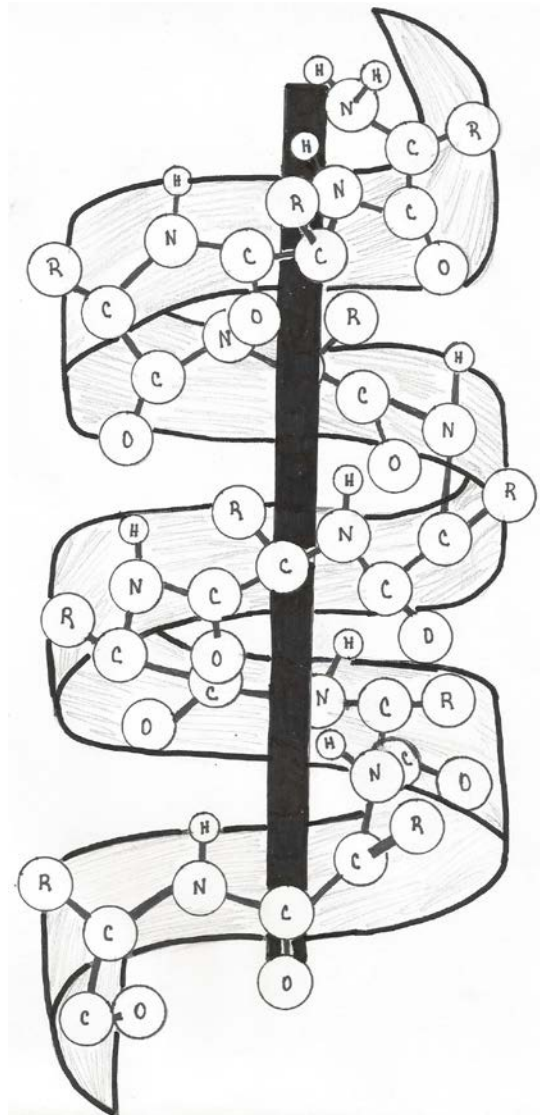


**Chemistry 4055 (Spring 2013)**

**Biochemistry I- Introduction to the Chemistry of the Animal Cell**

**Chapter 4 HW Assignment- Lecture 1**

1. What type of intramolecular interactions defines those that occur in the primary structure of proteins?
2. What makes peptide bonds planar?
3. Why can't psi ( $\Psi$ ) and phi ( $\phi$ ) both be zero? How are the values of these angles different between amino acids in  $\alpha$  helix and  $\beta$  sheet structures?
4. Draw in all of the hydrogen bonds in the  $\alpha$  helix shown. Note that the hydrogens on the  $\alpha$  carbons were omitted for clarity.



5. If you have an arginine residue in your  $\alpha$  helix, then which amino acid(s) should be 3 AA units away for an ion pair to exist?
6. What accounts for the different orientation of the hydrogen bonds that occur between amino acid residues in  $\beta$  sheet secondary structures? How does this affect the hydrogen bond strengths?
7. What characteristic of proline makes it favorable for  $\beta$  turn structures?
8. You very carefully perform multiple fractionation steps to purify a protein that is known to have high  $\beta$  conformation secondary structure. You decide to measure the UV CD spectrum of your protein but you notice that the spectrum shows a very poor signal for a  $\beta$  conformation. How would you classify the success of your of protein isolation/purification?