



## Technical Editorial and Promotional Writing Sample

*WholeFoods Magazine*  
*December Issue Special Report: Immune System*  
*By Vincent Annunziata*

**In your opinion, what are the most damaging factors to an individual's immune system (list and explain)? Who can benefit most from strengthening the immune system, and why (i.e. Men, Women, Children, Elderly, etc.)**

When the immune system is functioning well, it protects the body every day against harmful bacterial, fungal, and viral infections, and even destroys cancer cells. Unless, checked, these pathogens can invade cells, multiply, and cause clinical damage. The results of infectious illness can vary from mild to life-threatening.

Tobacco, alcohol, drugs, and even over-exposure to ultra violet light can suppress immune function. In addition, research shows that a lack of sleep can compromise your immune system, making you more susceptible to colds and viruses.

However, negative changes in the immune system are also believed to be directly related to the aging process. The main cause of immunosenescence seems to be the shrinkage of the thymus gland. This changes the populations of T cells and their functions and results in a breakdown of other types of immune cells. Studies have shown that older people have a higher incidence of infections. On the other hand, delayed immunosenescence is associated with a longer life. Studies of people who are over 100 years old show that their immune systems are not like those of the average older person but, are more similar to those of younger adults.

Immune health is important to everyone but, the very young and the old can especially benefit by strengthening their immune systems. The immune system develops during pregnancy and the first few months after birth. If an infant is born prematurely immune function is reduced. In fact, the effects on cell-mediated immunity are very significant and can be long lasting. Likewise, young children that are undernourished have impaired immune responses and exhibit increased mortality and illness, due

mainly to infectious disease. In old age, nutrition plays an important role in the maintenance of optimum immunity. For example, clinical research shows response to influenza virus is improved when nutritional deficiencies in the elderly are corrected.

**What are the basic needs of a healthy immune system? List them by importance and describe why they are so important.**

A healthy immune system is greatly dependent on good nutrition. Almost all nutrients in the diet play a crucial role in maintaining an optimal immune response. Poor nutrition has been shown to interfere with many parts of the immune system. A delicate balance of calories, protein, fat, carbohydrates and micronutrients must be provided on a regular basis to ensure optimal immune function. Research shows protein-energy-malnutrition is known to cause a decline in most aspects of immune function and strongly increases the risk of various types of infection. Protein depletion has also been shown to impair T cell response to antigens as well as antibody production.

Likewise, moderate physical activity has been shown to award beneficial changes to the immune system. Many people complain they don't have time to exercise and as result, miss out on the many benefits regular exercise has to offer. In contrast to the benefits of moderate physical activity, scientific evidence indicates that heavy or chronic exercise is associated with an increased risk of upper respiratory tract infections. Although this problem is usually limited to serious athletes, work-out warriors can also fall victim to overtraining and consequently wind up doing more harm than good.

In addition, to good nutrition and regular exercise, getting a good night's sleep can do wonders for your immune system. Research suggests that even a modest disturbance of sleep produces a reduction of natural immune responses and T cell cytokine production.

Recent research with animals indicates increased sleep during illness may help accelerate recovery. Nowadays, people don't have the time to rest even when they're sick. Not only does this slow recovery but, it likely increases the chances to spread the infection to other people. So, if you want to stay healthy, get the sleep you need.

**What illnesses are known to be caused or assisted by a weakened immune system? What research have you observed or been involved with that shows potential for natural prevention of any of the previously listed illnesses?**

A weakened immune system can leave the body vulnerable to almost every type of illness and disease.

Many bacterial infections that were once managed easily with antibiotics are becoming drug resistant. Gradually hospital super-bugs like MRSA and drug resistant tuberculosis, are becoming increasing threats. For years we have counted on antibiotics for protection against bacterial infection. Now, after years of over-prescribing, it looks like antibiotics might be losing their effectiveness.

Of course, antibiotics are no use in treating viral infections such as the flu, and the right vaccines to protect us against the new and potentially lethal viruses will probably not be available in time. Therefore, it is critical to keep our immune systems in tip-top shape.

Although natural prevention of illness is often scoffed at by the medical establishment, new research indicates that it just might be possible to boost your immune system naturally to repel even deadly illnesses like tuberculosis. As a matter of fact, high doses of vitamin D were widely used to treat active TB in the preantibiotic era. A recent, and what may be considered a ground-breaking study, found people that were exposed to a patient with active TB may be protected by additional vitamin D. With an estimated one-third of the world's population having latent TB infection, this safe and cheap vitamin may help prevent future epidemics.

**Retailers may have a hard time marketing and selling immune products. What selling points would you suggest they convey to their customers?**

Selling immune products does not have to be limited to the cold and flu season. They can be sold to the frequent flyer, to athletes, to the elderly and even to children year-round. Asking your customers specific questions about their diet and lifestyle will help you choose the correct immune product or products for them. Point out the fact that many infections are becoming drug-resistant and that maintaining

optimal immune function is important as ever. Not to mention, with the rising cost of healthcare many people cannot afford to get sick. The number of US citizens without health insurance reached a record 46.6 million in 2006. Many are turning to affordable and natural options for treatment and prevention. Finally, in this information age, people are more knowledgeable but, at the same time also more confused about alternative and complementary medicine. Educate your customers as much as possible about diet, nutrition and immunity. Moreover, keep up with the latest research supporting the efficacy of natural immune boosters.

**What natural dietary supplements and herb products does Jarrow Formulas offer that have shown promise in supporting immune health? Please cite research and explain their mechanisms of action.**

JarrowFormulas® offers a number of products to support immune health.

**Jarro-Dophilus EPST™** is a Stable-Dophilus due to its stability at room temperature and enteric coating. Eight (8) different strains of probiotic bacteria help to safeguard and preserve the health of the entire intestinal tract.\* Probiotic bacteria in Jarro-Dophilus EPST are selected from the following 4 genera: Lactobacillus, Bifidobacteria, Lactococcus and Pediococcus.

Bifidobacteria longum BB536 (morinaga strain) has been shown to colonize, stimulate immune response and suppress intestinal putrefactive bacteria.\* Lactobacillus rhamnosus R0011 is a unique, high producer of polysaccharides that facilitate colonization and stimulate intestinal immune response.\* Probiotics have been shown to benefit older people by boosting the immune system.\* Another study found when a group of healthy older people supplemented their diet with L casei for three weeks, they experienced better gastrointestinal and respiratory health.\*

**Jarrow Formulas Yum-Yum Dophilus** provides 4 strains of potent beneficial bacteria in a yummy chewable tablet. Recommended for children age 2 and above taken under the supervision of a parent or caregiver.

**Jarrow FORMULAS® Beta Glucan** activates immune function by stimulation of NK cells, granulocytes, monocytes, and macrophages.\*

**Jarrow formulas® IP6** supports immunity by enhancing Natural Killer (NK) cells and chelating reactive iron to protect against damaging hydroxyl free radicals.\*

**L-Arginine** is a non-essential amino acid that contributes to immune health by stimulating the production of

hormones from the pancreas, adrenal glands, pituitary, and liver.\*

**N-acetyl-l-cysteine (NAC)** is an amino acid and antioxidant. It is a precursor in the body to the critical antioxidant glutathione. Glutathione has a pivotal role in antioxidant defense, protecting the body from oxidative damage during the immune response, and in supporting T-cell proliferation.\*

**Zinc Balance**® is a synergistic combination of **Zinc Monomethionate and Copper Gluconate** in a 15:1 ratio, because supplementing with zinc without including copper may cause a copper deficiency. This trace element has a broad impact on key immunity mediators, such as enzymes, thymic peptides and cytokines.\*

**Jarrow FORMULAS® Lactoferrin** is freeze-dried. Lactoferrin is a glycoprotein from whey protein. One of the biological activities of lactoferrin comes from its powerful ability to bind iron.\* Digestion of lactoferrin liberates the immune supporting peptide lactoferricin B. Lactoferrin benefits intestinal health by promoting the growth of beneficial bacteria.\*

**Jarrow Formulas Larix 1000** contains arabinogalactans extracted from the larch tree (*Larix occidentalis*). Arabinogalactans are densely branched, high molecular weight, water-soluble polysaccharides that support healthy immune function, particularly macrophage activity and cytokine defense activity such as interferon gamma, tumor necrosis factor, IL-1 and IL-6. Arabinogalactans also promote the growth of the probiotic bacteria *Lactobacilli* and *bifidobacteria*.\*

**Curcumin 95™** is an 18:1 concentrate of the antioxidants found in the spice turmeric root. Curcumin has been shown to be a potent immunomodulatory agent that can modulate the activation of T cells, B cells, macrophages, neutrophils, natural killer cells, and dendritic cells.\*

**Jarrow FORMULAS® IMMUNE SOOTHERS™** combines vitamin C with other immune boosting botanicals, in a great-tasting, sugar-free lozenge.\* **IMMUNE SOOTHERS™** harnesses the power of Pink Rock Rose extract, an ancient Mediterranean preparation rich in health-promoting antioxidants, that has been used for centuries to strengthen immune function.\*

## References

Aspinall R. Age-related changes in the function of T cells. *Microsc Res Tech.* 2003 Dec 15;62(6):508-13.

Babineau TJ, Hackford A, Kenler A, et al. A phase II multicenter, double-blind, randomized, placebo-controlled study of three dosages of an immunomodulator (PGG-glucon) in high-risk surgical patients. *Arch Surg.* 1994 Nov;129(11):1204-10.

Barbul A. Arginine and immune function. *Nutrition.* 1990 Jan-Feb;6(1):53-8; discussion 59-62.

Baten A, Ullah A, Tomazic VJ, et al. Inositol-phosphate-induced enhancement of natural killer cell activity correlates with tumor suppression. *Carcinogenesis.* 1989 Sep;10(9):1595-8.

Calder PC. n-3 fatty acids, inflammation, and immunity--relevance to postsurgical and critically ill patients. *Lipids.* 2004 Dec;39(12):1147-61.

Calder PC, Kew S. The immune system: a target for functional foods? *Br J Nutr.* 2002 Nov;88 Suppl 2:S165-77.

Cavadini G, Petrzilka S, Kohler P, et al. TNF-alpha suppresses the expression of clock genes by interfering with E-box-mediated transcription. *Proc Natl Acad Sci U S A.* 2007 Jul 31;104(31):12843-8.

Dardenne M. Zinc and immune function. *Eur J Clin Nutr.* 2002 Aug;56 Suppl 3:S20-3.

de Bortoli N, Leonardi G, Ciancia E, et al. Helicobacter pylori eradication: a randomized prospective study of triple therapy versus triple therapy plus lactoferrin and probiotics. *Am J Gastroenterol.* 2007 May;102(5):951-6.

[De Flora S](#), [Grassi C](#), [Carati L](#). Attenuation of influenza-like symptomatology and improvement of cell-mediated immunity with long-term N-acetylcysteine treatment. *Eur Respir J.* 1997 Jul;10(7):1535-41.

Droebner K, Ehrhardt C, Poetter A, et al. CYSTUS052, a polyphenol-rich plant extract, exerts anti-influenza virus activity in mice. *Antiviral Res.* 2007 Oct;76(1):1-10.

Dye C, Scheele S, Dolin P, et al. Consensus statement. Global burden of tuberculosis: estimated incidence, prevalence, and mortality by country. WHO Global Surveillance and Monitoring Project. *JAMA.* 1999 Aug 18;282(7):677-86.

Grimble RF. Immunonutrition. *Curr Opin Gastroenterol.* 2005 Mar;21(2):216-22.

Hall M, Baum A, Buysse DJ, et al. Sleep as a mediator of the stress-immune relationship. *Psychosom Med.* 1998 Jan-Feb;60(1):48-51.

Hamer M, Wolvers D, Albers R. Using stress models to evaluate immuno-modulating effects of nutritional intervention in healthy individuals. *J Am Coll Nutr.* 2004 Dec;23(6):637-46.

Hamilton-Miller JM. Probiotics and prebiotics in the elderly. *Postgrad Med J.* 2004 Aug;80(946):447-51.

Hauer J, Anderer FA. Mechanism of stimulation of human natural killer cytotoxicity by arabinogalactan from *Larix occidentalis*. *Cancer Immunol Immunother.* 1993;36(4):237-44.

- Haw MP, Bell SJ, Blackburn GL. Potential of parenteral and enteral nutrition in inflammation and immune dysfunction: a new challenge for dietitians. *J Am Diet Assoc.* 1991 Jun;91(6):701-6, 709.
- Heiser P, Dickhaus B, Schreiber W, et al. White blood cells and cortisol after sleep deprivation and recovery sleep in humans. *Eur Arch Psychiatry Clin Neurosci.* 2000;250(1):16-23.
- Irwin M, McClintick J, Costlow C, et al. Partial night sleep deprivation reduces natural killer and cellular immune responses in humans. *FASEB J.* 1996 Apr;10(5):643-53.
- Jagetia GC, Aggarwal BB. "Spicing up" of the immune system by curcumin. *J Clin Immunol.* 2007 Jan;27(1):19-35.
- Kelly GS. Larch arabinogalactan: clinical relevance of a novel immune--enhancing polysaccharide. *Altern Med Rev.* 1999 Apr;4(2):96-103.
- Keusch GT. The history of nutrition: malnutrition, infection and immunity. *J Nutr.* 2003 Jan;133(1):336S-340S.
- Kirk SJ, Barbul A. Role of arginine in trauma, sepsis, and immunity. *JPEN J Parenter Enteral Nutr.* 1990 Sep-Oct;14(5 Suppl):226S-229S.
- Martineau AR, Wilkinson RJ, Wilkinson KA, et al. A single dose of vitamin D enhances immunity to mycobacteria. *Am J Respir Crit Care Med.* 2007 Jul 15;176(2):208-13.
- Martineau AR, Honecker FU, Wilkinson RJ, et al. Vitamin D in the treatment of pulmonary tuberculosis. *J Steroid Biochem Mol Biol.* 2007 Mar;103(3-5):793-8.
- Mempel TR, Henrickson SE, Von Andrian UH. T-cell priming by dendritic cells in lymph nodes occurs in three distinct phases. *Nature.* 2004 Jan 8;427(6970):154-9.
- Moncada S, Palmer RM, Higgs EA. Biosynthesis of nitric oxide from L-arginine. A pathway for the regulation of cell function and communication. *Biochem Pharmacol.* 1989 Jun 1;38(11):1709-15.
- Nehlsen-Cannarella SL, Nieman DC, Jessen J, et al. The effects of acute moderate exercise on lymphocyte function and serum immunoglobulin levels. *Int J Sports Med.* 1991 Aug;12(4):391-8.
- Nieman DC, Henson DA, Austin MD, et al. Immune response to a 30-minute walk. *Med Sci Sports Exerc.* 2005 Jan;37(1):57-62.
- Nieman DC, Nehlsen-Cannarella SL. The immune response to exercise. *Semin Hematol.* 1994 Apr;31(2):166-79.
- Oztürk L, Pelin Z, Karadeniz D, et al. Effects of 48 hours sleep deprivation on human immune profile. *Sleep Res Online.* 1999;2(4):107-11.
- Pawelec G, Remarque E, Barnett Y, et al. T cells and aging. *Front Biosci.* 1998 Jan 15;3:d59-99.
- Plat J, Mensink RP. Food components and immune function. *Curr Opin Lipidol.* 2005 Feb;16(1):31-7.
- Shamsuddin AM, Vucenic I, Cole KE. IP6: A novel anti-cancer agent. *Life Sci.* 1997 Jun 20;61(4):343-354.
- Tanne J. More US citizens lack health insurance. *BMJ.* 2006 Sep 9;333(7567):516.
- Trumpler U, Straub PW, Rosenmund A. Antibacterial prophylaxis with lactoferrin in neutropenic patients. *Eur J Clin Microbiol Infect Dis.* 1989 Apr;8(4):310-3.
- Turchet P, Laurenzano M, Auboiron S, et al. Effect of fermented milk containing the probiotic *Lactobacillus casei* DN-114001 on winter infections in free-living elderly subjects: a randomised, controlled pilot study. *J Nutr Health Aging.* 2003;7(2):75-7.
- Williams DL, Mueller A, Browder W. Glucan-based macrophage stimulators: a review of their anti-infective potential. *Clin Immunother.* 1996; 5:392-399.
- Zakay-Rones Z, Thom E, Wollan T, et al. Randomized study of the efficacy and safety of oral elderberry extract in the treatment of influenza A and B virus infections. *J Int Med Res.* 2004 Mar-Apr;32(2):132-40.
- Zakay-Rones Z, Varsano N, Zlotnik M, et al. Inhibition of several strains of influenza virus in vitro and reduction of symptoms by an elderberry extract (*Sambucus nigra* L.) during an outbreak of influenza B Panama. *J Altern Complement Med.* 1995 Winter;1(4):361-9.
- Zagozdzon R, Foroncewicz B, Paczek L. [The aging of the immune system] [Article in Polish] *Przegl Lek.* 2003;60(3):156-60.
- Zhang Z, Song Y, Wang XL. Et al. Inositol hexaphosphate-induced enhancement of natural killer cell activity correlates with suppression of colon carcinogenesis in rats. *World J Gastroenterol.* 2005 Aug 28;11(32):5044-6.

2600 Words