Lara K. Mahal

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Chemistry and Biochemistry Department
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Education

University of California, Berkeley (August 1995-December 2000)
Ph. D. in Chemistry
Research Director: Professor Carolyn R. Bertozzi
Thesis Title: Biosynthetic Modulation of Cell Surface Sialosides

University of California, Santa Cruz (September 1991-June 1995)
B. A. in Chemistry, *with Highest Honors*
Research Director: Professor Rebecca Braslau
Thesis title: The Stoichiometric Generation and Use of Novel Prochiral Carbon Radicals to Probe Stereoselectivity in Acyclic Radical Reactions.

Postdoctoral Research

Sloan-Kettering Institute (October 2000-July 2003)
Jane Coffin Childs Postdoctoral Fellow
Program of Cellular Biochemistry and Biophysics
Research Director: Dr. James E. Rothman

Awards and Honors

Johnson Scholar (August 1992-June 1994)
University of California, Regents Scholar (August 1993-June 1995)
Ellen D. Renard Scholar (August 1993-June 1994)
Achievement Rewards for College Scientists (ARCS) Foundation Scholar (U.C. Santa Cruz, August 1994-June 1995)
Drexler Scholar (August 1994-June 1995)
Phi Beta Kappa (1995)
ARCS Foundation Scholar (U.C. Berkeley, August 1996-June 1997 and, August 1997-June 1998)
Division of Medicinal Chemistry Pre-doctoral Fellow, A.C.S. (1998-1999)
Jane Coffin Childs Postdoctoral Fellow (November 2000- July 2003)
Fellow, Institute for Cellular and Molecular Biology, U.T. Austin (August 2003-present)
Recipient of *Synthesis* and *Synlett* Assistant Professor Journal Award (2004)
Beckman Young Investigator Award (August 2004-2007)
Invited Member, Faculty of 1,000, Biology (2006-2008)

NSF CAREER Award Recipient (April 2007-present)
Sloan Foundation Fellow (2008-present)

Affiliations

University of Texas at Austin
Organic Division
Biochemistry Division
Institute for Cellular and Molecular Biology
Center for Systems and Synthetic Biology
Consortium for Functional Glycomics
Participating Investigator

Professional Experience

Research Assistant, Department of Chemistry, U.C. Santa Cruz (1994-1995)
Research Assistant, Department of Chemistry, U.C. Berkeley (1995-2000)
Head Teaching Assistant for Organic Chemistry (Chem 3A, U.C. Berkeley, 1998)

Assistant Professor, U.T. Austin (2003-present)
Faculty Advisor, Colleges Against Cancer (2004-present)

Reviewer for:
Journal of the American Chemical Society
Nature Chemical Biology
Nature Biotechnology
Biochemistry
Organic Letters
Chemistry and Biology
ChemBioChems
ACS Chemical Biology
Carbohydrate Research

Invited Guest Editor of **2009** Analytical Techniques Section of *Current Opinion in Chemical Biology*

Professional Societies

American Chemical Society (A.C.S., 1995-present)
American Association for the Advancement of Science (1998-present)
Society for Glycobiology (2006-present)

Publications

1. Braslau, R.; Burrill, L. C.; **Mahal, L. K**.; Wedeking, T. A Totally Radical Approach to the Control of Stereochemistry: Coupling of Prochiral Radicals with Chiral Nitroxyl Radicals. *Angew. Chem. Int. Ed. Eng*. **1997**, *36*, 237-238.
2. **Mahal, L. K.**; Yarema, K. J.; Bertozzi, C. R. Engineering Chemical Reactivity on Cell Surfaces Through Oligosaccharide Biosynthesis. *Science* **1997**, *276*, 1125- 1128.
3. **Mahal, L. K.**; Bertozzi, C. R. Engineered Cell Surfaces: Fertile Ground for Molecular Landscaping. *Chemistry and Biology* **1997**, *4*, 415-422.

4. Braslau, R.; Burrill, L. C.; Siano, M.; Naik, N.; Howden, R. K.; **Mahal, L. K.** Low-Temperature Preparations of Unimolecular Nitroxide Initiators for "Living" Free Radical Polymerizations. *Macromolecules* **1997**, *30*, 6445-6450.

5. Yarema, K. J.; **Mahal, L. K.**; Bruehl, R. E.; Bertozzi, C. R. Metabolic Delivery of Ketone Groups to Sialic Acid Residues. Application To Cell Surface Glycoform Engineering. *J. Biol. Chem.* **1998**, *273*, 31168-79.

6. Lee, J. H.; Baker, T. F.; **Mahal, L. K.**; Zabner, J.; Bertozzi, C. R.; Weimer, D. F.; Welsh, M. J. Engineering Novel Cell Surface Receptors for Virus-Mediated Gene Transfer. *J. Biol. Chem.* **1999**, *274,* 21878-84.

7. **Mahal, L. K.**; Yarema, K. J.; Lemieux, G. A.; Bertozzi, C. R. CHEMICAL APPROACHES TO GLYCOBIOLOGY: Engineering Cell Surface Sialic Acids for Tumor Targeting, in *Sialobiology and Other Novel Forms of Glycosylation,* Inoue, Y.; Lee, Y. C.; Troy, F. A., III, eds. Gakushin Publishing Company: Osaka, **1999**, pp. 237-280.

8. Charter, N. W.; **Mahal, L. K.** *; Koshland, D. E., Jr.; Bertozzi, C. R. Biosynthetic Incorporation of Unnatural Sialic Acids into Polysialic Acid on Neural Cells. *Glycobiology* **2000**, *10*, 1049-1056. ** Co-first authors.*

9. Jacobs, C. L.; Yarema, K. J.; **Mahal, L. K.**; Nauman, D. A.; Charter, N. W.; Bertozzi, C. R. Metabolic Labeling of Glycoproteins with Chemical Tags through Unnatural Sialic Acid Biosynthesis. *Methods Enzymol.* **2000**, *327,* 260-275.

10. Groves, J. T.; **Mahal, L. K.**; Bertozzi, C. R. Control of Cell Adhesion and Growth with Micropatterned Supported Lipid Membranes. *Langmuir* **2001**, *17,* 5129-5233.

11. **Mahal, L. K.**; Charter, N. W.; Angata, K.; Fukuda, M.; Koshland, D. E., Jr.; Bertozzi, C. R. A Small Molecule Modulator of Poly-α-2,8-Sialic Acid Expression on Neurons and Tumor Cells. *Science* **2001**, *294,* 380-381.

12. Charter, N. W.; **Mahal, L. K.**; Koshland, D. E., Jr.; Bertozzi, C. R. Differential Effects of Unnatural Sialic Acids on the Polysialylation of Neuronal Cell Adhesion Molecule and Neuronal Behaviour. *J. Biol. Chem.* **2002**, *277*, 9255-9261.

13. **Mahal, L. K.**; Sequeira, S. M.; Gureasko, J. M.; Söllner, T. H. Calcium-Independent Stimulation of Membrane Fusion and SNAREpin Formation by Synaptotagmin I. *J. Cell Biol.* **2002**, *158,* 273-282.

14. Melia, T. J.; Weber, T.; McNew, J. A.; Fisher, L. E.; Johnston, R. J.; Parlati, F.; **Mahal, L. K.**; Söllner, T. H.; Rothman, J. E. Regulation of Membrane Fusion by Conformational Switching of the Membrane-Proximal Coil of the t-SNARE During Zippering of SNAREpins. *J. Cell Biol.* **2002**, *158,* 929-940.

*15. **Mahal, L.K.** Catching Bacteria with Sugar. *Chemistry & Biology*, **2004**, *11*, 1602-1604.

*16. Pilobello, K.T.; Krishnamoorthy, L.; Slawek, D.; **Mahal, L.K.** Development of a Lectin Microarray for the Rapid Analysis of Protein Glycopatterns. *ChemBioChem* **2005**, *6*, 985-989.

*17. Hsu, K.-L.; Pilobello, K.T; **Mahal, L.K.** Analyzing the dynamic bacterial glycome with a lectin microarray approach. *Nature Chemical Biology* **2006**, *2*, 153-157.

*18. Sanki, A.; **Mahal, L.K.** A One-Step Synthesis of Azide-Tagged Carbohydrates: Versatile Intermediates for Glycotechnology. *Synlett,* **2006**, *3*, 455-459.

*19. Hsu, K.-L.; **Mahal, L. K.** Profiling the sweet structures of the bacterial glycome. *Nature Protocols*, **2006**, *1*, 543-549.

*20. Carrillo, L.D.; Krishnamoorthy, L.; **Mahal, L.K.** A Cellular FRET Sensor for β-O-GlcNAc, a Dynamic Carbohydrate Modification Involved in Signaling, *J. Am. Chem. Soc.*, **2006**, *128*, 14768-14769.

*21. Pilobello, K.T.; **Mahal, L.K.** Deciphering the glycocode: the complexity and analytical challenge of glycomics, *Curr. Opin. Chem. Biol.*, **2007***, 11,* 300-305.

*22. Pilobello, K.T.; Slawek, D.E.; **Mahal, L.K.** A ratiometric lectin microarray approach to analysis of the dynamic mammalian glycome. *Proc. Natl. Acad. Sci. USA,* **2007**, *104*, 11534-11539.

*23 Pilobello, K.T.; **Mahal, L.K.** Lectin Microarrays for Glycoprotein Analysis. *Methods Mol. Biol.*, **2007**, *385*, 193-203.

*24. **Mahal, L.K.** Glycomics: Towards Bioinformatic Approaches to Understanding Glycosylation, *Anti-Cancer Agents Med. Chem.*, **2008***, 8*, 37-51.

*25 Hsu, K.-L.; Gildersleeve, J.C.; **Mahal, L.K.** A simple strategy for the creation of a recombinant lectin microarray. *Mol. BioSyst,* **2008**, *4,* 654-662.

*26 Krishnamoorthy, L.; Bess, J.W.; Preston, A.B.; Nagashima, K.; **Mahal, L.K.** HIV-1 disguises itself as a microvesicle via a carbohydrate cloak. **2008** *In Preparation.*

** Papers from University of Texas at Austin.*

Patents

Methods for Installing Novel Functional Groups on Cells and Cellular Products and Applications Thereof, application filed 5/14/97, patent granted 2000 (University of California and Lawrence Berkeley National Laboratory).

Invited Lectures

228th National American Chemical Society Meeting (A.C.S.), Philadelphia, PA.	Aug. 2004
Southwest Regional Meeting, A.C.S. Fort Worth, TX.	Oct. 2004
Medicinal Chemistry Seminar Series, U. T. Austin Austin, TX.	Dec. 2004
Cell and Developmental Biology Seminar Series, U.T. Austin Austin, TX.	Feb. 2005
Waggoner Center for Alcohol Research Seminar, U.T. Austin Austin, TX.	Aug. 2005

231st A.C.S. Meeting, *Carbohydrate Recognition Mechanisms and Applications Symposia,* Atlanta, GA.	Mar. 2006
Arizona Biodesign Center, *Interdisciplinary Translational Glycobiology Symposia*, Tempe, AZ.	May 2006
National Cancer Institute, Department of Medicinal Chemistry, Frederick, MD.	July 2006
Burnham Institute, San Diego, CA.	Nov. 2006
Albert Einstein College of Medicine, Department of Biochemistry, Bronx, NY	Jan. 2007
Mt. Sinai College of Medicine, Department of Biological Chemistry, New York, NY	Jan. 2007
Pittcon 2007, *Glycomics: Mass Spectrometry or Lectin Microarrays?* Session, Chicago, IL	Mar. 2007
Gordon Research Conference on Glycobiology Ventura, CA.	Mar. 2007
UCLA Nanomedicine and Chemical Biology Conference Los Angeles, CA.	Apr. 2007
234th A.C.S. Meeting, *Young Investigator's Symposia* Organic Division, Boston, MA.	Aug. 2007
University of Illinois, Urbana Champaign, Chemical Biology Seminar, Urbana, IL.	Jan. 2008
University of California, Berkeley Organic Seminar, Berkeley, CA	Feb. 2008
University of California, Santa Cruz Organic Seminar, Santa Cruz, CA	Feb. 2008
University of Michigan, Ann Arbor Chemical Biology Seminar, Ann Arbor, MI	Mar. 2008
University of Wisconsin, Madison Organic Seminar, Madison, WI	Mar. 2008
New York University Organic Seminar, New York, NY	April 2008

Harvard Medical School May 2008.
Biological Chemistry Seminar, Boston, MA

Gordon Research Conference on BioOrganic Chemistry June 2008
Proctor Academy, NH.

Poster Presentations

Pilobello, K.T; **Mahal, L. K.** *Development of a Lectin Microarray for Profiling Protein Glycosylation*. Gordon Research Conference on Bio-organic Chemistry, Andover, NH. June 2004

Mahal, L.K.; Pilobello, K.; Krishnamoorthy, L. *Development of a Lectin Microarray for the Glycomic Profiling of Cells* US/Japan 2004 Glycobiology Meeting, Honolulu, HI. Nov. 2004

Pilobello, K.T.; **Mahal, L.K.** *Further Developments in a lectin microarray: Complex systems and quality control*. 2005 Glycobiology Meeting, Boston, MA. Nov. 2005

Hsu, K.-L.; **Mahal, L.K.** *A new method for bacterial glycomics*. 2005 Glycobiology Meeting, Boston, MA. Nov. 2005

Pilobello, K.T., Slawek, D., **Mahal, L. K.** *Dynamic Cellular Glycomics via Lectin Microarrays*. 2006 BioOrganic Gordon Conference, Magdalene College, Oxford, U.K. Aug. 2006

Research Support

Current Research Support

National Science Foundation 4/1/07-3/31/12
"CAREER: Creating tools for the analysis of microbial glycosylation using chemical biology"
Role: PI

American Heart Association 7/1/07-6/30/09
"O-GlcNAc in Growth Factor Signaling: A New Link Between Heart Disease and Diabetes?"

Robert A. Welch Foundation *6/1/08-5/31/11*
" Rapid Identification of New Bacterial Carbohydrate Recognition Domains for Glycan Analysis"
Role: PI

Alfred P. Sloan Foundation *9/1/08-8/31/10*
Role: PI

Past Research Support
American Heart Association 7/1/04-6/30/06

"Measuring the Dynamics of O-GlcNAc *In Vivo*, An Important Modification in Cardiovascular Diseases."
Role: PI

Arnold & Mabel Beckman Foundation 9/1/04-8/31/07
"Developing New Tools for Glycobiology"
Role: PI

Robert A. Welch Foundation 6/1/05-5/31/08
“Chemically Modified UDP-GlcNAc Analogs for the Differentiation of OGT Splice-Form Substrates in Cells."
Role: PI