



RESPIRATORY SYSTEM

جامعة ساوة

كلية الصيدلة

المرحلة الأولى

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MSc histology

Respiratory tract consists of:

I- Conducting portion.

II- Respiratory portion.

I- Conducting portion:

A-Nose (Nasal cavity). B-Pharynx. C- Larynx.

D- Trachea. E-Subdivisions and branching of the bronchial tree.

N.B: Parts of the conducting system are present within the lungs (intrapulmonary), while the remainder are outside the lungs (extra pulmonary).

Conducting portion consists of:

- Nasal cavity.
- Nasopharynx.
- Larynx.
- Trachea.
- Bronchi
- Bronchioles.
- Terminal bronchioles.

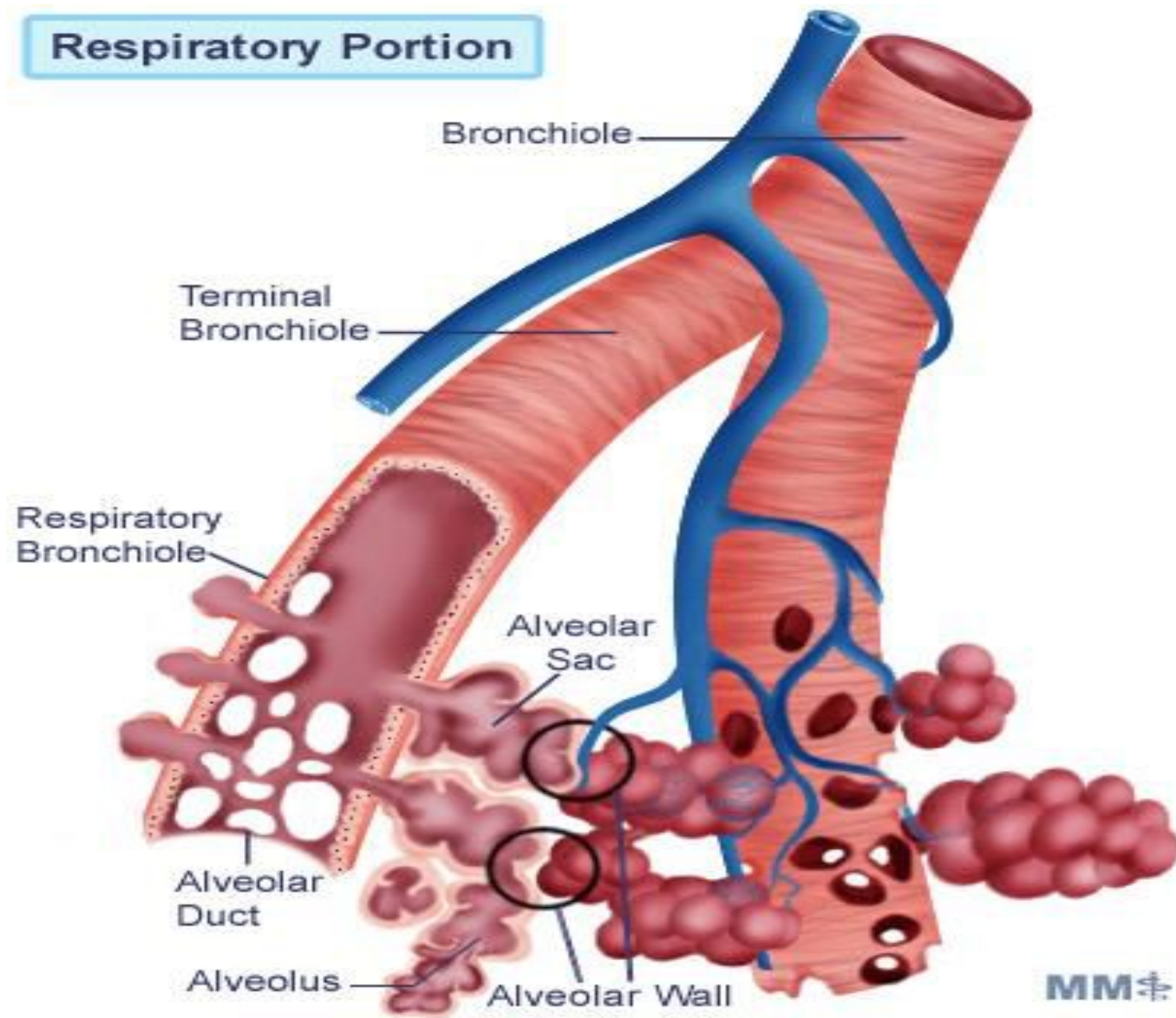
II-Respiratory portion:

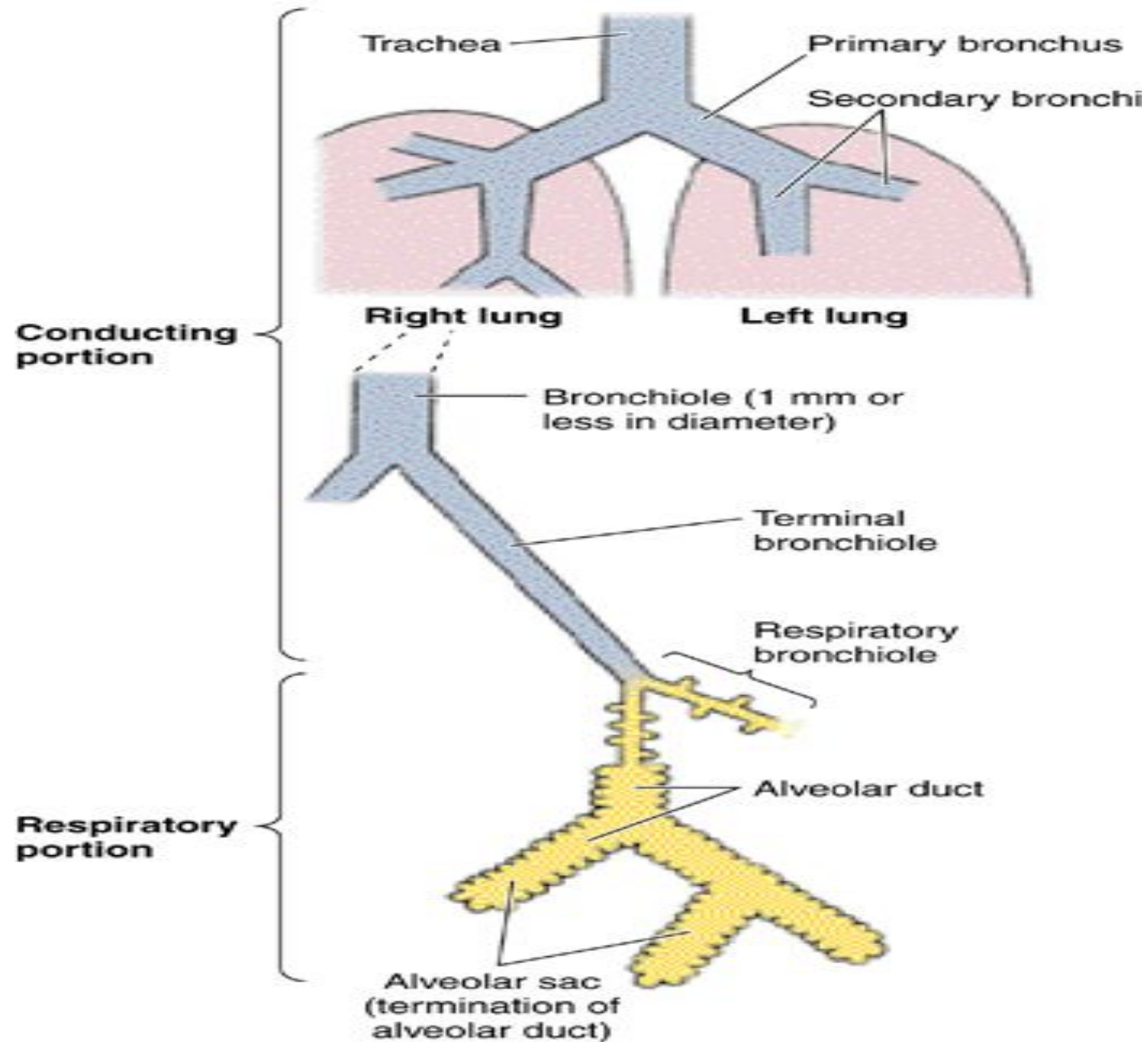
- Respiratory bronchioles.
- Alveolar ducts.
- Alveolar sac.
- Alveoli.

Nasal cavity: consists of:

- External vestibule.
- Internal nasal fossae (separated by osseous nasal septum).

Respiratory Portion





Vestibule:

- The outer integument of the nose enters the nares and continues part way up the vestibule.
- The inner surface of the narse have numerous sebaceous and sweat glands.
- Thick short hairs or vibrissae.
- Epithelium loses its keratinized nature and undergoes a transition into typical respiratory epithelium (pseudostratified ciliated columnar epithelium that contains goblet cells).

- C.T, lamona propria under lies the epithelium (lamina propria : C.T. + mucosa glands + serous glands + venous sinuses).
- The lamina propria fuse with the periosteum or perichondrium.

Nasal fossae:

They are 2 cavernous chambers separated by the osseous nasal septum covered by the respiratory epithelium.

Para nasal sinuses:

- Blind cavities in the frontal, maxillary, ethmoid and sphenoid bones.
- Lined with a thinner respiratory epithelium with goblet cells.
- Lamina propria contains a few small glands.
- Lamina propria is continuous with periosteum.

Trachea

Is a thin-walled tube that extends from the base of the larynx to the point at which it bifurcates into the 2 primary bronchi.

- The trachea is lined with a typical respiratory mucosa.
- The wall of trachea consists of:
- Mucosa.
- Sub mucosa with hyaline cartilage.
- Adventitia.

A- Mucosa: consists of:

- (pseudostratified ciliated columnar epithelium with goblet cells).
- Lamina propria consists of C.T. with diffuse lymphatic tissue and occasional solitary lymphatic nodules.

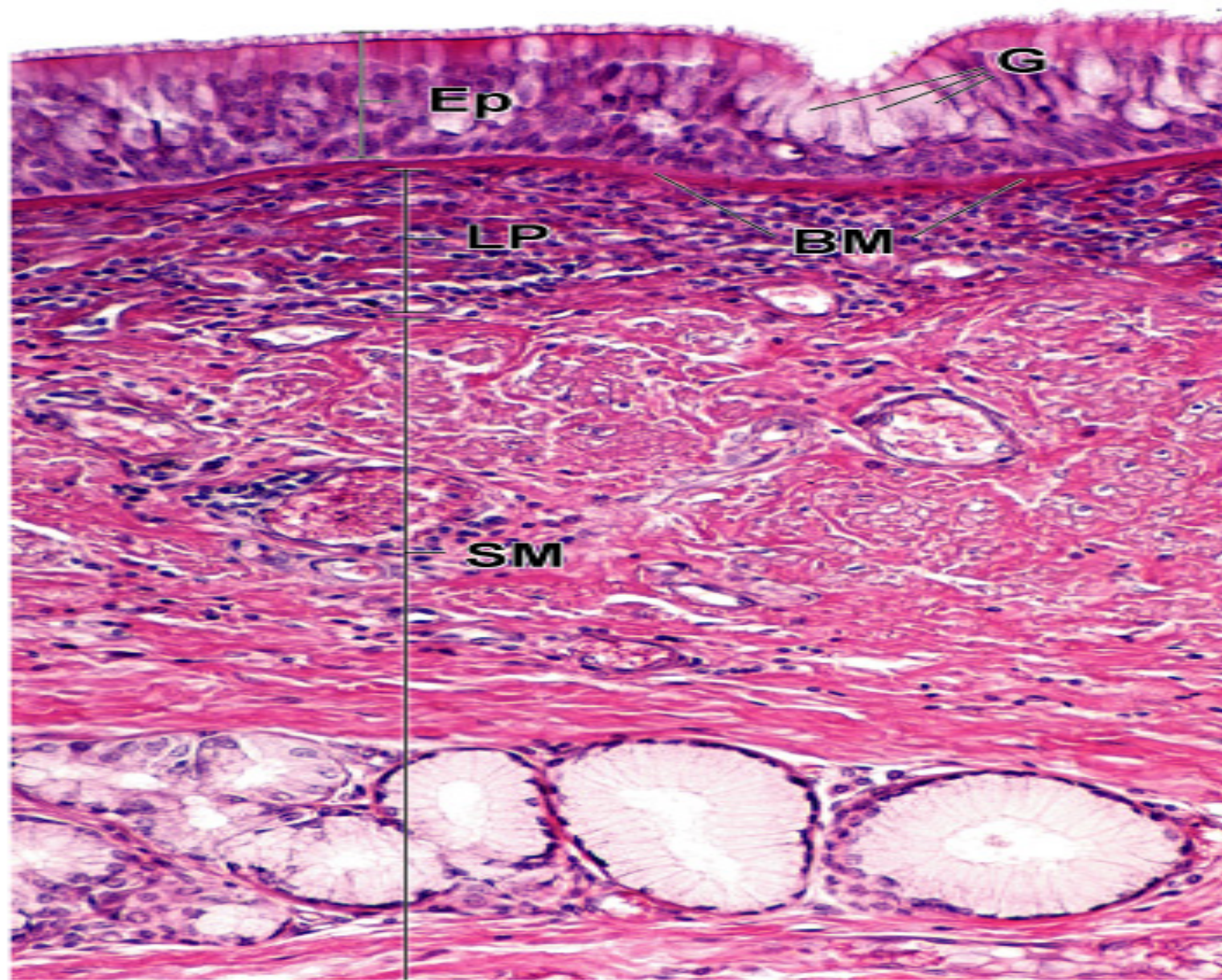
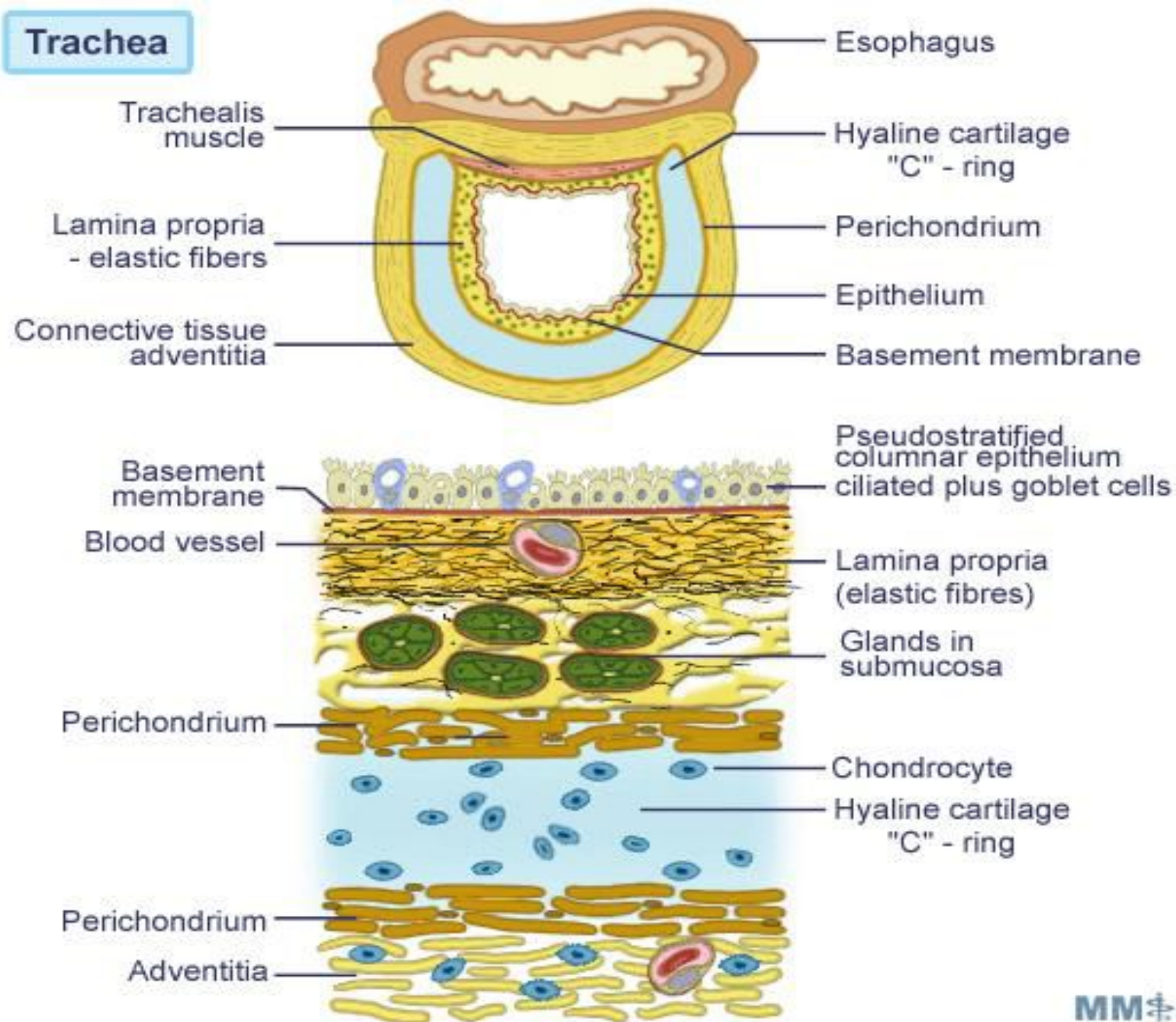


Figure 18.8. Photomicrograph of tracheal epithelium. *G*, goblet cells; *BM*, basement membrane; *LP*, lamina propria; *SM*, submucosa.

B- Sub mucosa: consists of:

- Loose C.T.
- Tubule alveolar mixed glands (whose ducts pass through the lamina propria to open into the lumen of the trachea).
- Plate of hyaline cartilage (C – shape cartilage) is surrounded by its perichondrium of dense fibrous tissue.
- **C- Adventitia:** C.T. elastic and reticular fibers + blood vessels and nerves.
- **D-Trachea muscles:** lie between the cartilages ends (smooth muscles).

Trachea



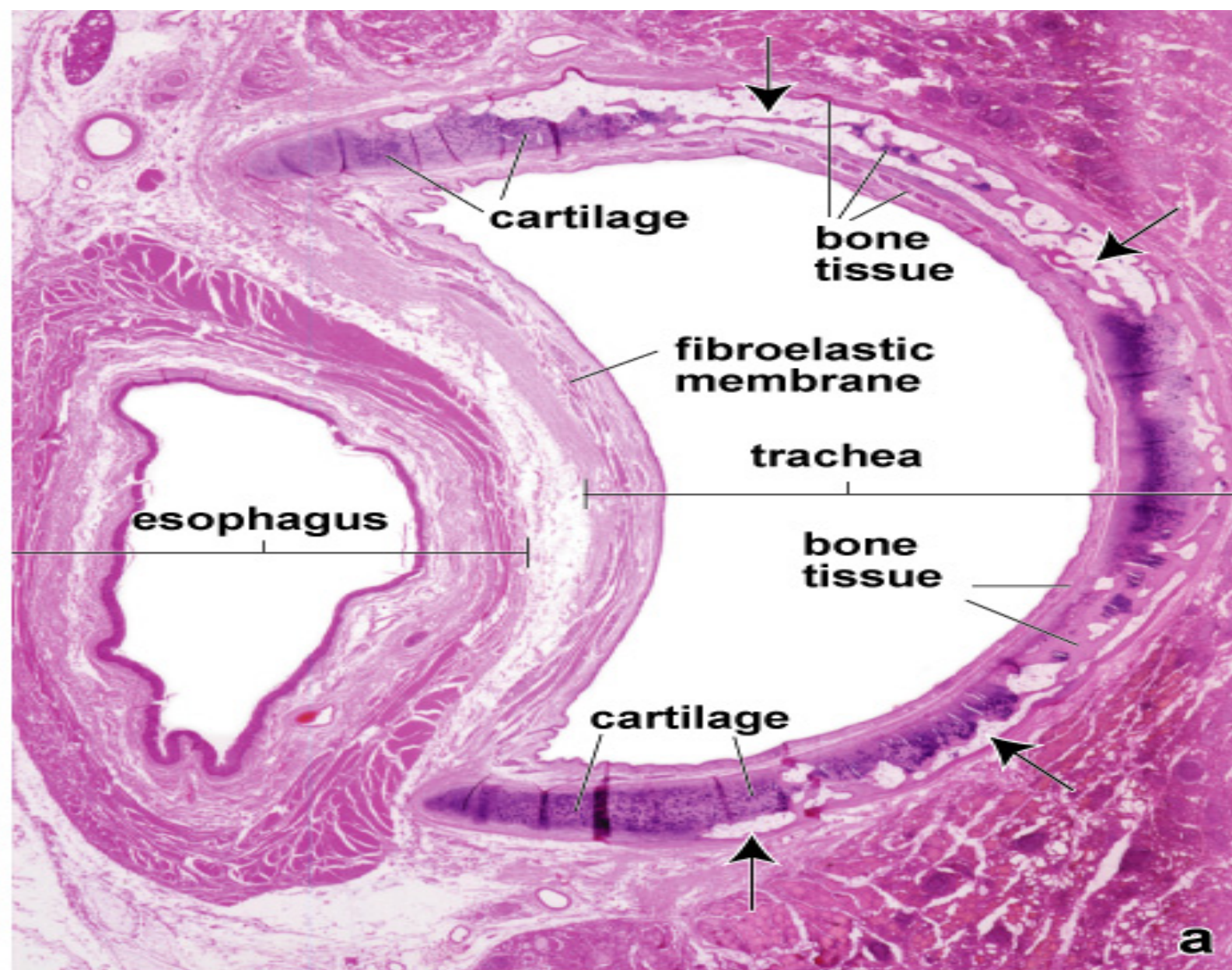


Figure 18.5a. **Photomicrograph** showing the relationship between the trachea and the esophagus at the base of the neck from an elderly individual. X3.25.

Bronchial tree:

The trachea divides into 2 primary bronchi which enter the lungs at the hilum.

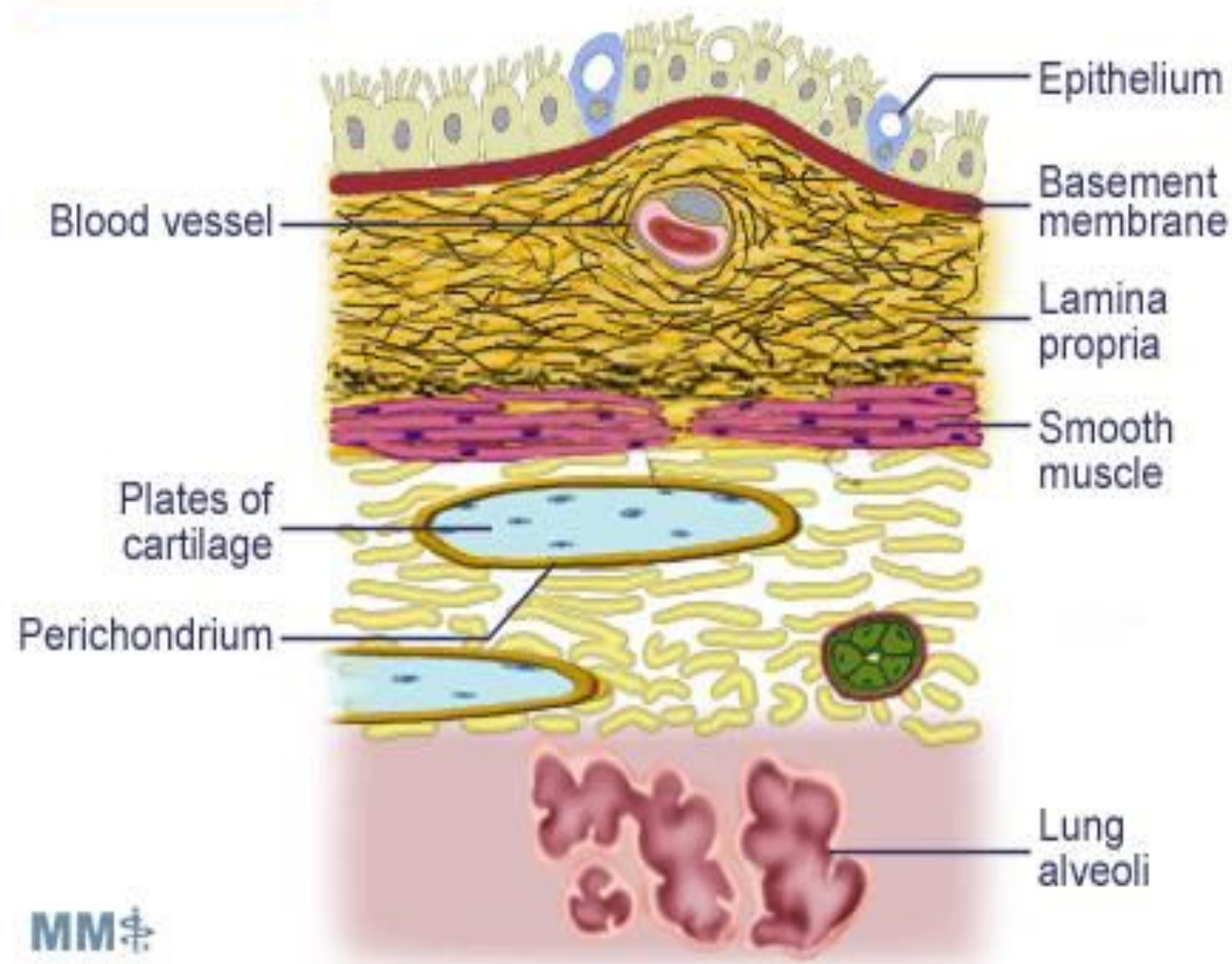
After entering the lungs, the primary bronchi course downward and outward, giving to:

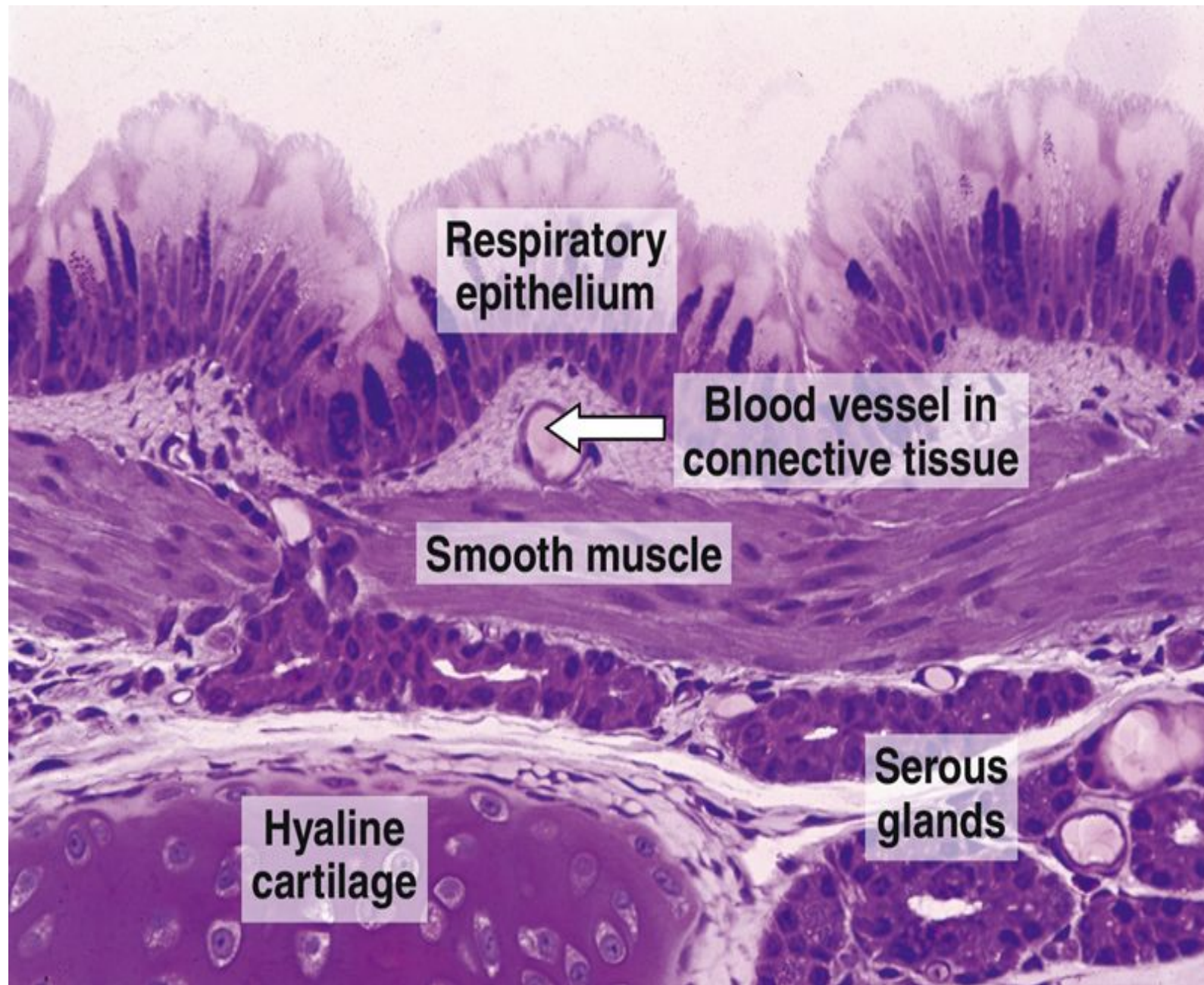
- 3 bronchi in the right lung.
- 2 bronchi in the left lung.

Secondary – Lobar – bronchus.

- Lined with pseudostratified ciliated columnar epithelium.
- The epithelium is surrounded by a thin lamina propria of fine C.T.
- A thin layer of smooth muscle surrounds the lamina propria
- Sub mucosa consists of C.T. + groups of serous glands (mucous glands are also present) + several cartilage plate.
- Adventitia consists of C.T. which a well developed layer.

Bronchus

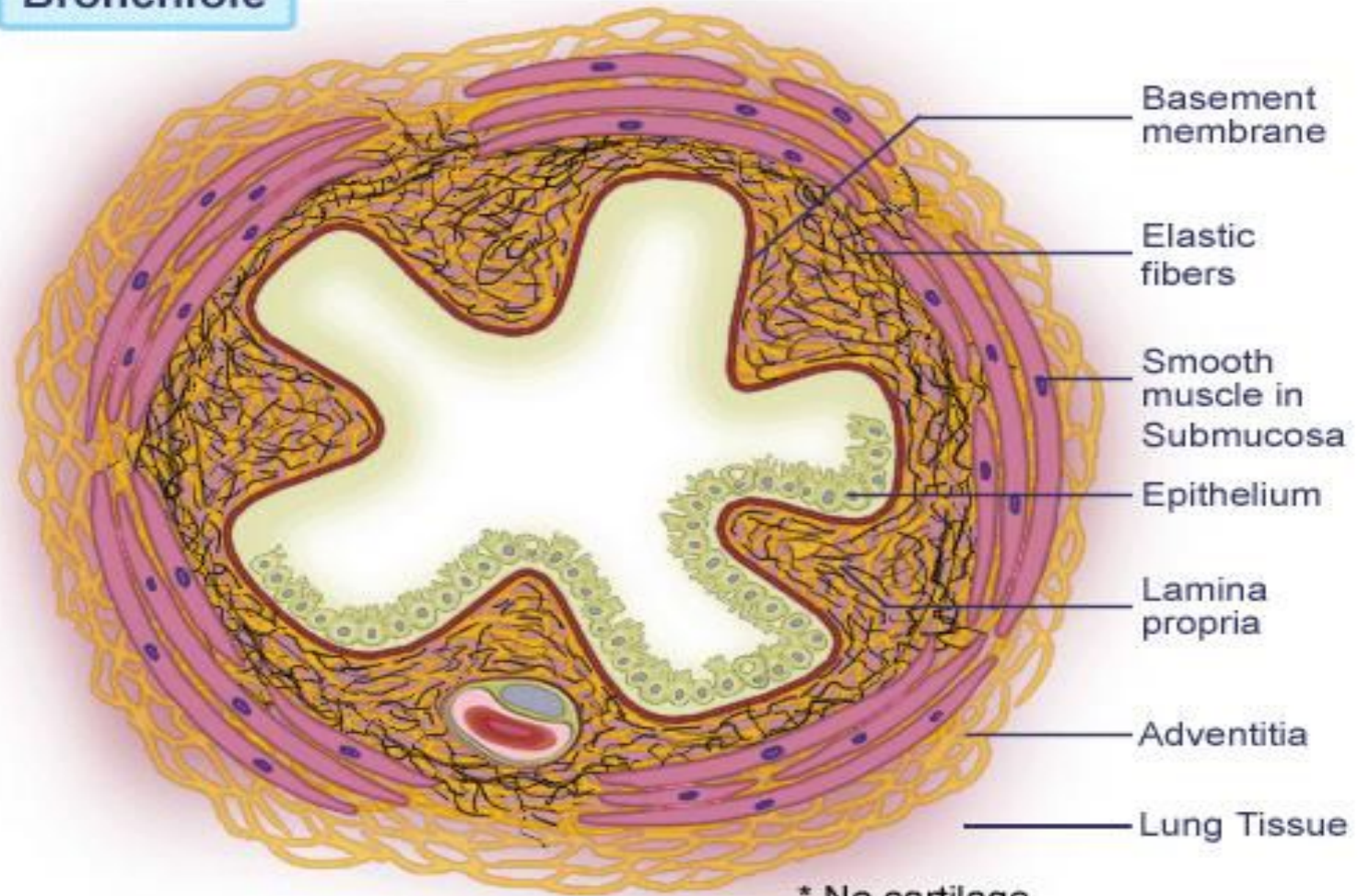




Terminal bronchiole

- Is of small diameter.
- Mucosal folds are prominent.
- The epithelium is low pseudostratified ciliated columnar with few goblet cells, (*it becomes columnar ciliated in terminal bronchioles, usually goblet cells are absent*).
- A well developed smooth muscle layer surrounds a thin lamina propria.
- Cartilage and glands are lacking.
- Adventitia is a C.T. (The bronchiole is surrounded by alveoli of the lung).

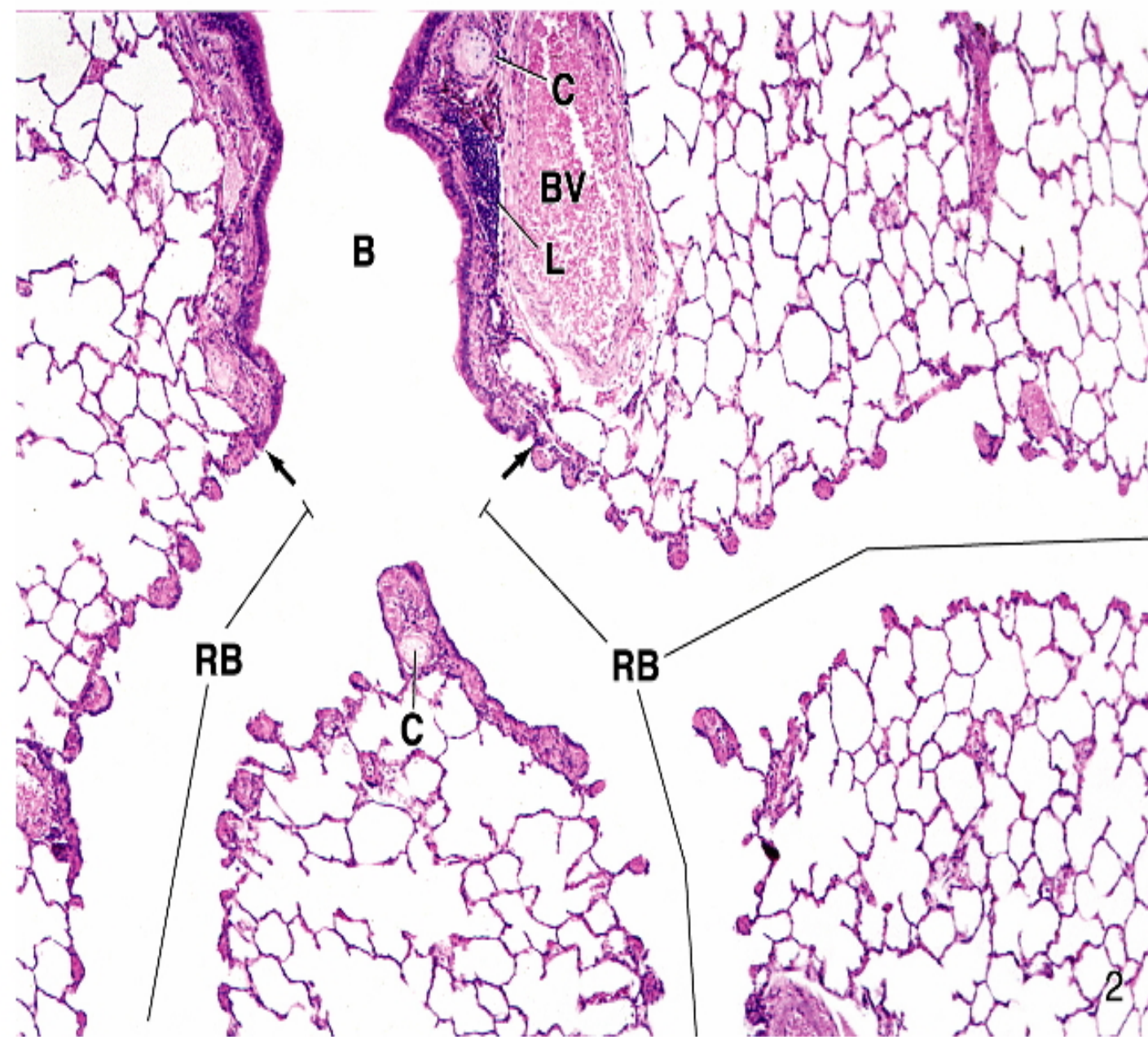
Bronchiole



* No cartilage
therefore, no solid tissue to
keep lumen patent, smooth
muscle spasms can block
bronchiole. → asthma

Respiratory bronchioles

- Lined with cuboidal epithelium.
- Cilia and goblet cells are lacking.
- Smooth muscle forms a layer close to epithelium.
- Surrounded by alveoli.



Alveoli

- Are sac like evaginations (within these oxygen and CO₂ are exchange between the air and blood).
- Inter-alveolar septum or alveolar wall lies between 2 neighboring alveoli.
- Alveolar septum or wall: consists of 2 thin squamous epithelium layers between which lie capillaries.

