
Abstract

The oral intake of *Lactobacillus* spp. can provide beneficial effects to the host by modulating the immune response. Atopic dermatitis (AD) is an allergic inflammatory disease mediated by various immune responses. In this study, we examined the effect of a *Lactobacillus* strain, *Lactobacillus delbrueckii* ssp.* bulgaricus* OLL1073R-1 (OLL1073R-1), on AD development in a murine model of AD that was developed by the topical application of mite antigen in NC/Nga mice. The oral intake of heat-killed OLL1073R-1 cells inhibited both the development of dermatitis and the elevation of an acute inflammation marker, serum amyloid A. Another bacterial strain, *Lactobacillus rhamnosus* OLL2984, exerted no inhibitory effects on dermatitis. The oral intake of heat-killed OLL1073R-1 cells also attenuated secretion of IL-6 from lymph node cells in response to mite antigen and reduced IL-6 levels in inflamed tissues, such as auricles. Production of IFN-γ or IL-4 was not influenced by OLL1073R-1 intake. We also found that inhibition of IL-6 signaling by gp130-Fc (a fusion protein consisting of the extracellular portion of glycoprotein 130 fused to the Fc region of human IgG1) markedly decreased the severity of dermatitis in NC/Nga mice. Moreover, secretion of IL-6 by lymph node cells was augmented in NC/Nga mice compared with that in BALB/c mice. These results indicate that IL-6 plays an essential role in the development of dermatitis in the NC/Nga mouse model of AD, and that OLL1073R-1 inhibits dermatitis, at least in part, by suppressing the IL-6 response.