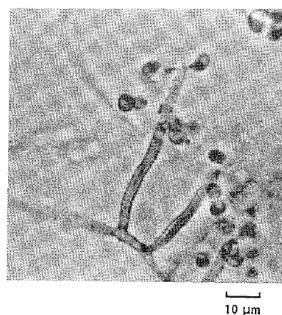


Novel diterpenoid isolated in 1987 by Ando and coworkers at Fujisawa Pharmaceutical Co. from fungal strain *Virgaria nigra*, isolated from soil collected at the foot of Mt. Aso, Japan:

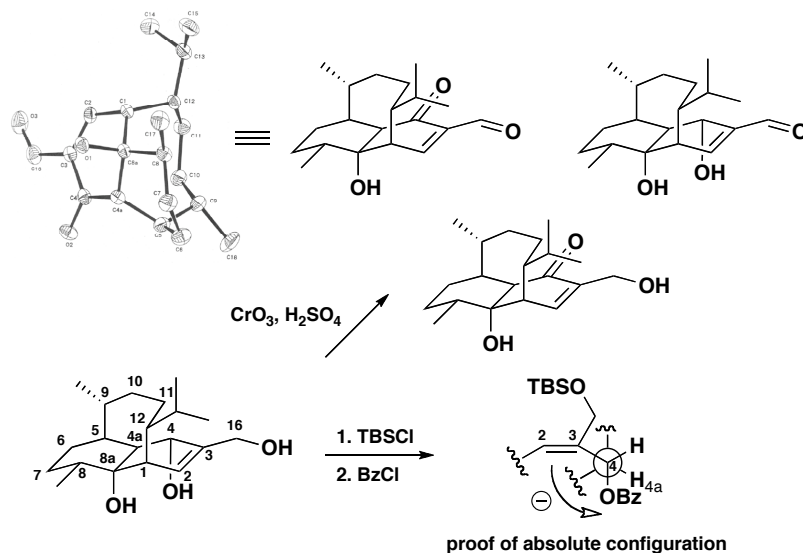


*Virgaria nigra* also found in US, Canada, and Cuba

**Biological activity:** antihypertensive, inhibition of platelet aggregation (rabbit and human), induces contraction of aortic smooth muscle (rat) through  $Ca^{2+}$  ion channel agonist activity, TNF antagonist for possible treatment of endotoxic shock, inflammation, muscle atrophy, progression of ARC to AIDS, autoimmune diseases, arthritis...

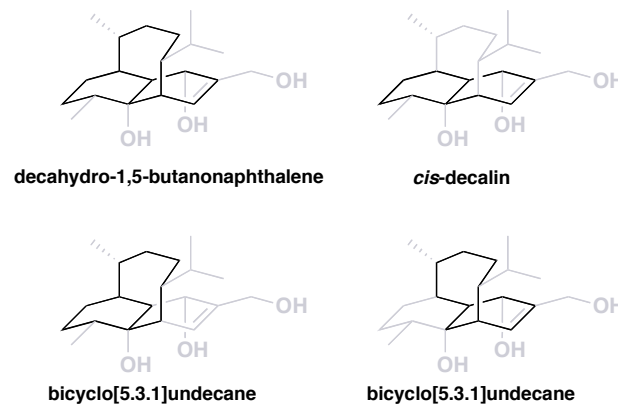
*J. Antibiot.* **1988**, *41*, 25 – 30 and 31 – 35.  
*Org. Prep. Proc. Int.*, **2007**, *39*, 311 – 353.

Publication breakdown: 16 studies toward, 4 dissertations, 8 patents, 1 review, 0 total syntheses.



*J. Org. Chem.* **1987**, *52*, 5292 – 5293.

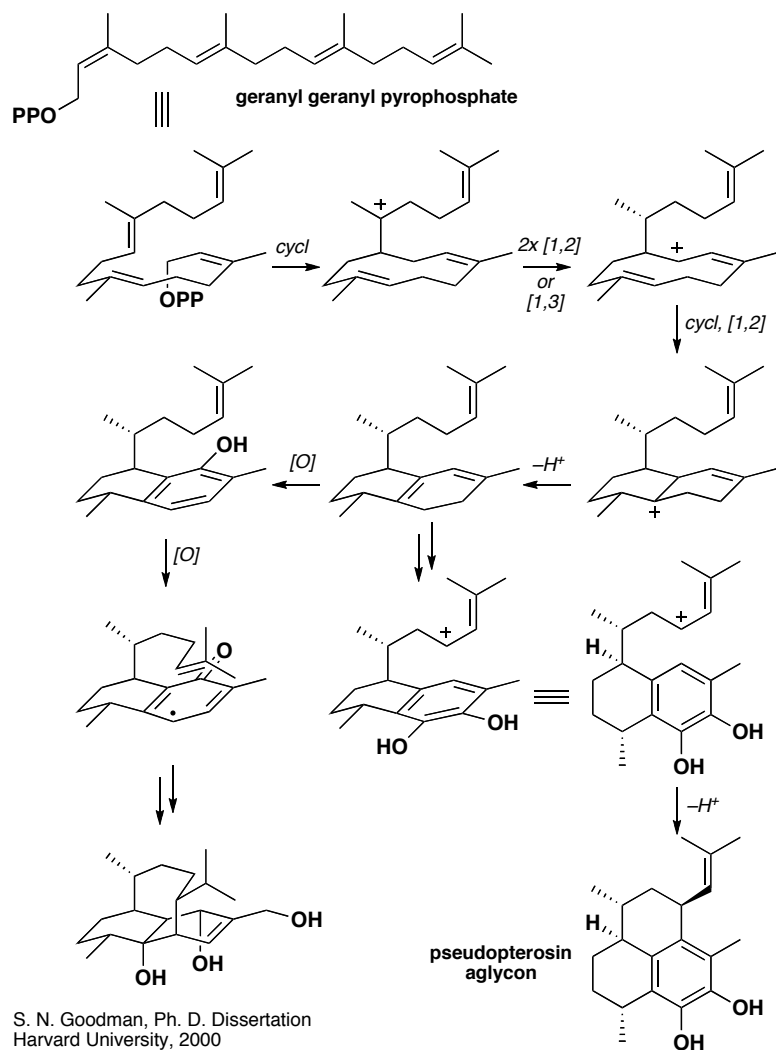
embedded core structures:



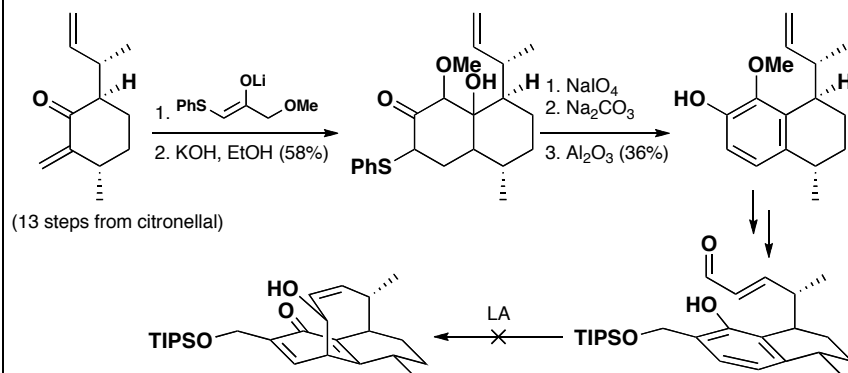
N. Z. Burns

# Vinigrol

Proposed biosynthesis by Corey and Goodman:

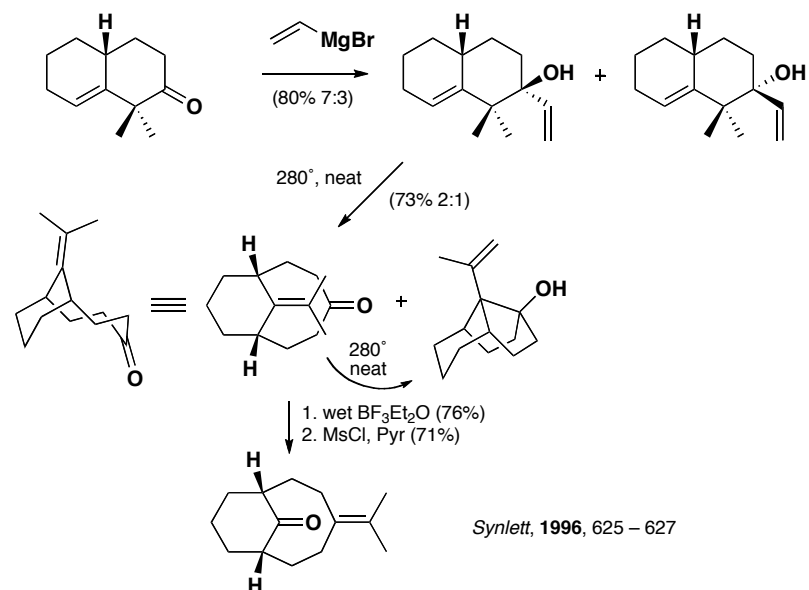


Corey biomimetic approach:



A. Palani, Harvard University, Unpublished results in:  
S. N. Goodman, Ph. D. Dissertation, Harvard University, 2000

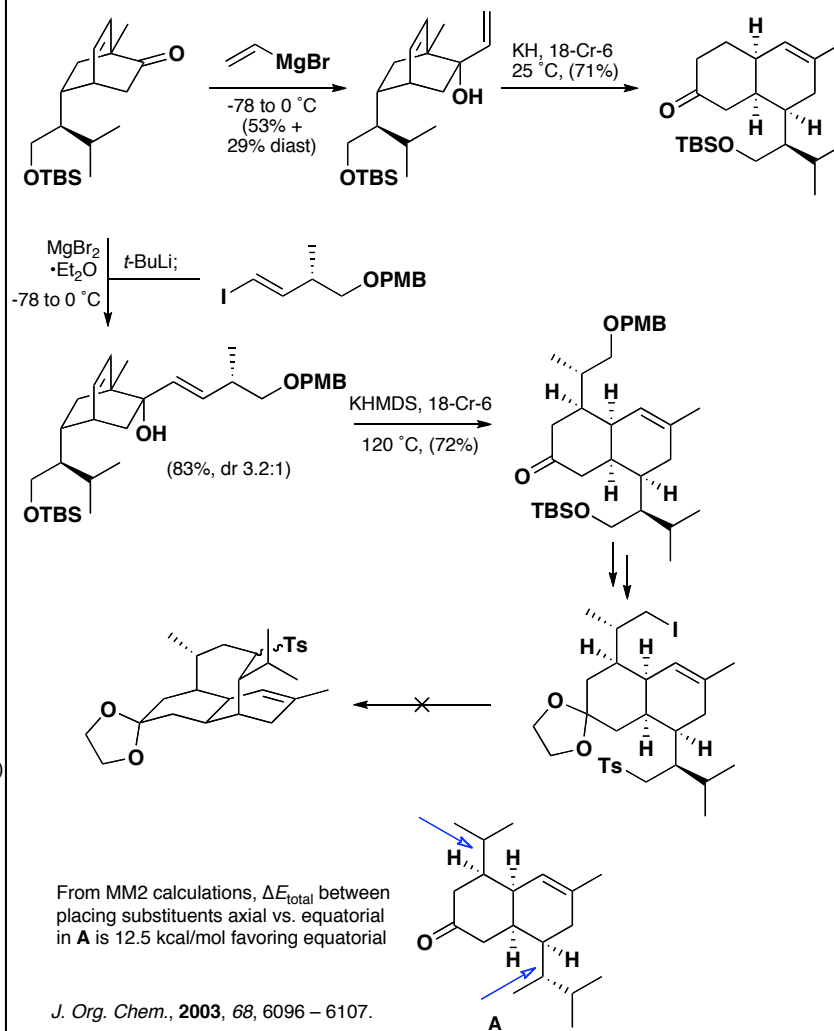
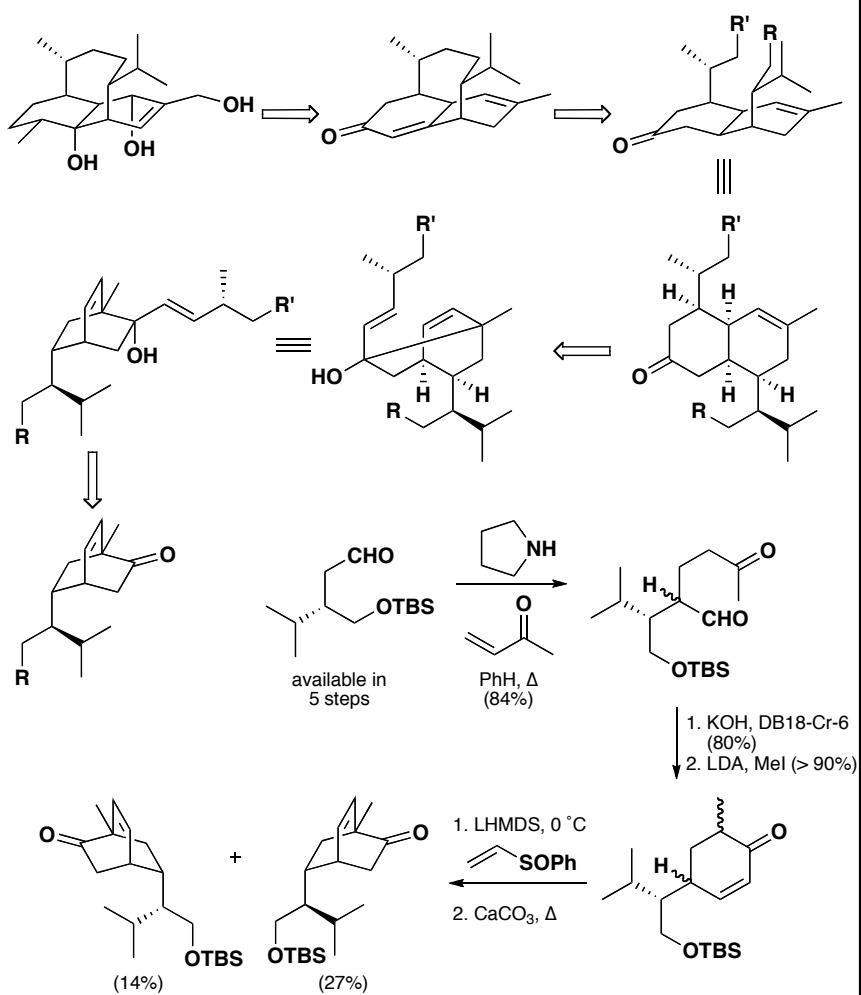
Mehta's bicyclo[5.3.1]undecane:



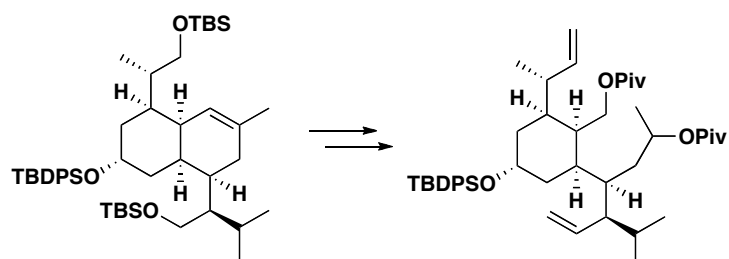
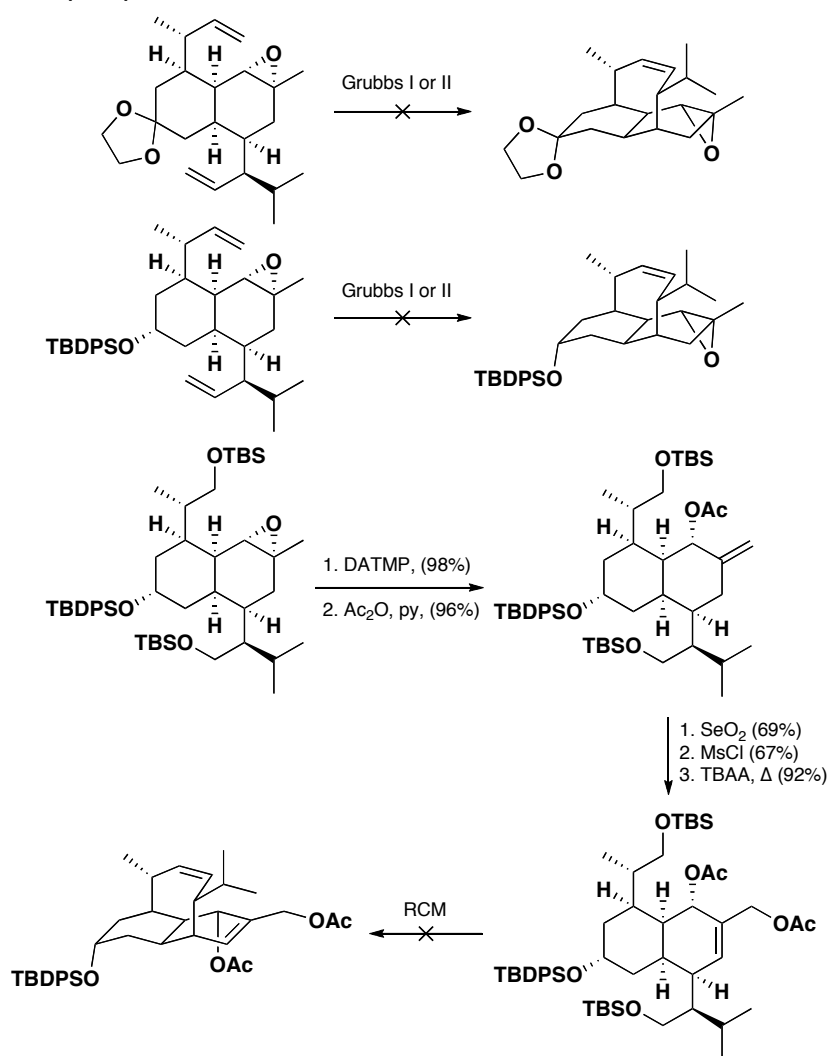
N. Z. Burns

# Vinigrol

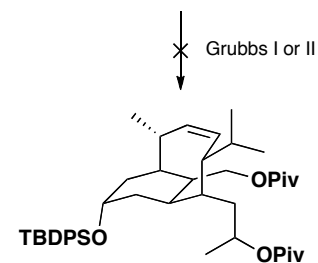
Paquette first generation:



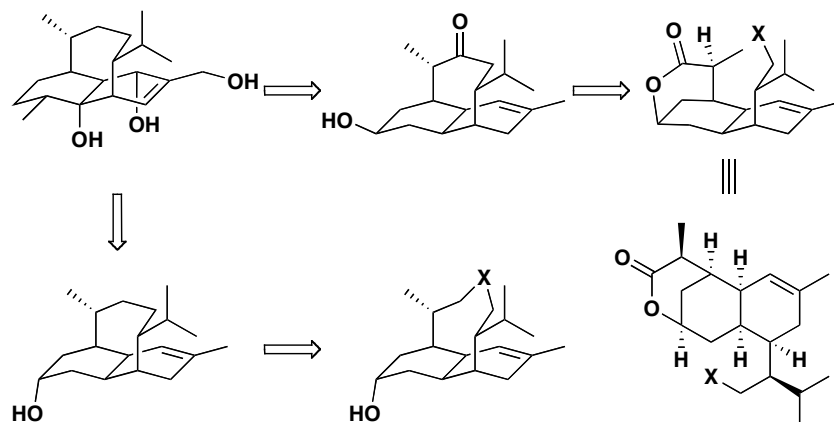
Paquette part deux:



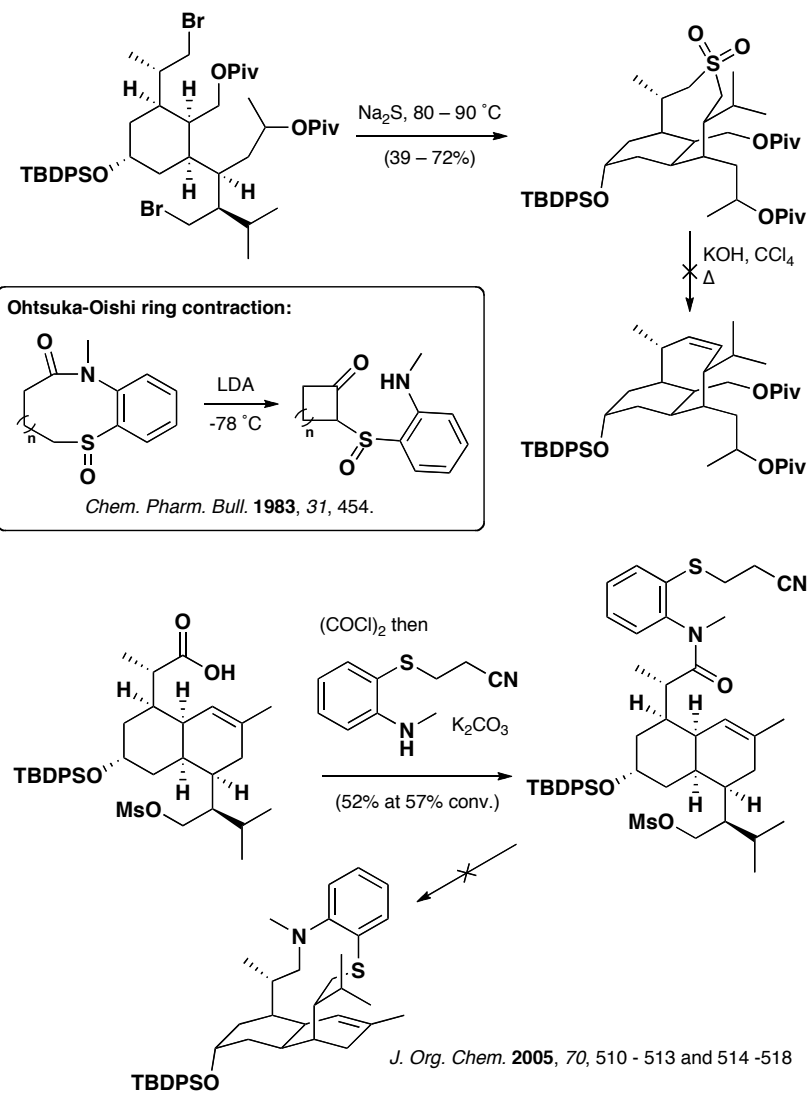
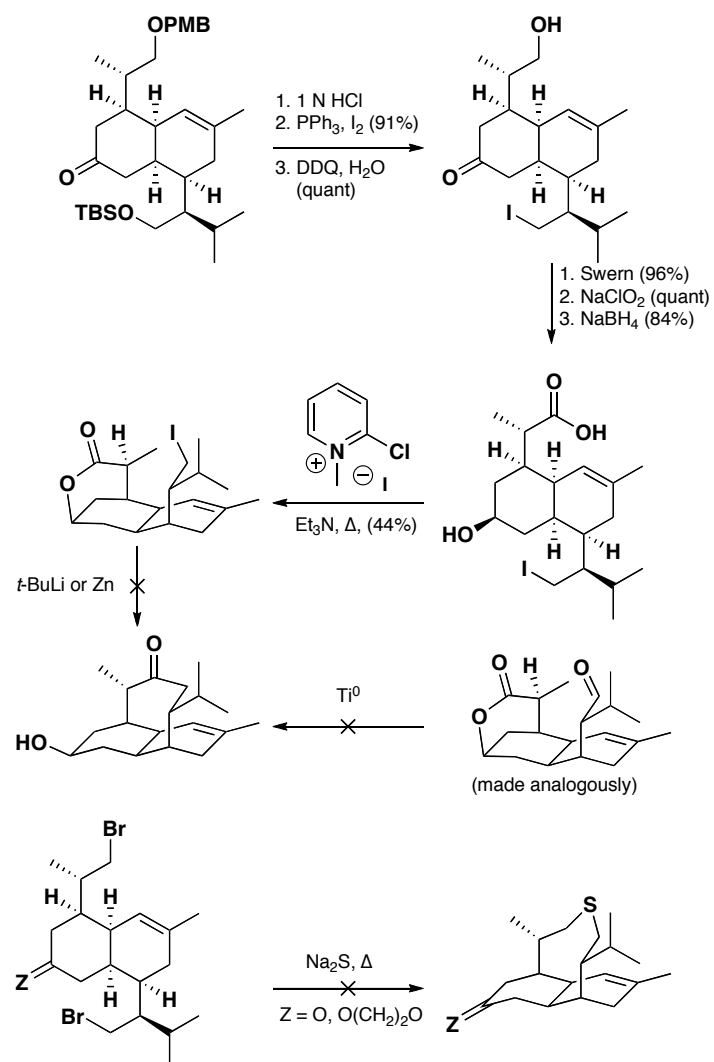
*J. Org. Chem.* 2005, 70, 505-509.



Paquette generation two and three:

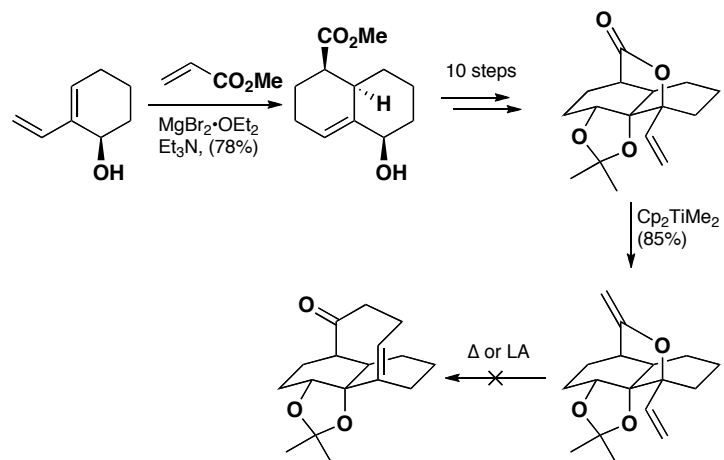


## Vinigrol

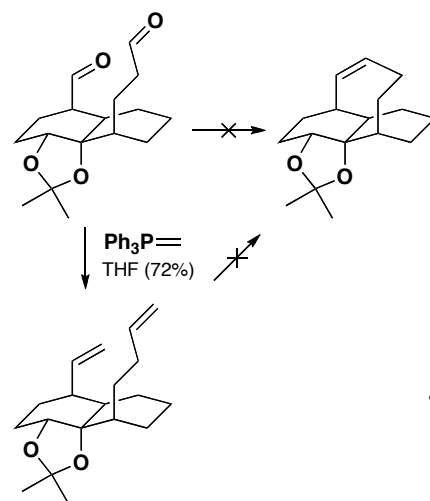




## Barriault second generation:

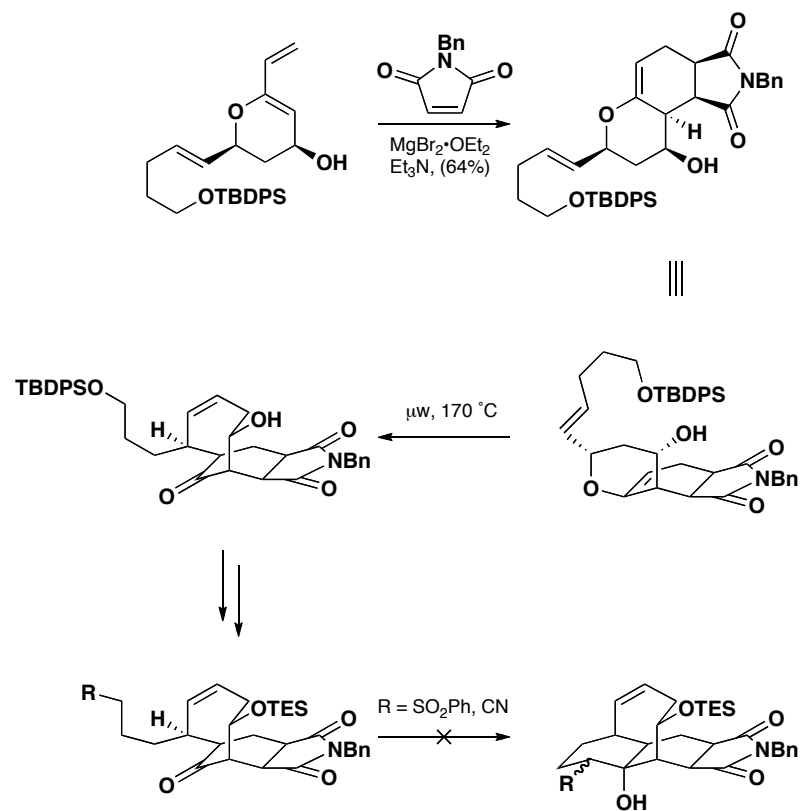


## Barriault macrocyclization:



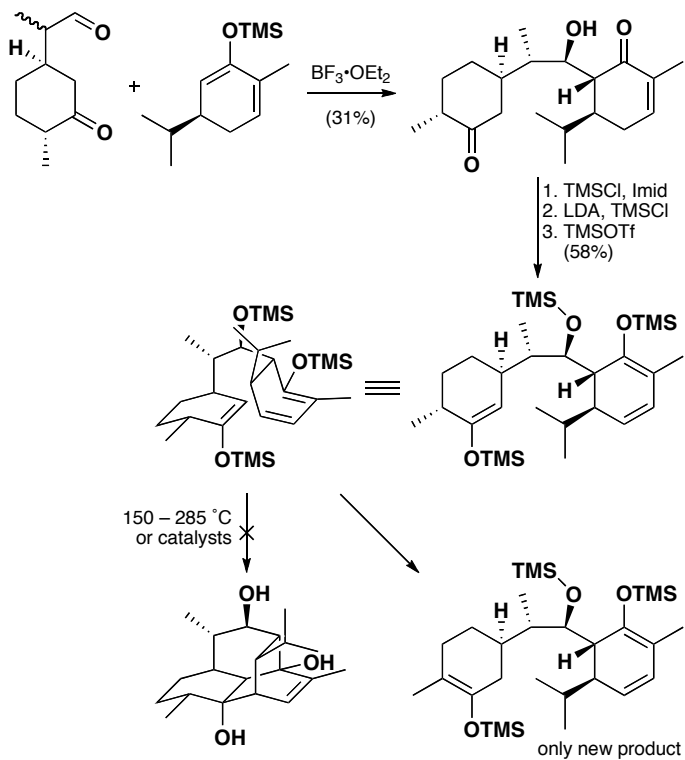
*J. Org. Chem.* **2005**, *70*, 8841 - 8853.

## Barriault fourth generation:

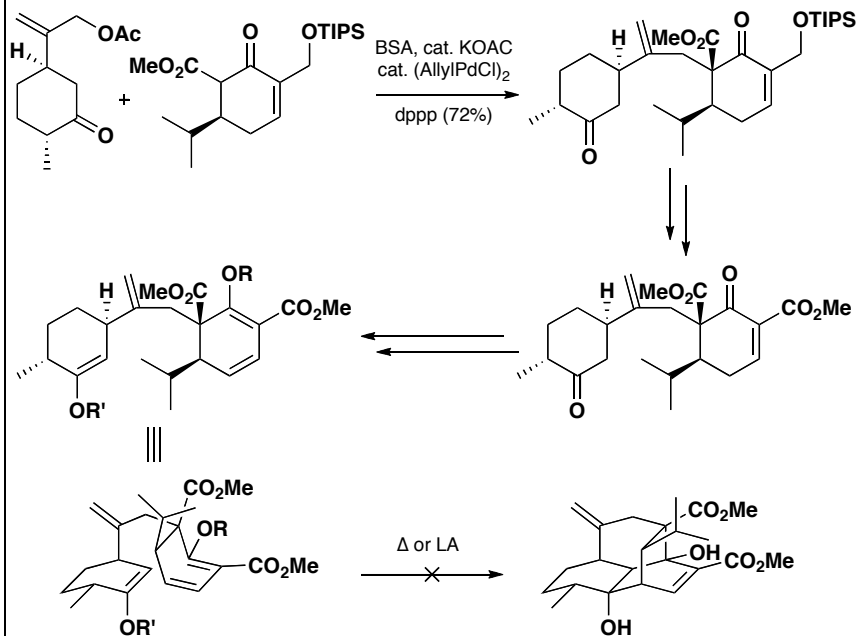
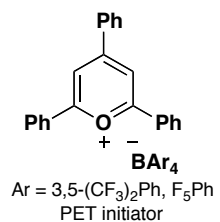
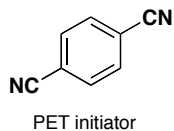
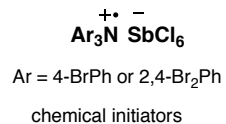


*J. Org. Chem.* **2005**, *70*, 8841 - 8853.

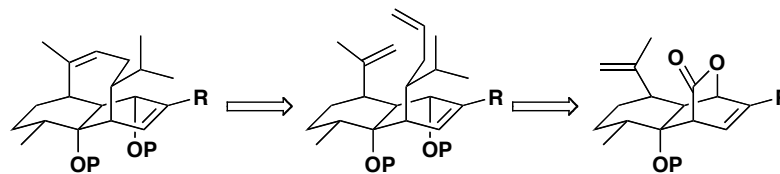
Corey IMDA approaches:



CET or PET catalysts tried for DA:



Another Corey strategy:

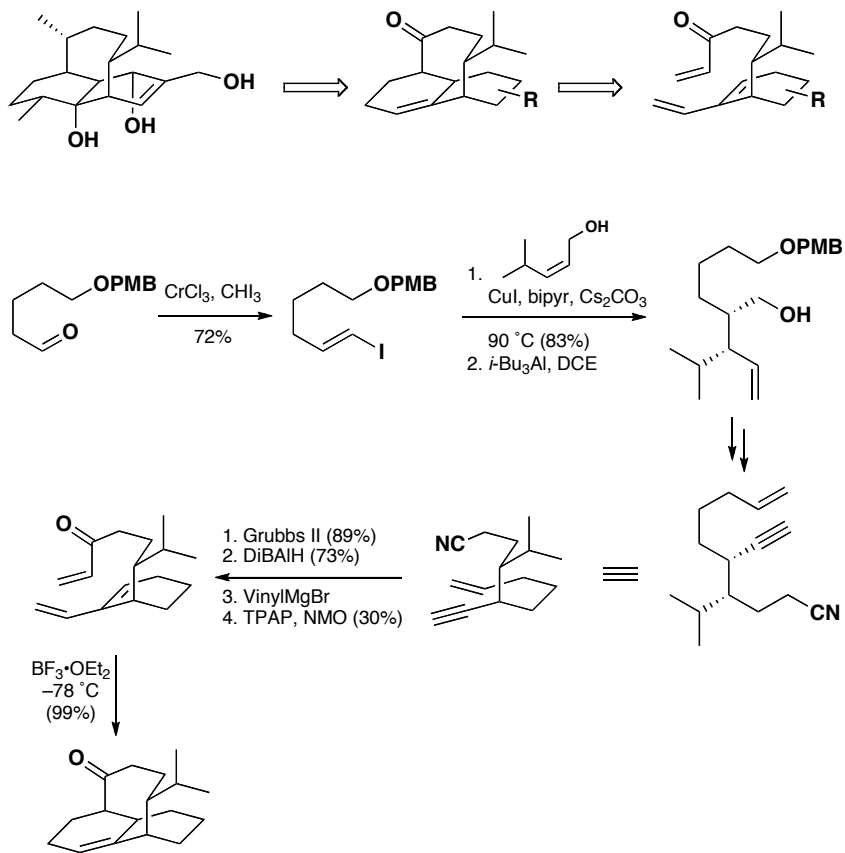


S. N. Goodman, Ph. D. Dissertation  
Harvard University, 2000

N. Z. Burns

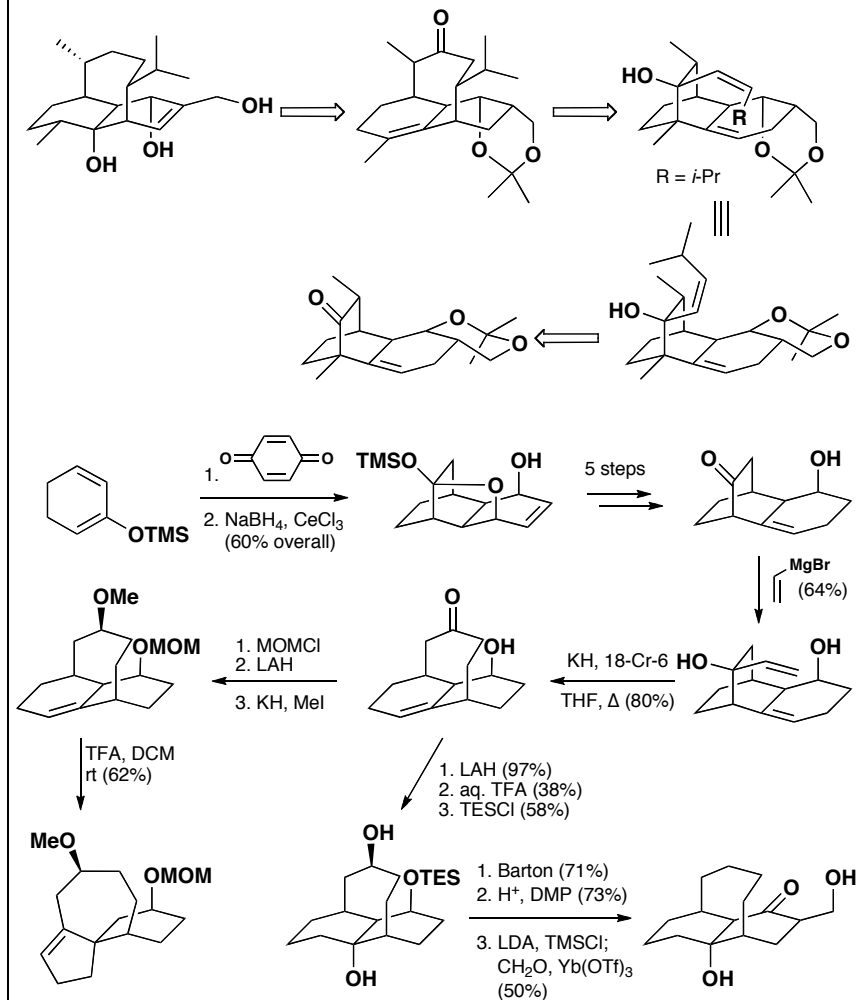
# Vinigrol

Barriault assault:



Org. Lett. 2007, 9, 1545 - 1548.

Hanna's advanced intermediate:

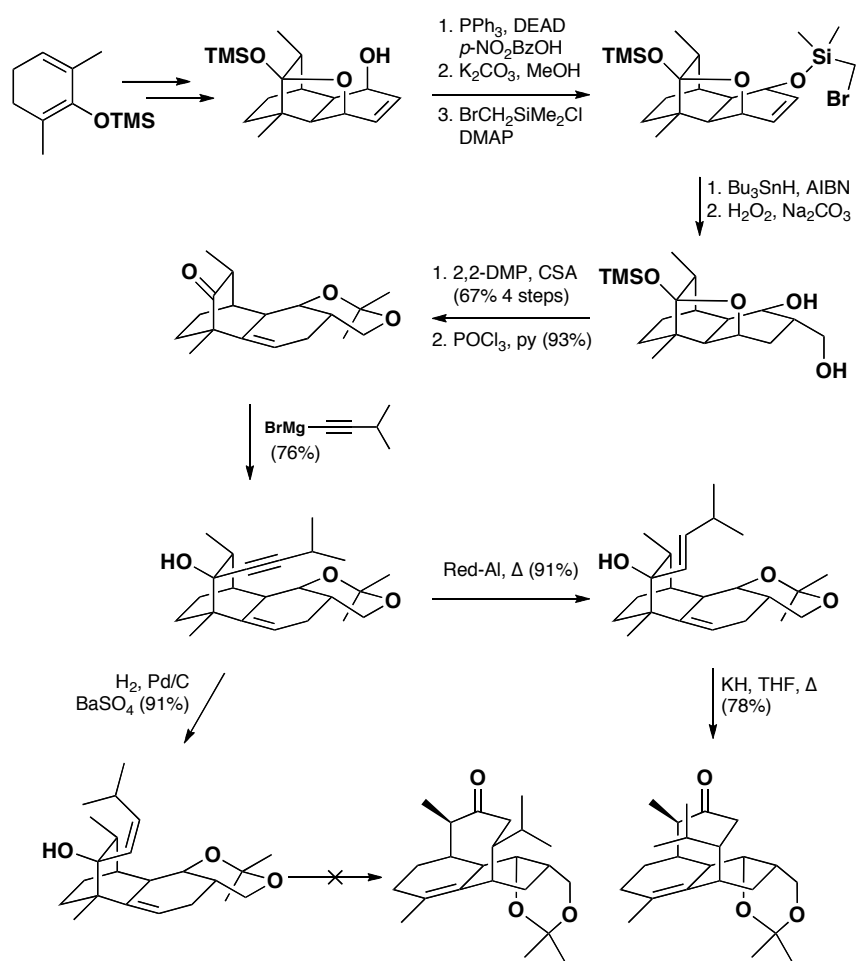


J. Org. Chem. 1993, 58, 2349 - 2350.  
J. Chem. Res. (Syn), 1996, 32 -33.

J. Org. Chem. 1997, 62, 5062 - 5068.

N. Z. Burns

# Vinigrol



*Org. Lett.* 2003, 5, 1139 - 1142.

