Structure and functions of Respiratory System

Presented by
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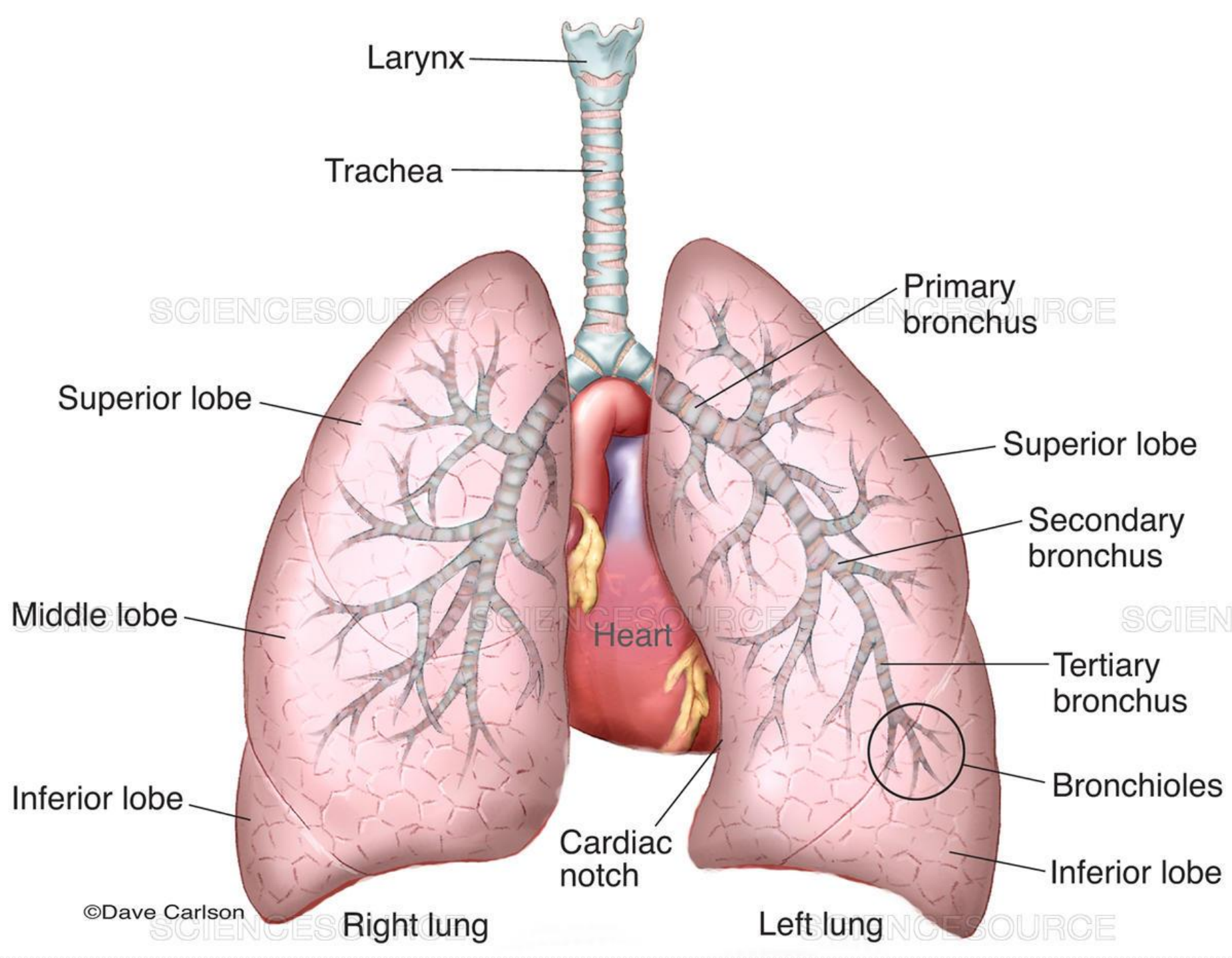
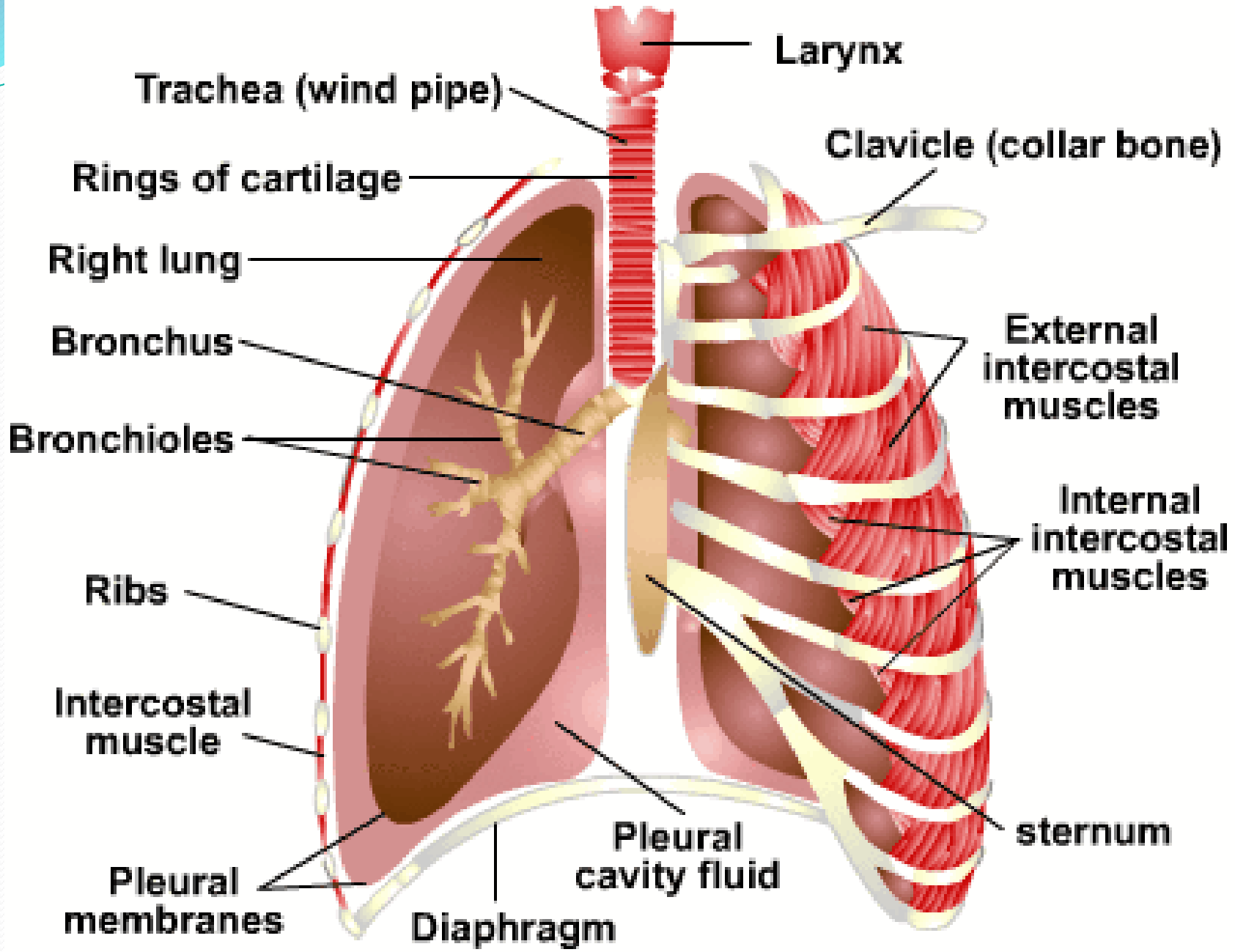
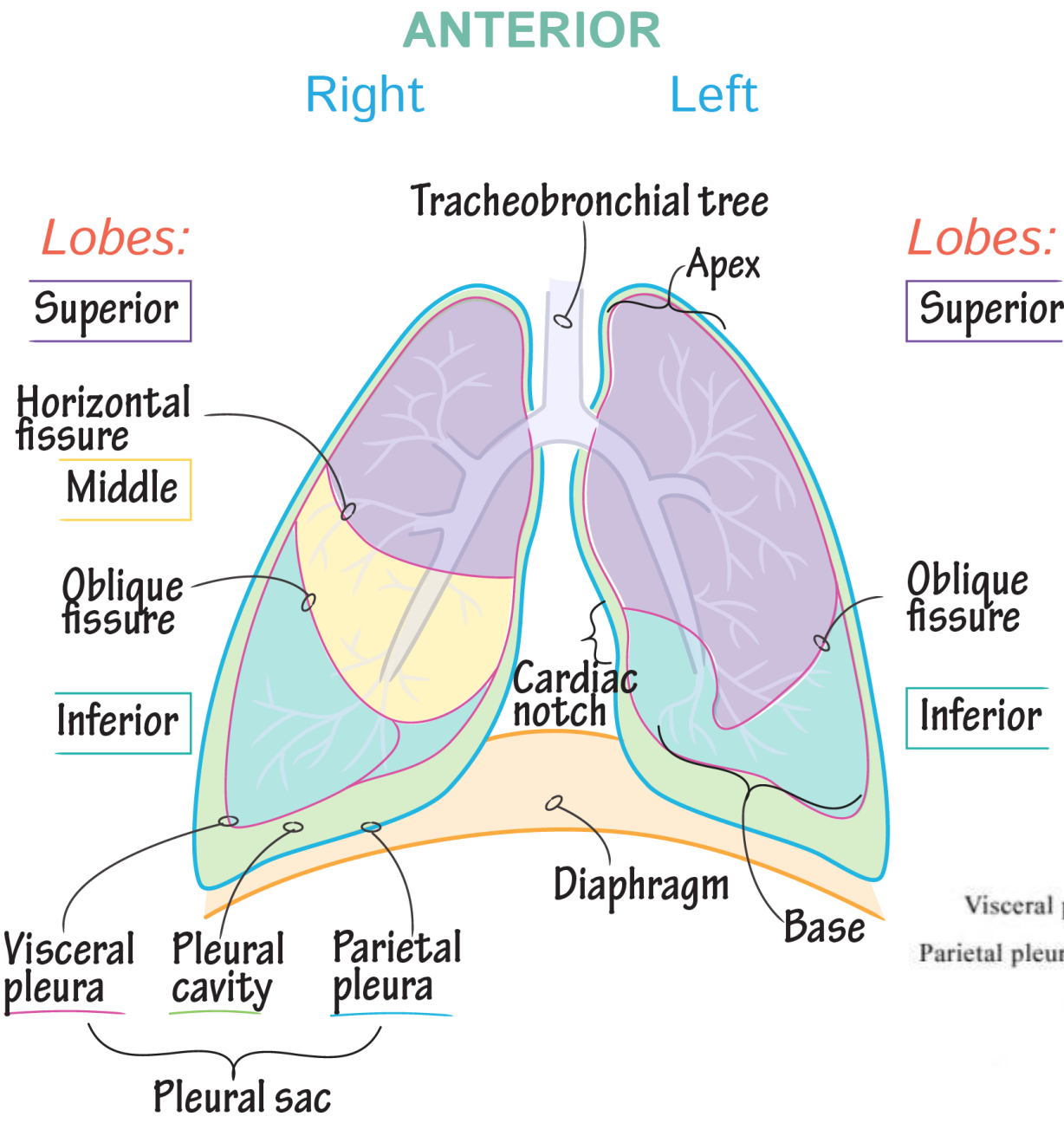
Structure of Human Lungs

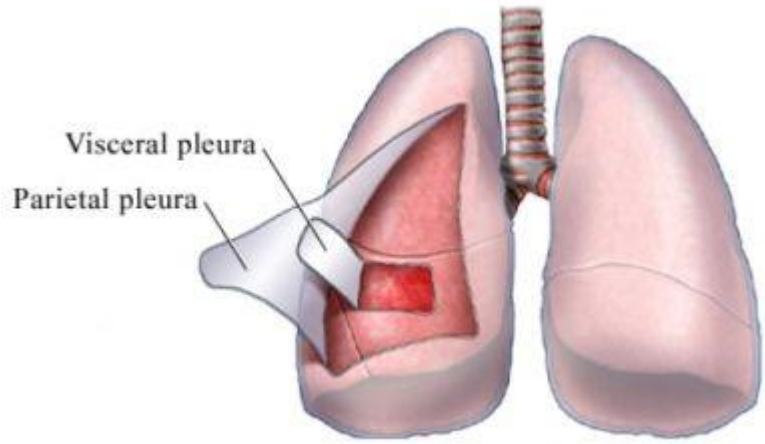

Larynx
Trachea
Primary bronchus
Superior lobe
Superior lobe
Secondary bronchus
Middle lobe
Heart
Tertiary bronchus
Bronchioles
Inferior lobe
Cardiac notch
Inferior lobe
©Dave Carlson
Right lung
Left lung

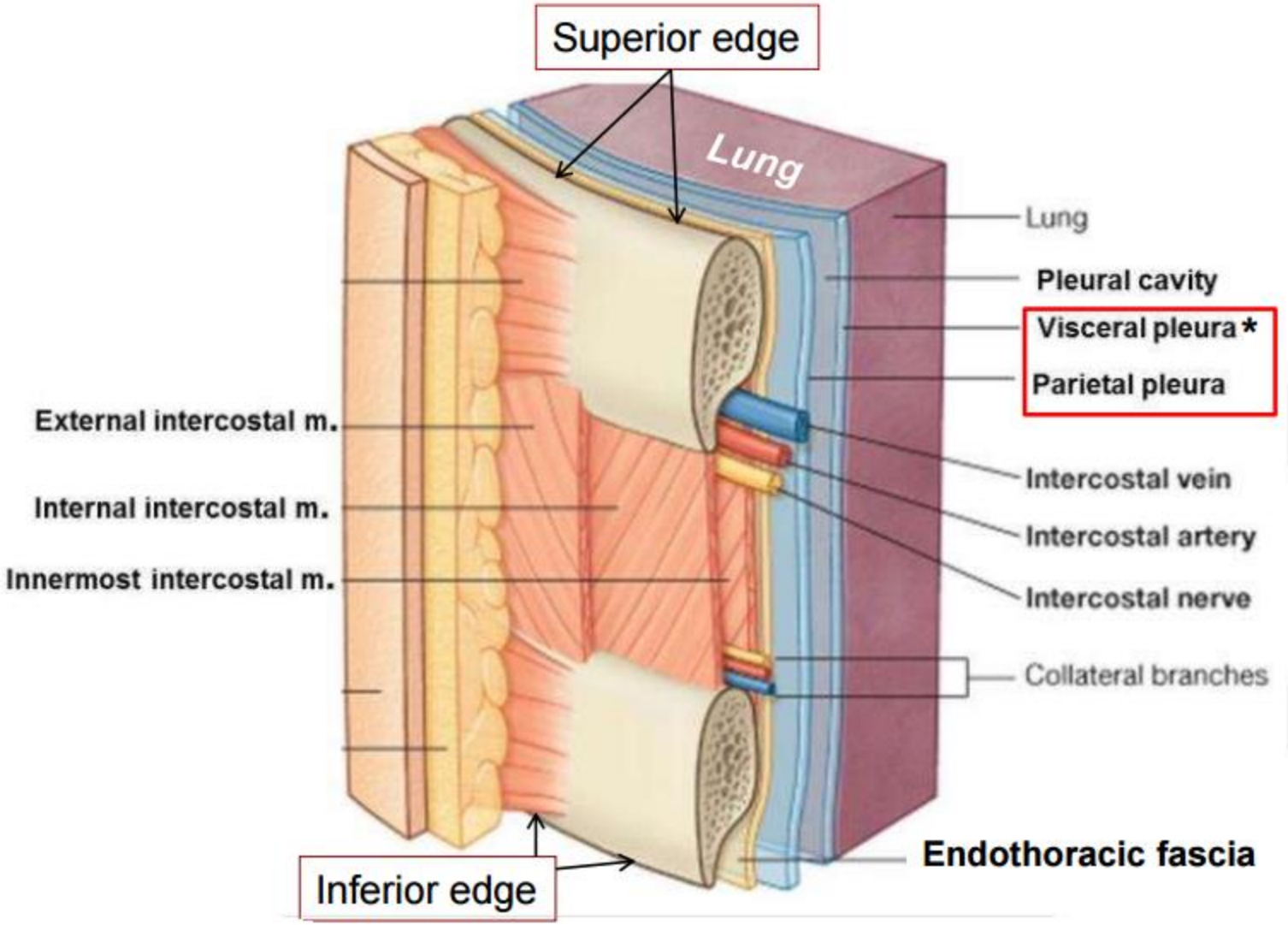

Larynx
Trachea (wind pipe)
Clavicle (collar bone)
Rings of cartilage
Right lung
Bronchus
External intercostal muscles
Bronchioles
Internal intercostal muscles
Ribs
Intercostal muscle
sternum
Pleural cavity fluid
Pleural membranes
Diaphragm



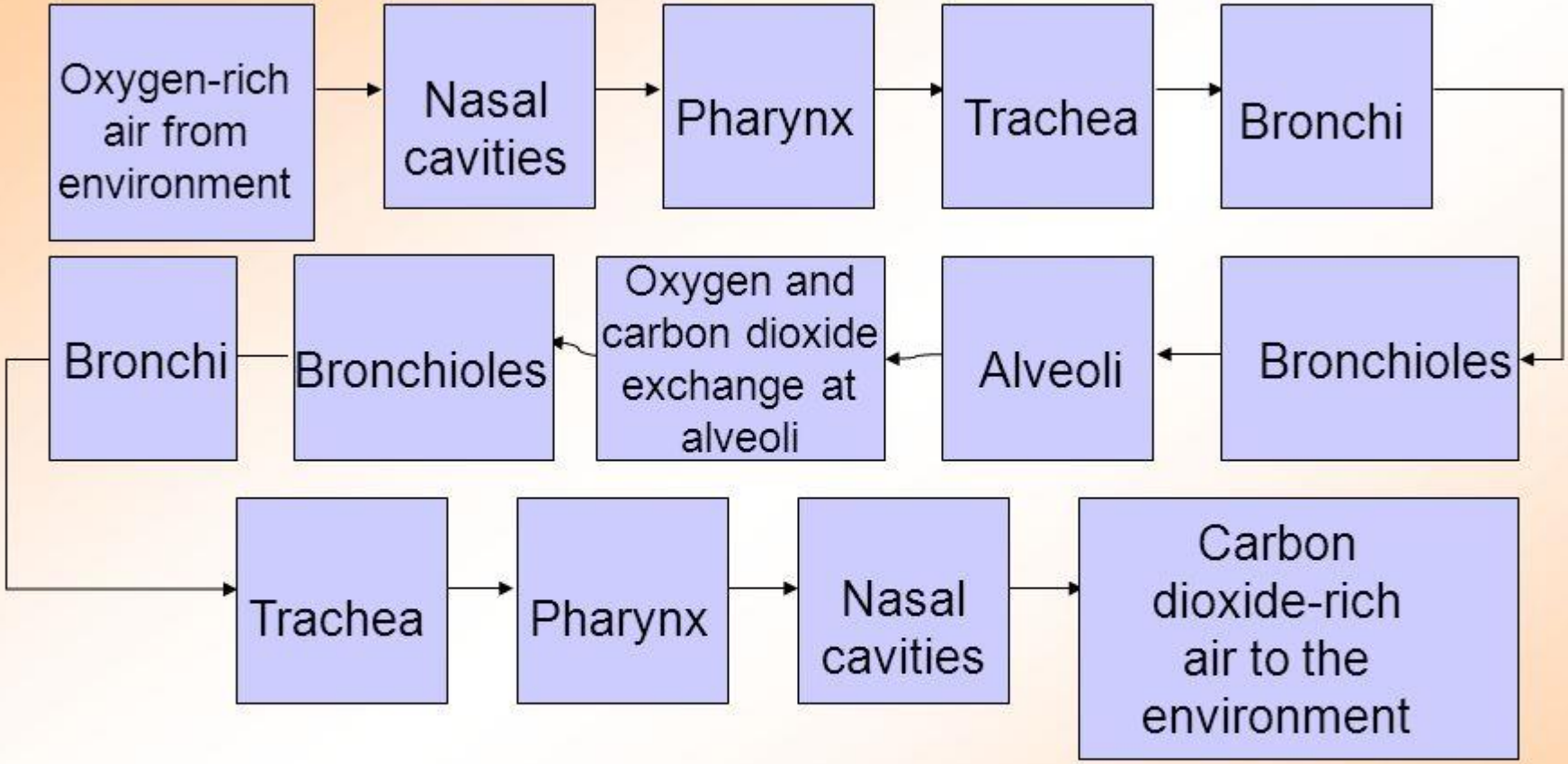
Pleura

The function of the pleura is to allow optimal expansion and contraction of the lungs during breathing. The **pleural fluid** acts as a lubricant, allowing the parietal and visceral pleura to glide over each other friction free.



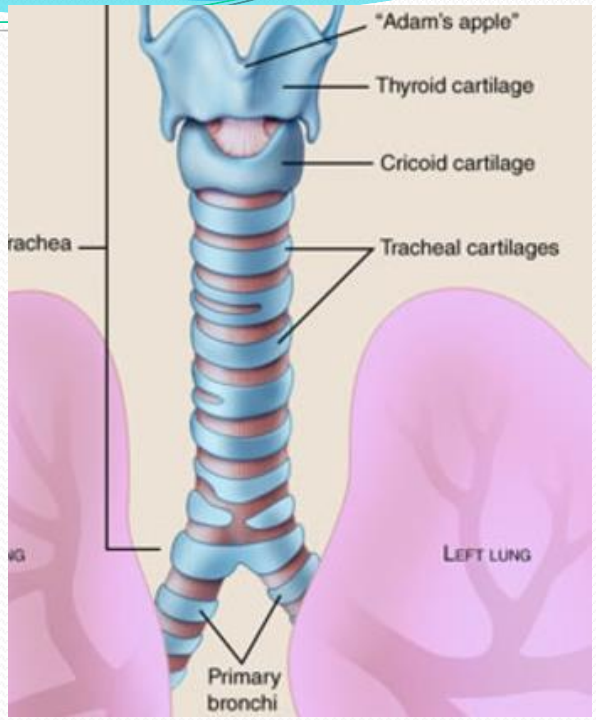

Superior edge
Lung
Lung
Pleural cavity
Visceral pleura *
Parietal pleura
External intercostal m.
Internal intercostal m.
Innermost intercostal m.
Intercostal vein
Intercostal artery
Intercostal nerve
Collateral branches
Endothoracic fascia
Inferior edge

Movement of Oxygen and Carbon Dioxide In and Out of the Respiratory System

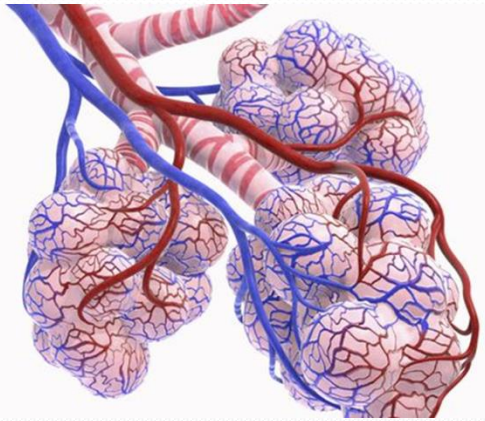


Why??

- **<u>Presence of Cartilaginous rings on trachea</u>**
- Walls of *trachea* is supported by *cartilaginous rings* so that the **air passage does not collapse**.

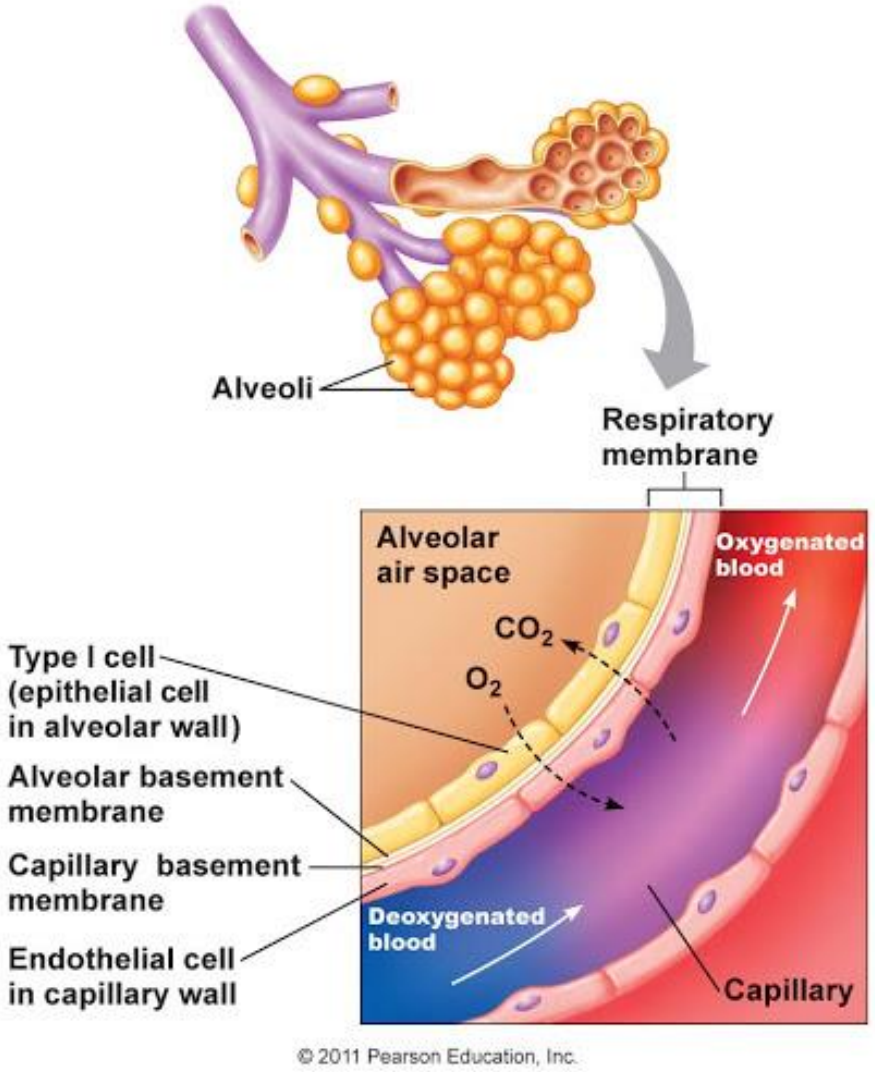


- **<u>Alveoli</u>**
- There are as many as 700 million alveoli in each **lungs**, where they facilitate **gaseous exchange** of oxygen and carbon dioxide between inhaled air and the bloodstream.

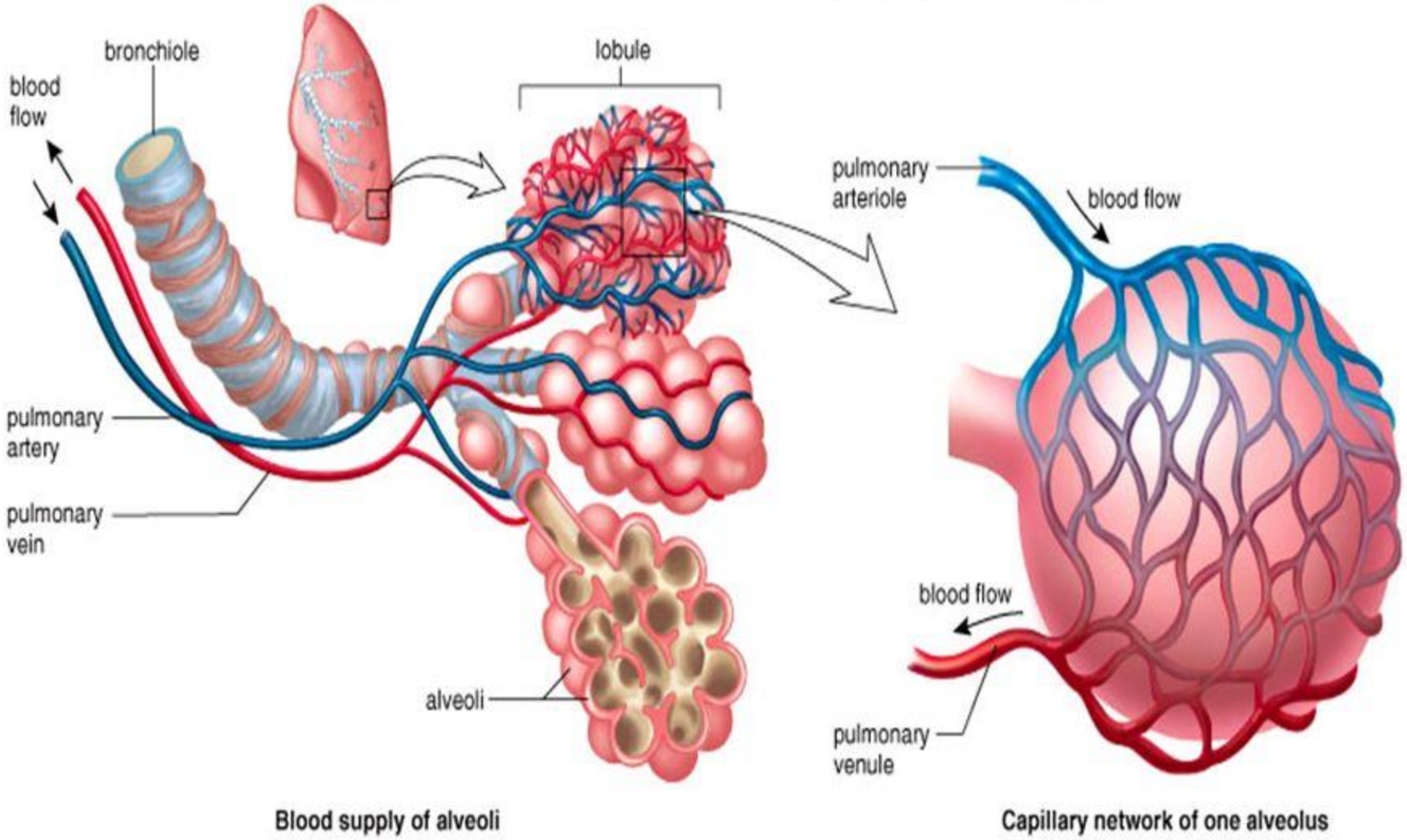


How are the **alveoli designed** to maximize the **exchange** of **gases**?

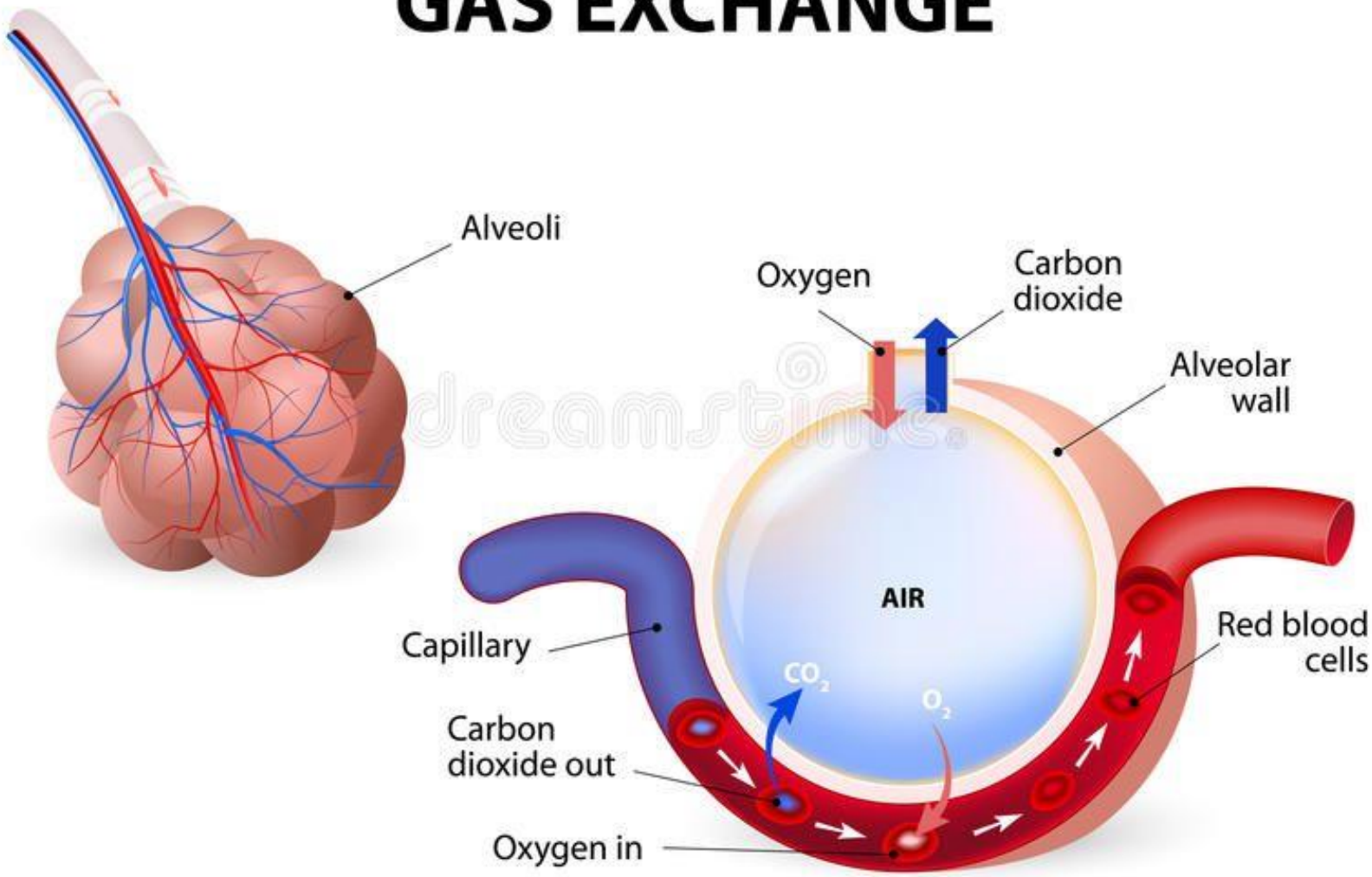
- The alveoli are thin walled and richly supplied with a network of blood vessels to facilitate exchange of gases between blood and the air filled in alveoli. They have balloon – like structure that provide maximum surface area for exchange of gases.

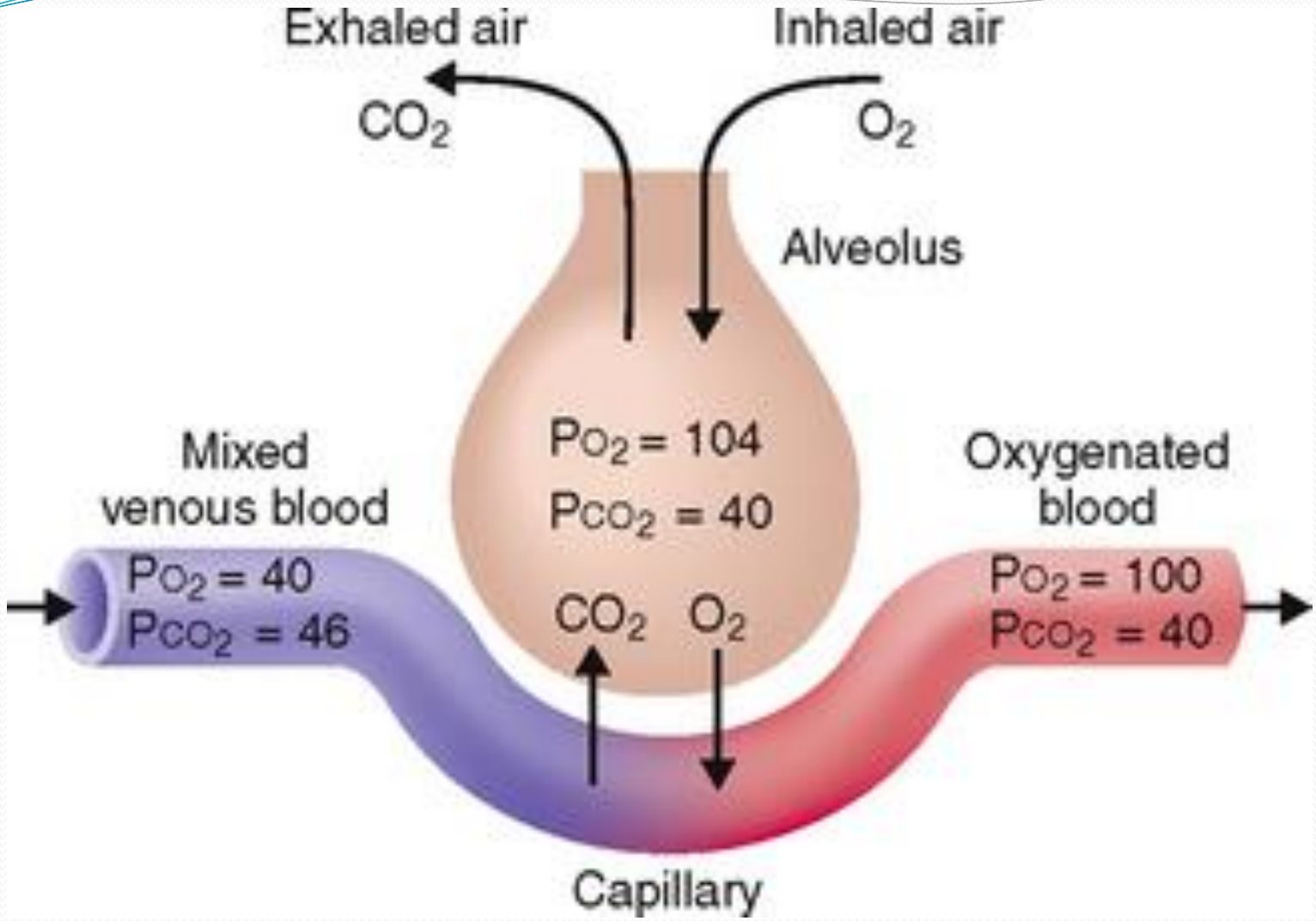


Gas exchange in the lungs



ALVEOLUS GAS EXCHANGE




Exhaled air
CO_2
Inhaled air
O_2
Alveolus
$P_{O_2} = 104$
$P_{CO_2} = 40$
Mixed venous blood
$P_{O_2} = 40$
$P_{CO_2} = 46$
CO_2
O_2
Oxygenated blood
$P_{O_2} = 100$
$P_{CO_2} = 40$
Capillary

Questions??

1. What is the function of cartilaginous rings in trachea?
2. Describe the structure of human lungs.
3. What are alveoli? How is it designed for gaseous exchange?
4. What is pleural fluid? Why pleura is present in lungs?
5. What is diaphragm? Where is it located? Write it's role.