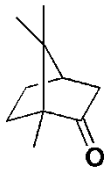
Name (Print)_____
ID#_____
Group #_____

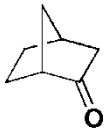
PS #5 – Rigid Bicyclic Compounds and Stereoselectivity

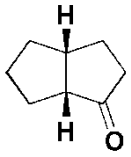
Part A) As a group, build 3-D models of the following molecules using the model kits provided. Use the models to answer the following questions for each molecule.

Draw the molecule in 3-D using the model you built as a group. Consider the C=O bond, where is the π^* orbital located? What path does the nucleophile take (use Nu^- to represent any nucleophile)? Show the path of nucleophilic attack on your diagram. What is the major product that results from this attack?

Part B) Brainstorm and list all possible carbonyl transformations that might be governed by these rules.

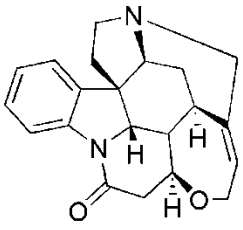
1. 

2. 

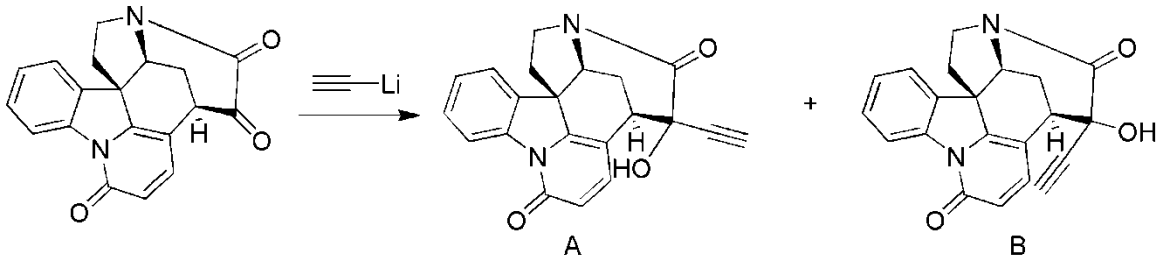
3. 

Part B) *Some nucleophiles that would result in carbonyl transformations governed by these rules:*

Part C) Strychnine is a natural plant toxin that has long been the target by which organic synthetic chemists test their skills. During the synthesis of strychnine, a key bond is formed by the following chemoselective and diastereoselective organometallic addition. The long bonds in the drawings below are telltale signs that this simple 2-D representation is not a good representation of the true structure of the molecule.



Strychnine
Woodward, 1954



Work together to arrive at a reasonable understanding of the 3-D structure of the precursor and sketch the molecule in a reasonable 3-D representation (no chair, Newman projection, or any such formalism is required, just a 3-D structure that you will have to be creative about).

Based on this structure, which product is favored — **A** or **B**?