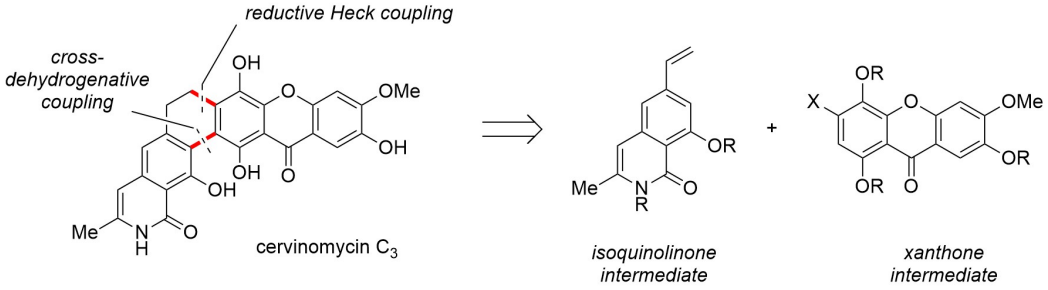
Studies Towards the Total Synthesis of Cervinomycin Natural Products

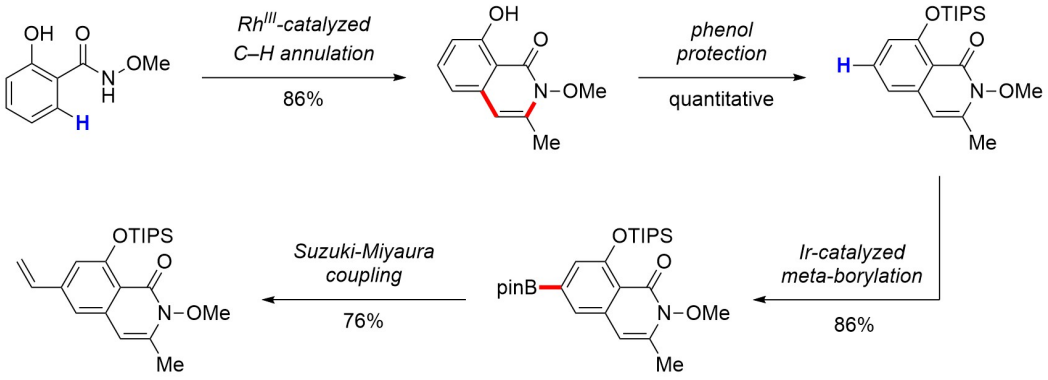
R. Lombardi[1], M. Wheatley[1], O. Baudoin[1]*

[1]University of Basel, Department of Chemistry

Cervinomycins are aromatic polyketides which exhibit antibiotic activity against gram-positive bacteria and high cytotoxicity. [1] Herein we report our studies towards the total synthesis of these natural products, in which multiple C–H functionalization steps allow for a convergent route. Retrosynthetically, we aim to construct cervinomycins from functionalized xanthone and isoquinolinone fragments, which will be joined through a reductive Heck coupling and a cross-dehydrogenative coupling. [2]



The isoquinolinone fragment was accessed in 5 steps from salicylic acid, using two strategic C–H activation reactions. A rhodium-catalyzed C–H annulation of 2-hydroxy-*N*-methoxybenzamide with chloroacetone gave the corresponding isoquinolinone product. [3] After protection of the phenol, an iridium-catalyzed C–H borylation furnished the meta-borylated isoquinolinone as a single isomer. [4] Suzuki-Miyaura coupling with vinyl tosylate gave the corresponding 6-vinylisoquinolinone intermediate. Currently, we are examining different C–H activation-based routes towards the xanthone fragment.



[1] a) Satoshi Omura, Yuzuru Iwai, Kiyoizumi Hinotozawa, Yoko Takahashi, Junko Kato, Akira Nakagawa, Atsushi Hirano, Hideki Shimizu, Katsuji Haneda, *J. Antibiotics,* **1982**, *35*, 645-652. b) Xiaowen Hu, Xinwin Hu, Xiaomin Hu, Shufen Li, LinLi Li, Liyan Yu, Hongyu Liu, Xuefu You, Zhen Wang, Li Li, Beibei Yang, Bingya Jiang, Linzhuan Wu, *J. Nat. Prod.,* **2019**, *82*, 2337-2342. c) Xiaowen Hu, Wei Sun, Shufen Li, LinLi Li, Liyan Yu, Hongyu Liu, Xuefu You, Bingya Jiang, Linzhuan Wu, *J. Antibiotics,* **2020**, *73*, 812-817.

[2] Kuanwei Chen, Tao Xie, Yanfang Shen, Haibing He, Xiaoli Zhao, Shuanhu Gao, *Org. Lett.,* **2021**, *23*, 1769-1774.

[3] Da-Gang Yu, Francisco de Azambuja, Frank Glorius, *Angew. Chem. Int. Ed.* **2014**, *53*, 2754-2758.

[4] Ibraheem A. I. Mkhalid, Jonathan H. Barnard, Todd B. Marder, Jaclyn M. Murphy, John F. Hartwig, *Chem. Rev.,* **2010**, *110*, 890-931.