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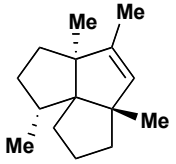
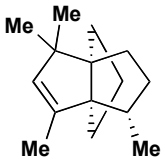
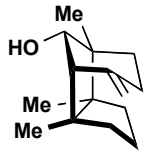
Syntheses partially of fully discussed



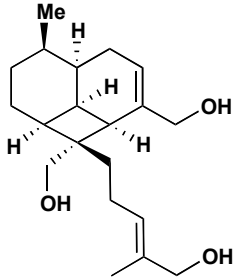
(±)Isocomene



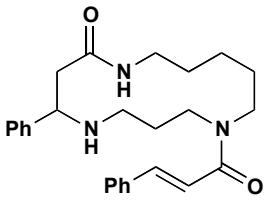
(±)Modhephene



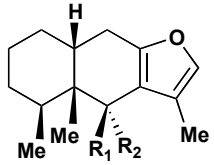
(±)Gymnomitrol



(±)Trihydroxydecipiadiene

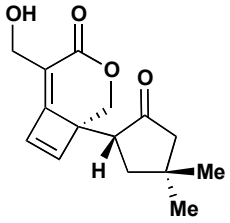


(±)Dihydroperiphylline

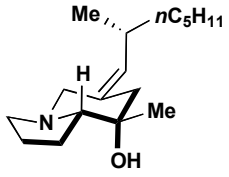


(±)Ligularone (R_1, R_2 = O)

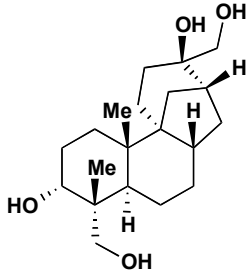
(±)Petasalbine (R_1 = OH, R_2 = H)



(±)Fomannosin



Dendrobatid Toxin 251D



(±)Aphidicolin

Methodologies discussed

(Trimethylsilyl)cyclopentene Annulation: A Regiocontrolled Approach to the Synthesis of Five-Membered Rings
Danheiser, R. L. et al. *JACS* **1981**, 103, 1604

A stereoselective Syntesis of Cyclopentene Derivatives from 1,3-Dienes
Danheiser, R. L. et al. *JACS* **1981**, 103, 2443

Nitrone Cycloaddition. A New Approach to β-Lactams
Padwa, A. et al. *JACS* **1981**, 103, 4974

High Acylation Rates and Enantioselectivity with Cyclodextrin Complexes of Rigid Sunstrates
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Still, C. W. et al. *JACS* **1981**, 103, 1283

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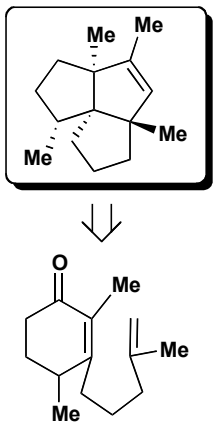
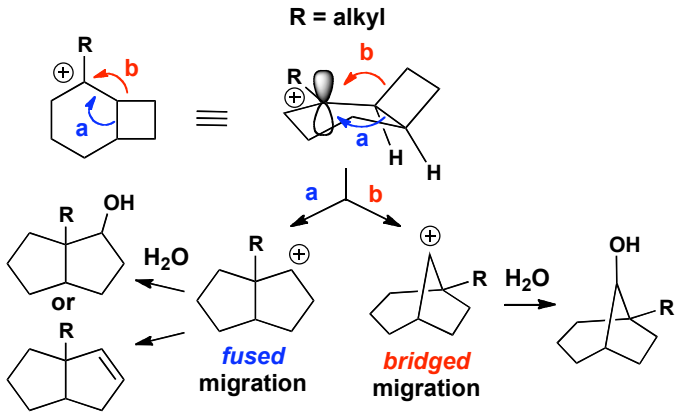
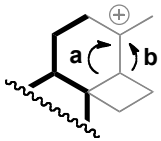
(±)Isocomene
Pirrung, M. C; *JACS* **1981**, 103, 82





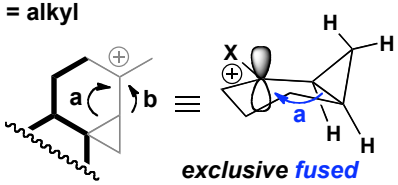
Known related studies at the time

Cyclobutyl carbinyl systems;
X = alkyl



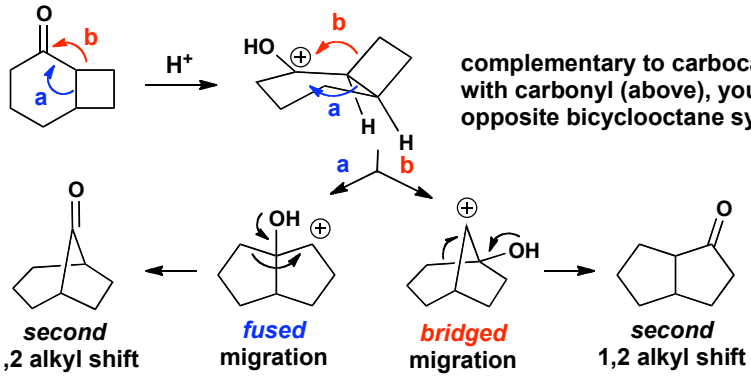
both *fused* and *bridged* observed

Cyclopropyl carbinyl systems;
X = alkyl

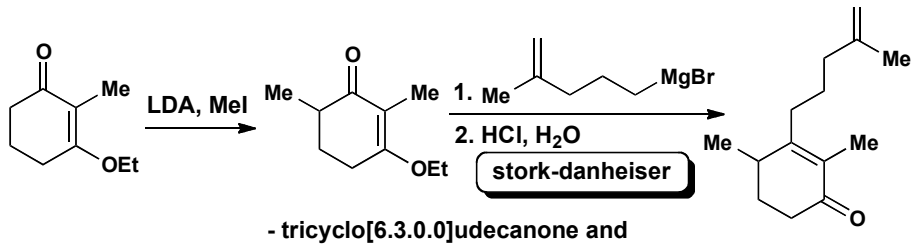


exclusive fused

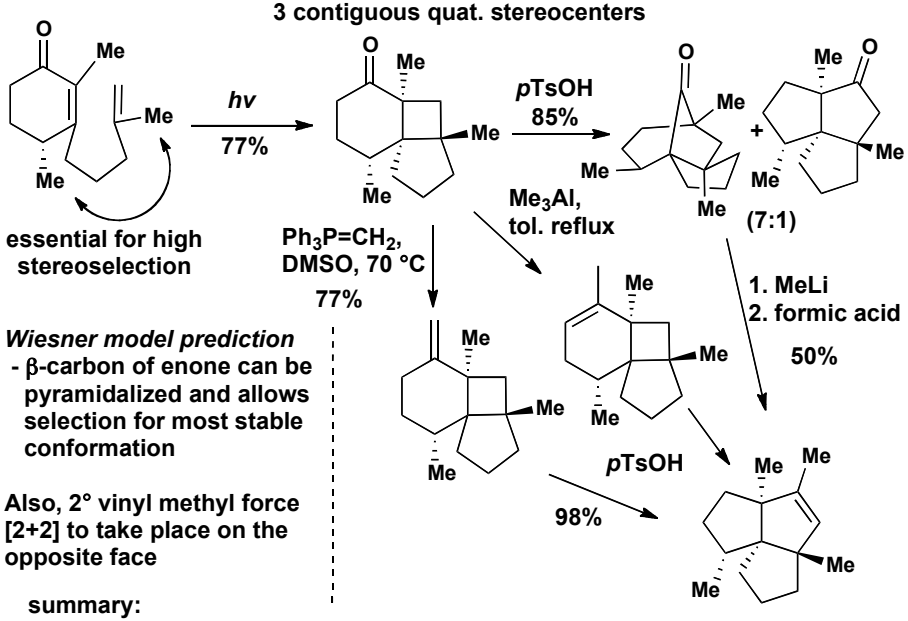
Acid cat. RR of Cyclobutyl carbinyl ketones systems (Cargill et al.)



complementary to carbocationic RR with carbonyl (above), you can get the opposite bicyclooctane system



- tricyclo[6.3.0.0]udecanone and
3 contiguous quat. stereocenters

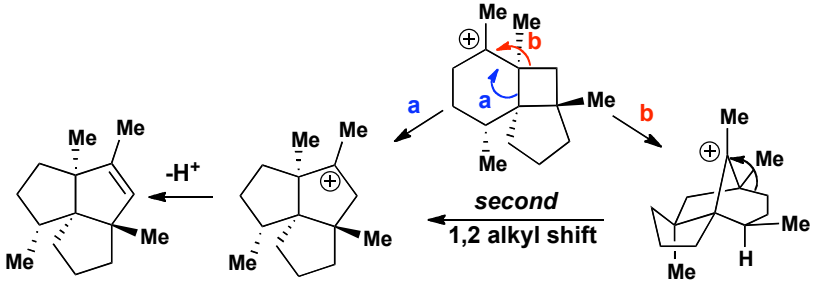


essential for high stereoselection

Wiesner model prediction
- β-carbon of enone can be pyramidalized and allows selection for most stable conformation

Also, 2° vinyl methyl force [2+2] to take place on the opposite face

summary:
1. Enolization was problematic with cycloadduct and typical nucleophilic methyl sources was not able to add into ketone
2. Cargill product was able to be converted to isocomene
3. Alternative methyl sources were looked into and two options were found



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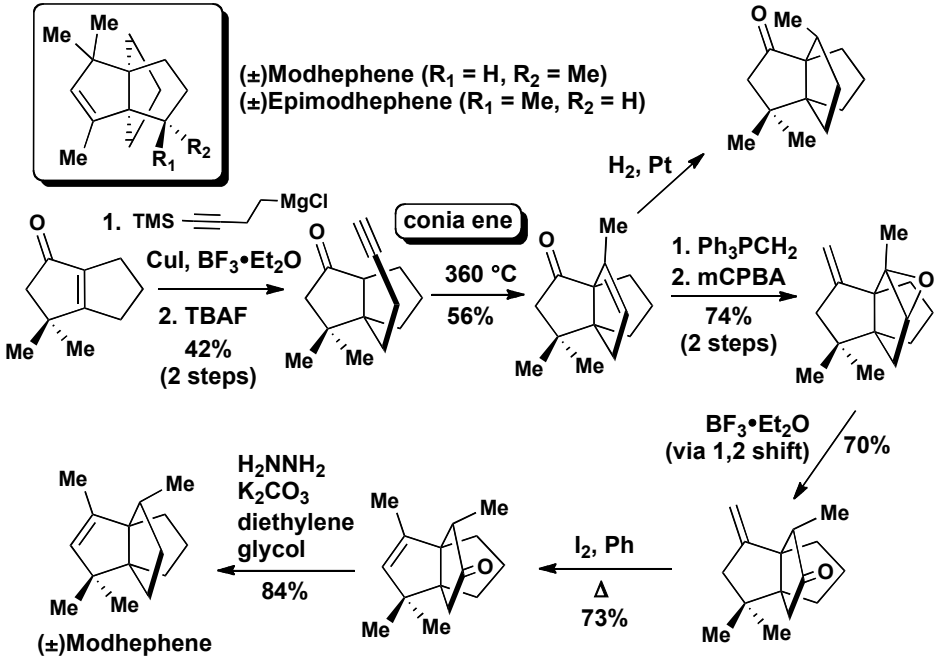
(±)Modhephene and (±)Epimodhephene

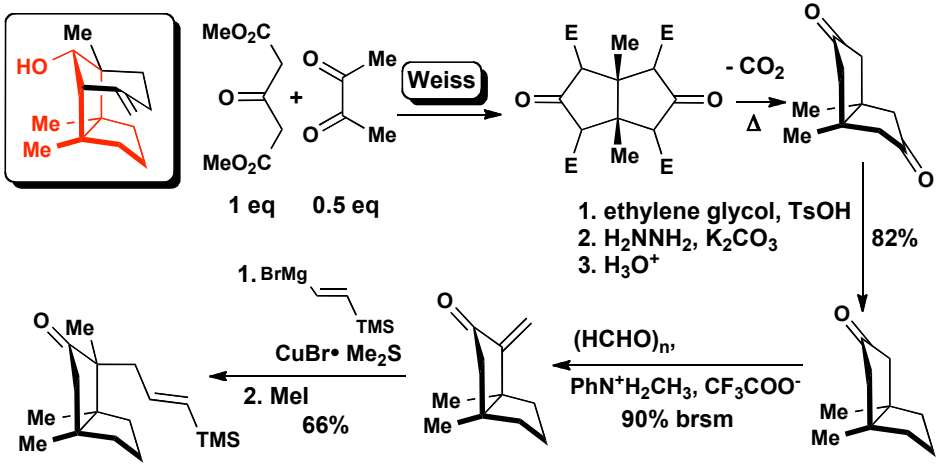
Paquette et al. *JACS* **1981**, 103, 722

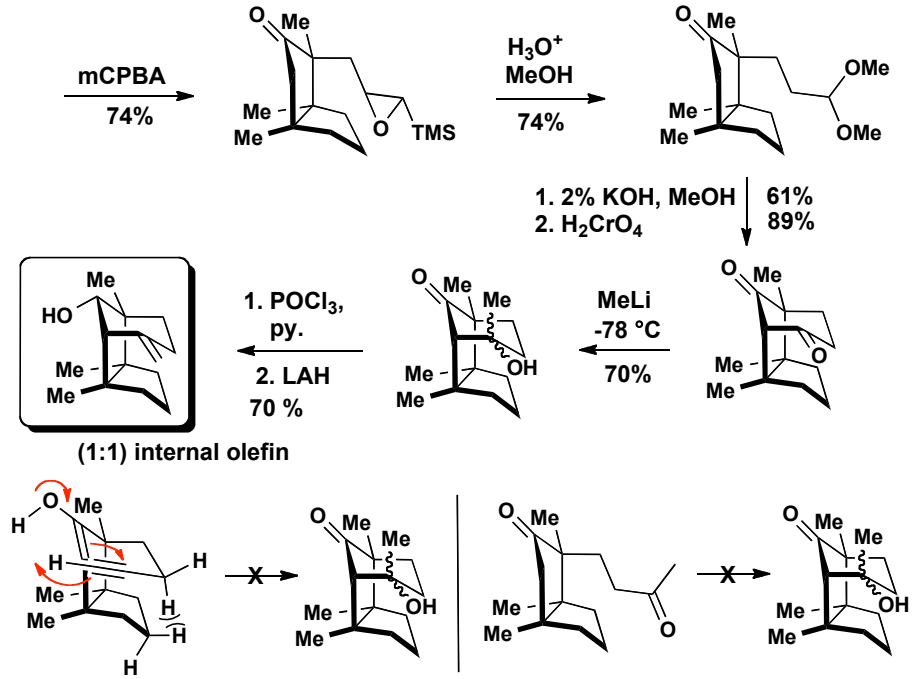
(±)Modhephene (R_1 = H, R_2 = Me)
(±)Epimodhephene (R_1 = Me, R_2 = H)



(±)Gymnomitrol

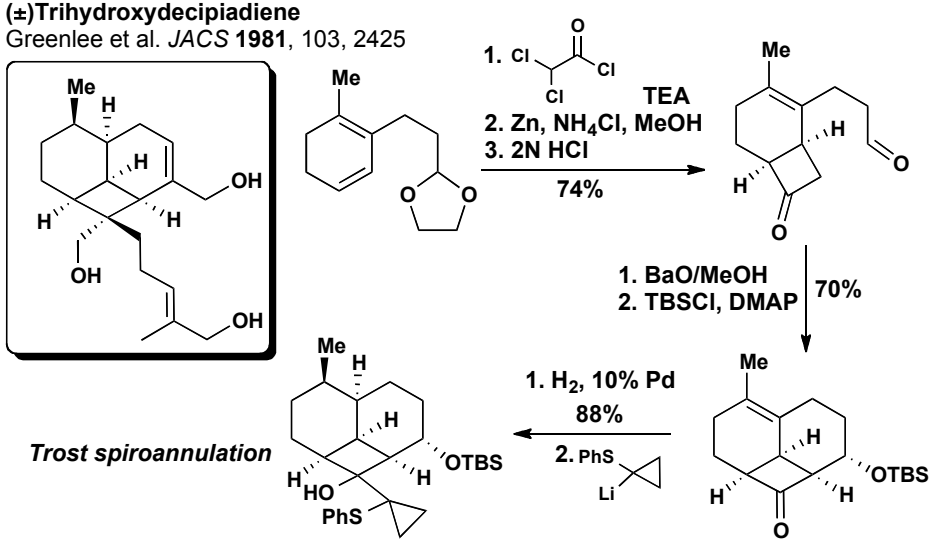
Paquette et al. *JACS* **1981**, 103, 1831





(±)Trihydroxydecipiadiene

Greenlee et al. *JACS* **1981**, 103, 2425



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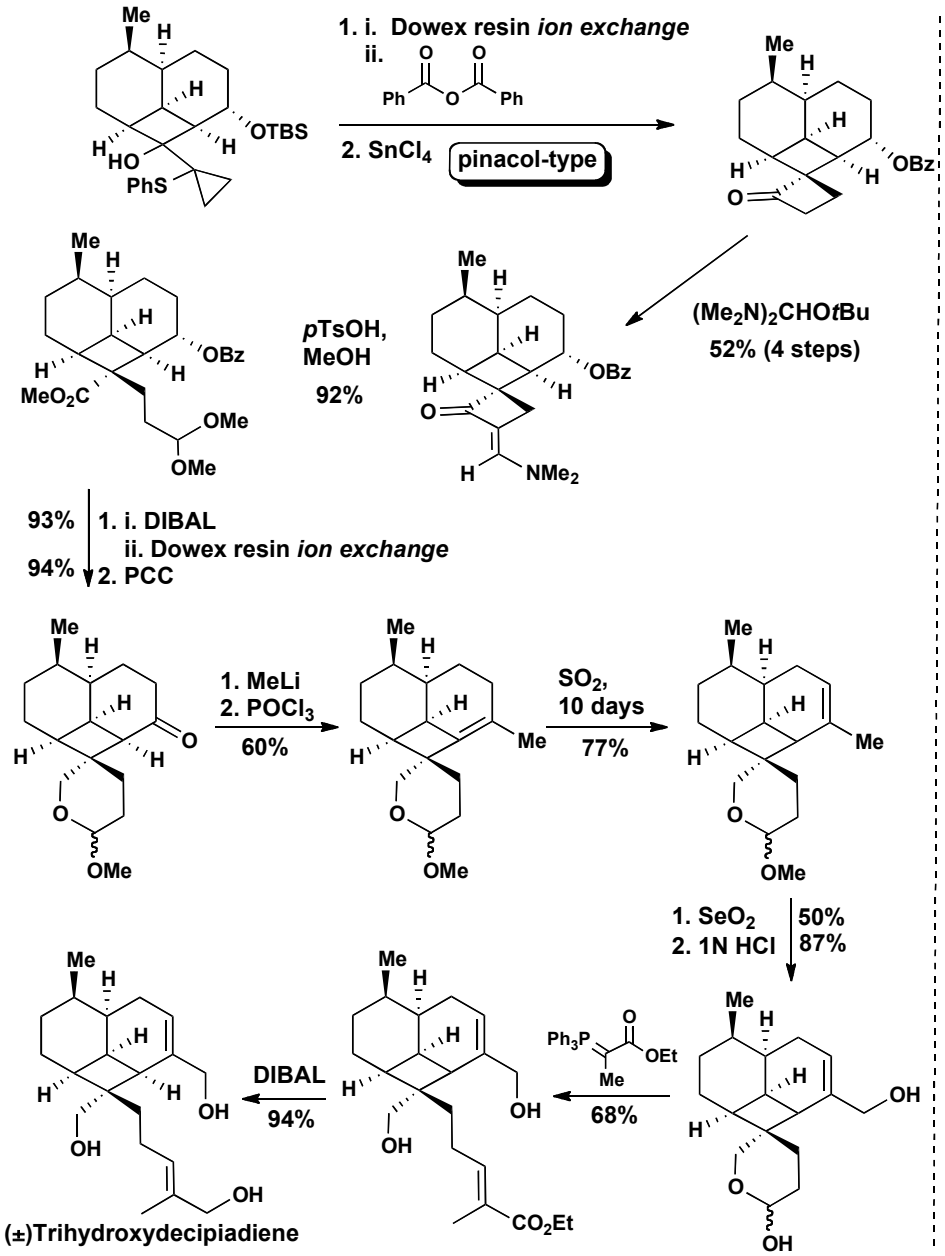

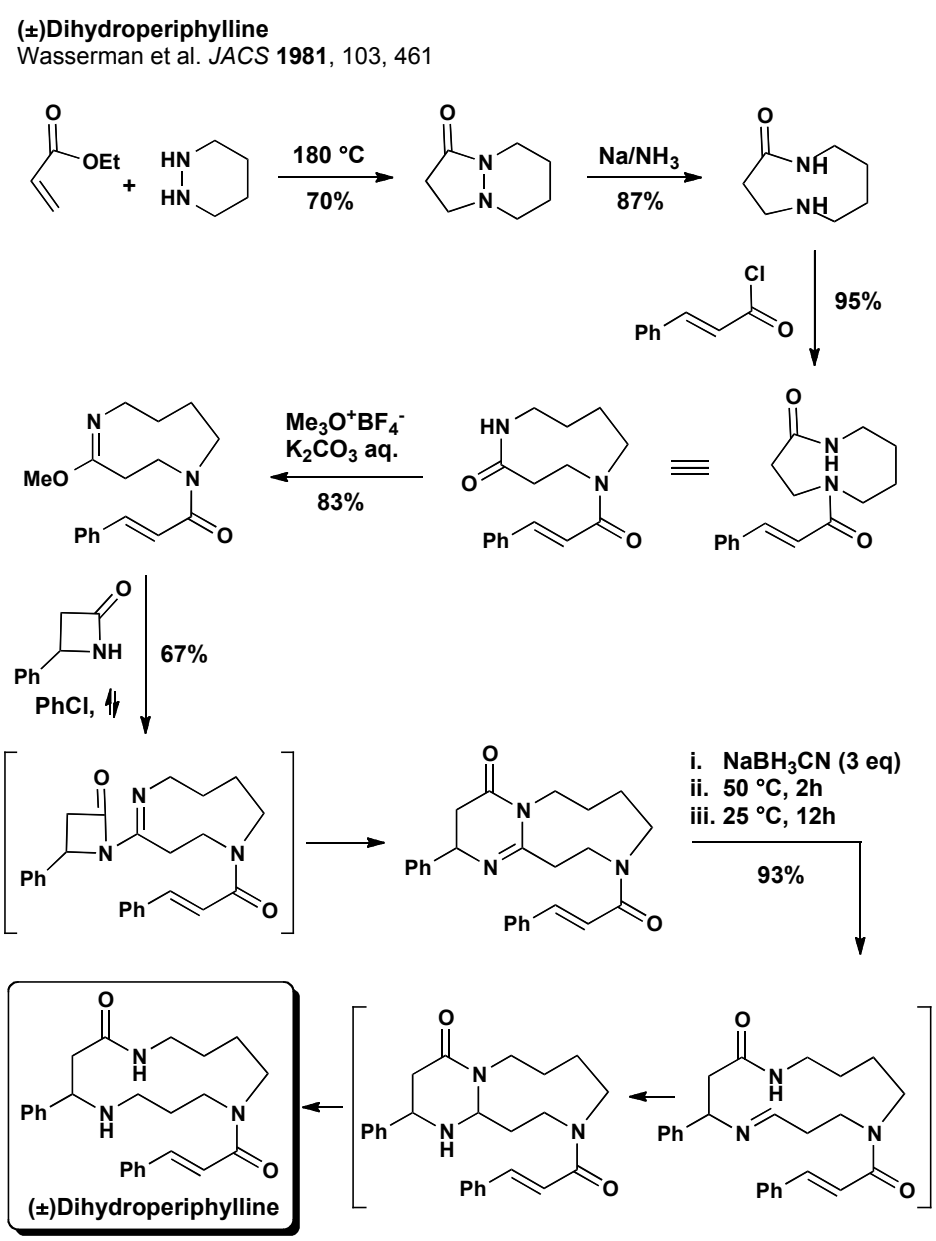

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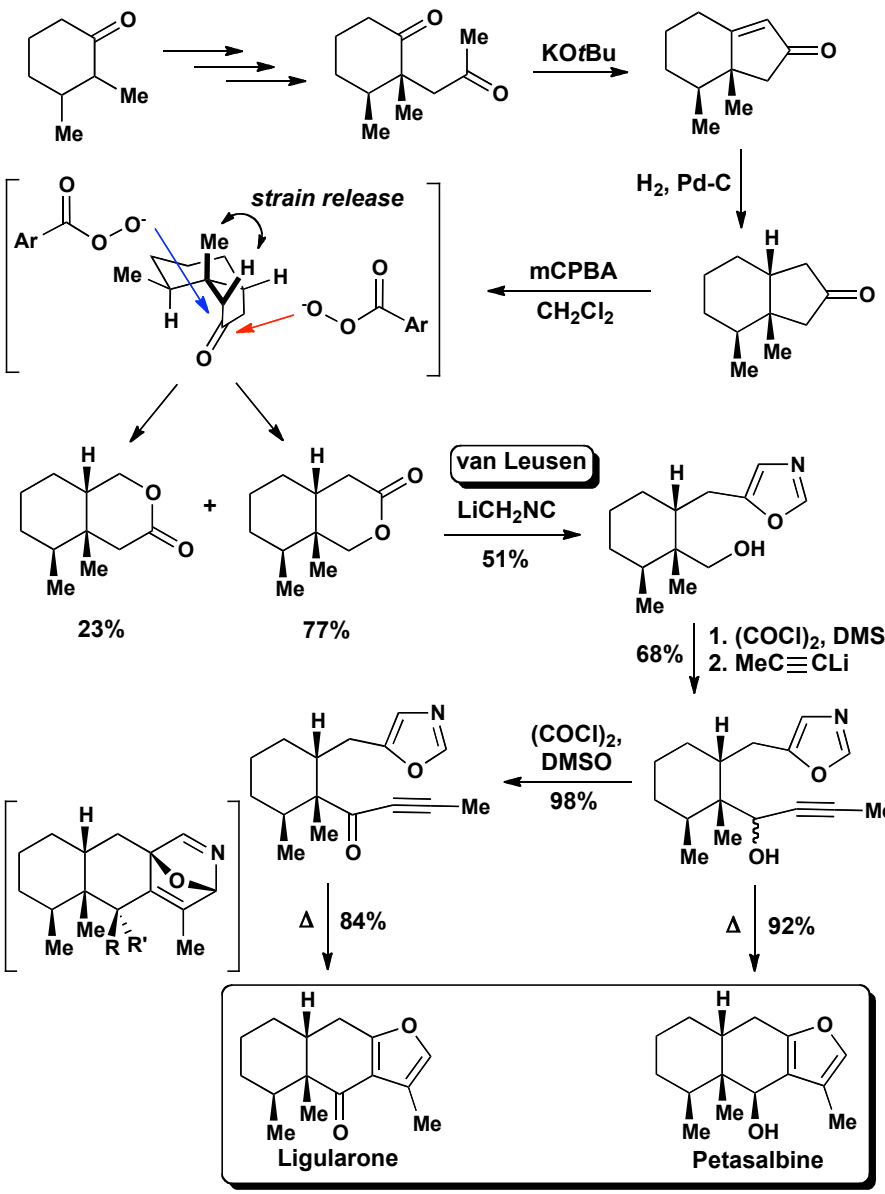
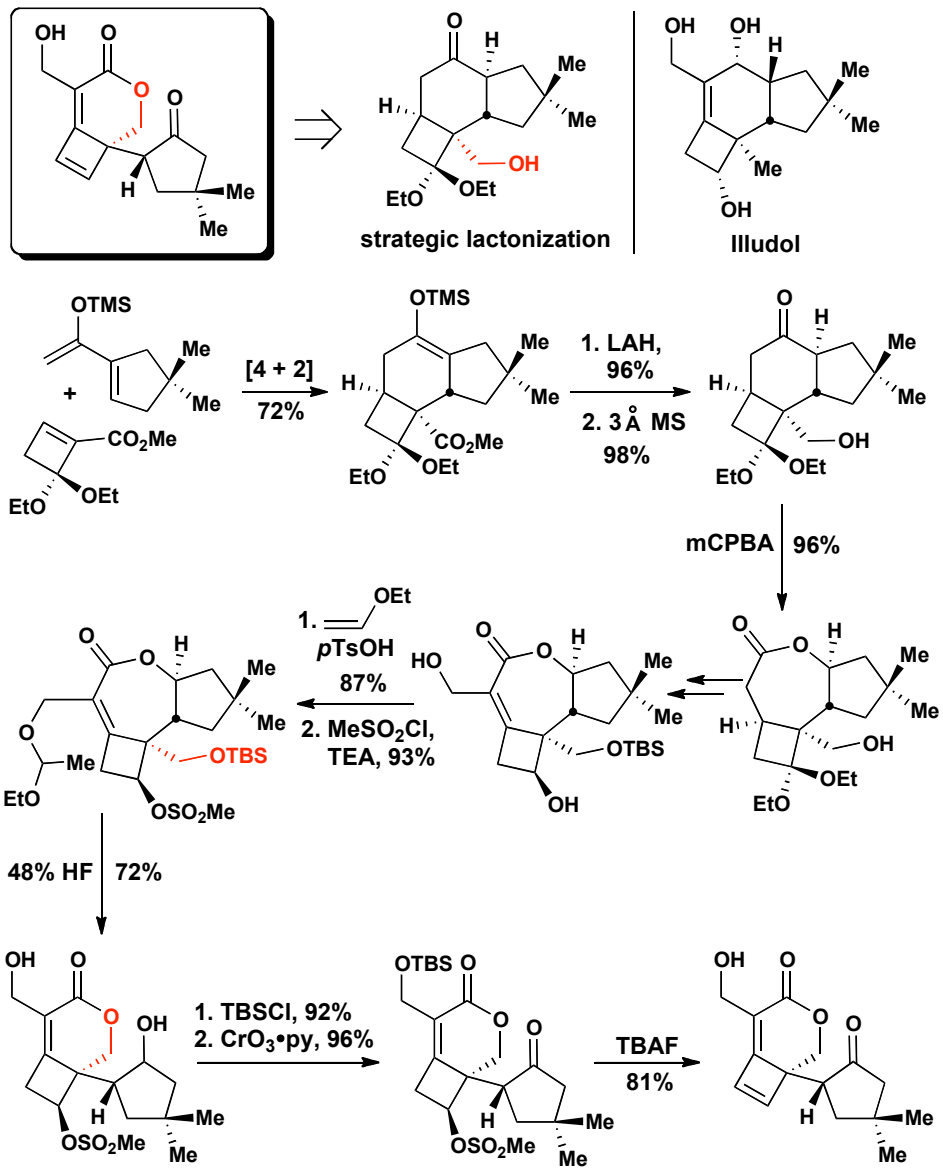
(±)Ligularone and (±)Petasalbine

Jacobi, P. A. et al. *JACS* **1981**, 103, 4611



(±)Fomannosin

Semmelhack, M. F. et al. *JACS* **1981**, 103, 2427



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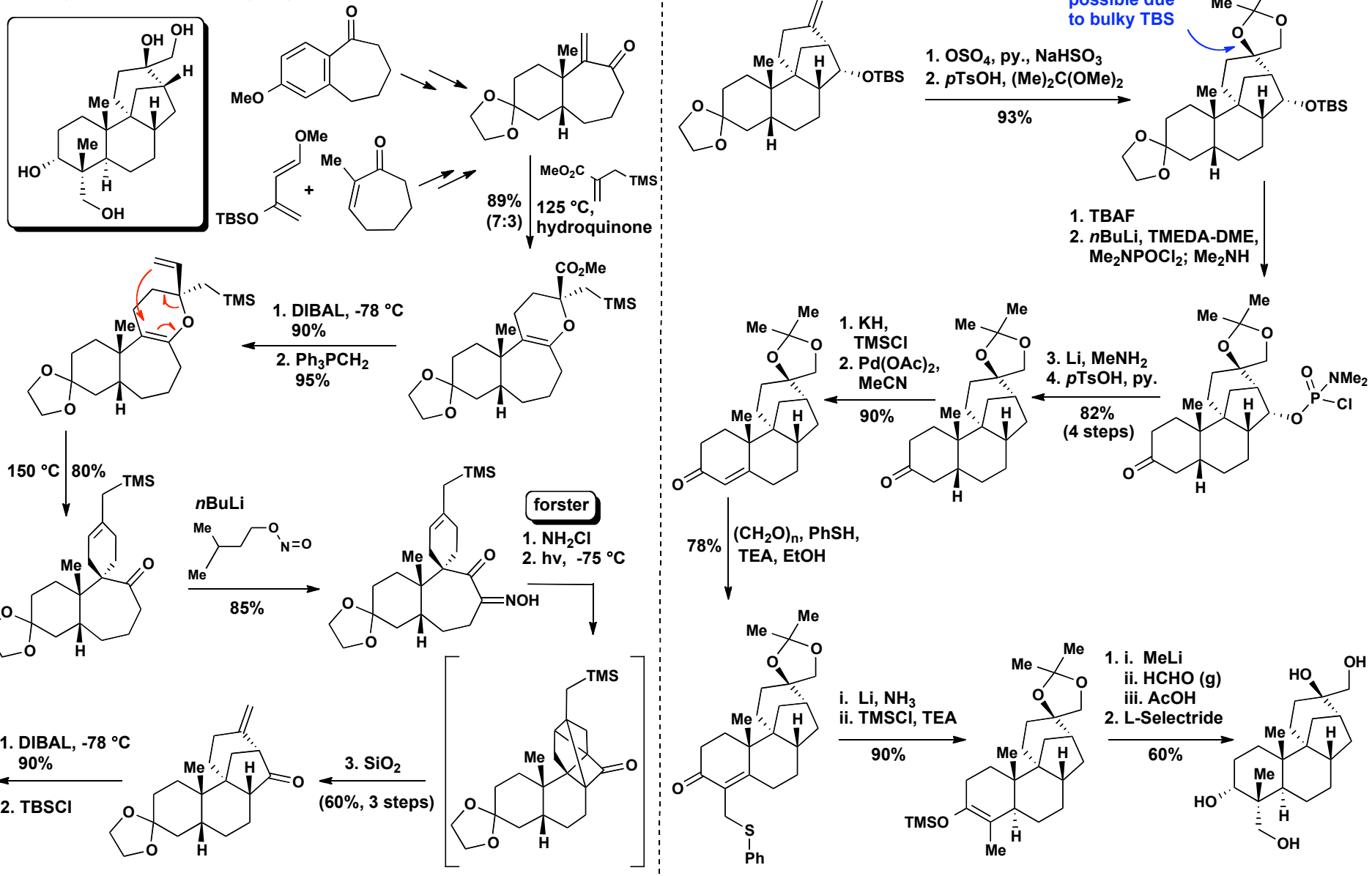
(±)Aphidicolin

Ireland, R. E. et al. *JACS* **1981**, 103, 2446



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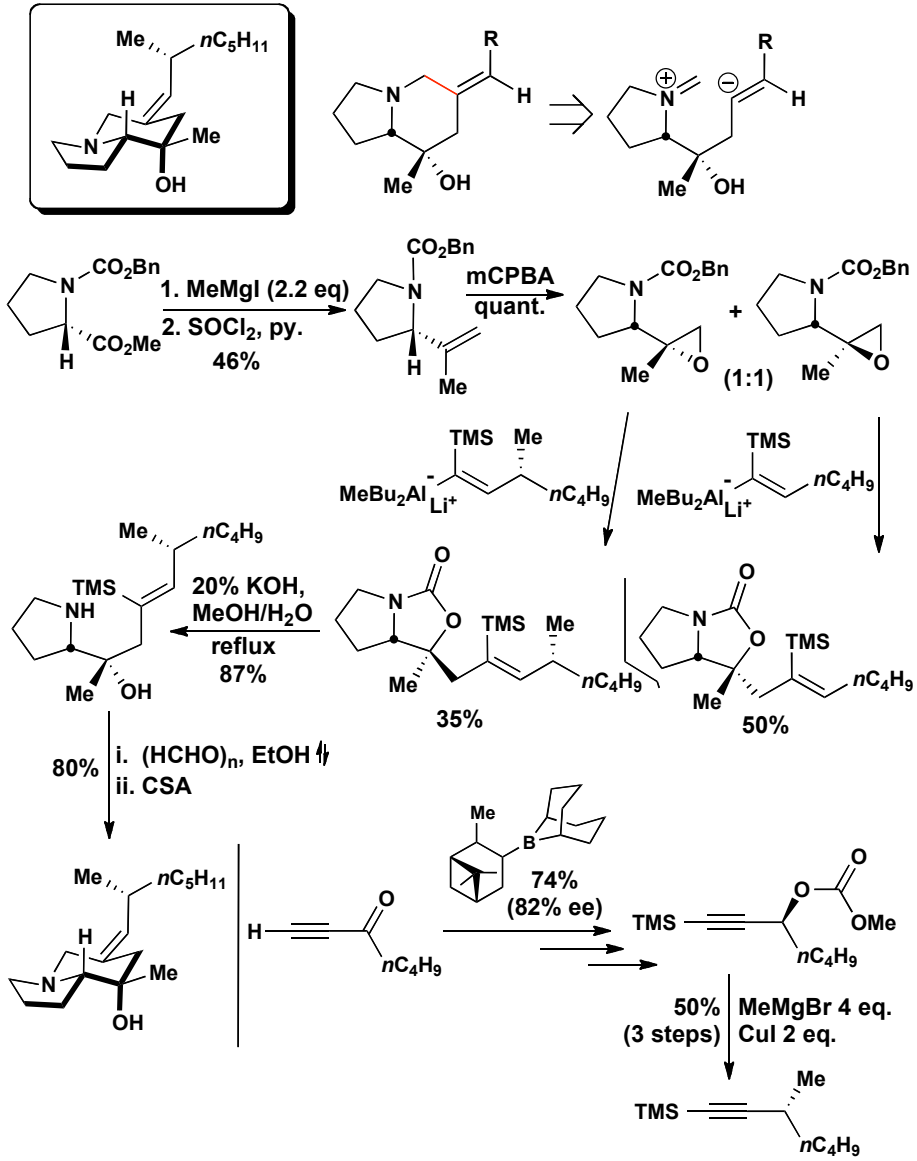
Dendrobatid Toxin 251D
Overman, L. E. et al. *JACS* **1981**, 103, 1851



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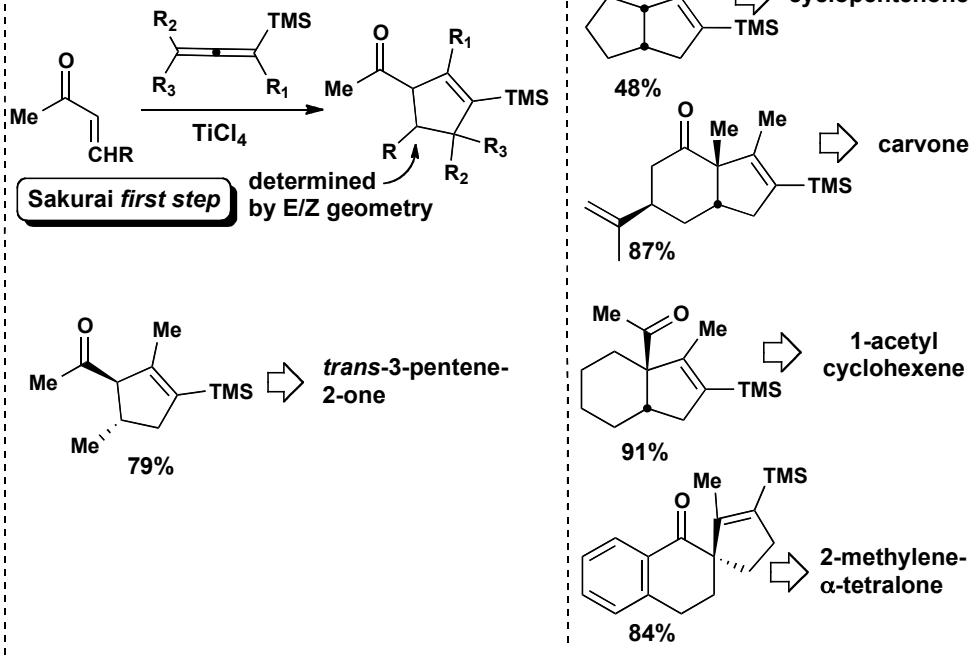
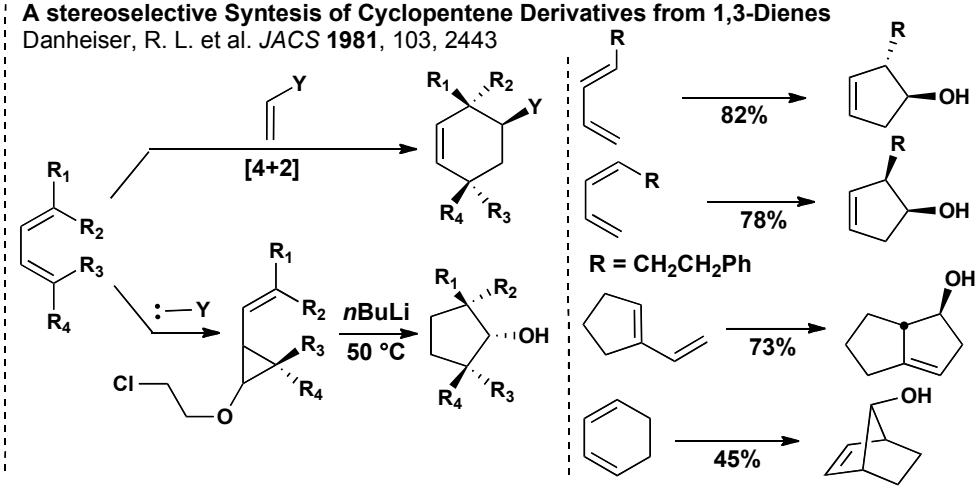


A stereoselective Syntesis of Cyclopentene Derivatives from 1,3-Dienes
Danheiser, R. L. et al. *JACS* **1981**, 103, 2443



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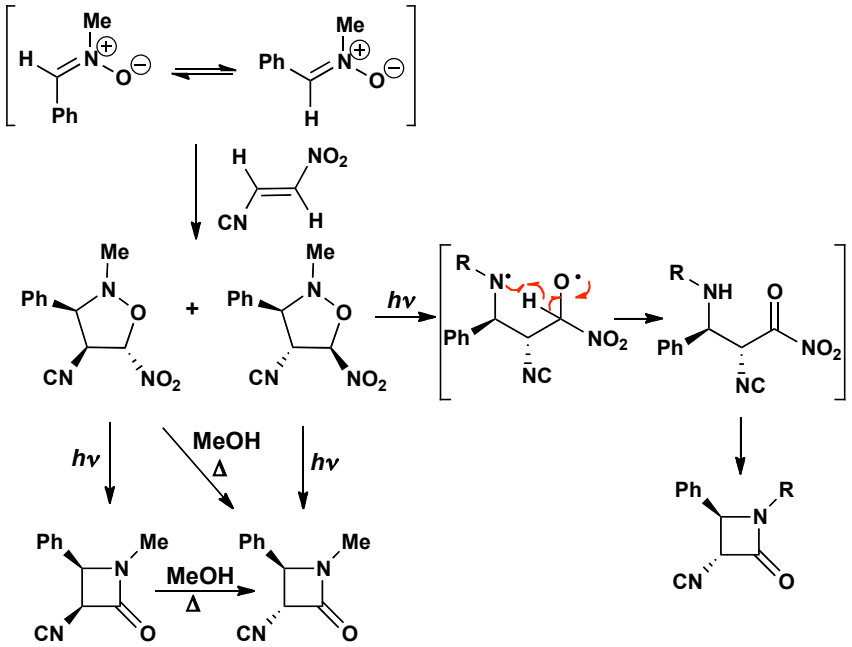
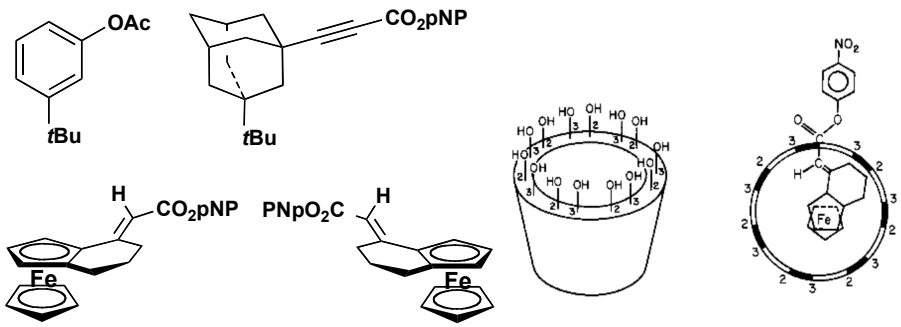
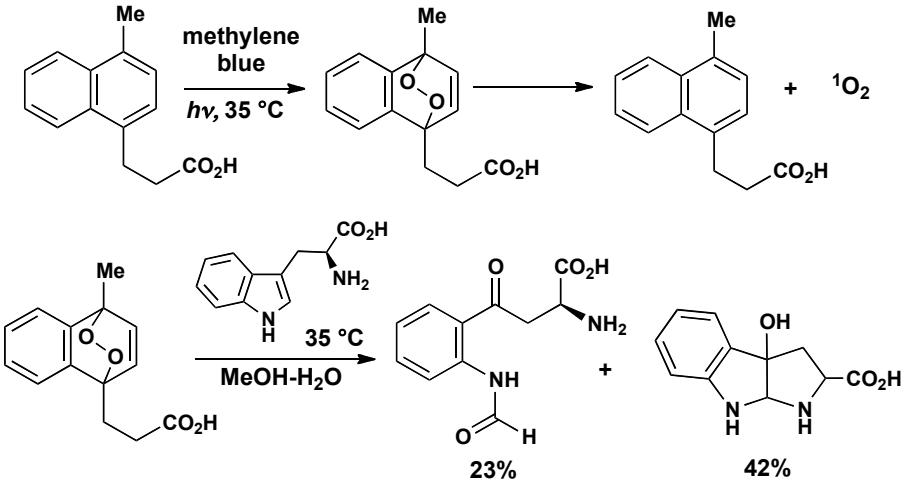


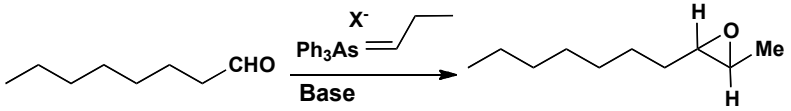
High Acylation Rates and Enantioselectivity with Cyclodextrin Complexes of Rigid Sunstrates
Breslow, R. et al. *JACS* 1**981,** 103, 154



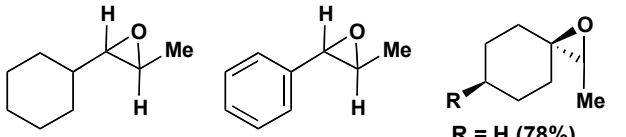
Formation of Superoxide Ion from Singlet Oxygen. On the Use of a Water-Soluble Singlet Oxygen Source
Saito, I. et al. *JACS* **1981**, 103, 188



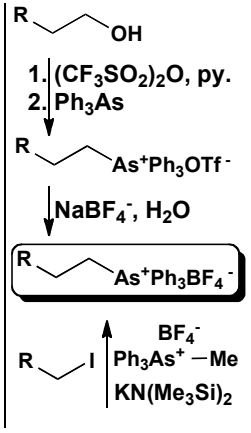
A Highly Stereoselective Synthesis of Trans Epoxides via Arsonium Ylides
Still, C. W. et al. *JACS* 1**981,** 103, 1283



Base	Solvent	X^-	trans:cis (yield)
$KN(Me_3Si)_2$	THF	BF_4^-	33:1 (73%)
$KN(Me_3Si)_2$	THF + 10% HMPA	BF_4^-	100:1 (80%)
nBuLi	THF + 10% HMPA	BF_4^-	3:1 (62%)
$KN(Me_3Si)_2$	THF + 10% HMPA	I^-	12:1 (74%)



>99% *E* (84%) | 83% *E* (61%) | R = H (78%), R = *t*Bu (66%)



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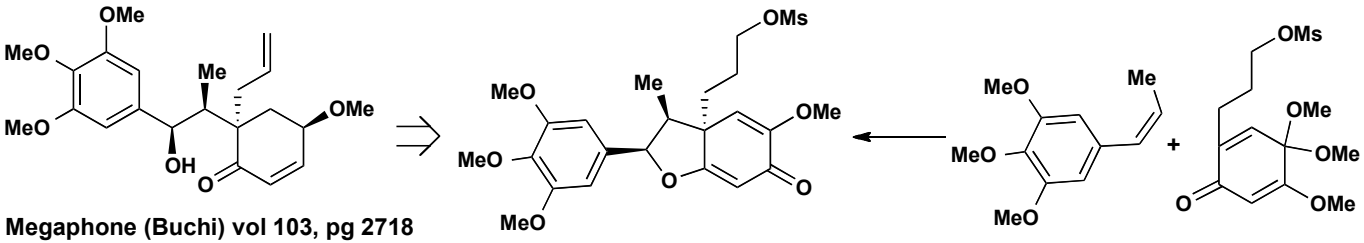
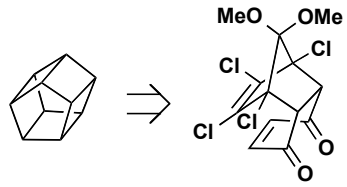
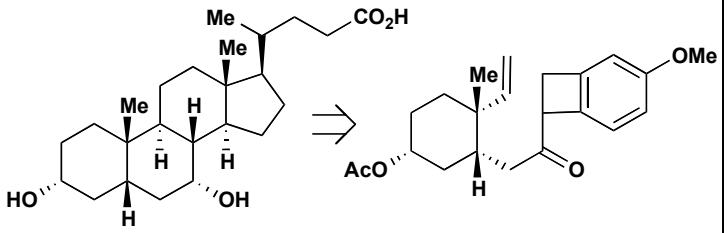


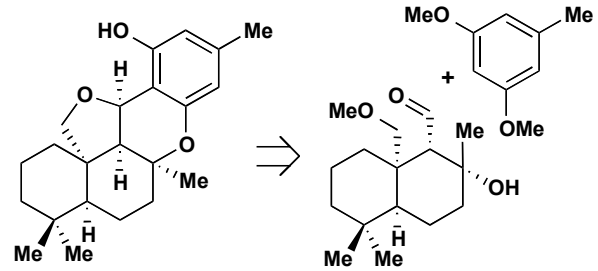
Megaphone (Buchi) vol 103, pg 2718



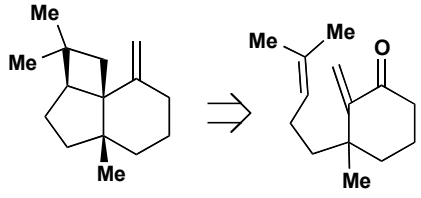
Pentaprismane (Eaton) vol 103, pg 2134



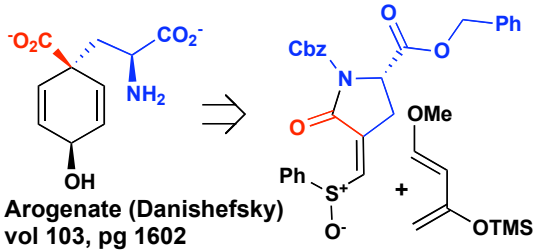
Chenodeoxycholic Acid (Kametani) vol 103, pg 2890



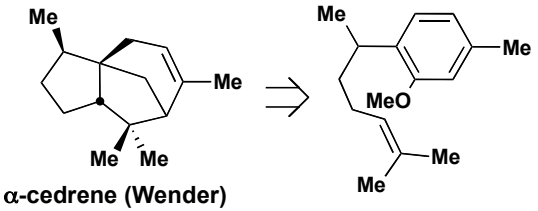
Siccanin (Yoshikoshi) vol 103, pg 2434



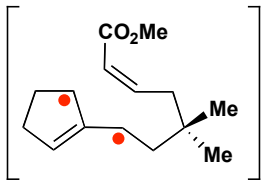
Panasinsene (Johnson) vol 103, pg 7667

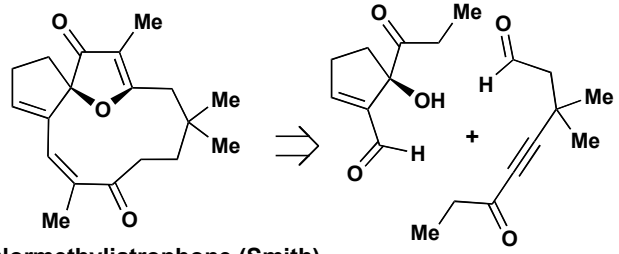


Arogenate (Danishefsky)
vol 103, pg 1602

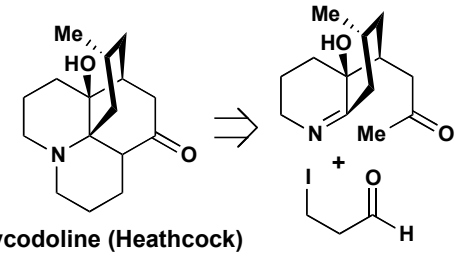


α-cedrene (Wender)
Voica Deromatization GM vol 103, pg 688

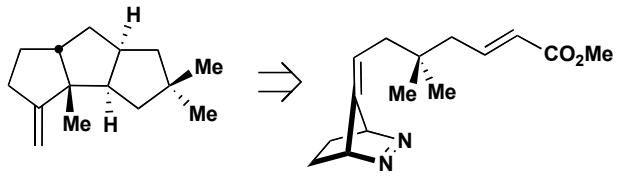




Normethyljatrophone (Smith)
vol 103, pg 219



Lycodoline (Heathcock)
covered in class (β amino ketone)
vol 103, pg 222



Hirsutene (Little)
Gallagher Coriolin GM
vol 103, pg 2744

R.A. Rodriguez

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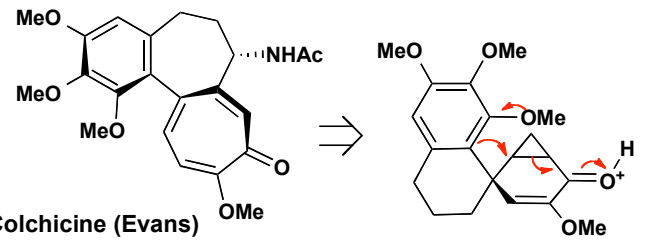
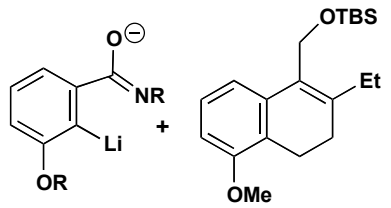
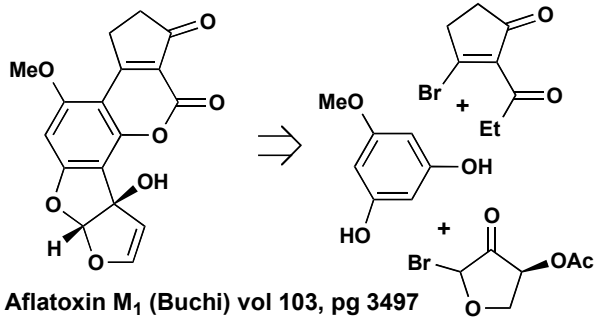
Baran GM
2011-01-29



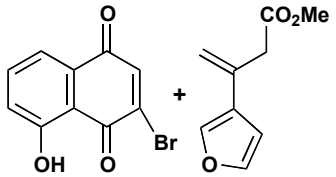
Colchicine (Evans)
covered in class vol 103, pg 5813



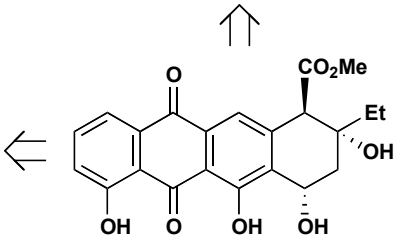
Kende (1st synthesis) vol 103, pg 4247



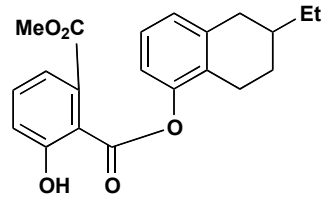
Aflatoxin M_1 (Buchi) vol 103, pg 3497



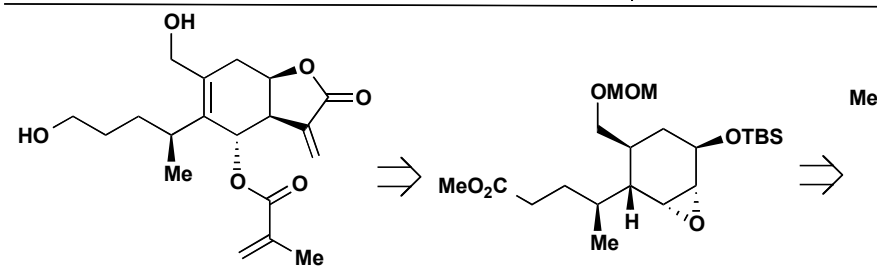
Kishi (back to back with Kende)
vol 103, pg 4248



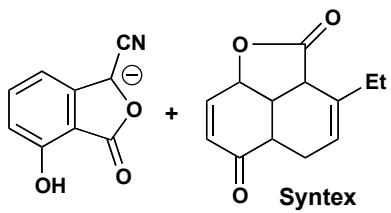
Aklavinone
(Kende, Kishi, Hoff-LaRoche, Syntex)



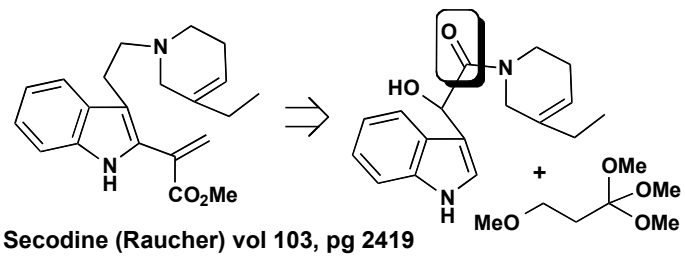
Hoffmann-LaRoche
vol 103, pg 4251



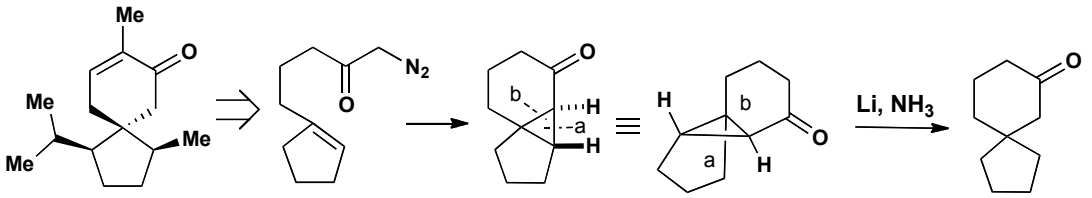
Eriolanin (Schlessinger) vol 103, pg 724



Syntex
vol 103, pg 7007



Secodine (Raucher) vol 103, pg 2419



Acorenone B and α-chamigrene (White) vol 103, pg 1813

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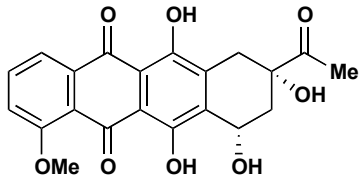
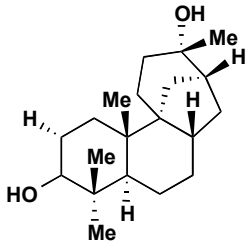
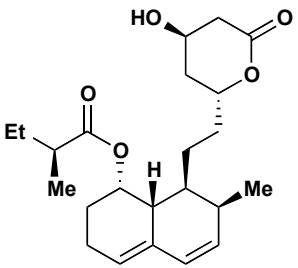


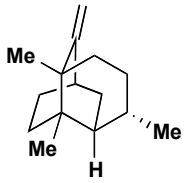
Daunomycinone (Swenton) & (Hauser)
vol 103 pg 5263 & pg 6378



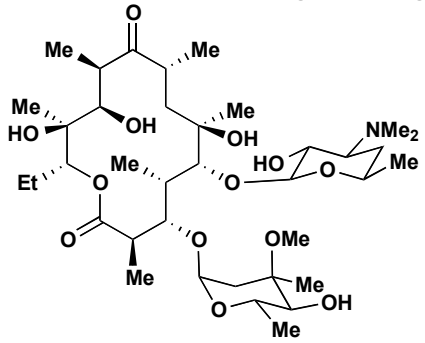
Maritimol (vanTamelen)
vol 103 pg 4615



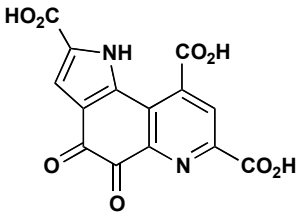
Compactin/ML-236B (Sih)
vol 103 pg 6538



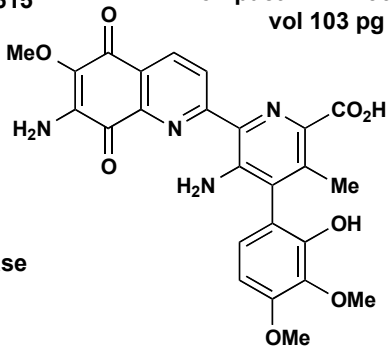
Seychellene (Jung)
vol 103 pg 6677



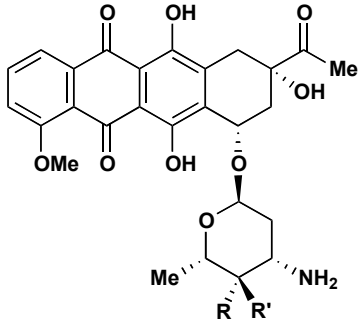
Erythromycin A (Woodward)
Ishihara Erythronolide & Erythromycin GM
vol 103 pg 3215



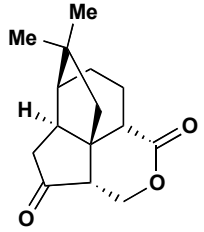
Quinonoid alcohol dehydrogenase
Coenzyme (Corey)
vol 103 pg 5599



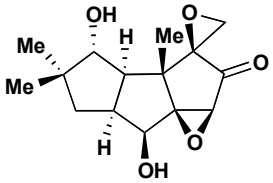
Streptonigrin (Kende)
vol 103 pg 1271



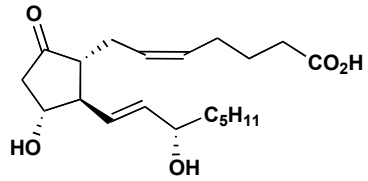
L-Acosamine (R = H; R' = OH)
L-Daunosamine (R = OH; R' = H)
(Wovkulich)
vol 103 pg 3956



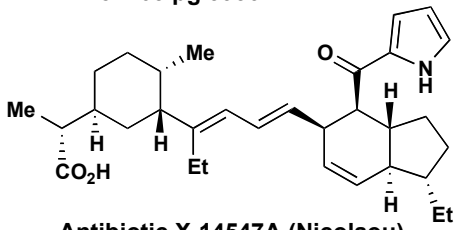
Quadrone (Danishefsky) & (Helquist)
Guerrero Quadrone GM



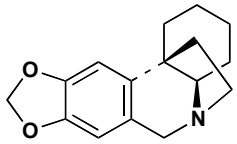
Coriolin (Danishefsky)
Gallagher Coriolin GM
vol 103 pg 3460



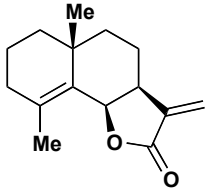
Prostaglandin E_2 (Fuchs)
vol 103 pg 2108



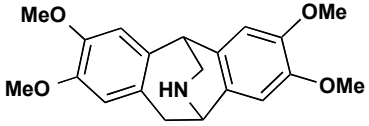
Antibiotic X-14547A (Nicolaou)
vol 103 pg 6967



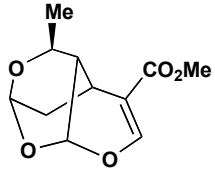
Crinane (Keck)
vol 103 pg 3173



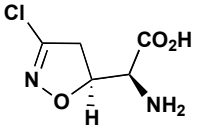
Frullanolide (Semmelhack)
vol 103 pg 3945



Isopavine (Jung)
vol 103 pg 1984



Sarracenin (Whitesell)
vol 103 pg 3468



Agent AT-125 (Baldwin)
vol 103 pg 942