



### Protein Folding Data Sheet

**Step 1:**

Find the chart of amino acids in your text. Look at the R group on each of the following amino acids, and identify each as nonpolar, polar, negatively charged, or positively charged.

- Red (methionine) = \_\_\_\_\_
- Orange (leucine) = \_\_\_\_\_
- Yellow (cysteine) = \_\_\_\_\_
- Green (threonine) = \_\_\_\_\_
- Blue (glutamic acid) = \_\_\_\_\_

Colored & Labeled Amino Acid Sequence:

What kinds of bonds hold this structure together? \_\_\_\_\_

**Step 2:**

The polypeptide is now in the secondary conformation; the pleats and helices are due to \_\_\_\_\_ bonds. (\*hint\* weak)

**Step 3:**

The tertiary conformation is where the peptide looks like a globular protein. Here are the rules to follow when forming the tertiary structure

- a. In a watery environment, polar amino acids want to have contact with \_\_\_\_\_
- b. In a watery environment, nonpolar amino acids want to be near each other and \_\_\_\_\_ from water
- c. Positively charged amino acids are \_\_\_\_\_ to negatively charged amino acids
- d. Cysteine side chains want to be near each other because they can form stabilizing \_\_\_\_\_ bridges

**Step 4:**

For some proteins, the tertiary conformation is its functional form. However, for some proteins to function, they need to associate with other tertiary structures (called subunits) creating what is called the \_\_\_\_\_ conformation.

Why are some of the structures formed in the class different? How does this relate to chaperonins? (see your textbook if you don't know what a chaperonin is)

**Analysis:**

1. Why are proteins such important molecules in living cells?
2. If we use an analogy that compares a cell to a factory, why could DNA be called "the boss" and proteins be called the "the factory workers"?
3. Egg white is normally a thick clear liquid containing protein. When heated, it turns into a white semi-solid. Explain why and how this happens.

4. Why are proteins among the most diverse macromolecules?



5. Imagine the protein on the right is composed of amino acids that are all hydrophobic. Draw a picture of the most likely tertiary structure in the box on the right. Explain your configuration based on the structure of protein and water.