Names: _____

Protein-Protein Interactions

Physical-Chemical Properties of Egg Albumin

Reading: *http://chemconnections.org/general/chem106/Tech%20Prep/Protein%20Activity%20II.1-2016.html*

Experimental Procedure:

1. Add about 75 mL of water to a 150 mL beaker and heat it to at least 80.^{o}C. Carefully break one fresh egg into a second 150 mL beaker. Using an eye dropper, separate the egg white from the yolk and place it in a small beaker. Discard the yolk. Add a few drops of the egg white to the hot water after the temperature of the water has reached 80.^{o} C
2. Place one or two drops of egg white into a test tube or small beaker, which contains about 3 mL of 6 M HCI.
3. Place one or two drops of egg white into a test tube or small beaker, which contains about 3 mL of vinegar.
4. Place one or two drops of egg white into a test tube or small beaker, which contains a few grams of $NaHCO_3$ (baking soda) dissolved in 3-4 mL of water.
5. Place one or two drops of egg white into a test tube or small beaker, which contains a few grams of NaCl (table salt) dissolved in 3-4 mL of water.

		Observation
1.	Heating	
2.	HCl(aq) hydrochloric acid	
3.	CH_3COOH(aq) vinegar	
4.	$NaHCO_3$(aq) baking soda	
5.	NaCl(aq) salt solution	

Post Lab Questions

1. How many different amino acids are there in the following peptide segment that is found in albumin: GSIGAASMEF CFDVFKELKV ?

2. Name the amino acid residue that appears most frequently in the peptide segment.

3. What do you think happens in the reaction of egg white with the hydrochloric acid and with the hot water? Is there a difference between them? What might account for this?

4. Provide a reasonable explanation for the difference observed in treating the egg white with sodium chloride and with sodium bicarbonate.

5. Provide a plausible reason that would explain albumin reacting with hydrochloric acid but not vinegar (acetic acid)?

6. What is the mass of 0.10 moles of albumin? (Show calculation)

7. How many moles of egg white are there in one large AA grade egg? (Show calculation)

8. Briefly describe how to prepare a perfect soft boiled egg.

9. Provide a clear explanation in your own words of why copper and not stainless steel bowls have been used in recipes and in practice for over 200 years to froth egg whites.

10. Which of the experimental steps if done before Humpty's fall would have allowed all of the king's men to put Humpty back together? Briefly explain why.

11. There are many pharmaceutical drugs that are closely related to proteins or are proteins themselves. Based on what you explored in this activity, do you think that it would be possible to take these pharmaceuticals orally? Briefly explain your answer. (The drugs must enter your blood stream chemically intact in order to work pharmacologically.)