Role of Innate Immune Receptors NOD1 and NOD2 in Bacterial Recognition and Host Defense

Dr Bindu Sukumaran
Assistant Professor,
Duke-NUS Medical School
Singapore

Abstract

Innate immune response is the first line of defense against invading bacterial pathogens. NOD-like Receptors (NLRs) are intracellular innate immune pattern recognition receptors (PRRs) for detecting bacterial pathogens and non-microbial danger-associated signals released by damaged cells. Upon activation, some NLRs form multi-protein complexes called inflammasomes, while others orchestrate nuclear factor kappa B and mitogen activated protein kinase signaling, leading to cytokine response and anti-microbial response. In addition, NLRs can also trigger cell death and autophagy pathways.

All NLRs contain a central NACHT domain for oligomerization, several leucine-rich repeats (LRRs) at the C-terminus for ligand sensing and N-terminal effector domains of varying nature. NLRC family of NLRs are characterized by the presence of an N-terminal CARD domain. NOD1 and NOD2 are the founding members of NLRC family that play critical roles in infection control and inflammatory response. In addition, mutations in NOD1 and 2 are associated with several human inflammatory genetic diseases.

This seminar will give an overview of the role and regulation of antibacterial innate immune response mediated by NOD1 and NOD2. Specific aspects discussed will include the signaling pathway associated with NOD1/2, the role of these PRRs in genetic diseases such as inflammatory bowel disease, and the how to harness NLRs for disease control.

Selected Publications for Reference


Visit our website @ medicine.nus.edu.sg/mbio/ for more upcoming seminars