

ImmuSANO™: The New Mushroom Nutritional Super Food

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How many people know that trees and green plants cannot grow without mushrooms; that viruses that afflict humans also afflict mushrooms; that Google has 11,400 hits on the topic – “antiviral compounds in mushrooms?”

There is a tremendous amount of information and data, much of which is presented here in this "white paper" on medicinal mushrooms, on their potent nutrients and antioxidants and on the healing relationship mushrooms provide to humans. I encourage readers to use their own knowledge and life experiences when evaluating and making decisions regarding the potential applications of mushrooms in addressing various illnesses and disease states. This “white paper” is not intended to diagnose, treat, cure or prevent any human disease but rather to provide you, the reader, with the information you need to make decisions regarding your nutrition and health.

Mushrooms are a complex biological system that has survived for more than 100 million years. Mushrooms process the environment (i.e. soil) and act as an interface between plant roots and nutrients within the soil. Because they are hidden within the ground, mushrooms for long did not attract as much scientific investigation as plants and animals. Ancient cultures, hunter-gatherer humans, and later Asian cultures have used mushrooms for food and medicines for thousands of years. It is only recently that Western civilization has turned its attention to this poorly understood food substance and come to recognize the important role of this early evolutionary biologic organism in human evolution and health. Mushrooms are the “food that feeds the food;” the great recycler that provides the essential nutrients that are needed by plants and animals.

ImmuSANO™: The Smart Choice for a Healthier Life

ImmuSANO™ is a mushroom nutritional supplement that can best be described as a newly discovered Super Food that is the result of years of research in university laboratories worldwide.

Why should one use ImmuSANO™ as a daily nutritional supplement? The prime reason is that mushrooms are able to produce one of the world’s most potent and stable, antioxidant compounds, but one that cannot be produced by humans or animals. This antioxidant compound is called L-Ergothioneine (ERGO). ERGO is found in high concentrations in a number of mammalian organ systems including the eye, liver, kidney, and red and white blood cells.

The biological significance of ERGO is only now beginning to be understood, but it is known that this important nutrient seems to play a dual role in both energy regulation and in protecting cells from oxidative damage. Further emphasizing the importance of ERGO to humans is the fact that human red and white blood cells contain a specific transport system whose only role is to deliver ERGO to these cells. This discovery was recently made by Dr. Dirk Gründemann of the University of Cologne, Cologne, Germany.

The Evidence is in the Blood

Human bodies cannot function without normal red and white blood cells. Blood is a life sustaining fluid and hemoglobin within red blood cells carries and releases oxygen to all bodily tissues. Red cells have a lifespan of 120 days and every day the body produces new red

blood cells to replace those that die. White blood cells, on the other hand, live a maximum of four days and have the important function of fighting germs, such as bacteria and viruses. They might also attempt to destroy cells that have become infected or have changed into cancer cells.

It is only logical that a person should have the best nutritious environment for the steady and continuous production/replacement of these life-supporting cells. The basic fact is that red and white blood cells have this unique specific transporter that is “calling out” for ERGO. Mushrooms appear to be the best supplier of large amounts of ERGO! Most people are limited in the amounts of mushrooms that they can consume on a daily basis and for this reason ImmuSANO™ was created. Collaborative research with food scientists at Pennsylvania State University enabled us to evaluate and include individual mushrooms with the highest ERGO content.

The basic compelling fact is that life-sustaining red and white blood cells maintain this transporter and, thus, require ERGO. But these cells can only get an adequate supply of this key antioxidant if a person consumes mushrooms!

Nutrition appears to play an important role in the preventive fight against bacterial and viral infection, and inflammatory diseases, such as bowel disease, stroke, Alzheimer’s disease, chronic fatigue syndrome, fibromyalgia and even premature aging. But in no way should the data presented herein be construed as suggesting a specific course of diagnosis, treatment or cure. The important message is “prevention rather than intervention.”

Nutrition, by itself, cannot treat a disease once it has occurred, but most people have forgotten about the role that nutrition plays in the daily fight against inflammatory diseases and infection. It is logical that if two people have pneumonia, the one with better nutrition will respond best to the antibiotic.

Nutrition: The Best Defense against Illness and Disease

The world is consumed with the fear of AIDS, yet most people, including doctors, are unaware of a published preclinical study in which synthetic ERGO may suppress the duplication of the AIDS virus. The paper is entitled “Activity of the Dietary Antioxidant Ergothioneine in a Virus-based assay for inhibitors of HIV Transcription.” In this paper, the authors suggest that ERGO can suppress certain enzymes that are associated with HIV duplication. They make the following statement: “Thus antioxidant strategy involving Ergothioneine derived from food plants might be of benefit in chronic immunodeficiency diseases. These authors are implying, although there are no clinical studies with ERGO in humans with active viral infections, that nutrition with antioxidants such as ERGO, could potentially be effective in elevating one’s immune status to a higher level of protection.

Further support of the use of mushrooms and their contained natural antiviral agents is published by Piraino and Brandt, Department of Ophthalmology, University of Wisconsin Medical School, Madison, Wisconsin. These scientists isolated the protein RC-183 from the edible mushroom *Rozites caperata* and suggest that this protein could inhibit the herpes simplex virus.

Research at Tufts University in Massachusetts proposed that eating mushrooms may help fight off infections and viruses by boosting the body’s natural immune system. This study revealed that mushrooms improved hormone-like proteins called cytokines that defend against infections and tumors.

We are bombarded by fears of all the recent viral mutations and attacks on humankind, such as SARS, Asian flu and Swine flu. One recent such infection was even termed the “CNN Flu.” What better way to allay one’s fears than to be proactive and consume dietary supplements such as ImmuSANO™, that can supply nutrients and antioxidants, such as

ERGO, and that may elevate one's immune system function to assist in the fight against foreign invasion.

Mushrooms: The Ultimate Nutritional Source

Mushrooms are uniquely designed, complex biologic organisms, that not only contain ERGO, but also contain other nutrients and bioactive substances that assist in maintaining more normal cellular and immune function. One mushroom can contain approximately 3,000 enzymes, proteins and nutrients that, when ingested, help our bodies adapt to everyday stresses. Because mushrooms contain some of the most powerful anti-oxidative properties known in any food product, they provide multiple health benefits. Research on the impacts of nutrition has shown that a composite of naturally occurring food components such as mushrooms can aid in reducing chronic inflammatory diseases.

Recent research indicates a strong link between inflammation and disease, examples being diabetes, heart disease, arthritis, fibromyalgia, Alzheimer's disease, cancer and even early aging. Hence, a reduction in inflammation through nutrition could play a key role in addressing illness and disease linked to inflammation whether in humans or animals.

Inflammatory gum disease is a prime example. The significance of oral inflammatory disease goes way beyond the mouth; the gums are a "barometer or window" of what is going on elsewhere in the body. At this point in time most periodontal disease data has come from human studies; however, the mechanism of action crosses most species lines. The impact of chronic inflammatory disease on mammalian health is especially emphasized by the following human data:

- 50%-70% of women will develop gingivitis (inflammation of the gums) sometime during their pregnancy. (WebMD)

- Association between periodontitis at 12-24 weeks of pregnancy and preterm labor. (Jeffcoat; Siristatidis)
- Research published in the June 2008 issue of the journal *Lancet Oncology* found that those who had gum disease had a 14 percent higher risk of cancer compared to those with no history of gum disease. (Michaud)
- The risk varied from cancer to cancer. Gum disease appeared to increase the risk for lung cancer by 36 percent, kidney cancer by 49 percent, pancreatic cancer by 54 percent, and for white blood leukemia by 30 percent.

Causation of Inflammation and/or Chronic Inflammatory Gum Disease

There is no question but that mammalian diseases are intimately linked to a chronic inflammatory disease process. Equine gum disease is a classic example and represents the injury response of the animal's body to the "tenuous balance of pro- and anti-inflammatory cytokines" (Gordon L. Jensen MD, PhD; "Presidential Address"). Dr. Jensen goes on to say: "...On the occasion of my presidential address, I sought to present a provocative examination of future opportunities in clinical nutrition by exploring the key role of inflammation at the interface of medicine and nutrition. There is growing appreciation for the central role of inflammation in a host of injury and disease states. It is imperative that nutrition professionals seize the initiative to participate in the pending multifaceted medical treatment of inflammatory disorders."

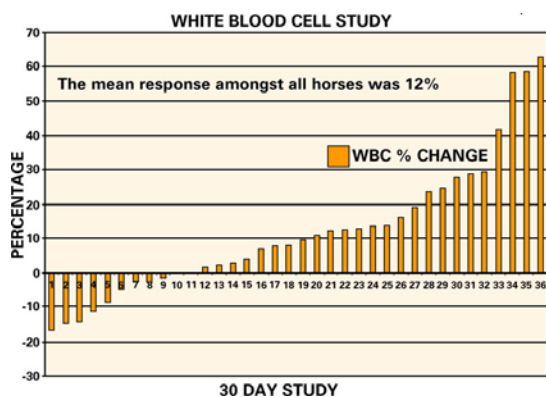
Upon review of the world's literature on medicinal mushrooms, one finds that many laboratory and clinical studies were performed in China and Japan. The research studies that I am referencing in this white paper were

performed in the United States and Europe and in most cases follow accepted western protocols for scientific testing and evaluation.

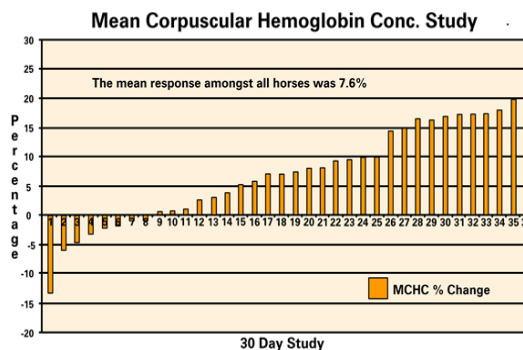
A study linking inflammatory changes and disease was performed by J.M. Mullington and colleagues in the Department of Neurology at Harvard Medical School, Boston, Massachusetts. This study revealed that mediators of inflammation, such as the cytokines, mentioned above by Dr. Jensen, are potentially altered in chronic fatigue syndrome and related diseases such as fibromyalgia. These findings suggest another possible application for a product that contains whole foods with anti-inflammatory components, such as ImmuSANO™.

Mushroom Clinical Studies

Clinical studies on the effect of mushroom supplements fed to animals indicate that mushrooms have the potential to promote healthier blood cells. In a clinical safety study performed by race horse trainer Carl Nafzger, 36 horses were fed a mushroom supplement for 30 days with blood tests taken both before and after mushroom supplementation. The blood tests showed a 12 percent increase in the numbers of white blood cells.



The same study also revealed a 7.6 percent increase in the concentration of hemoglobin within red blood cells.



The fact that these clinical results occurred within only 30 days after dietary supplementation with mushrooms are indicative of an active transport system that most likely quickly carried ERGO into adult and/or progenitor white and red blood cells.

Increased hemoglobin means increased oxygen carrying capacity within the blood and increased oxygenation of all bodily tissues including hair follicles and nail beds. Doctors are taught to check a person’s nail beds as an assessment of general health. A peachy-pink nail bed indicates a healthy oxygenated blood supply. While clinical studies have not yet been completed on humans, there is much anecdotal evidence on increased hair and nail growth among people taking mushroom supplements. Increased hair and nail growth is also an indication that a person is nutritionally well-balanced and in good health.

The increase in white blood cells with mushroom nutrition may be indicative of a stronger immune system. White blood cells (WBCs) or leucocytes are cells of the immune system defending the body against both infectious disease and foreign material invasion. Humans are continuously in battle against many foreign invasive organisms, such as viruses and bacteria. The everyday newswires continually report doom-and-gloom-events about a new super bacteria or virus. What better way to defend oneself than to have super good nutrition with natural foods that promote more normal cellular and immune function. “More police on the streets catch more criminals and increased numbers of better functioning white blood cells catch more viruses.”

ImmuSANO™: All Natural Ingredients

ImmuSANO™ is a proprietary nutritional blend of six medicinal mushrooms, each of which has different concentrations of bioactive enzymes and nutrients. ImmuSANO™ is a

holistic and natural approach to health care that nutritionally assists people in balancing cellular function and promoting a stronger immune system.

Total Nutraceutical Solutions, Inc. is an emerging nutraceutical company with a focus on discovering, formulating and marketing products composed primarily of organic natural mushroom compounds that contain bioactive nutrients for potential health benefits. TNS also develops production and analytic technologies for food and nutritional supplements. In addition to

preventative healthcare formulations and nutritional approaches to a wide variety of human conditions and illnesses, TNS also develops and acquires breakthrough nutritional tools and products in the fields of animal husbandry and livestock feeds. For more information visit www.totalnutraceutical.com.

BIBLIOGRAPHY

Adams, Casey. "Uncloaking the Mysteries of Medicinal Mushrooms." *Nutraceuticals World* Oct. 2008: 68-76

Brodie, Harold. *Fungi: Delight of Curiosity*. Toronto: University of Toronto Press, 1978.

Brucato, Sharon. *China's Cancer Solution: What the Chinese Know About Reishi Mushroom That Could Save American Lives*. California: 7 Day Health Publishing, 2005

Cheung, Peter. *Mushrooms as Functional Foods*. New Jersey: John Wiley & Sons, Inc, 2008.

Fine, Gary. *Morel Tales: The Culture of Mushrooming*. Illinois: University of Illinois Press, 1998.

Freeman, Scott and Jon Herron. *Evolutionary Analysis*. New Jersey: Pearson Education, Inc, 2004.

Gründemann, Dirk et al. Discovery of the Ergothioneine Transporter. *Proceedings of the National Academy of Science*, v102, no.14, 5256-5261, April 5, 2005.

Halliwell, Barry and Okezie Aruoma. *Molecular Biology of Free Radicals in Human Diseases*. OICA International, 1998.

Halpern, Georges. *Healing Mushrooms*. New York: Square One Publishers, 2007.

Hobbs, Christopher. *Medicinal Mushrooms*. Tennessee: Botanica Press, 1986.

Huddler, George. *Magical Mushrooms, Mischievous Molds*. New Jersey: Princeton University Press, 1998.

Jacobs, David R. and Tapsell, Linda C.; Food, Not nutrients, is the Fundamental Unit in Nutrition. *Nutrition Reviews*; 2007, October; 65, 10; 438-450.

Jeffcoat, M.K. et al. Periodontal Infection and Preterm Birth; Results of a Prospective Study. *J. Am. Dent. Assoc.*, Vol. 132, No. 7, 875-880, 2001. <http://jada.ada.org/cgi/content/full/132/7/875>

Jensen, Gordon L. Presidential Address: "Inflammation as the Key Interface of the Medical and Nutrition Universes: A Provocative Examination of the Future of Clinical Nutrition and Medicine." *Journal of Parenteral and Enteral Nutrition*. 2006, September. 20, No.5, 453-463.

Jones, Kenneth. *Shiitake The Healing Mushroom*. Vermont: Healing Arts Press, 1995.

Ley, Beth. *Medicinal Mushrooms for Immune Enhancement: Agaricus Blazei Murill*. Minnesota: BL Publications, 2001.

Michaud D. S., et al. "Periodontal disease, tooth loss, and cancer risk in male health professionals: a prospective cohort study." *The Lancet Oncology* 2008, 9, 550-8.

<http://www.cancerworld.org/CancerWorld/getStaticModFile.aspx?id=2368>

Mullington, J.M. et al. Mediators of Inflammation and their Interaction with Sleep: Relevance for Chronic Fatigue Syndrome and Related Conditions. *Ann. N Y Academy of Sciences*, 2001 March; 933:201-10.
<http://www.ncbi.nlm.nih.gov/pubmed/1200002>

Noggle, Ray and George Fritz. *Introductory Plant Physiology*. New Jersey: Prentice Hall, 1976.

Piraino, F and Brandt, CR; Isolation and Partial Characterization of an Antiviral, RC-183, from the Edible Mushroom *Rozites caperata*. *Antiviral Res*, 1999 Sep; 43(2): 67- 78.
<http://www.ncbi.nlm.nih.gov/pubmed/10517309>

Preuss, Harry and Sensuke Konno. *Maitake Magic*. California: Freedom Press, 2002.

Siristatidis, C., et al. Hormonal Alterations in Gum Disease Leading to Preterm Labor. *Arch. Of Gynecology and Obstetrics*, Vol. 274, No. 1, 13-18, February 2006.
<http://www.springerlink.com/content/5m5526j842157r58/>

Stamets, Paul. *Mycelium Running: How Mushrooms Can help Save the World*. California: Ten Speed Press, 2005.

Stengler, Mark. *The Health Benefits of Medicinal Mushrooms*. California: Basic Health Publications, Inc, 2005.

Willard, Terry. *Reishi Mushroom: Herb of Spiritual Potency and Medical Wonder*. Washington: Sylvan Press, 1990.

WebMD Medical reference.

<http://www.webmd.com/oral-health/pregnancy-gingivitis-tumors>.

Wu, D. et al. "Dietary Supplementation with White Button Mushroom Enhances Natural Killer cell Activity in C57BL/6 Mice." *Journal of Nutrition*. 137:1472-1477, June 2007.
<http://jn.nutrition.org/cgi/content/abstract/137/6/1472>.

Xiao, L. et al. Activity of the Dietary Antioxidant Ergothioneine in a Virus Gene-Based Assay for Inhibitors of HIV Transcription. *BioFactors*, 27(2006), 157-165, IOS Press.
<http://www3.interscience.wiley.com/journal/121573863/abstract>.