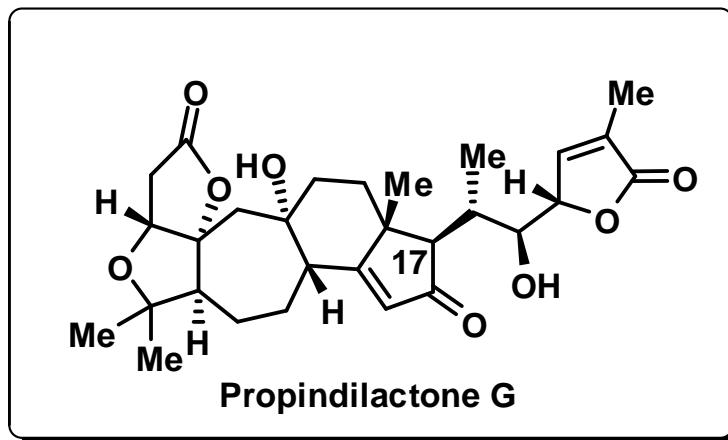


# Asymmetric Total Synthesis of Propindilactone G

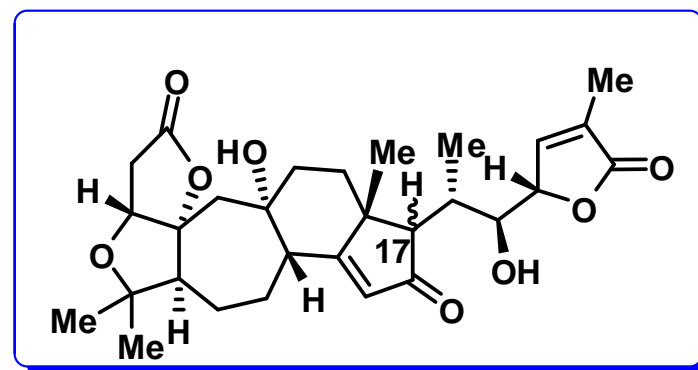


Sankar Rao Suravaru

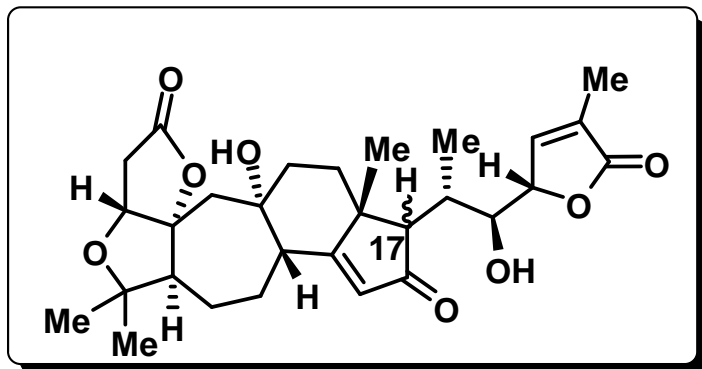
Z. Yang et al., *J. Am. Chem. Soc.* **2015**, *137*, 10120

## Introduction

- Isolated from stem of *Schisandra propinqua* var. *propinqua* by Sun et al.
- Used for liver protection and immune regulation
- Unique pentacyclic core structure bearing seven stereocentres, three of which are quaternary centers
- Exhibits promising anti-HIV activity



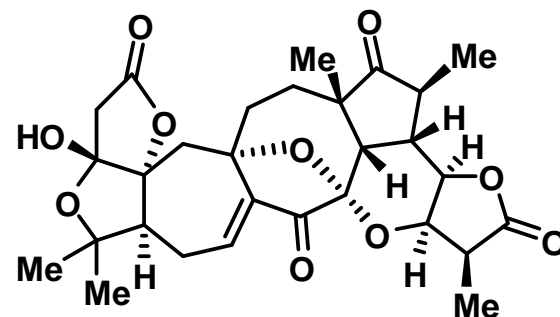
# Naturally occurring Nortriterpenoids



propindilactone G ( $\alpha$ -H17)

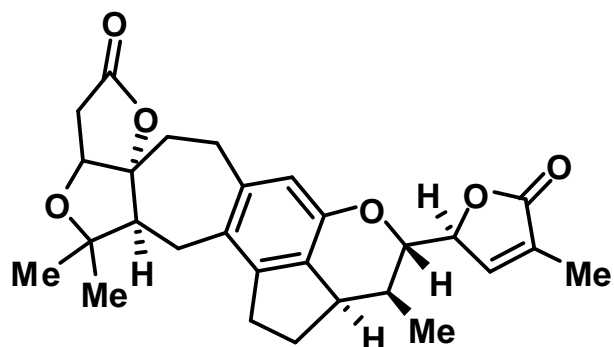
C17-*epi*-propindilactone G ( $\beta$ -H17)

(originally proposed structure)



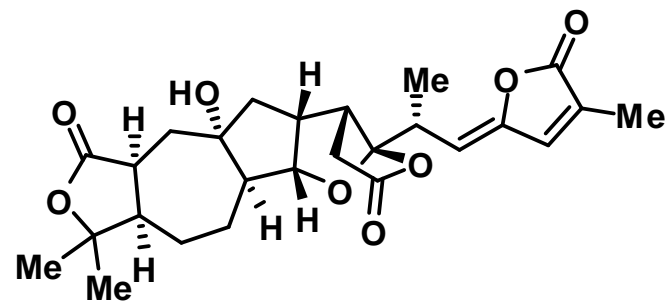
shindilactone A

Yang et al., *Angew. Chem., Int. Ed.* 2011, 50, 7373



rubriflordilactone A

Li et al., *J. Am. Chem. Soc.* 2014, 136, 16477

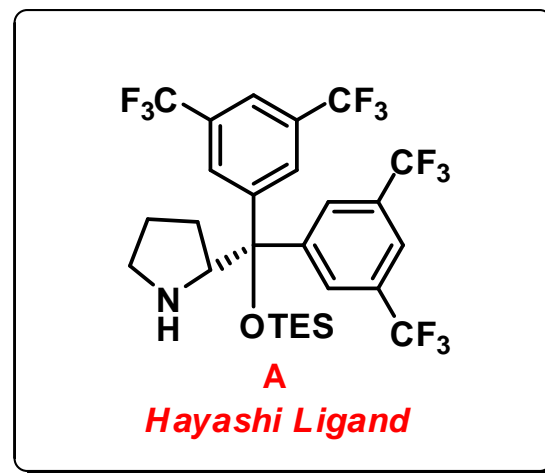
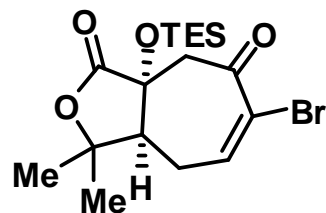
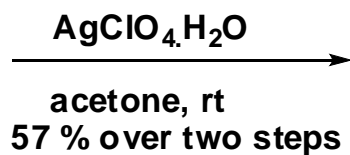
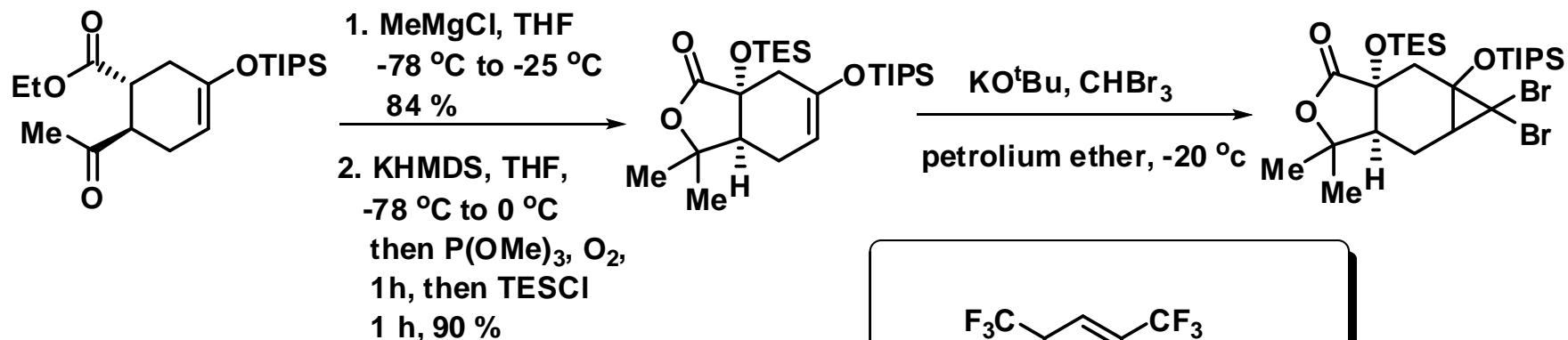
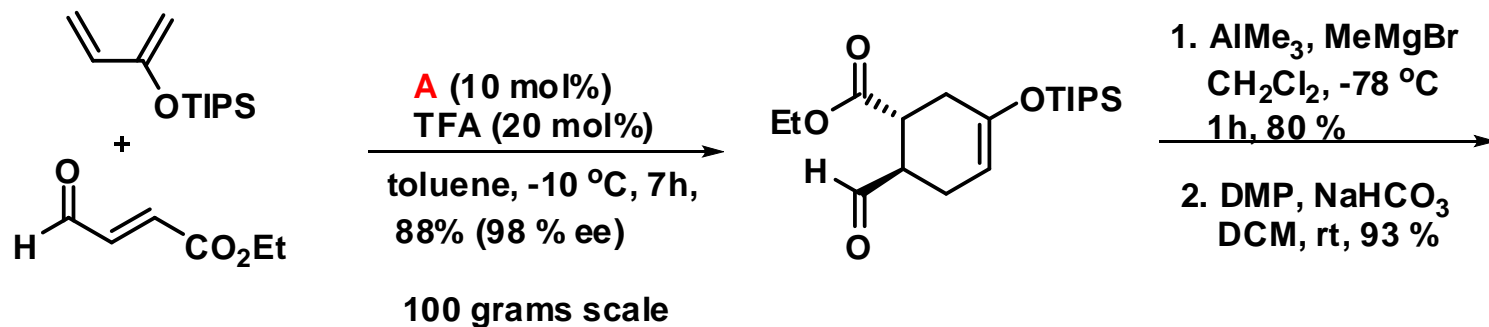


schilancitrilactone B

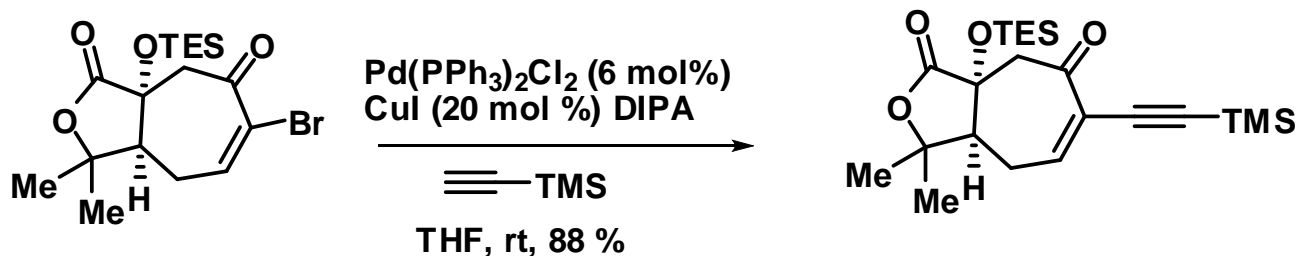
Tang et al., *Angew. Chem., Int. Ed.* 2015, 54, 5732



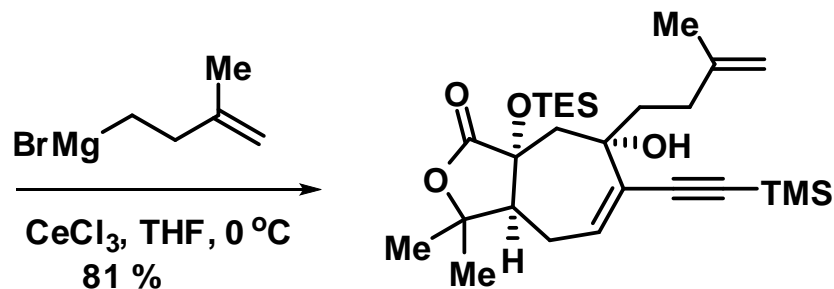
# Synthesis of the Bromoenone

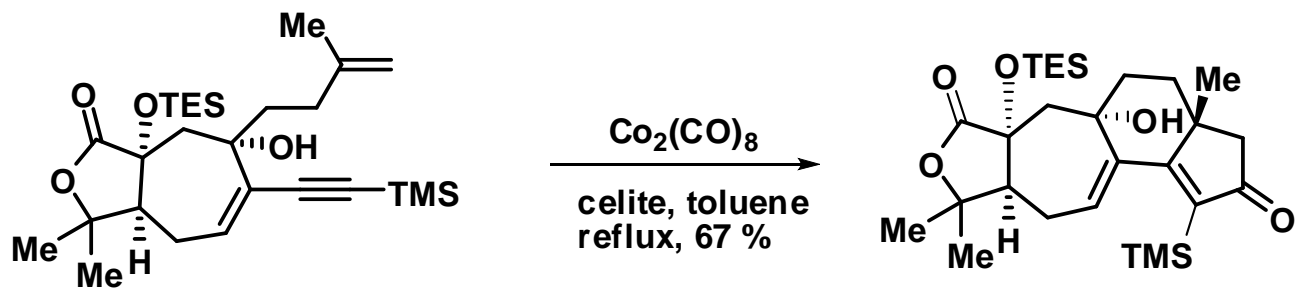


# Synthesis of the Tetracyclic Ring Fragment

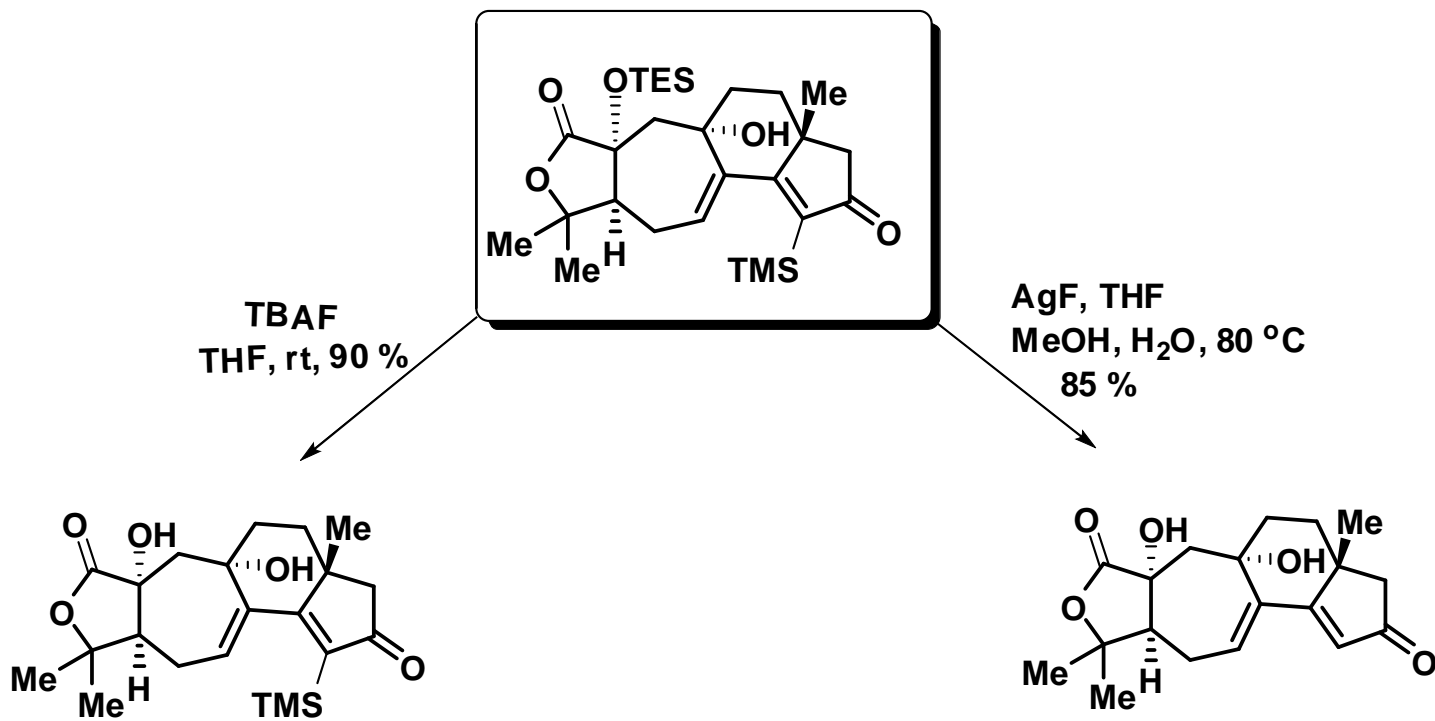


**Sonogashira coupling**

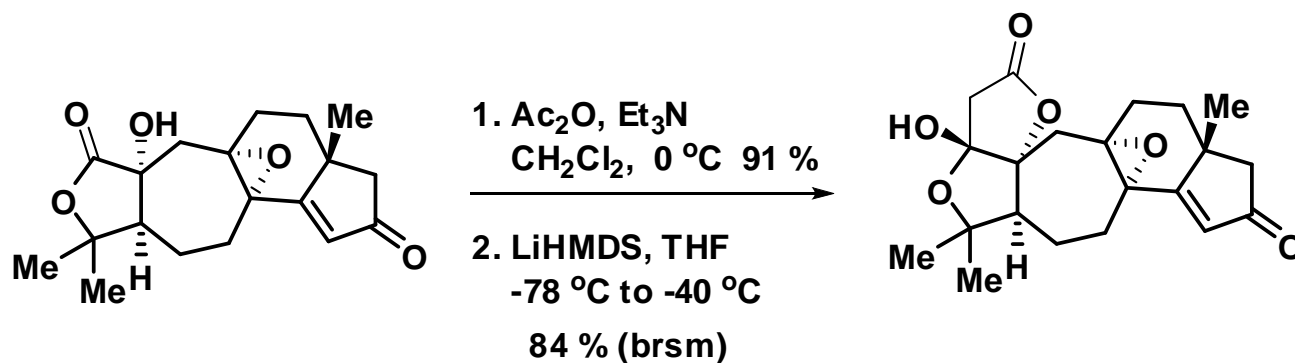
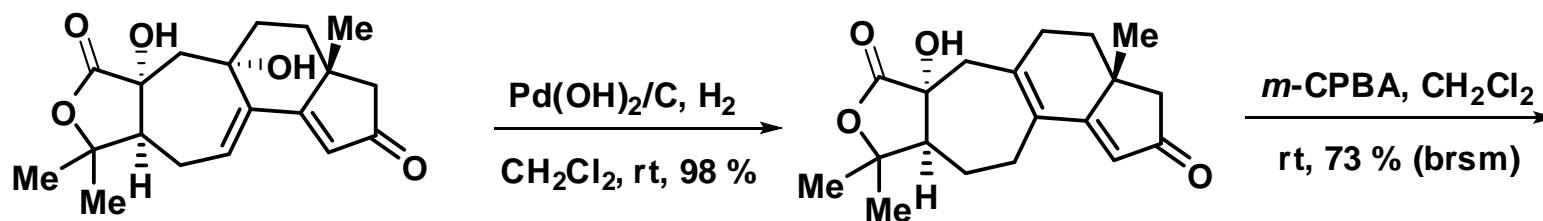




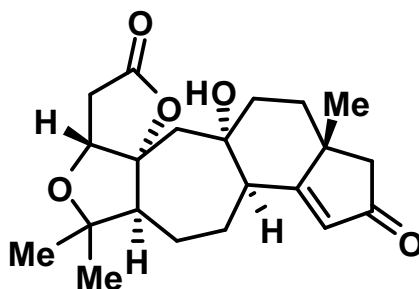
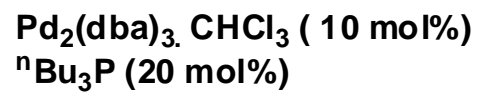
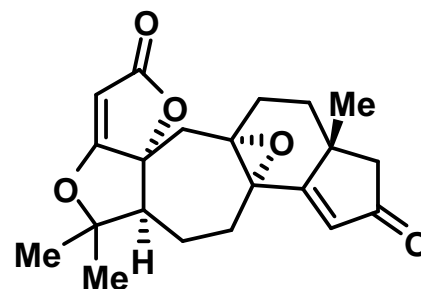
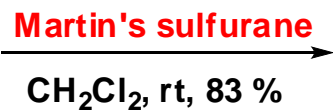
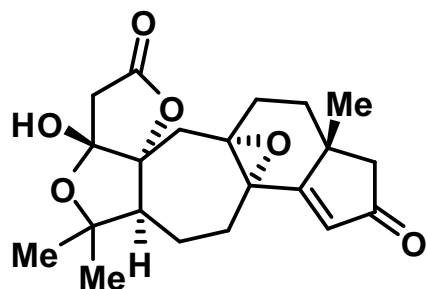
**Pauson-Khand reaction**



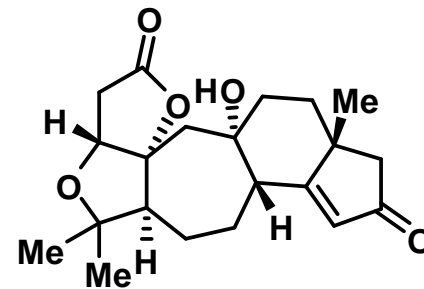
# Synthesis of ketolactone







+

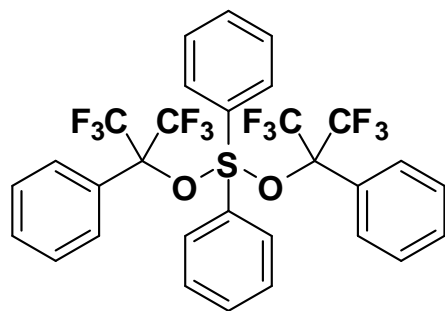


**A** 56 %

**B** 22 %

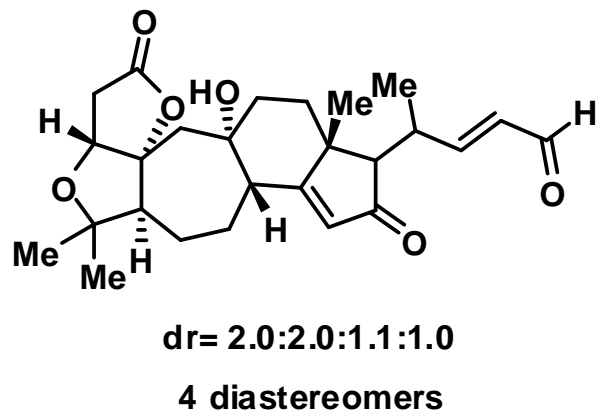
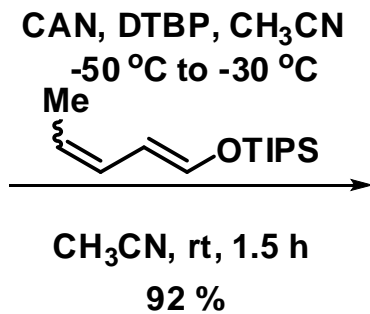
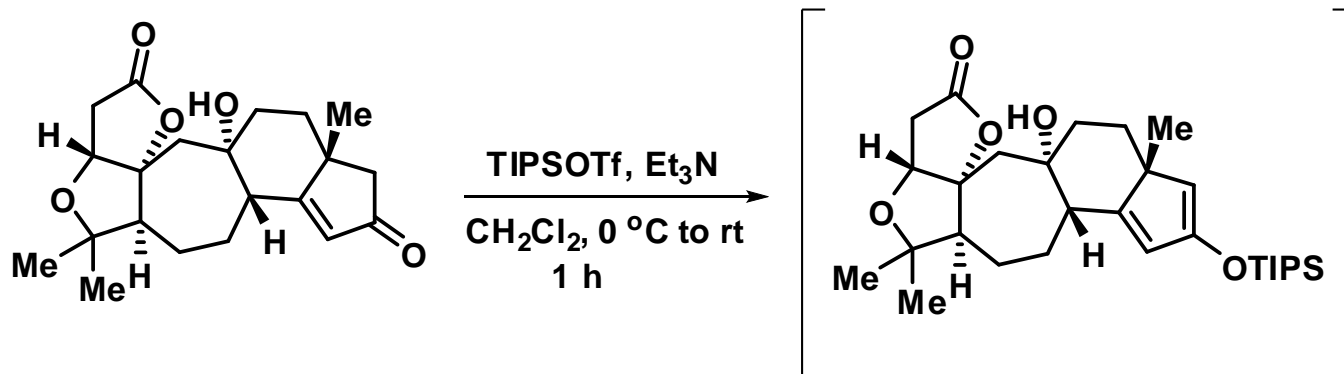
DBU, toluene

reflux, 41 %

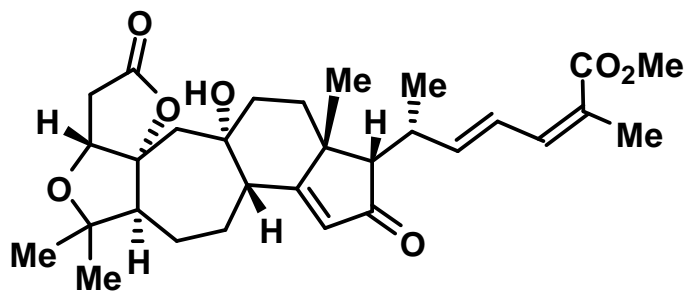
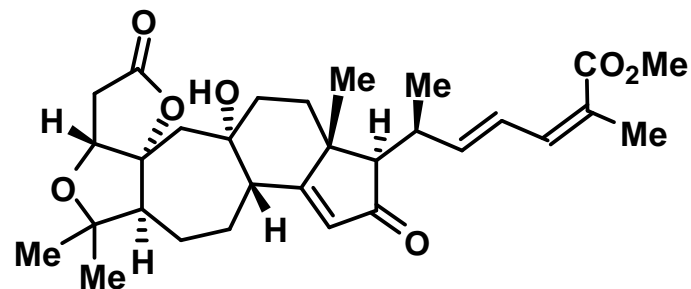
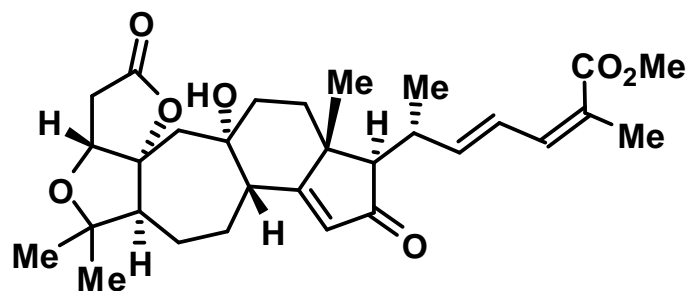
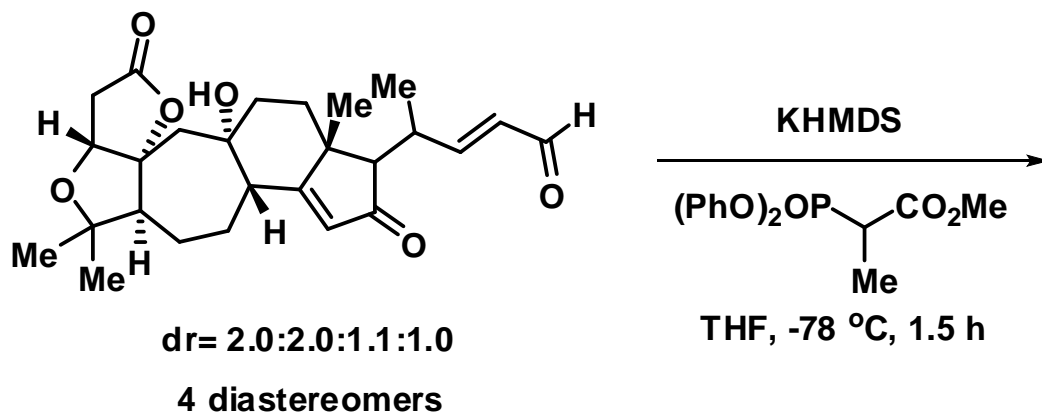


**Martin's sulfurane-  
dehydrating agent**

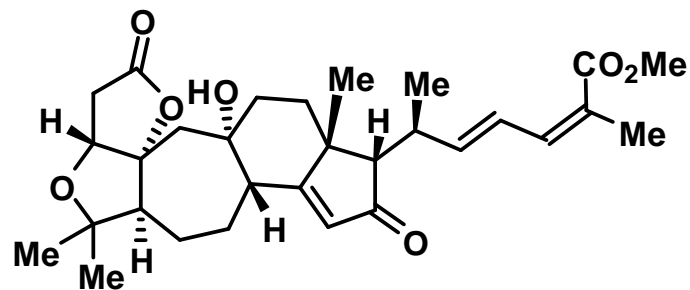
# End game of the synthesis



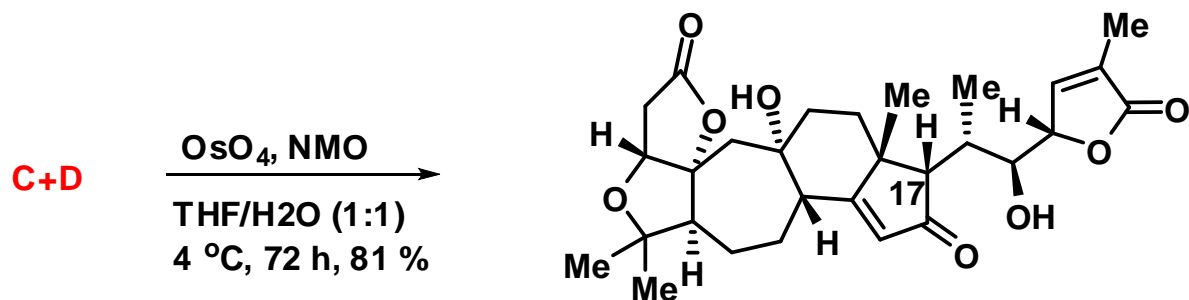
# End game of the synthesis



**C/D** = 1.5/1, 60 %



# End game of the synthesis



**Propindilactone G**

The yield based on amount of C in the mixture

## Key steps

1. Asymmetric Diels-Alder reaction
2. Pauson-Khand reaction
3. Oxidative hetero coupling of enolsilanes

## Conclusion

First total synthesis of (+)-propindilactone was achieved in 20 steps (longest linear)

**THANKS FOR  
YOUR ATTENTION**