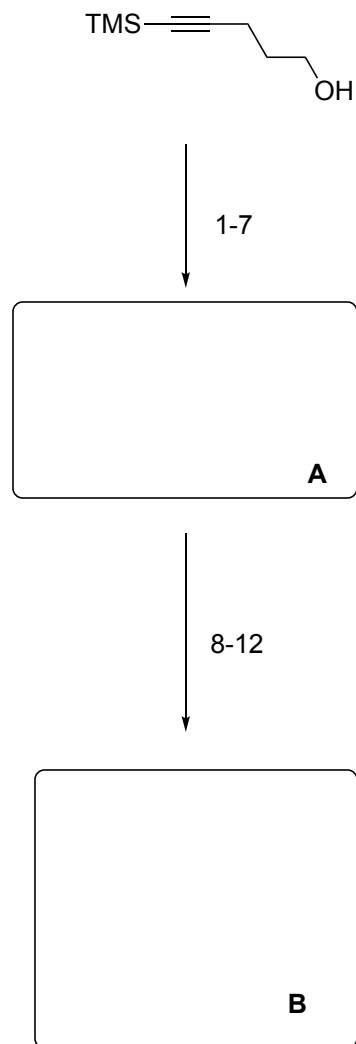


Total Synthesis of Echinopines A and B

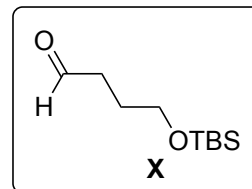
Philippe A. Peixoto, Jean-Alexandre Richard, Rene Severin and

David Y.-K. Chen

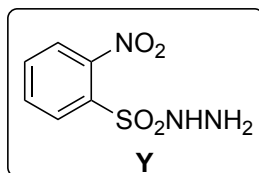
Org. Lett. **2011**, *13*, 5724–5727.



- 1) (COCl)₂, DMSO, NEt₃
- 2) Ph₃PCH₃I, *n*-BuLi, then TMSCH₂I, then *n*-BuLi, then product of step 1
- 3) **X**, TiCl₄
- 4) TBSOTf, NEt₃
- 5) *p*-TsOH
- 6) K₂CO₃, MeOH
- 7) (COCl)₂, DMSO, NEt₃



- 8) nitromethane, TMG
- 9) Ac₂O, pyridine
- 10) Pd(OAc)₂, PPh₃
- 11) **Y**, NEt₃
- 12) KO^t-Bu, oxone, Na₂HPO₄

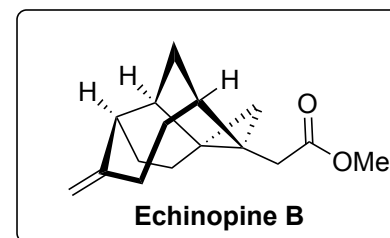


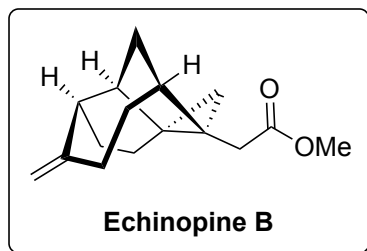
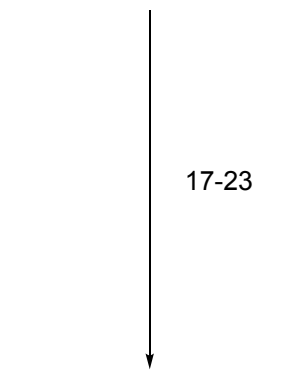
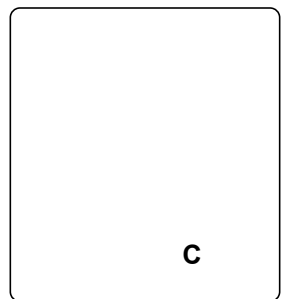
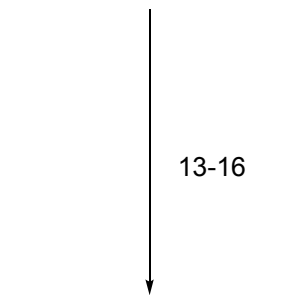
Name of step 3?

Name of step 8?

Mechanism for step 10?

Name and Mechanism for step 12?





- 13) LDA, PhSeBr
- 14) H₂O₂
- 15) NaOH, H₂O₂
- 16) TsNHNH₂, TFA, HCl

- 17) DMP
- 18) Ph₃PCH₃I, *n*-BuLi
- 19) Tebbe reagent
- 20) *n*-BuLi, (CH₂O)_n
- 21) CpRu(PPh₃)Cl, In(OTf)₃, CSA
- 22) NaClO₂
- 23) TMSCHN₂

Name of step 16?

Structure of the Tebbe reagent?

Mechanism for step 21?