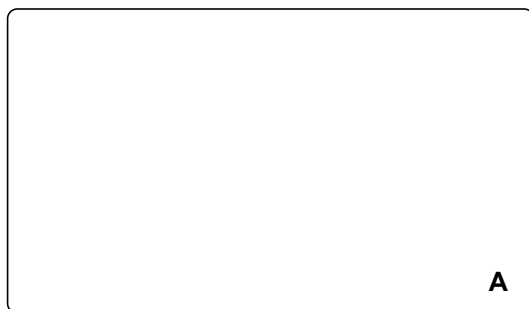
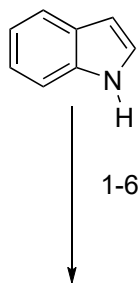
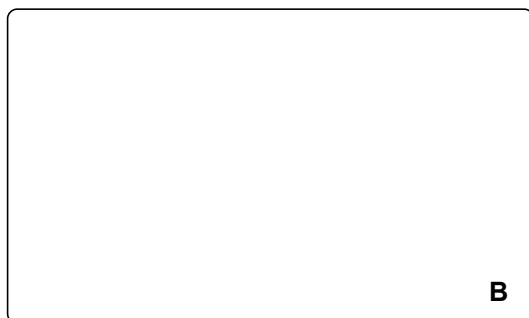


Total Synthesis of (-)-Vindorosine

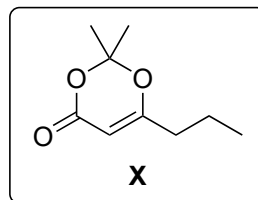
W. Chen, X.-D. Yang, W.-Y. Tan, X.-Y. Zhang, X.-L. Liao, H. Zhang
Angew. Chem. Int. Ed. **2017**, *56*, 12327-12331.



7-10



- 1) POCl₃, DMF
- 2) Boc₂O
- 3) (*S*)-*tert*-butylsulfonamide, Ti(OEt)₄
- 4) **X**, LiHMDS, BF₃·OEt₂
- 5) I₂ (0.2 equiv), THF/H₂O
- 6) K₂CO₃, NaI, 4-bromo-1-butene



- 7) TFA
- 8) CH₂ClCOCl
- 9) NaI
- 10) AgOTf

Which named reaction takes place in step 1?

Step 4 involves a named reaction.
Which one?

How would you synthesise **X** from Meldrum's acid?
What's the pK_a of Meldrum's acid?

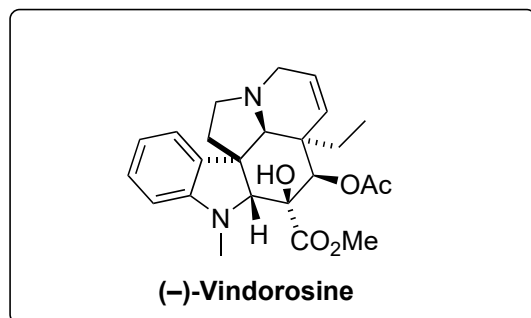
Please give a plausible mechanism for step 5.

Step 10 involves a named reaction. Please
provide name and mechanism.

11-18



19-24



11) ClCO_2Me , Na_2CO_3

12) OsO_4

13) NaIO_4

14) DBU

15) SOCl_2 , py, $90\text{ }^\circ\text{C}$

16) NaOMe , MeOH

17) $\text{CeCl}_3 \cdot 7\text{H}_2\text{O}$, O_2

18) $\text{CeCl}_3 \cdot 7\text{H}_2\text{O}$, NaBH_4

19) CBr_4 , Ph_3P then THF/aq. NaHCO_3

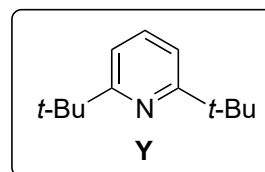
20) *m*-CPBA, $\text{CH}_2\text{Cl}_2/\text{MeOH}$

21) HCHO , NaBH_3CN

22) Ac_2O , py, DMAP

23) MeOTf , **Y**

24) NaBH_4 , MeOH



Step 12 involves a named reaction. Please provide the name. Which Nobel prize laureate developed an asymmetric variant?

Please provide the name for the reaction used in Step 19.