

Digestive System

University of Jordan
Faculty of Medicine
Batch of 2013-2019

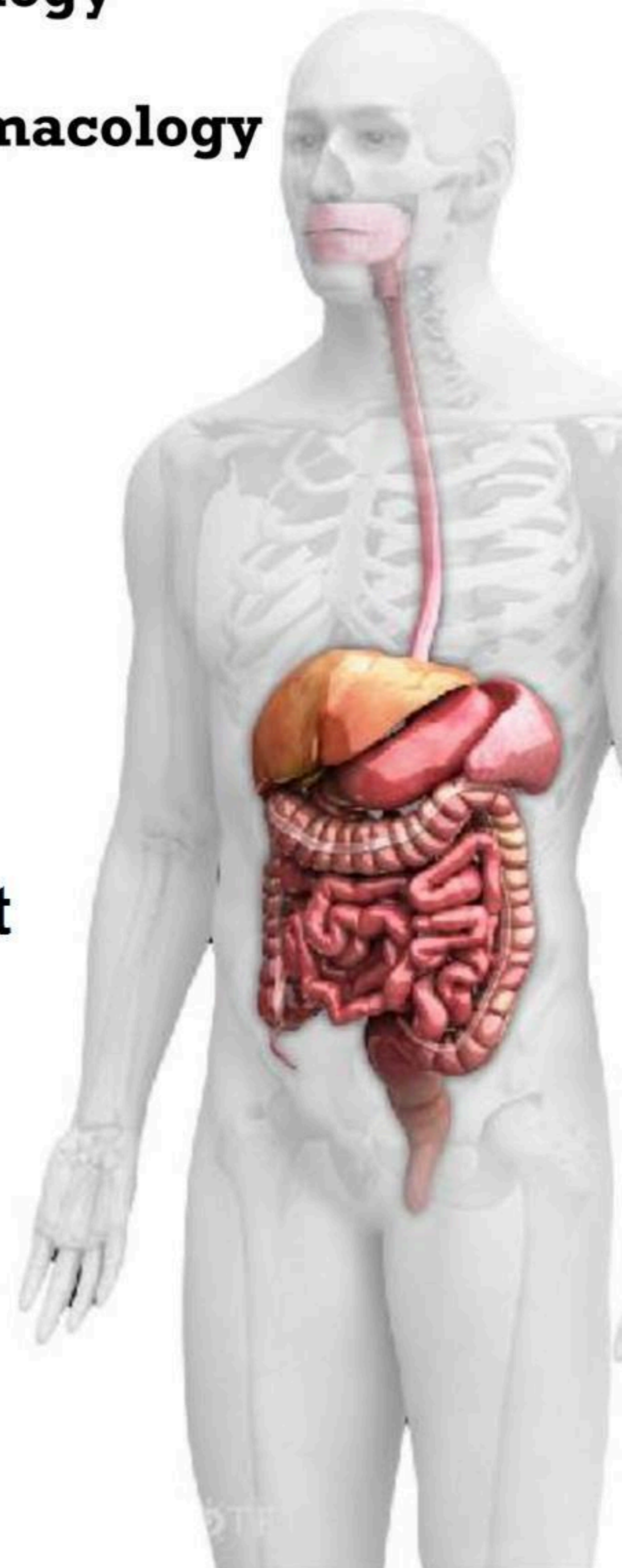


Slide Sheet Handout Other

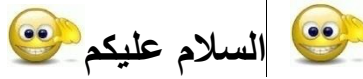
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Sheet #: Histology lab 1
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Date:
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Histology of the Upper Gastrointestinal Tract



In this lecture we will talk about the histology of the upper GIT which includes:

1- The lip.

* the skin *the vermilion zone *the inner part (inside the oral cavity)

2- The tongue

*the dorsal part *the ventral (lower part) *the tip of the tongue

3- Major salivary Glands:

*Parotid gland

*Submandibular gland

*Sublingual gland

4- The esophagus.

*the upper third

*the middle third

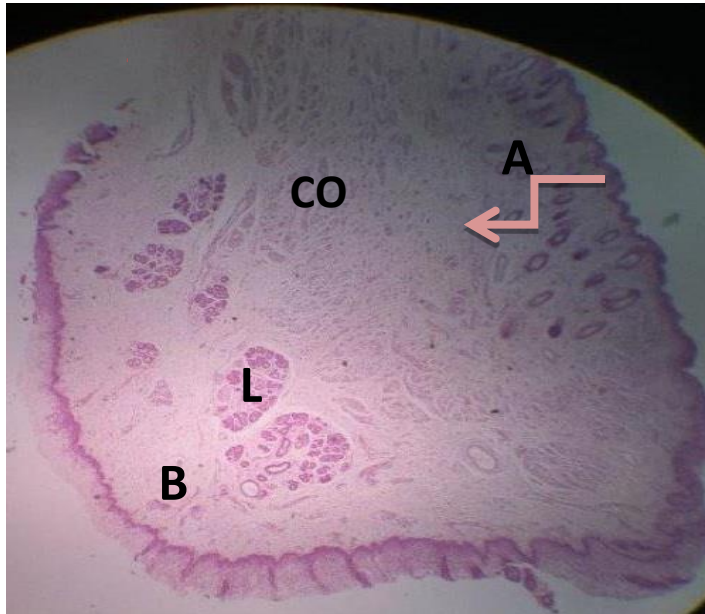
*the lower third

And finally the CARDIA (Gastro-esophageal junction)

Now we will start and I hope you will enjoy this sheet 😊

1- THE LIP:

Here we have a section in the lip:



-The **Lip** is divided to **three** regions or parts :

A- the skin: (from the outside)

-it contains hair follicles (where the arrow in the section above), sebaceous glands and sweat glands.

-It's normal skin, Stratified Squamous epithelium, keratinized.

B- the vermilion zone :

-Modified thin skin

- it's also called (the red lip zone,transitional zone).

-it contains numerous blood vessels so it's red in colour.

- it contains nerve terminals so it's a very sensitive area.

- it doesn't contain any hair follicles,sebaceous glands or sweat glands.

-in this layer the **lamina propria** is invaginated through the surface area, long connective tissue papillae extend deep into the epithelium. Capillaries and nerve

terminals are carried close to the surface in these papillae, those invaginations are known as **dermal papillae**.

C- The inner part (labial part) of the lip (inside the oral cavity)

- it contains labial salivary glands which are minor salivary glands
- the surface epithelium is stratified squamous **Non keratinized**
- it contains glands (labial glands) in the **submucosa**. (L) in the figure above
- it contains also mucus glands

*******The Core of The Lip*******

- It's formed by **SKELETAL** (striated) muscles
- Orbicularis oris muscle forms the core of the lip (CO at the figure above)



How we can know that this muscle is striated under the microscope?

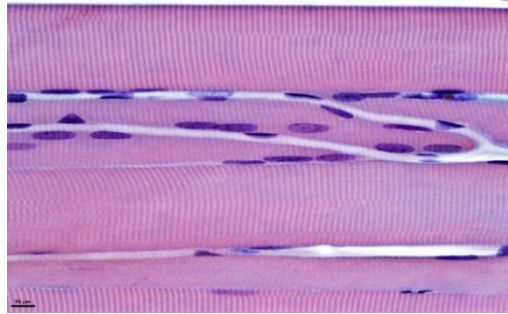
- the nucleus is peripheral and it's flattened



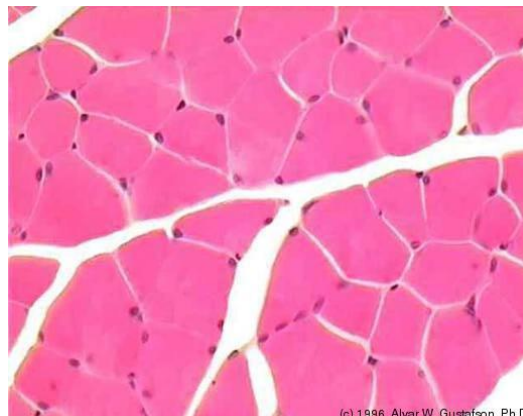
So when you look at a section of the core of the lip you find that the nuclei are **flattened** and located **peripherally** and they appear as dark

dots, and the rest mass which is coloured in red is the muscle fiber  .

#Generally, this is the appearance of any skeletal muscle (ex: orbicularis oris muscle) in **a longitudinal** section



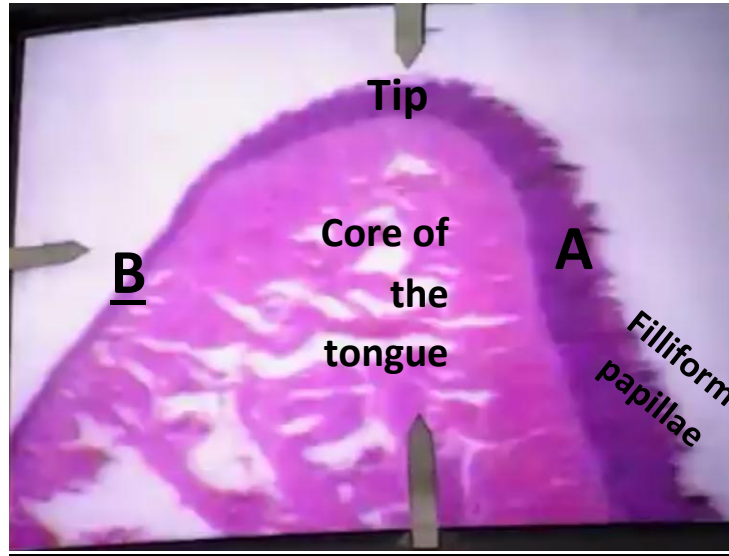
and this is the appearance of any skeletal muscle (ex: orbicularis oris muscle) in **transverse** section



Now we are done with the lip and I will start talking about the tongue.

2-THE TONGUE :

The tongue is a muscular organ that has skeletal muscles; intrinsic & extrinsic muscles.



--here we have a section in the tongue,,it's composed of two surfaces

A- dorsal surface

B- ventral or lower surface

-And it has a **Tip**

Note: the mucosa layer (mucous membrane), skeletal muscles and a very thin layer of submucosa in between.

A- The dorsal surface of the tongue :

-stratified squamous parakeratinized.

- it's filled with taste buds

-it has projections formed by papillae like the filiform papillae

*-Note that: The dorsum of the tongue is para-keratinized due to injuries; it used to be **keratinized** before injury, it cannot get back to normal (keratinized) since this process is irreversible.*

**** Types of lingual papillae:**

***Filliform papillae:**

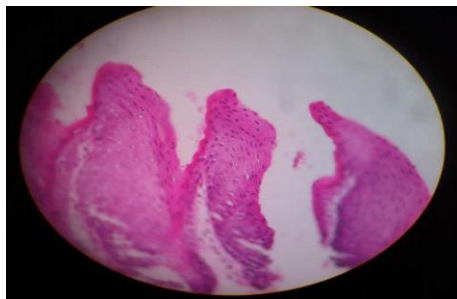
_they are just forming projections at the dorsum of the tongue

- they don't have any taste buds

What's the importance of these projections ? 🤔
To increase the surface area of the dorsum of the tongue and dissolving of materials.

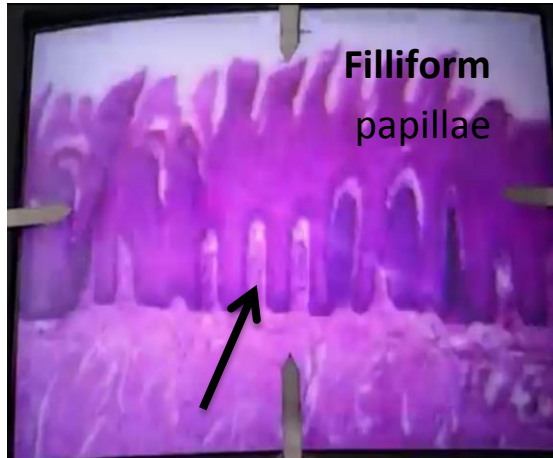


-Section in the filliform papillae with no taste buds



-Connective Tissue Papillae which projects into the epithelium and delivers blood supply, nerve supply and lymph vessels

- note : the sub-mucosa is found in the tongue but it is very thin.



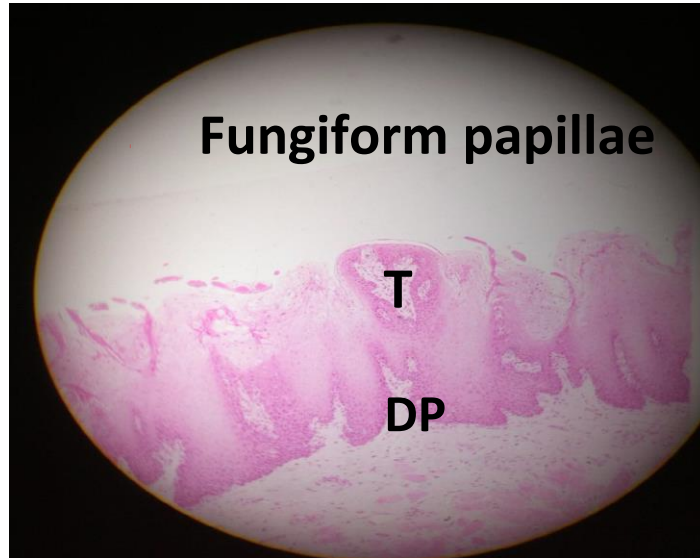
**** -Fungiform papillae:**



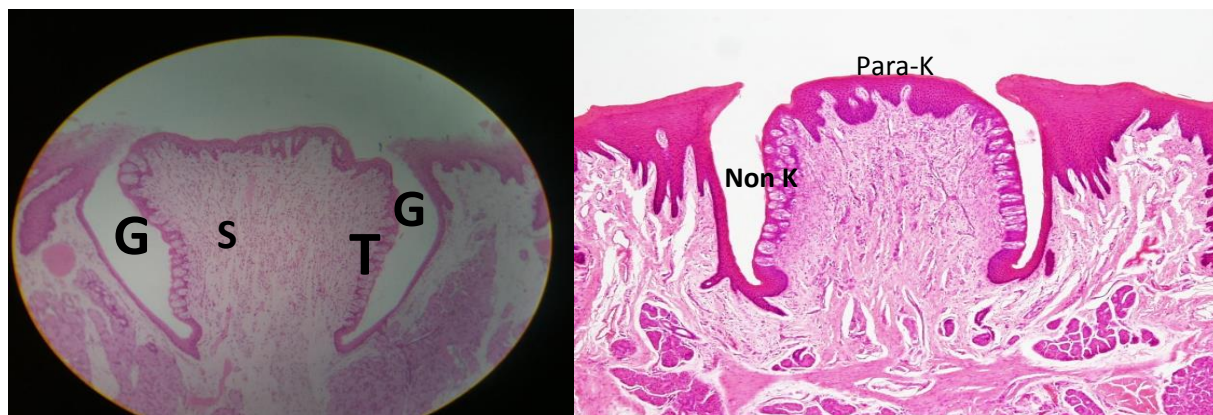
-they are mushroom in shape

-they have taste buds on their upper parts (T in the figure below)

-The lamina propria makes invaginations (dermal papillae) through the fungiform papillae (DP) in the figure below.



***-Circumvallate papillae:



-their number is from 8-12

-their position is anterior to the sulcus terminalis and the foramen cecum

-around the papillae there is a circular groove (only one groove.) G in the figure above



in the figures above because of the section it seems that there is two grooves because it's 2D but in fact there is only one circular groove.

-they contain taste buds at the sides of the papillae (at one side of the groove, the medial side of the groove or the sulcus, or the lateral side of the papillae. (T in the figure above). The other side of the groove is stratified squamous non-keratinized.

-also they contain a gland (**Von ebner's gland**) a **serous** gland, It's duct opens in the bottom of the sulcus and it helps in the dissolving of materials. It contains **serous acini** with a very narrow lumen in the middle.

-in the middle of each acini in the gland there is a lumen



Now; before we continue we need to know what's the acinus? And what are the main characteristics of the serous acini?

An acinus (plural, acini) refers to any cluster of cells that resembles a many-lobed berry

-Serous acini :

The nuclei are basal and rounded

The boundaries between the cells are undefined/ not clear

It has a narrow lumen

*if we compare it with the mucus acini we will find that they are different.

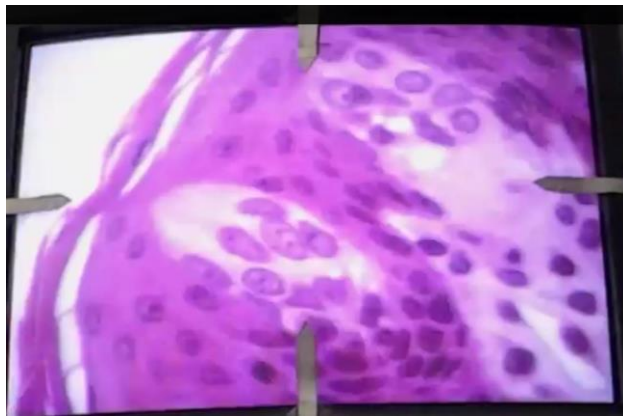
******* S in the figure above resembles:**

Connective Tissue Papillae and striated muscle core*****

This picture shows the the Von ebner gland and it's duct .



Now, we will talk about the taste buds which are found in the (**fungiform** and the **circumvallate** papillae),,and the figure below resembles a magnified taste Bud:



The taste bud contains three types of cells:

1-Bipolar cells=gustatory=taste cells:

-They are localized in **the middle** of the taste bud and they are responsible for the taste.

- on it's upper surface, there is a pore from which the dissolved material (which has the taste) penetrate these cells .

-at the bottom, they have nerve fibers which take the taste, so; these cells convert the chemical to electrical impulse.

2-The supporting cells:

- they are localized in the periphery (on sides/lateral)
- they support the bipolar cells.

3-basal stem cells:

- they are localized at the base of the taste bud, and they undergo mitosis and differentiate into many type of cells like bipolar or supporting cells.

Now we are done with the dorsum of the tongue.

The second part of the tongue is:

B-The ventral surface of the tongue:

- it's covered by stratified squamous **Non keratinized** Layer
- it's filled with salivary glands.

*******The Core of the tongue*******

- The core of the tongue is **STRIATED** muscles; nuclei are peripheral and multiple,, as we know the tongue is a muscular organ most of it is composed of muscles (extrinsic+intrinsic muscles of the tongue).

Now we will start talking about the salivary glands


3-SALIVARY GLANDS:

We are going to talk about three *major* glands : the parotid, the submandibular, and the sublingual glands.

(The type of these three glands is: **Compound tubuloacinar**)

A-THE PAROTID GLAND

- it's surrounded by two capsules

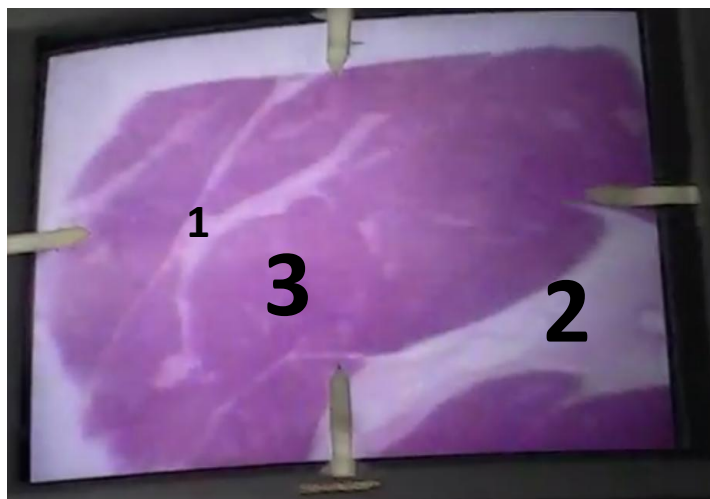
In general all major salivary glands are surrounded by one capsule except for **the parotid** ; 

It's surrounded by an extra capsule.

-the capsule which surrounds the gland gives **Septa that** divide the gland into lobules and lobes.

–inside each lobule there are two types of intralobular ducts: intercalated and striated ducts. –between lobules, we find large amounts of connective tissues containing **large ducts (interlobular ducts)** between lobules.

-between the lobes there are also **large ducts** formed by connective tissue (**interlobular duct**)



This section shows **a lobe** in the parotid gland.

1: interlobular duct (between lobules)

2: interlobular duct (between lobes)

3: Lobule

❖ Inside the gland we have two types of ducts; interlobular & intralobular.

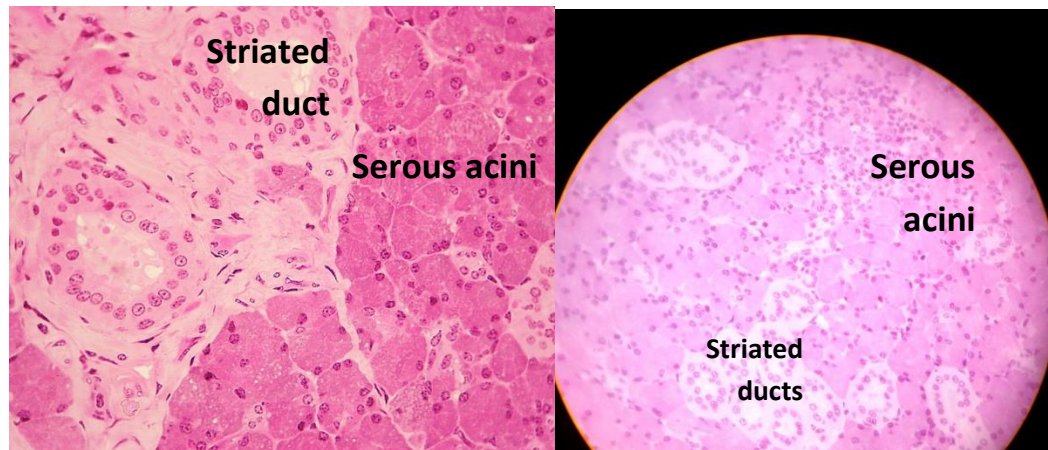
→ The **intralobular** type includes the intercalated and striated ducts and they are composed of **simple cuboidal** epithelium. So inside the lobule it is always simple cuboidal.

→ The **interlobular** type or the large ducts or the excretory ducts are between lobules. They start as **stratified cuboidal** and as you go distally they become **stratified columnar** then **stratified squamous**. Actually the parotid duct that is

outsided the gland and crosses the masseter and pierces the buccinator is composed of stratified squamous epithelium.

-The secretions of the parotid glands are mostly serous

Now if we look at a section in a lobule in the parotid gland:



We notice that there are two areas:

*-**dark area**: represents **the serous acini**:

-the nuclei are near the base, rounded and the lumen is very narrow,,also the boundaries between the cells is undefined.

*-**pale area**: represents **the intralobular ducts (striated and intercalated)**:

****Those ducts are found between the acini inside the lobule****

- the intercalated duct is smaller than the striated duct

– the intercalated duct is located after the lumen and it ends at the striated duct then it ends at the interlobular duct (the striated duct links the intercalated to the interlobular).

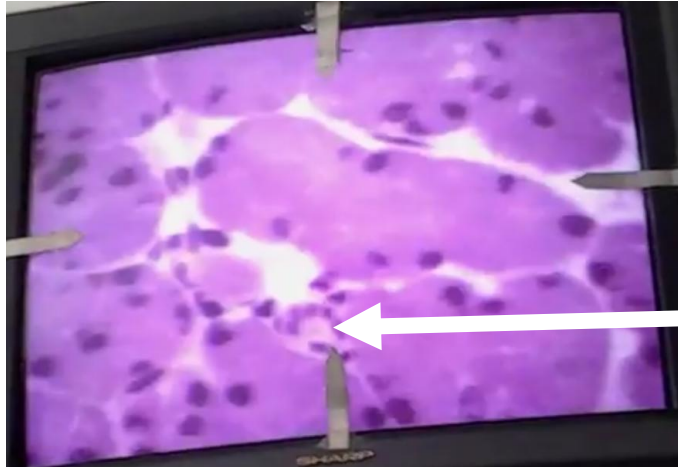
- the number of the cells in the intercalated duct is (5-6) (small duct).

–the number of the cells in the striated duct is larger than 10(larger diameter

than the intercalated duct).

–the type of the epithelium in both of them is **simple cuboidal** .

Here is a section for **the intercalated duct**:



So the pathway of secretions is :

Acinus to intercalated duct to striated duct to interlobular duct to interlobar duct.

B -THE SUBMANDIBULAR GLAND:

-it's a mixed gland (serous+mucus), SO; it has two types of acini:

*serous acini *mucus acini

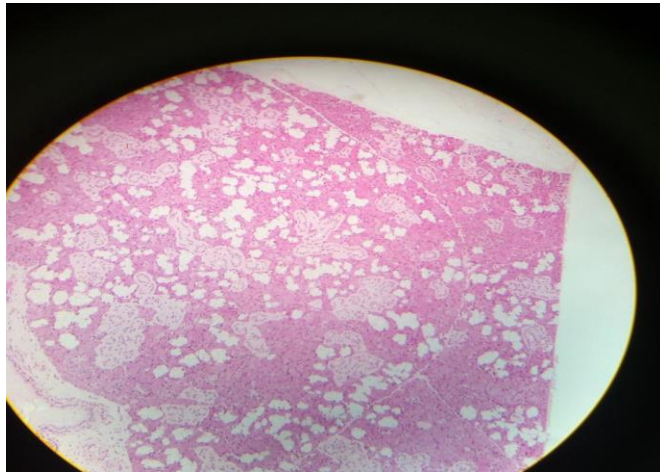
-it's a compound tubuloacinar gland .

-it has a **complicated duct system** because most of the ducts in it are **striated ducts** and they are numerous.

-intercalated ducts will not appear

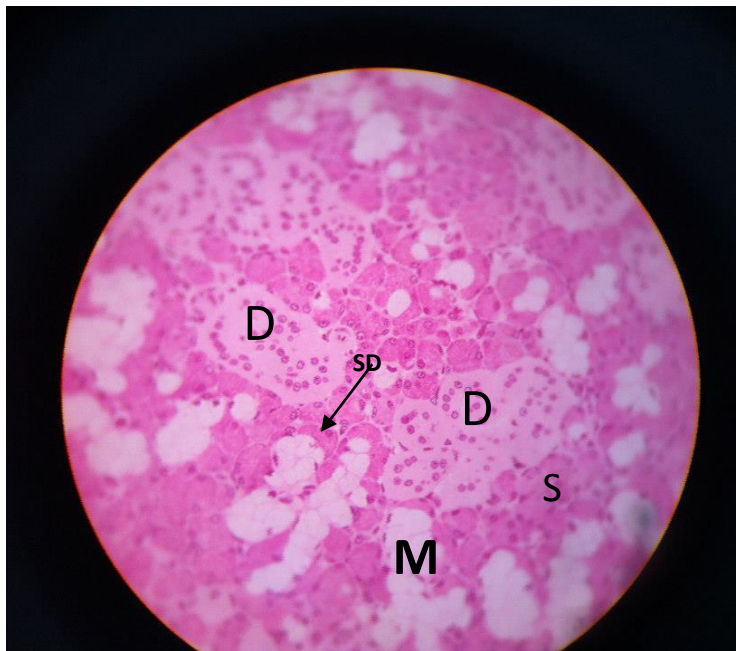
-also it has large ducts(interlobular and interlobar) which are made by septa of connective tissue,, and the type of the epithelium in them is stratified cuboidal or stratified columnar.

Here we have a section in the submandibular gland:



In this section We find three areas:

- *the white area: Mucous acini
- *the dark area (dark pink): serous acini
- *the pale area (light pink): duct system



M: mucus acini

S: Serous acini

D: duct system of numerous striated duct

SD:serous demilune

Mucous acini:

- they have white foamy appearance because of the dissolved white mucus
- they contain vacuoles and in the middle there is lumen and it's larger than that in the serous acini
- the boundaries between the cells of the acini are **distinct**



Quick comparison between the serous and the mucous acini:

	The serous acini	The mucous acini
The Lumen	Small and narrow	Large and wide
The boundaries between the cells	undefined	Well-defined
The nuclei	Basal and rounded(spherical)	Basal and flattened

****SEROUS DEMILUNE****

It's a part of the serous acini overlaps the mucous acini (capping of serous acini over mucous acini)



YOU CAN'T Find the serous demilune in the parotid gland because there aren't mucous acini in the parotid (just serous acini),,you can find serous demilune only in the submandibular and the sublingual glands because they have both serous and mucous acini.

C-THE SUBLINGUAL GLAND:

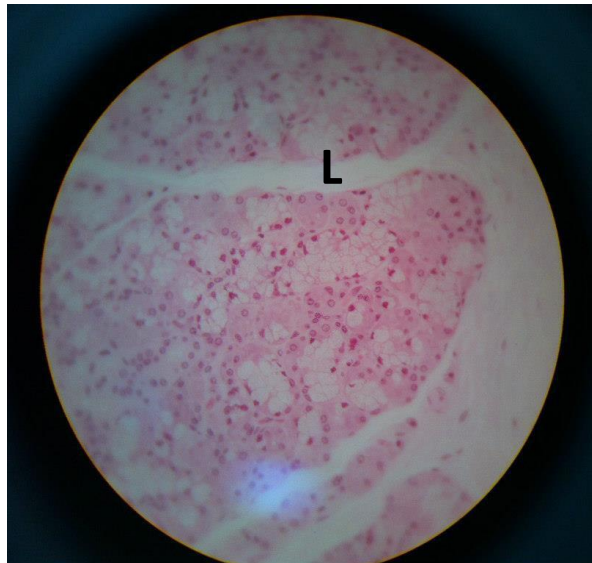
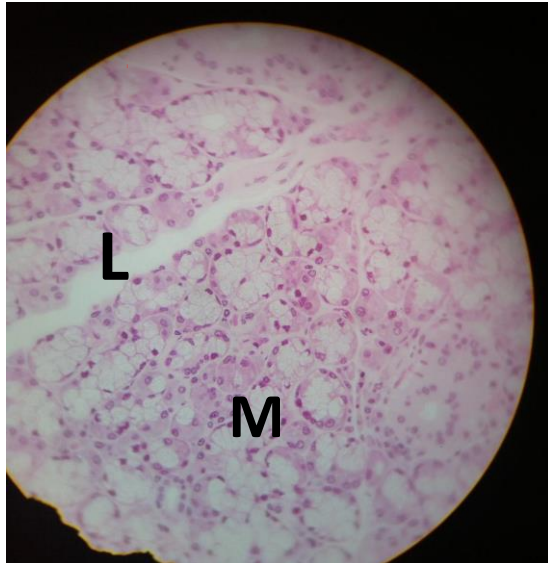
it's a compound tubuloacinar gland

-**Mostly** Musous secretions so it has large amounts of the mucous acini,but also it may contain small amounts of serous.

- inside the gland you can find large ducts(interlobular,interlobar) and intralobular ducts(striated) .

-You can find small amounts of the serous demilune.

Sections in the sublingual glands:



L:is the interLobular duct (large duct) M:is the mucous acini

Now we finished the salivary glands and we will start with the esophagus:

4-The esophagus:

-The esophagus is divided into three parts or regions according to type of muscles in the muscularis externa:

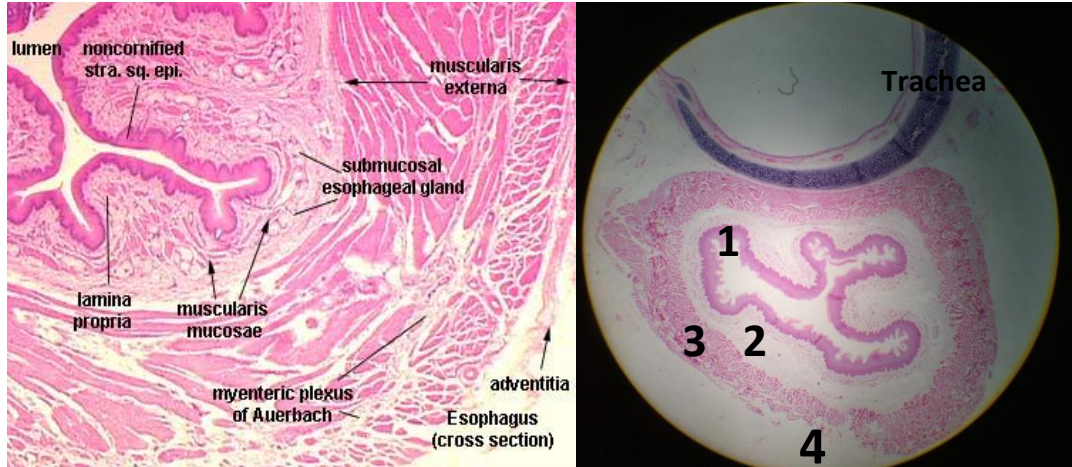
- *upper third: the type of muscles here is skeletal (voluntary)
- *middle third: the type of muscles here is mixed (skeletal+smooth)
- *Lower third: type of muscles here is smooth (involuntary)

-The lumen of the esophagus **has a star shape.**

*the layers of the esophagus are:

- 1-**Mucosa**: stratified squamous Non keratinized.
- 2-**Submucosa**: it contains glands (esophageal gland proper)
- 3-**Muscularis externae**:
- 4-**Adventitia**

The figure below clarifies these layers From the upper third of the esophagus.



*Remember that the type of muscles here is skeletal because the section is from the upper third.

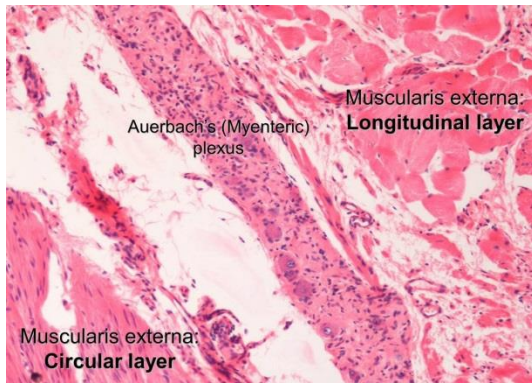


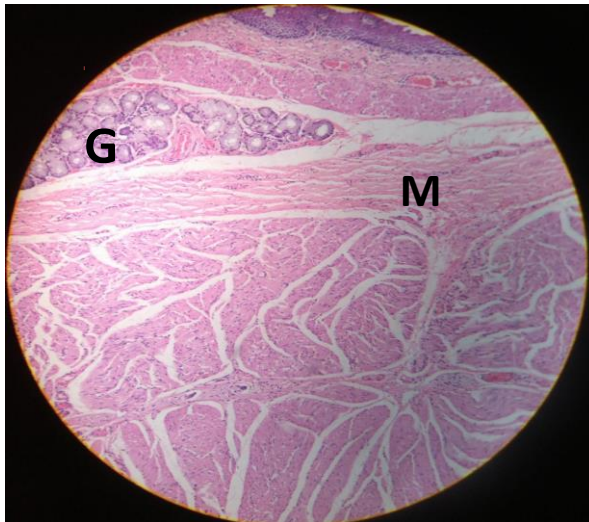
Fig.5c Myenteric plexus of Auerbach (93W6748)

This section is from the esophagus shows the myenteric plexus (Auerbach's plexus) between the longitudinal layer and the circular layer of the muscularis externae



Esophagus upper third section:
Lining epithelium stratified squamous non-keratinized and showing esophagus gland proper in the submucosa

2 organs with glands in submucosa; duodenum and esophagus



Section in the esophagus:

G:glands in the submucosa

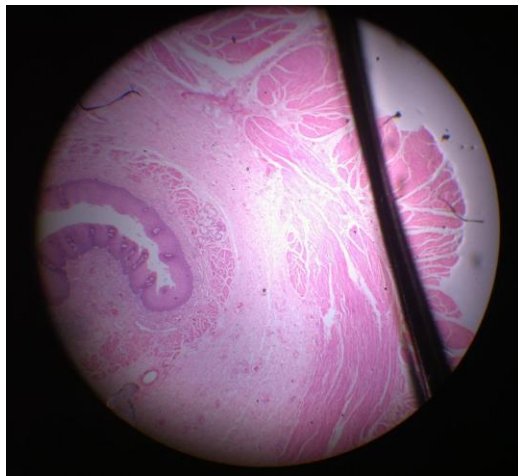
M:myenteric plexus or Auerbach's plexus

(Parasympathetic nerve fibers with Schwann cells around)

***Lower Esophagus:**

- it has the same layers as the upper esophagus but here it has smooth muscles instead of skeletal muscles

-The smooth muscles are spindle in shape and the nuclei are in the center not peripheral



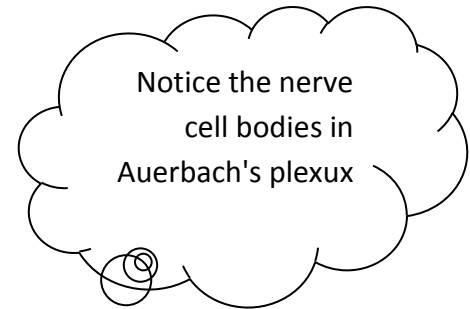
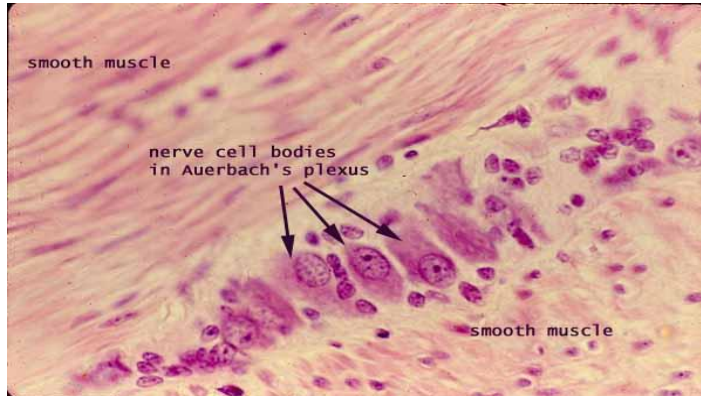
.Esophageal gland proper in the submucosa

Myenteric / Auerbach's plexus

Lamina propria contains lymphoid aggregations that increase distally called lymphatic nodules.

Smooth muscle since spindle in shaped and nuclei central

(LOWER esophagus)



*At the end of the lower third there is a *transitional* area forms a junction(gastro-esophageal junction (CARDIA)

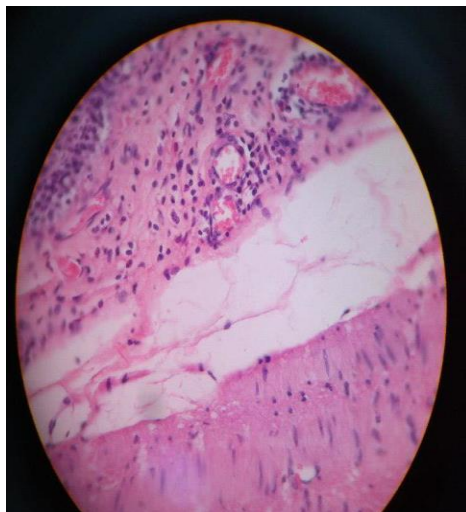
In this area there are two changes:

1-stratified squamous nonkeratinized changes to simple columnar epithelium

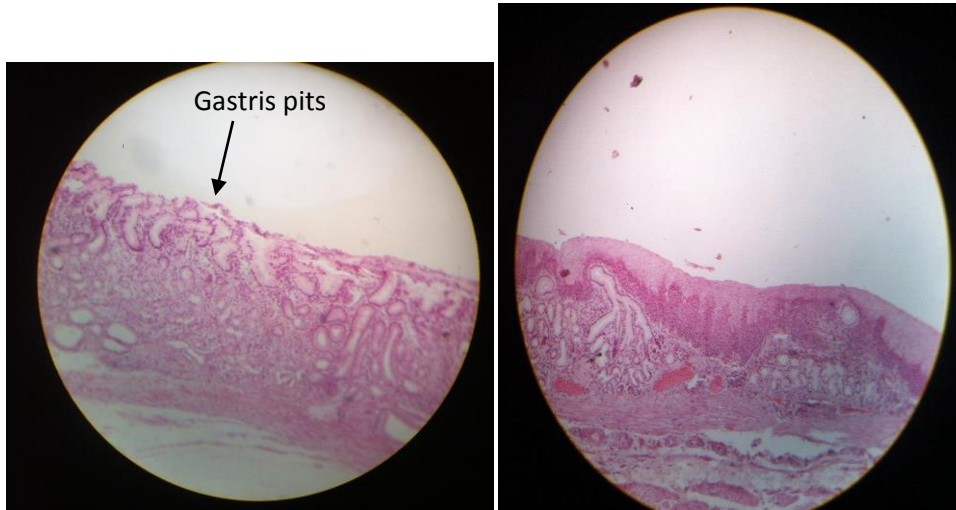
2-glands become in the lamina propria (cardiac glands)

-this junction is a weak area making it a common site of cancer .

***always any change in the epithelium considered as a weak area and could change into cancer



Section in the lower part before the
junction



Gastric pits as we go distally into the stomach,,and cardiac glands in the lamina propria.

(sections in the junction)

***Note that:**

- The cardiac glands & esophageal glands are mucus-secreting gland.
- Only The most distal portion of the esophagus, in the peritoneal cavity (the last 1.3 cm), is covered by **serosa**. The rest is enclosed by a layer of loose connective tissue, the **adventitia**, which blends into the surrounding tissue.
- Lymph nodules are found in the lamina propria & in the submucosa. They are made of lymphocyte aggregates.

End of the sheet 😊

"من غير اللائق أن تُذكر الأحلام و التعب في نفس العبارة ! لا يوجد تعب بسبب السعي لتحقيق الأحلام.

فالمبدعون لا يتعبهم سوى التخاذل عن تحقيق أحلامهم! أحلامك يا بني كهذه المائدة لن تلتهمها دفعة واحدة، لا بد أن تستمتع بتحقيقها قطعة قطعة. تلك متعة لن تنتهي إلا بانتهائها" بالتوفيق جميعا 😊