

Lesson at a Glance

- **Digestion:** The breakdown of complex component of food (which cannot be utilised by our body) into simpler and absorbable substances is called *digestion*.
- **Absorption:** The passage of digested food into the blood vessels is called absorption of food. This process takes place in the small intestine in case of human beings.
- **Amino Acid:** *Amino acids* are the building blocks (smallest unit) which combine to form complex molecules like proteins.
- **Amoeba:** It is a microscopic single-celled organism found in pond water. It has a cell membrane, nucleus and vacuoles in the cytoplasm. It has finger-like projections, called *pseudopodia* (Singular *pseudo-podium*). Amoeba constantly changes its shape and position.
- **Assimilation:** The process in which the absorbed food is used for producing energy and growth is called *assimilation*. (The absorbed food components are transported by the blood vessels to different organs/tissues/cells. These tissues/cells utilise the simpler components of food to build complex substances such as the proteins. This process is known as assimilation).
- **Bile:** It is *bile juice* which is commonly known as bile. It is secreted by the liver and stored in a sac, called *gall bladder*. The bile plays an important role in the digestion of fats.
- **Buccal cavity:** The cavity of mouth, with all its internal parts like cheeks, teeth, tongue and salivary glands, is called *buccal cavity*. The *alimentary canal* (digestive tract) begins from the buccal cavity.
- **Cellulose:** It is a type of carbohydrate. Many animals, including humans, cannot digest cellulose.

- **Egestion:** The removal of undigested and unabsorbed food material, called faecal matter through the anus from time to time is called *egestion*.
- **Fatty acids:** They are one of the main constituent of fats. Fatty acids and glycerol combine to form fats.
- **Glycerol:** It is one of the constituent of fats. Glycerol combines with fatty acid to form fats.
- **Ingestion:** The process of taking food into the body is known as *ingestion*.
- **Liver:** The *liver* is a reddish brown gland situated in the upper part of the abdomen on the right side. It is the largest gland in the body but it does not secrete any enzyme for digestion of food. It secretes bile juice which plays the important role in the digestion of fats.
- **Oesophagus:** It is also known as *food pipe*. The swallowed food passes into the oesophagus which runs along the neck and the chest. Food is pushed down by the movement of the walls of the food pipe. This movement takes place throughout the alimentary canal to push the food downwards.
- **Pancreas:** The pancreas is a large cream coloured gland located just below the stomach. The pancreatic juice contains enzyme which help in the digestion of carbohydrates and proteins.
- **Pseudopodia:** Amoeba engulfs tiny particles of food with the help of its false feet, known as *pseudopodia*. These cytoplasmic projections are called pseudopodia or false feet for movement and capture of food.
- **Rumen:** It is a part of stomach of some animals like cow, buffaloes and other grass eating animals. These animals quickly swallow the grass and store it in a separate part of the stomach called *rumen*. In the rumen, swallowed food (grass) preliminary digested by anaerobic bacteria and protozoa (unicelled organisms). These organisms especially act upon cellulose to break down in simple compounds. The partially digested food in the rumen is called *cud*.

- **Rumination:** After sometime, the cud of the rumen returns to the mouth in small lumps/bolus and the animal chews it. This process is called *rumination*.
- **Ruminant:** The animals which have rumen and carry out rumination are known as *ruminants*.
- **Salivary Glands:** In human mouth, there are present *salivary glands* which secrete saliva. Saliva moistens the food and helps in chewing of food by the teeth. Saliva also contains enzyme which breaks down the starch into sugars.
- **Saliva:** It is secreted by salivary glands present in the human mouth. *Saliva* contains an enzyme (saliva amylase) which breaks down the starch into sugar in the mouth.
- **Villi (Singular villus):** The inner walls of the small intestine have thousands of finger-like projections. These are called *villi*. Each villus has a network of thin and small blood vessels close to the surface. The surface of the villi absorbs the digested food materials. The villi increase the surface area for the absorption of the digested food into the blood.
- **Tongue:** The *tongue* is a fleshy muscular organ attached at the back to the floor of the buccal cavity. It is free at the front and can be moved in all directions. We use our tongue for:
 - (i) Speaking
 - (ii) Mixing saliva with food
 - (iii) Swallowing the food
 - (iv) Detecting different tastes of food with the help of *taste buds*. The tongue has different regions for different tastes.
- **Teeth:** The teeth help in chewing the food and break down the big pieces of food into small pieces. Each tooth is rooted in a separated socket in the gum. Both the jaws bear teeth. In adults, each jaw consists of 16 teeth of different types for different functions.

All human beings bear two sets of teeth. The first set of teeth called *milk teeth* appears after the age of six month. After the age of six years the milk teeth are gradually replaced by the second set of teeth called *permanent teeth*. The permanent teeth remain throughout the life. If broken, they are not replaced by new tooth or teeth. So, you must take proper care of your teeth.

The teeth are of 4 types—*incisors, canines, premolars* and *molars*. In grass eating animals like cow, incisors are well developed. Incisors are used for cutting things. In carnivorous animals like cat, dog and lion, canine teeth are well developed. Canine teeth are used to tear the things like flesh. Premolars and molars are used to chew the food.

In adult humans, there are 32 teeth of four different types, as stated above. Their number can be represented as given below:

Upper jaw: incisors 2, canines 1, premolars 2, molars 3 (in each half of the jaw)

Lower jaw: incisors 2, canines 1, premolars 2, molars 3 (in each half of the jaw)

- **Amazing fact:** Starfish opens the hard shells of animals like oysters. After opening the shell, the starfish pops out its stomach through its mouth to eat the soft animal inside the shell. The stomach then goes back into the body and the food is slowly digested.
- **Tooth decay:** After eating food, especially sweets, chocolates, cold drink and other sugars, if mouth is not washed properly then some left over food and sugars remain attached to teeth. The harmful bacteria breakdown the sugars and release acids. The acids gradually damage the teeth. This is called *tooth decay* which may lead to tooth ache and even loss of tooth.
- During the act of swallowing of chewed food a flap-like valve closes the passage of the wind pipe. It guides the food into the food pipe.
- **Oral Rehydration Solution (ORS):** It is prepared by dissolving a pinch of salt and sugar in boiled and cooled water. It prevents dehydration of the body due to diarrhoea and vomiting.

TEXTBOOK QUESTIONS SOLVED

Q.1. Fill in the blanks:

- (a) The main steps of nutrition in humans are _____, _____, _____ and _____.
- (b) The largest gland in the human body is _____.
- (c) The stomach releases hydrochloric acid and _____ juices which act on food.
- (d) The inner wall of the small intestine has many finger-like outgrowths called _____.
- (e) Amoeba digests its food in the _____.

Ans. (a) ingestion, digestion, absorption, assimilation, egestion
 (b) liver (c) digestive
 (d) villi (e) food vacuole.

Q.2. Mark 'T' if the statement is true and 'F' if it is false:

- (a) Digestion of starch starts in the stomach. (T/F)
 (b) The tongue helps in mixing food with saliva. (T/F)
 (c) The gall bladder temporarily stores bile. (T/F)
 (d) The ruminants bring back swallowed grass into their mouth and chew it for sometime. (T/F)

Ans. (a) F (b) T (c) T (d) T

Q.3. Tick (✓) mark the correct answer in each of the following:

- (a) Fat is completely digested in the
 (i) stomach (ii) mouth
 (iii) small intestine (iv) large intestine
- (b) Water from the undigested food is absorbed mainly in the:
 (i) Stomach (ii) Food pipe
 (iii) Small intestine (iv) Large intestine

Ans. (a) (iii) Small intestine (b) (iv) Large intestine

Q.4. Match the items of column I with those given in column II:

Column I	Column II
Food components	Product(s) of Digestion
Carbohydrates	Fatty acids and glycerol
Proteins	Sugar
Fats	Amino acids

Ans.

Column I	Column II
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Carbohydrates	Sugar
Proteins	Amino acids
Fats	Fatty acids and glycerol

Q.5. What are villi? What is their location and function?

Ans. The finger like projections in the inner walls of the small intestine is called villi. These are found in small intestine.

Function: The villi increase the surface area for absorption of the digested food.

Q.6. Where is the bile produced? Which component of the food does it help to digest?

Ans. Bile is produced in liver. The bile juice stored in sac called the gall bladder. It helps in the digestion of fats.

Q.7. Name the type of carbohydrate that can be digested by ruminants but not by humans. Give the reason also.

Ans. Cellulose is the carbohydrate that can be digested by ruminants. Ruminants have large sac like structure between the small intestine and large intestine. The cellulose of the food is digested by the action of certain bacteria which are not present in humans.

Q.8. Why do we get instant energy from glucose?

Ans. Because it easily breaks down in the cell with the help of oxygen which provides instant energy to the organism. Glucose does not need digestion, it is directly absorbed into the blood.

Q.9. Which part of the digestive canal is involved in:

- (i) Absorption of food _____.

- (ii) Chewing of food _____.
 (iii) Killing of bacteria _____.
 (iv) Complete digestion of food _____.
 (v) Formation of faeces _____.

Ans. (i) Small intestine (ii) Mouth
 (iii) Stomach (iv) Small intestine
 (v) Large intestine

Q.10. Write one similarity and one difference between the nutrition in amoeba and human beings.

Ans. Similarity: The digestive juices in amoeba are secreted into food vacuole and in human beings the digestive juices are secreted in stomach and small intestine. Then the juices convert complex food into simpler soluble and absorbable substances.

Difference: Amoeba captures the food with help of pseudopodia and engulf it. In human beings food is taken by the mouth.

Q.11. Match the items of Column I with suitable items in Column II.

Column I	Column II
(a) Salivary Gland	(i) Bile juice secretion
(b) Stomach	(ii) Storage of undigested food, faeces
(c) Liver	(iii) Saliva secretion
(d) Rectum	(iv) Acid release
(e) Small intestine	(v) Digestion is completed
(f) Large intestine	(vi) Absorption of water

Ans.

Column I	Column II
(a) Salivary gland	(iii) Saliva secretion
(b) Stomach	(iv) Acid release
(c) Liver	(i) Bile juice secretion
(d) Rectum	(ii) Storage of undigested food, faeces
(e) Small intestine	(v) Digestion is completed
(f) Large intestine	(vi) Absorption of water

Q.12. Label Fig. 2.1 of the digestive system (as given in the NCERT Textbook Exercise)

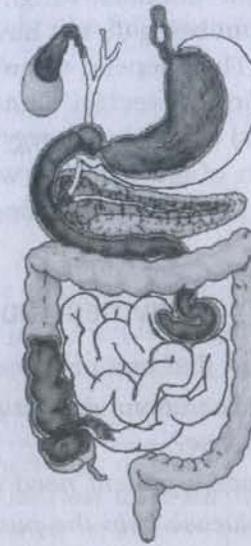


Fig. 2.1 Human digestive system.

Ans.

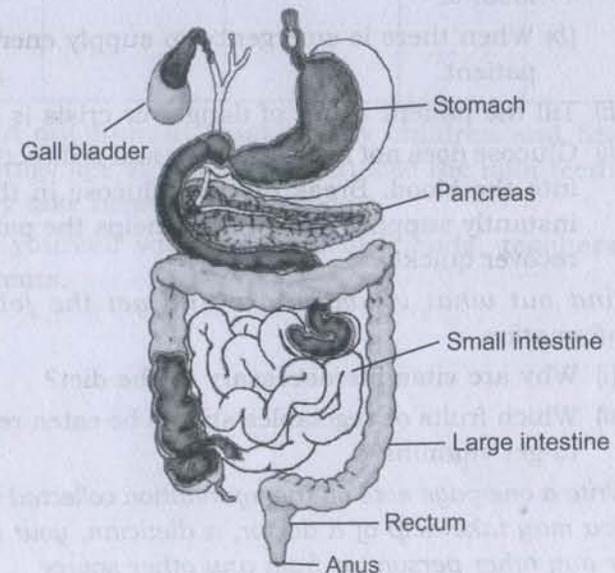


Fig. 2.2 Human digestive system.

Q.13. Can we survive only on raw, leafy vegetables/grass? Discuss.

Ans. We know that the animals, fungi, bacteria, non-green plants and human being do not have the ability to make their own food. They depend upon autotrophs for their food directly or indirectly. The green plant (leafy vegetables/grass) trap solar energy and make their own food in the form of glucose. So, we can say that leafy vegetables and grass can provide sufficient energy to help us survive.

EXTENDED LEARNING — ACTIVITIES AND PROJECT

Q.1. Visit a doctor and find out:

- Under what conditions does a patient need to be on a drip of glucose?
- Till when does a patient need to be given glucose?
- How does glucose help the patient recover?

Write the answers in your notebook.

- Ans.**
- When patient is unable to intake food or digest food, or
 - When there is emergency to supply energy to a patient.
 - Till the patient is out of danger or crisis is over.
 - Glucose does not need digestion and is directly given into the blood. Break down of glucose in the cells instantly supplies energy. This helps the patient to recover quickly.

Q.2. Find out what vitamins are and get the following information.

- Why are vitamins necessary in the diet?
- Which fruits or vegetables should be eaten regularly to get vitamins?

Write a one-page note on the information collected by you. You may take help of a doctor, a dietician, your teacher or any other person, or from any other source.

Ans. Vitamins: They are a group of organic compounds which are present in many foods and are essential for normal health. They are required in small quantities.

(i) Vitamins help in protecting our body against diseases. Vitamins also help in keeping our eyes, bones, teeth and gums healthy.

(ii) We should take the following fruits or vegetables to get vitamins.

Carrot, spinach, leafy vegetables, citrus fruits like orange, tomatoes, papaya, banana, cauliflower, gourds, beans, germinating grams, pineapple etc.

It is very important to eat seasonal fruits and vegetables.

Students are suggested to do it themselves.

Q.3. Collect data from your friends, neighbours and classmates to know more about "milk teeth".

Tabulate your data. One way of doing it is given below:

S. No.	Age at which first tooth fell	Age at which last tooth fell	No. of teeth lost	No. of teeth replaced
1.				
2.				
3.				
4.				
5.				

Find out from at least twenty children and find the average age at which children lose the milk teeth. You may take help of your friends.

Ans. Do yourself with the help of friends, teachers and parents.