SCIENTIFIC SEMINAR

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Genetic glycoengineering to dissect sialoglycan interactions and functions

Human cells produce a vast repertoire of structurally diverse sialoglycans. The structural diversity of sialoglycans derives from the combination of chemically diverse sialic acid types (e.g. Neu5Ac, Neu5Gc), linkage types (α2-3/6/8) produced by twenty sialyltransferase isoenzymes, and underlying glycoconjugate types (N-/O-linked, glycolipids). The vast structural diversity of sialoglycans is mirrored by their diverse molecular interactions and biological functions. Sialoglycans regulate the biochemical properties of glycoproteins and they modulate cell-cell and cell-extracellular matrix interactions. Sialoglycans form the ligands for endogenous sialic acid-binding lectins such as the Siglecs that are vital for immune cell function. On the contrary, sialoglycans are exploited by pathogens that express sialic acid-binding lectins to attach to host cells for infection. Aberrations of sialoglycan expression are associated with autoimmunity, neurodegeneration, and cancer. Many aspects regarding the biosynthesis, functions, and regulation of sialoglycans, however, remain elusive. We have developed a genetic glycoengineering platform that enables the combinatorial knock-in/out of distinct sialyltransferase subsets and individual isoenzymes in human cell lines. The engineered cells lack or display distinct sialoglycans and can furthermore be used to produce glycoproteins with specific sialoglycan structures. I will present how we apply genetic glycoengineering to understand the biosynthetic aspects of 'healthy' and 'diseased' sialoglycans. Furthermore, examples of how recombinantly produced sialoglycoproteins can be applied to study interactions with the immune system and microbiome will be highlighted.

CIC bioGUNE
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE
EXCELENCIA SEVERO OCHOA

Tuesday
September 17
Atrio 800
12.00H

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