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عنوان المحاضرة باللغة الانجليزية	Digestive Systimatic Tissue
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Digestive system

Gastrointestinal tract

The GI tract is essentially a tube extending from the oral cavity to the anus. This tube is organized into a series of four distinct layers

Mucosa : innermost layer (closest to the lumen),consisting of epithelium, lamina propria, and muscularis mucosae.

Submucosa: connective tissue supporting (outside, deep to) the mucosa.It allows the mucosa to move flexibly during peristalsis.

Muscularis : The muscularis externa ("muscularis" for short) is the muscular wall of the GI tract, deep to (surrounding) the submucosa.

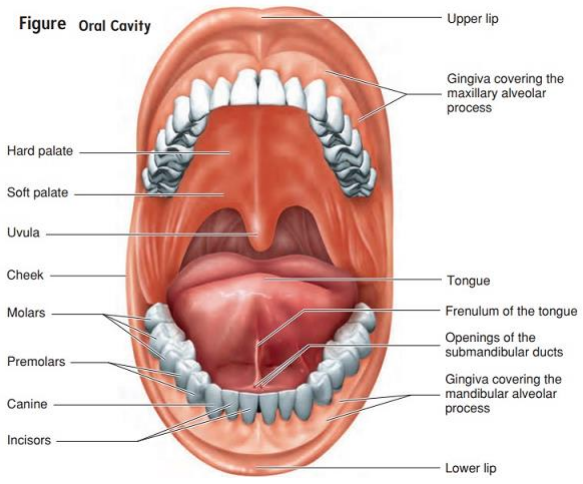
The tongue and the muscularis of the upper esophagus consists of striated muscle.

Adventitia or the **serosa** is the outermost layer of the GI tract.When the outermost layer is attached to surrounding tissue, it is called **adventitia**.

Adventitia is just ordinary fibrous connective tissue arranged around the organ which it supports.When the outermost layer lies adjacent to the peritoneal cavity, it is called **serosa**. consists of ordinary connective tissue with a surface of **mesothelium**.**Mesothelium** is a simple squamous epithelial tissue which forms the surface of the serosa in the major body cavities

Oral cavity.

1- **Lips**
2- **Cheeks**
3- **Gums(gingiva)**
4- **Floor of the mouth**
5- **Hard and soft palate**
6- **Teeth**
7- **Tongue.**



Oral cavity

Stratified squamous epithelium. — **Lamina prperia**

Keratinized	nonkeratinized.	Loose connective tissue
Gums,hard palate, Dorsal surface of Tongue	cheek,floor of mouth,soft palate, Ventral surface of tongue, Inner lip.	blood vessles,nerves, lymphatics,minor salivary gland

The epithelium of the oral mucosa is of the stratified squamous type, which tends to be keratinised in areas subject to considerable friction such as the palate. The oral epithelium is supported by dense collagenous tissue, the lamina propria. Throughout the oral mucosa, numerous small accessory salivary glands of both serous and mucous types are distributed in the submucosa

The lip structure:

1- **The external surface** .• is covered with thin skin formed of epidermis and dermis with the associated hair follicles, sebaceous glands and sweat glands.

•underneath the skin, bundles of circular skeletal muscle of the orbicularis oris ms., are present.

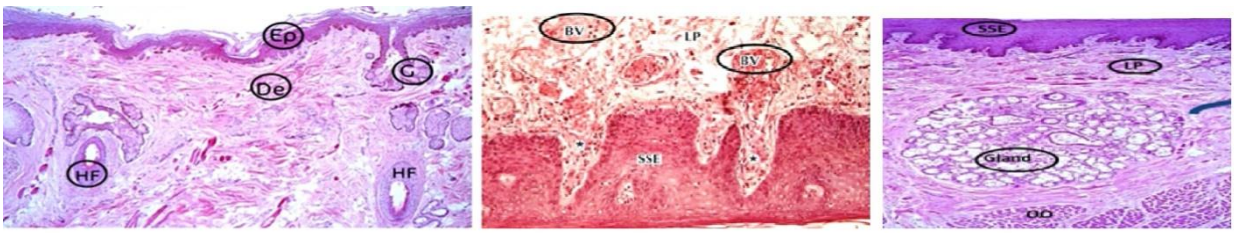
2- **The internal surface** Lines by mucous membrane which is formed of:

- stratified squamous non-keratinized epithelium (thicker than that of epidermis of the external surface)
- lamina propria: formed of C.T. contain; Bl.Vs. , lymphatic Vs. , nerves and group of labial minor salivary glands (mucous acini)

3- **the red margin** is continuous with the thin skin of the ext. surface of the lip covered by modified skin characterized by:

- transparent epithelium; formed of stratified squamous non-keratinized epithelium without hair follicles, sebaceous glands or sweat glands.

- deeply and heavily vascular dermal papillae (giving the red color of the lip margin), highly supplied with nerves.

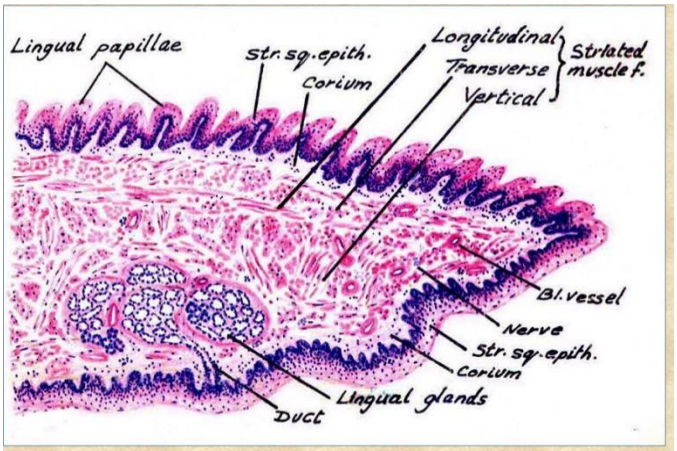


External Red margin Internal

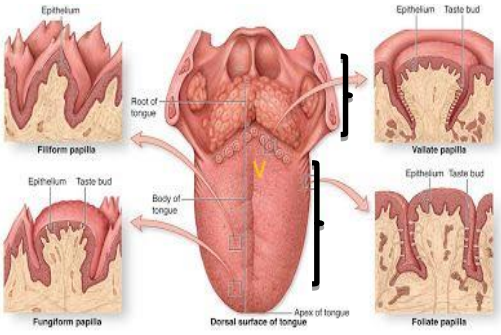
The Tongue

tongue is a muscular organ projecting into the oral cavity from its inferior surface. It is covered with a mucous membrane that consists of stratified squamous epithelium, keratinized in parts, resting on a loose connective tissue**.** The dorsal surface of the tongue is divided by the V shaped into an oral part, the anterior two-thirds, and a pharyngeal part, the posterior one-third.

The dorsal surface of the oral part has a characteristic appearance due to the presence of a large number of small projections, the lingual papillae. The epithelium of the pharyngeal part forms a somewhat irregular surface which covers the lingual tonsils.The lingual papillae consist of a connective tissue core covered with a stratified squamous epithelium. On the basis of their appearance four types of papillae can be distinguished - filiform, fungiform, circumvallate and foliate papillae.

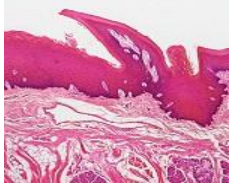


The tongue is considered as a "bag" of mucous membrane packed with striated muscle fibers running in all directions

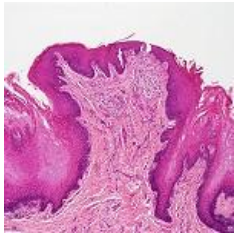


Filiform papillae

are the smallest and most numerous papillae. By providing the tongue with a rough surface they aid in the manipulation and processing of foods.



Fungiform papillae occur singly and are fairly evenly spaced between the filiform papillae. Their connective tissue core is richly vascularised. The epithelium is slightly thinner than on



the remaining surface of the tongue.

Circumvallate papillae

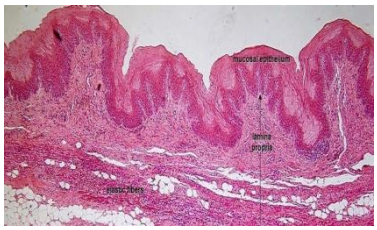
are the largest and least numerous papillae - in humans there are between 8 and 12 of them. They occur in depressions of the surface of the tongue Taste buds are particularly numerous on the lateral surfaces of these papillae.

Foliate papilla

are not well developed in humans and may be absent in aged individuals. If present, they form lamellae along the posterior and lateral border of the tongue.

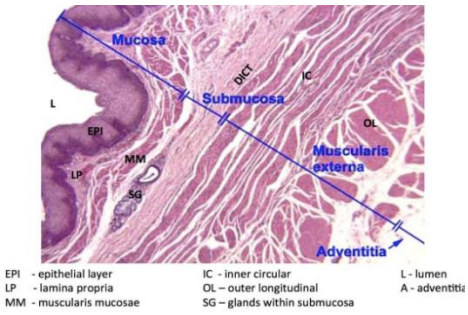
Pharynx:

The surface of the nasopharynx is covered by the same pseudostratified columnar epithelium that is found in the nasal cavity. Goblet cells in the epithelium secrete mucus, which further cleans, warms, and moistens inhaled air before it moves deeper into the respiratory tract. The other two regions of the pharynx, the oropharynx and laryngopharynx, are lined by nonkeratinizing stratified squamous epithelium.which protect the underlying tissues from damage caused by food moving through the passageway.



Esophagus

The esophagus provides passage from the oral cavity to the stomach. Compared to other regions of the GI tract, the esophageal lining is protected by a stratified squamous epithelium. Because this epithelium is normally not exposed to dryness or to abrasion, it is non-keratinized.The basic layers of the GI tract are especially distinct in the esophagus:

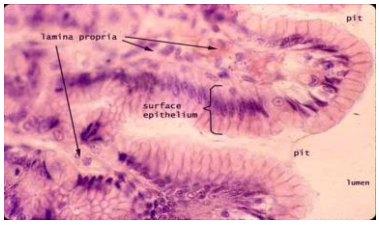


mucosa Esophageal epithelium is non –keratinized squamous epithelium ,Note that the basal surface of the epithelium can be deeply indented by connective tissue papillae. submucosa ,Connective tissue of the esophageal submucosa is typically more fibrous and less cellular than that in the lamina propria of the mucosa.small mucus gland are present which provide mucus for lubricating the passage of food down the esophagus, muscularis externa , n the upper third of the esophagus, striated muscle , In the lower two-thirds of the esophagus, the muscularis is smooth muscle.Adventitia consist of dense commective tissue.

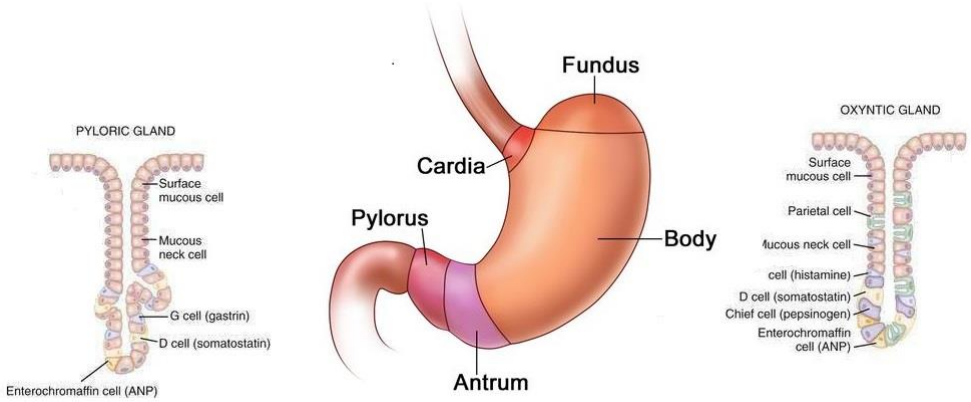
Stomach

The most conspicuous tissue feature of the stomach is the thick glandular mucosa, packed with gastric glands which secrete digestive enzymes and acid. The thick **mucosa** of the stomach is characterized by tubular glands beneath a surface of simple columnar epithelium.Lamina propria is highly vascular, with capillaries embracing each gland. The

surface is indented into numerous short gastric pits which open freely to the lumen. The entire surface consists uniformly of surface mucous cells, which protect the stomach from self-digestion. Failure of the surface mucous cells to protect the stomach wall can lead to an ulcer. The **submucosa** of the stomach is relatively unspecialized. The **muscularis externa** of the stomach is thicker than elsewhere along the tract. The smooth muscle fibers of the muscularis may form an oblique layer in addition to the inner circular and outer longitudinal" layers that charaterize the rest of the tract. the **serosa** of the stomach is normally unremarkable. Beneath the gastric pits, the mucosa of the stomach is filled with closely packed tubular glands, which differ by region(**cardiac, fundic, pyloric**).



Sections of the Stomach



Histologically, most of the stomach wall contains gastric glands (or fundic glands). These consist primarily **of parietal cells** which secret acid and (only present in the body of stomach) ,**chief cells** secrete the digestive enzymes pepsinogen(mostly present in fundus). The fundic glands also contain **mucous neck cells** inconspicuous cells with a typical mucous-secretory appearance and **stem cells** (located near the point where gastric glands open into gastric pits)are responsible for replenishing the gland cells and also the surface mucous cells that protect the stomach surface.and **enteroendocrine cell** (mostly present in Antrum) product **G-cell** (secret gastrin which stimulation of gastric acid secretion from parietal cell) and **D-cell** (secret somatostatin which inhibition gastrin secretion).

Small intestine

The small intestine is a convoluted tube , it is the longest section of the digestive tract. It extends from the junction with the stomach to the large intestine, or colon. The small intestine is divided into three parts: the **duodenum**, **jejunum**, and **ileum**. The main function of the small intestine is the digestion of gastric contents and absorption of nutrients into blood capillaries and lymphatic lacteals.

Layers of the small intestine The mucosa of the small intestine is characterized by evagination into plicae and villi, which increase the surface area for nutrient absorption, and by the crypts, which provide a protected site for stem cells.

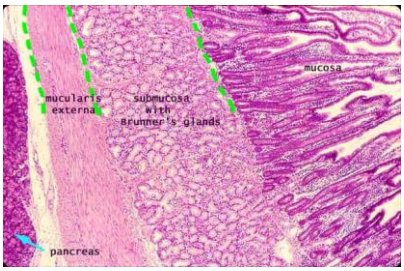
Cell types of the intestinal mucosa

Small intestinal mucosa is lined by a **simple columnar epithelium** which consists primarily of **absorptive cells** (**enterocytes**) are responsible for absorbing nutrients from the intestinal lumen and transporting them to the lamina propria, whence they diffuse into capillaries.

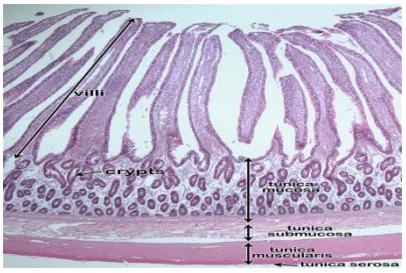
, **goblet cells** (secrete mucus to promote movement and effective diffusion of gut contents and **enteroendocrine cells** (secrete hormones to regulate secretion into the GI tract.). In crypts, the epithelium also includes **Paneth** cells(secrete lysosomal enzymes and other factors into the crypt lumen). and **stem cells** (line the walls of the crypts and continually replenish the intestinal epithelium).

The **submucosa** of the small intestine is relatively unspecialized, except in the duodenum where it is packed with the mucous-secreting Brunner's glands.

Muscularis externa of the small intestine has the standard layers of inner circular and outer longitudinal smooth muscle, with ganglia of **Auerbach's plexus** scattered in between.**serosa** attached to mesentery. The exception is the duodenum.



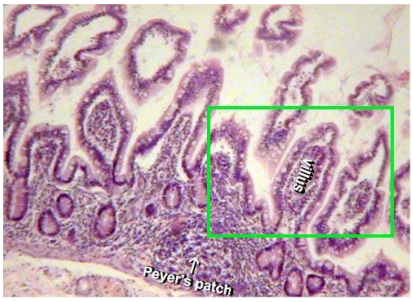
The **duodenum** distinguished from other regions of the small intestine by the presence of submucosal Brunner's glands, provide abundant alkaline mucus to neutralize the acid contents entering from the stomach. Villi are rather flatter in the duodenum than in the jejunum



The **jejunum** is the longest and most "typical" region of the small intestine, Villi are rather longer and more finger-like in the jejunum than in the duodenum, and plicae are usually

apparent.

The **ileum** has proportionally more goblet cells than more proximal sections of the small intestine,The ileum also displays(in the lamina properia and submucosa) an increase in the amount of mucosal lymphoid tissue called **Peyer's patches**. The epithelium of this lymphoid tissue is cuboidal (rather than columnar as on villi) and includes **Mcells** containing numerous B lymphocytes, some T lymphocytes, macrophages, and plasma cells.

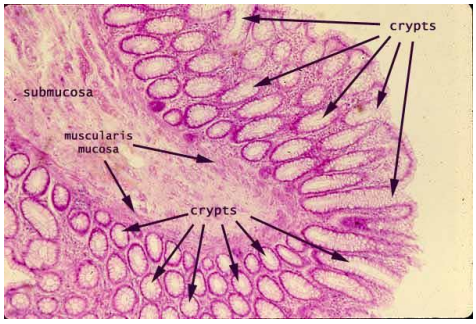


Large Intestine

The large intestine is situated between the anus and the terminal end of the ileum. It is shorter and less convoluted than the small intestine. The large intestine consists of the cecum; ascending, transverse, descending, and sigmoid colon; as well as the rectum and anus.

Regions of the lower tract

Three regions of the lower tract the **appendix**, the **colon**, and the **rectum** have very similar tissue architecture. A fourth region, the **anal canal**, represents a transition where the characteristics of lower-tract mucosa change to those of skin.The wall of the colon has the same basic layers as the small intestine. The **mucosa** consists of simple columnar epithelium , there are no villi with a much higher proportion of goblet cells interspersed among the absorptive cells , absorptive cells remain much more numerous than goblet cells.



The crypts are separated from one another by conspicuous lamina propria, whose composition is similar to that of small intestine:

loose connective tissue infiltrated by many white blood cells, with capillaries and thin strands of smooth muscle. The muscularis mucosa of the lower tract forms a thin layer (only a few muscle fibers in thickness) beneath the deep ends of the crypts .

the **submucosa** contains connective tissue cells and fibers,various blood vessels, and nerves. Two smooth muscle layers make up the **muscularis externa,** consist of inner circular and outer longitudinal layer is arranged into strips or bands of smooth muscle called the **taeniae coli** and supplied by blood vessels the **serosa** covers the transverse colon and the sigmoid colon.

The **rectum** has the same architecture as the colon, except for its location and outer layer is **adventitia** not **serosa.** The surface of anal canal changes from a simple columnar epithelium with goblet cells, through a short zone of non-keratinized stratified squamous epithelium, to the keratinized stratified squamous epithelium that is typical of epidermis. **Lamina propria** and **muscularis mucosae** disappear distally, and the connective tissue of submucosa changes to the dense fibrous tissue of dermis. This connective tissue contains both ordinary eccrine sweat glands and much larger apocrine sweat glands. Smooth muscle of the colon changes to striated muscle of the voluntary.