BIOLOGY

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01. Digestive System

The human digestive system comprises of alimentary canal and digestive glands.

02. Alimentary Canal

The alimentary canal is a tube-like structure extended from mouth to anus. Its lumen is called **enteric cavity.** On the basis of embryonic origin, the structure of alimentary canal contains three regions, namely foregut, midgut and hindgut. The foregut (stomodaeum) region is ectodermal in origin and contains mouth, buccal cavity, pharynx and oesophagus in it. The midgut (mesenteron) is endodermal in origin and contains main digesting parts, i.e. stomach and intestine upto the colon region. The hindgut (proctodaeum) is again ectodermal in origin and contains colon, rectum and anus.

03. Mouth and Buccal Cavity

Mouth is a transverse slit-like apperture on the ventral side of the body. It is normally guarded by two movable lips, i.e. upper and lower lip. A specific muscle is associated with lips. It is called orbicularis oris muscle.
The buccal cavity contains the palate, tongue and teeth. The palate is a horizontal structure separating the buccal cavity and the nasal cavity.

04. Tongue

It is a highly muscular structure containing voluntary muscles. It is attached to the floor of buccal cavity with the help of a connective tissue fold called **frenulum linguae** or **lingual frenulum.** The anterior part of tongue is free while posterior part of tongue is connected to hyoid plate or hyoid bone. The dorsal surface of tongue is divided into two unequal halves by a V-shaped sulcus, called as sulcus terminalis. These halves are pharyngeal part (i.e. posterior 1/3 part) and oral or papillary part (i.e. anterior 2/3 part).

05. Pharynx

The buccal or oral cavity is followed by the pharynx. It is sub-divided into oropharynx (oral part), nasopharynx (nasal part) and laryngopharynx (laryngeal part). Out of these, oropharynx and laryngopharynx are associated with alimentary canal, while nasopharynx is associated with the respiratory system.

06. Oesophagus

The oesophagus or food pipe in human beings is about 23-27 cm long. It is involved in deglutition or swallowing of food. It lies behind the trachea and the heart.It is lined by non-keratinised stratified squamous epithelium. The upper opening of oesophagus is called **gullet.**

The lower gastrooesophageal sphincter is called **cardiac sphincter**, which prevents the reflux of acidic contents of gastric juice into the oesophagus. No enzymes are secreted in the oesophagus. It just coveys food to stomach through peristalsis.

07. Stomach

The oesophagus opens into a J-shaped dilated sac called stomach or gaster or ventriculus. It has two orifices (openings), i.e. cardial orifice joined at the lower end of oesophagus and pyloric orifice, opening into the duodenum. The inner lining of stomach is raised into numerous longitudinal folds called **rugae.**

The stomach is divided into four regions or parts called as cardiac, fundus, body or corpus and pyloric part.

08. Small intestine

The small intestine is the longest part of the digestive tract. It is about 5-7 m long. It is divided into duodenum, jejunum and distal ileum. The duodenum is retroperitoneal, i.e. present behind the abdominal cavity or coelom while other parts are intraperitoneal, i.e. present inside the abdominal cavity.

The duodenum is a C-shaped structure which is connected to both the liver and pancreas. It is 4.0-4.5cm in diameter. It is the main digesting part of human alimentary canal.

The lining of small intestine has a series of circular folds called **plical circularis** or **valve of kerkring** or **valvulae conniventes.** These circular folds contain villi over them. These villi in turn contain microvilli or brush- bordered cells. These all looks like shown below

The proximal 1/3rd portion of small intestine is considered as jejunum, while the rest 2/3rd part is considered as ileum. The extra distal part of ileum is considered as terminal ileum or ileum terminalis. The jejunum and ileum are considered as two portions of mesentric intestine. The circular folds and villi decrease in jejunum, but increase in ileum. Thus, indicating that the chief function of jejunum is secretion, while that of ileum is absorption.

09. Large intestine

The large intestine consists of following three parts

(i) Caecum (ii) Colon (iii) Rectum

Caecum

It is a blind pouch-like structure situated below the junction of ileum and colon. The length of caecum is about 3-8 cm. Its width rages from 4-7 cm. It is considered as the widest part of large intestine (except for the ampulla of rectum). Caecum is intraperitoneal.

At the junction of ileum and colon the wall of ileum is thickened and become muscular to function as ileocaecal sphincter. It slows down the content of ileum into the colon. Externally, caecum bears a blind tube at this junction having lymphoid tissue. This tube is called **vermiform appendix.** It is 3-4 mm in diameter and 2.5-15 cm in length.

Colon

It is placed in abdominal cavity in such a way that it borders the coils of small intestine inside. The colon has longitudinal bands called **taeniae coli.** It also has small pouches name **haustra.**

As shown in figure above the colon consists of

(i) The ascending colon
(ii) The transverse colon
(iii) The descending colon
(iv) The pelvic or sigmoid colon

The transverse colon is considered as the longest part of large intestine. While the ascending colon is the shortest part of colon. The sigmoid colon is S-shaped structure situated in pelvis region. The curvature or flexor present between ascending and transverse colon is called **hepatic flexor** or **right flexor** (*Flexura coli dextra).* Similarly the flexor or curvature present between transverse and descending colon is called **splenic flexor** or **left flexor** (*Flexura coli sinistra).*

Rectum

It is the terminal part of large intestine as wall as the digestive tract. Its length varies from 14-18 cm and it mainly composed of two parts

(i) Pelvic part (ii) Perineal part

The pelvic part contains a narrow suprampullar part and a wide ampulla of rectum or ampulla recti. The perineal part is present in the perineal region and called as **anal canal** or **canalis analis.** This canal is a short canal about 3.8 cm long in adults. Its opening to exterior is called **anus.**

Following two sphincter muscles, control the opening of anus.

(i) **Internal sphincter** It is made up of involuntary or smooth muscles.
(ii) **External sphincter** It is made up of voluntary or striated muscles.