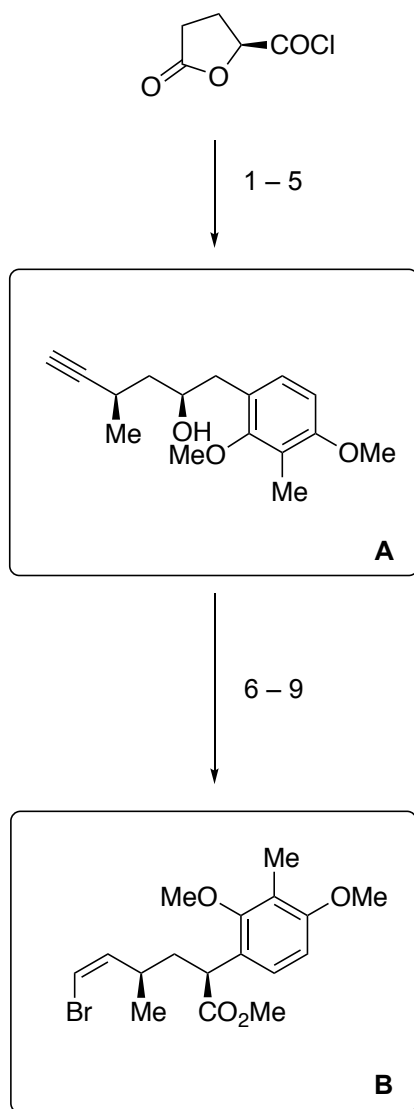
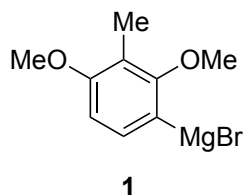


A General Strategy to Elisabethane Diterpenes: Stereocontrolled Synthesis of Elisapterosin B via Oxidative Cyclization of an Elizabethin Precursor

N. Waizumi, A. R. Stankovic, V. H. Rawal
J. Am. Chem. Soc. **2003**, *125*, 13022 – 13023.



- 1) **1**, ZnCl₂, PdCl₂(PPh₃)₂ cat., THF
- 2) TsOH cat., HC(OMe)₃, THF
- 3) NaHMDS, IeI, THF
- 4) DIBAL-H, toluene
- 5) (MeO)₂P(O)CHN₂, *t*-BuOK, THF

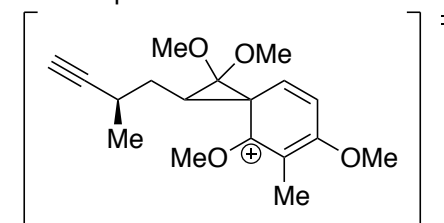


- 6) MsCl, 2,6-lutidine, 50 °C
- 7) CaCO₃, wet MeOH, 50 °C
- 8) AgNO₃ cat., NBS (1 eq.), acetone, r.t.
- 9) H₂NNHTs (6 eq.), AcONa (7 eq.), MeOH, reflux

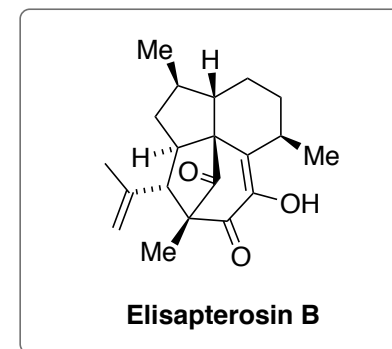
to 8) Ag²⁺ activate terminal H for terminal hydrogen exchange by formation of a π-complex with the triple bond (*ANIE* **1984**, *23*, 727–729)

- 2) Which side product do you expect to occur?
 Hint: it can be converted back towards the desired product with MeOH, *t*-BuOK.
Methanolysis of the Lactone
- 5) Please name the reaction in step 5 and describe the Mechanism
Seyfert-Gilbert Homologation

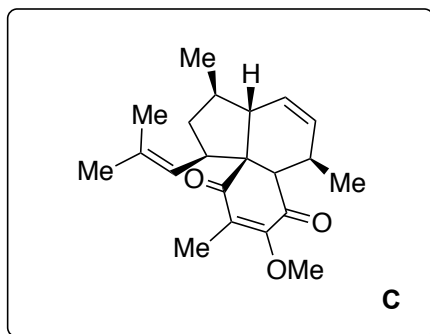
TS for step 7:



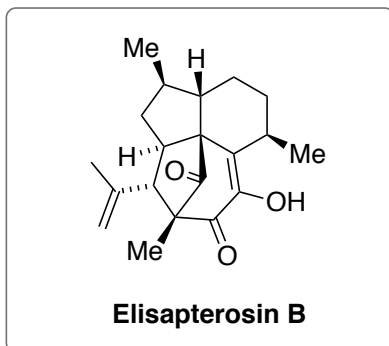
- 7) Please name the reaction in step 7 and describe the Mechanism *Pinacol-type rearrangement*; CaCO₃ = acid scavenger!
- 8) what is the function of AgNO₃?



10 – 15



16 – 18



10) *E*-1-bromopropene (1.2 eq.), *t*-BuLi (2.4 eq.), $-78\text{ }^{\circ}\text{C}$
then ZnCl_2 (1.2 eq.), $\text{PdCl}_2(\text{dppf})$ cat., THF, r.t.

11) DIBAL-H, $-95\text{ }^{\circ}\text{C}$

12) *n*-BuLi, $\text{Ph}_3\text{PCH}(\text{CH}_3)_2$, r.t.

13) NaSEt (10 eq.), DMF, $90\text{ }^{\circ}\text{C}$

14) O_2 , Salcomine, DMF, r.t.

15) toluene, $80\text{ }^{\circ}\text{C}$

16) $\text{Rh}(\text{PPh}_3)_3\text{Cl}$, H_2 , PhH, r.t.

17) LiI (2 eq.), 2,6-lutidine, $80\text{ }^{\circ}\text{C}$

18) CAN, MeCN, $0\text{ }^{\circ}\text{C}$, 10 min

then pyridine, Et_3N , $50\text{ }^{\circ}\text{C}$

to 13) deprotection of the sterically more hindered methoxy group:

J. Org. Chem. **1977**, *42*, 1228 – 1230.

13) Please explain the selectivity of the reaction
Which other methods for this general transformation do you know?

14) *Salcomine*: *Co-Salen complex*

15) Please provide the possible transition states of the transformation and discuss which would lead to the desired product.