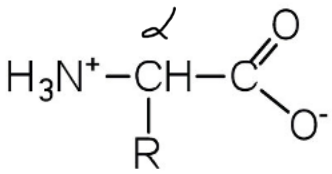
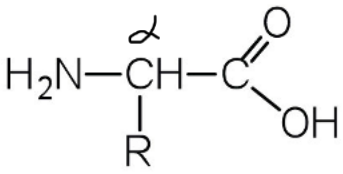
Chemistry 2, HW 25

Every amino acid has a central carbon atom (alpha carbon) bonded to a carboxylate group ($-COO^-$), an amino group ($-NH_3^+$), a hydrogen atom, and a side chain group (R group). The differences in the amino acids are due to the differences in the R groups. The proper form of amino acid is ionized structure called zwitterion, where COOH group lose proton and NH_2 group accept proton.



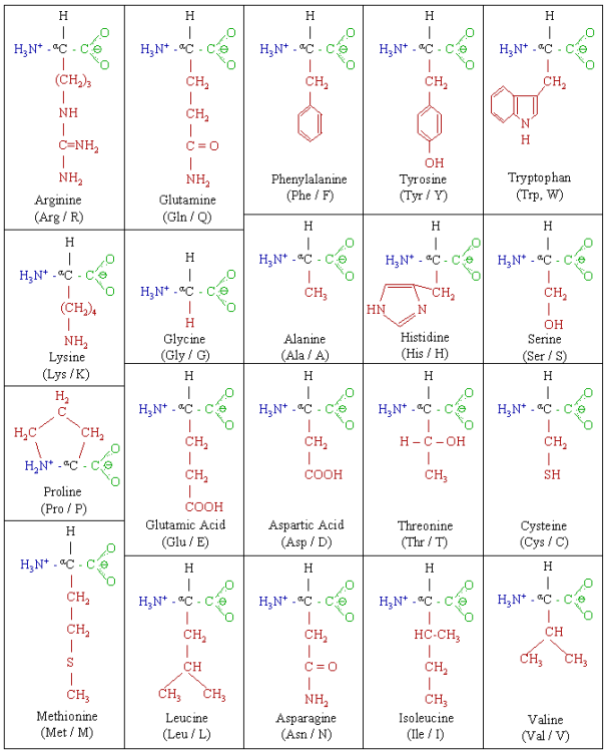
α-Amino acid drawn as a zwitterion



α-Amino acid drawn as an uncharged molecule; not an accurate respresentation of amino acid structure

Classification of amino acids

1. Nonpolar amino acids: R group is alkyl (CH3, C2H5 etc.) or aromatic group (benzene ring), which make amino acid hydrophobic ("water fearing")
2. Polar amino acids contain polar R groups such as -OH, -SH, -CONH2, they are hydrophilic, they interact with water.
3. Acidic amino acids where R groups have $-COO^-$ group.
4. Basic amino acids contain R group that have NH_3^+ group.



Questions:

1. Compare valine, threonine, lysine and glutamate. What type of atoms and group of atoms they have in their R group, are they polar or not, are they acidic or basic and why?
2. Which amino acids are acidic, and what gives them this property?