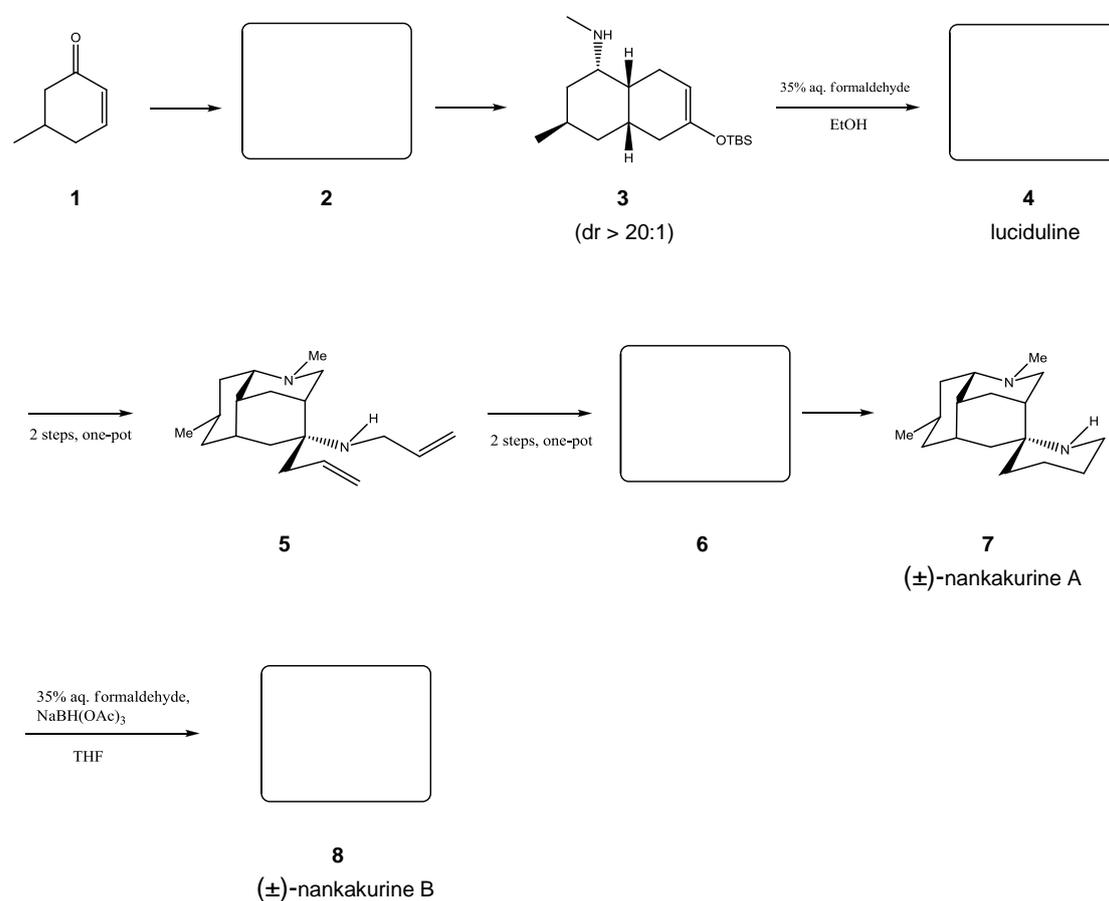


1) Total synthesis of (±)-Nankakurines A and B via Luciduline

Nankakurine A (**7**) and B (**8**) are natural products isolated from the club moss *Lycopodium hamiltonii*.¹ Low mM concentrations of nankakurine A were found to induce secretion of neurotrophic factors which in turn promoted significant neural outgrowth in rat adrenal glands.¹ Due to neurodegenerative disorders such as Alzheimer's and Parkinson's diseases there is an increased interest in small non-peptidic molecules capable of eliciting a neurotrophic response.

This combined with the scarcity of nankakurines A and B (0.003% and 0.002% yield respectively; corresponding to 1.6 mg and 1.1 mg respectively from 0.5 kg of plant material) as well as the synthetic challenges of the tetracyclic ring system containing 6 stereogenic centers, one of which quaternary, makes these molecules interesting targets for total synthesis.²

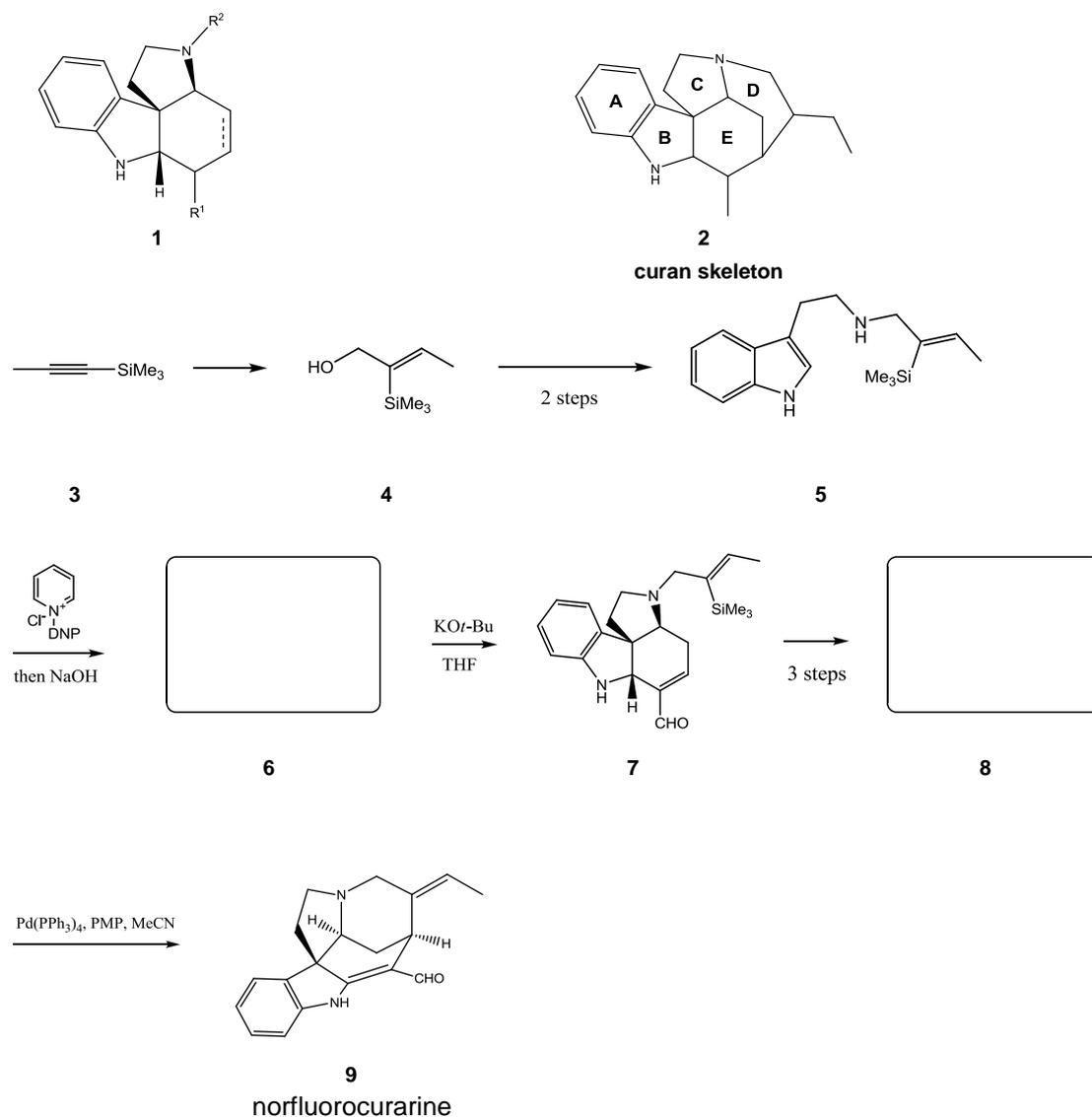
The total synthesis of luciduline (**4**) and nankakurines A (**7**) and B (**8**) is shown below (relative stereochemistry). Where missing, give structures and reagents.



2) Efficient Access to the Core of the *Strychnos* Alkaloids & Total Synthesis of Norfluorocurarine.

Tetracycle **1** constitutes the ABCE ring system of the curan skeleton (**2**) common to most *Strychnos* alkaloids.³ In their total synthesis of norfluorocurarine, a member of the *Strychnos* family of alkaloids, Martin and Vanderwal use a Zincke aldehyde to construct this tetracyclic core, making this the first successful use of a Zincke aldehyde in total synthesis.³

The total synthesis of norfluorocurarine (**9**) is shown below (relative stereochemistry). Where missing, give structures and reagents. Also, suggest a mechanism for the transformation of **5** to **6** and for the formation of **8**.



¹ Hirasawa, Y.; Kobayashi, J.; Obara, Y.; Nakahata, N.; Kawahara, N.; Goda, Y.; Morita, H. *Heterocycles* **2006**, *68*, 2357–2364

² Cheng, X.; Waters, S.P. *Org. Lett.* **2010**, *12* (2), 205–207

³ Martin, D.B.C.; Vanderwal, C.D. *J. Am. Chem. Soc.* **2009**, *131*, 3472–3473