Proceedings of the Nutrition Society (2013), **72 (OCE1)**, E59 doi:10.1017/S002966511300061X

6th International Workshop on Immunonutrition, 15th–17th October 2012, Palma de Mallorca

Human intestinal dendritic cells decrease cytokine release against *Salmonella* infection in the presence of *Lactobacillus paracasei* CNCM I-4034, a novel strain isolated from breast-fed newborns

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Dendritic cells (DCs) are antigen-presenting cells that are involved in immunity and tolerance. Innate pattern-recognition receptors, such as Toll-like receptors, play a crucial role in the host recognition of probiotics. Signalling via these receptors influences the chemokine and cytokine production, proteins that are essential in regulating immune response. Monocyte-derived dendritic cells (MoDCs) and murine DCs are different from human gut DCs; therefore, in this study, we used human DCs harvested from umbilical cord blood CD34+ progenitor cells, which are similar to the lamina propria DCs in the gut. In the present work, we investigated the immunomodulatory properties of a novel strain, *Lactobacillus (L.) paracasei* CNCM I-4034, isolated from exclusively breast-feeding infant feces, on human DCs against *Salmonella (S.) typhimurium* CECT 4594. Human intestinal DCs were directly challenged by addition of *L. paracasei* CNCM I-4034, *S. typhimurium* CECT 4594 or both. After 4 hours incubation, the medium was replaced with a new one, containing antibiotics and cytokines. After 20 hours, culture supernatants were collected for cytokine analysis. IFN-γ, IL-1β, IL-6, IL-8, IL-10, IL-12p40, IL-12p70, TNF-α, MCP-1(CCL2), MIP-1α (CCL3), RANTES (CCL5), MDC (CCL22), IP-10 (CXCL10) and TGF-β were measured by immunoassay, with a MILLIplex kit using the Luminex 200 system based in the xMap technology. Differences between treatments were assessed by the U Mann Whitney test. We found that DCs decreased the secretion of the pro-inflammatory cytokines, such as IL-6 and IL-8, and chemokines, like MIP-1α and RANTES, in response to stimulation with the probiotic and *S. typhimurium*. Interestingly, *L. paracasei* was a potent inducer of TGF-β2 secretion. In conclusion, *L. paracasei* CNCM I-4034 appears to be a promising modulator of immune system which is able to activate dendritic cells and reduce pathogen-induced inflammation.