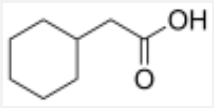
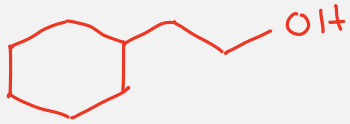
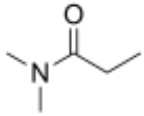
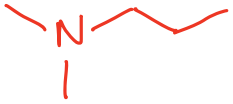
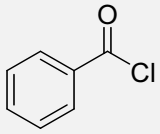
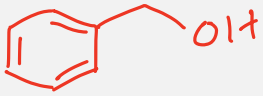
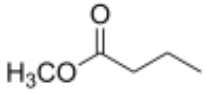
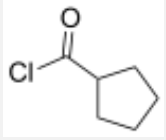
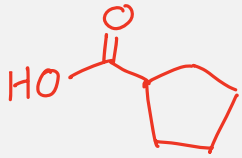
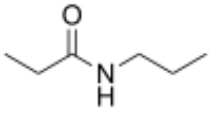
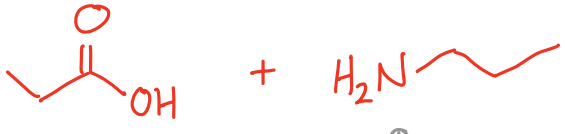
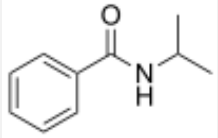
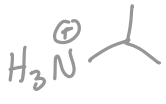
Chapter 22 Homework – Carboxylic Acids & Friends

20A. HYDROGEN & OXYGEN NUCLEOPHILES.

Draw the product of each reaction: **starting material + reagent → Product.**

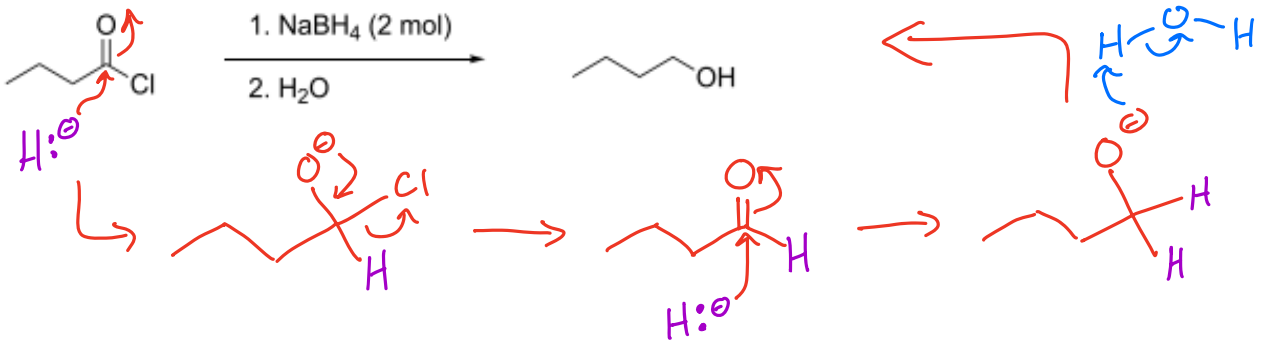
	Starting Material	Reagents *& translation*	Draw the Product
1		**1. xs $LiAlH_4$** **2. H_2O** *Excess lithium aluminum* ***hydride,*** *followed by water*	
2		**1. xs $LiAlH_4$** **2. H_2O**	
3		**xs $NaBH_4$, MeOH** *sodium boro****hydride*** *in methanol*	
4		**1. xs $LiAlH_4$** **2. H_2O**	Draw both organic products 
5		**H_3O^+,** *Aqueous acid and heat*	
6		**H_3O^+,**	Draw both organic products  acidic conditions, protonated amine
7		**H_3O^+,**	Draw both organic products 



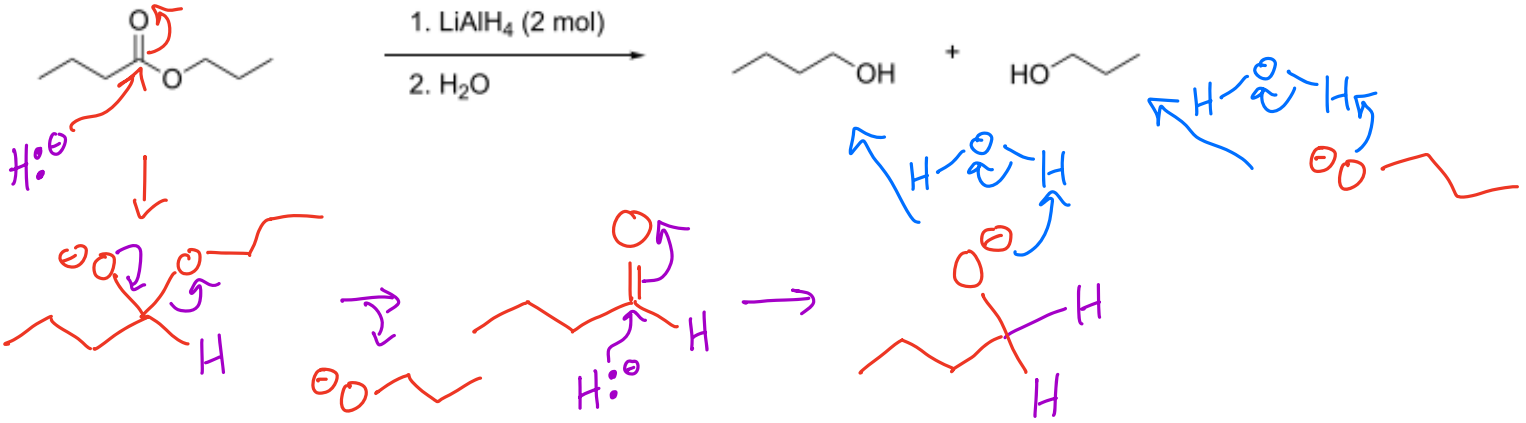
22B. Mechanisms – Acid Derivatives with hydrogen and oxygen nucleophiles.

- Draw the arrow-pushing mechanism for each reaction, including all charged intermediates and product.

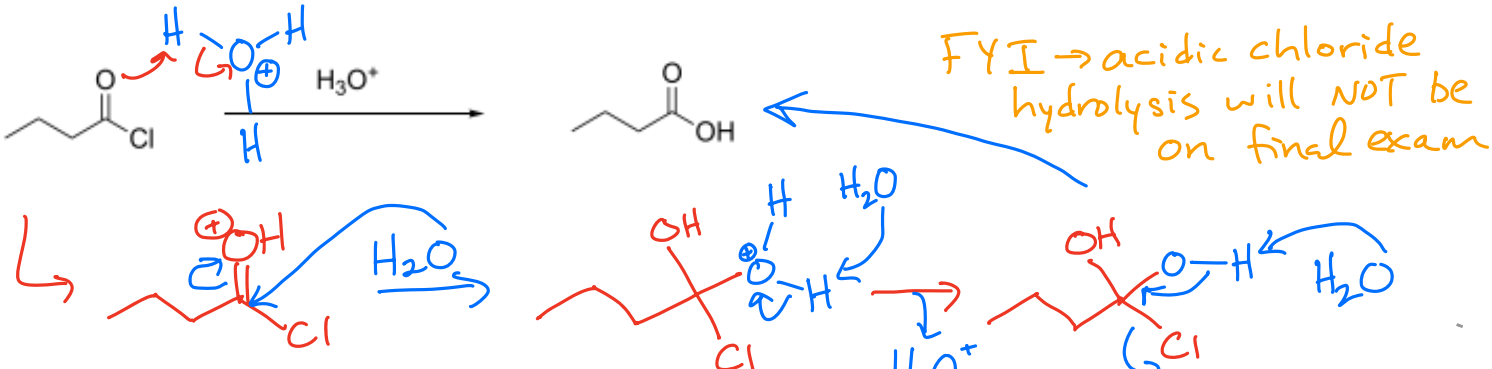
8. Acid chloride reduction with excess LAH



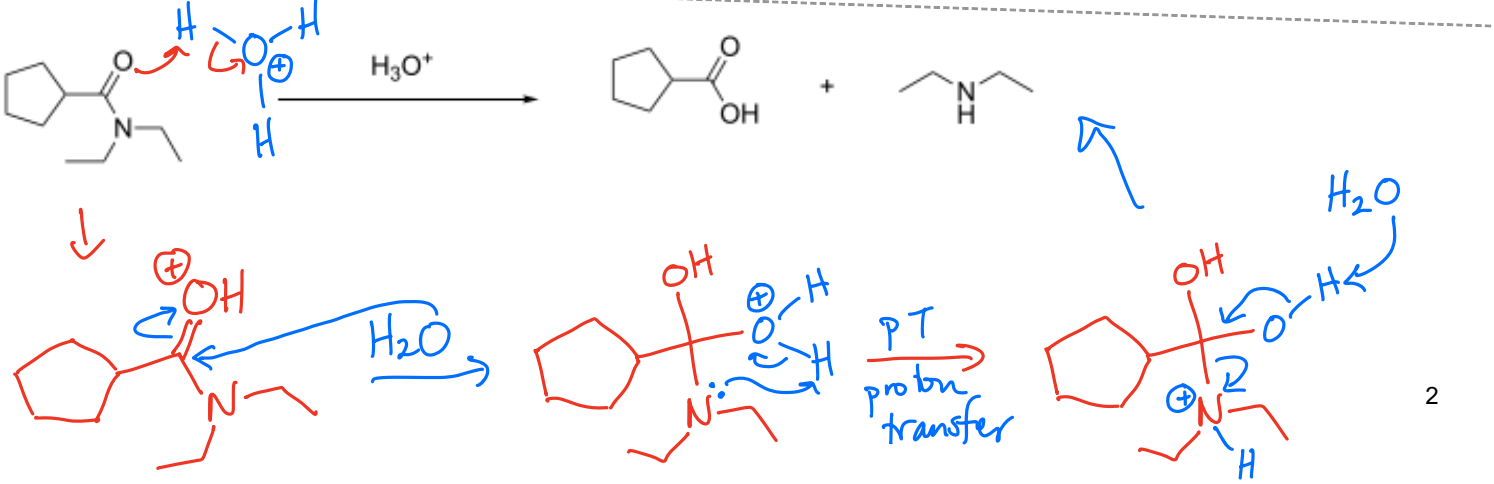
9. Ester reduction with excess LAH



10. Acid chloride hydrolysis

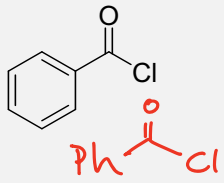
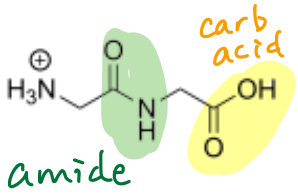
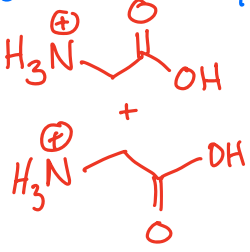
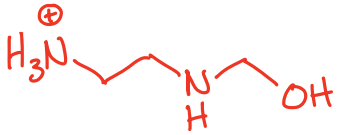
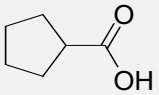
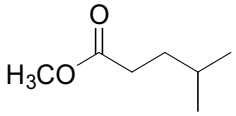
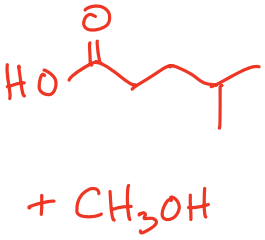
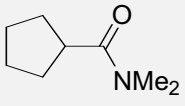
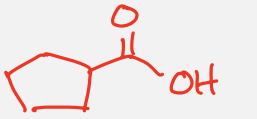
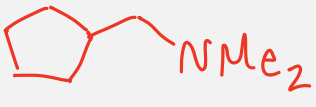
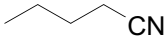


11. Amide hydrolysis



22C. Nucleophilic Acyl Substitution – Mix & Match with Reaction Bootcamp!

- Draw the product(s) of each reaction: **starting material + reagent → Product(s)**
- **Look out for "No Reaction"** – when the reagent does not react with the starting material

	React each molecule with each reagent and draw the product in the box	mild reduction **xs $NaBH_4$, MeOH**	hydrolysis **H_3O^+**	strong reduction **1. xs $LiAlH_4$** **2. H_2O**
12				
13	 dipeptide	NO REACTION amides & carb. acids DO NOT react w/ $NaBH_4$	amide hydrolysis 	 reduces amide & carb acid
14		NO REACTION carb acids DO NOT react w/ $NaBH_4$	NO REACTION carb acid hydrolyzes to carb acid!	
15		NO REACTION esters DO NOT react w/ $NaBH_4$	 + CH_3OH	 + CH_3OH
16		NO REACTION amides DO NOT react w/ $NaBH_4$	 + $HNMe_2$	
17	 Ch 18 refresher	NO REACTION nitriles DO NOT react w/ $NaBH_4$	SKIP - reaction not covered in 8B	

Ch 22 Rxns will NOT be included in reaction puzzles or multi-step synthesis on the final exam