

Chlorella – A Potent Super Food

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Chlorella is a single cell fresh water green microalgae that is loaded with nutrients. It contains more nucleic acids (RNA/DNA) than any other food, which gives it a lot of energy producing potential. It is a great supplement to boost any diet lacking in green vegetables. It's great for children, and it has a wide variety of useful nutritional applications, which include supporting natural detoxification, digestive health, immune function, inflammation reduction, antioxidant function, estrogen balance, cholesterol metabolism, and circulation.

Chlorella contains more chlorophyll than most plants, along with an impressive array of vitamins and minerals (A, D, E, K[1], beta carotene, lutein, B vitamins, iron, calcium, potassium, phosphorus, magnesium, and zinc).

Chlorella is one of the most vibrant and energetic organisms on earth, able to reproduce rapidly due to its highly active cellular components. These nutritious factors are called Chlorella Growth Factor (CGF). CGF is a mix of its nucleic acids along with important glyconutrients (glucose, mannose, rhamnose, arabinose, galactose, and xylose) and amino acids (glutamine, alanine, serine, glycine, proline, asparagine, threonine, lysine, cysteine, tyrosine, and leucine).

Chlorella is being actively researched around the world as a key food to support human nutrition and offset many of the stressors that induce wear and tear in our lives because of its unique concentration of nutrients as well as the energetic structure of these nutrients.

Chlorella is a Natural Detoxifier and Antioxidant Helper

Chlorella is one of the top nutrients for absorption of toxic metals. This information is well known in the field of environmental toxicology, where industrial pollution threatens the survival of chlorella due to high levels of exposure. Chlorella readily absorbs toxins such as uranium[1], cadmium[2], and mercury.[3]

The primary method chlorella uses to bind metal toxins is to sequester them on its cell wall.[4] This makes sense, as letting them into its cell interior as a first method of defense would cause cell malfunction eventually leading to cell death. Chlorella has survived for 2 billion years, so you can assume its basic strategy for protecting itself from poisons is pretty darn good.

Of course, supplemental chlorella is no longer living but these metal attracting properties of its cell wall appear to remain quite functional. For example, a study with mice showed that exposure to lead was reduced 66 percent when chlorella was given at the same time. If the lead exposure was previous, then chlorella helped reduce it by 17 percent with 10 days of supplementation. The equivalent dose of chlorella for a 150 pound adult is 3,500 mg per day. Obviously, once the lead was in the body of the animals it was harder to get out, compared to the ability of chlorella to sequester it in the digestive tract and prevent its absorption in the first place. Regardless, chlorella is a powerful tool in the natural detoxification toolbox.

In addition to its metal binding capacity chlorella has been shown to help protect against other toxins by supporting antioxidant status and preventing lipid damage. Exposing rats to mothball poison (naphthalene) resulted in serious free radical damage to the rat's liver and kidneys, while depleting numerous antioxidants (superoxide dismutase, catalase, glutathione peroxidase, glutathione, ascorbic acid, and alpha-tocopherol). Supplemental chlorella significantly reduced the free radical damage while simultaneously keeping the other antioxidants near normal levels. An equivalent human dose of chlorella for a 150 pound adult is 5,000 mg.

Another study showed that chlorella can directly modulate the core gene signal, NF-kappaB , which regulates the inflammatory response by helping quench inflammation. When there is too much inflammation antioxidants are rapidly depleted.

PCBs and their more toxic derivatives, furans, and dioxins, pose one of the great health challenges to all Americans. Monsanto, GE, and Westinghouse poisoned the United States with these toxins before they were made to stop. The problem is the toxins degrade very slowly and actually become more toxic as they degrade (for example, PCBs forming dioxins). These are fat soluble toxins that readily accumulate in the food chain and now permeate our food supply – with virtually all Americans proven to have excess amounts of these chemicals in their stored fat. They are also released during weight loss – any will poison a person trying to lose weight if they are not cleared properly by natural detoxification systems. PCBs are known to get in the way of thyroid function.

They also accumulate in breast tissue, increase breast cancer risk for certain genetic types, and pose a huge challenge to thyroid function – especially in a nursing baby (many mothers have elevated PCBs and dioxins in their milk). Exposure of high levels of these toxins during pregnancy and lactation are linked to nerve development disorders including ADHD and reduced intelligence.

A Japanese study with healthy pregnant women found that taking 6,000 mg of chlorella per day during pregnancy significantly reduced the amount of dioxins in breast milk compared to those not taking chlorella (a 40 percent reduction). Additionally, the study also showed an added immune benefit in that the sIGA of women taking chlorella was higher in their breast milk – meaning their children got better quality immune support.

Boosting Immunity and Lymph Function, Especially Under Stress

To get through life in one piece you must be able to withstand stress while maintaining your health. Too much stress provokes excessive inflammation that is core to undermining your health as well as depressing your immune system – a recipe for problems.

Chlorella has been found to preserve the function of important immune cells even in the presence of high stress. One study shows that thymocytes (lymph related immune cells that become regulatory T lymphocytes) were preserved by chlorella in the face of stress, while lowering the stress hormone cortisol. Another animal study shows that chlorella preserves the anti-viral defense system against cytomegalovirus, preventing infection induced death.

A recent study on human cells shows that chlorella boosts anti-inflammatory immune cell signals, favoring T Helper 1 activation. Many stressful factors provoke excessive and inappropriate activation of T Helper 2, leading to allergic hyper responses. This includes an overgrowth of *Candida albicans*, which directly communicates to the human immune system and confuses it into a pro-inflammatory and allergy-prone mode. This study suggests that chlorella should have a positive affect on reducing excessive and inappropriate pro-inflammatory immune responses.

An animal study shows that chlorella maintained the production of macrophages even under conditions of extreme stress (tumor exposure). The development of new macrophages is not only vital for bone health (so that too many osteoclasts are not made), but it is also essential for the proper functioning of the lymphatic system. Macrophages are your natural cleaning crew in your lymph system. Too many Americans suffer from sluggish lymphatic function (stiff shoulders, excessive mucous, pressure headaches, feeling crummy in the morning). An equivalent human dose for a 150 pound adult would be 3,500 mg to 14,000 mg per day (3.5-14 grams), amounts likely to support natural detoxification processes.

Estrogen Overload

A main problem women face is too much estrogen, resulting in a myriad of female issues. Estradiol levels naturally rise each month in the first half of the menstrual cycle as an egg is ripened. Once the egg is released, estradiol has done its job and must be cleared. The liver conjugates estradiol (binds it to a protein) for clearance and then places it into bile, which travels through the gall bladder and into the digestive tract for final elimination.

If digestive tract contents are too hostile (unfriendly bacteria) then the conjugation bond may be eaten by the bacteria, which causes estradiol to be released and re-enter the body. This is highly undesirable as it exposes the body to estrogen that is not appropriate. This can increase estrogen related cancer risk, gall stone formation, and endometrial overgrowth, as well as numerous menstrual cycle irregularities associated with high estrogen (bloating, breast swelling/tenderness, headaches, heavy flow, and/or cramps).

A study shows that chlorella actively biotransforms estradiol into estrone, and helps clear estrone as well – leaving estriol, your friendly antioxidant form of estrogen, alone. This study suggests that any woman with a combination of digestive distress and high estrogen symptoms would benefit from taking chlorella – a simple solution that can be judged to be working by improvement in digestive and female symptoms.

Chlorella Supports Healthy Cholesterol Metabolism

Numerous animal studies and a few human studies support chlorella's ability to favorably impact cholesterol metabolism. The mechanism was identified in a recent study showing that chlorella helps the liver convert cholesterol into bile – thus supporting the natural process by which your body clears cholesterol. It also helps sequester the bile in your digestive tract so that the cholesterol was not reabsorbed back into your body. Soluble fiber is synergistic with chlorella in supporting proper clearance of cholesterol from your digestive tract, so that higher than normal amounts are not reabsorbed back into your body. Because toxins that are being cleared are also within the bile, this same mechanism enhances toxin clearance as well as cholesterol clearance.

There are many natural ways to address cholesterol health by supporting proper metabolism. Chlorella's ability to help both the liver and digestive tract clear cholesterol means that it can be used in harmony with many other nutrients that also support healthy cholesterol metabolism for different reasons.

Blood Pressure

Numerous animal studies and one small human study indicate that chlorella provides important nutrients that support healthy vascular function. In the human study a dose of 10,000 mg of chlorella per day helped 25 percent of the participants correct elevated diastolic blood pressure (the lower number) and maintain it in the normal range.

Evaluation of blood components in the animal studies show enhanced antioxidant function in the vascular system as well as higher amounts of the protein arginine, which helps support vascular relaxation.

Summary

Chlorella is an effective natural source of nutrition with many useful applications to help keep you healthy. It can be used to shore up a diet lacking in vegetables, reduce inflammation, and offset more

specific problems such as excessive toxin exposure – especially to metals. It helps boost your antioxidant status, and so is synergistic with many other antioxidants you may take. Chlorella is one more great nutrient to support cardiovascular health and immunity.

Referenced Studies:

- [1] Chlorella Binds Uranium *Aquat Toxicol.* Hogan AC, van Dam RA, Markich SJ, Camilleri C.
- [2] Chlorella Binds Cadmium *Environ Toxicol Chem.* Franklin NM, Stauber JL, Lim RP, Petocz P.
- [3] Chlorella Bind Mercury *Arch Microbiol.* Kelly DJ, Budd K, Lefebvre DD.
- [4] Chlorella Binds Toxic Metals to Its Cell Surface *Arch Environ Contam Toxicol.* Wilde KL, Stauber JL, Markich SJ, Franklin NM, Brown PL.
- [5] Chlorella Chelates Lead *Int Immunopharmacol.* Queiroz ML, Rodrigues AP, Bincoletto C, Figueirêdo CA, Malacrida S.
- [6] Chlorella Reduces Inflammation at the Gene Level *Biosci Biotechnol Biochem.* Lee HS, Choi CY, Cho C, Song Y.
- [7] Thyroid-Depressing Toxins Released During Weight Loss *Toxicol Sci.* Pelletier C, Doucet E, Imbeault P, Tremblay A.
- [8] Dioxins and PCBs Affect Thyroid Function *Pediatr Res.* Koopman-Esseboom C, Morse DC, Weisglas-Kuperus N, Lutkeschipholt IJ, Van der Paauw CG, Tuinstra LG, Brouwer A, Sauer PJ.
- [9] PCBs Cause Breast Cancer in Susceptible Women *Am J Epidemiol.* Zhang Y, Wise JP, Holford TR, Xie H, Boyle P, Zahm SH, Rusiecki J, Zou K, Zhang B, Zhu Y, Owens PH, Zheng T.
- [10] PCB Exposure has Long Term Health Consequence for Children *N Engl J Med.* Jacobson JL, Jacobson SW.
- [11] Chlorella Reduces Dioxin Content of Breast Milk *Journal Med Food.* Nakano S, Takekoshi H, Nakano M.
- [12] Chlorella Offsets Stress and Preserves Immunity *Int J Immunopharmacol.* Hasegawa T, Noda K, Kumamoto S, Ando Y, Yamada A, Yoshikai Y.
- [13] Chlorella Supports Anti-Viral Defense *Nat Immun Cell Growth Regul.* Ibusuki K, Minamishima Y.
- [14] Chlorella Supports Antiinflammatory Immune Response *Planta Med.* Ewart HS, Bloch O, Girouard GS, Kralovec J, Barrow CJ, Ben-Yehudah G, Suárez ER, Rapoport MJ.
- [15] Chlorella Boost Macrophages, Supporting Immunity *Immunopharmacol Immunotoxicol.* Justo GZ, Silva MR, Queiroz ML.
- [16] Chlorella Helps Clear Estrogen *Appl Environ Microbiol.* Lai KM, Scrimshaw MD, Lester JN.
- [17] Chlorella Helps Metabolize and Clear Cholesterol *Biosci Biotechnol Biochem.* Shibata S, Hayakawa K, Egashira Y, Sanada H.
- [18] Chlorella Supports Blood Pressure Health *J Med Food.* Merchant RE, Andre CA, Sica DA.
- [19] Chlorella Nourishes Circulatory System *J Nutr Sci Vitaminol (Tokyo).* Sansawa H, Takahashi M, Tsuchikura S, Endo H.

<http://www.wellnessresources.com/tips/articles/chlorella/>