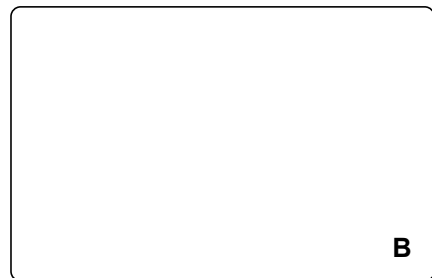
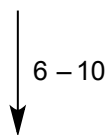
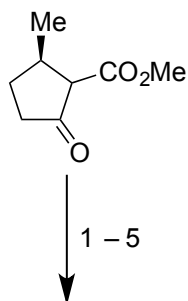


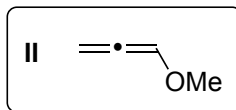
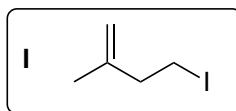
# Total Synthesis of Astellatol

N. Zhao, S. Yin, S. Xie, H. Yan, P. Ren, G. Chen, F. Chen, and J. Xu

*Angew. Chem. Int. Ed.* **2018**, *57*, 3386.

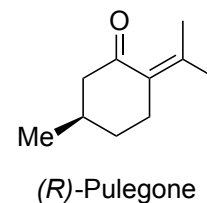


- 1) **I**, Cs<sub>2</sub>CO<sub>3</sub>, HMPA
- 2) **II**, *n*-BuLi
- 3) TMSOTf, NEt<sub>3</sub>,  
then 1M HCl
- 4) Grubbs II
- 5) Pd/C, H<sub>2</sub>

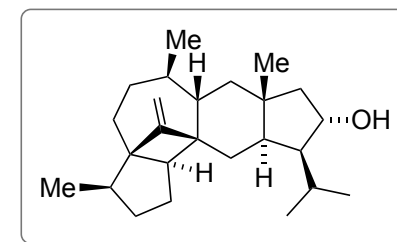


- 6) 10% HCl
- 7) Sml<sub>2</sub>
- 8) LDA, 2-methyl allylbromide
- 9) Mg, HgCl<sub>2</sub> (cat.),  
propargyl bromide
- 10) PdCl<sub>2</sub>(PPh<sub>3</sub>)<sub>2</sub>, CuI, NEt<sub>3</sub>,  
2-bromopropene

How could you prepare the starting material from (*R*)-pulegone in 2 steps?



Step 9: Why is HgCl<sub>2</sub> added to the reaction?



↓  
11 – 15

+

**C**

**D**

↓  
16

↓  
17

**E**

↓  
18 – 26

**Astellatol**

- 11)  $\text{Co}_2(\text{CO})_8$
- 12) DBU, HMPA,  
*then*  $\text{Et}_3\text{OBF}_4$ , DIPEA
- 13) DIBAL-H
- 14) TPAP, NMO
- 15)  $\text{SmI}_2$ , MeOH, HMPA

- 16) Crabtree's catalyst,  $\text{H}_2$
- 17) Pd/C,  $\text{H}_2$

- 18) TPAP, NMO
- 19) NaHMDS  
*then* Davis oxaziridine
- 20)  $\text{NaBH}_4$ ,  $\text{CeCl}_3 \cdot 7 \text{H}_2\text{O}$
- 21) Crabtree's catalyst,  $\text{H}_2$
- 22)  $(\text{Im})_2\text{C}=\text{S}$
- 23)  $\text{P}(\text{OMe})_3$
- 24) MeLi
- 25)  $\text{SOCl}_2$ , pyridine
- 26)  $\text{BH}_3 \cdot \text{SMe}_2$   
*then*  $\text{H}_2\text{O}_2$ , NaOH

In step 15 two products (**C** and **D**) are formed, which can both be converted into **E** by employing different hydrogenation conditions.

Step 22 + 23: Please name the reaction

