Enantioselective Total Synthesis of (+)-Neostenine

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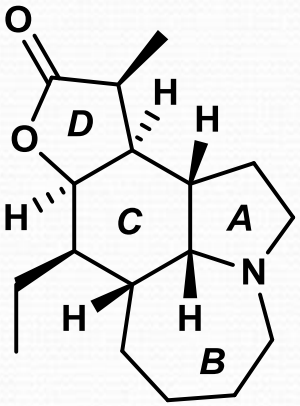

Stremona tuberosa

Current literature
Andrey Kuzovlev
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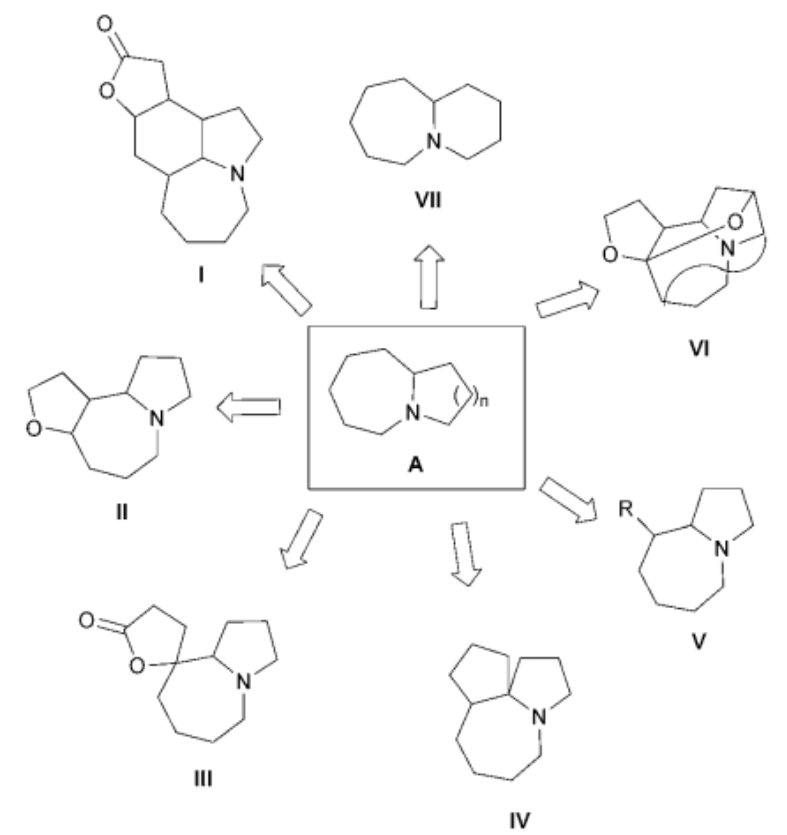
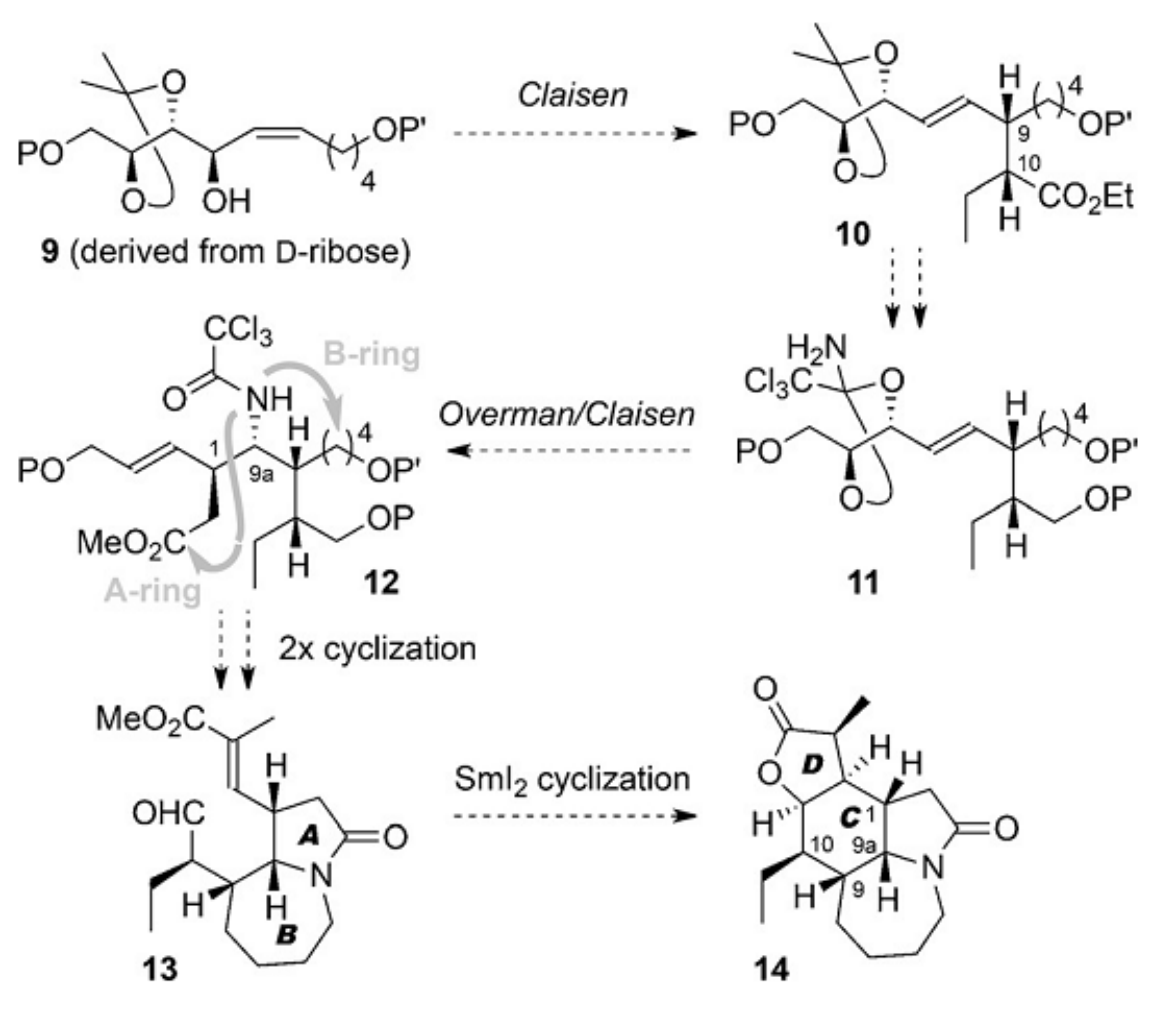
Introduction

- *Stemona* alkaloids contain pyrrolo[1,2-α]azepine core
- Isolated from *Stemonaceae* family plants (East Asia)
- Dried roots of these plants known as '*Non Tai Yak*' or '*Pong Mot Ngam*' in Thailand
- Used to suppress coughing, and are claimed to have antituberculosis, antibacterial, antifungal and antihelmintic properties

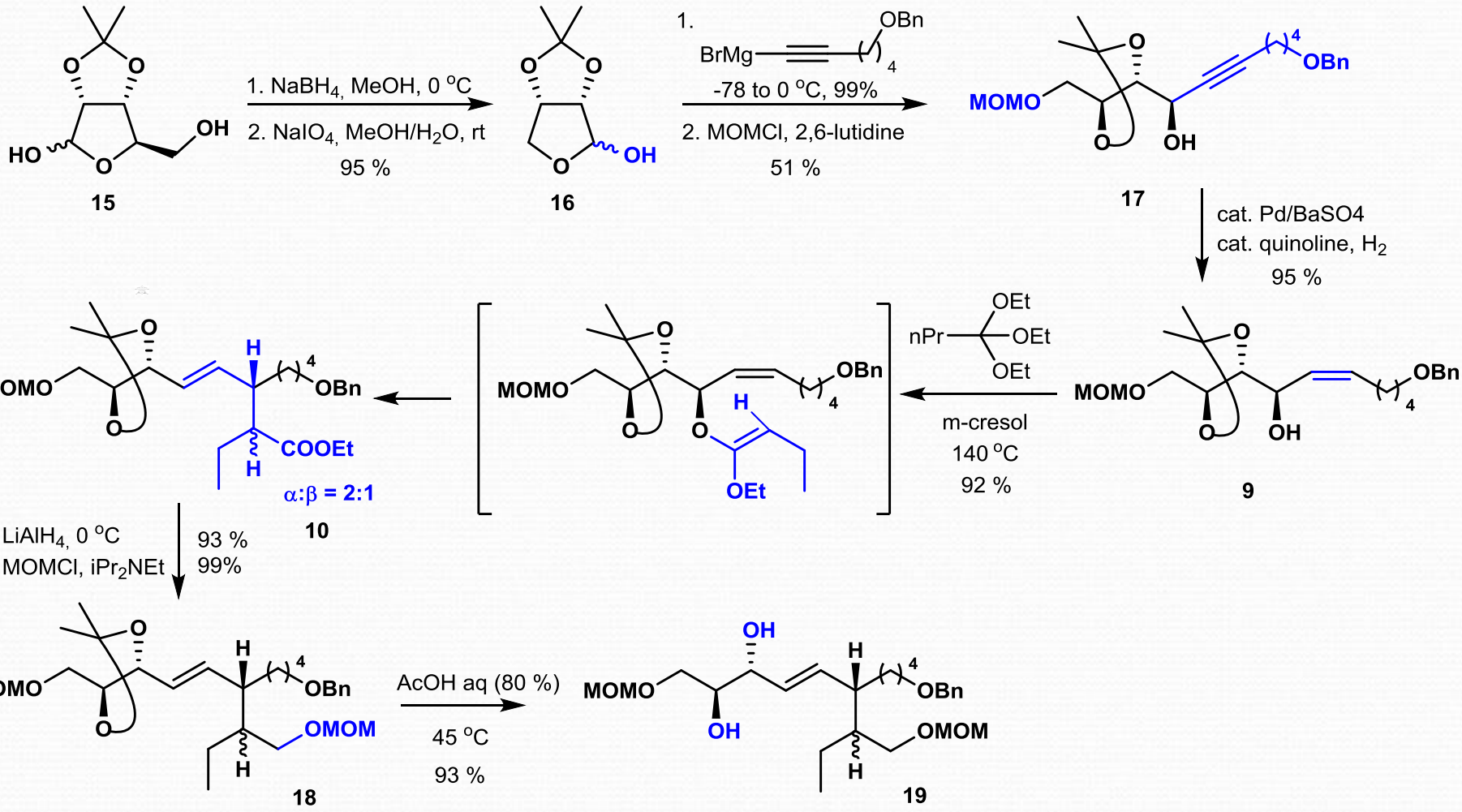


***Stemona* alkaloid group**

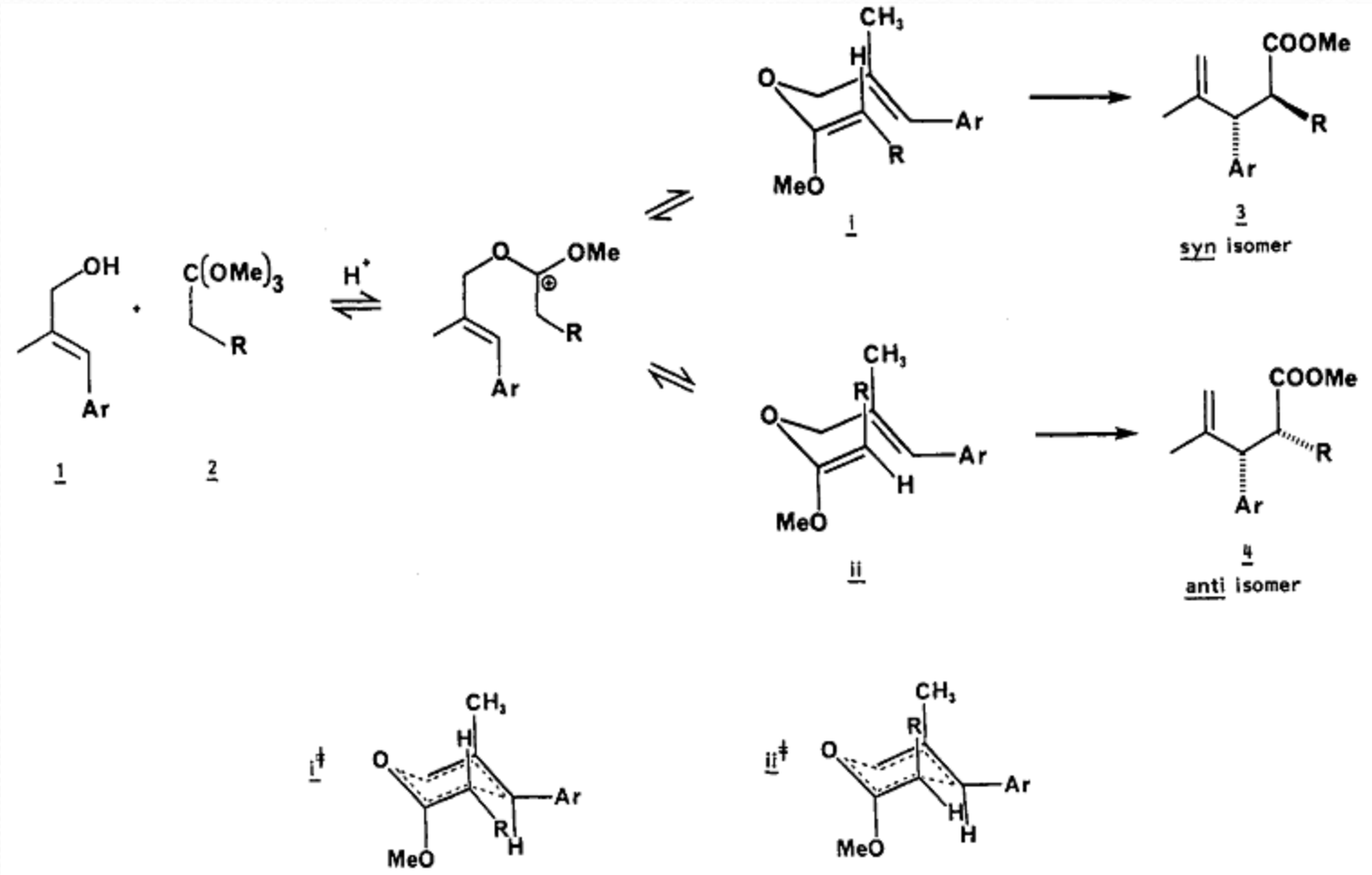
Synthetic plan for (+)-neostenine



Synthesis of allylic 1,2-diol 19

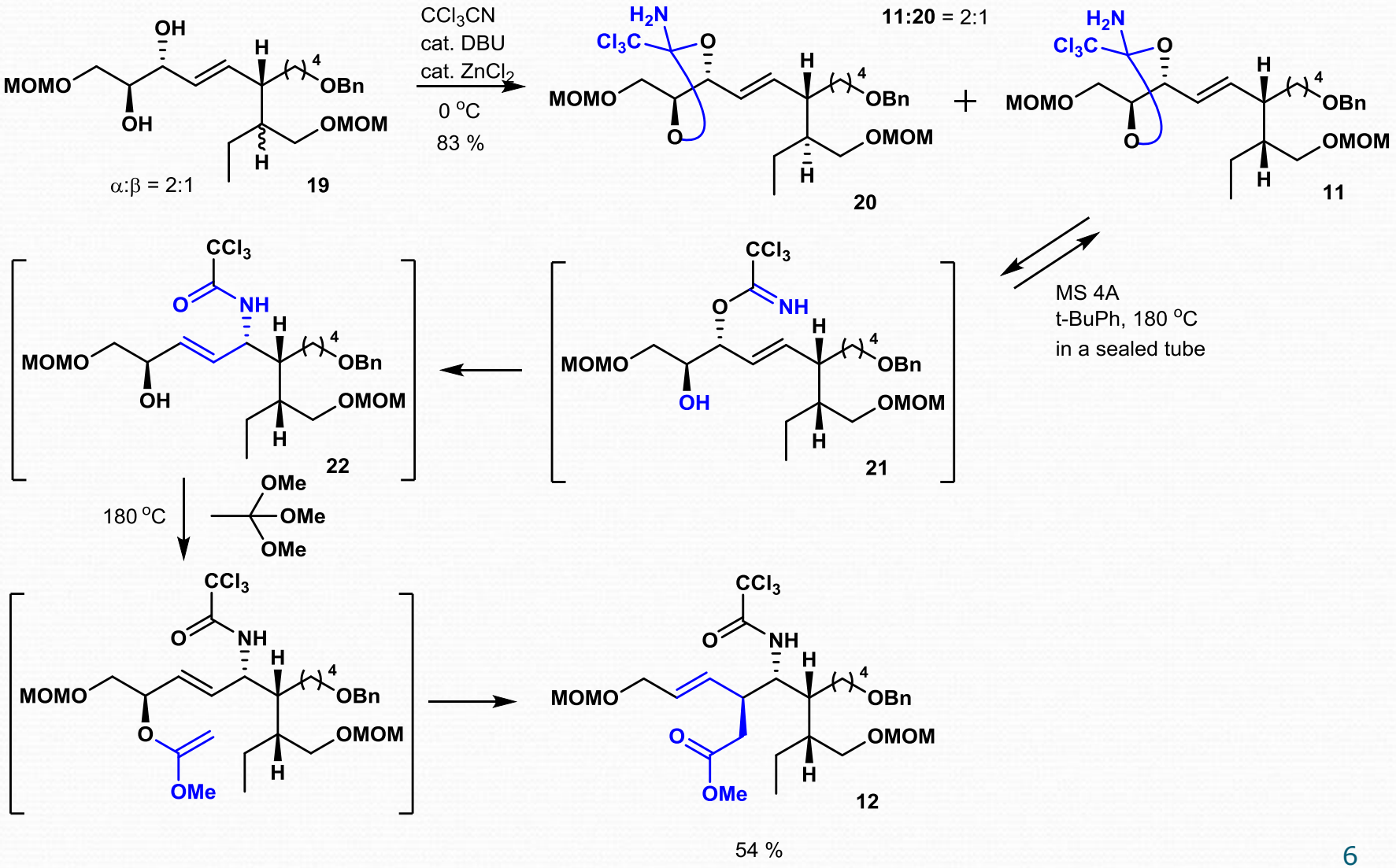


Diastereoselectivity in Claisen rearrangement

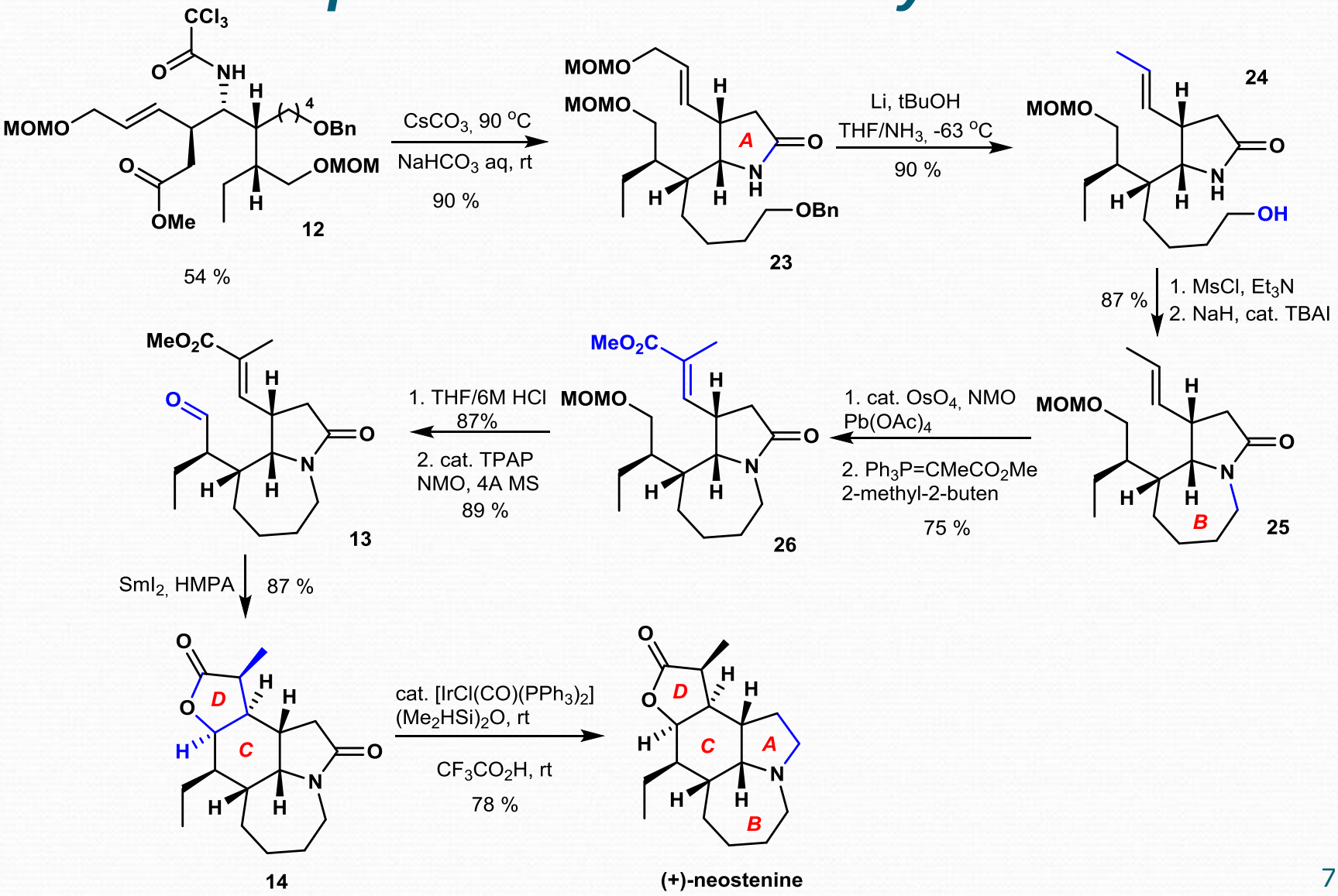


G. Daub, P. Shanklin, C. Tata *J. Org. Chem.* **1986**, *51*, 3402-3405.

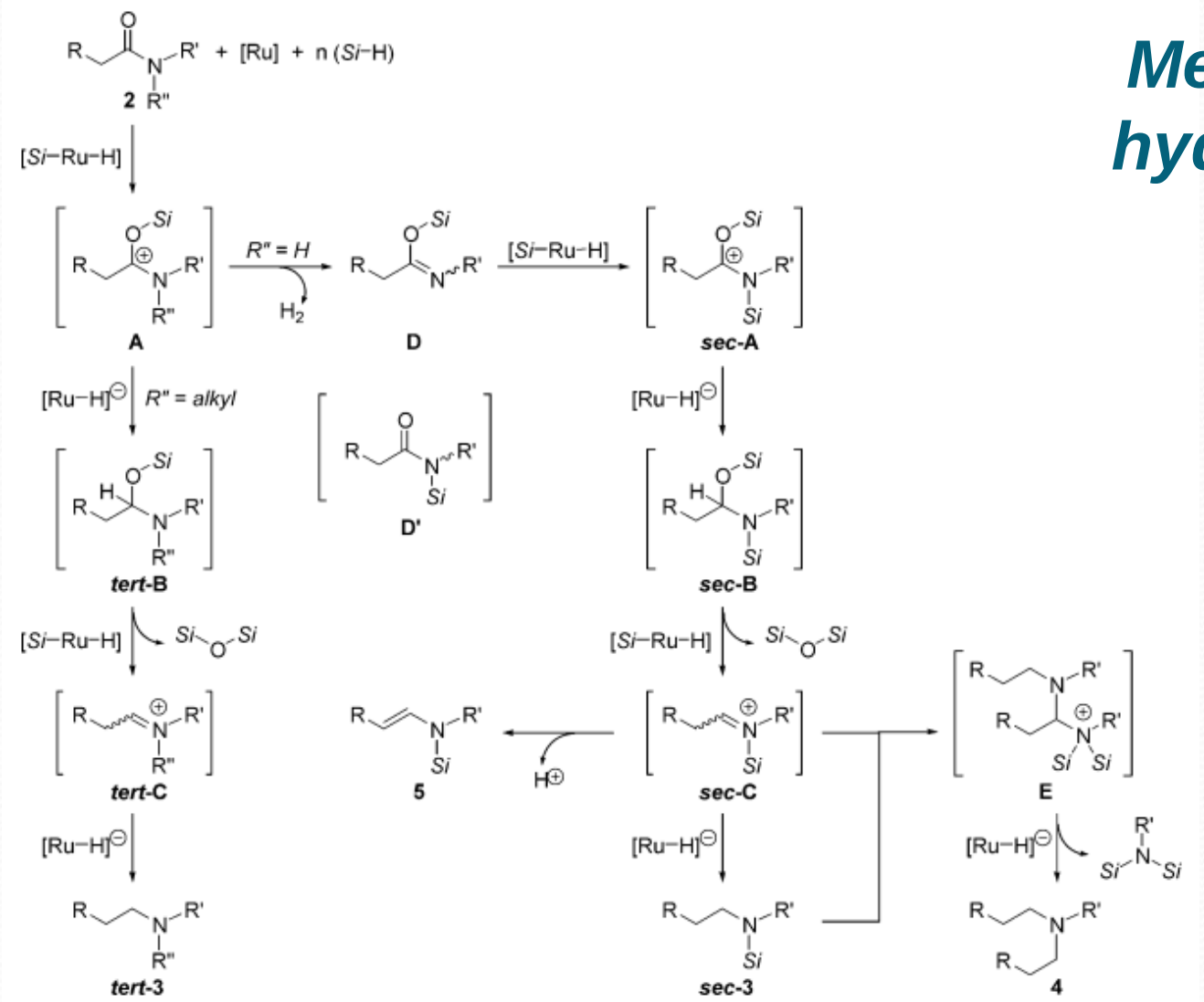
Overman/Claisen rearrangement of diol 19



Completion of the Total Synthesis



Mechanism of hydrosilylation (Ru = Ir)



S. Hanada, T. Ishida, Y. Motoyama, H. Nagashima *J. Org. Chem.* **2007**, *72*, 7551-7559.

Conclusions

- First enantioselective total synthesis of (+)-neostenine
- 18 steps from commercially available D-ribose
- 2.5 % total yield
- Key-steps:
  - Johnson-type of Claisen rearrangement
  - Overman / Claisen rearrangement
  - SmI_2 cyclization
  - Iridium-catalyzed hydrosylilation

Thank you for your attention!