Chemistry 201

Carbon dioxide and carbonate chemistry

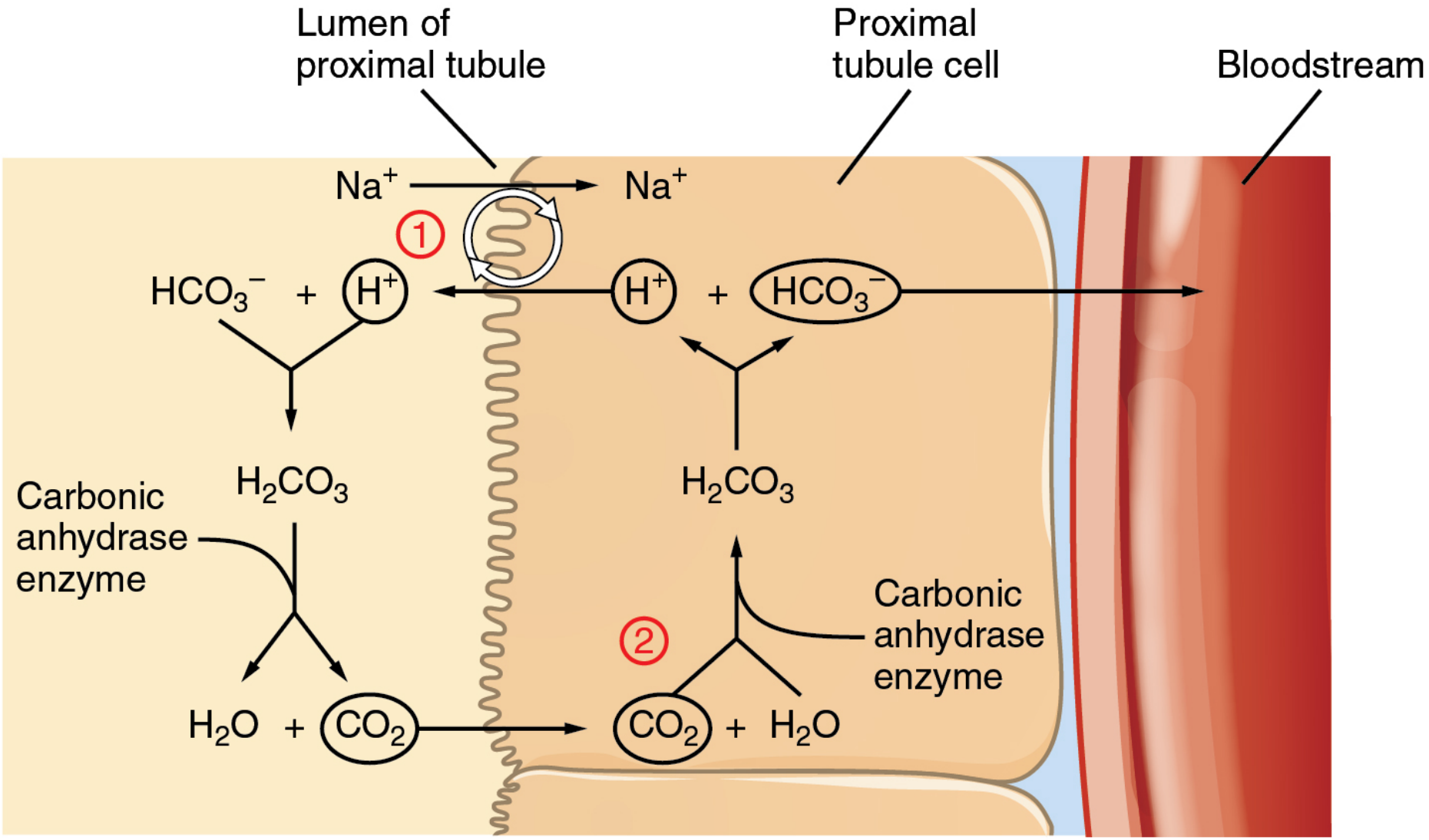
NC State University

Bicarbonate (hydrogen carbonate): an important regulator in the body

$$CO_2 + 2\,H_2O \leftrightarrow HCO_3^- + H_3O^+ + H_2O \leftrightarrow CO_3^{2-} + 2\,H_3O^+$$

Bicarbonate ions and CO_2 are present in the blood in a 20:1 ratio if the blood pH is within the normal range. With 20 times more bicarbonate than CO_2, this capture system is most efficient at buffering changes that would make the blood more acidic. This is useful because most of the body's metabolic wastes, such as lactic acid and ketones, are acids. Carbonic acid levels in the blood are controlled by the expiration of CO_2 through the lungs.

The role of carbonic anhydrase



The enzyme does not change the equilibrium, but it accelerates the Rate of reaching the equilibrium on each side of a membrane.