

Biochemistry: Protein structure
Homework for video (2)
Answers in video (3)

1. A solution is 7×10^{-6} M acetic acid. The K_a of acetic acid is 1.74×10^{-5} . What is the pH?
2. A solution is 7×10^{-6} M benzoic acid and 5.2×10^{-5} M benzoate. The pK_a of benzoic acid is 4.2. What is the pH of the solution?
3. What are the bonds between amino acids in a peptide called? What type of functional group does the bond consist of?
4. Draw an amine. Draw an amide. Are amines acidic, basic, or neither? Are amides acidic, basic, or neither?
5. (a) Draw the structure of the following peptide at physiological pH:
his-thr-pro-ile
(b) What is the primary structure of this peptide?
(c) Label the bonds whose rotation angle is measured by ϕ . Label the bonds whose rotation angle is given by ψ .
6. What are some important characteristics of peptide bonds? Explain why the peptide bond has those characteristics.
7. (a) Memorize the ballpark pK_a 's from the table on p. 41 of your textbook.
(b) **From memory**, write down all the ballpark pK_a 's.
8. What are the names of the three types of "weak interaction"?
9. What is an electrostatic interaction? Draw an example of an electrostatic interaction between two amino acids. Are electrostatic interactions in the body weaker or stronger than covalent bonds? (b) What is a hydrogen bond? Draw an example of a hydrogen bond between two amino acids. Draw an example of a hydrogen bond between an amino acid and water. Are hydrogen bonds weaker or stronger than covalent bonds?
10. What are the names of the main types of secondary structure?