Protein structure Homework for video (3) Solutions in video (4)

- 1. A solution is 5×10^{-6} M butyric acid. The K_a of butyric acid is 1.55×10^{-5} . What is the pH of the solution?
- 2. A solution is 5×10^{-6} M HCl acid. What is the pH of the solution?
- 3. What is the difference between pH and pK_a?
- 4. **From memory**, write down all the ballpark pK_a's.
- 5. What are the names of the three types of "weak interaction"? What is the name of the one "strong interaction" we have studied? Rank all four from strongest to weakest.
- 6. (a) What is an electrostatic interaction? Draw an example of an electrostatic interaction between two amino acids in separate positions on a peptide. (b) What is a hydrogen bond? Draw an example of a hydrogen bond between two amino acids in separate positions on a peptide. (c) What is a van der Waals interaction? Draw an example of a van der Waals interaction between two amino acids in separate positions on a peptide.
- 7. What is the hydrophobic effect?
- 8. (a) What force or interaction maintains the shape of an α -helix? (b) What is the value of the "rise" of an α -helix? (c) How many residues are in one turn of an α -helix? (c) How long is one turn of an α -helix?
- 9. (a) What is an angstrom? What is the symbol for "angstrom"?
- 10. An α -helix is 30 Å long. Approximately how many residues and how many turns does it contain?
- 11. An α -helix has 30 residues. Approximately how long is it and how many turns does it contain?
- 12. An α -helix has 14 turns. Approximately how long is it and how many residues does it contain?
- 13. Name some of the functions of proteins.
- 14. (a) What type of molecule is α -keratin? (b) What is the function of α -keratin?
- (c) Describe the structure of α -keratin.

