SYJC
Ch. 8
Respiration and Circulation

Unit 8.1 – Organs of Respiratory exchange

Pg. no. 153 & 154

Unit 8.2 – Human Respiratory system

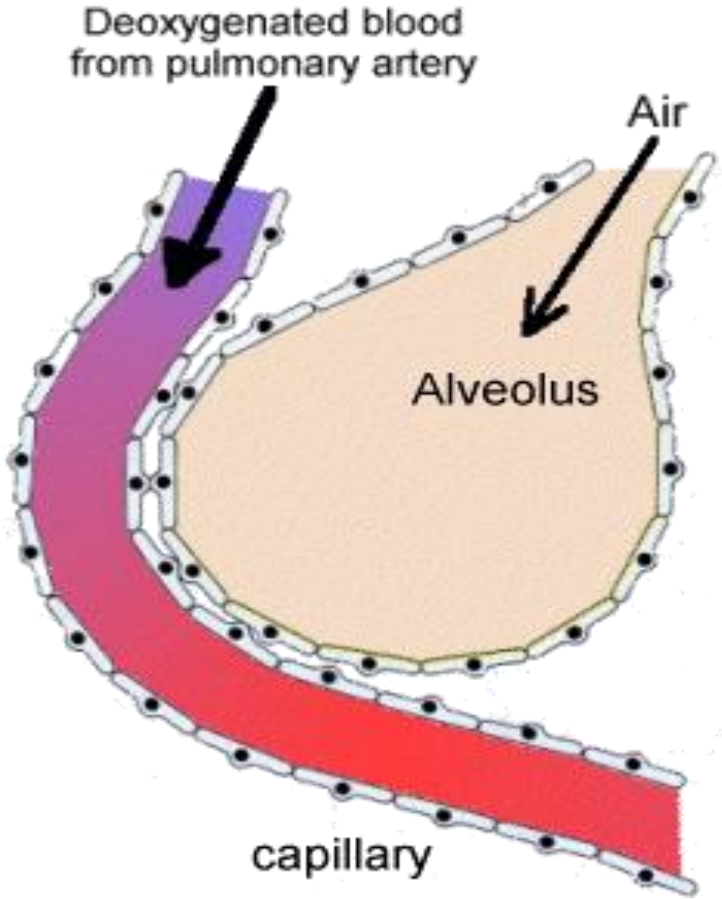
Pg. no. 154 to 156

Respiration

- **It is a biochemical process of oxidation of organic compounds in an orderly manner for the liberation of chemical energy in the form of ATP.**

8.1 Organs of respiratory exchange

Respiratory exchange – a simple physical process for exchange of respiratory gases.

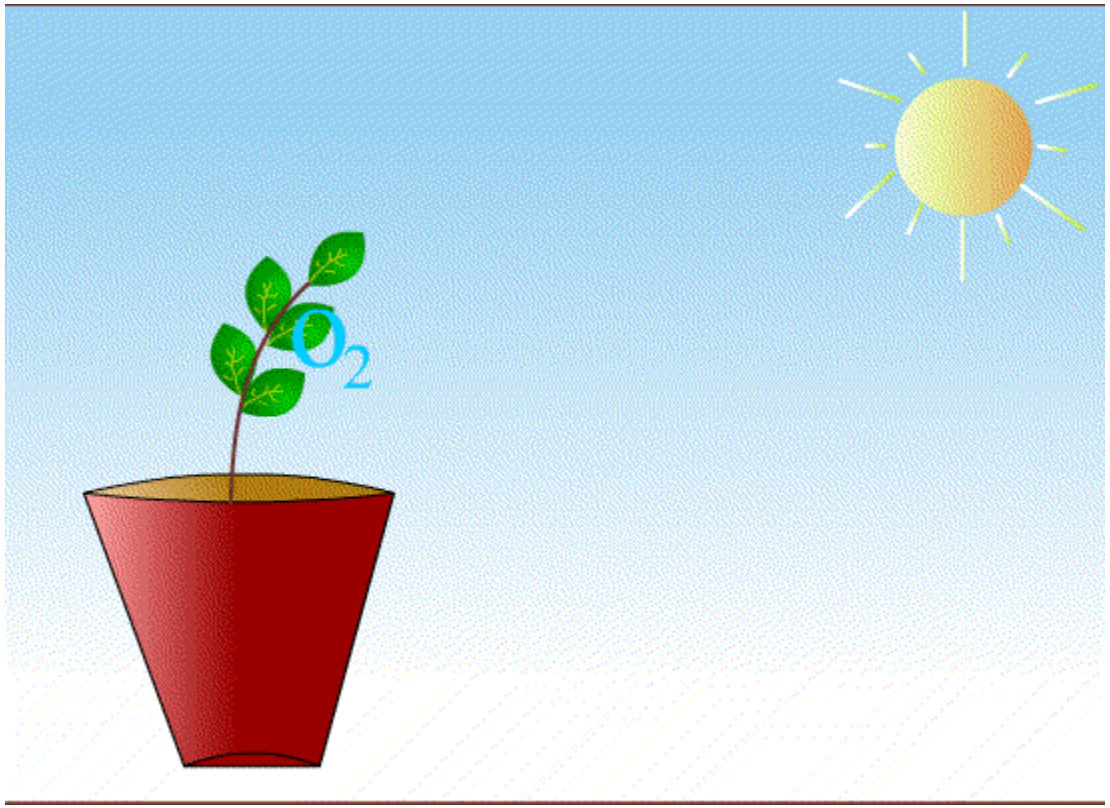


Characteristics of respiratory surfaces:

- It should have a large surface area.
- It should be thin, highly vascular and permeable to allow exchange of gases.
- It should be moist.

8.1 Organs of respiratory exchange

Gaseous exchange in plants

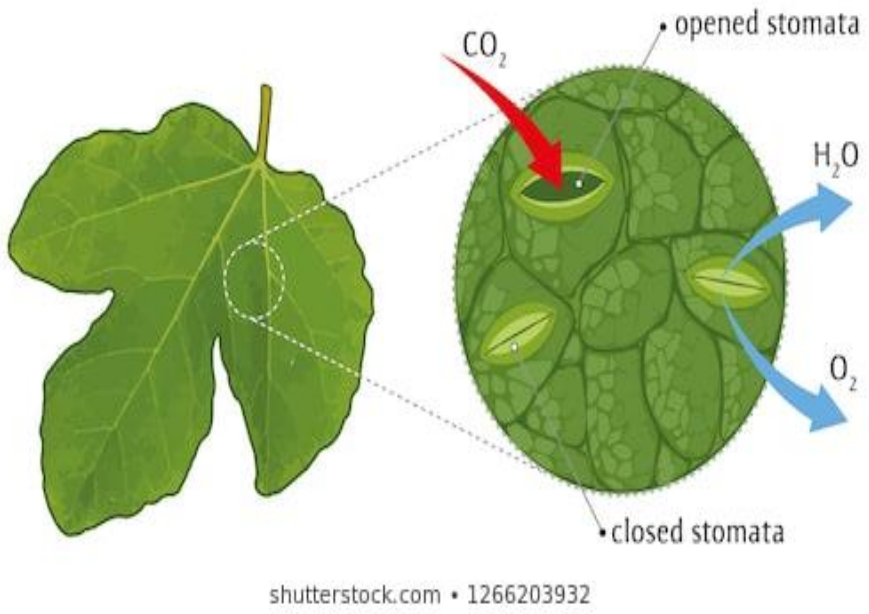


Diffusion

- Oxygen diffuses into the cells.
- Carbon dioxide and water vapor diffuses out.

8.1 Organs of respiratory exchange

Gaseous exchange in plants

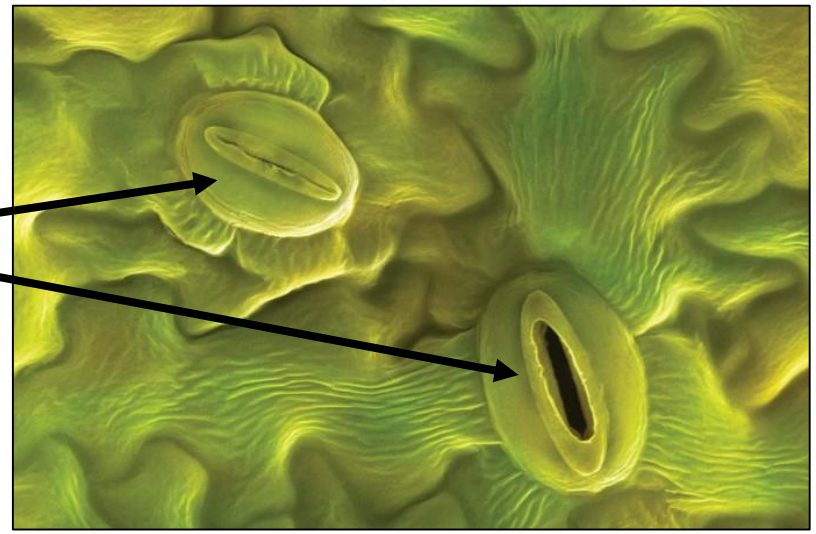


In terrestrial flowering plants:

- Many continuous air spaces between the cells.
- Gases diffuse in and out of the air spaces through stomata.

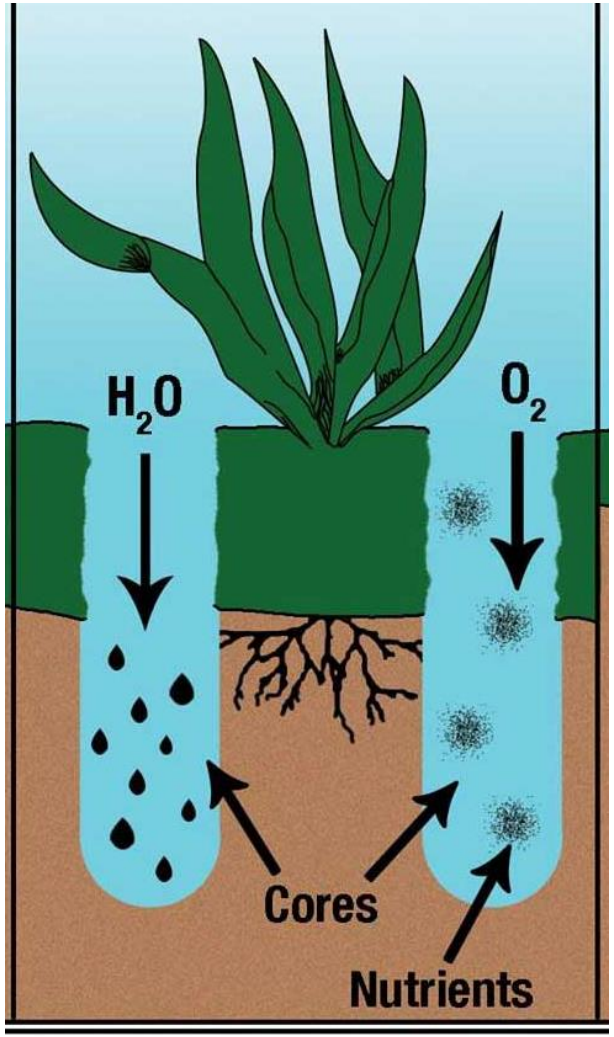
Stomata

Small pores on leaves and young stem surface



8.1 Organs of respiratory exchange

Gaseous exchange in plants



In aerated soil:

- Oxygen dissolves in water around the root and then enters by diffusion.

8.1 Organs of respiratory exchange

Gaseous exchange in plants

In woody flowering plants:

- External impervious bark.
- Gaseous exchange through lenticels.

Lenticels

Small pores in stem surface

8.1 Organs of respiratory exchange

Gaseous exchange in animals

Organism	Habitat	Respiratory surface/ organ
Protists, Sponges and Coelenterates	Aquatic	Plasma membrane
Flatworms like Planaria, Annelids (earthworm, nereis, leech), amphibians (frog)	Aquatic or semiquatic	Plasma membrane, general body surface (moist skin)
Insects	Terrestrial	Tracheal tubes and spiracles

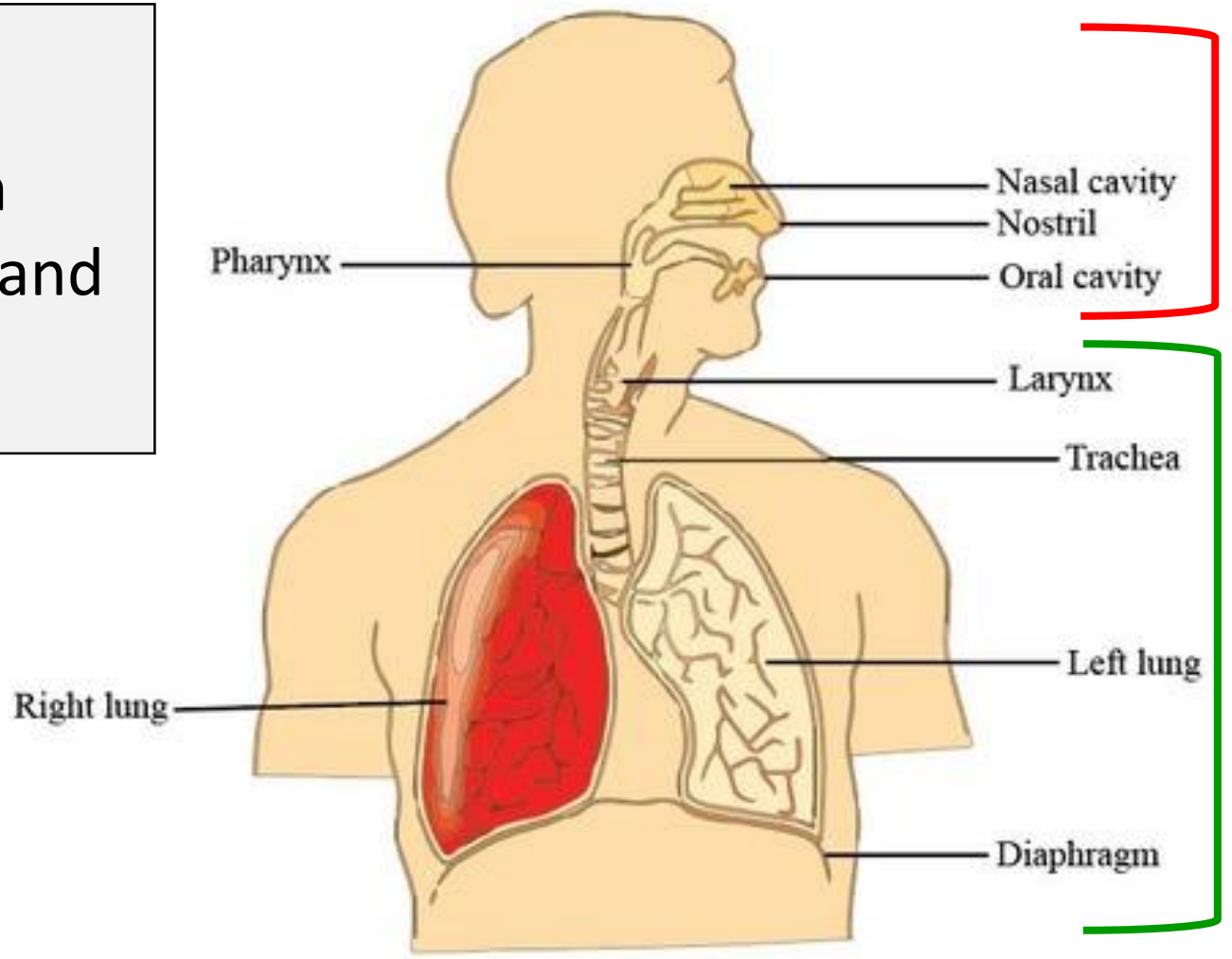
Organism	Habitat	Respiratory surface/ organ
Arachnids like spiders and scorpions	Terrestrial	Book lungs
Limulus (Arthropod)	Aquatic	Book gills
Amphibian tadpoles of frog, salamanders and newts	Aquatic	External gills
Fish	Aquatic	Internal gills
Reptiles, Birds and Mammals	Terrestrial	Lungs
Turtles	Underwater	cloaca

Pg. no. 154 - Table 8.2 Respiratory surface/ organ in organisms

8.2 Human respiratory system

Function:

- Exchange of gases in lungs by inspiration and expiration



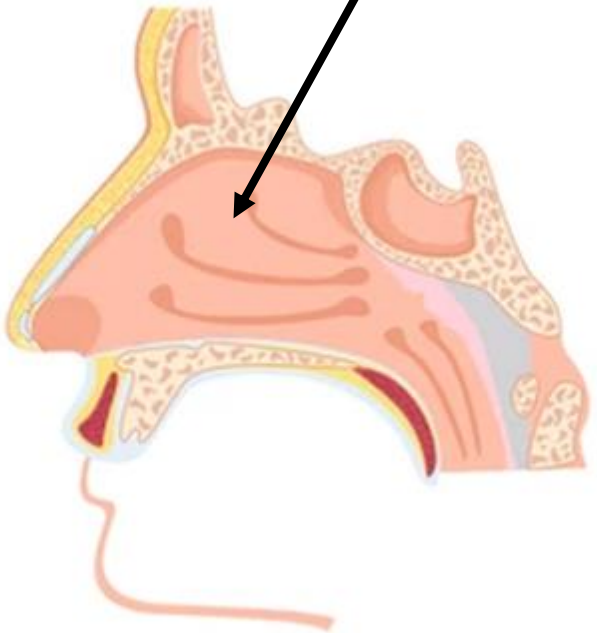
Upper respiratory tract

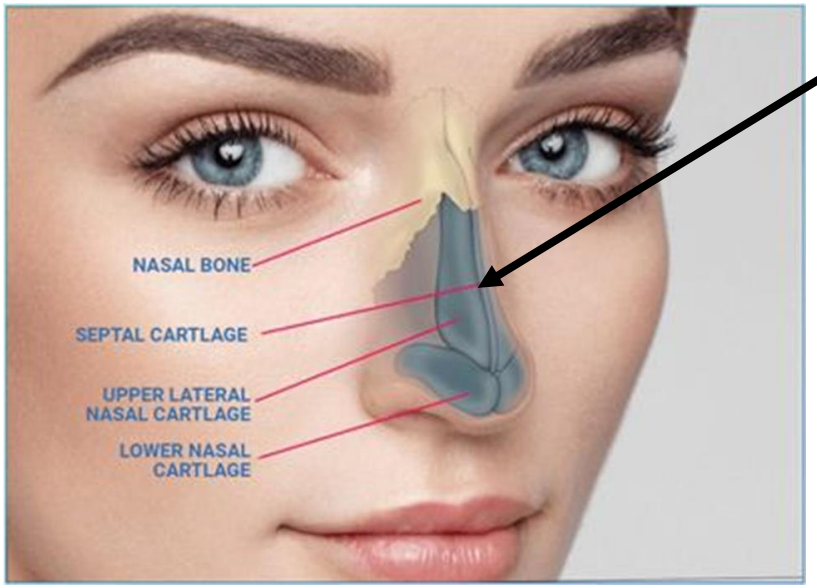
Lower respiratory tract

8.2 Human respiratory system

1. Nose

Nasal cavity





Mesethmoid cartilage -

The septum divides the nasal cavity into **left and right nasal chambers**.

External nares/ Nostrils

pair of slit like openings, for entry of air into nasal cavity

8.2 Human respiratory system

Nasal Chamber

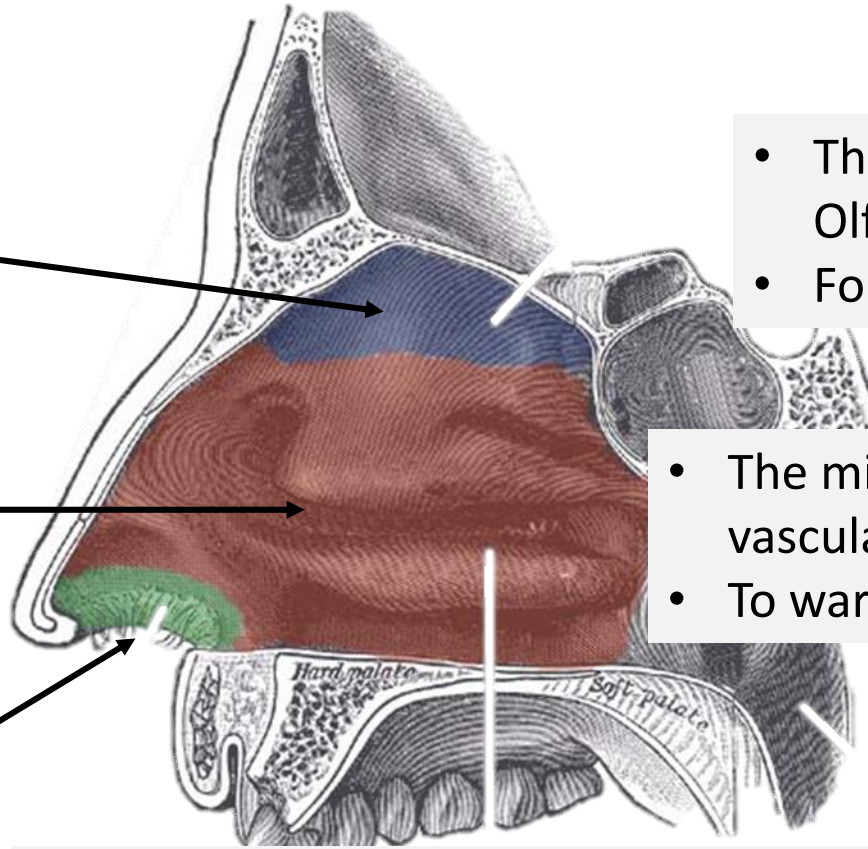
Sensory / olfactory region

- The uppermost part is lined by Olfactory epithelium
- For detection of smell.

Respiratory region

- The middle thin walled highly vascular part.
- To warm and moisten the inhaled air.

Vestibule



- Proximal part above the nostrils.
- Its skin has HAIR
- To filter the air and trap the dust /suspended particles in the inhaled air.

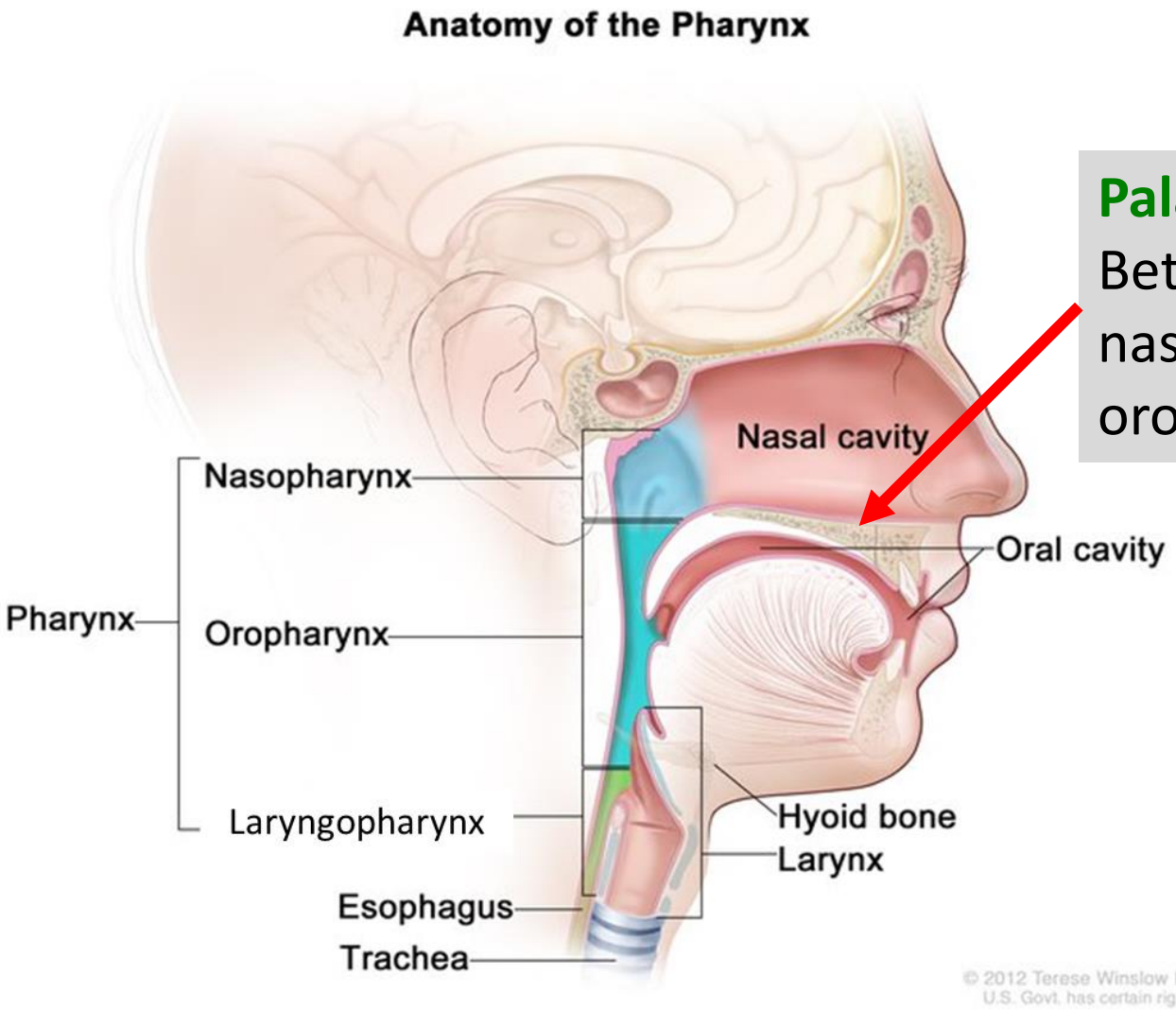
8.2 Human respiratory system

2. Pharynx

Nasopharynx – Uppermost part

Oropharynx – common passage for food and air

Laryngopharynx – leads into the Larynx



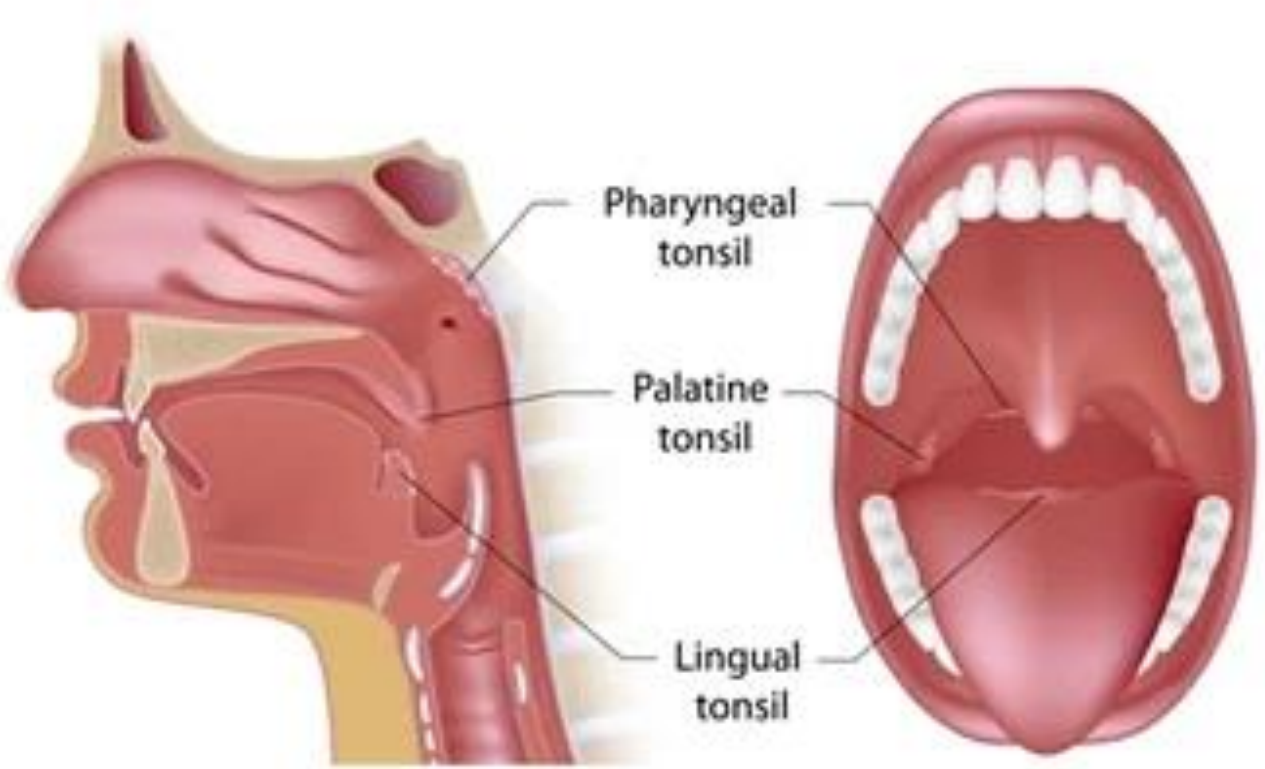
Palate bone :
Between the nasopharynx and oropharynx is the

8.2 Human respiratory system

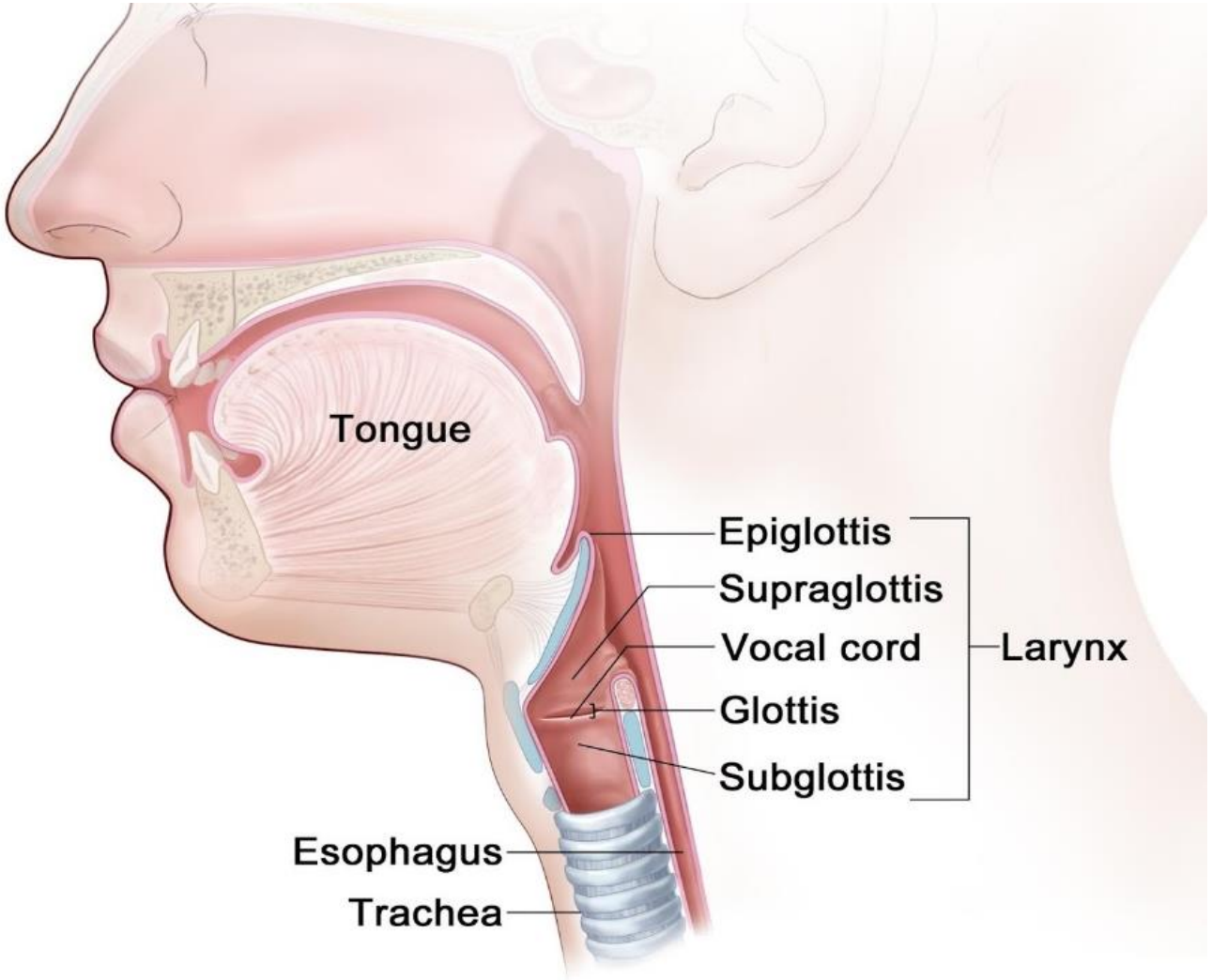
2. Pharynx

Tonsils –

- A set of lymphoid organs
- Provide protection against infections and flush away unwanted particles.

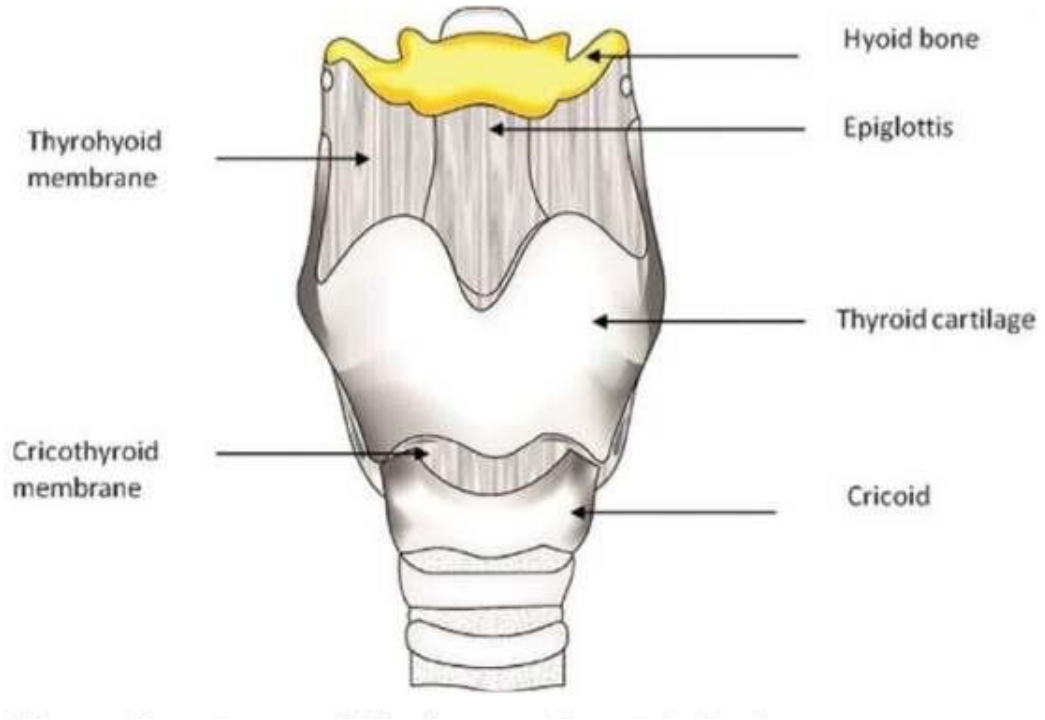


3. Larynx



- It is a hollow, tubular structure.
- It extends from the laryngopharynx and the **hyoid bone** to the trachea
- The connection is through an opening called **Glottis**.

3. Larynx

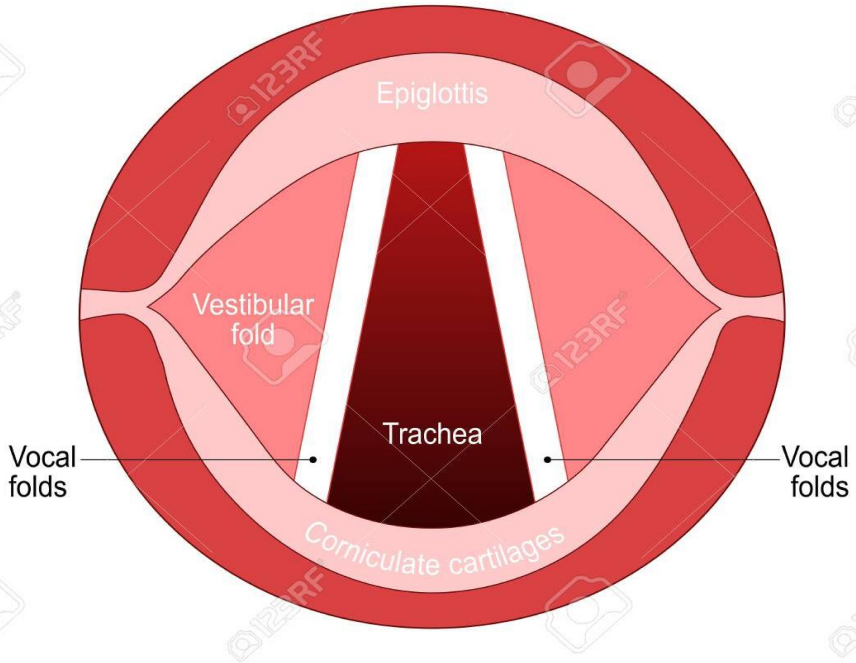


- Its wall is made up of cartilage plates held by membranes and muscles.

3. Larynx

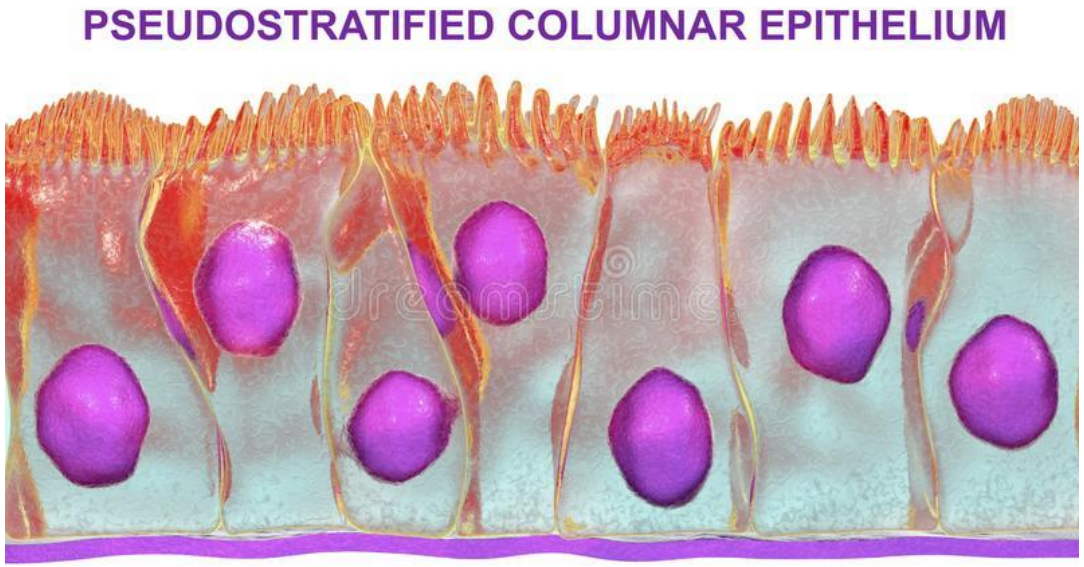
Vocal cords :

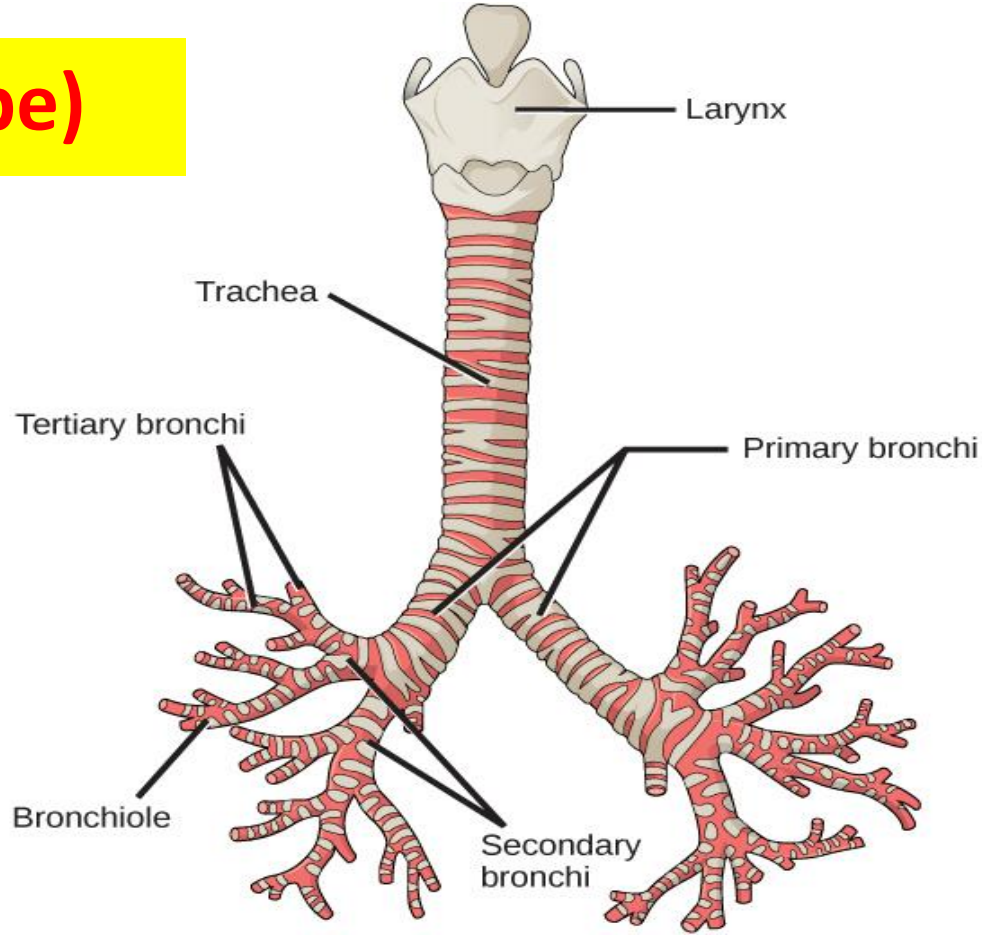
- Internally, it is lined by a pair of folds of elastic vocal cords (true vocal cords).
- Voice is produced by passage of air between the vocal cords and modulations created by tongue, teeth, lips and nasal cavity.



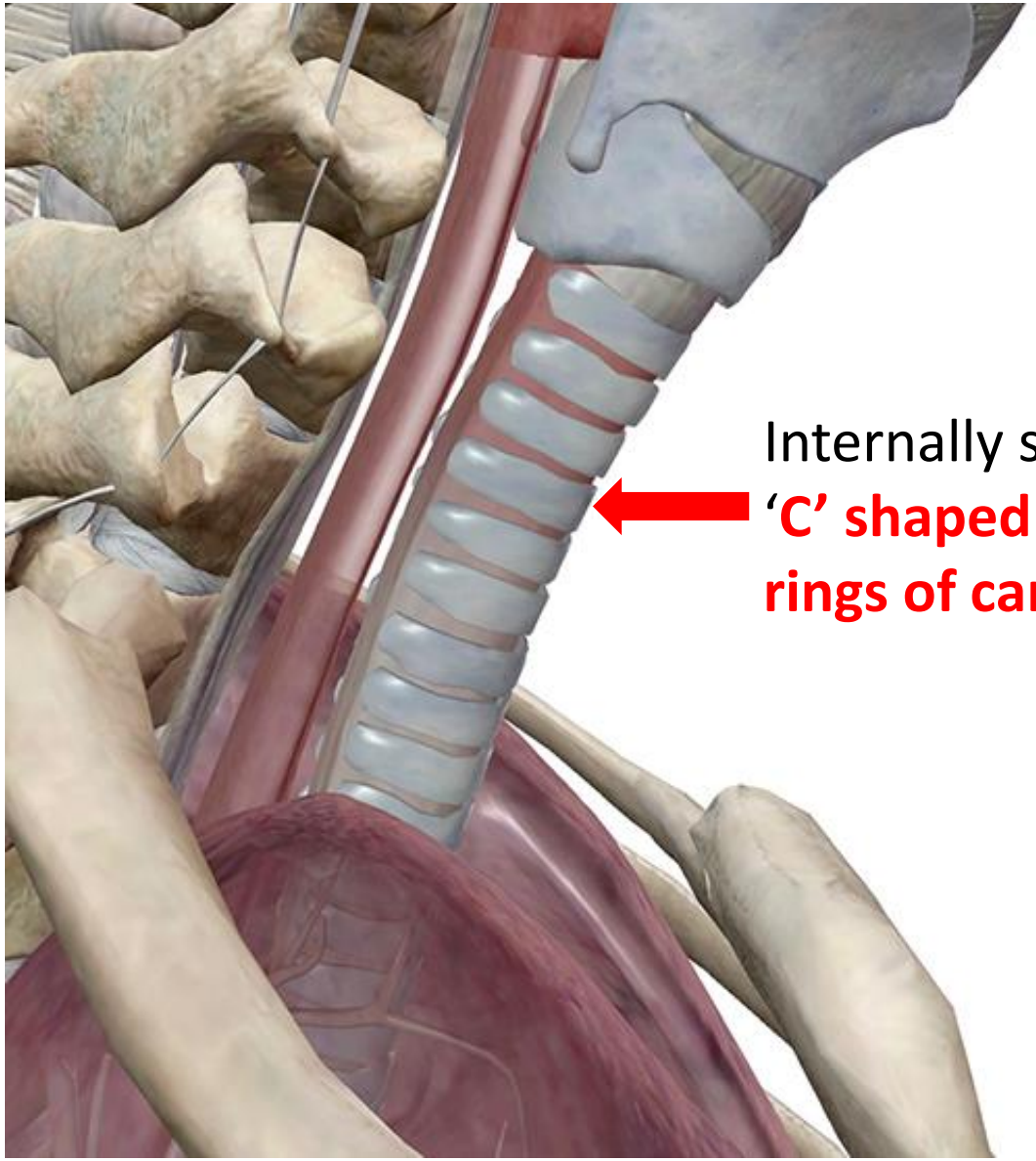
4. Trachea (wind pipe)

- It is a long tube 10 to 12 cm in length.
- It is lined internally with **ciliated, pseudostratified epithelium** and mucous glands that trap the unwanted particles preventing their entry into the lungs.





4. Trachea (wind pipe)



Internally supported by **'C' shaped incomplete rings of cartilage**.

TRACHEA reaches the middle of the thoracic cavity.

BRONCHI

RIGHT — PRIMARY — LEFT

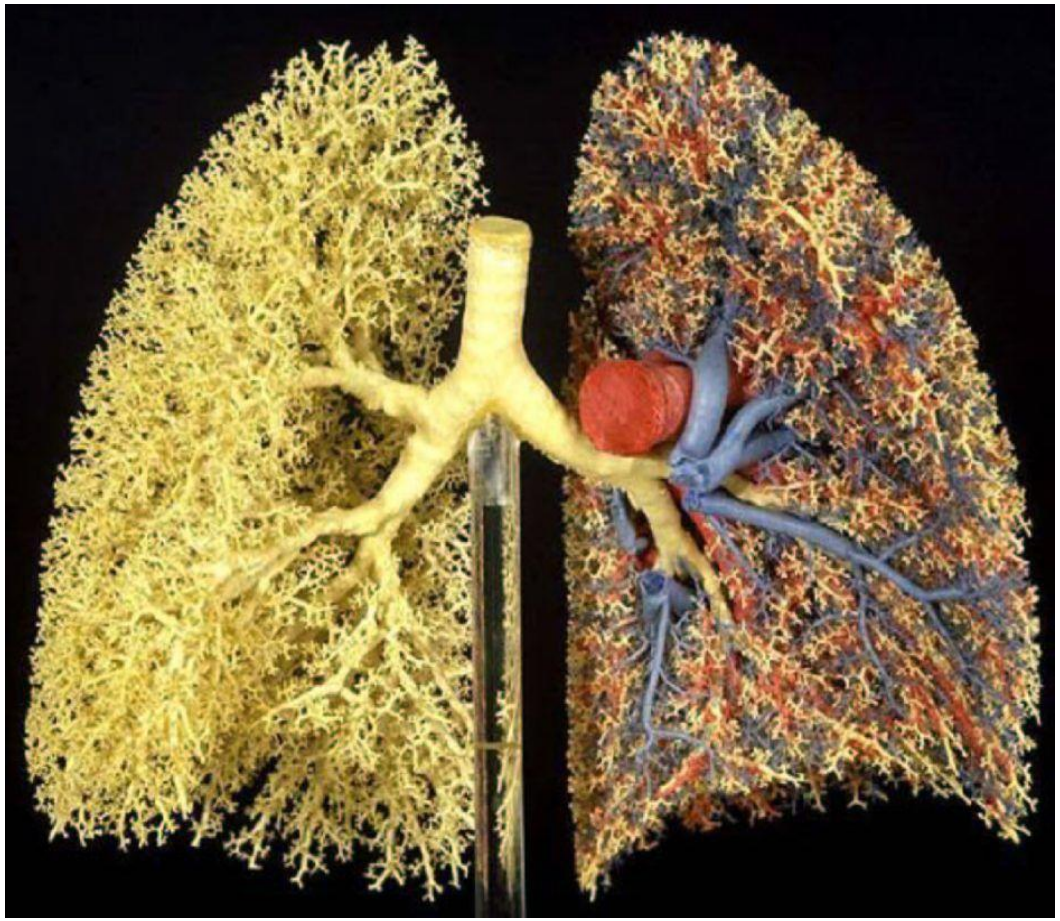
SECONDARY

TERTIARY

terminal BRONCHIOLES

ending into ALVEOLI

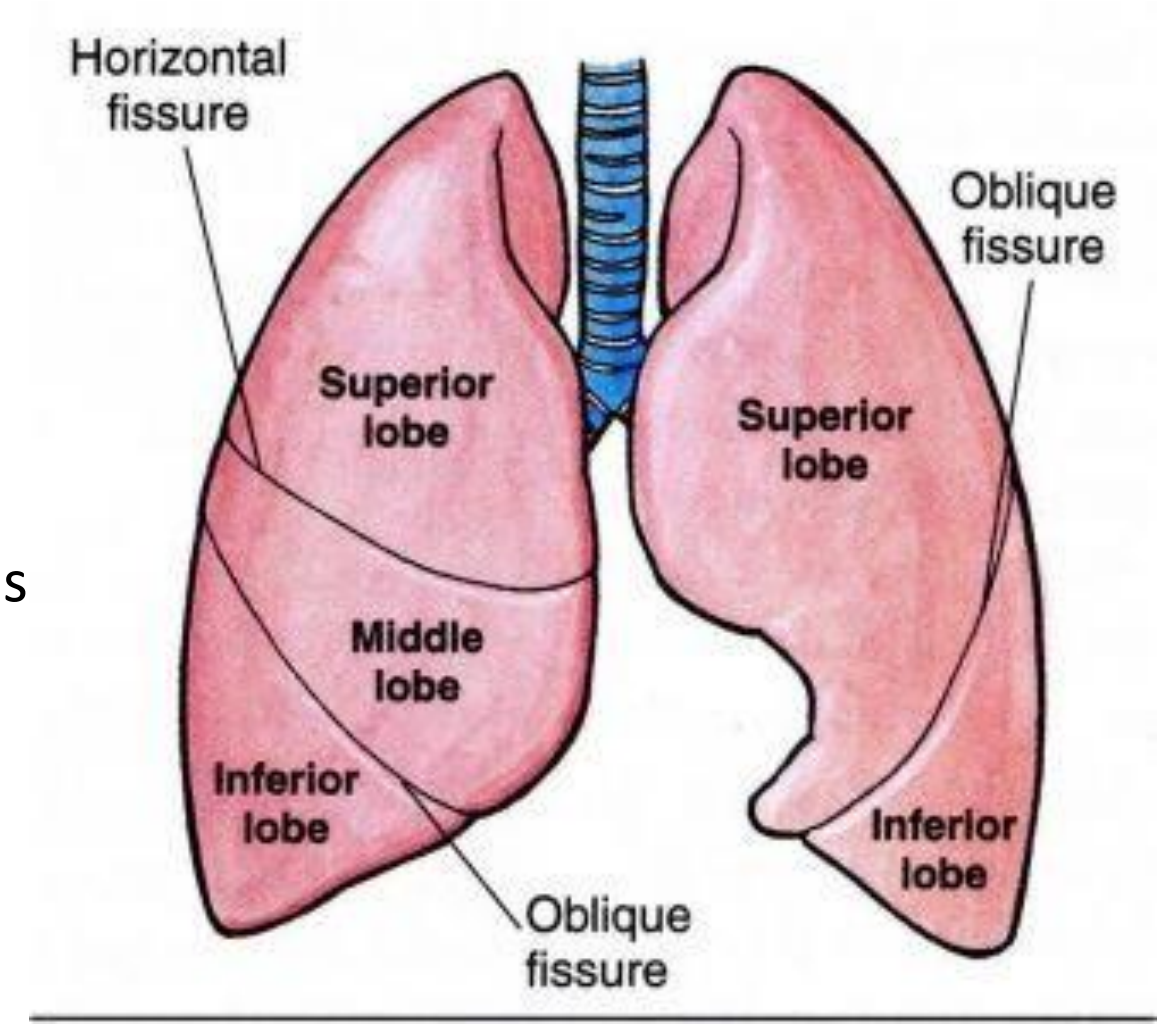
4. Trachea (wind pipe)



Each lobe of the lung has the terminal bronchioles ending in a bunch of air sacs, each with 10 to 12 alveoli.

5. Lungs

- One pair
- spongy and elastic lungs
- Present in the thoracic cavity.



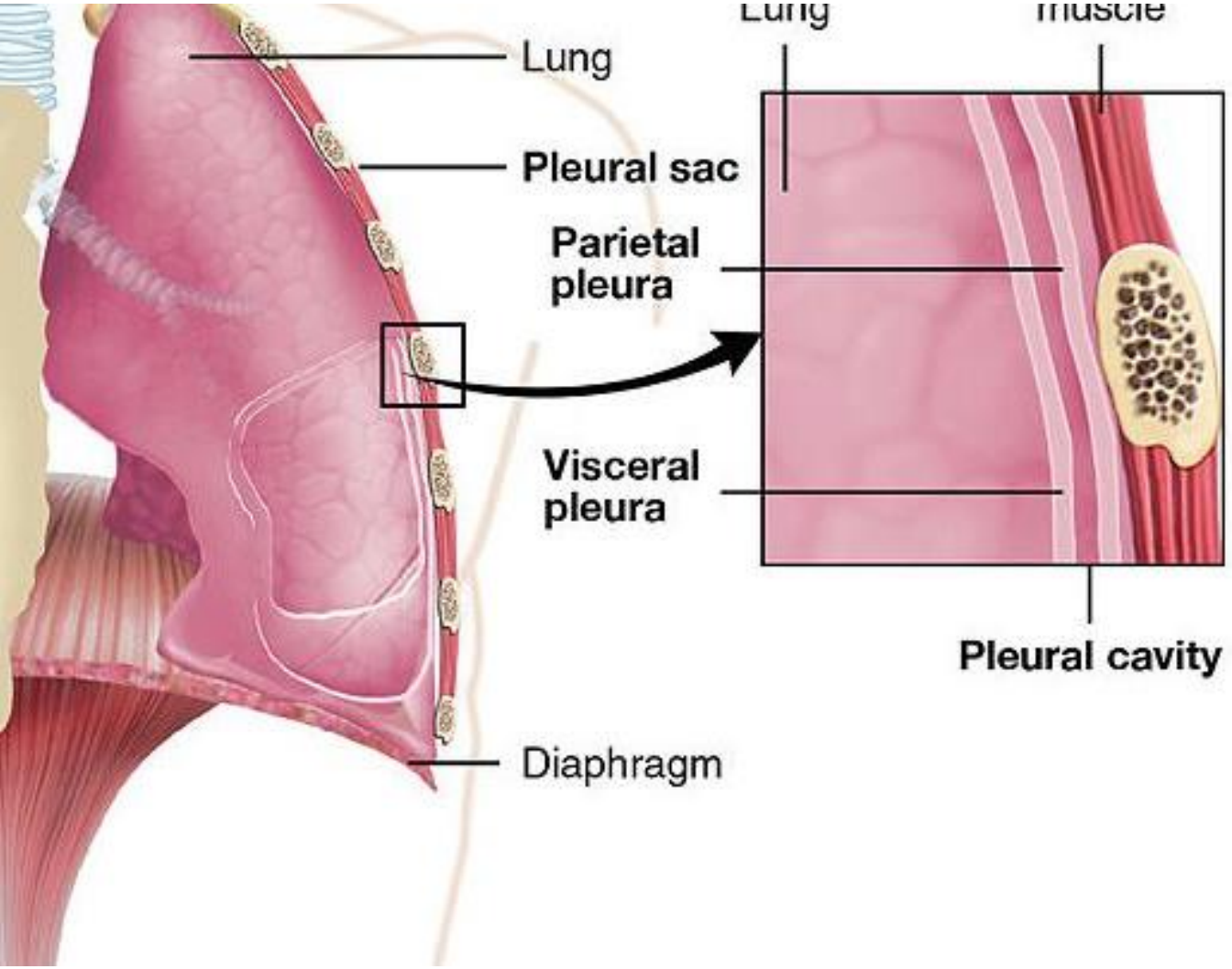
Right Lung

- Larger
- Divided into 3 lobes

Left Lung

- Smaller
- Divided into 2 lobes.

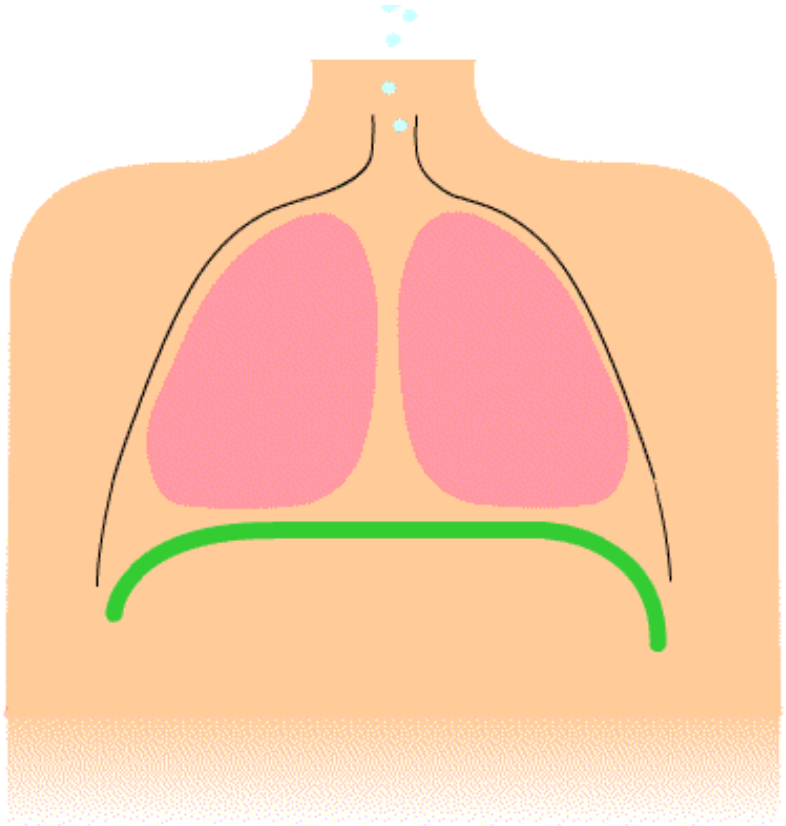
5. Lungs



Double Pleural Membrane

- Encloses each lung
- Outer - **parietal membrane**
- inner - **visceral membrane**.
- Between the two pleura is a **pleural cavity** filled with a lubricating fluid called **pleural fluid.**
- It is secreted by the membranes.

5. Lungs

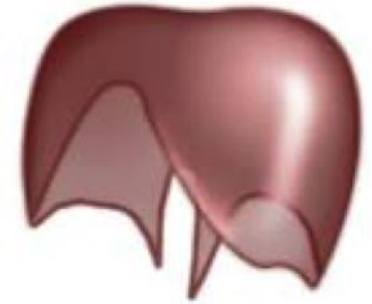


Diaphragm :

- Muscular septum
- Separates the thoracic and abdominal cavity.

Relaxed – dome shaped

Contraction – flattened.

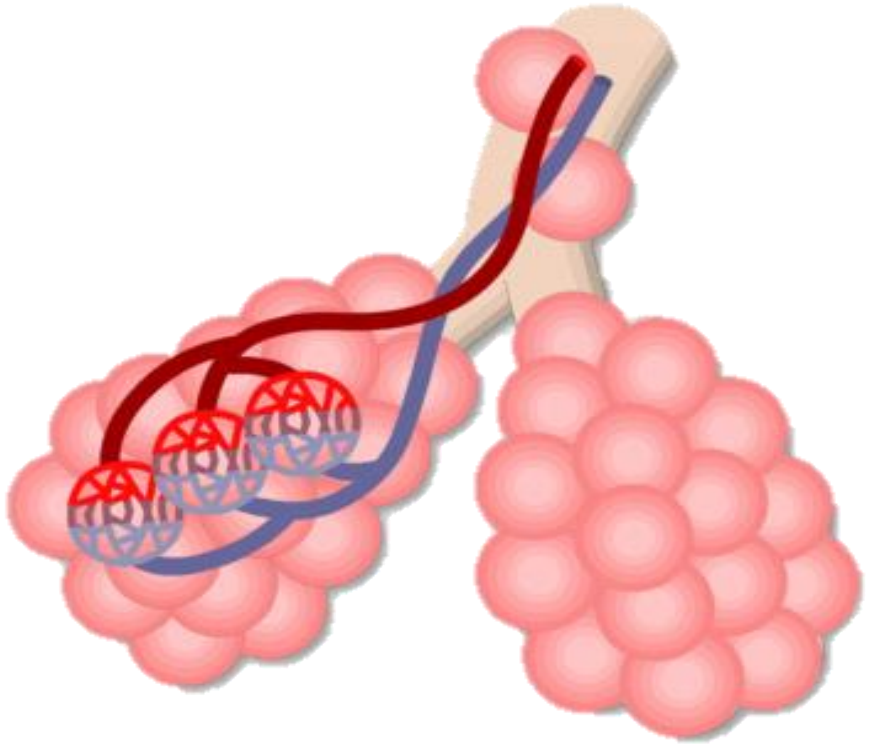


The diaphragm is shaped like a parachute

5. Lungs

Alveoli:

- Are thin walled lobulated structures
- **700 million alveoli**
- Highly elastic walls
- Made up of a single layer of **squamous epithelium resting on a basement membrane of connective tissue.**

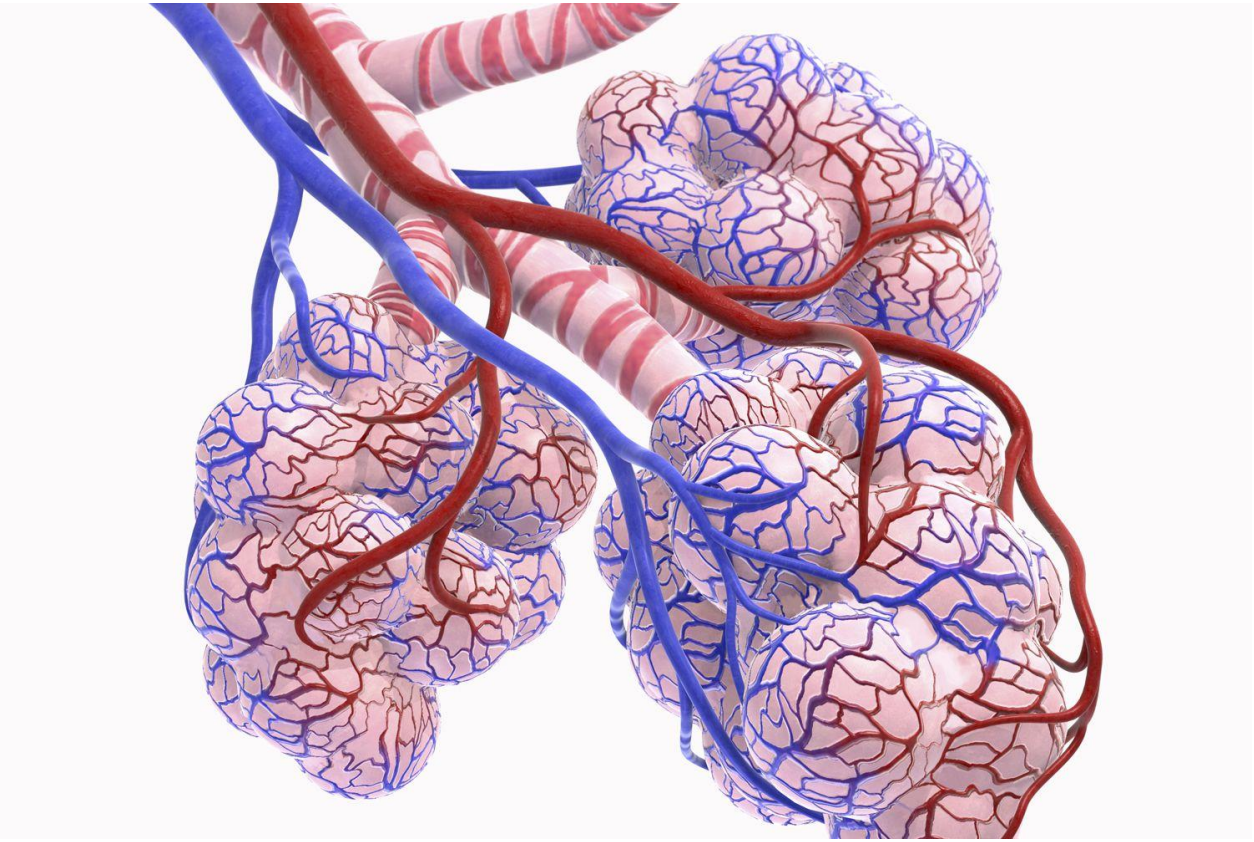


Function

- Provide the surface area for exchange of gases.

5. Lungs

Alveoli:



Each alveolus is surrounded by a **network of capillaries of pulmonary arteries and veins**.