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Role of glycosylation in toll-like receptor activation and pro-inflammatory responses

The mammalian Toll-like receptors (TLRs) are one of the families of sensor receptors that recognize pathogen-associated molecular patterns (PAMPs). Not only are TLRs crucial sensors of microbial (e.g., viral, bacterial and parasitic) infections in innate immune cells, they also play important roles in the pathophysiology of infectious, inflammatory and autoimmune diseases. Thus, the intensity and duration of TLR responses against invading microbial pathogens and endogenous danger signals must be tightly controlled. It follows that studies on the structural integrity of TLRs, their ligand interactions and signaling components may provide important information essential to our understanding of TLR-dependent immunological protection and disease intervention. Although the signaling pathways of TLR sensors are well characterized, the parameters controlling interactions between these receptors and their ligands still remain poorly defined. Here, the presentation will highlight the role of glycosylation and sialylation in TLR activation. The key interactions that induce TLR activation are identified and a novel TLR-signaling platform is identified. A mammalian neuraminidase-1 (Neu1 sialidase) and matrix metalloproteinase-9 (MMP-9) cross-talk in alliance with the G-protein coupled receptor (GPCR) neuromedin B is uncovered which is essential for cell surface and intracellular TLR-induced receptor activation, cellular signaling and pro-inflammatory responses.

Biography

Myron Szewczuk has completed his PhD 1974 from University of Windsor in Biology and Immunochemistry and his postdoctoral studies from Cornell University Medical College, New York City, U.S.A. in Cellular immunology with Dr. Greg Siskind (1975-1978). He is presently Full Professor of Immunology and Associate Professor of Medicine, Queen's University, Kingston, Ontario, Canada. He has published more than 100 papers in reputed journals and has been serving as an editorial board member of repute.

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