

Children with atopic dermatitis show clinical improvement after *Lactobacillus* exposure

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Summary

Background The role of probiotics in the treatment of atopic dermatitis (AD) is not clearly established. Further clinical trials with new probiotic formulations are warranted.

Objectives To assess the effects of *Lactobacillus paracasei* (LP) and *Lactobacillus fermentum* (LF), and their mixture on the disease severity, quality of life, and immune biomarkers of children with AD.

Method A double-blind, prospective, randomized placebo-controlled study was conducted on 220 children aged 1–18 years with moderate-to-severe AD (Trial number: NCT01635738). The children were randomized to receive LP, LF, LP + LF mixture, and placebo for 3 months. Changes in severity scoring of atopic dermatitis (SCORAD), Family Dermatology Life Quality Index (FDLQI), and Children's Dermatology Life Quality Index (CDLQI) scores in the different groups and at different visits were evaluated. Skin prick tests, levels of IgE, IFN- γ , IL-4, TGF- β , and TNF- α , and urine biomarkers were also evaluated.

Results Children who received LP, LF, and LP + LF mixture showed lower SCORAD scores than the placebo group ($P < 0.001$), and this difference remained even at 4 months after discontinuing the probiotics. The FDLQI and CDLQI scores were lower in the LP, LF, and LP + LF mixture group than in the placebo group ($P = 0.02$ and 0.03). IgE, TNF- α , urine eosinophilic protein X, and 8-OHdG levels decreased, whereas IFN- γ and TGF- β increased in the probiotic groups, but these did not reach statistical significance except for IL-4 ($P = 0.04$). In subgroup analyses, SCORAD scores significantly decreased after probiotic treatment especially in children younger than age 12, with breastfeeding > 6 months, and with mite sensitization ($P < 0.001$).

Conclusion Supplementation of a probiotic mixture of LP and LF is associated with clinical improvement in children with AD.

Keywords atopic dermatitis, clinical trial, probiotics, SCORAD score

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Introduction

The prevalence of atopic dermatitis (AD) has risen in the past decades. The hygiene hypothesis, or exposure to microbial stimuli in early life programs the immune system towards a Th2-type allergic response, is suggested to be a major mechanism in AD [1]. Intestinal microbiota plays a key role in signalling the developing mucosal immune system, and intestinal dysbiosis has been shown to precede the onset of allergic diseases through altered immune regulation [2]. Modulation of the intestinal

microbiota with probiotics, live micro-organisms with immuno-modulatory effects that stimulate Th1 cytokines and suppress Th2 responses, may offer a new way of preventing or treating allergic diseases [3].

A double-blind, randomized placebo-controlled trial in Finland has shown positive results in preventing the development of eczema in children 2 years of age [4]. Similar results have been reported by Kim et al. [5]. Although probiotics may have promise in preventing the initiation of the atopic march, there are considerable inconsistencies regarding their therapeutic effects in AD