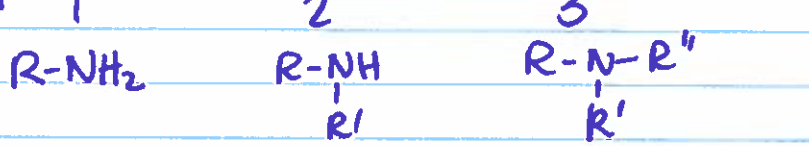
4/10/19

Amines & Amino Acids

Amines: Compounds containing nitrogen.

(pyramidal) when attached to Hydrogen it will form hydrogen bonds

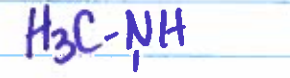
Classification: 1° 2° 3°



B.P. highest ⟶ lowest
(however B.P. for amines are higher than comparable hydrocarbons)

methanamine

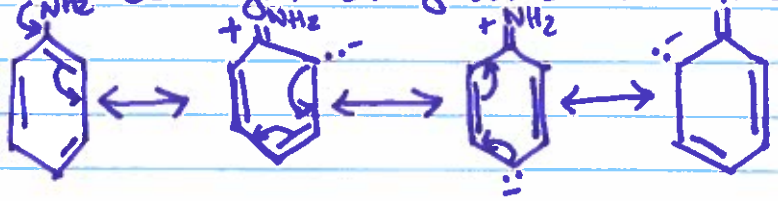
methyl amine



N-methyl ethanamine

ethyl methyl amine

Aniline



Resonance

This occurs due to the delocalization of the lone e⁻ pair, the process reduces the basicity of aryl amines.

nucleophile: an atom that donates both e⁻ to a bond.

Heterocyclic amine: nitrogen is part of the ring.

Heterocyclic aromatic amine: aromatic ring containing nitrogen.

Physical Properties

1. weak bronsted-Lowry bases because they are proton acceptors.
2. 1° & 2° can form hydrogen bonds.
3. foul smelling
4. polar, hydrophilic
5. generally soluble in H_2O, however, solubility decreases as the size of the carbon chain increases.

Reactivity:

Amines are generally proton acceptors, however, in the presence of a strong base they can be proton donors.

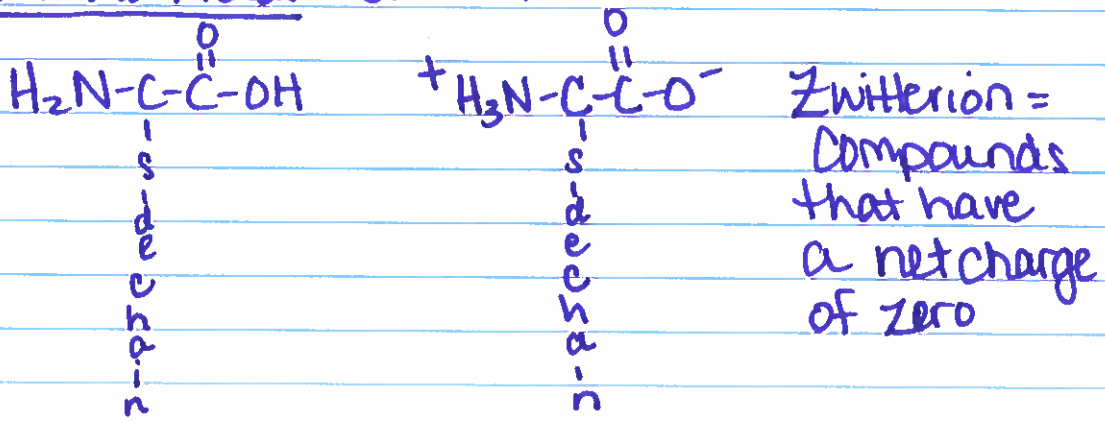
This makes them = amphiprotic (amphoteric)

If an amine reacts w/ a strong acid a water soluble salt will be formed.

$$RNH_2 + HCl \xrightarrow{H_2O} RNH_3^+ {}^-Cl$$

Amide = $-\overset{O}{\overset{\|}{C}}-N-$

Amino Acids (A.A.)



Zwitterion = Compounds that have a net charge of zero

- Basic structures for proteins
- 20 A.A. involved in proteins, called alpha amino acids
- Can be written as one letter or three letter codes

Classification

1. Non-polar side chain: don't → bond, give off protons, participate in H-bonding, or ionic bonds
   They are hydrophobic

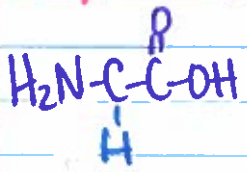
2. Uncharged polar side chains: zero net charge at neutral pH. They do participate in H-bonding.

3. Acidic side chains: Contain a proton donor, fully ionized at neutral pH
   $R-COO^-$
   Hydrophilic

4. basic side chains: Contain a proton acceptor, fully ionized at neutral pH
   $R-NH_3^+$
   Hydrophilic

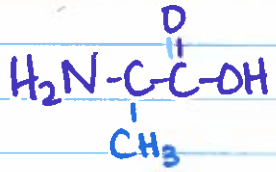
Thiol = Sulfur present

Glycine (gly)



Sweet & simple "glyce" to meet you!

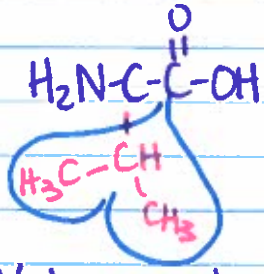
Alanine (ala)



Alan Mach$_3$

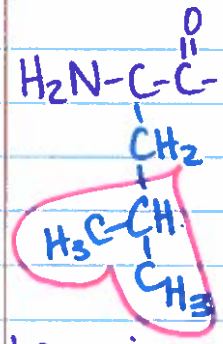
almost the nice one

Valine (val)



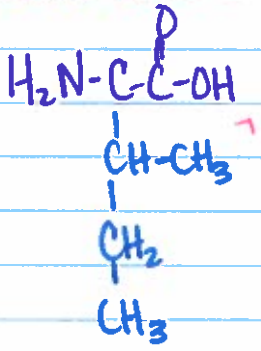
Val keeps her "♥" close

Leucine (leu)



Leucine plays loose wl his heart.

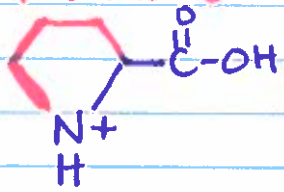
Isoleucine (Ile)



2nd leucine wl sec-butyl

Isolated looser

Proline (Pro)

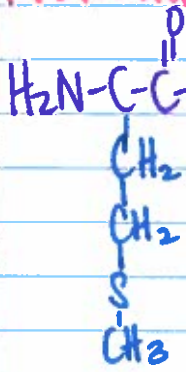


Pro-league b-ball

Pro-lean

lean protein

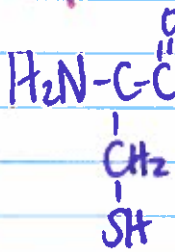
Methionine (Met)



Meth-thiol

Meet in the middle

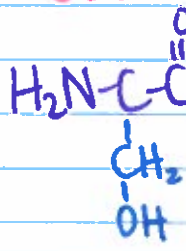
Cysteine (cys)



Sh, so we can hear the bells

C
S cysteine

Serine (ser)



Ser-OH-man