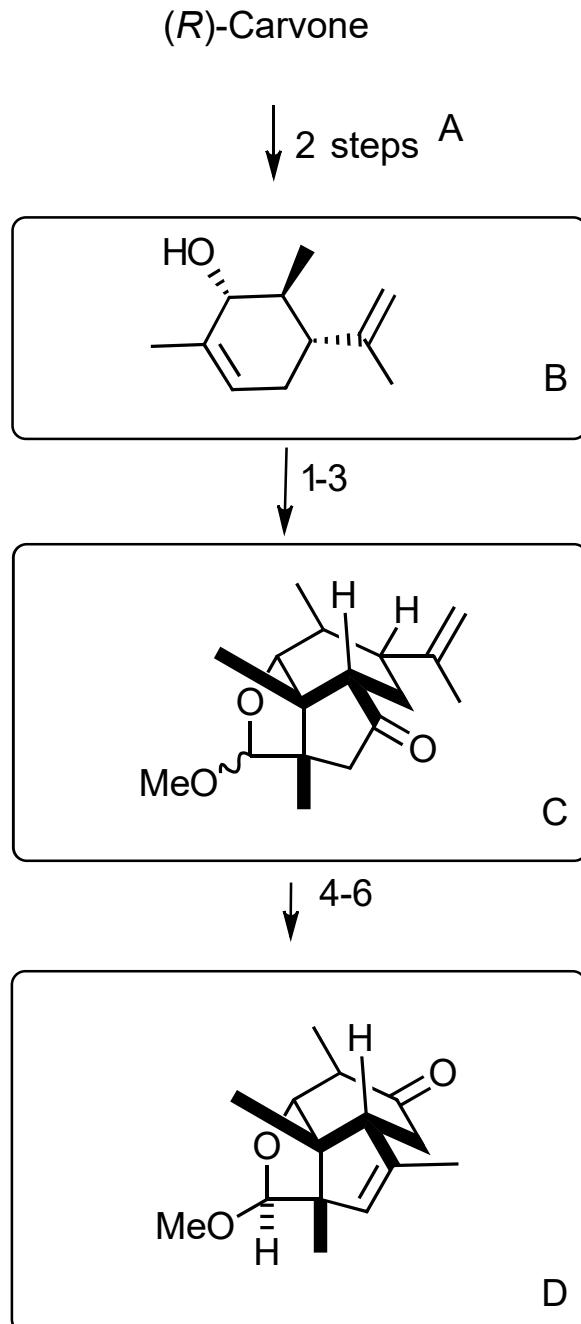


# Synthesis Challenge #80

Total Synthesis of (-)-Indoxamycins A and B

N. Hu, C. Dong, C. Zhang, G. Liang, *Angew. Chem. Int. Ed.* **2019**, *58*, 6659 –6662



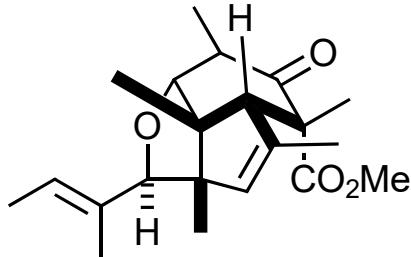
Please provide reagents for  
the transformation from **A** to **B**.

- a) A. Srikrishna, D. Vijaykumar, *J. Chem. Soc. Perkin Trans. 1* **2000**, 2583; b) Y. Chen, T. Ju, *Org. Lett.* **2011**, *13*, 86.

- 1) NBS (2.0 equiv), methoxyallene (2.0 equiv),  $\text{CH}_2\text{Cl}_2$ ,  $-20^\circ\text{C}$  to RT
- 2) *t*-BuOK (1.0 equiv), 18-crown-6 (0.05 equiv), pentane, RT
- 3)  $\text{Co}_2(\text{CO})_8$  (1.0 equiv),  $\text{CH}_2\text{Cl}_2$ ,  $0^\circ\text{C}$  then, NMO (6.0 equiv), MeCN

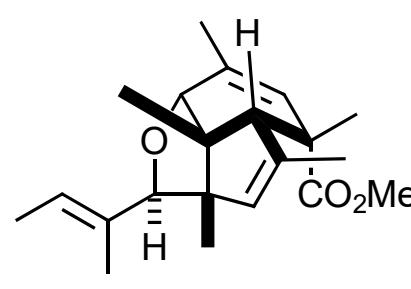
- 4) MeLi (3.0 equiv), Cul (1.5 equiv),  $\text{Et}_2\text{O}$ ,  $-20^\circ\text{C}$  to RT, Comins' reagent (1.5 equiv)
- 5) *p*-TsOH (1.0 equiv), PhMe,  $70^\circ\text{C}$ , then  $\text{NaHCO}_3$  (1.0 equiv),  $\text{O}_3$ ,  $\text{CH}_2\text{Cl}_2$ ,  $-78^\circ\text{C}$ , then  $\text{Me}_2\text{S}$
- 6)  $\text{Me}_2\text{Zn}$  (3.0 equiv),  $\text{Pd}(\text{PPh}_3)_4$  (0.1 equiv), THF,  $0^\circ\text{C}$

↓ 7-8



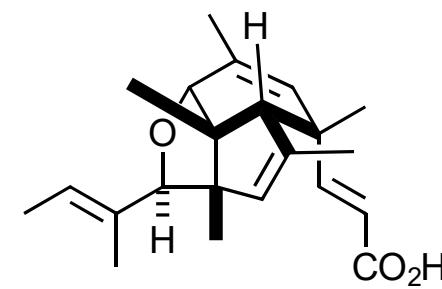
E

↓ 9-10



F

↓ 11-13



7) DBU (0.2 equiv), 4 Å MS, THF,  
80°C, 2 h, then -78°C,  
(*E*)-2-butenyl-2-magnesium bromide  
(1.3 equiv)  
8) KH (3.0 equiv),  $\text{CO}(\text{OMe})_2$   
(5.0 equiv), THF, reflux,  
then  $\text{MeI}$  (5.0 equiv), 0°C

9) KHMDS (2.0 equiv), Comins' reagent  
(1.5 equiv), THF, -78°C  
10)  $\text{Pd}(\text{OAc})_2$  (0.2 equiv),  $\text{PPh}_3$   
(0.4 equiv),  $\text{HCO}_2\text{H}$  (10 equiv),  
 $\text{Et}_3\text{N}$  (12 equiv), THF, 70°C

11)  $\text{LiAlH}_4$  (2.0 equiv), THF, 60°C  
12) oxalyl chloride (2.0 equiv), DMSO  
(3.0 equiv),  $\text{Et}_3\text{N}$  (5.0 equiv),  $\text{CH}_2\text{Cl}_2$   
13)  $\text{NaH}$  (3.0 equiv), *tert*-butyl diethyl-  
phosphonoacetate (3.0 equiv), THF,  
70°C, 1.5h, then TFA,  $\text{CH}_2\text{Cl}_2$ , RT