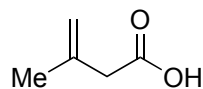


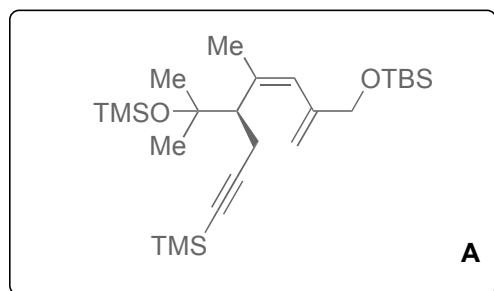
Total Synthesis of (+)-Haperforin G

Wei Zhang, Zhenyu Zhang, Jun-Chen Tang, Jin-Teng Che, Hao-Yu Zhang, Jia-Hua Chen and Zhen Yang

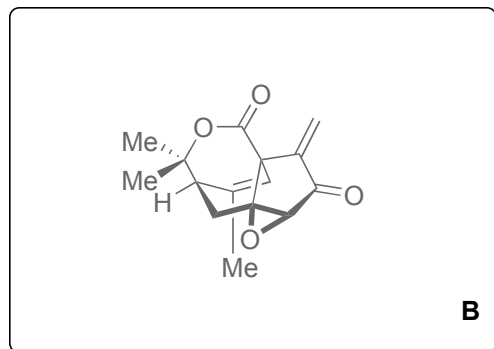
JACS 2020, 142, 19487-19492



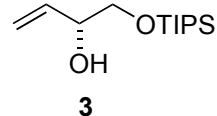
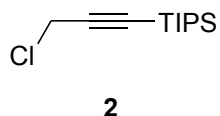
1-9



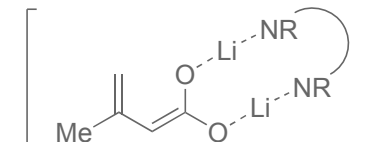
10-16



- 1) *n*-BuLi, **1**, $-78\text{ }^{\circ}\text{C}$ then HMPA, **2**
- 2) DCC, DMAP, **3**
- 3) Grubbs II (7% mol)
- 4) CeCl_3 (10 eq.), CH_3MgBr (10 eq.)
- 5) TBAF
- 6) TBSCl (1.05 eq.), imidazole
- 7) KHMDS, TMSCl
- 8) TPAP, NMO
- 9) $\text{PPH}_3=\text{CH}_2$

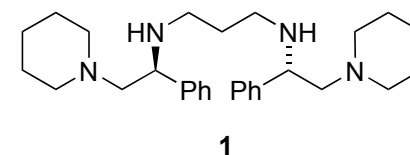


- 10) $\text{Co}_2(\text{CO})_8$ (0.2 eq.), CO, $120\text{ }^{\circ}\text{C}$
- 11) TBAF
- 12) NaOH, H_2O_2
- 13) TPAP, NMO
- 14) KHMDS, 18-crown-6, CH_3I , $-78\text{ }^{\circ}\text{C}$
- 15) KHMDS, PhSeBr, -78 to $-40\text{ }^{\circ}\text{C}$
- 16) NaHCO_3 , H_2O_2



- 1) Rationalize the stereoselectivity of this reaction.

Hint: the new stereocenter has R absolute configuration.



- 3) Grubbs II structure?

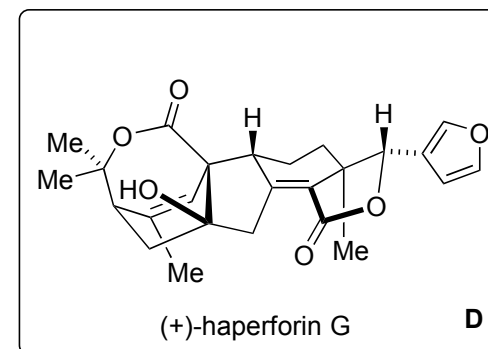
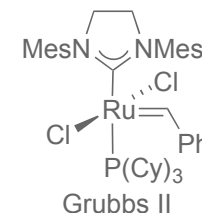
7) *Hint: Only one functional group is protected.*

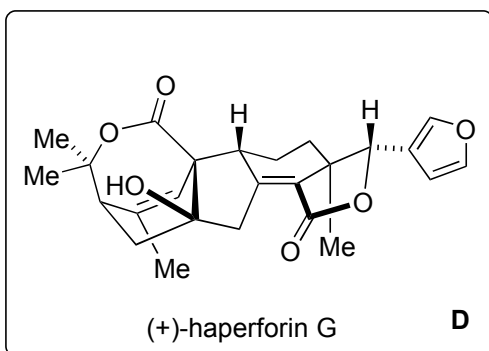
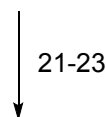
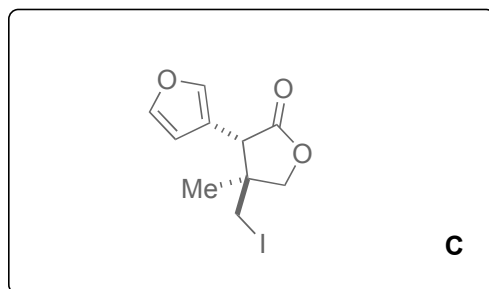
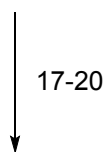
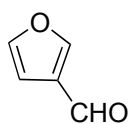
- 10) Name of reaction?

11) *Hint: Global deprotection*

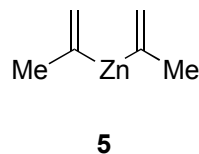
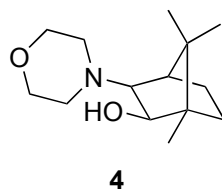
- 12) Name of reaction?

Weitz-Scheffer epoxidation





- 17) **4** (10% mol), Et₂Zn (3 eq.), **5** (1 eq.), -30 °C
 18) NIS, *tert*-butyl vinyl ether, -30 °C
 19) Pd(OAc)₂ (10% mol), DPPF (30% mol), 130 °C
 20) H₂CrO₄



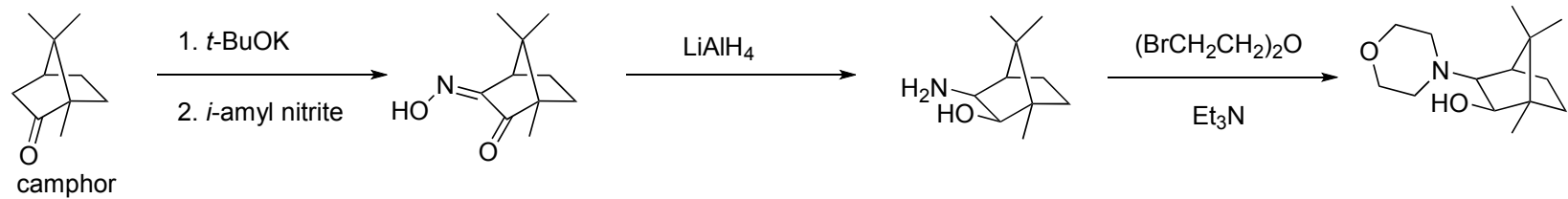
- 21) [Ir(ppy)₂(dtbbpy)]PF₆ (2.5% mol), DIPEA, Hantzsch ester, Blue LED
 22) *t*-BuOK, -78 °C
 23) SOCl₂, pyridine
 24) DBU, 50 °C

- 17) How would you make ligand **4**?
Hint: the new stereocenter has R absolute configuration.
 18) *Hint: the product is an inconsequential mixture of diastereomers*
 19) Propose mechanism for this reaction.
Hint: The iodine is transferred in this reaction.
 20) Name of reagent?

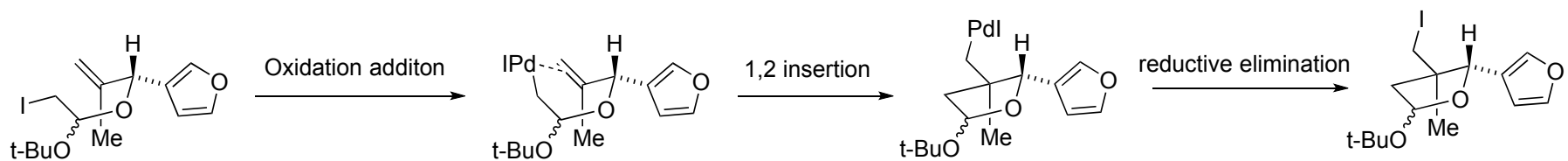
Jones Reagent

- 21) Propose a mechanism for this step.
 See below

Solution for step 17:



Solution step 19:



Solution step 21:

