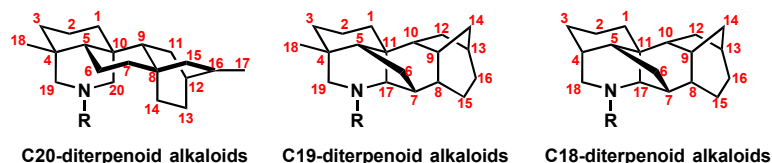
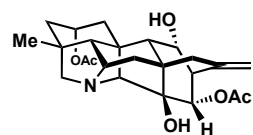


Skeletons of diterpenoid alkaloids

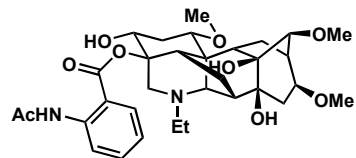


Isolation: *Aconitum*, *Delphinium*, *Consolida*, *Spiraea*...
over 1200 species

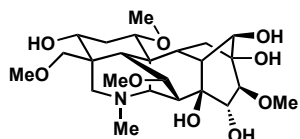
Representative members of the diterpenoid alkaloids



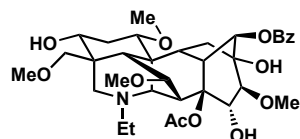
guan-fu base A [C₂₀]
antiarrhythmic
Na_v blocker



lappaconitine [C₁₈]
analgesic
Na_v blocker

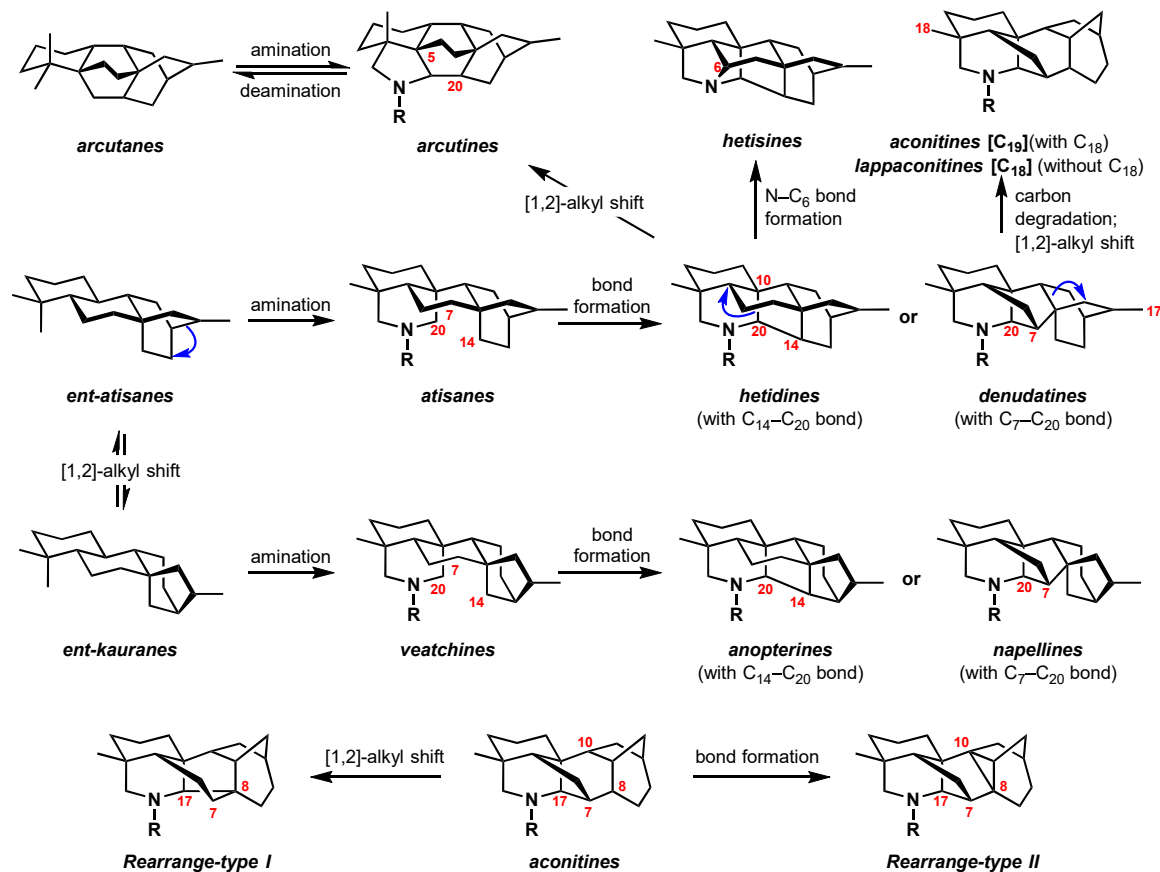


mesaconine [C₁₉]
cardiotonic
Na_v activator



aconitine [C₁₉]
highly toxic
Na_v activator

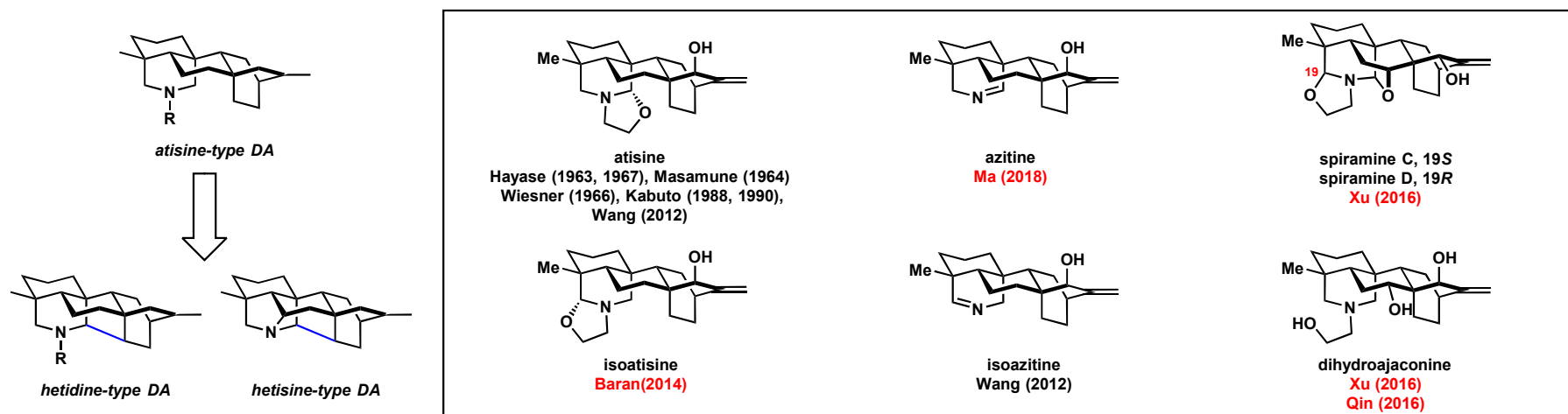
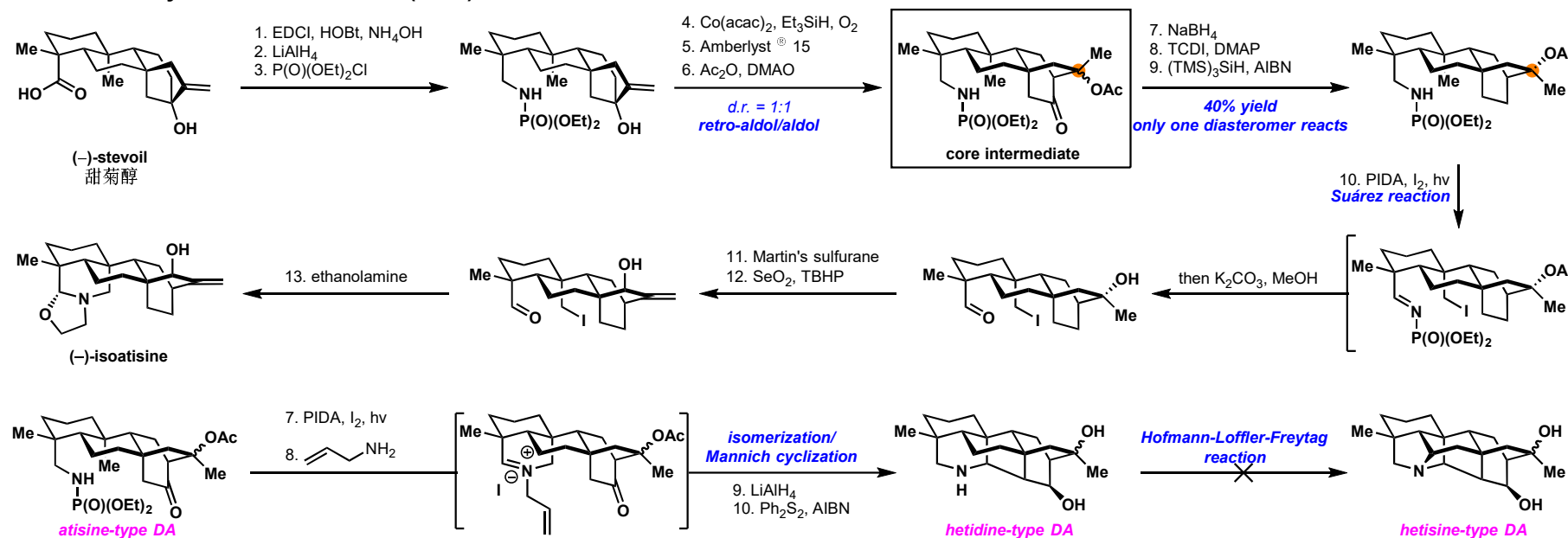
Biosynthetic Relationships of Diterpenoid Alkaloids



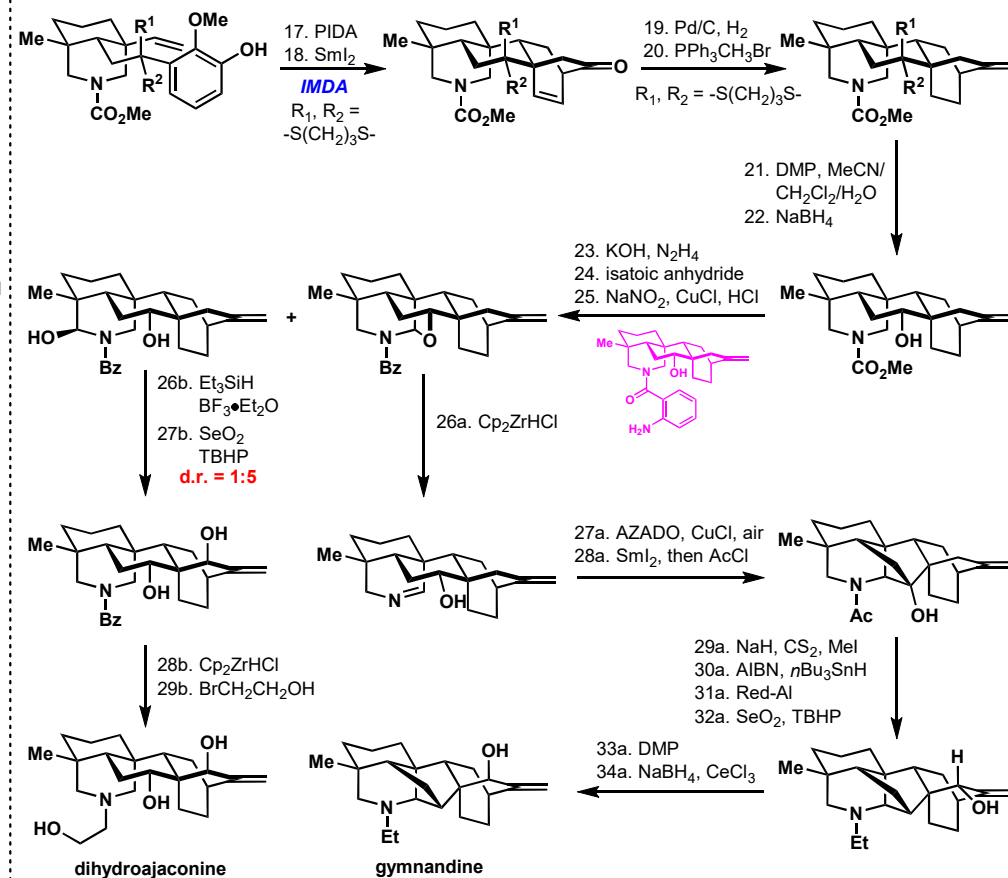
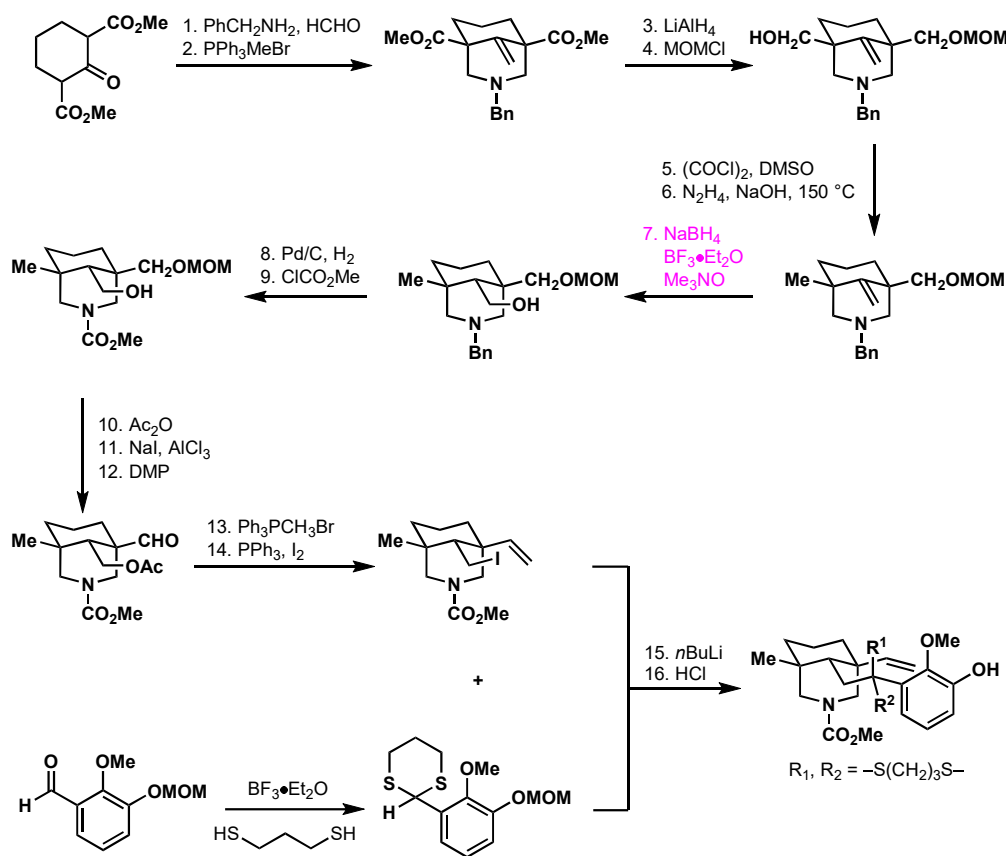
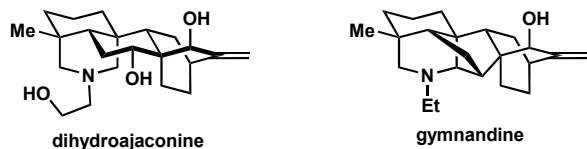
These are reviews you MUST READ:

- F. Wang *et al.* *Nat. Prod. Rep.* **2010**, *27*, 528
- B. Liu *et al.* *Synthesis* **2015**, *47*, 2691
- Y. Qin *et al.* *Nat. Prod. Rep.* **2017**, *34*, 1044
- M. Lautens *et al.* *Synthesis* **2019**, *51*, 3915
- R. Sarpong, R. W. Hoffmann *et al.* *Angew. Chem. Int. Ed.* **2020**, *59*, 10722
- R. Sarpong *et al.* *Chem. Sci.* **2020**, *11*, 7538
- Y. Qin *et al.* *Acc. Chem. Res.* **2021**, *54*, 22

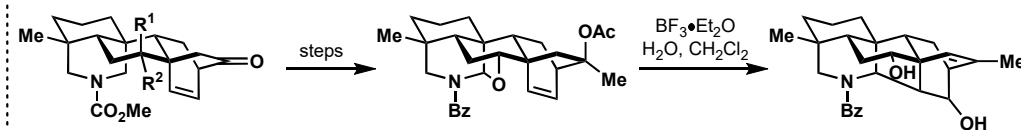
Total Synthesis of the Atisine-type Alkaloids

Baran's Synthesis of Isoatisine (2014) P. S. Baran *et al.* *J. Am. Chem. Soc.* 2014, 136, 12592

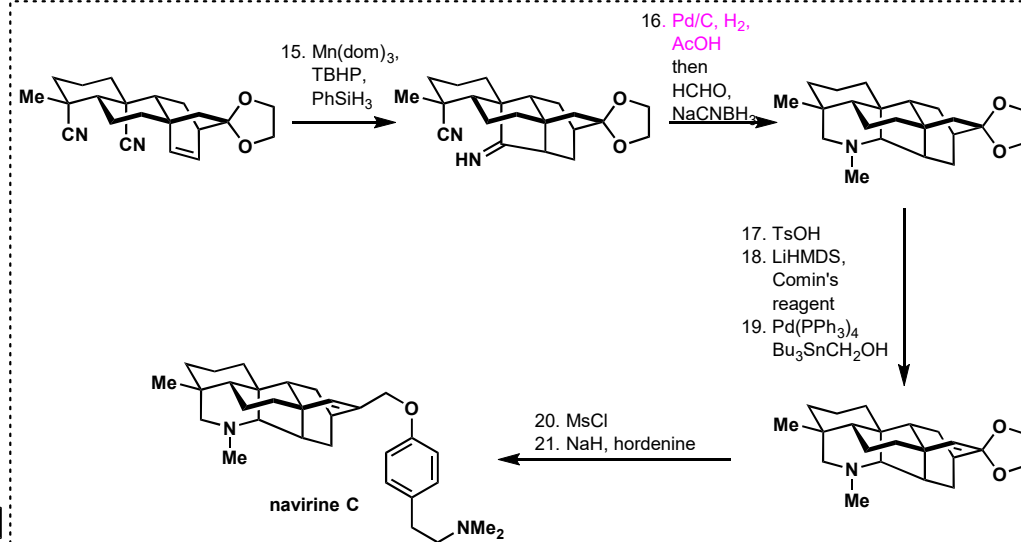
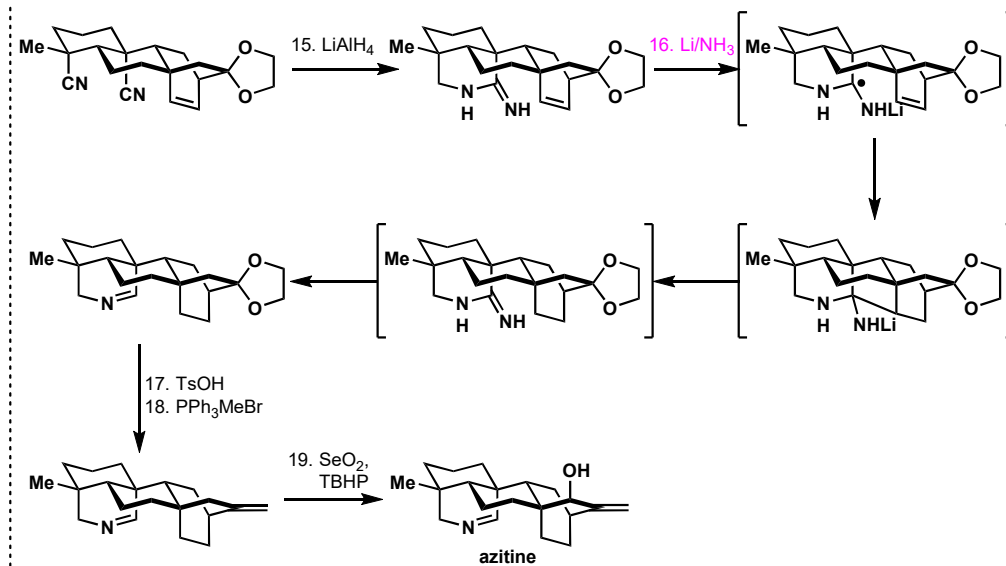
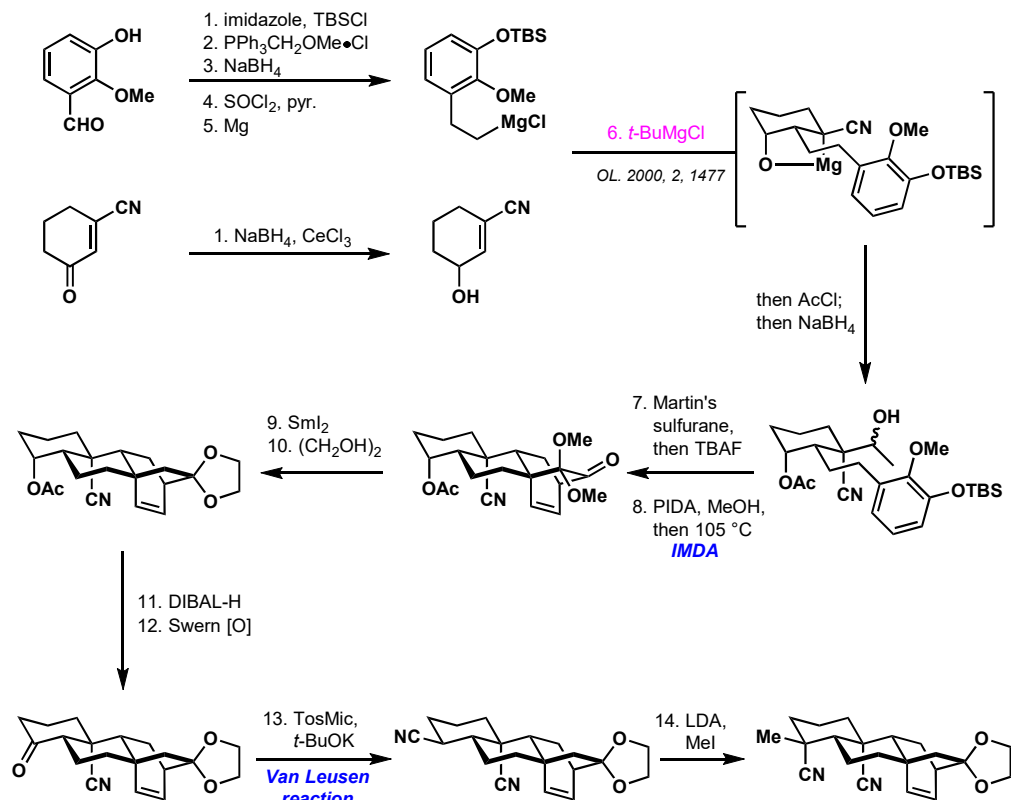
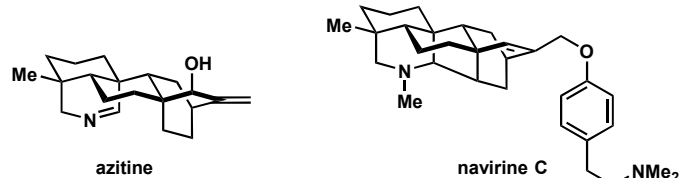
Qin's synthesis of dihydroajaconine and gymnandine

Y. Qin *et al.* *Angew. Chem. Int. Ed.* **2016**, *55*, 392

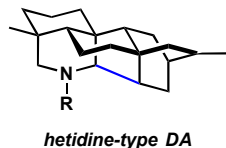
Qin's hetidine skeleton synthesis



Ma's synthesis of atizine and navirine C

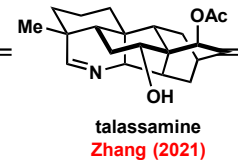
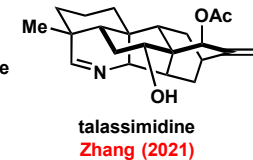
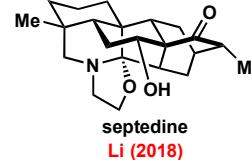
D. Ma et al. *Angew. Chem. Int. Ed.* 2018, 57, 6676

Total Synthesis of the Hetidine-type Alkaloids



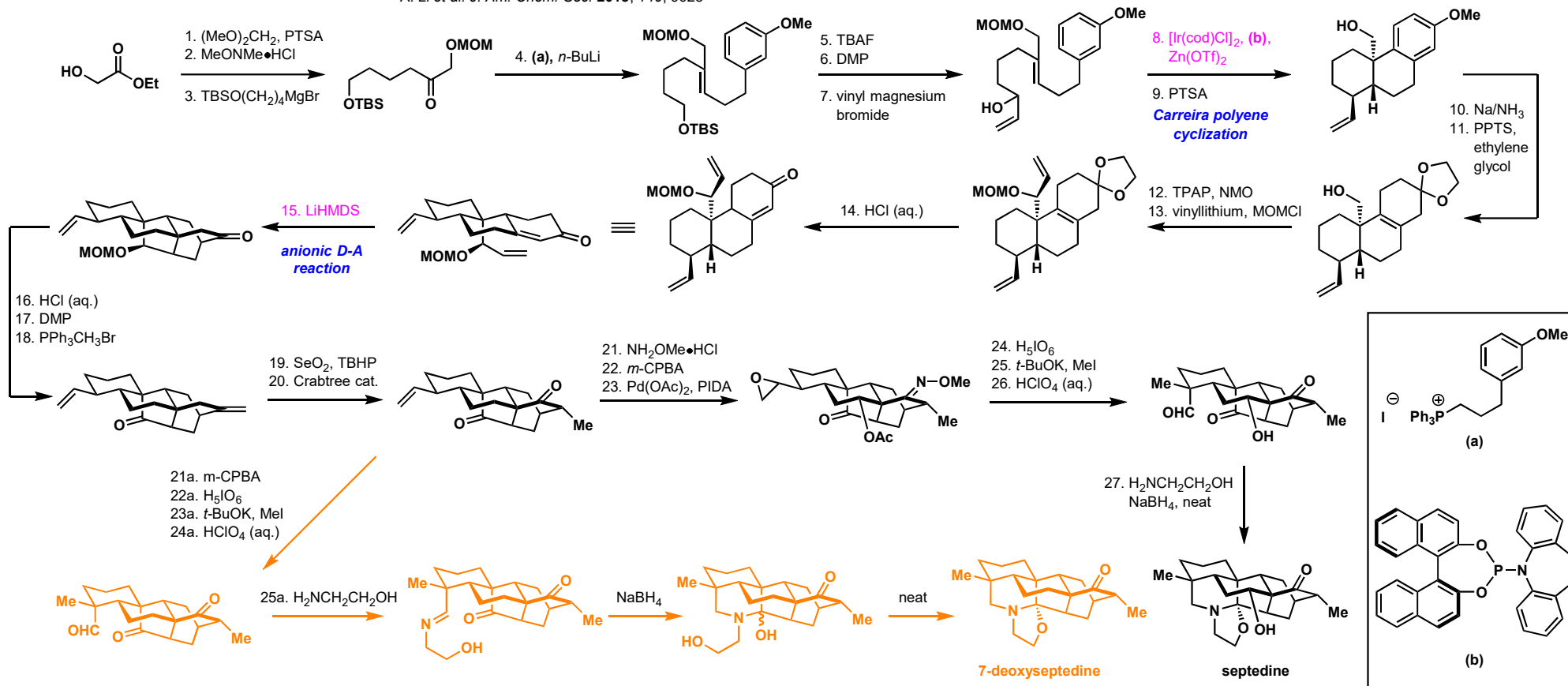
skeleton synthesis

R. Sarpong *et al.* *Angew. Chem., Int. Ed.* **2013**, 52, 4854
 P. S. Baran *et al.* *J. Am. Chem. Soc.* **2014**, 136, 12592
 Y. Qin *et al.* *Angew. Chem. Int. Ed.* **2016**, 55, 392
 D. Ma *et al.* *Angew. Chem. Int. Ed.* **2018**, 57, 6676
 M. Zhang *et al.* *Angew. Chem. Int. Ed.* **2018**, 57, 937

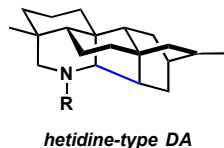


Li's Synthesis of septedine

A. Li *et al.* *J. Am. Chem. Soc.* **2018**, 140, 9025

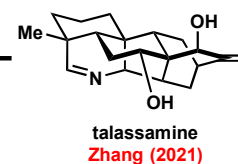
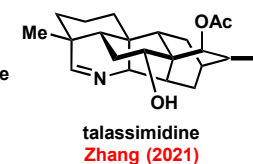
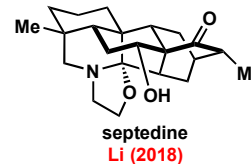


Total Synthesis of the Hetidine-type Alkaloids



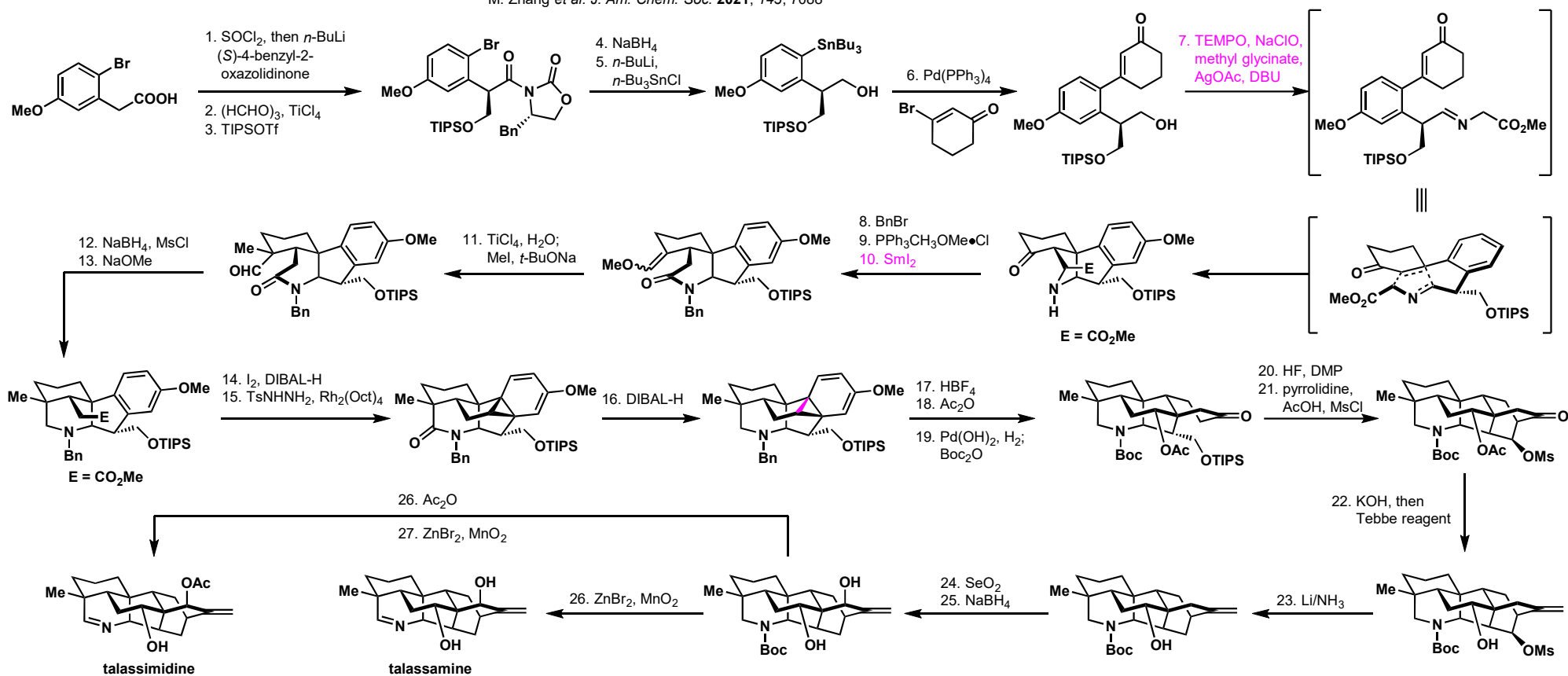
skeleton synthesis

R. Sarpong *et al.* *Angew. Chem., Int. Ed.* **2013**, 52, 4854
 P. S. Baran *et al.* *J. Am. Chem. Soc.* **2014**, 136, 12592
 Y. Qin *et al.* *Angew. Chem. Int. Ed.* **2016**, 55, 392
 D. Ma *et al.* *Angew. Chem. Int. Ed.* **2018**, 57, 6676
 M. Zhang *et al.* *Angew. Chem. Int. Ed.* **2018**, 57, 937

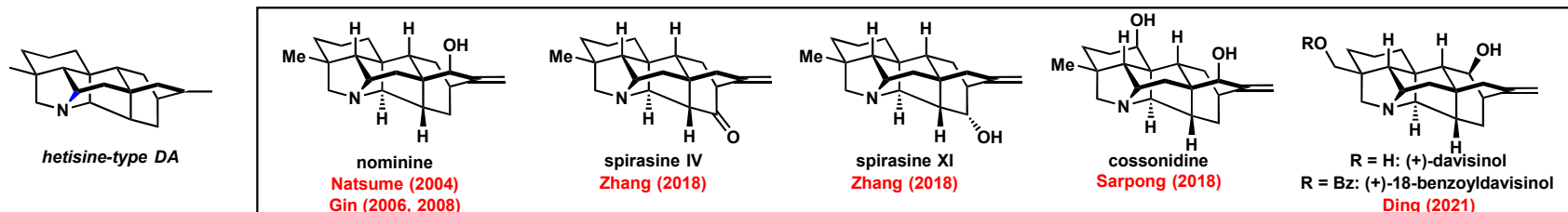


Zhang's synthesis of talassimidine and talassamine

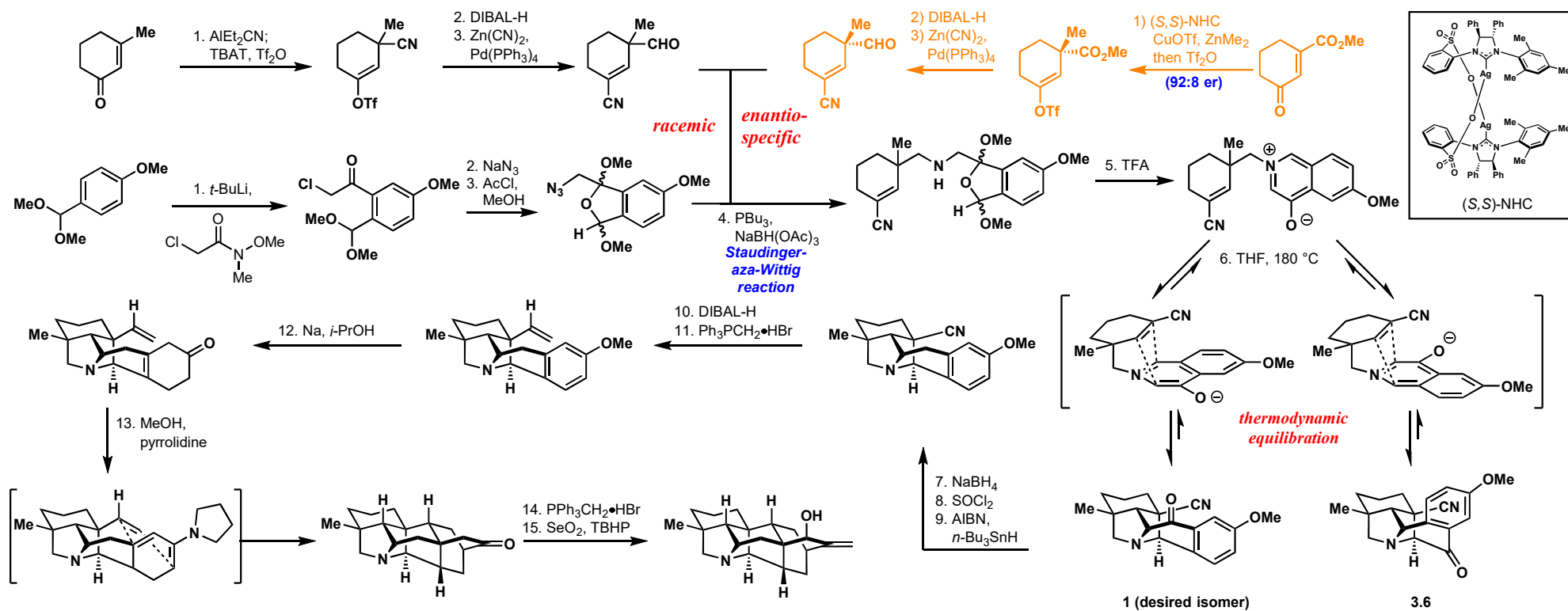
M. Zhang *et al.* *J. Am. Chem. Soc.* **2021**, 143, 7088



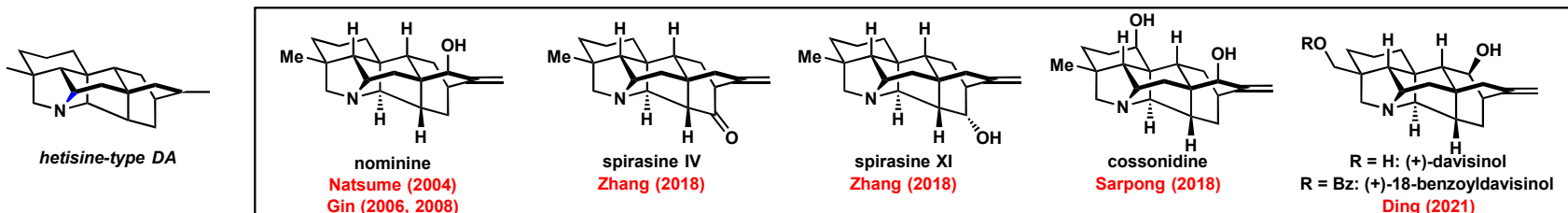
Total Synthesis of the Hetisine-type Alkaloids



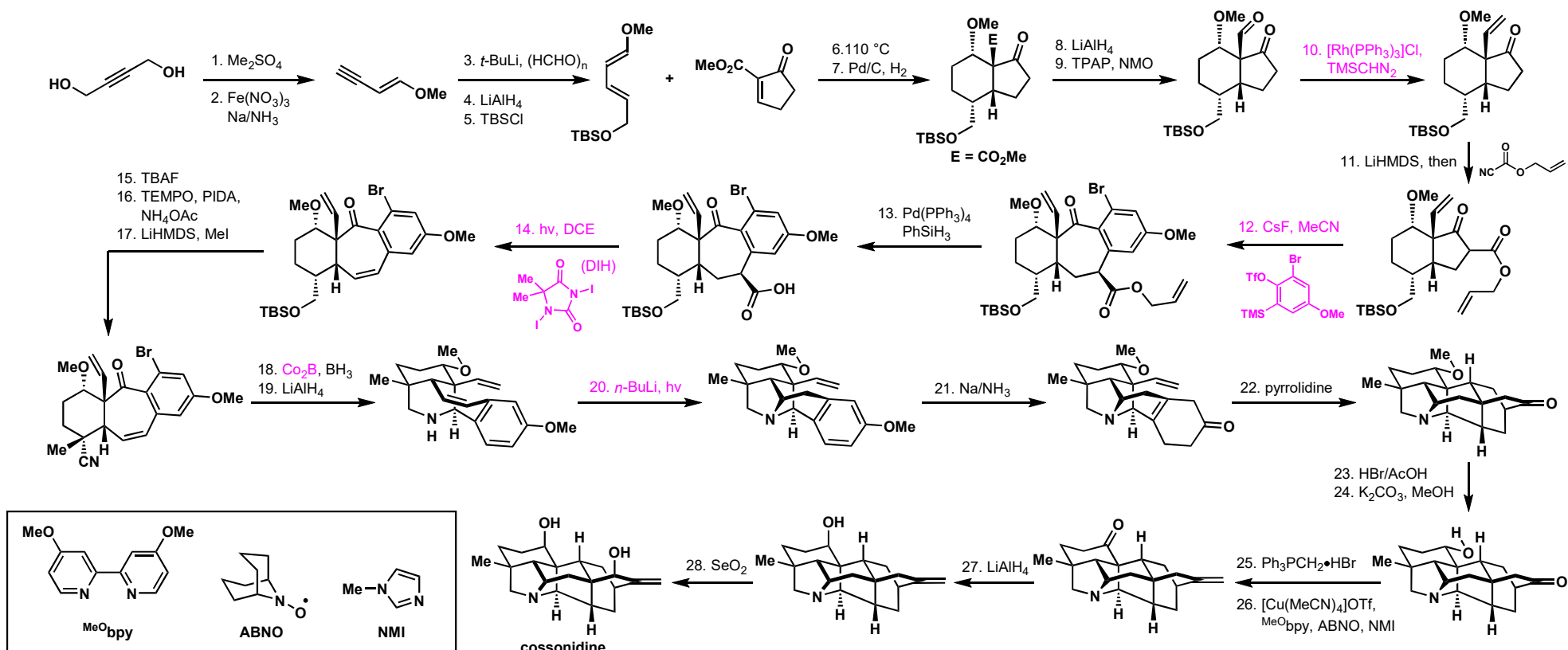
Gin's synthesis of nominine

D. Y. Gin et al. *J. Am. Chem. Soc.* **2006**, *128*, 8734D. Y. Gin et al. *Chem. Eur. J.* **2008**, *14*, 1654

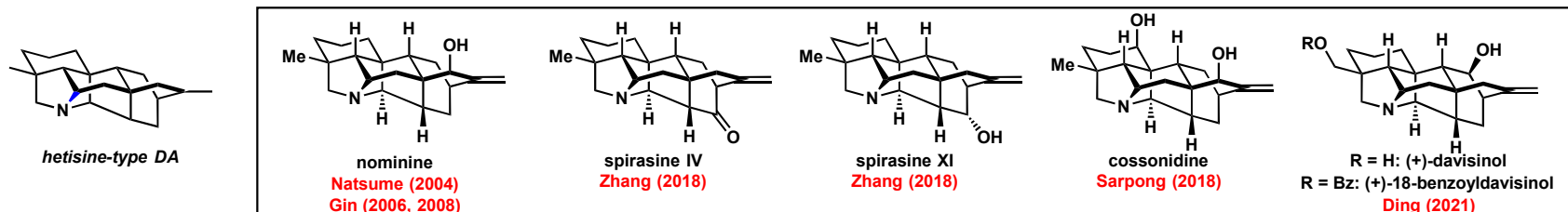
Total Synthesis of the Hetisine-type Alkaloids



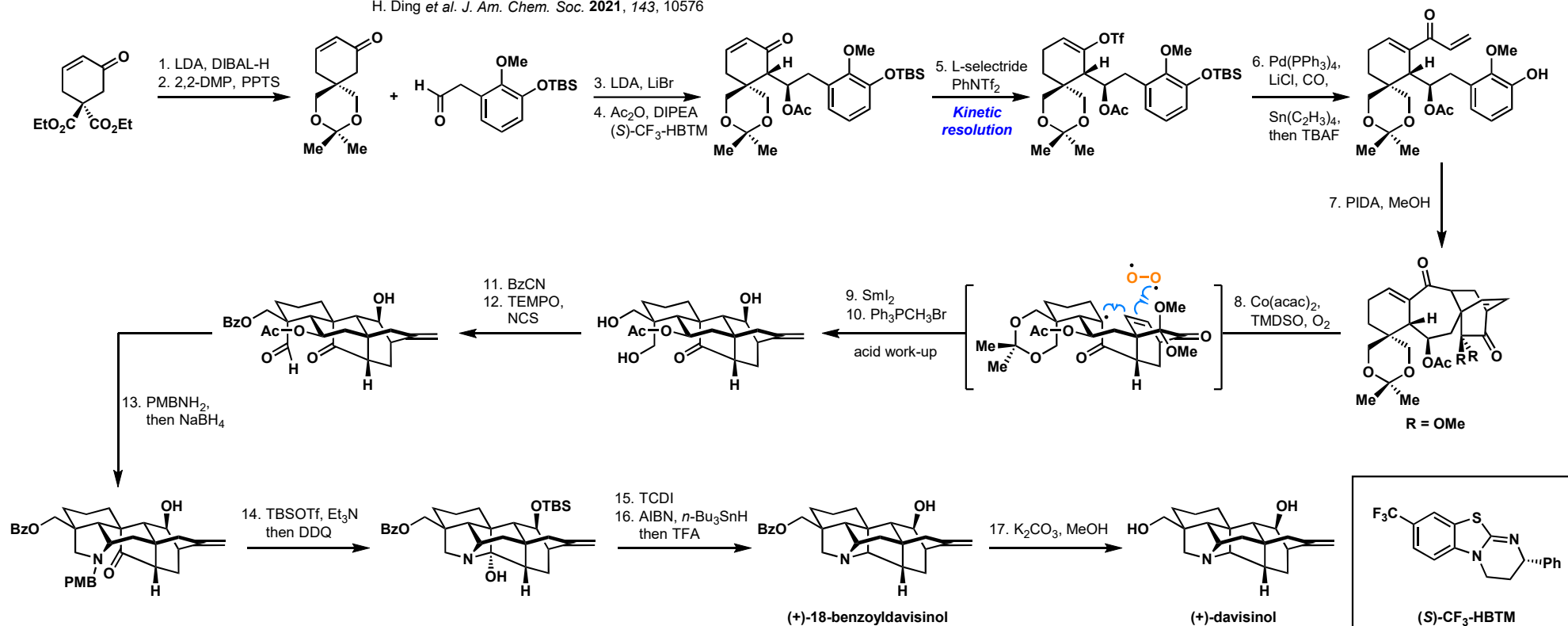
Sarpong's synthesis of cossonidine

R. Sarpong et al. *J. Am. Chem. Soc.* 2018, 140, 8105

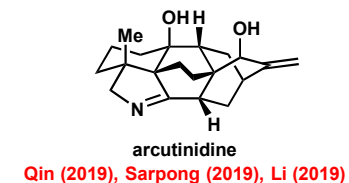
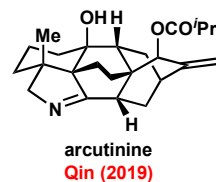
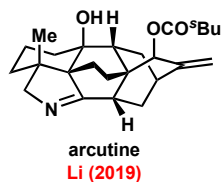
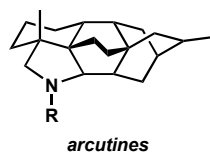
Total Synthesis of the Hetisine-type Alkaloids



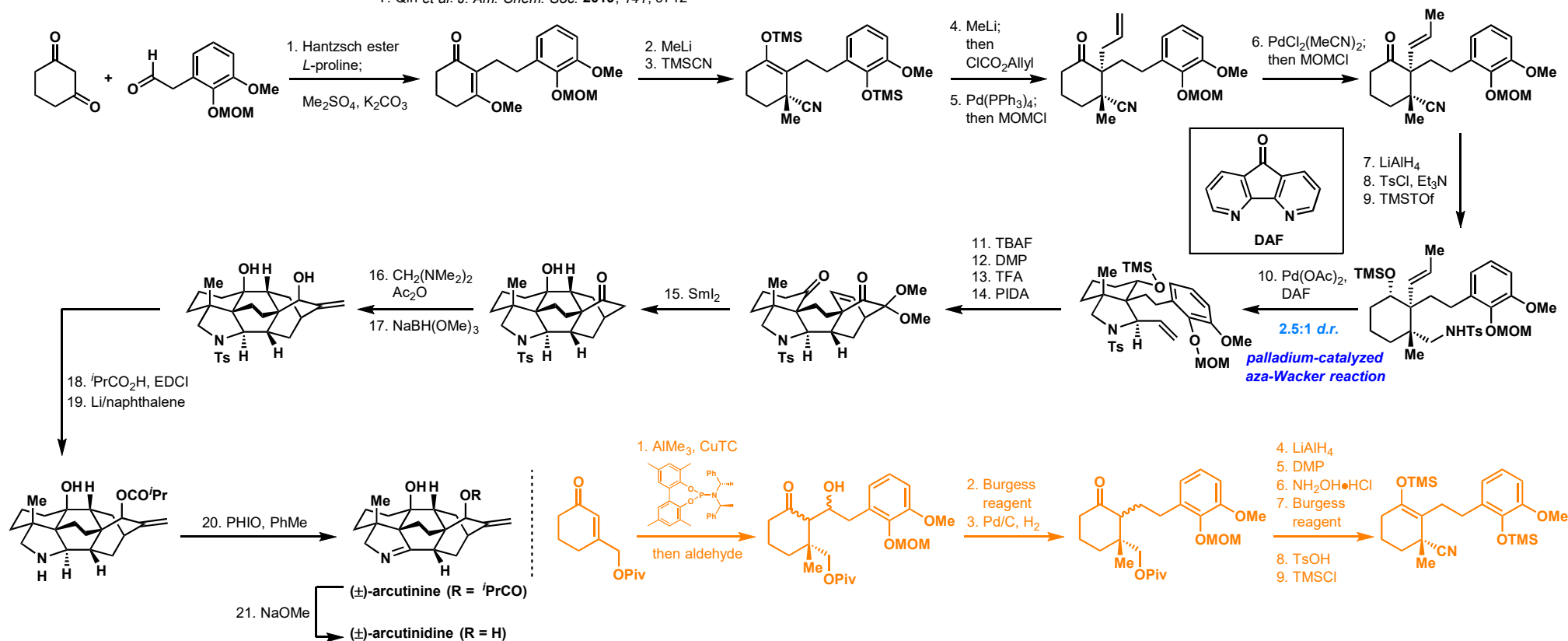
Ding's synthesis of (+)-davisinol

H. Ding *et al.* *J. Am. Chem. Soc.* 2021, 143, 10576

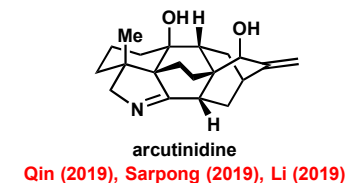
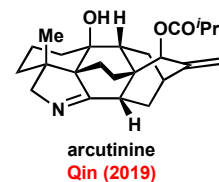
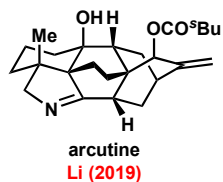
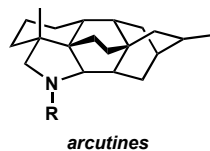
Total Synthesis of the Hetisine-type Alkaloids



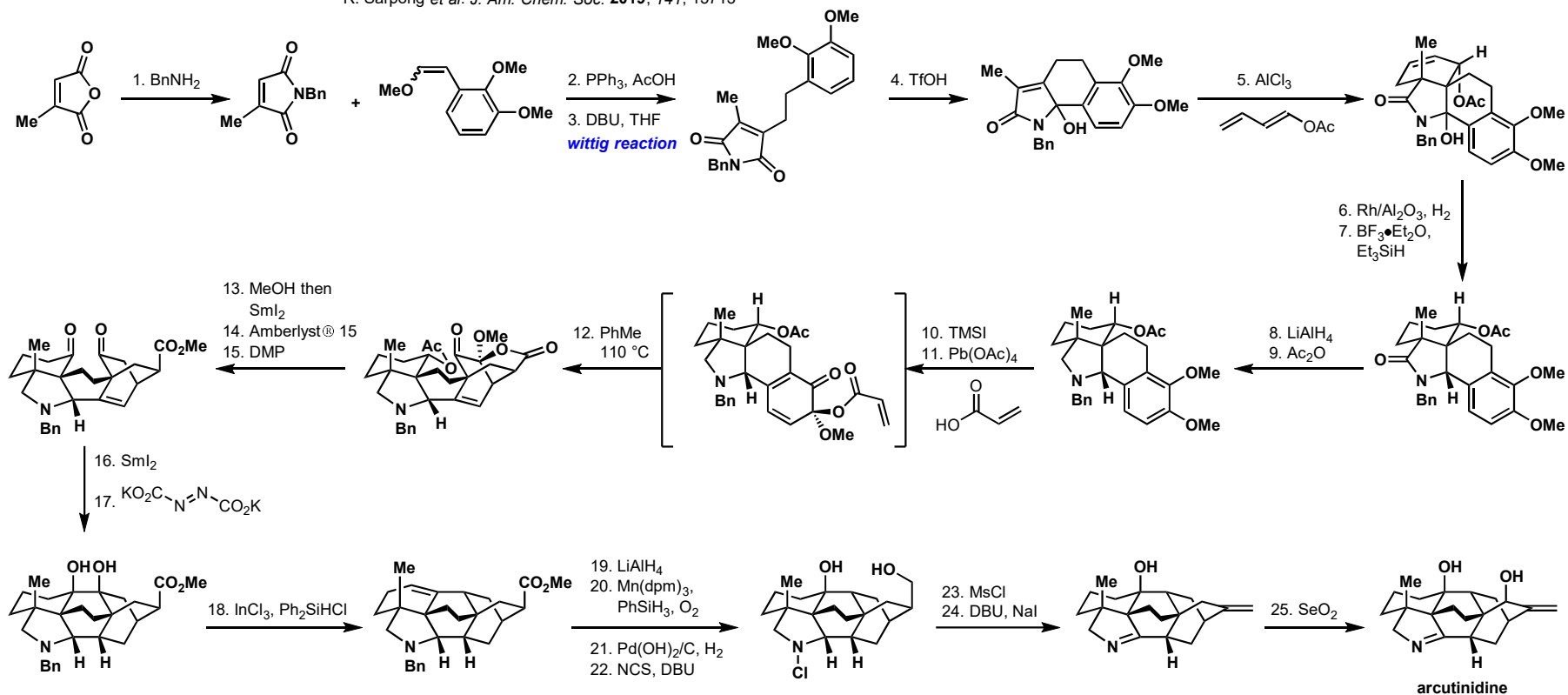
Qin's synthesis of arcutinine and arcutinidine

Y. Qin et al. *J. Am. Chem. Soc.* 2019, 141, 9712

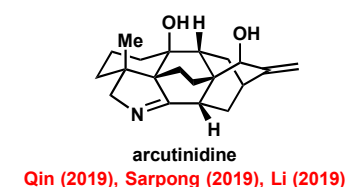
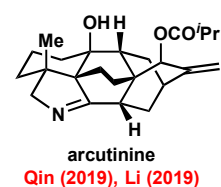
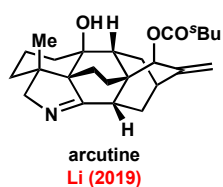
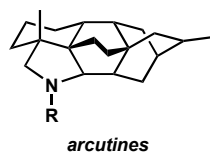
Total Synthesis of the Hetisine-type Alkaloids



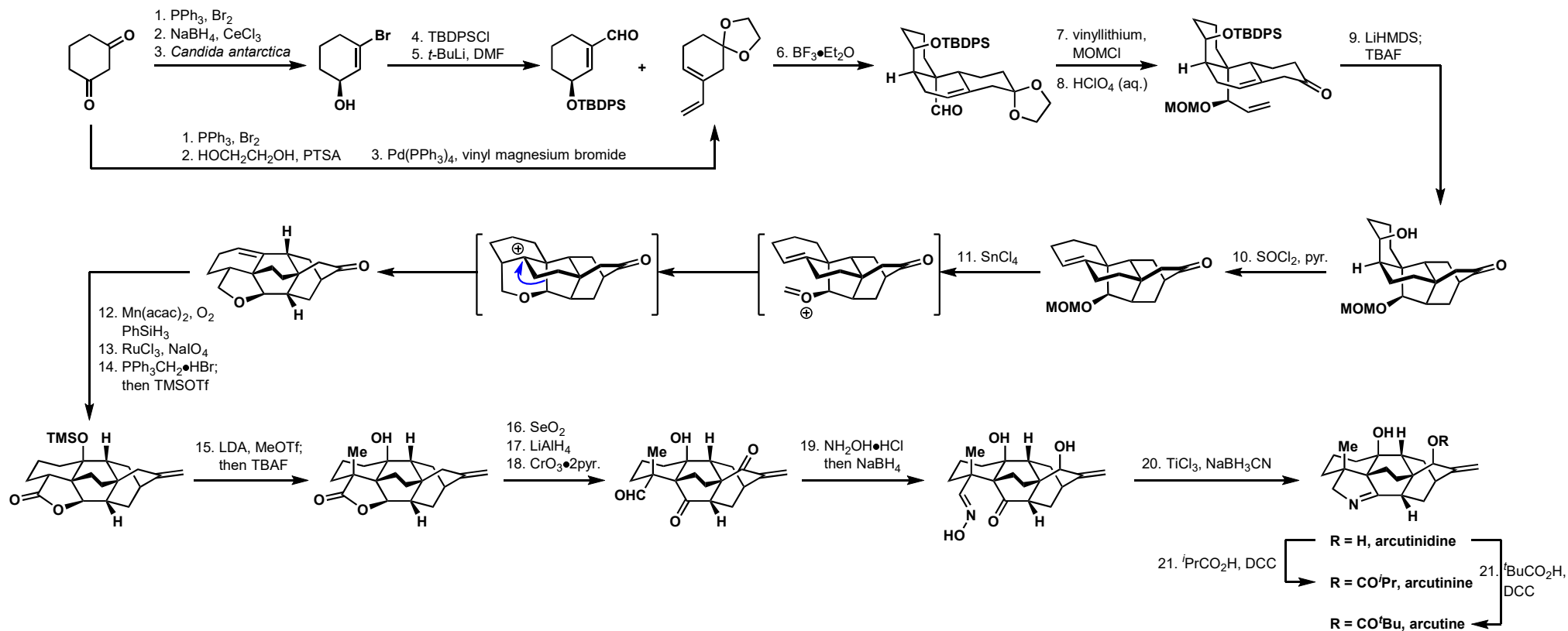
Sarpong's synthesis of arcutinidine

R. Sarpong *et al.* *J. Am. Chem. Soc.* **2019**, *141*, 13713

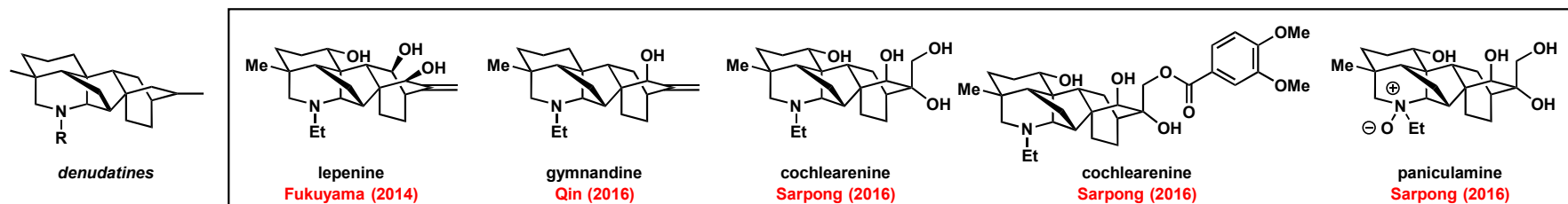
Total Synthesis of the Hetisine-type Alkaloids



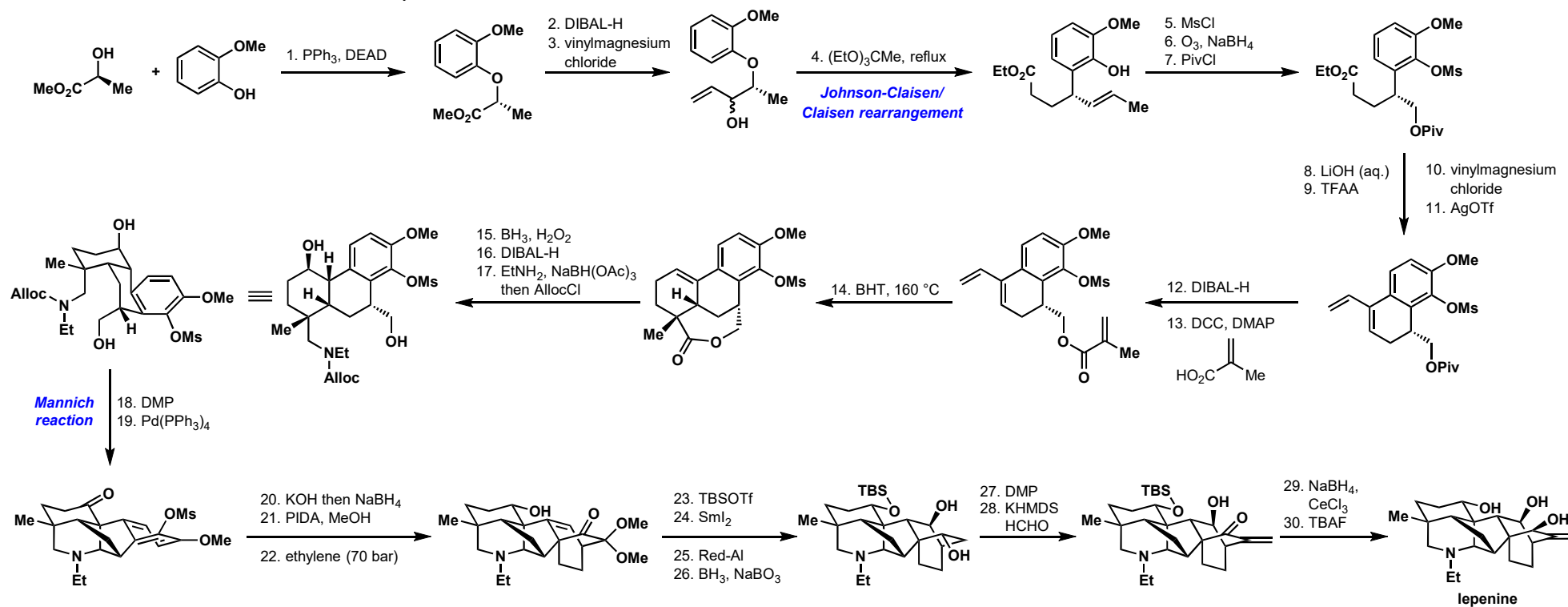
Li's synthesis of arcutine, arcutinine, arcutinidine

A. Li et al. *J. Am. Chem. Soc.* **2019**, *141*, 13718

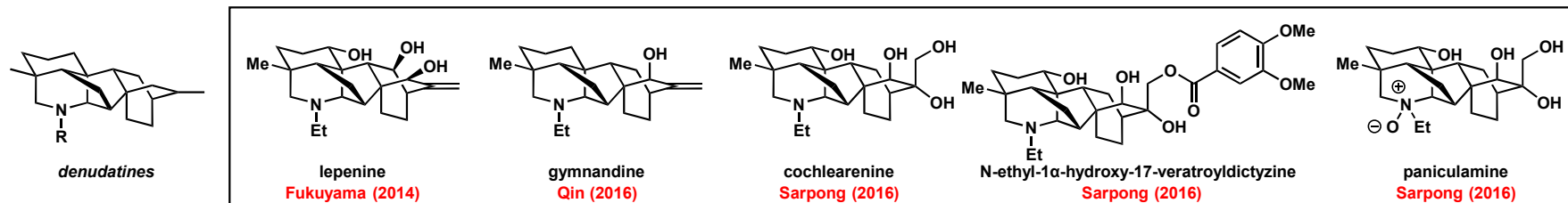
Total Synthesis of the denudatine-type Alkaloids



Fukuyama's Synthesis of the lepenine

T. Fukuyama *et al.* *J. Am. Chem. Soc.* **2014**, *136*, 6598

Total Synthesis of the denudatine-type Alkaloids



Sarpong's Synthesis of the denudatine-type alkaloids

R. Sarpong *et al.* *J. Am. Chem. Soc.* **2016**, *138*, 10830