LACTOBACILLUS RHAMNOSUS LB3

Introducing: Vivoflora *Lactobacillus rhamnosus* LB3. This highly beneficial LAB strain was isolated from a plant extract derived from pharmaceutical herbs. *L. rhamnosus* LB3 is especially effective against all types of pathogens and invasive organisms including yeast and fungus and is excellent for digestive health. It works well alongside antibiotics and also has good immune modulating properties including high levels of cytokine induction and adjuvant activity. It also has good anti-mutagenic properties.

TARGET APPLICATION: Perfect strain for special foods or supplements to protect and fight infections and digestion problems.

FUNCITONAL CHARACTERISTICS AND EFFICACY

L. rhamnosus LB3 assists the restoration and balancing of intestinal microbiota. It exhibits strong inhibition of the growth of pathogenic bacteria and fungi and the production of high levels of proteolytic enzymes for assistance with protein digestion and food allergies. *L. rhamnosus* LB3 also demonstrates the induction of specific antibody production, balancing of the immune system by stimulation or production of key cytokines such as IFNs, TNF, and NK cells for protection against viruses and cancer cells, the ability to decrease mutagenic impact, and an increase in level of mitochondria function.

Digestive Health Functionality

L. rhamnosus LB3 has high levels of survival in the human intestine as well as high resistance to bile salts, gastrointestinal enzymes and acids, and exhibits good adhesion properties in vivo. This strain also exhibits high levels of proteolytic activity to allow for better digestion of both plant and animal protein.

Protective Functionality

L. rhamnosus LB3 has strong antagonistic activity against a broad spectrum of pathogenic and conditionally-pathogenic microbes to create a favorable environment for development of useful gastrointestinal bacteria and stimulates growth of native microbiota to restore normal levels to the host.

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This strain also competes well for binding sites in the intestinal mucosa even in the presence of widely used antibiotics to prevent the gut lining from being compromised. In particular, *L. rhamnosus* LB3 exhibits high levels of antagonistic activity against Gram Positive and Gram Negative pathogens including those found in hospital infections, post operative infections and complications as well as antagonistic activity against food spoilage organisms. This strain has a high level of antagonistic activity against a wide spectrum of yeasts, fungus, as well as a very high level of anti-Candida activity. *L. rhamnosus* LB3 also maintains antagonistic activity in the presence of antibiotics.

Immune Modulation

Lactobacillus rhamnosus LB3 has the ability to affect innate and adaptive immunity through both specific and non-specific links thus controlling coordination of the immune response by TH1 and Th2 pathways depending upon the immune status of the subject. This strain also balances the immune system through the stimulation or production of key cytokines such as IFNs, TNF, and NK cells which consequently aid in protection against viruses and cancer cells. *L. rhamnosus* LB3 also stimulates a humoral immune response, the body's ability to produce immunoglobulins and other naturally occurring antibodies.

Anti-Mutagenic, Antibiotic Tolerant, and Detoxification Properties

L. rhamnosus LB3 shows strong resistance to chemotherapy drugs, a high level of adhesion in vivo in the presence of chemotherapy drugs, and demonstrates high anti-mutagenic and detoxification activity. This strain also works well alongside known antibiotics and exhibits good adhesion and immune stimulating ability in their presence.

CLINICAL STUDIES

L. rhamnosus LB3 alone and in probiotic composition with *L. delbrueckii* LE was clinically used for patients with different otolaryngology infections, including Candida and viruses, digestion and immune problems with 85-95% positive immune profiles. Clinical testing was done in the Hospital of Institute of Otolaryngology Academy of Medical Sciences, Kiev, 2002-2006, for State Program "New Probiotics for Otolaryngology".

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STRAIN ORIGIN AND HISTORY

Lactobacillus rhamnosus LB3 (IMB B-7038) was isolated from a plant extract derived from pharmaceutical herbs.

STRAIN AUTHENTICITY & DEPOSIT

According to FAO/WHO, this strain has been identified as *Lactobacillus rhamnosus* on the basis of phenotype, carbohydrate utilization or fermentation profile, and genetic ribotype technique. This strain is deposited in the Ukranian Strain Collection of Industrial Microorganisms as *L. rhamnosus* LB3 IBM B-7038.

SAFETY ASSESSMENT

A safety assessment has been performed for acute and chronic toxicity using rats and mice. The LD50 in acute testing was 18g/kg body mass. *Lactobacillus rhamnosus* is a strain commonly used in food culture and is generally regarded as safe (GRAS).

LIST OF PUBLICATIONS

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2. D. Zabolotny, L. Volosevich, I.Zarytska, V.D. Zabolotna. Perspectives of biotherapy in ENT diseases; *Journal of ear, nose and throat diseases ,* №3-c, 2003,p.180-181

3. O.Volska, D.Zabolotna. Study of the mechanisms of antagonistic activity of the Probiotics drugs. *Journal of ear, nose and throat diseases ,* №3-c, 2003,p.164-165

4. L.Shynkarenko, N.Dehtyrenko. Research of the Chemotherapy drugs influence on Lactic Acid Bacteria cells. *Scientific news of the NTU “KPI”, 2004,1 (33), pp.135-140*

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6. Zabolotny D., Melnilkov O., Zabolotnaya D., Shynkarenko L. Probiotic modulation of the immunogenesis in the experiment. *Immunology and allergy,* 1, 2006 ., p.19-21

7. O.Melnikov, D. Zabolotnaya. Experimental investigation of the Probiotic influence on the palate tonsils cells in patients with chronic tonsillitis in vitro . *The journal of ear, nose and throat diseases,* 2006, 3, pp.24-27.

8. Volska, L.Shynkarenko, I.Zarytska, D.Zabolotna. Study of the possibility of the using of the Lactobacilli for treatment and prevention of the Candida infections in ENT-organs. *Odessa medical Journal,* 2006, 4(96), pp.32-36

9. O.Melnikov, D Zabolotnaya, L. Kalinovskaya, V. Simonenko. Investigation of the functional and morphochemical characteristics of the cells and tissues under the conditions of the co-cultivation with L.rhamnosus LB3. *The journal of ear, nose and throat diseases,4,* 2007, 170-172.

10. Timoshok N, Shynkarenko L, Starovoytova S, Spivak N. Investigation of interferon induction activity of new Probiotic composition and strains L.delbrueckii 86, L.rhamnosus LB3 to compare with Del-Immune V and Lactobacterin (L.plantarum); 2009, IIX Congress of Ukrainian Microbiological Society , Abstracts Book, p.264

11. Starovoytova S, Timoshok N, Gorchakov V, Spivak N. Immunomodulating abilities of Lactic Acid Bacteria.2009; Microbiol.J.,V71, 3, pp.41-47

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