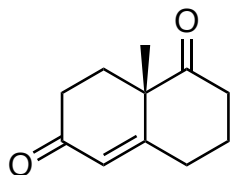


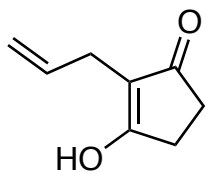
Total Synthesis of (-)-Batrachotoxin Enabled by a Pd/Ag-Promoted Suzuki–Miyaura Coupling Reaction

Y. Watanabe, H. Morozumi, H. Mutoh, K. Hagiwara, M. Inoue

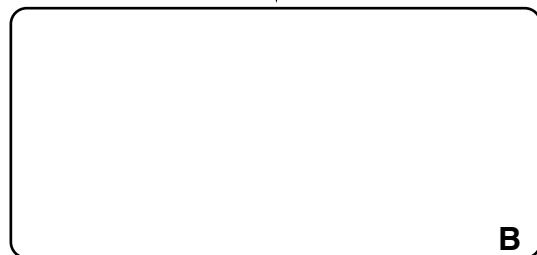
Angew. Chem. Int. Ed. **2023**, *62*, e202309688.



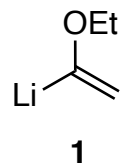
1-9



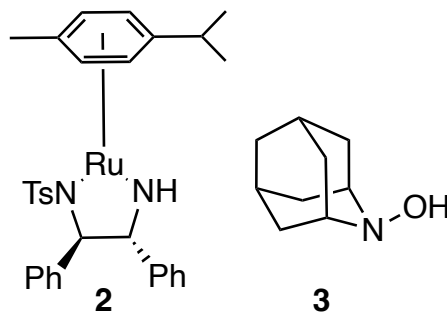
10-17



1. Pd/C, H₂
2. (HOCH₂)₂, (+)-CSA
3. KH, PhS(O)OMe
4. Na₂CO₃, toluene, 110 °C
5. Br₂, then pyridine
6. **1**, THF, -78 °C
7. (+)-CSA, CH(OMe)₃, MeOH
8. *t*-BuLi, then I₂
9. RuCl₃, NaIO₄



10. (HCHO)_n, TsOH, AcOH
11. **2**, *i*-PrOH
12. TBSCl, imidazole
13. O₃, CH₂Cl₂ then PPh₃
14. K₂CO₃, MeOH
15. **3**, NaClO, NaHCO₃
16. KN(TMS)₂, then Comins' Reagent
17. Pd(PPh₃)₄, B₂(pin)₂, KF



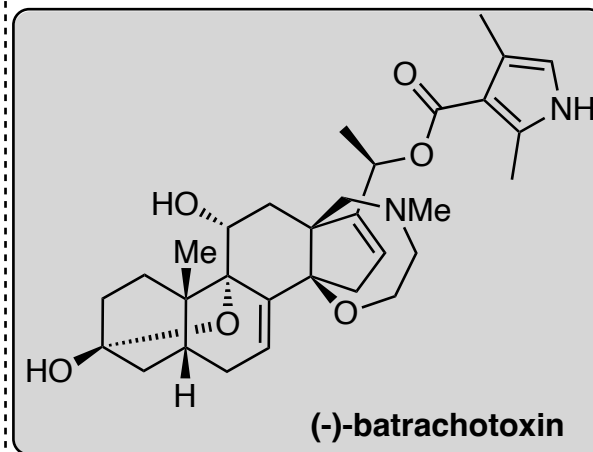
Name the starting material

2. Hint: only 1 dioxolane ring is formed

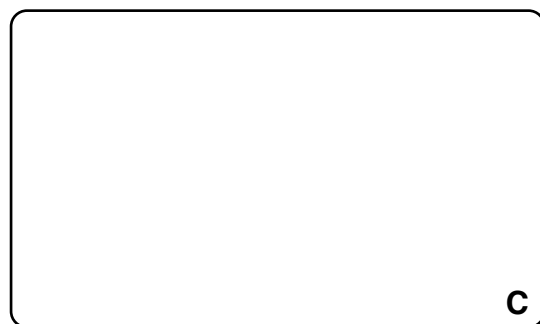
7. Hint: loss of (3H, triplet) and (2H, quartet), product shows 3 (3H, s) signals
δ 3.31, 3.24, 1.95

11. Hint: desymmetrization, single reduction, trans product

15. Name of **3**?



18-24



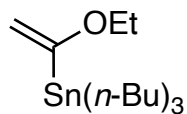
25-29

(-)-batrachotoxinin A

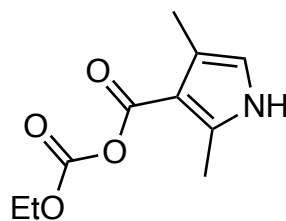
30



18. **A**, Pd(PPh₃)₄, Ag₂O, THF
19. t-BuOK, THF, *then* n-Bu₄NF
20. LiOH, THF/H₂O, *then* HCl, 0 °C, *then* o-dichlorobenzene, 135 °C
21. NaBH(OAc)₃, piperidine, DMF
22. TESCl, *i*-Pr₂NEt *then* MOMBr, *then* (+)-CSA, MeOH
23. VO(Oi-Pr)₃, MS 4A, PhC(CH₃)₂OOH
24. **3**, PhI(OAc)₂, CH₂Cl₂
25. MeNH₂, *then* NaBH(OCOCF₃)₃, *then* 2,6-lutidine, chloroacetyl chloride, *then* NaOEt
26. Pd/C, H₂
27. KN(TMS)₂, *then* PhNTf₂
28. Pd(PPh₃)₄, **4**, LiCl, CuCl, *then* aq. oxalic acid
29. AlH₃, THF, *then* aq. HCl
30. **5**, Et₃N, benzene



4



5

18. Name the reaction

20. Name the reaction

Hint: the hydroxyl handle formed in step 20 temporarily forms a hydroborate in 21 and a vanadium-oxidant complex in 23

25. Hint: lactamization

28. Name the reaction