Analytical Techniques for Structural Analysis of Glycosaminoglycans (GAGs)

August 22-24, 2022

Monday, August 22, 2022

9:00 a.m. – 9:15 a.m.

Introduction and Welcome — Dr. Parastoo Azadi

9:15 a.m. – 10:30 a.m.

Lecture – *"GAG Analysis Methods, Part 1"* — Dr. Christian Heiss

10:30 a.m. -10:45 a.m. – **Break**

10:45 a.m. – 11:15 a.m.

Lecture – *"GAG Analysis Methods"* (continued) — Dr. Christian Heiss

11:15 a.m. – 12:30 p.m.

Laboratory

Introduction to Laboratory experiments

Experiment 4 – Nitrous Acid Preparation and Digestion. *Page 9.*

Prepare samples for analysis by HPLC.

Dr. Lauren Pepi

Laboratory

Introduction to Chromatographic Methods - SAX-HPLC introduction. *Page 9*.

Dr. Stephanie Archer-Hartmann

12:30 p.m. – 1:30 p.m. – **Lunch**

1:30 p.m. – 2:30 p.m.

Laboratory

Experiment 4 – Discussion of Experiment 4 Results. Discussion of alternative method.

Dr. Lauren Pepi

2:30 pm-3:00 p.m. -

Lecture "Considerations for GAG Isolation from Cells and Tissue"

Dr. Stephanie Archer-Hartmann

3:00 p.m. – 5:00 p.m.

Laboratory

(Pre-Experiments 1-3) – Introduction of Analysis by Enzymatic Methodologies.

Start Enzyme Digestions. *Page 3*

Dr. Stephanie Archer-Hartmann

Experiment 5 – Sulfate Analysis **–** Introduction

Hydrolysis**.** *Page 13.*

Dr. Lauren Pepi

Tuesday, August 23, 2022

8:45 a.m. – 9:00 a.m.

Questions and Discussion

9:00 a.m. – 10:00 a.m.

Laboratory

Experiment 2 – Stop Enzyme Digestions

Prepare Sample and Inject on SAX-HPLC. *Page 6.*

Experiment 3- Prepare centrifuge tube to dry down. *Page 8.*

Dr. Stephanie Archer-Hartmann

10:00 a.m. – 10:30 a.m. – **Break**

10:30 a.m. – 11:30 p.m.

Lecture – *"Mass Spectrometry Analysis for Glycosaminoglycans"*

Dr. Franklin Leach

11:30 a.m. – 12:30 p.m.

Experiment 5 – Sulfate Analysis – Plate Assay. *Page 13.*

Dr. Lauren Pepi

12:30 p.m. – 1:30 p.m. – **Lunch**

1:30 p.m. – 2:00 p.m.

Demonstration – *"Optical Analytical Techniques: Surface Plasmon Resonance (SBR) and Biolayer-Interferometry (BLI)."*

Dr. Varughese (Alex) Mulamoottil

2:00 p.m. – 2:15 p.m**. – Break**

2:15 p.m. – 3:45 p.m.

Lecture – "*Carbohydrates Drug Products and their Structures"*

Dr. Parastoo Azadi

3:45 p.m. – 5:00 p.m.

Laboratory

Experiment 3 – Introduction to GAG Disaccharide Labels

Label with AMAC (Demonstration). *Page 8.*

Dr. Stephanie Archer-Hartmann

Wednesday, August 24, 2022

8:45 a.m. – 9:00 a.m.

Questions and Discussion

9:00 a.m. – 10:30 a.m.

Lecture – "Glycosaminoglycans in Biomedicine"

Dr. Ryan Weiss

10:30 a.m. – 10:45 a.m. – **Break**

10:45 a.m. – 12:30 p.m.

Laboratory

Experiment 1 – Data Analysis and Interpretation

Dr. Stephanie Archer-Hartmann

Experiment 5 - Data Analysis and Interpretation

Dr. Lauren Pepi

12:30 p.m. – 1:30 p.m. – **Lunch**

1:30 p.m. – 2:45 p.m.

Lecture – *"Monosaccharide Composition and Linkage by GC-MS."*

Dr. Parastoo Azadi

2:45 p.m. – 3:00 p.m. – **Break**

3:00 p.m. 4:00 p.m.

Laboratory

Experiment 2 – Data Analysis and Interpretation

Dr. Stephanie Archer-Hartmann

Experiment 6 – Introduction to SEC: MW Determination of whole GAGs and GAG products by SEC-HPLC. *Page 15.*

Dr. Stephanie Archer-Hartmann

4:00 p.m. – 5:00 p.m.

Laboratory

Experiment 3 (DEMO) – Separation of AMAC Labeled GAGs by Capillary Electrophoresis. *Page 8.*

Dr. Stephanie Archer-Hartmann