



Respiratory System

Breathe in....breathe out....

Respiratory System

- Why do we need to breathe?

Cellular Respiration!



Cellular Respiration

- The process of breaking down food molecules with the help of oxygen to produce carbon dioxide and water
- This process also releases energy (ATP) that can be used by the cell

Cellular Respiration

■ Cellular Respiration:



Cellular Respiration

- We need to breathe in order to take in oxygen to help us break down sugars and release energy
- And breathing out helps us get rid of CO₂ (waste)

Water is also considered a waste in this case!

Metabolism

- **Metabolism**

- *Your metabolism is the whole set of chemical transformations that take place in cells that keep you alive*

Metabolism

- *This includes:*
 - *Converting food to energy (cellular respiration)*
 - *Converting food into their building blocks (digestion)*
 - *Removal of nitrogenous wastes (excretory system)*

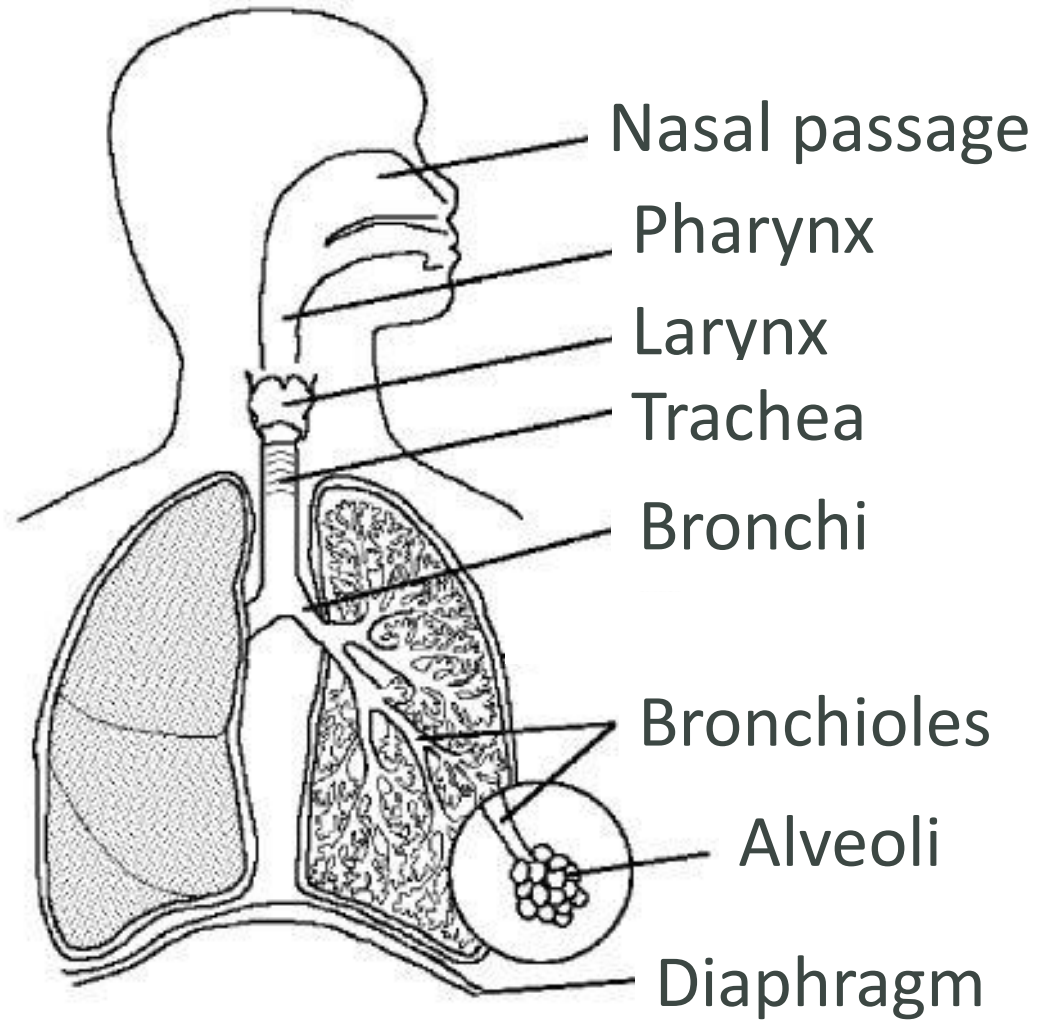
Respiratory System

- How does breathing work?
How does air enter the lungs?

First... let's take a look at the parts!

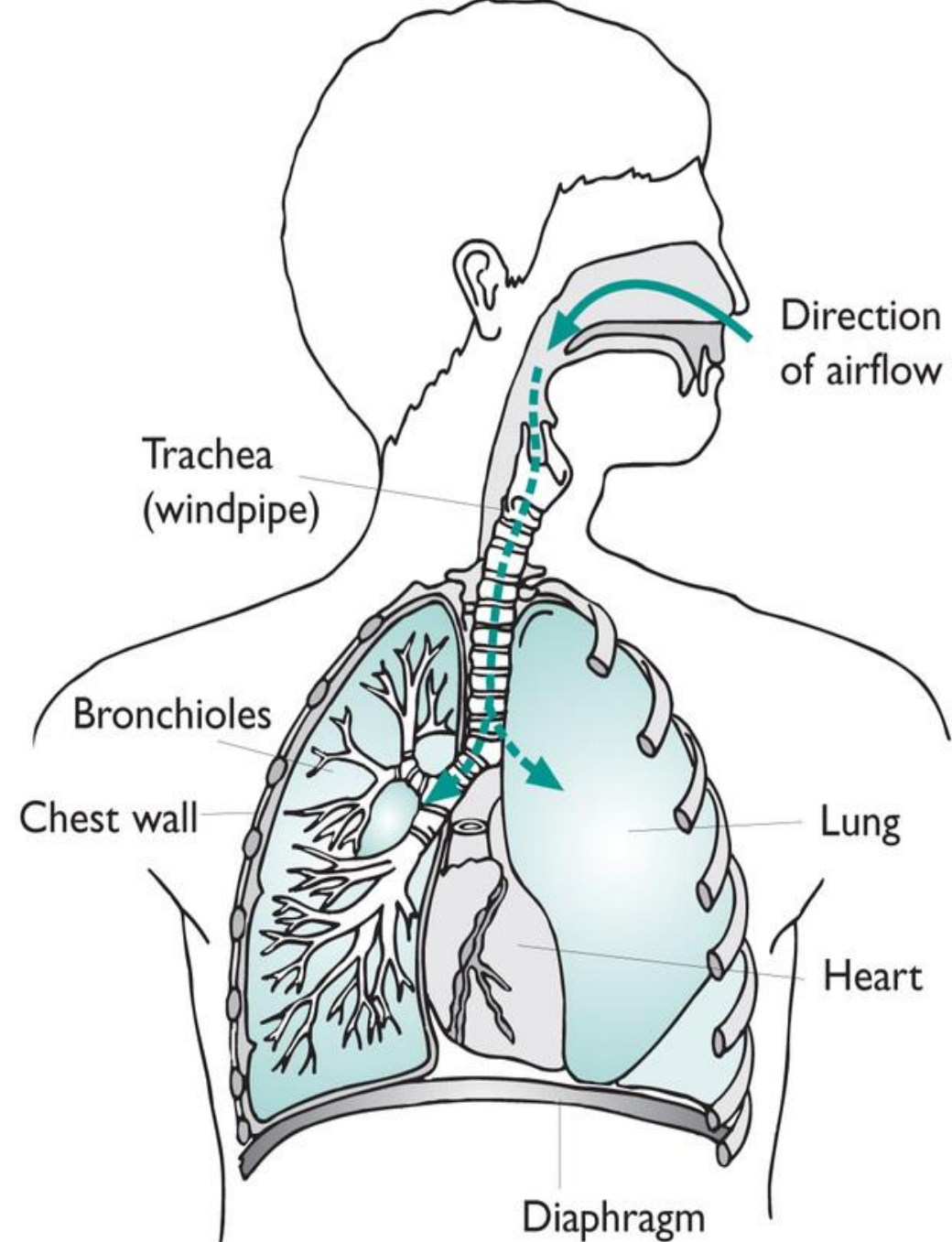
Respiratory System

Respiratory System



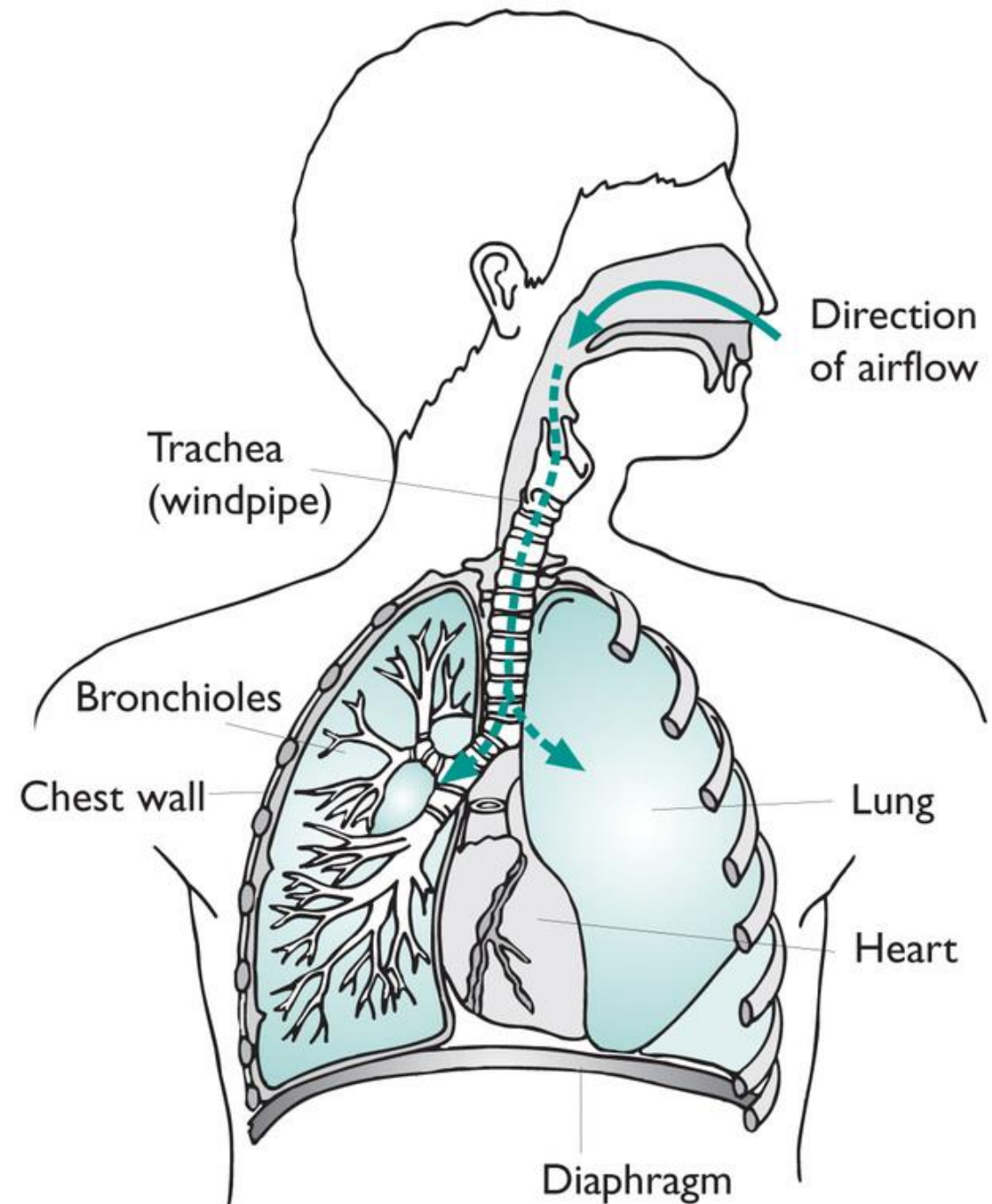
Respiratory System

- What is the pathway for air entering the lungs?
 - Nose (mouth) → Pharynx → Larynx
→ Trachea → Bronchi → Bronchioles
→ Alveoli



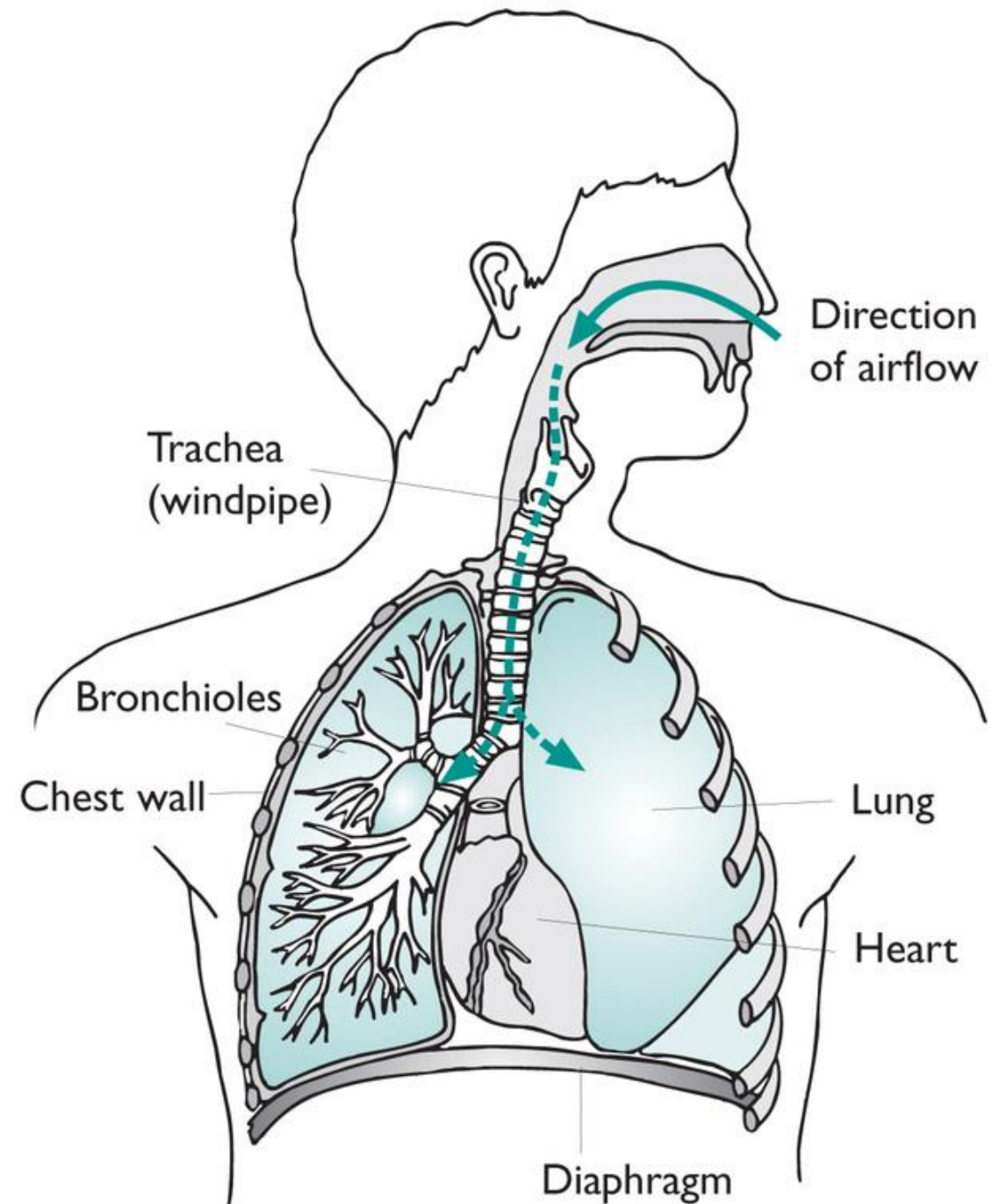
Respiratory System

- What do these parts do?
 - Nostril
 - Opening to respiratory system
 - Mouth
 - Secondary opening to respiratory system



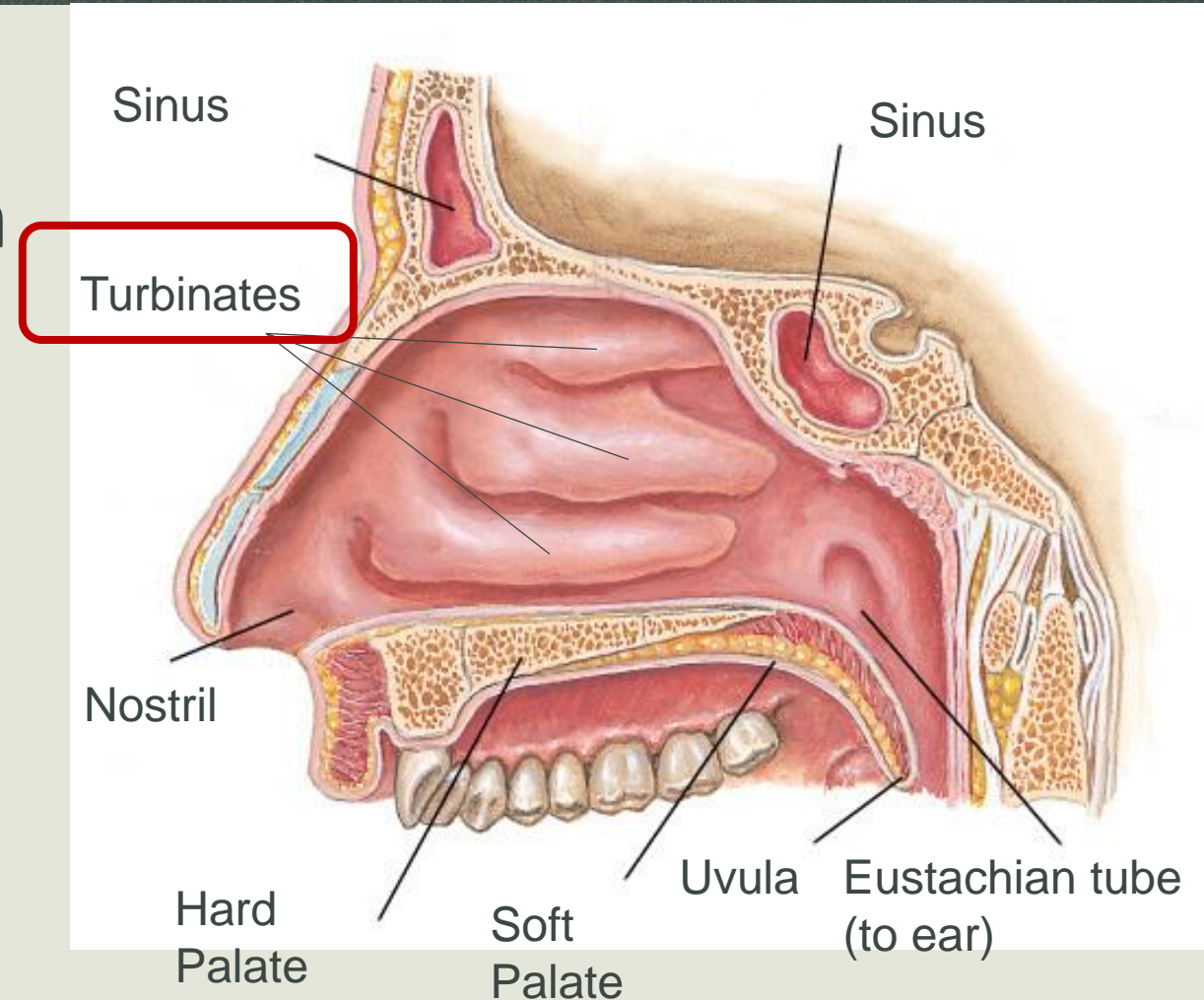
Respiratory System

- Nasal Cavity
 - Warms and moistens the air
 - Hairs (cilia) and mucus trap dirt and unwanted particles



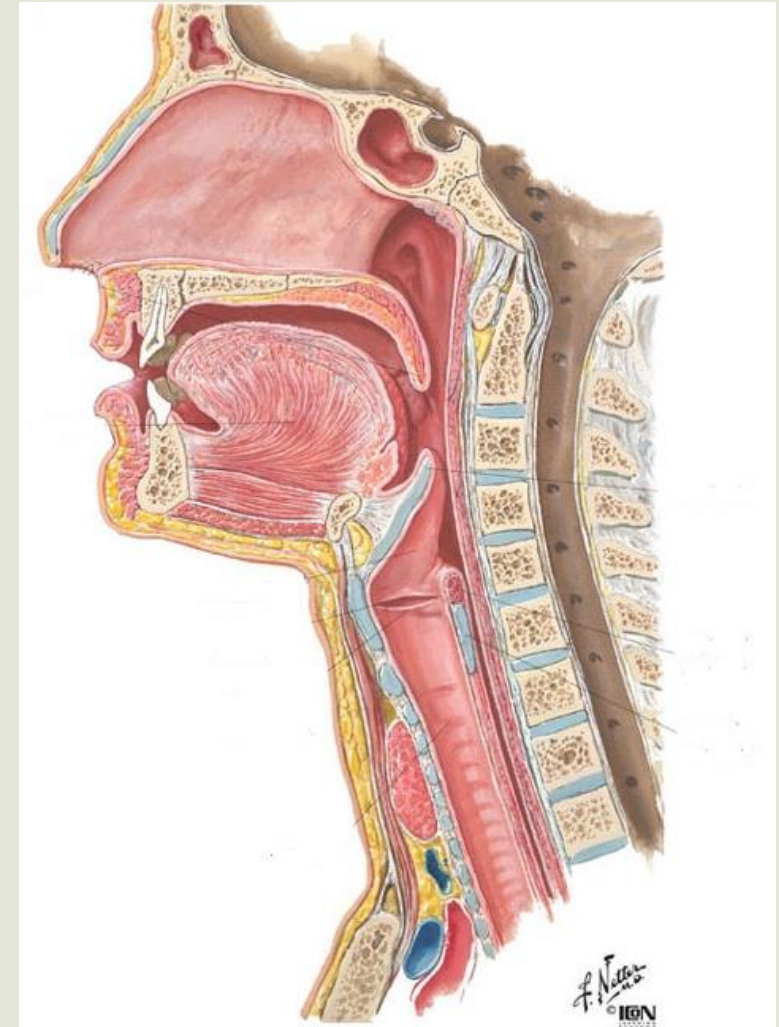
Respiratory System

- Turbinate bones
 - Increase the **surface area** in nasal cavity and bring the blood close to the air
 - This **helps to warm and moisten** (humidify) the air before it enters the lungs



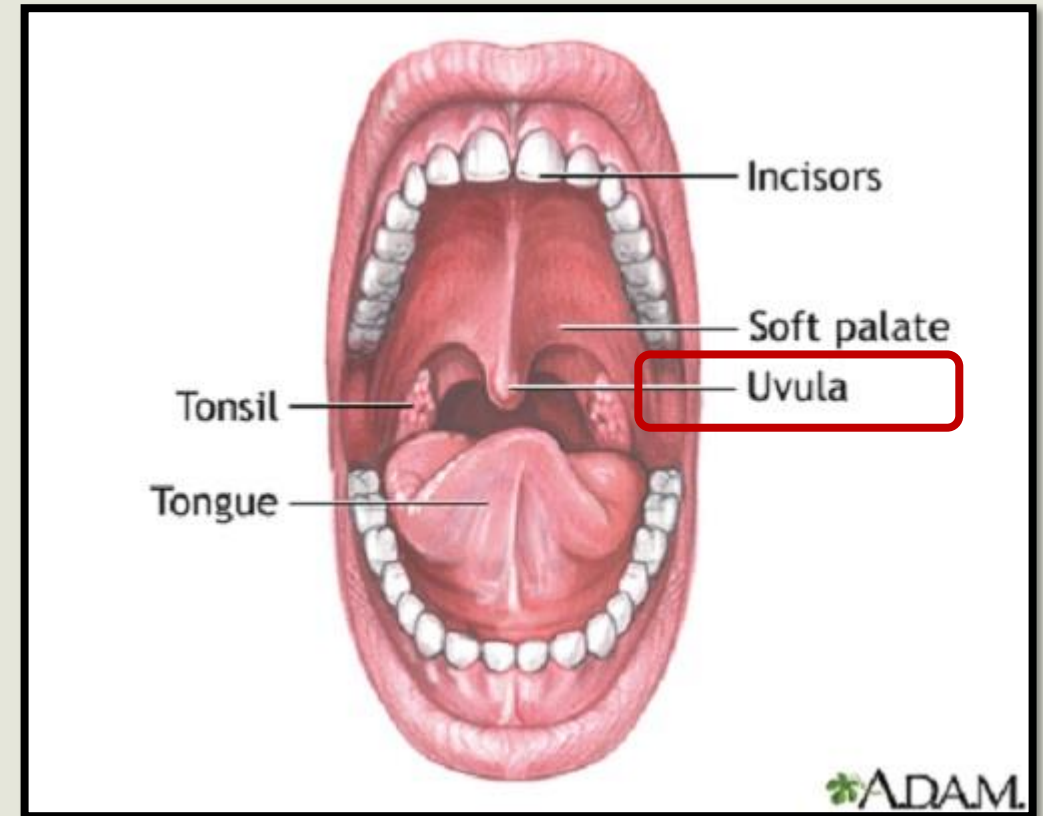
Respiratory System

- Pharynx
 - The area that is open to both the mouth and nose.
 - It's the place where food and air cross over.
 - *Shared by the digestive and respiratory systems!*



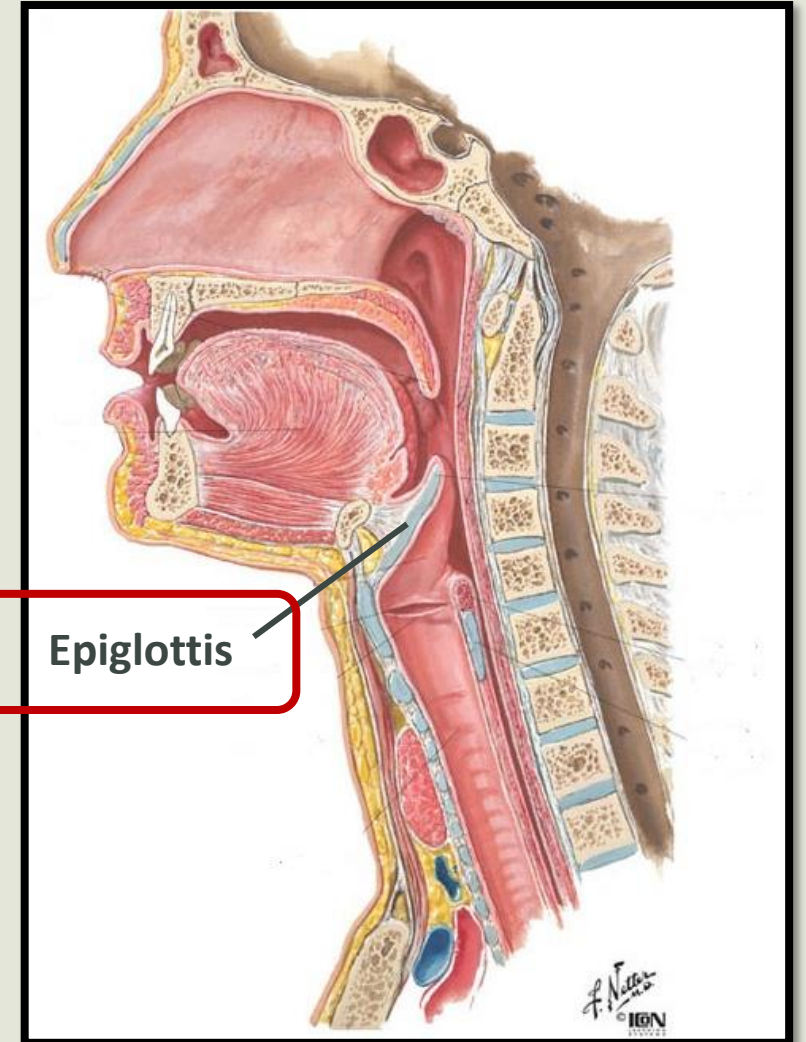
Respiratory System

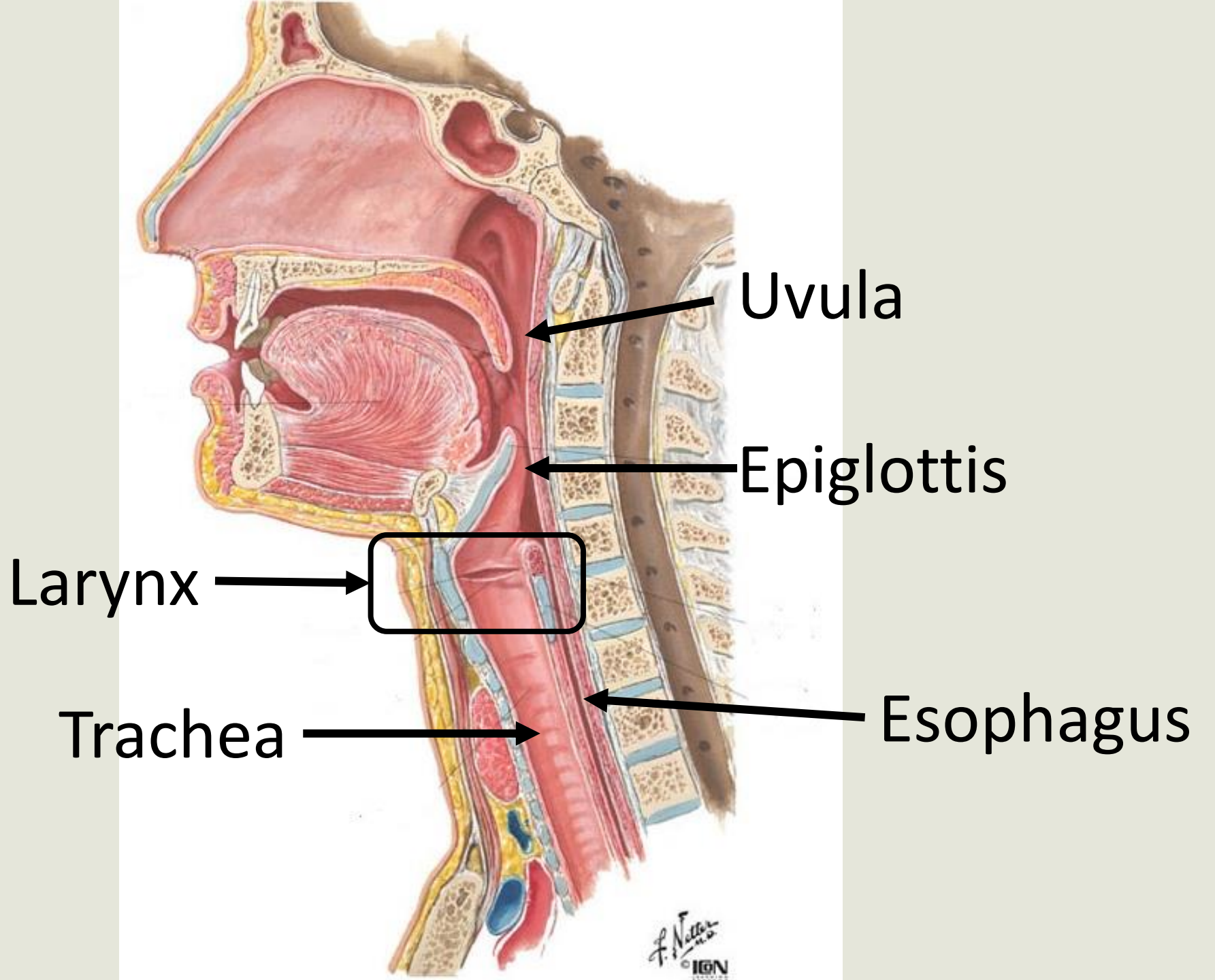
- Emergency flaps
 - Uvula
 - Closes off access to the nasal cavity when you swallow so food doesn't go up your nose!



Respiratory System

- Emergency flaps
 - Epiglottis
 - Closes off the trachea when you swallow so food doesn't go down the lungs

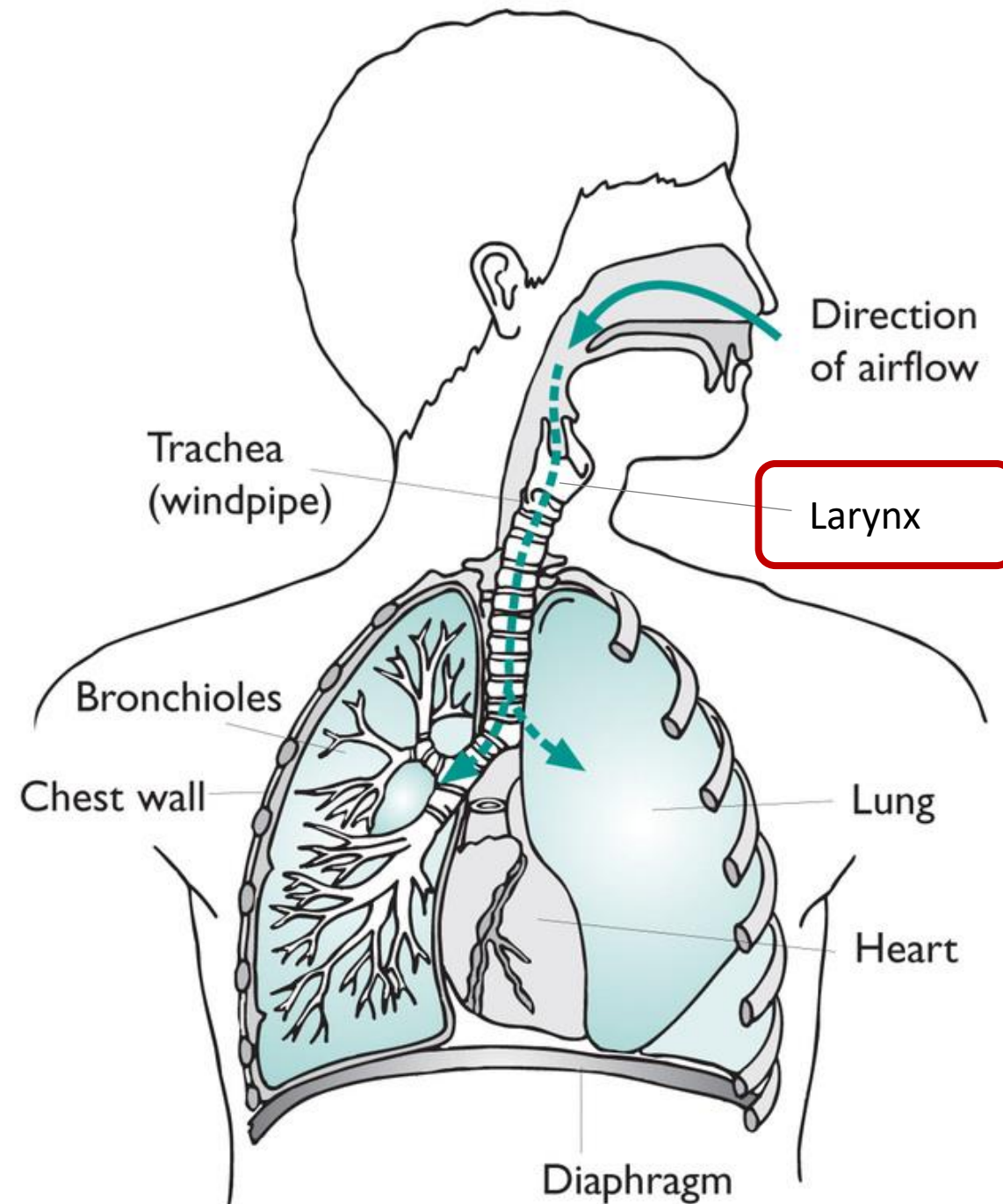




Respiratory System

■ Larynx

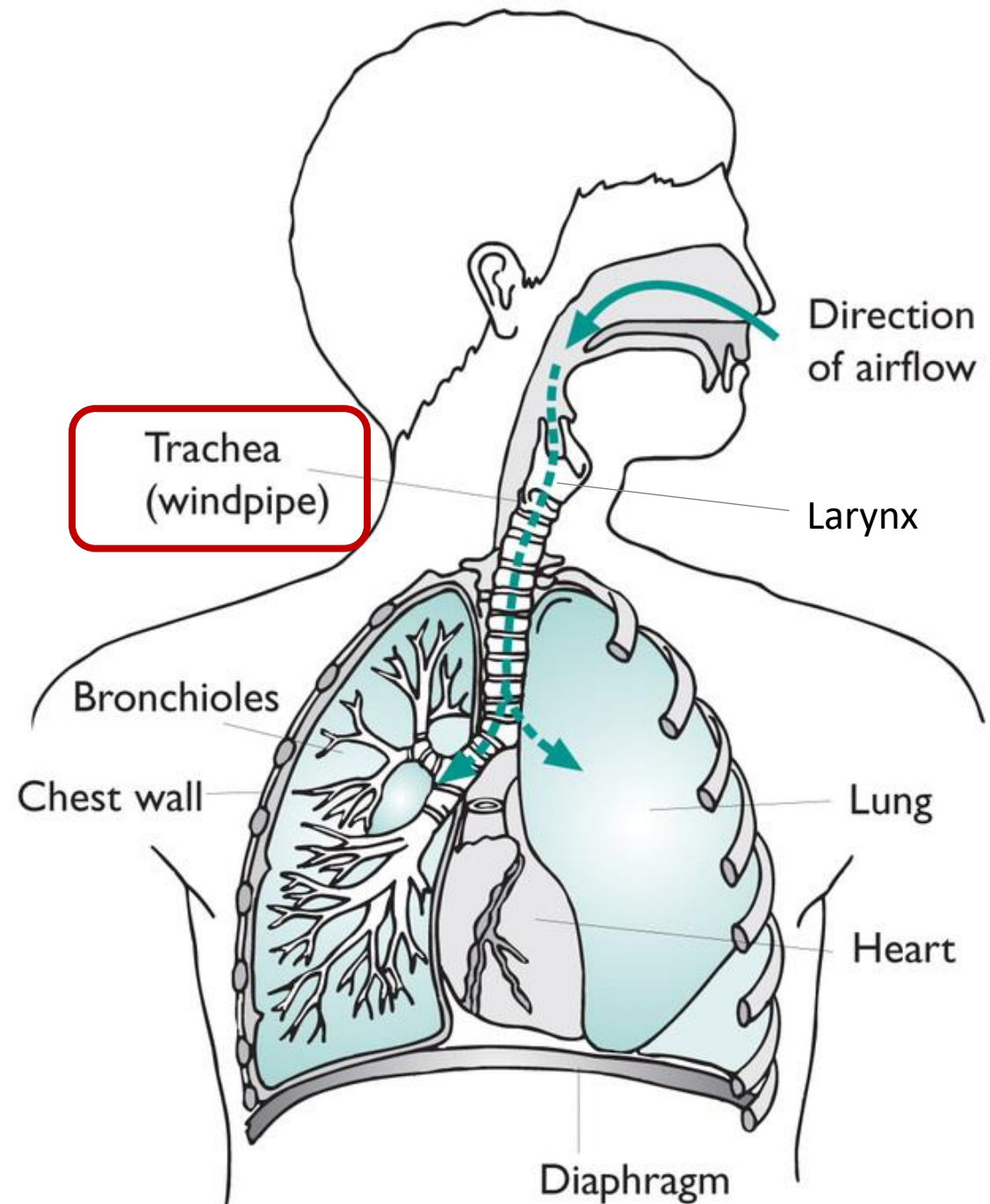
- Is the top of the trachea which contains the vocal chords.
 - These vibrate when air passes through them and make sound!
- Men have longer vocal chords (Adam's apple) → deeper voice



Respiratory System

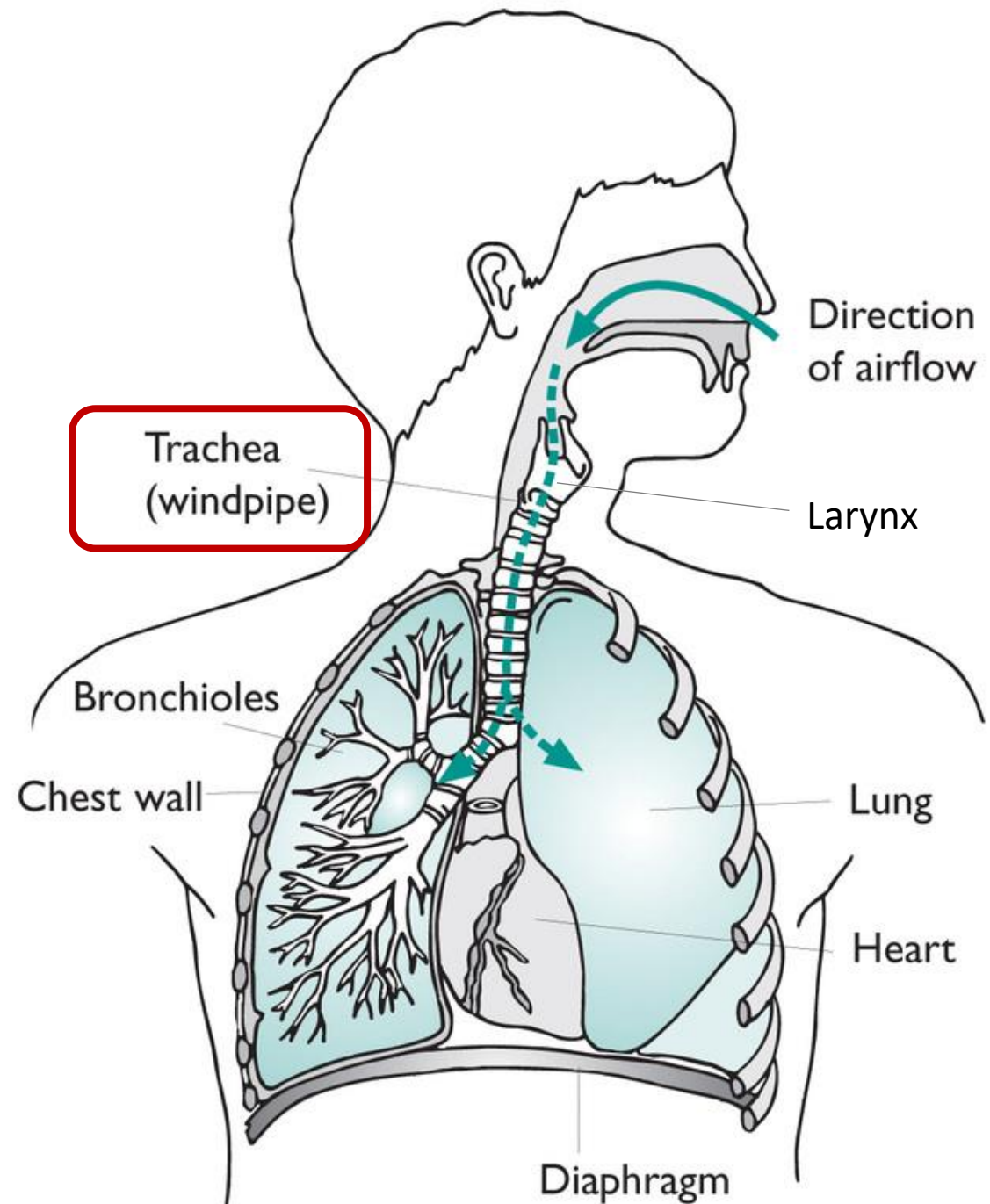
■ Trachea

- Is an open tube surrounded by cartilaginous rings.
 - These rings keep it open.
- It carries air down to the lungs.



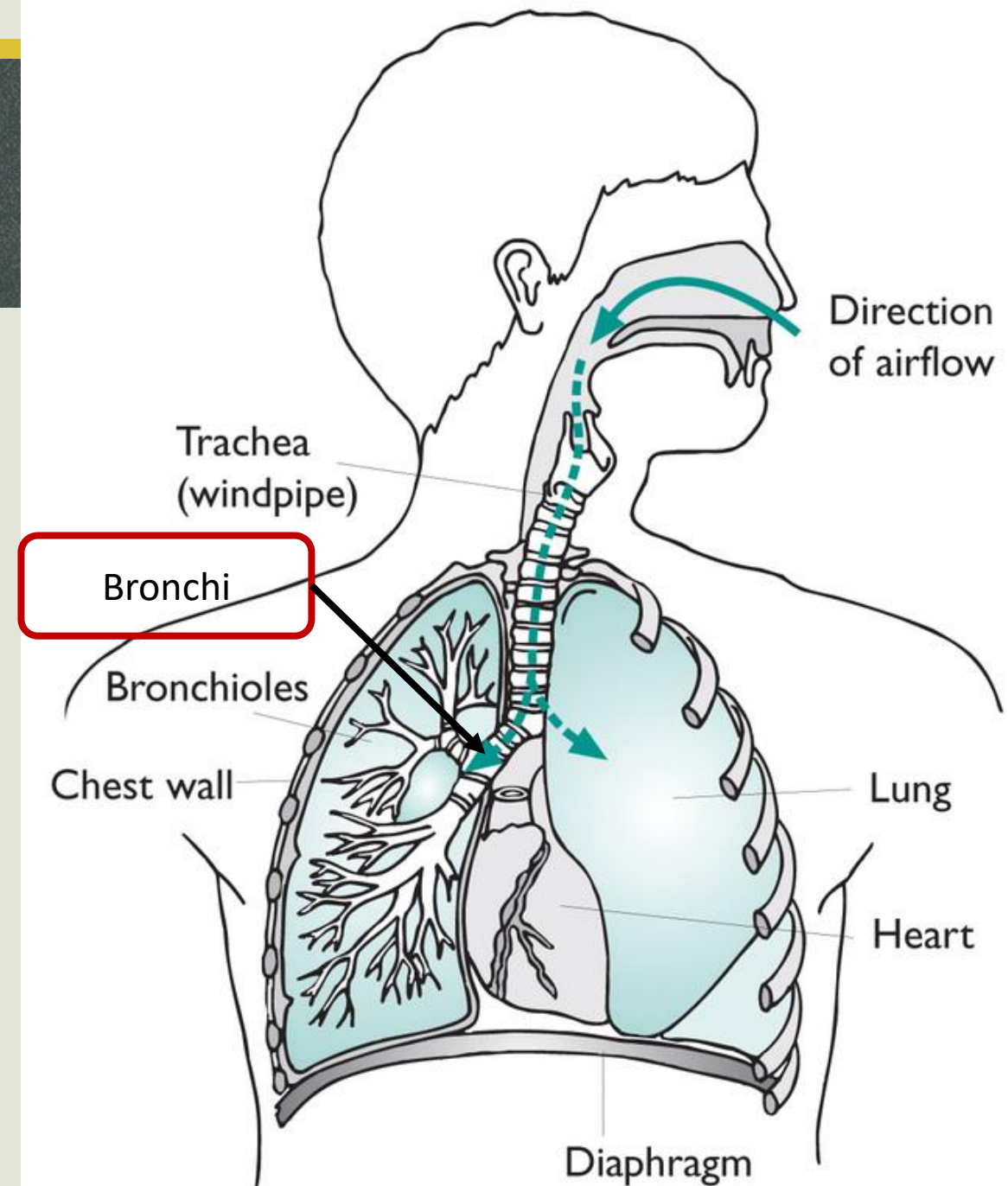
Respiratory System

- It's lined with mucus and little cilia to catch and brush out the dirt.



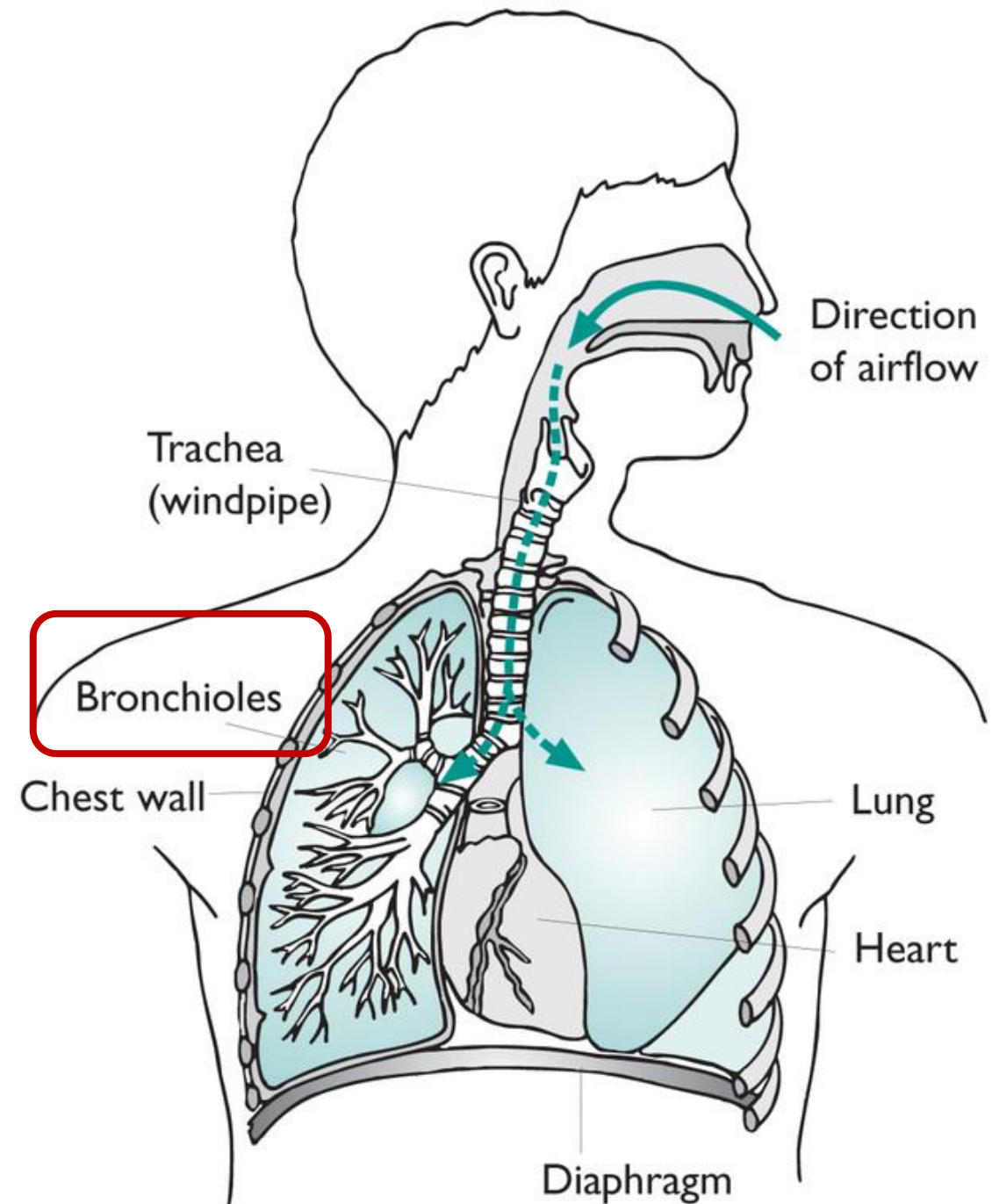
Respiratory System

- Bronchi
 - Two open tubes, built and protected like the trachea, that divide and carry air to each lung



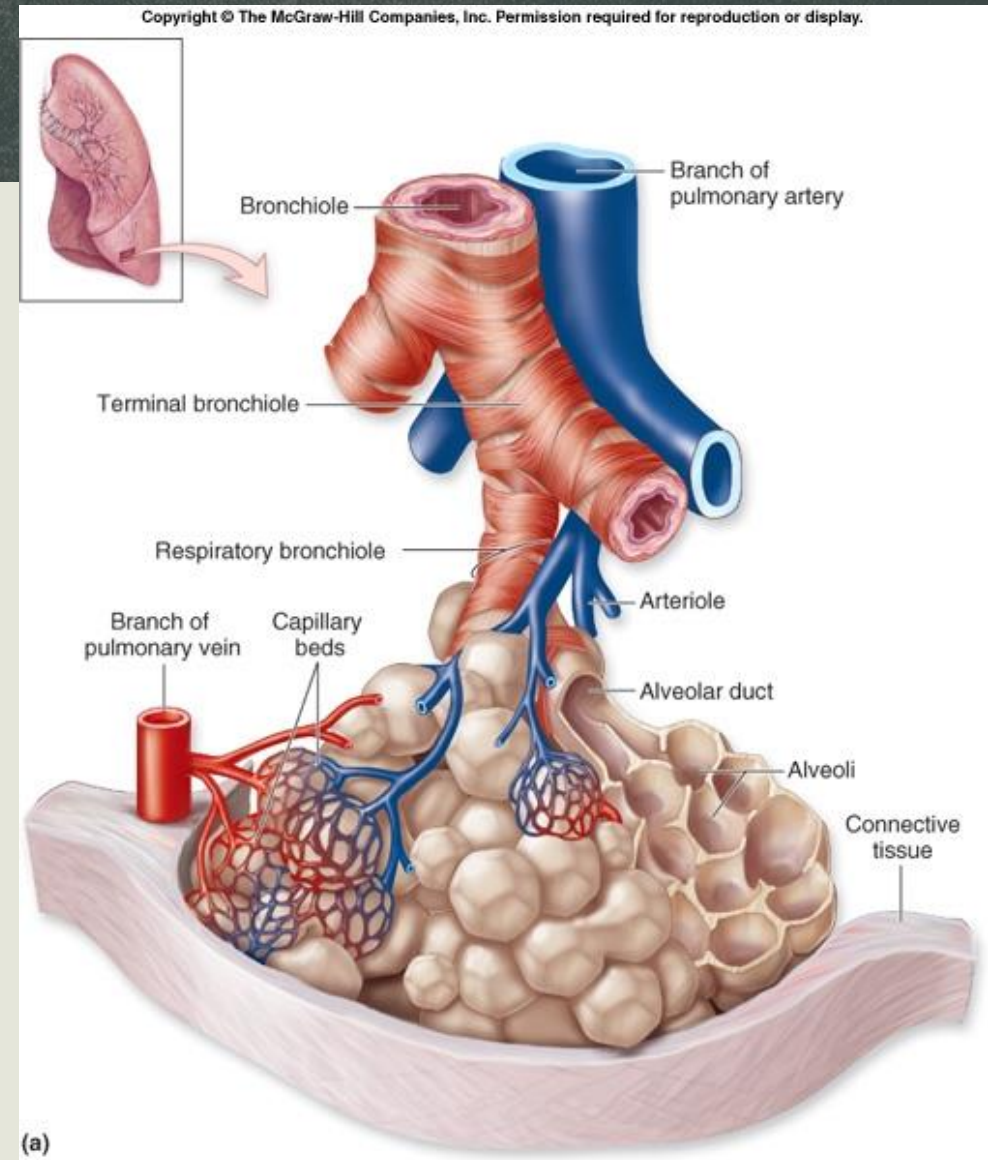
Respiratory System

- Bronchioles
 - The bronchi **branch out** into tiny branches like an upside down tree.
 - They **distribute the air** all through the lungs



Respiratory System

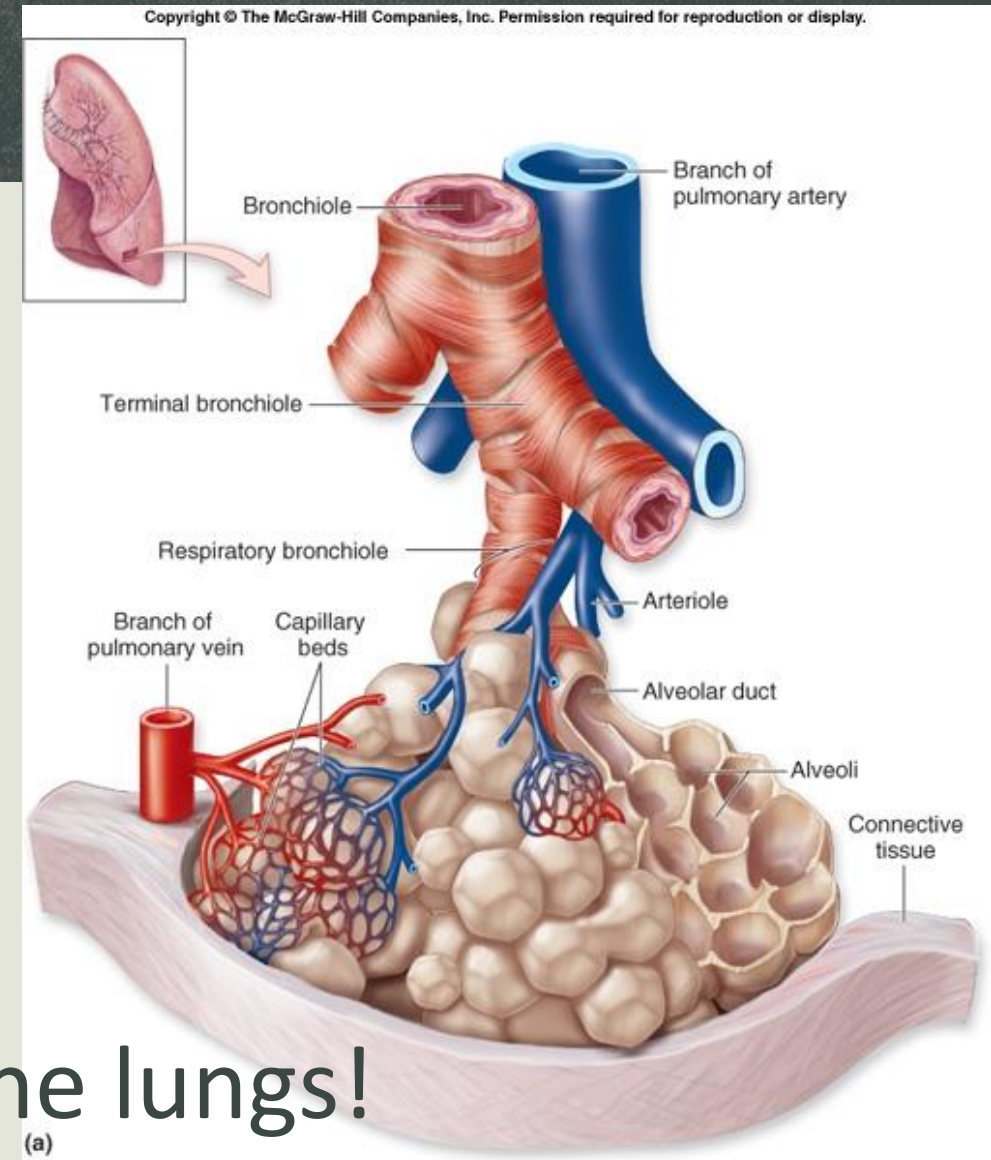
- Alveoli
 - Are **millions of air sacs**, like tiny bunches of grapes, at the end of the bronchioles.



Respiratory System

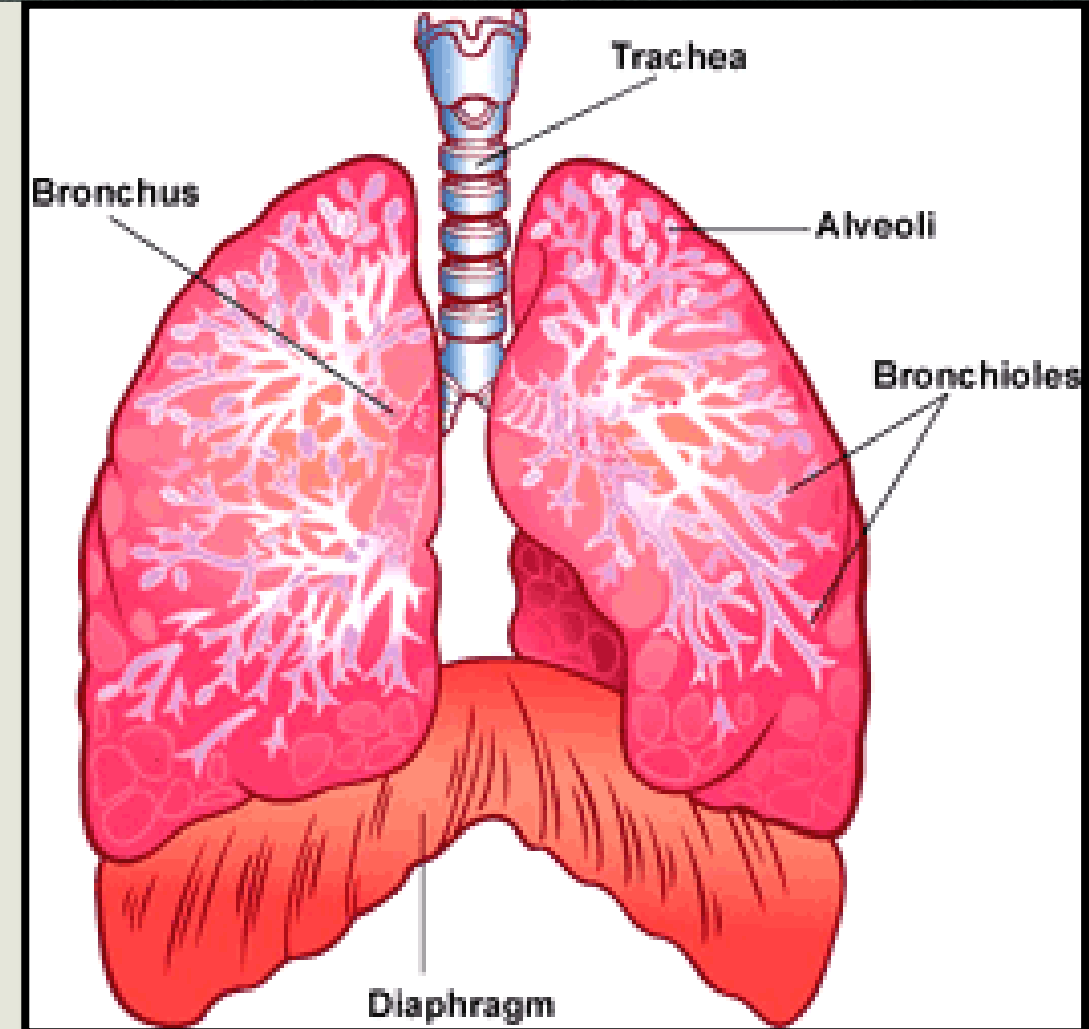
- They are surrounded by blood vessels (capillaries)
 - This is where gas exchange occurs through the process of diffusion. Oxygen moves into the blood and carbon dioxide moves out of the blood.

These are the functional units of the lungs!



Respiratory System

- Lungs
 - The organs that are made up of the alveoli
 - Note: the 2 lungs are NOT identical
 - The left one is somewhat smaller to make space for the heart

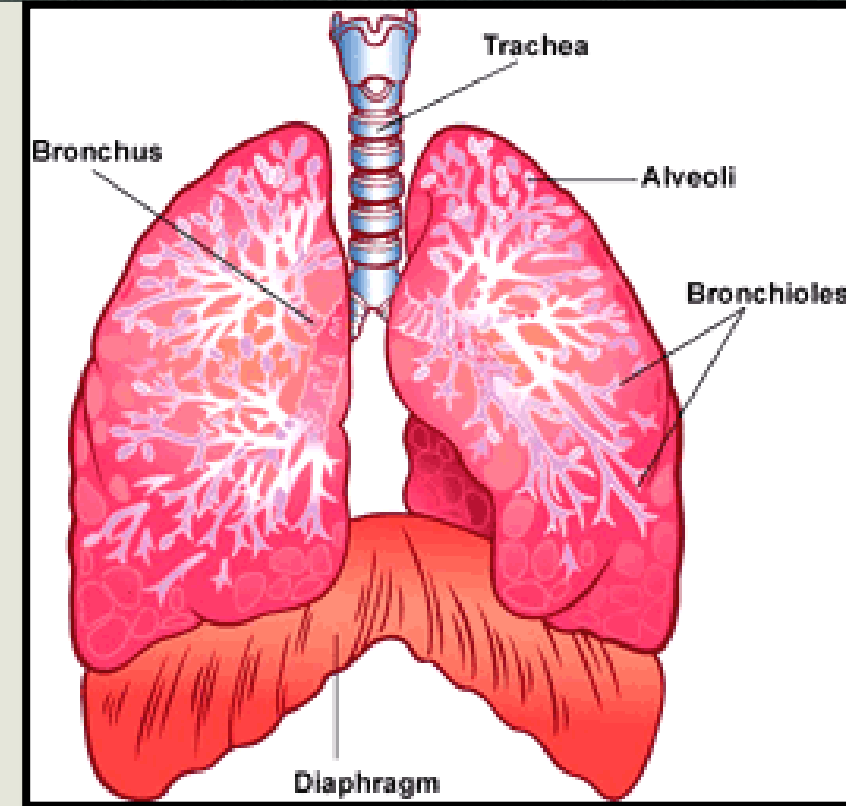


Respiratory System

We'll come back to this again later...!

- Diaphragm

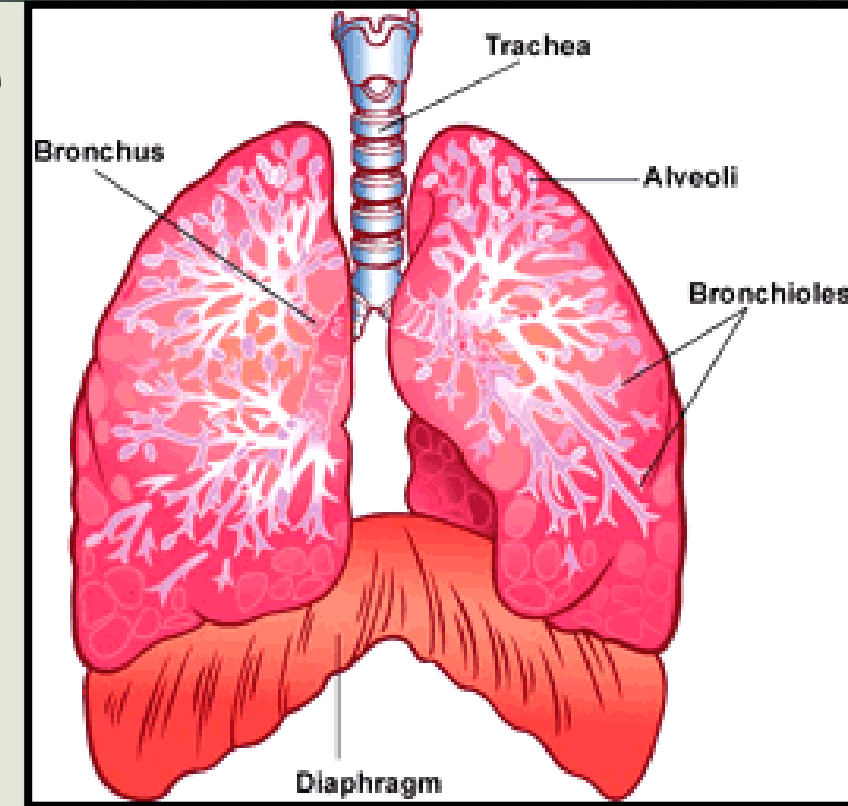
- sheet of muscle extending across the bottom of the rib cage



Respiratory System

We'll come back to this again later...!

- When it contracts, it lowers into the abdomen
 - this lowers the pressure in the lungs to suck in air
- When it relaxes, it rises back up under the ribs
 - This increases the pressure and forces the air out



Respiratory System

- How does breathing work? How does air enter the lungs?

First... we need to understand fluids!

But that is for another day....