

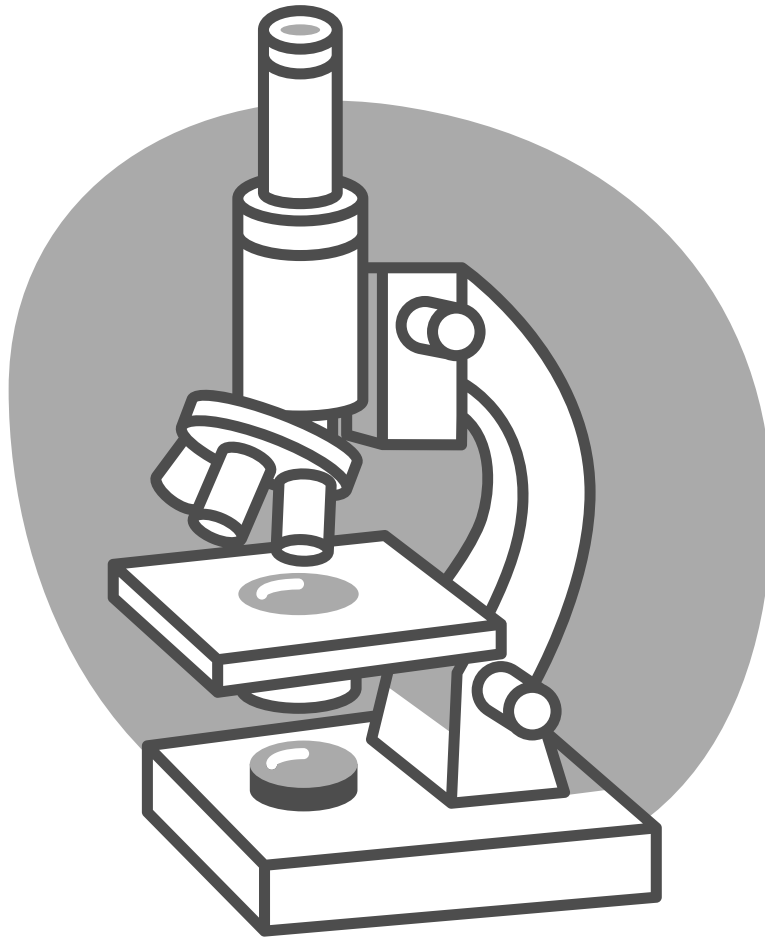
**GIS**

جغرافيا

no. 1

Modified

# Histology



Done by: Hala zaghloul

Correction: Hala zaghloul

Doctor: Mohammad almohtasib

# Histology Lab GIS part1

we'll discuss the histology of:

## 1. Oral cavity:

a) lip            b) tongue            c) salivary glands

## 2. Esophagus

Done by: Hala Zaghloul

# Oral cavity

Histology of the **lips** (A mucocutaneous junction)

Recall from Anatomy that the lips are divided into 3 parts:

1) **Oral part** (inside the oral cavity)

→ Epithelium: stratified squamous non-keratinized aka mucosa

2) **Red part** (transitional zone)

Contains large number of capillaries → RED, Rich in nerve terminals

→ Epithelium: stratified squamous para-keratinized (modified skin)

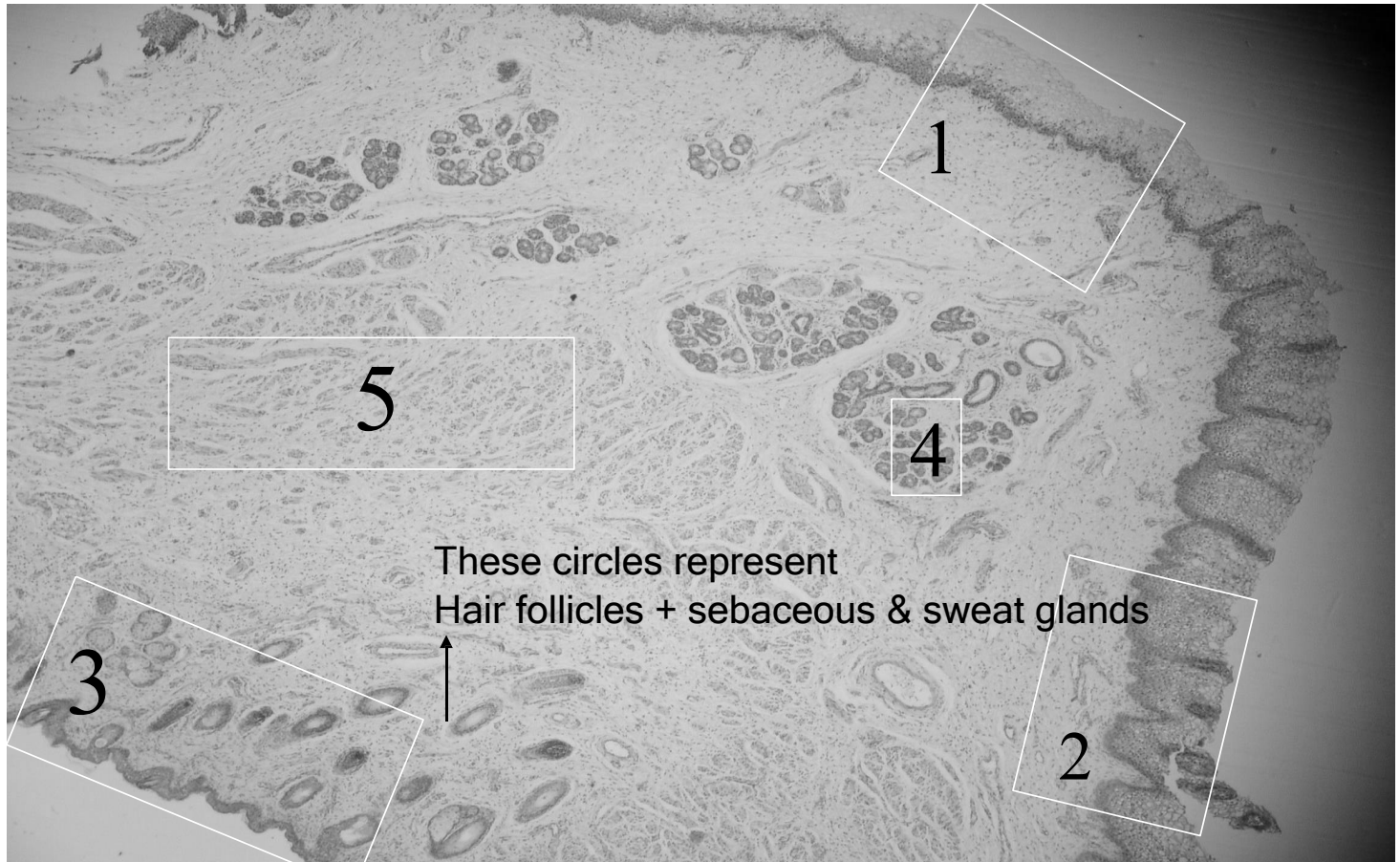
3) **Outer part** (skin)

→ Epithelium: stratified squamous keratinized + hair follicles + sebaceous & sweat glands

\*\*Don't forget that the tissue layers of the lips are: Mucosa, submucosa, skeletal muscle & skin

# Sagittal section of LIP

## 1 Oral mucosa 2 red margin



These circles represent  
Hair follicles + sebaceous & sweat glands

1. Oral part

2. transitional zone (vermilion)

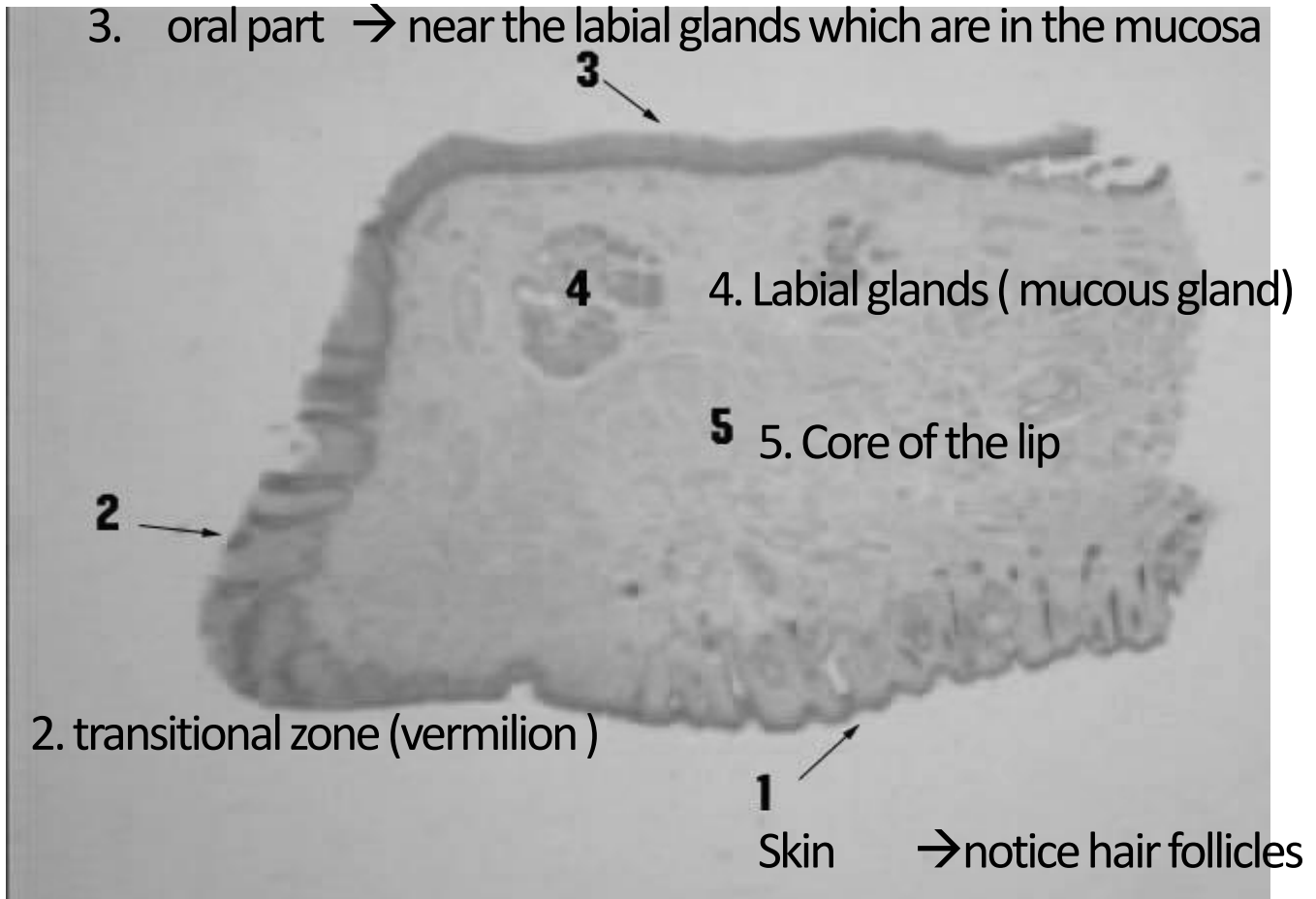
3. skin

4. Labial glands ( mucous gland)

5. Core of the lip: striated muscle → orbicularis oris

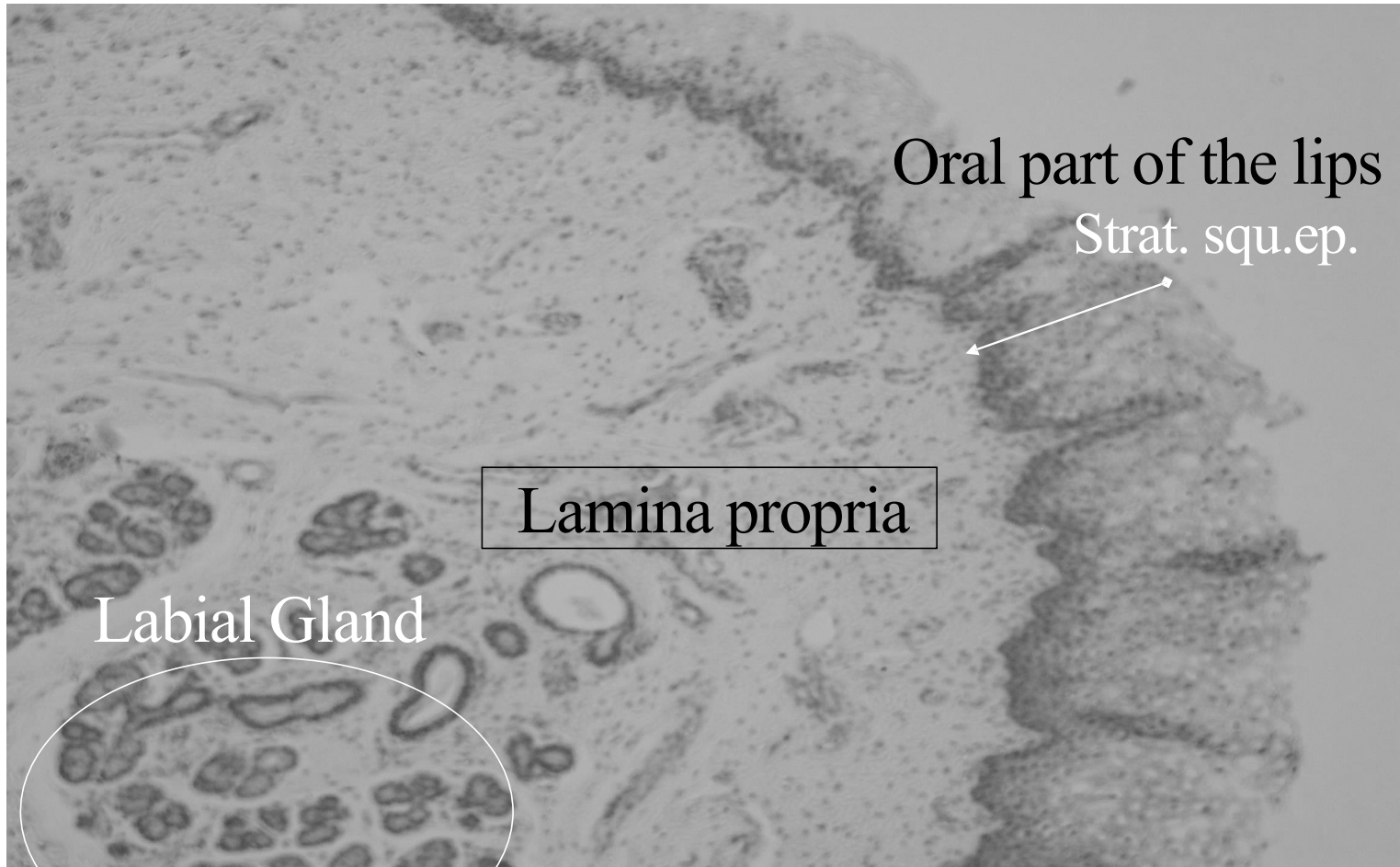
Test yourself 😊

# Sagittal (longitudinal) section of LIP

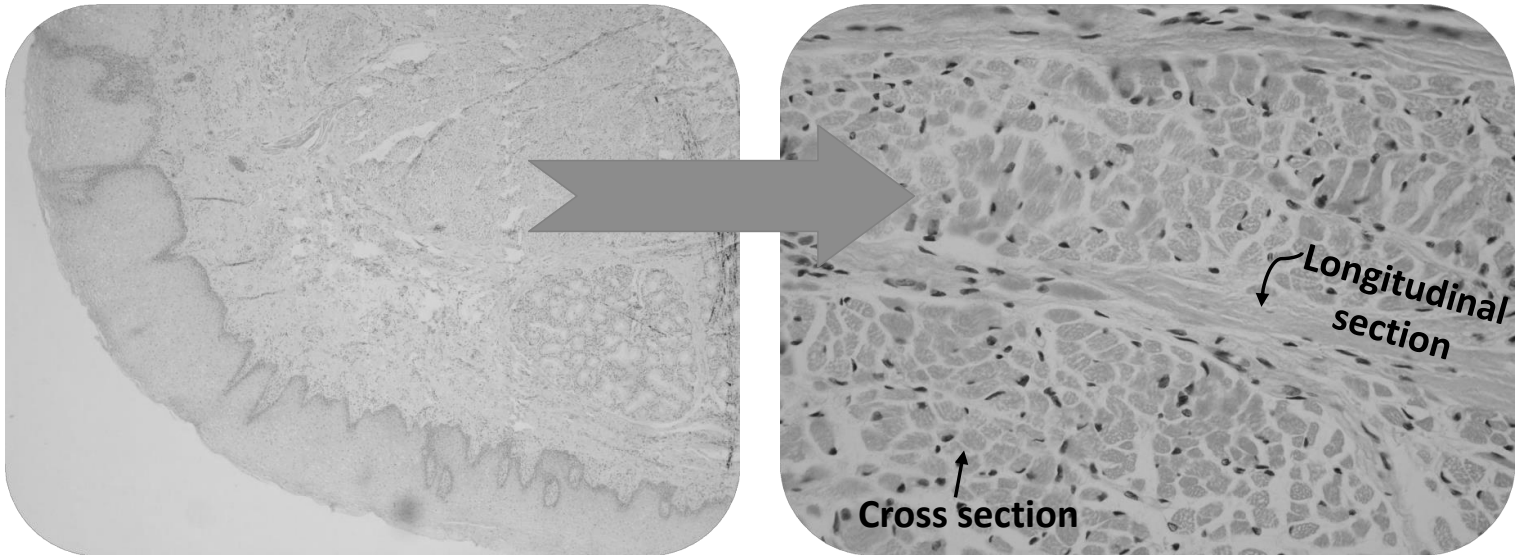


# Oral mucosa part

labial seromucous (minor salivary gland)

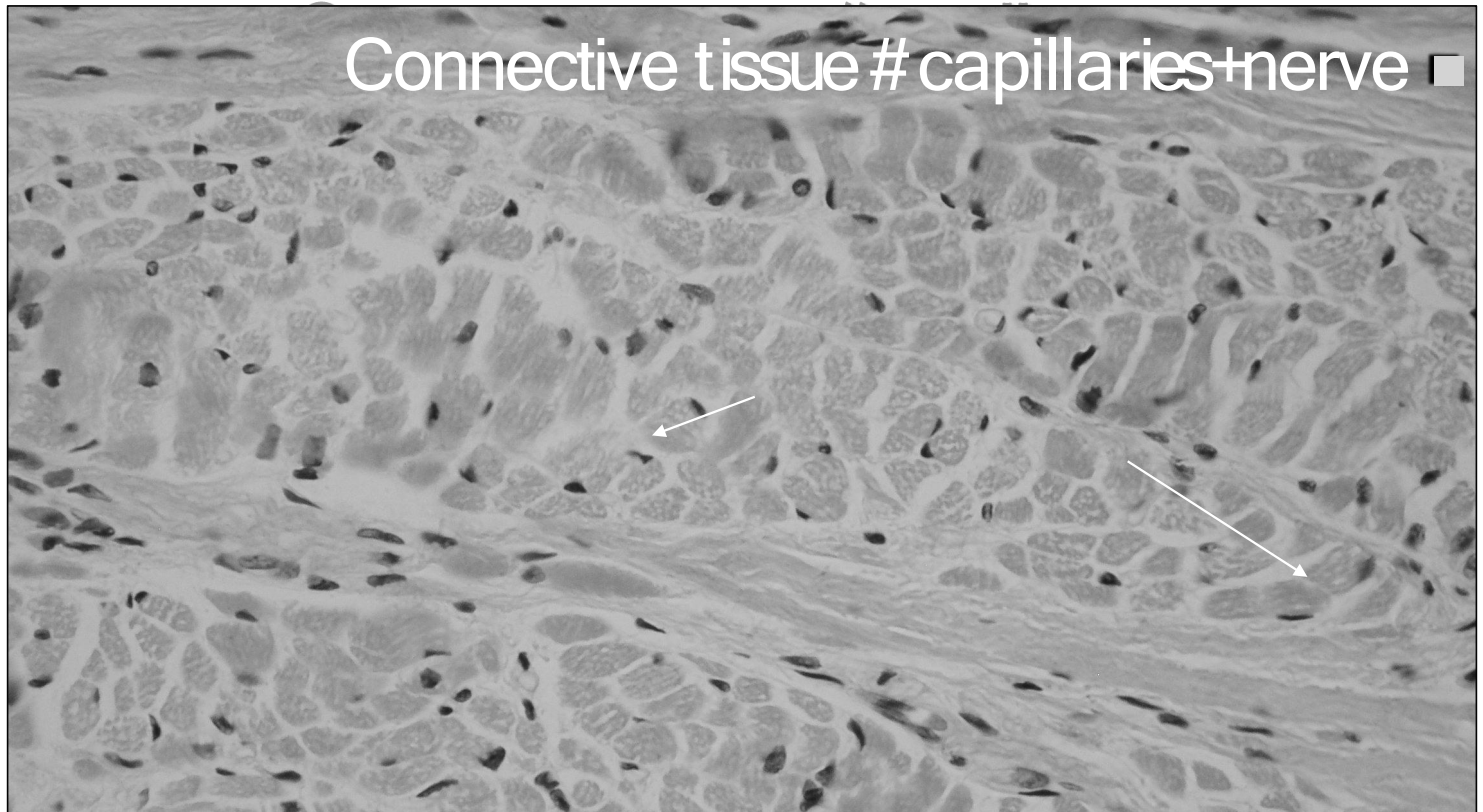


Core of lips: fine, striated skeletal muscle  
which is orbicularis oris



Skeletal Muscles are characterized by: Multiple, flattened,  
peripheral nuclei

# Fine skeletal muscle in core of lip



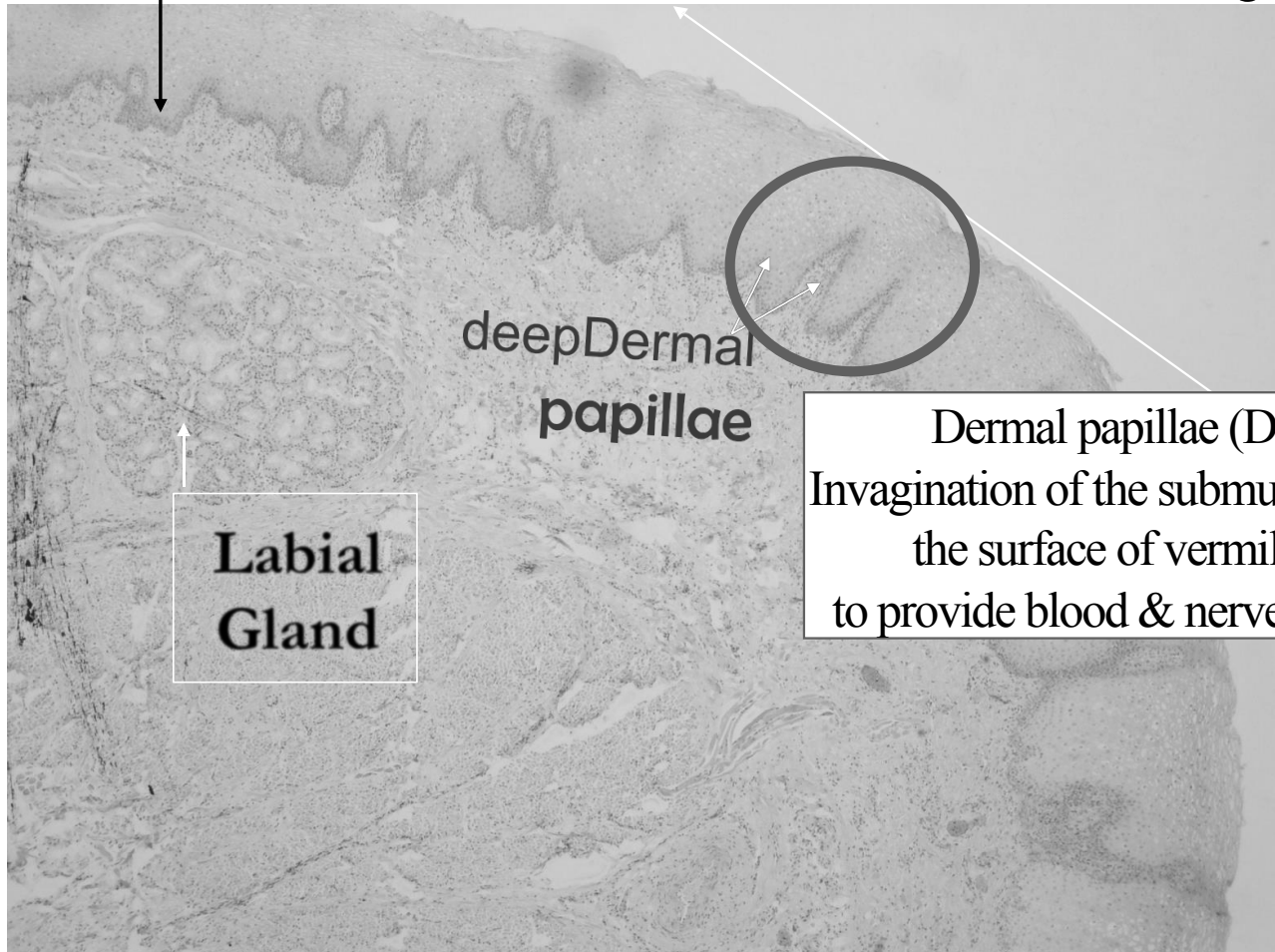
You can see the Multiple, flattened, peripheral nuclei of skeletal muscles



# Vermilion(transition zone)

Para-keratinized epithelium

Modified skin because → no hair follicle, no sweat glands

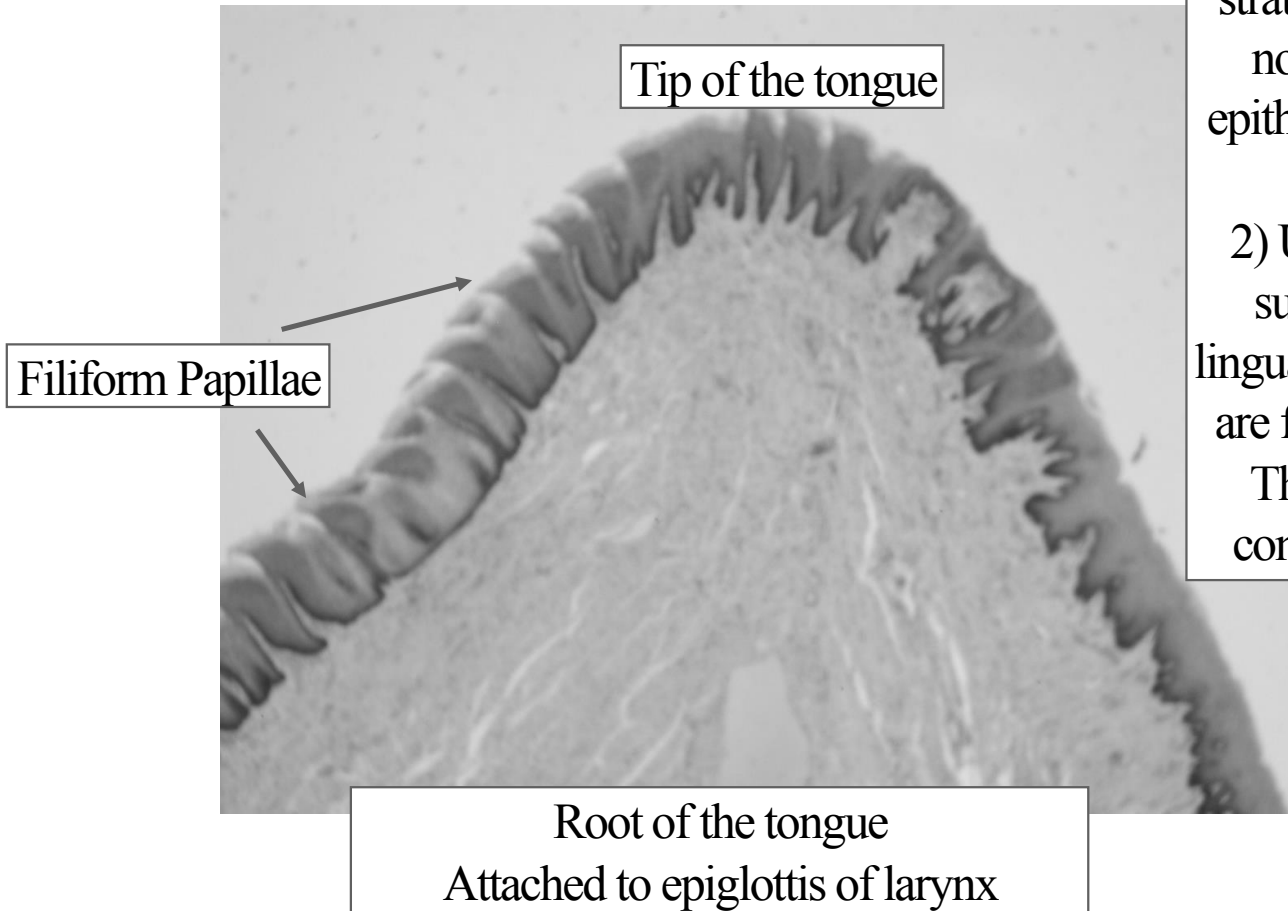


deep Dermal  
papillae

Labial  
Gland

Dermal papillae (DP)  
Invagination of the submucosa into  
the surface of vermilion  
to provide blood & nerve supply

# Tongue : dorsal surface



The tongue has two surfaces:

- 1) Lower surface that's covered by stratified squamous non-keratinized epithelium (mucosa)

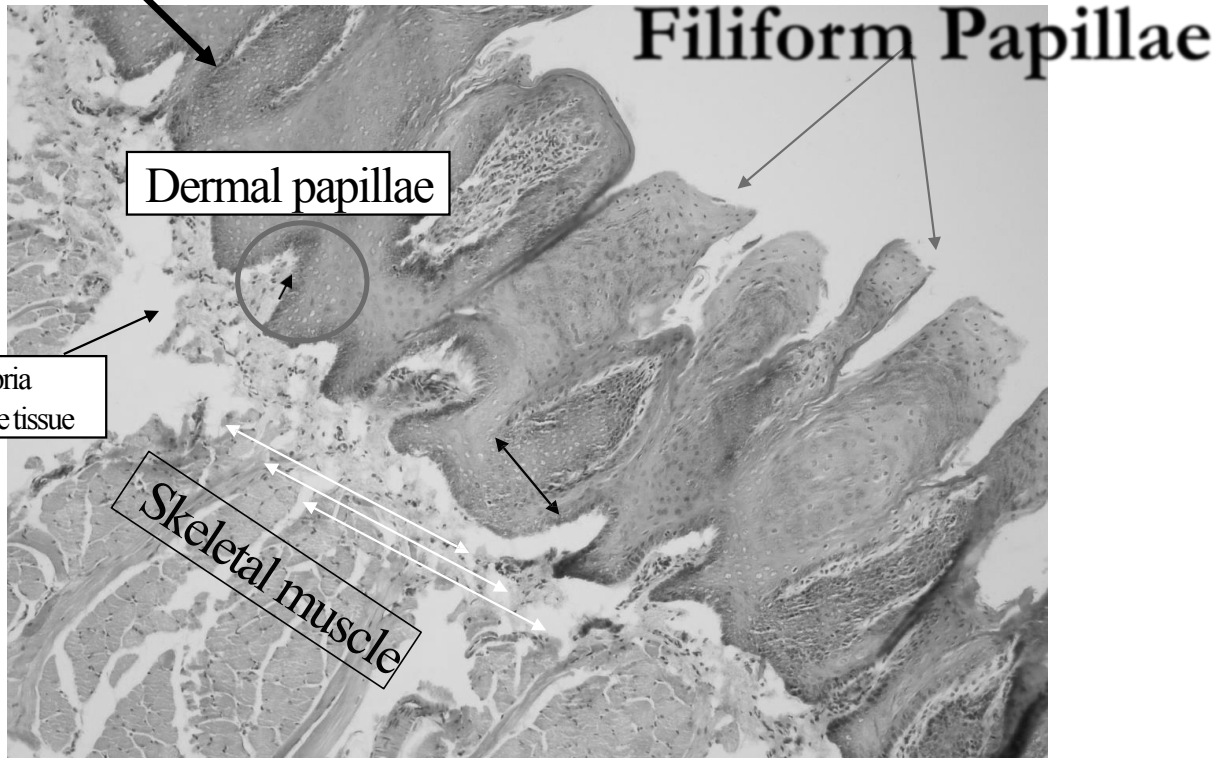
And

- 2) Upper (dorsal) surface that has lingual papillae which are filiform papillae

That does NOT contain taste buds

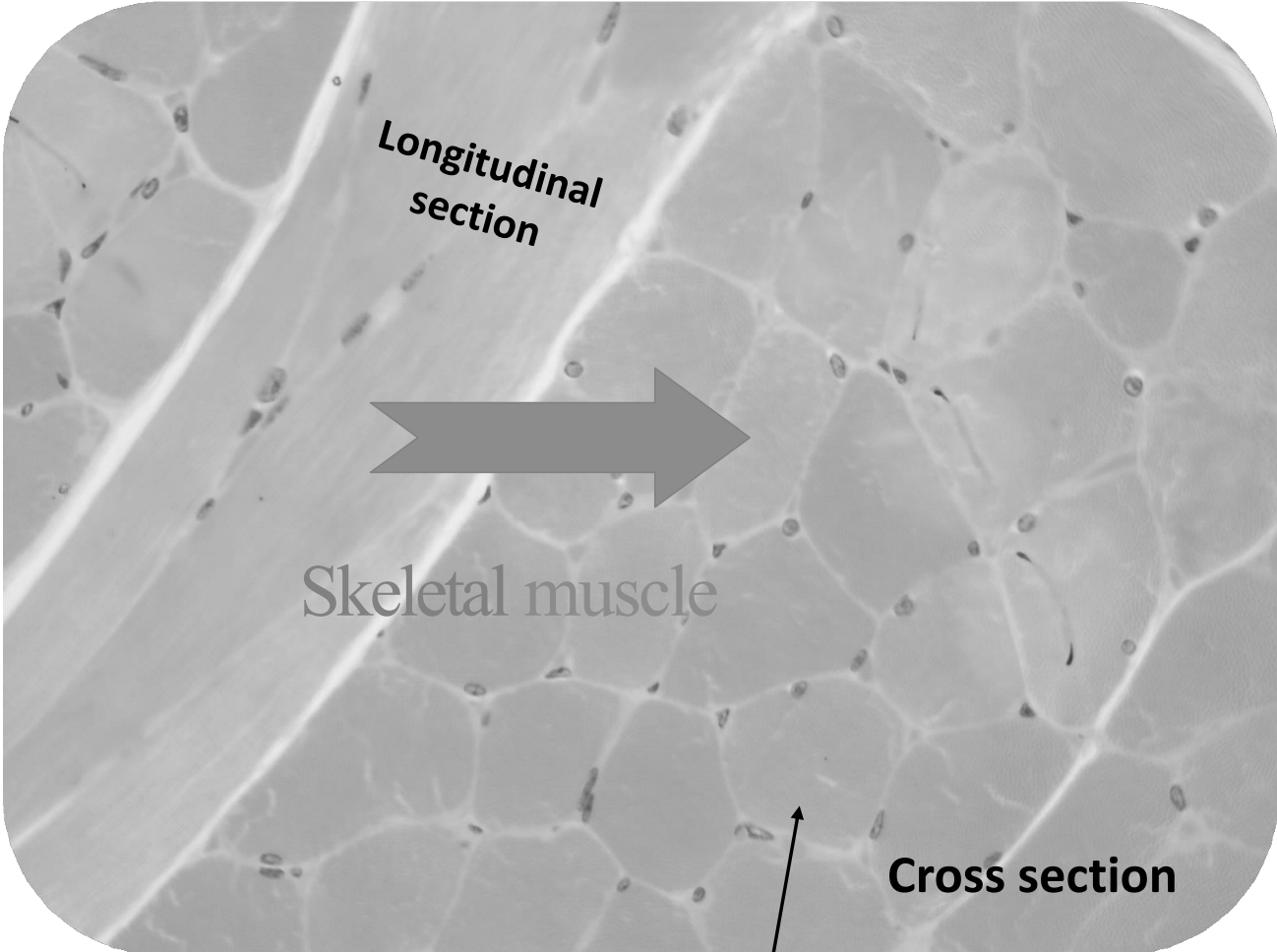
# Dorsal surface of the tongue

**Epithelium** stratified squamous para-keratinized, why **para**?  
Because once its injured, the epithelium doesn't regenerate back into the original state

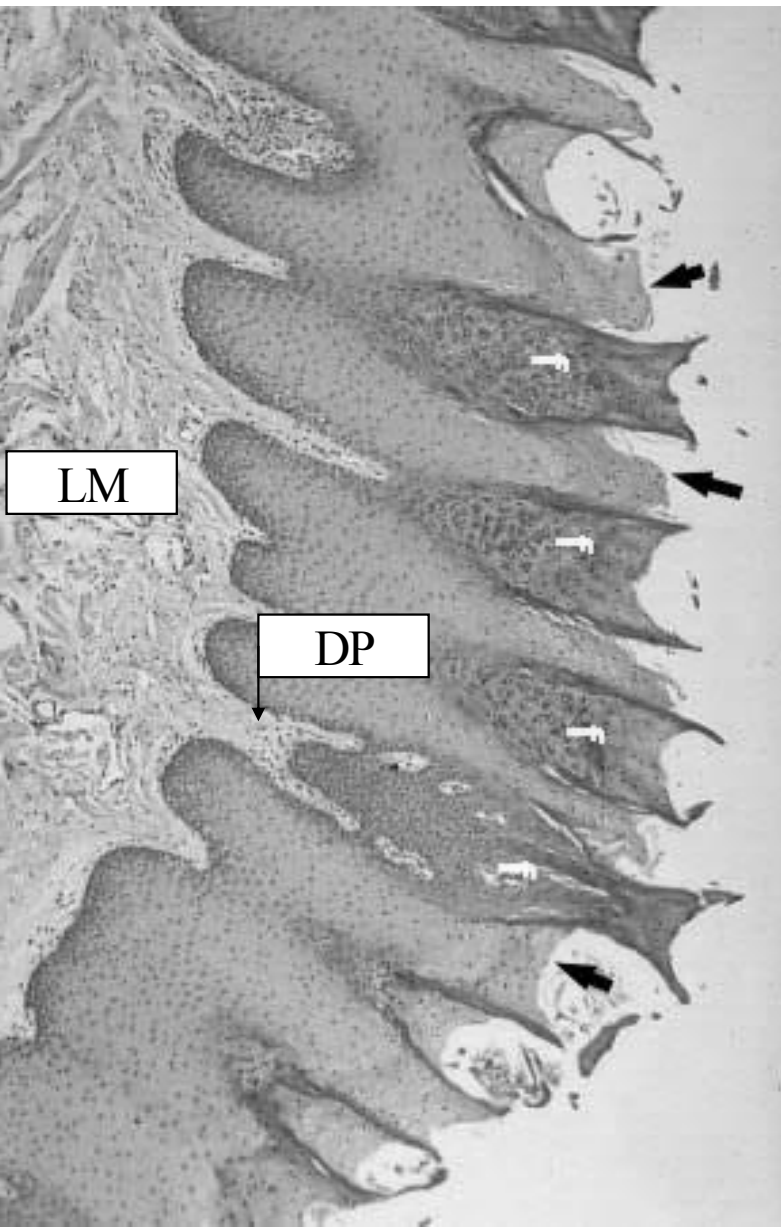


Core of the tongue is striated muscles since it's a muscular organ formed by intrinsic & extrinsic muscles

Notice the peripheral nuclei of skeletal muscles



Muscle Fiber



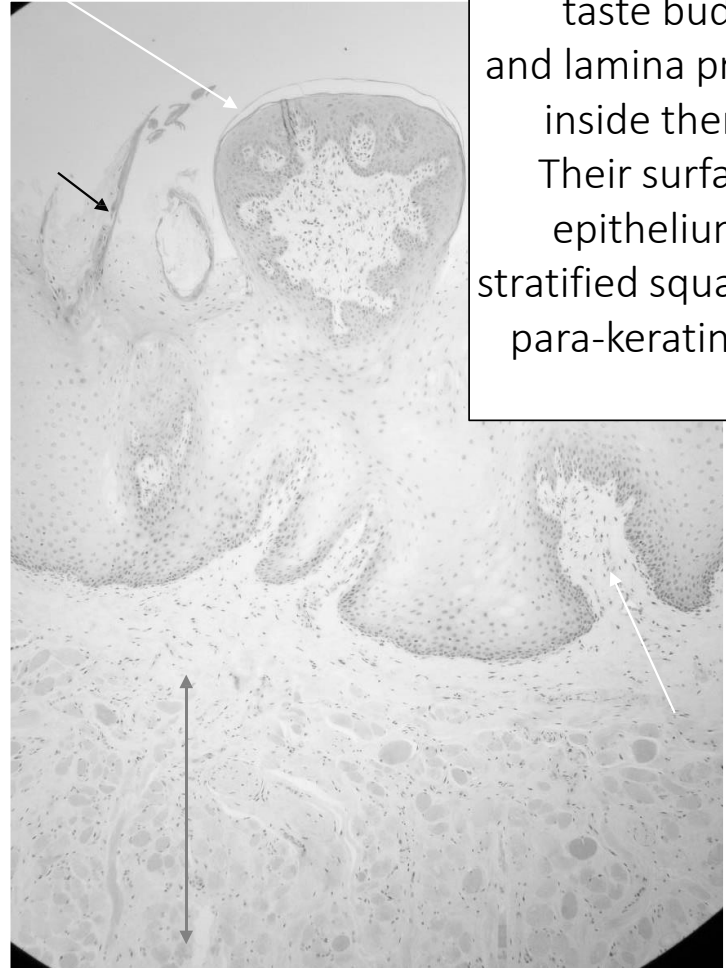
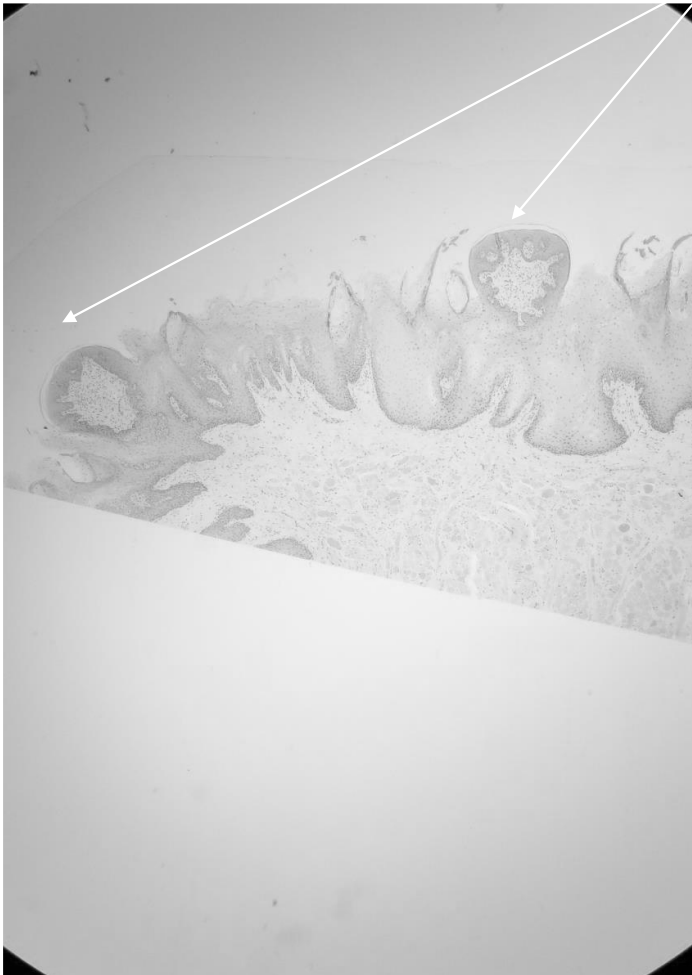
# Filiform Papillae

Are lingual papillae that are devoid of taste buds, present on the dorsal surface of the tongue

→ Notice their projections (arrows)

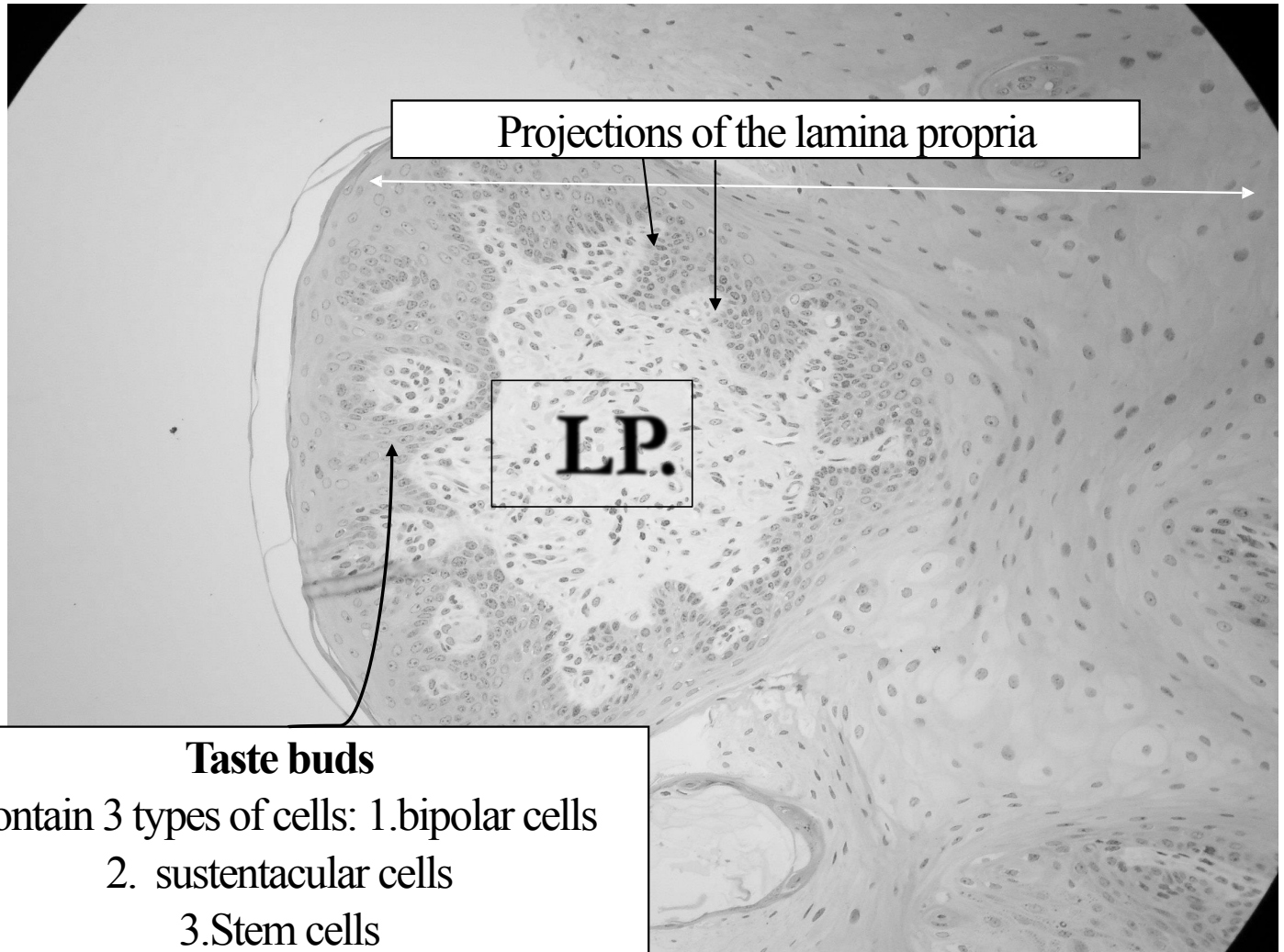
The Laminal propria (**LM**) creates invagination into the surface of the papillae to provide blood & nerve supply  
These invaginations are called dermal papillae (**DP**)

# Fungiform papilla



These papillae have taste buds and lamina propria inside them. Their surface epithelium: stratified squamous para-keratinized

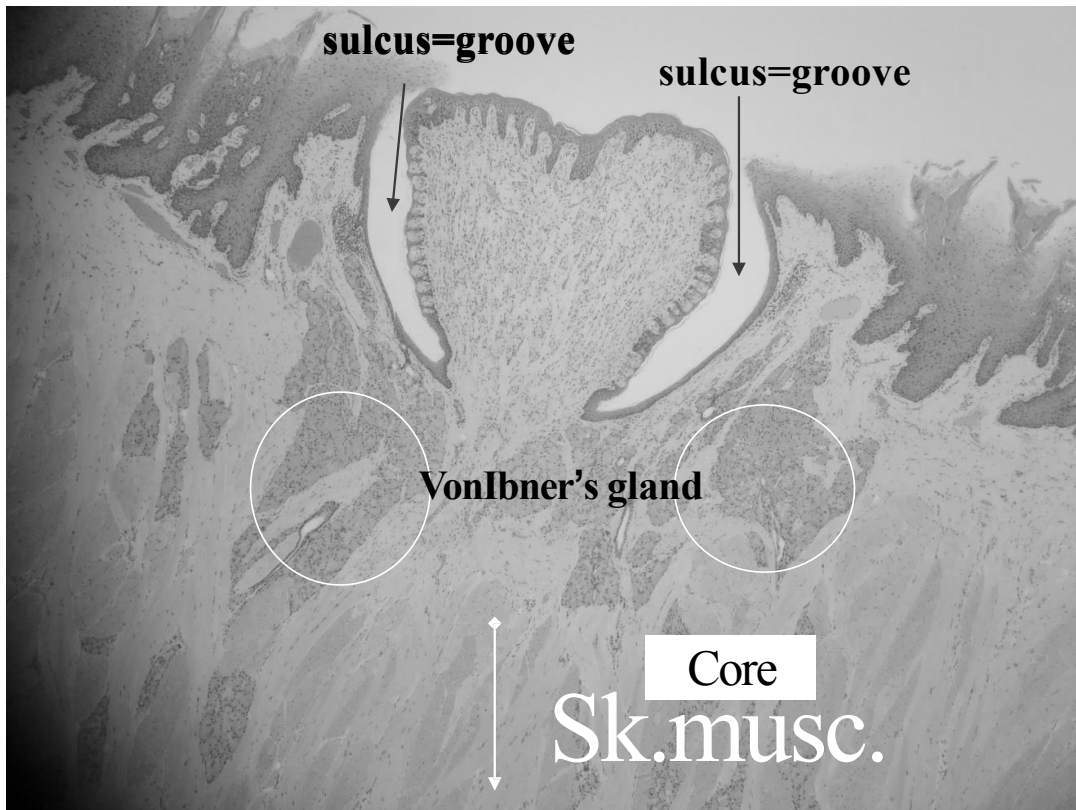
# Str. Squa.Ep..



## Taste buds

- Contain 3 types of cells:
1. bipolar cells
  2. sustentacular cells
  3. Stem cells

# 3rd type of papillae present in Tongue: Circumvallate Papilla



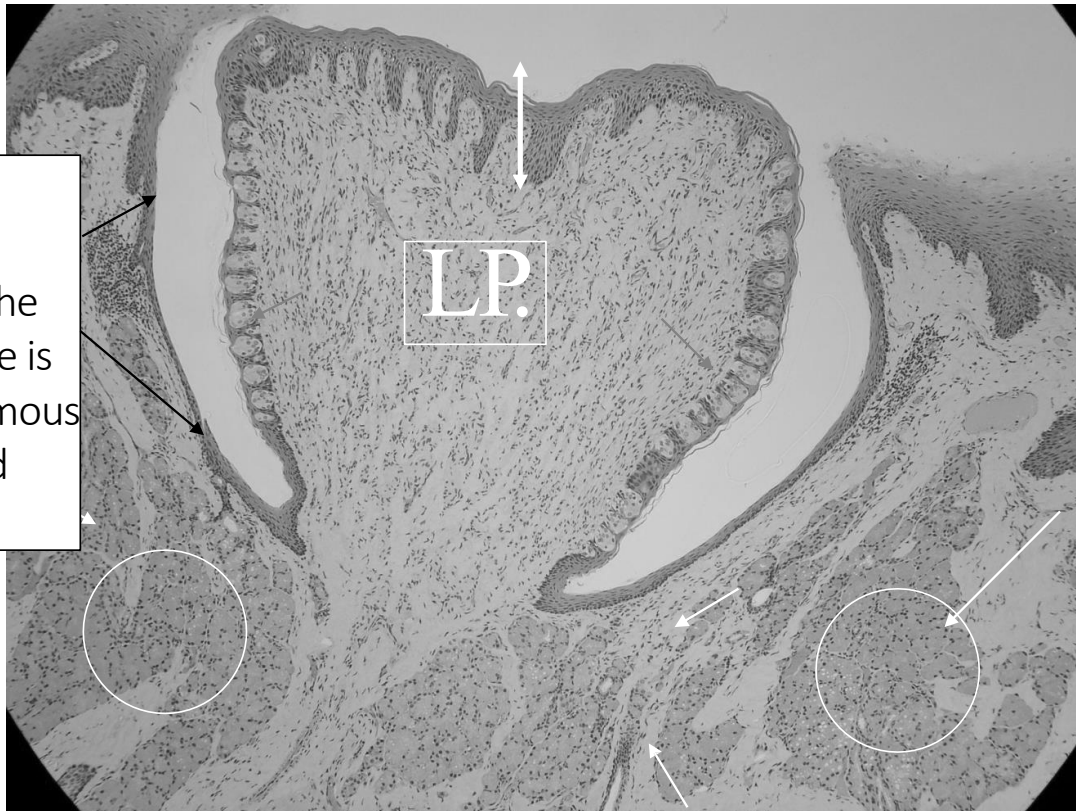
- Surrounded by a circular groove.  
Since both of the circumvallate papillae & the groove are circular in shape, they appear shallow because this is a longitudinal section
- Circumvallate papilla has taste buds present on its lateral side, medial to the groove
- von Ibner's gland duct opens in the groove, it releases serous secretions to dissolve materials we taste



Test yourself 😊

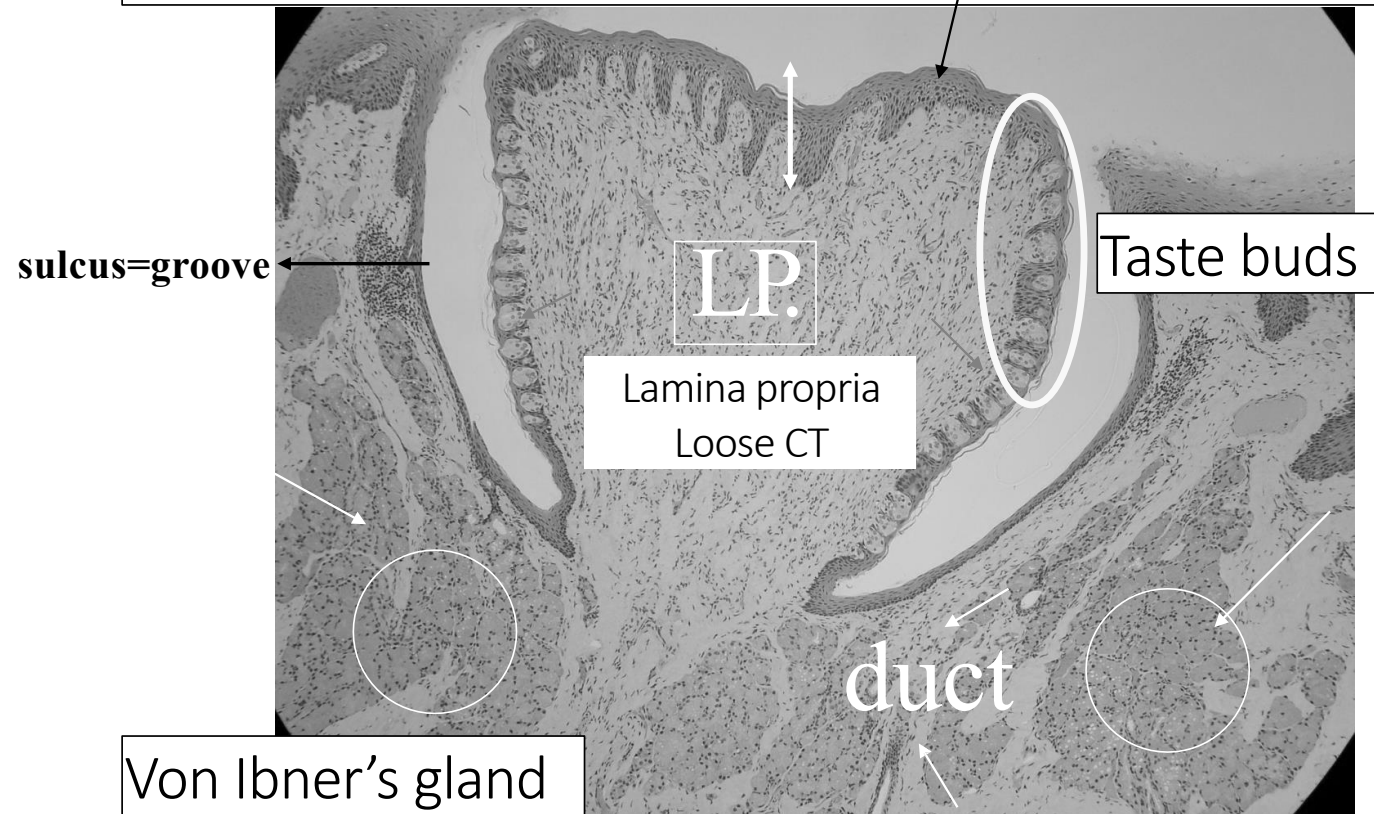
# Taste bud

Side note:  
The lining  
epithelium of the  
groove's surface is  
stratified squamous  
non-keratinized  
(mucosa)



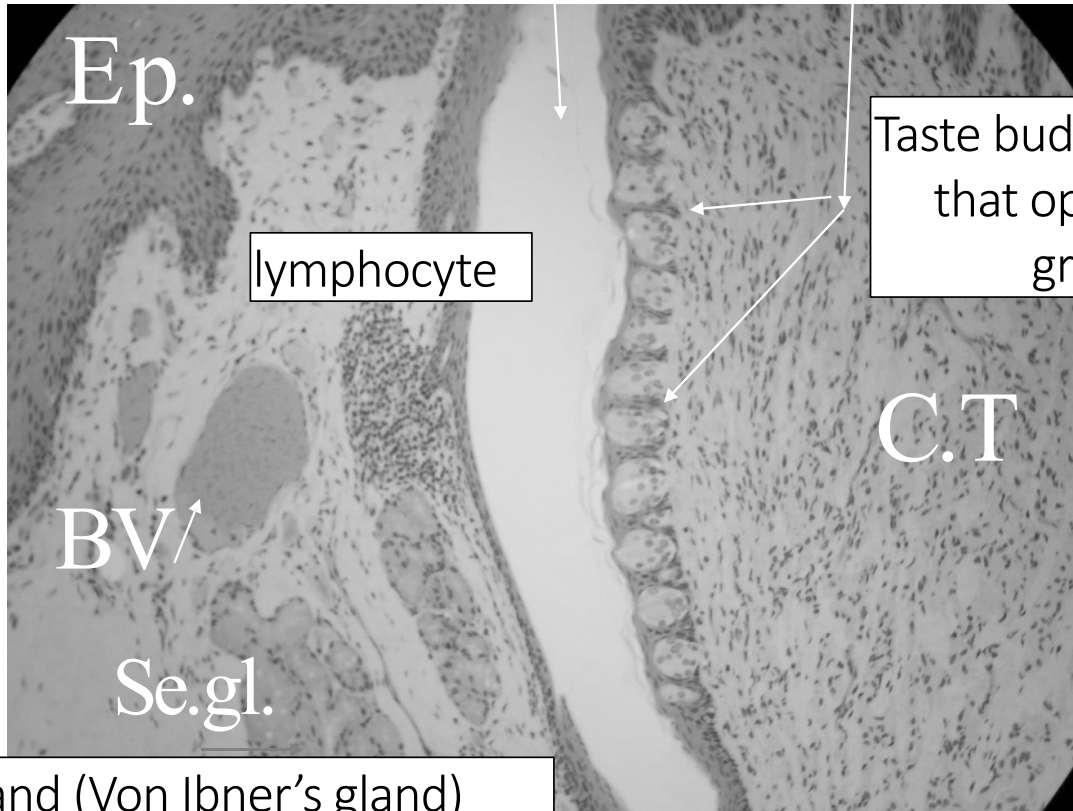
# Circumvallate papilla

Surface epithelium: stratified squamous para-keratinized



# Histology of Taste buds

## Serous gl. sulcus Taste bud



Ep.

lymphocyte

BV

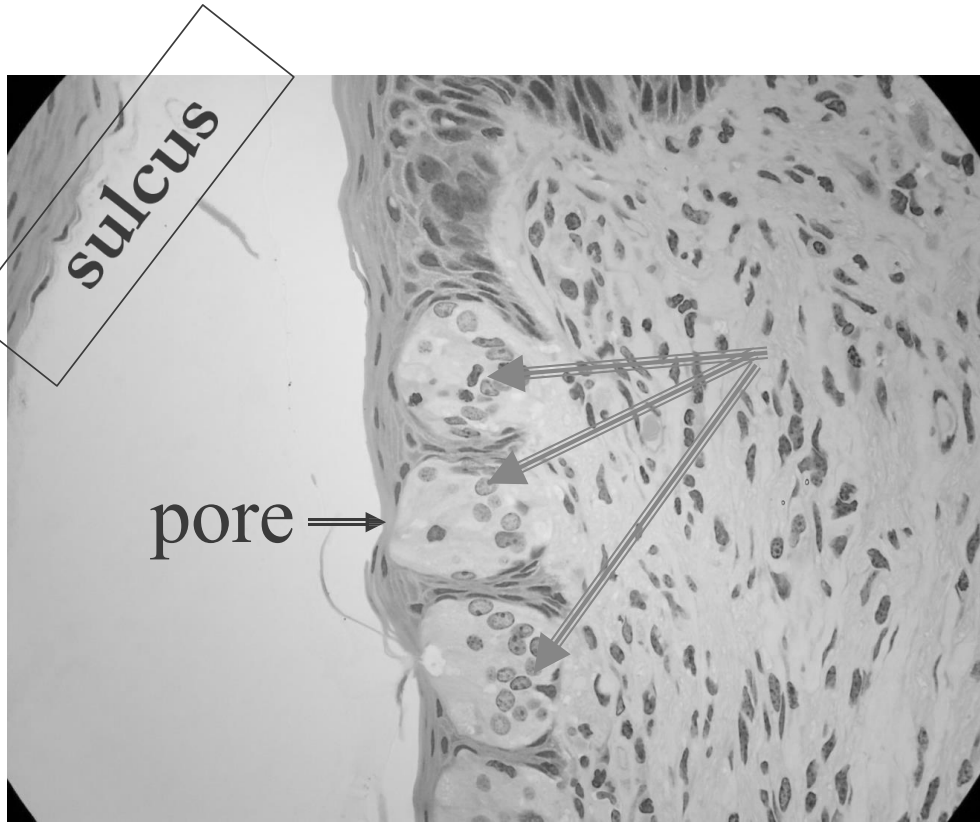
Se.gl.

Taste buds have pores that open to the groove

C.T

Serous gland (Von Ibner's gland) opens to the bottom of the sulcus

# Taste bud



## Cells of the taste bud

### Bipolar cells

Located at the center, have hairlets that connect it to the pore & at the base the cells are connected to nerve fibers.

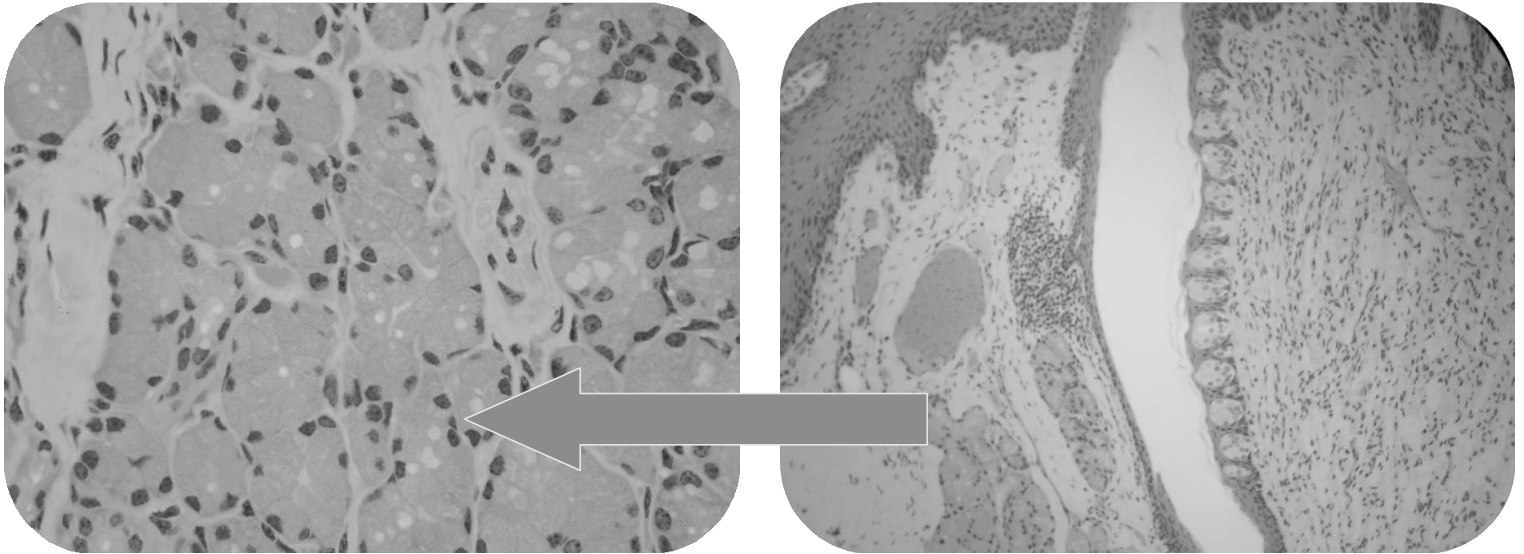
### Function of bipolar cells:

Covert chemical impulse to electrical and transduce it to the centers in the brain

To recognize sour, sweet, bitter tastes

On the lateral side lies the sustentacular cells ( supportive cells) & on the base stem cells are located

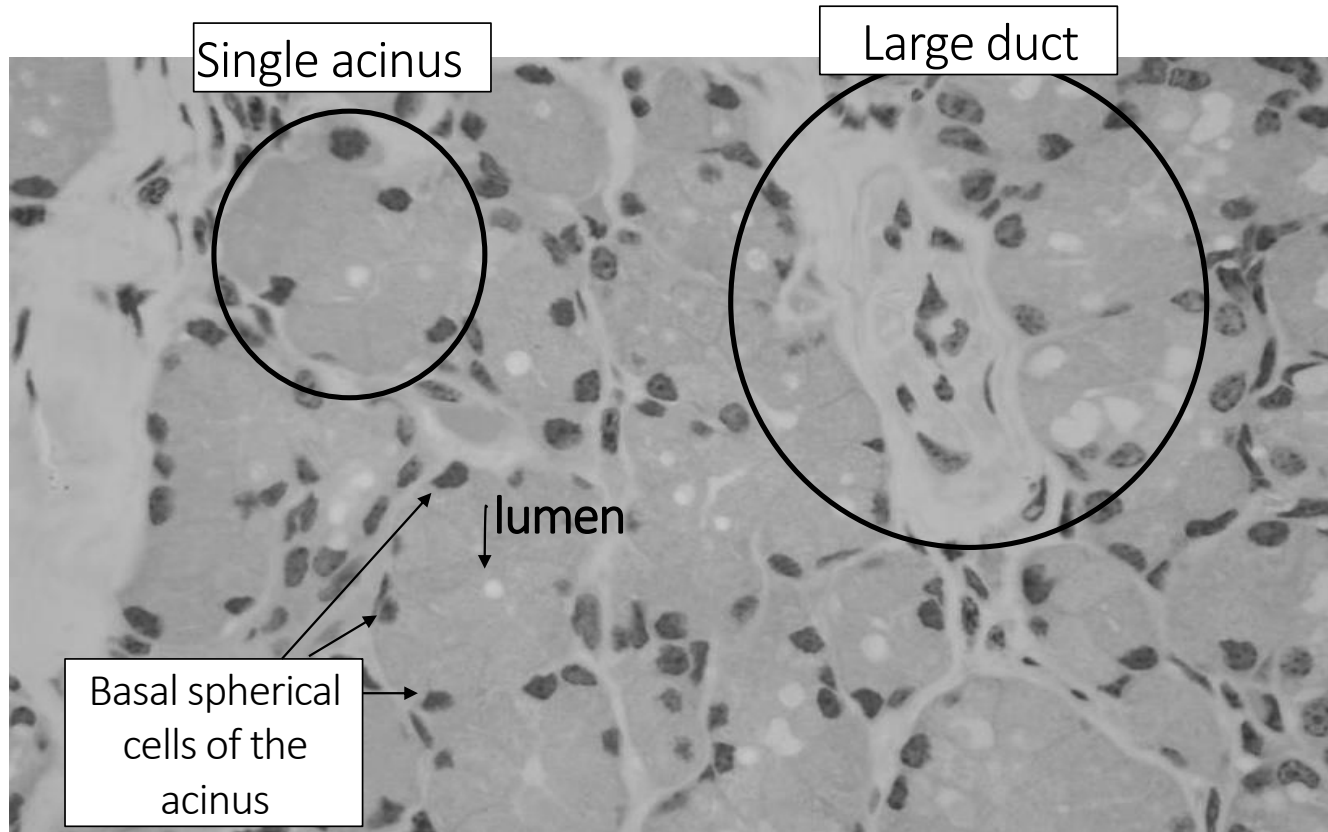
# VonIbner's gland=minor gland



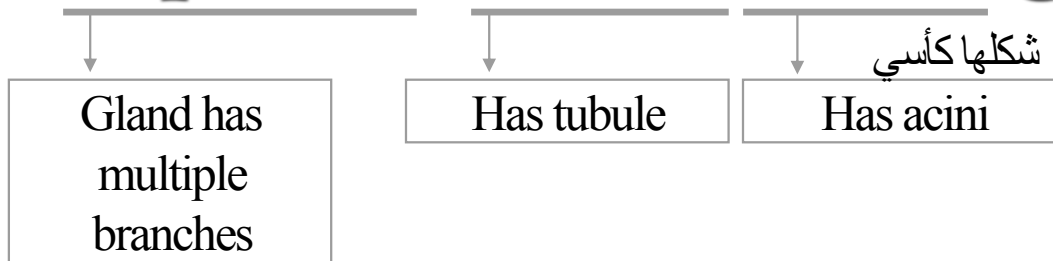
## Von Ibner's Gland:

- Minor salivary gland, releases serous secretions.
- Composed of multiples serous acini, each acinous has a central lumen & cells that has spherical basal ganglia and its apex directed towards the lumen, the boundaries between the cells are ill-defined.
- The gland drains its secretions via a large duct that opens at the bottom of the sulcus.

# Serous acinus



# Salivary glands:=major gland compound tubuloacinar gland

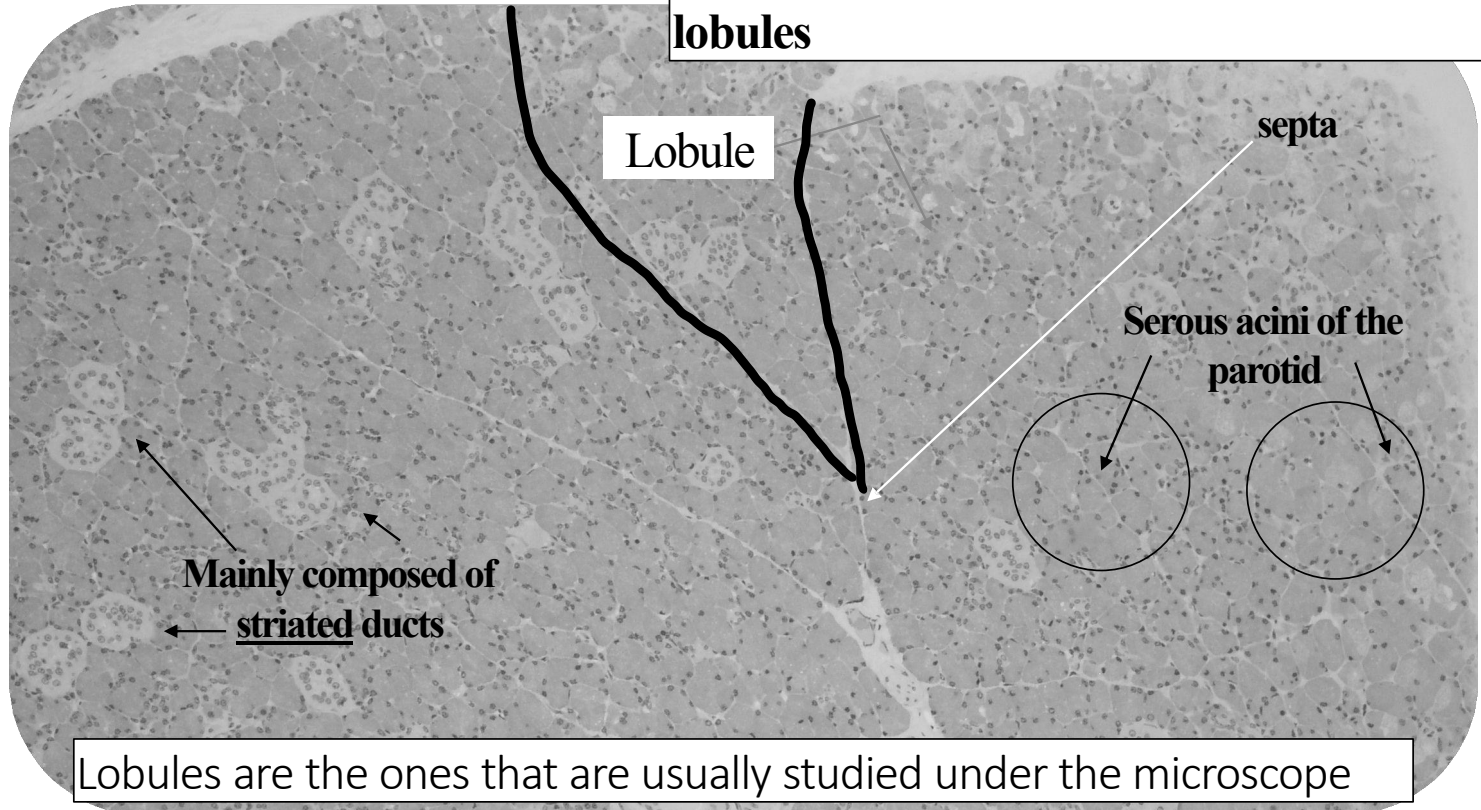


With parenchyma & stroma

Remember the 3 major salivary glands are:  
Parotid, submandibular & sublingual

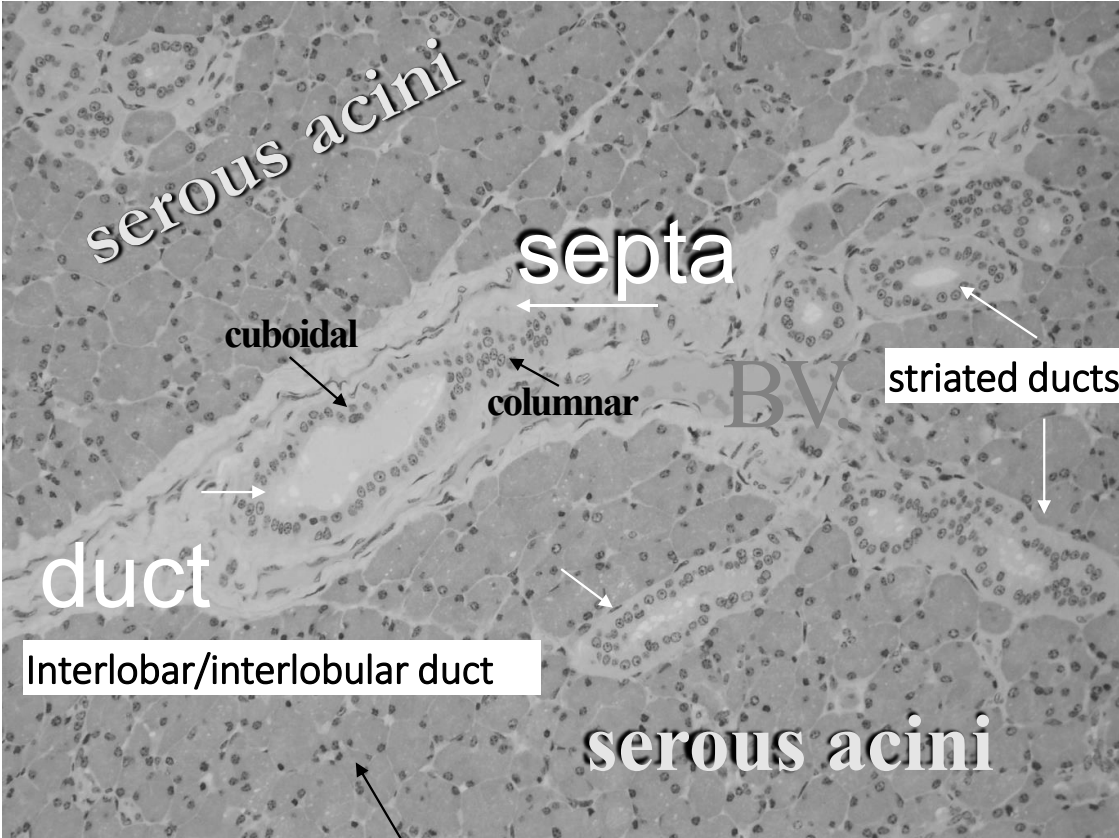
# Parotid gland:

Characterized by having two capsules, inner & outer  
the inner capsule sends connective tissue septa that divides the gland into lobes & lobules





# Parotid gland: serous gland



serous acini

septa

cuboidal

columnar

BV

striated ducts (Large ducts )

duct

Interlobar/interlobular duct

serous acini

Intercalated duct

Exam question: what are the two ducts present in lobules

## Intercalated vs. striated ducts in lobules

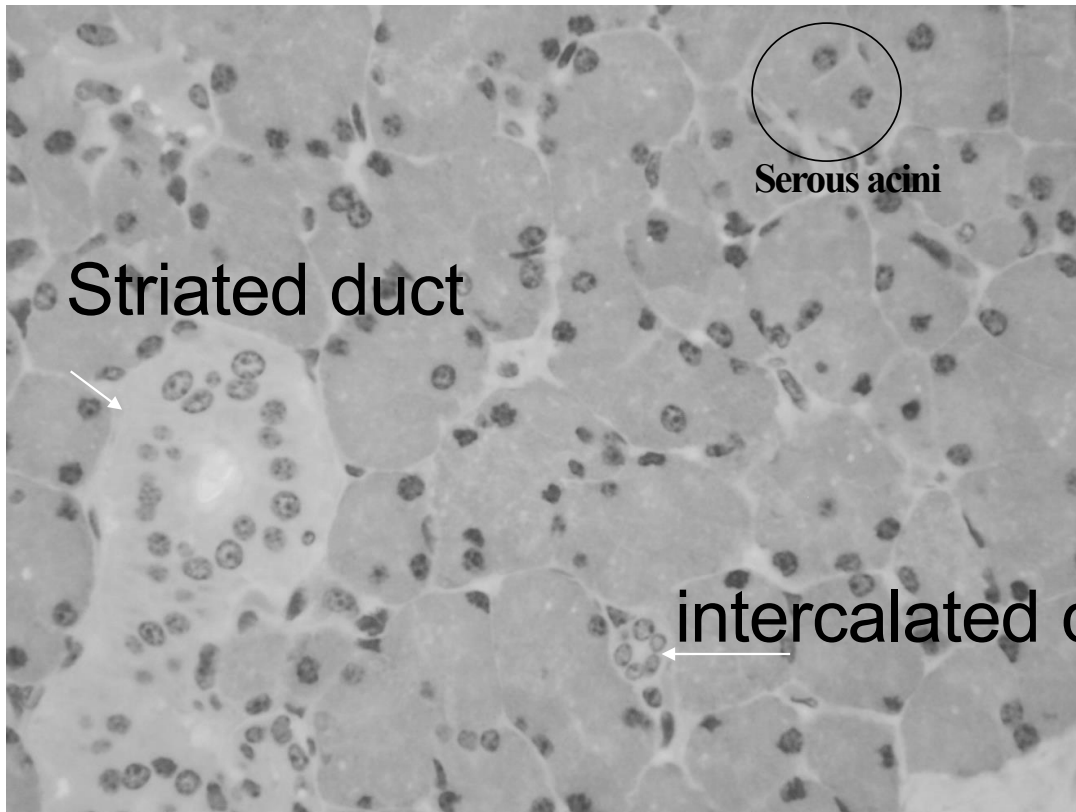
- **Striated ducts** appear pale in histological sections.
- larger in size, has large lumen, large number of nuclei, composed of more than 8 cells
- **Simple** cuboidal cells with rounded nuclei

- **Intercalated ducts** are small in size, narrow lumen, 5-7 cells

### **Interlobar/interlobular duct** (between the lobes & lobules)

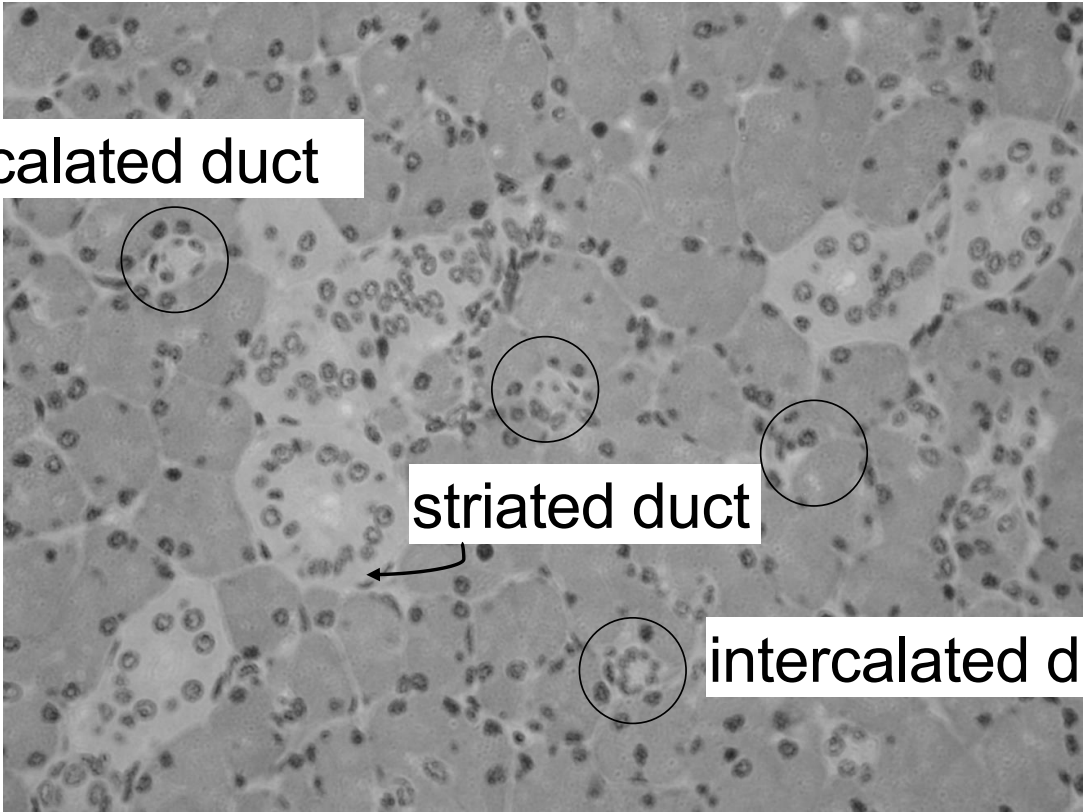
- Has larger lumen than striated ducts
- Lining Epithelium: **Stratified Cuboidal**, distally the epithelium changes into columnar, and eventually at the **main** excretory parotid duct the epithelium becomes stratified squamous non-keratinized

# Striated & intercalated (Intralobular duct)



**ALL the circled ducts are intercalated ducts**

intercalated duct

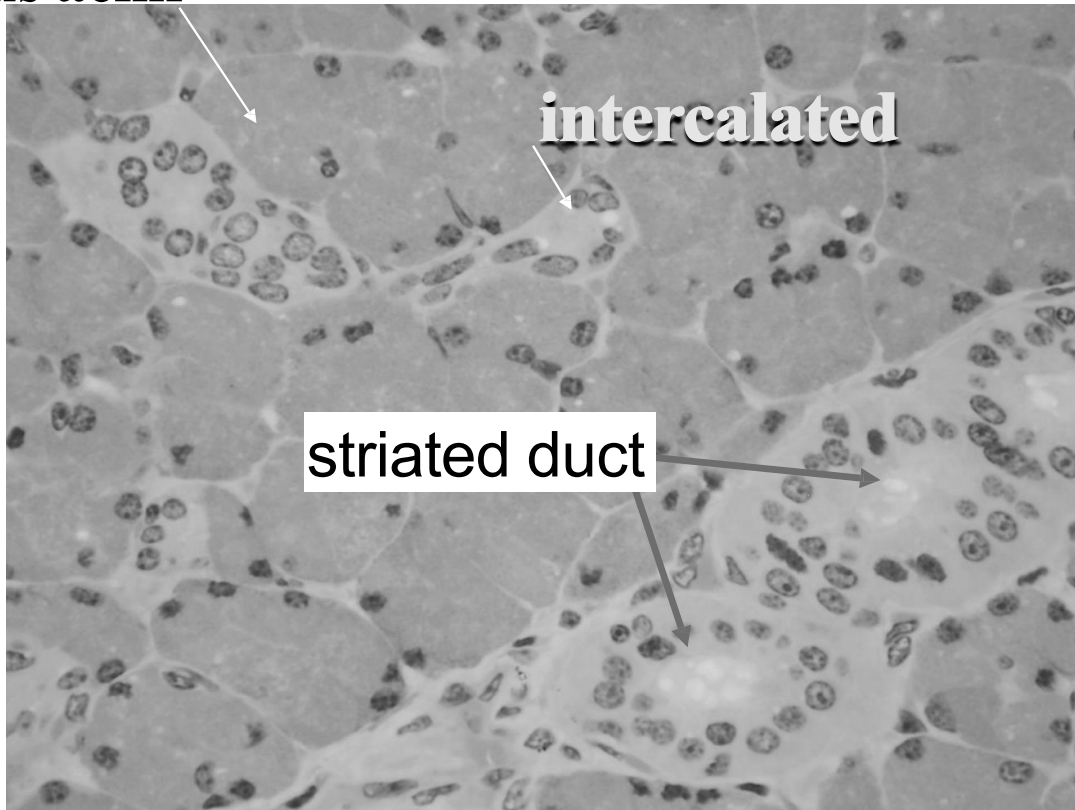


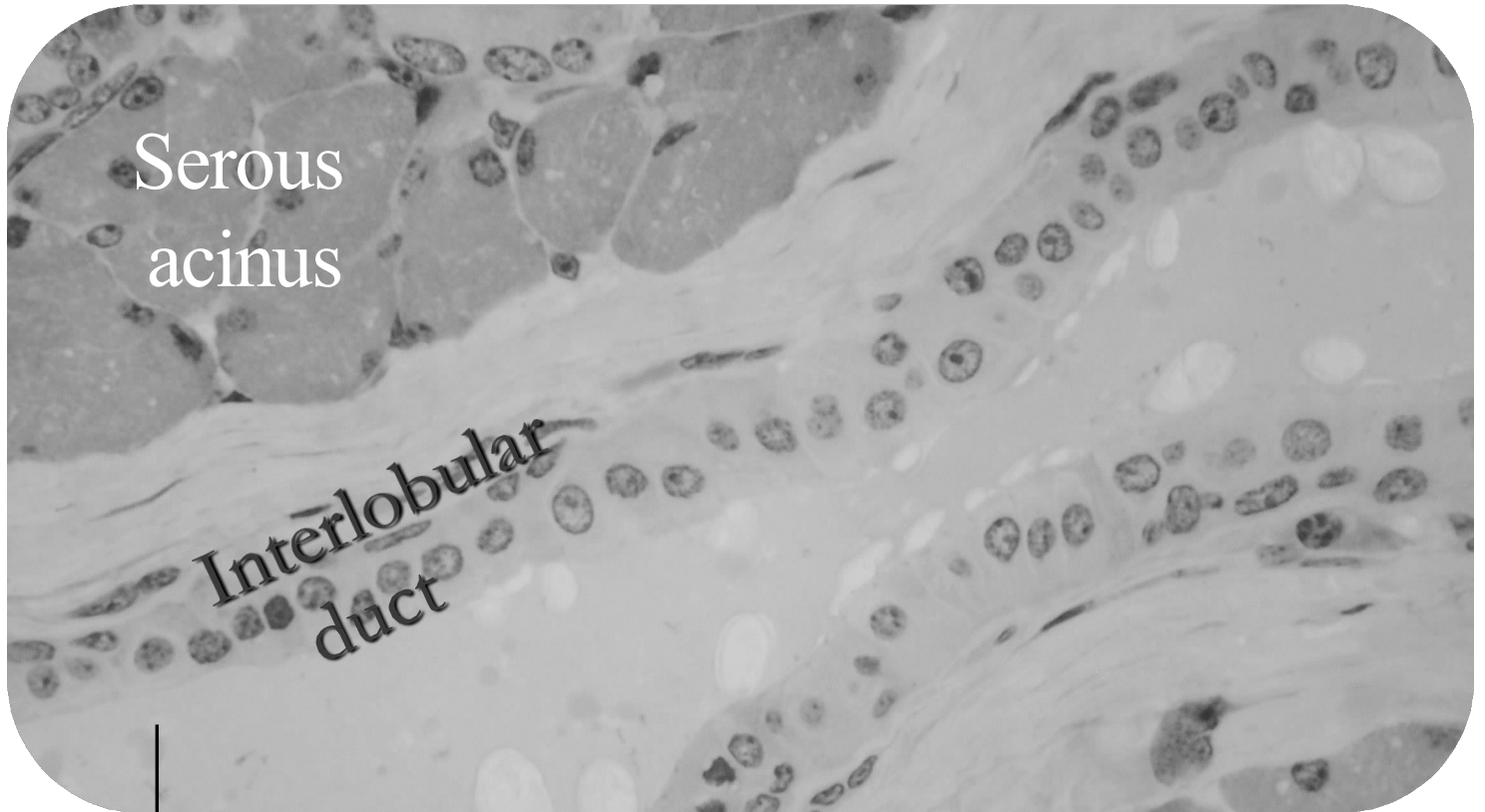
striated duct

intercalated duct

# Interlobular duct

Serous acini



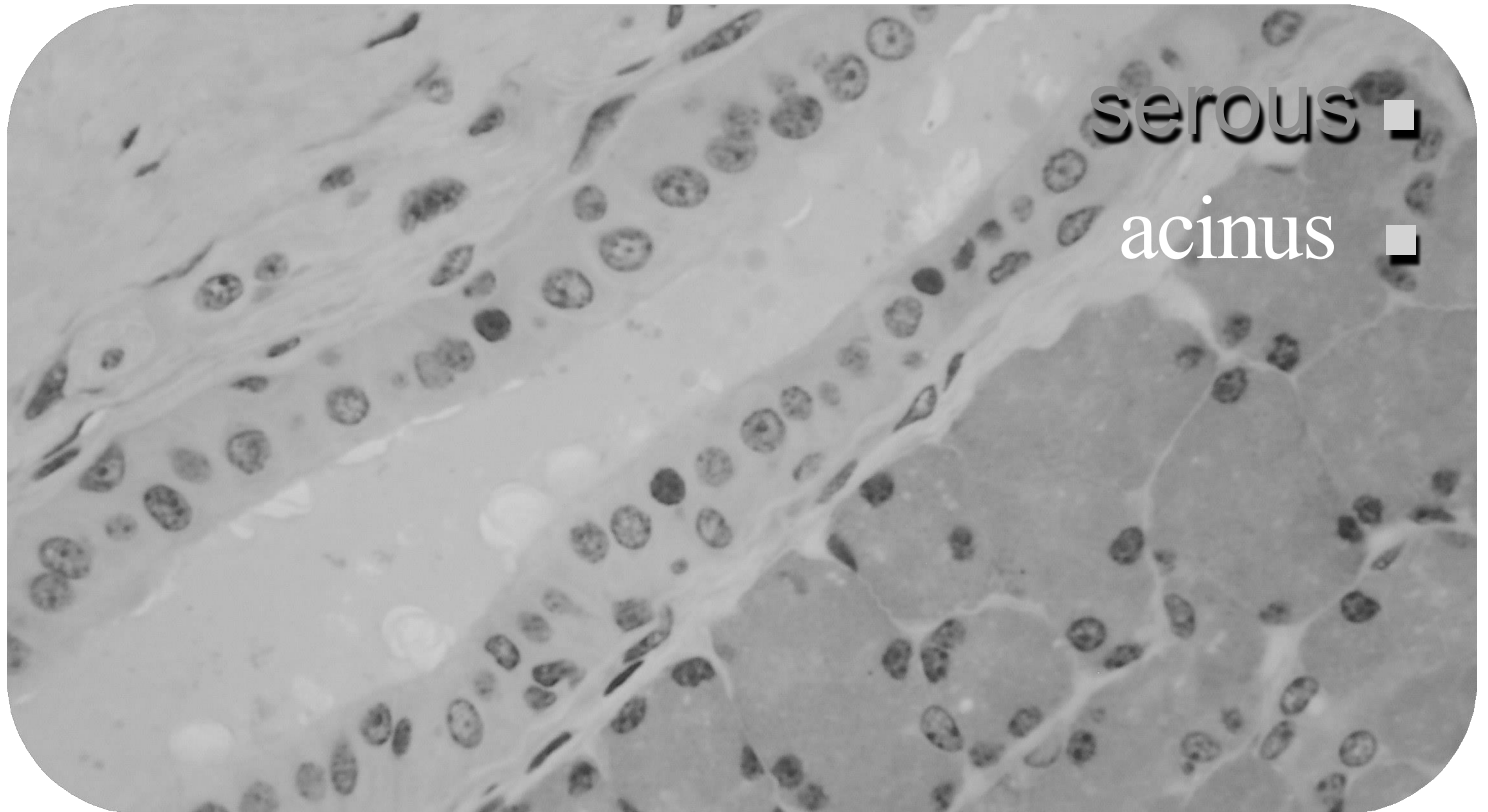


Serous  
acinus

Interlobular  
duct

Large duct with large lumen  
Lined by two layers of cuboidal  
cells → **stratified**

# Interlobular duct (excretory)



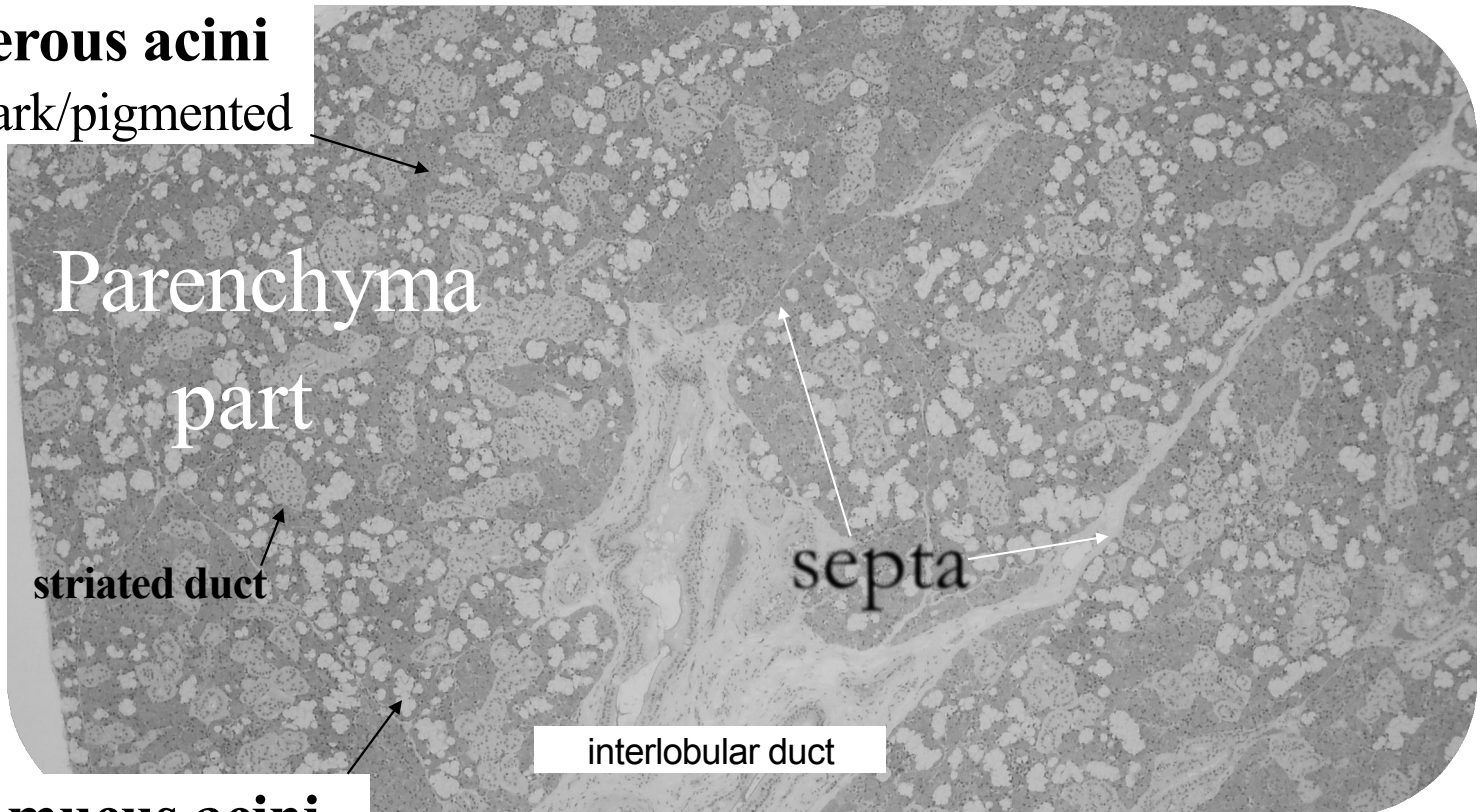
# Submandibular gland

Mixed gland: mucus & serous secretion

said to be a complicated gland because it has a **large** number of striated ducts

**Serous acini**

Dark/pigmented



Parenchyma  
part

striated duct

septa

interlobular duct

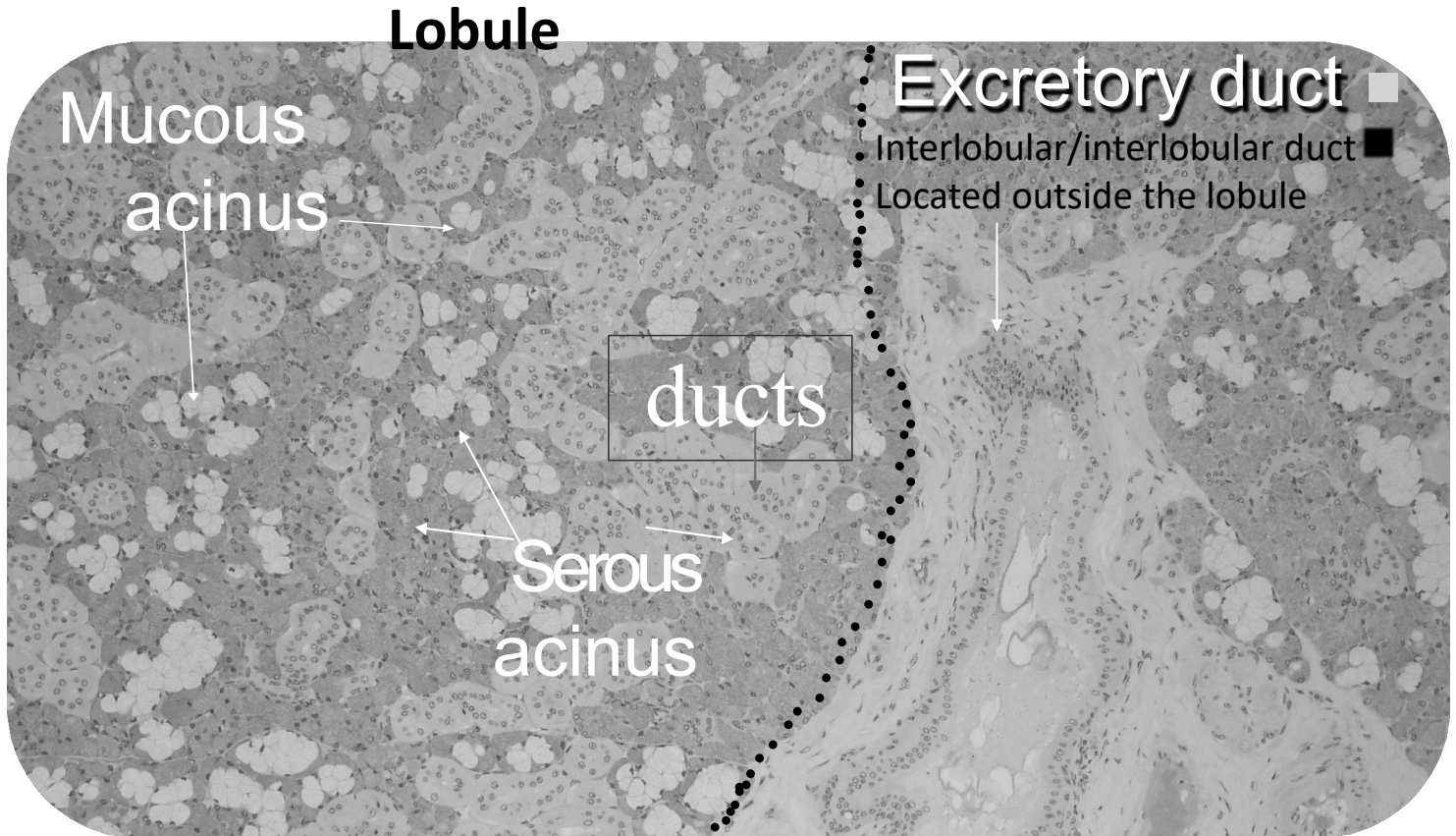
**mucus acini**

White/light

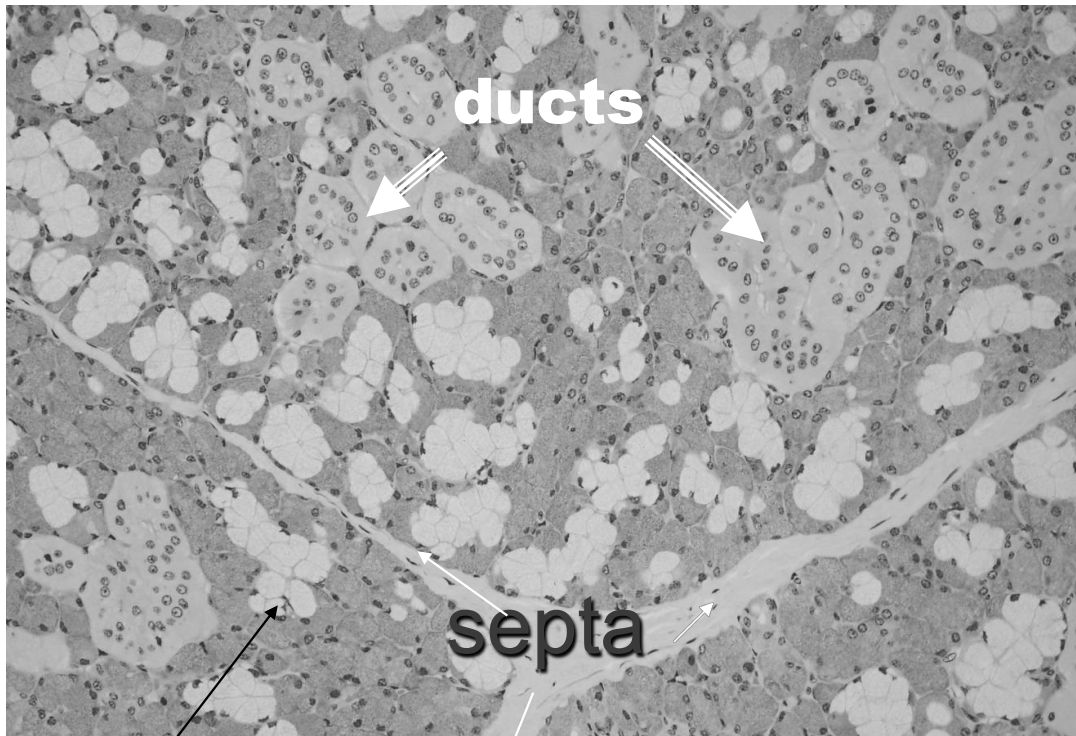
**\*\*Has intercalated ducts but not prominent**



# Seromucous gland(mixed)

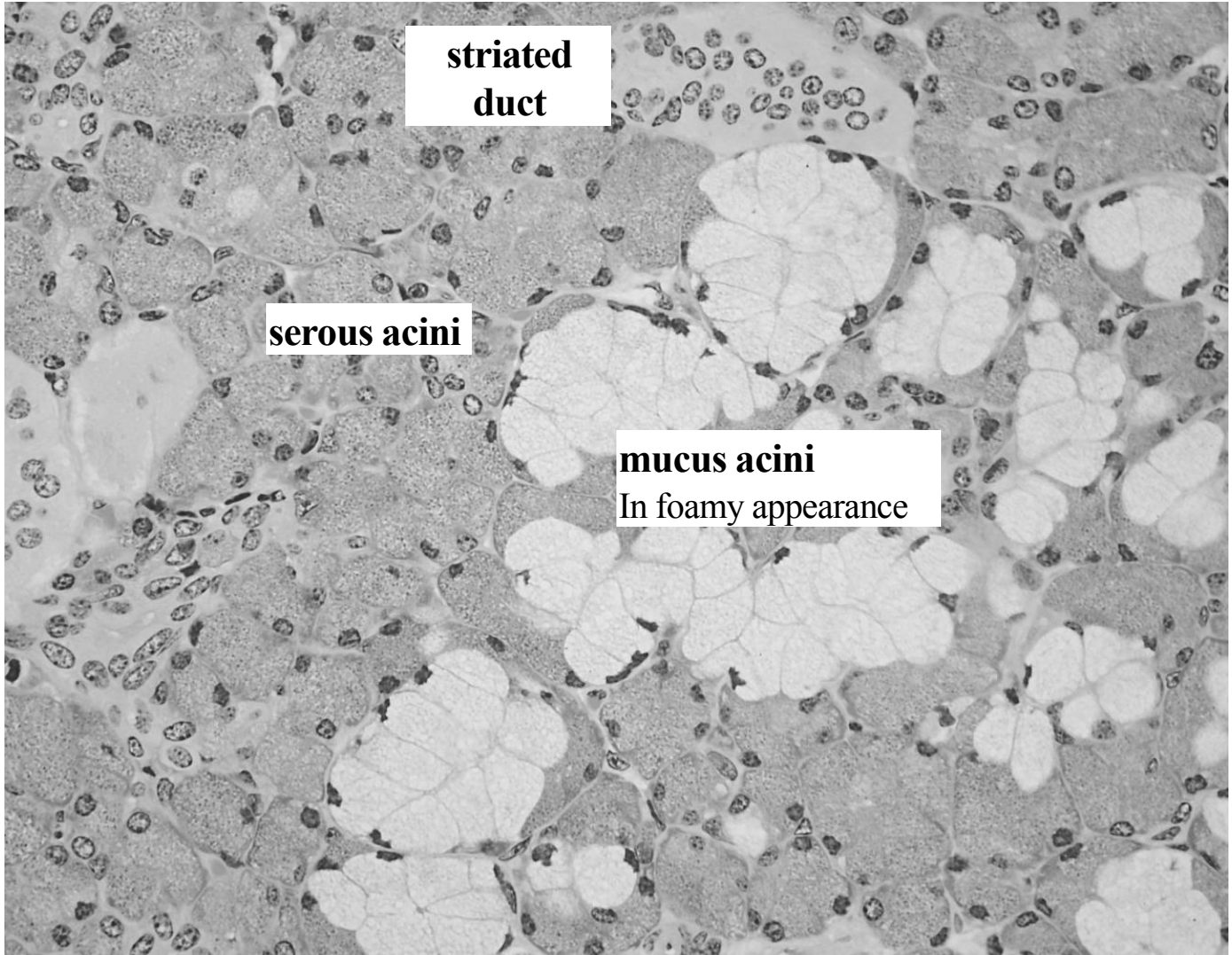


# Submandibular gland



**mucus acini**

Foamy appearance because the mucus gets dissolved during histological preparation of the slide, the boundaries between cells are apparent in contrast to boundaries between cells in the serous acini in which were ill-defined

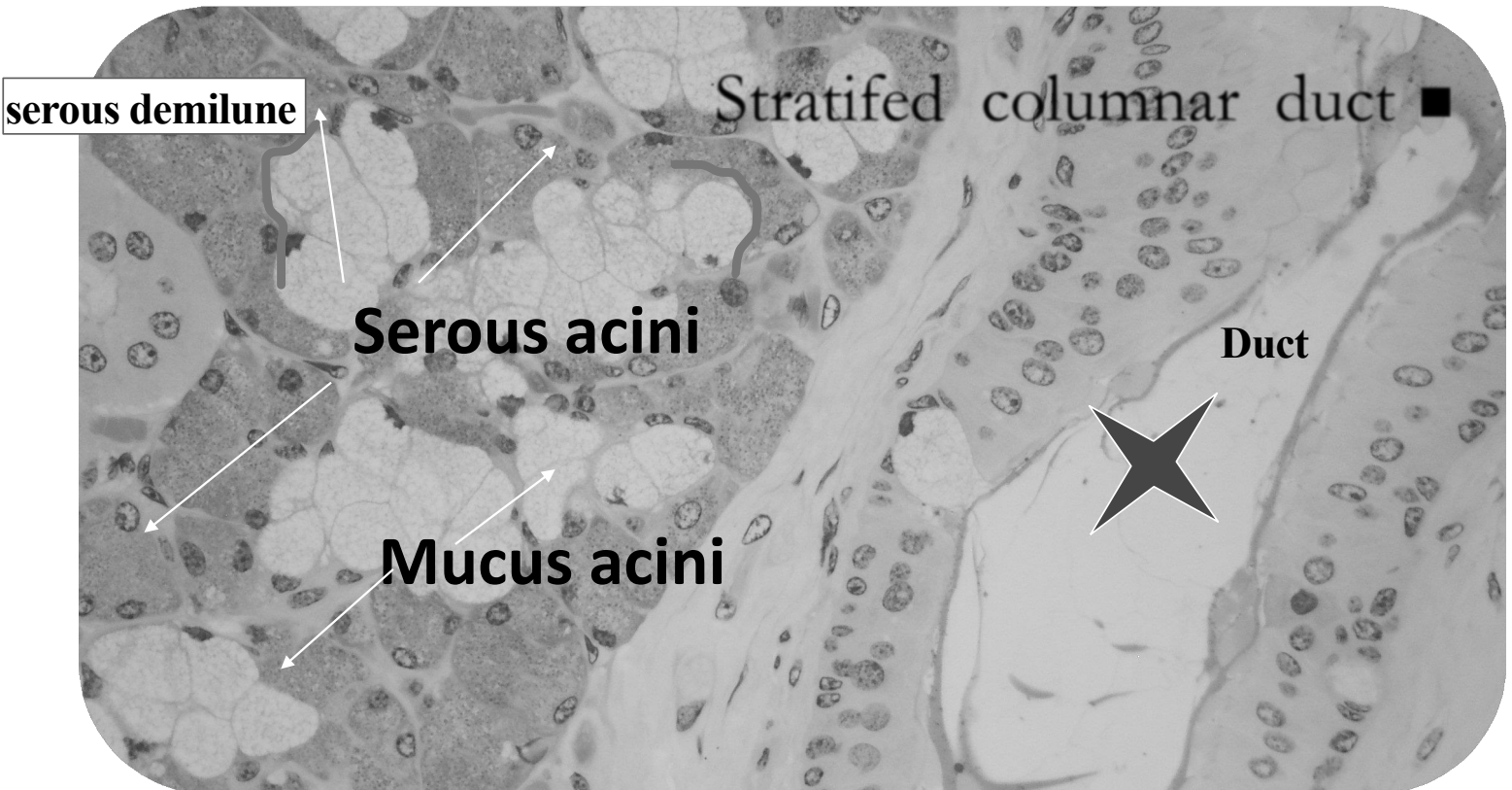


**striated  
duct**

**serous acini**

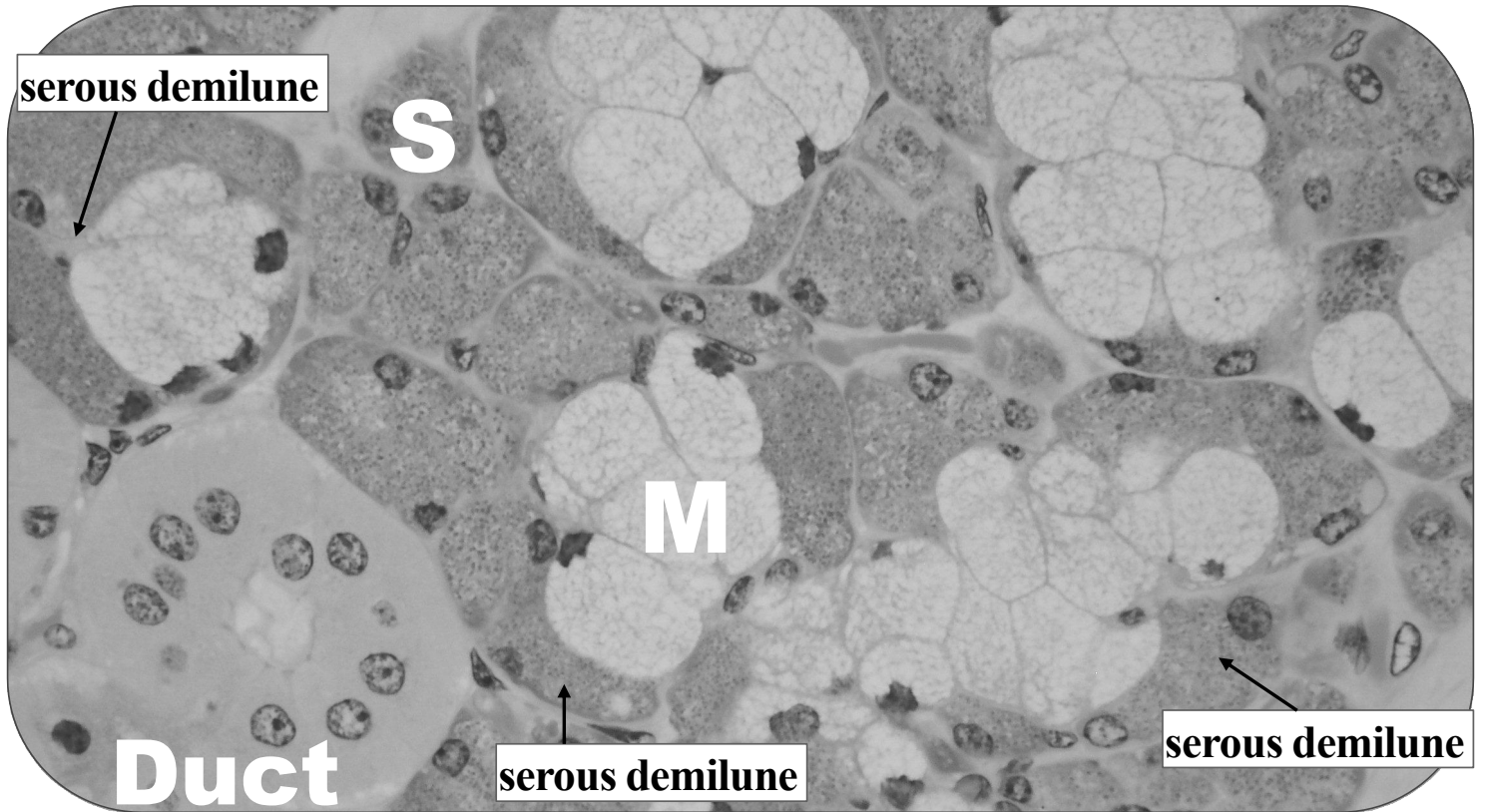
**mucus acini**  
In foamy appearance

The submandibular gland has **serous demilune** where serous acini overlies mucus acini like a cap only present in submandibular & sublingual glands since they're mixed and absent in parotid because its only a serous gland.



# Serous demilune

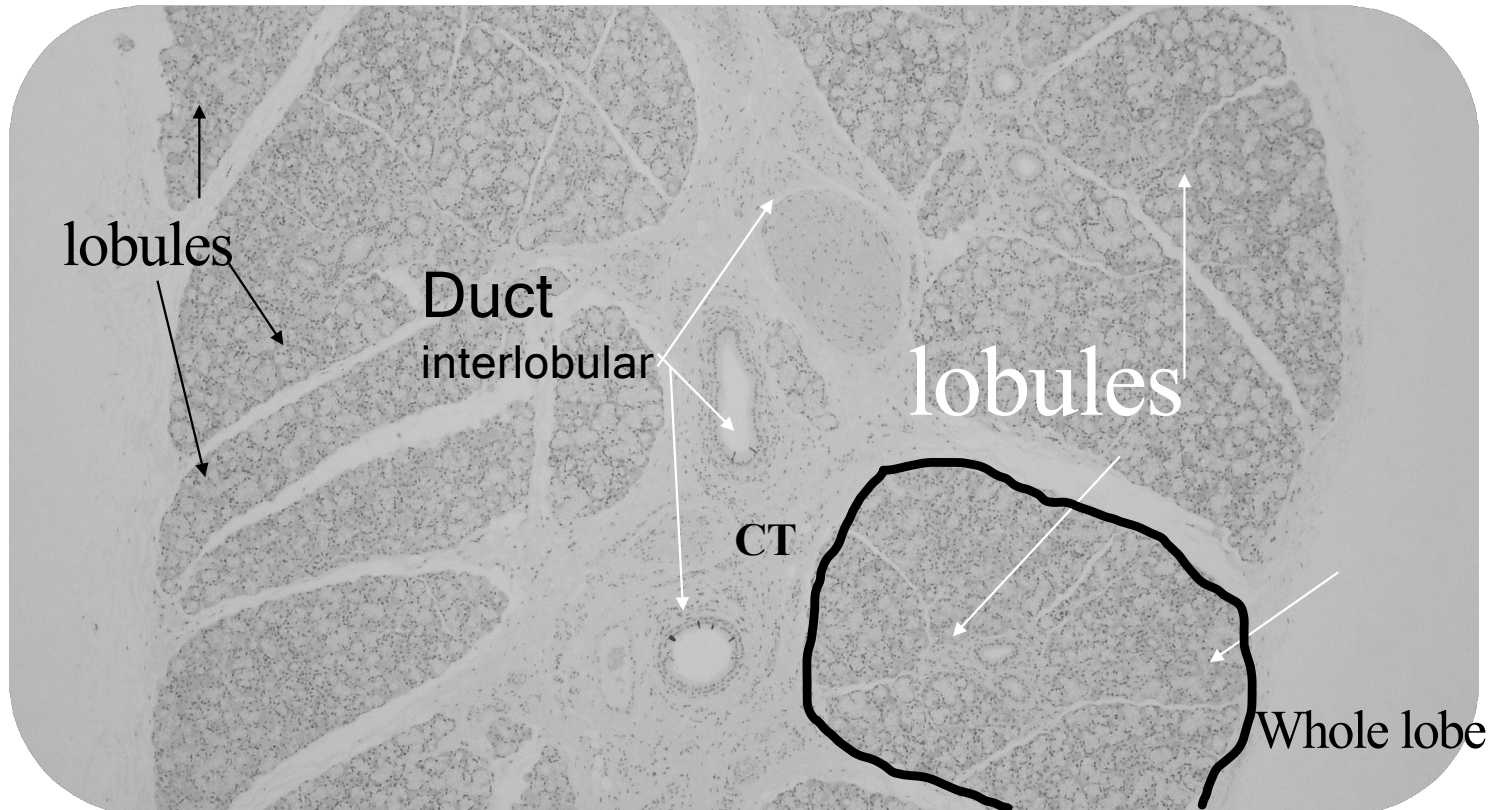
Serous acini overlying mucus acini



Compound tubular gland

# Sublingual gland

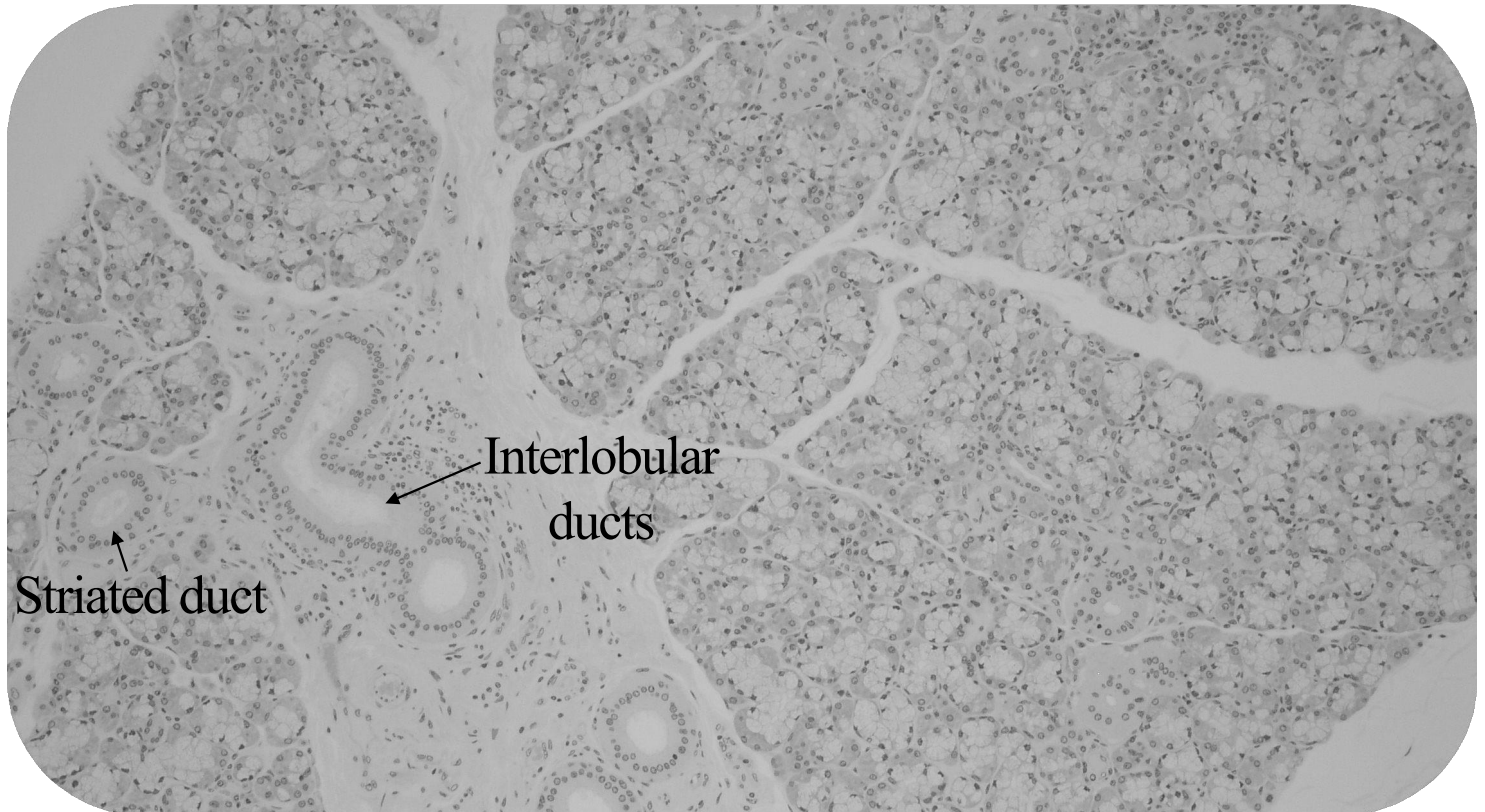
## Mucous (mostly) gland



**The capsule is divided into lobules by Connective tissue (CT)**

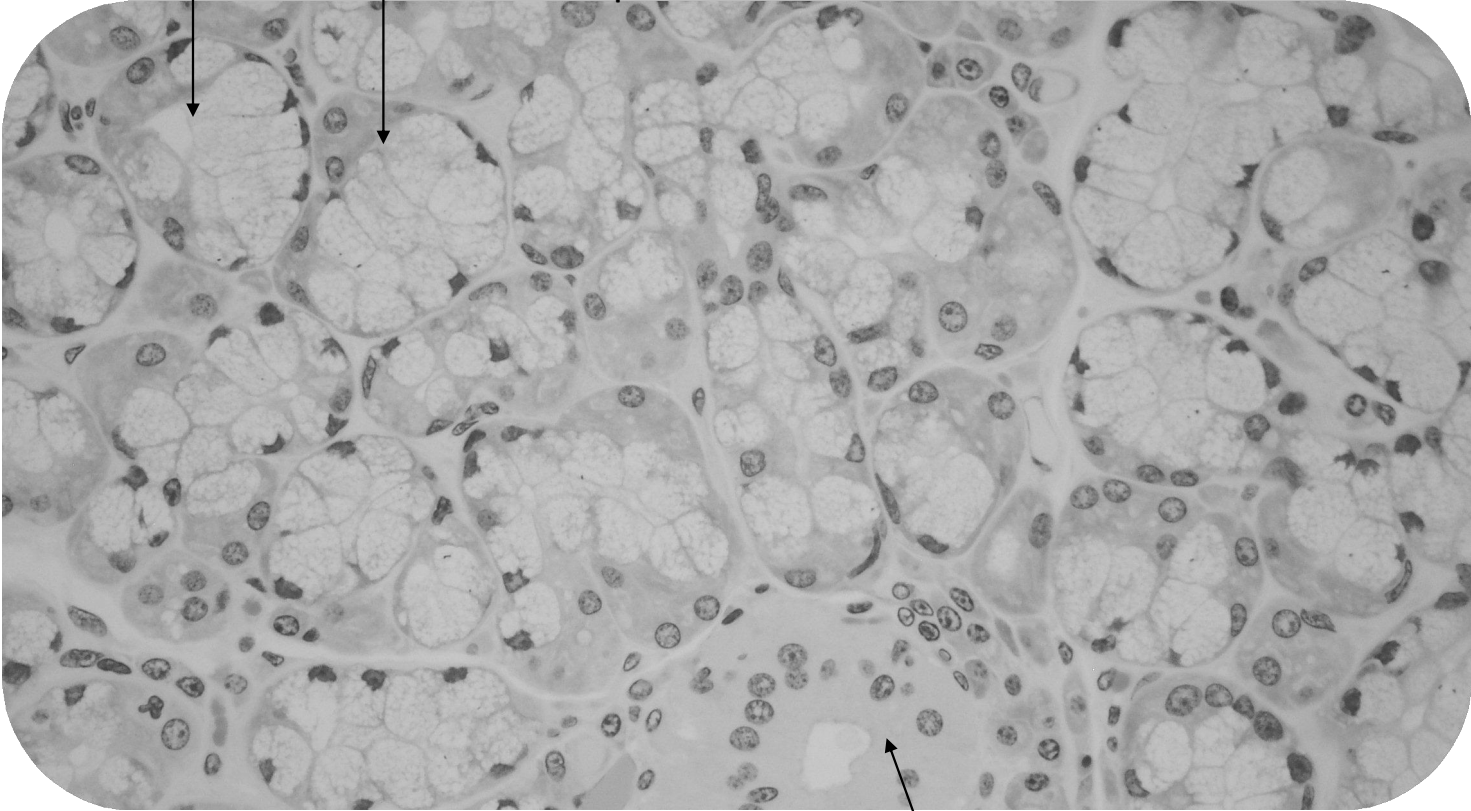
# compound tubuloacinar gland

The sublingual gland is mostly mucus, but to a lesser extent it also has serous acini. Inside the lobules there are striated ducts & intercalated ducts, less in number than submandibular.



As you can see mucus acini is dominant (foamy appearance)

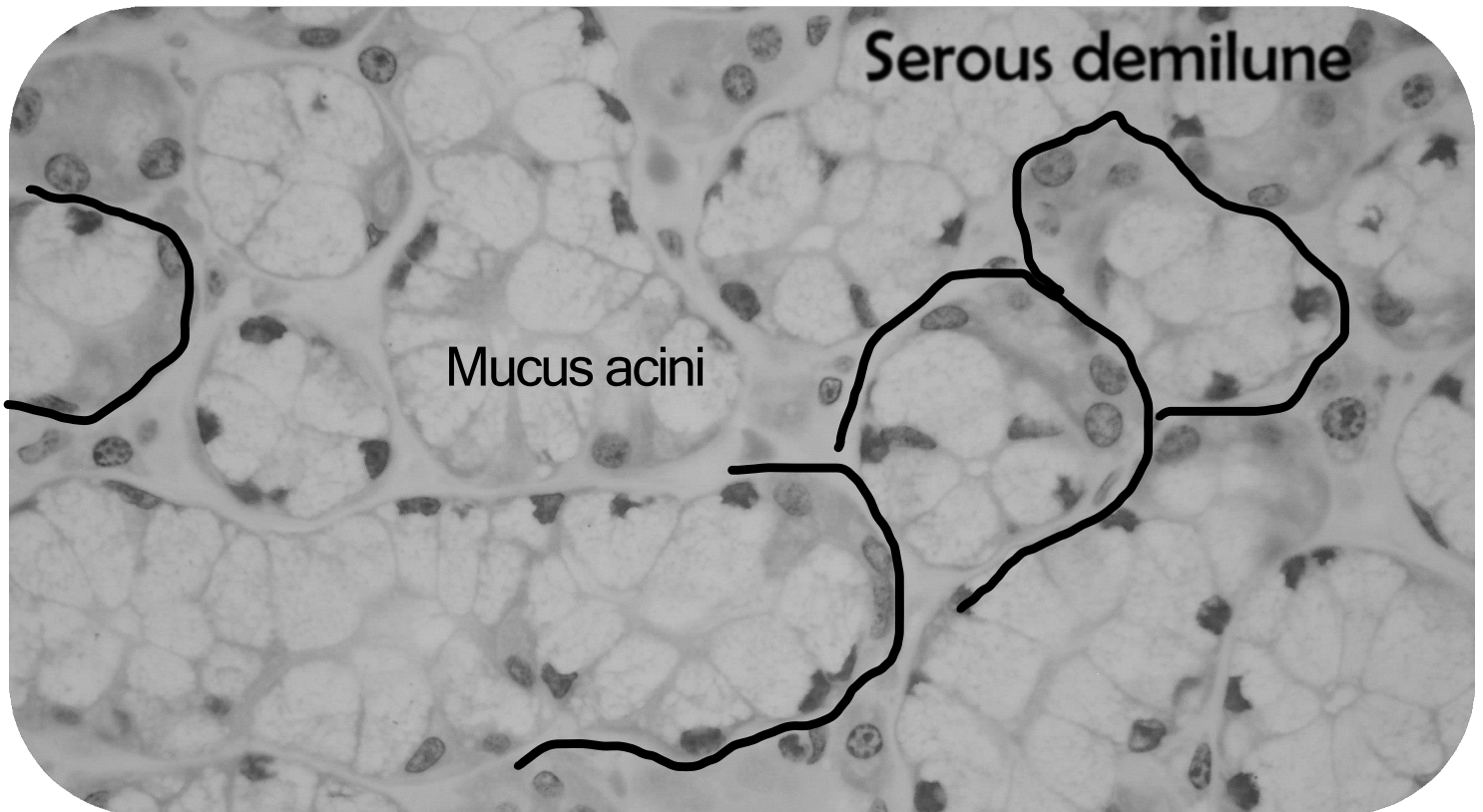
The basal nuclei in mucus acini is **flattened** whereas in serous it is spherical



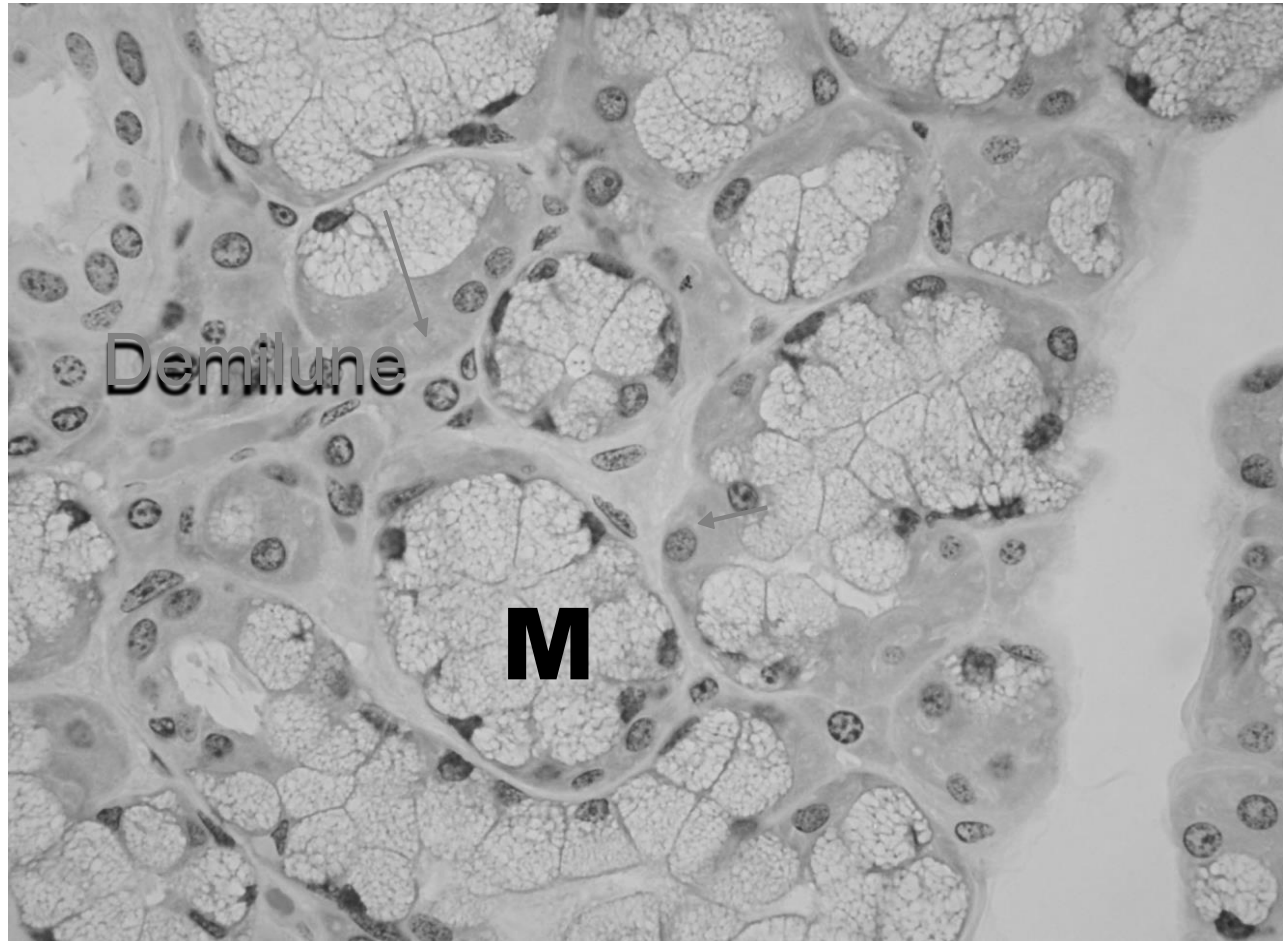
Striated duct



Since the **sublingual** is a mixed gland, it has serous demilune; a cap of serous acini surrounding mucus acini. But also, to a lesser extent in comparison to submandibular



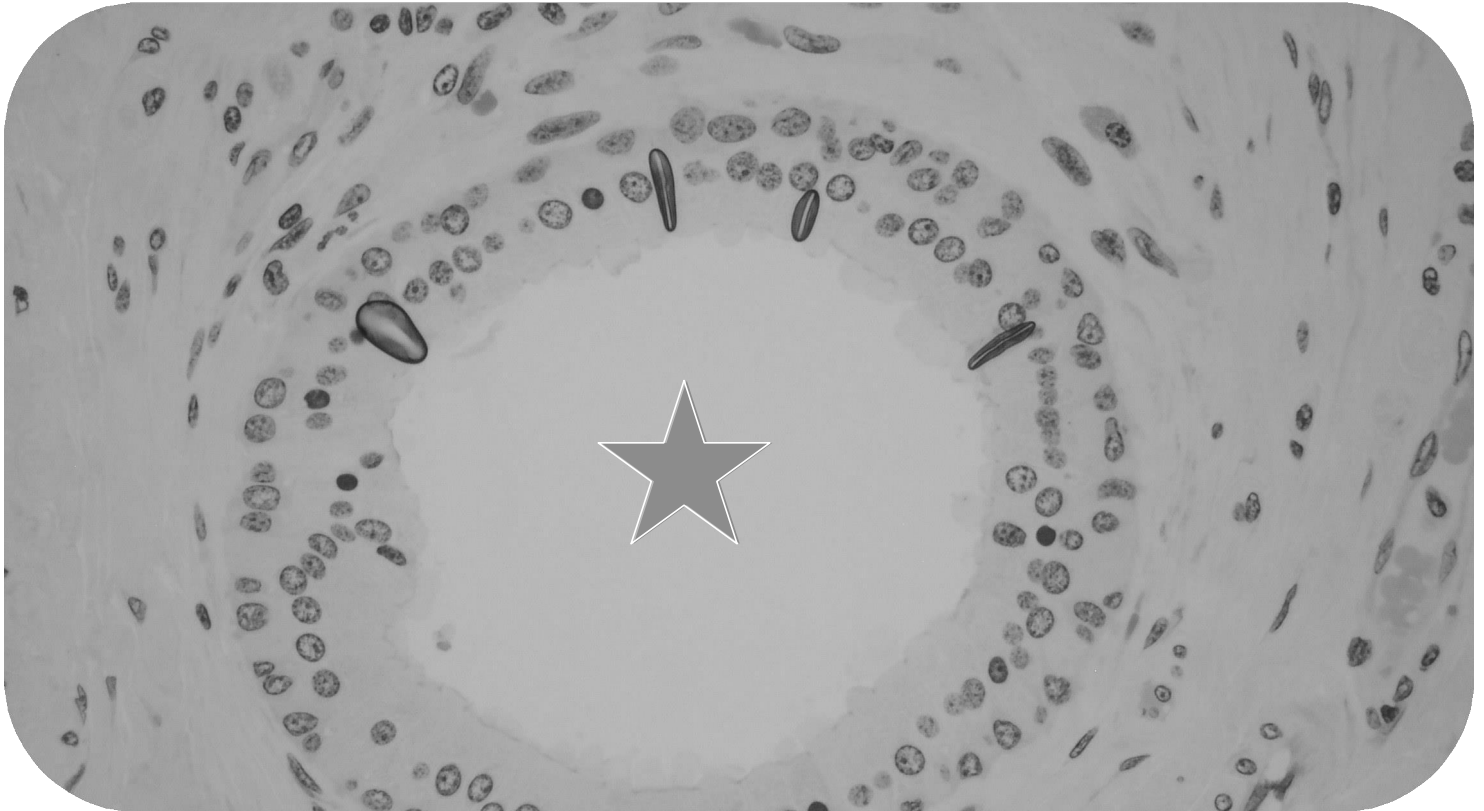
# Sublingual gland



# Interlobular duct

Large duct, lined by stratified cuboidal epithelium

As u can see here two layers of nuclei → stratified



# Esophagus

- Has the same layers as the GI tract; mucosa, submucosa, muscular layer, and finally adventitia/serousa
- The Esophagus is divided into 3 thirds:
  1. **Upper** 1/3 → the muscularis externa is completely made of skeletal muscle
  2. **Middle** 1/3 → the muscularis externa is made of a mix of skeletal + smooth muscles
  3. **Lower** 1/3 → the muscularis externa is made of smooth muscle ONLY

\*Histologically we can differentiate between these parts by looking at the muscularis externa

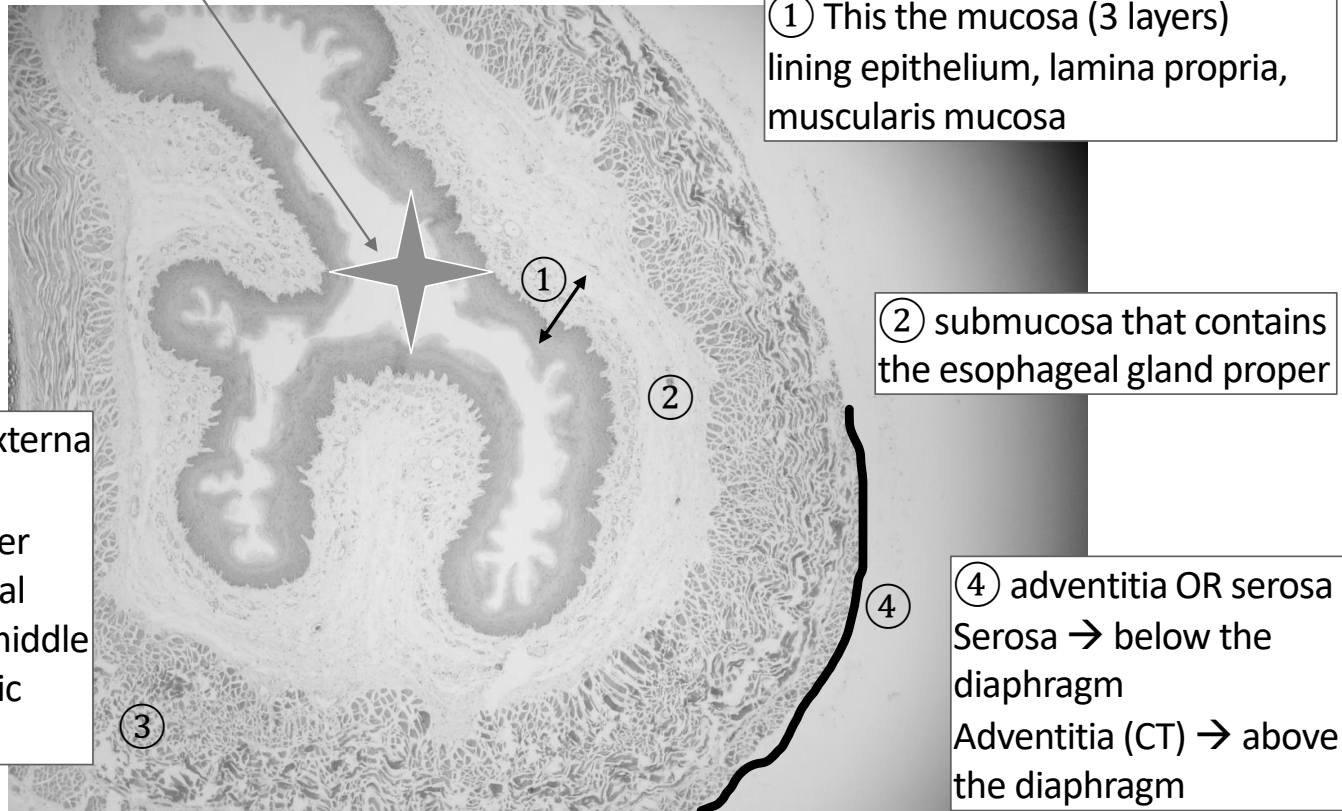
\*Remember that the esophagus has two types of glands: **glands in the submucosa** called esophageal gland proper.

Plus, glands in the **lamina propria** called cardiac/gastric gland, common at the lower 1/3, before reaching the stomach.

The stomach also has gastric glands in its lamina propria.

# Esophagus (star lumen)

The **lumen** of the esophagus is always collapsed and only opens when there's deglutition, swallowing or descending of bolus

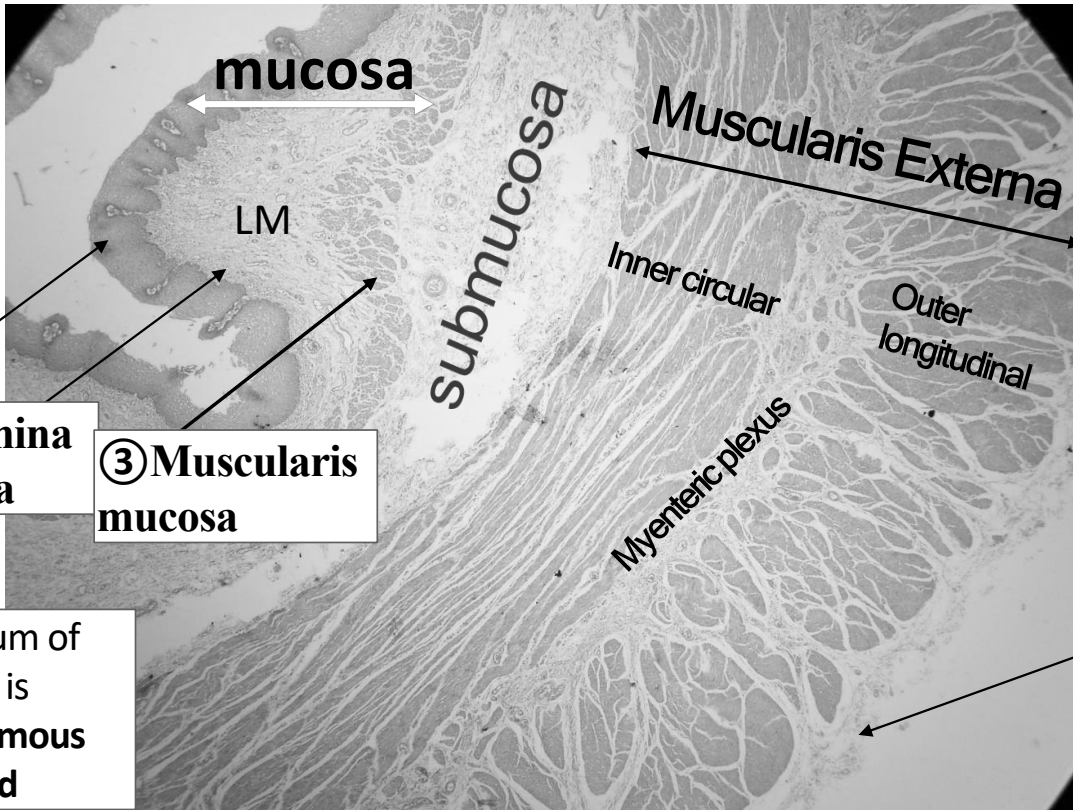


# Esophagus(lower third)

How did we know it's the lower 1/3?

By looking at muscularis externa layer, we notice that both (inner circular + outer longitudinal) layers are smooth muscle ONLY.

In smooth muscle the **nucleus is central, dot-like in appearance, irregular in shape.**



The 3 layers of Mucosa

① lining epithelium

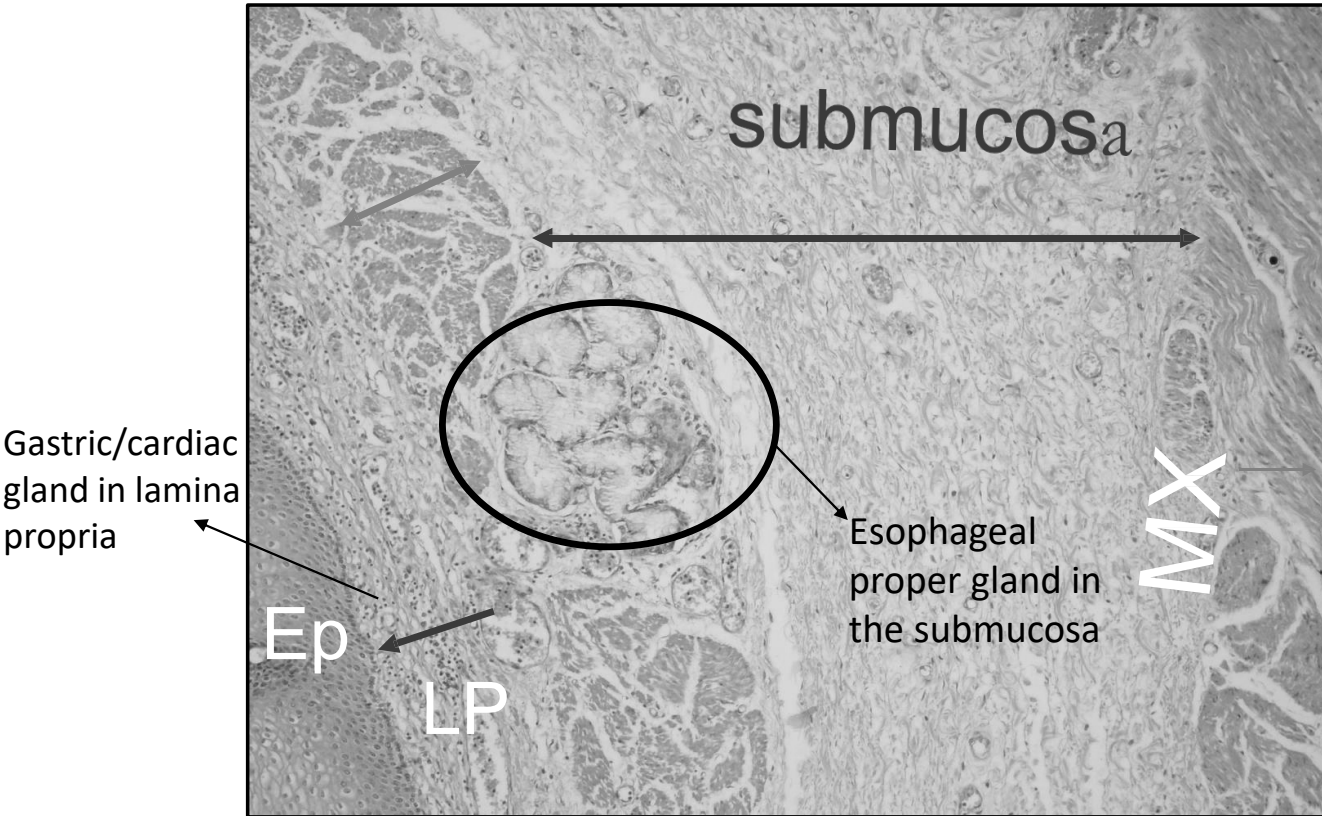
② Lamina propria

③ Muscularis mucosa

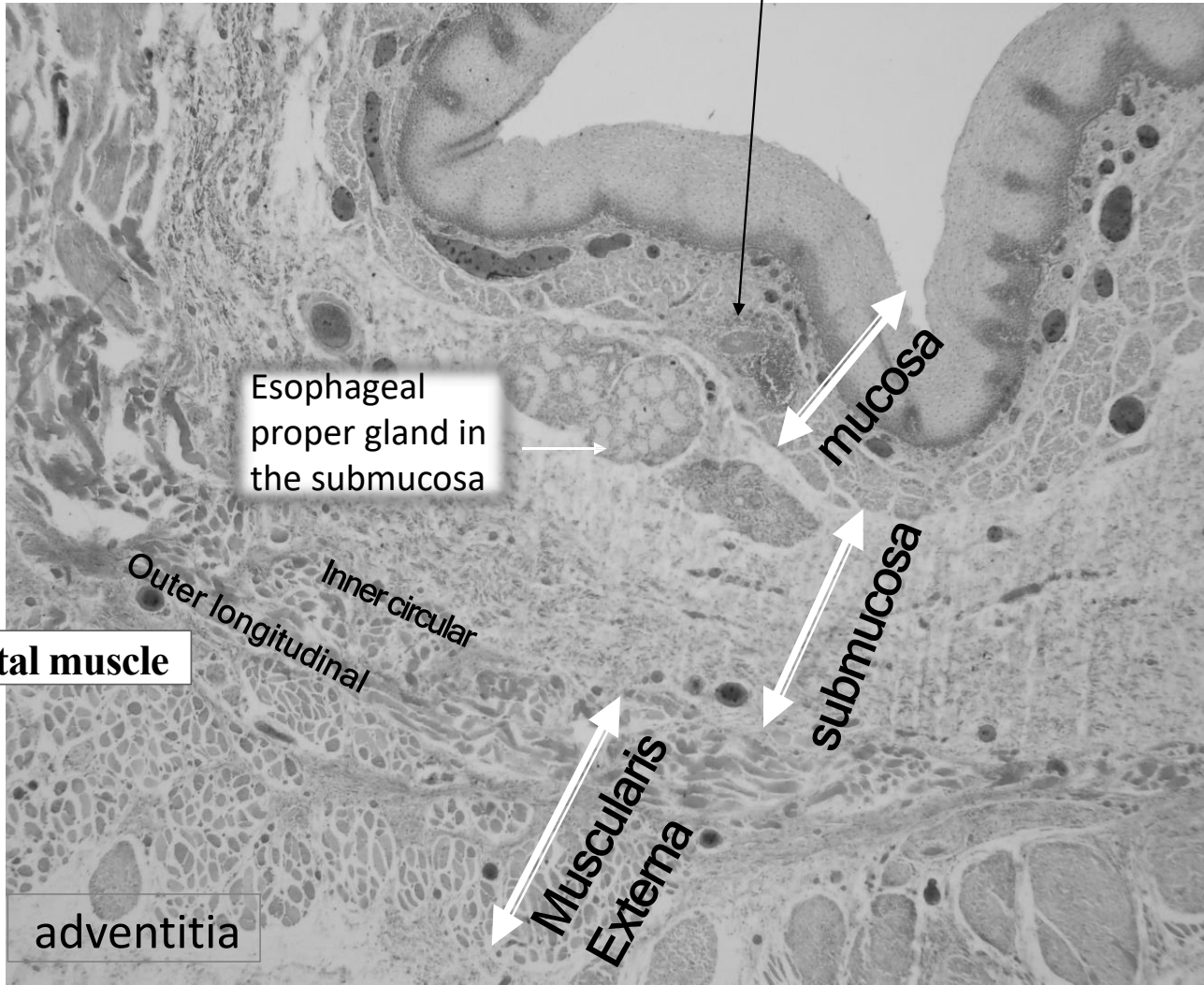
Lining epithelium of the esophagus is **stratified squamous non-keratinized**

**Serosa**  
Simple squamous epithelium

# Eosophageal proper gland muscularis mucosa



Lymphocyte



Esophageal proper gland in the submucosa

mucosa

submucosa

Outer longitudinal  
Inner circular

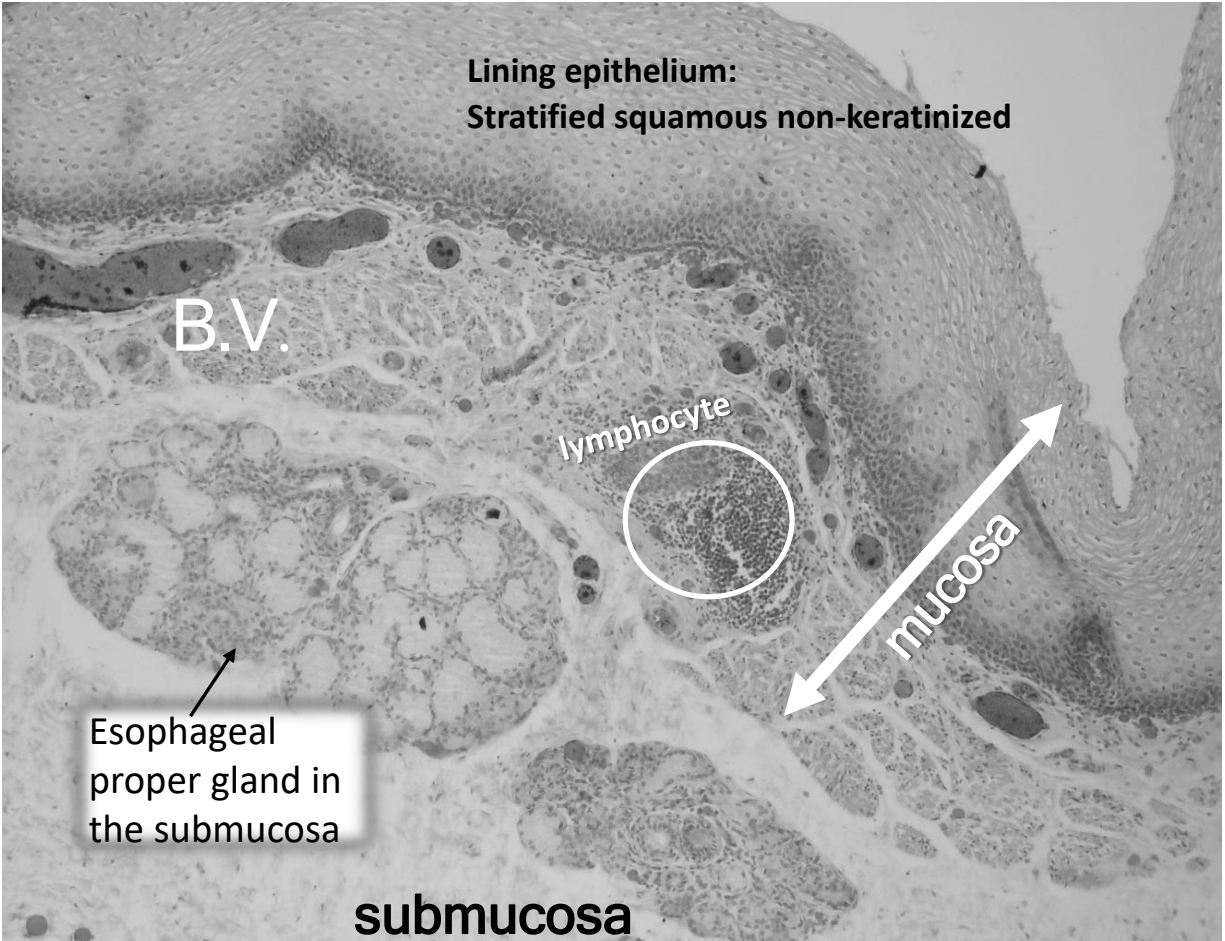
Skeletal muscle

Muscularis Externa

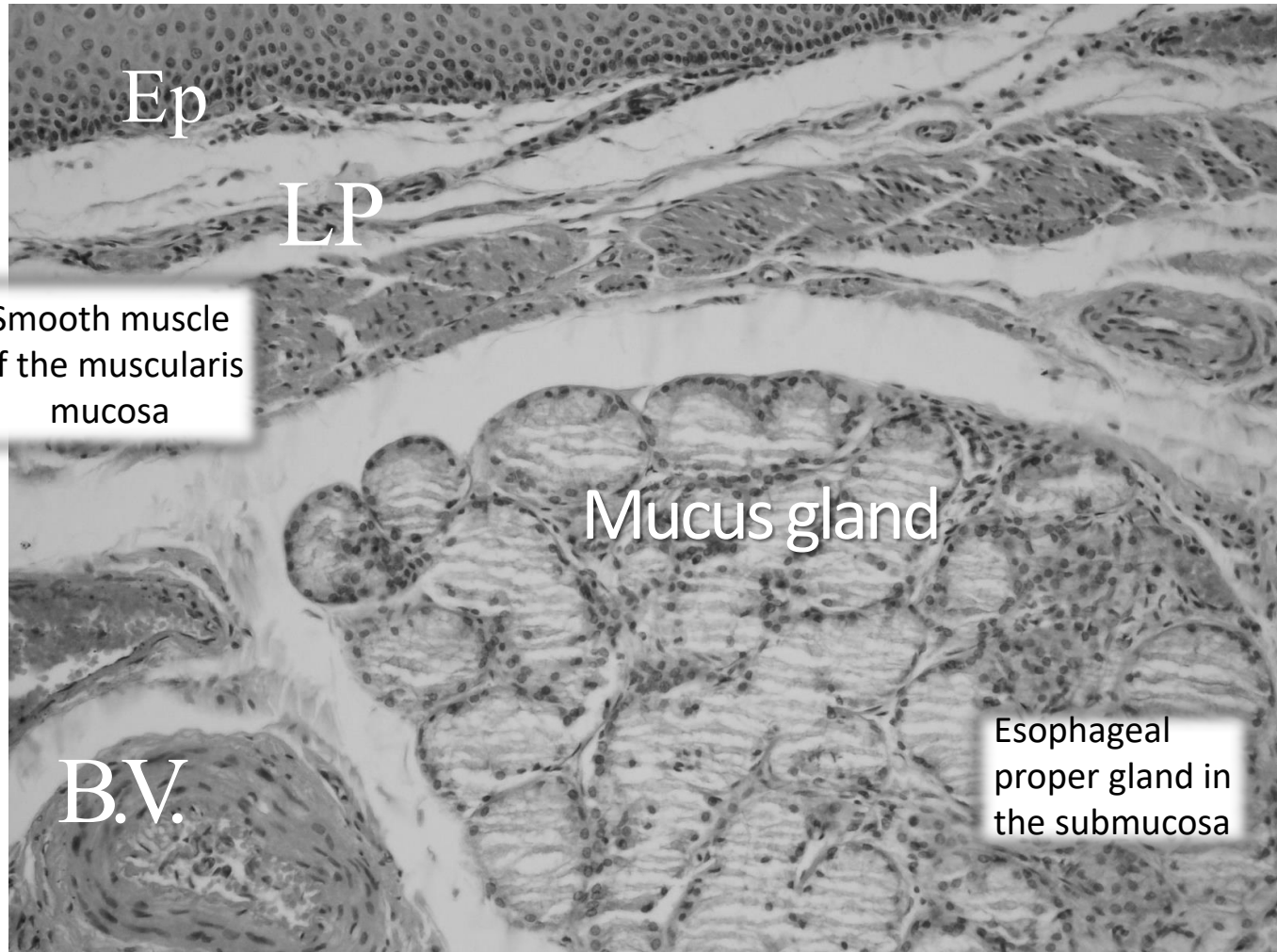
adventitia



This is a zoomed in picture of the previous slide



# Esophageal proper gland (in submucosa)



Ep

LP

Smooth muscle  
of the muscularis  
mucosa

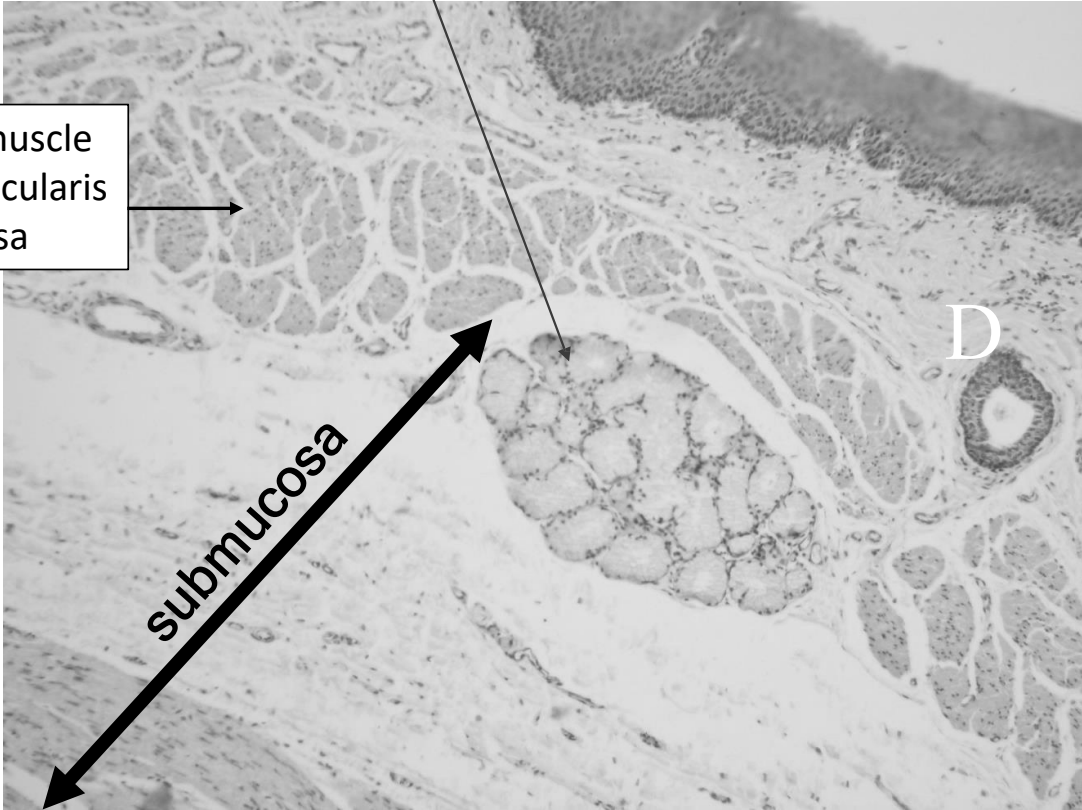
Mucus gland

Esophageal  
proper gland in  
the submucosa

B.V.

# Esophageal gland proper (in submucosa)

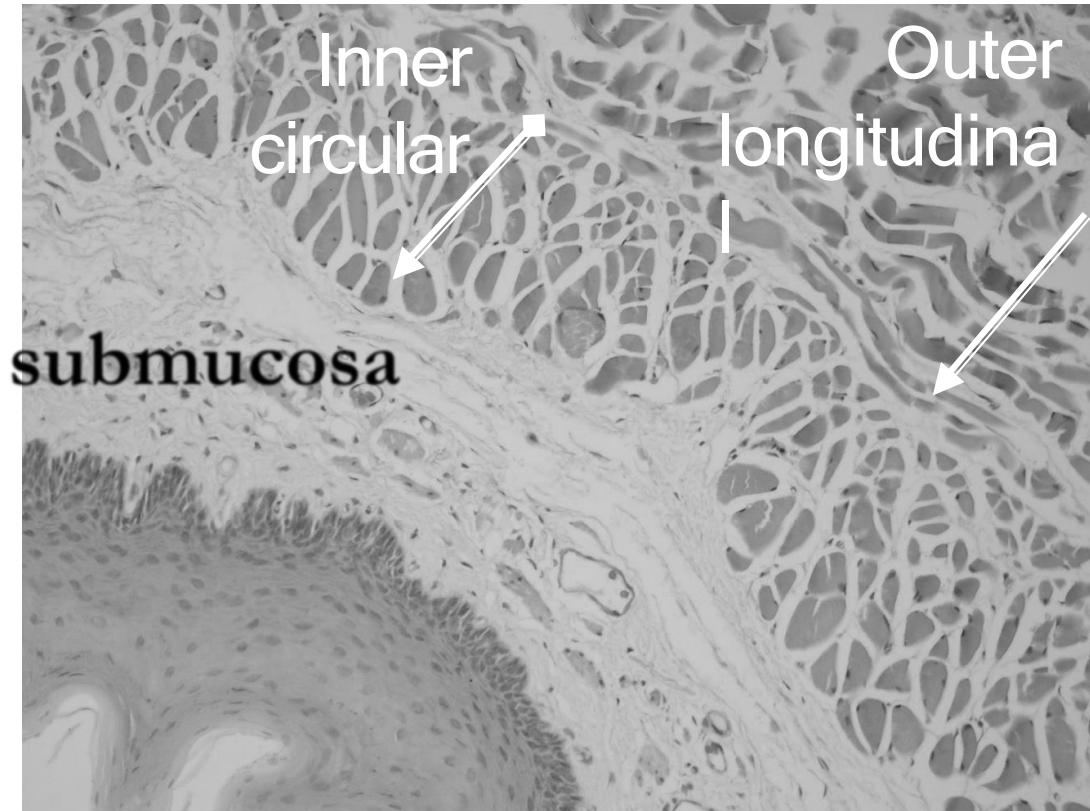
Smooth muscle  
of the muscularis  
mucosa



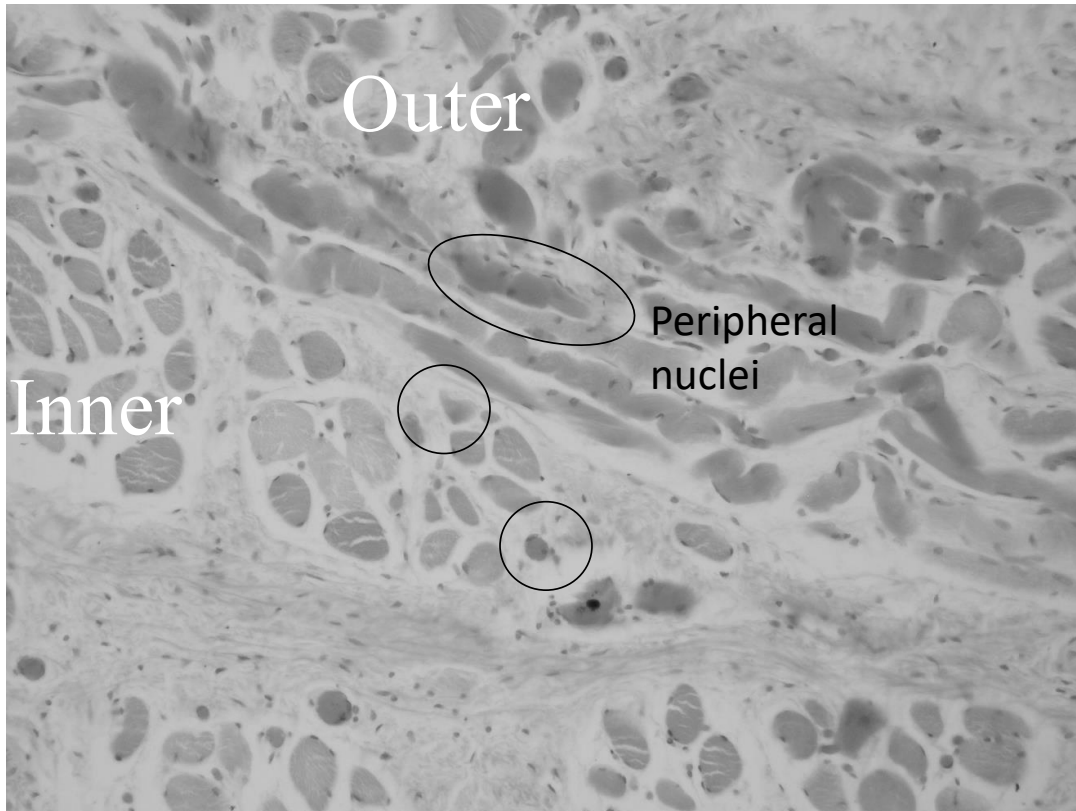


# Esophagus(upper third) skeletal muscle mus. ext.

By looking at muscularis externa layer, we notice that both (inner circular + outer longitudinal) layers are striated muscle ONLY, hence it's the upper 1/3 striated → skeletal muscle, the **nucleus is multiple, peripheral & flattened**.

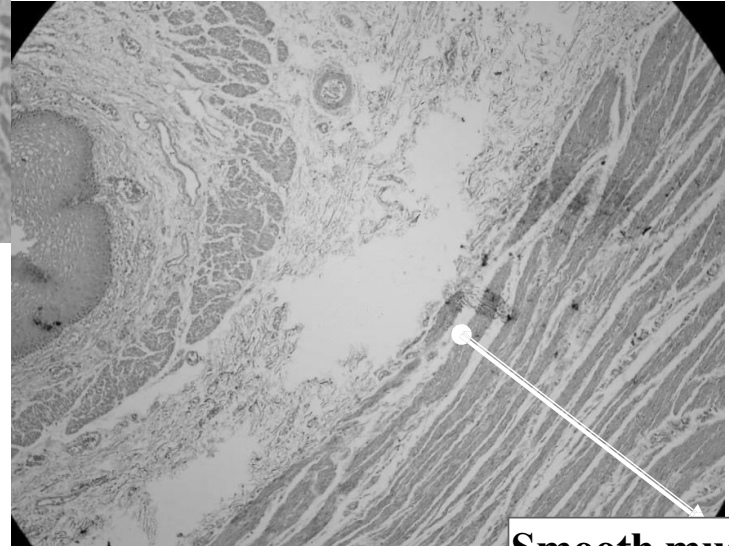
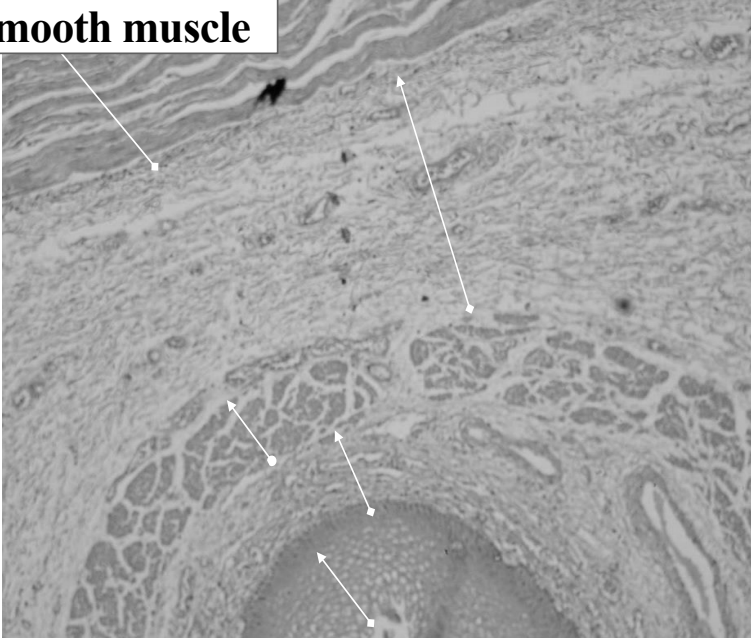


# Skeletal mus.



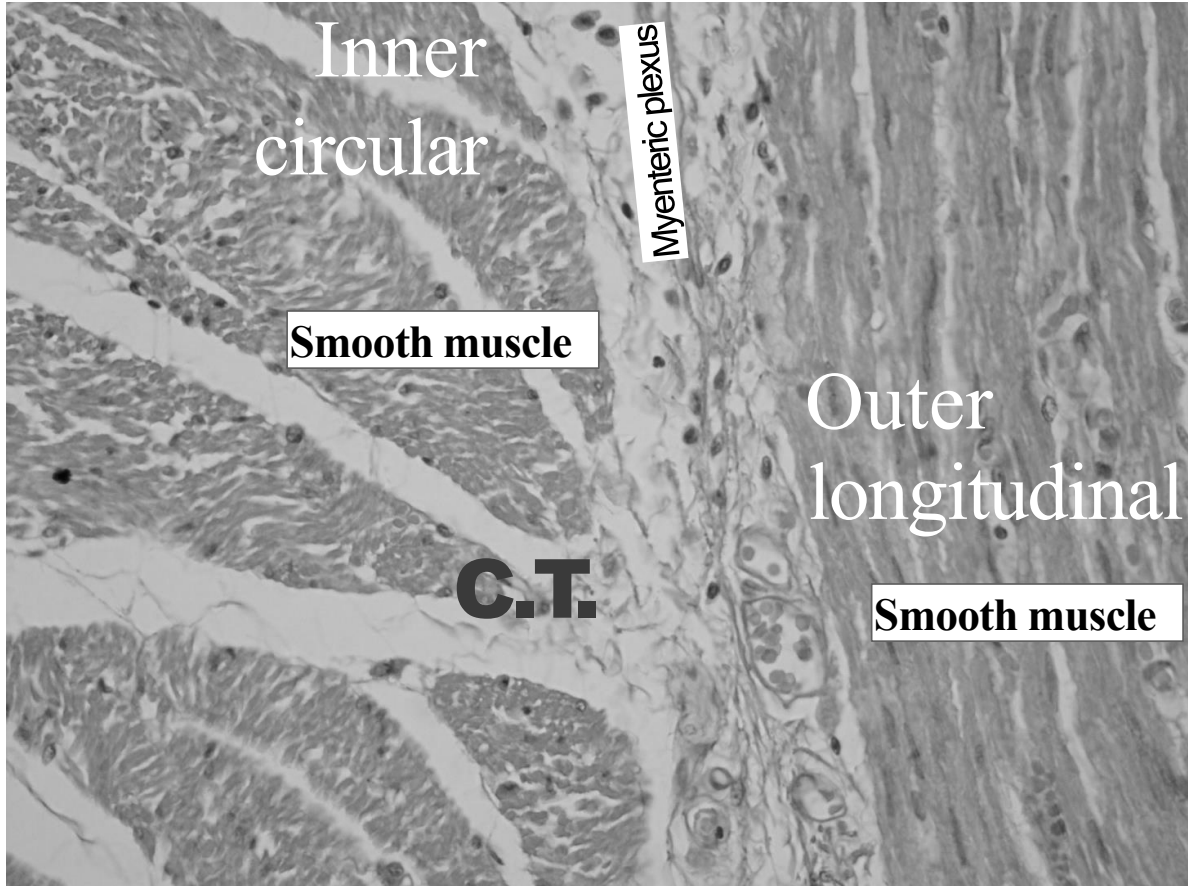
# Lower third(smooth muscle )

Smooth muscle



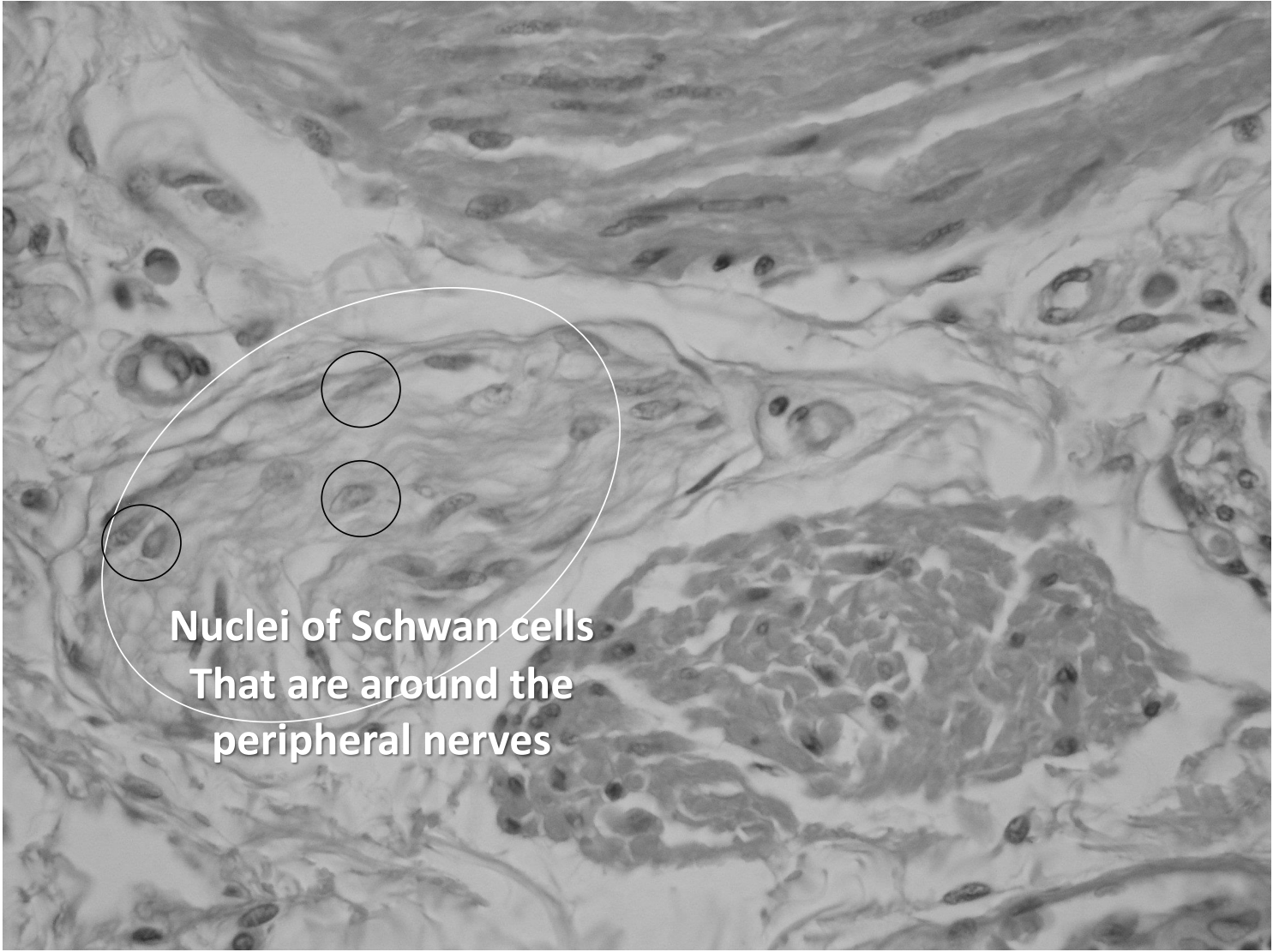
Smooth muscle

# Lower third(smooth muscle )





# Nerve Fibers of Myenteric Plexus

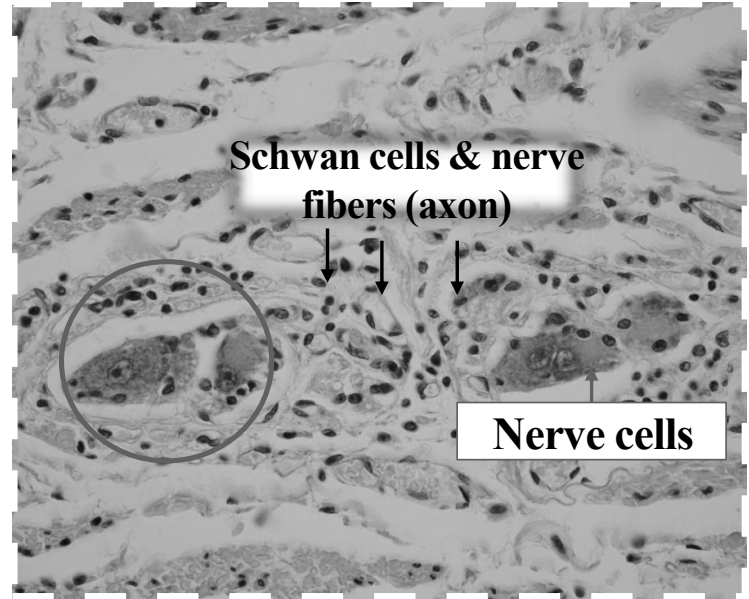


Nuclei of Schwann cells  
That are around the  
peripheral nerves

# intramural Parasympathetic ganglion- (G.I.T.)

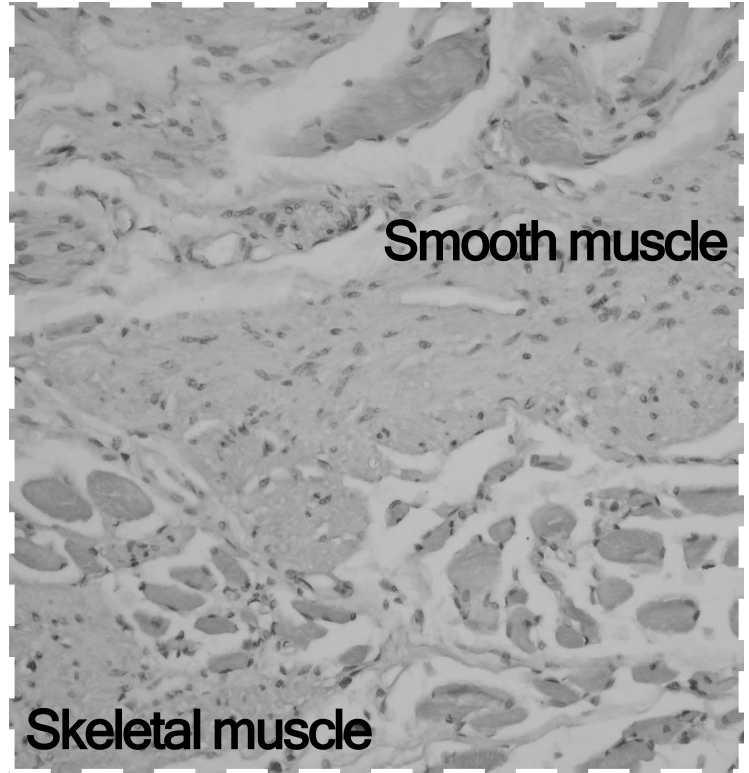
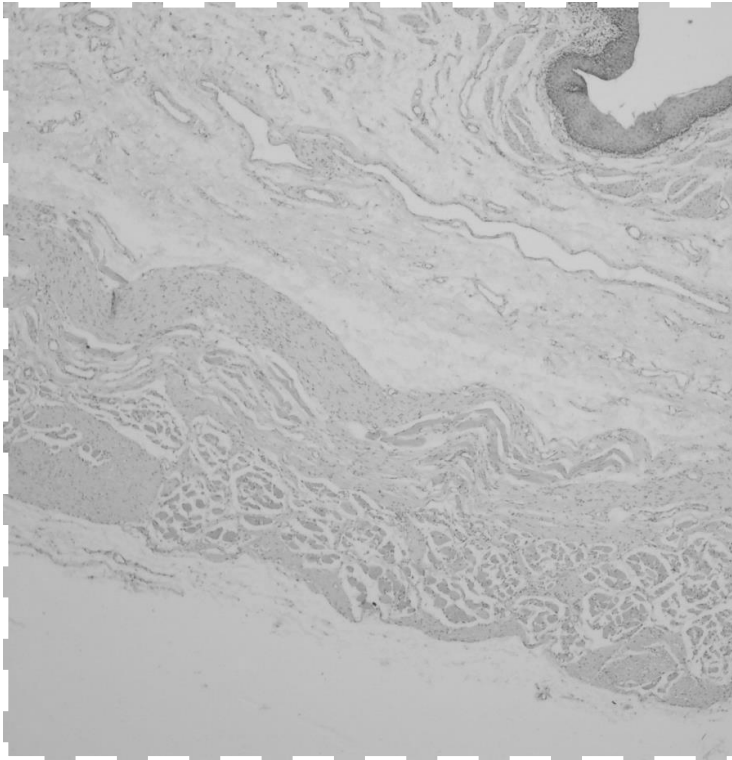


Myenteric plexus is located between the inner & outer layers of muscularis externa



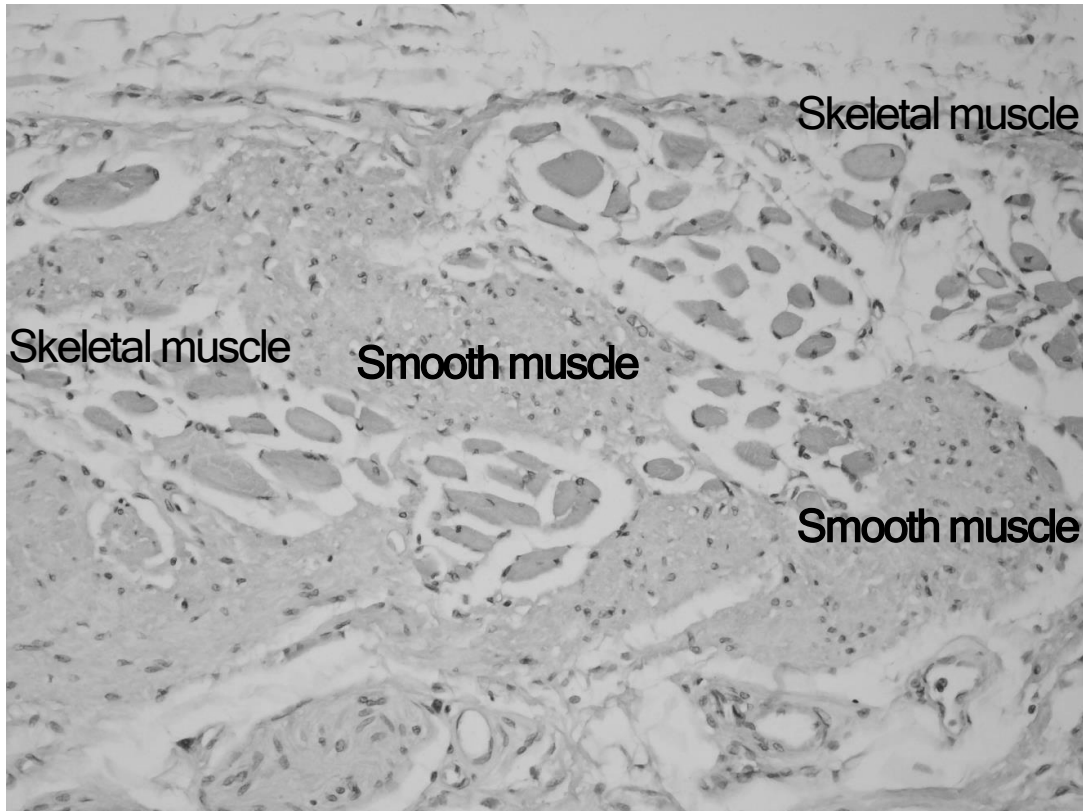
Zoomed in picture of the area pointed at with arrows

# Mixed smooth & skeletal in mid. esoph.



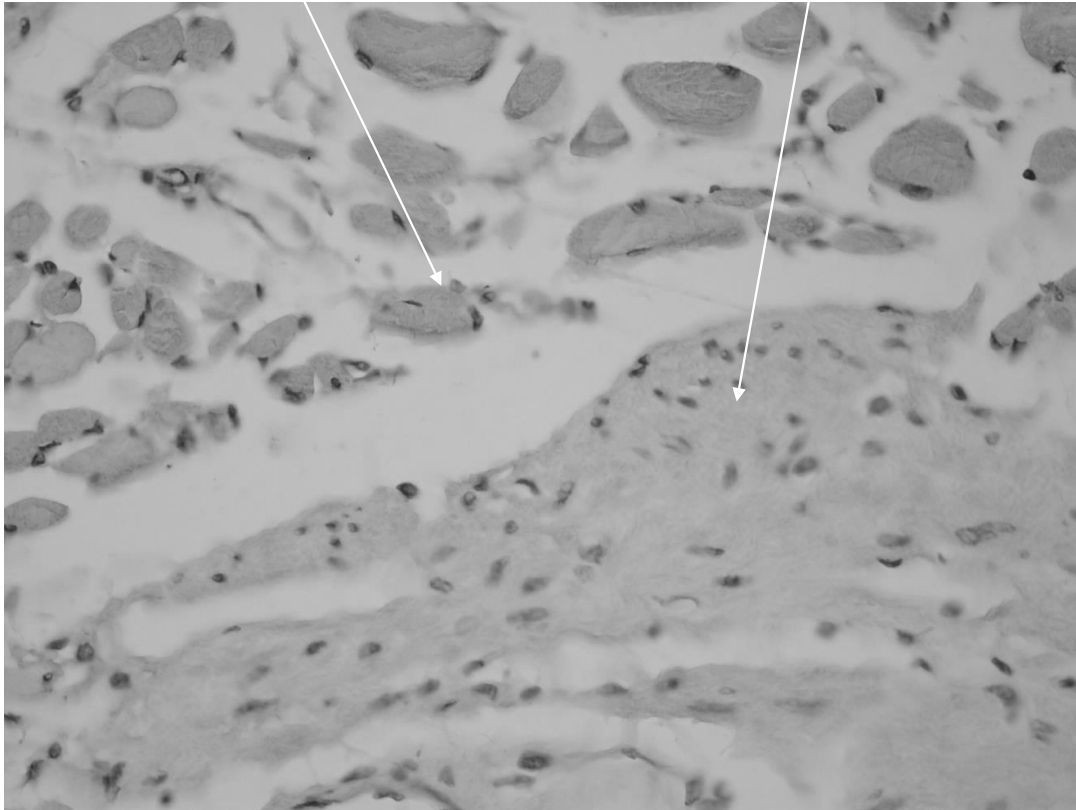
Mix between smooth & skeletal → middle 1/3 of esophagus

# Smooth skeletal muscle



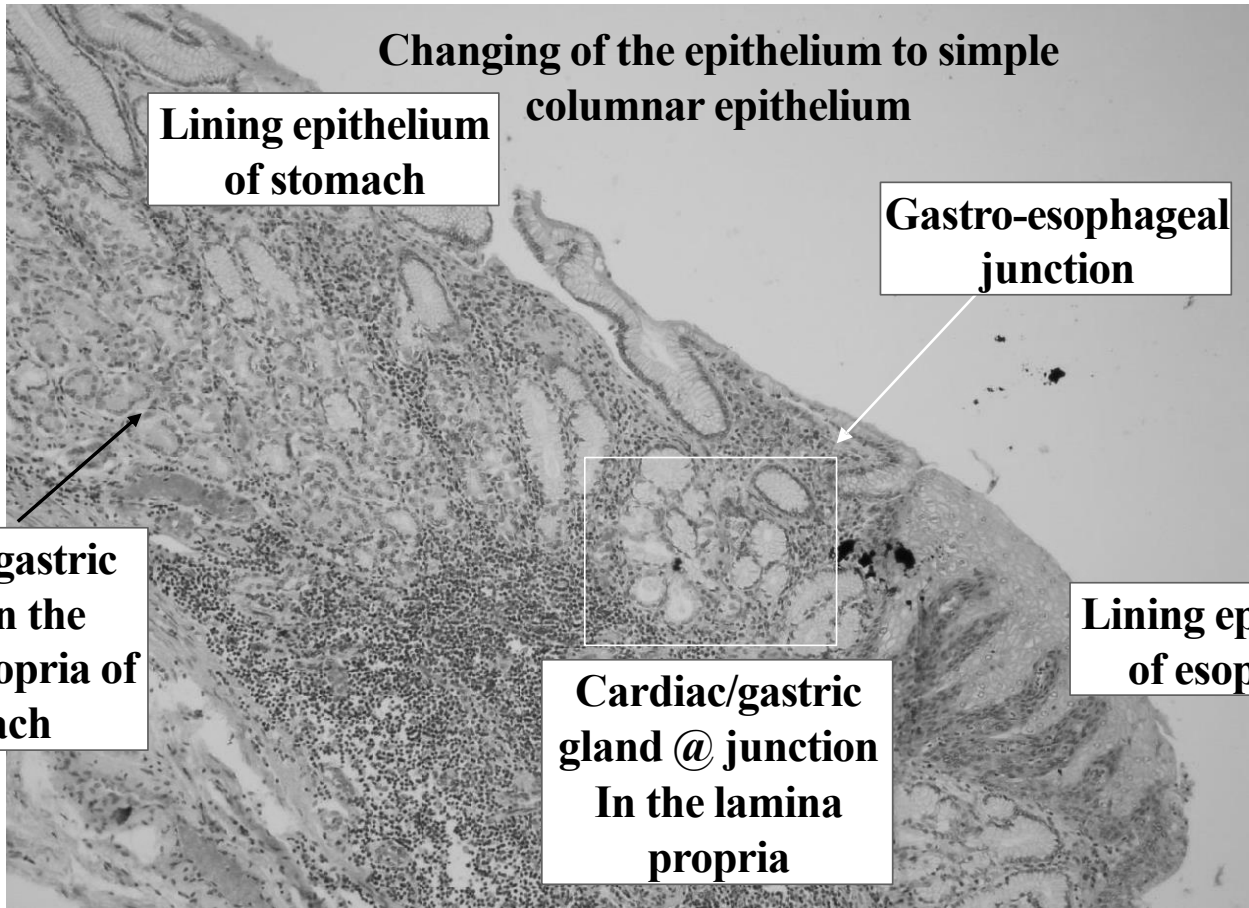
Mix between smooth & skeletal → middle 1/3 of esophagus

# Mixed skeletal and smooth muscle



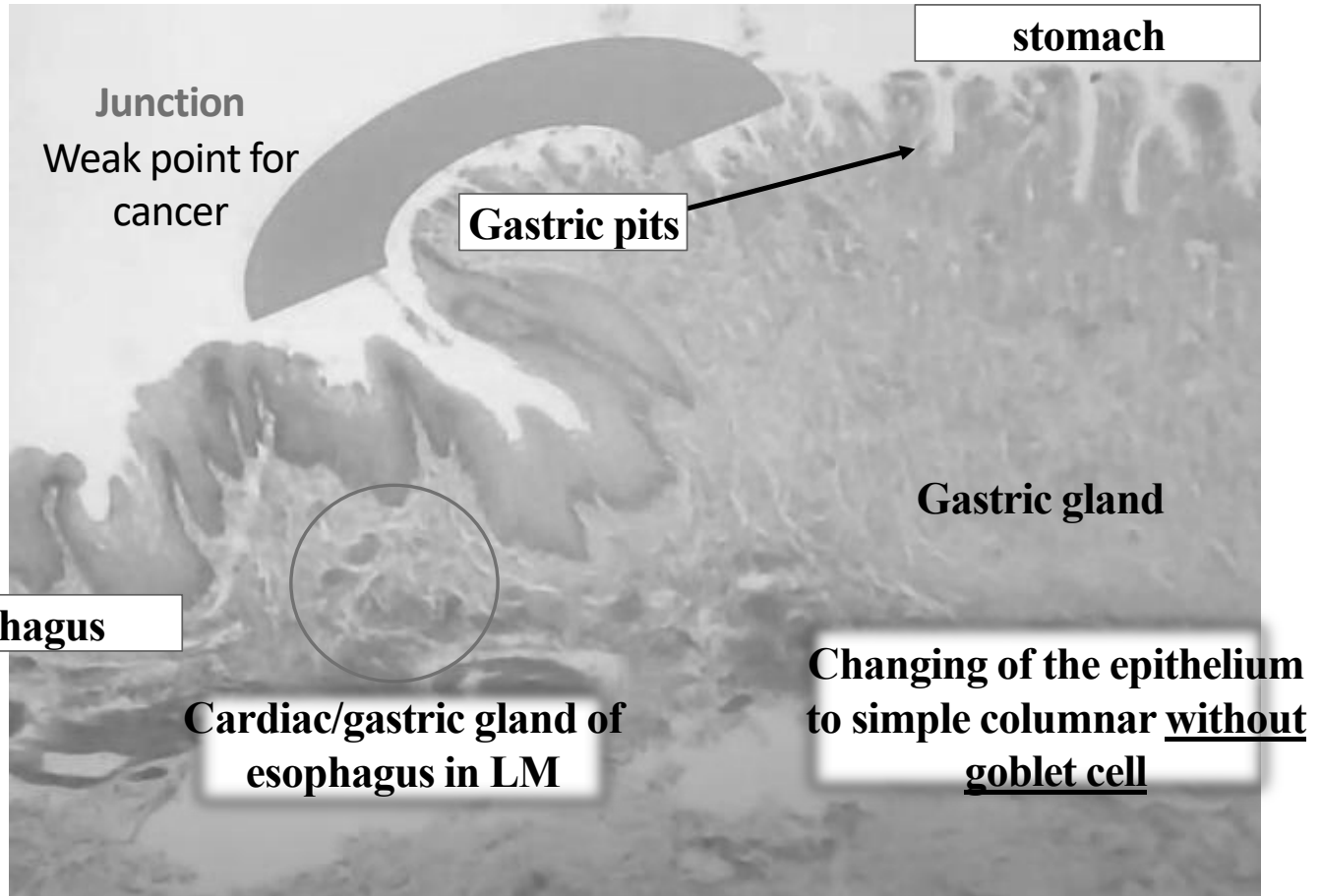
# Cardiac gland in I.P. @ junction

Cardiac gland means → lower 1/3 of esophagus



# Eosophago-gastric junction

The gastroesophageal junction is site of interest to Pathologists because it's a site of metaplasia, and is a site of common tumors (carcinoma) due to changes in epithelium



# Eosophago-gastric junction

stomach

Gastric gland

lymphocyte

esophagus

G

**Lymphocytes are scattered along the GI tract & aggregate in certain sites forming lymphatic nodules e.g. in pylorus**

