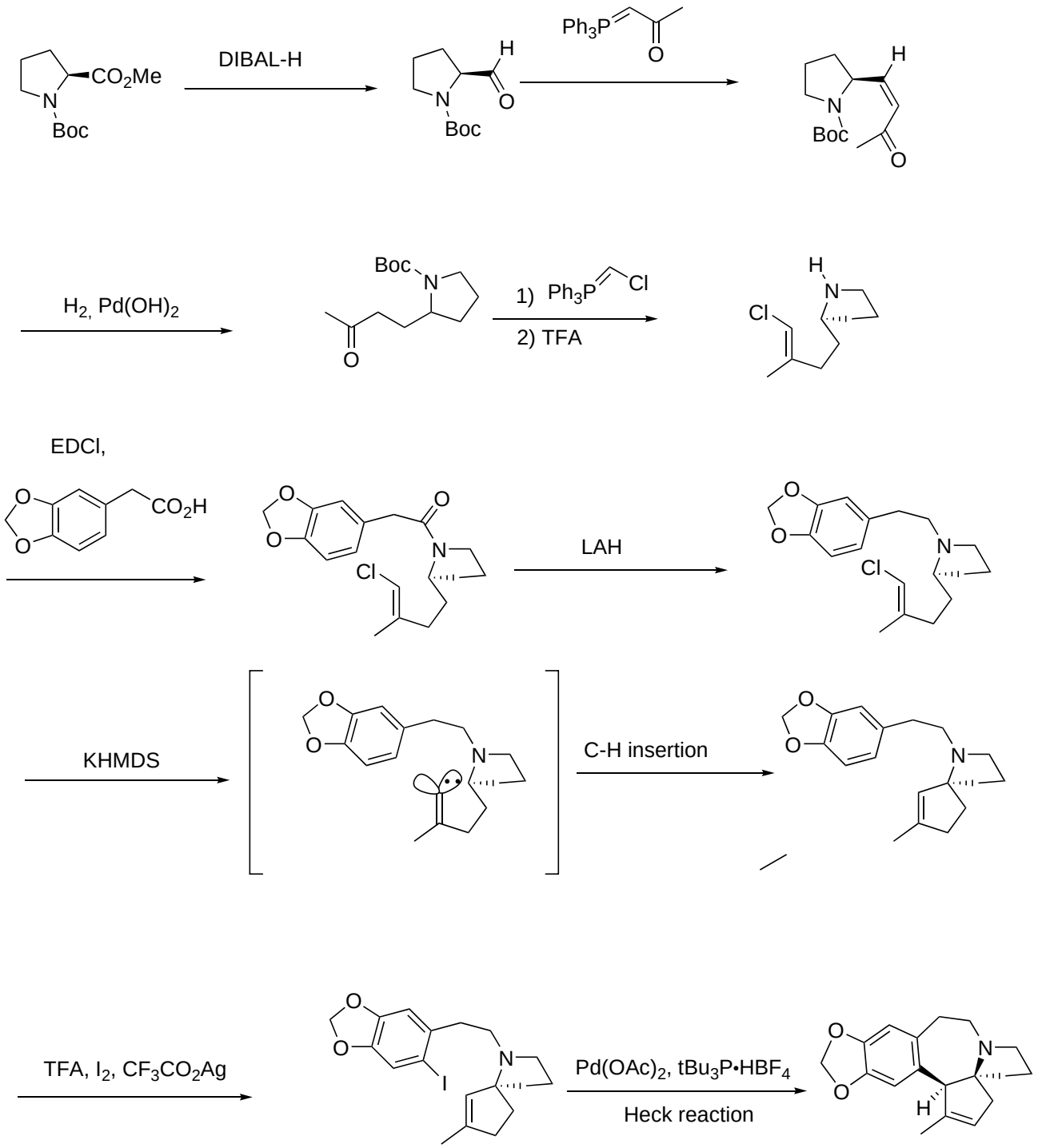
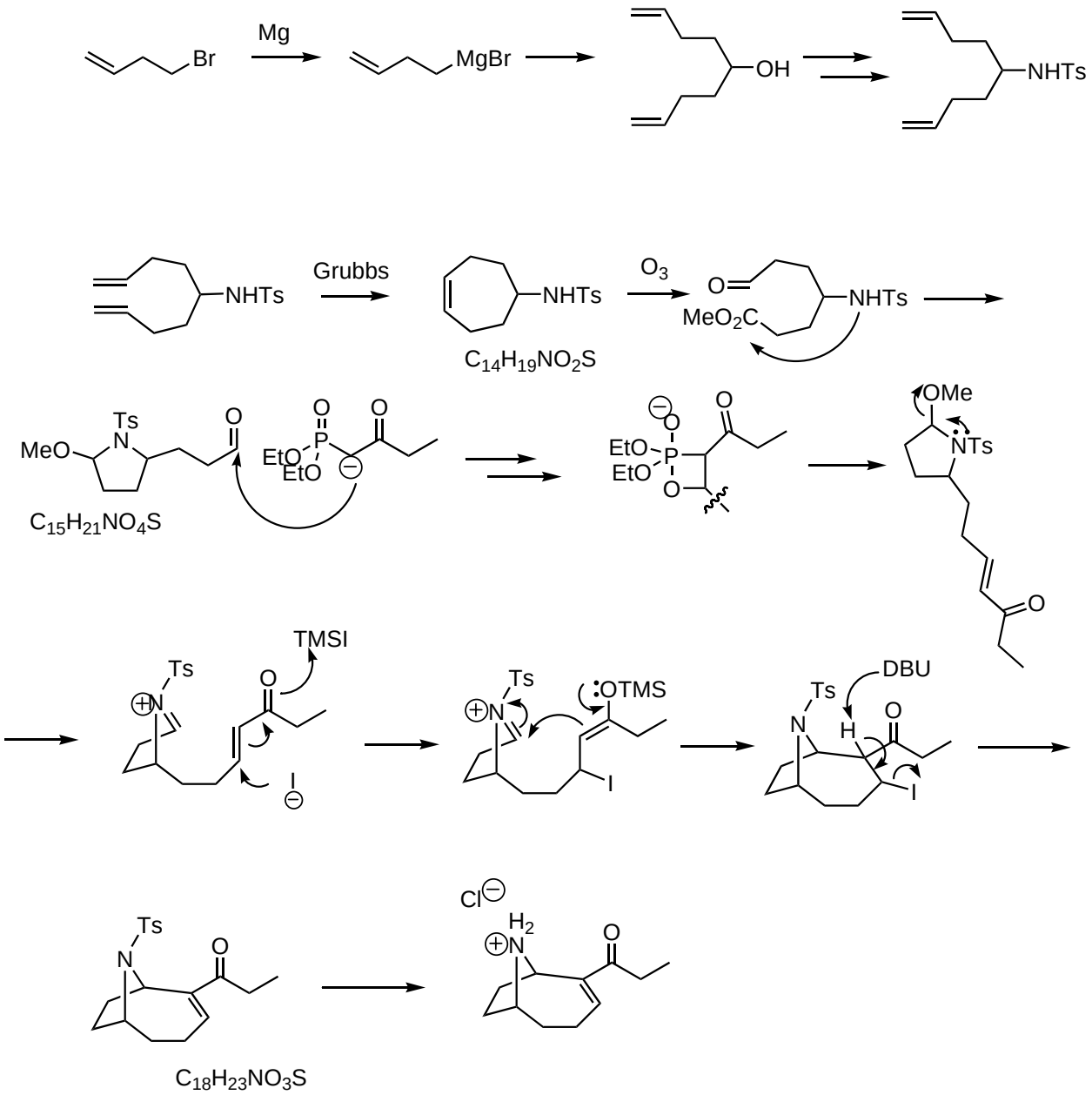

CO2Me
N
Boc
DIBAL-H
H
O
Ph3P
O
H
N
Boc
O
H2, Pd(OH)2
Boc
N
O
1) Ph3P
Cl
2) TFA
H
N
Cl
EDCl,
O
O
CO2H
O
O
O
N
Cl
LAH
O
O
N
Cl
KHMDS
O
O
N
C-H insertion
O
O
N
TFA, I2, CF3CO2Ag
O
O
N
I
Pd(OAc)2, tBu3P•HBF4
Heck reaction
O
O
N
H


Mg
Br
MgBr
OH
NHTs
Grubbs
NHTs
NHTs
O_3
O
MeO_2C
NHTs
$C_{14}H_{19}NO_2S$
Ts
N
MeO
O
$C_{15}H_{21}NO_4S$
O
P
EtO
EtO
O
O
EtO
EtO
P
O
O
OMe
NTs
O
TMSI
Ts
N
O
I
Ts
N
OTMS
I
Ts
DBU
N
H
O
I
Ts
N
O
$Cl^{\ominus}$
H_2
N
O
$C_{18}H_{23}NO_3S$