BENEFITS

• Clinically shown to enhance immunity*
• Immuno-LP20™ helps support healthy lung and respiratory function*
• Selenium is an antioxidant that helps reduce oxidative stress and supports the immune system*
• Zinc is an essential mineral for healthy immune function*
• Vitamin C is a potent free radical scavenger*
• Vitamin D3 enhances and regulates immune function, and enhances cellular function*

CLINICAL STUDIES

Heat-killed Lactobacillus plantarum strain L-137 (HK-LP) is a potent immune system enhancer in vitro as well as in vivo in mice. HK-LP has also been shown to suppress IgE production against food allergens, as well as tumor growth in mice, through IL-12 production, which induces the T helper (Th) 1 type immune response. To determine whether the intake of HK-LP influences human immune function and quality of life (QOL), a randomized, double-blind, placebo-controlled, parallel study was conducted in healthy humans. Sixty subjects (30 men and 30 women, mean age 56.3 y) were randomly assigned to receive a capsule containing 10 mg of HK-LP daily or a matching capsule for 12 wk. Biomarkers for innate immunity were measured. Health-related QOL was assessed using a self-rating questionnaire. Results suggest that a daily intake of HK-LP augments acquired immunity, especially Th1-related immune functions in healthy subjects, thereby improving the health-related QOL.

Another study examined the effect of HK L-137 intake on type I IFN in humans. Sixteen subjects were randomly assigned to receive a tablet containing 10 mg of HK L-137 or a matching tablet for 8 weeks and the serum levels of type I IFN were examined before and after the first or second dose of a trivalent inactivated influenza vaccine. Levels of IFN-β were significantly higher in the HK L-137 group than in the control group before vaccination although the vaccination conferred little additional induction of IFN-β. The researchers concluded that daily intake of HKL-137 enhances type I IFN production and host defense against influenza A virus in humans.

Other researchers examined the effects of HK L-137 intake on upper respiratory tract infection (URTI) symptoms and immune functions of human subjects in a randomized, double-blind, placebo-controlled, parallel study. A total of 78 healthy subjects were randomly assigned to receive HK L-137 (10 mg) or a placebo daily for 12 weeks. URTI symptoms were rated daily on the Wisconsin Upper Respiratory Symptom Survey-21. Immune functions were measured every 4 weeks. URTI incidence was significantly lower in the HK L-137 group than the control group. URTI incidence, duration and severity, and duration of medication showed significant negative correlations with HK L-137 intake. These findings suggest daily HK L-137 intake can decrease URTI incidence in healthy subjects, possibly through immune function augmentation.

Another study attempted to determine whether Echinacea purpurea (EP), vitamin C, selenium and zinc alleviate chronic-obstructive pulmonary disease (COPD) exacerbations caused by acute upper respiratory tract infection (URTI). This was a double-blind, randomized, placebo-controlled trial in 108 COPD patients with acute URTI. Patients were given ciprofloxacin for 7 days and additionally one tablet per day of EP, of EP along with zinc, selenium and ascorbic acid (EP+), or of placebo until day 14. EP+, but not EP resulted in significantly less severe and shorter exacerbation episodes following URTI as compared with placebo, demonstrating the effect of vitamin C, selenium and zinc. Study medication was safe and well tolerated. Researchers concluded the combination of EP, zinc, selenium and vitamin C may alleviate URTI.

Other research investigated the effects of vitamin C supplementation on immune response of aged women. Ten healthy women and 20 women (72 +/- 6 years old) with diseases associated with age (10 with major depression disorders, MDD, and 10 with coronary heart disease, CHD) were administered 1 g of vitamin C and 200 mg of vitamin E daily for 16 weeks. Blood samples were collected before and after treatment for measure-
ment of several immunological functions, namely proliferative response of lymphocytes to the mitogen phytohemagglutinin (20 mg/L) and phagocytic functions of polymorphonuclear (PMN) neutrophils, i.e., adherence to vascular endothelium, chemotaxis, phagocytosis of latex beads, and superoxide anion production. The findings suggest an important role of vitamin C supplementation for enhanced immune function in aged females as well as in the prevention and treatment of diseases associated with age that are quite prevalent in developed countries.3

Another research effort evaluated a therapeutic dose of 4-phenylbutyrate (PB) alone or in combination with vitamin D3 for induction of LL-37 expression in immune cells and enhancement of antimycobacterial activity in monocyte-derived macrophages (MDM). Healthy volunteers were enrolled in an 8-days open trial with three PB twice daily together with vitamin D3 (5000 IU once daily) orally for 4 days. Blood was then collected and infected with Mycobacterium tuberculosis (Mtbb). Results demonstrate that 500 mg PB with 5000 IU vitamin D3 induced LL-37 in macrophages and lymphocytes and intracellular killing of Mtbb by macrophages.6

Similarly, other researchers attempted to determine the effect of vitamin D supplementation on antimycobacterial immunity. A double-blind randomized controlled trial was conducted in 192 healthy adult tuberculosis contacts. Participants were randomized to receive a single oral dose of 2.5 mg vitamin D or placebo and followed up at 6 weeks. The study concluded that a single oral dose of 2.5 mg vitamin D significantly enhanced antimycobacterial immunity.7

Another clinical trial attempted to determine if restoring vitamin D levels induced antiviral immunity. This was a pilot, open-label, three-arm prospective phase 1 study with 28 patients (17 HIV+ and 11 healthy controls). Participants received a dose of 200000IU orally for 4 weeks. Blood was then collected and analyzed from peripheral blood of corticoid-dependent asthmatics (CDAs). Researchers measured CD4 T-cell function in blood samples at baseline and 1-month after vitamin D supplementation. Vitamin D supplementation restored plasma levels to sufficiency (>75 nmol/l) in 27 of 28 patients with no safety issues. The most striking change was in HIV+ patients - where increased antigen-specific T cells expressing macrophage inflammatory protein (MIP)-1β - an important anti-HIV blocking chemokine - which correlated significantly with vitamin D levels. In addition, plasma cathelicidin-a vitamin D response gene with broad antimicrobial activity - was enhanced. Researchers concluded that vitamin D supplementation modulates disease-relevant T-cell functions in HIV-infected patients, and represents a useful adjunct to standard therapy.8

Diarrhea due to enterotoxigenic Escherichia coli (ETEC), the most common bacterial pathogen in children. Researchers studied the immunological effect of zinc treatment (20 mg/d) and supplementation (10 mg/d) in children with diarrhea due to ETEC. A total of 148 children aged 6-24 mo were followed up for 9 mo after a 10-d zinc treatment or a 10-d zinc treatment plus 3-mo supplementation, as well as 50 children with ETEC-induced diarrhea not treated with zinc. Fifty control children (HC) of the same age and same location were also studied. Increased responses, including complement C3, phagocytic activity, and changes in T cell phenotypes, suggest that zinc administration enhances innate immunity against ETEC infection in children.9

Mild zinc deficiency is a common condition in healthy elderly individuals leading to impaired cell-mediated immune response. Researchers measured the effect of improved zinc status on TH1/TH2 balance and on the activation status of T helper cells in 19 healthy elderly subjects aged 69.8 +/- 5.1 years. Investigations revealed a mild zinc deficiency that was adjusted by oral zinc supplementation for seven weeks. Improved serum zinc levels significantly reduced levels of activated T helper cells. These findings suggest that elderly individuals may benefit from moderate zinc supplementation due to improved immune response leading to reduced incidences of autoimmune diseases and infections.10

Another study assessed the in vivo effect of zinc supplementation on systemic and mucosal responses in mildly to moderately malnourished children with shigellosis. A double-blind placebo-controlled trial was conducted in Shigella flexneri-infected children aged 12-59 mo. Daily for 14

Selenium (Se) is essential for immune function and protects the immune system from oxidative damage. One clinical study assessed the influence of selenium supplementation (SeS) on selected immune parameters analyzed from peripheral blood of corticoid-dependent asthmatics (CDAs). Seventeen CDAs aged from 30 to 74 years (7 females, 10 males) with suboptimal levels of Se in plasma were enrolled into the study. The follow up of SeS lasted 96 weeks. The daily dose was 200 micrograms. The results demonstrated significant changes, particularly in functional parameters of cellular and humoral immunity. This supports the immunomodulating effects of SeS.12

Another study evaluated selenium supplementation (200 mg/d) in a double-blind, randomized, placebo-controlled trial. Intention-to-treat analyses assessed the effect on HIV-1 viral load and CD4 count after 9 months of treatment with no related adverse events. The study concluded that daily selenium supplementation can suppress the progression of HIV-1 viral burden and provide indirect improvement of CD4 count. The results support the use of selenium as a simple, inexpensive, and safe adjunct therapy in HIV spectrum disease.13

SAFETY
Generally Recognized As Safe (GRAS).14

* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
SCIENTIFIC REFERENCES


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