

(84)

## Buffer of blood

A buffer is a solution which tends to maintain its pH, when a small amount of acid or base added to it. It contains a H<sup>+</sup> donor & H<sup>+</sup> acceptor form weak acid & weak bases.

carbonic acid-bicarbonate is common buffering system in blood plasma. The weak carbonic acid dissociates into H<sup>+</sup> & HCO<sub>3</sub><sup>-</sup>



When a small amount of HCl added to this system, H<sup>+</sup> produced from HCl combine with HCO<sub>3</sub><sup>-</sup> to form H<sub>2</sub>CO<sub>3</sub>. If a small amount of NaOH is added to it OH<sup>-</sup> combine with H<sup>+</sup> to form H<sub>2</sub>O. Thus this system 'soaks' the H<sup>+</sup> or OH<sup>-</sup> produced from strong acid or base & tend to maintain the original pH.

Buffering in blood →

pH of blood range from 7.35 to 7.45-

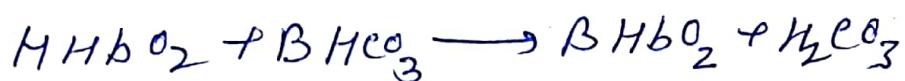
→ pH less than 7.35 cause acidosis & death occurs at 7

→ pH > 7.45 cause alkalosis & death occurs at 7.8

The death at pH 7 & 7.8 is due because the enzymes of blood are extremely sensitive to change in pH. To maintain the pH of blood buffering system present in blood. The major buffering system present in blood - bicarbonate - phosphate - Haemoglobin

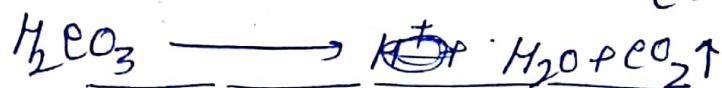
→ Hb is a good buffer because of its capacity to act as a oxygen acceptor as well as oxygen donor. Oxyhemoglobin ( $\text{HbO}_2$ ) is a stronger acid than carbonic acid but Haemoglobin (Hb) is a weaker acid.

When blood is circulated in pulmonary vein (in lung)  $\text{Hb}$  is converted to  $\text{HbO}_2$  by absorbing  $\text{O}_2$ . Because of its acidic nature it react with bicarbonates & produce



Lung

$$(\text{B} = \text{Na}^+, \text{K}^+ \dots)$$



The salt of oxyhemoglobin formed in Lung converted to salt ( $\text{BHCO}_3$ ) & Hemoglobin at tissue.

The HHb thus liberated goes to lungs again where it oxygenates again & cycle repeated.

This cyclic oxygenation & deoxygenation of haemoglobin between lung & tissue is called Henderson cycle.

