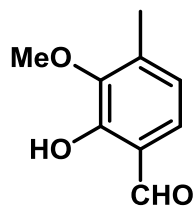
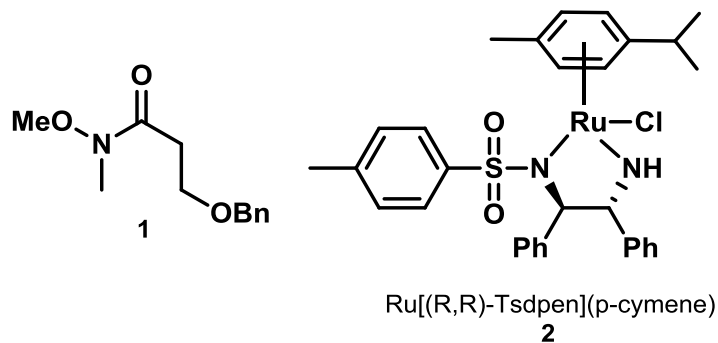


Total synthesis of (-)-Scabronines G and A, and (-)-Episcabroline A

Yu Kobayakawa and Masahisa Nakada *Angew. Chem. Int. Ed.* **2013**, *52*, 7569 – 7573.



- 1) TIPSCl, imidazole, DMF, 40 °C (83%)
- 2) propargyl bromide, Zn, TiCl₄ (5 mol%), THF, 0 °C
- 3) Et₃SiH, BF₃•OEt₂, DCM, 0 °C (84%, 2 steps)
- 4) *n*BuLi, **1**, THF, -78 °C to RT (89%)



- 11) (COCl)₂, DMSO, Et₃N, DCM, -78 °C to 0 °C (98%)
- 12) Ph₃PCH₃Br, *t*BuOK, THF, 0 °C (99%)

E

- 13) NaBH₄, MeOH, 0 °C; then 3M HCl (aq.) (95%)
- 14) **3**, Zn, THF, RT (91%)

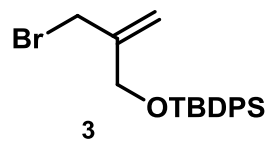
- 15) PIDA, DCM, RT (90%)
- 16) Grubbs II (2.5 mol%), DCM, reflux (98%)

A

- 5) **2** (6 mol%), *i*PrOH, RT (92%, 95% ee)

B

- 6) (EtO)₂P(O)Cl, DMAP, Et₃N, DCM, RT (97%)



- 7) *i*PrMgCl, CuCN•2 LiCl, THF, -78 °C (100%)
- 8) TBAF, THF, 0 °C (97%)

D

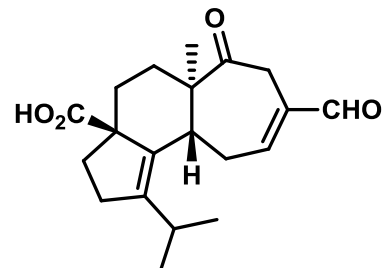
tricycle

- 9) PIDA, MeOH, RT, 7 days (97%)
- 10) H₂, Pd/C (5 mol%), EtOAc, RT (92%)

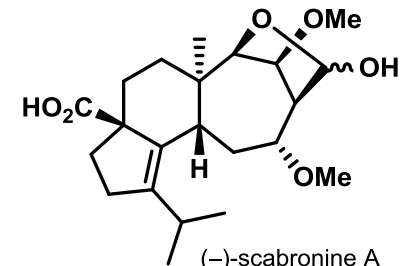
C

F

17) TBAF, AcOH, THF, RT (90%)
 18) NaClO₂, NaH₂PO₄, 2-methyl-2-butene,
 THF, *t*BuOH, H₂O, RT (97%)
 19) DMP, DCM, 0 °C (89%)



(-)-scabronine G



(-)-scabronine A

20) NaClO₂, NaH₂PO₄, 2-methyl-
 -2-butene, THF, *t*BuOH, H₂O, RT
 21) MeI, K₂CO₃, DMF, RT (74%, 2 steps)
 22) OsO₄ (2.5 mol%), NMO, THF, *t*BuOH, H₂O, RT
 23) triphosgene, pyridine, DMAP, DCM, 0 °C to RT
 (α - 66%, β - 20%, 2 steps)
 24) DBU, PhH, RT (100%)

29) MeI, NaH, THF, RT (99%)
 30) 2M NaOH (aq.), MeOH, 70 °C;
 then 3M HCl (aq.) (94%)

G

25) (*R*)-CBS, BH₃•SMe₂, THF, 0 °C
 26) TBAF, THF, 0 °C to RT (90%, 2 steps)
 27) TEMPO (20 mol%), PIDA,
 CH₃CN, DCM, KPBT (80%)

H

28) NaOMe, MeOH,
 0 °C to 15 °C;
 then HCl in MeOH,
 0 °C to RT
 (15α - 82%, 15β - 7%)

I

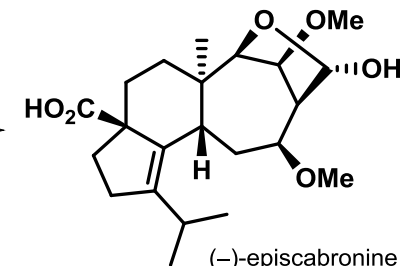
31) BzCl, Et₃N, DMAP, DCM, RT (97%)
 32) (*R*)-CBS, BH₃•SMe₂, THF, 0 °C
 33) TBAF, NH₄Cl, THF, 0 °C to RT (93%, 2 steps)
 34) TEMPO (20 mol%), PIDA, CH₃CN, DCM, KPBT (97%)

J

35) NaOMe, MeOH, RT;
 then HCl in MeOH,
 0 °C to RT (86%)

K

36) 2M NaOH (aq.), MeOH, 70 °C;
 then 3M HCl (aq.) (99%)



(-)-episcabronine A