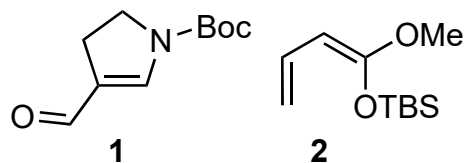


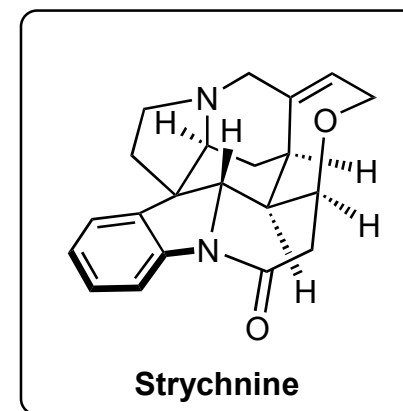
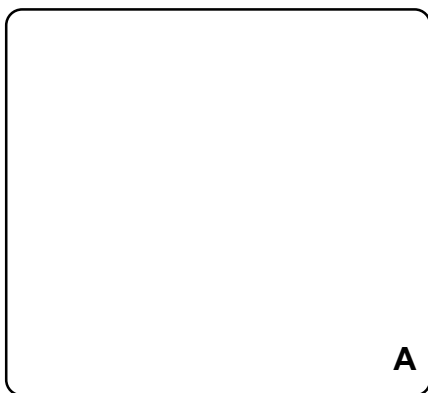
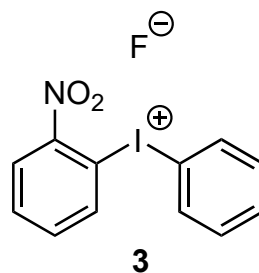
# Total Synthesis of Strychnine

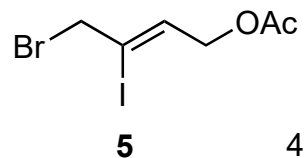
G. S. Lee, G. Namkoong, J. Park, D. Y.-K. Chen, Chem. - Eur. J. **2017**, 23, 16189–16193.



- 1) **1**, **2**, Zn(OTf)<sub>2</sub>, CH<sub>2</sub>Cl<sub>2</sub>, 23 °C  
2) **3**, THF/MeCN, -78 °C to 23 °C  
3) TiCl<sub>3</sub> in HCl (excess), NH<sub>4</sub>OAc in acetone, 23 °C

- 1) *Hint: Think outside the box, main product unbranched*  
Name 3 known dienes  
2) Please provide a mechanism. Who discovered this chemistry?  
3) *Hint: Most stable oxidation state of Ti?*  
*multiple transformations*





- 4) DBU, toluene, 23 °C
- 5) TFA, 23 °C
- 6) **5**, *i*Pr<sub>2</sub>NEt, MeCN
- 7) Pd(OAc)<sub>2</sub>, PPh<sub>3</sub>, NEt<sub>3</sub>, 70 °C
- 8) DIBAL-H (6.0 equiv), CH<sub>2</sub>Cl<sub>2</sub>, -78 °C  
*then* AcOH, NaBH<sub>3</sub>CN (5.0 equiv)
- 9) DIBAL-H (4.6 equiv), CH<sub>2</sub>Cl<sub>2</sub>, -78 °C
- 10) Malonic acid, Ac<sub>2</sub>O, NaOAc, AcOH, 110 °C

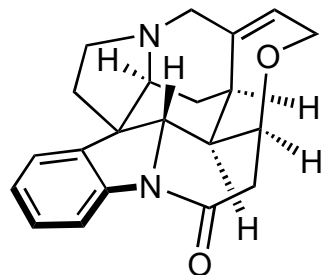
4) Structure of DBU?

7) What is the reactive palladium species? How is it generated?  
Name alternatives

8) *Hint: Methyl ester lives*

9) *Hint: Mind the reaction temperature*

10) Structure of Malonic acid



**Strychnine**