

Functional Groups

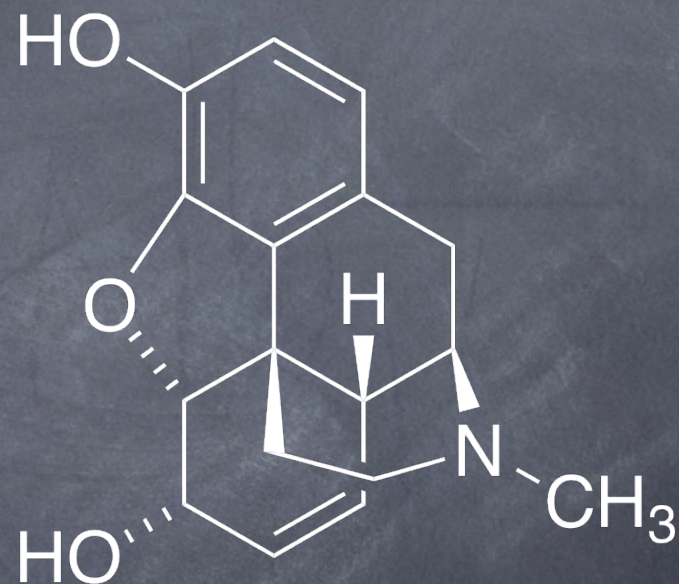
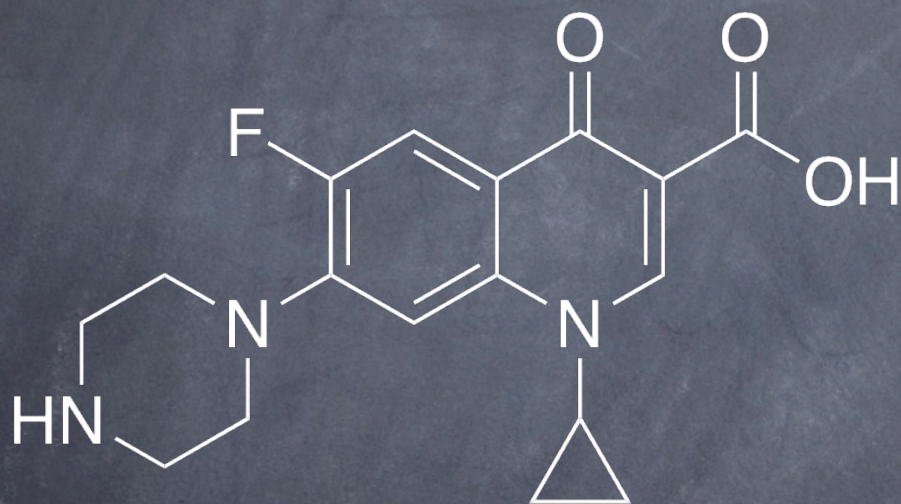
UCI Chem 51A

Dr. Link

Goals

- After this lesson you should be able to:
 - Recognize and identify common functional groups
- Memorization alert: There are a significant number of items in this lesson that will need to be memorized.

What Do These Molecules Have in Common?



- Functional groups are an important organizing factor in organic chemistry.

Functional Groups

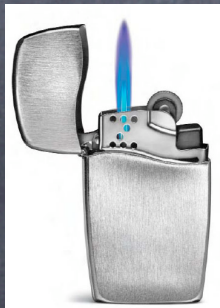
- Organic molecules have two main parts.
 - Carbon backbone: The carbon and hydrogen skeleton of a molecule
 - Functional groups: groups of atoms/bonds that determine the physical and biological properties and reactivity of a molecule

Memorization Alert: You will need to memorize functional groups!

Hydrocarbons

- Alkanes, alkenes, alkynes

alkane*



butane

alkene



ethylene
(ethene)

alkyne



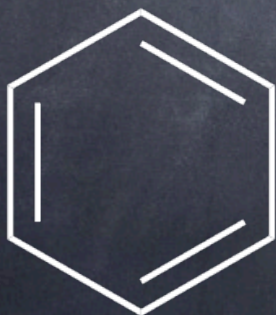
acetylene
(ethyne)

More Hydrocarbons

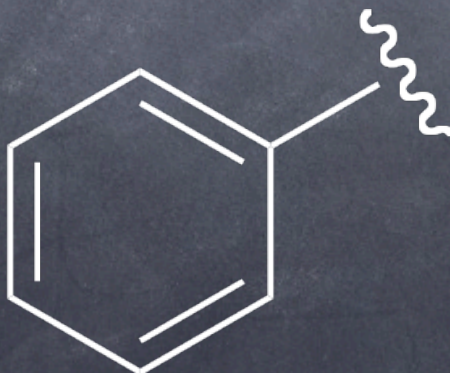
- Benzene rings and related groups
- "Aromatic hydrocarbons"



benzene



phenyl group

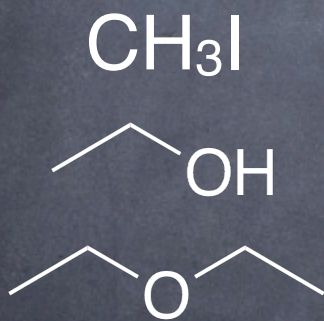


benzyl group



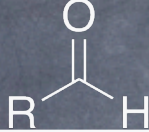
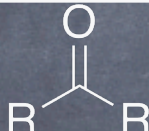
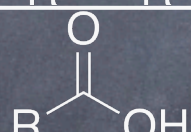
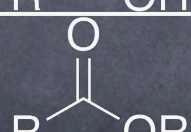
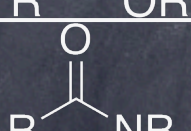
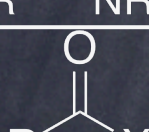
Electronegative Atoms

• AKA C-Z bonds



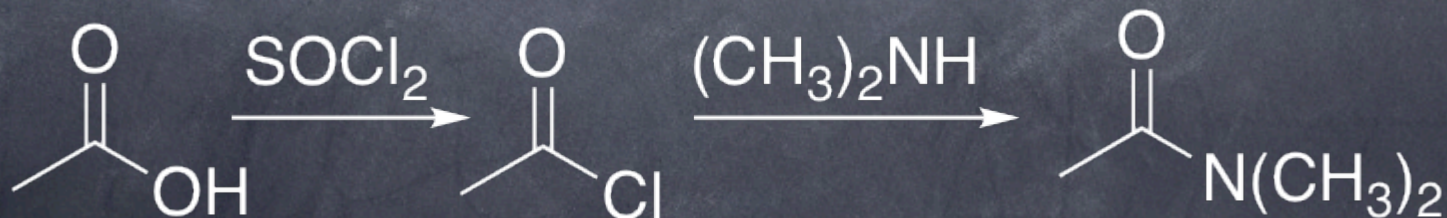
Bond	FG Name	Molecule Name
C-X	halo	alkyl halide
C-OH	hydroxy	alcohol
C-O-C	alkoxy	ether
C-NR ₂ [*]	amino	amine
C-SH	mercapto	thiol
C-S-C	alkythio	sulfide

Carbonyl-Related Functional Groups

Structure	FG Name	Molecule Name
	carbonyl	aldehyde
	carbonyl	ketone
	carboxy	carboxylic acid
	-COOR	ester
	-CONR ₂	amide
	-COX	acid halide (Cl)

Importance of Functional Groups: Reaction Preview

- Functional groups tell us how a molecule will react!



Importance of Functional Groups: Properties Preview

- Functional groups control physical and biological properties!



Wrapping Up

- Practice identifying functional groups in molecules.