AMRITA SRIVASTAVA, Ph.D.

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SUMMARY

Broad knowledge and working skills in the multi-step chemical and enzymatic synthesis. Highly skilled in purification and characterization of organic compounds and carbohydrates using modern chromatographic and spectroscopic methods. Expert in various nanoparticle formulations for targeted drug delivery.

EDUCATION

- **Research Associate** (May 2014 to present): Department of Molecular and cell biology, **The Scripps Research Institute, California**, **USA**.
  Research Focus: " ***In vivo*** **Targeting of Hematopoietic Cells with Glycan Ligands of Siglecs."**

- **Research Associate** (Nov 2013-April 2014): Department of Organic Chemistry, **Indian Institute of Science Bangalore**, **India**.
  Research Focus: "**Synthesis of Imino Sugar Derivatives."**

- ***Doctoral Studies*** (July 2006-Jan 2013): **Ph. D. in Organic Chemistry**, Department of Chemistry, **Indian Institute of Technology Madras**, **India**.
  Thesis title: "**Synthesis and Biophysical study of 1-*N*-Alkanamido-, Sulfonamido-, and Guanidinoacetamido Sugars as *N*-Glycoprotein Linkage Region Analogs."**

- **Masters in Organic Chemistry** (2003-2005): C.S.J.M. University, Kanpur, India**.**

RESEARCH EXPERIENCE

Research Associate, (May 2014 to present): Department of Molecular and cell biology, **The Scripps Research Institute, California**, **USA**. Advisor : Prof. James C. Paulson

- Designed and synthesized **high affinity glycan ligands** for Siglecs to elucidate their natural roles and exploit them to regulate immune cell responses.

- Designed and prepared **various polymeric, hybrid and liposomal nanoparticles** displaying **Siglec ligands and protein antigens**. Nanoparticles displaying such ligands can effectively target Siglec expressing cells *in vivo,* providing a modular platform for delivering cargo or modulating immune responses of the targeted cell.

- Utilized **electron microscopy and dynamic light scattering** for the characterization of various nanoparticle platforms. These tolerogenic nanoparticle platform will be used to induce antigen specific tolerance in B cells, T cells, mast cells and basophils, with potential to treat of a variety of **autoimmune diseases and allergies,** reduce the likelihood of **transplant rejection**, and prevent the development of **inhibitory antibodies** to bio-therapeutics.

Doctoral Studies (July 2006-Jan 2013): **Ph. D. in Organic Chemistry**, Department of Chemistry, **Indian Institute of Technology Madras**, **India**.

- Extensive knowledge in **multi-step organic synthesis** and analysis including structure based synthesis of glycoprotein models and analogs using chemical and chemo-enzymatic methods.

- Made a pioneering attempt to understand the structural feature of linkage region conformation between glycans and proteins by X-ray crystallography and neutron diffraction. Elucidation of the conformation of the *N*-glycoprotein linkage region and the molecular basis of intramolecular glycan-protein interactions is of fundamental importance considering that motion of the GlcNAcβAsn linkage can profoundly influence the presentation of the glycan chains on the cell surface.

- Preapred and solved low-temperature neutron crystal structures of three *N*-glycoprotein linkage models and analogs which provides accurate characterization of the three-dimensional structure of the conserved GlcNAcβAsn linkage. These first crystal structures of *N*-acetylated carbohydrates obtained by neutron diffraction provide high-resolution geometrical parameters that can be used for force-field parametrization and subsequent molecular dynamics simulation of *N*-glycoproteins.

- Designed and synthesized of *N*-(β-D-glycopyranosyl)guanidineacetamides. hydrochloride and *N*-(β-D-glycopyranosyl)guanidinemethyltriazoles as potential inhibitors of glycogen phosphorylase and glycosidases.

- supervised one **master research project** for **M. Sc.** thesis entitled **"Synthesis of novel glycolipids derived from *N*-glycofuranosyl azides"**.

- Supervised, trained and mentored students in the lab. Taught students to conduct organic chemistry experiments (reactions, purification) and to analyze results.

SKILLS / TECHNIQUES

Chemistry: Chemcial and enzymatic synthesis. Characterization of compounds using **NMR {^{1}H, ^{13}C, 2D-NMR (COSY, HSQC** and **HMBC)}, FT-IR, UV-VIS, HPLC, Mass spectrometry (ESI-MS & MALDI-TOF MS)** and **X-ray crystallography**.

Protein Biochemistry: High Performance Liquid Chromatography (HPLC, Agilent), ELISA, Dynamic light scattering, TEM, CRYO-TEM, Flow cytometry, Gel electrophoresis, Western blotting, Nanoparticle formulation, Size exclusion chromatography, Protein quantification.

Software Skills: **Prism, FlowJo, Excel, Photoshop, OriginLab, Mercury-Cambridge crystallographic data centre.**

PRIZES AND AWARDS

- **Swiss Government** Excellence Scholarship, **2014**.
- **Best Poster Presentation Award** in **International conference** ISCBC-2009, Department of Chemistry, Delhi, February 26-01 March, **2009**.
- **Awarded** Senior Research Fellowship from CSIR New Delhi, India (**2009**).
- **Awarded** Junior Research Fellowship from CSIR New Delhi, India (**2006**).

- **Awarded fellowship**, Graduate Aptitude Test of Engineering, India (**2006**).
- **2nd Prize** in general knowledge competition in **Kanpur**, organized by Chronicle magazine (**2002**).
- **State Scholarship** at junior level given by **Uttar Pradesh** state government **(1995)**.

PUBLICATIONS

1. Cioci, G.; **Srivastava, A**.; Loganathan, D.; Mason, S. A.; Pérez, S.; Imberty, A. Low Temperature Neutron Diffraction Structures of *N*-Glycoprotein Linkage Models and Analogs: Structure Refinement and Trifurcated Hydrogen Bonds, ***J. Am. Chem. Soc.,*** **2011,** *133***,** 10042-10045**.**

2. **Srivastava, A.;*** Loganathan, D. Synthesis of Guanidino Sugar Conjugates as GlcβArg Analogs. ***Glycoconjugate J.***, **2013, *30,*** 769-780.

3. **Srivastava, A.;*** Varghese, B.; Loganathan, D. Exploring the Effect of Bioisosteric Replacement of Carboxamide by Sulfonamide Moiety on the *N*-Glycosidic Torsion and Molecular Assembly: Synthesis and X-Ray Crystallographic Investigation of *N*-(β-D-Glycosyl)sulfonamides as *N*-Glycoprotein Linkage Region Analogs. ***Chemistry-A European Journal***, **2013**, *19*, 17720 – 17732.

4. **Srivastava, A.;*** Varghese, B.; Loganathan, D. Synthesis and X-ray Crystallographic Investigation of *N*-(D-Arabinopyranosyl)alkanamides as *N*-Glycoprotein Linkage Region Analogs. ***Carbohydr. Res.,*** **2013**, *380*, 92-100.

5. **Srivastava, A.;*** Varghese, B.; Loganathan, D. Examination of the influence of C5-hydroxymethyl group and configurations of hydroxyl groups at C2, C3 and C4 stereocentres on the *N*-glycosidic torsion: Synthesis and X-ray crystallographic investigation of *N*-(D-ribopyranosyl)alkanamides as *N*-glycoprotein linkage region analogs. ***Carbohydr. Res.,*** **2014**, *384*, 37-45.

6. Mathiselvam, M.; **Srivastava, A.;** Loganathan, D. Synthesis and X-Ray Crystallographic Investigation of *N*-(β-D-Glycosyl)butanamides Derived from GlcNAc and Chitobiose as Analogs of the Conserved Chitobiosylasparagine of *N*-Glycoproteins. ***Carbohydr. Res.,*** **2013**, *380*, 37-44.

7. **Srivastava, A.;*** Varghese, B.; Loganathan, D. X-Ray Crystallographic Investigation of Fully Acetylated *N*-(2-Deoxy-2-acetamido-β-D-glucopyranosyl)alkanamides as *N*-Glycoprotein Linkage Region Analogs. ***J. Carbohydr. Chem.***, **2012**, *31 (1),* 31-47.

8. **Srivastava, A.;*** Dey, S.; Jayaraman, N. Synthesis of azepanes from oxyglycal pathway. *Manuscript in preparation.*

9. **Srivastava, A.;*** Narsimhulu, P.; Loganathan, D. Synthesis of Novel Glycolipids Derived from *N*-D-Glycofuranosyl Azides. *Manuscript in preparation.*

10. Skourti, P.V.; **Srivastava, A.;** Loganathan, D.; Siafaka-Kapadai, A.; Chrysina, E.D. The Crystal Structure of Rabbit Muscle Glycogen Phosphorylase b in Complex with *N*-(β-D-Glucopyranosyl)guanidinoacetamide. *Manuscript in preparation*.

CONFERENCES

1. **Amrita Srivastava** and James C Paulson, Targeting Hematopoetic cells with glycan ligands of Siglecs. Sialoglyco 2016, **November 14-17, 2017.**

2. **Amrita Srivastava** and James C Paulson, Society of Glycobiology annual meeting – San Francisco**, December 1-4, 2015.**

3. **Amrita Srivastava** and James C Paulson, San Diego Glycobiology Symposium –San Diego**, March 25-26, 2016.**

4. **Amrita Srivastava** and James C Paulson, San Diego Glycobiology Symposium –San Diego**, Jan 09-10, 2015.**

5. **Amrita Srivastava** and Duraikkannu Loganathan, Exploring the Effect of Bioisosteric Replacement of Carboxamide by Sulfonamide Moiety on the *N*-Glycosidic Torsion and Molecular Assembly. **ICS 27, Department of Organic Chemistry, Indian Institute of Science Bangalore, India, January 12-17, 2014.**

6. **Amrita Srivastava** and Duraikkannu Loganathan, *Synthesis of N-(β-D-Glycosyl) guanidinoacetamides and Guanidine Linked N-Glycosyl Amino Acids,* **16th European Carbohydrate Symposium Sorrento-Naples, Italy, 2011, July 2-7, 2011**.

7. **Amrita Srivastava** and Duraikkannu Loganathan, *Synthesis and X-Ray Crystallographic Investigation of N-(β-D-Pentopyranosyl)alkanamides,* Recent Trends in Organic Synthesis, Department of Chemistry, **Bharthidasan University, Trichy, India, February 24-26, 2011**.

8. **Amrita Srivastava** and Duraikkannu Loganathan, *Synthesis and X-Ray Crystallographic Investigation of N-(β-D-Glycopyranosyl)methanesulfonamides,* ISCBC-2009, Department of Chemistry, **Delhi University**, **India, February 26-01 March, 2009**.

9. **Amrita Srivastava** and Duraikkannu Loganathan, *X-Ray Crystallographic Study of N-Glycoprotein Linkage Region Models and Analogs: Influence of C–H…X (O / Cl) Interactions on the Molecular Conformation*, XXII Carbohydrate Conference, Department of Chemistry, **NIPER, Mohali, India, December 13-15, 2007**.

WORKSHOP/SEMINARS/MISCELLENEOUS

- **Glycoimmunology Workshop**, June 24-25, 2014, organized by UCSD School of Medicine.
- Workshop on "**Current Trends in Medicinal Chemistry**", April 02-04, 2009, organized by Department of Chemistry, Indian Institute of Technology, Madras.