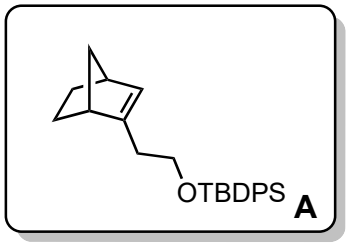
Total Synthesis of (-)-Isoschizoagamine

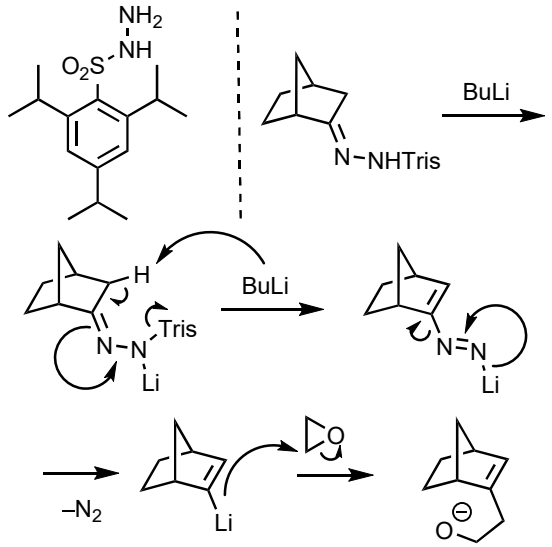
Y. Miura, N. Hayashi, S. Yokoshima, and T. Fukuyama, *J. Am. Chem. Soc.* **2012**, *134,*

1-3

1) TPAP, NMO
2) TrisNHNH$_2$, conc. HCl
3) *s*-BuLi (2.05 eq.)
then ethylene oxide (2.3 eq.)
then TBDPSCl (1.3 eq.)

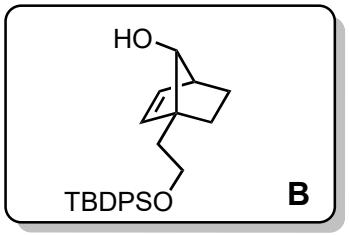


name and mechanism reaction 3?
Shapiro

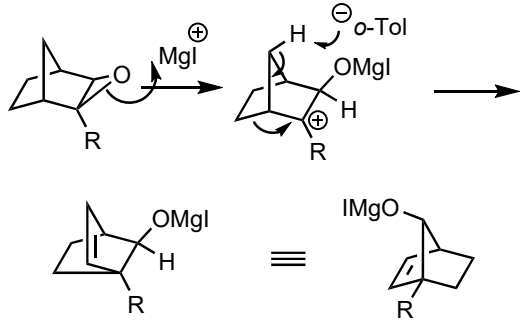


4,5

4) *m*CPBA
5) *o*-TolMgI (1.25 eq.)
Et_2O, reflux

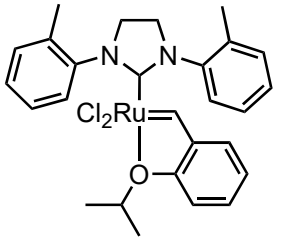


name and mechanism of reaction 5?
Wagner-Meerwein-Rearragement

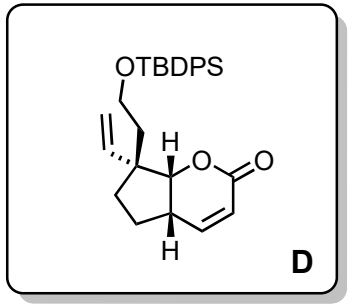


6,7

6) acryloyl chloride, DIPEA
7) **C** (5 mol-%), 1,6-heptadiene (cat.)



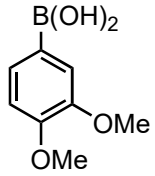
C



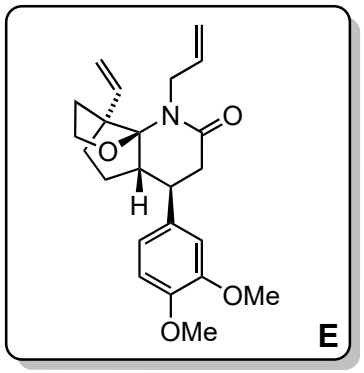
D

8-12

8) **F**, $[RhCl(cod)]_2$ (4 mol-%)
NEt_3, dioxane/H_2O
9) allylamine (20 eq.), 2-hydroxypyridine (5 eq.)
10) DMP
11) conc HCl, MeOH, 0 °C
12) PPTS (0.3 eq.), toluene, reflux



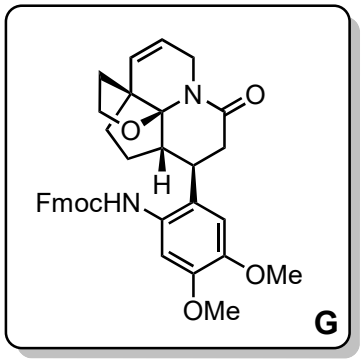
F



E

13-16

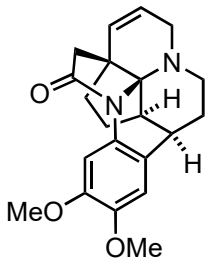
13) Hoveyda-Grubbs II (3 mol-%)
14) $Cu(NO_3)_2$, Ac_2O/CH_2Cl_2 (3:1)
15) $NaBH_4$, $Cu(acac)_2$
16) FmocCl, DIPEA



G

17-24

17) TMSOTf, 2,6-lutidine
18) TBAF, AcOH, THF
19) DMP
20) $(TMSOCH_2)_2$, TMSOTf
21) piperidine
22) $LiAlH_4$, THF, reflux
23) $AcOH/H_2O$ (1:1), reflux
24) PDC



(-)-Isoschizoagamine