

Oral mucous membrane (m.m.)

- The **moist lining** of the oral cavity that continuation with skin on one end and esophagus on the other end.
- The epithelia of this m.m. represent **the primary barrier** between the oral environment and deeper tissues that is either ectodermal or endodermal in origin
- It consists of **stratified squamous epithelium** termed **oral epithelium** and an underlying connective tissue termed **lamina propria**.
- The oral cavity described as a mirror that reflects the health of the individual. **Changes indicative of disease** are seen as alterations in the oral mucosa lining the mouth, which can reveal systemic conditions, such as diabetes or vitamin deficiency, or the local effects of chronic tobacco or alcohol use.

Organization of oral m.m.:

Basic divided into **three major types** according to primary function:

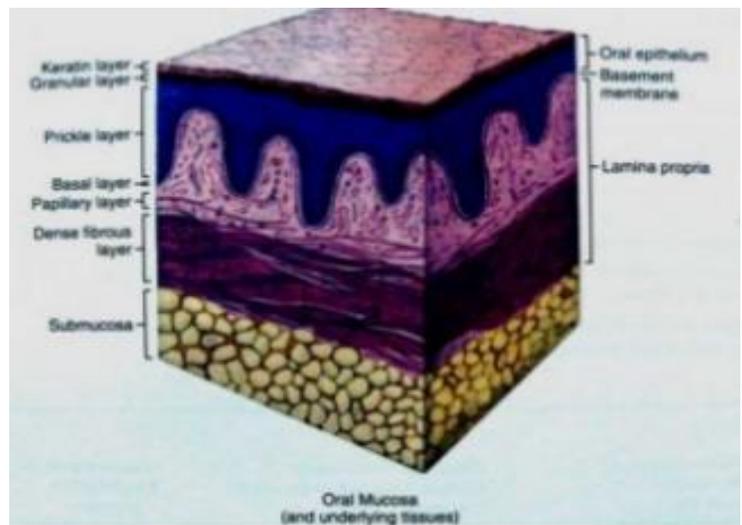
1- Masticatory Mucosa: is a part that is adapted to need **friction** produced by mastication, and this of keratinized or Parakeratinized oral epith. like **gingiva (free, attached and interdental)** and **hard palate**. Its form about 25% of total mucosa.

2- Lining Mucosa: Form about 60% of total mucosa. Covers the floor of mouth, ventral (underside) tongue, alveolar mucosa, cheeks, lips and soft palate. Does not function in mastication and therefore has minimal attrition. Its **non-keratinized epithelium; soft and pliable**.

3- Specialized Mucosa: Form about 15% of total mucosa. Covers dorsal tongue and composed of cornified epithelial papillae, it's so called because it holds the taste buds.

Oral M.M classified based upon location into:

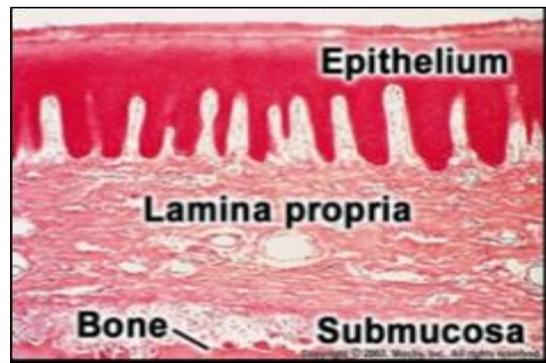
- 1-Buccal mucosa
- 2- Lingual mucosa
- 3-palatal mucosa
- 4-labial mucosa
- 5-alveolar mucosa



The structure of oral m.m.

It mainly composed of three layers which are:

- 1-Oral Epithelium ,
- 2-Connective tissue (lamina propria L.P)
- 3-Sub mucosa



Lamina propria is a connective tissue of variable thickness that supports the epithelia, it divided into 2 parts:

- 1- papillary part
- 2- Reticular part

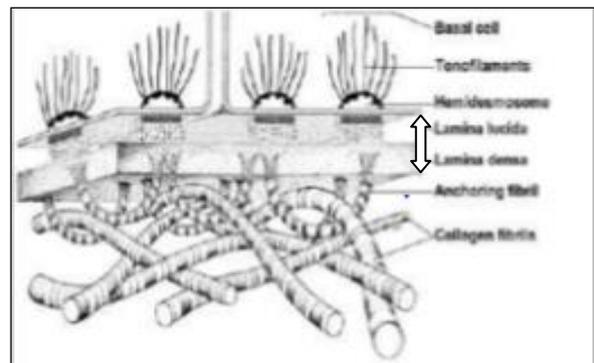
Both oral Epithelia and lamina propria formed an interface that is folded into corrugation papilla of C.T. protrude toward epith. carrying B.V. and nerves which is called **papillary projection**, look like pegs.

The epith. in turn is formed into ridges that protrude toward the lamina propria which is called **epithelial ridges**.

Reticular part is also a connective tissue contain net like collagen fibers and the basal layer (of connective tissue) contain large blood vessels, lymph vessels and nerves. The papillary part may be absent but the reticular part always present. e.g alveolar mucosa.

The junction between epithelia and lamina propria which is epithelia in origin called **basement membrane** when it's evident at light microscopical level and called **basal lamina** when seen at electronic microscopical level, it appears as cell free zone of width (**1 - 4**) μ , it contains:

- 1-Mucopolysaccharides
- 2-fibronectin
- 3-type IV collagen
- 4-proteoglycan
- 5-glycoprotein
- 6- Special anchoring fibrils.



This free zone basal lamina appears composed of two laminae:

- 1- **lamina lucida:** this is a clear cell free zone , its toward epith.
- 2- **lamina densa:** this is dark zone toward conn. T. , its filamentous and granular , contain fine collagen fibers called anchoring fibers.

The oral mucosa is either loosely attached to the underlying tissue and called **movable type** (contain submucosa) like in alveolar mucosa,

or its firmly attached to underlying tissue and called **immovable type** (not contain submucosa)like in gingiva and some parts of hard palate.

Oral epithelium:

The main characteristic features of oral epithelium are:

- 1-The epith. is stratified squamous epith. either keratinized or parakeratinized or nonkeratinized. This epith. composed of cells tightly link to each other by desmosomes and arranged in strata (layers), these cells are called keratinocytes not due to its ability to produce keratin but to its content of tonofilaments (fibrous protein) and these keratinocytes are present in all types of oral epith.
- 2-The deeper layers (basal and supra basal) have the ability of active mitotic division and these cells replace the continuously degenerated surface cells and the process called **cells renewal or cells turnover.**

Types of oral epith.

Classified according to keratinization :

- 1-keratinized (1- orthokeratinized 2- Parakeratinized)
- 2-non- keratinized

1- Keratinized oral epith. (orthokeratinized):

This type of oral epith consist of 4 layers:-

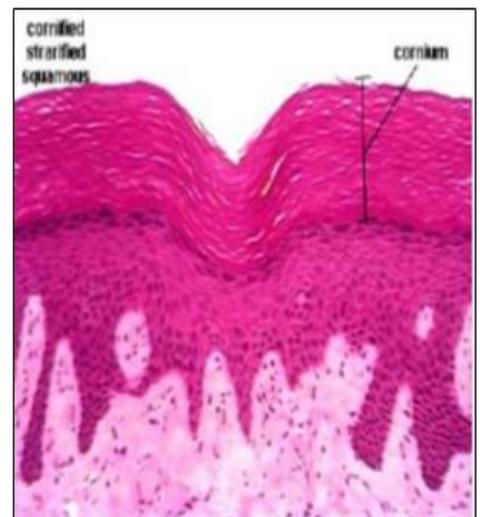
1- **Basal cell layer(stratum basale):**

Single cuboidal or short columnar cells layer attached to each other by **desmosomes** (a type of junction between the cells of the same embryonic origin). This layer is directly upon the basal lamina and attached to the Connective tissue by **hemidesmosome** (a junction resemble desmosomes but between the cells of different embryonic origin).

2- **Spinous or prickle cell layer (stratum spinosum):**

Cells are irregular, polyhedral or large oval in shape about 20-25 layers of cell. They joined together by intercellular bridges or processes which are desmosomes and tonofilaments. The intercellular spaces contain glycoprotein and fibronectin and these spaces are large in keratinized epith. which made the desmosomes more prominent and given the cells prickles appearance.

The basal cell layer and supra basal (**2-3 cell layers** from stratum spinosum just beyond the basal cell layer) are able to undergo mitotic division, so they are termed as **stratum germinativum layer.**



3- **Granular cell layer (stratum granulosum):**

Flatter and wider 2-3 layers of cells, containing basophilic keratohylin granules (blue staining with H&E). The nuclei of this layer show signs of **degeneration and pyknosis**.

Odland bodies: they are membrane coating granules (keratinosomes), has internal lamellated granules present between granular cell layer and stratum corneum and between prickle cell layer and granular cell layer. Its function is produce a defense permeability barrier and it present in all types of oral epith.

4- **Keratinized layer (stratum corium)**

Made up of keratinized and dehydrated squamous cells which are in layers. The cells are **flatter** than the cells of stratum granulosum, nuclei and cytoplasmic organelles disappeared (don't retained nuclei) the layer is larger acidophilic amorphous layer, and cells contain densely packed filaments developed from the tonofilaments.

2- **Parakeratinized oral epith.:**

It's similar to the keratinized in its layer except that the granular layer may be absent or not evident, the other differences in the stratum corneum , the surface layer retain nuclei that are pyknotic and condensed.

3- **Nonkeratinized Oral epith.**

Consist of 4 layers, differs from the keratinized type primarily because **they don't produce keratin**. The layers are:

- 1- **Basal cell layer:** similar to that of keratinized epith.
- 2- **Prickle cell layer:** similar to that of keratinized except that the intercellular bridges or prickles are not obvious. For this reasons, some persons prefer to ovoid the term prickle cell layer for nonkeratinized epith.
- 3- **Intermediate cell layer:** Flatter than the prickle cells, contains incompletely formed granules, but there is no granular cell layer.
- 5- **Superficial cell layer:** Nucleated, with flat cells, ultimately desquamated and don't form keratin, therefore they don't stain with eosin (red in color) as do the surface of keratinized epith.



Types of cells in oral epithelium:

1-keratinocyte cells: It form **90%** of cells present in oral epith, and its found in all layers and types of oral epith. It rapidly renewing through differentiation of basal/stem cells formation and they are connect by desmosomes.

2-Non-keratinocyte cells: It form **10%** of oral epith cells, they are of different embryonic origin than that of keratinocytes and also doesn't contain the same number of desmosomes at tonofilament such as that present in keratinocytes.

These cells are:

1-Melanocyte cells: dendritic's cell present in the basal cell layer, its embryonic origin from neural crest cells. These cells store melanine in form of melanosomes which elaborate melanin pigment responsible for pigmentation of oral mucous membrane.

2-Merkle's cells: non-dendritic cells present in basal cell layer, it's origin from neural crest cell, and act as tactile sensory cells.

3- Langerhanes cells: dendritic cells present in suprabasal layer, its origin from bone marrow, it's involved in immune response.

4- Lymphocyte cells: Its originate from hemopoietic stem cells and it present in any layer of oral epith. associated with inflammation.

Lamina propria (L.P)

- ❖ Its C.T. of variable thickness that support the epith,
- ❖ L.P may be directly attached to periosteum of alveolar bone or it may overly submucosa that contain minor salivary gland and large blood vessels.
- ❖ Its divided into two parts: A- Papillary part and B-Reticular part
- ❖ A-Papillary part is superficial zone of loose c.t. adjacent to epith. and surrounding the epith. ridges.
Papillary projections have considerable variations in length and width and depth contain predominantly fine collagen fibers and blood vessels and network of sensory nerve ending.

The papillary part of lamina propria help in 3 functions

- 1- Increasing surface contact between epith. and c.t. so it will strengthen attachment.
- 2- Allows greater proximity for passage of nutrition from b.v. and lymph vessels.
- 3- Serving for accurate sensation.

B-Reticular part

Its denser C.T. contain coarse collagen fibers and are closely packed together besides large B.V. and nerves, this reticular part is always present, while papillary part may be absent or very short as seen in alveolar mucosa.

Submucosa

- It's a C.T. of varying thickness and density .
- It attaches the mucosa to the underlying tissue,
- it contains the large B.V., lymph vessels and large nerves,
- in addition to mucous minor salivary glands, whose ducts penetrate the m.m.
- Also there is adipose tissue and lymph tissue.

