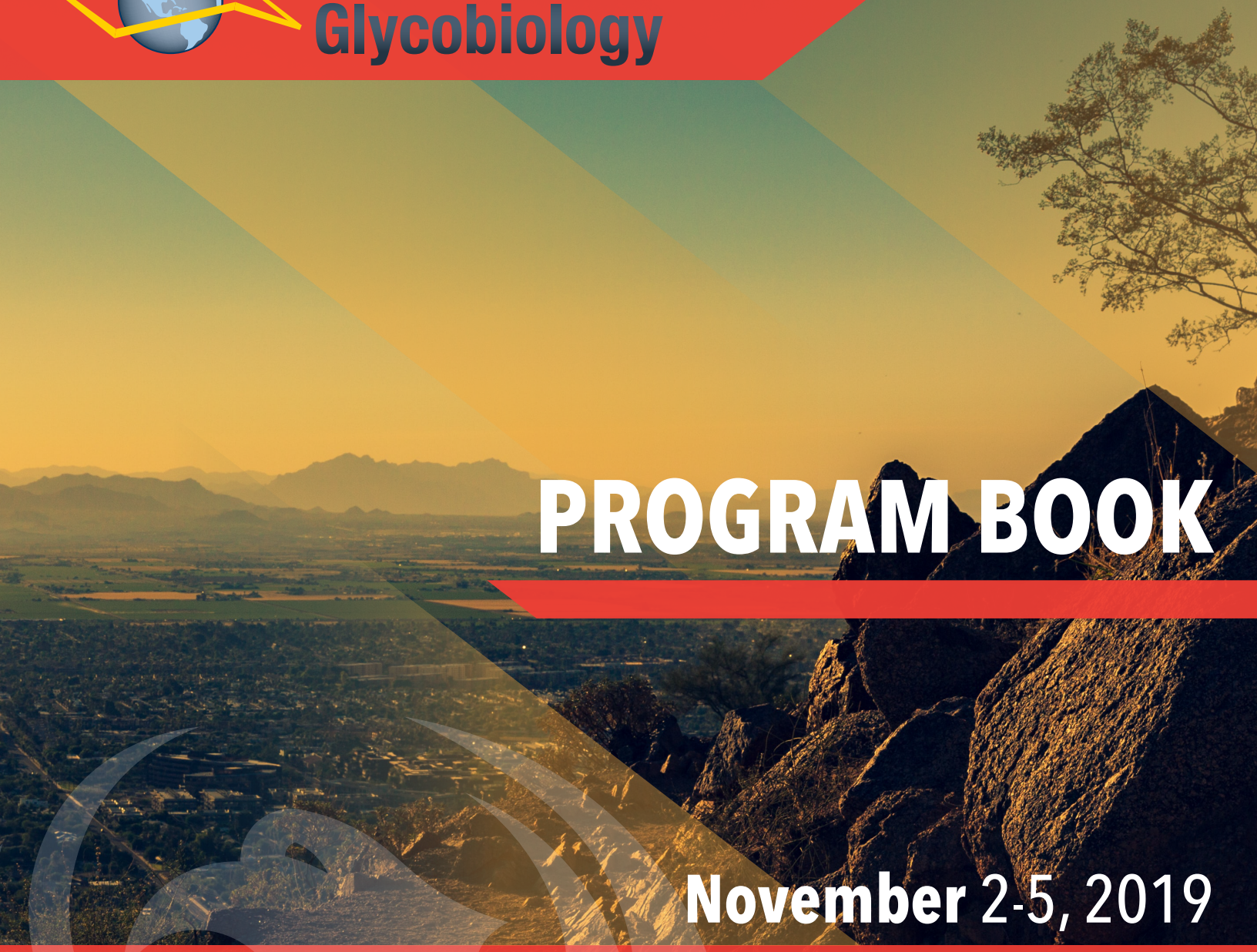
2019 **ANNUAL MEETING**

SOCIETY for Glycobiology



PROGRAM BOOK

November 2-5, 2019

Glycobiology: Research at the interface

PHOENIX, ARIZONA

Renaissance Phoenix Downtown Hotel

Meeting Chair: Dr. Markus Aebi, ETH Zurich

www.glycobiology.org

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ANNUAL MEETING

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MEETING CHAIR
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CCRC, University of Georgia

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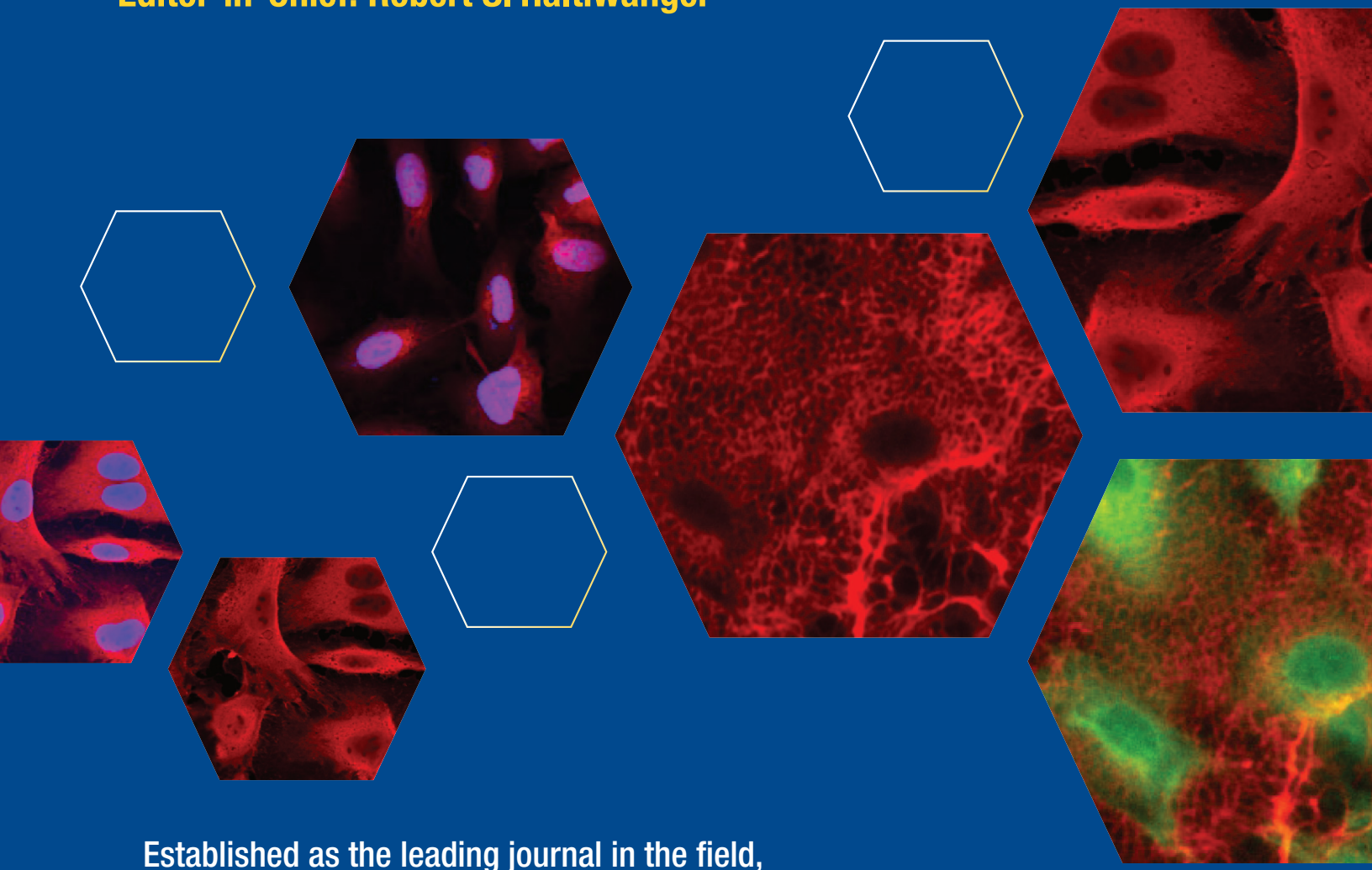
GLYCOBIOLOGY

Official Journal of the Society for Glycobiology

Editor-in-Chief: Robert S. Haltiwanger



Established as the leading journal in the field, *Glycobiology* provides a unique forum dedicated to research into the biological functions of glycans.

Glycobiology is essential reading for researchers in biomedicine, basic science, and the biotechnology industries. By providing a single forum, the journal aims to improve communication between glycobiologists working in different disciplines and to increase the overall visibility of the field.

Find out more at:
academic.oup.com/glycob

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SOCIETY for Glycobiology

The Society for Glycobiology is a nonprofit scholarly society devoted to the pursuit of knowledge of glycan structures and functions, and to the sharing of that knowledge among scientists worldwide. The society's mission is to research and stimulate personal communication in an inter-disciplinary sense, using as the common meeting ground an interest in the complex carbohydrates of glycoproteins, glycolipids, and glycosaminoglycans and the biological systems in which they are found.

www.glycobiology.org

Dear Glycoscientists,

Welcome to the 2019 Society for Glycobiology Meeting in Phoenix, Arizona. The theme of this meeting "Glycobiology, research at the interface" will lead us through an exciting program that covers new developments in many different areas. We all know that the hydrophilic nature of carbohydrates makes them especially suited to generate interphases of molecules and cells in an aqueous environment and that their defined spatial arrangement of the many hydroxyl groups can provide information and specificity to these interactions.

These biological functions of carbohydrates direct our research towards the interphase, both in a direct and in an indirect sense: interactions at a molecular and a cellular level are of central interest for many of us, and collaborations with other research areas can open new routes for exciting discoveries. The complexity of "glycan-based information" is high, but, unfortunately, not immediately accessible to newcomers in the field. Unlike for the other major classes of biological macromolecules, such as nucleic acids and proteins, we are still in need for better tools to retrieve this information. Still too often, I hear "glyco - too complicated"! It is our task as glycoscientists to break down these unjustified barriers and to work towards a better integration of our fascinating field into biological and medical research. There are fantastic opportunities to do this: as a single example example, I mention the recent developments in structural biology due to single particle cryoEM and cryoEM tomography: we now appreciate glycan modifications as integral part of the defined structure of glycoproteins!

The program of the 2019 Society of Glycobiology Meeting tries to highlight this interactive aspect of research in glycobiology. Two satellite meetings, Tools in Glycoscience, organized by Richard Cummings, and Glyco in Biotechnology, organized by Parastoo Azadi, represent an ideal kick-off for the meeting. We then start with the overarching theme in biology, evolution, and will continue with the role of glycans in prokaryotes and in microbial communities. Recent developments in Systems Biology and glycan analytics, new insights into the regulatory functions of glycans as well the role of glycans in mammalian development, the immune system and cancer are the themes of dedicated plenary sessions during the meeting. In addition, we will get new perspectives of translational aspects of glycoscience.

Of course, not all facets of glycobiology are covered in the plenary session of the meeting. However, our interactive poster sessions provide an ideal platform to present and discuss the latest experiments with interested members of the glyco-community.

During the meeting, we honor outstanding scientists for their achievements with the awards of the Society for Glycobiology: Robert J. Linhardt, the winner of the Karl Meyer Lectureship Award and Nancy Dahms, the winner of the Rosalind Kornfeld Lifetime Achievement Award. Gerald Hart, the winner of the President's Innovator Award will present his research on the biology of O-GlcNAc modification. Jochen Zimmer will receive the Glycobiology Significant Achievement Award, sponsored by Oxford University Press, and Manfred Wuhrer will deliver the Molecular and Cellular Proteomics (MCP)/American Society of Biochemistry and Molecular Biology (ASBMB) lecture.

Organizing the annual Society of Glycobiology Meeting is a team effort and I thank the Program Committee and the Session Chairs for helping with the development of the program. A special thank goes to the society officers, Kelley Moremen, Don Jarvis, Richard Steet and Mike Tiemeyer, for their essential input and support. The Board of Directors has provided important input and advice during the planning of the meeting. Silvy Song, Karen Wrublik and members of the staff at FASEB have been invaluable essential for the organization of the meeting. Without this team, this meeting would not be possible.

I wish all the attendees of the Society of Glycobiology Meeting 2019 interesting, motivating and enjoyable days in Phoenix!

Markus Aebi, President of the Society of Glycobiology

GENERAL INFORMATION

Meeting Venue: Renaissance Phoenix Downtown Hotel – 100 North 1st Street, Phoenix, Arizona 85004 USA

Awards: Those who have been notified that they are Student Travel Award recipients may pick-up their checks at the registration desk (signature required).

Badges: To enhance security, we ask all attendees to please wear your badge for the duration of the conference. Badges will be required for admission to sessions and refreshment functions. Your badge not only indicates that you are fully registered for conference but is also a courtesy to other registrants.

Catering: Included in registration fees are the following catered events:
- Saturday night reception light hors d'oeuvres
- Sunday, Monday, Tuesday light breakfast fare and coffee
- Daily coffee breaks

Dress: Dress during the conference is business casual. Be sure to dress in layers and carry a sweater as temperature in the meeting rooms is difficult to regulate, and meeting rooms may be cold or warm.

Exhibition: Please take time to visit the exhibit displays in the Ballroom during the opening reception, breaks and poster sessions. See the exhibitor listing for detailed information regarding our sponsoring companies.

Exhibit Hours:
Saturday Nov 2, 2019 @ 7:30PM – 9:30PM
Sunday Nov 3, 2019 @ 1:30PM – 4PM
Monday Nov 4, 2019 @ 1:30PM – 4PM

Internet Access: Complimentary access is provided by the society for attendees in meeting spaces.

Network: Renaissance_CONFERENCE
Use password: glyco2019

Liability: Neither the host venue nor the organizers can be held responsible for any personal injury, loss, damage to private property or additional expense incurred as a result of delays or changes in air, rail, sea, road or other services. All participants are encouraged to make their own arrangements for health and travel insurance.

Poster Sessions: Poster boards will be set-up in Pueblo Ballroom. Organizers are not responsible for any materials posted. Posters will be presented in two separate sessions with an accompanying coffee break and will be up for the duration of the conference.

Poster session 1: Sunday, Nov 3, 2019 @ 1:30 – 4:00PM
Poster session 2: Monday, Nov 4, 2019 @ 1:30 – 4:00PM

Set-up: Begin mounting posters starting Saturday, Nov 2, 2019 starting 5PM until any time before poster session 1.
Break-down: Monday, Nov 4, 2019 after poster session 2 (approx. 4PM)

Registration
Registration fees exclude travel, accommodations, abstract submission, pre-conference satellites, and banquet tickets. These are separate from the main conference registration and must be purchased separately. On-site registration will be accepted with payment via checks and credit cards.

Speakers: Presenters are asked to upload their presentations as soon as possible to: https://bit.ly/2Ms9cLV then visit the on-site technician in the general session room at least 2 hours prior to their sessions for final tech check. Please arrive in your session room at least 30 minutes prior to your start time.

Special Needs: Registrants with special needs are invited to contact the Registration Desk or hotel concierge for assistance.

Social Events

Saturday, November 2, 2019 @ 7:30PM – 9:30PM
Welcome Reception & Exhibits @ The Pueblo Ballroom of the Renaissance Phoenix Downtown Hotel
This event will mark the opening of the conference. Exhibits will be open, light hors d'oeuvres will be served, along with a cash bar. Please come and join your fellow attendees to celebrate the official opening of the program.

Monday, November 4, 2019 @ 7:00PM – 11:00PM
Banquet @ North & South Ballroom of the Renaissance Phoenix Downtown Hotel
ADVANCE TICKET PURCHASE REQUIRED. Limited availability, first come first served.
Enjoy this banquet reception with full buffet dinner, cash bar, live band entertainment, dancing, and conversation with fellow professionals.

Other Meetings

Saturday, Nov 2, 2019 @ 9:00AM – 5:00PM
Satellite I: Tools in Glycoscience: Glycan Expression and Function (Maricopa Room)
The meeting focuses on the roles of glycans in 4 sessions that exemplify the outstanding progress of research under the NIH Common Fund Glycoscience Program. The sessions are entitled: (1) Protein-Glycan Interactions, (2) Synthetic/Analytical techniques, (3) Bioinformatics and Biological Function in Glycoscience, and (4) Tools for in vivo Biological Systems and Disease States. This satellite meeting is sponsored by the National Center for Functional Glycomics (NCFG) at Harvard Medical School and the Consortium for Functional Glycomics (CFG), a large international research initiative that works with and serves the scientific community. The NCFG and CFG provide a networking forum and glycomics resources which enable Participating Investigators to reveal functions of glycans and glycan-binding proteins (GBPs) that impact human health and disease. This type of satellite meeting has been held yearly at various venues including the annual meeting of the Society for Glycobiology since the inception of the CFG in 2001.

Saturday, Nov 2, 2019 @ 9:00AM – 1:00PM
Satellite II: Glyco in Biotechnology *(Pima Room)*
The satellite meeting is going to cover topics on roles and applications of glycans in biotechnology. It will be a combination of presentations and informal discussions on production of mammalian enzymes glycoengineering and uses of lectin and chemical methods for host-microbial interactions and large scale production of glycans respectively. The meeting is an opportunity to discuss what impact and roles of glycoconjugates in biotechnology.

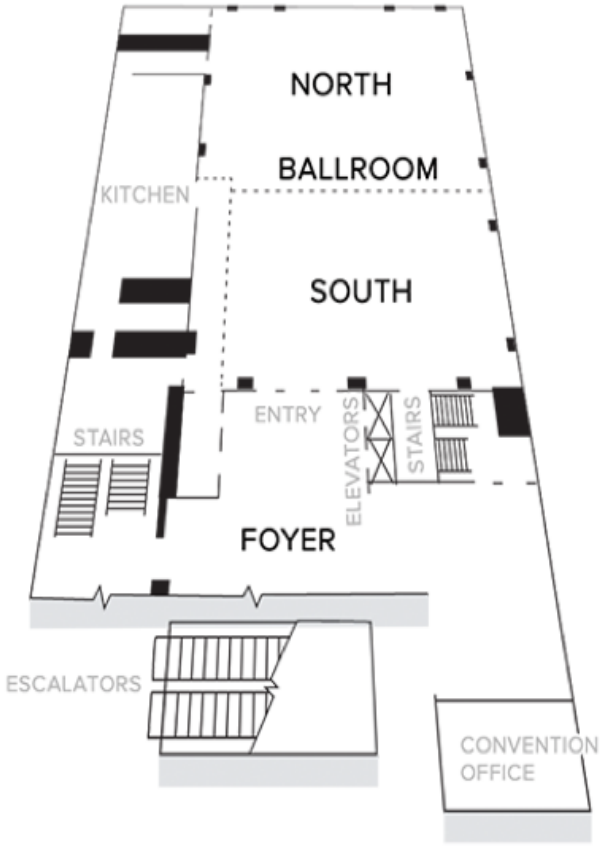
Saturday, Nov 2, 2019 @ 12:00PM – 4:00PM
Board of Directors Meeting *(Gila Room)*
Annual in-person meeting of the SFG leadership. For invitees only.

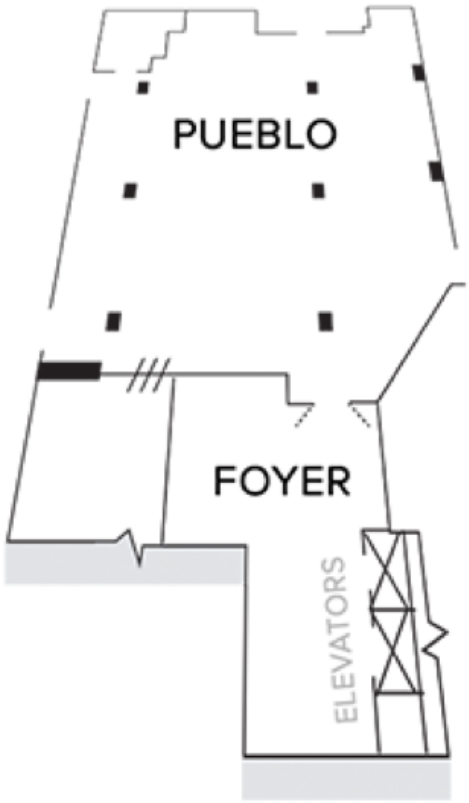
Sunday, Nov 3, 2019 @ 12:30PM – 1:30PM
Glycobiology Editorial Board Meeting *(Salons 7 & 8)*
Annual in-person meeting for the Glycobiology publications team. For invitees only.

Monday, Nov 4, 2019 @ 4:00PM – 4:45PM
SFG Business Meeting *(North Ballroom)*
Open to all attendees. The SFG leadership will report on the organization's current overall status and announce any important updates relevant to the membership. The advice and guidance of the membership on current society issues are welcome in this "open forum" meeting. If you are not currently a member, please visit www.glycobiology.org and sign up today.

HOTEL MAPS

North & South Ballroom (Ballroom Level):
General Session & Registration





Pueblo (Street Level):
Exhibits & Posters

SOCIETY for Glycobiology LEADERSHIP

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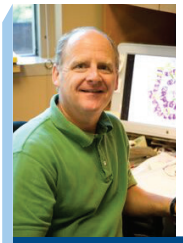
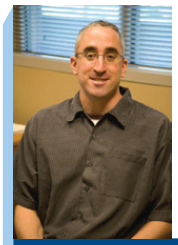
Dr. Markus Aebi
ETH Zurich

President-Elect
Dr. Michael Tiemeyer
Complex Carbohydrate Research Center



Past-President
Dr. Kelly Moremen
Complex Carbohydrate Research Center



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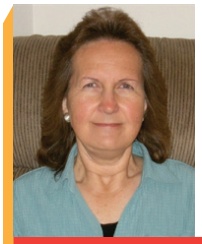
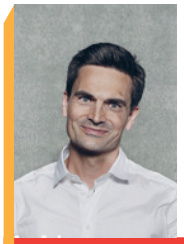
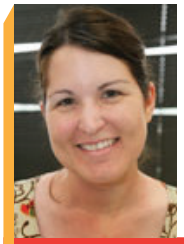


Dr. Nancy Dahms
Medical College of Wisconsin

Dr. J. Michael Pierce
University of Georgia



Dr. Hans Wandall
University of Copenhagen



Dr. Jennifer Kohler
University of Texas Southwestern Medical Center

Dr. Susan Bells
University of Alabama- Birmingham

Dr. Vlad Panin
Texas A&M University

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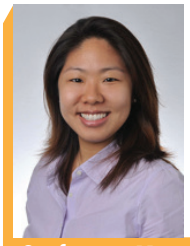
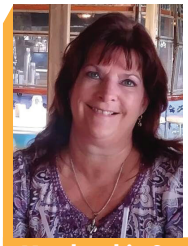


Conference Manager
Silvy Song, MSW
Federation of American Societies for Experimental Biology



Membership Services
Karen Wrublik
Federation of American Societies for Experimental Biology

INVITED SPEAKERS

Susan Bellis (UAB School of Medicine, Birmingham)
Max Crispin (University of Southampton)
Jerry Eichler (Ben Gurion University of the Negev, Israel)
Pascal Gagneux (UC San Diego)
David Gerlach (University of Tuebingen, Germany)
John Allan Hanover (National Institutes of Health)
Thierry Hennet (University of Zurich, Switzerland)
Jürgen Lassak (Ludwig-Maximilians University Munich, Germany)
Heinz Läubli (University of Basel, Dep of Biomedicine)
Nathan E. Lewis (UC San Diego)
Jamey Marth (UC Santa Barbara)
Laurence Mulard (Institut Pasteur, France)
Jim Paulson (Scripps Research, La Jolla)
Avery Posey (University of Pennsylvania)
Katharina Ribbeck (Massachusetts Institute of Technology)
Marco Sardiello (Baylor College of Medicine)
Robert Sackstein (Florida International University)
Pamela Stanley (Albert Einstein College of Medicine)
Morten Thaysen-Andersen (Macquarie University)
Hans Wandall (University of Copenhagen)
Ryan Weiss (UC San Diego, Esko-Laboratory)
Natasha E. Zachara (Johns Hopkins School of Medicine)
Fredrik Zetterberg (Galecto Biotech, Denmark)

SESSION CHAIRS

Parastoo Azadi (University of Georgia CCRC)
Richard Cummings (Harvard Medical School)
Thierry Hennet (University of Zurich)
Jeffrey D. Esko (UC San Diego)
Pamela Stanley (Albert Einstein College of Medicine)
Christine Szymanski (University of Georgia, MB)
Lance Wells (University of Georgia, BCMB)
Christopher West (University of Georgia, BCMB)

SOCIETY AWARD WINNERS

Karl Meyer Lectureship Award

The Karl Meyer Lectureship Award was established in 1990 to honor the distinguished career of Karl Meyer and his outstanding contributions to the field of Glycobiology. This international award is given to well-established scientists with currently active research programs who have made widely recognized major contributions to the field of Glycobiology.

The 2019 Karl Meyer Award will be presented to **Dr. Robert J. Linhardt**, who is Professor at Rensselaer Polytechnic Institute in the Departments of Chemistry and Chemical Biology, Chemical and Biological Engineering, Biology, and Biomedical Engineering. Professor Linhardt, *aka* "Bob", earned his Ph.D. degree in Chemistry in 1979 at The Johns Hopkins University. His Ph.D. research in Physical Organic Chemistry gave him a strong background in chemical analysis, synthesis and mechanistic chemistry. Bob moved to MIT in 1979 to undertake postdoctoral studies with Professor Robert Langer in drug delivery and removal systems.

There, he was a co-discoverer of poly(anhydrides) for drug delivery resulting in the Gliadel wafer to treat brain cancer and first purified heparinase for use in a heparin removal system (*Science* 1982), eventually leading to the invention of a new low molecular weight (LMW) heparin drug, Tinzaparin. On leaving MIT in 1982, Bob joined the faculty at the University of Iowa were he spent the next 21 years rising through the ranks to become a Chaired Professor in the Departments of Medicinal and Natural Products Chemistry, Chemical Engineering, and Chemistry. While at Iowa, Bob developed his reputation as one of the world's foremost experts on glycosaminoglycans (GAGs), particularly the drug heparin. He shepherded the introduction of LMW heparins into the market by being the first to use multi-dimensional NMR, MS, and gel and capillary electrophoresis (*Science* 2002) for its analysis. He also elucidated new biological and pharmacological roles for heparin in inflammation (*J Clin Inv* 1998), angiogenesis (*Science* 1983), cell growth (*Science* 1996; *Molec Cell* 2000), and as an anti-infective (*Nat Med* 1997). During this period, Bob had the opportunity to work with many exceptional glycobiologists, including work undertaken during his 1992 sabbatical at UCSD and the La Jolla Cancer Res Fdn (now SBP).

In 2003, Bob moved to Rensselaer with a focus on understanding heparin-protein interactions as they related to heparin's structure-activity relationships (*Angew Chem* 2002). In 2007-2008, when a heparin contamination crisis resulted in hundreds of deaths, Bob joined the team of scientists who discovered the OSCS adulterant (*Nat Biotechnol* 2008, 2010; *PNAS* 2009). He then worked with the USP to help write a new monograph protecting this critical drug (*Nat Biotechnol* 2016). It was at this point that Bob changed his focus to the chemoenzymatic synthesis of LMW heparins and heparin, relying on recombinant Golgi enzymes, first developed in the Rosenberg lab by his former students, Jian Liu and B. Kuberan. Working with Jian Liu, Bob has chemoenzymatically synthesized many LMW heparins (*Science* 2011; *Nat Chem Biol* 2014; *Sci Transl Med* 2017; *PNAS*, 2019). He also has successfully prepared bioengineered heparin, which is in pre-clinical evaluation (*J Am Chem Soc*. 2008; *Angew Chem* 2019).

Bob's new research directions include the application of metabolic engineering to GAG synthesis with targets including the large-scale production of heparin and chondroitin sulfates. He is applying CRISPR to control GAG biosynthesis (*Nat Meth* 2018) and better understand GAG glycobiology. Sequencing of GAG chains is underway (*Nat Chem Biol* 2011) and novel approaches for undertaking glycosaminoglycanomics are being investigated.

Over the past four decades Bob has mentored and advised over 200 graduate students, postdoctoral fellows and visiting scientists and over 60 of these have become Professors, themselves. He has published over 900 research papers and holds nearly 100 patents. Bob is a Fellow of the NAI and AAAS and has received numerous awards including the ACS Isbell, Hudson and Wolfrom awards for his work on carbohydrates and the Volwiler, Gisvold and USP awards for his pharmaceutical research.

In summary, the 2019 Karl Meyer Lectureship Award recognizes Professor Linhardt's seminal contributions to glycobiology, which include many outstanding contributions to our understanding of heparins and GAGs.

Rosalind Kornfeld Award for Lifetime Achievement in Glycobiology

The Rosalind Kornfeld Award for Lifetime Achievement in Glycobiology was established in 2008 to honor the distinguished scientific career and service to the Society by Dr. Rosalind Kornfeld. The award is given by the Society to scientists who have made significant contributions with an important impact on the field of Glycobiology over their professional lifetimes.

The 2019 Rosalind Kornfeld Award will be presented to **Dr. Nancy Dahms**, Professor in the Department of Biochemistry at the Medical College of Wisconsin. Dr. Dahms, a native of Wisconsin, received her B.S. degree from Marquette University in Milwaukee. She then entered graduate school at Johns Hopkins University where she earned her Ph.D. in Biochemistry working in the lab of Gerald Hart and was introduced to glycobiology studying the nature of glycans on several plasma membrane glycoproteins. Nancy then undertook her postdoctoral training in Stuart Kornfeld's lab at Washington University in St. Louis where, along with Peter Lobel, another postdoc, she succeeded in cloning the cDNAs for the two mannose 6-phosphate receptors, the cation-independent (CI-) and cation-dependent (CD-) MPRs. These receptors play a central role in the transport of newly synthesized acid hydrolases from the Golgi to the lysosome. Most of the FDA-approved treatments for Lysosomal Storage Diseases (LSDs) involve enzyme replacement therapy that target the CI-MPR for the uptake of recombinant acid hydrolases.

In 1989, Dr. Dahms began her independent career as Assistant Professor of Biochemistry at the Medical College of Wisconsin. Recognizing the importance of understanding how the MPRs bind Man-6-P-containing glycans, she had the courage to undertake the arduous task of determining the structure of the Man-6-P binding domains of these receptors. In a seminal Cell paper in 1998, in collaboration with Dr. Jung-Ja Kim, Dr. Dahms published the three-dimensional structure of the Man-6-P binding domain of the CD-MPR, providing the first insight into the mechanism of Man-6-P binding to the receptor. This was followed by structural studies of the CI-MPR, which has 15 repetitive domains in its extracellular region, as compared to only one for the CD-MPR. She discovered 4 of the 15 repeats bind Man-6-P. Two bind Man-6-P monoesters, one binds a Man-6-P-GlcNAc diester, and one binds both. Nancy identified the key residues within the binding pocket that interact with the mannose ring and phosphate and clarified the molecular basis for the difference in the ability to bind phosphodiesters.

Another of Dr. Dahms' major contributions has been her studies of the Man-6-P receptor homology (MRH) domain of the βeta-subunit of the ER enzyme, glucosidase II (GII β). The MRH domain of GII β shows homology to domains found in a family of ER proteins that function as mannose-binding lectins as well as to the Man-6-P binding domains of the Man-6-P receptors. In collaborative studies with Dr. Cecilia D'Alessio in the Parodi lab, Dr. Dahms elucidated the complete structure of the GII β MRH domain in both mannose bound and unbound states. This provided insight into how this MRH domain recognizes and binds carbohydrate ligands.

Dr. Dahms has generated the first non-mouse model of the LSD, Fabry disease. Fabry disease is caused by a deficiency of the acid hydrolase, α-galactosidase A, which leads to glycosphingolipid accumulation in many cell types. Unlike Fabry mouse models, this α-galactosidase A-deficient rat recapitulates ocular, hearing, heart and pain phenotypes experienced by Fabry patients. Fabry rats are being used to study disease mechanisms and test new therapies.

Together, these studies have greatly advanced our understanding of how the MPRs function in acid hydrolase transport and also how the MRH-containing lectins facilitate glycoprotein folding in the ER. Dr. Dahms has written the definitive reviews of this topic for major scientific journals. Her publications are models of careful and well executed research that is clearly presented.

Dr. Dahms' service to the Medical College of Wisconsin has been exceptional, especially in terms of teaching and mentoring. She has been recognized as the Outstanding Medical Student Teacher 8 times and has received the Outstanding Faculty Service Award 3 times. She also has received the Outstanding Graduate Student Teacher Award. She has served on the Ph.D. thesis committee of 50 graduate students and advised numerous post-doctoral students and junior faculty. Dr. Dahms has been active in the Society for Glycobiology for many years. Dr. Dahms served on the Board of Directors from 2003-2006 and again from 2017-2020. She was a member of the Nominations Committee from 2011-2012. She also has served on the Editorial Boards of Glycobiology and the Journal of Biological Chemistry. Based on the high impact of her research, her service to the field, and her high standards of scholarship, Dr. Dahms is a highly deserving recipient of the Rosalind Kornfeld Award for Lifetime Achievement in Glycobiology.

Glycobiology Significant Achievement Award

The Glycobiology Significant Achievement Award is given annually by Oxford University Press (publisher of *Glycobiology*) to honor new or mid-career scientists who have made key discoveries during their early careers with the potential to have a substantial impact on the glycoscience community.

This year, Oxford is delighted to present the Glycobiology Significant Achievement Award to **Dr. Jochen Zimmer**, who was recently appointed as a Full Professor in the Department of Molecular Physiology and Biological Physics at the University of Virginia School of Medicine. The award will be given to Dr. Zimmer at the Society for Glycobiology Annual meeting this November in Phoenix, Arizona.

Dr. Zimmer has made several significant discoveries during his time at UVA. His work has focused on complex carbohydrates and systems that make up the cell walls of both bacterial and eukaryotic cells. Due to the widespread importance and utility of these systems, Dr. Zimmer's pursuit has led him to bridge the gap between all forms of life through their glycobiology. Employing techniques including X-ray crystallography and electron microscopy, he has studied the translocation and surface expression of polysaccharides important for capsule and biofilm formation in bacteria, cell wall biosynthesis in plants, as well as extracellular matrix formation in vertebrates. In particular, there are two structures of great impact - groundbreaking firsts – the cellulose synthase and the O-antigen ABC transporter, which have been significant achievements in Dr. Zimmer's career. In addition to being widely applicable, the influence of Dr. Zimmer's work is exemplified through his many high impact publications and awards. In his career, he has published dozens of publications including five in Nature, one in Science, one in Nature Communications and three in PNAS, just to name a few. Dr. Zimmer continues to work on cell surface complex carbohydrates, with the goal to delineate the mechanisms by which they are synthesized, secreted, and embedded into an extracellular matrix. Oxford is proud to honor him with this year's Glycobiology Significant Achievement Award.

President's Innovator Award

The purpose of the Society for Glycobiology President's Innovator Award is to acknowledge the contributions of one scientist each year that has made a significant impact on society.

The 2019 President's Innovator Award will be presented to **Dr. Gerald Hart**, Professor and GRA Eminent Scholar in the Department of Biochemistry and Molecular Biology and Complex Carbohydrate Research Center at the University of Georgia. While Dr. Hart ("Jerry") is most famous for creating an entirely new field in glycobiology, the dynamic and inducible modification of nuclear and cytosolic proteins via O-GlcNAc, his previous scientific accomplishments in the glycoscience arena were also immense. As a graduate student with Gary W. Conrad at Kansas State University, Jerry made seminal contributions to the role of GAGs in corneal development. As a post-doctoral fellow in Bill Lennarz' laboratory, Jerry defined the minimal sequence requirement for *N*-linked protein glycosylation, the so-called "sequon" [N-X(not P)-S/T]. Jerry continued his studies on *N*-glycosylation as a junior professor at Johns Hopkins School of Medicine, firmly established the concept of site-specific oligosaccharide microheterogeneity, and demonstrated this is a non-random process that fine-tunes glycoprotein functions. At the same time, Jerry was working with Paul Englund's group to elucidate the pathway for GPI-anchor biosynthesis. It was actually Jerry's labs studies of complex glycosylation on the surface of intact cells in culture that led to the discovery of the O-GlcNAc modification of nuclear and cytoplasmic proteins.

Since his discovery of glycosylation inside the cell, but outside the secretory system, Jerry has continued to lead the ever-growing O-GlcNAc field for the last 30 years. Beyond establishing the existence of the O-GlcNAc modification on literally thousands of proteins, his laboratory has purified, characterized, and cloned the cycling enzymes, developed many of the tools in the field, and first proposed the yin-yang relationship between O-GlcNAc and phosphorylation, as well as the metabolic sensor hypothesis. Work from Jerry's lab was also key to establishing O-GlcNAc as part of the histone code and a metabolic regulator of gene expression via multiple mechanisms. More recently, Jerry's lab has been the leader in exploring crosstalk between phosphorylation and O-GlcNAcylation, as well as examining the role of O-GlcNAc in diabetes and Alzheimer's. While Jerry would never advocate defining a scientist by any number or set of numbers, he has an h-index of 117, an i10-index of 313, and his publications have been cited over 46,000 times.

In addition to his direct scientific contributions, Jerry has provided exemplary service to the glycobiology and life science community. He has trained and instilled the importance of excellence in research and service to a large number of graduate students and post-doctoral fellows, including many that have gone on to become Professors, Chairs of Departments, and Members of the SFG. He was the founding Editor-in-Chief of *Glycobiology*, the leading journal in glycoscience, and is a past-president of the Society for Glycobiology and the International Glycoconjugate Organization, as well as a former Chair of the Glycobiology Gordon Conference. He is currently an Associate Editor for two ASBMB journals; *J Biol Chem* and *Mol Cell Proteomics*. Jerry served as the Department Head of Biological Chemistry at Johns Hopkins School of Medicine for 21 years, won the Karl Meyer award, the highest Award given by the Society for Glycobiology, in 2006, and won the Herbert Tabor Research Award from ASBMB in 2018. He is currently the Georgia Research Alliance William Henry Terry, Sr. Eminent Scholar in Drug Discovery and Professor of Biochemistry and Molecular Biology at the Complex Carbohydrate Research Center, University of Georgia. Finally, Jerry is the current President of the American Society for Biochemistry & Molecular Biology. In short, Dr. Hart is the perfect selection for the 2019 SFG President's Innovator Award.

Molecular and Cellular Proteomics/American Society for Biochemistry and Molecular Biology Lectureship Award

The Molecular and Cellular Proteomics (MCP) / American Society for Biochemistry and Molecular Biology (ASBMB) Lectureship Award will be presented to **Manfred Wuhrer** at the Society for Glycobiology Annual meeting in Phoenix, Arizona. The MCP Journal was created in 2001 to address the growing needs of the proteomics community. Subsequently the MCP/ASBMB award was established in 2013 to honor scientists that have been at the forefront of the emerging field of glycomics and glycoproteomics.

Dr. Wuhrer is a Professor of Proteomics and Glycomics and Head of the Center for Proteomics and Metabolomics at Leiden University Medical Center (LUMC) in the Netherlands. He is chairman of the Dutch Society for Mass Spectrometry as well as a board member of The Human Glycome Project (https://human-glycome.org/). Dr. Wuhrer earned his Ph.D. in 1999 in Professor Rudolf Geyer's lab at Giessen University, Germany, where he focused on glycan structural analysis of parasite glycoconjugates. He undertook postdoctoral studies in this same lab, working on analyzing the glycans of NCAM. In 2003, he moved to the Leiden University Medical Center, where he worked on developing glycoanalytical technologies and their application to the study of parasite glycoconjugates.

In the last decade, Dr. Wuhrer's research has focused on analyzing the glycans of human proteins, with particular attention to immunoglobulins. From 2013 to 2015, Manfred served as a Professor in Analytics of Biomolecular Interactions at the VU University in Amsterdam before assuming his current position at the LUMC in Leiden.

Dr. Wuhrer's work on glycomics and glycoproteomics technology centers around higher throughput mass spectrometry glycomics workflows, which his lab applies to unravel protein glycosylation signatures of various human diseases including autoimmune diseases, infectious diseases, metabolic disorders, and cancer. Recently, his lab has worked on the comprehensive characterization of protein modifications, relying on intact protein analysis and functional receptor affinity separations with mass spectrometric detection, in order to structurally and functionally resolve proteoforms in an integrated manner. Another long-term goal of his work is to miniaturize mass spectrometry glycomics and glycoproteomics methods to open up new applications in clinical glycomics.

TRAVEL AWARD WINNERS

Ahana Addhya (National Institute of Immunology)
Daniel Afosah (Virginia Commonwealth University)
Yukie Akune (Imperial College London)
Katherine Ankenbauer (University of Alabama Birmingham)
Nikita Umakant Bhalerao (University of Alabama at Birmingham)
Daniela Carroll (UT Southwestern Medical Center)
Ishita Chandel (Texas A&M University)
Chao Gao (Beth Israel Deaconess Medical Center, HMS)
Atossa Ghorashi (UT Southwestern Medical Center)
Seung Yeop Han (Baylor College of Medicine)
Nan Jia (BIDMC/HMS)
Melissa Koff (Texas A&M)
Sohyoung Lee (Cornell University)
T.August Li (Johns Hopkins University)
Stacy Malaker (Stanford University)
Natalia Mantuano (University of Basel)
Masaaki Matsubara (University of Georgia)
Kenjiroo Matsumoto (UNIVERSITY OF GEORGIA)
Tri Nguyen (Cornell University)
Earnest James Paul Daniel (Case Western Reserve University)
Chatchai Phoomak (Yale University)
Sara Porfirio (Complex Carbohydrate Research Center)
Jeremy Praissman (University of Georgia)
Sadia Rahmani (Ryerson University)
Damien Restagno (SBP at UCSB)
Emily Rodrigues (University of Alberta)
Akshi Singla (Texas A&M University)
Paulina Sosicka (Sanford Burnham Prebys Medical Discovery Institute)
Jinyu Wang (University of Basel)
Paeton Wantuch (University of Georgia)
Julia Westman (SBP at UCSB)
Yang Yang (Georgetown University)
Yusen Zhou (SUNY at Buffalo)
Junhui Zhou (University of Delaware)
Yuqi Zhu (SUNY at Buffalo)

SCIENTIFIC PROGRAM

DAY 1: Saturday, Nov 2, 2019

08:00AM – 06:00PM	***Registration*** **Ballroom Foyer**
09:00AM – 05:00PM	**Satellite 1: Tools in Glycoscience** **Session chair: Richard Cummings (Harvard Medical School)** **Maricopa Room**
09:00AM – 01:00PM	**Satellite 2: Glyco in Biotechnology** **Session chair: Parastoo Azadi (University of Georgia, CCRC)** **Pima Room**
12:00PM – 04:00PM	Board of Directors Meeting (*by invitation only*) Gila Room
05:30PM – 07:15PM	**Opening Meyer and Kornfeld Awards Lectures** **North Ballroom**
5:30PM - 5:45PM	Conference Opening Remarks
5:45PM - 6:30PM	Karl Meyer Award Lecture: **Robert Linhardt** (Rensselaer Polytechnic Institute)
6:30PM - 7:15PM	Rosalind Kornfeld Award Lecture: **Nancy Dahms** (Medical College of Wisconsin)
07:30PM – 09:30PM	**Welcome Reception & Exhibits** **Pueblo Ballroom**

DAY 2: Sunday, Nov 3, 2019

07:30AM – 02:00PM	**Registration** **Ballroom Foyer**
07:30AM – 08:30AM	**Continental Breakfast** **Ballroom Foyer**
08:30AM – 10:10AM	**Session 1: Glycans and Evolution** **Session chair: Christopher West (University of Georgia, BCMB)** **North Ballroom**
08:30AM – 08:55AM	**Pascal Gagneux** (UC San Diego) #1
08:55AM – 09:20AM	**Marco Sardiello** (Baylor College of Medicine) – *A Stepwise Mechanism for ER-to-Golgi Transport of Lysosomal Enzymes*. #2
09:20AM – 09:45AM	**Jerry Eichler** (Ben Gurion University of the Negev, Israel) – *N-glycosylation in Archaea: Extremely creative*. #3
Poster Talks	
09:45AM – 09:50AM	**Rahil Taujale** (University of Georgia) – *Understanding the sequence-structure-function relationships through a comprehensive evolutionary analysis of GT-A fold glycosyltransferases*. #4/B001
09:50AM – 09:55AM	**Alan John** (University of Melbourne) – *Deciphering the molecular functions of tryptophan C-mannosylation*. #5/B002
09:55AM – 10:00AM	**Ishita Chandel** (Texas A&M University) – *Functional players of Protein O-mannosyltransferases 1/2 –mediated regulation of sensory neuron connectivity in Drosophila*. #6/B003
10:00AM – 10:05AM	**Camilo Perez** (University of Basel, Biozentrum) – *Structure and mechanism of a pH sensing lipoteichoic-ac id-anchor flippase*. #7/B004
10:05AM – 10:10AM	**Sudeshna Saha** (University of California San Diego) – *Exploring Evolutionary Origins of Human-Specific CD33/Siglec-3 Alleles that Protect against Late Onset Alzheimer's Disease: Prior Selection by Uniquely Human Pathogens?* #8/B005
10:10AM – 10:30AM	**Coffee Break** **Ballroom Foyer**

10:30AM – 12:10PM **Session 2: Glycobiology of the Microbiome**
Session chair: Christine Szymanski (University of Georgia, MB)
North Ballroom

10:30AM – 10:55AM **David Gerlach** (University of Tübingen, Germany) – *Staphylococcus aureus remodels surface glycopolmers to shape colonization and invasion capacities.* #9

10:55AM – 11:20AM **Thierry Hennet** (University of Zurich, Switzerland) – *Prebiotic action of dietary and mucosal carbohydrates on the gut microbiota.* #10

11:20AM – 11:45AM **Katharina Ribbeck** (Massachusetts Institute of Technology) – *Mucin glycans attenuate microbial virulence.* #11

Poster Talks

11:45AM – 11:50AM **Atossa C. Ghorashi** (University of Texas Southwestern Medical Center) – *Characterizing the role of host fucose in cholera toxin action*. #12/B006

11:50AM – 11:55AM **Anna Blenda and Nourine Kamili** (USC School of Medicine Greenville and Emory University School of Medicine) – *Distinct antimicrobial properties of the N- and C- terminal domains of the human protein galectin-9*. #13/B007

11:55AM – 12:00PM **Joanna Coker** (University of California San Diego) – *Bacterial community manipulation through glycan-lectin interactions.* #14/B008

12:00PM – 12:05PM **Sun-Mi Choi** (University of California San Diego) – *Staphylococcus Aureus Exacerbates Epithelial Barrier Dys function in Chronic Rhinosinusitis.* #15/B009

12:05PM – 12:10PM **Mathias Braun** (University of Natural Resources and Life Sciences, Vienna) – *A conserved glycosyltransferase from the general protein O-glycosylation pathway of Bacteroidetes.* #16/B010

12:10PM – 12:15PM **Sohyoung Lee** (Cornell University) – *Host adaptations of the Salmonella Typhi typhoid toxin and its ortho logue from a nontyphoidal Salmonella.* #17/B011

12:15PM – 01:30PM **Lunch on your own**

12:15PM – 01:30PM **Glycobiology Editorial Board Meeting** *(by invitation only)*
Salons 7 & 8

01:30PM – 04:00PM **Poster Session I and Exhibits**
Pueblo Ballroom

04:00PM – 05:45PM **Session 3: Glycotechnology, a translational perspective**
Session chair: Parastoo Azadi (University of Georgia CCRC)
North Ballroom

04:00PM – 04:25PM **Max Crispin** (University of Southampton) – *Glycosylation of enveloped viruses: structure and immunogen design.* #18

04:25PM – 04:50PM **Laurence Mulard** (Institut Pasteur, France) – *Synthetic oligosaccharide-based conjugate vaccines against shigellosis: from concept and design to first-in-human study.* #19

04:50PM – 05:15PM **Fredrik Zetterberg** (Galecto Biotech, Denmark) – *Translational aspects of drug discovery and development: TD139 case story, a small molecule Galectin 3 inhibitor in phase 2b trials against IPF*. #20

Poster Talks

05:15PM – 05:20PM **Stacy A. Malaker** (Stanford University) – *Enzyme toolkit for selective enrichment and analysis of mucin-do main glycoproteins*. #21/B012

05:20PM – 05:25PM **Uriel Ortega-Rodriguez** (University of Texas at El Paso) – *Structural characterization of T. cruzi Epimastigote Glycosylphosphatidylinositol-Mucin sialoglycans*. #22/B013

05:25PM – 05:30PM **Sriram Neelamegham** (State University of New York- Buffalo) – *Tuning metabolic decoy efficacy by modify ing the linkage between carbohydrate and aglycone.* #23/B014

05:30PM – 05:35PM **Manuela Mally** (LimmaTech Biologics AG, Switzerland) – *CustomGlycan: A novel platform for production of therapeutics*. #24/B015

05:35PM – 05:40PM **Jonathon E. Mohl** (University of Texas El Paso) – *Identification and design of transferase specific mucin-type O-glycosylation peptides using ISOGlyP's selective peptide function*. #25/B016

05:40PM – 05:45PM **Akshi Singla** (Texas A&M University) – *Glycolipid-based targeted drug delivery system against multidrug resistant Pseudomonas aeruginosa*. #26/B017

05:45PM – 06:45PM **Innovator Award Lecture**
North Ballroom
Gerald Hart (Complex Carbohydrate Research Center, UGA)

SCIENTIFIC PROGRAM

DAY 3: Monday, Nov 4, 2019

08:00AM – 02:00PM **Registration**
Ballroom Foyer

07:30AM – 08:30AM **Continental Breakfast**
Ballroom Foyer

08:30AM – 10:15AM **Session 4: Systems Biology approaches to Glycobiology**
Session chair: Thierry Hennet (University of Zurich)
North Ballroom

08:30AM – 08:55AM **Morten Thaysen-Andersen** (Macquarie University) – *Uncovering New Aspects of Neutrophil Glycobiology using Glyco(proteo)mics*. #27

08:55AM – 09:20AM **Nathan E. Lewis** (UC San Diego) – *The cellular impact of glycoengineering*. #28

09:20AM – 09:45AM **Ryan Weiss** (UC San Diego, Esko-Laboratory) – *Genome-wide Regulation of Heparan Sulfate Assembly*. #29

Poster Talks

09:45AM – 09:50AM **Ronghu Wu** (Georgia Institute of Technology) – *Mass Spectrometry-Based Chemical and Enzymatic Meth ods for Global Analysis of Protein Glycosylation in Complex Biological Samples*. #30/B018

09:50AM – 09:55AM **Benjamin L. Schulz** (The University of Queensland) – *SWATH glycoproteomics to interrogate post-transla tional modification dynamics in yeast and sparkling wine*. #31/B019

09:55AM – 10:00AM **Yusen Zhou** (University at Buffalo, SUNY) – *Integrating Mass Spectrometry and RNA-Seq data for Glycosyla tion Pathway Generation and Simulation*. #32/B020

10:00AM – 10:05AM **Steve M. Fernandes** (Johns Hopkins University School of Medicine) – *Comparative sialoglycan microarray analyses of selected human and mouse Siglecs*. #33/B021

10:05AM – 10:10AM **Kiyoko F. Aoki-Kinoshita** (Soka University) – *The GlyCosmos Portal as a part of the GlySpace Alliance: to wards an international glyco-data science collaboration environment*. #34/B022

10:10AM – 10:15AM **Shu Zhang** (Zhongshan Hospital, Fudan University) – *N-glycopeptide signatures of IgA2 in serum from patients with hepatitis B virus-related liver diseases*. #55/B035

10:15AM – 10:30AM **Coffee Break**
Ballroom Foyer

10:30AM – 12:10PM **Session 5: Regulatory functions of glycans**
Session chair: Lance Wells (University of Georgia, BCMB)
North Ballroom

10:30AM – 10:55AM **Jürgen Lassak** (Ludwig-Maximilians University Munich, Germany) – *An odd couple? – Arginine and rham nose form a novel glycoconjugate to rescue bacterial translation*. #35

10:55AM – 11:20AM **John Allan Hanover** (National Institutes of Health) – *Critical roles for O-GlcNAc in Metabolic Signaling, Stem Cell Biology, and DNA damage repair*. #36

11:20AM – 11:45AM **Natasha E. Zachara** (Johns Hopkins School of Medicine) – *Decoding the role of intracellular glycosylation in cytoprotection and disease*. #37

Poster Talks

11:45AM – 11:50AM **Yanzhuang Wang** (University of Michigan) – *GRASP55 senses energy and nutrient deprivation through O-GlcNAcylation to promote autophagosome-lysosome fusion*. #38/B023

11:50AM – 11:55AM **Adam J. Kanack** (Medical College of Wisconsin) – *Platelet and myeloid cell phenotypes in a rat model of Fabry disease*. #39/B024

11:55AM – 12:00PM **Brett E. Crawford** (BioMarin Pharmaceutical) – *Discovery of novel ceramide galactosyltransferase inhibitors and their therapeutic application to Krabbe disease*. #40/B025

12:00PM – 12:05PM **Seung Yeop Han** (Baylor College of Medicine) – *A Conserved Role for N-Glycanase 1 in Regulating Energy Metabolism through AMPK signaling*. #41/B026

12:05PM – 12:10PM **Angelica M. Gomes Ueltschy** (Cleveland Clinic) – *Glucose homeostasis is regulated by hyaluronan synthas es 1 and 3*. #42/B027

12:10PM – 01:30PM **Lunch on your own**

01:30PM – 04:00PM **Poster Session II and Exhibits**
Pueblo Ballroom

04:00PM – 04:45PM **Society Business Meeting**
North Ballroom

04:45PM – 06:15PM **MCP and Significant Achievement Award Lecture**
North Ballroom
Manfred Wuhrer (Leiden University Medical Center)

06:15PM – 07:00PM **Break**

07:00PM – 11:00PM **Banquet**
North Ballroom

DAY 4: Tuesday Nov 5, 2019

08:00AM – 12:00PM **Registration**
Ballroom Foyer

07:30AM – 08:30AM **Continental Breakfast**

08:30AM – 10:10AM **Session 6: Glycobiology of Mammalian development and Stem cells**
Session chair: Jeffrey D. Esko (UC San Diego)
North Ballroom

08:30AM – 08:55AM **Jamey Marth** (UC Santa Barbara) – *Glycoprotein aging and turnover in the pathogenesis of disease*. #43
08:55AM – 09:20AM **Pamela Stanley** (Albert Einstein College of Medicine) – *An Inhibitor of N-glycan Maturation in Mouse Germ Cells*. #44
09:20AM – 09:45AM **Hans Wandall** (University of Copenhagen) – *Contextualized Functions of Glycans in Tissue Formation*. #45

Poster Talks
09:45AM – 09:50AM **Ilhan Akan** (National Institute of Health) – *Oga mutants reveal epigenetic, transcriptional and metabolic factors effecting life span and body size in Drosophila*. #46/B028
09:50AM – 09:55AM **Frank Leon** (University of Nebraska Medical Center) – *Role of Immature CD44 O-glycosylation and its Activation of Targets Responsible for Stemness Properties of Pancreatic Cancer*. #47/B029
09:55AM – 10:00AM **Vladislav Panin** (Texas A&M University) – *Role of sialylation in the control of cardiac functions in Drosoph ila*. #48/B030
10:00AM – 10:05AM **Yang Yang** (Georgetown University) – *SULF2 overexpression affects survival and modulates sulfation of heparan sulfate proteoglycans in Squamous Cell Carcinoma of the Head and Neck*. #49/B031
10:05AM – 10:10AM **Yan Wang** (Cleveland Clinic) – *Enhanced myofibroblast differentiation in Hyaluronan Synthase1/3 double knockout mice is independent of hyaluronan and mediated by a TGFβR/p38MAPK/MRTF pathway*. #50/B032

10:10AM – 10:30AM **Coffee Break**
Ballroom Foyer

10:30AM – 11:45AM **Session 7: Glycobiology of the Immune System**
Session chair: Richard Cummings (Harvard Medical School)
North Ballroom

10:30AM - 10:55AM **Jim Paulson** (Scripps Research, La Jolla) – *Siglecs as checkpoints in immune cell responses*. #51
10:55AM - 11:20AM **Avery Posey** (University of Pennsylvania) – *Reprogramming T cells to target glycopeptide epitopes and gly colipids for effective cancer therapy*. #52

Poster Talks

11:20AM – 11:25AM **Marija Pezer** (Genos Glycoscience Research Laboratory) – *Immunoglobulin G glycosylation changes in dis eases and aging*. #53/B033

11:25AM – 11:30AM **Damien Restagno** (University California Santa Barbara) – *Glycoprotein Aging with Increased Mannose Expos ure Linked to Cardiovascular Disease through the Macrophage Mannose Receptor (Mrc1)*. #54/B034

11:30AM – 11:35AM **Jiaxuan Chen** (Beth Israel Deaconess Medical Center) – *Resident and Elicited Macrophages Differ in Expres sion of their Glycomes and Lectins*. #56/B036

11:35AM – 11:40AM **Vivianne I. Otto** (ETH Zurich) – *The particular glycomes of lymph node lymphatic endothelia and their role in localization and activation of Siglec-1+ subcapsular sinus macrophages*. #57/B037

11:40AM – 11:45AM **Melissa M. Lee-Sundlov** (Blood Research Institute, Versiti) – *Megakaryocyte O-glycan sialylation regulates platelet production through interferon-secreting plasmacytoid dendritic cells*. #58/B038

11:45AM – 01:30PM **Lunch on your own**

01:30PM – 03:10PM **Session 8: Glycobiology of Cancer**
Session chair: Pamela Stanley (Albert Einstein College of Medicine)
North Ballroom

01:30PM – 01:55PM **Robert Sackstein** (Florida International University) – *E-Selectin Ligands in Human Leukemogenesis.* #59

01:55PM – 02:20PM **Susan Bellis** (UAB School of Medicine, Birmingham) – *ST6Gal-I sialyltransferase promotes pancreatic cancer progression through imparting a cancer stem cell phenotype.* #60

02:20PM – 02:45PM **Heinz Läubli** (University of Basel, Dep of Biomedicine) – *Targeting the sialoglycan–Siglec axis augments antitumor immunity allowing effective PD-1 and CTLA-4 blockade*. #61

Poster Talks

02:45PM – 02:50PM **Yasuyuki Matsumoto** (Beth Israel Deaconess Medical Center- Harvard Meidcal Center) – *Identification of Novel Glycoproteins with Defined anti-Tn IgG and IgM; Applications as Tumor Diagnostic Biomarkers*. #62/B039

02:50PM – 02:55PM **Rachel A. Willand-Charnley** (South Dakota State University) – *Modulation of Siglec Binding Via SIAE and CASD1-An Immune Evasion Pathway for Breast and Colon Cancers*. #63/B040

02:55PM – 03:00PM **Su-Ryun Kim** (Food and Drug Administration) – *The Role of Core 3 β3-N-Acetylglucosaminyltransferase in Colorectal Cancer.* #64/B041

03:00PM – 03:05PM **Kathrin Stavenhagen** (Beth Israel Deaconess Medical Center- Harvard Medical Center) – *Endogenous Ligands of The Mannose Receptor C-Type Lectin Domain in Cancer and Control Tissue*. #65/B041

03:05PM – 03:10PM **Ryan N. Porell** (University of California San Diego) – *Reprogramming the Tumor Microenvironment with Macrophage-Targeted Glycopolymers*. #66/B043

03:10PM – 03:15PM **Closing Remarks**

POSTER PROGRAM

Poster #: B044 (presented @ PS1) || Abstract #: 67
ABNORMAL HYALURONAN IN INTRACELLULAR COMPARTMENTS OF MONOCYTES/MACROPHAGES UNDER HYPERGLYCEMIC STRESS
Amina Abbadi1, Jacqueline Loftis1, Minjia Yu2, Aimin Wang1, Xiaoxia Li2, Yan Wang1, Sajina Shakya1, Edward Maytin1, Vincent Hascall1;
1Departments of Biomedical Engineering and ; 2Inflammation and Immunity, Cleveland Clinic, Cleveland, Ohio, 44195 USA ;

Poster #: B045 (presented @ PS2) || Abstract #: 68
O-GlcNAc cycling disrupts hematopoietic stem cell homeostasis and alters T cell activation
Lara K. Abramowitz1, Christelle Harly2,3, Arundhoti Das2, Avinash Bhandoola2, John A. Hanover1;
1Laboratory of Cellular and Molecular Biology, National Institute of Diabetes and Digestive and Kidney Diseases, National Institute of Health, Bethesda, MD 20892, USA.; 2Laboratory of Genome Integrity, Center for Cancer Research, National Cancer Institute, National Institutes of Health, Bethesda, MD 20892, USA.; 3CRCINA, INSERM, CNRS, Université d'Angers, Université de Nantes, Nantes, France.;

Poster #: B046 (presented @ PS1) || Abstract #: 69
Probing the role of β-O-GlcNAc-ylation in T-cells using metabolic glycan engineering
Ahana Addhya, Hema M. Swasthi, Riya George, Srinivasa Gopalan Sampathkumar;
National Institute of Immunology;

Poster #: B047 (presented @ PS2) || Abstract #: 70
Many Apparently Non-Selective GAG – Protein Systems May Exhibit Interesting Selectivity Features: The Case of Human Neutrophil Elastase
Daniel K. Afosah1,2, Nehru Viji Sankaranarayanan1,2, Umesh R. Desai1,2;
1Department of Medicinal Chemistry, Virginia Commonwealth University; 2Institute for Structural Biology Drug Discovery and Development, Virginia Commonwealth University;

Poster #: B048 (presented @ PS1) || Abstract #: 71
Oxidized-Desialylated Low Density Lipoprotein Inhibits the Antitumor Functions of Human Lymphokine Activated Killer Cells
Jesus S. Aguilar Diaz de leon, Mark Knappenberger, Chad R. Borges;
School of Molecular Sciences and The Biodesign Institute, Arizona State University, Tempe, Az;

Poster #: B049 (presented @ PS2) || Abstract #: 72
Shortening heparan sulfate chains prolongs survival and reduces parenchymal plaques in fibrillar prion disease
Patricia Aguilar-Calvo1, Alejandro Sevillano1, Jaidev Bapat1, Daniel R. Sandoval3, Hermann Altmeppen2, Donald P. Pizzo1, Michael Geschwind4, Jiri G. Safar5, Steve Edland6, Markus Glatzel2, K. Peter R. Nilsson7, Jeffrey D. Esko3, Christina J. Sigurdson1;
1Department of Pathology, University of California San Diego; 2Institute of Neuropathology, University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany; 3Department of Cellular and Molecular Medicine, University of California San Diego; 4Department of Neurology, Memory and Aging Center, University of California, San Francisco ; 5Departments of Pathology and Neurology, Case Western Reserve University, Cleveland, OH; 6Departments of Family Medicine & Public Health and 8Neurosciences, University of California, San Diego; 7Department of Physics, Chemistry, and Biology, Linköping University, ;

Poster #: B028 (presented @ PS1) || Abstract #: 46
Oga mutants reveal epigenetic, transcriptional and metabolic factors effecting life span and body size in Drosophila
Ilhan Akan1, Adnan Halim2, Henrik Clausen2, John A. Hanover1;
1Laboratory of Cell and Molecular Biology, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD; 2Copenhagen Center for Glycomics, Departments of Cellular and Molecular Medicine and Odontology, Faculty of Health Sciences, University of Copenhagen, Copenhagen N, Denmark.;

Poster #: B050 (presented @ PS1) || Abstract #: 73
Carbohydrate microArray Analysis and Reporting Tool: CarbArrayART
Yukie Akune1, Sena Arpinar2, Lisete M. Silva1, Angelina S. Palma3, Yan Liu1, René Ranzinger2, Ten Feizi1;
11. Glycosciences Laboratory, Department of Surgery and Cancer, Imperial College, London, UK; 22. Complex Carbohydrate Research Center, University of Georgia, Athens, GA, USA ; 33. UCIBIO-Faculty of Science and Technology, NOVA University of Lisbon, Portugal;

Poster #: B051 (presented @ PS2) || Abstract #: 74
Assembly of chondroitin sulfate glycosaminoglycan-containing hypothalamic perineuronal nets contributes to the sustained antidiabetic effect of FGF1 action in the brain
Kimberly M. Alonge1, Zaman Mirzadeh2, Jarrad M. Scarlett1,3, Jenny M. Brown1, Marie A. Bentsen1,4, Aric F. Logsdon5,6, William A. Banks5,6, Gregory J. Morton1, Thomas N. Wight7, Miklos Guttman8, Michael W. Schwartz1;
1University of Washington Medicine Diabetes Institute, Department of Medicine, Seattle, WA; 2Department of Neurosurgery, Barrow Neurological Institute, Phoenix, AZ; 3Department of Pediatric Gastroenterology and Hepatology, Seattle Children's Hospital, Seattle, WA; 4Novo Nordisk Foundation Center for Basic Metabolic Research, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark; 5Department of Geriatric Research Education and Clinical Center (GRECC), Veterans Affairs Puget Sound Health Care System, University of Washington, Seattle, WA; 6Division of Gerontology and Geriatric Medicine, Department of Medicine, University of Washington, Seattle, WA; 7Matrix Biology Program, Benaroya Research Institute, Seattle, WA; 8Department of Medicinal Chemistry, University of Washington, Seattle, WA;

Poster #: B052 (presented @ PS1) || Abstract #: 75
Hemolytic anti ABO antibodies (hemolysins) in transplant patients have a broader IgM and restricted IgG glycan recognition repertoire
Waseem Q. Anani1,2, Anna P. Schmidt5, Greg A. Denomme3,5, Hoffmeister M. Karin5,4;
1Medical Sciences Institute, Versiti; 2Department of Pathology, Medical College of Wisconsin; 3Diagnostic Laboratory, Versiti; 4Department of Biochemistry, Medical College of Wisconsin; 5Blood Research Institute, Versiti;

Poster #: B053 (presented @ PS2) || Abstract #: 76
The glycosyltransferase ST6Gal-I confers resistance against natural killer cell mediated cytotoxicity
Katherine E. Ankenbauer, Andrew T. Holdbrooks, Amanda F. Swindall, Susan L. Bellis;
Department of Cell, Developmental, and Integrative Biology, University of Alabama at Birmingham;

Poster #: B022 (presented @ PS1) || Abstract #: 34
The GlyCosmos Portal as a part of the GlySpace Alliance: towards an international glyco-data science collaboration environment
Kiyoko F. Aoki-Kinoshita1, Frederique Lisacek2, Raja Mazumder3, William S. York4;
1Soka University; 2Swiss Institute of Bioinformatics; 3George Washington University; 4CCRC, University of Georgia;

Poster #: B054 (presented @ PS1) || Abstract #: 77
Collaboration, Service and Trainings at the Complex Carbohydrate Research Center
Stephanie A. Archer-Hartmann, Christian Heiss, Artur Muszynski, Zhirui Wang, Jiri Vlach, Ian Black, Asif Shajahan, Sara Porfirio, Nitin Supekar, Anne Gleinich, En Tzu Lu, John Tang, Parastoo Azadi;
Complex Carbohydrate Research Center, UGA, Athens, GA;

Poster #: B055 (presented @ PS2) || Abstract #: 78
Understanding the glycoconjugate receptors for cholera toxin: searching for alternative receptors
Stephanie A. Archer-Hartmann1, Han Wu2, Atossa Ghorashi2, Ian Black1, John Tang1, Jennifer Kohler2, Parastoo Azadi1;
1Complex Carbohydrate Research Center, The University of Georgia, Athens, GA, USA; 2Department of Biochemistry, University of Texas Southwestern Medical Center, Dallas, TX, USA;

Poster #: B056 (presented @ PS1) || Abstract #: 79
GlyThyra: An accessible and high-throughput mass spectrometry-based N-glycomics platform
Christopher Ashwood1,2, Rebekah L. Gundry1,2;
1University of Nebraska Medical Center, CardiOmics Program; 2Medical College of Wisconsin, Department of Biochemistry;

Poster #: B057 (presented @ PS2) || Abstract #: 80
Sickle Cell Trait and Sickle Cell Disease Change the Profile of Plasma Glycan-Binding Proteins
Heather E. Ashwood1, Waseem Q. Anani2, Anna P. Schmidt1, Karin M. Hoffmeister1,3;
1Blood Research Institute, Versiti; 2Medical Sciences Institute, Versiti; 3Department of Biochemistry, Medical College of Wisconsin;

Poster #: B058 (presented @ PS1) || Abstract #: 81
Altered Glycosidase Activities at Physiological pH in the Pathogenesis of Sepsis
Benjamin S. Haslund-Gourley1,2, Peter V. Aziz1,2,3, Douglas M. Heithoff1,3, Julia S. Westman1,2, Damien Restagno1,2, Benjamin J. Lewis1,2, Jeffrey C. Fried4, Mai-Britt Ilse5, Torben Lübke5, Jamey D. Marth1,2,3;
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Poster #: B059 (presented @ PS2) || Abstract #: 82
Functional Criticality of Glycosylation Attributes of a Therapeutic Cytokine-IgG Fc Fusion Protein.
Michelle Irwin1, Christina Tsai1, Peter Day2, Kimberly Salvia2, Aileen Mandani2, Meg Tung3, Shawn Pugh3, Tracy Bentley4, Jeff Lutman5, Siddharth Sukumaran5, Matt Kalo1, Tomasz Baginski1;
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Poster #: B060 (presented @ PS1) || Abstract #: 83
Targeting the sialoglycan/Siglec-9 immune checkpoint for cancer therapy
Anne Bärenwaldt1, Michal A. Stanczak2, Marcel P. Trefny2, Christoph Esslinger4, Simone Schmitt4, Alfred Zippelius2,3, Frank Stenner2,3, Heinz Läubli1,3;
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Poster #: B061 (presented @ PS2) || Abstract #: 84
Targeting Neurodegeneration in Gaucher Disease
Phillip L. Bartels;
UC San Diego;

Poster #: B062 (presented @ PS1) || Abstract #: 85
Diagnostic Peak Search for Glycomics and Glycoproteomics
Marshall Bern, Yong J. Kil, Wilfred Tang, Michelle English, Doron Kletter, K. Ilker Sen, Rose Lawler, St. John Skilton, Eric Carlson;
Protein Metrics Inc.;

Poster #: B063 (presented @ PS2) || Abstract #: 86
Sialyltransferase ST6Gal-I creates ligands for the Siglec receptors on immune cells and dampens the immune response during PDAC progression
Nikita U. Bhalerao, Asmi Chakraborty, Susan Bellis;
Cell, developmental and Integrative Biology, University of Alabama at Birmingham;

Sialyltransferase ST6Gal-I creates ligands for the Siglec receptors on immune cells and dampens the immune response during PDAC progression
Nikita U. Bhalerao, Asmi Chakraborty, Susan Bellis;
Cell, Developmental and Integrative Biology, University of Alabama at Birmingham;

Poster #: B090 (presented @ PS1) || Abstract #: 113
Distinct antimicrobial properties of the N- and C- terminal domains of the human protein galectin-9
Anna Blenda1,2, Nourine Kamili2, William Abel1, Christian Gerner-Smidt2, Guy Benian2, Connie Arthur2, Sean Stowell2;
1USC School of Medicine Greenville, Department of Biomedical Sciences, Greenville, SC, 29605; 2Center for Transfusion Medicine and Cellular Therapies, Department of Laboratory Medicine and Pathology, Emory University School of Medicine, Atlanta, GA, 30322;

Poster #: B007 (presented @ PS2) || Abstract #: 13
Distinct antimicrobial properties of the N- and C- terminal domains of the human protein galectin-9
Anna Blenda1,2, Nourine Kamili2, William Abel1, Christian Gerner-Smidt2, JianMei Wang2, Guy Benian2, Connie Arthur2, Sean Stowell2;
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Poster #: B010 (presented @ PS1) || Abstract #: 16
A conserved glycosyltransferase from the general protein O-glycosylation pathway of Bacteroidetes
Matthias L. Braun1, Bettina Janesch1, Markus B. Tomek1, Daniel Maresch2, Clemens Grünwald-Gruber2, Markus Blaukopf2, Paul Kosma2, Friedrich Altmann2, Christina Schäffer1;
1Department of NanoBiotechnology, Nanoglycobiology unit, Universitiy of Natural Resources and Life Sciences, Vienna; 2Department of Chemistry, University of Natural Resources and Life Sciences, Vienna;

Poster #: B064 (presented @ PS1) || Abstract #: 87
Carbohydrate-Carbohydrate and Carbohydrate-Lectin Interactions. Evolution of Glycan Mediated Cross-linking Interactions
Curtis F. Brewer;
Albert Einstein College of Medicine;

Poster #: B065 (presented @ PS2) || Abstract #: 88
Manipulating PrP glycan structure to understand toxic signaling pathways driving prion-induced neurodegeneration.
Julia A. Callender1, Alejandro M. Sevillano1, Katrin Soldau1, Helen Khuu1, Christina J. Sigurdson1,2;
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Poster #: B066 (presented @ PS1) || Abstract #: 89
IL-22-DEPENDENT REGULATION OF a1-3-FUCOSYLATION AND B3GNT7 GENE EXPRESSION
Daniela J. Carroll, Gabrielle M. Lessen, Daniel C. Propheter, Lora V. Hooper, Jennifer J. Kohler;
UT Southwestern Medical Center;

Poster #: B003 (presented @ PS1) || Abstract #: 6
Functional players of Protein O-mannosyltransferases 1/2 –mediated regulation of sensory neuron connectivity in Drosophila
Ishita Chandel1, Robert Bridger2, Ryan Baker1, Alicia Paulino1, Lance Wells2, Vlad Panin1;
1Texas A&M University; 2Complex Carbohydrate Research Center, The University of Georgia, Athens, GA, USA;

Poster #: B036 (presented @ PS1) || Abstract #: 56
Resident and Elicited Macrophages Differ in Expression of their Glycomes and Lectins
Jiaxuan Chen1, Diane D. Park1, Matthew R. Kudelka1, Nan Jia1, Carolyn A. Haller1, Revanth Kosaraju1, Melian Galizzi2, Alison V. Nairn2, Richard D. Cummings1, Elliot L. Chaikof1;
1Department of Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School; 2Complex Carbohydrate Research Center, University of Georgia;

Poster #: B009 (presented @ PS2) || Abstract #: 15
Staphylococcus Aureus Exacerbates Epithelial Barrier Dysfunction in Chronic Rhinosinusitis
Sun-Mi Choi1, Sandra Christiansen1, Taylor Doherty1, Adam DeConde3, Victor Nizet2;
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Poster #: B008 (presented @ PS1) || Abstract #: 14
Bacterial community manipulation through glycan-lectin interactions
Joanna Coker1, Austen L. Michalak2, Amber Hauw3, Karsten Zengler4;
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Poster #: B067 (presented @ PS2) || Abstract #: 90
EndoS and EndoS-like active and inactive endoglycosidases as a framework to study antibody glycosylation in vitro and in vivo
Mattias Collin;
Infection Medicine, Clinical Sciences, Lund University, Lund, Sweden;

Poster #: B025 (presented @ PS2) || Abstract #: 40
Discovery of novel ceramide galactosyltransferase inhibitors and their therapeutic application to Krabbe disease
Michael Babcock1, Christina Mikulka2, Bing Wang1, Sanjay Chandriani1, Sundeep Chandra1, Yue Xu1, Katherine Webster1, Ying Feng1, Alex Giaramita1, Bryan K. Yip1, Joseph Elsbernd1, Melanie Lo1, Qi Chao1, Josh Woloszynek1, Jerry Shen1, Shripad Bhagwat1, Mark Sands2, Brett E. Crawford1;
1BioMarin Pharmaceutical; 2Department of Medicine, Washington University School of Medicine, St. Louis MO;

Poster #: B068 (presented @ PS1) || Abstract #: 91
Acidosis, Zinc, and HMGB1 in Sepsis: A Common Connection Involving Sialoglycan Recognition
Chirag Dhar1,2, Shoib S. Siddiqui1,2, Venkatasubramaniam Sundaramurthy1,2, Aniruddha Sasmal1,2, Hai Yu3, Esther Bandala-Sanchez4,5, Leonard C. Harrison4,5, Xi Chen3, Ding Xu6, Ajit Varki1,2;
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Poster #: B069 (presented @ PS2) || Abstract #: 92
Structures of DPAGT1 give insights into glycosylation disorders and advance antibiotic development against TB
Yin Yao Dong2,3, Hua Wang1, Ashley CW Pike3, Stephen A. Cochrane4, Sadra Hamedzadeh1, Filip J. Wyszynski1, Simon R. Bushell3, Sylvain F. Royer1, David A. Widdick5, Andaleeb Sajid6, Helena I. Boshoff6, Yumi Park6, Ricardo Lucas1, Wei-Min Liu1, Seung S. Lee1, Takuya Machida1, Leanne Minall1, Shahid Mehmood7, Katsiaryna Belaya2, Wei-Wei Liu2, Amy Chu3, Leela Shreshtha3, Shubhashish MM Mukhopadhyay3, Claire Strain-Damerell3, Rod Chalk3, Nicola A. Burgess-Brown3, Mervyn J. Bibb5, Clifton E. Barry6, Carol V. Robinson7, David Beeson2, Benjamin G. Davis1, Elisabeth P. Carpenter3;
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Poster #: B070 (presented @ PS1) || Abstract #: 93
Toward a Genome-Wide CRISPR Screen to Elucidate the Unconventional Mechanism of Galectin Secretion
Justin Donnelly, Simon Wisnovski, Roarke Kamber, Mike Bassik, Carolyn Bertozzi;
Stanford University;

Poster #: B071 (presented @ PS2) || Abstract #: 94
Mammalian lectin arrays for screening interaction of microbes with the innate immune system
Sabine AF Jégouzo1, Angela Holder2, Dirk Werling2, Maureen E. Taylor1, Kurt Drickamer1;
1Imperial College London; 2Royal Veterinary College;

|| Abstract #: 3
N-glycosylation in Archaea: Extremely creative
Jerry Eichler;
Department of Life Sciences, Ben Gurion University of the Negev;

Poster #: B072 (presented @ PS1) || Abstract #: 95
Trypanosoma cruzi trypomastigote glycosylphosphatidylinositol-anchored mucins and an α-Gal-containing neoglycoprotein as Chagas disease biomarker candidates
Igor L. Estevao1, Uriel Ortega-Rodriguez1, Alba Montoya2, Luis Izquierdo3, Julio Padilla3, Maria-Jesús Pinazo3, Joaquim Gascon3, Katja Michael2, Igor C. Almeida1;
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Poster #: B021 (presented @ PS2) || Abstract #: 33
Comparative sialoglycan microarray analyses of selected human and mouse Siglecs
Steve M. Fernandes1, Steven Arbitman1, Ryan McBride2, Corwin Nycholat2, James C. Paulson2, Ronald L. Schnaar1;
1Department of Pharmacology and Molecular Sciences, Johns Hopkins University School of Medicine, Baltimore, MD; 2Department of Chemical Physiology, The Scripps Research Institute, La Jolla, CA.;

Poster #: B073 (presented @ PS2) || Abstract #: 96
Unique Mannose Binding Epitopes Dictated by Innate Immune Receptors and Immunoglobulins from Healthy Individuals and Patients with Common Variable Immunodeficiency
Chao Gao1, Tanya McKitrick1, Alyssa McQuillan1, Barbara Eckmair2, Kathrin Stavenhagen1, Akul Y. Mehta1, Lenette Lu3, Galit Alter3, Peter Jandus4, Mark B. Jones1, Stephan von Gunten5, Jamie Heimburg-Molinaro1, Richard D. Cummings1;
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Poster #: B074 (presented @ PS1) || Abstract #: 97
Lectenz®: A Novel Class of High-Specificity Affinity Reagents for Detection and Purification of Glycoconjugates
Christian Gerner-Smidt1, Sheng-Cheng Wu1, Lu Meng1, Robert J. Woods2, Loretta Yang1;
1Lectenz Bio; 2CCRC, University of Georgia;

Poster #: B006 (presented @ PS1) || Abstract #: 12
Characterizing the role of host fucose in cholera toxin action
Atossa C. Ghorashi, Jennifer J. Kohler;
University of Texas Southwestern Medical Center;

Poster #: B075 (presented @ PS2) || Abstract #: 98
Analysis of PD1/PD-L1 Glycoforms by LC-MS/MS and Reactivity of the Immune Checkpoint Proteins with Therapeutic Antibodies
Radoslav Goldman1, Oliver C. Grant2, Robert J. Woods2, Miloslav Sanda1, Zuzana Brnakova-Kennedy1, Julius Benicky1;
1Georgetown University, Department of Oncology and Clinical and Translational Glycoscience Research Center, Washington DC 20057; 2Complex Carbohydrate Research Center, Department of Biochemistry and Molecular Biology, University of Georgia, Athens, Georgia, GA 30602-4712;

Poster #: B027 (presented @ PS2) || Abstract #: 42
Glucose homeostasis is regulated by hyaluronan synthases 1 and 3
Angelica M. Gomes, Steven Shaffer, Rebecca C. Schugar, Jonathan M. Brown, Vincent C. Hascall, Mark A. Aronica;
Cleveland Clinic;

Poster #: B076 (presented @ PS1) || Abstract #: 99
Siglec ligands in mouse and human brain
Anabel Gonzalez Gil, Steven Arbitman, Steve M. Fernandes, T. August Li, Karan Patel, Ronald L. Schnaar;
Department of Pharmacology and Molecular Sciences, Johns Hopkins University School of Medicine, Baltimore, MD;

Poster #: B077 (presented @ PS2) || Abstract #: 100
Oral-supplemented 2-fucosyllactose attenuates spontaneous colitis in Il10-/- mice
Thomas Grabinger1, Jesus F. Glaus Garzon1, Martin Hausmann2, Annelies Geirnaert3, Christophe Lacroix3, Thierry Hennet1;
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Poster #: B026 (presented @ PS1) || Abstract #: 41
A Conserved Role for N-Glycanase 1 in Regulating Energy Metabolism through AMPK signaling
Seung Yeop Han1, Ashutosh Pandey1, Antonio Galeone1,2, Tereza Moore3, Tina M. Cowan3, Hamed Jafar-Nejad1;
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Poster #: B079 (presented @ PS2) || Abstract #: 102
N-glycome inheritance from cells to extracellular vesicles in B16 melanomas
Yoichiro Harada1,3, Yasuhiko Kizuka2, Yuko Tokoro2, Kiyotaka Kondo3, Hirokazu Yagi4, Koichi Kato4,5, Hiromasa Inoue3, Naoyuki Taniguchi1, Ikuro Maruyama3;
1Osaka International Cancer Institute; 2Gifu University; 3Kagoshima University Graduate School of Medical and Dental Sciences; 4Nagoya City University; 5National Institutes of Natural Sciences;

Poster #: B080 (presented @ PS1) || Abstract #: 103
Relationship between modified heparin-derived oligosaccharide non-polar surface areas and electrospray ionization response
Adam M. Hawkridge1,3, Daniel K. Afosah2,3, Samuel Holmes2,3, Jacob Rodriguez2, Umesh R. Desai2,3;
1Department of Pharmaceutics, Virginia Commonwealth University, Richmond, VA; 2Department of Medicinal Chemistry, Virginia Commonwealth University, Richmond, VA; 3Institute for Structural Biology Drug Discovery and Development, Virginia Commonwealth University, Richmond, VA;

Poster #: B081 (presented @ PS2) || Abstract #: 104
Role of Galectin-1 and Galectin-3 expression in acute lymphoblastic leukemia protection
Nora Heisterkamp1, Mingfeng Zhang1, Somayeh Tarighat2, Eun Ji Joo1, Fei Fei2, Tong Qi1, Sachith Gallolou1, Hisham Abdel-Azim2;
1Beckman Research Institute City of Hope ; 2Children's Hospital Los Angeles;

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Prebiotic action of dietary and mucosal carbohydrates on the gut microbiota
Thierry Hennet, Gisela Adrienne Weiss, Thomas Grabinger;
University of Zurich, Switzerland;

Poster #: B082 (presented @ PS1) || Abstract #: 105
Induction of peripheral lymph node addressin in human nasal mucosa with eosinophilic chronic rhinosinusitis
Toshiki Tsutsumiuchi1,2, Hitomi Hoshino1, Shigeharu Fujieda2, Motohiro Kobayashi1;
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Poster #: B083 (presented @ PS2) || Abstract #: 106
Synthetic galectin-3 oligomers to understand the role of carbohydrate-recognition domain multivalency in extrinsic pro-apoptotic signaling
Shaheen A Farhadi, Renjie Liu, Gregory A. Hudalla;
University of Florida;

Poster #: B084 (presented @ PS1) || Abstract #: 107
Characterization of specific cell-surface heparan sulfate-protein interactions
Shang-Cheng Hung;
Genomics Research Center/Academia Sinica;

Poster #: B085 (presented @ PS2) || Abstract #: 108
Databases for 3D-Structure of Lectins and Prediction Tools
François Bonnardel1,2, Serge Pérez1, Annabelle Varrot1, Frédérique Lisacek2, Anne Imberty1;
1CERMAV-CNRS; 2Swiss Institute of Bioinformatics;

Poster #: B086 (presented @ PS1) || Abstract #: 109
Capturing and detection of pharmaceutical glycoproteins by anti-glycan binding tools
Jun Iwaki, Hideki Ishida, Takashi Ota, Yoshihide Nishikawa, Kenta Iino, Yosuke Iwasaki, Noriyuki Yuasa, Kento Kawamura, Masato Habu, Takahiro Tanji, Yasuki Kato, Yuji Matsuzaki;
Tokyo Chemical Industry CO., LTD.;

Poster #: B087 (presented @ PS2) || Abstract #: 110
Evidence for reverse migration of 9-O-acetyl esters to 8- and 7-carbon positions of sialic acids
Yang Ji1, Aniruddha Sasmal1, Wanqing Li3, Saurabh Srivastava1, Brian Wasik2, Hai Yu3, Sandra Diaz1, Colin Parrish2, Xi Chen3, Ajit Varki1;
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Poster #: B088 (presented @ PS1) || Abstract #: 111
The human lung glycome reveals novel glycan ligands for respiratory pathogens
Nan Jia1, Lauren A. Byrd-Leotis1,3, Yasuyuki Matsumoto1, Chao Gao1,3, Alexander N. Wein2, Jenna L. Lobby2, Jacob E. Kohlmeier2, David A. Steinhauer2,3, Richard D. Cummings1,3;
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Poster #: B002 (presented @ PS2) || Abstract #: 5
Deciphering the molecular functions of tryptophan C-mannosylation
Alan John1,2, Ethan D. Goddard-Borger1,2;
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Poster #: B024 (presented @ PS1) || Abstract #: 39
Platelet and myeloid cell phenotypes in a rat model of Fabry disease
Adam J. Kanack, Angela Beltrame, Nancy M. Dahms;
Medical College of Wisconsin, Department of Biochemistry;

Poster #: B091 (presented @ PS2) || Abstract #: 114
Increased antibody response to fucosylated oligosaccharides in inflammatory bowel disease
Katharina Kappler1, Yi Lasanajak2, David F. Smith2, Thierry Hennet1;
1Institute of Physiology, University of Zurich, Zurich, Switzerland; 2Emory Comprehensive Glycomics Core, Department of Biochemistry, Emory University School of Medicine, Atlanta, GA, U.S.A.;

Poster #: B092 (presented @ PS1) || Abstract #: 115
A Structural Approach to Broadening Glycosyltransferase Binding Specificity
Benjamin P. Kellman, Nathan E. Lewis;
UC San Diego;

Poster #: B094 (presented @ PS1) || Abstract #: 117
Aberrant serum glycans as survival prognostics for the haematological cancer, multiple myeloma
Michelle Kilcoyne1, Marie LeBerre1,2, Marta Utratna1, Lokesh Joshi2, Michael O'Dwyer3;
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Poster #: B095 (presented @ PS2) || Abstract #: 118
Genetic Alteration of Heparan Sulfate Enhances Antigen Presentation on Dendritic Cells
So Young Kim1,2, Mark M. Fuster1,2,3;
1Department of Medicine, Division of Pulmonary and Critical Care, University of California San Diego; 2VA San Diego Healthcare System, Medical and Research Sections; 3Glycobiology Research and Training Center, University of California San Diego;

Poster #: B041 (presented @ PS2) || Abstract #: 64
The Role of Core 3 β3-N-Acetylglucosaminyltransferase in Colorectal Cancer
Su-Ryun Kim, Guozhang Zou, Tongzhong Ju;
Office of Biotechnology Products (OBP), Center for Drug Evaluation and Research (CDER), Food and Drug Administration, Silver Spring, MD 20993;

Poster #: B096 (presented @ PS1) || Abstract #: 119
A Fast, Reliable O-Glycan Analysis Workflow
Jason Koch, Hua Yuan;
Zoetis;

Poster #: B097 (presented @ PS2) || Abstract #: 120
Unraveling functions of novel protein O-mannosyltransferases using Drosophila as a model organism
Melissa A. Koff1, Adnan Halim2, Vlad Panin1;
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Poster #: B098 (presented @ PS1) || Abstract #: 121
An anti-Tn Antibody Microarray Platform for Early Cancer Detection
Matthew R. Kudelka1,2, Wei Gu1,2, Yasuyuki Matsumoto2, Richard H. Barnes II2, Robert Kardish2, Jamie Heimburg-Molinaro2, Sylvain Lehoux2, Junwei Zeng2, Cynthia Cohen3, Brian S. Robinson3, Kinjal Shah3, Elliot L. Chaikof2, Sean R. Stowell3, Richard D. Cummings2;
1Weill Cornell Medicine; 2Beth Israel Deaconess Medical Center/Harvard Medical School; 3Emory University School of Medicine;

Poster #: B078 (presented @ PS1) || Abstract #: 101
Regulation and fine-tuning of cadherin O-linked mannose glycosylation by the TMTC1-4 enzyme family
Ida SB Larsen, Yoshiki Narimatsu, Hiren J. Joshi, Sergey Vakhrushev, Henrik Clausen, Adnan Halim;
Department of Cellular and Molecular Medicine, Faculty of Health Sciences, Copenhagen Center for Glycomics, University of Copenhagen, DK-2200 Copenhagen, Denmark;

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An odd couple? – Arginine and rhamnose form a novel glycoconjugate to rescue bacterial translation
Jürgen M. Lassak;
Ludwig-Maximilians-Universität München ;

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Targeting the sialoglycan–Siglec axis augments antitumor immunity allowing effective PD-1 and CTLA-4 blockade
Heinz Läubli;
University of Basel, Switzerland;

Poster #: B099 (presented @ PS2) || Abstract #: 122
Lectin microarray-based investigation of protein glycosylation in murine and human biological fluids in response to diet and AGEs
Marie Le Berre;
National University of Ireland Galway;

Poster #: B011 (presented @ PS2) || Abstract #: 17
Host adaptations of the Salmonella Typhi typhoid toxin and its orthologue from a nontyphoidal Salmonella
Sohyoung Lee1, Yi-An Yang1, Shawn K. Milano2, Tri Nguyen1, Ji Hyun Sim1, Andrew J. Thompson3, Eric C. Hillpot2, Gyeongshik Yoo1, James C. Paulson3, Jeongmin Song1;
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Poster #: B038 (presented @ PS1) || Abstract #: 58
Megakaryocyte O-glycan sialylation regulates platelet production through interferon-secreting plasmacytoid dendritic cells
Melissa M. Lee-Sundlov1, Renata Grozovsky2, Silvia Giannini2, Leonardo Rivadeneyra1, Simon H. Glabere1, Zheng Yongwei1, Robert Burns1, Jon Wieser1, Walter HA Kahr3, Ulla Mandel4, Reza Abdi5, Weiguo Cui1, Demin Wang1, Karin M. Hoffmeister1;
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Poster #: B029 (presented @ PS2) || Abstract #: 47
Role of Immature CD44 O-glycosylation and its Activation of Targets Responsible for Stemness Properties of Pancreatic Cancer
Frank Leon1, Seema Chugh1, Rama K. Nimmakayala1, Rohitesh Gupta1, Satyanarayana Rachagani1, Surinder K. Batra1,2,3, Moorthy P. Ponnusamy1,2,3;
1Department of Biochemistry and Molecular Biology, University of Nebraska Medical Center; 2Eppley Institute for Research in Cancer and Allied Diseases; 3Fred and Pamela Buffett Cancer Center;

|| Abstract #: 28
The cellular impact of glycoengineering
Nathan E. Lewis1,2, Austin WT Chiang1, Bokan Bao1, Benjamin Kellman1, Chih-Chung Kuo1, Anne Richelle1, Johnny Arnsdorf2, Patrice Ménard2, Zulfiya Sukhova2, Anders Holmgaard Hansen2, Zhang Yang3, Hiren Joshi3, Henrik Calusen3, Bjorn G. Voldborg2;
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Poster #: B102 (presented @ PS1) || Abstract #: 125
Human Airway Siglec-8 Ligands
T. August Li1, Anabel Gonzalez-Gil1, Ryan N. Porell1, Steve M. Frenandes1, Steven Arbitman1, Karan Patel1, Hyun S. Lee2, Jean Kim2, Ronald L. Schnaar1;
1Department of Pharmacology and Molecular Sciences, Johns Hopkins University School of Medicine, Baltimore, MD; 2Otolaryngology-Head and Neck Surgery, Johns Hopkins University School of Medicine, Baltimore, MD;

Poster #: B100 (presented @ PS1) || Abstract #: 123
Metabolomics analysis of the effects of a GalNAc/Man-specific lectin CSL on yeast cells using UPLC–Q-TOF-MS
Shuai Liu1,2, Changqing Tong3, Min Qu3, Wei Li3;
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Poster #: B103 (presented @ PS2) || Abstract #: 126
Controlled cortical impact alters the chondroitin sulfate glycosaminoglycan composition in the mouse thalamus
Aric F. Logsdon1,2, Kimberly M. Alonge2,3, Michael W. Schwartz2,3, Thomas N. Wight4, Miklos Guttman5, William A. Banks1,2;
1Veterans Affairs, Puget Sound Health Care System, Seattle, WA ; 2University of Washington, Department of Medicine, Seattle, WA ; 3University of Washington, Diabetes Institute, Seattle, WA; 4Matrix Biology Program, Benaroya Research Institute, Seattle, WA ; 5University of Washington, Department of Medicinal Chemistry, Seattle, WA ;

Poster #: B104 (presented @ PS1) || Abstract #: 127
Exploring N-linked glycosylation and protein secretion: kinetic analysis of site-specific N-glycan processing in vivo
Marie-Estelle Losfeld, Ernesto Scibona, Chia-Wei Lin, Massimo Morbidelli, Markus Aebi;
ETH Zurich;

Poster #: B105 (presented @ PS2) || Abstract #: 128
Report from the bench: UC San Diego GlycoBootcamp 2019, a guide for integration of research objectives into hands-on training in laboratory glycomics
Sulabha Argade7, Patricia Aguilar10, Phillip Bartels5, Sun-Mi Choi9,6, Biswa Choudhury7, Joanna Coker8, Jeffrey Esko1, Kamil Godula5, So-Young Kim9, Taryn Lucas5, Rya McBride2, Mousumi Paulchakrabarti7, Anne Phan1, Ryan Porell5, Henry Puerta-Guardo3, Raquel Riley5, Tim Scott4, Nissi Varki10, Ryan Weiss1, Rob Woods11;
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Poster #: B106 (presented @ PS1) || Abstract #: 129
GlyGen - Computational and Informatics Resources for Glycoscience
Rupali Mahadik;
UGA;

Poster #: B012 (presented @ PS1) || Abstract #: 21
Enzyme toolkit for selective enrichment and analysis of mucin-domain glycoproteins
Stacy A. Malaker1, Judy Shon1, Kayvon Pedram1, Nicholas M. Riley1, Carolyn R. Bertozzi1,2;
1Stanford University; 2Howard Hughes Medical Institute;

Poster #: B015 (presented @ PS2) || Abstract #: 24
CustomGlycan: A novel platform for production of therapeutics
Manuela Mally, Amirreza Faridmoayer;
LimmaTech Biologics AG, Switzerland;

Poster #: B131 (presented @ PS2) || Abstract #: 154
Hyperglycemia enhances cancer immune evasion by inducing alternative macrophage polarization through increased O-GlcNAcylation
Natalia Rodrigues Mantuano, Michal Stanczak, Isadora Araújo Oliveira, Nicole Kirchhammer, Alessandra Filardy, Gianni Monaco, Ronan Santos, Agatha Fonseca, Miguel Fontes, Cesar de Souza Bastos Jr., Wagner Barbosa Dias, Alfred Zipellius, Adriane R. Todeschini, Heinz Läubli;

Poster #: B107 (presented @ PS2) || Abstract #: 130
Hyperglycemia enhances cancer immune evasion by inducing alternative macrophage polarization through increased O-GlcNAcylation
Natalia Rodrigues Mantuano1, Michal Stanczak1, Isadora Oliveira2, Nicole Kirchhamer5, Alessandra Filardy2, Gianni Monaco5, Ronan Santos2, Agatha Fonseca3, Miguel Fontes3, César Bastos Jr.3, Wagner Dias2, Alfred Zipellius4,5, Adriane Todeschini2, Heinz Läubli4,1;
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Poster #: B108 (presented @ PS1) || Abstract #: 131
Galectin 3 is a molecular integrator and tunable transducer in nutrient sensing
Mohit P. Mathew1, Julie G. Donaldson2, John A. Hanover1;
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Poster #: B109 (presented @ PS2) || Abstract #: 132
New extensions for GRITS Toolbox: MS data annotation for glycosphingolipids and editing of glycan structures and databases
Masaaki Matsubara, Brent Weatherly, Sena Arpinar, Mayumi Ishihara, Kazuhiro Aoki, René Ranzinger, Michael Tiemeyer, William S. York;
Complex Carbohydrate Research Center, University of Georgia;

Poster #: B093 (presented @ PS2) || Abstract #: 116
Why does loss of POFUT1 trap Notch in the ER of some cells but not others?
Kenjiroo Matsumoto, Robert S. Haltiwanger;
Complex Carbohydrate Research Center, University of Georgia;

Poster #: B039 (presented @ PS2) || Abstract #: 62
Identification of Novel Glycoproteins with Defined anti-Tn IgG and IgM; Applications as Tumor Diagnostic Biomarkers
Yasuyuki Matsumoto1, Sylvain Lehoux1, Sucharita Dutta1, Mark B. Jones1, Jamie Heimburg-Molinaro1, David F. Smith2, Tongzhong Ju2, Richard D. Cummings1;
1Beth Israel Deaconess Medical Center/Harvard Medical School; 2Emory University School of Medicine;

Poster #: B110 (presented @ PS1) || Abstract #: 133
Development of Smart Anti-Glycan Reagents (SAGRs) specific for sialic acid using immunized lampreys
Tanya McKitrick1, Christoffer Goth1, Charles Rosenberg2, Hirotomo Nakahara2, Jamie Heimburg-Molinaro1, Alyssa McQuillan1, Rosalia Falco1, Nicholas Rivers1, Brantley Herrin2, Max Cooper2, Richard D. Cummings1;
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Poster #: B112 (presented @ PS1) || Abstract #: 135
Prevalence of rhamnose biosynthesis pathways in completely sequenced genomes and metagenomes
Toshi Mishra, Petety V. Balaji ;
Department of Bioscieneces and Bioengineering, Indian Institute of Technology Bombay;

Poster #: B016 (presented @ PS1) || Abstract #: 25
Identification and design of transferase specific mucin-type O-glycosylation peptides using ISOGlyP's selective peptide function
Jonathon E. Mohl1, Thomas Gerken2, Ming-Ying Leung1;
1The University of Texas at El Paso; 2Case Western Reserve University;

Poster #: B113 (presented @ PS2) || Abstract #: 136
GlyGen Data Integration: Creating A Collaborative Environment For Data Generators, Bioinformatics Resources, And Users
Rahi Navelkar, GlyGen Consortium;
Department of Biochemistry & Molecular Medicine, The George Washington University.;

Poster #: B014 (presented @ PS1) || Abstract #: 23
Tuning metabolic decoy efficacy by modifying the linkage between carbohydrate and aglycone
Sriram Neelamegham1, Shuen-Shiuan Wang1, Xuefeng Gao2, Virginia del Solar1, Xinheng Yu1, Aristotelis Antonopoulos3, Alan E. Friedman1, Eryn K. Matich1, G. E. Atilla-Gokcumen1, Mehrab Nasirikenari4, Joseph T. Lau4, Anne Dell3, Stuart M. Haslam3, Roger A. Laine2, Khushi L. Matta2;
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Poster #: B114 (presented @ PS1) || Abstract #: 137
Insights into the functions of the Ost3 and Ost6 proteins in the yeast oligosaccharyltransferase
Julia Neuhaus, Eyring Jillianne, Aebi Markus;
Department of Microbiology, ETH Zürich;

Poster #: B115 (presented @ PS2) || Abstract #: 138
The role of 9-O-acetylated glycan receptor moieties in the typhoid toxin binding and intoxication outcomes
Tri Nguyen1, Sohyoung Lee1, Yi-An Yang1, Ji Hyun Sim1, Tiffany G. Kei1, Karen N. Barnard1, Hai Yu2, Shawn K. Milano1, Xi Chen2, Jeongin Song1;
1Cornell University; 2University of California Davis;

A carbohydrate mimetic peptide with binding specificity to the Annexin A1 N-terminus overcomes the blood-brain-barrier
Motohiro Nonaka, Michiko Fukuda;
Kyoto University;

Poster #: B116 (presented @ PS1) || Abstract #: 139
Linking maternal sugar consumption to progenies' developmental defect: a focus on OTX2's O-GlcNAcylation.
Eugenia wulff1, Jeffrey Boakye2, Rex Berendt1, John A. Hanover2, Stephanie Olivier-Van Stichelen1;
1Medical College of Wisconsin, Department of Biochemistry; 2National Institute of Diabetes and Digestive and Kidney Diseases, National Institute of Health;

Poster #: B013 (presented @ PS2) || Abstract #: 22
Structural characterization of T. cruzi Epimastigote Glycosylphosphatidylinositol-Mucin sialoglycans
Uriel Ortega-Rodriguez, Cameron C. Ellis, Igor Estevao da Silva, Igor C. Almeida;
Department of Biological Sciences, University of Texas at El Paso, TX 799683, U.S.A ;

Poster #: B037 (presented @ PS2) || Abstract #: 57
The particular glycomes of lymph node lymphatic endothelia and their role in localization and activation of Siglec-1+ subcapsular sinus macrophages
Jasmin Frey1, Marco D'Addio1, Carlotta Tacconi1, Cornelia Halin1, Michael Detmar1, Richard D. Cummings2, Vivianne I. Otto1;
1Institute of Pharmaceutical Sciences, ETH Zurich, Zurich, Switzerland ; 2Harvard Medical School, Boston Massachusetts, USA ;

Poster #: B117 (presented @ PS2) || Abstract #: 140
Succinylation of mycobacterial heteropolysaccharides and its impact on biophysical properties of the cell envelope
Zuzana Palčeková1, Shiva K. Angala1, Juan M. Belardinelli1, Haig A. Eskandarian2, Maju Joe3, Richard Brunton3, Christopher Rithner4, Victoria Jones1, Jérôme Nigou5, Todd L. Lowary3, Martine Gilleron5, Michael McNeil1, Mary Jackson1;
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A bi-to-mono CRD transition in GAL-9 potentiates mesenchymal invasion of breast cancer epithelia
Dharma Pally;
Indian Institute of Science;

Poster #: B030 (presented @ PS1) || Abstract #: 48
Role of sialylation in the control of cardiac functions in Drosophila
Brooke Allen, Ishita Chandel, Sergio Estrada, Vlad Panin;
Department of Biochemistry and Biophysics, Texas A&M University, College Station, Texas 77843, USA;;

Poster #: B118 (presented @ PS1) || Abstract #: 141
The impact of Thiamet G on cardiac O-GlcNAcylation and heart failure
Kyriakos N. Papanicolaou1, Ting Liu1, Natasha E. Zachara2, D. Brian Foster1, Brian O'Rourke1;
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Poster #: B119 (presented @ PS2) || Abstract #: 142
Modified Sialic Acid Expression in Cells and Animals
Karen Barnard, Brian Wasik, Brynn Lawrence, Colin Parrish;
Cornell University;

Poster #: B120 (presented @ PS1) || Abstract #: 143
Improved Profiling of Sialylated N-Linked Glycans by Ion Chromatography-Orbitrap Mass Spectrometry
Sachin Patil, Jeffrey Rohrer;
Thermo Fisher Scientific;

Poster #: B121 (presented @ PS2) || Abstract #: 144
Molecular basis for FGF23 site specific glycosylation by GalNAc-T3
Earnest James Paul Daniel1, Matilde de las Rivas2, Ramon Hurtado-Guerrero2, Thomas Gerken1;
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|| Abstract #: 51
Siglecs as checkpoints in immune cell responses
James C. Paulson, Britni M. Arlian, Shiteng Duan, Landon J. Edgar, Maidul Islam, Corwin M. Nycholat, Amrita Srivastava;
Departments of Molecular Medicine, and Immunology and Microbiology, The Scripps Research Institute, La Jolla, CA, 92037 USA;

Poster #: B004 (presented @ PS2) || Abstract #: 7
Structure and mechanism of a pH sensing lipoteichoic-acid-anchor flippase
Bing Zhang1, Xue Liu2, Elisabeth Lambert1, Guillaume Mas1, Sebastian Hiller1, Jan-Willem Veening2, Camilo Perez1;
1Biozentrum, University of Basel; 2University of Lausanne;

Poster #: B033 (presented @ PS2) || Abstract #: 53
Immunoglobulin G glycosylation changes in diseases and aging
Marija Pezer1, Frano Vuckovic1, Gordan Lauc1,2;
1Genos Glycoscience Research Laboratory, Zagreb, Croatia; 2University of Zagreb, Faculty of Pharmacy and Biochemistry, Zagreb, Croatia;

Poster #: B122 (presented @ PS1) || Abstract #: 145
TRAP Complex Facilitates N-linked Glycosylation Biosynthetic Process During ER-stress
Chatchai Phoomak1, Wei Cui1, Thomas J. Hayman1, Lance Wells2, Richard Steet3, Joseph N. Contessa1;
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Poster #: B043 (presented @ PS2) || Abstract #: 66
Reprogramming the Tumor Microenvironment with Macrophage-Targeted Glycopolymers
Ryan N. Porell, Daniel Honigfort, Kamil Godula;
Department of Chemistry and Biochemistry, University of California, San Diego;

Poster #: B123 (presented @ PS2) || Abstract #: 146
Udderly fascinating: relationships between breast milk composition and child development
Sara Porfirio1, Stephanie Archer-Hartmann1, Kathryn Lockwood1, G. Brett Moreau2, Girija Ramakrishnan2, Rashidul Haque3, William A. Petri, Jr.2, Parastoo Azadi1;
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Poster #: B124 (presented @ PS1) || Abstract #: 147
Glycan Engineering reveals that matriglycan alone recapitulates dystroglycan functions ranging from Laminin binding to Lassa Virus infection
M. Osman Sheikh1, Chantelle J. Capicciotti1,7, Lin Liu1, Jeremy L. Praissman1, Daniel G. Mead2, Melinda A. Brindley2, Kevin P. Campbell3, Kelley W. Moremen1,4, Lance Wells1,4, Geert-Jan Boons1,5,6;
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Poster #: B125 (presented @ PS2) || Abstract #: 148
Catalytic deficiency of O-GlcNAc transferase leads to X-linked intellectual disability
Veronica M. Pravata1, Villo Muha1, Mehmet Gundogdu1, Andrew T. Ferenbach1, Poonam S. Kakade2, Vasudha Vandadi1, Ariane C. Wilmes1, Vladimir S. Borodkin1, Shelagh Joss3, Marios P. Stavridis2, Daan M.F. van Aalten1;
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Poster #: B126 (presented @ PS1) || Abstract #: 149
The function of Golgi alpha-mannosidase II in somatosensory dendrite patterning
Maisha Rahman, Carlos A. Diaz-Balzac, Hannes E. Bülow;
Albert Einstein College of Medicine;

Poster #: B127 (presented @ PS2) || Abstract #: 150
REGULATION OF CLATHRIN-MEDIATED ENDOCYTOSIS BY O-LINKED ß-N-ACETYLGLUCOSAMINE MODIFICATIONS
Sadia Rahmani1, Costin N. Antonescu1,2, Warren W. Wakarchuk1,3;
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Poster #: B128 (presented @ PS1) || Abstract #: 151
A First-Generation Sequence Analyses for Carbohydrates
Vernon Reinhold, Thuy Tran, Qing Guo, David Ashline;
University of New Hampshire, Durham, NH 03824 ;

Poster #: B034 (presented @ PS1) || Abstract #: 54
Glycoprotein Aging with Increased Mannose Exposure Linked to Cardiovascular Disease through the Macrophage Mannose Receptor (Mrc1)
Damien Restagno1,2, Genaro Pimienta4, Won Ho Yang1,2,3, Peter V. Aziz1,2,3, Benjamin S. Haslund-Gourley1,2, Jeffrey W. Smith4, Jamey D. Marth1,2,3;
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Poster #: B129 (presented @ PS2) || Abstract #: 152
Tandem MS Strategies for Intact N- and O-Glycopeptide Characterization
Nicholas M. Riley1, Stacy A. Malaker1, Marc D. Driessen1, Carolyn R. Bertozzi1,2;
1Department of Chemistry, Stanford University, Stanford, California, USA; 2Howard Hughes Medical Institute, Stanford, California, USA;

Poster #: B130 (presented @ PS1) || Abstract #: 153
A New Generation of Soluble Siglecs for Probing Their Glycan Ligands on Cell Surfaces
Emily Rodrigues1, Heajin Park1, Caleb Loo2, Jaesoo Jung1, John Klassen1, Matthew S. Macauley1,3;
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Poster #: B132 (presented @ PS1) || Abstract #: 155
Interactions of the Mitogenic Cytokine Pleiotrophin with Structurally-Defined Heparin Oligosaccharides
Eathen O. Ryan, Xu Wang;
School of Molecular Sciences, Arizona State University, USA;

Poster #: B005 (presented @ PS1) || Abstract #: 8
Exploring Evolutionary Origins of Human-Specific CD33/Siglec-3 Alleles that Protect against Late Onset Alzheimer's Disease: Prior Selection by Uniquely Human Pathogens?
Sudeshna Saha1,2, Naazneen Khan1,2, Andrea Verhagen1,2, Aniruddha Sasmal1,2, Hai Yu4, Pascal Gagneux1,2, Xi Chen4, Nissi Varki1,2, Martin Frank3, Ajit Varki1,2;
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Poster #: B133 (presented @ PS2) || Abstract #: 156
Encoded Sialoglycan Microarray Reveals the Differential Sialoglycan Binding Patterns of Phylogenetically-Related Bacterial Exotoxin B Subunits
Aniruddha Sasmal1,2, Naazneen Khan1,2, Zahra Khedri1,2, Andrea Verhagen1,2, Hai Yu3, Anders B. Bruntse4, Sandra Diaz1,2, Nissi Varki1,2, Adrienne Paton5, James Paton5, Xi Chen3, Nathan Lewis1,4, Ajit Varki1,2;
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Poster #: B134 (presented @ PS1) || Abstract #: 157
Broadening the Landscape of ABO Typing with Multiplexed Lectins
Anna P. Schmidt1, Waseem Q. Anani2,5, Heather E. Ashwood1, Robert Burns1, Karin M. Hoffmeister1,4;
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Poster #: B019 (presented @ PS2) || Abstract #: 31
SWATH glycoproteomics to interrogate post-translational modification dynamics in yeast and sparkling wine
Cassandra L. Pegg, Toan K. Phung, Lucia F. Zacchi, Kate Howell, Benjamin L. Schulz;
The University of Queensland;

Poster #: B089 (presented @ PS2) || Abstract #: 112
Structure-function analysis of neutralizing antibodies that confer prophylactic and therapeutic protection against Salmonella Typhi typhoid toxin
Yi-An Yang1, Angelene F. Richards2, JiHyun Sim1, Tri Nguyen1, Changhwan Ahn1, Sohyoung Lee1, J. Ryan Feathers3, Haewon May Byun1, Greta Van Slyke2, J. Christopher Fromme3, Nicholas J. Mantis2, Jeongmin Song1;
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Poster #: B017 (presented @ PS2) || Abstract #: 26
Glycolipid-based targeted drug delivery system against multidrug resistant Pseudomonas aeruginosa
Akshi Singla1, Sabona Simbassa2, Kush Shah2, Panatda Saenkham2, Thushara Galbadage2, Preeti Sule2, Jeffrey Cirillo2, Carolyn L. Cannon2, Hung-Jen Wu1;
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Poster #: B135 (presented @ PS2) || Abstract #: 158
Novel insights into the fucose metabolism
Paulina Sosicka1, Bobby G. Ng1, Maurice Wong2, Zhi-Jie Xia1, David Scott1, Carlito B. Lebrilla2, Hudson H. Freeze1;
1Human Genetics Program, Sanford-Burnham-Prebys Medical Discovery Institute, La Jolla, CA, USA; 2Department of Chemistry, University of California, Davis, CA, USA;

Poster #: B136 (presented @ PS1) || Abstract #: 159
The prokaryotic pan-glycome: In silico identification of glycan building blocks in completely sequenced genomes
Jaya Srivastava, Petety V. Balaji;
Department of Biosciences and Bioengineering, Indian Institute of Technology Bombay;

Poster #: B137 (presented @ PS2) || Abstract #: 160
Development and Characterization of Sialoglycan Recognizing Probes (SGRPs) with defined specificities towards most predominant mammalian sialoglycans.
Saurabh Srivastava1,2, Andrea Verhagen1,2, Brian Wasik3, Hai Yu4, Aniruddha Sasmal1,2, Barbara Bensing5, Naazneen Khan1,2, Zahra Khedri1,2, Sandra Diaz1,2, Paul Sullam5, Nissi Varki1,2, Xi Chen4, Colin Parrish3, Ajit Varki1,2;
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|| Abstract #: 44
An Inhibitor of N-glycan Maturation in Mouse Germ Cells
Pamela Stanley, Ayodele Akintayo, Meng Liang, Boris Bartholdy, Frank Batista, Joshua Mayoral, Jillian Prendergast;
Albert Einstein College of Medicine;

Poster #: B042 (presented @ PS1) || Abstract #: 65
ENDOGENOUS LIGANDS OF THE MANNOSE RECEPTOR C-TYPE LECTIN DOMAIN IN CANCER AND CONTROL TISSUE
Kathrin Stavenhagen1,2, Lisa Laan2, Chao Gao1, Jonathan N. Glickman3, Irma van Die2, Richard D. Cummings1;
1Department of Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA; 2Department of Molecular Cell Biology and Immunology, VU University Medical Center, Amsterdam UMC, Amsterdam, The Netherlands; 3Departmen of Pathology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA;

Poster #: B138 (presented @ PS1) || Abstract #: 161
Cryo-Electron Microscopy of O-GlcNAc cycling enzymes
Agata Steenackers, Huaibin Wang, Ilhan Akan, Lara Abramowitz, Jenny Hinshaw, John A. Hanover;
Laboratory of Cell and Molecular Biology, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD 20892;

Poster #: B139 (presented @ PS2) || Abstract #: 162
Therapeutic potential of N-acetylglucosamine as a mitigating treatment for Duchesne Muscular Dystrophy (DMD)
Guillaume St-Pierre1, Ann Rancourt2, Sébastien Dufresne3, Dounia Hamoudi3, Julie-Christine Lévesque4, Masahiko Sato2, Jérome Frenette3, Sachiko Sato1,4;
1Glycobiology and Bioimaging Laboratory, Research Centre for Infectious Diseases, Research Centre of Centre Hospitalier Universitaire (CHU) de Québec-Université Laval; 2Laboratory of DNA Damage Responses and Bioimaging, Research Centre of Centre Hospitalier Universitaire (CHU) de Québec-Université Laval; 3Department of Rehabilitation, Research Centre of Centre Hospitalier Universitaire (CHU) de Québec-Université Laval; 4Bioimaging Platform, Research Centre of Centre Hospitalier Universitaire (CHU) de Québec-Université Laval;

Poster #: B140 (presented @ PS1) || Abstract #: 163
Multistage enrichment strategy for sensitive and unambiguous detection of unnatural glycans by both glycoproteomics and glycomics
NITIN T. SUPEKAR;
Complex Carbohydrate Research Center, University of Georgia;

Poster #: B141 (presented @ PS2) || Abstract #: 164
Significance of structurally diverse elongation of O-glucose glycans on Notch1 and Notch2
Hideyuki Takeuchi1, Urata Yusuke1, Yohei Tsukamoto1, Wataru Saiki1, Yuya Senoo1, Chenyu Ma1, Weiwei Wang1, Kazuhiro Aoki2, Michael Tiemeyer2, Tetsuya Okajima1;
1Department of Molecular Biochemistry, Nagoya University Graduate School of Medicine.; 2CCRC, University of Georgia;

Poster #: B001 (presented @ PS1) || Abstract #: 4
Understanding the sequence-structure-function relationships through a comprehensive evolutionary analysis of GT-A fold glycosyltransferases
Rahil Taujale1,2, Liang C. Huang1, Aarya Venkat3, Wayland Yeung1, Arthur S. Edison1,2,3, Kelley W. Moremen2,3, Natarajan Kannan1,3;
1Institute of Bioinformatics, University of Georgia; 2Complex Carbohydrate Research Center, University of Georgia; 3Department of Biochemistry & Molecular Biology, University of Georgia;

Poster #: B142 (presented @ PS1) || Abstract #: 165
Antibody-mucinase conjugates for degradation of cancer-related mucins
Gabrielle S. Tender1, Davey H. Huang1, Kayvon Pedram1, Carolyn R. Bertozzi1,2;
1Stanford University; 2Howard Hughes Medical Institute, Stanford, California, USA;

|| Abstract #: 27
Uncovering New Aspects of Neutrophil Glycobiology using Glyco(proteo)mics
Morten Thaysen-Andersen1, Harry C. Tjondro1, Ian Loke1, Sayantani Chatterjee1, Julian Ugonotti1, Ling Y. Lee1, Rebeca Kawahara1, Hannes Hinneburg1, Vignesh Venkatakrishnan2, Yuqi Zhu3, Siyun Chen4, Weston B. Struwe4, Marni A. Nenke5, Johan Bylund6, Sriram Neelamegham3, David J. Torpy5, Anna Karlsson2;
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Poster #: B143 (presented @ PS2) || Abstract #: 166
Bacterial glycoengineering for the synthesis of a potential cancer vaccine glycoepitope
Markus B. Tomek1, Chia-Wei Lin1,2, Hanne Tytgat1, Timothy G. Keys1, Markus Aebi1;
1Institute of Microbiology, Department of Biology, ETH Zürich, Switzerland ; 2Functional Genomics Center Zurich, Switzerland;

Poster #: B101 (presented @ PS2) || Abstract #: 124
Changqing Tong, Qingqing Yang, Min Qu, Wei Li;
College of Food Science and Engineering, Dalian Ocean University, Dalian 116023, China;

Poster #: B144 (presented @ PS1) || Abstract #: 167
An Approach to Determine the True Degree of Polymerization of Highly Unstable Polysialic Acids
Michael Vaill4,2,5, Sandra Diaz1,2,5, Dillon Chen1,3,5, Ajit Varki1,2,4;
1Department of Medicine, University of California San Diego; 2Department of Cellular and Molecular Medicine, University of California San Diego; 3Department of Pediatrics, University of California San Diego; 4Center for Academic Research and Training in Anthropogeny; 5Glycobiology Research and Training Center;

Poster #: B145 (presented @ PS2) || Abstract #: 168
Rapid Evolution of Bacterial Exotoxin B Subunits Independent of A subunits: Sialic Acid Binding Preferences Correlate with Host Range and Intrinsic Toxicity
Andrea Verhagen1, Naazneen Khan1, Aniruddha Sasmal1, Zahra Khedri1, Sandra Diaz1, Hai Yu3, Nissi Varki1, Adrienne Paton2, Xi Chen3, James Paton2, Ajit Varki1;
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Poster #: B146 (presented @ PS1) || Abstract #: 169
Production of sialylated O-glycans on therapeutic proteins in E. coli
Warren W. Wakarchuk1, Lyann Sim2, Nicole Thompson1, Nakita Buenbrazo3, Stephen G. Withers2;
1Department of Biological Sciences, University of Alberta, Edmonton, AB T6G 2G2; 2Michael Smith Laboratories, University of British Columbia, Vancouver, BC, V6T 1Z4 ; 3Department of Chemistry and Biology, Ryerson University, Toronto, ON M5B 2K3 ;

Poster #: B147 (presented @ PS2) || Abstract #: 170
Dissecting dendritic cell sialic acid-mediated interactions in antitumor immunity
Jinyu Wang1, Michal Stanczak2, Marta Trüb1, Marcel Trefny1, Anne Bärenwaldt1, Alfred Zippelius1,3, Heinz Läubli1,3;
1Department of Biomedicine, University of Basel; 2Max Planck Institute of Immunobiology and Epigenetics; 3University Hospital of Basel;

Poster #: B032 (presented @ PS1) || Abstract #: 50
Enhanced myofibroblast differentiation in Hyaluronan Synthase1/3 double knockout mice is independent of hyaluronan and mediated by a TGFβR/p38MAPK/MRTF pathway.
Yan Wang1, Judith A. Mack1,2, Vincent C. Hascall1, Edward V. Maytin1,2;
1Department of Biomedical Engineering, Lerner Research Institute; 2Department of Dermatology, Dermatology and Plastic Surgery Institute, Cleveland Clinic;

Poster #: B023 (presented @ PS2) || Abstract #: 38
GRASP55 senses energy and nutrient deprivation through O-GlcNAcylation to promote autophagosome-lysosome fusion
Yanzhuang Wang;
University of Michigan;

Poster #: B148 (presented @ PS1) || Abstract #: 171
Characterization of the type 3 Streptococcus pneumoniae capsule degrading glycoside hydrolase
Paeton L. Wantuch, Fikri Y. Avci;
Center for Molecular Medicine, University of Georgia, Athens, GA 30602, USA;

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Genome-wide Regulation of Heparan Sulfate Assembly
Ryan J. Weiss1, Philipp N. Spahn2, Austin Chiang2, Jing Li1, Qing Liu1, Nathan E. Lewis2,5, Jeffrey D. Esko1,3,4;
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Poster #: B149 (presented @ PS2) || Abstract #: 172
Skp1 isoforms are differentially modified by a dual function prolyl 4-hydroxylase/N-acetylglucosaminyltransferase in a plant pathogen
Hanke van der Wel1, Elisabet Gas-Pascual2,1, Christopher M. West2,3,1;
1University of Georgia, Athens, GA USA; 2Center for Tropical and Emerging Global Diseases; 3Complex Carbohydrate Research Center;

Poster #: B150 (presented @ PS1) || Abstract #: 173
Investigating the functions of endogenous neuraminidases Neu1 and Neu3 in blood cell and protein homeostasis
Julia S. Westman1,2, Won Ho Yang1,2,3, Jamey D. Marth1,2,3;
1Center for Nanomedicine; 2Sanford Burnham Prebys Medical Discovery Institute; 3Department of Molecular, Cellular, and Developmental Biology, University of California-Santa Barbara, Santa Barbara, California 93106;

Poster #: B040 (presented @ PS1) || Abstract #: 63
Modulation of Siglec Binding Via SIAE and CASD1-An Immune Evasion Pathway for Breast and Colon Cancers
Susan Grabenstein1, Jayda Zemlicka1, Mathias Anim1, Carolyn R. Bertozzi2, Rachel A. Willand-Charnley1;
1South Dakota State University ; 2Stanford University;

Poster #: B111 (presented @ PS2) || Abstract #: 134
A schizophrenia-associated variant in SLC39A8 alters protein N-glycosylation in the mouse brain
Sarah E. Williams1,2, Robert G. Mealer1,2,3, Ramnik J. Xavier4, Edward M. Scolnick3, Jordan W. Smoller1,3, Richard D. Cummings2;
1Psychiatric and Neurodevelopmental Genetics Unit, Massachusetts General Hospital, Harvard Medical School, Boston MA.; 2National Center for Functional Glycomics, Department of Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston MA.; 3The Stanley Center for Psychiatric Research at Broad Institute of Harvard/MIT, Cambridge, MA.; 4Center for the Study of Inflammatory Bowel Disease, Massachusetts General Hospital, Harvard Medical School, Boston, MA.;

Poster #: B151 (presented @ PS2) || Abstract #: 174
Expanding the toolkit for studying polysialic acid reveals polysialylated proteins in unexpected places
Lisa Willis1,2, Amanda Tajik3,6, Karla Williams4, Hon Sing Leong5, Mark Nitz6;
1University of Alberta; 2Women and Children's Health Research Institute; 3McMaster University; 4University of British Columbia; 5Mayo Clinic; 6University of Toronto;

Poster #: B152 (presented @ PS1) || Abstract #: 175
Insights into A Novel Molecular Based Recognition of 6'-sulfo sLeX
Xiaocong Wang1,2, Melinda Hanes3, Richard Cummings3, Robert J. Woods2;
1Hubei Key Laboratory of Agricultural Bioinformatics, College of Informatics, Huazhong Agricultural University, Wuhan, China; 2Complex Carbohydrate Research Center, University of Georgia, Athens, GA, USA; 3Department of Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA;

Poster #: B018 (presented @ PS1) || Abstract #: 30
Mass Spectrometry-Based Chemical and Enzymatic Methods for Global Analysis of Protein Glycosylation in Complex Biological Samples
Ronghu Wu;
School of Chemistry and Biochemistry, Petit Institute for Bioengineering and Bioscience, Georgia Institute of Technology, Atlanta, Georgia 30332, USA;

Poster #: B153 (presented @ PS2) || Abstract #: 176
Detecting substrate glycans of fucosyltransferases on glycoproteins with fluorescent fucose
Zhengliang L. Wu, Mark Whitaker, Anthony D. Person, Vassili Kalabokis;
Bio-techne, R&D Systems;

Poster #: B154 (presented @ PS1) || Abstract #: 177
Characterization of Erythropoietic Activity and In Vivo Neuroprotective Effects of Plant-produced Asialo-rhuEPO
Jiahua (Jay) Xie, Farooqahmed S. Kittur, Maotao He, Chiu-Yueh Hung, Jianhui Zhang, Andy P. Li;
Department of Pharmaceutical Sciences, Biomanufacturing Research Institute & Technology Enterprise, North Carolina Central University, Durham, NC 27707, USA. ;

Poster #: B155 (presented @ PS2) || Abstract #: 178
GlycoNAVI: Three-Dimensional Structure and Heterogeneity of Glycans in Glycoprotein
Issaku Yamada1, Kiyoko F. Aoki-Kinoshita2;
1The Noguchi Institute; 2Soka University;

Poster #: B156 (presented @ PS1) || Abstract #: 179
GlycoSense™: A flow cytometry-based technology for rapid and simplified glycan profiling
Matthew J. Saunders1, Robert J. Woods2, Loretta Yang1;
1Lectenz Bio; 2CCRC, University of Georgia;

Poster #: B031 (presented @ PS2) || Abstract #: 49
SULF2 overexpression affects survival and modulates sulfation of heparan sulfate proteoglycans in Squamous Cell Carcinoma of the Head and Neck
Yang Yang1, Jaeil Ahn2, Rekha Raghunathan3, Bhaskar V. Kallakury4, Bruce Davidson5, Joseph Zaia3, Radoslav Goldman6,1;
1Department of Biochemistry and Molecular & Cellular Biology, Georgetown University; 2Department of Biostatistics, Bioinformatics, and Biomathematics, Georgetown University; 3Center for Biomedical Mass Spectrometry, Boston University School of Medicine; 4Department of Pathology, Lombardi Comprehensive Cancer Center, Georgetown University; 5Department of Otolaryngology-Head and Neck Surgery, Medstar Georgetown University Hospital; 6Department of Oncology and Clinical and Translational Glycoscience Research Center, Georgetown University;

|| Abstract #: 37
Decoding the role of intracellular glycosylation in cytoprotection and disease
Albert Lee, Roger Henry, Devin Miller, Kamau Fahie, Reuben Levy-Meyers, Jasmin Zarb, Natasha Zachara;
Dept. Biological Chemistry, School of Medicine, Johns Hopkins University;

Poster #: B157 (presented @ PS2) || Abstract #: 180
Bioluminescent biochemical and cell-based assays for glycosylation studies
Hicham Zegzouti, Laurie Engel, Byounhoon (Brian) Hwang, Juliano Alves, Said Goueli;
Promega Corporation;

Poster #: B035 (presented @ PS2) || Abstract #: 55
N-glycopeptide signatures of IgA2 in serum from patients with hepatitis B virus-related liver diseases
Shu Zhang1, Xinyi Cao2, Chao Liu3, Wei Li2, Wenfeng Zeng4, Xue Qin5, Qiang Gao1, Haojie Lu2,6;
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Poster #: B158 (presented @ PS1) || Abstract #: 181
Peptidoglycan fragment microarray platform for human immune system investigation
Junhui Zhou1, Klare M. Lazor1, Catherine L. Grimes1,2;
1Department of Chemistry and Biochemistry, University of Delaware, Newark, Delaware 19716 United States; 2Department of Biological Sciences, University of Delaware, Newark, Delaware 19716 United States;

Poster #: B020 (presented @ PS1) || Abstract #: 32
Integrating Mass Spectrometry and RNA-Seq data for Glycosylation Pathway Generation and Simulation
Yusen Zhou, Gang Liu, Sriram Neelamegham;
Chemical and Biological Engineering, University at Buffalo, SUNY;

Poster #: B159 (presented @ PS2) || Abstract #: 182
Genome editing of primary neutrophils derived from CD34+ human hematopoietic stem cells
Yuqi Zhu, Sriram Neelamegham;
Chemical and Biological Engineering and Medicine, University at Buffalo, State University of New York, Buffalo, NY 14260, USA;

Poster #: B160 (presented @ PS1) || Abstract #: 183
The development of chemo-enzymatic method for simultaneously profiling N- and O-glycans on therapeutic glycoproteins
Guozhang Zou, Tongzhong Ju;
Office of Biotechnology Products (OBP) Center for Drug Evaluation and Research (CDER) Food and Drug Administration, Silver Spring, MD 20993;

Poster #: B163 (presented @ PS2) || Abstract #: 186
All Members of the Glycosyltransferase-C Superfamily Have a Conserved Membrane Topology
Hans Bakker, Andreia Albuquerque-Wendt, Hermann J. Hütte, Falk FR Buettner, Françoise H. Routier;
Institute of Clinical Biochemistry, Hannover Medical School, Germany;

Poster #: B164 (presented @ PS1) || Abstract #: 187
Changes in gut mucin glycosylation induced by mucin-degrading bacteria promotes colon tumorigenesis
Lubor Borsig, Jesus F. Glaus Garzon;
University of Zurich, Switzerland;

Poster #: B165 (presented @ PS2) || Abstract #: 188
Gelling mechanism of RG-I enriched citrus pectin: Role of arabinose side-chains in cation- and acid-induced gelation
Shiguo Chen1, Jiaqi Zheng1, Jianle Chen1, Hua Zhang1, Dongmei Wu1, Xingqian Ye1, Robert J. Linardt2;
1College of Biosystems Engineering and Food Science, Zhejiang Key Laboratory for Agro-Food Processing, Department of Food Science and Nutrition, Zhejiang University, Hangzhou 310058, China; 2Center for Biotechnology & Interdisciplinary Studies, Department of Chemistry & Chemical Biology, Rensselaer Polytechnic Institute, Biotechnology Center 4005, Troy, NY 12180, USA;

Poster #: B166 (presented @ PS1) || Abstract #: 189
Cell Wall Glycosyl Hydrolytic Enzymes Increase Antimicrobial Drug Activity Against Mycobacterium
Lingyi Lynn Deng, Matthew Bo Au; Cristofer Barry, Joshua N. Gustine
Department of Medicine, Boston University School of Medicine, Boston, Massachusetts 02118, USA;

Poster #: B167 (presented @ PS2) || Abstract #: 190
Role of Sialyation in GBM
Sajina GC, Chatherine Libby, Asmi Chakraborty, Brent Jones, Susan Bellis, Anita Hjelmeland;
University of Alabama at Birmingham;

Poster #: B168 (presented @ PS1) || Abstract #: 191
Glycan-Checkpoint Inhibitor unleashing CD8+ T cells against Cancer
Quentin Haas1, Kayluz F. Boligan1, Camilla Jandus2, Cedric Simillion3, Christoph Schneider1, Michal Stanczak4,5, Monika Haubitz6, Morteza Jafari7, Alfred Zippelius4,5, Heinz Läubli4,5, Robert E. Hunger7, Pedro Romero2, Hans-Uwe Simon1, Stephan von Gunten1;
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Poster #: B169 (presented @ PS2) || Abstract #: 192
Interaction of viral glycans with heterocomplex of C-type lectins are critical in the pathogenesis of viral infections
Shie-Liang Hsieh,
Genomics Research Center/Academia Sinica;

Poster #: B170 (presented @ PS1) || Abstract #: 193
CAR-T Cells Targeting a Cancer-Specific, Glycosylated Epitope of Fibronectin Exhibit Potent Anti-Tumor Activity
Tiffany R. King, Fang Liu, Brittany L. Gardner, Avery D. Posey, Jr.;
Department of Systems Pharmacology and Translational Therapeutics, Perelman School of Medicine, University of Pennsylvania;

Poster #: B171 (presented @ PS2) || Abstract #: 194
Suppression of terminal N-glycan modifications by bisecting GlcNAc
Yasuhiko Kizuka,
Center for Highly Advanced Integration of Nano and Life Sciences (G-CHAIN), Gifu University;

Poster #: B172 (presented @ PS1) || Abstract #: 195
Generation of a Human Organotypic Skin Model to Study Functions of Glycosaminoglycans
Asha M. Rudjord-Levann1, Sally Dabelsteen2, Richard Karlsson1, Yen-Hsi Chen1, Rebecca Miller1, Hans H. Wandall1;
1Copenhagen Center for Glycomics, Department of Cellular and Molecular Medicine, University of Copenhagen, 2200 Copenhagen, Denmark; 2School of Dentistry University of Copenhagen, 2200 Copenhagen, Denmark;

Poster #: B173 (presented @ PS2) || Abstract #: 196
Rapid mapping of glycoprotein structure-activity relationships by shotgun scanning glycomutagenesis
Mingji Li, Xiaolu Zheng, Matthew DeLisa;
Robert F. Smith School of Chemical and Biomolecular Engineering, Cornell University, Ithaca, NY 14853 USA;

Poster #: B174 (presented @ PS1) || Abstract #: 197
A Recent Advancement Making O-Glycan Preparation Flawless
Yoshiaki Miura1, Midori Sakaguchi1, Masaaki Toyoda1, Akihiko Kameyama2;
1Sumitomo Bakelite Co., Ltd., 5-8, Tennoz Parkside Building, Higashi-shinagawa 2-chome, Shinagawa ku, Tokyo 140-0002, Japan; 2Biotechnology Research Institute for Drug Discovery, National Institute of Advanced Industrial Science and Technology (AIST), 1-1-1 Umesono, Tsukuba, Ibaraki 305-8568, Japan;

Poster #: B175 (presented @ PS2) || Abstract #: 198
A carbohydrate mimetic peptide with binding specificity to the Annexin A1 N-terminus overcomes the blood-brain-barrier
Motohiro Nonaka1, Michiko N. Fukuda2;
1Human Health Sciences, Graduate School of Medicine, Kyoto University, Japan; 2Cancer Center, Sanford-Burnham-Prebys Medical Discovery Institute, La Jolla, CA;

Poster #: B176 (presented @ PS1) || Abstract #: 199
A bi-to-mono CRD transition in GAL-9 potentiates mesenchymal invasion of breast cancer epithelia
Dharma Pally1, Anagha Srinivas1, Rekha V. Kumar2, Ramray Bhat1.
1Indian Institute of Science, Bangalore, India. 2Kidwai Cancer institute, Bangalore, India.

Poster #: B177 (presented @ PS2) || Abstract #: 200
O-Linked Glycopeptides as CNS Penetrant Drugs for the Treatment of Neurodegenerative Diseases and Stroke
Robin Polt1,2, Michael L. Heien1,2, John Streicher1,2;
1Teleport Pharmaceuticals, LLC; 2The University of Arizona;

Poster #: B178 (presented @ PS1) || Abstract #: 201
NMR and MD Evidence for a Mechanistically Important Conformation Change in ST6Gal1
James H. Prestegard, Kelley W. Moremen, Gordon R. Chalmers, Alexander Eletsky, Laura C. Morris, Monique J. Rogals, Robert V. Williams, Jeong-Yeh Yang;
University of Georgia, Athens, GA USA;

Poster #: B179 (presented @ PS2) || Abstract #: 202
β4galt1 regulates expression of proto-oncogenes PIM-1/2 and Myc in hematopoietic stem cells.
Leonardo Rivadeneyra, Melissa Lee-Sundlov, Robert Burns, Simon Glabere, Heather Ashwood, Karin M. Hoffmeister;
Translational Glycomics Center, Blood Research Institute, Versiti Wisconsin, Milwaukee, WI, USA. ;

Poster #: B180 (presented @ PS1) || Abstract #: 203
The structure of GalNAc-T12 reveals the molecular basis of its substrate recognition mode
Amy J. Fernandez4, Earnest James Paul Daniel2, Sai Pooja Mahajan3, Jeffrey J. Gray3,4, Thomas A. Gerken2,5, Lawrence A. Tabak1, Nadine L. Samara6;
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Poster #: B181 (presented @ PS2) || Abstract #: 204
IgE Glycosylation Modulates Allergic Inflammation
Kai-Ting C. Shade, Robert M. Anthony;
Center for Immunology and Inflammatory Diseases, Division of Rheumatology, Allergy, and Immunology, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA 02129;

Poster #: B182 (presented @ PS1) || Abstract #: 205
Extracellular vesicles from CLEC2-activated platelets enhance dengue virus-induced lethality via CLEC5A/TLR2
Pei Shan Sung;
Genomics Research Center/Academia Sinica;

Poster #: B183 (presented @ PS2) || Abstract #: 206
Investigating the Role of α2,3 sialylation and poly-LacNac Structures in Cancer Stem Cell Function
Melanie Walker, Lara K. Mahal, Barbara A. Bensing, Arthur M. Mercurio;
University of Massachusetts Medical School;

Poster #: B184 (presented @ PS1) || Abstract #: 207
GRASP55 senses energy and nutrient deprivation through O-GlcNAcylation to promote autophagosome-lysosome fusion
Xiaoyan Zhang, Leibin Wang and Yanzhuang Wang
University of Michigan, Ann Arbor, MI 48109, USA;

Poster #: B185 (presented @ PS2) || Abstract #: 208
ST6GAL1 -mediated sialylation in intestinal homeostasis and maintenance of microbiome
Tianxin Yu, Joseph Lau;
Roswell Park Cancer Institute, Buffalo, NY, USA;

Poster #: B186 (presented @ PS1) || Abstract #: 209
MotifFinder, Managing the Glycomics Headache
Jian Zhang1, Zachary Klamer2, Jonathan Beirne1, Xi Chen1, Brian Haab2;
1Z Biotech, LLC, Aurora, Colorado; 2Center for Cancer and Cell Biology, Van Andel Research Institute, Grand Rapids MI;

Poster #: B187 (presented @ PS2) || Abstract #: 210
Interactions of Tau and Heparin/GAGs
Fuming Zhang1, Jing Zhao2, Chunyu Wang2, Robert J. Linhardt3;
1Department of Chemical and Biological Engineering, Rensselaer Polytechnic Institute; 2Department of Biology, Rensselaer Polytechnic Institute; 3Departments of Chemistry and Chemical Biology and Biomedical Engineering, Rensselaer Polytechnic Institute;

Poster #: B188 (presented @ PS1) || Abstract #: 211
Regulation of Extrinsic Glycosylation in Platelets
Jinchao Zhang, Joseph Lau;
Roswell Park Cancer Institute, Buffalo, NY, USA;

LATE-BREAKING ABSTRACTS

(186) All Members of the Glycosyltransferase-C Superfamily Have a Conserved Membrane Topology

Hans Bakker, Andreia Albuquerque-Wendt, Hermann J. Hütte, Falk FR Buettner, Françoise H. Routier

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Glycosyltransferases that use polyisoprenol-linked donor substrates are categorized in the GT-C superfamily. In eukaryotes, they act in the endoplasmic reticulum (ER) lumen and are involved in N-glycosylation, glypiation, O-mannosylation, and C-mannosylation of proteins. The membrane topology model of C-mannosyltransferases (DPY19 family) concurres perfectly with the 13 transmembrane domains (TMDs) observed in oligosaccharyltransferase (STT3 family) structures. A multiple alignment of family members from diverse organisms highlighted the presence of only a few conserved amino acids between DPY19 and STT3. Most of these residues were shown to be essential for DPY19 function and are positioned in luminal loops that showed high conservation within the DPY19 family. Multiple alignments of other eukaryotic GT-C families underlined the presence of similar conserved motifs in luminal loops, in all enzymes of the superfamily. Most GT-C enzymes are proposed to have an uneven number of TDMs with 11 (POMT, TMTC, ALG9, ALG12, PIGB, PIGV, and PIGZ) or 13 (DPY19, STT3, and ALG10) membrane spanning helices. In contrast, PIGM, ALG3, ALG6, and ALG8 have 12 or 14 TMDs and display a C-terminal dilysine ER-retrieval motif oriented towards the cytoplasm. We propose that all members of the GT-C superfamily are evolutionary related enzymes with preserved membrane topology with a basis of 11 TMDs to which several members obtained additional ones.

(187) Changes in gut mucin glycosylation induced by mucin-degrading bacteria promotes colon tumorigenesis

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Host cells in the gastrointestinal tract live in a mutualistic relationship with gut microbiota in healthy condition. The mucus layer represents the interface that both creates a physical barrier and forms a niche for microbiota thereby contributing to gut homeostasis. Alteration of gut microbiota has been associated with several diseases, including bowel inflammatory disease and cancer. While changes in cell surface glycosylation are typical hallmarks of tumorigenesis, a direct involvement of bacteria-derived glycolytic enzymes in cancer remains to be defined. We tested the hypothesis that a prominent mucin-degrading bacteria Akkermansia muciniphila may affect the progression of colorectal tumors.

First, we tested whether the glycolytic activity of A. muciniphila alters glycosylation of a panel of tumor cells. We observed changes in lectin binding to treated tumor cells, which was in agreement with the presence of sialidase, N-acetylglucosaminidase, and galactosidase activity. Colonization of mice with A. muciniphila resulted in altered levels of free monosaccharides in the cecum fluid, with a prominent increase in free sialic acid, and changes in microbiota. In addition, significant changes in SCFA in the colon has been observed. Cecum implantation of MC-38 tumor cells in A. muciniphila colonized mice resulted in enhanced tumor growth and altered tumor immunity. The ongoing characterization of colonic mucins indicate changes in glycosylation. Taken together, these data indicate that enhanced mouse colonization with mucin-degrading bacteria affects tumor growth.

(188) Gelling mechanism of RG-I enriched citrus pectin: Role of arabinose side-chains in cation- and acid-induced gelation

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RG-I enriched pectin is present in fruit and vegetable containing products. However, it is removed by the hot acid treatment during commercial pectin production to improve gelling properties and to afford a more uniform pectin quality. Recently, an awareness of the health benefits of RG-I enriched pectin has caused technologists to rethink its utilization by the food industry, especially as a novel healthy gelling agent. Unique RG-I enriched pectin with abundant arabinan side-chains was extracted from citrus membrane by sequential mild acidic and alkaline treatment. Arabinose was then removed by enzymatic treatment to investigate the impact of arabinose side-chains on gelation. The properties of RG-I enriched pectin gels, prepared using cations or acid, showed it could form gels under conditions required for both low and high methoxyl pectin as a result of its highly branched structure. In cation-induced gelation, the HG region forms egg-box junction zones with divalent cations and the side-chains of the RG-I region stabilizes the network structure through entanglements. In acid-induced gelation, low pH promotes formation of hydrogen bonding and hydrophobic interactions within the HG region and the side-chains create a tighter conformation, eventually allowing for stronger interactions between the pectin chains.

(189) Cell Wall Glycosyl Hydrolytic Enzymes Increase Antimicrobial Drug Activity Against Mycobacterium

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Cell wall glycosyl hydrolases are enzymes that cleave bacterial cell walls by hydrolyzing specific bonds within peptidoglycan and other portions of the envelope. Many organisms possess glycosyl hydrolases. This study specifically investigated whether cell wall glycosyl hydrolytic enzymes could be employed as exogenous reagents to augment the efficacy of antimicrobial agents against mycobacteria. Mycobacterium smegmatis cultures were treated with thirty conventional drugs (mostly antibiotics) and six anti-tuberculosis drugs – alone or in combination with cell wall hydrolases. Culture turbidity, colony-forming units (CFUs), metabolic assays (BioLog), vital staining, and oxygen consumption were all monitored. The majority of antimicrobial agents tested alone only had minimal inhibitory effects on bacterial growth. However, the combination of cell wall hydrolases and most of the antimicrobial agents tested, revealed a synergistic effect that resulted in significant enhancement of bactericidal activity. Vital staining showed increased cellular damage when M. smegmatis and Mycobacterium bovis bacillus Calmette–Guérin (M. bovis BCG) were treated with both drug and lysozyme. Respiration analysis revealed stress responses when cells were treated with lysozyme and drugs individually, and an acute increase in oxygen consumption when treated with both drug and lysozyme. Similar trends were also observed for three other enzymes (hydrolase-30, RipA-His6 and RpfE-His6). These findings demonstrated that cell wall glycosyl hydrolytic enzymes have the capability to improve the potency of many current antimicrobial drugs and render some ineffective antibiotics effective in killing mycobacteria. This combinatorial approach may represent an important strategy to eliminate drug-resistant bacteria.

(190) Role of Sialyation in GBM

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Glioblastoma (GBM) is one of the most aggressive and fatal cancers with a median survival of only 14 months with current standard of care which includes maximal surgical resection, radiation and chemotherapy. Despite available treatments, GBM is incurable with rapid recurrence and low life expectancy. Moreover, development of effective treatments is difficult due to the highly heterogeneous nature of GBM caused by brain tumor initiating cells (TICs), which exhibit stem cell-like capacity of self-renewal, multilineage differentiation, and tumorigenicity. Brain TICs are resistant to radio- and chemotherapy and thought to cause tumor recurrence. Therefore, it is highly imperative to understand the mechanisms promoting BTIC maintenance to develop new treatments for GBM. How BTIC maintenance is regulated by post-translational modifications like glycosylation is understudied. Altered cell surface glycosylation was one of the earliest modifications observed in malignant neoplastic progression. However, this facet of brain tumor biology has not received particular attention. Among the various glycosyltransferases present in human cells, golgi sialyltransferase ST6Gal-I (beta-galactoside alpha-2,6-sialyltransferase 1) adds sialic acid residues in α2-6 linkage to membrane bound and secreted N-glycans. Through this modification, ST6Gal-I is an important driver of tumorigenic processes such as epithelial to mesenchymal transformation, TIC maintenance, tumor cell resistance to apoptotic stimuli, radio- and chemoresistance and increased survival of cells exposed to stressors such as hypoxia and serum starvation in various cancers such as pancreatic and ovarian cancer. While roles of ST-6gal-I have not been explored in brain TICs, we hypothesize that ST6Gal-I mediated silalylation of surface receptors in GBM promotes stemness. Our data with GBM patient derived xenografts (PDX) depicts increased stemness with high α2,6 sialylation, while, ST6Gal-I knockdown (KD) in GBM PDX lines show decreased cell growth. These findings strongly implicate ST6Gal-I mediated in BTIC maintenance and GBM tumorigenesis. Determining the mechanistic basis of sialylation-dependent maintenance of BTICs will highlight a novel insight in GBM stemness.

(191) Glycan-Checkpoint Inhibitor unleashing CD8+ T cells against Cancer

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Cytotoxic T lymphocytes (CTL) play a key role against cancer. Siglecs are inhibitory receptors recognizing sialoglycans and are able to trigger inhibitory functions on immune cells. The ligands of Siglec receptors are highly expressed in various types of tumors, developing a coat of sialic acid on their surface.

We hypothesized that Siglec expression on CD8+ T cells is used by sialic acid-coated tumor cells to bypass immune cell recognition. Thus, we investigated Siglec+ CD8+ T cells characteristics in healthy donors as well as in tumor infiltrating lymphocytes (TILs) from patients with melanoma. CD8+ T cells functional capacities were analyzed, as well as the pattern of clonality and expansion of Siglec+ CD8+ T cells in melanoma. Beside, experiments performed on patients' material were corroborated with biostatistical analyses of cancers RNA databases. In complement, Siglecs ligands expression in melanoma was also quantified.

Our results show an extended Siglec+ CD8+ T cell pool in the tumor infiltrating lymphocytes (TILs) isolated from patients with melanoma compared to healthy donors. The Siglec+ CD8+ T cell pool represent a more differentiated, more cytotoxic and more proliferative subset of CD8+ T cell. We also demonstrated that these effector capacities were dampened upon ligation of Siglec with its ligands. This inhibitory capacity of Siglecs could be canceled when the ligands were removed from cancer cells surface.

Our data suggest that Siglecs on CD8+ T cells may represent a novel potential therapeutic targets for immune check-point therapy of malignancies with high expression of sialoglycans, such as melanoma.

(192) Interaction of viral glycans with heterocomplex of C-type lectins are critical in the pathogenesis of viral infections

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Previous studies of host-pathogen interactions are from the view point of single PAMP (pathogen-associated molecular pattern)-PRR (pattern recognition receptor) contact. However, pathogens carry multiple PAMPs and are able to activate multiple innate immunity receptors simultaneously upon engagement with immune cells. It has been demonstrated that dengue virus (DV) and influenza virus (H5N1) interact with CLEC5A, DC-SIGN, DC-SIGNR, and mannose receptor. Compared to DC-SIGN and DC-SIGNR, the affinity between viruses and CLEC5A is much lower. Nevertheless, only CLEC5A has clear biochemical evidence to trigger downstream signaling pathway after engagement, while the cytoplasmic domains of DC-SIGN, DC-SIGNR, and MR do not have well-defined domains for signal transduction. We demonstrate that viral glycans interact with heterocomplex of C-type lectins in macrophages, neutrophils, and platelets, thus enhances virus-induced inflammatory cytokine production and extracellular vesicles release via Syk-coupled C type lectins – CLEC5A and CLEC2. All these observations suggest that blockade of Syk-coupled C type lectins is a promising approach to attenuate inflammatory reactions and reduce lethality in acute viral infections.

(193) CAR-T Cells Targeting a Cancer-Specific, Glycosylated Epitope of Fibronectin Exhibit Potent Anti-Tumor Activity

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Current immunotherapy advances have been revolutionary for the treatment of hematologic malignancies as evident by the FDA approvals of CD19-targeting CAR-T cells for the treatment of acute lymphoblastic leukemia and diffuse-large B-cell lymphoma. However, the greatest unmet burden for cancer treatment is solid tumors, particularly prostate, breast, colorectal, and lung cancers, which account for approximately 45% of all cancer related deaths in the U.S. CAR-T cells have lacked efficacy in the fight against solid tumors due to a number of challenges, including the lack of tumor-specific antigens, overcoming obstacles of therapeutic resistance, tumor heterogeneity, poor expansion and persistence, and extrinsic dysfunction and physical barriers to T cell infiltration caused by the dense, immunosuppressive tumor microenvironment (TME). In order to enhance the efficacy of CAR-T cells against solid tumors, post-translational modifications that occur exclusively in transformed cells can be targeted. Aberrant glycosylation is considered a new hallmark of cancer development as glycans play a key role in tumor initiation, progression, and metastasis. Alterations in glycosyltransferases and chaperone proteins lead to the development of various tumor-associated antigens. For example, defects in mucin-type O-glycosylation leads to cell surface expression of terminal GalNAc, or Tn-antigen, on many tumors. Previous pre-clinical studies that target Tn-MUC1 with 5E5-CAR-T cells demonstrated efficacy against multiple tumor histotypes, and these studies have recently translated into a phase I clinical trial (NCT04025216) for the treatment of NSCLC, ovarian cancer, triple-negative breast cancer, pancreatic adenocarcinoma, and multiple myeloma. The present work targets Tn-antigen present on the IIICS domain of oncofetal fibronectin (onfFN), a cancer-specific splice isoform of the extracellular matrix protein (ECM) fibronectin (FN). Current data shows that onfFN-targeting CAR-T cells secrete high concentrations of IFN-γ in response to co-culture with metastatic prostate cancer cells. In vitro studies reveal onfFN-targeting CAR-T cells as a potent cytotoxic agent against the androgen-insensitive PC3 and DU145 prostate cancer cell lines at multiple effector-to-target ratios. Additionally, IIICS-FN targeting CAR-T cells promote rapid anti-tumor rejection in a subcutaneous PC3 xenograft model of prostate cancer. Here, we present a strategy to target a cancer-specific glycosylated epitope on an ECM protein found within the TME with CAR-T cells, which demonstrates in vitro and in vivo efficacy against metastatic prostate tumors. This data provides a novel cancer immunotherapy approach for the treatment of prostate tumors and potentially other cancer histotypes.

(194) Suppression of terminal N-glycan modifications by bisecting GlcNAc

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Biosynthesis of N-glycans is a highly regulated process with stepwise actions of various glycosyltransferases in the Golgi, and it is unclear how each step is inter-regulated and integrated. Bisecting GlcNAc, a central GlcNAc branch synthesized by GnT-III (MGAT3 gene), is highly expressed in brain. Our previous studies using Alzheimer's disease model mice showed that bisecting GlcNAc promotes Alzheimer's pathology by regulating the intracellular location of amyloid beta-producing enzyme BACE1. However, physiological functions of bisecting GlcNAc remain largely unclear. Here we found that bisecting GlcNAc is a general suppressor of various terminal modifications of N-glycans (Nakano et al., Mol. Cell. Proteomics, in press).

Previous in vitro enzymatic studies showed that the presence of bisecting GlcNAc inhibits the actions of other N-glycan branching enzymes, such as GnT-IV (MGAT4) and -V (MGAT5), suggesting that bisecting GlcNAc has a big influence on overall N-glycan profiles in vivo. To explore this possibility, we performed N-glycomic analysis of Mgat3-deficient brain using LC-MS and revealed that various types of terminal modifications of N-glycans were aberrantly upregulated in Mgat3-knockout, including Lewis-type fucose, sialic acid and HNK-1 epitopes. The similar results were also obtained in mouse kidney. The mRNA levels of the responsible glycosyltransferases were unaltered in Mgat3-knockout. In contrast, enzyme assays using bisected and non-bisected acceptor oligosaccharides clearly showed that most enzymes acting on N-glycan terminals prefer the non-bisected glycan as a substrate. This indicates that the upregulation of terminal N-glycan epitopes in Mgat3-KO were attributed to the fine substrate specificities of glycosyltransferases. We performed molecular dynamics simulation of glycosyltransferase-acceptor glycan complexes and showed that the presence of bisecting GlcNAc changed N-glycan conformation from an extended type to a back-fold type in which alpha1,6-mannose arm loses interaction with the enzymes. This conformation change is suggested to be the cause for the lower activity of various glycosyltransferases toward the bisected aceptor. In sum, these findings highlight the roles of bisecting GlcNAc as a general suppressor for terminal modifications of N-glycans and provide us with new insights into how protein N-glycosylation is regulated in cells.

(195) Generation of a Human Organotypic Skin Model to Study Functions of Glycosaminoglycans

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Glycosaminoglycans (GAGs) are long, linear, polysaccharide chains of alternating disaccharide units covalently linked to a protein core to form diverse proteoglycans that regulate processes involved in development, growth, aging, tissue regeneration, and cancer. GAGs control these processes through structural motifs specified by chain structure and modifications, which serve as binding sites for growth factors and their cognate receptors. Variations in GAG chain length, disaccharide composition and residue modifications confer a high degree of heterogeneity, which has made it difficult to define the molecular functions of the different GAG motifs in normal tissue formation and regeneration. Here, we employed CRISPR-Cas9 genetic engineering to deconstruct and dissect the molecular functions of the main GAG types in a human tissue model. We have generated a first-generation, 3D, organotypic platform to initiate the systematic dissection of GAG functions in human tissue formation and homeostasis. Our tissue library demonstrates distinct phenotypes with impact on general tissue homeostasis and barrier formation associated with loss of GAG chain initiation and elongation. Our platform provides a contextualized approach to define the functions of specific GAG structures in human epithelial biology with a broad discovery potential.

(196) Rapid mapping of glycoprotein structure-activity relationships by shotgun scanning glycomutagenesis

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N-linked glycosylation serves to diversity the proteome and is crucial for the folding and activity of numerous cellular proteins. Consequently, there is great interest in uncovering the rules that govern how glycosylation modulates protein properties so that the effects of site-specific glycosylation might eventually be predicted. Towards this goal, we describe a combinatorial strategy termed shotgun scanning glycomutagenesis (SSGM) that enables systematic investigation of the structural and functional consequences of glycan installation along a protein backbone. The utility of this approach was first demonstrated with two different model proteins, bacterial immunity protein Im7 and bovine pancreatic ribonuclease A, both of which were found to tolerate N-glycan attachment at an unexpectedly large number of positions and with relatively high efficiency. The stability and activity of many glycovariants was measurably altered by the N-linked glycan in a manner that critically depended on the precise location of the modification. Next, SSGM was leveraged to identify glycoengineered variants of an anti-HER2 human single-chain Fv (scFv) antibody with enhanced antigen-binding activity. By enabling high-resolution mapping of glycan-mediated effects on acceptor proteins, glycomutagenesis opens up possibilities for accessing unexplored regions of glycoprotein structural space and engineering protein variants with advantageous biophysical and biological properties.

(197) A Recent Advancement Making O-Glycan Preparation Flawless

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It has been widely recognized that glycosylations of proteins are responsible for their functions in many aspects. Therefore, the glycosylation of glycoconjugates are of interest for understanding their structure-function relationships. Analysis of N-linked glycans has been facilitated by means of N glycosidases such as PNGase F, while that of O-linked glycans is left behind due to lack of practical releasing method. Each technique to prepare free O-glycans from glycoproteins appears to possess pros and cons in terms of safety, yield, processing time, higher rate of undesired side reaction (peeling), and so on.

Here we introduce a newly developed research tool for O-glycan analysis of glycoproteins; EZGlyco® O-Glycan Prep Kit. The kit operation will be accomplished within 5 to 6 hours prior to the analysis, allowing one–day O-glycan analysis. The kit utilizes totally a new combination of chemical reagents and O-glycan enrichment bead, enabling a rapid and accurate recovery of O-linked sugars from glycoproteins. The kit generates a minimum amount of peeling products and efficiently liberates Olinked sugars. Sugars are recovered as reducing form so that the kit granted 2-aminobezamide labeling of the recovered carbohydrates for efficient detection with fluorescent detector equipped with LC system such as HPLC, UHPLC, and LC-MS.

Avoiding complicated manipulations and disadvantages of currently available methods, the well-designed kit would finally convince researchers for the choice of O-glycan preparation Kit. In this study, we will present a detailed investigation of the new kit including its robustness and
flawless integration in the O-glycan analysis. We believe that the EZGlyco O-Glycan Prep Kit is far more practical choice than any other conventional methods in all aspect.

(198) A carbohydrate mimetic peptide with binding specificity to the Annexin A1 N-terminus overcomes the blood-brain-barrier

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Annexin A1 (Anxa1) is normally expressed intracellularly in numerous cell types. However, in malignant tumors, Anxa1 is found on the cell surface of endothelial cells (Oh et. al., Nature, 429: 629-35, 2004), suggesting that it serves as a cell surface marker of tumor vasculature and could be useful for drug delivery. Previously, we identified a series of Lewis A glycan mimetic peptides using phage display technology. One of them, designated IF7, targeted malignant tumors following intravenous injection, likely via Anxa1 expressed on the tumor endothelial cell surface (Hatakeyama et.al. PNAS 108: 19587-92, 2011). Moreover, we observed that intravenously-injected IF7 crossed endothelial cells by transcytosis and penetrated the stroma where tumor cells reside. Based on these observations, we hypothesized that IF7 could overcome blood-brain-barrier (BBB) to function as a drug delivery vehicle for malignant brain tumors. To test this model, we injected fluorescently-labeled IF7 intravenously into glioma tumor model mice and observed accumulation of fluorescence in brain tumor cells, supporting the idea that IF7 crossed the BBB. We then conjugated IF7 with SN38, a biologically active metabolite of irinotecan, and injected the resulting peptide (IF7-SN38) intravenously at low dosage and observed regression of brain tumors in model mice. These results suggest that SN38 conjugated with an Anxa1-binding peptide can overcome BBB and efficiently suppress growth of malignant brain tumors. We have also developed a new series of more stable Anxa1-binding peptides composed of D-amino acids suitable for drug delivery to tumors.

(199) A bi-to-mono CRD transition in GAL-9 potentiates mesenchymal invasion of breast cancer epithelia

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Aberrant expression and functions of glycans and their binding proteins (lectins) represent one of the earliest 'hallmarks' of cancer. Galectins are a conserved family of lectins that can bind to β-galactosides. A special class of galectins known as tandem-repeat (GAL-4, -8, -9, and -12 in humans) can bind two distinct β-galactosides simultaneously and play intricate roles in physiological and pathological contexts. In this study, we asked if one or more tandem repeat galectins regulate breast tumor progression based on earlier reports of their differential expression. Upon mimicking a spectrum of progression from homeostatic breast- to invasive cancerous architectures by culturing HMLE (immortalised breast epithelial cell line), MCF7 (non-invasive breast cancer cell line), MDA-MB-231 (metastatic cell line) in laminin-rich ECM- and Type 1 collagen- rich scaffold gels, we observed that expression of the gene encoding GAL-9 tracked invasiveness of probed cells. Breast cancer patient samples (especially with a 'triple negative' (ER- /PR- /HER2-) histotype) showed higher levels of GAL-9 when compared with matched adjacent normal tissues. Perturbing GAL-9 levels in cancer epithelia showed its positive correlation with their adhesion to- and invasion within- laminin-rich matrices. Within a complex bimatrix scaffold that mimics the epithelial-basement membrane-stromal matrix organization, GAL-9 preferentially enhanced the solitary over collective invasion of cancer epithelia. To dissect which carbohydrate recognition domain (CRD) is involved in regulation of cancer invasion, we generated GAL-9 mutants with deletion of individual CRDs or the intervening linker. Only the misexpression of the N-terminal CRD of GAL-9 (and not the C-terminal CRD or linker deletion) is able to increase cancer invasion similar to full length GAL-9 overexpression. We also observed that GAL-9 in human and murine invasive cancer cells was cleaved into individual CRDs, as opposed to expression of primarily uncleaved biCRD forms in untransformed and non-invasive transformed cells. Our results, in the light of a strongly predicted protease-susceptibility of the GAL-9 linker region suggest that the N-CRD of GAL-9 that is free of the C-CRD potentiates the mesenchymal invasion of cancer epithelia through stromal-like milieu.

(200) O-Linked Glycopeptides as CNS Penetrant Drugs for the Treatment of Neurodegenerative Diseases and Stroke

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Endogenous peptide neurotransmitters related to enkephalins, dynorphins, angiotensins, secretins, and other peptide hormones, both cyclic and linear, have been converted into O-linked glycopeptide drug candidates. Short glycopeptides (5–7 residues) have been created which produce mu opioid agonism, delta opioid agonism, or synergistic mu + delta opioid agonism. By linking helical amphipathic "addresses" to these opioid "messages" it was possible to enhance their anti-nociceptive effects in vivo in rodents. Glycosylated angiotensin analogues with neuroprotective activity have been synthesized that show extended stability and blood-brain barrier (BBB) penetration in male rats. Large pituitary adenylate cyclase-activating peptide (PACAP) compounds have also been created with longer linear sequences. These have neuroprotective and neurorestorative potential. Remarkable therapeutic effects are observed in both stroke and TBI models in mice. MSN analysis in conjunction with microdialysis has been used to measure both stability and BBB penetration of these compounds in male rodents. With this advance it is now possible to determine pharmacokinetic profiles for this new class of drugs that are typically cleared from serum by the kidneys. Using this approach, we demonstrate that glycosylated peptide drugs possess enhanced metabolic stability and BBB penetration. Molecular weight (MW) does not appear to affect BBB penetration rates, at least in the range of MW's examined so far, 550—3,500 Daltons. This approach thus has great promise to make even large neuropeptides "drugable." We hypothesize that this ability to penetrate the BBB is due to the ability of the glycopeptides to adopt conformations that render them either highly water soluble or highly amphipathic structures that associate strongly with biological membranes, e.g. "biousian behavior."

Random coil conformational ensembles are water soluble for both peptides and glycopeptides. In the presence of membranes, neuropeptides are expected to adopt folded amphipathic conformations that maximize contact of the hydrophobic regions of the peptide to the membrane and hydrophilic regions with water. The native peptides sink deeper into the membrane, and are held more tightly. The introduction of water-soluble carbohydrates at the C-terminus is expected to shift the equilibrium toward the aqueous environment where the glycopeptide can "hop" to another membrane. The result is vastly improved PK/PD properties, allowing the glycopeptides to be used as drugs, whereas the unglycosylated neurotransmitters (hormones) bind to the first membrane they are exposed to, and never reach the site of action in the brain.

(201) NMR and MD Evidence for a Mechanistically Important Conformation Change in ST6Gal1

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It has long been known that the sialyl transferase, ST6Gal1, binds its galactose-terminated acceptors more tightly after its sialyl-CMP donor is bound, but a structural explanation has been lacking. In a continuing effort to provide assigned NMR resonances that can report on various states of this enzyme we ran an extended molecular dynamics (MD) simulation beginning with the crystal structure of the apo form of the rat enzyme, modified to include a segment from a crystal structure of the human, CMP-bound, enzyme that was missing in the apo rat structure. Surprisingly, after ~200ns of simulation there was a dramatic structural change in this loop that closed the commonly accepted entrance to the donor cavity and opened an alternate entrance ~90 degrees from the accepted entrance. An acceptor cannot bind in this alternate conformation, but if binding of a donor were to shift the alternate conformation back to that seen in the CMP-bound conformer, it could provide an explanation for the change in acceptor affinity on donor binding. Evidence supporting this conformation change comes from our recent assignment of crosspeaks in HSQC spectra of a sample expressed in HEK293 cells and isotopically labeled with 15N in all phenylalanine residues. The assignment strategy uses a genetic algorithm search for the best match between observed NMR parameters and parameters predicted from extended MD simulations. Using MD segments from a 1 μs trajectory we find that segments from the end of the trajectory give better assignment scores than segments from the beginning of the trajectory and combining all segments gives the best score. This suggests that the apo form is dynamic but favors a structure with an alternate donor entrance. Additional evidence comes from isotopic labeling the protein with 13C-methyl-methionine. There is a methionine near the missing segment. Interestingly, the 13C-methyl crosspeak for this methionine is spilt in two, supporting the existence of two conformers.

(202) β4galt1 regulates expression of proto-oncogenes PIM-1/2 and Myc in hematopoietic stem cells.

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The quiescence, self-renewal, and fate determination of hematopoietic stem cells (HSCs) is regulated in a concerted fashion by cellular and extrinsic components, including cell adhesion molecules, soluble and membrane-bound factors, extracellular matrix, surrounding cells, and glycans. Type-2 Lactosamines (LacNAc) are structures generated by β1-4 galactosyltransferase type 1 (β4galt1) that regulate homing and migration of HSCs. Here, we further investigated the role of β4galt1 in the regulation of HSCs.

Flow cytometry analysis showed that β4galt1-/- mouse bone marrow samples have increased numbers of Long-Term HSCs (LT-HSC), phenotypically defined as LineageNEG/cKitPOS/Sca-1POS/CD150POS/CD48NEG. Analysis of LT-HSC protein lysate using a 45- lectin microarray showed a decrease in high mannose structures (GNA), α2-3 sialylation (MAL I and ECA) and α1-2 and α1-6 fucosylation (LTL, UEL I and AOL). These changes are consistent with the lack of β4galt1-mediated galactosylation of target acceptors. In contrast, O-glycan structures appeared to be increased as judged by Calsepa and PTL-I lectin binding.

Single cell RNA sequencing (scRNA seq) of sorted LineageNEG/Sca-1POS/cKitPOS cells (LSK) showed a significantly increased expression of the proto-oncogene Pim1/2, its downstream signaling partner nuclear phosphoprotein Myc, and the transmembrane receptor mucin 13 (MUC13) in β4galt1-null cells compared to littermate controls. Pim1 is a serine/threonine kinase whose overexpression has been associated with human tumors, mainly in hematological malignancies. Unbiased gene set enrichment analysis (GSEA) revealed a significant upregulation in the Pim1-associated Jak/Stat pathway. Pro-inflammatory cytokines were not increased in the bone marrow as determined by cytokine profile analysis. The data suggest that cytokine-induced signaling does not play a role in activating Jak/Stat signaling cascades associated with proto-oncogene Pim1/2 and Myc upregulation in the β4galt1 deficient HSCs. Recent data suggest that MUC13 has oncogenic potential. Thus, the lack of β4galt1-dependent glycosylation is associated with over expression of several proto-oncogenes, including the heavily glycosylated MUC13, in HSCs, thereby affecting HSC function.

(203) The structure of GalNAc-T12 reveals the molecular basis of its substrate recognition mode

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Polypeptide N-acetylgalactosaminyl transferases (GalNAc-Ts) initiate mucin type O-glycosylation by catalyzing the transfer of N-acetylgalactosamine (GalNAc) to a Ser or Thr on a substrate. The enzymes do not recognize a consensus sequence or structural motif and the mechanism of substrate binding and recognition is not clear. However, it has been established that the N-terminal catalytic domain and C-terminal lectin domain of GalNAc-Ts can interact with peptide substrates and position them for transfer to a specific Thr or Ser on the substrate. The human isoform GalNAc-T12 is of biomedical interest as inactive and partially active variants are present in subsets of patients with colorectal cancer. Previous biochemical studies of GalNAc-T12 reveal a unique mechanism of substrate recognition that combines both catalytic and lectin domain binding to previously glycosylated sites on a peptide substrate. To understand the molecular basis of substrate recognition, we have solved the X-ray crystal structure of the enzyme bound to a di-glycopeptide substrate at 2.0 Å resolution. The structure reveals a distinct substrate recognition mode that is mediated by non-conserved residues in the catalytic domain of GalNAc-T12.

(204) IgE Glycosylation Modulates Allergic Inflammation

Kai-Ting C. Shade, Robert M. Anthony

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The prevalence of allergies has markedly increased over the past few decades, constituting a major healthcare problem. Allergies are caused by production of immunoglobulin ε (IgE) antibodies targeting environmental substances, such as pollens and foods. Individuals become sensitized when allergen-specific IgE binds to the high-affinity receptor (FcεRI) on tissue mast cells or blood basophils. Subsequent allergen exposure crosslinks cell-bound IgE, resulting in the release of inflammatory mediators including histamine, leukotrienes, and prostaglandins. Despite its significance in allergic diseases, IgE biology suffers from major knowledge gaps. While IgE is critical for pathogenesis of allergic diseases, some individuals have allergen-specific IgE but do not experience allergic symptoms. Further, some individuals outgrow their allergens, while retaining detecting levels of allergen-specific IgE. As diagnosis of allergy relies on detection of allergen-specific IgE with a clinically-suggestive history, these parameters result in almost 50% false-positive rate for allergies to food. This over-diagnosis of allergies is problematic, leading to treatment consisting of food avoidance which may actually contribute to allergies. Thus, despite its discovery over 50 years ago, it is not clear what make IgE pathogenic and glycosylation is often an overlooked aspect of IgE biology.

The importance of glycosylation for a number of antibody classes has been established. However, the contribution of glycosylation to IgE biology is less clear. IgE are the most heavily glycosylated monomeric antibodies with seven Asparagine (N)-linked glycosylation sites on its constant domains. One site carries exclusively oligomannose glycans (N394), one site is unoccupied (N383), while the remaining sites contain sialylated glycans. Previously we demonstrated that a single N-linked oligomannose structure in the constant domain 3 (Cε3) of IgE, at asparagine-394 (N394) in human IgE is absolutely required in allergic reactions. Genetic disruption of the site or enzymatic removal of the oligomannose glycan altered IgE secondary structure and abrogated IgE binding to FcεRI, rendering IgE incapable of eliciting mast cell degranulation, thereby preventing anaphylaxis. It is appealing to speculate that glycans on IgE explain the presence of allergen-specific IgE and manifestation of allergic symptoms, and may serve as a potential allergic disease biomarker and a novel therapeutic target.

(205) Extracellular vesicles from CLEC2-activated platelets enhance dengue virus-induced lethality via CLEC5A/TLR2

Pei Shan Sung

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Platelet-leukocyte interactions amplify inflammatory reactions, but the underlying mechanism is still unclear. CLEC5A and CLEC2 are spleen tyrosine kinase (Syk)-coupled C-type lectin receptors, abundantly expressed by leukocytes and platelets, respectively. CLEC5A is a pattern recognition receptor (PRR) to flaviviruses and binding to terminal fucose and mannose moieties of viral glycans, CLEC5A also binds to N-acetylglucosamine (GlcNAc) and N-acetylmuramic acid (MurNAc) disaccharides of bacterial cell walls. CLEC2 is the platelet-specific receptor which binds to its ligand podoplanin via O-glycan-dependent interaction. Here we show that dengue virus (DV) activates platelets via CLEC2 to release extracellular vesicles (EVs), including exosomes (EXOs) and microvesicles (MVs). DV-induced EXOs (DV-EXOs) and MVs (DV-MVs) further activate CLEC5A and TLR2 on neutrophils and macrophages, thereby induce neutrophil extracellular trap (NET) formation and proinflammatory cytokine release. Compared to stat1−/− mice, simultaneous blockade of CLEC5A and TLR2 effectively attenuates DV-induced inflammatory response and increases the survival rate from 30 to 90%. The identification of critical roles of CLEC2 and CLEC5A/TLR2 in platelet-leukocyte interactions will support the development of novel strategies to treat acute viral infection in the future.

(206) Investigating the Role of α2,3 sialylation and poly-LacNac Structures in Cancer Stem Cell Function

Melanie Walker, Lara K. Mahal, Barbara A. Bensing, Arthur M. Mercurio

University of Massachusetts Medical School

Cancer stem cells (CSCs) are defined as a subpopulation of tumor cells that exhibit self-renewal capacity and the ability to differentiate to other tumor cell populations. The realization that they contribute to resistance to conventional therapies, tumor recurrence and metastasis has heightened the need to understand mechanisms that sustain their function and to develop novel approaches to target them. We are pursuing the hypothesis that the genesis and function of CSCs is intimately associated with specific alterations in their glycome and that these alterations are potential therapeutic targets. In pursuit of this hypothesis, we have used RNA-seq and lectin microarray analysis to compare the glycosyltransferase expression profile and glycomes of breast CSCs and non-CSCs. Comparison of CSCs and non-CSCs from multiple models of breast cancer revealed that CSCs are distinguished from non-CSCs by a marked increase in α2,3 sialylation and poly-LacNac structures. Moreover, the enzymes responsible for these modifications, ST3GAL6 and GCNT2, are enriched in CSCs and expressed preferentially in aggressive breast cancer subtypes. Experiments are in progress to understand the mechanism by which α2,3 sialylation and poly-LacNac contribute to CSC function and to target them in mouse models of breast cancer.

(208) ST6GAL1 -mediated sialylation in intestinal homeostasis and maintenance of microbiome

Tianxin Yu, Joseph Lau

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We observed that mice unable to express ST6GAL1 are strikingly sensitive to acute radiation injury to the gastro-intestinal tract (GI-ARS), and they have altered fecal microbiome composition. Susceptibility to ionizing radiation and an altered environment to host microbiome are significant health concerns, and our preliminary observations implicate that the intestinal epithelial architecture is intimately affected by the sialyltransferase ST6GAL1. However, ST6GAL1 is generally not expressed in the adult intestinal epithelium, which are largely negative to binding by SNA (a lectin that recognizes the a2,6-sialic acids constructed by ST6GAL1). Therefore, how ST6GAL1 contributes to maintaining the intestinal architectural is not understood.

The intestinal stem cells, a rare cell population residing deep within the crypts of the adult intestinal villi, may be the only intestinal epithelial cells that express ST6GAL1. I will test the hypothesis that presence of active ST6GAL1 protects stem cells from ionizing adiation. Absence of active ST6GAL1 renders the stem cells to radiation destruction as well as promote iologically altered epithelial cells to sustain a microbiome population with decreased Clostridium, Corprobacillus and Aldercreutzia, and increased Helicobacter and Bilophila.

(209) MotifFinder, Managing the Glycomics Headache

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With the advent of glycan microarrays, it is now possible to screen glycan-binding proteins quickly and accurately. However, with high throughput screening comes massive amounts of data that is difficult to work with. We present a newly automated version of MotifFinder that can make even the largest glycan database accessible to interdisciplinary researchers. MotifFinder integrates microarray data to assemble motifs from data with varying concentrations and stemming from varying source databases. While traditional methods only identify high-affinity motifs, MotifFinder identifies both strong and weak binders. Additionally, MotifFinder can produce motifs that have variable linkages and residues. Z Biotech has found the automated version of MotifFinder to be intuitive, reliable, and it reproducibly identifies motifs that explain microarray data. As databases grow MotifFinder promises to streamline both glycan database mining and experiment analysis, turning the insurmountable computational analysis into bite-sized biochemical insights into the complex world of glycomics.

(210) Interactions of Tau and Heparin/GAGs

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Tau aggregates into paired helical filaments (PHF) within neurons, a pathological hallmark of Alzheimer's disease. Heparin promotes tau aggregation and recently has been shown to be involved in the cellular uptake of tau aggregates. In current study, we used surface plasmon resonance (SPR) and nuclear magnetic resonance spectroscopy (NMR) to characterize the interaction between tau fragments, K18 and K19, and glycosaminoglycans (GAGs), including heparin, heparin oligosaccharides, chemically modified heparin and other GAGs. Using a heparin-immobilized chip, SPR revealed that tau K18 and K19 bind heparin with KD of 0.2 mM and 70 mM, respectively. Using SPR competition experiments, N-desulfation and 2-O-desulfation has no effect on heparin binding to K18, while 6-O-desulfation severely reduces binding, suggesting a critical role for 6-O-sulfation in tau-heparin interaction. Chondroitin sulfate E and dermatan disulfate can efficiently compete against K18-heparin binding, both containing a 6-O-sulfo group. The tau-heparin interaction becomes stronger with longer-chain heparin oligosaccharides. NMR shows largest chemical shift perturbation (CSP) in R2 in tau K18, which is absent in K19, revealing differential binding sites in K18 and K19 to heparin. Dermatan sulfate binding produces minimal CSP while dermatan disulfate, with the additional 6-O-sulfo group, induces much larger CSP. 2-O-desulfated heparin induces much larger CSP in K18 than 6-O-desulfated heparin.

(211) Regulation of Extrinsic Glycosylation in Platelets

Jinchao Zhang, Joseph Lau

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Glycosyltransferases such as the sialyltransferase ST6GAL1 reside in the extracellular spaces, in addition to their canonically recognized locale within the intracellular ER-Golgi secretory apparatus. The existing data point to roles for the extracellular ST6GAL1 in influencing hematopoietic decisions on multiple levels in blood cell development within the marrow, and in modulating inflammation in the periphery. The extracellular milieu is generally devoid of significant levels of sugar donor substrates such as CMP-sialic acid, but previous data from the Lau Laboratory demonstrated that activating platelets release sialic acids that are used for extracellular, or extrinsic sialylation, and posited that the master regulator for extrinsic sialylation is the release of activated sugar donor substrates. However, the origin and nature of the donatable sialic acid within the platelets, and their biosynthetic precursor in the marrow, the megakaryocyte, remain unknown. Disturbed hematopoiesis with highly heterogenous presentation is the defining hallmark of clonal myeloid diseases such as myeloproliferative neoplasms (MPN) and myelodysplastic syndromes (MDS). A key feature of MPN and MDS are dysplastic megakaryocytes in the marrow and altered circulating platelet numbers and function. I hypothesize that megakaryocytes control marrow extrinsic sialylation in a manner similar to platelets in the periphery. This hypothesis will be tested by biochemically characterizing the activated sugar donor substrates within the platelets, and the glycobiological changes to the thrombocytes and their precursor megakaryocytes in disease.

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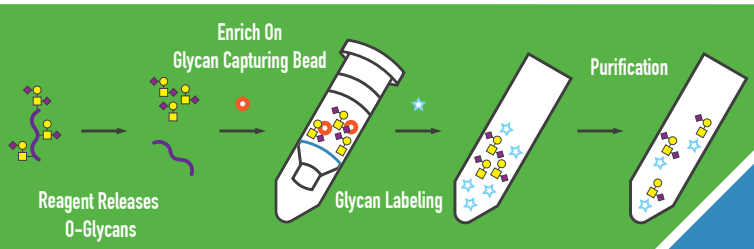

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PROGRAM OVERVIEW

SOCIETY for Glycobiology

DAY 1: Saturday, Nov 2, 2019

08:00AM - 06:00PM	**Registration** *Ballroom Foyer*
09:00AM - 05:00PM	**Satellite 1: Tools in Glycoscience** *Maricopa Room*
09:00AM - 01:00PM	**Satellite 2: Glyco in Biotechnology** *Pima Room*
12:00PM - 04:00PM	**Board of Directors Meeting** ***(by invitation only)*** *Gila Room*
05:30PM - 07:15PM	**Opening Meyer & Kornfeld Awards Lectures** *North & South Ballroom*
07:30PM - 09:30PM	**Welcome Reception & Exhibits** *Pueblo Ballroom*

DAY 2: Sunday, Nov 3, 2019

07:30AM - 02:00PM	**Registration** *Ballroom Foyer*
07:30AM - 08:30AM	**Continental Breakfast** *Ballroom Foyer*
08:30AM - 10:10AM	**Session 1: Glycans & Evolution** *North & South Ballroom*
10:10AM - 10:30AM	**Coffee Break** *Ballroom Foyer*
10:30AM - 12:10PM	**Session 2: Glycobiology of the Microbiome** *North & South Ballroom*
12:15PM - 01:30PM	**Lunch on your own**
12:15PM - 01:30PM	**Glycobiology Editorial Board Meeting** ***(by invitation only)*** *Salons 7 & 8*
01:30PM - 04:00PM	**Poster Session I & Exhibits** *Pueblo Ballroom*
04:00PM - 05:45PM	**Session 3: Glycotechnology, a translational perspective** *North & South Ballroom*
05:45PM - 06:45PM	**Innovator Award Lecture** *North & South Ballroom*

DAY 3: Monday, Nov 4, 2019

08:00AM - 02:00PM	**Registration** *Ballroom Foyer*
07:30AM - 08:30AM	**Continental Breakfast** *Ballroom Foyer*
08:30AM - 10:15AM	**Session 4: Systems Biology approaches to Glycobiology** *North & South Ballroom*
10:15AM - 10:30AM	**Coffee Break** *Ballroom Foyer*
10:30AM - 12:10PM	**Session 5: Regulatory functions of glycans** *North & South Ballroom*
12:10PM - 01:30PM	**Lunch on your own**
01:30PM - 04:00PM	**Poster Session II & Exhibits** *Pueblo Ballroom*
04:00PM - 04:45PM	**Society Business Meeting** *North & South Ballroom*
04:45PM - 06:15PM	**MCP & Significant Achievement Award Lecture** *North & South Ballroom*
06:15PM - 07:00PM	**Break**
07:00PM - 11:00PM	**Banquet** *North & South Ballroom*

DAY 4: Tuesday, Nov 5, 2019

08:00AM - 12:00PM	**Registration** *Ballroom Foyer*
07:30AM - 08:30AM	**Continental Breakfast** *Ballroom Foyer*
08:30AM - 10:10AM	**Session 6: Glycobiology of Mammalian development & Stem cells** *North & South Ballroom*
10:10AM - 10:30AM	**Coffee Break** *Ballroom Foyer*
10:30AM - 11:45PM	**Session 7: Glycobiology of the Immune System** *North & South Ballroom*
11:45PM - 01:30PM	**Lunch on your own**
01:30PM - 03:10PM	**Session 8: Glycobiology of Cancer** *North & South Ballroom*
03:10PM - 03:15PM	**Closing Remarks**