

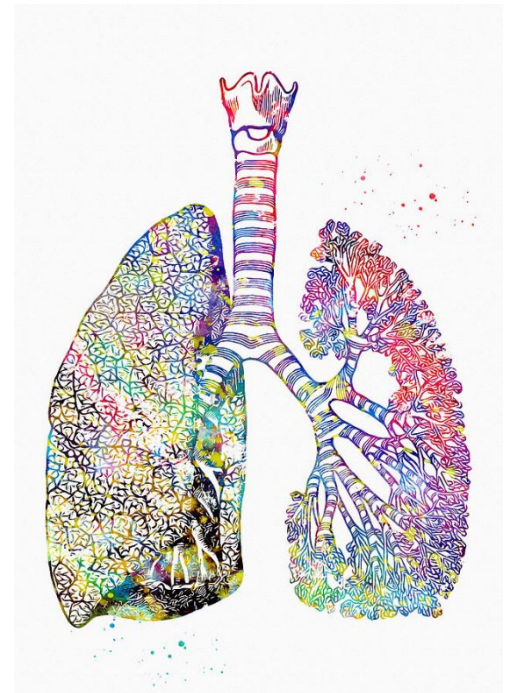
Anatomy and Physiology



Pulmonary Strong Wellness
2020

Respiratory System

- Our lungs fuel us with oxygen, the body's life sustaining gas
- Oxygen drives the process of respiration which provides our cells with energy which is required for our tissues and organs to function
- Lungs are the only internal organs that are constantly exposed to the external environment



Respiratory Tract

Upper

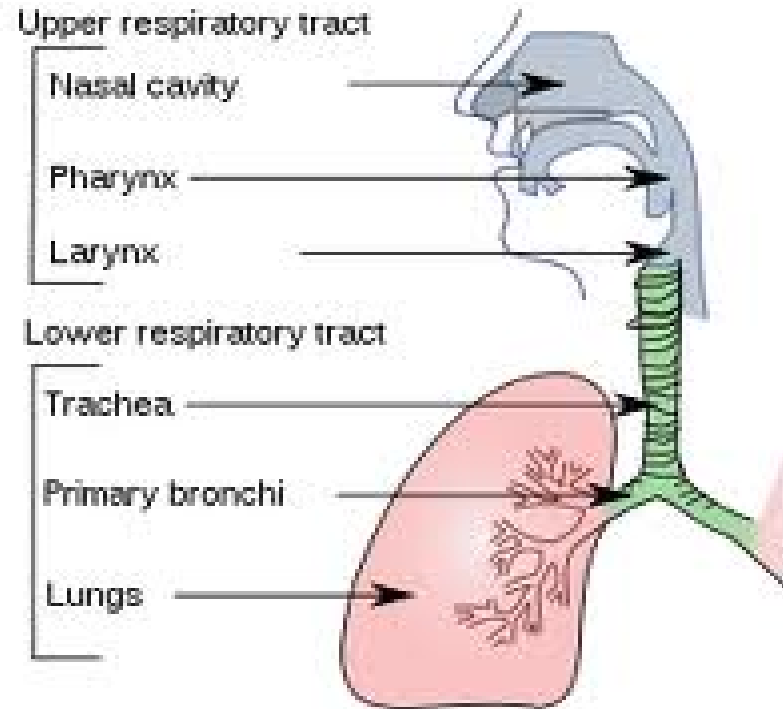
- Nose or nostrils
- Nasal cavity
- Mouth
- Throat (pharynx)
- Voice box (larynx)

Responsible for filtering, warming and adding moisture to the air we breathe

Lower

- Windpipe (trachea)
- Lungs- bronchi, bronchioles and alveoli

Responsible for “gas exchange”



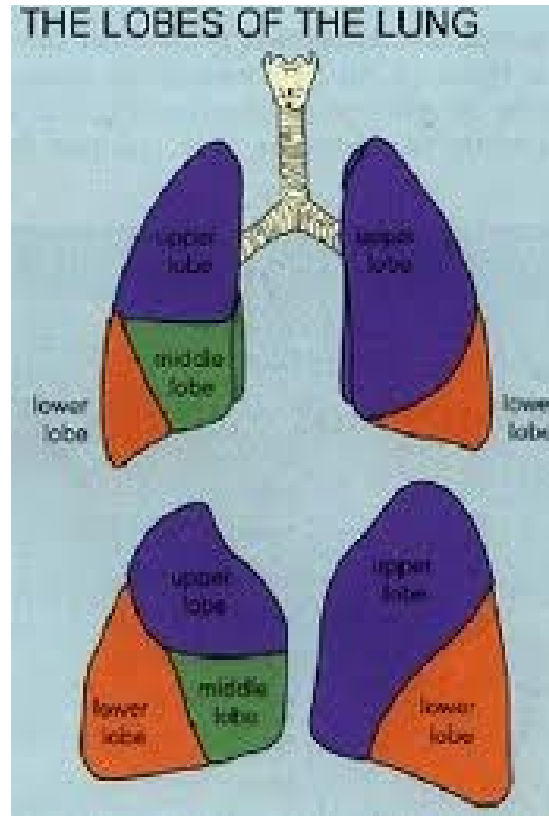
Lungs

Right lung has 3 lobes

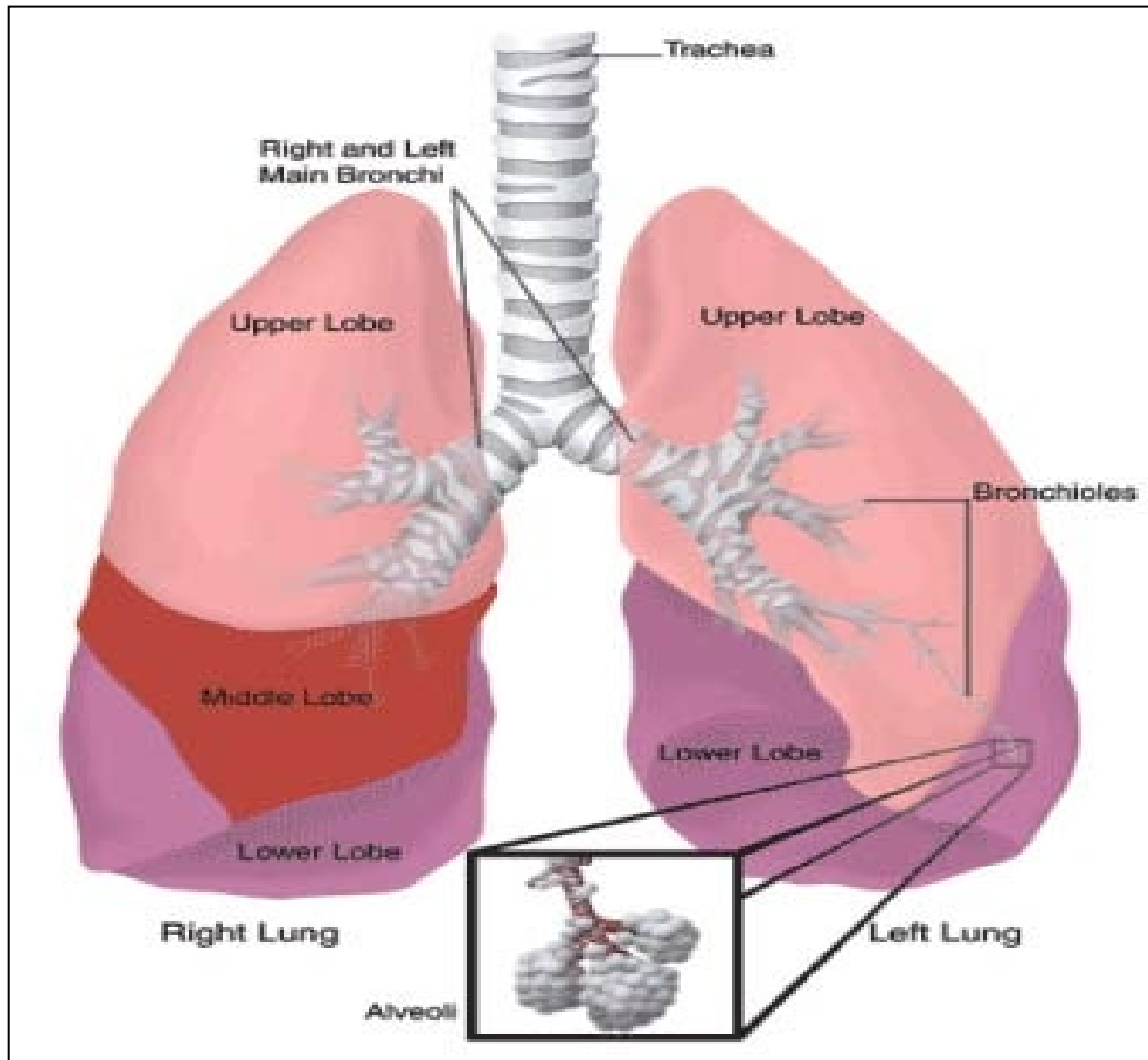
upper
middle
lower

Left lung has 2 lobes

upper
lower

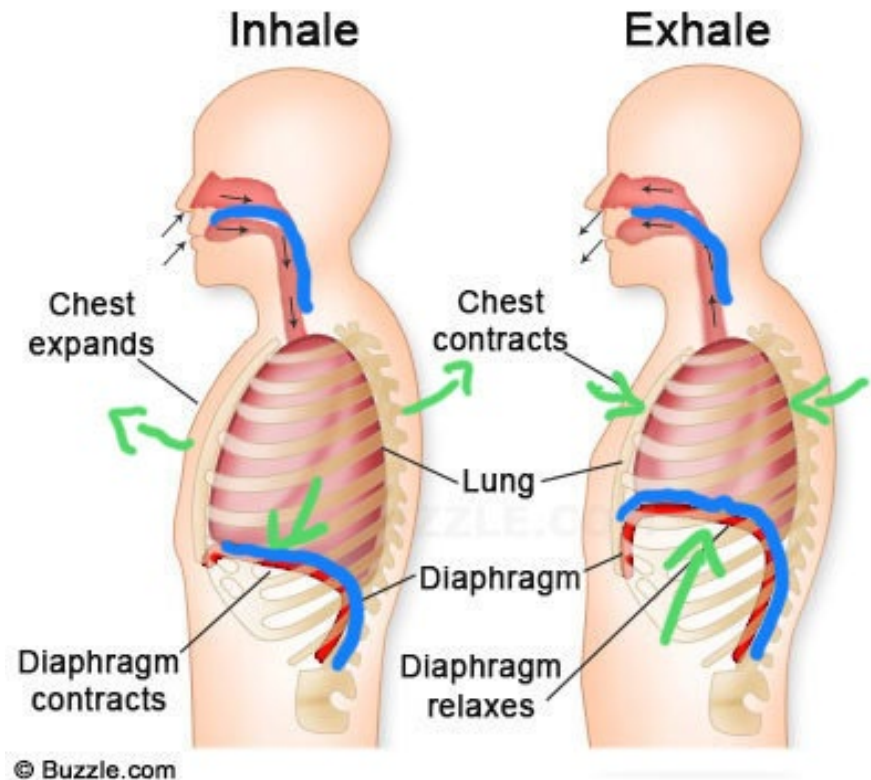


- Made up of alveoli's (air sacs) approx. 500 million sacs – Enough alveoli in one lung can cover an entire tennis court
- Human lungs have approx. 1500 miles of airways
- We breathe 13 pints of air every minute = 2100-2400 gallons each day



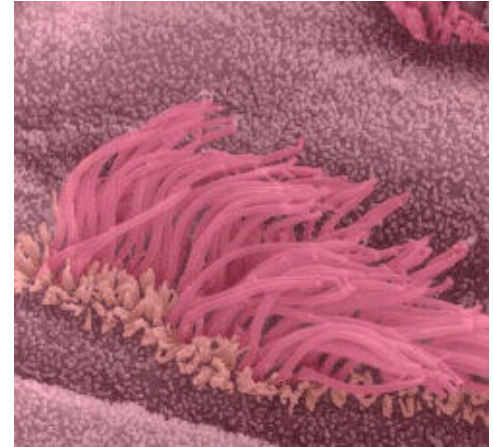
Diaphragm

- A dome shaped muscle between the chest and abdominal cavities
- Actual job of breathing is due to our diaphragm
- Contracts when we breathe in expanding the lungs, and relaxes when we breathe out
- Air trapping- the diaphragm becomes flattened due to hyperinflation of lung tissue



Cilia

- Cilia are tiny hair like structures that line the bronchial tubes. They are responsible for moving inhaled particles out of the lungs
- Damaged Cilia-exposure to cigarette smoke for less than 1 minute paralyzes the cilia. Continued smoking damages the cilia so they are unable to protect the lungs from the environment



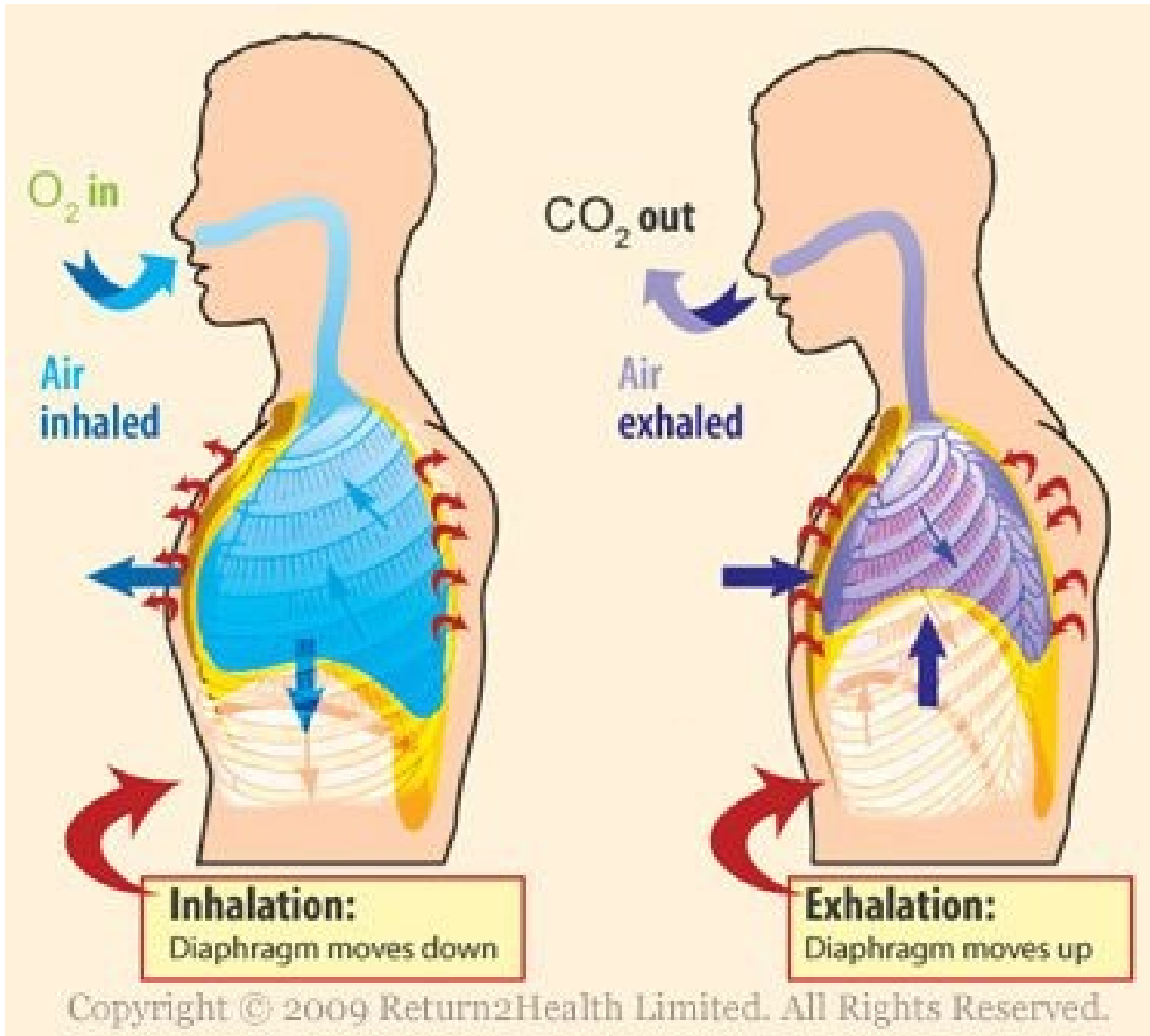
Gas Exchange

Oxygen-O₂

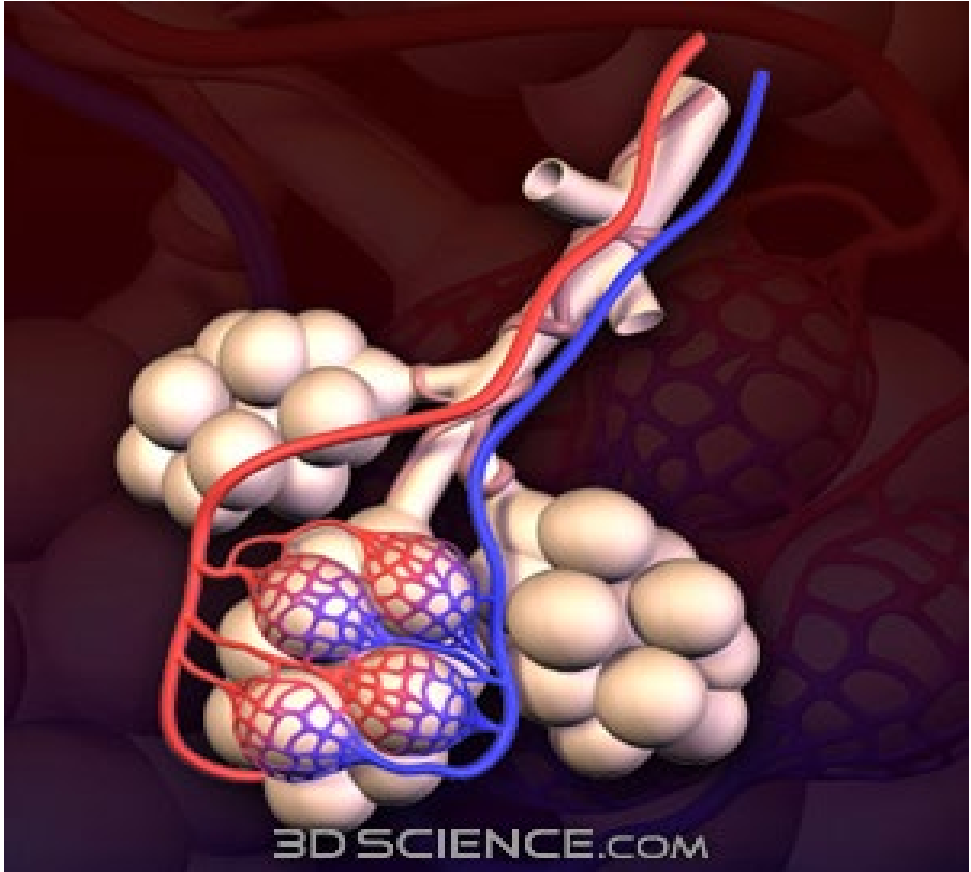
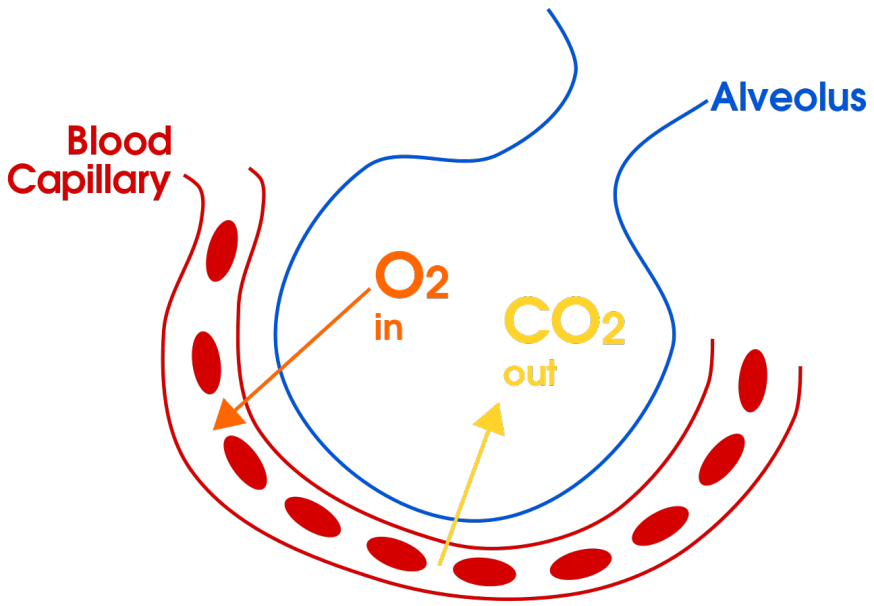
- Oxygen (O₂) drives the process of respiration which provides our cells with energy, which is required for our tissues and organs to function.
- As we inhale oxygen (O₂) it travels to the air sacs and passes into the blood vessels surrounding the alveoli's. The blood vessels then deliver the O₂ to all parts of your body by circulation.

Carbon Dioxide-CO₂

- Carbon Dioxide (CO₂) is the waste gas or by product of exhalation. Without this vital exchange our cells would quickly die and leave the body to suffocate.
- Carbon Dioxide (CO₂) leaves your body by way of the blood vessels. It passes through the alveoli to the bronchial tubes and then out through the trachea.

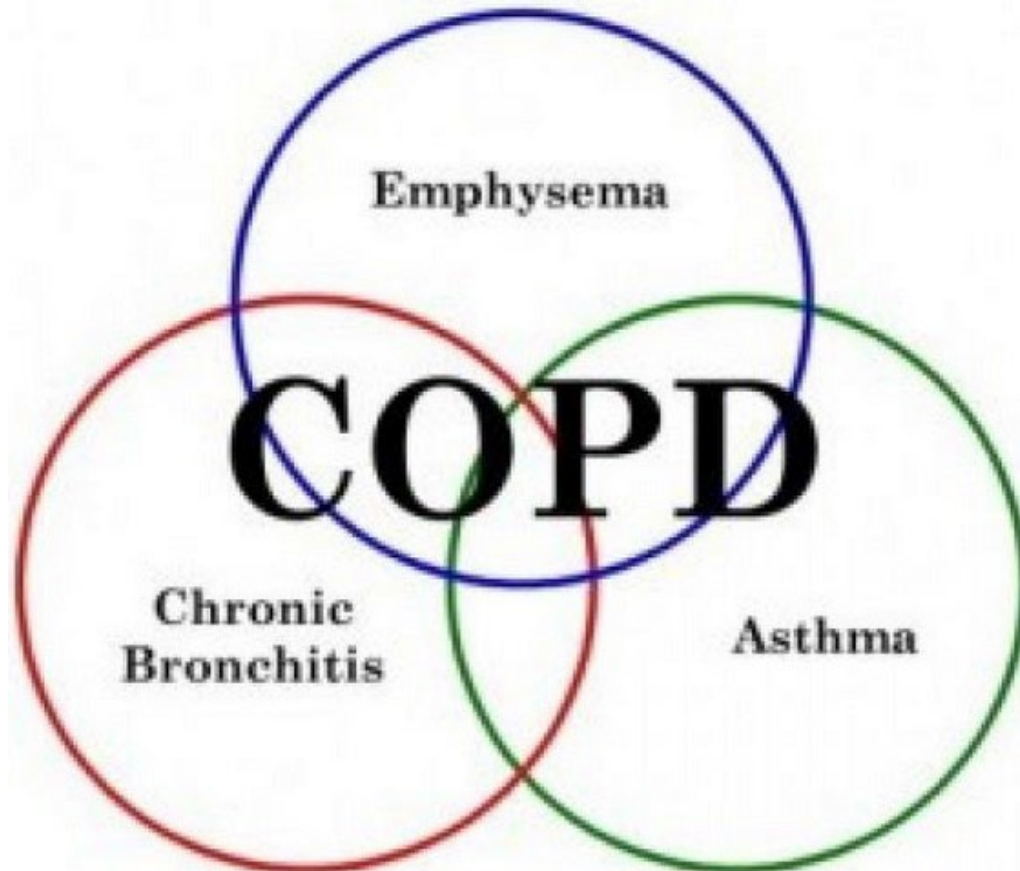


Blood Flow

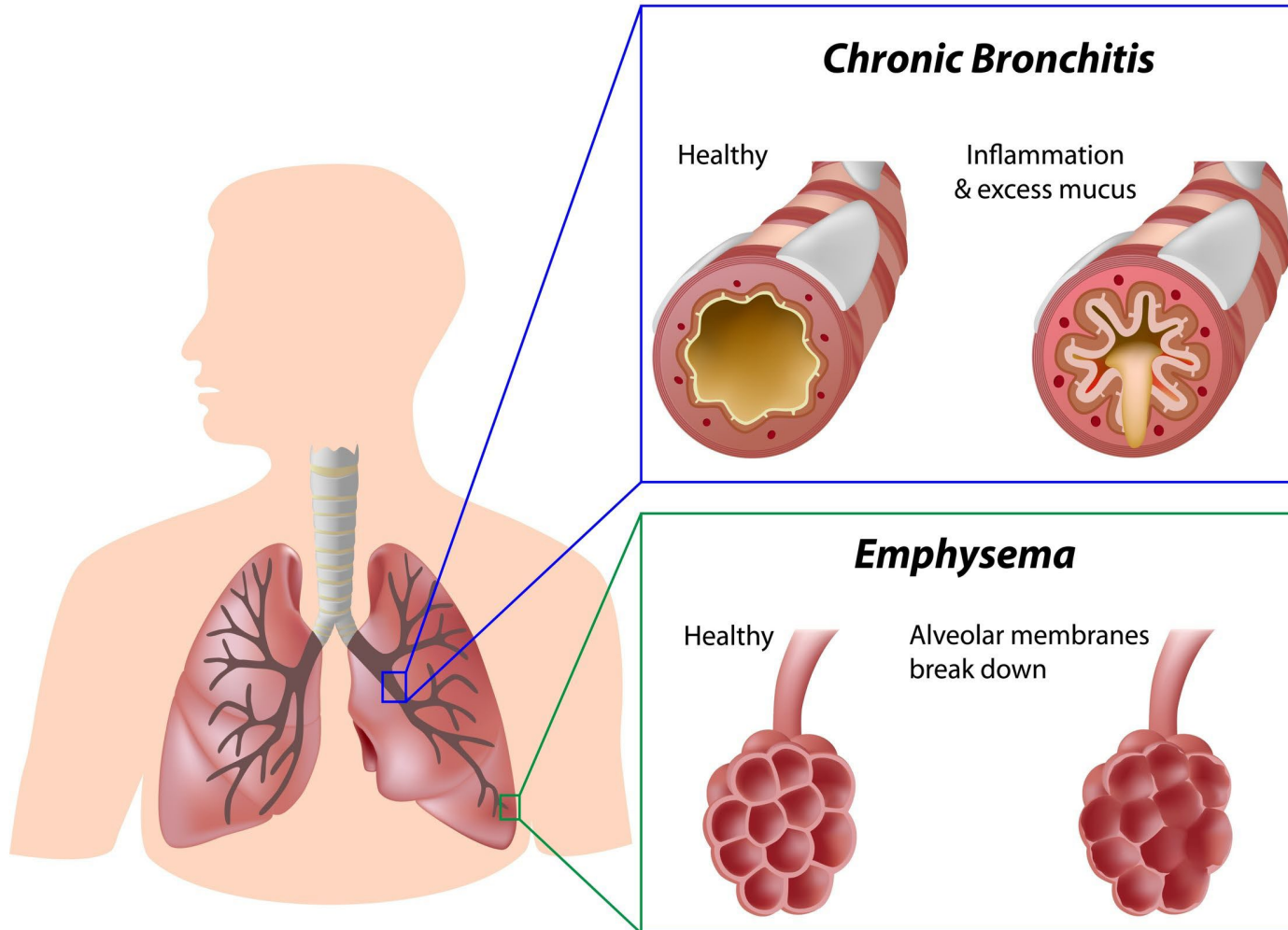


COPD

Chronic Obstructive Pulmonary Disease

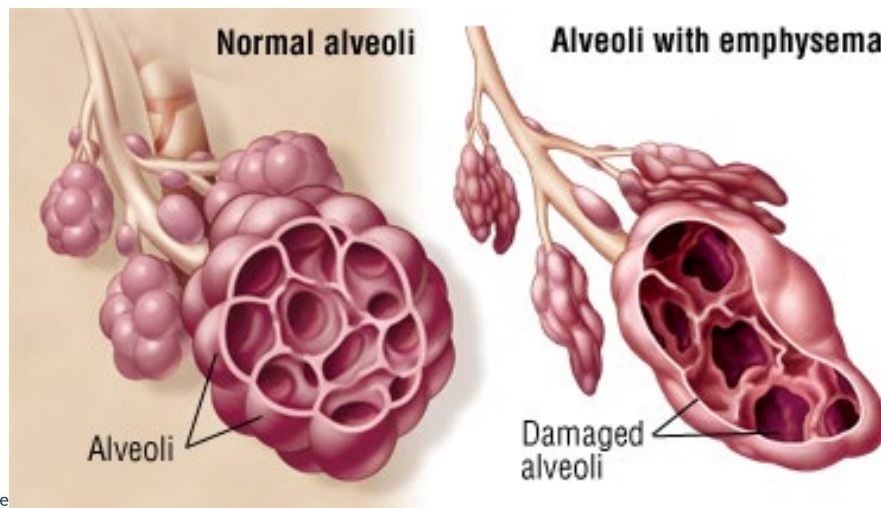


Chronic Obstructive Pulmonary Disease (COPD)



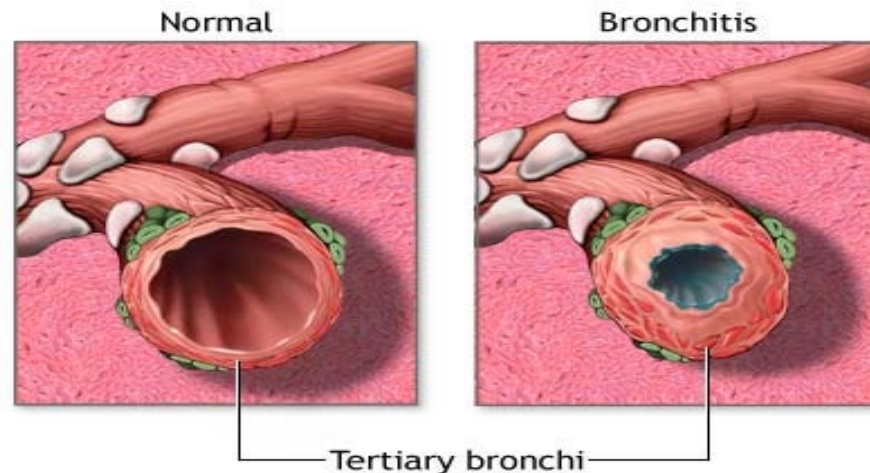
Emphysema

- When the air sacs are damaged, they lose their elasticity and become baggy.
- Damaged alveoli's may collapse during exhalation, trapping the carbon dioxide (CO₂). Trapped air makes breathing harder and can cause more damage. Blood vessels surrounding the alveoli's become damaged, which results in impaired gas exchange.
- Slow progression is over a 20-30year period.



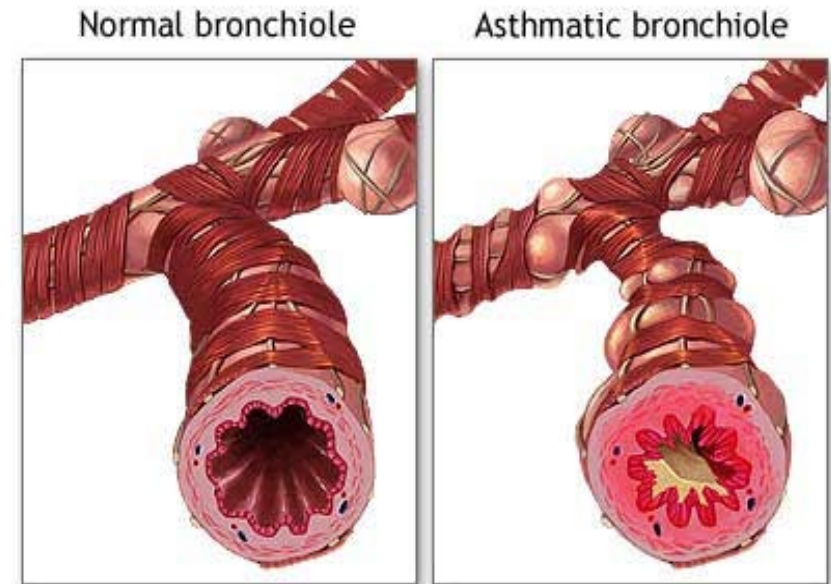
Chronic Bronchitis

Inflammation of the bronchial tubes resulting in a frequent cough that produces mucus and sputum. This cough occurs almost daily for at least three months or more a year for two consecutive years.



Asthma Variant

The airways are hypersensitive to allergens and irritants which makes the smooth muscle surrounding the bronchial tubes constrict. This constriction can lead to inflammation of the bronchial tubes and production of mucus.



What causes COPD?

- Usually caused by **cigarette smoking**
- Smoking accounts for as many as 8 out of 10 COPD-related deaths
- 85-90% of all reported COPD cases are caused by cigarette smoking
- Secondhand smoke
- 1 out of 4 people with COPD never smoked (non smokers)
- 50% of smokers can expect to develop COPD during their lifetime
- People with COPD are working 17% harder to breath than a person without lung disease

Other Causes Include

- Chronic respiratory infections
- Second hand smoke
- Air pollution
- Allergies
- Job exposure to pollutants
- Genetic susceptibility-Alpha 1 Antitrypsin (3%)