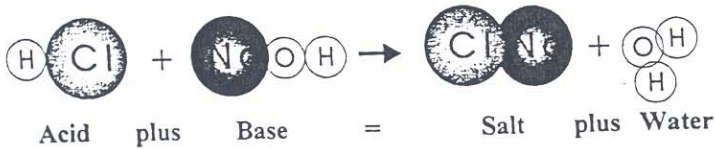


### 3.2.) ACID / BASE PHYSIOLOGY

*Our metabolism constantly produces acids ( $H^+$ ). If these were not buffered the plasma would become so acidic that life were impossible.*

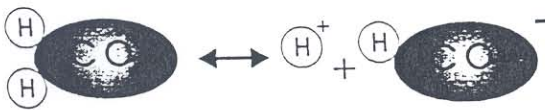


➤ Strong acids dissociate completely:



➤ Weak acids dissociate partially.

➤ Buffer = Weak acid + its Salt (for example  $H_2CO_3 + NaHCO_3$ ) ~  
When dissolved in water forms an equilibrium:



Add acid ( $H^+$ ): equilibrium shifts to the left:  $H_2CO_3 \leftarrow HCO_3^-$

Remove acid ( $H^+$ ): equilibrium shifts to the right:  $H_2CO_3 \rightarrow HCO_3^-$

**The body has two additional defense mechanisms against too much acid:**

1. If too much  $H_2CO_3$  is produced by the above reactions, the lungs can remove it in the form of  $CO_2$ .
  - ☞ Inability to remove  $CO_2$  due to hypoventilation causes acidosis.
  - ☞ Removal of too much  $CO_2$  by hyperventilation causes alkalosis.
2. The kidneys can supply (recover) additional buffer base  $HCO_3^-$  to compensate for acidosis.
  - ☞ Inability of the kidneys to recover  $HCO_3^-$  causes acidosis.