

SCIENCE

CHAPTER 2: NUTRITION IN ANIMALS



Nutrition in Animals

INTRODUCTION

Animals get their food from plants, either directly by eating plants or indirectly by eating animals that eat plants. Some animals eat both plants and animals. Recall that all organisms including humans require food for growth, repair and functioning of the body. Animal nutrition includes nutrient requirement, mode of intake of food and its utilisation in the body

To minimize the entropy, to maintain the body structure and its growth living being requires continuous input of energy and matter. Primary source for the both is food (or nutrient). Obtaining such substances is called.

The Process of Nutrition and its examples

Animals have highly evolved digestive mechanism that includes two basic components:

- **Alimentary canal:** Long, hollow, tubular structure consisting of various organs for digestion.
- **Digestive glands:** They secrete enzymes / hormones which help in digestion.

Digestion in animals consists of following steps:

Ingestion: The process of intake of food.

- **Digestion:** It is the breakdown of large and complex molecules into simpler, smaller and soluble forms.
- **Absorption:** Taking up of the digested food through intestinal wall to blood.
- **Assimilation:** In this process absorbed food is taken by body cells.
- **Egestion:** The process by which undigested matter is expelled out.

Nutrition- Ways of Taking in Food

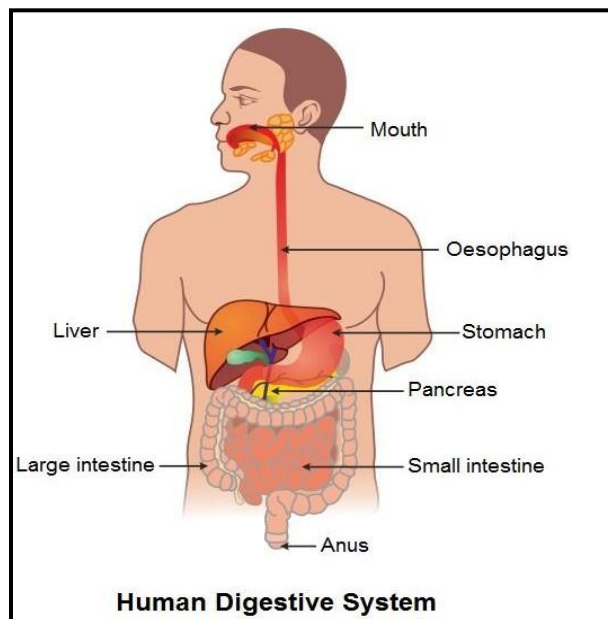
- The mode of taking in food by an organism and its utilisation by the body is called **nutrition**.
- The process of taking in food inside the body is called **ingestion**.
- Different animals have different feeding habits; their manner of taking in food also differs.

Animals	Ways of Taking in Food
Frog, chameleon, wall lizard	Use tongue to catch insects.
Bee, butterfly, humming bird	Suck nectar from flowers of plants.

Hydra	Uses tentacles with sting cells to kill the prey and put it in the mouth.
Butterfly	Long feeding tube to suck nectar from flowers of plants.
Snakes	Swallow the whole animal in one go.
Aquatic animals	Filter tiny food particles floating nearby and feed upon them.

Digestion in Human Beings

- The breakdown of complex components of food such as carbohydrates, proteins and fats into simpler substances such as glucose, amino acids and fatty acids respectively is called **digestion**.
- Digestion in human beings is carried out in the **alimentary canal** of the digestive system.
- The alimentary canal is about 8-9 metres long and consists of buccal cavity, oesophagus, stomach, small intestine, large intestine, rectum and anus.



Passage of Food in the Alimentary Canal

- Food is crushed and broken into small particles in the **mouth** with the help of teeth. It is then mixed with saliva.

- This chewed soft food then passes through the **oesophagus** in a wave-like movement (peristalsis) and moves to the stomach.
- In the **stomach**, food mixes with gastric juices and HCl.
- From the stomach, the food moves into the small intestine.
- In the **small intestine**, carbohydrates, proteins and fats are broken down with the help of juices secreted by the **pancreas**, the **liver** and the small intestine itself.
- The broken down food is then absorbed by small projections present on the inner walls of the intestine called villi.
- Finally, the food moves into the **large intestine** where most of the water is removed from the food and is then thrown out of the body through the **anus**.

Digestion in Grass-eating Animals

- Cows and buffaloes fall in the category of grass-eating animals.
- They quickly swallow the grass and store it in the rumen, where the food gets partially digested and is termed as **cud**.
- The cud returns to the mouth in small lumps and the animal chews it. This process is termed as **rumination**, and these animals are called **ruminants**.

Feeding and Digestion in Amoeba

- Amoeba is a unicellular microbe which has no definite shape, mouth or digestive system.
- It constantly changes its shape and position in order to obtain food.
- When it senses food, it pushes out pseudopodia or finger-like projections around the food and engulfs it.
- The food gets trapped in food vacuoles.
- In food vacuoles, the **digestive juices are secreted** which act on the food, breaking it into simpler substances.
- Gradually, the digested food gets absorbed. These absorbed substances are used for **growth, maintenance** and **multiplication**.
- The undigested food is expelled by the vacuole.

Small Intestine length

It is a coiled and narrow tube having 3 regions: duodenum, jejunum, and ileum. it is six to seven metres long and 2.5 cm in diameter.

Duodenum : Duodenum is the initial part of the small intestine. it is 'C' shaped, into which the bile and the pancreatic ducts open through a common bile duct.

Duodenal gland : Present mainly in duodenum; secretes mucous.

Jejunum : The part next to the duodenum is jejunum. It is a short region of small intestine before ileum.

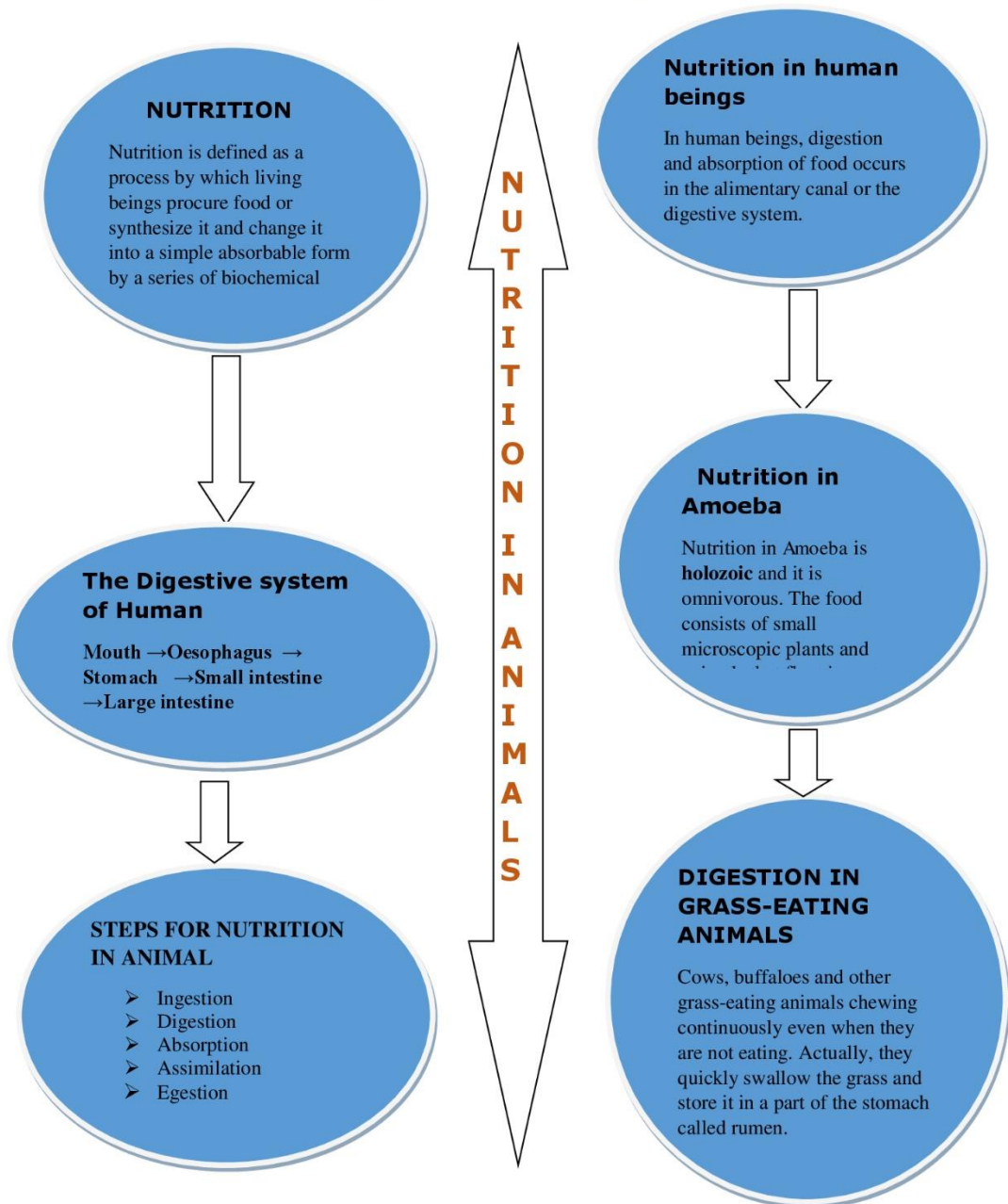
Ileum : It is the longest part of the small intestine. The major part of the process of digestion of food takes place in the small intestine. The inner lining of the small intestine is produced into a number of finger-like projections called villi. Each villus is covered by a single layer of epithelium and contains blood capillaries and a small lymph vessel.

Highly organised system of blood capillaries up to villi for the transportation of absorbed food.

The villi increase the surface area for absorption. In between the villi are glandular pits having glands which secrete the digestive enzymes into the lumen of the intestine.

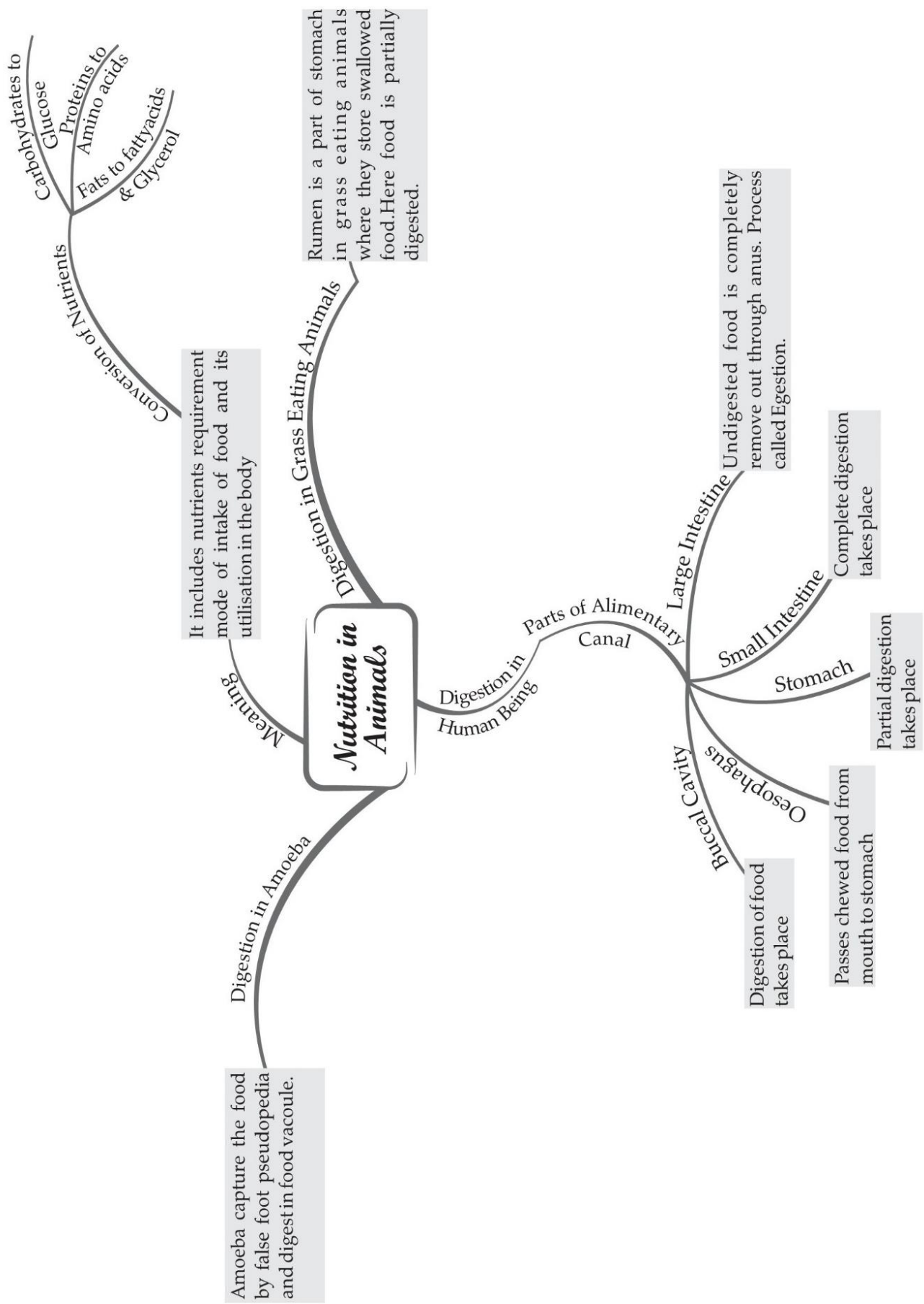
Mind Map

MIND MAP



MIND MAP : LEARNING MADE SIMPLE

CHAPTER-2



Important Questions

➤ Multiple Choice Questions:

Question 1. The false feet of Amoeba are used for

- (a) movement only
- (b) capturing food only
- (c) capturing food and movement
- (d) exchange of gases only

Question 2. The component of food which is complex is

- (a) protein
- (b) carbohydrate
- (c) fat
- (d) all of these

Question 3. The breakdown of complex components of food into simpler substances is called

- (a) ingestion
- (b) egestion
- (c) assimilation
- (d) digestion

Question 4. The way of taking food by bees is

- (a) swallowing
- (b) sucking
- (c) filtering
- (d) none of these

Question 5. Which of the following animals swallow its prey?

- (a) Human beings
- (b) Snakes
- (c) Humming birds
- (d) Ant

Answer

Question 6. Enzymes present in saliva converts

- (a) starch into simple sugars
- (b) proteins into amino acids

(c) complex sugars into simple sugars

(d) fats into fatty acids and glycerol

Question 7. From where do we take in food?

(a) Anus

(b) Mouth

(c) Stomach

(d) Oesophagus.

Question 8. The digestive tract and the associated glands together constitute the

(a) digestive system

(b) oesophagus

(c) alimentary canal

(d) nutrition system

Question 9. The teeth of first set fall off at the age between

(a) 10 – 20

(b) 6 – 8

(c) 9 – 11

(d) 0 – 2

Question 10. The teeth of the first set that grew during infancy are called

(a) permanent teeth

(b) milk teeth

(c) starting teeth

(d) all of these

Question 11. The teeth of the second set that replace the milk teeth are known as

(a) permanent teeth

(b) temporary teeth

(c) milk teeth

(d) hard teeth

Question 12. The process of taking food in the body is known as

(a) egestion

(b) ingestion

(c) digestion

(d) assimilation

Question 13. How many types of teeth are there?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

Question 14. The glands of mouth which secrete saliva are

- (a) salivary glands
- (b) pancreas
- (c) lungs
- (d) liver

Question 15. Starch is broken down into sugars by the action of

- (a) saliva
- (b) bile juice
- (c) hydrochloric acid
- (d) all of these

➤ **Fill In the Blanks:**

1. The present in the stomach kills the harmful bacteria that may enter along with the food.
2. Animals get their food from either directly or indirectly by eating animals that eat plants.
3. All organisms require for growth, repair and functioning of the body.
4. We get hiccups when food particles enter the
5. The of complex components of food into simpler substances is called digestion.
6. Enzyme present in saliva is

➤ **True or False:**

1. Diarrhoea is a condition in which one passes watery stool frequently.
2. Oesophagus helps in the digestion of food.
3. Ingestion is the breakdown of complex components of food into simple substances.
4. Sugary products are the major cause of tooth decay.
5. Food is taken in through the mouth.
6. Alimentary canal begins at the anus and ends at the buccal cavity.

➤ **Very Short Question:**

1. Name the largest gland in the human body.
2. Define digestion.
3. Name the parts of alimentary canal.
4. Name the glands that secrete digestive juice.
5. Name the mode of feeding of ant and mosquitoes.
6. Name ruminants.
7. Name the different types of teeth.
8. Name the finger like projection present in the inner wall of the small intestine.
9. Name the organ responsible for removal of undigested and unabsorbed residues from human body.
10. Name the type of food of ant

➤ Short Questions:

1. What do you mean by animal nutrition?
2. What is digestion?
3. Name different modes of feeding in animals?
4. What are villi? What are their location and function?
5. Where is the bile produced? Which component of the food does it digest?
6. Name the type of carbohydrates that can be digested by ruminants but not by humans. Give the reasons also.
7. Why do we get instant energy from glucose?
8. What are Milk teeth and permanent teeth?

➤ Long Questions:

1. Can we survive only on raw, leafy vegetables/ grass? Discuss.
2. Write one similarity and one difference between nutrition in amoeba and human beings.
3. What are the functions of the tongue in human body?
4. Explain tooth decay?
5. What are secreted inside the stomach?

✓ Answer Key-

➤ Multiple Choice Answers:

1. (c) capturing food and movement
2. (d) all of these
3. (d) digestion

4. (b) sucking
5. (b) Snakes
6. (a) starch into simple sugars
7. (b) Mouth
8. (a) digestive system
9. (b) 6 – 8
10. (b) milk teeth
11. (a) permanent teeth
12. (b) ingestion
13. (d) 4
14. (a) salivary glands
15. (a) saliva

➤ **Fill In the Blanks:**

1. acid
2. plants
3. food
4. windpipe
5. break down
6. salivary amylase

➤ **True or False:**

1. True
2. False
3. False
4. True
5. True
6. False

➤ **Very Short Answers:**

1. Answer: Liver
2. Answer: The process of breakdown of complex substances of food into simpler form is called digestion.
3. Answer: Buccal cavity, oesophagus, stomach, small intestine, large intestine, rectum and anus.

4. Answer: Salivary gland, pancreas and liver
5. Answer: The mode of feeding of ant: scraping and the mode of feeding of mosquitoes sucking.
6. Answer: Grazing animals like: Cow, buffaloes and deer.
7. Answer: Incisor, canine, premolar and molar.
8. Answer: Villi
9. Answer: Anus
10. Answer: Ant: sugar, food particles

➤ Short Answer:

1. Answer: Animal nutrition includes requirement of nutrients, mode of intake of food, and its utilization in the body.
2. Answer: Digestion is the process of breakdown of complex components of food such as carbohydrates into simpler substances that is absorbed and assimilated in the body.
3. Answer: Scraping, chewing, brewing, capturing and swallowing, sucking etc. are the different mode of feeding in animals.
4. Answer: The inner wall of the small intestine has thousands of finger-like outgrowths called villi.

These are found in small intestine. The villi increase the surface area for absorption of food.

5. Answer: Bile is produced in the liver and is stored in a sac called the gall bladder. The bile plays an important role in the digestion of fats.
6. Answer: 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 human beings.
7. Answer: Because glucose easily breakdown in the cell with the help of oxygen and give carbon dioxide, water and energy.
8. Answer: The first set of teeth grows during infancy and they fall off at the age between six to eight years. These are termed as milk teeth. The second set that replaces them are the permanent teeth. The permanent teeth may last throughout our life or fall off during old age.

➤ Long Answer:

1. Answer: We know that animals like most of the bacteria, non-green plants and human being do not possess the ability to synthesize their own food. Therefore, they depend upon autotrophs for their food supply either directly or indirectly. The green plants (leafy vegetables/ grass) trap solar energy and manufacture their food in the form of glucose. So, leafy vegetables and grass can provide sufficient energy required for the survival of human being.

2. Answer: Similarity: During the digestion of food, in amoeba digestive juices are secreted into the food vacuole. They act on the food and break it into simpler substances. In human being, the inner walls of stomach and the small intestine also secrete the digestive juices. The digestive juices convert complex substances of food to simpler ones.

Difference: Amoeba feeds on some microscopic organisms. When it senses food, it pushes out pseudopodia around the food particles. The food is trapped in a food vacuole. Human beings take food through the mouth, digest and utilize it. The food is gradually digested as food travels through the various compartments.

3. Answer: The functions of the tongue are as follows:

- i. It is used for talking, it is not possible to talk without this.
- ii. It mixes saliva with the food during chewing and helps in swallowing of food.
- iii. Due to the presence of taste buds on it, It is used to identify the taste of food like sweet or salty etc.

4. Answer: Our mouth contains some useful bacteria but if we do not clean our teeth and mouth after eating, many harmful bacteria also begin to live and grow in it. These bacteria break down the sugars present from the leftover food and release acids. These acids gradually damage the teeth and causes tooth decay.

5. Answer: Gastric juice is secreted by the walls of stomach which contains HCl and Pepsin. HCl helps to kill the germs present in food. After mixing with the food it provides an acidic medium to the food which is essential for the activation of pepsin enzyme. Pepsin digests protein into peptides.