L-92® Overview

Lactobacillus acidophilus Strain L-92 Has Potent Immune Benefits

***Lactobacillus acidophilus* strain L-92 (L-92)** has potent immunomodulatory effects for different health conditions that have immune-mediated causes. It improves allergic conditions of the skin and respiratory tract by supporting normal histamine response to pollen (cedar pollen allergy), promoting normal breathing and seasonal nasal health in perennial allergic rhinitis, and helping support a normal skin immune and inflammatory response in atopic dermatitis (AD).

Balancing the Immune System

The mechanisms of action for L-92 include the ability to decrease serum immunoglobulin E (IgE) levels, induce apoptosis of antigen-stimulated T cells by modulating dendritic cell function, and decrease the proliferation of CD4+ T cells, which has beneficial effects in patients with a hyper-response of CD4+ T cells. In addition, L-92 regulates the production of T helper type 1 (Th1) cytokines as well as decreases T helper type 2 (Th2) cytokines by improving the balance to more Th1 dominance. Excess Th2 cytokine balance can influence the predisposition to an allergic state. L-92 may have an antiallergic effect by influencing Treg (regulatory T) cells by increasing transforming growth factor-beta (TGF-β) activity, and alternately by causing a decrease in the levels of serum allergen-specific IgE, IFN-γ, IL-4, and IL-10. In addition, it is thought that L-92 stimulates IL-12 production from dendritic cells to induce the generation of Th1 cells from naïve T cells. This theoretically suppresses pro-allergic responses by reducing CD4+ T cell hyper-responsiveness, especially of Th2 cells. It also increases secretory immunoglobulin A on the surface of the mucous membrane to neutralize allergens.

Respiratory and Skin Health Effects

The main effect of L-92 is to prevent or reduce respiratory allergic and inflammatory skin conditions by causing a decrease in serum IgE levels. It has been clinically proven in cedar pollen allergy, perennial allergic rhinitis, and AD. The results of several of these human clinical studies testify to the beneficial effects of this supplement.

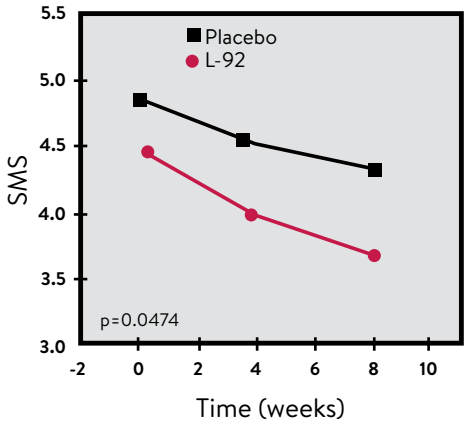
Atopic Dermatitis

A study investigated the effects of ingesting heat-killed L-92 in reducing symptoms of AD in adults (Inoue, 2014), whereas previous studies focused on children (Torii, 2011). AD is a chronic inflammatory skin disease affecting up to 20% of children throughout the world and is marked by eczema and itching. Various factors are involved in the onset of AD, such as a genetic predisposition that causes a poor skin barrier and sustained antigen ingress through defective barriers, leading to Th2-dominant inflammation.

A randomized, double-blind, placebo-controlled human intervention study included 49 AD patients ages 16 and older and found that changes in AD scores showed 70.8% of the subjects had an improvement in the L-92 group, whereas only 44% improved in the placebo group over an 8-week period (Inoue, 2014). The eosinophil count was significantly lower in the L-92 group, and there was an increase in the serum level of TGF-β, which is produced by cells such as CD4+ and CD25+ regulatory T cells. These so-called Tregs are known to suppress inflammation in allergic conditions.

A double-blind, placebo-controlled study was performed in children to determine if L-92 reduces symptoms of AD. L-92 given orally significantly reduced symptoms of AD in the children (see Chart 1 for symptom-medication scores during and after administration). L-92 also influenced thymus and activation-regulated chemokine in a time-dependent manner (Torii, 2011).

Chart 1. SMS: Symptom-Medication Score, Torii, 2011



Nasal Allergies

Cedar pollinosis is a common and severe respiratory allergy in some regions of the world. A study with 23 human volunteers, 26 to 48 years old, investigated whether a daily oral intake of sterilized milk fermented with L-92 for 6 consecutive weeks helped improve symptoms of cedar pollinosis. The results showed improved ocular allergy symptoms and allowed study subjects to reduce their doses of medications, while Th1 cytokines increased, demonstrating an improved Th1-to-Th2 cytokine balance (Ishida, Sept. 2005). Another study found benefits for perennial nasal rhinitis and nasal symptom-medication scores of patients in L-92 intervention group with a trend to improvement compared with those in the placebo group, and there were decreases in the scores of swelling and color of the nasal mucosa (Ishida, Feb. 2005).

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Chart 2. Nasal Symptom-Medication Score

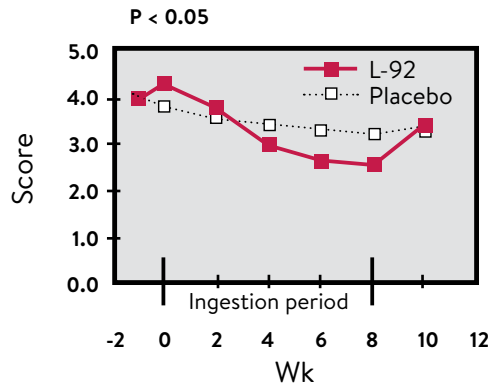
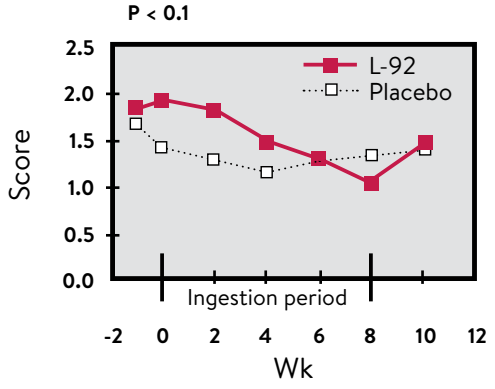


Chart 3. Ocular Symptom-Medication Score



*Daily averages of the symptom-medication score (SMS) throughout the study period. Chart 2. Nasal symptom-medication score. Chart 3. Ocular symptom-medication score. Each point and bar represent the mean daily average in each week and the standard error. Compared with the placebo group, in the intervention group, the nasal SMS decreased significantly ($p < 0.05$), and the ocular SMS tended to decrease ($p < 0.1$) by ANOVA of a split-plot design. ** $P < 0.01$ vs. the start date (Steel-Dwass test).*

Antiviral Effects

L-92 has antiviral effects in both live and heat-killed bacteria samples. Oral administration daily for 21 days to mice intranasally infected with influenza virus (H1N1) found that the treatment suppressed viral infection after 6 days compared with the control group. Natural killer activity in the heat-killed L-92 group was higher compared with that of the control group before virus infection and on day 6 of infection. Live L-92 showed a greater repression of virus proliferation compared with heat-killed L-92, 6 days after infection. Live L-92 also decreased the number of inflammatory neutrophils in the lungs and significantly increased immune cytokines in the lungs including eotaxin, macrophage colony-stimulating factor, IL-1β, RANTES (regulated on activation, normal T cell expressed and secreted), and interferon-α (Goto, 2013).

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