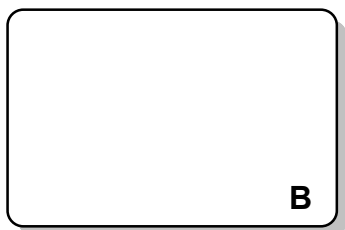
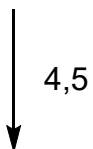
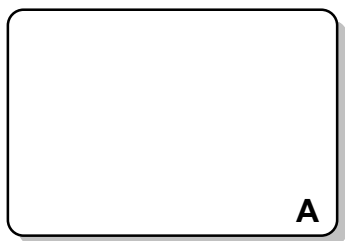
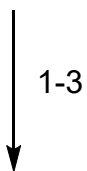
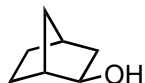


## Total Synthesis of (-)-Isoschizogamine

Y. Miura, N. Hayashi, S. Yokoshima, and T. Fukuyama, *J. Am. Chem. Soc.* **2012**, *134*, 11995-11997



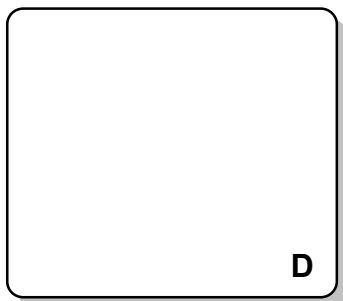
name and mechanism reaction 3?

- 1) TPAP, NMO
- 2) TrisNHNH<sub>2</sub>, conc. HCl
- 3) *s*-BuLi (2.05 eq.)  
then ethylene oxide (2.3 eq.)  
then TBDPSCI (1.3 eq.)

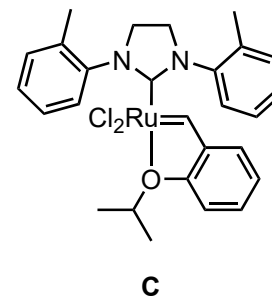
name and mechanism of reaction 5?

- 4) *m*CPBA
- 5) *o*-TolMgI (1.25 eq.)  
Et<sub>2</sub>O, reflux

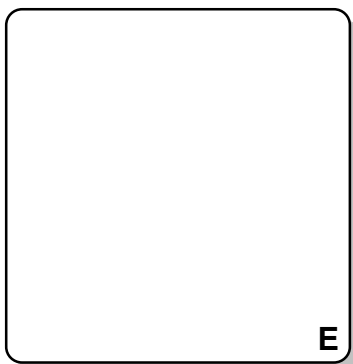
6,7



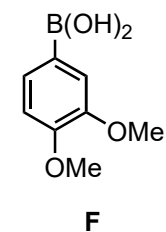
- 6) acryloyl chloride, DIPEA  
7) **C** (5 mol-%), 1,6-heptadiene (cat.)



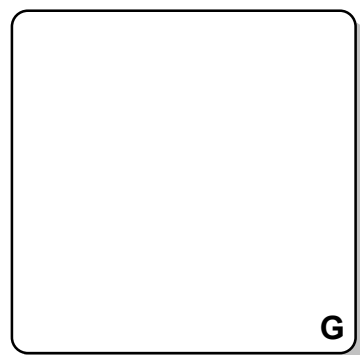
8-12



- 8) **F**,  $[\text{RhCl}(\text{cod})]_2$  (4 mol-%)  
 $\text{NEt}_3$ , dioxane/ $\text{H}_2\text{O}$   
9) allylamine (20 eq.), 2-hydroxypyridine (5 eq.)  
10) DMP  
11) conc HCl, MeOH, 0 °C  
12) PPTS (0.3 eq.), toluene, reflux



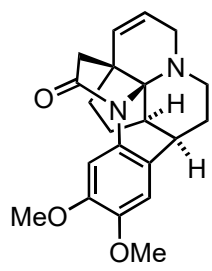
↓  
13-16



- 13) Hoveyda-Grubbs II (3 mol-%)
- 14)  $\text{Cu}(\text{NO}_3)_2$ ,  $\text{Ac}_2\text{O}/\text{CH}_2\text{Cl}_2$  (3:1)
- 15)  $\text{NaBH}_4$ ,  $\text{Cu}(\text{acac})_2$
- 16) FmocCl, DIPEA

↓  
17-24

- 17) TMSOTf, 2,6-lutidine
- 18) TBAF, AcOH, THF
- 19) DMP
- 20)  $(\text{TMSOCH}_2)_2$ , TMSOTf
- 21) piperidine
- 22)  $\text{LiAlH}_4$ , THF, reflux
- 23)  $\text{AcOH}/\text{H}_2\text{O}$  (1:1), reflux
- 24) PDC



**(-)-Isoschizogamine**