

CHAPTER 2

NUTRITION IN ANIMALS

2-mark questions:

1.What is the primary function of the stomach in the digestive system?

Answer:

The stomach functions to release hydrochloric acid and digestive juices, aiding in the digestion of proteins.

2.Define rumination and provide an example of an animal that practices it.

Answer:

Rumination is the process of regurgitating and re-chewing food for better digestion. Cows are examples of animals that practice rumination.

3.What are villi, and where are they located in the digestive system?

Answer:

Villi are finger-like outgrowths in the inner walls of the small intestine. They increase the surface area for the absorption of digested food.

4.Explain the role of pseudopodia in Amoeba's nutrition.**Answer:**

Pseudopodia are finger-like projections used by Amoeba for movement and capturing food. They surround and engulf food particles, forming a food vacuole where digestion takes place.

5.What is the significance of the buccal cavity in the digestive system?**Answer:**

The buccal cavity is where the digestion of carbohydrates, particularly starch, begins. It is the initial stage of the digestive process.

6.Why is the liver considered the largest gland in the human body?**Answer:**

The liver is considered the largest gland in the human body because of its significant size and various essential functions. It plays a crucial role in producing bile, a digestive juice that aids in the breakdown of fats. Additionally, the liver is involved in detoxification, storage of nutrients, and the synthesis of important proteins. Its multifunctional role contributes to its classification as the largest gland.

7. What are villi? What is their location and function?**Answer:**

Villi are finger-like projections or outgrowth. They are present in the small intestine of our digestive system. The villi increase the surface area for absorption of the digested food.

8. Where is the bile produced? Which component of the food does it help to digest?**Answer:**

Bile juice is produced in the liver, and it helps in the digestion of fats by breaking large fat globules into smaller ones.

9. Name the type of carbohydrate that can be digested by ruminants but not by humans. Give the reason also.**Answer:**

Cellulose is the carbohydrate that can be digested by ruminants but not by humans because humans lack cellulase enzyme required to digest the cellulose.

10. Why do we get instant energy from glucose?**Answer:**

Glucose is a simple sugar which is easily absorbed into the blood whereas other carbohydrates are first broken down into glucose and then absorbed; hence, glucose gives instant energy.

5-mark questions:

1.Explain the process of digestion in humans. Include the main organs involved and the role of digestive juices.

Answer:

The process of digestion in humans is a complex series of events that involve various organs and digestive juices. It can be summarized as follows:

Mouth and Buccal Cavity:

Digestion begins in the mouth with the mechanical breakdown of food by teeth and the chemical breakdown of starch by salivary amylase in saliva.

Oesophagus:

Swallowed food moves through the oesophagus by peristaltic contractions, a wave-like muscular movement.

Stomach:

The stomach receives food from the oesophagus and secretes hydrochloric acid and digestive juices. Proteins are partially digested in the stomach.

Small Intestine:

The small intestine is a major site of digestion and absorption. It receives bile from the liver and pancreatic juice from the pancreas. These digestive juices act on fats, proteins, and carbohydrates, breaking them down into simpler forms.

The inner walls of the small intestine contain villi, increasing the surface area for absorption.

Liver and Pancreas:

The liver produces bile, which is stored in the gall bladder. Bile emulsifies fats, facilitating their digestion.

The pancreas secretes pancreatic juice containing enzymes that further break down carbohydrates, fats, and proteins.

Absorption and Assimilation:

Digested nutrients are absorbed through the walls of the small intestine into the bloodstream. This absorbed food is then transported to different parts of the body for assimilation.

Large Intestine:

The large intestine absorbs water and some salts from the undigested food, forming semi-solid faeces.

Faecal matter is eliminated through the anus in the process of egestion.

2. Discuss the role of teeth in the digestive process. How are different types of teeth adapted for different functions?

Answer:

Teeth play a crucial role in the digestive process by mechanically breaking down food into smaller, manageable pieces. The different types of teeth are adapted for specific functions:

Incisors:

Function: Cutting and biting.

Adaptation: Broad, flat edges for cutting through food.

Canines:

Function: Piercing and tearing.

Adaptation: Pointed, conical shape for tearing food.

Function: Chewing and grinding.

Adaptation: Broad, flat surfaces with multiple cusps for efficient grinding and crushing of food.

The combination of these teeth types allows for the effective breakdown of different food textures and enhances the overall digestive process.

3.Explain the process of rumination in ruminant animals. Why is this process beneficial for animals like cows and buffaloes?

Answer:

Rumination is a unique digestive process observed in ruminant animals like cows and buffaloes. It involves the regurgitation and re-chewing of partially digested food, known as cud. The process can be explained as follows:

Ingestion:

Ruminants quickly swallow their leafy food without thorough chewing.

Storage in Rumen:

The food is stored in the rumen, a large fermentation chamber in the stomach.

Regurgitation:

Later, the cud (partially digested food) is regurgitated back to the mouth in small lumps.

Re-Chewing:

The animal chews the cud thoroughly, promoting better mechanical breakdown and exposing more surface area for digestion.

Multiple Stomach Compartments:

Ruminants have a stomach with multiple compartments, including the rumen. This allows for efficient fermentation and digestion of cellulose present in grass.

Benefits:

Enhanced Digestion: Rumination aids in breaking down tough plant materials like cellulose, which is challenging to digest. Re-chewing increases the exposure of food to digestive enzymes.

Nutrient Extraction: The process allows for better extraction of nutrients from the ingested food, improving overall digestive efficiency.

Adaptation to Herbivorous Diet:

Ruminants have evolved this process as an adaptation to their herbivorous diet, enabling them to extract maximum nutrition from plant materials.

Rumination is a crucial aspect of the digestive strategy of ruminant animals, contributing to their ability to thrive on a diet of fibrous plant material.

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 _____.

Solution:

(a) The main steps of nutrition in humans are **ingestion, digestion, absorption, assimilation** and **egestion**.

(b) The largest gland in the human body is **liver**.

(c) The stomach releases hydrochloric acid and **digestive** juices which act on food.

(d) The inner wall of the small intestine has many finger-like outgrowths called **villi**.

(e) Amoeba digests its food in the **food vacuole**.

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 some time. (T/F)**

Solution:

- a) F
- b) T
- c) T
- d) T

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

Solution:

- a) (iii) small intestine
- b) (iv) large intestine

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

Answer:

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

5. 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 _____.

Solution:

i) small intestine

ii) Buccal cavity

iii) Stomach

iv) small intestine

v) Large Intestine

6. Write one similarity and one difference between nutrition in amoeba and human beings.

Solution:

Similarity: Both amoeba and human beings follow the holozoic type of nutrition.

Difference: Humans' intake food through buccal cavity. In amoeba food is ingested through pseudopodia.

6. 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
c) Liver	(iii) Saliva secretion
d) Rectum	(iv) Acid release
e) small intestine	(v) Digestion is completed
f) large intestine	(vi) Absorption of water
	(vii) Release of faeces

Answer:

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
e) small intestine	(v) Digestion is completed
f) large intestine	(vi) Absorption of water

7. Label of the digestive system.

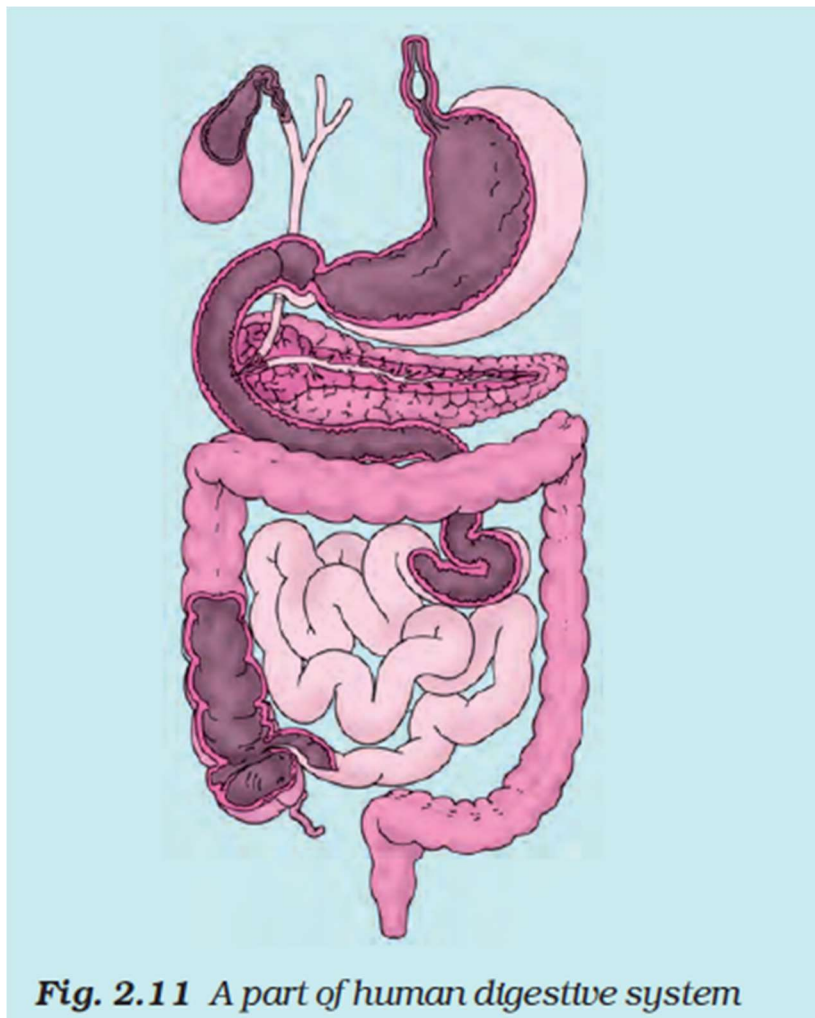
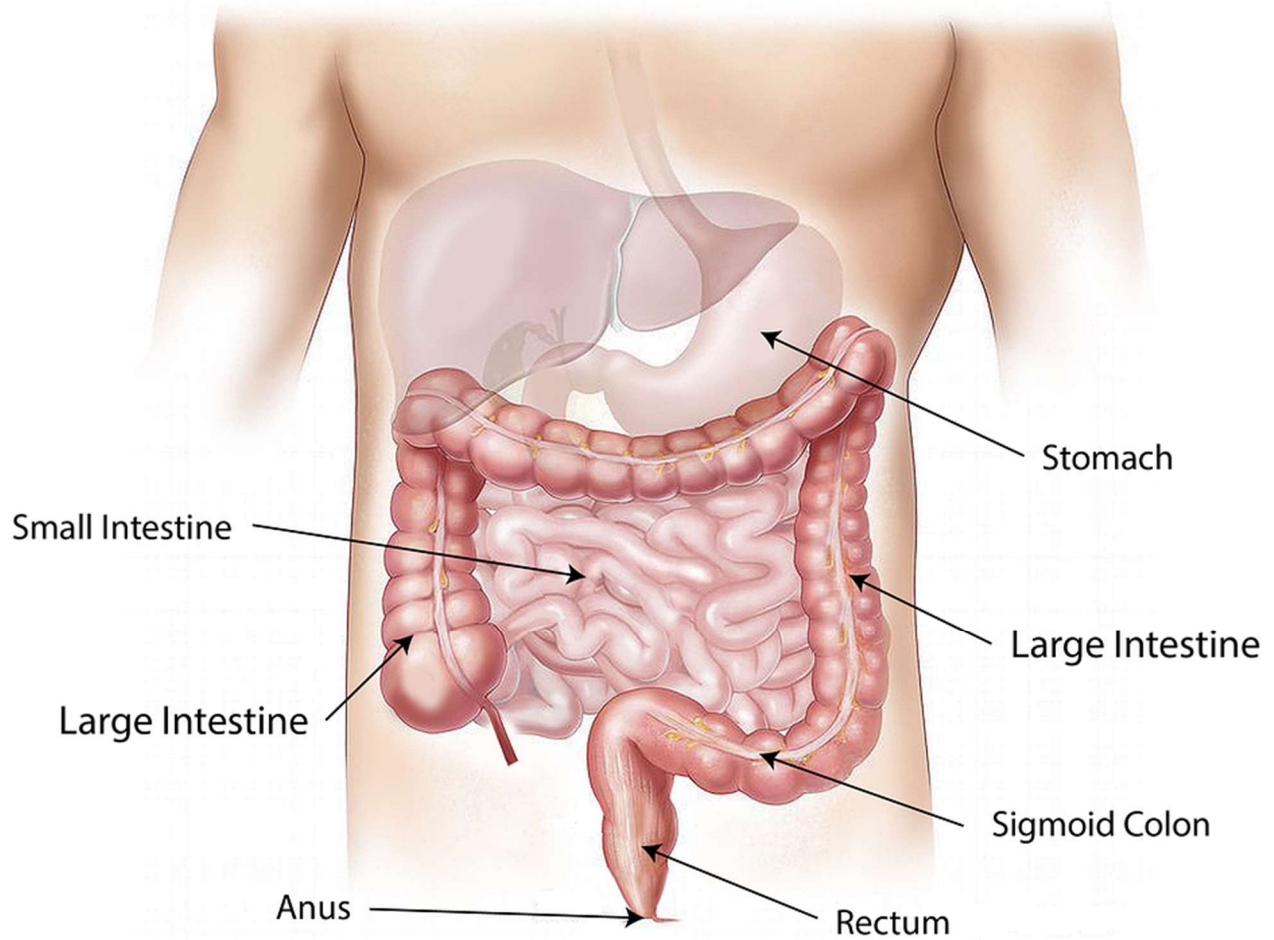


Fig. 2.11 A part of human digestive system

Answer:



SUMMARY:

In the chapter on "Nutrition in Animals," the focus is on understanding the digestive process in humans and certain animals. The human digestive system comprises the alimentary canal and digestive glands, involving the buccal cavity, oesophagus, stomach, small and large intestines, and anus. The salivary glands, liver, and pancreas secrete digestive juices. Digestion initiates in the mouth, where starch is broken down, and continues in the stomach for proteins and the small intestine for all components. The liver produces bile, aiding fat digestion, and the pancreas secretes pancreatic juice.

The process involves ingestion, digestion, absorption, assimilation, and egestion. The alimentary canal's various parts contribute to the breakdown of complex substances into simpler ones, facilitating nutrient absorption. The undigested food travels to the large intestine, where water absorption occurs, resulting in the formation of faeces. Ruminant animals, like cows, exhibit rumination, involving the regurgitation and re-chewing of food, aiding in cellulose digestion.

The chapter concludes by exploring amoeba's feeding and digestion, highlighting its unique process of engulfing food using pseudopodia. The digestion of ingested food occurs within food vacuoles, with absorbed nutrients contributing to growth and maintenance. The fundamental principles of digestion are similar across animals, emphasizing the importance of nutrient breakdown for energy release and cellular function.