RESPIRATORY SYSTEM

PART I NOTES: STRUCTURE FUNCTION

OUTCOMES

B11-3-13: Distinguish between cellular respiration, internal respiration, and external respiration. (GLO: D1)

B11-3-14: Identify major structures and functions of the human respiratory system from a diagram, model, or specimen. (GLO: D1) Include: lungs, pleura, nasal cavity, epiglottis, bronchi and bronchioles, alveoli, pulmonary capillaries, diaphragm, pharynx, larynx, trachea, uvula, ribs, and intercostal muscles

TYPES OF RESPIRATION

- In the human body there are 3 different types of respiration:

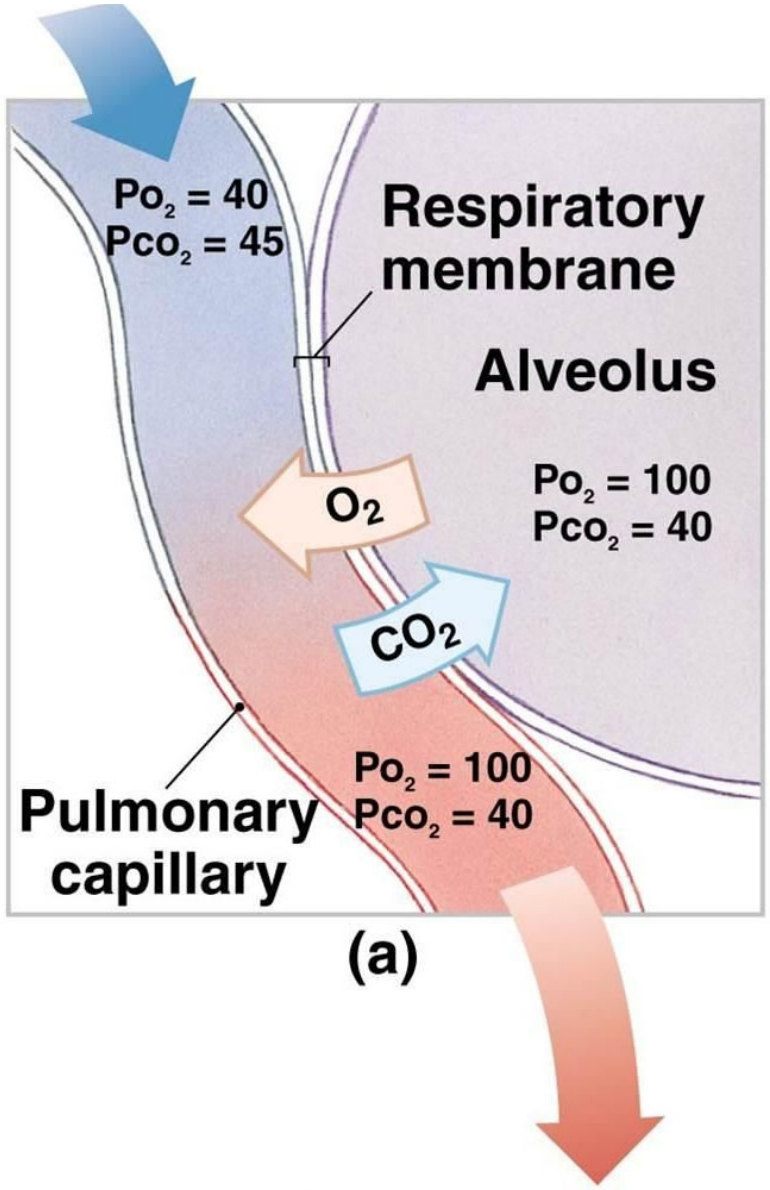
1. Cellular Respiration

- Occurs in the mitochondria
- Produces ATP (adenosine triphosphate) or energy
- $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ + energy (ATP)
- This is considered respiration because the reaction takes in oxygen and produces carbon dioxide for elimination

TYPES OF RESPIRATION

2. External Respiration

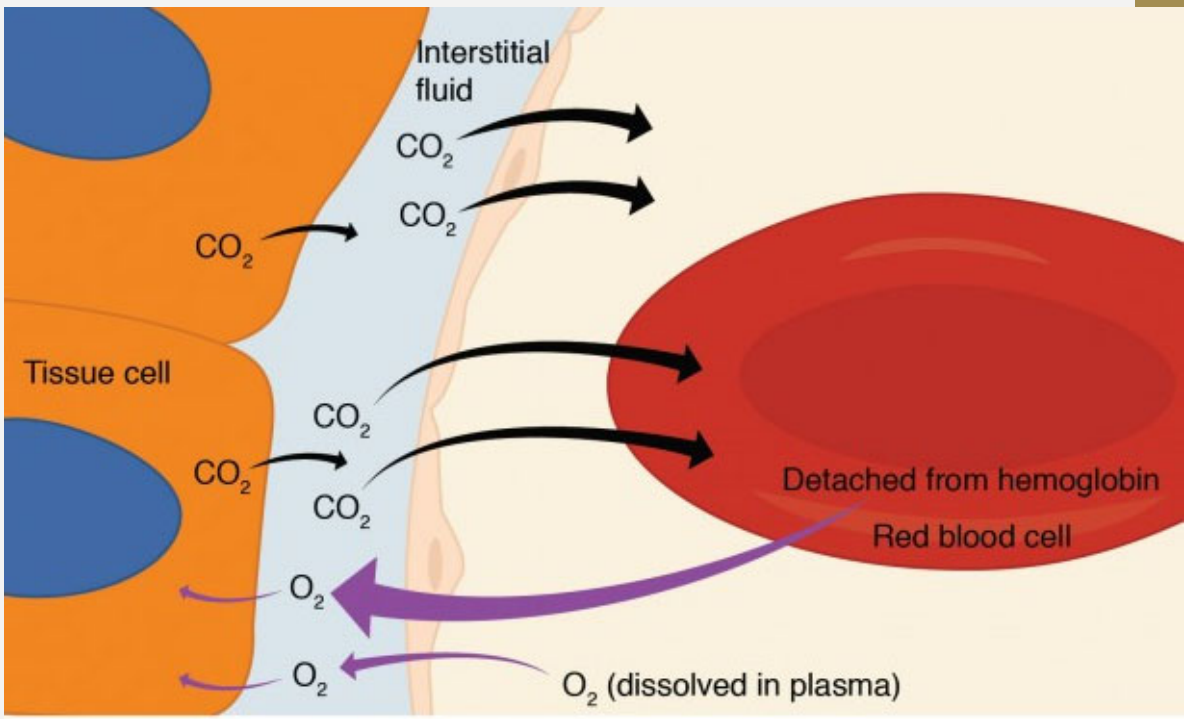
- Occurs at the lungs
- Gas exchange occurs between the alveoli and capillaries
- This is how the oxygen is getting into the bloodstream and the carbon dioxide is getting out of the blood stream.



TYPES OF RESPIRATION

3. Internal Respiration

- Occurs at the separate body tissues
- Gas exchange happens between the blood and the body cells
- This is how oxygen is getting to cells, and how the cells eliminate carbon dioxide.



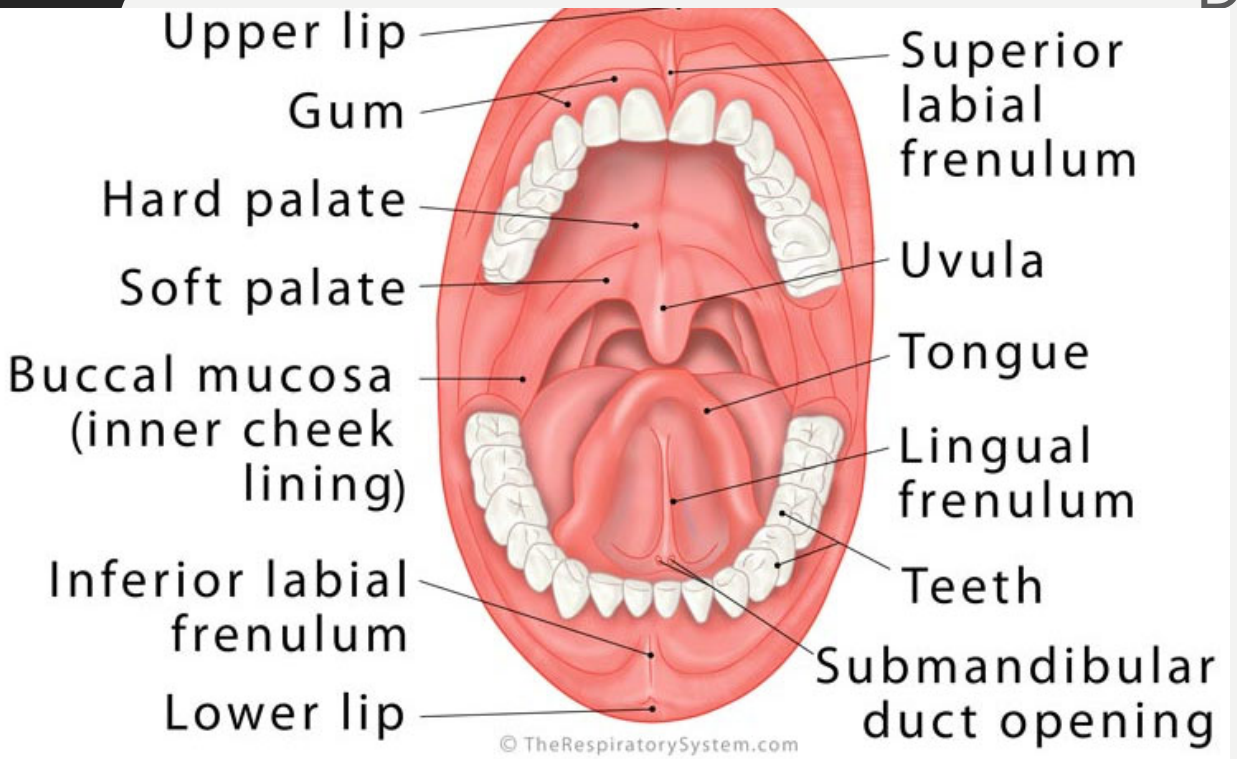
STRUCTURE AND FUNCTION

- The major structures in the respiratory system include:
  - Oral cavity
  - Nasal cavity
  - Sinuses
  - Pharynx
  - Epiglottis
  - Larynx
  - Trachea
  - Bronchi
  - Bronchioles
  - Alveoli
  - Pulmonary capillaries
  - Lungs
  - Pleura
  - Diaphragm
  - Ribs
  - Intercostal muscles

ORAL CAVITY (MOUTH)

STRUCTURE

- The space inside the mouth



FUNCTION

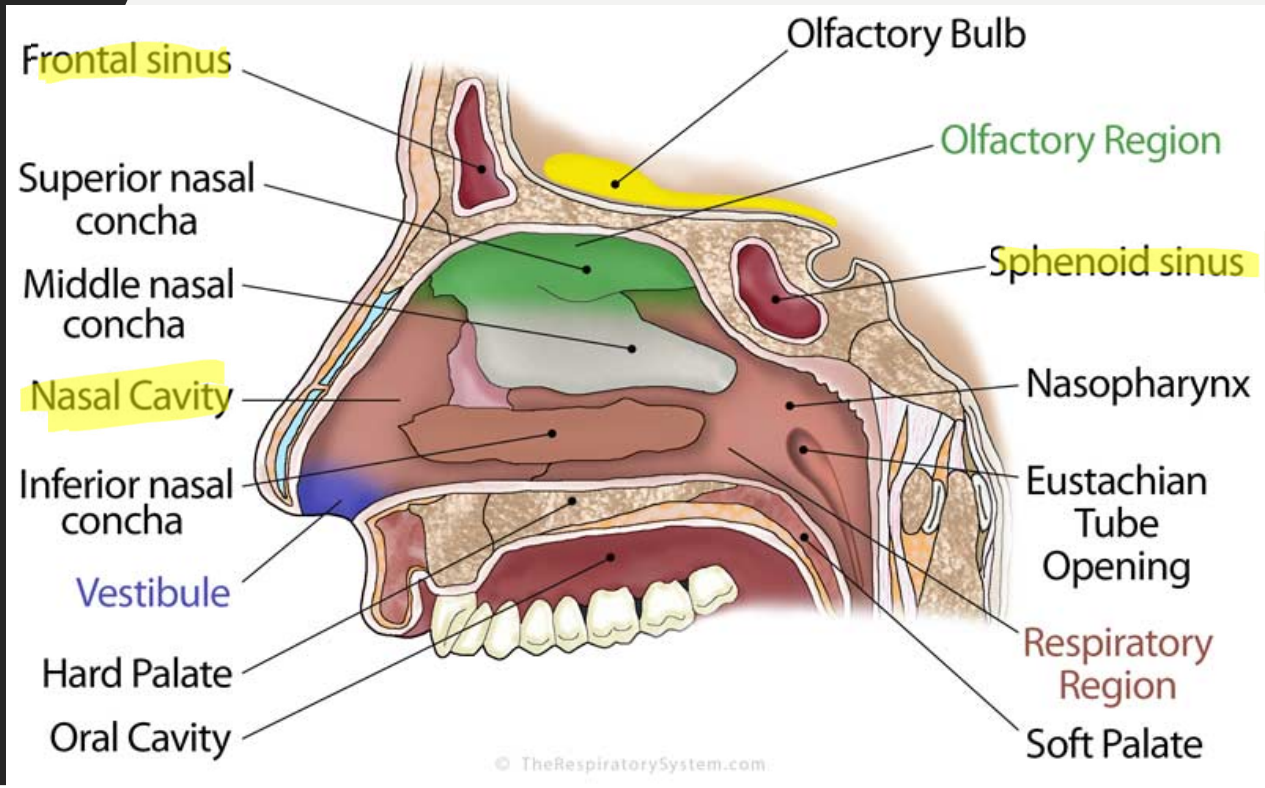
- Supplements breathing
- Draws air into the body and allows air to leave the body

- warms + moistens air

NASAL CAVITY

STRUCTURE

- Space inside of the nose



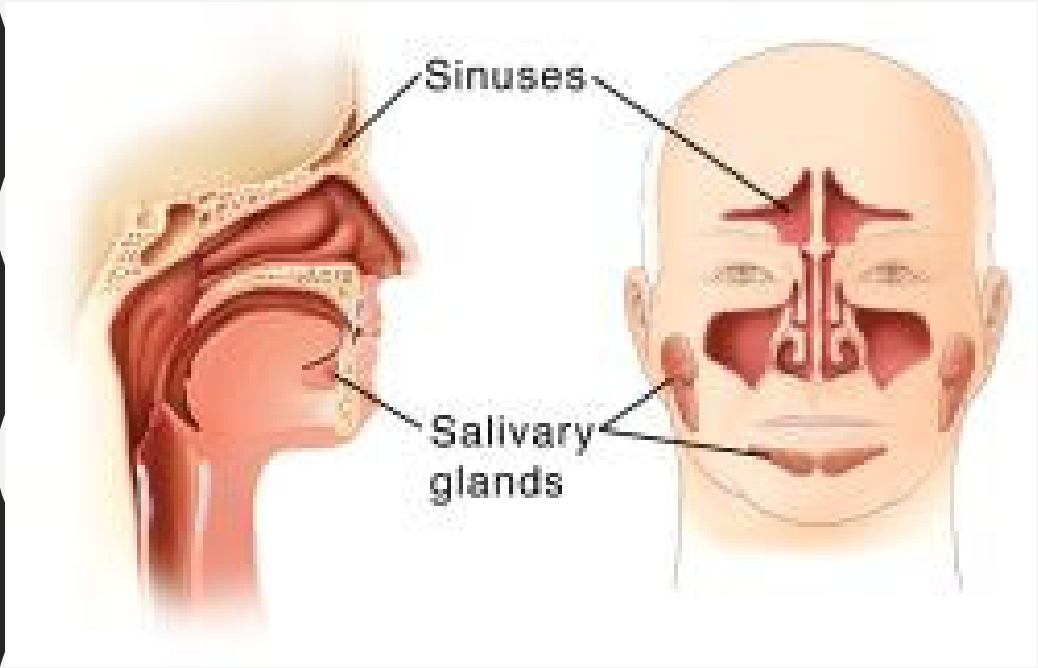
FUNCTION

- Main opening to the respiratory tract
- Warms and moistens air
- Cilia filters out air and mucus traps dust particles

SINUSES

STRUCTURE

- Air filled spaces along side the nose inside the bone



FUNCTION

- Makes mucus that moistens and cleans bacteria and dust out of the air that is breathed in through the nose.

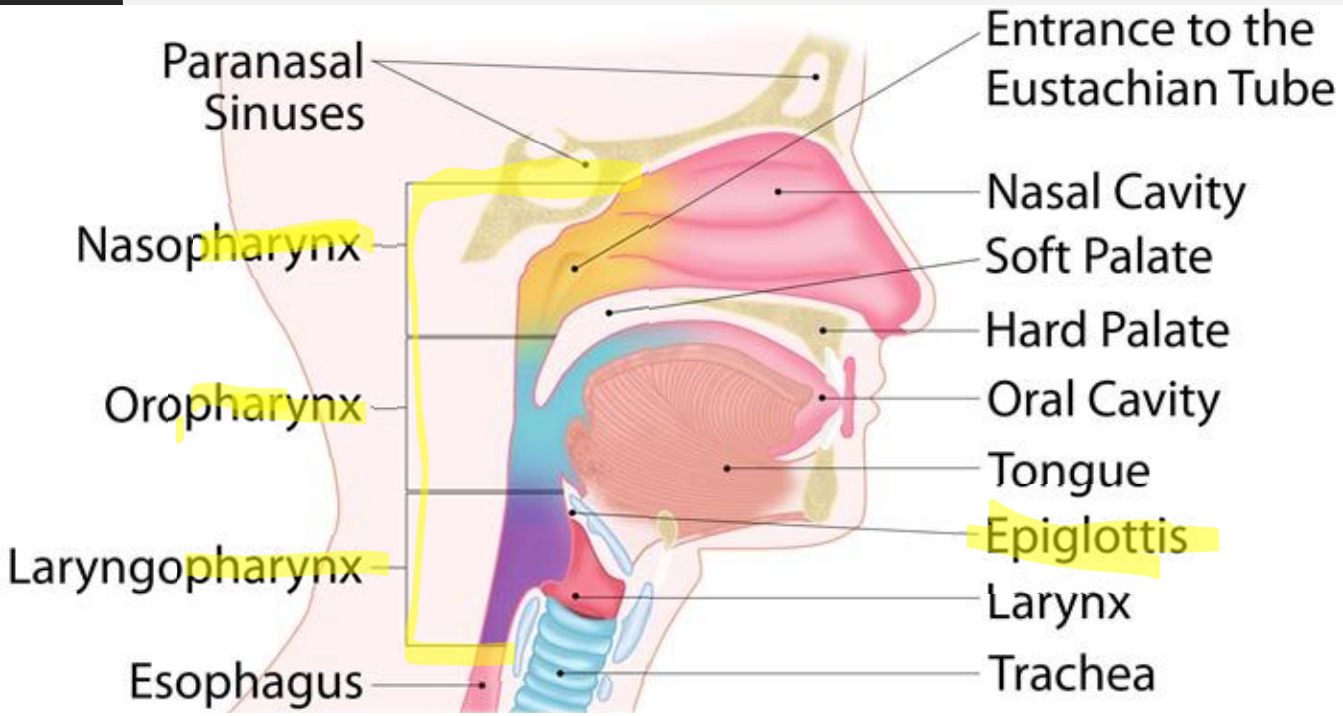
PHARYNX

STRUCTURE

- Space at the back of the oral cavity

FUNCTION

- Funnels air into the trachea
- Location of the epiglottis



aka - throat

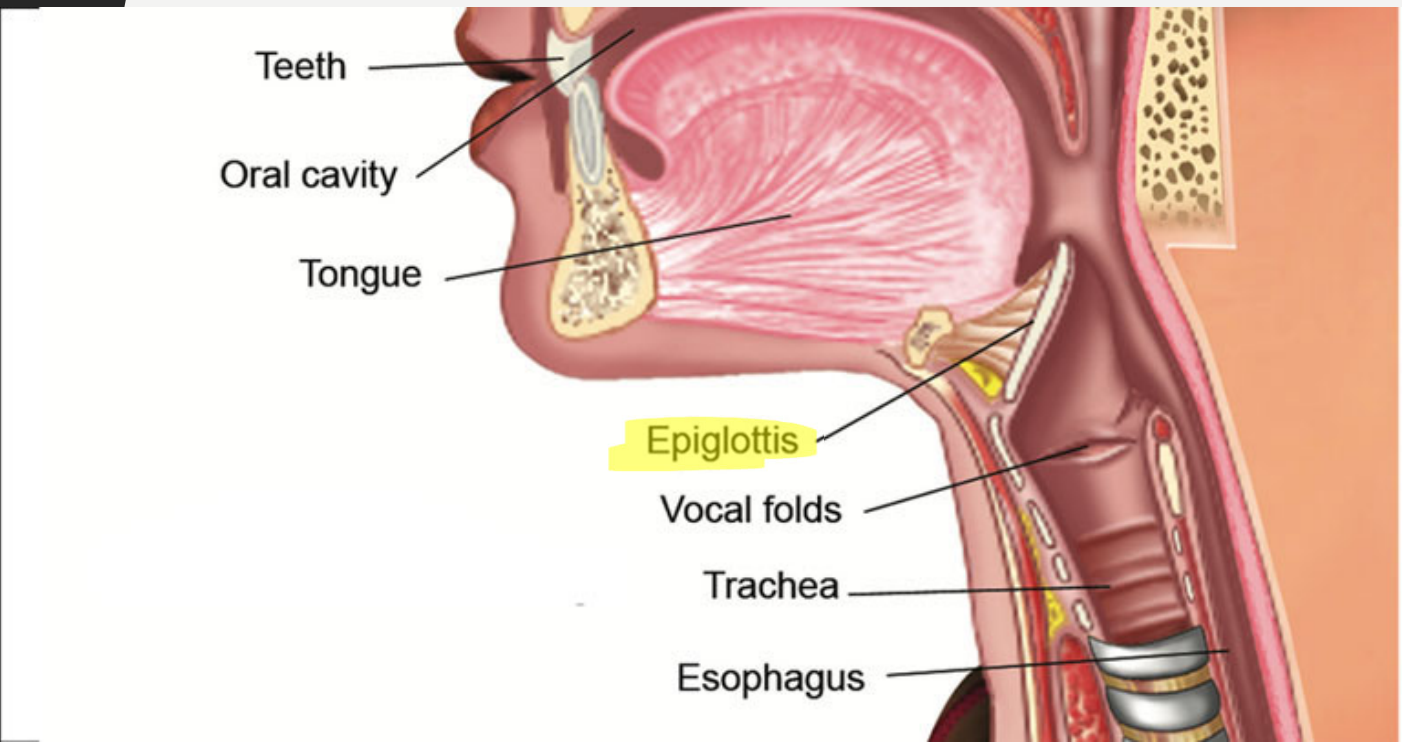
EPIGLOTTIS

STRUCTURE

- Elastic cartilage flap

FUNCTION

- Blocks the trachea when swallowing food or water



LARYNX

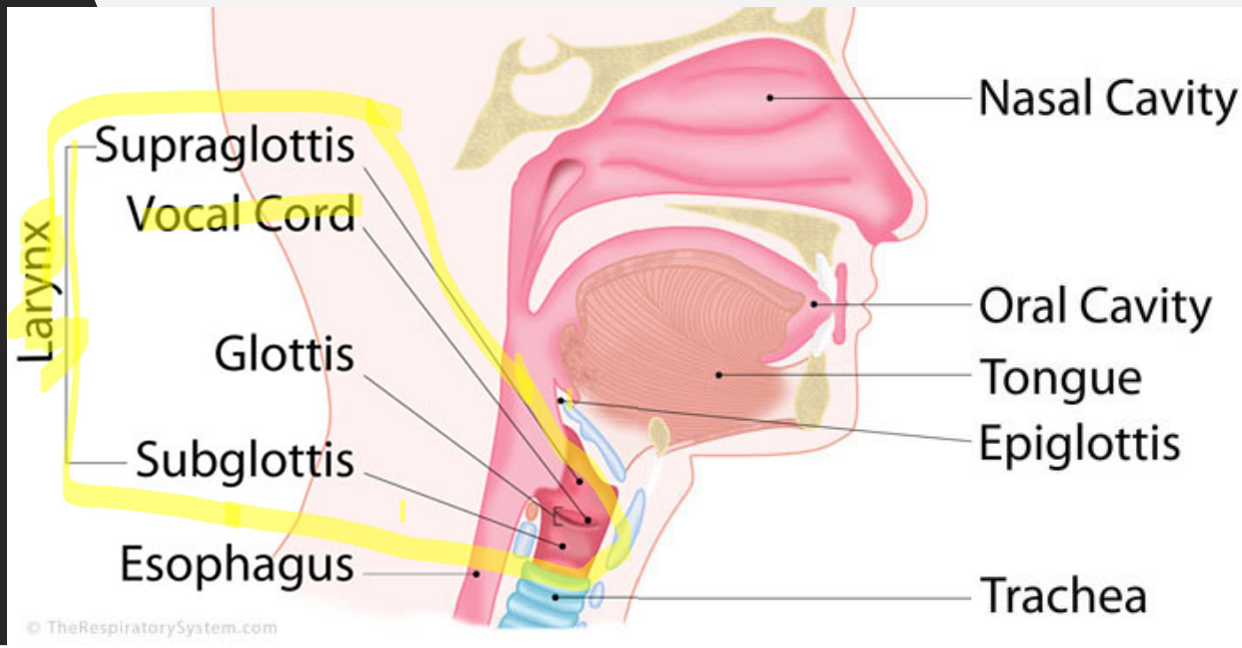
STRUCTURE

- Cartilage structure that contains the vocal folds

FUNCTION

- To house and protect the vocal folds
- Also known as the voice box

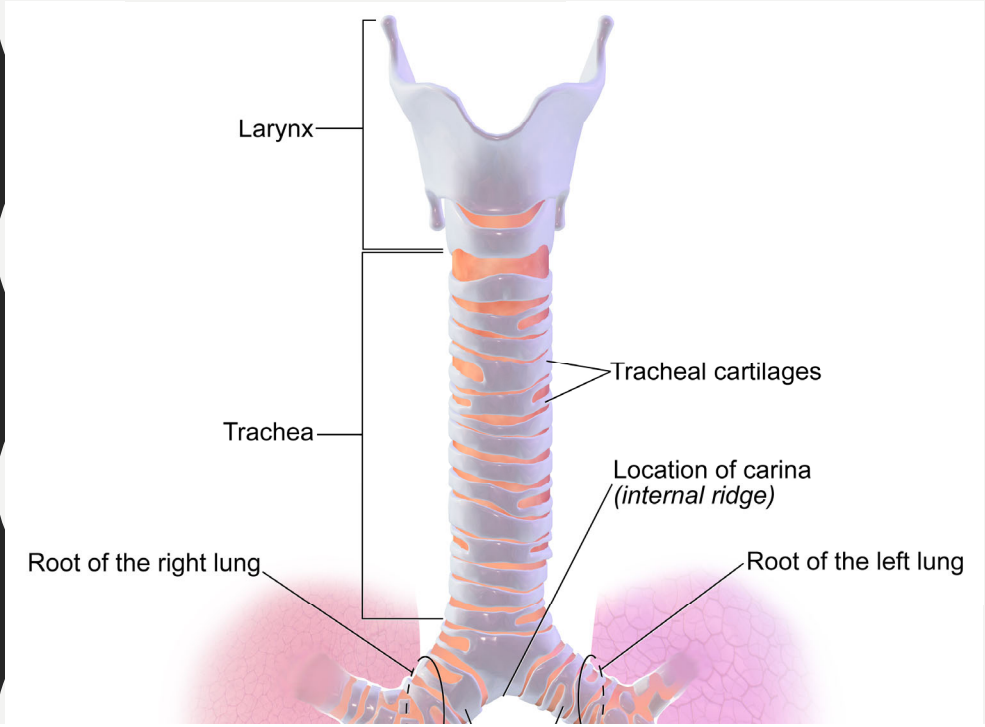
adam's apple



TRACHEA

STRUCTURE

- Made of ridged bands of cartilage rings



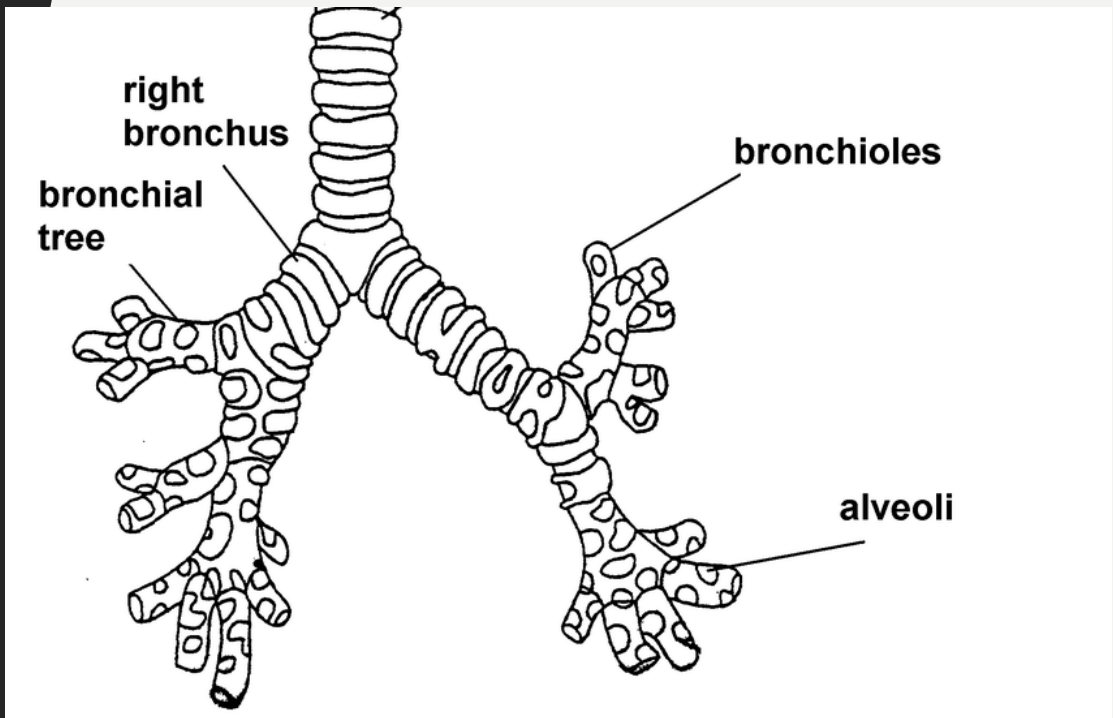
FUNCTION

- Main airway to bring air into and out of the lungs (connects larynx to bronchi)
- Lining produces **mucus** to trap dust and particles, and **cilia** moves mucous towards pharynx, so it can be swallowed and digested.
- Also known as the windpipe

BRONCHI

STRUCTURE

- Two branches from the trachea



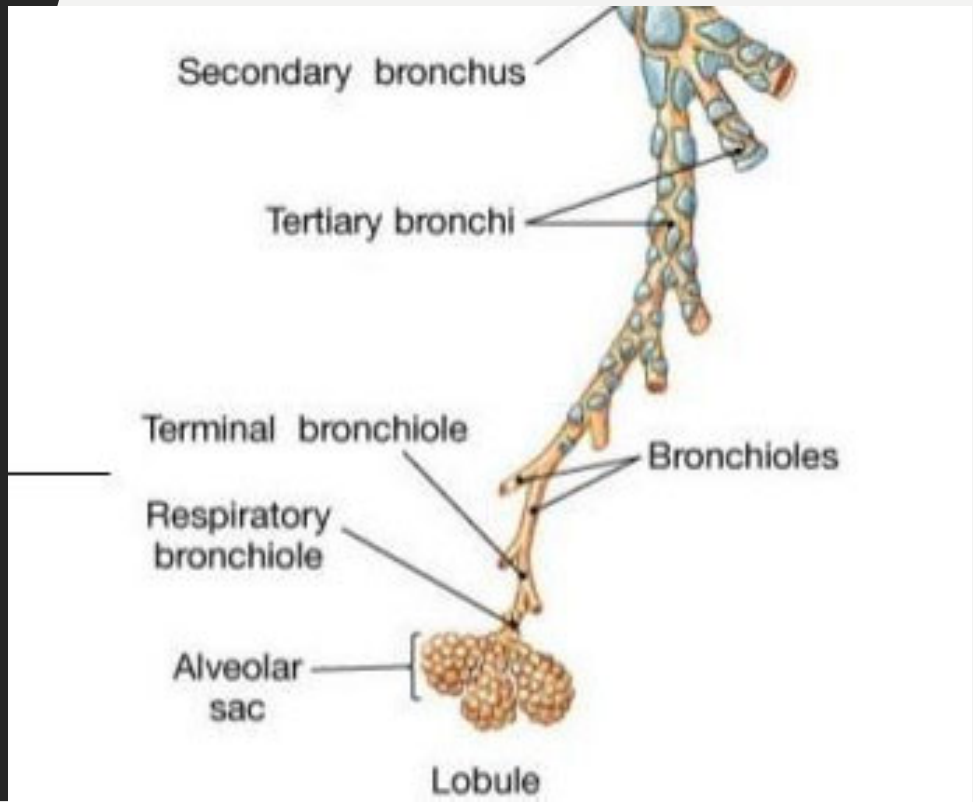
FUNCTION

- Brings air into and out of each lung
- Smooth muscle tissue inside allows control of airflow

BRONCHIOLES

STRUCTURE

- Smaller branches of bronchi



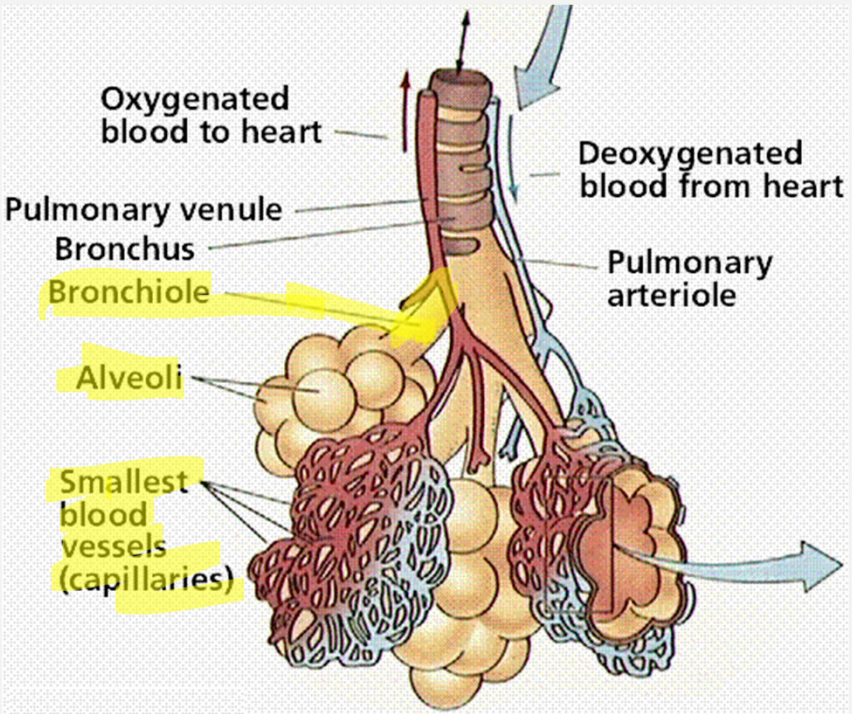
FUNCTION

- Continue to carry air to or from the alveoli
- More flexible than bronchi and can contract more

ALVEOLI

STRUCTURE

- Tiny air sacs surrounded by capillaries



FUNCTION

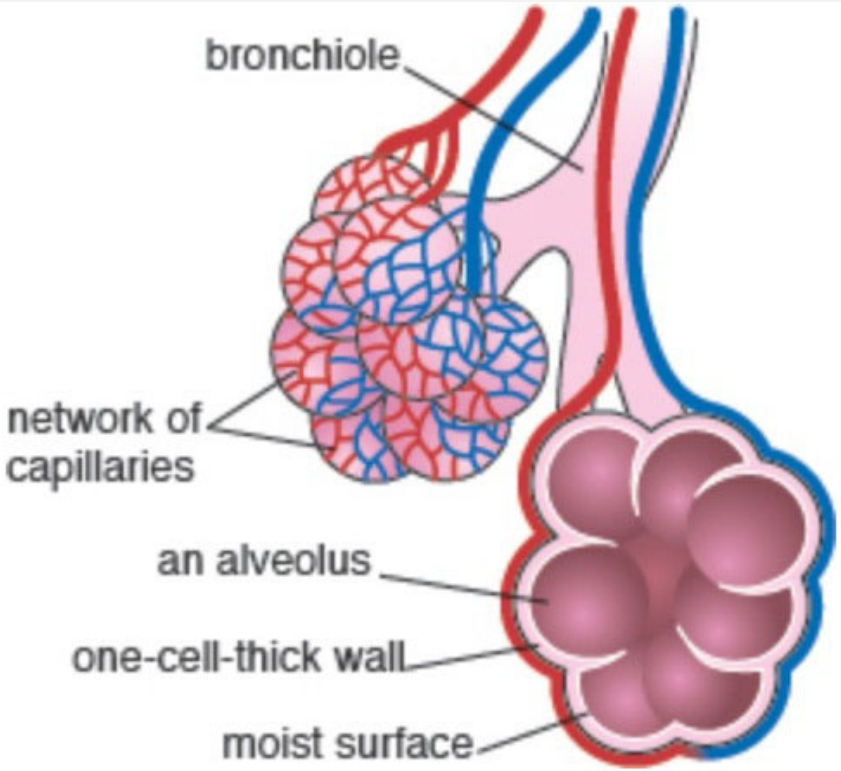
external resp.

- Actual site of gas exchange from the environment to the blood
- Oxygen transferred into the blood stream, and carbon dioxide transfers out to be exhaled

PULMONARY CAPILLARIES

STRUCTURE

- Thin blood vessels (one cell thick)



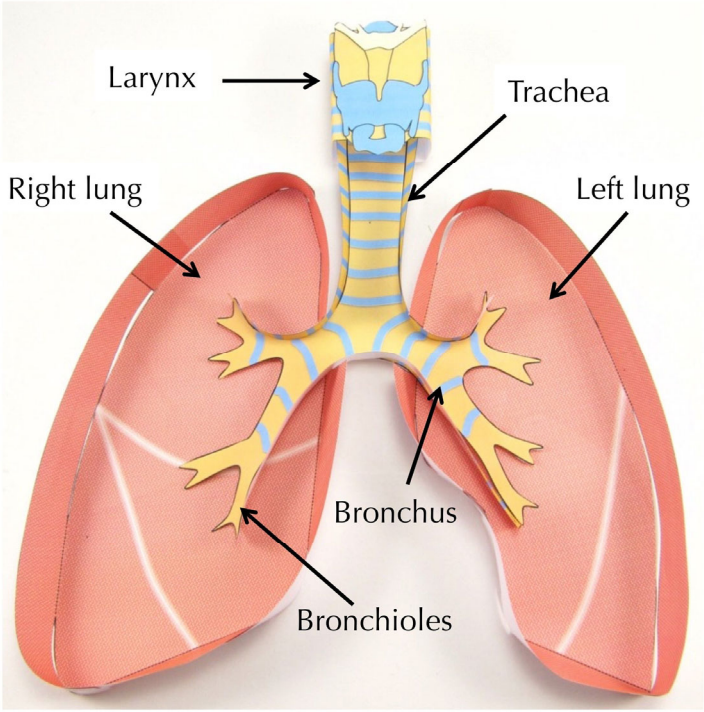
FUNCTION

- Brings deoxygenated blood to lungs, and brings oxygenated blood away from lungs

LUNGS

STRUCTURE

- Spongy organs that surround heart



FUNCTION

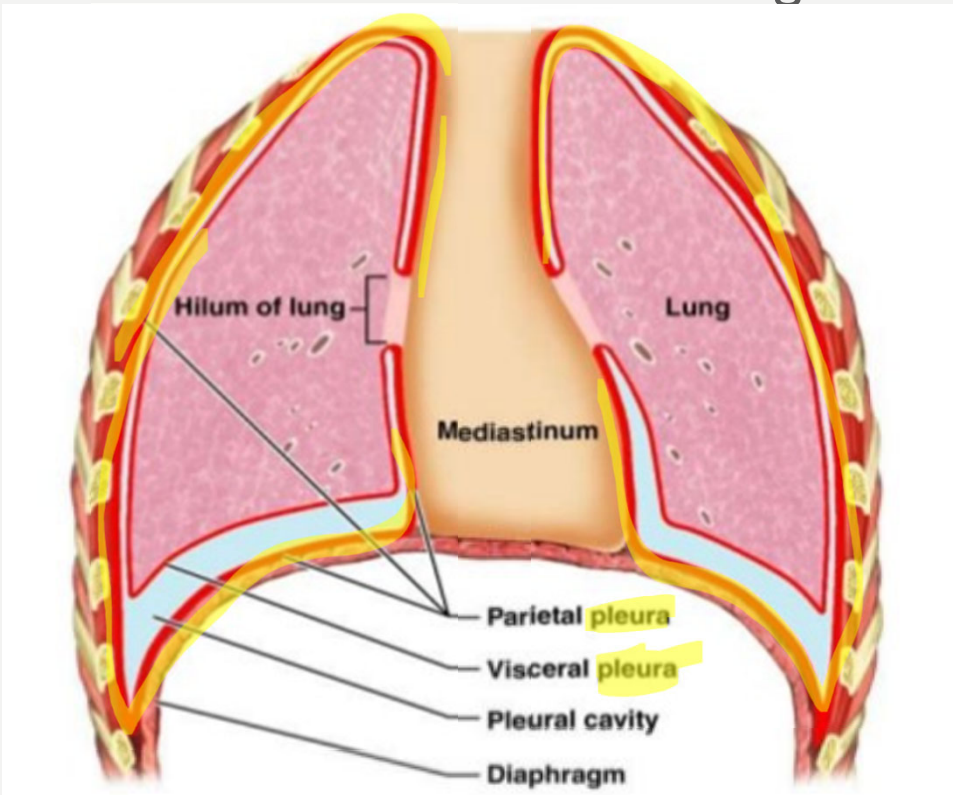
- Site of external respiration (gas exchange)

left lung is smaller than the right (over the heart)

PLEURA

STRUCTURE

- Membrane that encases lungs



FUNCTION

- Creates a negative pressure space relative to the body's exterior to allow air to passively fill the lungs

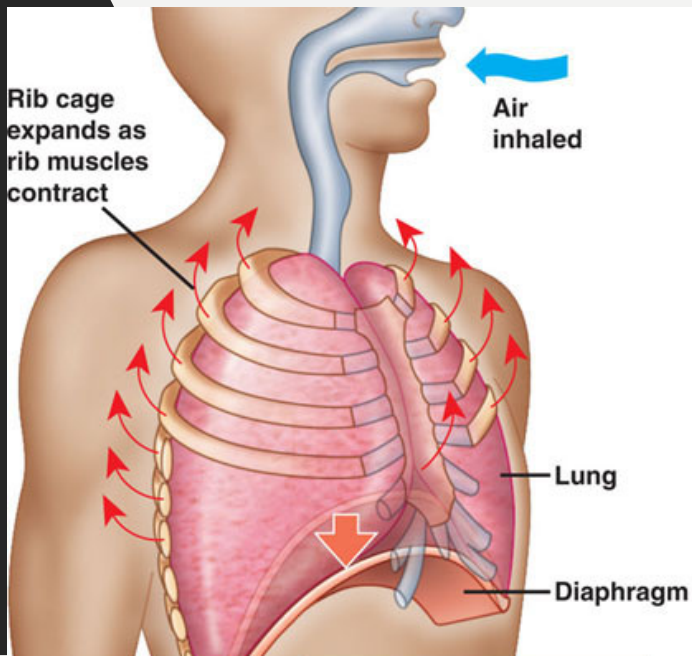
DIAPHRAGM

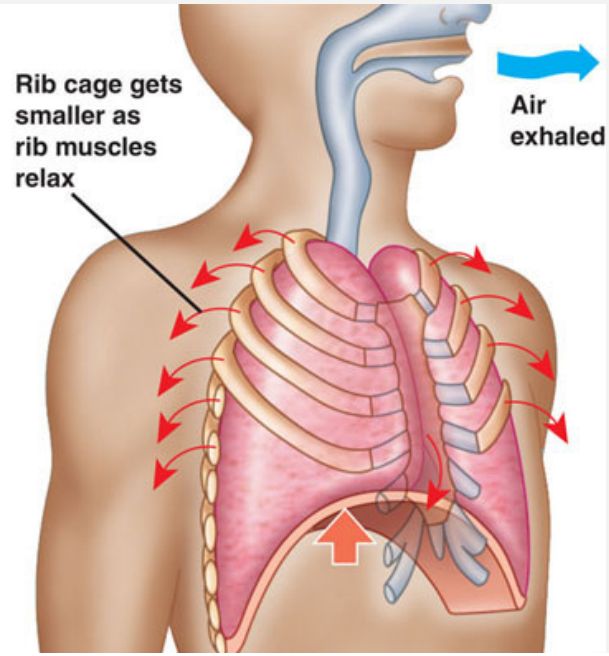
STRUCTURE

- Thin sheet of muscles under the lungs and ribs

FUNCTION

- When the diaphragm contracts it expands the space in the chest, which draws air into the lungs.
- When the muscles relax, the space shrinks and air is exhaled.

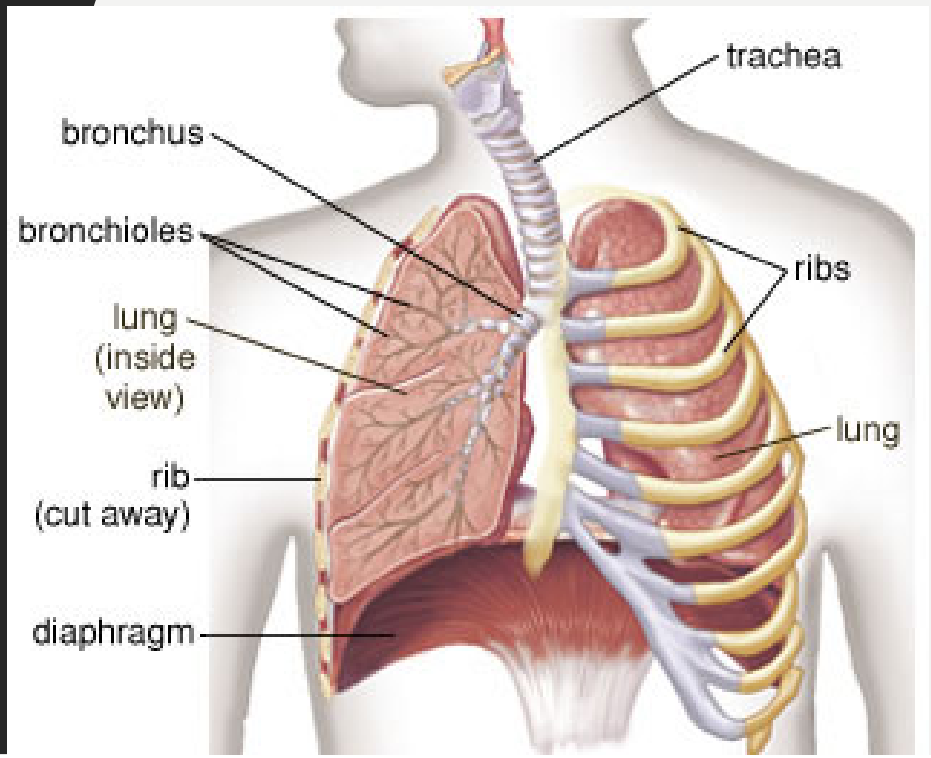




RIBS

STRUCTURE

- Bones that create the chest cavity



FUNCTION

- Protects the lungs
- Supports the muscles needed for respiration
- Expands and contracts with the muscles to control respiration

INTERCOSTAL MUSCLES

STRUCTURE

- Layers of muscles in between ribs.

FUNCTION

- Assist the diaphragm in expanding and compressing the lungs.