

*Curriculum Vitae*  
**Lance Wells**

---

Complex Carbohydrate Research Center  
Department of Biochemistry and Molecular Biology  
University of Georgia, Athens, GA 30602  
Office: 706-542-7806, Fax: 706-542-4412  
[lwells@ccrc.uga.edu](mailto:lwells@ccrc.uga.edu)

**Director of Integrated Life Sciences Program**  
**Professor of Biochemistry and Molecular Biology and Adjunct Chemistry**

**Education/Training:**

- 1987-1991 B.S. in Chemistry, Certificate in Psychology  
Georgia Institute of Technology, Atlanta, GA
- 1993-1998 Ph.D. in Biochemistry and Molecular Biology,  
Emory University School of Medicine, Atlanta, GA  
Dr. Judith L. Fridovich-Keil, Thesis Advisor
- 1998-2003 Post-Doctoral Fellow in Biological Chemistry (NCI/NIH NRSA Fellow 1999-2002)  
Johns Hopkins University School of Medicine, Baltimore, MD  
Dr. Gerald W. Hart, Post-doctoral mentor

**Professional Positions:**

- 1991-1993 Research Specialist II, Microchemical and Proteomics Facility, Winship Cancer  
Center, Emory University School of Medicine, under Dr. Jan Pohl
- 2003-2010 Assistant Professor of Biochemistry and Molecular Biology and the  
Complex Carbohydrate Research Center, University of Georgia
- 2004-2010 Adjunct Assistant Professor of Chemistry, University of Georgia
- 2008-2018 Director of Graduate Studies, Biochemistry and Molecular Biology, UGA
- 2010-2015 Associate Professor of Biochemistry and Molecular Biology and the Complex  
Carbohydrate Research Center, and Adjunct Chemistry, UGA
- 2012-2017 Georgia Research Alliance Lars G. Ljungdahl Distinguished Investigator,  
Endowed Position
- 2015-Present Professor Biochemistry and Molecular Biology and the Complex Carbohydrate  
Research Center, and Adjunct Chemistry, UGA
- 2018-Present Director, Integrated Life Sciences Program, UGA

**Significant Awards and Honors:**

- 2003 Georgia Cancer Coalition Scholar
- 2012 Georgia Research Alliance Lars G. Ljungdahl Distinguished Investigator  
(1 UGA faculty member for 5 year tenure)
- 2016 Molecular and Cellular Proteomics ASBMB Lectureship  
(2 international scientists awarded per year)
- 2019 Lamar Dodd Creative Research Award (1 UGA faculty per year)

**Entrepreneurial Activities:**

- 2017-Present Arestyr Oncologics, Co-Founder, CSO, Supported by Grants from GRA
- 2018-Present Third Floor Therapeutics, Co-Founder, CSO, Supported by a GRA Grant

**UGA Service Activities:**

2004-present Member, CCRC Mass Spectrometry Oversight Committee  
2004-present Member, Biomedical Health Science Institute  
2004-2007 Member, BMB Graduate Affairs Committee  
2004-2006 Chair, Graduate Student Orientation Committee, BMB  
2005 Member, Complex Traits/Genetics Department Faculty Search Committee  
2005-2006 Member, CCRC Faculty Search Committee  
2006-present Member, UGA Proteomics Facility Oversight Committee  
2007 Chair, Ad Hoc Committee for Graduate Student Recruiting, BMB  
2007-present Member, Institute of Bioinformatics  
2007-2008 Member, OVPR Research Task Force  
2008-2009 Member, UGA/MCG Med. School Basic Science Chair Search Committee  
2008-2018 Chair and Graduate Coordinator, BMB Graduate Affairs Committee  
2008-2014 Ex-officio Member, BMB Graduate Recruitment Committee  
2011-2012 Member, BMB Open Faculty Search Committee  
2012 Member, CCRC Facility Manager Search Committee  
2012 Member, BMB & Genetics Joint Obesity-Initiative Faculty Search Committee  
2012 Member, Center for Molecular Medicine Faculty Search Committee  
2012-2018 Member, Executive Committee for Biochemistry & Molecular Biology  
2013-Present Member, OVPR Core Facility Oversight Committee  
2014-2017 Member, OVPR Advisory Board for Genomics (GGF) Core Facility  
2015-2016 Chair, OVPR Scientific Misconduct Investigation Committee  
2015-2016 Chair, BMB Search Committee for Metabolomics Asst Prof Position  
2016-2018 BMB Representative, Integrated Life Science (ILS) Recruitment Committee  
2016-2017 Chair, X-ray Diffraction Center (XRDC) Advisory Committee  
2017 Member, Center for Molecular Medicine Faculty Search Committee  
2018-Present Member, Franklin College of Arts & Sciences Promotion and Tenure Committee  
2018-Present Director, Integrated Life Sciences Program  
2019-2020 Member, Complex Carbohydrate Research Center Faculty Search Committee  
2019-Present Member, UGA 2025 Strategic Planning Committee

**Professional Activities Since 2003:**

2003-present Georgia Cancer Coalition Distinguished Scholar  
2004-present Member, Society for Glycobiology  
2004-present Ad Hoc Reviewer, *Analytical Biochemistry*, *Analytical Chemistry*, *Biochemistry*, *Cell*, *Electrophoresis*, *eLife*, *Journal of American Society for Mass Spectrometry*, *Journal of Proteome Research*, *Nature Chemical Biology*, *Nature Methods*, *Nature*, *Proceedings of National Academy of Science*, *Proteomics*, and *Rapid Communications in Mass Spectrometry*.  
2004-2005 Member, American Diabetes Association  
2004-present Member, American Society of Biochemistry and Molecular Biology  
2005 Consultant, CIPHERGEN Biosystems, Inc.  
2006-2007 Consultant, GenNext Technologies, Inc.  
2006 University of Georgia Pew Scholar Nominee  
**2007-present** Member, NIH Alliance of Glycobiologists for detection of cancer & cancer risk  
2007 Ad Hoc Reviewer, US Army Medical Research and Materiel Command, Proteomics Section  
2008 Ad Hoc Reviewer, American Heart Association, Cardiac Biology Regulation Study Section  
2008-2010 Ad Hoc Reviewer, Wellcome Trust Senior Fellowships  
2008 Ad Hoc Reviewer, NIH, Cancer Biomarker Study Section (CBSS)  
2009 Ad Hoc Reviewer, Netherlands Organization for Scientific Research

2009 Ad Hoc Reviewer, NIH/NHLBI, Program Project Grant Study Section  
2009 Mail Reviewer, NIH, Stage 1 ARRA RC1 Challenge Grants, Cancer Biomarkers, Biology of Development and Aging IRG Panel  
2010-2011 Ad Hoc Reviewer, NIH Special Emphasis Panel ZRG1 Study Section  
2010 Organizer, American Society for Mass Spectrometry Fall Workshop  
2012-present Editorial Board Member, *Molecular and Cellular Proteomics*, ASBMB  
2012-2017 Editorial Board Member, *Journal of Biological Chemistry*, ASBMB  
**2012** Rapporteur and Invitee, National Academies of Science Workshop on Glycoscience  
2012 Co-organizer, *Mol. and Cell. Proteomics*/ASBMB Glycomics Standards Checklist Meeting  
2012 Co-Organizer and Chair, Warren Workshop IV on Glycoconjugate Analysis  
2012 Site Visit Reviewer, NCCR/NIGMS P41 Program  
2012-2013 Ad-Hoc Reviewer, NIH Intracellular Interactions (ICI) Study Section  
2012 ThermoFisher Selected Speaker at HUPO 11<sup>th</sup> Annual World Congress  
2012 Session Chair, Society for Glycobiology Annual Meeting held jointly with ASMB  
2013 Theme Organizer, Chair, and Invited Speaker, ASBMB/Experimental Biology  
2013-2016 Member of Board of Directors, Society for Glycobiology  
2013 Guest Editor for *Mol. and Cell. Proteomics*, Glycomic Special Issue  
2013-Present Member, Society for Glycobiology Education Committee  
2013 Session Chair, Glycobiology Gordon Conference  
2013-Present Editorial Board Member, *Glycobiology*  
2013-2014 Consultant, Abeome, LLC  
2014 Co-organizer, CFG Workshop: Exploring the Frontiers of Chemical Glycoscience  
2015-2017 Co-director, Bill & Melinda Gates Vaccine Accelerator Platform in Glycomics  
**2015-Present** Co-director, ThermoFisher Center of Excellence in Glycoproteomics  
2015 Reviewer, NHLBI/NIH P01 Program  
2015 Member, Organizing Committee for Society for Glycobiology Annual Meeting  
2015-2016 Member, Nominations Committee for Society for Glycobiology  
**2016** Theme Organizer, Chair, and Invited Speaker, ASBMB/Experimental Biology  
2016 Co-Organizer, Chair, and Speaker, Biochemistry Society Hot Topic Meeting, O-GlcNAcylation in Human Health and Disease, London, UK  
**2016** Co-Organizer and Speaker, Harnessing Glycoscience to Understand Optimize HIV Env Immunogenicity, Bill and Melinda Gates Foundation  
2017 External Ph.D. Defense Examiner at University of Copenhagen, Denmark  
2017 External Ph.D. Defense Examiner at University of Dundee, Scotland  
**2017** Organizer, Society for Glycobiology annual meeting session on Mentoring  
2018 Ad-Hoc Reviewer for NIH Membrane Biology and Protein Processing (MBPP) Study Section  
2018 Organizer, Society for Glycobiology annual meeting CFG-satellite meeting  
2019 Session Chair, Society for Glycobiology annual meeting  
**2019** Guest Editor for *Curr. Opin. Struct. Biol.*, O-Glycosylation Special Issue  
**2020** Guest Editor for *Mol. and Cell. Proteomics*, Glycoproteomic Special Issue  
2020-2024 Chartered Member/Reviewer, NIH Intracellular Interactions (ICI) Study Section

#### **Instructional Activities:**

2003-present Graduate Faculty Member of the School of Arts and Sciences  
2003-present Established and co-organize CCRC Journal Club  
2003-present CURO Apprentice Program Mentor  
2004-2008 Member, Graduate Affairs Committee for Biochemistry and Molecular Biology

2006-present Honors Undergraduate Faculty Mentor  
2006-present PSLAMP Scholar Faculty Mentor  
2006-present Foundation Fellows Faculty Mentor  
2006 Recipient, UGA M.G. Michael Award  
2008-2018 Director of Graduate Studies and Chair of Graduate Affairs Committee for  
Biochemistry and Molecular Biology  
2012-present Mentor, UGA High School Summer Young Dawgs Program  
2018-present Director, Integrated Life Sciences Graduate Student Umbrella Program

*Classroom Teaching:*

2005, 07, 09, 11, 13, 15, 17, 19 BCMB 8130 Glycobiology (developer, course organizer  
and taught with Tiemeyer), Spring  
2004, 06 BCMB 8150 Advanced Topics in Cell Communication and  
Regulation (developed and team taught with Dalton & Tiemeyer),  
Fall  
2005, 07, 09, 12, 14 BCMB 8300 Proteomics (developer, course organizer, and taught  
with Orlando, Spring)  
2014, 15, 16, 17, 18, 19 GRSC 8020 Primary Literature for ILS Students, Fall  
2013, 14, 15, 16, 17 BCMB 8060 Student Seminar Series, Fall & Spring (developed  
with Hajduk, taught with BMB Head)  
2015, 16, 17, 18, 19 BCMB 8112/8212 Unified Biochemistry, Cell Biology, and  
Genetics, Fall & Spring (2 lectures in each semester)  
2017, 18, 19 FY0S1001, Freshman Odyssey Course, "Actual and Perceived  
Controversies in Science", Fall  
2018, 19 BCMB8990 Grant Writing (Required Course for all 2<sup>nd</sup> year BMB  
graduate students, developed and taught)  
2003-Present Guest Lecturer in BCMB 3100, BCMB 4110/6110, BCMB 4121,  
BCMB 8010, BCMB 8140, and FRES 1010/1020

*Mentoring:*

High School

Young Dawgs Fellows: 2 (2013, 2014)  
High School Students Total: 4 (2013, 2014, and 2 in 2017)

Undergraduate

CURO Apprentices/Honors Scholars Supervised: 9  
Foundation Fellows Supervised: 7  
PSLAMP Recipients Supervised: 2  
CURO BHSI Summer Fellow Supervised: 2  
Howard and Jane Young CURO Summer Fellow Supervised: 2  
Barry M. Goldwater Scholar Supervised: 2  
BMB Honors Thesis Supervised: 7  
Genetics Honor Thesis Supervised: 1  
Total Undergraduate Students Supervised Since 2003: 41  
(Professional schools currently at or since graduated from include: Stanford, Johns Hopkins,  
Northwestern, Emory, Augusta University, University of Florida, and UCSD)

Graduate

BMB Graduate Students Supervised: 14 (6 Ph.D. graduate, 5 current, 3 M.S. graduates; 2  
Cousins Foundation/CCRC Fellows (CF), 2 NIH Glycoscience Training Grant Fellow (GTP,  
T32), 1 American Heart Association (AHA) Predoctoral Fellow): Edith Wollaston-Hayden (PhD,  
CF, post-doc UMinn), Krithika Vaidyanathan (PhD, post-doc Samford-Burnham), Sandii Brimble  
(PhD, post-doc Emory), Chin Fen Teo (PhD, AHA, CF, post-doc HHMI/UCSF), Sean Durning

(PhD, post-doc Yale), Jeremy Praissman (PhD, post-doc UGA), Anu Koppikar (MS), Crissy Dobson (MS), Ryan Stuart (MS), Sally Boyd (Current), Stephanie Halmo (Current, GTP), Hannah Stephen (DVM/PhD, Current, T32), Trevor Adams (Current).

Chemistry Graduate Students Supervised: 5 (4 Ph.D. graduates, 1 current): Jae-Min Lim (PhD, straight to tenure-track faculty position Chang-Won University, S. Korea), Peng Zhao (PhD, post-doc UVirginia), Stephanie Stalnaker (PhD, post-doc UGA), Meng Fang (PhD, post-doc NIH), Chelsea Desbiens (Current)

Non-degree Cellular Biology Student Supervised: 1 (since received M.D. from Tulane University)

Graduate Student Advisory Committee Member (not including those supervised): >65 to date

Graduate Coordinator for Biochemistry and Molecular Biology: 2008-2018

Director of Integrated Life Sciences Program: 2018-Present

### **Research Activities:**

>50 oral presentations since 2007

#### Selected Oral Presentations at Meetings:

- 2003 Selected Speaker, "Proteomics in Diabetes" Workshop, NIH, Bethesda, MD
- 2004 Selected Speaker, Society for Glycobiology Annual Meeting, Honolulu, HI
- 2004 Invited Speaker, Thermolectron Proteomics Symposium, Emory University, Atlanta, GA
- 2005 Invited Speaker, Federation of Analytical Chemists and Spectroscopy Society Annual Meeting (FACSS), Quebec City, Canada
- 2005 Invited Speaker, Thermolectron Proteomics Symposium, University of Florida, Gainesville, FL
- 2005 Invited Speaker, Society for Glycobiology Annual Meeting, Boston, MA
- 2006 Invited Speaker, PittCon, Orlando, FL
- 2007 Selected Speaker, Society for Glycobiology Annual Meeting, Boston, MA
- 2007 Invited Speaker, Glycobiology Gordon Conference, Ventura, CA
- 2008 Invited Speaker, Atlanta Clinical and Translational Science Institute, Atlanta, GA
- 2008 Invited Speaker, GlycoT 6<sup>th</sup> International Conference, Atlanta, GA
- 2008 Invited Speaker, 2<sup>nd</sup> Warren Workshop on Glycoconjugate Analysis, Durham, NH
- 2009 Invited Speaker, Glycobiology Gordon Conference, Ventura, CA
- 2009 Invited Speaker, Clinical and Translational Research on Cancer: Glycomics Applications, Ise-Shima, Japan
- 2009 Invited Speaker, Therapeutic Targets in the CMDs, Atlanta, GA
- 2010 Invited Speaker, Consortium for Functional Glycomics, Tampa, FL
- 2010 Invited Lecturer, ASMS Fall Workshop, Tampa, FL
- 2010 Invited Speaker, Society for Glycobiology, Tampa, FL
- 2010 Invited Speaker, Rare Disease Day, Sanford-Burnham Institute, San Diego, CA
- 2011 Invited Speaker, 4<sup>th</sup> Stem Cell Biology Workshop, Bethesda, MD
- 2012 Invited Speaker, ASBMB/Experimental Biology Annual Meeting
- 2012 Invited Speaker, ThermoFisher Select Speaker at HUPO World Congress, Boston, MA
- 2012 Invited Speaker, ASBMB Workshop on Post-translational Modifications
- 2013 Invited Speaker, US-HUPO, Baltimore, MD

- 2013** Invited Speaker, Theme Organizer, Session Chair, and Speaker at Experimental Biology/ASBMB
- 2014 Invited Speaker, ThermoFisher Select Speaker at ASMS, Baltimore, MD
- 2014 Invited Speaker, Warren Workshop on Glycoconjugate Analysis, Ireland
- 2014 Organizer and Speaker, CFG Workshop: Exploring the Frontiers of Chemical Glycoscience Bethesda, MD
- 2015 Invited Speaker and Panelist, Bill & Melinda Gates Foundation CAVD Meeting
- 2015 Invited Speaker, Society for Glycobiology Annual Meeting
- 2016** Invited Speaker, Theme Organizer, Session Chair, and Speaker at Experimental Biology/ASBMB, San Diego, CA
- 2016 Invited Speaker, Rare Disease Day Symposium, San Diego, CA
- 2016 Invited Speaker, Co-organizer, and Session Chair, Biochemical Society Hot Topic Meeting on O-GlcNAcylation, London, UK
- 2016 Invited Speaker, Co-organizer, Harnessing Glycoscience to Understand and Optimize HIV Env Immunogenicity, Bill & Melinda Gates Foundation, Seattle, WA
- 2016** Award Winner and Invited Speaker, *Molecular and Cellular Proteomics ASBMB Lectureship* at Society for Glycobiology Annual Meeting
- 2017 Invited Speaker, Glycobiology Gordon Conference, Ventura, CA
- 2017 Keynote Speaker, Korean Society for Mass Spectrometry, S. Korea
- 2017 Invited Speaker, GLYCO 24/IGO, Jeju, S. Korea
- 2017 Invited Speaker, Society for Glycobiology Annual Meeting
- 2018** Invited Webinar Speaker, *Nature*
- 2019 Invited Speaker, Glycoscience workshop at ASBMB/Experimental Biology
- 2019 Session Chair, Society for Glycobiology Annual Meeting
- 2020 Invited Speaker, ASBMB/Experimental Biology & Glycoscience Workshop

Selected UGA Seminars:

- 2003 Invited Speaker, Department of Biochemistry and Molecular Biology
- 2003 Invited Speaker, Department of Chemistry
- 2004 Invited Speaker, Department of Cellular Biology
- 2004 Colloquium Speaker, CCRC Facilities Dedication
- 2004 Invited Speaker, Georgia Biomedical Partnership
- 2006 Invited Speaker, Computational Systems Biology Seminar Series
- 2007 Invited Speaker, Department of Food and Nutrition
- 2008 Invited Speaker, Department of Cellular Biology
- 2011 Invited Speaker, Department of Biochemistry and Molecular Biology
- 2012 Invited Speaker, Obesity Initiative
- 2014 Invited Speaker, Department of Biochemistry and Molecular Biology
- 2017 Invited Speaker, Department of Biochemistry and Molecular Biology

Selected Academic Seminars:

- 2003 Invited Speaker, Department of Biochemistry, Emory University, Atlanta, GA
- 2003 Invited Speaker, Department of Genetics and Biochemistry, Clemson University, Clemson, SC
- 2005 Invited Speaker, Department of Biological Sciences, University of Alabama at Huntsville, AL
- 2006 Invited Speaker, Department of Biochemistry, University of Wisconsin-Madison, Madison, WI
- 2007 Invited Speaker, Department of Cell Biology, Medical College of Georgia, Augusta, GA
- 2007 Invited Speaker, Department of Pathology, Emory University, Atlanta, GA
- 2008 Invited Speaker, Department of Physiology, Medical College of Georgia, Augusta, GA

- 2009 Invited Speaker, Howard Hughes Medical Institute and Department of Physiology, University of Iowa, Iowa City, IA
- 2009 Invited Speaker, Kyota University, Kyota, Japan
- 2011 Invited Speaker, Cancer Center, University of Nebraska Medical Center, Omaha NE
- 2011 Invited Speaker, Department of Molecular Biology, University of Wyoming, Laramie
- 2012 Invited Speaker, Barnett Institute, Northeastern University, Boston, MA
- 2013** Visiting Professor, University of Nebraska Medical Center, Eppley Institute for Research in Cancer and Allied Diseases, Short Course in Cancer Biology
- 2013** Keynote Lecturer, University of Copenhagen, Institute for Cellular Molecular Medicine, Center for Glycomics, Short Course in Glycoanalysis and Glycochemistry
- 2014 Invited Speaker, Department of Biochemistry, Biophysics and Molecular Biology, Iowa State University, Ames, IA
- 2015** Invited Plenary Lecturer, Johns Hopkins Training Course in Glycobiology
- 2016 Invited Speaker, Medical University of South Carolina
- 2016 Student Invited Speaker, UCLA Muscle Cell Biology Seminar Series, Los Angeles, CA
- 2017 Invited Speaker, Department of Chemistry and Biology, Changwon University, S. Korea
- 2017 Invited Speaker, Department of Medicine, University of Alabama, Birmingham (UAB)
- 2017 Invited Speaker and External Examiner for Ph.D. Defense, Copenhagen Center of Glycomics, University of Copenhagen, Denmark
- 2017 Invited Speaker and External Examiner for Ph.D. Defense, College of Life Sciences, University of Dundee, Scotland, UK
- 2018 Invited Speaker, Texas A&M University, Department of Biochemistry and Biophysics
- 2018 Invited Speaker, Johns Hopkins School of Medicine, Department of Biological Chemistry
- 2019 Invited Speaker and External Examiner for Ph.D. Defense, Copenhagen Center of Glycomics, University of Copenhagen, Denmark
- 2020 Invited Speaker, University of Minnesota, Department of Integrative Biology & Physiology

#### Abstracts:

2003-present Co-authored more than 200 posters/abstracts at local, national, and international meetings including Gordon Conferences, Society for Glycobiology meetings, American Society for Mass Spectrometry meetings, HUPO, GlycoT, American Society for Cell Biology meetings, ASBMB/Experimental Biology, American Diabetes Association, ABRCMS and UGA CURO symposiums.

Publications: H-index=48 (i10-index=110); 10,131 citations as of 01/20 (Google Scholar)

- 1. Shafer WM, Shepherd ME, Boltin B, Wells L, Pohl J. Synthetic peptides of human lysosomal cathepsin G with potent antipseudomonal activity. *Infect Immun.* 1993 May;61(5):1900-8. PubMed PMID: 8478079; PubMed Central PMCID: PMC280782.
- 2. Fridovich-Keil JL, Quimby BB, Wells L, Mazur LA, Elsevier JP. Characterization of the N314D allele of human galactose-1-phosphate uridylyltransferase using a yeast expression system. *Biochem Mol Med.* 1995 Dec;56(2):121-30. PubMed PMID: 8825075.
- 3. Wells L, Fridovich-Keil JL. The yeast, *Saccharomyces cerevisiae*, as a model system for the study of human genetic disease. *SAAS Bull Biochem Biotechnol.* 1996;9:83-8. PubMed PMID: 8652137.
- 4. Reed RC, Louis-Wileman V, Wells RL, Verheul AF, Hunter RL, et al. Re-investigation of the circumsporozoite protein-based induction of sterile immunity against *Plasmodium berghei* infection. *Vaccine.* 1996 Jun;14(8):828-36. PubMed PMID: 8817831.

- 5. Elsevier JP, Wells L, Quimby BB, Fridovich-Keil JL. Heterodimer formation and activity in the human enzyme galactose-1-phosphate uridylyltransferase. *Proc Natl Acad Sci U S A*. 1996 Jul 9;93(14):7166-71. PubMed PMID: 8692963; PubMed Central PMCID: PMC38954.
- 6. Quimby BB, Wells L, Wilkinson KD, Fridovich-Keil JL. Functional requirements of the active site position 185 in the human enzyme galactose-1-phosphate uridylyltransferase. *J Biol Chem*. 1996 Oct 25;271(43):26835-42. PubMed PMID: 8900165.
- 7. Wells L, Fridovich-Keil JL. Biochemical characterization of the S135L allele of galactose-1-phosphate uridylyltransferase associated with galactosaemia. *J Inherit Metab Dis*. 1997 Sep;20(5):633-42. PubMed PMID: 9323558.
- 8. Crews C, Wilkinson KD, Wells L, Perkins C, Fridovich-Keil JL. Functional consequence of substitutions at residue 171 in human galactose-1-phosphate uridylyltransferase. *J Biol Chem*. 2000 Jul 28;275(30):22847-53. PubMed PMID: 10811638.
- 9. Christacos NC, Marson MJ, Wells L, Riehmman K, Fridovich-Keil JL. Subcellular localization of galactose-1-phosphate uridylyltransferase in the yeast *Saccharomyces cerevisiae*. *Mol Genet Metab*. 2000 Aug;70(4):272-80. PubMed PMID: 10993714.
- 10. Henderson JM, Wells L, Fridovich-Keil JL. Covalent heterogeneity of the human enzyme galactose-1-phosphate uridylyltransferase. *J Biol Chem*. 2000 Sep 29;275(39):30088-91. PubMed PMID: 10884393.
- 11. Wells L, Vosseller K, Hart GW. Glycosylation of nucleocytoplasmic proteins: signal transduction and O-GlcNAc. *Science*. 2001 Mar 23;291(5512):2376-8. PubMed PMID: 11269319.
- 12. Gao Y, Wells L, Comer FI, Parker GJ, Hart GW. Dynamic O-glycosylation of nuclear and cytosolic proteins: cloning and characterization of a neutral, cytosolic beta-N-acetylglucosaminidase from human brain. *J Biol Chem*. 2001 Mar 30;276(13):9838-45. PubMed PMID: 11148210.
- 13. Comer FI, Vosseller K, Wells L, Accavitti MA, Hart GW. Characterization of a mouse monoclonal antibody specific for O-linked N-acetylglucosamine. *Anal Biochem*. 2001 Jun 15;293(2):169-77. PubMed PMID: 11399029.
- 14. Vosseller K, Wells L, Hart GW. Nucleocytoplasmic O-glycosylation: O-GlcNAc and functional proteomics. *Biochimie*. 2001 Jul;83(7):575-81. PubMed PMID: 11522385.
- 15. Wells L, Gao Y, Mahoney JA, Vosseller K, Chen C, et al. Dynamic O-glycosylation of nuclear and cytosolic proteins: further characterization of the nucleocytoplasmic beta-N-acetylglucosaminidase, O-GlcNAcase. *J Biol Chem*. 2002 Jan 18;277(3):1755-61. PubMed PMID: 11788610.
- 16. Vosseller K, Wells L, Lane MD, Hart GW. Elevated nucleocytoplasmic glycosylation by O-GlcNAc results in insulin resistance associated with defects in Akt activation in 3T3-L1 adipocytes. *Proc Natl Acad Sci U S A*. 2002 Apr 16;99(8):5313-8. PubMed PMID: 11959983; PubMed Central PMCID: PMC122766.
- 17. Wells L, Vosseller K, Cole RN, Cronshaw JM, Matunis MJ, et al. Mapping sites of O-GlcNAc modification using affinity tags for serine and threonine post-translational modifications. *Mol Cell Proteomics*. 2002 Oct;1(10):791-804. PubMed PMID: 12438562.



- 18. Vosseller K, Sakabe K, Wells L, Hart GW. Diverse regulation of protein function by O-GlcNAc: a nuclear and cytoplasmic carbohydrate post-translational modification. *Curr Opin Chem Biol.* 2002 Dec;6(6):851-7. PubMed PMID: 12470741.
- 19. Wells L, Vosseller K, Hart GW. A role for N-acetylglucosamine as a nutrient sensor and mediator of insulin resistance. *Cell Mol Life Sci.* 2003 Feb;60(2):222-8. PubMed PMID: 12678487.
- 20. Wells L, Whelan SA, Hart GW. O-GlcNAc: a regulatory post-translational modification. *Biochem Biophys Res Commun.* 2003 Mar 14;302(3):435-41. PubMed PMID: 12615051.
- 21. Wells L, Hart GW. O-GlcNAc turns twenty: functional implications for post-translational modification of nuclear and cytosolic proteins with a sugar. *FEBS Lett.* 2003 Jul 3;546(1):154-8. PubMed PMID: 12829252.
- 22. Drew ME, Morris JC, Wang Z, Wells L, Sanchez M, et al. The adenosine analog tubercidin inhibits glycolysis in *Trypanosoma brucei* as revealed by an RNA interference library. *J Biol Chem.* 2003 Nov 21;278(47):46596-600. PubMed PMID: 12972414.
- 23. Wells L, Kreppel LK, Comer FI, Wadzinski BE, Hart GW. O-GlcNAc transferase is in a functional complex with protein phosphatase 1 catalytic subunits. *J Biol Chem.* 2004 Sep 10;279(37):38466-70. PubMed PMID: 15247246.
- 24. Akimoto Y, Yamamoto K, Munetomo E, Wells L, Vosseller K, et al. Elevated O-GlcNAc modification of proteins in various tissues of diabetic Goto-Kakizaki rats accompanied by diabetic complications. *Acta histochemica et cytochemica.* 2005; 38:131-142.
- 25. Vosseller K, Hansen KC, Chalkley RJ, Trinidad JC, Wells L, et al. Quantitative analysis of both protein expression and serine / threonine post-translational modifications through stable isotope labeling with dithiothreitol. *Proteomics.* 2005 Feb;5(2):388-98. PubMed PMID: 15648052.
- 26. Fakhouri M, Elalayli M, Sherling D, Hall JD, Miller E, et al. Minor proteins and enzymes of the *Drosophila* eggshell matrix. *Dev Biol.* 2006 May 1;293(1):127-41. PubMed PMID: 16515779; NIHMSID: NIHMS92834; PubMed Central PMCID: PMC2701256.
- 27. Woosley B, Xie M, Wells L, Orlando R, Garrison D, et al. Comprehensive glycan analysis of recombinant *Aspergillus niger* endo-polygalacturonase C. *Anal Biochem.* 2006 Jul 1;354(1):43-53. PubMed PMID: 16697346.
- 28. Woosley BD, Kim YH, Kumar Kolli VS, Wells L, King D, et al. Glycan analysis of recombinant *Aspergillus niger* endo-polygalacturonase A. *Carbohydr Res.* 2006 Oct 16;341(14):2370-8. PubMed PMID: 16854399.
- 29. Angel PM, Lim JM, Wells L, Bergmann C, Orlando R. A potential pitfall in 18O-based N-linked glycosylation site mapping. *Rapid Commun Mass Spectrom.* 2007;21(5):674-82. PubMed PMID: 17279607.
- 30. Akimoto Y, Hart GW, Wells L, Vosseller K, Yamamoto K, et al. Elevation of the post-translational modification of proteins by O-linked N-acetylglucosamine leads to deterioration of the glucose-stimulated insulin secretion in the pancreas of diabetic Goto-Kakizaki rats. *Glycobiology.* 2007 Feb;17(2):127-40. PubMed PMID: 17095531.
- 31. Aoki K, Perlman M, Lim JM, Cantu R, Wells L, et al. Dynamic developmental elaboration of N-linked glycan complexity in the *Drosophila melanogaster* embryo. *J Biol Chem.* 2007 Mar 23;282(12):9127-42. PubMed PMID: 17264077.

- 32. Smith TG, Lim JM, Weinberg MV, Wells L, Hoover TR. Direct analysis of the extracellular proteome from two strains of *Helicobacter pylori*. *Proteomics*. 2007 Jun;7(13):2240-5. PubMed PMID: 17533641.
- 33. Wells L. A QUIck look at O-GlcNAc dynamics. *Nat Chem Biol*. 2007 Jun;3(6):303-4. PubMed PMID: 17510643.
- 34. Starostina NG, Lim JM, Schvarzstein M, Wells L, Spence AM, et al. A CUL-2 ubiquitin ligase containing three FEM proteins degrades TRA-1 to regulate *C. elegans* sex determination. *Dev Cell*. 2007 Jul;13(1):127-39. PubMed PMID: 17609115; NIHMSID: NIHMS26946; PubMed Central PMCID: PMC2064902.
- 35. Koles K, Lim JM, Aoki K, Porterfield M, Tiemeyer M, et al. Identification of N-glycosylated proteins from the central nervous system of *Drosophila melanogaster*. *Glycobiology*. 2007 Dec;17(12):1388-403. PubMed PMID: 17893096.
- 36. Chalkey RJ, Wells L, Vosseller K. *Protein Mass Spectrometry*. Oxford, UK: Elsevier; 2008. Chapter 15, O-GlcNAc modification of proteins.
- 37. Lim JM, Sherling D, Teo CF, Hausman DB, Lin D, et al. Defining the regulated secreted proteome of rodent adipocytes upon the induction of insulin resistance. *J Proteome Res*. 2008 Mar;7(3):1251-63. PubMed PMID: 18237111.
- 38. Abbott KL, Aoki K, Lim JM, Porterfield M, Johnson R, et al. Targeted glycoproteomic identification of biomarkers for human breast carcinoma. *J Proteome Res*. 2008 Apr;7(4):1470-80. PubMed PMID: 18271524; NIHMSID: NIHMS793823; PubMed Central PMCID: PMC4932838.
- 39. Scholler N, Gross JA, Garvik B, Wells L, Liu Y, et al. Use of cancer-specific yeast-secreted in vivo biotinylated recombinant antibodies for serum biomarker discovery. *J Transl Med*. 2008 Jul 24;6:41. PubMed PMID: 18652693; PubMed Central PMCID: PMC2503970.
- 40. Wells L. *Handbook of Glycomics*. San Diego, CA: Elsevier; 2009. Chapter 2, O-glycan complexity and analysis.
- 41. Lim JM, Aoki K, Angel P, Garrison D, King D, et al. Mapping glycans onto specific N-linked glycosylation sites of *Pyrus communis* PGIP redefines the interface for EPG-PGIP interactions. *J Proteome Res*. 2009 Feb;8(2):673-80. PubMed PMID: 19072240; NIHMSID: NIHMS91586; PubMed Central PMCID: PMC4141487.
- 42. Li Y, Cao C, Jia W, Yu L, Mo M, et al. Structure of the F-spondin domain of mindin, an integrin ligand and pattern recognition molecule. *EMBO J*. 2009 Feb 4;28(3):286-97. PubMed PMID: 19153605; PubMed Central PMCID: PMC2637340.
- 43. Webster DM, Teo CF, Sun Y, Wloga D, Gay S, et al. O-GlcNAc modifications regulate cell survival and epiboly during zebrafish development. *BMC Dev Biol*. 2009 Apr 21;9:28. PubMed PMID: 19383152; PubMed Central PMCID: PMC2680843.
- 44. Orlando R, Lim JM, Atwood JA 3rd, Angel PM, Fang M, et al. IDAWG: Metabolic incorporation of stable isotope labels for quantitative glycomics of cultured cells. *J Proteome Res*. 2009 Aug;8(8):3816-23. PubMed PMID: 19449840; NIHMSID: NIHMS122732; PubMed Central PMCID: PMC4141490.

- 45. Hale CR, Zhao P, Olson S, Duff MO, Graveley BR, et al. RNA-guided RNA cleavage by a CRISPR RNA-Cas protein complex. *Cell*. 2009 Nov 25;139(5):945-56. PubMed PMID: 19945378; NIHMSID: NIHMS139284; PubMed Central PMCID: PMC2951265.
- 46. Yoshida-Moriguchi T, Yu L, Stalnaker SH, Davis S, Kunz S, et al. O-mannosyl phosphorylation of alpha-dystroglycan is required for laminin binding. *Science*. 2010 Jan 1;327(5961):88-92. PubMed PMID: 20044576; NIHMSID: NIHMS248430; PubMed Central PMCID: PMC2978000.
- 47. Brimble S, Wollaston-Hayden EE, Teo CF, Morris AC, Wells L. The Role of the O-GlcNAc Modification in Regulating Eukaryotic Gene Expression. *Curr Signal Transduct Ther*. 2010;5(1):12-24. PubMed PMID: 25484640; NIHMSID: NIHMS574961; PubMed Central PMCID: PMC4255977.
- 48. Humbard MA, Miranda HV, Lim JM, Krause DJ, Pritz JR, et al. Ubiquitin-like small archaeal modifier proteins (SAMPs) in *Haloferax volcanii*. *Nature*. 2010 Jan 7;463(7277):54-60. PubMed PMID: 20054389; NIHMSID: NIHMS158467; PubMed Central PMCID: PMC2872088.
- 49. Abbott KL, Lim JM, Wells L, Benigno BB, McDonald JF, et al. Identification of candidate biomarkers with cancer-specific glycosylation in the tissue and serum of endometrioid ovarian cancer patients by glycoproteomic analysis. *Proteomics*. 2010 Feb;10(3):470-81. PubMed PMID: 19953551; NIHMSID: NIHMS793820; PubMed Central PMCID: PMC4932840.
- 50. Nakamura N, Stalnaker SH, Lyalin D, Lavrova O, Wells L, et al. *Drosophila* Dystroglycan is a target of O-mannosyltransferase activity of two protein O-mannosyltransferases, Rotated Abdomen and Twisted. *Glycobiology*. 2010 Mar;20(3):381-94. PubMed PMID: 19969597; PubMed Central PMCID: PMC2912551.
- 51. Fang M, Lim JM, Wells L. Quantitative Glycomics of Cultured Cells Using Isotopic Detection of Aminosugars with Glutamine (IDAWG). *Curr Protoc Chem Biol*. 2010 Apr 1;2:55-69. PubMed PMID: 23061027; NIHMSID: NIHMS292635; PubMed Central PMCID: PMC3467102.
- 52. Teo CF, Wollaston-Hayden EE, Wells L. Hexosamine flux, the O-GlcNAc modification, and the development of insulin resistance in adipocytes. *Mol Cell Endocrinol*. 2010 Apr 29;318(1-2):44-53. PubMed PMID: 19799964; NIHMSID: NIHMS155216; PubMed Central PMCID: PMC2855202.
- 53. Teo CF, Ingale S, Wolfert MA, Elsayed GA, Nöt LG, et al. Glycopeptide-specific monoclonal antibodies suggest new roles for O-GlcNAc. *Nat Chem Biol*. 2010 May;6(5):338-43. PubMed PMID: 20305658; NIHMSID: NIHMS179240; PubMed Central PMCID: PMC2857662.
- 54. Chen L, Zhao P, Wells L, Amemiya CT, Condie BG, et al. Mouse and zebrafish Hoxa3 orthologues have nonequivalent in vivo protein function. *Proc Natl Acad Sci U S A*. 2010 Jun 8;107(23):10555-60. PubMed PMID: 20498049; PubMed Central PMCID: PMC2890846.
- 55. Stalnaker SH, Hashmi S, Lim JM, Aoki K, Porterfield M, et al. Site mapping and characterization of O-glycan structures on alpha-dystroglycan isolated from rabbit skeletal muscle. *J Biol Chem*. 2010 Aug 6;285(32):24882-91. PubMed PMID: 20507986; PubMed Central PMCID: PMC2915724.
- 56. Rahman MM, Stuchlick O, El-Karim EG, Stuart R, Kipreos ET, et al. Intracellular protein glycosylation modulates insulin mediated lifespan in *Celegans*. *Aging (Albany NY)*. 2010 Oct;2(10):678-90. PubMed PMID: 20952811; PubMed Central PMCID: PMC2993798.

- 57. Harper AD, Stalnaker SH, Wells L, Darvill A, Thornburg R, et al. Interaction of Nectarin 4 with a fungal protein triggers a microbial surveillance and defense mechanism in nectar. *Phytochemistry*. 2010 Dec;71(17-18):1963-9. PubMed PMID: 20970816.
- 58. Smith KN, Lim JM, Wells L, Dalton S. Myc orchestrates a regulatory network required for the establishment and maintenance of pluripotency. *Cell Cycle*. 2011 Feb 15;10(4):592-7. PubMed PMID: 21293186; PubMed Central PMCID: PMC3173999.
- 59. Wells L, Slawson C, Hart GW. The E2F-1 associated retinoblastoma-susceptibility gene product is modified by O-GlcNAc. *Amino Acids*. 2011 Mar;40(3):877-83. PubMed PMID: 20680651; NIHMSID: NIHMS233111; PubMed Central PMCID: PMC3030635.
- 60. Schell MA, Zhao P, Wells L. Outer membrane proteome of *Burkholderia pseudomallei* and *Burkholderia mallei* from diverse growth conditions. *J Proteome Res*. 2011 May 6;10(5):2417-24. PubMed PMID: 21391724; NIHMSID: NIHMS793792; PubMed Central PMCID: PMC4917286.
- 61. Stalnaker SH, Aoki K, Lim JM, Porterfield M, Liu M, et al. Glycomic analyses of mouse models of congenital muscular dystrophy. *J Biol Chem*. 2011 Jun 17;286(24):21180-90. PubMed PMID: 21460210; PubMed Central PMCID: PMC3122180.
- 62. Barnes J, Lim JM, Godard A, Blanchard F, Wells L, et al. Extensive mannose phosphorylation on leukemia inhibitory factor (LIF) controls its extracellular levels by multiple mechanisms. *J Biol Chem*. 2011 Jul 15;286(28):24855-64. PubMed PMID: 21613225; PubMed Central PMCID: PMC3137060.
- 63. Zhao P, Viner R, Teo CF, Boons GJ, Horn D, et al. Combining high-energy C-trap dissociation and electron transfer dissociation for protein O-GlcNAc modification site assignment. *J Proteome Res*. 2011 Sep 2;10(9):4088-104. PubMed PMID: 21740066; NIHMSID: NIHMS314262; PubMed Central PMCID: PMC3172619.
- 64. Mo KF, Fang T, Stalnaker SH, Kirby PS, Liu M, et al. Synthetic, structural, and biosynthetic studies of an unusual phospho-glycopeptide derived from  $\alpha$ -dystroglycan. *J Am Chem Soc*. 2011 Sep 14;133(36):14418-30. PubMed PMID: 21812486; NIHMSID: NIHMS323228; PubMed Central PMCID: PMC3176502.
- 65. Akimoto Y, Miura Y, Toda T, Wolfert MA, Wells L, et al. Morphological changes in diabetic kidney are associated with increased O-GlcNAcylation of cytoskeletal proteins including  $\alpha$ -actinin 4. *Clin Proteomics*. 2011 Sep 21;8(1):15. PubMed PMID: 21933451; PubMed Central PMCID: PMC3224550.
- 66. Stalnaker SH, Stuart R, Wells L. Mammalian O-mannosylation: unsolved questions of structure/function. *Curr Opin Struct Biol*. 2011 Oct;21(5):603-9. PubMed PMID: 21945038; NIHMSID: NIHMS324520; PubMed Central PMCID: PMC3356693.
- 67. McElroy CA, Holland PJ, Zhao P, Lim JM, Wells L, et al. Structural reorganization of the interleukin-7 signaling complex. *Proc Natl Acad Sci U S A*. 2012 Feb 14;109(7):2503-8. PubMed PMID: 22308406; PubMed Central PMCID: PMC3289338.
- 68. Fong JJ, Nguyen BL, Bridger R, Medrano EE, Wells L, et al.  $\beta$ -N-Acetylglucosamine (O-GlcNAc) is a novel regulator of mitosis-specific phosphorylations on histone H3. *J Biol Chem*. 2012 Apr 6;287(15):12195-203. PubMed PMID: 22371497; PubMed Central PMCID: PMC3320971.

- 69. Tran DT, Lim JM, Liu M, Stalnaker SH, Wells L, et al. Glycosylation of  $\alpha$ -dystroglycan: O-mannosylation influences the subsequent addition of GalNAc by UDP-GalNAc polypeptide N-acetylgalactosaminyltransferases. *J Biol Chem.* 2012 Jun 15;287(25):20967-74. PubMed PMID: 22549772; PubMed Central PMCID: PMC3375520.
- 70. Cabrera PV, Pang M, Marshall JL, Kung R, Nelson SF, et al. High throughput screening for compounds that alter muscle cell glycosylation identifies new role for N-glycans in regulating sarcolemmal protein abundance and laminin binding. *J Biol Chem.* 2012 Jun 29;287(27):22759-70. PubMed PMID: 22570487; PubMed Central PMCID: PMC3391114.
- 71. Zhao P, Nairn AV, Hester S, Moremen KW, O'Regan RM, et al. Proteomic identification of glycosylphosphatidylinositol anchor-dependent membrane proteins elevated in breast carcinoma. *J Biol Chem.* 2012 Jul 20;287(30):25230-40. PubMed PMID: 22654114; PubMed Central PMCID: PMC3408190.
- 72. Lee JK, Matthews RT, Lim JM, Swanier K, Wells L, et al. Developmental expression of the neuron-specific N-acetylglucosaminyltransferase Vb (GnT-Vb/IX) and identification of its in vivo glycan products in comparison with those of its paralog, GnT-V. *J Biol Chem.* 2012 Aug 17;287(34):28526-36. PubMed PMID: 22715095; PubMed Central PMCID: PMC3436567.
- 73. Nairn AV, Aoki K, dela Rosa M, Porterfield M, Lim JM, et al. Regulation of glycan structures in murine embryonic stem cells: combined transcript profiling of glycan-related genes and glycan structural analysis. *J Biol Chem.* 2012 Nov 2;287(45):37835-56. PubMed PMID: 22988249; PubMed Central PMCID: PMC3488057.
- 74. Polizzi SJ, Walsh RM Jr, Peeples WB, Lim JM, Wells L, et al. Human UDP- $\alpha$ -D-xylose synthase and Escherichia coli ArnA conserve a conformational shunt that controls whether xylose or 4-keto-xylose is produced. *Biochemistry.* 2012 Nov 6;51(44):8844-55. PubMed PMID: 23072385; NIHMSID: NIHMS793806; PubMed Central PMCID: PMC4932848.
- 75. Zhao P, Stalnaker SH, Wells L. Approaches for site mapping and quantification of O-linked glycopeptides. *Methods Mol Biol.* 2013;951:229-44. PubMed PMID: 23296534.
- 76. Liu S, Im H, Bairoch A, Cristofanilli M, Chen R, et al. A chromosome-centric human proteome project (C-HPP) to characterize the sets of proteins encoded in chromosome 17. *J Proteome Res.* 2013 Jan 4;12(1):45-57. PubMed PMID: 23259914; NIHMSID: NIHMS431316; PubMed Central PMCID: PMC4142220.
- 77. Wells L. The o-mannosylation pathway: glycosyltransferases and proteins implicated in congenital muscular dystrophy. *J Biol Chem.* 2013 Mar 8;288(10):6930-5. PubMed PMID: 23329833; PubMed Central PMCID: PMC3591603.
- 78. Wells L, Hart GW. Glycomics: building upon proteomics to advance glycosciences. *Mol Cell Proteomics.* 2013 Apr;12(4):833-5. PubMed PMID: 23378519; PubMed Central PMCID: PMC3617329.
- 79. Kang J, Shen Z, Lim JM, Handa H, Wells L, et al. Regulation of Oct1/Pou2f1 transcription activity by O-GlcNAcylation. *FASEB J.* 2013 Jul;27(7):2807-17. PubMed PMID: 23580612; PubMed Central PMCID: PMC3688745.
- 80. Dobson CM, Hempel SJ, Stalnaker SH, Stuart R, Wells L. O-Mannosylation and human disease. *Cell Mol Life Sci.* 2013 Aug;70(16):2849-57. PubMed PMID: 23115008; NIHMSID: NIHMS419060; PubMed Central PMCID: PMC3984002.

- 81. Meng L, Forouhar F, Thieker D, Gao Z, Ramiah A, et al. Enzymatic basis for N-glycan sialylation: structure of rat  $\alpha$ 2,6-sialyltransferase (ST6GAL1) reveals conserved and unique features for glycan sialylation. *J Biol Chem*. 2013 Nov 29;288(48):34680-98. PubMed PMID: 24155237; PubMed Central PMCID: PMC3843080.
- 82. Live D, Wells L, Boons GJ. Dissecting the molecular basis of the role of the O-mannosylation pathway in disease:  $\alpha$ -dystroglycan and forms of muscular dystrophy. *Chembiochem*. 2013 Dec 16;14(18):2392-402. PubMed PMID: 24318691; NIHMSID: NIHMS547967; PubMed Central PMCID: PMC3938021.
- 83. Lim JM, Wollaston-Hayden EE, Teo CF, Hausman D, Wells L. Quantitative secretome and glycome of primary human adipocytes during insulin resistance. *Clin Proteomics*. 2014;11(1):20. PubMed PMID: 24948903; PubMed Central PMCID: PMC4055909.
- 84. Wollaston-Hayden EE, Harris RB, Liu B, Bridger R, Xu Y, et al. Global O-GlcNAc Levels Modulate Transcription of the Adipocyte Secretome during Chronic Insulin Resistance. *Front Endocrinol (Lausanne)*. 2014;5:223. PubMed PMID: 25657638; PubMed Central PMCID: PMC4302944.
- 85. Panin VM, Wells L. Protein O-mannosylation in metazoan organisms. *Curr Protoc Protein Sci*. 2014 Feb 3;75:Unit 12.12.. PubMed PMID: 24510673; NIHMSID: NIHMS566438; PubMed Central PMCID: PMC3984005.
- 86. Porterfield M, Zhao P, Han H, Cunningham J, Aoki K, et al. Discrimination between adenocarcinoma and normal pancreatic ductal fluid by proteomic and glycomic analysis. *J Proteome Res*. 2014 Feb 7;13(2):395-407. PubMed PMID: 24328148; NIHMSID: NIHMS549099; PubMed Central PMCID: PMC3946306.
- 87. Vaidyanathan K, Durning S, Wells L. Functional O-GlcNAc modifications: implications in molecular regulation and pathophysiology. *Crit Rev Biochem Mol Biol*. 2014 Mar-Apr;49(2):140-163. PubMed PMID: 24524620; NIHMSID: NIHMS793797; PubMed Central PMCID: PMC4912837.
- 88. York WS, Agravat S, Aoki-Kinoshita KF, McBride R, Campbell MP, et al. MIRAGE: the minimum information required for a glycomics experiment. *Glycobiology*. 2014 May;24(5):402-6. PubMed PMID: 24653214; PubMed Central PMCID: PMC3976285.
- 89. Praissman JL, Wells L. Mammalian O-mannosylation pathway: glycan structures, enzymes, and protein substrates. *Biochemistry*. 2014 May 20;53(19):3066-78. PubMed PMID: 24786756; PubMed Central PMCID: PMC4033628.
- 90. Zhang L, Syed ZA, van Dijk Hård I, Lim JM, Wells L, et al. O-glycosylation regulates polarized secretion by modulating Tango1 stability. *Proc Natl Acad Sci U S A*. 2014 May 20;111(20):7296-301. PubMed PMID: 24799692; PubMed Central PMCID: PMC4034226.
- 91. Chandler KB, Brnakova Z, Sanda M, Wang S, Stalnakier SH, et al. Site-specific glycan microheterogeneity of inter-alpha-trypsin inhibitor heavy chain H4. *J Proteome Res*. 2014 Jul 3;13(7):3314-29. PubMed PMID: 24884609; PubMed Central PMCID: PMC4084840.
- 92. Praissman JL, Live DH, Wang S, Ramiah A, Chinoy ZS, et al. B4GAT1 is the priming enzyme for the LARGE-dependent functional glycosylation of  $\alpha$ -dystroglycan. *Elife*. 2014 Oct 3;3:PubMed PMID: 25279697; PubMed Central PMCID: PMC4227051.

- 93. Teo CF, Wells L. Monitoring protein O-linked  $\beta$ -N-acetylglucosamine status via metabolic labeling and copper-free click chemistry. *Anal Biochem.* 2014 Nov 1;464:70-2. PubMed PMID: 24995865; NIHMSID: NIHMS611310; PubMed Central PMCID: PMC4172539.
- 94. Vaidyanathan K, Wells L. Multiple tissue-specific roles for the O-GlcNAc post-translational modification in the induction of and complications arising from type II diabetes. *J Biol Chem.* 2014 Dec 12;289(50):34466-71. PubMed PMID: 25336652; PubMed Central PMCID: PMC4263854.
- 95. Zhao P, Schulz TC, Sherrer ES, Weatherly DB, Robins AJ, et al. The human embryonic stem cell proteome revealed by multidimensional fractionation followed by tandem mass spectrometry. *Proteomics.* 2015 Jan;15(2-3):554-66. PubMed PMID: 25367160; NIHMSID: NIHMS723868; PubMed Central PMCID: PMC4591931.
- 96. Al Jadda K, Porterfield MP, Bridger R, Heiss C, Tiemeyer M, et al. EUROCarbDB(CCRC): a EUROCarbDB node for storing glycomics standard data. *Bioinformatics.* 2015 Jan 15;31(2):242-5. PubMed PMID: 25217575; PubMed Central PMCID: PMC4287942.
- 97. Weigel PH, West CM, Zhao P, Wells L, Baggenstoss BA, et al. Hyaluronan synthase assembles chitin oligomers with -GlcNAc( $\alpha$ 1 $\rightarrow$ )UDP at the reducing end. *Glycobiology.* 2015 Jun;25(6):632-43. PubMed PMID: 25583822; PubMed Central PMCID: PMC4410831.
- 98. Majumdar S, Zhao P, Pfister NT, Compton M, Olson S, et al. Three CRISPR-Cas immune effector complexes coexist in *Pyrococcus furiosus*. *RNA.* 2015 Jun;21(6):1147-58. PubMed PMID: 25904135; PubMed Central PMCID: PMC4436667.
- 99. Durning SP, Flanagan-Steet H, Prasad N, Wells L. O-Linked  $\beta$ -N-acetylglucosamine (O-GlcNAc) Acts as a Glucose Sensor to Epigenetically Regulate the Insulin Gene in Pancreatic Beta Cells. *J Biol Chem.* 2016 Jan 29;291(5):2107-18. PubMed PMID: 26598517; PubMed Central PMCID: PMC4732198.
- 100. Yu SH, Zhao P, Sun T, Gao Z, Moremen KW, et al. Selective Exo-Enzymatic Labeling Detects Increased Cell Surface Sialoglycoprotein Expression upon Megakaryocytic Differentiation. *J Biol Chem.* 2016 Feb 19;291(8):3982-9. PubMed PMID: 26733198; PubMed Central PMCID: PMC4759176.
- 101. Rahman K, Zhao P, Mandalasi M, van der Wel H, Wells L, et al. The E3 Ubiquitin Ligase Adaptor Protein Skp1 Is Glycosylated by an Evolutionarily Conserved Pathway That Regulates Protist Growth and Development. *J Biol Chem.* 2016 Feb 26;291(9):4268-80. PubMed PMID: 26719340; PubMed Central PMCID: PMC4813455.
- 102. Praissman JL, Willer T, Sheikh MO, Toi A, Chitayat D, et al. The functional O-mannose glycan on  $\alpha$ -dystroglycan contains a phospho-ribitol primed for matriglycan addition. *Elife.* 2016 Apr 29;5PubMed PMID: 27130732; PubMed Central PMCID: PMC4924997.
- 103. Dong Y, Shahid-Salles S, Sherling D, Fechheimer N, Iyer N, et al. De novo actin polymerization is required for model Hirano body formation in *Dictyostelium*. *Biol Open.* 2016 Jun 15;5(6):807-18. PubMed PMID: 27215322; PubMed Central PMCID: PMC4920178.
- 104. Hildebrandt ER, Cheng M, Zhao P, Kim JH, Wells L, et al. A shunt pathway limits the CaaX processing of Hsp40 Ydj1p and regulates Ydj1p-dependent phenotypes. *Elife.* 2016 Aug 15;5PubMed PMID: 27525482; PubMed Central PMCID: PMC5014548.
- 105. Struwe WB, Agravat S, Aoki-Kinoshita KF, Campbell MP, Costello CE, et al. The minimum information required for a glycomics experiment (MIRAGE) project: sample preparation guidelines

for reliable reporting of glycomics datasets. *Glycobiology*. 2016 Sep;26(9):907-910. PubMed PMID: 27654115; PubMed Central PMCID: PMC5045532.

- 106. Sun T, Yu SH, Zhao P, Meng L, Moremen KW, et al. One-Step Selective Exoenzymatic Labeling (SEEL) Strategy for the Biotinylation and Identification of Glycoproteins of Living Cells. *J Am Chem Soc*. 2016 Sep 14;138(36):11575-11582. PubMed PMID: 27541995; NIHMSID: NIHMS822136; PubMed Central PMCID: PMC5067740.
- 107. Volke-Sepulveda T, Salgado-Bautista D, Bergmann C, Wells L, Gutierrez-Sanchez G, et al. Secretomic Insight into Glucose Metabolism of *Aspergillus brasiliensis* in Solid-State Fermentation. *J Proteome Res*. 2016 Oct 7;15(10):3856-3871. PubMed PMID: 27548361.
- 108. Teo CF, El-Karim EG, Wells L. Dissecting PUGNAc-mediated inhibition of the pro-survival action of insulin. *Glycobiology*. 2016 Nov;26(11):1198-1208. PubMed PMID: 27072814.
- 109. Liu Y, McBride R, Stoll M, Palma AS, Silva L, et al. The minimum information required for a glycomics experiment (MIRAGE) project: improving the standards for reporting glycan microarray-based data. *Glycobiology*. 2016 Nov 22; PubMed PMID: 27993942; PubMed Central PMCID: PMC5444268.
- 110. Lopez-Sambrooks C, Shrimal S, Khodier C, Flaherty DP, Rinis N, et al. Oligosaccharyltransferase inhibition induces senescence in RTK-driven tumor cells. *Nat Chem Biol*. 2016 Dec;12(12):1023-1030. PubMed PMID: 27694802; NIHMSID: NIHMS850904; PubMed Central PMCID: PMC5393272.
- 111. Halmo SM, Singh D, Patel S, Wang S, Edlin M, et al. Protein-O-Linked Mannose  $\beta$ -1,4-N-Acetylglucosaminyl-transferase 2 (POMGNT2) Is a Gatekeeper Enzyme for Functional Glycosylation of  $\alpha$ -Dystroglycan. *J Biol Chem*. 2017 Feb 10;292(6):2101-2109. PubMed PMID: 27932460; PubMed Central PMCID: PMC5313085.
- 112. Li X, Grant OC, Ito K, Wallace A, Wang S, et al. Structural Analysis of the Glycosylated Intact HIV-1 gp120-b12 Antibody Complex Using Hydroxyl Radical Protein Footprinting. *Biochemistry*. 2017 Feb 21;56(7):957-970. PubMed PMID: 28102671; NIHMSID: NIHMS845205; PubMed Central PMCID: PMC5319886.
- 113. Sheikh MO, Halmo SM, Patel S, Middleton D, Takeuchi H, et al. Rapid screening of sugar-nucleotide donor specificities of putative glycosyltransferases. *Glycobiology*. 2017 Mar 1;27(3):206-212. PubMed PMID: 28177478.
- 114. Zhou T, Doria-Rose NA, Cheng C, Stewart-Jones GBE, Chuang GY, et al. Quantification of the Impact of the HIV-1-Glycan Shield on Antibody Elicitation. *Cell Rep*. 2017 Apr 25;19(4):719-732. PubMed PMID: 28445724; NIHMSID: NIHMS867452; PubMed Central PMCID: PMC5538809.
- 115. Vaidyanathan K, Niranjan T, Selvan N, Teo CF, May M, et al. Identification and characterization of a missense mutation in the O-linked  $\beta$ -N-acetylglucosamine (O-GlcNAc) transferase gene that segregates with X-linked intellectual disability. *J Biol Chem*. 2017 May 26;292(21):8948-8963. PubMed PMID: 28302723; PubMed Central PMCID: PMC5448127.
- 116. Sheikh MO, Wells L. Whoa man! Unexpected protein O-mannosylation pathways in mammals. *J Biol Chem*. 2017 Jul 7;292(27):11599-11600. PubMed PMID: 28687598; PubMed Central PMCID: PMC5500820.



- 117. Aarnio-Peterson M, Zhao P, Yu SH, Christian C, Flanagan-Steet H, et al. Altered Met Receptor Phosphorylation and LRP1 Mediated Uptake in Cells Lacking Carbohydrate-Dependent Lysosomal Targeting. *J Biol Chem*. 2017 Jul 19;PubMed PMID: 28724630.
- 118. Capicciotti CJ, Zong C, Sheikh MO, Sun T, Wells L, et al. Cell-Surface Glyco-Engineering by Exogenous Enzymatic Transfer using a Bi-Functional CMP-Neu5Ac Derivative. *J Am Chem Soc*. 2017 Aug 31;PubMed PMID: 28858492.
- 119. Sheikh MO, Halmo SM, Wells L. Recent advancements in understanding mammalian O-mannosylation. *Glycobiology*. 2017 Sep 1;27(9):806-819. PubMed PMID: 28810660.
- 120. Constable S, Lim JM, Vaidyanathan K, Wells L. O-GlcNAc transferase regulates transcriptional activity of human Oct4. *Glycobiology*. 2017 Oct 1;27(10):927-937. PubMed PMID: 28922739.
- 121. Haltiwanger RS, Wells L, Freeze HH, Stanley P. Other Classes of Eukaryotic Glycans. 3rd ed. Varki A, Cummings RD, Esko JD, Stanley P, Hart GW, et al, editors. Cold Spring Harbor (NY): Cold Spring Harbor Laboratory Press; 2017. Chapter ch13
- 122. Rahman K, Mandalasi M, Zhao P, Sheikh MO, Taujale R, et al. Characterization of a cytoplasmic glucosyltransferase that extends the core trisaccharide of the *Toxoplasma* Skp1 E3 ubiquitin ligase subunit. *J Biol Chem*. 2017 Nov 10;292(45):18644-18659. PubMed PMID: 28928220; PubMed Central PMCID: PMC5682971.
- 123. Middleton DR, Zhang X, Wantuch PL, Ozdilek A, Liu X, et al. Identification and characterization of the *Streptococcus pneumoniae* type 3 capsule-specific glycoside hydrolase of *Paenibacillus* species 32352. *Glycobiology*. 2017 Nov 27;PubMed PMID: 29190349.
- 124. Amore A, Knott BC, Supekar NT, Shajahan A, Azadi P, et al. Distinct roles of N- and O-glycans in cellulase activity and stability. *Proc Natl Acad Sci U S A*. 2017 Dec 26;114(52):13667-13672. PubMed PMID: 29229855; PubMed Central PMCID: PMC5748201.
- 125. Yu WH, Zhao P, Draghi M, Arevalo C, Karsten CB, et al. Exploiting glycan topography for computational design of Env glycoprotein antigenicity. *PLoS Comput Biol*. 2018 Apr;14(4):e1006093. PubMed PMID: 29677181; PubMed Central PMCID: PMC5931682.
- 126. Selvan N, George S, Serajee FJ, Shaw M, Hobson L, et al. O-GlcNAc transferase missense mutations linked to X-linked intellectual disability deregulate genes involved in cell fate determination and signaling. *J Biol Chem*. 2018 Jul 6;293(27):10810-10824. PubMed PMID: 29769320; PubMed Central PMCID: PMC6036218.
- 127. Duan H, Chen X, Boyington JC, Cheng C, Zhang Y, et al. Glycan Masking Focuses Immune Responses to the HIV-1 CD4-Binding Site and Enhances Elicitation of VRC01-Class Precursor Antibodies. *Immunity*. 2018 Jul 24;PubMed PMID: 30076101.
- 128. Yu SH, Zhao P, Prabhakar PK, Sun T, Beedle A, et al. Defective mucin-type glycosylation on  $\alpha$ -dystroglycan in COG-deficient cells increases its susceptibility to bacterial proteases. *J Biol Chem*. 2018 Jul 26;PubMed PMID: 30049793.
- 129. Gas-Pascual E, Ichikawa HT, Sheikh MO, Serji MI, Deng B, Mandalasi M, Bandini G, Samuelson J, Wells L, West CM. [CRISPR/Cas9 and glycomics tools for \*Toxoplasma\* glycobiology](#). *J Biol Chem*. 2019 Jan 25;294(4):1104-1125. doi: 10.1074/jbc.RA118.006072. Epub 2018 Nov 21. PubMed PMID: 30463938; PubMed Central PMCID: PMC6349120.

- 130. Sheikh MO, Gas-Pascual E, Glushka JN, Bustamante JM, Wells L, West CM. [Trypanosoma cruzi 13C-labeled O-Glycan standards for mass spectrometry](#). Glycobiology. 2019 Apr 1;29(4):280-284. doi: 10.1093/glycob/cwy111. PubMed PMID: 30649355; PubMed Central PMCID: PMC6422234.
- 131. Escolano A, Gristick HB, Abernathy ME, Merckenschlager J, Gautam R, Oliveira TY, Pai J, West AP Jr, Barnes CO, Cohen AA, Wang H, Golijanin J, Yost D, Keeffe JR, Wang Z, Zhao P, Yao KH, Bauer J, Nogueira L, Gao H, Voll AV, Montefiori DC, Seaman MS, Gazumyan A, Silva M, McGuire AT, Stamatatos L, Irvine DJ, Wells L, Martin MA, Bjorkman PJ, Nussenzweig MC. [Immunization expands B cells specific to HIV-1 V3 glycan in mice and macaques](#). Nature. 2019 Jun;570(7762):468-473. doi: 10.1038/s41586-019-1250-z. Epub 2019 May 29. PubMed PMID: 31142836; PubMed Central PMCID: PMC6657810.
- 132. Klaver E, Zhao P, May M, Flanagan-Steet H, Freeze HH, Gilmore R, Wells L, Contessa J, Steet R. [Selective inhibition of N-linked glycosylation impairs receptor tyrosine kinase processing](#). Dis Model Mech. 2019 Jun 5;12(6). doi: 10.1242/dmm.039602. PubMed PMID: 31101650; PubMed Central PMCID: PMC6602306.
- 133. Wells L, Feizi T. [Editorial overview: Carbohydrates: O-glycosylation](#). Curr Opin Struct Biol. 2019 Jun 12;. doi: 10.1016/j.sbi.2019.05.010. [Epub ahead of print] PubMed PMID: 31202542.
- 134. Sheikh MO, Tayyari F, Zhang S, Judge MT, Weatherly DB, Ponce FV, Wells L, Edison AS. [Correlations Between LC-MS/MS-Detected Glycomics and NMR-Detected Metabolomics in Caenorhabditis elegans Development](#). Front Mol Biosci.2019;6:49. doi: 10.3389/fmolb.2019.00049. eCollection 2019. PubMed PMID: 31316996; PubMed Central PMCID: PMC6611444.

•

Disclosures/Provisional Patents/U.S. Patents/International Patents Filed Through UGA:

1. Co-Inventor, Novel Secreted Proteins of Adipocytes for Diagnostic Purposes, 2007. **Non-exclusive license to Linco (Millipore)**
2. Co-Inventor, IDAWG: A novel quantitative method for glycomics, 2008. Patent Issued. Patent Number 9,329,169
3. Co-Inventor, Novel IgG-mAb for O-GlcNAc modified proteins, 2010. **Non-exclusive license to Millipore**  
**Non-exclusive license to ThermoFisher/Pierce**
4. Co-Inventor, Intelligent Consecutive Reaction Monitoring for Automated Assignment and Quantification of Glycans, 2013.

### **Research Support (since 2003):**

#### **Current Funding:**

R01GM111939 (Wells, PI) 07/01/14-06/30/22  
 NIH/NIGMS \$125,000 per year (Wells)  
 "Structure and Function in alpha-Dystroglycan Glycosylation"  
 Elucidating the functional glycan structures on alpha-dystroglycan and characterizing the enzymes responsible.

R01GM130915-01 (Moremen, Wells, Woods, Kannan, PIs) 10/01/18 – 09/30/22  
 NIH \$165,000 per year (Wells)

“Origin of N-Glycan Site-Specific Heterogeneity”

Define the molecular mechanisms and rates of defined glycosylation reactions at specific sites on particular substrate proteins to understand the underlying cause of microheterogeneity in glycoproteins.

U01CA233581-01 (Bellis and Wells, PIs) 10/01/18 – 09/30/23  
NIH/NCI \$60,000 per year (Wells)  
“Sialylation-dependent mechanisms driving pancreatic cancer progression”  
Perform phospho- and glyco-proteomics on organoids and tissues.

R01GM132606 (Schmidt, Wells, Kannan, PIs) 09/20/19-07/31/23  
NIH/NIGMS  
*Determining the Scope of Prenylatable Protein Sequences*  
Define proteins carrying isoprenyl groups by tandem mass spectrometry

R21HD097652-01 (Wells, PI) 9/01/19 – 8/31/21  
NIH/NICHD \$137,500 per year (Wells)  
“O-GlcNAc dynamics and the OGT interactome in X-linked intellectual disability”  
Determine the impact of XLID OGT variants on O-GlcNAc turnover and OGT partners

Past External Competitive Funding:

P41GM103490 (Pierce, PI; Wells, Senior Investigator) 09/01/03-06/30/19  
NIH/NCRR \$125,000 direct per year (Wells)  
“National Center for Biomedical Glycomics”  
Development of glycomic and glycoproteomic technology platforms using murine human ESCs including quantitative glycomic and direct glycopeptidomic strategies.

U01CA128454 (Pierce, PI; Wells, co-PI) 07/01/07–06/30/19  
NIH/NCI \$75,000 direct per year (Wells)  
“Tumor Glycomics Laboratory for Discovery of Pancreatic Cancer Markers”  
The major goal of this project is to identify and begin validation of glycoprotein-based prognostic/diagnostic (and potential therapeutic) markers for pancreatic cancer.

CAVD Program (Alter, PI, Wells co-PI of UGA subcontract) 10/01/13 – 3/31/19  
Bill and Melinda Gates Foundation \$100,000 per year (Wells)  
*Glyco-adjuvanting HIV vaccines*  
Goal: Investigate the glycosignatures and glycosylation differences that predict or improve HIV vaccines.

W. M. Keck Foundation (Tiemeyer PI, Wells, co-PI) 01/01/15-12/31/17  
Keck Foundation \$125,000 per year (Wells)  
“The Glycomics of Human Neurodegenerative, Developmental, and Cognitive Disorders”  
Elucidating the impact of glycan changes in neurological disorders

P01GM107012 (Boons PI, Wells co-PI) 07/01/13-06/30/19  
NIH/NIGMS \$130,000 per year (Wells)  
“Mamallian glycosyltransferases for use in chemistry and biology”  
Determining in vitro and in vivo substrates for terminating glycosyltransferases and applying these findings and new technologies to diseases of trafficking.

R21AI123161 (Wells, West, Tarleton, PI) 07/01/15-12/31/17  
NIH/NIAID \$66,667 per year (Wells)  
"Enabling tools for protist pathogen glycobiology  
Genetically modified glycogenes and impact on glycome in Toxoplasma and T. Cruzi.

Contract Grant (Galinski PI, Wells PI of Sub-contract) 01/01/16-8/31/17  
NIH/DHHS \$50,000  
Malaria Host-Pathogen Interaction Center (MaHPIC)  
Serum glycomics of NHP infected with malaria.

Georgia Research Alliance Lars G. Ljungdahl Distinguished Investigator, 2011-2017  
\$250,000 endowment  
Non-competitive, awarded, income off interest to be used to facilitate creative research.

AHA (Wells, PI) \$59,000 direct per year 07/01/05 – 06/30/09  
*American Heart Association -- National Affiliate Scientific Development Grant*  
"Defining the Impact of Nutrients and Hormones on Adipocytokine Secretion"  
The focus is to define the impact of insulin resistance, the hallmark of type II diabetes, on secretion from adipocytes with an emphasis on how O-GlcNAc modulates this process.

MDA4074 (Wells, PI) 01/01/06-12/31/07  
*Muscular Dystrophy Association* \$83,000 direct per year  
"Glycan Site Mapping and Characterization of alpha-Dyroglycan"  
This work focuses on the mapping of functionally-relevant O-Man Sites on alpha-Dyroglycan and characterization of the glycans present at each residue and their functional impact in several forms of congenital muscular dystrophy.

R21AI070933 (Urbauer, PI; Wells, co-PI) 06/01/06 – 05/31/08  
NIH/NIAID \$10,000 direct per year (Wells)  
"Regulating Microbial Biofilm Formation: A Novel Prokaryotic Multi-Protein Complex"  
The goals of this project are to identify and understand the elaborate regulatory mechanisms utilized by *Pseudomonas aeruginosa* that result in biofilm formation and chronic infections.

R01DK075069 (Wells, PI) 01/01/07 - 12/31/11  
NIH/NIDDK \$163,000 direct/year  
"Role of O-GlcNAc in Metabolic Signaling" \$185,000 per year direct  
The major goal of this proposal is to elucidate the mechanism(s) by which post-translational modification of proteins via O-GlcNAc modulates insulin action. In both primary and stable mammalian cell lines, and in *C. elegans*, we are assessing the impact of O-GlcNAc on insulin's role in protection from apoptosis, glucose uptake, and lifespan regulation.

AHA (Teo, PI; Wells, Sponsor) 07/01/07-06/30/09  
*American Heart Association Predoctoral Fellowship* \$19,000 per year direct  
"Impacts of O-GlcNAc Modification on the Metabolic Branch of the Insulin Signaling Pathway"  
This predoctoral fellowship supports Chin Fen Teo, a BMB graduate student, in my laboratory.

R21AR056055-01 (Live, PI; Wells, co-PI) 09/22/08 – 06/30/10  
NIH \$25,000 direct per year (Wells)  
"Post-Translation Processing of Alpha-Dyroglycan"

The aim of this project is to investigate structural and biochemical aspects of O-Man and O-GalNAc glycosylation found in the mucin-like region of alpha-dystroglycan with emphasis on the relationship of glycosylation to forms of muscular dystrophy.

P01GM085354-01 (Dalton, PI; Wells, Project 2 PI) 01/01/09-12/31/13  
NIH/NIGMS \$125,000 direct per year (Wells)

“The Basic Biology of hESCs: Understanding mechanisms of self-renewal and cell fate”

Our project, in conjunction with the Tiemeyer laboratory, is to apply glycomic and glycoproteomic technologies to characterize the cell surface of derived cells, as well as to understand the role that glycosylation, with an emphasis on O-GlcNAc, plays in self-renewal and commitment to cell fate.

R01GM085448 (Smith, PI – Wells, Supplement PI) 08/01/09 – 07/31/11  
NIH/NIGMS \$90,000 direct per year (Wells)

“Shotgun Glycomics: Linking Glycan Structure and Function”

The aim of this supplemental proposal is to characterize glycans isolated from shotgun glycomic separations and arrays of functional interest in support of the parent grant.

1R41RR025291-01A2 (Atwood, PI, Wells, co-PI) 07/01/09 - 06/30/10  
NIH \$7,660 direct per year (Wells)

“Development of Software to Annotate/Interpret MS data of O and N-linked Glycans”

The research goal is to design an easy to use software application that will allow the automated assignment of MS<sup>n</sup> spectra obtained for O-linked and N-linked glycans.

NIH Consortium for Functional Glycomics Bridging Grant 09/01/09-08/31/10  
CFG/NIH (Wells, PI) \$35,00 direct per year

“O-linked Oligosaccharide Standards for Glycomics”

The research in this application is aimed at defining O-glycan standards for the field.

NIH Consortium for Functional Glycomics Bridging Grant 09/01/09-08/31/10  
CFG/NIH (Tiemeyer, PI; Wells, co-PI) \$15,00 direct per year (Wells)

“N-linked Oligosaccharide Standards for Glycomics”

The research in this application is aimed at defining N-glycan standards for the field.

U01CA128454 (Reilly, PI; Wells, co-PI of UGA subcontract) 08/20/11-06/30/15  
NIH/NCI \$66,667 per year (Wells)

“Glycomics of Heart and Lung Disease in the Genomic Era”

This project focuses on the role of blood group dependent glycosylation in cardiopulmonary disease.

R01CA135069 (Goldman, PI, Wells, PI of UGA subcontract) 08/01/12-07/31/14  
NIH/NCI \$50,000 per year (Wells)

“Glycans in Hepatocellular Carcinoma”

This project focuses on identifying glycoprotein biomarkers for liver cancer.

U01CA168930 (Cummings, PI; Wells, co-PI of UGA subcontract) 08/01/12-06/30/16  
NIH/NCI \$10,000 per year (Wells)

“The Tumor Antigens Tn and SialylTn in Human Colorectal Carcinoma”

This project focuses on identify biomarker proteins carrying Tn and SialylTn glycosylation.

P41GM103694 (Cummings, PI; Wells, PI of UGA subcontract) 09/01/13-06/30/16

NIH/NIGMS \$25,000 per year (Wells)  
"National center for functional glycomics"

This subcontract is geared towards identifying glycan structures of interest based on shotgun glycan arrays that interact with viruses, antibodies, bacteria, or glycan-binding proteins.

Bill and Melinda Gates Foundation (Alter, PI, Wells, co-PI) 12/01/13-11/30/15  
Gates Foundation \$125,000 per year (Wells)  
"Altering glycosylation for increased antigenicity of HIV Env"  
Determining the role of glycans in antigenicity of HIV Env.

State of Georgia (excluding start-up package and grants to start-up companies):

n/a (Wells, PI) 08/03-07/08  
*Georgia Cancer Coalition* \$250,000 total (45,000 direct per year)  
"Elucidating the Roles of O-GlcNAc in Cancer"  
This seed grant is focused on elucidating the role of glycosylation, with an emphasis on O-GlcNAc, in cancer.

n/a (Wells, PI) 01/05-12/05  
*UGARF Faculty Research Grant* \$9,500 total direct  
"Biologically-Relevant Sites of O-Glycosylation on alpha-dystroglycan"  
This seed grant allowed us to begin the characterization of alpha-dystroglycan and generated preliminary data for our successful grant application to the MDA followed by NIH R01 funding.

n/a (Wells, PI) 01/06-12/06  
*University of Georgia M.G. Michael Award* \$3,000 Direct  
"O-Glycosylation modulates *C. elegans* lifespan"  
This award focused on the preliminary data that we generated showing that O-GlcNAc cycling enzymes modulate *C. elegans* median lifespan and was used as preliminary data in our successful R01 application to NIDDK/NIH and resulting in a publication.

n/a (Wells, PI) 07/07-06/08  
*Georgia Research Alliance* \$875,000 Direct  
"Equipment Grant"  
This award, that was contingent upon the successful funding of a U01 proposal on pancreatic cancer from the NCI/NIH, was used to purchase two LC-MS/MS systems. Multiple research projects using these instruments have resulted in publications and additional external funding.

Private:

n/a (Wells, PI) 03/07-02/08  
*Novocell/Bresagen/Viacyte* \$65,000 Total (45,000 direct)  
"Proteomic Analysis of hESCs and derived cell lines"  
Application of proteomic methodologies to characterize the BG02 hESC proteome and lay the groundwork for quantitative analysis following differentiation that lead to a publication.

n/a (Wells and Tiemeyer, PI) 07/01/15-Present  
ThermoFisher, Inc. Equipment in excess of \$1,000,000  
"ThermoFisher appointed Center of Excellence in Glycoproteomics/Glycomics"  
Development of sample preparation/methods/data analysis for glycans and glycopeptides.

GRA Grants for Start-up Companies as Co-Founder and CSO--multiple