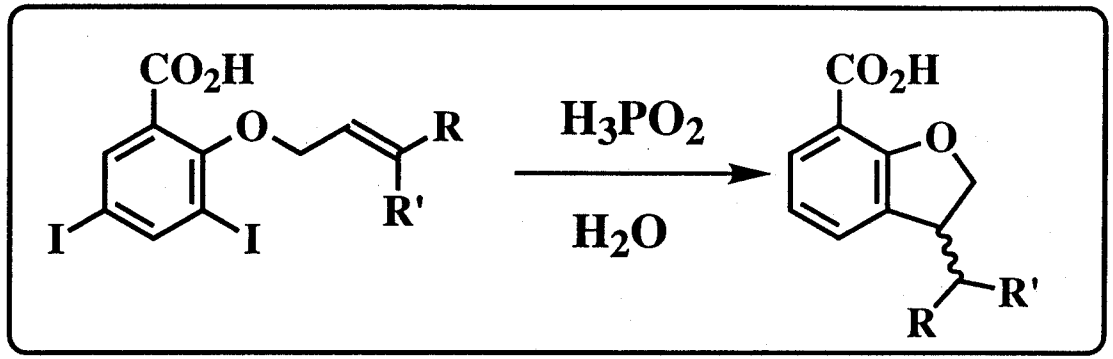
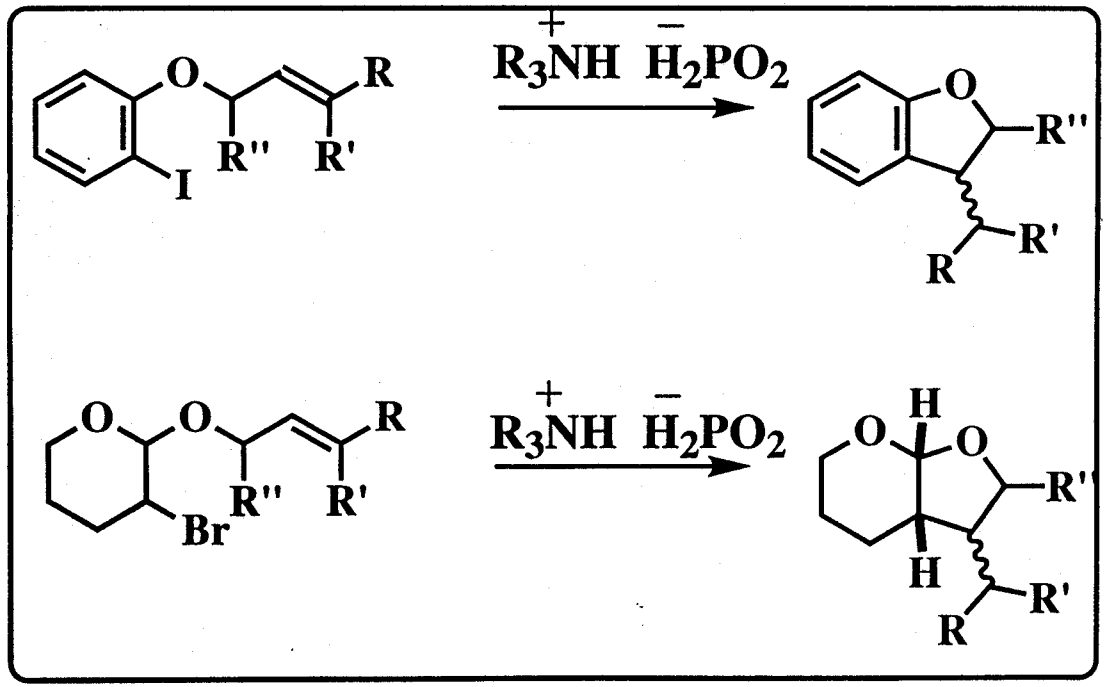
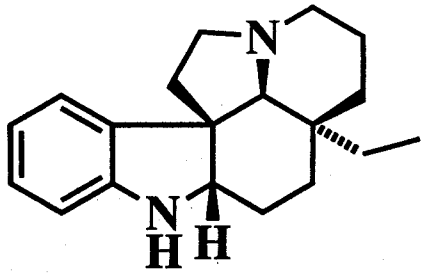
Clean Radical Chemistry



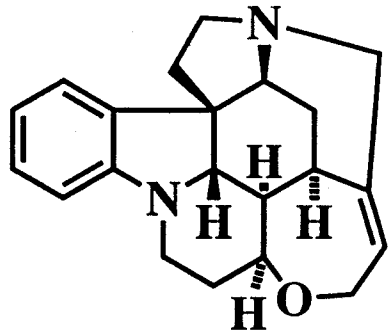


- 68-94% yield
- No residues
- No contamination
- No chromatography
- No toxicity
- Conducted in water or in organic solvent

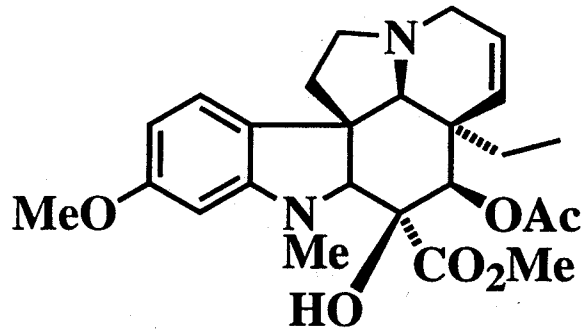
Stephen Graham



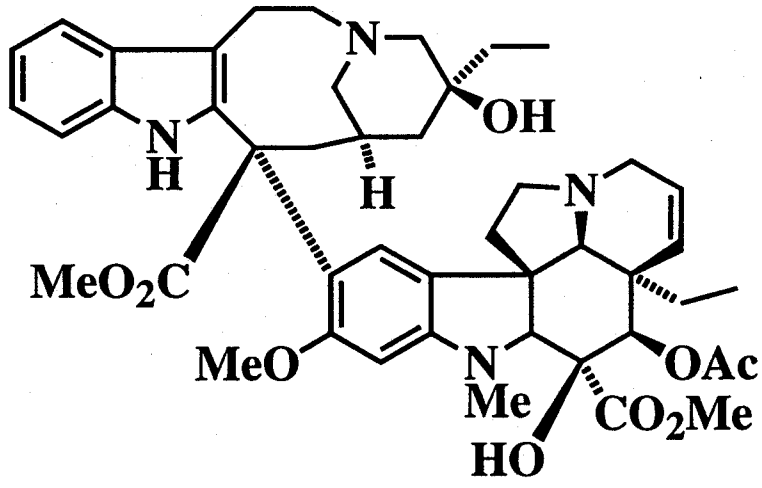
Aspidospermidine



Strychnine



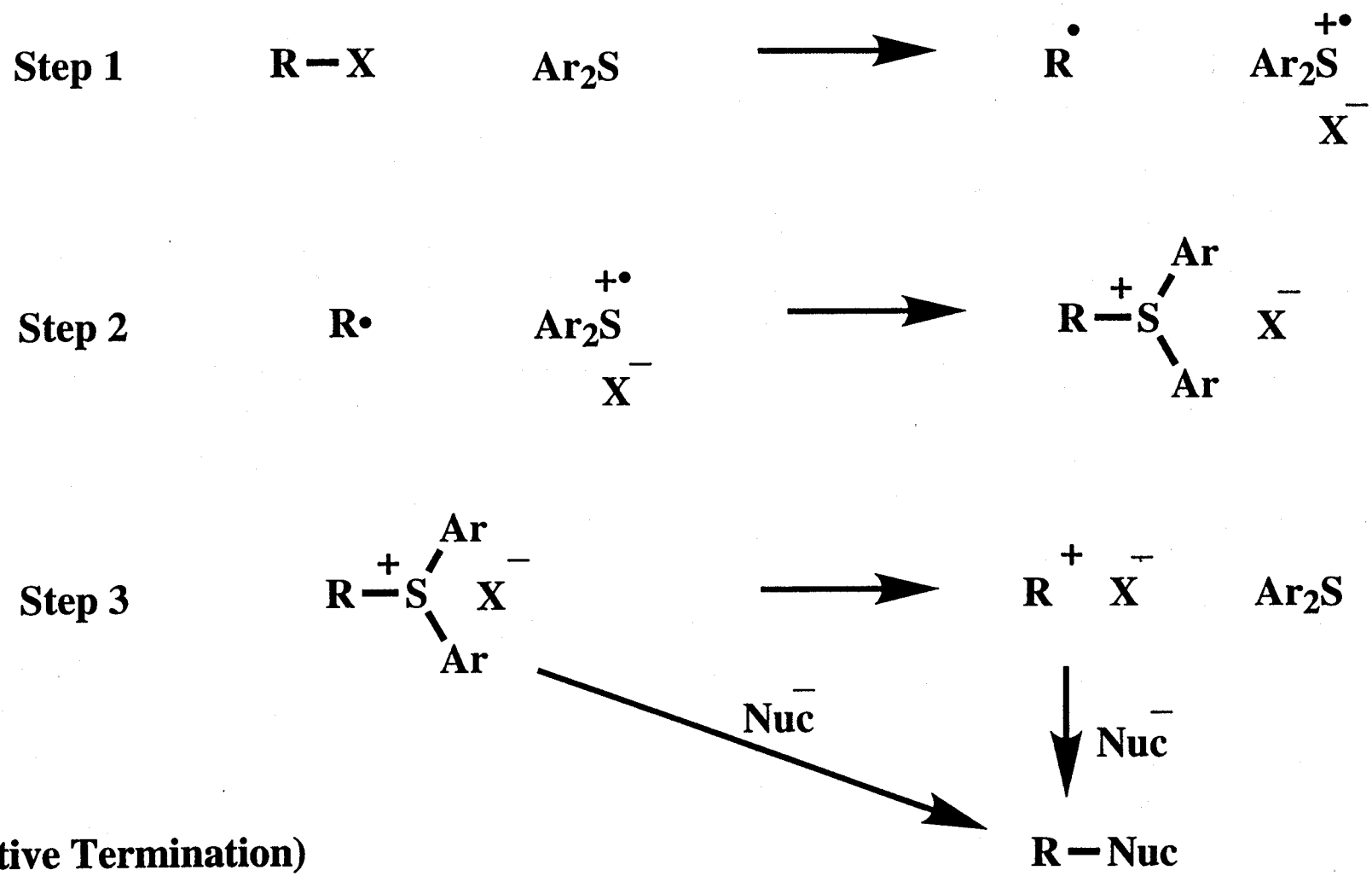
Vindoline



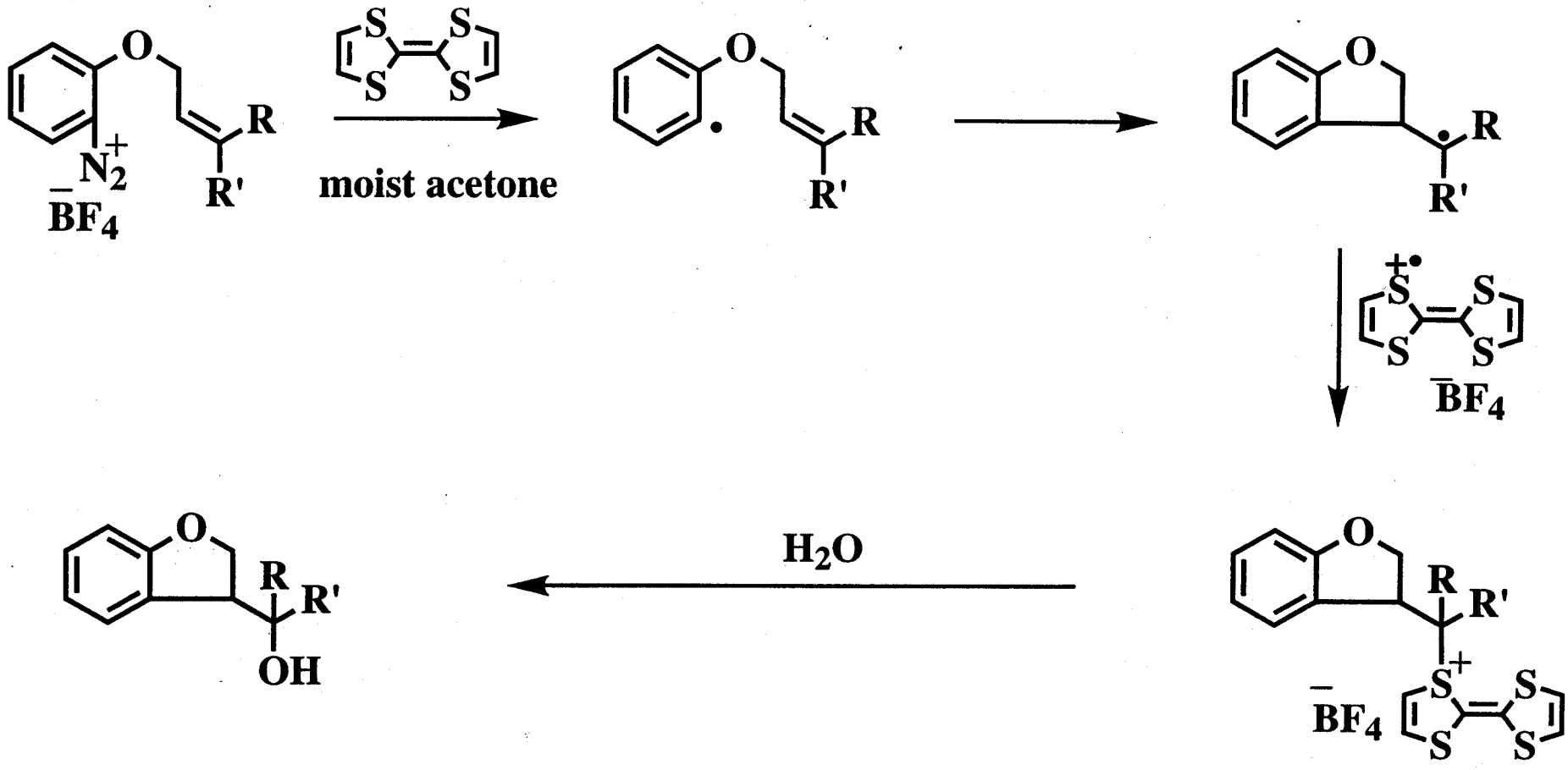
Vinblastine

Radical-Polar Crossover Proposal

Proposal:



(Oxidative Termination)

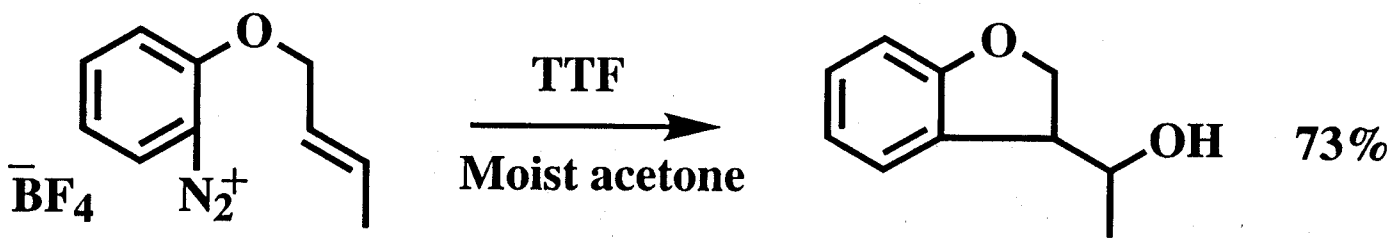


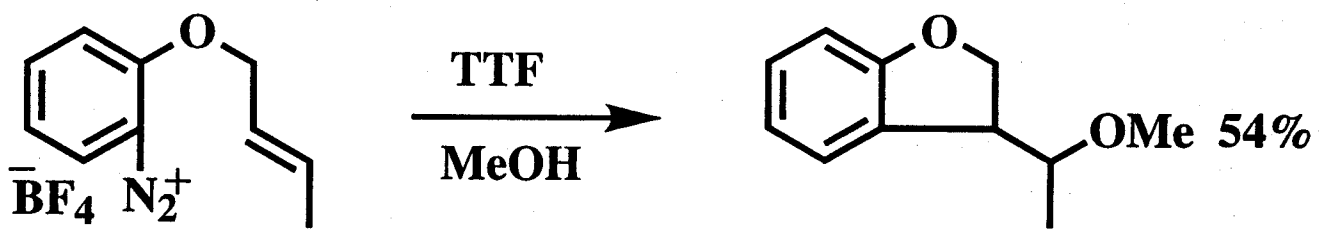
Catalytic

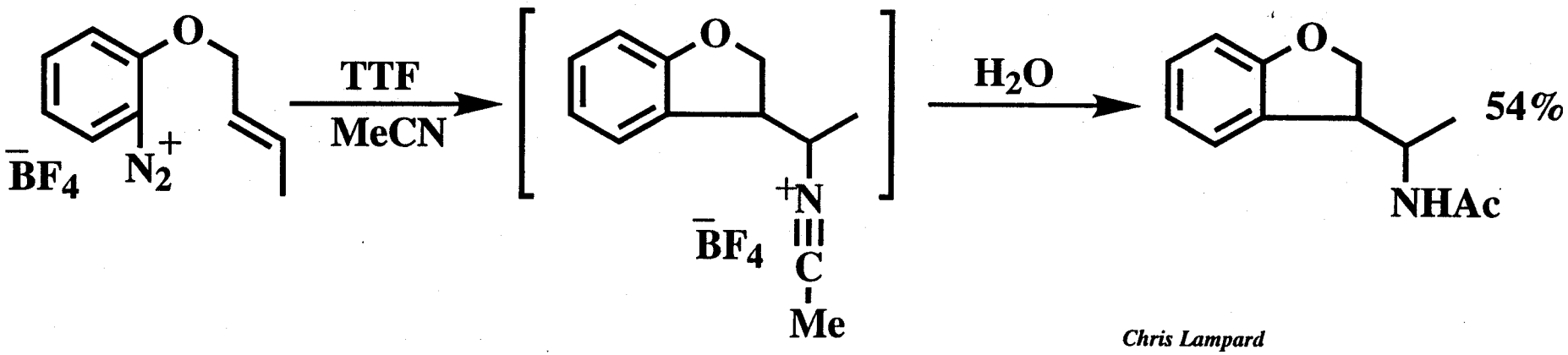
S_N1 Mechanism

Chris Lampard

Alternative Nucleophiles



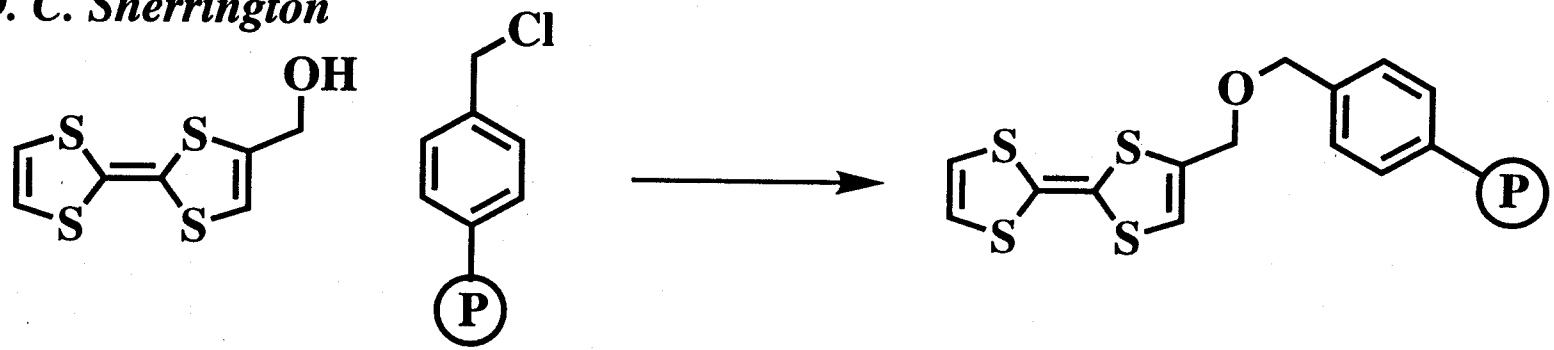


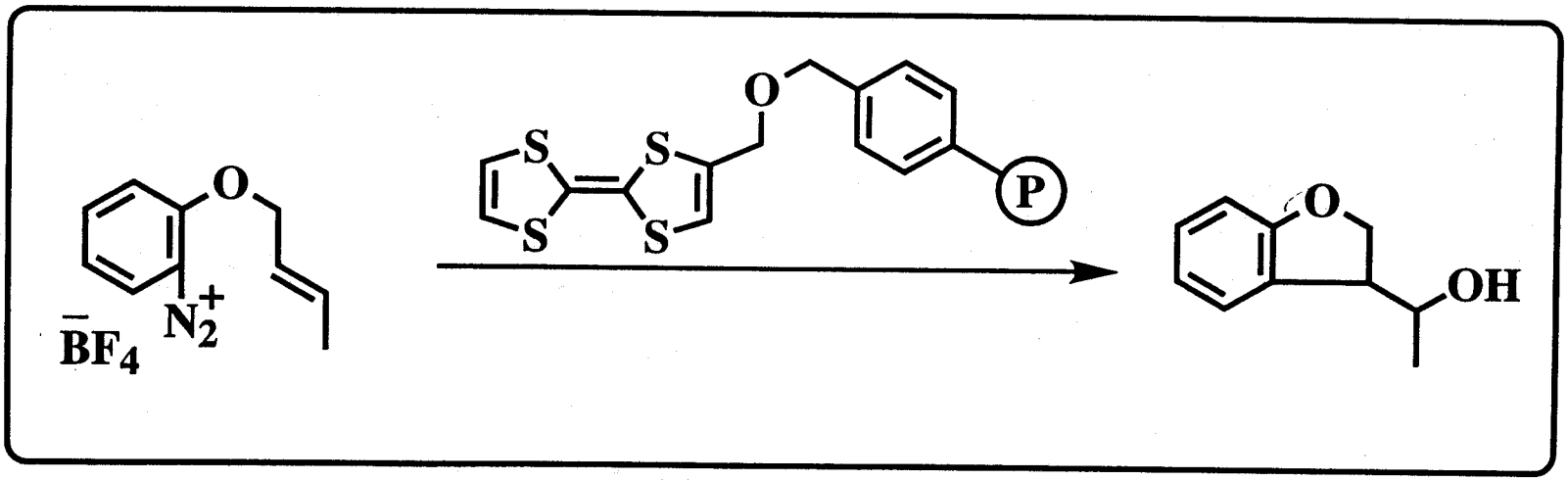


Chris Lampard

Polymer-Supported Catalysts

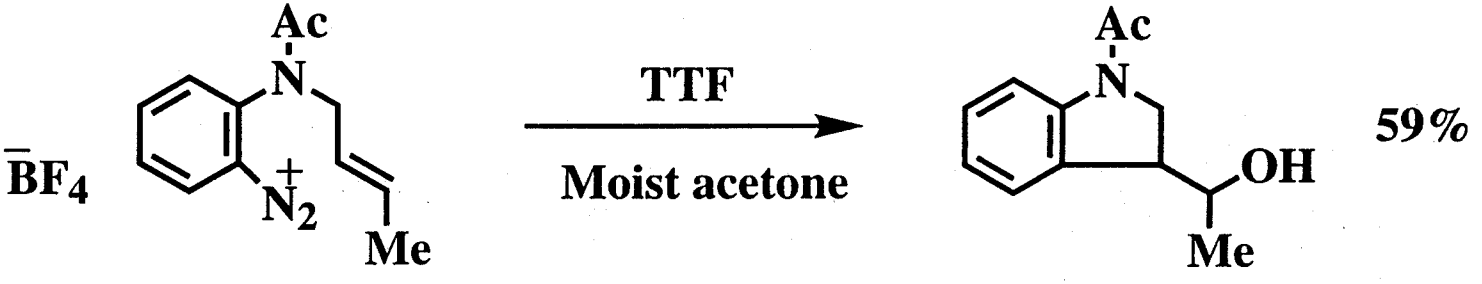
with Prof. D. C. Sherrington

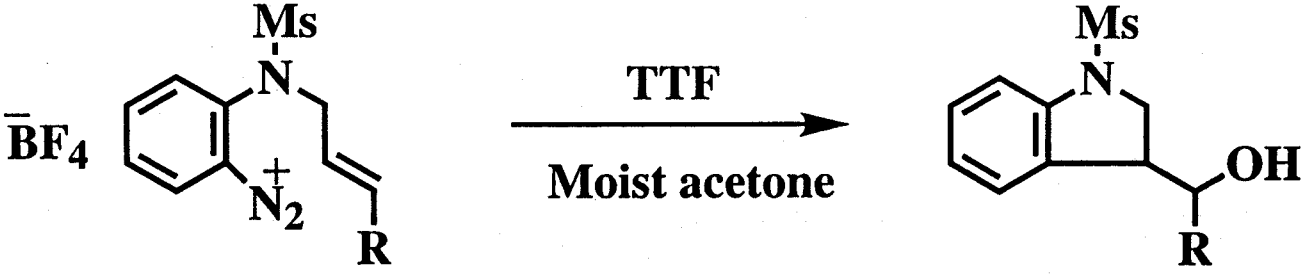


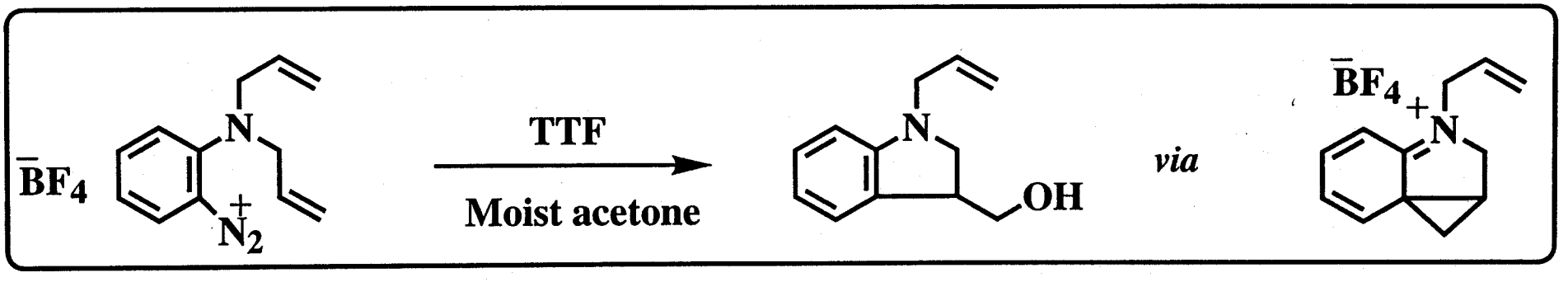


Balaram Patro, Michael Morrison, Martin Merrett

Preparation of Indolines

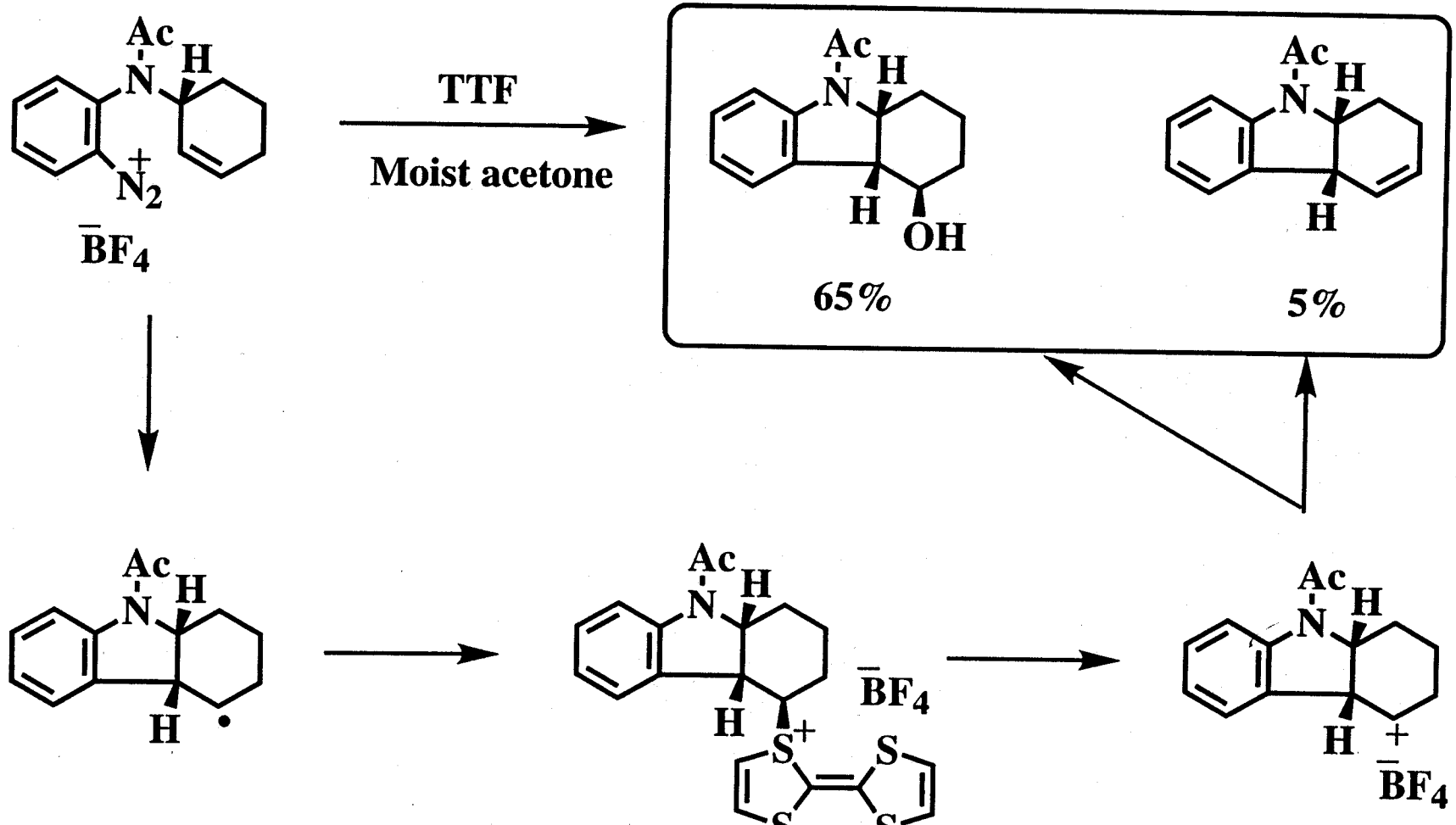






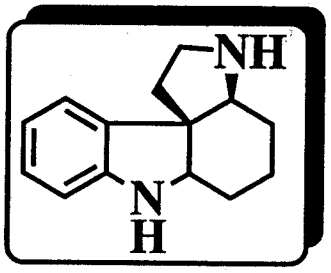
Faiza Rasheed

Stereoselectivity

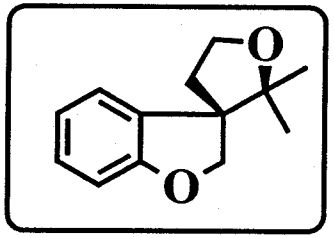


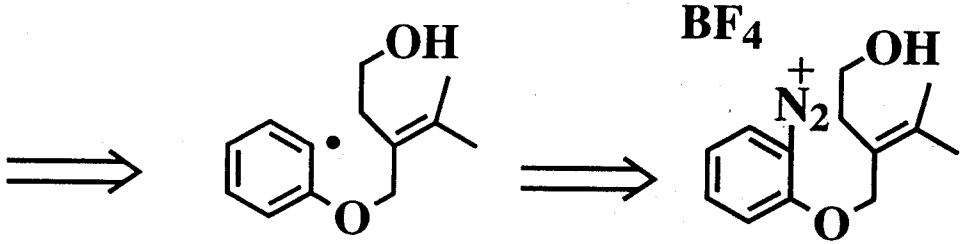
Faiza Rasheed

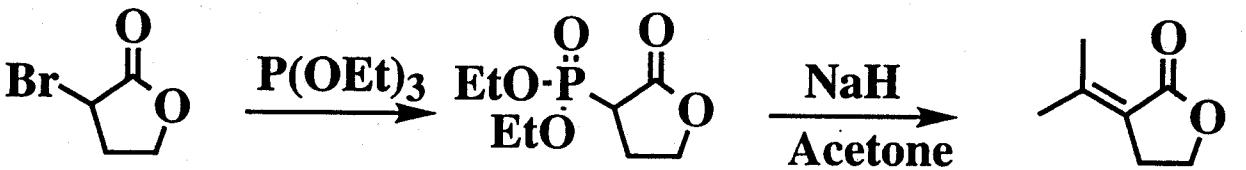
Long Term Goal

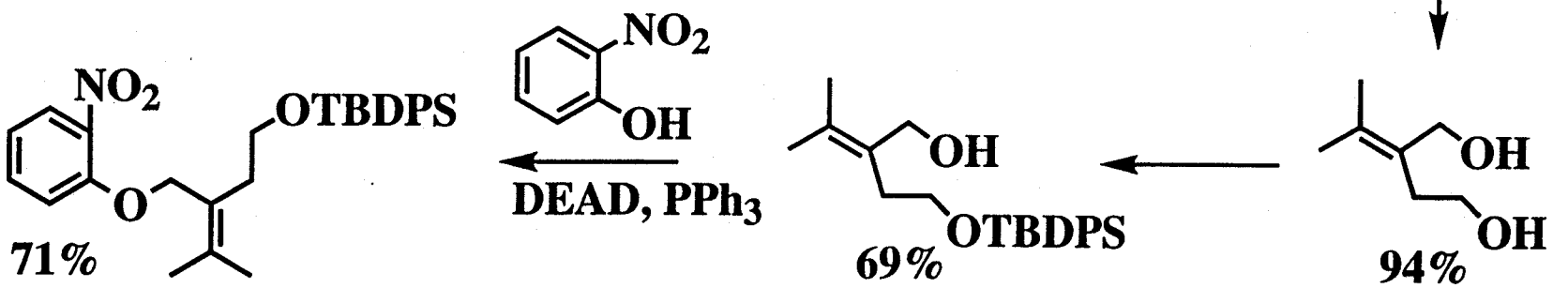


Short Term Goal

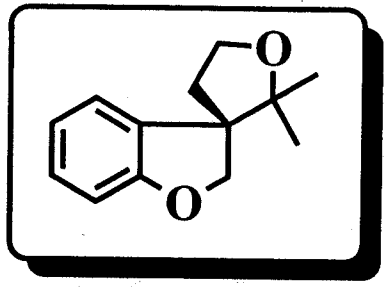


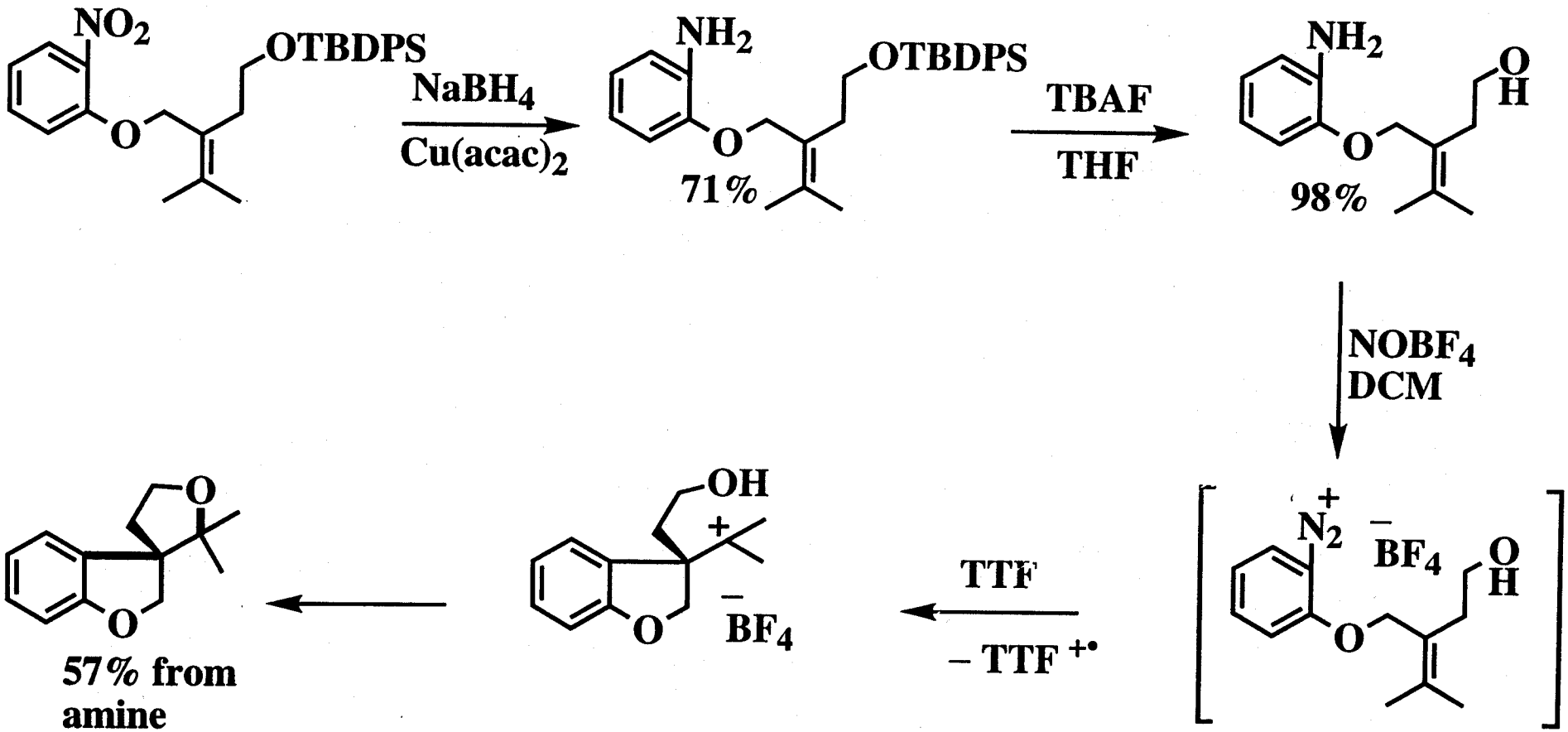




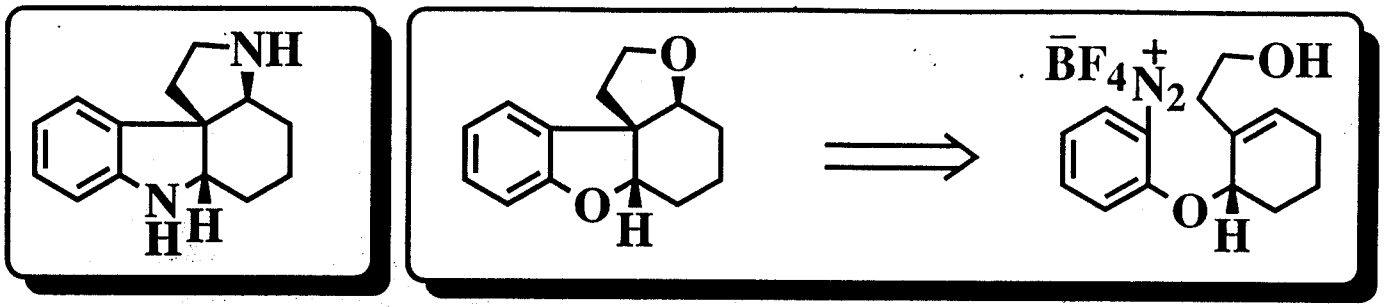


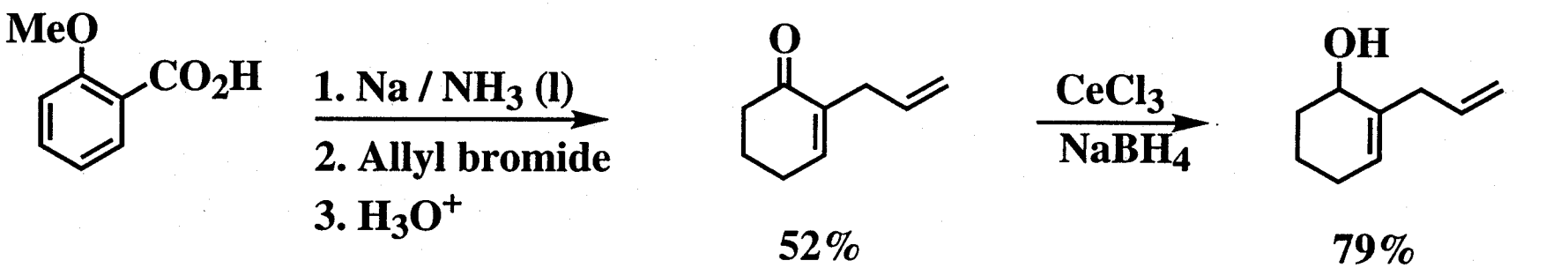
Steve Roome

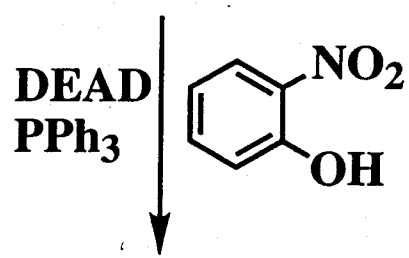


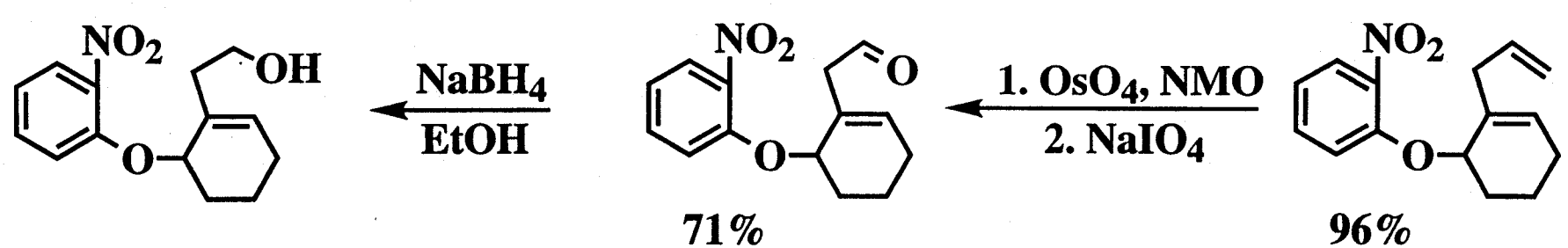

NO2
OTBDPS
NaBH4
Cu(acac)2
NH2
OTBDPS
71%
TBAF
THF
NH2
OH
98%
NOBF4
DCM
N2
BF4
OH
TTF
– TTF +•
OH
BF4
57% from amine

Steve Roome

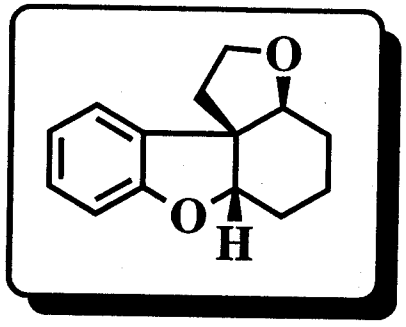

NH
NH
O
OH
$\bar{B}F_4$ $\overset{+}{N}_2$
OH
O
H

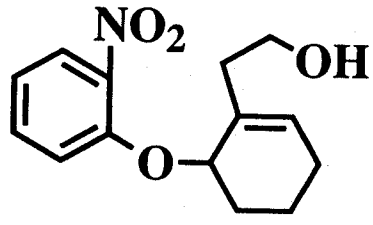

MeO
CO_2H
1. Na / NH_3 (l)
2. Allyl bromide
3. H_3O^+
O
52%
$CeCl_3$
$NaBH_4$
OH
79%


DEAD
PPh_3
NO_2
OH

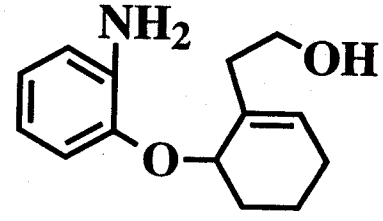

NO_2
OH
O
$NaBH_4$
EtOH
NO_2
O
O
71%
1. OsO_4, NMO
2. $NaIO_4$
NO_2
O
96%

Steve Roome



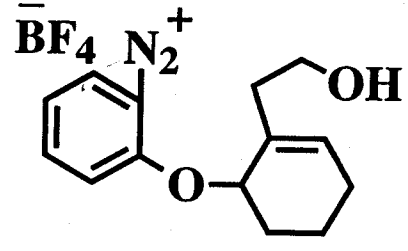


$\xrightarrow[Cu(acac)_2]{NaBH_4}$

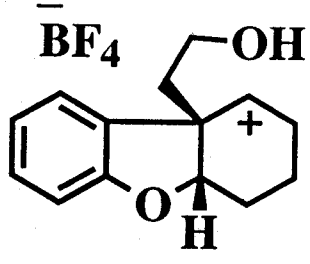


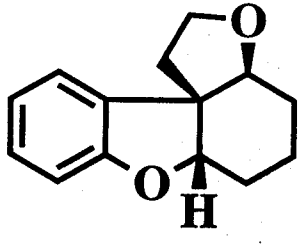
98%

$\xrightarrow[HBF_4]{NOBF_4}$



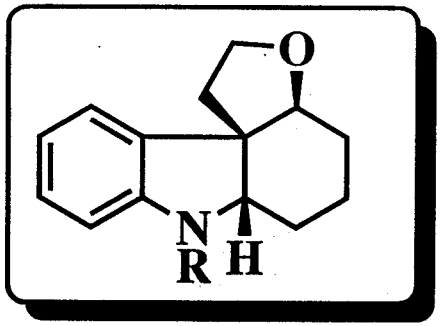
$\xrightarrow[-TTF^{+\bullet}]{TTF}$

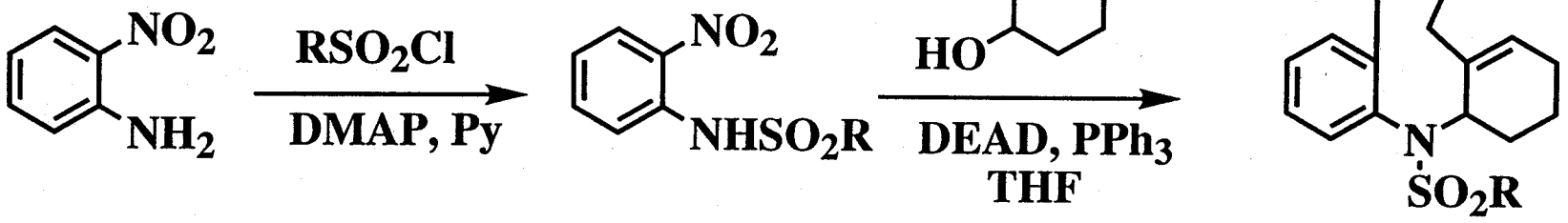


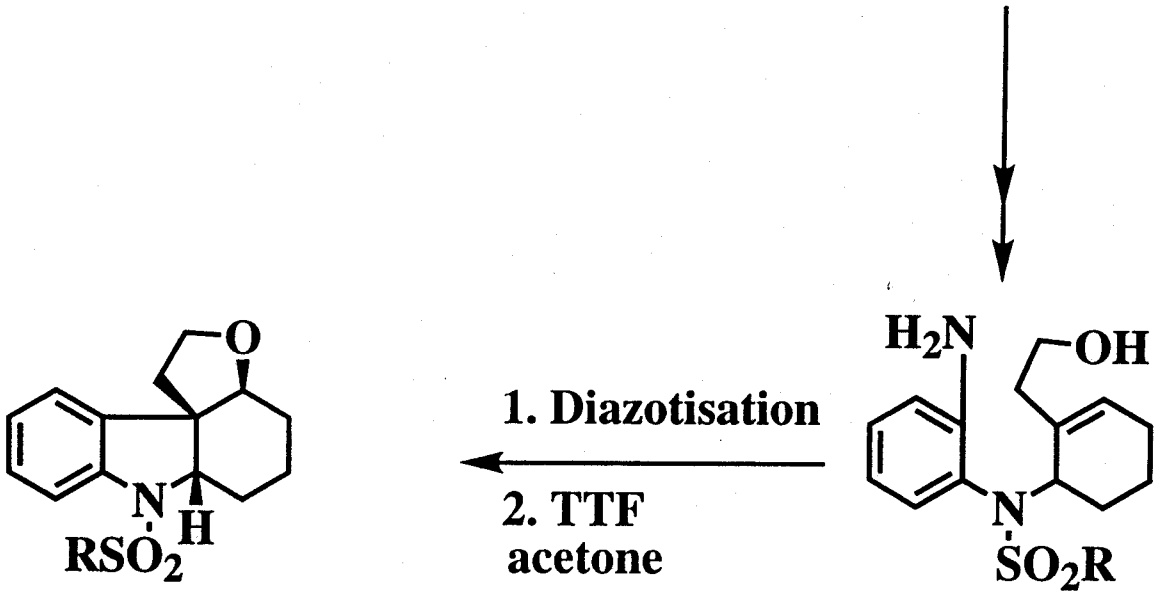


Only one isomer formed

Steve Roome



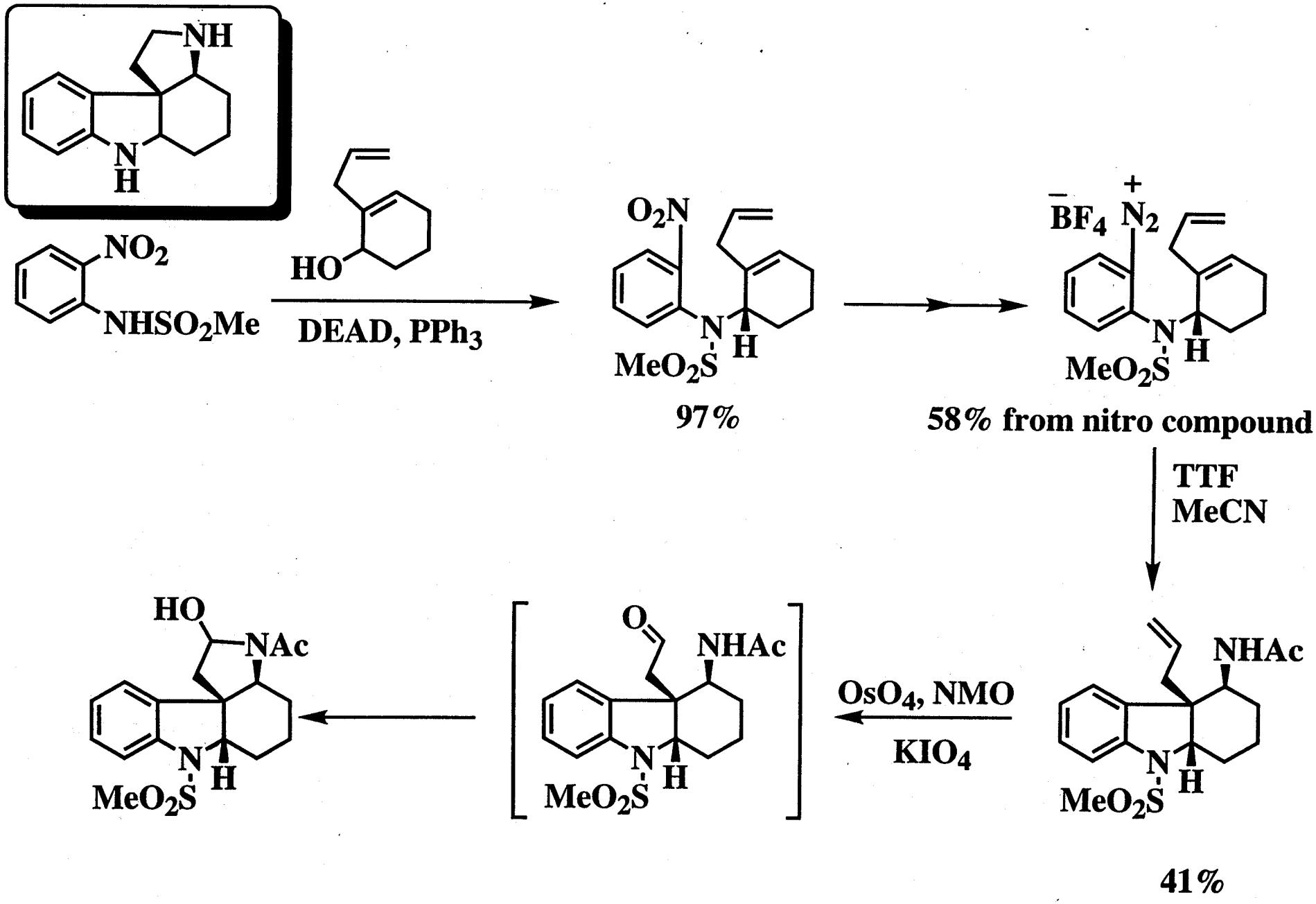




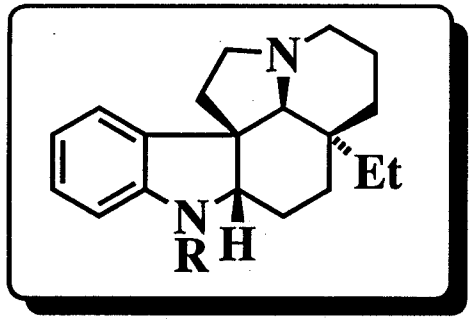
X-Ray confirmation!

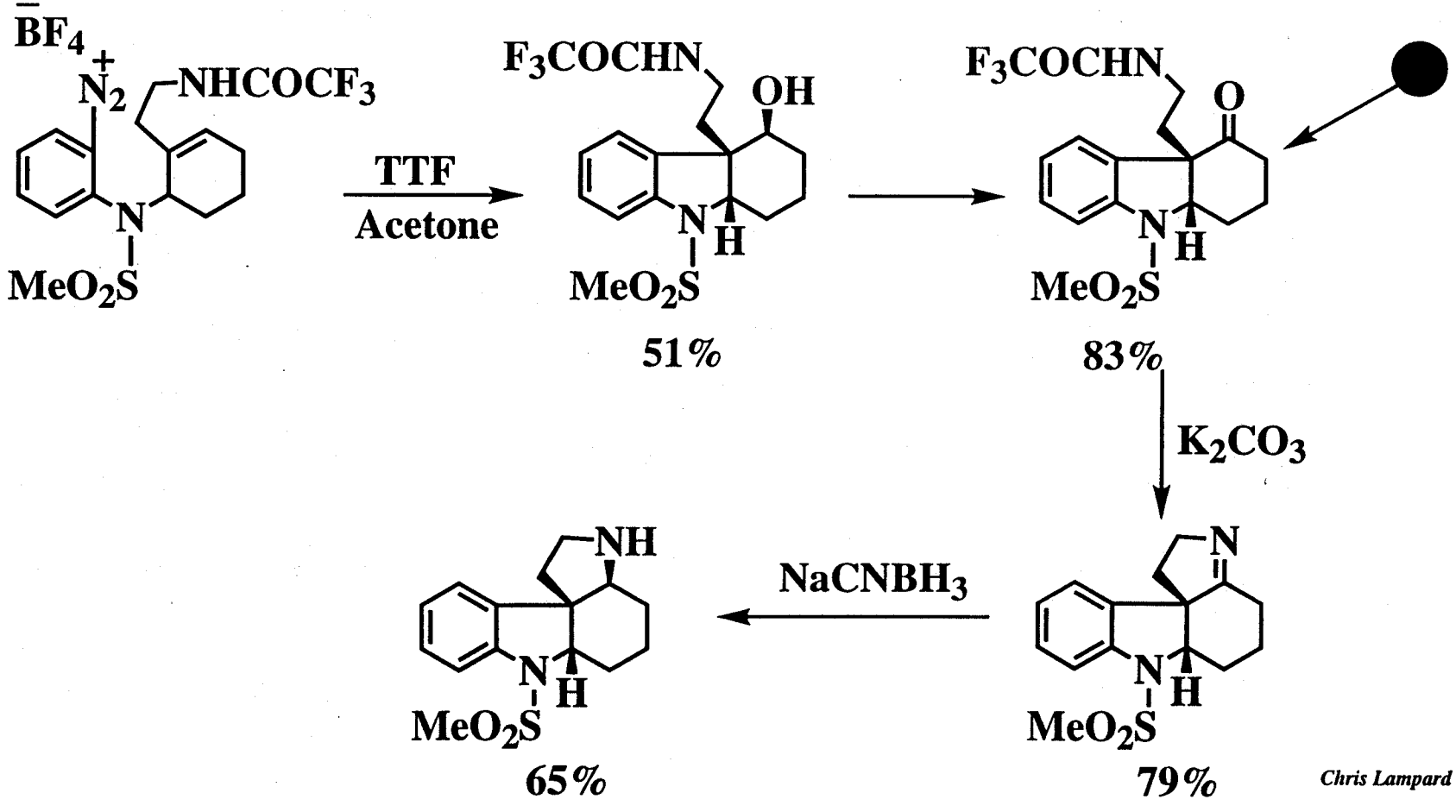
R = Ph, 68%
R = Me, 75%

Chris Lampard

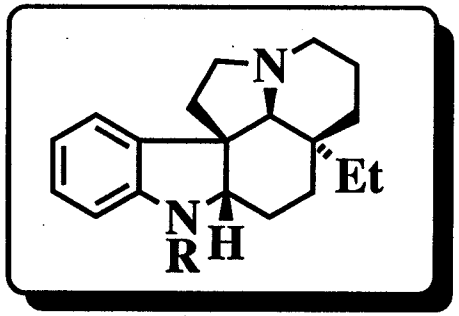

NH
N
H
NO2
NHSO2Me
HO
DEAD, PPh3
O2N
N
H
MeO2S
97%
BF4
+
N2
N
H
MeO2S
58% from nitro compound
TTF
MeCN
NHAc
N
H
MeO2S
41%
OsO4, NMO
KIO4
O
NHAc
N
H
MeO2S
HO
NAc
N
H
MeO2S

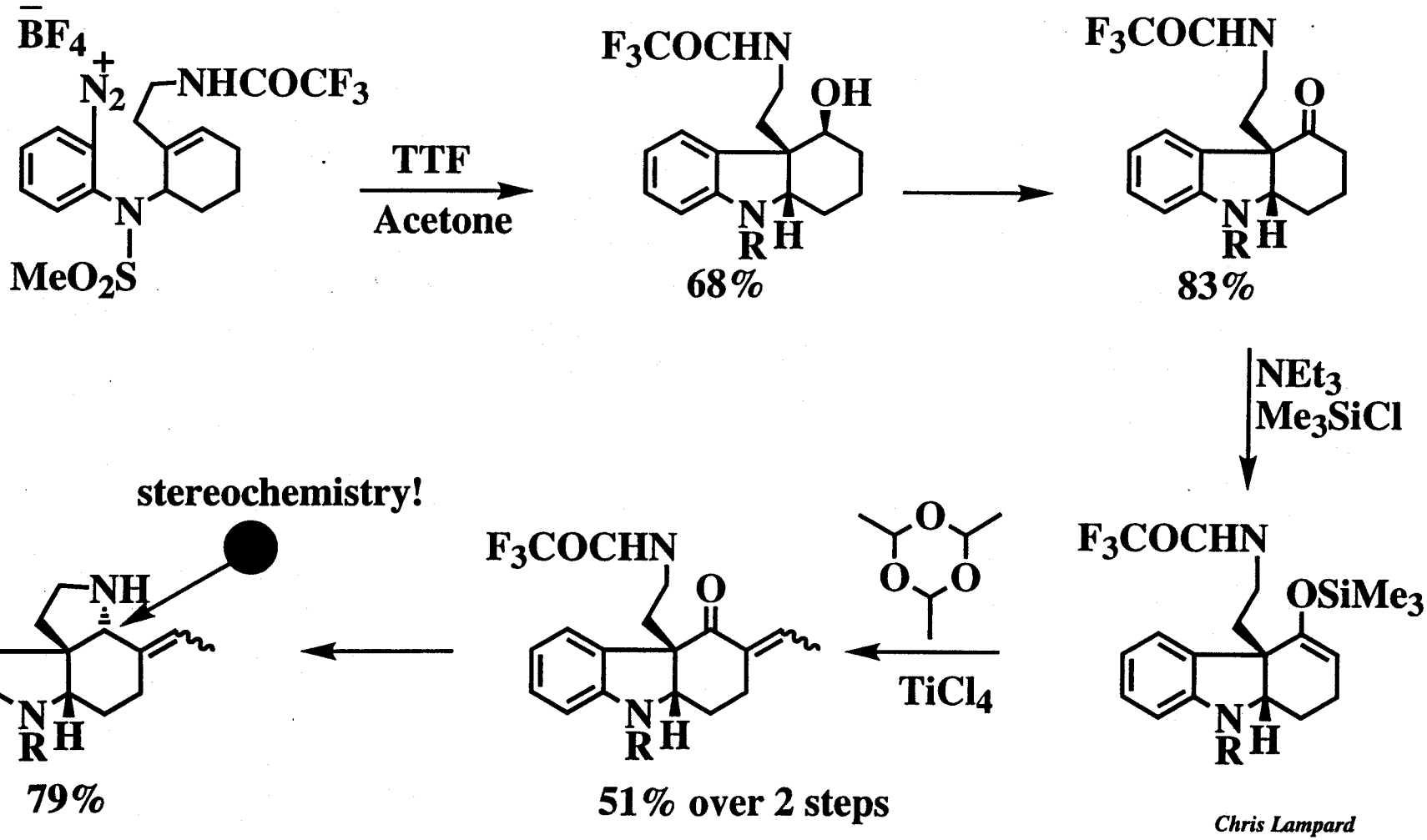
Murat Kizil



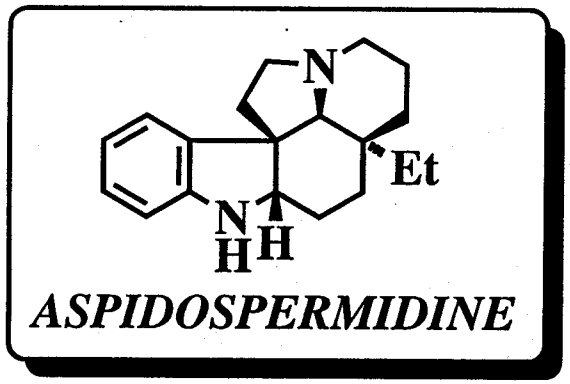


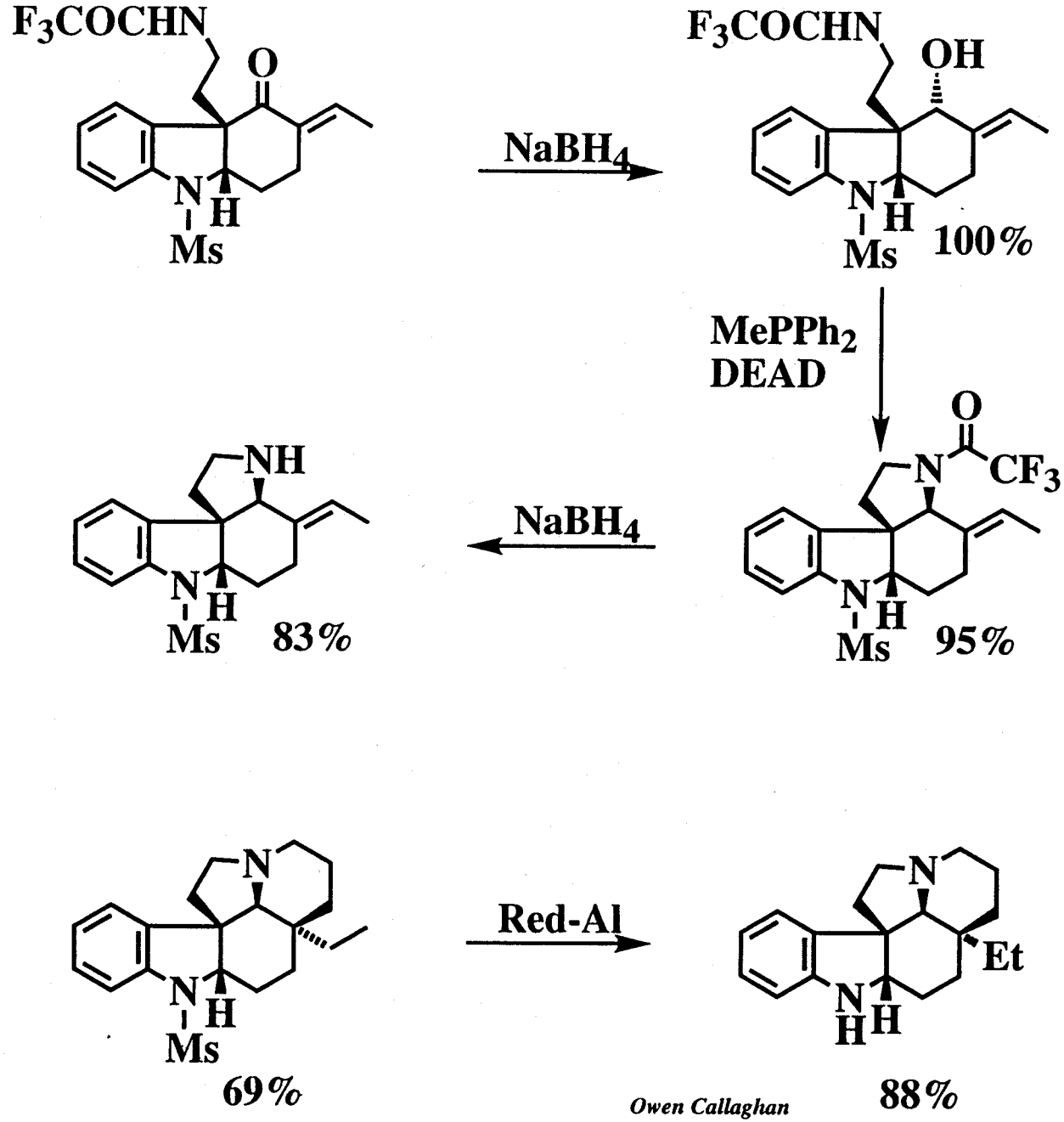
Chris Lampard





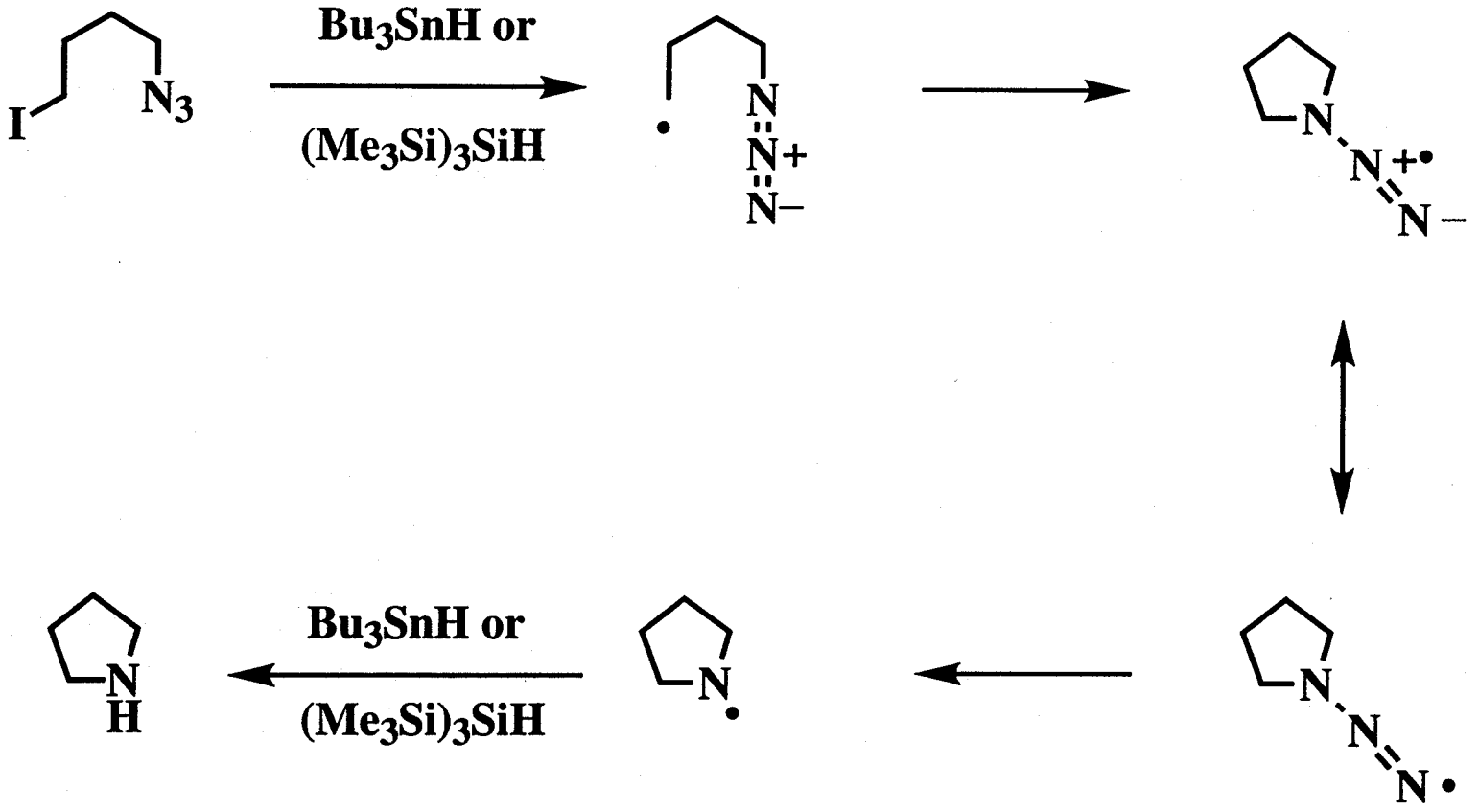
Chris Lampard





Owen Callaghan

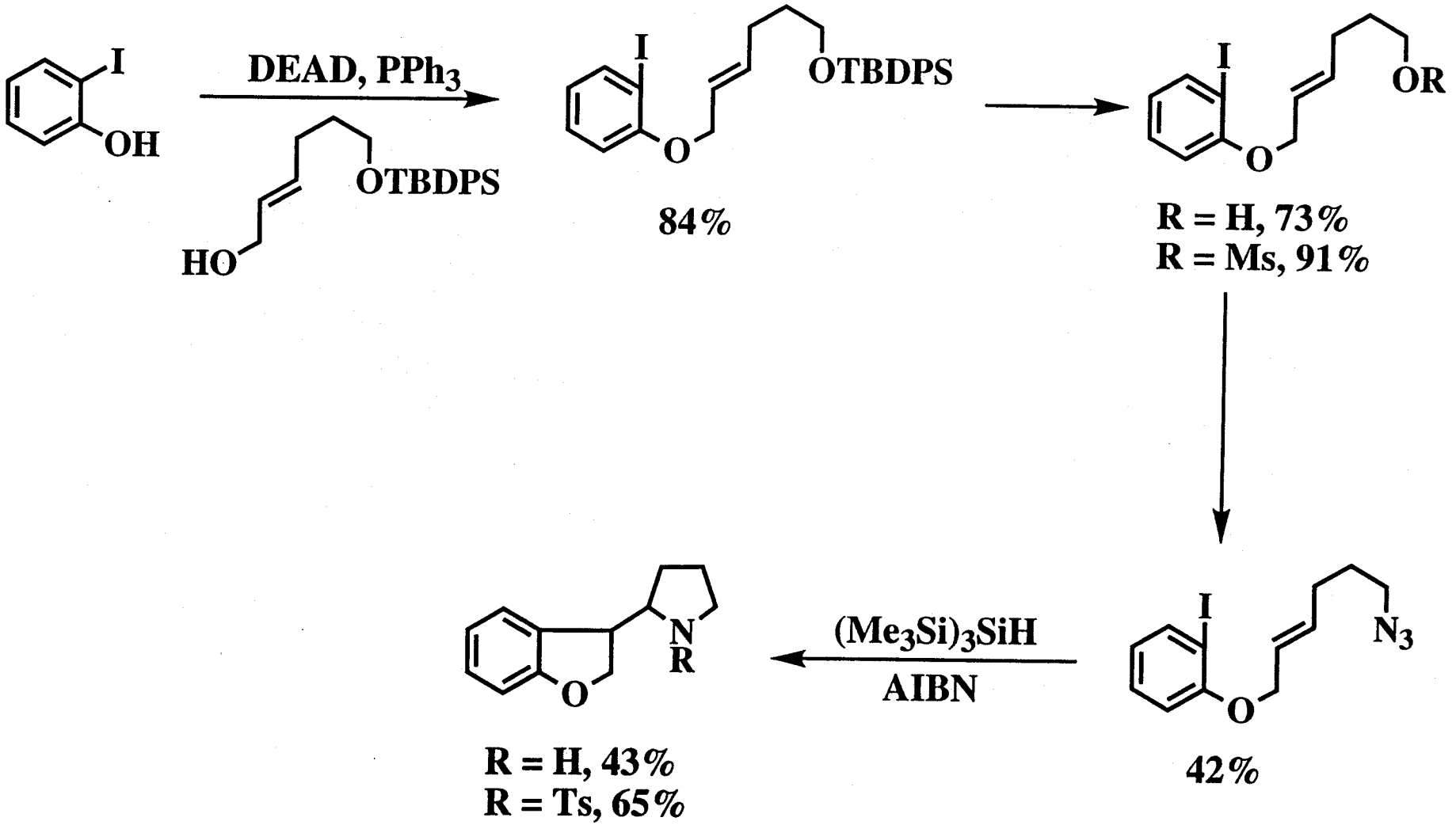
Kim's Reaction with Iodoazides

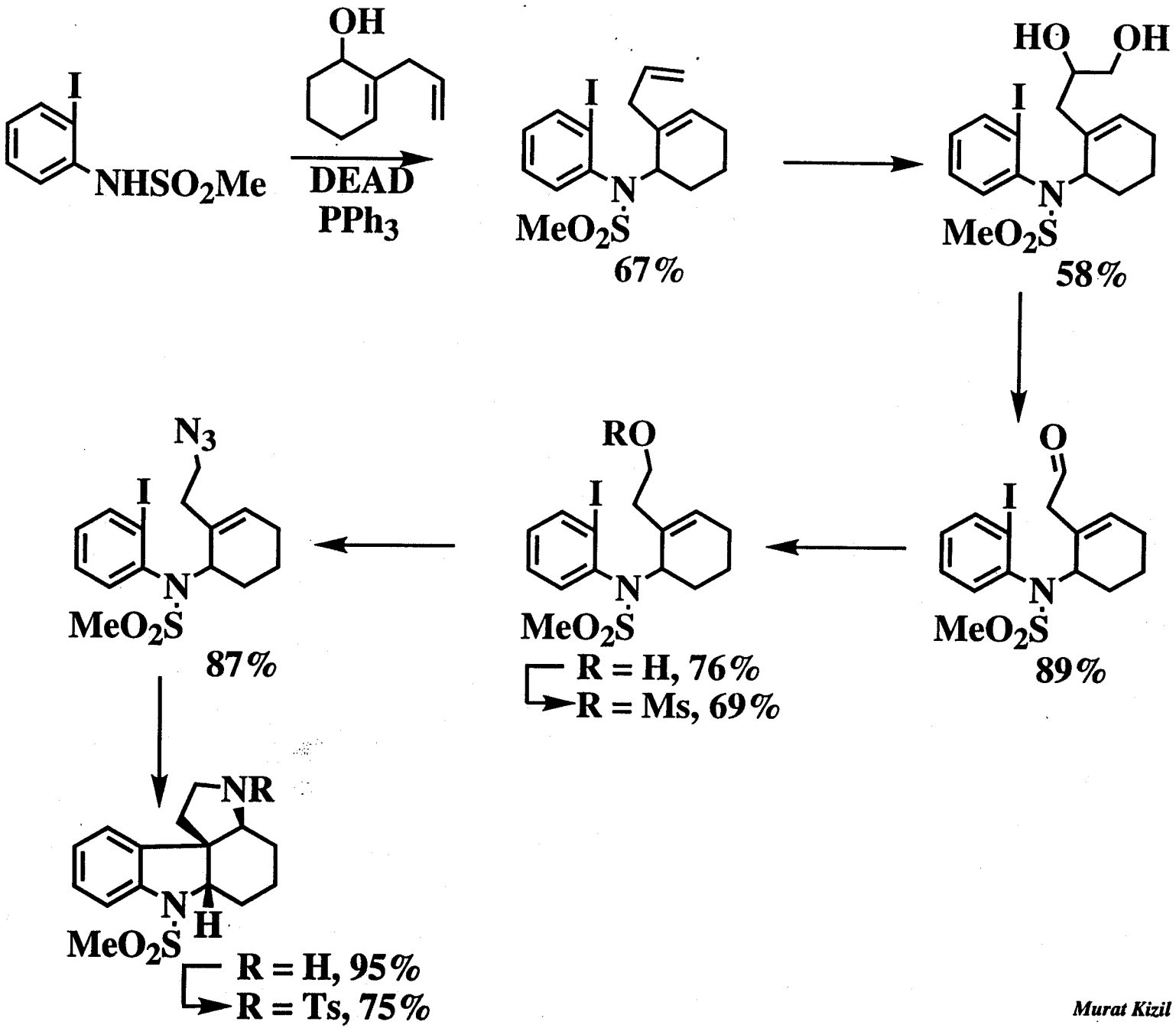


(Reductive Termination)

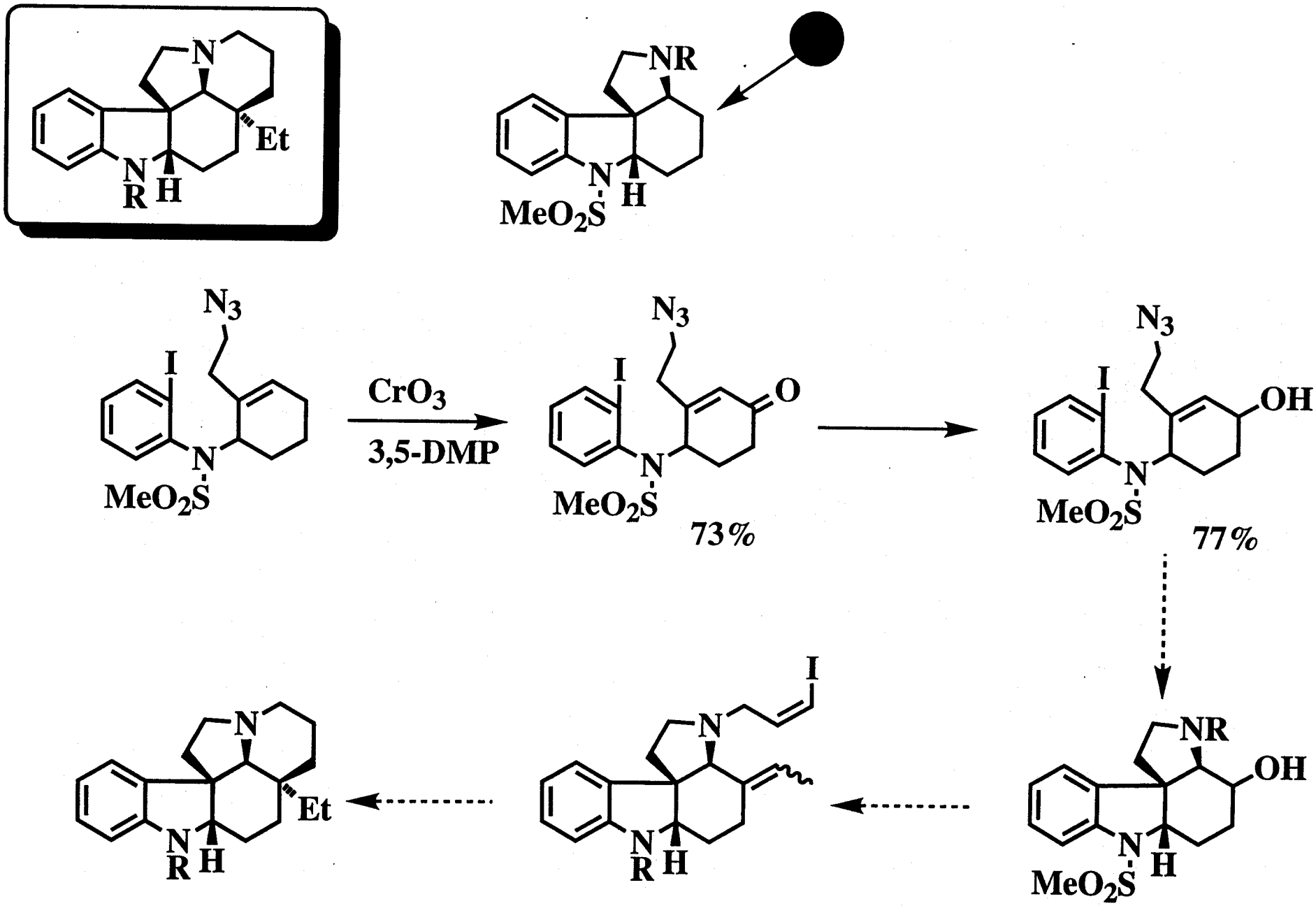
S. Kim, G. H. Joe and J. Y. Do, *J. Am. Chem. Soc.*, 1994, *116*, 5521

Model o-Iodoaryl Azide Tandem Reaction



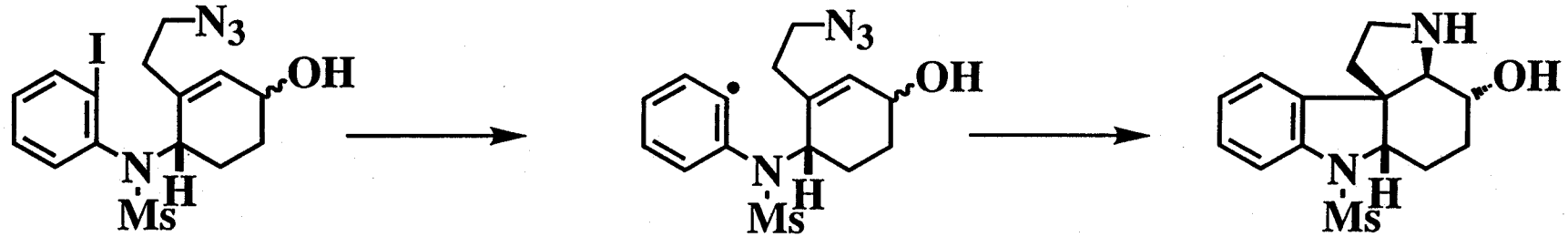

OH
I
NHSO2Me
DEAD
PPh3
MeO2S
67%
HO
OH
58%
O
89%
RO
R = H, 76%
R = Ms, 69%
N3
87%
NR
NH
R = H, 95%
R = Ts, 75%

Murat Kizil

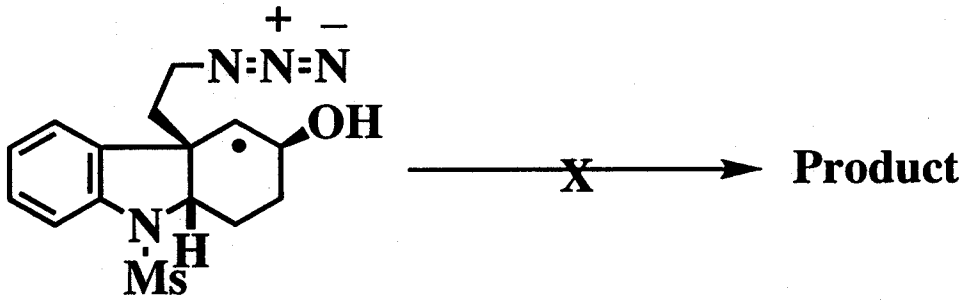


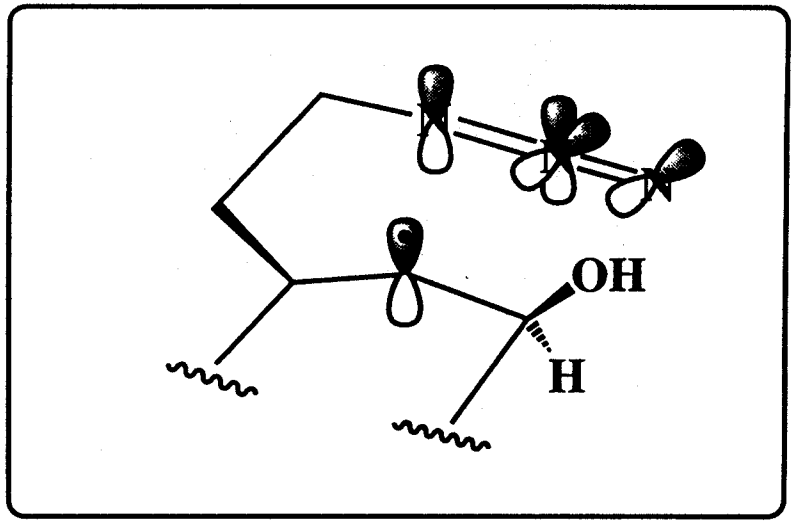
Chris Lampard, Murat Kizil

Stereoselectivity of Azide Tandem Cyclisation



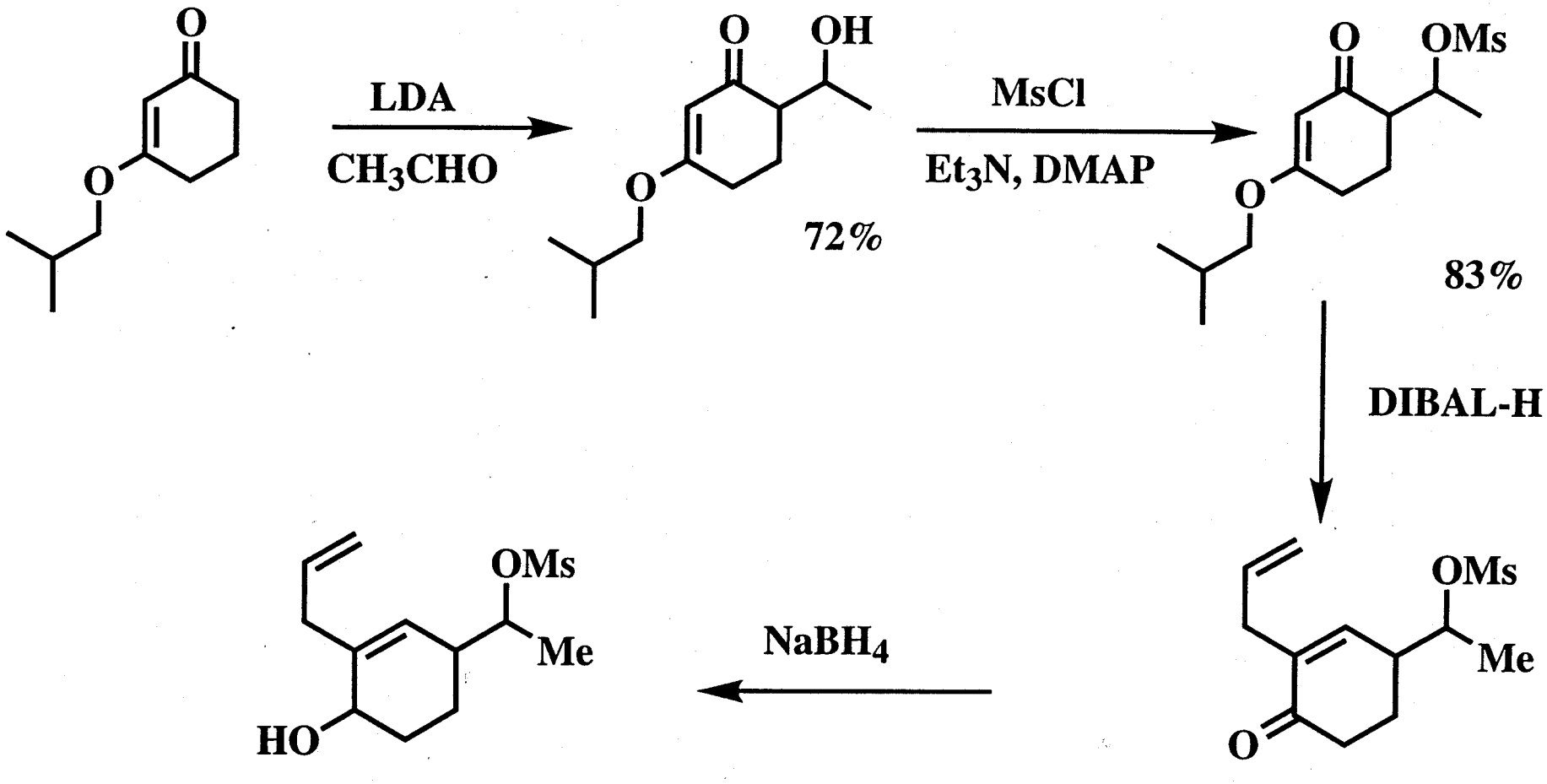
41%, one isomer





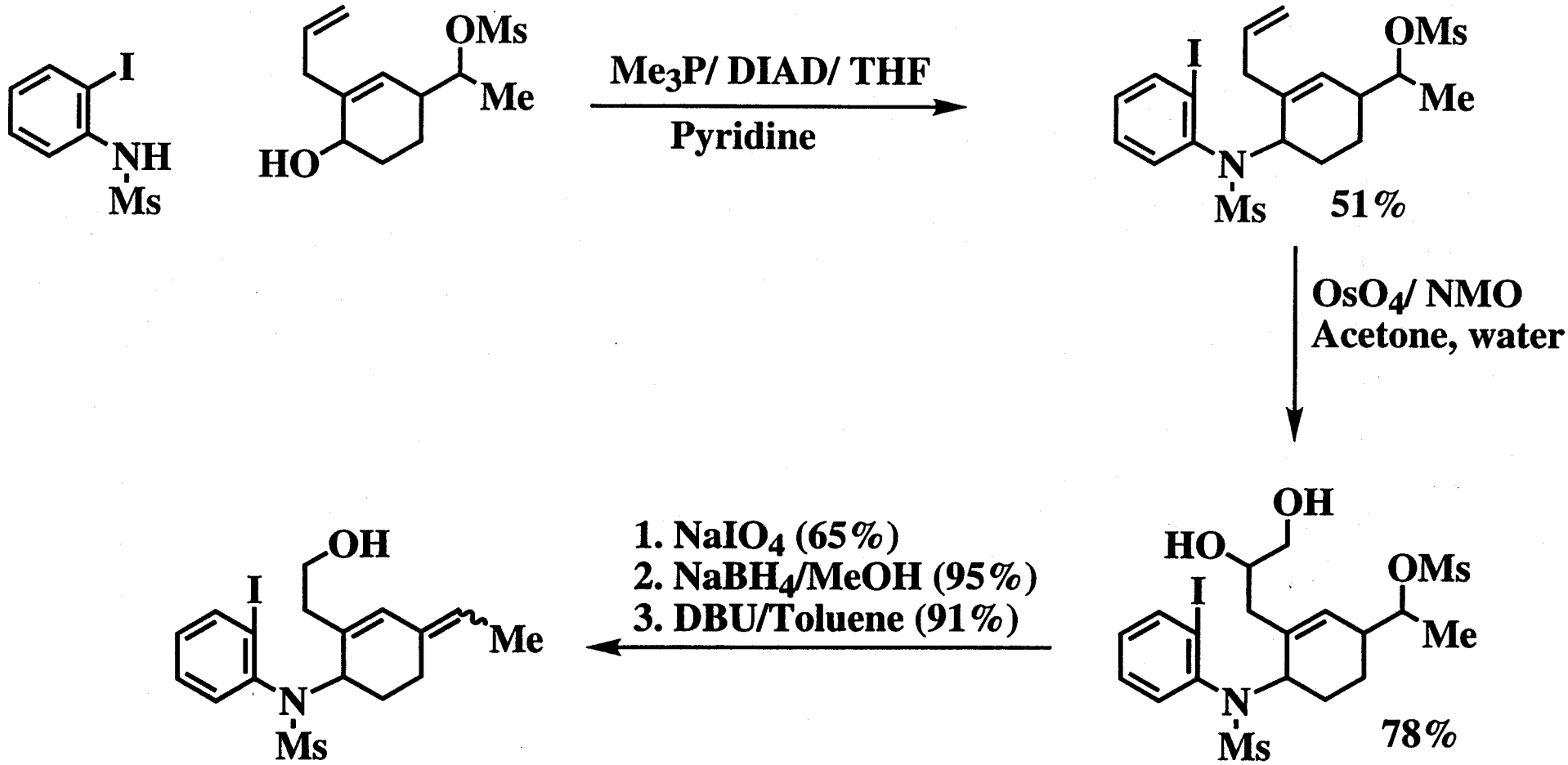
Chris Lampard

Synthesis Using Azide Tandem Cyclisation



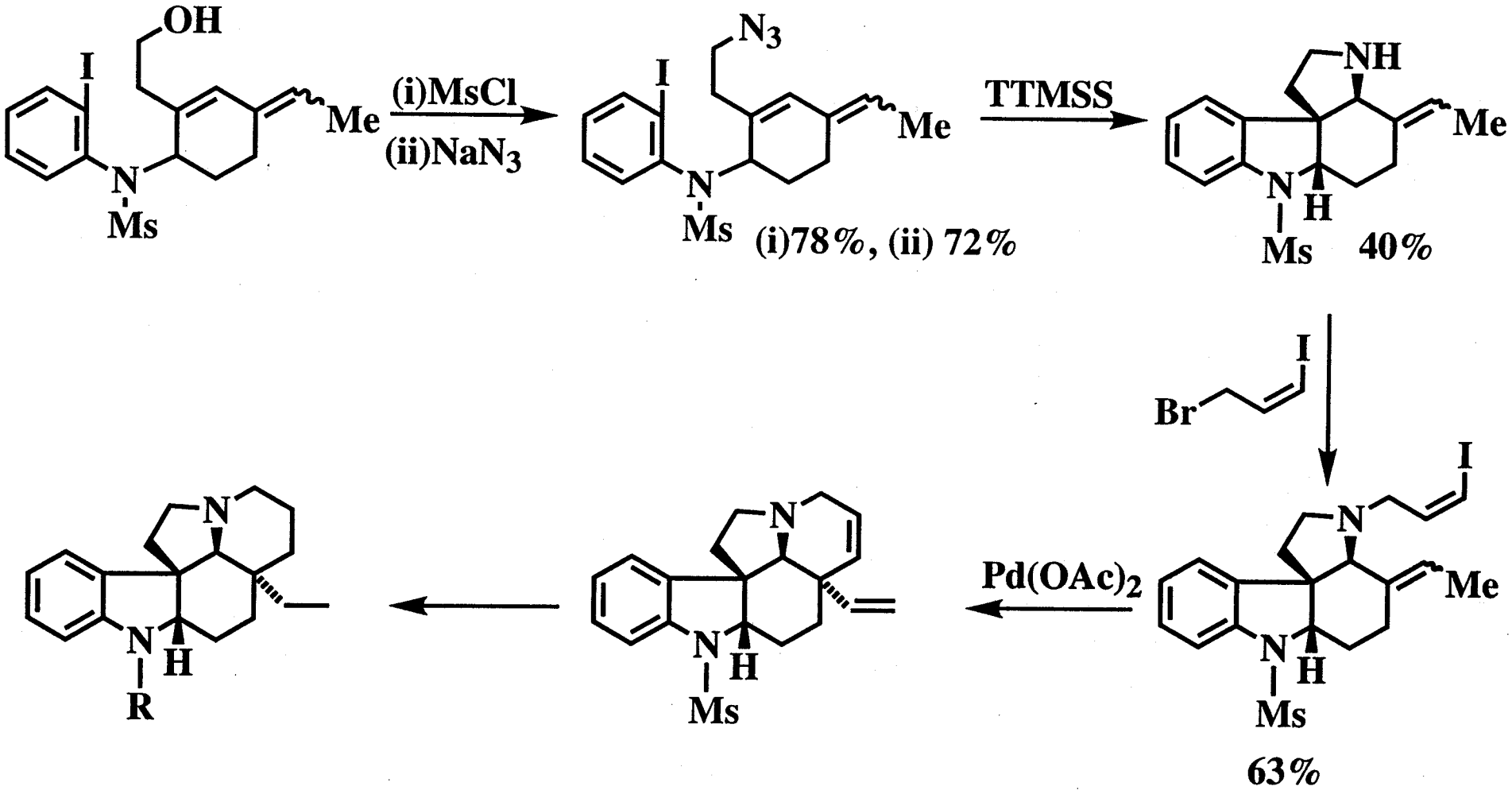
Balaram Patro

Synthesis Using Azide Tandem Cyclisation



Balaram Patro

Completion of the Azide Route to Aspidospermidine



Balaram Patro