

Chapter 2

Nutrition in Animals

Points to be studied:

- 2.1 Food Ingestion
- 2.2 Feeding and Digestion in amoeba
- 2.3 Digestion in grass-eating animals
- 2.4 Digestion in humans
- 2.5 Healthy eating habits.

2.1 Food Ingestion

We have studied in previous classes that the components of food such as carbohydrates, fats, vitamins and minerals are complex substances. These complex substances cannot be utilized as such. So they are broken down into simpler substances. The conversion or breakdown of complex components of food into simpler substances is called digestion.

All organisms require food. Plants can prepare their own food, but no one including humans, can't make their own food. Animals get their food from plants or animals that eat plants. Therefore, human and other beings directly or indirectly depend on plants for food.

Animals get Energy from food which conduct all activities of body. The mode of intake of needed food for growth, development and good health of the body is called nutrition. In this chapter we will study various modes of nutrition.

2.2: feeding and digestion in Amoeba -

Amoeba is a single-celled organism found in water bodies. Amoeba has a cell membrane, a rounded, dense nucleus and many small bubble-like vacuoles in its cytoplasm. Amoeba constantly changes its shape and position. It pushes out one, or more finger-like projections, called pseudopodia or false feet for movement and capture of food. Amoeba feeds on some microscopic organisms. When it senses food, it pushes out pseudopodia around the food particle and engulfs it. The food becomes trapped in a food vacuole. Digestive juices are secreted into the food vacuole. They act on the food and break it down into



simpler substances. Gradually the digested food is absorbed. The absorbed substances are used for growth, maintenance and multiplication. The undigested residue of the food is expelled outside by the vacuole. This method of nutrition found in amoeba is called Endocytosis.

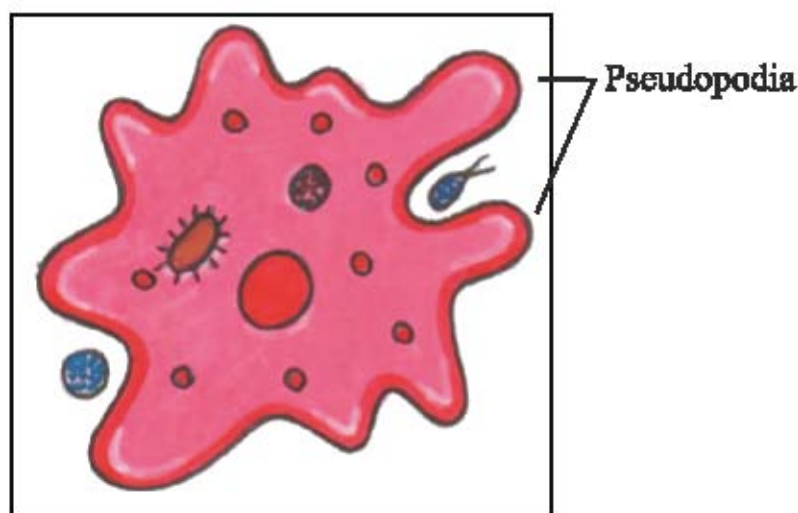


Fig.2.1: Digestion in Amoeba

2.3 Digestion in Herbivorous or Grass-eating Animals

Have you observed cows, buffaloes and other grass-eating animals chewing continuously even when they are not eating grass? Actually, they quickly swallow the grass and store it in a separate part of the stomach called **rumen** (first stomach). Here the food gets partially digested and is called **cud**. But later the cud returns to the mouth in small lumps and the animal chews it. This process is called **rumination** and these animals are called **ruminants**.

The grass is rich in cellulose, a type of carbohydrate. Many animals, including humans, cannot digest cellulose. Animals can digest cellulose as their intestine is big in size.

Ruminants have a large sac-like structure between the small intestine and large intestine, called **caecum**. The cellulose of the food is digested here by the action of certain bacteria which are not present in humans.

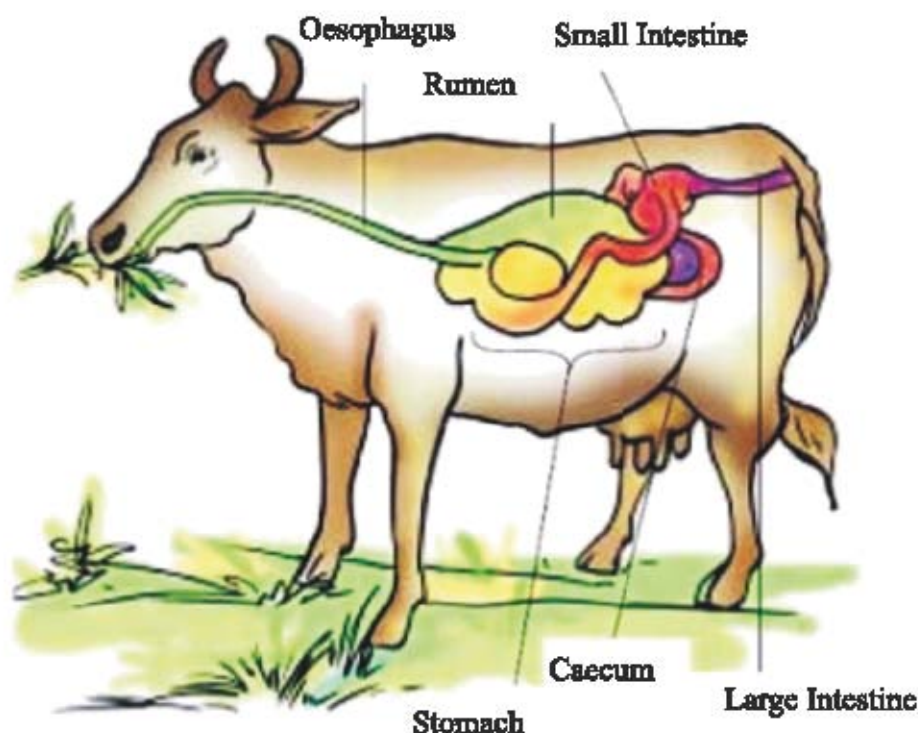


Fig 2.2: Digestive system in Cow

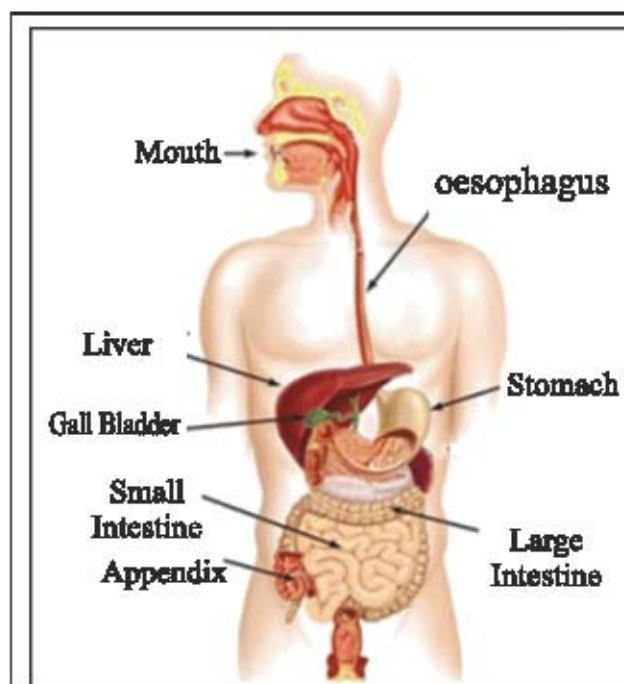


Fig 2.3 : Digestive System of human

2.4 Digestion in Humans

We take in food through the mouth, digest in alimentary canal and utilize it. The unused parts of the food are defecated. Have you ever wondered what happens to the food inside the body? The food passes through a continuous canal which begins at the buccal cavity and ends at the anus. This canal is called as alimentary canal.



Digestive System :

The alimentary canal of human can be divided into various compartments:
 (1) The buccal cavity (2) foodpipe or oesophagus, (3) stomach,
 (4) small intestine, (5) Large intestine ending in the rectum and (6) the anus.

These parts together form the alimentary canal (digestive tract). The food components gradually get digested as food travels through the various compartments. The inner walls of the stomach and the small intestine, and the various glands such as salivary glands, the liver and the pancreas secrete digestive juices. The digestive juices convert complex substances of food into simpler ones. The digestive tract and the associated glands together constitute the digestive system.

Now, let us know what happens to the food in different parts of the digestive tract.

The mouth and buccal cavity

Food is taken into the body through the mouth. The process of taking food into the body is called **ingestion**. Teeth are present in buccal cavity.

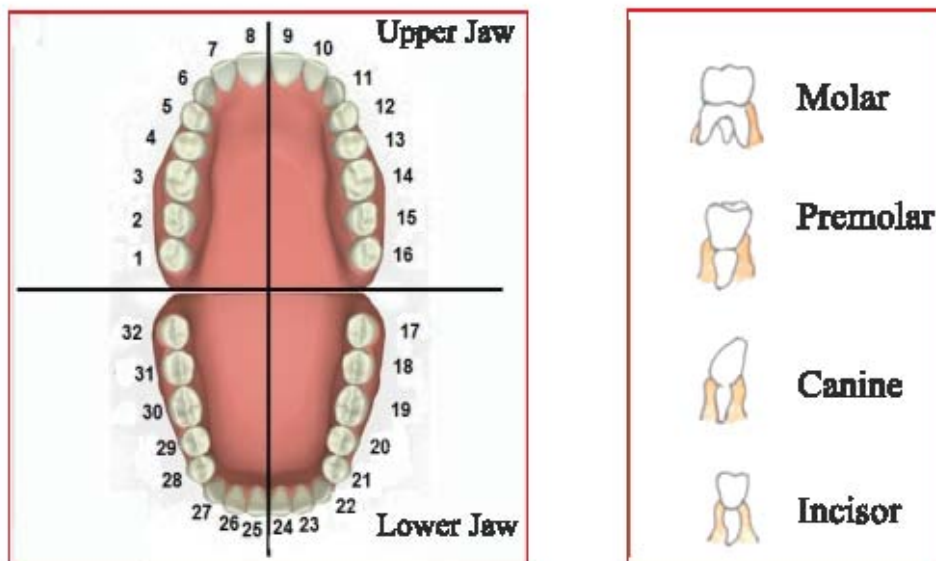


Fig 2.4 Teeth and (Teeth arrangement)

Are all teeth alike in appearance? What is the difference in the texture of the teeth? What is the difference in their functions?

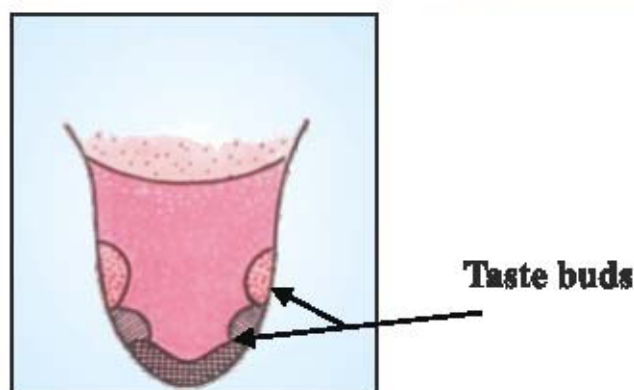
Now open your mouth and Look into the mirror. Identify the different types of teeth. Count their numbers. Use your finger to feel the teeth. Match your information with table.

Table 2.1 Types of teeth, Number of teeth and arrangement in mouth

S.N.	Type of teeth	Upper jaw	Lower jaw	Total and Characteristic	Function
1.	Incisor	4	4	8 sharp	Cutting food
2.	Canine	2	2	4 pointed	Piercing and tearing food
3.	Molar	4	4	8 rough	Chewing food
4.	Premolar	6	6	12 rough	Chewing food
	Total	16	16	32	

Sweets and tooth decay

Normally bacteria are present in our mouth but they are not harmful to us. However, 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. The acids gradually damage the teeth. This is called tooth decay. If it is not treated in time, it causes severe toothache and in extreme cases results in tooth loss. Chocolates, sweets, cold drinks and other sugar products are the major culprits of tooth decay. Therefore, one should clean the teeth with a brush or dantum and dental floss (a special strong thread which is moved between two teeth to take out trapped food particles) at least twice a day and rinse the mouth after every meal. Also, one should not put dirty fingers or any unwashed object in the mouth.

**Fig 2.5 Tongue**

Our mouth has the salivary glands which secrete saliva. When we chew the food, saliva secreted from salivary gland and mixes with food. Food becomes moist and bolus by mixing saliva.

The partial digestion of food starts here. 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. Do you know the functions of the tongue? We use our tongue for talking. Besides, it mixes saliva with the food during chewing and helps in swallowing food. We also taste food with our tongue. It has taste buds that detect different tastes of food.

The foodpipe (oesophagus)

The swallowed food passes into the foodpipe or oesophagus. The foodpipe runs along the neck and the chest. Food is pushed down by movement of the wall of the foodpipe. Actually this movement takes place throughout the alimentary canal and pushes the food downwards. At times the food is not accepted by our stomach and is vomited out. Recall the instances when you vomited after eating and think the reason for it. Discuss with your parents and teacher.

The stomach : The stomach is a thick-walled bag. Its shape is like a flattened U and it is the widest part of the alimentary canal. It receives food from the food pipe at one end and opens into the small intestine at the other. The inner lining of the stomach secretes mucous, hydrochloric acid and digestive juices. The mucous protects the lining of the stomach. The acid kills many bacteria that enter along with the food and makes the medium in the Stomach acidic, which helps of digestive juices to react. The digestive juices break down the proteins into simpler substances

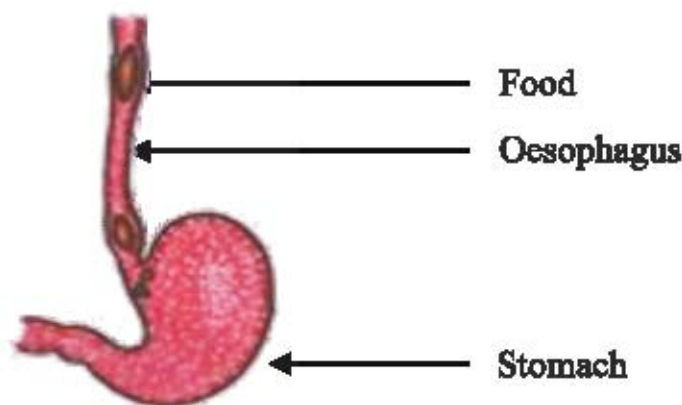


Fig 2.6: Stomach

The small intestine

The small intestine is highly coiled and is about 6-8 meters long. It receives secretions from the liver and the pancreas. Besides, its wall also secretes juices. The liver is a reddish brown gland situated in the upper part of the abdomen on the right side. It is the Largest gland of the body. It secretes bile juice that is stored in a sac called the gall bladder. The bile plays an important role in the digestion of fats. The pancreas is a large cream colored gland located just below the stomach. The pancreatic juice acts on carbohydrates and proteins and changes them into simpler forms. The partly digested food now reaches the lower part of the small intestine where the intestinal juice completes the digestion of all components of the food.

Absorption in the small intestine

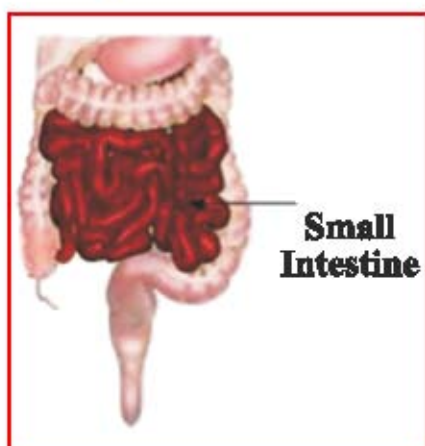


Fig 2.7 - Small Intestine The digested food can now pass into the blood vessels in the wall of the intestine. This process is called absorption. The inner walls of the small intestine have thousands of finger-like outgrowths. These are called villi. Can you guess what is the role of villi could be in the intestine? The villi increase the surface area for absorption of the digested food. Each villus has a network of thin and small blood vessels close to its surface. The surface of the villi absorbs the digested food materials. The absorbed substances are transported via the blood vessels to different organs of the body where they are used to build complex substances such as the proteins required by the body. This is called assimilation. In the cells, glucose breaks down with the help of oxygen into carbon dioxide and water, and energy is released. The food that remains undigested and unabsorbed then enters into the large intestine.

Large intestine

The large intestine is wider and shorter than small intestine. It is about 1.5 metres in length. Its function is to absorb water and some salts from the undigested food material. The remaining waste passes into the rectum and remains there as semi-solid faeces. The faecal matter is removed through the anus from time-to-time. This is called egestion.



Fig. 2.8 : Large Intestine

Diarrhoea

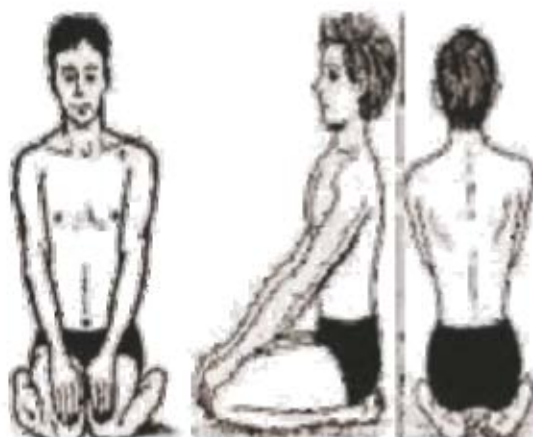
Sometime you may have experienced the need to pass watery stool frequently. This condition is known as **diarrhoea**. It may be caused by an infection, food poisoning or indigestion. It is very common in India, particularly among children. Under severe conditions it can be fatal. This is because of the excessive loss of water and salts from the body. Diarrhoea should not be neglected. Even before a doctor is consulted the patient should be given plenty of boiled and cooled water with a pinch of salt and sugar dissolved in it. This is called **Oral Rehydration Solution (ORS)** Which can get from government hospitals.

Now you understand that the digestive system is made up of different organs which help to digest food. We have daily meals. Our bodies remain healthy and free from disease, for the we should focus on the healthy eating habits.

2.5 Healthy eating habits.

By paying attention to these things we remain healthy:

1. Before Eating and after the meal wash your hand and mouth clean.
2. Take food on neat and clean place.
3. Always take fresh and covered meals.
4. Dine at certain times.
5. Eat with Healthy mind, stay relaxed and keep patience.
6. Take balanced diet.
7. Chew food thoroughly.
8. Take salad of fibrous and green vegetables in meal.
9. Do not eat more than necessary.
10. Take all types of food with interest.
11. Do not talk while eating.
12. Approximately one hour after a meal, drink water.
13. Do not waste food, because food grain is gift of God.

**Vajrasana:**

Today the problems related to digestion such as indigestion, acidity, constipation, gas, Obesity etc. is increasing rapidly in people. To deal with these problems a very simple and useful yoga is a Vajrasana:

Procedure :

1. After 5 minutes of meal , lay down a mat or blanket on a plane surface.
2. Sit down by spreading both legs ahead.
3. Thereafter, bend left knee such that paws of legs move back and upward.
4. Now bend the knee of right leg similarly.
5. Join together the toes of both the legs.
6. Keep body straight.
7. Keep your both hands on Knee.



What have you learnt

1. The process of taking food into the body is called ingestion.
2. Tongue has taste buds that detect different tastes of food.
3. The inner lining of the stomach secretes mucous, hydrochloric acid (HCL) and digestive juices.
4. The inner lining of the small intestine possess small finger like projections.
5. Cows, buffaloes and other grass eating animals are known as ruminants.
6. In Amoeba the digestion of food takes place in vacuole. This process is called as Endocytosis.
7. Incisor, Canine, Molar and Premolar are four types of teeth.
8. Buccal cavity, oesophagus, stomach, small intestine, large intestine, rectum are different parts of alimentary canal.

□□□

Exercises

Choose the most appropriate option -

1. Number of incisors in Buccal cavity of human being:
 (a) 2 (b) 4
 (c) 6 (d) 8 ()
2. Organ in which absorption of digested food takes place:
 (a) Stomach (b) small intestine
 (c) Large intestine (d) mouth ()
3. A part of our body which has digestive juice:
 (a) large intestine (b) small intestine
 (c) Stomach (d) oesophagus ()

Fill in the blanks with appropriate words:

- (i) Amoeba captures food with the help of.....
- (ii) In ruminants is located between the small intestine and large intestine.
- (iii) By on the tongue reveals taste.

Short answer questions -

- (i) What is a process of ingestion?
- (ii) If tongue doesn't has a taste bud than which process is affected?
- (iii) If ruminants doesn't have caecum what happened?
- (iv) Write name and functions of different types of teeth of human?

Long answer questions -

- (i) How do digestion of food takes place in stomach?
- (ii) Describe a method of feeding and digestion in Amoeba by a labeled diagram?
- (iii) Draw a labeled diagram of digestive system of humans?

Activity:

1. Draw a diagram of digestive system on chart, hard sheet, the model and color its different parts by different colors. There after cut the different parts. We can do different activities by pieces for example -
 - A student of class will speak organ name and another student pick it and tell the name
 - Make Digestive system by joining pieces.
 - Identification of various organs after bandaging on eyes.
 - Sit in Vajrasana for 5 Minutes after meal.
2. Prepare a chart of digestive system and fix in a class-room.

