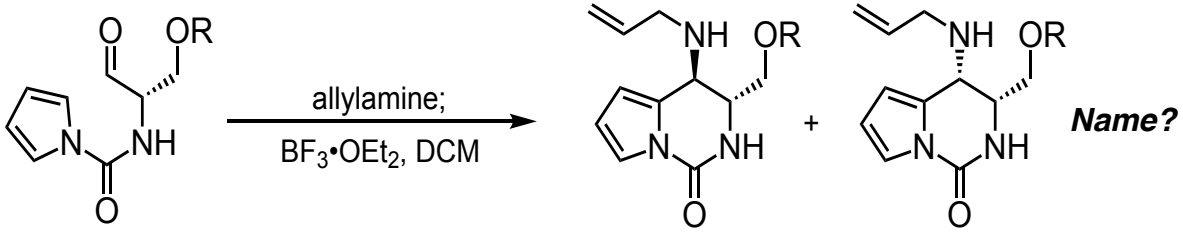
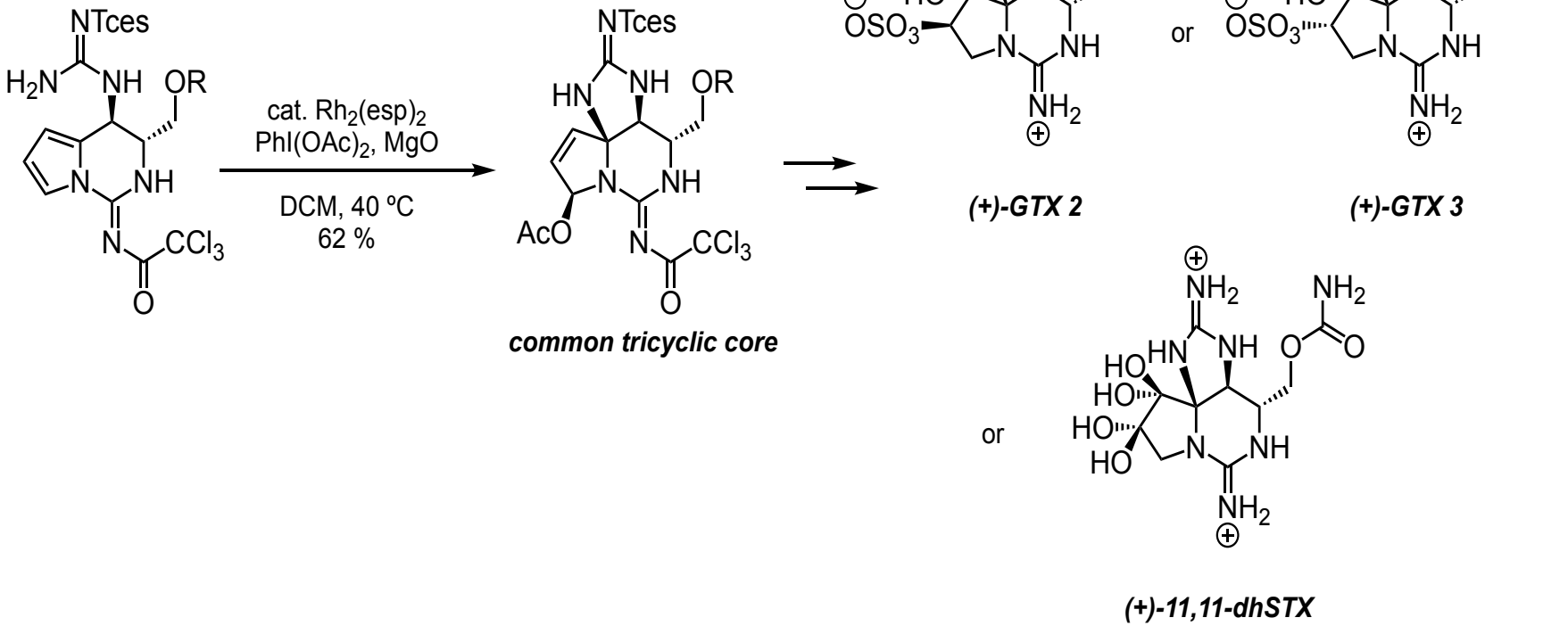
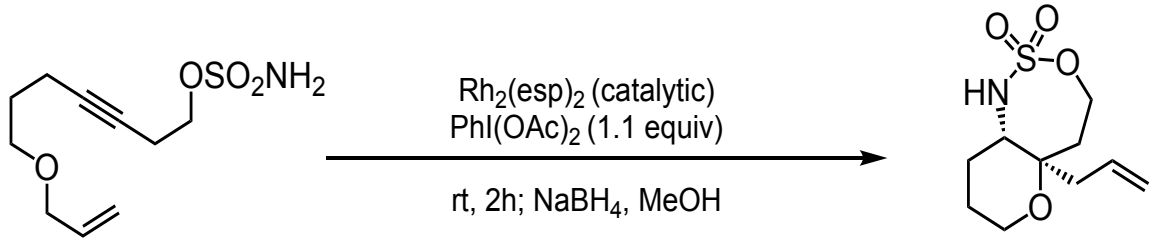
1. Provide mechanisms for each part and explain the preference for the trans diastereomer.
(Mulcahy et al. *J. Am. Chem. Soc.* **2016**, *138*, 5994-6001.)



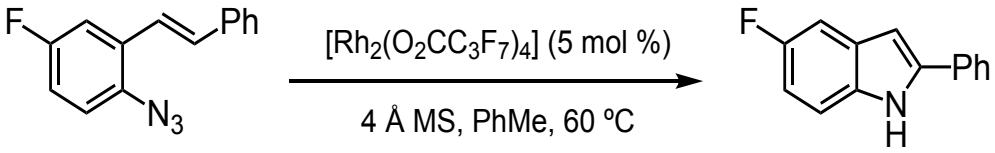
>20:1 preference for trans



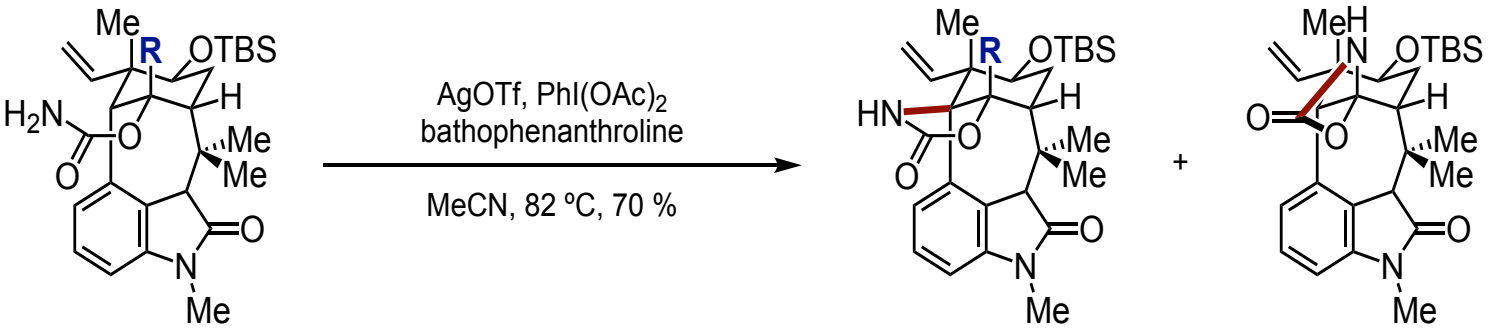
2. Provide a mechanism for the following transformation (Thornton and Blakey, *J. Am. Chem. Soc.* **2008**, *130*, 5020).



3. Mechanism? (*Angew. Chem. Int. Ed.* **2008**, *47*, 5056).



4. The following reaction was used in Garg's synthesis of N-methylwelwitindolinone D. What is the mechanism? Explain the observed selectivity for the two insertion products when R=H vs D. (*Angew. Chem. Int. Ed.* **2013**, *52*, 12422).



R=H	**44%**	**37%**
R=D	**70%**	**30%**