

## CBSE NCERT Solutions for Class 11 Biology Chapter 16

### *Back of Chapter Questions*

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

**Solution:**

- (i) Gastric juice carries out the digestion of fats, proteins and curdling of milk; hence, the enzymes present in it are pepsin, lipase, and rennin.

**(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

**Solution:**

(b): (ii) Intestinal juice is also known as **Succus entericus**. It is secreted by the Brunner's gland present in small intestine. It contains enzymes such as **maltase, lactase, sucrase** for the digestion of **disaccharides**, **lipases** for the digestion of **emulsified fats**, **nucleosidases** for the digestion of **nucleosides** and **dipeptidases** for the digestion of **peptides** and **peptones** etc.

**2. Match column I with 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

**Solution:**

Column-I	Column-II
a-Bilirubin and biliverdin	(ii) Bile
b-Hydrolysis of starch	(iv) Amylases
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?

**Solution:**

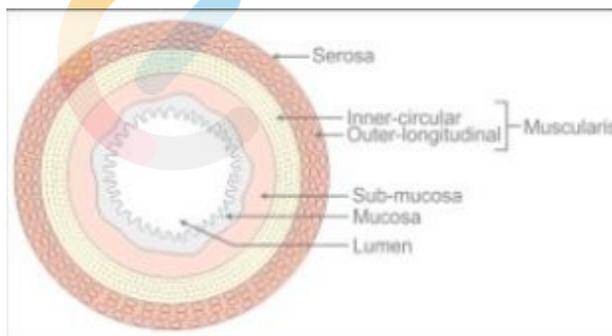
(a) Villi are the small finger like projections which are present in the small intestine. These villi form numerous microscopic projections microvilli which are rich in blood supply and lymphatic vessel.

The purpose of villi is to increase the surface area of small intestine and to facilitate the maximum absorption of nutrients into the blood. They are absent in stomach as the digestion process gets completed in small intestine and absorption takes place post digestion.

(b) **Pepsinogen** is the inactivated form of the enzyme **pepsin**. It gets converted into active form in the presence of acidic medium, which is formed due to HCl.

(c) The basic four layers of human alimentary canal are: (half mark for each correct layer)

- i- Outermost layer is Serosa
- ii- Second layer is Muscularis formed by inner circular and outer longitudinal.
- iii- Third layer is submucosa
- iv- Mucosa forms the fourth layer
- v- The innermost space is lumen



**Diagram showing lining of the stomach**

(d) Bile is secreted by the **liver** and is stored in the **gall bladder**. It is released in the duodenum and provides the alkaline medium for the action of pancreatic enzymes.

-Bile causes the **emulsification of fat**, which means conversion of fat into fat droplets.

-This increases the surface area of food for the action of enzyme lipase.

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

**Solution:**

Pancreatic juice is released into the duodenum through hepato-pancreatic duct.

The enzyme for the protein digestion is present in the inactive form in pancreatic juice are:

**-Trypsinogen**

**-Chymo-trypsinogen**

-Steps for the digestion of proteins by the pancreatic juice is as follows:

-The enzyme trypsinogen gets activated into trypsin in the presence of enzyme enterokinase secreted small intestine.

-Trypsin further acts upon the enzymes **chymotrypsinogen** and **pro-carboxy peptidase** and converts it into **chymotrypsin** and **carboxypeptidase**.

-Trypsin, chymotrypsin, and carboxypeptidase acts on peptides peptones and proteases and converts it into dipeptides.

Dipeptidases in intestinal juice further acts on dipeptides and convert it into amino acid.

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

**Solution:**

**Digestion of proteins begins in stomach:**

The food enters the stomach by the opening of gastro-esophageal sphincter.

In stomach, the secretion of gastric juice and HCl takes place.

-Gastric juice contains **proenzyme pepsinogen** in the presence of acidic medium it gets converted into **pepsin**.

-**Pepsin** acts on proteins and convert it into **proteoses** and **peptones**

-Gastric juice also contains the enzyme **rennin** it is a proteolytic enzyme which carries out the digestion of milk protein in infants.

**6. Give the dental formula of human beings.**

**Solution:**

Dental formula is the representation of different types and number of the teeth in upper half and lower half of the jaw.

Dental formula – Upper half of jaw- 2123

Lower half of jaw-2123

Incisors - 2

Canines - 1

Premolars-2

Molars - 3

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

**Solution:**

Bile juice is synthesized by liver and is stored in the gall bladder and is released in the duodenum it contains bile pigments bilirubin and biliverdin it is important for digestion because:

- It causes the emulsification of fat that is breaking down of fat into smaller fat droplets known as micelle.
- It also provides alkaline medium for the activation of pancreatic enzyme such as lipases.

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

**Solution:**

Chymotrypsin is the enzyme which is present in the pancreatic juice it is present in the in activated state in form of chymotrypsinogen. Chymotrypsin acts on proteins and converts it into dipeptides. Other digestive enzymes which belongs to same category of chymotrypsin are trypsin and carboxypeptidase, and they perform a similar function in the digestion of proteins.

**9. How are polysaccharides and disaccharides digested?**

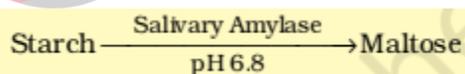
**Solution:**

**Digestion of polysaccharides:**

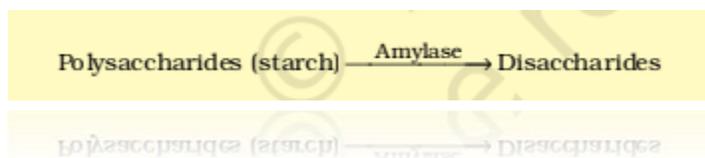
-Digestion of poly saccharide( Starch) begins in mouth.

-In oral cavity hydrolytic enzyme salivary amylase (Ptaylin) carries out the breakdown of starch to maltose at slight acidic pH.

30% of polysaccharide is digested in mouth.



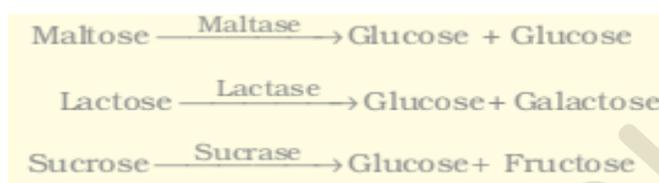
Poly-saccharide starch is further digested by pancreatic amylase and is converted into disaccharides in the presence of pancreatic enzyme amylase.



### Digestion of disaccharides in stomach

Disaccharides (maltose, lactose, and sucrose) are digested into simple absorbable form of monosaccharides in the duodenum of small intestine by the action of several intestinal enzymes present in the intestinal juice.

Steps are as follows



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

#### Solution:

HCl is secreted by the parietal cells of the gastric glands of the stomach. If HCl is not secreted by the gastric gland, the conversion of protein-digesting enzyme pepsinogen into pepsin will not occur; hence the conversion of proteins into peptones and peptides will not take place.

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

#### Solution:

- Butter contains the biomacromolecule lipid (fats). After the partial digestion of food is completed in stomach, then the food enters small intestine.

- Bile from the gall bladder is released into the duodenum of small intestine where it acts upon the fats and converts it into smaller fat droplets known as micelles. This process is referred to as the emulsification of fat.

-Alkaline medium created by bile activates pancreatic lipase which catalyze the fats into diglycerides and further into mono-saccharides.

-The intestinal lipase present in the intestinal juice succus entericus further converts di-glycerides and mono-glycerides in simple absorbable forms which is fatty acids and glycerol.

**Absorption of butter in the body:**

The final product of fat digestion is fatty acid and glycerol is insoluble and are not absorbed by the body directly.

- Fatty acids and glycerol are converted into small droplets known as micelle and are transported into intestinal mucosa.
- They are converted into protein coated fat globules known as chylomicrons.
- These globules are further transported into lymphatic vessels known as lacteals in villi.
- The lymph vessels further release the absorbed substances into blood vessels.

**12. Explain the term thecodont and diphyodont.**

**Solution:**

-When the teeth are embedded in the sockets of jaws, such types of arrangement is known as **thecodont**.

-The dentation in which teeth grows twice in entire life is referred to as **diphyodont**. In human life, teeth grow twice in the entire life the first set is known as milk teeth, which is replaced by permanent teeth.

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

**Solution:**

There are four different types of teeth in humans (heterodont dentition):

**1-Incisors(I)**-There are total eight in number. Four incisors are present in the upper jaw, and four incisors are present in the lower jaw.

-The main function of incisors is biting the food

**2.Canines(C)** – There are total 4 canines. Two are present in the upper jaw, and two are present in the lower jaw.

-The main function of canine is tearing the food.

**3.Pre-Molars (PM)**- Premolars are eight in number. Four premolars are present in the upper half of the jaw, and four premolars are present in the lower half of the jaw.

-They help in the grinding of the food.

**4-Molars (M)**- There are total 12 molars present that is 6 in the upper half and 6 in the lower half of the jaw. They help in the mastication of the food.

