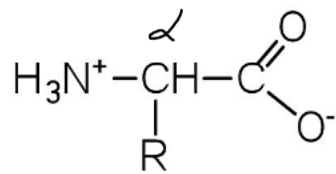
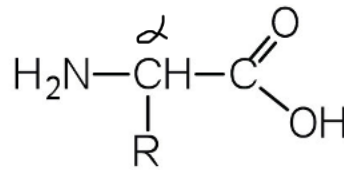


Chemistry 2, HW 25

Every amino acid has a central carbon atom (alpha carbon) bonded to a carboxylate group (-COO⁻), an amino group (-NH₃⁺), 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 NH₂ group accept proton.



α -Amino acid drawn as a zwitterion



α -Amino acid drawn as an uncharged molecule; not an accurate representation 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 NH₃⁺ group.

<p>Arginine (Arg / R)</p>	<p>Glutamine (Gln / Q)</p>	<p>Phenylalanine (Phe / F)</p>	<p>Tyrosine (Tyr / Y)</p>	<p>Tryptophan (Trp / W)</p>
<p>Lysine (Lys / K)</p>	<p>Glycine (Gly / G)</p>	<p>Alanine (Ala / A)</p>	<p>Histidine (His / H)</p>	<p>Serine (Ser / S)</p>
<p>Proline (Pro / P)</p>	<p>Glutamic Acid (Glu / E)</p>	<p>Aspartic Acid (Asp / D)</p>	<p>Threonine (Thr / T)</p>	<p>Cysteine (Cys / C)</p>
<p>Methionine (Met / M)</p>	<p>Leucine (Leu / L)</p>	<p>Asparagine (Asn / N)</p>	<p>Isoleucine (Ile / I)</p>	<p>Valine (Val / V)</p>

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?