Human antigen-presenting cells respond differently to gut-derived probiotic bacteria but mediate similar strain-dependent NK and T cell activation

The intestinal microbiota is essential for homeostasis of the local and systemic immune system, and particularly strains of lactic acid bacteria and Escherichia coli have been shown to have balancing effects on inflammatory conditions such as allergy and inflammatory bowel disease. However, in vitro assessment of the immunomodulatory effects of distinct strains may depend strongly on the cell type used as a model. To select the most appropriate model for screening of beneficial bacteria in human cells, the response to strains of intestinal bacteria of three types of antigen-presenting cells (APC) was compared; blood myeloid dendritic cells (DC), monocyte-derived DC and monocytes, and the effector response of natural killer cells and naïve T cells was characterized. Maturation induced by gut-derived bacteria differed between APC, with blood DC and monocytes responding with the production of IL-6 and tumour necrosis factor-alpha to bacteria, which elicited mainly IL-10 in monocyte-derived DC. In contrast, comparable IFN-gamma production patterns were found in both natural killer cells and T cells induced by all bacteria-matured APC. An inhibitory effect of certain strains on this IFN-gamma production was also mediated by all types of APC. The most potent responses were induced by monocyte-derived DC, which thus constitute a sensitive screening model.