Overview

Glycoconjugates are biologically very important components and consist of many different categories including glycoproteins, glycolipids, glycosphingolipids, glycans, lectins, and microorganisms. They are involved in cell-cell and cell-matrix interactions and multiple other recognition processes, where the glycan part plays an essential role for the function of the glycoconjugate. In a wide variety of specific interactions on cell surfaces as well as intracellularly the glycan part has been shown to be involved in specific targeting of cellular proteins to organelles and mediating the internalization of a variety of macromolecules, particles, and microorganisms into cells. Absence of specific glycan portions in glycoconjugates may interfere with biological processes due to mutations in the cause of more than 50 congenital disorders that are highly relevant for medicine and biomedical research. The ubiquitously occurring glycoconjugates and glycan-binding proteins play crucial roles in development, aging, and disease processes affecting multiple organs including the central nervous, cardiovascular, and respiratory systems. Yet glycoconjugates remain understudied. The glycanization of proteins has for long been considered to be an irreversible modification. We know now that it can be reversible, the glycan moiety cycling as fast as known for phosphorylation and dephosphorylation of proteins. We are far from having an understanding of the biological function of the dynamic glycosylation and deglycosylation of close to thousand proteins, mostly localized in the nucleus. In light of the important role of glycoconjugates, the many unmet fundamental problems and hence the potential opportunities for important discoveries, there is a need to establish more scientific investigators who have the necessary biochemical skills to enhance our understanding. Despite its undisputed importance glycoconjugate research in India is underrepresented both at the level and the research funding. The University of Heterodeto and the University of Hyderabad have actively collaborated to start the 1st International Research Training Group in Molecular and Cellular Glycobiology, for which the ICMR host faculty is the coordinator.

The course will aim to fill the gap in teaching curricula by introducing the basics in glycoconjugates and more recent advances in biochemical, biophysical, molecular functions of these important compounds. A major focus will be on the growing importance of glycoconjugates in health and disease and their potential applications. The course will be delivered through a series of lectures, tutorials, and hands-on training. At the end of the programme, it is anticipated that the participants will gain an in-depth understanding of glycoconjugates in cell and organismic biology and their Biomedical Relevance; both will serve as cornerstone of understanding for students from basic and applied research.

Objectives: The primary objectives of the course are as follows

I. Introducing the participants into
   a. Fundamentals of glycoconjugates (structural, biosynthetic and topological aspects)
   b. Cell biological functions of glycoconjugates
   c. Sorting and targeting of biomolecules, cells and microbial organisms by glycan- protein recognition
   d. Biomedical relevance of glycoconjugates
   e. Problem- and curiosity driven research strategies

II. Raising the enthusiasm of students for now and complex scientific topics by problem- oriented, interactive courses and encouraging them to formulate own questions

III. Raising the awareness and interest of the participants for a career in basic and applied research

Course Outline

Lectures: General, duration of each lecture is 1 hour 30 minutes. For each lecture we will handout study questions.

Home work: General, 1.5 h following the morning lecture, stands for time windows that can be used by the students for answering the study questions and reading text books in a dedicated room.

Tutorial: General, 1.5 h, before the afternoon lecture, stands for an event (i) where the answers for the study questions will be discussed, (ii) where the students can ask questions and (iii) where the docents may pose questions.

Lab course: Practical work on the bench, in general for the full day.

Who can attend

- Researchers and Faculty at University, Government, and industrial laboratories.
- Students at all levels (UGC, MPhil, PhD/Postdoc) from academic and technical institutions.

How to apply: Interested candidates must login at GIAN-MHRD website (http://www.gian-mhrd.gov.in/) to fill application. Please submit your detailed resume along with statement of purpose. For more details mode of payment contact: glycogian@gmail.com or visit http://www.sisuo.org/glyco

Teaching Faculty

- Prof. Dr. Kurt von Figura, born 1944 in Germany, studied Medicine at the Universities of Tübingen and Heidelberg. In 1971 in the Department of Physiological Chemistry at University of Münster. In the year 1988 he was appointed as a Full Professor of Biochemistry at the University of Göttingen and was the Director of the Bioclinical Institute III. He served as President of the University of Göttingen from 2003 till his retirement in 2010. During his presidency the University of Göttingen became one of the nine National Centres of Excellence. He was instrumental in creating the Center of Modern Indian Studies of the University of Göttingen and starting several new international Programmes and he was a major driving force in the Indian Science Initiative as well as of individual scientific projects and institutions. He is a world renowned scientist par excellence and eminence in the field of glycochemistry with major research contributions in lysosomal biogenesis and the disorders associated with lysosomal and congenital disorders of glycosylation. He has made a series of discoveries that were crucial for our understanding of protein trafficking to lysosomes and of the molecular defects in about a dozen of lysosomal storage disorders and of congenital disorders. His work is generally recognized as a major achievement in the field of glycotranslation. His recent work on glycolipids, especially on gangliosides, has provided a novel transmembrane pathway for the synthesis of gangliosides and for the regulation of ganglioside expression.

- Prof. Nadimpalli Siva Kumar, Professor in Biochemistry having more than 33 years of teaching and research experience at the University of Hyderabad. Trained 20 Doctoral students and published 75 research papers mostly in the field of glycochemistry and coordinates the first International Research Training Group in Molecular and Cellular Glycobiology, and is a recipient of DAE fellowship. Teaching and research awards, and serves as Head of the Biochemistry Department.

- Prof. M.J. Swamy, Professor in School of Chemistry with more than 35 years of teaching and research experience at the University of Hyderabad. He has trained 18 doctoral students and published over 100 research papers, mostly in the field of protein biochemistry and glycosylation and is a recipient of several fellowships of the National academies in India.

Registration Fees

<table>
<thead>
<tr>
<th>Category</th>
<th>Fees (in Rs.)</th>
</tr>
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<tr>
<td>Participants from abroad</td>
<td>3500</td>
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<tr>
<td>Masters students</td>
<td>1000</td>
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<tr>
<td>Ph.D./Scholars/Postdocs</td>
<td>1500</td>
</tr>
<tr>
<td>Academic institutions</td>
<td>4000</td>
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<tr>
<td>Industry</td>
<td>10000</td>
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For more details and registration please visit: http://www.sisuo.org/gian

The above fee includes all instructional materials, computer use for tutorials, 24/7 internet facility. The participants will be provided with single bedded accommodation on payment basis.

Course Coordinator

- Prof. N. Siva Kumar, Department of Biochemistry, University of Hyderabad, Hyderabad, INDIA.

- Prof. M.J. Swamy, School of Chemistry, University of Hyderabad, Hyderabad, INDIA.

Please send your detailed resume along with statement of purpose by

1st October, 2017 to glycogian@gmail.com