

YOUNGEVITY®
SCIENCE LIBRARY

RESEARCH STUDIES ON HEALTH EFFECTS OF
SELECT NUTRITIONAL FORMULATIONS



RESEARCH PERFORMED AT THE INSTITUTE OF
NUTRACEUTICAL RESEARCH, CLEMSON UNIVERSITY



THE VALUE OF RESEARCH

Youngevity® believes that research is paramount to supporting the value of its products. It is the first step to truly understanding the mechanisms that cause the Youngevity® products to provide exceptional health and overall wellness. To that end, Youngevity® sponsored this research.

YOUNGEVITY® INITIATES CLINICAL STUDIES AT CLEMSON UNIVERSITY'S INSTITUTE OF NUTRACEUTICAL RESEARCH

Studies Will Evaluate Potential Effects of Youngevity® Products on Human Biomarkers

Youngevity® contracted Clemson University's Institute of Nutraceutical Research to identify the potential benefits of two nutritional products. Youngevity's mission was to truly understand and clinically substantiate the health promoting benefits of the two formulations. Using Clemson – INR as a complete 3rd party researcher and academic university with no direct relationship, Youngevity® sought a fully unbiased perspective and evaluation of the formulas.

Multiple studies were recommended by Clemson scientists to provide a comprehensive evaluation of the formulas. Specific biomarkers were chosen to study in the areas of Safety, Inflammation, and Immune System Response.

To avoid any risk that any that the information in these studies will be perceived as evidence of an intent to promote or sell specific products, which is not our intent, we have refrained from disclosing the names of said researched products. We endeavor to reveal the research for informational and educational purposes only.

Youngevity®-developed formulations are evaluated scientifically. This report offers an assessment performed on two of Youngevity's best-selling products.

Formula 1

Vitamin A (7,500 IU), Vitamin C (1,000 mg), Vitamin D-3 (750 IU), Vitamin E (200 IU), Vitamin K (30 mcg), Thiamin (30 mg), Riboflavin (30 mg), Niacin (40 mg), Vitamin B-6 (30 mg), Folate (400 mcg), Vitamin B-12 (500 mcg), Biotin (600 mcg), Pantothenic Acid (150 mg), Calcium (50 mg), Iron (1 mg), Magnesium (20 mg), Zinc (2 mg), Selenium (100 mcg), Copper (1 mg), Chromium (200 mcg), Potassium (100 mg), Fruit and Vegetable Powder (500 mg), Organic Plant Extracts (300 mg), Glucosamine HCl (125 mg), Amino Acid Complex (alanine, arginine, aspartic acid, cystine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tyrosine and valine) (125 mg), MSM (100 mg), Chondroitin Sulfate (25 mg), Choline (25 mg), Inositol (25 mg), Dimethylglycine (20 mg), Bioflavonoids (15 mg), Grape Seed Extract (5 mg), Co-enzyme Q10 (3 mg), Boron (1 mg), Maltodextrin, citric acid, natural flavors, natural colors, fructose, fructooligosaccharides, pea protein, xanthan gum, stevia, sodium ascorbate, gallic acid, guar gum, ellagic acid.

Formula 2

Vitamin A (10,000 IU), Vitamin C (1,000 mg), Vitamin D3 (200 IU), Vitamin E (200 IU), Vitamin K1 (30 mcg), Vitamin B1 (30 mg), Vitamin B2 (30 mg), Vitamin B3 (30 mg), Vitamin B6 (30 mg), Folate (400 mcg), Vitamin B12 (500 mcg), Biotin (300 mcg), Pantothenic Acid (150 mcg), Calcium (600 mg), Iron (4 mg), Magnesium (300 mg), Zinc (15 mg), Selenium (100 mg), Copper (1 mg), Manganese (5 mg), Chromium (200 mcg), Sodium (0 mg), Potassium (100 mg), Choline (30 mg), Inositol (30 mg), Boron (1 mg), Amino Acid Complex (alanine, arginine, aspartic acid, cystine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tyrosine, valine) (125 mg), Grape Seed Extract (25 mg), CoEnzyme Q-10 (5 mg), Dimethyl Glycine (25 mg), Paba (30 mg) Citrus Bioflavonoids (13 mg), GDL (as glucono delta lactone) (150 mg), Plant Derived Minerals (600 mg), Purified Water, Plant Derived Minerals, Natural Vegetable Glycerine, CitriSweet, Sodium Erythorbate, Citric Acid, Malic Acid, Natural Flavors Blend, Xanthan Gum, Stevia, Sodium Benzoate, Potassium Sorbate.



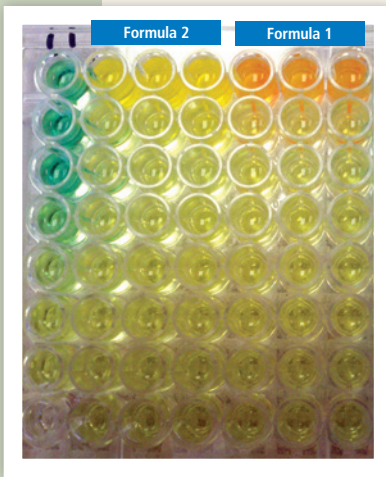
SAFETY

Dietary supplement safety is one of the most highly-regarded aspects of nutritional supplements. Ensuring that formulations are not "genotoxic" is of great importance to the public. The following test show empirically the range and degree of safety through looking at (3) factors – **Genotoxicity, Anti-Genotoxicity, and Anti-Mutagenicity.**

GENOTOXICITY RESULTS

Genotoxicity: When a nutrient and/or product is "genotoxic" it causes things such as cells, DNA, and other genetic material to be harmed. The three primary effects it can have is that it can be carcinogenic, or cancer-causing; mutagenic, causing cells to not develop properly; or teratogenic, causing birth or growth defects.

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STUDY ONE (SOS-CHROMOTEST-GENOTOXICITY):

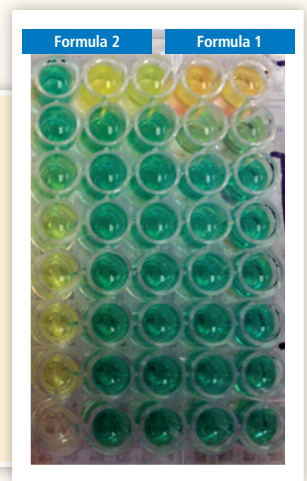
A sensitive and demonstrative bacteria, *Escherichia coli*, was exposed to various levels of the two formulations and was analyzed to determine if the products are genotoxic (shown by the indication of blue color) or non-genotoxic (show by the indication of yellow color).

Result: The formulations various concentrations did not show detectable genotoxicity. There was no observable or identifiable toxin that was produced after administering the two formulations to healthy test bacteria.

STUDY TWO (SOS-CHROMOTEST-ANTI-GENOTOXICITY/PROTECTIVE):

The healthy genes/bacteria of *E. coli* were administered the two formulations and then a known genotoxin, 4-Nitroquinoline 1-Oxide (4-NQO), to examine whether the products had any protective effects.

Result: When the toxin was administered to healthy test bacteria, the two formulations reduced the amount of genotoxicity to the cells. The lack of blue color (which indicates a genotoxic environment) when known toxins were placed in the vial, indicates that the two formulations protect genes/bacteria from damage.



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STUDY THREE (SOS-CHROMOTEST-ANTI-MUTAGENICITY/METABOLIZING):

Does Formula 2 and/or Formula 1 decrease the amount or availability of toxin (4-NQO) in the genotoxic environment?

Result: After 90 minutes, the genotoxic environments where Formula 1 was present showed less toxin (4-NQO). This indicates that with time, Formula 1 may help to metabolize or sequester the toxin.



INFLAMMATION

Some medical professionals and researchers feel that avoiding chronic inflammation leads to improved health and longevity. Acutely and in small amounts, inflammation is very helpful, activating an immune response when necessary. However, low-grade and chronic inflammation concerns researchers who believe overall health is largely dependent on an inflammation-free state. The solution to the problem of chronic inflammation and its link to the world's most debilitating health issues is being actively sought by researchers worldwide.

PRO-INFLAMMATORY AND ANTI-INFLAMMATORY RESULTS

Inflammation: a protective and destructive response of the body in response to injury, trauma or infection. When chronic, inflammation can override the immune system modulator causing destruction to healthy tissue, cells, and DNA.

STUDY ONE (LTB4 AND PGH2 TEST-PROINFLAMMATORY RESPONSE):

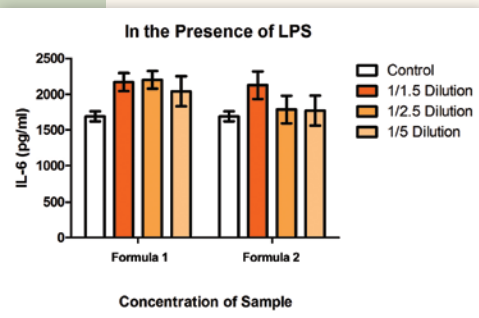
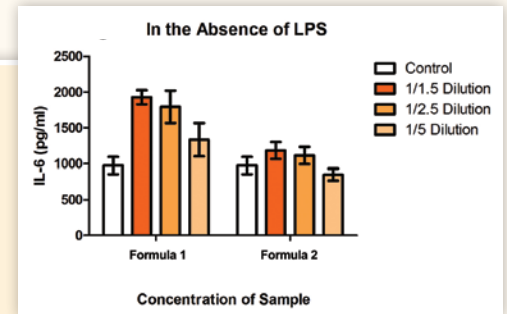
Taking healthy human cell lines, you then stimulate their differentiation/replication, and then administer the two formulations to examine two inflammatory responses, Leukotriene B4 (LTB4) and PGH2; these are indicators of an inflammatory response.

Result: When the two formulations were administered to healthy human cell lines, they did not induce or create any inflammatory response in levels above and below the recommended dosage.

STUDY TWO (IL-6 AND RAW 264.7 TEST-PROTECTION FROM INFLAMMATION):

IL-6 is an immune system modulator. It signals the body to respond and protect itself against inflammation. When there is a presence or heightened presence of IL-6, the body is thought to be in a protective and shielding response to inflammation. The two formulations were administered and levels of IL-6 production were examined.

Result: Formula 1 induced and increased the levels of IL-6 when there was no inflammation in the body, heightening the body's protective responses to possible inflammation. At various concentrations above and below the recommended dosage, Formula 1 induced a protective response by releasing levels of IL-6 in the body. The Formula 1 response was more significant than the Formula 2 response.



STUDY THREE

(IL-6 TEST-IMMUNE SYSTEM MODULATOR):

LPS is inflammation producing. In its presence, levels of IL-6 are elevated to alert the body of inflammation. IL-6 signals the body to send anti-inflammatory aids to support the increase in infection and injury. The two formulations were administered to inflamed induced cells (cells given LPS) to examine whether the IL-6 response could be lessened because of the additional support of the two products.

Result: In the presence of inflammation, Formula 1 increased the levels of IL-6. Meaning that the cell line was able to increase its levels of the natural signaling immunomodulator to enhance the immune response by administering Formula 1. Formula 1 was also able to decrease the levels of IL-6 in the presence of enhanced inflammation; it is important to note that too much inflammatory response (chronic inflammation) can be dangerous. Formula 1 was able to repress the IL-6 production of LPS; repressing the increased amount of inflammatory response also makes Formula 1 a potential immunomodulator.



CELL HEALTH

The body is made up of trillions of living cells that grow, divide and die in an orderly fashion. Deep within the cell, in its DNA, this process is tightly regulated. Abnormal cell growth and division is a matter that has been studied by many health experts who believe healthy cell division is essential to thriving health.

The cell is the basic, fundamental unit of the body, its organs and systems. Normal cell growth is critical to the overall health of the body.

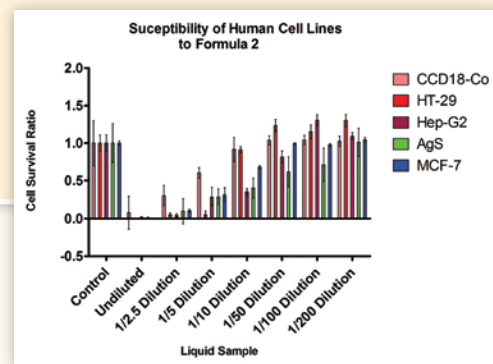
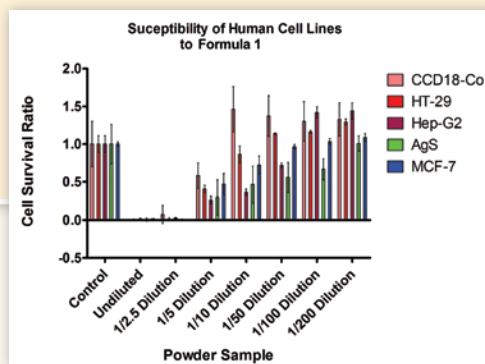
CELL LINE RESULTS

Cell lines can be cultivated from any areas of the body. The following studies have taken abnormal cell lines from the colon, liver, stomach and breast while also using a normal colon cell line to be the control sample.

STUDY ONE (CYTOTOXICITY ACTIVITY AGAINST CELL LINES):

The two formulations were administered to the various cell lines (normal and abnormal) to assess the survival rates of the cells. First, both products were given to healthy colon cells to assess whether there was a significant amount of death of healthy cells. Next, both products were given to each abnormal cell lines of the colon, liver, stomach, and breast to assess whether there was a significant amount of death of each individual type of abnormal cell.

Results: When the two formulations were administered to healthy human colon cells, there was no significant death of healthy human cells compared to abnormal colon cells. When exposed to Formula 2, there was a 95% reduction in abnormal colon cells, 65% of abnormal liver and stomach cells, and 30% of abnormal breast cells. When exposed to Formula 1, there was a 60% reduction of abnormal colon cells, 65% of abnormal liver and stomach cells, and 30% of abnormal breast cells. Both products were administered at levels above and below the recommended levels, the percentages above directly relate to the recommended dosage of both products.



STUDY TWO (MTS CELL PROLIFERATION ASSAY):

All the abnormal cell cultures were washed with saline and given fresh media or growing environment after being subjected to both formulations. Each cell line was evaluated at 24 hours post-treatment to see if there was any proliferation of abnormal cells. Survival rates of treated cells were compared to that of the untreated cells.

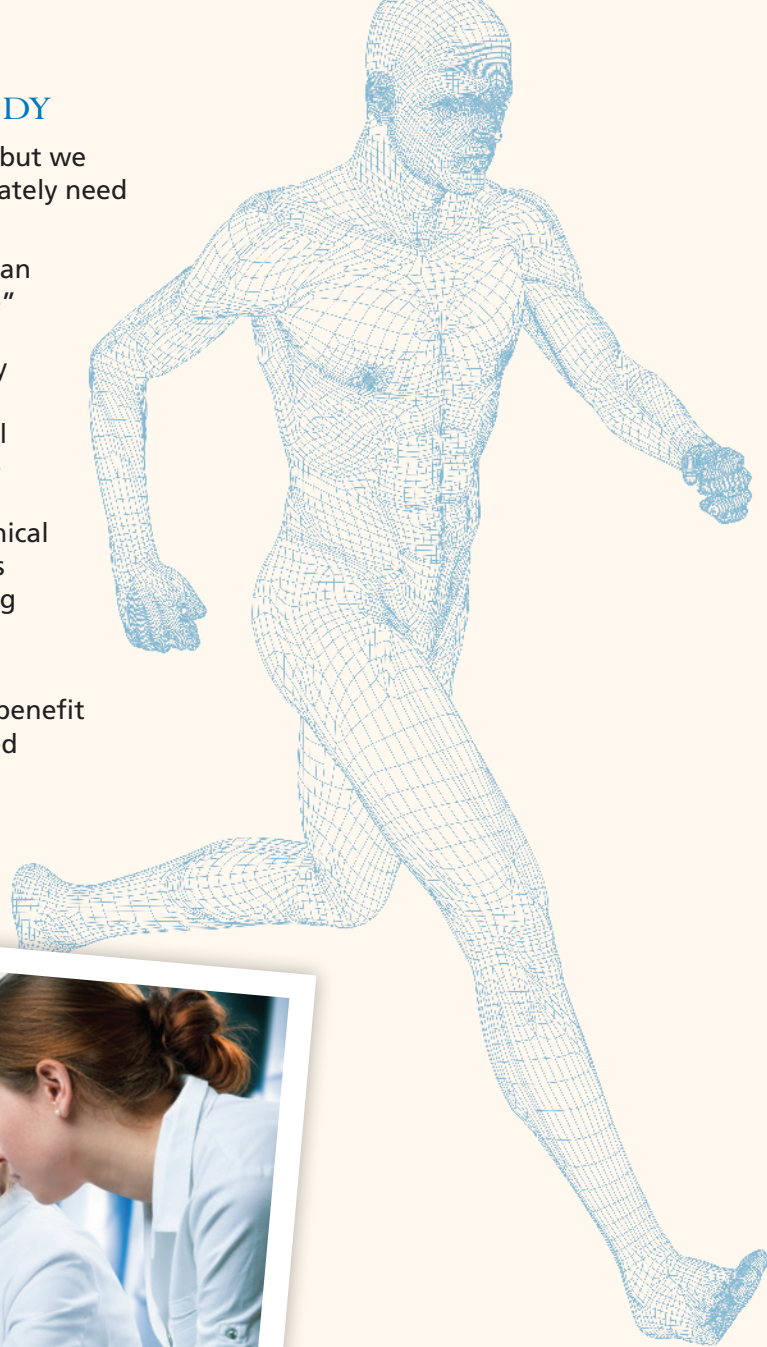
Result: Both formulations exhibited efficient inhibition on proliferation of abnormal cells at the recommended dosage levels. The assays, or evaluations, were carried out multiple times, sextuplicates (n=6), to confirm the results. Both products showed there was inhibition of the growth of more abnormal cells, preventing further malignant multiplication and growth of unhealthy cells.

UNDERSTANDING THE HUMAN BODY

Youngevity® is excited about the recent findings, but we caution that the results are preliminary and ultimately need confirmation in clinical trials.

The studies that were undertaken were NOT human clinical trials, but are called “bench” or “test tube” studies. The most scientific name is “in vitro”. In vitro is defined as, studies in experimental biology that are conducted using components of an organism that have been isolated from their usual biological surroundings in order to permit a more detailed or more convenient analysis than can be done with whole organisms. These are limited clinical studies; more research is needed. Youngevity® has committed to enhancing their studies by designing even better models that closely resemble the environments of the body.

The studies help us to understand the safety and benefit potential of select nutritional formulations created by Youngevity®.



Clemson University only supports the statistical data and analysis provided here. Clemson University does not support, endorse, or sponsor Youngevity® or any of its products. Clemson University and its researchers are not affiliated in any way with Youngevity®.

YOUNGEVITY®

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