- Amino group: -NH2 (amines) related to ammonia (–NH3) and act as base accepting a proton to form –N3+
    - Hydrophobic and reactive and hydrogens can be replaced by other groups
- Carbonyl group: -C=O one of the most important and reactive groups
    - Hydrophilic
    - Adehydes –CHO
        - CH3 – C –H
            - =O
    - Ketones
        - CH3 – C –CH3
            - =O
- Carboxylic acid group: -COOH
    - –OH can ionize making compounds containing this group weak acids
    - Krebs cycle (tricarboxylic acid cycle) is a cycle of cellular reactions envolving a number fo carboxylic acids
- Sulfhydryl groups: -SH
    - H atom can be removed easily
    - In proteins 2-SH groups may become oxidized to form a cross link structure –S-S-
- Several functional groups in 1 molecule:
    - Alpha- amino acids (building blocks of proteins)
        - Contains both –COOH and –NH2 but at neutral pH an amino acid is best written +H3N-CHR-CO2^-
    - Fatty acids contain both hydrophilic and hydrophobic groupings

Important reactions:

- Oxidation of alcohols
    - Alcohol groups may reversibly be oxidized to carbonyl groups
    - An aldehyde is the oxidation product when the alcohol has at least 2 H atoms attached to the C bearing the –OH groups
        - Known as the primary alcohol
        - Primary alcohol → aldehyde → carboxylic acid
        - If alcohol only has one H atom it will produce a ketone
- Reactions between functional groups
    - When carboxylic acid reacts with an alcohol, water is eliminated and an ester is formed
        - Condensation reaction
        - Reverse = hydrolysis

Organic Compounds

Carbon:

- Facilitated by its versatile valency of 4
- Ability to form long chains
    - More than one bond per atom
    - Preference for single bonds over double
        - 2 single bonds is more stable than 1 double
- Oxide must not be too much more stable than the pure element
    - Would only bond to oxygen

Hydrocarbon – organic carbon compound composed of hydrogen and carbon only

- Aliphatic and aromatic

Aliphatic:

- Carbon atoms form open chains, branched chains, & non-aromatic rings

Aromatic:

- Any organic compound characterized by 1 or more planar rings each of which contains 3 conjugated double bonds and delocalized pi electrons
- Undergo substitution reactions more readily than addition reactions
- Benzene