

THE TESTOSTERONE CONTROVERSY

# LifeExtension®

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The ULTIMATE Source For New Health And Medical Findings From Around The World

June 2012

## Rejuvenate Your Aging Skin

Telomeres  
Shortened by  
Chronic Stress

Aging Causes  
A Carnosine  
Deficit

Pomegranate  
Helps Fight  
Heart Disease

*Suzanne*  
**SOMERS**

How She Grows  
**YOUNGER**



PURE, HEART HEALTHY

# Super Omega-3

## EPA/DHA



Item # 01482

There's no debating the power of **omega-3** fatty acids. From support for **heart health** and **brain function** to help with **inflammation**, their broad-spectrum benefits have been firmly established in a wealth of studies.<sup>1-9</sup>

To ensure the purest, most stable, and easy-to-tolerate fish oil supplement, **Life Extension® SUPER OMEGA-3 EPA/DHA** is *molecularly distilled*. This proprietary technology ensures any environmental pollutants are reduced to extremely low levels. The result? Our fish oil enjoys a **5-star rating** for **purity, quality, and concentration** from the **International Fish Oil Standards** program (IFOS)—the highest possible ranking from the world's *premier* testing laboratory.

### Sesame Lignans and Standardized Olive Fruit Extract for Enhanced Benefits

Fish oils (and other fatty acids) have a tendency to **oxidize**, rendering them nutritionally inferior. Scientific studies show that when added to fish oil, **sesame lignans** safeguard against oxidation and direct fatty acids toward pathways that help with inflammatory reactions.<sup>10</sup>

To further emulate the benefits of a **Mediterranean diet**, **Super Omega-3** delivers standardized, high-potency **olive fruit extract**. Research shows that **fish oil** combined with **olive oil** help with inflammation better than fish oil alone.<sup>11</sup>

Olive also contains the compounds **hydroxytyrosol**, **tyrosol**, and **oleuropein**. Together these nutrients counter the action of free radicals, delay aging in specialized skin cells, prevent undesirable LDL oxidation, and help maintain normal platelet activation.<sup>12-15</sup>

**Super Omega-3** (4 softgels) supplies the equivalent content of **6 tablespoons of extra virgin olive oil**. Take two softgels twice daily with meals.

A bottle containing 120 softgels of **Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract** retails for \$32. If a member buys four bottles, the price is reduced to just **\$21** per bottle. If **10 bottles** are purchased, the cost is just **\$18.68** per bottle. (Item # 01482)



Ratings based on results of the 2012 ConsumerLab.com Survey of Supplement Users. More information at [www.consumerlab.com](http://www.consumerlab.com).

**CAUTION:** If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product. Contains fish (anchovy, mackerel), sesame, and corn.

Supportive but not conclusive evidence shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease. IFOS™ certification mark is a registered trademark of Nutrasource Diagnostics, Inc. These products have been tested to the quality and purity standards of the IFOS™ program conducted at Nutrasource Diagnostics, Inc.

Just four softgels of **SUPER OMEGA-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract** provide:

<b>EPA Pure+™ Extract</b> (eicosapentaenoic acid)	<b>1400 mg</b>
<b>DHA Pure+™ Extract</b> (docosahexaenoic acid)	<b>1000 mg</b>
<b>Olive Fruit Extract</b> [std. to 6.5% polyphenols (39 mg), 1.73% hydroxytyrosol/tyrosol (10.4 mg), 0.5% verbascoside/oleuropein (3 mg)]	<b>600 mg</b>
<b>Sesame Seed Lignan Extract</b>	<b>20 mg</b>

### A SMALLER SOFTGEL for easier swallowing!

Some members have requested we make **Super Omega-3** available in a smaller capsule for easier swallowing. We have accomplished this by making **half-size** softgels available.

A bottle containing 240 half-size softgels of **Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract** retails for \$32. If a member buys four bottles, the price is reduced to just **\$21** per bottle. If **10 bottles** are purchased, the cost is just **\$18.68** per bottle. (Item # 01619)

For those with sensitive stomachs, **Super Omega-3** is also available with **enteric coating** and retails for **\$34**. If a member buys four bottles, the price is reduced to **\$23.25** per bottle. If **10 bottles** are purchased, the cost is just **\$21** per bottle. (Item # 01484)

To order the most advanced fish oil supplement, **Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract (with or without enteric coating)**, call **1-800-544-4440** or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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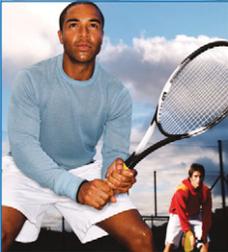
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## REPORTS



### 32 REJUVENATE YOUR AGING SKIN

Skin aging is a multi-factorial process, which means that comprehensive skin rejuvenation requires more than a single agent. With the discovery of **10** new validated anti-aging compounds, a nutrient-rich serum has been formulated that ensures deeper dermal penetration and optimal skin appearance.



### 44 CARNOSINE LEVELS PLUMMET IN OLDER PEOPLE

Carnosine is concentrated in the brain, heart, and muscles. Studies have shown that carnosine slows the aging of human cells and protects against *age-inducing* processes such as glycation and mitochondrial dysfunction. Carnosine levels in the body plummet as humans age, making supplementation a key component of an age-delaying program.



### 58 FRUIT EXTRACT BOOSTS HEART-PROTECTIVE ENZYME

An enzyme found in the body called PON1 provides natural protection against atherosclerosis and cardiovascular disease. Researchers have found that pomegranate extracts boost the multiple benefits of PON1, which increases HDL efficacy and supports healthy endothelial function.



### 70 CHRONIC STRESS SHORTENS TELOMERES

Scientists have discovered that stress can accelerate aging by shortening the body's telomeres. Fortunately, natural extracts can serve as adaptogens that normalize the body against the assault of both internal and external stressors. Research has shown that four natural adaptogens can modulate multiple pathways to protect against the physiological damage caused by stress.



82 ON THE COVER

### SUZANNE SOMERS: HOW SHE GROWS YOUNGER

Suzanne Somers's new book, **Bombshell**, exposes the limitations of current medical thinking and enlightens the public to what Life Extension® members long ago learned about delaying and reversing aging. With interviews from leading scientists and physicians, **Bombshell** provides a roadmap for what the future of medicine is likely to be. This exclusive chapter excerpt reveals **18** major **age promoters** and how you can stop them.

## DEPARTMENTS



### 7 THE TESTOSTERONE CONTROVERSY

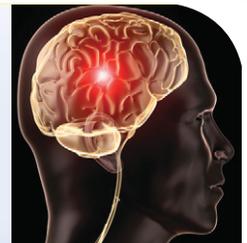
The benefits of testosterone in protecting against heart disease and metabolic disorders are well documented. Low testosterone is associated with excess abdominal fat, loss of insulin sensitivity, and atherosclerosis. This analysis discusses the testosterone debate and why it is critical for men to know what their testosterone blood levels are.

### 25 IN THE NEWS

DHA preserves brain volume; vitamin D relieves menstrual symptoms; taurine protects against coronary heart disease; lutein and zeaxanthin guard against cataracts and more.

### 97 ASK THE PHARMACIST

Many leading pharmaceuticals create nutrient deficiencies that are often mistaken for drug side effects. In her new book, **Drug Muggers**, pharmacist Suzy Cohen advises on how targeted supplementation can help you avoid the hidden dangers created by common pharmaceuticals.





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# HALF OF AGING HUMANS IN THE DEVELOPED WORLD ARE MAGNESIUM DEFICIENT!<sup>1</sup>

## **YOU MAY BE ONE OF THEM.**

Optimal amounts of magnesium may now be obtained in a novel, highly *absorbable* form called **Neuro-Mag™ Magnesium L-Threonate**, available in capsules or tasty natural lemon-flavored powder.

### **A Critical Brain Booster. . .**

Magnesium is needed for more than **300** biochemical reactions in the body.<sup>2</sup>

Long known for its role in cardiovascular<sup>3-5</sup> and bone health,<sup>6</sup> energy metabolism<sup>7</sup> and mood,<sup>8</sup> researchers are now focusing *intensely* on magnesium's benefits for **cognitive function**.<sup>2</sup>

Unfortunately, it is very *hard* for your body to maintain optimal levels of magnesium in the **brain**.<sup>2</sup> This problem is of *special concern* for maturing individuals, as magnesium deficiency increases over time.<sup>1</sup>

### **Scientifically Advanced, Lab Tested**

Most commercially available magnesium supplements are not readily absorbed into the central nervous system.

To overcome this obstacle, an innovative form of magnesium is being introduced called **Neuro-Mag™**, shown to specifically target the aging brain and nervous system.

In pre-clinical models, **L-threonate** contained in **Neuro-Mag™** boosted magnesium levels in spinal fluid by an impressive **15%** compared to no increase with conventional magnesium.<sup>2</sup>

Even more compelling, animal models revealed improvements of **18%** for short-term memory and **100%** for long-term memory using the **Neuro-Mag™** form of magnesium.<sup>2</sup>

### **Capsules or Powder... Value Priced**

The suggested daily dose of three **Neuro-Mag™ Magnesium L-Threonate Capsules** provides **2,000 mg** of **Magnesium L-Threonate**. While this supplies a modest **144 mg** of elemental magnesium, its superior *absorption* into the bloodstream and nervous system make it a preferred choice for aging humans to supplement with.

This highly absorbable brain health-supporting magnesium is also available in a good tasting powder mix called **Neuro-Mag™ Magnesium L-Threonate with Calcium and Vitamin D3 Powder**. In addition to its appealing natural lemon flavor, the one-scoop per day serving size supplies the same amount of magnesium plus **500 mg** of **calcium** (as calcium lactate gluconate—a highly *soluble* form of calcium) and **1,000 IU** of **vitamin D3**.

This offers maturing individuals an easy way to obtain these key nutrients in one simple formula.

A bottle containing 90 vegetarian capsules of **Neuro-Mag™ Magnesium L-Threonate** or **30** scoops of **Neuro-Mag™ Magnesium L-Threonate with Calcium and Vitamin D3 Powder** retails for \$40. If a member buys four bottles, the price is reduced to **\$27** per bottle. Contains corn.

#### **References**

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Magtein™ is a trademark of Magceutics, Inc, distributed exclusively by AIDP, Inc. Patent pending.



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Item # 01603



Item # 01602

**Gustavo Tovar Baez, MD**, operates the Life Extension Clinic in Caracas, Venezuela. He is the first physician in Caracas to specialize in anti-aging medicine.

**Ricardo Bernales, MD**, is a board-certified pediatrician and general practitioner in Chicago, IL, focusing on allergies, bronchial asthma, and immunodeficiency.

**Thomas F. Crais, MD, FACS**, a board-certified plastic surgeon, was medical director of the microsurgical research and training lab at Southern Baptist Hospital in New Orleans, LA, and currently practices in Sun Valley, ID.

**John Crisler, DO**, is an osteopathic physician and president of The All Things Male Center for Men's Health in Lansing, MI. Dr. Crisler is a distinguished leader in the field of anti-aging medicine.

**William Davis, MD**, is a preventive cardiologist and author of *Wheat Belly: Lose the Wheat, Lose the Weight and Find Your Path Back to Health*. He is also medical director of the online heart disease prevention and reversal program, *Track Your Plaque* ([www.trackyourplaque.com](http://www.trackyourplaque.com)).

**Martin Dayton, MD, DO**, practices at the Sunny Isles Medical Center in North Miami Beach, FL. His focus is on nutrition, aging, chelation therapy, holistic medicine, and oxidative medicine.

**Dr. John DeLuca** is a 2005 graduate of St. George's University School of Medicine. He completed his Internal Medicine residency at Monmouth Medical Center in Long Branch, New Jersey, in 2008 and is board certified by the American Board of Internal Medicine. Dr. DeLuca is a Diplomate of the American Academy of Anti-Aging Medicine and has obtained certifications in hyperbaric medicine, pain management, nutrition, strength and conditioning, and manipulation under anesthesia.

**Sergey A. Dzugan, MD, PhD**, was formerly chief of cardiovascular surgery at the Donetsk Regional Medical Center in Donetsk, Ukraine. Dr. Dzugan's current primary interests are anti-aging and biological therapy for cancer, cholesterol, and hormonal disorders.

**Patrick M. Fratellone, MD, RH**, is the founder and executive medical director of Fratellone Associates. He completed his Internal Medicine and Cardiology Fellowship at Lenox Hill Hospital in 1994, before becoming the medical director for the Atkins Center for Complementary Medicine.

**Carmen Fusco, MS, RN, CNS**, is a research scientist and clinical nutritionist in New York City who has lectured and written numerous articles on the biochemical approach to the prevention of aging and degenerative diseases.

**Norman R. Gay, MD**, is proprietor of the Bahamas Anti-Aging Medical Institute in Nassau, Bahamas. A former member of the Bahamian Parliament, he served as Minister of Health and Minister of Youth and Sports.

**Mitchell J. Ghen, DO, PhD**, holds a doctorate in holistic health and anti-aging and serves on the faculty of medicine at the Benemerita Universidad Autonoma De Puebla, Mexico, as a professor of cellular hemopoietic studies.

**Gary Goldfaden, MD**, is a clinical dermatologist and a lifetime member of the American Academy of Dermatology. He is the founder of Academy Dermatology of Hollywood, FL, and COSMESIS Skin Care.

**Miguelangelo Gonzalez, MD**, is a certified plastic and reconstructive surgeon at the Miguelangelo Plastic Surgery Clinic, Cabo San Lucas.

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**Prof. Francesco Marotta, MD, PhD** Gastroenterologist and Nutrigenomics expert with extensive international university experience. Consulting Professor, WHO-affiliated Center for Biotech. & Traditional Medicine, University of Milano, Italy. Hon. Res. Professor, Human Nutrition Dept, TWU, USA. Author of over 130 papers and 400 congress lectures.

**Philip Lee Miller, MD**, is founder and medical director of the Los Gatos Longevity Institute in Los Gatos, CA.

**Michele G. Morrow, DO, FAAFP**, is a board-certified family physician who merges mainstream and alternative medicine using functional medicine concepts, nutrition, and natural approaches.

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**Ross Pelton, RPh, PhD, CCN**, is director of nutrition and anti-aging research for Intramedicine, Inc.

**Patrick Quillin, PhD, RD, CNS**, is a clinical nutritionist in Carlsbad, CA, and formerly served as vice president of nutrition for Cancer Treatment Centers of America, where he was a consultant to the National Institutes of Health.

**Allan Rashford, MD**, graduated from the University of Iowa Medical School. Upon completing medical training, he became chief of medicine at St. Francis Hospital in South Carolina, and he was later named president of the Charleston Medical Society.

**Marc R. Rose, MD**, practices ophthalmology in Los Angeles, CA, and is president of the Rose Eye Medical Group. He is on the staffs of Pacific Alliance Medical Center, Los Angeles, and other area hospitals.

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**Ron Rothenberg, MD**, is a full clinical professor at the University of California San Diego School of Medicine and founder of California HealthSpan Institute in San Diego, CA.

**Roman Rozenzwaig, MD**, is a pioneer in research on melatonin and aging. He practices in Montreal, Canada, as research associate at Montreal General Hospital, Department of Medicine, McGill University.

**Carol Ann Ryser, MD, FAAP**, is medical director of Health Centers of America in Kansas City, MO, and focuses on pediatrics and mental health.

**Michael D. Seidman, MD**, is the regional coordinator of otolaryngology-head and neck surgery for the Bloomfield satellite of Henry Ford Health System (HFHS), Detroit, MI, co-director of the Tinnitus Center, and co-chair of the Complementary/Alternative Medicine Initiative for HFHS.

**Ronald L. Shuler, BS, DDS, CCN, LN**, is involved in immunoncology for the prevention and treatment of cancer, human growth hormone secretagogues, and osteoporosis.

**Herbert R. Slavin, MD**, is medical director of the Institute of Advanced Medicine in Lauderhill, FL, specializing in anti-aging medicine, disease prevention, chelation therapy, and natural hormone replacement therapy.

**R. Arnold Smith, MD**, is a clinical radiation oncologist who specializes in using immunotherapy to enhance the safety and efficacy of conventional cancer therapies.

**Stephen L. Smith, MD**, Richland, WA, focuses on treating allergies and is a member of the American Society for Lasers in Medicine and Surgery.

**Stephen Strum, MD**, is a medical oncologist who has specialized in prostate cancer treatment since 1983. He is co-founder and past medical director of the Prostate Cancer Research Institute. Currently, he directs a practice for prostate cancer patients in Ashland, OR.

**Javier Torres, MD**, is a member of the American Academy of Physical Medicine and Rehabilitation and is on the medical staffs of Sunrise Hospital, Desert Springs Hospital, Valley Hospital, and Mountain View Hospital, all in Las Vegas, NV.

**Paul Wand, MD**, Fort Lauderdale, FL, is a clinical neurologist with special expertise in treating and reversing diabetic peripheral neuropathy and brain injuries from various causes.

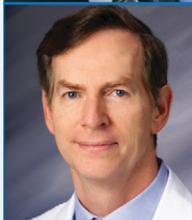
**Charles E. Williamson, MD**, Boca Raton, FL, focuses on anti-aging, longevity, and pain management.

**Jonathan V. Wright, MD**, is medical director of the Tahoma Clinic in Renton, WA. He received his MD from the University of Michigan and has taught natural biochemical medical treatments since 1983. Dr. Wright pioneered the use of bioidentical estrogens and DHEA in daily medical practice. He has authored 11 books and publishes *Nutrition and Healing*, a monthly newsletter with a worldwide circulation of more than 100,000.

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**Örn Adalsteinsson, PhD**, holds a master's and doctorate from the Massachusetts Institute of Technology (MIT). He has specialized in human therapeutics including vaccines, monoclonal antibodies, product development, nutraceuticals, formulations, artificial intelligence, hormones, and nutritional supplementation. He has also authored articles and contributed to peer-reviewed publications and served as an editor for the *Journal of Medicinal Food*.



**Russell L. Blaylock, MD**, is a board-certified neurosurgeon, author, and lecturer. He recently retired from his neurosurgical practice to devote his time to nutritional studies and research. He has written numerous journal articles and three books (*Excitotoxins: The Taste That Kills*, *Health and Nutrition Secrets That Can Save Your Life*, and *Natural Strategies for the Cancer Patient*) and currently publishes a monthly nutrition newsletter, *The Blaylock Wellness Report*.



**John Boik, PhD**, is the author of two books on cancer therapy, *Cancer and Natural Medicine* (1996) and *Natural Compounds in Cancer Therapy* (2001). He obtained his doctorate at the University of Texas Graduate School of Biomedical Sciences with research at the MD Anderson Cancer Center, focusing on screening models to identify promising new anti-cancer drugs. He conducted his postdoctoral training at Stanford University Department of Statistics. He is currently president of New Earth BioMed, a nonprofit cancer research corporation that studies mixtures of natural products.



**Eric R. Braverman, MD**, is director of the Place for Achieving Total Health (PATH Medical and the PATH Foundation) in New York City. Dr. Braverman received his BA from Brandeis University Summa Cum Laude/Phi Beta Kappa and his MD from New York University Medical School with honors. He is the author of *Younger You* (2006) and *Younger Thinner You* (2009) and over 100 research papers and is clinical assistant professor of integrative medicine in the Department of Neurosurgery at Cornell Weill Medical College, as well as a lecturer on mild cognitive decline.



**Frank Eichorn, MD**, is a urologist specializing in prostate cancer for 10 years. He has a private practice in Bad Reichenhall, Germany, and is prostate cancer consultant at the Urologische Klinik Castringius, Planegg, Munich. In his integrative approach to prostate cancer he is working together with an international network of experts to improve treatment outcomes for prostate cancer patients with a special focus on natural and translational medicine.



**Deborah F. Harding, MD**, is founder of the Harding Anti-Aging Center. She is triple board-certified in internal medicine, sleep disorder medicine, and anti-aging medicine. She also earned the Cenegenics certification in age management medicine. She is a faculty member of the new University of Central Florida Medical School.



**Steven B. Harris, MD**, is president and director of research at Critical Care Research, a company that grew out of 21st Century Medicine in Rancho Cucamonga, CA. Dr. Harris participates in groundbreaking hypothermia, cryothermia, and ischemia research. His research interests include antioxidant and dietary-restriction effects in animals and humans.



**Stanley W. Jacob, MD**, is Gerlinger Distinguished Professor, Department of Surgery, Oregon Health and Science University. He has authored 175 scientific articles and 15 books and holds 3 patents, including the initial patent on the therapeutic implications of dimethyl sulfoxide (DMSO).



**Richard Kratz, MD, DSci**, is clinical professor of ophthalmology at the University of California, Irvine, and the University of Southern California (Los Angeles). Dr. Kratz pioneered the cataract-removal technique called phacoemulsification and developed intraocular lenses to replace the crystalline lens. He is currently involved in projects relating to glaucoma, cataract extraction, and facilitating eyesight for the totally blind.



**Peter H. Langsjoen, MD, FACC**, is a cardiologist specializing in congestive heart failure, primary and statin-induced diastolic dysfunction, and other heart diseases. A leading authority on coenzyme Q10, Dr. Langsjoen has been involved with its clinical application since 1983. He is a founding member of the executive committee of the International Coenzyme Q10 Association, a fellow of the American College of Cardiology, and a member of numerous other medical associations.



**Ralph W. Moss, PhD**, is the author of books such as *Antioxidants Against Cancer*, *Cancer Therapy*, *Questioning Chemotherapy*, and *The Cancer Industry*, as well as the award-winning PBS documentary "The Cancer War." Dr. Moss has independently evaluated the claims of various cancer treatments and currently directs The Moss Reports, an updated library of detailed reports on more than 200 varieties of cancer diagnoses.



**Michael D. Ozner, MD, FACC, FAHA**, is a board-certified cardiologist who specializes in cardiovascular disease prevention. He serves as medical director for the Cardiovascular Prevention Institute of South Florida and is a noted national speaker on heart disease prevention. Dr. Ozner is also author of *The Great American Heart Hoax* and *The Miami Mediterranean Diet* (2008, Benbella Books). For more information visit [www.drozner.com](http://www.drozner.com).



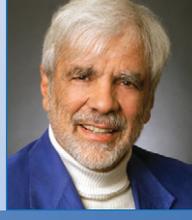
**Robert Pastore, PhD, CNS**, is a clinical nutritionist practicing in New York City. Due to his thorough nature and focus on organic chemistry and biochemistry, his colleagues have termed his practice forensic nutrition. He is a member of Harvard Medical School Postgraduate Association, the American College of Nutrition, New York Academy of Sciences, and the American Association of Pharmaceutical Scientists.



**Stephen B. Strum, MD**, is a medical oncologist who has specialized in prostate cancer treatment since 1983. He is co-founder and past medical director of the Prostate Cancer Research Institute. Currently, he directs a practice for prostate cancer patients in Ashland, OR.



**Jonathan Treasure, AHG, MNIMH**, is a British medical herbalist at the Centre for Natural Healing in Ashland, OR. Originally a medical sciences graduate from Cambridge University, he studied herbal medicine at the UK School of Phytotherapy. His clinical specialty is integrative botanical medicine for cancer, and his principal research interest is herb/drug interactions.



**Jonathan V. Wright, MD**, is medical director of the Tahoma Clinic in Renton, WA. He received his MD from the University of Michigan and has taught natural biochemical medical treatments since 1983. Dr. Wright pioneered the use of bioidentical estrogens and DHEA in daily medical practice. He has authored 11 books and publishes *Nutrition and Healing*, a monthly newsletter with a worldwide circulation of more than 100,000.

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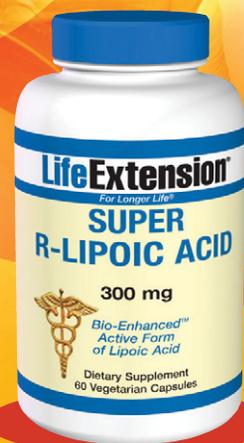
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#### References:

1. Carlson DA, Young KL, Fischer SJ, Ulrich H. In: Packer L, Patel M, eds. *Lipoic Acid: Energy Production, Antioxidant Activity and Health Effects*. London: Taylor & Francis Publishers; 2008:235-70.
2. Carlson DA, Smith AR, Fischer SJ, Young KL, Packer L. *Altern Med Rev*. 2007 Dec;12(4):343-51.

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# The Testosterone Controversy



BY WILLIAM FALOON

Testosterone levels are **high** in young men, but **plummet** during aging.

Despite compelling findings of efficacy, conventional doctors still question the value of **testosterone replacement** in maturing men. This oversight is causing **needless** heart attacks and strokes.

Low testosterone is associated with excess **abdominal fat**,<sup>1-4</sup> loss of **insulin sensitivity**,<sup>5,6</sup> and **atherosclerosis**.<sup>7,8</sup>

A critically important role of **testosterone** is to enable **HDL** to remove excess **cholesterol** from the arterial wall and transport it to the liver for disposal. This effect of enhancing HDL is termed “**reverse cholesterol transport**” and is vital to preventing arterial occlusion.<sup>9,10</sup>

Cardiologists routinely prescribe **statin drugs** to lower **LDL**, a lipoprotein that transports **cholesterol** from

the liver to the arteries. These same doctors, however, fail to maintain sufficient **testosterone** levels in their patients to enable **HDL** to remove cholesterol buildup in the arteries. This is one reason why statin drugs have not always been shown to work in older men, who require functional **HDL** to keep arterial linings free of excess cholesterol.<sup>11,12</sup>

Numerous studies document the vital role that testosterone plays in maintaining youthful metabolic processes throughout the body.<sup>6,7,13-21</sup> A large new study confirms the deadly impact of low testosterone in older men.<sup>22</sup>

What’s scary are clinical trials designed by doctors who have no idea how to achieve *youthful* hormone levels. Men who enroll in these studies are subjected to **lethal dangers** because **testosterone** and **estrogen** blood levels are not properly balanced. >>

## AS WE SEE IT

Cells throughout a man's body are laden with **receptor sites** that are activated by the hormone **testosterone**. When testosterone is available to **bind** to these receptor sites, good things happen such as **elevated mood** and **improved cognition** in response to plentiful testosterone being available to the brain.<sup>23-25</sup>

Be it muscle, bone, vascular, or nerve tissue, testosterone provides critical command signals for your cells to behave in a youthful manner.<sup>8,26-33</sup> As testosterone levels diminish, degenerative processes set in.

### New Published Study Confirms Testosterone's Benefits

Of considerable interest is the relationship between testosterone blood levels and cardiovascular events such as heart attack and stroke. In a revealing new study, researchers identified **2,416** men (aged 69-81 years) who were not on any kind of testosterone-

affecting treatment. These men were subjected to a battery of blood tests that included **total testosterone** and **estradiol** (estrogen).

The first observation was that men with **increasing** levels of **testosterone** had a **decreased** prevalence of **diabetes**, **hypertension**, and **body fat mass**. Compared to men with the highest testosterone levels, those with **low** testosterone were **twice** as likely to have a history of **cardiovascular disease**. It was also observed that men with the **highest testosterone** levels were the most **physically active**.<sup>17</sup>

This large group of men was followed for an average of **5.1 years**. Men in the **highest quartile** of **total testosterone** (above **550 ng/dL**) had a **30% lower risk** of cardiovascular events. Any level of total testosterone **below 550 ng/dL** resulted in significant **increased** risk, thus helping to establish a minimal baseline as to where **total testosterone** should be to guard against heart attack or stroke.

**Estradiol** levels measured in this group appeared to be mostly in safe ranges and did not impact incidence of cardiovascular events.

Data was tabulated based on hospital reports and/or death certificates for heart attack, stroke, unstable angina, bypass surgery, or stenting.

The four quartiles of **total testosterone** in this large group of older men were:

Quartile 1: Total testosterone **below 340 ng/dL**.

Quartile 2: Total testosterone between **341-438 ng/dL**.

Quartile 3: Total testosterone between **439-549 ng/dL**.

Quartile 4: Total testosterone **above 550 ng/dL**.

Of interest was the finding that **Quartiles 1, 2, and 3** had about the **same** risk of cardiac adverse events. It was only in **Quartile 4** (when total testosterone **exceeded 550 ng/dL**) that the **30% reduction** in cardiovascular events occurred.

This finding showed that it did not matter if these men's total testosterone was very low (below **340 ng/dL**) or moderately low (up to **549 ng/dL**)...they **all** had a similar **increased** risk for suffering a cardiovascular event. Only when total testosterone **exceeded 550 ng/dL** did cardiovascular risk plummet.

This finding remained consistent for cerebrovascular disease incidence, where men with the highest **total testosterone** (Quartile 4) had a **24% reduced** risk of **transient ischemic attack** or full-blown **stroke**. The researchers noted this association with reduced cerebrovascular risk remained after adjustment for traditional risk factors.





The conclusions by the researchers who conducted this study were:

*“Higher serum testosterone levels are associated with a reduced risk of fatal and non-fatal cardiovascular events in community dwelling elderly men.”<sup>17</sup>*

### **Mainstream Doctors Know Nothing About Hormone Balance**

If you ever wonder why so many deaths are directly caused by medical errors, look no further than the obvious mistakes made by doctors who design human clinical trials.<sup>34-36</sup>

It has long been known that aging men are at risk for having excess activity of an enzyme called **aromatase**. The effect of surplus *aromatase* is that too much **testosterone** is converted to **estrogen**.<sup>37,38</sup>

Aging men have a propensity to develop dangerously *high levels* of **estrogen** combined with woefully *inadequate* **testosterone**, though many aging men suffer both low testosterone and estrogen.<sup>39,40</sup>

Elevated estrogen can *sharply* increase **heart attack** risk by promoting **platelet aggregation** and **coagulation** in coronary arteries.<sup>41,42</sup> Higher estrogen in men

also increases **inflammation** which can cause unstable plaque to rupture and occlude a coronary artery, thus creating a sudden heart attack.<sup>43-45</sup>

Now just imagine designing a study where a huge dose of **testosterone cream** is applied to dilapidated men with a high prevalence of obesity, hypertension, diabetes, and elevated LDL. These men (average age 74) all suffered limited mobility and many had known cardiovascular disease. All these physically impaired men had very low **total testosterone** levels (mean **243 ng/dL**) at baseline, but the doctors never bothered to check their **estrogen** levels.

The study was stopped after six to twelve months because the decrepit men receiving testosterone (at a dose more than twice what is typically prescribed) showed a **4.6-fold increase** in adverse cardiovascular events.<sup>46</sup>

The purpose of the study was to see if high-dose testosterone cream could improve strength and mobility in these degenerated men. Early results showed it to be effective in improving muscle strength, but the study had to be stopped because too many cardiovascular events occurred.

The study authors admitted that the testosterone cream may have converted to **estrogen** and caused these cardiac problems. My question is why they failed to

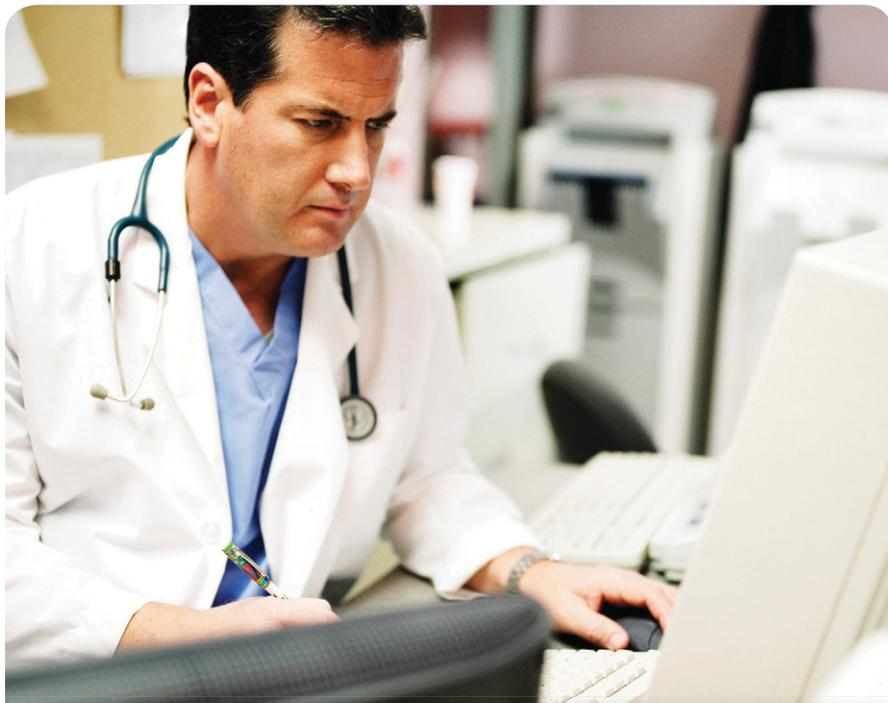
test estrogen levels in the beginning and monitor estrogen after administering high-dose testosterone cream?

**Obesity** alone causes estrogen levels in men to spike.<sup>38</sup> The reason overweight men grow breasts is that abdominal fat tissue synthesizes huge amounts of *aromatase*, which converts their testosterone to estrogen. Obese men with elevated estradiol are strongly advised to take aromatase-inhibiting agents.

By applying **high doses** of **testosterone** cream, **estrogen** levels would be expected to spiral upward in many of these unhealthy men, thus predisposing them to cardiovascular events inflicted by **abnormal arterial blood clotting** (thrombosis) and **inflammation**.

Despite these obvious flaws, this negative study was widely circulated in the medical mainstream and used as a basis to advise doctors to prescribe testosterone cream with caution.

This is unfortunate as the preponderance of data shows significant protective effects when **testosterone and estrogen** are in a *youthful* state of **balance**. Most published studies fail to look at **estrogen** levels in men, despite a massive body of evidence showing significant increases in mortality when estrogen levels are **too high** or **too low**.<sup>47-52</sup>



### Why Testosterone Studies Are Not Consistent

One might wonder how two studies could come to completely **opposite** conclusions.

A 2011 published study of **2,416** men showed a **30% reduction** in cardiovascular events when total testosterone levels exceeded **550 ng/dL**.<sup>19</sup>

Yet an unpublished report released in 2010 of less than **700** men stated that cardiovascular events more than **doubled** when total testosterone exceeded **495 ng/dL**.<sup>53</sup>

One problem relates to differing laboratory methodologies whose results vary more than professionals like to admit. This means that some of these studies may not have accurately measured testosterone blood levels. In the most recent positive study showing a **30% reduction** in cardiovascular events in men with total testosterone above **550 ng/dL**, the researchers exclusively used a **mass spectrometry**-based technique that provides a more accurate assessment of testosterone status than testing methods used in previous studies.

The more obvious flaw, however, relates to the large number of **independent risk factors** involved in the development of atherosclerosis, thrombosis and subsequent heart attack and stroke. While some of these other risk factors are sometimes factored in, no study on testosterone has included all of them and they all rely on outdated reference ranges for artery-damaging factors such as glucose and hypertension.

We have re-printed our 17 independent risk factors illustration on page 21 of this issue to enable readers to easily comprehend why for optimal reduction in risk for vascular disease, all known risk factors must be measured and adjusted to safe ranges.

### Unpublished Study Associates Testosterone With Greater Heart Risk

In August 2010, an unpublished report was circulated in the media that contradicted numerous published studies showing higher levels of testosterone protect against heart attack.<sup>53</sup>

This negative report was based on a study of less than **700** men (aged 65 and older) and claimed that men with higher testosterone doubled their risk of a heart attack or other cardiac events.

While even the author of this study admitted the findings were preliminary and had not been peer-reviewed, one striking discrepancy was that it defined **high** total testosterone as being greater than **495 ng/dL**. Recall that in the much larger (**2,416** men) published study (described at the beginning of this article) that a **30% reduction** in cardiovascular events did not occur until total testosterone levels exceeded **550 ng/dL**.

As is typical of so many of these studies, **estrogen** levels do not appear to have been measured, so we have no idea if *any* of these men in this negative study had the **youthful** balance of **testosterone** and **estrogen** *required* to protect against cardiovascular disease. (Estrogen was measured in the study showing reduction in cardiovascular events in men with the **highest** testosterone level.)

### How Testosterone Protects Against Heart Attacks

Most people know that higher blood levels of HDL protect against atherosclerosis and subsequent heart attack. What few understand is the critical role that testosterone plays in enabling

HDL to remove built-up cholesterol from the arterial wall.

HDL removes cholesterol from the arterial wall and returns it to the liver for safe disposal via a process known as **reverse cholesterol transport**. Testosterone enhances HDL-induced reverse cholesterol transport from the arterial wall.<sup>9</sup> That is one of testosterone's unique and lifesaving anti-atherosclerotic effects.

While a person can reduce their arterial wall exposure to cholesterol through healthier diets and by taking certain drugs, the average person still synthesizes about **750 mg** every day of cholesterol in their peripheral tissues (outside of the liver). If there is any distortion in the HDL-mediated removal of cholesterol (i.e. reverse cholesterol transport) from the arterial wall, the consequence is atherosclerosis.<sup>54</sup>

Said differently, testosterone is required for optimal transport of excess cholesterol from our tissues and blood vessels to our liver for processing and disposal. In the testosterone-deficient state, **reverse cholesterol transport** is compromised, and excess cholesterol cannot be removed from the arterial wall.<sup>55-57</sup> (See Chart 1 on this page)

HDL and testosterone levels often plummet in aging humans.<sup>59,60</sup> The combination of low HDL and low testosterone virtually guarantees an explosion in demand for vascular stents and drugs that earn tens of billions of dollars in profits each year for pharmaceutical behemoths.

Under optimal circumstances, HDL efficiently removes cholesterol from arterial walls and then transports it (via reverse cholesterol transport) to the liver for elimination (mostly through the bile duct into the intestines). When there is a deficiency of tes-

tosterone, HDL is less efficient in removing debris from the arterial wall and the liver is less efficient in breaking down cholesterol-laden HDL from the bloodstream.

Armed with this knowledge, you can now see past the charade perpetrated by the medical establishment that still questions the value of testosterone supplementation.

Numerous well-controlled human studies show that higher testosterone levels play a critical role in maintaining healthy blood

flow throughout the body by accelerating **reverse cholesterol transport**—thereby helping to prevent atherosclerosis.<sup>61,62</sup>

## Low Testosterone Sharply Increases Coronary Artery Disease Risk

The relationship between low testosterone and increased coronary artery disease incidence has been the featured topic of several covers of *Life Extension Magazine*<sup>®</sup> over the past two decades.



### Chart 1. How Testosterone Affects HDL

- Testosterone elevates the hepatic lipase enzyme that the liver needs to safely clear the body of excess cholesterol.
- The liver contains a receptor called scavenger receptor B1 that acts to stimulate cholesterol uptake for processing and disposal. Testosterone beneficially increases scavenger receptor B1.<sup>9</sup>
- Furthermore, a liver enzyme called hepatic lipase functions to remove phospholipids from the surface of HDL and helps enhance the uptake of these HDL-derived lipids by scavenger receptor B1.<sup>9,10,58</sup>
- Testosterone increases the activity of hepatic lipase.<sup>10</sup>
- By increasing both scavenger receptor B1 and hepatic lipase activities, testosterone facilitates an increase in reverse cholesterol transport, a process that removes excess cholesterol from the tissues and carries it to the liver for processing and disposal.<sup>9,10</sup>
- The important take home point is the critical role of reverse cholesterol transport in enabling HDL to protect against atherosclerosis.

# AS WE SEE IT

One study evaluated men under age 45 who presented with coronary artery disease compared with an age-matched control group. The findings revealed that even moderately reduced **free testosterone** blood levels (below **17.3 pg/mL** of blood) in these younger men resulted in a **3.3-fold greater** risk of developing premature coronary artery disease compared with men who had values **above 17.3 pg/mL**.<sup>70</sup>

To put this testosterone blood reading in perspective, aging men who don't use testosterone-boosting nutrients or drugs often have very low free testosterone blood levels (less than **10 pg/mL** of blood). These same men often have low HDL blood test readings in the danger zone (less than **40-50 mg/dL**).

More recent studies confirm low blood levels of free testosterone **increase** cardiovascular mortality in men.<sup>71,72</sup>

Is it any wonder that despite aggressive use of statin drugs and other advances in cardiac medicine, heart attack and stroke are still today's leading killers?

## Testosterone for Chronic Heart Failure

Chronic heart failure is a disabling condition characterized by exercise intolerance and shortness of breath. The disease arises from prolonged inflammatory cytokine activation that also causes severe muscle wasting. Testosterone increases anabolic function, improves arterial dilation, augments cardiac output, and is known to have anti-inflammatory activities. Low testosterone is a common characteristic in men suffering from heart failure.

In an interesting report, 20 men with an average age of 62

took part in a randomized study in which testosterone or placebo was injected every two weeks for 12 weeks. Compared to the placebo group, men receiving testosterone could walk **3.5 times** farther.<sup>73</sup> Mean symptom scores and a critical blood measurement of heart function (brain natriuretic peptide) improved in men receiving testosterone, but not in the placebo group.

A trend toward improved mood scores was noted in the testosterone group, which is important because men with chronic heart failure have high rates of

depression. The doctors concluded that 12 weeks of testosterone treatment led to significant improvements in physical capacity and symptoms.<sup>73</sup>

## Testosterone and Stroke Risk

One way to evaluate one's risk for a stroke is to undergo an ultrasound test to measure carotid artery thickness. When excess occlusion is detected, a risky surgical procedure (carotid endarterectomy) is performed to restore blood flow to the brain.

### Chart 2. Natural Hormones Slash Heart Disease Mortality!

A landmark study analyzed the relationship of natural hormones (free testosterone, DHEA, and insulin-like growth factor-1 [IGF-1]) to death rates in men suffering from chronic heart failure.<sup>63</sup> The findings from this study are tabulated on the chart in this box. As one can see, more men die when any of these hormones are deficient. This same chart shows catastrophic mortality when two or more of these hormones are deficient.<sup>63</sup>

#### HORMONE STATUS

#### THREE-YEAR SURVIVAL RATE

High levels of DHEA, testosterone, and IGF-1

**83%**

Deficiency in one hormone (DHEA, testosterone, or IGF-1)

**74%**

Deficiency in two hormones (DHEA, testosterone, or IGF-1)

**55%**

Deficiency in all three hormones (DHEA, testosterone, and IGF-1)

**27%**

A large number of studies reveal that higher testosterone or dehydroepiandrosterone (DHEA) levels are associated with reduced heart disease risk.<sup>64-69</sup> DHEA is a low-cost dietary supplement, while IGF-boosting nutrients and natural testosterone cream are available to Americans at affordable prices.

Cardiac drugs generate outrageous profits for pharmaceutical interests. Pharmaceutical companies thus face huge economic losses if too many Americans use natural hormones to reduce their reliance on expensive prescription drugs.



In a study published by the American Heart Association in April 2004, ultrasounds were used to measure the carotid intima-media thickness in 195 independently living elderly men in 1996 and again in 2000. The researchers also measured blood levels of free testosterone in these men.

The results showed that men with low testosterone had a **3.57 times** greater progression of carotid intima-media thickening than those with higher testosterone levels. These associations were independent of body mass index, waist-to-hip ratio, hypertension, diabetes, smoking, and serum cholesterol levels. The doctors concluded:

*“Low free testosterone levels were related to intima-media thickening of the common carotid artery in elderly men independently of cardiovascular risk factors.”<sup>21</sup>*

### Doctors Overlook Lethal Impact of Estrogen Imbalance

When Life Extension® started offering comprehensive **blood test** panels back in **1996**, men did not understand why we were check-

ing their **estrogen** levels. Back in those days, estrogen was considered a hormone of importance only to women.

We tested estrogen based on published data indicating that when estrogen levels are unbalanced, the risk of degenerative disease in aging men skyrockets.<sup>38,47-52</sup> Of concern to us 16 years ago were reports showing that excess estrogen contributes to the development of **atherosclerosis**.<sup>74,75</sup> Human clinical studies conducted more than a decade later confirmed our suspicions. Men with even slightly elevated estrogen levels doubled their risk of **stroke** and had far higher incidences of **coronary artery disease**.<sup>43,76,77</sup> Our early observations also revealed that men presenting with **benign prostate enlargement** or **prostate cancer** had higher blood estrogen levels (and often low free testosterone blood levels).<sup>78-81</sup> Subsequent clinical studies help confirm our early observations.<sup>82-86</sup>

Insufficient estrogen, on the other hand, predisposes men to **osteoporosis** and **bone fracture**.<sup>87,88</sup>

The fact that **99%** of men today have no idea what their **blood estrogen levels** are helps explain the epidemic of **age-related**

**disease** that is bankrupting this nation’s medical system.

A study published in the *Journal of the American Medical Association* (JAMA) measured blood estradiol (a dominant estrogen) in **501** men with chronic heart failure. Compared to men in the balanced estrogen quintile, men in the lowest estradiol quintile were **217%** more likely to die during a 3-year follow-up, while men in the highest estradiol quintile were **133%** more likely to die.<sup>39</sup>

The men in the balanced quintile—with the fewest deaths—had serum **estradiol** levels between **21.80** and **30.11 pg/mL**. This is virtually the ideal range that *Life Extension* has long recommended male members strive for.

The men in the highest quintile who suffered **133%** increased death rates had serum estradiol levels of **37.40 pg/mL** or above. The lowest estradiol group that suffered a **217%** increased death rate had serum estradiol levels under **12.90 pg/mL**.

The dramatic increase in mortality in men with unbalanced estrogen (i.e., estradiol levels either too high or too low) is nothing short of astounding. It uncovers a gaping hole in conventional cardiology practice that is easily correctable and explains why clinical trials on aging men that fail to measure estradiol have serious shortcomings.

This study revealing the lethal dangers of estrogen imbalance was published in conventional medicine’s Bastille of knowledge—the *Journal of the American Medical Association*, yet doctors continue to design clinical trials on aging men that measure total and/or free testosterone levels, but fail to account for estradiol, which can sharply **increase** when large doses of testosterone are administered.



hormone to youthful levels. Ideal free serum testosterone levels for most aging men are between **20-25 pg/mL**.

As you may surmise, a man who produces too little testosterone risks a lethal deficiency of both free testosterone and estradiol. That's because men need testosterone to synthesize estradiol in their bodies. In the presence of insufficient testosterone production, some aging men are vulnerable to low free testosterone and low estradiol that according to the latest study almost doubles their risk of dying over a 4.5 year period!<sup>40</sup>

### Testosterone Decline and Aging

**Aging** is accompanied by reduced levels of **hormones** required to sustain life.

As **testosterone** levels **decline** in **men**, their risk of dying markedly **increases**.<sup>105-107</sup>

**Heart disease**,<sup>7,19,63,73,108</sup> **osteoporosis**,<sup>109-111</sup> and **muscle wasting**<sup>112-114</sup> are strongly linked to **testosterone deficiency**, as are **chronic inflammatory**<sup>13,115</sup> and **neurodegenerative** disorders.<sup>18,116</sup> Most doctors are surprised to learn that men with low testosterone show an increased incidence of **prostate cancer**.<sup>117-121</sup>

Long before life prematurely ends, testosterone *deficit* can manifest in the form of

### The Most Recent Study on Testosterone and Vitamin D Blood Levels

As this article was being finalized, the findings from a brand new study were released that measured **free testosterone** and **25-hydroxyvitamin D** blood levels in a large group (2,069) men who were referred for coronary angiography.<sup>131</sup> The results were nothing short of **startling** for those who fail to maintain optimal blood ranges of **vitamin D and testosterone**.

The researchers conducting this study carefully adjusted for confounding factors like age, body-mass-index, active smoking, physical activity, diabetes, C-reactive protein, prevalent coronary artery disease, serum calcium, and parathyroid hormone.

After study researchers corrected for these confounding factors, they found that in comparison with people having higher levels of 25-hydroxyvitamin D and free testosterone in the body:

- Deficiencies of either **free testosterone** or **25-hydroxyvitamin D** resulted in a **40% increased risk** for **all-cause mortality** ( $p=0.002$ );
- Deficiencies of **free testosterone and 25-hydroxyvitamin D** resulted in a **111% increased risk** for **all-cause mortality** ( $p<0.001$ ).
- Deficiencies of **free testosterone and 25-hydroxyvitamin D** resulted in a **77% increased risk** for **cardiovascular mortality** ( $p<0.001$ );
- Deficiencies of either **free testosterone** or **25-hydroxyvitamin D** resulted in a **60% increased risk** for **non-cardiovascular mortality** ( $p=0.011$ );
- Deficiencies of **free testosterone and 25-hydroxyvitamin D** resulted in a **133% increased risk** for **non-cardiovascular mortality** ( $p<0.001$ ).

These sharp increases in mortality in response to deficiencies of **testosterone** and/or **vitamin D** reveal how far behind mainstream cardiologists are in treating patients with coronary artery disease. This study makes it abundantly clear that aging men should strive to achieve optimal **blood levels** of **vitamin D and free testosterone**, something that many Life Extension male members have been doing for the past three decades.

Since men lack this female anatomy, they need to produce estrogen through a process involving an enzyme called aromatase that transforms testosterone into estradiol.

Aging men sometimes have too much *aromatase* activity, which causes their testosterone to convert to excess estradiol. This results in depletion of vital testosterone while spiking estradiol to unsafe ranges.

## How Aging Men Can Control Their Estrogen Levels

An epidemic problem we at *Life Extension* observe in aging male members is insufficient free testosterone, i.e., less than **15-20 pg/mL** of serum. When accompanied by excess estradiol (over **30 pg/mL** of serum), this can signal excess aromatase enzyme activity.

Excess aromatase robs men of their testosterone while exposing them to higher than desirable estradiol.<sup>99</sup> Aromatase can be suppressed with absorbable forms of chrysin (a plant flavonoid) and/or lignans such as those extracted from the Norway spruce tree (HMRlignan™).<sup>100-104</sup>

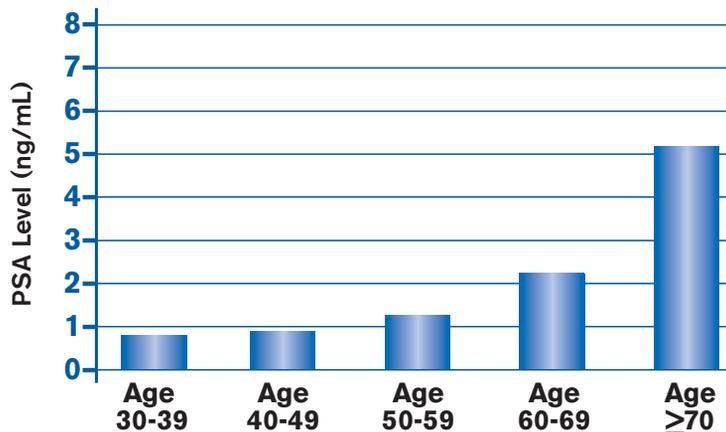
If these nutrients fail to reduce estradiol adequately, then we suggest that men ask their doctor to prescribe a low-cost generic aromatase-inhibiting drug like **anastrozole** in doses as low as **0.5 mg** twice a week.

When aromatase is properly suppressed, estradiol levels are reduced to safe ranges, while free testosterone often increases, since less testosterone is being aromatized into estradiol.

## Why Some Men Need Topical Testosterone Creams

Most testosterone in a man's body emanates from the testes. Aging results in a decline in testicular output, thus necessitating the topical application of a testosterone cream to restore this vital

**Mean PSA by Age Quintile in 7,619 Life Extension Member Tests (Male)**



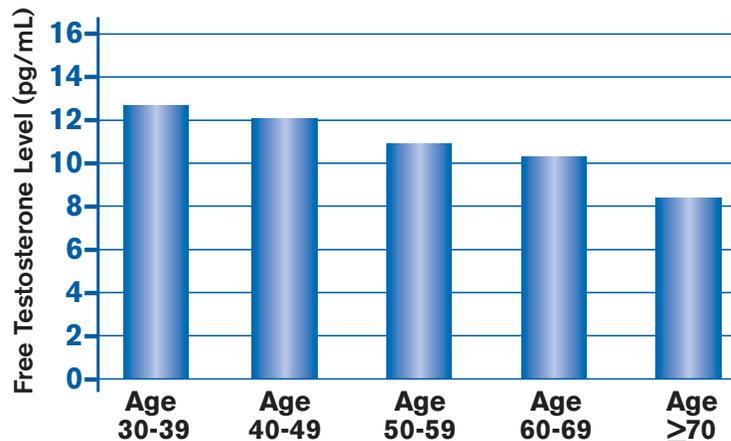
This chart shows how sharply **PSA** levels increase with age.

Some men lack *aromatase* and suffer an estrogen deficit. Other men produce so little endogenous testosterone that there is not enough to convert into estrogen, which causes low levels of both free testosterone and estradiol.

Fortunately, no matter what the underlying cause, aging men can easily achieve optimal free testosterone and estradiol serum levels.

Free testosterone is the unbound form that is biologically available to cell receptor sites throughout the body. Measuring free testosterone blood levels is the most accurate way of assessing testosterone status in aging men.

**Mean Free Testosterone by Age Quintile in 7,619 Life Extension Member Tests (Male)**



Note how free testosterone decreases with age as **PSA** levels (shown on chart above) sharply increase.

## AS WE SEE IT



### Low Testosterone Increases Prostate Cancer Risk

Fear of prostate cancer is the leading reason why aging men have shied away from restoring their free testosterone to youthful ranges. To dispel this concern, **Life Extension** long ago analyzed every published study and found there is no basis for asserting that testosterone causes prostate cancer.<sup>89-94</sup>

Our observations from the thousands of blood tests we perform each year for members confirm this. What we found is that men with low testosterone appear to be more likely to contract prostate cancer.

In the landmark book, *Testosterone for Life* (McGraw-Hill, 2008), Harvard professor Abraham Morgentaler thoroughly discredited the notion that testosterone causes prostate cancer.<sup>95</sup>

What came as a bombshell to the medical establishment was the compilation by Dr. Morgentaler of scientific facts showing that men with low testosterone levels have an increased percentage of prostate cancer-positive biopsies.<sup>96,97</sup>

To further help dispel the myth that higher testosterone levels increase PSA levels (and presum-

ably prostate cancer risk), the two charts (on the next page) compiled from our blood test analysis clearly show that as free testosterone levels decline in aging men, their PSA levels sharply increase.

### What are Optimal Free Testosterone Levels?

The number of men who suffer testosterone deficiency is so high that laboratory reference ranges accept ridiculously low levels as “normal.”

We at *Life Extension* suggest that men maintain their free testosterone in the range of **20 to 25 pg/mL** of blood.<sup>98</sup> Others with expertise in this area believe free testosterone as low as **15 pg/mL** is adequate.<sup>70</sup>

Conventional blood labs, on the other hand, say aging men are alright with as little as **6.6 pg/mL** of free testosterone in their blood—an absurdly low level!

Mainstream medicine’s ignorance regarding the need to maintain free testosterone in the higher ranges is a significant cause of premature disability and death in aging men.

When *Life Extension* conducted a study of its members free testosterone blood levels two years ago, a startling **86%** of the men

had less than **15 pg/mL** of *free testosterone*, placing them at high risk for virtually *every* age-related disease.

Free testosterone is the biologically active form of this hormone measured in the blood. When looking at **total testosterone** blood levels, one should strive for a moderately youthful range of **700-900 ng/dL**, though conventional reference ranges state that levels as low as **193 ng/dL** are sufficient, a range that we at *Life Extension* believe is woefully inadequate.

### Low Estradiol and Testosterone Predict Mortality in Aging Men

Sales of testosterone replacement drugs have surged more than 20-fold in response to studies linking low testosterone to a host of common maladies.

In a study of **3,014** men aged 69-80 years, serum levels of testosterone and estradiol were measured during a mean follow-up of 4.5 years. Men with low testosterone had **65%** greater all-cause mortality, while men with low estradiol suffered **54%** more deaths.<sup>40</sup>

Those men low in estradiol and testosterone were almost twice as likely to die (a **96%** increase in mortality) compared to men in the optimal ranges.<sup>40</sup>

This large study of aged men corroborates prior published reports linking **imbalances** of testosterone and/or estradiol with greater incidences of degenerative disease and death.<sup>6,7,13-18</sup>

### How Do Men Naturally Make Estrogen?

Women synthesize most of their estrogen in their ovaries and other reproductive tissues.

psychological disturbances such as *depression*,<sup>122-125</sup> reduced **sexual desire**,<sup>126-129</sup> and a loss of **sense of well-being**.<sup>125,130</sup>

The encouraging news is that restoring testosterone to youthful ranges can easily be accomplished at minimal cost.

## Critical Importance of Blood Testing

Today's conventional physicians prescribe blood tests to check glucose, cholesterol, and triglycerides, but rarely check their male patients' free testosterone and estradiol levels.

When looking at the horribly high mortality rates associated with *imbalances* of these critical hormones, it becomes strikingly apparent that a significant number of heart attacks, strokes, bone fractures, and other degenerative diseases are easily preventable.

One reason these hormone blood tests are not normally prescribed is their high retail cost, and the fact that many insurance companies refuse to pay for them.

As a member of the Life Extension Foundation®, you don't have

to be victimized by conventional medical ignorance, high prices, or insurance company indifference.

## Take Charge of Your Health with Low-Cost Blood Testing

An all-inclusive blood test panel that includes free testosterone and estradiol can retail for \$1,000 at commercial labs. Life Extension members can obtain these same tests for only **\$199** during the **Blood Test Super Sale**.

If your blood test result reveals an imbalance of free testosterone and/or estradiol, you are in a position to initiate immediate corrective action. Not only can restoring youthful hormone balance save your life, but men (and women) often experience an enhancement in their quality of life after their hormones are adjusted to optimal ranges.

A complete description of the **Male and Female Panels** can be found at the end of this article. As you'll readily see, these panels contain many important tests (such as total and free testosterone, estradiol, homocysteine, C-reactive

protein, and DHEA) that mainstream doctors seldom check for.

You'll also see that we added the **25-hydroxyvitamin D** test to the low-priced **Male and Female Panels**, so members can easily attain optimal vitamin D levels in their body.

When you order these tests, a requisition form is sent listing blood drawing stations in your local area. Appointments are usually not necessary, meaning you can have your blood drawn at your convenience.

To order a comprehensive Male and/or Female Blood Test Panel, just call **1-800-208-3444**. It is the single most important step you can take to ensure your continued good health.

**The Blood Test Super Sale** ends **June 4, 2012**, so you should order your tests soon and have your blood drawn any time thereafter at your convenience.

For longer life,



William Faloon

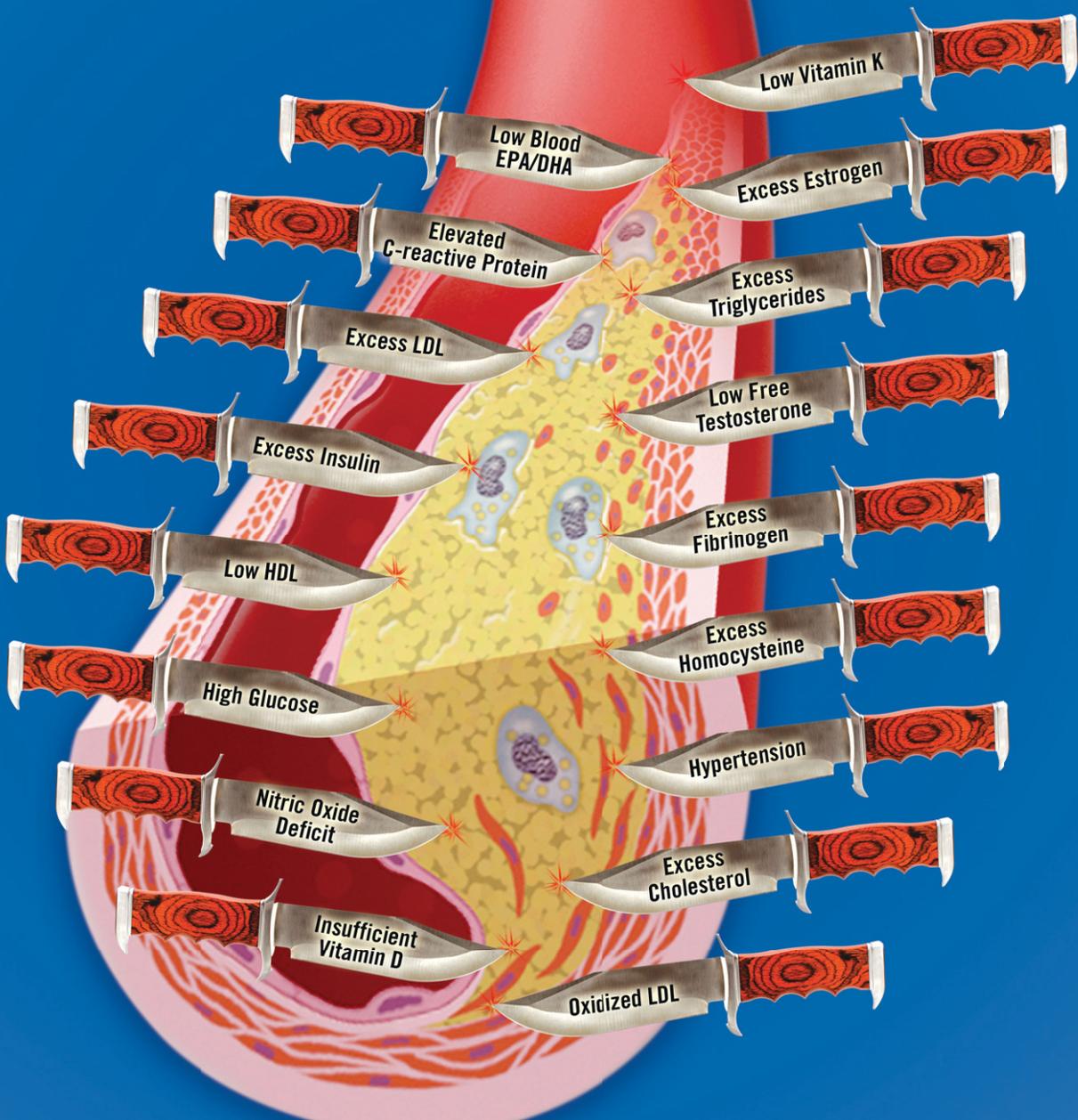
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(References continued on pages 20-22.)



## 17 DAGGERS OF ARTERIAL DISEASE



Life Extension has identified 17 independent risk factors for cardiovascular disease. This image shows 17 daggers pointed at an artery occluded with atherosclerotic plaque. Aging humans face an arsenal of atherogenic factors that, if not properly addressed, lead to damaged endothelial cells and the initiation of an oxidative and inflammatory cascade that ultimately results in the development of plaque deposits in the arteries.

Any one of these 17 “daggers” can initiate and propagate vascular disease. The role of many of these risk factors continues to be misunderstood by mainstream medicine. Unfortunately, the current standard response of mainstream medicine is to prescribe cholesterol-lowering drugs that address only a very small portion of the risk factors that contribute to the development of vascular disease.

## MALE AND FEMALE BLOOD TEST PANELS

Unlike commercial blood tests that evaluate only a narrow range of risk factors, Life Extension's **Male and Female Blood Test Panels** measure a wide range of blood markers that predispose people to common age-related diseases. Just look at the **huge** number of parameters included in the **Male and Female Blood Test Panels**:

### MALE PANEL

#### LIPID PROFILE

##### Total Cholesterol

**LDL** (low-density lipoprotein) calculated

**HDL** (high-density lipoprotein)

**Triglycerides**

#### CARDIAC MARKERS

**C-Reactive Protein** (high sensitivity)

**Homocysteine**

#### HORMONES

**DHEA-S**

**Free and Total Testosterone**

**Estradiol** (an estrogen)

**TSH** (thyroid function)

**Vitamin D 25 hydroxy**

NOW  
INCLUDES  
VITAMIN D

#### METABOLIC PROFILE

**Glucose**

**Kidney function tests:** creatinine, BUN, uric acid, BUN/creatinine ratio

**Liver function tests:** AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase

**Blood minerals:** calcium, potassium, phosphorus, sodium, chloride, iron

**Blood proteins:** albumin, globulin, total protein, albumin/globulin ratio

#### COMPLETE BLOOD COUNT (CBC)

**Red Blood Cell count including:** hemoglobin, hematocrit, MCV, MCH, MCHC, RDW

**White Blood Cell count including:** lymphocytes, monocytes, eosinophils, neutrophils, basophils

**Platelet count**

#### CANCER MARKER

**PSA (Prostate Specific Antigen)**

### FEMALE PANEL

#### LIPID PROFILE

##### Total Cholesterol

**LDL** (low-density lipoprotein) calculated

**HDL** (high-density lipoprotein)

**Triglycerides**

#### CARDIAC MARKERS

**C-Reactive Protein** (high sensitivity)

**Homocysteine**

#### HORMONES

**Progesterone**

**DHEA-S**

**Free and Total Testosterone**

**Estradiol** (an estrogen)

**TSH** (thyroid function)

**Vitamin D 25 hydroxy**

NOW  
INCLUDES  
VITAMIN D

#### METABOLIC PROFILE

**Glucose**

**Kidney function tests:** creatinine, BUN, uric acid, BUN/creatinine ratio

**Liver function tests:** AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase

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**Blood proteins:** albumin, globulin, total protein, albumin/globulin ratio

#### COMPLETE BLOOD COUNT (CBC)

**Red Blood Cell count including:** hemoglobin, hematocrit, MCV, MCH, MCHC, RDW

**White Blood Cell count including:** lymphocytes, monocytes, eosinophils, neutrophils, basophils

**Platelet count**

Non-member retail price: \$400 • Everyday member price: \$269

**Blood Test Super Sale member price: \$199 • Enjoy these savings until June 4, 2012**

To obtain these comprehensive **Male** or **Female Panels** at these **low prices**,  
**call 1-800-208-3444 to order your requisition forms.**

Then—at your convenience—you can visit one of the blood-drawing facilities provided by LabCorp in your area. (Restrictions apply in NY, NJ, RI, MA)

If you plan to use the result of these blood tests to assist in a medically supervised weight loss program, consider ordering the **Male or Female Weight Loss Panel** for the blood test super sale member price of \$224.25 through June 4, 2012. These panels were designed to offer additional hormone testing for those desiring assistance with weight loss.

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# High Potency **FAT-SOLUBLE** NUTRIENTS in ONE Softgel

Most people don't get enough oil-based nutrients like **vitamin K**, **lycopene**, and **gamma tocopherol**. This problem is solved with a one-per-day softgel called Life Extension® **Super Booster**. It provides high potencies of **fat-soluble** compounds lacking in dry powder formulas, along with other nutrients.

Just one **SUPER BOOSTER** provides:

- **VITAMIN K2** Scientific studies show **vitamin K2** provides superior benefits for the bones, arteries, and other tissues. The **MK-4** form of vitamin K2 is the most rapidly absorbed and is now routinely used in Japan to maintain healthy bone density. **MK-4**, however, only remains active in the blood for a few hours. The **MK-7** form of K2, on the other hand, remains bioavailable to the human body over a sustained **24-hour period**. Super Booster provides a potent dose of **MK-7 and MK-4** to keep calcium in the bone and out of the arteries.

- **LUTEIN** The carotenoid lutein helps maintain healthy cell division, supports the macula of the eye, and protects the endothelial lining of the arteries.

- **GINKGO** Hundreds of studies substantiate the multifaceted effects of *Ginkgo biloba* in promoting healthy circulatory and neurological function.



Item # 01680

- **GAMMA TOCOPHEROL** If one consumes only alpha tocopherol, the critically important **gamma** tocopherol is displaced from cells within the body. While *alpha tocopherol* vitamin E inhibits *lipid peroxidation*, the *gamma tocopherol* form quenches the dangerous *peroxynitrite* free radical. It is especially important for those who take vitamin E supplements to make sure they consume at least 200 mg a day of gamma tocopherol.

- **LYCOPENE** Evidence suggests that people who ingest the carotenoid lycopene enjoy healthier prostate function. Lycopene also helps guard against LDL oxidation.

- **CHLOROPHYLLIN** Scientific studies indicate that chlorophyllin may protect against environmentally induced damage to DNA.

## JUST ONE SOFTGEL OF SUPER BOOSTER SUPPLIES:

Vitamin K2 (as menaquinone-7)	200 mcg	Chlorophyllin	100 mg
Vitamin K2 (as menaquinone-4)	1000 mcg	Sesame lignans	20 mg
Vitamin K1 (as phytonadione)	1000 mcg	Lycopene	10 mg
Mixed tocopherols	359 mg	Lutein	2 mg
(providing Gamma Tocopherol 230 mg)		Vitamin B12	300 mcg
Ginkgo extract	120 mg	Vitamin C	95 mg

A bottle of 60 **Super Booster** softgels retails for \$42. If a member buys four bottles, the price is reduced to just **\$28.50** per bottle.

The **Super Booster** saves consumers **huge dollars** by combining a wide variety of costly nutrients into one daily softgel. If you add up the price of the individual ingredients contained in the **Super Booster**, you would spend **two to three times more** for this potency if taken separately.

To order Super Booster,  
call **1-800-544-4440** or  
visit **www.LifeExtension.com**

Contains soybeans, corn and sesame.

CAUTION: If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

Tomat-O-Red® is a registered trademark of LycoRed, Ltd.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

# Olive Leaf

## VASCULAR SUPPORT



Many of the validated benefits of the **Mediterranean diet** derive from heart-healthy compounds contained in the **olive fruit**, including the polyphenols **tyrosol** and **hydroxytyrosol**.<sup>1-4</sup>

When it comes to olive's power to **support blood pressure already within a healthy range**, research shows the bioactive compound **oleuropein**<sup>5-8</sup> is primarily responsible.

The problem is that optimal amounts of oleuropein are not found in the fruit. The highest concentrations of oleuropein are contained in the **olive leaf**<sup>9-13</sup>—a part of the plant that is neither readily available nor commonly consumed.

Oleuropein *normally* degrades during standard food processing. For this reason, **Life Extension®** introduces **Olive Leaf Vascular Support**.

**Olive Leaf Vascular Support** consists of a patented, standardized oleuropein extract using a unique, **gentle-processing** technique.

Researchers using **1,000 mg per day** of this formulation in a double-blind, controlled clinical trial documented an average **11.5-point** (mmHg) decline in *systolic* readings and **4.8-point** drop in *diastolic* readings in just eight weeks.<sup>14</sup>

The suggested daily serving of two **500 mg** vegetarian capsules of **Olive Leaf Vascular Support** supplies optimal concentrations of this proprietary, highly stable **oleuropein**, for maximum benefit.

**CAUTION:** Consult your healthcare provider before taking this product if you are being prescribed anti-hypertensive medication.

A bottle containing **60** vegetarian capsules of **Olive Leaf Vascular Support** retails for \$22. If a member buys four bottles, the price is reduced to **\$15** per bottle.

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To order the new  
**Olive Leaf Vascular Support**  
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## IN THE NEWS

### DHA Helps Preserve Brain Volume

The journal *Neurology*<sup>®</sup> reports a beneficial effect for higher red blood cell membrane levels of DHA (an omega-3 fatty acid) on brain volume and memory in older men and women.\* “To our knowledge, no prior study has related red blood cell fatty acid composition to subclinical markers of future dementia,” the authors note in their introduction.

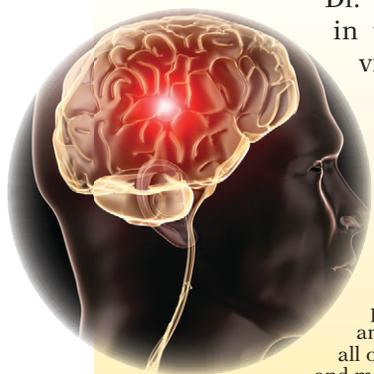
ZalDY S. Tan, MD, MPH, and colleagues measured red blood cell omega-3 fatty acid levels in 1,575 dementia-free subjects. Magnetic resonance imaging assessed brain volume, and cognitive tests evaluated various aspects of memory and mental function.

Dr. Tan’s team found a reduction in total cerebral brain volume, visual memory, executive function, and abstract thinking, among those whose DHA intake was among the lowest 25% of participants compared to those whose intake was higher.

**Editor’s Note:** DHA lowers blood pressure, reduces the risk of blood clots, and decreases serum triglyceride levels, all of which benefit the vascular system and may help delay the onset of brain aging.

—D. Dye

\* *Neurology*. 2012 Feb 28;78(9):658-64.



### Vitamin D Relieves Menstrual Symptoms

A letter published in the *Archives of Internal Medicine* reported the results of a study of women with primary dysmenorrhea which found that a single high dose of oral vitamin D3 reduced pain over a two month period.\*

Italian researchers enrolled forty women who reported at least four painful periods over the previous six months and whose serum vitamin D levels were lower than **18 ng/mL**. Twenty participants were administered **300,000 IU** vitamin D3 five days before the beginning of their next menstrual cycle, while the remainder received a placebo. Pain symptoms were scored before treatment and at one and two months.

Women who received vitamin D3 reported a reduction in pain over two months compared to the placebo group. While **40%** of subjects who received a placebo took drugs for pain at least once over the course of the trial, none who received vitamin D reported needing the drugs.

**Editor’s Note:** In an invited commentary in the journal, Elizabeth R. Bertone-Johnson, ScD and JoAnn E. Manson, MD, remark that it is important to determine how long a reduction in pain in association with a single dose of vitamin D would last. They note that, “If **300,000 IU** is required every two months, this would equate to approximately **5,000 IU/day**, considerably higher than the tolerable upper intake level set by the Institute of Medicine of **4,000 IU/day**.”

—D. Dye

\* *Arch Intern Med*. 2012 Feb 27;172(4):366-7.



## Taurine Protects Against Coronary Heart Disease in Women with High Cholesterol

An article in the *European Journal of Nutrition* revealed that the amino acid taurine may be protective against heart disease in women with elevated cholesterol levels.\*

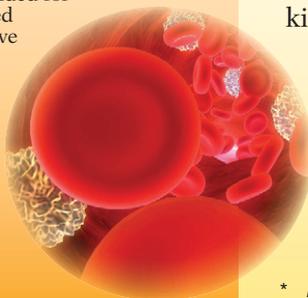
Yu Chen, PhD, MPH, and her colleagues analyzed data from subjects in the NYU Women's Health Study, which enrolled over 14,000 women from 1985 to 1991. Dr. Chen's team averaged taurine levels measured in prediagnostic serum samples from 223 participants who developed coronary heart disease and 223 women who had no history of the disease over the study's twenty-year follow-up period.

Although no significant relationship between taurine and coronary heart disease was found for the entire study population, when women with high cholesterol were analyzed, a different picture emerged. Hypercholesterolemic women whose intake of taurine was among the top one-third of subjects had a **61%** lower risk of heart disease compared to those in the lowest third.

**Editor's Note:** If the findings are replicated, supplemental taurine or increased taurine intake from food might be recommended for women with elevated cholesterol, who have an increased risk for cardiovascular disease.

—D. Dye

\* *Eur J Nutr.* 2012 Feb 10.



## Widespread Vitamin D Deficiency Among Nursing Home Residents Linked to Earlier Death

A study of nursing home residents described in an article in the *Journal of Clinical Endocrinology and Metabolism* reveals a link between being deficient in vitamin D and having a greater risk of dying over more than two years of follow up.\*

The study included 961 female nursing home residents residing in Austria whose age was greater than 70 years. Participants' serum 25-hydroxyvitamin D levels averaged **7 ng/mL**, and **93%** of the subjects had levels lower than the recommended **20 ng/mL**.

Over an average follow-up of 27 months, 284 deaths occurred. For subjects whose vitamin D level was among the lowest **25%** of participants at less than **5.6 ng/mL**, the risk of dying was **49%** greater than those whose level was over **10.2 ng/mL**.

**Editor's Note:** "We believe that our findings, together with previous data on institutionalized elderly, strongly point to the need for immediate action to prevent and treat vitamin D deficiency in these patients," the authors write. "Considering the high prevalence of vitamin D deficiency it seems reasonable to initiate vitamin D supplementation (at least **800 IU/day**) even without previous 25-hydroxyvitamin D testing in such individuals."



—D. Dye

\* *J Clin Endocrinol Metab.* 2012 Feb 8.

## Coenzyme Q10 Supplementation Lowers Interleukin-6 and Provides Antioxidant Benefits in Coronary Artery Disease Patients

In a trial described in the journal *Nutrition*, researchers in Taiwan compared the effects of twelve weeks of supplementation with **60** or **150 mg/day** of CoQ10, or a placebo in 40 men and women with coronary artery disease.\* Plasma CoQ10 levels, markers of inflammation including high-sensitivity C-reactive protein, interleukin-6 and homocysteine; malondialdehyde (a marker of lipid peroxidation) and levels of the antioxidant enzyme superoxide dismutase (SOD) were measured before and after the treatment period.

At the beginning of the study, having a higher CoQ10 level was associated with a lower level of interleukin-6 and C-reactive protein. Among those who received the higher CoQ10 dose, interleukin-6 levels decreased by **14%** and malondialdehyde levels were significantly lower by the end of the trial compared to baseline levels. Both groups that received CoQ10 experienced greater SOD activity.

**Editor's Note:** Inflammation plays a role in the development of heart disease, the leading cause of death in the Western world. While coenzyme Q10 (CoQ10) supplementation is known to benefit the heart, few studies have investigated its role in protecting against inflammation in heart disease patients.

—D. Dye

\* *Nutrition.* 2012 Feb 16.



## Resveratrol Improves Post-Meal Glucose Levels in Pilot Study

The results of a study of resveratrol supplementation published in the *Journal of Gerontology: Biological Sciences* indicate a benefit for resveratrol supplementation in men and women with impaired glucose tolerance.\*

Researchers at Albert Einstein College of Medicine enrolled ten overweight subjects aged 65 and older with elevated fasting and two-hour glucose. Participants were randomized to **1.0, 1.5 or 2 grams** resveratrol per day, to be consumed for four weeks. Fasting and postmeal glucose, as well as insulin levels, were measured before and at the end of the treatment period, and endothelial function was assessed during the meal test at the beginning and end of the study.

While fasting glucose levels remained unchanged after four weeks, peak postmeal glucose levels decreased by an average of **19 mg/dL** and three hour glucose levels also declined. Participants additionally experienced improved insulin sensitivity and a trend toward better postmeal endothelial function.

**Editor's Note:** The relatively high doses of resveratrol tested in the study were not associated with significant adverse events or changes in liver enzymes.

—D. Dye

\* *J Gerontol A Biol Sci Med Sci.* 2012 Jan 4.

## Higher Lutein and Zeaxanthin Levels May Help Guard Against Cataract

In the *British Journal of Nutrition*, Finnish researchers report that increased plasma levels of the carotenoids lutein and zeaxanthin are associated with a lower risk of cataract in older individuals.\*

The study included 1,130 men and 559 women who enrolled in the Kuopio Ischemic Heart Disease Risk Factor Study from 1998-2001. Plasma samples collected between 2005 and 2008 were analyzed for carotenoids and other factors.

From the beginning of the current investigation through 2008, 113 cataracts were diagnosed, including 108 nuclear cataracts, resulting in a four-year nuclear cataract incidence of **6.4%**. Among subjects whose lutein levels were among the top one-third of participants, there was a **42%** lower risk of being diagnosed with nuclear cataract and for those whose zeaxanthin levels were among the top third, the risk was **41%** lower risk, compared to subjects whose plasma levels were in the lowest third.

**Editor's Note:** While three cross-sectional studies have found a lower risk of nuclear cataract or their progression in association with higher serum levels or dietary intake of lutein and zeaxanthin, the current study's authors note that a recent FDA review concluded that there was no credible evidence to support a protective effect for lutein or zeaxanthin on cataract risk. However, Dr. Karppi and colleagues remark that there are factors that could explain previous inconsistent study results.

—D. Dye

\* *Br J Nutr.* 2011 Oct 18:1-7.

## More Evidence for Aspirin in Cancer Prevention

Articles published recently in *The Lancet* and *The Lancet Oncology* add evidence to a benefit for aspirin in protecting against cancer and preventing metastasis.\*

The first article analyzed data from 51 trials that compared the effects of daily aspirin to no aspirin on the risk of cardiovascular events. The researchers observed a **15%** lower risk of dying of cancer over the course of the trials for those who received daily aspirin, which improved to a **37%** reduction for those who received aspirin for five years or more.

The second study reviewed five trials that sought to determine the effect of daily aspirin on the effects of vascular events. Over an average 6.5 year follow up, those who received aspirin had a **36%** lower risk of being diagnosed with cancer with distant metastases.

The review published in *The Lancet Oncology* analyzed observational studies that compared the risk of cancer experienced by aspirin and non-aspirin users. The results indicate a **38%** lower risk of colorectal cancer over a 20-year period in association with aspirin use.

**Editor's Note:** In a commentary published in *The Lancet*, Dr. Andrew T. Chan and Dr. Nancy R. Cook of Brigham and Women's Hospital and Harvard Medical School write that, "Rothwell and colleagues' impressive collection of data moves us another step closer to broadening recommendations for aspirin use. Moreover, future evidence-based guidelines for aspirin prophylaxis can no longer consider the use of aspirin for the prevention of vascular disease in isolation from cancer prevention."

—D. Dye

\* *Lancet.* 2012 Mar 21. *Lancet Oncol.* 2012 Mar 21.





### Aloe May Boost the Efficacy of Chemotherapy

Chemotherapy, despite its many side effects, remains one of the mainstay treatments for people who have been diagnosed with cancer. New research is focusing on ways to enhance the efficacy and toxicity of chemotherapy through biological means. Aloe possesses several anticancer mechanisms. It contains compounds that stimulate the immune system, control cell growth and replication, and act as antioxidants. Italian scientists conducted a study comparing the use of aloe in combination with chemotherapy versus chemotherapy alone. They recruited 240 participants with solid metastatic tumors and randomized the participants to receive chemotherapy with or without aloe. The group treated with chemotherapy and aloe had significantly higher rates of tumor regression and disease control; achieving a **44%** increase in response to therapy and **25%** better disease control over chemotherapy alone.\*

**Editors Note:** There are 250 known varieties of aloe. While *Aloe vera* may be the most familiar, scientists consider *Aloe arborescens* to be among the most medicinally valuable because it contains active compounds at a much higher concentration than other varieties.

—A. Pryce

\* *In Vivo*. 2009 Jan-Feb;23(1):171-5

### Obesity Epidemic in America Found Significantly Worse Than Previously Believed

The scope of the obesity epidemic in the United States has been grossly underestimated, according to a study published in the journal *PLoS ONE*. Researchers found that the Body Mass Index (BMI) substantially under-diagnoses obesity when compared to the Dual Energy X-ray Absorptiometry (DXA) scan, a direct simultaneous measure of body fat, muscle mass, and bone density.\* The disparity is particularly significant for women of advancing age, those with high blood leptin levels, and the normal weight obese (NWO). Researchers also derived a leptin-revised BMI estimate of body fat for clinical use in the absence of DXA.

Co-authors Nirav Shah, MD, MPH, the current New York State Commissioner of Health and Eric Braverman, MD, the Founder and President of PATH Foundation NY, recognize the convenience, safety, and low cost of the BMI, yet agree that it is an outdated mathematical equation which needs to evolve in order to correctly evaluate body fat. The study suggests that adjusting the BMI will have broad population health implications, since obesity contributes to multiple co-morbidities such as coronary heart disease, hypertension, and diabetes.

“These estimates are fundamental to US policy addressing the epidemic of obesity and are central to designing interventions aimed at curbing its growth...Yet they [current policies] may be flawed because they are based on the BMI,” says Shah and Braverman.

They go on to articulate, “Obesity, body fat, and increased adiposity are more prevalent than the American public and American physicians are aware of.”

The principle findings of the study suggest that as many as **39%** of Americans who are classified as overweight are actually obese by adiposity measures. Misclassification occurred more frequently in women than in men, and was exacerbated by increasing age. Hyperleptinemia of aging explains why diets fail Americans who are eating less calories as they age but still gaining weight.

According to Shah and Braverman, “Adiposity and hyperleptinemia are more significant than BMI in predicting high risk obesity.” Patients with hyperleptinemic states can be corrected by a variety of hormones, nutrients, medication, and lifestyle changes. Dopaminergic transmission also may suppress hyperleptinemia.

“The BMI is an insensitive measure of obesity, prone to under-diagnosis, while direct fat measurements are superior because they show distribution of body fat,” Dr. Braverman added.

These findings provide a basis for aging individuals to have their blood tested for leptin and request their body fat percentage be measured when they get their bone density scan. In the near future, a leptin blood test for reversal and treatment of obesity may become as common as testing cholesterol for heart disease and hemoglobin A1c for diabetes.

\* *Measuring Adiposity in Patients: Utility of Body Mass Index (BMI), Percent Body Fat, and Leptin* PLoS ONE April 2nd, 2012 by Nirav R. Shah, MD, MPH and Eric R. Braverman, M.D. [www.pathfoundationny.org](http://www.pathfoundationny.org)



## BOOK REVIEW

### ABUNDANCE: THE FUTURE IS BETTER THAN YOU THINK

By Peter H. Diamandis & Steven Kotler

*"This brilliant, must-read book provides the key to the upcoming era of abundance replacing eons of scarcity. Abundance is a powerful antidote to today's malaise and pessimism." – Ray Kurzweil*

With endorsements from longevity enthusiast Ray Kurzweil, mega-entrepreneur Sir Richard Branson, and Jeff Skol, the co-founder of eBay, the book *Abundance: The Future is Better Than You Think*, appeals to some of the most forward thinking individuals of our time. As people who embrace the future and are doing everything at our disposal to live as far into it as we can, members of Life Extension® should count themselves among the people passing along this book's message. That message is the same one that *Life Extension Magazine*® founder William Faloon has been touting since the inception of Life Extension. It's a message of optimism about solving nearly all of today's common health problems and eradicating nearly all natural causes of death through cutting edge research, thinking, and innovation.

*Abundance* is written by Peter H. Diamandis, the chairman and CEO of the X PRIZE Foundation, the co-founder of Singularity University and co-founder of International Space University. With degrees in molecular biology and aerospace engineering from MIT, and an MD from Harvard Medical School, Diamandis has the background and the first-hand knowledge to tackle some of the world's most pressing issues.

While *Abundance* isn't exclusively about health care or even longevity, nearly all of the chapters in the book have the same theme: If we improve quality of life, decrease incidence of disease, and educate people about how to live smart and healthy lives, everyone will live longer and science will be able to devote even more time to curing the diseases that aren't caused by human ignorance or lack of resources.

To that end, one of the premises of the book is something called the Abundance Pyramid. It is a modern day version of Maslow's hierarchy of needs. In this updated model, food, water, and shelter form the foundation of the pyramid, with energy, education and ICTs (information and communications technologies) in the middle layer. The top of the pyramid is health and freedom.

One of the health innovations discussed in this book is Lab-on-a-Chip (LOC). In Diamandis' own words: "Packaged into a portable, cell-phone-sized device, LOC will allow doctors, nurses, and even patients themselves to take a sample of bodily fluid (such as urine, sputum, or a single drop of blood) and run dozens, if not hundreds, of diagnostic tests on the spot in a matter of minutes."

Diamandis interviews John T. McDevitt, a Rice University professor of bioengineering and chemistry about this new technology and what he says is striking. "It's a game changing technology," he says. "In the developing world, it will bring reli-



able health care to billions who don't currently have it. In the developed world, like here in the US—where medical costs go up another **8%** every year and **16.5%** of the economy goes to health care—if personalized medical technologies like lab-on-a-chip aren't brought to bear on the situation, we're going to bankrupt the country."

And that is just one example. In the chapter segment titled *Life Span*, there are several jaw-dropping technologies that are discussed that may end up bailing us out of our medical spending quagmire.

One of the main issues contributing to high fatality numbers when it comes to disease is often the time it takes to form a proper diagnosis of the ailment. Weeks or even months are sometimes lost running tests

on a person while the nefarious disease spreads throughout the body. How can this time be shortened, or even eliminated completely? Enter: Watson.

For *Jeopardy!* fans, Watson is the name of IBM's super computer that defeated the show's most intelligent human champions. Today, Watson takes up enough space to fill a medium-sized room. However, just as computers of fifty years ago took up entire buildings, in no time at all, a computer of Watson's power (an end product that can handle 500 gigabytes of data power per second, or the equivalent of 3.6 billion bytes per hour) will be the size of a modern-day laptop.

"Watson has the potential to help doctors reduce the time needed to evaluate and determine the correct diagnosis for a patient," says Dr. Herbert Chase, professor of clinical medicine at Columbia, in an interview for the book.

Watson will also have the ability to develop personalized treatment options for every patient based on an individual's DNA, medical history, blood type, etc. Dr. Eliot Siegel, professor and vice chair at Maryland's Department of Diagnostic Radiology, explains it this way in the book, "Imagine a super-computer that can not only store and collate patient data but also interpret records in a matter of seconds, analyze additional information and research from medical journals, and deliver possible diagnoses and treatments, with the probability of each outcome."

And that's just one future breakthrough. *Abundance* talks about dozens more, from robotic surgeons that never make mistakes, to robotic nurses, to harnessing the power of the mighty stem cell, there are so many new medical breakthroughs on the horizon that even the most pessimistic among us has to acknowledge that the future for humans, and longevity, looks very, very bright. Buy this book today to read about them all.

**Item# 33844 • Retail price \$26.99 • Member price \$20.24**

To order *Abundance: The Future is Better Than You Think*, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

# THE UPGRADED LIFE EXTENSION MIX™

Scientists have identified multiple mechanisms by which **green tea** extract helps protect against LDL oxidation, neuronal oxidation, and a host of other structural and functional age-related changes. LIFE EXTENSION MIX™ provides more green tea extract than found in commercial formulations.

**Broccoli** is one of the vegetables best documented to protect healthy DNA. The broccoli concentrate in LIFE EXTENSION MIX™ is standardized to provide **sulforaphane** and other **glucosinolates**, compounds responsible for broccoli's protective benefits.

**Olive polyphenols** help protect against LDL oxidation, quench free radicals, and stabilize cell membranes. LIFE EXTENSION MIX™ contains an olive extract standardized to provide the best-documented polyphenol called **hydroxytyrosol**.

**Luteolin** is a flavonoid found in **parsley, artichoke, basil, celery**, and other foods. It has shown the ability to help protect against DNA oxidative damage. When measured against 27 other citrus flavonoids, **luteolin** showed one of the most beneficial effects at maintaining healthy DNA. **Luteolin** also suppresses excess levels of **interleukin-6** and **interleukin-1b**. LIFE EXTENSION MIX™ contains a standardized dose of **8 mg** of luteolin.

**Lycopene** is the red carotenoid in **tomatoes** that supports a healthy prostate and helps promote healthy lipid profiles for those already within a normal range.

**Lutein** is found in **spinach** and **collard greens** and has been shown to help maintain **eye macula pigment** structure.

**D-glucarate** is found in **grapefruit, apples, oranges, broccoli**, and **Brussels sprouts**. D-glucarate supports a detoxification process that helps to remove DNA toxins.

**Pomegranate** may be the most effective plant to help maintain optimal endothelial function. This pomegranate extract is standardized to provide the punicalagins and other polyphenols found in up to 2.6 ounces of pomegranate juice.

**Sesame lignans** increase tissue levels of **vitamin E** and **gamma tocopherol**, and inhibit the formation of an inflammatory precursor called arachidonic acid.

**Wild blueberry extract**, concentrated and standardized to help maintain optimal neuronal function.

**Pterostilbene** is a compound naturally found in blueberries and grapes that has been shown to have beneficial, anti-aging effects on gene expression and to promote healthy cognitive function.

**Cyanidin-3-Glucoside** is a berry compound that promotes healthy function of the retina to help support night vision.

**Pyridoxal 5'-phosphate** helps protect against glycation reactions, a toxic process in which sugars bind to lipids and proteins to form non-functional structures in the body.



315 tablets  
Item #01655



490 capsules  
Item #01654



14.81 oz powder  
Item #01656

**9 tablets, 14 capsules, or three scoops of powder provide:**

## Vegetable-Fruit Complex

Green tea extract ( <i>decaf.</i> ) (45% EGCG)	325 mg
Broccoli sprout concentrate (providing sulforaphane, glucosinolates, D-3T, and PEITC)	525 mg
Olive juice extract (providing hydroxytyrosol, oleuropein)	12.5 mg
Grapeseed proanthocyanidin extract (Leucoselect®)	25 mg
Grape ( <i>vitis vinifera</i> ) extract (BioVin®)	25 mg
Ginger extract (5% gingerols)	200 mg
Luteolin (Pureolin™)	8 mg
Lycopene (tomato extract) (Tomat-O-Red®)	3 mg
Lutein (marigold extract) (465 mcg <i>trans-zeaxanthin</i> )	15 mg
Maqui Berry ( <i>Aristotelia chilensis</i> ) anthocyanin extract	100 mg
Milk thistle extract (85% <i>silymarin</i> )	100 mg
Bromelain	15 mg
Calcium D-Glucarate	200 mg
Citrus Bioflavonoids (50% <i>hesperidin</i> )	200 mg
Acerola extract 4:1	300 mg
Bilberry extract (MirtoSelect®)	30 mg
Pomegranate extract (30% punicalagins) (POMELLA®)	85 mg
Sesame seed lignan extract	10 mg
Berry-fruit blend (HiActives®) (blackberry, blueberry, cranberry, elderberry, persimmon, prune, and cherry)	200 mg
Wild Blueberry ( <i>Vaccinium angustifolium</i> ) anthocyanin extract (fruit)	150 mg
<i>trans</i> -Pterostilbene (from pure Pterospa™ and SMART™ pterostilbene)	0.5 mg
Cyanidin-3-Glucoside (C3G) (from blackcurrant extract)	1.25 mg
Tart Cherry ( <i>Prunus cerasus</i> ) proanthocyanidin extract	85 mg

## Water-Soluble Vitamins and Enzymatic Activators

Vitamin C	2000 mg
<i>as: ascorbic acid, calcium, magnesium &amp; niacinamide ascorbates, ascorbyl palmitate, acerola extract</i>	
Natural Folate (from lemon extract)	400 mcg
Biotin	3,000 mcg
Trimethylglycine (TMG) (from sugar beets)	100 mg
Vitamin B1 (thiamine HCl)	125 mg
Vitamin B2 (riboflavin)	50 mg
Supplying: Riboflavin 5'-phosphate	2 mg
Vitamin B3 (niacinamide and niacinamide ascorbate)	117 mg
Vitamin B3 (niacin)	73 mg
Vitamin B5 (D-calcium pantothenate)	600 mg
Pantethine	5 mg
Vitamin B6 (pyridoxine HCl)	5 mg
Pyridoxal 5'-phosphate (vitamin B6)	100 mg
Vitamin B12 (cyanocobalamin)	252 mcg
Vitamin B12 (hydroxycobalamin)	252 mcg
Vitamin B12 (ion exchange resin)	96 mcg
PABA ( <i>para</i> -aminobenzoic acid)	200 mg

# The Most Complete Multivitamin Available Today — Now with Tart Cherry and Maqui Berry!

Published scientific studies document that people who eat the **most fruits and vegetables** have much lower incidences of health problems. Few people, however, consistently eat enough plant foods to protect against common age-related decline,<sup>1-3</sup> and commercial multivitamins do not provide all of the vital plant components needed to maintain good health.

Life Extension Mix™ has been upgraded to include a rich source of anthocyanins from **maqui berry** and one rich source of proanthocyanidins, **tart cherry**. These potent plant-derived antioxidants promote cardiovascular wellness, support comfortable muscle and joint function, and support blood sugar levels already within a healthy range. The full daily dose of Life Extension Mix™ can be obtained for as little as **\$1.49** per day.

## Fat-Soluble Vitamins

Vitamin A (acetate)	5,000 IU
Vitamin D3 (cholecalciferol)	2,000 IU
Vitamin C (as calcium ascorbate, ascorbic acid, ascorbyl palmitate, magnesium ascorbate, niacinamide ascorbate, acerola extract)	2,000 mg
Ascorbyl palmitate (fat-soluble vitamin C)	250 mg
Vitamin E (natural D-alpha tocopheryl succinate)	100 IU

## Amino Acid Complex

N-acetyl-L-cysteine	600 mg
Taurine	200 mg

## Mineral Complex

Selenium (from Se-methyl L-selenocysteine)	100 mcg
Selenium (from L-selenomethionine—SelenoPure™)	50 mcg
Selenium (from sodium selenate)	50 mcg
Zinc (monomethionine) (OptiZinc®)	20 mg
Zinc (succinate)	15 mg
Boron (as boron citrate/aspartate/glycinate)	3 mg
Calcium	218 mg
Copper (as copper glycinate chelate TRAACS®)	1 mg
Chromium (as Crominex® 3+ chromium stabilized with Capros® and PrimaVie® Shilajit)	500 mcg
Potassium chloride (37.4 mg elemental)	71.3 mg
Molybdenum (sodium molybdate)	125 mcg
Manganese (gluconate)	1 mg
Iodine (potassium iodide)	150 mcg
Magnesium oxide (335.96 mg elemental)	560 mg
Magnesium citrate (35.28 mg elemental)	261.3 mg
Magnesium glycinate (11.74 mg elemental)	100 mg
Magnesium taurinate (7.83 mg elemental)	100 mg
Magnesium arginate (5.87 mg elemental)	100 mg
Magnesium ascorbate (3.40 mg elemental)	58.1 mg

## Cholinergic Complex

Choline (from bitartrate)	120 mg
Phosphatidylcholine (from soy)	150 mg
Inositol	250 mg

**Vitamin D3** helps maintain healthy bone density and DNA. There is five times more vitamin D in LIFE EXTENSION MIX™ compared to conventional multivitamins.

LIFE EXTENSION MIX™ contains only the expensive dry powder form of **vitamin E**. This natural form of vitamin E (succinate) has been shown to promote healthy DNA better than other forms.

**N-acetyl-L-cysteine** suppresses free radicals inside the cells and maintains healthy glutathione levels. **Taurine** may protect against free radicals between cells and supports eye health.

Some scientific evidence suggests that consumption of **selenium** may reduce the risk of certain forms of cancer; however, the FDA has determined that this evidence is limited and not conclusive.

**Zinc** is often poorly absorbed, but LIFE EXTENSION MIX™ provides two of the most bioavailable forms of zinc.

**Boron** is not only needed to maintain healthy bone density but may also help promote healthy prostate cell function.

LIFE EXTENSION MIX™ provides a high amount of **chromium** to help maintain arterial wall structure and already normal glucose levels. We have upgraded our chromium-containing products with Crominex® 3+, a highly stable and biologically active form of chromium blended with Capros® and PrimaVie®.

**Magnesium** helps protect arteries and heart valves, and supports heart and brain cells. LIFE EXTENSION MIX™ provides high potencies of six different forms of magnesium to fully saturate the body with this life-saving mineral.

Maintaining high levels of **acetylcholine** in the brain helps support cognitive function and memory.

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**CAUTION:** Some people choose a high-niacin version of Life Extension Mix that provides 862 mg in the daily dose, of which 345 mg is the form of niacin that can cause temporary flushing, itching or gastric disturbances. Liver function testing is recommended when niacin is taken in excess of 500 mg daily. Those with gout or liver diseases should avoid taking high doses of niacin. Consult with your doctor before using this product if you are taking anticoagulant medications. Individuals consuming more than 2,000 IU/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxyvitamin D measurement. Vitamin D supplementation is not recommended for individuals with hypercalcemia (high blood calcium levels).

Contains soybeans, corn, rice, and sesame.

## References

1. *Stroke*. 2004 Sep;35(9):2014-9.
2. *Mutant Res*. 1999 Jul 16;428(1-2):329-38.
3. *J Am Diet Assoc*. 1996 Oct;96(10):1027-39.

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.





# Rejuvenate your AGING SKIN

BY MICHAEL DOWNEY

According to a team of dermatology experts, “**Wrinkles now have a greater social impact because people live longer.**”<sup>1</sup>

This increased awareness is prompting maturing individuals to seek compounds that produce rapid **age-reversal** effects.

The problem has been that **skin rejuvenation** requires more than a single compound, as dermal aging is a **multi-factorial** process.

The good news is that ten **new bioactive compounds** have been identified that work in complementary ways to **restore youthful skin**. The **human studies** substantiating the **age-reversal** effects of these new compounds are **unprecedented!**

Consumers will be gratified to learn that these new **anti-aging compounds** have been combined into one **nutrient-dense serum** that *also* provides ingredients with time-tested benefits when applied to aged skin. > >



## Pioneering Skincare

Scientific skin rejuvenation traces back to the pioneering work of research scientist Carmen Fusco, associate professor of nutrition at New York Medical College.

Troubled by the adverse effects of drugs, the former pharmacology instructor focused her research on nutrient-dense compounds that generate not side effects, but “side benefits.”

For 35 years, Fusco has researched topical nutrients shown to inhibit DNA damage, protect skin cells, and help maintain the resiliency of youth as we age.

Science is catching up to Fusco’s early “side benefits” focus. According to one study, “*Active ingredients go well beyond simple moisturizers and exert a more complex activity in protecting skin... nourishing it and removing its superficial layers.*”<sup>1</sup>

We now know that—in addition to a good diet and regular sleep—topical application of a variety of nutrients can play an important role in skin preservation and rejuvenation.<sup>1</sup>

## The Evolution of Skin Science

Discoveries made by Professor Fusco and Life Extension® in the early 1980s triggered a decades-long evolution in science-based skincare. This led scientists to conclude that nutrients found in new cosmeceuticals are “*closer to drugs in preventing and treating wrinkles.*”<sup>1</sup>

Some of the earlier ingredients developed such as **alpha-hydroxy acid** and **beta-glucan** have become mainstay active ingredients in costly commercial skin care products.

A variety of bioactive compounds have now been confirmed to work in different but complementary ways to target skin aging issues. Their synergistic effect is documented by research showing that, when multiple pathways are triggered, cells in different dermal layers are able to signal or “talk to” each other—working cooperatively to repair tissue, boost cell energy, and prevent free radical damage.

Like a high potency multi-vitamin supplement, consumers now have access to **28** of these active compounds in one light and thin serum that spreads on like a lotion while providing unparalleled cell penetration.

## The New Topical Compounds!

In order to nourish skin topically, scientists previously identified compounds that inhibit the causes of prematurely aged skin: insufficient hydration, loss of collagen fibers, free radical damage, and clogged pores.

Adding to the list of established topical nutrients are **10** additional compounds that further modulate underlying causes of degeneration and damage to skin!

## Matrixyl® synthe'6™<sup>2</sup>

The breakdown of skin scaffolding is a major cause of wrinkles.

A novel tripeptide compound called **Matrixyl® synthe'6™** has been found to complete the maturation and stabilization of fibers, thereby stimulating the scaffolding of skin molecules.<sup>2</sup>

In a controlled clinical study of 25 women aged 42-70, a cream containing **Matrixyl® synthe'6™** was applied **2 times daily** to the crow's feet on one side of the face and the whole forehead and a placebo cream was applied to the crow's feet on the other side of the face. Scientists measured the participants' wrinkles and crow's feet before and after application of the creams.

The researchers found that frown lines among the **Matrixyl® synthe'6™** group were lifted by **28%**, and the volume of wrinkles was diminished by **31%**. Wrinkle depth also improved by **16%**. Wrinkle depth is one of the most important factors in the visual perception of wrinkles. And this anti-wrinkling effect was observed in just **2 months.**<sup>2</sup>

Scientists also observed that in the test group applying **Matrixyl® synthe'6™**, crow's feet were lifted by **13%**, the surface area they occupied shrunk by **29%**, and their volume was reduced by **21%**.<sup>2</sup>

Matrixyl® synthe'6™ actively promotes the synthesis of **six** skin matrix constituents—**collagen I, III, and IV, hyaluronic acid, fibronectin, and lamini**. These skin matrix constituents are found in the lower epidermis, where cells communicate with each other and with the cells in the dermal layer. (The epidermis is the upper layer of skin and the dermis sits beneath it.)

### Next Generation Hyaluronic Acid

Excessive dryness of the skin promotes fine lines and weakens cells. It can cause lipids in the skin's fatty layer to crystallize, causing dull and flaking skin.

**Hyaluronic acid**, a natural skin constituent, is a good moisturizer owing to its ability to capture water molecules, which reduces the visibility of lines. It is also a volumizing agent. For these reasons, hyaluronic acid is an ingredient in many skincare applications.<sup>3</sup>

However, scientists have now developed a potent new generation of this compound—an aqueous gel of **modified hyaluronic acid**. This gel forms a thin film on the skin and continuously delivers the larger amount of water bound by this new compound.<sup>4</sup>

When **Rutgers University** scientists tested this unique gel on human skin, they found that skin cells treated with this modified hyaluronic acid held **6 times more** moisture in total, and **5 times more** moisture in the *stratum corneum* (extreme outer layer), than cells treated with regular hyaluronic acid. This greater moisturizing effect was observed even **24 hours** after application!<sup>4</sup>

This advanced hyaluronic acid also exhibited the ability to combat oxidation and free radical attack, which can damage skin structure and cause wrinkles.<sup>4</sup>

### Vegetal Filling Spheres™<sup>5</sup>

Deterioration of skin matrix, combined with moisture loss, results in indentations and wrinkles. But a new compound attacks this problem from deep inside the indentations.

**Vegetal Filling Spheres™** are derived from wheat protein, which is a **biopolymer** known for its hydrating capacities.

Scientists applied either Vegetal Filling Spheres™, or placebo, to the crow's feet of 30 volunteers. They

## Rejuvenate and Protect Aging Skin

- Scientific evidence now indicates that modulating the many causes of skin aging—ranging from free radicals and collagen breakdown to moisture loss and glycation—requires the synergy of a network of topical compounds.
- A total of **28** bioactives have been developed to inhibit skin aging—from the more familiar **vitamin C** and **alpha hydroxy acid**, to the new **Matrixyl® synthe'6™**, **modified hyaluronic acid**, **Vegetal Filling Spheres™**, and lots more.
- However, to come close to benefiting from the entire network of complementary bioactives, you'd need to layer on a dozen skin creams, each of which provide only 2 or 3 active ingredients.
- A new multi-ingredient firming serum now delivers all **28** scientifically proven bioactives—in a nutrient-dense serum instead of a thick cream. Additionally, the serum is naturally scented and is free from mineral oil and sodium lauryl sulfate. This new generation formulation uniquely includes the addition of **ten new** breakthrough compounds!
- For an unparalleled multi-factorial skin rejuvenation program, get restful sleep, eat a nutrient-dense diet, exercise—and apply this new firming serum to your skin daily.



observed a **31% decrease** in the total wrinkle surface, and a **27% decrease** in wrinkle length. And this effect was seen in just **one hour!**<sup>5</sup>

Researchers found these spheres had settled inside the wrinkle indentations deep within the lower epidermis. There, they acted like microscopic sponges, trapping moisture that would normally be lost through the skin surface.<sup>5</sup>

The observed result was a *physicochemical effect*: the spheres expanded with moisture and physically **plumped** wrinkles—transforming the skin surface from wrinkled to smooth.<sup>5</sup>

Remarkably, the plumping effect occurs immediately after application—and is long-lasting! There is also a durable **increase** in hydration of the middle and upper layers of the epidermis.<sup>5</sup>



### Underlying Causes of Skin Damage

A person may look a decade or two older than his or her age due to an inadequate program to inhibit the chief causes of skin damage. An effective skin protection and rejuvenation program needs to be multi-factorial and synergistic to modulate the various age-related pathways.

All of the following factors can damage skin and cause premature skin aging:

**Stress-induced sleep loss** or insomnia can promote premature aging of the skin.

**An under-active thyroid** can result in reduced hormone levels that cause dry, flaky skin.

**Excess sun exposure** can result in photo-aging of the skin and skin cancer.

**Very low consumption of essential fatty acids** (such as fish oil, or flaxseed oil) can dry the skin.

**An antioxidant-impoverished diet** can result in oxidative, free-radical skin damage, and premature aging.

**A phytonutrient-poor diet**—one that includes too few plant foods—can accelerate free radical damage.

**An unbalanced diet high in processed foods** can promote skin cell damage.

**Breakdown of the skin scaffolding**—initiated even by frowning or laughing—can cause wrinkles.

**Dryness** can promote fine lines, weaken skin cells—and even cause lipids in the skin's fatty layer to crystallize, resulting in dull, dry and flaking skin.

**Compromised stem cells** inhibit the replacement of damaged skin.

**Stress**, both short term and chronic, can cause skin cells to appear tired.

**Free radicals** and **cosmic irradiation** cause damage to the skin cell structure, resulting in lines and wrinkles.

**Inflammation** can cause puffiness, blemishes, and pigmented lesions.

**Elevated glucose levels** can cause glycation—the process by which sugars attach themselves to the amino acids in collagen—which reduces the regenerative ability of collagen fibers, in turn promoting wrinkles, sagging and “creeping.”

**Gravity** and other mechanisms result in a tendency for skin to take on a sagging appearance.

**Aging** is associated with a slowing down in collagen renewal, causing damaged and wrinkled skin.

**Toxins** and environmental pollutants may prematurely age skin.

**Clogged pores** can harbor bacterial infections and cause inflammation, redness, blemishes, and scaly skin.

**Compromised shedding** of old skin cells in the epidermis can cause a rough or dull appearance.

**Topically applied nutrients** may—without a product-based ingredient delivery system—sit on the skin surface, overly saturating the wrong layers, causing inflammation, limiting any nutrient effect, and adding to the clogging of pores.

**Sodium lauryl sulfate**, often found in skincare products, might interfere with the activity of nutrients.

These **Vegetal Filling Spheres™** have been incorporated into this new firming serum.

### Poly P

Skin cell proliferation and collagen synthesis both slow down as we age, producing visible lines.

Fortunately, a **polyphosphate** compound found in almost all cells has been shown to inhibit this deterioration. Called **Poly P**, these polyphosphates promote tissue remodeling.<sup>6</sup>

Poly P communicates with skin cells at the dermal layer where *fibroblasts*—responsible for cell renewal—are produced. Scientists believe this interaction increases production of skin cells, which surface to replace old cells.<sup>6</sup> Poly P is believed to increase the production of collagen.<sup>6</sup>

Boosting production of both collagen and fibroblasts (cells responsible for building and maintaining the structural framework of the skin) improves skin volume and tone, making Poly P a vital component for advanced skincare.

### Taurine

Skin tissue can age prematurely due to various factors—compromised skin cell barrier, insufficient hydration, ultraviolet-induced *apoptosis* (cell death), and free radical damage.

Glycation reactions are another problem. These occur when sugars attach themselves to the amino acids in collagen—which reduces the regenerative ability of collagen—in turn promoting wrinkles, sagging, and “creping.”

Scientists noted that the body increases levels of the amino acid **taurine** in tissues that suffer physical damage or trauma. This led to a fascinating discovery: taurine modulates multiple skin-damaging pathways when applied topically to the skin!<sup>7</sup>

Specifically, evidence suggests taurine repairs the skin barrier, rehydrates *keratinocytes* (the main cells of the upper skin layers), inhibits apoptosis, and reduces free radical damage. Taurine also offers antioxidant, anti-inflammatory, and anti-toxin benefits—protecting against premature aging and environmental toxins.<sup>7</sup>

Taurine is believed to inhibit glycation, one of the main causes of cellular aging.

### Salicylic Acid

Clogged skin pores can harbor bacteria, causing inflammation, swelling, and blemishes. This impedes the desirable sloughing off of old skin cells, causing scaly or dry patches.

**Salicylic acid**—a **beta-hydroxy acid**—is known to be a *keratolytic* agent: it thins skin where there is an excess buildup of cells, and causes the skin’s outer layer to loosen and shed. In this way, salicylic acid renews the skin surface, revealing fresh, younger cells. *Keratolytics* also soften **keratin**, a major skin component, which in turn improves the skin’s moisture-binding capacity.

Salicylic acid is used topically for acne, because it penetrates pores containing *sebum* (oily matter), kills bacteria within pores, and then softens and sloughs off the outer skin cells (*epithelium*). It also prevents further pore clogging by constricting the pore diameter.





Scientists now recognize that salicylic acid can prevent pore clogging, promote the shedding of old cells, reduce the size of pores—and make room for new cell growth.<sup>8</sup>

### Pichia-Fermented Resveratrol

Skin often suffers from insufficient hydration, oxidative stress, or slow collagen turnover. These factors cause weakened cellular structure and result in wrinkles. Inflammation of the skin also promotes aging.

**Resveratrol** has long been known as an antioxidant and anti-inflammatory, as well as a mimetic of some of the benefits of calorie restriction. It appears to work partly by activating the *sirtuin 1 gene* and enhancing the functioning of *mitochondria*, cellular energy factories.<sup>9</sup>

The application of resveratrol to the skin is linked to anti-aging and anti-inflammatory effects.<sup>10</sup> And when one study showed that topical application of resveratrol prevented skin cancer in mice treated with a carcinogen,<sup>11</sup> this further suggested a role for resveratrol as a topical skincare agent.

Scientists then investigated ways to utilize resveratrol to generate a more direct and potent effect on skin appearance. They developed a special resveratrol, which is fermented by *pichia pastoris* yeast,<sup>12</sup> and tested it on the skin of humans.

### How Many of These Active Compounds Does Your Skincare Product Contain?

Scientists know that it takes an entire network of synergistic compounds to modulate all aspects of skin rejuvenation—including collagen, shedding, pore size, wrinkling, sagging, scaffolding, oxidation, inflammation, and glycation.

Check your skincare product. Most products contain only one or two active ingredients.

If you see a long list of ingredients that are not on the following list, they are most likely excipients—ingredients that have no direct, active effect on the skin but are added to increase spreadability or to keep the ingredients from separating, caking, or going bad. Some are added simply to provide color or fragrance. These are not active ingredients because they have no direct effect on the nourishing or repair of the skin.

The following is a list of bioactive ingredients that are now available in one new facial skin firming serum:

- Pomegranate (*Punica granatum*) extract
- Green tea (*Camellia sinensis*) extract
- White tea (*Camellia sinensis*) extract
- Matrixyl® synthe'6™
- Modified hyaluronic acid
- Vegetal Filling Spheres™
- Poly P (sodium polyphosphate)
- Taurine
- Salicylic acid
- Pichia-fermented Resveratrol
- DMAE (dimethylaminoethanol)
- Botanimoist® AMS (*pyrus malus*)
- Botanistat® PF-64
- QuSome® Delivery System
- Glycerin
- Avobenzone
- Glycine soja (soybean) oil
- Panthenol (Vitamin B5)
- Tocopherol (Vitamin E)
- Tocopheryl acetate (Vitamin E)
- Beta-glucan
- RNA
- Sodium PCA
- Hydroxydecyl ubiquinone (CoQ10)
- Ceramide-2
- Thioctic acid (alpha lipoic acid)
- Lactic acid
- Vitamin C (as ascorbyl phosphate)

In a double-blind, placebo-controlled, 22-person study, participants applied *pichia fermented resveratrol* to one side of their faces **twice a day**. Skin hydration was measured by a special technique known as *corneometric* reading, and high-resolution photos were taken.

The resveratrol-treated sides of the volunteers' faces showed a **36% greater** degree of hydration over the control sides. Wrinkles were dramatically **lifted**, and expression lines were noticeably **smoothed**. These effects were observed after **just 28 days!**<sup>12</sup>

## DMAE

When skin loses its firmness, this signifies thinning collagen, compromised membranes, and cellular dehydration. The result is a visible sagging, with a wrinkling tendency.

In a human study, scientists found that topical application of *dimethylaminoethanol* (DMAE) **increased** both the thickness of collagen fibers, and skin hydration.<sup>13</sup>

Another controlled study showed DMAE produces an anti-inflammatory effect and a clear **increase** in skin firmness.<sup>14</sup>

Also, when DMAE was topically tested on humans in a randomized clinical trial, researchers found it resulted in **mitigation** of lines in the forehead and around the eyes. There was a beneficial effect on the appearance of coarse wrinkles, under-eye dark circles, nasolabial folds ("laugh lines"), and neck skin, which was noticeably **firmed**. These effects were observed in **just 16 weeks!**<sup>14</sup>

Scientists also observed that DMAE exerts a general **firming** action on skin cells, likely explained by the fact that, as a precursor of acetylcholine, DMAE alters muscle contraction.<sup>15</sup>

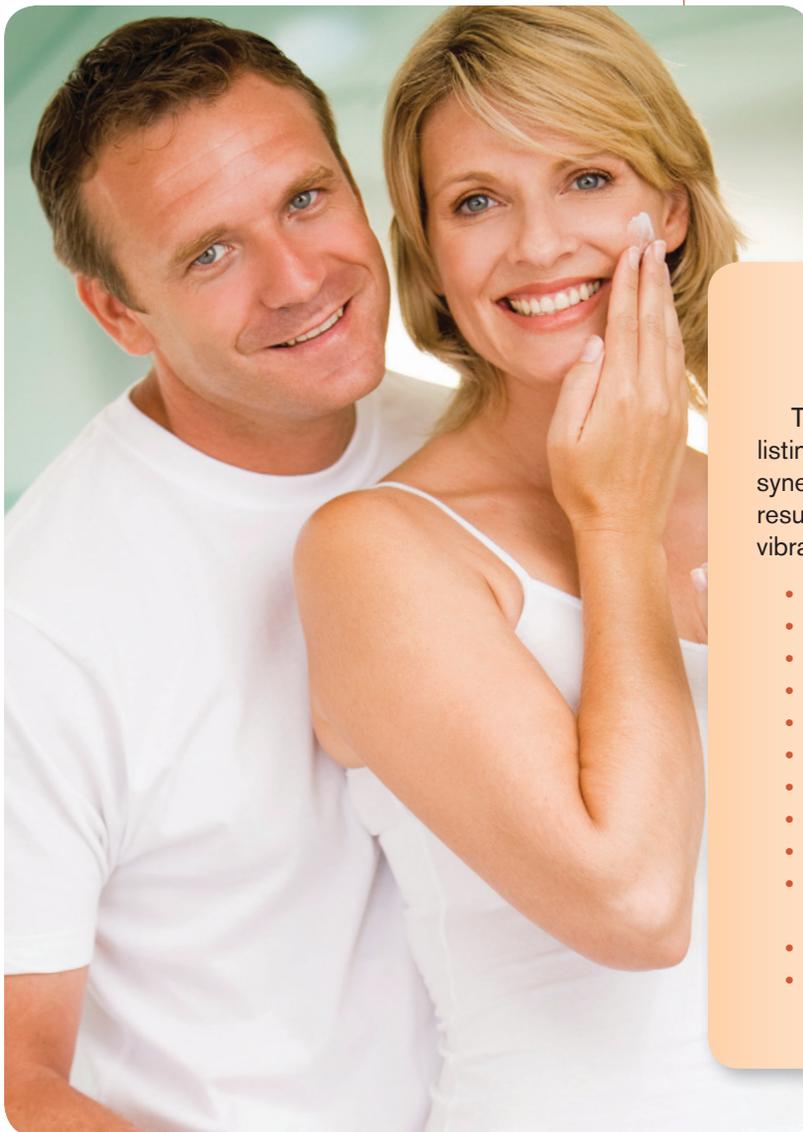
The acute **skin-firming** effects of DMAE were further confirmed in a randomized, double-blind, split-face study on 30 humans,<sup>16</sup> and by quantitative measures of *cutaneous tensile strength* (the force required to pull the skin).<sup>13</sup>

Daily skin application for an entire year showed **no** adverse effects.<sup>13</sup>

### How Topical Bioactives Repair and Rejuvenate Skin

The full range of topical agents (see the box listing these compounds on previous page) works synergistically, acting along a network of pathways, resulting in more youthful, firmer, healthier, and vibrant skin. Together these bioactives:

- Accelerate collagen production
- Promote shedding of old cells
- Decrease pore size
- Deliver more moisture to cells
- Protect stem cells
- Lift wrinkles
- Smooth fine lines
- Provide anti-sagging activity
- Stimulate skin cell scaffolding
- Fight free radical oxidation and DNA damage
- Combat inflammation
- Inhibit glycation—one of the chief causes of cellular aging



## Botanimoist® AMS Apple Saccharides

Keratinocytes produce keratin, the material comprising fibrous proteins responsible for strengthening skin membranes. So loss of hydration in keratinocytes causes a weakening of skin cells, resulting in a sagging, wrinkling effect. Also, a depletion of cellular moisture causes lines to be more visible.

Scientists tested hydrating capability of a dried extract of apple fruit, called **Botanimoist® AMS** (*apple moisturizing saccharide*) in a placebo-controlled human study. A single topical application of this extract resulted in **89% increase** in skin hydration—after **just 30 minutes!**<sup>17</sup>

Even **after 6 hours**, skin hydration of participants treated with **5% Botanimoist® AMS** remained **31% higher** than the hydration level of untreated skin.<sup>17</sup>

It has also been suggested that there may be a stem cell-protecting effect.

## Botanistat® PF-64

The nutrients found in all skincare products need protection against microbes and constituent breakdown. This is generally accomplished by including the preservative **paraben**.

However, fears have arisen concerning this common preservative's *estrogenic* effects.

Scientists seeking an alternative developed **Botanistat® PF-64**, which is a paraben-free blend of mild but effective *biocide* ingredients providing *broad-spectrum protection* against bacteria, fungi, yeasts, and molds.<sup>18</sup>

## Summary

Solid scientific evidence shows that it takes a synergistic network of topical nutrients to powerfully modulate the many factors of skin aging—from pore size and oxidation to *glycation* and wrinkling.

There are now **28** bioactive compounds available to inhibit skin aging—ranging from the earliest **alpha hydroxy acid** and **vitamin C** to the new **hydrating Vegetal Filling Spheres™** and modified **hyaluronic acid**.

But because commercial skin products generally focus on **only 2 or 3** active ingredients, you'd need to layer on a dozen skin creams to come close to benefiting from the entire complementary network of these proven compounds.

Some of these bioactive compounds sell for hundreds of dollars by themselves in commercial

preparations. Based on the clinically proven data substantiating their efficacy, it's easy to understand why maturing individuals would pay a king's ransom to obtain them.

Fortunately, a new firming serum delivers all **28** scientifically proven bioactives in a single, nutrient-dense serum—not a thick cream—and at a fraction of the cost.

Adding this new multi-ingredient firming serum to a nutrient-rich diet and a good sleep regimen is the greatest possible multi-factorial defense against the loss of youthful-looking skin. ●

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

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# TRIPLE ACTION CRUCIFEROUS

## Vegetable Extract with Apigenin



Item #01468



Item #01469

Triple Action Cruciferous Vegetable Extract provides the following concentrates in just one vegetarian capsule:

Broccoli Extract	400 mg
[standardized to 4% glucosinolates (16 mg)]	
Watercress 4:1 extract	50 mg
Indole-3-Carbinol (I3C)	80 mg
Rosemary Extract	50 mg
Cat's Claw Extract	50 mg
Cabbage Extract	25 mg
DIM (di-indolyl-methane)	14 mg
Apigenin	25 mg

Those who want to obtain the benefits of *trans-resveratrol* can order **Triple Action Cruciferous Vegetable Extract with Resveratrol**. Each capsule provides **20 mg of *trans-resveratrol*** in addition to the **vegetable extracts** and retails for \$32 per 60-capsule bottle. When a member buys four bottles, the price is reduced to only **\$22.20 per bottle**. Contains corn.

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To order Triple Action Cruciferous Vegetable Extract, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

Scientists have identified specific extracts from **cruciferous vegetables**—such as broccoli, cauliflower, cabbage and Brussels sprouts—that help maintain healthy hormone metabolite balance. **Triple Action Cruciferous Vegetable Extract** combines some of these plant extracts into a comprehensive formula for optimal DNA protection.

**I3C (indole-3-carbinol)** and **DIM (di-indolyl-methane)** favorably modulate estrogen metabolism and induce liver detoxification enzymes to help neutralize potentially harmful estrogen metabolites and xenoestrogens (potentially toxic, estrogen-like environmental chemicals).<sup>1-4</sup>

Extracts of **broccoli**, **watercress**, and **rosemary** provide **glucosinolates**, **isothiocyanates**, **carnosic acid**, and **carnosol**—bioactive compounds that have a multitude of favorable effects on estrogen metabolism and cell division.<sup>5-8</sup> **Apigenin**, a powerful plant flavonoid found in plants such as **parsley** and **celery**, is also added to the formula to boost cell protection,<sup>9</sup> while 25 mg of a natural source of benzyl isothiocyanate (BITC), are included to maintain cell health.<sup>10</sup>

Consumers should be aware that while consumption of cruciferous vegetables is highly recommended, the cooking process depletes many of the beneficial compounds such as **I3C**.

For those weighing less than 160 pounds, just one capsule a day provides optimal potencies. Those weighing over 160 pounds should consider taking two capsules a day. A 60 capsule bottle of **Triple Action Cruciferous Vegetable Extract** retails for \$24. If a member buys four bottles, the price is reduced to only **\$16.50 per bottle**.



**RejuveneX® Factor** provides **10** new compounds to improve the health and appearance of your skin.

The new **RejuveneX® Factor** delivers a total of **28** proven active ingredients in a nutrient-dense, *deep-penetrating serum*. Contrast this with commercial creams that merely sit on top of the skin.

### **Comprehensive Nutrition for the Skin**

The full name of this new formula is:

#### **RejuveneX® Factor Firming Serum**

To get this entire network of **28** synergistic bioactives anywhere else, you'd need to layer on a dozen skin creams—each providing only **2 or 3** of these active ingredients—with some creams costing as much as **\$600!**

The good news is that—for a fraction of the cost—**RejuveneX® Factor Firming Serum** delivers optimal dosages of the full range of clinically proven technologies... to promote the appearance of **youthful, firmer, healthier, and more vibrant skin**.

### **Serum vs. Cream**

**RejuveneX® Factor** is a **serum**—a more advanced and concentrated format that is thinner than a cream and ensures superior **absorption** of its **28** skin-enhancing compounds.

**RejuveneX® Factor Firming Serum** comes in an airless pump to protect the integrity of the bioactives, and also utilizes **QuSome®**, the patented deep-layer cellular delivery system that provides sustained release for **6 to 8 hours!**

And **RejuveneX® Factor Firming Serum** is uniquely free of paraben, irritants, estrogenic chemicals, mineral oil, and synthetic fragrances.

# TRANSFORM TO YOUNGER LOOKING SKIN!

## 10 NEW BREAKTHROUGH COMPOUNDS!

**Matrixyl® synthe'6™** helps minimize the appearance of fine lines and wrinkles.<sup>1</sup>

**Hylasome® EG10** holds more moisture in skin cells and targets free radicals.<sup>2</sup>

**Vegetal Filling Spheres™** expand with moisture, allowing plumping of wrinkles.<sup>3</sup>

**Poly P** supports production of collagen.<sup>7</sup>

**Taurine** offers antioxidant benefits and helps inhibit premature aging.<sup>8</sup>



ITEM# 01621

**Salicylic acid** supports production of new skin cells.

**Pichia-fermented/Resveratrol extract** increases hydration, diminishing the appearance of lines.<sup>4</sup>

**DMAE (dimethylaminoethanol)** helps smooth and firm skin.<sup>5,6</sup>

**Botanimoist® AMS** helps boost hydration of skin cells.<sup>9</sup>

**Botanistat® PF-64** helps preserve serum against environmental toxins.<sup>10</sup>

● A 1.7 oz bottle of **Rejuvenex® Factor Firming Serum** retails for \$65. If a member buys four bottles, the price is reduced to **\$41.25** a bottle. If eight bottles are purchased, the price is only **\$37.43** a bottle. Each bottle will last **two months** with once daily application to the face (or one month if used twice daily.)

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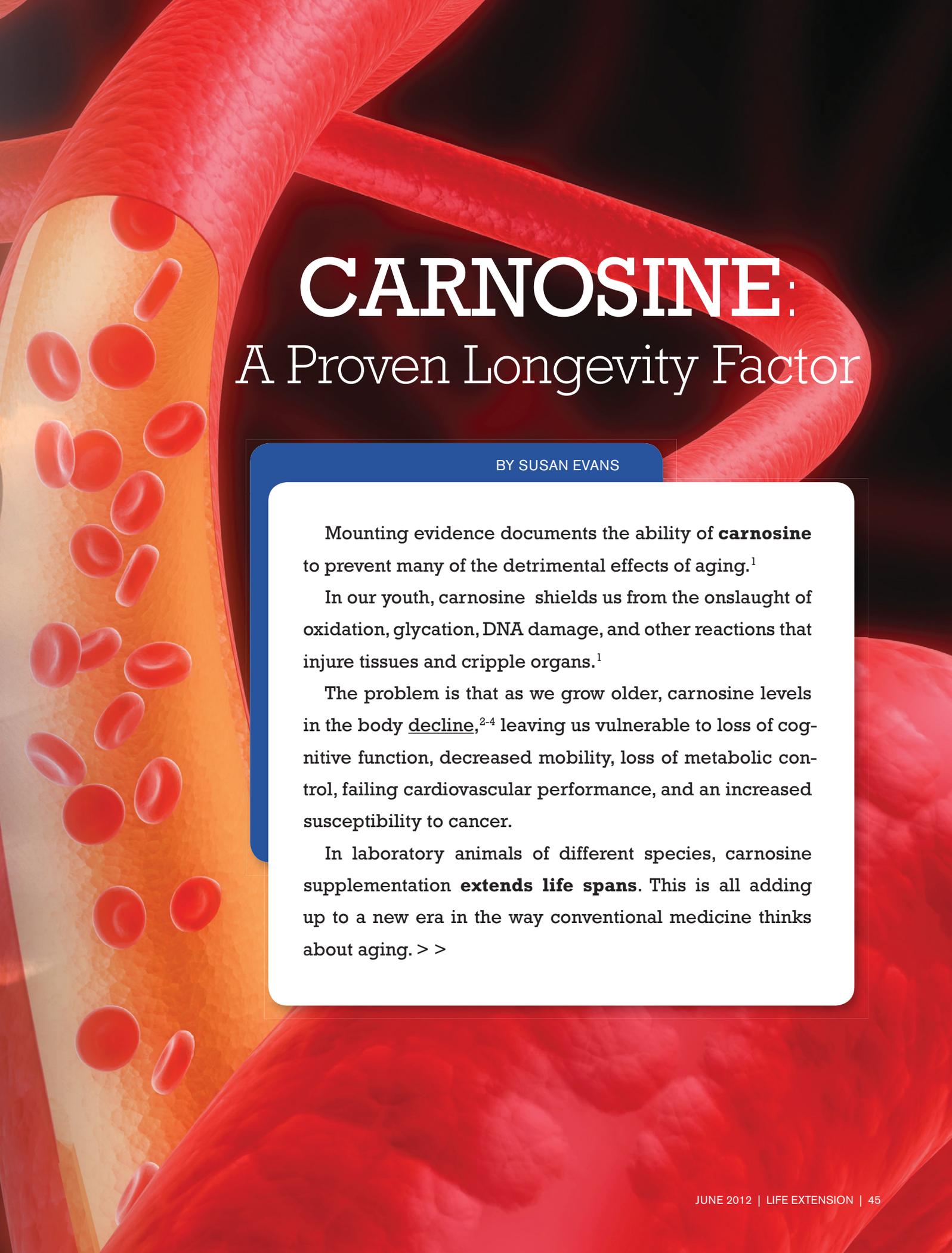
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## REJUVENEX® FACTOR DELIVERS 28 ACTIVE INGREDIENTS:

- Pomegranate (*Punica granatum*) extract
- Green tea (*Camellia sinensis*) extract
- White tea (*Camellia sinensis*) extract
- QuSome® delivery system
- Matrixyl® synthe'6™
- Vegetal Filling Spheres™
- Poly P (sodium polyphosphate)
- Pichia-fermented/Resveratrol extract
- Tocopherol (vitamin E)
- Tocopheryl acetate (vitamin E)
- Beta-glucan
- RNA
- Sodium PCA
- Hydroxydecyl ubiquinone (CoQ10)
- Taurine
- Salicylic acid
- Ceramide-2
- Thiocctic acid
- Lactic acid
- Vitamin C (ascorbyl phosphate)
- Hylasome® EG 10 (hyaluronate crosspolymer)
- Glycerin
- Avobenzone
- Glycine soja (soybean) oil
- Panthenol
- DMAE (dimethylaminoethanol Bitartrate)
- Botanimoist® AMS apple (*pyrus malus*)
- Botanistat® PF-64

To order **Rejuvenex® Factor Firming Serum**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)





# CARNOSINE: A Proven Longevity Factor

BY SUSAN EVANS

Mounting evidence documents the ability of **carnosine** to prevent many of the detrimental effects of aging.<sup>1</sup>

In our youth, carnosine shields us from the onslaught of oxidation, glycation, DNA damage, and other reactions that injure tissues and cripple organs.<sup>1</sup>

The problem is that as we grow older, carnosine levels in the body decline,<sup>2-4</sup> leaving us vulnerable to loss of cognitive function, decreased mobility, loss of metabolic control, failing cardiovascular performance, and an increased susceptibility to cancer.

In laboratory animals of different species, carnosine supplementation **extends life spans**. This is all adding up to a new era in the way conventional medicine thinks about aging. > >



### Scientists Explore Carnosine's Longevity Benefits

Carnosine is found throughout the body wherever there are high energy demands such as in the brain, the heart, and our muscles.<sup>5</sup> Its function is to protect these vital areas from the metabolic demands of energy production and management.<sup>6,7</sup>

Young organisms have high levels of carnosine in those energy-demanding tissues. As part of the aging process, carnosine levels decline over time.<sup>2-4</sup> That's because our bodies both make less carnosine as we age, and also because the carnosine we have is increasingly vulnerable to destruction. In human conditions such as diabetes and metabolic syndrome, which produce unnaturally accelerated aging, carnosine production is decreased, and its destruction is increased.<sup>8,9</sup>

These findings suggest that a "carnosine deficiency" might be partly responsible for the visible aging and loss of function in a multitude of areas throughout the body that occurs as we get older.

If we could restore our bodies' carnosine stores to their youthful levels, we might be able to arrest part of the aging process.

Here are a few of the most dramatic observations in recent years that demonstrate how carnosine supplementation extends life spans:

1. Carnosine slows the aging of human cells in culture dishes.<sup>10,11</sup> Scientists added carnosine to cultures of young cells. While the control cells developed the typical "old" appearance, those grown in high carnosine concentrations retained their youthful appearance.<sup>5</sup> When these youthful-appearing cells were transferred to culture dishes lacking extra carnosine, they quickly developed the "old" appearance of control cells of the same age. Yet, when scientists took old cells, approaching the limits of their life span, and transferred them into culture dishes containing high carnosine concentrations, they found that the cells rapidly became rejuvenated to resemble young cells.<sup>10</sup>
2. Carnosine extends the life span of *rotifers*, a microscopic aquatic organism now being used as a model of aging in many laboratories.<sup>12</sup> In this experiment, scientists tested many different antioxidant compounds, identifying carnosine as one of just four that had significant effects on the organisms' longevity.

3. Carnosine extends the life span of fruit flies, another organism commonly used to study aging, up to **20%** in males.<sup>13,14</sup> Normally, male fruit flies die much sooner than do females, but when fed a steady diet including a carnosine supplement, the males attained the same age as the females.
4. Carnosine extends the life span of laboratory mice, complex, warm-blooded mammals with many of the aging features common to humans.<sup>15,16</sup>

Scientists used a strain of mice in which aging is markedly accelerated and supplemented their food with carnosine. Not only did the animals live significantly longer, they retained the physical and behavioral features of youthful animals.<sup>15</sup> Next, the scientists tested the supplement in normal mice, finding much the same effects. Carnosine clearly improved the animals' external appearances and maintained the animals in better condition than control animals receiving no carnosine.<sup>16</sup>

### **Carnosine Protects Against Cardiovascular Disease**

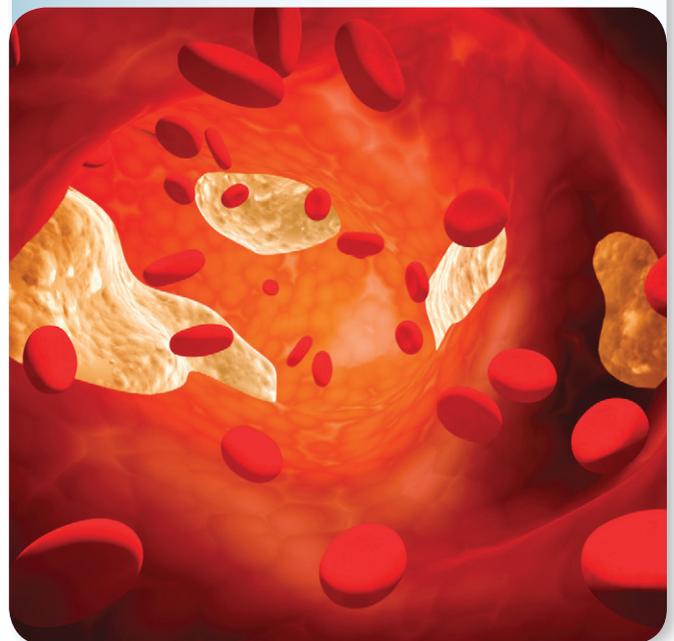
Carnosine's multi-targeted effects are most prominent in the heart and blood vessels. Carnosine has been shown to decrease mortality from strokes as well as mitigate the damaging effects of stroke on the brain itself.<sup>17-19</sup> Studies in experimental animals show that carnosine, administered before or after a stroke is induced, protects brain cells from the so-called ischemia-reperfusion injury that occurs when tissue is first deprived of oxygen and is then subjected to high oxygen levels when blood flow is restored.<sup>17,18</sup> That results in marked reduction in signs of oxidant damage to brain cells, and to a real and significant reduction in the size of the stroke area in the brain.<sup>18</sup>

Carnosine also protects heart muscle from ischemia (lack of blood flow), which can ultimately produce a heart attack. This protection derives from carnosine's antioxidant actions, combined with its ability to trap oxidation-inducing transition metals, its acid-buffering capacity, and its influence on inflammatory cell activity.<sup>19</sup> In fact, carnosine has been added to solutions used to protect heart muscle during open-heart surgery, when the heart is intentionally stopped, and there is high risk for ischemic damage.<sup>20</sup>

Carnosine's actions on blood vessels may even prevent ischemia from occurring in the first place. Carnosine protects artery-lining endothelial cells from oxidation and glycation, both of which are early events in development of atherosclerosis.<sup>21,22</sup> Studies show that carnosine prevents formation of dangerous

## **Carnosine Provides Broad-Spectrum Defense Against Aging**

- Carnosine is a natural anti-aging constituent in your body.
- Carnosine fights such age-inducing processes as oxidation, glycation, protein cross-linking, mitochondrial dysfunction, telomere shortening,<sup>6,4</sup> and transition metal accumulation.
- Carnosine levels decline with age, leaving you with progressively weaker defenses against age-related processes.
- Carnosine supplementation can restore youthful carnosine levels in blood and tissues, and it extends the life spans of experimental animals of many species.
- Carnosine supplementation may protect against neurodegenerative diseases and stroke; it also enhances exercise performance and comfort, ameliorates diabetes and its complications, and protects heart muscle and blood vessels from atherosclerosis.



“foam cells,” fat-laden scavenger cells that trigger the inflammatory response that produces deadly arterial plaque.<sup>23</sup>

Excessive muscle tone in arteries raises blood pressure and reduces blood flow to heart muscle and brain cells; carnosine reduces arterial tone by multiple mechanisms.<sup>24</sup> It modulates calcium ion signaling in the smooth muscle cells that control vascular tone and enhances production of beneficial endothelial nitric oxide synthetase (eNOS) that induces arteries to relax.<sup>25</sup>

Given carnosine’s beneficial impact on skeletal muscle and exercise performance, it is hardly surprising to learn that carnosine also enhances heart muscle contractility. This is again a multifactorial effect, produced in part by carnosine’s ability to control calcium flow, and partly by its antioxidant, acid buffering, and anti-glycation activities.<sup>19,26,27</sup>

### Carnosine Fights Diabetes and Its Consequences

The global obesity epidemic brings with it the growing threat of type 2 diabetes and all of its devastating consequences that include cardiovascular disease, kidney failure, nerve damage, and eye disorders.



Studies show that diabetics’ cells have lower-than-normal carnosine levels, similar to levels in older adults.<sup>10</sup> That may be one reason that diabetes produces accelerated aging.<sup>28</sup>

Yet carnosine supplementation can restore youthful carnosine levels in vital tissues, and offers protection against many of the components of diabetes.

Carnosine lowers elevated blood sugar levels, reduces long-term formation of dangerous advanced glycation end-products, limits oxidant stress and elevated inflammation, and prevents protein cross-linking, not only in diabetics, but also in otherwise healthy aging adults.<sup>29-33</sup>

Additionally, carnosine works ‘behind the scenes’ to offer important protection for diabetics’ physiological destruction from high blood sugar:

- Carnosine protects kidney cells from the effects of high glucose levels, helping to reduce the risk of diabetic kidney disease, or nephropathy.<sup>34-36</sup>
- Carnosine reduces oxidation and glycation of low-density lipoprotein (LDL) which bodes well for reduction of diabetes-induced atherosclerosis.<sup>37,23</sup>
- Carnosine reduces protein cross-linking in the lens of the eye and helps to reduce the risk of cataract, a common diabetic complication.<sup>38,39</sup>
- Carnosine supplementation also prevents the microscopic blood vessel damage that produces diabetic retinopathy, a major cause of blindness in diabetics.<sup>40</sup>
- Carnosine supplements prevent loss of sensory nerve function (neuropathy) in diabetic animals.<sup>41</sup>

### Carnosine Protects Brain Cells, Preserves Cognition

So far, drug treatment has shown only minimal effectiveness at slowing the progression of cognitive decline. Carnosine’s many therapeutic targets make it exceptionally promising for all of these conditions.<sup>42</sup>

*Alzheimer’s disease* is the most widely feared and the most common of the neurodegenerative disorders. Scientists have found that Alzheimer’s patients have even lower levels of carnosine in their brains and spinal fluid than those of other older adults.<sup>43</sup> It is not yet clear whether this is a cause or an effect of Alzheimer’s, but many intriguing observations suggest a role for carnosine in prevention of the disease.



Alzheimer's disease is the result of multiple causes, virtually all of which have some connection to carnosine and its function in the brain. Noted expert Alan R. Hipkiss of London's Queen Mary's School of Medicine and Dentistry recently summarized the relationship between Alzheimer's and falling levels of carnosine in the body.

Hipkiss observed that those parts of the brain that are first affected in early Alzheimer's disease are also those in which carnosine is normally found in highest concentrations.<sup>44</sup> That suggests that, as carnosine levels fall with age, those brain areas become the most vulnerable to the Alzheimer's-related damage. In addition, he notes that the abnormal protein, amyloid beta, which is seen exclusively in Alzheimer's diseased brains is typically full of zinc ions. Carnosine is capable of binding up zinc and keeping it from damaging tissues in excess.<sup>44,45</sup> Again, the implication is that falling levels of carnosine allow brain tissue to fall victim to an unnatural accumulation of a toxic substance.

Finally, Hipkiss notes that the so-called "neurofibrillary tangles" found in the brains of Alzheimer's disease patients contain proteins that are extensively cross-linked.<sup>44</sup> Carnosine is an effective inhibitor of protein cross-linking everywhere in the body.<sup>46</sup>

**Mitochondrial dysfunction** is yet another contributor to Alzheimer's disease; the oxidant stress it produces may be involved in formation of the Alzheimer's protein amyloid beta.<sup>47</sup> Experimental studies show

that supplementing Alzheimer's disease mice with carnosine potently reduces amyloid beta accumulation and completely rescues their brains from mitochondrial dysfunction.<sup>31</sup>

These biochemical relationships are now showing real effects in experimental models of neurodegenerative diseases of aging. Researchers fed aged rats a supplement rich in carnosine, which also contained vitamin D3 as well as blueberry and green tea polyphenols, or a control substance.<sup>48</sup> The animals were then trained in finding their way to a platform submerged in water. By the end of the training period, the treated group of impaired older animals performed better than the controls in the same age category. Supplemented animals also were found to have increased production of new brain cells and fewer markers of brain cell inflammation and deterioration than controls. Similar anti-oxidative and anti-inflammatory effects were seen in the brains of mice with an experimental form of Parkinson's disease.<sup>49</sup>

**Strokes** cause brain cells to die from oxidant damage. Recent studies show that carnosine's antioxidant effects provide some protection against both ischemic stroke (in which too little blood reaches brain tissue), and hemorrhagic strokes (in which bleeding exposes brain tissue to damage from free blood).

In one study, rats were supplemented with a carnosine-blueberry-green tea-vitamin D3 mixture for two weeks prior to experimentally-induced ischemic

## Carnosine Targets Six Multiple Molecular Aging Mechanisms

Initially, researchers considered carnosine as just an antioxidant molecule. But, while it has good antioxidant effects, carnosine is by no means the most powerful antioxidant in the body. What caught the researchers' attention was that supplementation with other, more potent, antioxidants did not produce the dramatic increase in longevity seen with carnosine.<sup>62,65</sup>

Clearly, something else is going on.

Few scientists, however, were prepared for the revelation that carnosine actually *targets six major processes* involved in the aging process. Let's look briefly at each one, to see how carnosine exerts its overall effects.

**1. Oxidation** at the cellular and tissue levels is one of the major contributors to the aging of organisms. Carnosine scavenges oxygen and nitrogen free radicals, and reduces their destructive impact on fat and DNA molecules.<sup>1,62,66,67</sup> These effects are a powerful means of stopping atherosclerosis and cancer formation, respectively.

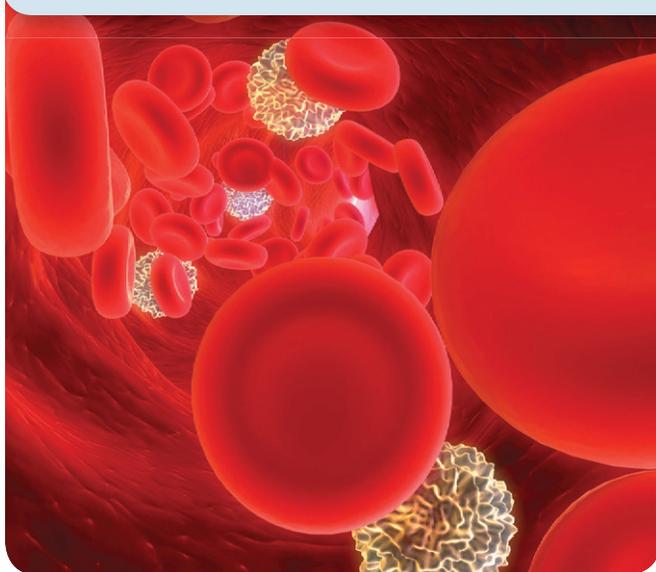
**2. Glycation**, the formation of molecular compounds of glucose with vital biomolecules such as enzymes and other proteins, is another major cause of aging. Glycated proteins induce potent oxidant stress and trigger inflammatory responses that hasten the aging process. Glycated proteins also form "cross-links" that bind them together, reducing their youthful flexibility and function. Carnosine takes a "sacrificial hit" and allows itself to be glycated, sparing other vital structures and preventing dangerous protein cross-linking.<sup>5,67,68</sup>

**3. Accumulation of excess metals**<sup>44,69</sup> Carnosine chelates, or binds to, ions of copper, zinc, and iron, which in excess are known to induce production of amyloid beta and other proteins found in Alzheimer's and Parkinson's diseases.<sup>66,70-72</sup>

**4. Cross-linked proteins** are the result of accumulated oxidant damage and glycation in youth. They are eliminated by intracellular structures called proteasomes.<sup>65</sup> With increasing age, however, proteasomal degradation drops off, allowing the dysfunctional proteins to accumulate and interfere with cellular function. Carnosine can react with these abnormal proteins, hastening their elimination.<sup>65,70</sup>

**5. Telomeres** are the repeating DNA sequences at the ends of chromosomes that function as a kind of "molecular clock," becoming shortened with each cycle of cell replication. When telomeres become too short, cells die. Carnosine reduces damage to telomeres and slows their rate of shortening in experimental systems.<sup>64</sup>

**6. Mitochondrial dysfunction** accelerates aging by depriving cells of the energy they need, and by adding to their oxidative burden as mitochondria lose their efficiency.<sup>73</sup> Carnosine alleviates all of these alterations, especially in vulnerable brain cells where mitochondrial dysfunction contributes to Alzheimer's and other neurodegenerative diseases.<sup>47,73,74</sup>



stroke, at which time a major brain artery was surgically blocked.<sup>50</sup> Pre- and post-surgery behavioral testing demonstrated that, compared with control animals, supplemented rats had a **12%** reduction in motor asymmetry, and a **24%** reduction in neurologic dysfunction following the stroke. Supplemented rats also had up to a **3-fold increase** in new brain cell proliferation after the stroke, compared with controls.

Other studies of ischemic stroke demonstrate a strong reduction in oxidative stress and brain cell death by apoptosis in animals supplemented with carnosine.<sup>51</sup> Importantly, carnosine also provides protection following ischemia from so-called glutamate excitotoxicity, the same sort of neuronal "overdrive" that is thought to further contribute to Alzheimer's disease.<sup>52</sup>

In experimental models of hemorrhagic stroke, carnosine treatment led to restoration of normal neurotransmitter receptors damaged by the presence of blood in brain tissue.<sup>53</sup> Carnosine also prevented some of the dangerous swelling that often follows a hemorrhagic stroke.<sup>53</sup>

### Carnosine Enhances Exercise Performance

While excess body fat increases the risk of diabetes, regular exercise reduces the risk of both obesity and diabetes. Carnosine supports exercise performance by buffering the rising levels of acid that accumulate in working muscle.<sup>55,56</sup> Accumulating acid in muscles produces the fatigue and pain that ultimately limits our workouts.<sup>54,57,58</sup>

Increasing muscle carnosine levels is now a well-established means of improving exercise performance and reducing fatigue, both in trained and untrained individuals.<sup>6,59,60</sup> In older adults, in whom frailty and the risk of falls increases with muscle weakness, it can be a critical factor in promoting safety and independent living.<sup>61</sup>

In one study of people 55-92 years old, raising muscle carnosine content increased their fatigue threshold by **29%** from pre- to post-supplementation, with no change seen in the placebo group.<sup>62</sup> A similar study among 60-80 year-olds demonstrated a significant increase in the time subjects could exercise before becoming exhausted.<sup>63</sup>

### Summary

The past decade has led to a broad array of findings regarding carnosine's multiple protective effects, arising from its ability to fight multiple processes that cause aging.

Carnosine defends against oxidant damage, glycation of vital proteins, acid accumulation in muscle and heart, dangerous transition metal ions, age-induced protein cross-linking, mitochondrial dysfunction, and age-accelerating telomere shortening.<sup>64</sup>

These multitargeted actions collaborate to prevent age-related diseases such as cognitive decline and dementia, to promote exercise comfort and performance, to slow progression of metabolic conditions such as diabetes, and to defend against atherosclerosis and heart disease. It's no wonder carnosine is referred to as the "antiaging dipeptide."<sup>26</sup> ●

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

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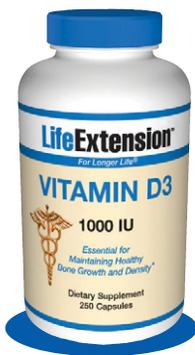


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# Which VITAMIN D is Right for You?

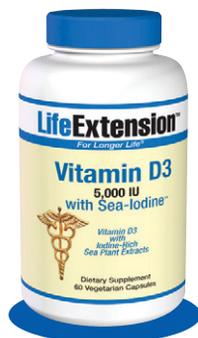


## Vitamin D3 1,000 IU 250 capsules

Retail: \$12.50  
Four-bottle  
Member Price: **\$8.44 ea.**

Commercial companies offered only 400 IU vitamin D products when Life Extension long ago introduced this 1,000 IU version. For most people, this 1,000 IU potency is *insufficient* to attain optimal vitamin D blood levels. For smaller individuals who obtain 2,000-3,000 IU in their multi-nutrient formulas (and children), this potency of vitamin D may be suitable.

**Item # 00251**  
Please refer to website for allergen information.

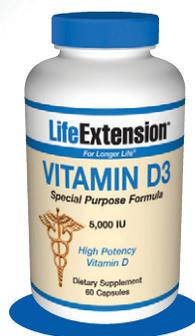


## Vitamin D3 5,000 IU with Sea-Iodine™\* 60 vegetarian capsules

Retail: \$14  
Four-bottle  
Member Price: **\$9.38 ea.**

Most people do not ingest enough vitamin D and iodine, especially those seeking to reduce their salt intake. Combining 5,000 IU of vitamin D3 and 1,000 mcg of iodine into one capsule makes taking these two nutrients economical and convenient.

**Item # 01372**  
Please refer to website for allergen information.

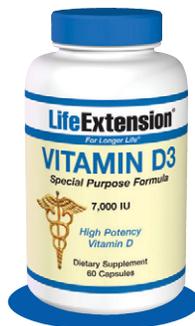


## Vitamin D3 5,000 IU 60 capsules

Retail: \$11  
Four-bottle  
Member Price: **\$7.43 ea.**

For those obtaining 1,000-3,000 IU of vitamin D in their multi-nutrient formulas, this 5,000 IU potency is what most need to *achieve* optimal vitamin D blood levels.

**Item # 00713**  
Please refer to website for allergen information.



## Vitamin D3 7,000 IU 60 capsules

Retail: \$14  
Four-bottle  
Member Price: **\$9.45 ea.**

Some individuals (such as those weighing more than 180 pounds) may require higher potencies of vitamin D. When combined with 1,000-3,000 IU obtained from multi-nutrient formulas, this 7,000 IU vitamin D3 capsule should enable these individuals to attain 25-hydroxyvitamin D blood levels above the desired range of 50 ng/mL.

**Item # 01418**  
Please refer to website for allergen information.



## Vitamin D3 Liquid Emulsion 2,000 IU 1 ounce

Retail: \$28  
Four-bottle  
Member Price: **\$18.75 ea.**

For those rare individuals who have difficulty absorbing enough vitamin D3 from powdered capsules, this liquid emulsion of vitamin D can be used.

**Item # 00864**

To order any of these high-potency vitamin D3 supplements, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

**CAUTION:** Individuals consuming more than 2,000 IU/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxyvitamin D measurement. Do not exceed 10,000 IU per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with hypercalcemia (high blood calcium levels). People with kidney disease, certain medi-

cal conditions (such as hyperparathyroidism or sarcoidosis), and those who use cardiac glycosides (digoxin) or thiazide diuretics should consult a physician before using supplemental vitamin D.

\* If you have a thyroid condition or are taking antithyroid medications, do not use without consulting your healthcare practitioner.



## AVOID ACCELERATED AGING with **CARNOSINE**

As we age, destructive **glycation** processes run rampant throughout our bodies.

**Glycation** involves a reaction of proteins with sugars that creates a variety of aging conditions ranging from wrinkled skin to cell structure damage.

Studies have shown that **carnosine** can inhibit **glycation**, while guarding the nervous system against toxic heavy metals.

A new laboratory study corroborates earlier research showing that **carnosine** can extend life span\*.

**Life Extension®'s Super Carnosine Caps** provide **500 mg** of L-carnosine per capsule—a dose **10 times more potent** than most commercial brands. **Super Carnosine Caps** also contain **luteolin** and **benfotiamine** (lipid-soluble vitamin B1) to provide multifaceted protection against glycation and its deadly consequences.

The recommended daily dose of two capsules provides:

<b>L-Carnosine</b>	<b>1000 mg</b>
<b>Benfotiamine</b>	<b>100 mg</b>
<b>Thiamine HCl</b>	<b>100 mg</b>
<b>Luteolin</b>	<b>8 mg</b>

The retail price for a bottle of 90 500 mg **Super Carnosine Caps** is \$66. If a member buys four bottles, the price is reduced to just **\$45** per bottle. Item # 01287

To order **Super Carnosine Caps**, call 1-800-544-4440 or visit **[www.LifeExtension.com](http://www.LifeExtension.com)**



Item #01287

\* *Rejuvenation Res.* 2010 Aug;13(4):453-7.

Note: Those who take the **Mitochondrial Energy Optimizer** are already consuming 1,000 mg of L-carnosine, along with benfotiamine.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

# IS IT LOW T?

TAKE  
THE TEST  
←

PLEASE ANSWER YES OR NO

	YES	NO
1. DO YOU HAVE A DECREASE IN LIBIDO (SEX DRIVE)?		
2. DO YOU HAVE A LACK OF ENERGY?		
3. DO YOU HAVE A DECREASE IN STRENGTH AND/OR ENDURANCE?		
4. HAVE YOU LOST HEIGHT?		
5. HAVE YOU NOTICED A DECREASED "ENJOYMENT OF LIFE?"		
6. ARE YOU SAD AND/OR GRUMPY?		
7. ARE YOUR ERECTIONS LESS STRONG?		
8. HAVE YOU NOTICED A RECENT DETERIORATION IN YOUR ABILITY TO PLAY SPORTS?		
9. ARE YOU FALLING ASLEEP AFTER DINNER?		
10. HAS THERE BEEN A RECENT DETERIORATION IN YOUR WORK PERFORMANCE?		

The above ADAM® questionnaire was developed by John E. Morley, M.B., B.Ch. It is to be used solely as a screening tool to assist a physician in diagnosing androgen (testosterone) deficiency. \*Androgen Deficiency in the Aging Male.

IF YOU HAVE ANSWERED YES TO #1, #7, OR ANY THREE OTHERS, YOU MAY HAVE SYMPTOMS ASSOCIATED WITH LOW TESTOSTERONE.

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# FIGHT BACK AGAINST AGING!



## Aging is Characterized by Inflammation, Glycation, and Mitochondrial Decay

The loss of cellular vitality is caused by a number of factors, including mitochondrial problems, glycation, and free-radical reactions. Life Extension® members have access to a state-of-the-art nutritional formula called MITOCHONDRIAL ENERGY OPTIMIZER WITH BioPQQ™ that helps protect delicate cellular structures and enables cells to perform life-sustaining metabolic processes.

Mitochondrial Energy Optimizer with BioPQQ™ is designed to counteract age-related structural and functional changes by providing the following unique ingredients:

- **CARNOSINE:** As humans age, proteins in their bodies become **irreversibly damaged** by glycation reactions. Glycation is the cross-linking of proteins and sugar to form **non-functioning** structures called advanced glycation end products in the body, which can lead to alterations of normal cell function. Carnosine is not only a powerful **anti-glycating** agent, but it also protects **neurons** against reactive and cytotoxic protein carbonyl species associated with normal aging.<sup>1-5</sup>
- **PQQ:** This breakthrough micronutrient has been shown to trigger **mitochondrial biogenesis**—the growth of **new** mitochondria in aging cells!<sup>6</sup> PQQ also activates genes involved in protecting the delicate structures within the mitochondria.<sup>7-10</sup>
- **LUTEOLIN:** Systemic inflammation is involved in most undesirable consequences of aging. Culprits behind **inflammatory** reactions are pro-inflammatory **cytokines**, such as **interleukin-1** and **tumor necrosis factor-alpha**. Luteolin is a plant extract that has been shown to modulate these dangerous inflammatory cytokines.<sup>11-16</sup>
- **BENFOTIAMINE:** Effectively modulates multiple destructive biochemical pathways that are induced by higher than desirable blood glucose levels. Human mortality studies indicate that **ideal** fasting glucose levels are between **74–85 mg/dL**. Yet many aging people have fasting glucose above **90 mg/dL**, which is less than optimal.<sup>16-19</sup> Benfotiamine protects endothelial cell integrity from the effects of high glucose levels. In addition, benfotiamine exhibits direct antioxidative capacity and prevents induction of DNA damage.<sup>20</sup>
- **PYRIDOXAL 5'-PHOSPHATE:** Aging results in the formation of **advanced glycation end products** throughout the body. **Pyridoxal 5'-phosphate** is the active form of vitamin B6 that has been shown to protect against both lipid and protein glycation reactions.<sup>21-24</sup>

- **R-LIPOIC ACID:** Destructive free-radical activity in the **mitochondria** plays a major role in the loss of cellular vitality. A **microencapsulated** Bio-Enhanced® **R-lipoic acid** facilitates youthful **mitochondrial energy output** while guarding against **free radicals**. Two forms of lipoic acid are sold on the supplement market, but **R-lipoic acid** is far more potent.<sup>25-28</sup>
- **ACETYL-L-CARNITINE ARGINATE:** The amino acid L-carnitine is required to transport fats into the **mitochondria** to be burned for cellular energy. **Acetyl-L-carnitine arginate** is a patented form of carnitine that also **supports neurites** in the brain.<sup>29</sup>

Taking all of the individual ingredients in the **Mitochondrial Energy Optimizer with BioPQQ™** separately would be prohibitively expensive, but Life Extension® members obtain this comprehensive formula at substantial savings.

A bottle of **Mitochondrial Energy Optimizer with BioPQQ™** containing **120 capsules** retails for \$94. If a member buys four bottles, the price is reduced to **\$63** per bottle. **Contains soybeans.**

### Just four capsules of Mitochondrial Energy Optimizer with BioPQQ™ provide:

Carnosine	1000 mg
ArginoCarn® Acetyl-L-carnitine arginate DiHCl	675 mg
R-Lipoic acid (as microencapsulated Bio-Enhanced®)	150 mg
Benfotiamine	150 mg
Pyridoxal 5'-Phosphate	100 mg
BioPQQ™	10 mg
Luteolin	8 mg



Item # 01568

To order Mitochondrial Energy Optimizer with BioPQQ™, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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*Fight Heart Disease  
by Activating a  
Protective Enzyme*





BY SETH RICHARDS

Despite billions being spent each year on coronary artery stents, bypass surgeries and statin drugs, heart disease remains the number one killer of Americans.<sup>1</sup>

In this article, you will learn about an enzyme called **PON1** that is proven to help combat heart disease and conditions that increase the risk of atherosclerosis.<sup>2</sup>

Studies show that people with higher **PON1** activity have a *significantly lower incidence of heart disease* and those who have lower **PON1** activity have a higher incidence of heart disease.<sup>2-4</sup>

Scientific research demonstrates that *pomegranate* can activate the **PON1** enzyme, which plays an important role in a cardiovascular protection program.<sup>5,6</sup>

While much of the initial research into pomegranate's extensive health benefits focused on its juice, exciting findings reveal the multi-modal actions of pomegranate's other components, including the juice, flower, leaves, and seed oil.<sup>2,3,5</sup>

# Pomegranate

## How PON1 Can Save Your Life

In the past five years, researchers from around the world have discovered how the various constituents of the pomegranate all work together to offer protection from a spectrum of inflammatory conditions as varied as heart disease, arthritis, cancer, diabetes, oral health, and genito-urinary tract diseases.<sup>4,5</sup>

Increasingly, research is targeting the application of pomegranate extracts for their ability to reduce the risk of cardiovascular disease. Pomegranate extracts accomplish this effect through multiple pathways. One of the most intriguing pathways is pomegranate's ability to raise blood levels of beneficial high-density lipoprotein (HDL) cholesterol, something few other therapeutic strategies can accomplish. Raising HDL cholesterol is a proven means to reduce your cardiovascular risk.<sup>3,4</sup>

We know that higher levels of HDL are associated with reduced risk for cardiovascular disease such as heart attack or stroke, but how does HDL actually produce these favorable effects on your body?

The answer lies with a group of medium-sized enzymes called the *paraoxonases*, which form a part of the HDL cholesterol particle.<sup>7</sup> Paraoxonases exert powerful antioxidant effects not only on the fats contained in the HDL particle, but also on the dangerous low-density lipoprotein (LDL) cholesterol.<sup>2,8,9</sup>

Oxidized LDL is largely responsible for the creation of arterial plaques and the inflammatory response that ultimately blocks arteries and triggers deadly vascular events.<sup>10</sup> Increasing levels of paraoxonase-containing HDL protects your tissues from deadly LDL oxidation.<sup>9</sup>

Enhancing PON1 (paraoxanase-1) activity in blood increases the antioxidant powers of beneficial HDL cholesterol, and increases the concentration of HDL in the blood.<sup>4</sup> It also contributes to the outflow of cholesterol from cells.<sup>9</sup> PON1 also slows the maturation of the inflammatory cells (macrophages) that accumulate oxidized LDL to set up arterial plaque formation.<sup>11</sup> Pomegranate extracts offer a potent means of increasing paraoxonase activity.<sup>12-14</sup> In one study, pomegranate juice treatment resulted in a **32%** reduction in the production of new cholesterol and a **37%** increase in cholesterol being transported out of the body.<sup>9</sup> Similarly, treatment with the main pomegranate polyphenol known as punicalagin, reduced triglyceride synthesis by as much as **40%**.<sup>15</sup>

Let's turn now to the practical impact of all this biochemistry on your body, to learn how pomegranate extracts can extend your life by preserving your cardiovascular health.

## Pomegranate's Powerful Cardioprotective Effects

Increased oxidative stress is both a cause and a consequence of atherosclerosis. Conditions such as diabetes and obesity only serve to worsen the impact of oxidative stress on your body's protective mechanisms.<sup>8,13</sup> Boosting your body's paraoxonase function and enhancing its HDL content with pomegranate extracts produces many important reductions in cardiovascular risks.<sup>16</sup>

One of the main causes that leads to atherosclerosis is development of an abnormal lipid profile. Typically, if your blood test shows a rise in LDL



cholesterol and triglycerides and a drop in HDL levels, you are on the road to atherosclerosis. In one study, fifty-one patients with abnormal lipid profiles consumed **400 mg** of pomegranate seed oil twice daily for four weeks.<sup>17</sup> By the end of the trial, not only were their triglyceride levels lower by **62 mg/dL**, but their HDL cholesterol levels had risen by more than **5 mg/dL**; control patients' beneficial HDL levels fell.

When diabetic patients with abnormal lipid profiles consumed **40 grams/day** of concentrated pomegranate juice, their total and LDL cholesterol levels fell significantly, as did the ratios of those lipids to beneficial HDL cholesterol.<sup>18</sup> Importantly, urinary markers of oxidative stress and inflammation also fell significantly in supplemented patients, but not in controls. Pomegranate seed oil, administered to patients with disturbed lipid profiles for four weeks, also significantly reduced blood triglyceride levels.<sup>17</sup>

Pomegranate extracts repair damage caused by oxidized LDL cholesterol, the main culprit in early atherosclerosis development. Oxidized LDL is highly inflammatory, and it decreases important cellular protective functions, leaving you open to blood vessel damage. For example, oxidized LDL reduces activity of protective endothelial nitric oxide synthetase (eNOS); treating cells with pomegranate juice before exposing them to oxidized LDL restores normal eNOS levels.<sup>19,20</sup>

Even people with pre-existing cardiovascular disease can benefit from supplementing with pomegranate extracts. A group of 45 patients with ischemic coronary heart disease (angina or history of heart attack) was given pomegranate juice (**240 ml/day**) or a placebo drink for three months.<sup>21</sup> Subjects underwent a single-positron emission computed tomography (SPECT) scan that evaluated how well their hearts were being perfused with blood; they also performed exercise stress testing. The pomegranate-supplemented patients had a significant reduction of **0.8** points on a standardized 4-point ischemia score, while control patients saw an increase of **1.2** points.

When cardiac ischemia proceeds too far, heart muscle cells begin to die, causing a heart attack or myocardial infarction. Animal studies show that pre-treatment with pomegranate extracts can protect cardiac cells from death that arises from excessive adrenaline-like compounds and from damage by the potent oxidant-inducing chemotherapy drug doxorubicin.<sup>22,23</sup> In both cases, pomegranate extracts prevented EKG abnormalities and elevation of serum markers of heart muscle injury.

Underlying heart disease and stroke is the dysfunction of your arteries' lining layer, the endothelium. Endothelial cells are powerful regulators of blood flow, and in health they are a first line of defense against



## Preserve Cardiovascular Health With Pomegranate

- Cardiovascular disease remains the #1 killer of Americans, the result of lifelong exposure to oxidant stress, disordered lipid metabolism, and inflammation.
- Your body has a natural protectant mechanism, the paraoxonases, that join with HDL cholesterol to help fight the dangerous lipid peroxidation that triggers atherosclerosis.
- People with higher levels of serum paraoxonase 1 (PON-1) have fewer serious cardiovascular events.
- You can boost your paraoxonase levels by supplementing with pomegranate extracts, which are more potent than juice alone at promoting cardiovascular health.
- Pomegranate supplementation helps raise HDL and lower LDL cholesterol levels, while improving blood flow to heart muscle cells.
- Pomegranate extracts also regulate blood sugar levels, reduce body fat mass, and prevent weight gain, thus indirectly lowering cardiovascular risk.
- Pomegranate extracts relieve post-exercise muscle soreness and restore strength, while reducing the joint pain and limitations imposed by arthritis; together these effects promote regular exercise, still another means of reducing cardiovascular risk.
- A whole-fruit pomegranate extract belongs in your repertoire of supplements aimed at promoting long life and strong cardiovascular health.



### **Pomegranate Extracts Suppress Appetite, Slow Weight Gain**

Animal studies suggest that pomegranate extracts may have an important role in preventing diet-induced obesity.<sup>35</sup> They suppress appetite in animals fed a high-fat diet and inhibit lipase, the pancreatic enzyme that helps break down fats for absorption.<sup>63</sup> They also inhibit another enzyme, alpha-glucosidase, responsible for starch breakdown and absorption.<sup>64</sup> This reduces after-meal glucose spikes, which are a known contributor to cardiovascular disease risk in both diabetic and non-diabetic people.<sup>64</sup>

plaque formation. Under continuous assault, however, from oxidant stress and inflammation, endothelial cells begin to malfunction, losing their blood flow and pressure-regulating abilities; this change constitutes the earliest stage of atherosclerosis.<sup>24</sup>

It's hardly surprising that PON1 activity, which reflects serum antioxidant activity, should be closely correlated with endothelial function. Studies show that as PON1 activity declines with age, endothelial function worsens, atherosclerosis increases, and the ability for the heart and brain to supply themselves with oxygen and nutrients deteriorates accordingly.<sup>24-27</sup>

Given the ability of pomegranate extracts to enhance PON1 enzyme activity in the body, one might expect that pomegranate would have favorable effects on endothelial function, thereby reducing your risk of atherosclerosis and its consequences. There's strong evidence for just such cause and effect.<sup>28</sup>

Adolescents with metabolic syndrome represent a new and challenging group of people with obesity- and diabetes-induced endothelial dysfunction and a high risk for cardiovascular problems. A pair of studies in this population points to the potent effects of pomegranate extracts as protectors of the blood vessel lining.

Obese teens with metabolic syndrome were given pomegranate juice supplements daily for one month, and their blood levels of oxidants and inflammatory markers were followed. In addition, the overweight adolescents underwent testing of their endothelial function through measurement of their arteries' ability to regulate blood flow. After just four hours, there was significant improvement in that measurement in the supplemented group.<sup>29</sup> That improvement persisted after the full month of supplementation, as did significant reduction in serum markers of inflammation, another important predictor of long-term arterial function.<sup>30</sup>

These studies reveal how pomegranate extracts can improve vascular health and lower your risk for heart disease and stroke through their PON1-boosting effects.

Pomegranate extracts' cardiovascular benefits don't stop at early prevention of atherosclerosis. A steady thickening of vital arteries throughout the body is an indication of moderately advanced atherosclerosis. Measured by ultrasound, it is a useful measure of one's risk for heart attack or stroke. A study of adults 45 to 74 years old with one or more major heart disease risk factors showed that consumption of pomegranate juice, **240 ml/day**, for 18 months reduced progression of arterial wall thickening among patients with the highest degree of oxidative stress and the most severe disturbances in their lipid profiles.<sup>31</sup>

Thickened, plaque-ridden arteries are targets for a blood clot which is often the final event leading to a stroke or heart attack. When blood platelets stick together they form clots. Pomegranate juice, and especially whole pomegranate extract, reduce platelet "stickiness" through suppressing several different aggregation factors.<sup>32</sup>

### **Pomegranate Extracts Fight Diabetic Complications**

Diabetes is another condition in which oxidant stress is a major factor as both a cause and a consequence.<sup>10</sup> Compared with healthy people, diabetics have sharply lower levels of PON1, and frequently have resulting reductions in their HDL cholesterol levels; this is one cause for their high rate of cardiovascular complications.<sup>10,13,33</sup> In addition, diabetics are in a constant struggle against weight gain and

inflammation, both of which further impair their ability to control blood sugar levels.

Pomegranate extracts offer multiple ways to battle the impact of diabetes. They increase the degree to which PON1 binds to HDL particles, enhancing their antioxidant function.<sup>13</sup> In turn, this enhances pancreatic insulin release and reduces obesity-related insulin resistance.<sup>34,35</sup>

One means by which pomegranate extracts enhance insulin sensitivity is by suppressing secretion of *resistin*, the compound recently discovered to be the link between obesity and type 2 diabetes.<sup>36</sup> Pomegranate extracts may become an essential part of the fight against obesity itself. Animals fed a high-fat diet and supplemented with pomegranate extracts show reduced total body and liver fat accumulation, along with significant reductions in body weight.<sup>35,37,38</sup> These effects are also attributed to PPAR activation by pomegranate, as well as to other biochemical events.<sup>39</sup> Human diabetics supplemented with pomegranate saw their weight levels plateau, rather than continuing to rise over time as did unsupplemented control patients.<sup>40</sup>

Since all of us develop some degree of insulin resistance with aging, it is worth noting a study that demonstrated improvements in age-related insulin resistance even in non-diabetic animals.<sup>41</sup> That study also revealed a reduction in abdominal fat stores, a known cardiovascular risk factor. Just as in non-diabetic people, pomegranate extracts improve diabetics' lipid profiles by lowering LDL and total cholesterol, while raising beneficial HDL levels.<sup>18,33</sup> Pomegranate extracts reduce the sometimes massively elevated

levels of serum oxidant markers in diabetics, increasing their cellular antioxidant systems, and markedly reducing uptake of oxidized LDL by macrophages.<sup>10</sup> Together these effects can reduce the risk of a diabetes-related cardiovascular event.

Diabetics can realize other benefits from pomegranate supplementation as well. The extracts can prevent hypertension through reduced oxidative stress and inhibition of angiotensin-converting enzyme (ACE), which stimulates higher blood pressure.<sup>42,43</sup> And, while learning and memory are impaired in diabetic animals, pomegranate supplementation restores cognitive performance on a maze test, an observation that has important bearing on human diabetics.<sup>44</sup>

### **Pomegranate Extracts Increase Your Freedom to Move**

Osteoarthritis and rheumatoid arthritis are two quite different conditions with a common presentation, namely joint pain, swelling, and reduction in movement. People with arthritis are substantially less likely to be able to exercise, which adds to the already elevated risk of heart attack and stroke in these populations.<sup>45-49</sup> Fortunately, pomegranate extracts are a promising therapy for both conditions.

Osteoarthritis is the most common form of arthritis. It is caused by a steady degradation of the vital cartilage cushion that protects and lubricates joints. Animal studies now show that supplementation with pomegranate juice can prevent experimentally-induced osteoarthritis, reducing damage to cartilage.<sup>50</sup> Other studies suggest that this effect is the result of





inhibition by pomegranate polyphenols of the biochemical signaling pathways that trigger cartilage loss and inflammation.<sup>6,51</sup>

Rheumatoid arthritis carries with it an increased risk of atherosclerosis and cardiovascular diseases.<sup>48,49</sup> People with rheumatoid arthritis have decreased levels of PON1 in their blood, limiting their ability to fight off dangerous lipid oxidation that promotes inflammation.<sup>47,52</sup> Pomegranate's PON1-restoring capabilities make it an appealing therapy in rheumatoid arthritis.

Animals supplemented with pomegranate extracts before induction of experimental rheumatoid arthritis have a delayed onset and lower incidence of the disease; their joints also show less severe inflammatory destruction.<sup>53</sup> In a study of those with rheumatoid arthritis who took a pomegranate extract for 12 weeks, they showed a significant reduction in their disease activity, mainly the result of a reduction in the number of tender joints.<sup>54</sup> These impressive results were accompanied by a significant increase in PON1 and reduction in markers of oxidation.

### **Additional Benefits of Pomegranate**

Our growing understanding of the molecular mechanisms of action of pomegranate fruit, juice, and extracts is revealing a host of benefits in addition to those we've discussed. Here is a brief synopsis of some of what we are learning, and a hint of what the future will bring.

Pomegranate extracts are proving their usefulness in laboratory models of multiple forms of cancer. Thus

far, cancers of the breast, lung, colon, liver, skin, and prostate have yielded in one way or another to pomegranate's multi-targeted mechanisms of action.<sup>55-60</sup> For example, pomegranate extracts slow cancer cell proliferation while increasing the rate at which cancer cells kill themselves through the programmed cell death process known as apoptosis.<sup>61-64</sup> Pomegranate extracts also inhibit the rate of cancerous invasion and spread by metastasis, processes which are ultimately responsible for death in a majority of cancer patients.<sup>65,66</sup> And, in certain sex hormone-dependent cancers such as those of the breast and prostate, pomegranate has shown its ability to inhibit both the enzymes that produce sex hormones, and the cellular receptors for those hormones on cancer cells.<sup>67-69</sup> Finally, pomegranate extracts can sensitize breast cancer cells to the chemotherapy agent tamoxifen, potentially allowing the use of lower doses of the drug.<sup>70</sup> Together, these capabilities may make these common and widely-feared cancers more tractable to treatment than does conventional therapy.

The most dramatic example of pomegranate's cancer-fighting effects comes from a study of prostate cancer in humans. Men who had undergone surgery or radiation therapy for their cancers were followed to determine the rate of rise of the cancer-marking chemical called prostate-specific antigen, or PSA.<sup>71</sup> The rate at which PSA levels double is a useful predictor of the rate of progression of the disease following treatment. At baseline, the rate of PSA doubling time was 15 months; with pomegranate supplementation that rate slowed dramatically to 54 months, a remarkable improvement.

Pomegranate has benefits related to oral health as well, specifically in controlling the dangerous dental plaque that leads to the gum disease gingivitis.<sup>72</sup> Extracts of pomegranate kill the germs involved in plaque formation.<sup>73</sup> Studies of pomegranate extracts used as oral rinses, or applied directly to diseased gums, show up to an **84%** reduction in dental plaque organisms, a reduction in inflammatory markers in saliva, and dramatic improvements in the way the gum tissue attaches to teeth.<sup>72-76</sup>

Finally, there is a small but growing body of evidence that pomegranate extracts may be helpful in preventing or treating various disorders of the urinary and genital tracts. Animal studies suggest that the extracts enhance sperm production through their antioxidant effects.<sup>77,78</sup> Others show protection against dangerous kidney stone development.<sup>79</sup> And there's encouraging evidence that the extracts can prevent prostatitis, an irritating prostate condition that causes misery to many older men.<sup>80</sup>

Laboratory and a few human studies have now shown that pomegranate extracts kill the organism *Trichomonas vaginalis*, a common cause of vaginitis in reproductive-aged women.<sup>81,82</sup> While not deadly, *Trichomonas* infections cause considerable annoyance and discomfort to millions of women, and conventional drug treatment is increasingly ineffective and fraught with side effects.

## Summary

Many people are catching on to the substantial health benefits of the pomegranate. Unfortunately, those who are consuming only commercial pomegranate juice are missing out on many other beneficial parts of the plant, such as the leaves, flowers, and oil from the seeds. Each component of pomegranate works together synergistically to maximize its beneficial effects on your health. Pomegranate extracts increase production of the vital paraoxonase enzymes that give HDL cholesterol its good name, helping it to fight the oxidative and inflammatory damage that leads to atherosclerosis. By lowering LDL and raising HDL cholesterol, pomegranate extracts directly reduce cardiovascular disease risk. The extracts also improve insulin sensitivity and glucose control, making pomegranate a versatile nutrient to supplement with. While some people enjoy pomegranate juice, we caution that it naturally contains more fructose than desirable for most individuals. Standardized pomegranate extracts supply the beneficial polyphenols without the sugar. ●

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

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Pomegranate tree

# Overlooked Benefits of Properly Formulated **PROBIOTICS**

**Probiotics** literally means "for life." Traditional diets comprising of foods containing **probiotics** (such as the **Mediterranean Diet**) have been shown to promote health and longevity.<sup>1</sup>

People take probiotics to facilitate healthy GI, but probiotics perform many more important functions. For example, researchers have discovered that probiotics inhibit **nuclear factor kappa B** (NFkB), which helps suppress inflammation as well as positively modulate cellular signaling pathways.<sup>2</sup>

Furthermore, studies have shown that probiotics can influence youthful gene expression.<sup>3</sup> Properly formulated probiotics provide biologically active materials that can positively influence many aspects of human health.<sup>4</sup>

## The Importance of the GI Tract on Immune Function

A little known fact is that **70-80% of our immunoglobulin-producing cells reside in our gut**, which is populated by nearly 100 trillion microorganisms, many of which are beneficial bacteria.<sup>3</sup> These bacteria are considered a living part of the human organism.<sup>5</sup>

With age, we can experience a decline in vital probiotics and the strength of our immune system. Restoring the gut's friendly bacteria can stimulate and regulate healthy immune function.<sup>5</sup>

## A Potent, Immune Enhancing Strain of Bifidobacteria

Researchers have shown that a unique well-studied strain of the bifidobacteria probiotic called **BB536®** increases the number of healthy bacteria in the colon.<sup>6</sup> An *in vivo* study demonstrated a significant increase in longevity in mice supplemented with bifidobacteria.<sup>7</sup> Long studied by Japanese scientists, BB536® was found to reduce production of inflammatory cytokines that often accompany seasonal symptom development.<sup>8</sup>

BB536® is a highly researched active probiotic. Each capsule provides 2,000,000,000 (two billion) colony forming units of viable healthy bacteria.

A bottle containing 60 capsules of **Bifido GI Balance** retails for \$20. If a member buys four bottles, the price is reduced to just **\$13.50** per bottle.



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### References

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To order  
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or visit  
[www.LifeExtension.com](http://www.LifeExtension.com)

## Comprehensive Pomegranate Protection!

# FULL-SPECTRUM POMEGRANATE™ FORMULA

Few nutritional fruits have gained as much scientific validation as **pomegranate**.<sup>1</sup>

The vast majority of research has focused on extracts from the *fruit*. Only recently have scientists identified the synergistic action of compounds specific to other parts of the pomegranate—most notably its **seeds** and **flowers**.

### The Next-Generation Pomegranate Formula

**Life Extension®** offers an advanced, cutting-edge pomegranate formula that brings together novel phytonutrients for the first time in a unique, high-potency blend.

**Full-Spectrum Pomegranate™** combines standardized extracts from the **whole fruit and flower**, along with pomegranate **seed oil**, to support system-wide health. In addition to the highly absorbable antioxidant powerhouses found in pomegranate fruit,<sup>2-4</sup> **Full-Spectrum Pomegranate™** augments these polyphenols with newly discovered biologically *active* compounds from other parts of the pomegranate plant.

These little-known nutrients include: **punicanolic acid**, a member of the **triterpene** family of essential oils that provides cellular support to help with inflammation,<sup>5</sup> and **pomegranatate**, to combat age-related metabolic changes.<sup>6</sup>

This superior formula supplies the **complete** nutritional profile of the pomegranate plant. Just one softgel of **Full-Spectrum Pomegranate™** provides polyphenols equivalent to 12.3 ounces of pomegranate juice concentrate (or 30 pomegranates) *plus* a proprietary blend of **seed oil** and **flower extract**.

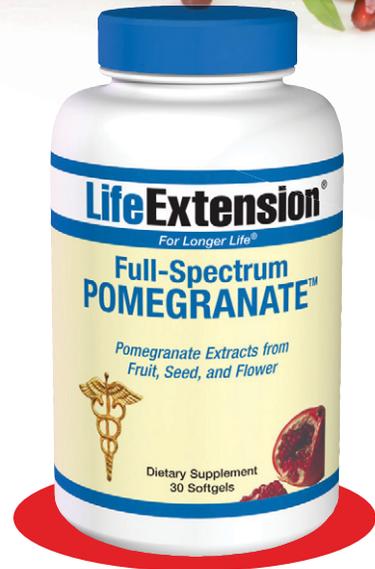
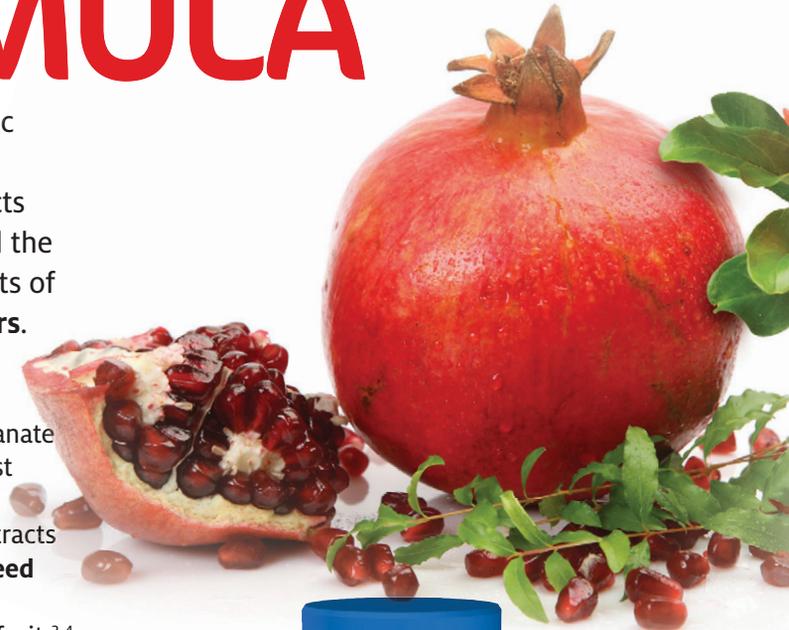
One softgel of **Full-Spectrum Pomegranate™** contains:

<b>POMELLA® Pomegranate</b> .....	400 mg
<i>(Punica granatum)</i> Extract (fruit) [std. to 30% punicalagins (120 mg)]	
<b>PomComplete™ Pomegranate</b> .....	137.5 mg
<i>(Punica granatum)</i> Blend [flower extract and seed oil (standardized to 22% (30 mg) punicic acid)]	

### Full-Spectrum Pomegranate™

A bottle containing 30 softgels of **Full-Spectrum Pomegranate™** retails for \$24. If a member buys four bottles, the price is reduced to just **\$15.75** per bottle. **Item # 01423**

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# New Reason to *Avoid* **STRESS**

BY MICHAEL DOWNEY

Scientists have made an alarming discovery—higher stress levels can cause **accelerated shortening of telomeres**.<sup>1-5</sup>

In a recently published study, researchers found that depression-related **stress** results in the significant shortening of telomeres—the caps at the ends of chromosomes—an indication of *accelerated aging*!<sup>1</sup>

The publication of this study emphasizes the importance of minimizing the impact of internal and environmental stress on the body. An estimated **75-90%** of visits to primary care physicians are now related to the effects of stress,<sup>6</sup> and this new study documents how lethal **stress** can be to our well-being and longevity.>>

## Telomeres, Stress, and Aging

**Telomeres** are protective **DNA** molecules. Often compared to the plastic caps on the ends of shoelaces, telomeres are found on the ends of coiled pieces of DNA known as **chromosomes**. They keep the chromosome material from deteriorating, or fusing with other chromosomes.

Every time chromosomes divide, the telomeres at the ends shorten.<sup>7</sup> As telomeres are increasingly consumed, they can be replenished by an enzyme called **telomerase reverse transcriptase**.

The eventual shortening of telomeres is correlated with **cellular senescence**—and **aging**.<sup>8</sup>

Ultimately, the telomeres become so depleted that the cell can no longer divide (known as the **Hayflick limit**), and that cell dies (**apoptosis**).<sup>9</sup>

Scientists have discovered that the multiple biochemical pathways of chronic stress dampen telomerase and accelerate **telomere-shortening**.<sup>1-5</sup> The most recent study found that the telomeres of patients with depression-related stress were **over 5% shorter** than the telomeres of those who had not been diagnosed with depression.<sup>1</sup>

## Stress and Homeostasis

Described as “our leading health problem,” sustained negative stress is now acknowledged as a key driver behind many of today’s health complaints, both psychological and physical.<sup>6</sup>

Because the term “stress” has long been incorrectly used, it lost its *medical* meaning. People often use the term to describe any situation they don’t like. For this reason, neuroscientists have recently clarified the term to mean:

**“Conditions where an *environmental demand* exceeds the *natural regulatory capacity* of an organism, in particular situations that include unpredictability and uncontrollability.”<sup>10</sup>**

Chronic negative stress triggers a number of critical changes throughout the body that act along **multiple biochemical pathways**, including the endocrine, nervous, and immune systems.

As long as stress levels are low, the effects of stressors are modulated by **homeostasis**, the body’s ability to maintain harmonious equilibrium by constantly readjusting its physiological processes. Cells and tissues exist in a constantly changing environment, but homeostasis keeps steering internal biochemical and bioelectrical levels back to their near-optimum points.



However, when stress is severe, chronic, or multi-layered, numerous biochemical changes overwhelm the body’s homeostatic mechanism (“*environmental demand* exceeds the *natural regulatory capacity*”). Studies have found that these harmful effects can persist long after a stressful situation has been normalized.<sup>11,12</sup> As a result, key biochemical levels can remain for too long at suboptimal levels.<sup>2</sup> This is called **homeostatic imbalance**.

Some of the many disease states associated with stress-induced homeostatic imbalance include obesity, diabetes, osteoporosis, hypertension, cardiovascular disease, infectious disease, gastric ulcer, cancer, gastrointestinal complaints, skin issues, neurological disorders, sexual dysfunction, psychological problems, suppressed immunity—and reduced telomerase and shortened telomeres and, as a result, accelerated cellular and tissue aging.<sup>1-5</sup>

Scientists have long known that homeostasis can be supported through the use of natural extracts called **adaptogens**. But to be effective against the onslaught of chronic stress, these pro-homeostatic botanical extracts would need to be combined so that their various mechanisms of action would complement each other to modulate the **multiple** pathways of stress.

Based on research from a variety of disciplines, researchers have discovered how extracts such as **Holy Basil, Bacopa, Cordyceps, and Ashwagandha** may protect against a broad range of chronic stress effects.

Full appreciation of the enormity of this finding requires an understanding of the multiple pathways through which stress disrupts homeostasis.

## The Multiple Pathways of Stress

Job pressure is recognized as the leading source of stress,<sup>13</sup> but whatever the stressor, the cascade of physiological responses is the same.

First, within seconds of the stressful event, various chemicals—**neurotransmitters** and **hormones** such as **cortisol** are released into the bloodstream. They launch the initial fight-or-flight, stress-adaptation responses in which **blood glucose** rises, blood vessels constrict, the heart races, and blood is diverted away from the digestive system. These responses originate at the cellular level and within every key body system, including the **neuroendocrine system**, the **hypothalamus-pituitary-adrenal (HPA) axis**, the **immune system**, and the **primary (endogenous) antioxidant enzyme system**.

Second, within minutes of the stressful event—and possibly lasting for several hours, weeks, or longer—specific biochemical pathways are activated within these systems, disrupting the body's natural homeostasis. If the body cannot restore equilibrium quickly, permanent damage occurs. The end result is a vast spectrum of chronic diseases.<sup>1-5</sup>

The biochemical effects of stress can be complicated and diverse, but basically, they contribute to the development of or create imbalance in the following:<sup>2,14-18</sup>

1. **Cortisol** (steroid hormone)
2. **Neurotransmitters (noradrenalin, dopamine, serotonin, acetylcholine, GABA)**
3. Hypothalamus-pituitary-adrenal (HPA) axis regulation
4. **Glucose** (blood sugar)
5. Primary antioxidant activity (e.g., **superoxide dismutase, catalase**)
6. Immune activity
7. **Amyloid** (linked to 20 serious diseases including Alzheimer's)
8. Inflammation (e.g., **cyclooxygenase, or COX enzyme**)
9. Gastric ulcerations
10. Lipid peroxidation (e.g., hepatic)
11. **Plasma creatine kinase** (enzyme)
12. ATP (**adenosine triphosphate**)
13. Cognition and memory function
14. Sexual response and function

Scientists are finding that stress-induced imbalances in levels of cortisol and other stress-affected substances may be seriously damaging important areas of the brain. For more on the *brain* effects of stress, see sidebar on the next page.

## Protection from the Damaging Effects of Stress

- A recently published study<sup>1</sup> has confirmed the alarming discovery<sup>2-5</sup> that stress can result in the **shortening of telomeres**—an indicator of accelerated aging!<sup>7</sup>
- Scientists have now pinpointed four extracts that powerfully modulate the multiple pathways of stress. Holy Basil, Bacopa, Cordyceps, and Ashwagandha each work to restore homeostasis and inhibit stress damage.
- Controlled human studies have now shown that the stress defense provided by these four potent adaptogens translates into *experiential* improvements in mental and physical health.
- The effects of stress have a significant impact on everyday health matters with an estimated **75-90%** of visits to primary care physicians now related to the effects of stress.





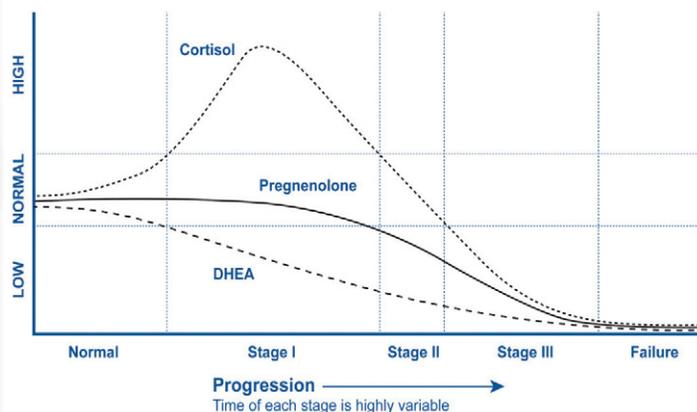
## The Effect of Stress on Your Brain

Stress is critical for survival. It focuses our attention, heightens our senses, raises our blood pressure and heart rate, and in general prepares us for the fight-or-flight response that can save our lives. At the same time, it shuts down systems not immediately important for short-term survival, such as digestion, or reproduction.

But prolonged, frequent or extreme stress can have devastating effects on the body and brain.

- Higher cortisol levels have been detected in Alzheimer's disease patients and have been linked to memory and cognitive impairments.<sup>55</sup>
- Exposure to chronic stress can cause the atrophy of hippocampal dendrites, followed by the apoptotic (programmed) death of neurons.<sup>55</sup>
- Stress activates the inflammatory response in the brain. An increase in pro-inflammatory factors, such as cytokines IL-1 and IL-6, can alter synaptic plasticity, affect cognitive skills, and damage memory. In fact, elevated levels of these cytokines have been associated with Alzheimer's.<sup>55</sup>
- Chronic stress was shown to accelerate the impairment of cognitive functions.<sup>55</sup>
- Post Traumatic Stress Disorder (PTSD) has been characterized as a disease in which there is accelerated aging, including the aging of both the memory and body.<sup>56</sup>
- In magnetic resonance imaging (MRI), the right side of the hippocampus area of the brain was found to be **8%** smaller in PTSD patients.<sup>56</sup>
- Chronically high cortisol levels are linked to brain damage.<sup>57</sup>
- Stress inhibits neurogenesis (the growth of new neurons) in the hippocampus.<sup>57</sup>
- Chronic stress has been associated with reduced size or atrophy of the hippocampus, possibly due to increased levels of cortisol.<sup>57</sup>

## Chronic Stress and Adrenal Hormone Output



## Inhibiting Stress Pathways

**Adaptogens** are a pharmacological group of compounds that metabolically support the ability of an organism to respond appropriately to stress, preserve structure and function from the damaging effects of stress, and hasten recovery of homeostasis. The rebalancing effects of adaptogens involve a complex interplay of physiological mechanisms. Adaptogen's main activity is the increase of a *heat shock protein* known as **Hsp70** that plays a key function in cell survival and *apoptosis* (programmed cell death).<sup>19</sup> Different adaptogens modulate different levels along the *hypothalamus-pituitary-adrenal (HPA) axis*. Some mediate cortisol, **nitric oxide**, or **molecular chaperons**.<sup>19</sup>

When combined adaptogens work together to modulate the multiple pathways of stress, the multiple benefits include improved mental and physical performance, reduced incidence of chronic disease, and increased longevity.<sup>2,19</sup>

Scientists investigated numerous extracts—some used for thousands of years to treat various stress-related symptoms.

This research led to four potent adaptogens that can provide a united defense against the multiple cellular pathways of chronic stress:

### Holy Basil (*Ocimum tenuiflorum*)

Also known as *tulsi*, Holy Basil has been used as a medicinal herb for thousands of years. Studies have shown that it modulates the effects of a variety of stress responses, as well as decreases **cholesterol** and increases endurance.<sup>20-25</sup>

Researchers have found that Holy Basil helps maintain internal equilibrium by normalizing specific, stress-induced, homeostatic imbalances in the areas of:

- Blood sugar<sup>25,26</sup>
- Antioxidant activity<sup>26,27</sup>
- Inflammation<sup>28</sup>
- Gastric ulceration<sup>23</sup>
- Cholesterol levels and lipid peroxidation<sup>27,29</sup>
- Plasma creatine kinase (enzyme)<sup>30</sup>

### **Bacopa (*Bacopa monnieri*)**

This aquatic plant, also known as *water hyssop*, is found in tropical and subtropical regions, and has been used for several thousand years, especially in India, as a rejuvenating herb. Research on *Bacopa monnieri* has indicated that it has an adaptogenic effect on systems related to cognition, motivation, sensory, and motor function.<sup>31-35</sup> It has also shown to provide a significant decrease in stress-related anxiety, mental fatigue, and memory loss.<sup>33</sup>

Recently, scientists have found that Bacopa modulates particular, stress-triggered disruptions in homeostasis:

- Cortisol<sup>36</sup>
- Neurotransmitters<sup>36</sup>
- Antioxidant activity<sup>37</sup>
- Amyloid<sup>37</sup>
- Lipid peroxidation<sup>37</sup>
- Cognition and memory<sup>38</sup>

### **Cordyceps (*Cordyceps sinensis*)**

Use of Cordyceps, which is a remarkably versatile medicinal mushroom, dates back almost two centuries. However, Cordyceps really grabbed Western attention in 1993 after its use was suggested to be the secret behind the setting of a series of long-distance records

by Chinese female runners within a very short period of time. Research has since established it as a therapy for the accelerated strengthening and revitalization of the body after exhaustion or lengthy illness.<sup>39-41</sup>

Studies show that Cordyceps normalizes stress-induced homeostatic imbalances in the following areas:

- Blood sugar<sup>41,42</sup>
- Antioxidant activity<sup>43,44</sup>
- Immune activity<sup>39,45</sup>
- Inflammation<sup>39</sup>
- Lipid peroxidation<sup>43</sup>
- ATP (adenosine triphosphate)<sup>46</sup>
- Sexual function<sup>43</sup>
- HPA axis activity<sup>43</sup>

### **Ashwagandha (*Withania somnifera*)**

Ashwagandha, also known as Indian ginseng or *Withania somnifera*, is considered the foremost adaptogen in Ayurvedic medicine. Studies have shown that it helps the body to recover from the energy loss and mood-altering effects of stress.<sup>47-50</sup>

Scientists have found that Ashwagandha modulates stress-induced changes to homeostasis in the areas of:

- Neurotransmitters (affecting depression and anxiety)<sup>51</sup>
- Cortisol<sup>52</sup>
- HPA axis activity<sup>14</sup>
- Lipid peroxidation<sup>52</sup>
- Blood sugar<sup>14</sup>
- Antioxidant activity<sup>52</sup>
- Inflammation<sup>14</sup>
- Gastric ulceration<sup>20</sup>



## Inhibiting the Effects of Stress in Humans

As we have seen, each of these four botanical extracts have been individually studied for their modulatory effects on stress in humans. The scientists who conducted these studies set out to determine whether these adaptogens could not only modulate multiple biochemical pathways of stress but also provide *experiential* improvements in mental and physical health. Across all studies, subjects were given standardized doses of the botanical, then evaluated for a range of indicators of health and wellbeing, looking for *measurable improvements* in vitality and performance. The results of these studies set the standard for clinical dosages.

### Holy Basil

To test the ability of Holy Basil to modulate homeostatic imbalance, scientists arranged a randomized, double-blind, placebo-controlled study in which 71 humans took **1,200 mg a day** of Holy Basil (*Ocimum tenuiflorum*), and 79 others took a placebo. For both groups, various cognitive and energy-related symptoms of stress were measured using a standard analysis (RMANOVA) at 0, 2, 4, and 6 weeks.

Scores were determined to be substantially improved for all stress related symptoms measured, including forgetfulness, sexual problems of recent origin, frequent feeling of exhaustion, and frequent sleep problems of recent origin. Also, the overall stress-management scores were found to have improved by an additional **39%** for the Holy Basil group over the placebo group—and this improvement was observed in just **6 weeks!**<sup>53</sup>

### Bacopa

Scientists set up a randomized, double-blind, placebo-controlled study for which they enlisted 20 healthy older adults age 60-75, each of which were given a standardized *Bacopa monnieri* extract in a 300 mg oral dosage once per day. (This is equivalent to **132 mg** daily of a more concentrated Bacopa extract.) Focus, attention, learning, memory, mood, and overall intelligence—all of which can be negatively impacted by stress—were assessed using a battery of standardized tests.

After **4 months**, several key indicators of cognitive function improved significantly from baseline measurements—including a **23%** improvement in focus and attention, a **24%** improvement in aspects of learning and memory, a **15%** improvement in performance measures of intelligence, and a **30% improvement in mood, particularly depression**. One of the most compelling findings in this study was the trend to do better on tests of attention, processing speed and working memory, which could be considered the “front end” of cognitive processing. In other words, good performance in key cognitive domains requires adequate attention and processing speed—which Bacopa is shown to support.<sup>54</sup>

### Cordyceps

The day-to-day experience of the effects of chronic stress can include reduced libido. To evaluate the capacity of *Cordyceps sinensis* to protect against loss of libido, scientists enlisted 189 men and women with decreased sex drive for a randomized, double-blind, placebo-controlled study. The test group took Cordyceps (strain Cs-4) in dosages of **3 grams daily**.

(This translates to **375 mg** of commercially prepared product, because it is formulated as an **8:1** extract.)

Among the test group, over **66%** experienced improvement in sex drive—in just **40 days**.<sup>39</sup> It is important to note that Cordyceps Cs-4 did not simply support continued sex drive in healthy participants; it reversed previously assessed libido loss.



## Ashwagandha

Scientists analyzed the stress-attenuating effects of *Withania somnifera* in a double-blind, placebo-controlled, randomized study of 98 *chronically stressed*, adult men and women. Subjects were randomly assigned to the placebo group, or to one of three Ashwagandha dosage groups: **125 mg once a day**, **125 mg twice a day**, or **250 mg twice a day**. Stress levels were assessed at the beginning of the study, and again at **60 days** of treatment, using a modified Hamilton anxiety (mHAM-A) scale. Also, certain biochemical and clinical values were measured, such as cortisol or blood pressure levels.

(A reduced score on the mHAM-A scale indicates fewer symptoms of: fatigue, flushing, perspiration, loss of appetite, headache, muscle pain, feelings of impending doom, palpitations, dry mouth, sleeplessness, forgetfulness, irritability, or inability to concentrate.)

After **60 days**, the group taking the least Ashwagandha—**125 mg daily**—had significantly reduced mHAM-A anxiety scores. This arm of the study also showed significantly decreased serum **C-reactive protein** (a measure of inflammation), pulse rate, and blood pressure, as well as balanced levels of serum cortisol.<sup>14</sup>

After the same **60-day** period, the *higher-dose* Ashwagandha groups also showed greater, dose-dependent responses in these same anxiety and biochemical parameters. But the researchers found that, additionally, the higher-dose subjects showed significantly reduced mean fasting glucose, serum lipid profiles, and cardiac risk ratios.<sup>14</sup>

It is particularly significant that all of the participants in this study had previously been *diagnosed as chronically stressed*.

No adverse effects were found for any of the four botanicals used in the studies. The various study findings confirm that these four adaptogenic extracts offer—at a basic biochemical level—substantial homeostatic protection against the *multiple* pathways of stress.

## Summary

In an alarming development, scientists have discovered that higher stress levels can result in the accelerated shortening of telomeres—an indicator of accelerated aging.

The good news is a formulation comprised of four broadly-acting adaptogenic extracts—Holy Basil, Bacopa, Cordyceps, and Ashwagandha—has been developed that may work to modulate multiple stress pathways. Scientists have shown in controlled human



## Stress-Induced Homeostatic Imbalance

- *Homeostasis* is the ability and tendency of a body to maintain harmonious equilibrium by constantly readjusting its physiological processes.
- Cells and tissues exist in a constantly changing environment—homeostasis steers internal biochemical levels back to near-optimum points.
- Physical and emotional stress triggers a cascade of biochemical changes, causing *homeostatic imbalance*.
- This interruption in homeostasis helps us prepare for dangerous external situations.
- These changes are *supposed* to be moderate, infrequent, and short-term.
- Ordinarily, after a stressor has passed, our system adjusts—raising and lowering different biochemical levels—returning the body to homeostasis.
- In today's world, our feedback mechanisms become *overwhelmed* by the extent, duration, intensity, frequency, or multiple layering of stress.
- This produces an excessive or prolonged homeostatic imbalance.
- Studies have even found that these harmful effects can persist long after a stressful situation has been normalized.<sup>11,12</sup>
- The result can be a *multitude* of physical and mental diseases, including permanent organ damage, DNA effects, and the physical changes associated with aging.
- Fortunately, extracts including Holy Basil, Bacopa, Cordyceps, and Ashwagandha have been shown to support the full range of homeostatic pathways.



studies—including patients who were chronically stressed—that these pro-homeostatic extracts result in experiential improvements in mental and physical health.

Holy Basil, for instance, improved stress management scores by **39%** more than placebo—in just 6 weeks. Bacopa improved mood scores, particularly depression, by **30%**.<sup>54</sup> ●

If you have any questions on the scientific content of this article, please call a **Life Extension®** Health Advisor at 1-866-864-3027.

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The primary reason people take CoQ10 supplements is to help restore youthful energy levels.

**Shilajit** boosts CoQ10's beneficial effects by stabilizing CoQ10 in the superior **ubiquinol** form, which *prolongs* its action at the cellular level.<sup>3,4</sup> Additionally, **shilajit** facilitates the more efficient *delivery* of CoQ10 into the mitochondria, which results in enhanced cellular energy.<sup>5-9</sup>

Shilajit helps the mitochondria convert fats and sugars into the body's main source of energy, ATP (adenosine triphosphate).<sup>5-9</sup>

Combining **ubiquinol CoQ10** with **shilajit** generates a powerful *synergy* that supports more youthful cellular energy production than CoQ10 alone.<sup>2,4,5</sup>

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The retail price for 60 100 mg softgels of **Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™** is \$62. If a member buys four bottles, the price is reduced to **\$42** per bottle. Item # 01426



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The retail price for 100 50 mg softgels of **Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™** is \$58. If a member buys four bottles, the price is reduced to **\$39.75** per bottle. Item # 01425



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The result is that an estimated **75-90%** of visits to primary care physicians are now related to the effects of stress.<sup>1</sup>

Even more alarming is a recently published study<sup>2</sup> linking stress with **shorter telomeres** (the caps on the ends of chromosomes), which is associated with accelerated aging!

## Inhibiting the Pathways of Stress

Stress disrupts multiple biochemical pathways, including **cortisol production**, the **hypothalamus-pituitary-adrenal (HPA) axis**, **pro-inflammatory enzyme** production and **neurotransmitter** production. A pre-clinical study has shown that stress also inhibits neural plasticity (the growth of new connections between neurons in the brain)<sup>3</sup>

Fortunately, **Life Extension®** has created a state-of-the-art formulation of botanical **adaptogens**, shown to modulate a **broad range** of factors to help relieve the effects of stress.

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**Adrenal Energy Formula** modulates stress and supports energy and balance.

The suggested dose of 4 capsules each day of Adrenal Energy Formula provides:

OciBest® (Holy Basil) extract	1,200 mg
Proprietary Blend	1,032 mg

Sensoril® (Ashwagandha) extract  
Cordyceps Cs-4 (*Cordyceps sinensis*) extract  
BaCognize® Ultra (Bacopa Monnie) extract



A bottle containing 60 vegetarian capsules of **Adrenal Energy Formula** retails for \$24. If a member buys four bottles, the price is just **\$16.50** per bottle. Item# 01628

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# SUZANNE SOMERS'S

## Quest to Educate the World About How to Delay Aging

Americans continue to suffer and die prematurely while proven methods exist to forestall pathological aging processes.

Life Extension® members long ago gained access to solid scientific data showing how healthy lifestyle choices slash disease risk. Yet the majority of Americans have their youth robbed by an epidemic of medical ignorance that results in sharply higher incidences of cancer, vascular occlusion, arthritis, dementia, and virtually every other age-related disorder.

While membership in the Life Extension Foundation® continues to grow, we still reach only a small fraction of the population. When a famous celebrity appears on national television to espouse what Foundation members learned decades ago, however, the average person stops to notice.

Suzanne Somers has turned her life around by removing toxic compounds from her environment, eating organic foods, meticulously keeping her hormones in natural balance, having her blood regularly tested, taking the appropriate supplements, and utilizing advanced stem cell therapy.

Suzanne is not the only prominent

personality doing this. Hollywood has long emphasized youthful appearances and those involved in show business are early examples of humans taking aggressive steps to thwart degenerative changes.

What differentiates Suzanne from our other celebrity members is that she describes in meticulous detail the many virtues she has personally attained by following a science-based youth restoration program.

In her latest book titled *BOMBSHELL*, Suzanne reveals to the public much of the data that Life Extension members already view as common sense approaches to protect against age-related illness.

What impresses us is the ability of Suzanne Somers to appear in the national media and describe in “people speak” how humans can successfully intervene into pathological aging processes. By lifting the veil of scientific ignorance, Suzanne educates millions of people about novel methods to slow and reverse degenerative processes.

The following is an excerpted chapter from Suzanne’s new book *BOMBSHELL* that describes 18 underlying mechanisms that cause us to age and how each of them may be circumvented. >>



### ADVANCED AGE REVERSAL

Based on new findings about the mechanisms of aging, the universal dream of a longer life is now a scientific reality. But what if you want to go deeper than making just a few changes and you want to dive into a more advanced age-reversing program? I asked Bill Faloon of Life Extension to provide a plan to counterattack the eighteen most common things that age us. Consult with an antiaging physician to see which of these might be issues for you, so that you can tailor your plan of attack to your individual needs.

The phenomenon known as “aging” is the result of pathological changes that are somewhat controllable using existing technologies. By prolonging our healthy life span, we put ourselves in a position to take advantage of future medical breakthroughs that could result in dramatic extensions of the human life span.

This chapter reveals what do about the eighteen controllable causes of age-related disease; follow these simple steps to correct them.

#### Aging Factor 1: Chronic Inflammation

Persistent *inflammation* occurs frequently with aging and is a primary contributor to the deterioration that our body undergoes as we grow old.

Inflammation can be triggered by both internal and external causes, making it difficult to prevent. For instance, excess belly fat releases inflammation-causing molecules called *cytokines*.

Continuous low-level inflammatory assaults inflict damage on everything from brain cells and arterial walls, to cell regulatory genes.

Heart attack, stroke, heart valve failure, cancer, and Alzheimer’s have all been linked to the chronic inflammation that occurs in most of us as we age.

#### Solution: Comprehensive Anti-Inflammatory Regimen

An array of clinically proven nutrients and hormones has been shown to effectively target the mechanisms behind inflammation. The agents listed next operate in multiple ways to neutralize pro-inflammatory processes.

#### NUTRIENT

#### TYPICAL DAILY DOSE

NUTRIENT	TYPICAL DAILY DOSE
Fish oil	1,400 mg EPA and 1,000 mg DHA
Curcumin*	400-800 mg
Bromelain (enteric coated)	500-1,000 mg
DHEA (dehydro-epiandrosterone)	15-50 mg

The most commonly used *blood test* for inflammation is known as *high-sensitivity C-reactive protein*, or hs-CRP. Any doctor should be able to provide this test for you, or you can order it directly by logging on to [www.suzannesomers.com](http://www.suzannesomers.com). CRP levels in men should ideally be below 0.55 mg/L while women should be below 1.50 mg/L.



In addition to the nutrients and hormones described in this section, those with persistently high levels of C-reactive protein should seek to reduce their fasting blood glucose levels to below 85 mg/dL of blood.

Carrying excess fat pounds, especially in the belly, is a common cause of systemic inflammation. There are nutrients that impede the absorption of carbohydrates and thus facilitate weight loss along with reductions in fasting blood sugar. (You will read in Aging Factor 16 about natural ways to reduce belly fat and lower blood glucose.)

Those with stubbornly high blood sugar levels may need to take a standardized *green coffee bean extract* (350 mg three times daily) that has been shown to naturally block the overproduction and release of glucose into the bloodstream.

High LDL (bad cholesterol) can also spark systemic inflammatory fires. Your LDL levels should ideally be kept below 80-100 mg/dL. The presence of inflammatory factors in the blood is why blood testing is so important when designing an individualized program to neutralize your Aging Factors. To inquire about low-cost comprehensive blood testing in your area, log on to [www.suzannesomers.com](http://www.suzannesomers.com) and click through to Life Extension.

**Aging Factor 2: Glycation**

It is well known that diabetics age prematurely and die about 10 years earlier than non-diabetics. One reason for this is a process called *glycation*, in which glucose (and other sugars) bind to proteins and/or fats in the body to form nonfunctioning structures.

Diabetics suffer accelerated glycation. What few people realize is that *non-diabetics* also suffer from deadly glycation reactions, only at a slower rate.

The health consequences of glycation are most evident in damage to the kidneys, eyes, nerves, and blood vessels. Glycation speeds up these kinds of age-related damage, but there are simple steps you can take to slow it down.

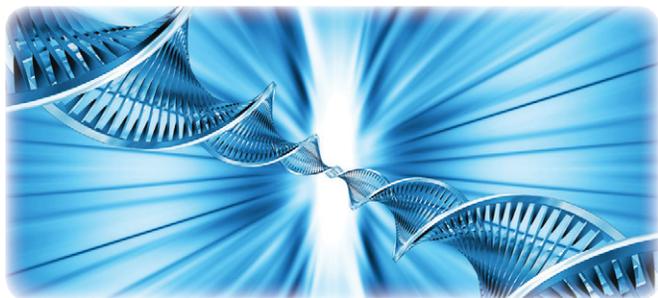
**Solution: Facilitate Glucose Metabolism and Inhibit Glycation**

Numerous studies have shown that the nutrients listed below suppress dangerous glycation reactions in the body.

NUTRIENT	TYPICAL DAILY DOSE
<b>Carnosine</b>	1,000 mg
<b>Pyridoxal-5'-phosphate</b> (active form of vitamin B6)	100 mg
<b>Benfotiamine</b> (a form of vitamin B1)	150 mg
<b>Chromium</b>	500 mcg

**Aging Factor 3: Methylation**

The DNA within every cell of your body requires constant enzymatic reactions called *methylation* for maintenance and repair. Aging *cripples* youthful methylation metabolism. The resulting DNA damage can manifest as cancer, liver damage, and brain cell degeneration.



**Solution: Methyl Donors**

Low-cost nutrients can safely *restore* methylation activity to youthful levels.

Taken together, the following nutrients are referred to as “methyl donors.” They induce so-called remethylation reactions—boosting levels of methylation activity and restoring healthy cellular function and repair.



NUTRIENT	TYPICAL DAILY DOSE
<b>L-methylfolate</b> (active form of folic acid)	1,000 mcg
<b>Pyridoxal-5'-phosphate</b> (active form of vitamin B6)	100 mg
<b>Vitamin B12</b>	1,000 mcg
<b>TMG</b> (trimethylglycine)	500-1,000 mg
<b>S-adenosyl-methionine</b> (S-AMe)	200-400 mg

**Aging Factor 4: Mitochondrial Dysfunction**

Over 350 studies published in 2010 alone show how mitochondrial *degradation* leads to the onset of virtually every degenerative disease. Mitochondrial dysfunction can result in congestive heart failure, muscle weakness, fatigue, and neurological disease. The good news is that researchers have found that age-related mitochondrial decline may be *reversed*.

**Solution: Mitochondrial Support**

To energize and restore aging mitochondria, the following four nutrients should be taken each day.

NUTRIENT	TYPICAL DAILY DOSE
<b>CoQ10</b> as ubiquinol	100-200 mg
<b>Pyroloquinoline quinone</b> (PQQ)	10 mg
<b>Acetyl-L-carnitine arginate</b>	675 mg
<b>R-lipoic acid</b>	150 mg

## Aging Factor 5: Hormone Imbalance

The cells in your body are synchronized to function by communication signals called “hormones.”

Aging creates severe *hormone imbalances* that contribute to depression, inflammation, osteoporosis, coronary artery blockage, and loss of libido.

These age-related hormone imbalances drastically affect quality of life. As testosterone, estrogen, progesterone (in women), and thyroid hormone levels inevitably decline, mood, energy levels, muscle mass, metabolism, memory, mental performance, and fulfilling sex all go by the wayside.

Age-related declines in hormone levels can be extreme. Serious health problems often don't get the right care because doctors fail to recognize that their aging patients' disorders may be caused by hormone concentrations that are up to **90% lower** than in their youth.

### **Solution:** Bioidentical Hormone Replacement with Nutrient Support

The most effective way to bring your sex hormones into balance is by *restoring* them to youthful levels with bioidentical hormone replacement therapy. There's no fixed dosage for these hormones. You and your doctor tailor the amount that's right for you through careful monitoring of your blood test results.



## HOW TO SUPPORT HORMONE BALANCE

NUTRIENT OR INTERVENTION	TYPICAL DAILY DOSE
<b>FOR WOMEN</b> (no prescription needed)	
DHEA*	15-25 mg
Pregnenolone*	50-100 mg
Natural progesterone cream	Follow label directions
Broccoli extract	400-800 mg
Indole-3-carbinol (I3C)	80-160 mg
Apigenin	25-50 mg
Calcium D-glucarate	200-400 mg
Vitamin D3	5,000 IU
<b>FOR WOMEN</b> (requires prescription)	
Bioidentical hormone replacement	Based on individual blood test results
<b>FOR MEN</b> (no prescription needed)	
DHEA*	25-100 mg
Pregnenolone*	50-100 mg
Saw palmetto extract	320 mg
Stinging nettle root extract	240 mg
Lignan extract	20 mg
Vitamin D3	5,000 IU
Broccoli extract	400-800 mg
Indole-3-carbinol (I3C)	80-160 mg
Apigenin	25-50 mg
<b>FOR MEN</b> (requires prescription)	
Bioidentical hormone replacement	Based on individual blood test results

\* Consult with your physician before taking DHEA or pregnenolone. Do not use DHEA or pregnenolone if you are at risk for or have been diagnosed as having any type of hormonal cancer, such as prostate or breast cancer.

Those taking bioidentical hormones should consider taking nutrients shown to help aging men and women safely utilize their hormones, protect against hormone-dependent cancers, and eliminate potentially carcinogenic compounds found in our diet and environment.



Estrogen imbalance poses a major threat to both women and men. Clinical studies reveal that too much or too little estrogen puts men at greater risk for heart disease, atherosclerosis, stroke, prostate cancer, and osteoporosis. Compounds found in *cruciferous vegetables* help our bodies regulate estrogen metabolites, neutralizing dangerous ones.

The chart in this section describes bioidentical hormones you can obtain right now and the nutrients you should take with them. Fortunately, many of these nutrients are available in special multiformulas, so you don't have to take a lot of pills.

**Aging Factor 6: Excess Calcification**

Aging *disrupts* calcium transport, resulting in excess calcium infiltration into the soft tissue cells of the brain, heart valves, and middle arterial wall (causing arteriosclerosis). Many age-related disorders are related to excessive calcification, including memory loss, aortic valve stenosis, atherosclerosis, vision problems, even dementia.

Gradual calcium buildup in your coronary arteries can constrict blood flow, causing chest pains and putting you at greater risk for a heart attack.

These deadly age-related processes can be halted and possibly *reversed* using two low-cost nutrients.

**Solution: Vitamins K and D**

Lining our blood vessels is a protein that regulates whether or not circulating blood calcium *infiltrates* (calcifies) our arteries. This protein requires vitamin K2 to function. When one is deficient in vitamin K2, vascular calcification occurs. When sufficient K2 is present, this protein functions to shield against arterial calcification.

Vitamins D and K work *together* to help remove calcium from circulation in the blood, trigger bone formation, and maintain bone strength. Vitamin D helps your bones absorb calcium. Vitamin K ensures that calcium is deposited in your bones and stays out of your arteries. Together they work to prevent excess calcium from depositing in your brain, arteries, and other soft tissues.

NUTRIENT	TYPICAL DAILY DOSE
Vitamin D3	5,000 IU
Vitamin K1*	1,000 mcg
Vitamin K2 as MK-4	1,000 mcg
Vitamin K2 as MK-7	100 mcg

\* If you're taking anticoagulant drugs like Coumadin® (warfarin), talk to your doctor before starting on a vitamin K regimen.

**Aging Factor 7: Digestive Enzyme Deficit**

Digestive enzymes are essential to the body's absorption and full utilization of food. They speed the chemical reactions that break down food in the digestive tract. Raw foods also provide enzymes that naturally break down food for proper absorption. The capacity of the living organism to make enzymes diminishes with age. One reason we pack on the fat pounds, feel sluggish, and grow more vulnerable to infectious disease as we grow old may surprise you. It's a connection I never made until I started talking to antiaging experts.

Our aging bodies no longer produce sufficient amounts of the active chemical compounds we need to extract essential nutrients from the foods we eat.

Meeting the full range of our nutritional requirements can create a high demand for these *digestive enzymes*. Their gradual loss accounts for many health problems that plague aging adults, from impaired immunity to digestive distress and nutritional deficiencies.



**Solution: Tailored Enzymatic and Nutritional Support**

NUTRIENT	TYPICAL DAILY DOSE
A complete high-potency digestive enzyme blend	Per label instructions
Prebiotic Fiber Blend	About 6 grams



Another way to restore digestive enzyme balance is to ensure you have enough beneficial bacteria in your gut. Supplements that supply these living bacteria are called *probiotics*.

You also need to ensure that “good” bacteria are getting enough of the nutrients they need to thrive. Dietary deficiency of these nutrients—known as *prebiotics*—is another reason we don’t have the robust digestive enzyme balance of our younger days.

So your digestive support strategy is threefold:

1. Replenish youthful levels of digestive enzymes.
2. Repopulate your gut with beneficial bacteria using probiotics.
3. Nourish beneficial bacteria so they can thrive with prebiotics.

One final word of caution, and something else that might surprise you: High-quality digestive enzyme supplements can cause you to gain weight if you’re not careful.

They work so well in helping your body break down food efficiently that you don’t get that “full” feeling as quickly. So you may wind up eating more than you should, *even though you know you shouldn’t*.

### Aging Factor 8: Fatty Acid Imbalance

Aging *distorts* the metabolism of *essential* fatty acids, throwing their delicate proportion and interplay off balance. The resulting *fatty acid imbalance* may manifest as anything from irregular heartbeat and skin disorders to heart disease, high blood pressure, and stroke.

#### Solution: Fatty Acid Intervention

NUTRIENT	TYPICAL DAILY DOSE
Fish oil	1,400 mg EPA and 1,000 mg DHA
Gamma-linolenic acid	300-600 mg
Lecithin granules	10 grams

### Aging Factor 9: DNA Mutation

We are continuously exposed to synthetic *and* natural carcinogens in our food supply, in everyday household products, and in our environment. Cooking any food at high temperatures (above 250 degrees Fahrenheit) also generates toxic cancer-causing agents. These environmental and dietary compounds *mutate* cellular DNA.

Aging cells gradually lose their ability to repair DNA from these constant assaults. The resulting DNA damage can cause normally functioning cells to proliferate out of control, turning them into cancer cells.

These processes can be halted and reversed with a number of plant-based compounds that break down carcinogens, prevent cells from becoming cancerous, and *disable* mutated cells.

#### Solution: Targeted DNA Protection and Repair

NUTRIENT	TYPICAL DAILY DOSE
Chlorophyllin	100-300 mg
Curcumin*	400-800 mg daily
Broccoli extract	400-800 mg
Watercress extract	50-100 mg
Rosemary extract	50-100 mg
Apigenin	25-50 mg

### Aging Factor 10 : Immune Dysfunction

As the aging *immune system* loses its ability to attack bacteria, viruses, and cancer cells, it instead generates excessive levels of *inflammatory* chemicals that turn on its host and create autoimmune diseases such as rheumatoid syndrome.

#### Solution: Supercharge Your Immune System

You can restore your immune system using a few safe, low-cost compounds that target age-related immune conditions. They enhance different parts of your immune system at the same time to optimize your defenses against infectious disease, including pneumonia, the flu, and other highly infectious diseases.

NUTRIENT	TYPICAL DAILY DOSE
Vitamin D3	5,000-8,000 IU
DHEA	15-50 mg
Beta 1,3/1,6 glucan	100-600 mg
Probiotic	333 million colony forming units (CFU)
High-potency multinutrient formula	Two tablets/capsules
Lactoferrin	300 mg

### Aging Factor 11: Enzyme Imbalance

Youthful functions within your cells depend on multiple enzymatic reactions occurring with precise timing. Aging causes enzyme imbalances in the brain and liver. The result can manifest as neurological diseases such as Parkinson's or persistent memory loss. Impaired liver function results in toxic damage to every cell in the body.

**Solution:** Restore Youthful Enzyme Cofactors

NUTRIENT	TYPICAL DAILY DOSE
L-methylfolate	1,000 mcg
S-adenosyl-methionine (SAME)	200-400 mg
High-potency multinutrient formula	Two tablets/capsules

### Aging Factor 12: Loss of Mitochondria

The increasing weakness and fatigue we inevitably experience as we get older isn't only the result of a steady age-related decline in the amount of energy our mitochondria can produce. The number of healthy mitochondria throughout our bodies declines sharply as well.

**Solution:** Stimulate Growth of New Mitochondria

Mitochondrial biogenesis is the scientific term for the process of growing fresh mitochondria. The most recent research indicates that the following nutrients listed can trigger mitochondrial biogenesis and increase mitochondrial energy output.

NUTRIENT	TYPICAL DAILY DOSE
Pyrroloquinoline quinone (PQQ)	10-20 mg
CoQ10	100-200 mg
R-lipoic acid	300-600 mg
Trans-resveratrol	250 mg
Acetyl-L-carnitine	1,000-2,000 mg

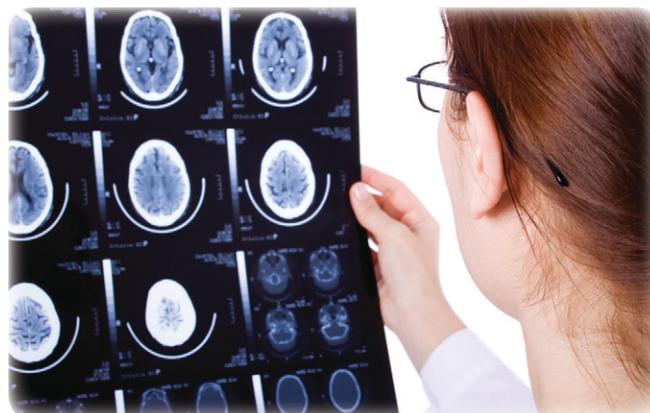
### Aging Factor 13: Excitotoxicity

Excitotoxicity is the pathological process by which nerve cells are damaged and killed by excessive stimulation by neurotransmitters such as glutamate. The result is brain cell damage and destruction leading to neurological disorders. Excitotoxicity contributes to lasting brain damage that arises from events like stroke and traumatic brain injury.

**Solution:** Compounds That Protect Against Glutamate Injury

There are nutrients that can protect brain cells and neurons from excitotoxicity injury and regenerate damaged cells.

NUTRIENT	TYPICAL DAILY DOSE
Vinpocetine	15-30 mg
B12	1 mg
Magnesium threonate	1,000-2,000 mg
Blueberry extract	500-2,000 mg
Melatonin	1-10 mg before bed
Carnosine	1,000 mg



### Aging Factor 14: Circulatory Deficit

Delivery of nutrient- and oxygen-rich blood to the brain, heart, and extremities is impaired as a part of normal aging. Major strokes and ministrokes are common problems associated with circulatory deficit to the brain. The skin of all aged people shows the effects of lack of nutrient-rich blood to the upper layers. An underlying cause of circulatory deficits is *endothelial dysfunction*, which destroys the inner lining of blood vessels and decimates their ability to efficiently transport blood.

#### Solution: Multimodal Support for Healthy Circulation

With all the mainstream medical and media attention focus on cholesterol and high blood pressure for heart health, a major issue facing most maturing people has been overlooked: *healthy circulation*.

Anywhere from two-thirds to three-fourths of Americans are concerned about circulatory issues by some estimates. Ruptured blood vessels, embolism, stroke, and varicose veins affect many people. Many resort to blood-thinning medications with potentially dangerous side effects. Most have been kept in the dark about low-cost, *natural* alternatives.

One of the most exciting is a brand-new, cutting-edge, high-potency *tomato extract*. This tomato extract is specially processed in such a way that provides benefits you cannot obtain by consuming cooked tomato products. In human clinical trials, it's proven to be completely safe with no side effects. Just three grams improves blood flow within ninety minutes and lasts for more than *twelve hours*!

It's already been approved in Europe for clinical use. It works by helping improve the balance of clotting factors—platelets—in your bloodstream. Even more exciting, it worked for 97 percent of test subjects, which means it will most likely work for you, without the risk of hemorrhaging, organ damage, and other side effects associated with blood-thinning drugs.

To protect against endothelial dysfunction, a critically important nutrient is *pomegranate*. In human clinical studies, those who drank pomegranate juice along with taking their standard therapy are able to reverse markers of circulatory deficit. In one study, circulation to the brain increased by 30 percent after one year in the pomegranate group, compared to *reduced* circulation to the brain in the placebo group not getting pomegranate. Both groups continued with their standard therapies.

NUTRIENT	TYPICAL DAILY DOSE
Tomato extract	3 grams
Pomegranate extract	500 mg
Fish oil	1,400 mg EPA and 1,000 mg DHA
Sweet orange extract	600 mg
Vinpocetine	10-30 mg

### Aging Factor 15: Loss of Youthful Gene Expression

In response to normal aging and environmental toxins, changes occur in *genes* required to sustain youthful cellular function. What happens is that genes that maintain cellular health slowly “turn off,” while genes that make us vulnerable to degenerative pathologies become overexpressed (turned on). As cells lose their youthful gene expression profile, we succumb to a plethora of discomforts, diseases, and eventual death.

#### Solution: Activate Your Longevity Genes

Longevity researchers have known for seventy-five years that consuming far fewer calories while meeting all nutritional needs can greatly increase life span in some species. More recently, geneticists discovered why: caloric restriction activates genes that slow cell aging.

In 2003, remarkable news arrived from the scientific community that a compound found in red grapes and other plants called *resveratrol* extended the life span of certain cells by as much as 70 percent. Even more exciting were findings in 2006 from a team of Harvard researchers showing that resveratrol “switches on” many of the same genes as caloric restriction!

Today this remarkable compound has attained celebrity status, with nationally known doctors endorsing its use. Medical researchers have found it combats not only aging but also the *diseases of aging*.

Further research into the area of *youthful gene* expression has brought to light a new class of compounds like resveratrol that enables aging cells to reverse course and function as though they were young again. These compounds work in synergy with resveratrol, mutually complementing and reinforcing its rejuvenating biological effects.

The following box describes four nutrients that help promote more youthful gene expression. Many of them can be found in multi-ingredient formulations, so you only need to take a few pills each day to obtain these potencies.

NUTRIENT	TYPICAL DAILY DOSE
Trans-resveratrol	250 mg
Fisetin	48 mg
Trans-pterostilbene	3-100 mg
Vitamin D	5,000 IU

**Aging Factor 16: Loss of Insulin Sensitivity**

In youth, we efficiently utilize ingested carbohydrates to produce cellular energy with a minimal amount converted to body fat storage. Aging reduces cellular sensitivity to insulin, which results in most people suffering chronically high blood glucose and insulin. This not only contributes to common age-related disorders but also unfavorably influences gene expression patterns.

Even if a blood test shows fasting glucose levels are normal, too many of us suffer from constant exposure to excess glucose throughout our normal days. In the presence of excess glucose, healthy tissue comes under an incredibly destructive free-radical assault. The ensuing cellular destruction has been linked to everything from blood vessel damage and stroke to cancer.

The bottom line is that most of us are playing with fire when it comes to excess blood sugar. Without knowing it, we place ourselves under a lifelong assault from excess glucose that wreaks havoc on our bodies long before we or our doctors recognize it. This is why some experts call glucose the *silent killer*. Even modest spikes in blood sugar (fasting glucose above 85 mg/dL) have been linked to increased risk of heart attack.

**Solution: Restore Youthful Glucose Control**

The good news is that forward-thinking researchers have identified a number of safe, completely natural substances that work in different ways to keep our after-meal blood sugar levels in check.

The most recently discovered of these is *green coffee bean extract*. I'm going to go into a bit of detail here because it really is exciting.

It works by blocking the destructive elevation in blood sugar that occurs after meals. Researchers have identified the active compound in raw coffee beans that combats excess blood sugar as *chlorogenic acid*. It brings blood sugar under control by both reducing the release of stored glucose into our bloodstreams and stopping the creation of excess glucose within our bodies.

In a recent clinical trial, just 350 mg three times a day of green coffee bean extract produced a remarkable 35 percent reduction in after-meal glucose spike. After twelve weeks, study participants shed on average almost eleven pounds, with fat loss accounting for 92 percent of the weight.

NUTRIENT	TYPICAL DAILY DOSE
Green coffee bean extract	350 –1,050 mg
Green tea phytosome	300 mg
Irvingia gabonensis extract	300 mg
Chromium	500 mcg
Cinnamon	175 –350 mg
R-lipoic acid	150 –300 mg



**Aging Factor 17: Loss of Bone Density**

Aging gradually weakens bones through decalcification and trace mineral loss. A compromised skeletal system negatively affects immune strength, blood cell production, nervous system function, insulin sensitivity, energy metabolism, and weight management.

**Solution: Broad-Spectrum Bone Support**

Ninety-nine percent of the calcium in our bodies resides in our teeth and bones. It stands to reason that if our bones and teeth store so much calcium, we would need to obtain additional calcium to preserve their strength. The real controversy is why mainstream doctors remain unenlightened about the need of maturing people to take the *right* kind of calcium supplement—and the proper nutrients to support it.

Ideal forms of calcium to look for on labels are dicalcium malate, calcium bisglycinate, or calcium citrate. They're easily tolerated by the body, highly absorbable, and supportive of bone mineral density—the key measure of a calcium supplement's value.

A daily dose of at least 1,000 mg is recommended for female adults. Women can take up to 1,200 mg. You won't get any additional benefit from high doses. (Men only need around 800 mg a day of supplemental calcium.)

Your body can't readily absorb calcium without *vitamin D3*. This vitamin also ensures calcium deposits properly in bone tissue. There are receptors for vitamin D3 in more than thirty different tissue types throughout the body. D3 binds with them to promote immune function, reduce inflammation, reduce hardening of the arteries, enhance heart function, improve brain and nerve tissue performance, and even prevent cancer.

*It's a good idea to have your vitamin D blood levels checked to make sure you're getting enough.* The current evidence suggests that your readings for

25-hydroxy-vitamin-D should be between 50 and 80 ng/ mL in blood for optimal health. Experts suggest taking at least 2,000 IU per day, with most people requiring 5,000 IU per day, to achieve blood levels in a healthy range.

NUTRIENT	TYPICAL DAILY DOSE
Calcium	1,200 mg
Vitamin D	1,000 IU
Magnesium	340 mg
Zinc	2 mg
Manganese	1 mg
Silicon	5 mg
Boron	3 mg
Vitamin K1	1,000 mcg
Vitamin K2 as MK-4*	1,000 mcg
Vitamin K2 as MK-7	100 mcg

\* If you're taking anticoagulant drugs like Coumadin (warfarin), talk to your doctor before starting on a vitamin K2 regimen.

**Aging Factor 18: Oxidative Stress**

Free radicals are fiery unstable molecules that have been implicated in most diseases associated with aging.

At the molecular level, the continuous chemical reactions keeping your heart beating, your blood moving, and your brain working look like controlled infernos. The constant exchange of electrons wheeling inside the tiny energy-producing powerhouses in your cells called the mitochondria throws off enormous quantities of energy.



The problem is that as we get older, the cellular structures that once kept these fires under control begin to degrade, including the *mitochondria* themselves. Aging causes our cells to lose control over these reactions and renders them more vulnerable to destruction.

### **Solution:** Quench the Raging Fires Within

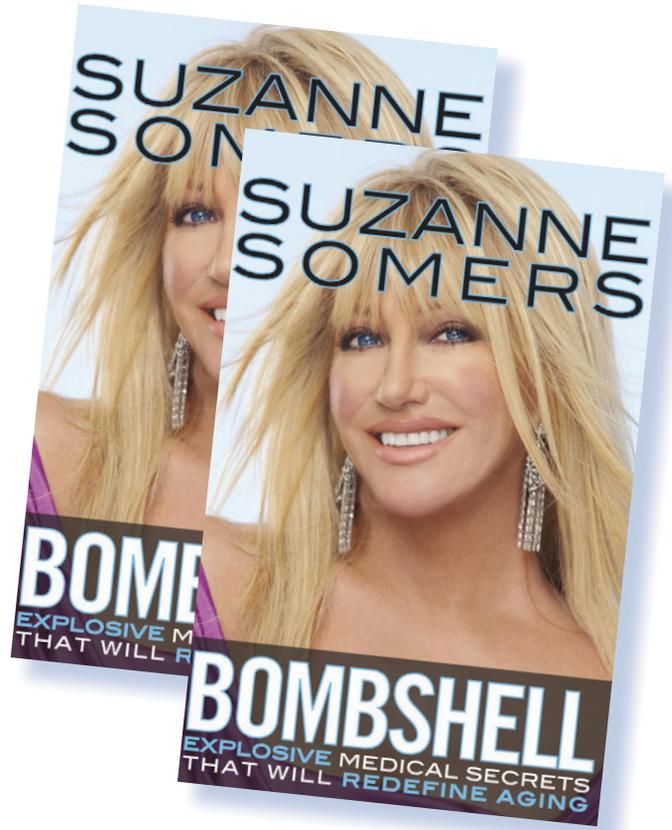
Antioxidants have become popular supplements to protect against free-radical-induced cell damage, but few people take the proper combination of antioxidant supplements to adequately compensate for age-induced loss of endogenous antioxidants such as SOD, glutathione, and catalase.

NUTRIENT	TYPICAL DAILY DOSE
Superoxide dismutase/ Gliadin complex (GliSODin®)	500 mg
Pomegranate extract	500 mg
Green tea extract	725 mg
Grapeseed extract	150 mg
S-adenosyl-methionine (S-AdoMet)	200-400 mg
Astaxanthin	5-6 mg
R-lipoic acid	300-600 mg
High-potency multinutrient formula	Two capsules
Gamma-tocopherol/ sesame lignans	200 mg gamma-E tocopherol with 20 mg of standardized sesame lignans

#### ONE FINAL NOTE

Children can benefit by taking vitamin supplements, but it is the *aging human* whose body is depleted of the endogenous antioxidants, hormones, enzymatic repair systems, and other biological chemicals needed to sustain life. What is optional in childhood becomes mandatory as humans enter middle age and become vulnerable to a host of degenerative diseases that await them if they fail to protect themselves.

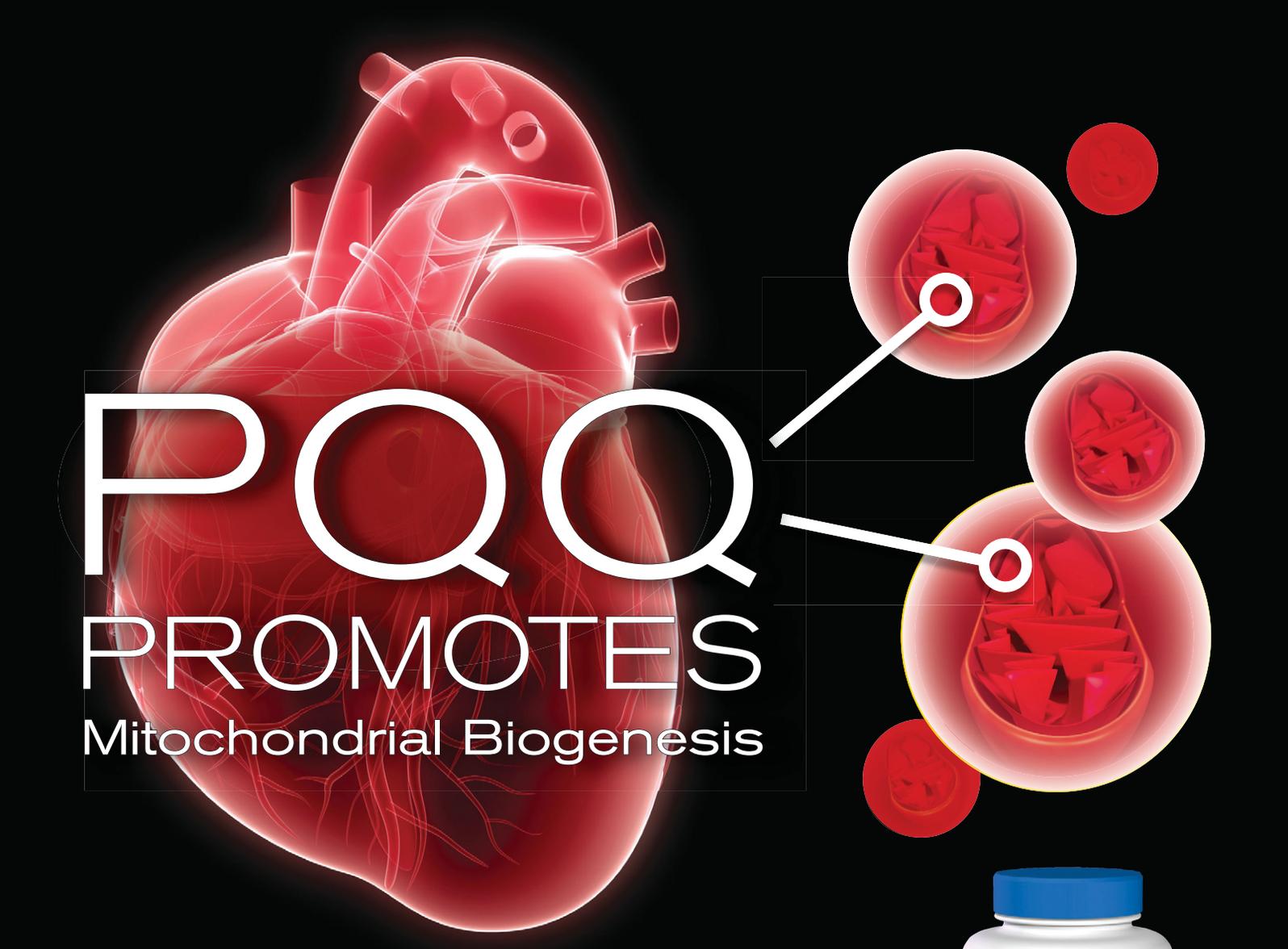
The encouraging news is that supplements like fish oil, vitamin D, lipoic acid, curcumin, CoQ10, resveratrol, DHEA, vitamin K, and SAME function to circumvent multiple aging factors that conspire to rob us of our youthful health. This means that you don't have to take gobs of pills to counteract the multiple mechanisms of aging described in this chapter.



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# PQQ

## PROMOTES

### Mitochondrial Biogenesis

## Critical Importance of Mitochondria

Back in 1983, **Life Extension**® was the first to introduce **CoQ10** as a proven method to enhance **mitochondrial** energy production.

**CoQ10** has since gained universal recognition for its role in supporting cellular performance throughout the body.<sup>1-6</sup>

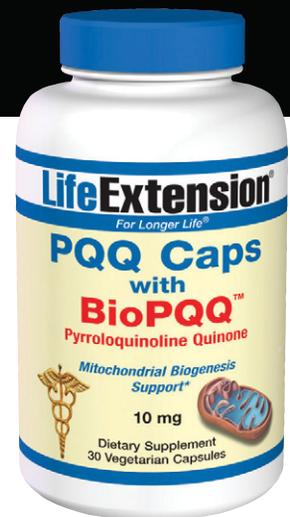
In an unprecedented breakthrough, a compound called **PQQ** (*pyrroloquinoline quinone*) has been shown to support **mitochondrial biogenesis**—the spontaneous generation of **new mitochondria** in aging cells.<sup>7</sup>

**PQQ** is available as a low-cost dietary supplement.

**Mitochondria** are cellular energy generators that supply virtually all the power your body requires for a healthy life span. An abundance of published studies underscores the critical importance of the **mitochondria** to overall health, especially as we age.<sup>8-14</sup> Energy-intensive organs like the heart and brain are *dense* with mitochondria.

Until recently, the only natural ways for aging individuals to increase the number of mitochondria in their bodies were long-term calorie restriction or exhaustive physical activity—which are difficult or impractical for most people to implement.

**PQQ** offers a viable alternative.



Item #01500

## The Ultimate Cell Rejuvenator

The enormous amount of energy generated within the mitochondria exposes them to constant free radical attack. The resulting **mitochondrial decay** is a hallmark of aging.

PQQ protects and augments delicate mitochondrial structures to promote *youthful* cellular function in **three** distinct ways:

- **Antioxidant power.** Like CoQ10, PQQ is a highly potent antioxidant. Its extraordinary molecular stability enables it to facilitate thousands of biochemical reactions in the mitochondria, without breaking down, for maximum antioxidant and bioenergetic support.<sup>15</sup>
- **Favorably modulates gene expression.** PQQ activates *genes* that promote formation of **new mitochondria**<sup>7</sup>—and beneficially interacts with genes directly involved in mitochondrial health. These same genes also support **healthy body weight**, normal **fat** and **sugar metabolism**, and **youthful cellular proliferation**.<sup>16</sup>
- **Mitochondrial defense.** Mitochondria possess their *own* DNA, distinct from the DNA contained in the nucleus. Unfortunately, compared to nuclear DNA, mitochondrial DNA is relatively unprotected. PQQ's antioxidant potency and favorable gene expression profile act to support mitochondrial defense.

## Vital Protection for the Aging Heart and Brain

PQQ is an **essential nutrient**, meaning your body cannot make it on its own. A growing body of research indicates that PQQ's unique nutritional profile supports heart health and cognitive function—alone and in combination with CoQ10.<sup>17,18</sup> This comes as no surprise, given how much energy these vital organs need.

Research shows that **PQQ** supports **heart cell function** in the presence of free radicals and promotes blood flow in heart muscle.<sup>19</sup>

When taken in combination with **CoQ10**, just **20 mg per day** of PQQ has been shown to promote **memory, attention, and cognition** in maturing individuals.<sup>20</sup>

## A Breakthrough Weapon in the Battle Against Aging

**Life Extension**® has identified a purified, highly potent form of PQQ from Japan that is produced through a unique fermentation process. The result is the highest quality PQQ available on the market today called **BioPQQ™**.

A bottle containing **30 10 mg** vegetarian capsules of **PQQ Caps with BioPQQ™** retails for \$24. If a member buys four bottles, the price is reduced to just **\$16.50** per bottle.

A 10 mg dose of PQQ is also included in the **Mitochondrial Energy Optimizer with BioPQQ™** and **Mitochondrial Basics with BioPQQ™** formulas.

Contains rice.



To order PQQ Caps with BioPQQ™ standalone or any other PQQ-containing formula call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

BioPQQ™ is a trademark of MGC (Japan).

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## ASK THE PHARMACIST

# “Drug Muggers” Can Slowly Steal the Life Out of You!

An Interview with Pharmacist Suzy Cohen, RPh



Suzy Cohen, RPh

Suzy Cohen has been a licensed pharmacist for 23 years and a Functional Medicine practitioner for 13 years. Dubbed ‘America’s Most Trusted Pharmacist™’ Suzy devotes most of her time to teaching others about the benefits of natural vitamins, herbs, and minerals. In addition to writing her own nationally syndicated health column, “Dear Pharmacist,” which has appeared in the *South Florida Sun-Sentinel* for 13 years, Suzy is the author of three best-selling books on natural health: *The 24-Hour Pharmacist* (Collins 2007), *Diabetes Without Drugs* (Rodale 2010) and her newest release, *Drug Muggers: Which Medications are Robbing You of Essential Nutrients, and Natural Ways to Restore Them* (Rodale 2011). Suzy has appeared on The Dr. OZ Show, The Doctors, The View, The 700 Club, and Good Morning America Health.

Cohen’s sensible health care advice comes from many years of education as she is an active member of The American College for Advancement in Medicine (ACAM), the Institute of Functional Medicine (IFM), the American Academy of Anti-Aging Medicine (A4M), and the American Pharmacist’s Association (APhA). Cohen answers some important questions about how to get the most out of your pharmacist in this exclusive Life Extension® interview.

# ASK THE PHARMACIST

## LE: Why did you decide to become a pharmacist?

SC: I decided to become a pharmacist because I realized that medications can often create additional detrimental health conditions. When a person starts a medication, it is not unusual that they soon need another one to take care of side effects from the first. When I did some research into this, it dawned on me that nutrient-depletion from medications could spark side effects. As a result, I was inspired to educate consumers that putting back what their medication stole could help them feel better, and perhaps prevent the need to get on the medication merry-go-round.

## LE: What are some ways that Life Extension members can get the most from having a pharmacist like you?

SC: Pharmacists are so knowledgeable about medications, interactions, and over-the-counter supplements that they can help you avoid medication problems;

you should take advantage of their extensive knowledge. Picking their brain is free, though you may have to wait a few minutes at the counter if it's a busy time of day. It is definitely worth the wait though, because they are sort of like 'drug store doctors' in that they can help you feel better fast if you have minor health concerns.

## LE: What are some typical questions that we should ask our pharmacist that could save us time, money, or aggravation?

SC: 1) *Does my medication come in a generic? If it does not, is there another medication in the same category that DOES come in a generic?* This could save you up to \$150 per month.

2) *Does my medication interact with fruit juice?* Some cholesterol lowering medications and allergy tablets interact with fruit juice and drug levels spike causing more side effects. Such a simple question can avoid so much aggravation. Grapefruit and its juice are particularly troublesome. It can cause a spike in levels of statin cholesterol

drugs. When the drug level rises, the person may experience severe muscle aches, headache, liver damage, kidney damage, leg cramps, peripheral neuropathy (pins and needle sensations, numbness), and breakdown of skeletal muscle: a life-threatening condition termed rhabdomyolysis.

3) *Is there a way to achieve the same effects of a prescription drug, using over-the-counter medications?* Often times, a sister drug is available over-the-counter for pennies on the dollar as compared to the prescription alternative.

## LE: Those are some excellent suggestions. What are the particulars that separate you from other pharmacists?

SC: Most pharmacists are focused solely on medications, and their educational track consists of pharmacy seminars. I study medications, but I am much more focused on the way foods act like drugs in the body, and the benefits of Mother Nature's medicine cabinet, meaning herbal remedies. There's a synergy when you combine the right medication with the right vitamin or mineral. When a medication mugs a vital nutrient, the result is an unwanted side effect. It's a rare breed to find a pharmacist that is cross trained in both conventional medicine as well as complimentary modalities. I think my specialty is the drug-nutrient depletion effect, something I've termed the "drug mugging" effect. This overlooked interaction between pharmaceuticals and nutrients lends explanation to why you take medicine and then develop other side effects which are then diagnosed as a new disease. Knowledge is power.



## ASK THE PHARMACIST



### COMMON DRUG MUGGERS AND WHAT TO TAKE WITH THEM

**Blood Pressure Medications:** Trace Minerals

**Statin Medications Cholesterol:** CoQ10 (Ubiquinol) 100 mg twice daily and Vitamin D about 2-5,000 IU per day

**Diabetes Medications:** Methylcobalamin 1,000 mcg per day and CoQ10 (see above)

**Hormones:** B6, B12, folic acid, magnesium, selenium, zinc

**Thyroid Medications:** Selenium, zinc and iron (but take it 4 hours later)

**Aspirin:** Vitamin C 500 mg per day

**Acid blockers/Antacids:** Everything is mugged. Hawaiian Spirulina is what I suggest here (Alternate: Trace Minerals, B complex, Probiotics, extra magnesium, about 250 mg daily.

#### LE: How would someone go about dealing with a nutrient problem like this?

SC: Like any other problem, the first thing to do is become aware that there may be a drug-induced nutrient depletion happening in your body causing one of your symptoms. Once you are aware, you can take a look at all your symptoms and try to determine

when they began. For example, if you have developed leg cramps and then got diagnosed with “restless leg syndrome” then I’m asking you to become aware that your symptoms of leg cramps may not really be a “disease” such as “restless leg syndrome.” Maybe you are just having a side effect to one of your medications, one that is known to deplete a nutrient needed for muscle health.

#### LE: So this “awareness” of your symptoms is vital?

SC: Yes, this awareness is very important. Did you know that leg cramps are associated with over 200 drugs via the drug mugging effect of CoQ10. A deficiency of that nutrient can very well cause cramps, muscle spasms, and weakness. Ta-dah! Restoring CoQ10 (or the active form of it called “ubiquinol”) could possibly cure your leg cramps – which was this terrible ‘disease’ that you thought you had! It’s so simple, and once you understand it, you have the power of knowledge to help yourself and others get back to vibrant health.

#### LE: Tell us a little more about this drug mugging effect.

SC: Prescription and OTC (over-the-counter) drugs that cause side effects do so most often (if not always) via the drug mugging effect. People have symptoms that are so insidious and because they develop them months to years later, they don’t often make the connection to the medication they are taking. And it could be like dominos. For example, in the case of hormone pills (like those containing estrogen) for menopause or birth control... those drugs are thieves for testosterone (among other hormones), but it’s not a direct connection. In other words, the estrogen-containing drugs don’t steal testosterone (i.e. reduce it directly), but these do steal zinc, magnesium, and certain B vitamins. Testosterone production just so happens to be dependent on these very micronutrients! So in this case, millions of women taking female hormones are being ‘mugged’ of their natural

# ASK THE PHARMACIST

testosterone, which is a ‘personality’ hormone. It’s the one that motivates us, gives a sense of well-being, power, and sex drive. It keeps us thin, in part by keeping us from developing low thyroid. Without enough testosterone or “T” we might feel dull, depressed, stressed-out, powerless, cold-sensitive, and chronically fatigued. If you don’t know about the drug mugging effect, then you would never make the connection that these symptoms might be related to your original medication, the female hormone. Before you know it, your doctor will hand you a prescription for Paxil, Xanax, Synthroid, and so on. This is how people suddenly end up on numerous medications that can often create even more negative interactions. Nothing against these drugs, I’m only saying that they may not have been necessary if you knew about the drug mugging effect, and began taking trace minerals, probiotics, and B vitamins when you began the female hormones! Hawaiian Spirulina is one of my favorite supplements to restore essential nutrients with female hormones, because it contains everything you need in one supplement.

If you read some of my examples of drug/nutrient depletions and they fit your situation, you can talk to your doctor about supplementing. For a modest price, you can get your life back!

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**LE: We’ve heard you say that people should install a “nutrient security system.” Can you elaborate on that, please?**

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SC: The nutrient security system that one has to install is based on their medication. The most fundamental supplement that I

## COMMON DRUG SIDE EFFECTS THAT ARE ALMOST ALWAYS RELATED TO MEDICATION USE

### Depression, osteoporosis, or irregular heartbeat:

It could be caused by a deficiency of the mineral magnesium. Common drug muggers include female hormones, diuretics, raloxifene, tea/coffee, anti-inflammatories, and aspirin.

### Bald patches, loss of taste/smell, erectile dysfunction, or chronic diarrhea:

It might be zinc deficiency. Common drug muggers are anti-inflammatories, antibiotics, antacids, ulcer/heartburn meds, diuretics, and estrogen drugs used for birth control and menopause.

### Leg cramps, muscle spasms, memory loss, or fatigue:

May be a deficiency of CoQ10 (ubiquinol). This life-sustaining antioxidant gets demolished by hundreds of medications including statin cholesterol drugs, metformin, anti-depressants, beta blockers, and diuretics. I’ve posted a “Big List of Drugs that Mug CoQ10” for free at my website, [www.SuzyCohen.com](http://www.SuzyCohen.com).

### Cell damage, high homocysteine, cataracts, macular degeneration, liver problems:

It could be tied to low glutathione, a powerful antioxidant needed to detoxify poisons in your body. Acetaminophen is a possible drug mugger of glutathione.

### Pins and needles, nerve pain, depression, fatigue, anemia, weight gain:

This could be related to a deficiency of B vitamins. Your stash gets depleted by female hormones (menopause and birth control), antacids, ulcer meds, diuretics, raloxifene, cholestyramine, diabetic drugs, and tea/coffee.





**LE: Is there a way to discover if we have a deficiency on our own?**

SC: Yes. Track new symptoms on a calendar so you can see if they began after you started a new medication. Research in my book, look up the drug and see what nutrients it depletes. It would be fantastic if people could find the underlying cause of their symptoms, or disease, and then correct that rather than taking additional medications. This would necessitate less medications, and thereby fewer side effects and drug-mugging symptoms.

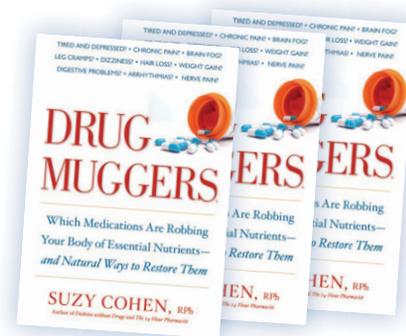
**LE: This information is fantastic. How can people get in touch with you or order one of your books?**

SC: If you have a personal health question, “like” my fan page [www.facebook.com/SuzyCohenRPh](http://www.facebook.com/SuzyCohenRPh)

To get my health newsletter, sign up at my website: [www.SuzyCohen.com](http://www.SuzyCohen.com)

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

To order *Drug Muggers*, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)  
Item # 33845, Retail price \$21.99,  
Member price \$16.49



recommend for anyone taking any medication (prescription or over-the-counter) is a good probiotic. Then, you take the supplement you need after that, based on the medication you're taking. If you want to know MY personal nutrient security system, which is the one that I recommend for everyone, that I feel is safe and covers pretty much all medications, I would recommend three basic supplements: probiotics, B-complex, and trace minerals (alternate Hawaiian Spirulina which restores all three at once).

**LE: Is fruit the number one food that interacts negatively with the largest number of drugs? How about other citrus fruits and pomegranate juice?**

SC: Yes, I think so. It contains an active ingredient (naringen) that causes drug levels to rise. Emerging studies show that other juices may have a similar, though weaker effect.

**LE: Besides prescription and over-the-counter drugs, your book *Drug Muggers* also mentions lifestyle drug muggers. What are those?**

SC: Wine is a drug mugger of thiamine (vitamin B1). Coffee is a drug mugger of iron.\* Medical conditions such as pancreatic insufficiency, gallbladder disease, IBS, Crohn's disease, gluten-intolerance or “Celiac” disease can inhibit the absorption of nutrients from the intestine, so it's best if you supplement with high-quality nutrients or get an IV infusion of nutrients called a “Meyer's cocktail.” Fat blockers such as Alli® can suppress absorption of fat soluble vitamins including A, D, E, and K.

*\* High levels of iron increase cancer and heart disease risk. If coffee reduces iron absorption, this would be a beneficial effect for anyone who is not otherwise iron deficient.*



For the past 30 years, the Life Extension Foundation® has stated that the most important step one can take to prevent disease cannot be found in a bottle of pills. The true cornerstone of any preventive health care program is annual blood screening. Proactive blood screening can help you greatly reduce your risk of disorders such as heart and kidney disease, stroke, liver conditions, anemia, and diabetes. Plus it's particularly valuable in helping you prevent and treat symptoms associated with hormone imbalance, such as fatigue, memory impairment, bone loss, weight gain, and depression. Blood testing remains one of the most important things you can do for yourself and your loved ones. More than any other measure, annual blood testing holds tremendous potential to protect both yourself and your loved ones.

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1. Call **1-800-208-3444** to discuss and place your order with one of our knowledgeable health advisors. (This order form can also be faxed to 1-866-728-1050 or mailed.) Online orders can also be placed at [www.lef.org/blood](http://www.lef.org/blood)
2. After your order is placed, you will be mailed either a requisition form to take to your local LabCorp Patient Service Center or a Blood Draw Kit, whichever is applicable. (Please note: If a blood draw kit is used, an additional local draw fee may be incurred.)
3. Have your blood drawn.
4. Your blood test results will be mailed, emailed, or faxed directly to you by Life Extension.
5. Take the opportunity to discuss the results with one of our knowledgeable health advisors by calling 1-800-226-2370; or review the results with your personal physician.

It's that simple! Don't delay—call today!

### For Our Local Members:

For those residing in the Ft. Lauderdale, Florida area, blood-draws are also performed at the Life Extension Nutrition Center from 9:00 am to 2:00 pm Monday through Saturday. Simply purchase the blood test and have it drawn with no wait! Our address is 5990 North Federal Highway, Ft. Lauderdale, FL, 33308-2633.

# ANNUAL Blood Test

March 30-June 4, 2012 **SUPER SALE**

LIFE EXTENSION'S SUGGESTIONS FOR ANNUAL SCREENING (Member Prices\*)

## MEN'S ANNUAL BLOOD TESTING

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 PSA (prostate-specific antigen)  
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 C-Reactive Protein (high-sensitivity)  
 Free Testosterone  
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 Vitamin D 25- hydroxy
 

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 Research is revealing that maintaining higher blood levels of CoQ10 may offer greater health benefits. This test measures blood levels of CoQ10.
- VAP™ TEST (LC804500)** **\$67.50**  
 The VAP cholesterol test provides a more comprehensive coronary heart disease (CHD) risk assessment than the conventional lipid profile. This test includes measurements of LDL particle size and lipoprotein subclasses.
- FOOD SAFE ALLERGY TEST\*\* (LCM73001)** **\$130.50**  
 This test measures delayed (IgG) food allergies for 95 common foods.

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 Homocysteine  
 C-Reactive Protein (high-sensitivity)  
 Progesterone  
 Free Testosterone  
 Total Testosterone  
 TSH for thyroid function  
 Vitamin D 25- hydroxy
 

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 To provide an even more in-depth analysis of a woman's hormone status, Life Extension has created this panel as an addition to the Female Life Extension Panel. This panel provides information about total estrogen status; and the hormone pregnenolone that acts as a precursor to all other hormones.
- THYROID ADD-ON PANEL (LCTHYROID)** **\$36**  
**Free T3 & Free T4.**
- OMEGA SCORE™\*\*\* (LCOMEGA)** **\$99**  
 Provides valuable information on your risk of developing heart disease, sudden heart attack, and cardiac death. The Omega Score™ also includes your AA:EPA ratio, allowing you to determine and track a major factor in total body inflammation.
- COENZYME Q10\* (LC120251)** **\$108.75**  
 Research is revealing that maintaining higher blood levels of CoQ10 may offer greater health benefits. This test measures blood levels of CoQ10.
- VAP™ TEST (LC804500) (UPDATED)** **\$67.50**  
 The VAP cholesterol test provides a more comprehensive coronary heart disease (CHD) risk assessment than the conventional lipid profile. This test includes measurements of LDL particle size and lipoprotein subclasses.
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 This test measures delayed (IgG) food allergies for 95 common foods.

**BLOOD TEST SUPER SALE SPECIAL:** Add a **VITAMIN D** test for only \$25 when purchasing the following panel:  
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 This panel contains mercury, arsenic, and aluminum.
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\* For non-member pricing call **1-800-208-3444**.

\*\* This test is packaged as a kit, requiring a finger stick performed at home.



## OTHER POPULAR PANELS

**CBC/CHEMISTRY PROFILE (LC381822)** \$26

**Note: This CBC/Chemistry Profile is included in the Male and Female Life Extension panels. Retest Profiles and Weight Loss Panels**

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Total Cholesterol	Cholesterol/HDL Ratio
HDL Cholesterol	Estimated CHD Risk
LDL Cholesterol	Glucose
Triglycerides	

**LIVER FUNCTION PANEL**

AST (SGOT)	Total Bilirubin
ALT (SGPT)	Alkaline phosphatase
LDH	

**KIDNEY FUNCTION PANEL**

BUN	BUN/Creatinine Ratio
Creatinine	Uric Acid

**BLOOD PROTEIN LEVELS**

Total Protein	Globulin
Albumin	Albumin/Globulin Ratio

**BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE**

Red Blood Cell Count	Monocytes
White Blood Cell Count	Lymphocytes
Eosinophils	Platelet Count
Basophils	Hemoglobin
Neutrophils (Absolute)	Hematocrit
Lymphs (Absolute)	MCV
Monocytes (Absolute)	MCH
Eos (Absolute)	MCHC
Baso (Absolute)	Neutrophils
RDW	

**BLOOD MINERAL PANEL**

Calcium	Sodium
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**FEMALE WEIGHT LOSS PANEL (LCWLF)** \$224.25

CBC/Chemistry Profile (see description above), DHEA-S, Estradiol, C-Reactive Protein (high-sensitivity), Progesterone, free and total Testosterone, TSH, SHBG, Free T3, Free T4, Insulin.

**MALE WEIGHT LOSS PANEL (LCWLM)** \$224.25

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**LIFE EXTENSION THYROID PANEL (LC304131)** \$56.25

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**(LC100010)** CBC/Chemistry Profile (see description above), DHEA-S, Estradiol, DHT, PSA, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3.

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CBC/Chemistry Profile (see description), Epstein -Barr Virus antibodies (IgG and IgM), Cytomegalovirus Antibodies (IgG and IgM), Ferritin, Total and Free Testosterone, DHEA-S, Free T3, Free T4, Cortisol, C-Reactive Protein (high sensitivity), Vitamin B12, Folate, Insulin.

**ANEMIA PANEL (LC100006)** \$64.50

CBC/Chemistry Profile (see description), Ferritin, Total Iron Binding Capacity (TIBC), Vitamin B12, Folate, Reticulocyte Count.

**INFLAMMATION PANEL (LC100007)** \$101.25

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†Certain tests need to be shipped to the lab on dry ice for customers using a blood draw kit, and incur an additional \$35 charge. If you are going to LabCorp, this charge **does not** apply.

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This is NOT a complete listing of LE blood test services. Call 1-800-208-3444 for additional information.

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Glycine Powder  
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L-Arginine Free Base Powder  
Arginine/L-Ornithine Capsules  
L-Carnitine Capsules  
L-Glutathione, L-Cysteine & C  
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L-Glutamine Powder  
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DMAE  
Ginkgo Biloba Certified Extract™  
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Lecithin with B5 and BHA  
Lecithin Granules  
Methylcobalamin Lozenges  
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Pancreatin  
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Probiotic Cleanse™  
Probiotic Colon™  
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Meso-Zeaxanthin and C3G  
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D-Ribose Powder  
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Full-Spectrum Pomegranate™  
Fibrinogen Resist  
Forskolin  
Garlicforce™  
Homocysteine Resist  
Krill Healthy Joint Formula  
Natural BP Management  
Olive Leaf Vascular Support  
Peak ATP® with GlycoCarn®  
Policosanol  
Red Yeast Rice  
Super Absorbable CoQ10™ with d-Limonene  
Super Omega-3 EPA/DHA with Sesame  
Lignans & Olive Fruit Extract  
Super Ubiquinol CoQ10  
Super Ubiquinol CoQ10 with Enhanced  
Mitochondrial™ Support  
Sytrolin™  
Theaflavin Standardized Extract  
TMG Powder  
TMG Tablets

## HERBAL/PHYTO PRODUCTS

Artichoke Leaf Extract  
Astaxanthin  
Berry Complete  
Blueberry Extract  
Blueberry Extract w/Pomegranate  
Butterbur Extract w/Standardized  
Rosmarinic Acid  
Calcium D-Glucarate  
Cilantro Herbal Extract  
Citrus Bioflavonoid  
Enhanced Berry Complete with RZD™ Acai  
Floradix® Iron & Herbs  
Floravital® Iron & Herbs  
Full-Spectrum Pomegranate™  
Grapeseed Extract with Resveratrol &  
Pterostilbene  
Huperzine A with Natural Vitamin E  
Kyolic® Garlic Formula 105  
Kyolic® Reserve  
Mega Green Tea Extract  
Mega Green Tea Extract (Decaffeinated)  
(also w/CoffeeGenic Green Coffee extract)  
Mega Lycopene Extract  
Nutrim  
Optimized Ashwagandha Extract  
Optimized Garlic  
Pomegranate Extract  
Pomegranate Juice Concentrate  
ProGreens®  
Pure-Gar™  
Pycnogenol  
Optimized Quercetin  
Resveratrol with Synergistic Grape-Berry Actives  
Rhodiola Extract  
Rosmarinic Acid Extract

Silymarin  
SODzyme™ with GliSODin®  
Stevia Extract  
Super Bio-Curcumin®  
Super Ginkgo Extract  
Triple Action Cruciferous Vegetable Extract  
Venotone  
Whole Grape Extract

## HORMONES

Advanced Natural Sex for Women®  
Cordyceps CS-4  
7-Keto® DHEA  
DHEA  
DHEA Complete  
GH Pituitary Support Day Formula  
GH Pituitary Support Night Formula  
Melatonin  
Melatonin Timed Release  
Natural Estrogen with Pomegranate Extract  
Pregnenolone  
ProFem Cream  
Pure IGF  
Super Miraforte with Standardized Lignans

## IMMUNE ENHANCEMENT

Agave Digestive-Immune Support  
AHCC® (Active Hexose Correlated Compound)  
Aloe Vera Force™  
Buffered Vitamin C Powder  
Echinacea  
Enhanced Life Extension Whey Protein  
i26 Hyperimmune Egg  
Immune Protect with PARACTIN®  
Lactoferrin  
Lifeshield® Immunity™  
Maitake SX-Fraction  
Norwegian Shark Liver Oil  
Optimized Fucoidan w/Maritech® 926  
Primal Defense™  
ProBoost™ Thymic Protein A  
Pure Gar™  
Sambu® Guard  
Supercritical Oreganoforce™  
Thymic Immune Factors  
Ultimate Flora Advanced Immunity  
Vitamin C with Dihydroquercetin  
Zinc Lozenges with Vitamin C

## INFLAMMATORY REACTIONS

Arthro-Immune Joint Support  
ArthroMax™ with Theaflavins  
Boswella  
Boswella™ Topical Cream  
Bromelain (Specially-coated)  
DHA 240  
Emulsified Norwegian Cod Liver Oil  
Emulsified Super Twin EPA/DHA  
Fast Acting Joint Formula  
Ginger Force  
Krill Oil  
5-LOX Inhibitor w/AprèsFlex™  
Mega EPA/DHA  
Mega GLA with Sesame Lignans  
MSM  
Natural Relief 1222™ Cream  
Omega-3 Chewables  
Serraflazyme  
SODzyme™ with GliSODin® and Wolfberry  
Super Omega-3 EPA/DHA with Sesame  
Lignans & Olive Fruit Extract  
Tart Cherry  
Udo's Choice Oil  
Zyflamend Easy

## LIVER HEALTH

Branch Chain Amino Acids  
N-Acetyl Cysteine  
Liver Force  
Liver Efficiency Formula  
Certified European Milk Thistle  
Hepatopro  
SAME  
Silymarin

## MINERALS

Biosil  
Bone Restore  
Bone Strength Formula w/KoAct®  
Bone-Up™  
Boron Capsules

Calcium Citrate with D3  
Chromium Ultra  
Copper  
Dr. Strum's Intensive Bone Formula  
Floradix® Iron & Herbs  
Floravital® Iron & Herbs  
Iodoral  
Iron Protein Plus  
Magnesium  
Magnesium Citrate  
Mineral Formula for Men  
Mineral Formula for Women  
Only Trace Minerals  
Optimized Chromium w/Crominex® 3+  
OptiZinc  
Sea-Iodine™  
Selenium  
Se-Methyl L-Selenocysteine  
Strontium  
Vanadyl Sulfate  
Zinc/Vitamin C Lozenges

## MISCELLANEOUS

Blender  
Blood Pressure Monitor Arm Cuff Medium  
Cell Sensor Gauss Meter™  
CR Way Edition Advanced Dietary Software  
Empty Gelatin Capsules  
LifeShield® Breathe™  
The Capsule Filler Machine

## MITOCHONDRIAL SUPPORT

Acetyl-L-Carnitine  
Acetyl-L-Carnitine-Arginate  
Mitochondrial Basics w/BioPQQ™  
Mitochondrial Energy Optimizer w/BioPQQ™  
Optimized Carnitine with GlycoCarn®  
Super Absorbable CoQ10™ with d-Limonene  
Super Alpha Lipoic Acid with Biotin  
Super R-Lipoic Acid  
Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™

## MOOD RELIEF

Adrenal Energy Formula™  
Bioactive Milk Peptides  
Holy Basil  
LifeShield® Cordyceps  
L-Theanine  
5 HTP  
Enhanced Natural Sleep® w/ Melatonin  
Enhanced Natural Sleep® w/o Melatonin  
Natural Stress Relief  
Optimized Tryptopure® Plus  
Stabilium® 200  
SAME  
St. John's Wort Extract  
Tryptopure® L-Tryptophan

## MOUTH CARE

Advanced Oral Hygiene  
Mist Oral III™ with CoQ10  
Mouthwash w/Pomegranate  
Toothpaste

## MULTIVITAMIN

Children's Formula Life Extension Mix  
Comprehensive Nutrient Pack  
Life Extension Booster  
Life Extension Mix™ Capsules  
Life Extension Mix™ Powder  
Life Extension Mix™ Tablets  
Life Extension Mix™ w/o Copper Capsules  
Life Extension Mix™ w/o Copper Tablets  
Life Extension Mix™ w/Extra Niacin  
Life Extension Mix™ w/Extra Niacin w/o Copper  
Life Extension Mix™ w/Stevia Powder  
Life Extension Mix™ w/Stevia w/o Copper Powder  
Life Extension One-Per-Day  
Life Extension Two-Per-Day  
Super Booster Softgels w/Advanced K2 Complex

## PET CARE

Cat Mix  
Dog Mix

## PROSTATE & URINARY HEALTH

BetterWOMAN®  
Optimized Cran-Max® with UTIRose™  
5-LOXIN®  
(Water-Soluble) Pumpkin Seed Extract

Super Saw Palmetto with Beta-Sitosterol  
Super Saw Palmetto/Nettle Root Formula  
w/Beta-Sitosterol  
Ultra Natural Prostate Formula

## SKIN CARE

Advanced Under Eye Serum with Stem Cells  
Amber Self MicroDermAbrasion  
Anti-Aging Mask  
Anti-Glycation Serum  
Antioxidant Rejuvenating Foot Cream  
Antioxidant Rejuvenating Foot Scrub  
Antioxidant Rejuvenating Hand Cream  
Antioxidant Rejuvenating Hand Scrub  
Anti-Redness & Blemish Lotions  
Corrective Clearing Mask  
DermaWhey  
DNA Repair Cream  
Dual-Action MicroDermAbrasion  
Elastin Collagen Body Firming Lotion  
Essential Plant Lipids Reparative Serum  
Face Master® Platinum  
Face Rejuvenating Antioxidant Cream  
Enhanced FernBlock® with Sendara™  
Fine Line-Less  
Hair Suppress Formula  
Healing Formula All-in-One Cream  
Healing Mask  
Hyaluronic Facial Moisturizer  
Hydrating Anti-oxidant Face Mist  
Hydroderm®  
Lavilin Underarm Deodorant  
Lifting & Tightening Complex  
LifeShield® Reishi  
Melatonin Cream  
Mild Facial Cleanser  
Neck Rejuvenating Antioxidant Cream  
Peel Off Cleansing Mask  
Pigment Correcting Cream  
(Ultra) Rejuvenex®  
Rejuvenex® Body Lotion  
Rejuvenex® Factor  
Rejuvenex® Factor Firming Serum  
Rejuvenating Serum  
Resveratrol Anti-Oxidant Serum  
Skin Lightening Serum  
Skin Restoring Ceramides w/Lipowheat™  
Skin Stem Cell Serum  
Stem Cell Cream w/Alpine Rose  
Supercritical Omega 7™  
Sun Protection Spray  
Total Sun Protection Cream  
Ultra Rejuvenex®  
Ultra RejuveNight® w/ Progesterone  
Ultra RejuveNight® w/o Progesterone  
Ultra Lip Plumper  
Ultra Wrinkle Relaxer  
Under Eye Refining Serum  
Under Eye Rescue Cream  
Vitamin C Serum  
Vitamin D Lotion  
Vitamin K Healing Cream

## SOY

Natural Estrogen w/Pomegranate  
Soy Protein Concentrate  
Super Absorbable Soy Isoflavones  
Ultra Soy Extract

## SPECIAL PURPOSE FORMULA

Anti-Alcohol Antioxidants w/HepatoProtection Complex  
Benfotiamine w/Thiamine  
Breast Health Formula  
Butterbur Extract w/Standardized Rosmarinic Acid  
Chlorella  
Chlorophyllin w/Zinc  
Cleanse Smart  
Green Coffee Extract CoffeeGenic™ (also w/Glucose control)  
Coriolus Super Strength  
CR Mimetic Longevity Formula  
Cinsulin® w/InSea2® and Crominex® 3+  
EDTA  
European Leg Solution Diosmin 95  
Fem Dophilus  
Femmenessence MacaPause®  
Flush & Be Fit

GlucoFit™  
Hearos™ Ear Plugs  
Ideal Bowel Support 299  
Maitake SX-Fraction™  
Migra-eeze™  
Natural Female Support  
Organic Total Body Cleanse  
Pecta-Sol®  
Potassium Iodide  
PQQ Caps with BioPQQ™  
PteroPure™  
Prelox® Natural Sex for Men®  
Pyridoxal 5' - Phosphate  
Rosmarinic Acid Extract  
Ultra Natural Prostate w/AprèsFlex™ and Standardized Lignans

## SPORTS PERFORMANCE

Creatine Capsules  
Creatine Powder  
Enhanced Life Extension Protein  
DMG (N, N-dimethylglycine)  
Inosine  
L-Glutamine Capsules  
L-Glutamine Powder

## VITAMINS

Ascorbic Acid Powder  
Ascorbyl Palmitate Capsules  
B1  
B2  
B12  
Beta-Carotene  
Biotin Capsules  
Biotin Powder  
Buffered Vitamin C Powder  
Complete B Complex  
Folic Acid + B12  
Gamma E Tocopherol w/Sesame Lignans  
Gamma E Tocopherol/Tocotrienols  
Inositol Capsules  
Inositol Powder  
Mega Lycopene Extract  
Methylcobalamin  
MK-7  
No-Flush Niacin  
Optimized Folate  
PABA Capsules  
Super Ascorbate C Capsules  
Super Ascorbate C Powder  
Super K w/Advanced K2 Complex  
Supercritical Omega 7™  
Tocotrienols w/Sesame Lignans  
Vitamin A Nutrisorb  
Vitamin B3 (Niacin) Capsules  
Vitamin B6  
Vitamin B12 Tablets  
Vitamin C  
Vitamin D  
Vitamin D3  
Vitamin D3 w/Sea-Iodine™  
Vitamins D and K w/Sea-Iodine™  
Vitamin E  
Vitamin K1

## WEIGHT MANAGEMENT

Alli® Refill Pack  
Advanced Anti-Adipocyte Formula w/AdipoStat & Integra Lean®  
Anti-Adipocyte Formula w/AdipoStat  
Calorie Control Weight Management Formula w/CoffeeGenic™ Green Coffee Extract  
7-Keto DHEA  
DHEA® Complete  
Fucoxanthin Slim™  
HCA  
Integra-Lean® Irvingia  
LuraLean® Caps Special Propolmannan Particle Size  
Optimized Irvingia w/Phase 3™ Calorie Control Complex  
Optimized Saffron w/Satiereal®  
Natural Appetite Control  
Natural Glucose Absorption Control  
Stevia Liquid Extract  
Super CLA Blend w/Guarana and Sesame Lignans  
Super CLA Blend w/Sesame Lignans  
Udo's Choice Wholesome Fast Food Blend  
WellBetX PGX® Soluble Fiber Blend

# Buyers Club Order Form

To order call: 1.954.766.8433 or 1.800.544.4440

No.		Retail Each	Member Each	Qty	Total
<b>A</b>					
00449	<b>ACETYL-L-CARNITINE</b> - 500 mg, 100 caps	\$34.00	\$25.50		
	Buy 4 bottles, price each	30.00	22.50		
00788	<b>ACETYL-L-CARNITINE ARGINATE</b> - 100 caps	59.00	44.25		
	Buy 4 bottles, price each	50.99	38.24		
01628	<b>ADRENAL ENERGY FORMULA™</b> - 60 veg. caps	24.00	18.00		
	Buy 4 bottles, price each	22.00	16.50		
01308	<b>ADVANCED LIPID CONTROL</b> - 60 veg. caps	30.00	22.50		
	Buy 4 bottles, price each	27.00	20.25		
01521	<b>ADVANCED ORAL HYGIENE</b> - 60 veg. mint lozenges	20.00	15.00		
	Buy 4 bottles, price each	18.00	13.50		
00681	<b>AHCC</b> - 500 mg, 30 caps	59.98	44.99		
	Buy 4 bottles, price each	53.33	40.00		
*46925	<b>ALLI® REFILL PACK</b> - 120 caps	69.95	58.00		
01375	<b>ALOE VERA FORCE™</b> - 60 veg. caps	34.95	26.21		
00457	<b>ALPHA-LIPOIC ACID W/BIOTIN (SUPER)</b> - 250 mg, 60 caps	37.00	27.75		
	Buy 4 bottles, price each	32.00	24.00		
01440	<b>ANTI-ALCOHOL ANTIOXIDANTS w/HEPATOPRO</b> - 100 caps	26.00	19.50		
	Buy 4 bottles, price each	23.00	17.25		
01510	<b>ANTI-ADIPOCYTE FORMULA w/ADIPOSTAT</b> - 60 veg. caps	35.00	26.25		
	Buy 4 bottles, price each	32.00	24.00		
01509	<b>ANTI-ADIPOCYTE FORMULA w/ADIPOSTAT &amp; INTEGRA LEAN® (ADVANCED)</b> - 60 veg. caps	39.00	29.25		
	Buy 4 bottles, price each	36.00	27.00		
00105	<b>APPLE PECTIN POWDER</b> - 227 grams	14.75	11.06		
	Buy 4 bottles, price each	13.75	10.31		
01625	<b>APPLEWISE POLYPHENOL EXTRACT</b> - 600 mg, 30 veg. caps	21.00	15.75		
	Buy 4 bottles, price each	19.00	14.25		
01039	<b>ARGININE/ORNITHINE</b> - 500/250, 100 caps	16.00	12.00		
	Buy 4 bottles, price each	14.50	10.88		
00038	<b>ARGININE/ORNITHINE POWDER</b> - 150 grams	22.95	17.21		
	Buy 4 bottles, price each	19.00	14.25		
01624	<b>(L)-ARGININE CAPS</b> - 700 mg, 200 veg. caps	26.50	19.88		
	Buy 4 bottles, price each	23.25	17.44		
01025	<b>(L)-ARGININE FREE-FORM POWDER</b> - 100 grams	15.98	11.99		
	Buy 4 bottles, price each	14.31	10.73		
01617	<b>ARTHRONAX™ w/THEAFLAVINS &amp; APRESFLEX™</b> - 120 veg. caps	44.00	33.00		
	Buy 4 bottles, price each	40.00	30.00		
01618	<b>ARTHRONAX™ ADVANCED w/UC-II® &amp; APRESFLEX™</b> - 60 caps	36.00	27.00		
	Buy 4 bottles, price each	32.00	24.00		
01404	<b>ARTHRO-IMMUNE JOINT SUPPORT</b> - 60 veg. caps	32.00	24.00		
	Buy 4 bottles, price each	28.00	21.00		
00919	<b>ARTICHOKE LEAF EXTRACT</b> - 500 mg, 180 veg. caps	28.00	21.00		
	Buy 4 bottles, price each	25.38	19.04		
00080	<b>ASCORBIC ACID POWDER</b> - 454 grams	38.00	28.50		
	Buy 4 bottles, price each	34.93	26.20		
00082	<b>ASCORBYL PALMITATE</b> - 500 mg, 100 caps	22.50	16.88		
	Buy 4 bottles, price each	20.00	15.00		

**SUB-TOTAL OF COLUMN 1**

No.		Retail Each	Member Each	Qty	Total
00888	<b>ASHWAGANDHA EXTRACT (OPTIMIZED)</b> - 60 veg. caps	\$10.00	\$7.50		
	Buy 4 bottles, price each	9.00	6.75		
01066	<b>ASPIRIN</b> - 81 mg, 300 enteric coated tablets	6.00	4.50		
	Buy 4 bottles, price each	5.33	4.00		
00708	<b>ASTAXANTHIN</b> - 2 mg, 30 softgels	10.25	7.69		
<b>B</b>					
00920	<b>BENFOTIAMINE W/ THIAMINE</b> - 100 mg, 120 veg. caps	\$19.95	\$14.96		
	Buy 4 bottles, price each	18.60	13.95		
00925	<b>BENFOTIAMINE (MEGA)</b> - 250 mg, 120 veg. caps	30.00	22.50		
	Buy 4 bottles, price each	27.00	20.25		
01206	<b>BERRY COMPLETE</b> - 30 veg. caps	21.00	15.75		
	Buy 4 bottles, price each	18.67	14.00		
01406	<b>BERRY COMPLETE w/RZD™ ACAI (ENHANCED)</b> - 60 veg. caps	29.00	21.75		
	Buy 4 bottles, price each	26.00	19.50		
00664	<b>BETA-CAROTENE</b> - 25,000 IU, 100 softgels	11.25	8.44		
	Buy 4 bottles, price each	10.13	7.60		
00653	<b>BETTERWOMAN®</b> - 40 caps	40.00	30.00		
	Buy 4 bottles, price each	38.00	28.50		
01622	<b>BIFIDO GI BALANCE</b> - 60 caps	20.00	15.00		
	Buy 4 bottles, price each	18.00	13.50		
01073	<b>BILBERRY EXTRACT</b> - 100 mg, 100 veg. caps	28.00	21.00		
	Buy 4 bottles, price each	25.00	18.75		
01512	<b>BIOACTIVE MILK PEPTIDES</b> - 30 caps	18.00	13.50		
	Buy 4 bottles, price each	16.00	12.00		
*01006	<b>BIOSIL™</b> - 5 mg, 30 veg. caps	18.95	15.16		
*01007	<b>BIOSIL™</b> - 1 fl oz	29.99	23.99		
00102	<b>BIOTIN</b> - 600 mcg, 100 caps	7.50	5.63		
	Buy 4 bottles, price each	6.50	4.88		
00145	<b>BIOTIN POWDER</b> - 30 grams	12.50	9.38		
	Buy 4 bottles, price each	11.00	8.25		
01008	<b>BLAST™</b> - 600 grams of powder	26.95	20.21		
51526	<b>BLENDER</b> - 28 oz bottle	8.99	6.74		
70000	<b>BLOOD PRESSURE MONITOR</b> - ARM CUFF (medium)	99.95	64.97		
70004	<b>BLOOD PRESSURE MONITOR</b> - WRIST (travel size)	69.95	52.46		
01214	<b>BLUEBERRY EXTRACT</b> - 60 veg. caps	22.50	16.88		
	Buy 4 bottles, price each	20.00	15.00		
01438	<b>BLUEBERRY EXTRACT w/POMEGRANATE</b> - 60 veg. caps	30.00	22.50		
	Buy 4 bottles, price each	27.00	20.25		
01506	<b>BONE FORMULA (DR. STRUM'S INTENSIVE)</b> - 300 veg. caps	56.00	42.00		
	Buy 4 bottles, price each	50.00	37.50		
01611	<b>BONE RESTORE</b> - 150 caps	22.50	16.88		
	Buy 4 bottles, price each	19.50	14.63		
01211	<b>BONE STRENGTH FORMULA w/KOACT®</b> - 120 caps	42.00	31.50		
	Buy 4 bottles, price each	38.00	28.50		
00313	<b>BONE-UP®</b> - 240 caps	24.95	18.71		
	Buy 4 bottles, price each	22.50	16.88		
01379	<b>BOOSTER</b> - 60 softgels	48.00	36.00		
	Buy 4 bottles, price each	44.00	33.00		
01680	<b>BOOSTER w/ADVANCED K2 COMPLEX (SUPER)</b> - 60 softgels	42.00	31.50		
	Buy 4 bottles, price each	38.00	28.50		
00621	<b>BORON</b> - 3 mg, 100 caps	5.95	4.46		
	Buy 4 bottles, price each	5.25	3.94		
00202	<b>BOSWELLA</b> - 100 caps	38.00	28.50		
	Buy 4 bottles, price each	30.00	22.50		

**SUB-TOTAL OF COLUMN 2**

No.		Retail Each	Member Each	Qty	Total
00258	<b>BOSWELLA TOPICAL CREAM</b> - 4 oz Buy 4 jars, price each	\$15.00 13.00	\$11.25 9.75		
01253	<b>BRANCHED CHAIN AMINO ACIDS</b> - 90 veg. caps Buy 4 bottles, price each	19.50 17.00	14.63 12.75		
00999	<b>BREAST HEALTH FORMULA</b> - 60 veg. caps Buy 4 bottles, price each	34.00 30.00	25.50 22.50		
00893	<b>BRITE EYES III</b> - 2 vials, 5 ml each Buy 4 boxes, price each	34.00 32.00	25.50 24.00		
00136	<b>BROMELAIN POWDER</b> - 100 grams Buy 4 bottles, price each	21.00 18.75	15.75 14.06		
01203	<b>BROMELAIN (SPECIALLY-COATED)</b> - 500 mg, 60 enteric coated tablets Buy 4 bottles, price each	21.00 19.00	15.75 14.25		
00884	<b>BUTTERBUR EXT. w/STANDARDIZED ROSMARINIC ACID</b> - 60 softgels Buy 4 bottles, price each	44.00 39.60	33.00 29.70		
<b>C</b>					
01015	<b>CALCIUM CITRATE w/VITAMIN D</b> - 300 caps Buy 4 bottles, price each	\$24.00 21.25	\$18.00 15.94		
00535	<b>CALCIUM D-GLUCARATE</b> - 200 mg, 60 caps Buy 4 bottles, price each	18.00 15.00	13.50 11.25		
01693	<b>CALORIE CONTROL WEIGHT MANAGEMENT FORMULA w/COFFEENIC™ GREEN COFFEE EXTRACT BLUEBERRY FLAVOR</b> - 414 grams powder Buy 4 jars, price each Buy 8 jars, price each	60.00 54.00 50.00	45.00 40.50 37.50		
01694	<b>CALORIE CONTROL WEIGHT MANAGEMENT FORMULA w/COFFEENIC™ GREEN COFFEE EXTRACT BLUEBERRY FLAVOR</b> - 60 individual packs Buy 4 boxes, price each Buy 8 boxes, price each	64.00 60.00 56.00	48.00 45.00 42.00		
00118	<b>CAPSULE FILLER MACHINE FOR "00" CAPSULES</b> Buy 4 machines, price each	18.95 18.25	14.21 13.69		
00613	<b>CAPSULE FILLER MACHINE FOR "0" CAPSULES</b> Buy 4 machines, price each	18.95 18.25	14.21 13.69		
00916	<b>CARNITINE w/GLYCOCARN® (OPTIMIZED)</b> - 60 veg. caps Buy 4 bottles, price each	36.00 32.00	27.00 24.00		
01041	<b>L-CARNITINE</b> - 500 mg, 30 caps Buy 4 bottles, price each	15.00 13.20	11.25 9.90		
01258	<b>CARNOSOOTHE w/PICROPROTECT™</b> - 60 veg. caps Buy 4 bottles, price each	29.95 27.00	22.46 20.25		
01287	<b>CARNOSINE (SUPER)</b> - 500 mg, 90 caps Buy 4 bottles, price each	66.00 60.00	49.50 45.00		
01003	<b>CAT MIX</b> - 100 grams powder Buy 4 jars, price each	15.00 12.00	11.25 9.00		
00390	<b>CDP CHOLINE CAPS</b> - 250 mg, 60 caps Buy 4 bottles, price each	36.00 34.00	27.00 25.50		
00998	<b>CELL SENSOR-EMF DETECTION METER</b>	39.95	29.95		
01370	<b>CHILDREN'S FORMULA LIFE EXTENSION MIX™</b> - 100 chewable tablets Buy 4 bottles, price each	18.00 16.00	13.50 12.00		
00550	<b>CHLORELLA</b> - 500 mg, 200 tablets Buy 4 bottles, price each	23.50 21.00	17.63 15.75		
01571	<b>CHLOROPHYLLIN w/ZINC</b> - 100 mg, 100 veg. caps Buy 4 bottles, price each	24.00 20.00	18.00 15.00		
01359	<b>CHO-LESS™</b> - 90 capsules	32.50	24.38		
00541	<b>CHOLINE CHLORIDE</b> - 16 oz liquid Buy 4 bottles, price each	14.95 14.00	11.21 10.50		
00364	<b>CHONDROITIN SULFATE CONCENTRATE</b> - 400 mg, 60 tablets Buy 4 bottles, price each	19.95 18.00	14.96 13.50		

**SUB-TOTAL OF COLUMN 3**

No.		Retail Each	Member Each	Qty	Total
01477	<b>CHROMIUM ULTRA</b> - 100 veg. caps Buy 4 bottles, price each	\$24.00 21.00	\$18.00 15.75		
01504	<b>CHROMIUM W/CROMINEX® 3+ (OPTIMIZED)</b> - 500 mcg, 60 veg. caps Buy 4 bottles, price each	9.00 8.00	6.75 6.00		
00551	<b>CILANTRO HERBAL EXTRACT</b> - 1 oz Buy 4 bottles, price each	12.00 11.00	9.00 8.25		
01503	<b>CINSULIN® W/INSEA® AND CROMINEX® 3+</b> - 90 veg. caps Buy 4 bottles, price each	38.00 34.00	28.50 25.50		
00069	<b>CITRUS BIOFLAVONOID</b> - 100 caps Buy 4 bottles, price each	16.79 15.56	12.59 11.67		
00818	<b>CLA BLEND W/SESAME LIGNANS (SUPER)</b> - 1000 mg, 120 softgels Buy 4 bottles, price each Buy 10 bottles, price each	36.00 33.00 26.33	27.00 24.75 19.75		
00819	<b>CLA BLEND w/GUARANA &amp; SESAME (SUPER)</b> -1000 mg, 120 softgels Buy 4 bottles, price each	42.00 38.33	31.50 28.75		
01078	<b>CLEANSE SMART</b> - 60 caps	31.99	23.99		
00050	<b>COD LIVER OIL (EMULSIFIED)</b> - 12 fl oz (355 ml) Buy 4 bottles, price each	14.58 12.27	10.94 9.20		
00293	<b>COD LIVER OIL (EMULSIFIED)</b> - 100 softgels (Emulsified) Buy 4 bottles, price each	10.97 10.34	8.23 7.76		
00922	<b>COGNITEX® w/PREGNENOLONE &amp; NEUROPROTECTION COMPLEX</b> - 90 softgels Buy 4 bottles, price each Buy 12 bottles, price each	74.00 66.60 64.00	55.50 49.95 48.00		
00921	<b>COGNITEX® w/o PREGNENOLONE w/NEUROPROTECTION COMPLEX</b> - 90 softgels Buy 4 bottles, price each Buy 12 bottles, price each	72.00 64.00 62.00	54.00 48.00 46.50		
01421	<b>COGNITEX® BASICS</b> - 60 softgels Buy 4 bottles, price each Buy 12 bottles, price each	38.00 35.00 32.00	28.50 26.25 24.00		
00110	<b>COMPLETE B-COMPLEX</b> - 180 caps Buy 4 bottles, price each	21.50 18.00	16.13 13.50		
01595	<b>COMPREHENSIVE NUTRIENT PACK</b> - 30-day supply Buy 4 bottles, price each	189.00 171.00	141.75 128.25		
00119	<b>COPPER CAPSULES</b> - 2 mg, 100 caps Buy 4 bottles, price each	9.91 8.96	7.43 6.72		
00949	<b>COQ10™ w/ #LIMONENE (SUPER ABSORBABLE)</b> - 50 mg, 60 softgels Buy 4 bottles, price each Buy 10 bottles, price each	25.00 22.00 20.00	18.75 16.50 15.00		
00950	<b>COQ10™ w/ #LIMONENE (SUPER ABSORBABLE)</b> - 100 mg, 100 softgels Buy 4 bottles, price each Buy 10 bottles, price each	66.00 60.00 56.00	49.50 45.00 42.00		
01226	<b>COQ10 (SUPER UBIQUINOL)</b> - 100 mg, 60 softgels Buy 4 bottles, price each Buy 10 bottles, price each	56.00 52.00 48.00	42.00 39.00 36.00		
01426	<b>COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (SUPER UBIQUINOL)</b> -100 mg, 60 softgels Buy 4 bottles, price each Buy 10 bottles, price each	62.00 56.00 52.00	46.50 42.00 39.00		
01425	<b>COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (SUPER UBIQUINOL)</b> -50 mg, 100 softgels Buy 4 bottles, price each Buy 10 bottles, price each	58.00 53.00 50.00	43.50 39.75 37.50		
01427	<b>COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (SUPER UBIQUINOL)</b> -50 mg, 30 softgels Buy 4 bottles, price each	20.00 18.00	15.00 13.50		
01431	<b>COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (SUPER UBIQUINOL)</b> -200 mg, 30 softgels Buy 4 bottles, price each Buy 10 bottles, price each	62.00 56.00 52.00	46.50 42.00 39.00		

**SUB-TOTAL OF COLUMN 4**

# Buyers Club Order Form

To order call: 1.954.766.8433 or 1.800.544.4440

No.		Retail Each	Member Each	Qty	Total
<b>C</b> CONTINUED					
01397	<b>CORDYCEPS CS-4™</b> - 60 veg. caps	\$29.99	\$22.49		
01053	<b>CORIOLUS SUPER STRENGTH</b> - 600 mg, 150 veg. caps	99.95	74.96		
80140	<b>COSMESIS ADVANCED UNDER EYE SERUM w/STEM CELLS</b> - 33 oz	49.00	36.75		
	Buy 2 bottles, price each	42.00	31.50		
80139	<b>COSMESIS AMBER SELF MICRODERMABRASION</b> - 2 oz	49.00	36.75		
	Buy 2 jars, price each	42.00	31.50		
80118	<b>COSMESIS ANTI-AGING MASK</b> - 2 oz	72.00	54.00		
	Buy 2 bottles, price each	63.36	47.52		
80134	<b>COSMESIS ANTI-GLYCATION SERUM</b> - 1 oz	33.00	24.75		
	<b>W/BLUEBERRY &amp; POMEGRANATE EXTRACTS</b>				
	Buy 2 bottles, price each	31.35	23.51		
80133	<b>COSMESIS ANTIOXIDANT FACIAL MIST</b> - 2 oz	32.00	24.00		
	Buy 2 bottles, price each	30.40	22.80		
80127	<b>COSMESIS ANTIOXIDANT REJUVENATING FOOT CREAM</b> - 2 oz	45.00	33.75		
	Buy 2 jars, price each	42.80	32.10		
80128	<b>COSMESIS ANTIOXIDANT REJUVENATING FOOT SCRUB</b> - 2 oz	59.00	44.25		
	Buy 2 jars, price each	51.92	38.94		
80117	<b>COSMESIS ANTIOXIDANT REJUVENATING HAND CREAM</b> - 2 oz	64.00	48.00		
	Buy 2 jars, price each	57.49	43.12		
80121	<b>COSMESIS ANTIOXIDANT REJUVENATING HAND SCRUB</b> - 2 oz	58.00	43.50		
	Buy 2 jars, price each	51.04	38.28		
80105	<b>COSMESIS ANTI-REDNESS &amp; BLEMISH LOTION</b> - 1 oz	74.50	55.88		
	Buy 2 bottles, price each	65.56	49.17		
80120	<b>COSMESIS CORRECTIVE CLEARING MASK</b> - 2 oz	64.50	48.38		
	Buy 2 jars, price each	56.76	42.57		
80141	<b>COSMESIS DNA REPAIR CREAM</b> - 1 oz jar	49.00	36.75		
	Buy 2 jars, price each	42.00	31.50		
80108	<b>COSMESIS ESSENTIAL PLANT LIPIDS REPARATIVE SERUM</b> - 1 oz	74.95	56.21		
	Buy 2 bottles, price each	65.95	49.46		
80123	<b>COSMESIS FACE REJUVENATING ANTIOXIDANT CREAM</b> - 2 oz	69.50	52.13		
	Buy 2 jars, price each	61.16	45.87		
80107	<b>COSMESIS FINE LINE-LESS</b> - 1 oz	74.50	55.88		
	Buy 2 bottles, price each	65.56	49.17		
80131	<b>COSMESIS HAIR SUPPRESS FORMULA</b> - 4 oz	59.00	44.25		
	Buy 2 bottles, price each	51.92	38.94		
80137	<b>COSMESIS HEALING FORMULA ALL-IN-ONE CREAM</b> - 1 oz	53.00	39.75		
	Buy 2 jars, price each	45.43	34.07		
80115	<b>COSMESIS HEALING MASK</b> - 2 oz	64.50	48.38		
	Buy 2 bottles, price each	56.76	42.57		
80102	<b>COSMESIS HEALING VITAMIN K CREAM</b> - 1 oz	79.50	59.63		
	Buy 2 bottles, price each	69.96	52.47		
80109	<b>COSMESIS HYALURONIC FACIAL MOISTURIZER</b> - 1 oz	58.00	43.50		
	Buy 2 bottles, price each	51.04	38.28		
80110	<b>COSMESIS HYALURONIC OIL-FREE FACIAL MOISTURIZER</b> - 1 oz	58.00	43.50		
	Buy 2 bottles, price each	51.04	38.28		
80138	<b>COSMESIS HYDRATING ANTI-OXIDANT FACE MIST</b> - 4 oz	39.95	29.96		
	Buy 2 bottles, price each	38.00	28.50		
80103	<b>COSMESIS LIFTING &amp; TIGHTENING COMPLEX</b> - 1 oz	74.50	55.88		
	Buy 2 tubes, price each	65.56	49.17		
80135	<b>COSMESIS MELATONIN CREAM</b> - 1 oz	33.00	24.75		
	Buy 2 jars, price each	27.10	20.33		
80114	<b>COSMESIS MILD FACIAL CLEANSER</b> - 8 oz	59.00	44.25		
	Buy 2 bottles, price each	51.92	38.94		

**SUB-TOTAL OF COLUMN 5**

No.		Retail Each	Member Each	Qty	Total
80122	<b>COSMESIS NECK REJUVENATING ANTIOXIDANT CREAM</b> - 2 oz	\$64.00	\$48.00		
	Buy 2 jars, price each	56.32	42.24		
80111	<b>COSMESIS PIGMENT CORRECTING CREAM</b> - 1/2 oz	74.00	55.50		
	Buy 2 bottles, price each	65.12	48.84		
80106	<b>COSMESIS REJUVENATING SERUM</b> - 1 oz	74.50	55.88		
	Buy 2 bottles, price each	65.56	49.17		
80142	<b>COSMESIS RESVERATROL ANTI-OXIDANT SERUM</b> - 1 oz	46.00	34.50		
	Buy 2 bottles, price each	39.00	29.25		
80112	<b>COSMESIS SKIN LIGHTENING SERUM</b> - 1/2 oz	85.00	63.75		
	Buy 2 bottles, price each	74.80	56.10		
80130	<b>COSMESIS SKIN STEM CELL SERUM</b> - 1 oz	74.00	55.50		
	Buy 2 bottles, price each	69.00	51.75		
80143	<b>COSMESIS STEM CELL CREAM W/ALPINE ROSE</b> - 1 oz jar	66.00	49.50		
	Buy 2 jars, price each	58.00	43.50		
80116	<b>COSMESIS ULTRA LIP PLUMPER</b> - 1/3 oz	64.00	48.00		
	Buy 2 bottles, price each	56.32	42.24		
80101	<b>COSMESIS ULTRA WRINKLE RELAXER</b> - 1 oz	89.95	67.46		
	Buy 2 bottles, price each	79.76	59.82		
80113	<b>COSMESIS UNDER EYE REFINING SERUM</b> - 1/2 oz	74.50	55.88		
	Buy 2 bottles, price each	65.56	49.17		
80104	<b>COSMESIS UNDER EYE RESCUE CREAM</b> - 1/2 oz	74.50	55.88		
	Buy 2 bottles, price each	65.56	49.17		
80129	<b>COSMESIS VITAMIN C SERUM</b> - 1 oz	85.00	63.75		
	Buy 2 bottles, price each	74.80	56.10		
80136	<b>COSMESIS VITAMIN D LOTION</b> - 4 oz	36.00	27.00		
	Buy 2 bottles, price each	33.66	25.25		
00862	<b>CRAN-MAX®</b> - 500 mg, 60 veg. caps	17.50	13.13		
	Buy 4 bottles, price each	15.00	11.25		
01424	<b>CRAN-MAX® with UTIROSE™ (OPTIMIZED)</b> - 60 veg. caps	18.00	13.50		
	Buy 4 bottles, price each	16.00	12.00		
00609	<b>CREATINE CAPSULES</b> - 120 caps	10.95	8.21		
	Buy 4 bottles, price each	9.25	6.94		
00610	<b>CREATINE POWDER</b> - 500 grams	29.00	21.75		
	Buy 4 bottles, price each	26.63	19.97		
01096	<b>CREATINE WHEY GLUTAMINE POWDER</b> - 1000 grams (vanilla)	50.00	37.50		
	Buy 4 bottles, price each	48.00	36.00		
01519	<b>CRUCIFEROUS VEGETABLE SOUP</b> - 32 oz. pouch	11.95	8.96		
	Buy 6 pouches, price each	11.25	8.44		
01520	<b>(ASIAN) CRUCIFEROUS VEGETABLE SOUP</b> - 32 oz. pouch	11.95	8.96		
	Buy 6 pouches, price each	11.25	8.44		
01429	<b>CR MIMETIC LONGEVITY FORMULA</b> - 60 veg. caps	39.00	29.25		
	Buy 4 bottles, price each	36.00	27.00		
*33840	<b>CRWAY GREAT GLUCOSE CONTROL CD</b>	98.00	82.00		
**CRWAY	<b>CR WAY OPTIMAL HEALTH PROGRAM SOFTWARE</b>	195.00	195.00		
00407	<b>CURCUMIN® (SUPER BIO)</b> - 400 mg, 60 veg. caps	38.00	28.50		
	Buy 4 bottles, price each	35.00	26.25		
<b>D</b>					
01376	<b>DAILY GINGER®</b> - 90 veg. caps	\$21.95	\$16.46		
01313	<b>DERMAWHEY</b> - 400 mg, 60 caps	65.00	48.75		
	Buy 4 bottles, price each	59.00	44.25		
00995	<b>DHA 240</b> - 240 mg, 60 softgels	19.00	14.25		
	Buy 4 bottles, price each	17.00	12.75		
00658	<b>7-KETO® DHEA METABOLITE</b> - 25 mg, 100 caps	28.00	21.00		
	Buy 4 bottles, price each	24.00	18.00		
01479	<b>7-KETO® DHEA METABOLITE</b> - 100 mg, 60 veg. caps	40.00	30.00		
	Buy 4 bottles, price each	36.00	27.00		

**SUB-TOTAL OF COLUMN 6**

No.		Retail Each	Member Each	Qty	Total
00607	<b>DHEA</b> - 25 mg, 100 tablets (dissolve in mouth) Buy 4 bottles, price each	\$14.00 11.75	\$10.50 8.81		
01478	<b>DHEA COMPLETE</b> - 60 veg. caps Buy 4 bottles, price each	48.00 43.20	36.00 32.40		
00335	<b>DHEA</b> - 25 mg, 100 caps Buy 4 bottles, price each	15.00 12.50	11.25 9.38		
00454	<b>DHEA</b> - 15 mg, 100 caps Buy 4 bottles, price each	12.00 10.00	9.00 7.50		
00882	<b>DHEA</b> - 50 mg, 60 caps Buy 4 bottles, price each	16.00 14.00	12.00 10.50		
00883	<b>DHEA</b> - 100 mg, 60 caps Buy 4 bottles, price each	22.50 19.00	16.88 14.25		
01358	<b>DIGEST RC</b> - 30 tablets Buy 4 boxes, price each	19.95 17.00	14.96 12.75		
01272	<b>DIGESTIVE ENZYMES (ENHANCED SUPER)</b> - 100 veg. caps Buy 4 bottles, price each	18.95 16.00	14.21 12.00		
00034	<b>D,L-PHENYLALANINE CAPSULES</b> - 500 mg, 100 caps Buy 4 bottles, price each	18.75 16.00	14.06 12.00		
00257	<b>DMAE BITARTRATE</b> - 150 mg, 200 caps Buy 4 bottles, price each	14.00 10.50	10.50 7.88		
00059	<b>DMG</b> - 125 mg, 60 tablets Buy 4 boxes, price each	22.80 21.00	17.10 15.75		
01570	<b>DNA PROTECTION FORMULA</b> - 60 veg. caps Buy 4 bottles, price each	34.00 32.00	25.50 24.00		
00544	<b>DOG MIX</b> - 100 grams powder Buy 4 jars, price each	19.50 16.00	14.63 12.00		
00321	<b>DR. PROCTOR'S ADVANCED HAIR FORMULA</b> - 2 oz Buy 4 bottles, price each	39.95 32.00	29.96 24.00		
00320	<b>DR. PROCTOR'S HAIR FORMULA SHAMPOO</b> - 8 oz Buy 4 bottles, price each	24.95 22.00	18.71 16.50		
00899	<b>DUAL-ACTION MICRODERMABRASION ADV. EXFOLIATE</b> - 2.4 oz Buy 4 jars, price each	39.95 38.95	29.96 29.21		
00240	<b>DUAL-C</b> - 90 caps Buy 4 bottles, price each	12.00 10.50	9.00 7.88		
<b>E</b>					
00388	<b>ECHINACEA EXTRACT</b> - 250 mg, 60 caps Buy 4 bottles, price each	\$14.35 12.50	\$10.76 9.38		
01395	<b>EDTA</b> - 500 mg, 60 caps	9.98	7.49		
01321	<b>ELASTIN &amp; COLLAGEN BODY FIRING LOTION</b> - 8 fl. oz.	10.00	7.50		
01498	<b>ENDOTHELIAL DEFENSE™ w/FULL-SPECTRUM POMEGRANATE™</b> - 60 softgels Buy 4 bottles, price each	56.00 52.00	42.00 39.00		
00997	<b>ENDOTHELIAL DEFENSE™ w/GLISODIN®</b> - 60 veg. caps Buy 4 bottles, price each	52.00 46.00	39.00 34.50		
00625	<b>EPA/DHA (MEGA)</b> - 120 softgels Buy 4 bottles, price each	19.95 18.00	14.96 13.50		
01042	<b>EUROPEAN LEG SOLUTION DIOSMIN 95</b> - 600 mg, 30 veg. tabs Buy 4 bottles, price each	20.00 18.00	15.00 13.50		
01514	<b>EYE PRESSURE SUPPORT w/MIRTOGENOL®</b> - 30 veg. caps Buy 4 bottles, price each	38.00 34.00	28.50 25.50		
<b>F</b>					
01054	<b>FACE MASTER® PLATINUM</b>	\$199.00	\$199.00		
00965	<b>FAST-ACTING JOINT FORMULA</b> - 30 caps Buy 4 bottles, price each	39.00 36.00	29.25 27.00		
20053	<b>FEM DOPHILUS®</b> - 30 caps	25.95	19.46		
20055	<b>FEM DOPHILUS®</b> - 60 caps	39.95	29.96		
01064	<b>FEMMESENCE MACAPAUSE®</b> - 120 veg. caps	34.99	26.24		

**SUB-TOTAL OF COLUMN 7**

No.		Retail Each	Member Each	Qty	Total
01311	<b>FERNBLOCK® w/SENDARA™ (ENHANCED)</b> - 30 veg. caps Buy 4 bottles, price each	\$39.00 35.00	\$29.25 26.25		
00229	<b>FIBER FOOD CAPS</b> - 200 caps Buy 4 bottles, price each Buy 10 bottles, price each	15.00 12.50 11.90	11.25 9.38 8.93		
00718	<b>FIBRINOGEN RESIST™</b> - 30 veg. caps Buy 4 bottles, price each	49.00 44.00	36.75 33.00		
00873	<b>FLAXSEED POWDER (HI-LIGNAN® NUTRI-FLAX®)</b> - 16 oz powder	9.95	7.46		
01384	<b>FLORADIX® IRON &amp; HERBS</b> - 17 fl. oz	43.99	35.19		
01382	<b>FLORAVITAL® IRON &amp; HERBS</b> - 17 fl. oz	43.99	35.19		
01212	<b>FLUSH + BE FIT</b> - 2- week cleanse for women	29.99	22.49		
01439	<b>FOLATE (OPTIMIZED) (L-METHYL-FOLATE)</b> 1000 mcg - 100 veg. caps Buy 4 bottles, price each	28.00 25.00	21.00 18.75		
00347	<b>FOLIC ACID + B12 CAPSULES</b> - 200 caps Buy 4 bottles, price each	10.50 9.50	7.88 7.13		
00300	<b>FORSKOLIN</b> - 10 mg, 60 caps Buy 4 bottles, price each	15.00 12.50	11.25 9.38		
01513	<b>FUCOIDAN w/MARITECH® 926 (OPTIMIZED)</b> - 60 veg. caps Buy 4 bottles, price each	36.00 33.00	27.00 24.75		
00993	<b>FUCOXANTHIN-SLIM™</b> - 90 softgels Buy 4 bottles, price each	44.00 39.00	33.00 29.25		

**G**

00127	<b>GABA POWDER</b> - 100 grams Buy 4 bottles, price each	\$23.75 22.50	\$17.81 16.88		
00559	<b>GAMMA E TOCOPHEROL/TOCOTRIENOLS</b> - 60 softgels Buy 4 bottles, price each	42.00 37.00	31.50 27.75		
00759	<b>GAMMA E TOCOPHEROL W/SESAME LIGNANS</b> - 60 softgels Buy 4 bottles, price each	32.00 29.00	24.00 21.75		
01394	<b>(OPTIMIZED) GARLIC</b> - 200 veg. caps Buy 4 bottles, price each	24.95 21.00	18.71 15.75		
01378	<b>GARLIC FORCE™</b> - 30 softgels	34.95	26.21		
00117	<b>GELATIN CAPSULES</b> - 1000 empty caps size "00" Buy 4 bags, price each	19.00 18.00	14.25 13.50		
01301	<b>GH PITUITARY SUPPORT DAY FORMULA</b> - 120 vegetarian tabs Buy 4 bottles, price each	48.00 44.00	36.00 33.00		
01302	<b>GH PITUITARY SUPPORT NIGHT FORMULA</b> - 120 veg. caps Buy 4 bottles, price each	25.00 22.50	18.75 16.88		
01228	<b>GINGER FORCE</b> - 60 softgels	29.95	22.46		
00778	<b>GINKGO BILOBA CERTIFIED EXTRACT™</b> - 120 mg, 365 caps Buy 2 bottles, price each	46.00 43.50	34.50 32.63		
00504	<b>GINKGO EXTRACT (SUPER)</b> - 120 mg, 100 caps Buy 4 bottles, price each	29.00 26.50	21.75 19.88		
01032	<b>(PANAX RED) GINSENG</b> - 60 veg. caps	29.99	22.49		
00756	<b>GLA WITH SESAME LIGNANS (MEGA)</b> - 60 softgels Buy 4 bottles, price each	19.50 18.00	14.63 13.50		
00345	<b>(L) GLUTAMINE CAPSULES</b> - 500 mg, 100 caps Buy 4 bottles, price each	14.95 13.50	11.21 10.13		
00141	<b>(L)-GLUTAMINE POWDER</b> - 100 grams Buy 4 bottles, price each	19.00 16.88	14.25 12.66		
00522	<b>GLUCOSAMINE/CHONDROITIN CAPSULES</b> - 100 caps Buy 4 bottles, price each	38.00 32.00	28.50 24.00		
00512	<b>GLUCOFIT™</b> - 100 softgels Buy 4 bottles, price each	28.00 25.00	21.00 18.75		
00113	<b>GLUTATHIONE, CYSTEINE &amp; C</b> - 750 mg, 100 caps Buy 4 bottles, price each	18.00 16.00	13.50 12.00		
00314	<b>L-GLUTATHIONE (MEGA)</b> - 250 mg, 60 caps Buy 4 bottles, price each	39.64 35.68	29.73 26.76		

**SUB-TOTAL OF COLUMN 8**

# Buyers Club Order Form

To order call: 1.954.766.8433 or 1.800.544.4440

No.		Retail Each	Member Each	Qty	Total
<b>G CONTINUED</b>					
00795	<b>GLYCINE</b> - 1000 mg, 100 caps Buy 4 bottles, price each	\$12.00 10.80	\$9.00 8.10		
00128	<b>GLYCINE POWDER</b> - 300 grams Buy 4 bottles, price each	18.00 16.00	13.50 12.00		
01091	<b>GRAPE EXTRACT w/RESVERATROL (WHOLE)</b> - 60 veg. caps Buy 4 bottles, price each	36.00 34.00	27.00 25.50		
01411	<b>GRAPE SEED EXTRACT w/RESVERATROL &amp; PTEROSTILBENE</b> - 100 mg, 60 veg. caps Buy 4 bottles, price each	36.00 34.00	27.00 25.50		
01604	<b>GREEN COFFEE EXTRACT COFFEEGENIC™</b> - 200 mg, 90 veg. caps Buy 4 bottles, price each	25.00 22.00	18.75 16.50		
01620	<b>GREEN COFFEE EXTRACT COFFEEGENIC™</b> - 400 mg, 90 veg. caps Buy 4 bottles, price each	38.00 34.00	28.50 25.50		
01607	<b>GREEN COFFEE EXTRACT COFFEEGENIC™</b> - 90 veg. caps <b>w/GLUCOSE CONTROL COMPLEX</b> Buy 4 bottles, price each	58.00 52.00	43.50 39.00		
00953	<b>GREEN TEA EXTRACT (MEGA)</b> - lightly caffeinated - 100 veg. caps Buy 4 bottles, price each	28.00 26.50	21.00 19.88		
00954	<b>GREEN TEA EXTRACT (MEGA)</b> - decaffeinated - 100 veg. caps Buy 4 bottles, price each	28.00 26.50	21.00 19.88		
01606	<b>GREEN TEA w/COFFEEGENIC™ GREEN COFFEE EXTRACT (MEGA)</b> 120 veg. caps, low caffeine Buy 4 bottles, price each	32.00 28.00	24.00 21.00		
01605	<b>GREEN TEA w/COFFEEGENIC™ GREEN COFFEE EXTRACT (MEGA)</b> 120 veg. caps Buy 4 bottles, price each	32.00 28.00	24.00 21.00		
<b>H</b>					
01074	<b>5 HTP</b> - 100 mg, 60 caps	\$27.95	\$20.96		
00010	<b>HAIR CONDITIONER</b> - 16 oz Buy 4 bottles, price each	6.00 4.50	4.50 3.38		
00230	<b>HCA</b> - 90 caps Buy 4 bottles, price each	18.00 15.50	13.50 11.63		
01629	<b>HEAROS™ EAR PLUGS</b> - 1 pack - regular size	14.00	10.50		
01635	<b>HEAROS™ EAR PLUGS</b> - 1 pack - small size	14.00	10.50		
01393	<b>HEPATOPRO</b> - 900 mg, 60 softgels Buy 4 bottles, price each	50.00 46.00	37.50 34.50		
01433	<b>HOLY BASIL</b> - 60 softgel caps	34.95	26.21		
01434	<b>HOLY BASIL</b> - 120 softgel caps	54.95	41.21		
01435	<b>HOMOCYSTEINE RESIST</b> - 100 caps Buy 4 bottles, price each	24.00 21.60	18.00 16.20		
01527	<b>HUPERZINE A</b> - 200 mcg, 60 veg caps Buy 4 bottles, price each	34.00 30.00	25.50 22.50		
00661	<b>HYDRODERM®</b> - 1 oz Buy 2 bottles, price each	79.95 65.33	59.96 49.00		
<b>I</b>					
*01060	<b>i26® HYPERIMMUNE EGG</b> - 140 grams powder	\$49.99	\$42.00		
*01319	<b>i26® HYPERIMMUNE EGG</b> - 135 capsules	31.99	25.59		
*01318	<b>i26® HYPERIMMUNE EGG CHEWABLES</b> - (vanilla) 45 tablets	31.99	25.59		
01065	<b>IDEAL BOWEL SUPPORT 299V</b> - 30 veg. caps	21.95	16.46		
00955	<b>IMMUNE PROTECT w/PARACTIN®</b> - 30 veg. caps Buy 4 bottles, price each	29.50 26.55	22.13 19.91		
01049	<b>INNERPOWER™</b> - 555 grams powder	42.00	31.50		
00155	<b>INOSINE</b> - 500 mg, 60 caps Buy 4 bottles, price each	22.95 21.00	17.21 15.75		
00410	<b>INOSITOL CAPSULES</b> - 1000 mg, 360 caps Buy 4 bottles, price each	48.00 43.75	36.00 32.81		

**SUB-TOTAL OF COLUMN 9**

No.		Retail Each	Member Each	Qty	Total
00108	<b>INOSITOL POWDER</b> - 100 grams Buy 4 bottles, price each	\$18.00 16.88	\$13.50 12.66		
01292	<b>INTEGRA-LEAN® IRVINGIA</b> - 150 mg, 60 veg. caps Buy 4 bottles, price each	28.00 24.00	21.00 18.00		
01002	<b>IODORAL®</b> - 180 tabs	50.00	37.50		
00563	<b>IRON PROTEIN PLUS</b> - 300 mg, 100 caps Buy 4 bottles, price each	24.00 22.00	18.00 16.50		
01492	<b>IRVINGIA w/PHASE 3™</b> - 120 veg. caps <b>CALORIE CONTROL COMPLEX (OPTIMIZED)</b> Buy 4 bottles, price each	56.00 48.00	42.00 36.00		
<b>J, K</b>					
00056	<b>JARRO-DOPHILUS EPS™</b> - 60 veg. caps	\$21.95	\$16.46		
01387	<b>JARRO-DOPHILUS ORAL PROBIOTIC GUM</b> - Pom-Berry flavor, 8 pieces	4.95	3.71		
01388	<b>JARRO-DOPHILUS ORAL PROBIOTIC LOZENGES</b> - Pom-Berry flavor, 8 pieces	4.95	3.71		
01224	<b>K w/ADVANCED K2 COMPLEX (SUPER)</b> - 90 softgels Buy 4 bottles, price each	26.00 23.00	19.50 17.25		
01600	<b>KRILL HEALTHY JOINT FORMULA</b> - 30 softgels Buy 4 bottles, price each	32.00 29.00	24.00 21.75		
01050	<b>(NKO) KRILL OIL</b> - 60 softgels	33.95	25.46		
00316	<b>KYOLIC® GARLIC FORMULA 102</b> - 200 caps Buy 4 bottles, price each	23.95 20.50	17.96 15.38		
00214	<b>KYOLIC® GARLIC FORMULA 105</b> - 200 caps Buy 4 bottles, price each	22.95 18.25	17.21 13.69		
00789	<b>KYOLIC® RESERVE</b> - 600 mg, 120 caps Buy 4 bottles, price each	24.75 21.45	18.56 16.09		
<b>L</b>					
00513	<b>LACTOFERRIN (APOLACTOFERRIN) CAPS</b> - 60 caps Buy 4 bottles, price each	\$40.00 36.00	\$30.00 27.00		
00017	<b>LAVILIN UNDERARM DEODORANT</b> - 12.5 grams cream Buy 4 jars, price each	16.99 15.75	12.74 11.81		
00020	<b>LECITHIN</b> - 16 oz. granules Buy 4 jars, price each	15.00 12.50	11.25 9.38		
01655	<b>LIFE EXTENSION MIX™</b> - 315 tablets Buy 4 bottles, price each Buy 10 bottles, price each	98.00 86.00 69.50	73.50 64.50 52.13		
01657	<b>LIFE EXTENSION MIX™ w/EXTRA NIACIN</b> - 315 tablets Buy 4 bottles, price each Buy 10 bottles, price each	98.00 86.00 69.50	73.50 64.50 52.13		
01654	<b>LIFE EXTENSION MIX™</b> - 490 caps Buy 4 bottles, price each Buy 10 bottles, price each	110.00 98.00 85.00	82.50 73.50 63.75		
01656	<b>LIFE EXTENSION MIX™ POWDER</b> - 14.81 oz Buy 4 bottles, price each Buy 10 bottles, price each	98.00 86.00 72.00	73.50 64.50 54.00		
01665	<b>LIFE EXTENSION MIX™</b> - 315 tablets w/o copper Buy 4 bottles, price each Buy 10 bottles, price each	98.00 86.00 69.50	73.50 64.50 52.13		
01667	<b>LIFE EXTENSION MIX™ w/EXTRA NIACIN</b> 315 tablets w/o copper Buy 4 bottles, price each Buy 10 bottles, price each	98.00 86.00 69.50	73.50 64.50 52.13		
01664	<b>LIFE EXTENSION MIX™</b> - 490 caps w/o copper Buy 4 bottles, price each Buy 10 bottles, price each	110.00 98.00 85.00	82.50 73.50 63.75		

**SUB-TOTAL OF COLUMN 10**

No.		Retail Each	Member Each	Qty	Total
01666	<b>LIFE EXTENSION MIX™ POWDER</b> - 14.81 oz w/o copper	\$98.00	\$73.50		
	Buy 4 bottles, price each	86.00	64.50		
	Buy 10 bottles, price each	72.00	54.00		
00263	<b>LIFE FLORA™</b> - 300 mg, 120 caps	20.50	15.38		
	Buy 4 bottles, price each	18.75	14.06		
01377	<b>LIFESHIELD® BREATHE™</b> - 60 veg. caps	34.95	26.21		
01349	<b>LIFESHIELD® CORDYCEPS</b> - 60 veg. caps	34.95	26.21		
01314	<b>LIFESHIELD® IMMUNITY™</b> - 60 veg. caps	39.95	29.96		
01339	<b>LIFESHIELD® REISHI™</b> - 60 veg. caps	34.95	26.21		
01608	<b>LIVER EFFICIENCY FORMULA</b> - 30 veg. caps	18.00	13.50		
	Buy 4 bottles, price each	16.00	12.00		
01227	<b>LIVER FORCE</b> - 30 veg. caps	34.95	26.21		
01639	<b>5-LOX INHIBITOR W/APRESFLEX™</b> - 100 mg, 60 veg. caps	22.00	16.50		
	Buy 4 bottles, price each	20.00	15.00		
01013	<b>L-LYSINE</b> - 620 mg, 100 caps	9.00	6.75		
	Buy 4 bottles, price each	8.00	6.00		
00129	<b>L-LYSINE POWDER</b> - 300 grams	16.00	12.00		
	Buy 4 bottles, price each	13.75	10.31		
01470	<b>LURALEAN® CAPS SPECIAL PROPOLMANNAN PARTICLE SIZE</b> - 120 veg. caps	28.00	21.00		
	Buy 4 bottles, price each	25.00	18.75		
00455	<b>LYCOPENE EXTRACT (MEGA)</b> - 15 mg, 90 softgels	35.00	26.25		
	Buy 4 bottles, price each	30.00	22.50		
<b>M</b>					
01369	<b>MAGNESIUM CAPS</b> - 500 mg, 100 veg. caps	\$10.00	\$7.50		
	Buy 4 bottles, price each	9.00	6.75		
00502	<b>MAGNESIUM CITRATE</b> - 160 mg, 100 caps	9.00	6.75		
	Buy 4 bottles, price each	7.50	5.63		
00704	<b>MAITAKE™ SX-FRACTION</b> - 90 veg. tablets	49.95	37.46		
00547	<b>MELATONIN</b> - 300 mcg, 100 caps	5.75	4.31		
	Buy 4 bottles, price each	5.00	3.75		
01083	<b>MELATONIN</b> - 500 mcg, 200 veg. caps	18.00	13.50		
	Buy 4 bottles, price each	16.00	12.00		
00329	<b>MELATONIN</b> - 1 mg, 60 caps	5.00	3.75		
	Buy 4 bottles, price each	4.63	3.47		
00330	<b>MELATONIN</b> - 3 mg, 60 caps	8.00	6.00		
	Buy 4 bottles, price each	6.88	5.16		
01086	<b>MELATONIN</b> - 3 mg, 60 time-release veg. caps	10.50	7.88		
	Buy 4 bottles, price each	9.38	7.04		
00331	<b>MELATONIN</b> - 10 mg, 60 caps	28.00	21.00		
	Buy 4 bottles, price each	24.00	18.00		
00332	<b>MELATONIN</b> - 3 mg, 60 lozenges	8.00	6.00		
	Buy 4 bottles, price each	6.88	5.16		
01087	<b>MELATONIN TIME RELEASE</b> - 300 mcg, 100 veg. caps	6.25	4.69		
	Buy 4 bottles, price each	5.63	4.22		
01088	<b>MELATONIN TIME RELEASE</b> - 750 mcg, 60 veg. caps	5.75	4.31		
	Buy 4 bottles, price each	5.00	3.75		
01009	<b>MEMORY UPGRADE™</b> - 600 grams powder	26.95	20.21		
01536	<b>METHYLCOBALAMIN</b> - 1 mg, 60 lozenges (vanilla)	9.95	7.46		
	Buy 4 bottles, price each	8.00	6.00		

**SUB-TOTAL OF COLUMN 11**

No.		Retail Each	Member Each	Qty	Total
01537	<b>METHYLCOBALAMIN</b> - 5 mg, 60 lozenges (vanilla)	\$32.00	\$24.00		
	Buy 4 bottles, price each	25.00	18.75		
	Buy 10 bottles, price each	23.00	17.25		
00709	<b>MIGRA-EEZE™ (BUTTERBUR)</b> - 60 softgels	29.50	22.13		
	Buy 4 bottles, price each	26.33	19.75		
01522	<b>MILK THISTLE (CERTIFIED EUROPEAN)</b> - 750 mg, 60 veg. caps	34.00	25.50		
	Buy 4 bottles, price each	30.00	22.50		
01517	<b>MILK THISTLE (CERTIFIED EUROPEAN)</b> - 120 veg. caps	52.00	39.00		
	Buy 4 bottles, price each	48.00	36.00		
00623	<b>MINERAL FORMULA FOR MEN</b> - 100 caps	15.00	11.25		
	Buy 4 bottles, price each	12.50	9.38		
	Buy 12 bottles, price each	10.83	8.13		
00624	<b>MINERAL FORMULA FOR WOMEN</b> - 100 caps	15.00	11.25		
	Buy 4 bottles, price each	12.50	9.38		
	Buy 12 bottles, price each	10.83	8.13		
01315	<b>MIRAFORTE w/STANDARDIZED LIGNANS (SUPER)</b> - 120 caps	62.00	46.50		
	Buy 4 bottles, price each	56.00	42.00		
01569	<b>MITOCHONDRIAL BASICS w/BIOPQQ™</b> - 30 caps	52.00	39.00		
	Buy 4 bottles, price each	46.00	34.50		
01568	<b>MITOCHONDRIAL ENERGY OPTIMIZER w/BIOPQQ™</b> - 120 caps	94.00	70.50		
	Buy 4 bottles, price each	84.00	63.00		
00803	<b>MIST ORAL III w/COQ10</b> - 2 fl oz	28.00	21.00		
	Buy 4 bottles, price each	25.33	19.00		
00065	<b>MK-7</b> - 90 mcg, 60 softgels	28.00	21.00		
	Buy 4 bottles, price each	25.00	18.75		
01279	<b>MOUTHWASH w/POMEGRANATE</b> - 16 oz	18.50	13.88		
	Buy 4 bottles, price each	17.00	12.75		
00451	<b>MSM (METHYLSULFONYLMETHANE)</b> - 1000 mg, 100 caps	14.00	10.50		
	Buy 4 bottles, price each	11.95	8.96		
<b>N</b>					
00215	<b>N-ACETYL-L-CYSTEINE</b> - 600 mg, 60 caps	\$14.00	\$10.50		
	Buy 4 bottles, price each	13.50	10.13		
00066	<b>NATOKINASE</b> - 60 softgels	24.98	18.74		
00891	<b>NATURAL APPETITE CONTROL</b> - 90 softgels	28.00	21.00		
	Buy 4 bottles, price each	25.20	18.90		
00984	<b>NATURAL BP MANAGEMENT</b> - 60 tablets	42.00	31.50		
	Buy 4 bottles, price each	37.80	28.35		
00913	<b>NATURAL ESOPHAGUARD</b> - 10 softgels	19.95	14.96		
	Buy 2 boxes, price each	19.00	14.25		
00712	<b>NATURAL ESTROGEN w/POMEGRANATE EXTRACT</b> - 60 caplets	38.00	28.50		
	Buy 4 bottles, price each	33.00	24.75		
01221	<b>NATURAL FEMALE SUPPORT</b> - 30 veg. caps	28.00	21.00		
	Buy 4 bottles, price each	24.00	18.00		
01471	<b>NATURAL GLUCOSE ABSORPTION CONTROL</b> - 60 veg. caps	39.00	29.25		
	Buy 4 bottles, price each	36.00	27.00		
00698	<b>NATURAL RELIEF 1222™</b> - 2 oz	28.00	21.00		
	Buy 4 tubes, price each	25.00	18.75		
01627	<b>NATURAL SEX FOR WOMEN® (ADVANCED)</b> - 60 veg. caps	42.00	31.50		
	Buy 4 bottles, price each	38.00	28.50		
01626	<b>NATURAL SEX FOR WOMEN® 50+ (ADVANCED)</b> - 90 veg. caps	59.00	44.25		
	Buy 4 bottles, price each	53.00	39.75		

**SUB-TOTAL OF COLUMN 12**

# Buyers Club Order Form

To order call: 1.954.766.8433 or 1.800.544.4440

No.		Retail Each	Member Each	Qty	Total
<b>N CONTINUED</b>					
01084	<b>NATURAL SLEEP®</b> - 3 mg, 60 veg. caps Buy 4 bottles, price each	\$12.99 10.00	\$9.74 7.50		
01507	<b>NATURAL SLEEP® (ENHANCED) W/ MELATONIN</b> - 30 caps Buy 4 bottles, price each	22.00 20.00	16.50 15.00		
01511	<b>NATURAL SLEEP® (ENHANCED) W/O MELATONIN</b> - 30 caps Buy 4 bottles, price each	20.00 18.00	15.00 13.50		
01085	<b>NATURAL SLEEP MELATONIN®</b> - 5 mg, 60 veg. caps Buy 4 bottles, price each	18.00 16.00	13.50 12.00		
00987	<b>NATURAL STRESS RELIEF</b> - 30 veg. caps Buy 4 bottles, price each	28.00 24.00	21.00 18.00		
01603	<b>NEURO-MAG™ MAGNESIUM L-THREONATE</b> - 90 veg. caps Buy 4 bottles, price each	40.00 36.00	30.00 27.00		
01602	<b>NEURO-MAG™ L-THREONATE W/CALCIUM &amp; VITAMIN D</b> 205 grams - Lemon flavor Buy 4 bottles, price each	40.00 36.00	30.00 27.00		
00373	<b>NO-FLUSH NIACIN</b> - 800 mg, 100 caps Buy 4 bottles, price each	19.00 17.00	14.25 12.75		
01035	<b>NUTRIM</b> - 225 grams powder	25.95	19.46		
<b>O</b>					
01623	<b>OLIVE LEAF VASCULAR SUPPORT</b> - 500 mg, 60 veg. caps Buy 4 bottles, price each	\$22.00 20.00	\$16.50 15.00		
01518	<b>OMEGA-3 CHEWABLES</b> - 60 softchews, 120 mg EPA/DHA Buy 4 pouches, price each	24.00 22.00	18.00 16.50		
01483	<b>OMEGA 3 EPA/DHA w/SESAME LIGNANS &amp; OLIVE FRUIT EXTRACT (SUPER)</b> - 60 softgels Buy 4 bottles, price each	18.00 16.00	13.50 12.00		
01482	<b>OMEGA 3 EPA/DHA w/SESAME LIGNANS &amp; OLIVE FRUIT EXTRACT (SUPER)</b> - 120 softgels Buy 4 bottles, price each Buy 10 bottles, price each	32.00 28.00 24.90	24.00 21.00 18.68		
01484	<b>OMEGA 3 EPA/DHA W/SESAME LIGNANS &amp; OLIVE FRUIT EXTRACT (SUPER)</b> - 120 enteric coated softgels Buy 4 bottles, price each Buy 10 bottles, price each	34.00 31.00 28.00	25.50 23.25 21.00		
01619	<b>OMEGA 3 EPA/DHA W/SESAME LIGNANS &amp; OLIVE FRUIT EXTRACT (SUPER) (SMALL SOFTGEL)</b> - 240 softgels Buy 4 bottles, price each Buy 10 bottles, price each	32.00 28.00 24.90	24.00 21.00 18.68		
01601	<b>ONE-PER-DAY</b> - 60 veg. tablets Buy 4 bottles, price each	22.00 20.00	16.50 15.00		
01328	<b>ONLY TRACE MINERALS</b> - 90 caps Buy 4 bottles, price each	15.00 12.50	11.25 9.38		
00915	<b>OPTIZINC®</b> - 30 mg, 90 veg. caps Buy 4 bottles, price each	5.95 5.00	4.46 3.75		
01348	<b>OREGANOFORCE™</b> - 30 softgels	34.95	26.21		
01070	<b>ORGANIC TOTAL BODY CLEANSE™</b> - 14-day supply	34.99	26.24		
<b>P</b>					
00107	<b>PABA CAPS</b> - 500 mg, 100 caps Buy 4 bottles, price each	\$15.42 13.59	\$11.57 10.19		
00073	<b>PANCREATIN</b> - 500 mg, 50 caps Buy 4 bottles, price each	13.22 12.12	9.92 9.09		
01323	<b>PEAK ATP® WITH GLYCOCARN®</b> - 60 veg. caps Buy 4 bottles, price each	59.00 56.00	44.25 42.00		

**SUB-TOTAL OF COLUMN 13**

No.		Retail Each	Member Each	Qty	Total
00342	<b>PECTA SOL-C® MODIFIED CITRUS PECTIN</b> - 454 grams powder Buy 4 jars, price each	\$99.95 95.70	\$74.96 71.78		
01080	<b>PECTA SOL-C® MODIFIED CITRUS PECTIN</b> - 270 veg. caps	69.95	52.46		
00673	<b>PGX™ SOLUBLE FIBER BLEND (WELLBETX®)</b> -180 caps	34.95	26.21		
00865	<b>PHARMAGABA™</b> - 60 chewable tablets Buy 4 bottles, price each	29.95 27.00	22.46 20.25		
00368	<b>PHOSPHATIDYLSERINE CAPS</b> - 100 mg, 100 caps Buy 4 bottles, price each	54.00 48.00	40.50 36.00		
00561	<b>POLICOSANOL</b> - 10 mg, 60 tablets Buy 6 bottles, price each	24.00 18.00	18.00 13.50		
01423	<b>POMEGRANATE™ (FULL-SPECTRUM)</b> - 30 softgels Buy 4 bottles, price each	24.00 21.00	18.00 15.75		
00956	<b>POMEGRANATE EXTRACT</b> - 30 veg. caps Buy 4 bottles, price each	19.50 17.55	14.63 13.16		
00957	<b>POMEGRANATE JUICE CONCENTRATE</b> - 16 oz. liquid Buy 4 bottles, price each	25.95 24.00	19.46 18.00		
00577	<b>POTASSIUM IODIDE</b> - 1 box, 14 tablets Buy 4 boxes, price each	6.95 5.25	5.21 3.94		
01500	<b>PQQ CAPS W/BIOPQQ™</b> - 10 mg, 30 veg. caps Buy 4 bottles, price each	24.00 22.00	18.00 16.50		
00302	<b>PREGNENOLONE</b> - 50 mg, 100 caps Buy 4 bottles, price each	24.00 19.00	18.00 14.25		
00700	<b>PREGNENOLONE</b> - 100 mg, 100 caps Buy 4 bottles, price each	26.00 22.50	19.50 16.88		
***01373	<b>PRELOX® NATURAL SEX FOR MEN®</b> - 60 tablets Buy 4 bottles, price each	52.00 48.00	39.00 36.00		
00571	<b>PRIMAL DEFENSE™</b> - 90 caplets Buy 4 bottles, price each	49.95 48.50	37.46 36.38		
01329	<b>PROBIOTIC ALL-FLORA®</b> - 60 veg. caps	25.95	19.46		
01326	<b>PROBIOTIC ANTI-AGING™</b> - 90 veg. caps	30.95	23.21		
01324	<b>PROBIOTIC CLEANSE™</b> - 90 veg. caps	29.95	22.46		
01322	<b>PROBIOTIC COLON™</b> - 90 veg. caps	30.95	23.21		
00525	<b>PROBOOST THYMIC PROTEIN A™</b> - 4 mcg, 30 packets	59.95	44.96		
00869	<b>PRO FEM CREAM</b> - 2 fl oz (Progesterone Cream) Buy 4 bottles, price each	32.00 29.00	24.00 21.75		
01020	<b>PROGREENS®</b> - 15 stick pack	22.50	16.88		
01072	<b>PRO-M INTERNAL DEODORIZER</b> - 500 mg, 100 veg. caps Buy 4 bottles, price each	28.00 25.00	21.00 18.75		
01695	<b>PROSTATE FORMULA W/APRESFLEX™ STAND. LIGNANS (ULTRA NAT)</b> 60 softgels Buy 4 bottles, price each Buy 12 bottles, price each	38.00 35.00 32.00	28.50 26.25 24.00		
01092	<b>PROTEIN - VANILLA</b> - (Enhanced Life Extension) -1000 grams powder Buy 4 bottles, price each	50.00 48.00	37.50 36.00		
01093	<b>PROTEIN - CHOCOLATE</b> - (Enhanced Life Extension) -1000 grams powder Buy 4 bottles, price each	50.00 48.00	37.50 36.00		
01094	<b>PROTEIN - NATURAL</b> - (Enhanced Life Extension) -1000 grams powder Buy 4 bottles, price each	50.00 48.00	37.50 36.00		
01095	<b>PROTEIN - BERRY</b> - (Enhanced Life Extension) -1000 grams powder Buy 4 bottles, price each	50.00 48.00	37.50 36.00		
01508	<b>PTEROPURE™</b> - 50 mg Pterostilbene 60 veg. caps Buy 4 bottles, price each	32.00 30.00	24.00 22.50		
01075	<b>PURE PLANT PROTEIN</b> - Natural Vanilla 450 grams powder Buy 4 jars, price each	36.00 33.00	27.00 24.75		
01209	<b>PUMPKIN SEED EXTRACT (WATER-SOLUBLE)</b> - 60 veg. caps Buy 4 bottles, price each	20.00 18.00	15.00 13.50		

**SUB-TOTAL OF COLUMN 14**

No.		Retail Each	Member Each	Qty	Total
01210	<b>PUMPKIN SEED EXT w/SOY ISOFLAVONES (WATER-SOLUBLE)</b> - 60 veg. caps Buy 4 bottles, price each	\$22.00 20.00	\$16.50 15.00		
01031	<b>PHYCOGENOL®</b> - 60 veg. caps	89.95	67.46		
01217	<b>PYRIDOXAL 5'-PHOSPHATE</b> - 100 mg, 60 veg. caps Buy 4 bottles, price each	22.00 19.80	16.50 14.85		
<b>Q, R</b>					
01309	<b>QUERCETIN (OPTIMIZED)</b> - 250 mg, 60 veg. caps Buy 4 bottles, price each	\$18.00 17.00	\$13.50 12.75		
01030	<b>RED YEAST RICE</b> (Bluebonnet)- 600 mg, 60 veg. caps	17.50	13.13		
00979	<b>RED YEAST RICE</b> (Nature's Plus)- 600 mg, 60 veg. caps	23.95	17.96		
00060	<b>RED YEAST RICE EXTENDED RELEASE</b> - 30 veg. tablets	21.50	16.13		
00605	<b>REGIMINT</b> - 60 enteric-coated caps Buy 4 bottles, price each	19.95 18.67	14.96 14.00		
01448	<b>REJUVENEX® BODY LOTION</b> - 6 oz Buy 4 tubes, price each Buy 8 tubes, price each	24.00 19.80 17.00	18.00 14.85 12.75		
00918	<b>REJUVENEX® FACTOR</b> - 1.7 oz airless pump Buy 2 bottles, price each Buy 4 bottles, price each Buy 8 bottles, price each	65.00 60.00 55.00 49.91	48.75 45.00 41.25 37.43		
01621	<b>REJUVENEX® FACTOR FIRMING SERUM</b> - 1.7 oz Buy 2 bottles, price each Buy 4 bottles, price each Buy 8 bottles, price each	65.00 60.00 55.00 49.91	48.75 45.00 41.25 37.43		
01220	<b>REJUVENEX® (ULTRA)</b> - 2 oz Buy 2 jars, price each Buy 4 jars, price each Buy 8 jars, price each	52.00 48.00 44.00 39.93	39.00 36.00 33.00 29.95		
00676	<b>REJUVENIGHT® (ULTRA)</b> - 2 oz Buy 4 jars, price each	39.95 36.00	29.96 27.00		
00706	<b>REJUVENIGHT® w/PROGESTERONE (ULTRA)</b> - 2 oz Buy 4 jars, price each	42.00 38.00	31.50 28.50		
01413	<b>RESVERATROL W/PTEROSTILBENE</b> - 20 mg, 60 veg. caps Buy 4 bottles, price each	24.00 22.00	18.00 16.50		
01410	<b>RESVERATROL W/PTEROSTILBENE</b> - 100 mg, 60 veg. caps Buy 4 bottles, price each	36.00 32.00	27.00 24.00		
01430	<b>RESVERATROL w/SYNERGISTIC GRAPE-BERRY ACTIVES (OPTIMIZED)</b> - 250 mg, 60 veg. caps Buy 4 bottles, price each	46.00 41.33	34.50 31.00		
00889	<b>RHODIOLA EXTRACT</b> - 250 mg, 60 veg. caps Buy 4 bottles, price each	11.75 10.58	8.81 7.94		
00972	<b>(D) RIBOSE POWDER</b> - 150 grams Buy 4 jars, price each	27.50 24.75	20.63 18.56		
01473	<b>(D) RIBOSE TABLETS</b> - 100 veg. tabs Buy 4 bottles, price each	32.00 28.00	24.00 21.00		
01609	<b>RICH REWARDS BREAKFAST GROUND COFFEE</b> - 12 oz. bag	13.00	9.75		
01610	<b>RICH REWARDS DECAFFEINATED ROAST GROUND COFFEE</b> - 12 oz. bag	14.00	10.50		
01208	<b>R-LIPOIC ACID (SUPER)</b> - 300 mg, 60 veg. caps Buy 4 bottles, price each	49.00 45.00	36.75 33.75		
00070	<b>RNA CAPSULES</b> - 500 mg, 100 caps Buy 4 bottles, price each	17.95 16.16	13.46 12.12		
00917	<b>ROSMARINIC ACID EXTRACT</b> - 60 veg. caps Buy 4 bottles, price each	59.00 53.00	44.25 39.75		

**SUB-TOTAL OF COLUMN 15**

No.		Retail Each	Member Each	Qty	Total
<b>S</b>					
01067	<b>SACCHAROMYCES BOULARDII + MOS</b> - 90 veg. caps	\$21.95	\$16.46		
01432	<b>SAFFRON w/SATIREAL (OPTIMIZED)</b> - 60 veg. caps Buy 4 bottles, price each	36.00 32.00	27.00 24.00		
*00573	<b>SAMBU® GUARD</b> - 175 ml	17.79	14.23		
00358	<b>SAME (S-ADENOSYL-METHIONINE)</b> - 200 mg, 20 enteric coated tablets Buy 8 boxes, price each	16.00 14.00	12.00 10.50		
00453	<b>SAME (S-ADENOSYL-METHIONINE)</b> - 200 mg, 50 enteric coated tablets Buy 4 bottles, price each	\$36.00 32.00	\$27.00 24.00		
00557	<b>SAME (S-ADENOSYL-METHIONINE)</b> - 400 mg, 20 enteric coated tablets Buy 6 boxes, price each	28.00 24.00	21.00 18.00		
01055	<b>SAME (S-ADENOSYL-METHIONINE)</b> - 400 mg, 50 enteric coated tablets Buy 4 bottles, price each	66.00 60.00	49.50 45.00		
01043	<b>SEA-IODINE™</b> - 1000 mcg, 60 veg. caps Buy 4 bottles, price each	8.00 7.20	6.00 5.40		
00046	<b>SELENIUM</b> - 2 oz dropper bottle Buy 4 bottles, price each	9.95 9.45	7.46 7.09		
00567	<b>SE-METHYL L-SELENOCYSTEINE</b> - 200 mcg, 100 caps Buy 4 bottles, price each	12.00 11.00	9.00 8.25		
00318	<b>SERRAFLAZYME</b> - 100 tablets Buy 4 bottles, price each	18.00 16.00	13.50 12.00		
00011	<b>SHAMPOO</b> - 16 fl oz Buy 4 bottles, price each	6.00 4.75	4.50 3.56		
00284	<b>SHARK LIVER OIL (NORWEGIAN)</b> - 1000 mg, 30 softgels Buy 4 bottles, price each	18.00 16.00	13.50 12.00		
00184	<b>SILYMARIN</b> - 100 mg, 50 caps Buy 4 bottles, price each	9.25 8.25	6.94 6.19		
01502	<b>SKIN RESTORING CERAMIDES w/LIPOWHEAT™</b> - 30 liquid caps Buy 4 bottles, price each	25.00 23.00	18.75 17.25		
00961	<b>SODZYME® w/GLISODIN® AND WOLFBERRY</b> - 90 veg. caps Buy 4 bottles, price each	28.00 24.00	21.00 18.00		
00657	<b>SOLARSHIELD SUNGLASSES</b> - 1 pair smoke color Buy 2 pairs, price each	12.99 11.50	9.74 8.63		
01097	<b>SOY EXTRACT (ULTRA)</b> - 150 veg. caps Buy 4 bottles, price each	87.00 78.00	65.25 58.50		
00286	<b>SOY PROTEIN CONCENTRATE</b> - 16 oz of powder Buy 4 jars, price each	12.00 10.63	9.00 7.97		
01099	<b>STABILIMUM® 200</b> - 30 caps	30.00	22.50		
00432	<b>STEVIA EXTRACT</b> - 100 packets, 1 gram each Buy 4 boxes, price each	9.95 9.00	7.46 6.75		
01396	<b>ST. JOHN'S WORT EXTRACT</b> - 300 mg, 60 veg. caps Buy 4 bottles, price each	10.98 10.00	8.24 7.50		
00327	<b>ST. JOHN'S WORT EXTRACT (PLANETARY)</b> - 600 mg, 60 tablets Buy 4 bottles, price each	16.75 13.85	12.56 10.39		
01476	<b>STRONTIUM</b> - 750 mg, 90 veg. caps Buy 4 bottles, price each	20.00 18.00	15.00 13.50		
00971	<b>SUN PROTECTION SPRAY W/BETA GLUCAN</b> - SPF30 - 6 oz Buy 4 bottles, price each	14.95 13.50	11.21 10.13		
00747	<b>SUNGLASSES (OVERXCAST POLARIZED)</b> - gray color, large Buy 2 pairs, price each	27.00 21.00	20.25 15.75		
00748	<b>SUNGLASSES (OVERXCAST POLARIZED)</b> - gray color, medium Buy 2 pairs, price each	27.00 21.00	20.25 15.75		
00758	<b>SUPER ABSORBABLE SOY ISOFLAVONES</b> - 60 caps Buy 4 bottles, price each	28.00 25.00	21.00 18.75		

**SUB-TOTAL OF COLUMN 16**

# Buyers Club Order Form

To order call: 1.954.766.8433 or 1.800.544.4440

No.		Retail Each	Member Each	Qty	Total
<b>S CONTINUED</b>					
01381	<b>SUPERCritical OMEGA 7™</b> - 60 softgels caps	\$56.95	\$42.71		
01408	<b>SUPER SAW PALMETTO/NETTLE ROOT W/BETA-SITOSTEROL</b> 60 softgels	28.00	21.00		
	Buy 4 bottles, price each	26.00	19.50		
	Buy 12 bottles, price each	24.00	18.00		
01407	<b>SUPER SAW PALMETTO W/BETA-SITOSTEROL</b> - 30 softgels	15.00	11.25		
	Buy 12 bottles, price each	12.00	9.00		
00578	<b>SUPER SELENIUM COMPLEX</b> - 200 mcg, 100 caps	12.00	9.00		
	Buy 4 bottles, price each	10.00	7.50		
	Buy 12 bottles, price each	9.00	6.75		
00674	<b>SYTRINOL™</b> - 60 softgels	32.00	24.00		
	Buy 4 bottles, price each	28.00	21.00		
<b>T</b>					
<b>TAL•SHI™ COSMETICS</b> • For information please call 1-800-544-4440 or visit www.LifeExtension.com					
01062	<b>TART CHERRY</b> - 600 mg, 60 caps	\$18.95	\$14.21		
00199	<b>TAURINE</b> - 1000 mg, 50 caps	8.95	6.71		
	Buy 4 bottles, price each	8.00	6.00		
00133	<b>TAURINE POWDER</b> - 300 grams	20.00	15.00		
	Buy 4 bottles, price each	16.88	12.66		
01304	<b>THEAFLAVIN STANDARDIZED EXTRACT</b> - 30 veg. caps	18.00	13.50		
	Buy 4 bottles, price each	16.00	12.00		
00555	<b>(L) THEANINE</b> - 100 mg, 60 caps	24.00	18.00		
	Buy 4 bottles, price each	20.50	15.38		
01038	<b>THERALAC PROBIOTICS</b> - 30 caps	44.95	33.71		
00224	<b>THYMIC IMMUNE FACTORS</b> - 100 caps	18.00	13.50		
	Buy 4 bottles, price each	14.00	10.50		
00668	<b>THYROID FORMULA™ (METABOLIC ADVANTAGE)</b> - 100 caps	21.95	16.46		
00349	<b>TMG POWDER</b> - 50 grams	14.00	10.50		
	Buy 4 bottles, price each	11.00	8.25		
00359	<b>TMG</b> - 500 mg, 180 tablets	18.00	13.50		
	Buy 4 bottles, price each	15.50	11.63		
00781	<b>TOCOTRIENOLS WITH SESAME LIGNANS</b> - 60 softgels	38.00	28.50		
	Buy 4 bottles, price each	36.00	27.00		
01400	<b>TOCOTRIENOLS (SUPER-ABSORBABLE)</b> - 60 softgels	30.00	22.50		
	Buy 4 bottles, price each	28.00	21.00		
01278	<b>TOOTHPASTE</b> - 4 oz (Mint)	9.50	7.13		
	Buy 4 tubes, price each	8.67	6.50		
01274	<b>TOTAL SUN PROTECTION CREAM W/BETA GLUCAN</b> - 4 oz	28.00	21.00		
	Buy 4 tubes, price each	25.20	18.90		
01468	<b>TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT</b> - 60 veg. caps	24.00	18.00		
	Buy 4 bottles, price each	22.00	16.50		
01469	<b>TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT W/RESVERATROL</b> - 60 veg. caps	32.00	24.00		
	Buy 4 bottles, price each	29.60	22.20		
01386	<b>TRUFIBER®</b> - 180 grams	29.95	22.46		
00866	<b>TRYPTOPURE® L-TRYPTOPHAN</b> - 500 mg, 90 veg. caps	38.00	28.50		
	Buy 4 bottles, price each	34.00	25.50		
01202	<b>TRYPTOPURE® PLUS (OPTIMIZED)</b> - 90 veg. caps	40.00	30.00		
	Buy 4 bottles, price each	36.00	27.00		
01616	<b>TWO-PER-DAY</b> - 60 veg. tablets	10.50	7.88		
	Buy 4 bottles, price each	9.50	7.13		
01615	<b>TWO-PER-DAY</b> - 120 veg. tablets	20.00	15.00		
	Buy 4 bottles, price each	18.00	13.50		
01614	<b>TWO-PER-DAY</b> - 120 caps	22.00	16.50		
	Buy 4 bottles, price each	20.00	15.00		

**SUB-TOTAL OF COLUMN 17**

No.		Retail Each	Member Each	Qty	Total
00326	<b>L-TYROSINE</b> - 500 mg, 100 tablets	\$12.98	\$9.74		
	Buy 4 bottles, price each	11.81	8.86		
<b>U</b>					
* 00310	<b>UDO'S OIL 3-6-9 BLEND</b> - 17 fl oz	\$27.79	\$22.23		
* 00311	<b>UDO'S 3-6-9 OIL BLEND</b> - 180 caps	34.79	27.83		
* 00322	<b>UDO'S CHOICE® WHOLESOME FAST FOOD</b> - 16 oz bottle	27.99	22.39		
01061	<b>ULTIMATE FLORA ADVANCED IMMUNITY PROBIOTICS</b> - 30 caps	29.99	22.49		
<b>V</b>					
00213	<b>VANADYL SULFATE</b> - 7.5 mg, 100 tablets	\$15.00	\$11.25		
	Buy 4 bottles, price each	12.50	9.38		
00252	<b>VELVET DEER ANTLER</b> - 250 mg, 30 caps	36.00	27.00		
	Buy 4 bottles, price each	34.00	25.50		
00408	<b>VENOTONE</b> - 60 caps	18.95	14.21		
	Buy 4 bottles, price each	16.00	12.00		
01327	<b>VINPOCETINE</b> - 10 mg, 100 tablets	18.00	13.50		
	Buy 4 bottles, price each	14.00	10.50		
01033	<b>VISION OPTIMIZER</b> - 90 caps	29.95	22.46		
01219	<b>VITAMIN A NUTRISORB</b> - 0.6 fl oz	27.00	20.25		
00091	<b>VITAMIN B1 CAPS</b> - 500 mg, 100 caps	18.73	14.05		
	Buy 4 bottles, price each	17.00	12.75		
00093	<b>VITAMIN B2 CAPS</b> - 100 mg, 100 caps	14.32	10.74		
	Buy 4 bottles, price each	13.00	9.75		
00096	<b>VITAMIN B3 NIACIN</b> - 1000 mg, 100 caps	12.75	9.56		
	Buy 4 bottles, price each	12.00	9.00		
00372	<b>VITAMIN B3 NIACIN</b> - 500 mg, 100 caps	7.65	5.74		
	Buy 4 bottles, price each	6.65	4.99		
00098	<b>VITAMIN B5</b> - 500 mg, 100 caps (Pantothenic Acid)	10.50	7.88		
	Buy 4 bottles, price each	9.38	7.04		
00556	<b>VITAMIN B6</b> - 250 mg, 100 caps	12.50	9.38		
	Buy 4 bottles, price each	11.00	8.25		
00361	<b>VITAMIN B12</b> - 500 mcg, 100 lozenges	8.75	6.56		
	Buy 4 bottles, price each	7.25	5.44		
00927	<b>VITAMIN C WITH DIHYDROQUERCETIN</b> - 1000 mg, 250 tablets	25.50	19.13		
	Buy 4 bottles, price each	23.25	17.44		
00084	<b>VITAMIN C (BUFFERED) POWDER</b> - 454.6 grams	23.95	17.96		
	Buy 4 bottles, price each	22.00	16.50		
00864	<b>VITAMIN D3</b> - 2000 IU, 1 fl oz	28.00	21.00		
	Buy 4 bottles, price each	25.00	18.75		
00251	<b>VITAMIN D3</b> - 1000 IU, 250 caps	12.50	9.38		
	Buy 4 bottles, price each	11.25	8.44		
00713	<b>VITAMIN D3</b> - 5000 IU, 60 caps	11.00	8.25		
	Buy 4 bottles, price each	9.90	7.43		
01418	<b>VITAMIN D3</b> - 7000 IU, 60 caps	14.00	10.50		
	Buy 4 bottles, price each	12.60	9.45		
01372	<b>VITAMIN D3 w/SEA-IODINE™</b> - 5000 IU, 60 veg. caps	14.00	10.50		
	Buy 4 bottles, price each	12.50	9.38		
01472	<b>VITAMINS D AND K w/SEA-IODINE™</b> - 60 veg. caps	24.00	18.00		
	Buy 4 bottles, price each	22.00	16.50		
00063	<b>VITAMIN E (PURE NATURAL)</b> - 400 IU, 100 caps	18.75	14.06		
	Buy 4 bottles, price each	17.25	12.94		
	Buy 10 bottles, price each	15.00	11.25		
01225	<b>VITAMIN K2 (LOW-DOSE)</b> - 45 mcg, 90 softgels	18.00	13.50		
	Buy 4 bottles, price each	16.00	12.00		

**SUB-TOTAL OF COLUMN 18**

To order online visit: [www.LifeExtension.com](http://www.LifeExtension.com)

No.		Retail Each	Member Each	Qty	Total
<b>Z</b>					
01585	<b>ZEAXANTHIN W/LUTEIN &amp; MESO-ZEAXANTHIN AND C3G (SUPER) - 60 softgels</b>	\$22.00	\$16.50		
	Buy 4 bottles, price each	19.80	14.85		
01586	<b>ZEAXANTHIN W/LUTEIN &amp; MESO-ZEAXANTHIN PLUS ASTAXANTHIN AND C3G (SUPER)</b>	42.00	31.50		
	Buy 4 bottles, price each	38.00	28.50		
00061	<b>ZINC LOZENGES - 75 lozenges</b>	9.50	7.13		
	Buy 4 bottles, price each	6.75	5.06		
01051	<b>ZYFLAMEND - 120 softgels</b>	60.95	45.71		
01029	<b>ZYFLAMEND EASYCAPS - 180 softgels</b>	31.95	23.96		

**SUB-TOTAL OF COLUMN 19**

\* These products are not 25% off retail price.

\*\*Not eligible for member discount or member renewal product credit.

\*\*\*Due to license restrictions, this product is not for sale to customers outside of the USA.

†Member pricing not valid on this item.

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SUB-TOTAL COLUMN 15	
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SUB-TOTAL COLUMN 17	
SUB-TOTAL COLUMN 18	
SUB-TOTAL COLUMN 19	

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Sub-Total A (Sub-total of Columns 1 through 19)	
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<b>GRAND TOTAL</b> (Must be in U.S. dollars)	

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EXP. DATE

SIGNATURE

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33842	<b>HEART ATTACK PROOF</b> • by Michael Ozner, MD	2012	\$19.95	\$14.96		
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33806	<b>THE CR WAY</b> • by Paul McGlothlin and Meredith Averill	—	\$15.95	\$11.25		
33828	<b>THE SEXY YEARS</b> • by Suzanne Somers (paperback)	2004	\$15.00	\$10.50		
33695	<b>WE BECOME SILENT</b> • DVD by Kevin Miller	—	\$24.98	\$18.74		
33803	<b>WHAT YOUR DOCTOR MAY NOT TELL YOU ABOUT DIABETES</b> • by Steven V. Joyal, MD	2008	\$14.99	\$10.49		
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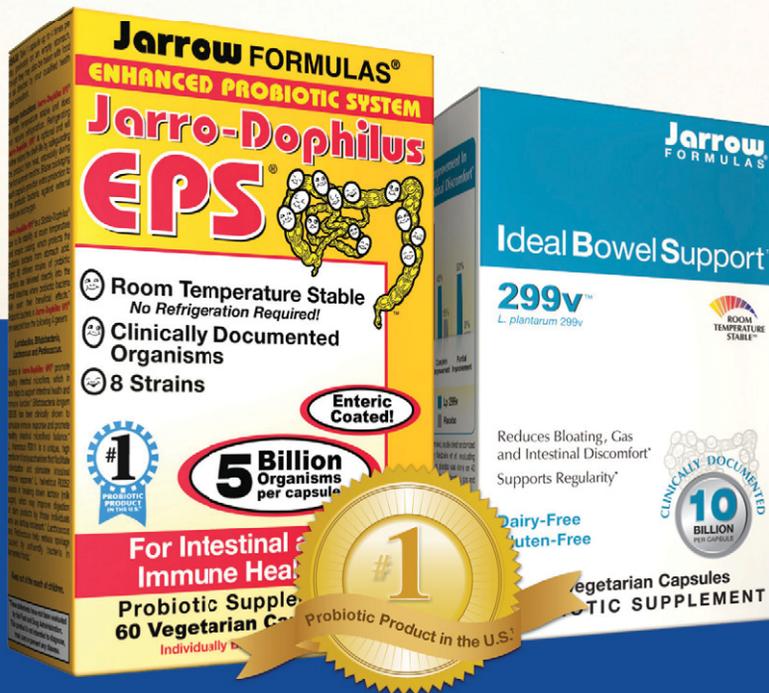
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†† #1 in both Dollar Sales and Unit Volume in the Natural Channel, according to SPINS, a market research and consulting firm for the Natural Product Industry (SPINScan Natural, 52 Weeks Ending 1/22/11).

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# A Partnership in Bone Health

## New Chapter® Zyflamend® & LifeExtension® Bone Restore



New Chapter Zyflamend  
120 Softgels Item #01051  
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LifeExtension Bone Restore  
150 Capsules Item #01611  
Retail Price \$22.50  
Member Price \$16.88

### Bone Health: The Inflammation Connection

Emerging evidence suggests that inflammation exerts a significant effect on bone metabolism by stimulating production of RANKL (Receptor Activator for Nuclear Factor K B Ligand), a molecule that activates osteoclasts, the cells responsible for the breakdown of bone.

Throughout life, cells known as osteoblasts construct bone matrix and fill it with calcium. At the same time, osteoclasts work just as busily to tear down and resorb bone. This fine balance is regulated by many factors.

As our bodies age, this fine balance is lost. As the relative hormone levels shift in midlife—more drastically in women than in men—the osteoclasts gain the upper hand and bone mass begins to dwindle.

Life Extension offers a proprietary comprehensive mineral formula called Bone Restore which has been designed to support healthy bone density and strength.\* Bone Restore provides 1,200 elemental milligrams of calcium from three different forms, along with the critically important nutrients magnesium, boron, zinc, silicon, manganese and vitamin D needed for healthy bones.

An ideal bone health protocol would pair the necessary building blocks for bone remodeling with a formula that promotes a healthy and natural inflammation response.\* Zyflamend, the patented herbal formula for a healthy inflammation response\*, coupled with Bone Restore, a mineral formula designed to support healthy bone density and strength, is the comprehensive approach to total bone health.\*

### The Premier Herbal Formula for Whole-Body Healthy Inflammation Response\*

Zyflamend is an intelligent blend of full-spectrum herbal extracts containing hundreds of naturally occurring components. These whole, active phytonutrients work together to promote a healthy inflammation response.\* Just as important as a daily multivitamin, Zyflamend from New Chapter is the patented herbal protocol to help your whole body's natural inflammation process stay balanced and healthy every single day.\* Inflammation is a natural response process that affects every cell and organ in the body. Zyflamend promotes a healthy inflammation response that helps support joint health and many other body benefits.\* Zyflamend has been studied at leading research institutions and has been shown to benefit multiple areas of health including skin health, healthy aging, joint health, and bone health.\*

To order Zyflamend or Bone Restore,  
call 1-800-544-4440 or  
visit [www.LifeExtension.com](http://www.LifeExtension.com)

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† According to 2012 SPINS® Market Research

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# Advanced RESVERATROL Formula

In 2003, the **Life Extension Foundation**® introduced a standardized **resveratrol** extract shown to favorably alter genes implicated in the aging process—many of the same genes that respond to **calorie restriction**.

Since then, we have identified additional compounds that simulate calorie restriction's ability to trigger youthful **gene expression**—the process by which genes transmit signals that slow certain aspects of aging.

Compelling evidence reveals that certain compounds found in berries, such as **pterostilbene** and **fisetin**, possess potent “longevity gene” activators that work in synergy with **resveratrol**. For example, **fisetin** (found in strawberries) has been shown to **stabilize** resveratrol in the body by shielding it from metabolic breakdown,<sup>1-10</sup> thus extending its beneficial effects.

## High-Potency Resveratrol with Synergistic Activators

Life Extension® members gain access to standardized **trans-resveratrol** combined with plant extracts that favorably influence longevity gene expression. Unlike many commercial formulas, Life Extension standardizes to **trans-resveratrol**, which researchers contend is the most active constituent.

A bottle containing 60 vegetarian capsules of **Optimized Resveratrol with Synergistic Grape-Berry Actives** retails for \$46. If a member buys four bottles, the price is reduced to just **\$31** per bottle. The suggested dose of one capsule a day provides:

<b>Trans-Resveratrol</b>	<b>250 mg</b>
<b>Grape-Berry Actives</b>	<b>85 mg</b>
<b>Quercetin</b>	<b>60 mg</b>
<b>Trans-Pterostilbene</b>	<b>0.5 mg</b>
<b>Fisetin</b>	<b>10 mg</b>

Contains yeast.

Item # 01430



**CAUTION:** If you are taking anti-coagulant or anti-platelet medications or have a bleeding disorder, consult your healthcare provider before taking this product.

### References

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To order Optimized Resveratrol with Synergistic  
Grape-Berry Actives, call 1-800-544-4440  
or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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# LifeExtension® Magazine



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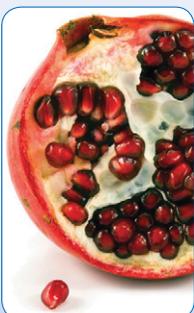
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