

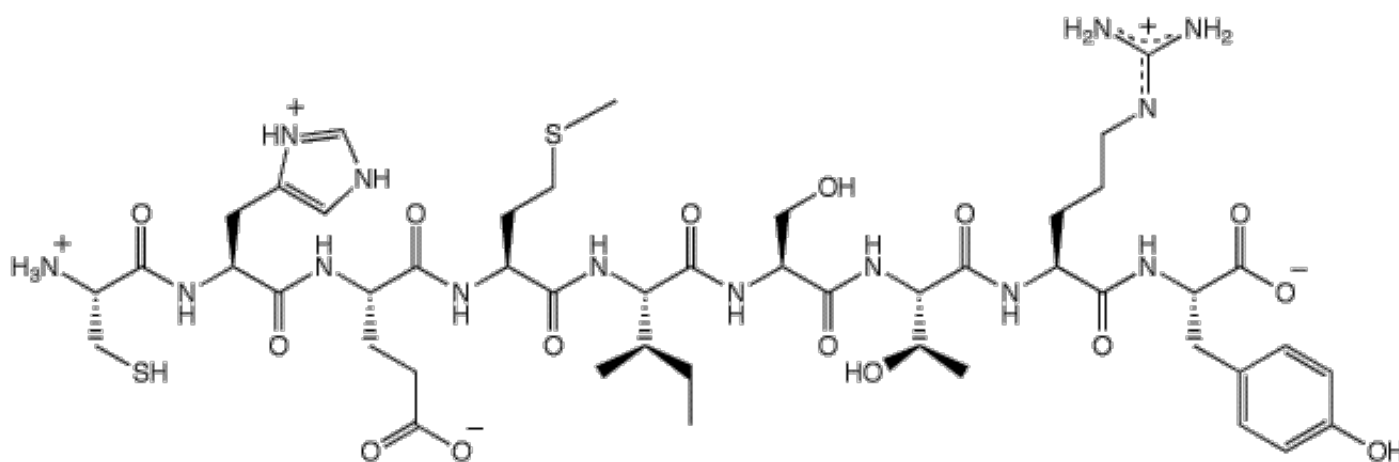
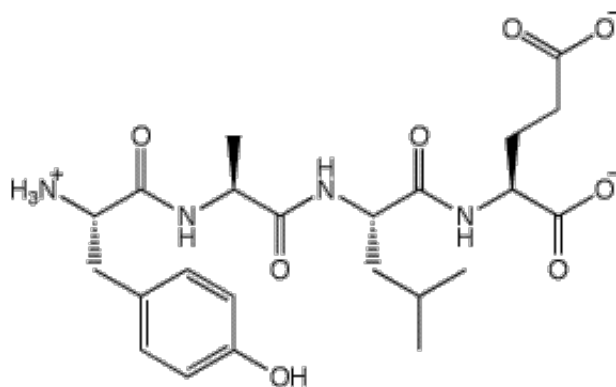
Chem 221b

Problem Set 10, Chapter 24

Amino Acids

Due: Monday, April 25, 2005

1. The New Chemistry Research Building, whose construction is nearing completion just north of Sterling/Kline Laboratories, is scheduled to open in the Fall of 2005. The Prospect Street entrance ([look here for a view](#)) will have a [gate](#) bearing ornamentation related to four areas of chemistry: organic, inorganic, theory/physical, and biological. Ornamentation gate are the two peptides shown below. What is the message? [Thanks to [Professor Valentine](#) for the structure.]



2) The Strecker synthesis converts isobutyraldehyde into (d,l)-valine. When the same reaction is applied to (d,l)-2-methylbutanal (α -methyl butyraldehyde) in an attempt to prepare racemic isoleucine ($2R^*$, $3S^*$),

a) What problem may arise? Explain and illustrate.

b) Draw the Fischer projection of L-isoleucine. Provide a mechanism for the formation of α -methyl butyraldehyde from isoleucine using the ninhydrin reaction.

3) Design a synthesis of d,l-aspartic acid from oxalic acid using the Claisen condensation.

4) An undecapeptide **A** is digested in the presence of trypsin to form Phe-Gly-Arg, Val-Glu-Pro-

Lys, and Trp-Ser-Leu-Asp. Sanger analysis of the undecapeptide produces $C_{11}H_{13}N_3O_6$ **B** after hydrolysis.

a) What are the structures of **A** and **B**? Explain.

b) What peptide fragments are formed in the presence of chymotrypsin?

5) Without the use of an automated peptide synthesizer, prepare ala-gly-val. The three -amino acids are available to you.

6) When peptides are liberated from a Merrifield resin, anisole is usually included with the HF (See page 1150). Explain.