

# Oral histology and embryology

PRACTICAL LECTURE

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## **Microscopical analyses: - Prepared slides:**

- labium oris (1)
- palatum molle (5)
- apex linguae (2)
- papilla vallata (3)

## Quick revision:

- Oral cavity
- Oral mucosa and classification
- Papillae

# ORAL CAVITY

# ORAL CAVITY (*cavitas oris*)

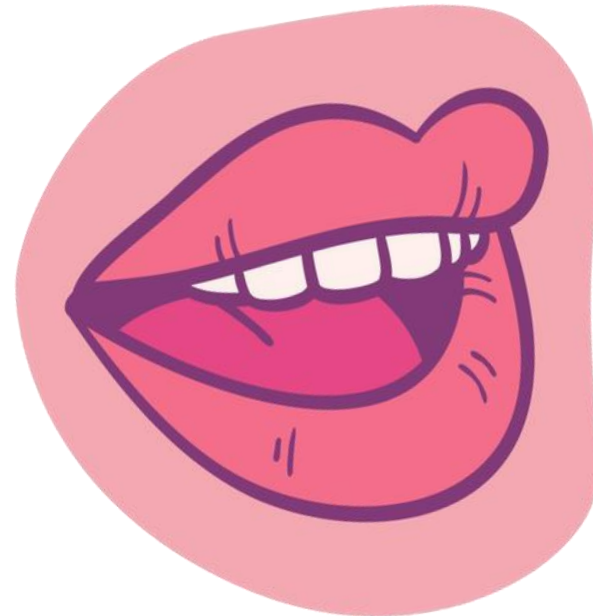
vestibulum oris / *cavitas oris propria*

## Walls



Walls  
Ceiling  
Floor

## Content



# ORAL CAVITY (*cavitas oris*)

vestibulum oris / *cavitas oris propria*

## WALLS

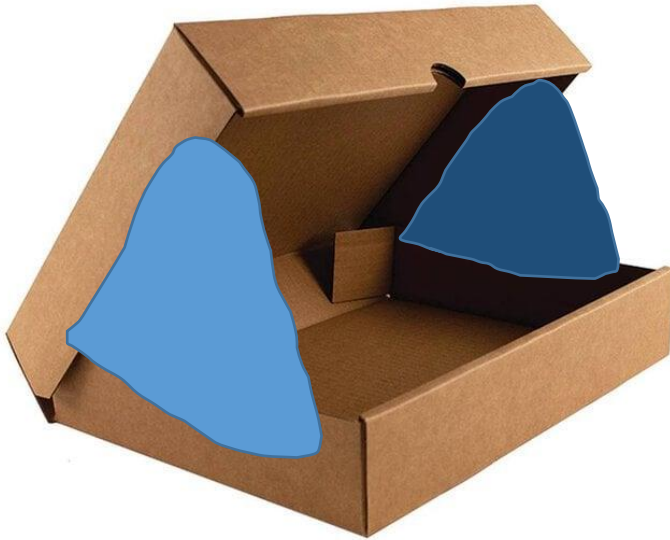


- Lips

# ORAL CAVITY (*cavitas oris*)

vestibulum oris / *cavitas oris propria*

## WALLS



- Lips
- Cheeks

# ORAL CAVITY (*cavitas oris*)

vestibulum oris / *cavitas oris propria*

## WALLS



- Lips
- Cheeks
- Hard and soft palate



# ORAL CAVITY (*cavitas oris*)

vestibulum oris / *cavitas oris propria*

## WALLS



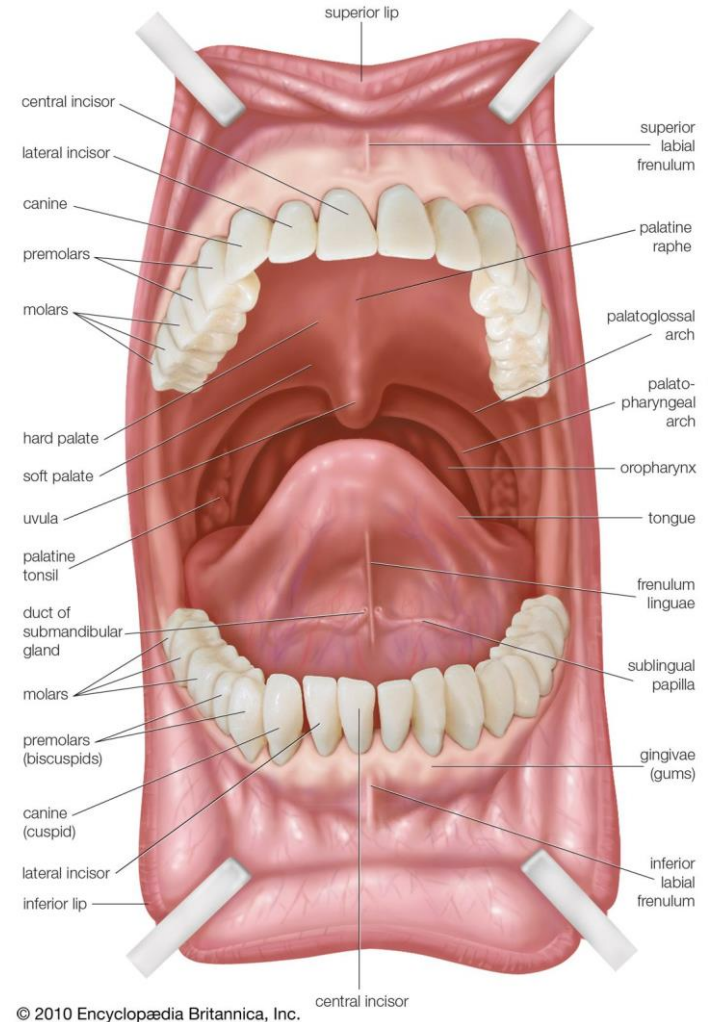
- Lips
- Cheeks
- Hard and soft palate
- Floor of the oral cavity

# ORAL CAVITY (*cavitas oris*)

vestibulum oris / *cavitas oris propria*

## CONTENT

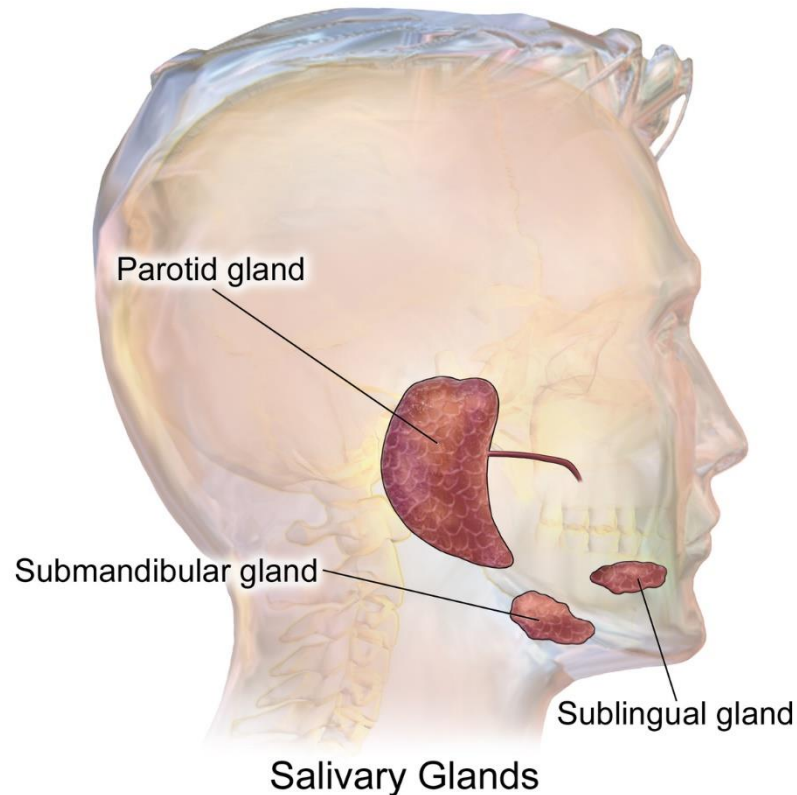
- Teeth
- Tongue
- Gums
- Uvula



# ORAL CAVITY (*cavitas oris*)

vestibulum oris / *cavitas oris propria*

## CONTENT



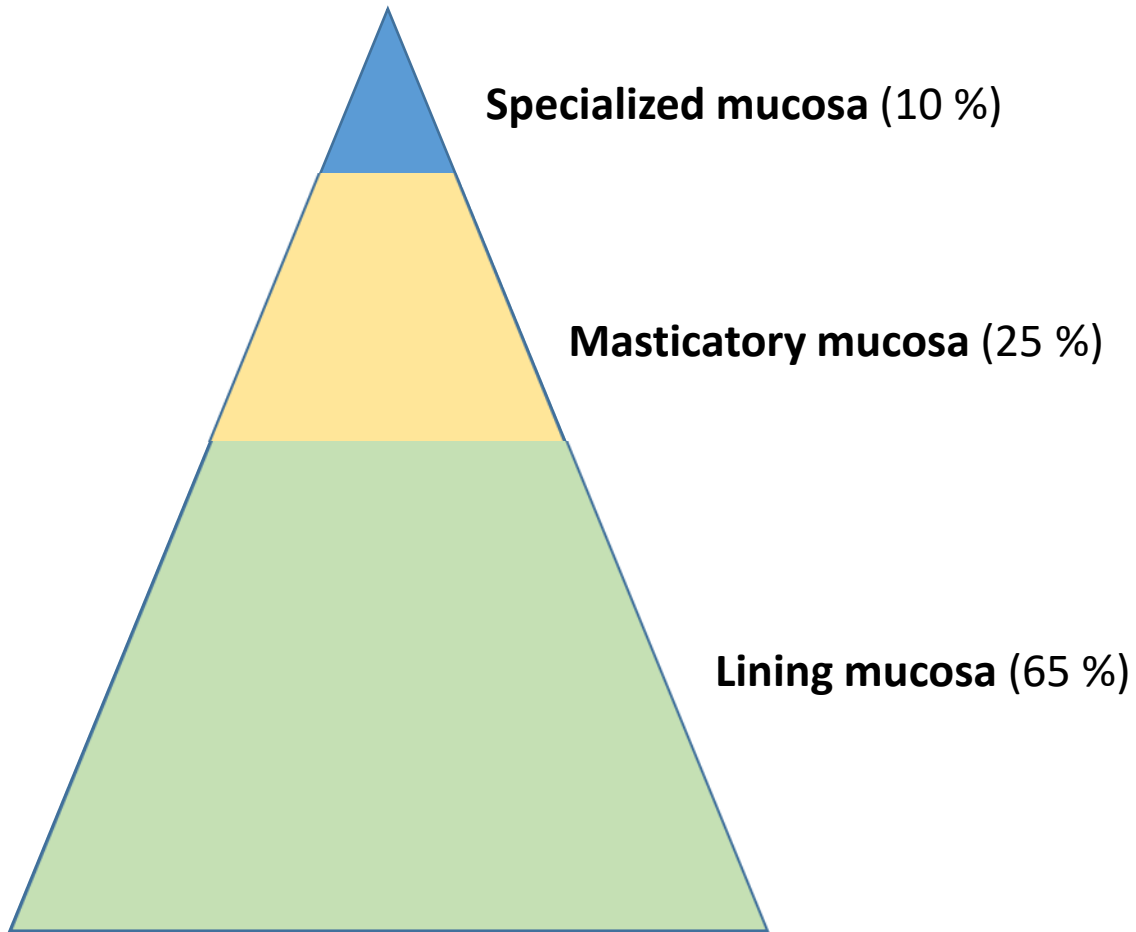
**Large salivary glands:**

- Sublingual
- Submandibular

Parotid Gland (out of the oral cavity)

# ORAL MUCOSA

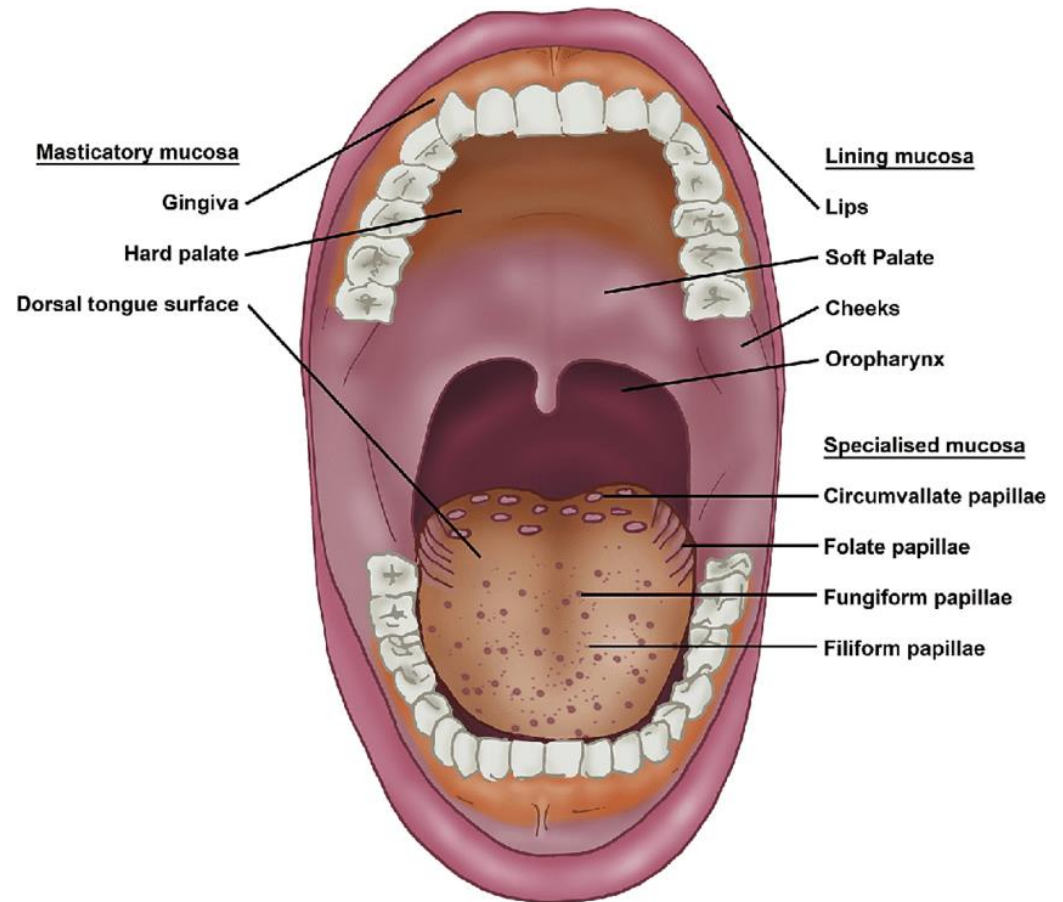
# ORAL MUCOSA: Classification



# ORAL MUCOSA: Classification

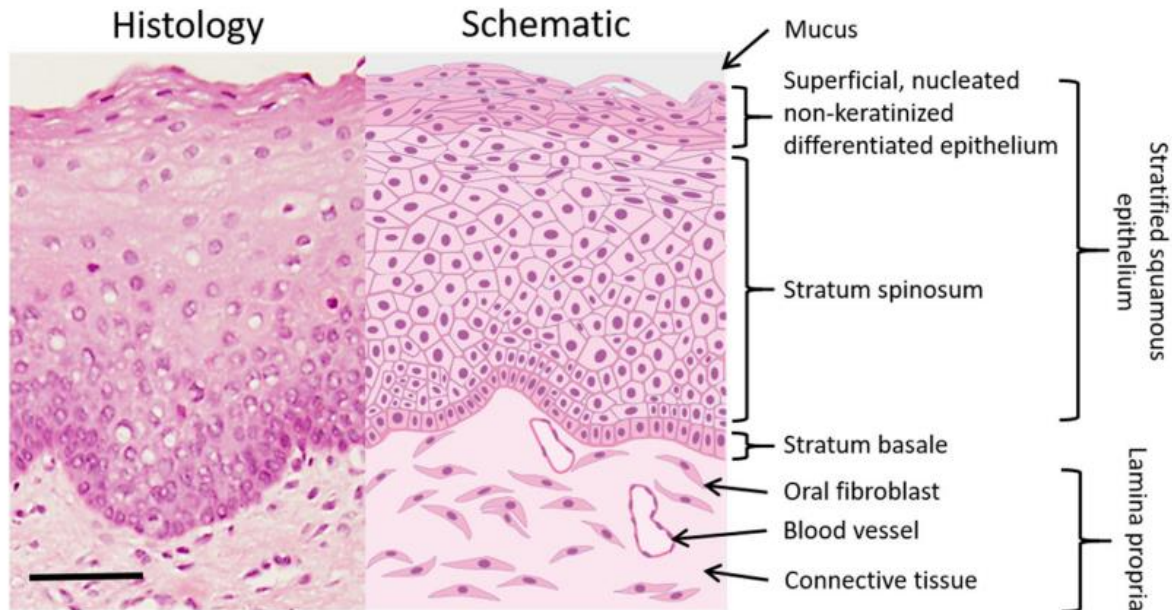
## Lining mucosa (65 %):

- Inner side of lips and cheeks
- Soft palate
- Lower side of the tongue
- Floor of the oral cavity
- Alveolar processes



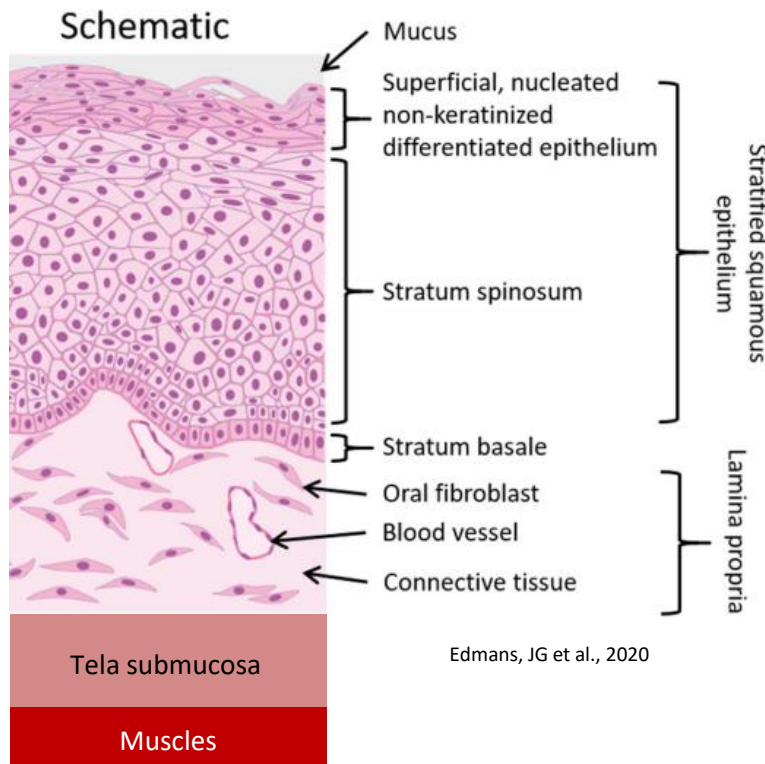
# ORAL MUCOSA: Classification

Lining mucosa (65 %):



# ORAL MUCOSA: Classification

## Lining mucosa (65 %):



- Stratified squamous epithelium: mitosis and cell differentiation
- Basal membrane: layer of specialized extracellular matrix – origin of Keratinocytes
- Lamina Propria: mucosal tissue
  - > fibroblasts: production of extracellular matrix
  - Blood vessels, nerves and glands
- Tela submucosa: layer of loose connective tissue between the tunica mucosa and the tunica muscularis > connection



# ORAL MUCOSA: Classification

## Lining mucosa (65 %): Lip

Outer side:

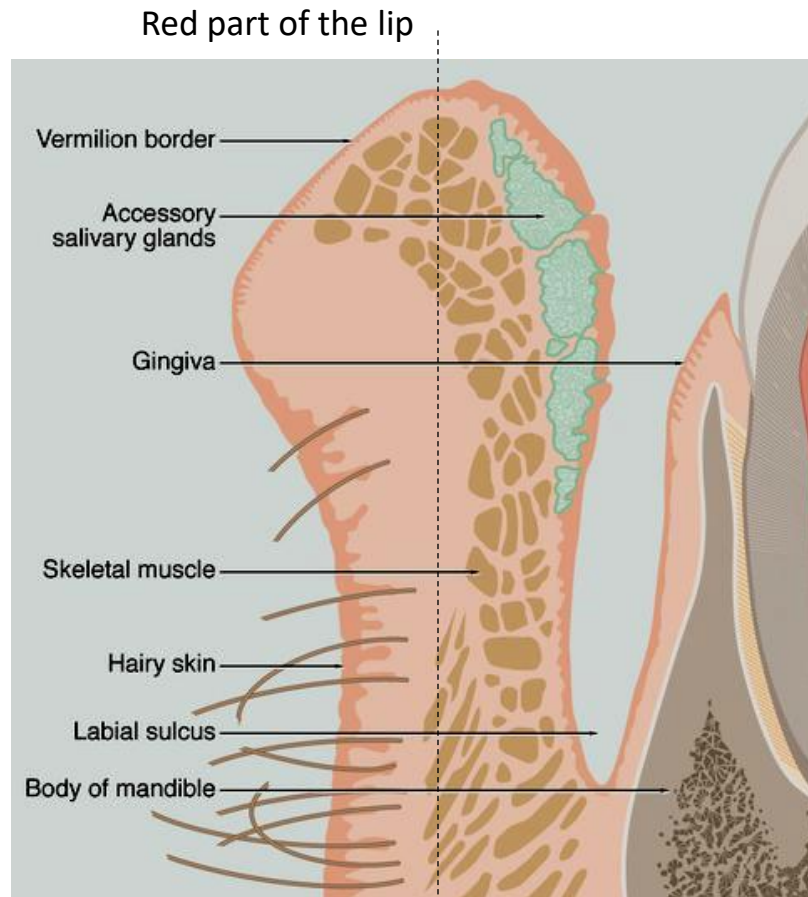
Sebaceous glands

Sweat glands

Hair follicles

Blood vessels

Nerves



Inner side:

Salivary glands/  
Mucous glands

Blood vessels

Nerves

m. orbicularis oris

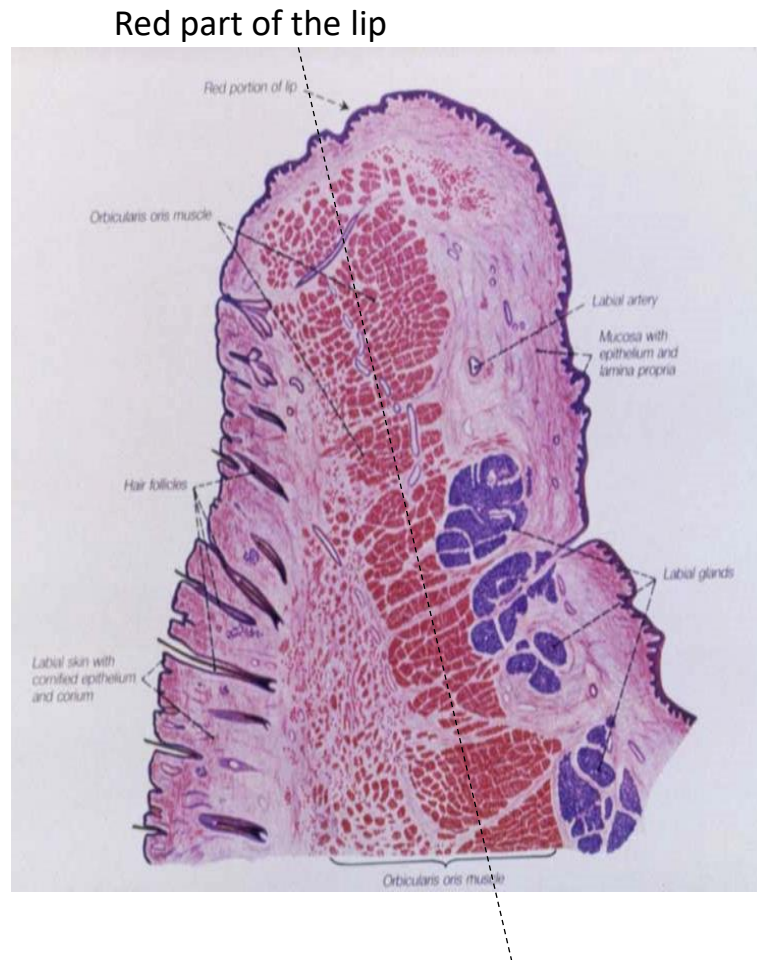
# ORAL MUCOSA: Classification

## Lining mucosa (65 %): Lip

Outer side:

Sebaceous glands  
Sweat glands  
Hair follicles

Blood vessels  
Nerves



Inner side:

Salivary glands/  
Mucous glands

Blood vessels  
Nerves

# ORAL MUCOSA: Classification

**Lining mucosa (65 %):** Lip of the newborn

**Two distinct parts:**

**pars glabra (2 mm)**

Thinner, ventral

**pars glabra**

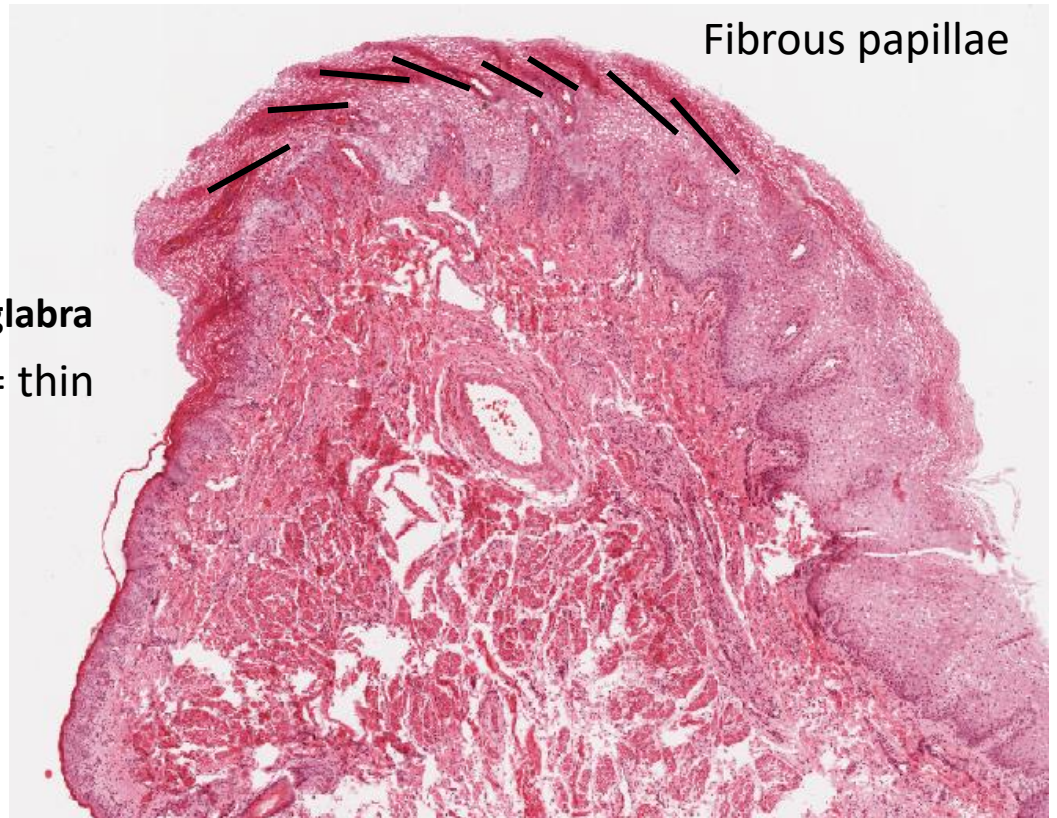
Glabra = thin

**pars villosa (asi 4 mm)**

Thicker, dorsal

Villosa = villous

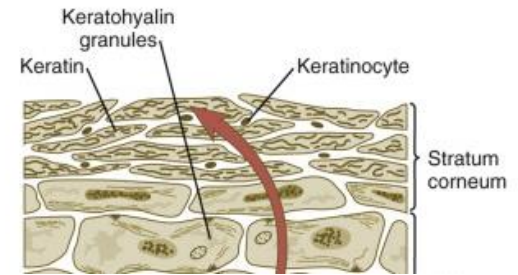
Fibrous papillae





# ORAL MUCOSA: Classification

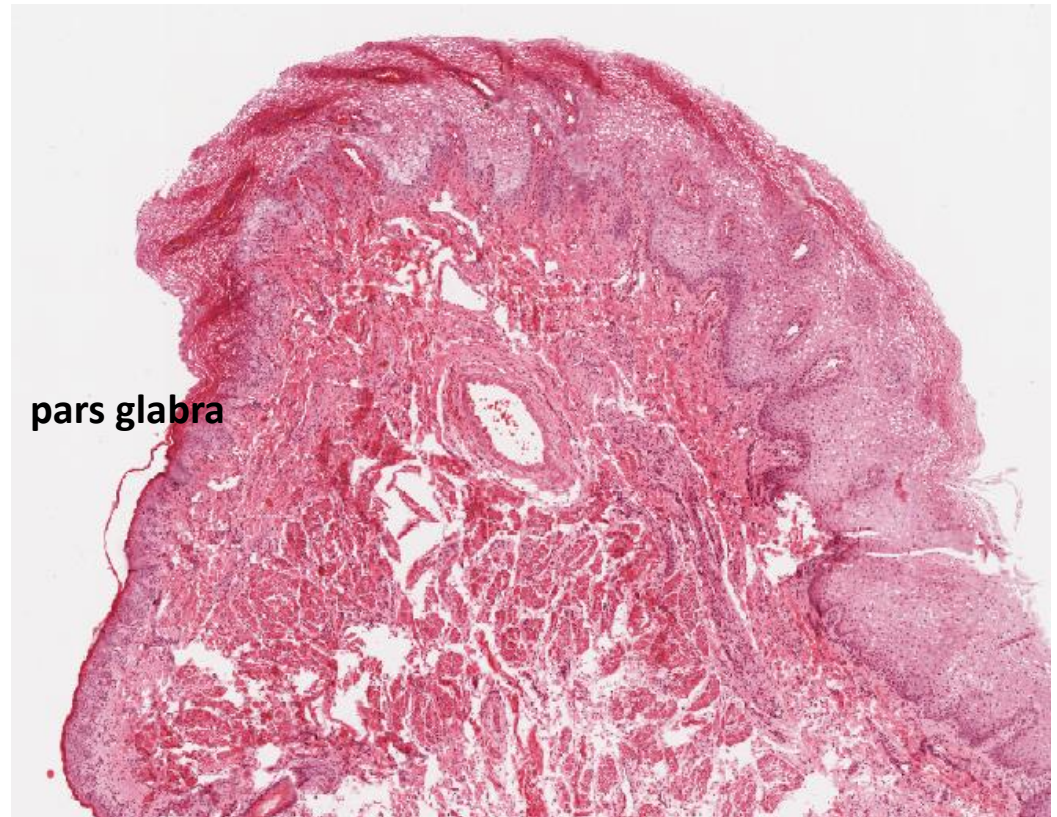
**Lining mucosa (65 %):** Lip of the newborn

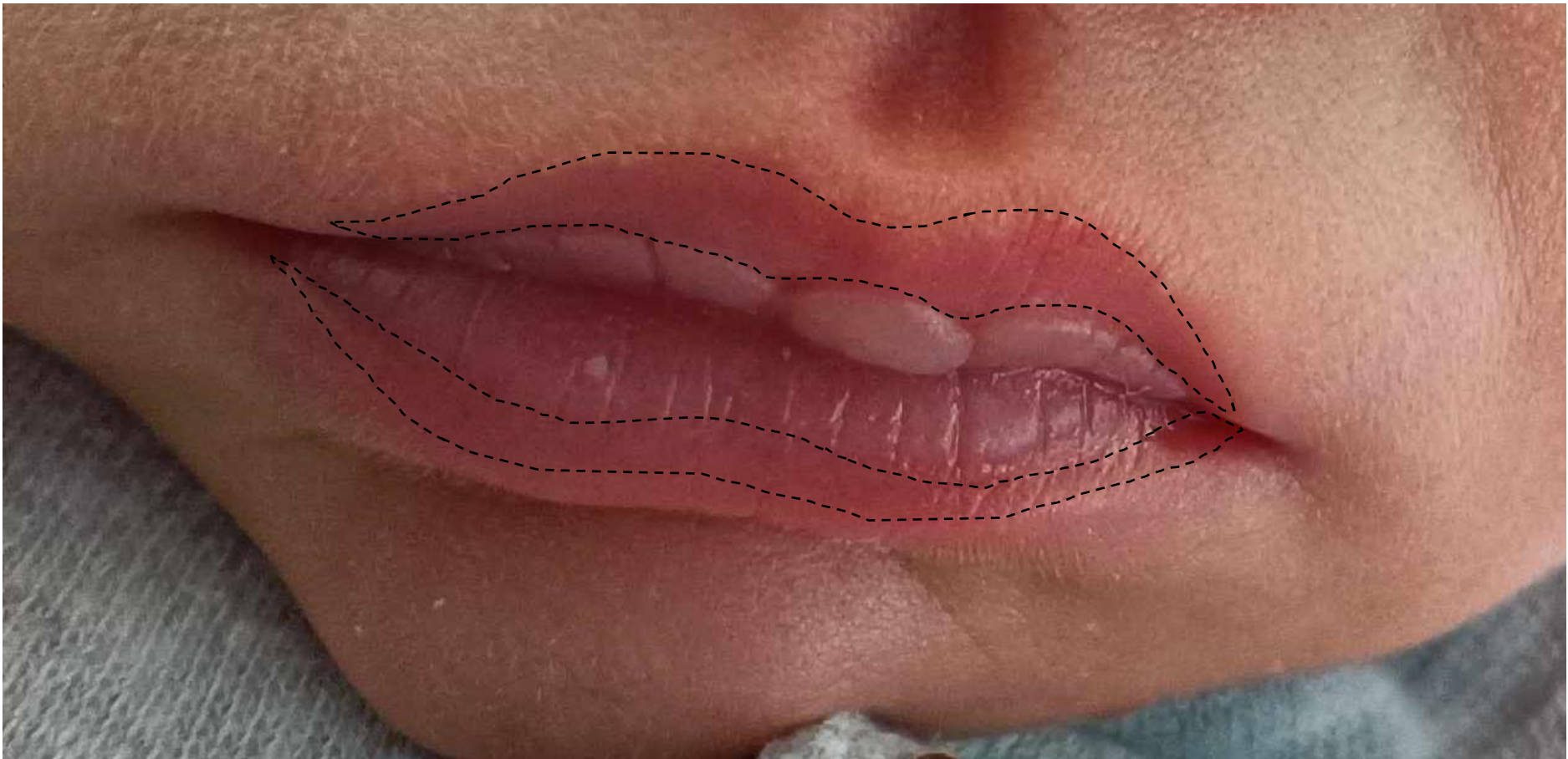


**Two distinct parts:**

## **Pars glabra**

- Stratified squamous epithelium with keratohyalin grains in the cells
- The papillae of the lamina propria vs epithelium are longer than those of the skin
- In 50% of cases, contains small sebaceous glands





Hyperkeratotic sucking pad – pars glabra



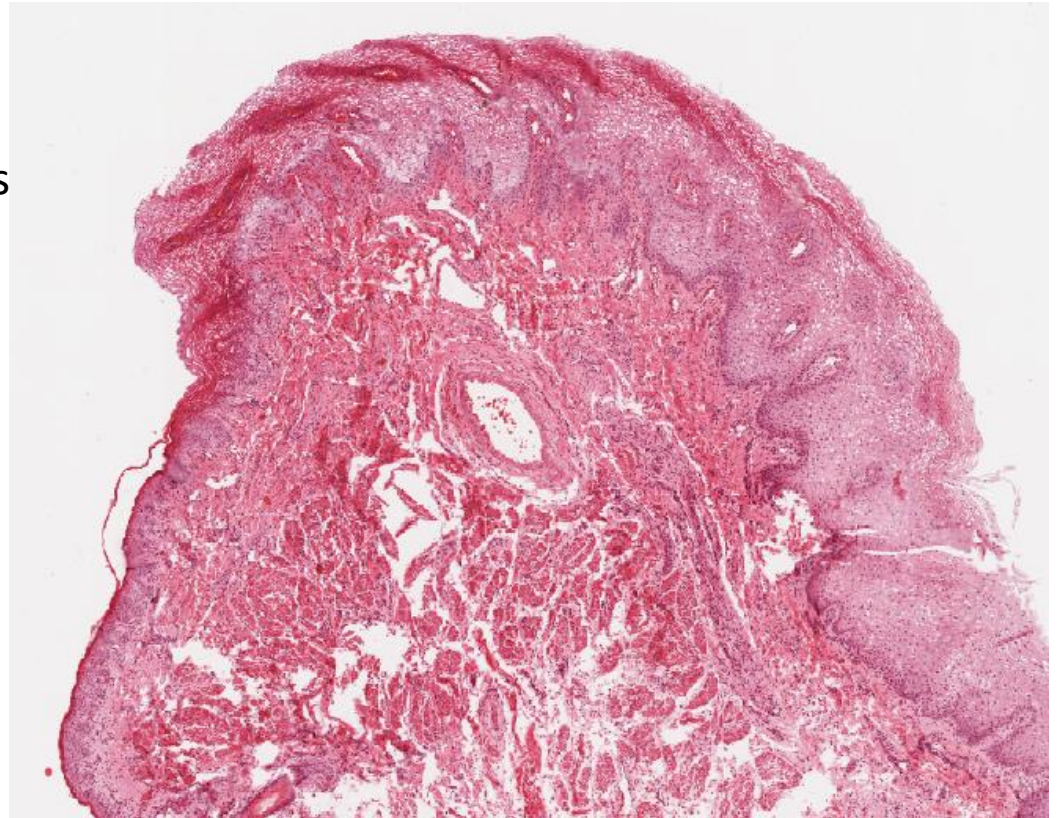
# ORAL MUCOSA: Classification

**Lining mucosa (65 %):** Lip of the newborn

**Two distinct parts:**

## **Pars villosa**

- Very thick stratified squamous epithelium
- Numerous mucosal papillae
- The papillae are highly vascularized with sensitive nerve endings
- When moist, it allows better attachment to the mother's nipple





Hyperkeratotic sucking pad – pars villosa

# ORAL MUCOSA: Classification

**Lining mucosa (65 %):** Lip of the newborn

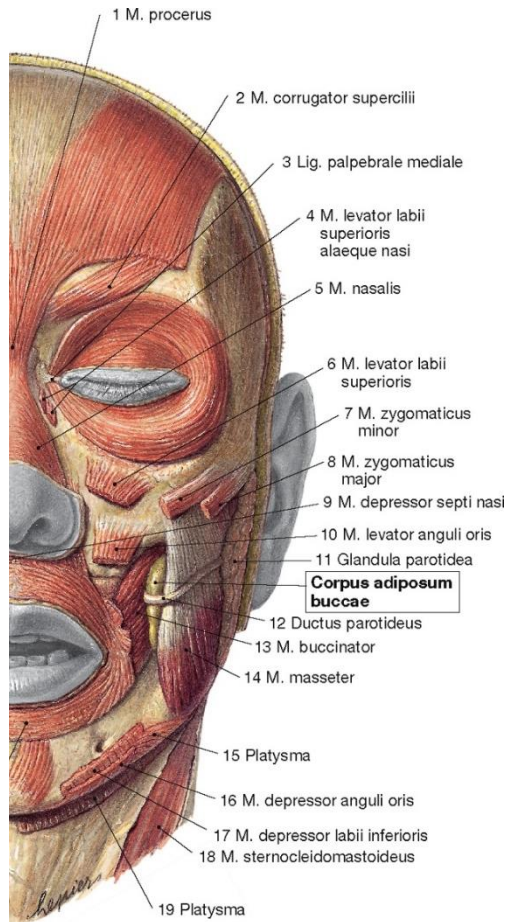
The structural difference between pars villosa and pars glabra gradually disappears as the child ages





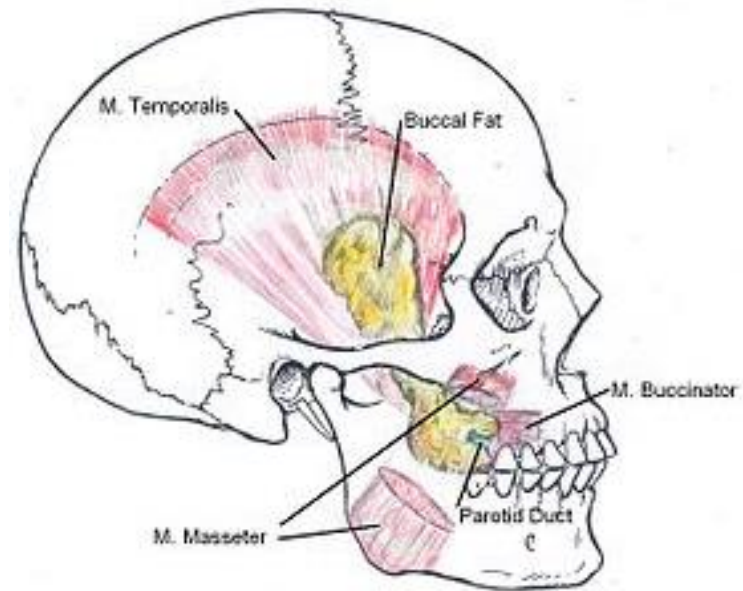
# ORAL MUCOSA: Classification

## Lining mucosa (65 %): Cheeks



Histologically similar to the lips.

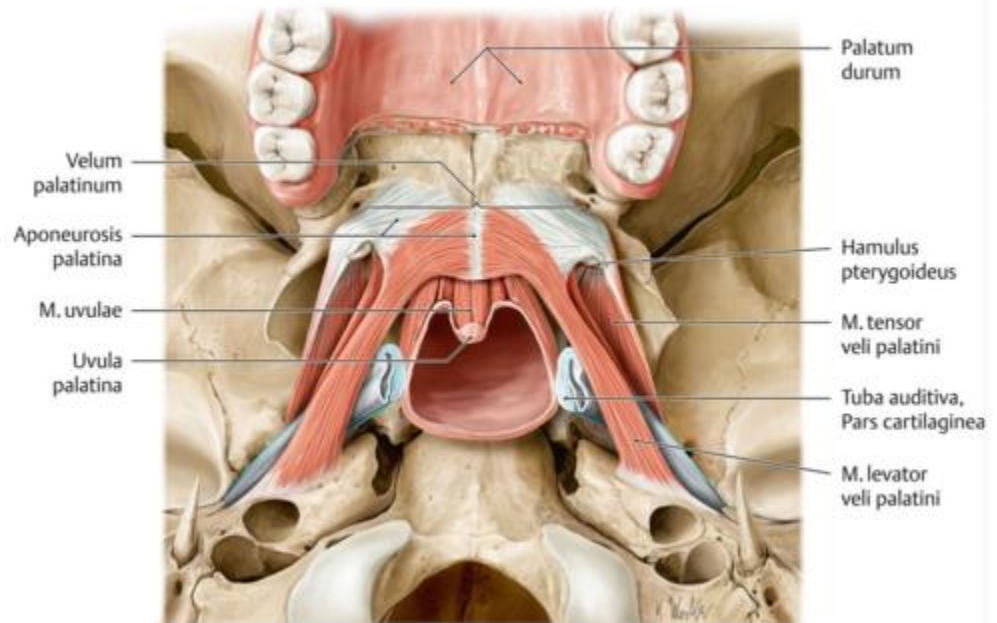
Before and above the r. mandibulae, the **Corpus adiposum buccae** (Bichat's body) is inserted between the buccinator and masseter muscles.



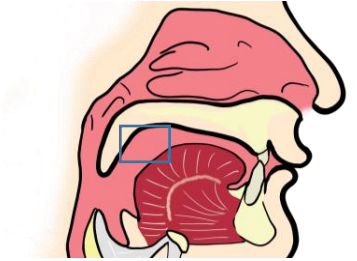
# ORAL MUCOSA: Classification

## Lining mucosa (65 %): Soft palate

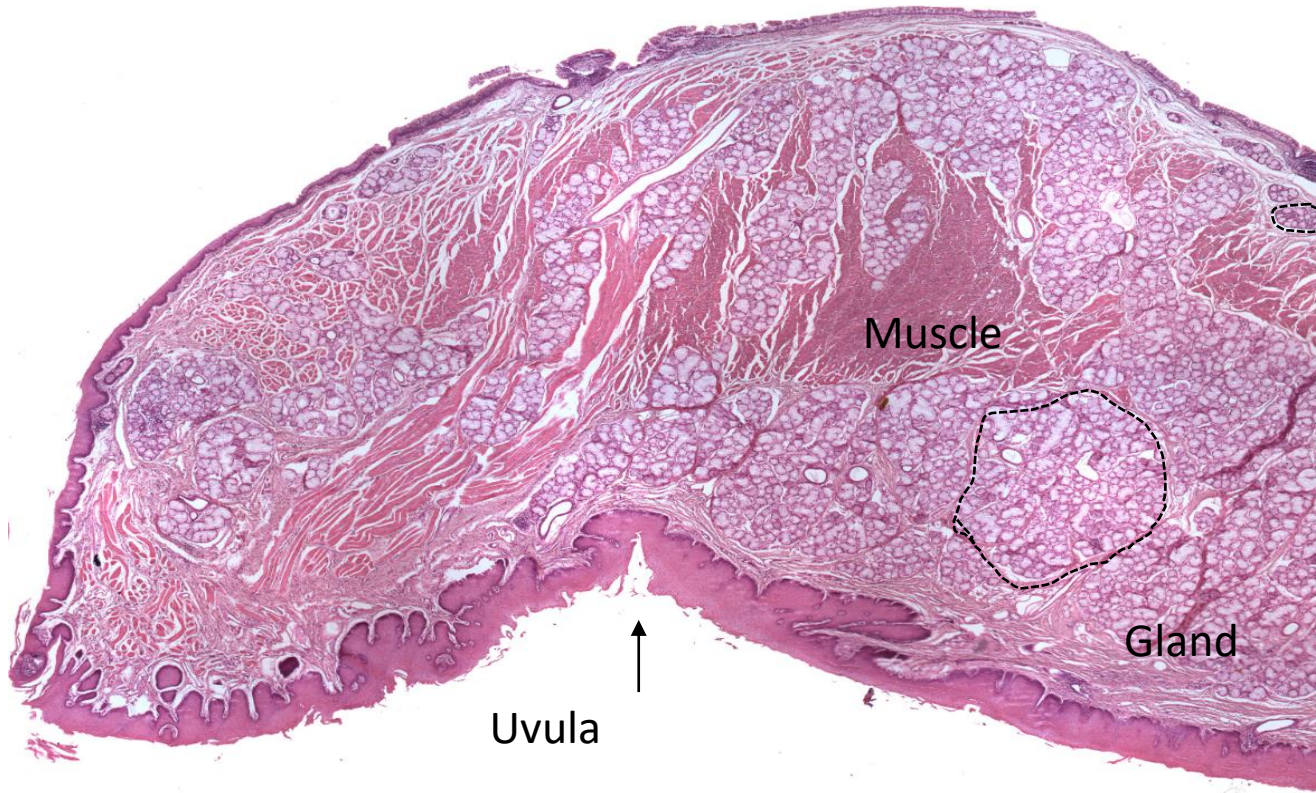
- The basis is the palatine aponeurosis (composed of tendon attachments of muscles and bundles of striated fibers - mainly the tensor veli palatini muscle)
- Ending in the uvula
- Separated into nasal and oral parts
- Lining mucosa
- With purely mucinous glands  
(*glandulae palatinae*)



# ORAL MUCOSA: Classification



Lining mucosa (65 %): Soft palate



*Glandulae nasales*

Uvula

Muscle

Gland

Oral side

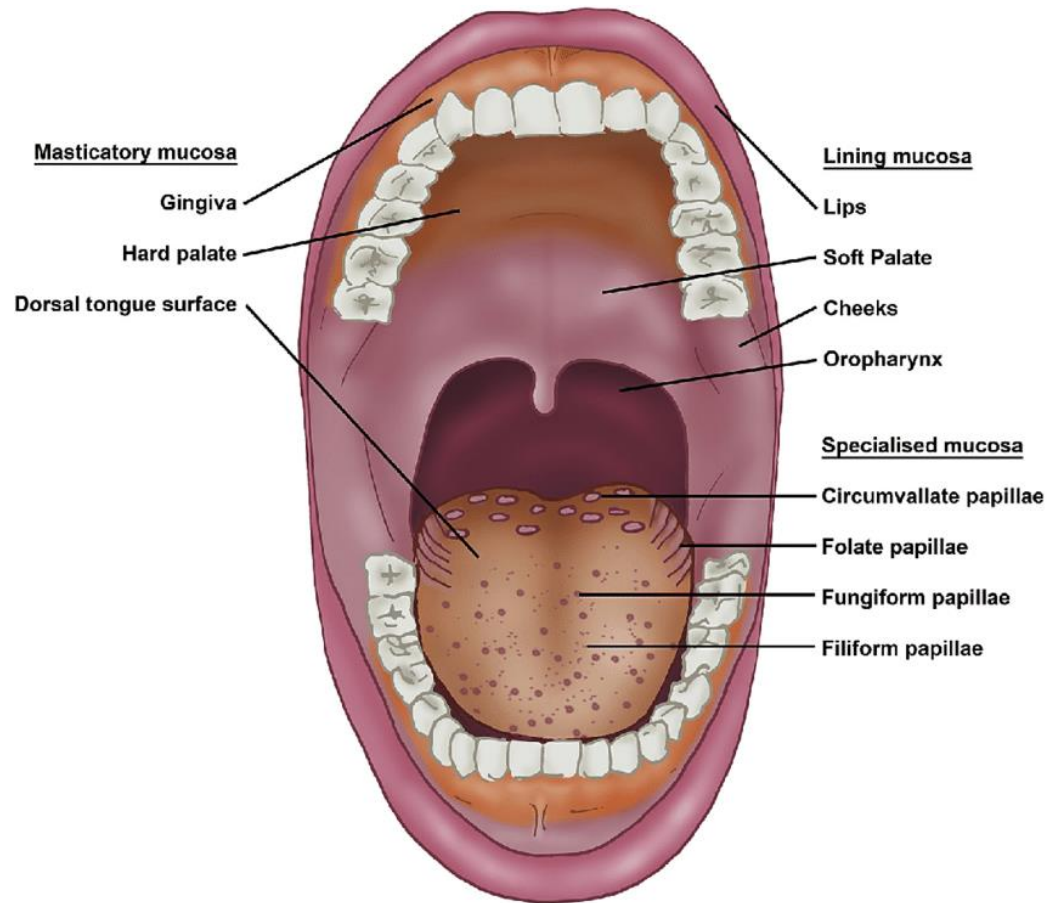
Non-keratinized stratified squamous epithelium



# ORAL MUCOSA: Classification

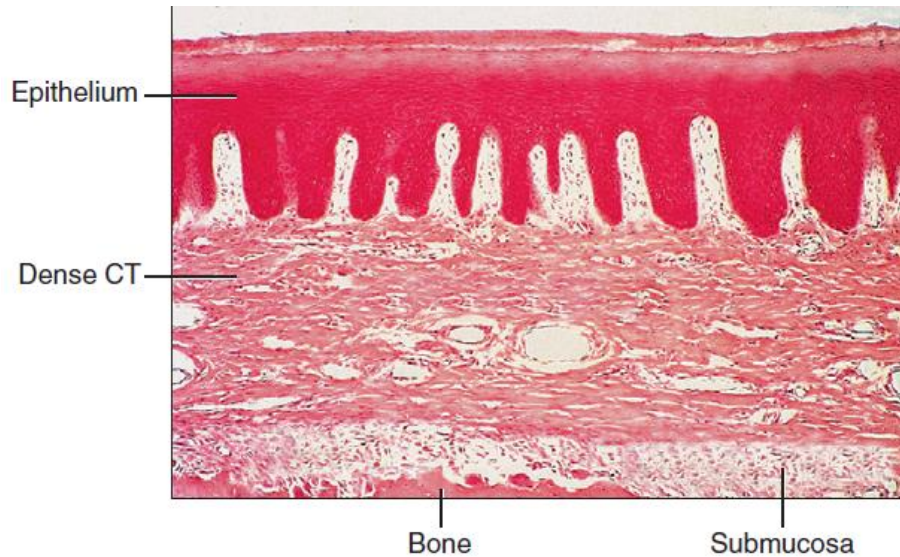
## Masticatory mucosa (25 %):

- Gums
- Hard palate



# ORAL MUCOSA: Classification

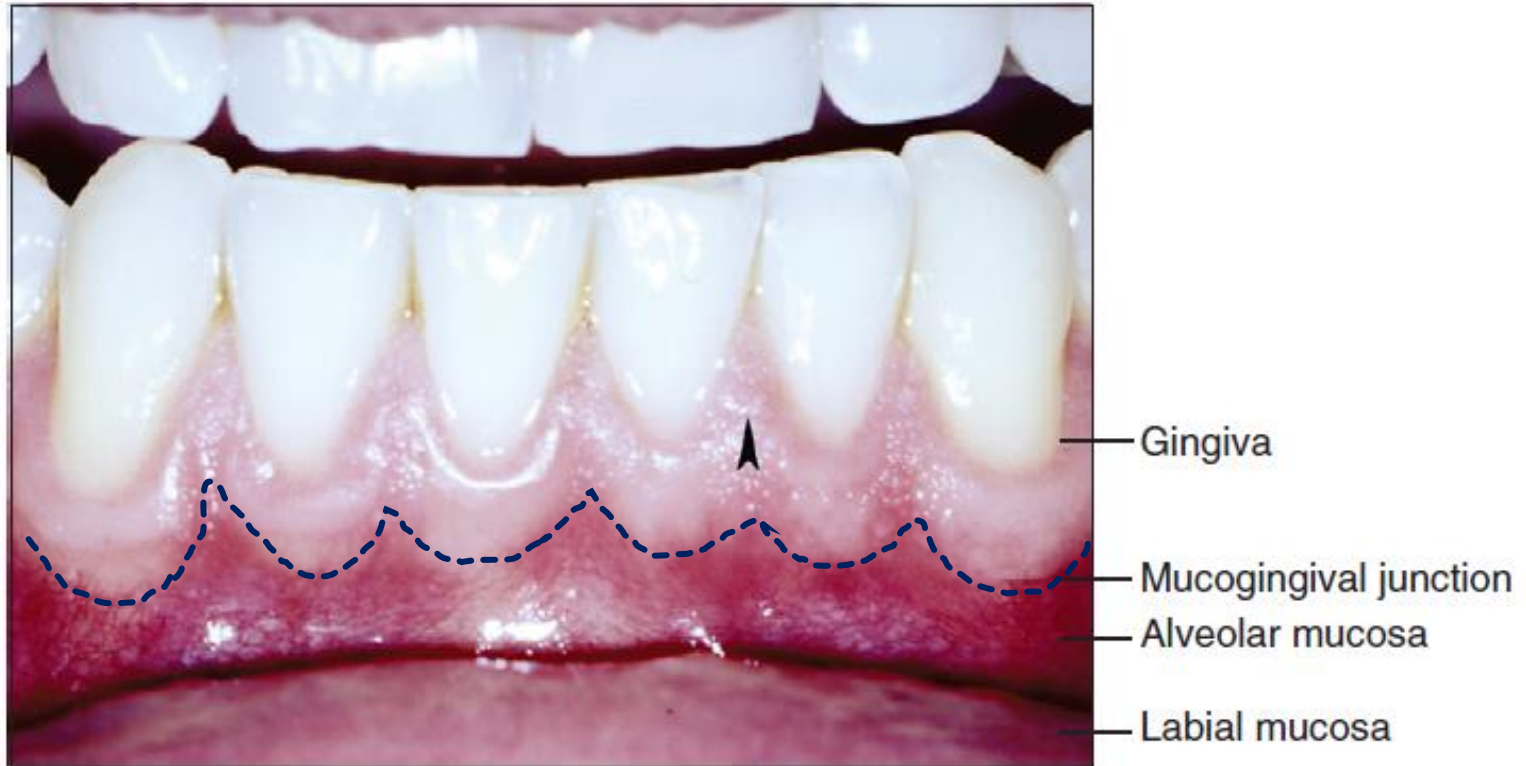
## Masticatory mucosa (25 %):



Edmans, JG et al., 2020

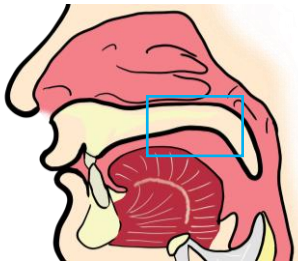
- The epithelium is cornified - attrition  
Keratinised stratified squamous epithelium
- Lamina propria of dense and unorganized collagenous tissue, firmly fused with the periosteum (mucoperiosteum)
- Absent tela submucosa

# ORAL MUCOSA: Classification

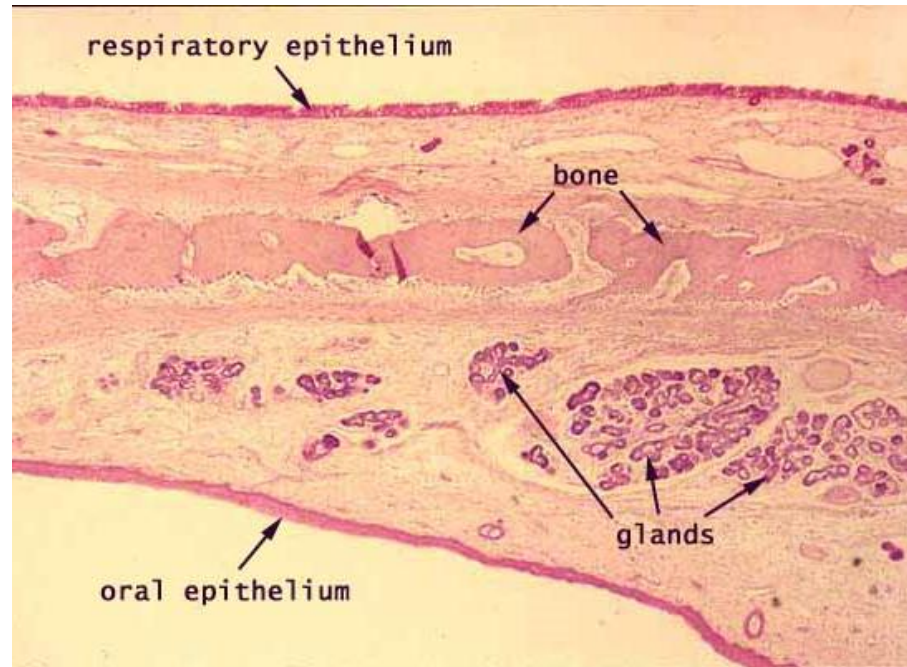


# ORAL MUCOSA: Classification

Masticatory mucosa (25 %):



Nasal side



Keratinized stratified squamous epithelium

Oral side

# ORAL MUCOSA: Classification

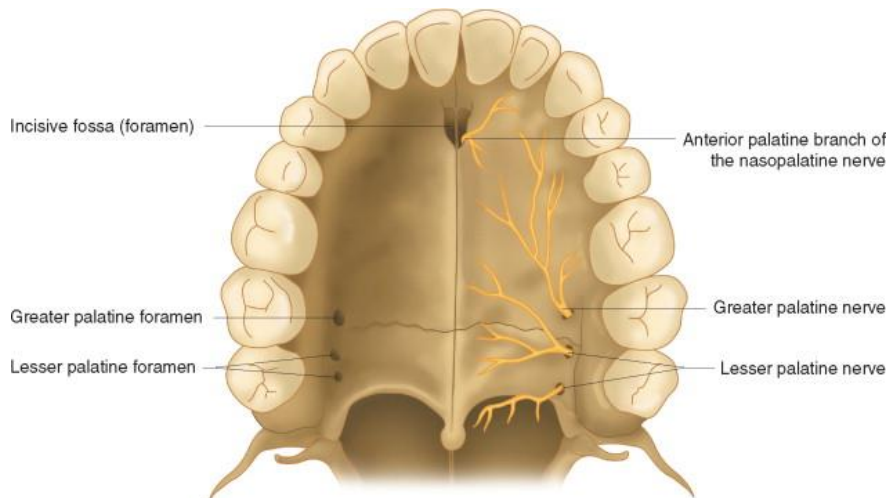
## Masticatory mucosa (25 %):

- Anatomical variability:

### *Foramen incisivum*

Where the incisive papilla is localized (in close proximity to it)

Anatomical marker for the anesthesia of the nasopalatine nerve



Ceiling of the oral cavity



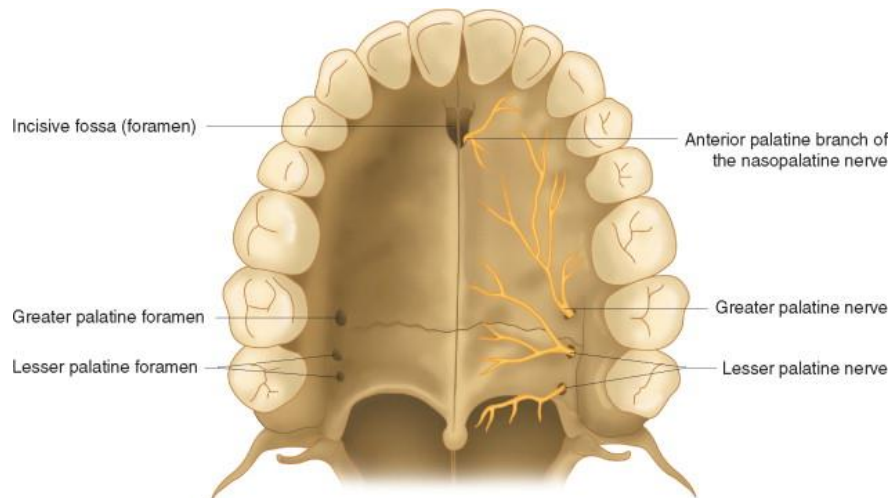
# ORAL MUCOSA: Classification

## Masticatory mucosa (25 %):

- Anatomical variability:

### *Raphe palati*

Midline area from incisive papilla to soft palate, raphe palati mucosa without glands and adipocytes



Ceiling of the oral cavity

# ORAL MUCOSA: Classification

## Masticatory mucosa (25 %):

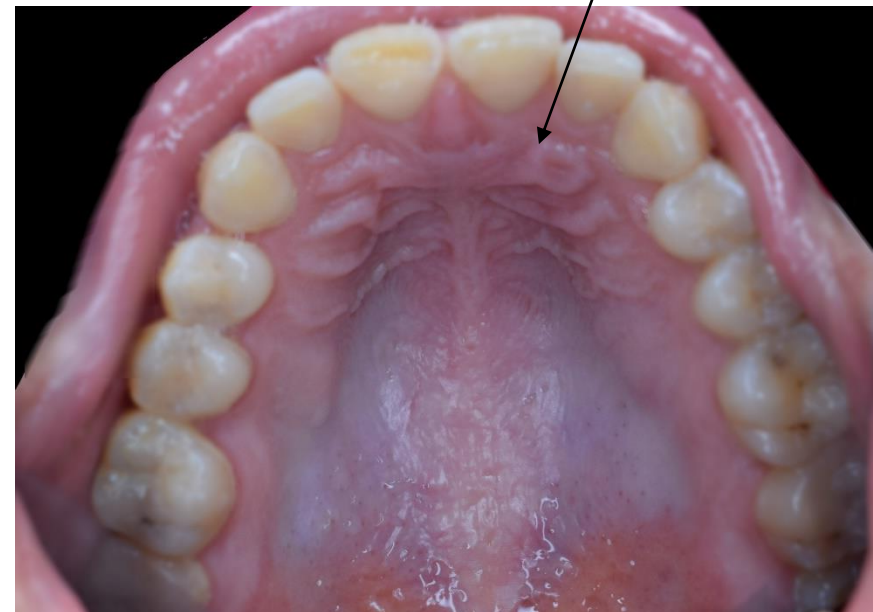
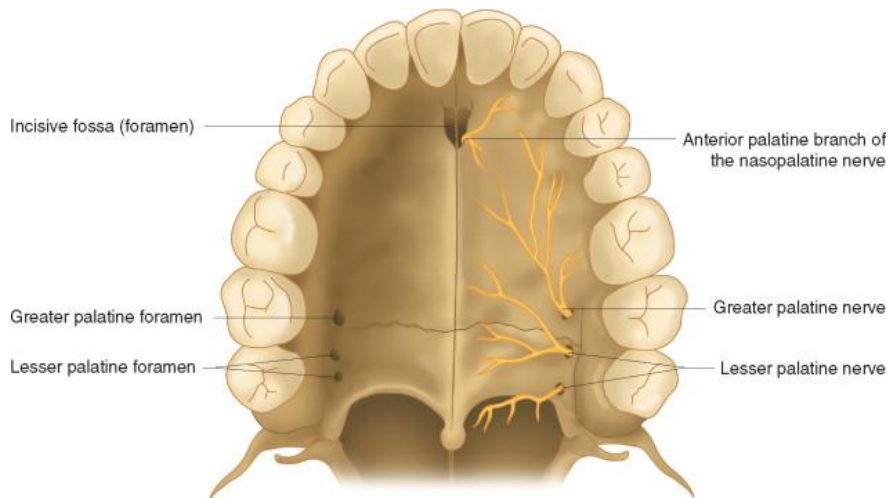
- Anatomical variability:

### Fatty zone

Borders: incisive papilla, lateral gums and premolars.

Strips of dense collagen tissue, fat cells, sometimes even fat lobules.

3-5 plicae palatinae transversae  
rugae palatine



Ceiling of the oral cavity

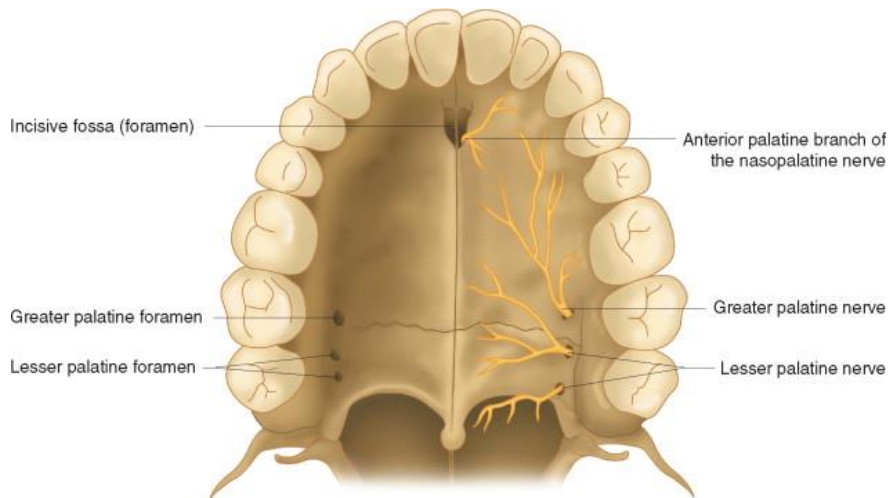
# ORAL MUCOSA: Classification

## Masticatory mucosa (25 %):

- Anatomical variability:

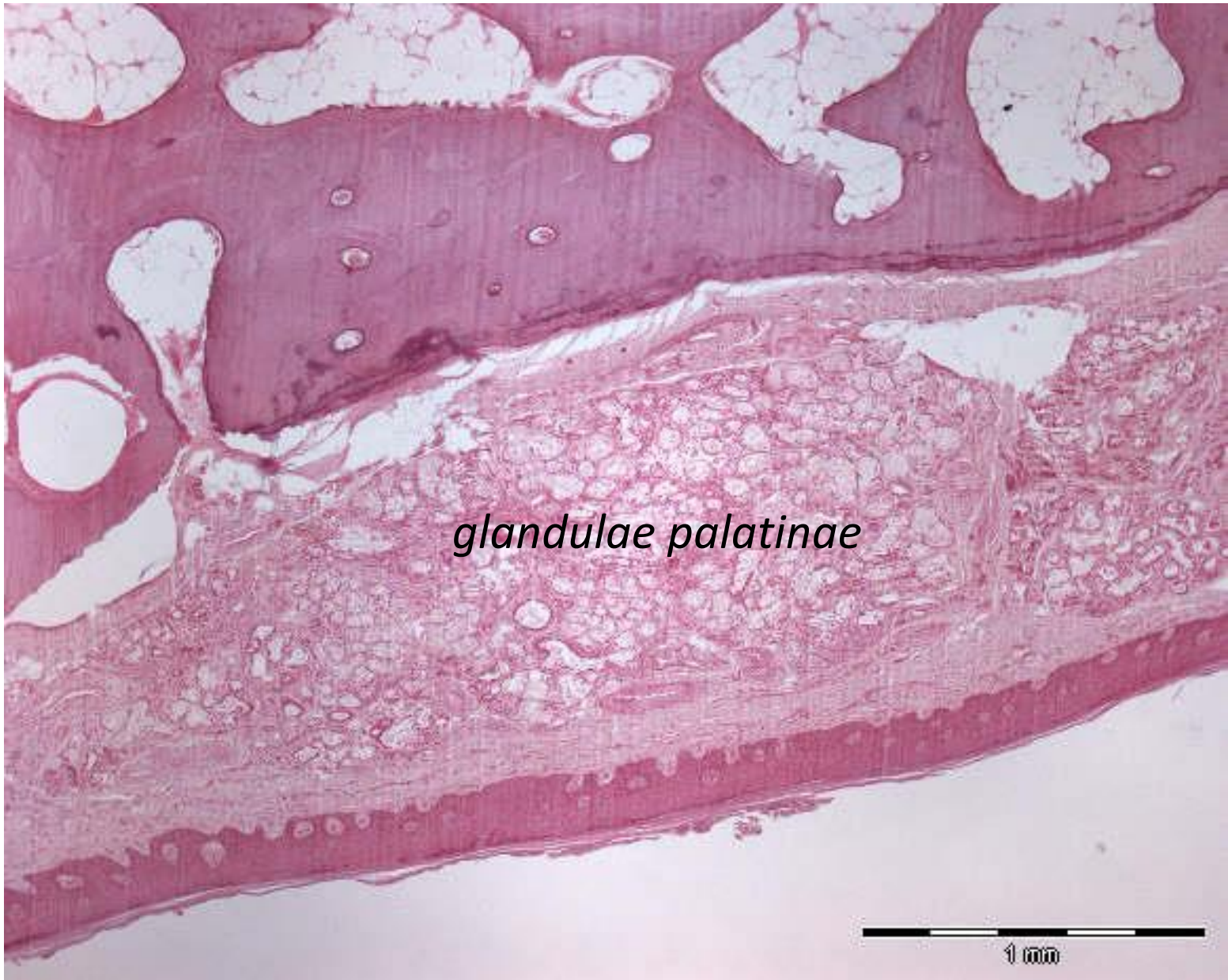
### Gland zone

The dorsal continuation of the fatty zone, with smooth mucosa, containing numerous Mucinous glands (glandulae palatinae)



Ceiling of the oral cavity



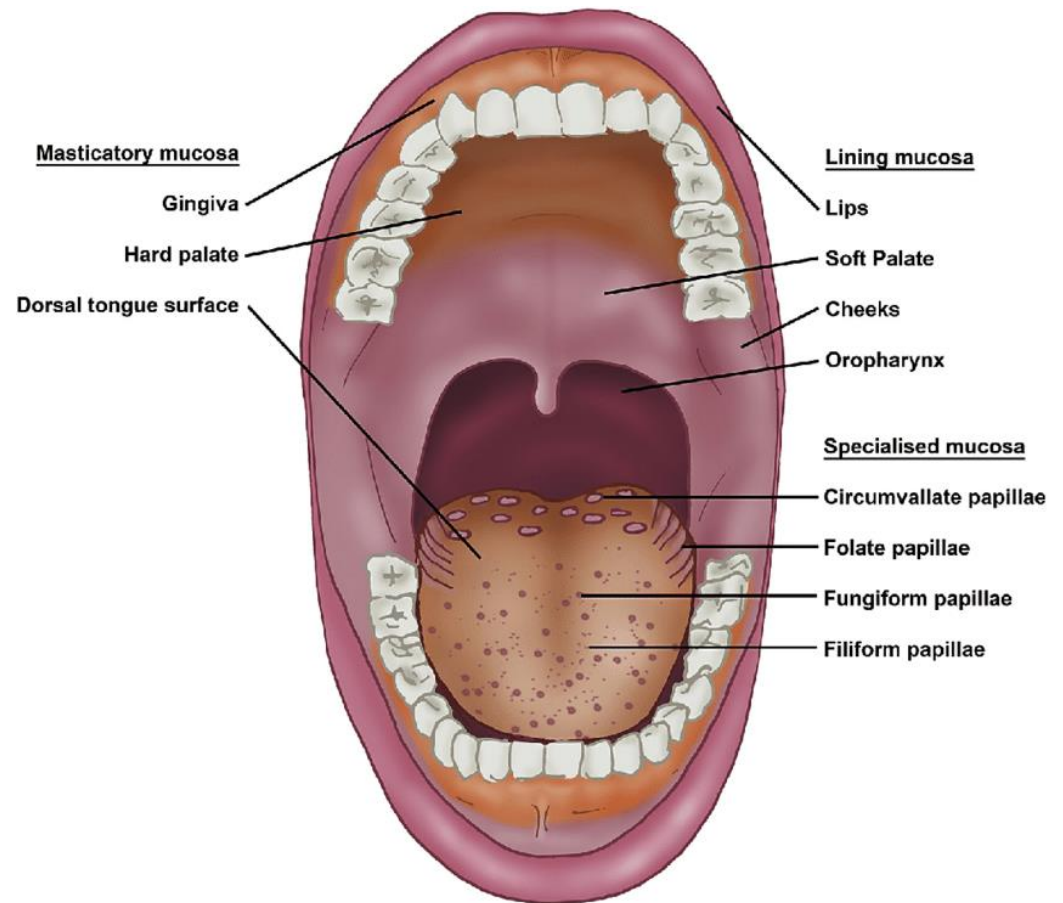


Hard palate – Gland zone (frontal section)

# Klasifikace orální sliznice

Specializovaná (10 %):

- Jazyk (papily)

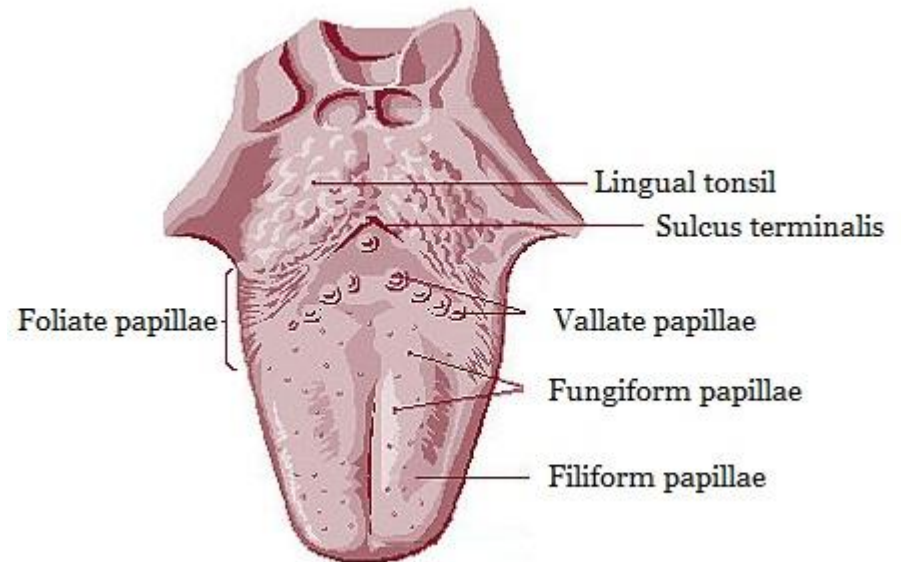


# ORAL MUCOSA: Classification

**Tongue body** - Lingua (lat.) - Glossa (gr.)

**Body** (*dorsum linguae*) –  
specialized mucosa:

- Papillae filiforme
- Fungiformes
- Vallatae
- Foliatae



# Tongue

**Body** (*dorsum linguae*) – specialized mucosa

Partially keratinized squamous stratified epithelium

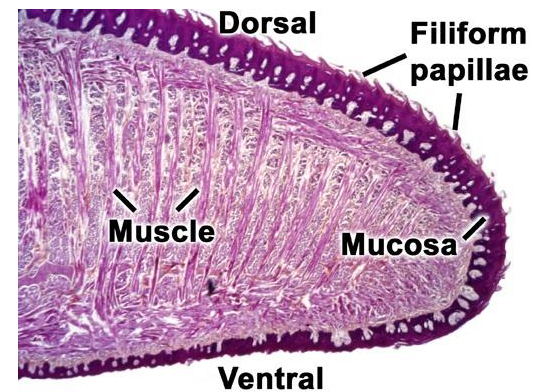
Aponeurosis linguae - thickened lamina propria – to connect muscles and mucosa.

Absent tela submucosa

**Bottom side** – lining oral mucosa

Non-keratinized stratified squamous epithelium

Submucosa is present





# Papillae

Outgrowth of mucous tissue covered by epithelium

## ***Papillae filiformes:***

The most numerous

Along the entire dorsal surface (from apex lingualis to sulcus terminalis)

Brush-like formations (height 0.5 - 1.0 mm, width 0.2 - 0.3 mm)



Tongue



*Papillae filiformes* – Scanning electron microscopy



# Papillae

Outgrowth of mucous tissue covered by epithelium

## *Papillae filiformes:*

Corneal epithelium – epithelial desquamation + poor oral hygiene = "coated/white tongue"



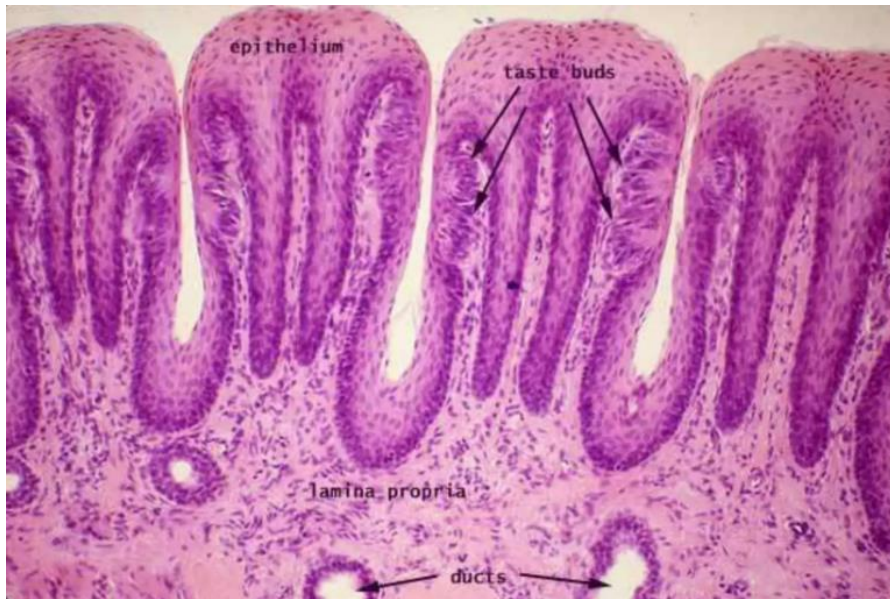
**Brushing the tongue is essential and enough to get rid of it!**

# Papillae

Outgrowth of mucous tissue covered by epithelium

## *Papillae foliateae:*

Occur at the back of the tongue (especially on the sides)  
Taste buds



*Papillae foliateae*

# Papillae

Outgrowth of mucous tissue covered by epithelium

## ***Papillae fungiformes:***

Localized on *Apex linguae*

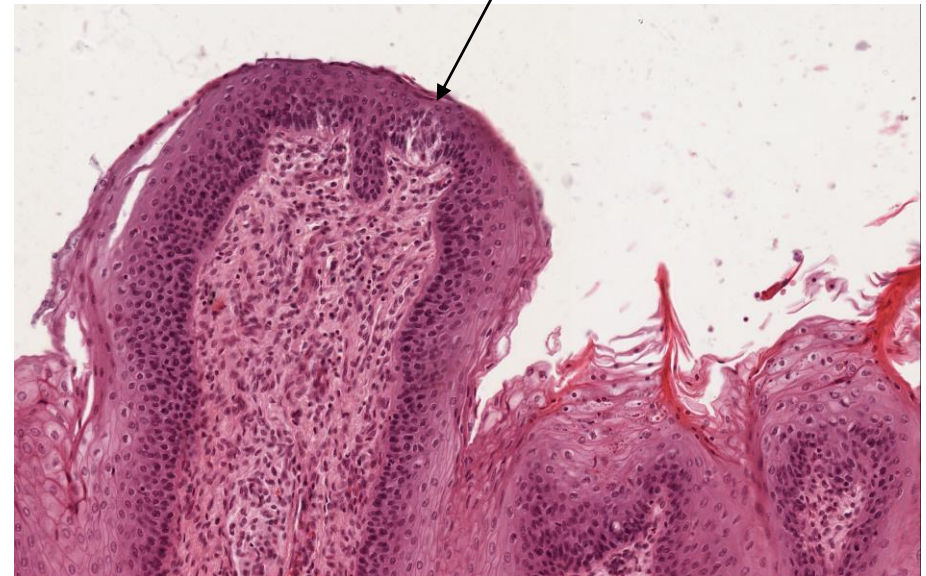
Mushroom-shaped projections (height 0,5–1,5 mm, width 0,5–1,0 mm)

Taste buds in the epithelium

Difference in queratinization



Tongue



*Papillae fungiforme* with taste bud



# Papillae

Outgrowth of mucous tissue covered by epithelium

## ***Papillae vallatae:***

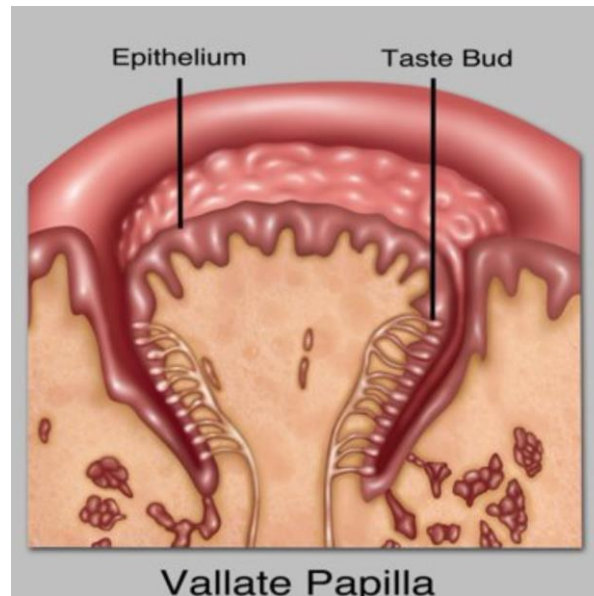
Largest papillae (height 1-4 mm, width 1-3 mm)

Quantity: 7–12 just before the sulcus terminalis

Immersed in the mucous membrane

Deep circumpapillary groove separates the papilla from the protruding ridge

Taste buds

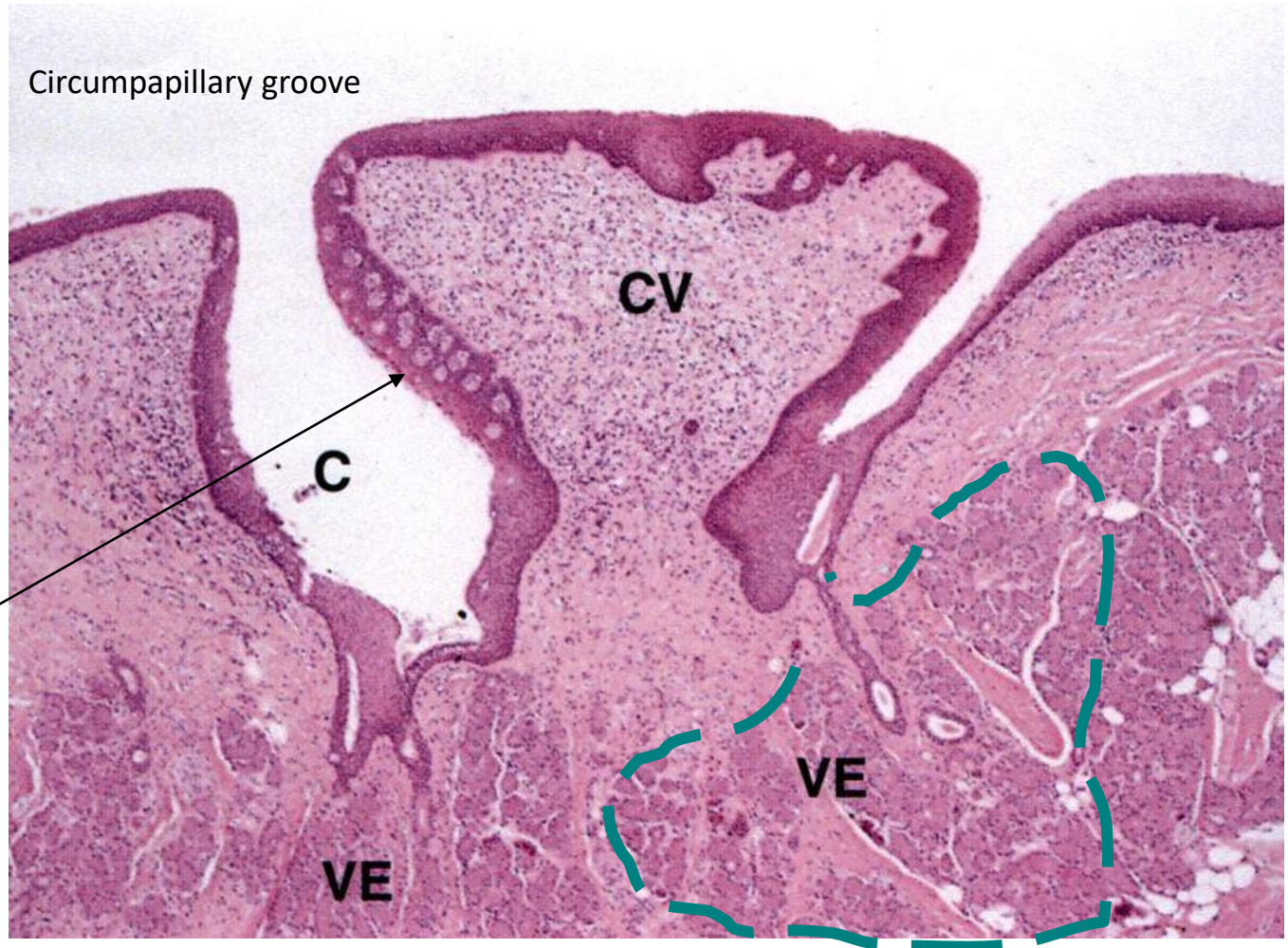


*Papillae vallatae* – Scanning electron microscopy

# Papily

výrůstek slizničního vaziva krytý epitelem jazyka

## *Papillae vallatae*



Taste buds

Von Ebner Gland – serous glands

# ANATOMICAL QUIZ

