Ch-2 Nutrition in Animals

Digestion in Humans

Digestion in Grass-Eating Animals

Feeding and Digestion in Amoeba

Digestion in Humans

Animals have a heterotrophic mode of nutrition. They depend on the plants or autotrophs for nutrition. Animal nutrition includes

- Nutrient requirement
- Mode of intake of food
- Its utilisation in the body

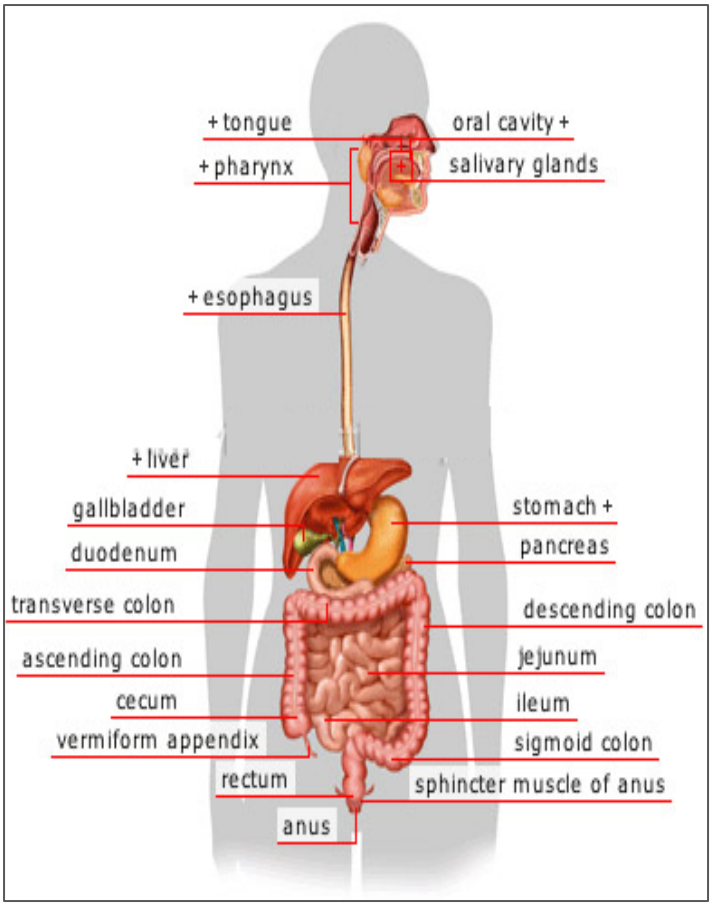
Different ways of taking food

- Bees and humming-birds suck the nectar of plants.
- Infants of human and many other animals feed on mother's milk.
- Snakes like the python swallow the animals they prey upon.
- Some aquatic animals filter tiny food particles floating nearby and feed on them.

Digestion in Humans

The breakdown of complex components of food into simpler substances is called digestion. The digestive tract and the associated glands together constitute the digestive system. The process of digestion include

- **Ingestion**
- **Digestion**
- **Absorption**
- **Assimilation**
- **Egestion**



Human Digestive System

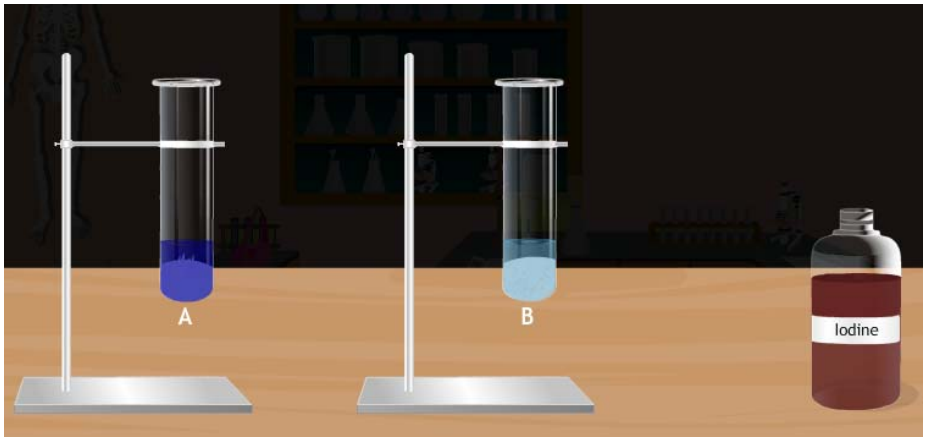
The human digestive system or the alimentary canal can be divided into various compartments:

(1) The buccal cavity
(2) Foodpipe or oesophagus
(3) Stomach
(4) Small intestine
(5) Large intestine ending in the rectum and
(6) The anus

The mouth and buccal cavity

- The food enters the body through the mouth and this process is called as **ingestion**.
- The salivary glands in the buccal cavity secrete saliva having enzymes which breaks the complex starch molecules into simple sugars.
- The food is chewed by the teeth which breaks it mechanically into smaller pieces.
- Humans have two sets of teeth, the milk teeth and the permanent teeth. The teeth are of four types namely the incisors, canines, pre molars and the molars.
- The tongue is a fleshy muscular organ attached at the back to the floor of the buccal cavity. It mixes saliva with the food during chewing and helps in swallowing food and has taste buds that detect different tastes of food.

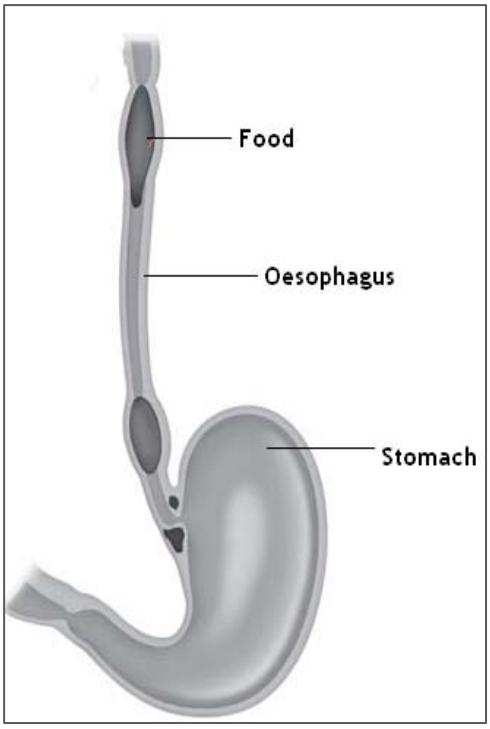
Activity



Take two test tubes. Label them 'A' and 'B'. In test tube 'A' put one teaspoonful of boiled rice; in test tube 'B' keep one teaspoonful of boiled rice after chewing it for 3 to 5 minutes. Add 3–4 mL of water in both the test tubes now pour 2–3 drops of iodine solution in each test tube and observe. The chewed rice will not turn blue black by the addition of iodine unlike the unchewed rice. The saliva breaks down the starch into sugars due to which the chewed rice didn't show test for starch.

The food pipe/ Oesophagus

- The food is passed to the food pipe which runs down the neck. The food is pushed to the stomach by the movement of the walls of the oesophagus.
- A flap like structure called epiglottis folds over the glottis while swallowing the food to prevent it from entering the trachea.



Stomach and Oesophagus

The stomach

- The food then reaches stomach a flattened U shaped bag like structure leading to the small intestine.
- The stomach has an acidic environment due to the presence of hydrochloric acid to kill the microbes entering the stomach with food.
- The inner walls are surrounded by the mucous layer which protects the stomach from acidic medium.
- Stomach also secretes digestive juices and enzymes which act on proteins and simplify it.

The small intestine

- It is a highly coiled structure which is about 7.5 m long. The secretions from the small intestine, liver and pancreas further digest the food.
- The liver secretes bile juice that is stored in a sac called the gall bladder which plays an important role in the digestion of fats.
- The pancreas also secretes pancreatic juices that help in the digestion of carbohydrates and proteins.
- 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

- Now the **absorption** of the digested food takes place as the food passes through the blood vessels in the wall of the small intestine.
- The small intestine has many small finger like projections called villi which increase the surface area for the absorption of the digested food.
- Each villus has a network of thin and small blood vessels close to its surface.
- This food is then transported to each and every tissue of the body where is utilized for synthesizing proteins. This process is called **assimilation**.

Large intestine

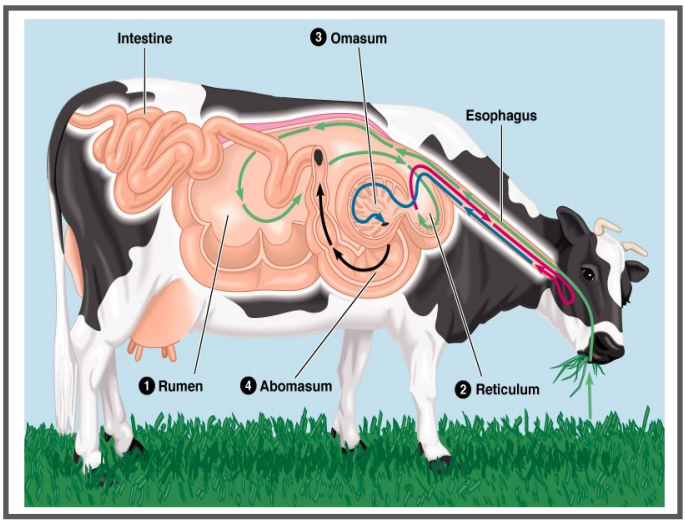
- The undigested food is then transported to the large intestine which absorbs water and some salts from the undigested food material.
- The rest of the waste passes into the rectum and remains there as semi-solid faeces.
- The faecal matter is removed through the anus from time-to-time. This is called **egestion**.

Digestion in Grass-Eating Animals

- Grass-eating animals like cows and buffaloes ingest the food and store it in a separate part of the stomach called rumen where it is partially digested.

- This food is called cud. After sometime they chew this cud which returns to the mouth in small lumps.
- These animals are called as ruminants and this process is called as rumination.

- They have a sac like structure containing certain bacteria which can digest cellulose present in grass.



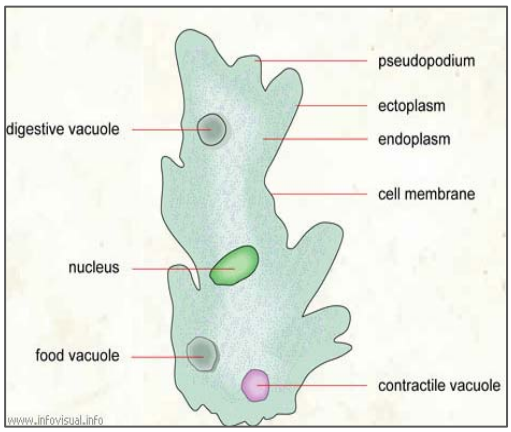
Ruminant

Feeding and Digestion in Amoeba

- Amoeba is a single cellular organism living in ponds with irregular shape which has only a single cell to perform all body functions.

- It has finger like pseudopodia which help in engulfing food which is then taken inside the food vacuole where the digestive juices act on the food and break it down into simpler substances.

- The food is absorbed to gain energy for carrying out various metabolic processes while the undigested food is expelled out.



Amoeba