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Education

Ph.D., Chemistry, University of California, Davis, CA	2009
M.S., Chemistry, California State University, Fresno, CA	2004
B.S., Chemistry, California State University, Fresno, CA	2003

Professional Experience

Assistant Professor of Chemistry, Alfaisal University, Riyadh, KSA	2014-Present
Postdoctoral Fellow, National Cancer Institute, NIH, Frederick, MD, USA	2010-2014
Lecturer, University of California, Merced, CA, USA	2009-2010

Awards and Professional Memberships

- Outstanding Teaching Assistant Award, University of California, Davis, CA 2009
- Graduate Student Travel Award, California State University, Fresno, CA 2005
- American Chemical Society 2003-Present

Research Interests

- In the interface of chemistry and biology with focus on studying the roles of carbohydrates in biological and pathological processes
- Chemical and enzymatic synthesis of carbohydrates and glycoconjugates
- High-throughput screening
- Glyconanotechnology

Selected Presentations

- "A simple strategy for predicting beneficial clinical responses on prostate cancer vaccine therapy", Gordon Research Conference, Carbohydrates, West Dover, VT, June, 2015.
- "Anti-glycan immunity: From biomarker discovery to blood typing." Short talk and poster presentation, Gordon Research Conference, Carbohydrates, West Dover, VT, **2013**.
- "Glycan microarray: A new approach for blood typing." Poster presentation, NIH & FDA Glycosciences Day, Bethesda, MD, **2012**.
- "Chemoenzymatic synthesis of carbohydrates containing sialic acids." Invited seminar, California State University, Fresno, CA, **2009**.
- "Chemoenzymatic synthesis of a new Class of macrocyclic oligosaccharides." Poster presentation, 238th ACS National Meeting & Exposition, Washington, DC, **2009**.
- "Chemoenzymatic synthesis of size-defined polysaccharides containing internal sialic acid residues." Poster presentation, Gordon Research Conference, Carbohydrates, Tilton, NH, **2007**.

- “Measurements of effective Henry’s law constants for hydrogen peroxide in concentrated salt solutions.” Poster presentation, 229th ACS National Meeting, San Diego, CA, **2005**.

Selected Publications

1. **Muthana, S.M.** and Gildersleeve, J.C. Factors Affecting Anti-Glycan IgG and IgM Repertoires in Human Serum. *Scientific Reports*, **2016**, 6, 19509; doi: 10.1038/srep1959.
2. **Muthana, S. M.**; Gulley, J.L.; Hodge, J. W.; Schlom, J.; Gildersleeve, J.C., ABO blood type correlates with survival on prostate cancer vaccine therapy. *Oncotarget*, **2015**, 6, 32244-32256.
3. **Muthana, S. M.**; Xia, L. Campbell, C.T.; Zhang, Y.; Gildersleeve, J.C., Competition between serum IgG, IgM, and IgA anti-glycan antibodies. *PLOS ONE*, **2015**, 10(3): e0119298.
4. **Muthana, S. M.**; Gildersleeve, J.C., Powerful tools for biomarker discovery. *Cancer biomarkers : section A of Disease markers* **2014**, 14 (1), 29-41.
5. Khedri, Z.; Li, Y.; **Muthana, S.**; Muthana, M.; Hsiao, C.; Yu, H.; Chen, X., Chemoenzymatic synthesis of sialosides containing C7-modified sialic acids and their application in sialidase substrate specificity studies. *Carbohydr. Res.* **2014**, 389, 100-111.
6. Zhang, Y.; **Muthana, S. M.**; Barchi, J. J., Jr.; Gildersleeve, J. C., Divergent behavior of glycosylated threonine and serine derivatives in solid phase peptide synthesis. *Org. Lett.* **2012**, 14 (15), 3958-3961.
7. Padler-Karavani, V.; Song, X.; Yu, H.; Hurtado-Ziola, N.; Huang, S.; **Muthana, S.**; Chokhawala, H. A.; Cheng, J.; Verhagen, A.; Langereis, M. A.; Kleene, R.; Schachner, M.; de Groot, R. J.; Lasanajak, Y.; Matsuda, H.; Schwab, R.; Chen, X.; Smith, D. F.; Cummings, R. D.; Varki, A., Cross-comparison of protein recognition of sialic acid diversity on two novel sialoglycan microarrays. *J. Biol. Chem.* **2012**, 287 (27), 22593-22608
8. Zhang, Y.; **Muthana, S. M.**; Farnsworth, D.; Ludek, O.; Adams, K.; Barchi, J. J., Jr.; Gildersleeve, J. C., Enhanced epimerization of glycosylated amino acids during solid-phase peptide synthesis. *J. Am. Chem. Soc.* **2012**, 134 (14), 6316-6325.
9. **Muthana, S. M.**; Campbell, C. T.; Gildersleeve, J. C., Modifications of glycans: biological significance and therapeutic opportunities. *ACS Chem. Biol.* 2012, 7 (1), 31-43.
10. Li, Y.; Yu, H.; Cao, H.; **Muthana, S.**; Chen, X., Pasteurella multocida CMP-sialic acid synthetase and mutants of Neisseria meningitidis CMP-sialic acid synthetase with improved substrate promiscuity. *Appl. Microbiol. Biotechnol.* 2012, 93 (6), 2411-2423.
11. Khedri, Z.; Muthana, M. M.; Li, Y.; **Muthana, S. M.**; Yu, H.; Cao, H.; Chen, X., Probe sialidase substrate specificity using chemoenzymatically synthesized sialosides containing C9-modified sialic acid. *Chem. Commun.* **2012**, 48 (27), 3357-3359.
12. Padler-Karavani, V.; Hurtado-Ziola, N.; Pu, M.; Yu, H.; Huang, S.; **Muthana, S.**; Chokhawala, H. A.; Cao, H.; Secretst, P.; Friedmann-Morvinski, D.; Singer, O.; Ghaderi, D.; Verma, I. M.; Liu, Y. T.; Messer, K.; Chen, X.; Varki, A.; Schwab, R., Human xeno-autoantibodies against a non-human sialic acid serve as novel serum biomarkers and immunotherapeutics in cancer. *Cancer Res.* **2011**, 71 (9), 3352-3363.
13. Ding, L.; Yu, H.; Lau, K.; Li, Y.; **Muthana, S.**; Wang, J.; Chen, X., Efficient chemoenzymatic synthesis of sialyl Tn-antigens and derivatives. *Chem. Commun.* **2011**, 47 (30), 8691-8693.
14. **Muthana, S.**; Yu, H.; Cao, H.; Cheng, J.; Chen, X., Chemoenzymatic synthesis of a new class of macrocyclic oligosaccharides. *J. Org. Chem.* **2009**, 74 (8), 2928-2936.
15. **Muthana, S.**; Cao, H.; Chen, X., Recent progress in chemical and chemoenzymatic synthesis of carbohydrates. *Curr. Opin. Chem. Biol.* **2009**, 13 (5-6), 573-581.

16. Cao, H.; **Muthana, S.**; Li, Y.; Cheng, J.; Chen, X., Parallel chemoenzymatic synthesis of sialosides containing a C5-diversified sialic acid. *Bioorg. Med. Chem. Lett.* **2009**, *19* (20), 5869-5871.
17. Cao, H.; Li, Y.; Lau, K.; **Muthana, S.**; Yu, H.; Cheng, J.; Chokhawala, H. A.; Sugiarto, G.; Zhang, L.; Chen, X., Sialidase substrate specificity studies using chemoenzymatically synthesized sialosides containing C5-modified sialic acids. *Org. Biomol. Chem.* **2009**, *7* (24), 5137-5145.
18. Wang, Z.; Gilbert, M.; Eguchi, H.; Yu, H.; Cheng, J.; **Muthana, S.**; Zhou, L.; Wang, P. G.; Chen, X.; Huang, X., Chemoenzymatic Syntheses of Tumor-Associated Carbohydrate Antigen Globo-H and Stage-Specific Embryonic Antigen 4. *Adv Synth Catal* **2008**, *350* (11-12), 1717-1728.
19. Li, Y.; Yu, H.; Cao, H.; Lau, K.; **Muthana, S.**; Tiwari, V. K.; Son, B.; Chen, X., Pasteurella multocida sialic acid aldolase: a promising biocatalyst. *Appl. Microbiol. Biotechnol.* **2008**, *79* (6), 963-970.
20. Cao, H.; Huang, S.; Cheng, J.; Li, Y.; **Muthana, S.**; Son, B.; Chen, X., Chemical preparation of sialyl Lewis x using an enzymatically synthesized sialoside building block. *Carbohydr. Res.* **2008**, *343* (17), 2863-2869.
21. **Muthana, S.**; Yu, H.; Huang, S.; Chen, X., Chemoenzymatic synthesis of size-defined polysaccharides by sialyltransferase-catalyzed block transfer of oligosaccharides. *J. Am. Chem. Soc.* **2007**, *129* (39), 11918-11919.
22. Chung, M.; **Muthana, S.**; Paluyo, R.; Hasson, A., Measurements of effective Henry's law constants for hydrogen peroxide in concentrated salt solutions. *Atmos. Environ.* **2005**, *39* (16), 2981-2989.