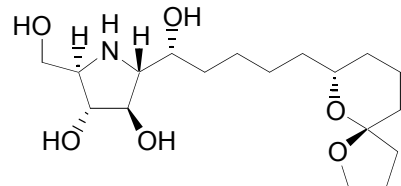
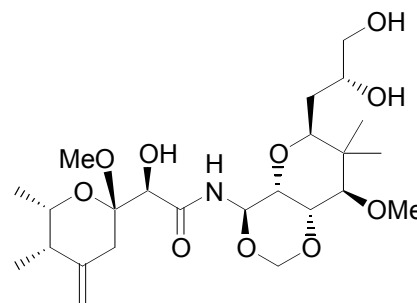


Palladium π -Allyl Complexes in Total Synthesis



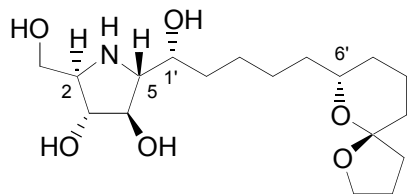
(+)-broussonetine G



(-)-mycalamide A

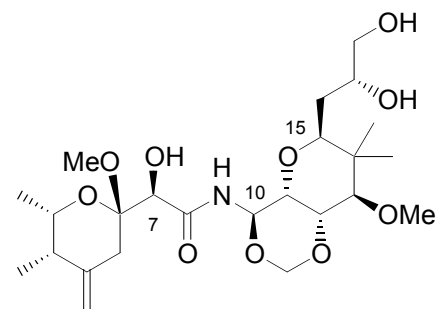
“Total Synthesis of (+)-Broussonetine G”, Trost, B. M. *et al.* *ACIEE*, **2003**, 42, 5987-5990.

“A Formal Synthesis of (-)-Mycalamide A”, Trost, B. M. *et al.* *JACS*, **2004**, 126, 48-49.



(+)-broussonetine G

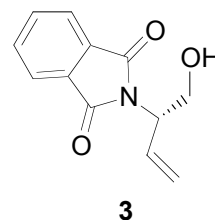
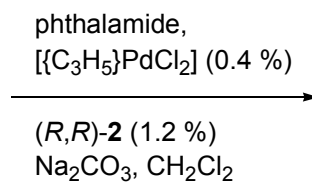
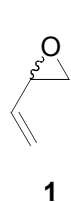
- isolated from the deciduous tree *Broussonetia kazinoki*
- possess glycosidase inhibitory properties and as such have potential as antitumor and anti-HIV agents
- relative stereochemistry of the spiroketal and the 1'-alcohol were unknown



(-)-mycalamide A

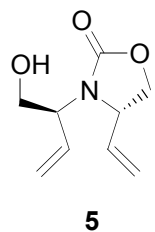
- isolated from 'marine sponges'
- possess antiviral and antitumor properties due to their ability to inhibit protein synthesis
- syntheses reported by Kishi (*JOC*, **1990**, 55, 4242), Nakata (*Tet. Lett.* **1994**, 35, 8229) and Roush (*Org. Lett.*, **2000**, 2, 859)

Synthesis of the Pyrrolidine Core

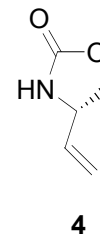
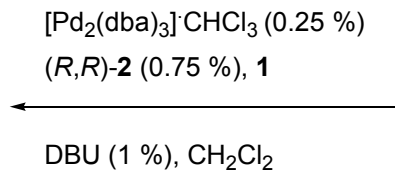


94 %, 98 % ee

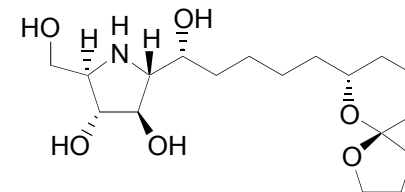
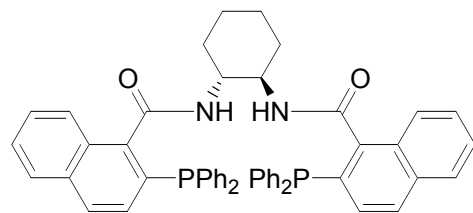
1. NH₂CH₂CH₂NH₂,
EtOH, reflux
2. triphosgene, NaHCO₃,
toluene/H₂O, 0°C



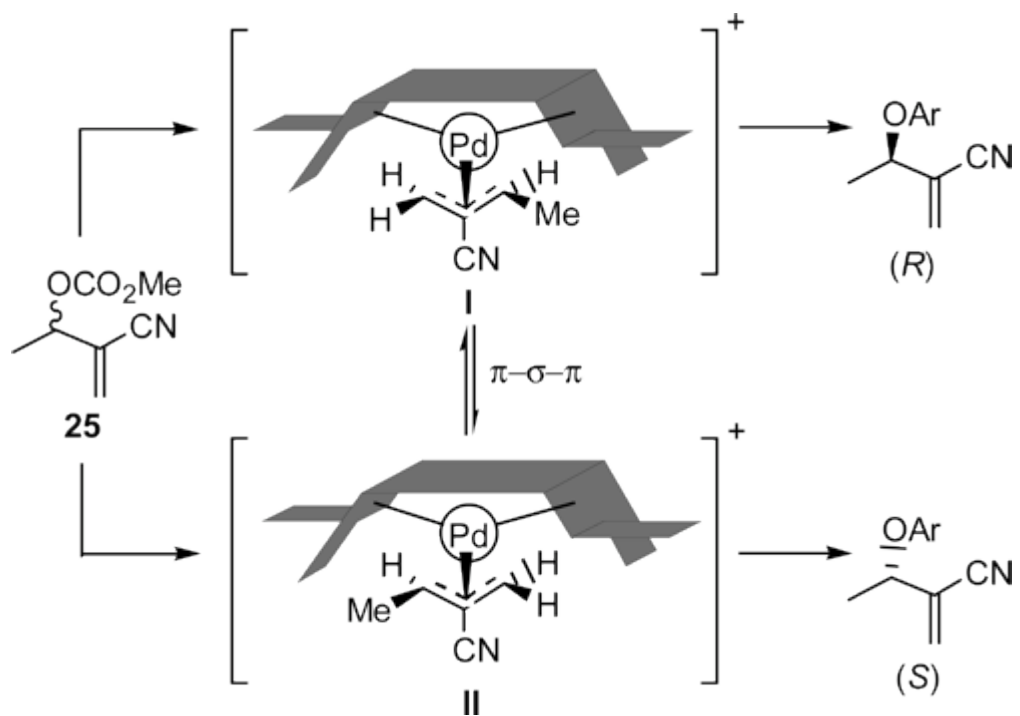
91 %, 86 % de



71 % for two steps

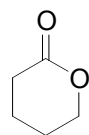


Dynamic Kinetic Asymmetric Transformation (DYKAT)



•Trost et al. JACS, 125, 13155-13164, 2003

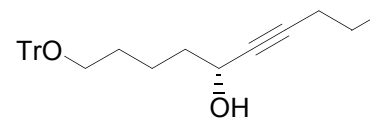
Spiroketal Formation



6

1. *n*-BuLi, 1-pentyne, THF -78 °C --> rt
2. TrCl, Et₃N, DMAP, DMF

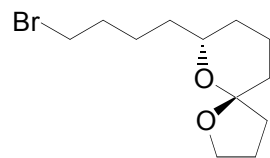
3. **7** (3 mol %), *i*-PrOH¹



8

69 % for three steps, 97 % ee

1. KH (10 equiv.), NH₂(CH₂)₃NH₂, THF
2. DHP, PPTS, CH₂Cl₂
3. *n*BuLi, AlMe₃, BF₃·Et₂O, Et₂O then ethylene oxide, -78 °C --> rt
4. 1 % HCl/MeOH

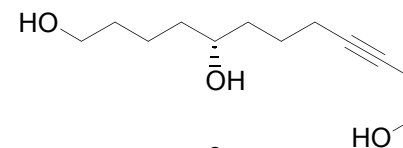


10

77% for two steps, 94 % dr for spiroketalization

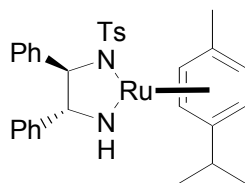
1. [PdCl₂(PhCN)₂] (2 %), CH₃CN/THF (3:2)
2. PPh₃Br₂, imid., THF

Q



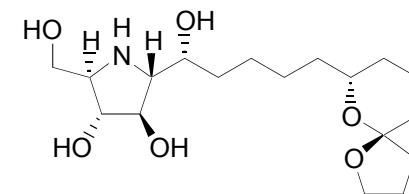
9

43 % for four steps

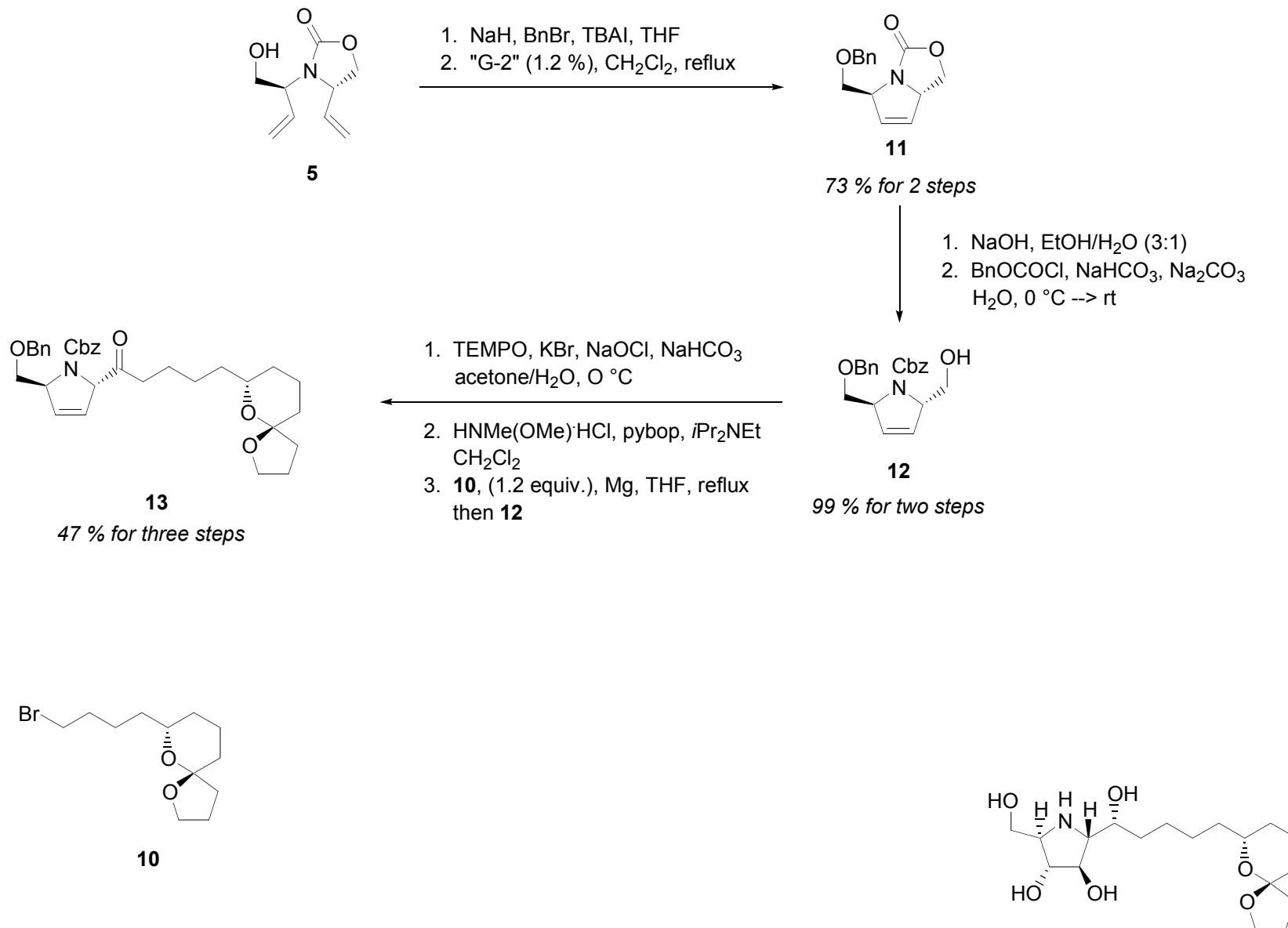


7

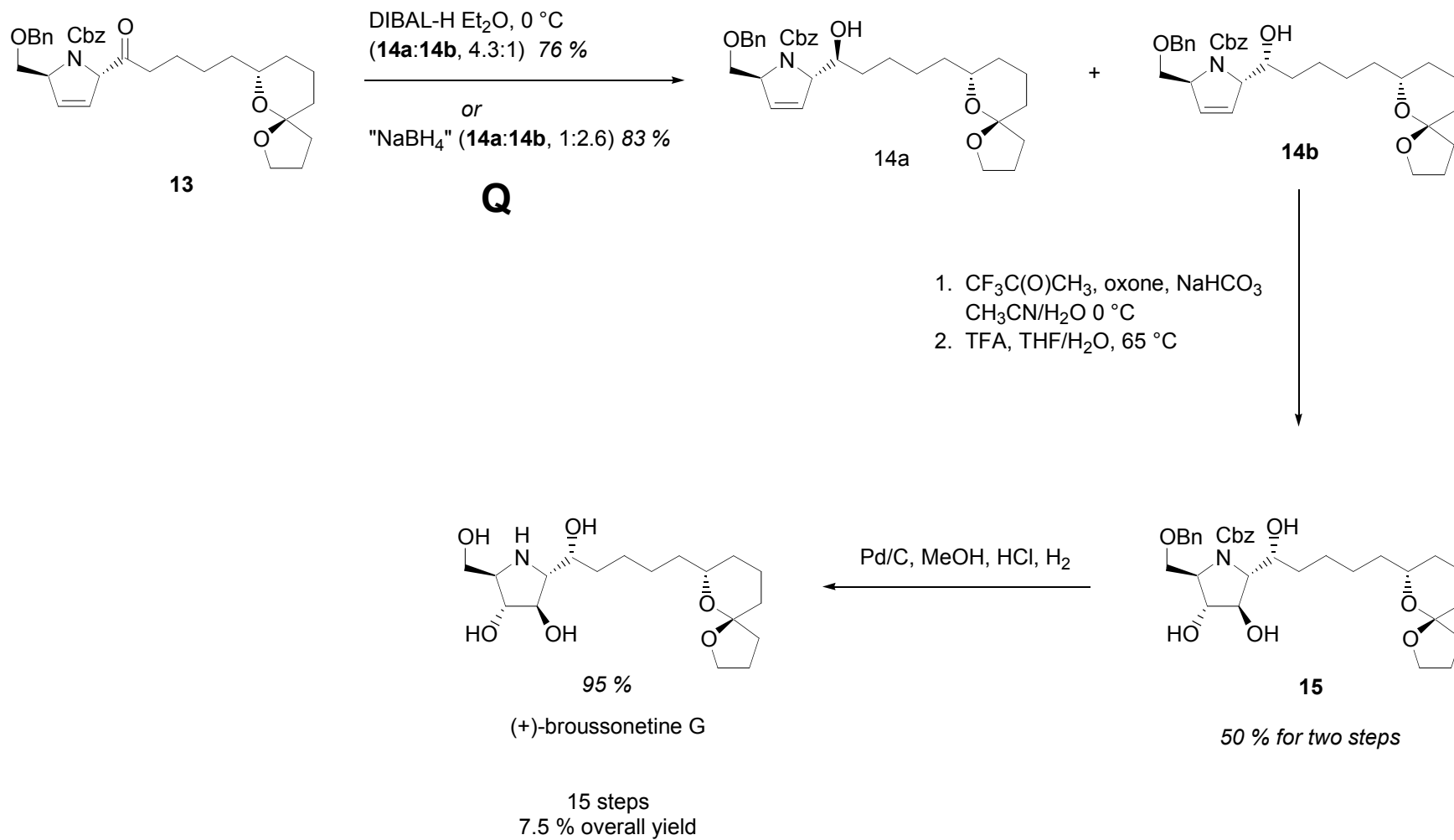
¹ Noyori et al. *JACS*, **1997**, *119*, 8738



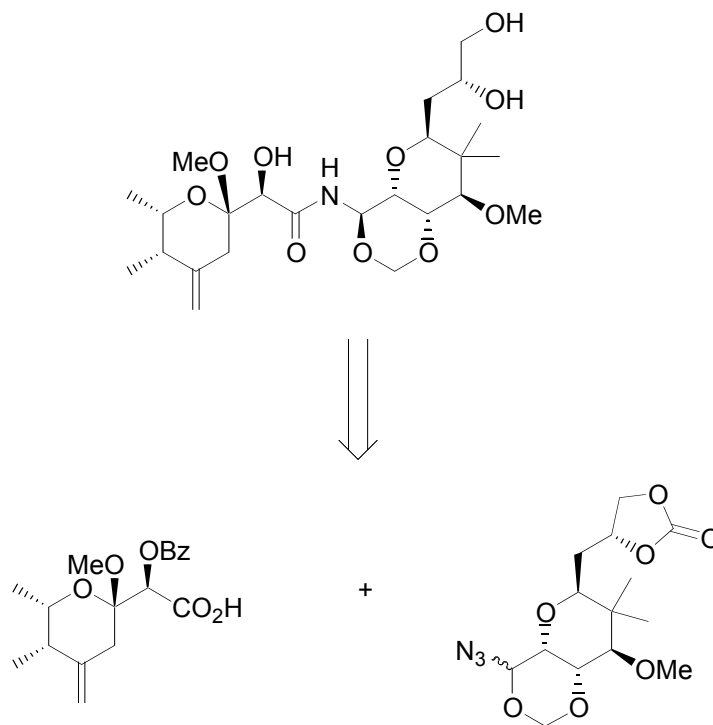
Grignard Coupling



Conclusion of (+)-Broussonetine

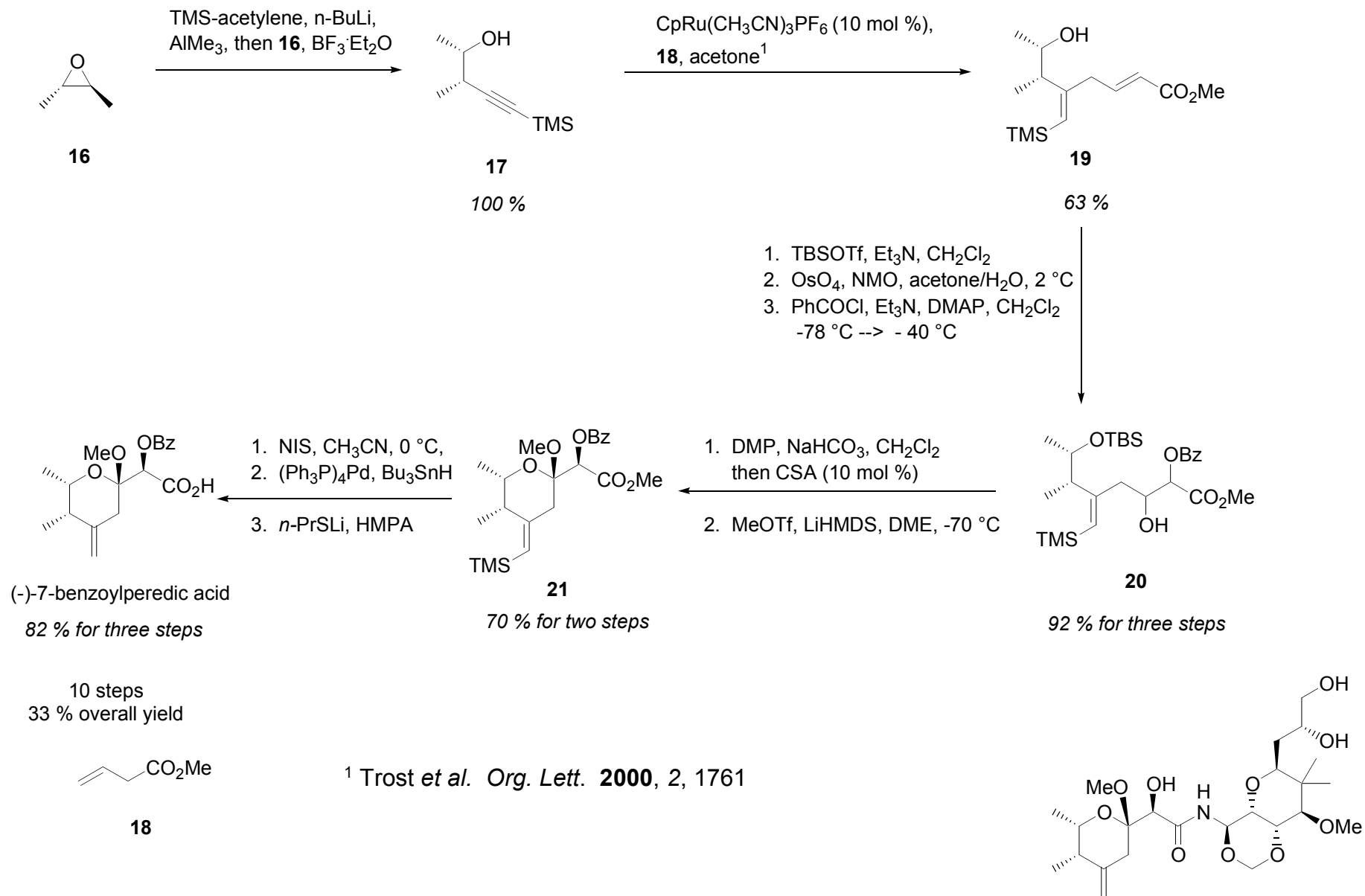


Formal Synthesis of (-)-Mycalamide A

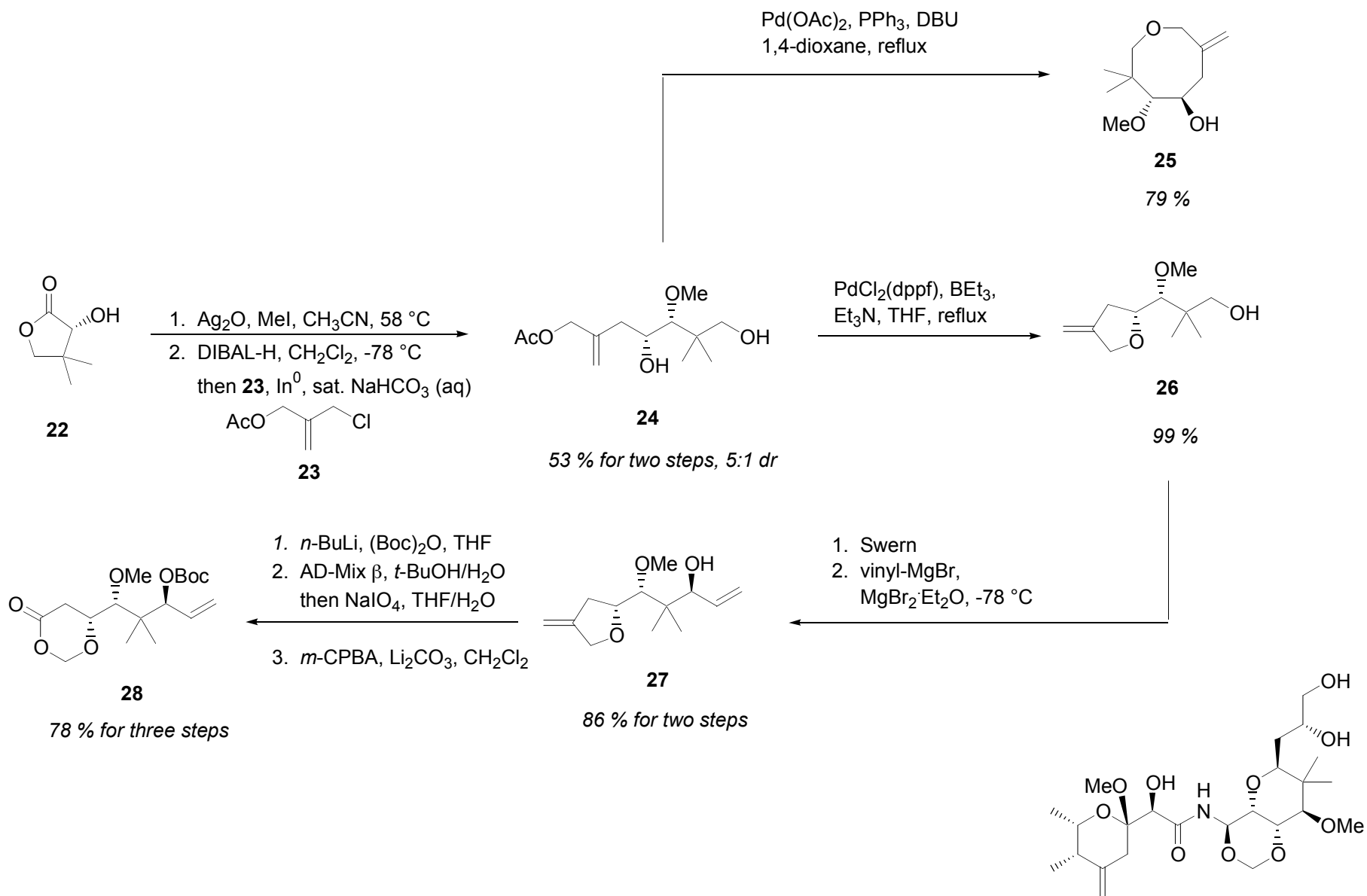


- For completion of the synthesis see Nakata *et al.* *Heterocycles*, **1996**, 42, 869

Synthesis of (-)-7-Benzoylpederic Acid



Palladium Catalyzed Cyclization



Conclusion of Azide Fragment

