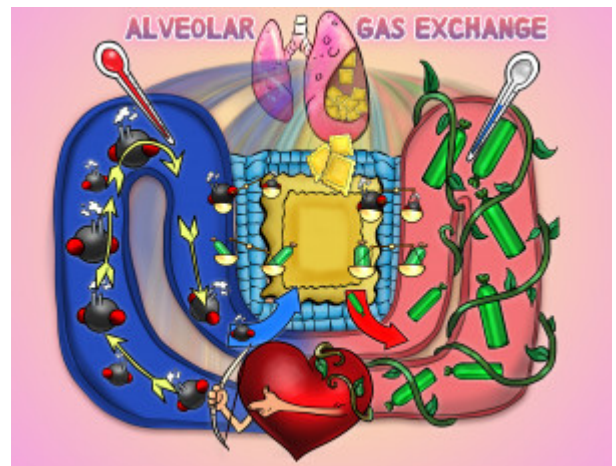


## Alveolar Gas Exchange

Alveoli are locations for gas exchange. O<sub>2</sub> from inhaled air can be exchanged for CO<sub>2</sub>, which will be exhaled. They are the most basic structural unit of the lungs. The pulmonary artery brings deoxygenated blood, which is O<sub>2</sub>-poor and CO<sub>2</sub>-rich, from the heart to the lungs. The CO<sub>2</sub> comes from the byproduct of cellular respiration released by cells throughout the body and picked up by the blood. These gases then diffuse across a two-cell thick barrier. CO<sub>2</sub> diffuses into the air of the alveoli to be exhaled, while O<sub>2</sub> diffuses from the air into the blood for distribution to cells. The gases reach an equilibrium value (equal partial pressures in the blood and alveoli), and the blood leaves the alveoli back to the heart. Blood travels through the pulmonary vein to the left atrium and is now O<sub>2</sub>-rich and CO<sub>2</sub>-poor. Heat can also be exchanged across the alveoli. This is a useful mechanism of thermoregulation, as the body can release excess heat through warm breaths and retain needed heat if the body temperature is too low.



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### Characteristics

#### Pulmonary Artery Blood is O<sub>2</sub>-Poor, CO<sub>2</sub>-Rich

[Arrow-vessel going to Lungs with lots of CO<sub>2</sub> molecules](#)

Blood in the pulmonary artery is low in O<sub>2</sub> concentration because it has returned from dropping off oxygen to all cells in the body. It is high in CO<sub>2</sub> concentration because it picked up CO<sub>2</sub>, a metabolic byproduct, from those cells.

#### Two-Cell Thick Air-Blood Barrier

[Two Cell Barrier](#)

The layer of cells between an alveolus and blood is only two cells thick, which allows for diffusion of gas in both directions following separate concentration gradients.

#### CO<sub>2</sub> Diffuses Into Air

[CO<sub>2</sub>-molecule Diffuses Into Air](#)

Carbon dioxide diffuses into the alveoli from the CO<sub>2</sub>-rich blood and is exhaled.

#### O<sub>2</sub> Diffuses Into Blood

[O<sub>2</sub>-tank Diffusing Into Blood](#)

O<sub>2</sub> is inhaled into the alveoli and diffuses into the oxygen-poor blood traveling towards the heart.

#### Gases Equilibrate

[Gas-scales at Equilibrium](#)

The concentration of both CO<sub>2</sub> and O<sub>2</sub> equilibrate through diffusion until there are roughly equal concentrations of both in the alveoli and in the blood.

#### Pulmonary Vein is O<sub>2</sub>-Rich, CO<sub>2</sub>-Poor

[Vine from Lungs with lots of O<sub>2</sub>-tanks](#)

The pulmonary vein runs from the alveoli to the left atrium of the heart, and is eventually pumped out to the body. This blood is O<sub>2</sub>-rich and CO<sub>2</sub>-poor, because it has just picked up oxygen and dropped off carbon dioxide at the alveoli.

## Thermoregulation

### Thermometers

The other exchange that occurs at the alveoli is heat exchange. Breathing is a way of contributing to body temperature regulation by breathing out warm air if the body temperature is high, or retaining heat from the air if the body temperature is low.