

## Immune Support

By Dallas Cloutre, Ph.D.

It is a truism that cellular immunity plays a significant role in the maintenance of health. Too often, however, this is taken to mean that greater immune activity is the proper goal, whereas balance is more in order. Balancing the immune system, however, is quite a bit harder than simply stimulating it. Balance involves immunostimulants, immuno-modulators, and Phase 1 and 2 regulators, such as glutathione. Which of these items and in what amounts are most useful depends upon individual circumstances.

A number of herbs and mushrooms help to support immune responses. Astragalus has been shown in clinical and non-clinical studies to support aspects of healthy immune function, including the maintenance of T-cell and Natural Killer Cell (NK cell) activity (1 – 4). A blend of organic mushrooms can provide additional immune support due to high 1,3 beta-glucan content maintaining T-cell and macrophage activity. 1-3 beta-glucans are especially valuable to immune system response, though they are increasingly lacking in today's typical diet. Scientific studies have demonstrated that the 1,3 form of beta-glucans found in mushrooms supports aspects of immunity (5 – 7).

AHCC®, short for Active Hexose Correlated Compound, is the patented extract of Basidiomycete mycelia. According to clinical research as well as numerous non-clinical studies, AHCC® supports immune system function through its ability to maintain macrophage and NK cell activity. It supports immune surveillance by regulating both innate and adaptive immune responses, including under immunosuppressive conditions (8, 9). Studies have shown support of hepatic and renal, as well as endocrine function in the face of oxidative stress (10, 11). AHCC®, further, acts as a prebiotic and supports the healthy regulation of inflammatory responses in the bowel (12).

Again, immune maintenance is only part of the immune pie. An important component of immune function actually is detoxification. A special broccoli concentrate (sgs™) from seed supplies chemoprotective sulfur compounds, such as glucoraphanin, that support the body's natural detoxification mechanisms. This and sulforaphane glucosinolate are potent modulators of the body's immune defense system through effects on Phase 1 and 2 detoxification enzymes. Phase 1 enzymes make many toxins more water-soluble in preparation for their elimination from the body, but in the process can increase their toxicity. Phase 2 enzymes bind and remove these now soluble toxins. Thus, the Phase 1 and 2 enzyme systems must be in balance to protect health. Broken down during digestion, sulforaphane and glucoraphanin are converted to isothiocyanates (ITCs). These compounds can inhibit the rate at which Phase 1 enzymes make toxins more soluble for elimination — but thereby also more active — while at the same time inducing the detoxification activities of Phase 2 enzymes (13, 14).

The dependence of the immune system on hepatic and antioxidant enzymes highlights the role of glutathione precursors in the body and supplements, such as N-acetyl-L-

cysteine (NAC). NAC is a stable form of the non-essential amino acid L-cysteine. It is a sulfur-containing amino acid that acts as a stabilizer for the formation of protein structures, and is also necessary for the formation of glutathione (15). NAC may decrease plasma homocysteine via elevated urinary excretion (16).

Glutathione, which is created from cysteine, glycine and glutamic acid, takes free radicals and reactive oxygen species and accepts their unpaired electrons or donates its own. The free radical is then scavenged as it becomes a stable compound, such as water. The glutathione, however, has been oxidized. It is now glutathione peroxidase

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(GSSG) in reference to the fact that it has become electron-poor. Subsequently, the glutathione is "rehabilitated" by the donation of an electron and it becomes reduced glutathione (GSH), meaning that it is again electron-rich and ready to scavenge yet more free radicals. The donated electron comes from the same enzyme which allows the "oxygen burst" of the immune cells and which is itself "enriched" by the breakdown of glucose. Making cysteine more available to the body encourages the production of glutathione.

A neglected player in immune function recently revitalized by new research is vitamin D3. The discovery of the vitamin D receptor (VDR) in tissues that are not involved in calcium and phosphate metabolism led to the search for other roles for the vitamin. VDR has been discovered in most tissues and cells in the body and is able to elicit a wide variety of biologic responses, including maintenance of the immune system (17). For instance, research indicates a critical role for the VDR and 1,25(OH)2D3 in maintaining innate immunity and the response of the colon to chemical injury (18). It has been suggested that increasing vitamin D intake or sun exposure increases circulating concentrations of 25-hydroxyvitamin D, which in turn, is metabolized to 1,25-dihydroxyvitamin D(3) in prostate, colon, breast, etc. The local cellular production of 1,25-dihydroxyvitamin D acts in an autocrine fashion to regulate cell growth and differentiation (19).

Other supplements, such as probiotics, can play useful and unexpected roles in supporting normal immune function. The important point to remember is that immune activity is a team sport. Balance and cooperation are key elements.

#### References

1. Gao XP, et al. [Effect of Huangqi Zengmian powder on interstitial response in patients with esophageal cancer at peri-operational period] *Zhongguo Zhong Xi Yi Jie He Za Zhi*. 2001 Mar;21(3):171-3. Chinese.
2. Liu ZG, et al. [Effect of astragalus injection on immune function in patients

(References continued)

- with congestive heart failure] Zhongguo Zhong Xi Yi Jie He Za Zhi. 2003 May;23(5):351-3. Chinese.
- Taixiang W, et al. Chinese medical herbs for chemotherapy side effects in colorectal cancer patients. *Cochrane Database Syst Rev.* 2005 Jan 25;(1):CD004540.
  - Kurashige S, et al. Effects of astragal radix extract on carcinogenesis, cytokine production, and cytotoxicity in mice treated with a carcinogen, N-butyl-N'-butanol-nitrosoamine. *Cancer Invest.* 1999;17(1):30-5.
  - Shen J, et al. Potentiation of intestinal immunity by micellary mushroom extracts. *Biomed Res.* 2007 Apr;28(2):71-7.
  - Pacheco-Sanchez M, et al. A bioactive (1->3)-, (1->4)-beta-D-glucan from *Collybia dryophila* and other mushrooms. *Mycologia.* 2006 Mar-Apr;98(2):180-5.
  - Borchers AT, et al. Mushrooms, tumors, and immunity. *Proc Soc Exp Biol Med.* 1999 Sep;221(4):281-93.
  - Gao Y, et al. Active hexose correlated compound enhances tumor surveillance through regulating both innate and adaptive immune responses. *Cancer Immunol Immunother.* 2006 Oct;55(10):1258-66.
  - Aviles H, et al. Active hexose correlated compound enhances the immune function of mice in the hindlimb-unloading model of spaceflight conditions. *J Appl Physiol.* 2004 Oct;97(4):1437-44.
  - Ye SF, et al. Suppressive effects of Active Hexose Correlated Compound on the increased activity of hepatic and renal ornithine decarboxylase induced by oxidative stress. *Life Sci.* 2003 Dec 19;74(5):593-602.
  - Ye SF, et al. Amelioration by active hexose correlated compound of endocrine disturbances induced by oxidative stress in the rat. *Endocr Regul.* 2004 Mar;38(1):7-13.
  - Daddaoua A, et al. Active hexose correlated compound acts as a prebiotic and is antiinflammatory in rats with hapten-induced colitis. *J Nutr.* 2007 May;137(5):1222-8.
  - Conaway C, et al., Disposition of glucosinolates and sulforaphane in humans after ingestion of steamed and fresh broccoli. *Nutr Cancer.* 2000. 38(2): p. 168-78.
  - Myzak MC, et al. A novel mechanism of chemoprotection by sulforaphane: inhibition of histone deacetylase. *Cancer Res.* 2004;64(16):5767-5774.
  - Roes EM, et al. Effects of oral N-acetylcysteine on plasma homocysteine and whole blood glutathione levels in healthy, non-pregnant women. *Clin Chem Lab Med.* 2002 May;40(5):496-8.
  - Ventura P, et al. Urinary and plasma homocysteine and cysteine levels during prolonged oral N-acetylcysteine therapy. *Pharmacology.* 2003 Jun;68(2):105-14.
  - Mullin GE, Dobs A. Vitamin d and its role in cancer and immunity: a prescription for sunlight. *Nutr Clin Pract.* 2007 Jun;22(3):305-22.
  - Froicu M, Cantorna MT. Vitamin D and the vitamin D receptor are critical for control of the innate immune response to colonic injury. *BMC Immunol.* 2007 Mar 30;8:5.
  - Holick MF. Vitamin D: its role in cancer prevention and treatment. *Prog Biophys Mol Biol.* 2006 Sep;92(1):49-59.

## AHCC® 500 mg

AHCC® (Active Hexose Correlated Compound) is a patented formulation produced from several types of Basidiomycetes family mushrooms, including Shiitake. These mushrooms are uniquely grown in rice bran extract.

AHCC® was developed in Japan in 1989, and most of the studies with AHCC® supplements have been conducted in Japan where it is considered a super food. Many beneficial qualities of mushrooms can be traced to the special polysaccharides they contain. Polysaccharides are large, chain-like molecules built from many smaller sugar molecules. Certain polysaccharides in mushrooms have been widely used for their immune-supporting properties.

As a result of extensive research in humans and numerous non-clinical studies, AHCC® has been shown to support immune system functions through its effects on macrophages and NK (Natural Killer) Cells. NK cells are critical for the maintenance of healthy cell cycle function. AHCC® has also been shown to possess outstanding antioxidant properties, and can help to support healthy liver functions.

This Protocol For Life Balance™ formula is suitable for vegetarians and is offered in Vcaps®.\*

### Supplement Facts

Serving Size 2 Vcaps®  
Servings Per Container 30

	Amount Per Serving
Calories	5
Total Fat	< 0.5 g
Trans Fat	0 g
Total Carbohydrate	< 1 g
<b>AHCC®</b>	<b>1.0 g (1,000 mg)</b>
<b>(Proprietary Formula of Mushroom Mycelia Extract, Candelilla Wax, Cyclodextrin and Cellulose)</b>	

Other ingredients: Cellulose (capsule), Cellulose, Silica and Magnesium Stearate (vegetable source).

Contains no sugar, salt, starch, yeast, wheat, gluten, corn, soy, milk, egg or preservatives.

Vegetarian/Vegan Formula.

AHCC® is a registered trademark of Amino Up Chemical Company, Ltd. of Sapporo, Japan.



## Brocco Immune™

Brocco Immune™ contains broccoli concentrate from broccoli seeds. It is widely recognized that broccoli and broccoli seeds can offer multiple health properties including vitamin C, beta-carotene, and fiber.

Broccoli is also rich in phytochemicals, particularly glucoraphanin. Glucoraphanin is also found in other cruciferous vegetables, such as kale, turnip greens, cabbage, cauliflower, and Brussels sprouts. Cruciferous vegetables have long been associated with antioxidant and cellular protection.

When broccoli and broccoli sprouts are consumed, glucoraphanin is converted to sulforaphane. It is quickly absorbed and metabolized, and finally excreted in the urine. In this process, it produces the formation of a variety of detoxifying and antioxidant peptides and proteins. Extensive scientific studies have demonstrated that sulforaphane is a potent inducer of phase 2 detoxifying enzymes. In addition, Sulforaphane is also able to boost the level of thioredoxin, an enzyme that protects retinal cells of the eye against various types of oxidative attack.\*

For more information on sgs™, please visit [www.yoursgsmed.com](http://www.yoursgsmed.com).

### Supplement Facts

Serving Size 1 Vcap®

	Amount Per Serving
Brocco sgs™-100 (Broccoli Concentrate from Seed) ( <i>Brassica oleracea italica</i> ) (min. 5% Glucoraphanin)	300 mg

Other ingredients: Cellulose, Cellulose (capsule), Silica and Magnesium Stearate (vegetable source).

Contains no sugar, salt, starch, yeast, wheat, gluten, corn, soy, milk, egg, shellfish or preservatives.

Vegetarian/Vegan Product.

sgs™ is produced under US patents 5,725,895; 5,968,505; 5,968,567; 6,177,122; 6,242,018; 6,521,818 and other US and international patents licensed from Brassica Protection Products

LLC. Process patents pending to C S Health.

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## **NEW! L-Tryptophan 500mg Vcaps®, USP Grade**

L-Tryptophan is an essential amino acid that plays a number of important roles in human health and nutrition. It's most important role, however, involves the production of serotonin—a key neurotransmitter that helps regulate mood and emotion. It is also a precursor for the production of melatonin—a hormone that regulates the body's wake and sleep cycles. Since L-Tryptophan can not be manufactured by the body, it must be obtained through the diet. It is most commonly found in protein-rich foods, including meats, poultry, whole grains, rice, legumes, and dairy products.

Once it has successfully crossed the blood brain barrier, tryptophan is first converted to 5-HTP (5-hydroxytryptophan) and shortly thereafter, to serotonin. Poor serotonin levels have been linked to depression, emotional challenges, aggression, irritability, sleep disorders and appetite abnormalities. Additionally, tryptophan is necessary for the production of vitamin B3 (niacin)—a process that requires vitamin B6, biotin, Vitamin C and zinc to synthesize the enzyme needed to carry out the process. Considering that all of these processes begin with protein, tryptophan is of considerable importance to those who do not consume adequate amounts.

With regard to safety, L-Tryptophan has been used and consumed by millions of individuals throughout the years. It has been shown in numerous studies, including clinical studies, to improve mood and emotional stability, as well as appetite and sleep patterns. Aside from its role in supporting normal cognitive function, tryptophan also provides many of the building blocks needed for protein synthesis, and is currently being studied for its role in supporting healthy immune system response.\*

Protocol For Life Balance™ L-Tryptophan has been developed to ensure absolute safety and efficacy. Each lot is subject to Peak E testing, as well as potency and microbial testing. In fact, we spent over six months delaying this launch to assure 100% peak E free Tryptophan through expensive and detailed stability testing. Tryptophan should not be combined with other supplements that affect serotonin production, such as 5-HTP or St. John's Wort, as well as SSRI's or other medications being used to treat depression. Vitamin B6 and magnesium have been shown to enhance the effect of tryptophan.



**Serving Size 2 Vcaps®**  
**L-Tryptophan (Free-Form).....1.0 g (1000 mg)**

Other ingredients: Cellulose (capsule), Cellulose and Stearic Acid (vegetable source)

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