Institute of Molecular and Cell Biology
A*STAR

SEMINAR ANNOUNCEMENT

We would like to invite you to attend this seminar hosted by A/Prof. Frederic Bard:

Date: 18 September 2019, Wednesday
Time: 11:00AM – 12:00PM
Venue: Level 3, IMCB Seminar Room 3-46, Proteos, Biopolis

Speaker: Prof Henrik Clausen, Copenhagen Center for Glycomics, University of Copenhagen
Title: A Genetic Dissection Approach to Functional Glycomics

Abstract
The structural diversity of the human glycome is vast and poses challenges for exploring biological functions and dissection specific structure-function relationships. The true functional diversity of the glycome is, however predicted to be lower when grouping structures with common or repeated features. The human glycome is orchestrated by over 200 glycosyltransferase genes, and our knowledge of the properties of these and their roles in known glycosylation pathways in cells is relatively advanced. Currently some 170 glycosyltransferase genes can be assigned to rather specific roles in biosynthetic steps for the human glycome, although for many of the isoenzyme families our understanding of the unique functions of individual enzymes is limited. Current knowledge of assembly of the human glycome suggests that it is simpler to explore and dissect the glycome by a genetic entry point rather than from a structural entry point. Emergence of nuclease-based gene-editing tools enabling highly specific and facile knockout and site-directed knockin of glycosylation-related genes have led to wide use of the genetic approach to glycomics and new tools for the field. Our group has extensively adopted the genetic approach for dissection and discovery of biological functions of protein glycosylation, and explored the options for custom design of glycosylation of recombinant glycoprotein therapeutics as well as using cell libraries for display of the glycome. An overview of these efforts will be presented.

Biography
DDS (1981) and DSc (1990). Worked in the glycobiology field for 30+ years focusing on structure, biosynthesis and genetic regulation of complex carbohydrates. Studied with professor Sen-Itiroh Hakomori in Seattle (1983-90) on blood group related carbohydrates, glycosyltransferases and genes. Founded a glycobiology research group at the Faculty of Health and Medical Sciences, University of Copenhagen, Denmark, in 1990, and since 2007 head of a Center of Excellence in Glycomics funded by University of Copenhagen and since 2012 the Danish National Research Foundation. Past member of scientific advisory boards and consultant for Neose Technologies and ZymeQuest. National representative for International Glycoconjugate Organization (IGO) and member of the Royal Royal Danish Academy of Sciences and Letters. Research focus is primarily protein glycosylation, where we have isolated, cloned, and expressed many of the

human glycosyltransferases involved in the biosynthesis. Our interests are broad and include basic understanding of genetic regulation, and biosynthesis of protein glycosylation, Immunity to glycans and glycoproteins, consequences of deficiencies in glycosylation in diseases, and biomedical applications. We have developed strategies to isolate and characterize O-glycoproteomes of cells by use of nuclease-mediated gene engineering and a combination of lectin chromatography and mass spectrometry (SimpleCells). Applied broad genetic glycoengineering of mammalian cells for deconstruction of glycosylation capacities and design of optimal platform cells for recombinant therapeutics. We have further developed glycopeptide arrays with comprehensive chemoenzymatic synthesis of glycopeptides, and we are now developing cell-based glycan arrays.

ALL ARE WELCOME *(No registration required)*

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