(3) **Today**

Section 1.2: Chemical Foundations of Biochemistry

Next Class (4)

Sections 1.3 - 1.4: Foundations of Biochemistry

Chap 2: Water and Its Role in Life

(5) **Second Class from Today**

Chap 2: Water and Its Role in Life

Chap 3: Amino Acids, Peptides, and Proteins

Third Class from Today (6)

Chap 3: Amino Acids, Peptides, and Proteins

Office hours canceled today

Alkanes

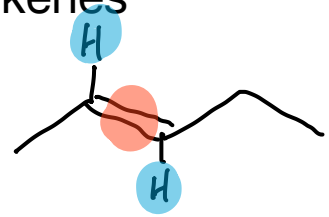
$CH_3-CH_2-CH_2-CH_2-CH_3$

not particularly reactive

nonpolar ... LDF

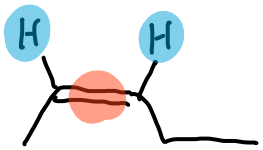
don't interact well with H_2O

Alkenes



trans geometry

limit rotation as compared to alkanes



cis geometry

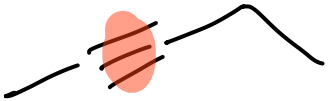
cause kinks

nonpolar ... LDF

don't interact well with H_2O

π bonds of alkenes are reactive e⁻ rich or nucleophilic

Alkynes



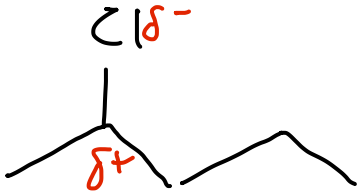
nonpolar ... LDF

don't interact well with H_2O

π bonds of alkynes are reactive e⁻ rich or nucleophilic

$CH_3-C\equiv C-CH_2-CH_2$

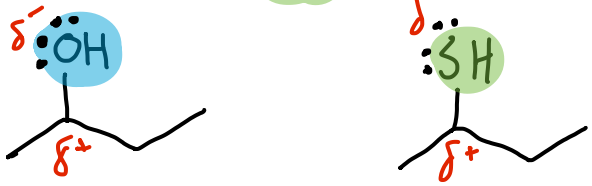
Alkyl Halides



the C atom bonded to the halogen is electrophilic .... attractive to e⁻ rich nucleophiles

slightly polar at the halogen but as chain gets longer the molecules become more nonpolar

Alcohols and Thiols



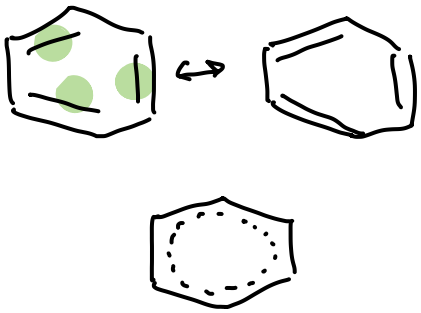
alcohols have a polar functional group
alcohols are H-bond donors & acceptors
an OH can drag about 3 CH_2 groups into solution

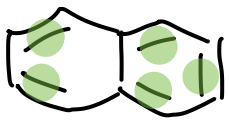
both have electrophilic C atoms

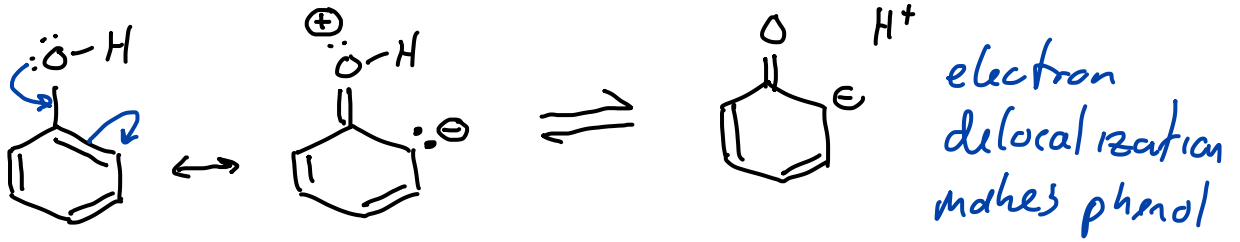
both the O & S can be nucleophiles

slightly polar .... but more polarizable ... its e⁻'s are more easily moved around

Aromatics and Phenols



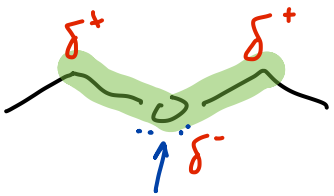




electron delocalization makes phenol a weak acid

electron delocalization in the π bonds

Ethers



H-bond acceptor but not donor

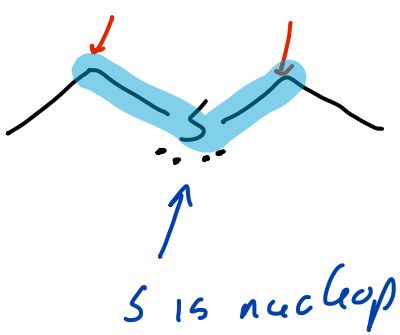
non polar ... not water soluble

but not nucleophilic

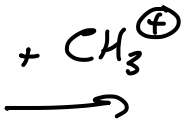
the C atoms are electrophilic

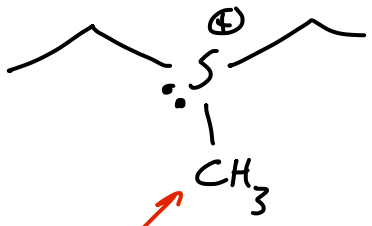
Thioethers/Sulfides

electrophilic C atoms non polar



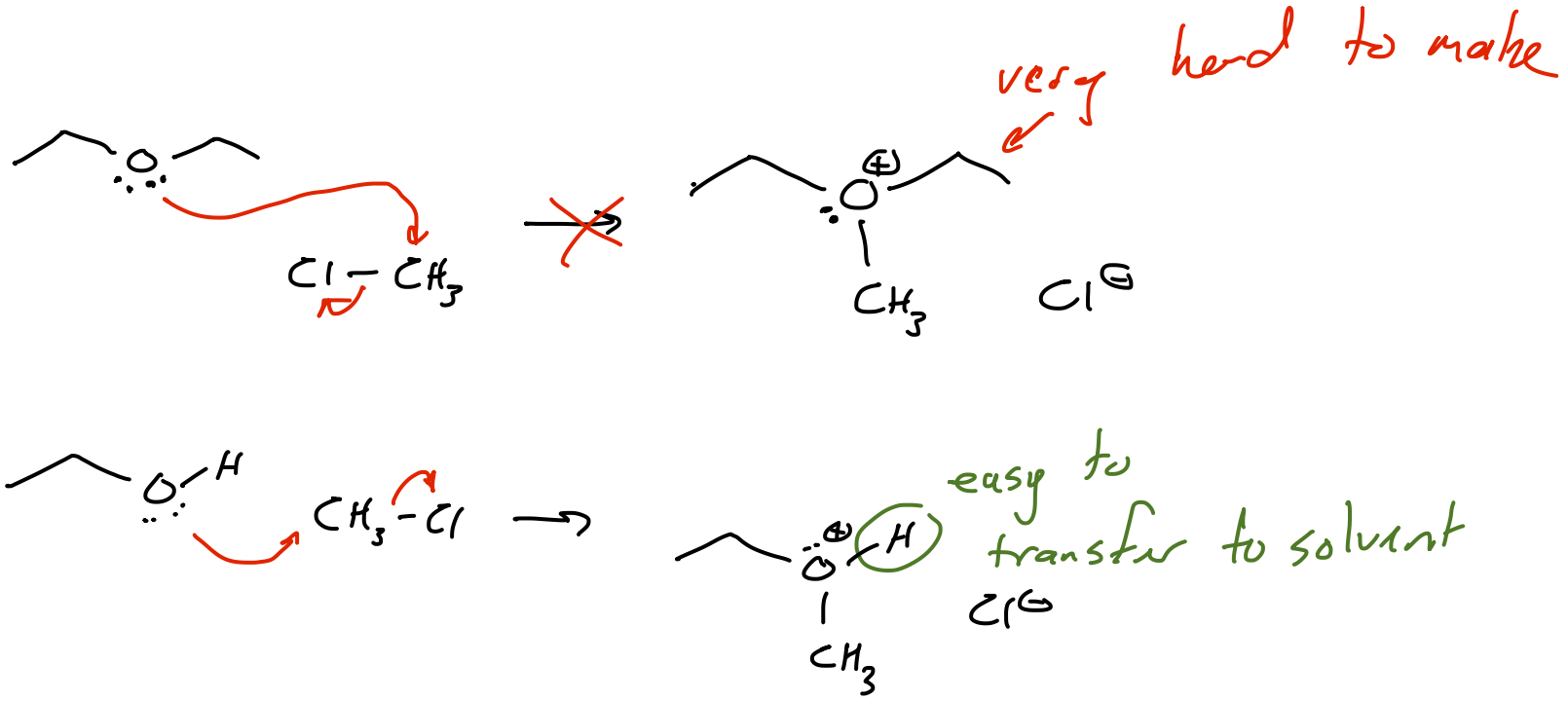
S is nucleophilic





not as high in E as O+... these do form biochemically

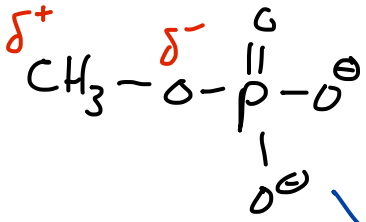
electrophilic


very hard to make
Cl – CH3
CH3
Cl⊖
H
CH3 – Cl
easy to transfer to solvent
H
Cl⊖
CH3

Organophosphates

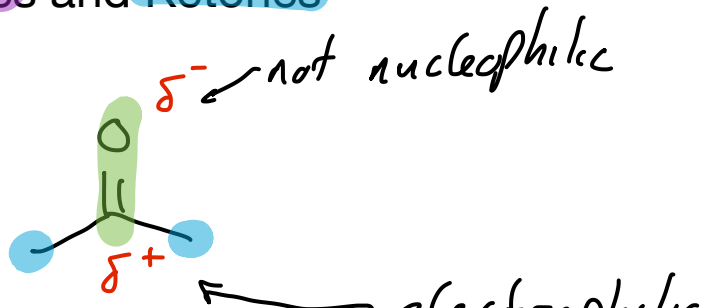
polar, water soluble with short hydrocarbons

C is a very good electrophile



good Leaving Group

Aldehydes and Ketones

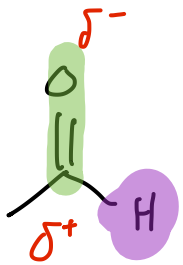


not nucleophilic

electrophilic

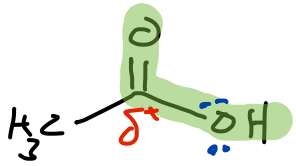
carbonyl

C atoms on both sides of the carbonyl



aldehyde

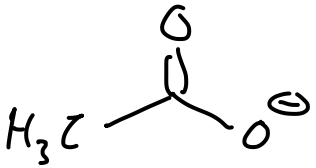
Carboxylic Acids



polar Functional group

electrophilic & acan

nucleophilic



carboxylate ion

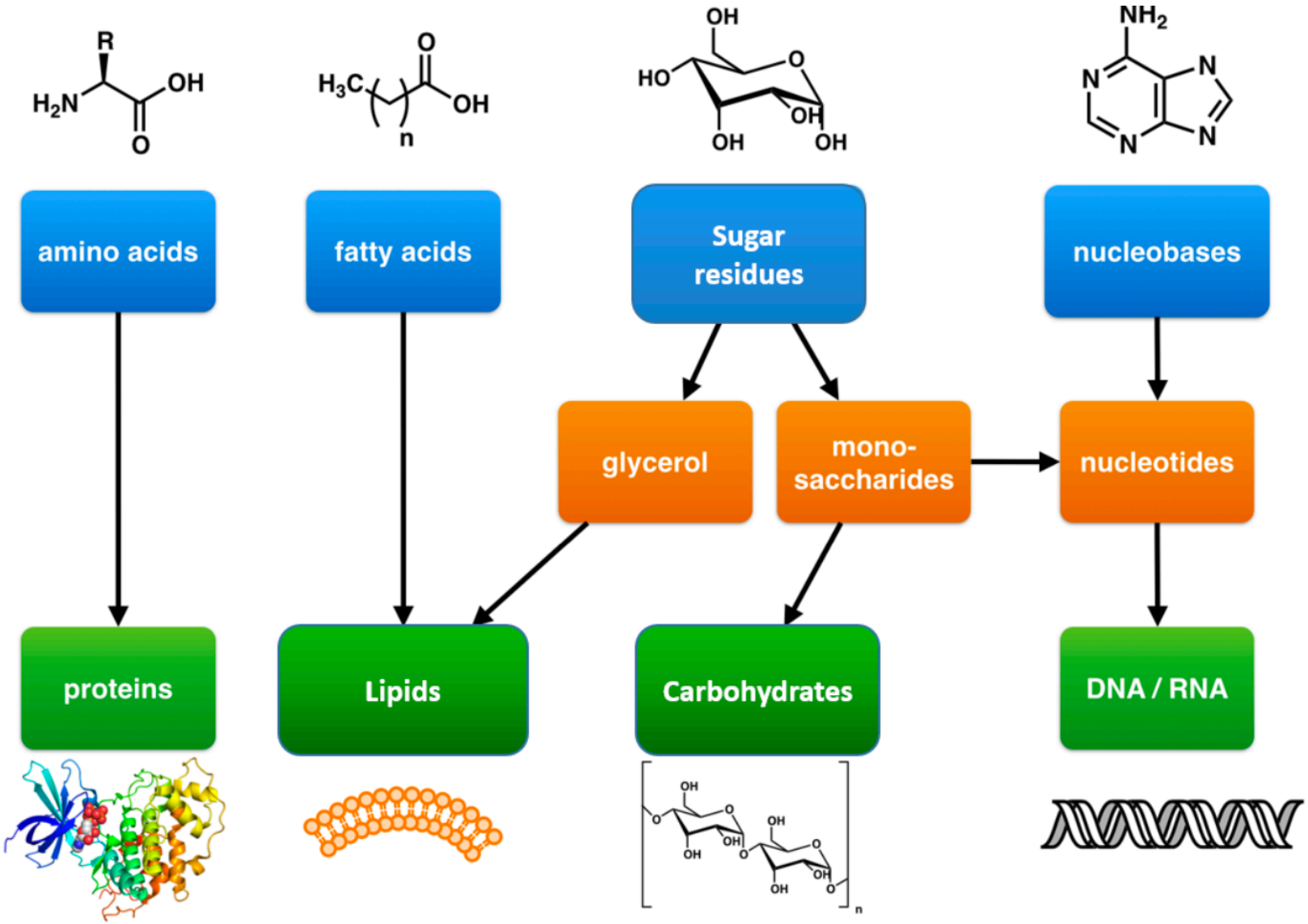
at physiological pH

Esters/Thioesters

Amides

Acyl Phosphates

Chemical Foundations: Primary Metabolites



Fundamentals of Biochemistry Vol 1, Jakubowski and Flatt, LibreTexts

Acyl Substitution Reactions

Nucleophilic Addition Reactions

Nucleophilic Substitution Reactions

Elimination and Addition Reactions