Digestive System part one

It is can be divided into three regions:-

1. **The oral cavity** involved salivary glands and oropharynx .
2. **The tubular digestive tract** , involved esophagus , stomach , small intestine and large intestine .
3. **The associated glands** which are located outside G.I.T. (salivary glands, liver, pancreas, gallbladder).

The oral cavity is lined by ***a masticatory mucosa*** and ***lining mucosa***.

1. **The masticatory mucosa** has a ***keratinized stratified squamous epithelium*** and in some areas ***a parakeratinized stratified squamous epithelium***, these mucosa is found on the gingiva (gums) and the hard palate .
2. **Lining mucosa** has a ***nonkeratinized stratified squamous epithelium*** and found on the lips, cheeks , floor of the mouth, inferior and underside surface of the tongue and soft palate .

   The lips may be subdivided into three regions:

   A- ***The external aspect***, which consist of *keratinized stratified squamous epithelium* contains hair follicles, sebaceous glands and sweat glands.

   B- The transitional zone , (vermilion zone) , in this zone the blood vessels are close to the lips surface imparting a pink color to the lips and covered by *keratinized stratified squamous* epithelium and devoid of hair follicles , sweat glands and occasionally nonfunctional sebaceous glands are present .

   C- The internal aspect inside the free margin of the lip, the lining change to a thicker *nonkeratinized stratified squamous epithelium* .

   - The core of the lips is composed of *skeletal muscle fibers* that are responsible for lip mobility.

Pharynx :

It is lined by ***nonkeratinized stratified squamous epithelium*** in the continuous with esophagus and lined by ***ciliated pseudostratified columnar epithelium*** containing goblet cells in the regions close to the nasal cavity.

Tongue :

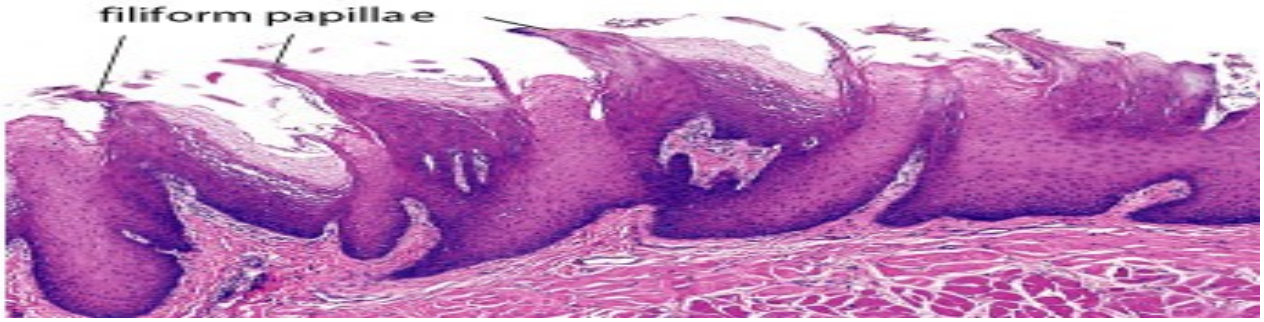
The tongue is a striated muscular organ projecting into the oral cavity from its inferior and covered by a mucous membrane which is smooth on the lower surface of the tongue and the dorsal surface is irregular, covered anteriorly by a great number of small eminences called **papillae**.

The striated muscle of the tongue is arranged in bundles usually separated by connective tissue that generally run in **three plans** ; because the connective tissue of the lamina propria penetrates the spaces between the muscular bundles , the mucous membrane is strongly adherent to the muscle .

Papillae :

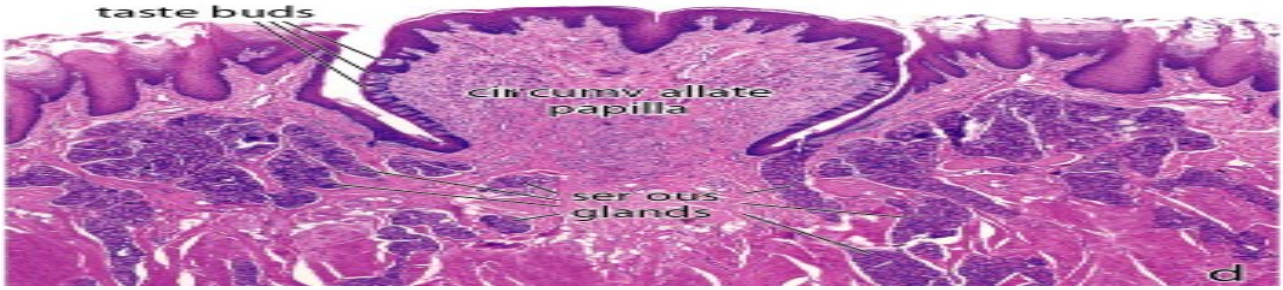
The papillae are numerous mucosal irregularities and elevations called lingual papillae cover the dorsal surface of the tongue. There are four types of papillae:

1- ***Filiform papillae*** are the smallest and most numerous in humans they are conical elongated projections of connective tissue that are covered with highly (heavily)keratinized stratified squamous epithelium which gives their a gray or whitish appearance and doesn't contain taste buds . These papillae serve as a mechanical role in providing a rough surface that facilitates food movement during chewing and distributed over the entire anterior dorsal surface of the tongue with the tips pointing backward.

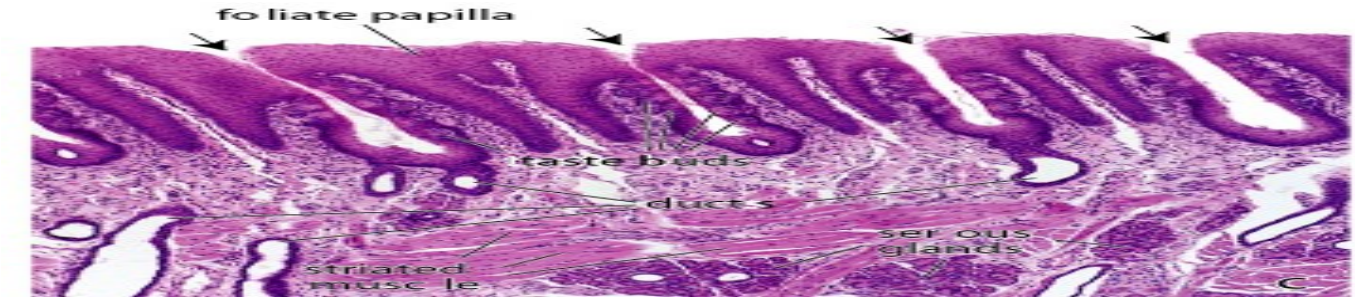


2- ***Fungiform papillae*** resemble mushrooms shape that have a narrow stalk and smooth surface , dilated upper part and less numerous, lightly keratinized but larger , broader and taller than the filiform papillae and more prevalent in the anterior region of the tongue . These papillae has scattered taste buds on their upper surface and these papillae are interspersed among the filiform papillae.

3- ***Circumvallate papillae*** are 8 – 12 largest circular lingual papillae and least numerous whose flattened surface and form a V-shaped that reside in the mucosa just anterior to the sulcus terminalis. each papillae is surrounded by deep moat like invagination completely encircle them, lined with non-keratinized. stratified squamous epithelium that contain numerous taste buds on the dorsolateral surface of the tongue. The serous glands ***(Von Ebner's glands)*** located in connective tissue and empty secretion by ducts into the base of the moat for presumably flushes material from the moat to enable that taste buds to respond rapidly to changing stimuli and also these glands secrete a lipase that prevents the formation of a hydrophobic film over the taste buds that would hinder their function.



4- ***Foliate papillae*** are poorly developed in adult and consist of two or more parallel ridge and furrows on the dorsolateral surface of the tongue and contain many taste buds on their lateral surface and covered by str.sq.epith. that usually not keratinized or slightly keratinized .



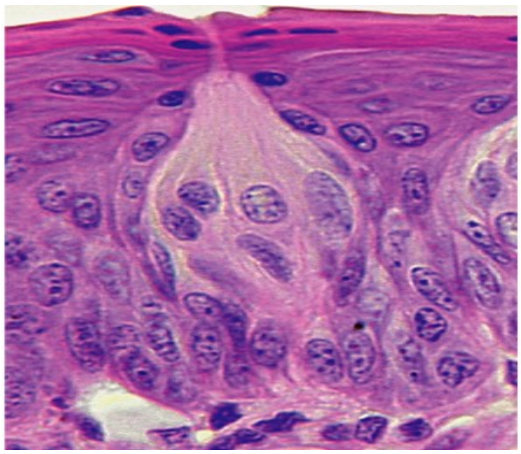
<u>The taste bud</u> :

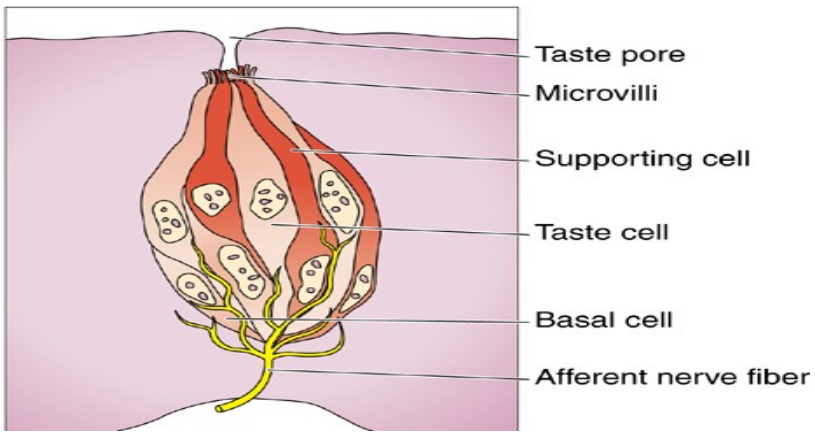
These structures appear as oval , pale staining bodies that extend through the thickness of the epithelium. The free surface of each taste bud contains an opening called ***the taste pore***.
It is consist of three types of cells :-

1- ***Neuroepithelial cells*** (sensory cells) or (Gustatory cell) are the most numerous cells in the taste bud and elongated cells extend from the basal lamina of the epithelium to the taste pore, at their base they form a synapse with the processes of afferent sensory neurons .They contain microvilli on their apical surface .

2- ***Supporting cells*** are less numerous and elongated cells that extend from the basal lamina to the taste pore & contain microvilli on their apical surface but do not synapse with the nerve cells .

3- ***Basal cells*** are small cells located in the basal portion of the taste bud , near the basal lamina and serve as a stem cells for two other cell types .





Esophagus

The esophagus is a muscular tube whose function is to transport food stuffs from the mouth to the stomach and to prevent the retrograde flow of gastric contents.

The esophagus is composed of four concentric layers :-

A-Mucosa :

The mucosa has three regions thrown into longitudinal folds , and as follows :-

Epithelium : It is ***stratified squamous nonkeratinized epithelium.***

Lamina propria : It is a ***loose connective tissue*** that contains mucus-producing ***esophageal cardiac glands*** in regions near of the stomach .

The muscularis mucosae : It is composed of a single layer of longitudinally smooth muscle.

B-Submucosa :

It is composed of fibro elastic connective tissue that contains ***esophageal glands proper*** produce a mucous secretion facilitated the transport of food stuffs and protects the mucosa . Meissner's submucosal plexus houses postganglionic parasympathetic nerve cells.

C-Muscularis Externa :

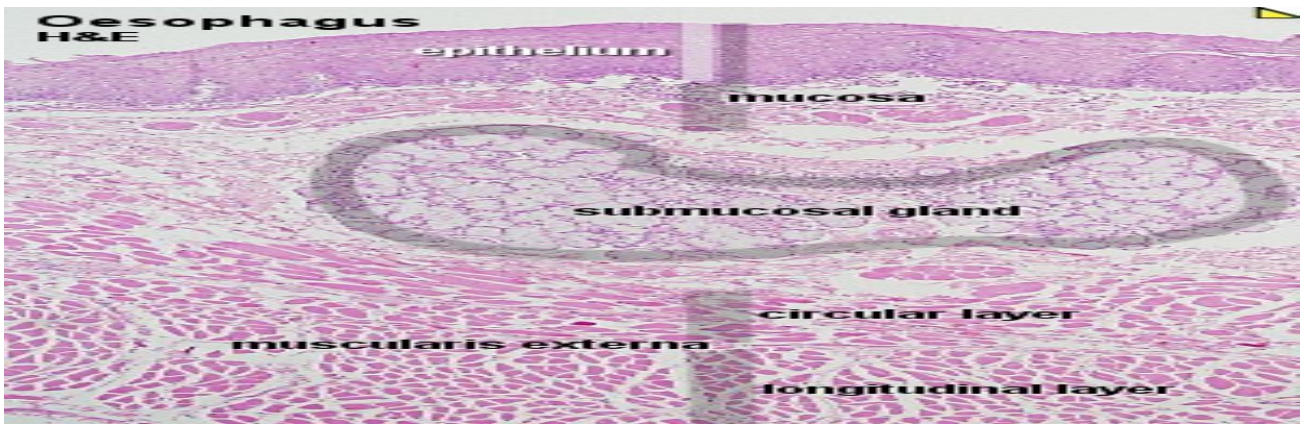
The muscularis externa is composed of **inner circular** and **outer longitudinal** muscle layers. In ***the upper one-third*** of the esophagus these consist of ***skeletal muscle*** ,

in ***the middle one-third*** they consist of ***skeletal and smooth muscle*** , and

in ***the lower one-third*** they consist of ***smooth muscle*** .

D- Adventitia :

The adventitia of the esophagus is composed of loose connective tissue that blends into the surrounding tissue . inferior to the diaphragm in the peritoneal cavity is covered by serosa.



Stomach

The stomach is an expanded hollow organ situated between the esophagus and small intestine . At the esophageal – stomach junction , there is an a abrupt transition from the ***stratified squamous epithelium*** to the ***simple columnar epithelium*** of the stomach. The mucosa and submucosa of the stomach lie in longitudinally directed folds known as rugae. when the stomach is filled with food, these folds disappear .

The stomach composed of :-

A- Mucosa :

(1) Epithelium :

The gastric mucosa consist of a surface epithelium that invagination forming **gastric pits** extents in to the lamina propria ,. Emptying in to the gastric pits are (cardiac, gastric, and pyloric glands). ***The simple columnar epithelium*** has no goblet cells composing this epithelium are known as ***surface lining cells*** and extend in to the gastric pits . all the cells secrete an alkaline mucous form a protective gel .

(2) Lamina propria :

It is loose connective tissue houses numerous gastric glands (cardiac, fundic and pyloric glands).

Cardia region : its mucosa contains ***cardiac gland*** consist of mucous gland cells produce mucus and lysozyme.

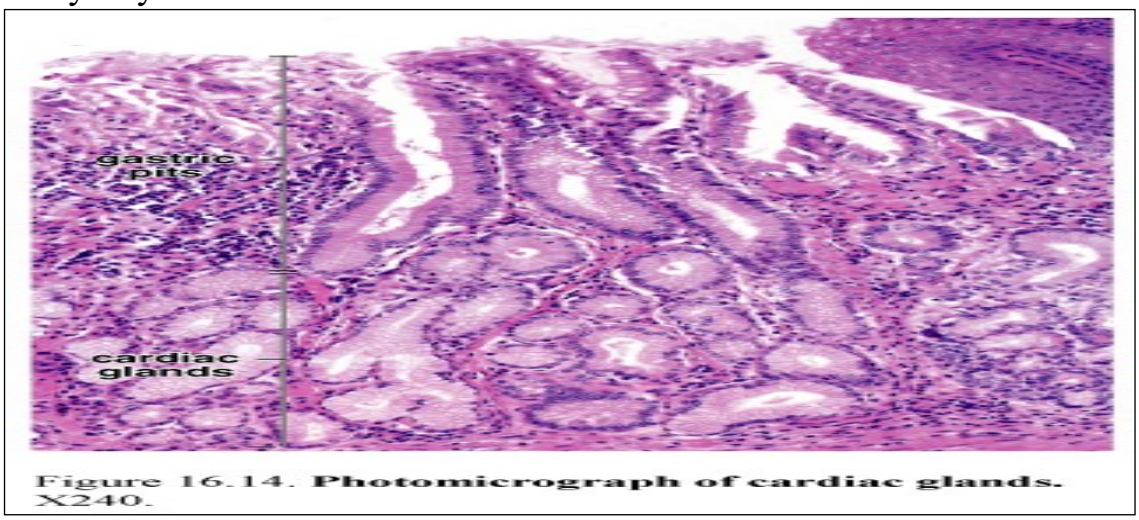


Figure 16.14. **Photomicrograph of cardiac glands.** X240.

Fundus and Body region :

The lamina propria of the fundus and body is filled with ***fundic gland***

Cells of Gastric glands .

a- Stem cells have a high rate of mitosis :

b- Mucous neck cells these cells secretion less alkaline mucous.

c- Oxyntic (parietal) cells secrete Hcl also secrete gastric intrinsic factor , a glycoprotein required for the absorption of vitamin B_{12} in the ileum .

d- Chief cells (zymogenic) contain the inactive enzyme pepsinogen rapidly converted into enzymes pepsin , and also rennin and lipase , which initiate digestion in the stomach.

e- Enteroendocrine Cells are an epithelial cell type in the mucosa throughout the digestive

In the fundus (enterochromaffin cells) secrete serotonin ,

In the pylorus and ***lower body*** produce gastrin and also different enteroendocrine cells produce hormones such as somatostatin , secretin, cholecykinin , and others .

Pylorus Region :

the pyloric glands secrete mucus as well as amount of the enzymes lysozymes and lymphoid nodules present.

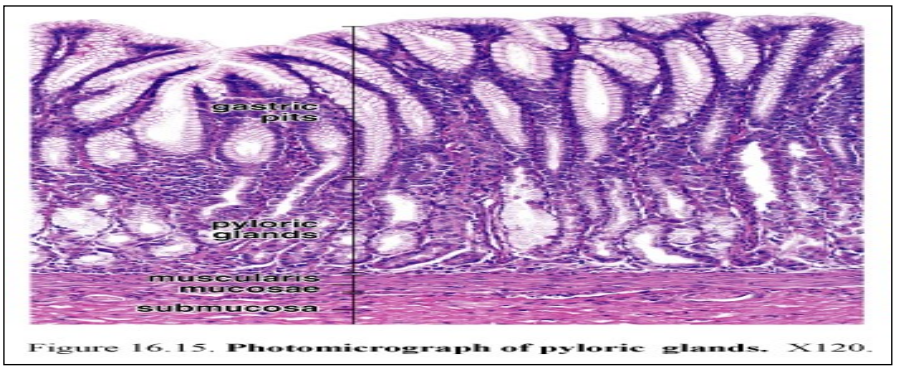


Figure 16.15. **Photomicrograph of pyloric glands.** X120.

(3) Muscularis mucosae

The muscularis mucosae is composed of the ***inner circular*** and an ***outer longitudinal*** smooth muscle. A third layer may be present in certain regions.

B- Submucosa:

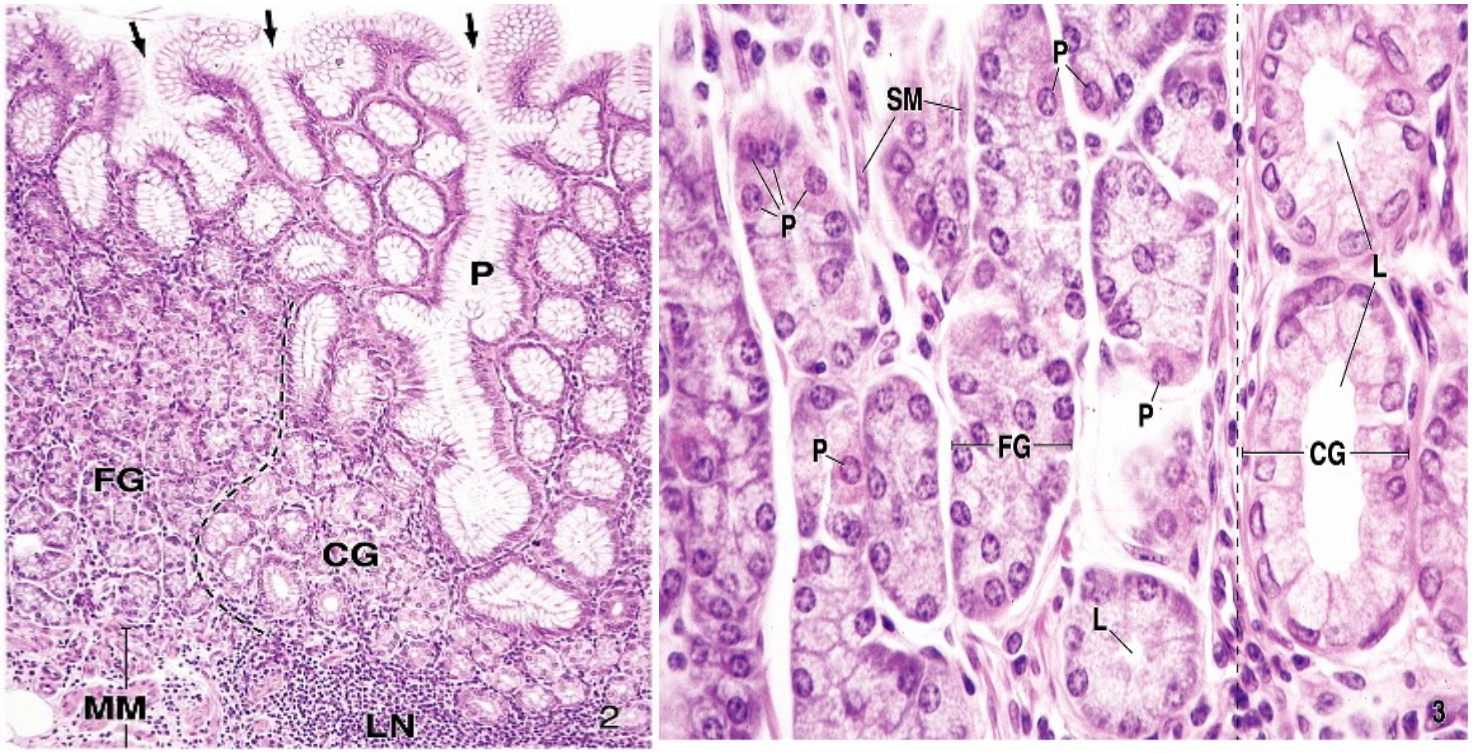
Its composed of ***dense connective tissue*** and no gland as well as Meissner's plexus .

C- Muscularis externa :

The Muscularis externa is composed of smooth muscle fibers oriented in three main directions . The external layer is ***longitudina***l , the middle layer is ***circular*** , and the internal layer is ***oblique*** . At the pylorus, the middle layer is greatly thickened to form the pyloric sphincter.

D- Serosa :

The stomach is covered by a thin connective tissue coat enveloped.



DR. AHMED ADEEB AL-TAMIMI

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