

About Enhanced Nutrition

Edited by John Williamson and John Burkitt

OVERVIEW:

Life on Earth is a wonderful self-supporting and self-healing system of producers that capture the power of the sun, herbivores that harvest that stored energy, and carnivores that prey on the herbivores. It's traditionally called the "food chain" or more properly "food web," but it has become popularly known through the movie "The Lion King" as the "Circle of Life." Whatever you call it, this interdependence encourages strong traits, eliminates weak traits, and even returns life to ravaged areas. Imagine if your front yard or flower garden maintained itself without any work--no lawn cutting, no weed pulling, and no watering. Imagine if it rearranged trees and shrubs for best effect to keep things attractive and functional. Then multiply this small miracle by several million times and you would have some idea how wonderful nature really is.

Still, look at how much longer properly maintained animals can live in captivity and you realize what's natural is not always what's best for an individual animal. "Enhanced nutrition," is going beyond the short list of vitamins, minerals, proteins, fats and carbohydrates drawn up by mainstream husbandry practices.

Enhanced nutrition can raise the level of wellness and well being of animals beyond the arbitrary norm. A supplement we use at Tiger Touch includes fatty acids, amino acids, phytonutrients, and trace minerals needed in the thousands of different enzyme reactions crucial to the animals' correct synthesis of proteins and specialized cells such as those of the immune and nervous systems.

This supplement also includes phytochemicals found to combat free radical cell damage, tumor formation, and viral replication. These phytochemicals act to minimize the effects of a vast number of man made toxins impacting the environment and moving into the food chain which serves us all.

Though the precise roles of most of these chemicals is not known, their benefits to living things are becoming less a theory and more a fact as scientists look into how enhanced nutrition works.

A century ago, the way food was produced and distributed ensured a healthy, well balanced diet. But a growing population and changing economy have had an impact on the food we buy. We rely on vitamin and mineral supplements to replace part of what we have lost, but these supplements are also shaped by population and the economy. The micronutrients that play small but important roles in health and well-being are considered an expensive nuisance by mainstream nutritional science. These "expensive nuisances" have important stress-resisting and disease-fighting properties.

The only way to counteract this trend is to supplement a basic diet with the essential macro and micro nutrients. Even felines living in the wild are suffering ill effects because the food chain is being rapidly compromised or broken through habitat depletion.

Since food supplements seem necessary in these times, it remains to be determined the best supplements available for "dietary insurance." We concluded nature left a near perfect legacy among the algae and certain grasses. When these green superfoods are added to conventional nutrition, significant health improvements can be expected in most animals. We called this "Grreen Magic."

Grreen Magic is a natural dietary supplement containing an impressive array of vitamins, minerals, amino acids, phytonutrients, fatty acids, and sulfolipids. Grreen Magic is a natural food with health-giving properties whose benefits for animals are just beginning to be realized.

Grreen Magic is a synergistic mix of blue-green spirulina and green chlorella algae which evolved some three million years ago. These are often called superfoods because of their rich, balanced nutritional profile and unprecedented bioavailability. They are grown and consumed in many countries throughout the world. Another important ingredient is wheat grass. Our sources are approved for human consumption and are carefully monitored for their quality. "Safety net" amounts of taurine, arginine, and vitamin A are included for felines.

We feel that animal supplements should offer the greatest benefits and contribute to the highest quality of life possible, the same standards we humans hold for ourselves.

SPIRULINA:

Spirulina is a natural food source used for centuries which is rich in protein, chlorophyll, and essential fatty acids, and high in vitamin A, and the B-vitamins. Spirulina contains a rich supply of iron, magnesium, and phosphorus, as well as calcium, potassium, sodium, vitamin C and E, RNA and DNA nucleic acids, and phycocyanin. Spirulina is the highest plant source of beta-carotene, vitamin B12 and gamma linolenic acid (GLA). It contains more beta-carotene than carrot sources and 250% more vitamin B12 than liver.

Spirulina is comprised of 65 to 70% protein and provides all eight essential proteins. While beef is comprised of 18% protein, Spirulina is at least 65% protein. In addition, 80% of the protein content of Spirulina is assimilated by the body as compared to 20% for beef. The calcium content of Spirulina is 26 times that of milk.

Two other constituents account for Spirulina's remarkable improvements on the well being and behavior of animals. The first is Muramyl Dipeptide, a small protein which automatically modulates the immune system to a high state of readiness. This increased readiness means that the immune system begins to fight disease infections almost immediately instead of having to build up to an effective level over a period of days.

The other significant constituent is Dopamine, a neurohormone. Dopamine is a messenger molecule which modulates the activity of several other cell groups having dopamine receptors. Dopamine coordinates movement and body systems, triggers other important hormones, and contributes to a healthy nervous system. In general, it promotes an animal's sense of well being. Over the course of an animal's life, Dopamine production ordinarily drops to very low levels, affecting many other systems accordingly. Supplementation of Dopamine preserves, to a fair extent, the vigor and well being of youth well beyond its normal decline.

CHLORELLA:

Chlorella is also an ancient natural food, with many of the same properties as Spirulina. It differs from Spirulina in that it contains a little less protein, a fraction of the beta-carotene, and more than double the amount of nucleic acid and chlorophyll. Generally speaking, it is more expensive than Spirulina due to the additional processing required in its production.

Chlorella is one of the most widely consumed nutrients in Japan. Because the Japanese are exposed to higher levels of radiation and pollution, Chlorella is used as a detoxifier. The detoxification capability of Chlorella is due to its unique cell wall and the material associated with it. The Japanese cultivated Chlorella during World War II as a practical way to feed millions of their people during times of food shortages.

Chlorella also has an impressive array of vitamins and minerals, including 19 amino acids. Studies have confirmed Chlorella stimulates the immune system by enhancing macrophages which kill bacteria, viruses, and cancer cells. It also helps to regulate cholesterol levels and promotes optimum health.

Like Spirulina, Chlorella has been shown to exhibit impressive immune stimulation through promoting interferon production and stimulating the activity of killer-T cells. While Chlorella is similar in its applications, it is considered by experts to be better for people and animals suffering from nutrient deficiencies or compromised immunity.

Chlorella has been used for Chronic Fatigue Syndrome in humans, and fungal infections such as *Candida albicans*. Because it contains more fatty acids than Spirulina, it is an effective artery cleanser and has been shown to be effective in reducing cholesterol and preventing atherosclerosis.

Unlike Spirulina, Chlorella does not contain phycocyanin. However, it does contain a higher percentage of fatty acids.

WHEATGRASS:

Wheatgrass has been around for eons, and was actually one of the first crops to be cultivated by man. Currently, wheat is the fifth most important cereal crop in the United States, and the fourth most

important crop in the world. Wheat grass is wheat before it matures and is still in its early stage of development.

Wheatgrass, a green food, is gaining notoriety as a fast and convenient source of a wide variety of potent nutrients. Wheat grass is particularly nutritious, with a high concentration of vitamins, minerals, protein, enzymes, chlorophyll, and mucopolysaccharides.

By now most people are well aware of the roles vitamins and minerals play in health and nutrition right down to the cell level. What about other nutrients, such as enzymes?

Enzymes are chemical substances required by every living cell for every biochemical process. For example, the simple act of breathing requires enzymes, for they are involved in the exchange of oxygen and carbon dioxide in the lungs. Every single bodily response, reaction, and function is dependent upon enzymes. Wheat grass is a storehouse of "live" food enzymes and co-enzymes. Enzymes are tiny chemical compounds just as vital as vitamins and minerals.

Wheatgrass is rich in both the major minerals and the trace minerals that play a crucial role in the actions of enzymes. Without these trace minerals in the diet, enzymes don't function and vitamins are worthless.

GREEN MAGIC:

Benefits of Green Magic

- Enhances the immune system with anti-tumor, anti-viral, and interferon effects.
- Stimulates macrophages to destroy invading disease and carcinogens.
- Detoxifies the body and promotes the growth of friendly bacteria.
- Promotes tissue and wound repair.
- Reduces blood cholesterol and tri-glyceride levels.
- Reduces arthritis pain and inflammation.
- Improves blood pressure level.
- Improves dental health.
- Alleviates digestive problems.
- Increases energy and overall well-being.
- Balances RNA/DNA (nucleic acids).
- Lowers risk of cardiovascular disease.
- Provides superior nutrition support.
- Curbs excessive appetite.
- Stimulates metabolism.

Spirulina is gaining more attention from medical scientists as a nutraceutical and source of potential pharmaceuticals. There are several new peer reviewed scientific studies about Spirulina's ability to inhibit viral replication, strengthen both the cellular and humoral arms of the immune system and cause regression and inhibition of

cancers. While these studies are preliminary and more research is needed, the results so far are exciting.

Potent Anti-Viral Activity: In April 1996, scientists from the Laboratory of Viral Pathogenesis, Dana-Farber Cancer Institute and Harvard Medical School, Boston, Massachusetts, and Earthrise Farms, Calipatria, California, announced on-going research, saying "Water extract of *Spirulina platensis* inhibits HIV-1 replication in human derived T-cell lines and in human peripheral blood mononuclear cells. A concentration of 5-10 µg/ml was found to reduce viral production"¹.

HIV-1 is the AIDS virus. Small amounts of *Spirulina* extract reduced viral replication while higher concentrations totally stopped its reproduction. Importantly, with a therapeutic index of >100, *Spirulina* extract was non-toxic to the human cells at concentrations stopping viral replication.

Another group of medical scientists has published new studies regarding a purified water extract unique to *Spirulina* named Calcium-Spirulan. It inhibits replication of HIV-1, Herpes Simplex, Human Cytomegalovirus, Influenza A virus, Mumps virus and Measles virus in-vitro yet is very safe for human cells. It protects human and monkey cells from viral infection in cell culture. According to peer reviewed scientific journal reports this extract, "holds great promise for treatment of ...HIV-1, HSV-1, and HCM infections, which is particularly advantageous for AIDS patients who are prone to these life-threatening infections."⁸.

Calcium-Spirulan is a polymerized sugar molecule unique to *Spirulina* containing both Sulfur and Calcium. Hamsters treated with this water soluble extract had better recovery rates when infected with an otherwise lethal Herpes virus⁹.

How does it work? When attacking a cell, a virus first attaches itself to the cell membrane. However, because of *Spirulina* extract, the virus cannot penetrate the cell membrane to infect the cell. The virus is stuck, unable to replicate. It is eventually eliminated by the body's natural defenses. *Spirulina* extracts may become useful therapeutics that could help AIDS patients lead longer, more normal lives^{1, 8, 9}.

What Is *Spirulina*? *Spirulina*, (rhymes with 'ballerina'), is a traditional food of some Mexican and African peoples. It is a planktonic blue-green algae found in warm water alkaline volcanic lakes. Wild *Spirulina* sustains huge flocks of flamingos in the alkaline East African Rift Valley Lakes. It possesses an amazing ability to thrive in conditions much too harsh for other algae. As might be expected, it has a highly unusual nutritional profile. *Spirulina* has a 62% amino acid content, is the world's richest natural source of Vitamin B-12 and contains a whole spectrum of natural mixed carotene and xanthophyll phytopigments. *Spirulina* has a soft cell wall made of complex sugars and protein, and is different from most other algae in that it is easily digested.

Millions of people worldwide eat *Spirulina* cultivated in scientifically designed algaefarms. Current world production of *Spirulina* for human consumption is more than one thousand metric tons annually. The United

States leads world production followed by Thailand, India and China. More countries are planning production as they realize it is a valuable strategic resource.

Differences between Spirulina, chlorella and 'wild' blue green algae. Spirulina is not Chlorella or the blue-green algae harvested from Klamath Lake Oregon. Chlorella, a green micro-algae, is a nutritious food but does not have the same anti-viral, anti-cancer and immune stimulating properties of Spirulina. The Chlorella cell wall is made of indigestible cellulose, just like green grass, while the cell wall of Spirulina is made of complexed proteins and sugars.

The Klamath Lake blue-green algae has the scientific name *Aphanizomenon flos-aquae*. It is not the same as Spirulina. There are serious concerns about the safety of eating *Aphanizomenon flos-aquae*⁵, because it can sometimes contain potent nerve toxins. While the scientific literature is full of information concerning the toxicity of *Aphanizomenon flos-aquae* and its dangers to humans and animals, there are few, if any, peer reviewed scholarly scientific papers regarding therapeutic benefit. In contrast, the scientific literature is full of information concerning the benefits and safety of humans and animals eating Chlorella and Spirulina⁴

Anti-Cancer Effects: Several studies show Spirulina or its extracts can prevent or inhibit cancers in humans and animals. Some common forms of cancer are thought to be a result of damaged cell DNA running amok, causing uncontrolled cell growth. Cellular biologists have defined a system of special enzymes called Endonuclease which repair damaged DNA to keep cells alive and healthy. When these enzymes are deactivated by radiation or toxins, errors in DNA go unrepaired and, cancer may develop. In vitro studies suggest the unique polysaccharides of Spirulina enhance cell nucleus enzyme activity and DNA repair synthesis. This may be why several scientific studies, observing human tobacco users and experimental cancers in animals, report high levels of suppression of several important types of cancer. The subjects were fed either whole Spirulina or treated with its water extracts^{3,12,13}.

Strengthens Immune System: Spirulina is a powerful tonic for the immune system. In scientific studies of mice, hamsters, chickens, turkeys, cats and fish, Spirulina consistently improves immune system function. Medical scientists find Spirulina not only stimulates the immune system, it actually enhances the body's ability to generate new blood cells.

Important parts of the immune system, the Bone Marrow Stem Cells, Macrophages, T-cells and Natural Killer cells, exhibit enhanced activity. The Spleen and Thymus glands show enhanced function. Scientists also observe Spirulina causing macrophages to increase in number, become "activated" and more effective at killing germs.

Feeding studies show that even small amounts of Spirulina build up both the humoral and cellular arms of the immune system¹⁶. Spirulina accelerates production of the humoral system, (antibodies and cytokines), allowing it to better protect against invading germs. The cellular immune system includes T-cells, Macrophages, B-cells and the

anti-cancer Natural Killer cells. These cells circulate in the blood and are especially rich in body organs like the liver, spleen, thymus, lymph nodes, adenoids, tonsils and bone marrow. Spirulina up-regulates these key cells and organs, improving their ability to function in spite of stresses from environmental toxins and infectious agents^{2,10,12,14,15,16}.

Spirulina Phycocyanin Builds Blood. Studies show that Phycocyanin affects the stem cells found in bone marrow. Stem cells are "Grandmother" to both the white blood cells that make up the cellular immune system and red blood cells that oxygenate the body.

Chinese scientists document Phycocyanin stimulating hematopoiesis, (the creation of blood), emulating the affect of the hormone erythropoetin, (EPO). EPO is produced by healthy kidneys and regulates bone marrow stem cell production of red blood cells. Chinese scientists claim Phycocyanin also regulates production of white blood cells, even when bone marrow stem cells are damaged by toxic chemicals or radiation¹⁷.

Based on this effect, Spirulina is approved in Russia as a "medicine food" for treating radiation sickness. The Children of Chernobyl suffer radiation poisoning from eating food grown on radioactive soil. Their bone marrow is damaged, rendering them immunodeficient. Radiation damaged bone marrow cannot produce normal red or white blood cells. The children are anemic and suffer from terrible allergic reactions. Children fed just five grams of Spirulina in tablets each day make dramatic recoveries within six weeks. Children not given Spirulina remain ill⁶.

Other Potential Health Benefits: Spirulina is one of the most concentrated natural sources of nutrition known. It contains all the essential amino acids, rich in chlorophyll, beta-carotene and its co-factors, and other natural phytochemicals. Spirulina is the only green food rich in GLA essential fatty acid. GLA stimulates growth in some animals and makes skin and hair shiny and soft yet more durable. GLA also acts as an anti-inflammatory, sometimes alleviating symptoms of arthritic conditions.

Spirulina acts as a functional food, feeding beneficial intestinal flora, especially Lactobacillus and Bifidus. Maintaining a healthy population of these bacteria in the intestine reduces potential problems from opportunistic pathogens like *E. coli* and *Candida albicans*. Studies show when Spirulina is added to the diet, beneficial intestinal flora increase.

Conclusion: Based on this preliminary research, scientists hope the use of Spirulina and its extracts may reduce or prevent cancers and viral diseases. Bacterial or parasitic infections may be prevented or respond better to treatment and wound healing may improve. Symptoms of anemia, poisoning and immunodeficiency may be alleviated. Scientists in the USA, Japan, China, Russia, India and other countries are studying this remarkable food to unlock its potential. More research is needed to determine its usefulness against AIDS and other killer diseases. However, it is already clear this safe and natural food provides concentrated nutritional support for optimum health and wellness.

How safe is Grreen Magic? During the 1970's, many extensive safety tests of Grreen Magic's constituents were made with animals and fish. Independent feeding tests in France, Mexico, and Japan showed no undesirable or toxic side effects on humans, rats, pigs, chickens, fish, and oysters. In Japanese rat trials, no negative effects at all were found for acute or chronic toxicity or reproduction.

Moreover, in 1980, the United Nations Industrial Development Organization sponsored the most important and comprehensive study on rats and mice. Spirulina comprised 10 to 35% of the total diet. No second or third generation reproduction, fertility, lactation, or birth defect problems were found. No cancer causing properties were found. No problems with heavy metals, nucleic acids, pesticides, or bacteria were found.

Chlorella has also been intensely studied. It offers many of the benefits of Spirulina as well as some unique ones of its own. One of the most important properties of Chlorella is the ability of its crushed cell walls to bind toxic heavy metals and remove them from the body. Chlorella is used extensively in Japan as a human, animal, and fish food supplements to reach and maintain optimum health.

Specially grown wheat grass is also an important component in our supplements. Among other important nutrients, it provides a source of chelated trace minerals. Many of these crucial minerals are largely missing from today's seriously depleted soils and without them, the nutrient value of plants is greatly diminished, causing a nutritional deficit and a significant health impact passing up the food chain. This results in chronic systemic problems and diminished resistance to disease of all kinds.

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