CHEM 109, Lecture 1
Structure – Property Relationships
Acid-Base Chemistry

- McMurry & Begley (M&B) Chapter 1.1-1.2 (posted on CHEM 109 website)

Revisiting General Chemistry through Structure – Property Relationships

- *Before class:* brainstorm your current understanding of any or all of the terms below
- *During class:* instructions provided for collaborative activity (concept map)
- *Discussion section:* complete a concept map with any one column of terms below

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
Lewis structure	Intramolecular Forces	Boiling	Polar
Skeletal structure	Ionic Bond	Melting	Non-polar
Hybridization	Covalent Bond	Dissolve	Nucleophile
Molecular Geometry	Intermolecular Forces	Dissociate	Electrophile
Bond Polarity	Hydrogen bond	Salt	Mechanism
Molecular Polarity	London Dispersion	Hydrocarbon	Arrow Pushing
Dipole	Dipole-Dipole	Solubility	Chemical Reaction
Electronegativity	Ion-Dipole	Alcohol	Physical Change

ACID-BASE CHEMISTRY

Rulez to Live By

	Bronsted-Lowry (BL)	Lewis
Acid		
Base		

- **pKa** = - log Ka = **AFFINITY OF AN ACID FOR ITS PROTON**

- Equilibrium (eq≡m) favors the weaker acid

Acid Dissociation Equation: HA →

K_a = pK_a =

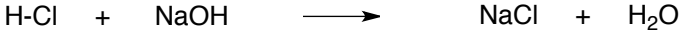
What does it mean if $K_a > 1$? If $K_a < 1$? If $K_a = 1$?

ARROW-PUSHING = the language / symbology of this class!

What do arrows push? What are the possible outcomes of arrow pushing?

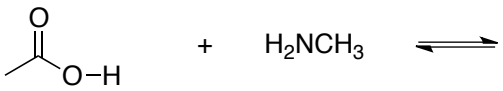
ELECTRON RICH TO **ELECTRON POOR**

Identify the acid, base, conjugate base, conj. acid, and direction of equilibrium (eq≡m)

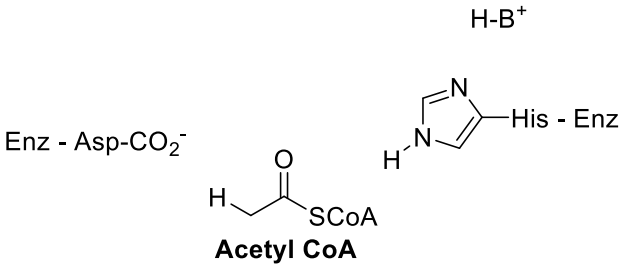


Draw proper Lewis structures & mechanism for the reaction above

Organic Acid-Base Reactions

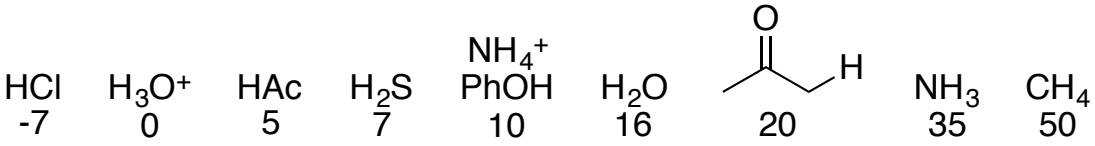


*Amino acid residues = acids & bases in **enzyme active sites**:*

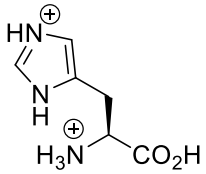


Acetyl CoA

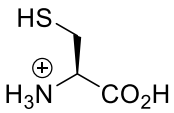
pKa's to Memorize



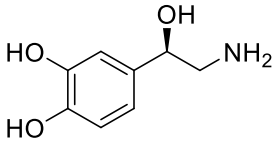
Approximating pKa's: Into which pKa family does each compound belong?



L-Histidine
(fully protonated)



D-Cysteine
(fully protonated)



Norepinephrine

L1 & L2 HW "due" in discussion next week (quiz directly from HW) – assignment online

Next time: Electrophilic Add'n & Substitution Reaction Mechanisms