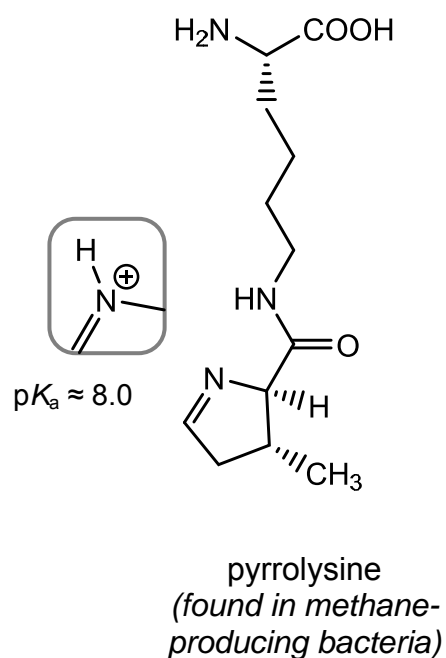
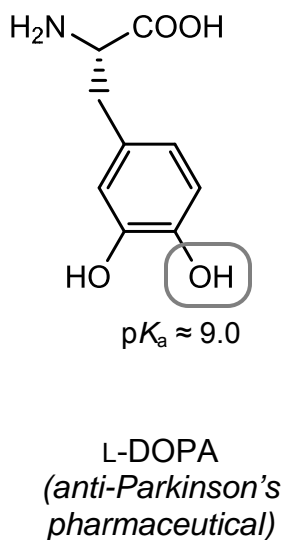
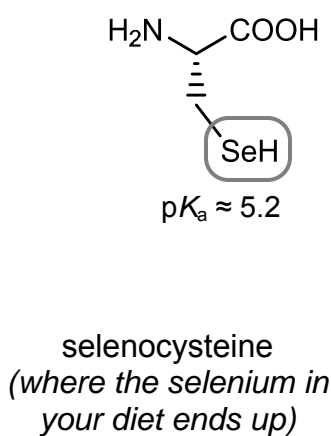


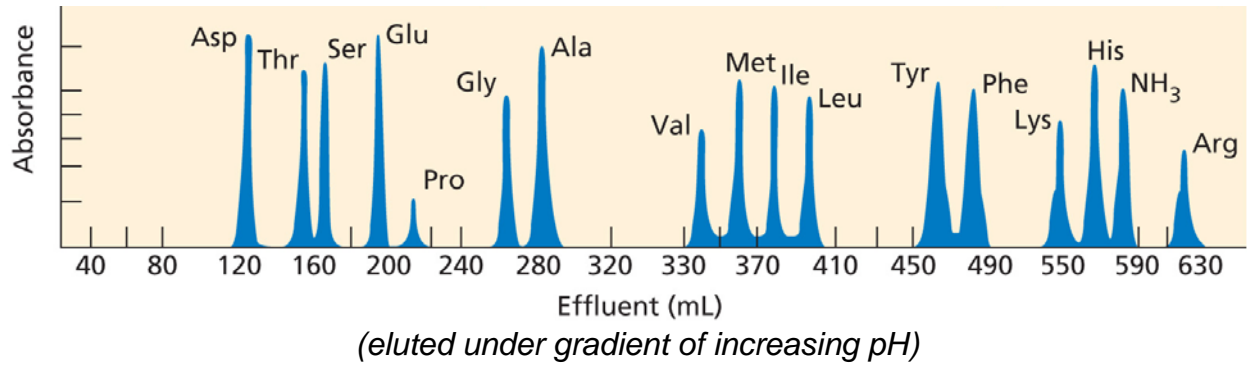
Workshop 25
Analyzing Non-Standard Amino Acids

Along with the twenty standard amino acids, there are many more non-standard amino acids that can be detected by amino acid analysis. A few are specified by the genetic code in prokaryotes, but most are generated by modifying a standard amino acid after it has been incorporated into a protein.

1. Ion exchange chromatography separates amino acids partly on the basis of isoelectric point (and partly by hydrophobic attraction to the polystyrene column resin). For each of the non-standard amino acids below:
 - Draw the most stable structures for the $z = +1$, 0, and -1 charge states.
 - Using the pK_a values for the acid-base reactions that connect the $z = 0$ charge state with its $z = +1$ and $z = -1$ neighbors, predict the isoelectric point pI .



2. Predict where, relative to the standard amino acids shown below, each non-standard amino acid would elute in ion-exchange chromatography.



3. Based on their structures, which standard amino acid would you guess is modified to produce each non-standard amino acid above?