

# Respiratory system.

- 1- Conducting Portion.
- 2- Respiratory

**Conducting Portion** → Conduction of air.  
→ Conditioning inspired air.  
(clean, moist, warm)

→ lined by Respiratory Epithelium.  
(Pseudo stratified Columnar ciliated with goblet cell)

- Parts :**
- 1- Nasal Cavity
  - 2- Naso Pharynx.
  - 3- Larynx.
  - 4- Trachea.
  - 5- Bronchi
  - 6- Bronchioles
  - 7- Terminal bronchioles.

## Respiratory Portion.

For gas exchange between Blood and inspired air.

- Parts :-**
1. Respiratory bronchioles.
  2. Alveolar Duct
  3. Alveolar sac
  4. Alveoli.

Nasal Cavity  $\left\{ \begin{array}{l} \text{external vestibule.} \\ \text{internal nasal fossa.} \end{array} \right.$

Vestibule  $\left\{ \begin{array}{l} \text{ant. dilated Portion. of Nasal Cavity.} \\ \text{lined by keratinized stratified squamous epi.} \\ \text{has thick short hair vibrissa.} \end{array} \right.$

Nasal fossa  $\rightarrow$  2 cavernous  $\left\{ \begin{array}{l} \text{sup. conchae.} \\ \text{middle} \\ \text{inf.} \end{array} \right.$   $\left. \begin{array}{l} \text{of factory epi-} \\ \text{Respiratory} \\ \text{Epi Thelium} \end{array} \right\}$

### Respiratory epi Thelium

(Pseudo stratified columnar ciliated with goblet cell)

5 Type of Cell

$\left\{ \begin{array}{l} \text{ciliated columnar cell} \\ \text{mucous cell} \\ \text{Brush cell} \\ \text{Basal cell} \\ \text{Neuro endocrine cell.} \end{array} \right.$

BBC

CMBBN

Ciliated Columnar:-  $\left\{ \begin{array}{l} \text{* has about 300 motil cilia.} \\ \text{* contain. mitochondria supply energy for ciliary beating.} \\ \text{* cilia sweep the mucus towards nose.} \end{array} \right.$

Mucous goblet cell:-  $\left\{ \begin{array}{l} \text{* secrete mucus which trap bacteria.} \end{array} \right.$

Brush cell:-  $\left\{ \begin{array}{l} \text{* has basal aff-rent nerve. act as} \\ \text{Sensory Receptor.} \end{array} \right.$

Basal cell:-  $\left\{ \begin{array}{l} \text{* act as stem cell for replace other cell} \end{array} \right.$

Neuro endocrine cell:-  $\left\{ \begin{array}{l} \text{Releas Hormones Calcitonine.} \\ \text{Serotonin.} \\ \text{Somatostadine.} \end{array} \right.$



olfactory area.

**Olfactory epithelium** (Pseudo stratified Columnar ciliated with no goblet cell)

3 Type.

- olfactory cell
- supporting cell
- basal cell → columnar, microvilli  
yellow pigment  
stem cell.

**olfactory cell** → bi Polar

C.T Corium →

Bomans gland

غدة بومان

**Para nasal cell** → lined by respiratory epi -

**Respiratory Epi** ← Conducting Part ممرات تنفسية

Production of voice,  
Prevent Food From entering  
Respiratory Passage



**Large Cartilage.**  
(hyaline)

thyroid  
cricoid  
arytonoid

**Muscle** ⇒ striated muscle.

**Larynx**, Tube. which. Connect  
Pharynx with Trachea



**Small Cartilage.**  
(elastic)

epiglottis  
Cuneiform.  
Corniculate.

Tip of arytonoid.

**Respiratory epithelium** ← **larynx** الحنك

Stratified squamous

true vocal cords

ant. surface of epiglottis

# Olfactory area

## Olfactory epithelium

1- olfactory cell

2- Supporting cell

3- basal cell

C.T. Corium.



\* Contain. blood and lymphatic capillary and nerve fiber

\* Contain Bowman's gland

## Olfactory cell

\* bipolar nerve cell

\* nuclei occupy zone below supporting cell

\* dendrite. extend towards the surface and end by olfactory vesicle

\* act as solvent for odorous gases.

\* Cilia extend to increase surface area exposed to odor.

## Supporting cell

\* Columnar cell

↳ cylindrical apex  
↳ narrow base

\* Surface → microvilli

## Basal cell

act as stem cell for sensory supporting cell.



\* Para nasal Sinus  $\begin{cases} \text{maxillary} \\ \text{frontal} \\ \text{ethmoidal} \\ \text{sphenoidal} \end{cases}$

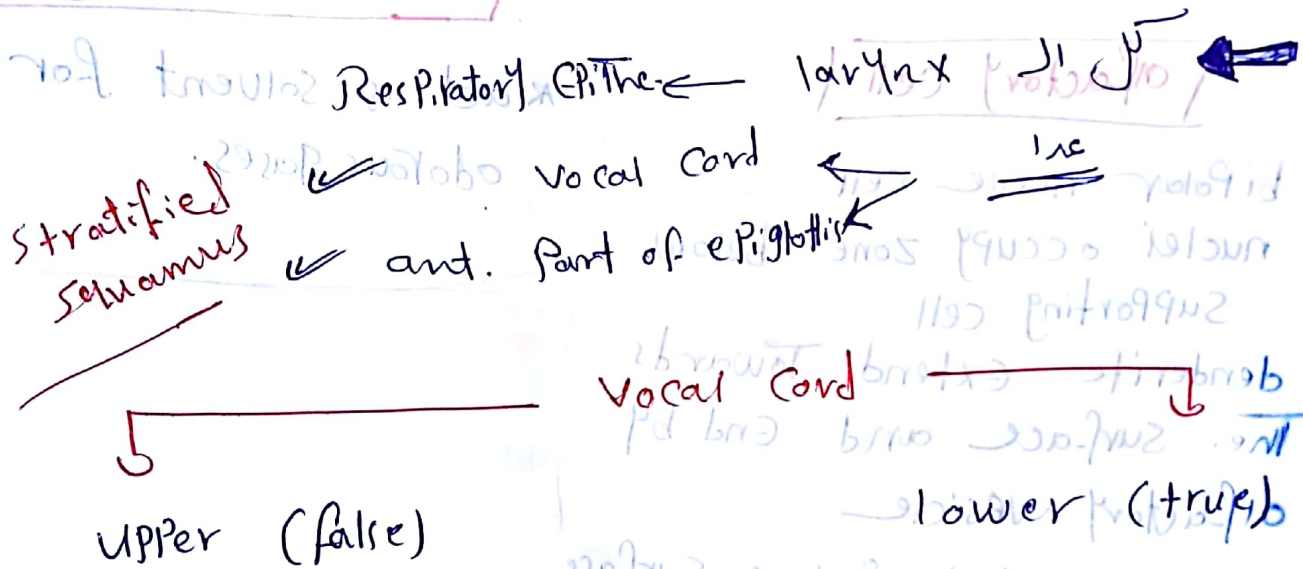
\* lined by Respiratory Epith.

\* Naso Pharynx  $\rightarrow$

The 1st Part of Pharynx. Continuous Ant. with nasal fossa and Continuous inf with oro Pharynx

\* lined by Respiratory Epithelium.

\* C.T corium Contain  $\rightarrow$  Pharyngeal tonsil



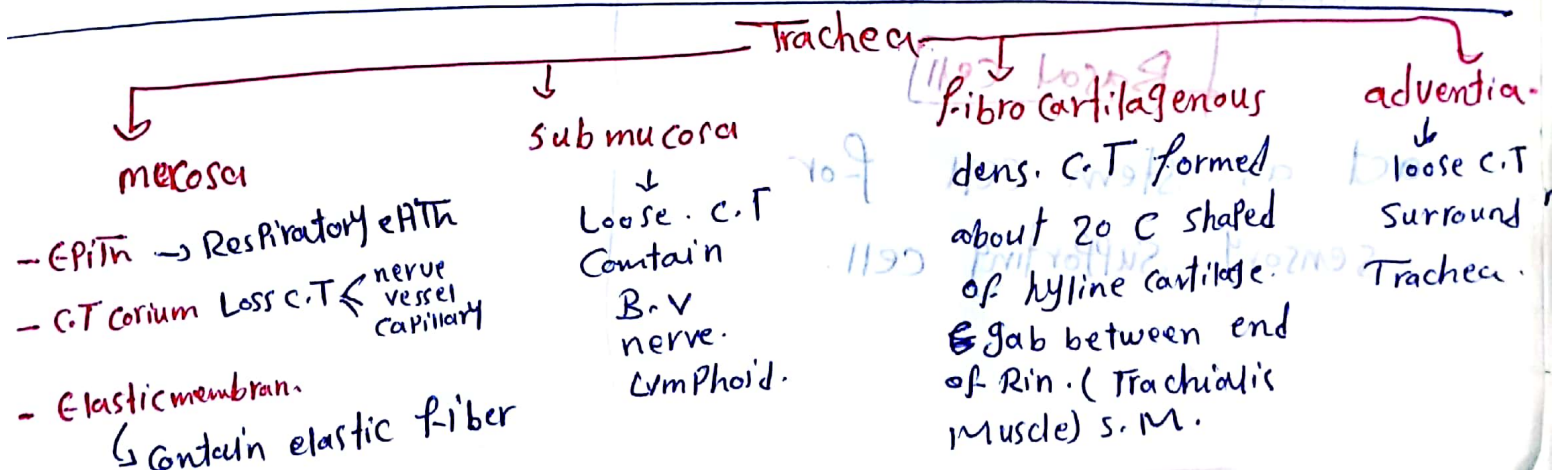
\* Covered by Respiratory Epith.

\* Stratified squamous Epithelium

\* Protect larynx from entering foreign bacteria.

\* formed of

$\begin{cases} \text{Vocal ligam} \rightarrow \text{elastic} \\ \text{Vocal Muscle} \rightarrow \text{stratified squamous} \end{cases}$

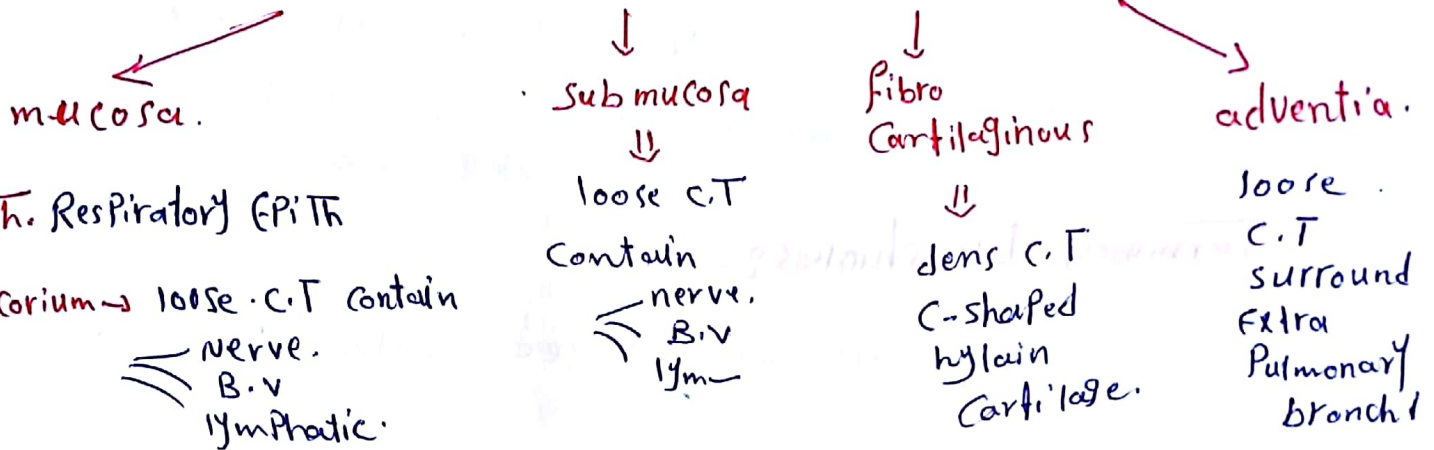


\* in Conducting Portion. →

- Cartilage and Respiratory Epithelium and goblet cell decreases
- Smooth muscle and Elastic fiber increases.

### Extra Pulmonary bronchi.

\* have the same structure of Trachea.



### Intra Pulmonary bronchi

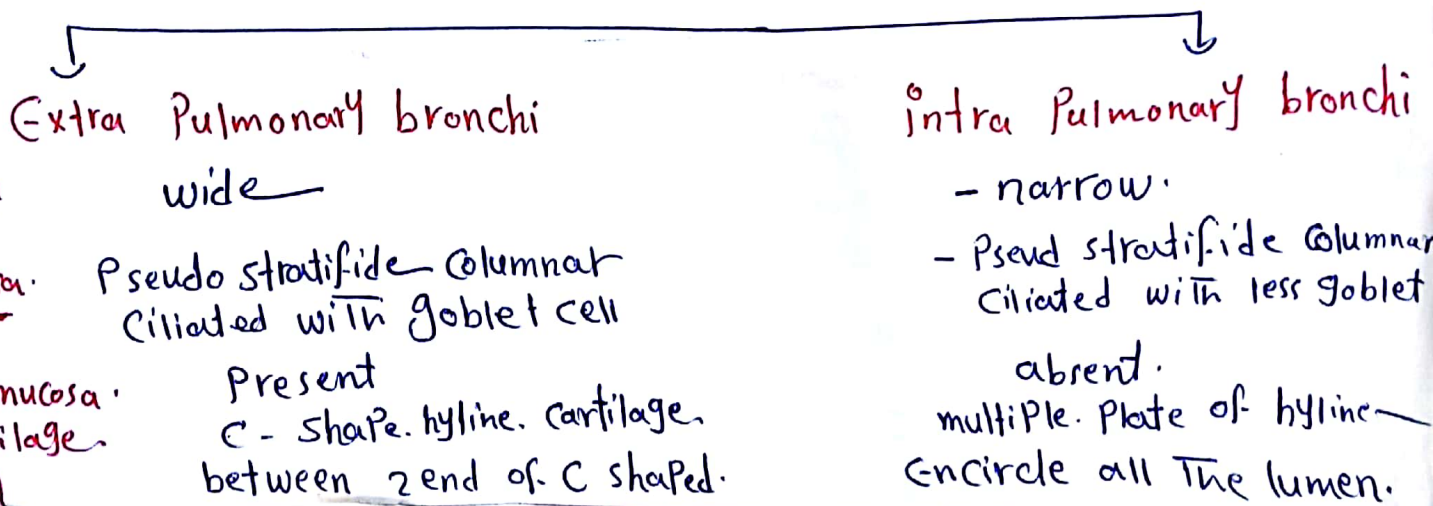
\* mucosa Pseudo stratified columnar ciliated with less goblet.

\* No submucosa.

\* muscle → layer of smooth muscle

\* Adventitia → \* C.T Rich. in elastic fiber.

\* multiple. irregular plate of hyaline cartilage





## bronchioles

لازم تتغير

mucosa

~~Pseudo~~ simple columnar ciliated with Clara cell.

oii  
no Clara Cell

- \* Dome shape.
- \* Has no cillia. in its surface

### Function

- ① secrete surfactant.
- ② Protect against emphysema.
- ③ act as stem cell.

## terminal bronchioles:-

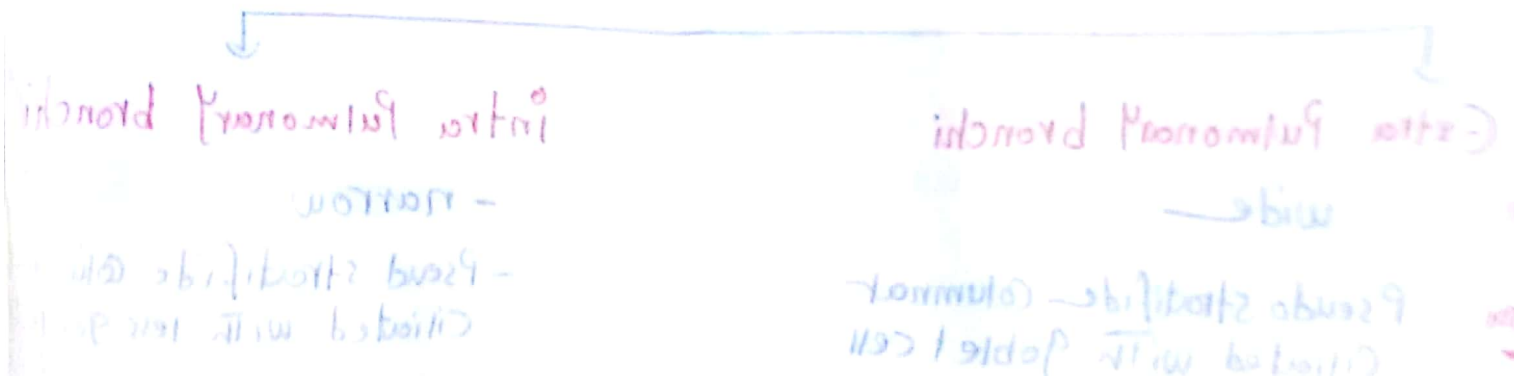
\* Simple cubical ciliated. with clara cell

mucosa pseudo stratified columnar ciliated with low dome

muscular → layer of smooth muscle

Adventitia → C.T. Rich in elastic fibers

\* multiple irregular plates of hyaline cartilage



# Vocal Cords

Upper Pair

Lower Pair

- Fals
- Respiratory epi.
- Pseudo stratified Columnar

- True
- stratified squamous

## Trachea

- \* Respiratory epithelium
- \* C shape <sup>قوس</sup> (Trachealis muscle) S.M.
- \* Fibro elastic ligament

## bronchi

- \* Intra Pulmonary bronchi → Respiratory epithelium but less goblet.

- \* No Sub mucosa → gall bladder

ترنج Smooth muscle و elastic fiber ← bronchi

ترنج Respiratory epi و Cartilage

## bronchioles

Simple Columnar ciliated with Clava cell

Clava cell

Function. secrete surf. clant ✓  
protect against emphysema. ✓  
act as stem cell ✓

Terminar bronchioles Simple cubical <sup>ciliated.</sup> with Clava cell



all Trachea → Respiratory epithelium. except <sup>Ture vocal</sup> ant. Part of epiglottis

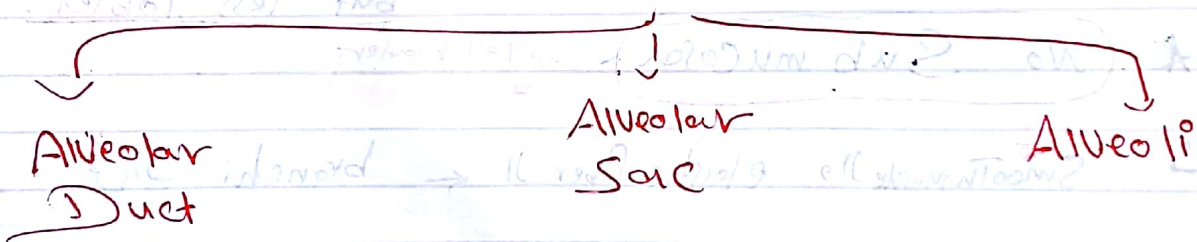
bronchi → Respiratory epithelium with less goblet

bronchioles → Simple Columnar epith — with cilia cell

Terminal bronchus → Simple cuboidal — with cilia-cell

### Respiratory Portion

Respiratory bronchioles → Simple cubical with few cilia cell.  
\* Rich S.M + elastic fiber



\* wall consist of adjacent alveoli separated by interalveolar septum

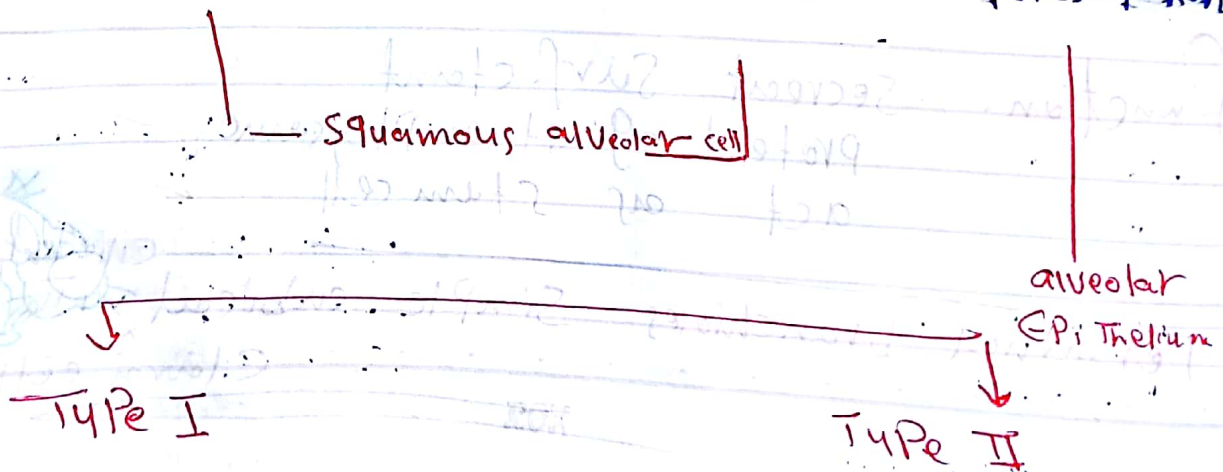
\* wall formed by adjacent alveoli

\* separated by interalveolar septa.

آفرس سوس  
Smooth muscle

No Smooth muscle

between its wall pores of kohn



TYPE I      TYPE II

\* 97 %

\* 3 %

\* Simple Squamous

\* low cuboidal cell

✓ \* Contain Pino cyte.  
Visicles.

\* Can. divide.

✓ \* Connected by T-j

\* Can. divide.

Function: gas exchange

Secret  
- Pulmonary surfactant  
- Prevent collapse of alveoli  
- act as stem cell

### Blood air Barrier:-

4 layers.

\* between. blood inside capillary and air inside. alveoli

\* 1- Pulmonary Surfactant

\* 2- Squamous Epithelium. (Type I)

\* 3- basement membrane of Type I alveolar cell.

\* 4- Endothelial cell.

### alveolar phagocyte.

Dust cell

Heart failure cell

Engulf Dust  
bacteria.

phagocyte erythrocyte  
That escape from  
capillary

Then Expel to outside.  
Through. Respiratory Passage.



## Pleura.

lined by  $\rightarrow$  Flat ~~mesothelial~~ mesothelial cell

ant. part of epiglottis.  $\rightarrow$  True vocal cords.

\* all Trachea  $\rightarrow$  Respiratory epithelium

\* bronchi  $\rightarrow$  Respiratory epithelium with few goblet cell

\* bronchioles  $\rightarrow$  Simple columnar with few goblet cell.

\* Terminated bronchiole  $\rightarrow$  Simple cubical with cilia

\* Respiratory bronchiole  $\rightarrow$  Simple cubical with few cilia

\* Alveolar duct, sac  $\rightarrow$  squamous alveoli

\* Alveoli  $\rightarrow$  Type I Simple squamous

$\rightarrow$  Type II low cuboidal cell

\* Pultra  $\rightarrow$  Flat mesothelial cell.

\* lobe and lobule are clear due to presence of thick C.T septa

\* bronchi and bronchioles are folded

\* Alveoli are collapse and lined by simple cubical epithel

\* Pulmonary blood vessels  $\rightarrow$  congested

\* Fetal lung similar to gland.



# oral cavity

Vestibule

mou cavity

space between the inner aspect of lips and cheeks and outer aspect of gums.

site for ingestion. Fragmentation, moistening. Speech, digestive. Role of saliva.

mucous membrane lining oral cavity

oral mucosa

Epithelium lining

C.T

\* Non-keratinized stratified squamous Epithelium

loose C.T

Dense C.T

soft Palate, Floor of the mouth, lips.

when the under lining attachment is soft when the under lining attachment is Hard

\* Keratinized squamous Epithelium

Contain

Hard Palate, dorsal surface of tongue, gums.

Blood vessels.

Lymphatic.

nerves.

Minor salivary gland

oral cavity



## orbicularis oris

between. Epidermis of the skin and Epithelium of oral mucosa.



### outer surface.

- Covered by skin.
- Contain hair follicles
- sebaceous gland
- sweat gland.
- Keratinized stratified squamous Epithelium.

### inner surface.

- Covered by mucous membran.
- non keratinized squamous Epithelium.
- The submucosa contain.
- Vermilion (red line)
- \* Free edge of the lips
- \* Contain no hair follicles
- No sebaceous
- No sweat gland.

### Tubulo acinar

### labial gland

mostly

mucous

Few

serous

- \* very thin skin
- \* its Epidermis Translucent
- \* show red color
- \* highly sensitive

## the cheeks

### outer surface.

- Covered by skin.
- Contain hair follicles.
- sebaceous gland
- sweat gland
- Epithelium lining.
- \* keratinized stratified squamous Epithelium.

### inner surface.

- Covered by oral mucosa i.e. Epithelium of non keratinized stratified C.T - loose connective - containing <sup>B.V.</sup> nerv 14mph -
- Contain minor gland called buccal gland

buccinator skeletal muscle



# Tongue

- \* highly mobile muscular organ
- \* The muscle of the Tongue arranged in three direction.
  - vertically
  - horizontally
  - longitudinallyat right angle

\* The anterior  $\frac{2}{3}$  and posterior  $\frac{1}{3}$  of Tongue has different embryological origin. Separated by shallow groove called Sulcus Terminalis.

## Dorsal surface of Tongue

- Covered by Rough mucosa.
- Partially keratinized squamous Epithelium.

## Ventral surface of Tongue

- Covered by smooth mucosa.
- non-keratinized stratified squamous Epithelium.

The Anterior  $\frac{2}{3}$  of Tongue is irregular due to presence of Papillae.

- no lingual Papillae.
- contain lingual gland = mixed serous + mucous.

The Posterior  $\frac{1}{3}$  of Tongue is Rough due to presence of lingual Tonsils.

C.T contain

↓  
B.V. nerve



FiliForm Papillae	FungiForm Papillae	Circumvallat Papillae	Foliate Papillae
* most numerous		* least common	* poorly developed in the human but well developed in Rabbits, monkey, animal
<ul style="list-style-type: none"> <li>- Conical shape</li> <li>- slightly curved</li> </ul>	<ul style="list-style-type: none"> <li>- mushrooms (narrow stalk and dilated upper part)</li> </ul>	<ul style="list-style-type: none"> <li>- largest type</li> <li>- surrounded by circular sulcus</li> </ul>	<ul style="list-style-type: none"> <li>- two or more parallel ridges and groove</li> </ul>
<ul style="list-style-type: none"> <li>- covered by keratinized stratified squamous Epithelium</li> </ul>	<ul style="list-style-type: none"> <li>- covered by non-keratinized stratified squamous Epithelium</li> </ul>	<ul style="list-style-type: none"> <li>- non keratinized stratified squamous Epithelium</li> </ul>	<ul style="list-style-type: none"> <li>- non keratinized stratified squamous Epithelium</li> </ul>
<ul style="list-style-type: none"> <li>- contain <sup>no</sup> taste buds</li> </ul>	<ul style="list-style-type: none"> <li>- scattered taste buds</li> </ul>	<ul style="list-style-type: none"> <li>- contain taste buds</li> </ul>	<ul style="list-style-type: none"> <li>- contain taste buds</li> </ul>
<ul style="list-style-type: none"> <li>- cover the anterior <math>\frac{2}{3}</math> of dorsum of tongue</li> </ul>	<ul style="list-style-type: none"> <li>- scattered among FiliForm Papillae</li> <li>- lateral margin and tip of tongue</li> </ul>	<ul style="list-style-type: none"> <li>- on the sides of Papillae</li> <li>- on the front of sulcus terminalis</li> </ul>	<ul style="list-style-type: none"> <li>- dorso lateral surface of tongue</li> </ul>
<ul style="list-style-type: none"> <li>- whitish color</li> </ul>	<ul style="list-style-type: none"> <li>- red appearance highly vascular</li> </ul>	<ul style="list-style-type: none"> <li>- contain Von Ebner's gland</li> </ul>	<ul style="list-style-type: none"> <li>- contain serous gland discharge their secretion in the cleft separating the Papillae</li> </ul>

\* Elevation of the oral Epithelium and lamina propria present in the anterior  $\frac{2}{3}$  of the tongue

- Lingual Papillae - "

4 Type of lingual papillae



## Taste buds:-

shape :- conical shape. (has wide base and narrow apex)

- each one Taste buds contain. So - 100 cell.
- Present in:
  - Tongue Papillae
  - Soft Palate
  - Esophagus
  - Epiglottis
- - Circumvallate
  - Fungiform
  - Foliate Papillae

- The narrow apex has small opening in.

Superficial layer called taste pore.

- Each Taste buds Formed of 3 Type of cell
- Dark supporting cell
  - Light gustatory cell
  - Basal cell

- slender cell → Elongated cell
- Central nucleus → central nuclei
- have long microvilli → have long Processes
- Villi Projection into taste pore → Several time. The diameter of microvilli.
- secrete amorphous glycoprotein material
- No nerve fiber
- contain dense core in their basal cytoplasm. contain neurotransmitter.
- The basal of taste cell surrounded by non myelinated nerve fiber.
- act as stem cell for Renewal of taste cell and supporting cell
- Present in the basal of taste buds.



Soft Palate → continuous Anterior with hard Palate.  
and Posterior continuous with nasal mucosa.

## Palate

\* Formed of anterior hard Palate  
and Posterior soft Palate.

### Hard Palate

### Soft Palate

- Anterior Part of The <sup>oral</sup> Roof of The Cavity.      - Posterior Part of <sup>oral</sup> The Cavity.

- Covered by keratinized stratified squamous Epithelium.      \* Covered by non-keratinized stratified squamous Epithelium.

In its anterior oral Part:

\* Covered by Pseudo/2 - stratified columnar ciliated with goblet cell in its posterior Part with continuous oral cavity nasal cavity.

- Mucosa firmly attached to The Periosteum by dense C.T.

- Mucosa loosely attached to The underlying by loose C.T.

has  
→ Core of skeletal  
→ mucous gland  
→ lymphoid nodules



# Pharynx

Transition space between oral cavity and Respiratory and digestive system.

Function: Conduct air to the larynx and food to esophagus.

Epithelium

Pharynx divided into

oro Pharynx

naso Pharynx

laryngo Pharynx

\* lined by oral mucosa i.e.

Non keratinized stratified squamous Epithelium

Respiratory mucosa i.e.

Pseudo stratified columnar ciliated with goblet cells

oral mucosa i.e.

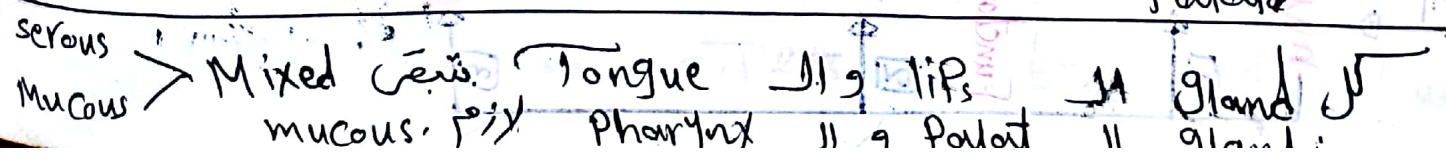
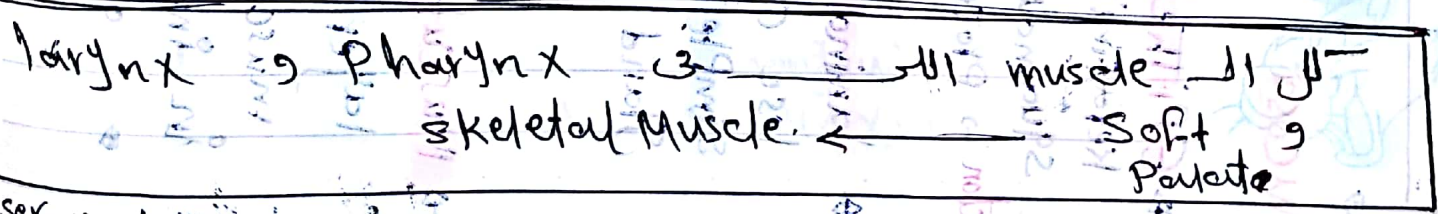
non keratinized stratified squamous Epithelium

C.T

\* lamina propria contain mucous salivary gland and dense elastic fiber.

muscle layer

under lamina propria → Pharyngeal muscle which consist of inner longitudinal striated muscle and outer oblique.





# Eso Phagus

\* Muscular Tube Transport The ingested Food from Pharynx to Stomach.

Adventitia  
↓  
lose C.T. bind Esophagus to adjacent structure  
Replaced by serosa in abdomen

muscular layer arranged in:  
- inner circular  
- outer longitudinal

UPPER 1/3 → skeletal M.  
middle 1/3 → Mixed  
lower 1/3 → Smooth

It consist of 4 layers.

muscular

Sub. mucosa

lose. C.T. B.V  
Contain nerve lymph

Contain.

mesenteric Plexus

Contain.

Esophageal gland

(Tubular alveolar)

their duct pierce mucosa and open in to the lumen.

its secretion.

protect the mucosa.

mucosa

① Epithelium: non keratinized stratified squamous Epithelium.  
Function → protect against injury

② lamina Propria:

lose C.T. Contain.

Simple Tubular mucous Gland (Cardiac gland)

③ Muscularis Mucosa:

layer of smooth

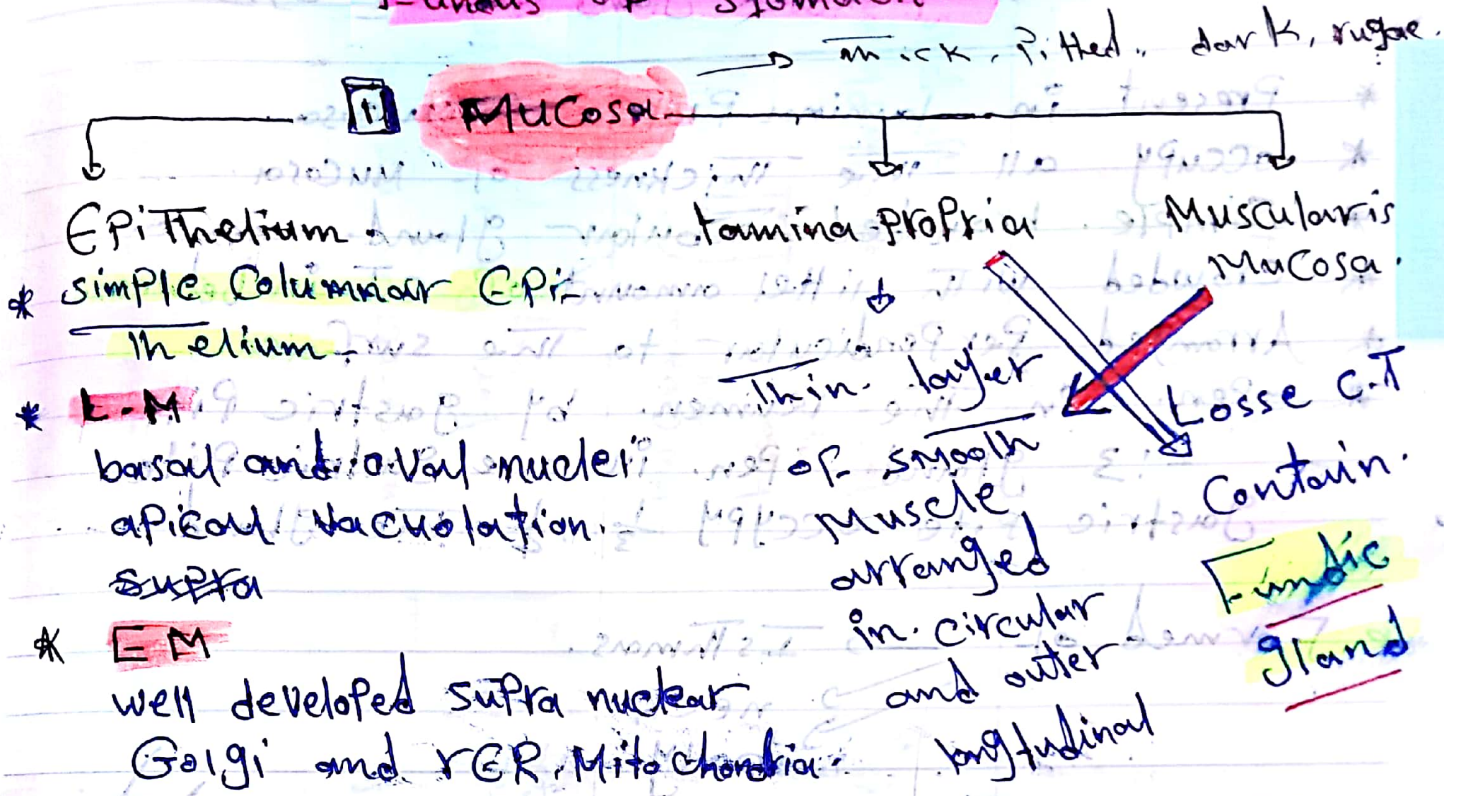
muscle arranged

in inner circular

outer longitudinal



# Fundus of Stomach.



Function :-

secrete neutral mucus

→ Lubrication. Protection.

## (2) Submucosa

C.T. Contain. → blood vessels, lymphatic, Missner's Plexus.

## (3) Muscularis

3 layer → inner oblique ✓  
middle circular ✓  
outer longitudinal ✓  
Contain. Auerbach's Plexus ✓

(4) Serosa ⇒ loose C.T. covered by mesothelium.

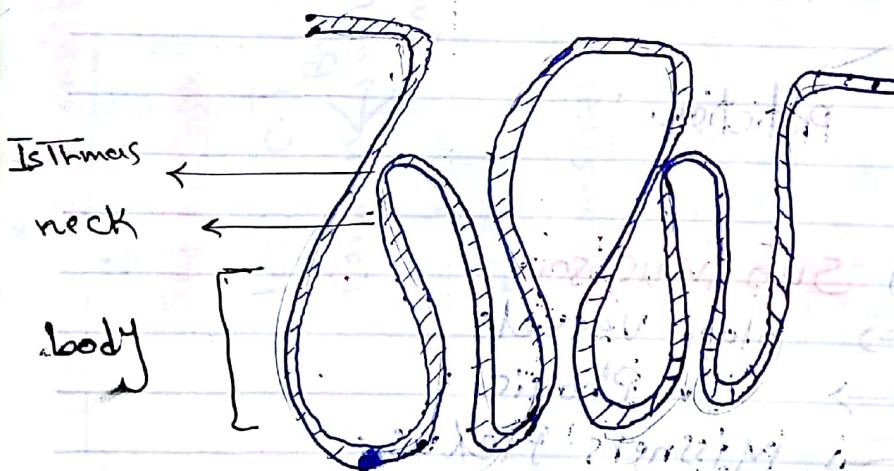


## Fundic gland نقری

- \* Present in lamina Propria of Mucosa.
- \* occupy all the thickness of Mucosa.
- \* Simple branched Tubular gland.
- \* crowded with little amount of c.T in between.
- \* Arranged Perpendicular to the surface.
- \* open in the lumen by gastric Pite.
- 2:3 gland open in one gastric Pite.
- gastric pite occupy  $\frac{1}{3}$  or  $\frac{1}{4}$  the gland.

\* Formed of

- Isthmus.
- neck
- body



Simple branched  
Tubular

very crowded

Perpendicular

open on surface  
by gastric Pite

3 Part → isthmus  
                  neck  
                  body

Pite  $\frac{1}{3}$  or  $\frac{1}{4}$  gland

Site

## Surface mucous cell

- surface of the gland
- lining the pit
- line isthmus.

Function

## \* Secretion: neutral mucous

For < lubrication.  
Protection

Gastric mucosa

L.M

- Tall Columnar
- basal oval nucleus
- apical vacuolated cytoplasm
- stained red by PAS



EM

## mucous neck cell.

- neck of gland.

## \* secretion acidic mucous

For: Protect gastric mucosa

- low Columnar cell
- basal flat nucleus
- Pol vacuolated cytoplasm
- stained Red by PAS.



EM



site

### Oxyntic cell (Parietal)

- main in upper half of gland.
- Few cell scattered in the base of gland.

Function

secretion and formation of

- (1) HCl
- (2) Anti Perinicious Anemia

L.M

- Pyramidal cell
- central ~~oval~~ rounded nucleus
- basophilic cytoplasm



basophilic cytoplasm

EM

secretion and formation of

- HCl
- Anti Perinicious Anemia

### Peptic cell

mainly in the base of gland.

secretion of

- Pepsinogen
- Renin
- Lipase



- Pyramidal cell
- Apical acidophilic zymogen.
- basal rounded nucleus
- basal basophilic cytoplasm

secretion and formation of

- Pepsinogen
- Renin
- Lipase

site

Function

L.M

## Stem cell

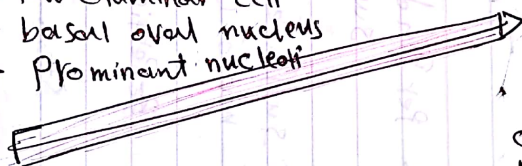
mainly in the neck

Renewal For other Type of cell

Proliferation → differentiation →  
migration. → up ward  
→ down ward.



- low columnar cell
- basal oval nucleus
- Prominent nucleolus



## Entero Endocrine cell

- bas of gland.

secrete many Hormon.

- (A) cell → glucagon.
- (D) " → somatostatin.
- (E) " → serotonin.
- (F) " → endorphine.
- (G) " → Gastrin.



called  
Argentaffine.

- low columnar cell
- apical rounded nucleus
- Prominent nucleolus
- has basal granule appear when stained by



Fundus

Pylorus.

Mucosa :-

Highly Folded

less folded

C.T Corium :-

Fundic gland

pyloric gland.

Gland :-

\* crowded

\* less crowded.

\* occupy all

\*  $\frac{1}{2}$  Thickness of

Thickness of gland

Gland.

\* Gastric Pit  $\frac{1}{4}$  to  $\frac{1}{3}$   
The gland.

$\frac{1}{2}$  gland

\* Perpendicular on  
Surface.

Not Per Pend.

Epith.

Surface Columnar  
mucous neck cell

Peptic & oxyntic

No Peptic  
Few oxyntic.

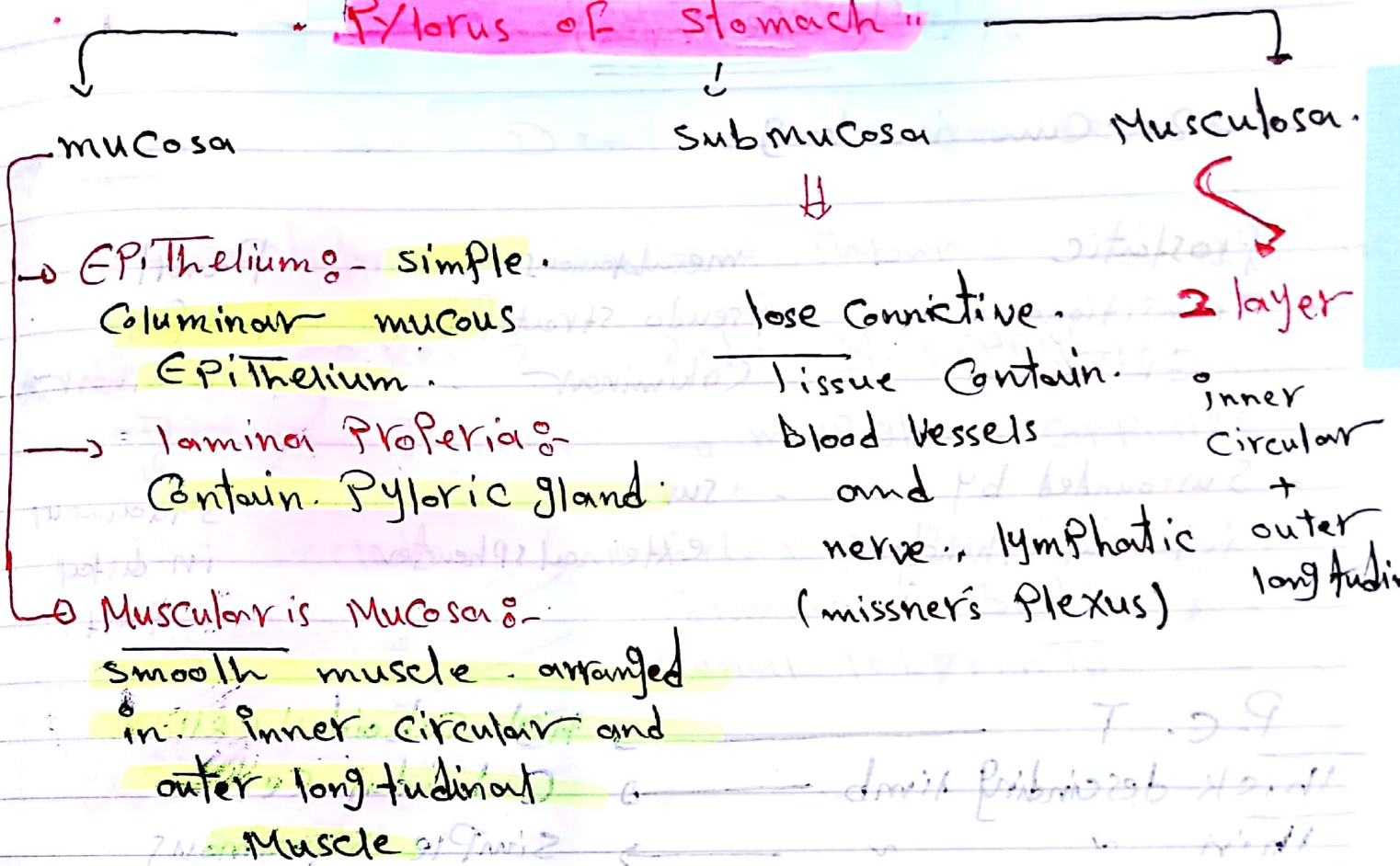
Stem & Entero.

Muscle

3 layer

2 layer

## Pylorus of Stomach

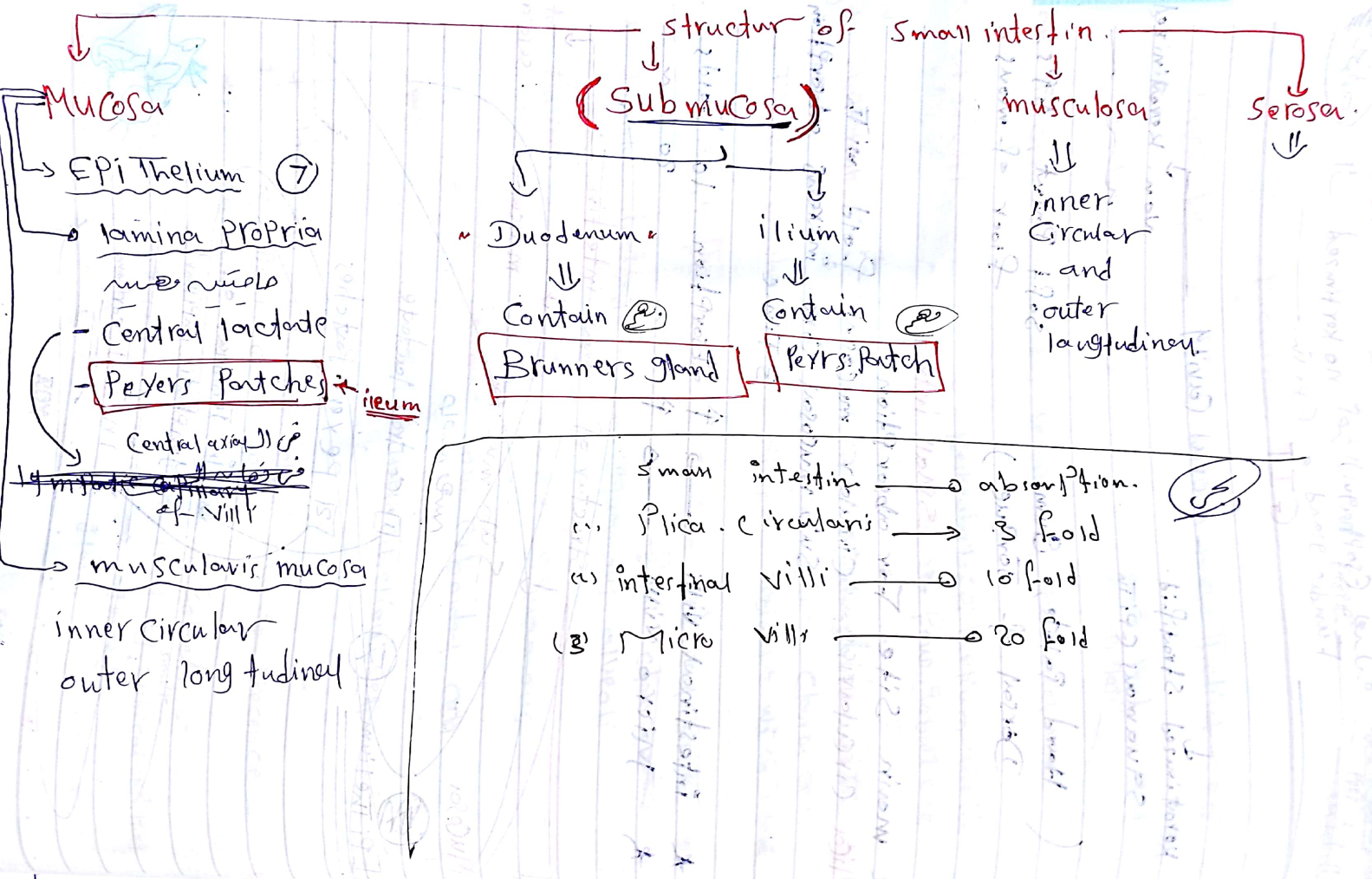


### Pyloric gland

- \* Not Crowded
- \* Not Perpendicular on surface
- \* Not Contain Peptic
- \* Few oxyntic cell
- \* occupy  $\frac{1}{2}$  thickness of mucosa
- \* Pit are deep
- \* lined by
  - o mucous cell \*
  - o Entero Endocrine \*
  - o Surface Columnar \*

Gland highly convoluted.





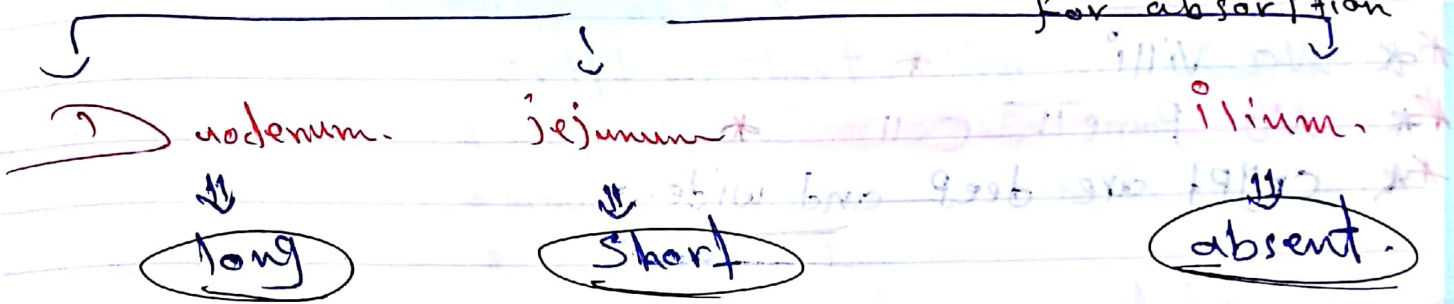


Simple  
unbranched

\* Contain central  
lactat.

## intestinal villi

\* but growth of intestinal mucosa  
\* increases surface area for absorption



Cell lining villi  $\Rightarrow$  simple columnar  
entero- goblet

- \* ① Simple columnar absorbing cell
- \* ② goblet cell on microvilli
- \* ③ entero endocrine cell

## intestinal crypt (invagination from surface)

\* Simple tubular  
lined by 6 types of cells

- 1) Simple columnar  $\rightarrow$  terminal digestion of CHO, Ptn.  
\* absorption of a.a, glucose, F.A.
- 2) Goblet cell  $\rightarrow$  secrete mucus
- 3) Stem cell  $\rightarrow$  Renewal other cell
- 4) Paneth cell  $\rightarrow$  secrete intestinal enzyme  
\* lysosome (Anti bacteria)
- 5) M cell (micro fold)  $\rightarrow$  Antigen-Presenting cell  
+ Macrophage
- 6) Entero Endocrine  $\rightarrow$  I cell  $\rightarrow$  C.C.K

## Cecum and Colon.

- \* No Villi \*
- \* No Paneth Cell \*
- \* Crypt are deep and wide.

Epithelium: كل أنواع ال cells الموجودة في ال Small intestine.  
لا يوجد Paneth Cell

Submucosa ⇒ Contain. no gland.

Musculosa ⇒ inner circular and outer longitudinal

✎ \* The outer longitudinal muscle. not continuous but present in three bands called Tenia Coli.

Serosa ⇒ Covered by Peritoneum.

✎ Accumulation of adipose tissue beneath the Peritoneum called appendices epiploica.

- ✓ Tenia Coli
- ✓ appendices epiploica.
- ✓ Plicae circularis.



## appendix

2 - 8 cm

Villi absent

crypt → short, few in number

\* No appendices, epiploicae

\* lamina Propria → Rich in L.V.

## Rectum

\* No villi

\* crypt are deeper and fewer in number

→ \* No tenia coli

\* Serosa replaced by adventitia

\* 12 cm

## anal Canal

\* 3 - 4 cm

\* crypt short and fewer ... absent in distal half

artery  
vein  
s.m

Column

\* mucosa form longitudinal fold  
← called Columns of Morgagni

\* Column. of Morgagni join together  
to form anal valve

Epithelium

Rectum

Columns

anal valve

anus

Simple Columnar Epithelium

→ Stratified Columnar

→ non-keratinized stratified squamous

→ keratinized stratified squamous

# Salivary gland.

- ✓ \* Exocrine gland.
- ✓ \* watery secretion.
- ✓ \* Contain: IgA

## Type

### Major

Secret 90% of the volume of Salivary.

### Minor

- \* mostly mucous.
- 70% of mucous secreted.

### \* Parotid

\* Sub mandibular

\* Sub lingual.

## Stromal Gland

### Stromal

### Parafachmer

### Capsule

### Trabecula

### Reticular Strom

\* C.T cell (Fibroblast)

\* C.T. septa

\* Reticular Fiber

\* C.T Fiber (collagen)

Divide the gland into lobe and lobule.

Forming back ground of gland.

### secretory Portion

### Duct system



# Parenchyma.

## Secretory Portion.

### 1] Serous acini.



- \* adjacent cell joined by junction. Complex.

- \* intracellular canaliculi seen in apical of junction. Complex.

- \* Surrounded by 2 myo epithelial cell.

- \* ~~Pyramidal~~ Pyramidal

### 2] mucous acini.

- \* Cubical cell

- \* Surrounded by (myo epithelium)

### 3] muco serous acini.

Crescent Cap.

Called serous demitune



### 4] myo epithelial cell

- \* non secretory cell
- \* surround secretory acini and duct.

\*

## Duct system

### 1] intercalated duct






### 2] interlobular duct

### 3] intra lobular duct

### 4] inter lobar duct.

### 5] main duct

## Duct system

	site.	epithelium	
<u>intercalated ducts</u>	inside the lobules acini jobs	Simple <u>cubical</u>	
<u>intra lobular duct</u>	inside the lobules	lined by <u>columnar</u> cell	
<u>intr lobular duct</u>	between the lobules	Simple <u>columnar</u>	
<u>interlobar duct</u>	between the lobes	<u>Pseudostratified columnar</u>	
<u>Main duct</u>	in oral cavity	<u>Stratified columnar</u> Then, <u>Stratified squamous</u>	



## Parotid Duct:-

- ✓ \* Purely Serous
- ✓ \* have amylase activity → ingest CHO
- ✓ \* Duct System:
  - intercalated duct → simple cubical
  - intra lobular → cuboidal
  - inter lobular → Columnar
  - inter lobar → Pseudo stratified
  - Stenson Duct → Stratified columnar

\* open opposite 2nd molar Tooth. (Stenson duct)

## Sub mandibular:-

- \* mostly Sero mucous
  - 90% serous
  - 10% mucous
- \* Contain lysosome
- \* main Duct (Wharton's Duct)
- \* open floor of mouth at side of frenulum.

## Sub lingual Gland

- \* Mucoserous gland mostly mucous
- \* main Duct open in floor of mouth

Parotid	Sub mand.	Sub lingual
Pure serous	Sero mucous	Mucoserous
* has amylase activity	* has <del>amylase</del> activity	

# (Pancreas)

Exocrine Part



Pancreatic juice

Endocrine Part



Pancreatic Hormone

Parenchyma

Exocrine Portion

Duct system

Pancreatic Exocrine Secretion Controlled by Hormones Secreted From Entero Endocrine Cell of GIT

CCK - Stimulate acini To secrete Pancreatic Enzyme

Secretin - Stimulate Inter Calated Duct to secrete alkaline fluid.



Function

**$\alpha$  cell**

15%

Glucagon Hormone

- \* Have <sup>alpha</sup> Acido Philic granule
- \* located in Prephery of islet

**$\beta$  cell**

70%

insulin Hormone

- \* Have basophilic granule
- \* located in center of the islet

**Delta cell**

10%

Somatostatin Hormone

- \* ~~located~~ in stain by Silver
- \* locate in Prephery

**C-cell**

3%

not yet or imatur cell

**PP(Fx)**

Poly Peptide Hormone

- \* Few in numb.
- \* Few organells
- \* Few granules

**G cell**

Gastrin  
Cell of islets of langerhans

Ganglion cell  
aggregated nerve cell.  
For autonomic control of cell of islet

bio 2012 blood liver

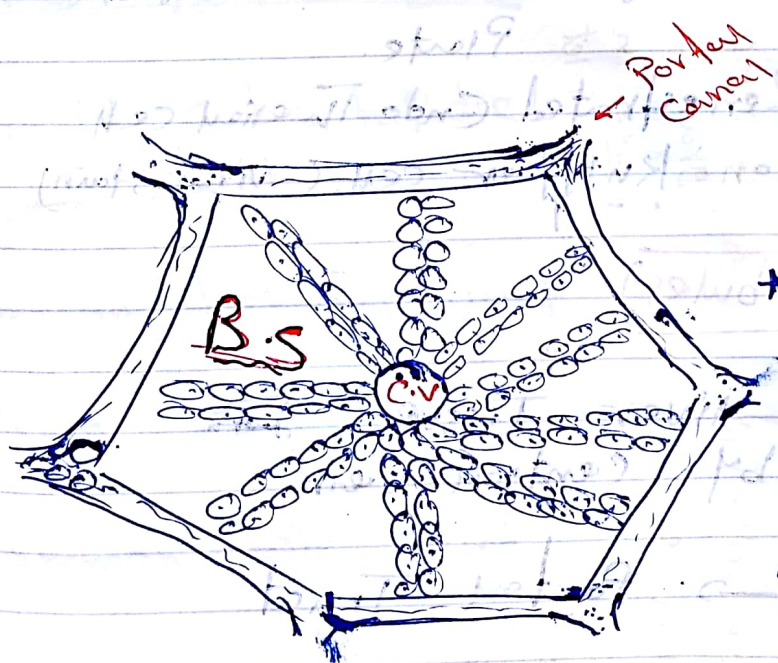
blood supply  $\rightarrow$  70-80%  $\rightarrow$  Portal vein.  
 $\rightarrow$  25%  $\rightarrow$  hepatic artery.

Mixed gland  $\rightarrow$  Exocrine function  $\rightarrow$  bile.  
 $\rightarrow$  Endocrine  $\rightarrow$  Glucose, Plasma Ptn, Lipid.

\* Secretion of IgA, IgG.

\* basic structural component  $\rightarrow$  hepatocyte  
arranged to form  $\rightarrow$  classic hepatic lobules.

Classic Hepatic Lobules.



\* Hexagonal  
\* Drain in central vein.

\* Thickened in corner forming Portal Tracts (portal canal)

Portal Canal  
Contain

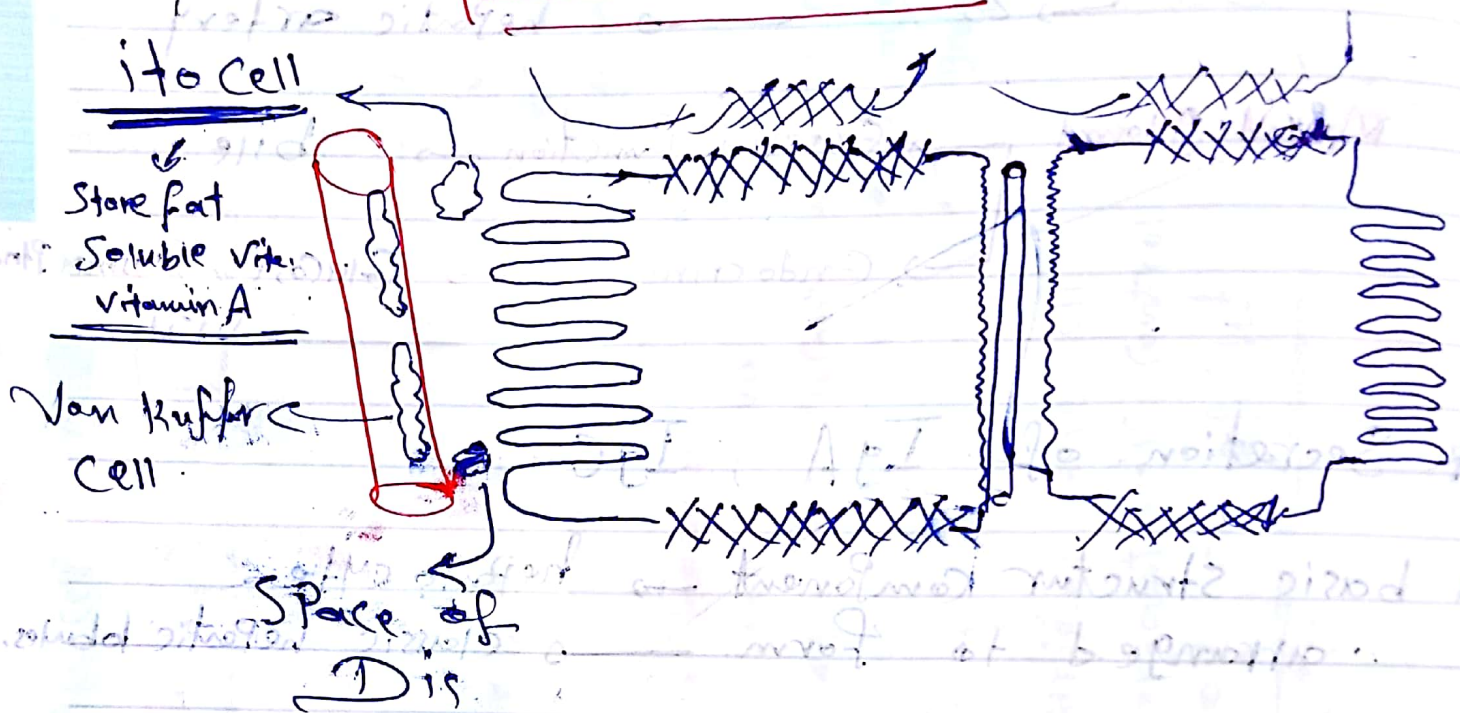
\* For hepatocyte arranged in cords or plates  
\* Each plate formed of 2 row

- 1- branch of Portal vein
- 2- branch of hepatic artery
- 3- branch of bile duct
- 4- lymph vessel.



\* The Endothelium lining blood sinusoid.  
Separated from hepatocyte by

Space of Dis.



Blood Sinusoid  $\rightarrow$  Blood space between hepatic Plate.

lined by  $\rightarrow$  fenestrated Endothelial cell  
von Kuffer cell. (vital stain)

(Portal lobules)

\* Triangle area of liver tissue  
it apex formed by central vein.

\* in it  $\rightarrow$  Central  $\rightarrow$  Portal Tract

\* all the cell of Portal lobule Drain  
in central of Triangle.



# (liver acinus)

Diamond shape mass of liver surrounding Central Vascular Core

* Zone I	Zone II	Zone III
↓ Close to Vascular Core	↓ intermidiant	↓ Periphery

projection of  
Hepatocyte Form  
↑ bile canaliculi

**Biliary Tract**  
Site.

between hepatocytes

lined Epith

Bile Canaliculi

Bile Ductules

Intr lobular Duct

in Portal vein.

Simple cubical

simple cubical

~~Intra hepatic duct~~

Rt. Lt. Extra hepatic  
Duct.

Simple Columnar

Common hepatic Duct

Simple Columnar

Cystic Duct.

Simple Columnar

Common bile Duct

Simple Columnar

Simple cubical ← 80%

Simple Columnar ← 20%



# Gall bladder

Epithelium → Simple Glandular

\* acidophilic.

\* No submucosa.

## Serous acini

## Mucous acini

lumina

Small

large

Narrow

wide

more

Few

Pyramidal

Cubical

Round

Flat

Basophilic

apical

Zymogen

Pale & vacuolated

Secretion

Serous

Mucous

Myoepithelial cell

Few

new

	duodenum.	jejunum	ileum
length	25 cm.	2,5 m.	3,5 m.
Goblet cell	Few	more than	numerous
Villi	long	short	absent
Sub mucosa.	Brunners gland	Neither — nor —	Peyer's Patch

Epithelium

non keratinized st. ← oral cavity

is not

Simple. Columnar ← Fundus

Simple. Columnar ← Rectum

Strat. Columnar ← Column

Non keratin st. squ → anal valve

Keratin — → End

