Ph.D. Open Seminar

Title of Thesis: **"Total Syntheses of 3a,3a'-Bis-Pyrrolo[2,3-*b*]indoline Alkaloids via the Development of Catalytic Deacylative Alkylations (DaA)"**

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Date: **Aug. 02, 2017** Time: **4:00 PM** Venue: **AB2-401**

Abstract

The presence of all-carbon quaternary stereocenters invariably increases the difficulty of a chemical synthesis in the target molecule.[1] Due to the steric congestion imposed by the four attached carbons, a very limited number of reports on C–C bond-forming reactions that reliably assemble quaternary carbons, are known in literature.[1] Therefore, synthesis of molecules with an all-carbon quaternary cneter puts forward a great synthetic challenge.[2] The challenge is aggravated even further when two all-carbon quaternary stereocenters are contiguous. Typically, one of the ways to solve this problem is typically by installing the quaternary stereocenters sequentially.[3] Towards this architecturally complex biologically relevance C_2-symmetric indole alkaloids possessing contiguous stereogenic quaternary carbons [e.g. folicanthine (**1**), chimonanthine (**2**), and calycanthine (**3**)] drew our interest (Figure 1).[2-3]

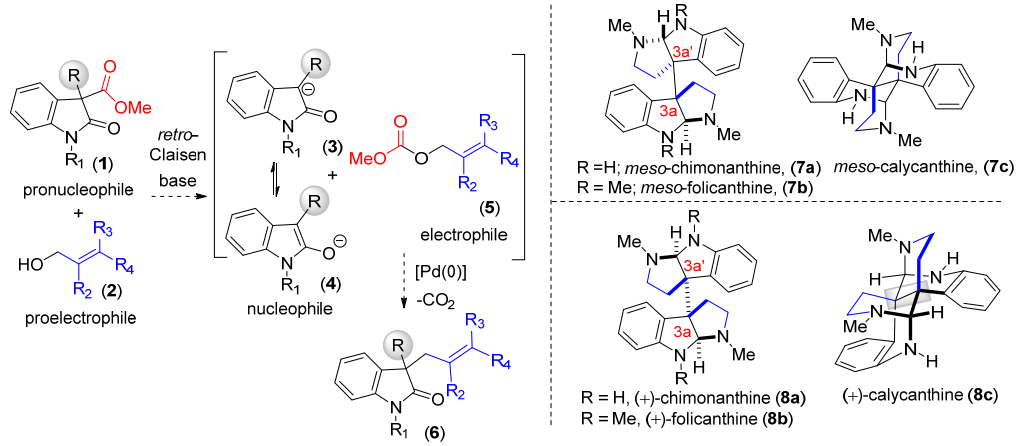

Figure 1. Indole alkaloids sharing vicinal all-carbon quaternary stereocenters.

During my Ph.D. programme, I undertook synthetic approaches to the cyclotryptamine alkaloids having hexacyclic 3a,3a'-bis-pyrrolo[2,3-*b*]indoline ring from 2-oxindoles (Figure 1). Towards this, I have been engaged in developing Pd(0)-catalyzed highly efficient synthesis of 2-oxindoles with C3-quaternary centers,[4] which goes through via *retro*-Claisen activation.[5a] Gratifyingly, this method has been extended for the synthesis of dimeric 2-oxindoles sharing vicinal all-carbon quaternary stereocenters.[5b] Finally, I have also developed a direct formation of pyrrolo[2,3-*b*]indoline ring from tryptamine derivative through Pd(0)-catalyzed deacylative alkylations.[6]

References and Notes:

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3. (a) L. E. Overman, D. V. Paone, B. A. Sterns, *J. Am. Chem. Soc.* 1999, **121**, 7702. (b) S. Ghosh, S. Bhunia, B. N. Kakde, S. De, A. Bisai *Chem. Commun.* 2014, **50**, 2434.
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5. (a) N. Kumar, M. K. Das, S. Ghosh, A. Bisai *Chem. Commun.* 2017, **53**, 2170. (b) N. Kumar, A. Maity, V. R. Gavit, A. Bisai *Manuscript under preparation.*
6. N. Kumar, V. R. Gavit, A. Maity, A. Bisai *Manuscript under preparation.*