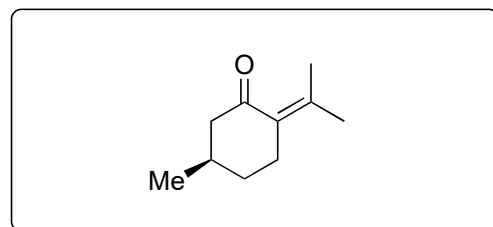


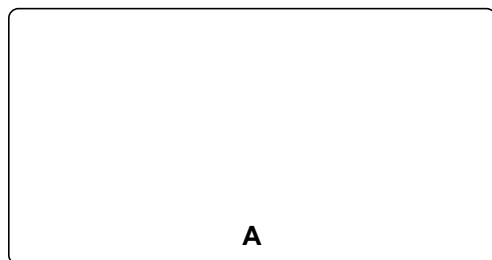
# A 16-step synthesis of the isoryanodane diterpene (+)-perseanol

Arthur Han, Yujia Tao & Sarah E. Reisman

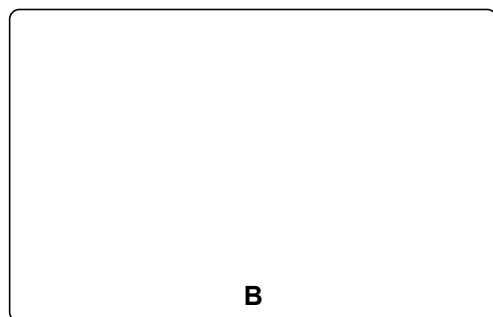
*Nature* **2019**, *573*, 563–567



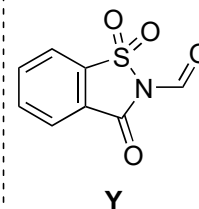
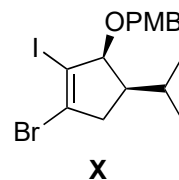
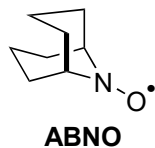
1–6



7–13



- 1) Br<sub>2</sub>, NaHCO<sub>3</sub> then NaOMe, MeOH 55 °C
- 2) KHMDS then O<sub>2</sub>, P(OMe)<sub>3</sub>
- 3) m-CPBA
- 4) Et<sub>2</sub>Al(TMP)
- 5) PhCH(OMe)<sub>2</sub>, CSA, then DIBAL
- 6) Cu<sup>(MeO)<sub>2</sub>bpy</sup>OTf (5 mol%), ABNO (1mol%), NMI (10 mol%), O<sub>2</sub>



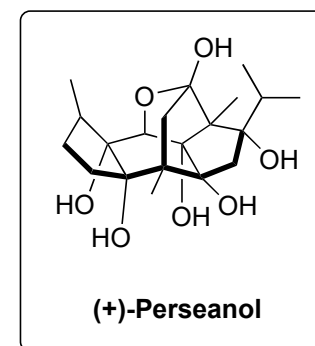
- 7) X, n-BuLi
- 8) Pd(PPh<sub>3</sub>)<sub>4</sub> (50 mol%), Y, KF, NEt<sub>3</sub>, 100 °C
- 9) DDQ
- 10) DMDO, Na<sub>2</sub>SO<sub>4</sub>
- 11) MeMgCl, CeCl<sub>3</sub>·LiCl
- 12) TFA, 0 °C
- 13) SeO<sub>2</sub>

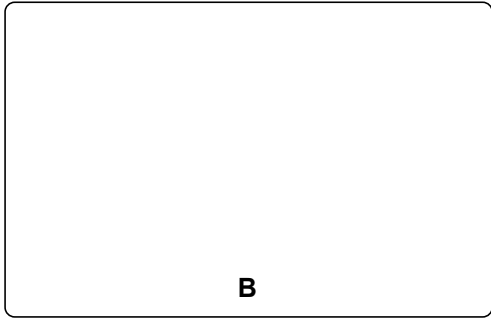
ad 1) Name of starting material?  
Name reaction?

ad 6) Please provide a mechanism for the transformation

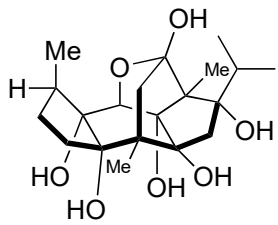
Hint: in step 8) two rings are closed

ad 13) Name reaction?





14–16



**(+)-Perseanol**

- 14)  $\text{VO}(\text{On-Pr})_3$ , TBHP
- 15) LiPhNap
- 16)  $\text{Pd}(\text{OH})_2$ ,  $\text{H}_2$

15) Propose a mechanism