Ph.D. Open Seminar

Title of Seminar: **Total Synthesis of the Proposed Structure of Mycobactin J and Transition Metal-Catalyzed Directed C-H Dienylation**

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Abstract

According to the World Health Organization (WHO), tuberculosis (TB) is one of the most predominant diseases in the world, mainly in the third world countries and one of the top 10 death-causing diseases worldwide. Considerable research is focused on metabolites of *Mycobacterium sp.* and the development of credible drug delivery systems is the main focus of such research. Siderophores containing hydroxamic acid residues are the key system for survival of *Mycobacterium sp*. mycobactins (metabolites of *Mycobacterium sp.*), formobactin, nocobactin, amamistatin and lasso peptides such as lariatins are some of such metabolites. Depending upon chemical structures, mycobactins show either growth promotion or inhibition activity. Among all the naturally occurring mycobactins, Mycobactin J (MJ) is the only commercially available with most complex structure in its family[1] and this drew our attention for its total synthesis. In this dissertation, the first streamlined total synthesis of the proposed structure of MJ is presented, with extensive elaboration.[2] This work, features novel chemistry for keeping the *Z*-form of long chain fatty acid intact until the synthetic game is over. Along with this, the other key step is the biomimetic construction of the chiral oxazoline building block, containing protecting group-free phenol moiety throughout the synthesis.

In the second part of the Thesis, a TM-catalyzed C-H dienylation of arenes is described. Allenes are highly valuable synthetic precursors in synthetic organic chemistry. Under coordinating group-directed, transition metal-catalyzed C-H functionalization, the presence of substituents alters the allene's reactivity and leads to a wide range of step-economical chemical reactions.[3] The present work studies the C-H dienylation of arenes to produce highly unsaturated, conjugated olefins with good efficiency, along with detailed mechanistic investigations.[4]

References:

(1) (a) McCullough, W. G.; Merkal, R. S. *Current Microbiology* **1982**, *7*, 337; (b) Schwartz, B. D.; De Voss, J. *Tetrahedron Lett.* **2001**, *42*, 3653.
(2) Ghosh, C.; Pal, S.; Patel, A. Kapur, M. (*manuscript submitted*).
(3) (a) Santhoshkumar, R.; Cheng, C.-H. *Asian J. Org. Chem.* **2018**, DOI: 10.1002/ajoc.201800133; (b) Gong, T.-J.; Su, W.; Liu, Z.-J.; Cheng, W.-M.; Xiao, B.; Fu, Y. *Org. Lett.* **2014**, *16*, 330; (c) Ma, S. *Chem. Rev.* **2005**, *105*, 2829.
(4) Ghosh, C.; Nagtilak, P. J.; Kapur, M. (*manuscript submitted*).