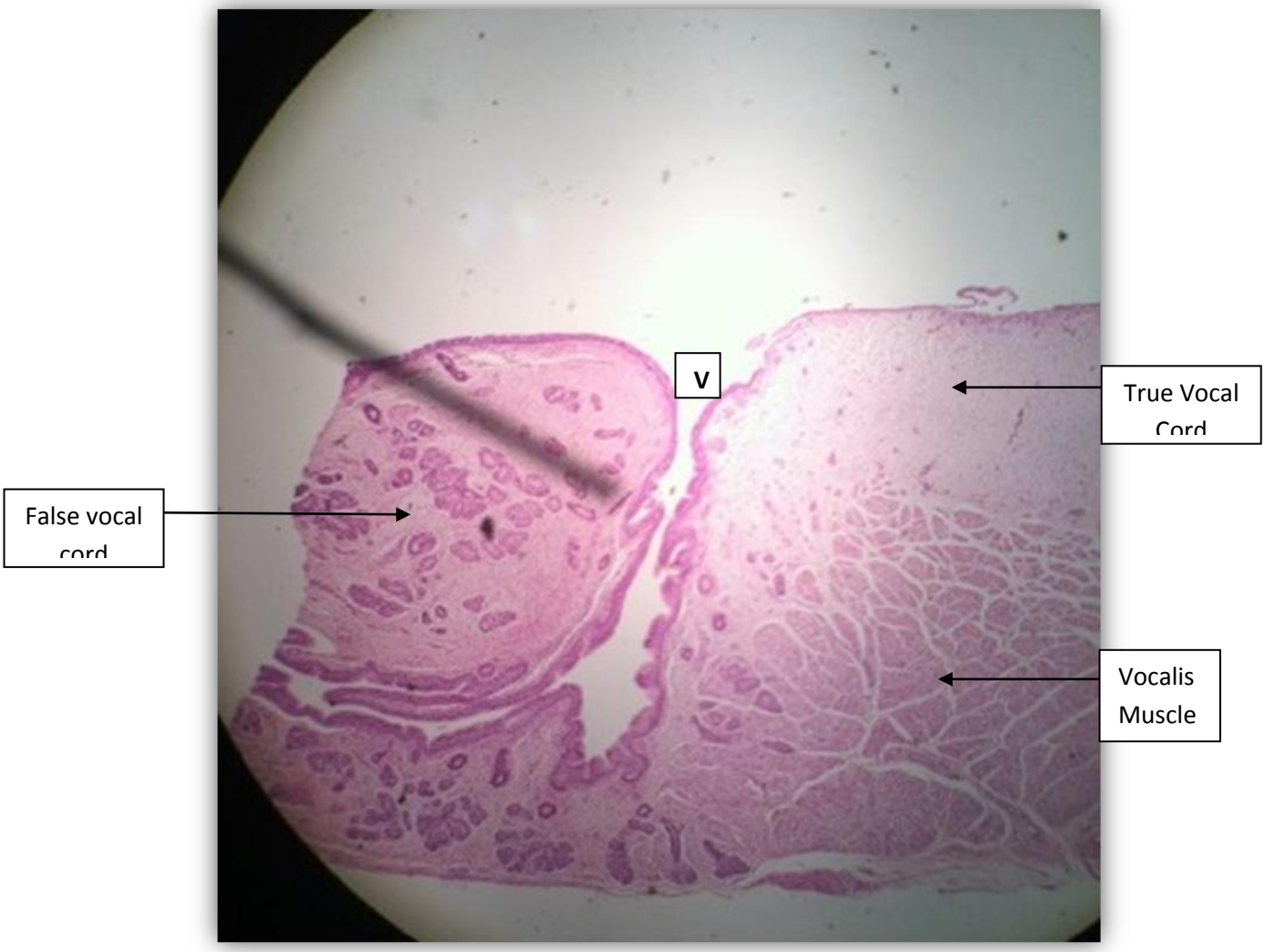
Upper Respiratory Histology

- Today we'll discuss the histology of larynx, trachea, primary, secondary, and tertiary bronchus.

*First: **<u>The Larynx:</u>**

-The picture below represents a section in the larynx, the land mark and the first thing you look for is the **ventricle**. You can see at 3 o'clock is the true vocal cord, at 9'oclock is the false vocal cord, at 6 o'clock there's hyaline cartilage, and we can also see vocal ligament and vocalis muscle.



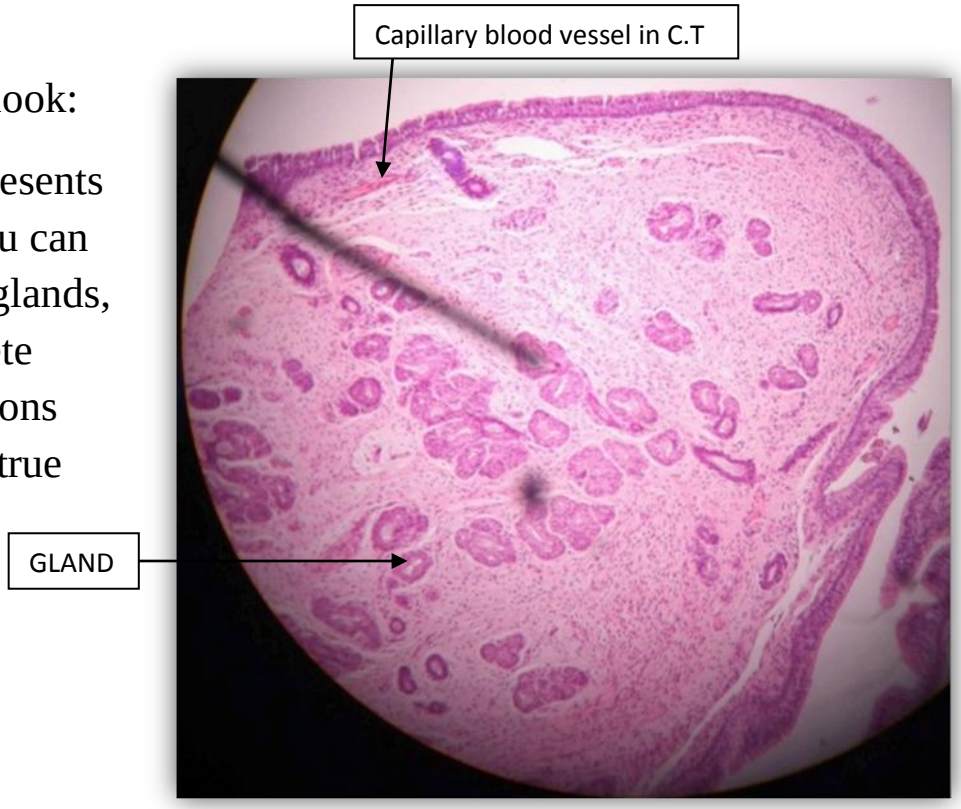
The larynx is a box of cartilage which contains true and false vocal cords separated by ventricle, and lined by <u>respiratory epithelium</u>.

> **<u>Respiratory Epithelium</u>**: is a pseudostratified ciliated columnar epithelium, usually rests on a thick basement membrane, and has several cell types; columnar, basal, and goblet cells

1) Ventricle: is a space between true and false vocal cords, its lining is respiratory epithelium.
2) True and false vocal cord:
   *How to differentiate between them??
   False >> -contain glands
   -respiratory epithelium.
   True >> -No glands
   -epithelium is stratified squamous non-keratinized..Why non-keratinized? Because we use our vocal cords alot so the epithelium is susceptible to injury and must be regenerated by mitosis when that happens.
   -Vocal ligament for vibration of true vocal cords.
   -Vocalis muscle is a striated (skeletal) muscle.

Now for a closer look:

*This picture represents **false vocal cord**, u can see the abundant glands, these glands secrete seromucus secretions for lubrication of true vocal cords.



*This picture represents the **true vocal cord**, Layers from above to below are:

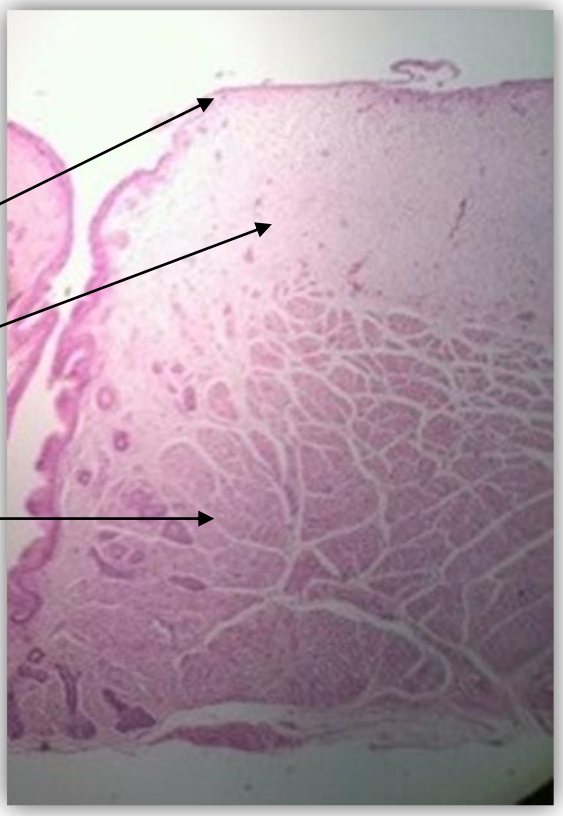
1. Epithelium: stratified squamous non-keratinized.

2. C.T and elastic fibers (vocal ligament).

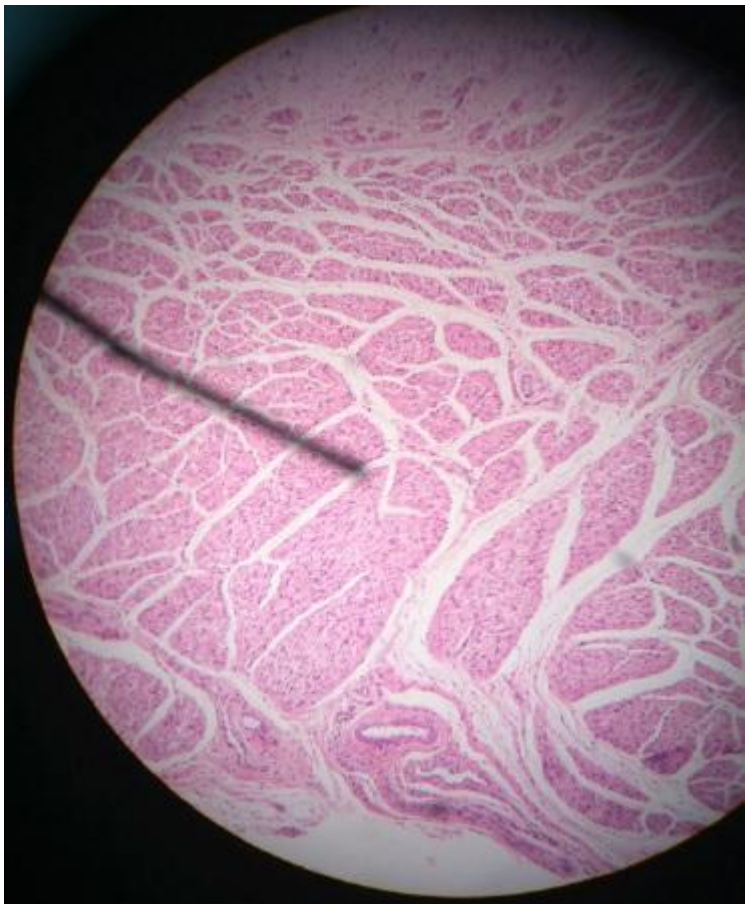
3. Vocalis muscle

4. Hyaline cartilage

*Notice: there's no submucosa, no lymphatic vessels, so no edema in true vocal cord.



*This picture shows a transverse section in vocalis muscle, notice peripheral nuclei.



*Notice hyaline cartilage (chondrocyte inside lacunae, basophilic, form a nest).

*At the surface is the pericondrium which contains chondroblast cells.

****NOTE**: Gland are only absent in true cord so when glands reappear and epithelium becomes respiratory again, this is the **infraglottic space** below true cord.

*Second: **Trachea:**

-Trachea lies anterior to esophagus.

Hyaline cartilage is C-shaped, always open

Mucosa is star shaped, collapsed, opens only when pollus get down

Note: as we move distally...

-Goblet cells and Glands become less

-Smooth muscles become smaller and more

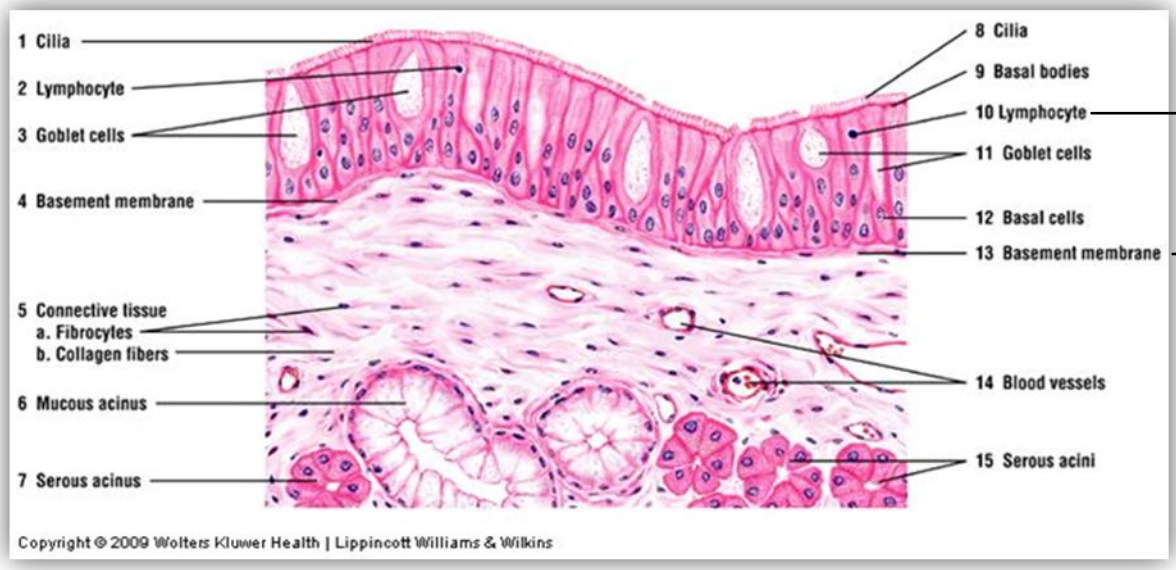
-Lymphocytes aggregate into lymphatic nodule

-Posteriorly between trachea and esophagus cartilage is replaced by **Trachialis muscle** (smooth muscle, innervated by ANS, spindle in shape, central nuclei).

- 4 Layers:

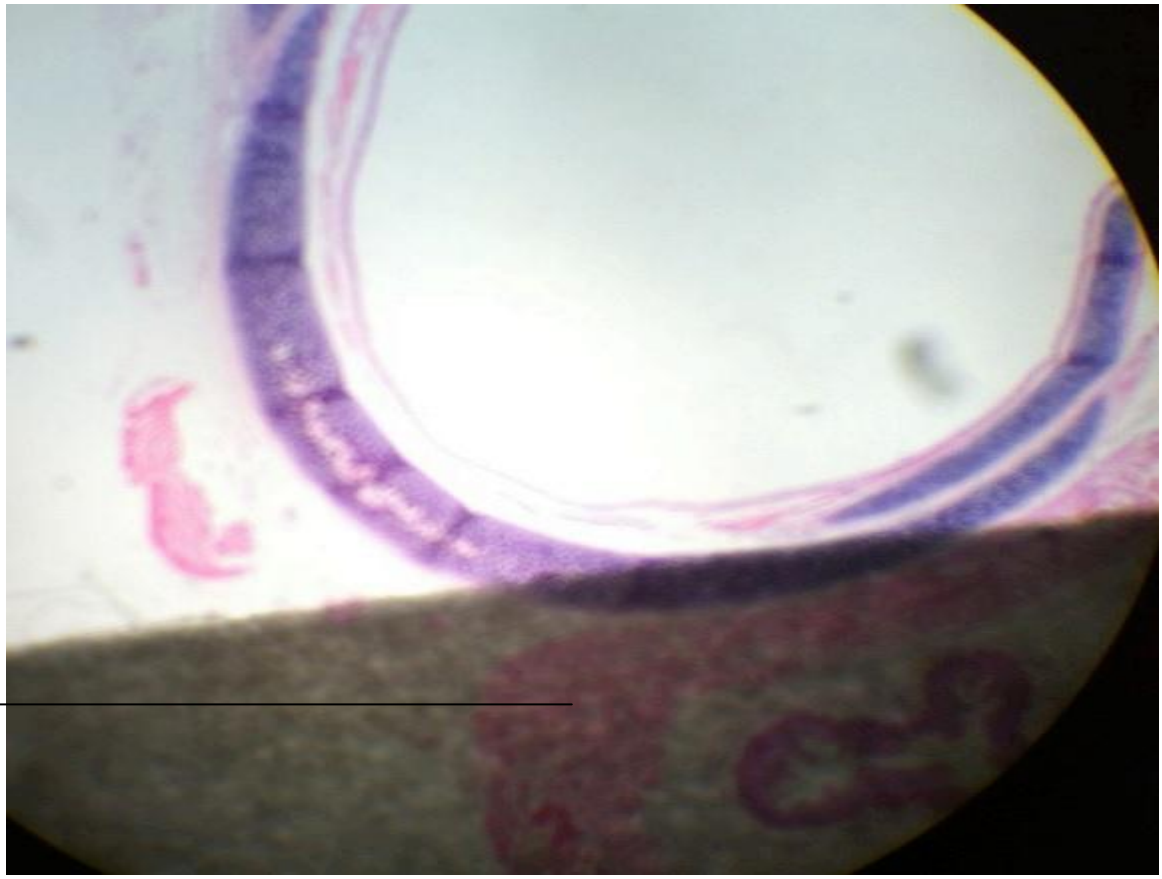
Mucosa > Submucosa > Supportive layer > Adventitia

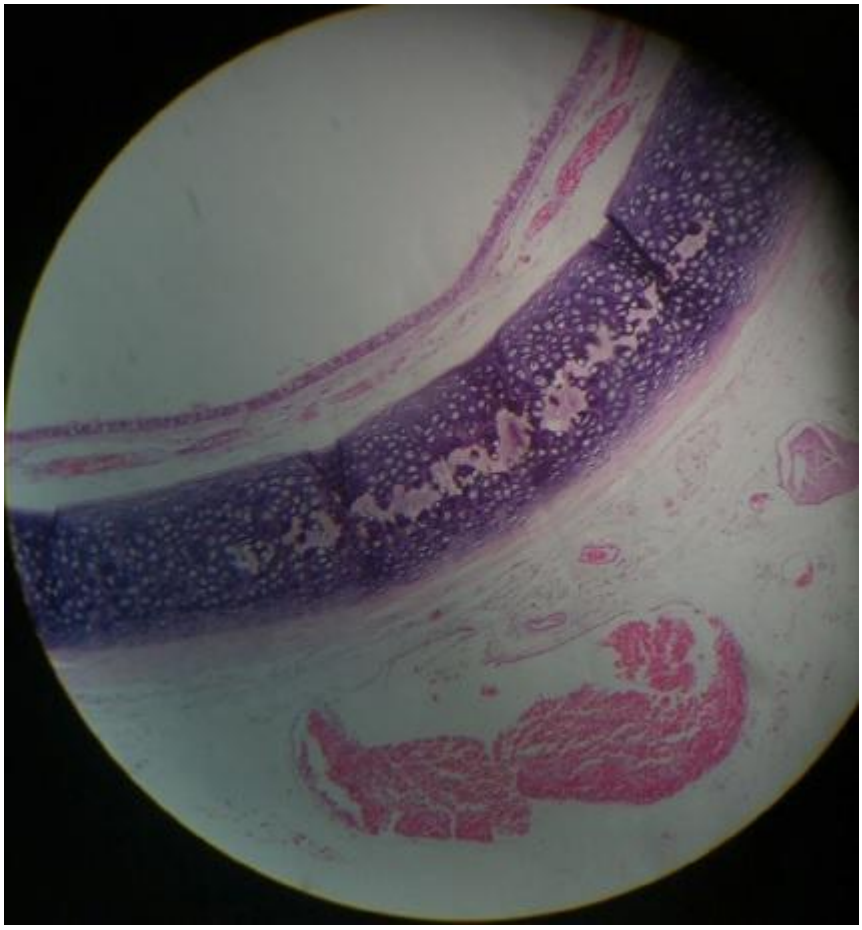
-Lining Epithelium: Pseudostratified ciliated columnar. -**Goblet cells: less.**	-Blood vessels -**glands: less**	Hyaline Cartilage -pericondrium and chondroblast -chondrocyte nests	Connective tissue



Scattered

Thick and continues with lining epithelium


Esophagus


Trachea

*Third: **Primary Extrapulmonary Bronchus:**

Extrapulmonary ⟶ No lung tissue yet

- Exactly the same as trachea except that Hyaline cartilage is now pieces with small spaces in between instead of C-shaped cartilage in trachea.

*Forth: **Secondary Intrapulmonary Bronchus:**

-Intrapulmonary ⟶ Lung tissue appears.

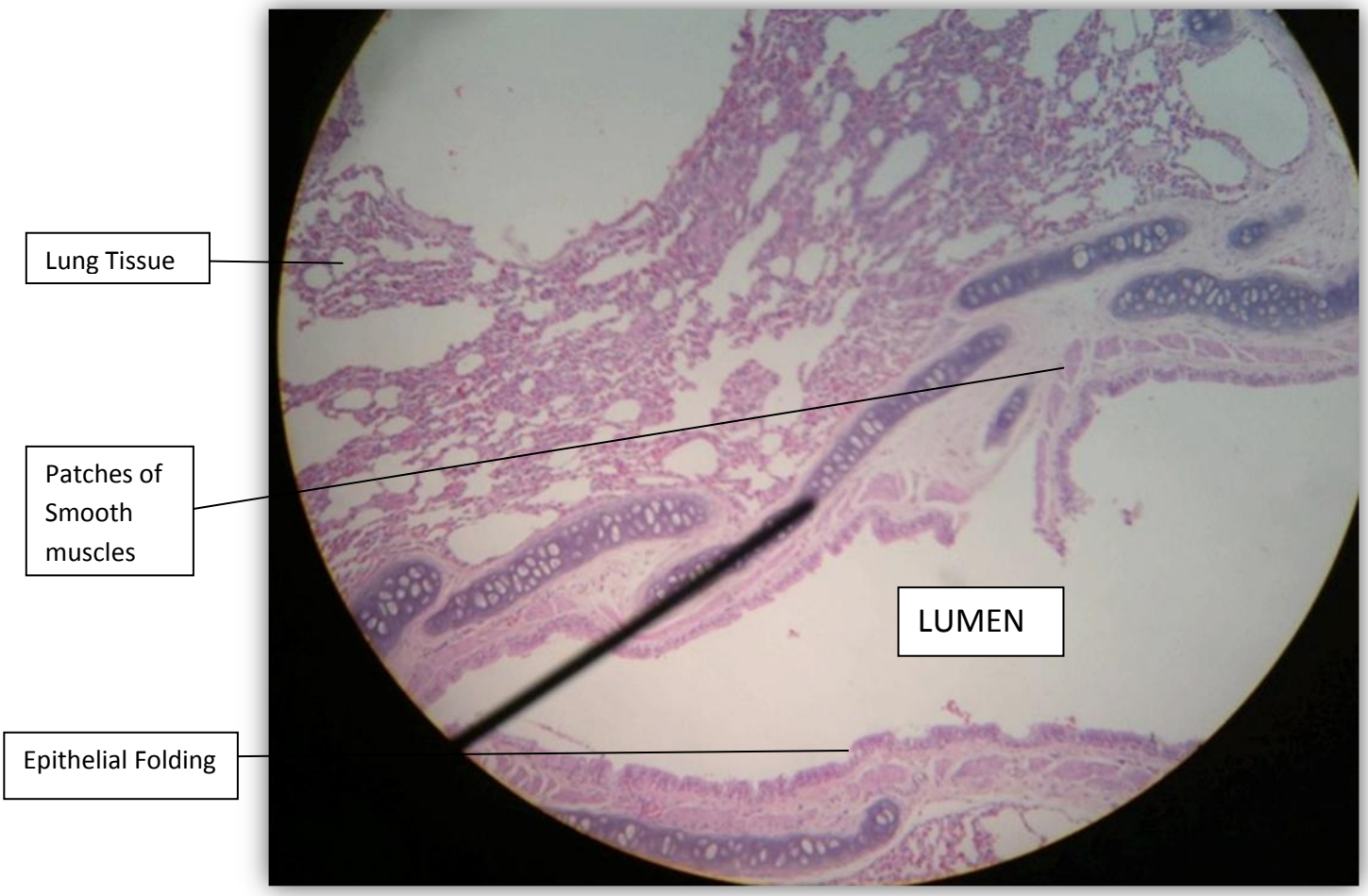
-Respiratory epithelium starts to have foldings (because of less cartilage and increased smooth muscles and elastic fibers).

-Hyaline Cartilage: Plates with wider spaces in between.

-Lymphocytes start to aggregate into lymphatic nodule.

-Patches of smooth muscles appear around lumen.

-Glands and Goblet cells fewer.



*Fifth: **Tertiary Intrapulmonary Bronchus:**

- Increase folding in respiratory epithelium.

- Hyaline cartilage: replaced by smooth muscles and elastic fibers, only 1 or 2 plates remain.

- Goblet cells and seromucus Glands: Very Rare.

- Smooth muscles: increased and continuous with lumen.

-Lymphatic nodules present.

** Ofcaurse as we move distally, bronchus diameter become less:

Primary > Secondary > Tertiary

*<u>REMEMBER</u>:

Goblet cell > Mucus secretions

Glands> Seromucus secretions

Cartilage appear thin and faint in plastic sections and thick in paraffin sections.

*Please refer to slides to see the rest of them.