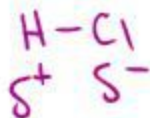


# Acid Strength + Structure

Binary Acids = Acids made up of only 2 elements

↳ H + another electronegative element



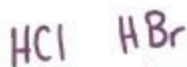
① The more polar the H-A bond (w/  $\delta^+$  on the H) the stronger the acid



EN of Cl > EN of S

• HA polarity increases across row, increasing acid strength

② Bond strength: Weaker bonds can be broken more easily making the acid stronger



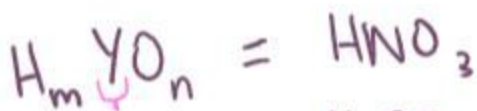
↳ weaker bond = stronger acid

• HA bond strength decreases down a column, increasing acid strength

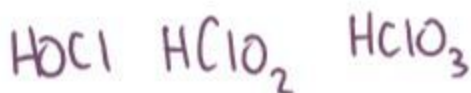
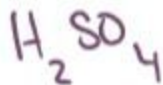
③ Stability of  $\text{A}^-$ : More stable anion means stronger acid

## Oxyacids

↳ acids bonded w/ oxygens



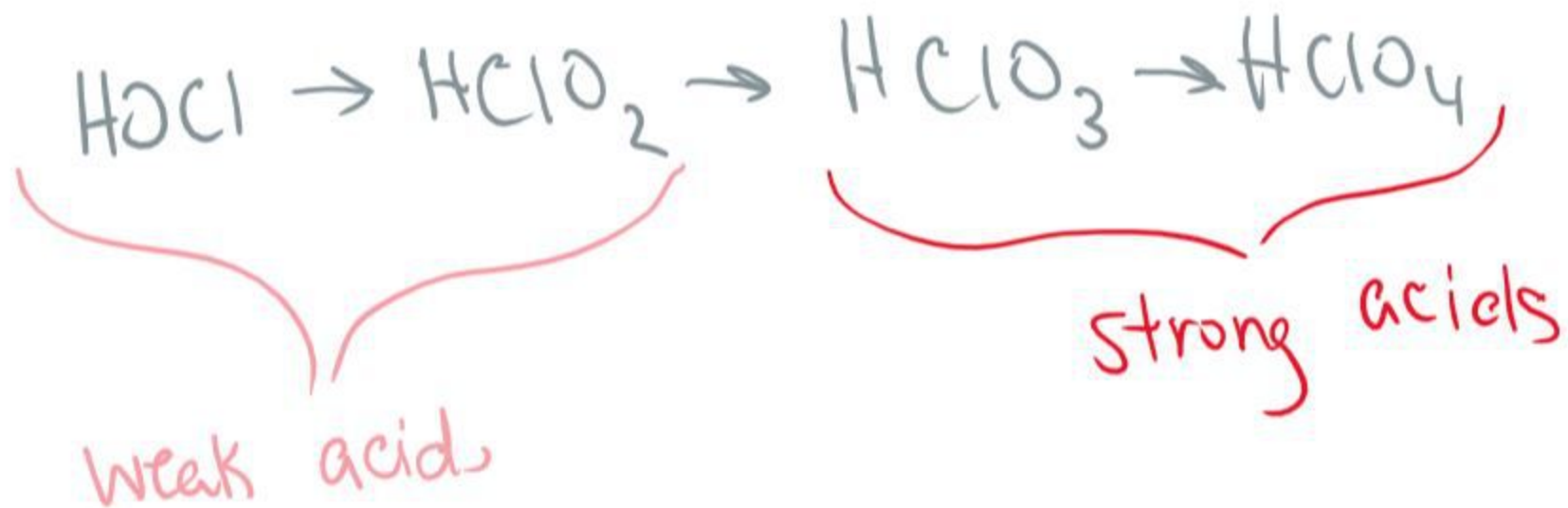
EN of central  
atom



- More EN central atom (Y) makes a stronger acid



- for a series of oxyacids of Y in the same column (same # of O's), acidity increases as EN of Y increases



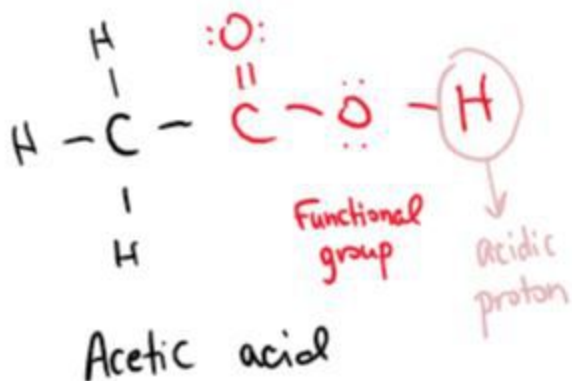
increasing strength 

- As # of O's bonded to Y increases, the strength of the acid increases

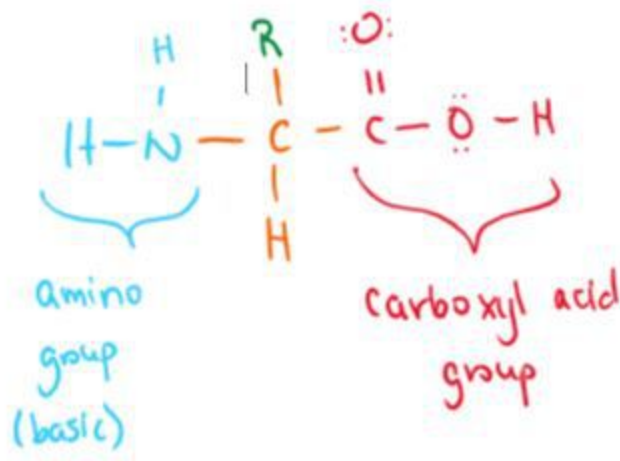
↳ more oxygens = more spread out negative charge (stabilizing)

# Carboxylic Acids

↳ they contain both oxygen and carbon

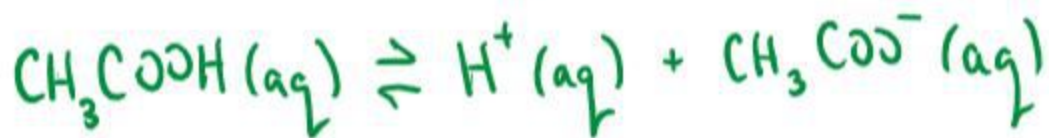


↳ amino acids can act as acids/bases becu  
it contains carboxyl acid group and basic amino group



What happens when we add salt to acid/base soln?

① Add  $\text{NaCH}_3\text{COO}$  to soln of  $\text{CH}_3\text{COOH}$



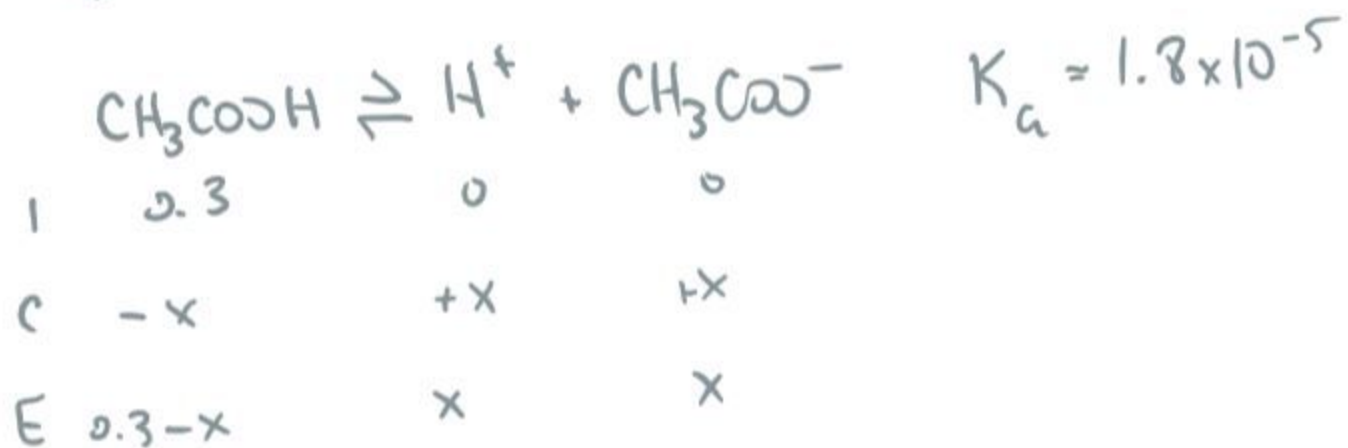
↳ addition of  $\text{CH}_3\text{COO}^-$  shifts rxn to left

↳ thus lowering  $\text{H}^+$  conc. and making soln more basic

- The presence of common ion suppresses the ionization of weak acid/base

Ex: What is pH of soln made by adding 0.3 mol acetic acid to enough water to make 1.0L of solution?

$$K_a = 1.8 \times 10^{-5}$$



$$K_a = \frac{x^2}{0.3 - x}$$

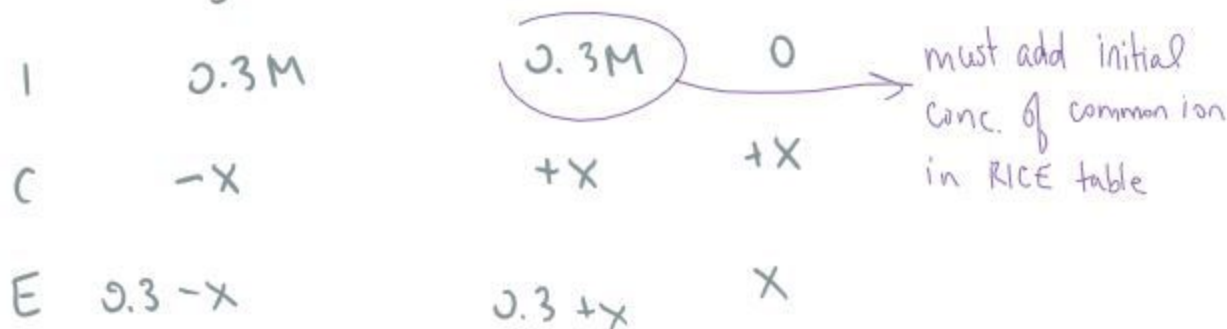
ignore x approx.

$$1.8 \times 10^{-5} = \frac{x^2}{0.3}$$

$$x = 2.3 \times 10^{-3} \text{ M} = [\text{H}^+]$$

$$\boxed{\text{pH} = 2.63}$$

How does the pH change if 0.3 mol of sodium acetate is added?



$$K_a = \frac{x(0.3 + x)}{0.3 - x}$$

can still do  
"ignore x approx."  
bec. since we are making  
[H<sup>+</sup>] even smaller w/ the addition of  
the common ion

$$1.8 \times 10^{-5} = \frac{x(0.3)}{0.3}$$

$$1.8 \times 10^{-5} = x = [\text{H}^+]$$

$$\text{pH} = 4.74$$

↳ soln is less acidic bec. of common ion