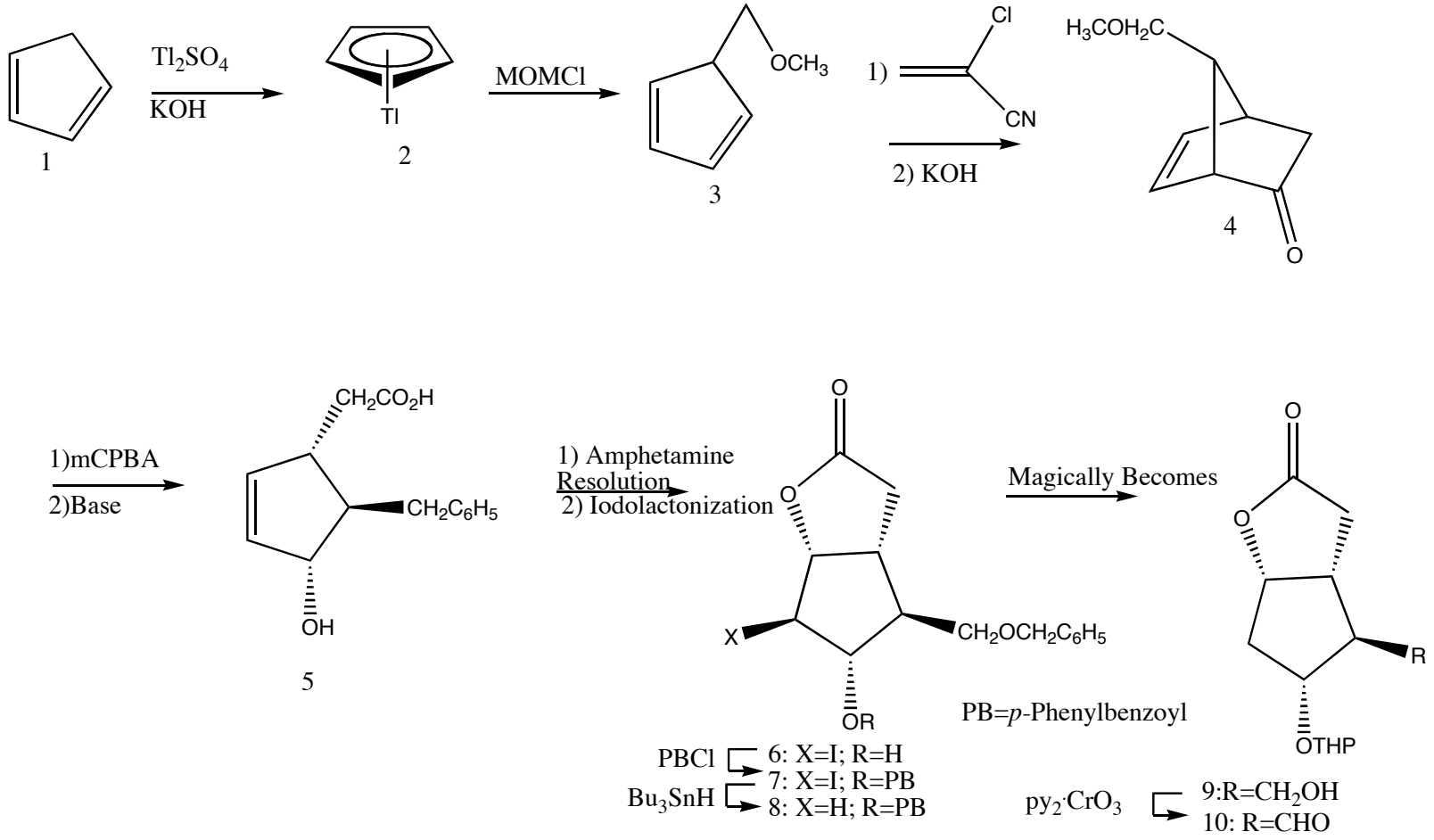
JACS I Love ‘71

Dan O’Malley

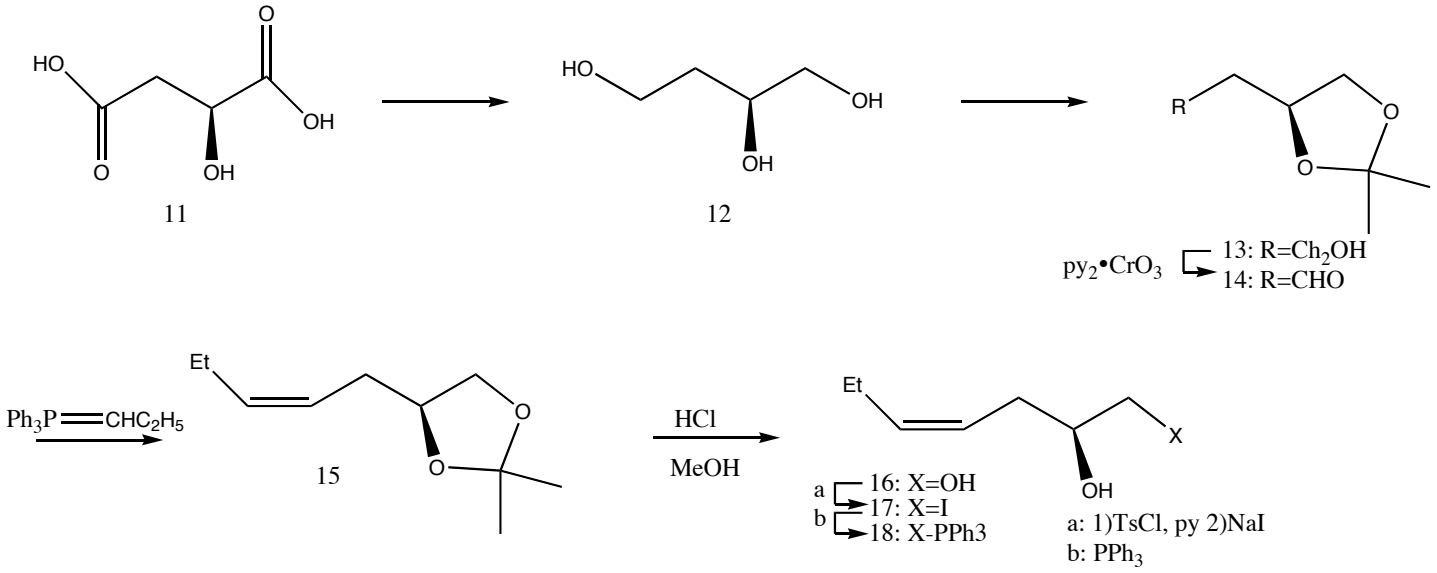
Baran Lab Group Meeting 9/10/2003

Corey Prostaglandins E_8 and $F_{3\alpha}$

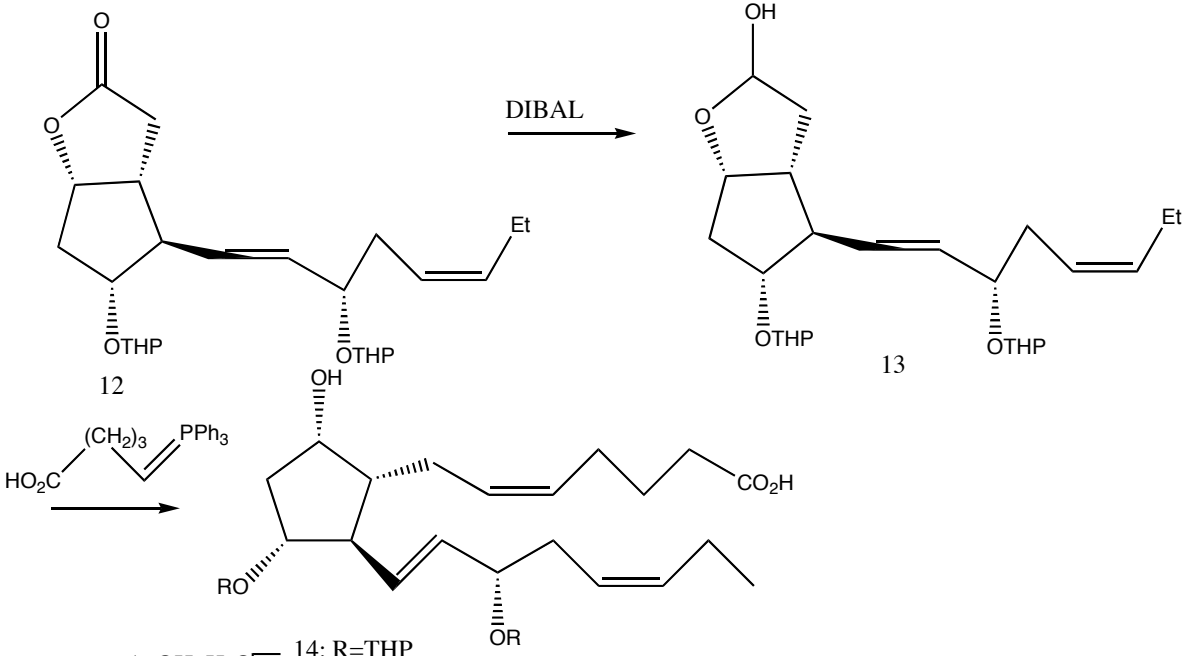


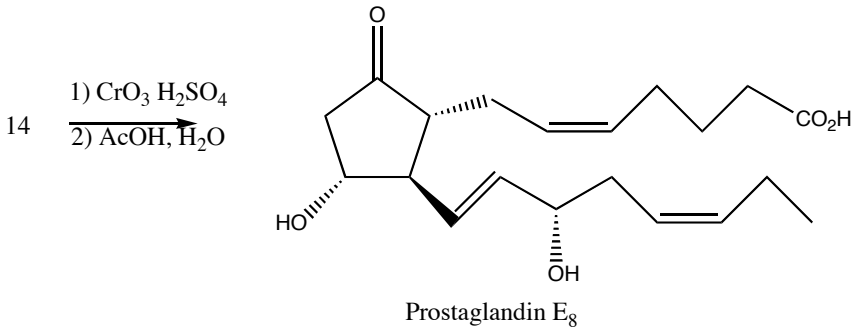
Corey et. Al. JACS 1971.1489-90, 1490-91, 1491-92.

Prostaglandins Part 2



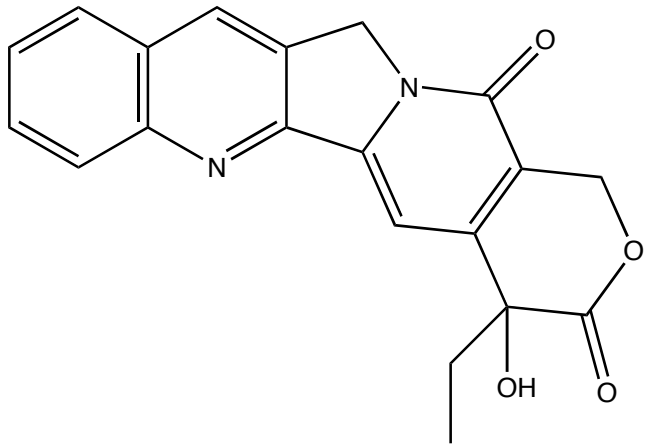
Prostaglandins Part 3





Prostaglandin E_8

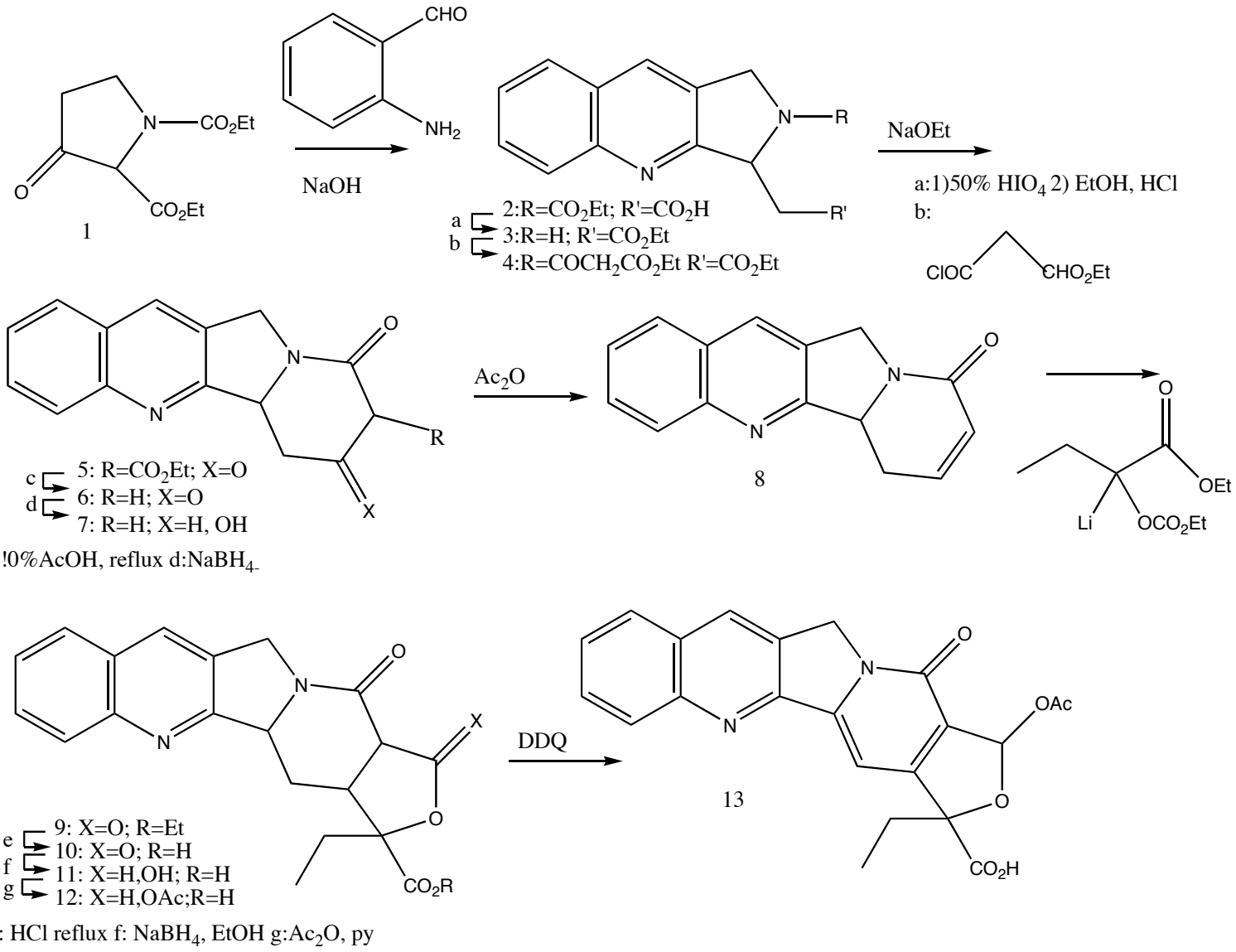
2 Syntheses of (±)-Camptothecin



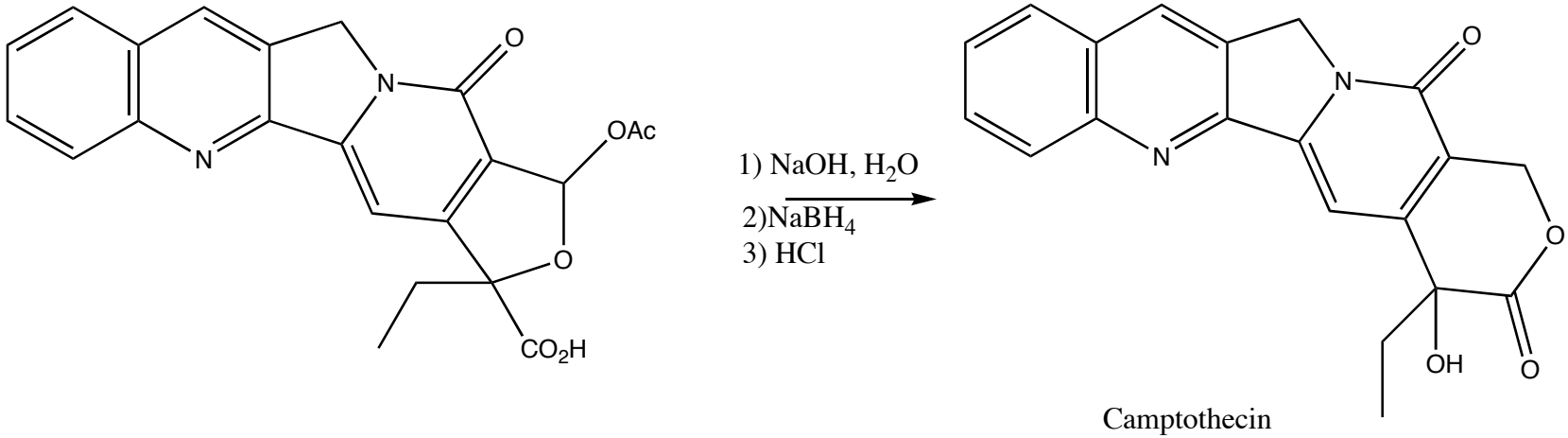
Camptothecin

Antitumor and antileukemia alkaloid
from *Camptotheca acuminata* tree

Stork Camptothecin



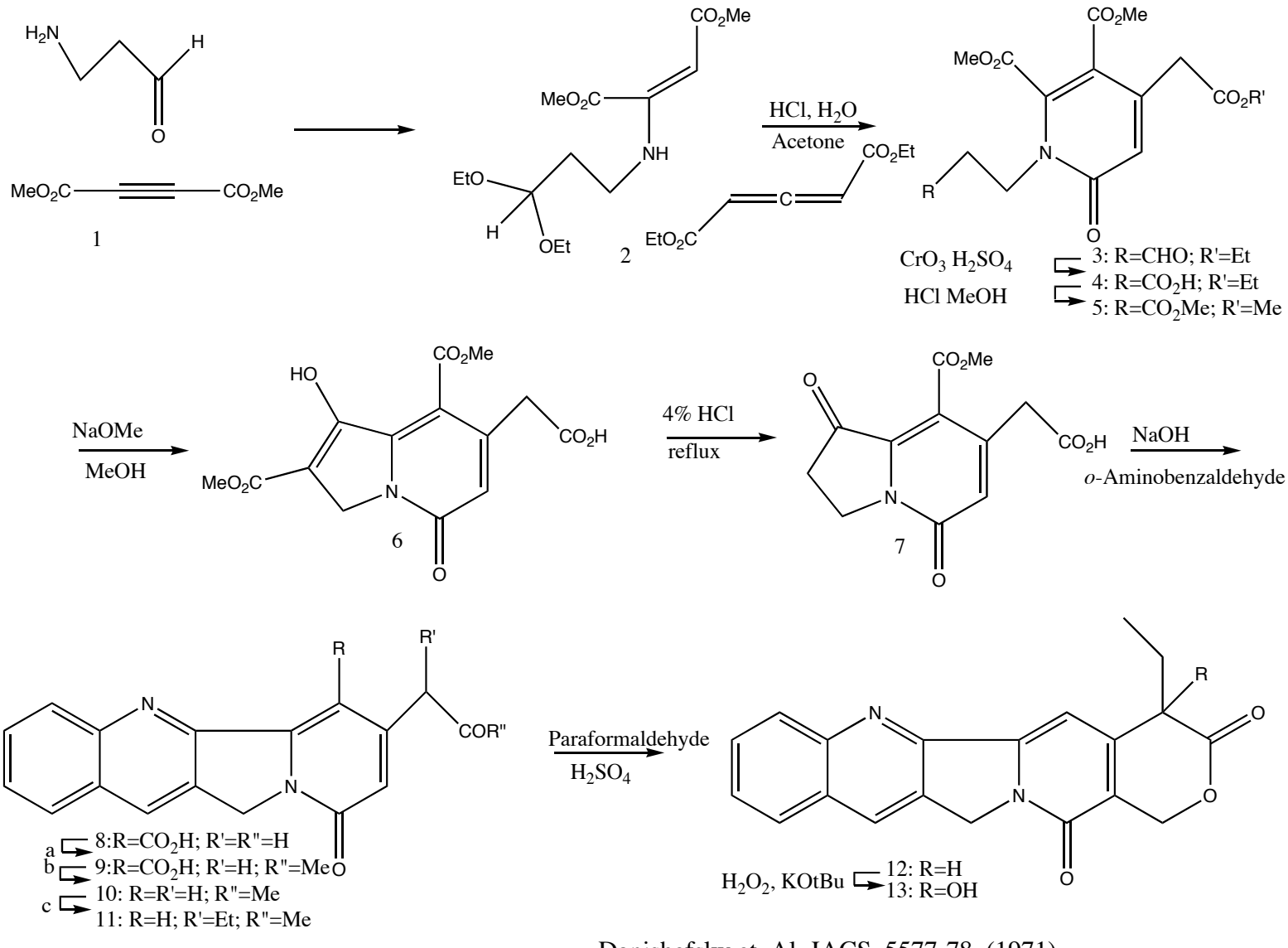
Stork Camptothecin part 2



Camptothecin

Stork and Schultz. JACS 1971 4074-4075

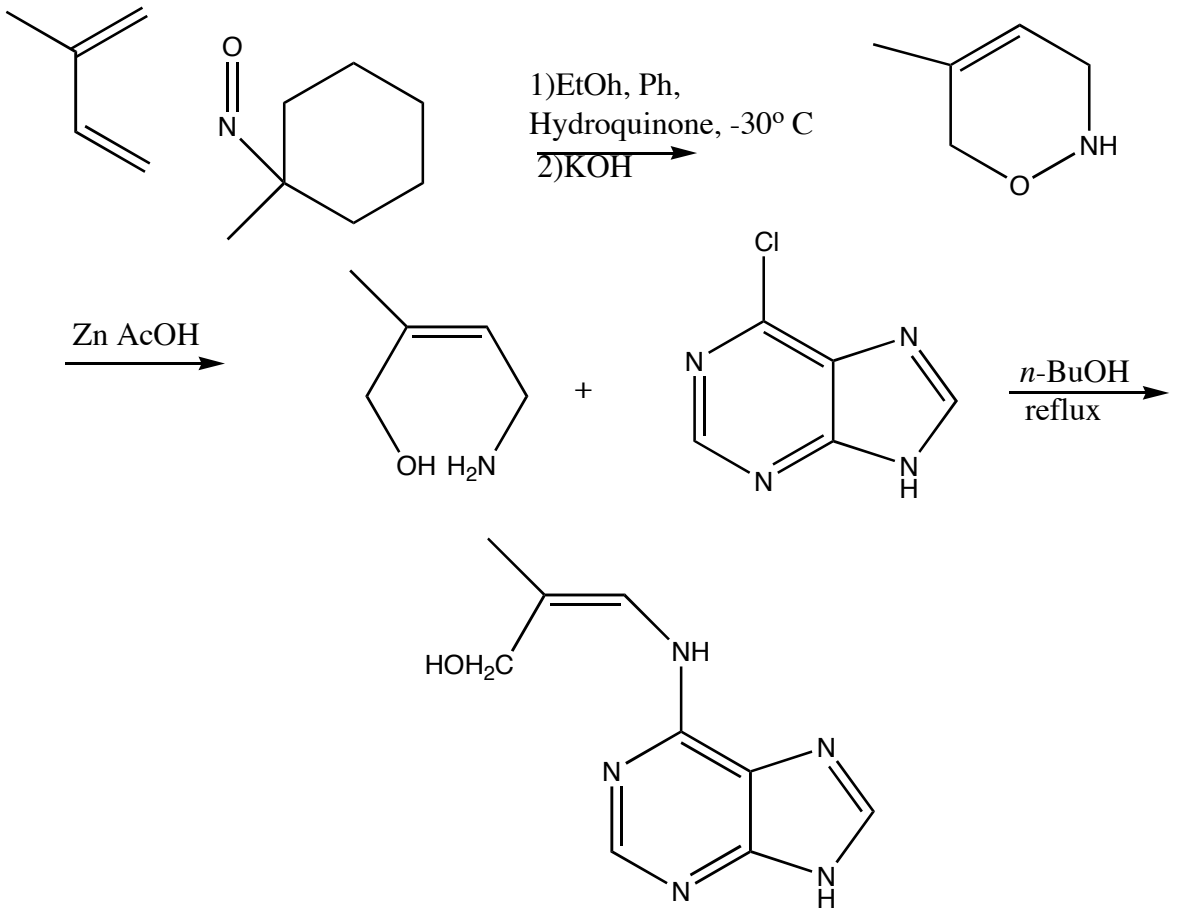
Danishefsky (±)-Camptothecin



a: esterification b:CuO, heat c: NaH·DME, EtI

Danishefsky et. Al. JACS, 5577-78. (1971)

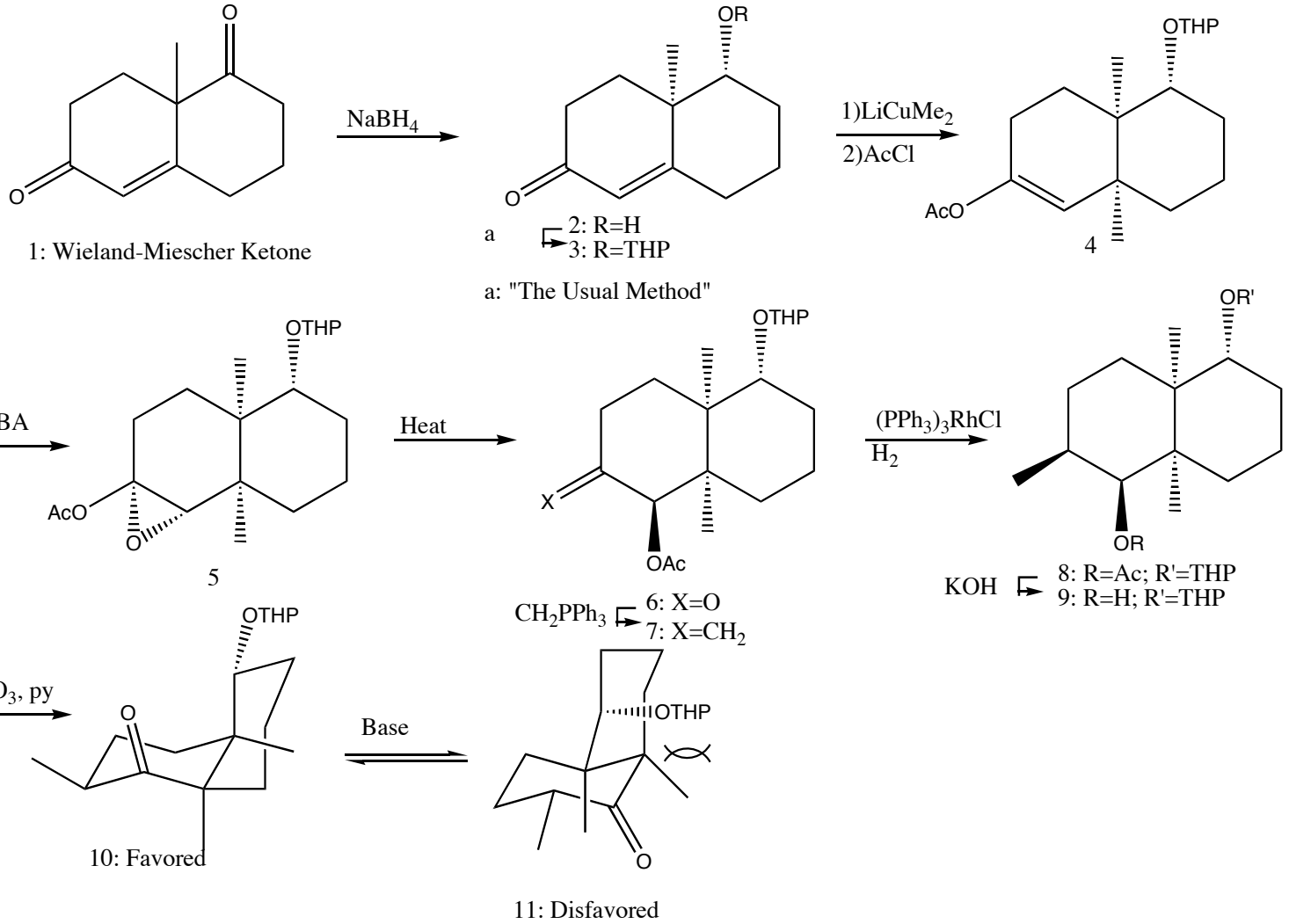
Cis-Zeatin



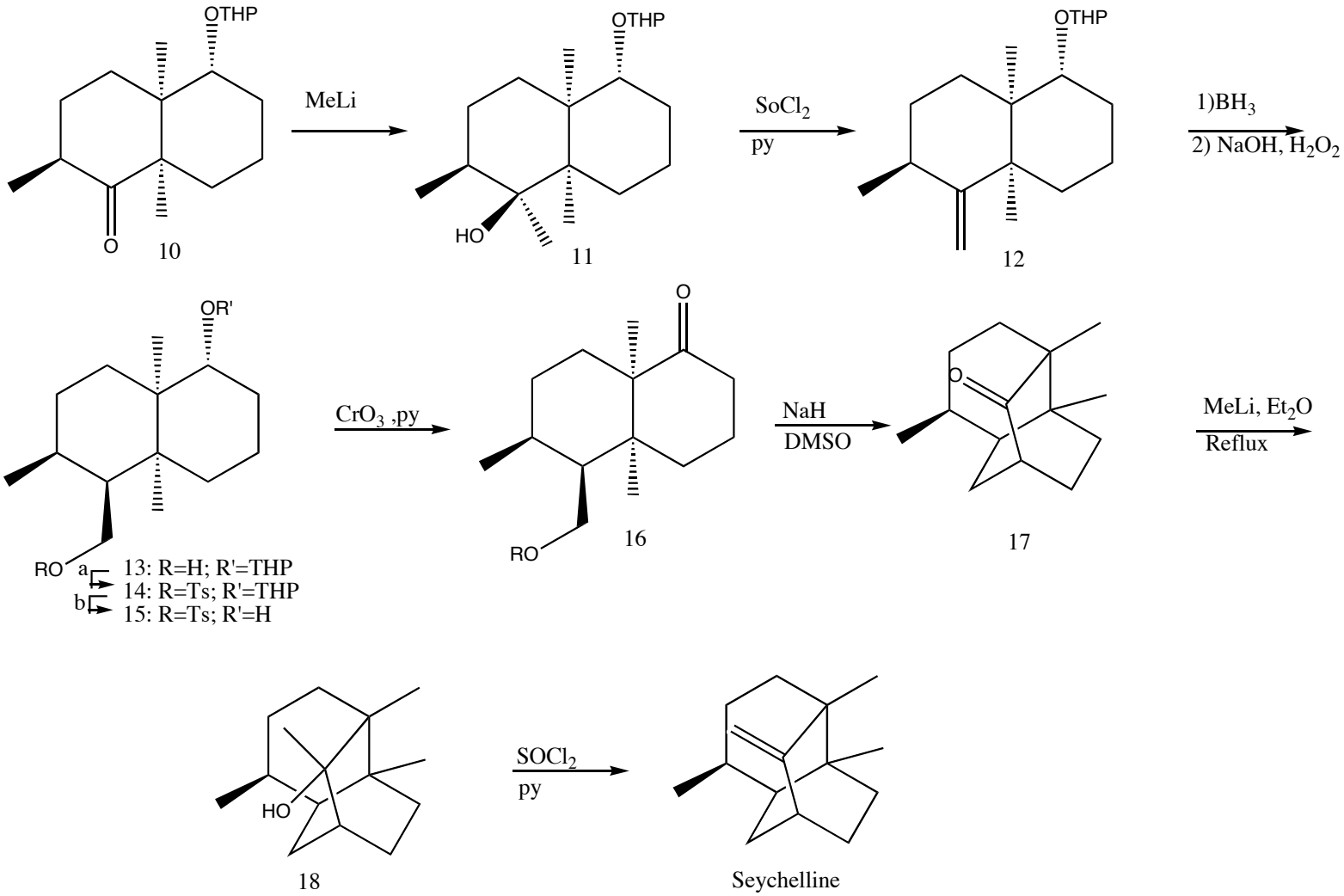
cis-Zeatin

Leonard et al. . JACS 1971. 3057-58

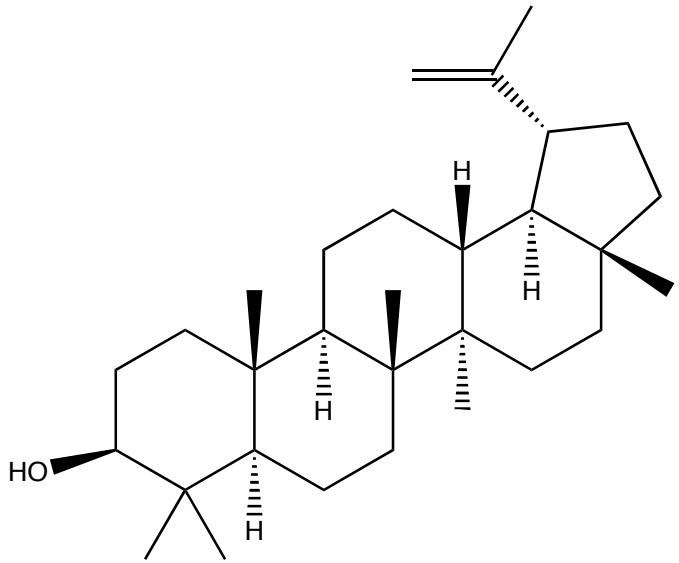
(±)-Seychellene



Seychelline Part 2



Stork (±)-Lupeol

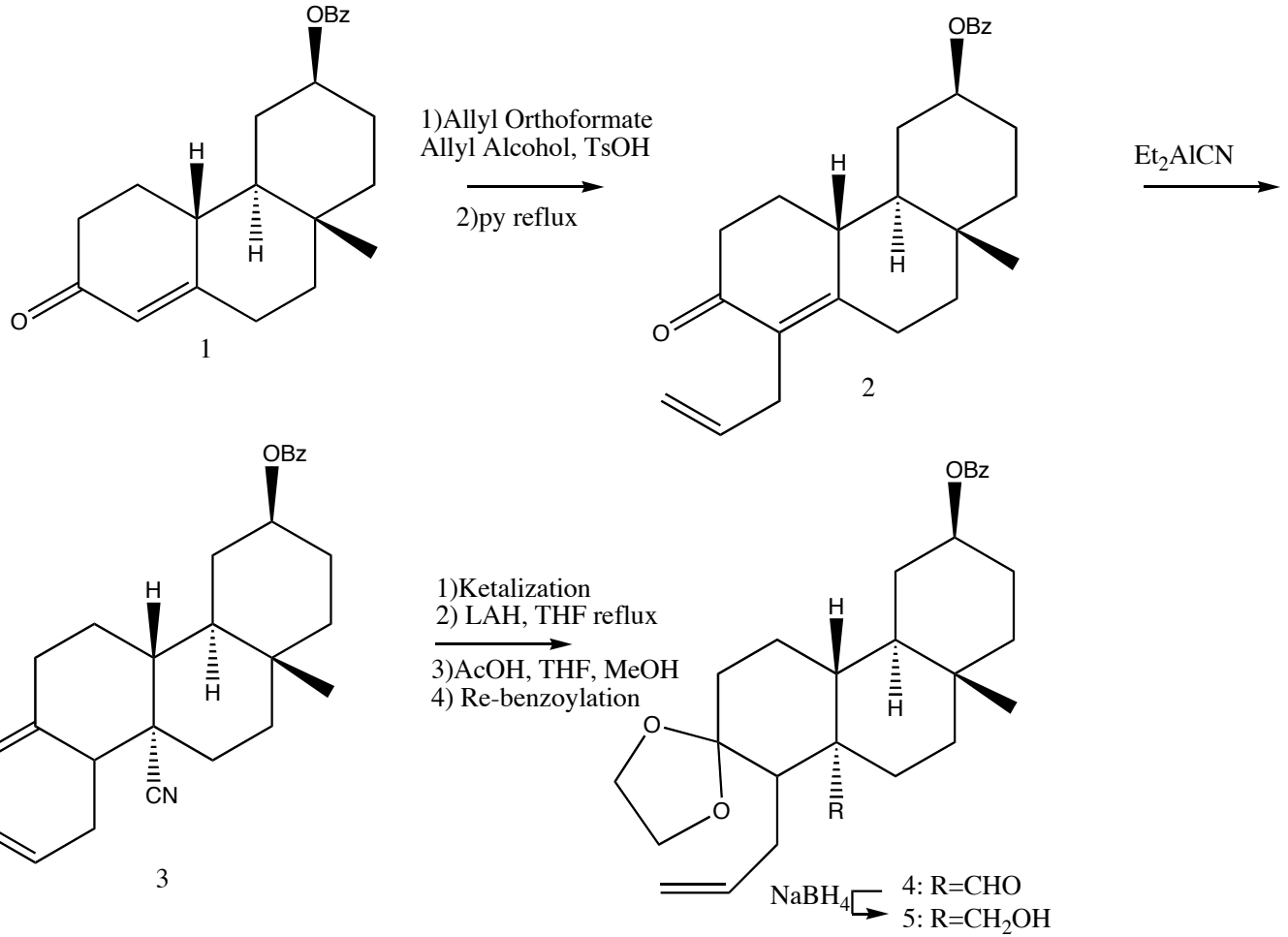


Lupeol

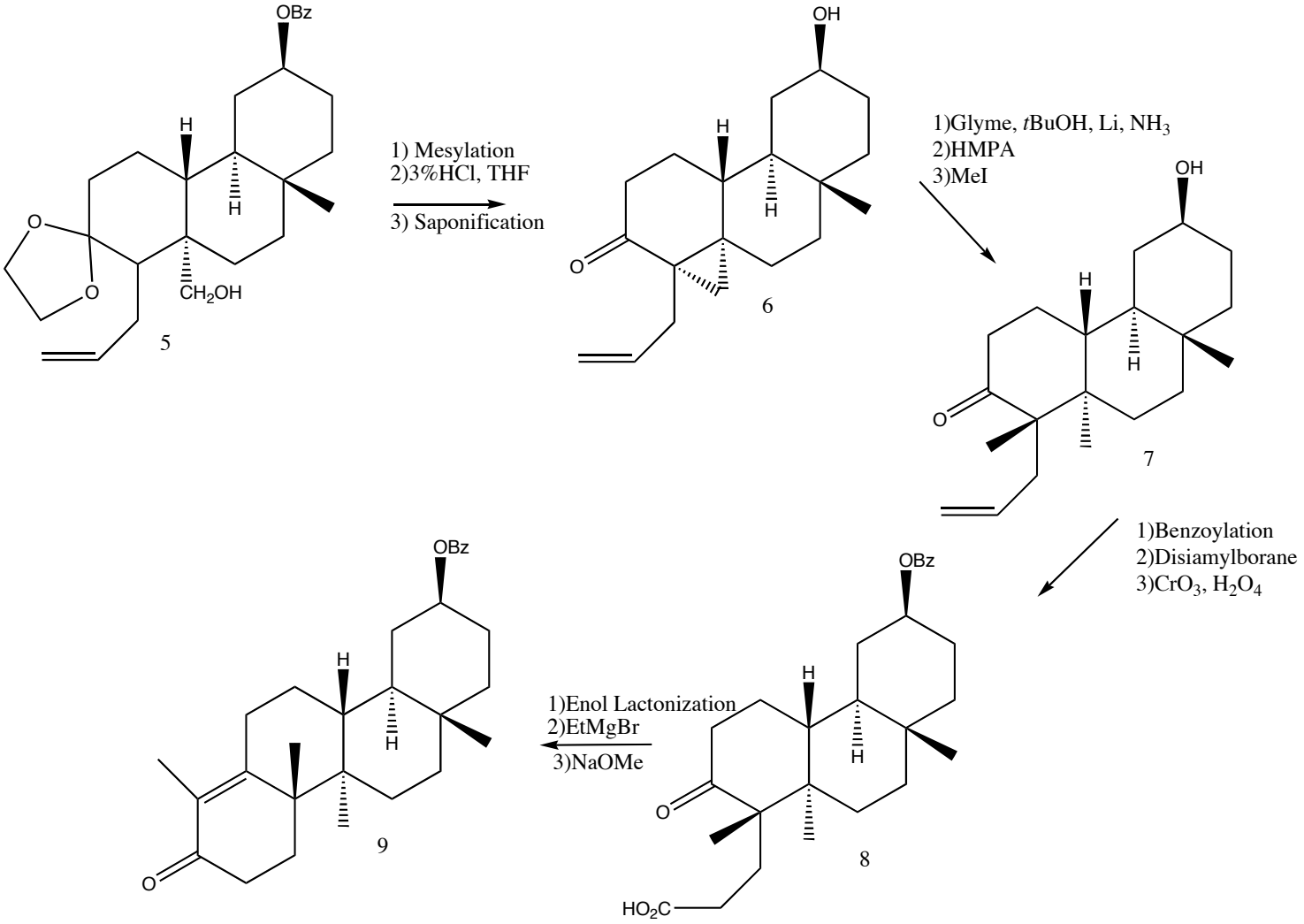
Pentacyclic Triterpene
10 Asymmetric Centers

Stork et. Al. JACS 1971. 4945-47.

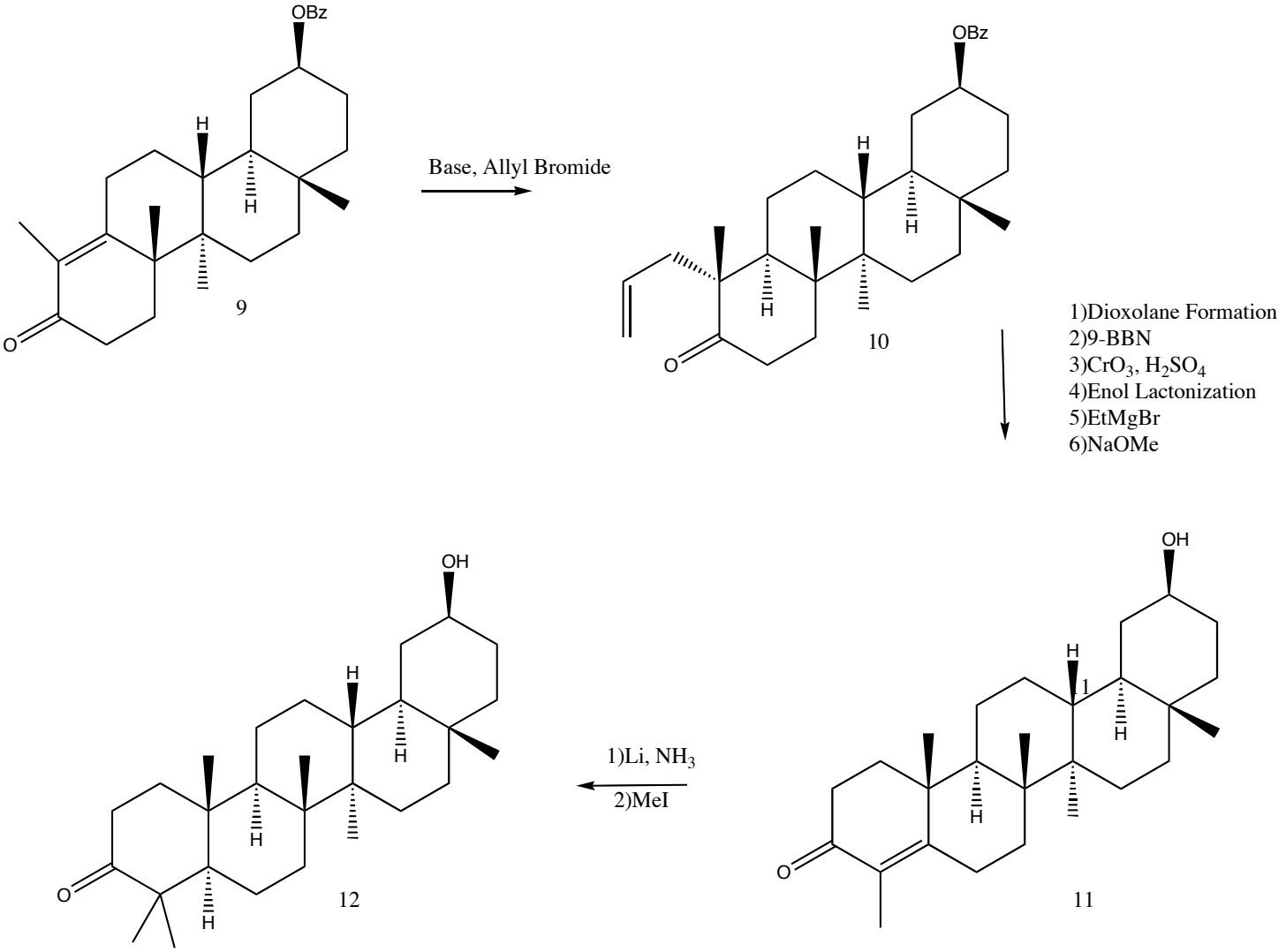
Lupeol 1


OBz
H
H
O
1
1)Allyl Orthoformate
Allyl Alcohol, TsOH
2)py reflux
OBz
H
H
O
2
Et2AlCN
OBz
H
H
O
CN
3
1)Ketalization
2) LAH, THF reflux
3)AcOH, THF, MeOH
4) Re-benzoylation
OBz
H
H
O
O
R
NaBH4
4: R=CHO
5: R=CH2OH

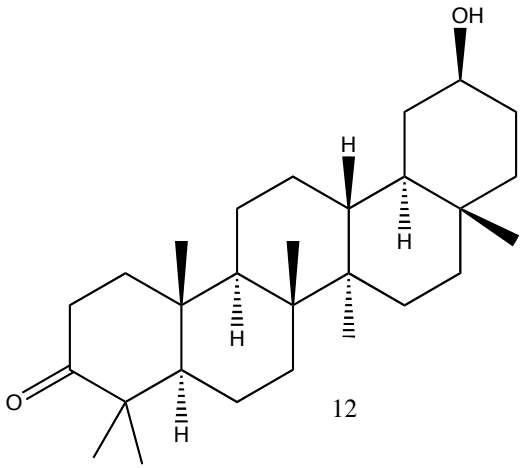
Lupeol 2


OBz
H
H
O
O
CH2OH
5
1) Mesylation
2)3%HCl, THF
3) Saponification
OH
H
H
O
6
1)Glyme, tBuOH, Li, NH3
2)HMPA
3)MeI
OH
H
H
O
7
1)Benzoylation
2)Disiamylborane
3)CrO3, H2O4
OBz
H
H
O
HO2C
8
1)Enol Lactonization
2)EtMgBr
3)NaOMe
OBz
H
H
O
9

Lupeol 3

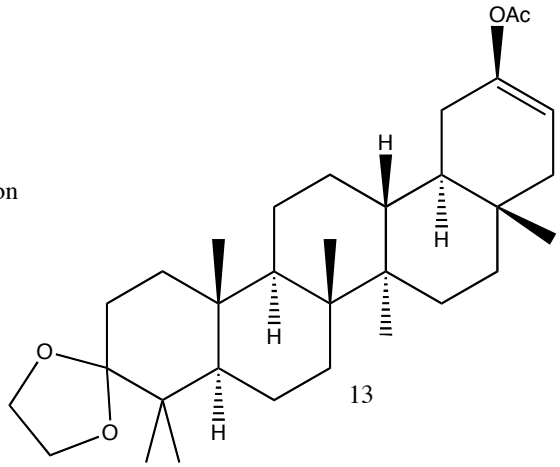

OBz
H
H
O
9
Base, Allyl Bromide
OBz
H
H
H
O
10
1)Dioxolane Formation
2)9-BBN
3)CrO_3, H_2SO_4
4)Enol Lactonization
5)EtMgBr
6)NaOMe
OH
H
H
H
H
O
11
1)Li, NH_3
2)MeI
OH
H
H
H
H
O
12

Lupeol 4



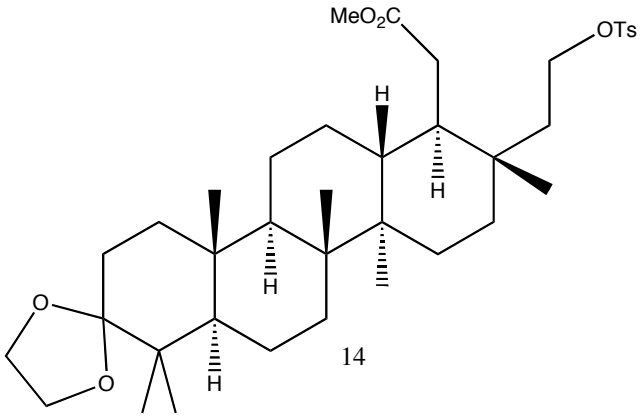
12

1)Ketalization
2) [O]
3)NaHMDS
4)Ac_2O



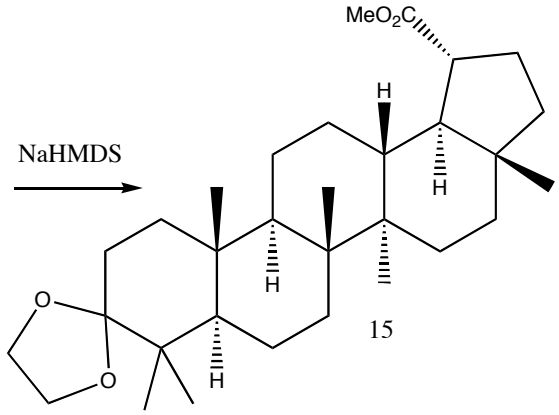
13

1)O_3
2)$NaBH_4$, NaOH
3)CH_2N_2
4) Tosylation



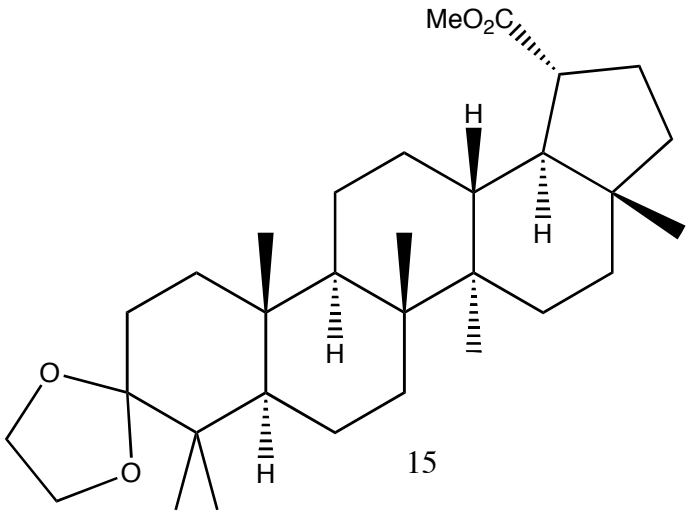
14

NaHMDS



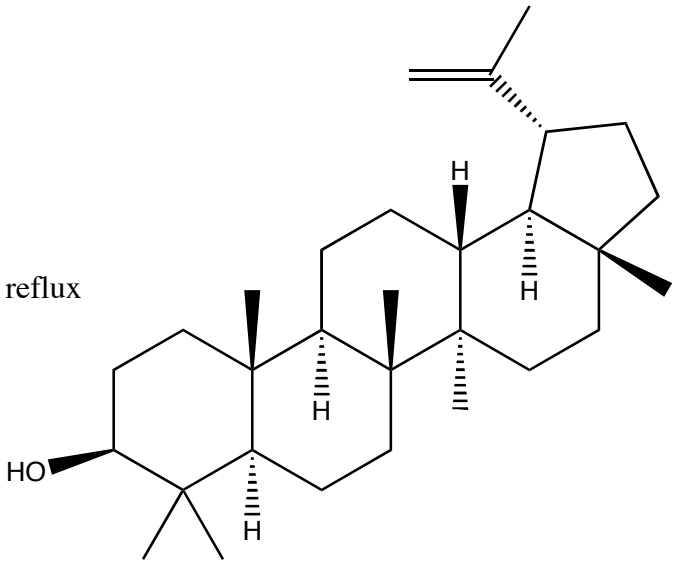
15

Lupeol 5



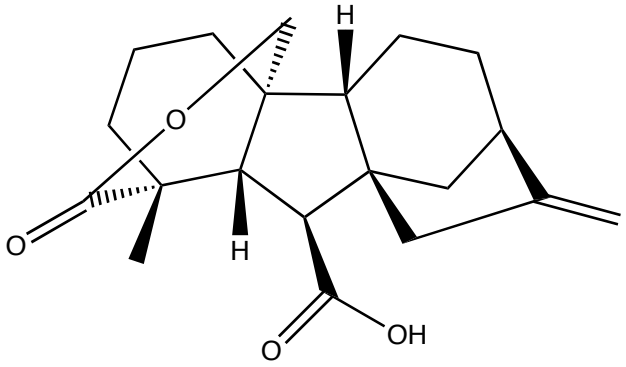
15

1) MeLi, Dioxane reflux
2)$POCl_3$, py
3)deketalization
4)$NaBH_4$



Lupeol

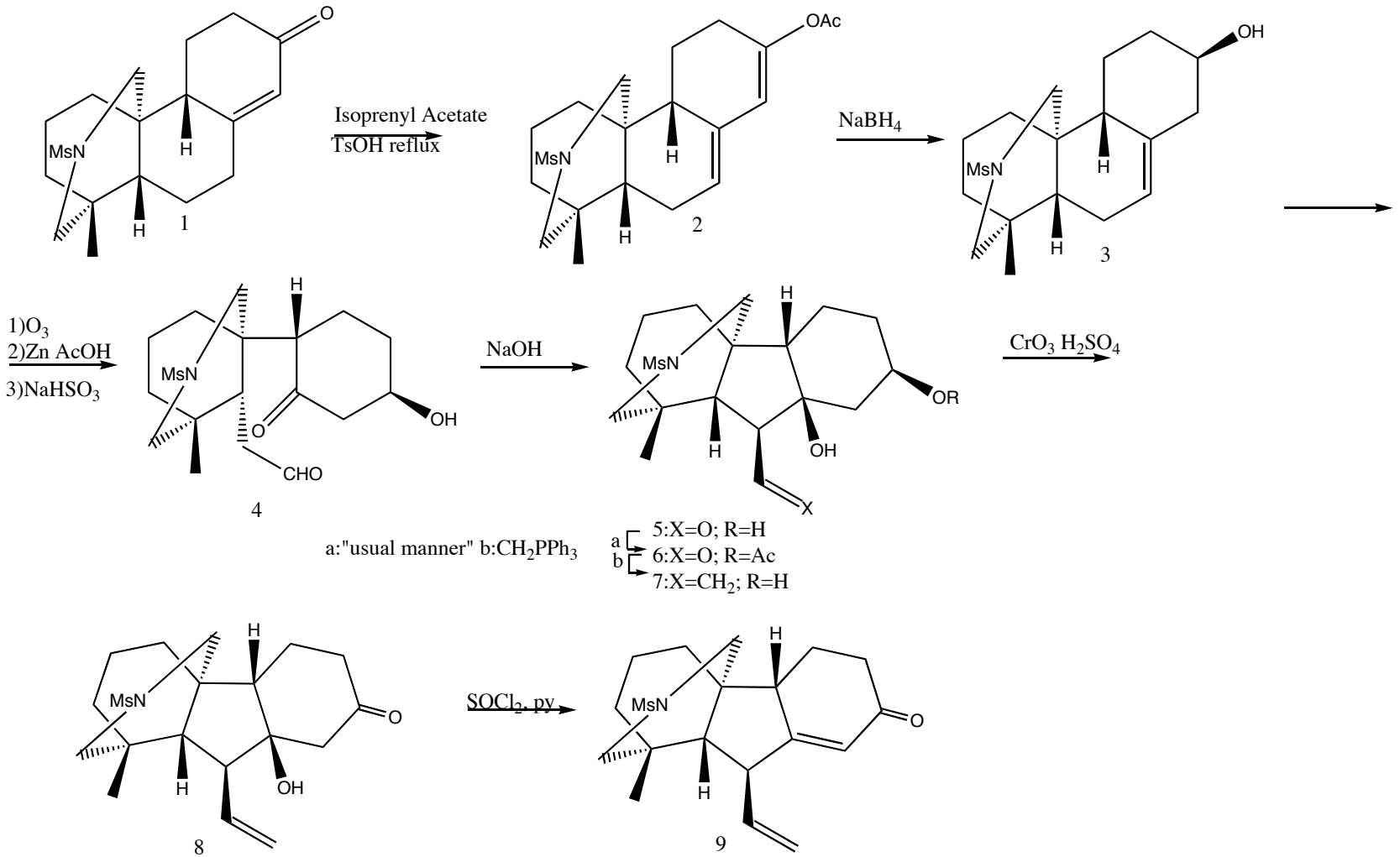
(±)-Gibberelin A_{15}



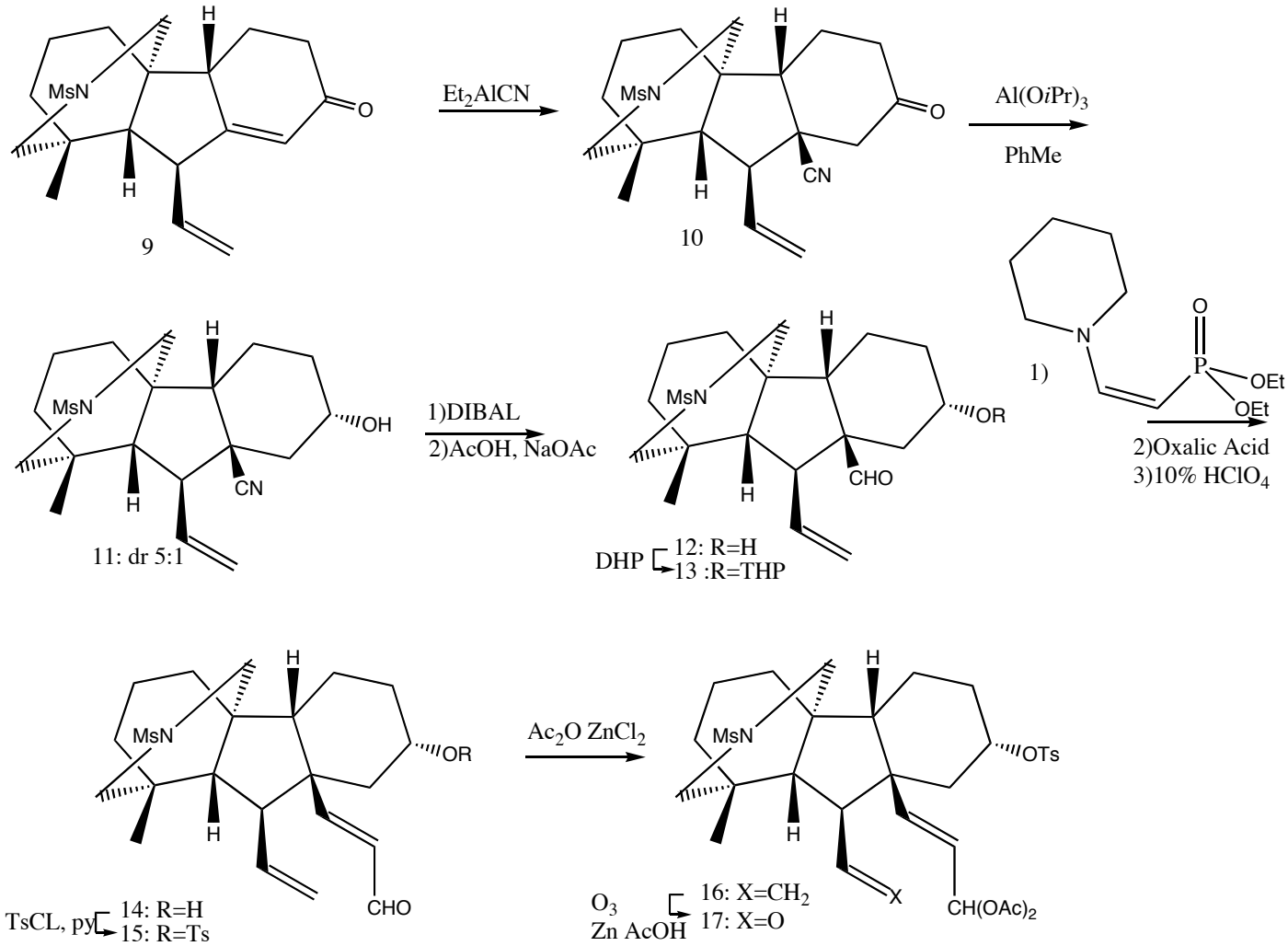
Gibberelin A_{15}

Nagata et. Al. JACS 1971 5740-58.

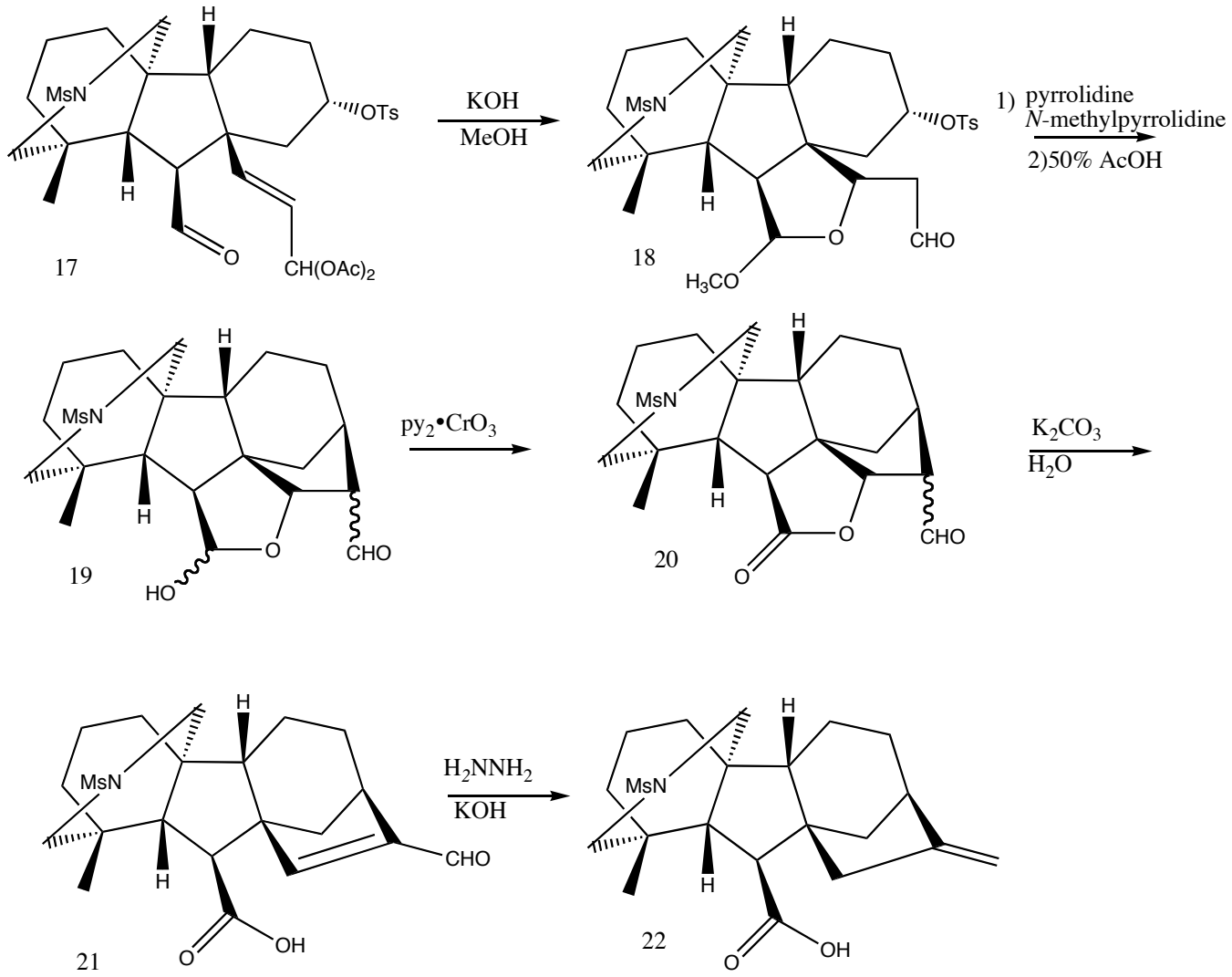
Gibberelin 1



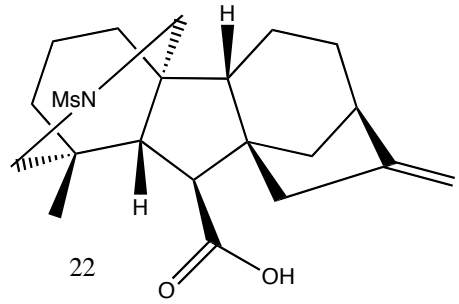
Gibberelin 2



Gibberelin 3

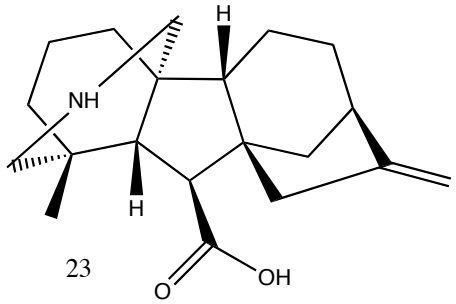


Gibberelin 4



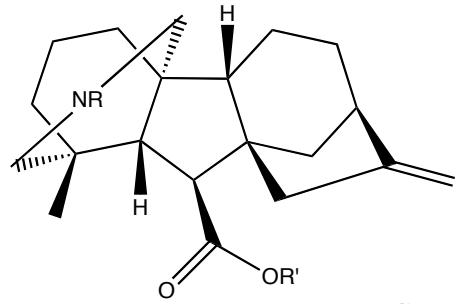
22

$Li\ NH_3$



23

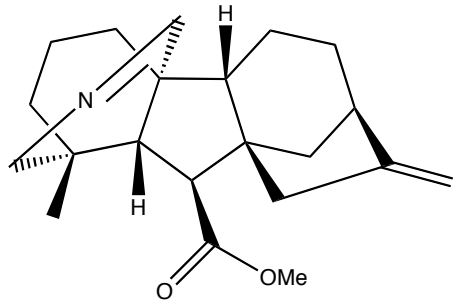
TFAA, py



a: 24: R=CF_3CO; R'=H
b: 25: R=CF_3CO; R'=Me
26: R=H; R'=Me

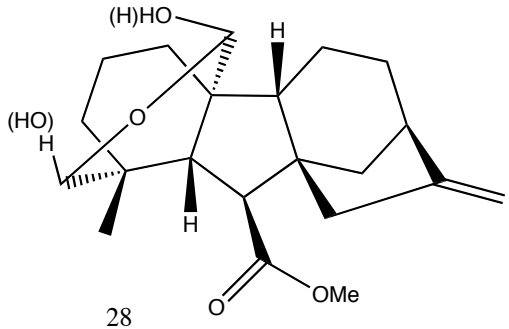
$Pb(OAc)_4$
K_2CO_3

a: CH_2N_2
b: K_2CO_3



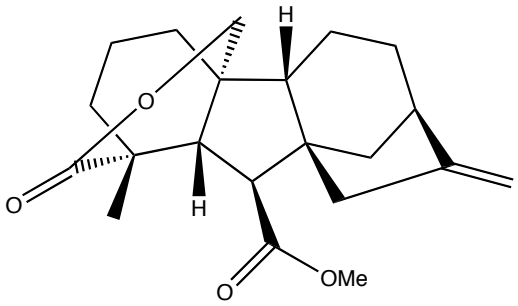
27: Mixture of Regioisomers

$NaNO_2$ AcOH
H_2O NaOAc



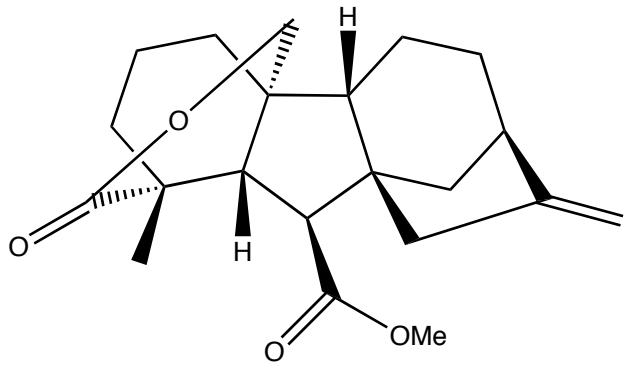
28

$py_2 \bullet CrO_3$



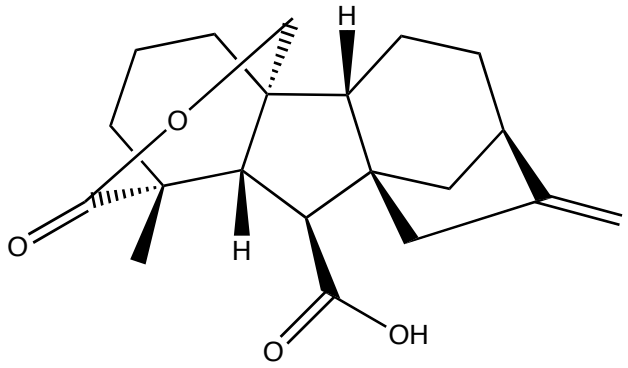
29: Regioisomers Seperated

Gibberelin 5



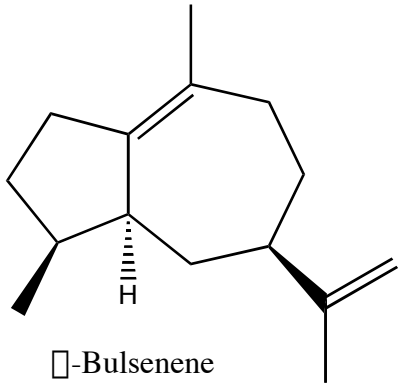
29

-Collidine
LiI, PPH_3

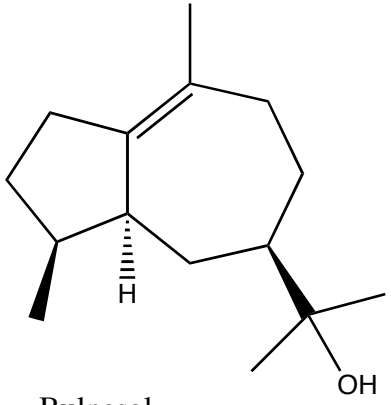


Gibberelin A_{15}

Heathcock (±)-□-Bulnesene and (±)-Bulnesol



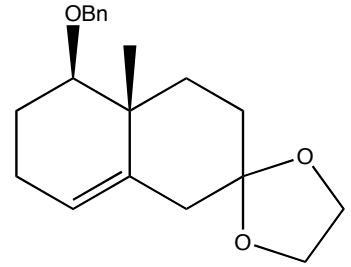
□-Bulsenene



Bulnesol

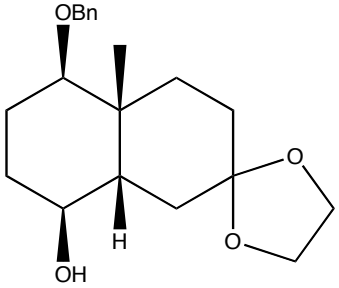
Heathcock et. Al. JACS 1971 1746-56

Bulnesene 1



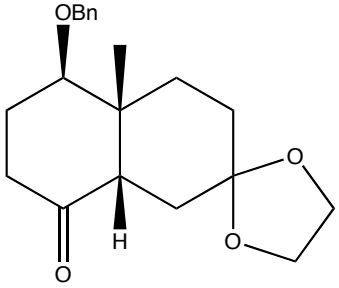
1: From Wieland-Miescher Ketone

1) BH_3
2) NaOH, HOOH



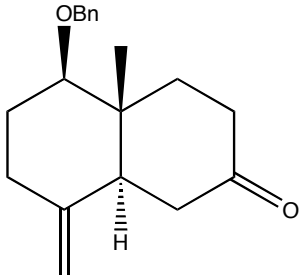
2: 2:1 dr

$py_2 \bullet CrO_3$



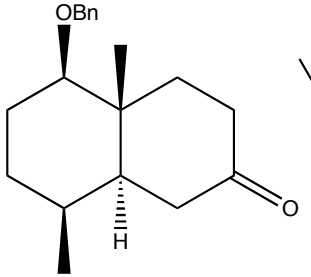
3: 2:1 dr

1) CH_2PPh_3
2) AcOH, H_2O

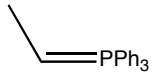


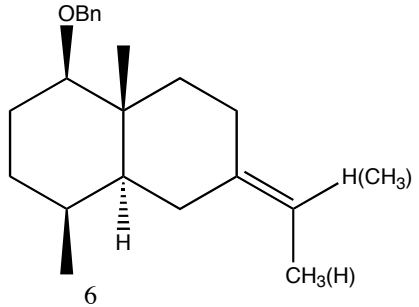
4: Single Diastereomer

Rh/Al_2O_3
H_2



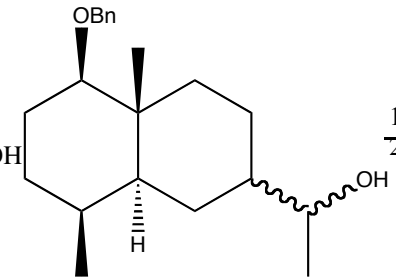
5: Diastereomers Seperated





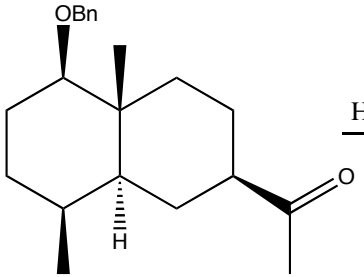
6

1) BH_3
2) NaOH, HOOH



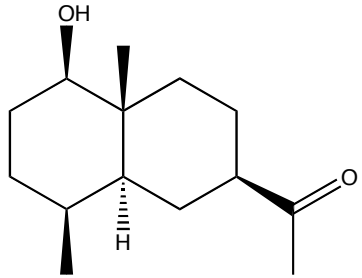
7

1)$py_2 \bullet CrO_3$
2)HCl



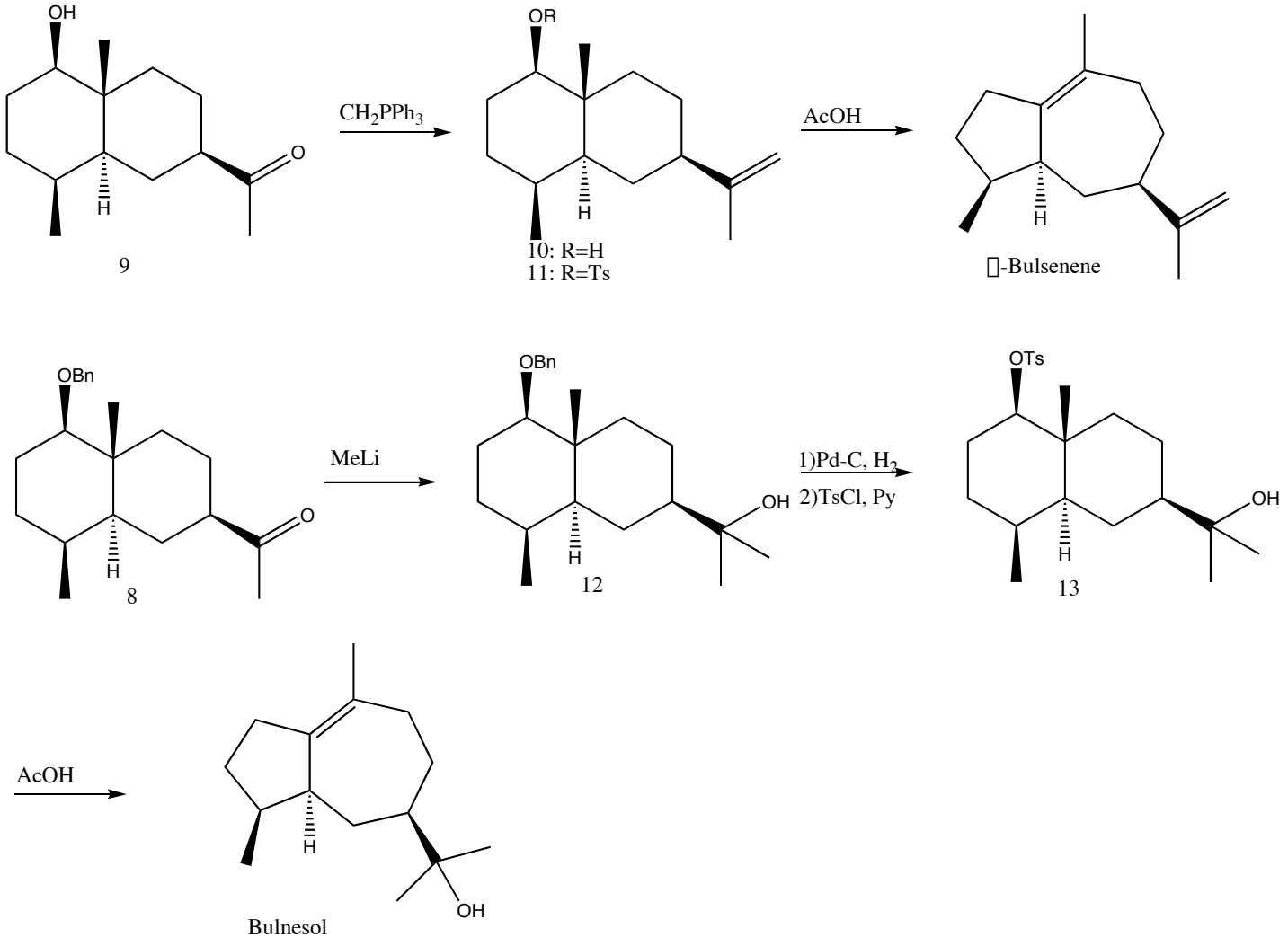
8: Single Diastereomer

H_2 Pd-C

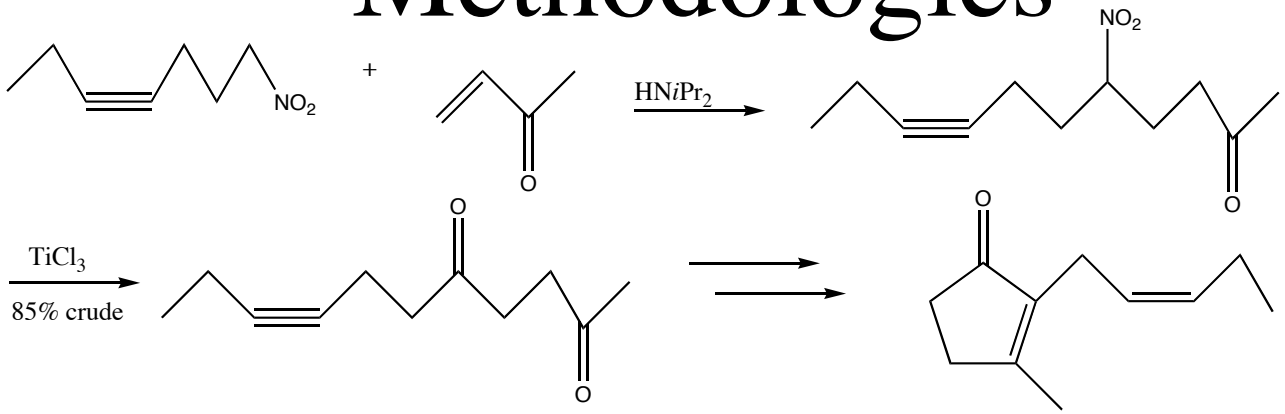


9

Bulnesene 2

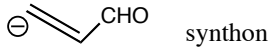

OH
O
H
9
CH2PPh3
OR
H
10: R=H
11: R=Ts
AcOH
H
-Bulsenene
OBn
O
H
8
MeLi
OBn
OH
H
12
1)Pd-C, H2
2)TsCl, Py
OTs
OH
H
13
AcOH
H
OH
Bulnesol

Methodologies

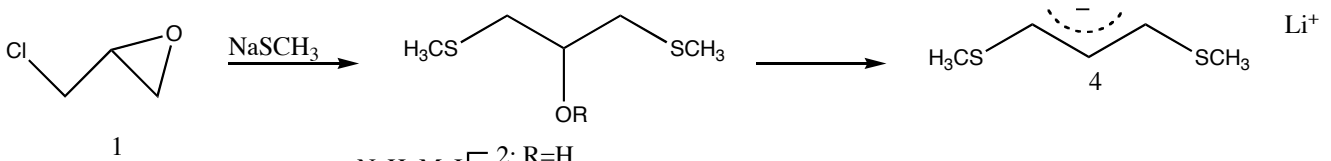


McMurry and Melton, JACS 1971, 5310-11.

cis-jasmone

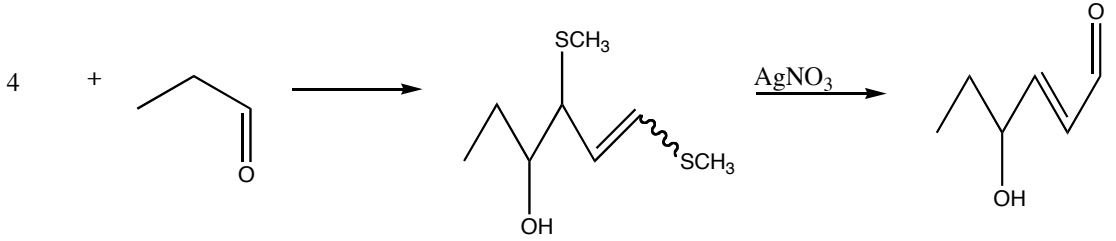


synthon



1

NaH, MeI → 2: R=H, 3:R=Me



Corey et. Al. JACS 1971 1724-1729