

Digestive System

The digestive system consists of the digestive tract extended from oral cavity, mouth , esophagus, stomach , small and large intestine, rectum and anus and digestive glands , **salivary gland , pancreas , liver , and gallbladder** . The digestive tract is a hollow tube composed of four (4) principal layers from the lumen outward:

- **Mucosa**, consisting of a lining *epithelium* , an underlying connective tissue called the *Lamina propria* ,and *muscularis mucosae*, composed of smooth muscle
- **Submucosa** , consisting of dense irregular connective tissue
- **Muscularis externa** , consisting of two layers of muscle
- **Serosa**, consisting of a simple squamous epithelium, the *mesothelium* , and a small amount of underlying connective tissue. (View 48-49)



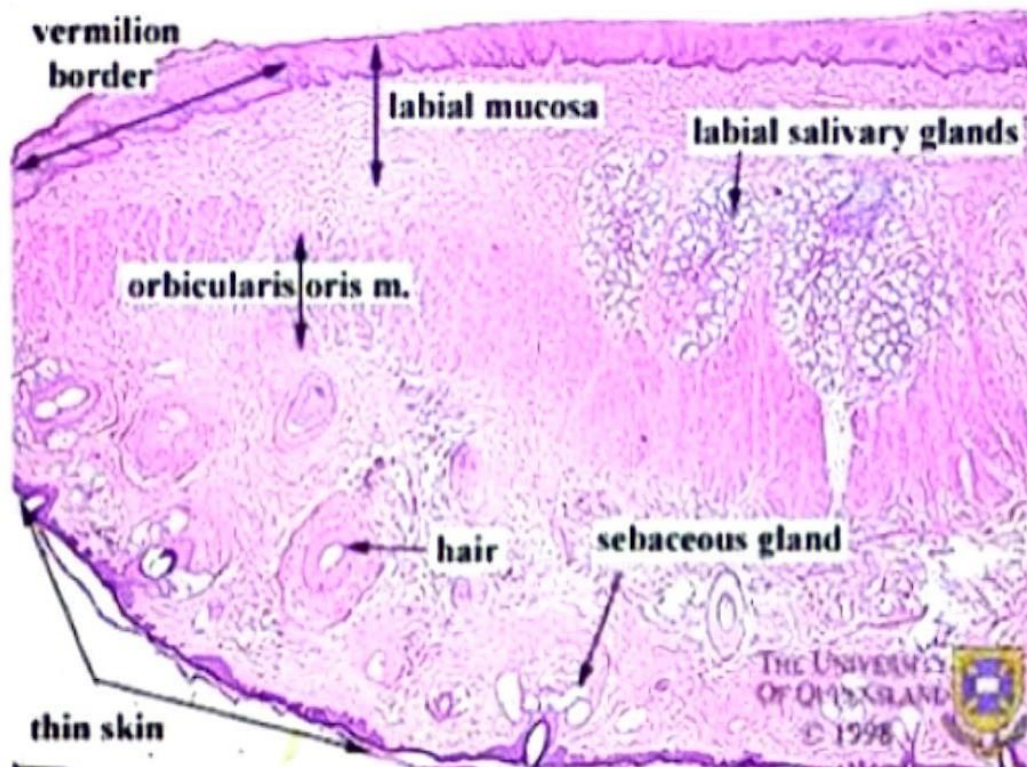
(View 49)

Oral cavity

The oral cavity is lined with nonkeratinized stratified squamous epithelium

1-Lip :

In the lips a transition from nonkeratinized to keratinized epithelium can be observed, the lamina propria has papillae. A submucosa containing diffuse small salivary glands (tubuloacinar labial glands), and has a core of skeletal muscle, which called Orbicularis oris . (View 50)



(View 50)

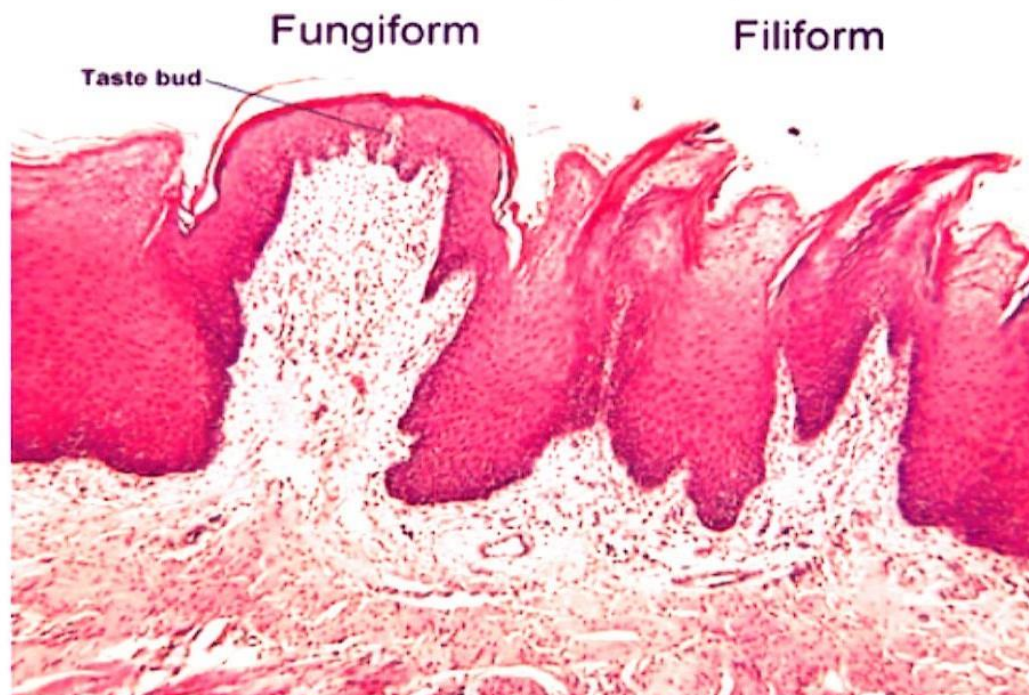
2- The tongue :

Is a mass of striated muscle covered by a mucous membrane whose structure varies according to the region studied ,this allows the tongue great mobility for chewing and swallowing of food .

The mucosa consists of : *Epithelium* (stratified squamous epithelial tissue) and thin papillated *lamina propria* .

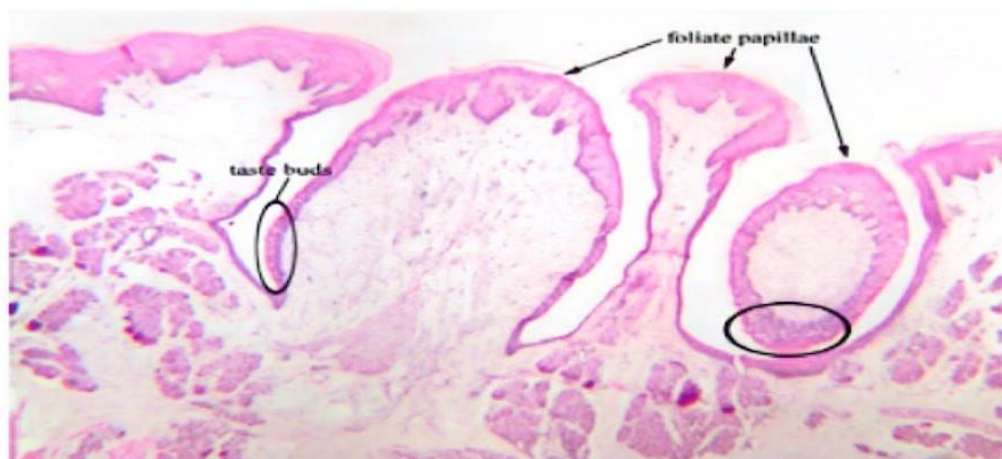
On the lower surface of the tongue , the mucous membrane is smooth , while the dorsal surface is irregular ,covered anteriorly by papillae , which are elevation of the oral epithelium and lamina propria .There are 4 types of papillae :

- **Filiform papillae** , have elongated conical shape ; numerous and present over the entire surface of the tongue.(View 51)



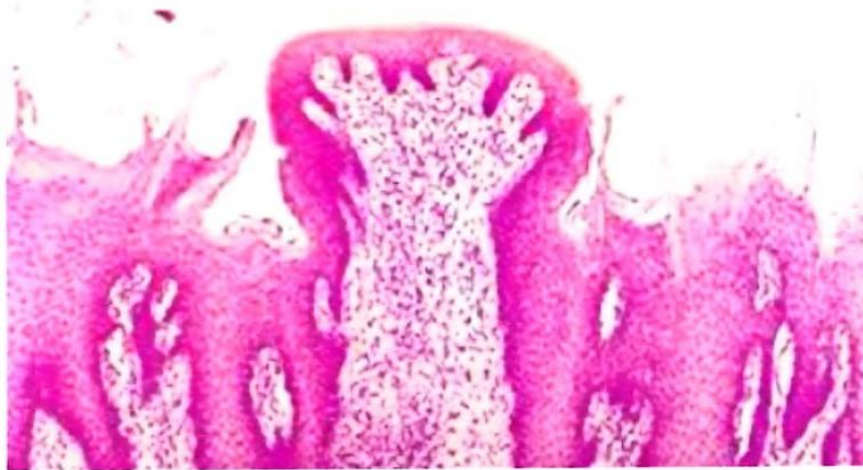
(View 51)

- **Fungiform papillae** , these resemble mushrooms , they have a narrow stalk and a smooth surface, dilated upper part. These papillae contain scattered taste buds on their upper surfaces.(View 51)
- **Foliate papillae** : These are poorly developed in humans. (View 51)



(View 51)

- **Circumvallate papillae** : These are extremely large circular papillae whose flattened surfaces extend above the other papillae and are distributed in the V region in the posterior portion of the tongue. Number of taste buds present along the sides of this papilla . (View 51)



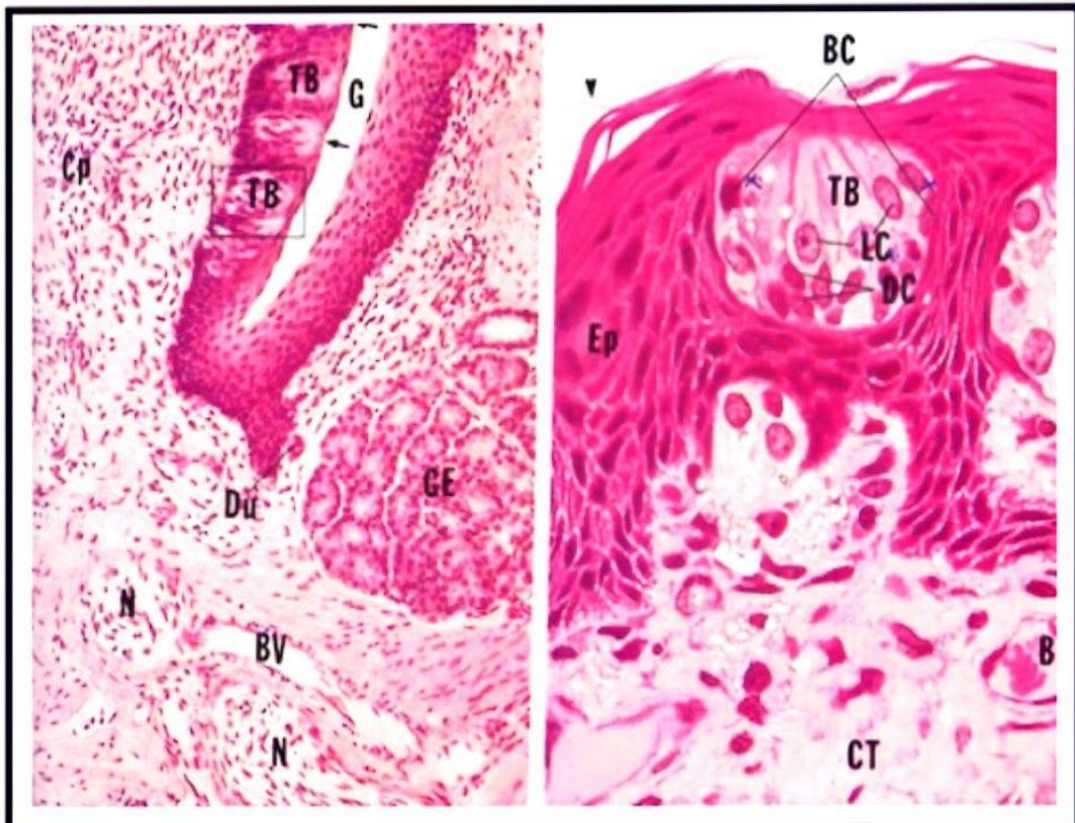
(View 51)

Taste Buds

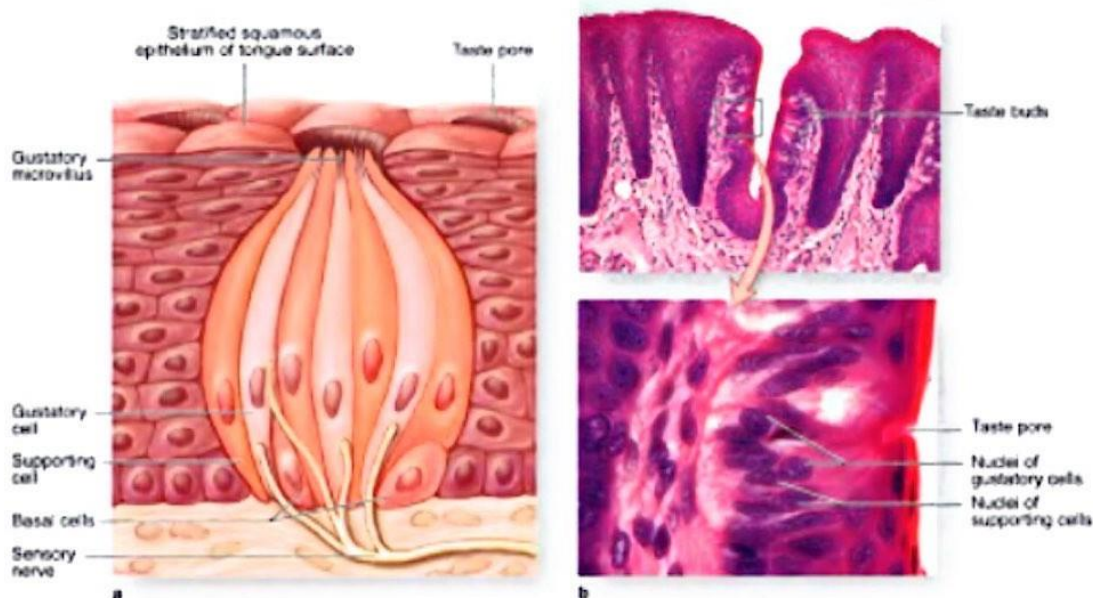
In histological sections, taste buds appear as oval, pale staining bodies that extend through the thickness of the epithelium .A small opening onto the epithelial surface at the apex of the taste bud is called the *taste pore* .

Taste buds are present in the lateral surface of the fungiform, foliate and circumvallate papillae . Are distinguished from the surrounding stratified epithelium by their oval shape & elongated cells , there are several types of cells in the taste buds :

- 1-**Sustentacular (supporting) cells** : Are elongated with a darker cytoplasm and slender dark nucleus .
- 2-**Light taste or gustatory cells** : A lighter cytoplasm and more oval lighter nucleus.
- 3-**The basal cells** : Are located at the periphery of the taste bud , near the basement membrane.(View 52-53)



BC : basal cell, BV : blood vessels, DC: dark cells ,DU: ducts, EP: epithelium, G:groove, GE: glands of Von Ebner, LC: light cells, LP: lamina propria, MG: mucous gland,, N: nerve, SM: skeletal muscles , TB: taste buds(View 52)



(View 53)

3 - The pharynx :

The pharynx represents a transition space between the oral cavity and the respiratory and digestive system . It contains the tonsils

4- Esophagus :

Is a muscular tube whose function is to transport food stuffs from the mouth to the stomach . (view 54)

the layers that constitute the wall from the lumen to outward are :

• **Mucosa** , consists of :

- 1) *Epithelium* , nonkeratinized stratified squamous ep. T.
- 2) *Lamina propria*, thin layer
- 3) *Muscularis mucosa* , longitudinal smooth muscle

- **Submucosa** , is composed of connective tissue with groups of small mucus – secreting glands, the esophageal glands.
- **Muscularis externa** , composed of two well defined muscle layers , the inner is circular and the outer is longitudinal. The muscularis externa of the esophagus is highly variable in different species ,in humans , the upper third of esophagus consists of striated skeletal muscle ,the middle third , a mixture of both smooth and skeletal muscle can be seen and in the lower third only smooth muscle is found .
- **Adventitia** , consists of loose connective tissue .