

RESPIRATORY SYSTEM HISTOLOGY

- **Trachea**

- **Bronchus**

 - Primary bronchus*

 - Secondary bronchus*

 - Tertiary bronchus*

- **Bronchiole**

- **Lung**

- **BY**

- **Dr Navneet Kumar**

- **Professor Anatomy**

- **KGMU LKO**

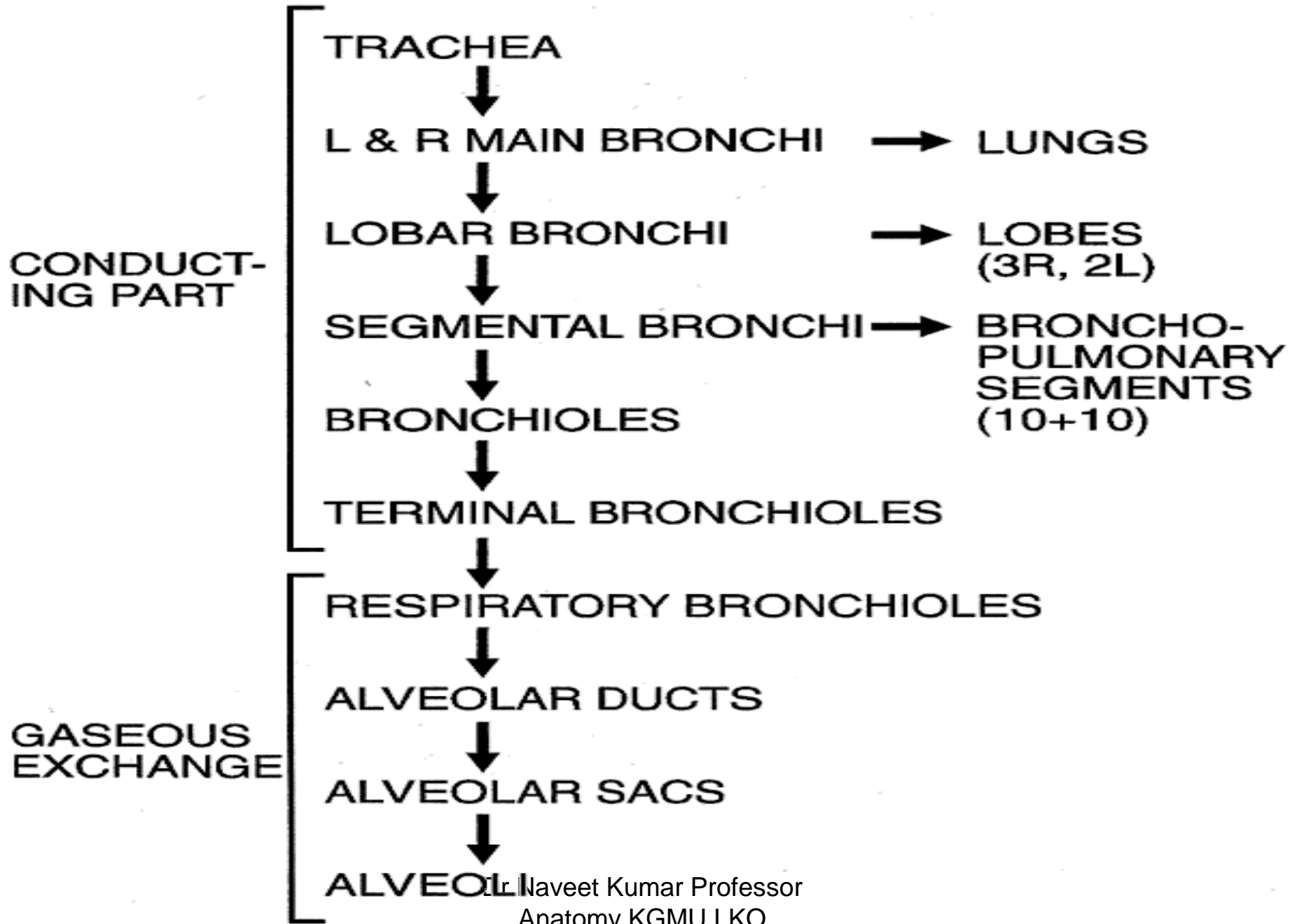
- **RESPIRATORY SYSTEM
HISTOLOGY**

BY

Dr Navneet Kumar

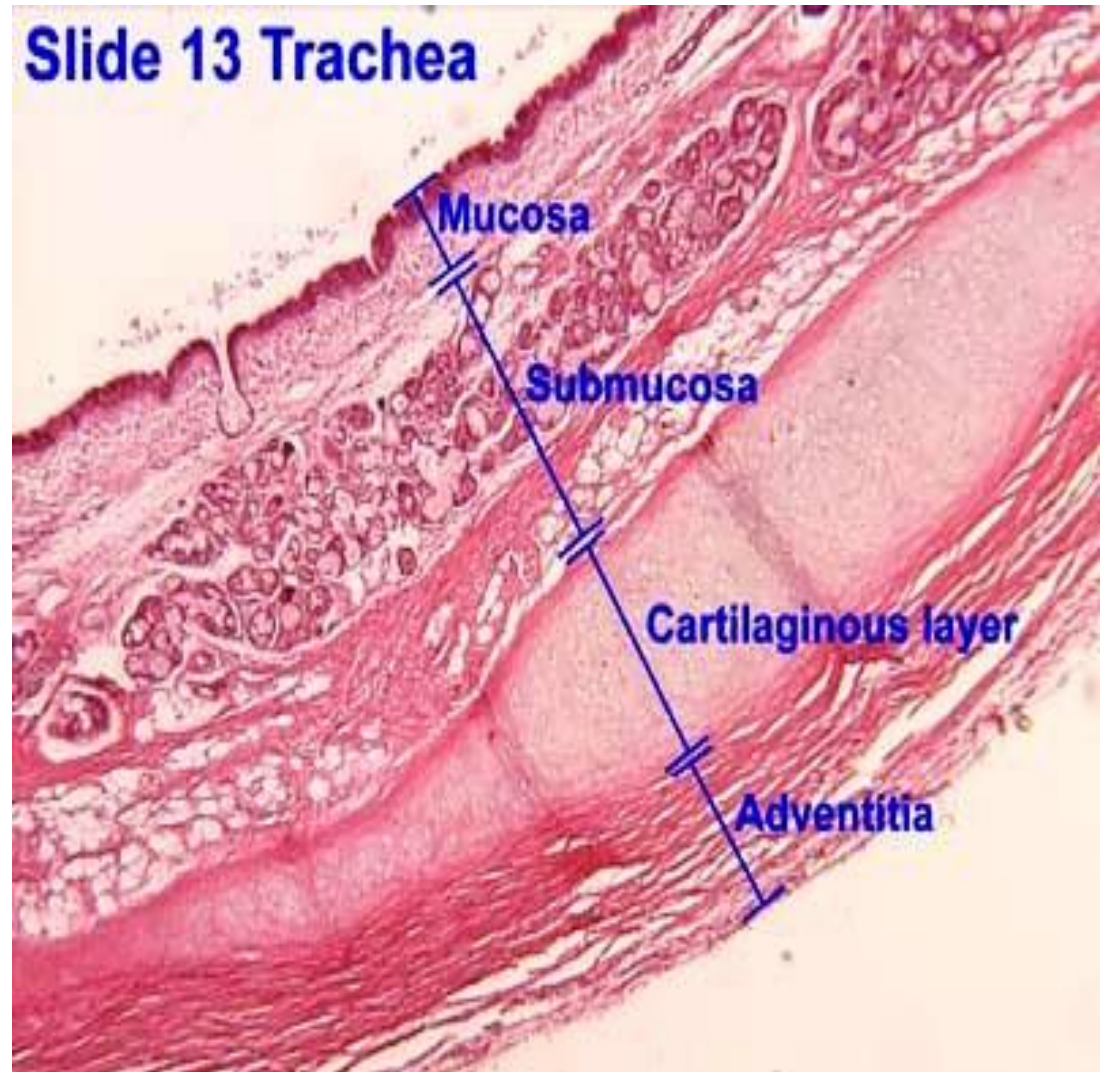
Professor Anatomy

KGMU LKO



Trachea

- **Mucosa**
 - Epithelium*
 - Lamina propria*
- **Sub mucosa**
- **Cartilage & muscle layer**
- **Adventitia**



Trachea

Mucosa

- **Epithelium**

- Pseudo stratified ciliated columnar/ Respiratory epithelium

- Cells**-Ciliated columnar cells

- Goblet cells

- Brush cells

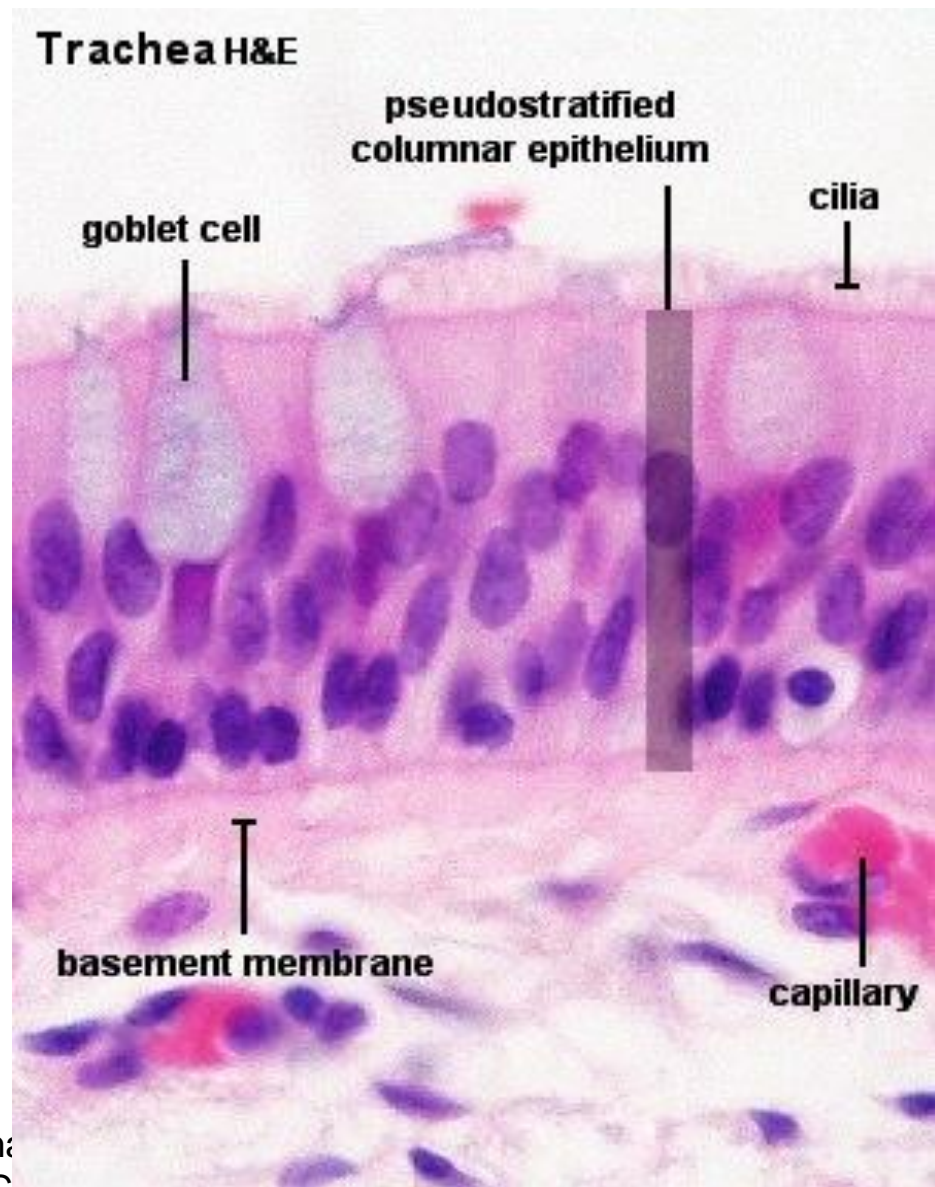
- Basal cells

- Granule (kulchitsky)

cells

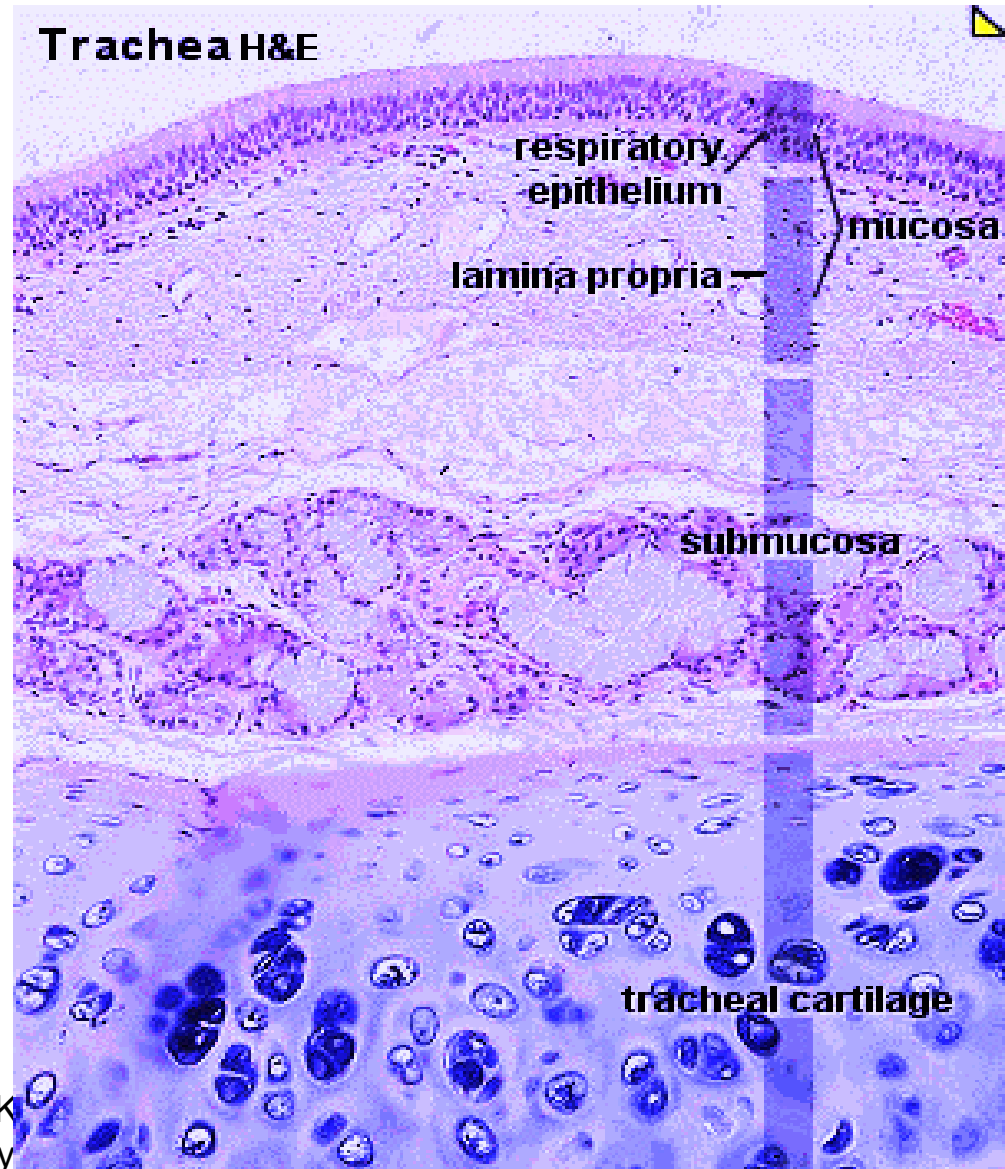
- Clara cells(bronchiolar cells) surfactant secretion

- **Lamina propria** - Elastic fibre, Lymphocyte, Mast cells, Blood vessels



Trachea

- **Sub mucosa-**
- **Loose connective tissue**
- **Tracheal glands-Mixed (serous & mucus) glands**
- **Cartilage & smooth muscle layer-**
- **”C” Shaped hyaline cartilage**
- **Ends of cartilage connected by smooth muscles**
- **Adventitia-fibro elastic tissue**



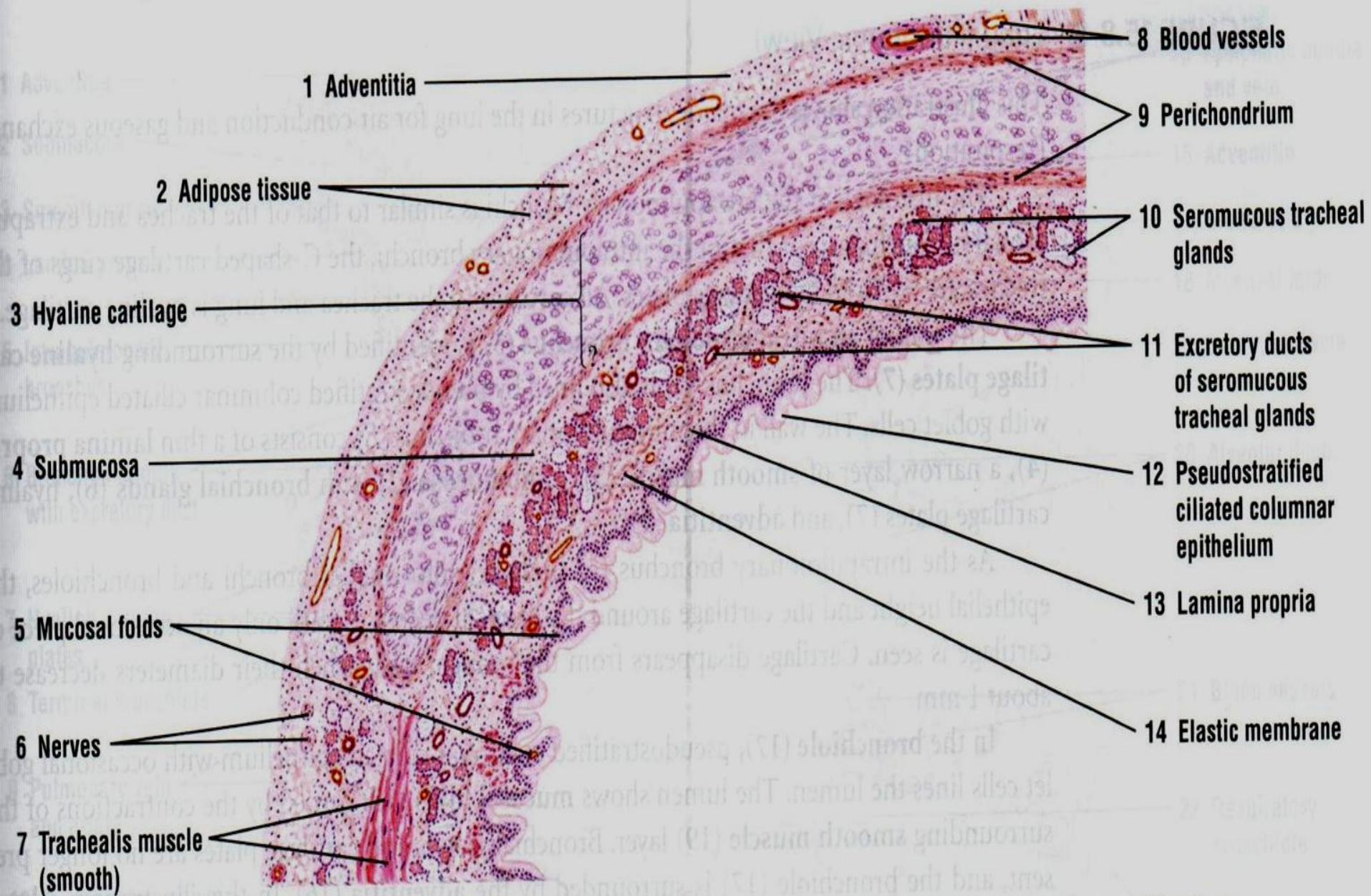


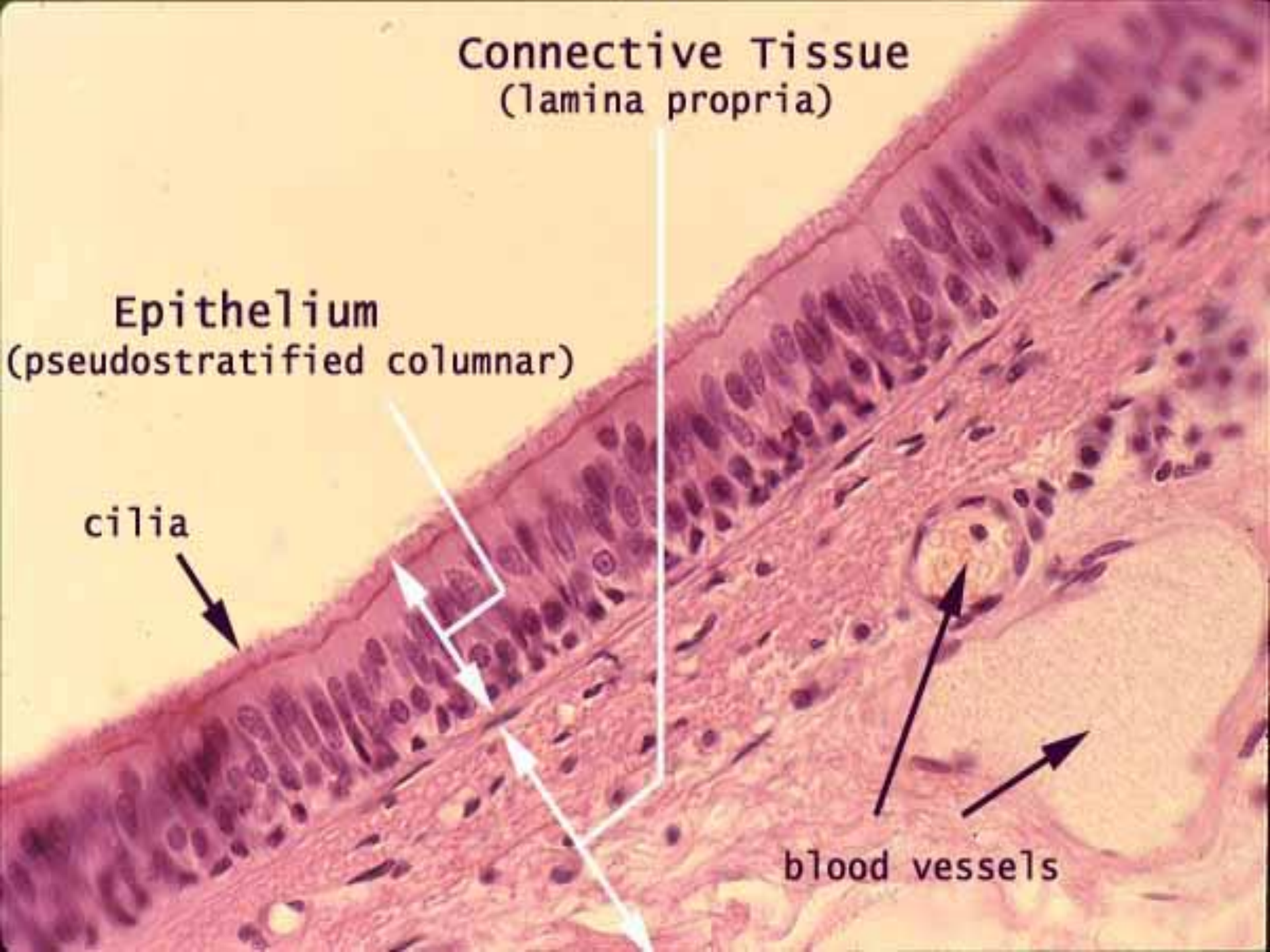
FIGURE 15.6 ■ Trachea (transverse section). Stain: hematoxylin and eosin. Low magnification.

Connective Tissue
(lamina propria)

Epithelium
(pseudostratified columnar)

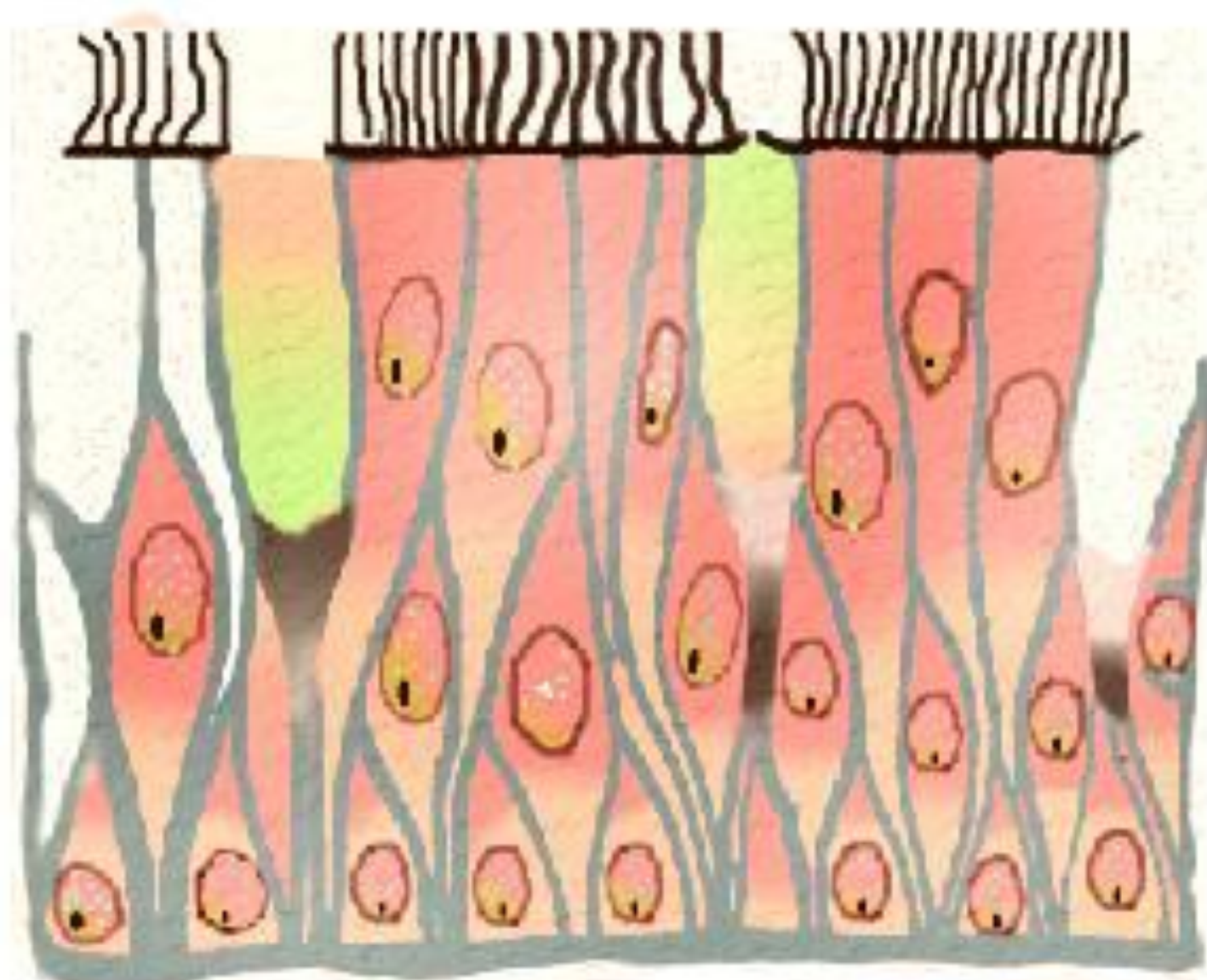
cilia

blood vessels



Goblet Cell

Basement
Membrane



Pseudostratified Columnar Ciliated Epithelium

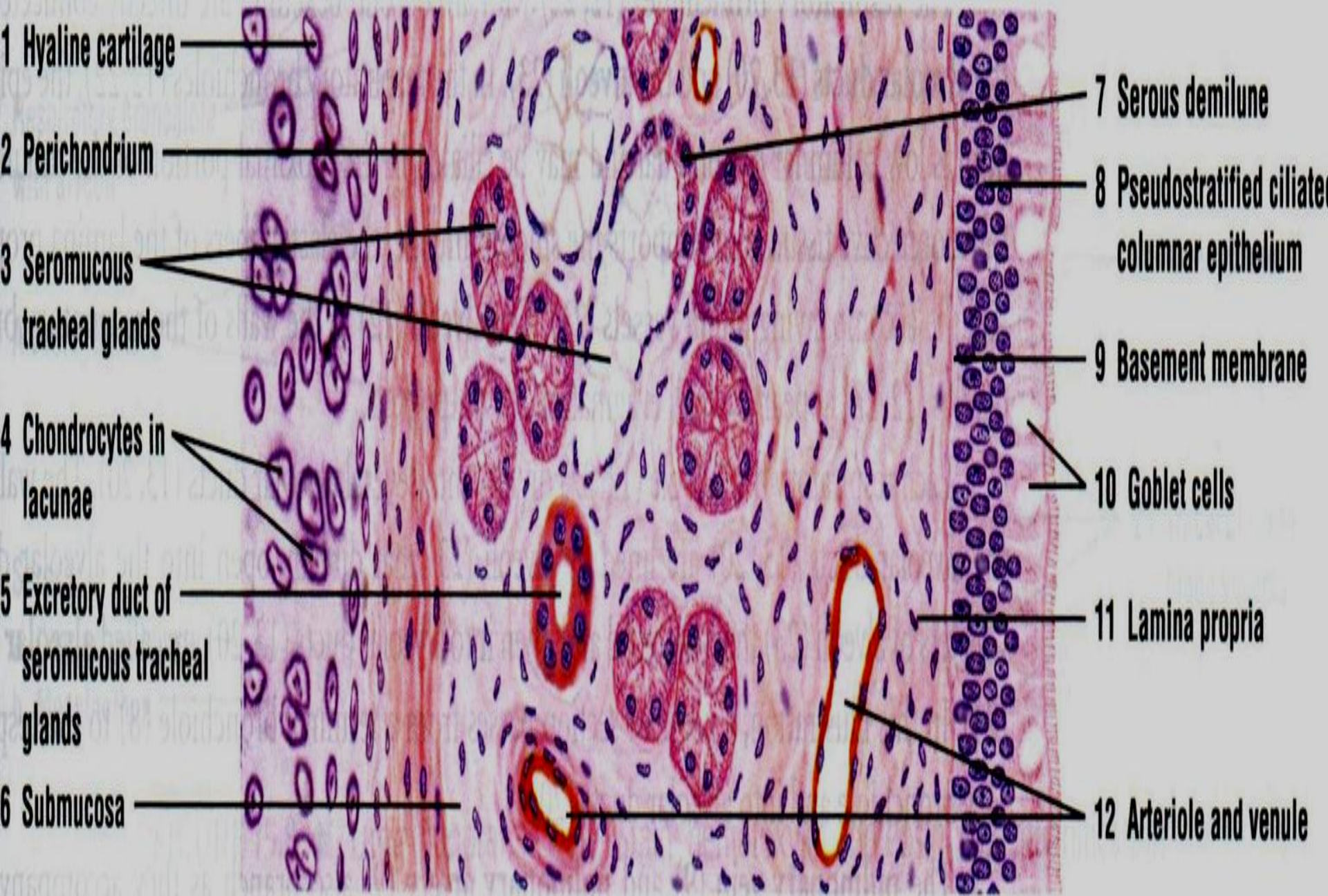
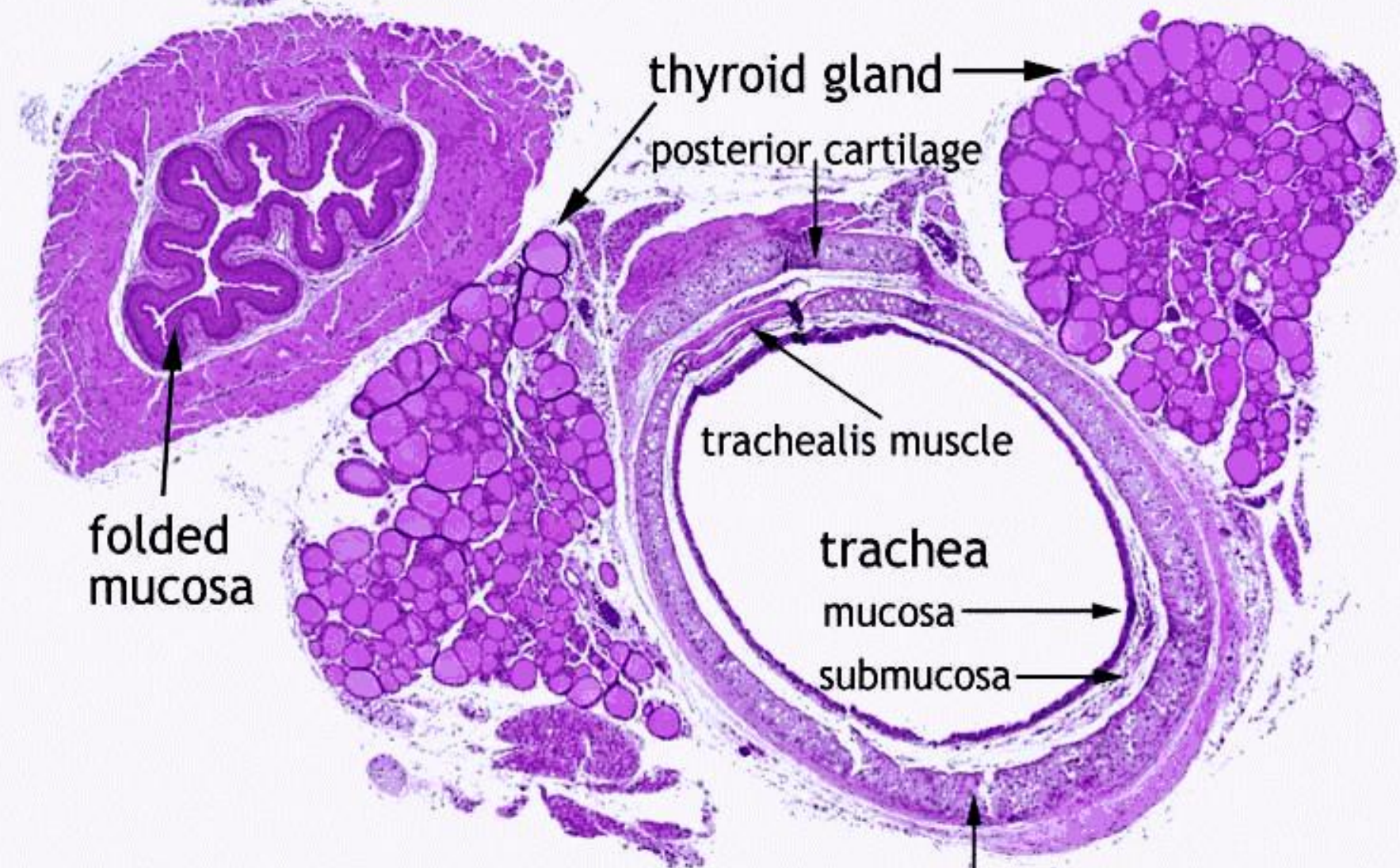


FIGURE 15.7 ■ Tracheal wall (sectional view). Stain: hematoxylin and eosin. Medium magnification.

esophagus



thyroid gland

posterior cartilage

folded mucosa

trachealis muscle

trachea

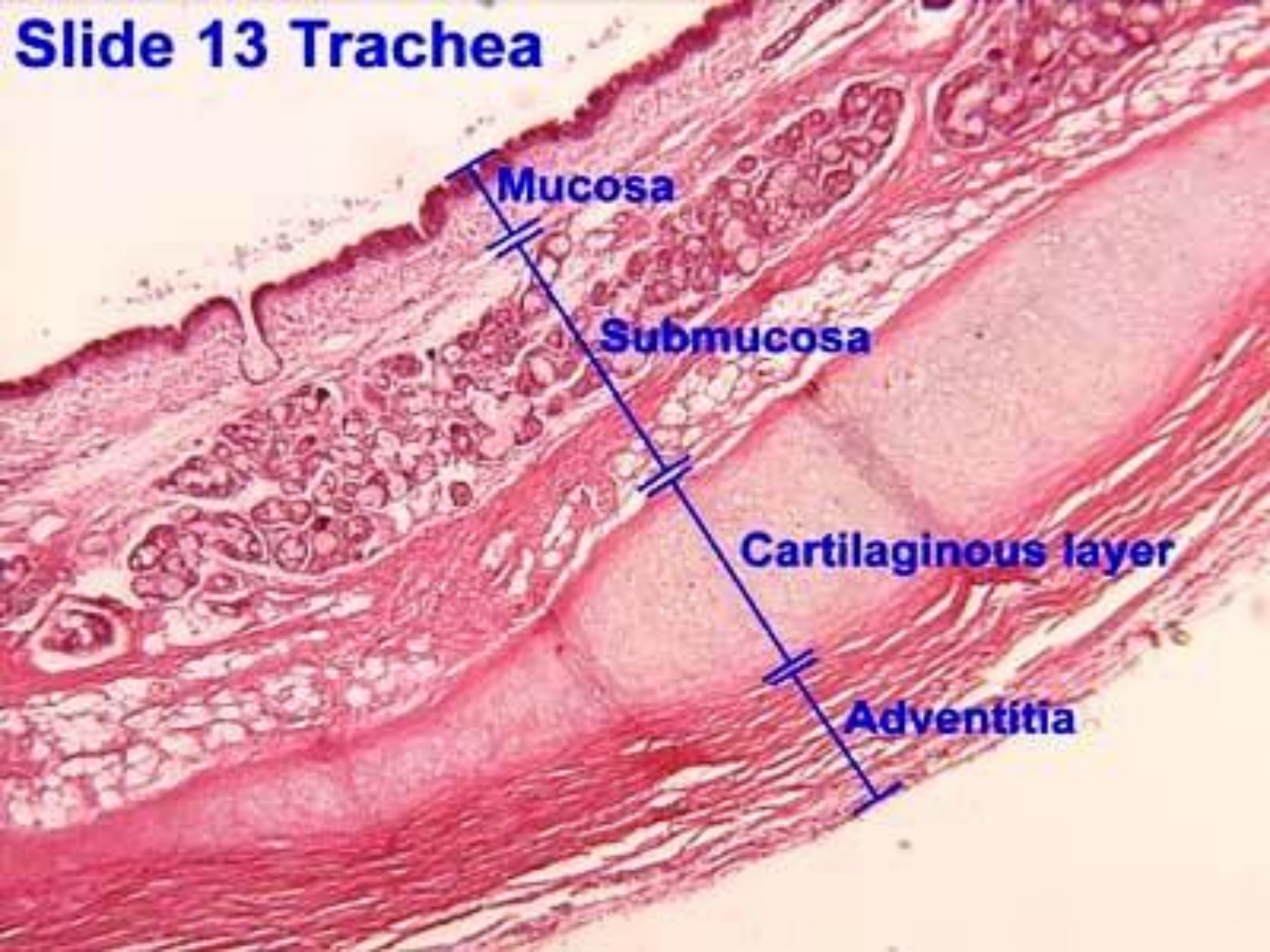
mucosa

submucosa

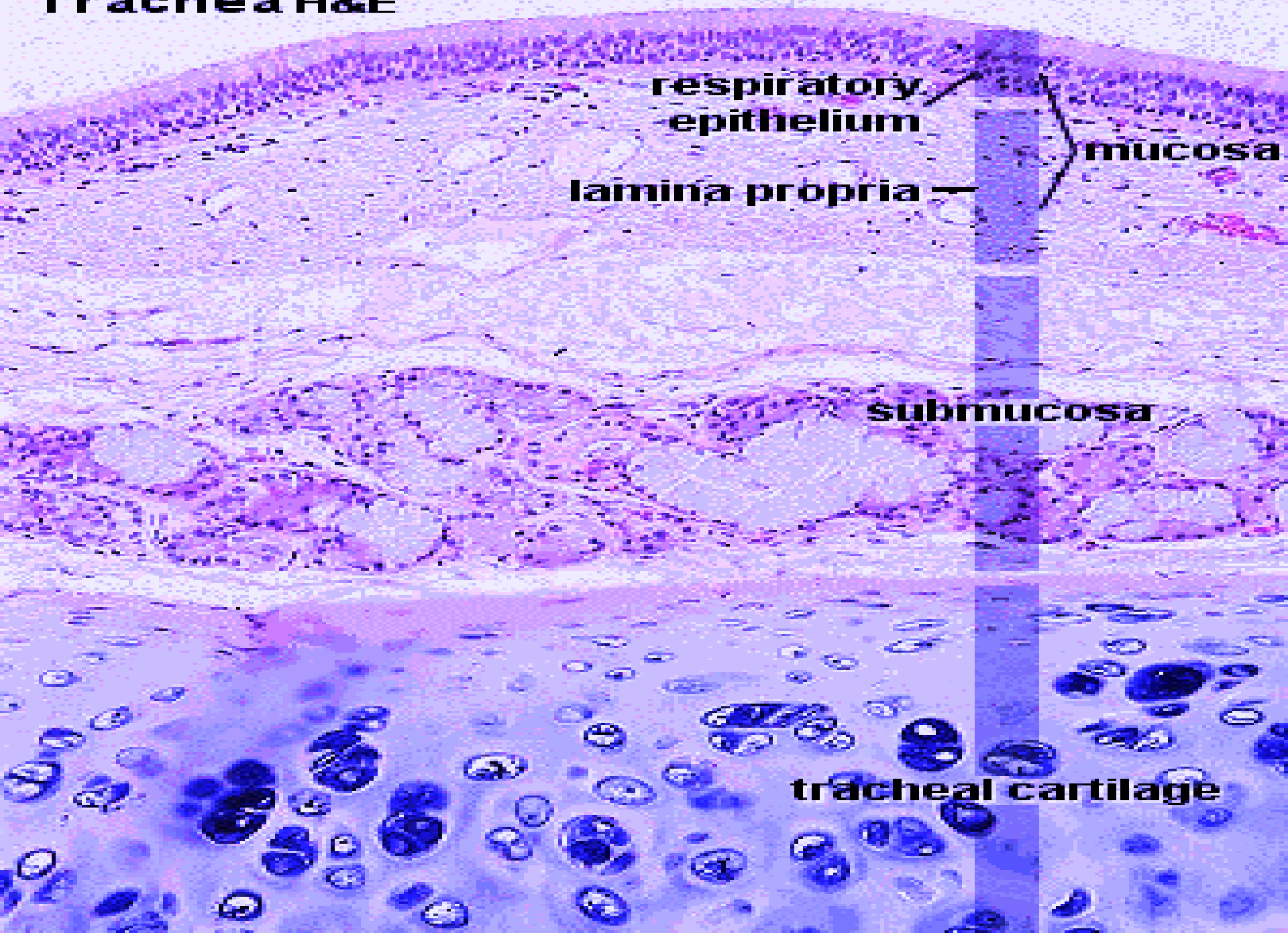
c-shaped ring of cartilage



Slide 13 Trachea



Trachea H&E

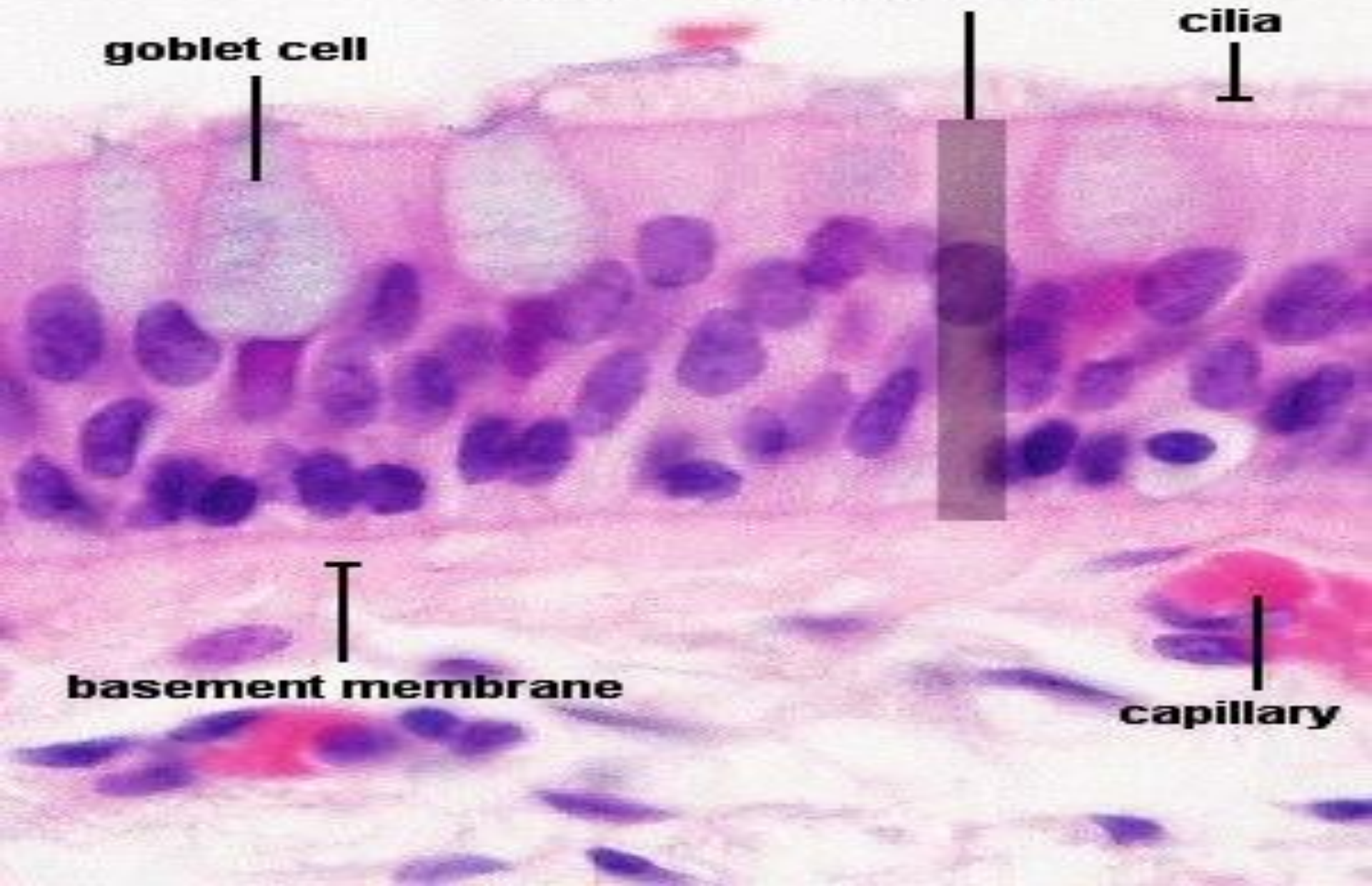


Trachea H&E

**pseudostratified
columnar epithelium**

goblet cell

cilia

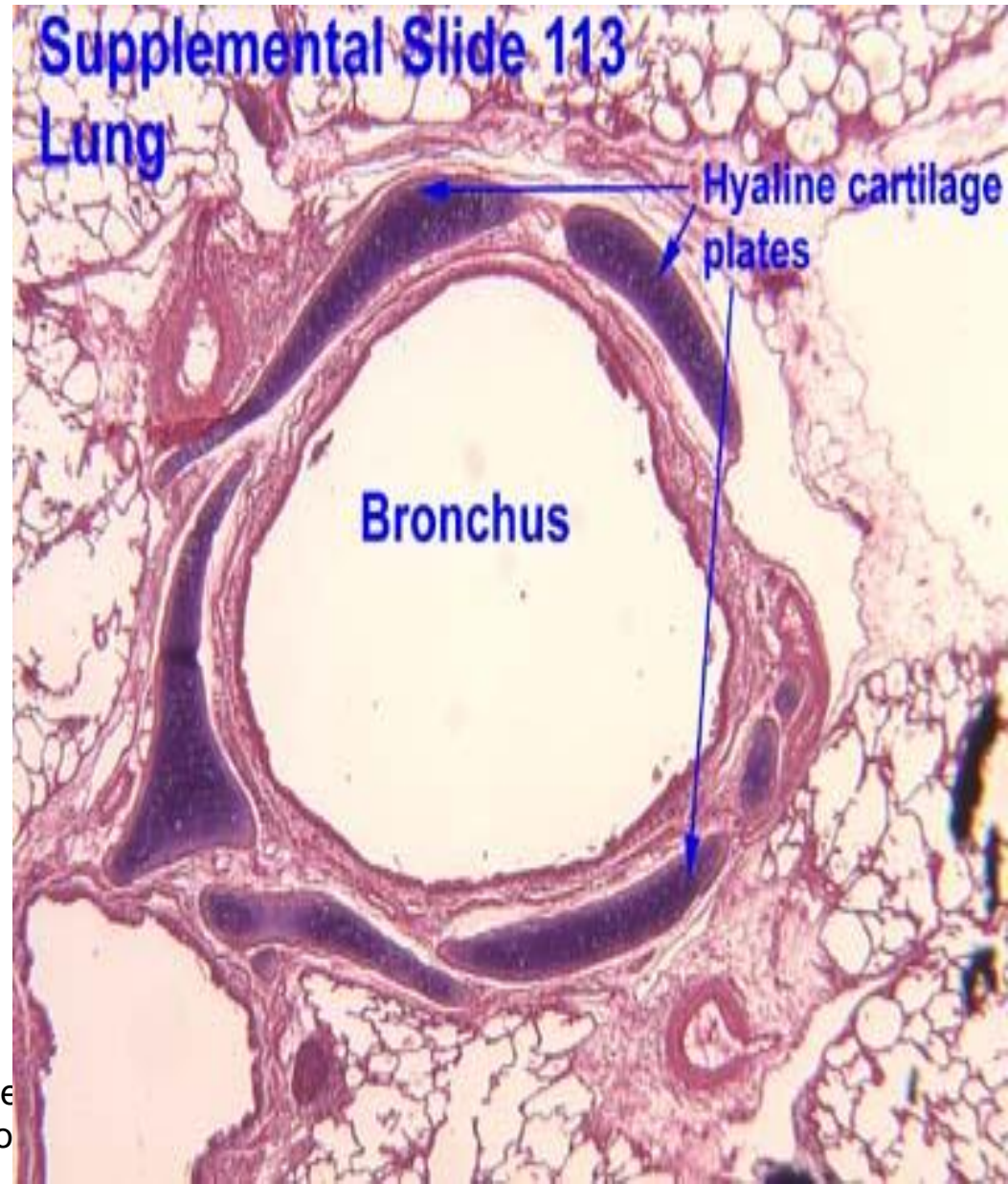


basement membrane

capillary

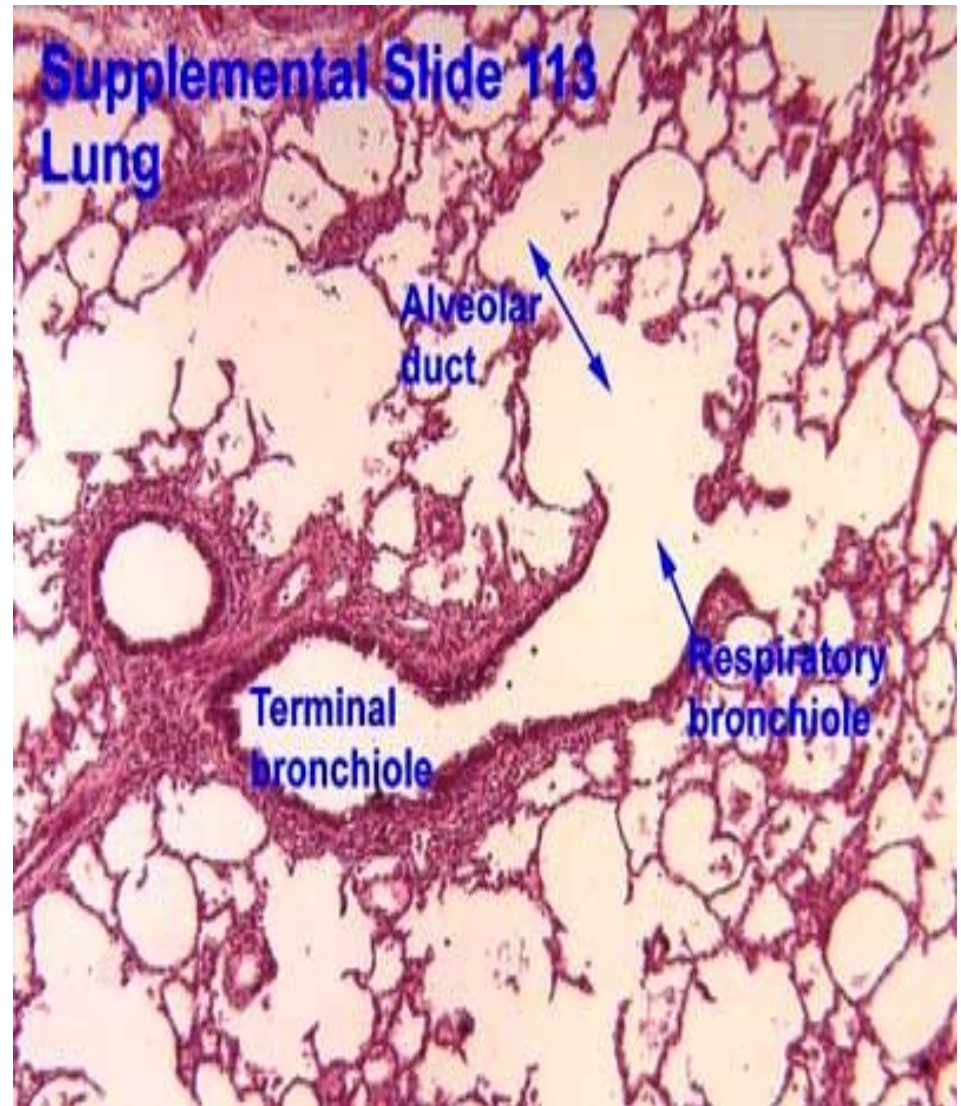
Bronchus

- **Principal bronchus**
 - same as trachea
- **Secondary bronchus**
 - Irregular hyaline cartilage
 - Pseudo stratified ciliated columnar
- **Tertiary bronchus**
 - Columnar epithelium
 - Patches of cartilage

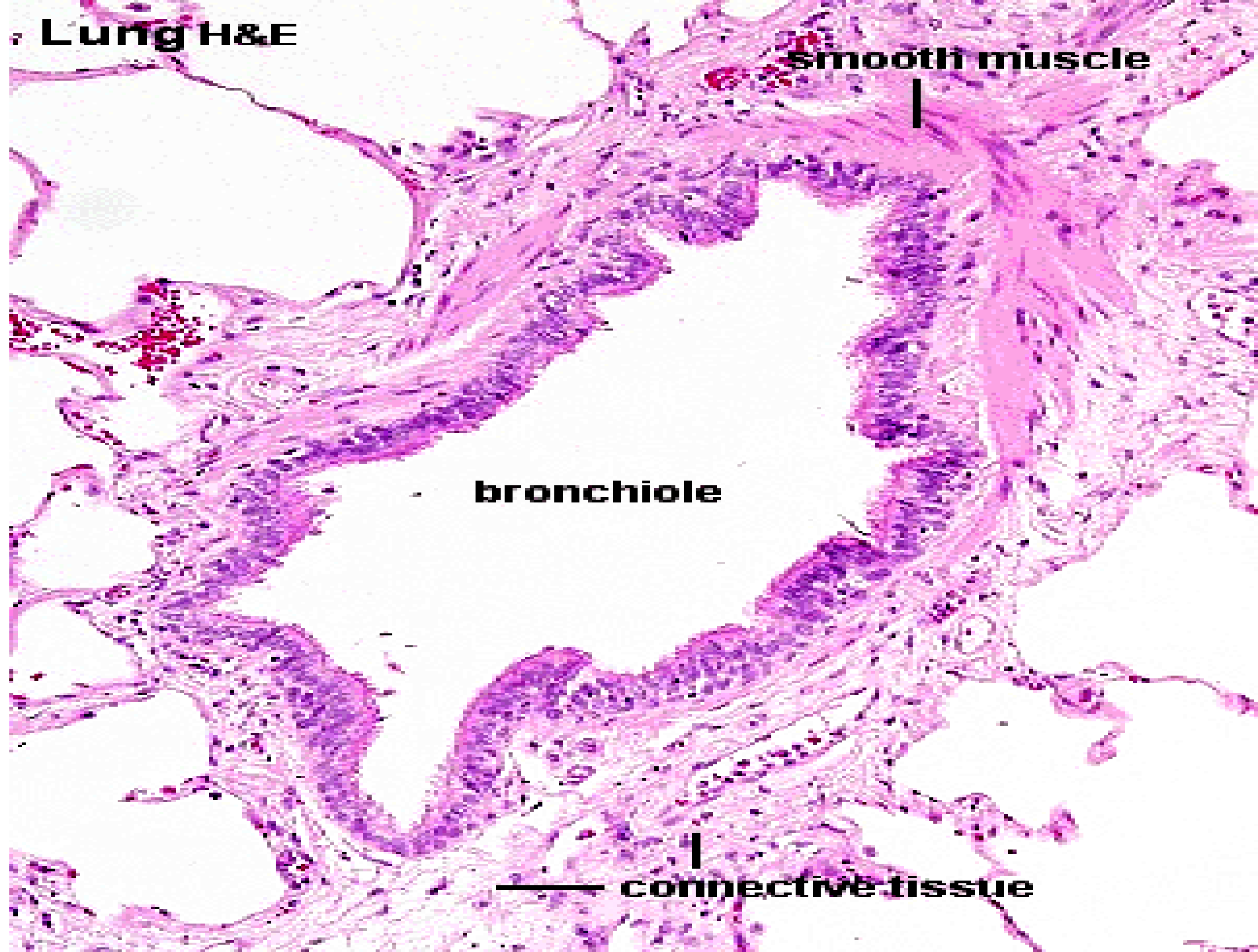


Bronchiole

- **Terminal bronchiole**
 - Columnar epithelium
 - No cartilage but smooth muscle
 - Clara cells present**
- **Respiratory bronchiole**
 - Cuboidal epithelium
 - No mucous gland



Lung H&E



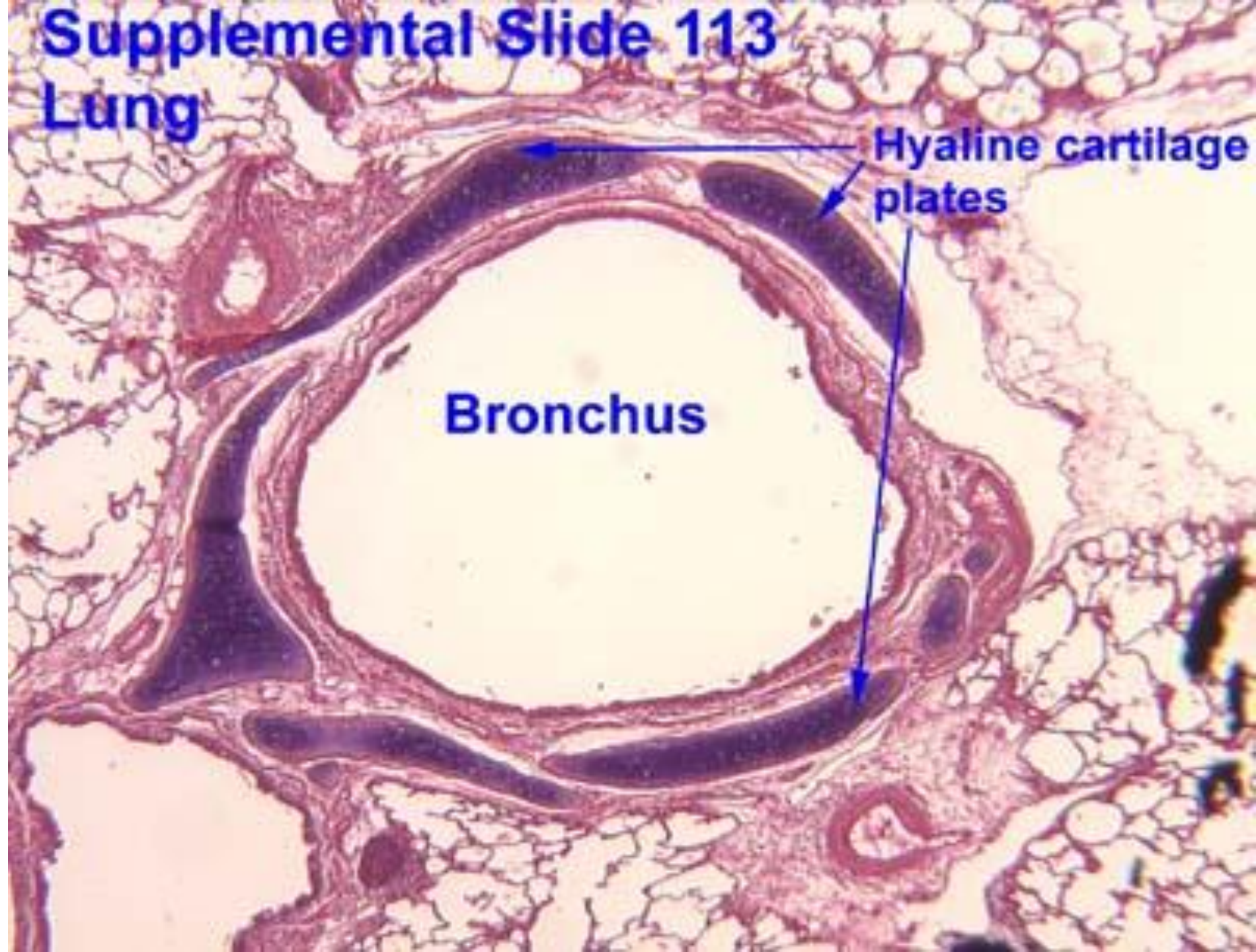
smooth muscle

bronchiole

connective tissue

Supplemental Slide 113

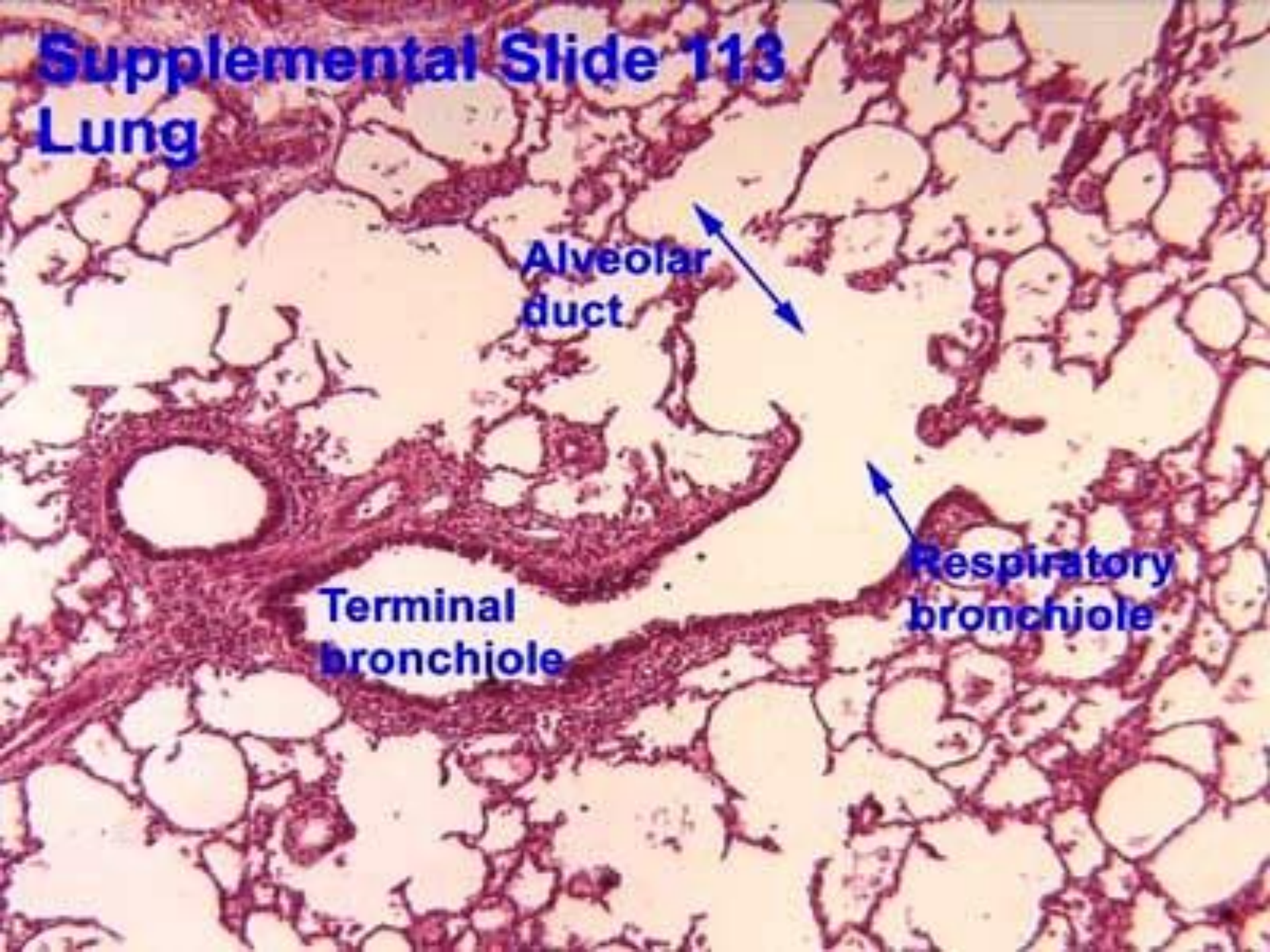
Lung



Hyaline cartilage plates

Bronchus

Supplemental Slide 113
Lung



Alveolar duct

Terminal bronchiole

Respiratory bronchiole

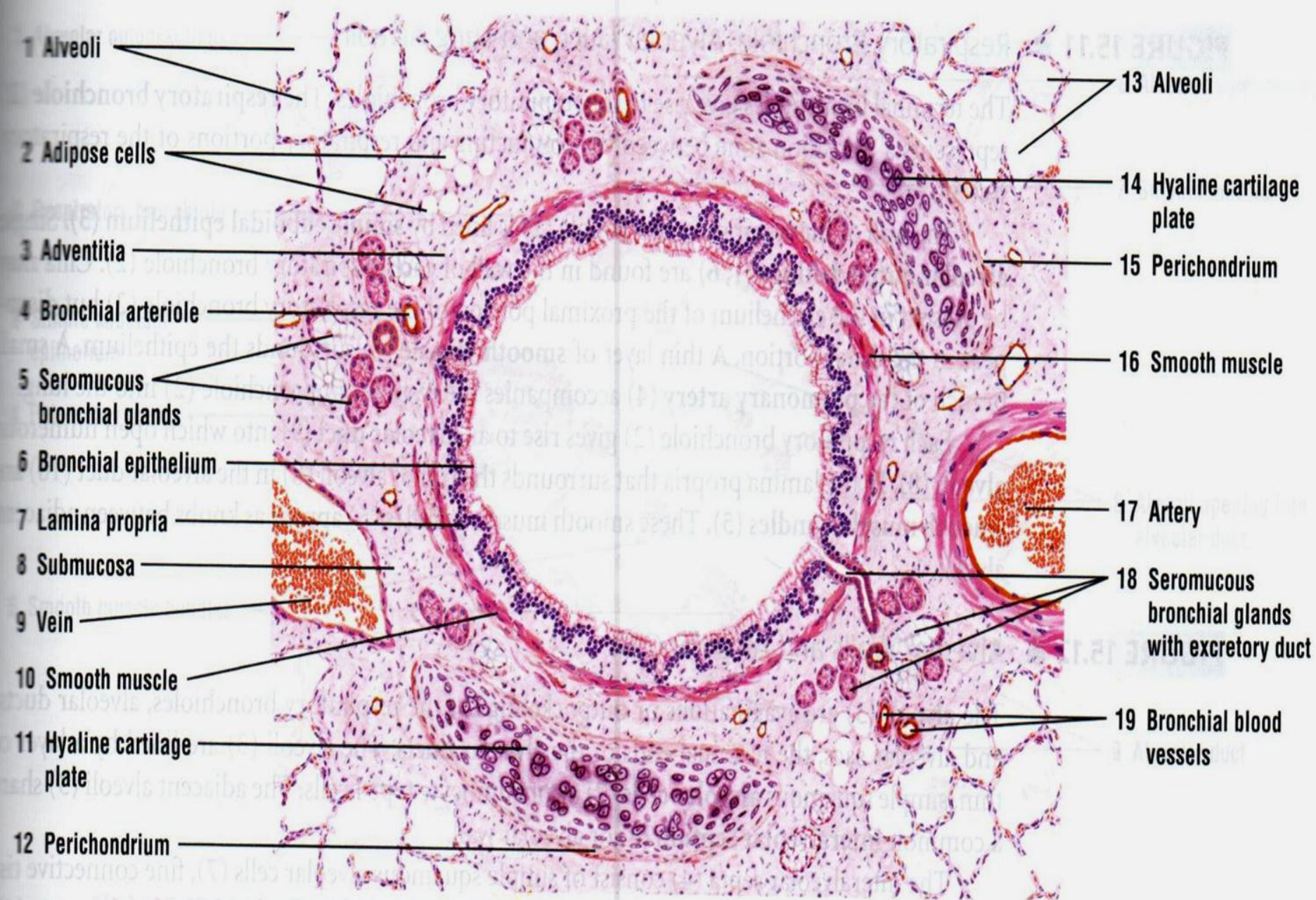


FIGURE 15.9 ■ Intrapulmonary bronchus (transverse section). Stain: hematoxylin and eosin. Low magnification.

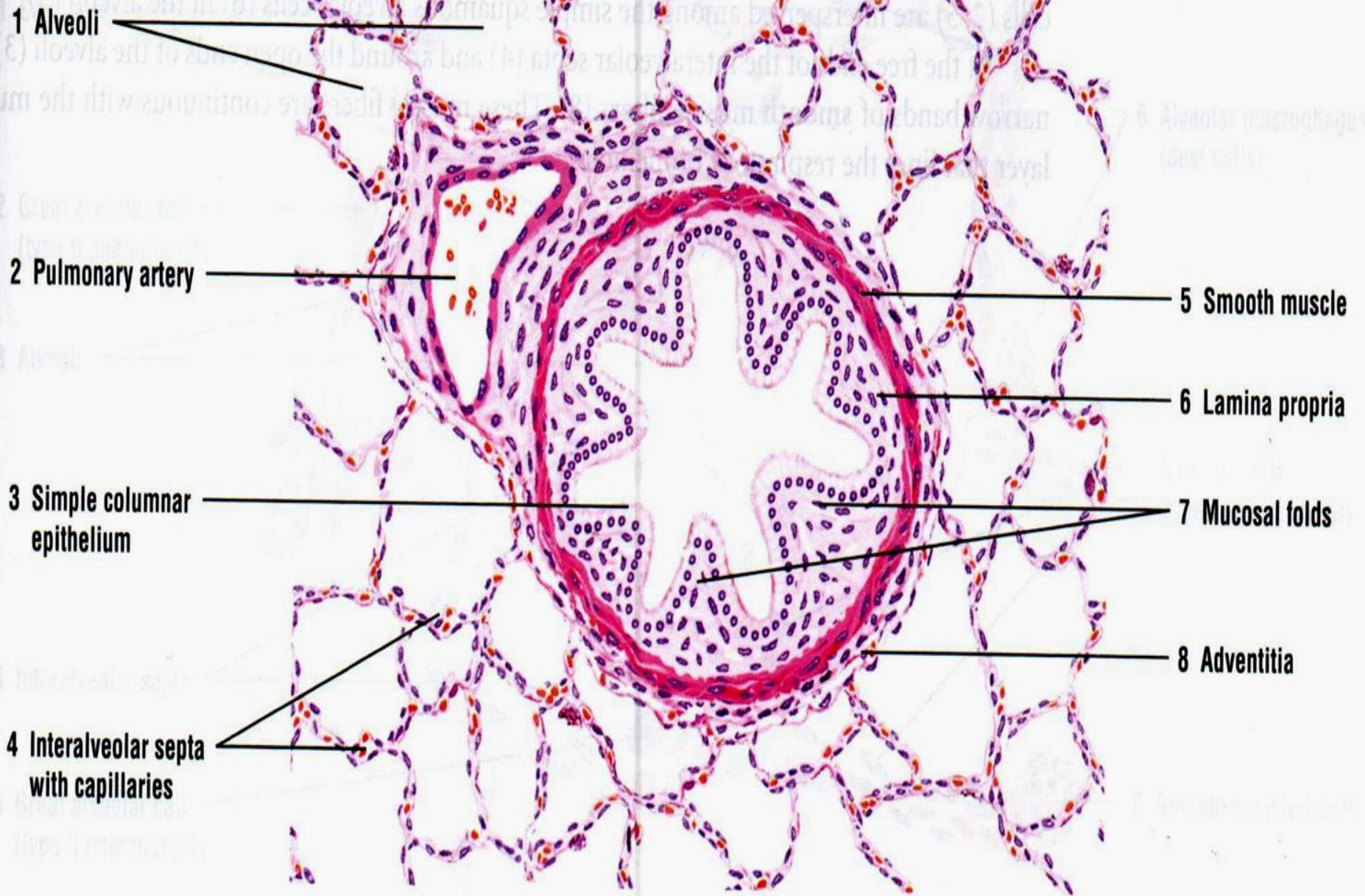


FIGURE 15.10 ■ Terminal bronchiole (transverse section). Stain: hematoxylin and eosin. (Lumen is on the left.)

	Trachea	Bronchus	Tertiary bronchus	Bronchiole	Respiratory bronchiole
Epithelium	Pseudostratified	➔	Columnar	➔	Cuboidal
Goblet cells	+++	++	++	+	Absent
Clara cells	Absent	Absent	Absent	+	+
Muscularis mucosae	Absent	+	++	+++	+++
Mucous glands	+++	++	+	Absent	Absent
Cartilage	+++	++	+	Absent	Absent
Alveoli	Absent	Absent	Absent	Absent	+

Lung

1-Bronchus and bronchioles are present

2-Alveolar duct and alveoli-

-Simple squamous epithelium

Type 1 Pneumocytes(97%)

-*Blood Air barrier*

Type2 Pneumocytes(2%)

- *pulmonary surfactant*

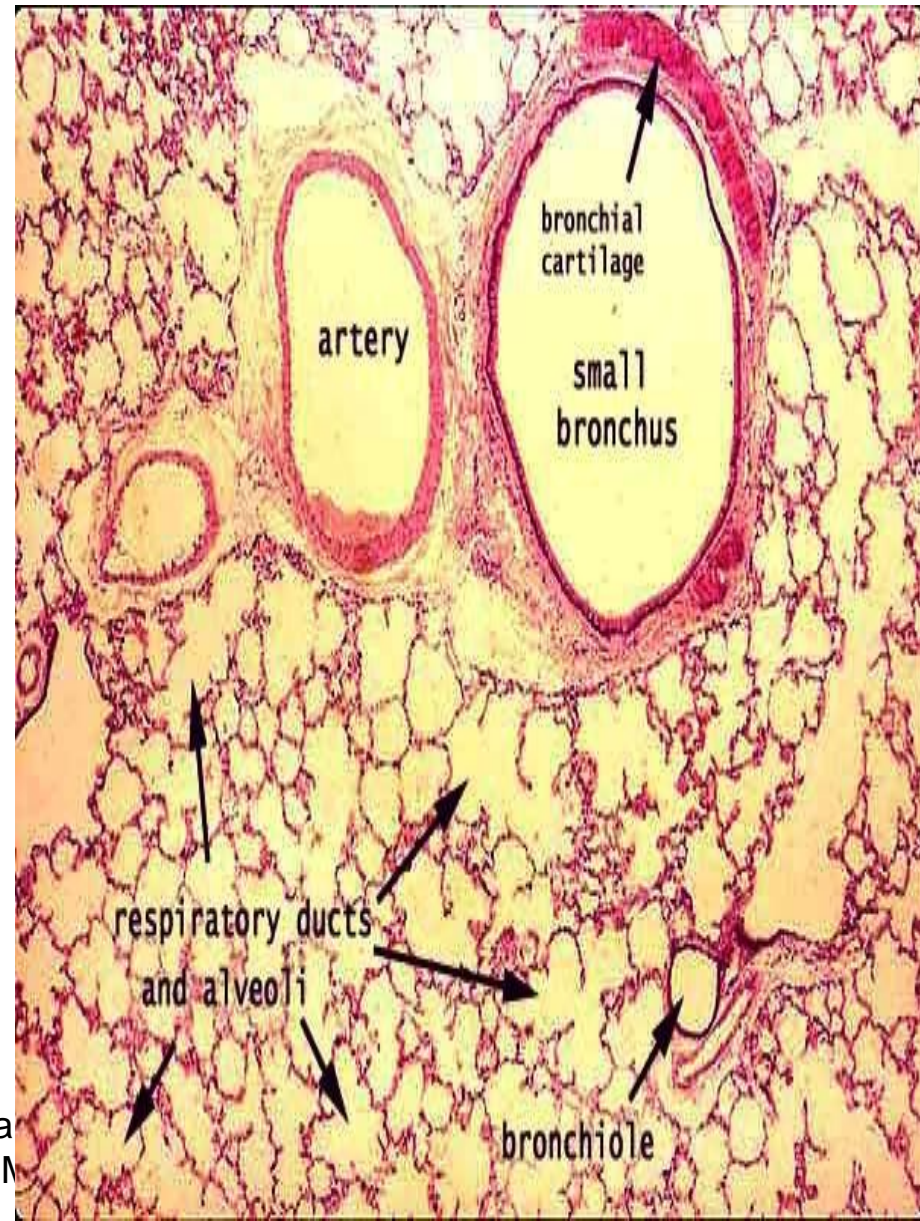
- *lamellar bodies*

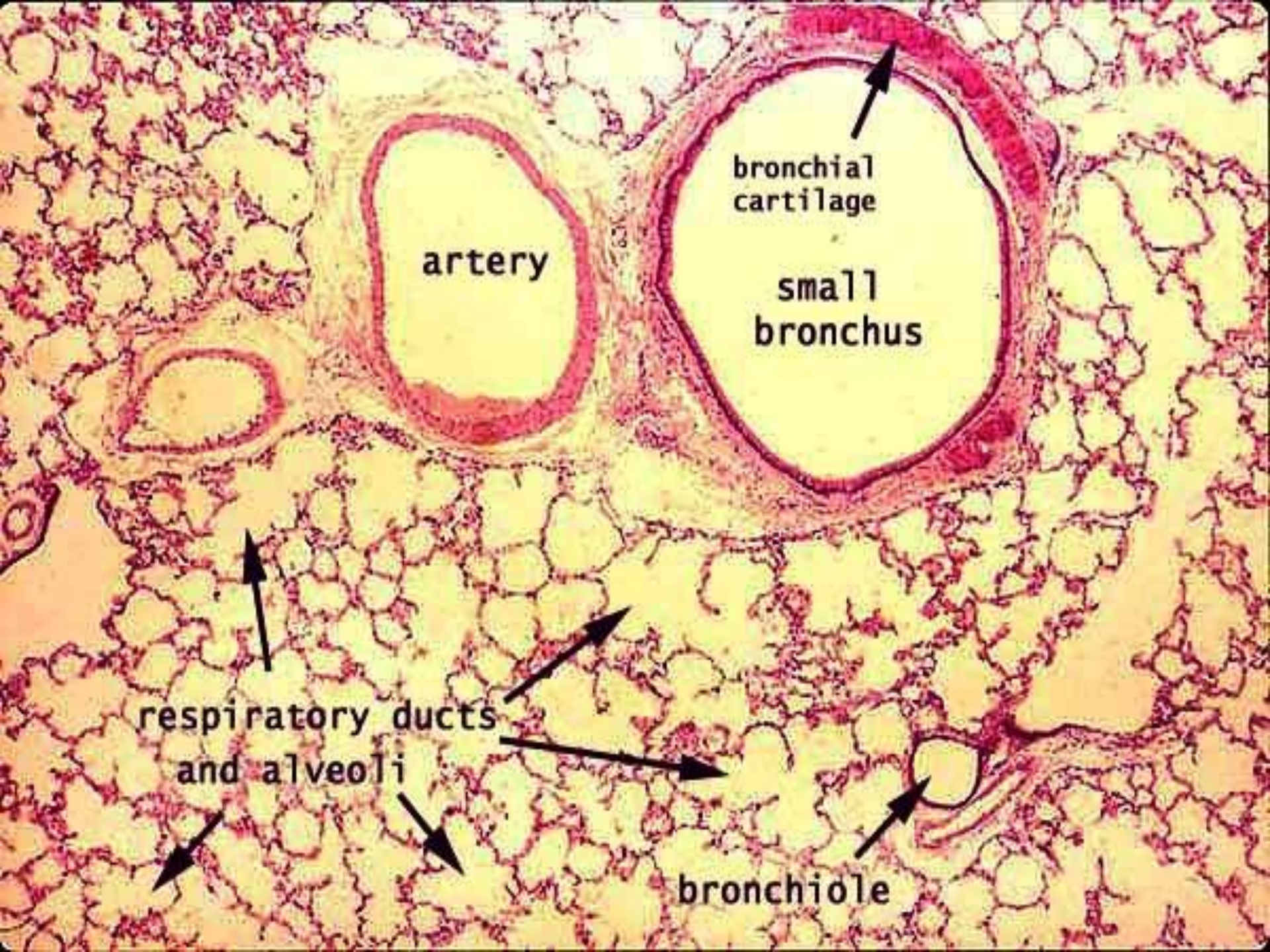
Type3Pneumocytes (brush cells)

-**Macrophages or Dust cells**

(**Heart failure cells**),

3-Inter alveolar septa & Supportive tissue





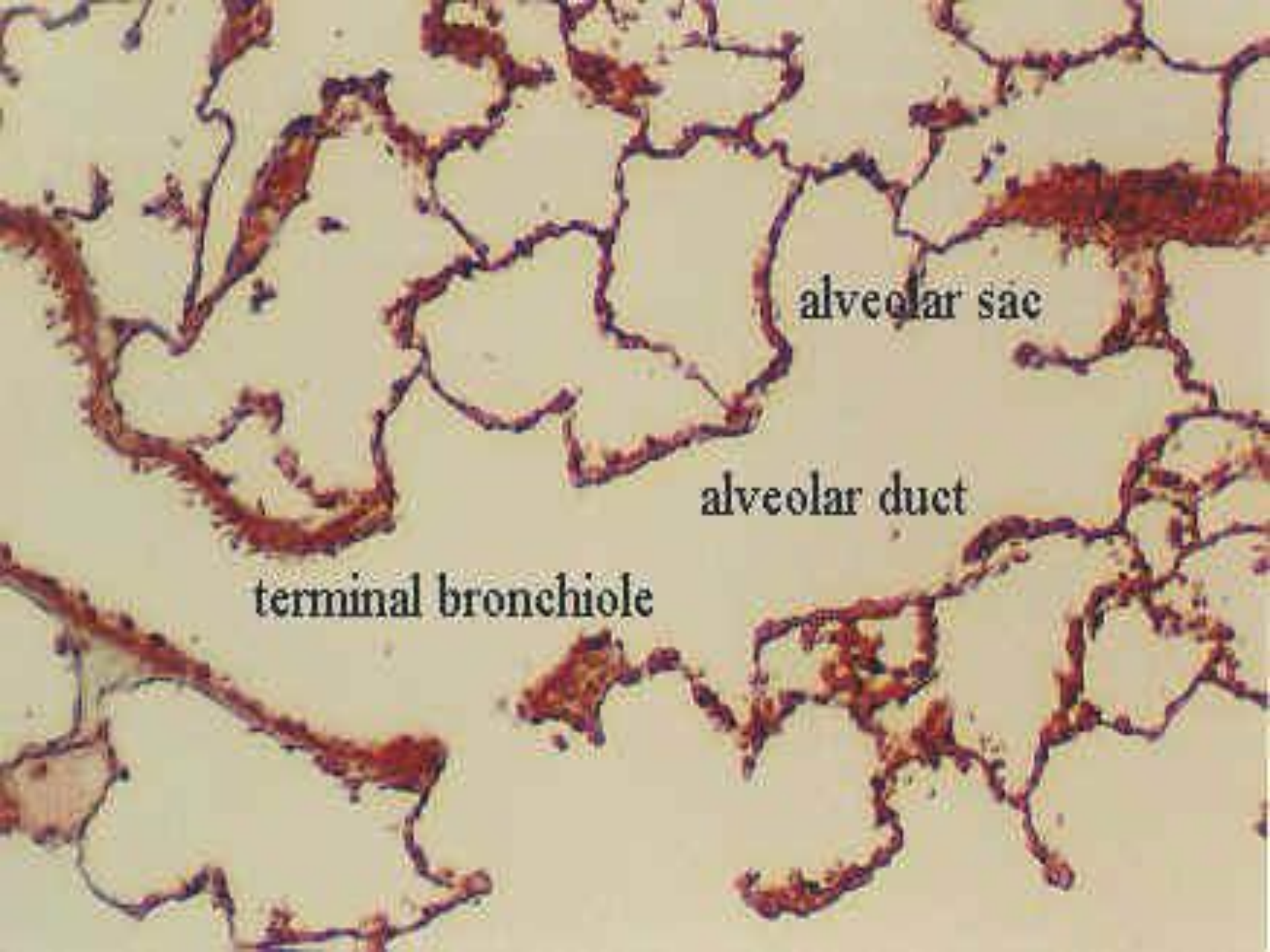
artery

bronchial
cartilage

small
bronchus

respiratory ducts
and alveoli

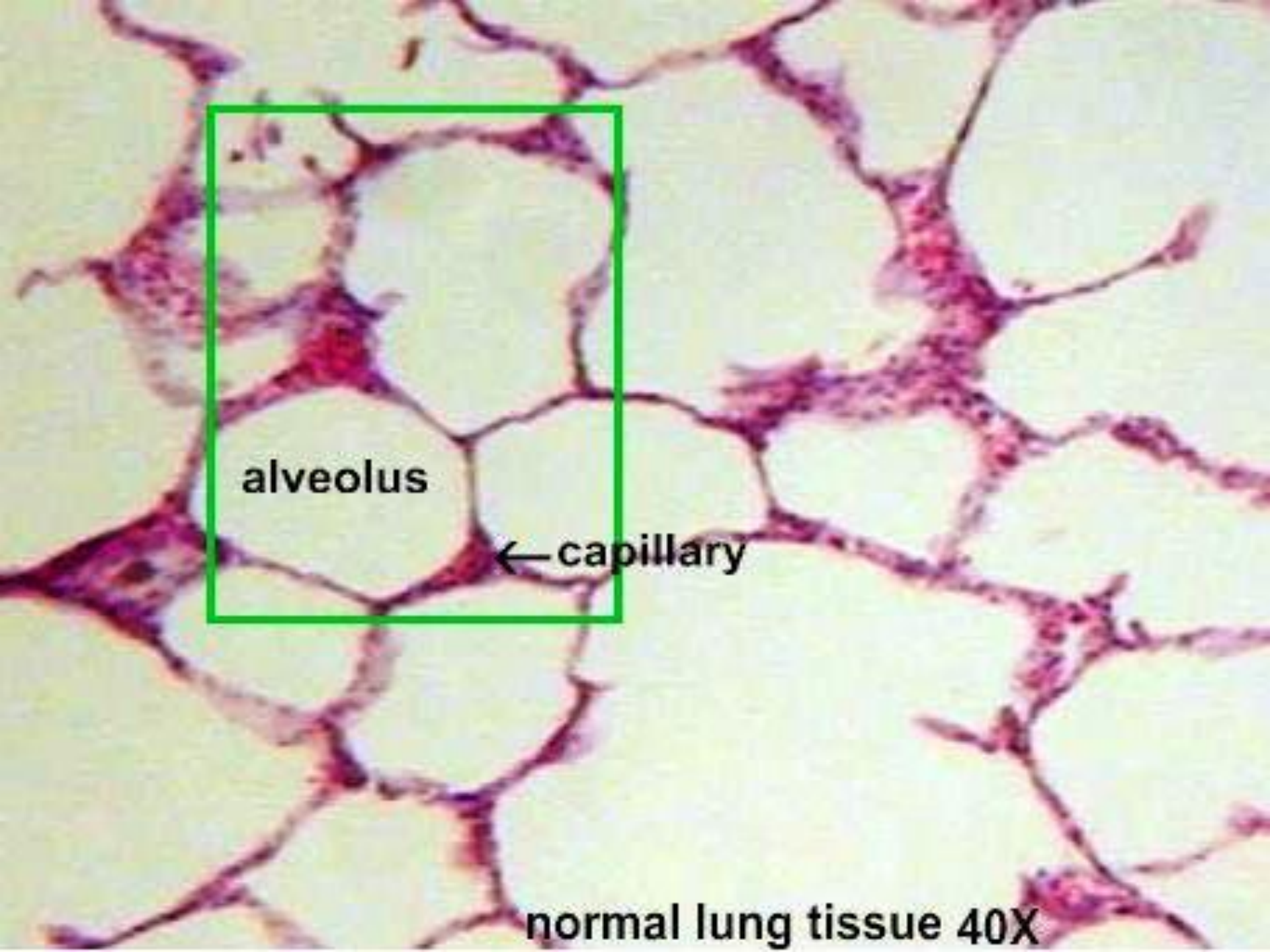
bronchiole



alveolar sac

alveolar duct

terminal bronchiole



alveolus

← capillary

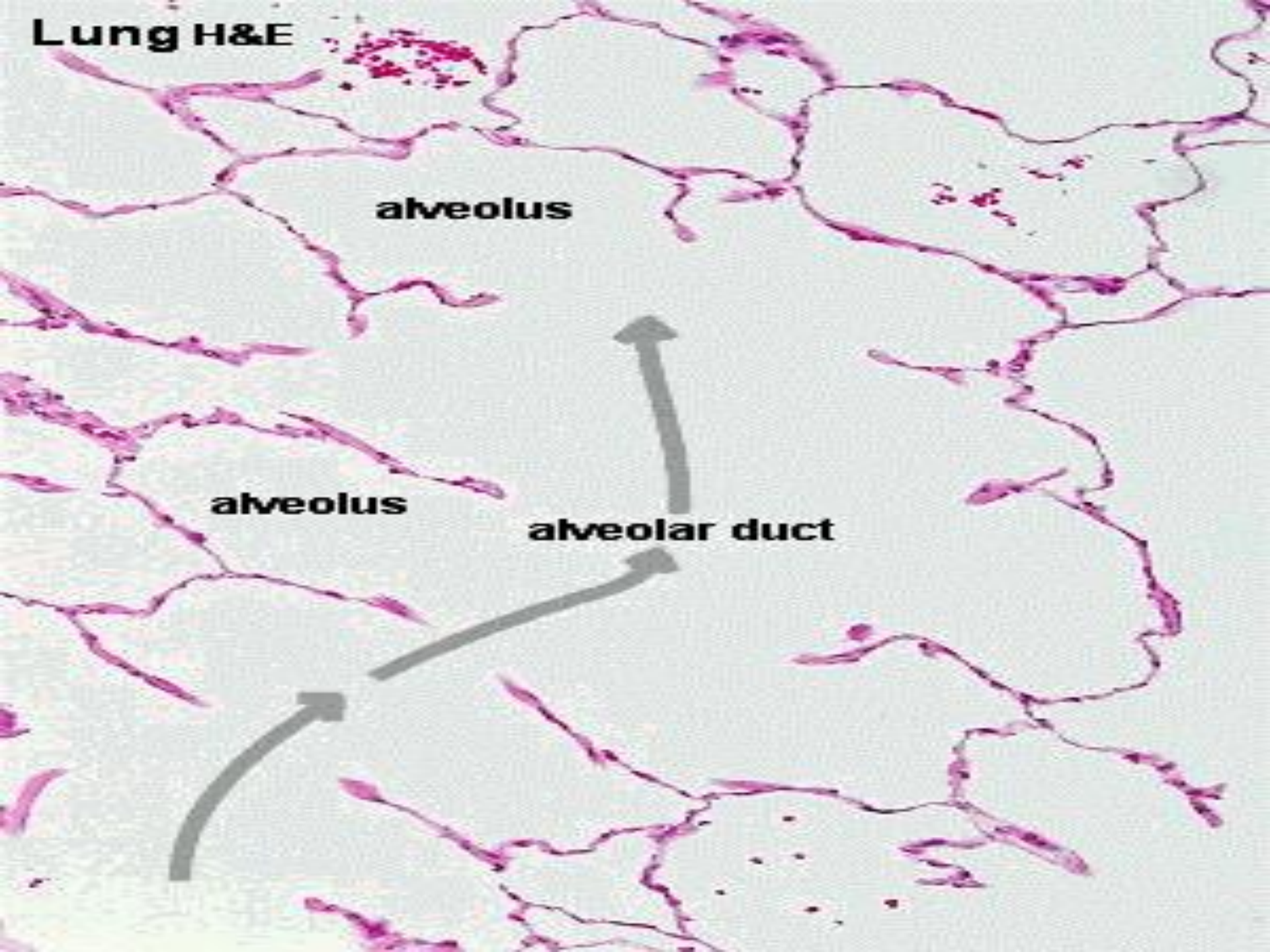
normal lung tissue 40X

Lung H&E

alveolus

alveolus

alveolar duct



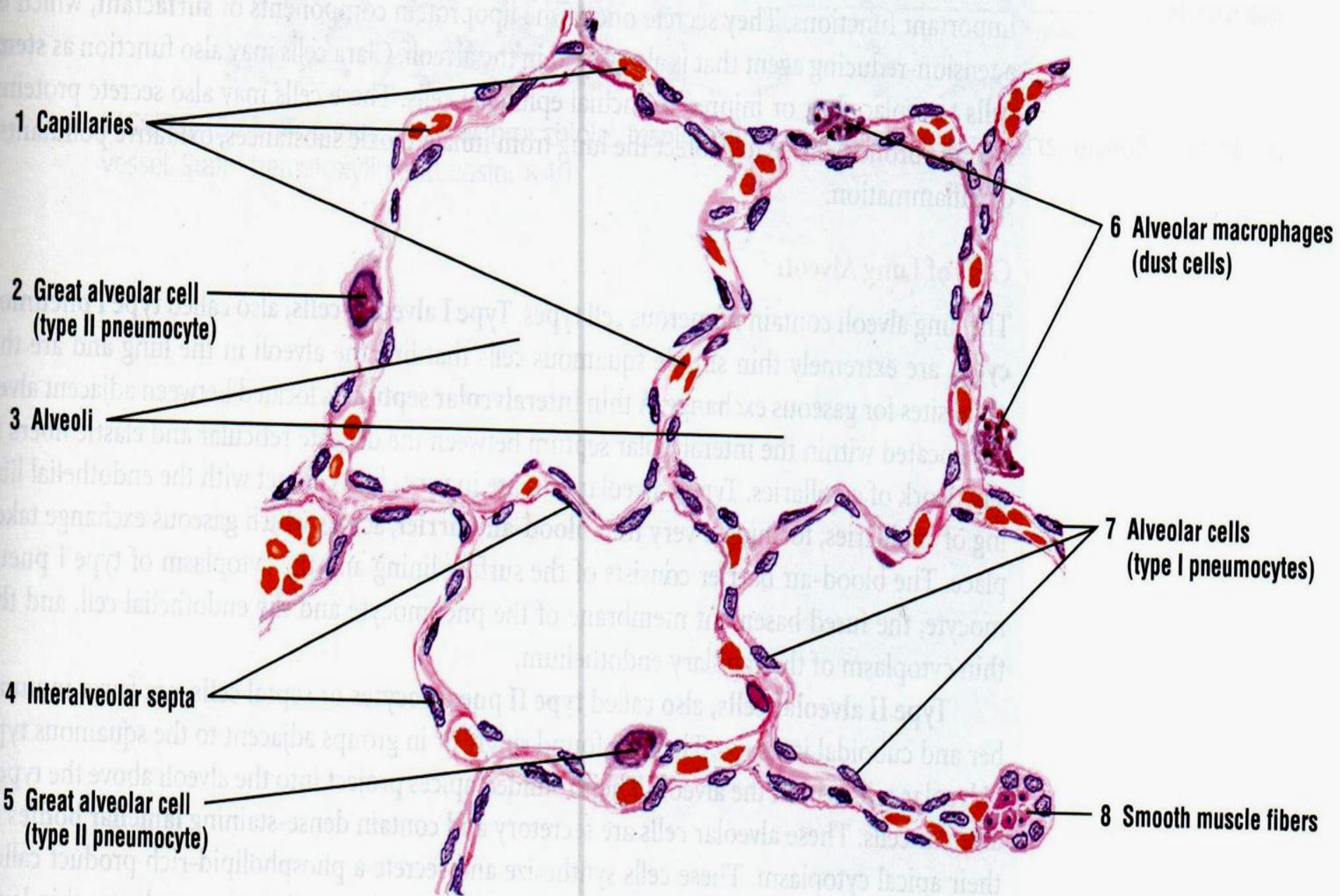


FIGURE 15.12 ■ Alveolar walls and alveolar cells. Stain: hematoxylin and eosin. High magnification.

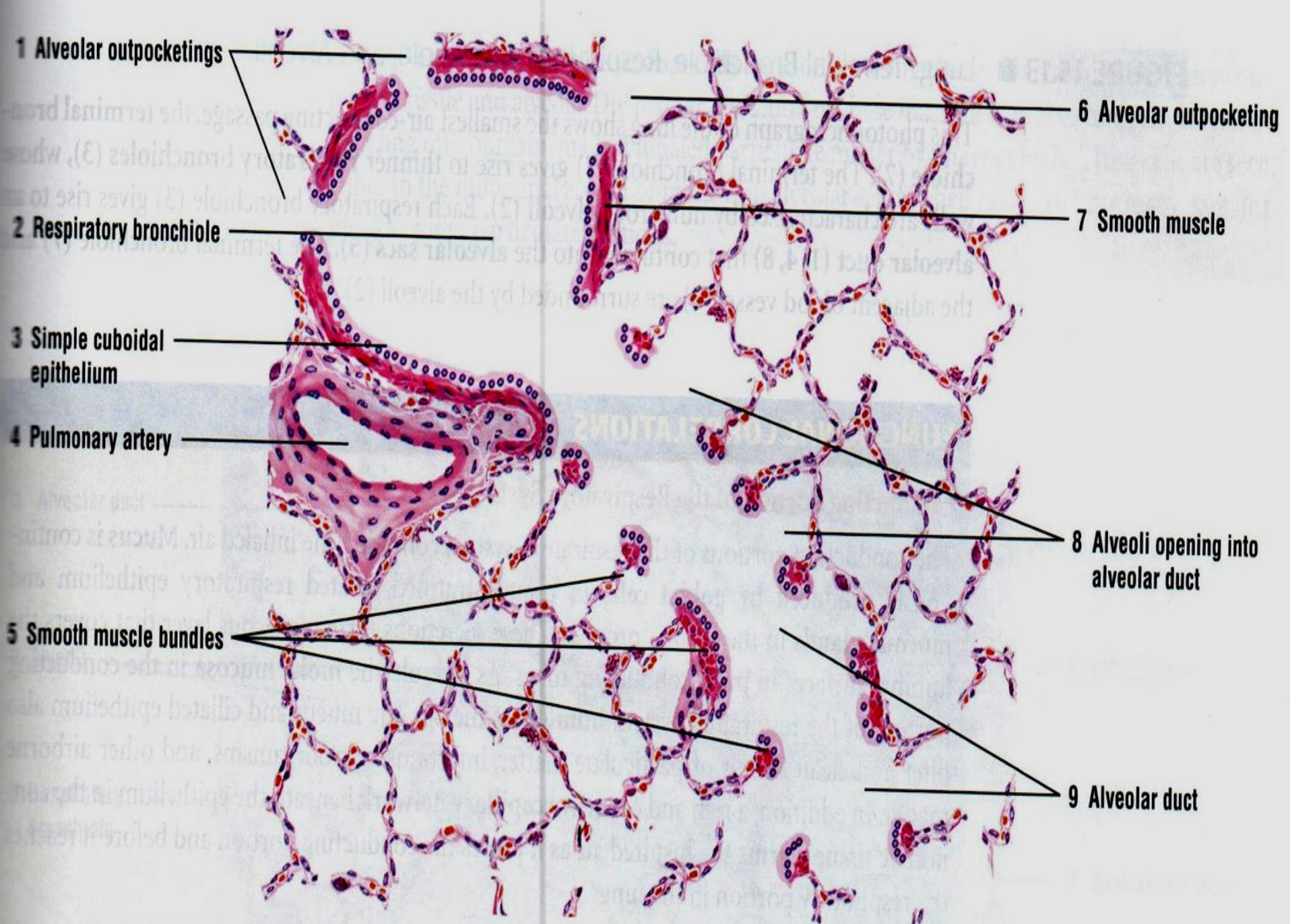
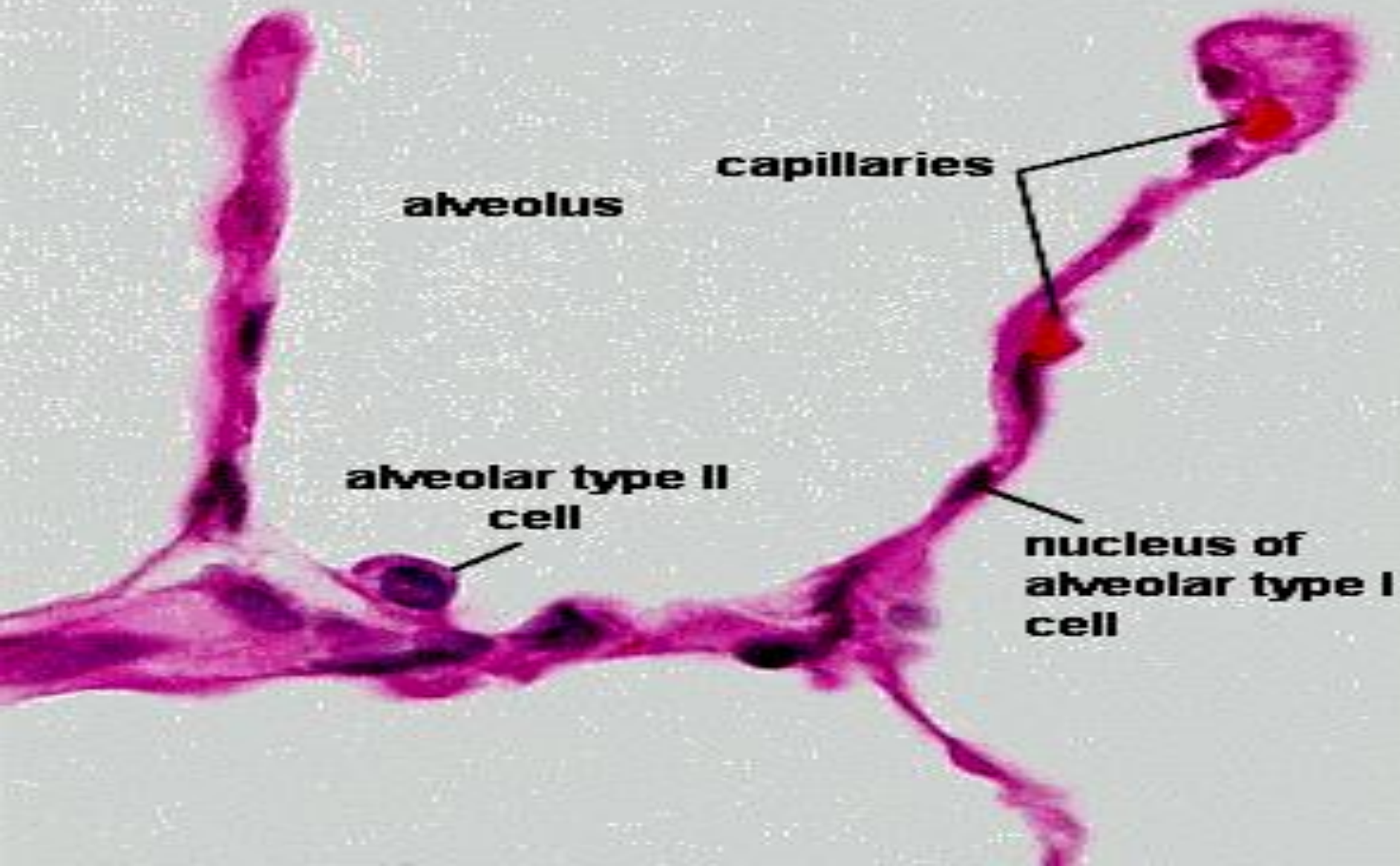
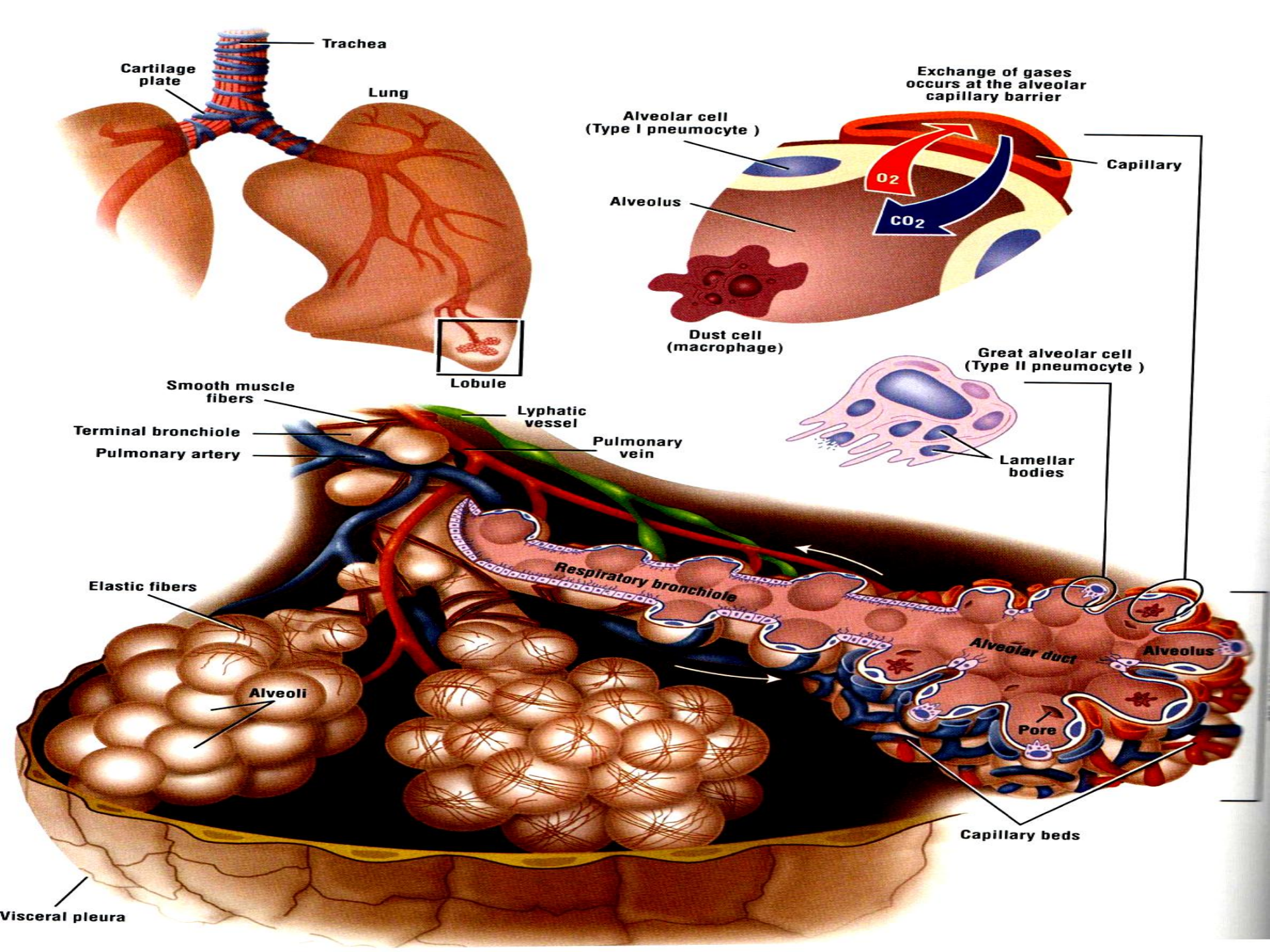


FIGURE 15.11 ■ Respiratory bronchiole, alveolar duct, and lung alveoli. Stain: hematoxylin and eosin.

Lung H&E





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**MEDICAL
SCIENCE
303**



*DOONAN
MAY 1985*

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"That was creepy. They ran short on cadavers, so we operated on the dean of students."