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November 2015

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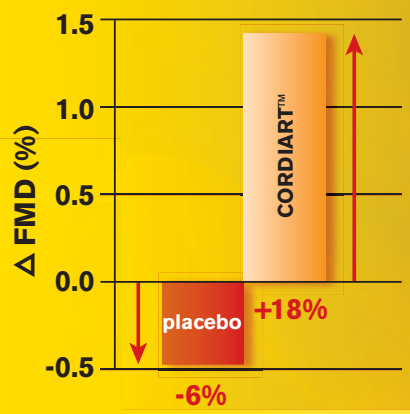
BOOST *Endothelial Function* For
Vascular Health

*Optimal heart health depends on many factors, including proper **endothelial function**.*[1]



*Dramatic effects of Cordiart™ on flow-mediated dilation (FMD), a real-time measure of endothelial function and nitric oxide production. Supplemented patients (orange bar) had a mean increase in FMD of **18%** compared with baseline, while placebo recipients (red bar) sustained a **6%** drop in FMD.*

Even with cholesterol/glucose levels in the healthy range, aging individuals need to maintain youthful integrity of their **endothelium**—the thin layer of cells lining the interior of the entire circulatory system.

Based on published studies showing improvements in *endothelial function*, health-conscious people have been drinking **pomegranate juice** or taking a *standardized* **pomegranate** supplement.

GOING BEYOND POMEGRANATE

The addition of **CORDIART™** (extract from sweet orange peels) to pomegranate provides another vascular benefit by activating endothelial production of ***nitric oxide***, which signals the smooth muscles to relax, inducing vasodilation to support healthy circulation.

In clinical research, **500 mg** of CORDIART™ alone produced an **18%** improvement in **flow mediated dilation**, a direct marker of endothelial function. CORDIART™ also inhibited the pro-inflammatory factors **C-reactive protein** and **serum amyloid A** that interrupt healthy *nitric oxide* production.[2]

TRIPLE-ACTION PROTECTION

For those seeking the convenience of three nutrients clinically shown to help with blood flow and age-related changes in **endothelial function**,[2-6] the newly formulated **Endothelial Defense™** provides:

1) Full-Spectrum Pomegranate™
2) CORDIART™
3) Superoxide dismutase (SOD).

The orally active form of **superoxide dismutase (SOD)**—called GliSODin®—has been clinically demonstrated to support healthy arterial function and structure, while boosting levels of the body's protective enzymes—**SOD** and **catalase**.[4-6] The new **Endothelial Defense** contains a potent dose of **GliSODin®** along with **500 mg** of **CORDIART™**.

The new **Endothelial Defense™** also provides standardized **pomegranate juice** extract and a proprietary **pomegranate flower** and **seed oil blend**. These extracts from different parts of the pomegranate plant provide potent *polyphenols* clinically shown to support healthy blood flow, youthful lipid and glucose metabolism, and healthy inflammatory factors.[2,3,7-9]

Endothelial Defense™ with Full-Spectrum Pomegranate™ and CORDIART™ addresses many factors that promote youthful endothelial function in a dose of two softgel capsules daily.

LOW-COST CORDIART™ CAPS

For those who only need the benefits of **CORDIART™**, it also comes in a low-cost **500 mg** capsule called **NitroVasc with CORDIART™** that requires only one-per-day dosing.

Endothelial Defense™ with Full-Spectrum Pomegranate™ and Cordiart™

Item #01997 • 60 softgels • Non-GMO

	Retail Price	Your Price
1 bottle	$68	**$51**
4 bottles		**$46.50 each**

NitroVasc with CORDIART™

Item #01990 • Non-GMO
30 **500 mg** vegetarian capsules

	Retail Price	Your Price
1 bottle	$18	**$13.50**
4 bottles		**$12 each**

To order **Life Extension® Endothelial Defense™ with Full-Spectrum Pomegranate™ and CORDIART™** or **NitroVasc with CORDIART™**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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 Contains wheat.

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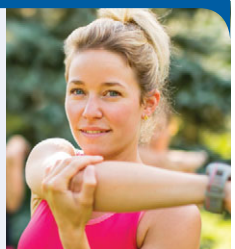

LifeExtension® Magazine

VOLUME TWENTY ONE / NUMBER ELEVEN • November 2015

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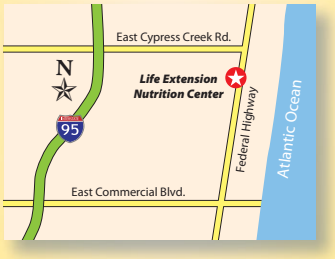

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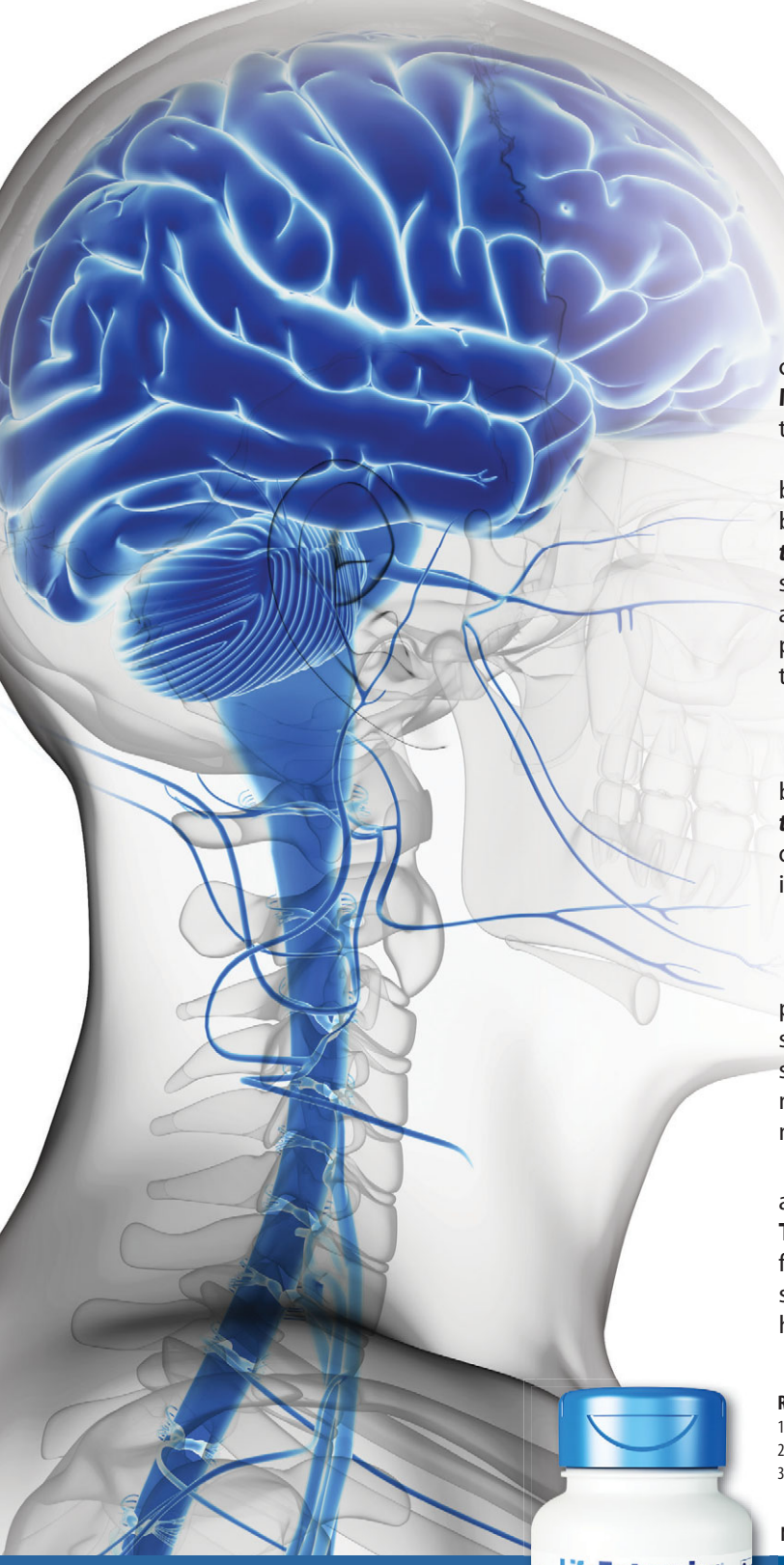
LIFE EXTENSION (ISSN 1524-198X) Vol. 21, No.11 ©2015 is published monthly except bi-monthly in April by LE Publications, Inc. at 3600 West Commercial Blvd., Fort Lauderdale, FL 33309-3338. Published 13 times a year. Subscription rate: $40 per year in the United States. US $47 in Canada. US $60 in other countries. Mail subscriptions or address changes to: LE Publications, Inc., P.O. Box 407198, Fort Lauderdale, FL 33340-7198, USA. Or phone us toll-free at: 1-800-841-5433. Canada Subscriptions: Publications mail agreement number 40028967. Return undeliverable Canadian addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill, ON L4B4R6. You will be sent your first issue within six weeks after LE Publications, Inc. receives your subscription fee. Periodicals Postage paid at Fort Lauderdale, FL and at additional mailing offices. POSTMASTER: Send address changes to Life Extension, P.O. Box 407198, Ft. Lauderdale, Florida 33340-7198, USA. Printed in USA.



MAGNESIUM BOOSTS BRAIN HEALTH

Profound shrinkage of **synaptic connections** between nerve cells is one of the major hallmarks associated with brain aging. **Magnesium** is a critical factor in controlling **synaptic density** in the brain.[1]

An innovative form of magnesium called **Neuro-Mag®** has been shown to specifically target multiple areas of the aging brain. In fact, preclinical models show that the ***magnesium-L-threonate*** contained in **Neuro-Mag®** boosted levels of magnesium in spinal fluid by **15%** versus no increase from conventional magnesium.[2] This means that this form of **magnesium** is passing through the blood-brain barrier for assimilation into the **brain**.

Comprehensive Cognitive Benefits

Scientists continue to uncover **magnesium's** comprehensive benefits for cognitive function.[1,3] Studies using ***magnesium-L-threonate*** show this unique form of magnesium maintains the quantity of ***synaptic*** connections between brain cells and inhibits the dysregulation of signaling pathways.[1]

Neuro-Mag...Capsules Or Powder

The suggested daily dose of three **Neuro-Mag®** capsules provides **2,000 mg** of **Magnesium-L-Threonate**. While supplying a modest **144 mg** of elemental magnesium, its superior absorption into the bloodstream and nervous system make it a preferred choice for maturing individuals to supplement with.

This same brain-health supporting magnesium is also available in a powder called **Neuro-Mag® Magnesium-L-Threonate with Calcium and Vitamin D3**. In addition to its fresh lemon flavor, the one-scoop-per-day serving supplies the same amount of magnesium as the capsules, plus **500 mg** of highly soluble calcium and **1,000 IU** of vitamin D3.

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Non-GMO

Neuro-Mag® Magnesium-L-Threonate
Item #01603 • 90 vegetarian capsules

	Retail Price	Your Price
1 bottle	$40	**$30**
4 bottles		**$27 each**

Non-GMO

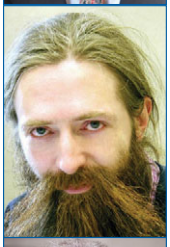
Neuro-Mag® Magnesium-L-Threonate with Calcium and Vitamin D3 Powder
Item #01602 • 225 grams of powder

	Retail Price	Your Price
1 jar	$40	**$30**
4 jars		**$27 each**

To order Neuro-Mag® Magnesium L-Threonate Capsules or Powder call 1-800-544-4440 or visit www.LifeExtension.com

LifeExtension® Magazine

Örn Adalsteinsson, PhD, is chairman of the Life Extension® Scientific Advisory board. He 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*.



Aubrey de Grey, PhD, is a biomedical gerontologist and Editor-in-Chief of Rejuvenation Research, the world's highest-impact peer-reviewed journal focused on intervention in aging. He received his BA and PhD from the University of Cambridge in 1985 and 2000 respectively. Dr. de Grey is a Fellow of both the Gerontological Society of America and the American Aging Association and sits on the editorial and scientific advisory boards of numerous journals and organizations.

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 anticancer 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.

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 double board-certified in internal medicine and sleep disorder 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.

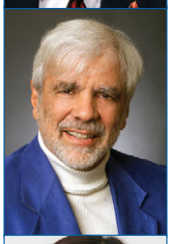
Steven B. Harris, MD, is president and director of research at Critical Care Research, a company that grew out of 21st Century Medicine in Rancho Cucamonga, CA. Dr. Harris participates in groundbreaking hypothermia, cryothermia, and ischemia research. His research interests include antioxidant and dietary-restriction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

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.

Dipnarine Maharaj MD, MB, ChB, FRCP (Glasgow), FRCP (Edinburgh), FRCPath., FACP
Dr. Dipnarine Maharaj is the Medical Director of the South Florida Bone Marrow Stem Cell Transplant Institute and is regarded as one of the world's foremost experts on adult stem cells. He received his medical degree in 1978 from the University of Glasgow Medical School, Scotland. He completed his internship and residency in Internal Medicine and Hematology at the University's Royal Infirmary.

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,The Complete Mediterranean Diet* and *Heart Attack Proof*. For more information visit www.drozner.com.



Jonathan V. Wright, MD, is medical director of the Tahoma Clinic in Tukwila, 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.

Xiaoxi Wei, PhD, is a chemist expert in supramolecular assembly and development of synthetic transmembrane nanopores with distinguished selectivity via biomimetic nanoscience. She has expertise in ion channel function and characterization. She founded X-Therma Inc., a company developing a radical new highway towards non-toxic, hyper-effective antifreeze agents to fight unwanted ice formation in regenerative medicine and reduce mechanical icing.

Advanced Defense Against Cellular Aging

OPTIMIZED RESVERATROL

with NAD+ Cell Regenerator

Over 6,000 studies have been published on **resveratrol**, a compound shown to favorably alter genes that help slow the aging process. In fact, resveratrol triggers some of the same beneficial youthful gene expression activated by **calorie restriction**.[1]

Optimized Resveratrol with NAD+ Cell Regenerator contains NIAGEN® **nicotinamide riboside**, a novel nutrient shown to support mitochondrial health and promote longevity pathways. This formula provides **100 mg** of **NIAGEN® nicotinamide riboside**—an amount equivalent to almost 667 cups of milk![2]

Optimized Resveratrol with NAD+ Cell Regenerator also contains specific compounds in berries, such as **pterostilbene** and **fisetin**, which researchers say work in synergy with resveratrol to "turn on" the body's own longevity genes.

Optimized Resveratrol with NAD+ Cell Regenerator

Item #01930 • 30 vegetarian capsules

	Retail Price	Your Price
1 bottle	$42	**$31.50**
4 bottles		**$27 each**

Just one capsule of Optimized Resveratrol with NAD+ Cell Regenerator supplies:

Trans-Resveratrol	250 mg
NIAGEN® Nicotinamide Riboside	100 mg
Grape-Berry Actives	40 mg
Quercetin	60 mg
Trans-Pterostilbene (from pTeroPure®)	0.5 mg
Fisetin	10 mg

The suggested dose is **one** capsule daily of this resveratrol formula.

Non-GMO

NIAGEN® and pTeroPure® are registered trademarks of ChromaDex, Inc. Patents see: www.ChromaDexPatents.com.

To order Optimized Resveratrol with NAD+ Cell Regenerator, call 1-800-544-4440 or visit www.LifeExtension.com

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"To Grow Old Without Disease"

Headline news story in ***The Wall Street Journal***

BY WILLIAM FALOON

An article in the ***Wall Street Journal*** describes a group of academic researchers who are seeking to initiate a **human** study where a single **pill** will be tested to see if it will **prevent** or **delay** the most debilitating diseases of **aging**.[1]

These top-level scientists describe findings from published studies that support the **anti-aging** effects of this single **drug**. These researchers boldly proclaim:

> ***"Aging is the major risk factor for all these diseases—heart disease, cancer, diabetes, and Alzheimer's… If you want to make a real impact you have to modulate the risk of aging and by that the risk for all those diseases of aging."***

What makes the above statement so unique is that today's medical mainstream does not recognize ***aging*** as a disease. This conventional view is changing, however, as prominent scientists' state that "***fighting every major disease of old age is not a winnable strategy***."[2] They argue that if:

> ***"We lower the risk of heart disease, somebody lives long enough to get cancer. If we reduce the risk of cancer, somebody lives long enough to get Alzheimer's disease… We are suggesting that the time has arrived to attack them all by going after the biological process of aging."***[2]

In case you haven't guessed it by now, the "pill" these scientists want to test in a human anti-aging study is the **AMPK-activating** drug **metformin**.

If you go back to the **March 1995** issue of this magazine, you'll see **metformin** listed in a group of recommended offshore anti-aging therapies. We were harshly persecuted by the **FDA** for daring to do this. We've since published dozens of articles urging members to ask their doctor to prescribe **metformin** to prevent age-related disease.

Those not able to secure a physician's prescription learned last year of **AMPK-activating** nutrients that compared favorably to **metformin** in side-by-side research.[3]

The mainstream and even the **FDA** may finally be catching on to the deadly impact of **loss of AMPK activity**. It's a shame that it has taken **20 years** for researchers to want to initiate a **human study** of the anti-aging properties of metformin. The scientific data has been so clearly evident for so long.

Widespread use of **AMPK-activating** compounds could be a game-changing breakthrough that, as the ***Wall Street Journal*** stated could, "***increase the number of years of healthy, independent living***."[1]

The first article in this month's edition describes the profound ***age-delaying*** and ***age-reversing*** effects that occur in response to activating one's cellular **AMPK**.

This month's issue also features eye-opening reports about newly discovered benefits of **boron** and **selenium**. The good news is that most readers of this magazine have been obtaining optimal forms of these minerals for many years.

The recognition of the **age-delaying** benefits of **metformin** is a major vindication of ***Life Extension***'s long-standing position for people to take **AMPK-activating** compounds to extend their healthy life spans.

For longer life,

William Faloon

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THE MOST COMPLETE PROSTATE PROTECTION

Ultra Natural Prostate formula provides the latest scientifically validated botanical extracts shown to promote healthy prostate function.

No other prostate protection formula provides such a broad array of nutrients to support the multiple factors involved in the health of the aging prostate gland. **Ultra Natural Prostate** contains:

- **Standardized lignans** provide support for prostate cells against excess estrogen levels.[1-3]
- **AprèsFlex®** supports normal inhibition of *5-lipoxygenase* or *5-LOX*, an enzyme associated with undesirable cell division changes.[4,5]
- **Stinging and Dwarf nettle root extracts** help support prostate cells against excess estrogen levels.[6,7]
- **Saw Palmetto CO_2 extract** helps inhibit *dihydrotestosterone* (DHT) activity in the prostate, helps support normal urinary flow, and helps regulate inflammatory reactions in the prostate.[8-11]
- **Pygeum** extract helps suppress prostaglandin production in the prostate and supports healthy urination patterns.[12,13]
- **Pumpkin seed oil**, enhances the composition of free fatty acids and augments saw palmetto's benefits.[14-16]
- **Beta-sitosterol** enhances the protective effects of other botanical extracts and helps improve quality of life.[17-19]
- **Graminex® Flower Pollen Extract™**, has been shown to help relax the smooth muscles of the urethra and help regulate inflammatory reactions.[20-22]
- **Boron** has been shown to slow elevation of prostate-specific antigen (PSA).[23-25]
- **Lycopene** supports efficient cellular communication, helps maintain healthy DNA, regulates hormonal metabolism, and promotes healthy prostate size and structure.[26-32]
- **Phospholipids** enhance absorption of active compounds.

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Contains soybeans.

Ultra Natural Prostate
Item #01898 • 60 softgels

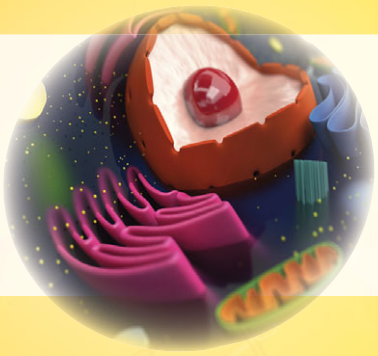
	Retail Price	Your Price
1 bottle	$38	**$28.50**
4 bottles		**$26.25 each**

The suggested daily dose of two softgels of ***Ultra* Natural Prostate** provides:

Saw Palmetto CO_2 extract (fruit) [providing 272 mg total fatty acids]	**320 mg**
Graminex® Flower Pollen Extract™ (from rye)	**252 mg**
Stinging and Dwarf nettle extracts (root)	**240 mg**
Beta-Sitosterol	**180 mg**
Phospholipids	**160 mg**
Pygeum extract (bark)	**100 mg**
Pumpkin seed oil [providing 170 mg total fatty acids]	**200 mg**
AprèsFlex® Indian frankincense (*Boswellia serrata*) **extract** (gum resin) [providing 14 mg AKBA*]	**70 mg**
Proprietary Enterolactone Precursors Blend [HMRlignan™ Norway spruce (*Picea abies*) (knot wood) and Flax (seed) lignan extracts]	**20.15 mg**
Lycopene [from natural tomato extract (fruit)]	**10 mg**
Boron (as Albion® bororganic glycine)	**3 mg**

*** 3-O-acetyl-11-keto-ß-boswellic acid**

To order **Ultra Natural Prostate**, call **1-800-544-4440** or visit **www.LifeExtension.com**



AMPK Activator

RESTORE YOUTHFUL CELLULAR FUNCTION

Found in every cell,[1,2] **AMPK** promotes ***longevity factors*** that have been shown to extend life span in numerous organisms.[3,4]

Increasing AMPK signaling "***turns off***" many damaging effects of aging, thus enabling cells to return to a more youthful vitality.[5]

AMPK Activator is a specialized *dual-extract formulation* that facilitates **AMPK** activation for health optimization.

Importance Of AMPK

Studies show **increased** AMPK activity supports reduced fat storage,[6] new mitochondria production,[7] and the promotion of healthy blood glucose and lipids already within normal range.[4]

Gynostemma Pentaphyllum

An extract of the plant *Gynostemma pentaphyllum* promotes **AMPK** activation![8-10] In one of many studies showing a wide variety of benefits, researchers documented a 1-inch reduction in **abdominal circumference** in overweight individuals who took **450 mg** daily of *G. pentaphyllum* extract for 12 weeks.[11]

Trans-Tiliroside

Trans-tiliroside, extracted from plants such as **rose hips**, boosts **AMPK** activation, but triggers different downstream metabolic benefits than *G. pentaphyllum*.[12-14] Among its many benefits, a low equivalent dose of **56 mg** daily *trans-tiliroside* has been shown by researchers in preclinical studies to promote healthy blood glucose levels and body weight already within normal range.[15]

Major Anti-Aging Discovery

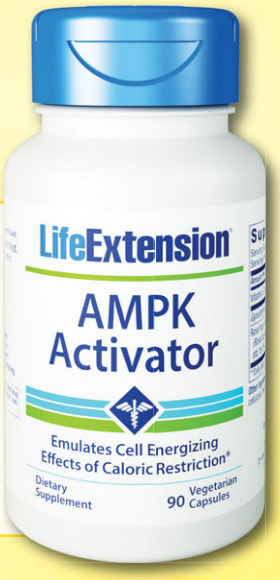
The suggested daily dosage of **AMPK Activator** is two capsules with the first meal of the day and one capsule with the second meal. Three capsules provide:

ActivAMP®	
***Gynostemma pentaphyllum* extract**	**450 mg**
Rose hip extract	**1,119 mg**
Standardized to 5% ***trans*-tiliroside**	**56 mg**

Other Methods Of Boosting AMPK

Those practicing aggressive **calorie restriction**, taking more than **1,000 mg/day** of the drug **metformin**, or are regularly/vigorously **exercising** (and under age 60) may not need **AMPK Activator**. The reason is that persistent calorie restriction, metformin and/or exercise under age 60 may adequately boost **AMPK** activity.

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



AMPK Activator

Item #01907 • 90 vegetarian capsules

	Retail Price	Your Price
1 bottle	$48	**$36**
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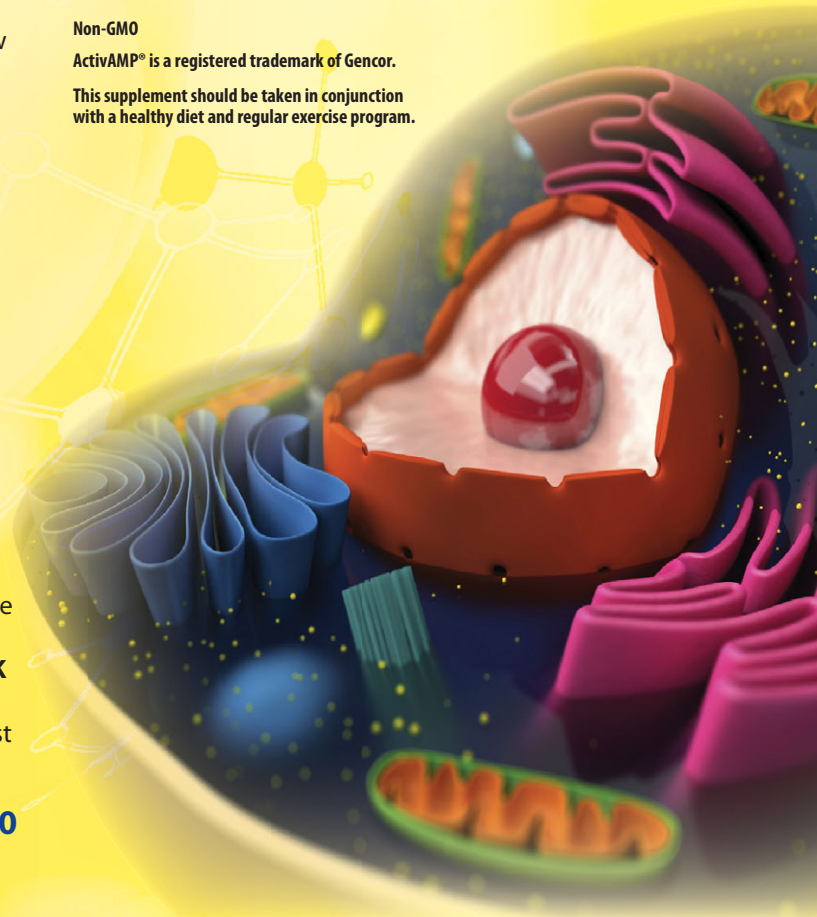
This supplement should be taken in conjunction with a healthy diet and regular exercise program.



Fat-Soluble Nutrients *Missing* From Most Multi-Vitamin Formulas

Life Extension®'s **Health Booster** is a **cost-effective** formula that combines a **variety** of valuable nutrients in just one softgel. **Once-Daily Health Booster** provides the following nutrients:

Vitamin K1 is found in plants. It is often bound to plant fiber and requires intestinal conversion to transform into bioactive active **vitamin K2**.[1-3] Data supports value of K1 in addition to the K2 forms.[4-7]

Vitamin K2 is the active form that keeps calcium in bone and out of arteries. **MK-4** is rapidly absorbed,[1,8-9] while **MK-7** provides 24-hour bioavailability of vitamin K2.[9]

***Trans*-zeaxanthin**, **meso-zeaxanthin**, and **lutein** supports eye health and healthy vision.

Gamma tocopherol is a form of vitamin E that quenches the damaging ***peroxynitrite*** free radical.[10-11] Those who take ***alpha***-tocopherol should also take ***gamma*** tocopherol.

Blueberry extract boosts DNA repair and sustain healthy blood sugar levels already within normal range.[12,13]

Sesame lignans increases tissue levels of **gamma tocopherol**, which plays a pivotal role in quenching certain kinds of inflammation.[14]

Lycopene supports prostate health, protect against free radical activity, and guard against LDL oxidation.[15,16]

Chlorophyllin offers protection against environmentally induced DNA damage from toxins like smoke, emission particles, and foods cooked at high temperatures.[17]

Black currant extract (C3G) anthocyanins promotes eye health and help ease eye fatigue.[18]

Vitamin B12 helps maintain a healthy nervous system and metabolism.[19] Vitamin B12 levels decrease with age.[20]

Each Bottle Of Health Booster Lasts Two Months

Super Cost Effective!

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Once-Daily Health Booster

Item #01981 • 60 softgels (two-month supply)

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1 bottle	$52	**$39**
4 bottles		**$36 each**

One daily Health Booster softgel provides:

Vitamin K1	**1,000 mcg**
Vitamin K2 (MK-4)	**1,000 mcg**
Vitamin K2 (MK-7)	**200 mcg**
Vitamin B12	**300 mcg**
Chlorophyllin	**100 mg**
Gamma E Mixed Tocopherols	**359 mg**
Gamma tocopherol 197.45 - 269.25 mg	
Delta tocopherol 71.8 - 107.7 mg	
Alpha tocopherol 30.52 - 43.08 mg	
Beta tocopherol < 17.95 mg	
MacuGuard® Carotenoid Phospholipid Blend	**145 mg**
Phospholipids, marigold extract (flower) [providing 10 mg free lutein, 4 mg meso-zeaxanthin & trans-zeaxanthin]	
C3G (Cyanidin-3-glucoside) [from European black currant extract (fruit)]	**2.2 mg**
Lycopene (tomato extract)	**10 mg**
Sesame Seed Lignan Extract	**20 mg**
Wild Blueberry Whole Extract (fruit)	**100 mg**

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Contains soybeans.

Caution: if taking anticoagulant or antiplatelet medication, consult your health care provider before taking this product.

IN THE NEWS

Subnormal Selenium Levels Linked With Increased Mortality

The *European Journal of Clinical Nutrition* reported an association between decreased serum selenium levels and a greater risk of mortality in an older population over a period of 6.8 years.*

The study included 449 older men and women who participated in an epidemiologic project in southeast Sweden. Serum selenium levels were measured upon enrollment in January 2003 and in 98 subjects after 48 months.

Through February 2010, there were 122 deaths from all causes, including 85 that were attributable to cardiovascular disease. Among those whose selenium levels were among the lowest quartile of subjects, there was an adjusted **43%** increase in the risk of dying from any cause and a **56%** increased risk of cardiovascular mortality in comparison with the remainder of the study population that had ***higher*** serum **selenium** levels.

Editor's Note: "This result may suggest the value of modest selenium supplementation in order to improve the health of the Swedish population," the authors conclude.

* *Eur J Clin Nutr.* 2015 Jun 24.

Weight Loss Plus Vitamin D Lowers Inflammation

The July 2015 issue of *Cancer Prevention Research* reports the findings of a randomized, placebo-controlled trial of overweight postmenopausal women, which uncovered a reduction in inflammation in response to weight loss and supplementation with vitamin D.*

Participants in the study, whose serum 25-hydroxyvitamin D levels were lower than **32 ng/mL** upon enrollment, were assigned to a five-day-per-week exercise program combined with a low-calorie diet supplemented with **2,000 IU** (international units) vitamin D per day or a placebo for one year. Blood samples collected at the beginning and end of the study were assessed for markers of inflammation and other factors.

Although changes in body mass index and other factors were similar between the groups, for those who lost **5** to **10%** of their weight, the decline in the inflammatory cytokine **interleukin-6** was significantly greater among those who received vitamin D compared to those who received a placebo.

Editor's Note: "It is thought that this state of chronic inflammation is pro-tumorigenic, that is, it encourages the growth of cancer cells," commented lead author Catherine Duggan, PhD. "Weight loss reduces inflammation, and thus represents another mechanism for reducing cancer risk. If ensuring that vitamin D levels are replete, or at an optimum level, can decrease inflammation over and above that of weight loss alone, that can be an important addition to the tools people can use to reduce their cancer risk."

* *Cancer Prev Res (Phila).* 2015 Jul;8(7): 628-35.

Breast Cancer, Chemotherapy Connected To Weight Gain

Breast cancer survivors are more likely to gain weight over a four-year period than women who have not had cancer, especially if they were treated with chemotherapy, according to a study by researchers at Johns Hopkins Kimmel Cancer Center.

For the study, published in the journal *Cancer Epidemiology, Biomarkers & Prevention*, the researchers reviewed a baseline questionnaire and a follow-up one completed four years later by 303 breast cancer survivors and 307 cancer-free women.*

In the four-year span, survivors gained more weight—an average of 3.6 pounds—than cancer-free women. Among 180 survivors diagnosed with cancer during the last five years of the study period, **21%** gained at least 11 pounds over a four-year period compared with **11%** of their cancer-free peers. The weight change findings remained the same after accounting for other factors associated with weight gain, such as increasing age, transition to menopause, and level of physical activity.

Women who had completed chemotherapy within five years of the study were **2.1 times** as likely as cancer-free women to gain at least **11 pounds** during the study.

Editor's Note: The authors do not suggest patients worry about weight gain intervention during chemotherapy. "But we are suggesting that oncologists, internists, or anyone treating breast cancer survivors, including those with a family history of the disease, could help them monitor their weight over the long term," they add.

* *Cancer Epidemiol Biomarkers Prev.* 2015 July 15.

New Studies Show Metformin Is Indicated As A Potential Anticancer Drug

Numerous studies provide evidence of the anticancer effect of metformin.* A recent review published in *PLOS One* found an association between the diabetes medication and a significant reduction in the risk of colorectal, liver, pancreatic, stomach, and esophagus cancers in patients with myotonic dystrophy type II, an inherited disorder of the muscles and other body systems. A further study published in *Cancer Prevention Research* found that low doses of **250 mg** per day of metformin administered for four weeks to nondiabetic patients suppressed markers for colorectal cancer.

Metformin may impact cancer through indirect (insulin-dependent) and/or direct (insulin-independent) mechanisms. Metformin reduced lung tumor development primarily through an insulin-dependent mechanism by decreasing circulating levels of insulin-like growth factor-I (IGF). IGF activates its receptor, which in addition to a metabolic effect promotes proliferation and metastasis. The direct-insulin independent antitumor action of metformin is mainly induced by activating the AMPK signaling pathway, resulting in an inhibition of the mammalian target of rapamycin (mTOR), a signaling pathway that plays a central role in cancer cell growth, proliferation, and pathogenesis.

The effects of metformin as a breast cancer target have been studied extensively. A study published in *Cancer Research* found that metformin targets cancer stem cell (tumor-initiating cells) in four genetically different kinds of breast cancer cell lines. Treatment with a low-dose of metformin was found to eliminate cancer stem cells, possibly due to the inhibition of the inflammatory pathway. This observation could be the definitive link between the diabetic drug and its anticancer benefits, since inflammation plays a key role in both diseases.

Editor's Note: *Life Extension*® Magazine has been reporting on the benefits of metformin since the early 1990s. While metformin has been available for use in Europe since the 1950s, the drug was not approved by the FDA for use in the United States until 1994.

* *Curr Cancer Drug Targets.* 2015 Dec;15(1).

Resveratrol, Quercetin Could Improve Safety Of Cancer Drug

Findings described in the *Journal of Controlled Release* suggest that the polyphenols resveratrol and quercetin could help improve the safety of Adriamycin (doxorubicin), an effective but potentially cardiotoxic chemotherapy.* Adriamycin's mechanism of cardiotoxicity involves reactive oxygen and nitrogen species generation, a phenomenon that is reduced by free radical scavengers such as these plant-derived compounds.

Using a system involving polymeric micelles to improve bioavailability, Adam Alani of Oregon State University's College of Pharmacy and associates first tested the compounds in human ovarian cancer cells and rat heart muscle cells. While Adriamycin was antagonistic toward heart cells, resveratrol and quercetin decreased the activity of caspases (protein-degrading enzymes) involved in apoptosis (programmed cell death) in these cells while not interfering with Adriamycin's caspase activity in cancerous cells. Reactive oxygen species generated in both cell lines were reduced by resveratrol and quercetin only in the heart muscle cells.

Editor's Note: When the combo was tested in mice, resveratrol and quercetin were shown to confer full cardioprotection.

* *J Control Release.* 2015 Jul 6;213:128-33.

Depression Higher In Men With Borderline Testosterone Levels

An article that appeared in the *Journal of Sexual Medicine* reports the findings of researchers at George Washington University of a greater risk of depression and depressive symptoms in men with borderline testosterone levels.*

"In an era where more and more men are being tested for 'low T'—or lower levels of testosterone—there is very little data about the men who have borderline low testosterone levels," observed lead researcher Michael S. Irwig, MD.

Dr. Irwig and his associates analyzed data from 200 men between 20 to 77 years of age who were referred for tertiary care for testosterone levels ranging from **200** to **350 ng/dL**. Patient Health Questionnaire scores were used to determine the presence of depressive symptoms.

The study results showed that, compared with the general population, men with borderline testosterone levels had a significantly higher rate of depression than the general population (**56%** versus **23%**). Analysis showed that the study participants had higher rates of obesity and lower rates of physical activity than men in the general population. Study subjects also suffered from erectile dysfunction, decreased libido, fewer morning erections, low energy, and sleep disturbances. Rates of depression were **62%** for study participants in their 20s and 30s, **65%** for those in their 40s, **51%** for those in their 50s and **45%** for those age 60 and over.

Editor's Note: "Clinicians should consider screening for depression/depressive symptoms and overweight and unhealthy lifestyle risk factors in men referred for tertiary care for potential hypogonadism," the authors conclude. **Life Extension** has long urged aging men to consider maintaining **total testosterone** levels in the range of **700-900 ng/dL**, which is where younger, healthier men normally are.

* *J Sex Med*. 2015 Jun 30.

Making More Transplantable Organs Available

According to the World Health Organization, organ transplants are meeting less than **10%** of the global need. In the United States, critical shortages of kidneys, hearts, and livers for transplant result in huge numbers of needless deaths.

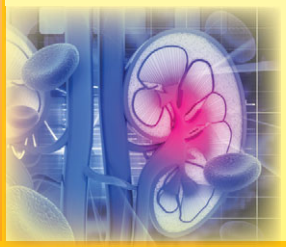
The Life Extension® Foundation funds a fulltime research project to perfect organ preservation so that more organs will be available for transplant.Cryobiologists at a laboratory funded by Life Extension®—21st Century Medicine—have made an important advance in kidney cryopreservation.*

A common way to measure some aspects of kidney function is to measure an animal's (or human's) creatinine level in its blood. Creatinine is a waste product of muscle metabolism, and accumulates in the blood when the kidney is not functioning well. Kidney tubules (nephrons) excrete creatinine as an extended network of small, tissue conduits that filter and reabsorb various blood components. Because they are so small and sensitive to damage, the nephrons of the kidney must be very carefully cryopreserved so as to avoid freezing and thawing damage from ice formation. When the nephrons are damaged, one way to notice this damage is to observe a high level of creatinine in the blood.

Cryobiologists at 21st Century Medicine have recently made significant progress in kidney cryopreservation by making new refinements in their cryopreservation protocols. Previously, cutting-edge techniques for protecting kidneys from ice formation resulted in levels of creatinine in the blood of animals receiving transplants of protected kidneys that were at the borderline of acceptable function, and only **75%** of the kidneys fully survived the procedure. This indicated that these previously used protocols were encouraging, but still caused undesirable levels of kidney damage.

By further refining their protocols, researchers have substantially lowered the peak creatinine in these animals receiving cryoprotected kidneys. Moreover, these improvements to their protocols substantially reduced the amount of recovery time required for these transplanted kidneys to restore normal creatinine levels. This was accomplished in as little as eight days post-operation, which is shorter than the time many human kidneys require to function after transplantation today. Post-transplant, a low peak creatinine, combined with a relatively short recovery time to normal creatinine, suggest the kidneys were minimally damaged by the cryoprotection protocol, and much (or all) of that damage was quickly repaired once transplanted into an otherwise healthy animal. Just as importantly, as the peak creatinine goes down, the chance of a kidney not surviving also goes down, and so far, all kidneys have fully survived the procedure.

These kinds of advances may lead to the development of organ banks where tissue-typed matched donor kidneys and other organs will be stored and made available to all people in need, just as blood banks provide this lifesaving function today. According to the Organ Preservation Alliance, being able to bank lungs and hearts could eliminate the current waiting list for these organs in two to three years or less, and being able to bank kidneys could increase the effective supply of kidneys by more than **25%**. Currently in the US, there are more deaths from organ failure than from cancer and the global cost of end-stage renal disease has been estimated at $1 trillion per decade.



*Available at: http://www.21cm.com/transplant.html. Accessed September 1, 2015.

Increased Vitamin C Linked To Reduced Risk Of Early Mortality

The *American Journal of Clinical Nutrition* published findings from researchers at the University of Copenhagen of a lower risk of cardiovascular disease and premature death in association with increases in plasma vitamin C and fruit and vegetable intake.*

The investigators analyzed data from 87,030 men and women enrolled in the Copenhagen General Population Study and 10,173 participants in the Copenhagen City Heart Study. Plasma vitamin C levels were measured in 3,512 newly recruited subjects and dietary intake data was available for 83,256 subjects.

Ischemic heart disease was documented in 10,123 individuals and there were 8,477 deaths over the studies' follow-up periods. "We can see that those with the highest intake of fruit and vegetables have a **15%** lower risk of developing cardiovascular disease and a **20%** lower risk of early death compared with those who very rarely eat fruit and vegetables," reported lead author Camilla Kobylecki.

Editor's Note: "At the same time, we can see that the reduced risk is related to high vitamin C concentrations in the blood from the fruit and vegetables," Dr. Kobylecki added.

* *Am J Clin Nutr.* 2015 Jun;101(6):1135-43.

Minimum Vitamin D Dose Inadequate For Overweight African Americans

On July 4, 2015, the journal *BioMed Central Obesity* published the results of a trial of overweight and obese African Americans that revealed a failure of the Institute of Medicine's recommended minimum daily dose of vitamin D to elevate serum levels to a healthy range after 16 weeks of treatment.*

The trial included 70 overweight or obese African Americans between the ages of 13 to 45 years with 25 hydroxyvitamin D levels of **20 ng/mL** or lower. Participants were randomized to groups that received a placebo or a monthly dose equivalent to **600 IU** (international units), **2,000 IU**, or **4,000 IU** vitamin D per day for 16 weeks.

While the two higher doses were successful at restoring serum vitamin D levels to **30 ng/mL** or more at 16 weeks, those who were given the lowest dose failed to achieve this level.

Editor's Note: In contrast, participants in the **2,000** and **4,000 IU** equivalent group reached a serum level of **30 ng/mL** as early as eight weeks. Life Extension has long recommended that optimal 25-hydroxyvitamin D levels are in the range of **50-80 ng/mL**.

* *BMC Obes*. 2014 Jul 4.

Aging Switch Located

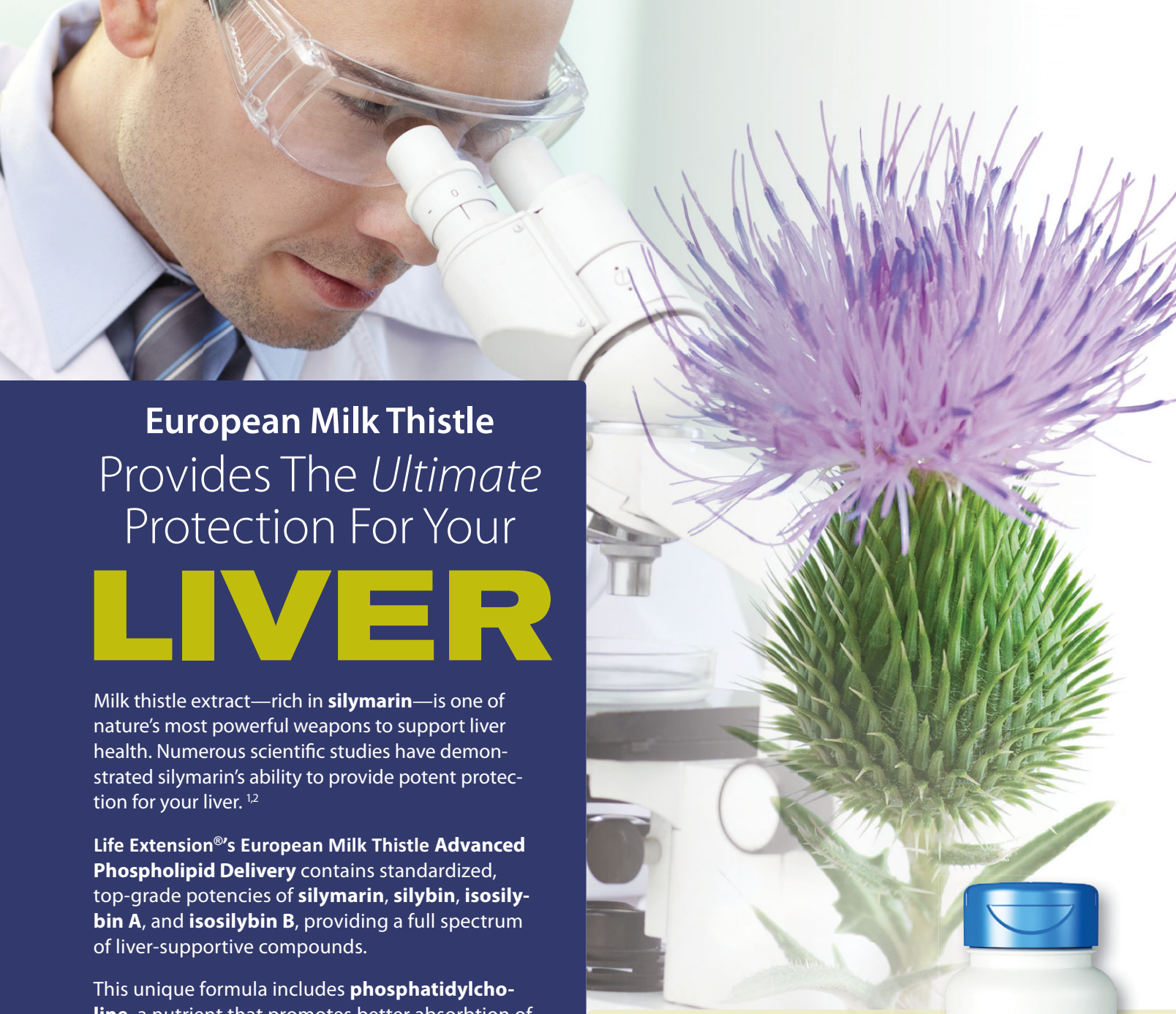
Reducing many of the effects of aging might be something as simple as the flip of a switch, according to a report published on July 23, 2015, in *Molecular Cell*.*

Research conducted at Northwestern University found that the heat shock response, which is essential for proper protein formation and cellular health, declined steeply over a period of hours that coincided with the onset of reproductive maturity in *C. elegans* (a roundworm used in aging experiments) due to the activation of a genetic switch. The switch is conserved in humans and other animals, making it a target for aging research.

By blocking germline cells from sending the signal, Richard I. Morimoto and Jonathan Labbadia found that the tissues of adult animals remained stress resistant. "We had, in a sense, a super stress-resistant animal that is robust against all kinds of cellular stress and protein damage," Dr. Morimoto reported.

Editor's Note: "*C. elegans* has told us that aging is not a continuum of various events, which a lot of people thought it was," Dr. Morimoto commented. "In a system where we can actually do the experiments, we discover a switch that is very precise for aging. All these stress pathways that ensure robustness of tissue function are essential for life, so it was unexpected that a genetic switch is literally thrown eight hours into adulthood, leading to the simultaneous repression of the heat shock response and other cell stress responses."

* *Mol Cell*. 2015 July 23.



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European Milk Thistle Advanced Phospholipid Delivery, with **480 mg** of silymarin, is a unique complex that is absorbed nearly **5 times** better than silymarin alone, and its concentration in the liver is **10 times** better.

References:
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BY RAEGAN LINTON

AMPK and Aging "A Technical Review"

The notion that we "***die of old age***" is a common and misleading myth of modern medicine.

We die not of old age, but of cumulative failures within our cellular machinery. These failures should not be thought of as inevitable breakdowns, but instead as reversible *elements of aging*.

One such reversible factor is a cellular enzyme called **AMPK**.

No matter which organ system or underlying disease is involved, if you trace the pathological process far enough back, you will likely encounter a problem related to insufficient **AMPK** activity.

This is good news for people who believe in significantly extending their life spans. That's because a growing body of evidence suggests that boosting **AMPK activity** can prevent, and even reverse,[1-4] life-shortening effects of aging. This includes disorders as disparate as cardiovascular disease, diabetes, liver and kidney failure, neurodegenerative diseases (e.g., Alzheimer's), cancers, and more.[5]

In fact, scientists are beginning to refer to AMPK as literally *a suppressor of aging itself*.[6]

Substantial evidence indicates that **restoring** AMPK activity not only increases longevity, but works to fight the symptoms of aging in individual body systems.

In this article, we'll take a closer look at AMPK, what it does, and how its activity level changes with advancing age and unhealthy lifestyles. We'll then examine evidence showing that restoring AMPK activity can increase healthy longevity.

What Is AMPK?

AMPK stands for *adenosine monophosphate-activated protein kinase*.[7] It is found in every living cell of every living mammal (and most other animals) on Earth.[8-12] If you want to avoid the life span-shortening symptoms of aging, you need to maintain optimal AMPK activity.[13]

AMPK has been referred to as a "metabolic master switch."[14] AMPK controls a gamut of metabolic pathways that enable us to extract energy from food, store and distribute that energy safely through the body, and ultimately use that energy for everything from moving and mating to talking and thinking, and even to understanding these very words as you read them.[14,15]

The core role of AMPK is to sense each cell's energy status at every moment, and to trigger responses that maintain the cell's energy at precisely the optimum level.[5,9,14] Too little available energy starves the cell, while too much energy can exhaust and disrupt cellular components.[16] In either case (too little or too much energy), the cell (and the tissues, organs, and systems in which it is a part) functions inefficiently. That energy inefficiency ultimately leads to the dysfunctions we identify as the diseases (or symptoms) of aging.

Here's how AMPK works: Every cell in your body depends absolutely on a steady supply of energy in the form of chemical bonds.[17,18] When you eat and absorb nutrients, energy from chemical bonds in food is released and passed down a complex series of enzymes until it is stored again in a molecule called adenosine ***tri***phosphate, or **ATP**. The more ATP that is present in the cell, the higher the cell's available energy supply. When ATP is broken down to release energy for cellular work, a major end product is adenosine ***mono***phosphate, or **AMP**.[5,19]

If a cell were to use up all of its energy from ATP, it would rapidly fill up with low-energy AMP molecules. It would then run out of energy, and shortly thereafter, it would collapse and die, unable to sustain even the simplest energy-requiring processes.

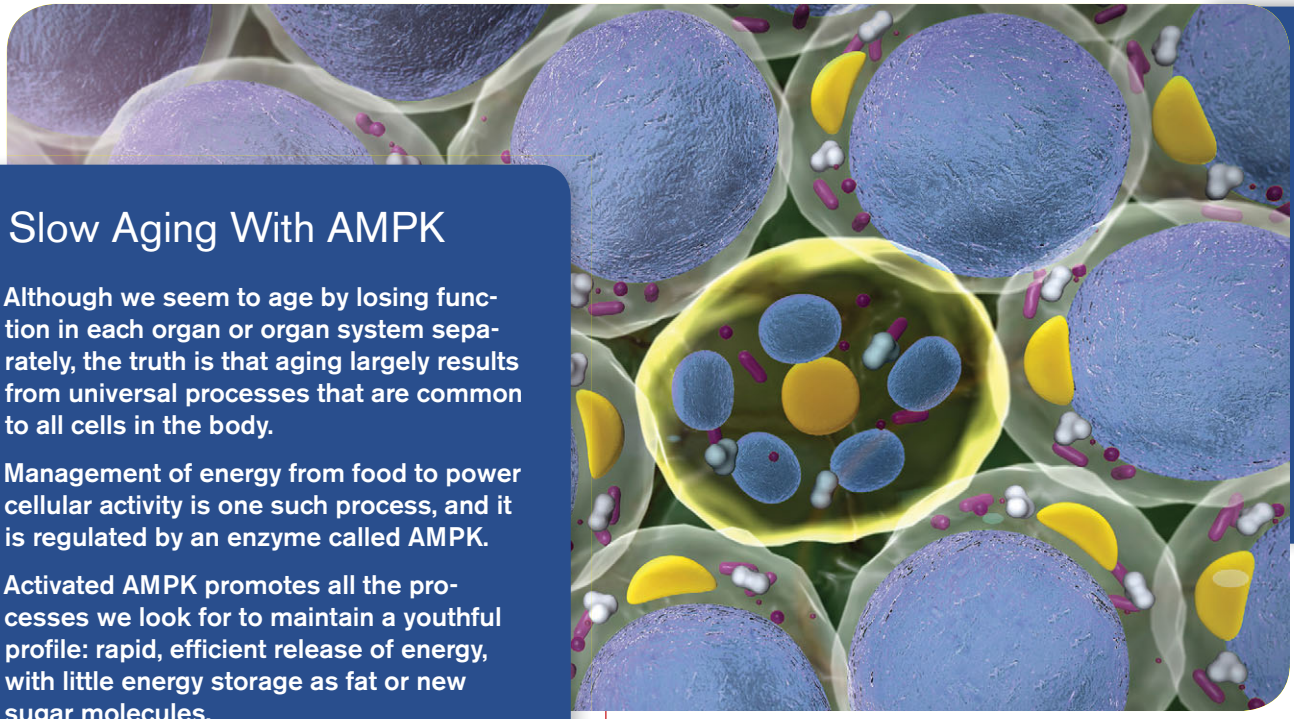
And that is precisely where AMPK comes into play.

AMPK is biochemically activated in the presence of rising levels of AMP (and decreasing levels of ATP).[5] Activated AMPK, in turn, increases fatty acid oxidation and glucose transport, thereby releasing additional energy from available or stored sources (fats and sugars).[14]

These processes, detailed in Table 1 at the bottom of this page, all work together to balance cellular metabolism.[5,9] The net result is tight control over cellular energy levels so that they never fall low enough to impair cellular activity, but never rise high enough to damage cellular machinery.

TABLE 1: Impact Of AMPK Activation In Selected Human Tissues[5]

Effect / Tissue	Energy-Releasing Processes				Energy-Storing Processes		
	Glucose Uptake	Fat Burning	Glucose Burning	New Mitochondria	Fat and/or Cholesterol Synthesis	Fat Storage and Release	Glucose Synthesis
Skeletal Muscle	↑	↑		↑			
Cardiac Muscle	↑	↑	↑				
Liver	↑	↑			↓		↓
Adipose (Fat) Tissue		↑			↓	↓	



What You Need To Know

Slow Aging With AMPK

- **Although we seem to age by losing function in each organ or organ system separately, the truth is that aging largely results from universal processes that are common to all cells in the body.**
- **Management of energy from food to power cellular activity is one such process, and it is regulated by an enzyme called AMPK.**
- **Activated AMPK promotes all the processes we look for to maintain a youthful profile: rapid, efficient release of energy, with little energy storage as fat or new sugar molecules.**
- **Thus, activated AMPK keeps us lean and active, with a steady renewal of cellular components.**
- **AMPK activity fades with age. Just as importantly, when excessive calories are available, the result is accelerated tissue aging.**
- **You can boost AMPK activity through exercise and/or calorie restriction, but should also make use of natural supplements that support AMPK activity.**
- **Boosting AMPK activity will keep your tissues young and slow aging throughout your body.**

The benefit of such tight control of energy levels is evident from studies of fruit flies genetically modified to synthesize high levels of AMP: They live up to one-third longer as a result of precise energy maintenance by activated AMPK.[20]

A long life span would be predictable from the data in Table 1, which shows that activated AMPK promotes energy-releasing processes while suppressing energy-storing processes. As a result, organisms with high AMPK activity are vigorous, active, and lean, with relatively low blood sugar and fat levels and little fat storage, and a very low risk of heart disease, diabetes, and other metabolic disorders.

AMPK also promotes the cellular "housekeeping" function called autophagy,[21,22] in which cells consume themselves and recycle their contents, a process that eliminates damaged DNA[23] and misshapen proteins[24] that can themselves impair cellular function and even trigger cancers.[25-32] As a result, young organisms with higher AMPK activity[33] have a very low risk of cancer and degenerative disorders, such as Alzheimer's disease,[33] which stem from misfolded or damaged proteins.

High levels of activated AMPK occur in youth, while ***low levels of activated AMPK occur in aging***.[34] We grow old, not simply because time passes, but because our youthful levels of AMPK drop away.

And AMPK activity does decline sharply with age.[35] That is why we become less energetic and get fatter as we grow older, while becoming increasingly vulnerable to cancer and diseases associated with impaired DNA and protein function.

But the modern American lifestyle, with its overabundance of nutrients and low level of physical activity, is even worse for the AMPK system than aging alone.

It is now clear that, when caloric intake remains much higher than needed to sustain energy expenditure (think couch potato eating potato chips), AMPK activation is markedly decreased.[36] This puts the body into a state exactly the opposite of that shown in Table 1. With reduced AMPK activity, cells decrease their energy-releasing ATP-generating activities, and instead shift to energy-storing processes that generate new fat deposits and make excess new glucose molecules.

The modern picture of the overweight American, living a sedentary lifestyle and enjoying an overabundance of carbohydrates and calories, is harmful for AMPK activation and therefore deadly. We are literally eating ourselves to death. By suppressing AMPK activation, we develop dangerous fat deposits, especially in the belly region. Burgeoning fat masses reduce insulin sensitivity[37-39] and produce systemwide inflammation,[40] which may contribute to "metabolic syndrome."[41]

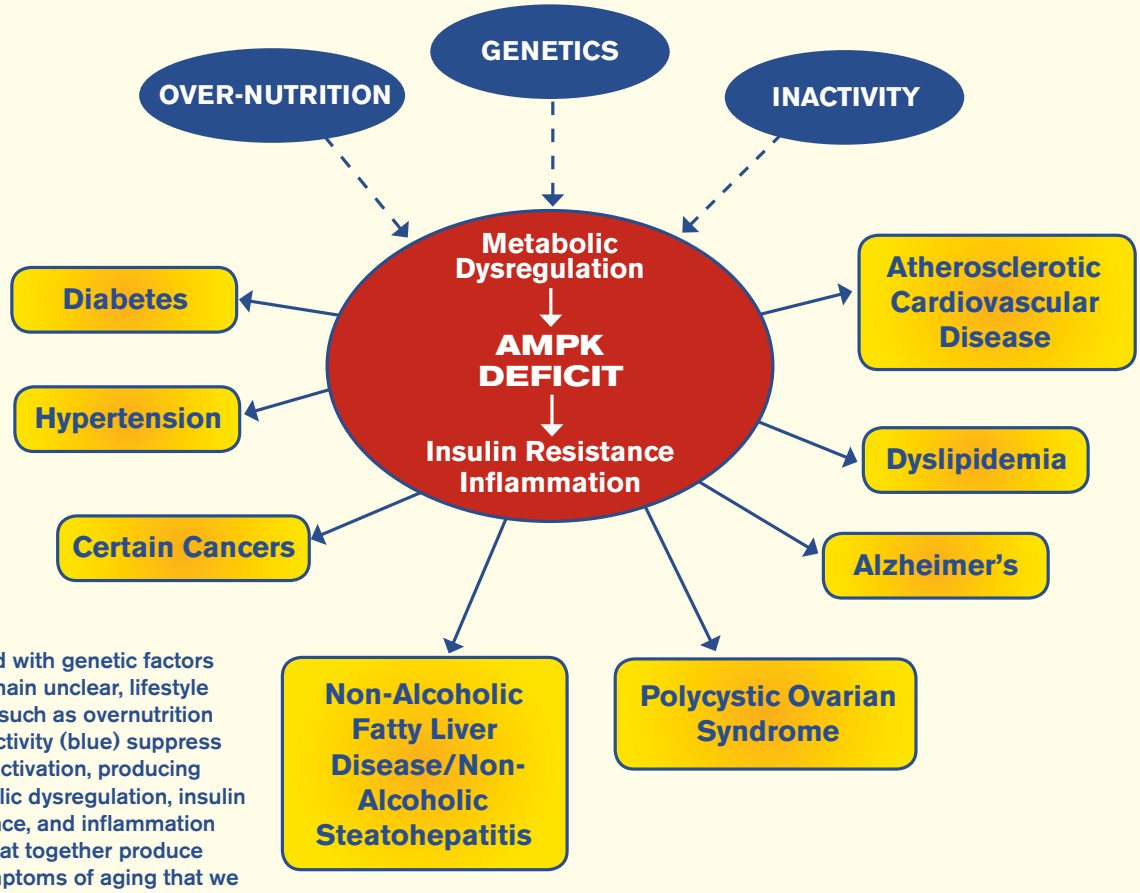
Inflammation is intimately involved in many disorders of aging, such as cardiovascular disease, diabetes, and cancer,[42] conversely, inflammation further suppresses AMPK activation in a rapidly tightening lethal spiral. These processes can be seen schematically in Figure 1.[41,43,44]

Activated AMPK Promotes Longevity

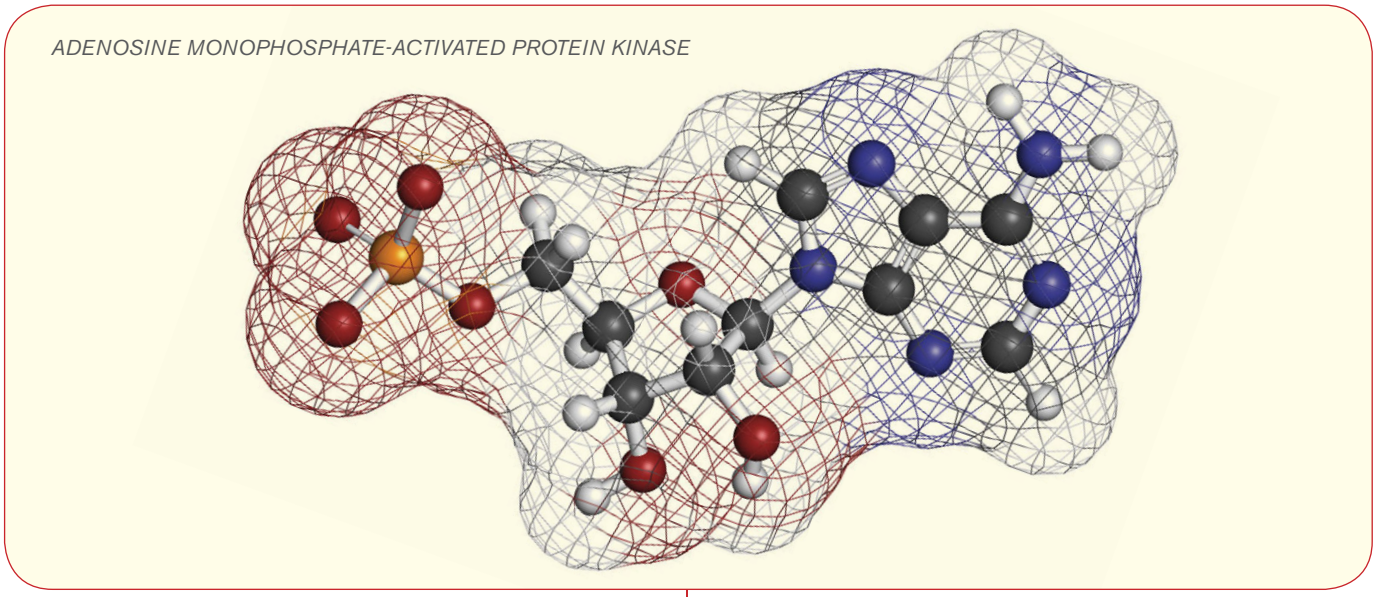
The good news, as we'll now see, is that we can restore our dwindling AMPK activity through a combination of lifestyle, diet, and supplement interventions, with the possibility of significantly increasing life span through mitigation of potentially fatal symptoms of aging.

The most compelling evidence that activating AMPK can help you live longer comes from a study just released in 2014, in which diabetic patients treated with the drug metformin, a potent AMPK activator, lived a median of **15%** longer than did matched controls without diabetes.[45]

FIGURE 1: Lifestyle And Genetic Factors Impair AMPK Activation



Coupled with genetic factors that remain unclear, lifestyle factors such as overnutrition and inactivity (blue) suppress AMPK activation, producing metabolic dysregulation, insulin resistance, and inflammation (red), that together produce the symptoms of aging that we identify as age-related diseases.



Take a moment to read that again: This study showed a ***longer*** median life span in diabetics than in healthy people—the only difference was their use of AMPK-activating metformin! By contrast, diabetics treated with drugs in the sulfonylurea category lived on average **38%** shorter lives than did the metformin-treated group.[45]

Metformin is the most commonly used antidiabetic drug,[46] but it has also been shown to have life-extending properties closely related to its activation of AMPK.[47] Metformin-treated roundworms, for example, have higher AMPK activity and live about **20%** longer than untreated control animals.[48]

Higher animals can also be made to live longer through metformin-induced AMPK activation. Mice supplemented with the drug demonstrated an increase in mean life span of nearly **6%** compared with controls.[47] As expected with AMPK activation, the supplemented mice also weighed less throughout their lives, which may have contributed to their increased longevity.

In fact, AMPK is so important in maintaining and restoring youthful function that it has been called a "gerosuppressor," that is, a compound that significantly suppresses, not one or several diseases, but processes of biological aging.[7] This is shown by the results of several lines of laboratory investigation.

AMPK activation triggers increased production of mitochondria, the energy-releasing "power plants" found in every cell.[49-54] Since a reduction in mitochondrial numbers and function is associated with accelerated aging,[55] AMPK-induced "mitochondrial biogenesis" can be expected to slow the aging process.

Activating AMPK in human cells in culture also stimulates production and activation of SIRT1,[56] an enzyme that is increased in laboratory animals with extended life spans.[57-59] SIRT1 can also be activated by marked calorie restriction, which has been demonstrated to increase life span in some species.[60] Research now shows that AMPK activation can trigger the life-extending actions of SIRT1.[41]

Studies in primitive animals demonstrate that AMPK slows aging by modulating expression of critical transcription factors and enzymes, as would be expected by its effects on SIRT1.[21,61,62] In fruit flies engineered to have higher AMP levels (which results in higher AMPK activity), for example, life span was extended by **one-third** compared with controls.[20]

One specific area of genetic modulation by AMPK is in control of systemwide inflammation; studies show that AMPK inhibits signaling by the master inflammation regulator called NF-kappaB.[13] Reducing inflammation throughout the body is a key target in extending life span by preventing premature death from complications of aging such as cardiovascular and metabolic diseases. Let's now look at some other aging manifestations, and see how AMPK can influence their outcomes.

Activated AMPK Promotes Systemic Healthy Longevity

AMPK activation has been shown to extend life span in several species.[20,63,64] We've looked at some of the universal ways it does this, e.g., enhancing energy utilization, promoting new mitochondria, and reducing inflammation. Starting on the next page is a quick rundown on the roles of AMPK in specific body systems, where its activation can reduce the risk of age-related disorders.

Immune Function

Infections are a leading cause of death among older adults and AMPK activation is critical in the immune system, where it has been shown to:

- Enhance white blood cells' ability to home in on and kill invading bacteria.[65]
- Prevent infection with Rift Valley Fever Virus (a potentially lethal virus originating in Africa) by blocking fatty acid synthesis the virus needs to replicate itself.[66]

Cancer

Cancer remains the second leading cause of death in the US.[67] Its growth and invasiveness are closely related to the loss of regulation of AMPK signaling.[68] AMPK activation is critical in:

- Inhibiting tumor cell growth and promoting tumor cell destruction by programmed cell death (apoptosis).[69-72]
- Increasing cancer cell vulnerability to chemotherapy.[73,74]
- Switching cancer cells' metabolism from the unique ability to burn sugar in the absence of glucose toward a more normal oxygen-requiring pathway, thereby inhibiting tumor growth.[75,76]

Cardiovascular Disease And Atherosclerosis

Heart and blood vessel diseases are the leading causes of death in Americans.[77] They are intimately related to AMPK's functions as an energy regulator, particularly when it comes to fatty acids and cholesterol.[78] Activation of AMPK has been shown to:

- Inhibit damage to blood vessel lining (endothelial) cells caused by oxidized LDL ("bad") cholesterol.[79]
- Reduce vascular cell death in response to low oxygen levels (which occur during a heart attack or stroke).[80]
- Reduce the ability of vascular smooth muscle cells to migrate and draw in inflammatory cells to form artery-clogging plaques.[81]
- Suppress activity of enzymes known to produce large volumes of dangerous reactive oxygen species that damage arterial linings.[82]
- Regulate oxidative metabolism to reduce inflammation caused by immune system cells in cardiac tissue.[83-85]
- Reverse the hypertension-inducing effects of angiotensin II, a peptide hormone involved in salt and fluid balance.[86]

Metabolic Syndrome And Diabetes

Diabetes alone is the seventh leading cause of death in America and like metabolic syndrome, energy balance is dysregulated.[87] As a metabolic regulator, AMPK has been shown to:

- Reduce insulin resistance and support glucose transport out of the bloodstream, allowing body cells to utilize available insulin and lower blood sugar.[88,89]
- Reduce weight gain in diet-induced obesity in animals.[90]
- Inhibit metabolic syndrome-associated inflammation.[13]
- Increase utilization of stored fat for energy, potentially helping to reduce both obesity and lipid disorders.[91]
- Reduce output of glucose from the liver, a major contributor to sustained high blood sugar levels.[92,93]
- Improve mitochondrial fat-burning[94] function and enhance the effect of the anti-obesity hormone adiponectin.[95]

Why It's Difficult To Lose Weight By Cutting Calories Without Exercise

If metabolism were as simple as accounting, overweight and obese people could readily lose weight simply by cutting their calorie intake and changing nothing else. For example, if you ate 2,500 calories a day, but only burned 1,800, you would gain weight. If you ate exactly 1,800 calories/day, you would maintain weight, and you could lose weight simply by cutting your caloric intake modestly, to, say 1,500/day, because your caloric intake would then be less than you burned.

As anyone who has tried dieting knows, it simply doesn't work that way. You can cut calories painfully, but lose very little weight unless you add a program of moderate exercise. Now that we understand how AMPK works, we can see why.

An American who has been enjoying a surfeit of calories for a long time has suppressed the AMPK system sharply.[36] That leaves the person's body in a state of continued energy storage and reduced energy utilization. Cutting calories forces the body to activate AMPK to make more of its own glucose and fat, and to sustain fat stores inappropriately.

Exercise, we now know, is a powerful AMPK-activating strategy.[9,41,51,109] So it is only when adding exercise, or some other AMPK-activating factor, that regular dieting becomes effective. Activated AMPK puts the whole body back on its youthful track, effectively burning off energy, while draining fat stores instead of refilling them.

Sustained exercise programs, of course, are hard for most people to manage. Drug companies are rushing to manufacture synthetic molecules to activate AMPK,[110] but these are years in the future and likely to be fraught with high costs and safety issues. Fortunately, a growing number of naturally occurring molecules show potent and safe AMPK-activating properties, and are available now at a low cost.[5]

Liver Disease

Fat accumulation in the liver is a major consequence of the metabolic syndrome, and can lead to liver inflammation and scarring that shortens life span.[96,97] AMPK activation in liver tissue:

- Reduces the expression of lipogenic genes while increasing the expression of lipolytic genes.[98]
- Inhibits liver fibrosis, the scarring that leads to life-threatening cirrhosis.[99]
- Increases the number of mitochondria, thereby enhancing fatty acid oxidation.[100]

Promoting AMPK Activation Naturally

It is evident that you should do all you can to maintain and even boost your AMPK activity if you want to slow aging throughout your body. You can use drugs, but obtaining prescriptions for drugs like metformin is challenging unless you happen to be a type II diabetic.

More natural ways to boost AMPK involve lifestyle changes. Regular moderate exercise is a good approach, since we know that muscle contractions are potent triggers for AMPK activation.[9,14,21] And of course, an exercising body uses up ATP, generating higher AMP levels, activating AMPK.[5] As we age past 60, however, the ability of vigorous exercise to increase AMPK diminishes.

Or, you can take the opposite approach, metabolically, by engaging in marked calorie restriction of **30%**, which is not the same as the moderate dieting we all try. In this case, low levels of available energy lead to rising AMP levels, and again activation of AMPK. AMPK activation is credited with the remarkable life extension seen in several species, with promising physiological effects in humans.[35,48,63,101]

But, regardless of which of these strategies you try, or even if you haven't the discipline to do any of them, there is still plenty you can do to boost your AMPK activity by using certain supplements. Indeed, many supplements originally recognized for their nutritional properties are now being found to increase AMPK activation, which may contribute to their life-extending effects.[102]

Here are two of the better-documented **AMPK-activating** ingredients and their beneficial impact on processes that accelerate aging:

1. *Gynostemma pentaphyllum*, a traditional Vietnamese herb, activates AMPK to dramatically reshape the way human bodies handle excess glucose and fat.[103-106] A study of human type II diabetics, taking no medications, showed that daily supplementation with *G. pentaphyllum* tea for 12 weeks:[103]

- Reduced fasting blood sugar levels by a significant **54.1 mg/dL**, compared with just **10.8 mg/dL** in the control group.
- Lowered hemoglobin A1c levels, a measure of chronic glucose elevation, by a **2%** unit reduction, which accounts for a **10-fold** improvement over controls.
- Significantly reduced insulin resistance in the supplemented group, while insulin resistance rose in the control subjects.

A similar study in type II diabetics already on therapy with a common antidiabetic drug, gliclazide, showed that *G. pentaphyllum* extract could add significantly to the drug's effects:[105]

- A further reduction in fasting blood sugar of **52.2 mg/dL** in subjects who added the supplement, compared with just **16.2 mg/dL** in patients on the drug alone.
- A **2%** unit reduction in hemoglobin A1c in supplemented patients, compared with only **0.7-unit** reduction in controls.

A study of obese people with elevated waist-to-hip ratio showed that daily supplementation with *G. pentaphyllum* extract for 12 weeks:[106]

- Significantly reduced body weight, total abdominal fat area, body fat mass, percentage of body fat, and body mass index, compared to a placebo group of similarly obese patients.

2. *Trans*-tiliroside, a bioactive obtained from rose hips, adds additional AMPK activation to sharply curtail fat accumulation and speed fat burning. In cultured human fat cells (adipocytes), rose hip extract and *trans*-tiliroside both prevented new fat accumulation.[107]

When mice were made obese through a high-fat diet, and then either supplemented with rose hip extract or no supplement, the supplemented animals:

- Gained less body weight and developed less abdominal fat than the control animals.
- Had lower liver weight, indicating less liver fat, than controls.

In a study of obese humans, a daily drink made from rose hip powder, used for six weeks, resulted in:[108]

- Reduction of systolic blood pressure by **3.4%**.
- Reductions in total and LDL ("bad") cholesterol of **4.9** and **6%**, respectively, and of **6.5%** in the ratio of LDL to HDL ("good") cholesterol.
- A **17%** reduction in a standardized cardiovascular disease risk score.

It seems certain that many other natural products will emerge as AMPK activators, given the widespread distribution of AMPK throughout the world.

Summary

To really understand aging, we have to recognize that it is not an automatic result of time passing, but rather the result of reversible events that occur in all cells, regardless of the tissue or organ system to which they belong.

One of the most fundamental of those events is a decline in activity of AMPK, the universal cellular energy sensor that dictates whether cells store energy as dangerous fats or use energy efficiently to power vital processes. Activated AMPK creates a more youthful energy profile, one with only small amounts of fat stores, a great deal of energy for useful activity, and rapid recycling of old, damaged proteins.

Studies are increasingly revealing the central role of AMPK in maintaining youthful function across the entire spectrum of cell and tissue types, resulting in increased longevity. This "systemic anti-aging" approach is likely to be much more successful than mainstream medicine's "one disease at a time" strategy, which treats each disease as a separate entity and accounts for America's destructive addiction to prescription drugs.

It's critical that you understand AMPK and how to optimize its activation in your body if you want to extend your life span in the best possible state of health. ●

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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Importance Of AMPK

Studies show **increased** AMPK activity supports reduced fat storage,[6] new mitochondria production,[7] and the promotion of healthy blood glucose and lipids already within normal range.[4]

Gynostemma Pentaphyllum

An extract of the plant *Gynostemma pentaphyllum* promotes **AMPK** activation![8-10] In one of many studies showing a wide variety of benefits, researchers documented a 1-inch reduction in **abdominal circumference** in overweight individuals who took **450 mg** daily of *G. pentaphyllum* extract for 12 weeks.[11]

Trans-Tiliroside

Trans-tiliroside, extracted from plants such as **rose hips**, boosts **AMPK** activation, but triggers different downstream metabolic benefits than *G. pentaphyllum*.[12-14] Among its many benefits, a low equivalent dose of **56 mg** daily *trans-tiliroside* has been shown by researchers in preclinical studies to promote healthy blood glucose levels and body weight already within normal range.[15]

Activate Your AMPK!

Over **7,500** published studies document the role that **AMPK** plays in protecting critical cellular functions. Those seeking healthy aging should prioritize re-activating their AMPK cellular enzyme.

AMPK Activator provides nutrients shown to significantly boost **AMPK** activity. The suggested daily dosage of **AMPK Activator** is to take two capsules with the first meal of the day and one capsule with the second meal. Three capsules provide:

ActivAMP®	
Gynostemma pentaphyllum extract	**450 mg**
Rose hip extract	**1,119 mg**
Standardized to 5% ***trans*-tiliroside**	**56 mg**

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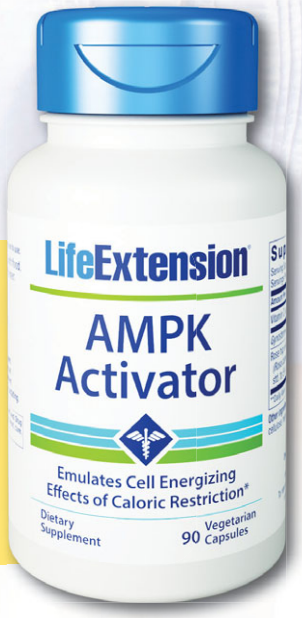

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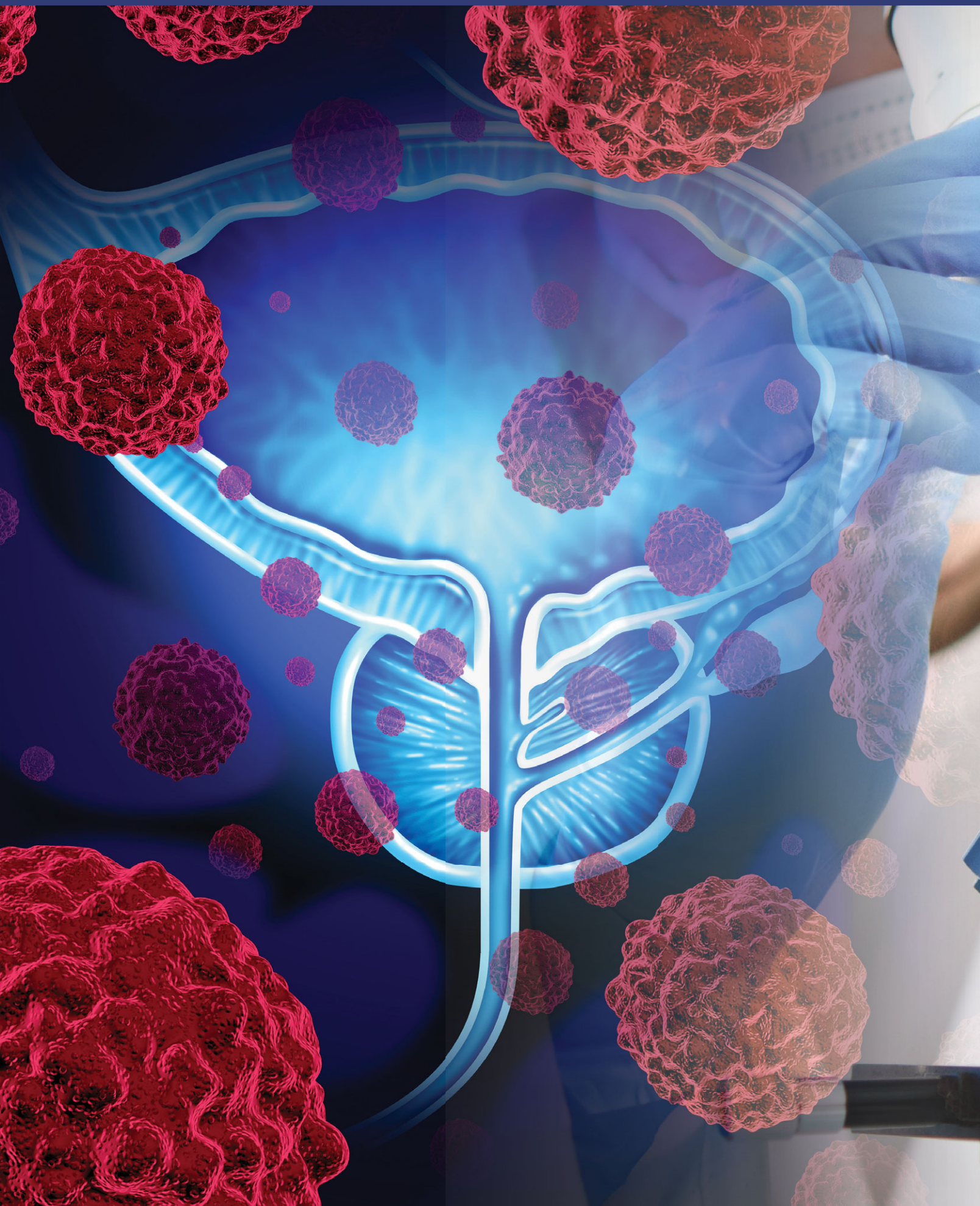
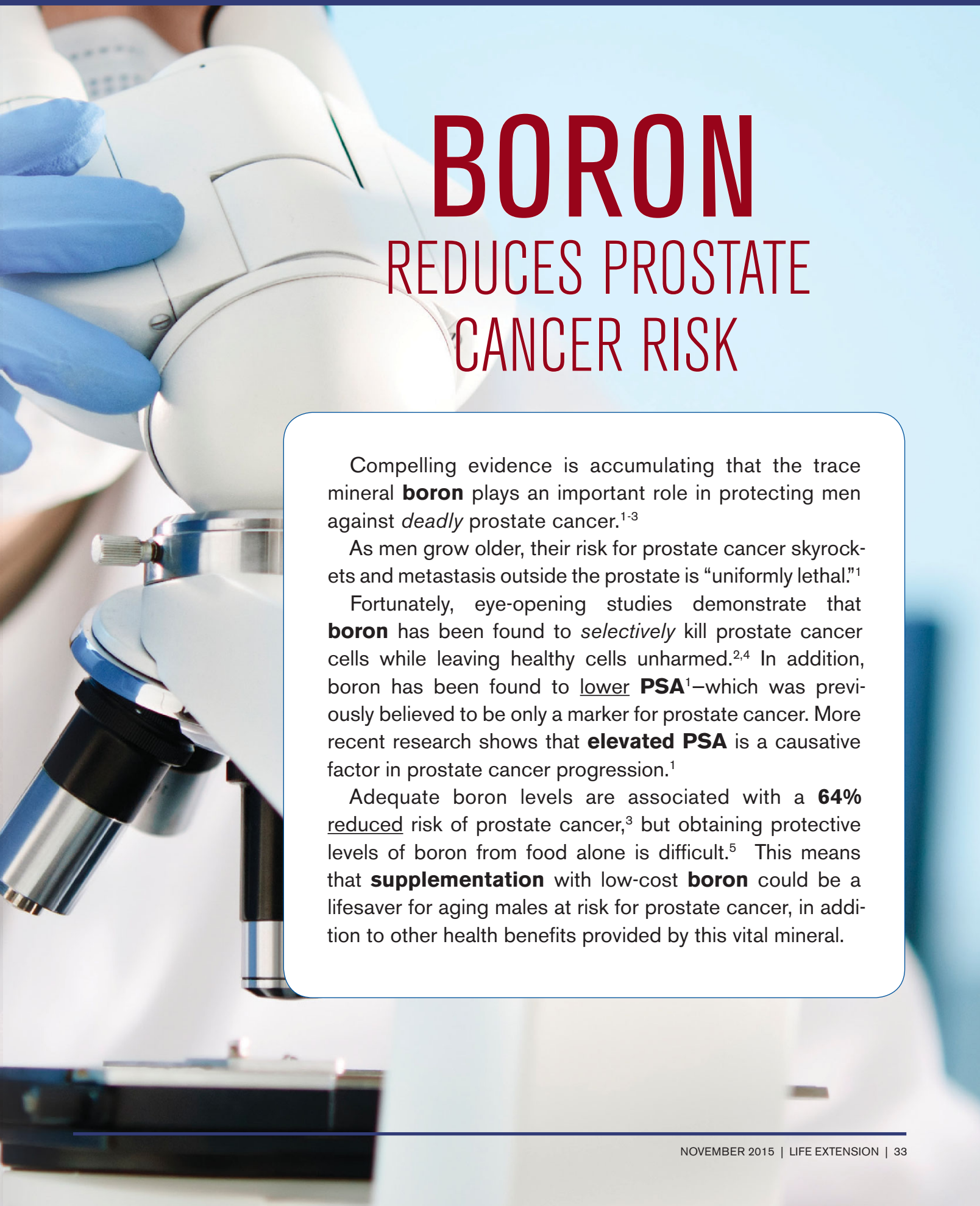


BY MICHAEL DOWNEY



BORON
REDUCES PROSTATE CANCER RISK

Compelling evidence is accumulating that the trace mineral **boron** plays an important role in protecting men against *deadly* prostate cancer.[1-3]

As men grow older, their risk for prostate cancer skyrockets and metastasis outside the prostate is "uniformly lethal."[1]

Fortunately, eye-opening studies demonstrate that **boron** has been found to *selectively* kill prostate cancer cells while leaving healthy cells unharmed.[2,4] In addition, boron has been found to lower **PSA**[1]—which was previously believed to be only a marker for prostate cancer. More recent research shows that **elevated PSA** is a causative factor in prostate cancer progression.[1]

Adequate boron levels are associated with a **64%** reduced risk of prostate cancer,[3] but obtaining protective levels of boron from food alone is difficult.[5] This means that **supplementation** with low-cost **boron** could be a lifesaver for aging males at risk for prostate cancer, in addition to other health benefits provided by this vital mineral.

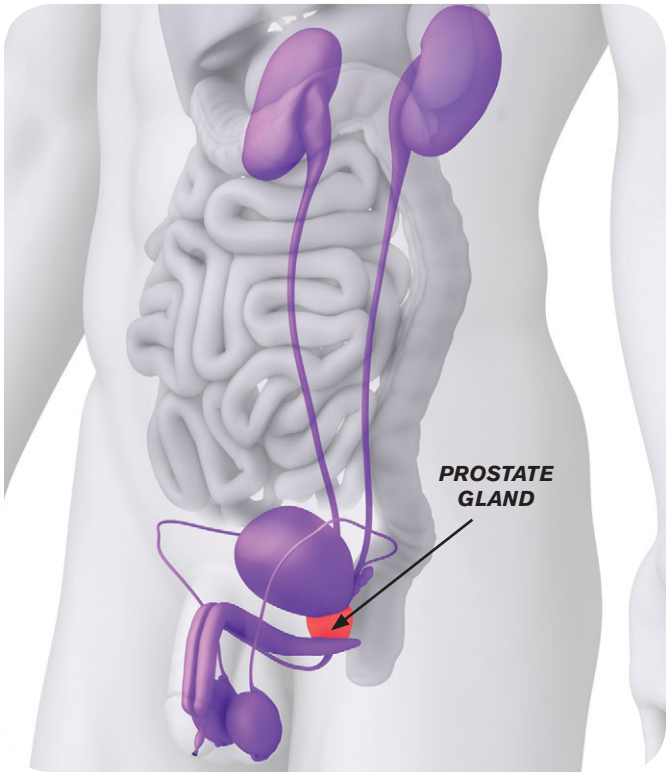
Preferentially Targets Prostate Cancer Cells

The idea that supplemental use of boron might reduce the risk of prostate cancer was first brought to the attention of scientists following a 2001 study on dietary patterns of prostate cancer patients as reported long ago in ***Life Extension*** magazine.

This study compared the diets of 76 prostate cancer patients with those of 7,651 men without cancer. Researchers found that men who ingested the greatest amount of boron from their diets were **64%** less likely to develop prostate cancer than those who consumed the least.

Interestingly, while there was a significant decrease in cancer risk in the group that consumed the most boron, those in the highest intake group only consumed 2.5 additional servings of fruit and one additional serving of nuts per day compared to those in the lowest boron intake group.[3]

A subsequent study confirmed these findings. For the study, the researchers compared the dietary boron intake of 95 prostate cancer patients with that of 8,720 healthy male controls. Researchers controlled for age, race, education, smoking, body mass index, dietary caloric intake, and alcohol consumption. They found that men with the highest boron intake showed a **54%** lower risk of prostate cancer compared to those with the lowest intake.[6] In addition, they noted that increased dietary boron intake was associated with a decreased risk of prostate cancer in a dose-response manner.



These findings not only underscored the remarkable, broad-spectrum health benefits associated with consuming fruits, but also suggested that boron in particular may be responsible for some of these protective benefits.

Encouraged by these epidemiological findings showing a connection between dietary intake of boron and reduced risk for prostate cancer, scientists set out to determine if supplementing with boron could protect against prostate cancer. Initial animal studies indicate that the answer is yes.

In a validated animal model of prostate cancer, researchers found that oral administration of various concentrations of a boron-containing solution substantially decreased tumor size. It also lowered levels of prostate-specific antigen or PSA—the most abundant protein synthesized in the prostate gland—suggesting a possible mechanism for these anticancer effects.[7]

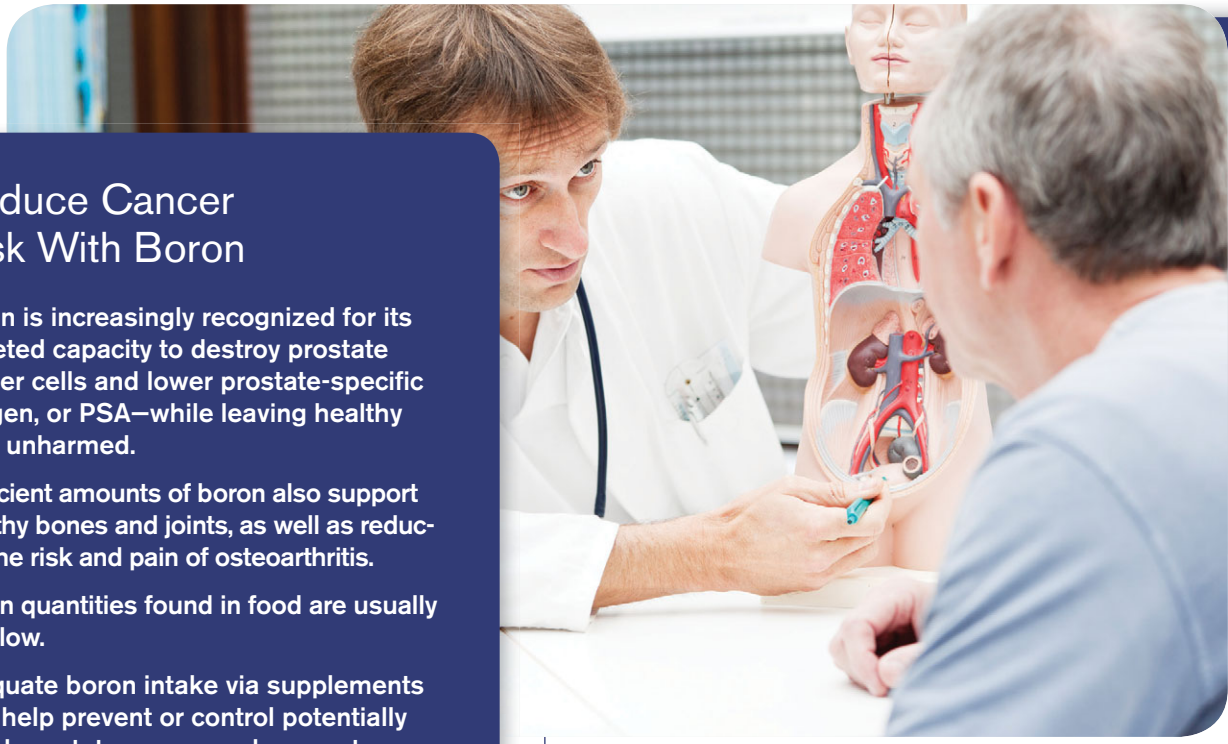
In this animal model, researchers orally administered various concentrations of a boron-containing solution to test subjects and found that this resulted in decreases in prostate tumor size by **25%** to **38%**. Remarkably, PSA levels dropped by an astounding **86%** to **89%** in the animals that received boron.[7]

These findings suggested that supplemental boron may have both preventive and therapeutic effects—helping both to shrink prostate tumors and to decrease levels of PSA.

Novel Protective Mechanisms

The finding that supplemental boron can help to shrink prostate tumors while also decreasing levels of PSA[7] is particularly exciting. At one time, PSA was viewed primarily as a blood indicator of prostate cancer, infection, or inflammation. However, evidence now reveals that PSA plays a critical role in the progression and metastasis of prostate cancer, thus opening up new therapeutic pathways for preventing and treating this epidemic disease with PSA-lowering nutrients such as boron.[1,8-11]

Scientists now believe that elevated PSA breaks down the protein surrounding the cells (called the extra-cellular protein matrix) within the prostate gland. The breakdown of these cellular barriers by excess PSA may be what enables prostate cancer cells to more readily invade healthy tissue and spread themselves beyond the prostate gland, with potentially lethal consequences.[8] This remarkable data provides further understanding as to how we may prevent or slow down prostate cancer by reducing PSA levels.



What You Need To Know

Reduce Cancer Risk With Boron

- **Boron is increasingly recognized for its targeted capacity to destroy prostate cancer cells and lower prostate-specific antigen, or PSA—while leaving healthy cells unharmed.**
- **Sufficient amounts of boron also support healthy bones and joints, as well as reducing the risk and pain of osteoarthritis.**
- **Boron quantities found in food are usually very low.**
- **Adequate boron intake via supplements may help prevent or control potentially lethal prostate cancer and support optimum health.**

Published evidence further suggests that higher intake of boron-containing compounds can inhibit PSA activity[7] and lower the risk of prostate cancer by reducing intracellular calcium signals and storage.[12]

Using Boron As Adjuvant Treatment

A number of studies have led researchers to conclude that boron could have specific therapeutic potential in the treatment of prostate cancer.

Less well-known than PSA is a protein called **prostate specific membrane antigen** or **PSMA**. While PSMA has not yet been completely verified as a marker for prostate cancer, studies have shown that the expression of PSMA in tumors and metastases of men with prostate cancer is greater than PSMA in men without prostate cancer.[13]

In **2014**, scientists published a cell study based on the ability of boron to inhibit **PSMA**. They found that boron-rich compounds demonstrated significant uptake by prostate cancer cells, which indicated that boron compounds may be useful in developing a new class of therapeutic agents—among those known as **boron neutron capture therapy** or **BCNT**—against prostate cancer. BCNT is a type of noninvasive, injection-based anticancer therapy using boron.[14]

Another aspect of boron that makes it an especially beneficial therapeutic agent is its ability to selectively inhibit the growth of prostate cancer cells while still allowing normal prostate cells to grow. Scientists know that these actions are dose-dependent, though the underlying mechanism for this targeted effect is still under investigation.[4]

A **2014** study published in *Tumour Biology*, however, did reveal that a compound containing boron induced apoptosis, or cell death, in prostate cancer cells. The researchers were able to determine that the boron agent disrupted the normal organization of prostate cancer cells' **actin filaments**, which are threadlike, protein fibers that are an essential element or building block of the cell. The compound containing boron exerted other cytotoxic or cell-killing effects, including the reduction of telomerase activity in the cancer cells. They concluded that the boron in this compound "***could be an important agent for its therapeutic potential in the treatment of prostate cancer***."[2]

The increasingly evident conclusion is that ensuring an adequate daily boron intake via supplementation—and not relying on the small and extremely variable amounts of boron available in plant foods from different agricultural regions—represents an important component of a strategy to prevent prostate cancer and maintain optimal PSA levels.

In fact, emerging studies now suggest that boron delivers another layer of protection against the symptoms of this prostate cancer—in the bone.

Prostate Cancer: What's Your Risk?

Also known as carcinoma of the prostate–a gland in the male reproductive system–prostate cancer:

- Is diagnosed in about 209,000 American men every year[31]
- Is the most common cancer among men[32,33]
- Is the second leading cause of cancer death among men (after lung cancer)[32]
- Kills about 28,000 American men annually[31]
- Can occur without exhibiting any symptoms at all[34]
- Can result in any of the following symptoms:[34]
  - Difficulty starting urination
  - Weak or interrupted flow of urine
  - Frequent urination, especially at night
  - Difficulty emptying the bladder completely
  - Pain or burning during urination
  - Blood in the urine or semen
  - Pain in the back, hips, or pelvis that doesn't go away
  - Painful ejaculation
- May be up to **64%** less likely to strike men with adequate boron levels than men with boron deficiency[3]

Critical Player In Bone Health

The major and most deadly danger in prostate cancer is its ability to spread to the bone, which is its natural evolution. Bone is the initial and main site for about **80%** of all prostate cancer metastases.[15] They occur most commonly in the spine, pelvis, ribs, skull, and proximal femur.[16]

These bone metastases induce significant skeletal remodeling, fractures, anemia, and pain—and are a major cause of morbidity and mortality.[17] Prostate cancer has been described as "uniformly lethal once it has escaped the confines of the prostate gland."[1] Sadly, the median survival of patients after prostate cancer has spread to the bone is 40 months.[16]

Although more studies are needed, boron's remarkably targeted capacity to inhibit the spread of prostate cancer cells while sparing normal cells[4] may have the same targeted effect against prostate cancer cells that have migrated to the bone. With wider boron supplementation, this cytotoxic effect—combined with boron's potential to help prevent prostate cancer from occurring in the first place—could reduce the current 28,000 American deaths from this disease every year.[1]

Weak bones—whether the result of cancer or aging—can lead to pain, fracture, and disability. Few people realize that boron plays an integral part in bone metabolism. Boron supports the functions of calcium, magnesium, and vitamin D, all of which are crucial to promoting dense, healthy bone tissue.[5,18-20]

In an important study of postmenopausal women who were not on estrogen replacement therapy, scientists found that a boron-supplemented diet increased levels of two hormones associated with healthy bone mass. Boron also reduced depletion of the body's stores of bone-building calcium and magnesium—importantly, this benefit occurred during periods of both adequate magnesium intake and magnesium deficiency.[19]

Another study showed that when animals were fed a diet deficient in vitamin D, increasing their dietary intake of boron helped support optimal calcium absorption—demonstrating that boron promotes optimal mineral balance and ensures healthy calcium utilization.[20]

A 2013 scientific review found that calcium fructoborate—a natural boron complex—significantly reduces human serum levels of **C-reactive protein** (CRP). This protein is a marker for inflammation, and has been identified as a possible contributor to the disruption of the normal bone remodeling process. Remodeling is essential to healthy bone mineral density, and the study author concluded that this boron complex *"**may contribute to bone health by controlling the inflammation associated with loss of bone mineral density**."*[21]

Helps Reduce Inflammatory Conditions

Beyond its promising reduction of prostate cancer risks, boron's anti-inflammatory mechanisms have other benefits throughout the body. About **52 million** Americans suffer from some form of arthritis.[22] Fortunately, boron inhibits pro-inflammatory factors that contribute to the development of arthritis.[21,23]

A review of previous studies found that boron exerts favorable immunomodulatory effects on the inflammatory process, decreasing joint swelling and improving restricted movement. Boron was also found to inhibit ***lipoxygenase*** (LOX)—an enzyme that triggers the inflammatory cascade to increase inflammatory leukotrienes.[24]

In a double-blind study in people with severe osteoarthritis, scientists found that in those who completed the trial, **71%** of those taking boron improved, while only **10%** of those taking placebo improved. No side effects were observed.[25]

We mentioned earlier that boron is essential to promoting strong, healthy bones. This makes boron especially important for those suffering from osteoarthritis. This was clearly demonstrated in a study in which scientists compared control bone samples to samples taken from fracture patients and osteoarthritis patients. While fracture bone samples did not differ from control samples, bone samples taken from areas adjacent to osteoarthritic joints showed reduced mineral content—including a lower level of boron. This suggests that there is a more rapid turnover of bone in afflicted joints and that boron—used as a bone-building material—is quickly depleted.[26]

One study even found that boron can reduce the pain associated with osteoarthritis. For the study, **50%** of osteoarthritis patients who received **6 mg** of boron daily reported less pain from movement, while only **10%** given a placebo experienced similar improvement.[25] This was likely due to decreased production of pain-provoking inflammatory mediators.[27-29]

Adding further proof to boron's beneficial impact on arthritis, researchers have found a connection between dietary intake and incidence of arthritis. In areas of the world where daily boron intake is **1 mg** or less, the incidence of arthritis ranges from **20%** to as high as **70%**. Conversely, in world regions where daily boron intake is **3** to **10 mg**, the incidence of arthritis is much lower, ranging from **0** to **10%**.[30]

These findings indicate that adequate boron intake confers powerful protection against osteoarthritis.

Summary

In addition to its potent support for healthy bones and joints, boron is emerging as a highly targeted inhibitor of prostate cancer cells and their metastases.

It can kill these cancerous cells without harming healthy prostate cells.

Boron: Not Abundantly Found In Food

Boron is a trace mineral that is essential to plant growth and finds its way into the human diet through our consumption of plant foods–especially apples, plums, grapes, avocados, vegetables, nuts, and legumes.

Despite its widespread availability in plant foods, ingesting adequate amounts of boron through dietary choices can be difficult. Why? Because the total quantity of boron in any one plant food is very low.[35]

For example, apples are considered to be a good source of boron. However, to attain the minimum **3 mg** daily intake of boron that is generally suggested, you would need to eat about **2.4 pounds** of apples a day[35]–that's over eight apples![36] You wouldn't have to worry about surpassing the tolerable daily intake (TDI) for boron until you managed to consume about 68 apples during a single day![35,36]

Worse, with modern dietary habits, many individuals can develop a boron deficiency by simply failing to eat enough fruits, vegetables, and nuts. And even among those whose diets include rich quantities of these plant foods, their boron intake will be greatly affected by regional geology because the food content of boron varies greatly according to the boron content of the soil in the region where the produce was grown. Even local preferences for some foods over others can result in high or low human boron levels.[36,37]

Ensuring optimal boron intake becomes increasingly important as we age. While boron has long been recognized for its critical role in safeguarding bone health, scientists are increasingly excited about growing evidence of boron's powerful role in blocking the development of prostate cancer.

This idea has sparked intense interest among researchers, because this potentially fatal disease is at epidemic proportions. Autopsy evidence indicates that prostate cancer is histologically evident in up to **34%** of men aged 40 to 49 and up to **70%** of men aged 80 and older.[38-40]

Scientists have demonstrated that boron lowers prostate-specific antigen, or PSA—and may help prevent or control the spread of prostate cancer. Other evidence links boron to reduced cognitive decline.

Boron levels in foods are low, but supplementing with this trace mineral may be the little-known missing link for those seeking a mechanism of defense against prostate cancer, bone loss—as well as overall support for optimum health.

For many years, most Life Extension supporters have been getting **3** to **6 mg** of **boron** in their multinutrients supplements. For most individuals, this may be an optimal amount. Certain individuals may want to increase this dose to **9** to**12 mg** daily. Fortunately, boron is a very low-cost supplement. ●

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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BUILD BONE DENSITY AND INCREASE SKELETAL STRENGTH

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Bone Restore combines numerous bone-boosting nutrients into one superior, easy-to-take formula.

Bone density loss is more than just a calcium deficiency—it also includes an insufficient intake of a host of other nutrients. In addition to **700 mg** of **calcium**, **Bone Restore** includes **highly absorbable** forms of:

- **Vitamin D3**
- **Magnesium**
- **Manganese**
- **Boron**
- **Zinc**
- **Silicon**

These nutrients help aging adults achieve optimal calcium levels.

Bone Restore also contains vitamin K2, which has been shown to play a critical role in maintaining healthy bone density by facilitating the transport of calcium from the bloodstream into the bone.

Those taking **Once-Daily Health Booster** or **Super K** usually do not need additional vitamin K2. For these individuals, **Bone Restore** is available without vitamin K2. The retail price for of this formula of 120 capsules is $22. If four bottles are purchased, the price is reduced to **$14.25** per bottle. (Item# 01726)

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MITOCHONDRIAL ENERGY OPTIMIZER

MAJOR PRICE REDUCTION

Back in year **2001**, we at **Life Extension**™ faced a dilemma. Potent nutrients had been discovered to counteract undesirable **age-related** changes. Yet the cost of the individual ***ingredients*** was too high. So we combined these nutrients into one formula so consumers could obtain them at an **affordable** price.

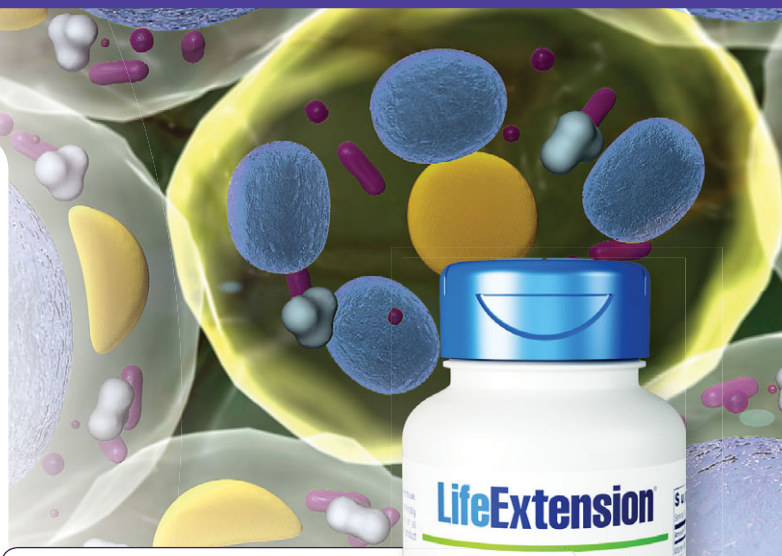
Over the years, the published data about the amino acid **taurine** has grown enormously. In addition to protecting **cardiac** function, **taurine** has demonstrated powerful **brain-boosting** effects that include enhancing neurites[1] and promoting new brain cell formation.[2]

These new findings indicate that **taurine** is more important to supplement with than ***acetyl-l-carnitine arginate***. In addition, **taurine** costs much less than ***acetyl-l-carnitine arginate***.

So we've re-formulated the popular **Mitochondrial Energy Optimizer** using **taurine** and reduced the retail price over **20%**.

Aging is characterized by inflammation, glycation, mitochondrial decay, and loss of cellular structure/function. **Mitochondrial Energy Optimizer** provides the following nutrients to help neutralize these changes:

- **CARNOSINE:** As humans age, proteins in their bodies become **irreversibly damaged** by **glycation** reactions. *Glycation* can lead to alterations of normal cell function. **Carnosine** is a powerful **anti-glycating** agent, and protects **neurons** against reactive and cytotoxic protein carbonyl species associated with normal aging.[3-7]
- **PQQ:** This micronutrient has been shown to trigger the growth of new mitochondria in aging cells![8] PQQ also activates genes involved in protecting the delicate structures within the mitochondria.[9-12]
- **LUTEOLIN:** Systemic inflammation is involved in most consequences of aging. Culprits behind **inflammatory** reactions are pro-inflammatory **cytokines**, such as **interleukin-6** and **tumor necrosis factor-alpha**. *Luteolin* is a flavonoid that has been shown to help suppress these inflammatory cytokines.[13-17]
- **BENFOTIAMINE:** Benfotiamine blocks multiple destructive biochemical pathways, including AGEs' formation pathway,[18-22] which is induced by higher than desirable blood glucose levels.[23] Benfotiamine can activate glucose metabolism and promote already healthy blood glucose levels. In addition, benfotiamine exhibits direct antioxidative capacity and supports DNA function.[24]
- **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.[25-28]
- **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**.[29-33]
- **TAURINE:** This free amino acid supports whole-body health and boosts new brain cell formation in the area of the brain connected to learning and memory.[1]



Mitochondrial Energy Optimizer with BioPQQ®
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Just four capsules of Mitochondrial Energy Optimizer with BioPQQ® provide:

Carnosine	**1,000 mg**
Taurine	**800 mg**
R-Lipoic acid (as microencapsulated Bio-Enhanced®)	**150 mg**
Benfotiamine	**150 mg**
Vitamin B6 (as pyridoxal 5'-phosphate)	**100 mg**
BioPQQ® Pyrroloquinoline quinone disodium salt	**10 mg**
Luteolin	**8 mg**

Note: Those interested in continuing to take **acetyl-L-carnitine arginate** can do so by ordering item #01525.

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BORON

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Boron supports the functions of calcium, magnesium, and vitamin D—all of which are crucial to promoting dense, healthy bone tissue.[6] By regulating pro-inflammatory factors, boron may support joint health.[7] Additional evidence suggests boron may help maintain normal brain function.[8]

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- **Life Extension Mix**

The suggested daily dose for most adults is **6-9 mg** of boron.[9] If you are already obtaining this potency in your multi-nutrient formulas, you may not need additional boron. Certain individuals may want to supplement with up to 12 mg of boron each day.

Boron

Item #01661 • 100 vegetarian capsules

	Retail Price	Your Price
1 bottle	$5.95	**$4.46**
4 bottles		**$3.94 each**

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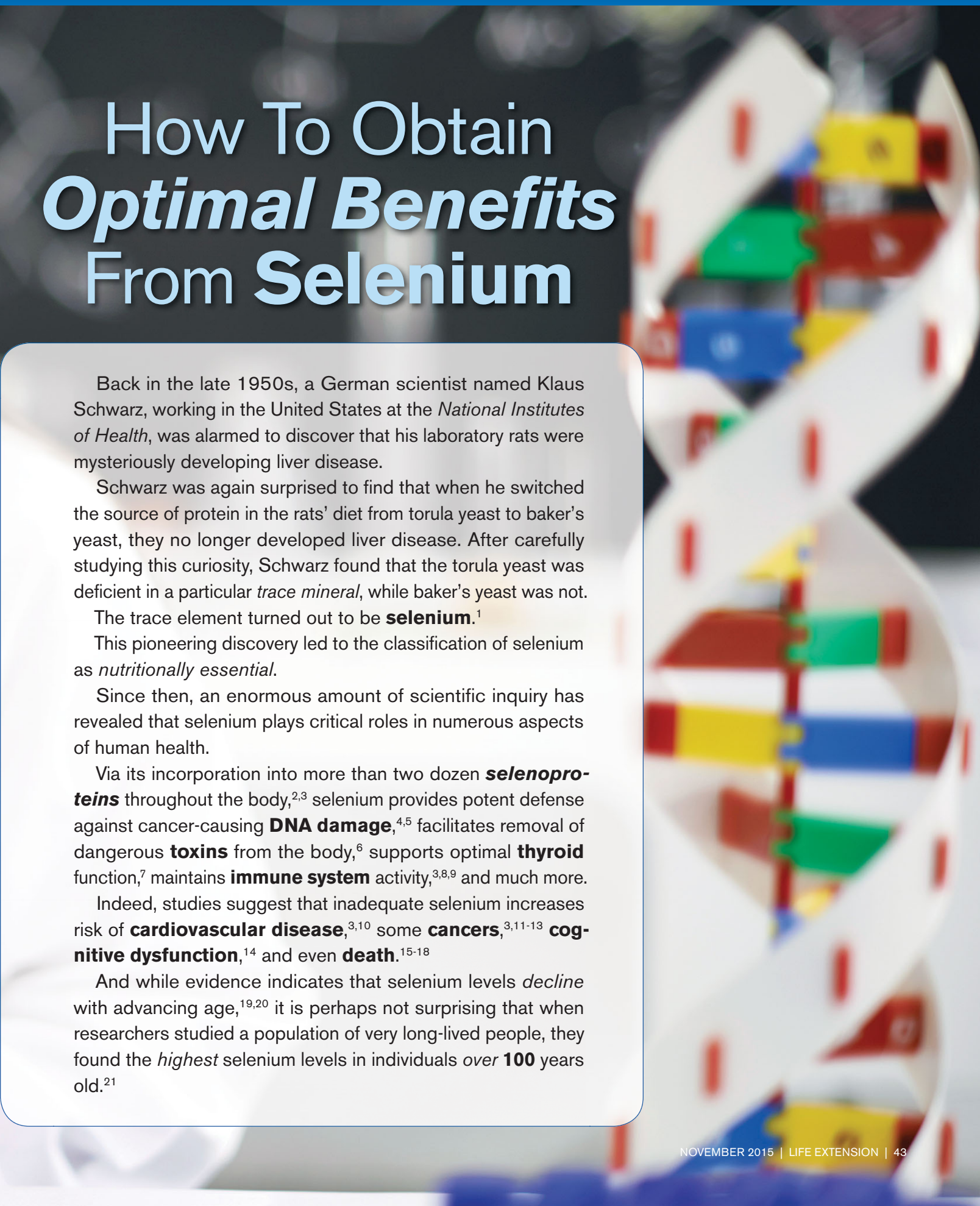
BY ALICE LANGSTROM

How To Obtain *Optimal Benefits* From **Selenium**



Back in the late 1950s, a German scientist named Klaus Schwarz, working in the United States at the *National Institutes of Health*, was alarmed to discover that his laboratory rats were mysteriously developing liver disease.

Schwarz was again surprised to find that when he switched the source of protein in the rats' diet from torula yeast to baker's yeast, they no longer developed liver disease. After carefully studying this curiosity, Schwarz found that the torula yeast was deficient in a particular *trace mineral*, while baker's yeast was not.

The trace element turned out to be **selenium**.[1]

This pioneering discovery led to the classification of selenium as *nutritionally essential*.

Since then, an enormous amount of scientific inquiry has revealed that selenium plays critical roles in numerous aspects of human health.

Via its incorporation into more than two dozen ***selenoproteins*** throughout the body,[2,3] selenium provides potent defense against cancer-causing **DNA damage**,[4,5] facilitates removal of dangerous **toxins** from the body,[6] supports optimal **thyroid** function,[7] maintains **immune system** activity,[3,8,9] and much more.

Indeed, studies suggest that inadequate selenium increases risk of **cardiovascular disease**,[3,10] some **cancers**,[3,11-13] **cognitive dysfunction**,[14] and even **death**.[15-18]

And while evidence indicates that selenium levels *decline* with advancing age,[19,20] it is perhaps not surprising that when researchers studied a population of very long-lived people, they found the *highest* selenium levels in individuals *over* **100** years old.[21]

What The "Oldest Old" Have In Common

Selenium functions as a critical regulator of vital metabolic and physiological pathways involved in the aging process.[3,22]

One of the best examples of selenium's importance in longevity came from a study of people who live in areas of China known to have the "oldest old" population. For the study, researchers evaluated the plasma selenium levels of 446 elderly participants living in these areas of notable longevity in China. The study included 208 centenarians (those over 100 years old) and 238 people between 90 and 100 years old. The researchers found that the oldest inhabitants had the ***highest*** levels of selenium and other minerals like zinc.[21]

Animal studies confirm that selenium can extend survival—even for those with typically life-threatening diseases. For example, laboratory mice with induced mammary cancers (like human breast cancers) die earlier than do their cancer-free peers. Supplementing the animals with selenium markedly extended their survival.[23]

Plasma selenium levels appear to predict mortality in humans as well. In a nine-year study of older adults living in France, those with the highest plasma selenium levels at the beginning of the study were more likely to remain alive at the end.[24] The risk of dying during the study period was **54%** higher in subjects with the lowest baseline selenium levels. The risk of dying specifically from cancer in this study was **79%** higher in those with the lowest selenium levels.[24]

Selenium Protects Against Some Cancers

One way that selenium may boost longevity is by protecting against various forms of cancer. As early as 1996, selenium supplementation was shown to lower overall cancer rates, and to specifically reduce rates of lung, colorectal, and prostate cancers.[25-27]

By 2011, nine randomized controlled clinical trials including 152,538 participants established that selenium supplementation cut risk for all cancers by **24%**. And in people with low baseline levels of selenium, the cancer-preventive effect rose significantly to **36%**.[28] Studies also show that adequate dietary selenium exerts powerful preventive effects on **prostate** and **colorectal** cancer, two of the most common malignancies.[29-31]

In addition, many studies have demonstrated that a deficiency in selenium increases cancer risk. Large-scale epidemiologic studies have shown that populations with low selenium levels are at significantly increased risk for developing many different types of cancer.[26,32-35] Specifically, selenium insufficiencies are now known to significantly increase risk of cancers of the **bladder**, **lung**, **stomach**, **esophagus**, and **liver**.[36-40]

Not all forms of selenium are the same. It is important to utilize three specific forms in order to maximize selenium's cancer-fighting potential. The three forms include **sodium selenite**, **L-selenomethionine**, and **selenium-methyl L-selenocysteine**. All three selenium compounds induce cell death in various cancer types, though each compound is better at destroying some cancers than others.[41,42]

For example, **sodium selenite** boosts the body's natural immune system responsiveness to abnormal cells, helping to destroy malignancies before they can fully develop.[9,43,44]

The second form, **L-Selenomethionine**, helps stop cancer at the earliest stages of development. It's so powerful that it has been shown to inhibit the growth of cancer cells at rates ***more than a thousand times greater*** than it does healthy normal tissue.[45] L-selenomethionine requires a functioning "suicide gene" in cells in order for it to induce the desired cell death by apoptosis.[41] This is an important first step that can stop cancer cells very early in the development of a malignancy. Unfortunately, as cancer cells reproduce, they gradually lose the "suicide gene," thereby requiring backup therapy to fully close the door on cancer.

That's why it's beneficial to partner L-selenomethionine with the third form, **selenium-methyl L-selenocysteine**, which is one of the most potent forms of selenium known.[46] Selenium-methyl L-selenocysteine induces apoptosis in cancer cells further down the cascade of events in a fashion that kills more mature cancer cells that have lost the "suicide gene."[41]

Intervention studies examining the anti-cancer effects of selenium have produced variable results. Important differences between the studies that may have influenced the results, include initial selenium status and the form of selenium that was provided.[47] An assessment of status is a key factor for all nutritional intervention studies. With respect to selenium, the form ingested may influence outcomes, since it dictates the metabolic fate and ultimately the biological function; however additional clinical research would be required to prove such a connection.[48-50]

Human Studies

A number of human studies have examined the role of three different forms of selenium and cancer risk. We describe a few of them here.

In a randomized controlled clinical trial, patients with aggressive head and neck cancers took either **200 micrograms** per day of **sodium selenite** or a placebo. The supplemented patients showed an increased ability to destroy tumor cells, which is the result of enhanced immune responses.[43] Remarkably, the enhanced immunity continued even after therapy ended.

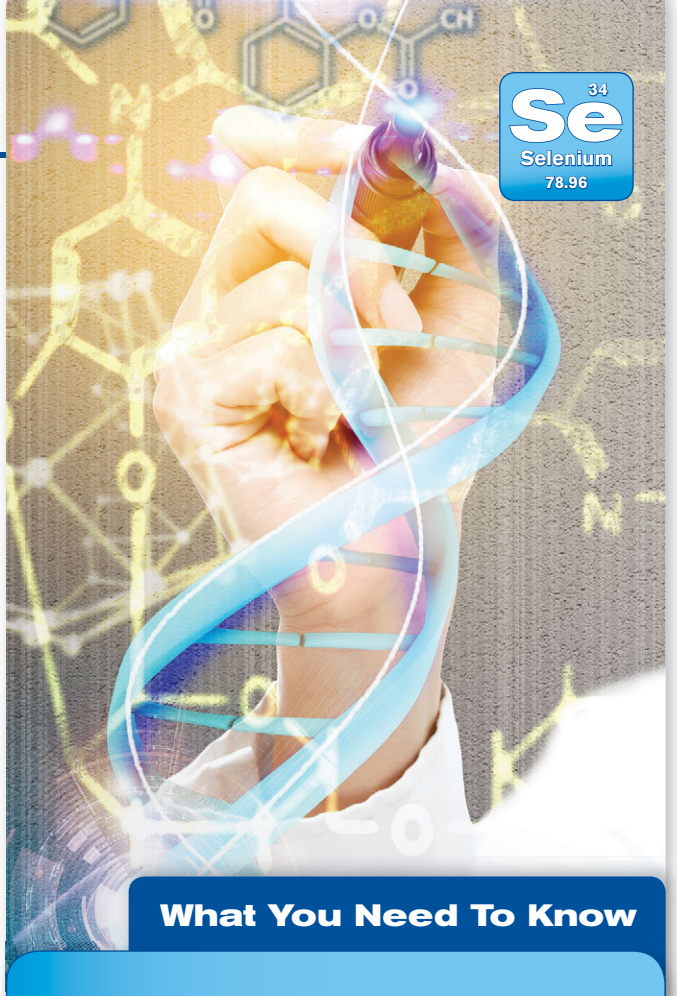
In patients with mild precancerous changes of their esophagus, **200 micrograms** of **L-selenomethionine** slowed the progression of potentially cancerous cells and triggered *regression* of precancerous cells to normal.[51]

In terms of prevention, sodium selenite supplementation for three years reduced the occurrence of new cases of liver cancer by **40%**.[52] And a reduction in new ***breast cancer cases*** was demonstrated in a group of women with the high-risk BRCA1 gene mutation, during a double-blind supplementation trial.[53]

In a now-famous 1996 study, **200 micrograms** per day of L-selenomethionine was found to significantly protect patients from death by *all* cancers (a **50%** reduction compared with controls), from developing *any* cancer (a **37%** reduction), and specifically from developing lung, colorectal, and prostate cancers.[25]

Since then, L-selenomethionine has been found to produce a **63% reduction** in occurrence of **prostate cancer** among men with a history of prior cancers.[54]

Not all studies, however, show cancer risk reduction with L-selenomethionone by itself.[55-57] That's why it is important to include more than just one form of selenium in your daily program. Since the three best-studied selenium compounds differ in the way your body handles them and in their impact on cancer risk, it is important to combine them for maximum protection.



What You Need To Know

Selenium Promotes Longevity

- **DNA damage is a major promoter of accelerated aging in the human body.**
- **Our bodies are well-equipped in youth with mechanisms to protect against DNA damage, but these begin to fail as we age, leaving us vulnerable to the chronic diseases of aging.**
- **One essential protective system in the body is the enzyme glutathione peroxidase, which depends on the trace mineral selenium for its actions against oxidative damage.**
- **Studies show that selenium may enhance longevity and reduce the risk of dying from a wide variety of chronic, age-related diseases.**
- **Appropriate selenium intake may decrease the risks of developing cancer, cardiovascular disease, and cognitive decline.**
- **Get your blood tested to find out if you are selenium deficient, and begin selenium supplementation as required.**

Protecting Against DNA Damage

One of the main ways selenium supplementation helps reduce the risk of cancer is by preventing damage to DNA, which is a major trigger for the transformation of normal cells into malignant ones.[58,59]

An important approach in cancer prevention has been to focus on the *BRCA1* gene, a tumor suppressor that prevents cells from turning cancerous by repairing damage to DNA strands.[53,60,61] Mutations in the *BRCA1* gene reduce its anticancer effect. In fact, women with such mutations have up to an **80%** lifetime risk of developing breast cancer, and up to a **60%** chance of developing ovarian cancer.[62]

Because of the high incidence of cancer associated with this gene mutation, many women who test positive for it elect to undergo a preventive mastectomy—one of the most well-known being Angelina Jolie.

Selenium appears to help repair DNA damage caused by mutations in the *BRCA1* gene. This was demonstrated by a study published in *Cancer Epidemiology, Biomarkers, & Prevention*. For the study, women with mutations in the *BRCA1* gene were supplemented with placebo or selenium after precautionary removal of their ovaries and adjacent tissues.[53] Researchers found that levels of chemical markers for DNA damage fell markedly in selenium-supplemented women, while markers of successful DNA repair rose.[53] These were exciting results because less DNA damage means lower risk for future cancers.

Animal studies show that a diet supplemented with organic selenium compounds such as *selenomethionine* could also protect against the spread of breast cancer to other parts of the body (metastases), which is the primary cause of death in most cancer patients.[63]

In 2011, a large meta-analysis (a pooled analysis of results of multiple studies) was able to demonstrate that, among people with low baseline serum selenium levels, selenium supplementation reduced the risk of developing cancer by **36%**. In people at high risk for cancer (even with normal selenium levels), supplementation reduced the risk by **32%**.[28]

Selenium Combats Immunosenescence

Aging is associated with increased susceptibility to infections and cancer, and declining immune function plays a major role in this vulnerability. This age-related reduction in immune system vigilance is called **immunosenescence**.[64]

Some studies suggest that selenium levels generally *decline* as we get older, and this may partly underlie immunosenescence.[8,19,20]

Selenium supplementation has been shown in preclinical research to enhance proliferation of cytotoxic

precursor cells, which give rise to the crucial *T immune cells* that fight cancer and viruses within the body.[8,65] Moreover, an intriguing study of healthy men found that selenium supplementation for one year led to **increased** expression of genes associated with natural killer cell and T-cell *cytotoxicity*.[66]

Selenium is also critical for the optimal function of *neutrophils*,[67] which are normally the most abundant type of white blood cell.[68] Neutrophils ingest invading microbes and destroy them using an intricate system that is in part regulated by selenium and selenoproteins.[69,70] In fact, neutrophils from *selenium-deficient* animals have been shown to be **less effective** in killing microbes than those from animals with sufficient selenium intake.[8,65]

Not surprisingly, selenium supplementation may *boost* immune system function in aging individuals and confer protection against infections. In one study, elderly individuals who supplemented with selenium (along with zinc) were significantly less likely to develop an infection over a two-year period than those who took a placebo.[71]

Aside from buttressing immune defenses against infection, selenium also appears able to keep certain viruses from **mutating** and becoming more pathogenic once they're inside the body. One group of researchers showed that a normally benign strain of coxsackievirus becomes *virulent* and damages the heart when administered to selenium-deficient mice. It was determined that replication in the low-selenium environment allowed the virus to directly change its genome to become

more pathogenic. When the viral strain was administered to mice with adequate selenium, its genome did not change and the animals remained free of heart damage.[72,73]

Similarly, a relatively mild strain of **influenza** caused *severe* lung inflammation when administered to selenium-deficient mice.[74] Follow-up research found that the virus had mutated its genome to become more aggressive in the presence of low selenium levels.[75]

A major consequence of age-related immunosenescence is *decreased* **vaccine effectiveness**. Vaccinations require a robust and well-organized immune response in order to establish immunity, but the aging immune system often falls short, leaving older individuals vulnerable to infections. This is such an important issue that new vaccines specifically for the elderly are being developed in hope of overcoming the barrier of immunosenescence.[76]

Intriguingly, selenium supplementation may **enhance** the immune response to vaccination among elderly individuals. In a trial of 725 elderly individuals, participants took selenium (plus zinc) or placebo for two years. Those who received selenium and zinc exhibited much higher antibody titers after influenza vaccination, and were less likely to develop a respiratory infection during the study period.[77]

Similarly, a study of patients with insulin-dependent diabetes showed that selenium supplementation increased their immune response to hepatitis B vaccination, regardless of age or gender. In this study, insulin-dependent diabetics were administered a three-dose hepatitis B vaccine, on days one, 10, and 21 of the study. Beginning on day one and continuing for 30 days, subjects received either a placebo or **200 micrograms** of selenium along with their vaccinations. Thirty days after vaccination completion, **74%** of the subjects who took selenium had protective levels of anti-hepatitis B antibodies in their blood, while protective antibody levels were found in only **48%** of those who received the placebo.[78]

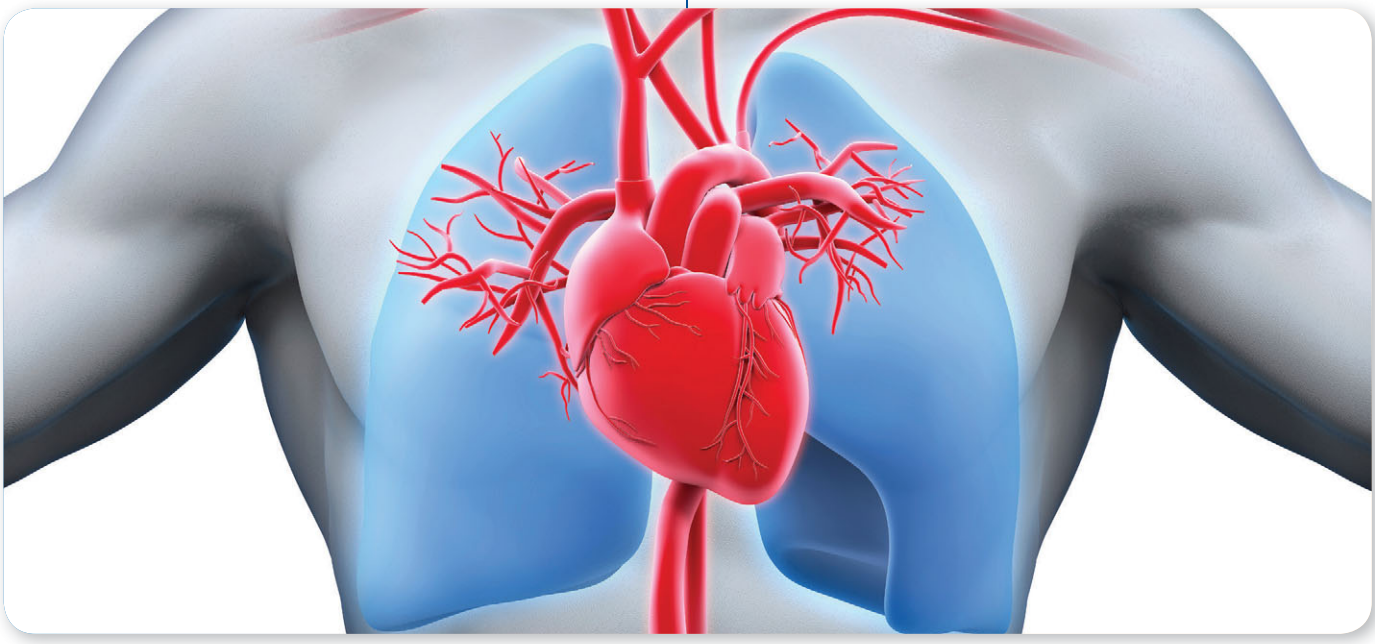
The Heart Depends On Selenium

Despite mainstream medicine's costly diagnostics and invasive treatments, cardiovascular disease remains the leading killer of Americans. More than **61 million** people in the United States have one or more types of cardiovascular disease, and **600,000** of those people die every year.[79,80]

There is evidence that selenium supplementation can reduce many of the risk factors that predispose people to heart attacks or other cardiovascular diseases, including oxidative damage and atherosclerosis.

One of the main reasons why selenium deficiency is so damaging to heart muscle is because of the role selenium plays in protecting the heart against free radical damage, a leading risk factor for heart disease.[81-83]

Selenium is essential to the proper functioning of one of the heart's most *extensively studied* protective mechanisms against oxidative stress—an enzyme called **glutathione peroxidase**.[84] This enzyme is **100%** dependent on having a selenium atom at its core for proper function.[85] In fact, selenium is what gives the enzyme its potency in preventing and cleaning up after destructive oxygen free radicals.



Decreased selenium in the blood leads to decreased **glutathione peroxidase** activity,[86] which in turn makes heart tissue more vulnerable to the damage that can impair its function.[87] This situation is especially grave in older adults.[84,88]

A study found that adding selenium to human coronary artery cells in culture significantly raised levels and activity of **glutathione peroxidase**.[87] And in humans, supplementing with **200 micrograms** per day of selenium significantly increased **glutathione** peroxidase activity by **11%**.[87]

In a particularly impressive study, 81 heart attack survivors were treated with either **100 micrograms** per day of selenium or a placebo for six months (all other cardiovascular drug treatment was continued).[89] As expected, the mean selenium blood concentration rose significantly in the supplemented group but remained unchanged in the placebo group.

But the real difference between the two groups showed up in the number of patients who either had heart attacks or died of heart disease. Four patients who did not receive the selenium supplements died of cardiac disease, while **100% of the patients in the selenium group survived**.[89]

Statin Drugs And Selenoprotein Synthesis

Roughly a quarter of Americans aged 40 or older take a **statin** drug to control their LDL-cholesterol.[90]

Statins inhibit an enzyme called *HMG-CoA reductase*. This enzyme is involved in cholesterol production. But it also has many other important functions, including participation in metabolic pathways leading to **selenoprotein synthesis**,[91,92] and statins have been shown to significantly *reduce* the synthesis *and* activity of **glutathione peroxidase**.[93,94]

As you just learned, the selenoprotein glutathione peroxidase protects against numerous insults that contribute to life-threatening heart disease.[2]

Indeed, a study of over 600 coronary artery disease patients published in the prestigious *New England Journal of Medicine* found that **low activity levels of red blood cell glutathione peroxidase** were independently associated with an ***increased risk of cardiovascular events***. Study participants who had the *highest* levels of *glutathione peroxidase activity* were **71%** less likely to have a cardiovascular event during the study period than participants with the *lowest* levels of glutathione peroxidase activity.[95]

Fortunately, supplementation with selenium bolsters *glutathione peroxidase* enzyme activity. A laboratory study found that culturing cells with statin drugs increased their sensitivity to oxidative damage by inhibiting glutathione peroxidase; this effect was *reversed* by adding *sodium selenite* to the cells.[93]

Selenium Is Essential For Normal Brain Function

The brain is very vulnerable to the damage caused by oxidative stress.[96,97]

Excessive oxidative exposure has been associated, both in the lab and in living humans,[98-101] with increased risk of neurodegenerative changes—the same kinds of changes seen in Alzheimer's, Parkinson's, and Huntington's diseases, which are important causes of dementia in the United States.[14,95,102,103] Currently, more

than **6 million** Americans suffer from such neurodegenerative diseases.[104]

Studies show that people with neurodegenerative disorders have lower selenium levels in their blood and red blood cells than those without neurodegenerative disorders.[14,105,106] In fact, people with low plasma selenium levels have a **58% greater risk of cognitive decline** than those with normal levels.[102] Studies also show that, among people who already have Parkinson's disease, lower selenium blood levels are associated with significantly decreased performance on neurological tests of coordination.[107]

Prevent Stroke-Induced Brain Damage

Selenium has also been shown, in animal models, to help protect against stroke-induced brain damage when taken before a stroke occurs.

Ischemic strokes cause major oxidative damage to vulnerable brain tissue.[108,109] Preclinical studies show that animals given experimental strokes undergo sharp reductions in **glutathione** (a molecule that helps protect against oxidative damage), while at the same time experiencing increased levels of fat oxidation, compared with control animals.[110] But when animals were pretreated with selenium, glutathione levels were protected significantly.[110]

The lack of oxygen immediately following a stroke[111] (known as ischemia) reduces energy production in the tiny cellular powerhouses known as mitochondria.[112] Mitochondria burn fuel from food, releasing energy that is then stored in a chemical "battery" called ATP (short for adenosine triphosphate). When mitochondria are impaired, they can't make enough ATP to support brain tissue function.[113-116]

The negative effects of this energy disruption were clearly seen in a study on laboratory animals. In an animal model of stroke, ATP levels in brain cells dropped significantly, while chemical markers of cellular stress increased.[112]

However, when the animals were treated with selenium supplements before the stroke, their ATP levels and levels of stress markers remained near normal, and stroke-induced impairments in behavior were not seen. This remarkable study indicates that having adequate levels of selenium could prevent some of the brain damage caused by a stroke. Microscopic analysis of these animals' brains showed substantially less swelling between cells and lower rates of infiltration by the immune cells called microglia.[112]

Higher Doses Of Selenium Not Needed

The data showing tremendous benefits in people with the ***highest*** selenium levels should not prompt people to take high doses of selenium. The reason is that the selenium contained in ***scientifically designed*** multi-nutrient formulas ***already*** provides optimal potencies of all three forms of selenium. Commercial multivitamins usually contain only one form of selenium, usually in a very low dose.

Summary

Selenium, a trace element, is essential to the proper function of enzyme systems that protect the entire body from age-accelerating damage.

Selenium deficiency has been linked to leading causes of premature death, including heart disease, cancer, and immune senescence. Selenium plays a role in decreasing the risk of cancer and cardiovascular disease, as well as promoting normal brain function.

Optimal daily dosing usually requires about **200 mcg**, divided into the **selenite**, **selenomethionine**, and **selenocysteine** forms of selenium. ●

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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Polyphenol-Retained Coffee

The *Healthy* Gourmet Choice

Not all coffee provides the same powerful protection.[1-13]

When it comes to obtaining coffee's full range of health benefits, *most people aren't getting their money's worth!*

The reason? Most of the coffee bean's polyphenol content is ***destroyed*** during the roasting process.

Among the most beneficial of these polyphenols is ***chlorogenic acid***, a potent inhibitor of the ***glucose-6-phosphatase*** enzyme that stimulates excess **gluconeogenesis**.

A Patented Organic Roast

Life Extension®'s Rich Rewards® Breakfast Blend and **Decaffeinated Roast** are made using a patented, **100%** *natural* process called **Healthy-Roast®**.* It delivers a more complete nutritional profile of the coffee bean, yielding **chlorogenic acid** levels *far greater* than other premium brands.

Handpicked deep in the rainforests of Central America, **Rich Rewards®** consists exclusively of **100% USDA certified organic *arabica*** coffee beans, gently roasted in small batches and ground for easy brewing.

Savory Taste Without Stomach Upset

Have you given up coffee because it upsets your stomach? With **Rich Rewards®**, you can enjoy coffee again. The **HealthyRoast®** process also preserves special, naturally occurring compounds in coffee that soothe your stomach.

Concerned about caffeine but don't like the weak taste of decaffeinated coffee? With **Rich Rewards® Decaffeinated Roast**, you can limit your caffeine intake without compromising on flavor. The caffeine is removed through a completely chemical-free ***Water Process***, which relies solely on water and carbon filters. It delivers the full flavor, aroma, and body of the *arabica* bean.

Life Extension's **Rich Rewards®** coffees give you a uniquely beneficial brew with superior flavor. The **Rich Rewards® Breakfast Blend** contains up to **87%** more **chlorogenic acid** than conventional caffeinated coffees. **Rich Rewards® Decaffeinated Roast** contains up to **187%** more **chlorogenic acid** than conventional decaffeinated coffees.

Comparison of Conventional Coffee to Life Extension's Rich Rewards® Blend

Chlorogenic Acid		Chlorogenic Acid	
Conventional Coffee (Caffeinated)	**92 mg**	**Rich Rewards® Coffee Blend** (Caffeinated)	**172 mg**
Conventional Coffee (Decaffeinated)	**46 mg**	**Rich Rewards® Coffee Blend** (Decaffeinated)	**132 mg**

This chart shows Life Extension's **Rich Rewards® Breakfast Blend** contains up to **87% more chlorogenic acid** than conventional caffeinated coffees and the **Rich Rewards® Decaffeinated Roast** contains up to **187% more chlorogenic acid** than conventional decaffeinated coffees. This enables one to obtain the benefits of heavy coffee drinking in about half the number of cups.

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*** US Patent 6,723,368.**

Rich Rewards® Breakfast Blend
Item #01609 • 12 oz bag

	Retail Price	Your Price
1 bag	$13	**$9.75**

Rich Rewards® Decaffeinated Roast
Item #01610 • 12 oz bag

	Retail Price	Your Price
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Compare CENTRUM® to TWO-PER-DAY:

Sample Ingredient Comparison	Centrum® Silver® Adults 50+	Life Extension® Two-Per-Day
Vitamin C	60 mg	500 mg
Vitamin D3	1,000 IU	2,000 IU
Vitamin B1	1.5 mg	75 mg
Vitamin B2	1.7 mg	50 mg
Vitamin B6	3 mg	75 mg
Vitamin B12	25 mcg	300 mcg
Niacin (as niacinamide)	20 mg	50 mg
Pantothenic acid	10 mg	100 mg
Vitamin E	50 IU (synthetic)	100 IU (natural)
Folate	400 mcg (synthetic)	400 mcg (natural)
Zinc	11 mg	30 mg
Selenium	55 mcg (one form)	200 mcg (three forms)
Lutein	250 mcg	5,000 mcg
Lycopene	300 mcg	2,000 mcg
Biotin	30 mcg	300 mcg
Chromium	45 mcg	200 mcg
Molybdenum	45 mcg	100 mcg
Magnesium	50 mg	100 mg
Manganese	2.3 mg	2 mg
Iodine	150 mcg	150 mcg
Potassium	80 mg	25 mg
Vitamin A (as beta-carotene)	1,000 IU	4,500 IU
Vitamin A (preformed)	1,500 IU	500 IU
Choline (as bitartrate)	(none)	20 mg
Inositol	(none)	50 mg
Calcium	220 mg	12 mg
Alpha Lipoic Acid	(none)	25 mg
Natural Mixed Tocopherols (providing gamma, delta, alpha, and beta tocopherols)*	(none)	20 mg
NIAGEN® Nicotinamide Riboside**	(none)	1 mg

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Life Extension® **Two-Per-Day** formulas are the highest-potency multivitamins on the market. In fact, they have the highest potencies of *any* science-based multivitamin formula that can fit inside two easy-to-take tablets or capsules.

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- **10 times more biotin**
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Life Extension's **Two-Per-Day** contains bioactive forms of vitamin B2 and B6, plus lycopene, alpha-lipoic acid, and natural mixed tocopherols. **Two-Per-Day** also contains three different forms of **selenium**, each having its own unique beneficial function in the body.

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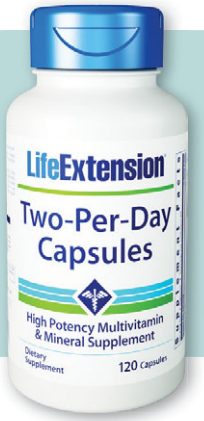

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*Two-Per-Day provides a small amount of gamma tocopherols as part of natural mixed tocopherols, which include natural vitamin E.
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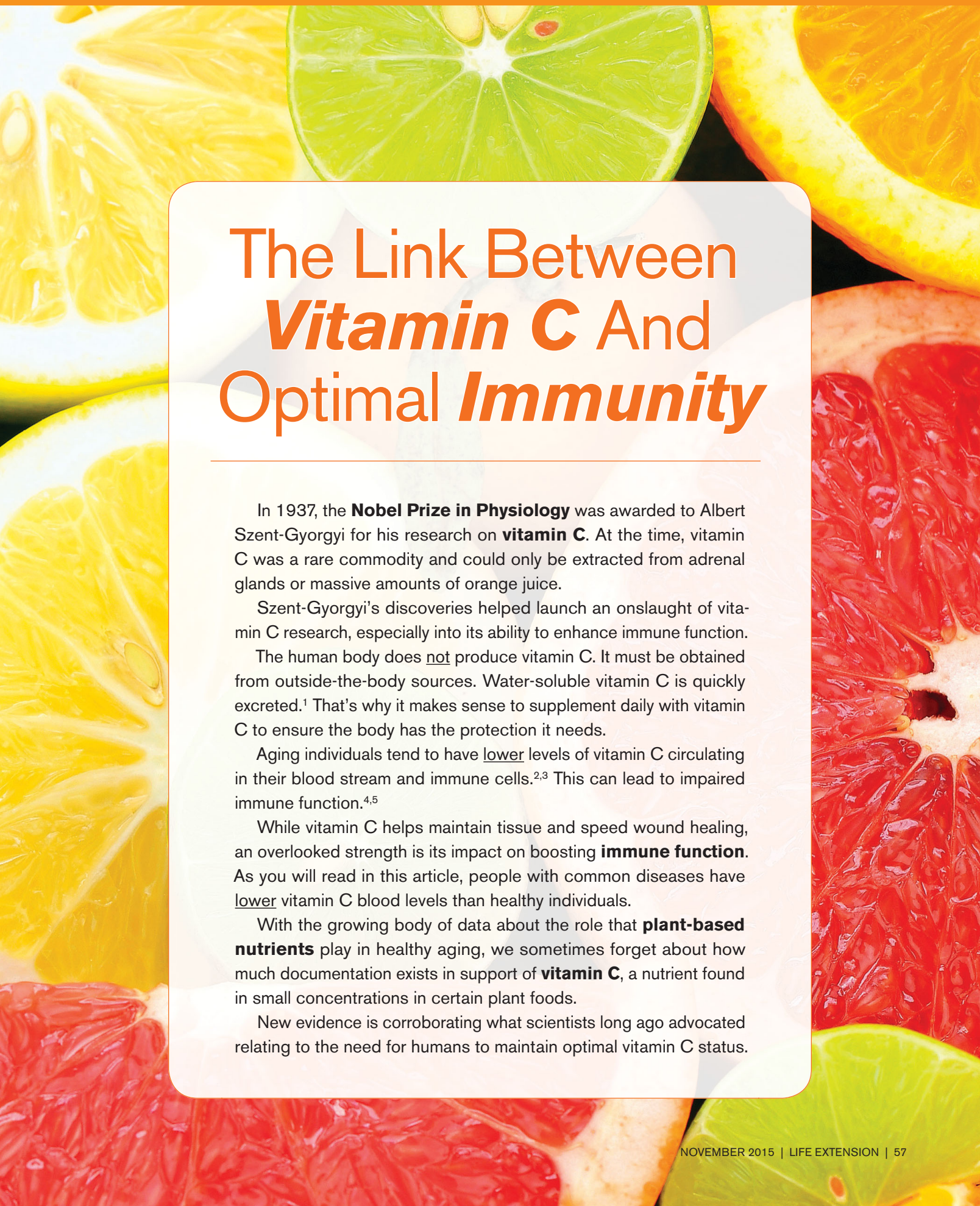
To order **Super Selenium Complex**, call **1-800-544-4440** or visit **www.LifeExtension.com**

BY CHAD ROBERTSON



The Link Between *Vitamin C* And Optimal *Immunity*

In 1937, the **Nobel Prize in Physiology** was awarded to Albert Szent-Gyorgyi for his research on **vitamin C**. At the time, vitamin C was a rare commodity and could only be extracted from adrenal glands or massive amounts of orange juice.

Szent-Gyorgyi's discoveries helped launch an onslaught of vitamin C research, especially into its ability to enhance immune function.

The human body does not produce vitamin C. It must be obtained from outside-the-body sources. Water-soluble vitamin C is quickly excreted.[1] That's why it makes sense to supplement daily with vitamin C to ensure the body has the protection it needs.

Aging individuals tend to have lower levels of vitamin C circulating in their blood stream and immune cells.[2,3] This can lead to impaired immune function.[4,5]

While vitamin C helps maintain tissue and speed wound healing, an overlooked strength is its impact on boosting **immune function**. As you will read in this article, people with common diseases have lower vitamin C blood levels than healthy individuals.

With the growing body of data about the role that **plant-based nutrients** play in healthy aging, we sometimes forget about how much documentation exists in support of **vitamin C**, a nutrient found in small concentrations in certain plant foods.

New evidence is corroborating what scientists long ago advocated relating to the need for humans to maintain optimal vitamin C status.

The Importance Of Vitamin C

Vitamin C deficiency has been associated with frequency and duration of colds, along with immune system defects.[6] While colds aren't usually dangerous in themselves, they can lead to pneumonia and other respiratory diseases, especially for aging individuals.[7] Colds can be an early indicator of gaps in immune function that could leave one vulnerable to a cascade of serious infections.

A deficiency of vitamin C broadly affects the various key aspects of immune function, which include the *innate system* we are born with, the *adaptive system* that develops from infancy to young adulthood, the cells that kill invaders, the cells that coordinate those attacks, and even the production of antibodies that fight known infections.

As a result of vitamin C's wide-ranging impact on the immune system, a deficiency could leave us vulnerable to infections.[5] A weakened immune system caused by low vitamin C levels can make any infection more serious. This danger becomes more ominous in older adults, in whom the phenomenon of *immunosenescence* (the aging of the immune system) already heightens risk.[8]

There are multiple causes of insufficient vitamin C. Aging is one major cause of lowered vitamin C levels.[2,3] The concentration of vitamin C in immune cells decreases with age, partly the result of an increasingly oxidative environment that consumes vitamin C. This can lead to damage to DNA, proteins, and fat molecules needed for normal immune function.[4,5]

Stress is another major trigger for reducing vitamin C levels, leaving the affected individuals vulnerable to infection at precisely the time that stronger immune support is needed.[4,5,9]

In some remarkable human findings, low vitamin C blood levels have been associated with a number of common human diseases.[5,10] The table below shows higher plasma vitamin C levels in healthy individuals compared to those with serious diseases, most notably cancer and sepsis.

TABLE: Vitamin C Levels Fall In Multiple Disease States

Healthy Vitamin C Range is 61-80 mmol/L	
Vitamin C In Disease States	**Mean Plasma Vitamin C Level (micromol/L)**
Diabetes	**42** mmol/L
Gastritis	**46** mmol/L
Pancreatitis	**33** mmol/L
Pneumonia	**31** mmol/L
Cancer	**< 24** mmol/L
Trauma or sepsis (overwhelming infection)	**10** mmol/L
Arthritis	**27** mmol/L

A healthy vitamin C level is considered to be between **61** and **80 micromol/L**. Those afflicted with serious diseases have much lower vitamin C levels. It is likely that the **inflammation** and **oxidative stress** caused by some of these diseases contributes to this reduced vitamin C since it will rapidly be used up quenching free radicals. It's also possible that lower levels of vitamin C contributed to the development or progression of some of these disorders.

Why The Immune System Depends On Vitamin C

One of the most important functions of vitamin C is to support and energize the body's immune system. Immune cells have active vitamin C transporter molecules embedded in their membranes that actively pump the vitamin into the cells when more vitamin C is required.[5,11]

For example, during times of inflammation or infection, those transporters ramp up their activity to provide sufficient vitamin C to the cells' inner workings, causing cells to attain levels up to **100-fold** that of the plasma level. This is why blood levels of vitamin C drop during times of disease or infection (see Table above).[5,11]

This can create a potentially vicious cycle in which, just when you need extra vitamin C, your body's stores are depleted. This also makes it especially important to increase one's intake of vitamin C when sick.

The content of vitamin C within immune cells is closely related to those cells' activity, especially in the case of specific cells that engulf and destroy infecting organisms (phagocytes) and of those that recruit, organize, and direct other immune cells (T-lymphocytes).[11]

Fortunately, you can improve your immune system's function by supplementing with vitamin C.[4,6,8,12] The recommended daily allowance of vitamin C is around **90 mg** per day. For optimal immune function, many experts now recommend supplementing with **1 gram** (**1,000 mg**) of vitamin C daily in addition to a diet rich in fruits and vegetables.[13]

Human studies have shown that this amount of vitamin C can not only reduce the duration and severity of the common cold—but can reduce the incidence of developing a cold as well. Not all common cold studies produce consistent results. This means more than vitamin C alone is needed to combat common colds, such as using the right dose of **zinc acetate lozenges** as soon as cold symptoms manifest.

Reduce The Duration And Severity Of Colds

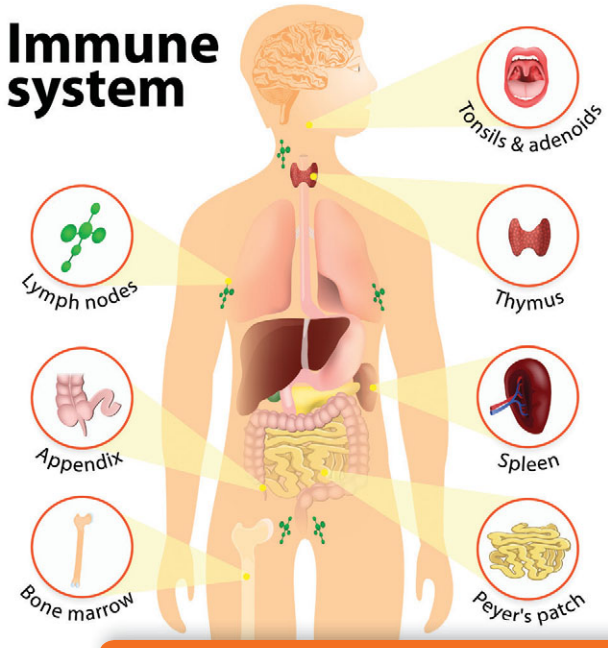
One of the best-known uses of vitamin C is in the prevention and treatment of the common cold.[14] While for young people a cold is little more than a nuisance, in older adults, colds can herald the onset of serious bacterial infections such as pneumonia or bronchitis, both of which increase the risk of premature death.

There is no shortage of research demonstrating that vitamin C can reduce symptoms and shorten duration of the common cold.[4,15] Studies show that vitamin C supplementation can reduce the ***duration*** of colds by anywhere from **5** to **21%**.[15]

Vitamin C supplementation has also been shown to significantly reduce the ***severity*** of cold symptoms. And in older people who require hospitalization for pneumonia and chronic bronchitis, even a dose of just **200 mg** per day was shown to reduce the clinical severity of the illness.[4]

Vitamin C Reduces Incidence Of Colds

While the evidence demonstrating the ability of vitamin C to reduce the duration and the severity of colds is clear, the question of whether vitamin C supplementation could also reduce the ***incidence*** (rate of occurrence) of colds has been fiercely debated.[16] Newer studies using higher doses of vitamin C show that vitamin C can, in fact, reduce the incidence of colds.



What You Need To Know

Vitamin C Supports The Immune System

- **Older adults are at ever-increasing risk of serious infections or cancers as their immune systems age.**
- **An intact immune system relies upon many layers of protection from multiple cell types and a host of immunologically active signaling molecules.**
- **The function of those specialized cells and molecules is being increasingly found to depend on adequate supplies of vitamin C in the body.**
- **Roughly 23% of Americans have vitamin C depletion, causing their immune systems to not function properly.[44]**
- **Studies show that doses of vitamin C at 1,000 mg per day can effectively restore function to myriad components of the immune system.**
- **New studies confirm that vitamin C supplementation at 1,000 mg per day shortens the duration and mitigates the severity of colds, while also preventing colds from developing, especially in those with low vitamin C levels.**
- **Take a 1,000 mg per day supplement to optimize your immunity and potentially lengthen your life.**

Emerging Areas Of Vitamin C Importance In Human Health

This article primarily considered the role of vitamin C in supporting the immune system, particularly in aging or stressed individuals. There is growing support, however, for use of vitamin C in these other areas as well:

- ***Diabetes:*** Diabetes induces powerful oxidant stress throughout the body, leading to inflammation and loss of function. Studies now show that vitamin C status may influence the incidence of type II diabetes, the accelerated cognitive decline of diabetics, the anxiety, depression, and stress experienced by diabetics, and the risk of atrial fibrillation in diabetics.[45-48]
- ***Cardiovascular disease:*** Heart disease and stroke have many causes, but oxidant damage and inflammation lead the pack.[49-53] Studies now show vitamin C improves endothelial function (function of the active lining of blood vessels that controls blood flow and pressure) and potentially other areas of cardiovascular medicine.[54-56]
- ***Anemia:*** There is evidence from animal studies that vitamin C can prevent the kind of anemia that arises from excessive iron, which can be seen in older adults.[57]
- ***Periodontal disease:*** Bleeding gums and tooth loss were common symptoms of scurvy that were readily reversed with vitamin C supplementation. Today's scientists are demonstrating a role of vitamin C in preventing less obvious, but still important causes of tooth loss in older adults, such as gingivitis.[58]
- ***Osteoporosis:*** Vitamin C is an absolute requirement for normal formation of bone proteins, and preliminary studies are showing the potential of the vitamin in preventing bone loss and fractures related to osteoporosis.[59,60]

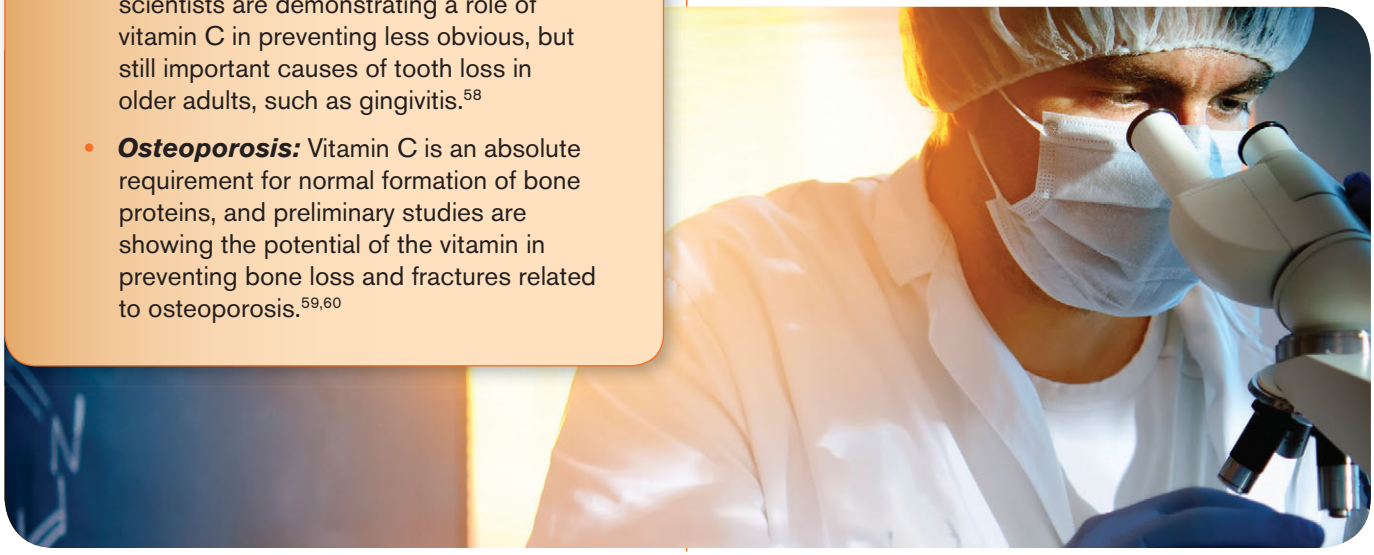
Studies using **1,000 mg** or more have shown that vitamin C reduces cold incidence by a remarkable **50%** among people undergoing heavy stress, such as soldiers and athletes.[4,15,17] These studies found that the people who had the lowest dietary intake of vitamin C had the greatest benefit.

In **2014**, a study of vitamin C published in the journal *Nutrients* provided definitive evidence that vitamin C supplementation can reduce the incidence of the common cold in otherwise healthy people with chronic stress or obesity.[6] The study included 18- to 35-year-old men who had vitamin C levels of less than **45 micromol/L** (**61** to **80** is considered adequate). The study lasted eight weeks, and scientists recorded scores on a physical activity scale and tracked the occurrence of cold episodes.

During the study, **85%** of placebo recipients experienced a cold compared with just **47%** of supplemented subjects, a statistically significant difference and a risk reduction of **45%**.[6]

Reduction in cold duration was also significant in the supplemented versus the control group, with supplemented subjects experiencing an average of **3.2** (**59%**) fewer days with cold symptoms than placebo subjects. Intriguingly, supplemented subjects' physical activity scores also rose by **40%** compared with placebo recipients, strongly suggesting that supplementation was correcting hidden symptoms of vitamin C depletion, such as fatigue and malaise.

Even more impressive, at least three controlled studies also show that vitamin C supplementation can reduce the incidence of ***pneumonia*** by as much as **80%**.[15] This is a crucial finding for older adults since the death rate for elderly people with pneumonia exceeds **16%**, even with antibiotic treatment, highlighting the urgency of prevention.[18,19]



Vitamin C And Immunity: Details From Laboratory Studies

The aging of the immune system (*immunosenescence*) can leave older individuals vulnerable to infection and disease that wouldn't be an issue for younger people.[20] Laboratory studies indicate that vitamin C can restore an aging immune system to that of younger individuals.

An abundance of laboratory studies show that vitamin C can boost immune function, particularly in older people. One particular study demonstrates this perfectly. White blood cells from elderly people typically perform poorly in response to stimulation by foreign material (antigens). However, a study published in the *International Journal of Immunopharmacology* showed that incubating these white blood cells overnight in a solution enriched with vitamin C restored the performance levels of these cells to that of normal cells from younger people.[8]

In fact, vitamin C produces beneficial effects on virtually all of the immune system's cells.

- ***Natural killer* (NK) cells**. These "hit men" of the immune system move in on infectious and malignant targets that have been identified as foreign by other immune system components. Like other immune cells, NK cells' function declines with aging.[21] Detailed scientific studies show that NK function improves in the presence of adequate vitamin C, and declines without it.[22-24] Vitamin C helps NK cells track and destroy tumor cells as well by reducing the shielding effect of platelets (blood clotting cell fragments) that would prevent NK cells from destroying them. This effect may help to prevent cancers from producing deadly metastases.[23]

- ***Neutrophils*** are the main immune system cell for fighting bacterial infections. Neutrophils engulf invading organisms, then destroy them with powerful blasts of short-lived oxygen free radicals. Vitamin C supports many aspects of neutrophil function, aiding in their ability to chase down bacterial targets and improving their ability to engulf and kill such targets.[25,26] Since the bacterial killing process creates potent oxidation products, neutrophils would destroy themselves in short order without ample vitamin C, which scavenges up the dangerous oxidizing molecules once they have done their work to destroy the bacterial cell.[25-27]

  A study published in the *Canadian Journal of Physiology and Pharmacology* showed that when human volunteers took an oral dose of **1,000 mg** or more of vitamin C, neutrophils performed more vigorously than those of unsupplemented subjects.[28]

  Improved function of neutrophils in the presence of adequate vitamin C is so evident that clinicians have begun to use vitamin C at **1,000 mg** per day doses for people with **chronic granulomatous disease**, a disorder in which neutrophils lack proper killing ability once they have ingested bacteria.[26,29] Similar improvements in neutrophil performance have been shown in the much larger population of people with asthma, another condition in which neutrophil impairment can worsen patients' clinical status.[26]

- ***Lymphocytes*** are immune system cells that produce antibodies (called ***B-lymphocytes***) and coordinate with other immune cells to guide them towards threats needing destruction.[8,30] When they detect such an incipient threat, lymphocytes rapidly reproduce in a proliferative response that is enhanced in the presence of vitamin C. In older adults, that proliferation is impaired, but vitamin C treatment restores them to youthful levels of function.[8,31] Similar enhancements of lymphocyte proliferation have been demonstrated by supplementing aging laboratory animals with vitamin C, which also boosts lymphocytes' ability to track down threats.[32]

  Diabetes, like aging, impairs the production of lymphocytes and the functioning of T-lymphocytes.[33,34] However, supplementing diabetic rats with vitamin C pushed lymphocyte production from **57%** of that of controls to virtually **100%** of control values, essentially creating "nondiabetic" immune cells within a living diabetic body.[35]

- ***Antibodies*** are noncellular components of the immune system that help identify and destroy invading threats and cancerous cells.[36] Vitamin C benefits this portion of the immune system by raising levels of three main classes of antibody immunoglobulins: **IgA**, which protects against infections mainly on mucosal surfaces, such as the respiratory and digestive tracts, **IgG**, which provides long-term protection in the bloodstream, and **IgM**, which is the earliest immunoglobulin to appear in blood in response to threats.[37-40] Blood levels of antibodies and other protective molecules rose significantly when volunteers took **1,000 mg** doses of vitamin C daily for 75 days, demonstrating the effect in humans.[41]

Human Studies Confirm Vitamin C's Immune Benefits

There is now copious evidence that vitamin C benefits people with impaired immune function, whether that impairment is the result of disease or simply of aging.

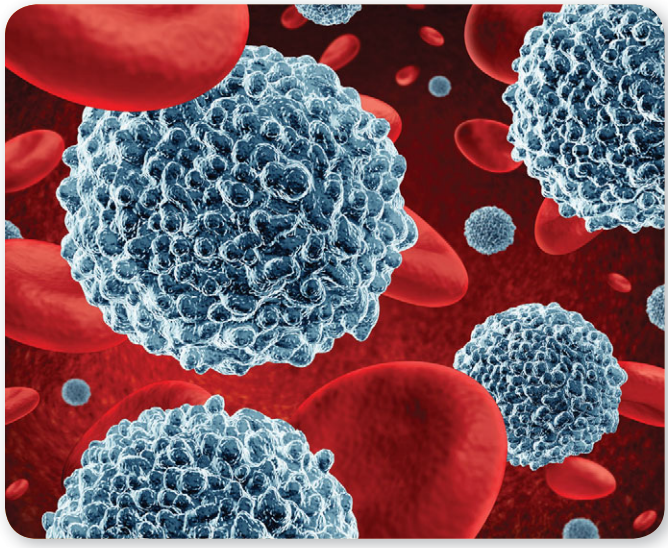
In patients with frequent skin infections, for example, who had known impairment in **neutrophil** tracking and killing of microorganisms, vitamin C was as effective as a powerful immune-regulating drug, *levamisole*, at improving neutrophil function and producing long-lasting remission.[42] But unlike levamisole, which produced severe side effects causing **8%** of subjects to drop out of the study, no patients in the vitamin C arm dropped out. Similar improvements in neutrophil function, and dramatic clinical recoveries, were seen in patients with recurrent furunculosis (boils), on a dose of **1,000 mg** per day.[43]

This same dose of vitamin C was found to boost immune cell functions in women who were an average of 72 years old.[28] In this study, lymphocyte and neutrophil function improved in all members of this group, including those who were healthy, those with major depression, and those with coronary heart disease. This study demonstrated the far-reaching effects of vitamin C in the aging body.

Summary

Few people realize the importance of having ample supplies of water-soluble vitamin C in their body.

Without regular ingestion, ascorbic acid (vitamin C) levels drop rapidly and can produce hidden effects, long before major signs of scurvy appear. Otherwise unexplained fatigue, malaise, or "mind fog" may in reality be symptoms of vitamin C depletion.



All major immune system cell lines function at their peak with ample vitamin C supplies. With inadequate intake or plasma levels, those cells are less able to detect, track, and kill invading organisms or precancerous cells. That means that vitamin C depletion can leave one vulnerable to dangerous infections.

New studies are helping to confirm that vitamin C supplementation can reduce duration and severity of the most prevalent respiratory infection, the common cold, and makes it less likely one will catch a cold in the first place.

Given the health risks associated with adults who develop pneumonia after a cold, prevention with adequate **vitamin C** (**1,000 mg** and higher daily doses) looks more promising. This dose, greater than what can fit into most multi-nutrient formulas, will assure you are obtaining sufficient vitamin C to emulate studies documenting improved immune function, protection against the common cold, and other age-related disorders. ●

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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References:

1. *Neuropsychopharmacology*. 2003 Oct;28(10):1871-81.
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BEWARE OF IMITATIONS The L-theanine used in the new Natural Stress Relief is Suntheanine®, the only pure form of L-theanine available worldwide and the only form protected by 40 internationally recognized patents and scientifically proven in clinical studies to be safe and efficacious. Independent laboratory analysis has verified that certain other products on the market claiming to contain "L-theanine" are only half L-theanine, the other half being a different form of theanine known as "D-theanine" that has not been scientifically evaluated in published studies. Suntheanine® is a registered trademark of Taiyo International, Inc. Use of Suntheanine® is protected by US Trademark Registration No. 2,548,957. Cyracos® is a registered trademark of Naturex.

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Item #01912 • One box of 30 packets

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1 box	$21	**$15.75**
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References

1. *J Altern Complement Med*. 2008 Dec;14(10):1291-8.
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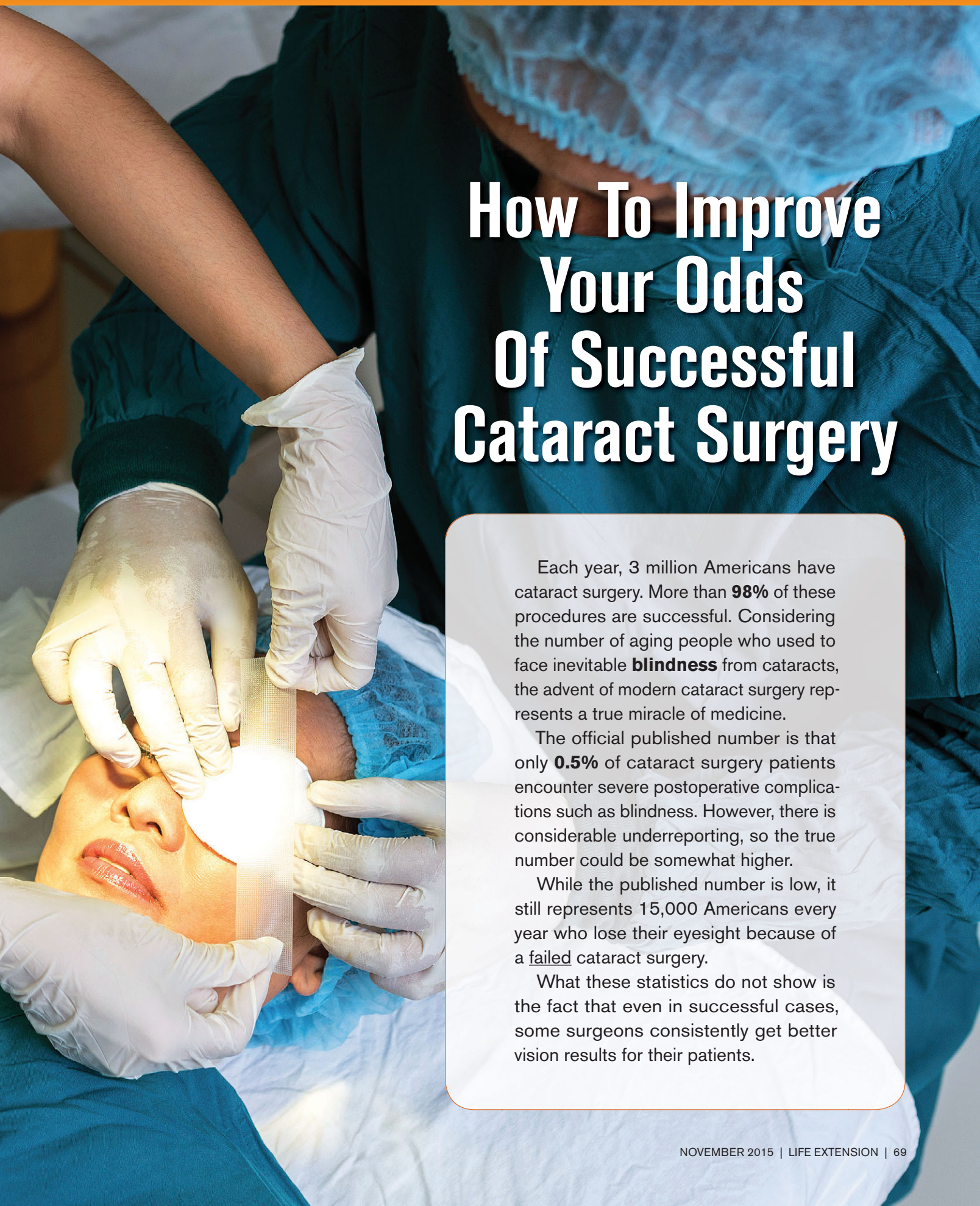
BY KENNETH J. ABSHER, DO, BCCN



How To Improve Your Odds Of Successful Cataract Surgery

Each year, 3 million Americans have cataract surgery. More than **98%** of these procedures are successful. Considering the number of aging people who used to face inevitable **blindness** from cataracts, the advent of modern cataract surgery represents a true miracle of medicine.

The official published number is that only **0.5%** of cataract surgery patients encounter severe postoperative complications such as blindness. However, there is considerable underreporting, so the true number could be somewhat higher.

While the published number is low, it still represents 15,000 Americans every year who lose their eyesight because of a failed cataract surgery.

What these statistics do not show is the fact that even in successful cases, some surgeons consistently get better vision results for their patients.

To avoid being among the 15,000 who have serious complications, including unnecessary blindness from cataract surgery, it is important to learn how to select your eye surgeon. While most surgeons are good, some are definitely better than others.

The most independent source as to which ophthalmologist (eye surgeon) is the best surgeon is a good optometrist. They do not do surgery but refer many patients for surgery and co-manage the patient after the surgery. The last thing they want is to send a loyal patient to a bad surgeon.

Optometrists see the complications of an unsuccessful surgery and generally know what surgeons are bad, good, and really good. But you have to inquire the correct way in order to get that information. For example, ask who your eye doctor would send his or her family to instead of asking if a specific doctor is good or bad. Asking if a certain surgeon is "good or bad" puts the doctor in an uncomfortable position as he or she may be co-managing a number of patients from the surgeon you are inquiring about.

While there are no guarantees of a favorable outcome, surgeons that own and control their own surgery center and only do cataract surgery generally have a higher success ratio than those that do different kinds of surgery and use the hospital for their surgery facility. When the surgeon uses a hospital facility, they generally cannot control the type or kind of equipment available, the training of the nurses, the times available for surgery, the placement of equipment, or even which nurses will be available for a given surgery. There are many conditions besides the surgeon's skills that can affect success or failure. A cataract surgery center recommended by your optometrist is more likely to produce a consistently better outcome.

Some hospitals, however, do have good equipment and surgeons. A growing trend is for hospitals to buy out successful medical practices so higher rates can be billed to insurance. This trend has brought some successful and skilled surgeons into the hospital environment wherein they work for the hospital. However, make sure that you fully research the surgeon you are going to use.

If you have other eye conditions or diseases such as diabetic retinopathy, glaucoma, history of injury to the eye, or any other known serious condition, make sure to see a doctor who specializes in that condition before your cataract surgery. These doctors will know the risk associated with your condition related to

Understanding Cataracts

Age-related cataracts are a progressive clouding of the lens tissue, which is inside the eye behind the iris or colored part of the eye. This change in the lens tissue can affect one or both eyes. In the case of age-related cataracts, one eye will generally deteriorate faster than the other, but both will eventually need treatment.

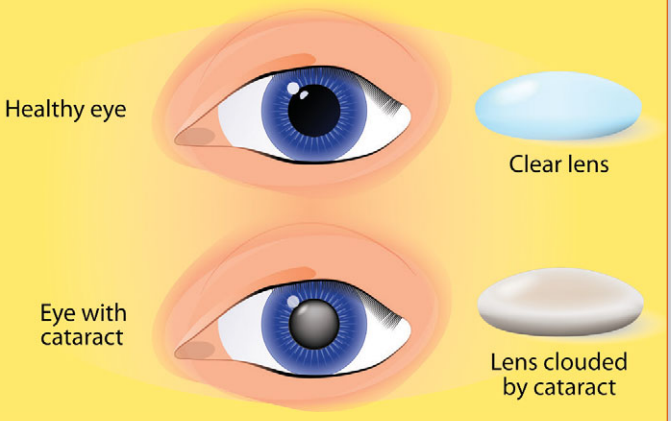
Cataracts occur when proteins in the lens of the eye become **glycated** to the point that clarity is diminished. The result is a gradual degradation of visual quality that if not surgically corrected leads to virtual blindness.

Glycation is the pathologic binding of a sugar molecule to the body's proteins or lipid molecules resulting in the formation of nonfunctioning tissue structures. The lens of the eye is especially vulnerable to this type of degeneration. Some of the nutrients that help to inhibit glycation include carnosine, benfotiamine, glutathione, and activated forms of vitamin B6 (pyridoxal-5-phosphate).

Risk factors that can cause or increase cataract risk include:

- Diabetes
- Sunlight exposure
- Cigarette smoking
- Eating foods cooked at high temperatures
- Hypertension
- Blunt trauma to the eye
- Electrical shock
- All forms of radiation, especially ultraviolet light (specifically UVB)
- Corticosteroid drugs

However, the most common risk of cataracts is aging.



cataract surgery and generally knows which cataract surgeon is best trained and skilled to handle that associated condition.

Please realize ophthalmologists are not created equal in skill or training. Most practice general ophthalmology wherein they do a little bit of everything while others get additional training and are generally really good at specific treatments and most often limit their practice to that area of treatment. For example, when a cataract surgery goes bad it often involves the retina and the retinal specialist is the one that often saves the eye. Therefore, retinal specialists are acutely aware of which cataract surgeons routinely have problems. The caveat here is to not let a cataract surgeon make this referral to a retinal specialist for you as the specialist will now be obligated to refer you back to the referring doctor. You have to be aware of the associated politics and traditions concerning referring doctors.

If you do have problems with your cataract surgery and your surgeon is not responding quickly and with great concern, then do not hesitate to get a second opinion. A patient generally knows when things are not right. The caveat here is the second opinion must be from a doctor completely unassociated with your current doctor. This means that you must seek this opinion from a doctor in a different town and preferably a considerable distance from your current doctor. A doctor associated with a university medical school is often a good choice as these doctors are often more critical and outspoken as to why doctors are not doing what they have been trained to do.

A referral from a friend is often a poor choice as it is a very small snapshot of the surgeon's ability. If your friend had what they perceived to be a good outcome they will think the doctor is great even though the patient before and the one after had a horrible outcome. Do not hesitate to contact the state board to see if any action has been brought concerning the doctor you are thinking of using. Your selection of a doctor is serious and perhaps a life-altering decision. Make it carefully.

Summary

While **98%** of cataract surgeries are successful, 15,000 people still lose vision following surgery each year. To choose a well-qualified surgeon, ask a trusted optometrist. Find one who controls his or her own surgery center rather than who performs surgery in a hospital where outside conditions may affect a surgery's success or failure. Those suffering from another eye condition or disease need to see a surgeon who specializes in that condition before having the operation. ●

The article that follows this one is written by Patricia Faloon, the mother of William Faloon, who describes what went terribly wrong with her cataract surgery in the hands of a poorly qualified doctor. You will learn what anyone contemplating cataract surgery should do ahead of time to help ensure a successful outcome.

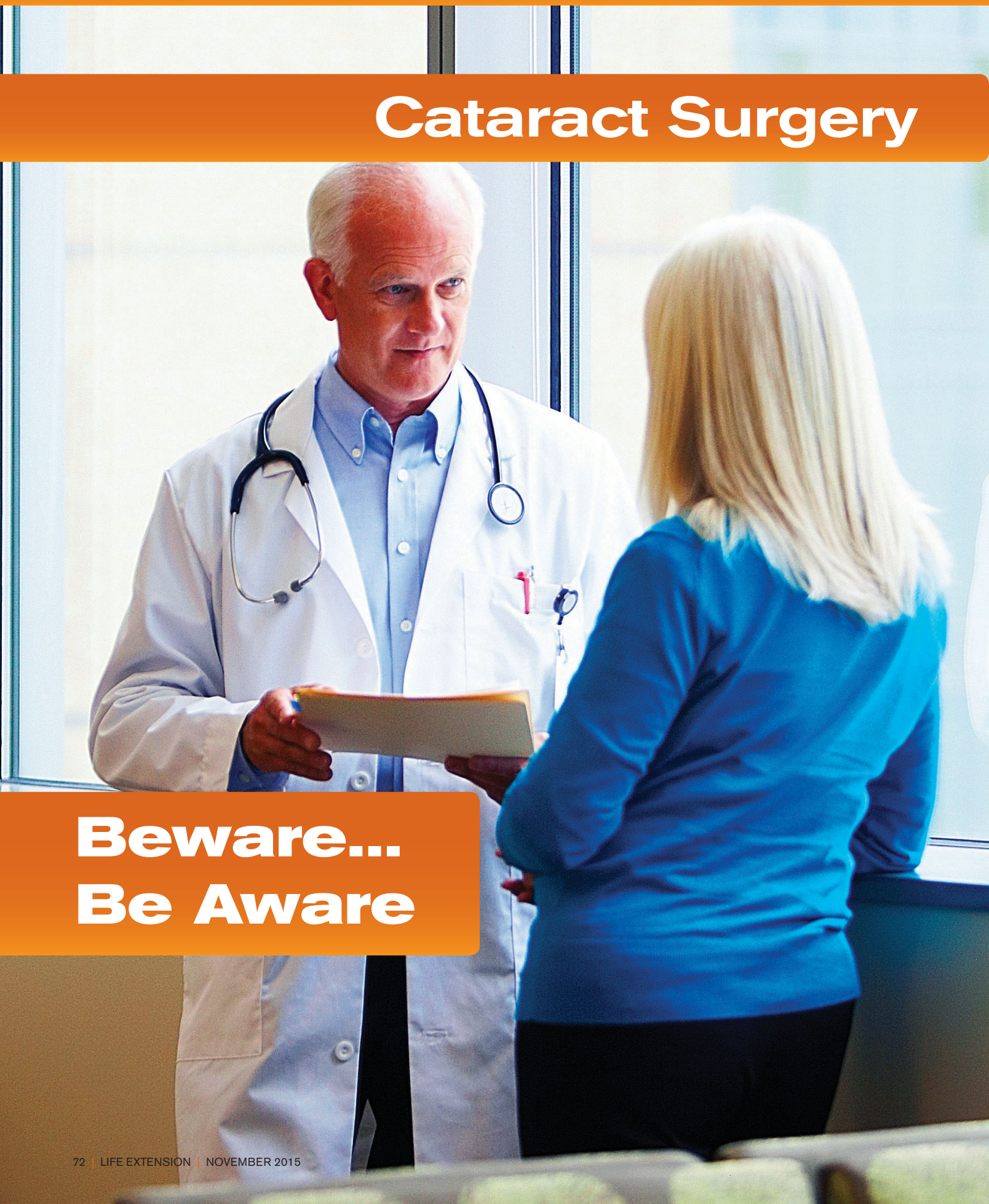
If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

What You Need To Know

How To Have Successful Cataract Surgery

- **Three million Americans have cataract surgery each year. While over 98% of these procedures are successful, 15,000 patients lose their eyesight because of a failed cataract surgery.**
- **A good optometrist is your best source for finding the best surgeon. A cataract surgery center owned and controlled by the surgeon generally produces a better outcome than a hospital.**
- **If you have an eye condition or disease such as diabetic retinopathy, glaucoma, history of injury to the eye, see a doctor who specializes in that condition before your cataract surgery.**

Cataract Surgery



Beware... Be Aware

BY PATRICIA FALOON

Do you think I want to scare you? You bet I do! I would gladly save someone the fear, pain, and blindness I have endured.

I want to share my experience about a sight-robbing cataract surgery outcome that could have been prevented.

My first cataract surgery left me blind in one eye. After the botched procedure, I visited numerous ophthalmologist surgeons and found out about the mistakes my first doctor should have never made.

My Story Begins

In 2013, I found out my eye doctor had retired. He had performed two successful cataract surgeries on my late husband and I had been going to this doctor for over 25 years. I didn't know the new doctor who took over his practice, whom I will call Dr. X. So, I obtained all my history records from this office in search of an ophthalmologist I could trust my vision to.

In the meantime I met a friend who had both cataracts done successfully by Dr. X. Everything went fine with my friend. So, ignoring my first instinct, I decided to have Dr. X examine my eyes. He told me I was a candidate for cataract surgery and he would do my right eye. I explained to him that my career as a professional clown takes me to all kinds of locations and I need to be able to see not only the street signs, but the intricate face painting I perform. Dr. X said these problems would be solved with the surgery. I decided to have him do the cataract surgery.

Like most people, I thought this surgery has become so routine that they were all successful. I wish I had heard some "bad" stories like mine. I'm sure I would have done more research.

The First Surgery

July 17, 2013, was the day of my surgery. I was told by many that this operation took about 15 minutes. I had no idea I would be in for an ugly surprise.

I was sedated for about 20 minutes. It soon became more like 45 minutes. The anesthetic had worn off and I was suddenly waking up and heard scrambling, as well as nervous talk above my head. I said, "Is everything okay?" The doctor mumbled something about a lens.

That evening I was having so much pain that my daughter tried to call the doctor, but she couldn't reach him. He finally called back near midnight. He said there was no use in going to the hospital since it would take too long for an eye doctor to get to the emergency room to see me. He said he would see me in the morning. Pain and scary images of black and white designs were swirling and flashing in my affected eye. It didn't stop all night. It was so frightening and I knew something was terribly wrong.

The next day when the bandage was taken off, my vision was not good. There were dark brown pieces throughout my visual field. Dr. X told me to use several types of eye drops during the day. He said that because of a "saggy bag" behind my eye he had to put the lens in the front, instead of behind my eye, which is the usual cataract procedure.

I and my family were all getting a bit frantic by this time. My eye was bloody and irritated and my vision severely impaired.

On July 22 (five days after my surgery), I had a 10:15 appointment to see Dr. X. I told the doctor my eye felt scratchy and asked if it could be the stitches. He said no, it was just dry and gave me a little bottle of eye drops.

At 4:10 that same day, I got an appointment with an ophthalmologist specialist to see if he could help me. I told this specialist about the drops for the scratchy eye. After examining my eye he said it wasn't dry, there were stitches left in the eye from the surgery and that was what was causing the unbearable scratchy sensation.

This doctor was able to see remnants of lens particles still present in my eye, which apparently can happen after surgery. I was told there was too much swelling to get a good exam. I had to undergo another surgical procedure with this new doctor to remove these particles. My eye still was a bloody, irritated mess. I was having a terrible time with bright lights and sun. In order to see, I needed to keep the eye squinted or closed.

Finding A Surgeon With Special Talent

Fortunately for me, I was able to relate my ordeal to a health professional in another field. When she saw and heard about my eye, she told me about a specialist from Allegheny General Hospital in Pittsburgh. His name is Garry Condon, MD, and he had a great reputation for solving complex problems. The difficulty was I couldn't get an appointment until September 20th. I had to endure the pain and vision loss for two more months.

Dr. Condon ran a number of tests. He said my eye had been traumatized by the surgery, and remained inflamed. I should never have discontinued the steroid drops, which one of the doctors had prescribed. My eye was constantly inflamed. Dr. Condon was hoping the affected eye would settle down and regain some better vision.

For the next three months, there would be many tests. I believe all the doctors were puzzled. They reviewed my complete eye history. On November 5th, Dr. Condon pulled out another stitch. On December 10th, Dr. Condon's colleague did an exam. He guessed that a blood vessel or nerve had been damaged during surgery.

I have had to accept the fact that this eye was going to be permanently blind from the surgical errors. The central vision is blurred and gray. I cannot see the face of a clock. I could not drive a car with this eye. I cannot read with this eye. As a clown, painting faces I never needed glasses. I do now. The anguish and frustration of having my left eye done has been a worrisome ordeal.

I was somewhat confident, however, that I had now found an ophthalmologic surgeon with special talent.

Should I Have Cataract Surgery On My Remaining Eye?

My dilemma was that I needed cataract surgery on my other eye. The botched surgery that blinded my right eye left me very frightened to consider doing the left eye.

I have (I thank God) been an independent, active person all of my life. At age 85, I'm still alert, agile, and physically able to perform as a professional entertainer. I've been health conscious my entire life. Now my other eye needed surgery. What really scares me is the possibility that I might now need constant care by a health aide because of my lack of vision due to my botched operation. We all value our independence as long as we live.

My Letter To The Doctor Who Blinded Me

On January 23, 2014, I wrote this letter to Dr. X.

It has been over six months since you did cataract surgery on my right eye. For me, it has been a dismal outcome.

During the surgery, I was not given enough anesthetic. I was awake the last 10 minutes of a 45-minute operation. I could hear you talking. I asked if everything was okay. You said something about a lens. I literally felt the last four stitches… and it was excruciating! Then you mildly "slapped" the eye patch onto my eye. I asked, as you were walking away (with your BACK to me), "Is everything going to be okay? You kept walking away and said, "It'll take time… a long time."

That night I experienced "horrible" images as I tried to sleep. There was pain and symptoms of a detached retina. We tried getting in touch with you for three or four hours. I was ready to go to the emergency room when you called back.

When I saw you the next day, you attempted to reassure me that everything was normal. The fact that I could barely see and that my eye was inflamed with stitches you forgot to remove should have told you that everything was not okay. I couldn't see.

I have now been to four specialists. Tests, tests, and more tests. I was told my eye was traumatized (wounded, injured, and inflamed).

After these four specialists, we are still trying to figure out what went wrong and if I can regain any eyesight at all from this "routine" operation. I am now dealing with a guess as to what is happening. Maybe it's an injury to my optic nerve and a blood vessel not getting the blood supply. I still cannot see clearly out of my eye. A very respected and esteemed specialist, in his evaluation, has determined that based on the structure of my eye, the risks far outweighed any benefit of even having the eye surgery. I should have been guided to wait for the surgery.

I'm not looking to sue you...but, in all fairness, if I have to start paying for any treatment pertaining to my eye, I am going to request that you pay for it.

So angry and disappointed,
Patricia Faloon

I had to send two registered letters; because the first one was returned to me. He never did reply.

I realized that I had made the mistake of trusting a doctor I now believe did not have the experience or proper readiness for complications.

On March 12, 2015, I called Dr. Condon. There was no change in my blinded right eye, but I could tell that I needed cataract surgery for my left eye. I was really scared of another failure and that I could wind up completely blind.

Dr. Condon gave me a pamphlet that described "Exfoliative Glaucoma." At first it frightened me. As I read it, I finally understood my problem. It described "an accumulation of protein in the drainage system and other structures of the eye."

An important reason to know whether exfoliation is present is that these patients sometimes have increased difficulty with cataract surgery. According to the pamphlet, "The abnormal protein seen in this condition settles and weakens the lens zonules, which are suspensory fibers that hold the lens in place. In most cases the surgical techniques can be modified to obtain a good outcome."

In reviewing my eye history charts, from 1999, 2001, 2007, 2009, my original doctor (before Dr. X) noted exfoliative glaucoma pertaining to my eyes and wrote "not ready for surgery." In other words, none of this had to happen. I could still have all my vision if Dr. X had simply done a proper exam before rushing me into surgery.

In my research, I have read that "in the case of exfoliative glaucoma, the findings from a slit lamp eye exam are often characteristic, and so readily seen when the eye is dilated."

I was never told about this. Why didn't Dr. X see this? He could have been prepared for this or properly referred me to a cataract surgeon with specialized equipment and expertise for this difficult cataract procedure.

The Second Cataract Surgery

The operation on my other eye was scheduled for April 1, 2015, with Dr. Condon. I was mildly sedately but awake for the operation.

I was stunned with happiness when it was over.

I could see (very well) immediately. No bandage on my eye. My evening and next day were joyful! Dr. Condon said: "I kept the anatomy of the eye as intact as possible. I put your lens behind where it should be. I had to work with it, but it all worked out. Usually with your condition of exfoliative glaucoma, you will find the 'high' pressure a problem. In your case the pressure is staying low, which is a good thing."

Dr. Condon told me he was not concerned with glaucoma at this point. Unlike Dr. X, I was called the night of the surgery checking to see if everything was okay.

Needless to say, the surgery on my second eye was a success and I could have spared myself blindness on my first eye if Dr. X had bothered to read my medical history.

Finding Out About Dr. X Too Late

I believe Dr. X was untrained in knowing what procedure to perform. I believe he was not prepared and went into a "panic" mode as he encountered my situation. He didn't attempt to strengthen what holds the lens in place, and instead removed it and placed the new lens in front.

I was left with a "horrible" mangled eye, which several doctors could not figure out. And so, have what is probably considered a "legally" blind right eye.

A neighbor heard about my "mess" and called me. She had been seeing Dr. X. As she sat in his waiting room, she kept hearing horror stories about other failed eye surgeries. Dr. X had told her she had macular degeneration. I told her to find another doctor. She did make an appointment with a doctor in Dr. Condon's group. After a complete eye exam, she was told that she did not have macular degeneration!

What I Now Know About Cataract Surgery

A cataract surgery can be an extremely simple procedure for many. In other instances, however, it can end up having an irreparable outcome when performed by the wrong doctor. As in any profession, there are those who "get by" with the knowledge that was imparted to them in school, and then there are the professionals who receive their degree but realize learning never stops.

The safest route is to first see a qualified "Vision Source" optometrist. Vision Source is a nationally recognized organization that lists private practices that must continue to complete higher levels of education and have within their practice the latest technologies to diagnose a problem properly. They would have been able to properly diagnose my pre-existing condition of exfoliative glaucoma and would have known who to refer me to as a result. We must become our own health advocates in order to survive in today's health care world!

I can only suggest that patients do their utmost due diligence in investigating an ophthalmic surgeon whose skill level will determine if you will see clearly immediately after cataract surgery, or if you will you be rendered blind in one eye as I am.

I hope I have scared enough people into doing the research for a happy and successful cataract surgery. Trust me; it is worth the time and energy.

As far as Dr. X is concerned, he can probably perform general ophthalmology exams and earn a decent living. From everything I have learned about him, however he should not be doing eye surgery. With Medicare paying over $3,000 per eye, I suspect Dr. X will continue his lucrative practice.

Complications with cataract surgery can be avoided. Ophthalmologists should be prepared for problems and if they don't have the expertise for a solution, should be ready to recommend a doctor who does. My blindness could have been prevented.

I put in a formal complaint against Dr. X. to the Commonwealth of Pennsylvania Office of General Counsel in Harrisburg, Pennsylvania.

On August 28, 2015 an investigator came to my house to conduct an inquiry into the allegations about my cataract problem. The investigator seemed to feel my complaint had merit. He would begin by having a legal meeting with Dr. X.

My wishes are that he is forced to refer complicated cases like mine to a surgeon and facility that has the expertise/equipment to properly perform the cataract procedure. ●

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 find a qualified Vision Source optometrist, visit www.visionsource.com.

Technical Comments About The Botched Surgery

Dr. X appears to be incompetent and appears to be using surgery techniques that were discontinued years ago. The surgeon used multiple interrupted sutures to close the eye after surgery.

The current standard of care uses no sutures in **99%** of cases and if sutures are used, it is usually just one suture. Additionally, it is extremely rare that a patient is completely sedated for cataract surgery. Most cataract surgeries are done with a local anesthetic and the patient is awake throughout the entire procedure.*

* Sandford-Smith J. Sutureless Cataract Surgery: Principles and Steps. *Community Eye Health*. 2003;16(48):49-53.

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Provides
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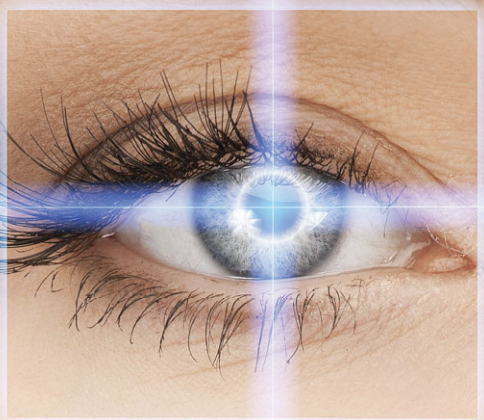

It's not easy to get all the vital nutrients you need to take care of your eyes from food alone. Fortunately, **MacuGuard® Ocular Support with Astaxanthin** contains the nutritional building blocks necessary to maintain the structural integrity of your eyes.

MacuGuard® Ocular Support with Astaxanthin maintains eye health in many ways:[1-7]

- Supports lutein concentration in the eye
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- Maintains zeaxanthin concentrations in the eye
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- Contains cyanidin-3-glucoside, shown to help with night vision.
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1 bottle	$42	**$31.50**
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Suggested dose is one softgel daily with or without food. Each bottle of **MacuGuard** provides a **two-month** supply.

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To order **MacuGuard® Ocular Support with Astaxanthin**, call **1-800-544-4440** or visit **www.LifeExtension.com**

NEW HIGHLY PURIFIED
ALASKAN FISH OIL

The health benefits of eating **cold-water fish** are robust, yet concerns remain about **contaminants** found in wild and farm-raised fish.

This should not stop consumers from including fish in their diet, as the longevity advantages of consuming cold-water **fish** instead of foods like **beef** are substantial.

A recent study found that even **vegetarians** that include some **fish** in their diet fare better than strict vegetarians.[1]

Eliminate Virtually All Fish-Derived Toxins

Consumers can exert significant control over their exposure to fish-borne toxins.

High-quality **fish oil** is distilled to remove synthetic and natural contaminants that existed in the **fish** itself. Enhanced molecular distillation techniques utilize redundant processes to virtually eliminate detectable environmental toxins.

The other safety concern about fish oil is that its delicate ***omega-3 fats*** are highly vulnerable to **rancidity**. No one wants to ingest oxidized (rancid) oils.

A new fish oil blend derived from pristine waters off the coast of **Alaska** utilizes a **multistep** process to remain exceptionally **fresh**. The result is that this **Alaskan-derived** fish oil has a greater than **5-fold** reduction in the upper level threshold measurement for **oxidation**.

Current oxidation standards for quality fish oils ensure products free from rancidity. The new **Alaskan-derived** fish oil specification advances this premium standard **5-fold** better!

The chart below reveals the reduction in upper limit for **oxidation** of this new **Alaskan fish oil** blend over existing ***quality*** fish oils:

Higher Percentages Of EPA And DHA

An advantage to higher EPA and DHA fish oil concentrations is smaller sized omega-3 capsules.

The addition of this new **Alaskan-derived** fish oil to the ***Super Omega-3*** supplement group enables the same high-potency **EPA/DHA** to fit into slightly smaller softgels for easier swallowing.

International Fish Oil Association "Five-Star Rating"

The **International Fish Oil Association** (IFOS) is an independent organization that tests fish oils to determine their overall safety and quality. A **Five-Star Rating** indicates fish oils have been tested to meet very strict standards of quality as determined by EPA and DHA content, and for purity to rule out contamination with heavy metals, radiation, oxidation, and organic pollutants such as PCBs and dioxin.

The new **Alaskan-derived** fish oil enjoys the same **Five-Star Rating** mandated for all fish oils contained in the ***Super Omega-3*** family of supplements.

Sustainable Fishing

The **Marine Stewardship Council** is an independent nonprofit organization that sets a standard for **sustainable fishing** so that fishing can continue indefinitely with minimal environmental impact.

The new **Alaskan-derived** fish oil is the first refined omega-3 concentrate available worldwide that carries the prestigious **seafood sustainability** certification from the Marine Stewardship Council.

	Alaskan-Derived Specification	Current High-Quality Specification
TOTOX (total oxidation value) (Lower means less oxidation)	**Maximum: 5**	**Maximum: 26**
PEROXIDE LEVEL (Measure of current oxidation)	**Max: 1.0 meq/kg**	**Max: 5.0 meq/kg**
ANISIDINE LEVEL (Measure of past oxidation and measure of aldehyde production during handling and storage)	**Maximum: 5**	**Maximum: 20**

Most Advanced Omega-3 Dietary Supplement

From supporting **heart health** and **brain function** to balancing the **inflammatory** response, there is no debating the broad-spectrum benefits of **omega-3** fatty acids.[2-4]

There are hundreds of fish oil supplements on the market. Only one incorporates lifesaving findings to provide **omega-3** and **olive fruit** extracts, along with **sesame lignans**, in a family of formulas called **Super Omega-3**.

Fish Oil + Olive Fruit Extract = Greater Efficacy!

Research findings indicate that a combination of **fish oil** and **olive oil** can support a healthy inflammatory response better than fish oil alone.[5] **Super Omega-3** incorporates the benefits of both fish oil and olive fruit extract into a single novel formula. A four softgel serving supplies the equivalent polyphenol content of **8** to **12** tablespoons of **extra virgin olive oil**.

Sesame Lignans Enhance Fish Oil Efficacy

Studies show that when **sesame lignans** are added to **fish oil**, there is a greater safeguard against **oxidation** along with the EPA/DHA fatty acids being directed toward pathways that help with inflammatory reactions.[6]

Benefits Of A Mediterranean Diet

The most popular ***Super Omega-3*** formula provides the following potencies of Mediterranean health benefits in just four smaller softgel capsules:

Four softgels contain:		
Alaskan Wild Fish Oil Concentrate		**4,000 mg**
Omega-3s		**2,400 mg**
EPA	1,400 mg	
DHA	1,000 mg	
Polyphen-Oil™ Olive extract (fruit and leaf)		**600 mg**
Sesame seed lignan extract		**20 mg**

To order Super Omega-3, call 1-800-544-4440 or visit www.LifeExtension.com

Super Omega-3
Item #01982 • 120 softgels

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1 bottle	$32	**$24**
4 bottles		**$21** each
10 bottles		**$17.05** each

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Supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.

BY ROBERT GOLDFADEN AND GARY GOLDFADEN, MD

Novel Strategy To Restore Youthful Facial Contour

Over time, the skin's underlying support structure of collagen and elastin degenerates from repeated sun exposure. Combined with the effects of gravity, these factors rob facial skin of its youthful firmness and resilience.[1-3]

Medical interventions to improve loose and sagging skin such as surgical face lifts are costly and associated with side effects.[4,5] This leaves many people without a viable option.

You may not have to be one of them. Scientists have uncovered several new compounds that can turn the tide in your favor–providing a safe and effective alternative to current treatments.

This article will describe how an innovative peptide and three plant stem cell extracts work together to stimulate new production of collagen and elastin in aging skin, while protecting existing collagen and elastin against damaging ultraviolet radiation (UV). This novel strategy results in visibly firmer, more defined, younger-looking facial skin.

Collagen And Elastin: The Dynamic Duo

The physical appearance of your skin largely depends on the condition of the **extracellular matrix** that lies between cells in the dermis. In younger skin, the **extracellular matrix** is a highly organized structure rich in collagen and elastin proteins that work in tandem to maintain firmness and resilience.[6,7]

Collagen types I and III comprise most of the **extracellular matrix**, forming rope-like fibers that supply high-tensile strength and resist stretching.[8] A different type of collagen—type IV—is a major component of the basement membrane that connects the dermis to the epidermis, where it self-assembles into a scaffolding network to provide mechanical stability.[1]

Elastin, on the other hand, accounts for the impressive ability of skin to stretch and recoil, allowing it to return to its original shape after facial expressions such as smiling, laughing, and squinting. Although elastin makes up only a small percentage of the total dry weight of the dermis, it is equally as important as collagen in supporting the appearance of youthful skin.[9,10]

As we age, however, elastin and collagen fibers decrease as a result of reduced synthesis,[11,12] as well as increased degradation from UV-induced matrix metalloproteinases which are ***enzymes*** that destroy our skin's support structure.[13,14] Combined with the force of gravity, these age-related changes translate into loose and saggy facial skin with fine lines and wrinkles.[15]

Since surgical face lifts, injections, and laser treatments are expensive, uncomfortable, and often accompanied by side effects,[14,15] researchers have been investigating compounds that could lift and tighten loose skin without these notable drawbacks.

Let's take a look at how a unique peptide regenerates collagen and elastin to deliver remarkable skin tightening effects.

Acetyl Tetrapeptide-2 Creates New Collagen And Elastin

Aware of the fact that collagen and elastin molecules are too large in molecular weight to significantly penetrate the skin,[16] scientists designed a low-molecular weight peptide called **acetyl tetrapeptide-2** to overcome this problem.[17]

When scientists treated dermal fibroblasts with acetyl tetrapeptide-2, they observed a **47%** increase in type I collagen synthesis.[17] In addition, it was shown to favorably modulate gene expression of collagen types I and IV to improve skin cohesion and resistance.[17]

Elastin is made from its precursor molecule tropoelastin, which forms elastic fibers after key steps involving the enzyme **lysyl oxidase-like 1** (LOXL1) and **glycoprotein fibulin-5** (FBLN5).[18-20] Both of these compounds decline with advancing age and consequently interfere with the proper formation of elastic fibers that give skin its elasticity.[212,22]

Acetyl tetrapeptide-2 has not only been shown to increase the synthesis of elastin by **22%**, but also encouraged its formation into functional fibers by raising LOXL1 and FBLN5 **1.7 fold** and **2.3 fold**, respectively.[17]

Additional research shows that acetyl tetrapeptide-2 further supports skin firmness and elasticity by producing adhesion molecules that strengthen the attachment of cells to the **extracellular matrix**.[17]

To determine its effectiveness in humans, researchers conducted a clinical trial involving a group of mature women suffering from saggy facial skin. After eight weeks of twice daily applications of acetyl tetrapeptide-2 to the targeted region, participants had average reductions of **9.5%** in indentation and **23.2%** in a skin flaccidity area parameter—leaving them with noticeably tighter and smoother facial skin.[17]

Next, we'll examine plant secondary metabolites and their protective role against sun damage that damages elastin and collagen in the first place.

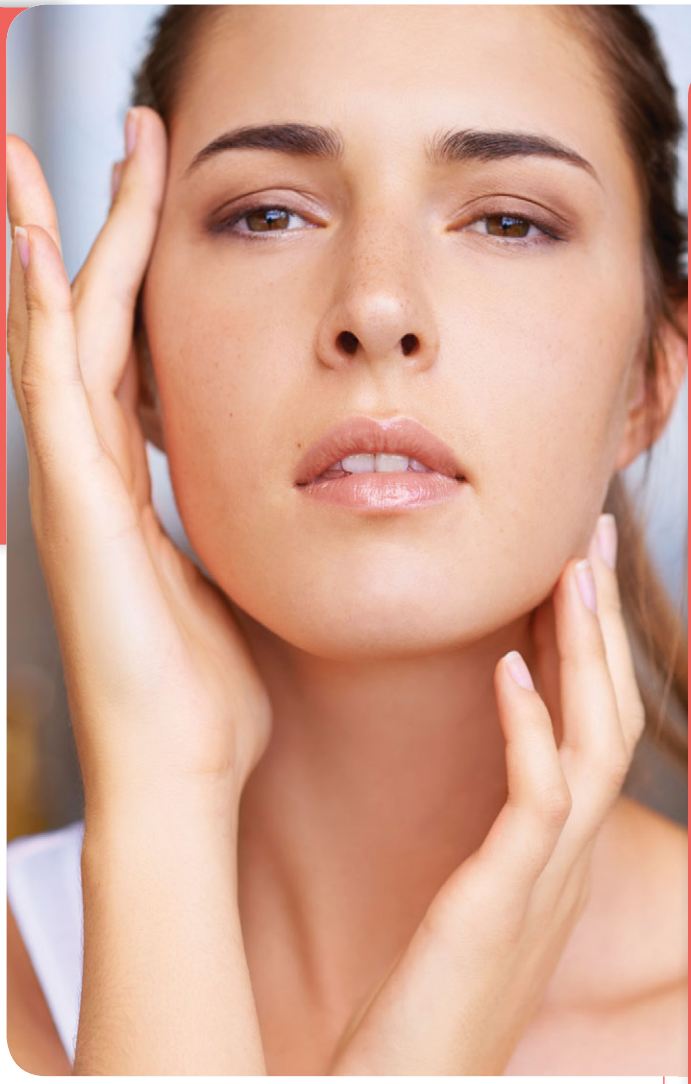
Targeting Plant Secondary Metabolites

Have you ever wondered why some plants have astonishing life spans? The answer lies in the remarkable regenerative capacity of meristematic cells located in the tips of plant roots and shoots.[23,24] These plant stem cells, like human stem cells, can self-renew or differentiate into any other type of cell with a specific function based on the surrounding environment.[25]

For instance, meristematic cells give rise to secondary metabolites as part of the plant's survival strategy under stress conditions imposed by living microorganisms (biotic stress) or the physical environment (abiotic stress).[26,27] Although once believed to be useless waste products, secondary metabolites have now been shown to demonstrate potent, anti-inflammatory and anti-microbial properties—all of which shield the skin against its external enemies.[28,29]

Scientists quickly turned to plant cell culture as a means to access secondary metabolites, but early research was unsuccessful.[30] After going back to the drawing board, scientists soon discovered a novel way to target secondary metabolites. By co-culturing plant stem cells with microorganisms (like bacteria), biotic stress is created that promotes the formation of secondary metabolites.[31-33] More importantly, this approach yields sufficient quantities of these high-value compounds.

What You Need To Know



Lift And Tighten Aging Skin

- As we age, the skin's underlying structural support of collagen and elastin breaks down from repeated sun exposure, and combined with the effects of gravity, make loose and sagging facial skin almost an inevitable part of aging.
- Researchers have identified several new compounds that provide a safe and effective alternative to current treatments with high cost and substantial side effects.
- Acetyl tetrapeptide-2 enhances skin cohesion and firmness in humans by triggering new production of collagen and elastin in aging skin.
- Three plant stem cell extracts and their secondary metabolites reduce damage to existing collagen and elastin fibers from UV rays through multiple mechanisms including decreasing interleukin-6 synthesis and boosting ATP production.
- Human studies show their ability to increase water content in aging cells, with *Euterpe oleracea* fruit extract improving moisture by 51% *within 24 hours* of topical application.
- Taken together, these four compounds create visibly firmer, more defined, younger-looking skin.

Plant Stem Cell Extracts And Their Secondary Metabolites

Researchers have identified three plants around the world—*Açaí palm*, *Quercus alba*, and *Perilla frutescens*—shown to adapt and resist harsh environmental conditions, from droughts to intense UV radiation.[31-33] To stimulate production of the compounds responsible for this longevity, cells of each plant were extracted and then co-cultured with bacteria. This resulted in the following plant stem cell extracts, each of which provide a specific secondary metabolite:

1. **Euterpe oleracea fruit** extract (Cabbage Palm Fruit of the açaí palm family)—*ferulic acid*[31]
2. **Perilla frutescens** extract—rosmarinic acid[32]
3. **Quercus alba bark** extract—tannic acid[33]

The skin's loss of firmness and flexibility can be traced back to unprotected sun exposure. Plant stem cell extracts and their respective secondary metabolites have been demonstrated in laboratory studies to reduce damage to existing collagen and elastin fibers from ultraviolet radiation in several ways:

- Plant stem cell extracts modulate pro-inflammatory cytokine production following exposure to ultraviolet radiation. For instance, these stem cell extracts decrease the synthesis of a damaging cytokine called **interleukin-6** (IL-6).[31-33] As people age, **IL-6** levels increase, which triggers the release of matrix metalloproteinase ezymes that degrade collagen and elastin.[34,35]

- They suppress UV-induced free radicals—evident by their high **oxygen radical absorbance capacity** (*ORAC*) scores [31-33] that contribute to oxidative stress involved in the destructive cross-linking of healthy collagen and elastin fibers.[36] This process renders both proteins dysfunctional, leading to loose and inflexible skin.
- By inhibiting free radical generation, plant stem cell extracts protect vulnerable DNA and preserve the natural order for regenerating new collagen and elastin.[31,37]
- Ultraviolet radiation alters mitochondrial energy production in dermal fibroblasts, resulting in less energy in the form of **adenosine triphosphate** (ATP).[38] This slows down cellular activities that maintain firm and smooth skin. By ramping up ATP production, plant stem cell extracts replenish energy levels to improve cellular metabolism, promote new collagen and elastin, and boost DNA repair. [31-33]

Human studies using the same three plant extracts confirm their ability to increase water content in aging cells, keeping them plump to give the appearance of firmer and smoother skin.[31-33] In one of these human studies, *Euterpe oleracea* fruit extract improved moisture by **51%** *within 24 hours* and **102%** after four weeks compared to a control, thereby demonstrating its immediate and long-lasting hydrating effects. [31]

Summary

While wrinkles and fine lines have been treated successfully with topical solutions, improving loose and sagging skin so far has been a losing battle. One primary reason is that medical interventions are costly, uncomfortable, and often accompanied by side effects.

Fortunately, scientists have identified new compounds that provide a safe and effective alternative to current treatments.

Acetyl tetrapeptide-2 enhances skin cohesion and firmness by triggering new production of collagen and elastin, while three plant **stem cell extracts** and their respective secondary metabolites work to protect existing collagen and elastin fibers from damaging UV rays.

This novel strategy results in visibly firmer, more defined, younger-looking facial 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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Zinc

Supports And Maintains A Healthy Prostate

By the time men turn **40**, one of the most important health factors they must monitor is the condition of their **prostate**. Researchers have uncovered data revealing that **zinc** plays an active role in maintaining prostate health and that optimal zinc intake is an essential factor in preventing the unhealthy cell division in prostate cells.

Numerous carefully designed studies show zinc provides aging men considerable protection of the prostate. For example, zinc:[1-4]

- **Repairs DNA damage**
- **Supports normal cell division in the prostate**
- **Reduces expression of pro-inflammatory cytokines**
- **Promotes normal cell life cycle**

In addition to prostate health, zinc also supports and maintains:[5-7]

- **A healthy inflammation response**
- **Insulin production**
- **Thyroid and bone production**

Between **35-45%** of people over age 60 don't get the daily recommended requirement.[8] A longstanding problem is that zinc absorption can be limited by certain plants and grains, which contain a compound called phytate.[9]

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Zinc Caps
Item #01813 • 90 vegetarian capsules

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4 bottles		**$5.25 each**

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

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The new **Multi Stem Cell Skin Tightening Complex** contains **acetyl tetrapeptide-2**. This low-molecular-weight peptide works at the cellular level to trigger new production of collagen and elastin.[1] Eight weeks of twice-daily applications of ***acetyl tetrapeptide-2*** were shown to give facial skin a tighter and smoother appearance.[1]

Plant Stem-Cell Extracts

To support this new collagen and elastin production, dermatologists blended three *plant* stem-cell extracts that support existing collagen and elastin against UV rays.[2-4] These stem cells allow plants to resist harsh environmental conditions from droughts to UV radiation.[2-4] **Cabbage Palm Fruit Extract** (*Euterpe oleracea*), **White Oak Bark Extract** (*Quercus alba*), and **Perilla Exract** (*Perilla frutescens*) were shown in human studies to boost water content in aging skin,[2-4] which can result in a firmer and smoother appearance.

Just 1-2 drops of this formula, day and night, effectively target the underlying origins of the appearance of aging and damaged skin.

To order **Cosmesis Multi Stem Cell Skin Tightening Complex**, call 1-800-544-4440 or visit www.LifeExtension.com

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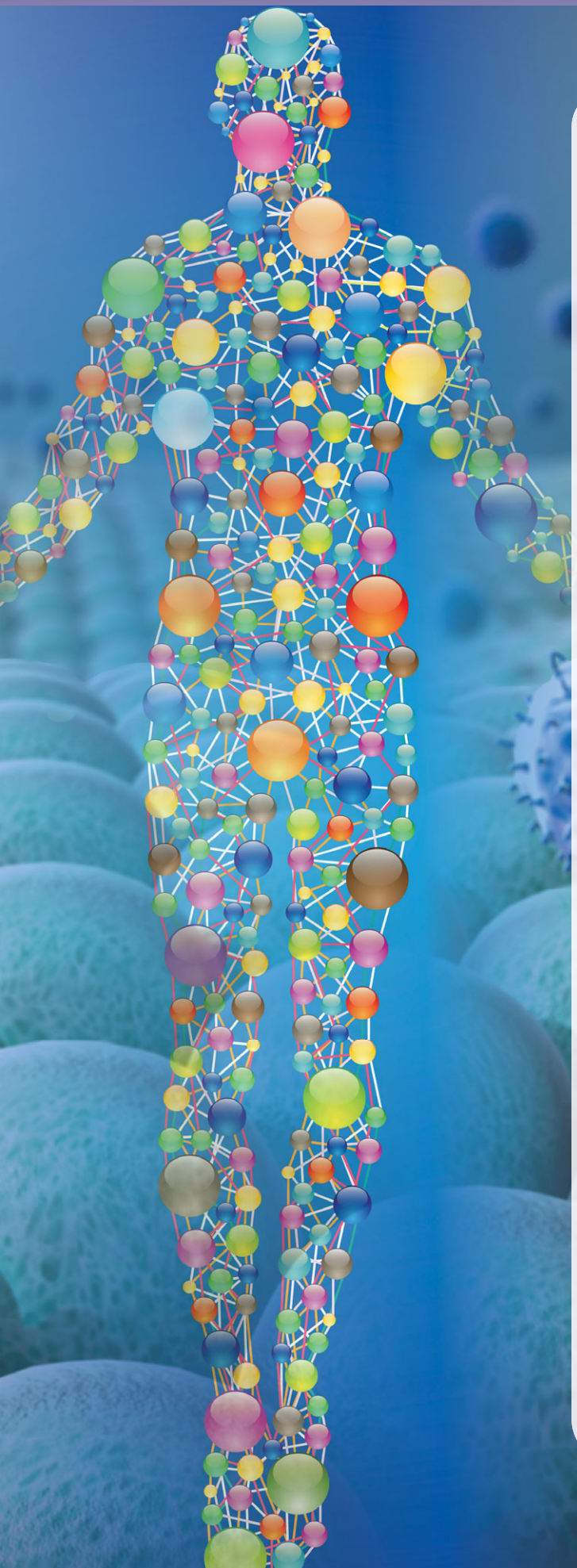
The Microbiome Of Aging And Age-Related Disease Conference



The **microbiome** refers to the full complement of microbial organisms inhabiting the human body, including bacteria, protozoa, fungi, and viruses.[1] There are about 10 times as many microbial cells as there are human cells in the body.[2] The great majority of these organisms reside in the gut, particularly the colon. The human colon typically contains almost half a pound of bacteria,[3] which function as if they were another human organ. There are many thousands of times more bacteria in the colon than there are in the small intestine, just as there are many thousands of times more bacteria in the small intestine than there are in the stomach.[4,5] Beneficial effects of bacteria in the gut include displacement of harmful bacteria, synthesis of vitamins, degradation of fibrous foods, maintenance of intestinal wall integrity, and stimulation of the immune system.[6-10]

Ingested food typically spends less than an hour in the stomach, where acidic conditions are very unfavorable to most microorganisms. Food being digested typically spends two to six hours in the small intestine where most absorption occurs.[11] Thereafter, food remnants (mostly fiber) reach the large intestine (colon, large bowel), where they remain an average of about 40 hours for the many bacteria to ferment the fiber that cannot be digested in the small intestine.[12] The sulfur component of gas resulting from fermentation gives an unpleasant odor to flatus and feces.[13] Human feces composition is about three-quarters bacterial.[14]

On October 16 to 19, 2014, what may have been the world's first conference on the impact of the microbiome on aging was held near San Antonio, Texas. The conference was organized by the Barshop Institute, an organization dedicated to curing the diseases of aging. The Director of the Barshop Institute, Dr. Nicolas Musi, attended the sessions and gave a presentation.

The Human Microbiome Project

William Nierman, PhD, (Director, Infectious Disease Program, J. Craig Venter Institute, California) reported on some of the results of the Human Microbiome Project (HMP). The HMP was initiated in 2007 by the National Institutes of Health as a follow-up of the Human Genome Project. The mandate of the HMP was to sequence the genomes of microorganisms inhabiting five major body areas: gastrointestinal tract, oral cavity, skin, urogenital/vaginal, and respiratory tract.[15] The J. Craig Venter Institute, where Dr. Nierman works, was one of the four research centers designated to do HMP genome sequencing.[16]


Nierman

More than **99%** of the microorganisms identified in the colon were bacteria from the ***Bacteroidetes*** and ***Firmicutes*** phyla of bacteria out of the dozens of possible bacterial phyla that exist.[17] Aside from bacteria producing short-chained fatty acids from fiber, there were organisms converting the hydrogen gas produced by fermentation into methane.[17]

The skin offers a more harsh habitat for organisms than other areas of the body, which means fewer species of bacteria reside there.[18] As in other areas of the body, some species of bacteria on the skin are protective by preventing overgrowth of harmful species.[18] Oily areas of the skin can attract acne-causing bacterial strains,[18,19] which can be treated with topical ginseng, pine, or black currant.[18]

Staphylococcus overgrowth on the skin is associated with **atopic dermatitis** (also called atopic eczema, "atopic" meaning hypersensitive), a condition that affects about **15%** of American children.[20] Atopic dermatitis is the most common inflammatory skin disease.[21] Atopic dermatitis is associated with growing up in an excessively sanitary environment that is believed to counteract the development of a healthy immune system (ie, the hygiene hypothesis).[22] One study found that children who received antibiotics early in life have a **40%** increased risk of developing atopic dermatitis.[23] Conversely, childhood exposure to furry pets or farm animals was associated with reduced risk (although this is partly because allergy-sensitive families will avoid having furry pets).[24] Vitamin D supplementation has been shown to reduce atopic dermatitis.[25] Paradoxically, mineral baths can be beneficial, whereas hard water may be harmful.[25]


Weinstock

George Weinstock, PhD, (Professor, Jackson Laboratory for Genomic Medicine, Maine) was a Principal Investigator of the Human Microbiome Project.[26] In particular, Dr. Weinstock was Principal Investigator for studying the "human virome" (the cumulative genetic makeup of viruses inhabiting the human body).[27] Although viruses can cause disease, the typical healthy human carries many persistent viruses that cause no harm, and may even be protective.[27] Dr. Weinstock reported on the microbiome of the mouth and the vagina.

As with other areas of the body, studying the organisms that inhabit the oral cavity is difficult because the majority of them cannot be cultured in a laboratory.[28] Oral bacteria are linked to a variety of diseases, including diabetes, stroke, pneumonia, and cardiovascular disease.[28] A correlation has been found between bacteria in dental plaque and bacteria in atherosclerotic plaque.[29] Dietary sugar increases acidity in the mouth, which encourages the growth of acid-producing (cavity-producing) bacteria.[30]

A healthy vagina is dominated by ***Lactobacillus*** bacteria that turn lactose and other sugars into lactic acid.[31,32] In contrast to the mouth, a slightly acid environment is protective in the vagina because it suppresses the growth of harmful bacteria.[33] Displacement of *Lactobacilli* by other classes of bacteria results in **bacterial vaginosis**, a condition that affects **8** to **23%** of women of reproductive age. Symptoms include a vaginal discharge having a fishy odor, although about **40%** of women do not have these symptoms.[34] The condition is present in over **70%** of sex workers, and is associated with sexually transmitted disease.[35] Although irrigating the vagina (douching) is imagined to be hygienic, the practice increases the risk of bacterial vaginosis, so douching should be avoided.[36]

Chronic Inflammation And The Microbiome

Tyler Curiel, MD, (Professor of Medicine, University of Texas Health Sciences Center) is concerned with the effects of inflammation in the gut, which can lead to inflammatory bowel disease[37] as well as cancer of the colon and rectum.[38,39]


Curiel

Bacteria are generally classified as either gram-negative or gram-positive on the basis of whether they take a Gram stain. **Gram-positive** bacteria have a thick layer of **peptidoglycan** protecting the cell membrane, whereas **gram-negative** bacteria have an exposed cell membrane displaying **lipopolysaccaride** (**LPS**), a carbohydrate-fat complex.[40,41] LPS is a potent inducer of inflammation,[42] which is why it is called **endotoxin**. LPS causes intesti-

nal inflammation.[43] Olive oil has been shown to protect mice against septic shock induced by LPS.[44]

Dietary fiber in the colon is fermented to produce the short-chain fatty acids **acetate**, **propionate**, and **butryate**. Acetate absorbed into the bloodstream from the colon is an energy source for muscle, heart, kidney, and brain. Butyrate mainly remains in the colon, where it is the major energy source for colon cells.[45] In mice fed a high-fat diet, butyrate supplementation prevented obesity and insulin resistance.[46] Human patients with inflammatory bowel disease have been effectively treated with butyrate enemas.[47,48]

Dr. Curiel described a study showing that the short-chain fatty acid butyrate boosts anti-inflammatory action of the immune system.[49] Butyrate leads to epigenetic changes in immune system cells (macrophages) that reduce the secretion of inflammatory factors (like IL-6).[50] Butyrate reduces intestinal permeability and the infiltration of harmful molecules, like LPS, into the bloodstream from the colon.[51] Butyrate given orally as a doubly enteric-coated tablet was an effective treatment for irritable bowel syndrome.[52] Propionate and acetate also have anti-inflammatory effects.[53,54]

Nicolas Musi, MD, (Director of the Barshop Institute, and Professor of Medicine at the University of Texas Health Center) discussed the role of dietary fat in inflammation, obesity, and aging. Both aging and obesity are characterized by chronic inflammation.[55] The innate immune system reacts to lipopolysaccharide (LPS) in the cell membranes of gram-negative bacteria by an inflammatory response.[56,57] As a defense against bacteria, this form of inflammation is protective in contrast to the chronic inflammation associated with obesity and aging. Chronic inflammation causes the muscle wasting (sarcopenia) so often seen with aging.[58]


Musi

Toll-like receptors on immune system cells (macrophages) and fat cells are detectors that trigger inflammation in response to the fat (in LPS) in bacterial cell membranes.[59] Unfortunately, these receptors also produce an inflammatory response to forms of fat other than what is found in bacterial cell membranes.[60] Infusion of free fatty acids or LPS into mice has been shown to increase inflammation and, as a consequence, increases insulin resistance and obesity.[60,61] Healthy men given a high-calorie diet showed increased plasma LPS.[62] LPS in the bloodstream of type II diabetics was found to be about **75%** higher than in healthy subjects.[63]

An inflammatory effect is seen in healthy humans after eating a high-fat, high-carbohydrate meal—but not after eating a meal rich in fruit and fiber.[64] Not all fat has this effect, however. In fact, supplementation with the omega-3 fatty acid eicosapentaenoic acid (EPA) has been shown to reduce inflammation and muscle wasting.[65]

Claudio Franceschi, MD, (Professor of Immunology, University of Bologna, Italy) is best known for his concept of chronic inflammation as the cause of aging and aging-related disease (ie, inflammaging).[66,67] The innate immune system recognizes peptidoglycan in the cell wall of gram-positive bacteria and lipopolysaccharide (LPS) in the cell membrane of gram-negative bacteria to produce an inflammatory response that fights the bacteria.[68] LPS is more inflammatory than peptidoglycan.[69] In a healthy immune system, the inflammation ceases after the bacteria have been eliminated, but aging results in an increasingly unhealthy immune system characterized by chronic inflammation.[70,71] Mice fed a high-fat diet showed a higher proportion of gram-negative (LPS-containing) bacteria in their gut, greater intestinal wall permeability, and a higher concentration of LPS in their bloodstream.[72,73] Fat may assist in transporting LPS from the gut into the bloodstream.[62] Excess body fat also causes chronic inflammation, leading to atherosclerosis, insulin resistance, high blood pressure, and other aging-related diseases.[74]

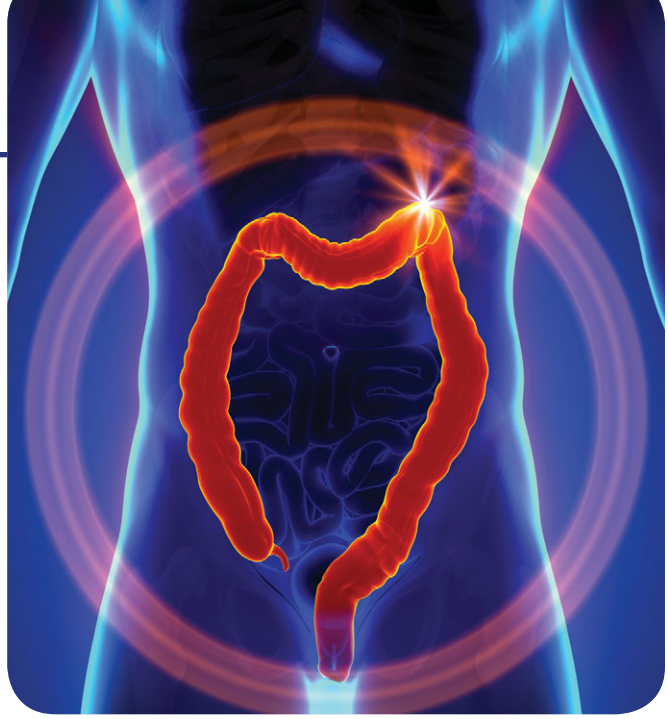

Franceschi

Dr. Franceschi believes that an aging-related decline in short-chain fatty acids, especially butyrate, plays an important role in age-related chronic inflammation.[75,76] Butyrate is the preferred energy source for cells lining the colon, and those cells produce mucin that protects the walls of the colon. When the colon cells do not get enough butyrate, the inflammatory bacterial components peptidoglycan and LPS continuously leak out of the colon into the blood stream, resulting in chronic inflammation.

The Microbiome In Model Organisms

Filipe Cabreiro, PhD, (Lecturer, University College, London, UK), like many researchers studying the microbiome, uses nematode worms and fruit flies as model organisms. Model organisms are used because their biology is known in great detail and can be easily manipulated, and because they have such short life spans. Nematodes rely upon their gut bacteria for nitric oxide, which enhances stress resistance and longevity.[77]


Cabreiro



Dr. Cabreiro has found that the antidiabetic drug **metformin** has effects apart from lowering blood sugar. Metformin activates the energy-sensing enzyme AMPK in both nematode worms and fruit flies, but extends the life span of nematodes, not fruit flies.[78,79] Metformin alters bacterial metabolism in such a way as to restrict the amino acid methionine.[80] Methionine restriction has also been shown to extend life span in rats.[81] Dr. Cabriera established that the effect of metformin on nematode life span is dependent upon the strain of bacteria in the worms. He suggested that the lack of a life span extension effect in fruit flies is due to different bacteria in the fruit flies.[80]

Dr. Cabreiro also cited literature emphasizing the intimate relationship between humans and their microbiota. Germ-free mice exhibit numerous defects in the development of their immune systems.[82] As the human immune system develops it learns to distinguish between self and non-self. At the same time, however, the human immune system learns that the microbiome is part of the self, which protects the microbiome from attack by the immune system.[83] Specific bacteria have been shown to be important for the development of the human immune system.[84,85]

H. pylori is one of the few bacteria that can tolerate the acidic conditions of the stomach.[86] Although *H. pylori* can cause stomach ulcers, the bacterium has many beneficial effects, including regulation of stomach acid and stomach hormones controlling appetite.[87,88] Although the great majority of Americans once had *H. pylori* in their stomach, now only a few percent do, as a result of overuse of antibiotics in childhood. The result has been an increase in obesity and acid reflux disease.[87]

Studying The Colon Microbiome

Paul O'Toole, PhD, (Professor, University College Cork, Ireland) has studied the difference between colon microbiota in the elderly compared to the microbiota in the colon of healthy adults living in Ireland. By phyla (major divisions of bacterial type), he found healthy adults to have **51%** *Firmicutes* and **41%** *Bacteroidetes*, whereas he found **40%** *Firmicutes* and **57%** *Bateroidetes* in the elderly.[89] Studies in different European countries show very different changes in bacteria phyla populations with aging.[75] Differences in species below the phylum level may account for the seemingly contradictory results. Obese mice and humans show fewer *Bacteroidetes* than those who are lean.[90] A mouse study showing greater weight gain with a high-saturated-fat diet than with a high-unsaturated-fat diet found that the saturated-fat-diet elevated the *Firmicutes*-to-*Bacteroidetes* ratio.[91]

Dr. O'Toole found that institutionalized elderly had less bacterial diversity in their colon than non-institutionalized elderly, and this lack of microbial diversity correlated with frailty.[92] Dr. O'Toole addressed the effect of high antibiotic use among the elderly and others. Antibiotics can be life saving, but there can be negative side effects. A major function of some bacteria is to prevent overgrowth of harmful bacteria. Diarrhea resulting from antibiotic treatment is sometimes due to the bacterium ***Clostridium difficile.*** Further antibiotic treatment is often futile.[93] For decades, stools from healthy patients have been inserted into the rectum of patients suffering from *C. difficile* overgrowth after antibiotic treatment.[94] Recently, stools from lean donors have been shown to increase insulin sensitivity when transplanted into the colon of metabolic syndrome patients.[95] Also recently, stool substitutes consisting of collections of known bacterial species ensured to be free of pathogenic microbes have been used with success.[96]

Stephen O'Keefe, MD, (Professor, University of Pittsburg, Pennsylvania) is a specialist in inflammatory bowel diseases (ulcerative colitis and Crohn's disease) and colorectal cancer. Crohn's disease is not an autoimmune disease, but instead is a combined result of both genetics and intestinal bacteria.[97,98] Inflammatory bowel disease leads to colorectal cancer in the range of about **8** to **18%** of cases.[99]

According to the American Cancer Society, colorectal cancer is the third leading cause of cancer death in males and females in the United States: breast (female) and prostate (male) are first, lung/bronchial is second,

and colon/rectum is third. Although colon cancer is up to **25%** more common among African Americans than Caucasian Americans, native Africans rarely get colon cancer.[100] Bile acids, which are normally synthesized in the liver from cholesterol, function to emulsify fats in the intestine. But with a high-fat, low-fiber diet, certain colonic bacteria can lead to an increase in toxic secondary bile acids **lithocholic acid** and **deoxycholic acid**, which can increase colon cancer risk.[101] Comparing colon fluid samples, Dr. O'Keefe's team found that lithocholic acid was **3.3 times** higher in African Americans than in Africans, and deoxycholic acid was **5.1 times** higher.[100]

Butyrate is chemopreventive and inhibits the survival of colon cancer cells.[102] Calcium in milk or supplements has been shown to precipitate toxic bile acids, and reduce the risk of colon cancer.[103,104] Chlorogenic acid in coffee and blueberries can protect the colon from toxic bile acids.[105] Conversely, dietary pro-inflammatory omega-6 fatty acids (found in many vegetable oils and prevalent in the Western diet) and vitamin D deficiency increase inflammation and risk of colon cancer.[106]

In comparing the gut bacteria from rural African children with European children, Dr. O'Keefe's team found much greater diversity in the bacteria of the Africans, and a relative absence of inflammatory bacteria.[107] Much of the African bacteria were from the genus *Prevotella*, whereas this genus was virtually absent in the Europeans. Aside from diet, Dr. O'Keefe attributed these differences to greater use of antibiotics and Caesarean section birth in Europe, as well as reduced breast feeding by Europeans.[107]Short-term antibiotic treatment can alter microbiota for years.[108]

When babies are born naturally, they acquire their first microbiota from their mother's birth canal.[109,110] When born by Caesarean section, their first bacterial exposure is generally from the mother's skin.[110] Caesarian birth has been associated with greater vulnerability to childhood asthma.[111,112] Birth by Caesarian section has greatly increased in recent decades, currently accounting for nearly a third of births in the United States, **40%** of births in China, and nearly half of births in Brazil.[113]Although Caesarean section can be life-saving in specific situations, the American College of Obstetricians and Gynecologists recently expressed concern that Cesarean delivery is overused.[114]

Breastfeeding provides an infant not only with microorganisms from the mother, but with growth factors, oligosaccharides, and more whey protein than is found in cow's milk.[115] The proportion of children who were ever breastfed is lower in the US than in many other countries.[116] Compared to formula feeding, breastfed infants have less diarrhea, less inflammatory bowel disease, and possibly fewer food allergies.[115,117] Oligosaccharides in breast milk reportedly contribute to brain development.[118]

Good Diet For The Microbiome

Maria Marco, PhD, (Assistant Professor, Food Science and Technology, University of California) described the benefits of a diet high in fiber and digestion-resistant starch. Foods such as potatoes, rice, pasta, bread, noodles, sugars, and breakfast cereals are rapidly digested, which rapidly increases blood sugar that stimulates insulin release. Blood sugar then quickly drops resulting in a repeating cycle of hunger and eating—leading to obesity, insulin resistance, and type II diabetes. By contrast, split peas, lentils, black beans, artichokes, raspberries, rolled oats, and other foods high in fiber or resistant starch are very slowly digested and have important health benefits.[119] Short-chain fatty acids (especially butyrate) produced in the colon by bacteria fermenting dietary fiber prevent inflammation and help prevent colon cancer.[119] Mice fed digestion-resistant starch show better glucose tolerance and increased levels of hunger-reducing peptides.[120,121] A human study showed similar benefits.[122] Weight cycling (repeated loss and regaining of body weight) is associated with bone loss, an effect that can be minimized by a diet high in digestion-resistant starch.[123]


Marco

Probiotics And Prebiotics

Fiber and digestion-resistant starch are called **prebiotics**. Prebiotics are components of food that cannot be digested by the stomach or small intestine, but are fermented in the colon to provide additional nutrients and health benefits.[124,125]


E. coli in colon

By contrast, **probiotics** are live bacteria that provide health benefits when taken orally.[126] Probiotics able to survive the acidic environment of the stomach include acid-producing bacteria from the genus ***Lactobacillus*** and the genus ***Bifidobacterium***.[127-129] *Escherichia coli* and *Streptococcus* from the birth canal are predominantly the first bacteria in a newborn, but upon breastfeeding, these bacteria are mostly displaced by *Bifidobacteria*.[5] *Bifidobacteria* can account for **95%** of gut bacteria in healthy, breast-fed babies.[130] The decline of *Bifidobacteria* with age may contribute to aging-associated disease.[131]

Probiotics have been used in medicine to prevent or treat antibiotic-associated diarrhea.[132] Probiotics given to mothers prenatally were shown to reduce the incidence of atopic eczema in their children by about half.[133] Probiotics given to the elderly were shown to enhance immune system function.[134-137] Probiotics fed to rats and mice were shown to prevent diet-induced obesity and prevent insulin resistance.[138-140] Probiotics fed to mice increased longevity by suppressing chronic inflammation.[141]

Prebiotics are digestion-resistant chains (polymers, oligosaccharides) of sugar molecules. Such oligosaccharides occur naturally in chicory, asparagus, onions, soybeans, and milk.[142-144] Prebiotics promote the growth of *Bifidobacteria* in the colon.[145] Prebiotics have been shown to protect rats from colon cancer.[146,147] In humans, prebiotics have been shown to reduce appetite,[148] improve insulin sensitivity, and promote weight loss.[149]

Fermentation of fiber produces gas, but this effect was reduced for longer polymers (chains) of sugar molecules.[150] Alpha-galactosidase (an enzyme that may be taken orally) has been shown to reduce the volume of gas resulting from fiber fermentation in the colon.[151,152] Concern about flatulence from eating beans is reportedly based on an exaggerated perception of the effect,[153] and ignores the health benefits. Mixing prebiotics can reduce gas.[154] Dietary meat increases the unpleasant odor in gas resulting from sulfur compounds,[155] which can cause DNA damage (increasing cancer risk).[156]

Conclusion

Existing and new information about the importance of our microbiota suggests everyone should supplement with a high-quality probiotic on a daily basis. Considering the harm that can be caused to the microbiota by the use of antibiotics, it seems prudent to avoid antibiotics when possible and to supplement with probiotics following an antibiotic treatment cycle. ●

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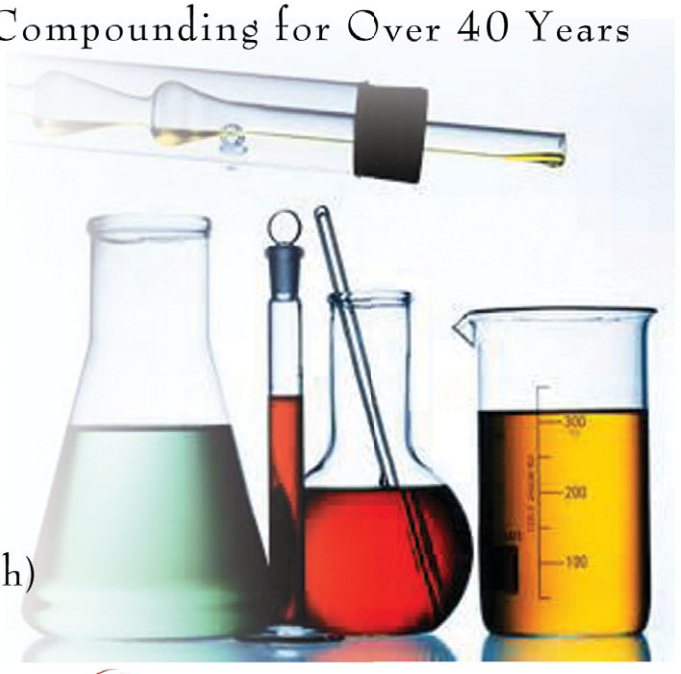

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LIFE EXTENSION MIX™

Tablets, Capsules, or Powder…Your Choice!

Studies document that people who eat the most **fruits** and **vegetables** have far fewer health problems. The dilemma is that most individuals do not consistently eat enough plant foods, and commercial multivitamins do not provide the vital plant components needed to maintain good health.[1-3]

Life Extension Mix™ is vastly superior to commercial multivitamins because it provides a remarkably broad array of **fruit** and **vegetable extracts**. Packed into this blend are extracts of fruits ranging from grape and maqui to pomegranate and tart cherry. Its vegetable extracts range from olive to broccoli and artichoke.

Another reason to consider **Life Extension Mix**™ is its exhaustive list of **water** and **fat-soluble vitamins**, **minerals**, **amino acids**, and more. It's the only multivitamin to contain **nicotinamide riboside,** which supports mitochondrial health and promotes longevity pathways.

Life Extension Mix™ is the most *comprehensive*, high-potency daily multivitamin anywhere.

When the original **Life Extension Mix**™ was introduced in **1983**, people lined up to purchase it because it provided the most efficient way to affordably obtain a broad-array of beneficial nutrients.

Since its introduction **32 years** ago, the **Life Extension Mix**™ formula has been upgraded **dozens of times** to reflect new findings in the scientific literature.

Life Extension Mix™ has always been a bargain because the cost of taking the individual nutrients separately would be much ***higher*** than its retail price. We are pleased to announce that the price of **Life Extension Mix**™ has been reduced by up to **21%**.

Each Bottle Provides a 5-Week Supply!

(Turn this page to review the entire Life Extension Mix™ formula.)

LIFE EXTENSION MIX™
315 TABLETS • ITEM #01955

	RETAIL PRICE EACH BOTTLE	YOUR PRICE EACH BOTTLE
1 BOTTLE	$80.00	$60.00
4 BOTTLES		$52.00
10 BOTTLES		$43.75

The regular tablet version of Life Extension Mix™ used by most customers contains **73 mg** of niacin and **1 mg** of copper. There is an extra-niacin version that provides **345 mg** of niacin at no additional charge. Niacin is used to help maintain healthy cholesterol, triglyceride and fibrinogen levels in those within normal ranges. Some people find the niacin "flush" unpleasant. Those with underlying liver disease sometimes cannot tolerate any niacin. Either one of these versions can be obtained without copper. The suggested dose is 9 tablets per day in divided doses with meals.

LIFE EXTENSION MIX™
490 CAPSULES • ITEM #01954

	RETAIL PRICE EACH BOTTLE	YOUR PRICE EACH BOTTLE
1 BOTTLE	$90.00	$67.50
4 BOTTLES		$58.00
10 BOTTLES		$47.50

The encapsulated version of Life Extension Mix™ used by many customers provides **1 mg** of copper. These capsules are also available without copper. The suggested dosage is 14 capsules per day in divided doses with meals. Capsules are easier to swallow for some people than tablets.

LIFE EXTENSION MIX™
14.81 OZ POWDER • ITEM #01956

	RETAIL PRICE EACH BOTTLE	YOUR PRICE EACH BOTTLE
1 BOTTLE	$80.00	$60.00
4 BOTTLES		$52.00
10 BOTTLES		$43.75

The powder version of Life Extension Mix™ contains **1 mg** of copper. This powder version is also available without copper. The suggested dose is three scoops per day in divided doses with meals. Because there are so many different ingredients, the powder can be difficult for some people to easily mix. Some people use a blender to combine the Life Extension Mix™ powder with whey protein and other powdered supplements.

To order your supply of LIFE EXTENSION MIX™, call 1-800-544-4440 or visit www.LifeExtension.com

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

Contains soybeans. Contains fish (Tilapia).

COMPREHENSIVE **VEGETABLE-FRUIT COMPLEX**

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** proved one of the most beneficial 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.

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**, including **gamma tocopherol**, and inhibit the formation of an inflammatory precursor called arachidonic acid.

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

Bilberry extracts have antioxidative properties that not only are ***neuroprotective***, but they also help suppress photooxidative processes and have been shown to improve microcapillary circulation.

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

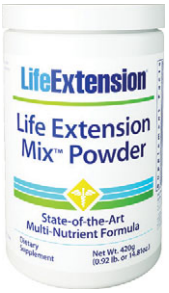
Pterostilbene is a compound naturally found in blueberries and grapes that has been shown to have beneficial, anti-aging effects on gene expression and to promote healthy cognitive function.

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

Delphinidins are potent anthocyanins found in maqui berries that activate production of ***nitric oxide***, enabling vascular relaxation and supporting blood pressure. They can also help control inflammatory processes, stimulate the immune system, and stabilize blood sugar.

315 tablets
Item# 01955

490 capsules
Item# 01954



14.81 oz powder
Item# 01956

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

Vegetable-Fruit Complex

Decaffeinated Green tea extract *(45% EGCG)*	325 mg
Broccoli sprout concentrate extracts and calcium D-glucarate	725 mg
(providing sulforaphane, glucosinolates, D-3T, and PEITC)	
Olive juice extract *(providing polyphenols, hydroxytyrosol, tyrosol, oleuropein)*	12.5 mg
Grape seed proanthocyanidin extract (Leucoselect®)	25 mg
Grape *(proanthocyanidin)* extract (BioVin®)	25 mg
Luteolin (from orange extract)	8 mg
Lycopene (natural tomato extract) (Tomat-O-Red®)	3 mg
Lutein (marigold extract)	15 mg
(465 mcg trans-zeaxanthin)	
Maqui Berry *(Aristotelia chilensis)* anthocyanin extract	100 mg
Milk thistle extract *(85% silymarin)*	100 mg
Bromelain (from pineapple)	15 mg
Citrus Bioflavonoids *(50% hesperidin)*	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
Fruit/Berry Complex blend	200 mg
(proprietary blend of concentrated blackberry, blueberry, cherry, cranberry, elderberry, persimmon, prune powders)	
Wild Blueberry anthocyanin extract (fruit)	150 mg
trans-Pterostilbene (from pTeroPure™)	0.5 mg
Cyanidin-3-Glucoside (C3G) (from blackcurrant extract)	1.25 mg
CherryPure® Tart Cherry *(Prunus cerasus)* proanthocyanidin extract	85 mg
Delphinidins	2 mg
(from Delphinol® Maqui berry *(Aristotelia chilensis)* extract)	

Water-Soluble Vitamins and Enzymatic Activators

Vitamin C	2000 mg
as: ascorbic acid, calcium, magnesium & niacinamide ascorbates, ascorbyl palmitate, acerola extract	
Natural Folate (from lemon extract)	400 mcg
Biotin	3,000 mcg
Trimethylglycine (TMG)	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 (methylcobalamin)	600 mcg
Nicotinamide Riboside (NIAGEN®)	2 mg

THE MOST COMPLETE MULTIVITAMIN AVAILABLE TODAY

Life Extension Mix™ is a multi-nutrient formula long favored by cost-conscious consumers. It is available in easy-to-swallow **tablet**, **capsule**, or dry **powder** form.

One reason so many people choose **Life Extension Mix**™ is the comprehensive blend of **fruit** and **vegetable** extracts it provides.

A unanimous recommendation of health experts is for Americans to consume more fruits and vegetables. Despite constant media publicity, the majority of aging people today do not ingest enough of these plant foods each day.

Life Extension Mix™ provides standardized fruit and vegetable **extracts**, along with ***high-potency*** vitamins, minerals, and amino acids that form the cornerstone of a science-based health-maintenance program.

Life Extension Mix™ saves time and money by combining the most popular nutrients into one product, eliminating the need to take separate bottles of B-complex, vitamins C and E, minerals, and much more that would be required to achieve the same effects.

The **Life Extension Mix**™ formula is regularly upgraded to reflect to new findings in the medical literature about achieving healthy longevity.

A keystone of a science-based supplement program, **Life Extension Mix**™ saves you money because it provides so many well-studied nutrients in one formula. If you are on a budget, the **Life Extension Mix**™ is your best "***cost-per-milligram***" value. Each bottle provides a **five-week supply**!

Consumers flocked to **Life Extension Mix**™ decades ago because it enabled them to conveniently obtain so many nutrients at a very low price. This broad-spectrum multi-ingredient formula can be obtained for as little as **$1.49** a day, which represents one of the great bargains on the dietary supplement marketplace today.

Fat-Soluble Vitamins

Vitamin A (as Betatene® natural beta-carotene from dunaliella and 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
Vitamin E (natural D-alpha tocopheryl succinate and D-alpha tocopherol)	100 IU
Natural mixed tocopherols (prodiving gamma, delta, alpha, and beta tocopherols)	60 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.

The **Life Extension Mix**™ utilizes **natural** mixed **tocopherols** that provide natural vitamin E from alpha tocopherol and a small amount of gamma tocopherol (40 mg). Compared to synthetic vitamin E, the natural form is far more **bioavailable** to the body.

Amino Acid Complex

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

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

Mineral Complex

Selenium (from Se-methyl L-selenocysteine)	100 mcg
Selenium (from L-selenomethionine—SelenoPure™)	50 mcg
Selenium (from sodium selenite)	50 mcg
Zinc (as zinc citrate)	20 mg
Zinc (monomethionine) (OptiZinc®)	15 mg
Boron (Albion® bororganic glycine)	3 mg
Calcium	218 mg
Copper (as copper bisglycinate 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

Life Extension Mix™ contains the **sodium selenite**, **selenomethionine**, and **Se-methyl L-selenocysteine** forms of selenium. 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 an optimal form of **chromium** to help maintain arterial wall structure and already normal glucose levels.

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.

Cholinergic Complex

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

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

Fatty Acid Nutrition

Medium-chain triglycerides	80 mg

A healthy type of dietary fat, **medium-chain triglycerides** are easily absorbed intact and transported directly to the liver, where they are immediately used for energy.

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Contains soybeans. Contains fish (Tilapia).

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

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Scientists are increasingly discovering that probiotics impact the health of our entire body.[1-6] Unfortunately, most commercial probiotics are destroyed by the stomach's natural digestive acids before they reach their destination.[7]

FlorAssist® Probiotic Liquid Vegetarian Capsules with "**dual encapsulation**" technology delivers maximum probiotic protection to your small intestines.

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- Have ***dual encapsulation technology***, which keeps the capsule intact longer and ensures that the probiotic reaches the small intestine
- Provide **15 billion CFU**—Colony Forming Units—per capsule
- Contain **6** varieties of beneficial bacteria

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4 bottles		**$21 each**

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FlorAssist™ contains the following bacterial strains:

1. Lactobacillus acidophilus LA-14 *2. Lactobacillus rhamnosus LR-32*
3. Lactobacillus paracasei LPC-37 *4. Bifidobacterium longum BL-05*
5. Bifidobacterium lactis BL-04 *6. Bifidobacterium bifidum/lactis BB-02*

These potent strains of probiotic bacteria adhere to the soft lining of the intestinal tract and help maintain a healthy surface and aid in support for the digestive system.

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BY LORETTA GRANHAM

Dr. Vladimir Turovskiy
At The Forefront Of Integrative Medicine

From the rigors of the Russian Army to the splendor of the Turnberry Isle Miami resort, Dr. Vladimir Turovskiy has evolved into one of South Florida's foremost integrative medicine physicians, blending acupuncture, supplementation, lifestyle changes, and other therapies to treat patients of all ages.

"I call it the four Is–intensive, inclusive, individual, and involved," says Turovskiy, whose Center for Integrative Medicine has two offices in Aventura, Florida, including one in the Turnberry Isle Miami Spa and Fitness center, and a third location in North Miami Beach. "Treatments, whether traditional or nontraditional, are put together inclusively to create an individual plan for each patient, whether that person is here for thyroid and hormone imbalances, chronic pain, obesity, or whatever the case may be."

He also treats headaches, anxiety and depression, insomnia, allergies, arthritis, neurological issues, and many other conditions.

"We want the treatment plan to be intense so that it delivers the greatest possible results in the shortest amount of time," he says. "From day one when a patient comes in, they're involved in every decision surrounding their treatment based on time, financial preferences, and medical recommendations. They also have to be involved by actively participating in their own care, which includes daily dietary and lifestyle adjustments that I refer to as 'homework.' That's integrative medicine to me, and it's what I've been doing for more than 20 years."

Turovskiy's Training

Turovskiy moved to the United States in 1993 after serving in the military and later working as a sports therapist and rehabilitation specialist for Russian ballet dancers and elite athletes. He attended medical school in Moscow and studied Oriental medicine, including acupuncture, herbs, and massage, in Florida.

"Training in the Soviet Union created a uniformity because if you had anything to do with health—acupuncture, chiropractor, massage, nursing, physical therapy, and so on—you went to medical school. Anyone other than a doctor studied at a junior level, but everyone started with the same training and then specialized later, so it qualified you to work alongside other practitioners for the best interest of the patient.

"Once a day we would meet for about an hour—everyone in the hospital from the surgeon to the acupuncturist to the massage therapist—and share how each patient's treatment was progressing," he says, recalling his time at the Central Institute of Trauma and Orthopedics in Moscow. "We'd discuss what was working and what needed to change for the patient to get the best outcome."

That teamwork is what taught him to incorporate a variety of treatments into his current practice, ranging from supplements that boost stress tolerance to cold laser therapy that activates the body's anti-inflammatory response.

A Successful Outcome

Successful outcomes are achieved and maintained when a doctor doesn't stop at treating just one symptom, Turovskiy says, referring to a recent case of a woman in her 70s who initially sought acupuncture treatment for pain.

"This is a perfect example of integrative medicine. She came in for one thing, and then said, 'Oh, by the way, I want to talk to you about another problem. I've been depressed for the past year and a half. I feel very down and I just don't feel like doing anything.'

"In addition to recommending an amino acid called L-tryptophan, which improves sleep and mood, I sent her for extensive bloodwork, and sure enough, her thyroid was off. It's a pretty typical story because her doctor had said her tests were normal and that she was fine, but there's more than just one measurement when evaluating the thyroid."

The patient used Life Extension® supplements to boost L-tryptophan (mood) and iodine (thyroid function), along with acupuncture and exercise to elevate mood and manage other symptoms.

"After about three months, she was back to being her cheerful, productive self," the doctor says. "She continues to follow these recommendations and come in for acupuncture for support. This is what the Center for Integrative

Dr. Vladimir Turovskiy's Supplement Recommendations

The integrative health practitioner, who takes vitamin D, a probiotic, turmeric, and omega-3 fatty acids, recommends these seven supplements as a starting point for most people:

- **Food concentrate supplement containing greens and berries.**
- **Mineral supplements, including magnesium, zinc, and calcium.**
- **Probiotic to improve intestinal health.**
- **Vitamin D (even in regions with a sunny climate).**
- **Omega-3 fatty acids.**
- **Adaptogenic herbs, such as rhodiola, to help the body withstand stress.**
- **Collagen to support and repair connective tissue.**

Medicine is all about. First you diagnose a symptom, and then you look at the patient as a whole to see why that symptom started in the first place."

Inspired By His Mother's Illness

Turovskiy, who exercises six days a week running, doing calisthenics, or lifting weights, has been using and recommending Life Extension supplements for 15 years.

"Quality is the main reason why I use Life Extension," he says. "I feel that the company holds itself to a higher standard because it sells directly not only to consumers but also to health care providers. There's feedback from both sides. I also know what to expect, as far as results, because of the extensive research that's involved."

The youngest son of a scientist and schoolteacher, Turovskiy, 47, was inspired to become an integrative medicine practitioner—and especially eager to learn acupuncture—after seeing his mother get help for a neurological condition that conventional medicine failed to treat.

"My mom had severe attacks of dizziness, and it was traumatic for me as a child because I never knew if she would come home or if the paramedics would have to respond," he says. "After about a month in the hospital, they told her there was nothing more they could do, so they said, 'There's some crazy doctor here who does something on the side with needles, so maybe she can help you. Good luck.' She had acupuncture treatment on and off for about three years, and it resolved many of her symptoms. I was impressed and wanted to learn to do it myself."

Turovskiy adds that he often shares his mother's story with patients who want a quick fix.

"If I told patients that I could cure cancer with acupuncture, but that it was going to take three years, I probably could close my doors," he says jokingly. "Most people who come here want instant gratification, but then they'll take a prescription drug forever. I try to help them see that the body is an incredible machine that can heal itself from within if we properly feed and support it, but it doesn't happen overnight. It takes guidance from the doctor and commitment from the patient."

In addition to traditional acupuncture, Turovskiy offers treatments with a microcurrent stimulator, a needle-free option that uses electrical conductivity on acupuncture points.

"It's a very unique approach, and many patients like the technology because they can look at graphics on the computer screen and see exactly where their electrical imbalances are," he says, adding that acupuncture works well not only for pain but also for stress, smoking cessation, appetite control, and sexual dysfunction.

"Acupuncture isn't about needles. It's about the proper selection of points on the skin and the movement of energy. Symptoms are always the result of an internal imbalance, a disruption in the life force, the energy. Acupuncture is the backbone of almost all of my treatments."

Accepting Alternative Treatments

Tammy Pahel, spa director at Turnberry Isle Miami, says the increased acceptance of alternative therapies make Turovskiy's practice a perfect fit for the resort, which serves nearly a thousand members and also is open to the public.

"We're trying to get the word out to the community and beyond—we have guests from around the world—that we offer a warm, relaxing environment, not a medical one, and having the Center for Integrative Medicine here means you can do much more towards improving your health than just getting a massage or facial."

Turovskiy, who views health care as more of a passion than a profession, says his goal is to be an overall wellness partner, which can't be achieved in today's typical 10-minute office visit with a conventional doctor.

"I do a lot of coaching and consulting on nutrition and supplements, and I take the time to get to know my patients and ask questions that may reveal an unexpected reason for their symptoms," he says. "I want to not only treat those symptoms but also help people live longer, happier, more productive lives. The best way to do that is to support the body's natural ability to heal from within." ●

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

For more information about Dr. Vladimir Turovskiy and the Center for Integrative Medicine, call 1-305-466-1977 or visit floridaintegrativemedicine.com.

For information on Turnberry Isle Spa, located at 19999 W. Country Club Dr. Miami, FL, visit turnberryislemiami.com/spa-and-fitness/ or call 1-305-933-6930.

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3. Have your blood drawn.
4. Your blood test results will be sent 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.

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The Ultimate Information

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COMPREHENSIVE PANELS

MALE LIFE EXTENSION PANEL (LC322582) — $269

Chemistry Profile includes glucose, cholesterol, LDL, HDL, triglycerides, liver and-kidney function tests PLUS 20 additional tests. **CBC** includes immune (white) cell count, red blood cell count and platelet count. Also includes:

DHEA-S
TSH for thyroid function
Estradiol
Vitamin D 25- hydroxy
Hemoglobin A1c
C-Reactive Protein
Homocysteine
Free Testosterone
Total Testosterone
PSA (prostate-specific antigen)

FEMALE LIFE EXTENSION PANEL (LC322535) — $269

Chemistry Profile includes glucose, cholesterol, LDL, HDL, triglycerides, liver and-kidney function tests PLUS 20 additional tests. **CBC** includes immune (white) cell count, red blood cell count and platelet count. Also includes:

DHEA-S
TSH for thyroid function
Estradiol
Progesterone
Hemoglobin A1c
C-Reactive Protein
Homocysteine
Free Testosterone
Total Testosterone
Vitamin D 25-hydroxy

WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028) — $275

CBC/Chemistry profile (see description at right), DHEA-S, free and total Testosterone, Estradiol, Progesterone, Cortisol, TSH, Free T3, Free T4, Reverse T3, Insulin, Hemoglobin A1c, Vitamin D 25-hydroxy, C-Reactive Protein (high sensitivity), and Ferritin.

MALE ELITE PANEL* (LC100016) — $575

Chem/CBC profile, Free and Total Testosterone, Total Estrogens, Estradiol, DHEA-S, Progesterone, Pregnenolone, DHT, FSH, LH, TSH, Free T3, Free T4, Reverse T3, Free and Total PSA, IGF-1, SHBG, Vitamin D 25-OH, hs-CRP, Ferritin, Homocysteine

FEMALE ELITE PANEL* (LC100017) — $575

Chem/CBC profile, Free and Total Testosterone, Total Estrogens, Estradiol, Estrone, DHEA-S, Progesterone, Pregnenolone, DHT, FSH, LH, TSH, Free T3, Free T4, Reverse T3, IGF-1, SHBG, Vitamin D 25-OH, hs-CRP, Ferritin, Homocysteine

MALE HORMONE ADD-ON PANEL (LCADDM)* — $120

Pregnenolone and Dihydrotestosterone (DHT)

To provide an even more in-depth analysis of a man's hormone status, Life Extension has created this panel as an addition to the Male Life Extension Panel. This panel provides valuable information about a testosterone metabolite that can affect the prostate, and the mother hormone that acts as a precursor to all other hormones.

FEMALE HORMONE ADD-ON PANEL (LCADDF)* — $125

Pregnenolone and Total Estrogens

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 valuable information about total estrogen status, and the mother hormone that acts as a precursor to all other hormones.

LIFE EXTENSION THYROID PANEL (LC304131) — $75

TSH, T4, Free T3, Free T4.

FEMALE COMPREHENSIVE HORMONE PANEL* (LC100011) — $299

CBC/Chemistry Profile (see description above right), DHEA-S, Estradiol, Total Estrogens, Progesterone, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3, Free T4, Cortisol.

MALE COMPREHENSIVE HORMONE PANEL* (LC100010) — $299

CBC/Chemistry Profile (see description above right), DHEA-S, Estradiol, DHT, PSA, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3, Free T4, Cortisol.

THE CBC/CHEMISTRY PROFILE (LC381822) — $35

Note: This CBC/Chemistry Profile is included in many Life Extension panels. Please check panel descriptions.

CARDIOVASCULAR RISK PROFILE
Total Cholesterol
HDL Cholesterol
LDL Cholesterol
Triglycerides
Cholesterol/HDL Ratio
Estimated CHD Risk
Glucose
Iron

LIVER FUNCTION PANEL
AST (SGOT)
ALT (SGPT)
LDH
Total Bilirubin
Alkaline Phosphatase

KIDNEY FUNCTION PANEL
BUN
Creatinine
BUN/Creatinine Ratio
Uric Acid

BLOOD PROTEIN LEVELS
Total Protein
Albumin
Globulin
Albumin/Globulin Ratio

BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE
Red Blood Cell Count
White Blood Cell Count
Eosinophils
Basophils
Polys (Absolute)
Lymphs (Absolute)
Monocytes (Absolute)
Eos (Absolute)
Baso (Absolute)
RDW
Monocytes
Lymphocytes
Platelet Count
Hemoglobin
Hematocrit
MCV
MCH
MCHC
Polynucleated Cells

BLOOD MINERAL PANEL
Calcium
Potassium
Phosphorus
Sodium
Chloride
Iron

COMPREHENSIVE THYROID PANEL (LC100018) — $199

TSH, T4, Free T4, Free T3, Reverse T3, TPO, ATA

FOOD SAFE ALLERGY TEST (LCM73001)** — $198

This test measures delayed (IgG) food allergies for 95 common foods.

STRESS MANAGEMENT PROFILE (LC100043) — $125

Cortisol AM/PM, DHEA-S, Glucose, Insulin, Progesterone, Free T3, Lipid Panel

HEALTHY AGING PANEL-COMPREHENSIVE* (LC100026) — $249

CBC/Chemistry profile (see description above), C-Reactive Protein (high sensitivity), Vitamin B12, Folate, Homocysteine, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Free T3, Free T4, Ferritin, Urinalysis, Fibrinogen, and Insulin.

HEALTHY AGING PANEL-BASIC* (LC100025) — $149

CBC/Chemistry profile (see description above), C-Reactive Protein (high sensitivity), Vitamin B12, Folate, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Ferritin, and Insulin.

VAP™ TEST* (LC804500) — $90

The VAP™ cholesterol test provides a more comprehensive coronary heart disease (CHD) risk assessment than the conventional lipid profile. Direct measurements, not estimations, are provided for total cholesterol, LDL, HDL, VLDL, and cholesterol subclasses.

VAP™ PLUS* (LC100009) — $330

VAP, C-Reactive Protein (high sensitivity), Homocysteine, Fibrinogen, PLAC® Test (Lp-PLA2), Vitamin D 25-hydroxy.

Other Popular Tests and Panels

◯ **NUTRIENT PANEL*** **(LC100024)** — **$349**
Vitamin B12, Folate, Vitamin D 25-hydroxy, Vitamin C, Vitamin A, Selenium, Zinc, CoQ10, and RBC Magnesium.

◯ **CHRONIC FATIGUE PROFILE** **(LC100005)** — **$375**
CBC/Chemistry Profile (see description previous page), 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)** — **$79**
CBC/Chemistry Profile (see description previous page), Ferritin, Total Iron Binding Capacity (TIBC), Vitamin B12, Folate

◯ **AUTOIMMUNE DISEASE SCREEN*** **(L100041)** — **$199**
ANA screen, hs-CRP, TNF , Immunoglobulins, IgA, IgG, IgM

◯ **DIABETES MANAGEMENT PROFILE – COMPREHENSIVE** **(LC100040)** — **$129**
Hemoglobin A1C, Glucose, Insulin, Lipid Panel, Glycomark

◯ **DIABETES MANAGEMENT PROFILE – BASIC** **(LC100039)** — **$39**
Hemoglobin A1C, Glucose, Insulin

ADVANCED CARDIAC BIOMARKERS

◯ **ADVANCED OXIDIZED LDL PANEL*** **(LC100035)** — **$285**
This panel looks at vascular inflammatory biomarkers, beginning with lifestyle choices to the development of metabolic as well as cardiovascular disease and the formation of vulnerable plaque. The panel contains the following tests: F2-Isoprostanes, Myeloperoxidase, and Oxidized LDL.

◯ **OXIDIZED LDL PANEL*** **(LC100034)** — **$175**
This panel looks at vascular inflammatory biomarkers, beginning with the development of metabolic as well as cardiovascular disease and the formation of vulnerable plaque. The panel contains the following tests: Myeloperoxidase and Oxidized LDL.

◯ **OXIDIZED LDL*** **(LC817472)** — **$75**
OxLDL is a powerful initiator of inflammatory changes in the artery wall, which eventually lead to the formation of plaque.

HORMONES

◯ **DHEA-SULFATE** **(LC004020)** — **$61**
This test shows if you are taking the proper amount of DHEA. This test normally costs $100 or more at commercial laboratories.

◯ **MALE BASIC HORMONE PANEL** **(LC100012)** — **$75**
DHEA-S, Estradiol, Free and Total Testosterone, PSA

◯ **FEMALE BASIC HORMONE PANEL** **(LC100013)** — **$75**
DHEA-S, Estradiol, Free and Total Testosterone, Progesterone

◯ **DIHYDROTESTOSTERONE (DHT)*** **(LC500142)** — **$50**
Measures serum concentrations of DHT.

◯ **ESTRADIOL** **(LC004515)** — **$33**
For men and women. Determines the proper amount in the body.

◯ **INSULIN FASTING** **(LC004333)** — **$29.90**
Can predict those at risk of diabetes, obesity, heart and other diseases.

◯ **PREGNENOLONE*** **(LC140707)** — **$116**
Used to determine ovarian failure, hirsutism, adrenal carcinoma, and Cushing's syndrome.

◯ **PROGESTERONE** **(LC004317)** — **$55**
Primarily for women. Determines the proper amount in the body.

◯ **SEX HORMONE BINDING GLOBULIN (SHBG)** **(LC082016)** — **$33**
This test is used to monitor SHBG levels which are under the positive control of estrogens and thyroid hormones, and suppressed by androgens.

GENERAL HEALTH

◯ **VITAMIN D (250H)** **(LC081950)** — **$47**
This test is used to rule out vitamin D deficiency as a cause of bone disease. It can also be used to identify hypercalcemia.

◯ **FERRITIN** **(LC004598)** — **$28**
Ferritin levels reflect your body's iron stores and is also a biomarker for insulin resistance.

◯ **VITAMIN B12/FOLATE*** **(LC000810)** — **$39.68**
Measurements of B12 and Folate help evaluate your general health and nutritional status since the B vitamins are important for cardiac health as well as energy production.

◯ **PSA (PROSTATE SPECIFIC ANTIGEN)** **(LC010322)** — **$31**
Screening test for prostate disorders and possible cancer.

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Signature

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L-Carnitine
L-Glutamine
L-Glutamine Powder
L-Lysine
L-Taurine Powder
L-Tyrosine Powder
Super Carnosine
Taurine

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Advanced Olive Leaf Vascular Support with Celery Seed Extract
Blood Pressure Monitor Arm Cuff
Endothelial Defense™ with Full-Spectrum Pomegranate™ and CORDIART™
Endothelial Defense™ with GliSODin®
Full-Spectrum Pomegranate™
Natural BP Management
NitroVasc with Cordiart™
Pomegranate Extract Capsules

Bone Health

Bone Restore
Bone Restore with Vitamin K2
Bone Strength Formula with KoAct®
Bone-Up™
Calcium Citrate with Vitamin D
Dr. Strum's Intensive Bone Formula
Strontium Caps

Books and Media

CR Way Edition Advanced Dietary Software

Brain Health

Acetyl-L-Carnitine
Acetyl-L-Carnitine Arginate
Blast
Brain Shield® Gastrodin
Cognitex® Basics
Cognitex® with Brain Shield®
Cognitex® with Pregnenolone & Brain Shield®
Cognizin® CDP-Choline Caps
DMAE Bitartrate (dimethylaminoethanol)
Ginkgo Biloba Certified Extract™
Huperzine A
Lecithin Granules
Migra-Eeze™
Migra-Mag with Brain Shield®
Neuro-Mag® Magnesium L-Threonate
Neuro-Mag® Magnesium L-Threonate with Calcium and Vitamin D3
Optimized Ashwagandha Extract
Prevagen™
PS (Phosphatidylserine) Caps
Super Ginkgo Extract 28/7
Vinpocetine

Cholesterol Management

Advanced Lipid Control
Cho-Less™
CHOL-Support™
Policosanol
Red Yeast Rice
Theaflavins Standardized Extract
Vitamin B3 Niacin Capsules

Digestion Support

Artichoke Leaf Extract
Carnosoothe with PicroProtect™
Digest RC®
Effervescent Vitamin C - Magnesium Crystals
Enhanced Super Digestive Enzymes
Esophageal Guardian
Extraordinary Enzymes
Fem Dophilus
Ginger Force®
Gutsy Chewy Digestive Tablets
Organic Golden Flax Seed
Pancreatin
Regimint
Tranquil Tract™
TruFiber™
WellBetX PGX plus Mulberry

Energy Management

Adrenal Energy Formula
Asian Energy Boost
D-Ribose Powder
D-Ribose Tablets
Forskolin
Mitochondrial Basics with BioPQQ®
Mitochondrial Energy Optimizer with BioPQQ®
NAD+ Cell Regenerator™
Peak ATP® with GlycoCarn®
PQQ Caps with BioPQQ®
Rhodiola Extract
RiboGen™ French Oak Wood Extract

Eye Health

Astaxanthin with Phospholipids
Brite Eyes III
Certified European Bilberry Extract
Eye Pressure Support with Mirtogenol®
MacuGuard® Ocular Support
MacuGuard® Ocular Support with Astaxanthin
Tear Support with MaquiBright®

Fish Oil & Omegas

Mega EPA/DHA
Mega GLA with Sesame Lignans
OMEGA FOUNDATIONS™ Super Omega-3 EPA/DHA with Sesame Lignans & Olive Extract
OMEGA FOUNDATIONS™ Super Omega-3 Plus EPA/DHA with Sesame Lignans, Olive Extract, Krill & Astaxanthin
Organic Golden Flax Seed
Provinal® Purified Omega-7
Vegetarian Sourced DHA

Food

Rich Rewards® Breakfast Blend
Rich Rewards® Breakfast Blend Natural Mocha Flavor
Rich Rewards® Breakfast Blend Natural Vanilla Flavor
Rich Rewards® Breakfast Blend Whole Bean Coffee
Rich Rewards® Cruciferous Vegetable Soup
Rich Rewards® Decaf Roast
Stevia Sweetener

Glucose Management

CinSulin® with InSea2® and Crominex® 3+
CoffeeGenic® Green Coffee Extract
Glycation Protection Formula
Mega Benfotiamine
Natural Glucose Absorption Control
Tri Sugar Shield®

Heart Health

Aspirin (Enteric Coated)
Cardio Peak™ with Standardized Hawthorn and Arjuna
Fibrinogen Resist™ with Nattokinase
Folate & Vitamin B12 Caps
Optimized Carnitine with GlycoCarn®
Super Ubiquinol CoQ10
Super Ubiquinol CoQ10 with BioPQQ®
Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™
Super-Absorbable CoQ10 Ubiquinone with *d*-Limonene
TMG Powder
TMG Liquid Capsules

Hormone Balance

DHEA (Dehydroepiandrosterone)
Inner Power
Pregnenolone
Triple Action Cruciferous Vegetable Extract with Resveratrol
Triple Action Cruciferous Vegetable Extract

Immune Support

AHCC®
Echinacea Extract
Enhanced Zinc Lozenges
i26 Hyperimmune Egg
Immune Modulator with Tinofend®
Immune Protect with PARACTIN®
Immune Senescence Protection Formula™
Kinoko® Gold AHCC
Kyolic® Garlic Formula 102
Kyolic® Garlic Formula 105
Kyolic® Reserve
Lactoferrin (apolactoferrin) Caps
NK Cell Activator™
Optimized Garlic
Optimized Quercetin
Peony Immune
ProBoost Thymic Protein A
Reishi Extract Mushroom Complex
Standardized Cistanche
Ten Mushroom Formula®
Zinc Lozenges

Inflammation Management

5-LOX Inhibitor with AprèsFlex®
Advanced Bio-Curcumin® with Ginger & Turmerones
Black Cumin Seed Oil with Bio-Curcumin®
Black Cumin Seed Oil
Boswella
Cytokine Suppress™ with EGCG
Nervia®
Serraflazyme
Specially-Coated Bromelain
Super Bio-Curcumin®
Zyflamend® Whole Body

Joint Support

Arthro-Immune Joint Support
ArthroMax® Advanced with UC-II® & AprèsFlex®
ArthroMax® with Theaflavins & AprèsFlex®
Bio-Collagen with Patented UC-II®
Fast-Acting Joint Formula
Glucosamine/Chondroitin Capsules
Krill Healthy Joint Formula
MSM (Methylsulfonylmethane)

Kidney & Bladder Support

Cran-Max® Cranberry Whole Fruit Concentrate
Optimized Cran-Max® with Ellirose™
Water-Soluble Pumpkin Seed Extract

Liver Health & Detoxification

Anti-Alcohol Antioxidants with HepatoProtection Complex
Calcium D-Glucarate
Chlorella
Chlorophyllin
European Milk Thistle
Glutathione, Cysteine & C
HepatoPro
Liver Efficiency Formula
Mega L-Glutathione Capsules
N-Acetyl-L-Cysteine
PectaSol-C®
Silymarin
SODzyme® with GliSODin® & Wolfberry

Longevity & Wellness

AMPK Activator
AppleWise Polyphenol Extract
Berry Complete
Blueberry Extract
Blueberry Extract with Pomegranate
CR Mimetic Longevity Formula

DNA Protection Formula
Enhanced Berry Complete with Acai
Essential Daily Nutrients
Grapeseed Extract with Resveratrol & Pterostilbene
Mega Green Tea Extract (decaffeinated)
Mega Green Tea Extract (lightly caffeinated)
Optimized Fucoidan with Maritech® 926
Optimized Resveratrol with NAD+ Cell Regenerator™
Optimized Resveratrol with Synergistic Grape-Berry Actives
pTeroPure®
Pycnogenol® French Maritime Pine Bark Extract
Resveratrol with Pterostilbene
RNA (Ribonucleic Acid)
Super Alpha-Lipoic Acid
Super R-Lipoic Acid

Men's Health

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PalmettoGuard® Saw Palmetto with Beta-Sitosterol
PalmettoGuard® Saw Palmetto/Nettle Root Formula with Beta-Sitosterol
Pomi-T®
Prelox® Natural Sex for Men®
Super MiraForte with Standardized Lignans
Triple Strength ProstaPollen™
Ultra Natural Prostate

Minerals

Boron
Chromium Ultra
Copper
Iron Protein Plus
Magnesium (Citrate)
Magnesium Caps
Only Trace Minerals
Optimized Chromium with Crominex® 3+
Sea-Iodine™
Se-Methyl L-Selenocysteine
Super Selenium Complex
Vanadyl Sulfate
Zinc Caps

Miscellaneous

Advanced Iodine Complete
Solarshield® Sunglasses

Mood & Stress Management

5 HTP
L-Theanine
Natural Stress Relief
SAMe (S-Adenosyl-Methionine)

Multivitamins

Children's Formula Life Extension Mix™
Comprehensive Nutrient Packs ADVANCED
Life Extension Mix™ Capsules without Copper
Life Extension Mix™ Capsules
Life Extension Mix™ Powder without Copper
Life Extension Mix™ Powder
Life Extension Mix™ Tablets with Extra Niacin
Life Extension Mix™ Tablets without Copper
Life Extension Mix™ Tablets
Once-Daily Health Booster
One-Per-Day Tablets
Two-Per-Day Capsules
Two-Per-Day Tablets

Personal Care

Advanced Oral Hygiene
Anti-Aging Rejuvenating Scalp Serum
Biosil
Dr. Proctor's Advanced Hair Formula
Dr. Proctor's Shampoo
European Leg Solution Featuring Certified Diosmin 95
Face Master Platinum Facial Toning System
Hair Suppress Formula
Life Extension Toothpaste
Sinus Cleanser
Venotone
Xyliwhite Mouthwash

Pet Care

Cat Mix
Dog Mix

Probiotics

Bifido GI Balance
FlorAssist® Heart Health Probiotic
FlorAssist®
Jarro-Dophilus EPS®
Theralac® Probiotics
TruFlora® Probiotics

Skin Care

Advanced Anti-Glycation Peptide Serum
Advanced Lightening Cream
Advanced Peptide Hand Therapy
Advanced Triple Peptide Serum
Advanced Under Eye Serum with Stem Cells
Amber Self MicroDermAbrasion
Anti-Aging Face Oil
Anti-Aging Mask
Anti-Aging Rejuvenating Face Cream
Anti-Glycation Serum with Blueberry & Pomegranate Extracts
Antioxidant Facial Mist
Anti-Oxidant Rejuvenating Foot Cream
Anti-Oxidant Rejuvenating Foot Scrub
Anti-Oxidant Rejuvenating Hand Cream
Anti-Redness & Adult Blemish Lotion
Bioflavonoid Cream
Broccoli Sprout Cream
Collagen Boosting Peptide Serum
Corrective Clearing Mask
DNA Repair Cream
Dual-Action MicroDermAbrasion
Enhanced FernBlock® with Red Orange Complex
Essential Plant Lipids Reparative Serum
Face Rejuvenating Anti-Oxidant Cream
Fine Line-Less
Healing Formula
Healing Mask
Healing Vitamin K Cream
Hyaluronic Facial Moisturizer
Hyaluronic Oil-Free Facial Moisturizer
Hydrating Anti-Oxidant Facial Mist
Hydroderm
Lifting & Tightening Complex
Lycopene Cream
Melatonin Cream
Mild Facial Cleanser
Multi Stem Cell Skin Tightening Complex
Neck Rejuvenating Anti-Oxidant Cream
Pigment Correcting Cream
Rejuvenating Serum
Rejuvenex® Body Lotion
RejuveneX® Factor Firming Serum
Renewing Eye Cream
Resveratrol Anti-Oxidant Serum
Skin Lightening Serum
Skin Restoring Phytoceramides with Lipowheat®
Skin Stem Cell Serum
Stem Cell Cream with Alpine Rose
Tightening & Firming Neck Cream
Ultra Lip Plumper
Ultra Rejuvenex®
Ultra RejuveNight®
Ultra Wrinkle Relaxer
Under Eye Refining Serum
Under Eye Rescue Cream
Vitamin C Serum
Vitamin D Lotion
Vitamin E-ssential Cream
Youth Serum

Sleep

Bioactive Milk Peptides
Enhanced Natural Sleep® with Melatonin
Enhanced Natural Sleep® without Melatonin
Fast-Acting Liquid Melatonin
Glycine
L-Tryptophan
Melatonin
Optimized Tryptophan Plus

Sports Performance

Creatine Capsules
Creatine Whey Glutamine Powder (Vanilla Flavor)
DMG (N, N-dimethylglycine)
New Zealand Whey Protein Concentrate, (Natural Chocolate and Vanilla Flavor)
Pure Plant Protein
Tart Cherry Extract
Whey Protein Isolate (Chocolate and Vanilla Flavor)

Vitamins

Ascorbyl Palmitate
Benfotiamine with Thiamine
Beta-Carotene
Biotin
Buffered Vitamin C Powder
Complete B-Complex
Daily C+
Fast-C® with Dihydroquercetin
Gamma E Tocopherol with Sesame Lignans
Gamma E Tocopherol/Tocotrienols
High Potency Optimized Folate
Inositol Caps
Liquid Emulsified Vitamin D3
Liquid Vitamin D3
Low-Dose Vitamin K2
Methylcobalamin
MK-7
Natural Vitamin E
No Flush Niacin
Optimized Folate (L-Methylfolate)
Pantothenic Acid (Vitamin B-5)
Pyridoxal 5'-Phosphate Caps
Super Absorbable Tocotrienols
Super Ascorbate C Capsules
Super Ascorbate C Powder
Super K with Advanced K2 Complex
Vitamin B12
Vitamin B6
Vitamin C with Dihydroquercetin
Vitamin D3 with Sea-Iodine™
Vitamin D3
Vitamins D and K with Sea-Iodine™

Weight Management

7-Keto® DHEA Metabolite
Advanced Anti-Adipocyte Formula
Advanced Natural Appetite Suppress
CalReduce Selective Fat Binder
DHEA Complete
Garcinia HCA
HCActive™ Garnicia Cambogia Extract
Integra-Lean®
Mediterranean Trim with Sinetrol™-XPur
Optimized Irvingia with Phase 3™ Calorie Control Complex
Optimized Saffron with Satiereal®
Super Citrimax®
Super CLA Blend with Guarana and Sesame Lignans
Super CLA Blend with Sesame Lignans
Waist-Line Control™

Women's Health

Advanced Natural Sex for Women® 50+
Breast Health Formula
Femmenessence MacaPause®
Natural Estrogen without Soy Isoflavones
Natural Estrogen
ProgestaCare® for Women
Super-Absorbable Soy Isoflavones
Ultra Soy Extract

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
	A						
01524	**ACETYL-L-CARNITINE** • 500 mg, 100 veg. caps	34.00	25.50	22.50			
01525	**ACETYL-L-CARNITINE ARGINATE** • 100 veg. caps	59.00	44.25	38.24			
01628	**ADRENAL ENERGY FORMULA** • 60 veg. caps	24.00	18.00	16.50			
01630	**ADRENAL ENERGY FORMULA** • 120 veg. caps	46.00	34.50	31.50			
01828	**ADVANCED LIPID CONTROL** • 60 veg. caps	30.00	22.50	20.25			
01521	**ADVANCED ORAL HYGIENE** • 60 mint lozenges	20.00	15.00	13.50			
00681	**AHCC®** • 500 mg, 30 caps	59.98	44.99				
29727	**AHCC® (KINOKO® GOLD)** • 500 mg, 60 veg. caps	74.95	52.47				
00457	**ALPHA-LIPOIC ACID W/BIOTIN** (Super) • 250 mg, 60 caps	37.00	27.75	24.00			
01907	**AMPK ACTIVATOR** • 90 veg. caps	48.00	36.00	33.00			
01440	**ANTI-ALCOHOL ANTIOXIDANTS W/HEPATOPRO** • 100 caps	26.00	19.50	17.25			
01509	**ANTI-ADIPOCYTE FORMULA W/MERATRIM® & INTEGRA LEAN®** (Advanced) • 60 veg. caps	39.00	29.25	27.00			
01625	**APPLEWISE POLYPHENOL EXTRACT** 600 mg, 30 veg. caps	21.00	15.75	14.25			
01039	**ARGININE/ORNITHINE** • 500/250, 100 caps	17.99	13.49				
00038	**ARGININE/ORNITHINE POWDER** • 150 grams	22.95	17.21	14.25			
01624	**(L)-ARGININE CAPS** • 700 mg, 200 veg. caps	26.50	19.88	17.44			
01617	**ARTHROMAX® W/THEAFLAVINS & APRÈSFLEX®** 120 veg. caps	44.00	33.00	30.00			
01618	**ARTHROMAX® ADVANCED W/UC-II® & APRÈSFLEX®** 60 caps	36.00	27.00	24.00			
01404	**ARTHRO-IMMUNE JOINT SUPPORT** • 60 veg. caps	32.00	24.00	21.00			
00919	**ARTICHOKE LEAF EXTRACT** • 500 mg, 180 veg. caps	30.00	22.50	21.00			
01533	**ASCORBYL PALMITATE** • 500 mg, 100 veg. caps	22.50	16.88	15.00			
00888	**ASHWAGANDHA EXTRACT** (Optimized) • 60 veg. caps	10.00	7.50	6.75			
01805	**ASIAN ENERGY BOOST** • 90 veg. caps	24.00	18.00	16.50			
01066	**ASPIRIN** • 81 mg, 300 enteric coated tablets	6.00	4.50	4.00			
01720	**ASTAXANTHIN WITH PHOSPHOLIPIDS** • 4 mg, 30 softgels	16.00	12.00	10.50			
	B						
00920	**BENFOTIAMINE W/ THIAMINE** • 100 mg, 120 veg. caps	19.95	14.96	13.95			
00925	**BENFOTIAMINE** (Mega) • 250 mg, 120 veg. caps	30.00	22.50	20.25			
01206	**BERRY COMPLETE** • 30 veg. caps	21.00	15.75	14.00			
01496	**BERRY COMPLETE W/ACAI** (Enhanced) • 60 veg. caps	29.00	21.75	19.50			
00664	**BETA-CAROTENE** • 25,000 IU, 100 softgels	11.25	8.44				
01622	**BIFIDO GI BALANCE** • 60 veg. caps	20.00	15.00	13.50			
01073	**BILBERRY EXTRACT** • 100 mg, 100 veg. caps	42.00	31.50	28.50			
01512	**BIOACTIVE MILK PEPTIDES** • 30 caps	18.00	13.50	12.00			
01631	**BIO-COLLAGEN W/PATENTED UC-II®** • 40 mg, 60 small caps	36.00	27.00	24.00			
*01006	**BIOSIL™** • 5 mg, 30 veg. caps	18.95	15.16				
*01007	**BIOSIL™** • 1 fl oz	31.99	25.59				
00102	**BIOTIN** • 600 mcg, 100 caps	7.50	5.63	4.88			
01709	**BLACK CUMIN SEED OIL** • 60 softgels	16.00	12.00	10.50			
01710	**BLACK CUMIN SEED OIL W/BIO-CURCUMIN®** • 60 softgels	32.00	24.00	22.50			
01008	**BLAST™** • 600 grams of powder	26.95	20.21				
70000	**BLOOD PRESSURE MONITOR (ACCUFIT™)** • med/lg cuff	79.99	49.99				
70004	**BLOOD PRESSURE MONITOR** • Digital wrist cuff	69.95	52.46				

SUBTOTAL OF COLUMN 1

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01214	**BLUEBERRY EXTRACT** • 60 veg. caps	22.50	16.88	15.00			
01438	**BLUEBERRY EXTRACT W/ POMEGRANATE** • 60 veg. caps	30.00	22.50	20.25			
01506	**BONE FORMULA** (DR. STRUM'S INTENSIVE) • 300 caps	56.00	42.00	37.50			
01726	**BONE RESTORE** • 120 caps	22.00	16.50	14.25			
01727	**BONE RESTORE W/VITAMIN K2** • 120 caps	24.00	18.00	16.50			
01725	**BONE STRENGTH FORMULA W/KOACT®** • 120 caps	45.00	33.75	30.00			
00313	**BONE-UP®** • 240 caps	28.95	21.71	20.41			
01661	**BORON** • 3 mg, 100 veg. caps	5.95	4.46	3.94			
00202	**BOSWELLA** • 100 caps	38.00	28.50	22.50			
01802	**BRAIN SHIELD® GASTRODIN** • 300 mg, 60 veg. caps	33.00	24.75	22.50			
01253	**BRANCHED CHAIN AMINO ACIDS** • 90 caps	19.50	14.63	12.75			
01699	**BREAST HEALTH FORMULA** • 60 caps	34.00	25.50	22.50			
00893	**BRITE EYES III** • 2 vials, 5 ml each	34.00	25.50	24.00			
01203	**BROMELAIN** (Specially-coated) 500 mg, 60 enteric coated tablets	21.00	15.75	14.25			
	C						
01653	**CALCIUM CITRATE W/VITAMIN D** • 300 caps	24.00	18.00	15.94			
01651	**CALCIUM D-GLUCARATE** • 200 mg, 60 veg. caps	18.00	13.50	11.25			
†01823	**CALREDUCE SELECTIVE FAT BINDER** 120 mint chewable tablets	45.00	33.75	28.50			
01700	**CARDIO PEAK™ w/STANDARDIZED HAWTHORN & ARJUNA** 120 veg. caps	36.00	27.00	24.00			
00916	**CARNITINE W/GLYCOCARN®** (Optimized) • 60 veg. caps	36.00	27.00	24.00			
01532	**L-CARNITINE** • 500 mg, 30 veg. caps	15.00	11.25	9.90			
01258	**CARNOSOOTHE W/PICROPROTECT™** • 60 veg. caps	29.95	22.46	20.25			
01829	**CARNOSINE** • 500 mg, 60 veg. caps	36.00	27.00	24.00			
01687	**CARNOSINE** (Super) • 500 mg, 90 veg. caps	66.00	49.50	45.00			
01830	**CAT MIX** • 100 grams powder	14.00	10.50	8.25			
01891	**CHILDREN'S FORMULA LIFE EXTENSION MIX™** 100 chewable tablets	20.00	15.00	13.50			
00550	**CHLORELLA** • 500 mg, 200 tablets	23.50	17.63				
01571	**CHLOROPHYLLIN** • 100 mg, 100 veg. caps	24.00	18.00	15.00			
01359	**CHO-LESS™** • 90 capsules	35.00	26.25				
01910	**CHOL-SUPPORT™** • 60 liquid veg. caps	52.00	39.00	34.50			
01477	**CHROMIUM ULTRA** • 100 veg. caps	24.00	18.00	15.75			
01504	**CHROMIUM W/CROMINEX®** 3+ (Optimized) 500 mcg, 60 veg. caps	9.00	6.75	6.00			
01503	**CINSULIN® W/INSEA2® AND CROMINEX® 3+**- 90 veg. caps	38.00	28.50	25.50			
01906	**CISTANCHE** (Standardized) • 30 veg. caps	20.00	15.00	12.00			
01818	**CITRIMAX®** (Super)- 180 veg. caps	40.00	30.00	28.50			
00818	**CLA BLEND W/SESAME LIGNANS** (Super) 1,000 mg, 120 softgels	36.00	27.00	24.75	19.75		
00819	**CLA BLEND W/GUARANA & SESAME** (Super) 1,000 mg, 120 softgels	42.00	31.50	28.75			
01896	**COGNITEX® W/BRAIN SHIELD®** • 90 softgels	60.00	45.00	39.00	36.00		
01897	**COGNITEX® W/PREGNENOLONE & BRAIN SHIELD®** 90 softgels	62.00	46.50	39.75	37.50		
01421	**COGNITEX® BASICS** • 60 softgels	38.00	28.50	26.25	24.00		
01659	**COGNIZIN® CDP CHOLINE CAPS** • 250 mg, 60 veg. caps	36.00	27.00	25.50			
01835	**COMPLETE B-COMPLEX** • 60 veg. caps	10.00	7.50	6.75			

SUBTOTAL OF COLUMN 2

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01999	**COMPREHENSIVE NUTRIENT PACKS ADVANCED** • 30 packs	90.00	67.50	61.50			
00119	**COPPER CAPSULES** • 2 mg, 100 caps	9.91	7.43				
00949	**COQ10 w/*d*-LIMONENE** (Super-absorbable) 50 mg, 60 softgels	25.00	18.75	16.50	15.00		
00950	**COQ10 w/*d*-LIMONENE** (Super-absorbable) 100 mg, 100 softgels	46.00	34.50	28.00	26.25		
01226	**COQ10** (Super ubiquinol) • 100 mg, 60 softgels	56.00	42.00	36.00	33.00		
01733	**COQ10 w/BIOPQQ®** (Super ubiquinol) • 100 mg, 30 softgels	54.00	40.50	33.00	30.00		
01426	**COQ10 w/ENH MITOCHONDRIAL SUPPORT™** (Super ubiquinol) 100 mg, 60 softgels	62.00	46.50	39.00	36.00		
01425	**COQ10 w/ENH MITOCHONDRIAL SUPPORT™** (Super ubiquinol) - 50 mg, 100 softgels	58.00	43.50	34.50	31.50		
01427	**COQ10 w/ENH MITOCHONDRIAL SUPPORT™** (Super ubiquinol) - 50 mg, 30 softgels	20.00	15.00	12.00			
01431	**COQ10 w/ENH MITOCHONDRIAL SUPPORT™** (Super ubiquinol) - 200 mg, 30 softgels	62.00	46.50	39.00	36.00		
00862	**CRAN-MAX®** • 500 mg, 60 veg. caps	17.50	13.13	11.25			
01424	**CRAN-MAX® WITH ELLIROSE™** (Optimized) • 60 veg. caps	18.00	13.50	12.00			
01529	**CREATINE CAPSULES** • 120 veg. caps	10.95	8.21	6.94			
01746	**CREATINE WHEY GLUTAMINE POWDER** • 454 grams (vanilla)	30.00	22.50	20.25			
01429	**CR MIMETIC LONGEVITY FORMULA** • 60 veg. caps	39.00	29.25	27.00			
00407	**CURCUMIN®** (Super bio) • 400 mg, 60 veg. caps	38.00	28.50	26.25			
01808	**CURCUMIN® W/GINGER & TURMERONES** (Advanced bio) 30 softgels	30.00	22.50	20.25			
01804	**CYTOKINE SUPPRESS™ W/EGCG** • 30 veg. caps	30.00	22.50	20.25			
	COSMESIS						
80157	**ADVANCED ANTI-GLYCATION PEPTIDE SERUM** • 1 oz	53.00	39.75	34.50			
80154	**ADVANCED LIGHTENING CREAM** • 1 oz	65.00	48.75	42.75			
80155	**ADVANCED PEPTIDE HAND THERAPY** • 4 oz	46.00	34.50	29.25			
80152	**ADVANCED TRIPLE PEPTIDE SERUM** • 1 oz	65.00	48.75	42.75			
80140	**ADVANCED UNDER EYE SERUM W/STEM CELLS** • .33 oz	49.00	36.75	31.50			
80139	**AMBER SELF MICRODERMABRASION** • 2 oz	49.00	36.75	31.50			
80158	**ANTI-AGING FACE OIL** • 1 oz	59.00	44.25	39.00			
80118	**ANTI-AGING MASK** • 2 oz	72.00	54.00	47.52			
80151	**ANTI-AGING REJUVENATING FACE CREAM** • 2 oz	65.00	48.75	42.75			
80153	**ANTI-AGING REJUVENATING SCALP SERUM** • 2 oz	46.00	34.50	29.25			
80134	**ANTI-GLYCATION SERUM W/BLUEBERRY & POMEGRANATE EXTRACTS** • 1 oz	33.00	24.75	23.51			
80133	**ANTIOXIDANT FACIAL MIST** • 2 oz	32.00	24.00	22.80			
80127	**ANTIOXIDANT REJUVENATING FOOT CREAM** • 2 oz	45.00	33.75	32.10			
80128	**ANTIOXIDANT REJUVENATING FOOT SCRUB** • 2 oz	59.00	44.25	38.94			
80117	**ANTIOXIDANT REJUVENATING HAND CREAM** • 2 oz	64.00	48.00	43.12			
80105	**ANTI-REDNESS & ADULT BLEMISH LOTION** • 1 oz	74.50	55.88	49.17			
80147	**BIOFLAVONOID CREAM** • 1 oz	46.00	34.50	29.25			
80144	**BROCCOLI SPROUT CREAM** • 1 oz	46.00	34.50	29.25			
80156	**COLLAGEN BOOSTING PEPTIDE SERUM** • 1 oz	59.00	44.25	39.00			
80120	**CORRECTIVE CLEARING MASK** • 2 oz	64.50	48.38	42.57			
80141	**DNA REPAIR CREAM** • 1 oz	49.00	36.75	31.50			
80108	**ESSENTIAL PLANT LIPIDS REPARATIVE SERUM** • 1 oz	74.95	56.21	49.46			

SUBTOTAL OF COLUMN 3

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
80123	**FACE REJUVENATING ANTIOXIDANT CREAM** • 2 oz	69.50	52.13	45.87			
80107	**FINE LINE-LESS** • 1 oz	74.50	55.88	49.17			
80131	**HAIR SUPPRESS FORMULA** • 4 oz	59.00	44.25	38.94			
80137	**HEALING FORMULA ALL-IN-ONE CREAM** • 1 oz	53.00	39.75	34.07			
80115	**HEALING MASK** • 2 oz	64.50	48.38	42.57			
80102	**HEALING VITAMIN K CREAM** • 1 oz	79.50	59.63	52.47			
80109	**HYALURONIC FACIAL MOISTURIZER** • 1 oz	58.00	43.50	38.28			
80110	**HYALURONIC OIL-FREE FACIAL MOISTURIZER** • 1 oz	58.00	43.50	38.28			
80138	**HYDRATING ANTIOXIDANT FACE MIST** • 4 oz	39.95	29.96	28.50			
80103	**LIFTING & TIGHTENING COMPLEX** • 1 oz	74.50	55.88	49.17			
80146	**LYCOPENE CREAM** • 1 oz	28.00	21.00	19.05			
80135	**MELATONIN CREAM** • 1 oz	33.00	24.75	20.33			
80114	**MILD FACIAL CLEANSER** • 8 oz	59.00	44.25	38.94			
80159	**MULTI STEM CELL SKIN TIGHTENING COMPLEX** • 1 oz	59.00	44.25	39.00			
80122	**NECK REJUVENATING ANTIOXIDANT CREAM** • 2 oz	64.00	48.00	42.24			
80111	**PIGMENT CORRECTING CREAM** • 1/2 oz	74.00	55.50	48.84			
80106	**REJUVENATING SERUM** • 1 oz	74.50	55.88	49.17			
80150	**RENEWING EYE CREAM** • 1/2 oz	65.00	48.75	42.75			
80142	**RESVERATROL ANTI-OXIDANT SERUM** • 1 oz	46.00	34.50	29.25			
80112	**SKIN LIGHTENING SERUM** • 1/2 oz	85.00	63.75	56.10			
80130	**SKIN STEM CELL SERUM** • 1 oz	74.00	55.50	51.75			
80143	**STEM CELL CREAM W/ALPINE ROSE** • 1 oz	66.00	49.50	43.50			
80148	**TIGHTENING & FIRMING NECK CREAM** • 2 oz	39.00	29.25	26.25			
80116	**ULTRA LIP PLUMPER** • 1/3 oz	64.00	48.00	42.24			
80101	**ULTRA WRINKLE RELAXER** • 1 oz	89.95	67.46	59.82			
80113	**UNDER EYE REFINING SERUM** • 1/2 oz	74.50	55.88	49.17			
80104	**UNDER EYE RESCUE CREAM** • 1/2 oz	74.50	55.88	49.17			
80129	**VITAMIN C SERUM** • 1 oz	85.00	63.75	56.10			
80136	**VITAMIN D LOTION** • 4 oz	36.00	27.00	25.25			
80145	**VITAMIN E-ESSENTIAL CREAM** • 1 oz	28.00	21.00	19.50			
80149	**YOUTH SERUM** • 1 oz	65.00	48.75	42.75			
	D						
01912	**DAILY C+ CITRUS FLAVOR** • 30 stick packs	21.00	15.75	14.25			
00658	**7-KETO® DHEA METABOLITE** • 25 mg, 100 caps	28.00	21.00	18.00			
01479	**7-KETO® DHEA METABOLITE** • 100 mg, 60 veg. caps	40.00	30.00	27.00			
01640	**DHA** (Vegetarian sourced) • 30 veg. softgels	20.00	15.00	13.50			
00607	**DHEA** • 25 mg, 100 tablets (Dissolve in mouth)	14.00	10.50	8.81			
01478	**DHEA COMPLETE** • 60 veg. caps	48.00	36.00	32.40			
00335	**DHEA** • 25 mg, 100 caps	18.00	13.50	11.25			
00454	**DHEA** • 15 mg, 100 caps	14.00	10.50	9.00			
00882	**DHEA** • 50 mg, 60 caps	19.00	14.25	12.75			
01689	**DHEA** • 100 mg, 60 veg. caps	24.00	18.00	16.50			
01358	**DIGEST RC®** • 30 tablets	19.95	14.96	12.75			
01272	**DIGESTIVE ENZYMES** (Enhanced Super) • 100 veg. caps	18.95	14.21	12.00			
01671	**D,L-PHENYLALANINE** • 500 mg, 100 veg. caps	18.75	14.06	12.00			

SUBTOTAL OF COLUMN 4

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01540	**DMAE BITARTRATE** • 150 mg, 200 veg. caps	18.00	13.50	11.25			
00059	**DMG** • 125 mg, 60 tablets	24.80	18.60	17.02			
01570	**DNA PROTECTION FORMULA** • 60 veg. caps	34.00	25.50	24.00			
01831	**DOG MIX** • 100 grams powder	18.00	13.50	11.25			
00321	**DR. PROCTOR'S ADVANCED HAIR FORMULA** • 2 oz	39.95	29.96	24.00			
00320	**DR. PROCTOR'S HAIR SHAMPOO** • 8 oz	24.95	18.71	16.50			
00899	**DUAL-ACTION MICRODERMABRASION ADV. EXFOLIATE** • 2.4 oz	39.95	29.96	29.21			
	E						
01528	**ECHINACEA EXTRACT** • 250 mg, 60 veg. caps	14.35	10.76	9.38			
01997	**ENDOTHELIAL DEFENSE™ w/FULL-SPECTRUM POMEGRANATE™ AND CORDIART™** • 60 softgels	68.00	51.00	46.50			
00997	**ENDOTHELIAL DEFENSE™ w/GLISODIN®** • 60 veg. caps	54.00	40.50	36.00			
00625	**EPA/DHA** (Mega) • 120 softgels	19.95	14.96	13.50			
01737	**ESOPHAGEAL GUARDIAN** (Berry flavor) • 60 chewable tablets	36.00	27.00	24.00			
01042	**EUROPEAN LEG SOLUTION DIOSMIN 95** 600 mg, 30 veg. tabs	20.00	15.00	13.50			
01706	**EXTRAORDINARY ENZYMES** • 60 caps	26.00	19.50	18.00			
01514	**EYE PRESSURE SUPPORT W/MIRTOGENOL®** • 30 veg. caps	38.00	28.50	25.50			
	F						
*01054	**FACE MASTER® PLATINUM** • Facial Toning System	199.00	199.00				
00965	**FAST-ACTING JOINT FORMULA** • 30 caps	39.00	29.25	27.00			
01717	**FAST-C® W/DIHYDROQUERCETIN** • 120 veg. tabs	26.00	19.50	18.00			
20053	**FEM DOPHILUS®** • 30 caps	25.95	19.46				
20055	**FEM DOPHILUS®** • 60 caps	39.95	29.96				
01064	**FEMMENESSENCE MACAPAUSE®** • 120 veg. caps	34.99	26.24				
01728	**FERNBLOCK® W/RED ORANGE COMPLEX** (Enhanced) 30 veg. caps	42.00	31.50	28.50			
00718	**FIBRINOGEN RESIST™** • 30 veg. caps	49.00	36.75	33.00			
01749	**FLAX SEED** (Organic golden) • 14 oz	11.67	8.75				
01821	**FLORASSIST® HEART HEALTH PROBIOTIC** • 60 veg. caps	32.00	24.00	21.00			
01825	**FLORASSIST® PROBIOTIC** • 30 liquid veg. caps	32.00	24.00	21.00			
01913	**FOLATE** (Optimized) • 5,000 mcg, 30 veg. tablets	25.00	18.75	16.50			
01939	**FOLATE** (Optimized) • 1,000 mcg, 100 veg. tablets	19.00	14.25	12.75			
01841	**FOLATE + VITAMIN B12 CAPS** • 200 veg. caps	10.50	7.88	7.13			
01544	**FORSKOLIN** • 10 mg, 60 veg. caps	16.00	12.00	10.50			
01513	**FUCOIDAN W/MARITECH® 926** (Optimized) • 60 veg. caps	36.00	27.00	24.75			
	G						
00559	**GAMMA E TOCOPHEROL/TOCOTRIENOLS** • 60 softgels	42.00	31.50	27.75			
00759	**GAMMA E TOCOPHEROL W/SESAME LIGNANS** • 60 softgels	32.00	24.00	21.75			
01394	**GARLIC** (Optimized) • 200 veg. caps	24.95	18.71	15.75			
**01122	**GINGER FORCE®** • 60 liquid caps	34.95	26.21				
01658	**GINKGO BILOBA CERTIFIED EXTRACT™** 120 mg, 365 veg. caps	46.00	34.50	31.50			
01648	**GINKGO EXTRACT 28/7** (Super) • 120 mg, 100 veg. caps	29.00	21.75	19.88			
00756	**GLA WITH SESAME LIGNANS** (Mega) • 60 softgels	19.50	14.63	13.50			
00345	**(L-) GLUTAMINE CAPSULES** • 500 mg, 100 caps	14.95	11.21	10.13			
00141	**(L-) GLUTAMINE POWDER** • 100 grams	22.00	16.50	15.00			
00522	**GLUCOSAMINE/CHONDROITIN CAPSULES** • 100 caps	38.00	28.50	24.00			

SUBTOTAL OF COLUMN 5

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01541	**GLUTATHIONE, CYSTEINE & C** • 100 veg. caps	20.00	15.00	13.50			
00314	**L-GLUTATHIONE** (Mega) • 250 mg, 60 caps	39.64	29.73				
01987	**GLYCATION PROTECTION FORMULA** • 60 veg. caps	44.00	33.00	29.25			
01669	**GLYCINE** • 1,000 mg, 100 veg. caps	12.00	9.00	8.10			
01411	**GRAPE SEED EXTRACT W/RESVERATROL & PTEROSTILBENE** 100 mg, 60 veg. caps	36.00	27.00	25.50			
01604	**GREEN COFFEE EXTRACT COFFEEGENIC®** 200 mg, 90 veg. caps	22.00	16.50	15.00			
01620	**GREEN COFFEE EXTRACT COFFEEGENIC®** 400 mg, 90 veg. caps	32.00	24.00	21.00			
00953	**GREEN TEA EXTRACT** (Mega) • lightly caffeinated, 100 veg. caps	30.00	22.50	18.00			
00954	**GREEN TEA EXTRACT** (Mega) • decaffeinated, 100 veg. caps	30.00	22.50	18.00			
01545	**GUTSY CHEWY DIGESTIVE** (Citrus flavor) • 8 tablets	11.50	8.63				
01546	**GUTSY CHEWY DIGESTIVE** (Wildberry flavor) • 8 tablets	11.50	8.63				
	H						
01074	**5 HTP** • 100 mg, 60 caps	27.95	20.96				
01738	**HCA** (Garnicia) • 90 veg. caps	17.00	12.75	11.25			
29754	**HCACTIVE™ GARCINIA CAMBOGIA EXTRACT** • 90 caps	30.00	22.50				
01393	**HEPATOPRO** • 900 mg, 60 softgels	50.00	37.50	34.50			
01527	**HUPERZINE A** • 200 mcg, 60 veg. caps	40.00	30.00	27.00			
00661	**HYDRODERM®** • 1 oz	79.95	59.96	49.00			
	I						
*01060	**I26 HYPERIMMUNE EGG** • 140 grams powder	54.99	46.75				
01704	**IMMUNE MODULATOR W/TINOFEND®** • 60 veg. caps	17.00	12.75	11.25			
00955	**IMMUNE PROTECT W/PARACTIN®** • 30 veg. caps	29.50	22.13	19.91			
01905	**IMMUNE SENESCENCE PROTECTION FORMULA™** 60 veg. caps	40.00	30.00	27.00			
01049	**INNERPOWER™** • 530 grams powder	42.00	31.50				
01674	**INOSITOL CAPSULES** • 1,000 mg, 360 veg. caps	62.00	46.50	43.50			
01292	**INTEGRA-LEAN® AFRICAN MANGO IRVINGIA** 150 mg, 60 veg. caps	28.00	21.00	18.00			
01248	**IODINE COMPLETE** (Advanced) • 12.5 mg, 180 tablets	46.00	36.50				
01677	**IRON PROTEIN PLUS** • 300 mg, 100 caps	28.00	21.00	19.50			
01492	**IRVINGIA W/PHASE 3™ CALORIE CONTROL COMPLEX** (Optimized African Mango) • 120 veg. caps	56.00	42.00	36.00			
	J, K, L						
00056	**JARRO-DOPHILUS EPS®** • 60 veg. caps	22.95	17.21				
01759	**JARRO-DOPHILUS EPS®** • 30 caps	39.95	29.96				
01724	**K W/ADVANCED K2 COMPLEX** (Super) • 90 softgels	30.00	22.50	20.25			
01600	**KRILL HEALTHY JOINT FORMULA** • 30 softgels	32.00	24.00	21.75			
01050	**KRILL OIL** • 60 softgels	33.95	25.46				
00316	**KYOLIC® GARLIC FORMULA 102** • 200 veg. caps	26.45	19.84				
00214	**KYOLIC® GARLIC FORMULA 105** • 200 caps	27.45	20.59				
00789	**KYOLIC® RESERVE** • 600 mg, 120 caps	27.95	20.96				
01681	**LACTOFERRIN** • 60 caps	52.00	39.00	36.00			
00020	**LECITHIN** • 16 oz granules	18.00	13.50	12.00			
01955	**LIFE EXTENSION MIX™** • 315 tablets	80.00	60.00	52.00	43.75		
01957	**LIFE EXTENSION MIX™ W/EXTRA NIACIN** • 315 tablets	80.00	60.00	52.00	43.75		
01954	**LIFE EXTENSION MIX™** • 490 caps	90.00	67.50	58.00	47.50		

SUBTOTAL OF COLUMN 6

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01956	**LIFE EXTENSION MIX™ POWDER** • 14.81 oz	80.00	60.00	52.00	43.75		
01965	**LIFE EXTENSION MIX™** • 315 tablets w/o copper	80.00	60.00	52.00	43.75		
01964	**LIFE EXTENSION MIX™** • 490 caps w/o copper	90.00	67.50	58.00	47.50		
01966	**LIFE EXTENSION MIX™ POWDER** • 14.81 oz w/o copper	80.00	60.00	52.00	43.75		
01608	**LIVER EFFICIENCY FORMULA** • 30 veg. caps	18.00	13.50	12.00			
01639	**5-LOX INHIBITOR W/APRÈSFLEX®** • 100 mg, 60 veg. caps	22.00	16.50	15.00			
01678	**L-LYSINE** • 620 mg, 100 veg. caps	9.00	6.75	6.00			
00455	**LYCOPENE** (Mega) • 15 mg, 90 softgels	35.00	26.25	22.50			
	M						
01885	**MACUGUARD® OCULAR SUPPORT** • 60 softgels	22.00	16.50	14.85			
01886	**MACUGUARD® OCULAR SUPPORT w/ASTAXANTHIN** 60 softgels	42.00	31.50	28.50			
01459	**MAGNESIUM CAPS** • 500 mg, 100 veg. caps	12.00	9.00	7.50			
01682	**MAGNESIUM (CITRATE)** • 160 mg, 100 veg. caps	9.00	6.75	5.63			
01908	**MEDITERRANEAN TRIM WITH SINETROL™-XPUR** 60 veg. caps	18.00	13.50	12.00			
01668	**MELATONIN** • 300 mcg, 100 veg. caps	5.75	4.31	3.75			
01083	**MELATONIN** • 500 mcg, 200 veg. caps	18.00	13.50	12.00			
00329	**MELATONIN** • 1 mg, 60 caps	5.00	3.75	3.47			
00330	**MELATONIN** • 3 mg, 60 caps	8.00	6.00	5.16			
00331	**MELATONIN** • 10 mg, 60 caps	28.00	21.00	18.00			
00332	**MELATONIN** • 3 mg, 60 veg. lozenges	8.00	6.00	5.16			
01734	**MELATONIN** (Fast-Acting Liquid) • 2 oz (Citrus-Vanilla)	12.00	9.00	8.25			
01787	**MELATONIN TIMED RELEASE** • 300 mcg, 100 veg. tabs	12.00	9.00	8.25			
01788	**MELATONIN TIMED RELEASE** • 750 mcg, 60 veg. tablets	8.00	6.00	5.25			
01786	**MELATONIN TIMED RELEASE** • 3 mg, 60 veg. tabs	12.00	9.00	8.25			
01536	**METHYLCOBALAMIN** • 1 mg, 60 veg. lozenges (vanilla)	9.95	7.46	6.00			
01537	**METHYLCOBALAMIN** • 5 mg, 60 veg. lozenges (vanilla)	32.00	24.00	18.75	17.25		
00709	**MIGRA-EEZE™** (Butterbur) • 60 softgels	29.50	22.13	19.75			
01800	**MIGRA-MAG w/BRAIN SHIELD®** • 90 veg. caps	22.00	16.50	15.00			
01522	**MILK THISTLE** (European) • 60 veg. caps	34.00	25.50	22.50			
01822	**MILK THISTLE** (European) • 60 softgels	28.00	21.00	18.75			
01817	**MILK THISTLE** (European) • 120 softgels	44.00	33.00	30.00			
01698	**MIRAFORTE w/STANDARDIZED LIGNANS** (Super) • 120 caps	62.00	46.50	42.00			
01869	**MITOCHONDRIAL BASICS W/BIOPQQ®** • 30 caps	44.00	33.00	30.00			
01868	**MITOCHONDRIAL ENERGY OPTIMIZER w/BIOPQQ®** • 120 caps	72.00	54.00	48.00			
00065	**MK-7** • 90 mcg, 60 softgels	28.00	21.00	18.75			
00451	**MSM** (Methylsulfonylmethane) • 1,000 mg, 100 caps	14.00	10.50	8.96			
	N						
01534	**N-ACETYL-L-CYSTEINE** • 600 mg, 60 veg. caps	14.00	10.50	10.13			
01904	**NAD+ CELL REGENERATOR™** • 100 mg, 30 veg. caps	34.00	25.50	19.50			
00066	**NATTOKINASE** • 60 softgels	25.50	19.13				
01807	**NATURAL APPETITE SUPPRESS** (Advanced) • 60 veg. caps	38.00	28.50	25.50			
00984	**NATURAL BP MANAGEMENT** • 60 tablets	44.00	33.00	30.00			
01892	**NATURAL ESTROGEN** • 60 veg. tabs	38.00	28.50	25.50			
01893	**NATURAL ESTROGEN W/O SOY ISOFLAVONES** • 30 veg. caps	32.00	24.00	21.00			
01626	**NATURAL SEX FOR WOMEN® 50+** (Advanced) • 90 veg. caps	59.00	44.25	34.00			

SUBTOTAL OF COLUMN 7

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01444	**NATURAL SLEEP®** • 60 veg. caps	13.00	9.75	7.50			
01551	**NATURAL SLEEP® w/ MELATONIN** (Enhanced) • 30 caps	22.00	16.50	15.00			
01511	**NATURAL SLEEP® W/O MELATONIN** (Enhanced) • 30 caps	20.00	15.00	13.50			
01445	**NATURAL SLEEP® MELATONIN** • 5 mg, 60 veg. caps	18.00	13.50	12.00			
00987	**NATURAL STRESS RELIEF** • 30 veg. caps	28.00	21.00	18.00			
01121	**NERVIA®** • 60 softgels	49.95	37.46				
01603	**NEURO-MAG® MAGNESIUM L-THREONATE** • 90 veg. caps	40.00	30.00	27.00			
01602	**NEURO-MAG® L-THREONATE W/CALCIUM & VITAMIN D3** 225 grams • Lemon flavor	40.00	30.00	27.00			
01990	**NITROVASC w/CORDIART™** • 500 mg, 30 veg. caps	18.00	13.50	12.00			
01903	**NK CELL ACTIVATOR™** • 30 veg. tablets	45.00	33.75	31.50			
00373	**NO-FLUSH NIACIN** • 800 mg, 100 caps	19.00	14.25	12.75			
	O						
01824	**OLIVE LEAF VASCULAR SUPPORT w/CELERY SEED EXTRACT** (Advanced) • 60 veg. caps	36.00	27.00	24.00			
01988	**OMEGA-3 PLUS EPA/DHA w/SESAME LIGNANS, OLIVE EXTRACT, KRILL & ASTAXANTHIN** • 120 softgels	45.00	33.75	31.50	24.75		
01983	**OMEGA-3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 60 softgels	18.00	13.50	12.00	9.38		
01982	**OMEGA-3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 120 softgels	32.00	24.00	21.00	17.05		
01984	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 120 enteric coated softgels	34.00	25.50	23.25	18.00		
01985	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 60 enteric coated softgels	20.00	15.00	13.50	10.50		
01986	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 240 small softgels	32.00	24.00	21.00	17.25		
01981	**ONCE-DAILY HEALTH BOOSTER** • 60 softgels	52.00	39.00	36.00			
01901	**ONE-PER-DAY** • 60 tablets	22.00	16.50	15.00			
01328	**ONLY TRACE MINERALS** • 90 veg. caps	15.00	11.25	9.38			
	P						
01789	**PALMETTOGUARD® SAW PALMETTO W/BETA-SITOSTEROL** 30 softgels	15.00	11.25	10.50	9.00		
01790	**PALMETTOGUARD® SUPER SAW PALMETTO/ NETTLE ROOT W/BETA-SITOSTEROL** • 60 softgels	28.00	21.00	19.50	18.00		
00073	**PANCREATIN** • 50 caps	13.22	9.92				
01323	**PEAK ATP® WITH GLYCOCARN®** • 60 veg. caps	54.00	40.50	37.50			
00342	**PECTA SOL-C® MODIFIED CITRUS PECTIN** • 454 grams powder	109.95	82.46				
01080	**PECTA SOL-C® MODIFIED CITRUS PECTIN** • 270 veg. caps	79.95	59.96				
01811	**PEONY IMMUNE** • 60 veg. caps	36.00	27.00	24.00			
00673	**PGX® PLUS MULBERRY** (WellBetX®) • 180 veg. caps	34.95	26.21				
01676	**PHOSPHATIDYLSERINE CAPS** • 100 mg, 100 veg. caps	54.00	40.50	36.00			
01436	**POLICOSANOL** • 10 mg, 60 veg. caps	20.00	15.00	11.25			
01423	**POMEGRANATE™** (Full-Spectrum) • 30 softgels	24.00	18.00	15.75			
00956	**POMEGRANATE EXTRACT** • 30 veg. caps	19.50	14.63	13.16			
01797	**POMI-T®** • 60 veg. caps	33.33	25.00	22.50			
01500	**PQQ CAPS W/BIOPQQ®** • 10 mg, 30 veg. caps	24.00	18.00	13.50	12.00		
01647	**PQQ CAPS W/BIOPQQ®** • 20 mg, 30 veg. caps	40.00	30.00	24.00	21.00		
00302	**PREGNENOLONE** • 50 mg, 100 caps	26.00	19.50	16.50			
00700	**PREGNENOLONE** • 100 mg, 100 caps	30.00	22.50	20.25			
**01373	**PRELOX® NATURAL SEX FOR MEN®** • 60 tablets	52.00	39.00	36.00			

SUBTOTAL OF COLUMN 8

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01576	**PREVAGEN®** • 30 caps	60.00	45.00				
*01577	**PREVAGEN®** ES • 30 caps	70.00	60.00				
00525	**PROBOOST™ THYMIC PROTEIN A** • 30 packets	59.95	44.96				
01441	**PROGESTACARE® FOR WOMEN** • 4 oz cream	35.50	26.63	24.38			
01898	**PROSTATE FORMULA** (Ultra NAT) • 60 softgels	38.00	28.50	26.25	24.00		
01909	**PROSTAPOLLEN™** (Triple strength) • 30 softgels	28.00	21.00	18.75			
01742	**PROTEIN-ISOLATE** (Whey) Vanilla • 1 lb. powder	30.00	22.50	20.25			
01743	**PROTEIN-ISOLATE** (Whey) Chocolate • 1 lb. powder	30.00	22.50	20.25			
01770	**PROTEIN CONCENTRATE** (New Zealand Whey) Vanilla 520 grams	30.00	22.50	19.95			
01771	**PROTEIN CONCENTRATE** (New Zealand Whey) Chocolate 660 grams	30.00	22.50	19.95			
01812	**PROVINAL® PURIFIED OMEGA-7** • 30 softgels	27.00	20.25	18.00			
01508	**PTEROPURE®** • 50 mg Pterostilbene 60 veg. caps	32.00	24.00	22.50			
01209	**PUMPKIN SEED EXTRACT** (Water-soluble) • 60 veg. caps	20.00	15.00	13.50			
01587	**PURE PLANT PROTEIN** • Vanilla 540 grams powder	38.00	28.50	26.25			
01637	**PYCNOGENOL® FRENCH MARITIME PINE BARK EXTRACT** 100 mg, 60 veg. caps	64.00	48.00	45.00			
01217	**PYRIDOXAL 5'-PHOSPHATE** • 100 mg, 60 veg. caps	22.00	16.50	14.85			
	Q, R						
01309	**QUERCETIN** (Optimized) • 250 mg, 60 veg. caps	22.00	16.50	15.00			
01030	**RED YEAST RICE** (Bluebonnet) • 600 mg, 60 veg. caps	16.95	13.56				
00605	**REGIMINT** • 60 enteric-coated caps	19.95	14.96	14.00			
01708	**REISHI EXTRACT MUSHROOM COMPLEX** • 60 veg. caps	30.00	22.50	20.25			
01448	**REJUVENEX® BODY LOTION** • 6 oz	24.00	18.00	14.85	12.75		
01621	**REJUVENEX® FACTOR FIRMING SERUM** • 1.7 oz	65.00	48.75	37.50			
01220	**REJUVENEX®** (Ultra) • 2 oz	52.00	39.00	33.00	29.25		
00676	**REJUVENIGHT®** (Ultra) • 2 oz	39.95	29.96	27.00			
01410	**RESVERATROL W/PTEROSTILBENE** • 100 mg, 60 veg. caps	36.00	27.00	24.00			
01930	**RESVERATROL W/NAD+ CELL REGENERATOR™** (Optimized) • 30 veg. caps	42.00	31.50	27.00			
01430	**RESVERATROL W/SYNERGISTIC GRAPE-BERRY ACTIVES** (Optimized) • 250 mg, 60 veg. caps	46.00	34.50	31.00			
00889	**RHODIOLA EXTRACT** • 250 mg, 60 veg. caps	14.00	10.50	9.00			
01900	**RIBOGEN™ FRENCH OAK WOOD EXTRACT** 200 mg, 30 veg. caps	36.00	27.00	24.75			
00972	**(D) RIBOSE POWDER** • 150 grams	27.50	20.63	18.56			
01473	**(D) RIBOSE TABLETS** • 100 veg. tabs	32.00	24.00	21.00			
01609	**RICH REWARDS® BREAKFAST GROUND COFFEE** • 12 oz. bag	13.00	9.75				
01730	**RICH REWARDS® BREAKFAST BLEND GROUND COFFEE** Natural Mocha • 12 oz. bag	15.00	11.25	10.50			
01729	**RICH REWARDS® BREAKFAST BLEND GROUND COFFEE** Natural Vanilla • 12 oz. bag	15.00	11.25	10.50			
01612	**RICH REWARDS® BREAKFAST BLEND WHOLE BEAN COFFEE** 12 oz. bag	13.00	9.75				
01610	**RICH REWARDST® DECAFFEINATED ROAST GROUND COFFEE** 12 oz. bag	14.00	10.50				
01530	**RICH REWARDS® CRUCIFEROUS VEGETABLE SOUP** • 32 oz.	11.95	8.96	8.44			
01208	**R-LIPOIC ACID** (Super) • 240 mg, 60 veg. caps	49.00	36.75	33.75			
00070	**RNA CAPSULES** • 500 mg, 100 caps	17.95	13.46	12.12			

SUBTOTAL OF COLUMN 9

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
	S						
01432	**SAFFRON W/SATIEREAL®** (Optimized) • 60 veg. caps	36.00	27.00	24.00			
00358	**SAMe** (S-ADENOSYL-METHIONINE) 200 mg, 20 enteric coated tablets	16.00	12.00	10.50	9.75		
00557	**SAMe** (S-ADENOSYL-METHIONINE) 400 mg, 20 enteric coated tablets	28.00	21.00	18.00			
01740	**SEA-IODINE™** • 1,000 mcg, 60 veg. caps	8.00	6.00	5.40			
00046	**SELENIUM** • 2 fl. oz dropper	11.95	8.96				
01679	**SE-METHYL L-SELENOCYSTEINE** • 200 mcg, 100 veg. caps	12.00	9.00	8.25			
00318	**SERRAFLAZYME** • 100 tablets	18.00	13.50	12.00			
01684	**SILYMARIN** • 100 mg, 50 veg. caps	9.25	6.94	6.19			
01249	**SINUS CLEANSER** • 4 oz. bottle	25.00	18.75				
01596	**SKIN RESTORING PHYTOCERAMIDES w/LIPOWHEAT®** 30 veg. liquid caps	25.00	18.75	17.25			
00961	**SODZYME® w/GLISODIN® & WOLFBERRY** • 90 veg. caps	28.00	21.00	18.00			
00657	**SOLARSHIELD® SUNGLASSES** • Smoke color	12.99	9.74	8.63			
01097	**SOY EXTRACT** (Ultra) • 150 veg. caps	87.00	65.25	58.50			
00432	**STEVIA™** (Better) • 100 packets, 1 gram each	9.95	7.46				
00438	**STEVIA™ ORGANIC LIQUID SWEETENER** (Better) • 2 oz	11.00	8.25				
01476	**STRONTIUM** • 750 mg, 90 veg. caps	20.00	15.00	13.50			
01649	**SUPER ABSORBABLE SOY ISOFLAVONES** • 60 veg. caps	28.00	21.00	18.75			
01778	**SUPER SELENIUM COMPLEX** • 200 mcg, 100 veg. caps	14.00	10.50	9.00	8.25		
	T						
01723	**TART CHERRY EXTRACT W/STANDARDIZED CHERRYPURE®** 60 veg. caps	22.00	16.50	15.00			
01827	**TAURINE** • 1,000 mg, 90 veg. caps	13.00	9.75	9.00			
01918	**TEAR SUPPORT w/MAQUIBRIGHT®** • 60 mg, 30 veg. caps	18.00	13.50	12.00			
00133	**L-TAURINE POWDER** • 300 grams	20.00	15.00	12.66			
13685	**TEN MUSHROOM FORMULA®** • 120 veg. caps	39.95	29.96				
01304	**THEAFLAVIN STANDARDIZED EXTRACT** • 30 veg. caps	18.00	13.50	12.00			
01683	**(L) THEANINE** • 100 mg, 60 veg. caps	24.00	18.00	15.38			
***01038	**THERALAC® PROBIOTICS** • 30 caps	47.95	35.96				
00668	**THYROID FORMULA** (Metabolic Advantage™) • 100 caps	21.95	16.46				
00349	**TMG POWDER** • 50 grams	14.00	10.50	8.25			
01859	**TMG** • 500 mg, 60 liquid veg. caps	13.00	9.75	9.00			
01400	**TOCOTRIENOLS** (Super-absorbable) • 60 softgels	30.00	22.50	21.00			
01278	**TOOTHPASTE** • 4 oz (Mint) tube	9.50	7.13	6.50			
01917	**TRANQUIL TRACT™** • 60 veg. caps	52.00	39.00	34.50			
01468	**TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT** 60 veg. caps	24.00	18.00	16.50			
01469	**TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT w/RESVERATROL** • 60 veg. caps	32.00	24.00	22.20			
01803	**TRI SUGAR SHIELD®** • 60 veg. caps	36.00	27.00	24.00			
01386	**TRUFIBER™** • 180 grams	32.95	24.71				
01389	**TRUFLORA® PROBIOTICS** • 32 veg. caps	42.95	32.21				
01722	**L-TRYPTOPHAN** • 500 mg, 90 veg. caps	33.00	24.75	22.50			
01721	**TRYPTOPHAN PLUS** (Optimized) • 90 veg. caps	32.00	24.00	21.75			
01916	**TWO-PER-DAY** • 60 tablets	10.50	7.88	7.13			
01915	**TWO-PER-DAY** • 120 tablets	20.00	15.00	13.50			

SUBTOTAL OF COLUMN 10

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01914	**TWO-PER-DAY** • 120 caps	22.00	16.50	15.00			
00326	**L-TYROSINE** • 500 mg, 100 tablets	12.98	9.74				
	V						
00213	**VANADYL SULFATE** • 7.5 mg, 100 veg. tablets	15.00	11.25	9.38			
00408	**VENOTONE** • 60 caps	18.95	14.21	12.00			
01327	**VINPOCETINE** • 10 mg, 100 veg. tablets	18.00	13.50	10.50			
00372	**VITAMIN B3 NIACIN** • 500 mg, 100 caps	7.65	5.74	4.99			
00098	**VITAMIN B5** • 500 mg, 100 caps (Pantothenic Acid)	10.50	7.88	7.04			
01535	**VITAMIN B6** • 250 mg, 100 veg. caps	12.50	9.38	8.25			
00361	**VITAMIN B12** • 500 mcg, 100 lozenges	8.75	6.56	5.44			
01634	**VITAMIN C w/DIHYDROQUERCETIN** 1,000 mg, 60 veg. tablets	10.00	7.50	6.75			
00927	**VITAMIN C w/DIHYDROQUERCETIN** 1,000 mg, 250 veg. tablets	25.50	19.13	17.44			
00084	**VITAMIN C POWDER** (BUFFERED) • 454 grams	23.95	17.96	16.50			
01736	**VITAMIN C-MAGNESIUM CRYSTALS** (EFFERVESCENT) 180 grams	20.00	15.00	13.50			
01732	**VITAMIN D3** • 2,000 IU, 1 fl oz, Mint flavor	28.00	21.00	18.75			
01753	**VITAMIN D3** • 1,000 IU, 90 softgels	7.00	5.25	4.50			
01751	**VITAMIN D3** • 1,000 IU, 250 softgels	12.50	9.38	8.44			
01713	**VITAMIN D3** • 5,000 IU, 60 softgels	11.00	8.25	7.43			
01718	**VITAMIN D3** • 7,000 IU, 60 softgels	14.00	10.50	9.45			
01758	**VITAMIN D3 W/SEA-IODINE™** • 5,000 IU, 60 caps	14.00	10.50	9.38			
00864	**VITAMIN D3 LIQUID EMULSION** • 2,000 IU, 1 oz.	28.00	21.00	18.75			
01840	**VITAMINS D AND K W/SEA-IODINE™** • 60 caps	24.00	18.00	16.50			
01763	**VITAMIN E** (Natural) • 400 IU, 100 softgels	30.00	22.50	21.00	19.50		
01225	**VITAMIN K2** (Low-dose) • 45 mcg, 90 softgels	18.00	13.50	12.00			
	W						
01902	**WAIST-LINE CONTROL™** • 120 veg. caps	42.00	31.50	28.50			
	X, Y						
00409	**XYLIWHITE™ MOUTHWASH** • 16 oz	10.00	7.50				
	Z						
01813	**ZINC HIGH POTENCY** • 50 mg, 90 veg. caps	7.95	5.96	5.25			
01561	**ZINC LOZENGES** • 60 veg. lozenges	9.00	6.75	6.00			
01961	**ZINC LOZENGES** (Enhanced) • 30 veg. lozenges	12.00	9.00	6.00			
**01051	**ZYFLAMEND® WHOLE BODY** • 120 softgels	64.95	48.71				
	BOOKS						
33880	**OUTSTANDING HEALTH:** THE 6 ESSENTIAL KEYS TO MAXIMIZE YOUR ENERGY AND WELL BEING by Michael Galitzer, MD & Larry Trivieri Jr. • 2015	24.95	18.71				
33878	**TESTOSTERONE REPLACEMENT THERAPY** by Dr. John Crisler • 2015	19.99	14.99				
33877	**THE TRUTH ABOUT MEN AND SEX** by Abraham Morgentaler, MD, FACS • 2015	16.99	12.74				
33876	***TOX*-SICK** • by Suzanne Somers • 2015	26.00	19.50				
33875	**DOCTORED: THE DISILLUSIONMENT OF AN AMERICAN PHYSICIAN** • by Sandeep Jauhar • 2015	26.00	19.50				
33874	**MISSING MICROBES** • by Martin J. Blaser, MD • 2014	28.00	21.00				
33873	**EATING ON THE WILD SIDE** • by Jo Robinson • 2014	16.00	12.00				
33872	**GET SERIOUS** • by Brett Osborn, MD • 2014	24.95	18.71				

SUBTOTAL OF COLUMN 11

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
33868	**TOXIN TOXOUT:** GETTING HARMFUL CHEMICAL OUT OF OUR BODIES AND OUR WORLD • by Bruce Lourie and Rick Smith • 2014	25.99	19.49				
33867	**THE COMPLETE MEDITERRANEAN DIET** by Michael Ozner, MD • 2014	19.95	14.96				
33869	**UNLEASH THE POWER OF THE FEMALE BRAIN** by Daniel Amen, MD • 2014	16.00	12.00				
33870	**MAGNIFICENT MAGNESIUM** by Dennis Goodman, MD • 2014	14.95	11.21				
33864	**THE SUPPLEMENT PYRAMID** by Michael A. Smith, MD • 2014	24.95	18.71				
DPT05	**DISEASE PREVENTION AND TREATMENT, EXPANDED FIFTH EDITION** (Hardcover) • 2014	69.95	39.95	36.00			
33865	**THE RESTORATION OF THE HUMAN BODY [IN 7 PARTS]** by Sergey A. Dzugan, MD, PhD • 2014	29.95	22.46				
33862	**I'M TOO YOUNG FOR THIS** • by Suzanne Somers • 2013	26.00	19.50				
33835	**PHARMOCRACY** • by William Faloon • 2011	24.00	9.60	8.00			
33854	**THE GREAT CHOLESTEROL MYTH** • by Jonny Bowden, PhD, CNS and Stephen Sinatra, MD • 2012	19.99	14.99				
33958	**THE VITAMIN D SOLUTION** by Michael F. Holick, PhD, MD (Paperback) • 2013	16.00	12.00				
33838	**YOUR GUIDE TO HEALTHY SKIN THE NATURAL WAY** by Gary Goldfaden, MD • 2012	26.00	15.00				
33815	**KNOCKOUT** • by Suzanne Somers • 2009	25.99	17.00				
33809	**TESTOSTERONE FOR LIFE** by Abraham Morgentaler, MD • 2008	16.95	11.87				
33696	**LIFE EXTENSION REVOLUTION** by Philip Lee Miller, MD (Paperback)	16.00	12.00				
33805	**MIAMI MEDITERRANEAN DIET WITH 300 RECIPES** by Michael D. Ozner, MD, FACC, FAHA (Hardcover) • 2008	24.95	16.25				
33906	**THE MIGRAINE CURE** • by Sergey Dzugan, MD, PhD • 2006	24.00	15.60				
33803	**WHAT YOUR DOCTOR MAY NOT TELL YOU ABOUT DIABETES** by Steven V. Joyal, MD • 2008	14.99	10.49				

SUBTOTAL OF COLUMN 12

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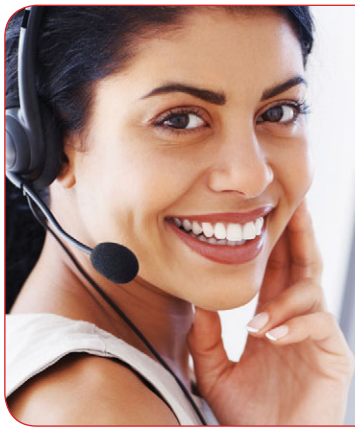

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† CHOICE Standard pre-paid shipping offers unlimited shipping to any mailing address within the 50 U.S. states, excluding U.S. territories. CHOICE also gives you discounts on non-standard shipping, shipping outside of the United States, and expedited shipping costs. CHOICE pre-paid unlimited shipping excludes blood test products and gift cards. This offer is not available to international customers serviced by distributors of Life Extension products.

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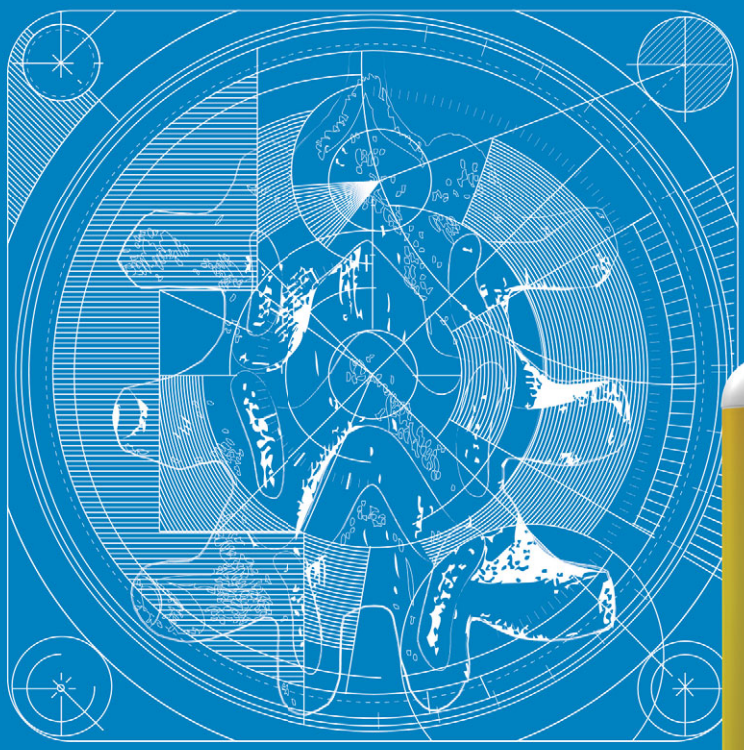

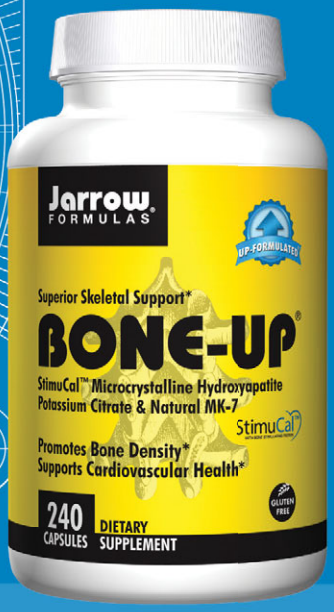

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Bone-Up® is an effective addition to any bone health regimen.* It features added vitamins and minerals that synergistically support healthy bone density and overall bone health*:

- **Stimucal™ Ossein Microcrystalline Hydroxyapatite (MCHA):** Promotes calcium balance.*
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Jarrow FORMULAS®

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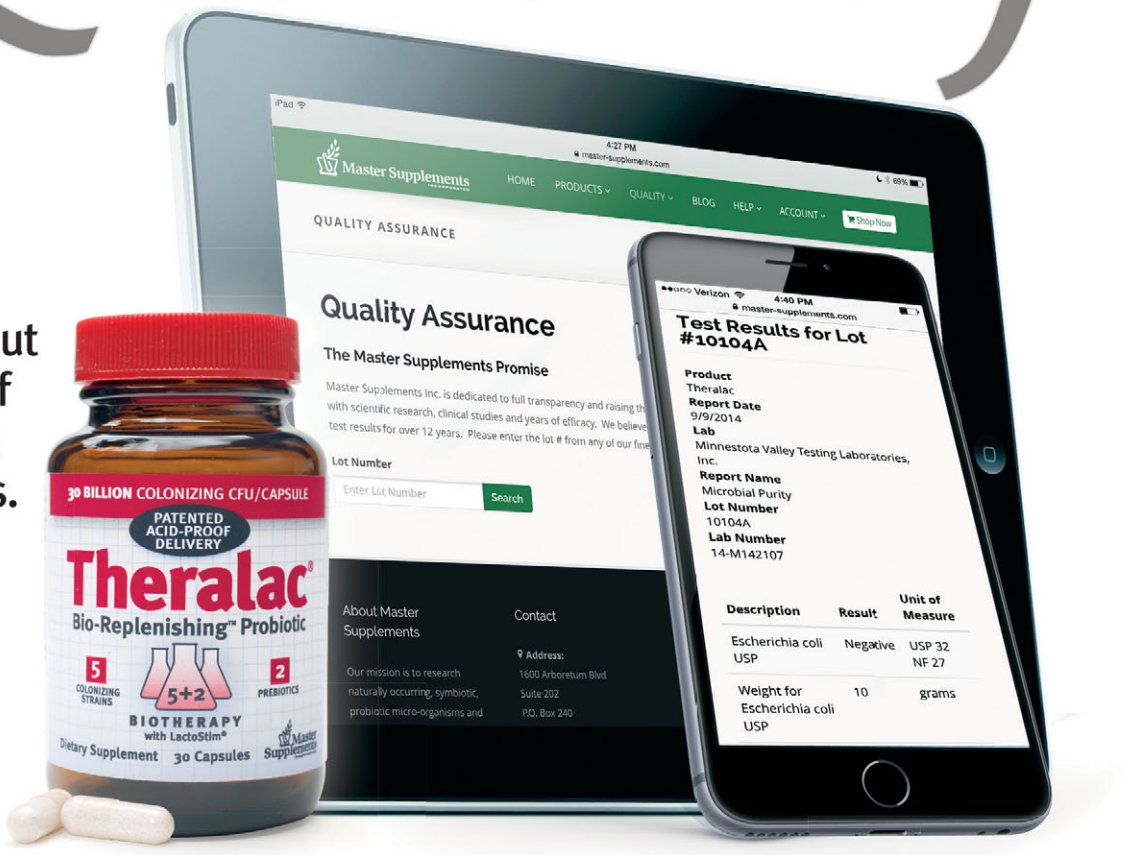

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Every year, 23 million days of work are lost to feeling under the weather. While most people view immune challenges as part and parcel of the cold weather season, they are not, in fact, inevitable. After all, many people manage to stay well all year round, even though they are exposed to the same environments as those who have weaker resistance. The reason is because the environment is not responsible for whether you feel well or not. Your immune system is.

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You have two basic types of immunity: innate and adaptive. Your innate immunity launches an immediate, general attack against a threat. Your adaptive immunity takes longer to kick in, but produces a targeted, specific response to a threat. Very few natural compounds have the ability to augment both innate and adaptive immunity. AHCC® (short for Active Hexose Correlated Compound) is one exception.*

How AHCC® Works

AHCC® is a patented, fermented, medicinal mushroom extract whose efficacy is **supported by over 20 human clinical research studies**. It has been shown to modulate immune response in several ways.

- **AHCC®** enhances the production of cytokines, the messengers of the immune system, so that your whole immune team can coordinate an organized response to outside threats.*
- **AHCC®** boosts populations of macrophages, the "street cleaners" of your immune system, which pick up foreign substances and cellular debris.*
- **AHCC®** increases the activity of natural killer (NK) cells, your innate immune system's first line of defense against invasion.*
- And **AHCC®** raises levels of dendritic cells and T cells, key players in your adaptive immune system's highly specialized response to specific threats.*

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FINALLY AN IMMUNE FORMULA THAT SCORES A PERFECT 10

	Mushroom Latin Name	Common Name	Benefits
1	*Ganoderma lucidum*	Reishi	Immune, cellular, cardiovascular, liver, respiratory*
2	*Wolfiporia extensa*	Poria; Fu Ling	Immune, cellular, liver, digestive, spleen, respiratory*
3	*Cordyceps sinensis*	Caterpillar Mushroom	Immune, liver, spleen, respiratory*
4	*Tremella fucifomis*	Tremella	Immune, metabolic/glucose balance, lung, spleen*
5	*Polyporus umbellatus*	Zhu Ling	Immune, liver, kidney, spleen*
6	*Trametes versicolor*	Turkey Tails; Coriolus	Immune, cellular, spleen, liver*
7	*Grifola frondosa*	Maitake	Immune, cellular, digestive, metabolic/glucose balance*
8	*Lentinula edodes*	Shiitake	Immune, cellular*
9	*Auricularia auricula*	Wood Ear Fungus	Immune, cardiovascular*
10	*Hericium erinaceus*	Lion's Mane; Monkey's Head	Immune, digestive*

Ten Mushroom®
Formula

- All Season, Year-Round Immune Support*
- Safe for Everyday Use*
- Organically Grown in the Pacific Northwest*

Ten Mushroom® is a **synergistic** blend of ten **organic** mushroom varieties, carefully selected based on their **broad-spectrum benefits** for immune and overall health. Additional beta-glucans give an extra boost to help **optimize immune function**.

For thousands of years, traditional cultures have relied on medicinal mushrooms to promote **optimal health** and **longevity**. **Ten Mushroom®** is designed based on this time-honored wisdom, and substantiated with **extensive research** on the **broad-spectrum health benefits** offered by each mushroom in this unique formula.

This **synergistic** mushroom blend delivers **powerful** yet gentle support for **immune health**, with additional **organ-specific benefits** to help you reach optimal vitality. **Organically grown** in a controlled indoor environment and packaged under strict GMP guidelines, **Ten Mushroom®** uses the vegetative **mycelium** of each mushroom, rather than the spore-containing fruiting body (which often cause allergic reactions).

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Finally, an immune formula that scores a perfect Ten!

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Highly Absorbable CURCUMIN

Used medicinally for over 4,000 years, **curcumin** benefits almost every organ in the body.[1-3] The challenge in obtaining these benefits is that most supplements are poorly ***absorbed*** into the bloodstream and are not well retained in the body.

Life Extension®'s curcumin supplements utilize a patented, bio-enhanced curcumin preparation that can reach up to **7 times** higher concentrations in the blood than standard curcumin.[4]

Studies comparing standard curcumin to **Super Bio-Curcumin®** and **Advanced Bio-Curcumin® with Ginger & Turmerones** found:[5,6]

- Nearly **2 times** the support for **immune health**,
- Nearly **twice** the support for **healthy inflammatory** response, and
- Approximately **double** the **free-radical fighting** support.

Life Extension® offers the choice of two super-***absorbing*** curcumin formulas that require only one serving a day dosing:

- **Super Bio-Curcumin®** provides optimal potency of highly absorbable curcumin.
- **Advanced Bio-Curcumin® with Ginger & Turmerones** provides the following additional nutrients for those seeking more comprehensive support for prolonged functional inflammatory responses:
  - **Ginger** to complement health benefits,[7]
  - **Turmerones** to increase the amount of curcumin inside cells, and
  - **Phospholipids** to further enhance absorption.[8]

Super Bio-Curcumin®

Item #00407 • 60 vegetarian capsules

	Retail Price	Your Price
1 bottle	$38	$28.50
4 bottles		$26.25 each

Non-GMO

Advanced Bio-Curcumin® with Ginger & Turmerones

Item #01808 • 30 softgels

	Retail Price	Your Price
1 bottle	$30	$22.50
4 bottles		$20.25 each

Contains soybeans.

References

1. *Br J Nutr*. 2010 Jun;103(11):1545-57.
2. *Nat Sci Biol Med*. Jan-Jun;4(1):3-7.
3. *Biofactors*. 2013 Jan-Feb;39(1):2-13.
4. *Indian J Pharm Sci*. 2008 Jul-Aug; 70(4):445-9.
5. *Int J Pharmocol*. 2009;5(6):333-45.
6. *Food Nutr Res*. 2009;48(3):148-52.
7. *J Med Food*. 2012 Mar;15(3):242-52.
8. *Cancer Chemother Pharmacol*. 2007;60:171-7.

To order **Super Bio-Curcumin®** or **Advanced Bio-Curcumin® with Ginger & Turmerones**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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