Albert A. Bowers, Ph.D.
Assistant Professor

University of North Carolina at Chapel Hill
UNC Eshelman School of Pharmacy
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PROFESSIONAL APPOINTMENTS

Assistant Professor, UNC Eshelman School of Pharmacy, Chapel Hill, NC — 2012-present
Division of Chemical Biology and Medicinal Chemistry

Assistant Professor, Purdue University, West Lafayette, IN — 2011-2012
Dept. of Medicinal Chemistry & Molecular Pharmacology

Postdoctoral research associate, Harvard Medical School, Boston, MA — 2009-2011
Advisor: Prof. Christopher T. Walsh
Biosynthesis, mutasynthesis, & mode of action of thiazolyl peptide antibiotics

Postdoctoral research associate, Colorado State University, Fort Collins, CO — 2008
Advisor: Prof. Robert M. Williams
Total synthesis and structure-activity relationship studies of Largazole and related anticancer HDAC inhibitors

EDUCATION

Visiting scholar, National Institutes of Health, Bethesda, MD — 2011
Host: Dr. David L. Levens

Ph.D., organic chemistry, University of Illinois at Chicago, Chicago, IL — 2003-2007
Advisor: Prof. David Crich
Mechanistic studies of thioglycoside couplings, free radical "dynamic combinatorial libraries," and peptide ligations.

Visiting scholar, Kyoto University, Kyoto, Japan — 2005
Host: Prof. Jun-Ichi Yoshida

B.A., art history, University of Chicago, Chicago, IL — 1996-2001

SELECT AWARDS

AACP New Investigator Award — 2013

NIH (NCI) Ruth L Kirschstein Postdoctoral Fellowship (F32) — 2008-2010

Robert M. Moriarty Graduate Fellowship — 2006

NSF/Japan Society for the Promotion of Science Fellowship — 2005

PRESENTATIONS, PATENTS, & INVITED PUBLICATIONS

8 "Bacterially-Encoded, Post-Translationally Modified Peptidomimetics for Drug Discovery," High-Throughput Chemistry and Chemical Biology Gordon Research Conference, New London, NH, June 2-7, 2014.

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.

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* (*e*EROS)], eds. R. M. Coates and S. E. Denmark, John Wiley & Sons, Ltd.

PUBLICATIONS

23 J. M. Guerra-Bubb, **A. A. Bowers**, W. B. Smith, R. Paranal, G. Estiu, O. Wiest, J. E. Bradner, R. M. Williams, Synthesis and HDAC inhibitory activity of isosteric thiazoline-oxazole largazole analogs, *Bioorg. Med. Chem. Lett.*, ahead of print, **2013**.

22 X. Du, D. Wojtowicz, **A. A. Bowers**, D. Levens, C. Benham, and T. M. Przytycka Genome-wide distribution of non-B DNA motifs is shaped by operon structure and suggests transcriptional importance of non-B DNA structures in *Escherichia coli*, *Nuc. Acid. Res.*, 41(12), 5965-5977, **2013**.

21 W. Wever, M. A. Cinelli, **A. A. Bowers**, Visible Light Mediated Activation and O-Glycosylation of Thioglycosides*, Org. Lett.,* 15(1), 30-33, **2013**.

20 Arnison, P. *et al.*, Ribosomally Synthesized and Post-Translationally Modified Peptide Natural Products: Overview and Recommendations for a Universal Nomenclature, *Nat. Prod. Rep.*, 30, 108-160, **2013**.

19 **A. A. Bowers,** Preparation of natural product-like cyclic peptide libraries, *MedChemComm*, 3, 905-915 **2012**.

18 **A. A. Bowers**, M. G. Acker, T. S. Young, and C. T. Walsh, Generation of Thiocillin Ring Size Variants by Prepeptide Gene Replacement and In Vivo Processing by *Bacillus cereus, J. Am. Chem. Soc.*, 134(25) 10313-10316, **2012**.

17 B. Li, R. R. Forseth, **A. A. Bowers**, F. C. Schroeder, C. T. Walsh, A Backup Plan for Self-protection: S-Methylation of Holomycin Biosynthetic Intermediates in *Streptomyces clavuligerus*, *ChemBioChem*, 13(17) 2521-2526, **2012**.

16 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.

15 **A. A. Bowers**, C. T. Walsh, M. G. Acker, Genetic Interception and Structural Characterization of Thiopeptide Cyclization Precursors from Bacillus cereus*, J. Am. Chem. Soc.*, 132(35) 12182-12184, **2010**.

14 **A. A. Bowers**, M. G. Acker, 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**.

13 M. G. Acker, **A. A. Bowers**, 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**.

12 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.

11 D. Crich, K. Sasaki, M. Sardar, **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, 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, 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, **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, **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, 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**, 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, **A. A. Bowers**, Total Synthesis of a β-(1→3)-D-Rhamnotetraose by a One-Pot, Multiple Radical Fragmentation*, Org. Lett,* 8(19) 4327-4330, **2006**.

2 D. Crich, **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**.

TRAINING

Current Group Members

Dr. Scott Allen — Post-doc
Ph.D. University of Pennsylvania (PI: Marisa Kozlowski)

Walter Wever — Graduate Student
B.S., M.S. Texas Tech University

Rachel M. Bleich — Graduate Student
B.S. Western Carolina University

Paul M. Himes — Graduate Student
B.S. Rose Hulman Institute of Technology

Chuck Kuang — Undergraduate
B.S. UNC Chapel Hill (expected May 2015)

Past Group Members

Dr. Maris A. Cinelli — Post-doc
Ph.D. Purdue University (PI: Mark Cushman) — *Current: Postdoc, Northwestern University (R. B. Silverman)*

Dr. Nicoleta Economou — Post-doc
Ph.D. Drexel School of Medicine (PI: Patrick Loll) — *Current: Product Development, PerkinElmer*