László Kürti, Med chem 2016, 6:7(Suppl)
http://dx.doi.org/10.4172/2161-0444.C1.021

Organocatalytic atroposelective synthesis of functionalized biaryls and stereospecific N-H aziridination of olefins

László Kürti
Rice University, USA

The Kürti lab has been exploring several fundamentally new strategies for the transition-metal-free direct arylation of arenes, in particular the organocatalytic atroposelective synthesis of 1,1'-linked functionalized biaryls. Without exaggeration it can be stated that axially chiral non-racemic biaryls (e.g., BINAP, BINOL, BINAM and their derivatives) have become the most successful class of ligands used in catalytic enantioselective processes. 1,1'-linked biaryls have also been referred to as "privileged chiral catalysts" because these ligands result in good enantioselectivity over many different (i.e., mechanistically unrelated) reactions. Given the abundance of axially chiral biaryl compounds in nature as well as their importance in drug discovery, asymmetric catalysis and materials science, it is surprising that relatively few methods are available for their atroposelective synthesis. In the first part of this presentation, we will describe how achiral N,N'-diaryl hydrazines and iminoquinones can be used as substrates in the presence of chiral acid catalysts to achieve the catalytic atroposelective synthesis of 1,1'-linked-2,2'-di-heteroatom substituted biaryls by utilizing highly atom-economical [3,3]-sigmatropic rearrangements (i.e., diaza-Cope rearrangement as well as Claisen rearrangement). These sigmatropic rearrangement approaches constitute a complete departure from existing strategies towards the catalytic asymmetric synthesis of biaryls. Computational studies on the transition state, rational catalyst design as well as the mode of chirality transfer will be presented. In the second part of the presentation, the Rh-catalyzed direct and stereospecific N-H/N-alkyl aziridination of olefins, a transformation that eluded synthetic chemists for decades, will be discussed along with the possible modes of NH-transfer.

Biography

László Kürti has completed his PhD under the guidance of Professor Amos B Smith III at the University of Pennsylvania in 2006 and completed his Post-doctoral studies at Harvard University with Nobel Laureate Professor EJ Corey. In 2010, he began his independent career at UT South-western Medical Center (Dallas, TX) and, in June 2015, he moved to Rice University (Houston, TX) as an Associate Professor of Chemistry. He is the author of three widely used textbooks/reference books and recently received the Thieme Chemistry Journal Award (2010), the Amgen Young Investigators' Award (2014), the JSPS Fellowship (2014), NSF Career Award (2015) as well the Biotage Young Principle Investigator Award (2015).

kurti.laszlo@rice.edu

Notes: