**Acid-Base Buffer Lab**

**Alkalosis or Acidosis** Humans (and many other animals) have chemicals in their blood that help maintain homeostasis of the pH in the bloodstream. These chemicals are known as buffers, and specifically in humans, the buffers are carbonic acid, H2CO3, and sodium bicarbonate, NaHCO3. If these buffers were absent from our blood, the eating of acidic or basic foods would cause the pH to shift too high (alkalosis) or shift too low (acidosis), and the result could be deadly.   This lab will demonstrate the buffering solutions found in your bloodstream and their ability to minimize changes in blood pH.

**Pre-Lab Questions**

1.What is a buffer?

2.What two parts are necessary in a buffer?

3.What does each part do?

4. Read through the procedure. Which setup is the control?

5. What is the independent variable in the experiment?

**Procedure**

*Beaker #1: Unbuffered Solution*

1.Place 50 ml of deionized water in a beaker and add 6 drops of universal pH indicator. Note the color and record.

2.Add 3 drops of 1.0 M HCl. Note the new color and record the pH.

3.Save this beaker & solution for comparison to situation #2.

*Beaker #2: Buffered System*

1.Make a buffer solution in a new beaker. Do this by putting 50 ml of 0.1 M NaHCO3 solution in the beaker and blowing exhaled breath into the solution for at least 2 minutes.

2.Add 6 drops of universal pH indicator. Note the color and record the pH.

3.Add 3 drops of 1.0 M HCl as you did above and note the color and record the pH.

4.Continue to add acid drop by drop, counting the drops (swirl to mix) until the color matches the unbuffered solution from step 2 in situation #1. How many drops did you use? Record.

* **Data Table**

|  |
| --- |
| **Beaker 1** |
|  | *Color* | *pH* |
| *Initial* |  |  |
| *Final* |  |  |
| **Beaker 2** |
|  | *Color* | *pH* |
| *Initial* |  |  |
| *Final* |  |  |
| Number of Drops Added to match Beaker 1? |  |
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**Post-Lab Questions**

1. Did the buffer system work? Give evidence.

2. Exhaled breath contains CO2. This carbon dioxide reacted with the water in the beaker to form carbonic acid, H2­CO3. Write the chemical reaction.

3. Describe what you think happens to the HCl when it is mixed with the buffer?

4. Describe what you think would happen to molecules of NaOH if they were mixed with the buffer?