Protein Practice Sheet

(Amino Acid list, last page)

1. Consider the following structures, which are Fischer projections, and answer the questions that follow.

|  |  |  |
| --- | --- | --- |
|  |  |  |
| What is the name of the amino acid? |  |  |
| Is the amino acid D or L? |  |  |
| Is the amino acid at an acidic, neutral, or basic pH? |  |  |
| What function group(s) are shown in the side chain (R group) |  |  |
| What family does the amino acid belong to?  (nonpolar, polar neutral, polar acidic or polar basic) |  |  |
| What is the three-letter and one letter abbreviation for this amino acid? |  |  |

1. Draw structures of the following amino acids at the indicated pH’s.

|  |  |  |
| --- | --- | --- |
| a. Valine at a neutral pH (isoelectric point) | b. Valine at a very basic pH | c. Valine at a very acidic pH |
|  |  |  |

1. Define isoelectric point
2. Draw the structure of the polypeptide represented by the sequence SFG at pH=7. Label the C-terminus and the N-terminus.
3. Shows structures for the acid hydrolysis of a dipeptide.



1. Explain why the notations Val-Phe-Cys and Cys-Phe-Val represent two different molecules rather than the same molecule.
2. Explain what is meant by the following terms.
3. The primary structure of a protein.

1. The secondary structure of a protein. What kinds of attractive forces are associated with this?

1. The tertiary structure of a protein. What kinds of attractive forces are associated with this?

1. What kind of tertiary interaction occurs between the following amino acids at pH 7 ? Draw the structure of the amino acid side chains illustrating the interaction
   * 1. Aspartic acid and Lysine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     2. Serine and Asparagine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     3. Valine and Phenylalanine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Answer the following:
   1. Describe the denaturation of proteins. Be sure to address what happens and doesn’t happen to the protein structure.
   2. Give three examples of a reagent which would cause denaturation?
   3. How is denaturation of proteins different from coagulation of proteins?
   4. What is the difference between protein digestion and protein denaturation?
3. Compare two differences between fibrous and globular proteins.

1. Why do amino acids typically have very high melting points?
2. How does detergent denature?

