MHRD Scheme on Global Initiative on Academic Network (GIAN)

Glycoconjugates : Role in Biology and Biomedical Relevance

13th November to 23rd November, 2017

The Department of Biochemistry, School of Life Sciences and School of Chemistry, University of Hyderabad, Hyderabad, India is offering a course on "Glycoconjugates: Role in Biology and Biomedical Relevance". The course is funded by the MHRD under Global Initiative on Academic Network (GIAN) Programme.

Overview

Glycoconjugates are biologically very important components and consist of many different categories including glycoproteins, glycosaminoglycans, peptidoglycans, glycolipids, lipopolysaccharides and formally also nucleic acids. They are involved in cell–cell and cell–matrix interactions and multiple other recognition processes, where the glycan part(s) play an essential role for the function of a glycoconjugate. In a wide variety of specific interactions on cell surfaces as well as intracellularly the glycan parts have 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 or modifications due to mutations is 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, ageing and disease processes affecting multiple organs including the central nervous, cardiovascular and respiratory systems. Yet glycoconjugates remain understudied. The glycosylation 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 understanding 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 unsolved fundamental problems and hence the potential opportunities for important discoveries, there is a need to establish more scientific investigators who have the necessary carbohydrate chemistry skills to enhance our understanding. Despite its undisputed importance glycoconjugate research in India is under represented both at the taught and the research level. The University of Hyderabad and the University of Muenster, Germany have actively collaborated to start the First International Research Training Group in Molecular and Cellular Glycosciences, for which the UoH 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 course-work and end of module examination will be assessed and graded.

Objectives: The primary objectives of the course are as follows

I. Introducing the participants into the

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 new 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: In general, duration of each lecture is 1hour 30 minutes. For each lecture we will hand out study questions.

Home work: In 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: In general for 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 (MSc / PhD, Postdocs) from academic and technical institutions.

How to apply: Interested candidates must login at GIAN-MHRD website **(http://www.gian.iitkgp.ac.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.slsuoh.org/glyco**

Teaching Faculty

Prof. Dr. Kurt von Figura, born 1944 in Germany, studied Medicine at the Universities of Tübingen and Vienna and started his research career in 1971 in the Department of Physiological Chemistry at University of Münster. In the year 1986 he was appointed as a Full Professor of Biochemistry at the University of Göttingen and was the Director of the Biochimie Institut-II. He served as President of the University of Göttingen from 2005 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 Centre of Modern Indian Studies of the University of Göttingen and starting several new International Programs and tie ups with Indian Universities and institutions.

He is a world renowned scientist par excellence and eminence in the field of glycobiology with major research contributions in lysosomal biogenesis and the disorders associated with lysosomes 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. With formylglycine residues in pro- and eukaryotic sulfatases he has discovered a novel posttranslational modification of proteins with far reaching potentials for biotechnology. He has won highly rewarding academic laurels in his scientific career including the Otto-Warburg-Medaille 2002 and the Körber Preis 2004 für Europäische Wissenschaft. He served on the boards of scientific organisations, including the Deutsche Forschungsgemeinschaft, Alexander von Humboldt Foundation, is the member of academies including the Deutsche Akademie der Natur forscher Leopoldina, member of EMBO and holds a Honorary Doctorate. During his career he has trained several Habilitation researchers holding now chairs of Biochemistry and Cell Biology, supervised more than 100 doctoral students and postdoctoral researchers and established numerous scientific collaborations with scientists around the world. His research is published as more than 400 highly rated research articles.

Prof. Nadimpalli Siva Kumar, Professor in Biochemistry having ~31 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 glycobiology and coordinates the first International Research Training Group in Molecular and Cellular Glycosciences and is recipient of DAAD fellowship, Teaching and research awards, and served as the Head of the Biochemistry Department.

Prof. M. J. Swamy, Professor in School of Chemistry with ~25 years of teaching and research experience at the University of Hyderabad. He has trained 18 doctoral students and published >140 research papers, mostly in the field of protein biochemistry and glycobiology and is a recipient of several Fellowships of the National academies in India.

Registration Fees

Participants from abroad	:	US $500
Masters students	:	Rs. 1000/-
Ph.D scholars/Postdocs	:	Rs. 1500/-
Academic Institutions	:	Rs. 4,000/-
Industry	:	Rs. 10,000/-

For mode of payment please visit: http://www.slsuoh.org/gian

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

Course Venue: Seminar Hall, School of Life Sciences, University of Hyderabad.

Course Coordinators

Prof. N. Siva Kumar, Department of Biochemistry
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