

CBSE Class 11 Biology
NCERT Solutions
Chapter 16
Human physiology

1. Choose the correct answer among the following :

(a) Gastric juice contains

(i) pepsin, lipase and rennin

(ii) trypsin, lipase and rennin

(iii) trypsin, pepsin and lipase

(iv) trypsin, pepsin and renin

(b) Succus entericus is the name given to

(i) a junction between ileum and large intestine

(ii) intestinal juice

(iii) swelling in the gut

(iv) appendix

Ans. (a) (i) pepsin, lipase and rennin

(b) (ii) intestinal juice

2. Match column I with column II

Column I		Column II	
(a)	Bilirubin and biliverdin	(i)	Parotid
(b)	Hydrolysis of starch	(ii)	Bile
(c)	Digestion of fat	(iii)	Lipases
(d)	Salivary gland	(iv)	Amylases

Ans.

Column I		Column II	
(a)	Bilirubin and biliverdin	(ii)	Bile
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(c)	Digestion of fat	(iii)	Lipases
(d)	Salivary gland	(i)	Parotid

3. Answer briefly:

(a) Why are villi present in the intestine and not in the stomach?

(b) How does pepsinogen change into its active form?

(c) What are the basic layers of the wall of alimentary canal?

(d) How does bile help in the digestion of fats?

Ans. (a) Villi are finger like structures that absorb the nutrients from digested food in the intestine. The main function of villi is to absorption of nutrients so they are present in small intestine as this is the place where absorption of food takes place. Villi is not present in stomach because the food is still yet to be broken down therefore, similar finger like structures called "rugae" is present which secrete pepsin and the gastric juices for the digestion to take place in the stomach.

(b) Pepsinogen changes into its active form by the action of hydrochloric acid.



(c) The walls of the alimentary canal are made up of four layers. These are:

- Serosa: It is the outermost layer and is made up of a thin mesothelium with some connective tissues.

- **Muscularis:** It is a thin layer of smooth muscles which are usually arranged into an inner circular and outer longitudinal layer.
- **Sub-mucosa:** It is a layer of loose connective tissues, containing nerves, blood, and lymph vessels which supports mucosa.
- **Mucosa:** It is the innermost lining of the lumen of the alimentary canal which is mainly involved in absorption and secretion.

(d) Bile helps in emulsification of fats and also activates lipases. Therefore, bile helps in digestion of fats.

4. State the role of pancreatic juice in digestion of proteins.

Ans. Pancreatic juice contains a variety of inactive enzymes such as trypsinogen, chymotrypsinogen, and carboxypeptidases which help in the digestion of proteins and the partially hydrolysed proteins, like proteoses and peptones, into dipeptides.

5. Describe the process of digestion of protein in stomach.

Ans. The food that enters the stomach becomes acidic on mixing with this gastric juice which is secreted by gastric glands present on the wall of stomach. The main components of gastric juice are hydrochloric acid, pepsinogen, mucus, and rennin. The inactive proenzyme, pepsinogen when acted upon by hydrochloric acid gets converted into active enzyme pepsin which converts protein into proteoses and peptides.

Renin which is present in gastric juice of infants helps in the digestion of milk protein.

6. Give the dental formula of human beings.

Ans. Dental formula of human beings is **2123/2123**.

7. Bile juice contains no digestive enzymes, yet it is important for digestion. Why?

Ans. Bile juice not contain any digestive enzymes yet it plays an important role in the digestion of fats. as it contains bile salts, bile pigments like bilirubin, biliverdin and

phospholipids. Bile salts break down large fat globules into smaller globules so that the pancreatic enzymes can easily act on them. This process is known as emulsification of fats. It also makes the medium of food from acidic to alkaline and activates lipase.

8. Describe the digestive role of chymotrypsin. What two other digestive enzymes of the same category are secreted by its source gland?

Ans. Chymotrypsin is an active enzyme formed by the action of trypsin in the pancreatic juice. This helps in the digestion of proteins peptones and proteoses converting it into dipeptides.

The other two digestive enzyme secreted by its source gland is amylase and lipases.

9. How are polysaccharides and disaccharides digested?

Ans. The polysaccharides and disaccharides are partially digested by the amylase enzyme present in the pancreatic juice. The remaining digestion takes place by enzymes in the succus entericus. The enzyme maltase converts maltose into two molecules of glucose, lactase converts lactose into glucose and galactose, sucrase converts sucrose into glucose and fructose.

10. What would happen if HCl were not secreted in the stomach?

Ans. If HCl were not secreted in the stomach then it would affect protein digestion. The HCl secreted by glands present on stomach walls provides acidic medium to food. The acidic medium allows pepsinogen to be converted into pepsin. Pepsin plays an important role in the digestion of proteins. Therefore, if HCl were not secreted in the stomach, then pepsin would not be activated and affects its digestion.

11. How does butter in your food gets digested and absorbed in the body?

Ans. Butter is mainly composed of fat. Bile juice secreted by the liver contains bile salts break down large fat globules into smaller globules which increases the surface area for the action of lipase. This is known as emulsification of fats. After this, the pancreatic lipase present in the pancreatic juice and the intestinal lipase present in the intestinal juice

hydrolyse the fat molecules into triglycerides, diglycerides, monoglycerides, and ultimately into fatty acids and glycerol.

The ultimate products of fat i.e., fatty acids and glycerol is not water soluble so they can't be absorbed into the blood directly. Therefore, they are first incorporated into small droplets called micelles and then transported into the villi of the intestinal mucosa. They are re-formed into very small protein coated fat globules called the chylomicrons which are transported into the lymph vessels in the villi. These lymph vessels ultimately release the absorbed substances into the blood stream.

12. Discuss the main steps in the digestion of proteins as the food passes through different parts of the alimentary canal.

Ans. The digestion of protein starts in stomach and completes in small intestine.

In stomach, active pepsin is formed by the action of HCl on inactive pepsinogen converts proteins into proteases and peptones.

In small intestine, the pancreatic juice contains inactive enzymes - trypsinogen, chymotrypsinogen and procarboxypeptidases in the inactive form. Trypsinogen is activated by an enzyme, enterokinase, secreted by the intestinal mucosa into active trypsin, which in turn activates the other enzymes in the pancreatic juice. Chymotrypsinogen and procarboxypeptidases get converted into chymotrypsin and carboxypeptidase in the presence of trypsin. Chymotrypsin converts the proteins into peptides, and carboxypeptidase further converts peptides into smaller peptide chains and amino acids.

13. Explain the term thecodont and diphyodont.

Ans. The type of attachment in which each tooth is embedded in a socket of jawbone is called thecodont. Majority of mammals including human beings form two sets of teeth during their life, a set of temporary milk or deciduous teeth, replaced by a set of permanent or adult teeth. This type of dentition is called diphyodont.

14. Name different types of teeth and their number in an adult human.

Ans. Different types of teeth and their number in an adult human are:

- Incisors: Total number is 8
 - Canine: Total number is 4
 - Premolars: Total number is 8
 - Molars: Total number is 12
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15. What are the functions of liver?

Ans. The functions of liver are:

- a. The liver secretes bile juice which helps in the digestion of fats.
- b. It secretes an anticoagulant called heparin which prevent clotting of blood inside blood vessels.
- c. It produces a protein, angiotensinogen, which helps the kidneys in maintaining body fluid osmoregulation.
- d. It is an important place of lymph formation.
- e. It produces red blood cells in the embryo.
- f. It also helps in breakdown of insulin and other hormones, haemoglobin, some toxic substances and conversion of ammonia into urea takes place in liver.