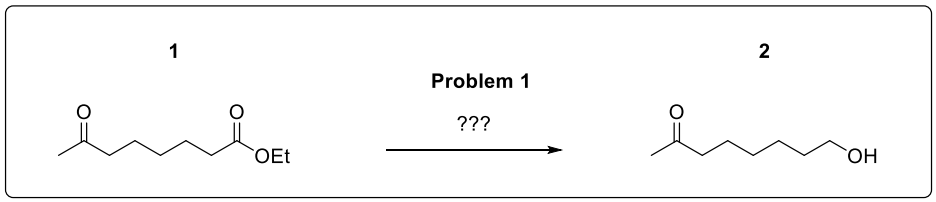
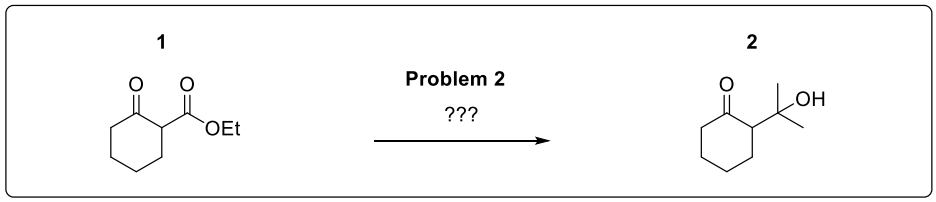
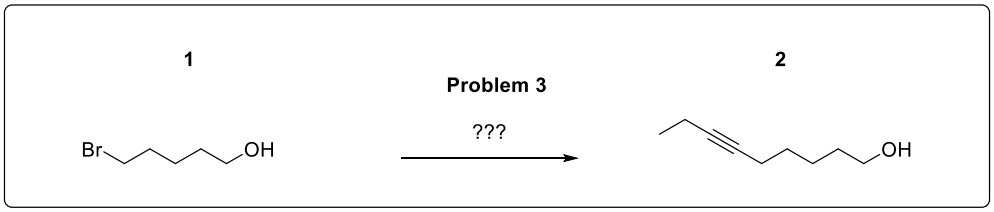
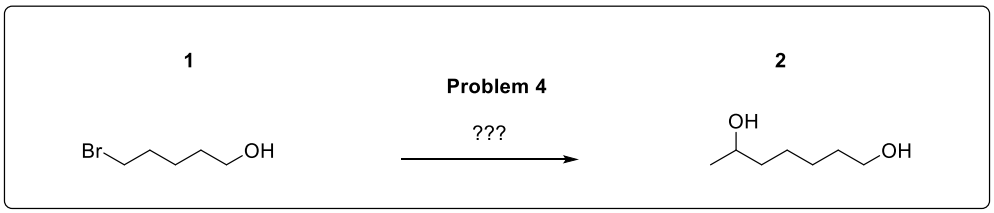
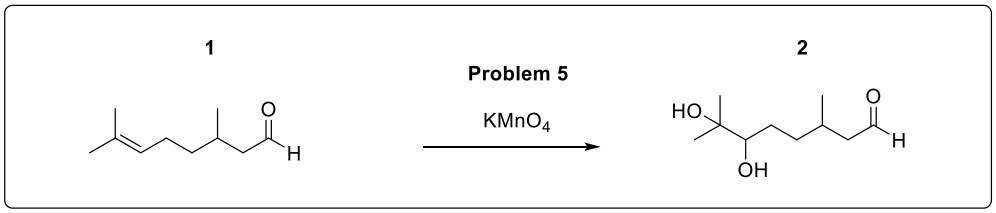
1. Propose a strategy to go from starting material **1** to final compound **2**. Make use of protecting groups and explain why they are necessary.

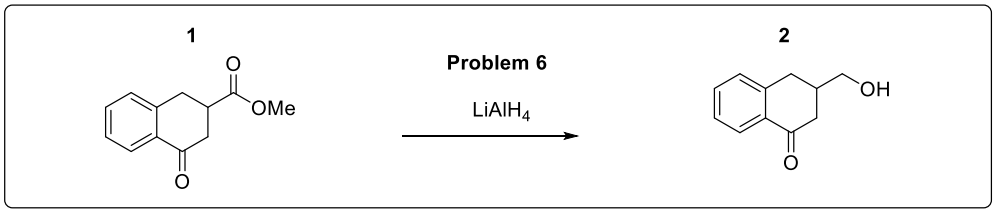


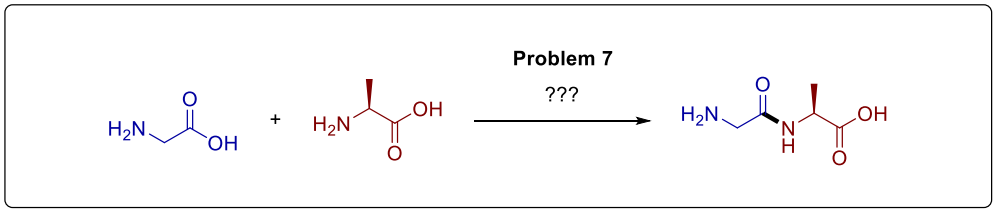




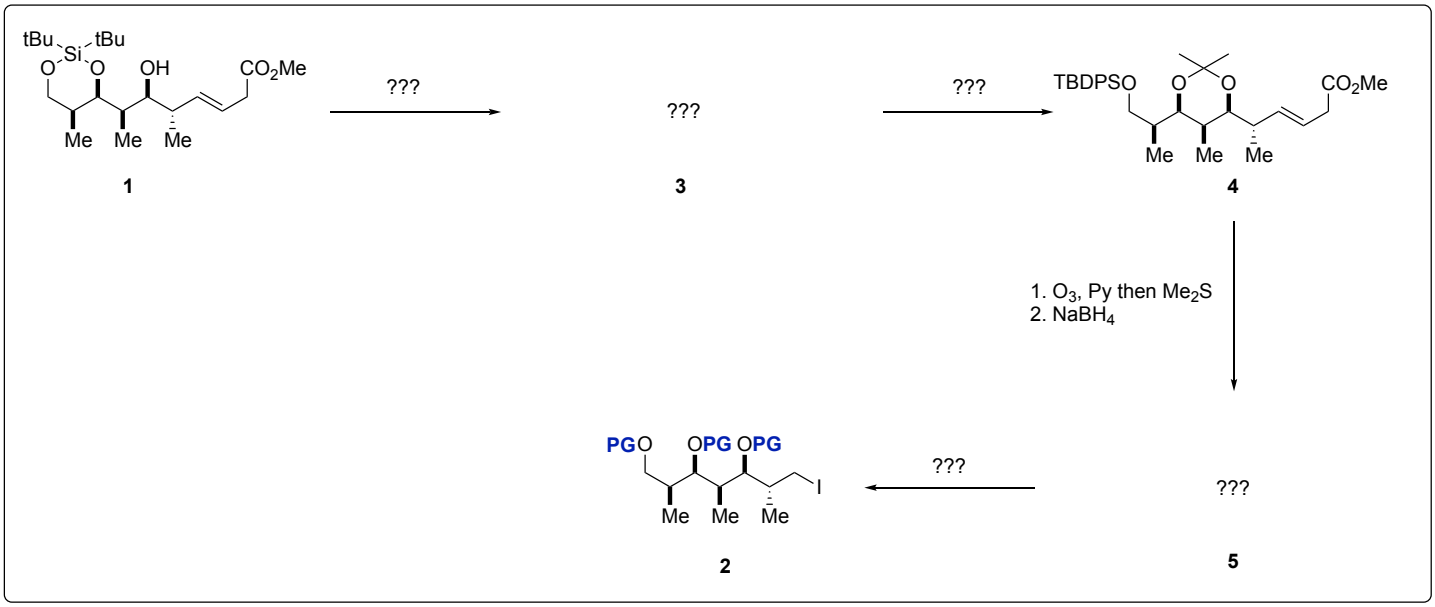




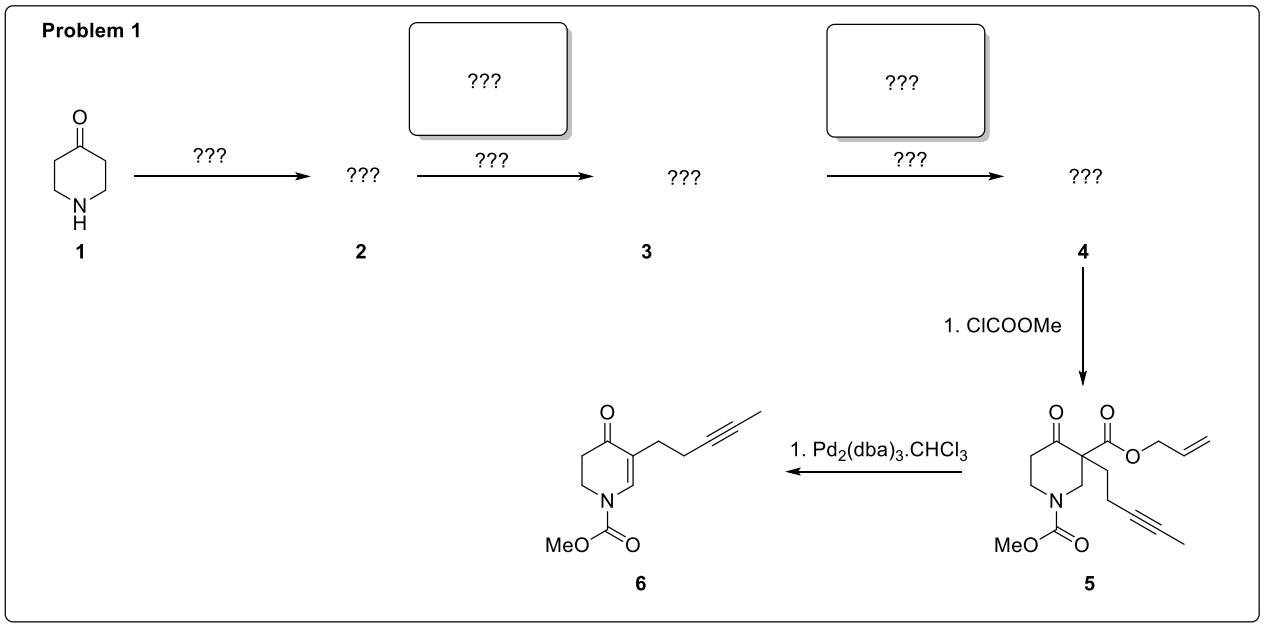




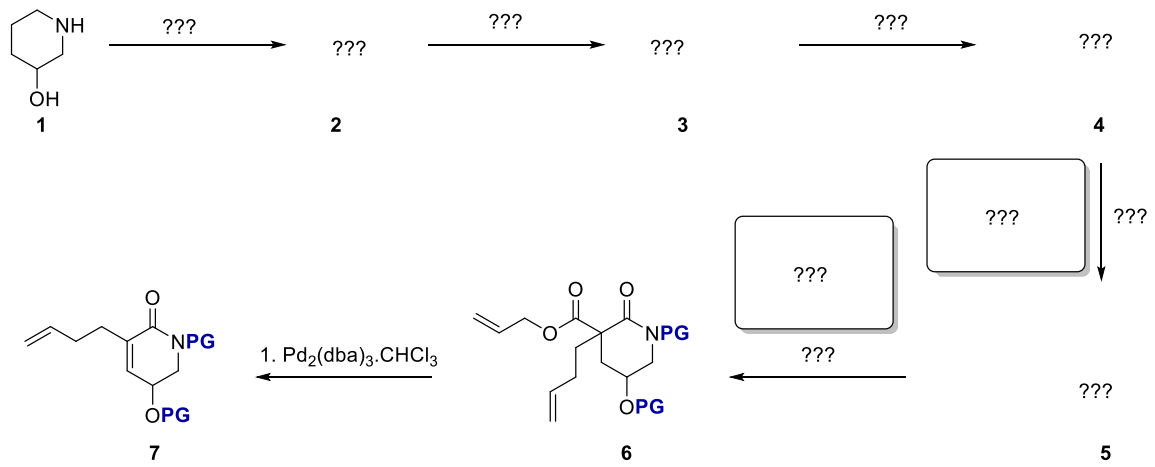
2. Fill in the missing structures and reagents in the scheme and explain potential side reactions in the absence of protecting groups.



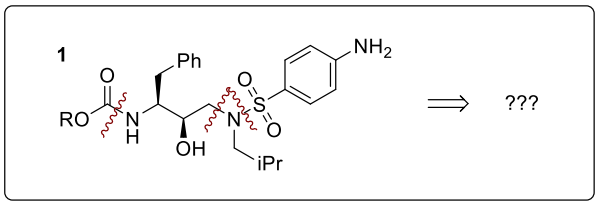
3. Propose a strategy to prepare intermediate **6** of **problem 1** and intermediate **7** of **problem 2** below. Fill in the missing structures and reagents in the scheme and explain potential side reactions in the absence of protecting groups.



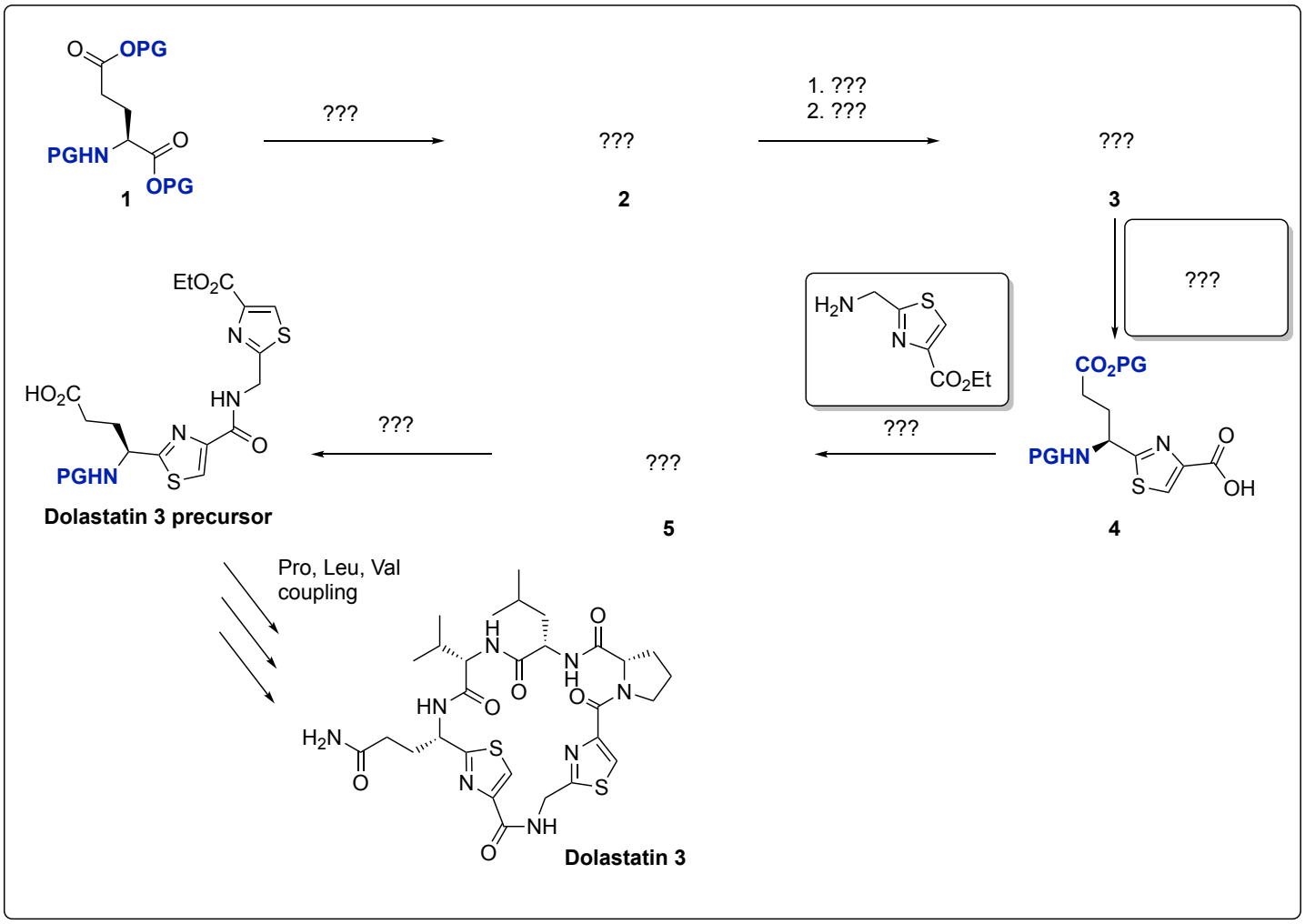
Problem 2



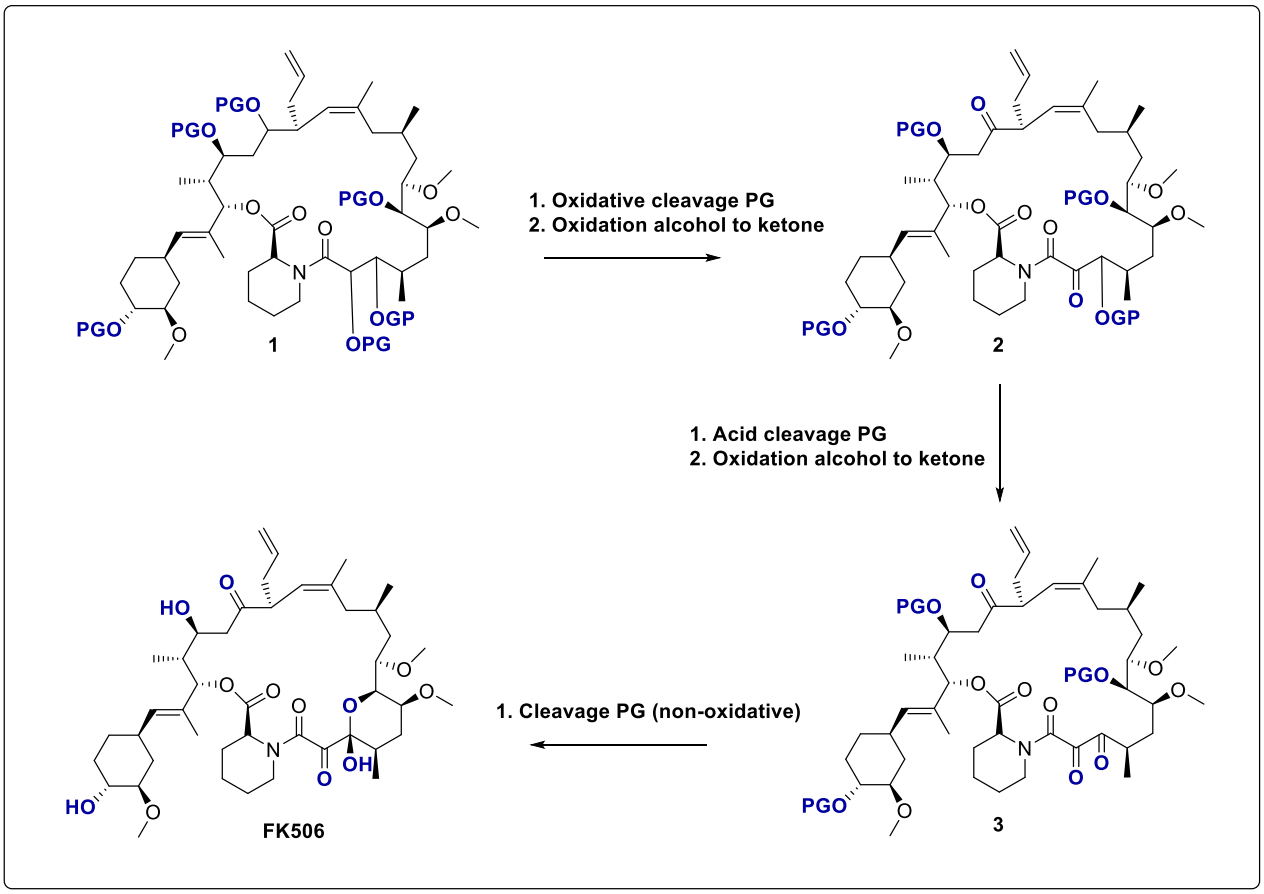
4. Based on the disconnections shown for compound **1** propose which reagents you would use and propose a synthetic strategy. If you make use of protecting groups, explain why they are necessary.



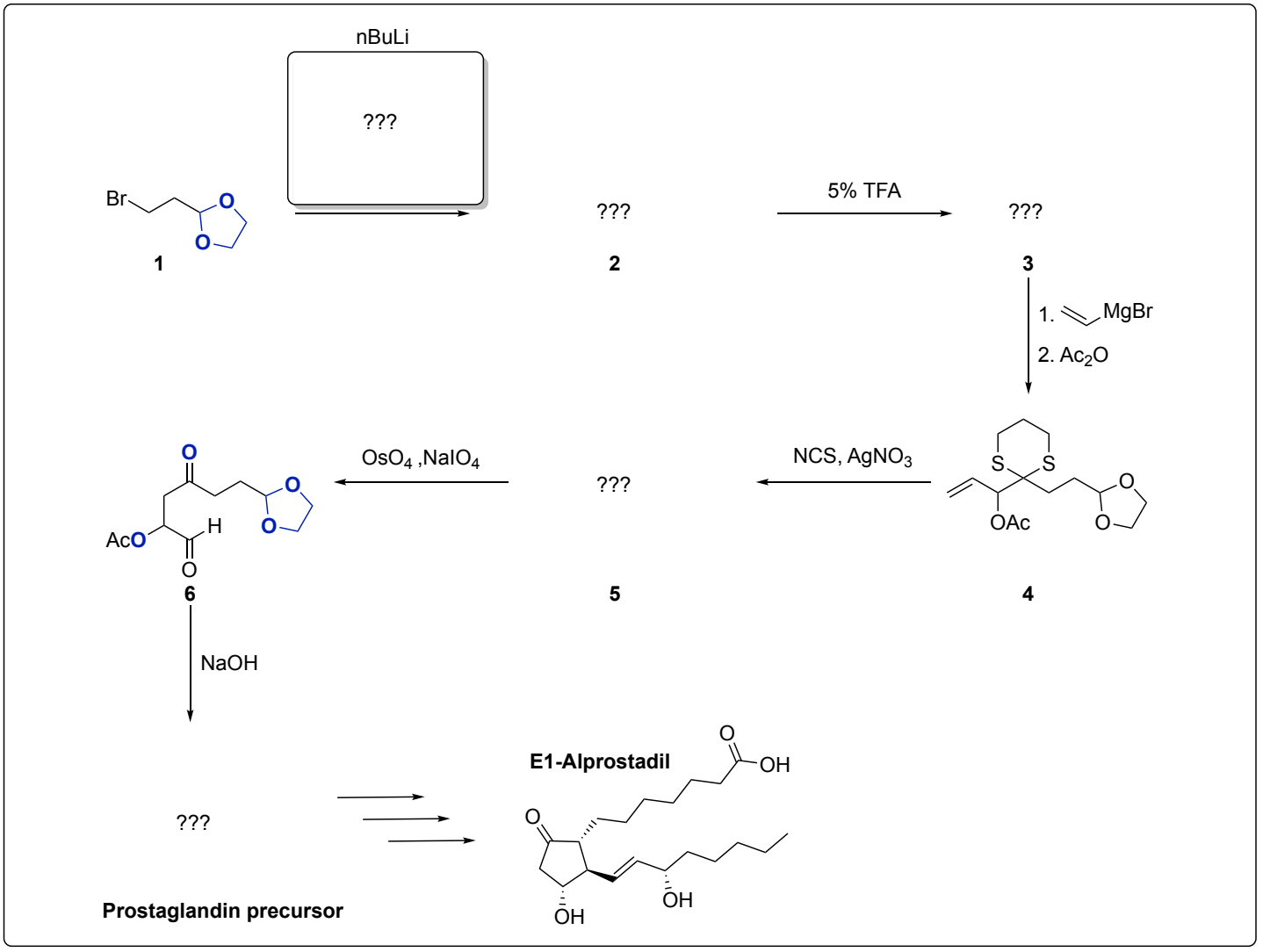
5. Propose a synthetic approach for the synthesis of the **Dolastatin 3 precursor** shown in the scheme. Fill in the missing reagents and reactants and explain your choice of protecting groups.



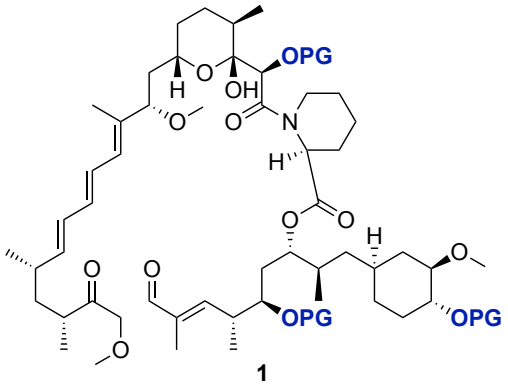
6. The ultimate steps towards Immunosuppressant **FK506** are shown. The final steps involve selective oxidative cleavage, selective acid-mediated cleavage, and a final cleavage. Propose a structure for the protecting groups and suitable reagents for the different cleavage steps.



7. A **prostaglandin precursor** was prepared from readily available starting materials. Fill in the missing reagents and reactants and explain your choice of protecting groups.



8. The final steps towards **Rapamycin** are shown below. Propose a structure for the protecting groups, intermediates, and suitable reagents for cleavage. In this exercise you are only allowed to use one type of protection group commonly used for alcohols.



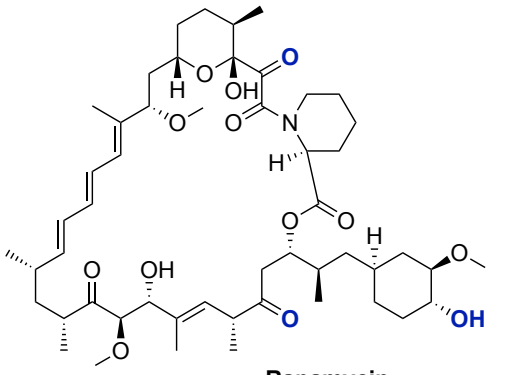
1

1. ???
2. DMP

???

2

$TiCl_3(O^iPr)$



Rapamycin

???

???

3