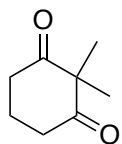


## Synthesis Challenge 103

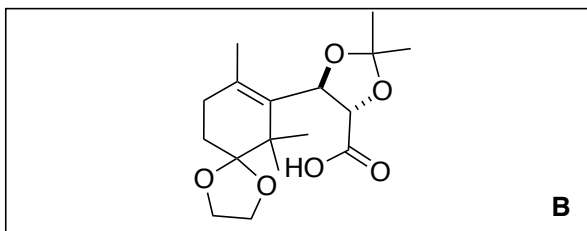
AG Wegner

16.03.2023



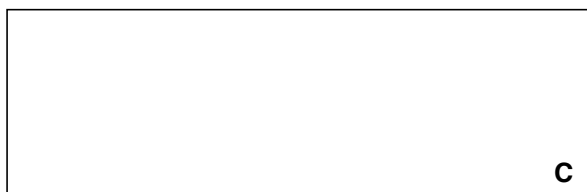
↓ ???

**A**



**B**

↓ 1-2



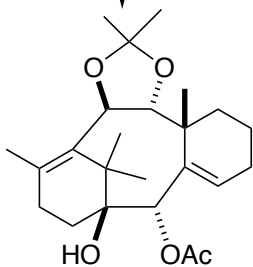
**C**

↓ 3-5



**D**

↓ 6-7



**E**

Please draft a synthesis from **A** to **B**?

1) *t*BuOCOCl, *N*-methylmorpholine (NMM), THF; (PhTe)<sub>2</sub>, NaBH<sub>4</sub>, THF, MeOH, 0 °C to 25 °C, 91 %; 2) **I** (2 equiv), Et<sub>3</sub>B (3 equiv), air, benzene, 50 °C; 2,3-dichloro-5,6-dicyano-*p*-benzoquinone (DDQ), 2,6-lutidine, 50 °C,

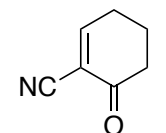
3) MeMgBr, CuI, Me<sub>2</sub>S, toluene, -20 °C, then NaBH<sub>4</sub>, EtOH, 25 °C

4) Methanesulfonyl chloride (MsCl), Et<sub>3</sub>N, benzene, 25 °C, then 1,8-diazabicyclo[5.4.0]undec-7-ene (DBU), 100 °C

5) *t*Bu<sub>2</sub>AlH, hexane, -20 °C, then 1 M aq. HCl, 25 °C

6) TiCl<sub>4</sub> (4 equiv), Zn (10 equiv), pyridine, THF, 50 °C

7) Ac<sub>2</sub>O, *N,N*-dimethyl-4-aminopyridine (DMAP), pyridine, CH<sub>2</sub>Cl<sub>2</sub>, 25 °C



**I**

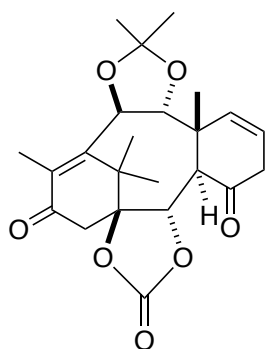
8-10



11-12



13-15

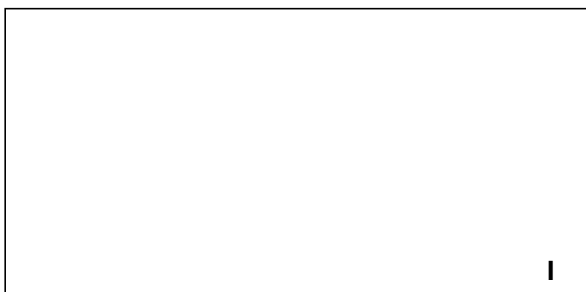


8)  $\text{CrO}_3$ , 3,5-dimethylpyrazole,  $\text{CH}_2\text{Cl}_2$ ,  $25^\circ\text{C}$   
9) *p*-Toluenesulfonyl hydrazide ( $\text{TsNHNH}_2$ ),  $\text{AcOH}$ ,  $25^\circ\text{C}$ , then  $\text{NaBH}_3\text{CN}$ ,  $25^\circ\text{C}$   
10)  $\text{CsOAc}$ , *i*PrOH,  $60^\circ\text{C}$ , then  $\text{OsO}_4$  (10 mol%), *N*-methylmorpholine *N*-oxide (NMO), acetone,  $\text{H}_2\text{O}$ ,  $25^\circ\text{C}$ ,

11) DMAP, toluene,  $120^\circ\text{C}$ , then  $(\text{Cl}_3\text{CO})_2\text{CO}$ , pyridine,  $\text{CH}_2\text{Cl}_2$ ,  $-20^\circ\text{C}$   
12) DMSO,  $(\text{CF}_3\text{CO})_2\text{O}$ ,  $\text{CH}_2\text{Cl}_2$ ,  $-78^\circ\text{C}$ , then  $\text{Et}_3\text{N}$ ,  $25^\circ\text{C}$ , then  $\text{K}_2\text{CO}_3$ , MeOH,  $0^\circ\text{C}$

13)  $\text{MsCl}$ ,  $\text{Et}_3\text{N}$ ,  $\text{CH}_2\text{Cl}_2$ ,  $25^\circ\text{C}$   
14)  $\text{Pd}(\text{OCOCF}_3)_2$  (40 mol%),  $\text{PPh}_3$ ,  $\text{Et}_3\text{N}$ , DMSO,  $60^\circ\text{C}$   
15) trimethylsilyl trifluoromethanesulfonate (TMSOTf), *i*PrNMe<sub>2</sub>,  $(\text{CH}_2\text{Cl})_2$ ,  $40^\circ\text{C}$ , then HF · pyridine, pyridine, MeCN,  $25^\circ\text{C}$

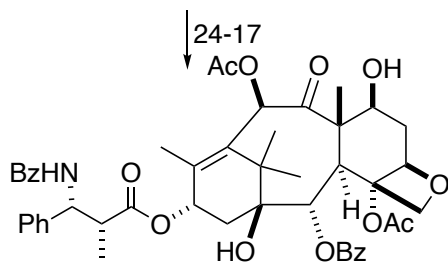
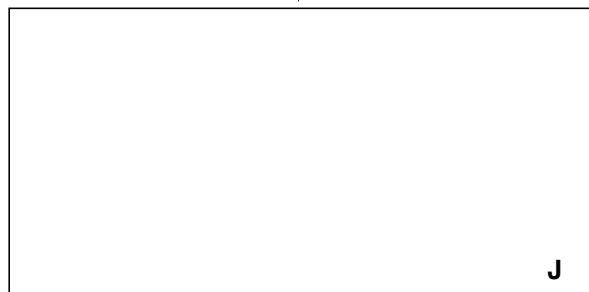
↓16-17



↓18-20



↓21-23



16) *N*-bromosaccharin, NaHCO<sub>3</sub>, MeCN/H<sub>2</sub>O, 25 °C  
17) KOH, Ag<sub>2</sub>O DMF/H<sub>2</sub>O, 0 °C

18) Triethylsilyl trifluoromethanesulfonate (TESOTf), *i*PrNMe<sub>2</sub>, (CH<sub>2</sub>Cl)<sub>2</sub>, 50 °C  
19) Rh/Al<sub>2</sub>O<sub>3</sub>, H<sub>2</sub> (1 atm), benzene, 25 °C  
20) *N*-(5-chloropyridin-2-yl)-*N*-(methanesulfonyl)methanesulfonamide, KN(SiMe<sub>3</sub>)<sub>2</sub>, THF, -78 °C, then 1 M aq. HCl, EtOH, 25 °C

21) [tBu<sub>3</sub>PPd(μ-I)]<sub>2</sub> (40 mol%), Me<sub>3</sub>SiCH<sub>2</sub>ZnCl, *N*-methylpyrrolidone, 25 °C, then *N*-bromosuccinimide, 0 °C  
22) CF<sub>3</sub>CO<sub>2</sub>H, MeOH, 40 °C, then Ac<sub>2</sub>O, CeCl<sub>3</sub> · 7H<sub>2</sub>O, THF, 40 °C, then triethylsilyl chloride (TESCl), imidazole, DMF, 0 °C  
23) OsO<sub>4</sub> (1 equiv), pyridine, THF, 25 °C

24) *i*Pr<sub>2</sub>NEt, toluene, 100 °C, then DMSO, (CF<sub>3</sub>CO)<sub>2</sub>O, CH<sub>2</sub>Cl<sub>2</sub>, -78 °C, then Et<sub>3</sub>N, 25 °C  
25) Ac<sub>2</sub>O, DMAP, CH<sub>2</sub>Cl<sub>2</sub>, 25 °C  
26) LiBH<sub>4</sub>, THF, -78 °C  
27) PhLi, THF, -78 °C, then β-lactam II, 0 °C, then 1 M aq. HCl, MeOH, 25 °C

