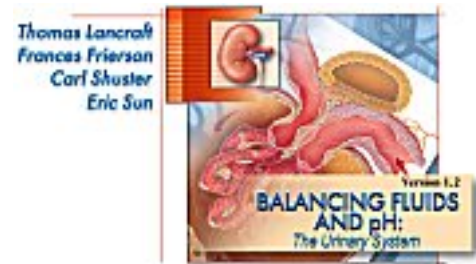


Regulation of pH



Directions:

- a. Click the "Contents" button.
- b. Open the *Urinary System* File.
- c. Click *Animations*.
- d. Click *Regulation of pH*.

Introduction

1. a. Explain the correlation between molecular dissociation and hydrogen ions.



- b. Explain the function of the pH scale. How does it reflect hydrogen ion concentration (acidosis or alkalosis)?

- c. Why is pH important to enzymes? _____

- d. Explain the importance of blood pH regulation. _____

- e. Identify 3 regulatory mechanisms for blood pH. _____

Chemical Buffers

2. a. Explain buffer action in each of the following situations:

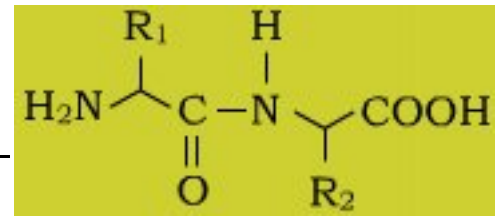
increased hydrogen ions / decreasing pH - _____

decreased hydrogen ions / increasing pH - _____



- b. Identify the three chemical buffer systems: _____

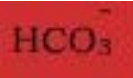
c. Explain how protein buffers accommodate dropping or rising pH conditions.



d. Explain how phosphate buffers accommodate dropping or rising pH conditions.

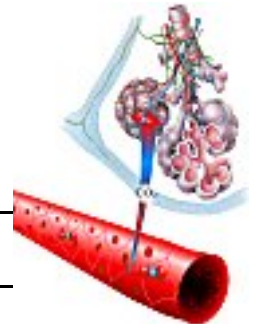


e. Explain how bicarbonate buffers accommodate dropping or rising pH conditions.

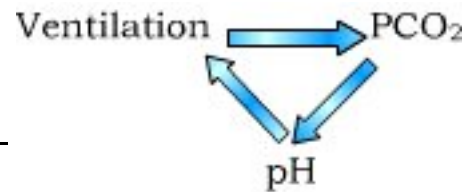


Role of Respiratory System

3. The respiratory system regulates blood pH by controlling the amount of carbon dioxide in the blood. Explain.

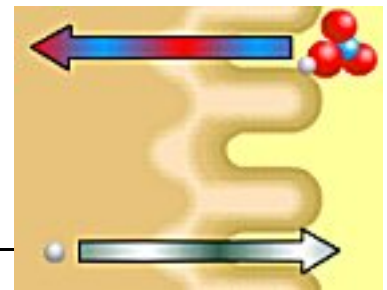


4. Explain how the respiratory center accommodates rising and falling blood pH resulting from carbon dioxide.



Role of the Urinary System

5. Describe how the tubular cells of the PCT and collecting ducts (tubules) alter blood pH.



6. Explain how the nephron accommodates acid conditions.



7. Explain how the nephron accommodates alkaline conditions.



Acid-Base Imbalances

8. a. Chemical buffers, the respiratory system, and the urinary system work together to maintain blood pH homeostasis. Identify the two main categories that cause pH imbalance.

b. Define the following:

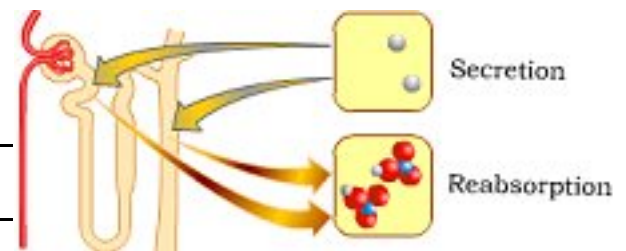
respiratory acidosis - _____

respiratory alkalosis - _____

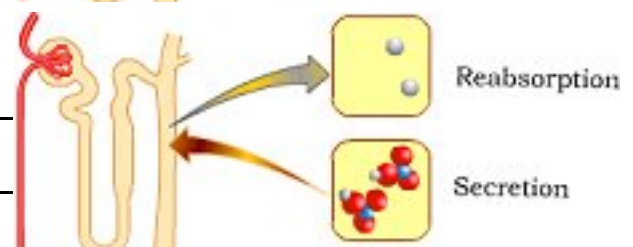
metabolic acidosis - _____

metabolic alkalosis - _____

9. Describe urinary system compensation for respiratory acidosis.



10. Describe urinary system compensation for respiratory alkalosis.



11. Describe respiratory compensation for metabolic acidosis.

12. Describe respiratory compensation for metabolic alkalosis.

