Respiratory System

Respiratory system is divided into two parts:

A- Conducting portion consists

1- Nasal cavity
2- Nasopharynx
3- Larynx
4- Trachea
5- Bronchi
6- Bronchioles

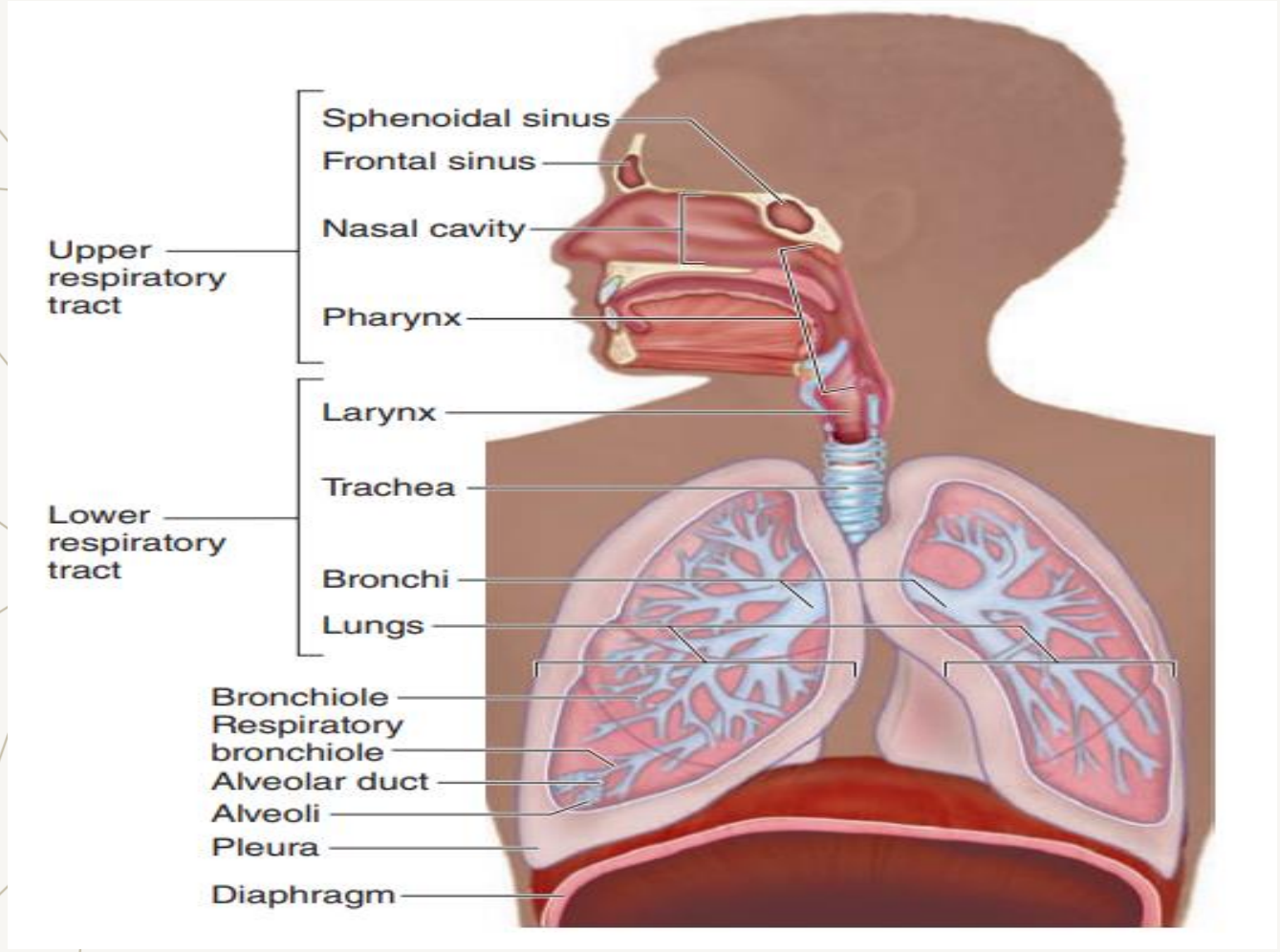
functions : two

1- provide a passage through which air moves to and from lungs.
2- to condition the inspired air

B- Respiratory portion consists:

1- Bronchioles
2- Alveolar ducts
3- Alveoli
-Function is the exchange of O2 and CO2 in blood.

Q/ Where is the gases exchange occur ? In which organ?


Upper respiratory tract
Lower respiratory tract
Sphenoidal sinus
Frontal sinus
Nasal cavity
Pharynx
Larynx
Trachea
Bronchi
Lungs
Bronchiole
Respiratory bronchiole
Alveolar duct
Alveoli
Pleura
Diaphragm

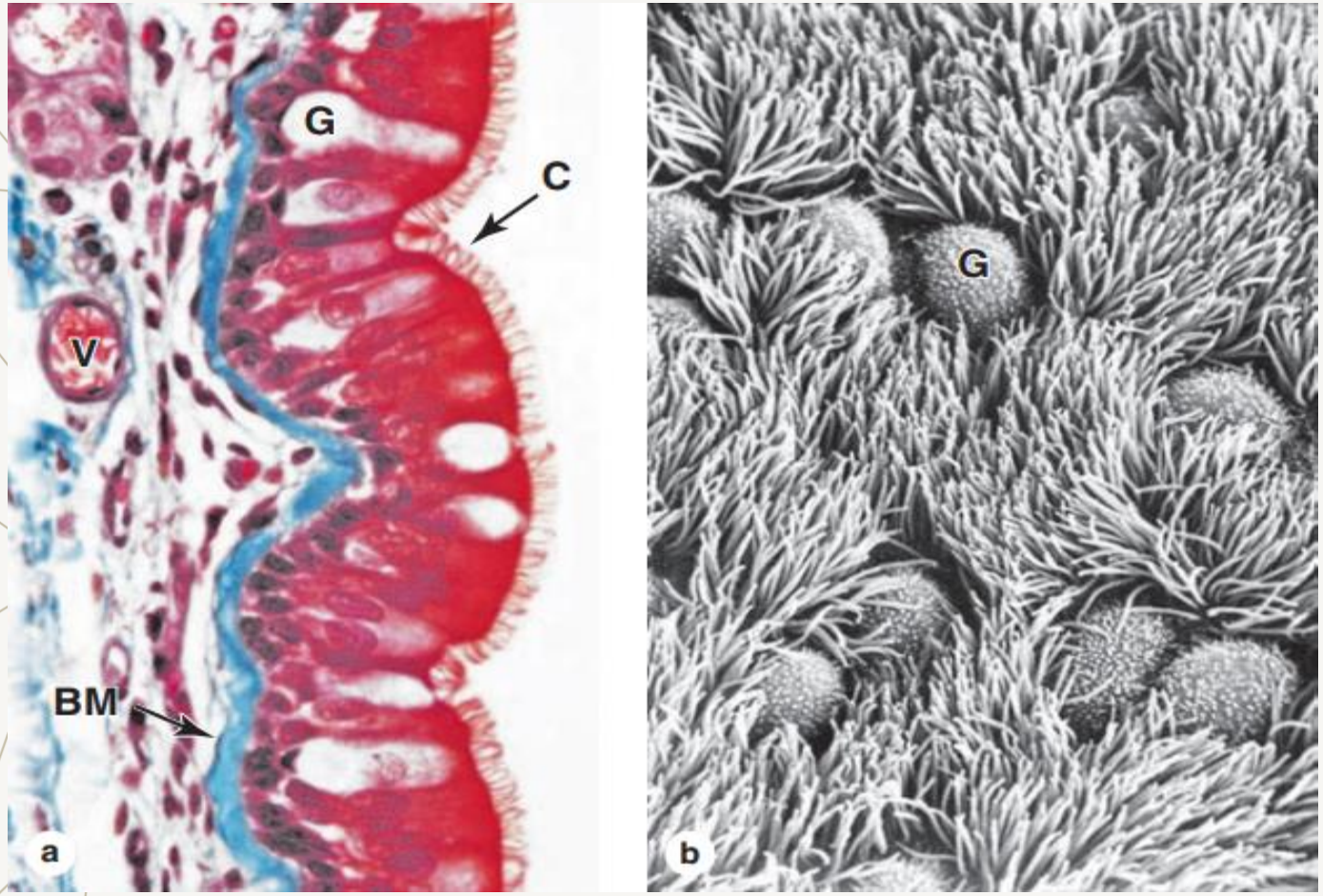
Note: to ensure an uninterrupted supply of air ,

A combination of cartilage , elastic and ,collagen fibers and smooth muscle to provide the conducting portion with rigidity and flexibility criteria.

Respiratory Epithelium ,What is it?

- Is a ciliated pseudostratified columnar epithelium tissue.
- This tissue is lining most respiratory organs .
- The tissue has at least five cell types on it basement membrane which are :

1- Ciliated columnar cells: most abundant .
2- Goblet cells : with mucin glycoproteins –numerous.
3- Brush cells : less, scattered
4- Small granule cells
5- Basal cells : stem cells ,that give rise to other cell types



Respiratory Epithelium

Nasal Cavity (N.C.)

(1) Anterior portion of N.C. :

Vestibule: is lined with thin skin (keratinized stratified squamous epithelium) with sweat glands, sebaceous glands, and coarse, moist vibrissae (hairs).

(1) Posterior portion of N.C. :

a- **Respiratory region.**

b- **Olfactory region.**

Respiratory region of nasal cavity

MUCOSA (Mucous Membrane):

(A) Epithelium:

Pseudo-stratified ciliated columnar epithelium with goblet cells (respiratory epithelium).

(B) Lamina propria :connective tissue contains:

1- Loops of capillaries (highly vascularized)

2- Many seromucous glands.

3- Abundant lymphoid elements: including occasional lymphoid nodules, plasma cells & mast cells

Olfactory region of nasal cavity

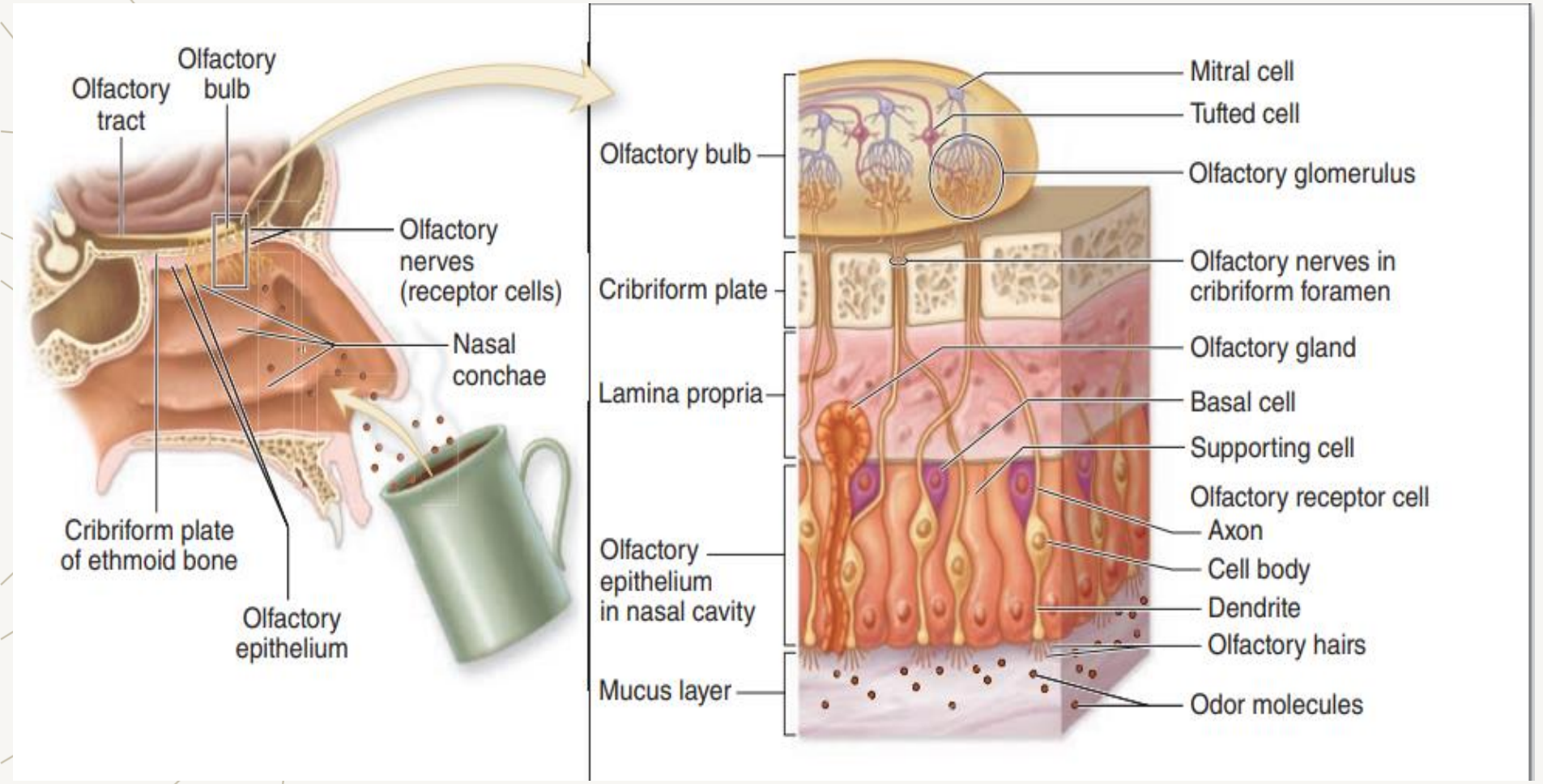
Smell (olfaction)

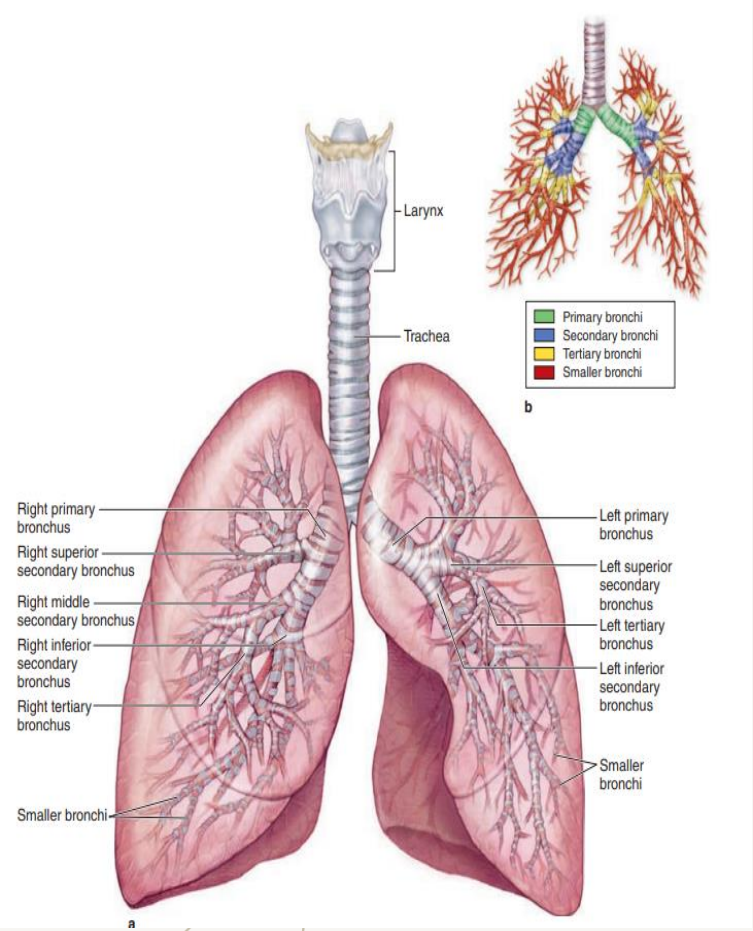
- smelling receptors are located in the epithelium (area:10 cm^2)
- It is a pseudostratified epithelium, three types of cells

1- basal cells = stem cells

2- columnar supporting cells

3- olfactory neurons


Olfactory tract
Olfactory bulb
Olfactory nerves (receptor cells)
Nasal conchae
Cribriform plate of ethmoid bone
Olfactory epithelium
Olfactory bulb
Cribriform plate
Lamina propria
Olfactory epithelium in nasal cavity
Mucus layer
Mitral cell
Tufted cell
Olfactory glomerulus
Olfactory nerves in cribriform foramen
Olfactory gland
Basal cell
Supporting cell
Olfactory receptor cell
Axon
Cell body
Dendrite
Olfactory hairs
Odor molecules

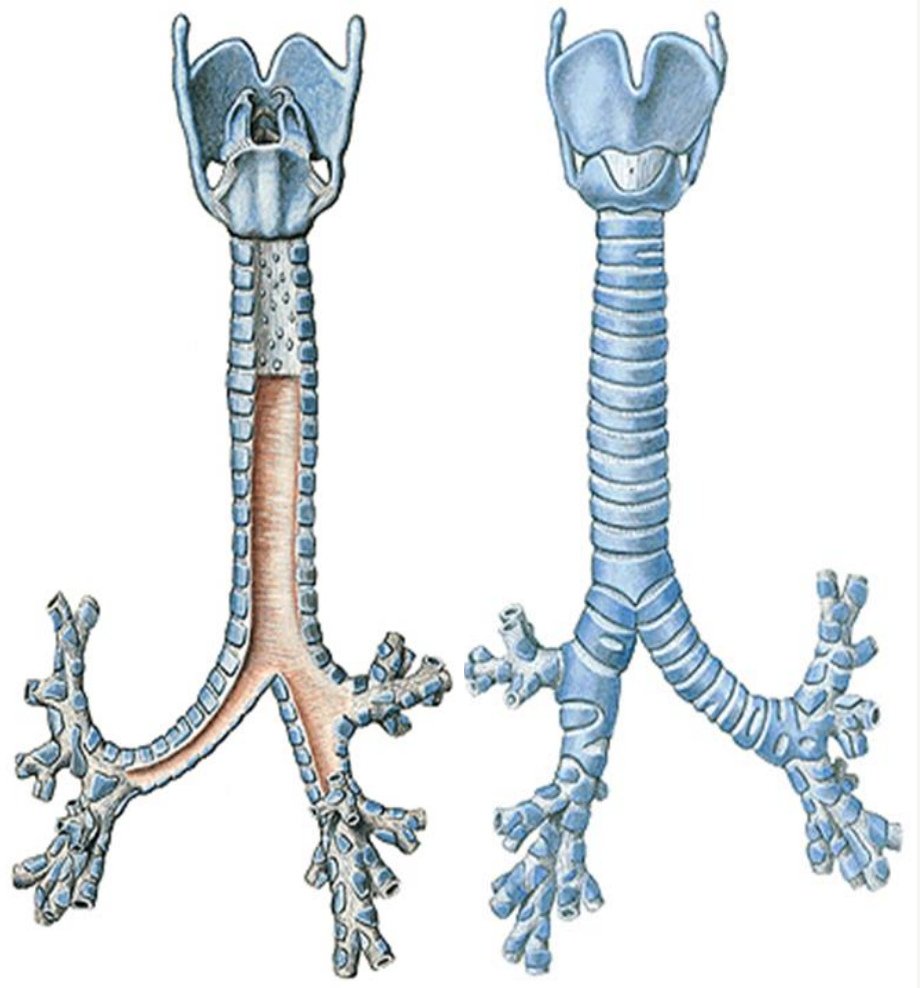


TRACHEA

The trachea (12-14) long
- lined with respiratory epithelium mucosa
- the lamina propria with seromucous gland
- the submucosa with c- shaped rings of hyaline cartilage (function to keep the trachea open)

- with smooth muscle in posterior surface against esophagus

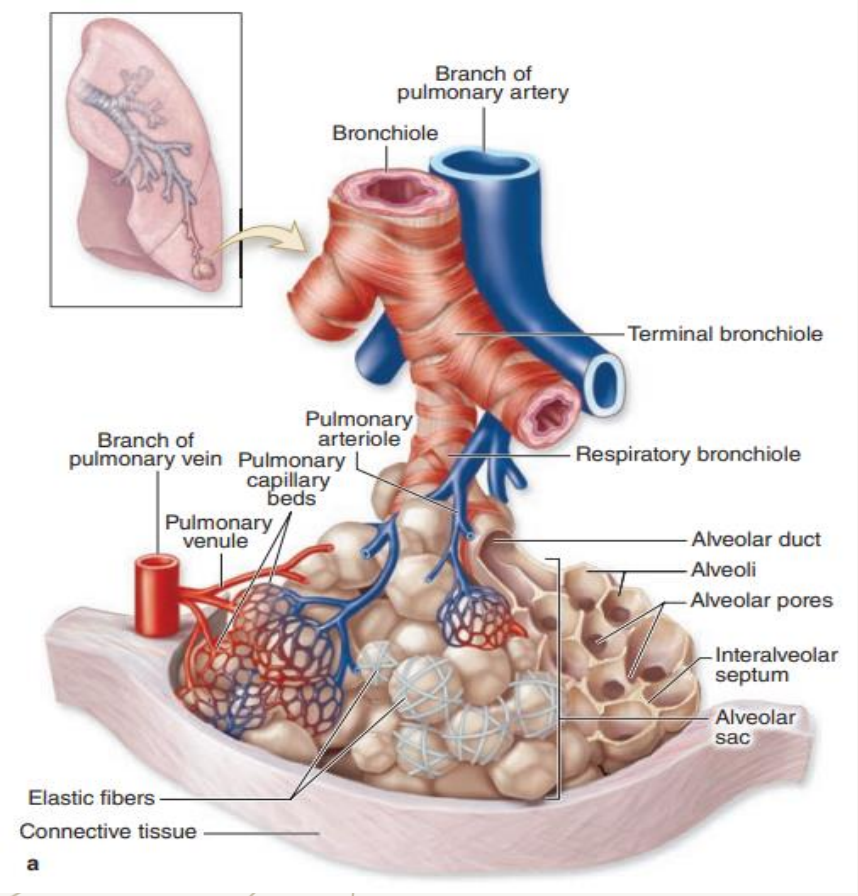
- the entire trachea is surrounded by adventitia



Notes

Trachea relaxes during swallowing to facilitate the passage of food in esophagus .

In the cough reflex the muscle contract to narrow the trachea lumen and provide for increased velocity of the expelled air and material.



Intrapulmonary airway:
(airways within the lungs)

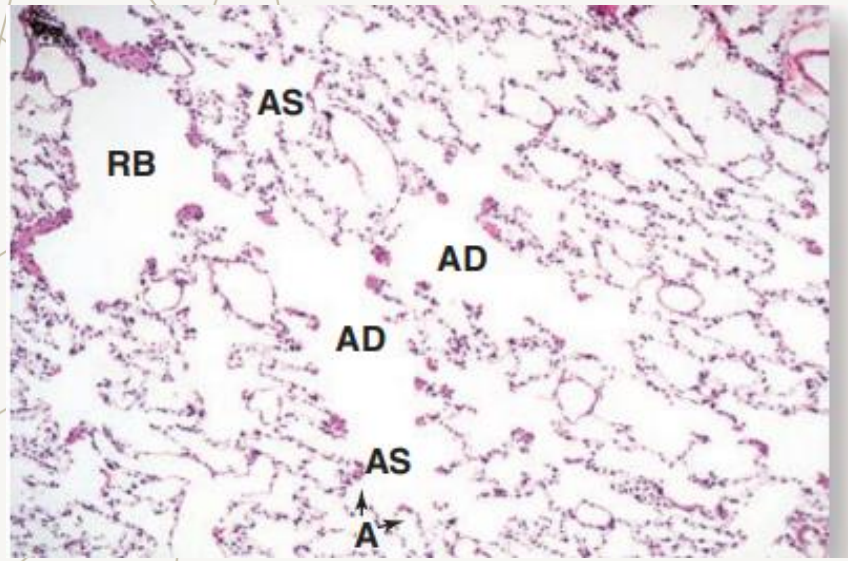
1- Bronchi (respiratory epithelium):
- principal
- lobar
- segmental

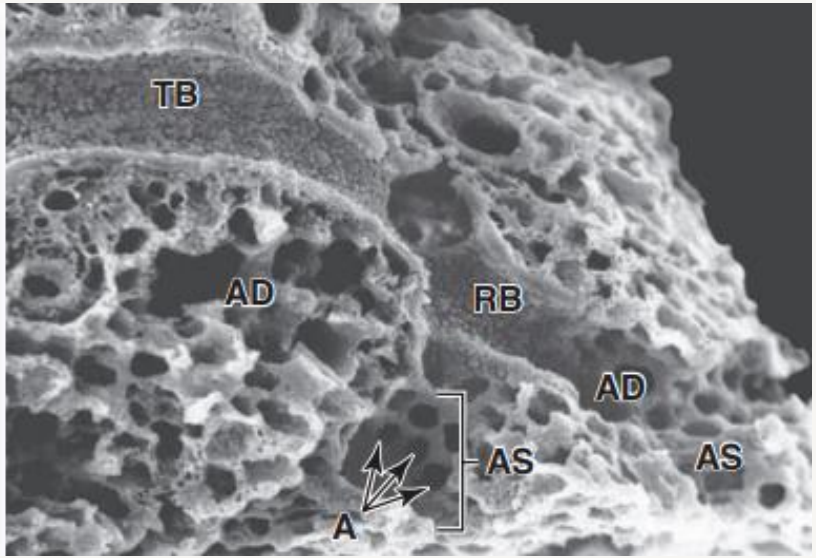
2- Bronchioles: Simple ciliated cuboidal to columnar.
- terminal
- respiratory

3- Alveolar ducts and sacs (simple cuboidal).

4- Alveoli

- Lined by extremely attenuated squamous cells.
- Air in these structures exchanges O2 and CO2 with the blood.
- secrete components of surfactant which reduces surface tension and helps prevent collapse of the bronchioles.





Thank you