**Lecture title: Digestive system**

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## Digestive system consist of :

**1-** Oral cavity (lips , Cheeks, Hard Palate, Soft Palate, Tongue, Special lingual structures

Teeth , salivary gland).

**2-** Gastro intestinal duct include( esophagus , stomach , small intestine and large intestine) .

The gastro intestinal duct lined with specific epithelium related on their function of each organ.

| Organ | Function |
|---|---|
| Lips | Ingestion and fragmentation of food. |
| Teeth | Fragmentation of food. |
| Tongue | Prehension and mastication and deglutition of food. |
| Salivary gland | Fragmentation and moisture of food and swallowing. |
| Esophagus | Passage of food from oral cavity to stomach. |
| Stomach | Complete the fragmentation and beginning of digestion. |
| Small intestine<br>**1-** duodenum<br>**2-** jujenum<br>**3-** ileum | Digestion by enzyme from pancreas and liver.<br><br>Complete digestion and absorption. |

| | |
|---|---|
| Large intestine<br>**1-** cecum<br>**2-** colon<br>**3-** rectum<br>Anus | Absorption of water and liquid material.<br><br>Storage of feces.<br>Route for defecation. |

**There is general structure pattern for all tubular organ of the digestive system.**

1- Tunica mucosa (mucous membrane) :

a- epithelium. b- lamina properia. c- muscularis mucosa.

Epithelium:-it is defer from organ to another .

Lamina properia:- loose C.T with reticular fiber.

Muscularis mucosa:- One or more than one layer of smooth muscle fiber.

Note : In same organ there was gland in lamina properia called mucosa gland.

2- Tunica submucosa :

Consist of loose C.T with fatty tissue and in some organ have gland called (Submucosal gland or Browner glands).

3- Tunica muscularis :

a- Inner circular. b- Outer longitudinal. (smooth muscle fibers)

4- Tunica adventitia or serosa:

Adventitia loose C.T without one layer of mesothelium cell,it is cover by fascia.

Serosa loose C.T with one layer of mesothelium cell.

There are two types of ganglionic nerve plexuses of autonomic nervous system in the tunica submucosa called :-

▲Meissner's plexus : ganglionic cell capsulated with C.T.

▲ Auerbachs plexus:found between inner circular and outer longitudinal of tunica muscularis.

## Oral cavity :

### Lips and Cheeks:-

The external surface (skin side) of the lips and cheeks is covered by hair-bearing skin with sebaceous and sweat glands.

The internal surface (oral side) is lined by oral mucosa that is made up of stratified squamous epithelium rests on lamina propria-submucosa Depending on the nature of the animal's diet, the epithelium may or may not be keratinized. Those animals which eat a great deal of roughage, such as ruminants and horses, usually have a very heavily keratinized oral epithelium, while those which eat softer food such as carnivores show less or non keratinized type. The lamina propria-submucosa is a loose connective tissue layer containing numerous accessory salivary glands of serous, mucous or seromucoid type.
The center of the lips and cheeks contains some of the buccal muscles, strands of skeletal muscle that are part of the muscle sheet underlying the skin The place of continuity between the "dry" integument and the "wet" oral mucosa is a sort of transition point referred to as a muco-cutaneous junction.

# Tongue :

The tongue in mammals is an extremely muscular organ within whose substance there are a number of smaller salivary glands and a number of motor and sensory nerve fibers. The bulk of the tongue is skeletal muscle, arranged in three layers, all at right angles to each other. This provides for an amazing degree of flexibility and is vital to vocalization. There may be a considerable amount of adipose tissue present as well.

The ventral surface of the tongue is smooth and is covered by thin non-keratinized stratified squamous epithelium continuous with that of the floor of the mouth.
The dorsal surface is covered by stratified squamous keratinized epithelium and is raised into a series of elevations called lingual papillae.

## Lingual Papilla

Lingual papillae are small elevations found on the dorsal surface of the tongue. Each papilla is formed of an epithelial cap and a connective tissue core derived from the underlying lamina propria. they are classified into two major groups:

1. mechanical and 2. gustatory papillae.

The ***mechanical*** papillae contain no taste buds and are principally concerned with movement of foods within and into the oral cavity. They include filiform, conical and lenticular papillae
The ***gustatory*** papillae contain taste buds and are primary concerned with reception of taste sensation. They include, vallate, .fungiform and foliate papillae.

## ▲Mechanical papillae (st.sq.epi.k) :

1- Filiform papillae.

2- Conical papillae.

3- Lenticular papillae.

## ▲Chemical papillae (st.sq.epi nonk) :

1- Fungiform papillae.

2- Circumvallate papillae. + taste bud

3- Foliate papillae.

The **filiform papillae** are the most numerous types, forming a velvety covering on the tongue Their shapes vary among different animal species. Equine filiform papillae appear as thin cornified threads projecting above the surface and their connective tissue cores end at the bases of the cornified threads

-Ruminant filiform papillae are cone-shaped structure projecting above the surface and their connective tissue cores have several secondary papillae.

-Cat filiform papillae are large with two prominences of unequal size. The caudal prominence is especially large and gives rise to a caudally directed keratinized spine. The rostral papilla is rounded with a thinner stratum corneum.

-Dog filiform papillae have two or more apices; the caudal one is larger and has a thicker stratum corneum than the others.

**Conical papillae** : are larger than filiform papillae use manipulation and break down of food and facilitate the movement of ingesta with oral cavity , project above other papillae and do not have taste bud.

**Lenticular papillae** are flattened, lens-shaped projections that are found on the torus linguae of ruminants. They are covered by keratinized stratified squamous epithelium and have a core of dense irregular connective tissue.

**Fungiform** are smooth with rounded surface they help to manipulate food. This papillae have test bud on the apical surface and some animal this test bud located on the lateral surface responsible for perception of the sense of taste .

**Foliate papillae** cover with non keratinized squamouse epithelium as leaf shape in the invagination of the mucous membrane of the tongue many taste on the lateral surface of papillae there are absent in ruminant but there more developed in horse , dog and rabbit.

**Vallate or Circumvallate Papillae**

Vallate papillae are the largest type, easily visible with the naked eye in most animals They are paired and located near the back of the tongue.

A vallate papilla is set into a deep pocket in the tongue's surface, and anchored at the bottom by a short broad stalk. It does not protrude above the general level of the surface It's surrounded by a deep narrow epithelial-lined cleft called "moat". Vallate papillae usually show taste buds which are located on the undersides of the papilla proper, and on the " tongue side of the "moat " Aggregates of serous glands called Von-Ebners glands whose ducts open into the moat are located beneath the papilla The serous secretions of these associated glands help to clean up the moat and thus facilitate taste reception.