

Martin D. Burke, Ph.D., M.D.

Work

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Personal

Born: Feb. 5, 1976. Westminster, MD
Married: M.-Christina White, Ph.D.

Education

- 1998-2005 National Institutes of Health Fellow in the Medical Scientist Training Program
Harvard Medical School/Massachusetts Institute of Technology
Division of Health Sciences and Technology: Boston, Massachusetts
Degree awarded: M.D.
- 1999-2003 Howard Hughes Medical Institutes Predoctoral Fellow
Harvard University, Department of Chemistry and Chemical Biology
Cambridge, Massachusetts, Degree Awarded: Ph.D.
Thesis advisor: Professor Stuart L. Schreiber
Thesis title: A Synthesis Strategy for Generating Diverse Skeletons of Small Molecules
Combinatorially.
- 1994-1998 Johns Hopkins University, Baltimore, Maryland
Degree Awarded: B.A. Chemistry
Research advisors: Professors Henry Brem and Gary H. Posner
Undergraduate Research: Development of 1,25 D₃ Analog-loaded Biodegradable
Polymer Wafers for Treatment of Systemic Tumors Metastatic to the Brain.

Appointment

August 2005- present Assistant Professor, Department of Chemistry
University of Illinois at Urbana-Champaign, Urbana, Illinois.

Awards and honors

- 2005 ACS Petroleum Research Foundation Type G Award
2005 Camille and Henry Dreyfus New Faculty Award
2005 Henry Asbury Christian Award, Harvard Medical School
2003 NIH Medical Scientist Training Program Fellowship – Harvard Medical School
2000 Howard Hughes Medical Institute Predoctoral Fellowship

1998	Hunterian Research Award - Johns Hopkins Department of Neurosurgery
1997	Phi Beta Kappa - Junior Year, Johns Hopkins University
1997	Howard Hughes Undergraduate Research Fellowship - Johns Hopkins University
1997	Provost's Undergraduate Research Award - Johns Hopkins University
1997	Golden Key National Honor Society - Johns Hopkins University
1994-1998	Dean's List - Johns Hopkins University
1994-1998	Beneficial Hodson Scholar - Johns Hopkins University
1994-1998	Maryland Distinguished Scholar

Peer-reviewed publications

1. S.J. Lee, K.C. Gray, J.S. Paek, M.D. Burke. "Simple, Efficient, and Modular Syntheses of Polyene Natural Products via Iterative Cross-Coupling" *Submitted* **2007**.
2. E.P. Gillis, M.D. Burke "Iterative Cross-Coupling with B-Protected Haloboronic Acids" *Invited contribution to Organic Syntheses, manuscript in preparation, 2007*.
3. D.S. Palacios, T.M. Anderson, M.D. Burke "A Post-PKS Oxidation of the Amphotericin B Skeleton Predicted to be Critical for Channel Formation is Not Required for Potent Antifungal Activity" *J. Am. Chem. Soc.* **2007**, *129*, 13804-13805.
4. E.P. Gillis and M.D. Burke. "A Simple and Modular Strategy for Small Molecule Synthesis: Iterative Suzuki-Miyaura Coupling of B-Protected Haloboronic Acid Building Blocks." *J. Am. Chem. Soc.* **2007**, *129*, 6716-6717.

This paper is highlighted in the June 18th 2007 issue of *Chemical and Engineering News*: S. Borman, "Masks unveil new synthetic routes" *Chem. Eng. News* **2007**, *85*, 63-64. It was also selected as the "most intriguing contribution of the month" by *SynFacts* **2007**, *10*, 1007.: (<http://www.thieme-connect.com/ejournals/html/synfacts/doi/10.1055/s-2007-968950>).

5. M.D. Burke, E.M. Berger, and S.L. Schreiber. "A Synthesis Strategy Yielding Skeletally Diverse Small Molecules Combinatorially." *J. Am. Chem. Soc.* **2004**, *126*, 14095-14104.
6. M.D. Burke and S.L. Schreiber. "A Planning Strategy for Diversity-Oriented Synthesis." *Angew. Chem. Int. Ed.* **2004**, *43*, 46-58.

This paper has been recognized by Thomson-ISI as "one of the most cited recent papers in the field of chemistry." *ISI Essential Science Indicators* (> 215 citations).

7. M.D. Burke, E.M. Berger, and S.L. Schreiber. "Generating Diverse Skeletons of Small Molecules Combinatorially." *Science* **2003**, *302*, 613-618.

This paper was selected as one of the top *Chemistry Highlights 2003* "for making natural-product-like libraries of unprecedented diversity." *Chem. & Eng. News* **2003**, *81:51*, 48. For additional commentaries see: *Chem. & Eng. News* **2003**, *81:43*, 40; *Nature Rev. Drug Discovery "Highlights,"* **2003**, *2:12*, 948; *Chem. & Eng. News* **2004**, *82:40*, 32. This work has also been reviewed in *Nature*, **2004**, *432*, 846-854.

8. R.M. Kohli, M.D. Burke, X.L. Tao, and C.T. Walsh. "Chemoenzymatic Route to Macrocyclic Hybrid Peptide/Polyketide-like Molecules." *J. Am. Chem. Soc.* **2003**, *125*, 7160-7161.
9. M.C. White, M.D. Burke, S. Peleg, P. Dolan, T. Kensler, H. Brem, and G.H. Posner. "Conformationally Restricted Hybrid Analogs of 1,25-Dihydroxyvitamin D₃, Design, Synthesis, and Preliminary Biological Evaluation." *Bioorg. & Med. Chem.* **2001**, *9*, 1691-1699.
10. G.H. Posner, J.K. Lee, Q. Wang, S. Peleg, M.D. Burke, H. Brem, P. Dolan, and T. Kensler. "Non-Calcemic, Antiproliferative, Transcriptionally-Active, 24-Fluorinated Hybrid Analogs of the Hormone 1 α ,25-Dihydroxyvitamin D₃. Synthesis and Preliminary Biological Evaluation." *J. Med. Chem.* **1998**, *41*, 3008-3014.

Dissertation

M.D. Burke. "A Synthesis Strategy for Generating Diverse Skeletons of Small Molecules Combinatorially." Department of Chemistry and Chemical Biology, Harvard University, **2003**.

Patents

1. M.D. Burke, E.P. Gillis, S.J. Lee "System for Controlling the Reactivity of Boronic Acids" Patent Application Pending, UIUC Office of Technology Management.
2. M.D. Burke, E.M. Berger, O. Kwon, S.B. Park, and S.L. Schreiber. "Generation of Skeletal Diversity Within a Combinatorial Library." Harvard University. Patent Application Pending: U.S.S.N. 10/640834, Filed August 14, 2003.
3. C.T. Walsh, M. Burkart, R.M. Kohli, and M.D. Burke. "Method for the Preparation of Macrocyclic Molecules, Macrocyclic Molecules Prepared Thereby, and Substrates and Solid Supports for Use Therein." Harvard Medical School, Pending Patent Application: U.S.S.N. 10/289157 Filed October 6, 2002.

Reviews

1. M.D. Burke and G. Lalic. "Teaching Target-Oriented and Diversity-Oriented Organic Synthesis at Harvard University." *Chemistry and Biology* **2002**, *9*, 535-541.
2. M.D. Burke, H. Brem, and R. Langer. "Central Nervous System, Drug Delivery to Treat." In *The Encyclopedia of Controlled Drug Delivery*. Mathiowitz, E., Ed.; John Wiley and Sons., Vol. 1, **1999**, 184-212.
3. J. Hanes and M.D. Burke. "Polymer-Controlled Drug Delivery: An Overview for the Clinician." *Hospital Pharmacist Report*. December **1997**, 2-11.

Abstracts

1. M.D. Burke "Molecular Prosthetics: Replicating the Functions of the Molecules of Life" *Enhancing Chemistry Conference*. University of Illinois at Urbana-Champaign, Urbana, Illinois, March 17, 2006.
2. M.D. Burke and S.L. Schreiber. "The Generation of Structural Diversity in Split-Pool Synthesis." Harvard-MIT Division of Health Sciences and Technology Forum. Book of Abstracts. Cambridge, Massachusetts: March 9, 2000, p 5.
3. M.D. Burke, M.C. White, M. Watts, J. Lee, B. Tyler, G.H. Posner, and H. Brem. "Hybrid Analogs of 1,25-Dihydroxyvitamin D₃ Having Potent Antiproliferative Effects Against Murine Tumor Cell Lines Metastatic to the Brain." In *Vitamin D₃: Chemistry, Biology, and Clinical Applications of the Steroid Hormone; Proceedings of the Tenth Workshop on Vitamin D*; A.W. Norman, R. Bouillon, and M. Thommasser, Eds.; University of California Press, 1997, p 487.
4. M.D. Burke, M.C. White, J. Lee, M. Watts, B. Tyler, G.H. Posner, and H. Brem. "Biodegradable Polymer Wafers Impregnated with Hybrid Analogs of 1,25-Dihydroxyvitamin D₃ for the Treatment of Intracranial Metastases." Fifth Annual Brown University Symposium on Vitamin D. Providence, Rhode Island, September 7-9, 1997.
5. M. Watts, M. Lesniak, M.D. Burke, A. Samdani, B. Tyler, and H. Brem. "Efficacy of Adriamycin in the Treatment of Malignant Glioma." Conference of the American Association of Neurological Surgeons. Denver, Colorado, April 12-17, 1997.