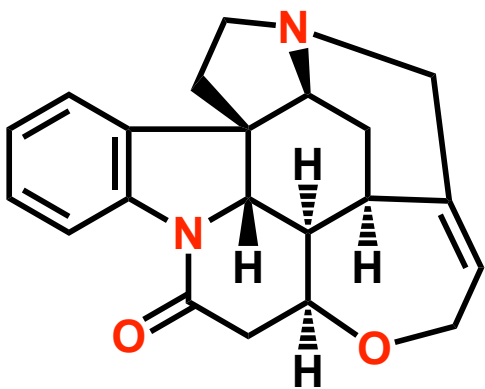




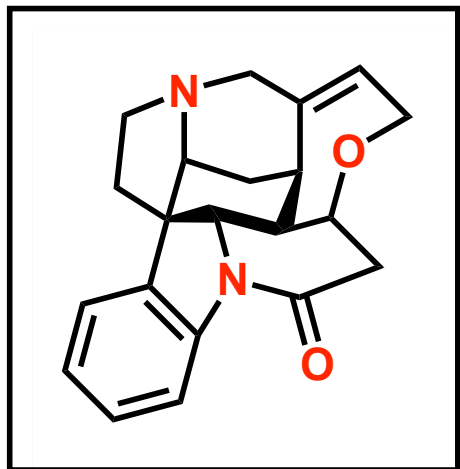
Krishna P Kaliappan
Professor of Chemistry, IIT Bombay

CH-588 Course on Organic Synthesis

Strychnine



Strychnine



Isolated from *Strychnos nux-vomica* in 1918

Consumption of 50 mg and above of Strychnine is **fatal**.

Discussed its usage in many novels or poetry for killing people

More than 400 research papers have been reported about its structural elucidation.

Using UV, **R. B. Woodward** proposed the correct structure of Strychnine in **1948**.

His proposed structure was finally confirmed by **X-ray**

7-Fused rings

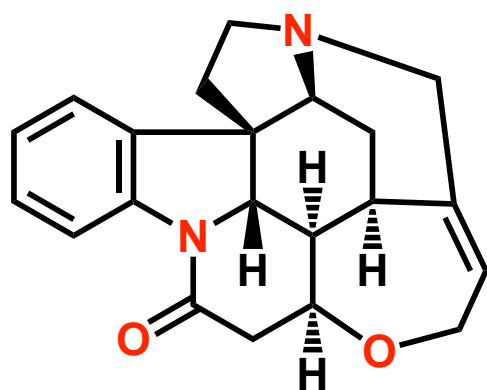
6-Stereocenters and out of which **5** are in **one ring (contiguous)**

Presence of a unique **7-membered ring**

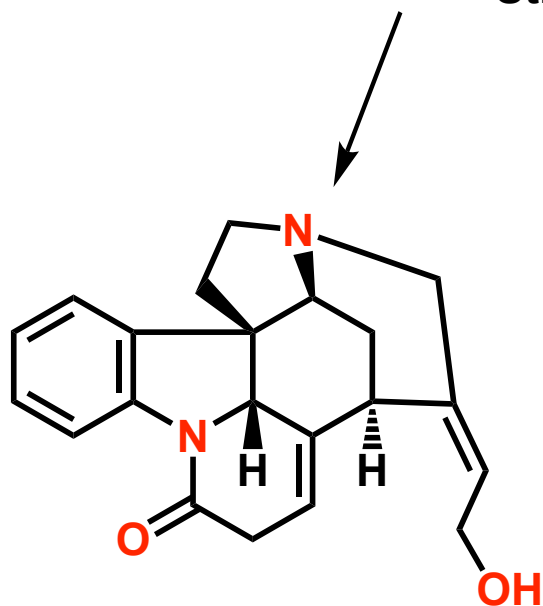
Presence of a unique **spiro center**

If we can't **make Strychnine**, we will **take it** - **R. B. Woodward**

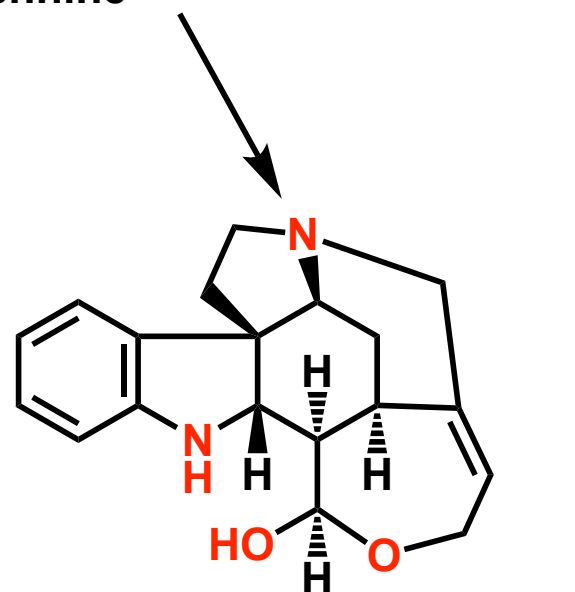
Degradation Products of Strychnine



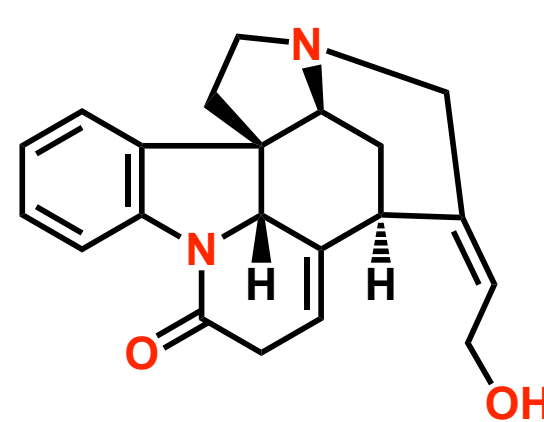
Strychnine



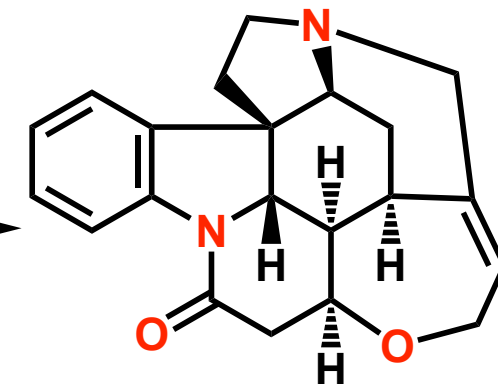
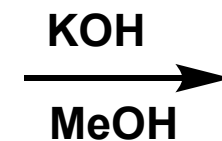
Isostrychnine



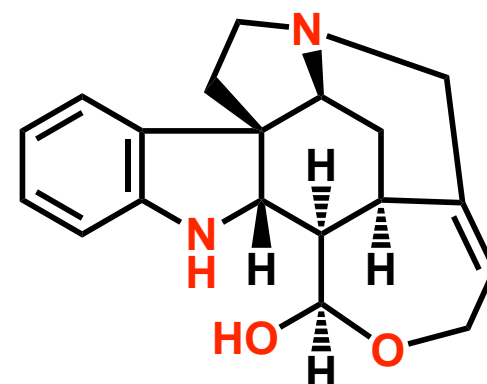
Wieland-Gumlich Aldehyde



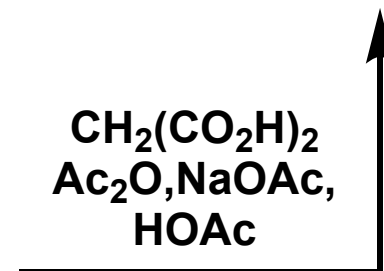
Isostrychnine



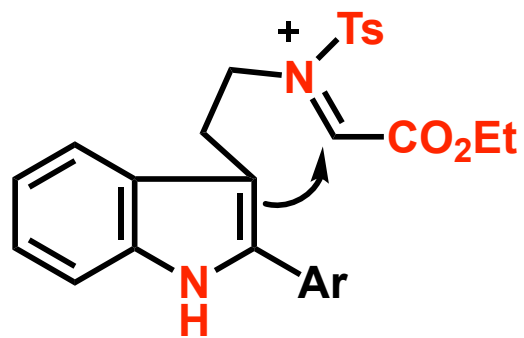
Strychnine



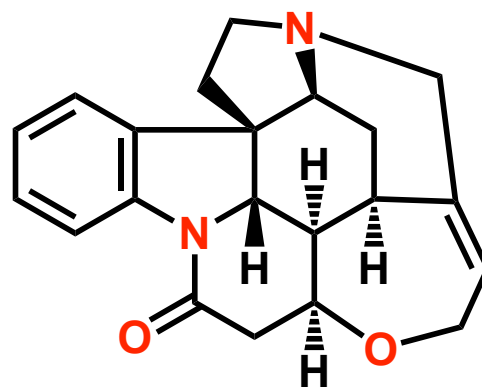
Wieland-Gumlich Aldehyde



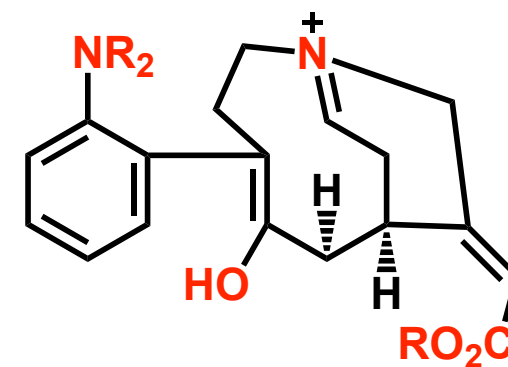
Key Disconnections of Strychnine



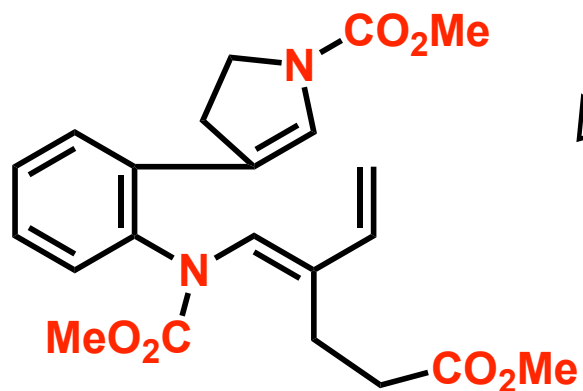
Woodward



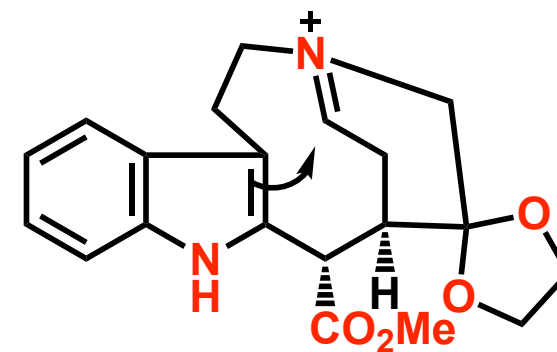
Strychnine



Overmann

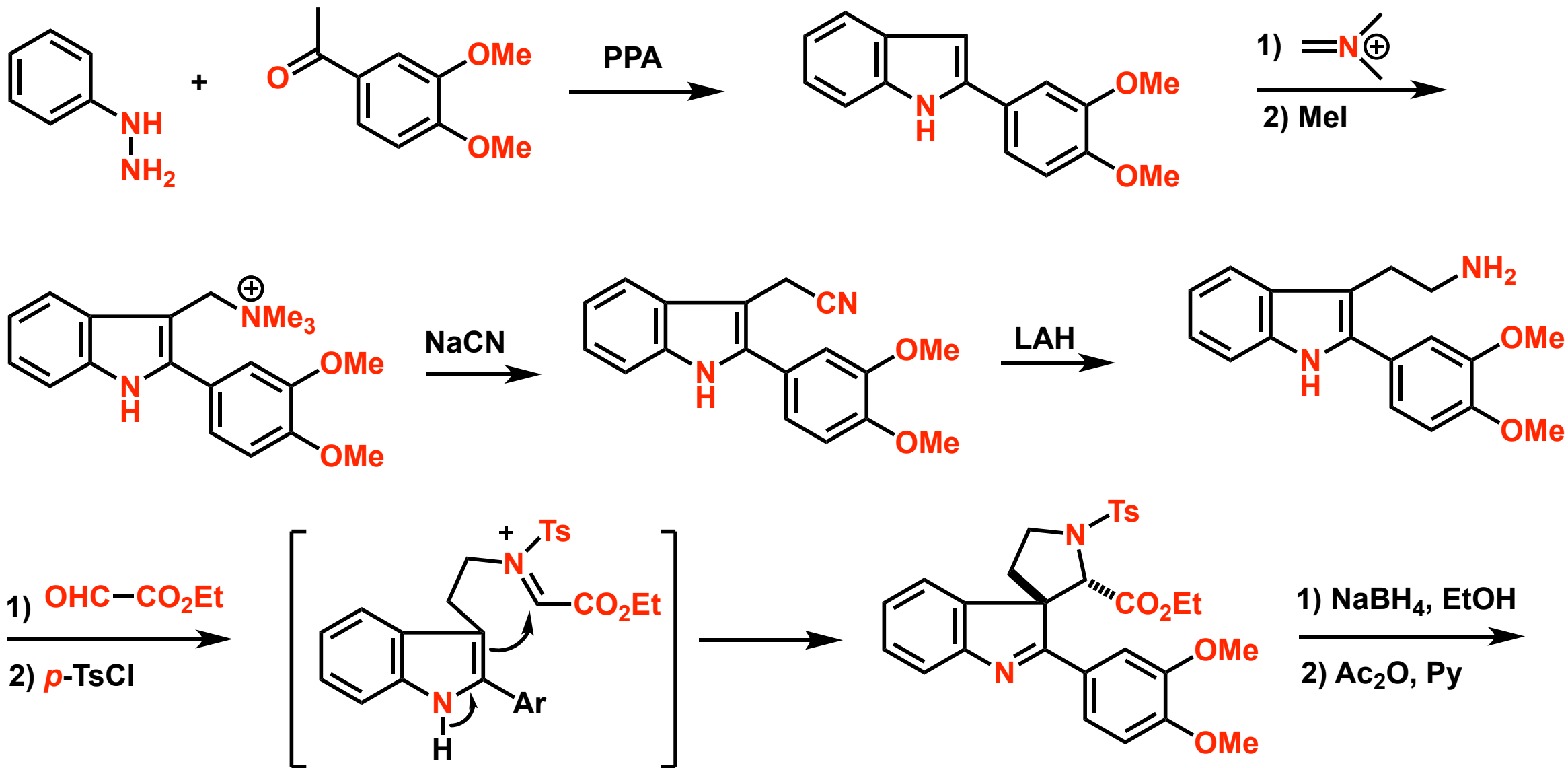


Rawal

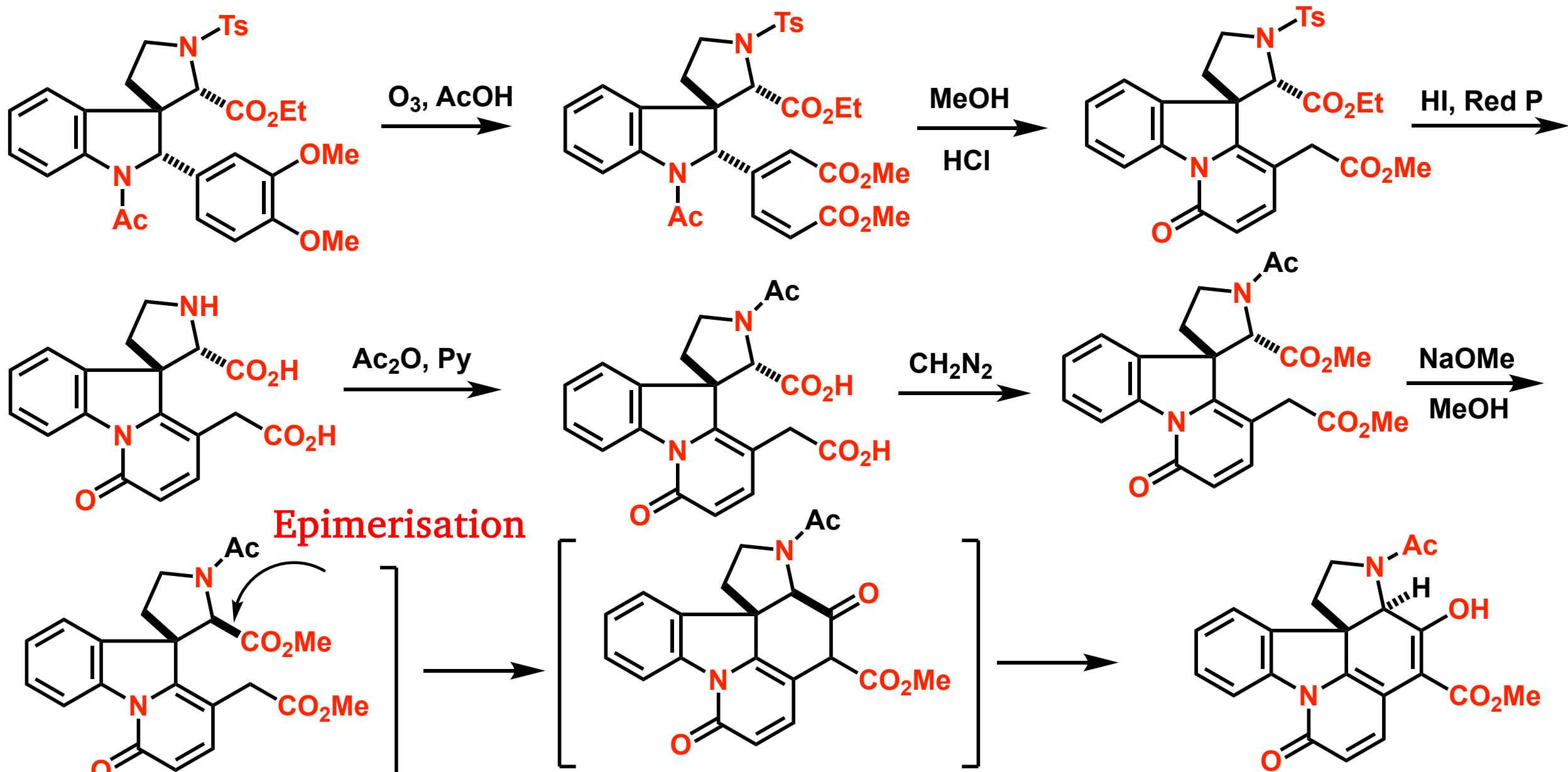


Magnus

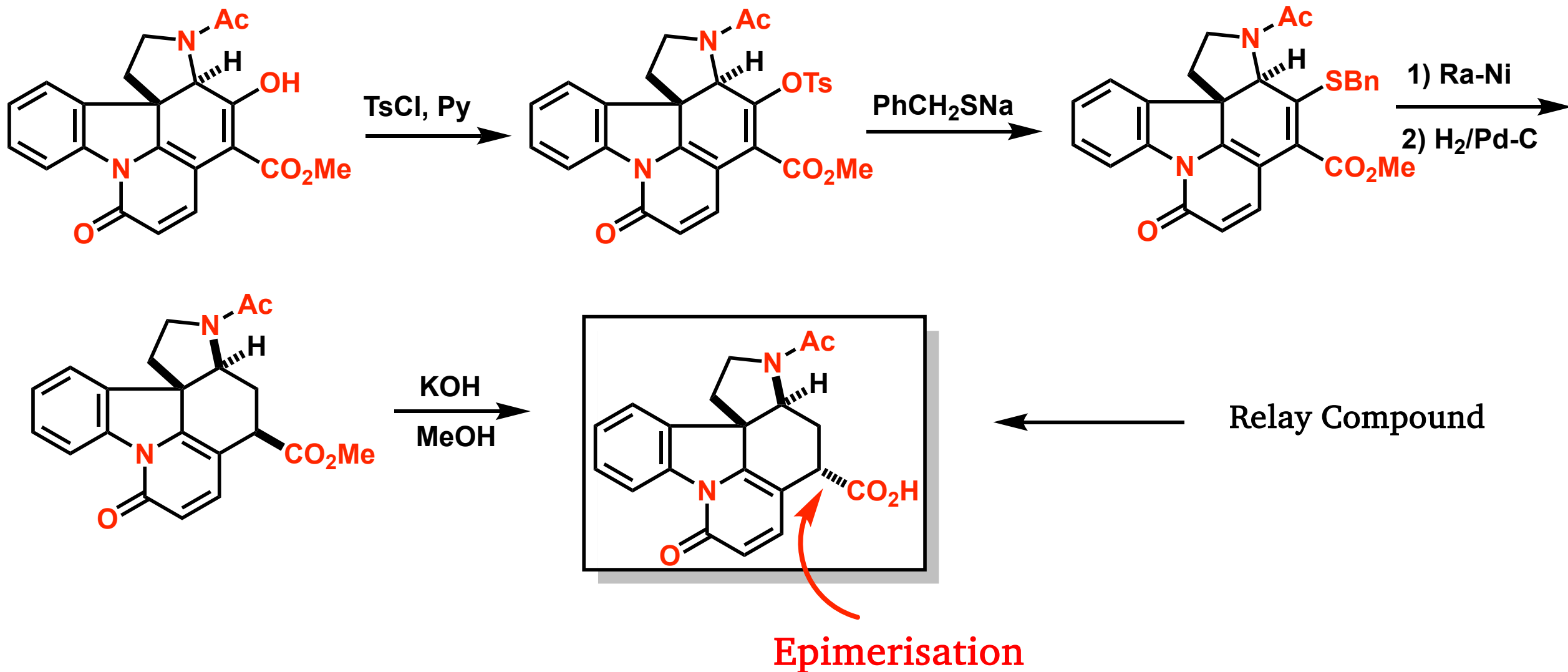
Woodward's Total Synthesis of Strychnine



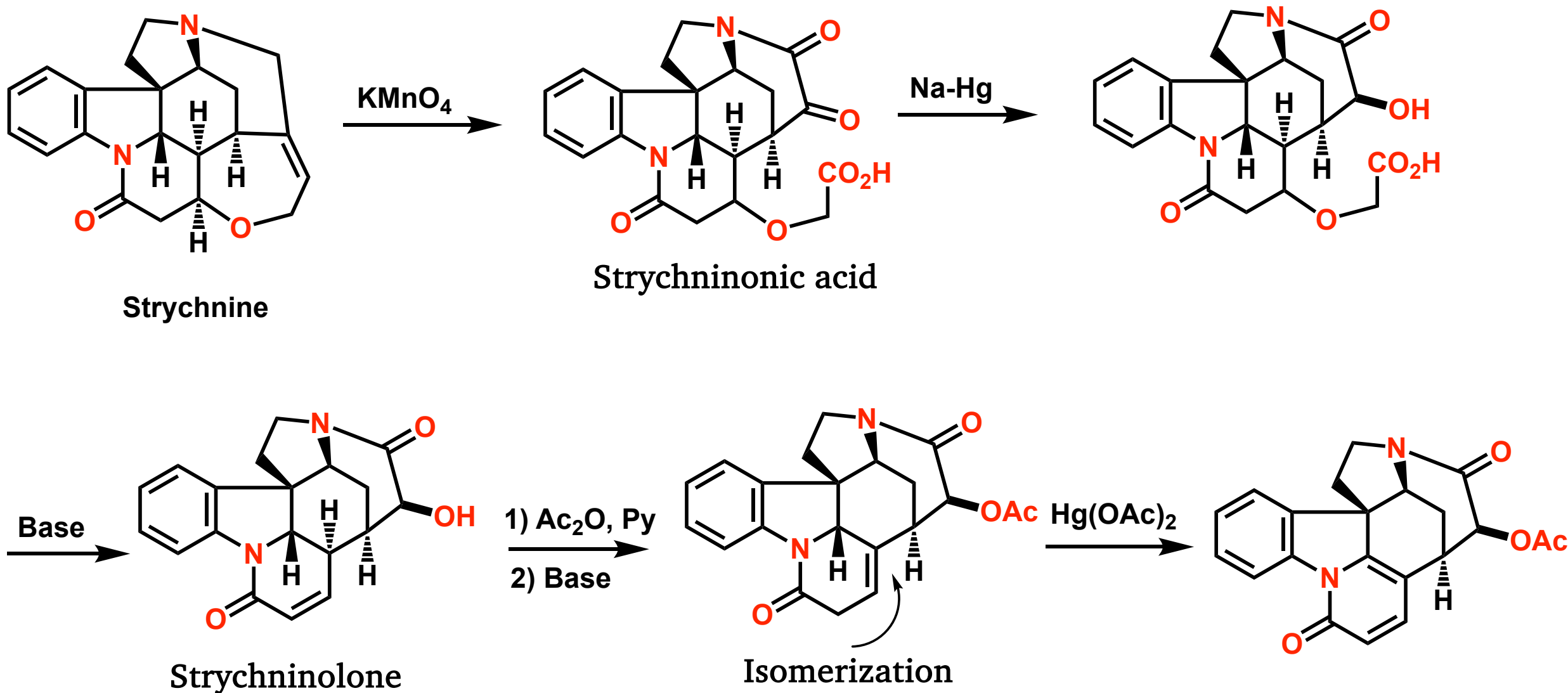
Woodward's Total Synthesis of Strychnine



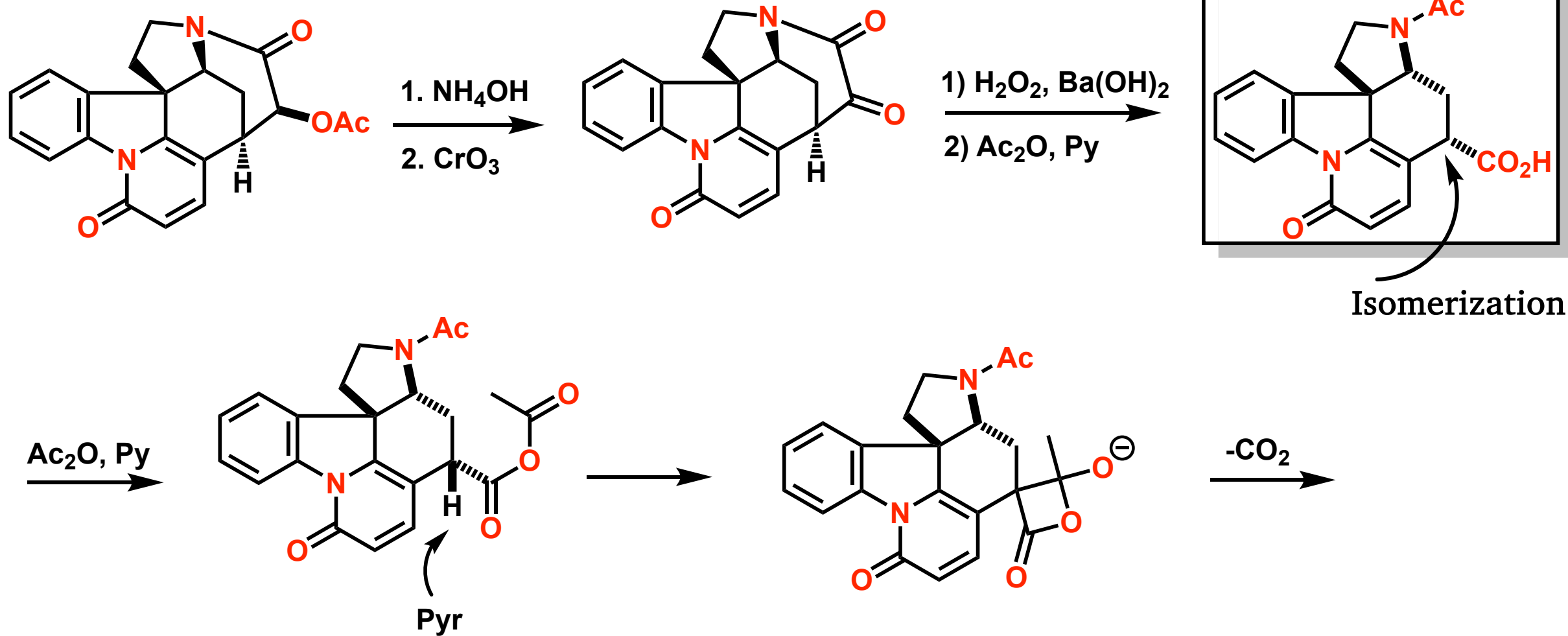
Woodward's Total Synthesis of Strychnine



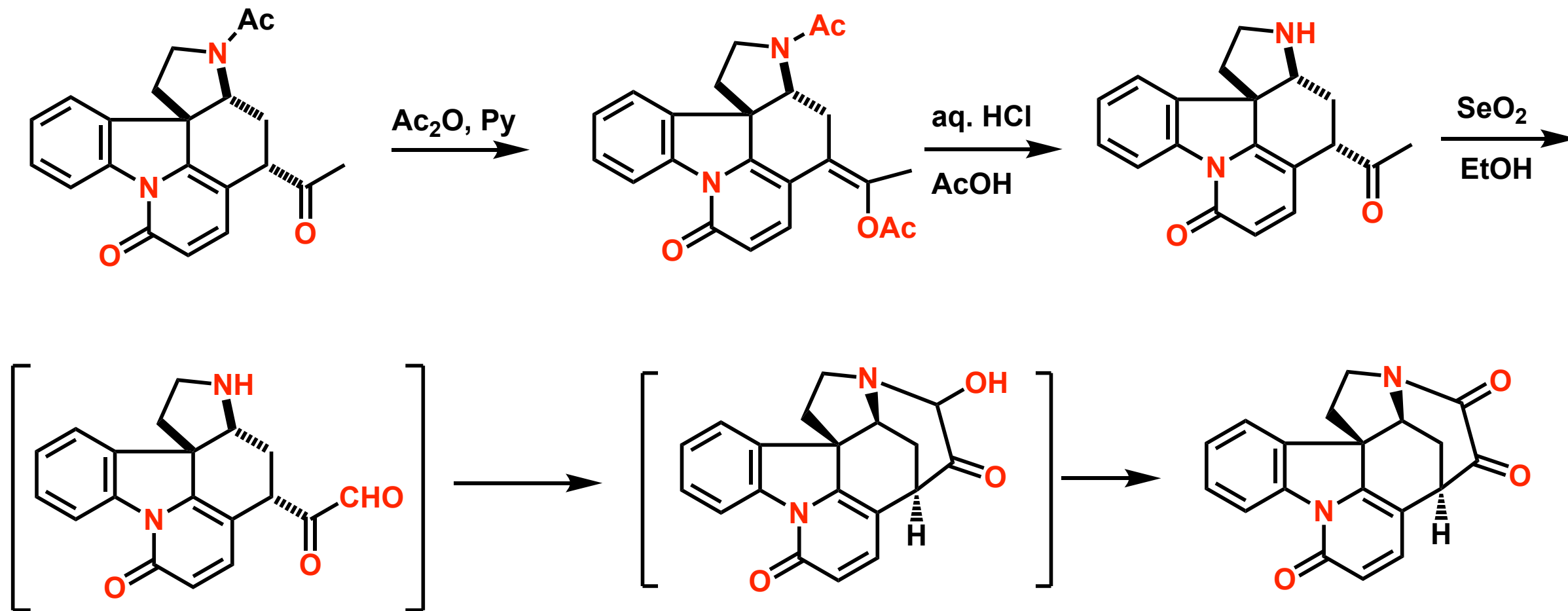
Woodward's Relay Approach

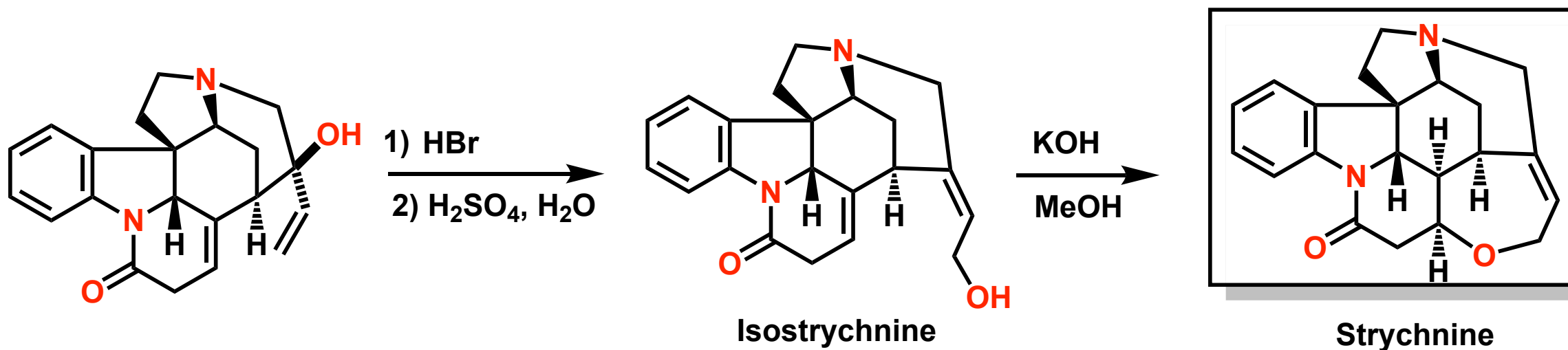
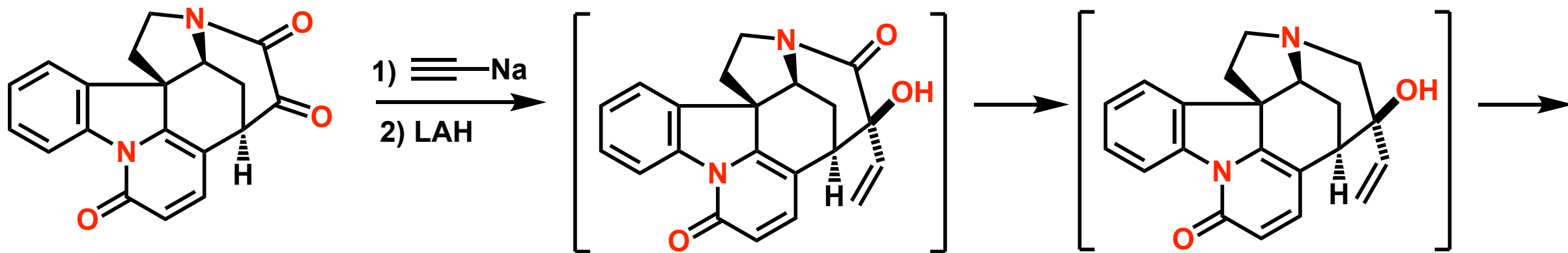


Woodward's Relay Approach

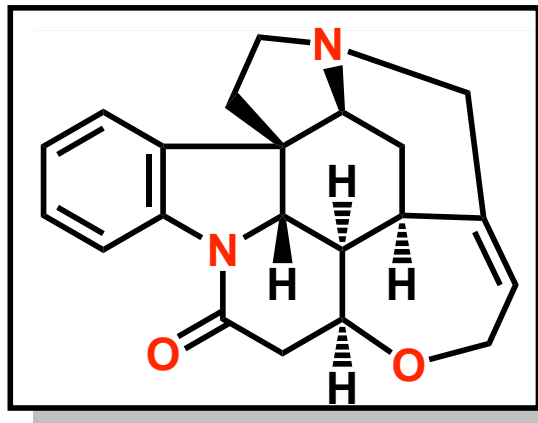


Woodward's Relay Approach

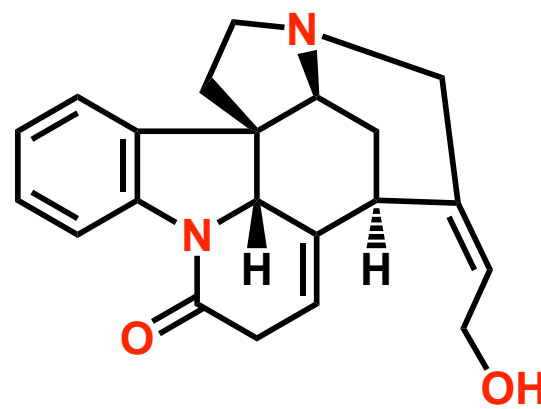
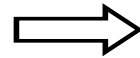




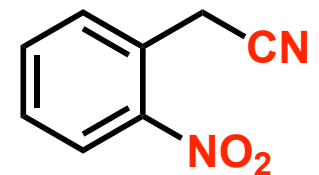
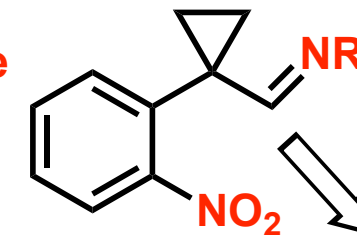
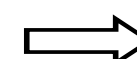
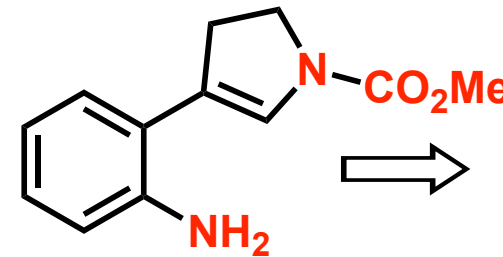
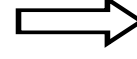
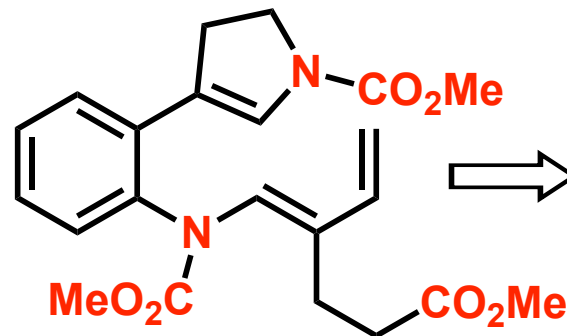
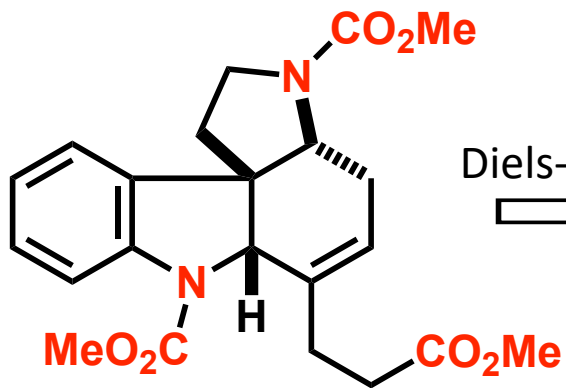
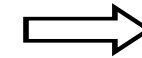
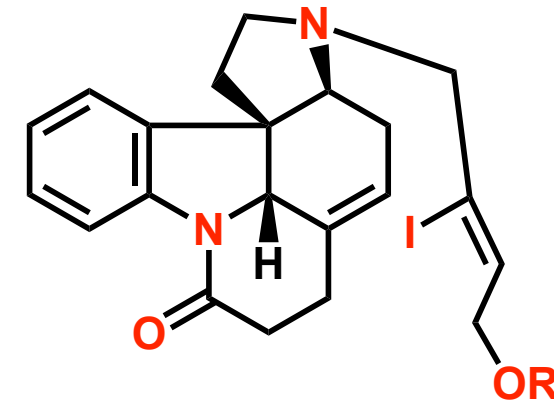
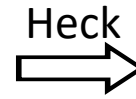
R. B. Woodward *et al.* *J. Am. Chem. Soc.*, 1954, 4749-4752.

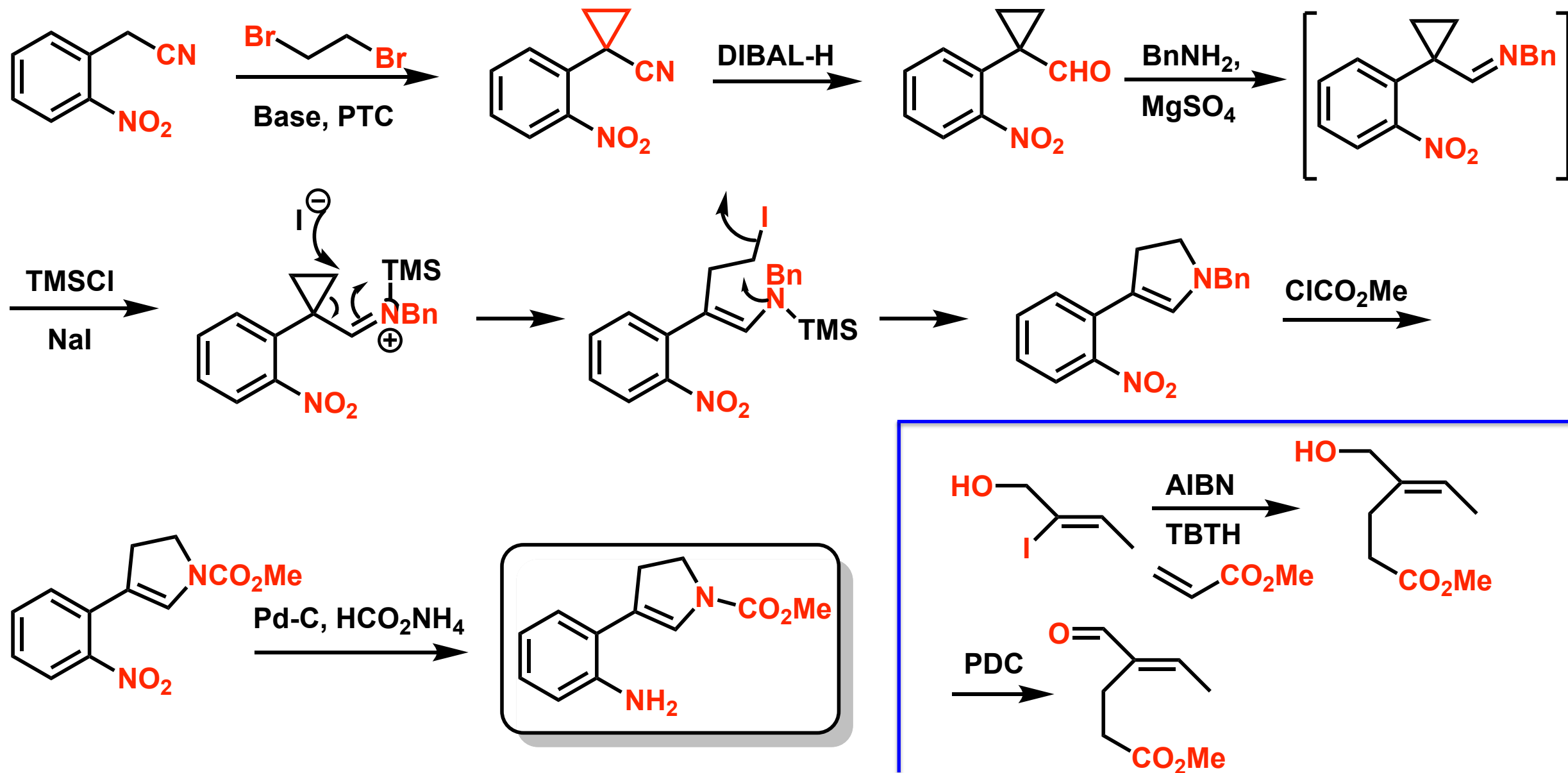


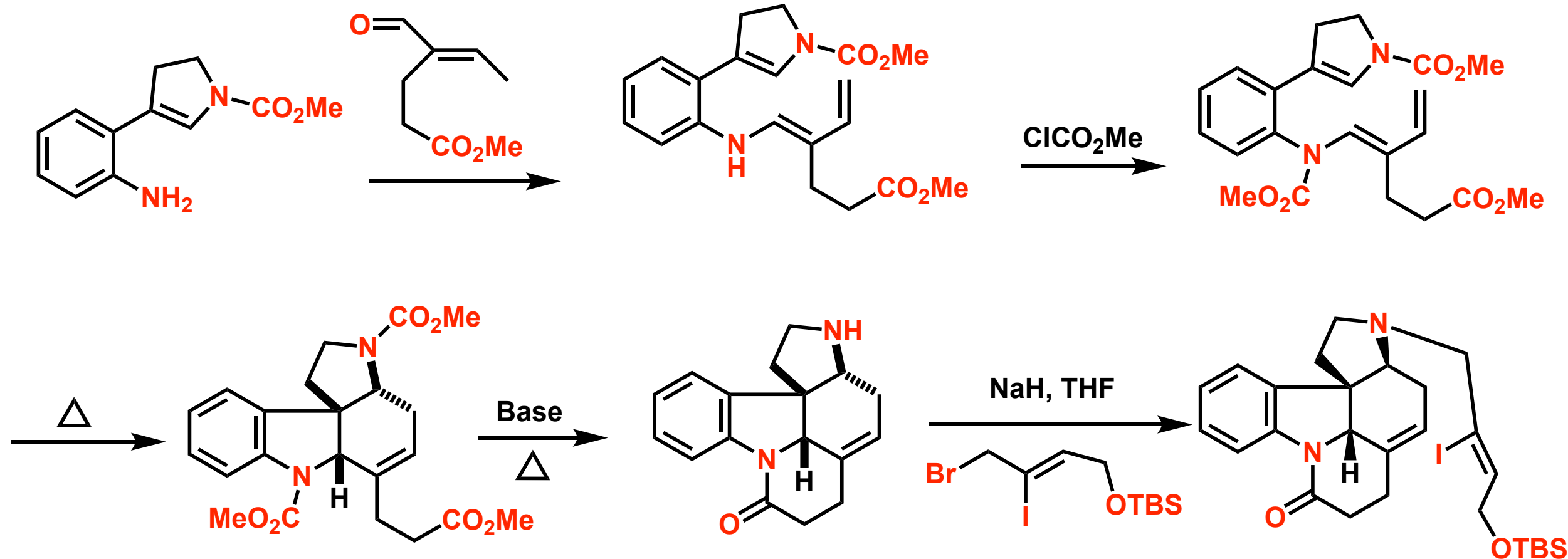
Strychnine



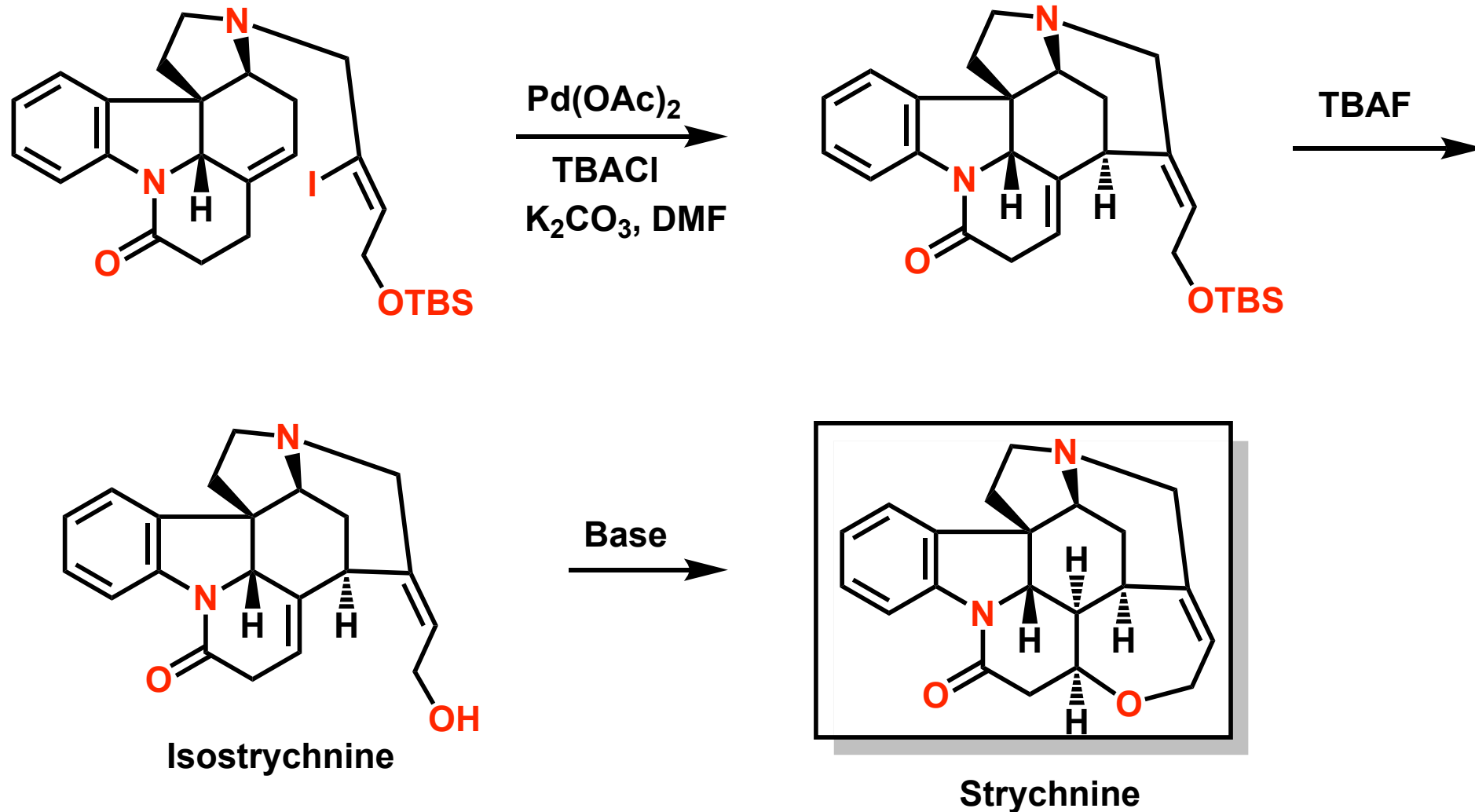
Isostrychnine





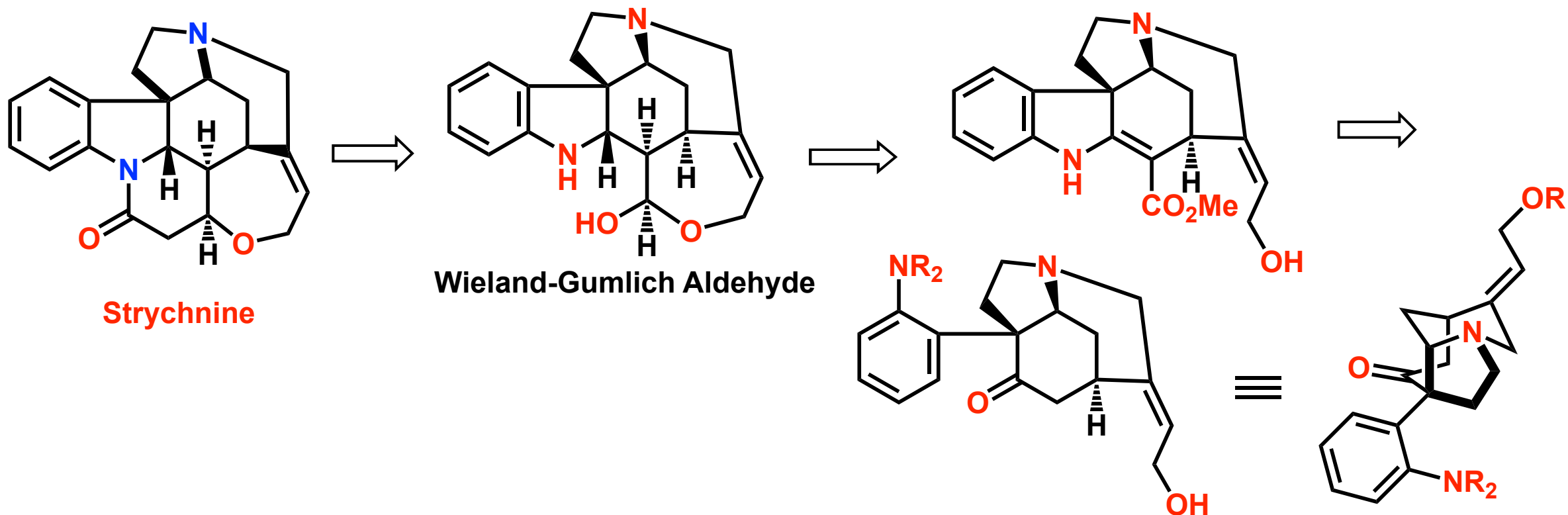


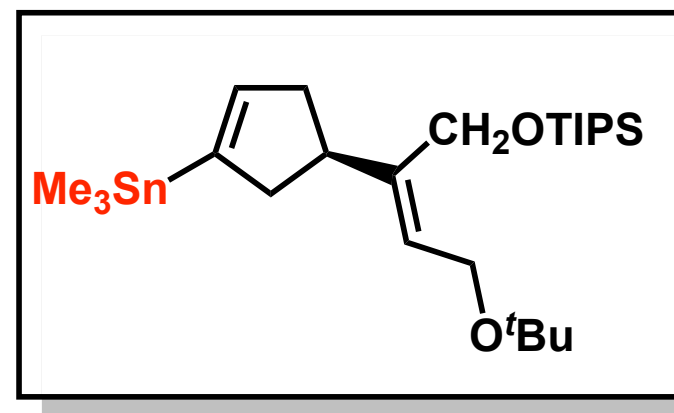
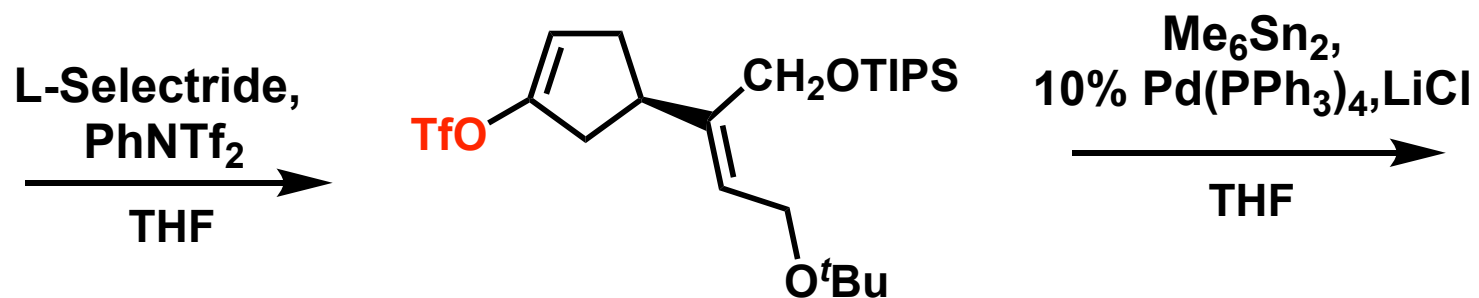
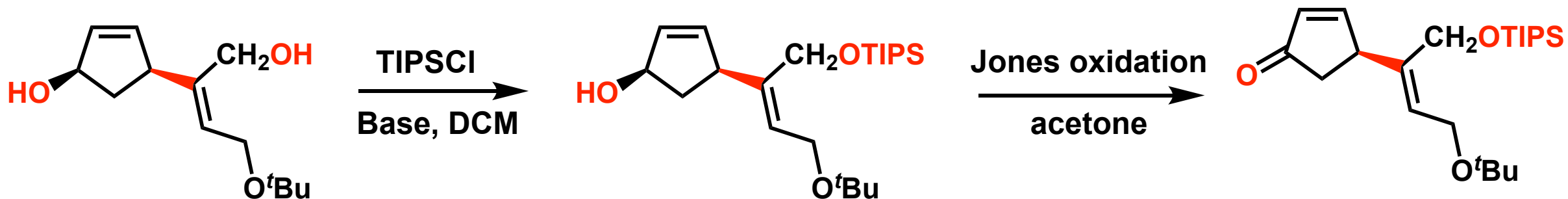
Dieckmann cyclization



V. Rawal and co-workers. *J. Org. Chem.*, **1994**, *59*, 2685-86

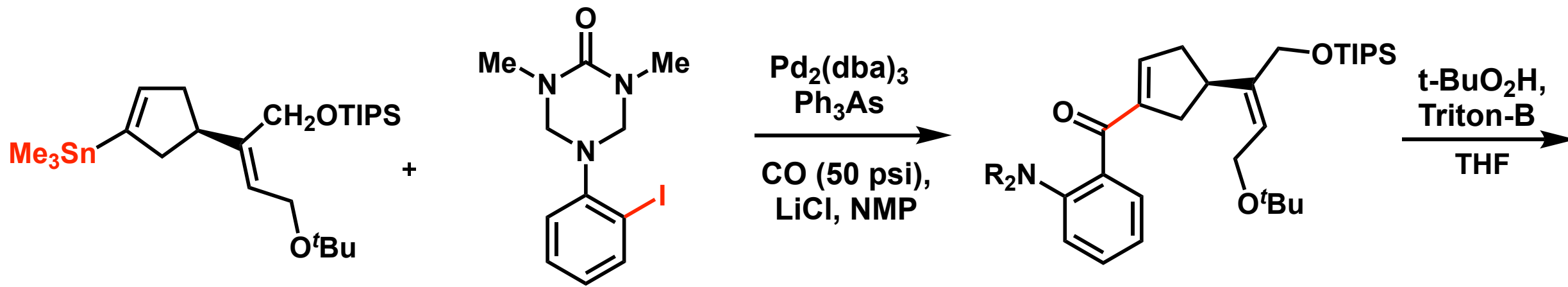
- First **asymmetric total synthesis** of (-)- strychnine
- This highly efficient total synthesis features the use of the cationic **aza-Cope-Mannich reaction** to assemble the pentacyclic strychnan core
- **20 step total synthesis with 3% overall yield**



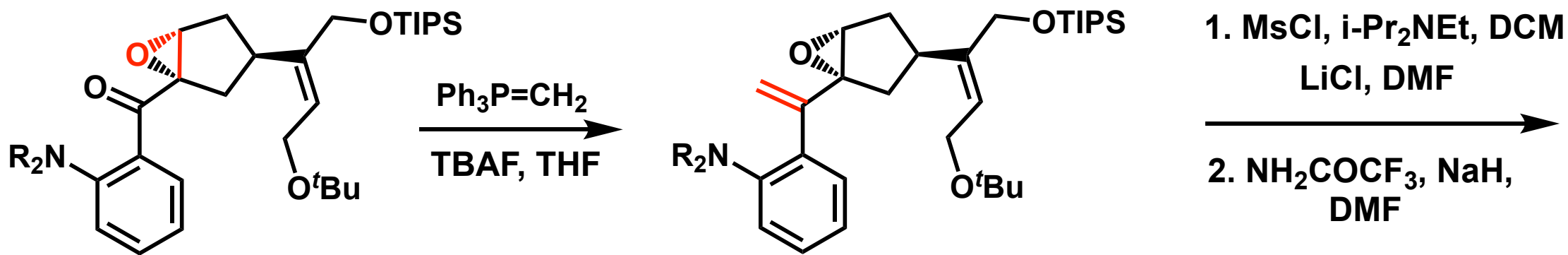


Fragment A

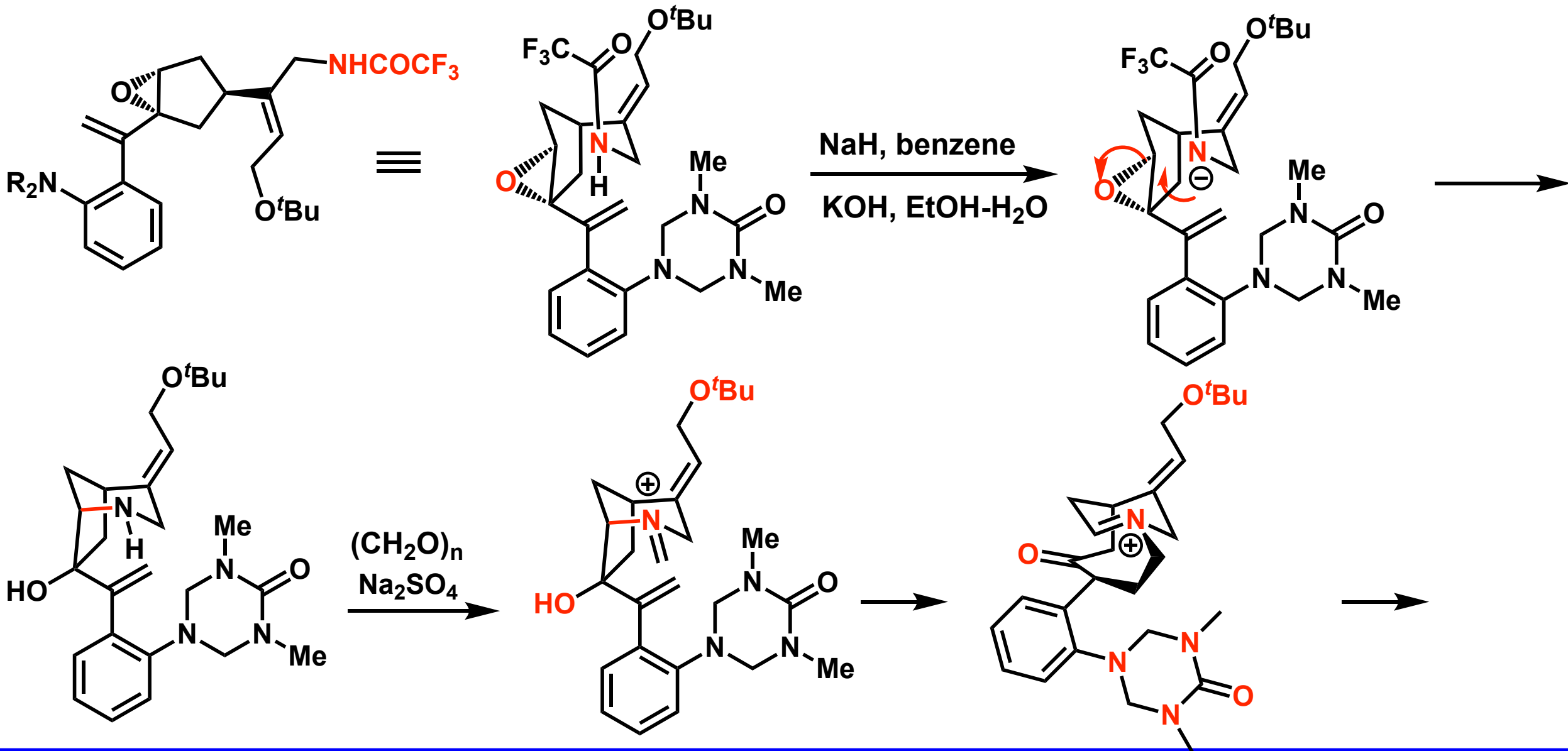
Overman's Total Synthesis



Fragment B



Overman's Total Synthesis



Overman's Total Synthesis

