

# Description

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Mechanisms in which CO<sub>2</sub> is carried in the blood Blood arriving in alveoli has a higher carbon dioxide concentration that is during respiration by the cells in the body. Transportation of the CO<sub>2</sub> in the blood is through three mechanisms: Dissolved CO<sub>2</sub>, Bound to hemoglobin and Bicarbonate ions (HCO<sub>3</sub><sup>-</sup>).

#### Dissolved CO<sub>2</sub>

CO<sub>2</sub> dissolves in plasma where it combines chemically with protein molecules to form a carbamino compound. In addition, CO<sub>2</sub> combines with water forming a carbonic acid that ionizes into bicarbonate and hydrogen ions. About five percent of the total CO<sub>2</sub> released by the lungs is dissolved too in the plasma.

#### Bound to hemoglobin

Hemoglobin, found in the red blood cells has the primary function of transporting oxygen from the lungs to the tissues and then transporting CO<sub>2</sub> from the tissues back to the lungs. Deoxyhemoglobin is a form of hemoglobin that has a higher affinity form CO<sub>2</sub>. CO<sub>2</sub> to hemoglobin and forms carbaminohemoglobin molecule. The process is reversible thus when it reaches the lungs, the CO<sub>2</sub> dissociates freely from the hemoglobin and expelled from the body. This mechanism accounts for about ten percent of the CO<sub>2</sub>.

#### Bicarbonate ions (HCO<sub>3</sub><sup>-</sup>)

CO<sub>2</sub> diffuses into red blood cells where Carbonic anhydrase in the RBC quickly converts the CO<sub>2</sub> into carbonic acid that is an unstable molecule. CA dissociates fast into bicarbonates ions and hydrogen ions which bind to hemoglobin. The bicarbonate ions formed is transported out of the RBC into

the blood liquid component in exchange for a chloride ion. Upon the blood reaching the lungs, the bicarbonate ion is transported back into the RBC in exchange for chloride ion. The hydrogen ions dissociate from the hemoglobin and binds to the bicarbonate ion, producing carbonic acid, that through the enzymatic action of CA is converted back into CO<sub>2</sub>. The CO<sub>2</sub> produced is expelled through exhalation by the lungs.

#### Works cited

Geers. C. and Gersolf . G. " Carbon dioxide transport and carbonic anhydrase in blood and muscle." *Physiological reviews* 80. 2 (2000): 681-715.