

DIGESTION AND ABSORPTION

The process of conversion of complex food into simpler absorbable form is called digestion

digestive System - Human digestive system consists of alimentary canal and associated glands.

1. Alimentary canal comprises of following parts

Mouth - Teeth are embedded in socket of jaw bone (mandible). Milk teeth are replaced by permanent or adult teeth, this type of dentition is called **diphyodont**. Four different types of teeth are incisors (IL), canine, premolar (PM) and molar (M).

Dental formula =
$$\begin{array}{cccc} & 1 & 2 & 3 \\ \hline & 2 & 1 & 2 & 3 \\ & 2 & 1 & 2 & 4 \end{array}$$

Upper surface of tongue has small projections called papillae, some of which contain taste buds.

Pharynx passage for food and air. Cartilaginous flaps called epiglottis prevents the entry of food into wind pipe (trachea) during swallowing.

Stomach - Oesophagus leads to stomach. The opening of stomach is guarded by a sphincter (gastro-esophageal).

Stomach is divided into three parts - cardiac, fundic and pyloric.

Small Intestine - is the longest part of alimentary canal divided into duodenum, jejunum and ileum. Pyloric sphincter is present between stomach and duodenum.

Large intestine - ileum opens into large intestine, which is divided into caecum, colon and rectum. Caecum is a blind sac which hosts microbes. Vermiform appendix arises from caecum. Rectum opens through anus.

Histology of Alimentary canal-

The wall of alimentary canal from oesophagus to rectum consists of four layers:

- Serosa-
- Muscularis-
- Submucosa-
- Mucosa-

Digestive Glands

Salivary Glands - secrete their release in oral cavity. In human beings salivary glands are three pairs: parotid, sublingual and submandibular.

Utricle - it is the largest gland in human body lies in upper right side of the abdominal cavity just below the diaphragm.

Hepatic lobules, covered by Glisson's capsule, are structural and functional unit of liver made up of hepatic cells. The secretion is stored and concentrated in gall bladder. Bile duct and pancreatic duct open together in duodenum common duct guarded by sphincter of Oddi.

Pancreas - consists of exocrine and endocrine portion. The exocrine portion secretes alkaline pancreatic juice (enzymes) and endocrine secretes hormones insulin and glucagon.

- Chemical digestion of food starts in oral cavity by the action of enzyme salivary amylase and lysozyme. Lysozyme acts as antibacterial agent in mouth to prevent infection.
- Mucosa of stomach has gastric glands having three types of cells- mucus neck cells that secrete mucus, peptic chief cells that secrete proenzyme pepsinogen and parietal or oxyntic cells that secrete HCl. HCl activates the pepsinogen to pepsin to digest protein.
- Protein $\xrightarrow{\text{Pepsin}}$ Peptones + proteases
- Mucus and gastrin present in gastric juice play important role in lubrication and protecting inner wall of stomach from the action of HCl. Inulin is a prototypic enzyme found in gastric juice of infants to digest milk protein.
- The Ryle, pancreatic juice and Intestinal juice are released in small Intestine. Pancreatic juice contain inactive trypsinogen, chymotrypsinogen, procarboxypeptidases, amylases, lipases and nucleases
- Trypsinogen is activated by enterokinase in to trypsin, which further activates the other enzyme of intestinal juice.
- Bile contains bile pigments [bilirubin and bil-verdin), bile salts, cholesterol and phospholipids which help in emulsification of fats

Dipeptides $\xrightarrow{\text{Amino acid}}$ Amino acids

Maltose $\xrightarrow{\text{Lactase}}$ Glucose + Glucose

UPC time $\xrightarrow{\text{Lactase}}$ Glucose + Galactose

SLICICIS $\xrightarrow{\text{SuCrifia}}$ GIUCCISE FrUctene

Nucleotides $\xrightarrow{\text{Nucleosides}}$ Nucleosides + Sugars + Bases

Dial and Monallycerides $\xrightarrow{\text{Lip}}$ Fatty acids + Glycerol

Disorder al Digestive System

- Jaundice. It is a disease of liver. In jaundice the skin and the eyes turn yellow due to large quantities of bilirubin pigments in the extra cellular fluid.
- Vomiting - It is the ejection of stomach content through the mouth. This reflex action is controlled by the vomiting Centre in the medulla.
- Diarrhoea - Frequent defecation of liquid faeces is known as Diarrhoea. It reduces the absorption of food.
- Constipation. In constipation the faeces are retained within the rectum as the bowel movements occur irregularly.
- Indigestion- Incomplete digestion is usually accompanied by one or more of the following symptoms- pain, nausea, vomiting, heartburn, acid regurgitation, accumulation of gas.

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