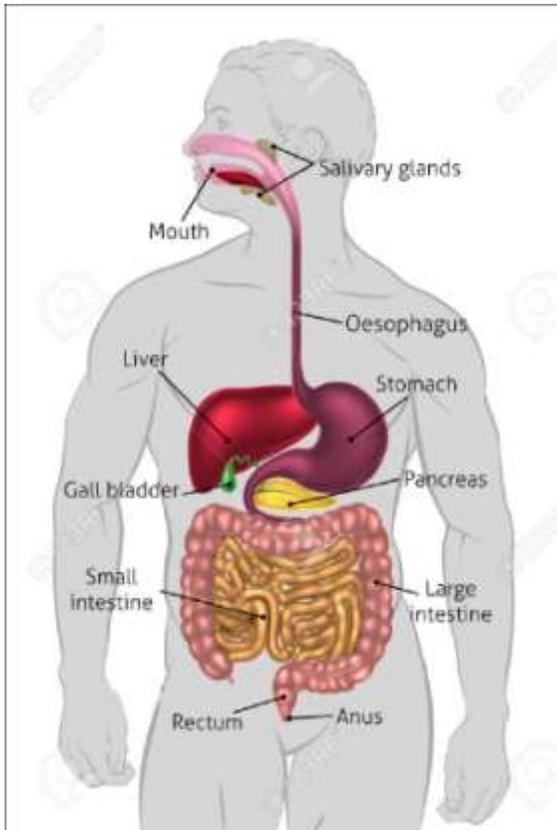


Nutrition in Animals (Humans)- Part II

DIGESTION IN HUMANS



Process of Nutrition in Humans follows the following steps:

PROCESSES OF DIGESTION (NUTRITION) IN HUMANS

1. Ingestion
2. Digestion
3. Absorption
4. Assimilation
5. Egestion

ALIMENTARY CANAL

- We take food through the mouth, digest and utilize it.
- The food passes through a continuous canal which begins out the buccal cavity (mouth cavity) and ends at the anus.
- The canal can be divided into various compartments:

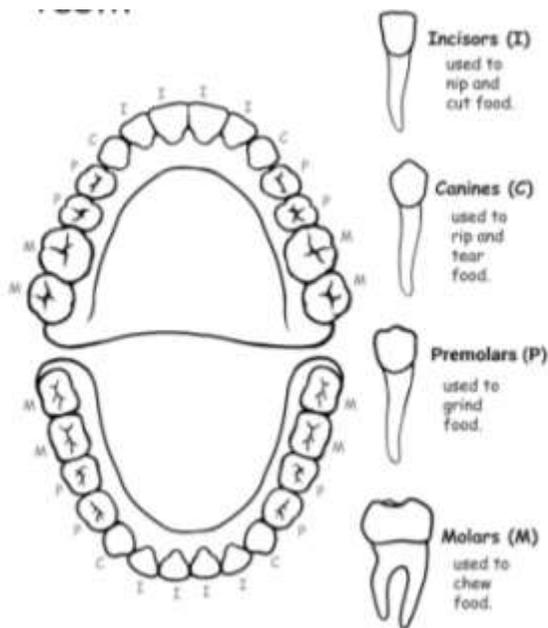
- a. the buccal cavity – or the mouth
 - b. food pipe or esophagus – also known as gullet
 - c. stomach
 - d. small intestine
 - e. large intestine ending in the rectum (comprising of Caecum which has the appendix, colon and rectum)
 - f. anus
- These parts together form the alimentary canal (digestive tract). It therefore comprises of the whole passage along which food passes through the body from mouth to anus during digestion.
 - The food components gradually get digested as food travels through various compartments.
 - Finally the undigested food exits from our body through the process of Egestion.

THE MOUTH AND BUCCAL CAVITY

INGESTION

- The process of taking food into the body is called Ingestion.
- The breakdown of food into small pieces with the help of teeth is known as Mastication.
- Digestive glands known as salivary glands release a watery liquid into the mouth called the Saliva
- We chew the food with the teeth and break it down mechanically into small pieces. Our teeth vary in appearance and perform different functions.

TEETH



- There are 32 permanent teeth present in our mouth (16 in each jaw). These come after the milk teeth start falling off.

Type	Function	Upper Jaw teeth	Lower Jaw teeth	Total
Incisors (front)	Cutting and biting	4	4	8
Canines (an either side of the incisors)	Piercing and tearing	2	2	4
Pre Molars (behind the canines)	Chewing and grinding	4	4	8
Molars	Chewing and grinding	6	6	12
				32

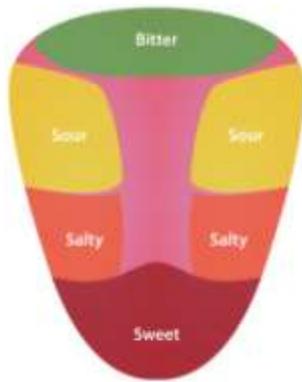
Dental Care

- Tooth decay or dental cavities is a common dental disease.
- This disease destroys the tooth's structure and produces holes called cavities.
- When food particles get stuck in the space between two teeth, they are acted upon by the bacteria which are already present in the mouth.
- Bacteria form a sticky colourless film on the teeth called plaque.
- This leads to production of certain acids that slowly damage the teeth leading to cavities.
- When plaque is not removed, it accumulates on the gums and teeth and hardens into a lime-like substance called tartar.
- This leads to disease called pyorrhea.
- People suffering from pyorrhea have shiny and bright-red swollen gums which tend to bleed easily.

SALIVARY GLANDS AND SALIVA

- Our mouth has the salivary glands which secrete saliva.
- Saliva acts on carbohydrates i.e. it converts starch into sugar (glucose).
- The process of digestion starts in the mouth, the moment you chew the food.
- Mechanical digestion of food happens when teeth break food into small pieces.
- Chemical digestion of food in the mouth is done by saliva.

TONGUE



The tongue is a fleshy muscular organ attached at the back to the bottom of the mouth. It is free at the front and can be moved in all directions.

Functions of Tongue:-

- It is used by us for talking
- It mixes saliva with the food during chewing
- It helps in swallowing food
- We also taste food without tongue. It has taste buds that detect different tastes of foods.

THE FOODPIPE / OESOPHAGUS

- The tongue pushes the food towards the pharynx, where it reaches the esophagus / food pipe / gullet.
- The esophagus is a long muscular tube in the chest which connects or joins the mouth to the stomach.
- The moist swallowed ball of food, known as the bolus enters the food pipe or esophagus.
- Food pipe runs along the neck and the chest.
- Food is pushed by movement of the wall of the food pipe through wave like contraction and relaxation of the esophagus called Peristalsis or Peristaltic movement

Epiglottis

It is a flat lid – like structure, which closes the opening of the windpipe, while eating and prevents the entry of food into the windpipe.

Q. Why should we avoid laughing or talking, while eating?

Ans. If we talk and eat in a hurry, the epiglottis may not close. The food may enter the windpipe, and may choke us.

Q. Why do we get hiccups, cough or choke?

Ans. This happens when food particles enter the windpipe. The windpipe carries air from the nostrils to the lungs. It runs adjacent to the food pipe. But inside the throat, air and food share a common passage. During the act of swallowing, a flap – like valve closes the passage of the windpipe & guides the food into the foodpipe. If by chance food particles enter the windpipe, we feel choked, get hiccups or cough.

Q. How is food prevented from entering the windpipe?

Ans. Inside the throat, air and food.. get hiccups or cough.

THE STOMACH

The stomach is a J-shaped, muscular bag/pouch and is the widest part of the alimentary canal.

It receives food from the food pipe at one end and into the small intestine at the other.

- It is located on the left side of the abdomen
- The muscular walls of the stomach churn food and secrete enzymes like Pepsin(which helps in the breakdown of proteins into simpler substances called amino acids.)
- The inner lining produces and secretes Hydrochloric Acid which kills many bacteria that enter along with the food and makes the medium in the stomach acidic in order to help the digestive juices to act.
- The inner lining of the stomach also secretes mucus which protects the lining of the stomach from harmful acids.
- Inside the stomach, the food is processed into a thick liquid called Chyme which then moves down from there to the small intestine.

THE SMALL INTESTINE

The small intestine is highly coiled and is about 7.5 meters long.

- Most of the digestion takes place here.
- It receives secretions from the liver and the pancreas. Besides, its wall also secretes juices (enzymes).

LIVER

The liver is a reddish brown gland situated in the upper part of abdomen on the right side. It is the largest gland in 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.

PANCREAS

The pancreas is a large cream coloured gland located just below the stomach. The pancreatic juice acts on carbohydrates, fats 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.

- The carbohydrates are digested to (get broken into) simple sugar (glucose).
- Fats are digested to fatty acids and glycerol (glycerin).
- Proteins are digested to amino acids.

ABSORPTION IN THE SMALL INTESTINE

The digested food can now pass into the blood vessels in the inner wall of the intestine. This process is called **absorption**. The inner walls of the small intestine have thousands of fingers – like outgrowths. These are called **villi** (Singular: villus).

- 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 the surface.
- The surface of the villi absorbs the digested food materials.
- The food absorbed into the blood is transported to different parts of the body. It is used to provide energy and materials for growth and repair of body tissues.
- This is the final stage in the process of digestion and is known as **assimilation**.
- The food that remains undigested and unabsorbed enters into the large intestine.

LARGE INTESTINE

- The large intestine is wider and shorter than the small intestine. It is about 1.5 meter 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.
- Egestion – The faecal matter is removed through the anus from time-to-time. This is called Egestion.