

New Methods for the Synthesis of Nitrogen Heterocycles

Jeffrey Aubé, Professor, Organic Medicinal Chemistry

New methods for the introduction of nitrogen-containing functional groups into organic molecules are constantly needed for the synthesis of new drug candidates and other kinds of useful molecules. (It is only necessary to leaf through a recent volume of the *Journal of Medicinal Chemistry* to convince oneself of this!) Our research group has been heavily involved in the development of new ring-expansion methods that permit the selective insertion of nitrogen adjacent to a carbonyl group.

However, it is not enough to discover a new reaction and test it on simple model substrates. To be truly useful, a reaction must be tested in the arena of synthesizing complex targets, such as natural products or various drug candidates inspired by peptides. Such “total synthesis” endeavors underway in the group involve a variety of fascinating molecules of nature. These targets display a variety of important biological properties as well, ranging from novel immunosuppressants to anticancer agents to ion channel blockers.

The REU student would choose from one of our ongoing projects in either synthetic methodology or total synthesis. The participant would garner experience in state-of-the-art synthetic technology, spectroscopy, and chromatography. To find out more about the group’s research in these areas, see the following selected recent publications:

“Modular Synthesis of Cyclic Peptidomimetics Inspired by β -Turns.” Senthil Kumar Ramanathan, John Keeler, Huey-Lih Lee, D. Srinavasa Reddy, Gerald Lushington, and Jeffrey Aubé, *Organic Letters*, **2005**, 7, 1059-1062.

“Facile C–N Cleavage in a Series of Bridged Lactams.” Yao Lei, Aaron D. Wroblewski, Jennifer E. Golden, Douglas R. Powell, and Jeffrey Aubé, *Journal of the American Chemical Society*, **2005**, 127, 4552-4553.

“Regioselective Single and Double Conjugate Additions to Substituted Cyclohexa-2,5-Dienone Monoacetals.” Scott Grecian, Aaron D. Wroblewski, and Jeffrey Aubé, *Organic Letters*, **2005**, 7, 3167–3170.

“An Expedient Total Synthesis of (\pm)-Stenine.” Yibin Zeng and Jeffrey Aubé, *Journal of the American Chemical Society*, **2005**, 127, 15712–15713.

“Revisiting a Classic Approach to the *Aspidosperma* Alkaloids: An Intramolecular Schmidt Reaction-Mediated Synthesis of (+)-Aspidospermidine.” Rajesh Iyengar, Klaas Schildknegt, Martha Morton, and Jeffrey Aubé, *Journal of Organic Chemistry*, **2005**, 70, 10645-10662.

“Remote Control of Diastereoselectivity in Intramolecular Reactions of Chiral Allylsilanes.” Weston R. Judd, Soho Ban, and Jeffrey Aubé, *Journal of the American Chemical Society*, **2006**, 128, 13736 - 13741.