



**A Compendium of Research on Key Components of
Health-Right Discoveries
Advanced H-Plex Defense Formula 11**

The referenced abstracts are available in their entirety at www.pubmed.org along with considerably more research conducted on the components of this wellness formula. PubMed is a database accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics. The United States National Library of Medicine (NLM) and the National Institutes of Health maintain the database as part of the Entrez information retrieval system.

I. INTRODUCTION

There are several key functions of an effective wellness supplement. One is the ability to scavenge free radicals in the body. Another is the ability to increase components of the immune system, so it is better able to respond quickly to foreign substances in the body, such as viruses and bacteria, before an infection can take hold. It is also essential to help support the body in maintaining a balanced internal environment.

A free radical is an atom which contains an unpaired electron in its outer ring. Electrons have a strong tendency to exist in pairs, so an atom with a single electron will scavenge other molecules until it can find another electron to pair up with. That molecule's structure is then changed and can begin a chain reaction leading to significant physiological damage, right down to the DNA level. Free radicals can be formed from exposure to x-rays, ultraviolet rays, cigarette smoke, and air pollution to name a few. However, the body produces its own free radicals during its metabolic processes which are crucial to life. A person can take all the precautions to avoid exposure to damaging environmental elements, but will still have free radicals in the body. Even doing something good for the body, such as exercise, generates free radicals.

Antioxidants are free radical scavengers. These protective molecules donate electrons to the free radicals and neutralize them, shutting down the chain reaction and preventing cells from being oxidized. The capacity of a substance to neutralize free radicals is measured in ORAC units (Oxygen Radical Absorbing Capacity). The higher the ORAC value, the greater the ability to scavenge free radicals. Certain vitamins and enzymes act as antioxidants, including vitamin C, vitamin E, CoQ10, and glutathione, as well as substances such as green tea and olive leaf extract.

Each component of our formula is backed by legitimate, published scientific research. Each one has been shown to significantly impact wellness by its strong antioxidant capacity, its ability to enhance immune function, or its ability to keep the body in a neutral, balanced state.

II. ADDITIONAL KEY COMPONENTS FOUND IN ADVANCED H-PLEX DEFENSE FORMULA 11

PRUNELLA VULGARIS

Prunella vulgaris, also known as Selfheal, is a medicinal plant commonly used in herbal medicine to treat numerous ailments, including burns, wounds and sores. Studies have shown it to be effective in stopping viral growth of both HSV-1 and HSV-2, including acyclovir-resistant strains.

- **Nolkemper, S., Reichling, J., Stintzing, F.C., Carle, R., Schnitzler, P. (2006): Antiviral effects of aqueous extracts from species of the Lamiaceae family against Herpes simplex virus type 1 and type 2 in vivo. *Planta Med* 72(15):1378-82**
In this study, *Prunella vulgaris* showed highly effective antiviral activity against HSV-1, HSV-2 and an acyclovir-resistant strain of Herpes simplex virus.
 - **Zheng, M.(1990): Experimental study of 472 herbs with antiviral action against herpes simplex virus. *Zhong Xhi Yi Jie He Za Zhi*.10(1):39-41 (Article in Chinese)**
This study demonstrated that *Prunella vulgaris* is a highly effective herb against the Herpes simplex virus.
 - **Chiu, L.C., Zhu, W., Ooi, V.E. (2004): A polysaccharide fraction from medicinal herb *Prunella vulgaris* downregulates the expression of herpes simplex virus antigen in Vero cells. *J. Ethnopharmacol.* 93(1):63-8**
This study shows that a polysaccharide from *Prunella vulgaris* reduced the expression of the HSV antigen and is effective against both HSV-1 and HSV-2. Its mode of action differs from that of acyclovir, a common antiviral medication prescribed for HSV, and has been shown to also reduce the expression of acyclovir-resistant HSV.
 - **Zhang, Y., But, P.P., Ooi, V.E., Xu, H.X., Delaney, G.D., Lee, S.H., Lee, S.F. (2007): Chemical properties, mode of action, and in vivo anti-herpes activities of a lignin-carbohydrate complex from *Prunella vulgaris*. *Antiviral Res.* 75(3):242-9**
This study showed that the polysaccharide from *Prunella vulgaris* demonstrated activities against HSV-1 and HSV-2 by interfering with viral binding and cell penetration. Guinea pigs and mice administered with *Prunella vulgaris* cream showed a reduction in skin lesions and symptoms of HSV.
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L-LYSINE

L-lysine is the active form of lysine, one of the body's essential amino acids. A person must ingest lysine via diet or supplements as it cannot be produced by the body. Good dietary sources of lysine are meat, dairy and legumes. Studies have shown that supplementing with lysine can inhibit growth and replication of the herpes virus.

- **Griffith, R.S., Walsh, D.E., Myrmel, K.H., Thompson, R.W., Behforooz, A. (1987): Success of L-lysine therapy in frequently recurrent herpes simplex infection. Treatment and prophylaxis. *Dermatologica* 175(4): 183-90**
This double-blind, placebo-controlled study showed that oral supplementation with L-lysine is effective in reducing the occurrence, severity and healing time for recurrent HSV infection.
- **McCune, M.A., Perry, H.O., Muller, S.A., O'Fallon, W.M. (1984): Treatment of recurrent herpes simplex infections with L-lysine monohydrochloride. *Cutis* 34(4): 366-73**
This randomized, double-blind, placebo-controlled study showed that oral supplementation with L-lysine reduced the severity of symptoms associated with recurrent HSV infection.
- **Singh, B.B., Udani, J., Vinjamury, S.P., Der-Martirosian, C., Gandhi, S., Khorsan, R., Nanjegowda, D., Singh, V. (2005): Safety and effectiveness of an L-lysine, zinc and herbal-based product on the treatment of facial circumoral herpes. *Altern Med Rev* 10(2):123-7**
This study showed that a supplement containing L-lysine significantly relieved the symptoms in subjects with facial and circumoral herpes infections.

RED MARINE ALGAE

Red marine algae, or Rhodophyta, has exhibited antiviral and immune-enhancing properties. Clinical trials have shown it to be effective against the Herpes simplex virus, HIV, and the influenza virus.

- **Bouhhal, R., Haslin, C., Chermann, J., Collic-Jouault, S., Simon, G., Cerantola, S., Riadi, H., Bourgougnon, N. (2011): Antiviral activities of sulfated polysaccharides isolated from *Sphaerococcus coronopifolius* (Rhodophyta, Gigartinales) and *Boergeseniella thuyoides* (Rhodophyta ceramiales). *Mar Drugs* 9(7): 1187-1209**
This study showed that the Red Marine Algae polysaccharides were able to inhibit the replication of the Herpes simplex virus in vitro. The mode of action involved interfering with the adsorption step of HSV-1 to the host cell.
- **Harden, E.A., Falshaw, R., Carnachan, S.M., Kern, E.R., Prichard, M.N.(2009): Virucidal activity of polysaccharide extracts from four algal species against herpes simplex virus. *Antiviral Res* 83(3): 282-9**
This study concluded that extracts from marine algae are nontoxic and potent antiviral agents, effective at low concentrations.
- **Deig, E.F., Ehresmann, D.W., Hatch, M.T., Reidlinger, D.J.(1974):Inhibition of herpesvirus replication by marine algae extracts. *Antimicrob Agents Chemother* 6(4): 524-5**
This study showed that two types of Red Marine Algae inhibited Herpes simplex virus replication in vivo.

ASTAXANTHIN

Astaxanthin is a colorful, fat-soluble carotenoid found in microalgae, yeast, salmon, shrimp, krill, etc. It is a potent antioxidant and anti-inflammatory that has been demonstrated to be safe in numerous human clinical trials. Astaxanthin has a broad range of clinical benefits, from boosting immunity and improving cholesterol to protecting the body from age-related functional decline.

- **Kidd, P. (2011): Astaxanthin, cell membrane nutrient with diverse clinical benefits and anti-aging potential. *Altern Med Rev* 16(4): 355-64**
This literature review summarized the results of several published studies on Astaxanthin, including double-blind, randomized controlled trials in humans, and showed that Astaxanthin improved immune function, inflammation levels, triglycerides, cholesterol, cognitive function, sports performance, reproductive performance, and reflux symptoms.
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- **Fassett, R.G., Coobes, J.S. (2009): Astaxanthin, oxidative stress, inflammation and cardiovascular disease. *Future Cardiology* 4(3):333-342**
This study shows that Astaxanthin supplementation may be effective in the treatment of cardiovascular, inflammatory, immune and neurodegenerative diseases.
- **Choi, H.D., Kim, J.H., Chang, M.J., Kyu-Youn, Y., Shin, W.G. (2011): Effect of Astaxanthin on Oxidative Stress in Overweight and Obese Adults. *Phytother Res* 25(12): 1813-8**
This study showed that supplementing with Astaxanthin for 3 weeks significantly lowered the amount of oxidative stress and stimulated the antioxidant defenses in overweight adults.
- **Park, J.S., Chyun, J.H., Kim, Y.K., Line, L.L., and Chew, B.P. (2010): Astaxanthin decreased oxidative stress and inflammation and enhanced immune response in humans. *Nutr Metab* 7:18.**
This study showed that dietary Astaxanthin significantly lowered CRP levels, indicating a decrease in systemic inflammation, and enhanced immune response in healthy, young females.
- **Nakagawa, K., Kiko, T., Miyazawa, T., Carpennero Burdeos, G., Kimura, F., Satoh, H., Miyazawa, T. (2011): Antioxidant effect of Astaxanthin on phospholipid peroxidation in human erythrocytes. *British Journal of Nutrition* 31: 1-9**
This study showed that supplementation with Astaxanthin improved erythrocyte antioxidant status and may contribute to the prevention of dementia.

OLIVE LEAF EXTRACT

Olive Leaf Extract (*Olea europaea*) has been known for its medicinal properties since ancient times. Laboratory bioassays show its antibacterial, antifungal, and anti-inflammatory effects. It is a well-researched, non-toxic, potent immunity enhancer.

- **Ali, N.H., Faizi, S. and Kazmi, S.U. (2011): Antibacterial activity in spices and local medicinal plants against isolates of Karachi, Pakistan. *Pharm Biol.*, 49: 833-39**
This study identified Olive Leaf Extract as being a safe antimicrobial agent with the ability to control infections by drug-resistant bacteria.
- **Lee, O.H. and Lee B.Y. (2010): Antioxidant and antimicrobial activities of individual and combined phenolics in *Olea europaea* leaf extract. *Bioresour. Technol.*, 101: 3751-3754**
This study showed that Olive Leaf Extract possesses antioxidant and antimicrobial properties.
- **Stevenson, L, et al. Oxygen Radical Absorbance Capacity (ORAC) Report on Olive Leaf Australia's Olive Leaf Extract, Southern Cross University (2005)**
This study showed that Olive Leaf Extract (*Olea europaea*) is a powerful antioxidant with an ORAC level almost twice that of green tea and four times that of Vitamin C.
- **Goulas, V., Exarchou, V., Troganis, A.N., Psomiadou, E., Fotsis, T., Briasoulis, E. and Gerothanassis, I.P. (2009): Phytochemicals in olive-leaf extracts and their antiproliferative activity against cancer and endothelial cells. *Mol. Nutr. Food Res.*, 53: 600-608**
This study showed Olive Leaf Extract is a potent antioxidant and inhibited the growth of cancer and endothelial cell proliferation.
- **Jemai, H., Bouaziz, M., Fki, I, El Feki, A. and Sayadi, S. (2008): Hypolipidemic and antioxidant activities of oleuropein and its hydrolysis derivative-rich extracts from Chemlali olive leaves. *Chem Biol. Interact.*, 176: 88-98**
This study showed Olive Leaf Extract to be effective in lowering LDL(bad) cholesterol levels and increasing HDL(good) cholesterol levels in rats. The results also suggested this improvement in blood cholesterol may be due to its ability to slow lipid peroxidation and enhance antioxidant enzyme activity.
- **Poudyal, H., Campbell, F. and Brown, L. (2010): Olive leaf extract attenuates cardiac, hepatic, and metabolic changes in high-carbohydrate, high fat-fed rats. *J Nutr.*, 140: 946-953**
This study showed that Olive Leaf Extract reversed the oxidative stress and chronic inflammation associated with diet-induced obesity and diabetes in rats.

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- **Turkez, H. and Togar, B. (2011): Olive (*Olea europaea* L.) leaf extract counteracts genotoxicity and oxidative stress of permethrin in human lymphocytes. *J. Toxicol. Sci.*, 36:531-537**
This study showed that Olive Leaf Extract was genoprotective and an effective antioxidant against permethrin-induced toxicity (from a common pesticide)

BETA-GLUCAN

Beta-glucans are naturally-occurring sugars that are extracted from grains, seaweed, and mushrooms. The body recognizes them as foreign substances, so their presence stimulates the immune system to generate macrophages. Macrophages are immune cells that recognize, engulf and digest invading cells. The presence of beta glucans in the body leads to having an increased number of macrophages available to fight infection when a harmful foreign substance, such as a virus, is detected. Beta-glucans have been well-studied and numerous human clinical trials have been performed showing their effectiveness in enhancing immune response.

- **Miura, N.N., Ohno, N., Aketagawa, J., Tamura, H., Tanaka, S and Yadomae, T. (1996): Blood clearance of (1,3)-beta-D-glucan in MRL lpr/lpr mice. *FEMS Immunol. Med Microbiol.*, 13:51-57**
This study considers Beta-glucans "biological response modifiers" due to their ability to activate the immune system.
 - **Babineau, T.J., Marcello, P., Swails, W., Kenler, A., Bistrain, B., Forse, R.A. (1994): Randomized Phase I/II trial of a macrophage-specific immunomodulator (PGG-glucan) in high-risk surgical patients. *Annals of Surgery* 220(5): 601-09**
This double-blind, placebo-controlled clinical trail showed that patients administered Beta glucans had significantly fewer infectious complications after surgery than those who received the placebo.
 - **Onderdonk, A.B., Cisneros, R.L., Hinkson, P., Ostroff, G. (1992): Anti-infective effect of poly-beta 1-6 glucotriosyl-beta 1-3 glucopyranose glucan in vivo. *Infection and Immunity* 60(4): 1642-1647**
In this study, mice were infected with either *E. coli* or *S. aureus* bacteria. It showed the mice administered beta-glucan 4-6 hours prior to infections were protected against septic infections.
 - **Kogan, G., Stasko, A., Bauerova, K., Polovka, M., Soltes, L., Brezova, V., Navarova, J.(2005): Antioxidant properties of yeast (1-3)- β -D-glucan studied by electron paramagnetic resonance spectroscopy and its activity in the adjuvant arthritis. *Carbohydrate Polymers* 61:18-28**
This study showed yeast-derived glucan reduced the oxidative damage to tissues that occurs with the progression of arthritic disease. These results suggest beta-glucans may be effective in the treatment of arthritis.
 - **Zhou, L.D., Zhang, Q.H., Zhang, Y., Liu, J. and Cao, Y.M. (2009): The shiitake mushroom-derived immunostimulant lentinan protects against murine malaria blood-stage infection by evoking adaptive immune-responses. *Int Immunopharmacol.*, 9:455-62**
This study showed that lentinan, a (1,3)-beta glucan, is an effective immune stimulator that has potential to be prophylactic for the treatment of malaria.
 - **Vetvicka, V., Terayama, K., Mandeville, R., Brousseau, P., Kournikakis, B., and Ostroff, G., (2002): Pilot Study: Orally-Administered Yeast β 1,3-glucan Prophylactically Protects Against Anthrax Infection and Cancer in Mice. *Journal of the American Nutraceutical Association* 5:5-9**
This study conducted by the Canadian Department of Defense showed that mice that ingested beta-glucans were protected against anthrax infection.
 - **Kirmaz, C., Bayrak, P., Yilmaz, O., Yuksel, H. (2005): Effects of glucan treatment on the Th1/Th2 balance in patients with allergic rhinitis: a double-blind, placebo-controlled study. *European Cytokine Network* 16: 128-134**
This study showed that orally-administered yeast-glucan decreased the level of inflammatory cytokines responsible for the clinical symptoms of allergic rhinitis.
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ASHWAGANDHA (*Withania somnifera*)

Ashwagandha (*withania somnifera*) is a shrub that has been used as an Ayurvedic herbal remedy for centuries. It is considered an adaptogen, a nontoxic medication that normalizes physiological functions, disturbed by chronic stress. Hundreds of research studies have been performed on Ashwagandha and have demonstrated it safe and effective in enhancing immune function, reducing inflammation, combating the effects of stress, and improving blood sugar, cholesterol and memory.

- **Bhatnagar, M., Sharma, D., Salvi, M. (2009): Neuroprotective effects of *Withania somnifera* dunal: A possible mechanism. *Neurochem Res* 34(11): 1975-83**
This study focused on the Ashwagandha-mediated inhibition of neurodegeneration during stress. The results indicate Ashwagandha can be used as a preventive or therapeutic agent for stress-induced neurological disorders.
- **Kulkarni, S.K., Dhir, A. (2008): *Withania somnifera*: an Indian ginseng. *Prog Neuropsychopharmacol Biol Psychiatry* 32(5): 1093-105.**
This review outlines the pharmacological basis of Ashwagandha's use to combat stress and disorders of the central nervous system.
- **Kushwaha S, Roy S, Maity R, Mallick A, Soni VK, Singh PK, Chaurasiya ND, Sangwan RS, Misra-Bhattacharya S, Mandal C. (2012): Chemotypical variations in *Withania somnifera* lead to differently modulated immune response in BALB/c mice. *Vaccine* 30(6): 1083-93**
This study showed *Withania somnifera* demonstrated immunostimulatory activity.
- **Datta S, Kumar Pal NK, Nandy AK (2011): Inhibition of the emergence of multi drug resistant *Staphylococcus aureus* by *Withania somnifera* root extracts. *Asian Pac J Trop Med* 4(11):917-20.**
This study demonstrated the antimicrobial properties of *W. somnifera* and concluded it may be an effective therapy for multi drug resistant staphylococcal infections.
- **Ganesan K, Sehgal PK, Mandal AB, Sayeed S. (2011): Protective effect of *Withania somnifera* and *Cardiospermum halicacabum* extracts against collagenolytic degradation of collagen. *Appl Biochem Biotechnol* 165(3-4): 1075-91**
The results of this study suggest that *Withania somnifera* inhibits the collagenases that are involved in the degradation of cartilage, tendon, and bone that occurs in rheumatoid arthritis and osteoarthritis. It concludes that *Withania somnifera* facilitates collagen stabilization.

SUPPLEMENT MINERALS

The human body is not able to manufacture its own minerals, so they must be obtained through food or dietary supplementation. The body depends on minerals to maintain a proper chemical balance. Minerals function as coenzymes and are crucial for important physical processes such as immune function, energy production, proper utilization of vitamins, fluid balance, growth, and healing. Potassium is important for proper functioning of the nervous system and is critical in maintaining fluid balance. Magnesium helps form bones, and prevents cardiovascular disease and osteoporosis. A deficiency in even a single mineral can lead to illness. If sufficient minerals are not circulating in the body, the body will leech them from tissues such as bone.

Mineral supplements, such as Potassium Bicarbonate, Potassium Glycinate, DiCalcium Malate, and Magnesium Glycinate, also help to maintain a neutral or slightly alkaline environment in the body and promote overall health. Supplementation with bicarbonates has also been shown to improve sports performance.

- **He, F.J., Marciniak, M., Carney, C., Markandu, N.D., Anand, V., Fraser, W.D., Dalton, R.N., Kaski, J.C., MacGregor, G.A. (2010): Effects of potassium chloride and potassium bicarbonate on endothelial function, cardiovascular risk factors and bone health in mild hypertensives. *Hypertension* 55(3): 681-8**
This study demonstrated that supplementing with Potassium Bicarbonate may improve bone health.
 - **Houston, M. The role of magnesium in hypertension and cardiovascular disease (2011). *J Clin Hyperten* 13(11): 843-7**
This study states that oral magnesium supplementation decreases blood pressure, increases nitric oxide, improves endothelial dysfunction and induces vasodilation.
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- **Frassetto, L. Sebastian, A. (1996) Age and systemic acid-base equilibrium: analysis of published data. *J Gerontol A Biol Sci Med Sci* 51: B91-99**
This literature review showed that metabolic acidosis may be responsible for the age-related decline in kidney function and should be considered a factor in age-related degenerative diseases.
- **Abramowitz, M.K., Hostetter, T.H., Melamed, M.L. (2011): Association of serum bicarbonate levels with gait speed and quadriceps strength in older adults. *Am J Kidney Dis* 58(1): 29-38**
This study showed that lower levels of serum bicarbonate were associated with a slower gait speed and decreased quadriceps strength.
- **Wu, C.L., Shih, M.C., Yang, C.C., Huang, M.H., Chang, C.K. (2010): Sodium bicarbonate supplementation prevents skilled tennis performance decline after a simulated match. *J Int Soc Sports Nutr* 7:33**
This study demonstrates that bicarbonate supplementation could increase performance and delay fatigue during intermittent high-intensity exercise.

VITAMIN D

Vitamin D is a fat-soluble vitamin that promotes calcium absorption in the gut and is needed for bone growth and bone remodeling. In addition, Vitamin D plays an important role in immune function, neuromuscular function, cell growth, and reduction of inflammation in the body. Current research has shown Vitamin D to be a combatant against several types of cancer. There are two main forms of Vitamin D: Vitamin D2 (ergocalciferol) and Vitamin D3 (cholecalciferol). Vitamin D3 is made in the skin when it reacts with UV light. Very few foods, other than those fortified with it, contain Vitamin D so it is important to supplement in order to get adequate amounts.

- **Wimalawansa, S.J. (2011): Vitamin D: an essential component for skeletal health. *Ann N Y Acad Sci* 1240:E1-12.**
This article states that Vitamin D enhances calcium absorption from the intestines and mineralization of osteoid tissue; improves muscle strength and coordination, insulin release, immunity; and prevents infection and cancers.
- **Grant, W.B., Holick, M.F. (2005): Benefits and requirements of Vitamin D for optimal health : a review. *Altern Med Rev* 10(2): 94-111**
This review stated that Vitamin D receptor ligands have been shown to increase the activity of natural killer cells and enhance the phagocytic activity of macrophages, both important immune system components. It also reviewed the numerous studies on Vitamin D that showed it to be linked to a decrease in several forms of cancer.
- **Holick, M.F. (2004): Vitamin D: importance in the prevention of cancers, type 1 diabetes, heart disease and osteoporosis. *Am J Clin Nutr* 79(3): 362-71**
This study emphasized the importance of adequate Vitamin D intake, as a deficiency has been linked to an increased risk of several common cancers, diabetes, cardiovascular disease and osteoporosis.
- **Cannell, J.J., Vieth, R., Umhau, J.C., Holick, M.F., Grant, W.B., Madronich, S., Garland, C.F., Giovannucci, E. (2006): Epidemic Influenza and Vitamin D. *Epidemiol Infect* 134(6): 1129-40**
This study states that active Vitamin D dramatically stimulates the expression of potent anti-microbial peptides, which exist in neutrophils, monocytes, natural killer cells, and in epithelial cells lining the respiratory tract where they play a major role in protecting the lung from infection.

The above references are just a small sampling of the prolific research done on the components of our Advanced Formulas. Abstracts and full articles can be found online at www.pubmed.org.



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