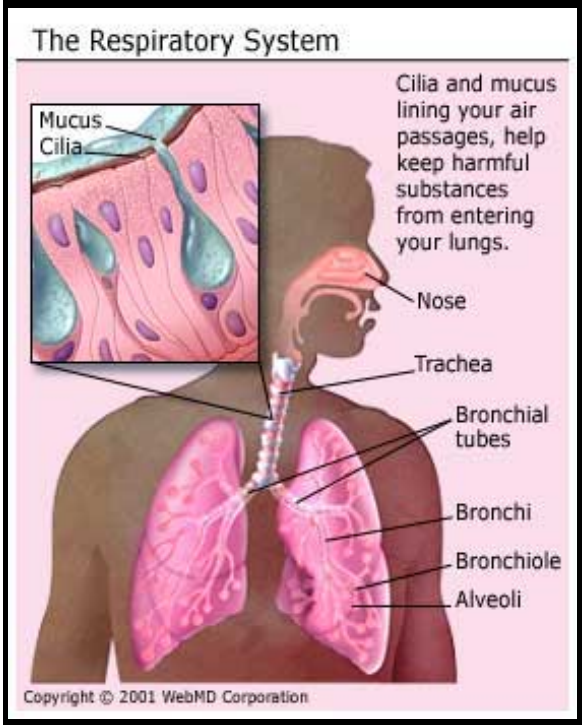
Respiration

Dec 1 - 2:45 PM

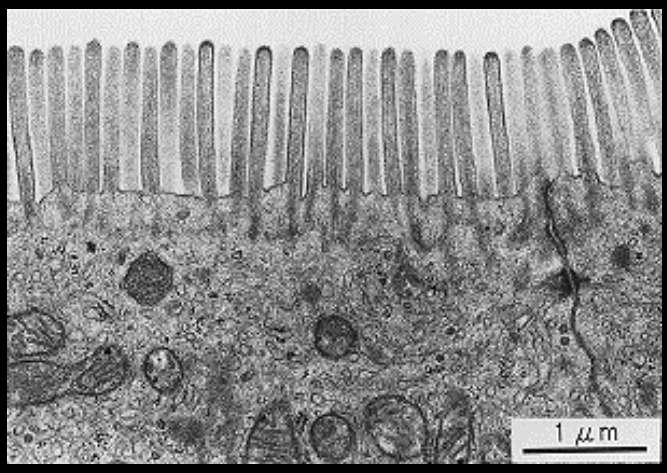
Respiration

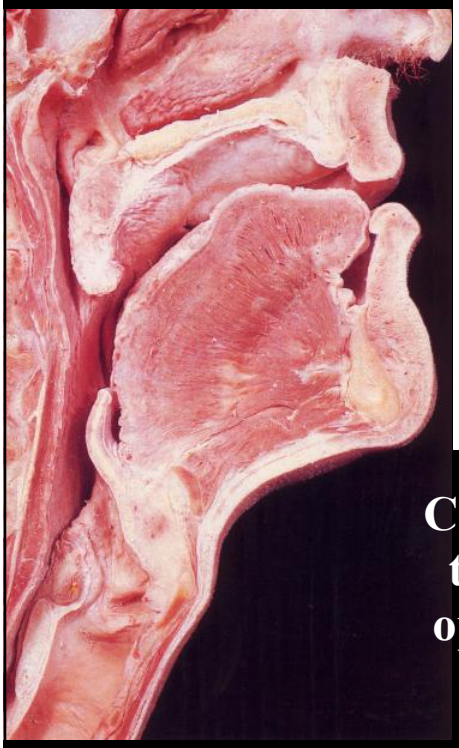
The Earth's atmoshphere is made up of 78% nitrogen, 21% oxygen, and the remaining 1% is made up of trace gases such as carbon dioxide.

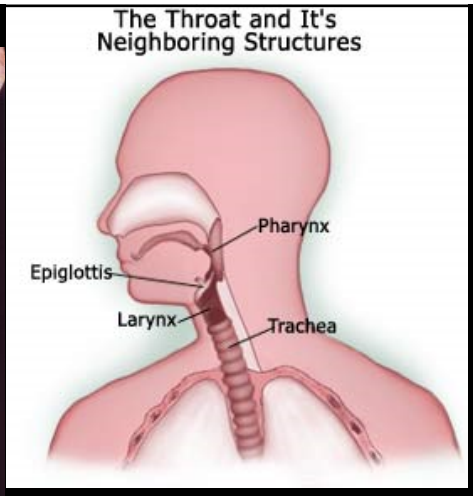
Dec 1 - 2:26 PM



Air enters the respiratory system via the mouth or nose. Tiny hairs line the passageway and act like a filtering system. Mucus is present and traps particles and keeps the cavity moist.



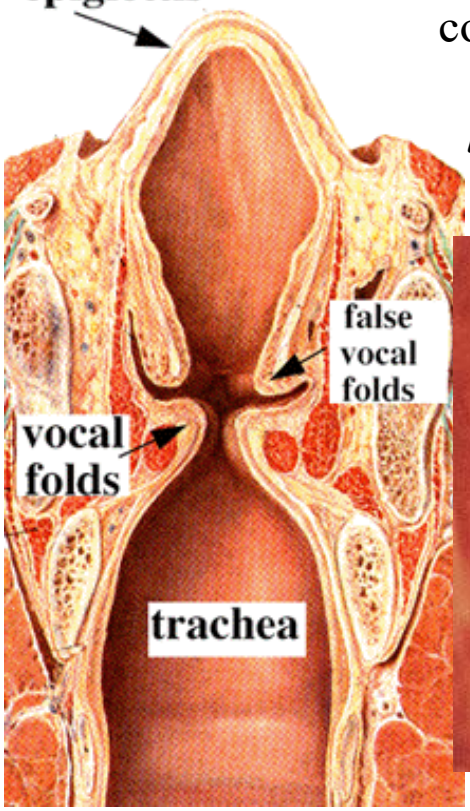


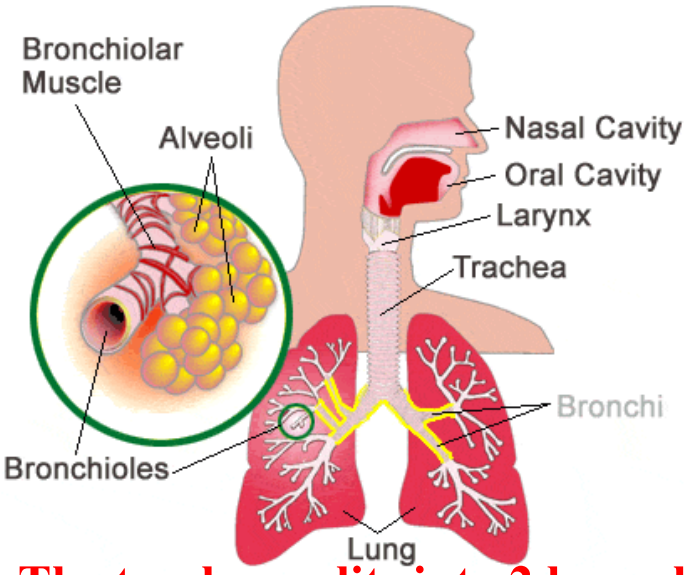


The pharynx is a passageway for both food and air. The pharynx branches into the trachea (windpipe) and esophagus, the passageway for food.

Cilia and mucus line and protect the trachea. The epiglottis covers the opening of the trachea when food is being swallowed. This prevents food or drink from entering the trachea.

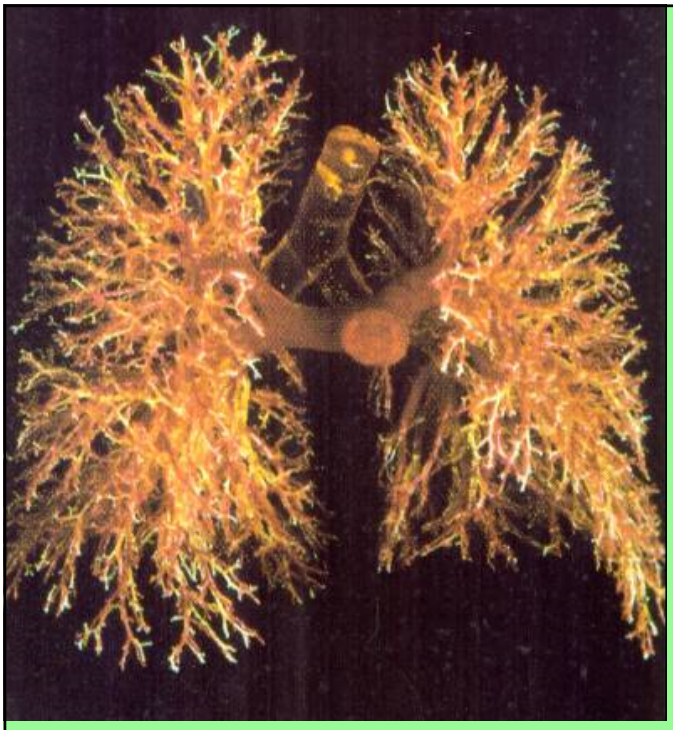
The *larynx*, or voice box, is made up of two thin bands of elastic filaments called vocal cords. Vocal cords produce sound. Severe inflamation of the vocal cords is called *laryngitis*, and loss of voice may occur.

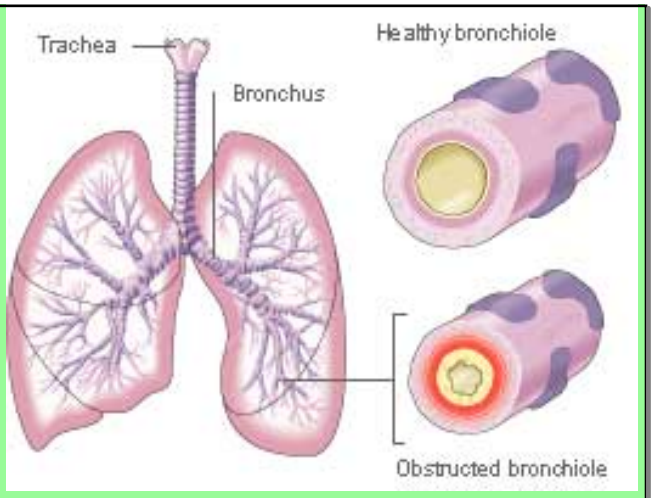




The trachea splits into 2 bronchi which may have cartilage rings. These go to the left and right lung and branch into smaller airways called bronchioles.

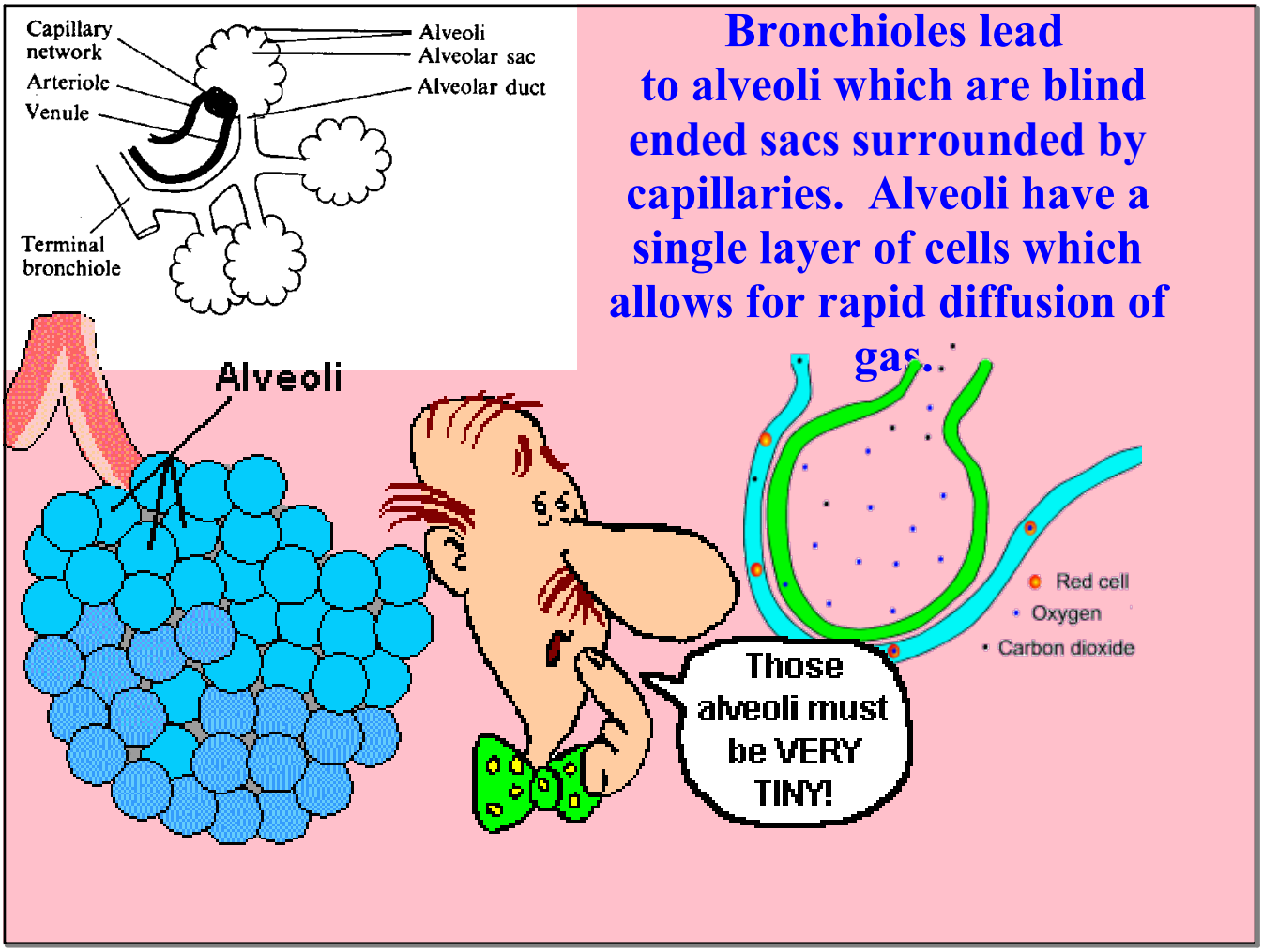
Dec 1 - 2:59 PM



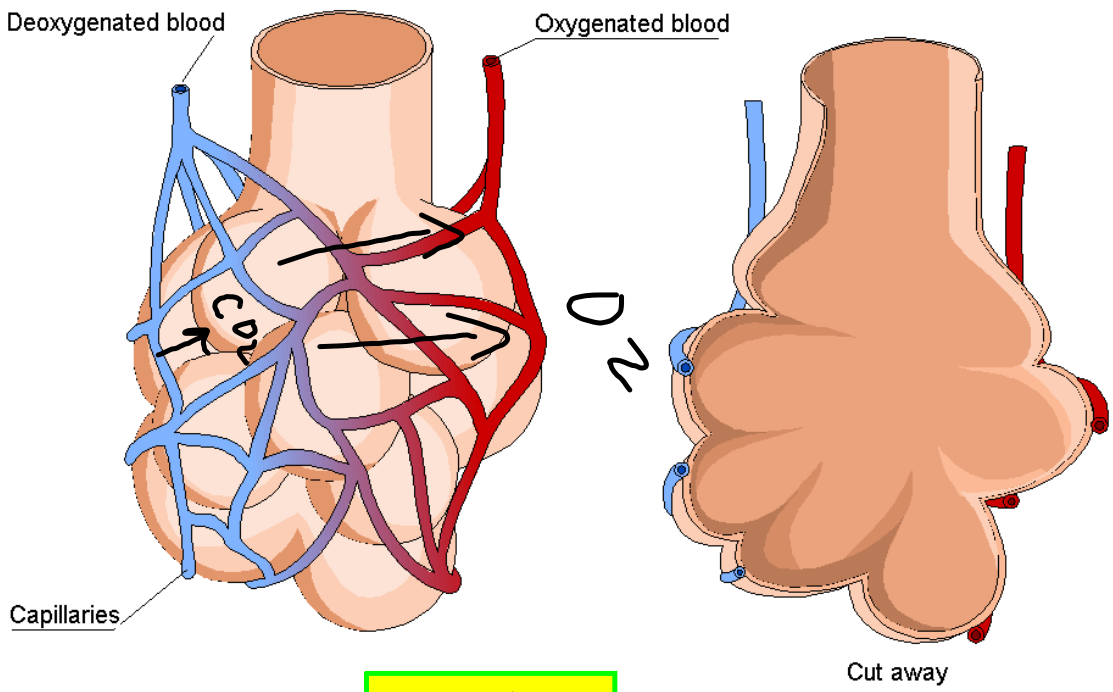


Bronchioles do not have cartilage and are controlled by smooth muscle which may decrease their diameter. This increases resistance to air movements and produces wheezing sound.

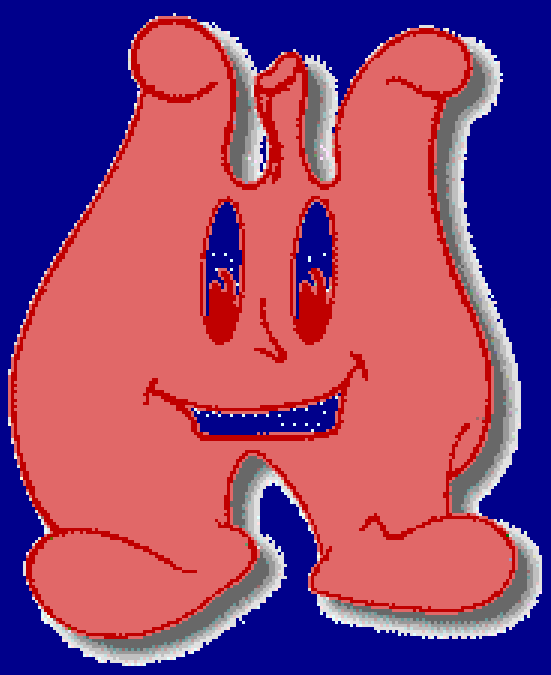
Dec 1 - 3:03 PM


Capillary network
Arteriole
Venule
Terminal bronchiole
Alveoli
Alveolar sac
Alveolar duct
Bronchioles lead to alveoli which are blind ended sacs surrounded by capillaries. Alveoli have a single layer of cells which allows for rapid diffusion of gas.
Alveoli
Those alveoli must be VERY TINY!
Red cell
Oxygen
Carbon dioxide

Alveoli



Gas Exchange



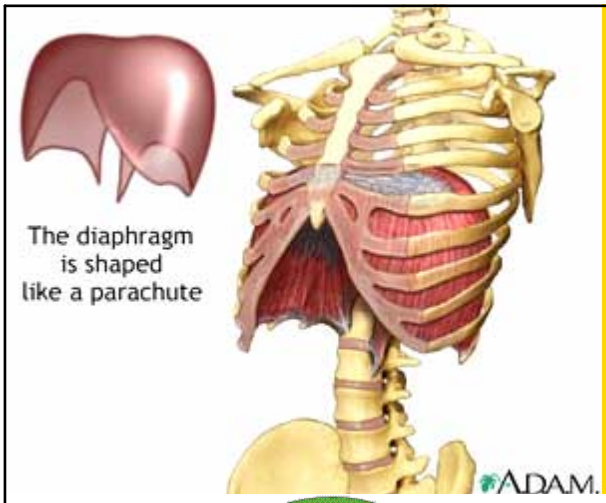
Lungs are surrounded by a thin membrane called the plural membrane. It prevents friction between the lungs and the chest cavity. Build up of fluid in the chest cavity and inflamation of the plural cavity called pleurisy. It is caused by 2 membranes rubbing together. Expiration is easier but inspiration is much more difficult.

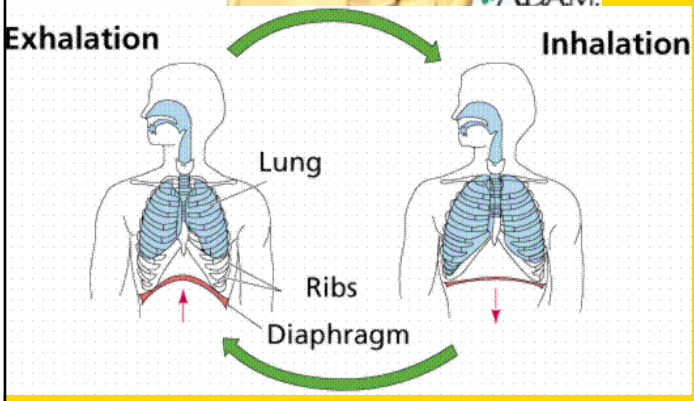
Dec 1 - 3:10 PM

Regulation of Breathing Movements

Breathing movements are controlled by a part of the brain called the *medulla oblongata.*

Apr 27 - 10:17 AM



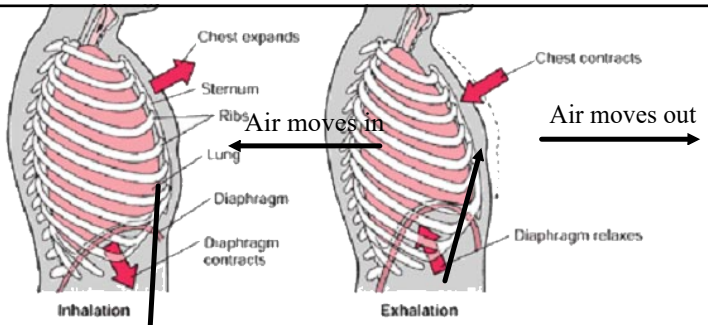


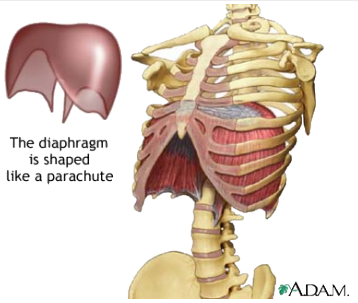
Chemoreceptors detect levels of oxygen and carbon dioxide. This message is sent to the medulla oblongata, and then to the muscles of the diaphragm and rib cage. This initiates breathing movements.

Apr 27 - 10:17 AM

Breathing movements

Gas moves from an area of high pressure to an area of low pressure





The diaphragm is a band of muscles that seperate the chest cavity from the abdominal cavity. It regulates the pressure in the chest.

When the diaphragm contracts, it flattens and pulls downward. As chest volume increases, pressure decreases.

When the diaphragm relaxes, it returns to dome-shape. As chest volume decreases, pressure increases.

Atmospheric pressure > Pleural pressure

Atmospheric pressure < Pleural pressure

Differences in pressure between the atmosphere and chest (pleural) determines the movement of gases in and out.

Inspiration, or inhalation-diaphragm contracts and pulls downward, intercostal muscles pull the ribs outward, chest volume is increased which decreases air pressure, air moves into the lungs.

Expiration, or exhalation-diaphragm relaxes and returns to its dome shape, intercostal muscles allow the ribs to move inward, chest volume decreases, air pressure increases, air moves out of the lungs.

Jan 16-9:27 AM

A person may control their breathing to some extent, but as carbon dioxide levels build up, the medulla oblongata takes over and forces breathing. *Carotid* and *aortic* bodies are receptors that monitor levels of carbon dioxide. These receptors help keep a person breathing normally.

Apr 27 - 10:17 AM

Low levels of oxygen are found at high altitude. Carbon monoxide may also take up space in red blood cells, thus reducing oxygen delivery. All respiratory disorders result in decrease of oxygen to tissue.

Apr 27 - 10:17 AM

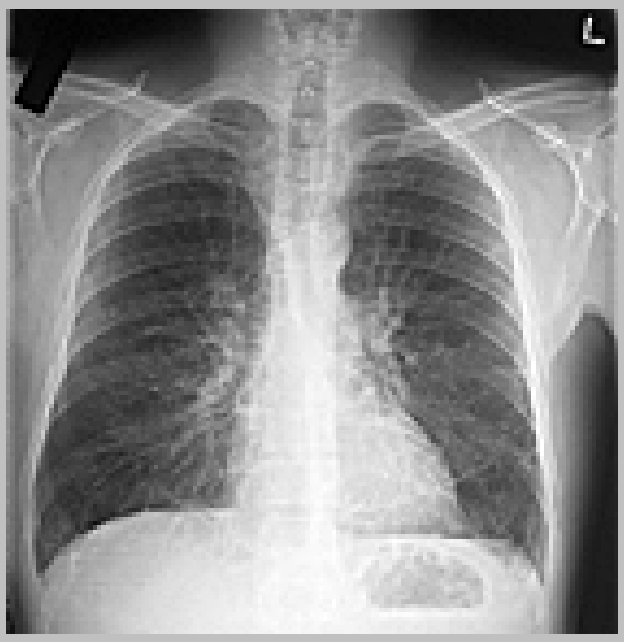
Carbon monoxide

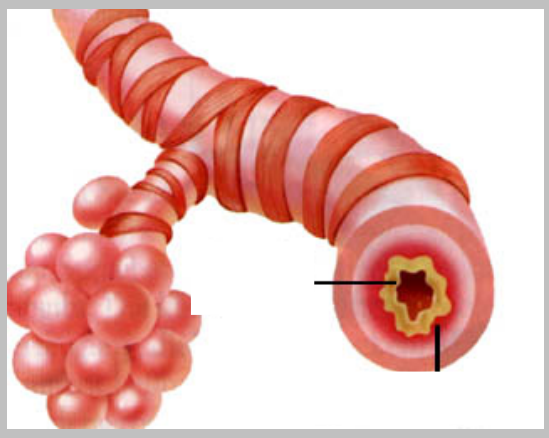
Results from combustion with an inadequate supply of oxygen.

Carbon monoxide (CO) competes with oxygen for the active site on the hemoglobin molecule. CO gains faster access. As CO binds, less oxygen is delivered to the tissues. Carbon dioxide levels tend not to increase, so chemoreceptors are late to react to the low oxygen levels.

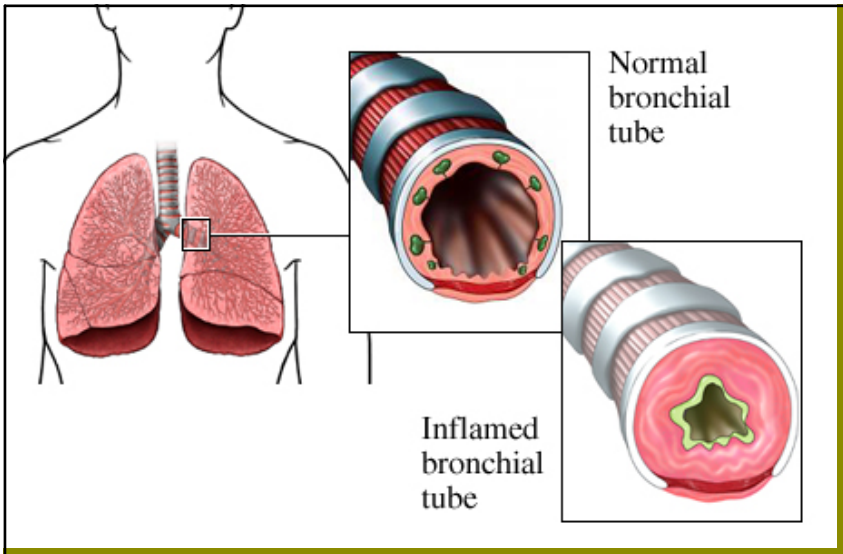
Oct 25-3:29 PM

Bronchitis is caused by a bacterial or viral infection, which causes mucus secretions to increase. As a result, the airways become narrow, which limits breathing. Mostly occurs in the bronchioles.



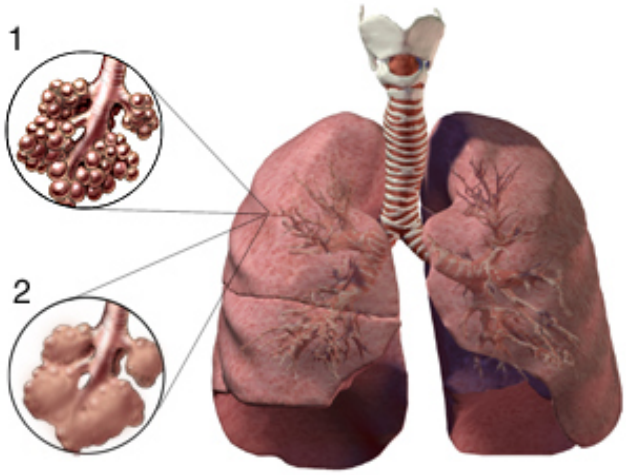


Apr 27 - 10:17 AM



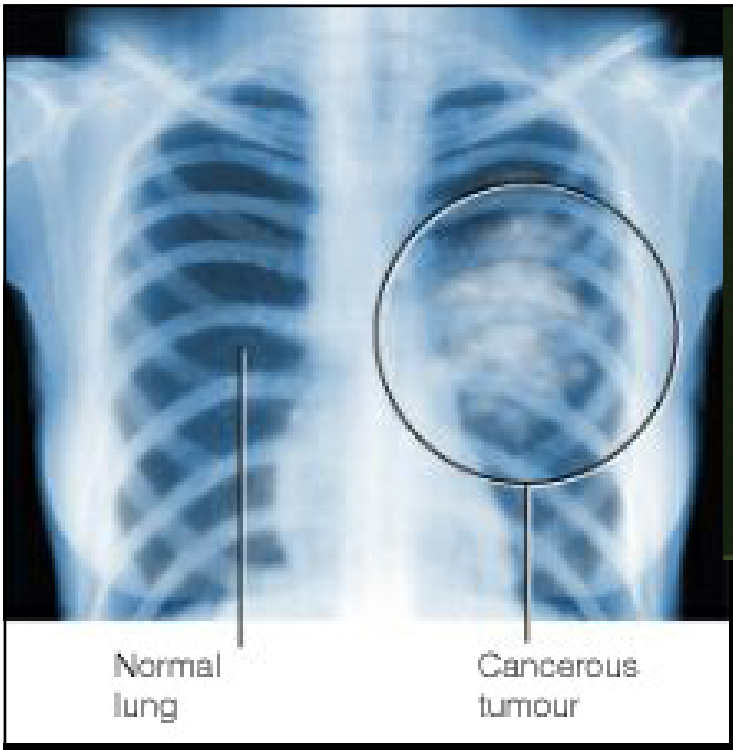
Inflammation of the bronchioles makes it more difficult to exhale than inhale. Allergic reactions cause asthma attacks because they cause inflammation of tissue.

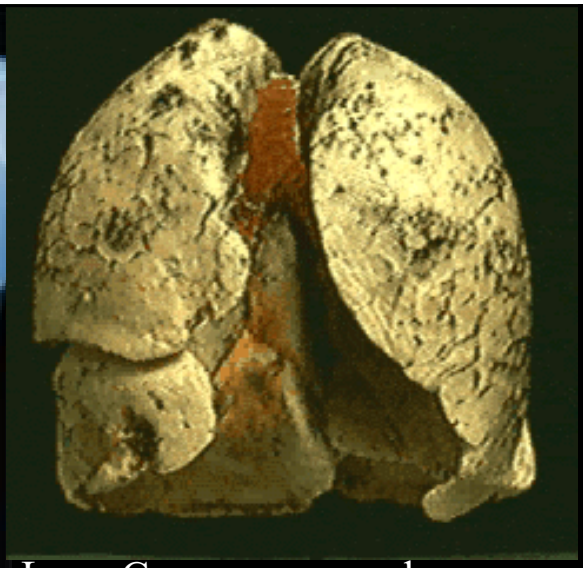
Apr 27 - 10:19 AM



Emphysema is associated with chronic, or recurring bronchitis. Air pressure builds up in the lungs and stretches the alveoli. If they rupture, there is less surface area for gas exchange. As a result, there is less oxygen in the body, and a person breathes faster to make up for low levels of oxygen. As the alveoli rupture, capillaries are destroyed and scar tissue forms. This makes the lungs less elastic and breathing more difficult. Heart rate may also increase to accommodate low oxygen levels.

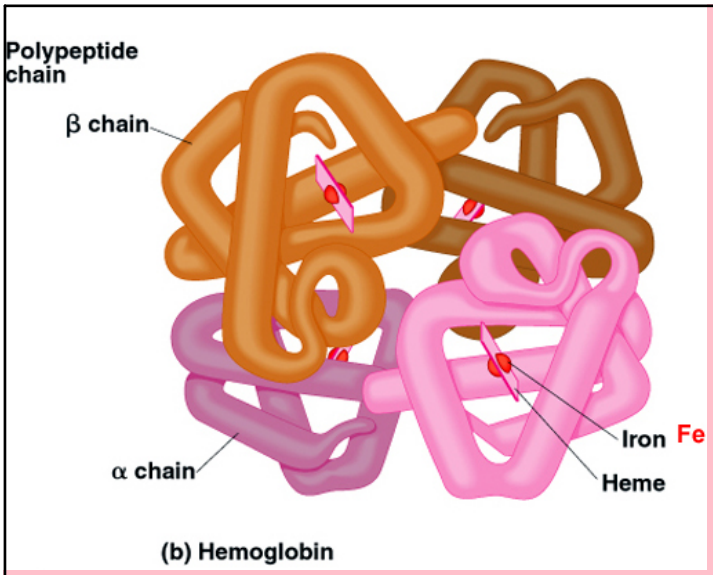
Apr 27 - 10:19 AM





Lung Cancer occurs when cancer cells in the lungs reduce surface area for diffusion of gases. Tumors may block airways and eventually the lung will collapse.

Apr 27 - 10:19 AM



Oxygen Transport

Oxygen moves from the atmosphere to the alveoli. With the help of hemoglobin, oxygen can be carried in large amounts. Hemoglobin does not give up much oxygen until it reaches tissues where the level is low. This is when diffusion takes place.

Carbon Dioxide Transport

9 % of carbon dioxide is carried in the plasma. 27% of the body's carbon dioxide combines with hemoglobin to form carbominohemoglobin. The remaining 64% combines with water in the plasma to form Carbonic acid.

Hemoglobin is essential to ensure low levels of CO_2 in the blood. As it binds with CO_2, and some CO_2 binds with water, partial pressure of CO_2 remains low. This allows diffusion to continue into the blood. If this mechanism did not work properly, there would be an overaccumalation of CO_2 in the blood and diffusion of CO_2 would occur back into body cells.

Oct 26-9:36 AM

The second function of hemoglobin is to act as a buffer. When CO_2 and water form carbonic acid the Ph level of the blood lowers. This can be dangerous to blood vessels and tissues and therefore must b e buffered. Carbonic acid is unstable and dissociates into bicarbonate ions and hydrogen ions. Once oxygen is dislodged from hemoglobin, the hydrogen ions attach to form reduced hemoglobin. This ensures Ph levels remain stable as the bicarbonate ions and hydrogen ions do not recombine until they reach the lungs. After reaching the lungs, oxygen dislodges the hydrogen ions which bind with bicarbonate ions to reform CO_2. CO_2 can now be safely exhaled from the body.

Oct 26-9:28 AM