

# Nutritional Support for the Immune System

— Cristiana Paul, M.S.

THIS INFORMATION IS PROVIDED FOR THE USE OF PHYSICIANS AND OTHER LICENSED HEALTH CARE PRACTITIONERS ONLY. THIS INFORMATION IS INTENDED FOR PHYSICIANS AND OTHER LICENSED HEALTH CARE PROVIDERS TO USE AS A BASIS FOR DETERMINING WHETHER OR NOT TO RECOMMEND THESE PRODUCTS TO THEIR PATIENTS. THIS MEDICAL AND SCIENTIFIC INFORMATION IS NOT FOR USE BY CONSUMERS. THE DIETARY SUPPLEMENT PRODUCTS OFFERED BY DESIGNS FOR HEALTH ARE NOT INTENDED FOR USE BY CONSUMERS AS A MEANS TO CURE, TREAT, PREVENT, DIAGNOSE, OR MITIGATE ANY DISEASE OR OTHER MEDICAL CONDITION.

Research suggests that certain herbs, mushroom extracts and other natural compounds have potential antiviral and antibacterial ability as well as the ability to stimulate natural killer (NK) cell activity, cytokine synthesis and the T-cell and B-cell mediated responses.

The research below on compounds found in nature show significant improvement in an array of conditions such as influenza, respiratory tract infections, sinusitis, cancer, viral hepatitis, and various bacterial infections.<sup>1-17</sup> So, if one were to design the perfect immune supportive formula, it would include the following ingredients:



## **Echinacea augustifolia**

“The Echinacea-treated group showed a significant augmentation of their primary and secondary IgG response to the antigen, during the first 2 weeks of treatment.”<sup>7</sup> “Traditional herbal medicine provides several remedies for strengthening the body's resistance to illness through effects on immune system components. This review article examines 3 popular herbal immune stimulants that are often of interest to cancer

patients. Echinacea, a native of North America, is widely used to prevent, or provide early treatment for colds. Preclinical studies lend biological plausibility to the idea that echinacea works through immune mechanisms. Numerous clinical trials have been carried out on echinacea preparations: it appears that the extracts shorten the duration and severity of colds and other upper respiratory infections (URIs) when given as soon as symptoms become evident.”<sup>16</sup>

## **Goldenseal Root**

“A number of immunomodulatory effects have been attributed to the medicinal plants Echinacea augustifolia and Goldenseal (*Hydrastis canadensis*); however, little is known about whether treatment with these plants can enhance antigen-specific immunity. We investigated the antigen-specific in vivo immunomodulatory potential of continuous treatment with Echinacea and Goldenseal root extract over a period of 6 weeks using rats that were injected with the novel antigen, keyhole limpet hemocyanin (KLH) and re-exposed to KLH after the initial exposure. Immunoglobulin production was monitored via ELISA continuously over a period of 6 weeks. The Echinacea-treated group showed a significant augmentation of their primary and secondary

IgG response to the antigen, whereas the Goldenseal treated group showed an increase in the primary IgM response during the first 2 weeks of treatment. Our results suggest that medicinal plants like Echinacea or Goldenseal may enhance immune function by increasing antigen-specific immunoglobulin production.”<sup>7</sup> “Of these isolates, berberine (goldenseal) and, to a lesser extent, 1 and 2, showed antimicrobial activity when evaluated against the oral pathogens *Streptococcus mutans* and *Fusobacterium nucleatum*.”<sup>17</sup>



## **Green Tea**

“The authors suggested the mechanism of anti tumor effects of Green Tea Extract possibly included both cellular immune function and the inhibition of tumor growth. The natural killer cell's activity

(cpm) of treated group was raised from 10.7% of control group to 41%.”<sup>6</sup>

## **Astragalus**

“Astragalus extract improved the memory, raised SOD activity in brain and liver, decreased the MDA content in the liver of aged mice, reduced the MDA content in ischemia-reperfusion kidney, decreased the creatinine level in blood of rats, and promoted the activity of NK cells.”<sup>7</sup> “Astragalus has demonstrated a wide range of immunopotentiating effects and has proven efficacious as an adjunct cancer therapy.”<sup>8</sup> (MDA = Malonyldialdehyde)

## **Elderberry**

“Symptoms were relieved on average 4 days earlier and use of rescue medication was significantly less in those receiving elderberry extract compared with placebo. Elderberry extract seems to offer an efficient, safe and cost-effective treatment for influenza.”<sup>15</sup>

## **Andrographis paniculata**

“It is concluded that *Andrographis paniculata* had a high degree of effectiveness in reducing the prevalence and intensity of the symptoms in uncomplicated common cold beginning at day two of treatment. No adverse effects were observed or reported.”<sup>10</sup> Temperature was moderately reduced in the treatment group. It can be concluded that Kan Jang has a positive effect in the treatment of acute upper respiratory tract infections and also relieves the inflammatory symptoms of sinusitis. The study drug was well tolerated.”<sup>11</sup> (Kan Jang = *Andrographis paniculata*)

### Larch tree (Arabinogalactans)

“Larch arabinogalactan is composed of greater than 98-percent arabinogalactan, a highly branched polysaccharide consisting of a galactan backbone with side-chains of galactose and arabinose sugars. Evidence also indicates human consumption of larch arabinogalactan has a significant effect on enhancing beneficial gut microflora, specifically increasing anaerobes such as Bifidobacteria and Lactobacillus. Larch arabinogalactan has several interesting properties which appear to make it an ideal adjunctive supplement to consider in cancer protocols. Experimental studies have indicated larch arabinogalactan can stimulate natural killer (NK) cell cytotoxicity, enhance other functional aspects of the immune system, and inhibit the metastasis of tumor cells to the liver. The immune-enhancing properties also suggest an array of clinical uses, both in preventive medicine, due to its ability to build a more responsive immune system, and in clinical medicine, as a therapeutic agent in conditions associated with lowered immune function, decreased NK activity, or chronic viral infection.”<sup>4</sup>

### Cordyceps sinensis

“These results indicate that an oral administration of hot water extract of Cordyceps sinensis may modulate IL-6 production by the activation of macrophages, and also enhance the secretion of hematopoietic growth factors such as GM-CSF and IL-6 from Peyer's patch which results in the modulation of not only the local but also systemic immune system.”<sup>3</sup>



### Shiitake

“The production of IL-2 and TNF-alpha were augmented in the treated human peripheral blood mononuclear cells. These results suggest that LE may induce Th1 immune responses.”<sup>14</sup> (LE = *Lentinus Edodes* = Shiitake mushroom) (Th1 = T helper cell Type 1)

### Maitake

“Edible mushrooms such as shiitake may have important salutary effects on health or even in treating disease. A mushroom characteristically contains many different bioactive compounds with diverse biological activity, and the content and bioactivity of these compounds depend on how the mushroom is prepared and consumed. It is estimated that approximately 50% of the annual 5 million metric tons of cultivated edible mushrooms contain functional "nutraceutical" or medicinal properties. In order of decreasing cultivated tonnage, *Lentinus* (shiitake), *Pleurotus* (oyster), *Auricularia* (mu-er), *Flammulina* (enokitake), *Tremella* (yin-er), *Hericium*, and *Grifola* (maitake) mushrooms have various degrees of immunomodulatory, lipid-lowering, antitumor, and other beneficial or therapeutic health effects without any significant toxicity...because of their potential usefulness in preventing or treating serious health conditions such as cancer, acquired immune deficiency syndrome (AIDS), and hypercholesterolemia, functional mushrooms deserve further serious investigation.”<sup>13</sup>

### Reishi

“Reishi treatment showed positive results on hepatitis patients, particularly those without severe impairment. The improvement was seen in 92% of 355 patients studied. Use against liver disease is one of the mushroom's longest standing traditional applications.”<sup>14</sup>

### Monolaurin (Lauric acid)

“Previous studies have shown that glycerol monolaurate (GML), a surfactant commonly used in a wide variety of food and cosmetic products, inhibits the production of a variety of exotoxins by group A streptococci and staphylococci. Given the highly lipophilic nature of the structure of GML, it is suspected that the surfactant exerts its toxin inhibition effects via interaction with the cell membrane. Studies suggest that GML may be exerting its T-cell-proliferative effects along the calcium-dependent inositol phospholipid signal transduction pathway, but did not affect B cells.”<sup>5</sup>

### Beta 1,3 Glucan

“Beta-glucans are structural cell wall polymers of many fungi which possess immunomodulatory activities. Although the therapeutic benefits associated with these compounds, particularly as anti-infective and antitumorogenic agents, have led to a large body of published research over the last five decades, it is still unclear how these carbohydrates mediate their effects.”<sup>1</sup> “It was found that the function of NK cells was potentiated by preincubation with beta-glucan.”<sup>2</sup>

### References

1. Brown GD, Gordon S. Fungal beta-glucans and mammalian immunity. *Immunity*. 2003 Sep; 19(3): 311-5
2. Di Renzo L, Yefenof E. The function of human NK cells is enhanced by beta-glucan, a ligand of CR3 (CD11b/CD18). *Eur J Immunol*. 1991 Jul;21(7):1755-8.
3. Koh JH, Yu KW. Activation of macrophages and the intestinal immune system by an orally administered decoction from cultured mycelia of *Cordyceps sinensis*. *Biosci Biotechnol Biochem*. 2002 Feb;66(2):407-11, Suh HJ, Choi YM, Ahn TS.
4. Gregory S, Kelly, N.D. Larch Arabinogalactan: Clinical Relevance of a Novel Immune Enhancing Polysaccharide Larch arabinogalactan. *Altern Med Rev* 1999;4(2):96-103
5. Witcher KJ, Novick RP. Modulation of immune cell proliferation by glycerol monolaurate. *Clin Diagn Lab Immunol*. 1996 Jan;3(1):10-3
6. Yan YS. Effect of Chinese tea extract on the immune function of mice bearing tumor and their antitumor activity. *Zhonghua Yu Fang Yi Xue Za Zhi*. 1992 Jan;26(1):5-7.
7. Rehman J, Dillow JM. Increased production of antigen-specific immunoglobulins G and M following in vivo treatment with the medicinal plants *Echinacea augustifolia* and *Hydrastis canadensis* (Goldenseal) *Immunol Lett*. 1999 Jun 1; 68(2-3): 391-5
8. Jin R, Zhang X. Studies on pharmacological junctions of hairy root of *Astragalus membranaceus*. *Zhongguo Zhong Yao Za Zhi*. 1999 Oct; 24(10): 619-21, 639.
9. Sinclair S. Chinese herbs: a clinical review of *Astragalus*, *Ligusticum*, and *Schizandra*. *Altern Med Rev*. 1998 Oct; 3(5): 338-44.
10. Caceres DD, Hancke JL. Use of visual analogue scale measurements (VAS) to assess the effectiveness of standardized *Andrographis paniculata* extract SHA-10 in reducing the symptoms of common cold. A randomized double blind-placebo study. *Phytomedicine*. 1999 Oct;6(4):217-23.
11. Gabrielian ES, Shukarian AK. A double blind, placebo-controlled study of *Andrographis paniculata* fixed combination Kan Jang in the treatment of acute upper respiratory tract infections including sinusitis. *Phytomedicine*. 2002 Oct;9(7):589-97.
12. Kodama N, Komuta K Effects of D-Fraction, a polysaccharide from *Grifola frondosa* on tumor growth involve activation of NK cells. *Biol Pharm Bull*. 2002 Dec;25(12): 1647-50.
13. Kodama N, Yamada M. Addition of Maitake D-fraction reduces the effective dosage of vancomycin for the treatment of *Listeria*-infected mice. *Jpn J Pharmacol*. 2001 Dec;87(4):327-32.
14. Chang HM, Pui-Hay But P. *Pharmacology And Applications Of Chinese Materia Medica*. Vol.1. 1986. Singapore: World Scientific.
15. Liu M, Li J, Kong F. Induction of immunomodulating cytokines by a new polysaccharide-peptide complex from culture mycelia of *Lentinus edodes* (shitake mushroom). *Immunopharmacology*. 1998 Nov;40(3):187-98
16. Block KI, Mead MN. Immune system effects of echinacea, ginseng, and astragalus: a review. *Integr Cancer Ther*. 2003 Sep;2(3):247-67.
17. Hwang BY, Roberts SK, Chadwick LR, Wu CD, Kinghorn AD. Antimicrobial constituents from goldenseal (the Rhizomes of *Hydrastis canadensis*) against selected oral pathogens. *Planta Med*. 2003 Jul; 69(7): 623-7.