Gi Histology Lab

Modified based on 2020 batch lectures

Done by :

Zeina Yassin

Before we start :)

The doctor usually asks both **theory** and **identification** questions. These identification questions can be about the entire image or just a specific part.

I wrote down some past questions to help you out ✨

If you see this emoji (🔍), it means the image was used in an identification question ,but I didn’t mention if it was for the whole image or just part of it.

For theory questions, I added them with their answers next to the related images.

Take a deep breath 😤 the slides aren’t as scary as they look!

You’ve got this 💞

اقرأوا سورة يس بالأول، وبعدين بلشوا 🙏💙

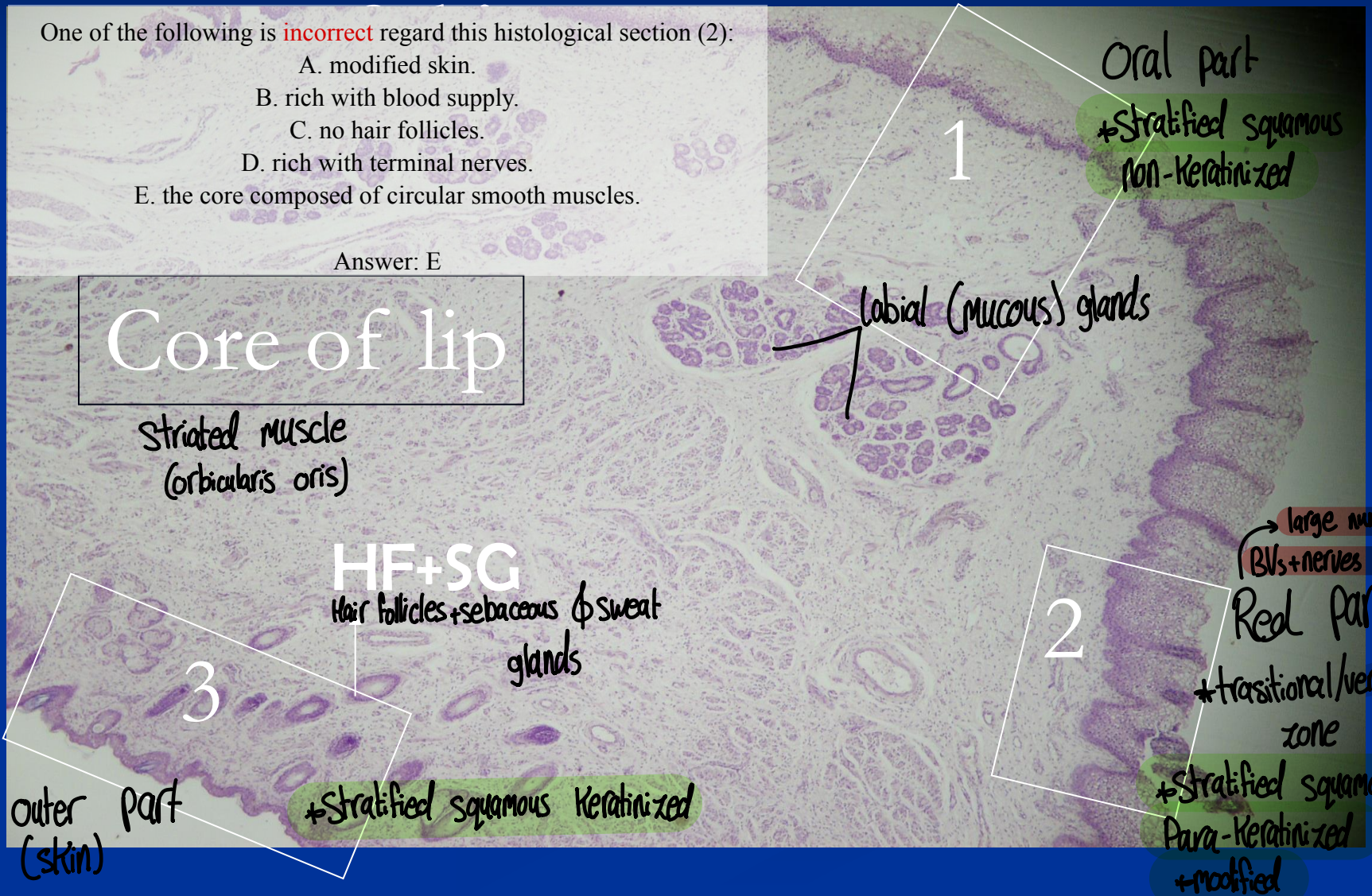
Good luck! 💙

Oral cavity

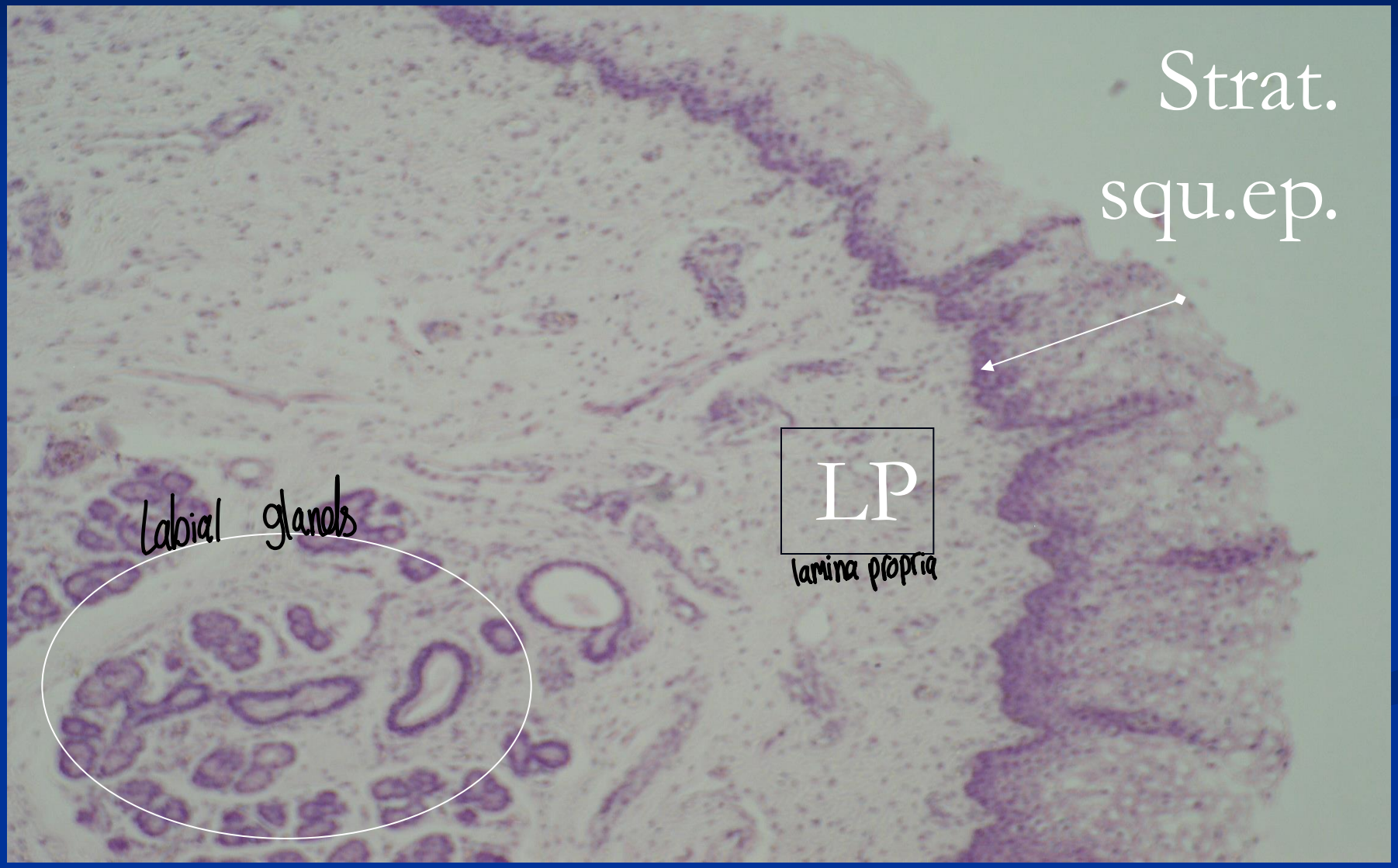
- A mucocutaneos junction (lip)
- Tongue
- Salivary glands

Sagital section of LIP

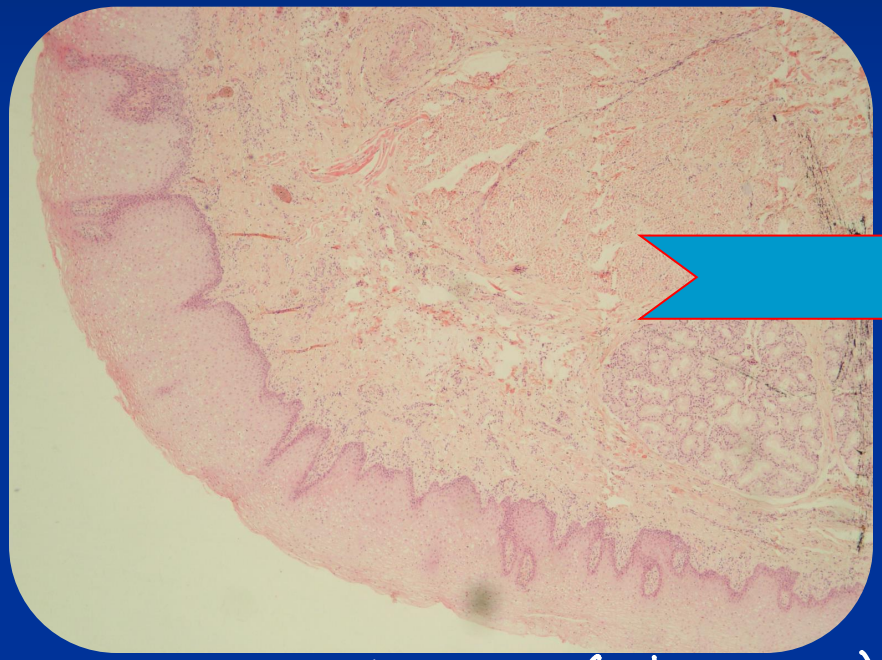
1 Oral mucosa 2red margin

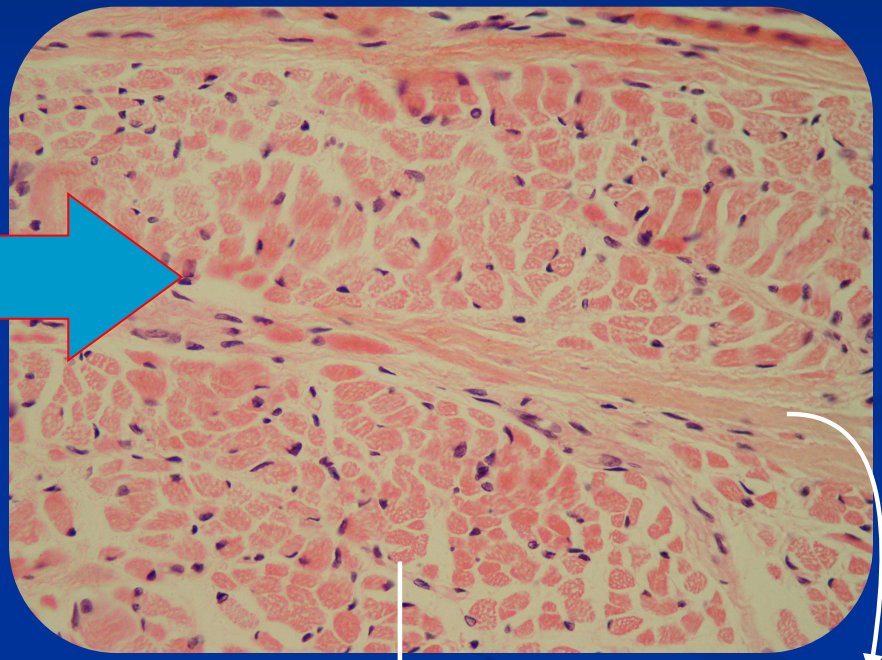


Oral mucosa part
labial seromucous gland



Core





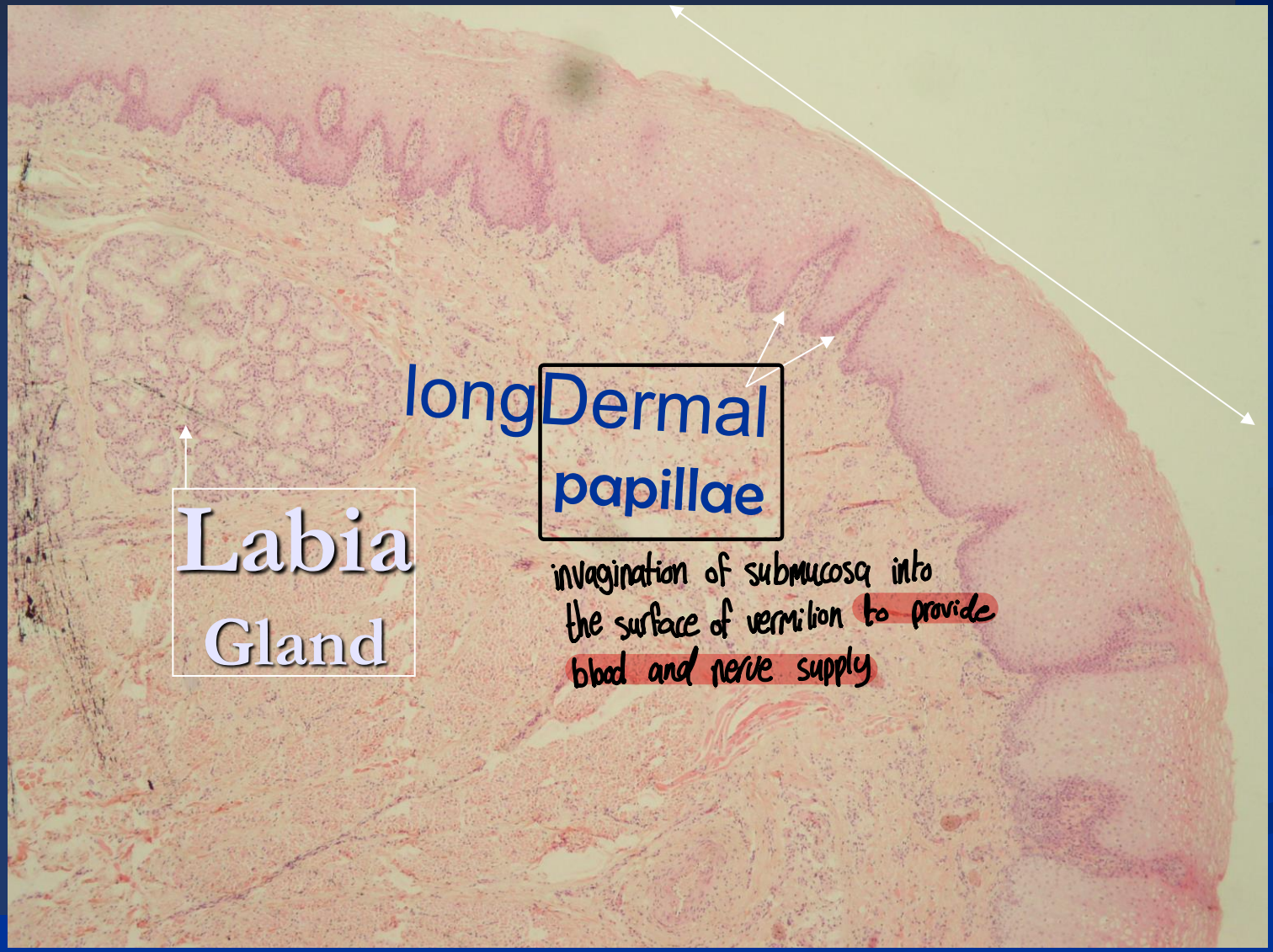
+Striated skeletal muscle (Orbicularis oris)

→ Multiple, flattened and peripheral nuclei

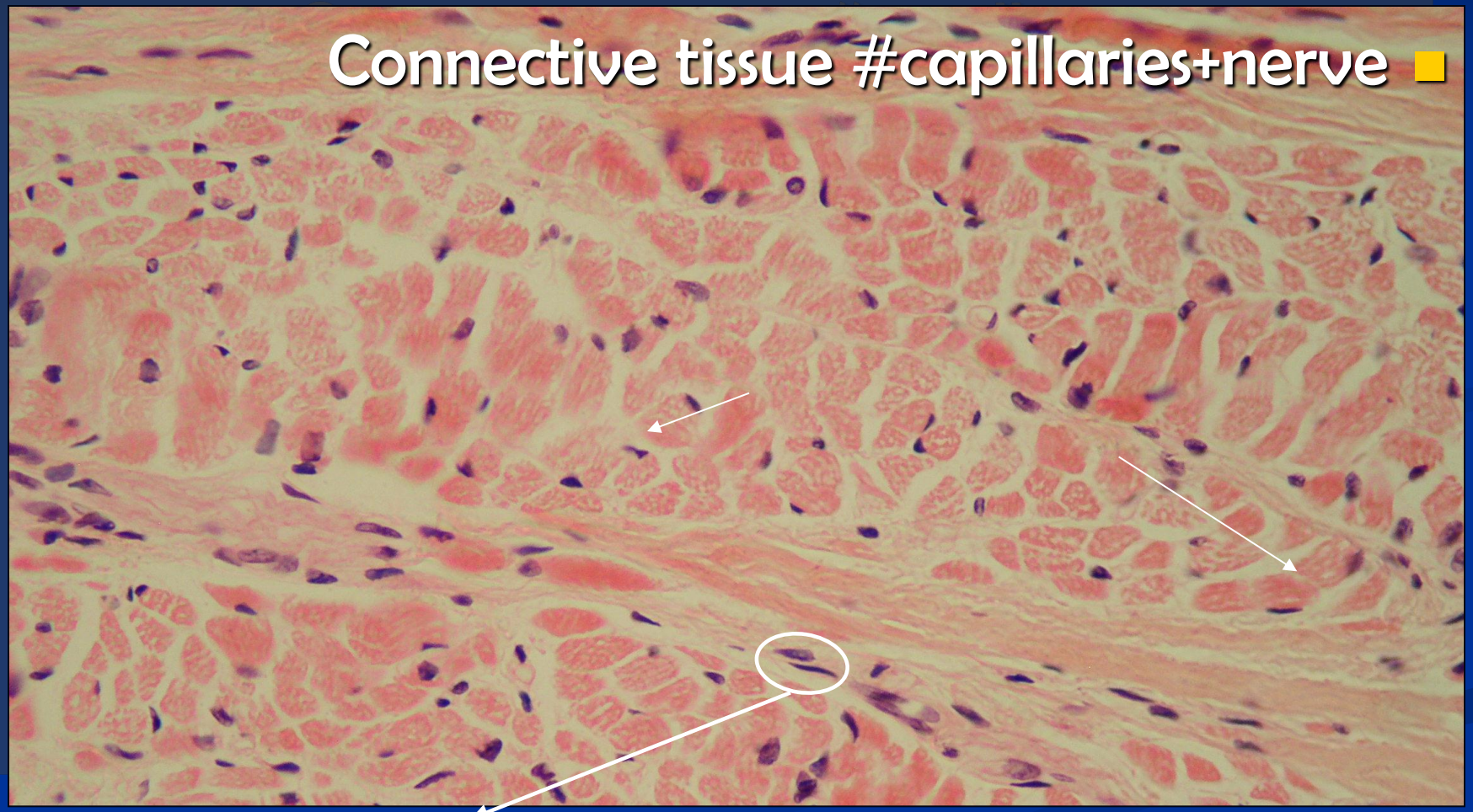
Cross section

longitudinal section

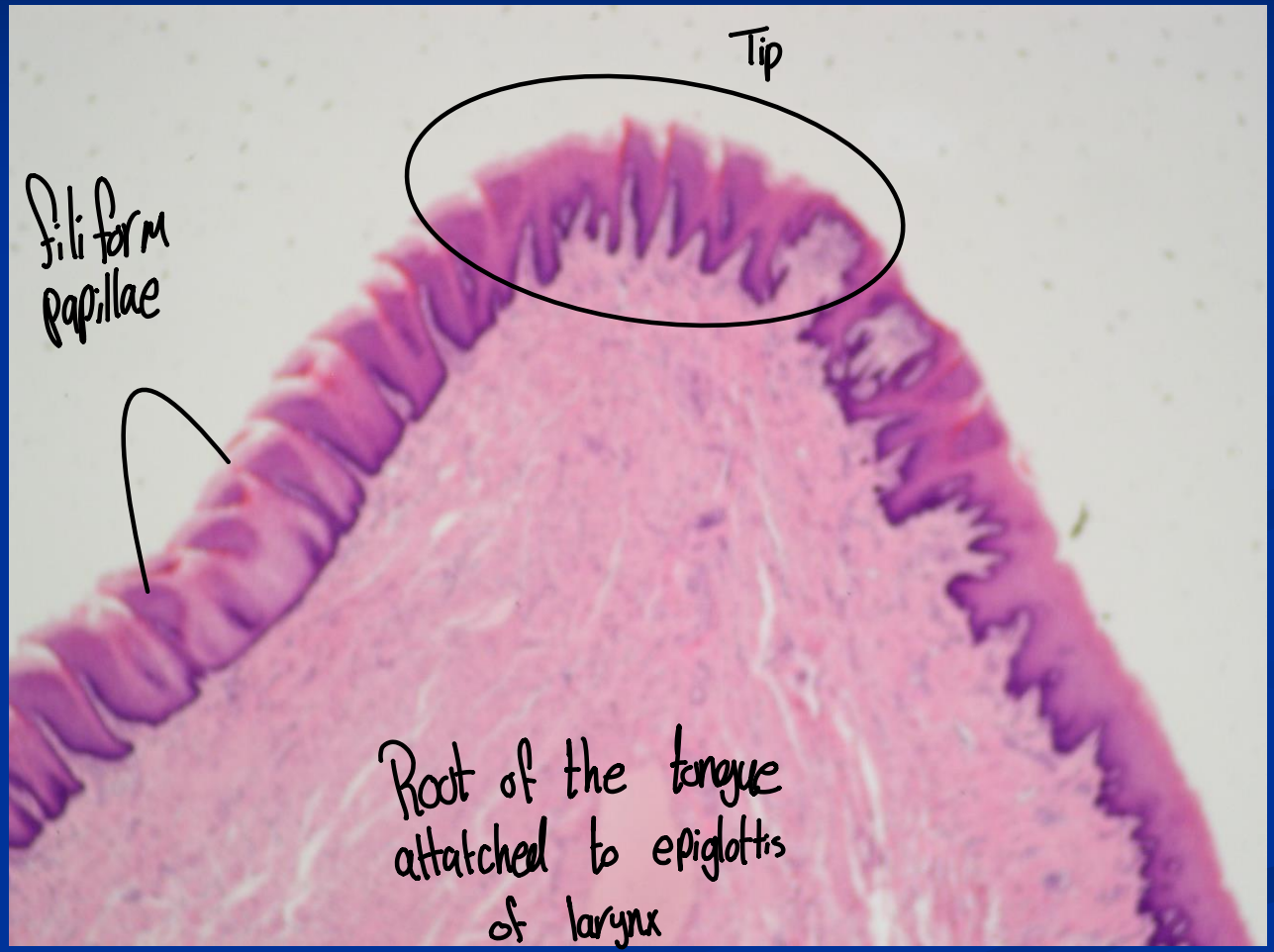
Vermilion(transition zone)



Fine skeletal muscle in core of lip

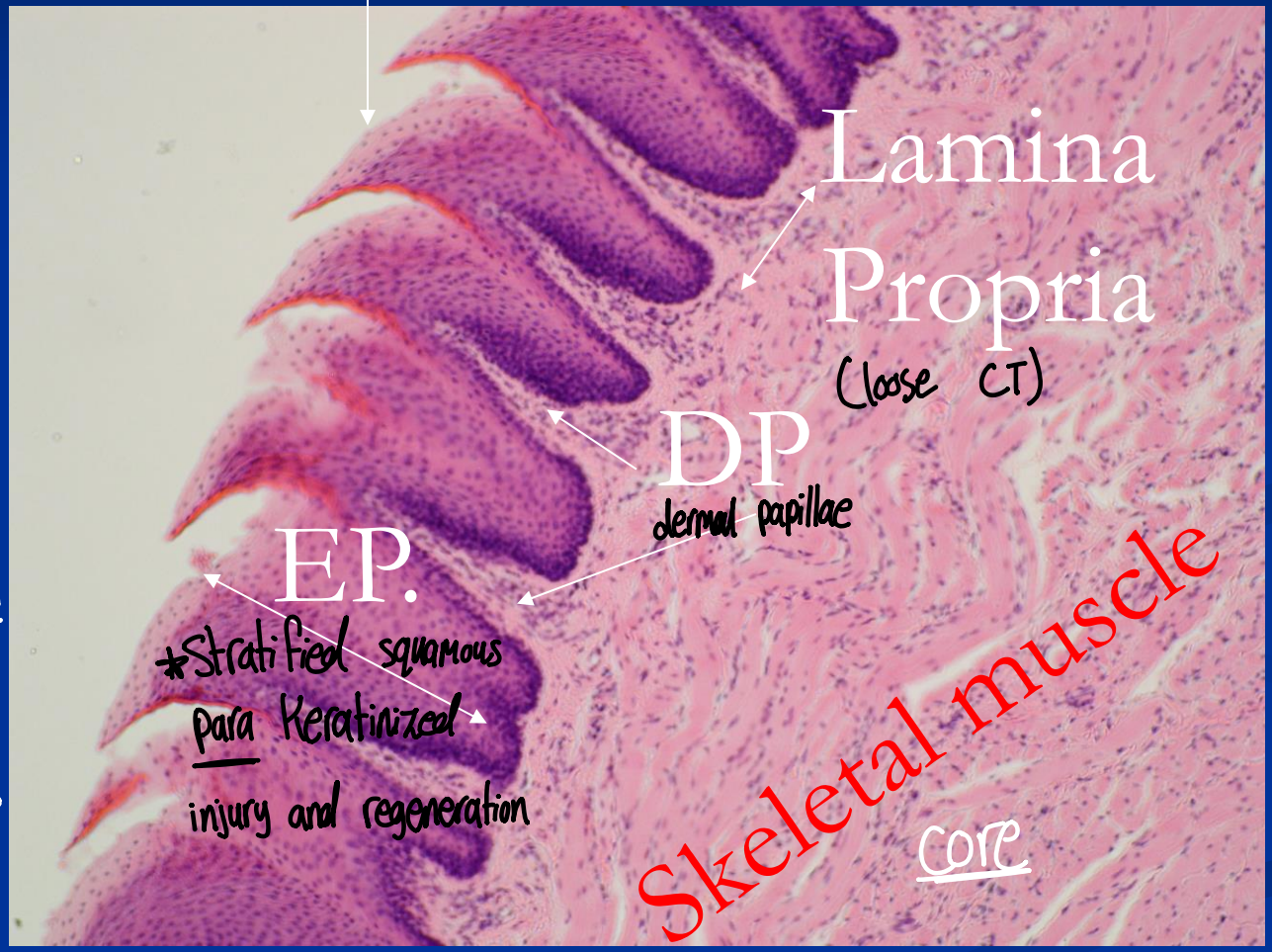


Tongue(dorsal surface)



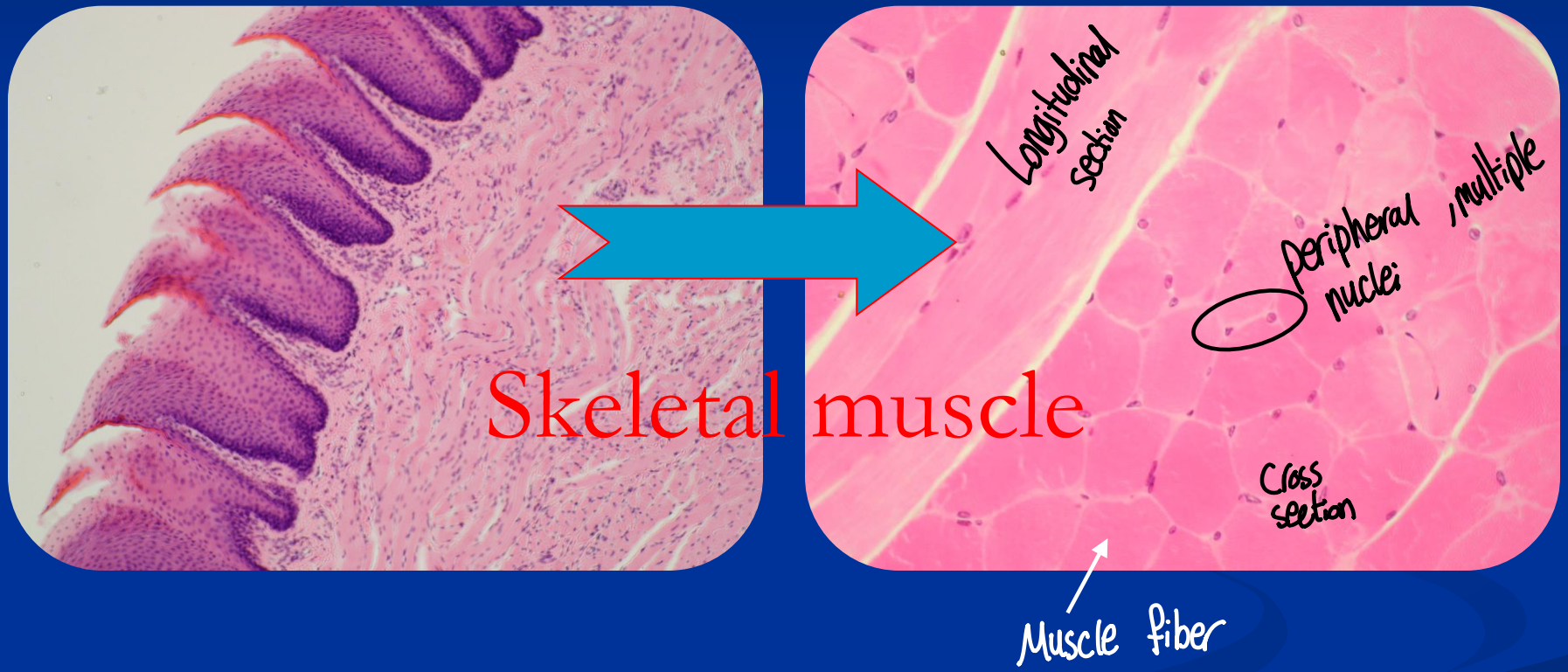
1 Filiform Papillae

*No taste buds



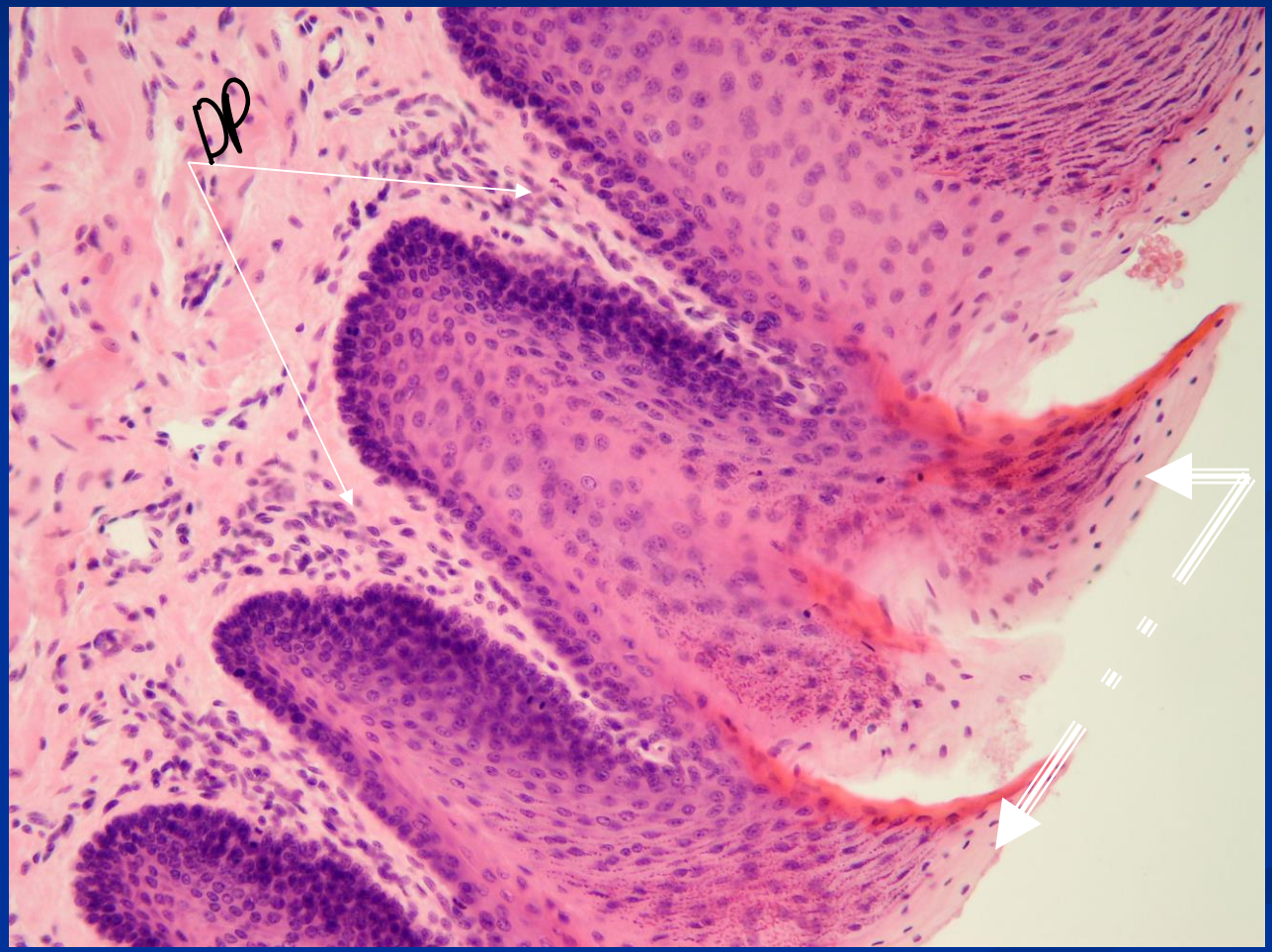
*lower surface of the tongue:

-stratified squamous non-Keratinized

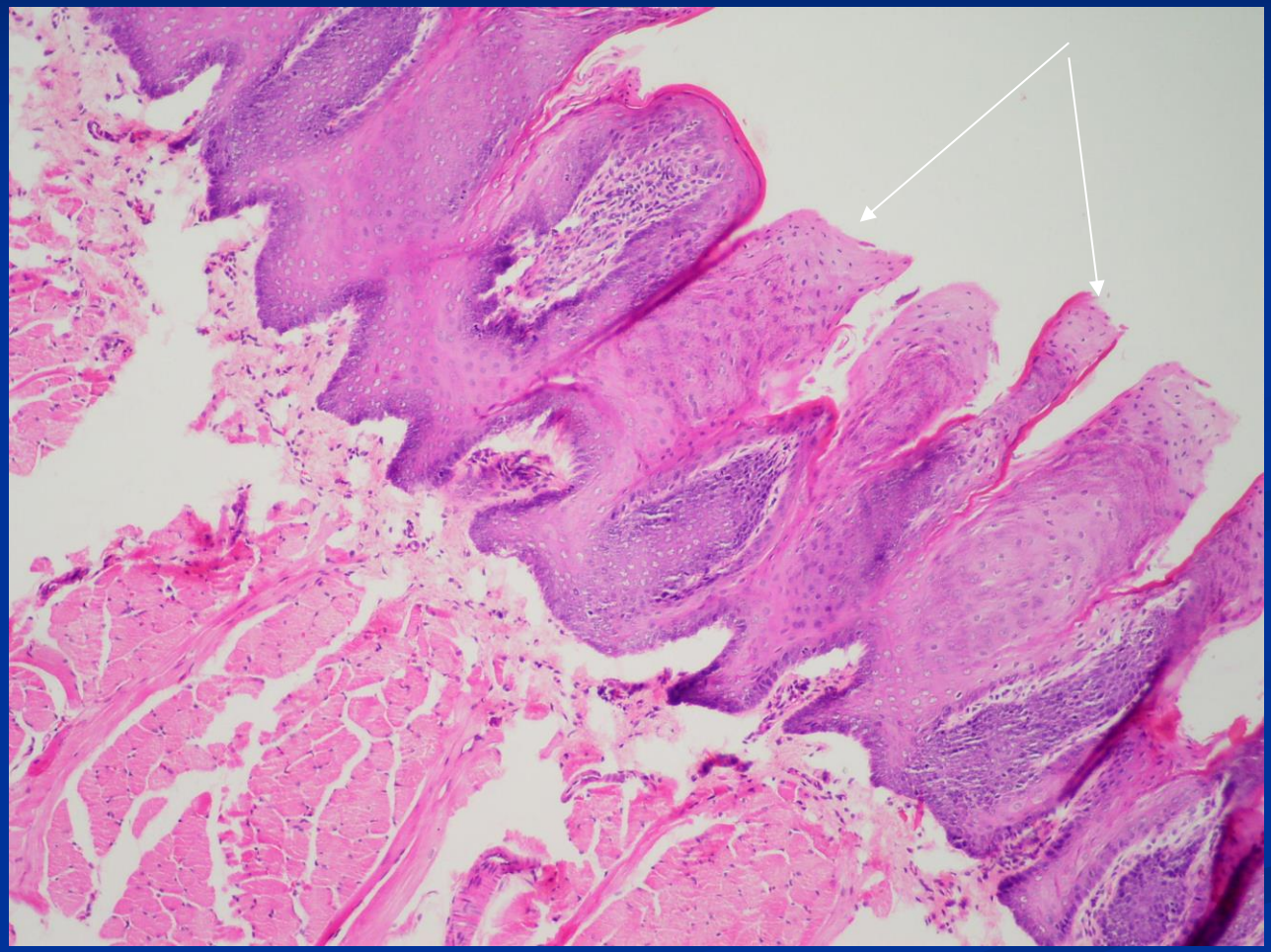


Skeletal muscle

Filiform Papillae

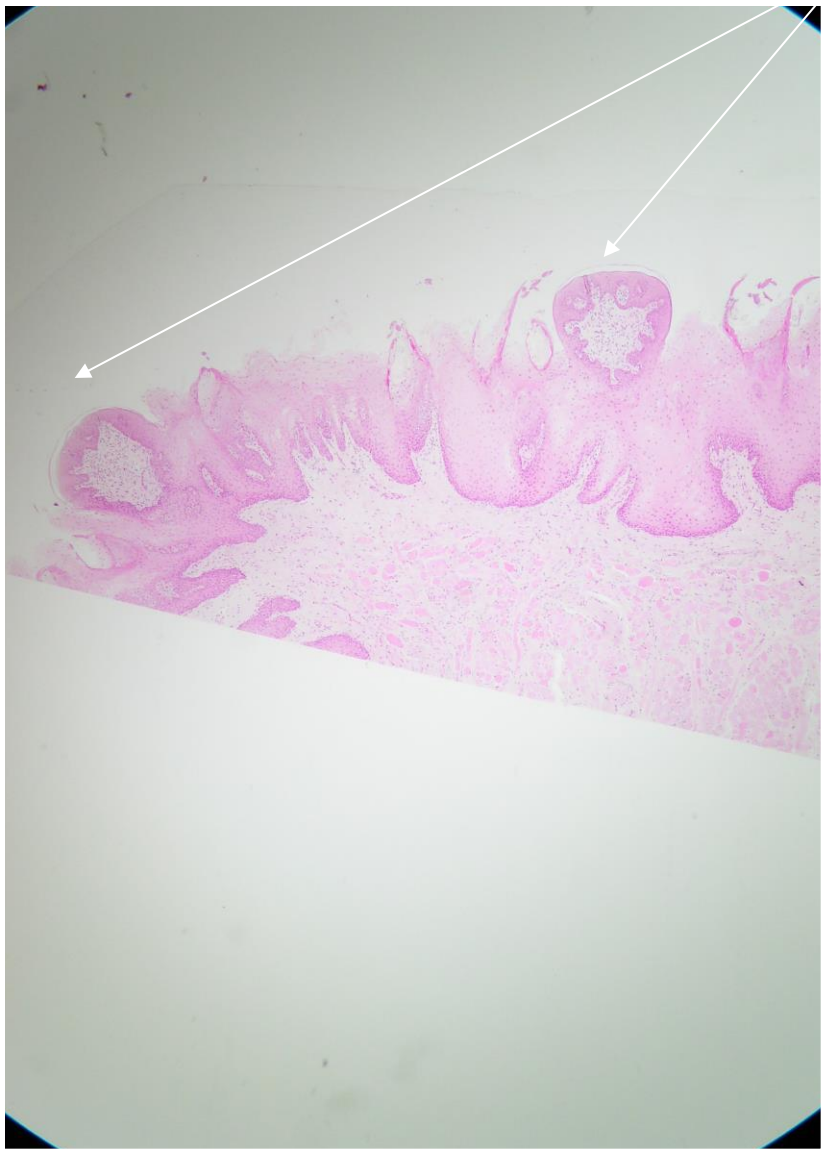


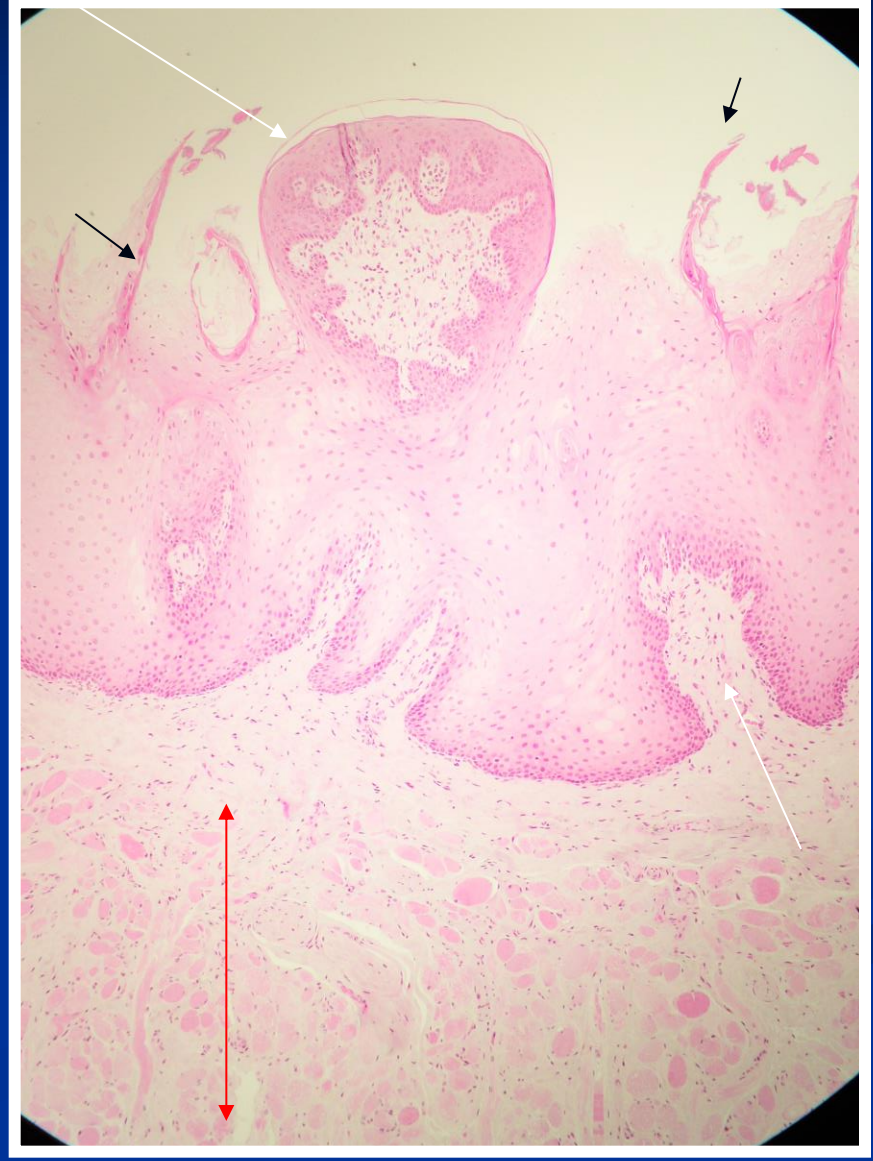
Filiform Papillae



② Fungiform papilla

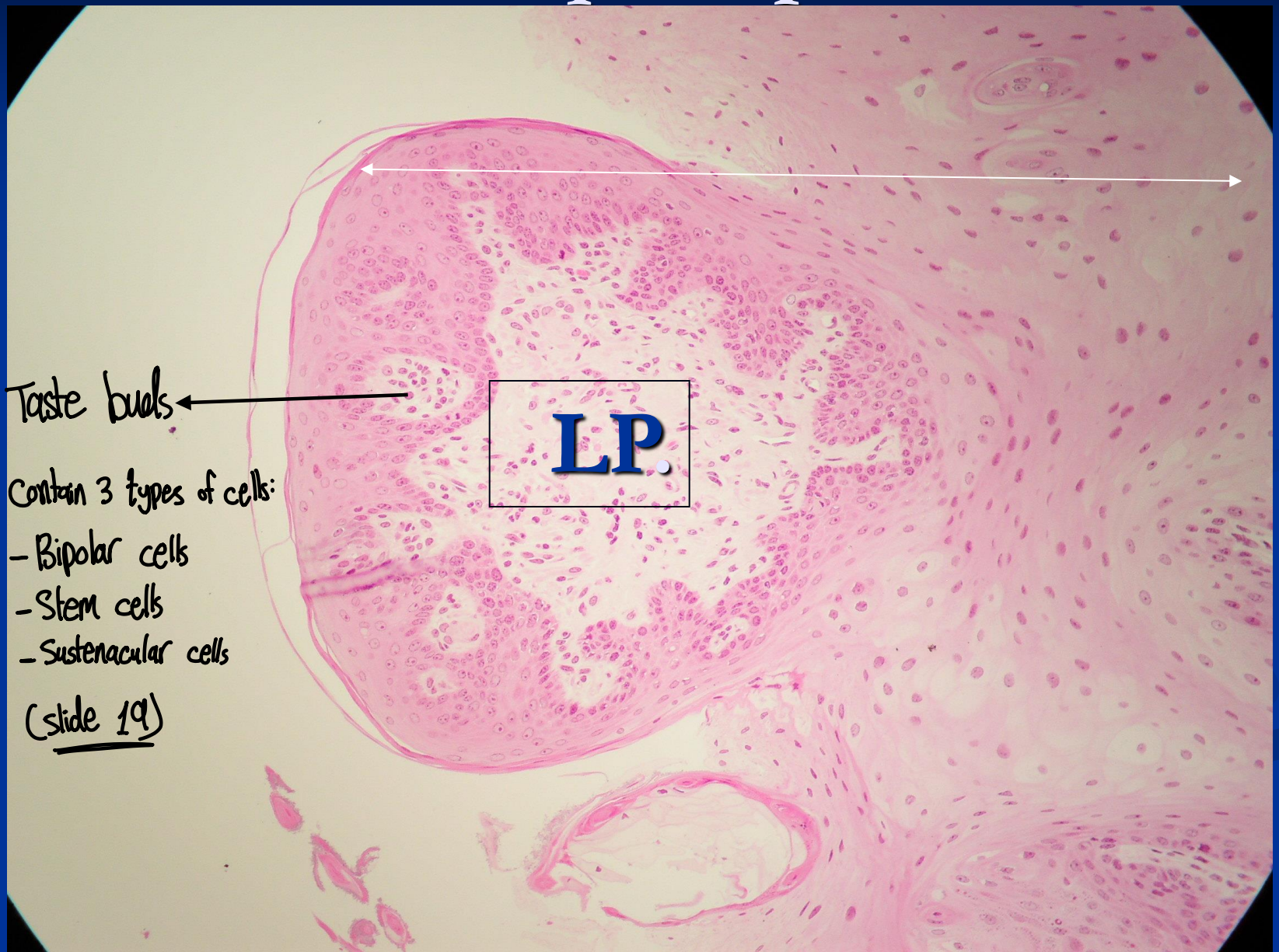
+ They have taste buds





Str. Squa.Ep..

*Stratified squamous para Keratinized



Contain 3 types of cells:

- Bipolar cells
- Stem cells
- Sustenacular cells

(slide 19)

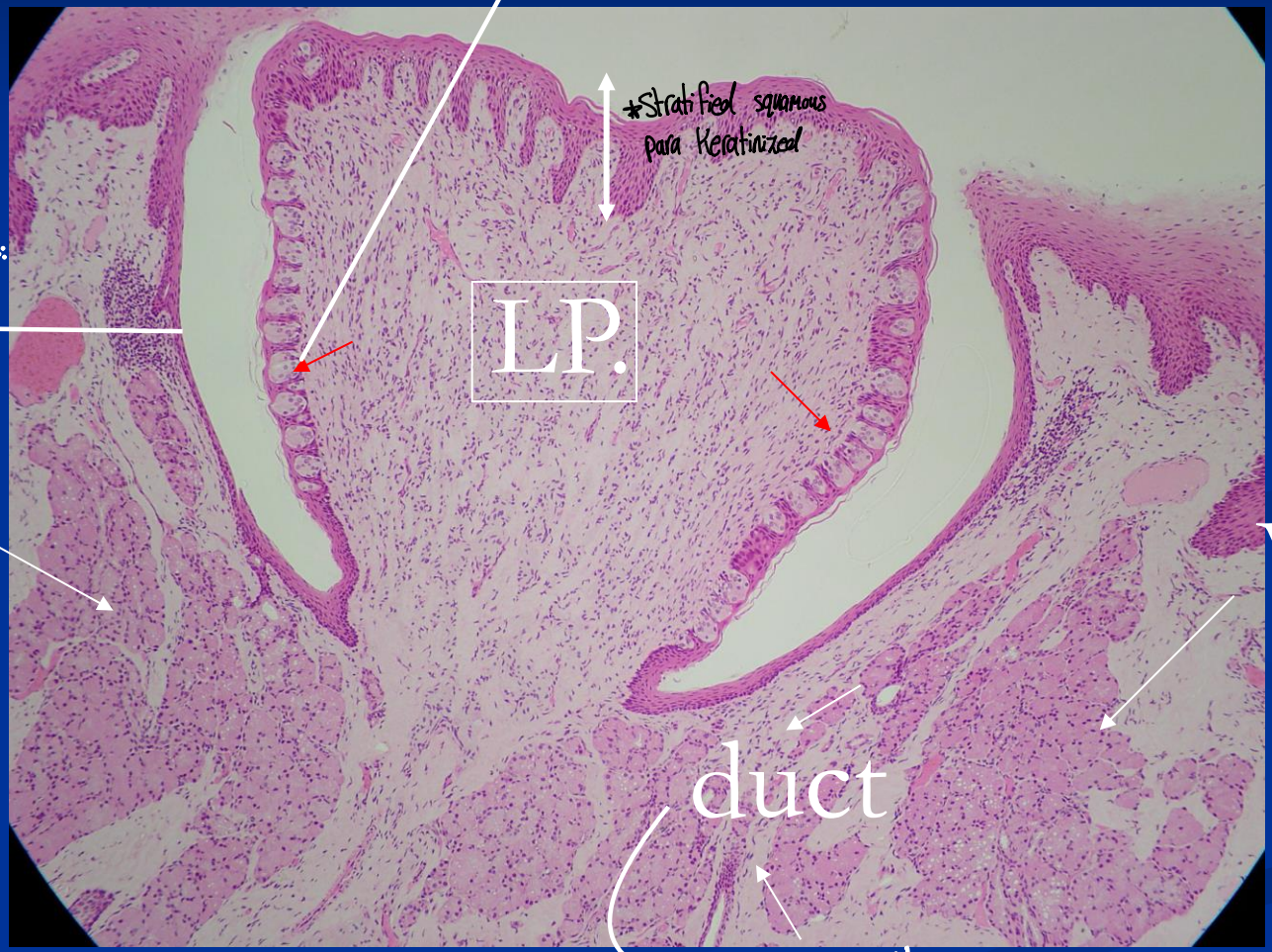
③ Circumvallate Papilla

sulcus=groove

VonIbner's gland

Taste bud

: lateral to Circumvallate papilla
medial to the groove, cleft



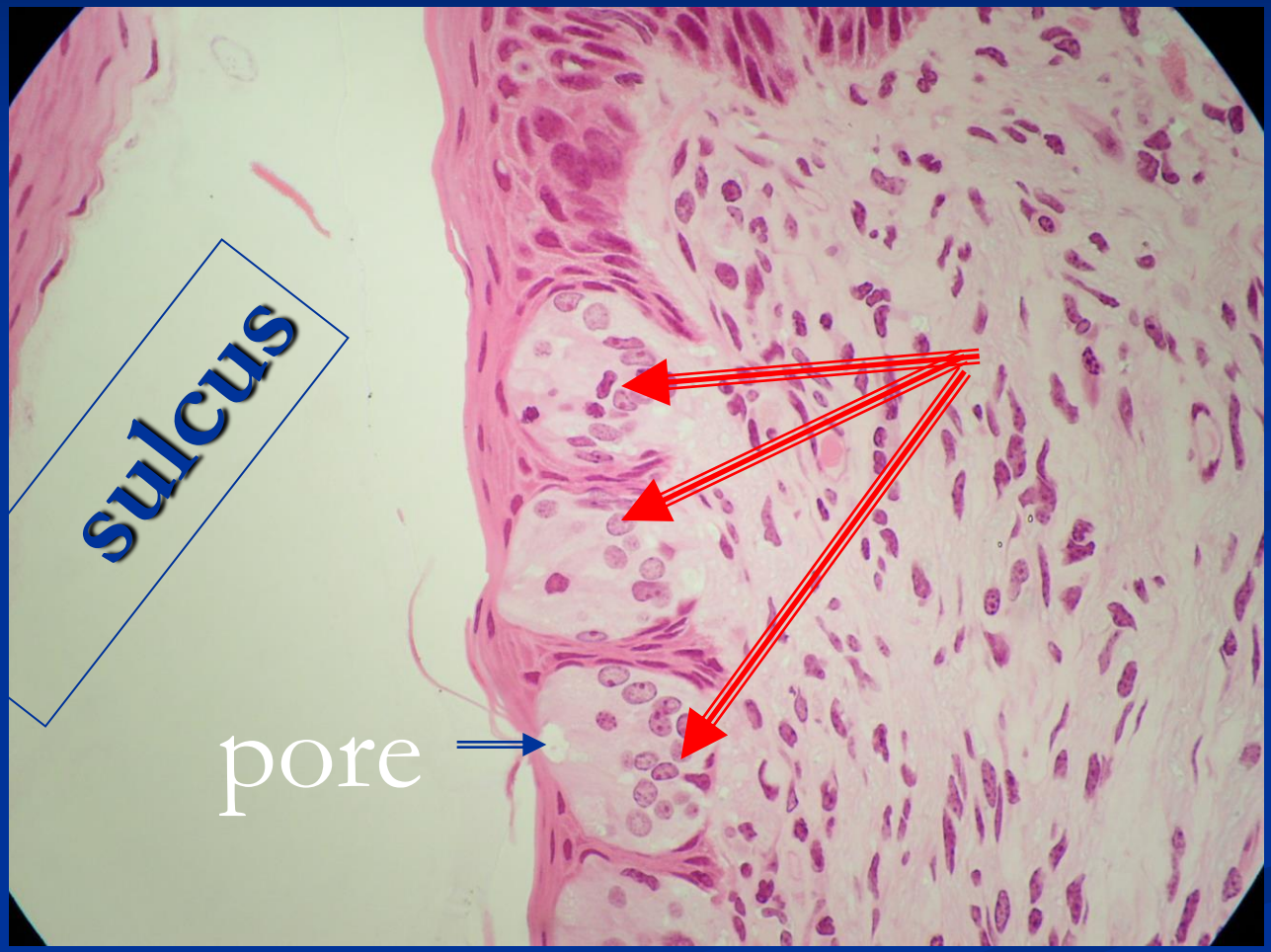
Ep of the groove:
Stratified squamous non-Keratinized
*no injury

VonIb. Gl.

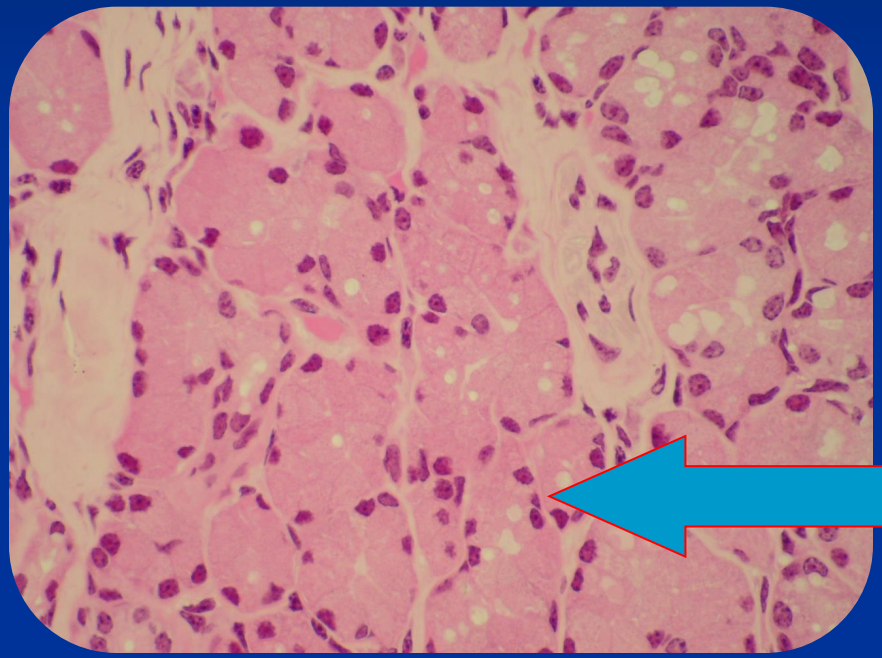
opens in the groove, it releases serous secretions to dissolve materials we taste

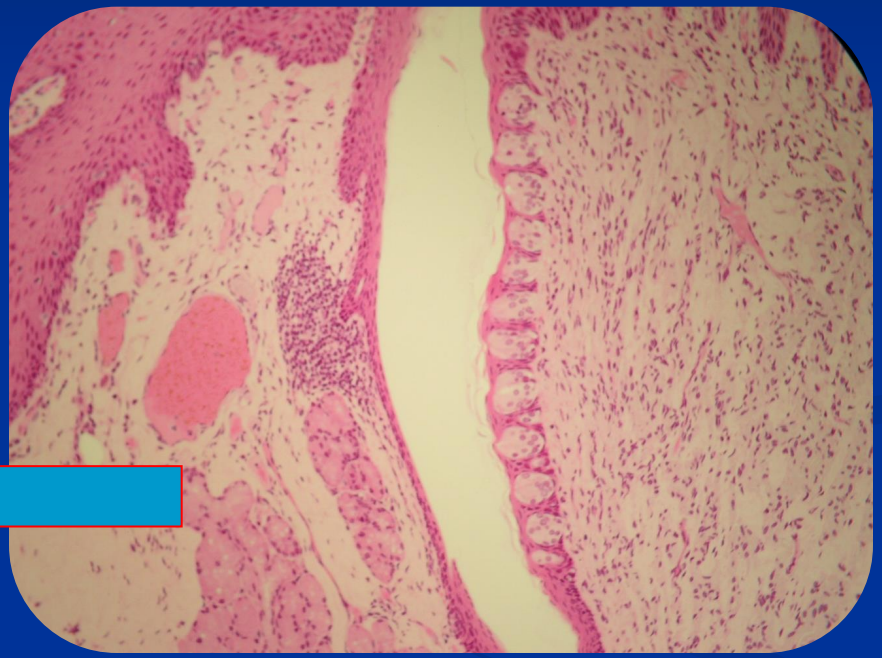
Serous gl. sulcus Taste bud

Taste bud



At the center are bipolar cells, which have hairlets extending to the taste pore and are connected at their base to nerve fibers. Their function is to convert chemical impulses into electrical signals and transmit them to brain centers to recognize sour, sweet, and bitter tastes. On the lateral sides are the sustenacular (supporting) cells, and at the base lie the stem cells that help in regeneration

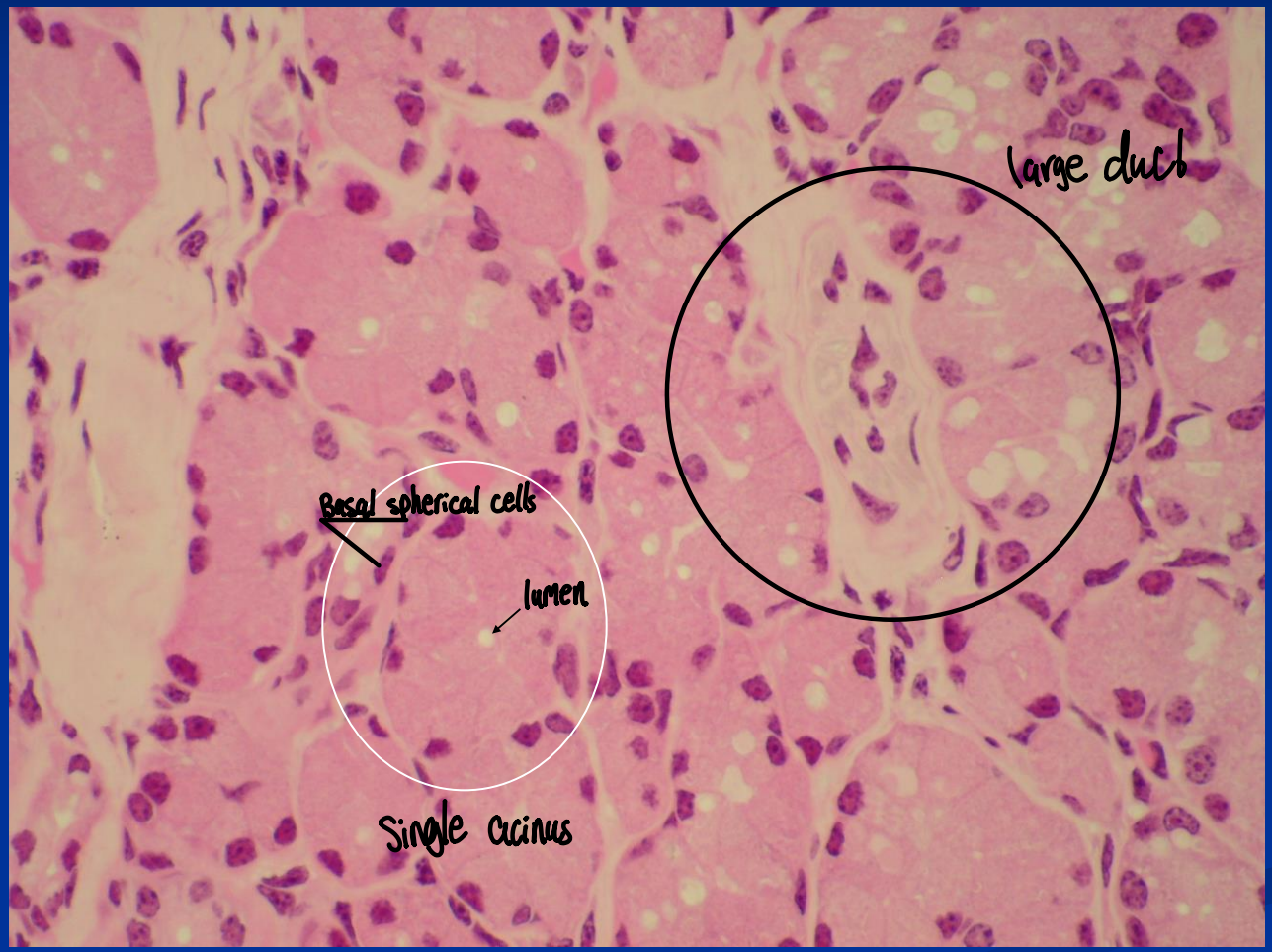




VonIbner's gland is a minor salivary gland that releases serous secretions. It is composed of multiple serous acini, each containing a central lumen surrounded by cells with spherical basal nuclei and apices directed toward the lumen. The boundaries between the cells are ill-defined. The gland drains its secretion through a large duct that opens at the bottom of the sulcus

Next slide

Serous acinus



Salivary glands:

has multiple branches → has tubule → has acini

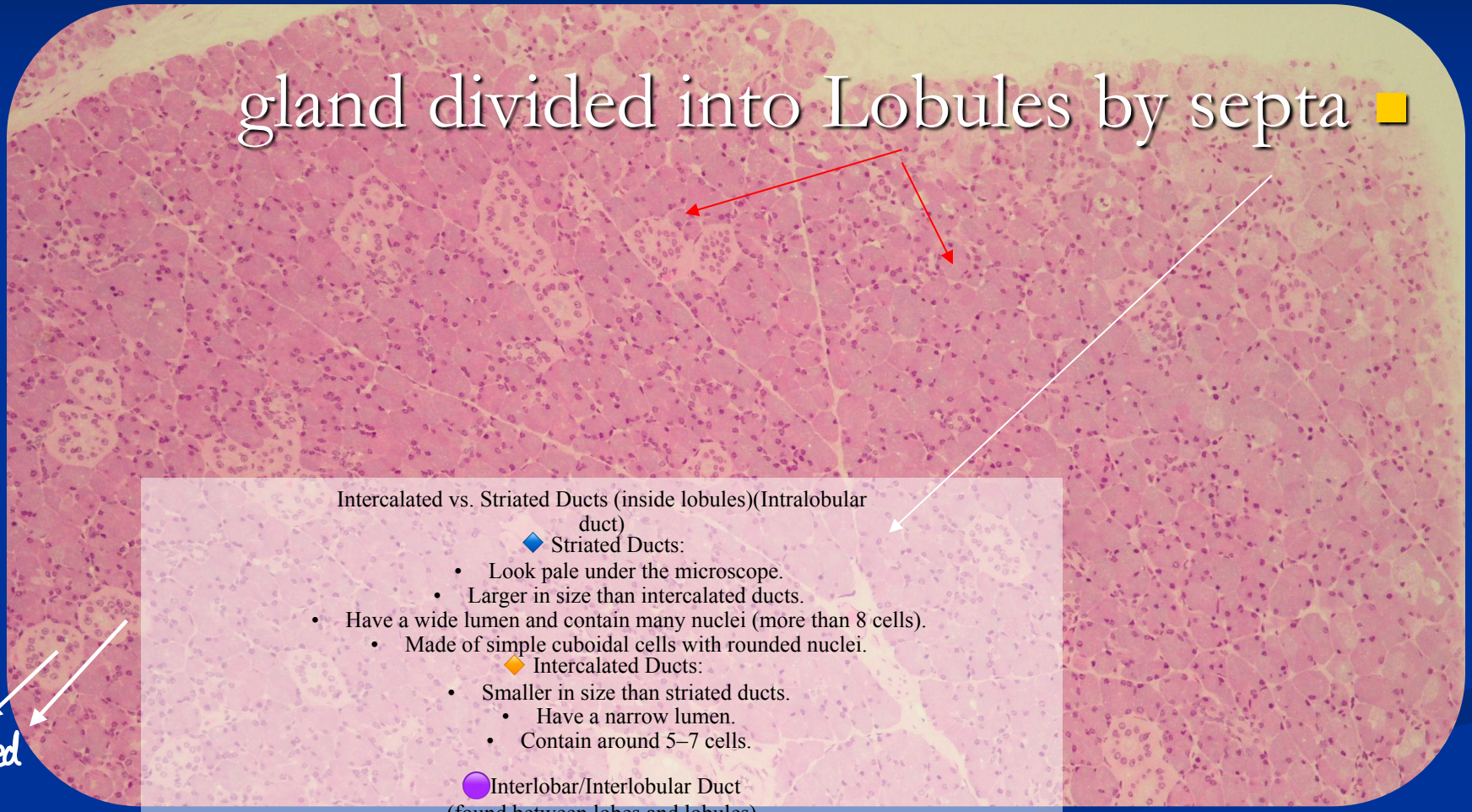
copound tubuloacinar gland

parenchyma&stroma

*Quick revision:

Feature	Parotid Gland	Submandibular Gland	Sublingual Gland
Type of Secretion	Serous	Mixed (mostly serous)	Mixed (mostly mucous)
Acini Type	Serous acini only	Mostly serous, some mucous	Mostly mucous, few serous
Appearance of Acini	Dark-staining (basophilic)	Mixed: serous (dark) and mucous (light)	Pale-staining (mucous) with demilunes
Duct System	Well-developed	Well-developed	Poorly developed
Serous Demilunes	Absent	**Prominent**	Present
Connective Tissue	Prominent septa	Moderate	Thin septa
Location	Near ear	Floor of mouth (posterior)	Floor of mouth (anterior)

Parotid gland:



Intercalated vs. Striated Ducts (inside lobules)(Intralobular duct)

🔷 Striated Ducts:

- Look pale under the microscope.
- Larger in size than intercalated ducts.
- Have a wide lumen and contain many nuclei (more than 8 cells).
- Made of simple cuboidal cells with rounded nuclei.

🔶 Intercalated Ducts:

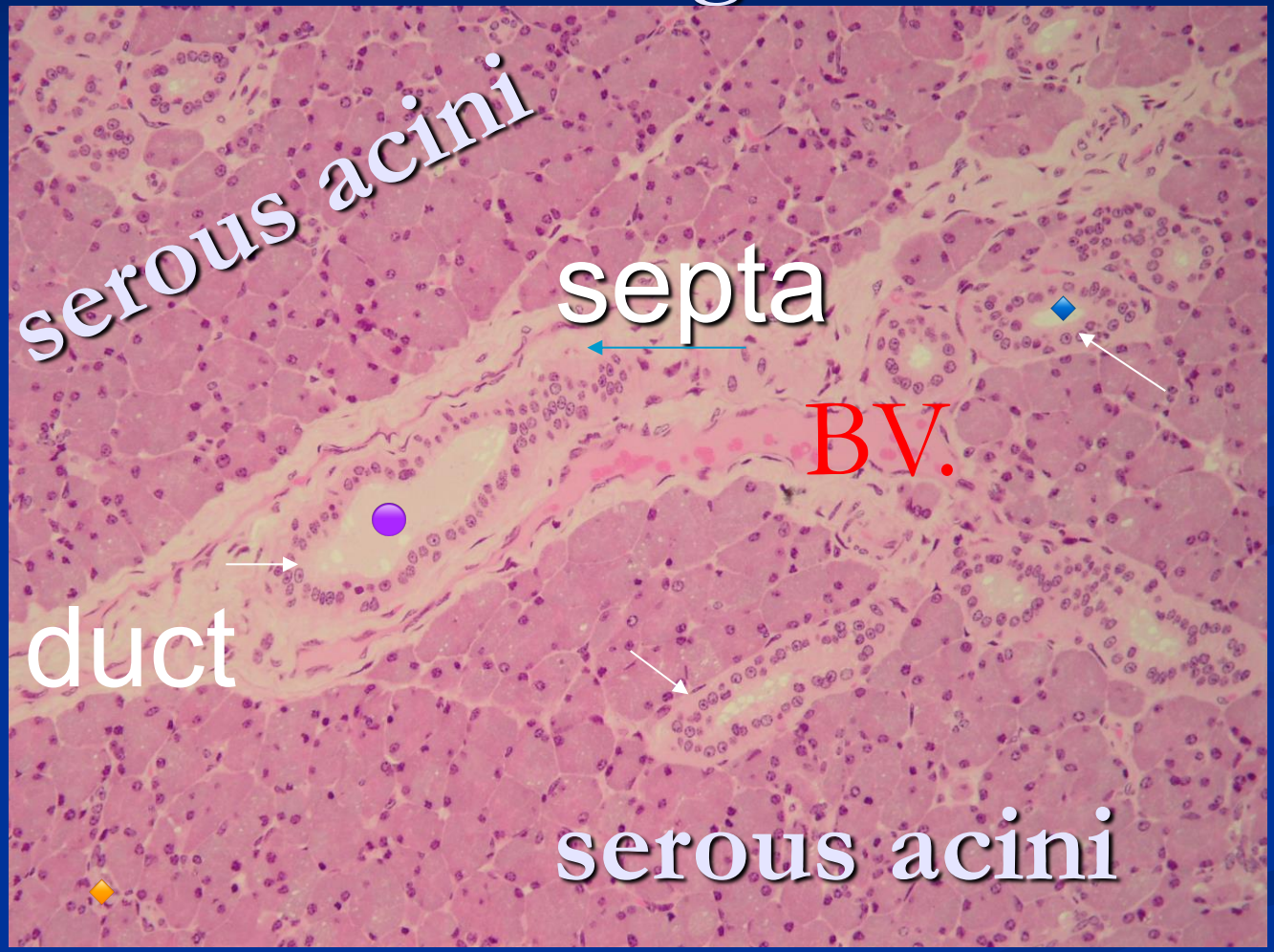
- Smaller in size than striated ducts.
- Have a narrow lumen.
- Contain around 5–7 cells.

🟣 Interlobar/Interlobular Duct (found between lobes and lobules)

- Lumen is wider than in striated ducts.
- Lined by stratified cuboidal epithelium.
- As the duct goes further, the lining changes to columnar, then finally becomes stratified squamous non-keratinized (like in the main excretory duct of the parotid gland).

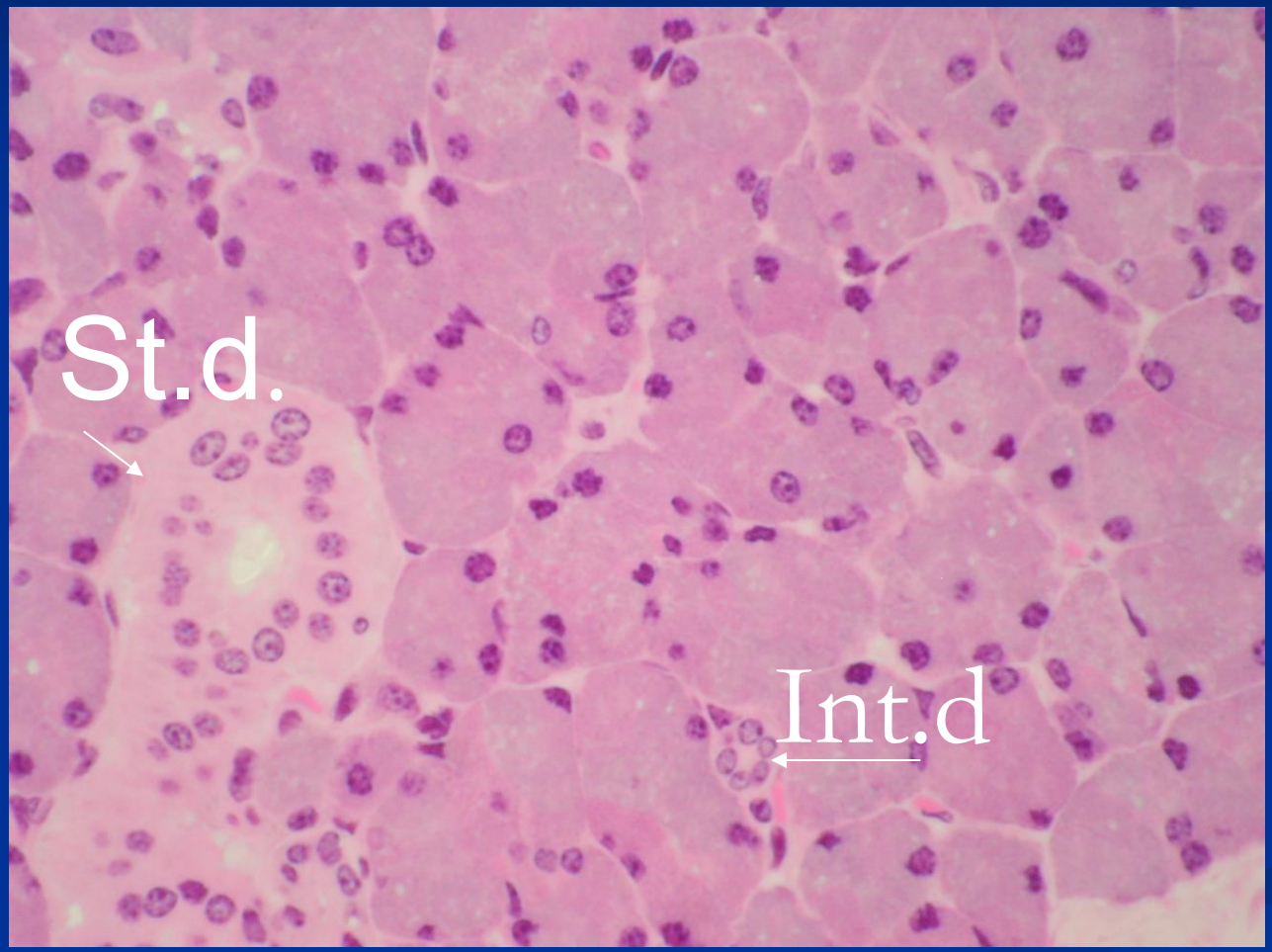
Next slides will help visualize and understand this better

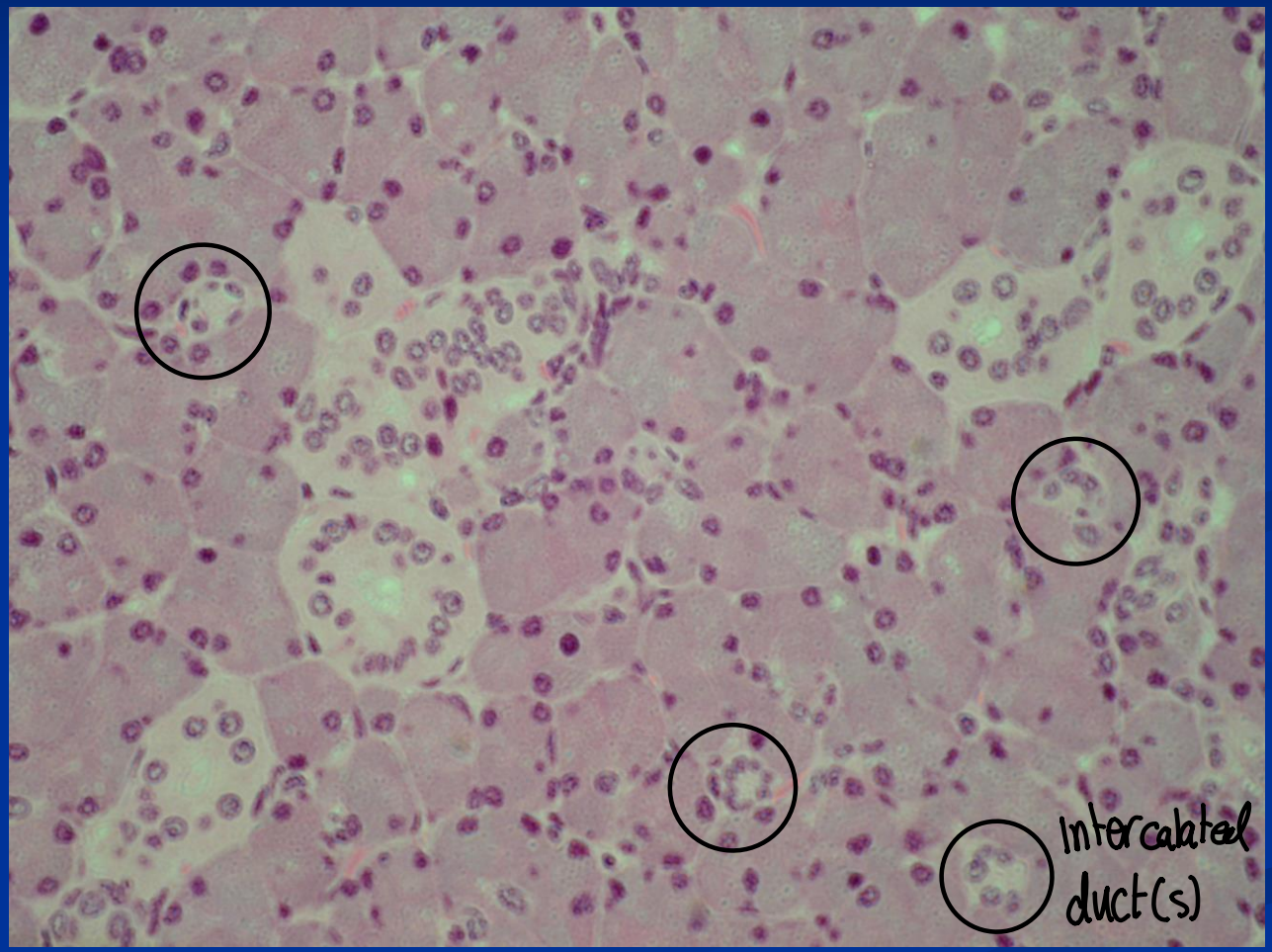
Parotid gland: serous gland

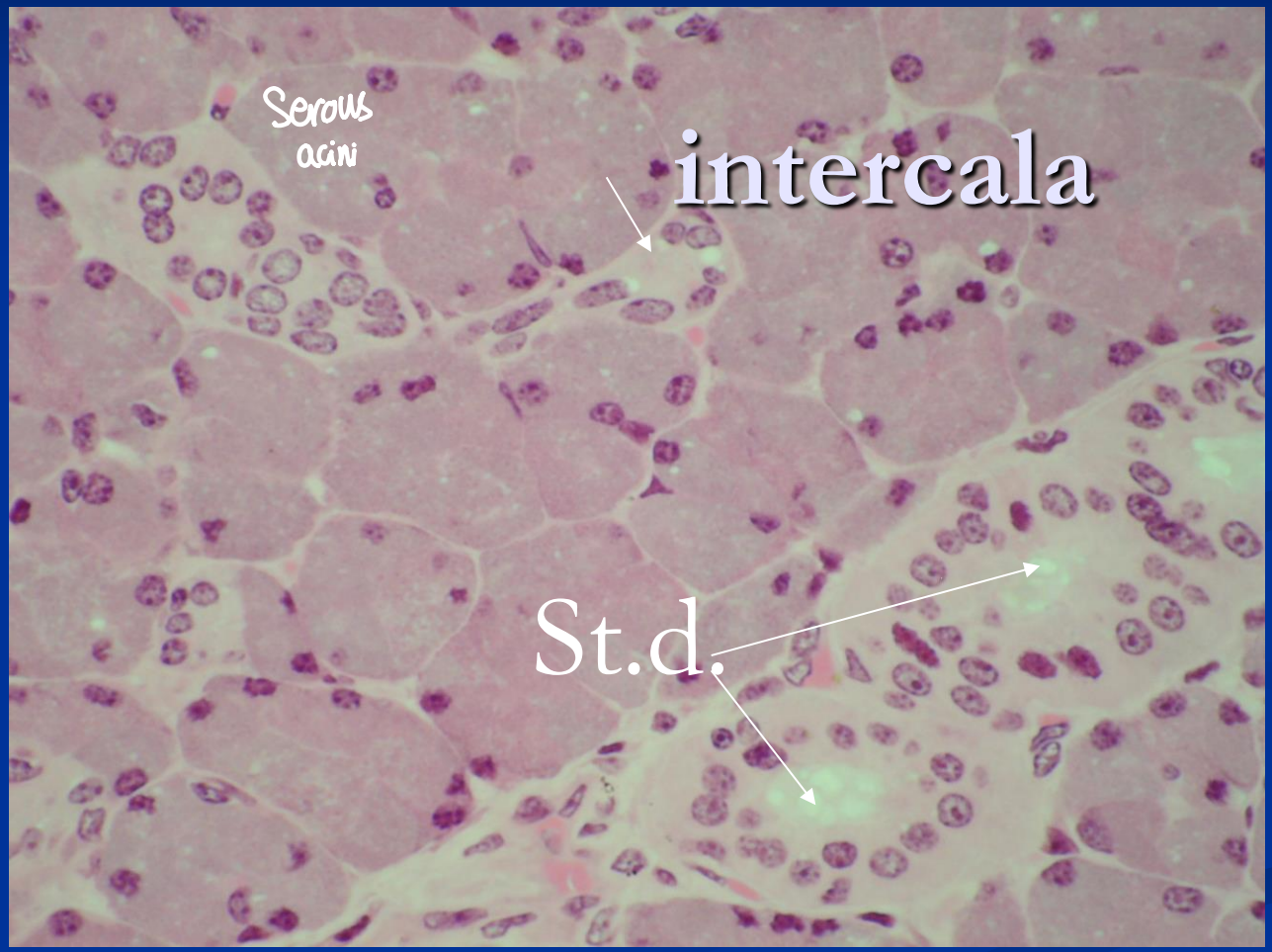


Striated&intercalated (Intralobular duct)

Not inter!

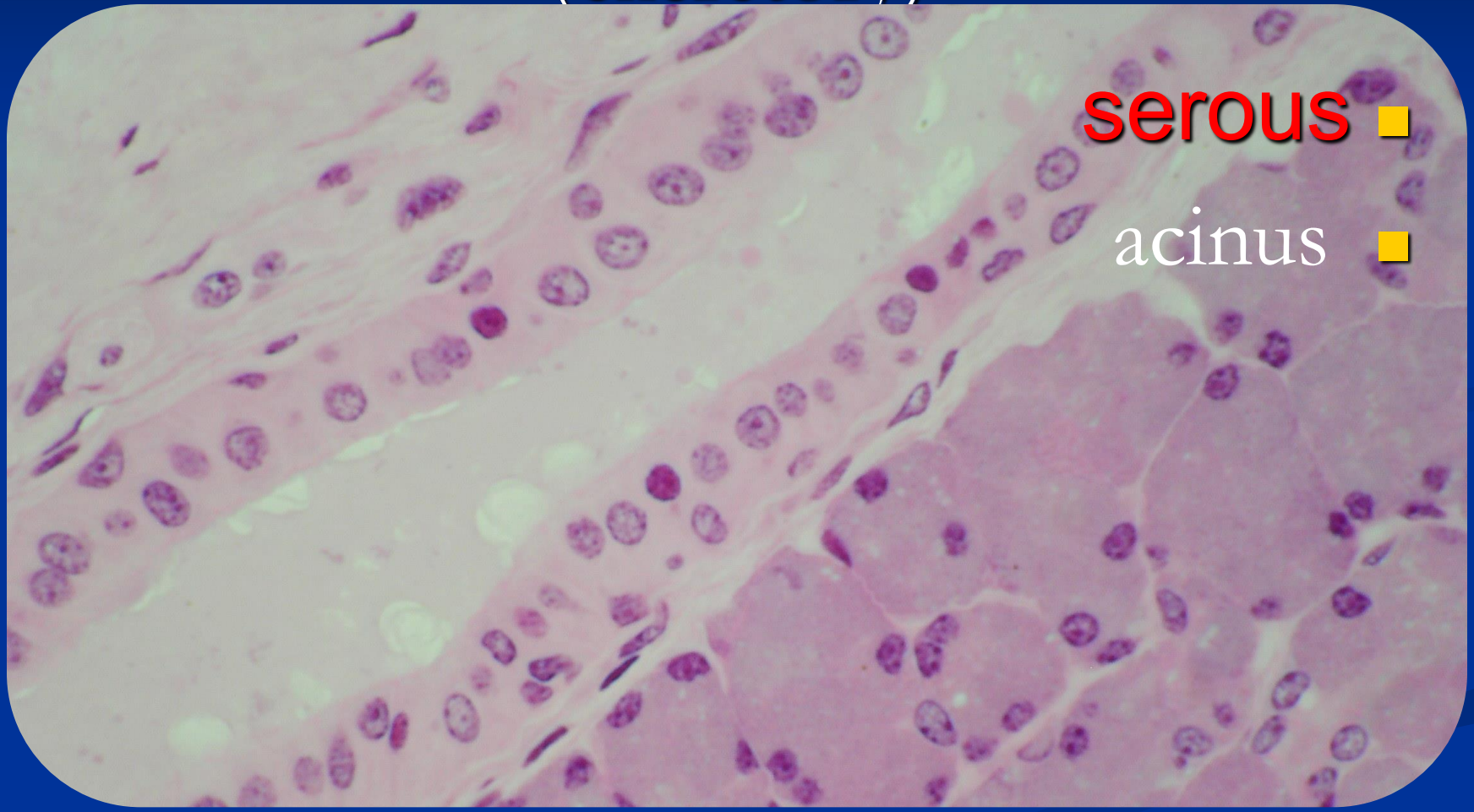



Intercalated
duct(s)


Serous
acini
intercala
St.d.

Large duct → large lumen
*lined by two layers of cuboidal cells

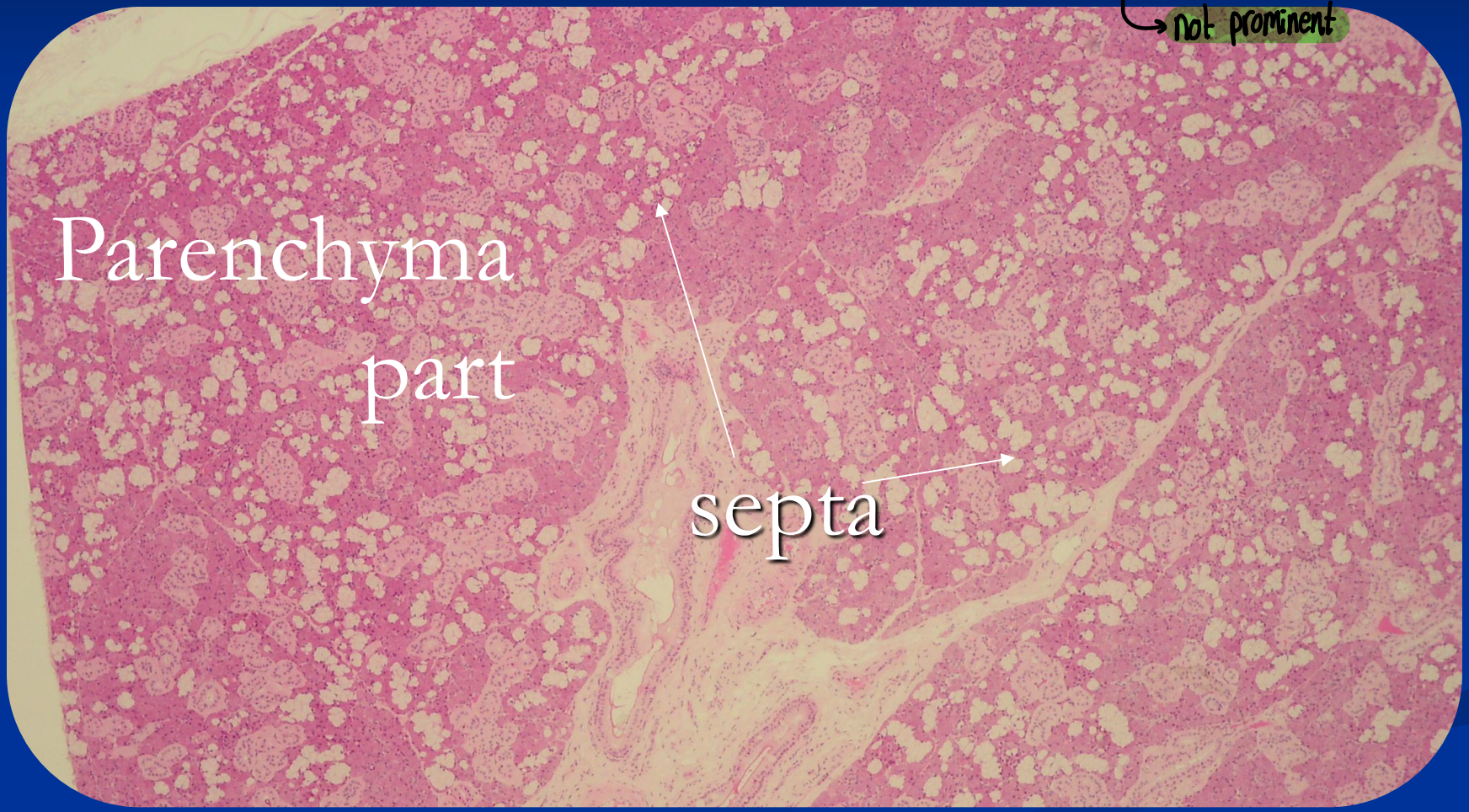
Interlobular duct (excretory)



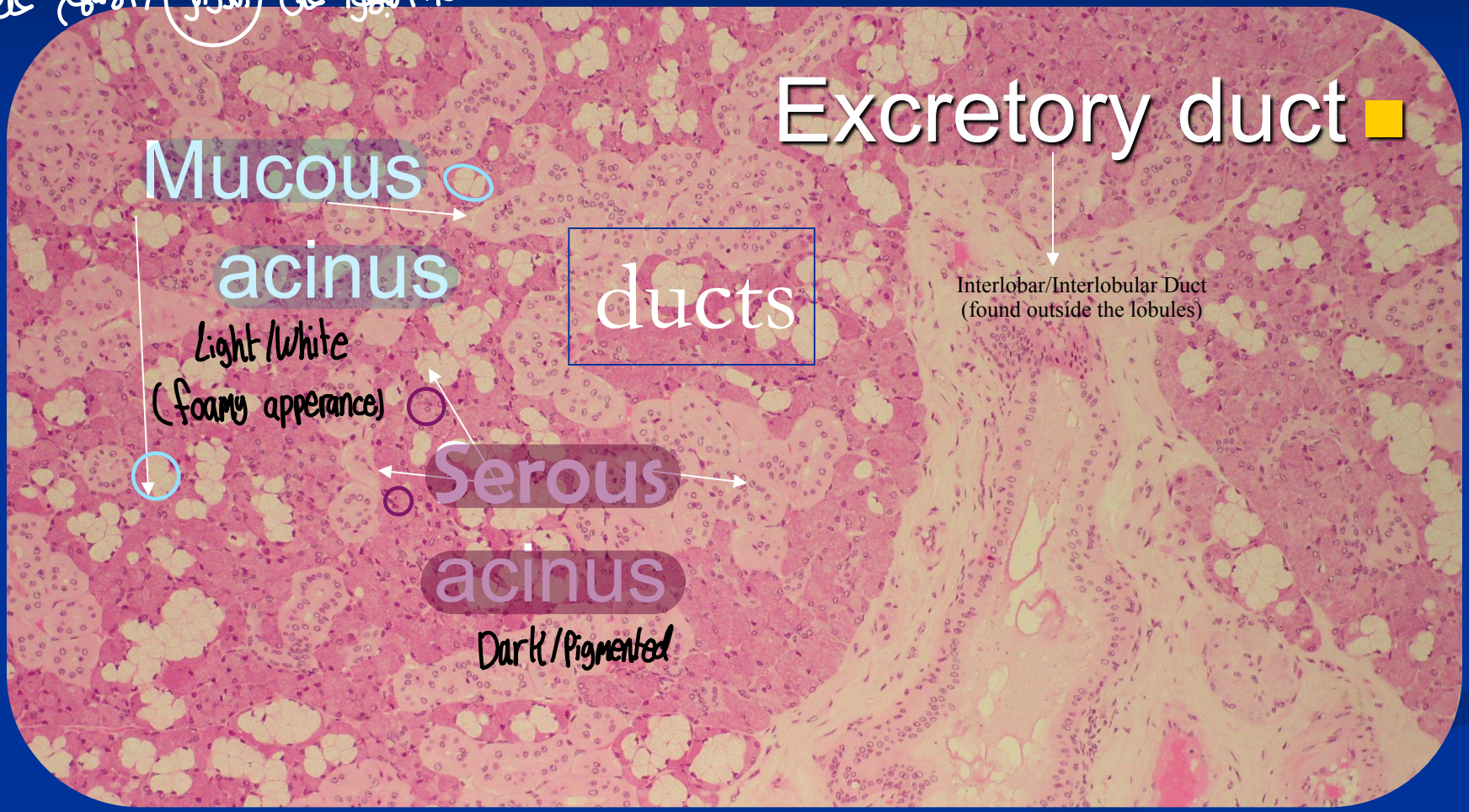
- serous
- acinus

Submandibular gland

it has a large number of striated ducts and intercalated ducts
→ not prominent

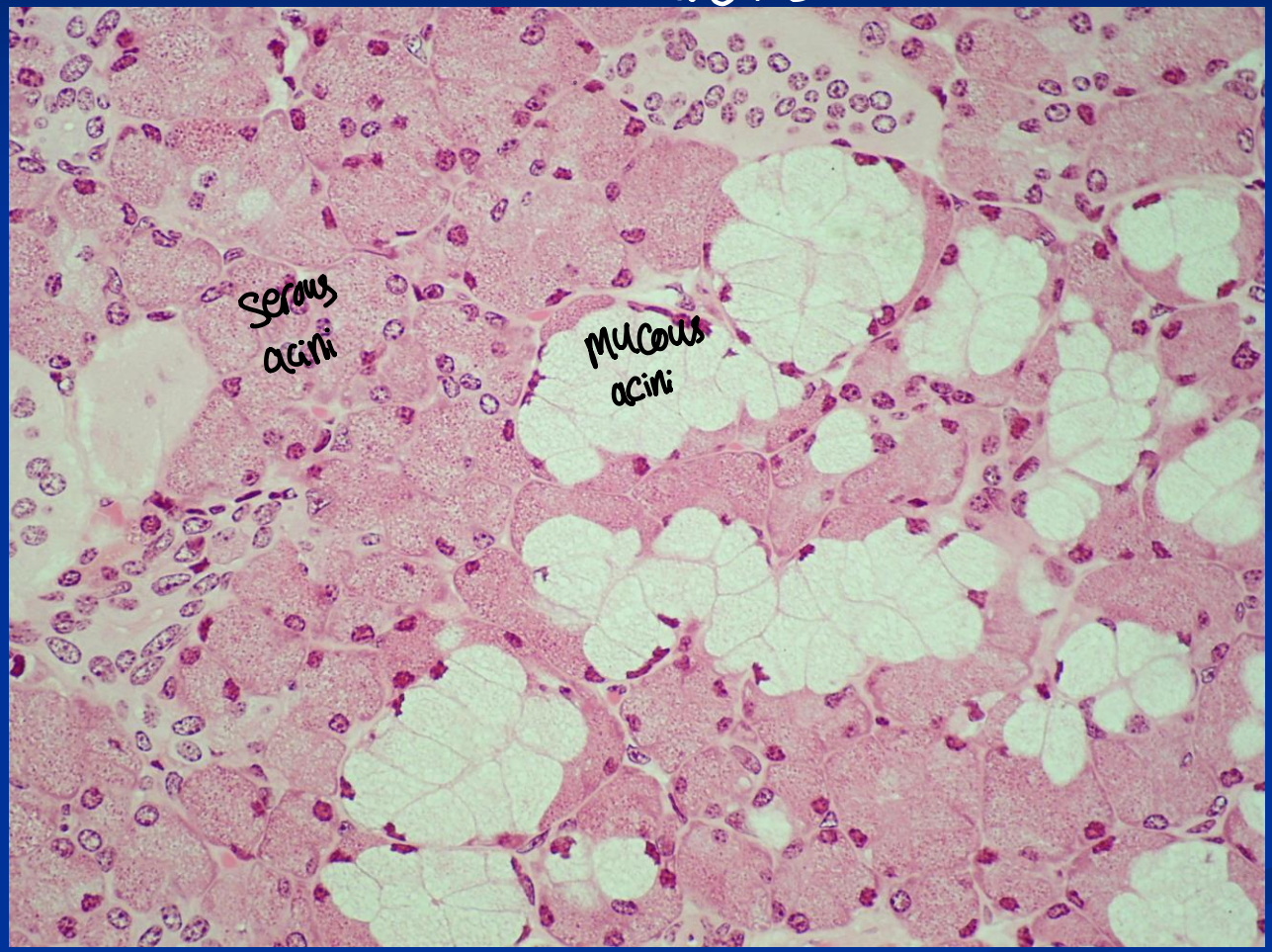


Seromucous gland(mixed)



Submandibular gland

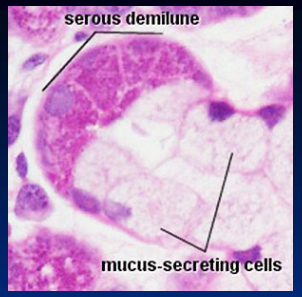
Striated duct



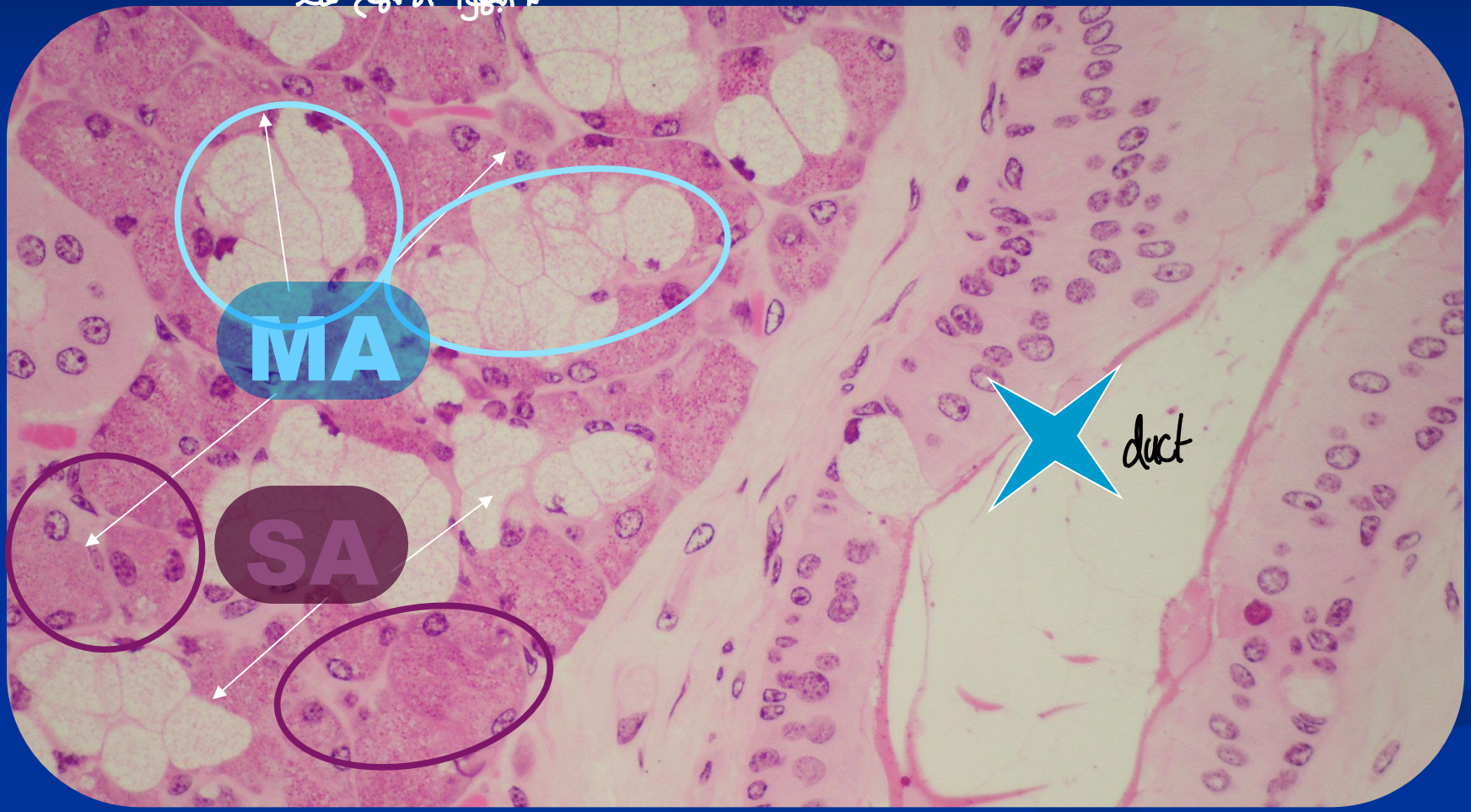
Serous demilunes

Crescent-shaped serous cells capping mucous acini

*زيادة بس أوضح

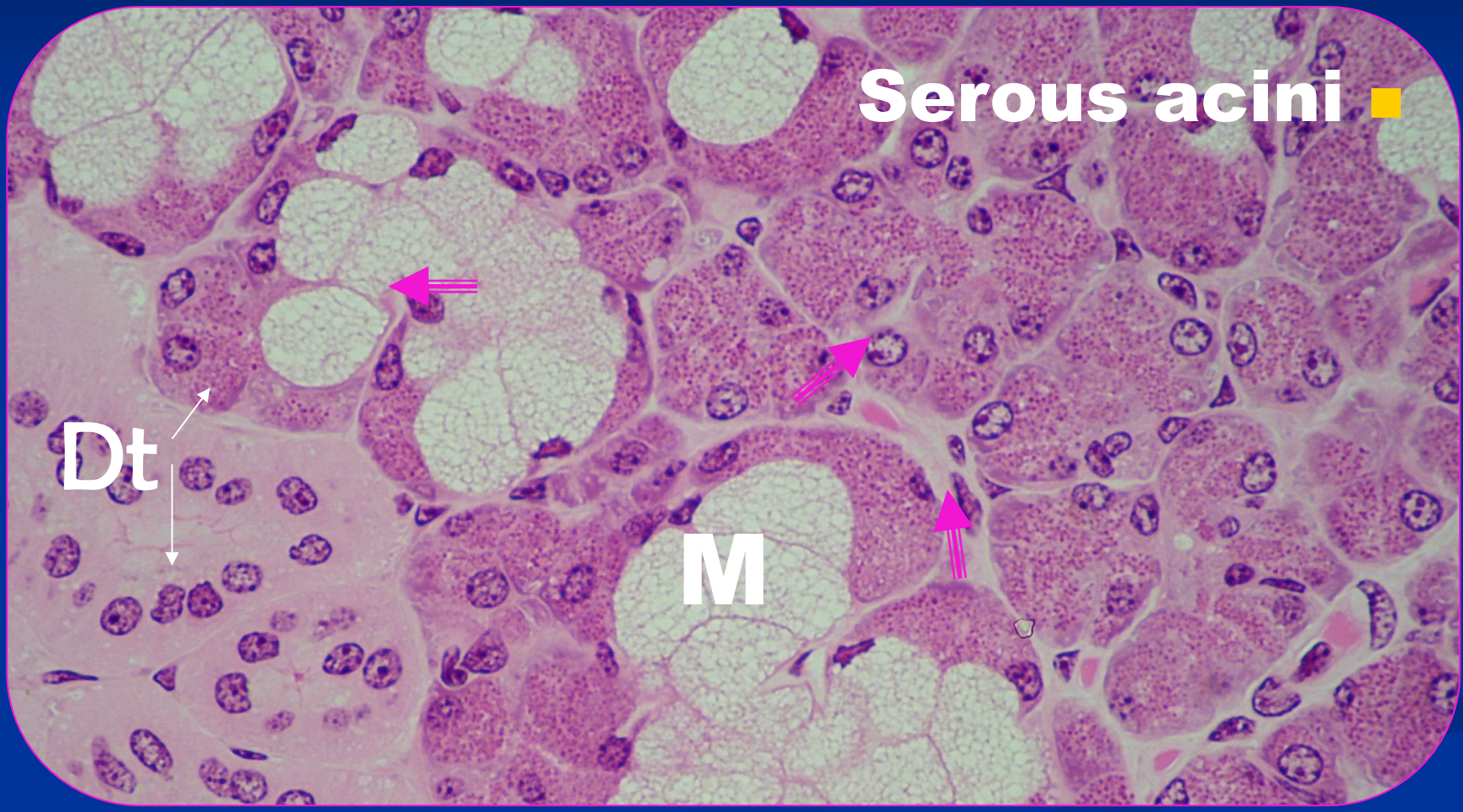


*انتبهوا الأسهم غلط



Serous demilune

Serous demilune



This slide was added by mistake (from the original file) 😱

But maybe it’s a good moment to pause 🤍

اللهم انصر أهل غـــزة نصراً من عندك

يغنيهم عن نصر من سواك ، اللهم تقبّل

شهداءهم ، واشـــفِ جرحاهم ، واربط

على قلوبهم ، وأنزل السكينة عليهم ،

اللهم أرِنا في اليهود المحتلين عجائب

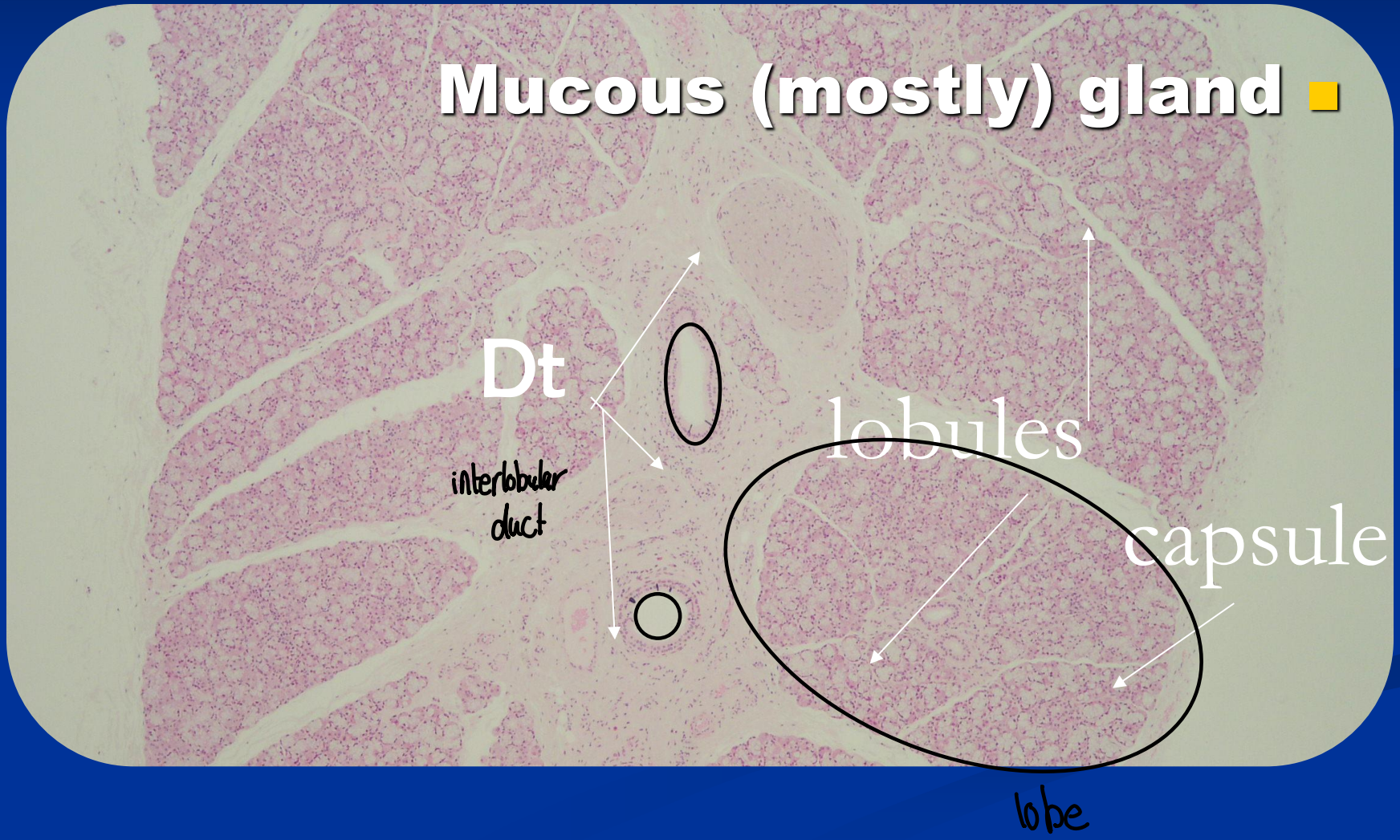
قدرتك ، وفجاءة نقمتك ، وجميـــــع

سخطك ، اللهم اهزمهم وزلزلهم ، اللهم

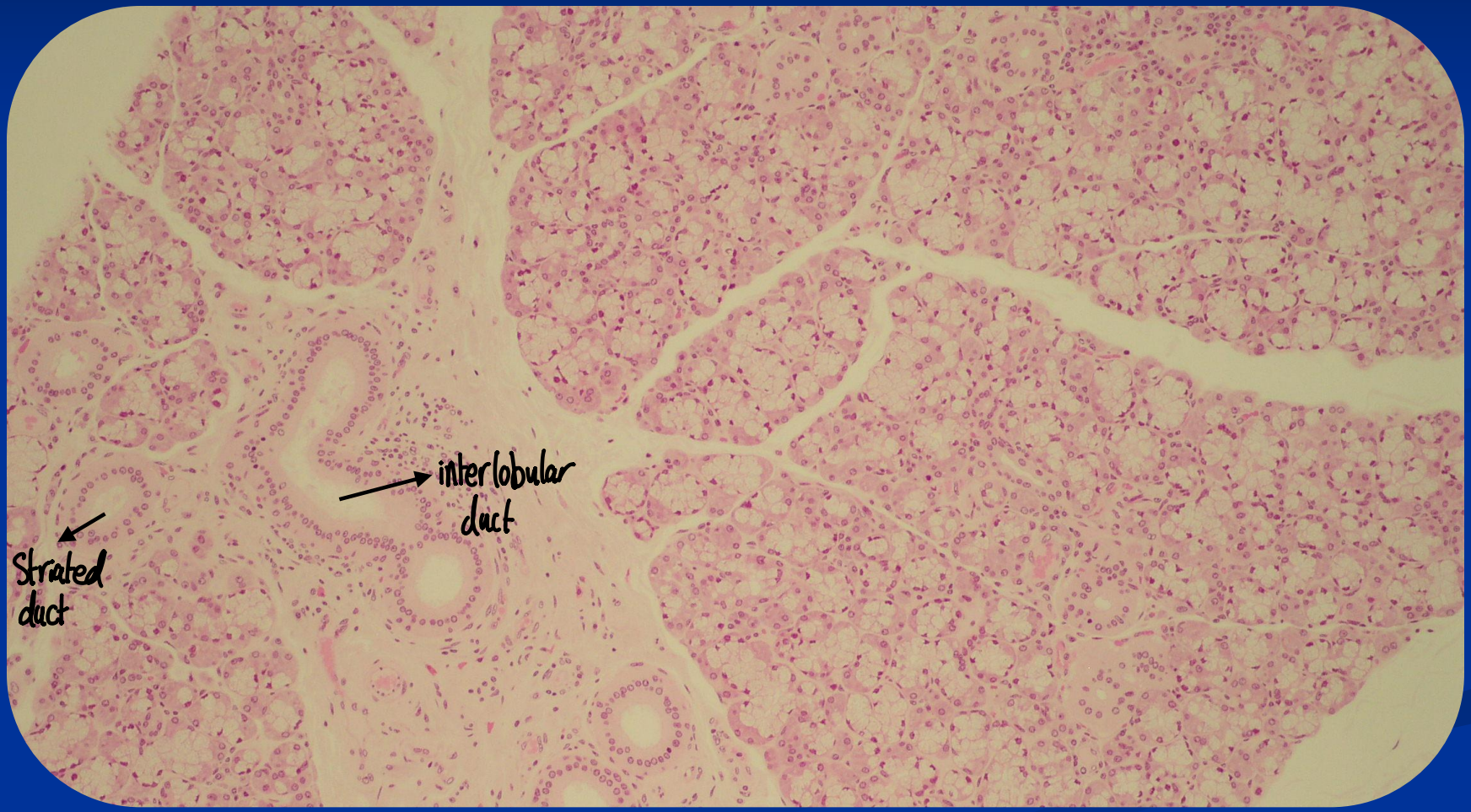
ارفع الذلَّ والهوان عن أمـــةِ نبيّك ﷺ

Sublingual gland

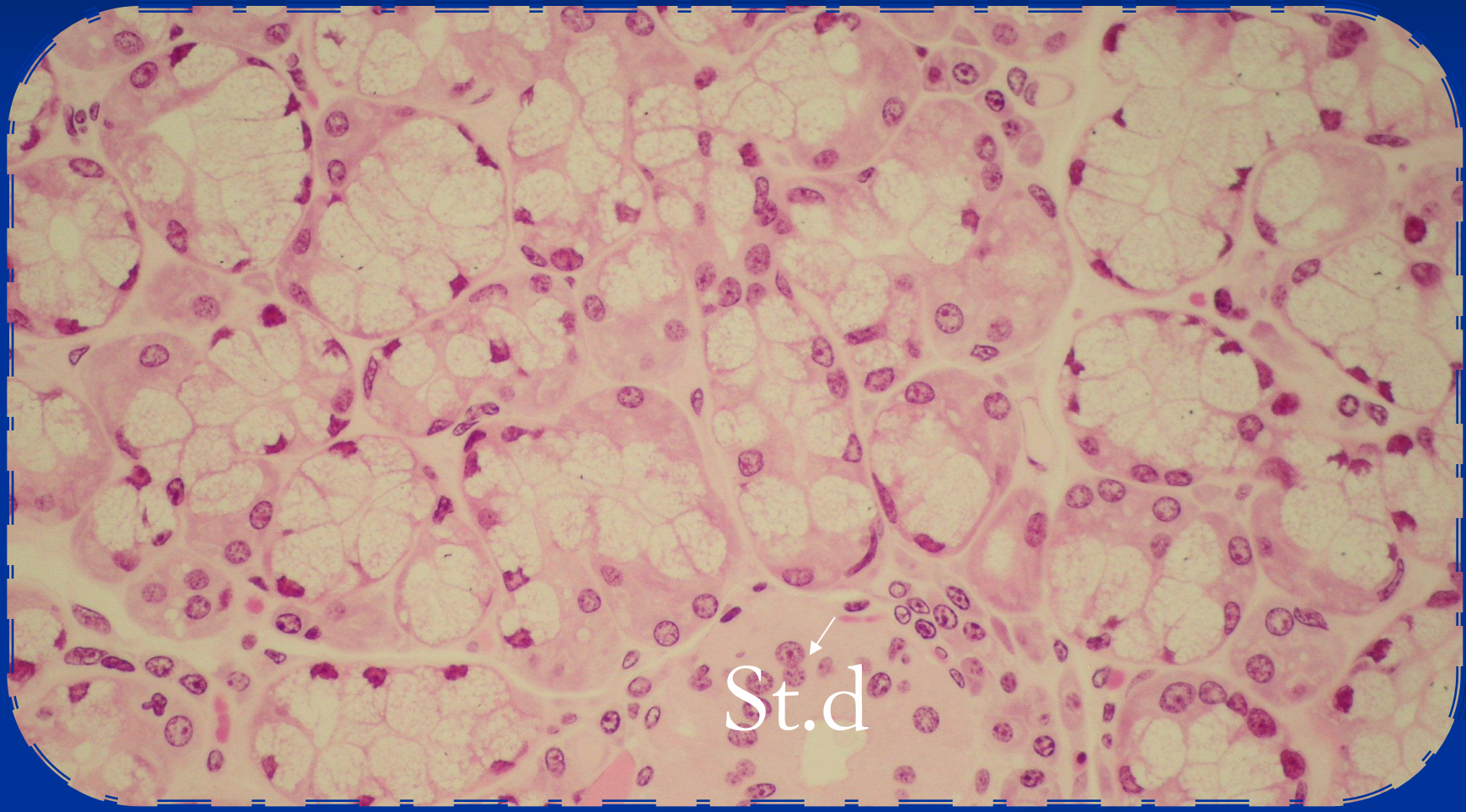
- **Mucous (mostly) gland**



copound tubuloacinar gland

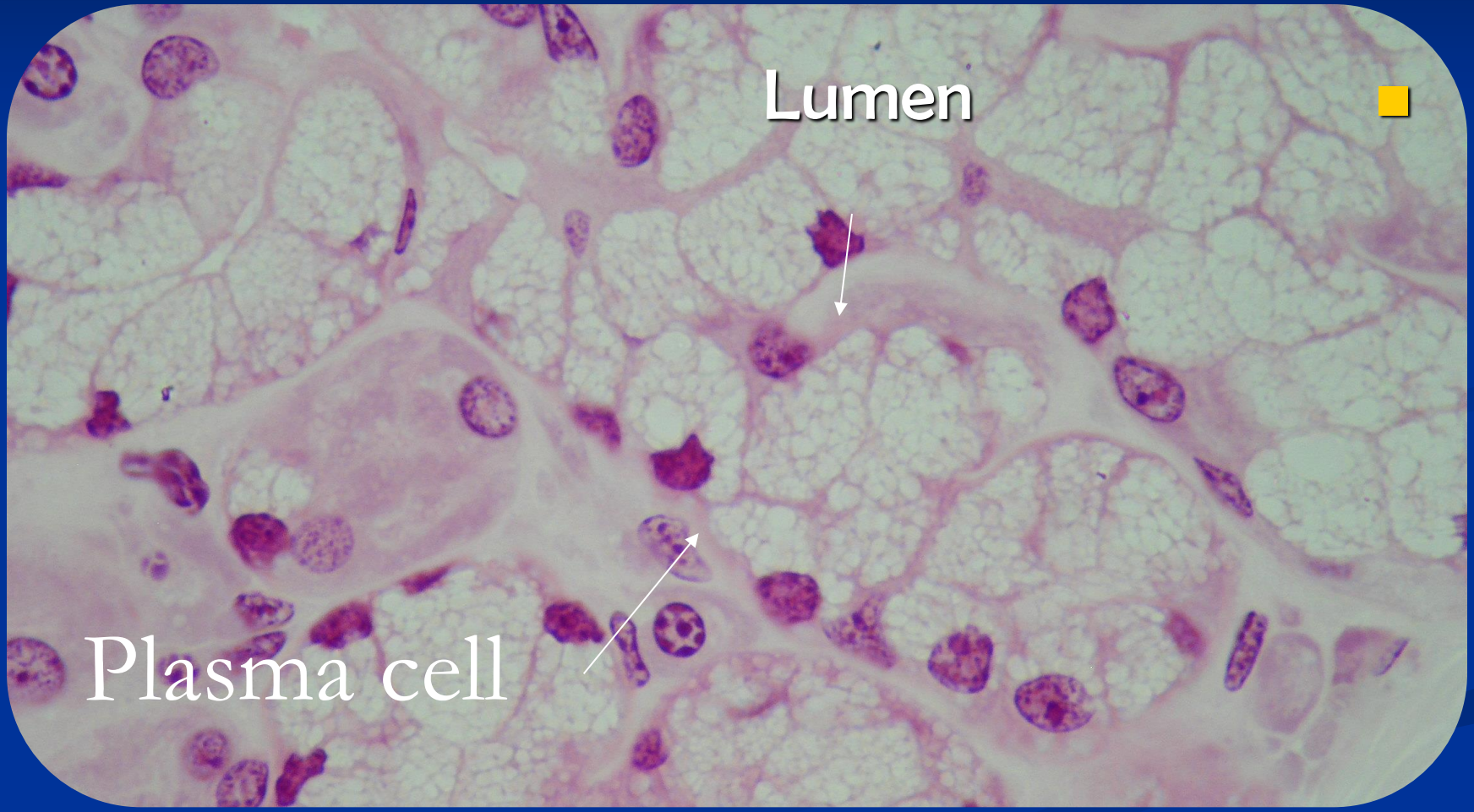


more mucous

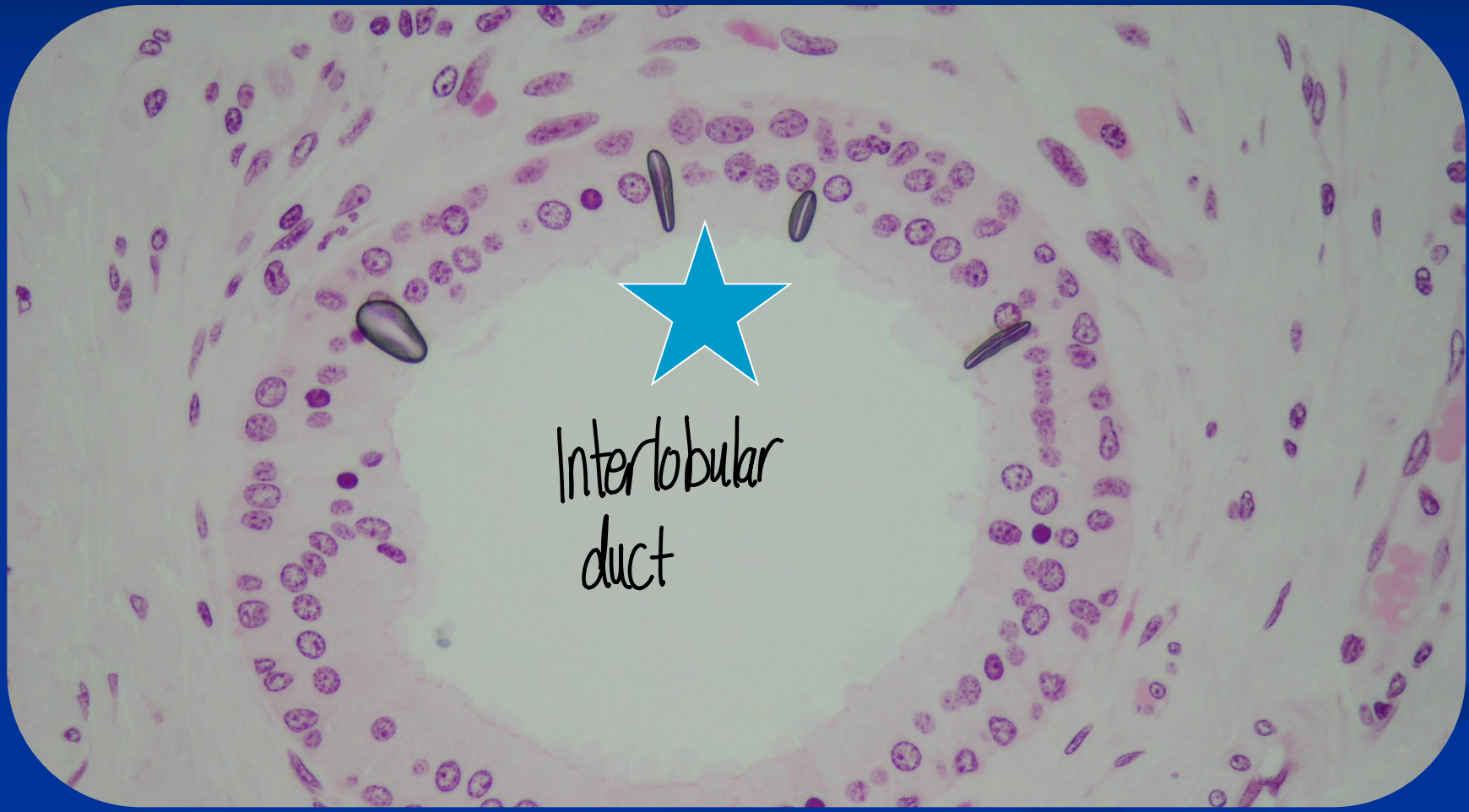



less than submandibular
Serous demilune
MA

Sublingual gland


Lumen
Plasma cell

Strat. cubo.epth. duct



لا إله إلا أنت وحدك لا شريك لك لك الملك ولك الحمد وأنت على كل شيء قدير

Esophagus

The wall of the esophagus is composed of:

1. Mucosa
2. Submucosa
3. Muscularis externa
4. Adventitia or Serosa

Divided into 3 thirds:

1. Upper third
2. Middle third
3. Lower third

Histologically we can differentiate between them by looking at the Muscularis externa:

1. Upper third >Skeletal muscle
2. Middle third > Mixed of skeletal and smooth muscles
3. Lower third >Smooth muscle

It has two types of glands:

- Esophageal gland proper (in the submucosa)
- Cardiac/gastric glands (in the lamina propria) — common in the lower third, before reaching the stomach

Esophagus(star lumen)

- always collapsed and only opens when there is : deglutition, swallowing or descending of bolus

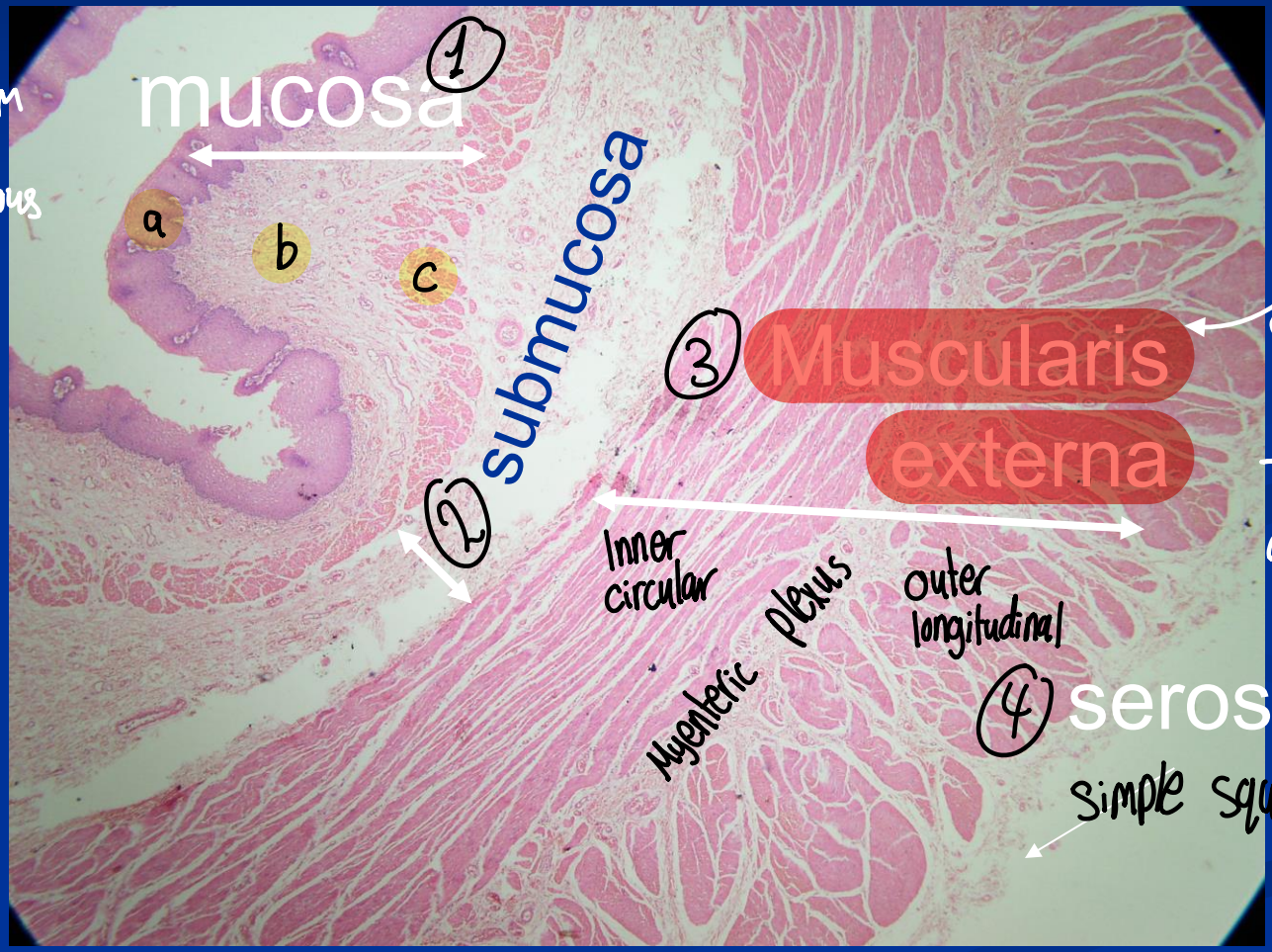
Esophagus (lower third)

كيف عرفنا ؟

a. Lining epithelium
- stratified squamous non-keratinized

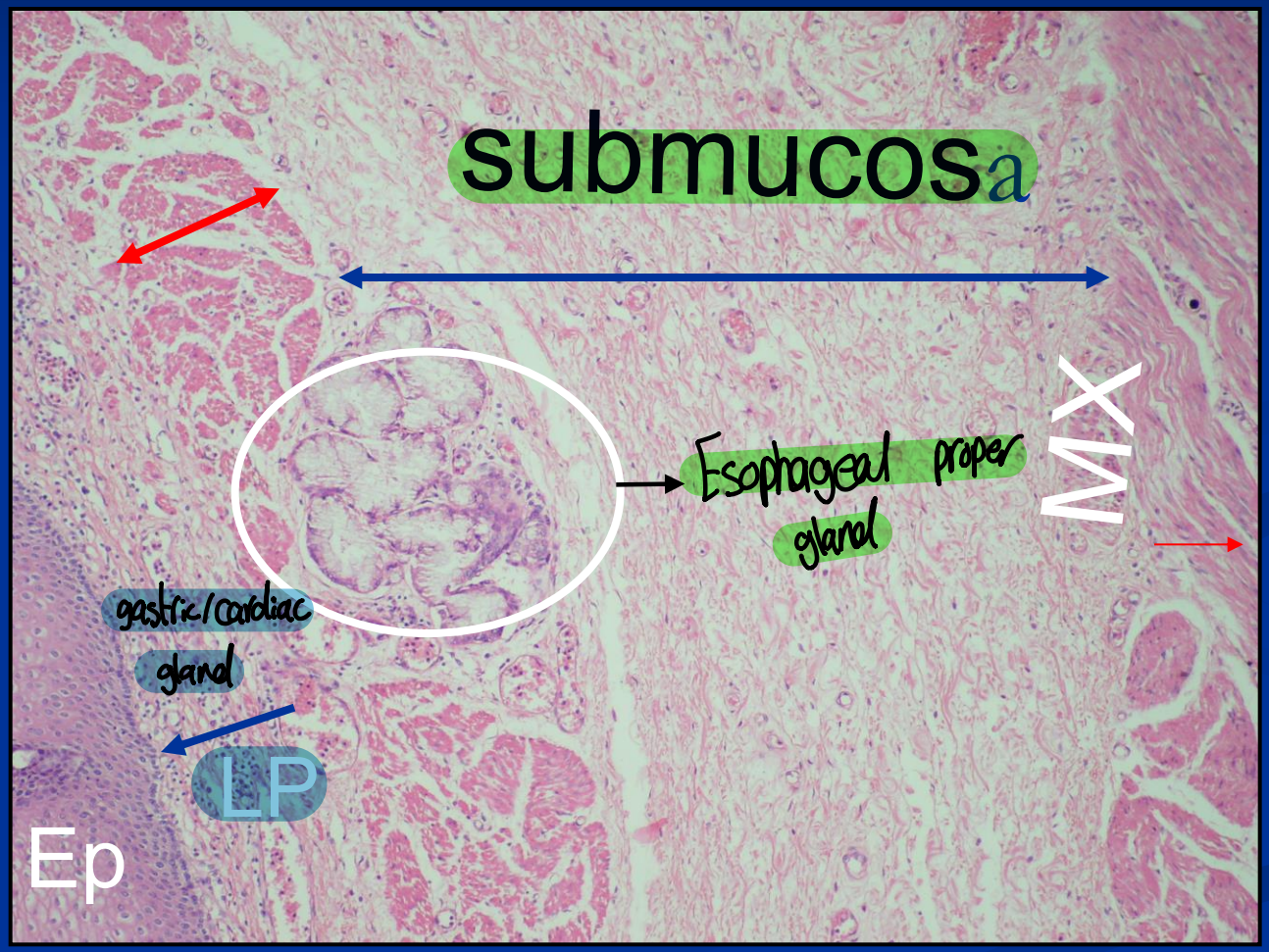
b. lamina propria

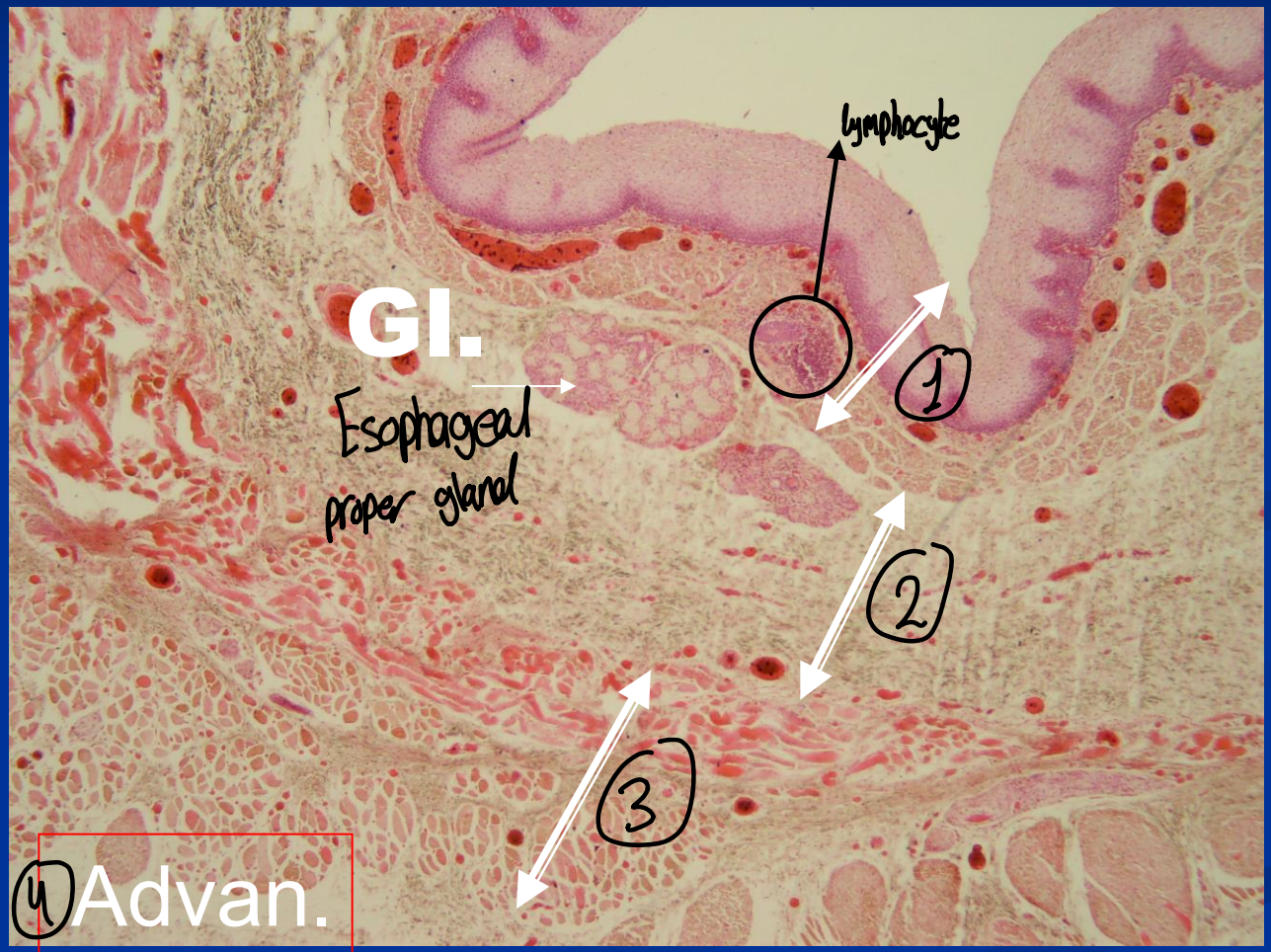
c. Muscularis mucosa



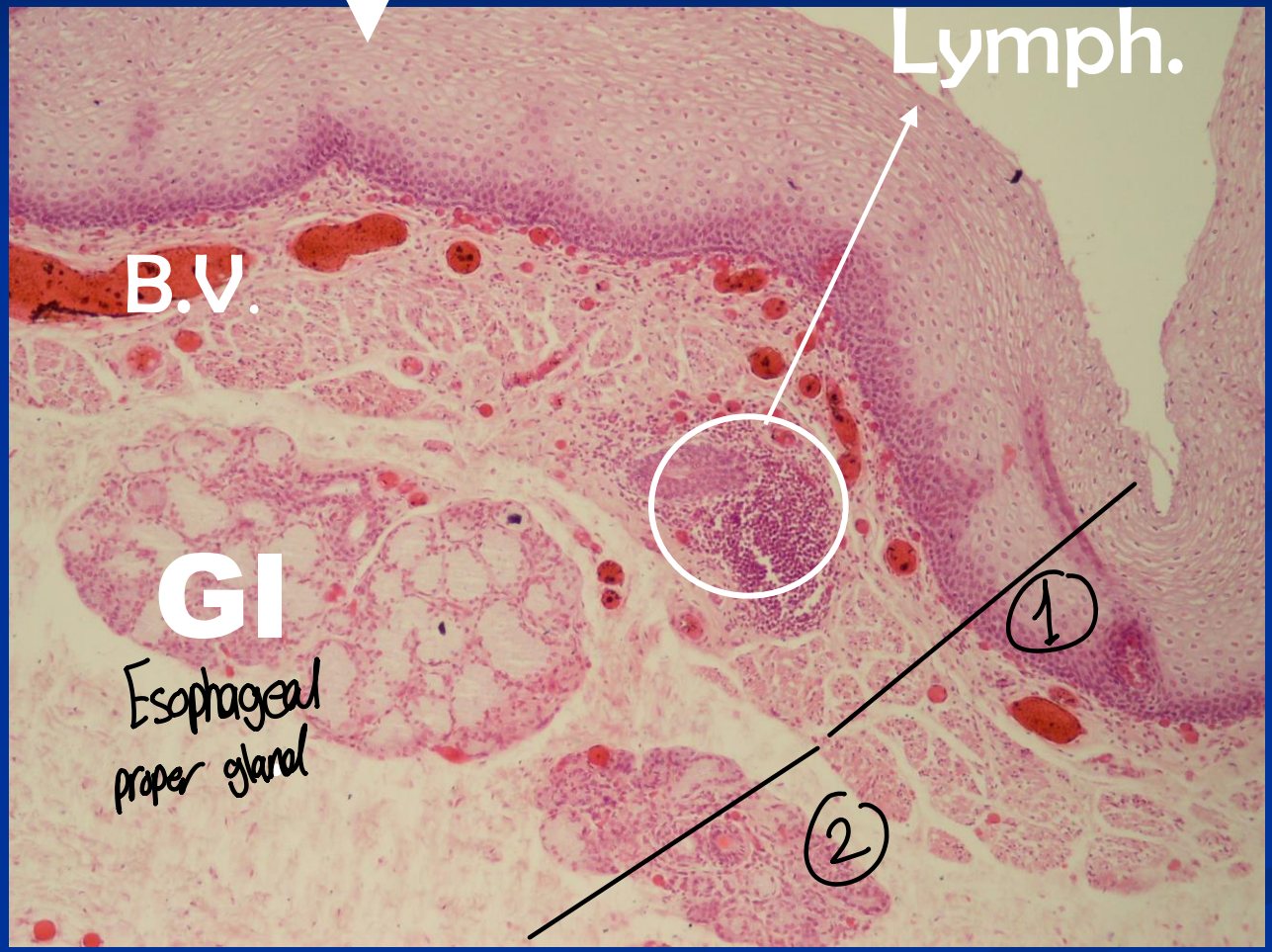
Smooth muscle
- central, irregular and dot like nuclei

Eosophageal proper gland
muscularis mucosa

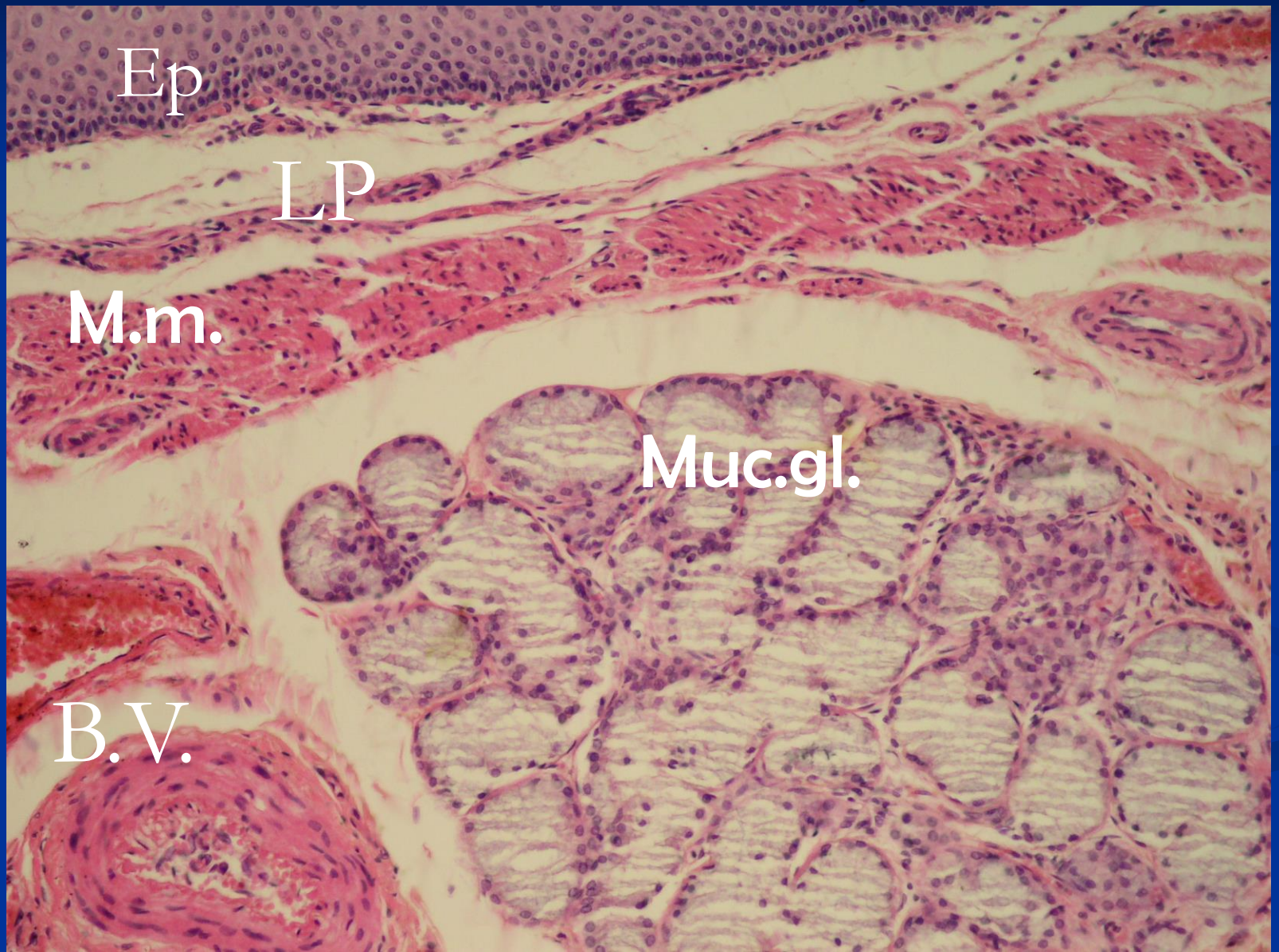



lymphocyte
GI.
Esophageal
proper gland
1
2
3
4 Advan.

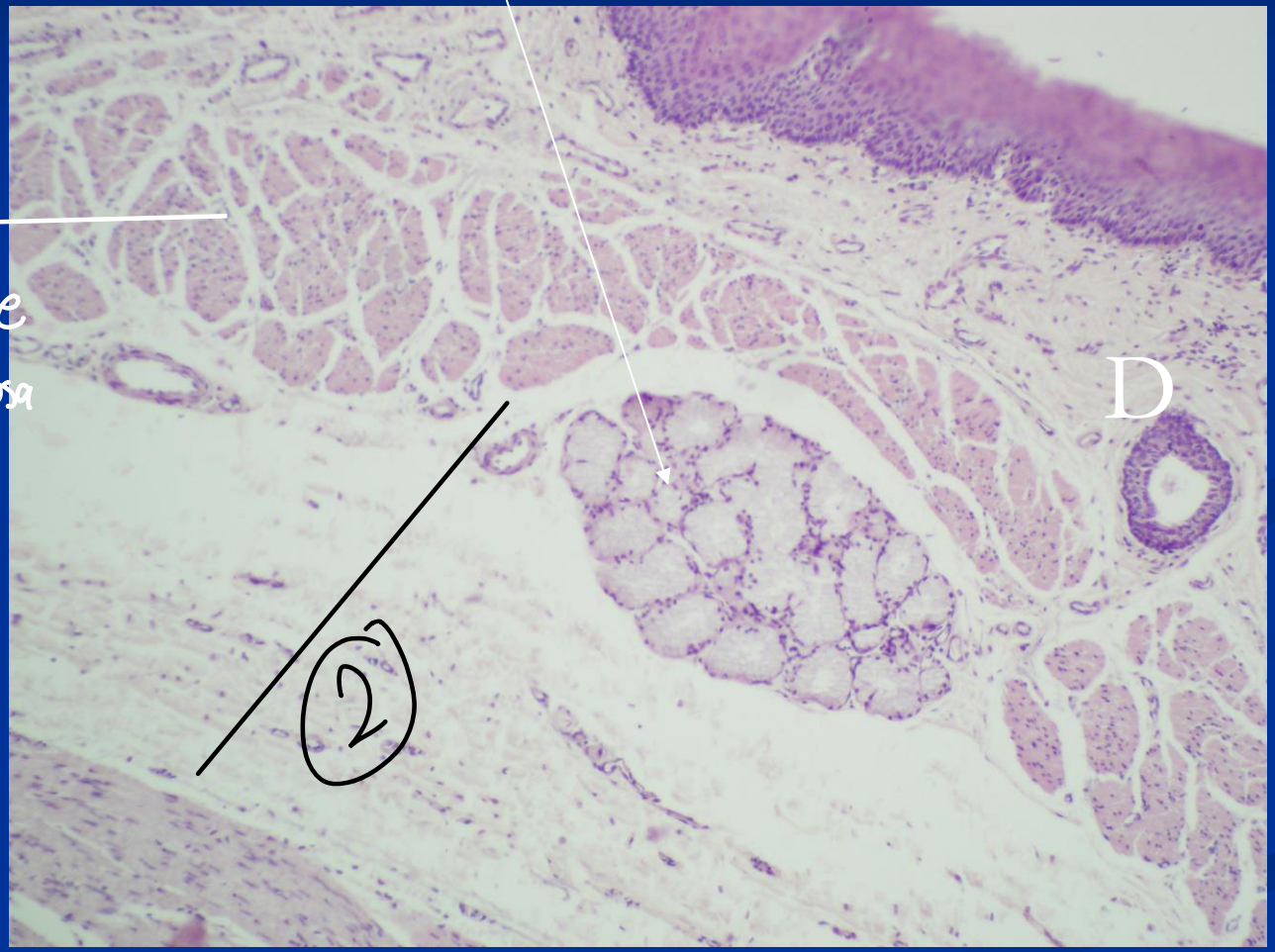
Str. Squa.epi.non ker.

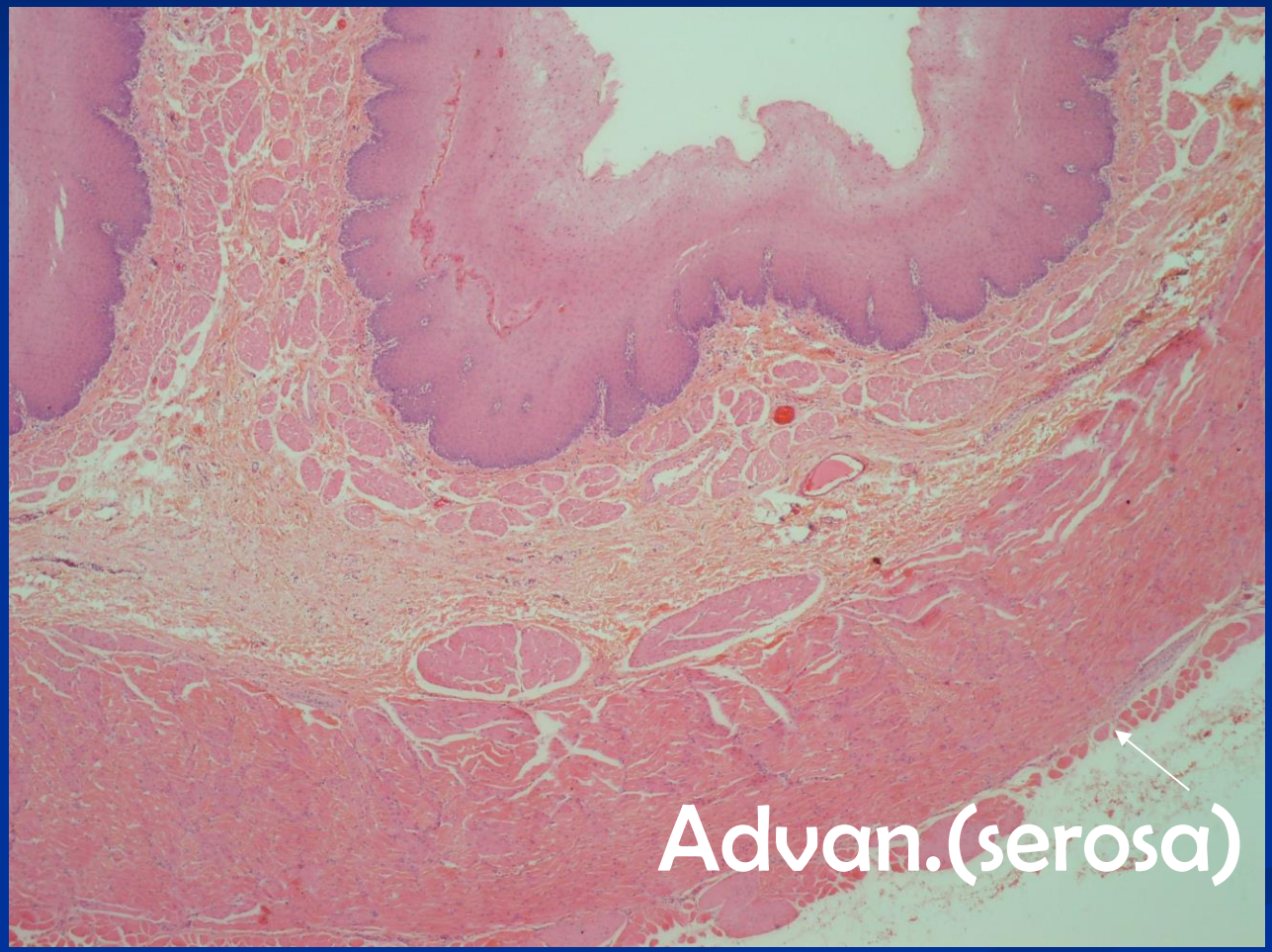


Eosophageal proper gland(in submucosa)



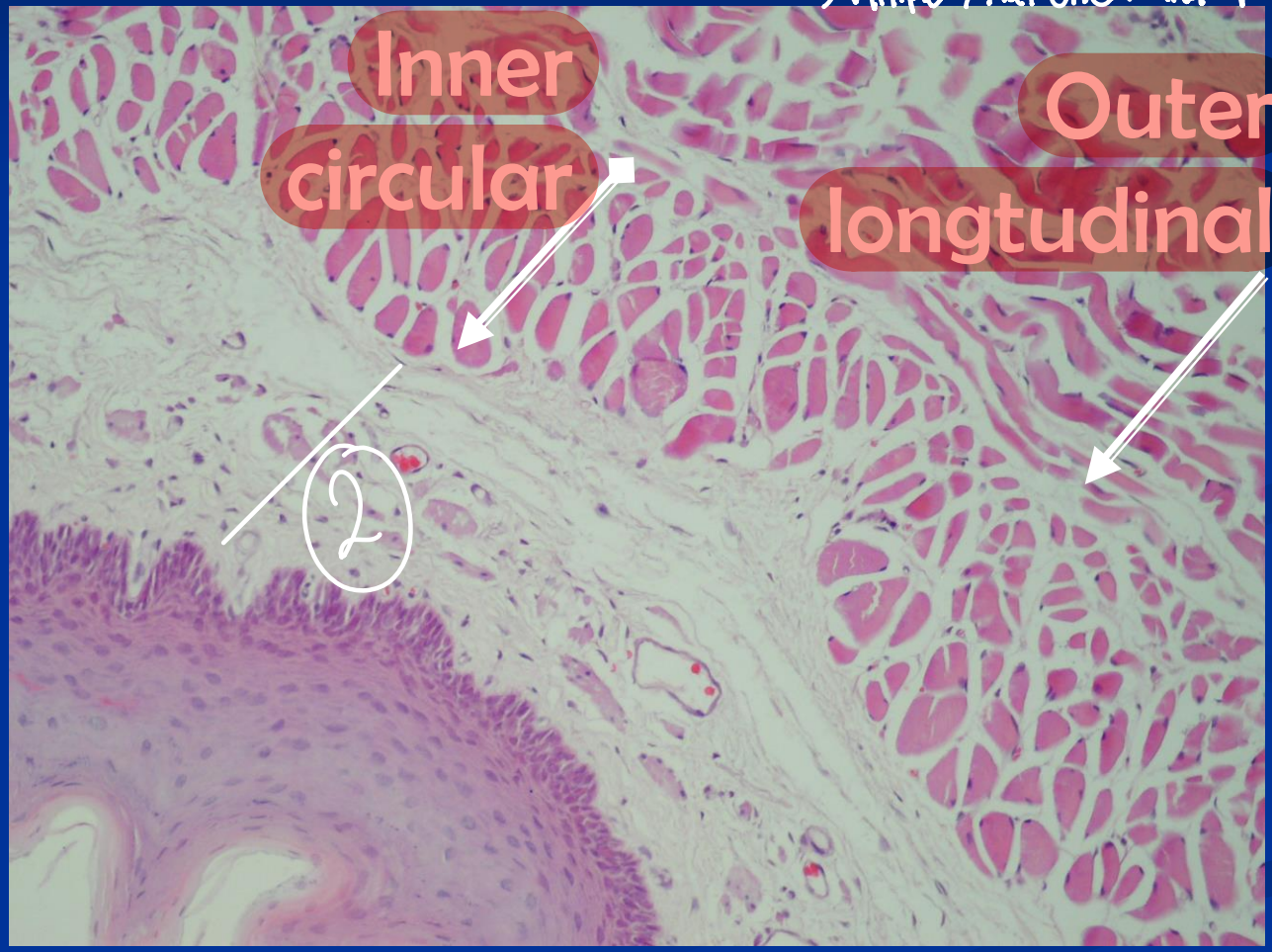
Esophagial gland proper (in submucosa)



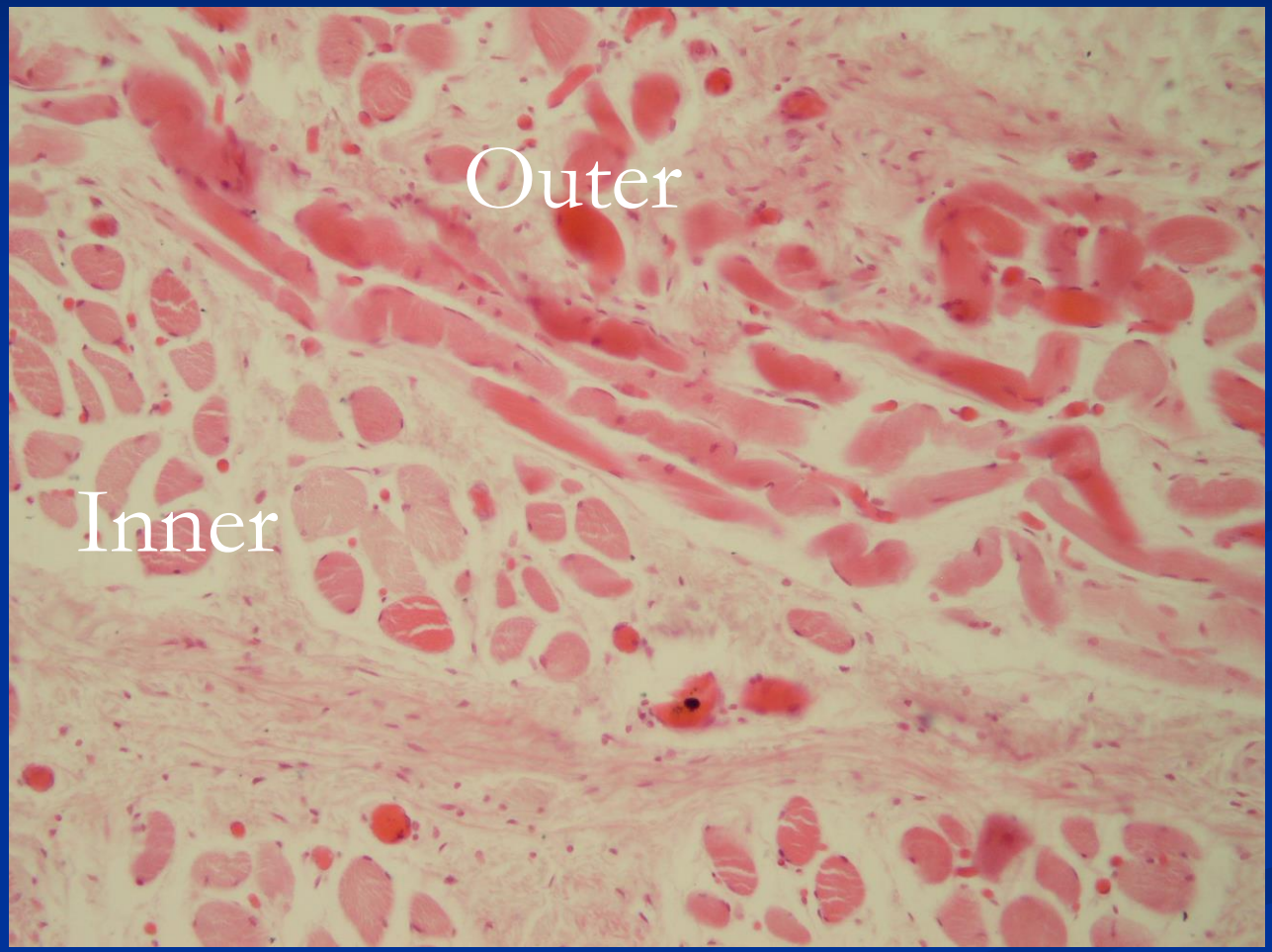

Advan.(serosa)

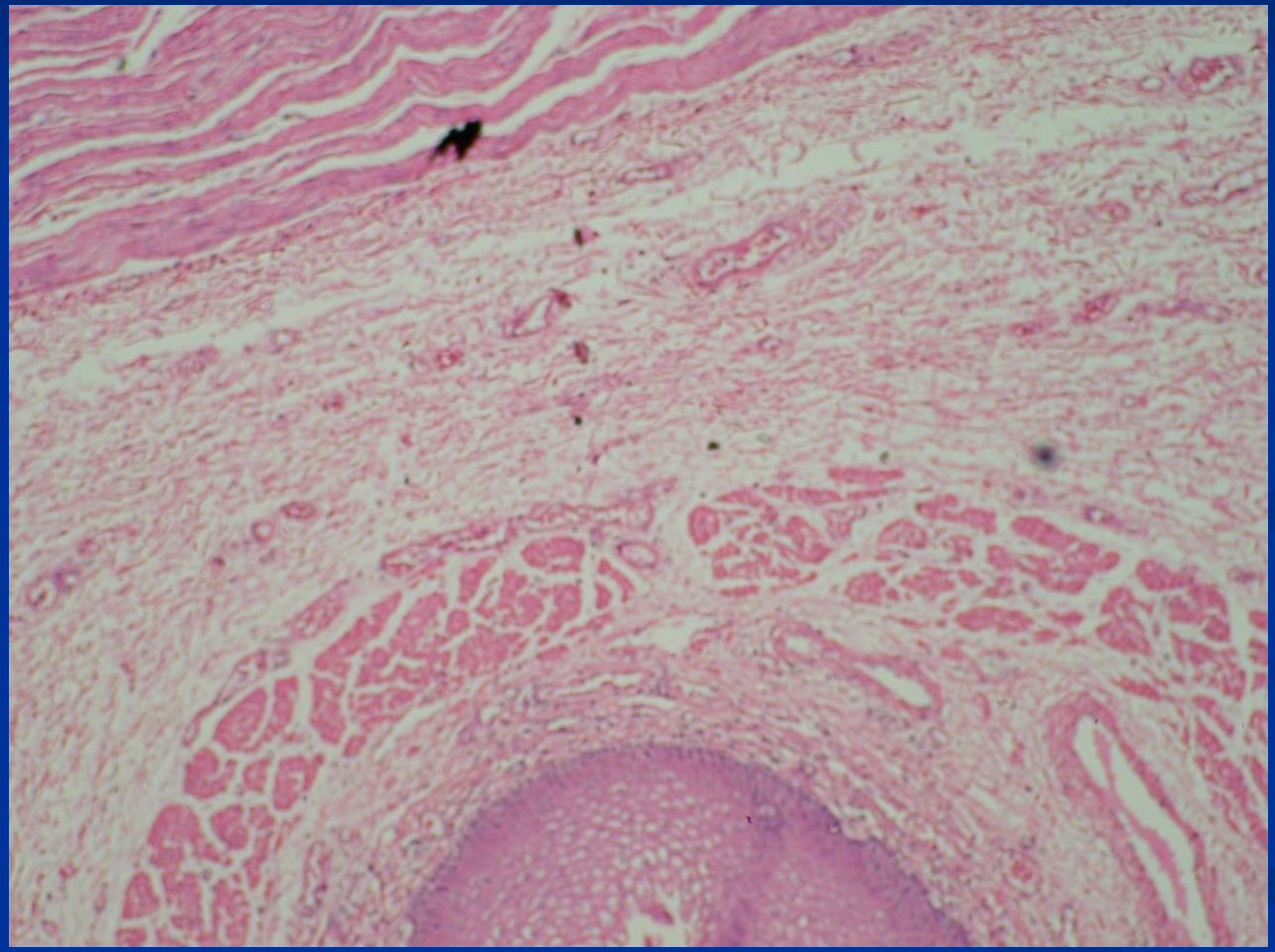
Esophagus (upper third) skeletal muscle mus. ext.

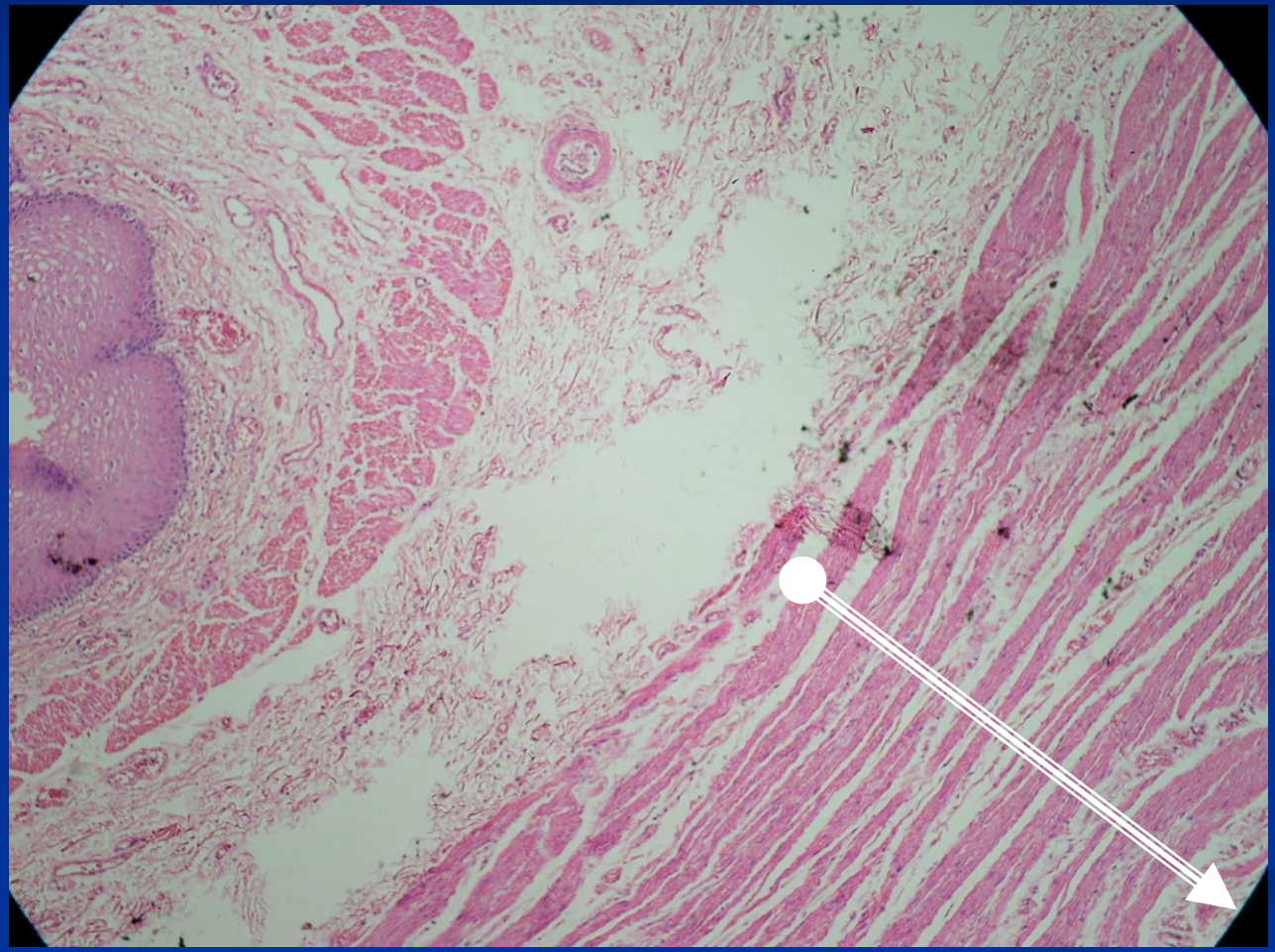
Multiple, flattened and peripheral nuclei



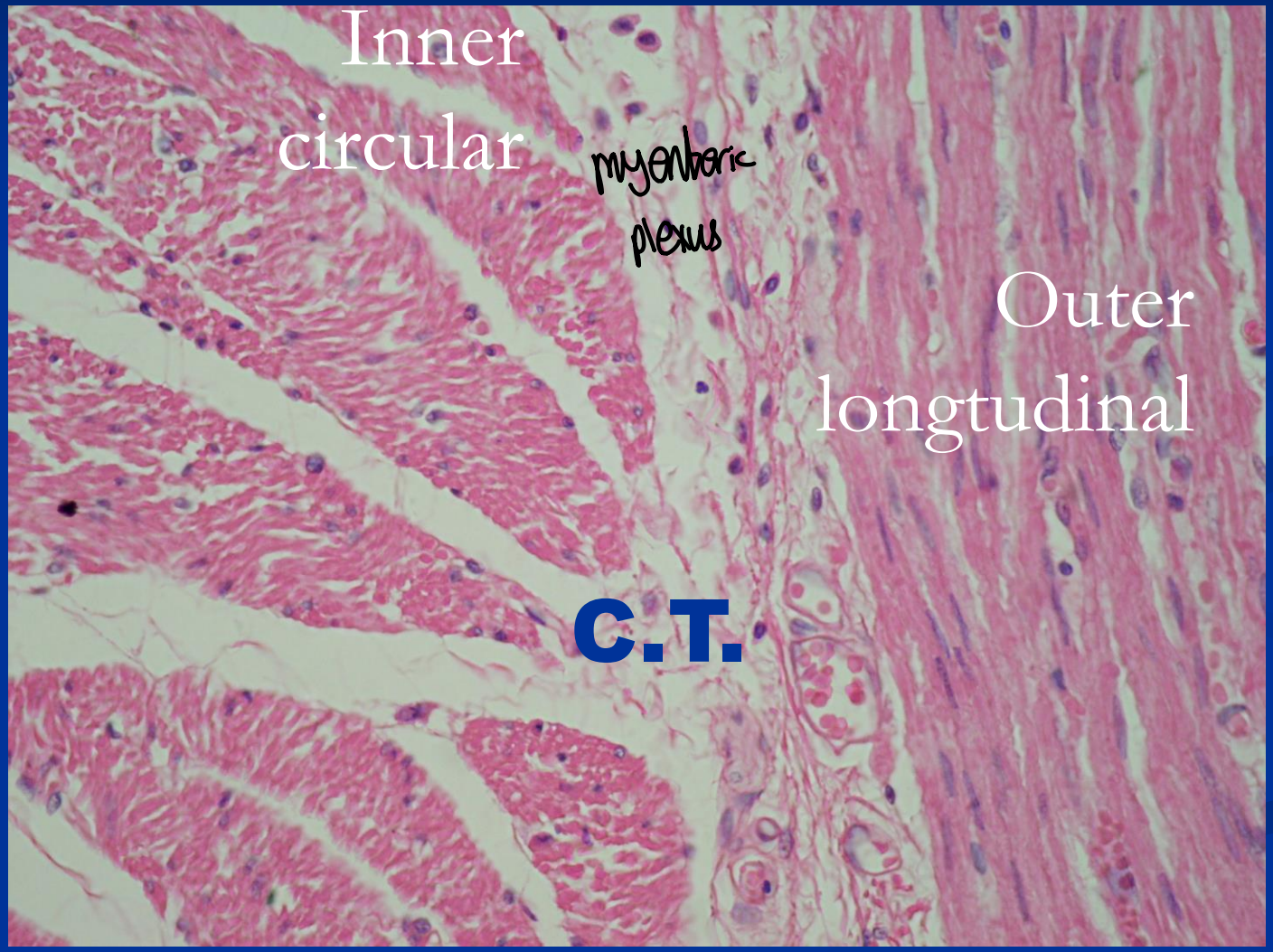
Skeletal mus.







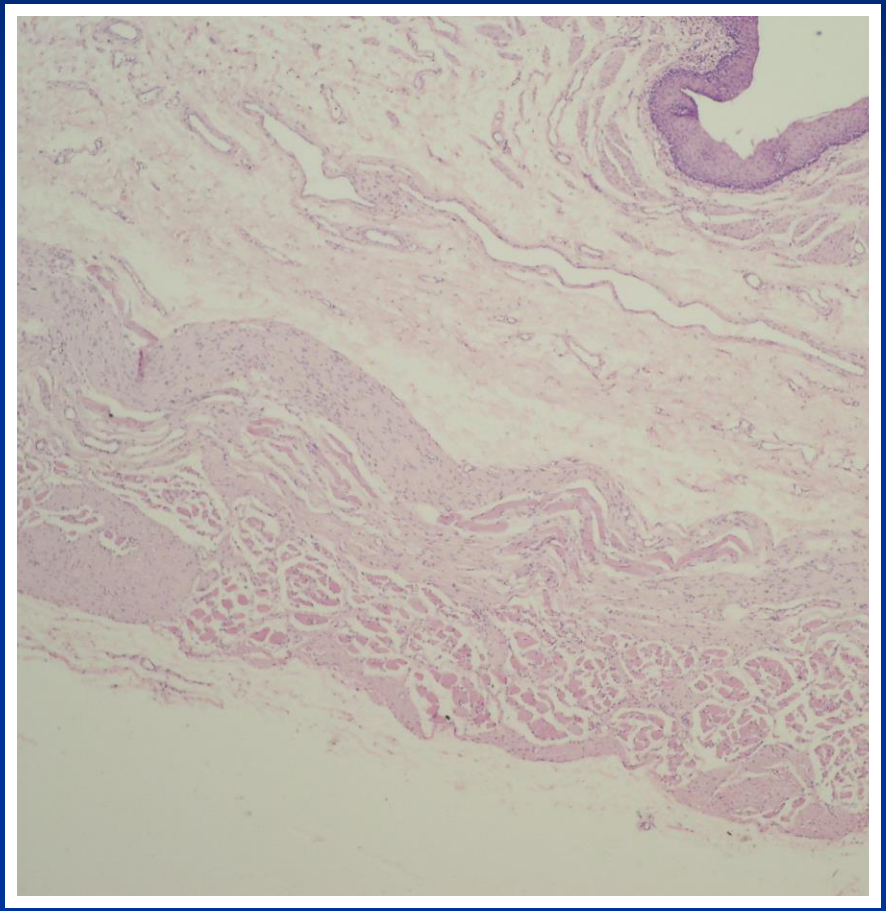
Lower third(smooth muscle)

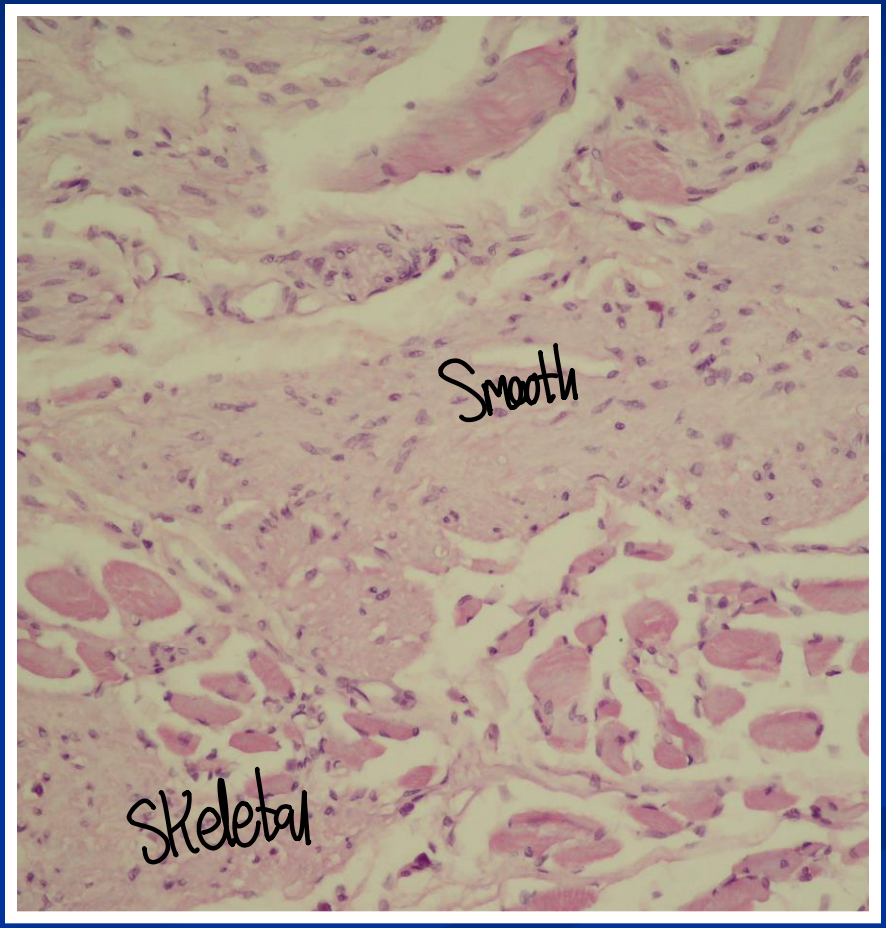


Nerve fibers

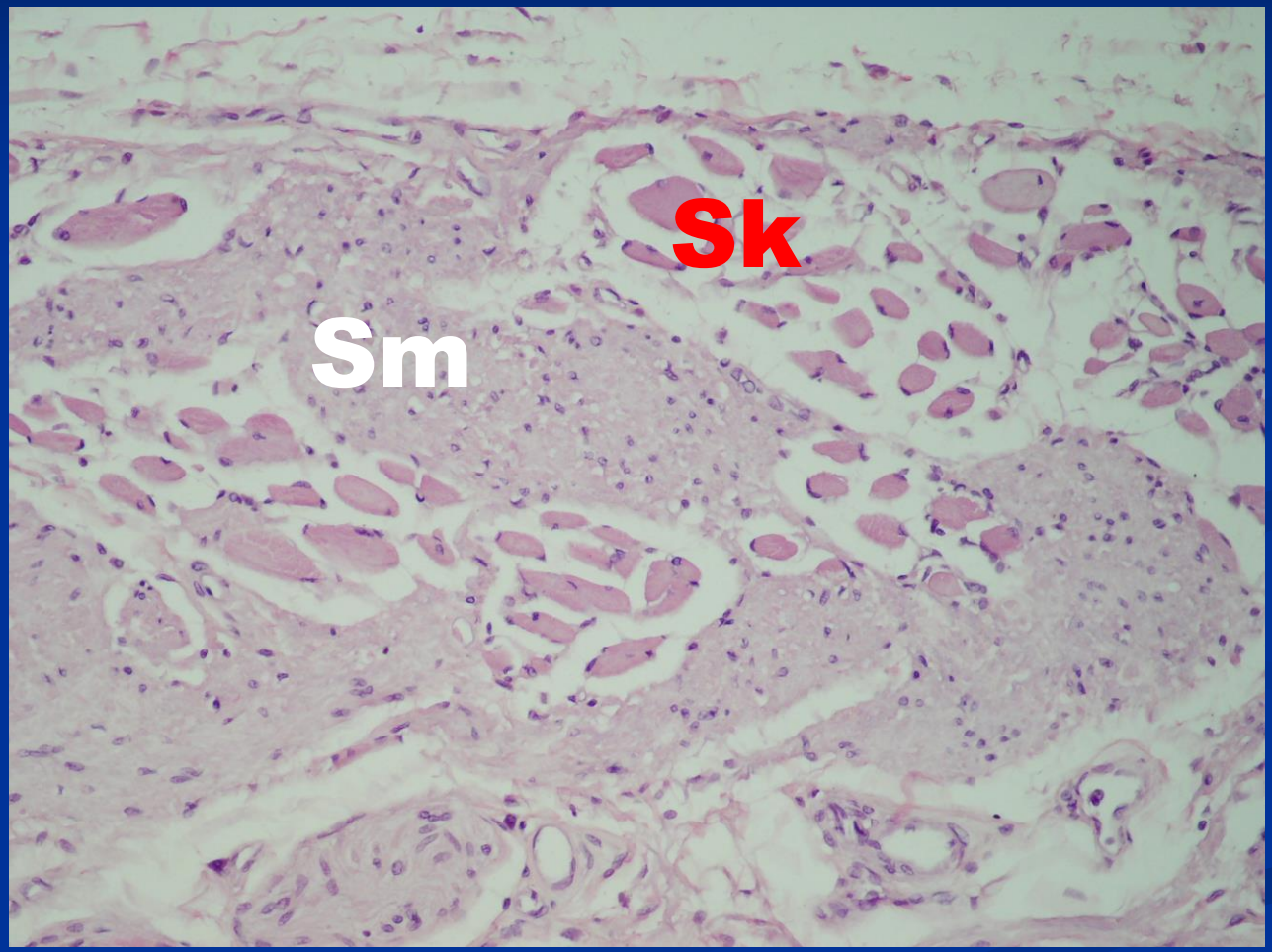
Mixed smooth&skeltal in mid.

eOsoph.

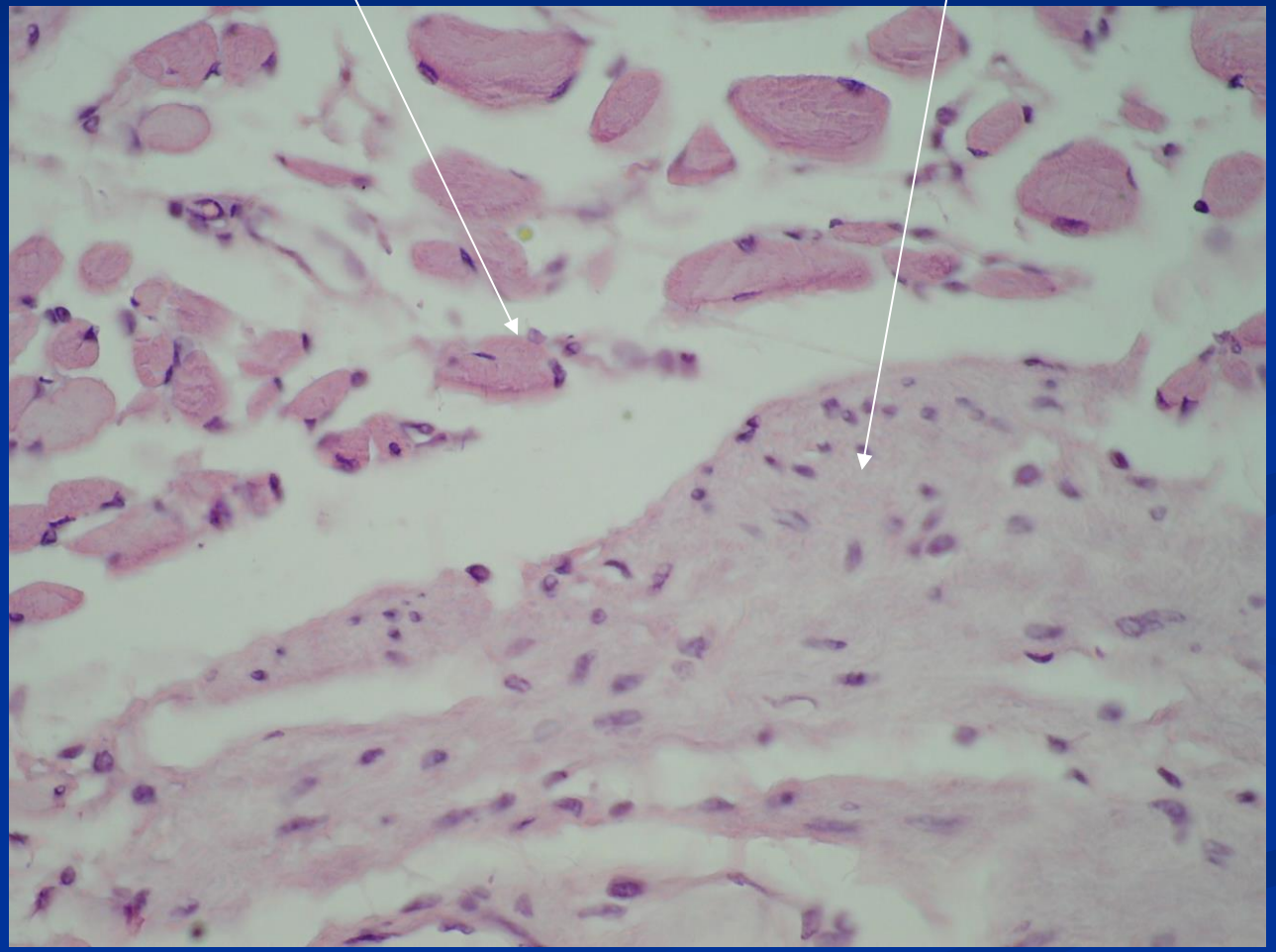




Smooth skeletal muscle



Mixed skeletal and smooth muscle

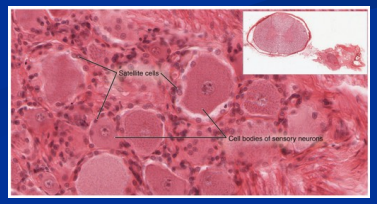


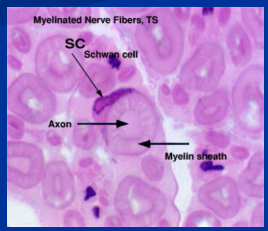
Parasympathetic ganglion- intramural (G.I.T.)

Myenteric plexus ⟶ Zoom in

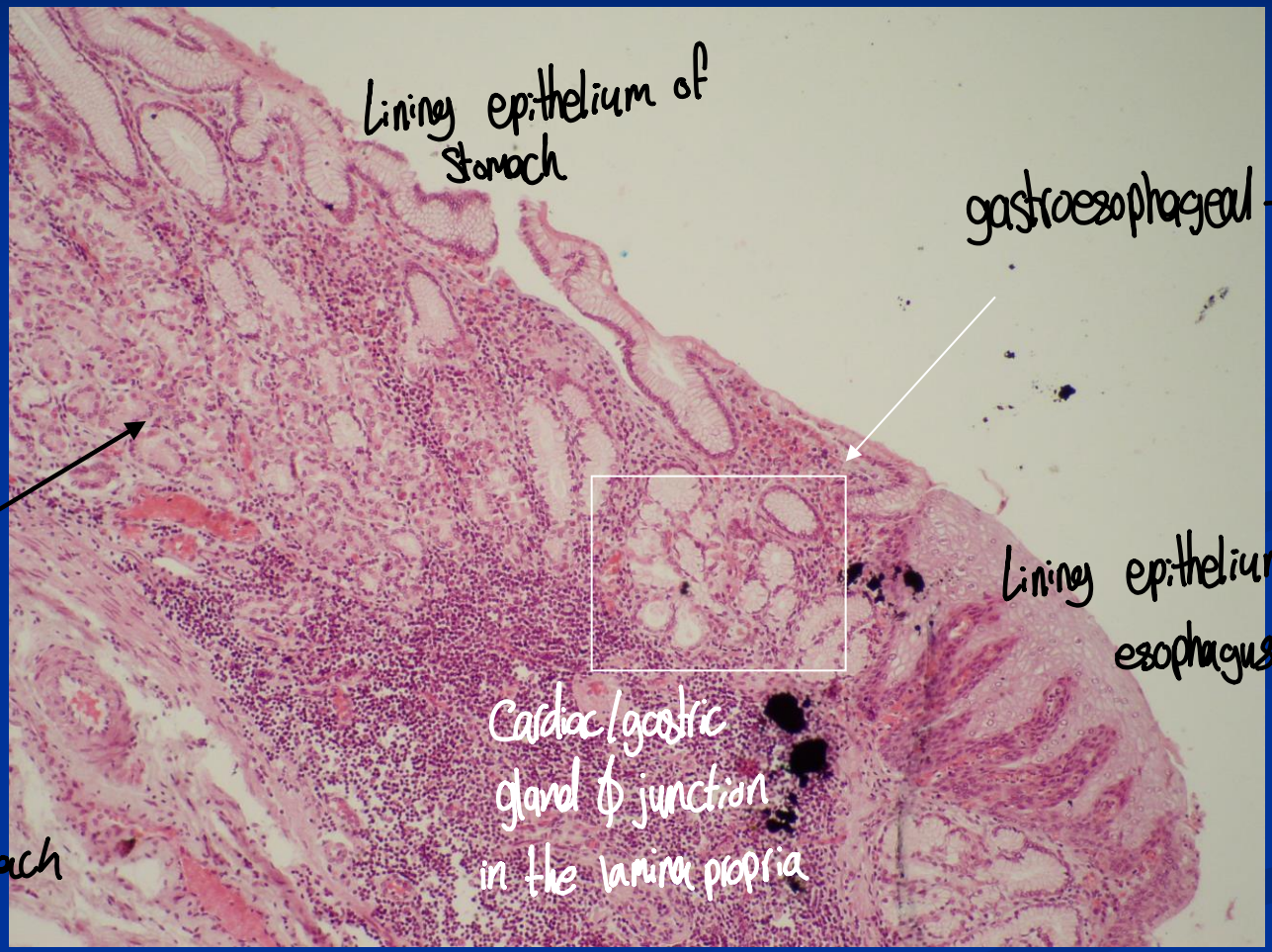
Additional (you can skip):

- "Nerve cells" represents large sensory neuron cell bodies. These cells are round or oval in shape, with a large, centrally located nucleus and a prominent nucleolus. Each neuron is surrounded by small, flat nuclei of satellite cells, which provide support and protection.
- "Schwann cells and nerve fibers (axon)" contains bundles of nerve fibers (axons), which appear as wavy pink structures. Scattered among them are Schwann cell nuclei, which belong to glial cells responsible for forming the myelin sheath around the axons.





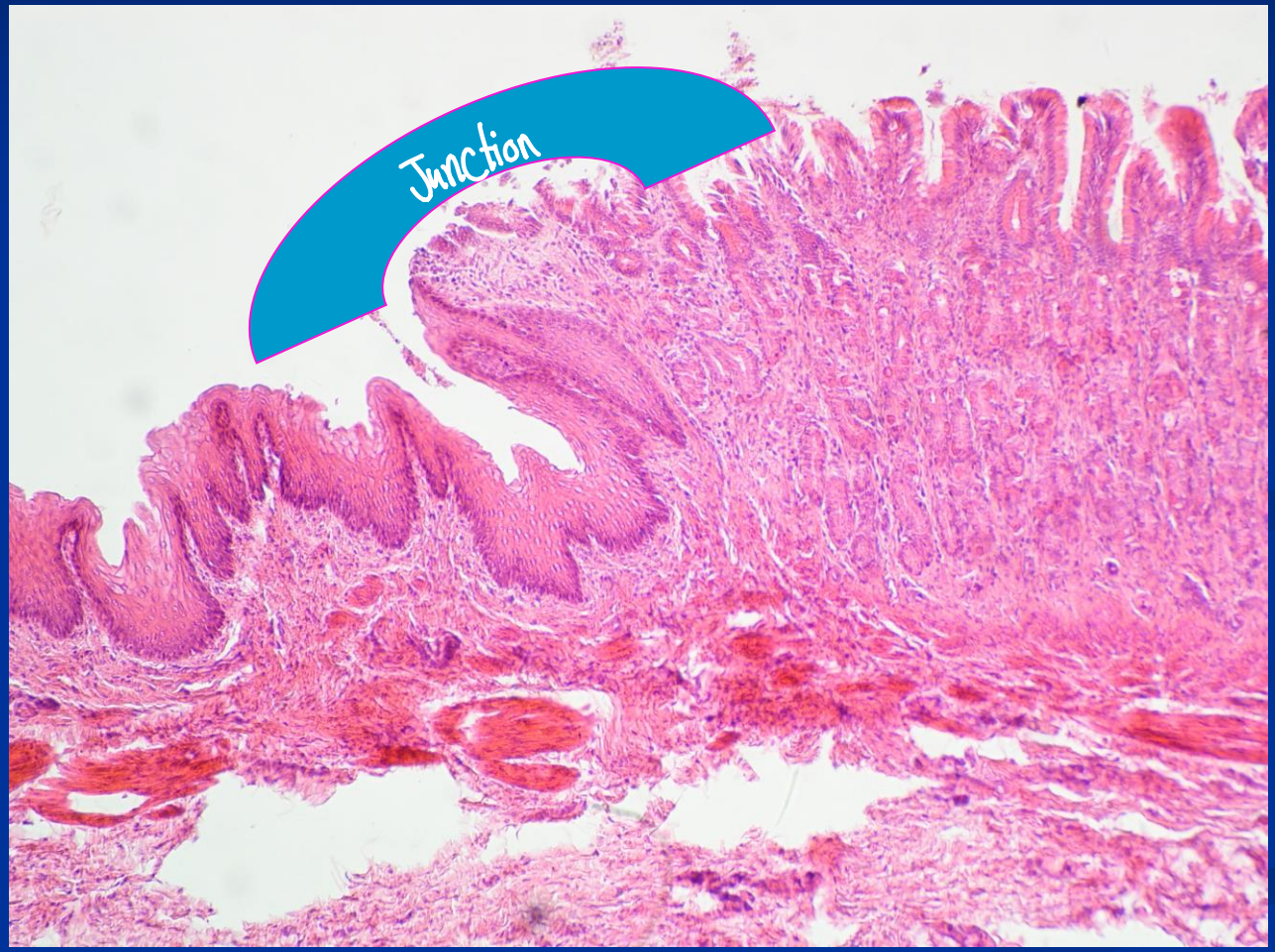
Cardiac gland in l.P.@junction



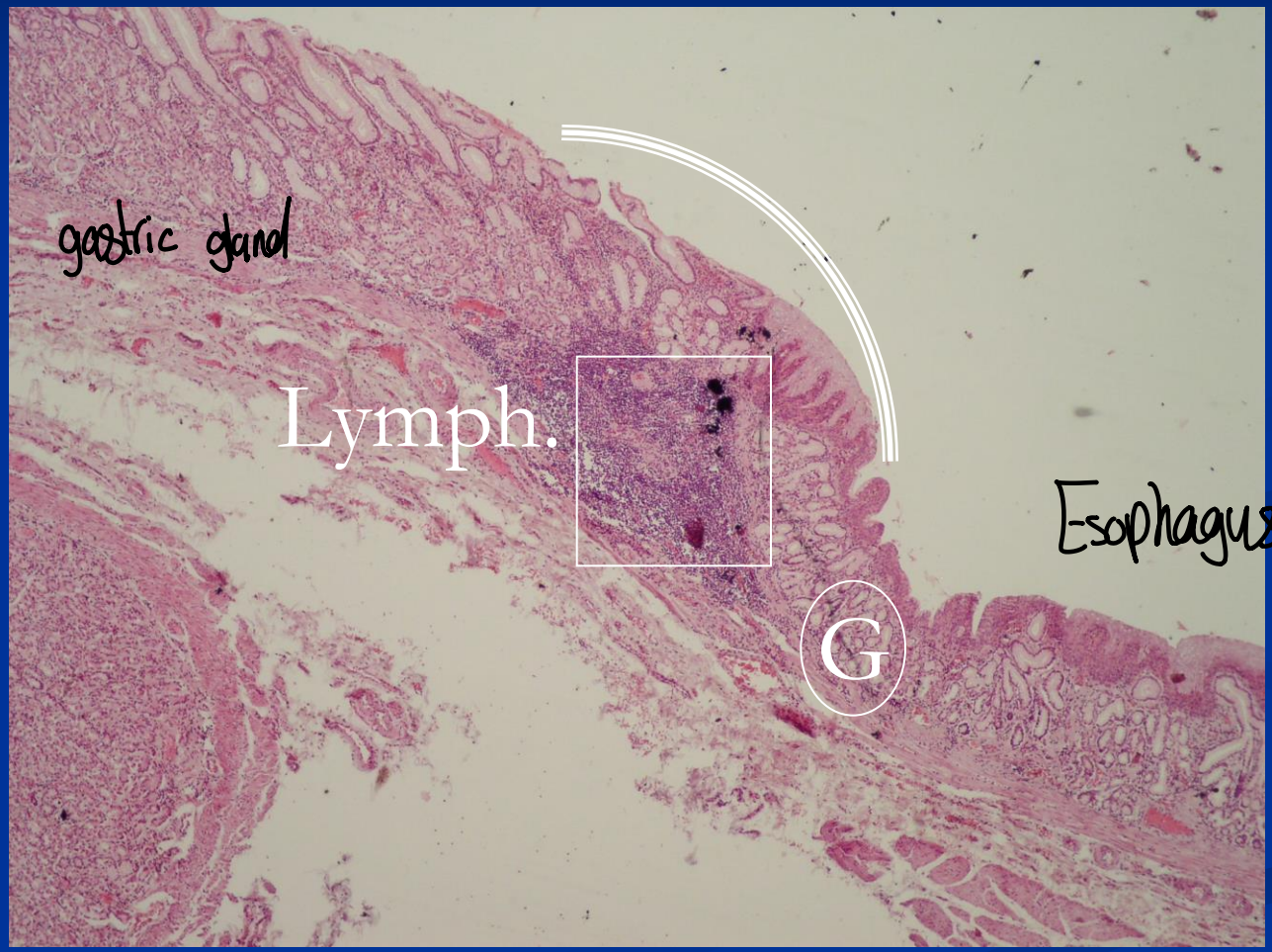
Oesophago-gastric junction

* الدكتور شرح شوي عن الـStomach ، بس كله موجود بالسلايدات الجاي :

Stomach



Esophagus


gastric gland
Lymph.
Esophagus
G

Go and get some tea ☕🫣

Your stomach will thank you! 😂

Let’s keep going after

Stomach

Histological Feature	Cardia	Body/Fundus	Pylorus
Mucosa Thickness	Moderate	Thick (due to abundant glands)	Thicker pits, short glands
Gastric Pits : Glands	1:1 (equal length)	2:3 (short pits, long glands)	Long pits, short glands
Gland Type	Tubular glands	Branched tubular glands	Coiled glands
Main Cell Types	Mucous, few parietal, few chief, enteroendocrine	Parietal (upper), chief (base), mucous neck, EE, stem	Mucous and enteroendocrine cells only
Parietal Cells	Few	**Abundant** in isthmus and upper gland	❌ Absent
Chief Cells	Few	**Abundant** in base of glands	❌ Absent
Mucous Cells	Present	Present (mainly in neck)	**Dominant**
Enteroendocrine Cells	Present (gastrin)	Present (base of glands)	Present (gastrin)
Stem Cells	Present	Located in neck/isthmus	Present
Lamina Propria	Filled with glands	Filled with glands	Contains **lymphoid nodules**
Goblet Cells	❌ Absent	❌ Absent	❌ Absent

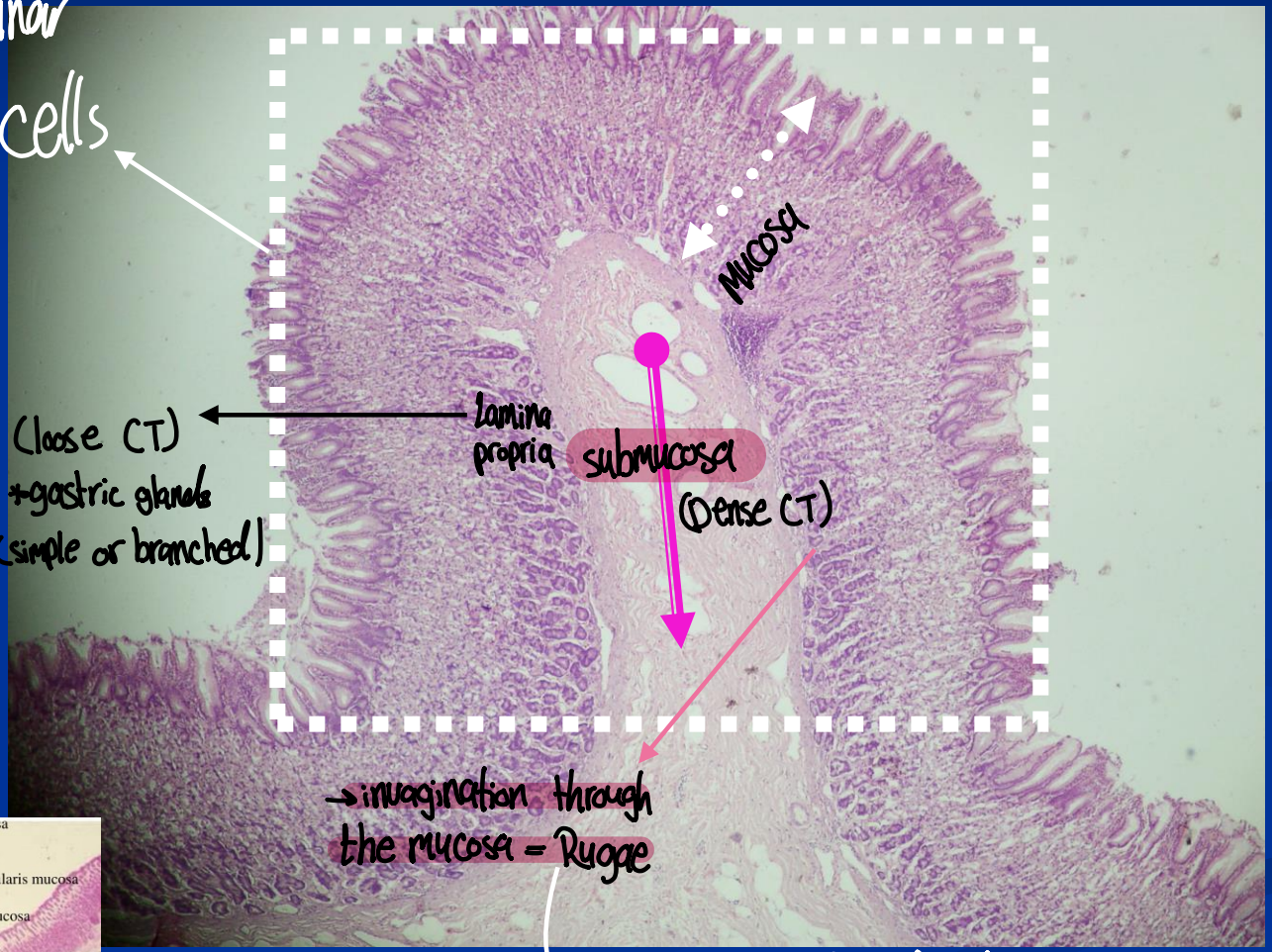
Muscular is externa > 3 layers:

1. outer longitudinal
2. inner circular
3. most inner oblique (absent in pylorus)

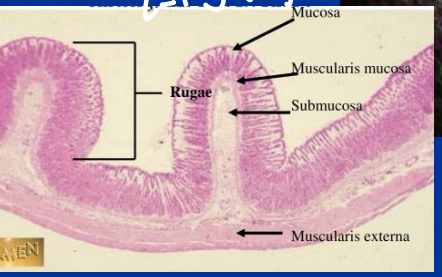
اللهم صلِ وسلم وبارك على نبينا محمد

Rugae(stomach):mucosa+submucosa

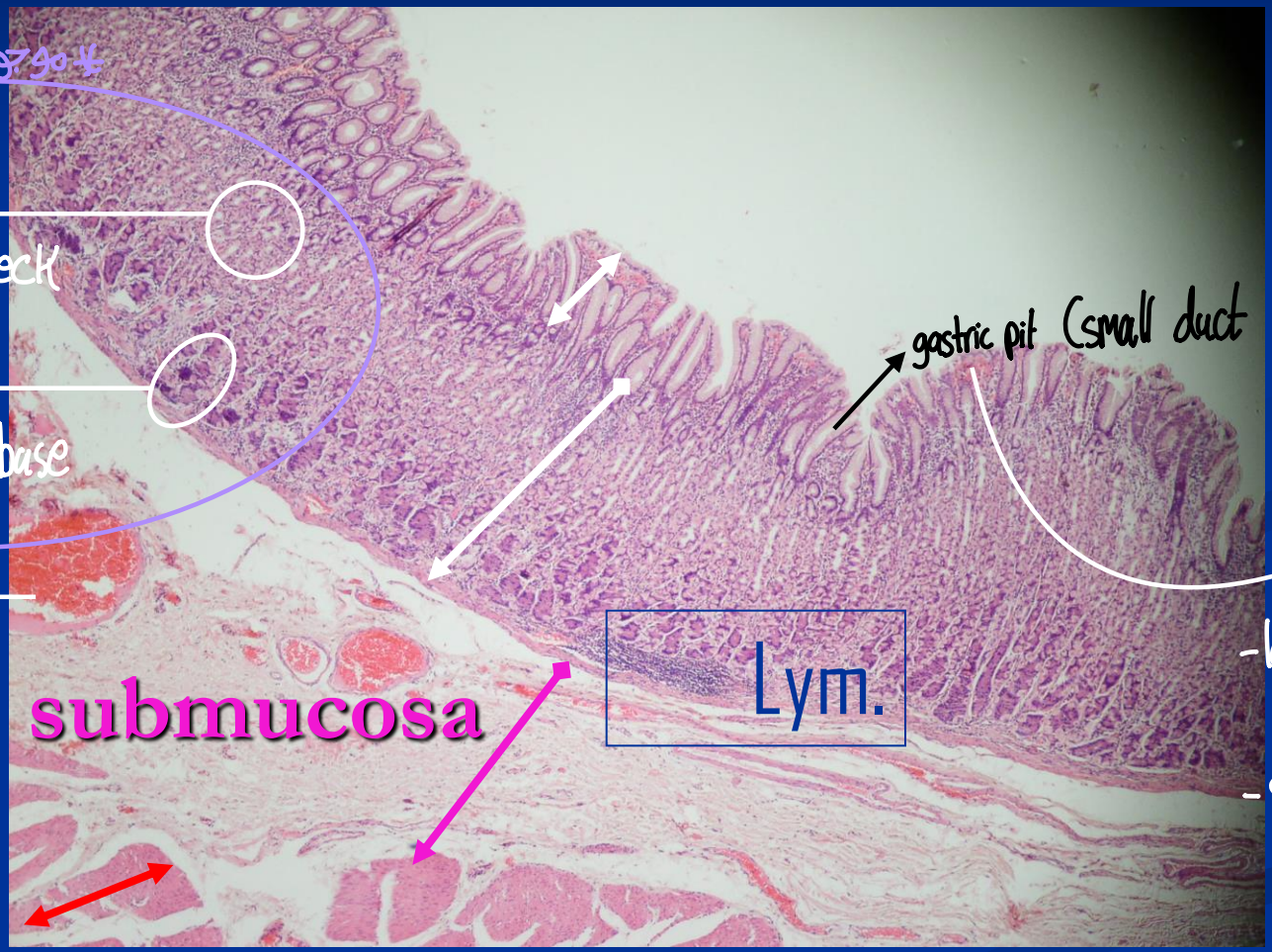
*Simple columnar without goblet cells



*التوضيح :



-mucous membrane: gastric pit+l.p+mus.mucosa



*موجودين لقوام أوفج

-Parietal cells
acidophilic, at the neck

-Chief cells
basophilic at the base

Capillaries

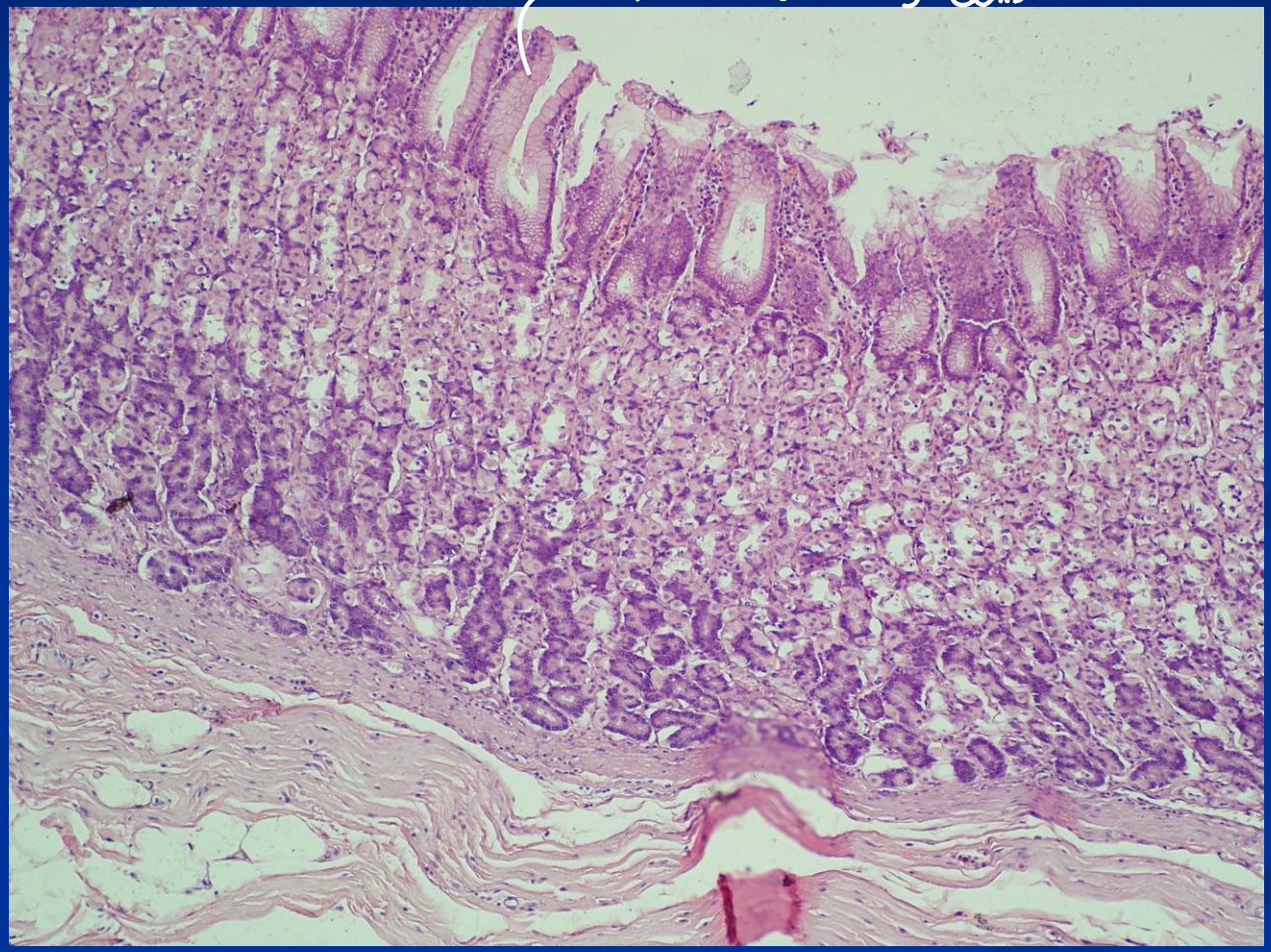
gastric pit (small duct for gland)

Body:
-long and large glands
-short and wide pits

Pylorus:
+The opposite

← No digestion function = short glands

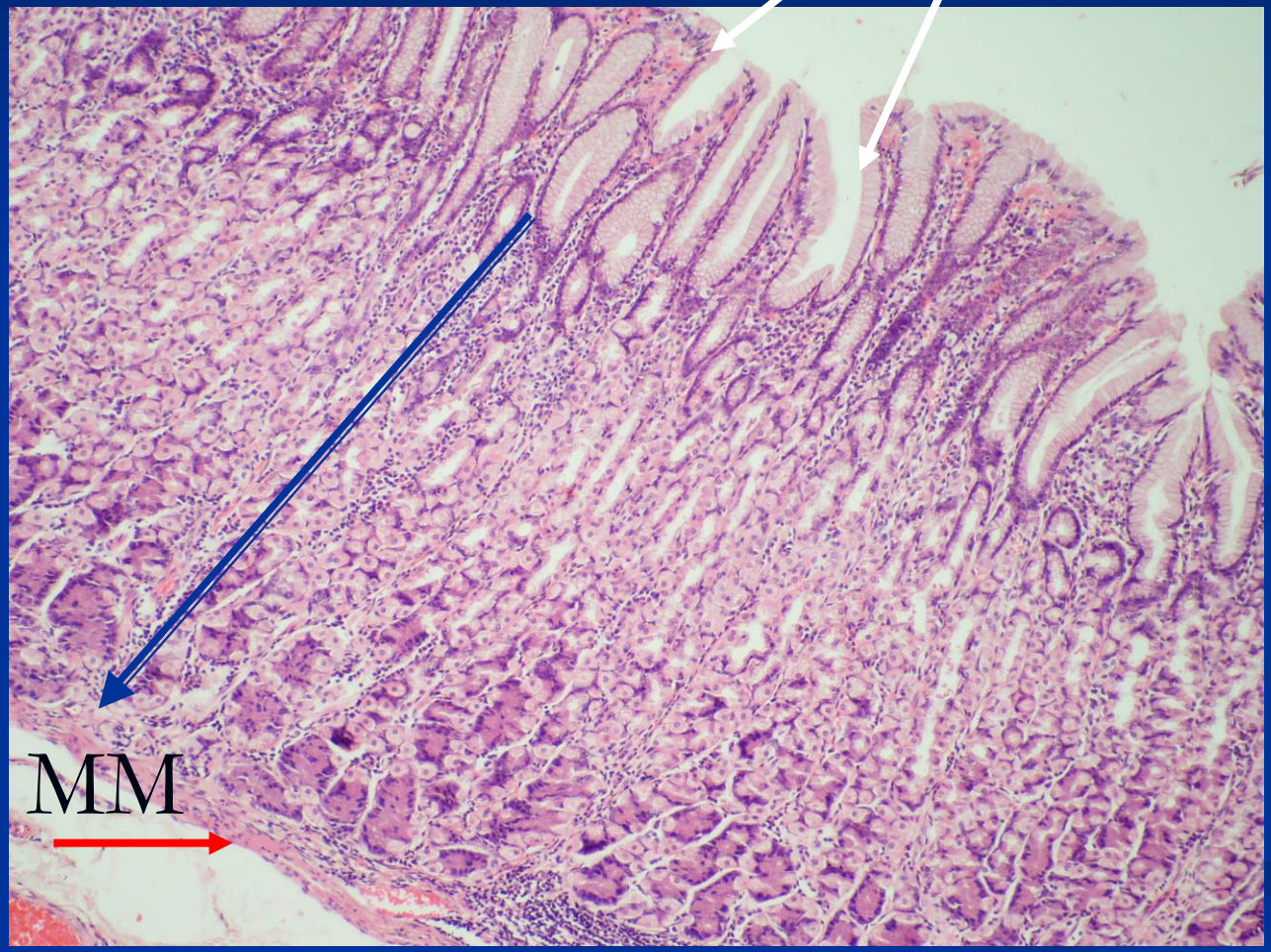
Fundus or body of stomach



Gastric pit (simple columnar epith.)

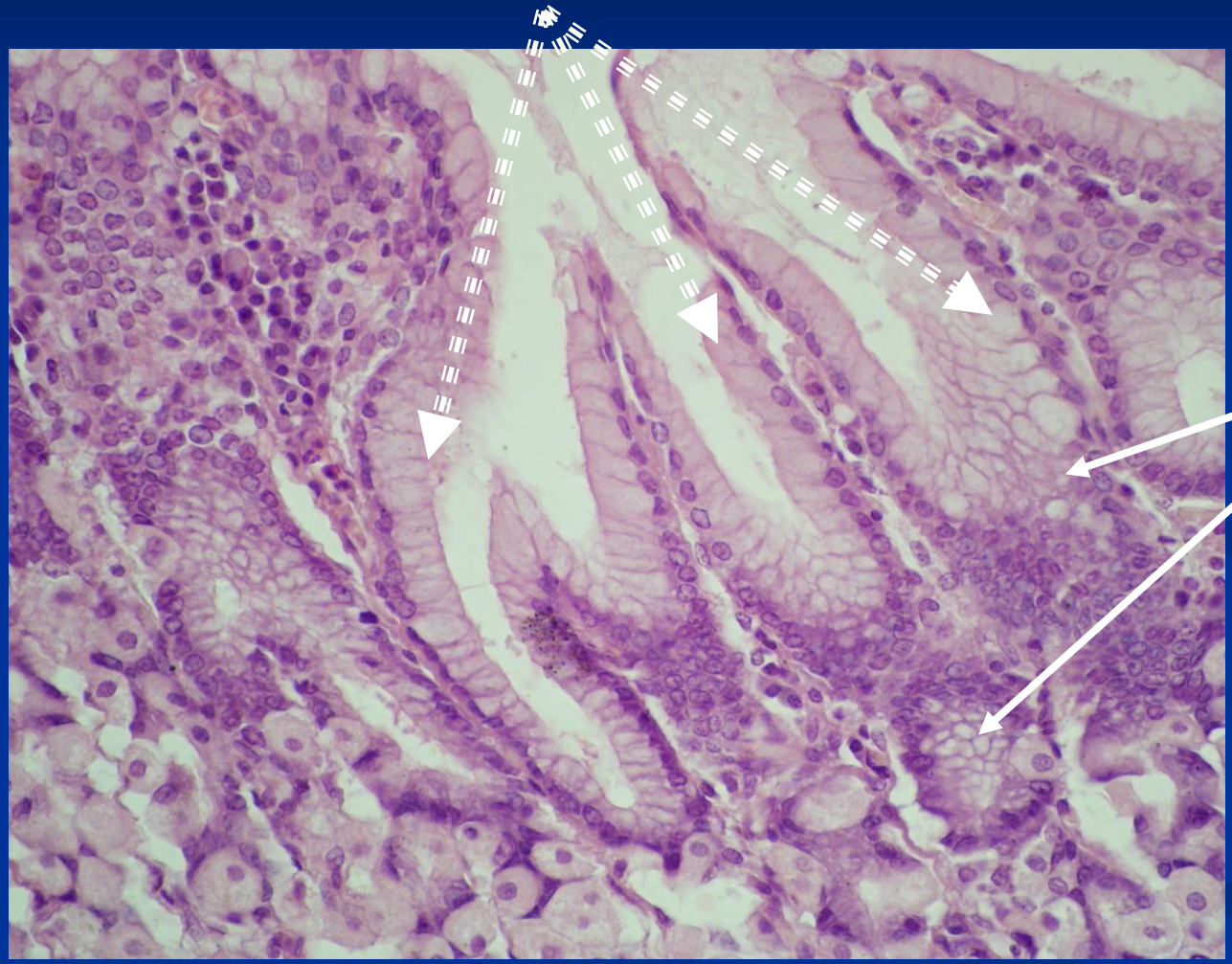
gastric glands

isthmus
neck
body
base



Gastric pit simple/branched tubular gland

Mucous_secreting surface cells



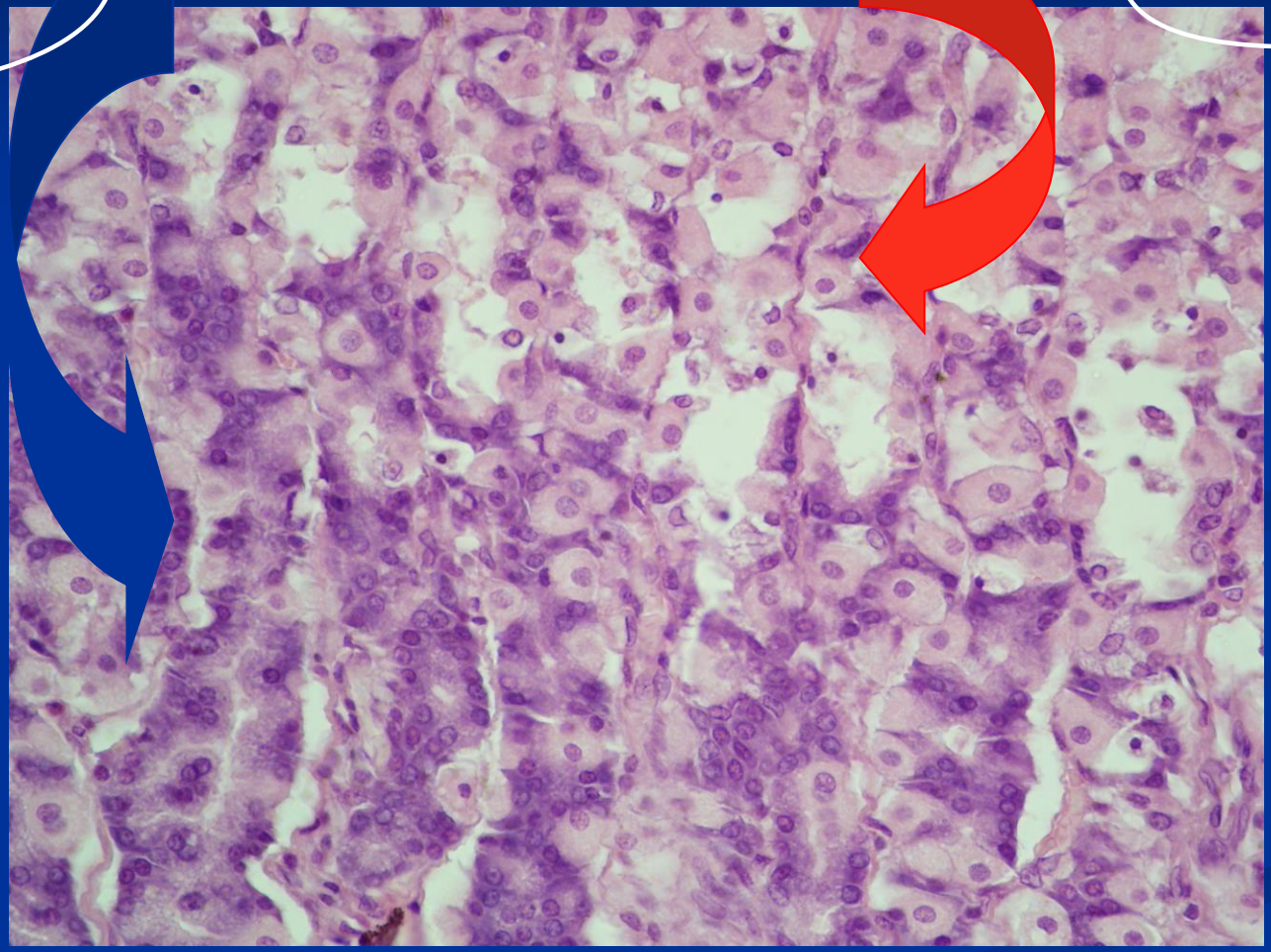
Neck mucous cells

Chief cells parietal cell

light Microscope

Pepsinogen

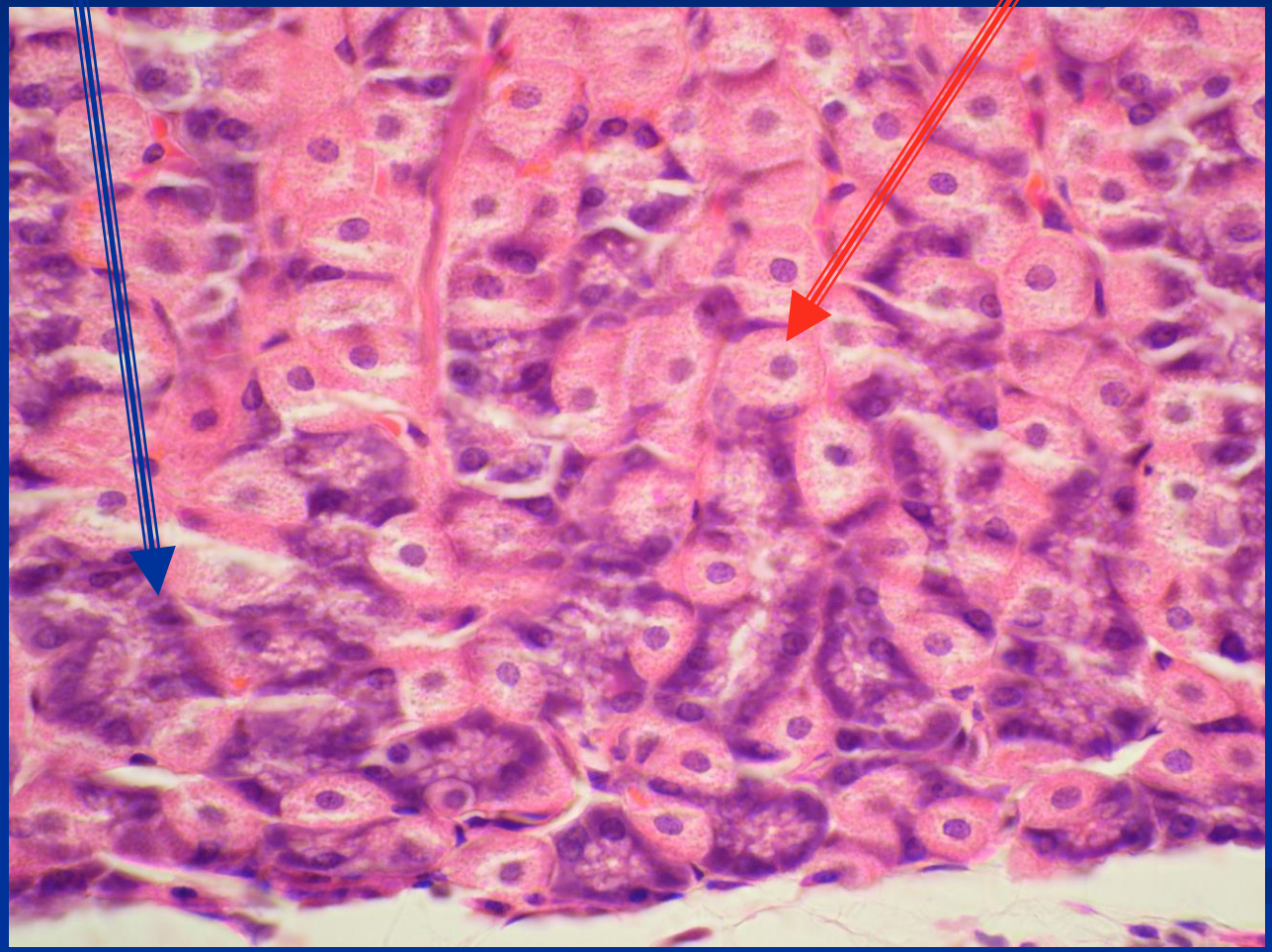
HCl



+ neuroendocrine and stem cells → Electron microscope

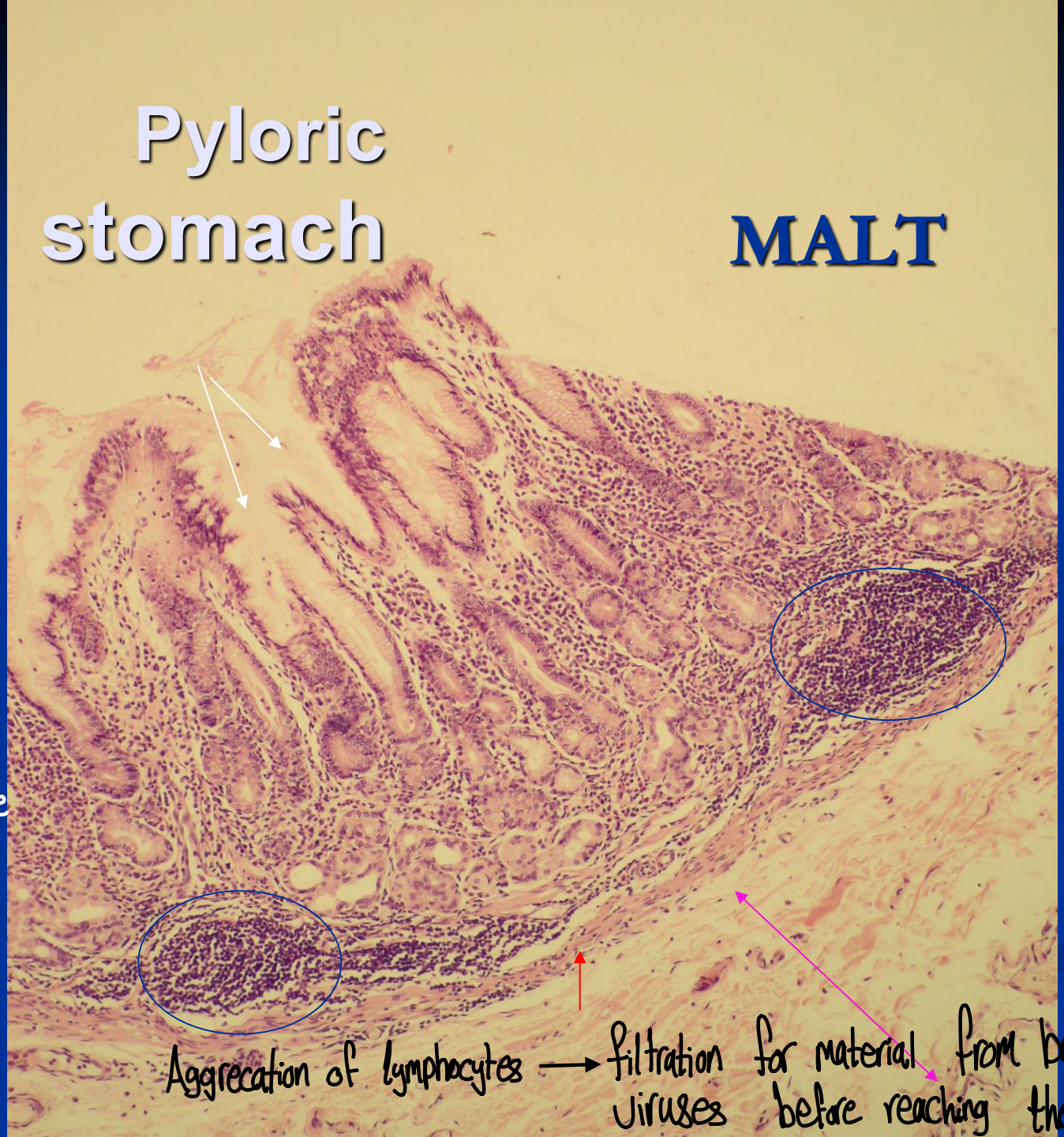
Chief cells

parietal cell



Pyloric stomach

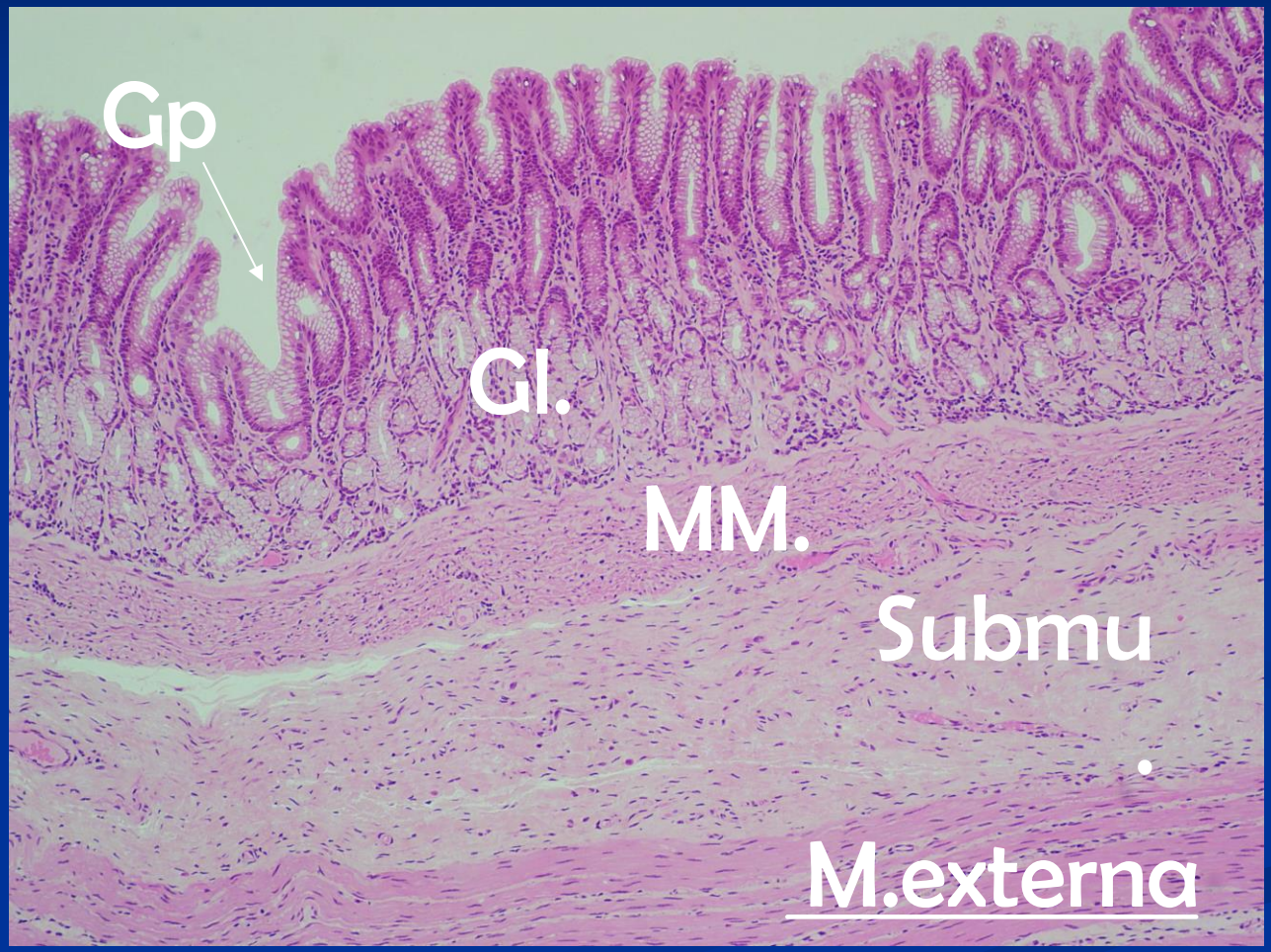
MALT



- narrow and long pits
- No chief, No parietal
- Mostly mucous cells → to neutralize the acidity

Aggregation of lymphocytes → filtration for material from bacteria and viruses before reaching the duodenum

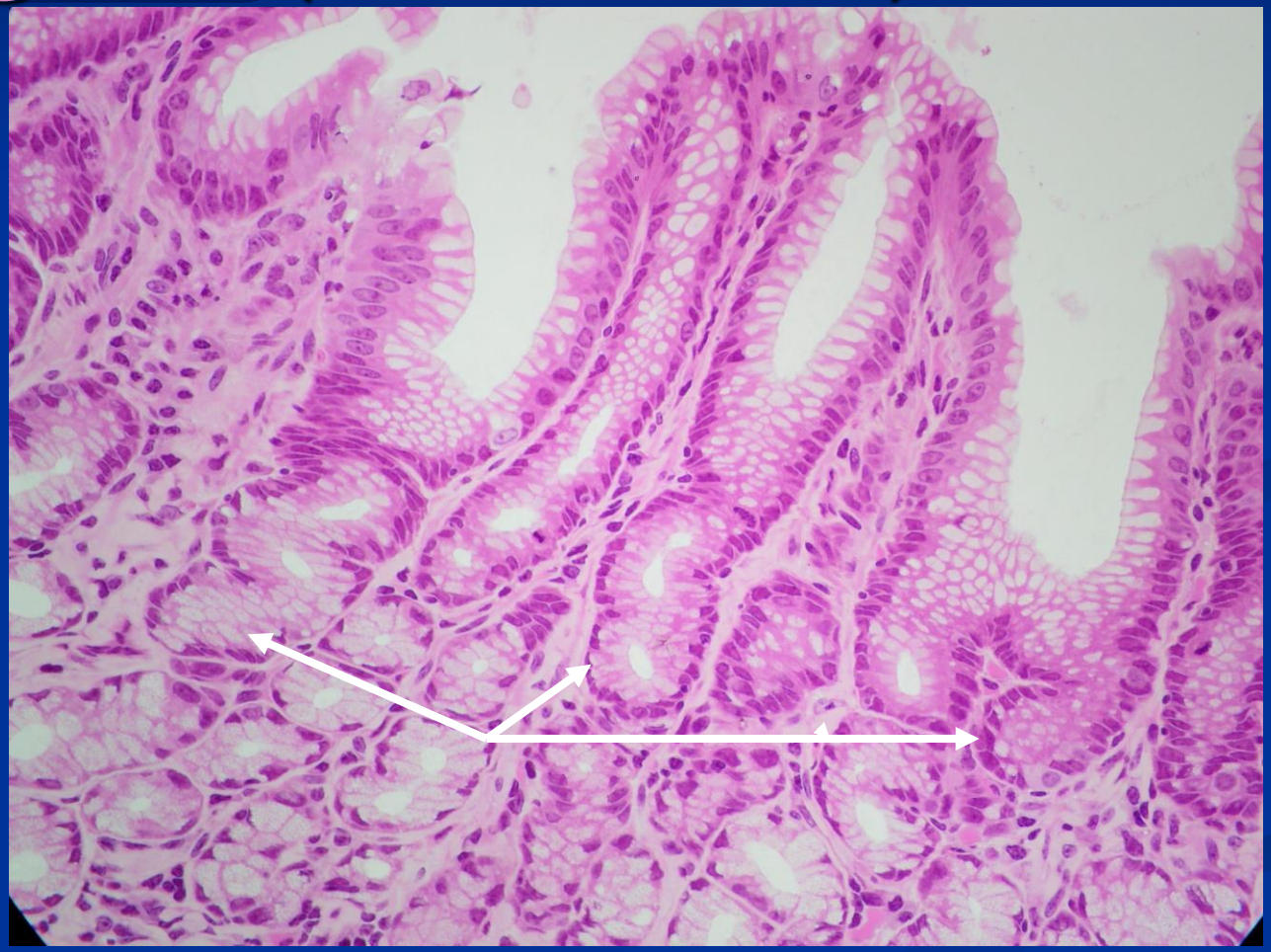
Pyloric stomach



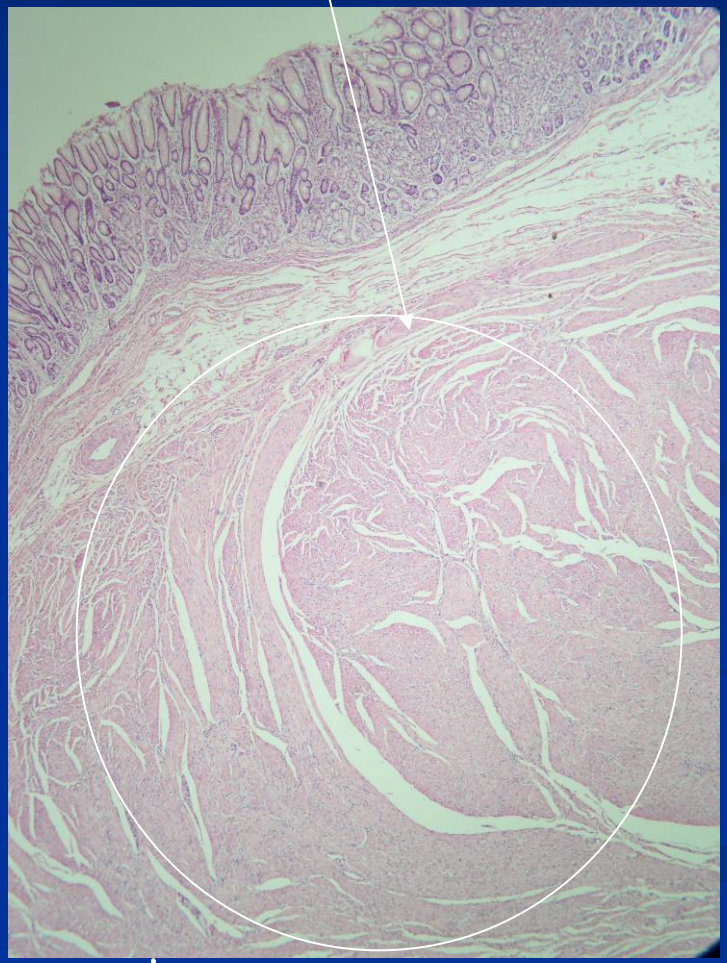
inner circular smooth muscle

Pyloric glands

simple branched tubular coiled glands(mucous cells)

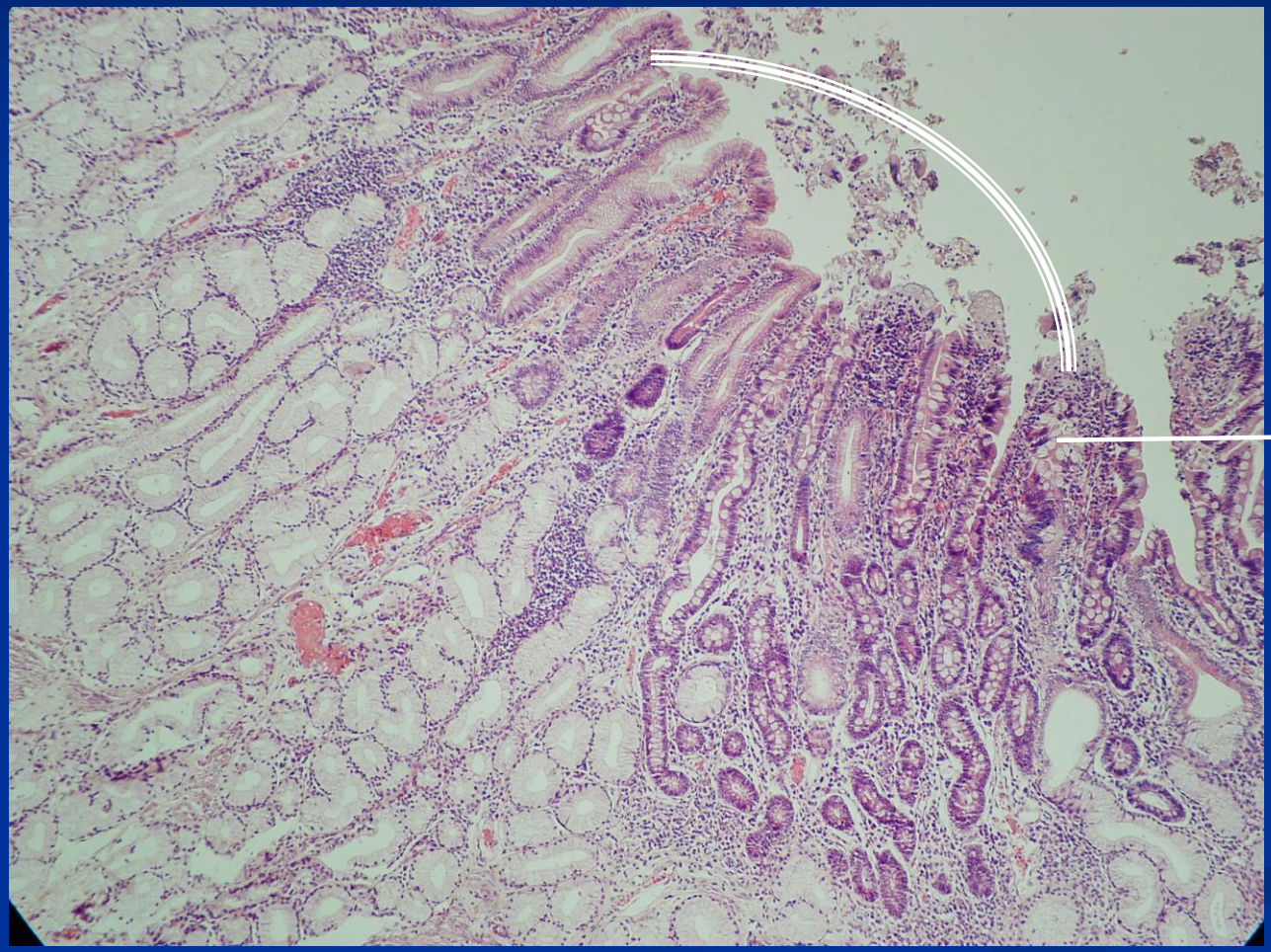


Sphinctor pyloric



Thickening of inner circular

Pyloric- duodenal junction



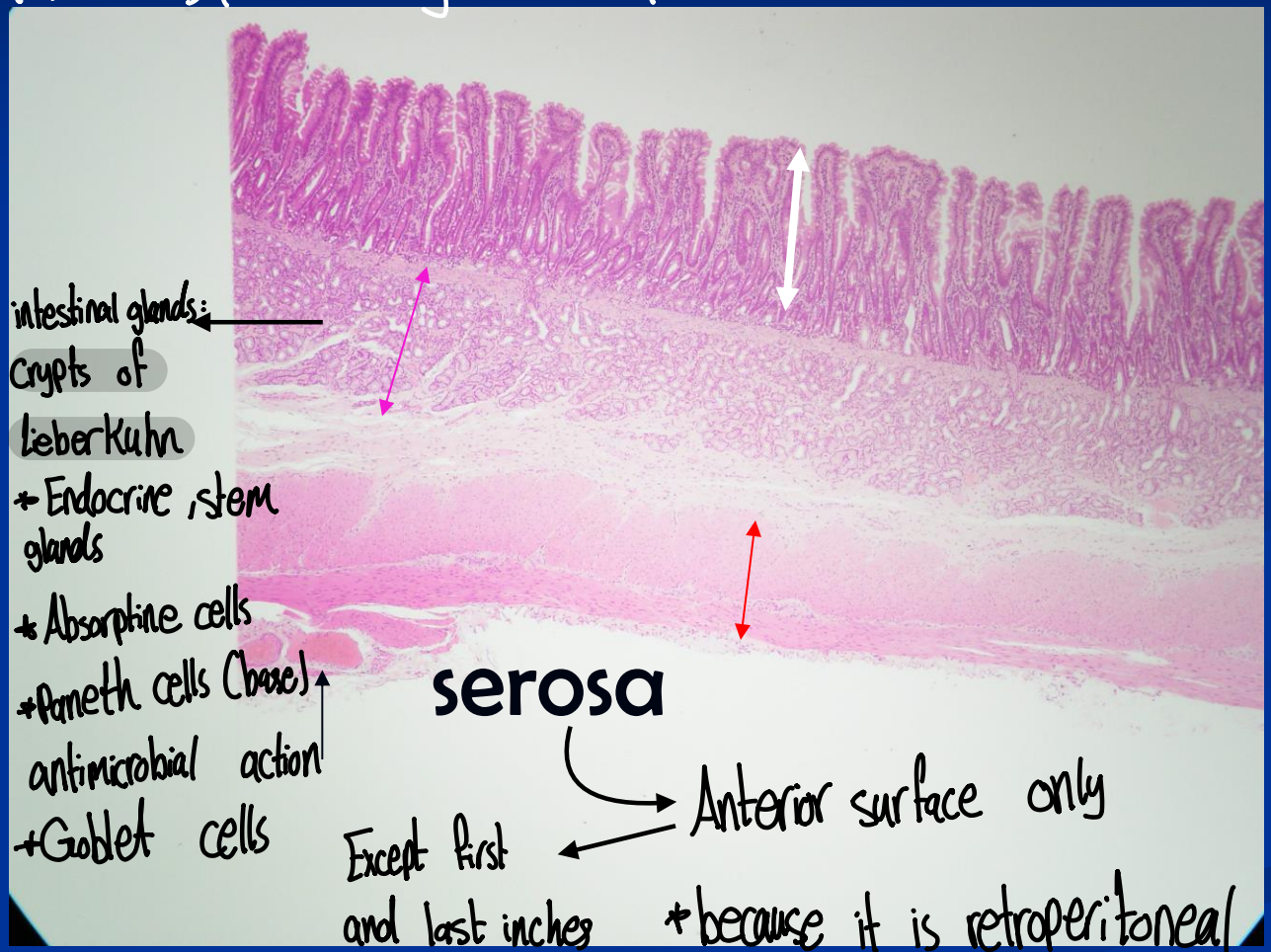
اللهم إني أعوذ بك من قلب لا يخشع، ومن دعاء لا يسمع، ومن نفس لا تشبع، ومن علم لا ينفع، اللهم إني أعوذ بك من هؤلاء الأربع

Small intestine

Histological Feature	Duodenum	Jejunum	Ileum
Villi Shape	Broad, leaf-like	Long, finger-like	Short, club-like
Epithelium	Simple columnar with goblet cells (few)	Simple columnar with goblet cells (moderate)	Simple columnar with **many** goblet cells
Crypts of Lieberkühn	Present in lamina propria	Present	Present
Paneth Cells	Present (less prominent)	**Prominent** at crypt base	Present and active
Brunner's Glands	**Present in submucosa** (alkaline mucus)	❌ Absent	❌ Absent
Peyer's Patches	❌ Absent or rare	❌ Absent	✅ **Present** in lamina propria (lymphoid nodules)
M Cells	❌ Not prominent	❌ Not prominent	✅ Overlying Peyer's patches (GALT component)
Goblet Cells Trend	Few	More than duodenum	**Most numerous**
Microvilli (Brush Border)	Present (very active in absorption)	Present	Present
Plicae Circularis	Few or low	**Well-developed**	Reduced or absent
Lamina Propria	Contains blood vessels, lacteals, crypts, loose CT	Same	Same + **more lymphoid tissue**

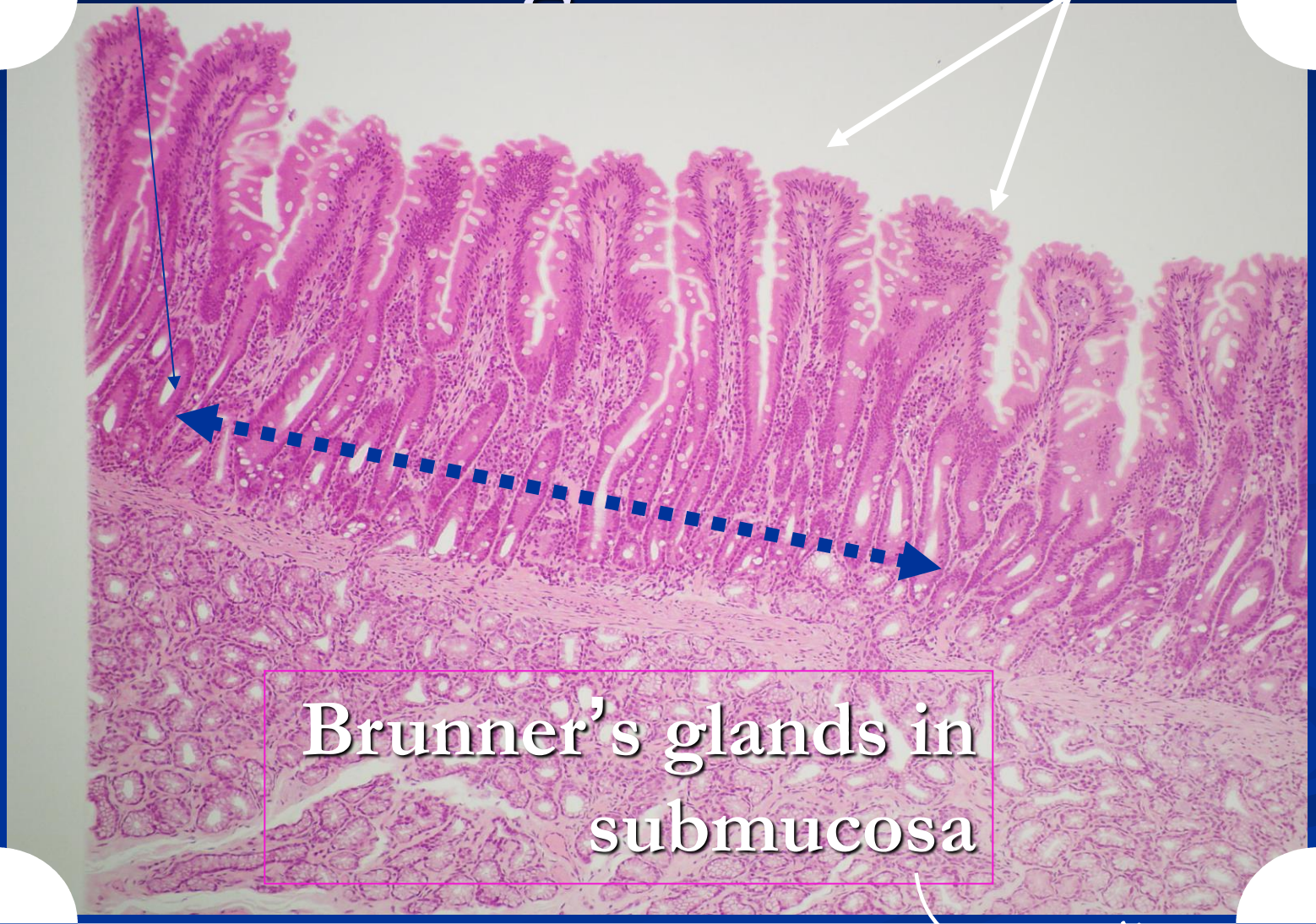
Duodenum

+Mucosa → finger like projection (leaf-like)



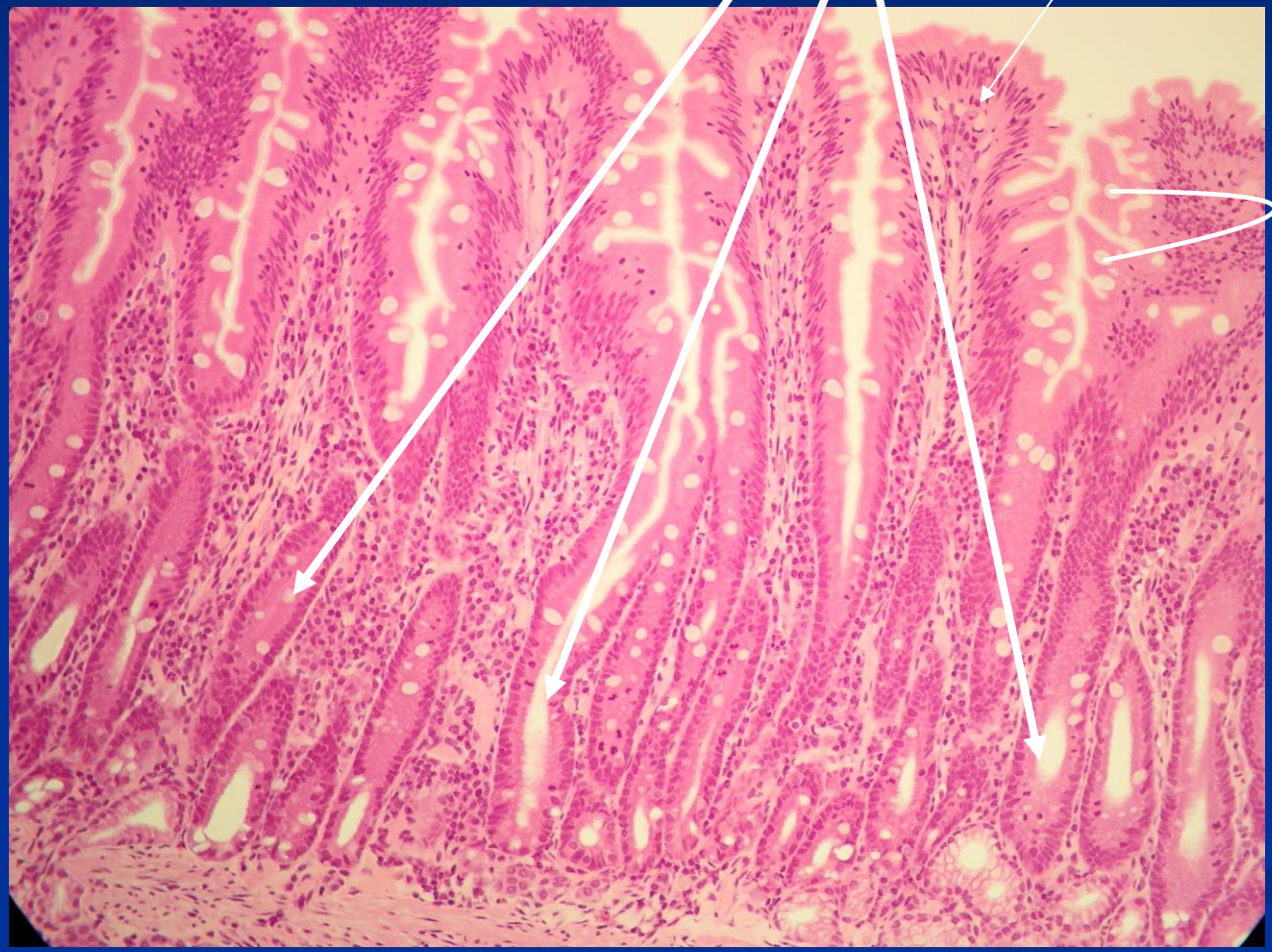
Intestinal glands

villi & microvilli

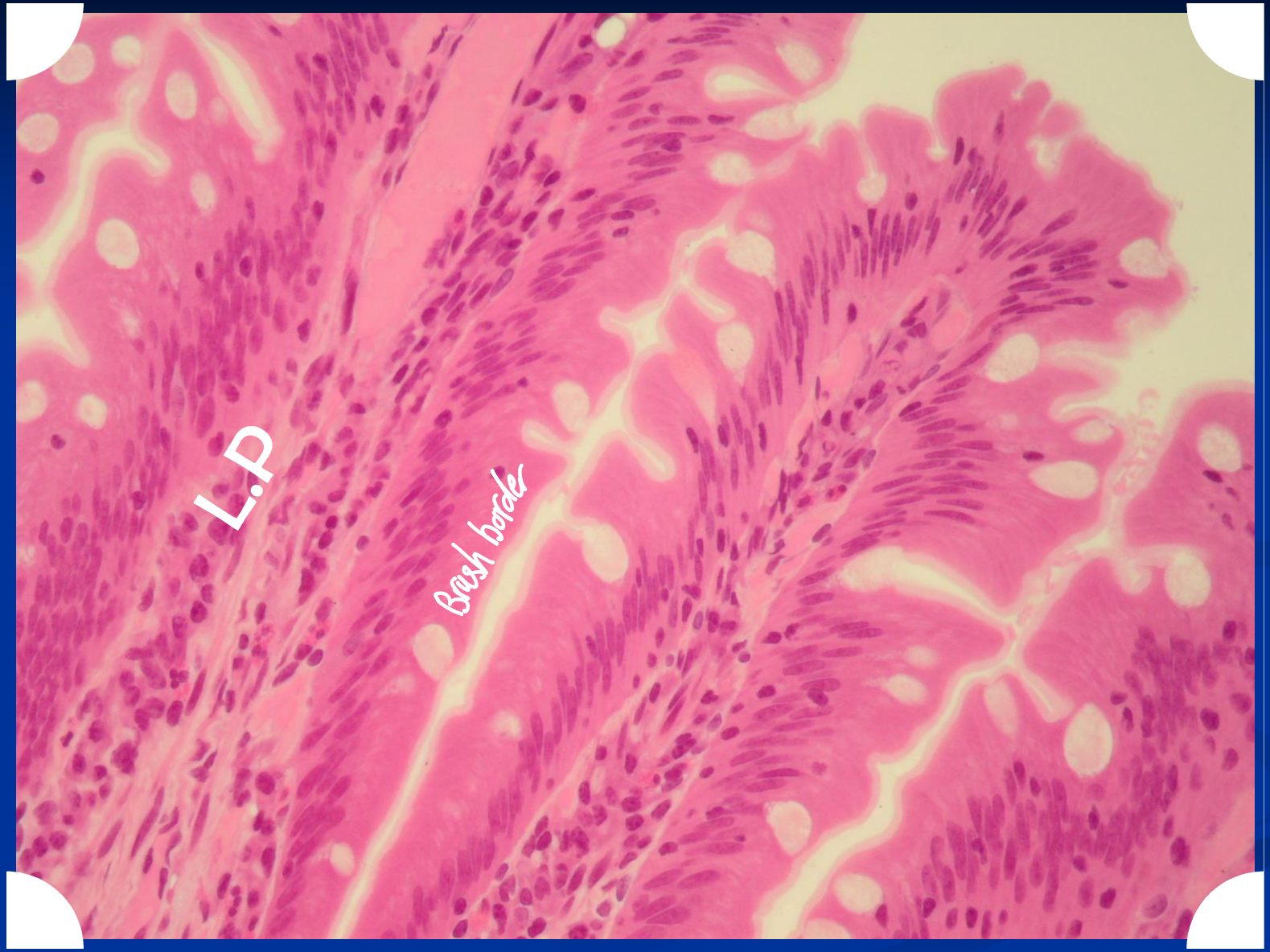


Crypt of Lieberkuhn villus

Lp invagination through villi → contain BVs, lacteal: absorbs digested fats

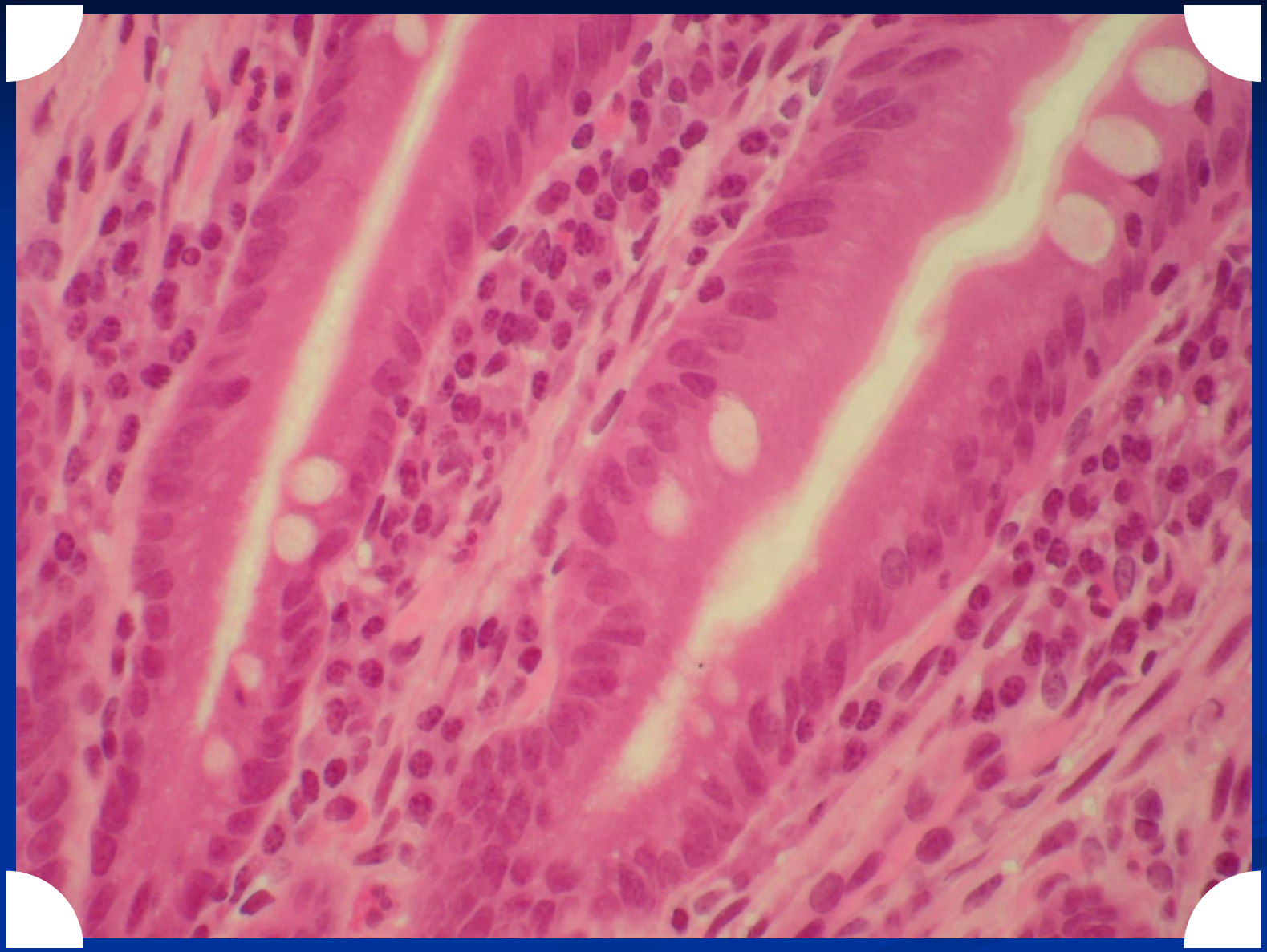


goblet cells


L.P
Brush border

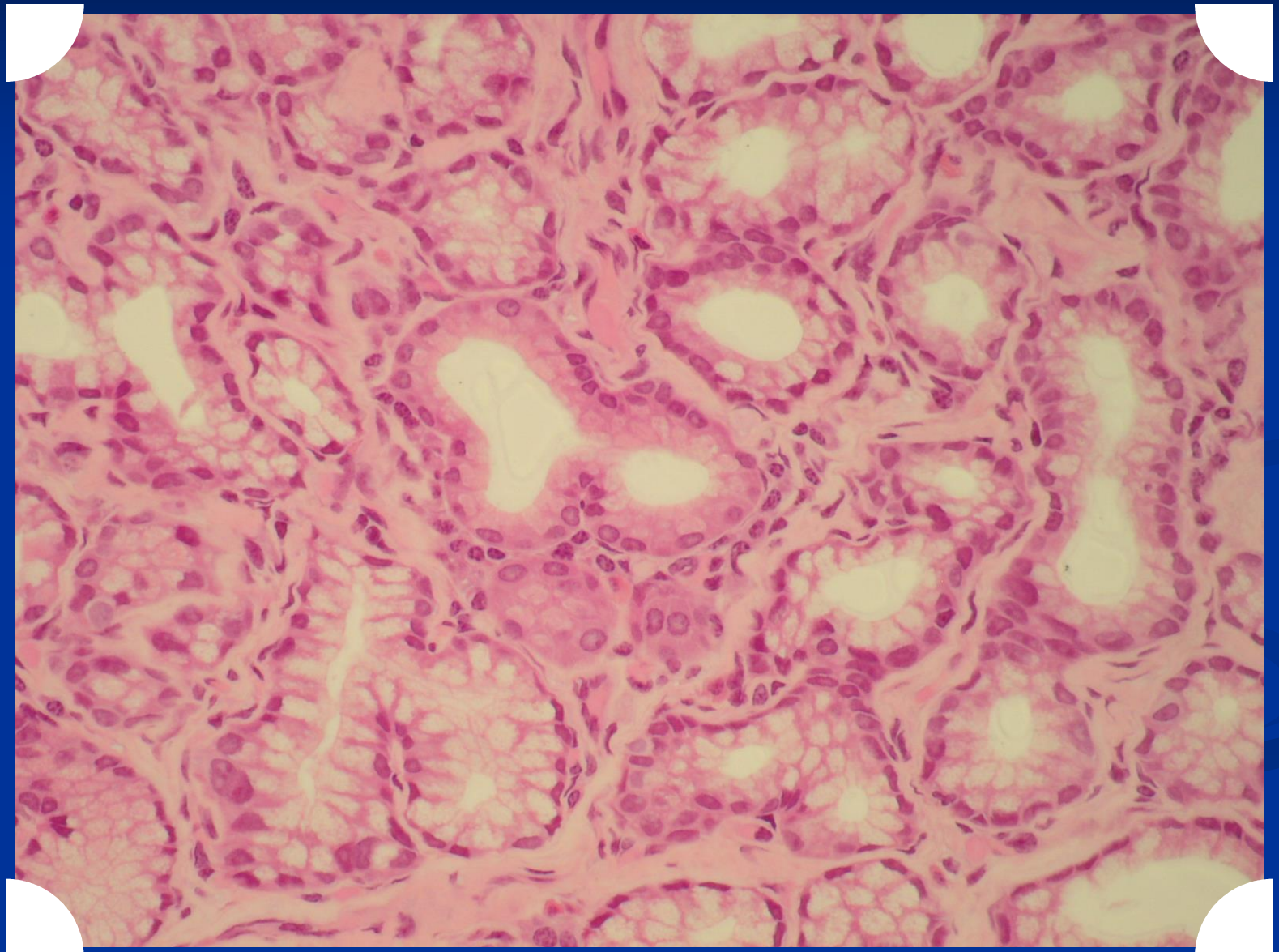
Surface absorbtive cells(simple columnar with brush border)

=made by microvilli

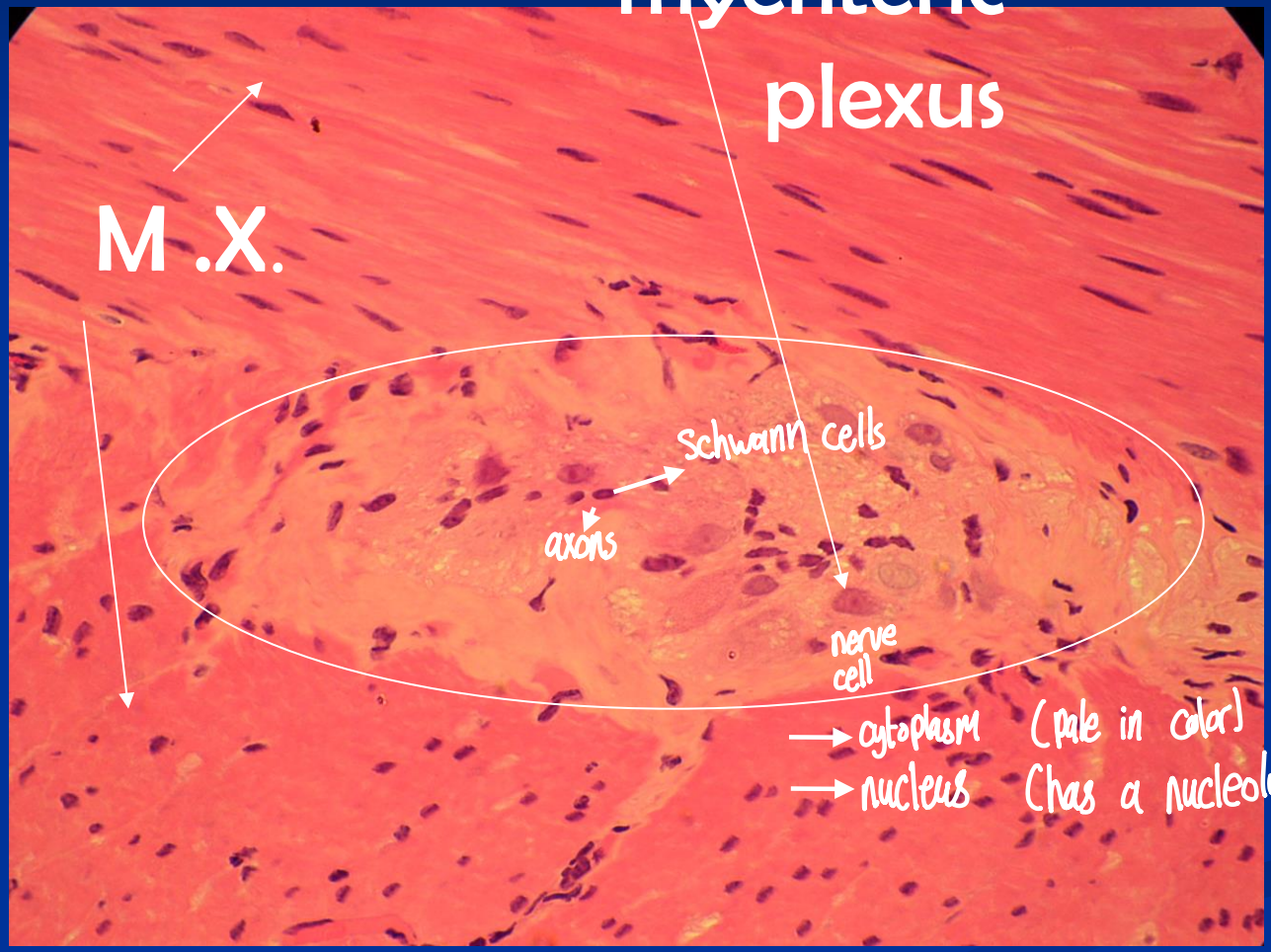


duodenum

Simple branch tubular gl.=mucous



Auerbach's myenteric plexus



Plicae circularies in jejunum

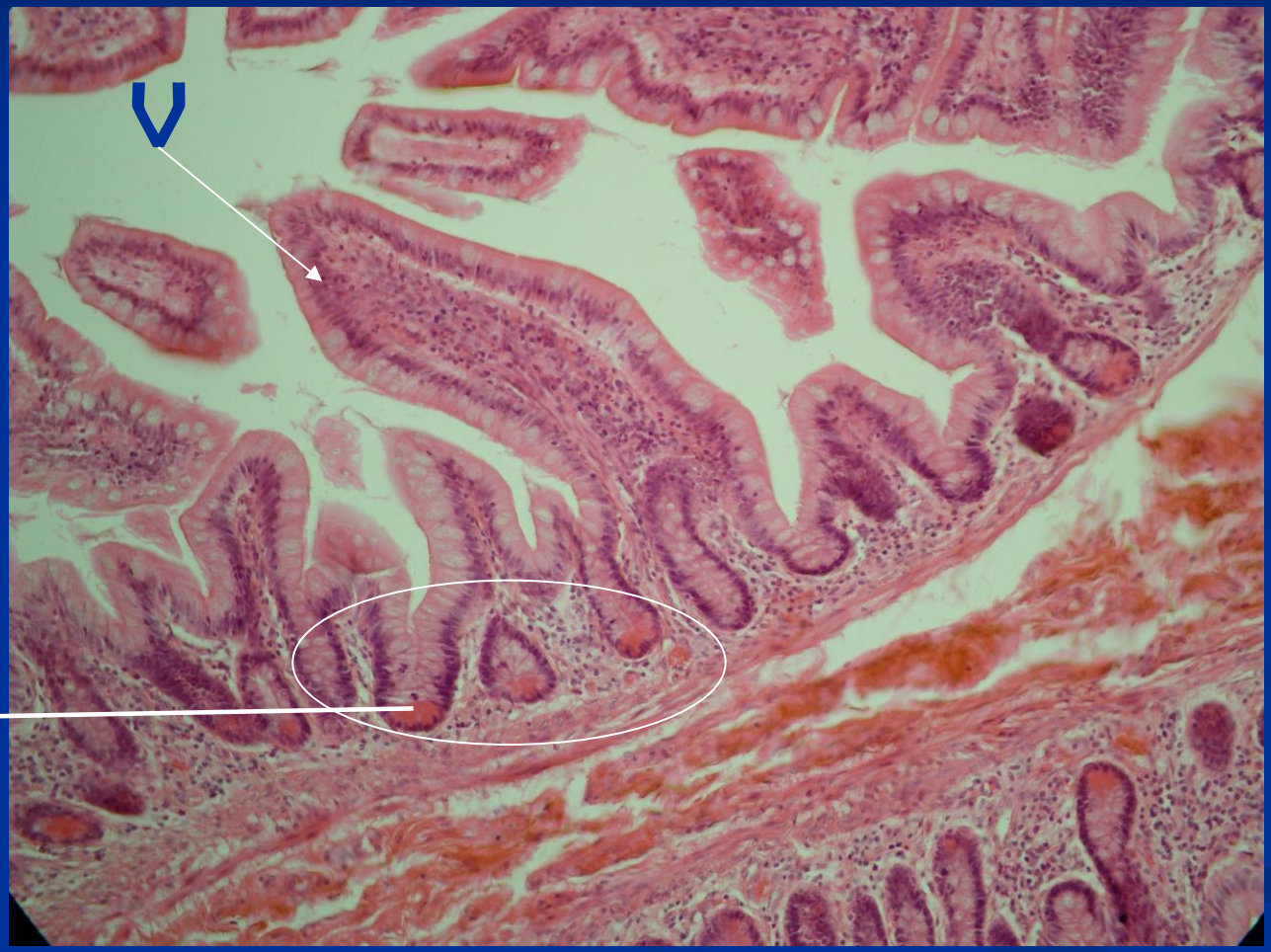
Submucosa invaginates into mucosa → same as stomach Rugae

To increase absorbtive surface area

villi

Plica circularis

Crypt= intestinal gland

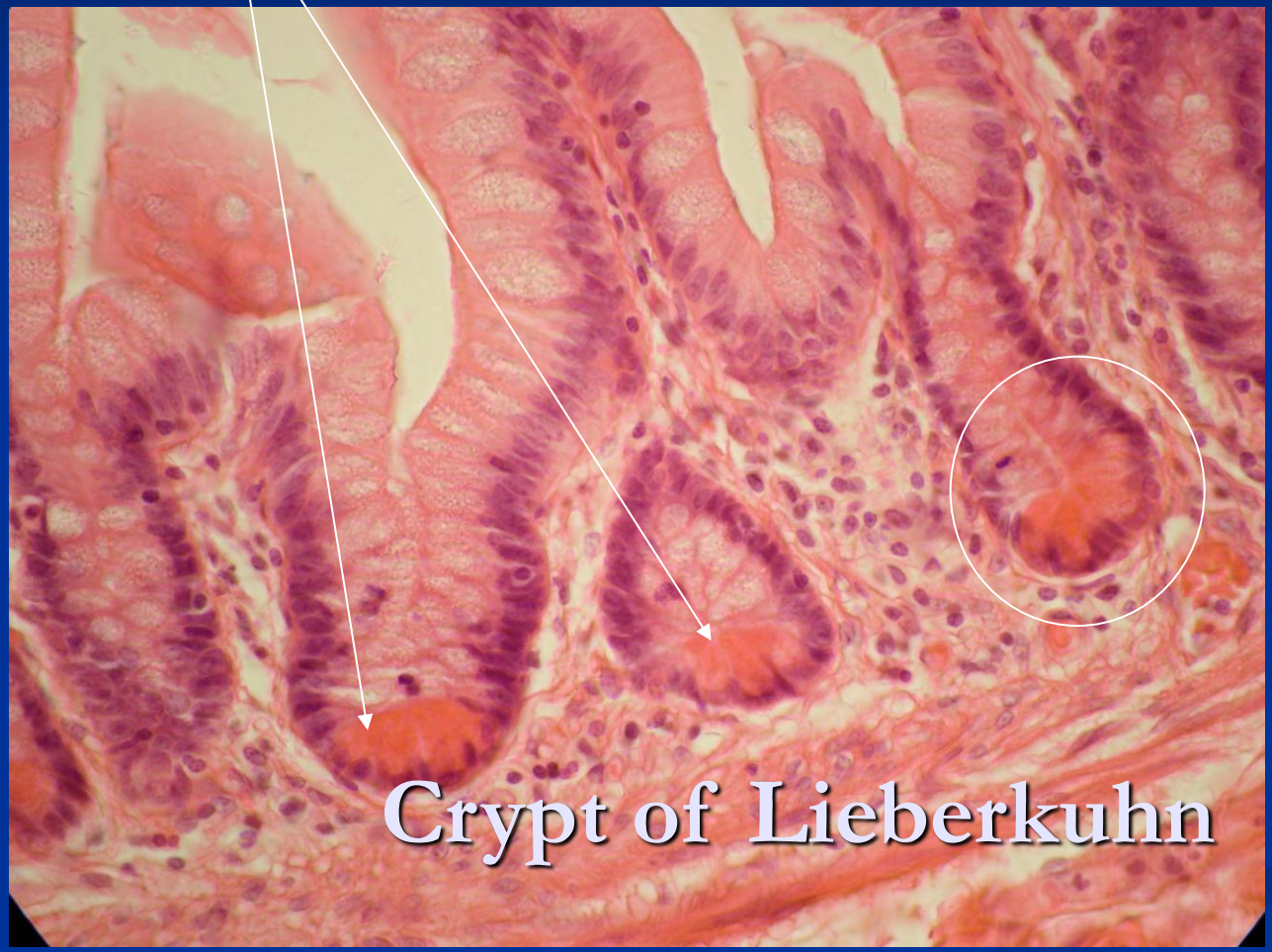


Paneth cells

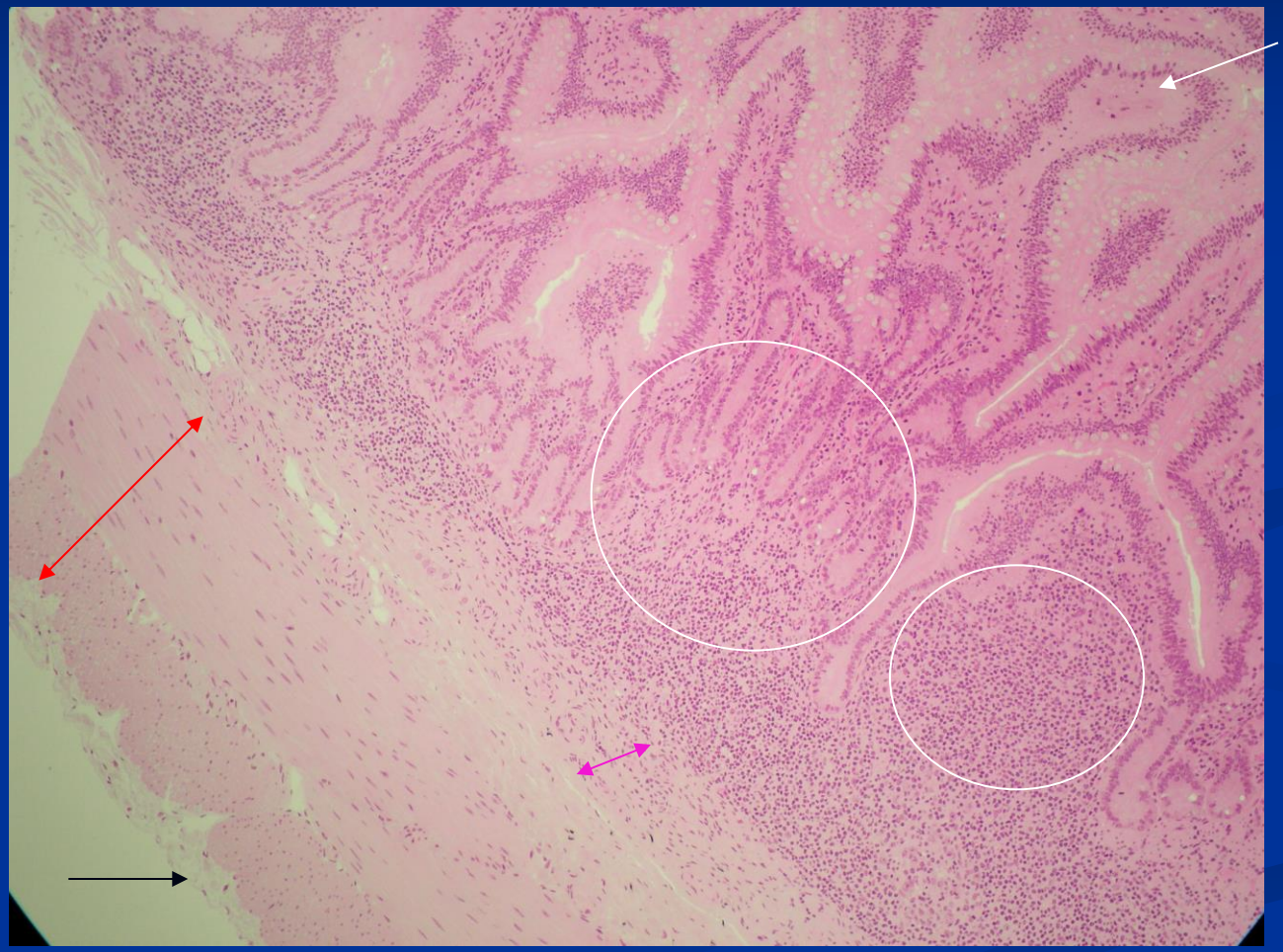
→ prominent in jejunum

→ secretes lysozymes

Paneth cell of intestinal gland

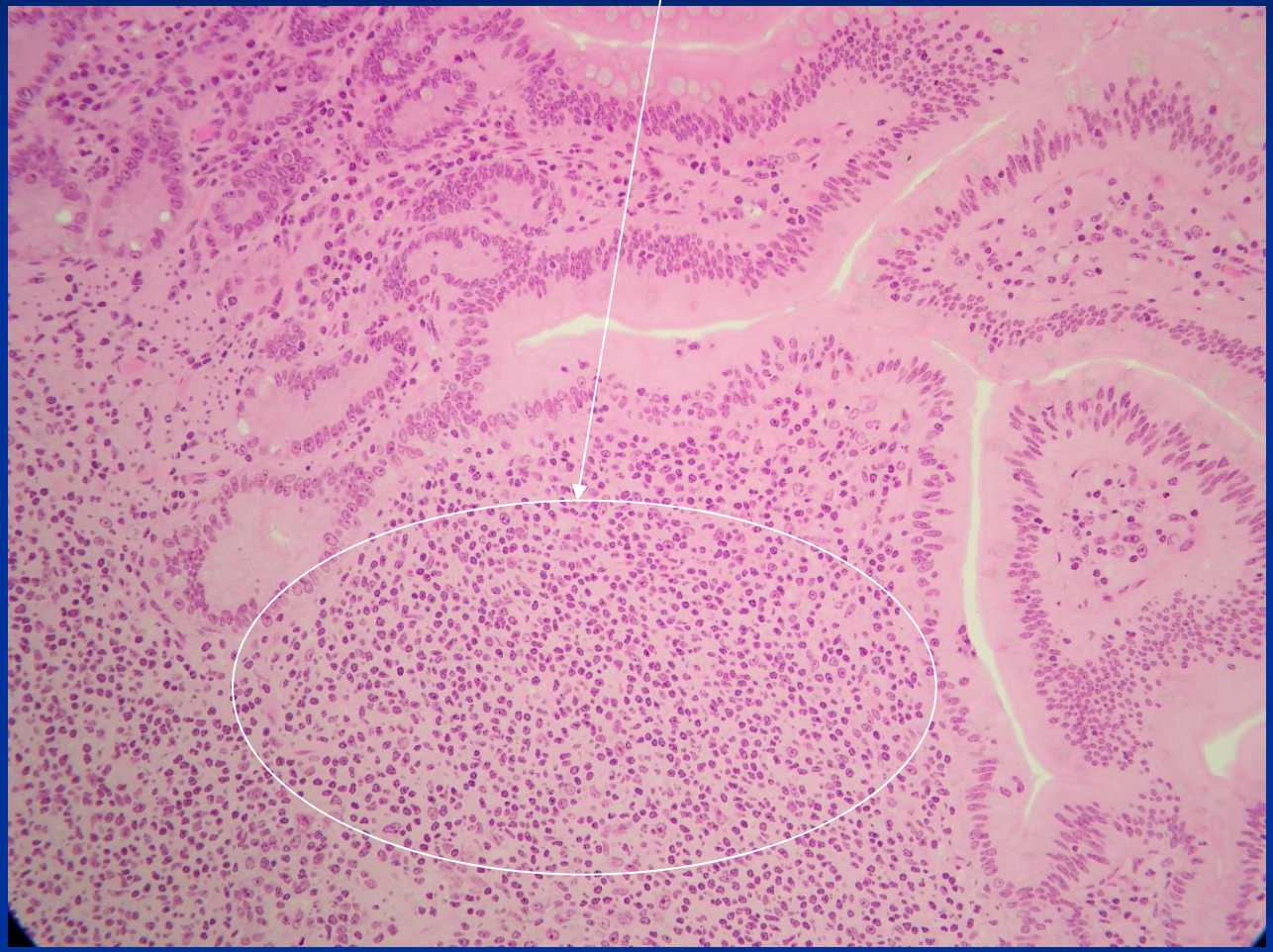


Ileum



Peyer's patches

in the lamina propria and submucosa

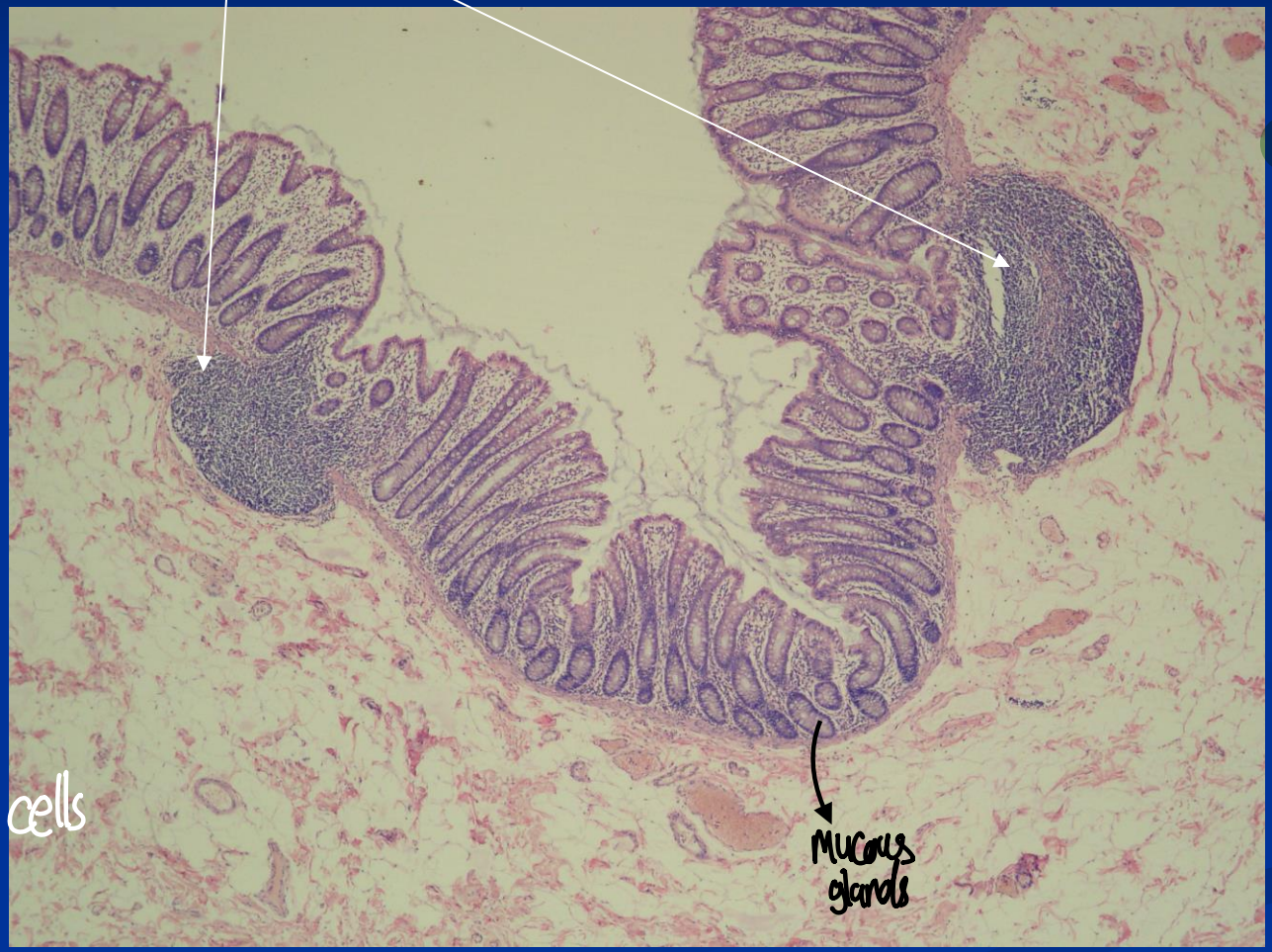


اللهم أنت ربي لا إله إلا أنت، خلقتني وأنا عبدك وأنا على عهدك ووعدك ما استطعت، أعوذ بك من شر ما صنعت، أبوء لك بنعمتك عليّ وأبوء بذنبي فاغفر لي إنه لا يغفر الذنوب إلا أنت

Large intestine

solitery nodule in colon

Simple columnar with numerous goblet cells



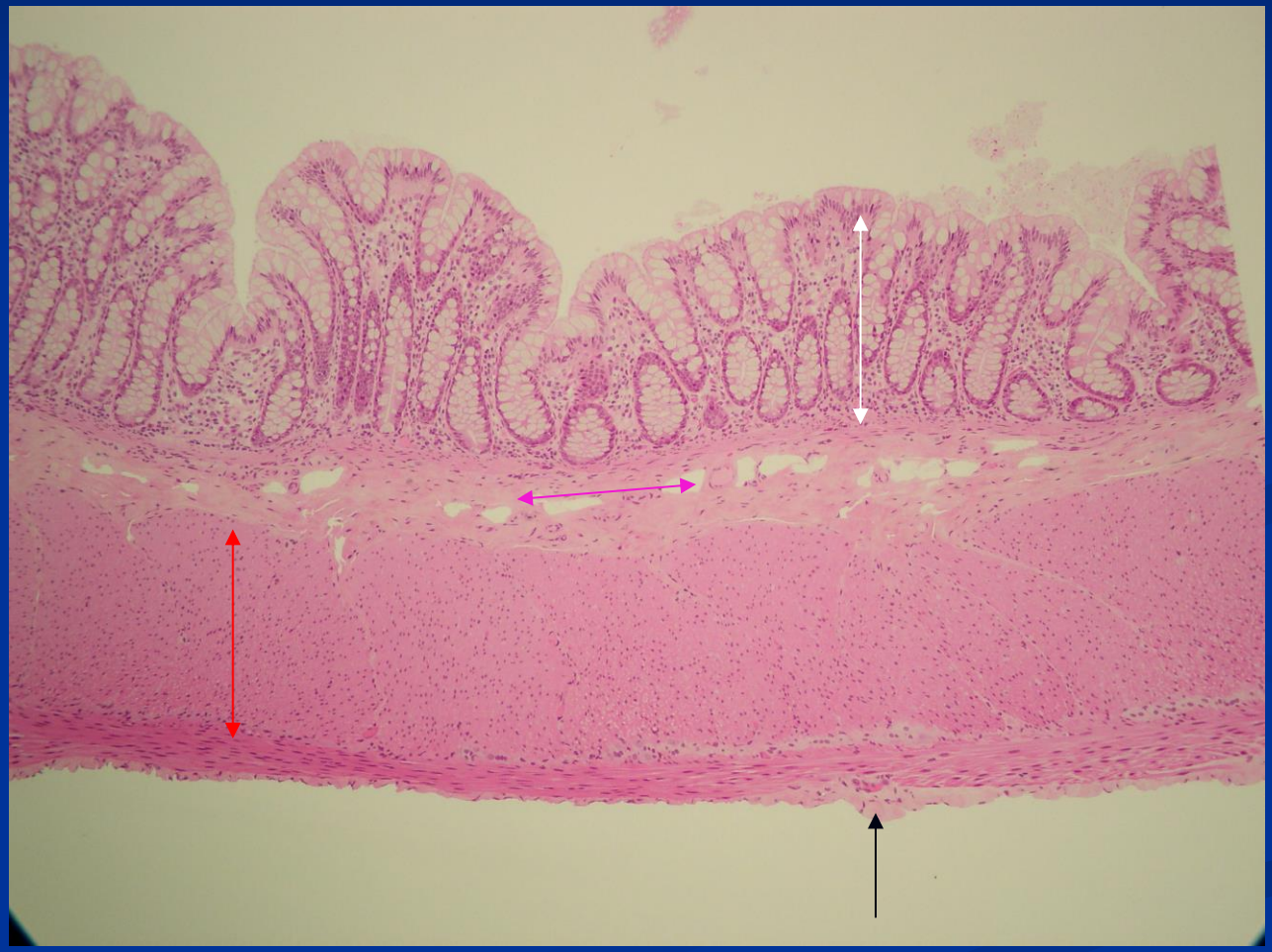
+intestinal glands: simple tubular +No branch

*No villi

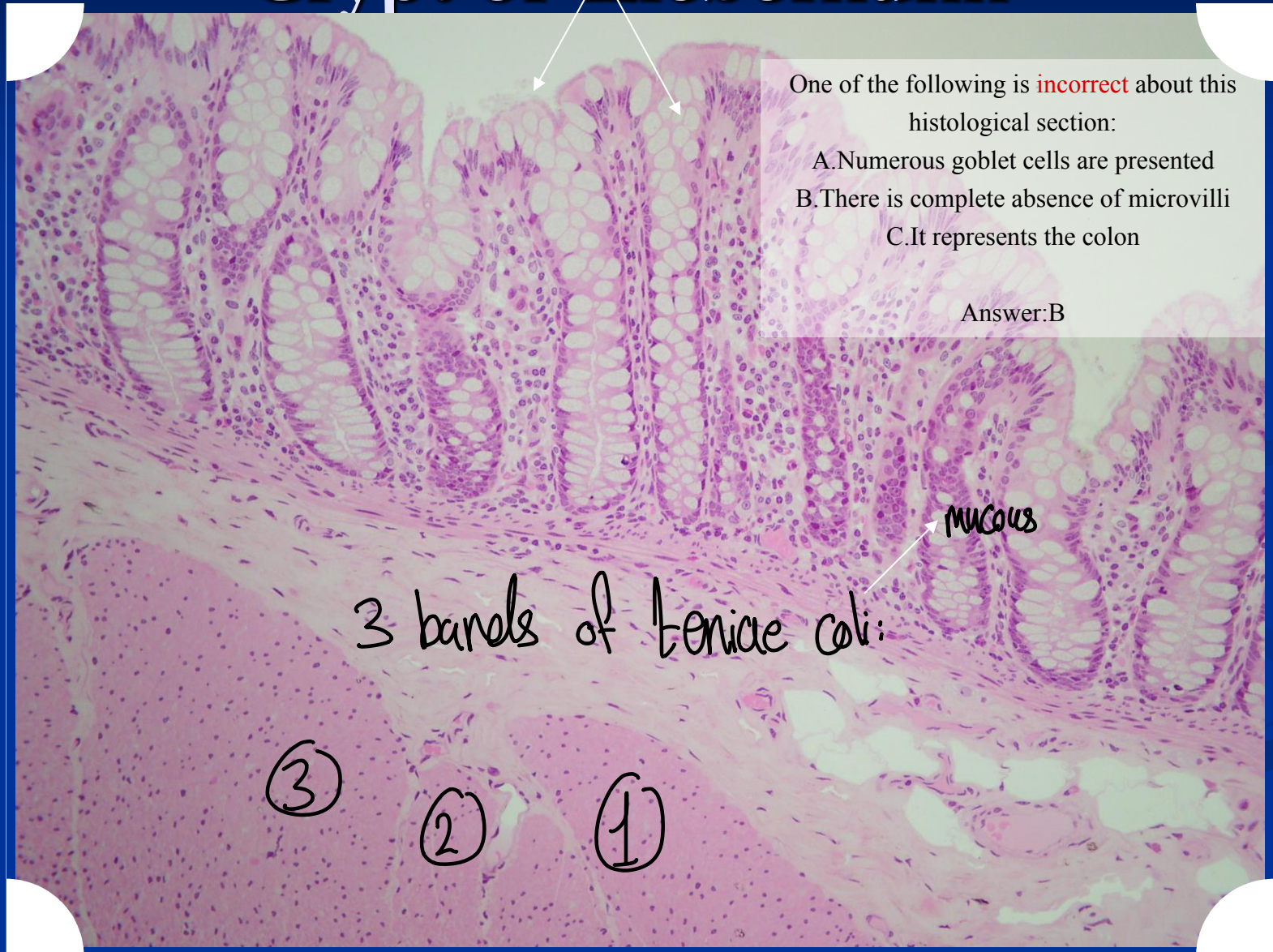
*No paneth cells

+ Teniae coli:
thickening of the outer longitudinal muscle

colon



Simple tubular gland in colon
Crypt of Lieberkuhn=



One of the following is incorrect about this histological section:

A.Numerous goblet cells are presented

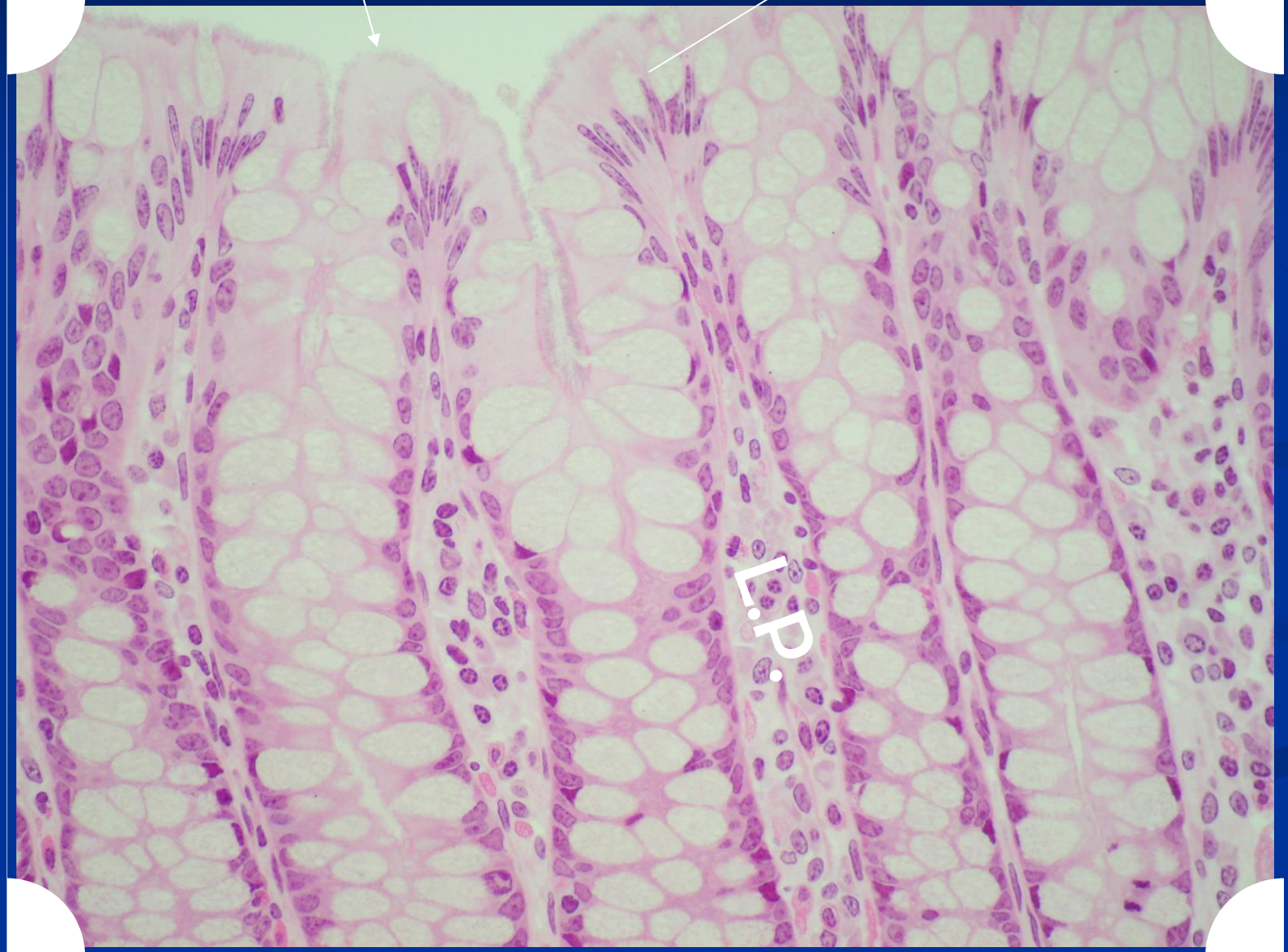
B.There is complete absence of microvilli

C.It represents the colon

Answer:B

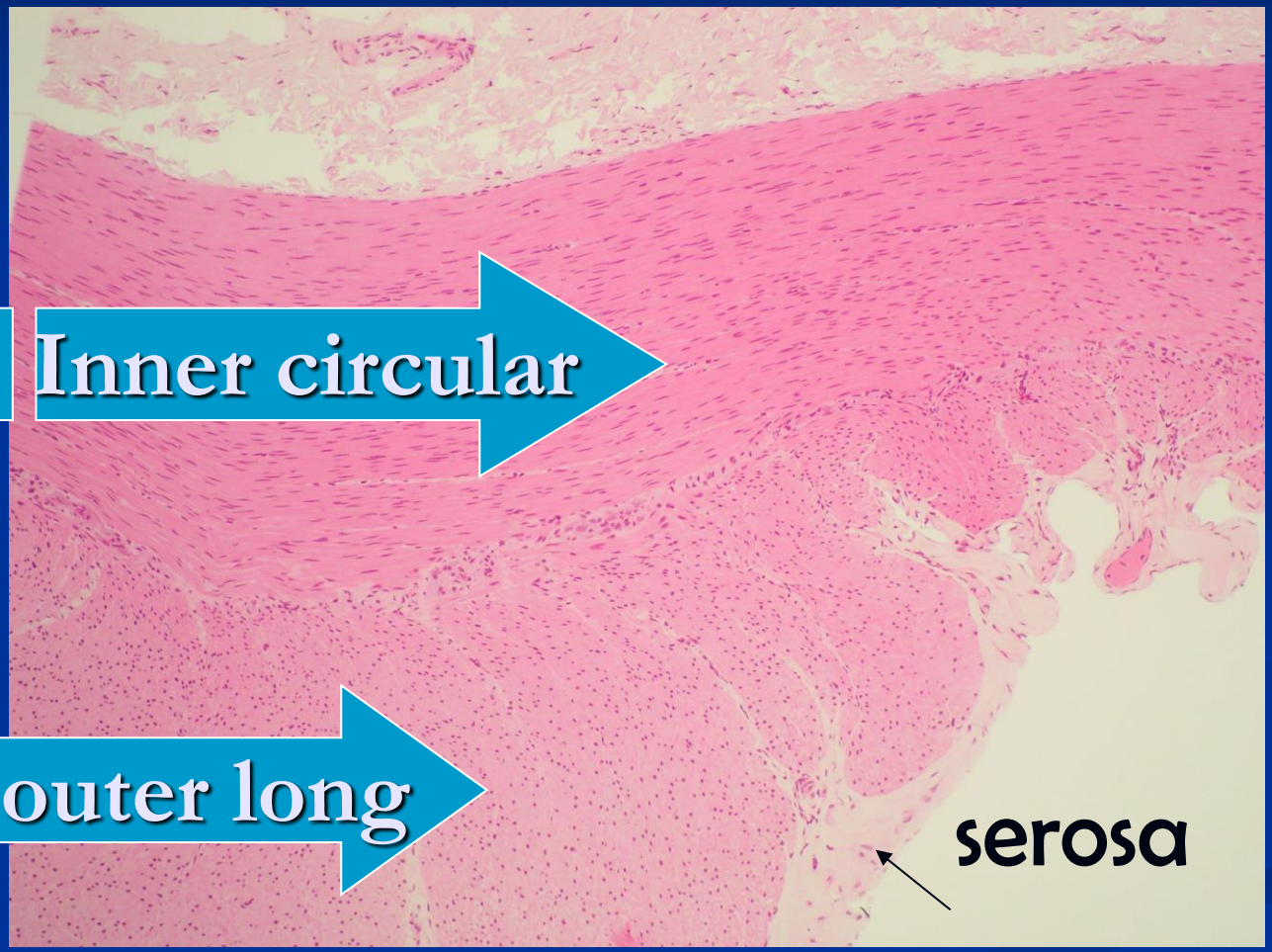
surface cell

Goblet cells



Taeniae coli

Inner circular outer long smooth muscle.



Appendix

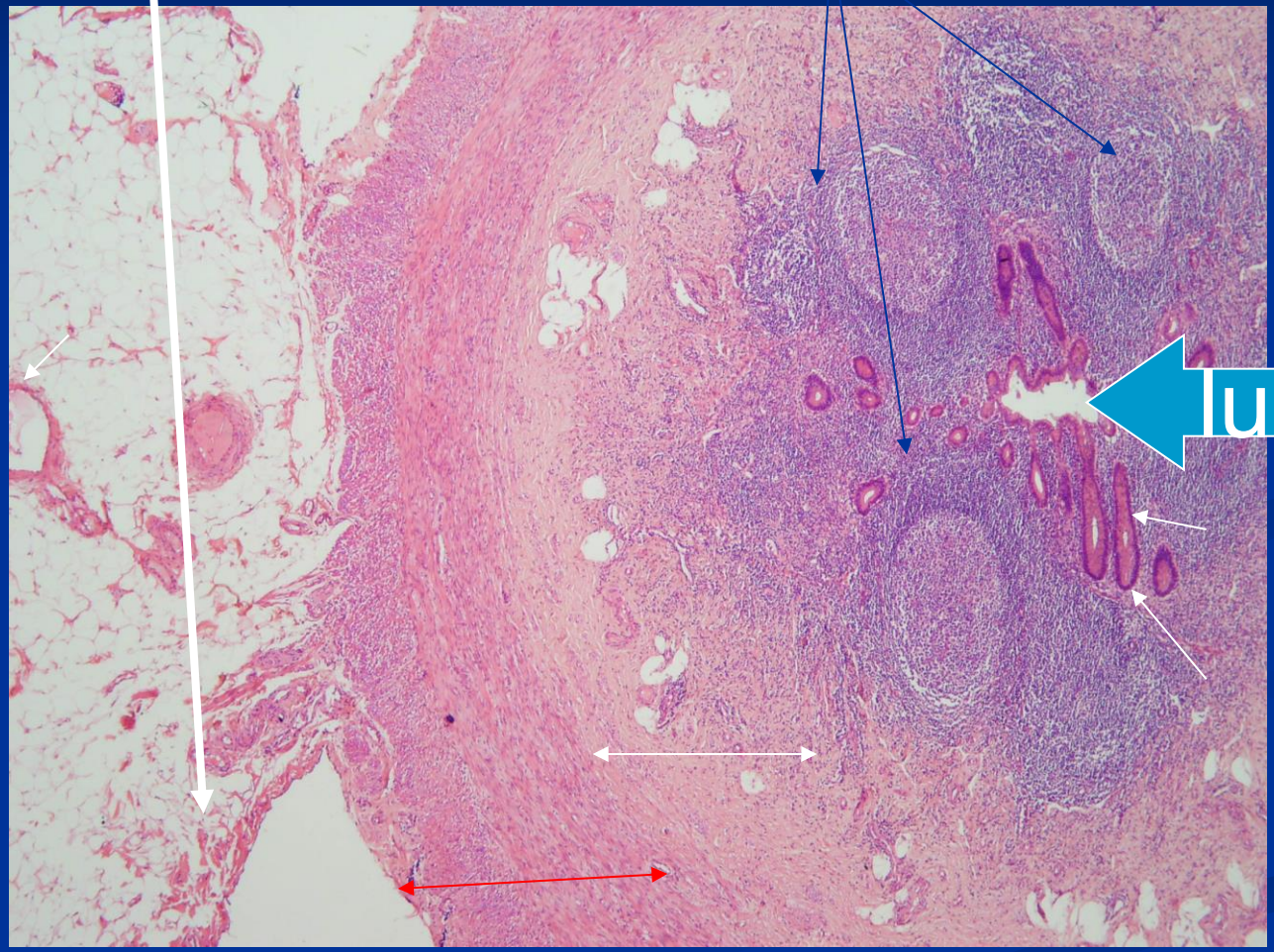
Mesoappendix:
has appendicular artery + lymphatic vessel

narrow lumen

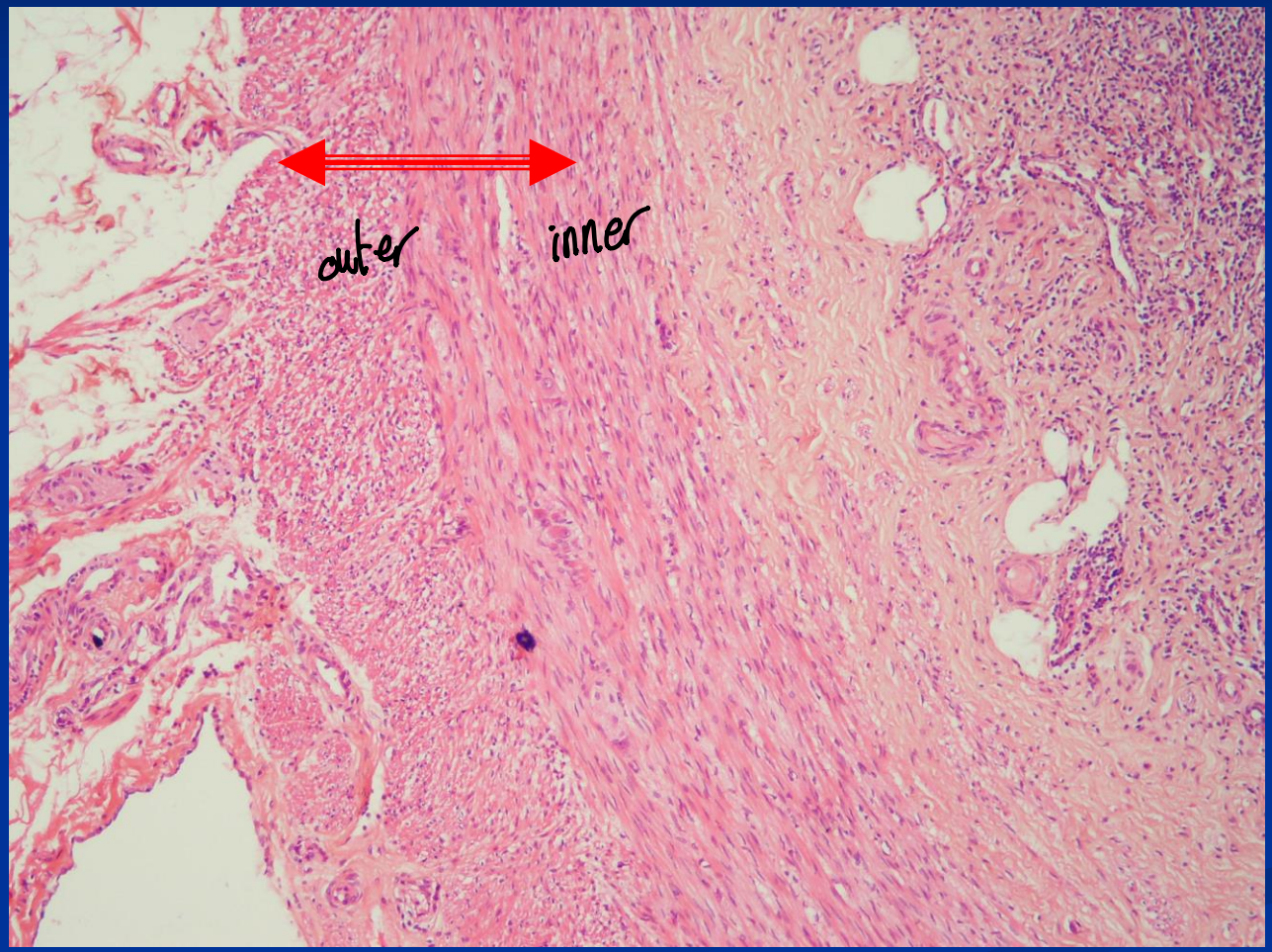
glands + no role

lymphatic nodules in submucosa and lamina propria

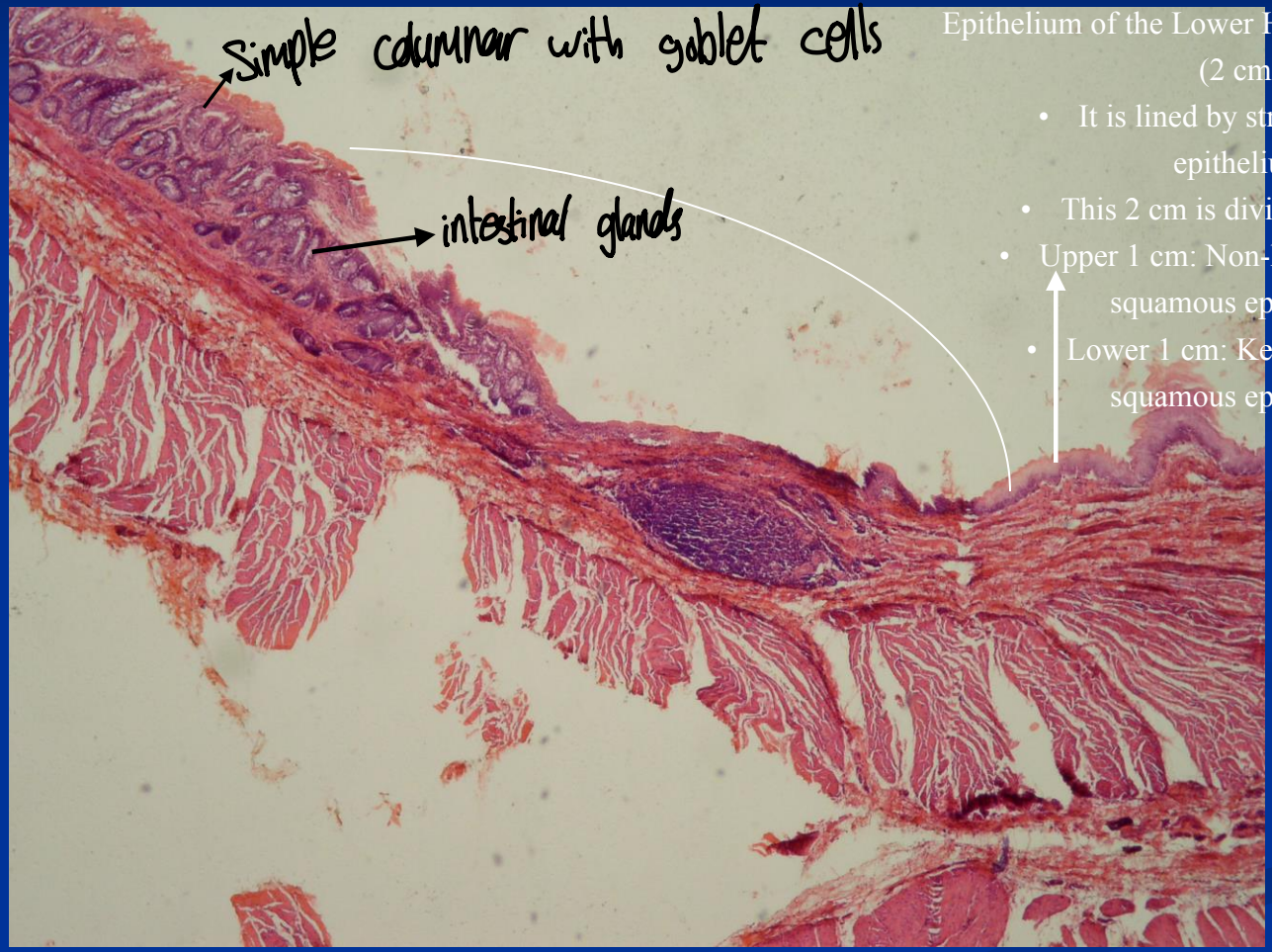
Mesoappedix lymph. Nodu.
Crypt of Lieberkuhn



Mu.x.



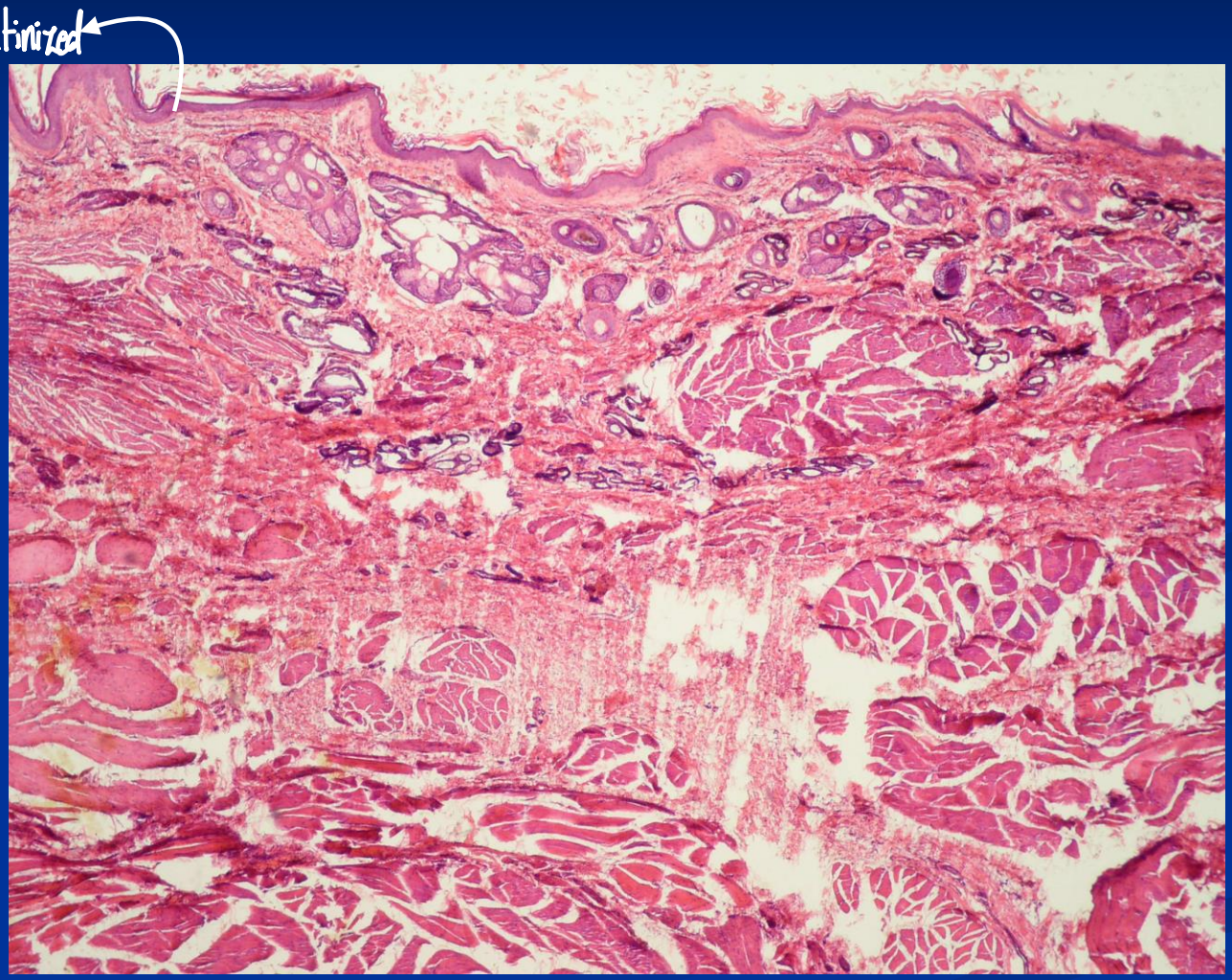
Rectoanal junction



Epithelium of the Lower Half of the Anal Canal (2 cm):

- It is lined by stratified squamous epithelium.
- This 2 cm is divided into two parts:
- Upper 1 cm: Non-keratinized stratified squamous epithelium
- Lower 1 cm: Keratinized stratified squamous epithelium

Lower anal canal



سبحان الله ، والحمد لله ، ولا إله إلا الله ، والله أكبر

Gallbladder

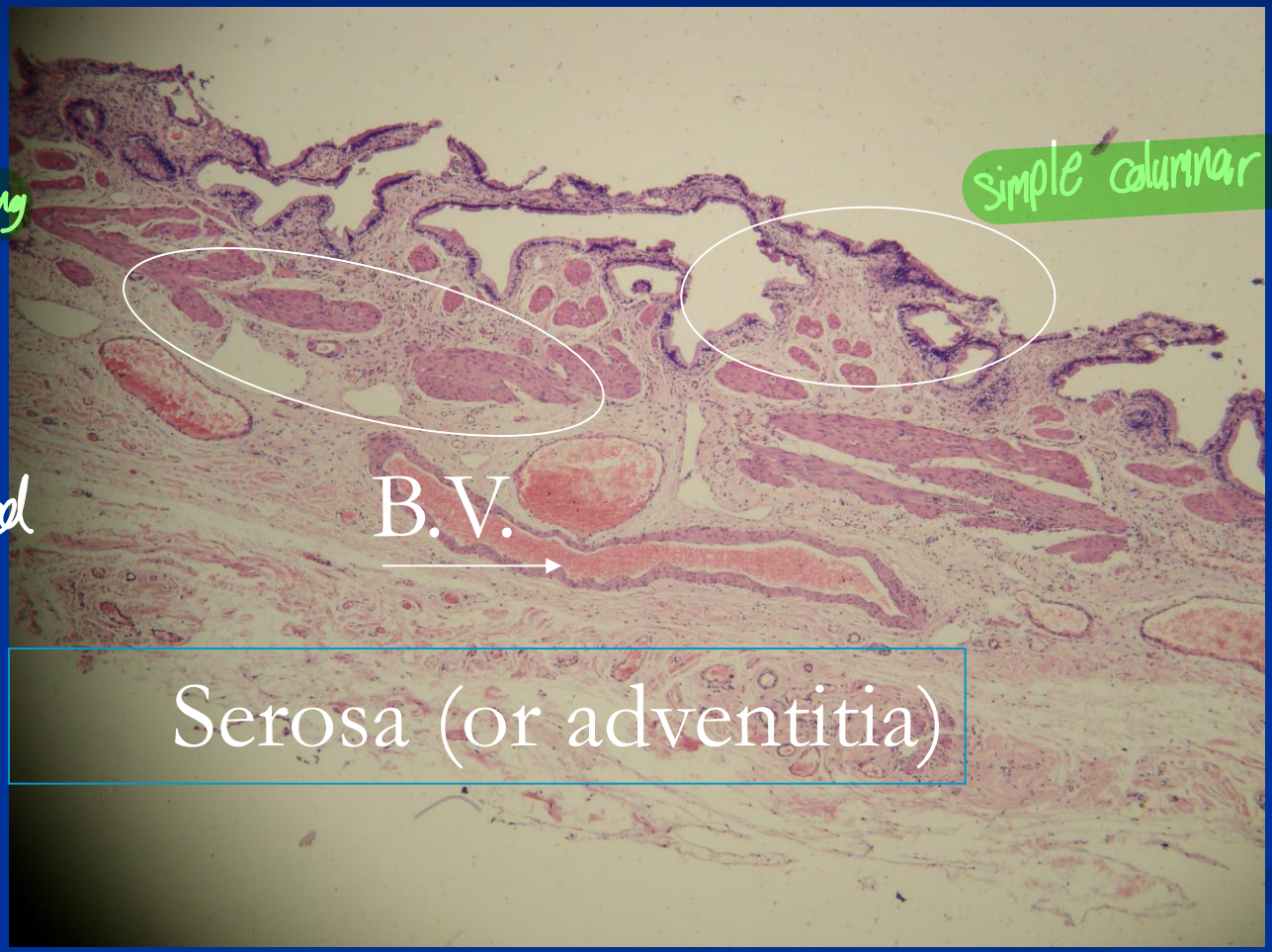
Honey comb folding

musc. Bundleswithin lamina propria

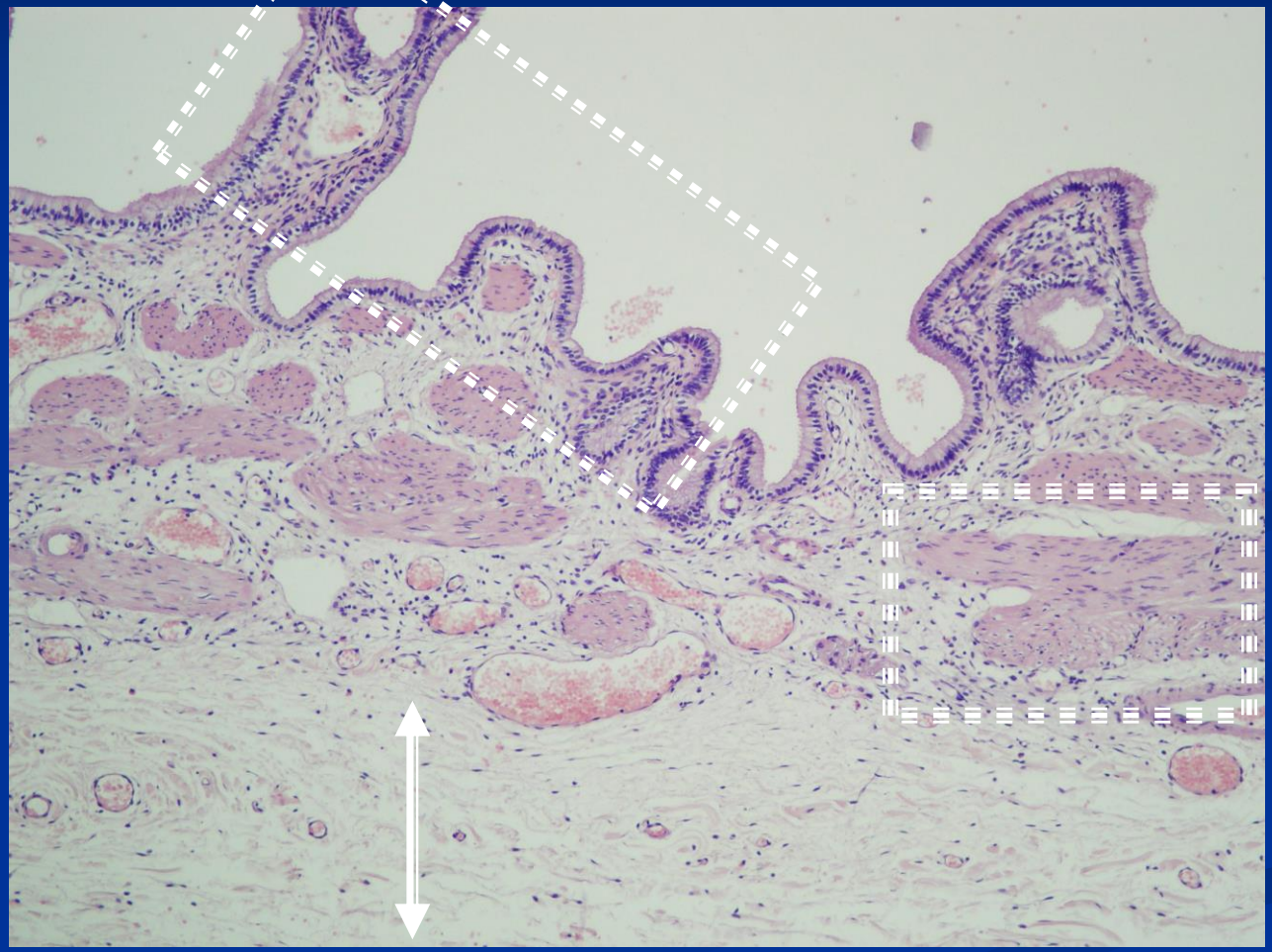
→ Muscularis is patches

→ Abundant folding of the mucosa

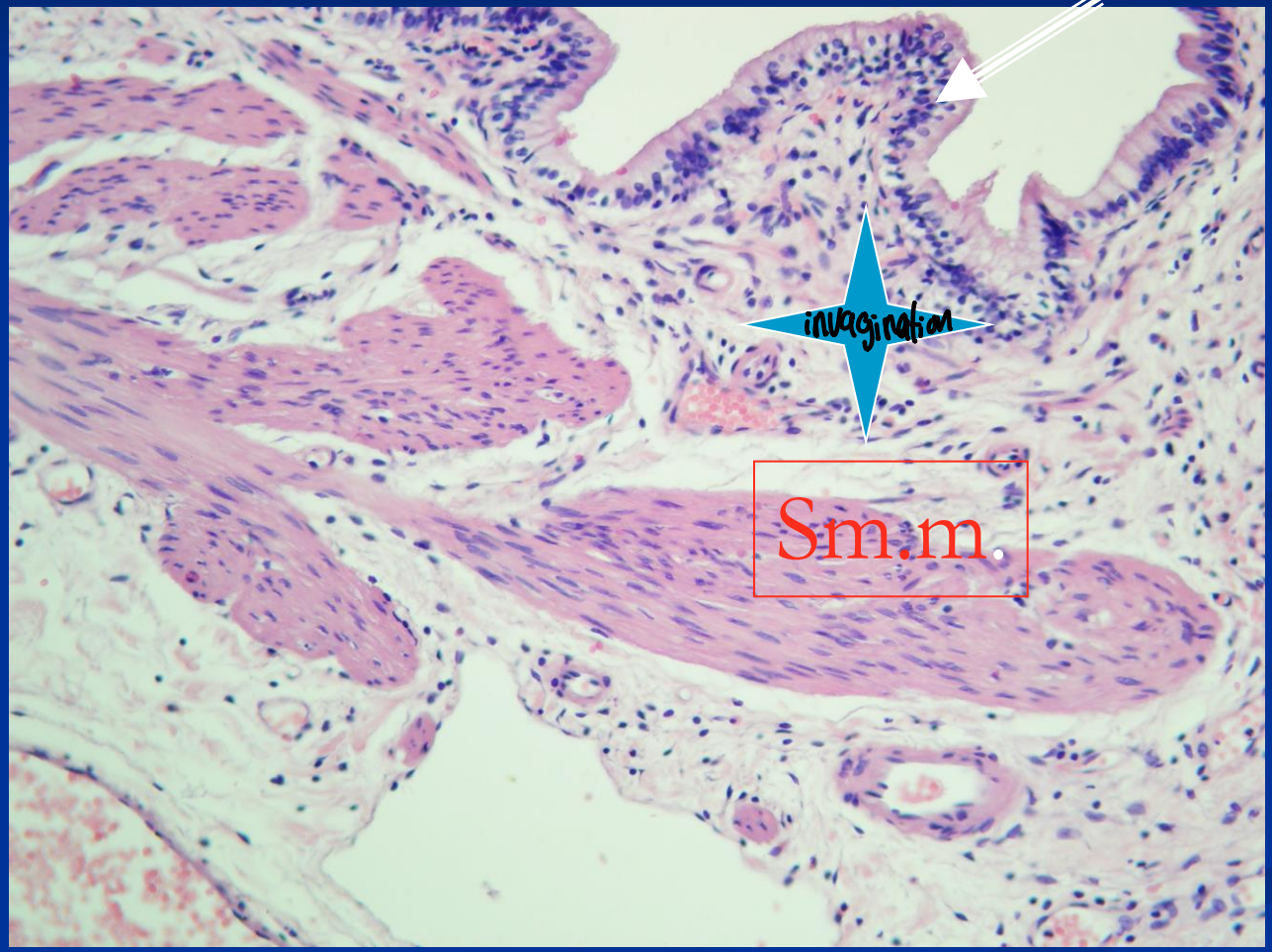
+submucosa and LP are ill-defined



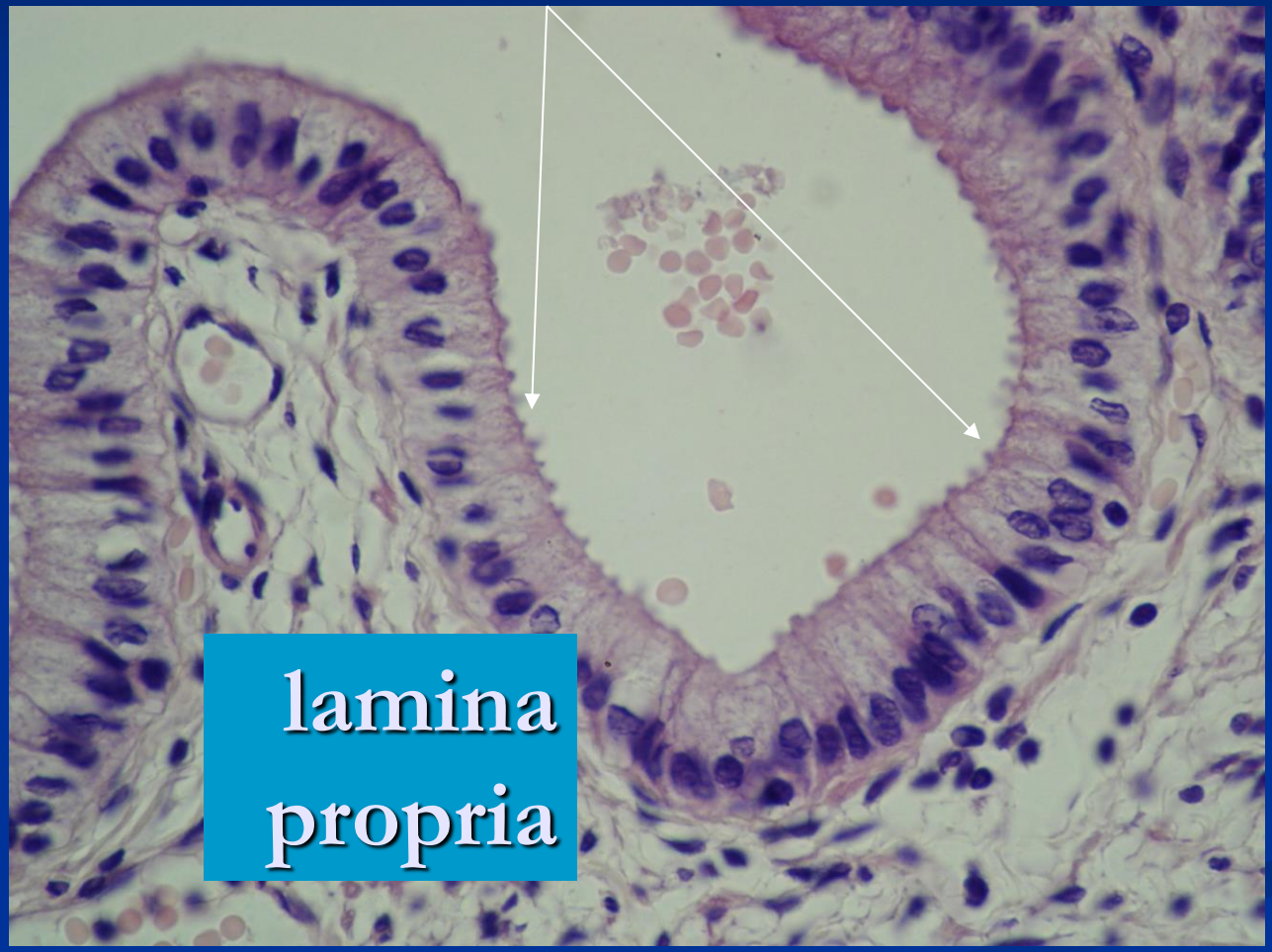
Honey comb folding mucosa musc. Bundleswithin lamina propria



lamina propria



Simple columnar epithelium

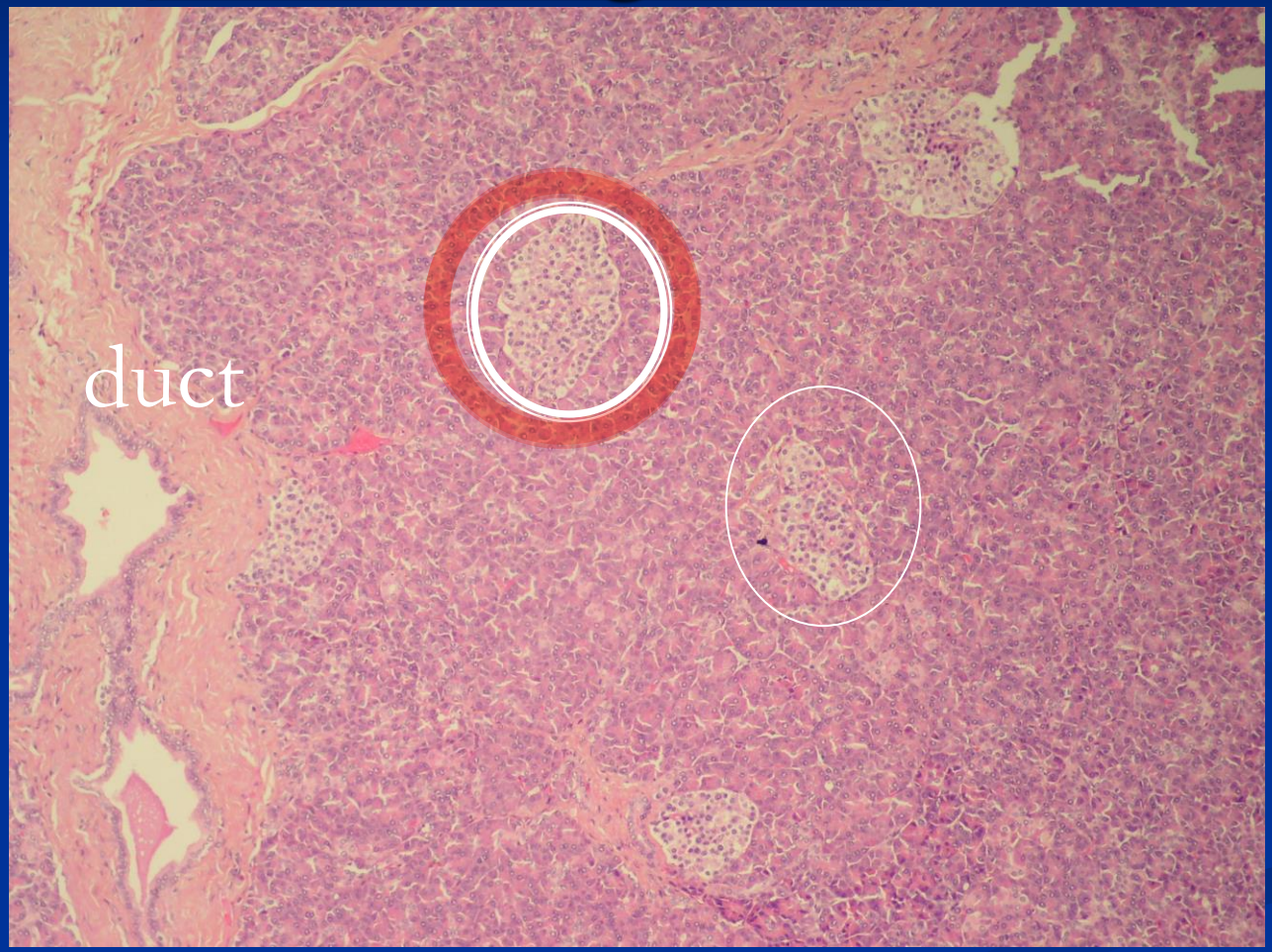


ربنا آتنا في الدنيا حسنة وفي الآخرة حسنة وقنا عذاب النار

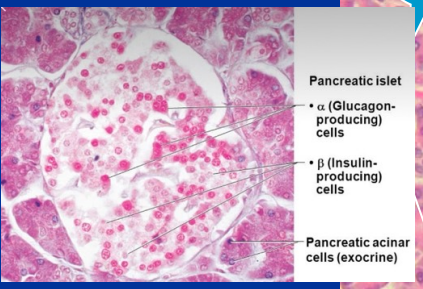
Pancreas

Mixed endocrine-exocrine gland

Islet of Langerhans



Exocrine pancreatic portion: compound acinar gland



Large -
and in the center
>Alpha cells which
secrete glucagon.

Small and
scattered
>Beta cells which
secrete insulin

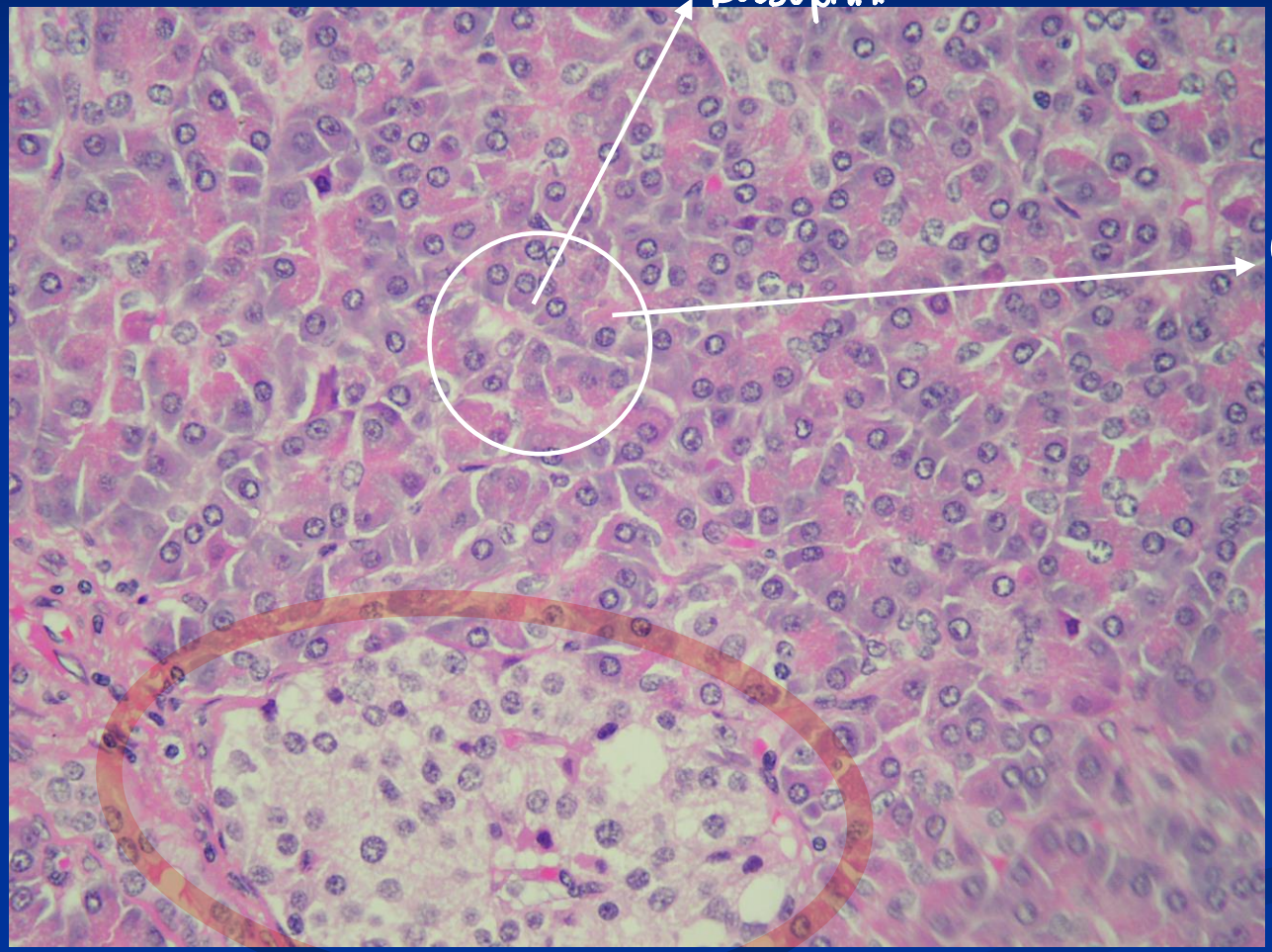
Langerhans

septa

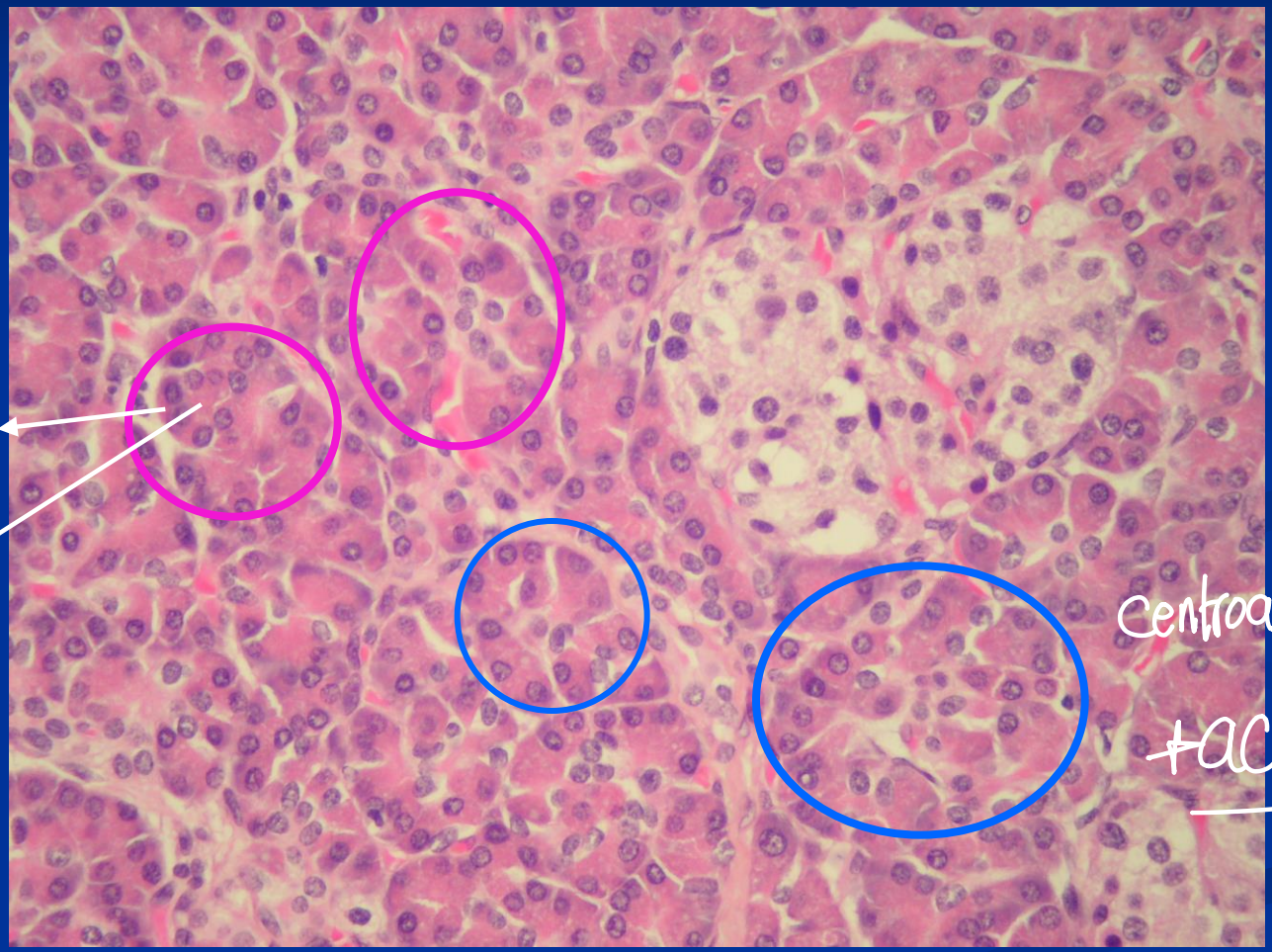
pancreatic acini

-Base : basophilic
- Apex: acidophilic
} Polarity

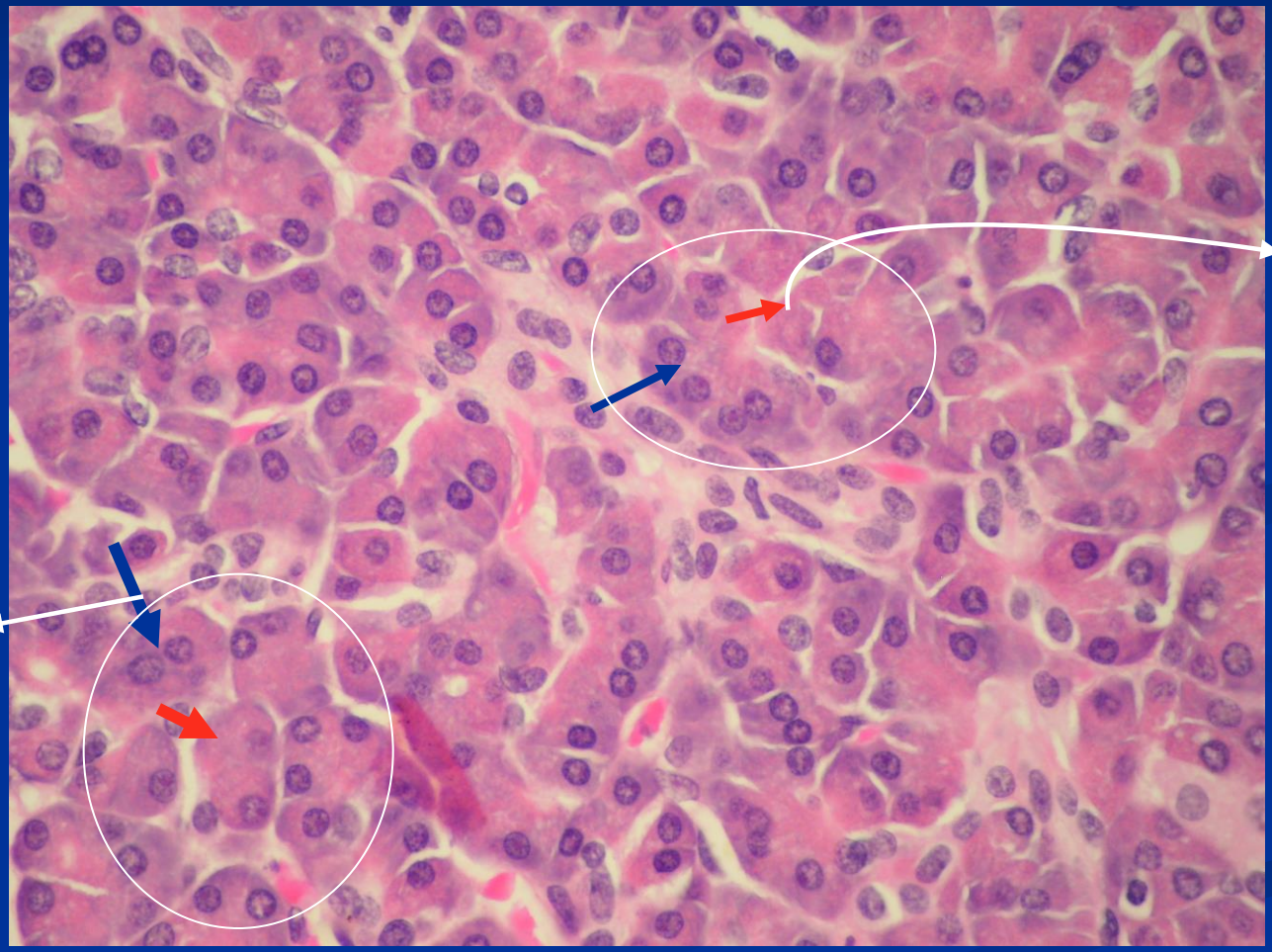
* السلايد الجاي أوضح



pancreatic Serour acini: protein secretory cells



Zymogenic granules
basophilil cell cytoplasm



Inter calated duct

+No striated ducts

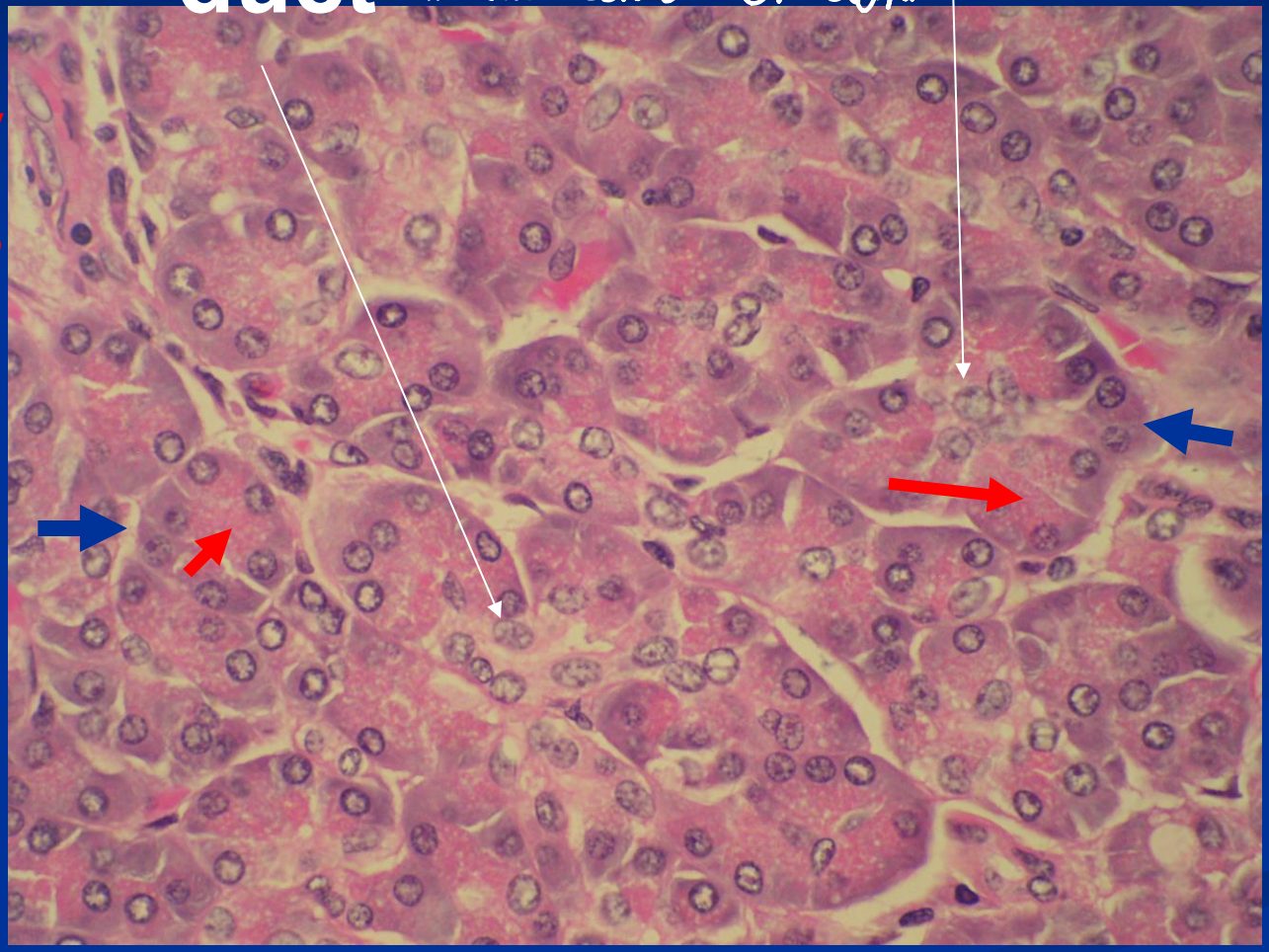
Centroacinar cells

large and pale

in the center of acini

Secretory granules

r-ER

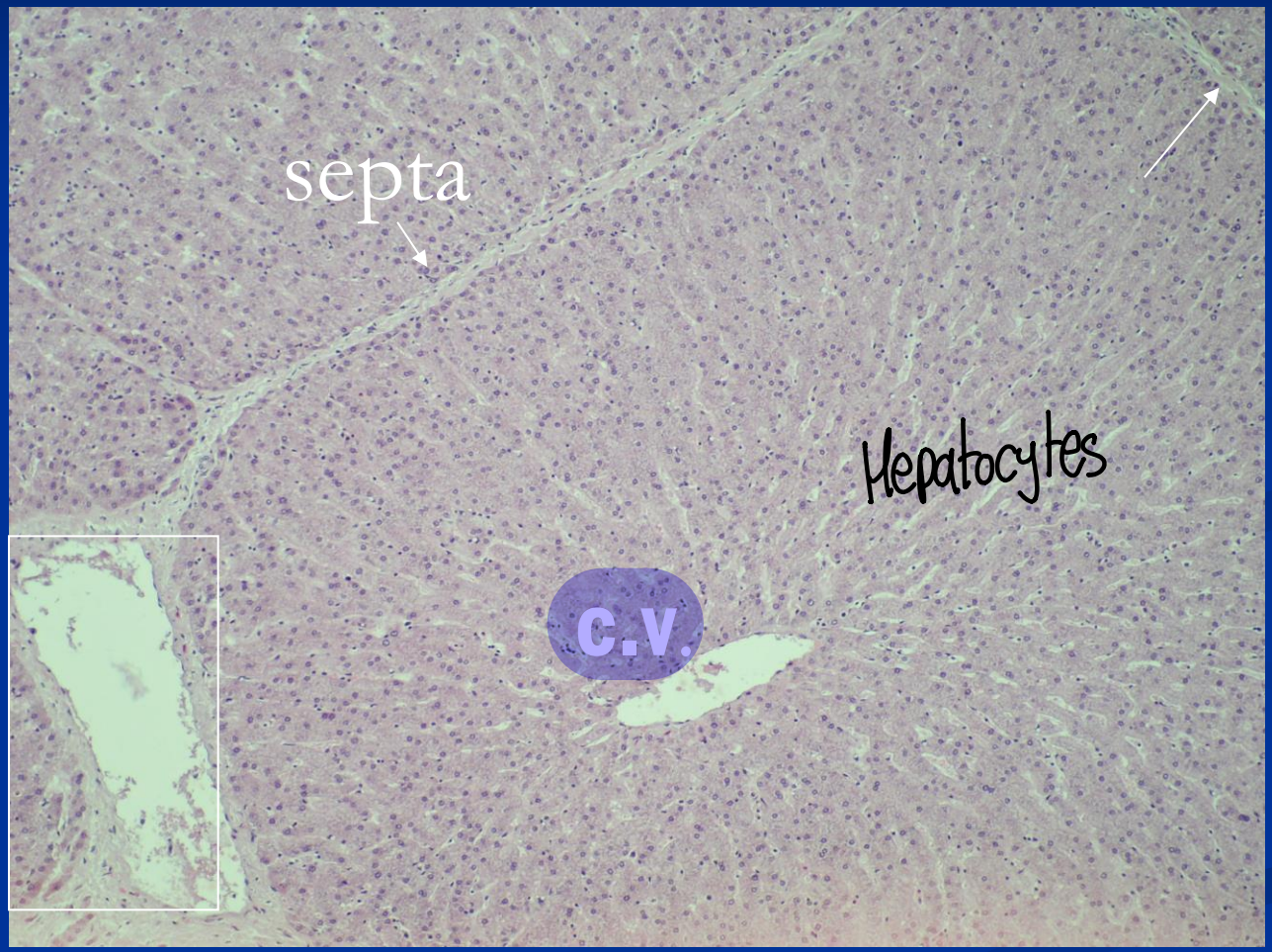


اللهم لك الحمد حتى ترضى، ولك الحمد إذا رضيت، ولك الحمد بعد الرضى

The Liver

Animal liver

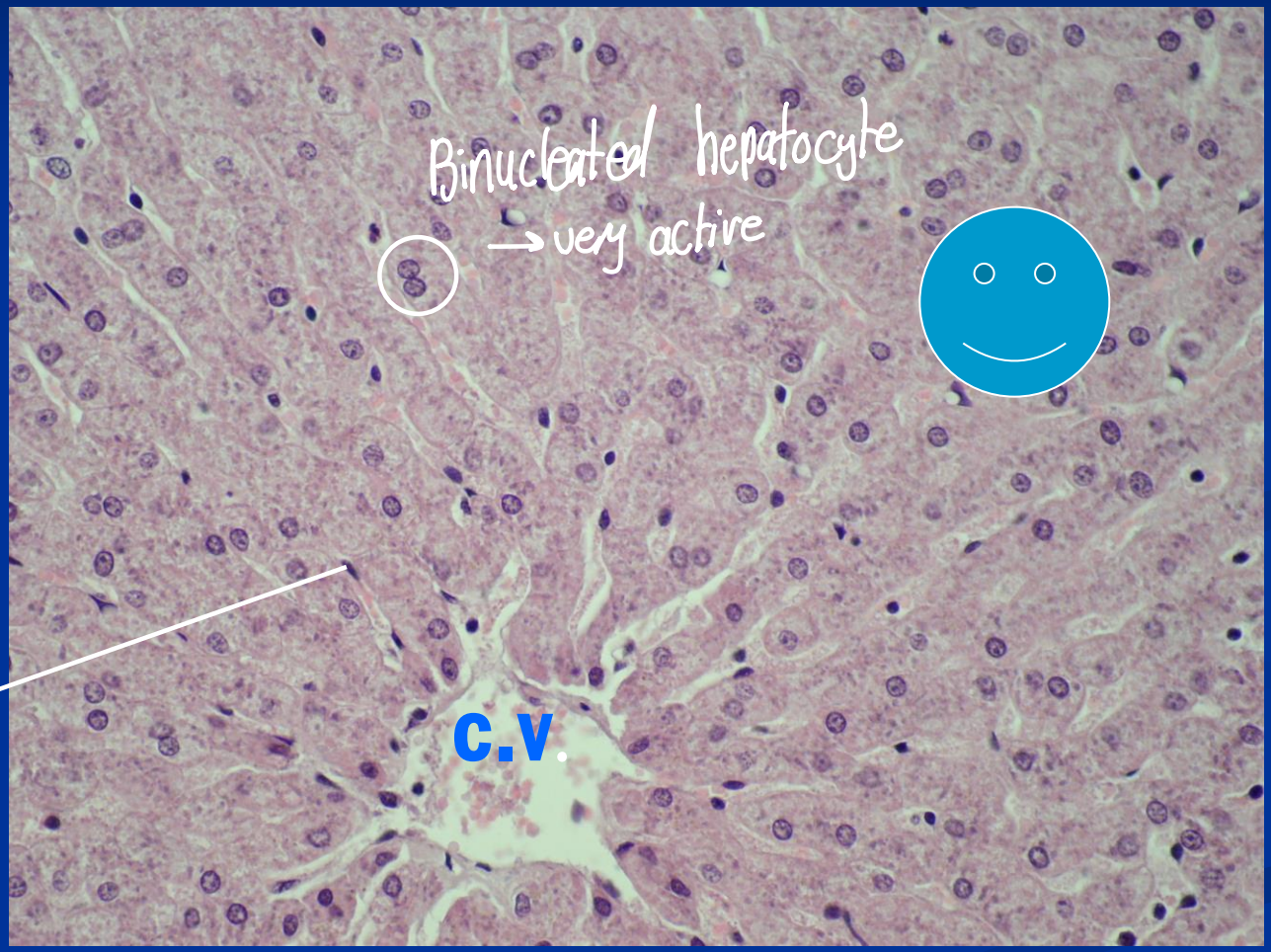
glisson'capsule



Portal space

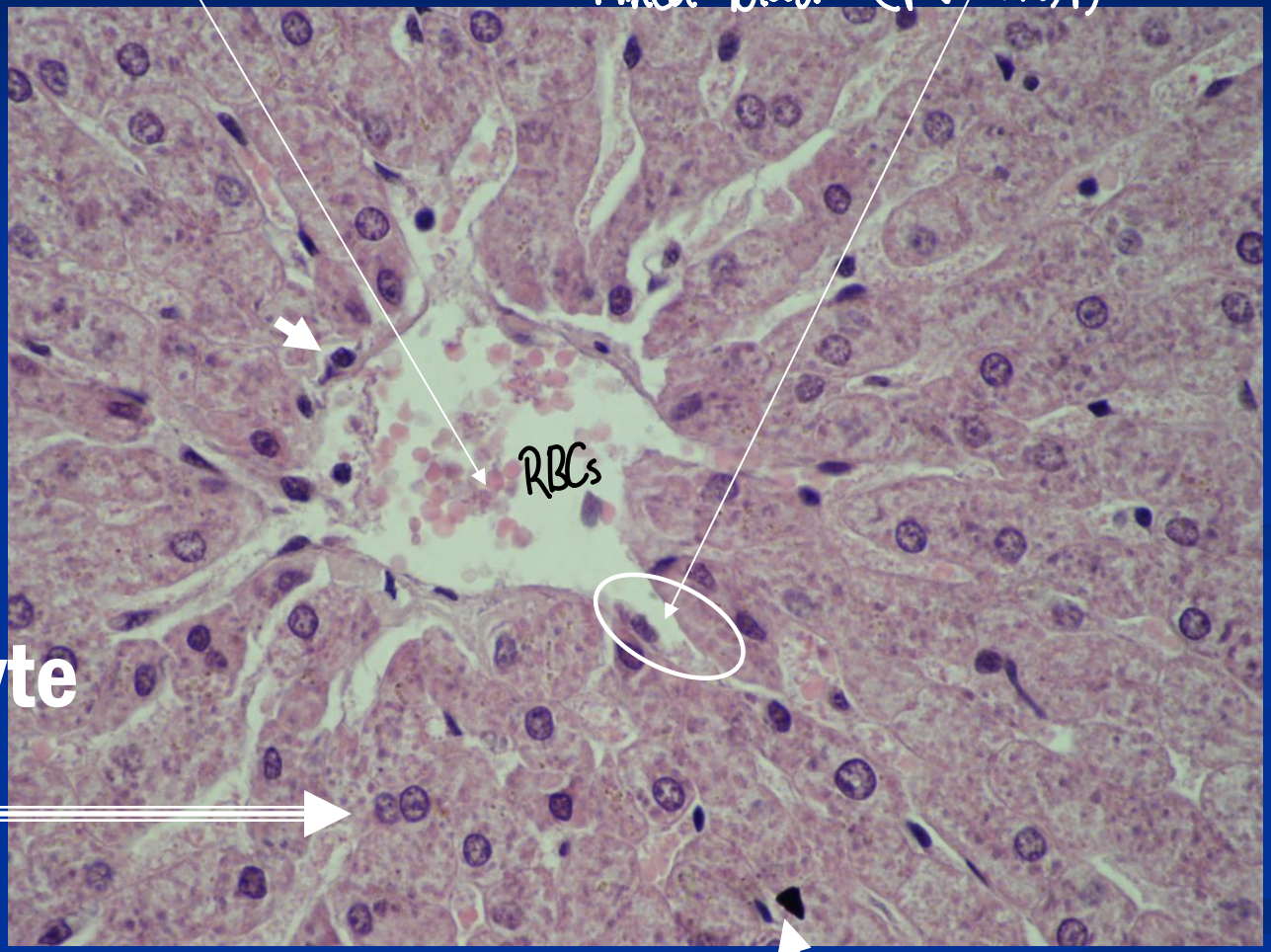
+portal triad

Parenchyma portion



Central vein

Sinusoid(endothelium)

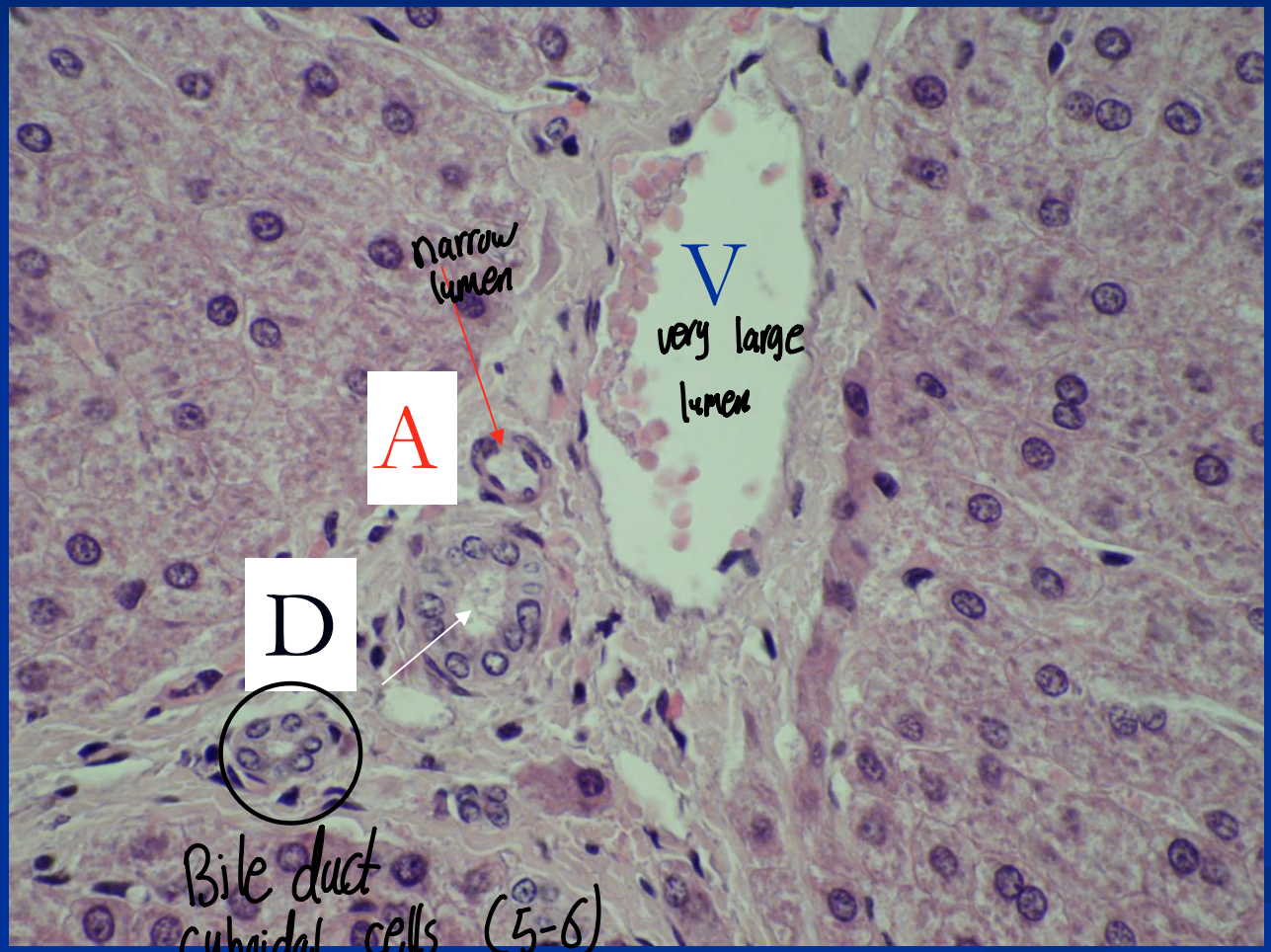


hepatocyte

Kupffer Cell

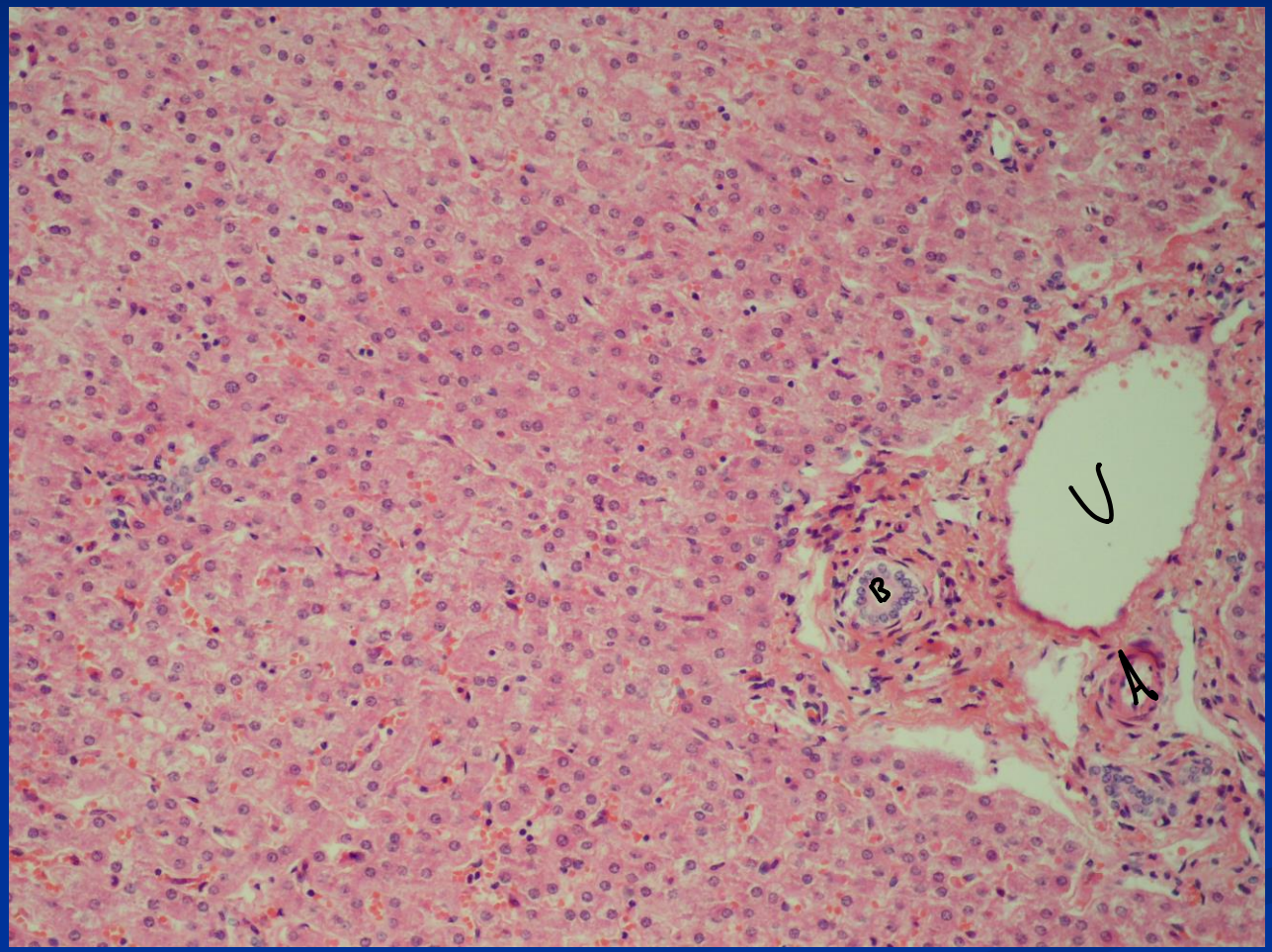
Portal vein hepatic artery bile duct

Portal triad



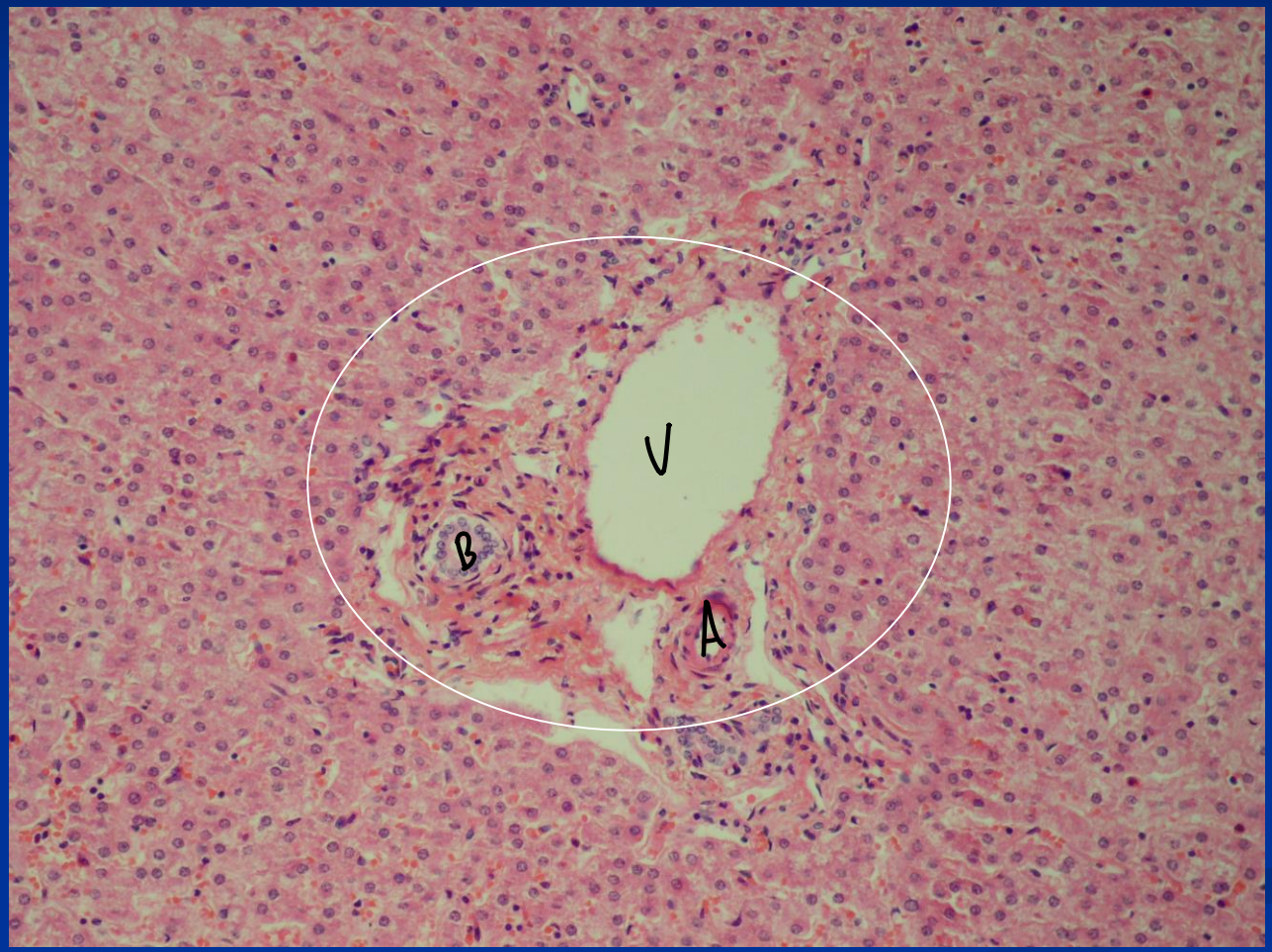
Human Liver

+Boundaries ill defined



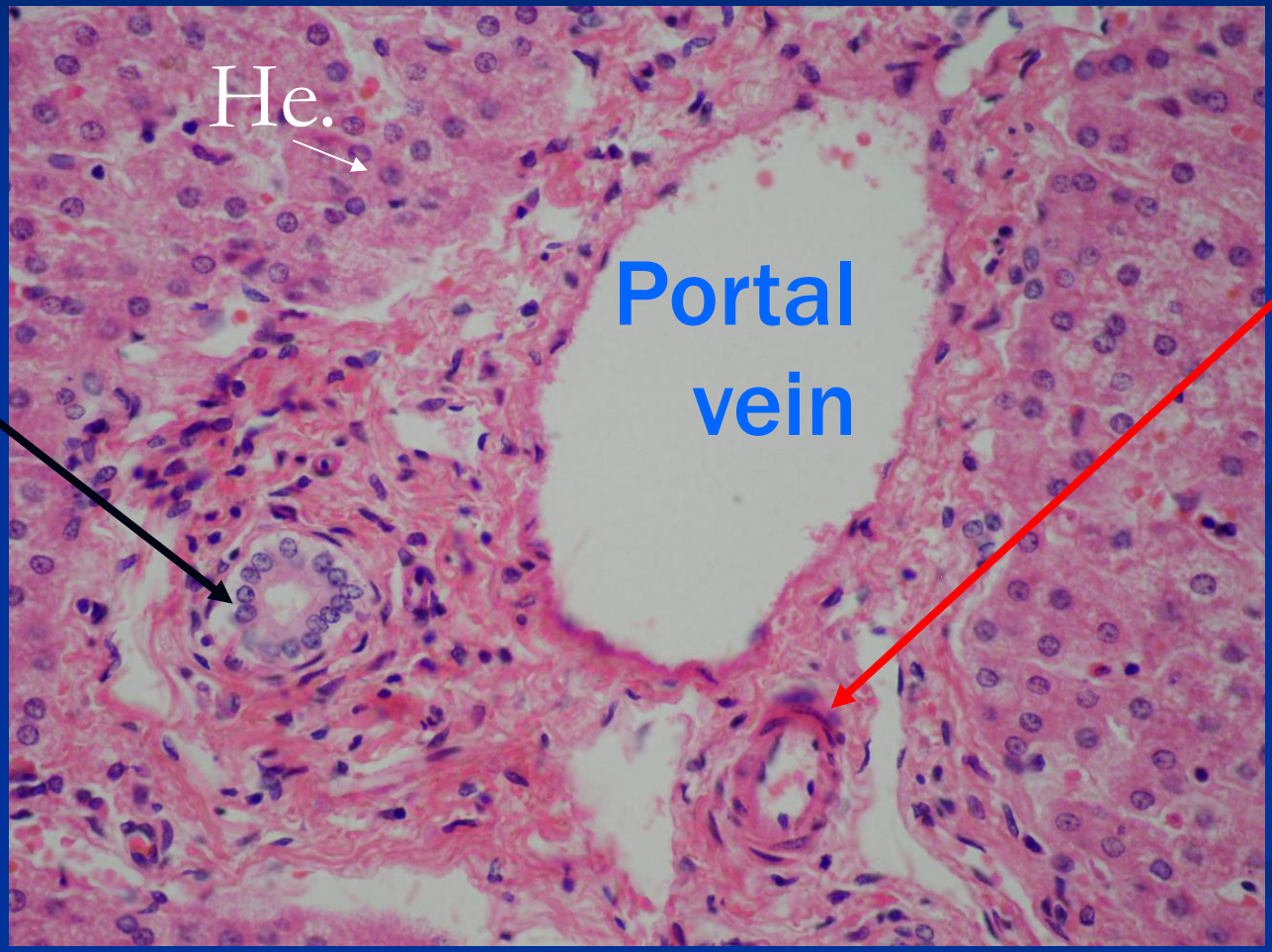
Portal triad

Portal space



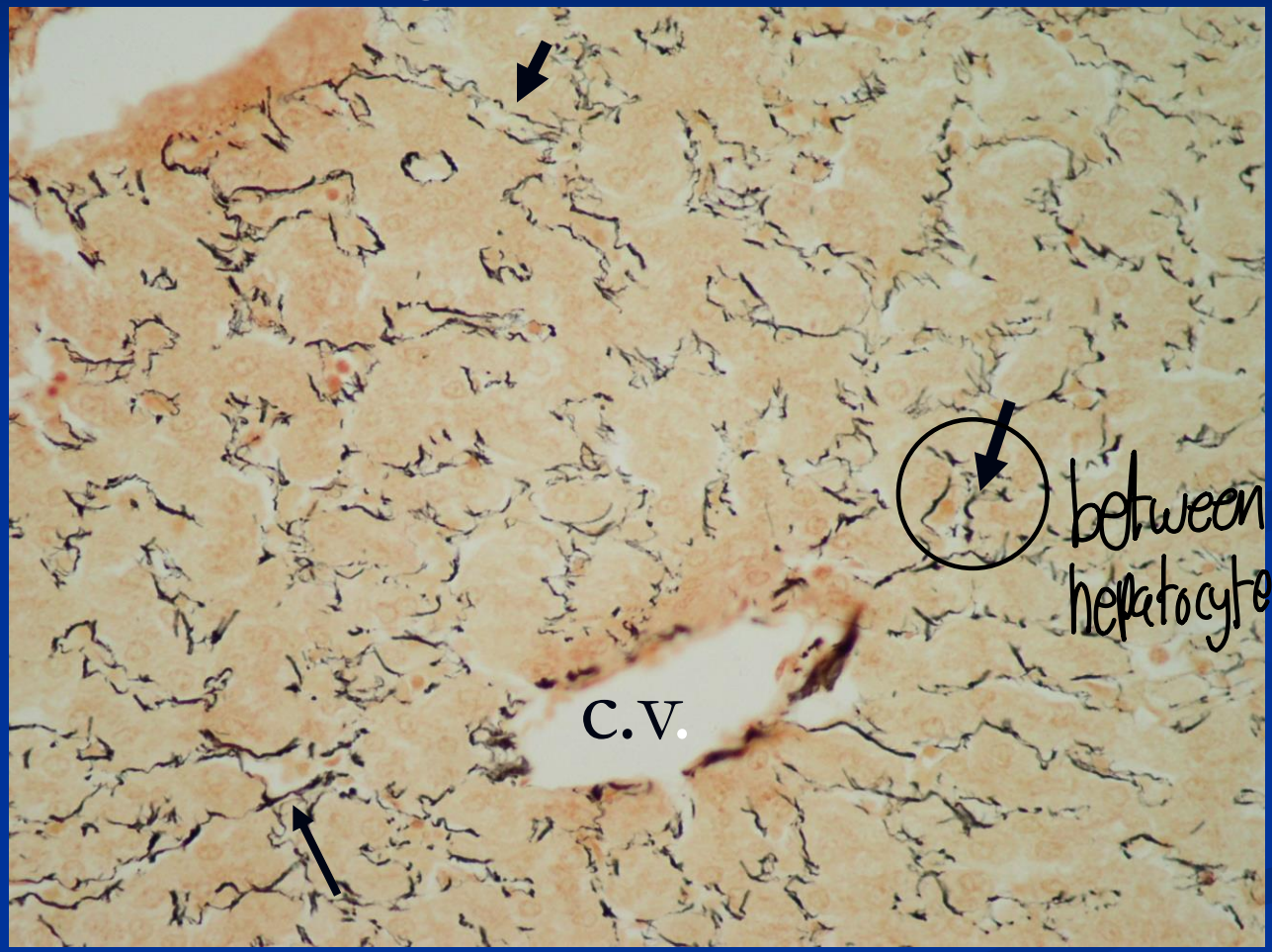
bile duct

hepatic artery



Silver impregnation reticular fibers

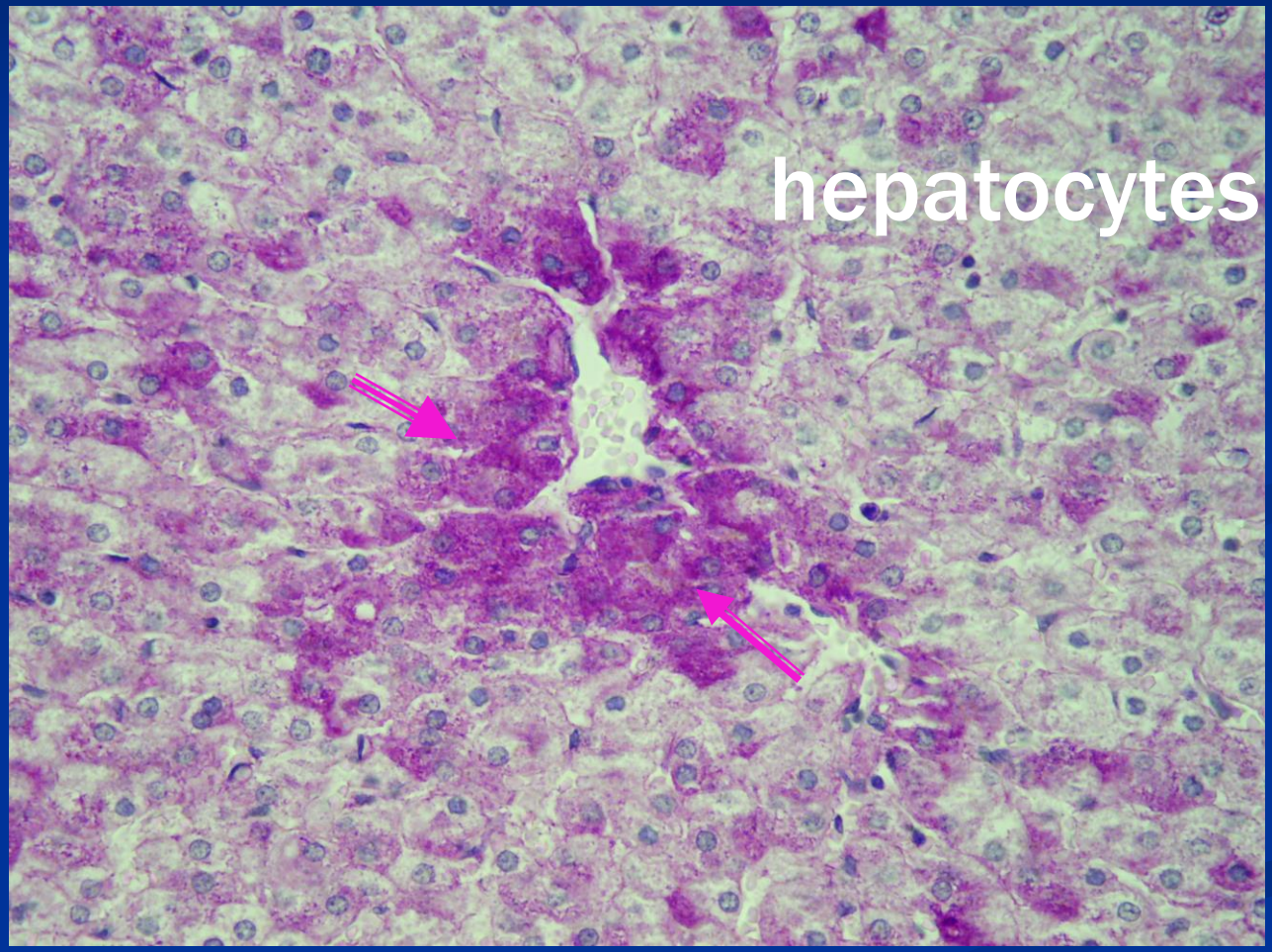
special stain



P.A.S reaction

special stain

glycogen



الحمدلله 🙏

End of 130 slides 🔥🥳

If this helped you, please keep me in your prayers 💞

And if you find any mistakes, please let me know