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Class: X

Subject: Science (BIOLOGY)

LIFE PROCESSES - Nutrition

1. 'Bile does not contain any enzyme but it is essential for digestion'. Explain.
   Bile does not contain any enzyme but is essential for digestion because
   i) Bile is alkaline and contain salts which help to emulsify the fat.
   ii) They convert acidic part of the food to alkaline for the pancreatic enzyme to act.

2. What substances are contained in the gastric juices? What are their functions?

   Gastric juice contains three substances: hydrochloric acid, enzyme pepsin and mucus.

i) HCL in the stomach is used to make the medium acidic to facilitate the action of the enzyme pepsin and to kill germs.
ii) Enzyme pepsin digests protein to convert them into peptones.
iii) The mucus helps to protect the stomach wall from the secretion of hydrochloric acid.

3. Explain the nutrition process in amoeba with neat labelled diagram.
   The mode of nutrition in amoeba is holozoic.
   The various steps involved in the process of nutrition are:
   i. INGESTION: Amoeba ingests food with the help of its finger-like extension, called pseudopodia.
   ii. DIGESTION: Various enzymes from the cytoplasm enter into the food vacuole and breaks them down into soluble molecules.
   iii. ABSORPTION: The simple soluble food is absorbed by cytoplasm of Amoeba from food vacuole through the process of diffusion.
   iv. ASSIMILATION: The digested food components are utilised by the cell.

v. EGESTION: When a considerable amount of undigested food gets collected inside amoeba, the cell membrane ruptures and throws out the undigested food.
(Refer the text for diagram)

4. How is small intestine designed to absorb digested food?
The inner lining of small intestine has millions of tiny finger-like projections called villi.
   i) The presence of villi gives the inner walls of the small intestine a very large surface area for absorption of digested food.
   ii) The villi are richly supplied with blood vessels which take the absorbed food to each and every cell of the body.

5. How are fats digested in our bodies?
   i) The food coming from the stomach is acidic and has to be made alkaline for the pancreatic enzyme to act. It is made alkaline by bile juice secreted by liver.
   ii) Bile salts help in breaking down of large globules of fats into smaller one.
   iii) The enzyme lipase secreted by pancreas break down the emulsified fats.
   iv) The intestinal juice secreted by intestinal gland converts fats into fatty acids and glycerol.

Life Processes – Continued

RESPIRATION

6. What is glycolysis? Where does it take place?

The break-down of 6-carbon molecule glucose to 3-carbon molecule pyruvate is called glycolysis. It takes place in the cytoplasm of the cell.

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

Aquatic organisms obtain oxygen which is dissolved in water. The amount of oxygen dissolved in water is very low. On the other hand, the terrestrial organisms take oxygen directly from air.

8. Differentiate between aerobic and anaerobic respiration.

AEROBIC RESPIRATION	ANAEROBIC RESPIRATION
Occurs in the presence of oxygen	Occurs in the absence of oxygen
Takes place in cytoplasm and mitochondria	Takes place in cytoplasm only
Complete oxidation takes place	Incomplete oxidation takes place.
End products are carbon-di-oxide and water	Carbon-dioxide and alcohol or lactic acid
Large amount of energy is obtained(38 ATP molecules)	Less amount of energy is obtained (2 ATP molecules)

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

Each lung has 300 to 700 million alveoli. They provide large surface area for exchange of gases. To facilitate the exchange of gases alveoli are thin walled, moist and surrounded by numerous blood capillaries.

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

a) **In the presence of oxygen:**

Glucose--→Pyruvate--→ CO_2 + water + Energy

b) **In the absence of oxygen (in yeast):**

Glucose-→ Pyruvate-→ Ethanol + CO_2 + Energy

c) **Lack of oxygen (muscle cell):**

Glucose-→ Pyruvate-→ Lactic acid + Energy

11. How is oxygen and carbon-di-oxide transported in human beings?

Oxygen has high affinity for the respiratory pigment haemoglobin. Oxygen combines with haemoglobin to form oxyhaemoglobin and thus transported. Carbon-di-oxide is more soluble in water than oxygen and hence transported in the dissolved form in our blood.

12. What is diaphragm? Give its significance.

Diaphragm is a sheet of muscle that separates thoracic cavity from the abdominal cavity. Contraction and relaxation of the diaphragm helps in inhalation and exhalation.

13. Give reason why trachea is guarded by rings of cartilage?

Rings of cartilage is present in the trachea to prevent the air-passage from collapse.

14. How does exchange of gases take place in plants?

Exchange of gases take place by the process of diffusion through a) leaves and young stem, b) root hairs and c) lenticels

15. Draw a neat labelled diagram of human respiratory system and digestive System.

(Refer Text)