

DIGESTIVE SYSTEM

INTRODUCTION:

The cell requires materials for growth, repair of worn-out structures, and a source of energy for these activities. The food material we eat serves these purposes. Thus, a regular supply of food is a need of the body. The food we eat contains complex substances and it is necessary to convert these complex substances into simpler forms; so that they can be absorbed into the blood and transported to the cells for utilization. This conversion of complex food into a simple form, making it suitable for absorption is described as the digestion of food.

This conversion is both mechanical and chemical. The organs that cause the mechanical splitting of food include teeth, tongue, and muscles that help in mastication and peristaltic movement in the gastro intestinal tract. The chemical conversion is caused by the secretory action of the alimentary canal and the secretions produced and poured into it by the glands, i.e. salivary glands, liver, and pancreas.

Thus, the organs involved in and constituting the digestive system are placed into two groups:

1. The alimentary canal; a long tube starting from the mouth extending up to the anus and
2. Accessory organs, i.e. teeth, tongue, salivary glands, liver, and pancreas.

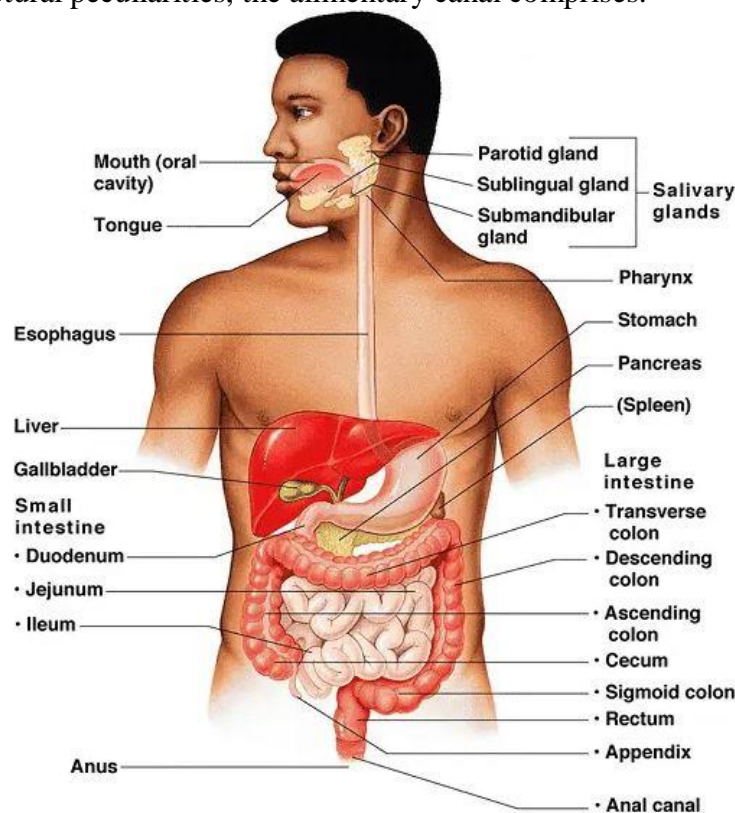
THE ALIMENTARY CANAL

It is 09 meters long tube extending from the mouth to the anus; through which the food passes. It serves the following functions:

1. Receiving the food (Ingestion).
2. Peristalsis.
3. Mechanical splitting of food.
4. Chemical splitting of food.
5. Absorption of food and
6. Elimination of unabsorbed food residue (Excretion).

On the basis of structural peculiarities, the alimentary canal comprises:

1. Mouth cavity
2. Pharynx
3. Esophagus
4. Stomach
5. Small intestine
6. Large intestine
7. Rectum and



anus

MOUTH CAVITY

The alimentary canal begins at the mouth. The mouth or oral cavity extends from the lips to the oropharynx.

The roof of the mouth cavity is formed by a hard anterior bone palate; it is soft on the posterior. From the posterior margin of the soft palate, a small muscular flap hangs down called a uvula. The soft palate is attached to the tongue by the gloss palatine arches and to the wall of the oropharynx by the pharyngopalatine arches. The palatine tonsils are composed of lymphoid tissue and are located in the fosse between the two arches. The floor of the mouth cavity is occupied by the tongue. The mouth cavity consists of two parts, the outer vestibule and the inner mouth cavity proper. The vestibule is the space outside the gum and teeth and inside the lips and cheeks. The lips, cheeks, and tongue help in moving the food between the upper and lower teeth during mastication (chewing).

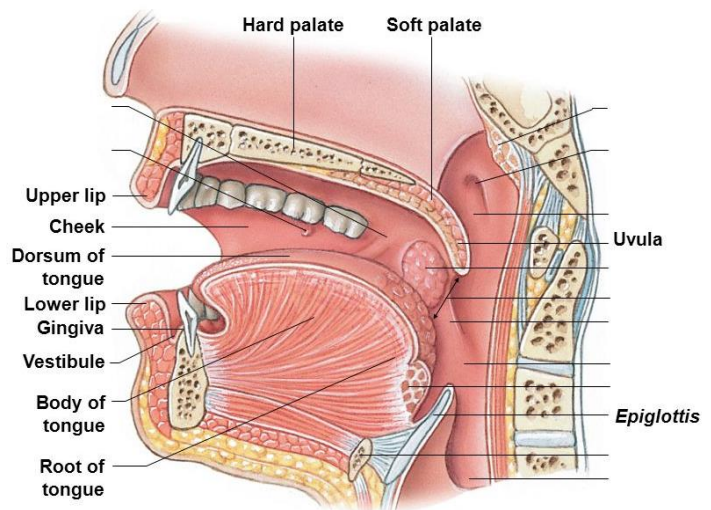
TEETH AND MASTICATION

Teeth develop within sockets of the alveolar processes of the maxillae and mandible. Dense connective tissue covered by smooth mucous membranes, the gums, covers these processes and extends a little way into each socket. The sockets are lined with a fibrous membrane called the periodontal membrane.

A tooth possesses a crown, neck, and root. The crown projects above the gum, the neck is surrounded by the gum and the root is beneath it.

A tooth is made up of a very hard material called dentin. The dentin of the crown is covered by enamel, which is harder than dentin. A bone-like substance called cementum covers the dentin of the root and anchors the tooth to the periodontal membrane that lines the sockets. The central part of the tooth contains the pulp cavity that shows a connective tissue called the pulp, the blood vessels, and nerves.

There are four types of teeth; named on the basis of their shape. The incisors are chisel-shaped, the canines are cone-shaped and the premolars and molars have broad crowns with rounded cusps. In the lifetime of each individual normally two types of teeth are developed: the deciduous teeth or milk teeth, and the permanent teeth.



Mastication is the main function of the teeth. It involves biting and grinding of food between the upper and lower teeth. Movements of the tongue and cheeks and lips assist in moving the food against the hard palate and the teeth.

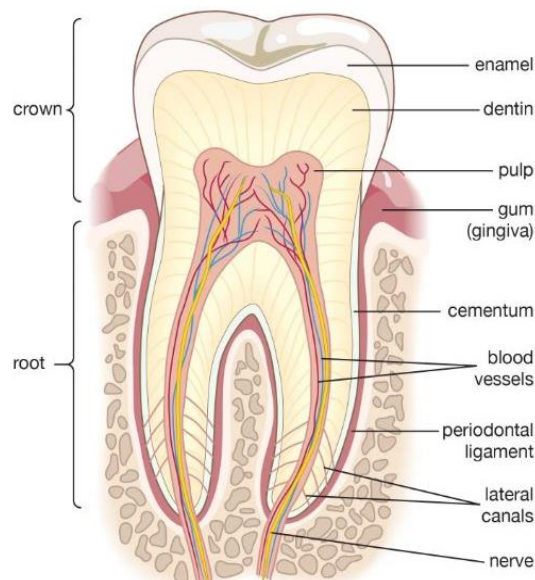
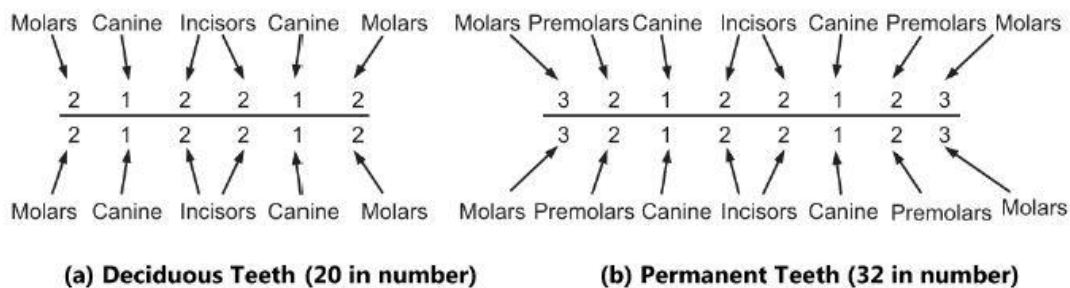
PHARYNX

A muscular cone-shaped tube, situated behind the nasal cavity, oral cavity, and larynx. The base of the cone is above while the apex is below. It communicates with the nasal cavity, mouth cavity, and larynx on the anterior side. The part of the pharynx behind the nasal cavity and into which the nasal cavity opens is known as the nasopharynx. Like the nasal cavity nasopharynx is linked with pseudo-stratified columnar epithelium. On the lateral sides the auditory tubes open into the nasopharynx. The part of the pharynx located behind the mouth cavity and into which it opens is known as the oropharynx. The mucous membrane of the oropharynx is composed of stratified squamous epithelium. The laryngopharynx extends from the oropharynx above to the larynx and the esophagus below. It is lined with stratified squamous epithelium and like the oropharynx; it serves as a passageway for both food and air. The laryngopharynx continues downwards as the esophagus.

OESOPHAGUS

It is a muscular tube that continues from the pharynx above and opens into the stomach below. It is situated behind the trachea and passes through the mediastinum of the thorax. It pierces the diaphragm and enters the abdomen, where it opens into the stomach. The peristaltic movement of the esophagus moves the food toward the stomach.

STOMACH



It is the most dilated part of the alimentary canal lying just below the diaphragm; Obliquely in the epigastric, umbilical, and left hypochondriac regions of the abdominal cavity. It is a collapsible bag-like structure serving as a temporary reservoir for food. The esophagus opens into the stomach at the cardiac orifice and the duodenum continues from it at the pyloric orifice. It is J shaped and shows two curvatures termed the greater curvature and lesser curvature. The part of the stomach above the cardiac orifice is called the fundus, the main middle part is the body and the lower part is the pyloric antrum.

Organs associated with the stomach. Anteriorly – Anterior abdominal wall and left lobe of the liver

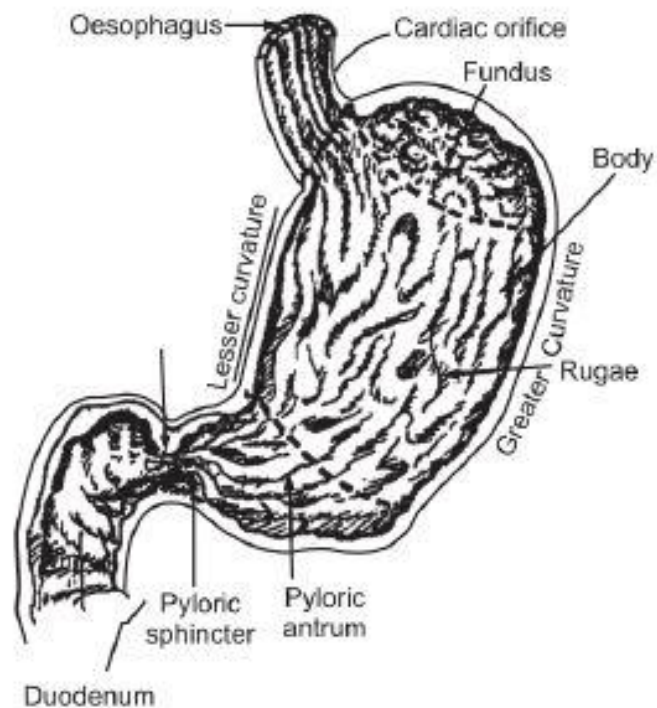
Posterior kidney– Pancreas, spleen, abdominal aorta, and left kidney

Superiorly - Diaphragm, esophagus, left lobe of the liver

Inferiorly - Transverse colon and small intestine

To the right - Right liver lobe and duodenum

To the left - Spleen and diaphragm
Our layers of tissues as described in the general structural pattern of the alimentary canal are found in the stomach. Of these layers, the muscle layer is modified to show three layers of smooth muscle fibers: the outer layer of longitudinal fibers; the middle layer of circular fibers; and the inner layer of oblique fibers. This characteristic arrangement allows for strong muscular action causing churning motion and peristaltic movements. The mucous membrane lining is made up of columnar epithelial cells.



When the stomach is empty, the mucosa and sub-mucosa layers form longitudinal folds called as rugae. There is a large number of gastric glands situated below the surface of the mucous membrane. There are three kinds of such glands; those situated in the fundus and bodies of the stomach are the fundic glands, those in the cardiac region are the cardiac glands and those in the pyloric region are the pyloric glands. The fundic glands contain different types of cells, of which the chief cells secrete pepsinogen and the parietal cells secrete hydrochloric acid. The cardiac

and pyloric glands secrete mucous.

