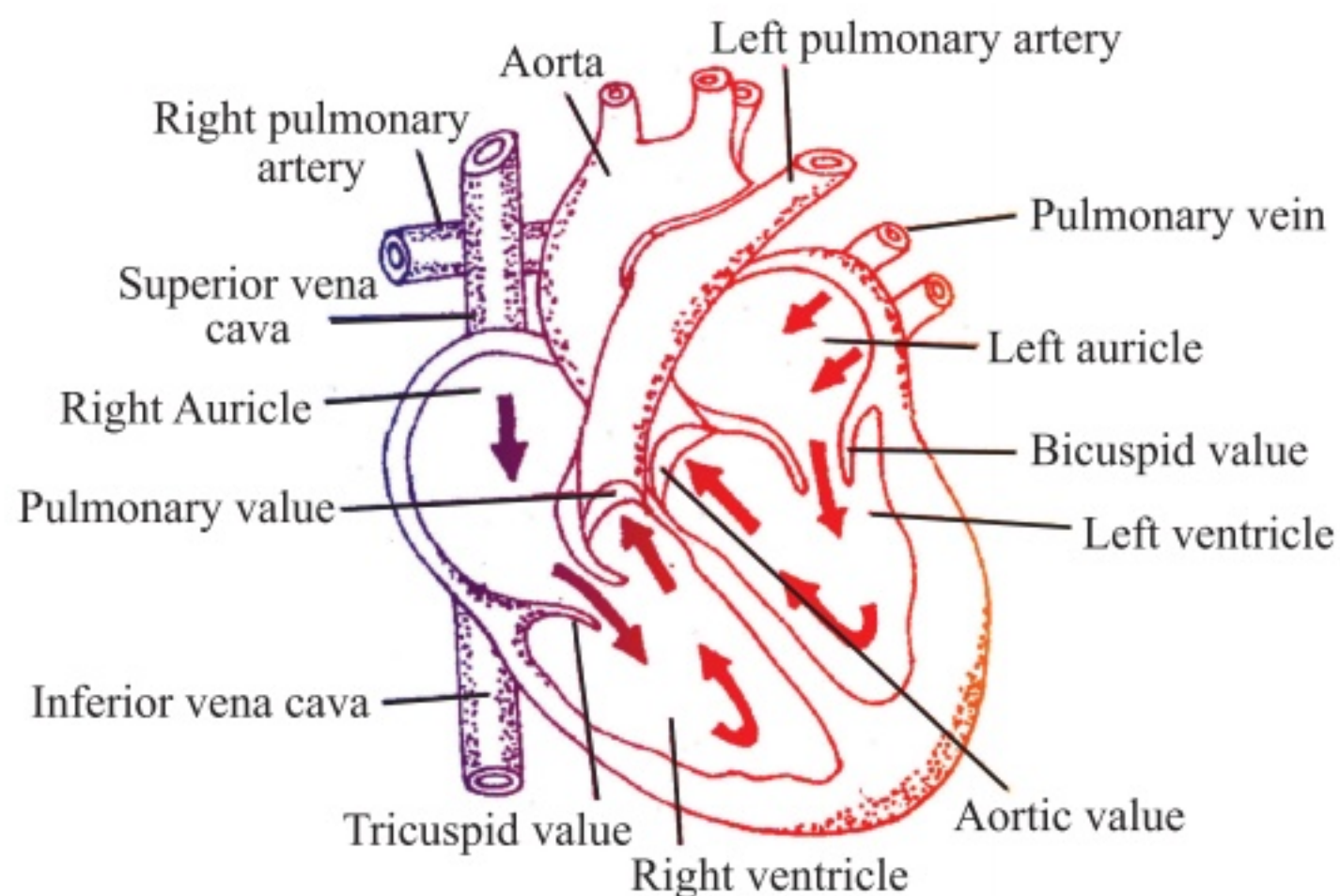


Diagram to show blood circulation in human body

Double circulation

Blood travels twice through the heart in one complete cycle of the body.



Direction of blood flow through human heart

- **Pulmonary Circulation :** Blood moves from the heart to the lungs and back to the heart.
- **Systemic Circulation :** Blood moves from the heart to rest of the body and back to the heart.

9. Give reasons:

- (i) The number of stomata are more on the lower surface of the leaf as compared to the upper surface.
- (ii) Arteries are thick walled.
- (iii) Plants have low energy needs.
- (iv) Aquatic animals breathe faster than the terrestrial animals.

10. (i) What stops blood from flowing backwards through the heart.

(CBSE 2008)

- (ii) Name the process used by single-celled organisms for taking in food, exchange of gases or removal of wastes. (CBSE 2016)

11. State one difference between autotrophic and heterotrophic mode of nutrition.

12. Define peristaltic movement.

13. What is the role of saliva in the digestion of food ?

14. Name the tissue that transports water and minerals in plants.

15. What is the role of acid in our stomach ?

16. What is emulsification ?

17. Name the cell organelle in which photosynthesis occurs.

18. Name the largest artery in the human body.

19. Define transpiration.

20. What is the structural and functional unit of kidney called ?

21. Assertion : Stomata are tiny openings present on the surface of the leaf

Reason : Gaseous exchange takes place in plants through stomata

a) (A) is incorrect and (R) is correct

b) (A) is correct and (R) is incorrect

c) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

22. Assertion : Saliva in the mouth of humans contain the enzyme called = salivary amylase.
Reason : Salivary amylase is responsible for digestion of starch.
- a) (A) is incorrect and (R) is correct
 - b) (A) is correct and (R) is incorrect
 - c) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
 - d) Both (A) and (R) are correct and (R) is the correct explanation of (A)

SHORT ANSWER TYPE QUESTION (3 MARKS)

1. Name the organ which perform the following functions in human
 - i) Absorption of digested food
 - ii) Absorption of water
 - iii) Secretion of Bile juice.
2. Diagrammatically illustrate the process of utilization and digestion of food in Amoeba.
3. Give two examples each of organisms which perform the following types of nutrition.
 - a) Saprotrophic b) Parasitic c) Holozoic.
4. What will happen if green plants disappear from earth?
5. Mention three major events that occur during photosynthesis?
6. Name the energy currency in the living organisms. When and where it is produced?
7. How do carbohydrates, proteins and fats get digested in human beings?
8. Explain the three pathways of breakdown of glucose in living organisms.
9. How is small intestine designed to absorb digested food.
10. Describe the process of double circulation in human beings.
11. Define the term transpiration. Design an experiment to demonstrate this process. (CBSE 2018-19)