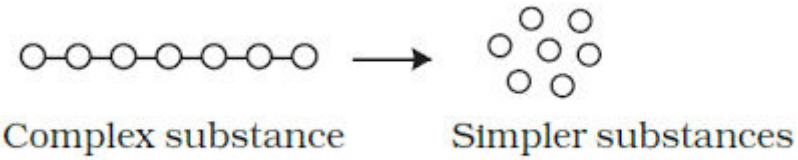
NUTRITION IN ANIMALS

✗ The process of taking food and its utilization in the body by an animal is called **Animal Nutrition**. All animals require food for energy, growth, and repair of damaged body parts.

✗ Carbohydrates are complex substances, these complex substances cannot be utilized by our body in this form. So, they are broken down into simpler substances. The breakdown of complex substances of food into simpler substances are called **Digestion**.



DIFFERENT WAYS TO TAKING FOOD

- **Modes of feeding in different animals:**

Name of animal	Kind of food	Mode of feeding
Snail	Grass	Chewing
Ant	Insects	scrapping
Eagle	Flesh	Swallowing
Humming bird	Nectar	Sucking
Lice	Blood	Sucking
Mosquito	blood	Sucking
Butterfly	nectar	Sucking
House fly	Decaying matter	brewing

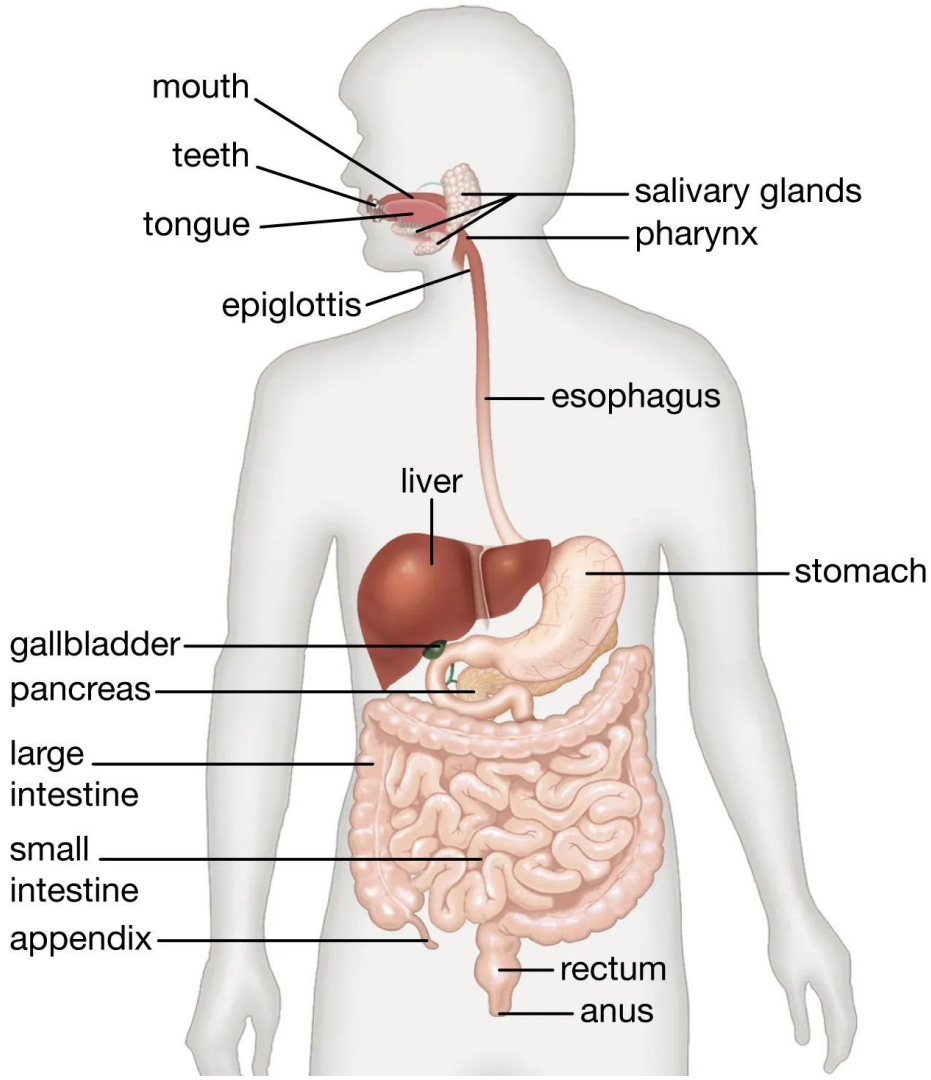
Starfish feeds on animals that are covered by hard shells of calcium carbonate. After opening the shell, the starfish pops out its own stomach through its mouth and eats the soft body of the prey inside the shell. The stomach (containing the prey) then goes back into the body. The **food is digested slowly** by the Starfish.

DIGESTION IN ANIMALS

Nutrition in animals takes place in five steps -

a) **Ingestion** – The process of taking food into our body is called Ingestion.
b) **Digestion –** The process in which the food containing large, insoluble substances is broken down into small, water-soluble substances is called Digestion.
c) **Absorption** – The process in which the digested food passes through the intestinal wall into the bloodstream is called absorption.
d) **Assimilation** – The process in which the absorbed food is taken in by the body cells and used for energy, growth, and repair is called assimilation.
e) **Egestion** – The process in which the undigested food is removed out form the body.

HUMAN DIGESTIVE SYSTEM



✗ The food passes through a continuous canal which begins at the buccal cavity and ends at the anus.

✗ ALIMENTARY CANAL (Digestive Track) -

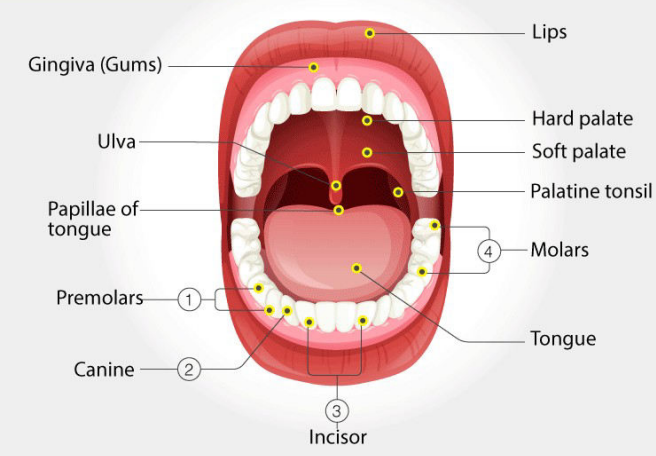
The Alimentary canal consists of following Organs:

1. **The Buccal Cavity** (Mouth)
2. **Oesophagus** (Food Pipe)
3. **Stomach**
4. **Small Intestine**
5. **Large Intestine** ending in the Rectum
6. **Anus**

- ✗ The inner walls of the stomach and the small intestine, and the various glands associated with the canal such as **Salivary glands**, the liver and the pancreas **secrete digestive juices**.

- ✗ The Digestive juices **converts complex substances of food into simpler ones**. The digestive track and the associated glands together constitute the digestive system.

1. BUCCAL CAVITY (MOUTH) -



- ✗ The digestion of the food starts in our mouth
- ✗ The buccal cavity contains the **tongue, teeth and a salivary glands** (which secrete saliva).
- ✗ Saliva is a digestive juice that **helps to digest the starch present in the food** partially.
- ✗ The partially digested food is swallowed by the tongue and goes down into the oesophagus.

TEETH

We have **four different types of teeth** -

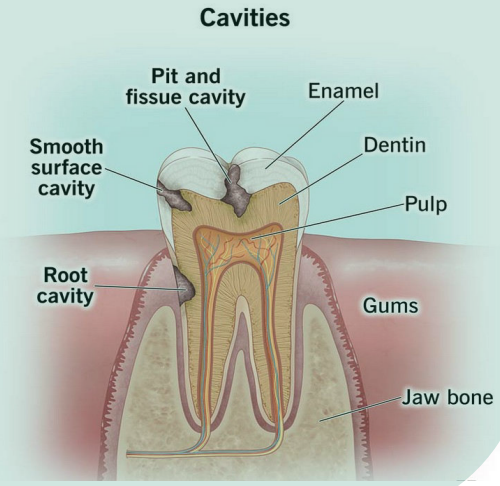
Type of teeth	No of teeth in lower jaw	No. of teeth in upper jaw	Total No. of teeth	Function
Incisors	4	4	8	Cutting and biting
Canines	2	2	4	Piercing and tearing
Premolar	4	4	8	Chewing and grinding
Molar	6	6	12	Chewing and grinding

MILK TEETH AND PERMANENT TEETH

The first set of teeth grows during infancy and they **fall off at the age of Six to Eight years**. These are termed **Milk Teeth**.

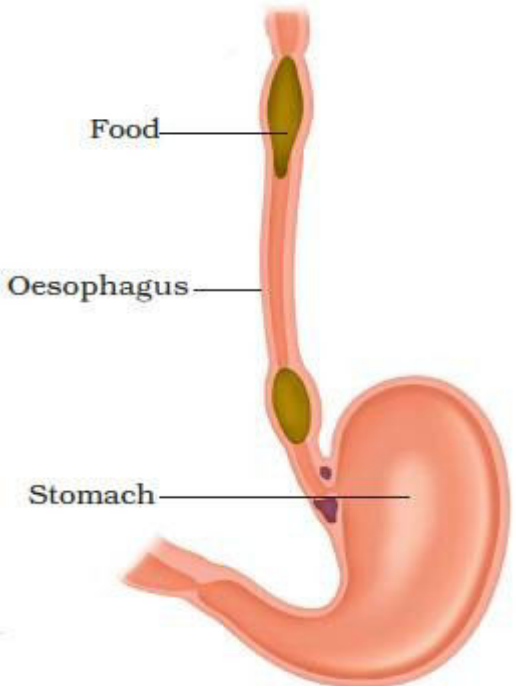
The second set that replaces them are the Permanent Teeth. The **permanent teeth may last throughout the life** or **fall of during old age or due to some dental diseases**.

TOOTH DECAY – The bacterial break down the sugars present form the leftover food and release acids. This **acids gradually damage the teeth**. This is called Tooth Decay.

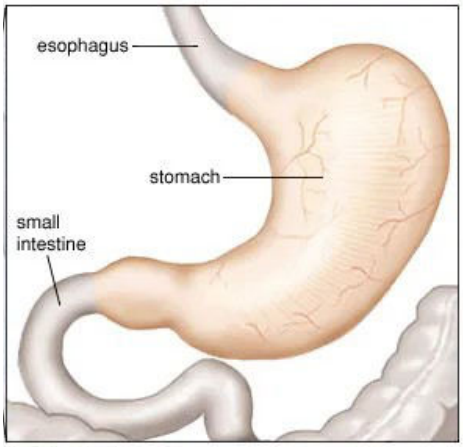


2. OESOPHAGUS (FOOD PIPE) -

- ✗ Oesophagus **carries the slightly digested food** from the **mouth to the stomach**. The food coming from the mouth moves down through oesophagus by the process of **Peristalsis**.
- ✗ Food is pushed down by the movement of the food pipe.
- ✗ At times the food is not accepted by our stomach and is **Vomited out**.



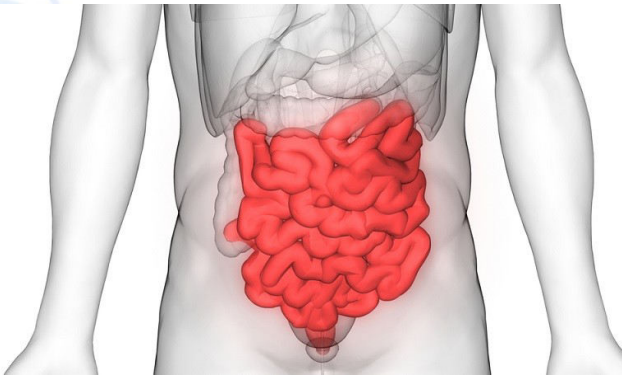
3. STOMACH -



- ✗ The Stomach is a **thick-walled bag**.
- ✗ Its shape is like a **Flatted J**.
- ✗ 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 **stomach secretes** -
  (i) Mucus – It protects the lining of the stomach.
  (ii) Hydrochloric Acid – It kills bacteria that enter the stomach with the food and makes the medium in the stomach acidic (*acidic medium is necessary for the proper action of digestive juices on proteins*)
  (iii) Digestive Juices – It breakdown the proteins into simpler substances.

4. SMALL INTESTINE -



- ✗ The Small intestine is **highly coiled and tube-like structure**.
- ✗ It is about **7.5 metre long** in adults.
- ✗ The partially digested food enters into the small intestine from the stomach.
- ✗ It is the site of complete digestion of food.
- ✗ The small intestine **receives secretion from the liver and the pancreas**.

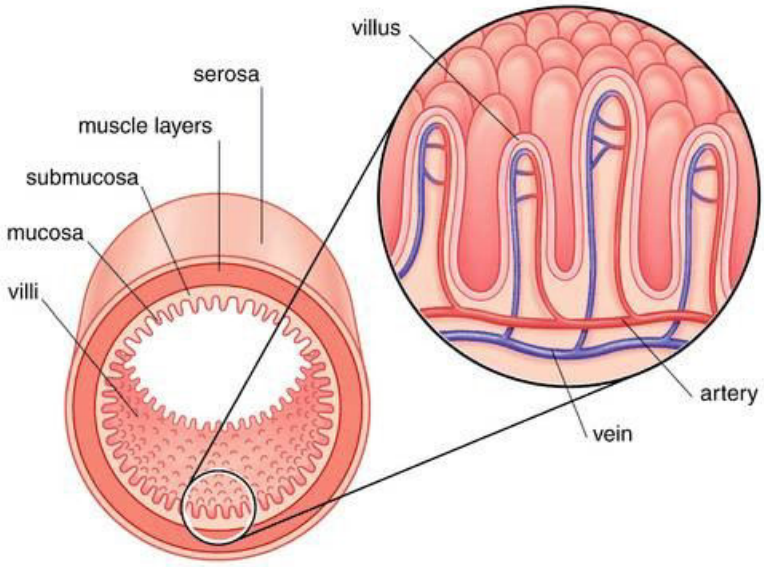
- ✗ **LIVER** (*Reddish brown gland situated in the upper part of the abdomen on the right side*) secretes **Bile juice** that is stored in the **gall bladder** (**sac-like structure**). Bile **plays an important role in the digestion of fats**.

- ✗ **PANCREAS** (*Large cream coloured gland located just below the stomach*) secretes **pancreatic juice** which **act on carbohydrates and proteins and change them into simpler forms**.

- ✗ In the Small intestine -
  -- The **Carbohydrates** get broken **into simple sugar** like glucose.
  -- **Proteins** are broken **into amino acids**.
  -- **Fats** are broken **into acids and glycerol**.

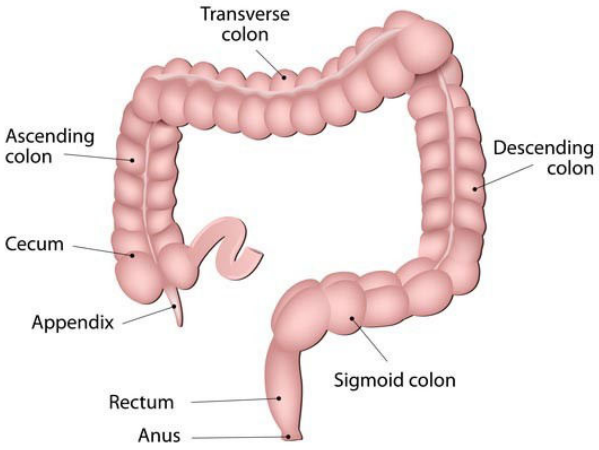
ABSORPTION OF DIGESTED FOOD IN SMALL INTESTINE

- ✗ The inner walls of the small intestine have thousands of finger-like outgrowths, these are called **Villi**.
- ✗ The Villi **increase the surface area for absorption** of digested food.
- ✗ The digested food materials are **now transported via blood vessels to different parts of the body**. The food is used for energy, growth and repair. This is called **Assimilation**.



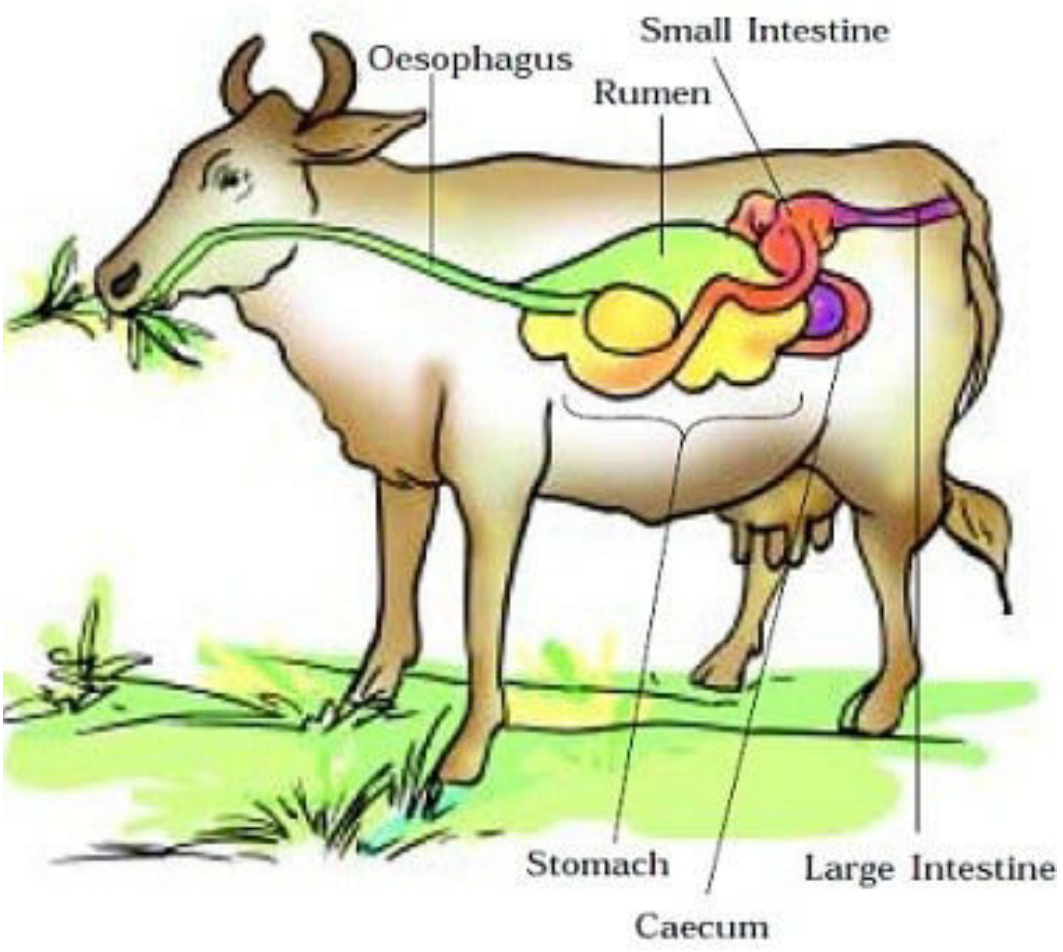
5. LARGE INTESTINE -

- ✗ The Large intestine is **wider and shorter than small intestine**.
- ✗ It is about **1.5 metre in length**.
- ✗ Its **function is to absorb water and some salts** from the undigested food materials.
- ✗ The remaining waste food passes into the **rectum** and is removed out from the body through the **Anus** from time-to-time. This is called **Egestion**.



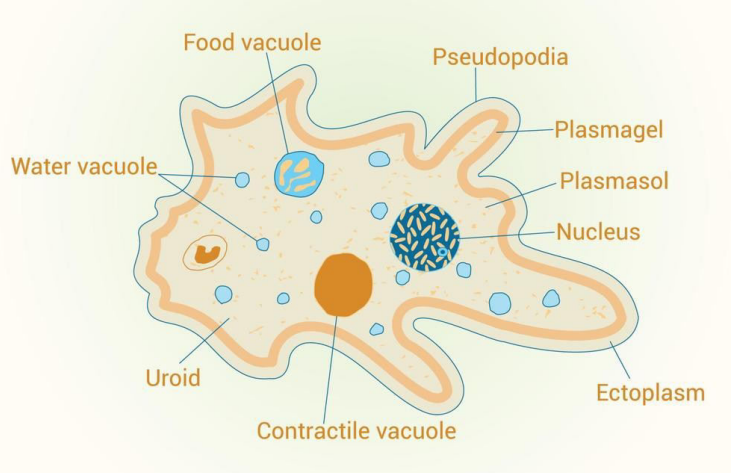
DIGESTION IN GRASS-EATING ANIMALS

- **Grass eating animals** (like cows, buffaloes, goats etc.) are called **Ruminants**.
- They **quickly swallow the grass** and store it **in a part of the stomach** called **Rumen**. Here the food gets partially digested called **Cud**.
- After some time this cud is brought back from the stomach to the mouth and chewed again. This process is called **Rumination**.
- Grass is rich in cellulose (a type of carbohydrate). Ruminants have cellulose digesting bacteria in their rumen.
- Animal like horses, rabbit, etc., have a large sac-like structure called **Caecum** between the Oesophagus and small intestine. The cellulose of the food is digested here by the action of certain bacteria.



- Humans cannot survive by eating only grass because humans cannot digest cellulose as we do not have cellulose digesting bacteria in our stomach.

FEEDING AND DIGESTION IN AMOEBA



- ✗ Amoeba is a **single-celled organism** found in pond water.
- ✗ 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**.
- ✗ Amoeba has **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 engulf it. The food becomes trapped in a food vacuole.
- ✗ Amoeba **secretes digestive juices** in the food vacuoles which help in digestion of food particles.