Asian Transplantation Week 2023

Nov. 15(Wed)~18(Sat), 2023
Conrad Seoul, Korea

Submission No.: PG07-9325
Session : Postgraduate Course 7 (Basic)
Date & Time, Place : November 16 (Thu), 13:00-14:30, Room 6F-1
Session Title : Newly emerging immune cells

# Biology and clinical implications of mucosal-associated invariant T cells

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Mucosal-associated invariant T (MAIT) cells are a subset of innate-like T cells, characterized by a semi-invariant TCR composed of Vα7.2-Jα33/12/20 and a restricted set of β chains in humans. In humans, MAIT cells are present in the peripheral blood (PB) and various mucosal tissues, including the intestines, lungs, oral cavity, nasopharynx, and genital tract, and are particularly enriched in the liver, comprising 10–40% of intrahepatic T cells. The TCRs of MAIT cells recognize microbial-derived riboflavin (vitamin B2) biosynthesis intermediates, such as 5-(2-oxopropylideneamino)-6-D-ribitylaminouracil (5-OP-RU), presented by the highly conserved major histocompatibility complex (MHC) class I-related molecule 1 (MR1). Consequently, MAIT cells are typically activated during bacterial or fungal infections and produce pro-inflammatory cytokines, including interferon (IFN)-γ, tumor necrosis factor (TNF), and interleukin (IL)-17, upon TCR-mediated activation by microbial ligands. In addition, MAIT cells exert cytolytic activity against cells presenting a bacterial ligand on MR1. MAIT cells can also be activated by diverse cytokines, such as IL-12, IL-15, IL-18, and type I IFNs, in a TCR-independent manner. Given that MAIT cells have the ability to respond to a range of bacteria and yeasts, a non-redundant role for MAIT cells in protection from microbial infection appears clear. Furthermore, accumulating evidences have shown that MAIT cells play a critical role in the pathogenesis of chronic inflammatory and autoimmune diseases. In this presentation, I will summarize and discuss current knowledge on biology and functional importance of MAIT cells in the context of human diseases and potential therapeutic applications.