

# BL/CH401 Biochemistry 1

## ANSWERS FOR AMINO ACID SEQUENCE PROBLEMS

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If you are having trouble with the structures of the amino acids, look them over in [Lecture 4](#).

To see the structure of simple peptides look at Figure 3 in [Lecture 5](#).

To see the structure of Homoserine lactone (HSL) look at Figure 15 in [Lecture 5](#).

**1. The amino acid sequence of the peptide is:**

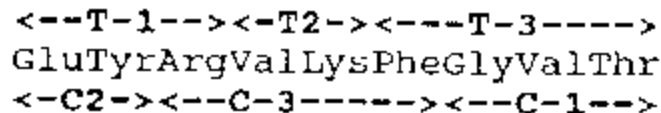


Figure 1.

The net charge of the peptide at pH 7 = +1

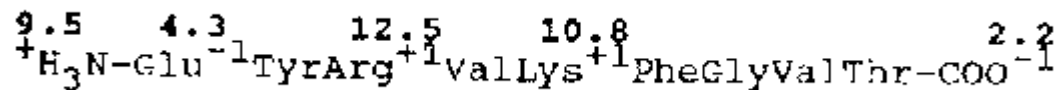


Figure 2.

Approximate isoelectric point is  $pI = (9.5 + 10.8)/2 = 10.15$

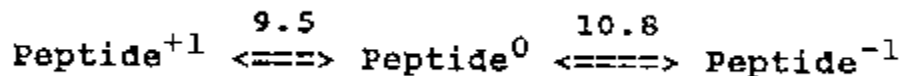


Figure 3.

Structure at pH 7 is:

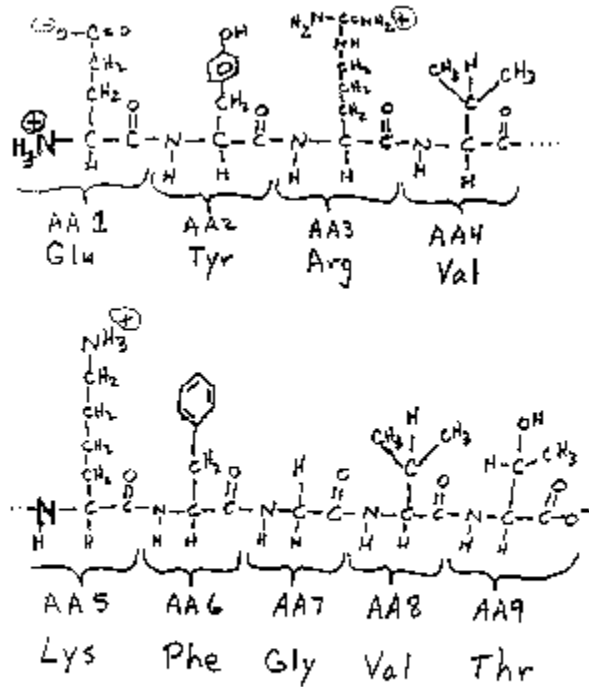


Figure 4.

2. The amino acid sequence of the peptide is:

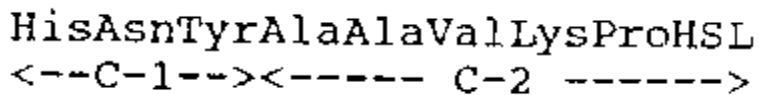


Figure 5.

HSL = homoserine lactone, which comes from Met when cleaved with CNBr.

Since the peptide is not the C-terminal peptide of the protein after cleavage with CNBr, it must have HSL as its last amino acid residue. Trypsin will not cleave the LysPro bond. The amino acid composition of C-1 contained Asp, while the peptide contains Asn, this is because Asn is converted to Asp during acid hydrolysis.

3. The amino acid sequence of the whole peptide is:

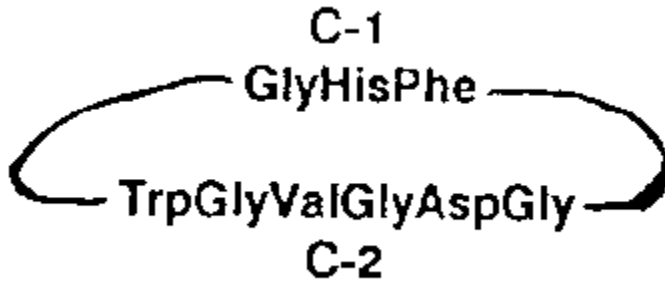


Figure 6. Shows AA sequence of C-1 and C-2 also.

The Net charge on this peptide at pH 3 = +1; at pH 5 = 0; at pH 7 = -1.

Since the peptide is circular, the only charged groups are the side chains of His (assume pK = 6) and Asp (assume pK = 4).

Approximate isoelectric point is:  $pI = (4 + 6)/2 = 5$ .

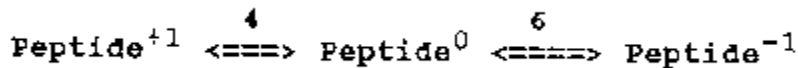


Figure 7. Model of peptide showing charged forms

4. The amino acid sequence of the peptide is:

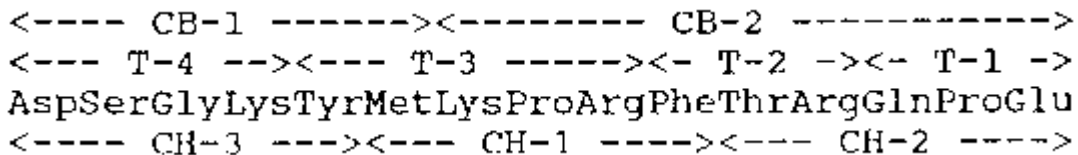


Figure 8.

5. Amino acid sequence problem from Exam I, 1993:

This is a circular peptide:

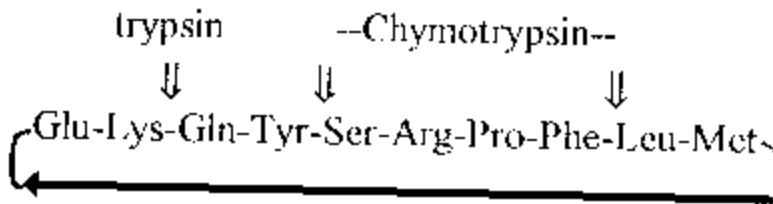


Figure 9a.

Draw the Tryptic Peptide (shown with charges at pH 7):

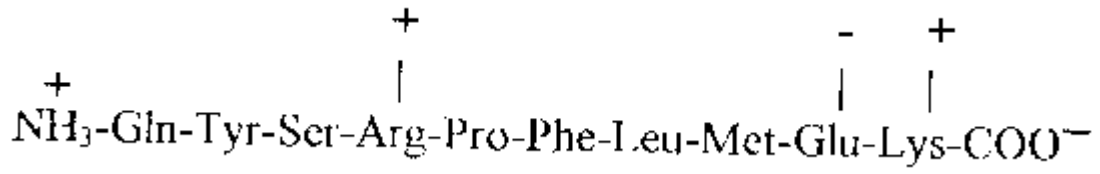


Figure 9b. Tryptic Peptide.

Charge at pH 4 = +2; pI = 10.2

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