

Analytical Techniques for Structural Characterization of Glycosaminoglycans

August 17-18, 2020

Schedule

Monday, August 17, 2020

8:45 a.m. – 9:00 a.m.

Introduction and Welcome

9:00 a.m. – 10:00 a.m.

Lecture – “Analytical methods for the structural characterization of GAGs”

Dr. Christian Heiss

10:00 a.m. – 11:00 p.m.

Isolation of GAGs from Tissue and Cells

Dr. Stephanie Archer-Hartmann

11:00 a.m. – 12:00 p.m.

Lecture – “Role of GAGs in biomedicine and significance of structure characterization”

Dr. Ryan Weiss

12:00 p.m. – 1:00 p.m. – **Lunch**

1:00 p.m. – 2:00 p.m.

Laboratory Demos: Enzymatic Digestion Methods and Disaccharide Analysis

Enzymes and Digestion Protocols

Introduction to SAX-HPLC

Introductions to On- and Offline Labeling Protocols

Dr. Stephanie Archer-Hartmann

2:00-2:30 p.m.

Break/Zoom “Open Office”

2:30 – 3:30 p.m.

GAG Disaccharide - Data Analysis

Dr. Stephanie Archer-Hartmann

3:30 p.m. – 4:30 p.m.

Lecture – “Carbohydrates Drug Products and their Structures”

Dr. Parastoo Azadi

Tuesday, August 18, 2020

8:45 a.m. – 9:00 a.m.

Morning Zoom Discussions

9:00 a.m. – 9:30 a.m.

Lecture – “Analytical methods for the structural characterization of GAGs” cont.

Dr. Christian Heiss

9:30 a.m. – 10:15 a.m.

Lecture – “GAG structure analysis by NMR”

Dr. Christian Heiss

10:15 a.m. – 10:30 a.m. – **Break**

10:30 a.m. – 12:00 p.m.

Lecture – “Mass Spectrometry Analysis of Glycosaminoglycans”

Dr. Franklin Leach

12:00 p.m. – 1:00 p.m. – **Lunch**

1:00 p.m. – 2:00 p.m.

Laboratory Demos: Non Enzymatic Methods of GAG Depolymerization and Modification

Selective Desulfation Protocols

Sulfation Analysis Plate Assay

Dr. Zhirui Wang

2:00 p.m. – 2:30 p.m.

Break/Zoom “Open Office”

2:30 p.m. – 3:15 p.m.

Laboratory Demos: Characterization of GAGs by Size Exclusion Chromatography

SEC Basics

Sample Protocol for GAG Separations

Alt Protocol for Preparative GAG Separations

Data Handling

Dr. Stephanie Archer-Hartmann

3:30 p.m. – 4:30 p.m.

Lecture – “Use of Surface Plasmon Resonance (SPR) to study protein – glycosaminoglycan interactions.”

Dr. Anne Gleinich

4:30 p.m. – 5:00 p.m.

Question and answer for all techniques

Dr. Parastoo Azadi

Dr. Christian Heiss

Dr. Stephanie Archer-Hartmann

Dr. Zhirui Wang

Instructors:



Dr. Parastoo Azadi - Dr. Parastoo Azadi received her B.Sc. in Chemistry in 1987 from University of North London, UK and her Ph.D. degree in Biochemistry in 1991 from Imperial College of Science and Technology, University of London, studying structural characterization of carbohydrates and glycoproteins by mass spectrometry under the supervision of Profs. A. Dell and H.R. Morris. Since 2001, Dr. Parastoo Azadi has been the Technical Director of Analytical Service and Training at the Complex Carbohydrate Research Center. The samples submitted for these types of analyses come from academic, government, non-profit organizations, and private companies throughout the United States and internationally.



Dr. Ryan Weiss – Dr. Ryan Weiss received his B. Sc. Degree in Chemistry from Point Loma Nazarene University in San Diego in 2008 and his Ph. D. from the University of California, San Diego in 2015. He is currently working as a postdoctoral scholar in the Esko Lab in the Department of Cellular and Molecular Medicine at UCSD. His expertise is in the genome-wide analysis of heparan sulfate using the CRISPR/Cas9 genome editing system.



Dr. Christian Heiss – Dr. Christian Heiss received his B.Sc. in Chemistry in 1991 from the University of Erlangen, Germany, and his Ph.D. in Organic Chemistry in 1999 from the University of Georgia. He serves as the Assistant Technical Director of Analytical Service and Training at the Complex Carbohydrate Center. He has written multiple papers on the analysis of carbohydrates, and established the expansion of the CCRC's analysis to glycosaminoglycans in 2006.



Dr. Stephanie Archer-Hartmann – Dr. Stephanie Archer-Hartmann received her B.Sc. in Chemistry in 2006 and her Ph.D. in Analytical Chemistry in 2012 from West Virginia University. She has spent more than 10 years working towards improvements for the analysis of carbohydrates, including the isolation, preparation, and analysis of glycosaminoglycans.



Dr. Franklin Earl Leach – Dr. Franklin Leach received his B.Sc. in Chemistry in 2001 from Mississippi State University, and his Ph.D. in Analytical Chemistry in 2011. He currently serves as an Assistant Professor at the CCRC.



Dr. Zhirui Wang – Dr. Wang received a B.Sc. in 1999 and M.S. in 2002 in the area of Biochemistry and Bio-organic chemistry from Jilin University and Ph.D. in Medicinal Chemistry in 2005 from Peking Union Medical College & Chinese Academy of Medical Sciences. She has been working in Complex Carbohydrate Research Center since 2007. Her research focuses on isolation, purification and structural characterization of poly-, oligo-saccharides and glycol-conjugates. Her research area also involves in compositional and structural profiling of GAGs related pharmaceutical products.



Dr. Anne Gleinich – Dr. Anne Gleinich received her M.Sc. equivalent in Biochemistry in 2014 from the Goethe University Frankfurt am Main, Germany, with a focus on Biophysical Chemistry. The Ph.D. in Medical Sciences – including extensive work via Surface Plasmon Resonance (SPR) technique – was conferred on her by the University of Warwick, United Kingdom, in 2019 and she joined the Analytical Service and Training at the Complex Carbohydrate Research Center in the same year. Her research centers around the glycomic and glycoproteomic characterization of N- and O-linked glycans using mass spectrometry techniques.