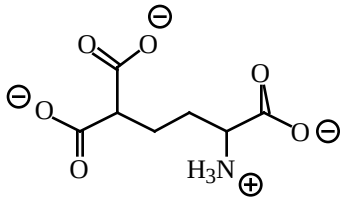
Chemistry 304B Problem Set 10

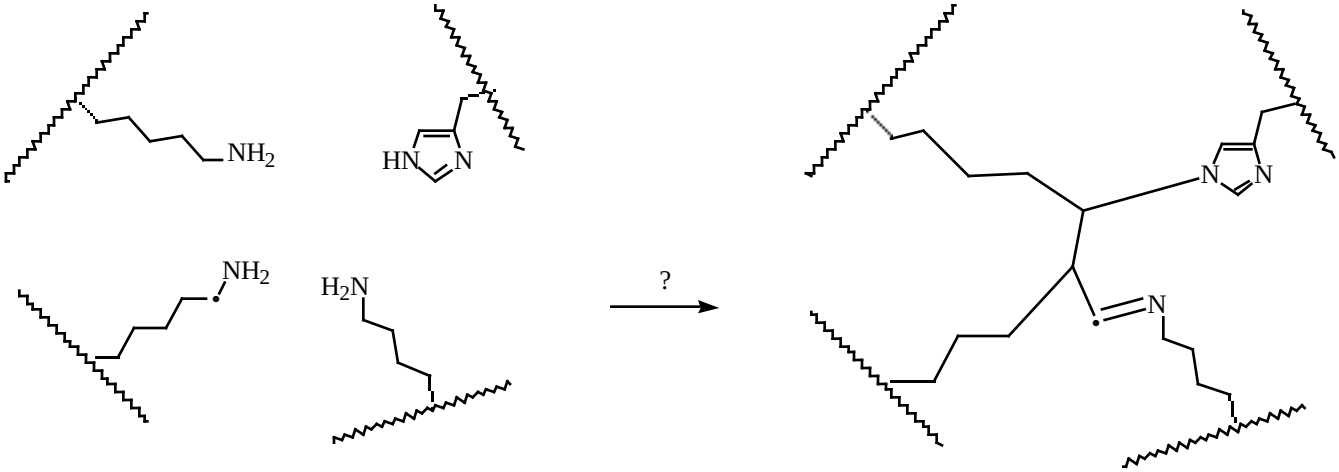
1. Amino acids [and peptide units in proteins] can racemize in the presence of acid. Explain with a mechanism. Begin by drawing the structure of phenyl alanine and use this for your example

2. An unusual amino acid, **1**, eluded detection until 1974. Explain why this molecule might be difficult to isolate.



1

3. The structural protein collagen is made more rigid by "cross-linking" of the side chains of some basic amino acids through some functional group conversions. Lysine amino groups can be oxidized to aldehyde units, as shown in a simple case below (no mechanism shown; don't worry about that now). The cross-linking takes place following two oxidations. Write the pathway leading to the cross-linked product on the right. HINT: among other processes, you should find an aldol reaction and a 1,4-addition of a nucleophile. Identify these carefully in your mechanism.



4 polypeptide chains in the collagen structure

crosslinked collagen