

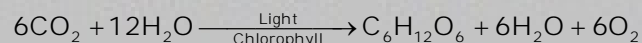
## Nutrition

- “All the basic functions performed by living organisms to maintain their life on this earth are called the life processes,” such as nutrition, respiration, transportation, excretion etc.
- Energy is needed for the maintenance.
- Nutrition is process of intake of food or nutrients and their utilization by an organisms for physiological processes.

### Types of Nutrition :

- (i) Autotrophic nutrition
- (ii) Heterotrophic nutrition

- **Autotrophic nutrition** is a process in which green plants convert solar energy into chemical energy by the process of photosynthesis.



e.g. All green plants and blue green algae.

- **Heterotrophic nutrition** is a mode of nutrition in which an organism can not synthesize its own food from simple inorganic materials like carbon dioxide and water on other organisms for food.

e.g. All animals, non-green plants like fungi.

- **Nutrition in Amoeba** In *Amoeba* there are two different modes of nutrition :
  - (a) **Pinocytosis** : Intake of liquid food materials through cell membrane
  - (b) **Phagocytosis** : Intake of solid food materials through cell-membrane and digestion of food occurs inside food vacuole.

## Human Digestive System

- It includes : (a) Mouth → Teeth, Tongue and Salivary gland. (b) Alimentary canals (c) Digestive glands.

- **Alimentary Canals** :

**Oesophagus** : Short tubular structure responsible for conduction of food.

**Stomach** : It has gastric gland which secretes digestive juice. Digestive juice contains HCl, pepsinogen and mucus. Stomach digests proteineous food in

acidic medium (pH 1.8 – 3.0) by pepsin.

- **Intestine** : It has three different parts like duodenum, Jejunum and Ileum.

**Duodunum** is connected with pancreas and liver with common bile pancreatic duct. It completes the digestion of food in alkaline medium.

**Jejunum** It also secretes enzyme for digestion of food.

**Ileum** : It has many finger like projections which increases the absorptive surface area of small intestine and helps in digestion of food.

- **Large Intestine** : It also has four different parts like coecum, colon, rectum and anus.

(c) **Digestive glands** : (i) **Liver** & (ii) **Pancreas** :

(i) **Liver** : Secretion and synthesis of bile juice and bile salt.

Bile juice helps in emulcification of fat.

(ii) **Pancreas** : It is heterocrine gland which secretes both hormones and enzymes. Enzymes are Trypsinogen, Amylase, Lipase and nucleases.

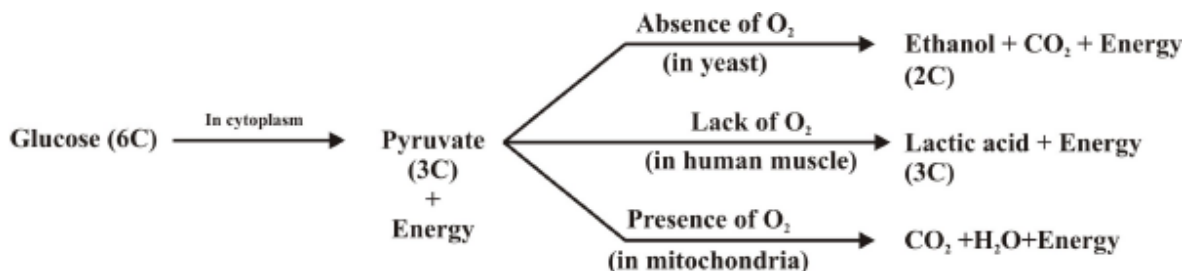
## Respiration

- Respiration is a physical and physiological process in which food is oxidized to release energy. It also involves inhale of oxygen and exhale of carbon dioxide from body.

### Types of Respiration

(i) **Aerobic Respiration** : It requires oxygen. The end products of aerobic respiration of carbohydrates are  $\text{CO}_2$  and water. It takes place in mitochondria of cell.

(ii) **Anaerobic Respiration** : It takes place in the absence of  $\text{O}_2$ .



- **Human Respiratory System** : It includes respiratory tracts and lungs.
- **Respiratory tracts** : It includes both upper respiratory tract and lower respiratory tracts. Both respiratory tracts help in exchange of gases like  $\text{CO}_2$  and  $\text{O}_2$ .

## Lungs

- Both the lungs are guarded by rings of cartilage and bony cage including ribs, sternum and vertebrae.
- It is known as respiratory surface. It is highly vascularized. It contains several functional unit called *alveoli*.
- The alveoli helps in exchange of gases through diffusion.
- In human beings, the respiratory pigment is haemoglobin which has high affinity for oxygen.
- This pigment is present in red blood corpuscles.
- CO<sub>2</sub> is more soluble in water than oxygen.

## Transportation

- The transport system or circulatory system is responsible for transportation of materials throughout the body. It transports nutrients, water and oxygen to our billions of body cells and carries away waste materials such as carbon dioxide and urine that body cells produce to out of body. It is an amazing highway that travels through our body connecting all our body cells. It involves (i) Heart, (ii) Blood vessels (iii) Lungs.

- (i) **Heart** : It is a hollow, muscular organ in vertebrates responsible for pumping of blood throughout the body.

Human heart is fist shaped and chambered.

It is four chambered in which two auricles and two ventricles are located.

**Systole** : Contraction of heart chambers.

**Diastole** : Relaxation of heart chambers.

- (ii) **Blood Pressure** : The force that blood exerts against the wall of a vessel is called **blood pressure**.

$$\text{Blood pressure} \frac{\text{Cardiac systole}}{\text{Cardiac diastole}} = \frac{120 \text{ mm of Hg}}{80 \text{ mm of Hg}}$$

- **B.P.** is measured by an instrument called *Sphygmomanometer*.
- **Oxygen** enters the blood vessels from the lung through diffusion.
- **The tubes-Blood vessels** : There are three blood vessels like arteries, veins and capillaries.
- Arteries are thick walled and carry oxygenated blood except pulmonary artery.
- Vein are thin walled and carry deoxygenated blood except pulmonary vein.

## Blood

- Blood is a fluid connective tissue which carries gases, nutrients, waste materials and other chemicals.
- Blood corpuscles + Plasma,
- Blood Corpuscles → RBC, WBC and Blood platelets.

### Red Blood Corpuscles (RBC)

- It is anucleated in mammals except camel.
- It is biconcave.

### White Blood Corpuscles (WBC)

- It is colourless cell having multi-lobed nucleus.
- It forms antibody.

### Blood Platelets

- It is oval and nucleated cell.
- It helps in clotting of blood.

### Lymph

- It is colourless tissue fluids, present in intercellular spaces of tissue.
- It is transported by lymph vessels.

### Transport in Plants

- Transport of materials like water, food and nutrients in plants are completed by conducting tissues or vascular tissues.
- These vascular tissues are **Xylem** and **Phloem**.
- Xylems conduct water and minerals from roots to leaves of plants.
- Phloem conducts food synthesized in leaves to different parts of plant body.

### Excretion

- Removal of unwanted waste materials from body called **excretion**.

### Excretion in Human

- Removal of unwanted nitrogenous waste materials, carbon dioxide and other chemical from body called excretion.
- Human excretory system involves a pair of kidney, a pair of ureter, a urinary bladder and a urethra.
- Kidney consists several functional unit called nephron.
- There are 1 million nephrons present in each kidney which are involved in excretion of nitrogenous waste materials.
- Kidney consists glomerulus, Bowman's capsule and tubules.

- Each kidney opens into ureter and ureters into urethra respectively.

### Excretion in Plants

- Plants use completely different strategies for excretion than those of animals.
- Oxygen itself can be thought of as a waste products generated during photosynthesis.
- The excretory structures in plants are; stomata in leaves, lenticels and cellular vacuoles.



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## SOLVED QUESTIONS

1. How are fats digested in our bodies? Where does this process take place?

**Ans.** Fats are digested in duodenum with the help of enzyme lipase. The enzyme lipase secreted from pancreas.



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

**Ans.** Saliva secreted from salivary gland which contains digestive enzymes like salivary amylase and lysozyme. Salivary amylase acts on starch and digest it into maltose + sucrose.

3. What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.

**Ans.** **Aerobic respiration** : is that which occurs in presence of oxygen. It takes place in mitochondria of a cell to generate ATP i.e., oxidizes the food to liberate  $\text{CO}_2$ ,  $\text{H}_2\text{O}$  and ATP.

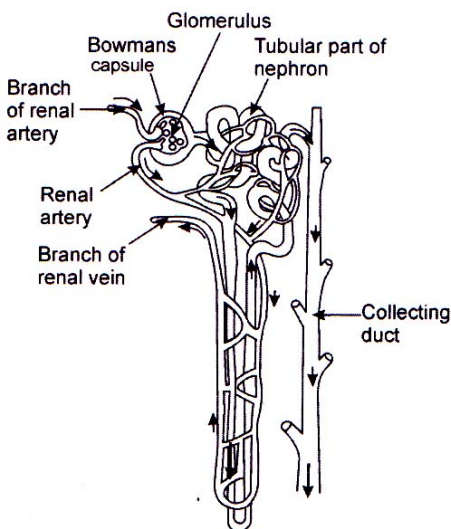
**Anaerobic respiration** : is that which takes place in absence of  $\text{O}_2$ . It takes place in cytoplasm of cell during glycolysis to liberate pyruvic acid and ATP.

In yeast the anaerobic respiration is commonly found. This causes formation of ethyl alcohol and ATP. This is known as fermentation.

4. Draw a well-labelled diagram of excretory unit of human kidney and label the following parts :

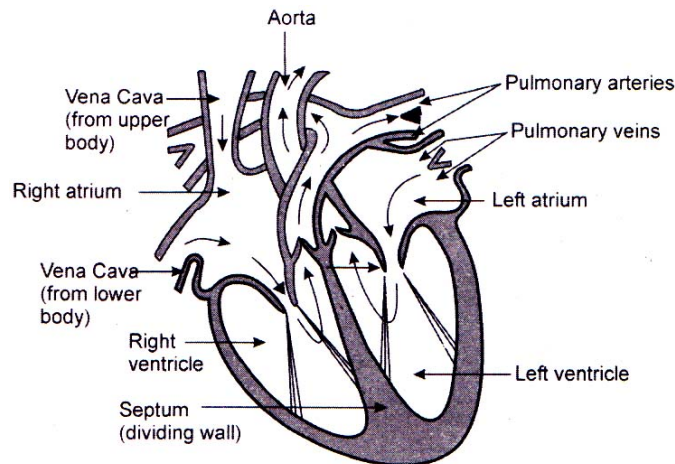
- |                    |                       |
|--------------------|-----------------------|
| (i) Glomerulus     | (ii) Bowman's capsule |
| (iii) Renal artery | (iv) Collecting duct. |

**Ans.**



5. Draw a sectional view of human heart and label the following :  
Aorta, left atrium, right ventricle, vena cava, pulmonary vein, pulmonary artery.

**Ans.**



6. How are the alveoli designed to maximize the exchange of gases?

**Ans.** Alveoli is the structural and functional unit of lungs : It is highly vascularised.

The partial pressure in the alveoli is higher than that of blood vessels, so the oxygen easily diffuses through the alveolar wall to blood vessels. Thus, the vascularized alveoli maximises the exchange of gases through it.

7. Describe double circulation in human beings. Why is it necessary?

**Ans.** Heart of human being is four chambered in which two auricles and two ventricles are separated to each-other by septum. Both the right auricle and right ventricle pump oxygenated blood to body. Similarly, the left auricle and left ventricle pumps deoxygenated blood to lungs for purification. So the oxygenated and deoxygenated both blood separately pumped by heart chambers. This type of circulation is known as double circulation.

The double circulation is necessary to supply oxygenated blood to body and deoxygenated blood to lungs for purification.

8. What are the differences between the transport of materials in xylem and phloem?

**Ans.** Xylem and phloem both are conducting tissue vascular tissue in higher plants. Xylem conducts water from roots to leaves of plants whereas phloem conducts food from leaf to different parts of body.



**EXERCISE****NCERT QUESTIONS**

Pick (✓) the correct choice :

1. The kidneys in human beings are a part of the system for  
(a) nutrition. (b) respiration.  
(c) excretion. (d) transportation.
2. The xylem in plants are responsible for  
(a) transport of water. (b) transport of food  
(c) transport of amino acids. (d) transport of oxygen.
3. The autotrophic mode of nutrition requires  
(a) carbon dioxide and water (b) chlorophyll  
(c) sunlight (d) all of the above
4. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in  
(a) cytoplasm. (b) mitochondria.  
(c) chloroplast. (d) nucleus.
5. How are fats digested in our bodies? Where does this process take place?
6. What is the role of saliva in the digestion of food?
7. What are the necessary conditions for autotrophic nutrition and what are its by-products?
8. What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.
9. How are the alveoli designed to maximise the exchange of gases?
10. What would be the consequences of a deficiency of haemoglobin in our bodies?
11. Describe double circulation in human beings. Why is it necessary?
12. What are the differences between the transport of materials in xylem and phloem?
13. Compare the functioning of alveoli in the lungs and nephrons in the kidneys with respect to their structure and functioning.



**LEVEL-I**

1. What is nutrition?
2. What are life processes?
3. In what form the food energy is stored in plants and animals?
4. What is peristaltic movement?
5. Why is nitrogen essential for plants?
6. What are the two functions of the kidney?
7. Name the blood vessel which carries blood away from the heart for purification.
8. What is the full form of ATP and ADP?
9. What do you mean by 'Holozoic' nutrition?
10. What is the difference between ectoparasite and endoparasite?

**TEACHING CARE****LEVEL-II**

1. In desert plants the stomata remains closed during the day and opens at night. How do these plants perform photosynthesis?
2. Why is more energy released in aerobic respiration than in anaerobic respiration?
3. Give the events that occurs during the photosynthesis.
4. Differentiate between the aerobic and anaerobic respiration with example.
5. Explain the digestion in stomach.
6. Explain the process of breathing in human.
7. What causes the opening and closing of stomata?
8. Draw a diagram of open and closed stomata.
9. Name the glands associated with common ducts in digestive system. Also name their secretions.
10. When is lactic acid formed in our muscles?

### LEVEL-III

1. How does nutrition occur in *Amoeba*?
2. What do the following transports :
 

(i) Xylem	(ii) Pulmonary artery
(iii) Aorta	(iv) Vena cava
3. Write one features which is common to each of the following pairs of terms :
 

(i) Glycogen and Starch	(ii) Chlorophyll and Haemoglobin
(iii) Gills and lungs	(iv) Arteries and Veins
4. Draw a labelled diagram of transverse section of leaf and what are the two steps of photosynthesis.
5. What are the various types of heterotrophic nutrition? Give example of each type.

### MULTIPLE CHOICE QUESTIONS

Pick (✓) the correct option :

1. Exchange of gases involves
 

(a) osmosis	(b) diffusion
(c) Imbibition	(d) Suction pressure
2. The lungs are covered by two thin membranes called as
 

(a) Ventilator	(b) Alveoli
(c) Thoracic cavity	(d) Pleura
3. Breathing out of CO<sub>2</sub> is called as
 

(a) Inhalation	(b) Reduction
(c) Degeneration	(d) Exhalation
4. The process of respiration is concerned with
 

(a) Liberation of oxygen	(b) Liberation of carbon dioxide
(c) Liberation of energy	(d) Both (b) and (c)
5. Many plants waste products are stored in
 

(a) Vacuole	(b) Golgi bodies
(c) E.R.	(d) Cytoplasm
6. The blood cell responsible for clotting of blood at the point of injury is
 

(a) Red blood corpuscles	(b) White blood corpuscles
(c) Blood platelets	(d) All of the above
7. The heart of which animal always pumps deoxygenated blood
 

(a) Amphibians	(b) fishes
(c) Reptiles	(d) Birds

8. Sphygmomanometer is an instrument used to measure
- (a) Heart beat (b) Pulse rate  
(c) Blood pressure (d) Both (a) and (b)
9. Which one is maximum soluble in water
- (a) Carbon dioxide (b) Oxygen  
(c) Nitrogen (d) Both (a) and (b)
10. Which enzyme acts in acidic medium
- (a) Salivary amylase (b) Pepsin  
(c) Trypsin (d) None of the above

### QUESTIONS BASED ON HIGH ORDER THINKING SKILL

1. The transport system in plants consists of two kinds of tissues X and Y. The tissue X is made up of living cells and consists of two components A and B. The component A has tiny pores in its end walls and contains only cytoplasm as well as nucleus. The tissue Y is made up of dead cells and consists of two components C and D. The component C has open ends whereas component D does not have open ends. In flowering plants, either only C or both C and D transport water but D is the only water conducting tissue in non-flowering plants.
- (a) What is
- (i) Tissue X?
- (ii) Component A, and
- (iii) Components B?
- (b) What is
- (i) Tissue Y?
- (ii) Component C, and
- (iii) Component D?
2. A liquid A of colour B circulates in the human body only in one direction : from body tissues to heart. Among other things, liquid A contains germs from cells and dead cells. The liquid A is cleaned of germs and dead cells by a special types of white blood cells called C. This cleaned liquid is then put into blood circulatory system in subclavian veins.
- (a) What is (i) liquid A, and (ii) colour B
- (b) What are C?

- (c) The liquid A is somewhat similar to a component of blood. Name this component.
- (d) Why is liquid A not red.

**VALUE BASED QUESTIONS**

1. Many days Mohan has started cycling for long distance. But on his way back he feels cramps in his calf muscles.
- (i) Name the process involved and its equation.
- (ii) What can be the possible cause of it?
- (iii) How can Mohan have quick relief from muscle cramps?
2. Akash's grand father was not feeling well. He went to a physician who after examining him told, his blood urea level is high and advised him to undergo 2 – 3 days regular dialysis.
- (i) What happens with Akash's grand father?
- (ii) Why does physician called him for dialysis? How is dialysis performed?
- (iii) Is there any other remedy that can help to avoid Akash's grandfather regular dialysis?
3. A person made an accident at highway. A hospital 2 km away from the place of accident. People admitted the injured person in the said hospital. Doctor advised that this person needs immediate transfusion of blood. After some hours the team of doctors found that there is internal injury and lack of blood clotting factor :
- (a) What type of blood should be transfused to patient immediately?
- (b) What type of blood group is also need to transfuse to the injured person?
4. A person circumferentially removed the bark of small tree by using knife A few days later he found that the roots of plant dries up
- (i) What does he observed?
- (ii) Why does the roots of plant dries up first?
- (iii) Which tissue is responsible for conduction of food in plants?



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## WORKSHEET - 1

1. Give the name of the types of nutrition in living organisms?
2. Differentiate between autotrophic and heterotrophic organisms with an examples?
3. Draw a neat and labelled diagram of human digestive system.
4. Give a simplified outline diagram to explain the mechanism of photosynthesis in plants. Write a reaction of photosynthesis.
5. Define the process of nutrition in *Amoeba*.



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## WORKSHEET - 2

1. What are the characteristic of good respiratory surface?
2. What happens to the rate of breathing during vigorous exercise?
3. Differentiate between
  - (a) Respiration and combustion
  - (b) Respiration and photosynthesis
  - (c) Aerobic and anaerobic respiration
4. Write down the chemical equations for aerobic and anaerobic respiration.
5. What are three basic steps of respiration?

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## WORKSHEET - 3

1. Differentiate between
  - (a) Xylem and Phloem
  - (b) Arteries and veins
  - (c) Open and closed circulatory system
2. What are the functions of Blood?
3. What are the advantages of transpiration?
4. Explain the term 'double circulation' in humans.
5. What is a heart beat?

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## WORKSHEET - 4

1. Describe the structure and functions of nephron with a well labelled diagram.
2. Draw a well labelled diagram of excretory system.
3. What are the methods used by plants to get rid of excretory products?
4. Define dialysis process with a well labelled diagram.
5. (a) Draw a diagram of longitudinal section of a kidney.  
(b) Write a note on a kidney.



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