

Chapter – 6 Life Processes

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Q1. Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?

Answer:

In multicellular organisms like humans, the oxygen of air travel large distances inside the human body to reach every cell. Diffusion is a very slow process; it takes long time to make oxygen available to all the body cells. Diffusion is insufficient because the volume of human body is so big that oxygen cannot diffuse into all the cells of the human body. So, when the size of the multicellular organism is large, then respiratory pigments present in blood take up the oxygen from the air in the lungs and carry to body cells.

Q2. What criteria do we use to decide whether something is alive?

Answer:

The criteria used to decide whether something is alive or not are:

- i) Living things move by themselves.
- ii) Living things need food, air and water.
- iii) Living things grow.
- iv) Living things respond to changes and are sensitive.
- v) Living things respire (release energy from food).
- vi) Living things excrete and get rid of waste materials.
- vii) Living things can reproduce. They can have young ones.

Q3. What are outside raw materials used by an organism?

Answer:

- i) An autotrophic organism, like a green plant uses outside raw material such as carbon dioxide, water and minerals along with sunlight to make its own food by the process of photosynthesis.
- ii) A heterotrophic organism, like animal uses raw material like organic food to grow, develop, synthesis proteins and other substances in the body.
- iii) Most organisms use oxygen for breaking down food and releasing energy in a process called respiration.

Q4. What processes would you consider essential for maintaining life?

Answer:

The processes essential to maintain life are: Nutrition, Respiration, Transport, Excretion, Control and Coordination, Growth, Movement and Reproduction.

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Q1. What are the differences between autotrophic nutrition and heterotrophic nutrition?

Answer:

- i) In autotrophic nutrition, an organism synthesises organic food from simple inorganic materials like carbon dioxide, water and minerals using solar energy. In heterotrophic nutrition, an organism cannot synthesise its own food, it depends on other organisms.
- ii) Autotrophic nutrition occurs in green plants and certain bacteria that can carry out photosynthesis. Heterotrophic nutrition occurs in all animals, and non-green plants which cannot carry out photosynthesis.

Q2. Where do plants get each of the raw materials required for photosynthesis?

Answer:

The raw materials required for photosynthesis are: Carbon dioxide and Water. The plants get carbon dioxide from the air and water from the soil.

Q3. What is the role of the acid in our stomach?

Answer:

The acid in the stomach makes the medium of gastric juice acidic so that the enzyme pepsin can break down proteins of the food as the enzyme pepsin can digest proteins in the acidic medium and kills any bacteria which enter the stomach with our food.

Q4. What is the function of digestive enzymes?

Answer:

Digestive enzymes are the biological catalysts which break complex food molecules into small particles which are absorbed from the alimentary canal into the blood stream.

Q5. How is the small intestine designed to absorb digested food?

Answer:

The presence of villi gives the inner walls of the small intestine large surface area which are millions of tiny, finger-like projections and help in absorption of food.

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Q1. What advantages over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?

Answer:

The aquatic organisms use the oxygen dissolved in water for respiration. The terrestrial organism take oxygen from air which contains higher amount of oxygen because it is surrounded by an oxygen-rich air.

Q2. What are the different ways in which glucose is oxidized to provide energy in various organisms?

Answer:

There are two different ways in which glucose is oxidized to provide energy in various organism: aerobic respiration, and anerobic respiration. Aerobic respiration uses oxygen of air whereas anaerobic respiration takes place without oxygen.

- i) In aerobic respiration, the glucose food is broken by the oxygen of air inhaled to form carbon dioxide and water, and energy is released.
- ii) In anerobic respiration, the glucose food is incompletely broken by micro-organism like yeast in the absence of oxygen to form ethanol and carbon dioxide but less energy is released.

Q3. How are oxygen and carbon dioxide transported in human beings?

Answer:

In human beings, oxygen is carried from the lungs by the respiration pigment hemoglobin which is present in red blood corpuscles. Carbon dioxide is more soluble in water than oxygen. So, carbon dioxide produced in the human body is transported in the dissolved form in blood.

Q4. How are the lungs designed in human beings to maximize the area for exchange of gases?

Answer:

These are millions of alveoli in the lungs which provides large area for the exchange of gases. And maximizes the exchange of gases. Example, if all alveoli from the two human lungs are unfolded, they give an area of 80 square meters.

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Q1. What are the components of transport system in human beings? What are the functions of these components?

Answer:

The components of transport system in human beings are blood and lymph. The functions of blood and lymph are:

- i) Red blood cells carry oxygen from the lungs to all the cells of the body. Blood plasma carries digested food, proteins, common salt, waste products and hormones in the body.
- ii) Lymph helps in circulation of protein molecules by carrying from the tissues into the blood stream and also carries digested fat from intestine to tissues, and excess fluid from the extra cellular space into blood.

Q2. Why is it necessary to separate oxygenated and deoxygenated blood in mammals and birds?

Answer:

The mammals and birds are warm-blooded animals which require energy to maintain their body temperature and to separate oxygenated and deoxygenated blood in mammals and birds as such a separation help efficient supply of oxygen to the body cells for producing a lot of energy.

Q3. What are the components of the transport system in highly organized plants?

Answer:

The two components of transport in highly plants are xylem and phloem.

- i) Xylem tissue is dead cells with xylem vessels and tracheid and transports water and dissolved minerals from roots to all parts of the plants.
- ii) Phloem tissue is living cells with sieve tubes and companion cells and transports food in leaves by photosynthesis to all the parts of a plant.

Q4. How are water and minerals transported in plants?

Answer:

Water and the minerals are transported in plants by xylem tissue and xylem vessels and tracheids of the roots, stems and leaves are interconnected to form water conducting channel in all the parts of the plant. The mechanism of transport of water in plants is:

1. The leaves have tiny pores called stomata.
2. The water is transported by xylem to the leaves which is lost by evaporation through stomata.
3. The loss of water in the form of water vapor from the leaves is called transpiration.
4. The continuous evaporation of water from the cells of leaves is by suction which pulls up water from the roots through the xylem.
5. transpiration helps in the upward movement of water and dissolved minerals from the roots to the leaves.

Q5. How is food transported in plants?

Answer:

The transport of food in the plants leaves takes place through 'phloem tissue'. The phloem tissue consists of sieve tubes with their companion cells. The mechanism of movement of food in phloem is:

1. The sugar in leaves is laden in sieve tubes of phloem by using energy from ATP.
2. Water enters into sieve tubes containing sugar by osmosis so pressure in the phloem tissue rises.
3. Pressure produced in the phloem moves the food to the parts of the plant having less pressure.
4. The phloem transport food on need of the plant.
5. The movement of food in phloem move upwards or down wards on the requirements of the plant.

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Q1. Describe the structure and functioning of nephrons.

Answer:

The nephron has cup-shaped bag is Bowman's capsule. The lower end of Bowman's capsule is tube-shaped and is a tubule and both together make a nephron. One end of the tubule is connected to Bowman's capsule and its other end is connected to a urine-collecting duct of the kidney.

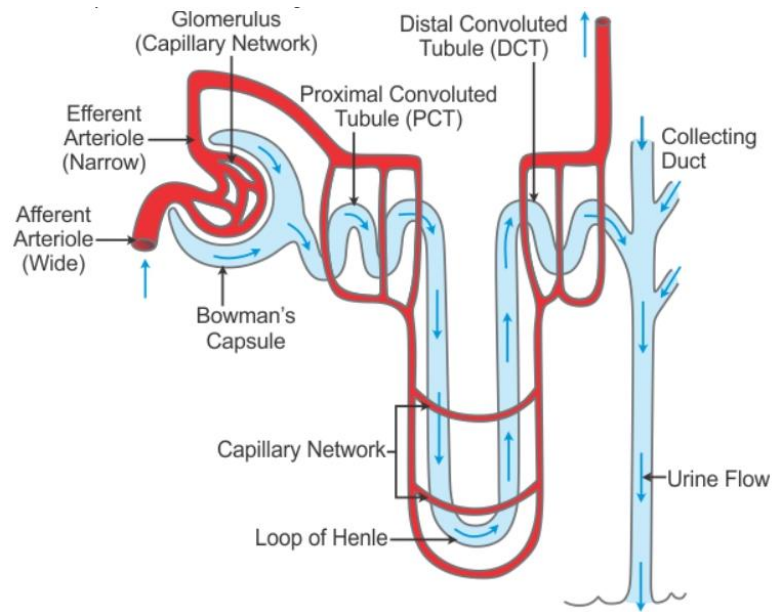


Diagram to show the working of a nephron

The Bowman's capsule has bundle of capillaries called glomerulus. One end of glomerulus is to renal artery to brings dirty blood with urea waste in it. The other end of glomerulus comes from Bowman's capsule as a blood capillary joins a renal vein. The function of glomerulus is to filter the blood.

The dirty blood with urea enters the glomerulus and filters blood. During filtration, glucose, amino acids, salts, water and urea etc., pass into Bowman's capsule and then enter the tubule of nephron. When the filtrate with useful substances and the waste substances passes through the tubule, then the blood through blood capillaries surrounding the tubule.

the waste substance urea, some unwanted salts and excess water remains behind in the tubule. The liquid left behind is urine. The nephron carries this urine into kidney from where to ureter. From the ureter, urine passes into urinary bladder. Urine is stored in the bladder and passes out of the body through urethra.

Q2. What are the methods used by plants to get rid of excretory products?

Answer:

- i) The plants produce carbon dioxide as a waste product during respiration and oxygen as a waste product during photosynthesis and remove gaseous waste through stomata in leaves and lenticles in stems.
- ii) The plants store solid and liquid wastes in leaves, bark and fruits. The plants get rid of these wastes by the shedding of leaves, peeling of bark and felling of fruits.
- iii) The plants get rid of their wastes in the form of gums and resin and transport into the soil too.

Q3. How is the amount of urine produced regulated?

Answer:

The amount of urine is regulated by reabsorption of water and dissolved substances through blood capillaries surrounding the tubules of nephrons. The amount of urine produced depends on how much excess water is present in the body and dissolved wastes are excreted.

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Q1. The kidney in human beings are a part of the system for:

- a) Nutrition
- b) Respiration
- c) Excretion
- d) Transportation

Answer: Option c)

Kidney has nephrons. A functional unit which help in filtering the blood, and excreting urine.

Q2. The xylem in plants are responsible for:

- a) Transport of water
- b) Transport of food
- c) Transport of amino acids
- d) Transport of oxygen

Answer: Option a)

The xylems in plants are responsible for transport of water.

Q3. The autotrophic mode of nutrition requires:

- a) Carbon dioxide and water
- b) Chlorophyll
- c) Sunlight
- d) All of the above

Answer: Option d)

Autotrophic nutrition prepares its own food from water, mineral salts and carbon dioxide in the presence of sunlight. known as photosynthesis which requires carbon dioxide, water, chlorophyll and sunlight.

Q4. The breakdown of pyruvate to give carbon dioxide, water and energy takes place in:

- a) Cytoplasm
- b) Mitochondria
- c) Chloroplast
- d) Nucleus

Answer: Option b)

Pyruvate break into carbon dioxide and water in the mitochondria.

Q5. How far fats digested in our bodies? Where does this process take place?

Answer:

Fats are digested in the small intestine in our body. The liver secretes bile into smaller intestine. The salts present in bile emulsify fat present in our food into smaller globules for the enzymes to act on and digest them. Pancreas secretes pancreatic juice in small intestine with an enzyme called 'lipase' which breaks down the emulsified fat. the enzyme in intestinal juice help in digestion of fats by converting them into fatty acids and glycerol.

Q6. What is the role of saliva in the digestion of food?

Answer:

Saliva contains salivary amylase which breaks down the complex 'starch' carbohydrate in food into a simpler sugar.

Q7. What are the conditions necessary for autotrophic nutrition and what are its by-products?

Answer:

Autotrophic involves the making of food by green plants by the process of photosynthesis. The condition necessary for autotrophic nutrition are the presence of: Carbon dioxide, water, chlorophyll and sunlight. Carbon dioxide combines with water and solar energy to form glucose which is used for providing energy. A part of glucose is stored in plants as starch which is used as energy when plant needs it.

Q8. Answer the following:

- a) What are the differences between aerobic and anerobic respiration?

b) Name some organism that use the anerobic mode of respiration.

Answer:

a) Difference between aerobic and anaerobic respiration:

S/No.	Aerobic respiration	Anaerobic respiration
1.	Aerobic respiration takes place in the presence of oxygen.	Anaerobic respiration takes place in the absence of oxygen.
2.	Complete breakdown of food occurs in aerobic respiration.	Partial breakdown of food occurs in anaerobic respiration.
3.	The end products in aerobic respiration are carbon dioxide and water.	The end products in anaerobic respiration may be ethanol and carbon dioxide or lactic acid.
4.	Aerobic respiration produces a considerable amount of energy.	Much less energy is produced in anaerobic respiration.

b) Anaerobic mode of respiration is used by certain micro-organisms such as yeast and some bacteria known as anerobic bacteria.

Q9. How are the alveoli designed to maximize the exchange of gases?

Answer:

There are millions of alveoli in the lungs which provides a large area for the exchange of gases Example, if all alveoli from the two human lungs are unfolded, they give an area of 80 square meters.

Q10. What would be the consequence of a deficiency of hemoglobin in our bodies?

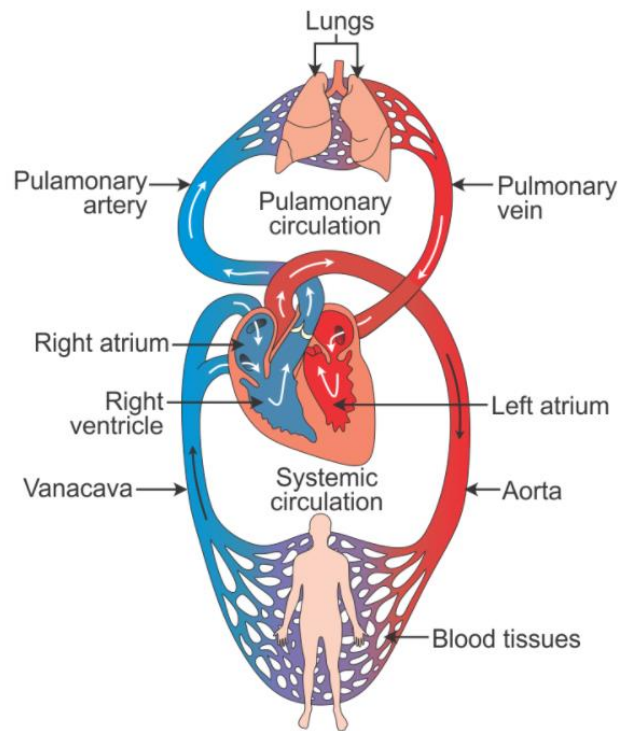
Answer:

The oxygen required for breathing and respiration is carried by hemoglobin The deficiency of hemoglobin in the blood of a person reduces the oxygen-carrying capacity of blood resulting in breathing problems, tiredness and lack of energy.

Q11. Describe double circulation in human beings. Why is it necessary?

Answer:

The heart receives deoxygenated blood from different parts of the body, and it pumps blood to the lungs. The oxygenated blood from the lungs returns to the heart, which is pumped again into different parts. Thus, the blood passes twice through the heart called **double circulation**.



The pulmonary circulation affects lungs. The blood flows from the right ventricle to the lungs. Pulmonary veins collect oxygenated blood from the lungs and carry to the heart (left auricle). The aorta receives the blood from the left ventricle and sends it to the various parts of the body. Veins collect the deoxygenated blood from the body parts and pour it into the right auricle.

Q12. What are the differences between the transport of materials in xylem and phloem?

Answer:

- i) Xylem tissue transports water and dissolved minerals in plants and phloem tissue transports the food.
- ii) Xylem tissue carries the water and dissolved minerals upwards from the roots of the plant but the movement of food from the leaves through phloem which moves upwards and downwards.
- iii) The upward movement of water and dissolved minerals in xylem tissue is caused by a suction by the continuous evaporation of water from leaves of the plant which pulls up water from the roots. The food in leaves is transported through phloem tissue by energy from ATP.

Q13. Compare alveoli in the lungs and nephrons in the kidneys with respect to their structure and functioning.

Answer:

- i) **Structure.** Alveoli in the lungs and nephrons in the kidney, both possess network of blood capillaries.
- ii) **Functioning.** Alveoli purify the deoxygenated blood by removing carbon dioxide from it and oxygenated it by introducing oxygen in it. Similarly, nephrons purify the dirty blood by filtering waste products, urea from it in the form of urine.

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