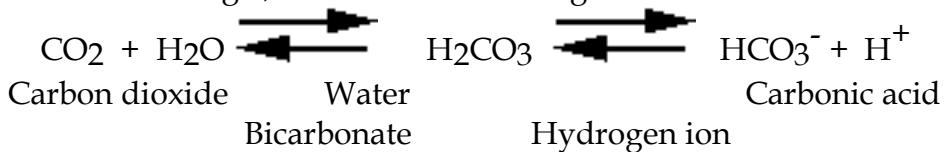


Acid/Base Homeostasis (Part 6)

Graphics are used with permission of:
Pearson Education Inc., publishing as Benjamin Cummings (<http://www.aw-bc.com>)

80. (Page 36.) Using the diagrams on page 36, list the steps in the secretion of H⁺.
81. (Page 36.) What is the result of this whole process of the secretion of H⁺?
82. (Page 37.) Label the diagram on p. 37 and show the three mechanisms that occur during acidosis.
83. (Page 38.) Contrast the amount of time it takes for chemical buffers, the respiratory system and the urinary system to work.
84. (Page 38.) The respiratory mechanism is important for compensation for what type of acidosis and alkalosis?
85. (Page 38.) The urinary mechanism is important for compensation for what type of acidosis and alkalosis?
86. (Page 38.) What types of acids are eliminated via the respiratory system?
87. (Page 38.) What types of acids are eliminated via the urinary system?
88. (Page 39.) Alkalosis occurs when the pH of the blood rises above 7.45. What are two major types of alkalosis?
89. (Page 39.) Acidosis occurs when the pH of the plasma falls below 7.35. What are two major types of acidosis?
90. (Page 40.) Summarize how the body compensates for acidosis and alkalosis with three major mechanisms.
91. (Page 40.) Why can't the buffer systems take care of acidosis and alkalosis?
92. (Page 41.) When does metabolic acidosis occur?
93. (Page 42.) Why did Jennifer experience dehydration in her ketoacidosis?
94. (Page 43.) When ketoacidosis occurs, is the pH of the plasma high or low?

95. (Page 44.) Once an individual has metabolic acidosis, the carbonic acid/bicarbonate buffer system will come into action. Which direction will the equilibrium reaction go, to the left or to the right?



96. (Page 44.) As a result of metabolic acidosis, will the level of bicarbonate increase or decrease?

97. (Page 44.) Which body system will respond to compensate for this acid/base imbalance, the urinary system or the respiratory system?

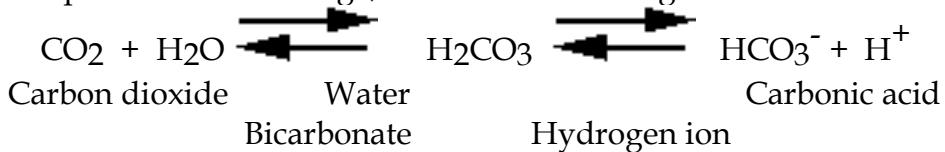
98. (Page 44.) Predict how the respiratory system will compensate for metabolic acidosis, will you breathe faster or slower?

99. (Page 45.) What causes metabolic alkalosis?

100. (Page 46.) When vomiting from the stomach occurs, what is lost from the body?

101. (Page 46.) What would you expect to happen to the pH when vomiting from the stomach occurs?

102. (Page 47.) Once an individual has metabolic alkalosis, the carbonic acid/bicarbonate buffer system will come into action. Now which direction will the equilibrium reaction go, will it shift to the right or to the left?



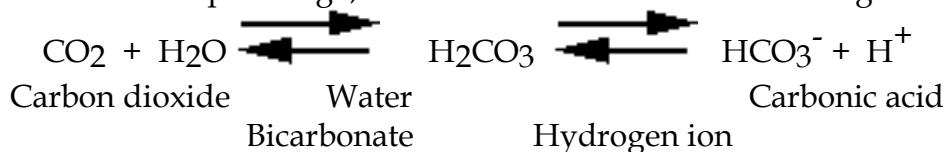
103. (Page 47.) Predict how the body will compensate for metabolic alkalosis. Will hypoventilation or hyperventilation occur?

104. (Page 48.) When does respiratory acidosis occur?

105. (Page 49.) What is the defect in emphysema?

106. (Page 50.) Why would the neurologic symptoms of respiratory acidosis be sometimes more severe than those of metabolic acidosis?

107. (Page 50.) As a result of respiratory acidosis from emphysema, which direction will this equation go, would it shift to the left or to the right?

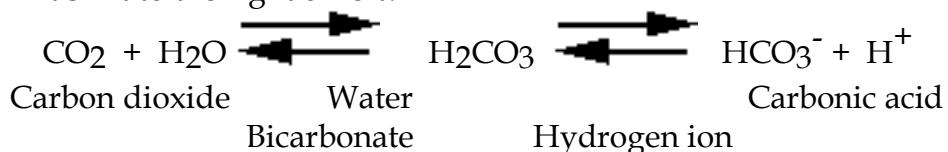


108. (Page 51.) What happens to acid levels in the blood, will they rise or fall?

109. (Page 51.) How the body compensates for respiratory acidosis.

110. (Page 52.) What causes respiratory alkalosis?

111. (Page 53.) As a result of hyperventilation, which direction will this equation go, will it shift to the right or left?



112. (Page 54.) What will happen to the concentration of H^+ in the blood, will it increase or decrease?

113. (Page 54.) How will the body compensate for respiratory alkalosis?

114. (Page 41, 45, 48, & 52.) Would the following cause metabolic acidosis, metabolic alkalosis, respiratory acidosis or respiratory alkalosis?

- Excessive diarrhea, caused by loss of bicarbonate which is plentiful in intestinal fluid.
- Vomiting of stomach contents containing hydrochloric acid would deplete the acid in the body.
- Severe anxiety over a visit to the dentist.
- Some types of kidney disease, which prevent elimination of acid from the body.
- Stimulation of the brain stem in the case of meningitis may cause hyperventilation.
- Ketoacidosis from total absence of insulin in the body, or starvation.
- Decreased activity of the diaphragm muscle.
- Low levels of oxygen in the blood, may cause hyperventilation.
- Lack of oxygen in the tissues which causes the production of lactic acid.
- Ingestion of too much bicarbonate, or baking soda, would produce an excess of base.
- Vomiting of intestinal contents.

- l. Head injury may also cause hyperventilation.
- m. Excess acid can also appear in the extracellular fluids due to a high potassium ion concentration in the extracellular fluid.
- n. Metabolic alkalosis can occur when there is too little potassium in extracellular fluid.
- o. Conditions that impair exchange of gases in the lungs.
- p. Lack of respiratory control in the brain stem.

115. (Pages 55-58.) Fill out this diagram:

	Acidosis	Alkalosis
Metabolic	Cause: 	Cause:
Respiratory	Compensation: $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{HCO}_3^- + \text{H}^+$	Compensation: $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{HCO}_3^- + \text{H}^+$
	Cause: $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{HCO}_3^- + \text{H}^+$	Cause: $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{HCO}_3^- + \text{H}^+$
	Compensation: 	Compensation:

116. (Page 55.) What is the cause of metabolic acidosis? (Check all that apply.)

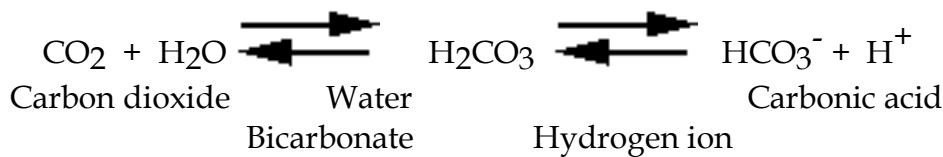
- Excess H^+ generated within the body
- Loss of base from the body
- Deficit of H^+ within the body
- Gain of base in the body

117. (Page 55.) Which of the following would be observed in simple, uncompensated metabolic acidosis?

- CO_2 rises
- CO_2 falls
- HCO_3^- rises
- HCO_3^- falls

118. (Page 55.) What system will compensate for respiratory acidosis, the respiratory system or the renal system?

119. (Page 55.) As a result of compensation, which direction will this reaction go, to the right or to the left?



120. (Page 55.) Will this individual hyperventilate or hypoventilate?

121. (Page 56.) What is the cause of metabolic alkalosis? (Check all that apply.)

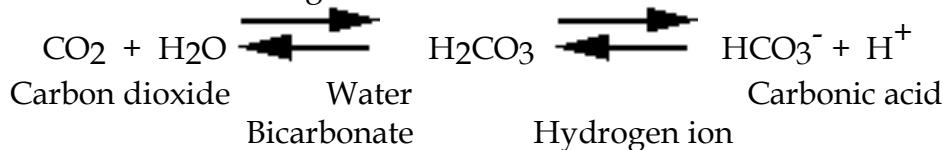
- Excess H⁺ generated within the body
 - Loss of base from the body
 - Deficit of H⁺ within the body

122. (Page 56.) Which of the following would be observed in simple, uncompensated metabolic alkalosis?

- CO₂ rises
 - CO₂ falls
 - HCO₃⁻ rises
 - HCO₃⁻ falls

123. (Page 56.) What system will compensate for metabolic alkalosis, the respiratory system or the renal system?

124. (Page 56.) As a result of compensation in metabolic alkalosis, which direction will this reaction go?



125.(Page 56.) Will the individual in metabolic alkalosis hyperventilate or hypoventilate?

126. (Page 57.) What is the cause of respiratory acidosis? (Check all that apply.)

- Excess H⁺ generated in the body
 - Loss of H⁺ from the body
 - Loss of CO₂ from the body
 - Buildup of CO₂ in the body

127. (Page 57.) As a result of respiratory acidosis, which direction will this reaction go?





128.(Page 57.) Which of the following would be observed in simple, uncompensated respiratory acidosis?

- CO₂ rises
- CO₂ falls
- HCO₃⁻ rises
- HCO₃⁻ falls

129. (Page 57.) What system will compensate for respiratory acidosis, the respiratory system or the renal system?

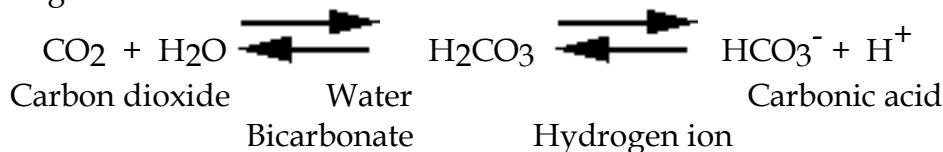
130. (Page 57.) Complete this chart:

NORMAL	ABOVE	Below

131. (Page 58.) What is the cause of respiratory alkalosis? (Check all that apply.)

- Excess H⁺ generated in the body
- Loss of H⁺ from the body
- Loss of CO₂ from the body
- Buildup of CO₂ in the body

132. (Page 58.) As a result of respiratory alkalosis, which direction will this reaction go?



133. Which of the following would be observed in simple, uncompensated respiratory alkalosis

- CO₂ rises
- CO₂ falls

HCO₃⁻ rises

HCO₃⁻ falls

134. What system will compensate for respiratory alkalosis, the respiratory system, or the renal system?

Continue to Acid/Base Homeostasis – Part VII
(Separate Document)