

Albert A. Bowers, Ph.D.
Assistant Professor

Purdue University
Dept. Medicinal Chem. & Mol. Pharmacology
Heine Pharmacy Building
575 Stadium Mall Drive
West Lafayette, IN 47906-2091 Email:
bowers13@purdue.edu

EDUCATION & RESEARCH EXPERIENCE

- 2009-2011 **Postdoctoral research associate**, *Harvard Medical School, supervised by Prof. Christopher T. Walsh.* Biosynthesis, mutasynthesis, derivitization, & mode of action of thiazolyl peptide antibiotics.
- 2007-2008 **Postdoctoral research associate**, *Colorado State University, supervised by Prof. Robert M. Williams.* Total synthesis of Largazole and related anticancer HDAC inhibitors; investigation of their mode of action.
- 2003-2007 **Ph.D., organic chemistry**, *University of Illinois at Chicago, supervised by Prof. David Crich.* Mechanistic studies of thioglycoside couplings, free radical “dynamic combinatorial libraries,” and peptide ligations.
- 1996-2001 **B.A., art history**, *University of Chicago.*

AWARDS

- 2008 *National Institutes of Health National Cancer Institute Ruth L. Kirschstein Postdoctoral Fellowship.*
- 2006 *Robert M. Moriarty Graduate Fellowship, University of Illinois at Chicago.*
- 2005 *National Science Foundation/Japan Society for the Promotion of Science Fellowship, Kyoto University, Japan, supervised by Prof. Jun-Ichi Yoshida.*

RESPONSIBILITIES & ACHIEVEMENTS

- 2009 American Cancer Society Charity Runner, ING New York City Marathon (\$1,500 raised, 3:13:32 finish).
- 2006-2007 Supervision of undergraduate in research project on sulfonamide-based chemical ligation of peptides.
- 2004-2007 Chemical safety officer, Crich group.
- 1998-2001 Two-time captain, University of Chicago Men’s Crew.

SKILLS

Teaching experience: teaching assistant (UIC) in following undergraduate courses – CHEM114 (honors general chemistry), CHEM222 (analytical chemistry lecture & lab), CHEM234 (organic 2 lecture), CHEM235 (organic 2 lab).

Organic chemistry: Skilled in use of inert atmosphere/Schlenk and syringe techniques, vacuum line and glove box, radical and anionic chemistries, protecting group manipulations.

Separations and analysis: HPLC, FPLC, GC, GPC, and flash chromatography, FTIR, UV, LC/MS, MS/MS, and NMR.

Molecular Biology: PCR, cloning, overexpression and purification of recombinant protein in *E. coli*. *In vitro* biochemical assays. *In vivo* gene disruption and knock-out. Culture, growth, and isolation of natural products.

Languages: native English speaker; beginner French and Japanese.

PRESENTATIONS, PATENTS, & INVITED PUBLICATIONS

- 8 C. T. Walsh, M. G. Acker, **A. A. Bowers**, *Thiazolyl peptide antibiotic biosynthesis: a cascade of posttranslational modifications on ribosomal nascent proteins*, *J. Bio. Chem.*, **2010**, 285, 27525-27531.
- 7 R. M. Williams, J. E. Bradner, **A. A. Bowers**, T. L. Newkirk, A. E. Troutman-Youngman *Method for Preparing Largazole Analogs and Uses Thereof*, PCT Int. Appl., **2010**, WO 2010009334.
- 6 **A. A. Bowers**, R. M. Williams, “Total Synthesis and Biological Mode of Action of Macrocyclic Histone Deacetylase Inhibitors.” Discovery on Target, Boston, MA, November 2, 2009.
- 5 T. L. Newkirk, **A. A. Bowers**, R. M. Williams, *Discovery, biological activity, synthesis and potential therapeutic utility of naturally occurring histone deacetylase inhibitors*, *Nat. Prod. Rep.*, **2009**, 26(10), 1293-1320.
- 4 D. Crich, **A. A. Bowers**, *Multicomponent coupling and glycopeptides synthesis with cyclic thioanhydrides*, US. Pat. Appl. Publ., **2009**, US 20090163697.
- 3 D. Crich, **A. A. Bowers**, “Sulfoxides, Sulfimides, and Sulfones” in *Handbook of Chemical Glycosylation*, ed. A. Demchenko, Wiley-VCH, Weinheim, Germany, **2008**, 303-328.
- 2 D. Crich, **A. A. Bowers**, and D. Grant “Dithiocarbamate-, dithiobenzoate-, and nitroxyl- based free radicals in dynamic combinatorial chemistry: Library generation and deconvolution.” ACS National Meeting, Chicago, IL March 28, 2007.
- 1 W. Kantlehner, **A. A. Bowers**. *t*-Butoxybis(dimethylamino)methane, *Encyclopedia of Reagents for Organic Synthesis [Online (eEROS)]*, eds. R. M. Coates and S. E. Denmark, John Wiley & Sons, Ltd.

PUBLICATIONS

- 15 **A. A. Bowers**, S. Pondoru, R. Paranal, M. G. Acker, C. T. Walsh, and J. E. Bradner, *Mechanism of 20S Proteasome Inhibition by Genetic Library of Thiopeptide Variants*, submitted.
- 14 **A. A. Bowers**, C. T. Walsh, and M. G. Acker, *Genetic Interception and Structural Characterization of Thiopeptide Cyclization Precursors from Bacillus cereus*, *J. Am. Chem. Soc.*, 132(35) 12182-12184, **2010**.
- 13 **A. A. Bowers**, M. G. Acker, and C. T. Walsh, *In vivo Manipulation of Thiocillin: Structure, Conformation, and Activity of Heterocycle Substitution Mutants*, *J. Am. Chem. Soc.*, 132(21) 7319-7327, **2010**.
- 12 M. G. Acker, **A. A. Bowers**, and C. T. Walsh, *Generation of Thiocillin Variants by Prepeptide Gene Replacement and In Vivo Processing by B. cereus*, *J. Am. Chem. Soc.*, 131(48) 17563-17565, **2009**.
- 11 D. Crich, K. Sasaki, M. Sardar, and **A. A. Bowers**, *One-Pot Syntheses of Dissymmetric Diamides Based on the Chemistry of Cyclic Monothioanhydrides. Scope, Limitations, and Application to the Synthesis of Glycopeptides*, *J. Org. Chem.*, 74(10) 3886-3893, **2009**.
- 10 **A. A. Bowers**, N. West, T. Newkirk, A. Troutman-Youngman, S. L. Schreiber, O. Wiest, J. E. Bradner, and R. M. Williams, *Synthesis and HDAC Inhibitory Activity of Largazole Analogs: Alteration of the Zinc-Binding Domain and Macrocyclic Scaffold*, *Org. Lett.*, 11(6) 1301-1304, **2009**.
- 9 **A. A. Bowers**, T. Greshock, N. West, G. Estiu, S. L. Schreiber, O. Wiest, R. M. Williams, J. E. Bradner, *Synthesis & Conformation-Activity Relationships of Peptide Isosteres of FK228 & Largazole*, *J. Am. Chem. Soc.*, 131 2900, **2009**.
- 8 **A. A. Bowers**, N. West, J. Taunton, S. L. Schreiber, J. E. Bradner, and R. M. Williams, *The Total Synthesis and Biological Mode of Action of Largazole: A Potent Class I Histone Deacetylase (HDAC) Inhibitor*, *J. Am. Chem. Soc.*, 130(33) 11219-11222, **2008**.
- 7 D. Crich and **A. A. Bowers**, *Cyclic Thioanhydrides: Linchpins for Multicomponent Coupling Reactions Based on the Reaction of Thioacids with Electron-Deficient Sulfonamides and Azides*, *Org. Lett.*, 9(25) 5323-5325, **2007**.
- 6 D. Crich, D. Grant, and **A. A. Bowers**, *Heterobivalent Library Expansion by "Living Radical" Processes. Thiocarbonyl Addition Elimination, and Nitroxide-Based Reactions with Fluorous Deconvolution*, *J. Am. Chem. Soc.*, 129(40) 12106-12107, **2007**.
- 5 T. Nokami, A. Shibuya, H. Tsuyama, **A. A. Bowers**, D. Crich, S. Suga, and J.-I. Yoshida, *Electrochemical Generation of Glycosyl Triflates*, *J. Am. Chem. Soc.* 129(35) 10922-10928, **2007**.
- 4 D. Crich, C. M. Pedersen, **A. A. Bowers**, and D. J. Wink, *Does Conformational Restriction Influence Stereoselectivity in the Formation of Arabinofuranosides? The 3,5-Di-O-benzylidene and 3,5-Di-O(di-tert-butylsilylene)-2-O-benzylarabinofuranosides as Glycosyl Donors*, *J. Org. Chem.*, 72(5) 1553-1565, **2007**.
- 3 D. Crich and **A. A. Bowers**, *Total Synthesis of a β -(1 \rightarrow 3)-D-Rhamnnotetraose by a One-Pot, Multiple Radical Fragmentation*, *Org. Lett.*, 8(19) 4327-4330, **2006**.
- 2 D. Crich and **A. A. Bowers**, *4,6-O-[1-Cyano-2-(2-iodophenyl)ethylidene] Acetals. Improved Second Generation Acetals for the Stereoselective Formation of β -D-Mannopyranosides and Regioselective Reductive Radical Fragmentation to β -D-Rhamnopyranosides. Scope and Limitations*, *J. Org. Chem.* 71(9) 3452-3463, **2006**.
- 1 D. Crich, Q. Yao, **A. A. Bowers**, *On the regioselectivity of the Hanessian-Hullar reaction in 4,6-O-benzylidene protected galactopyranosides*, *Carbohydrate Res.*, 341(10) 1748-1752, **2006**.

REFERENCES

Professor Christopher T. Walsh
Harvard Medical School
Dept. Biological Chem. & Mol. Pharmacology
200 Longwood Ave.
Boston, MA 02115
Tel: 617-432-1715
Fax : 617-432-0556
christopher_walsh@hms.harvard.edu

Professor David Crich
Centre de Recherche CNRS de Gif-sur-Yvette
Institut de Chimie des Substances Naturelles
Avenue de la Terrasse, 91198
Gif-sur-Yvette, France
Tel: 313-577-1915
Fax: 313-577-8822
dcrich@icsn.cnrs-gif.fr

Professor Robert M. Williams
Department of Chemistry
Colorado State University
Fort Collins, CO 80523
Tel: 970-491-6747
Fax: 970 491-3944
robertmwilliams8@gmail.com

Professor Jun-ichi Yoshida
Dept. of Synthetic & Biological
Chemistry
Graduate School of Engineering
Kyoto University
Kyoto 615-8510 Japan
Tel: +81-75-383-2726
Fax +81-75-383-2727
yoshida@sbchem.kyoto-u.ac.jp

Dr. James E. Bradner, MD
Dana-Farber Cancer Institute
44 Binney Street
Dana Building D510D
Boston, MA 02115
Tel: 617-632-6629
Fax: 617-582-7370
james_bradner@dfci.harvard.edu