

**REVIVE YOUTHFUL IMMUNE FUNCTION**

# LifeExtension<sup>®</sup>

LifeExtension.com

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

January 2016

## **New! Oral Probiotic Restores Healthy Gums**

**Live to 100 Years  
In Good Health**

**Reduce Dental  
Plaque by 44%**

**Vitamin D Reduces  
Stroke-Induced  
Brain Damage**



**PLUS—**

**Overlooked Risk of Proton Pump Inhibitors  
Slash After-Meal Insulin/Glucose Spikes  
Olive Oil Lowers Breast Cancer Risk by 68%**



# SUPER \$ SALE

Life Extension's annual **SUPER SALE** enables clients to obtain **premium-grade** nutrient formulas at the year's lowest prices. Long-term supporters know that the **quality** of the products are backed by **Life Extension's** commitment to radically extended human life spans. Below are a few examples of the savings you can enjoy during the **SUPER SALE**:

	Retail Price	SUPER SALE Discount Price Per Bottle
<b>Two-Per-Day Multi-Nutrient Formula</b> <b>120 capsules • Item #02014</b> Compared to commercial formulas like Centrum®, <b>Two-Per-Day</b> has up to <b>50 times</b> higher potency, plus unique ingredients. <b>Two-Per-Day</b> provides biologically <b>active</b> nutrients such as the <b>5-MTHF</b> form of folate. Each bottle provides a <u>two-month</u> supply!	\$22	<b>\$13.50</b> <i>(four-bottle purchase)</i>
<b>Super Omega-3 EPA/DHA with Sesame Lignans/Olive Fruit Extract</b> <b>120 softgels • Item #01982</b> A highly refined, super purified Alaskan Pollock <b>fish oil</b> blend plus sesame <b>lignans</b> and potent <b>olive</b> (fruit and leaf) extract provides essential omega-3 fatty acids and vital components of the Mediterranean diet in a smaller-sized softgel that's easier to swallow.	\$32	<b>\$15.35</b> <i>(ten-bottle purchase)</i>
<b>AMPK Activator</b> <b>90 vegetarian capsules • Item #01907</b> Activating AMPK "turns off" many of the destructive factors of aging, enabling cells to return to their youthful vitality. Research shows that the two plant extracts contained in this formula promote AMPK activation.	\$48	<b>\$29.70</b> <i>(four-bottle purchase)</i>
<b>Optimized Resveratrol with Nicotinamide Riboside</b> <b>30 vegetarian capsules • Item #02031</b> This <b>trans-resveratrol</b> formula now includes <b>150 mg</b> of quercetin— <b>2.5 times</b> the previous amount—to support beneficial apoptosis in senescent cells along with <b>nicotinamide riboside</b> that converts to NAD+ to energize cells.	\$42	<b>\$24.30</b> <i>(four-bottle purchase)</i>
<b>Taurine</b> <b>90 vegetarian capsules • Item #01827</b> Research shows taurine can promote new brain cell formation along with whole-body health benefits.	\$13	<b>\$8.10</b> <i>(four-bottle purchase)</i>
<b>Health Booster</b> (formerly called Super Booster) <b>60 softgels • Item #01989</b> (Two-month supply) Just <u>one</u> daily softgel provides a variety of valuable nutrients including vitamins K1 and K2, blueberry extract, gamma tocopherol, sesame lignans, chlorophyllin, and lycopene, along with vision protecting carotenoids zeaxanthin, meso-zeaxanthin, and lutein.	\$52	<b>\$32.40</b> <i>(four-bottle purchase)</i>
<b>Advanced Bio-Curcumin® with Ginger and Tumerones</b> <b>30 softgels • Item #01808</b> Enhanced-absorbing <b>curcumin</b> with additional inflammation-easing support.	\$30	<b>\$18.23</b> <i>(four-bottle purchase)</i>
<b>Ultra Natural Prostate</b> <b>60 softgels • Item #01928</b> Comprehensive support for the aging prostate gland utilizing standardized nettle root, flower pollen, lignans, plus boron and phospholipids for enhanced absorption.	\$38	<b>\$21.60</b> <i>(ten-bottle purchase)</i>
<b>Triple Action Thyroid</b> <b>60 vegetarian capsules • Item #02003</b> Signs of suboptimal thyroid function including "brain fog" and fatigue are often dismissed as "normal aging." An array of nutrients has been shown to combat many of the complaints that arise from suboptimal thyroid health.	\$36	<b>\$21.60</b> <i>(four-bottle purchase)</i>

**The SUPER SALE extends to February 1, 2016.**

Customers traditionally take advantage of the **SUPER SALE** to stock up on a year's supply of their favorite supplements. To place your order, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com) (**SUPER SALE** pricing available only to customers in the US, Canada, and England.)

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



## REPORTS



## 34 REBUILD YOUR AGING IMMUNE SYSTEM

**Immune senescence** is characterized by severe **weakening** of our ability to ward off **pathogens** while simultaneously fueling fires of chronic **inflammation**. Three natural compounds have been shown to **reverse** harmful immune cell imbalances that accelerate aging systemically.



## 52 REBUTTAL TO MEDIA ATTACK AGAINST VITAMIN D

The **American Medical Association** published a deeply flawed report against **vitamin D** that the media misinterpreted with tabloid-like headlines. In response, **Dr. Ward Dean** writes a meticulous rebuttal showing how the data was so skewed that it has zero real-world value...except to the pharmaceutical industry that financially benefits if Americans remain vitamin D deficient.



## 60 VITAMIN D PROTECTS HOSPITALIZED PATIENTS

Startling findings published in **2015** reveal that people with **higher** blood levels of **vitamin D** enjoy sharply **lower** rates of stroke-induced paralysis and death in the hospital. These new studies also confirm that people with higher vitamin D levels have fewer psychiatric disorders and markedly lower risk of multiple sclerosis.



## 70 SUPPRESS AFTER-MEAL SURGES OF GLUCOSE AND DEADLY FATS

Millions of Americans are now at risk for **metabolic disorders**, caused by too much fat and sugar, as well as a poor lifestyle. Fortunately, scientists have identified a unique dietary fiber called **alpha-cyclodextrin** that **selectively** blocks absorption of harmful fats in the bloodstream while limiting after-meal glucose spikes.



## 82 HEALTH RISKS OF COMMON ACID REFLUX MEDICATIONS

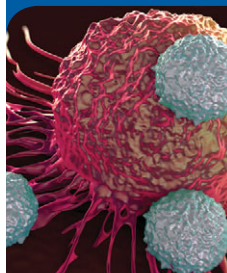
For chronic GERD (acid reflux) sufferers, most physicians prescribe drugs that reduce acid secretion in the stomach called **proton pump inhibitors**. Long-term use of these drugs brings a host of side effects that may impact the heart, the bones, and risk for infection. Alternative solutions are proposed to reduce the number of days when proton pump inhibitors may be needed.



## 22 NOVEL PROBIOTIC RESTORES HEALTHY GUMS

Conventional brushing and flossing may not be enough to ward off deterioration of gums and teeth. Researchers have discovered a targeted **probiotic** that reduces indicators of plaque buildup, gingivitis, bleeding gums, and pocket depth between gums and tooth roots.

## DEPARTMENTS



## 7 AS WE SEE IT: WHEN AGING IMMUNE SYSTEMS FALL OFF A CLIFF

Significant dollars are being invested to develop technologies to turn back "**on**" youthful **immune function**. Yet many of us can't wait for bureaucratic delays while our immune systems "**fall off a cliff**." This article will explain what **Life Extension®** is doing to help restore **immune competence** in aging humans today, including suppressing the deadly **interleukin-6** cytokine.



## 15 IN THE NEWS

Aspirin improves GI cancer survival; high blood sugar increases dementia risk; omega-3 softens arterial stiffness; vitamin D supports memory; resveratrol improves Alzheimer's; olive oil inhibits breast cancer; and much more.

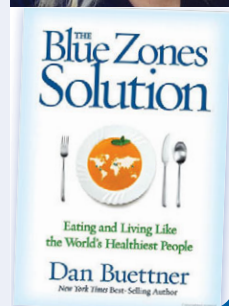
## 95 WELLNESS PROFILE

The owner and director of the Gardens Wellness Center in Palm Beach Gardens, Florida, oversees a unique, comprehensive wellness facility offering a range of holistic treatment modalities.



## 99 AUTHOR INTERVIEW: LIVING TO 100 YEARS IN GOOD HEALTH

In his new book, *The Blue Zones Solution: Eating and Living Like the World's Healthiest People*, health activist Dan Buettner reveals the lifestyle secrets of those living in Blue Zones, which are areas of healthy longevity around the world where a higher percentage of people live beyond age 100.





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# 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.

A 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 that are free from rancidity. This **Alaskan-derived** fish oil specification advances this premium standard **5-fold** better!

## High Percentage EPA and DHA

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

The addition of **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 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.

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

## Benefits of a Mediterranean Diet

The most popular **Super Omega-3** formula provides the following potencies in just four smaller softgels:

<b>Alaskan Wild Fish Oil Concentrate</b>	<b>4,000 mg</b>
Providing:	
<b>Omega-3s</b>	<b>2,400 mg</b>
EPA	1,400 mg
DHA	1,000 mg
.....	
<b>Polyphen-Oil™ Olive extract</b> (fruit and leaf)	<b>600 mg</b>
.....	
<b>Sesame seed lignan extract</b>	<b>20 mg</b>

## 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.<sup>1</sup> **Super Omega-3** incorporates the benefits of both fish oil and olive fruit extract into a single novel formula. A four-softgel serving provides 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.<sup>2</sup>

## Comprehensive Protective Benefits

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**.

## Super Omega-3

Item #01982 • 120 softgels

	Retail Price	Super Sale Price
1 bottle	\$32	\$21.60
.....		
4 bottles		\$18.90 each
.....		
10 bottles		\$15.35 each

Non-GMO

## References

1. *Nutrition*. 2005 Feb 2;21(2):131-6.
2. *Biochem Biophys Acta*. 2004 Jun 1;1682(1-3):80-91.



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

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

# LifeExtension®

Magazine

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**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.



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**Dipnarine Maharaj MD, MB, ChB, FRCP (Glasgow), FRCP (Edinburgh), FRCPPath., 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](http://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 or co-authored 14 books, selling over 1.5 million copies.



**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.

# Highly Absorbable CURCUMIN

Used medicinally for over 4,000 years, **curcumin** benefits almost every organ in the body.<sup>1-3</sup> The challenge is that most curcumin supplements are poorly **absorbed** into the bloodstream and are not well retained in the body.

**Life Extension** offers two curcumin supplements that utilize a patented, bio-enhanced preparation that can reach up to **7 times** higher concentrations in the blood than standard curcumin.<sup>4</sup>

Studies comparing standard curcumin to **Super Bio-Curcumin®** and **Advanced Bio-Curcumin® with Ginger & Turmerones** found:<sup>5,6</sup>

- 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 once daily dosing:

**Super Bio-Curcumin®** provides optimal potency of highly absorbable curcumin.

OR

**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 curcumin's health benefits,<sup>7</sup>
- ∞ **Turmerones** to increase the amount of curcumin inside cells, and
- ∞ **Phospholipids** to further enhance absorption.<sup>8</sup>



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1 bottle	\$38	<b>\$25.65</b>
4 bottles		<b>\$23.63 each</b>



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## Advanced Bio-Curcumin® with Ginger & Turmerones

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1 bottle	\$30	<b>\$20.25</b>
4 bottles		<b>\$18.23 each</b>

Contains soybeans.



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# When Immune Function “Falls Off a Cliff”



BY WILLIAM FALOON

A startling change occurs around **age 65** that decimates our ability to combat **infections** and **malignancies**.

This catastrophic event decreases **naïve T cells** needed to ward off new bacteria, viruses, and cancers. The chart on this page shows how production of these vital **immune cells** sharply declines as we age.

At the same time **naïve T cells** are lost, we accumulate senile **memory T cells** that emit **pro-inflammatory** signals that wreak havoc in every organ system.<sup>1</sup>

One of the most deadly of these inflammatory “signals” is a cytokine called **interleukin-6** (IL-6).<sup>2</sup>

Higher **IL-6** levels are associated with a **2-fold** greater risk of death.<sup>3</sup> Higher levels are also involved with multiple degenerative processes including **frailty** that so many elderly suffer.<sup>4-7</sup> A common trait of healthy **centenarians** is that they have unusually low levels of **IL-6**.<sup>8</sup>

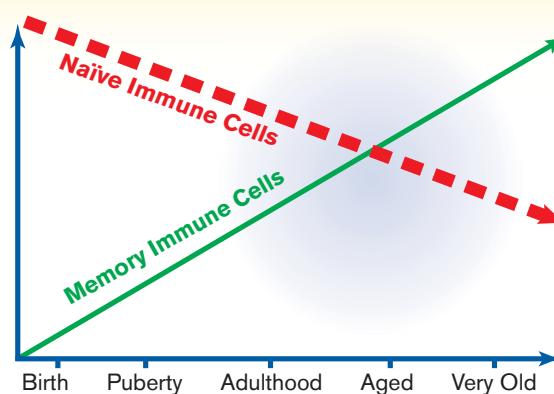
People associate **immune senescence** with weakened immune function. It turns out that impaired immunity is only half the problem. Spiraling levels of **IL-6** that attack our **healthy tissues** are another component of **immune senescence** that must be addressed.<sup>9</sup>

The encouraging news is that significant dollars are being invested to develop technologies to turn

back “**on**” youthful **immune function**.<sup>10</sup> These immune-restoration therapies will likely add decades to our healthy life spans.

The problem is that many of us can’t wait for bureaucratic delays while our immune systems **fall off a cliff**. This article will explain what **Life Extension®** is doing to accelerate restoration of **immune** competence in aging humans today, including suppressing deadly **interleukin-6** levels.

## Age-Related Decline in Immune Function



In youth we enjoy abundant **naïve T cell** populations that stand ready to destroy new bacteria, viruses, and cancers. Once a **naïve** immune cell does its job, it converts to a **memory T cell** that responds only to the same bacteria, virus, etc. Aging results in excess memory cells that emit **inflammatory** signals, while depriving the body of vital **naïve cells** to fight new invaders and malignancies.

**Immune senescence** is a leading cause of disability and death in aging humans.<sup>11</sup>

By way of example, deaths from **pneumonia** are rare in youth, but spiral upwards as humans mature.<sup>12</sup> If you read obituaries (as I do), the number of once-vigorous individuals who perish from opportunistic illnesses caused by **immune senescence** is startling.

One year ago, *Life Extension Magazine*® published in-depth reports about underlying causes of **immune senescence** and what stop-gap measures people should initiate to reverse this deadly trend.<sup>13-15</sup>

In people over age 65, the top 10 causes of death include influenza, pneumonia, and sepsis.<sup>16</sup> **Immune senescence** is a major cause of all these maladies.<sup>12,17-22</sup>

Cancer, stroke, Alzheimer's, and heart attack are common diseases of aging.<sup>16</sup> These illnesses are all related to **immune senescence**.

At this time of year, we often hear the term "**immune health**" as people seek to protect against **viral infections**. The public does not yet understand what causes our immune system to fail as we age.

## More Naïve T Cells Urgently Needed

Immune **imbalance** occurs when our aging immune system fails to protect against new cancers/infections, and instead generates **inflammatory** reactions (including increased **IL-6**) that attack every cell in our body.

A "**naïve**" immune cell is one that has not yet been activated.<sup>23</sup> Since it is "naïve" (not yet exposed to an antigen), naïve immune cells are primed to effectively respond to new infectious agents and malignancies.

Once exposed, **naïve immune cells** become **memory cells** or plasma cells specific to the original antigen. As our internal reservoir of naïve immune cells is decreased, we have less ability to respond to new infections/malignancies.<sup>23</sup>

A deficit of **naïve immune cells** combined with overaccumulation of **exhausted memory cells** decreases the efficacy (antibody response) of **vaccinations**.<sup>24</sup>

Exhausted **memory T cells** are associated with increased risks of coronary heart disease, impaired vascular function, and endothelial dysfunction, along with systemic **inflammation**.<sup>25-30</sup>

If we are to guard against the ravages of **immune senescence**, we need to increase our numbers of **naïve cells** ("virgin" immune cells), while reducing numbers of senile **memory cells**.

## Protecting against Immune Senescence Today

Most *Life Extension*® customers take nutrients that exert beneficial effects on immune activity.

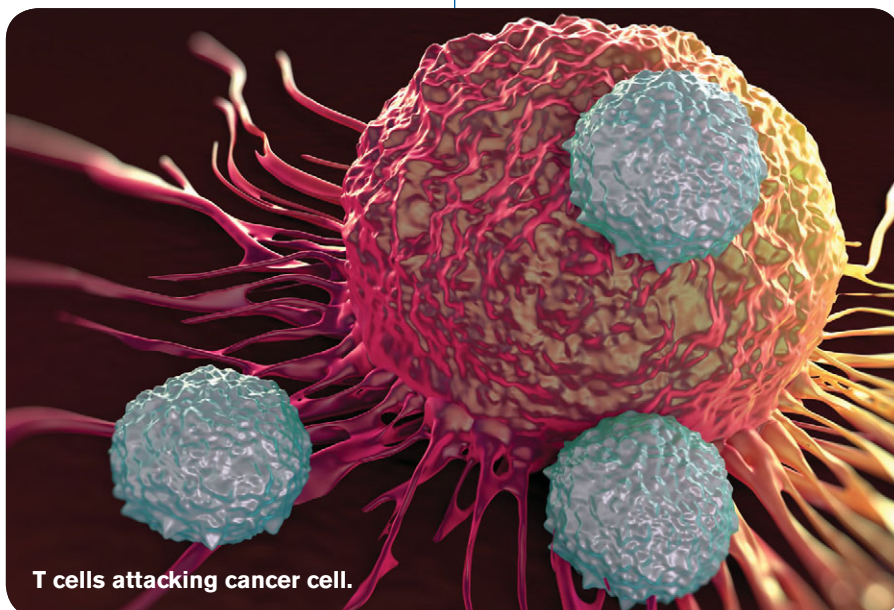
**Zinc** and **DHEA** partially restore **thymus function**, which is vital to transforming bone marrow-derived immune cells into activated **T cells**.<sup>31-35</sup> **DHEA** and **fish oil** help suppress deadly **interleukin-6**.<sup>36-41</sup>

A major advance announced last year in combatting **immune senescence** is an herb called **Cistanche**. This medicinal plant has been used extensively in China to treat the "**ailments of aging**."<sup>42</sup>

Supplementation with **Cistanche** has been shown to increase **naïve T cells** and **natural killer (NK) cells** while decreasing **memory T cells** and pro-inflammatory **interleukin-6**.<sup>43</sup> One of the characteristics of people who live over **100 years** is low levels of **interleukin-6**.<sup>8</sup>

A prime cause of the severe immune dysfunction suffered by the elderly is a marked decrease in **naïve T cells**<sup>44-46</sup> and functional **natural killer cells**,<sup>47-49</sup> with a concomitant increase in **memory T cells**.<sup>50,51</sup>

**Cistanche** counteracts these pathological trends that characterize **immune senescence**.<sup>43</sup>



T cells attacking cancer cell.



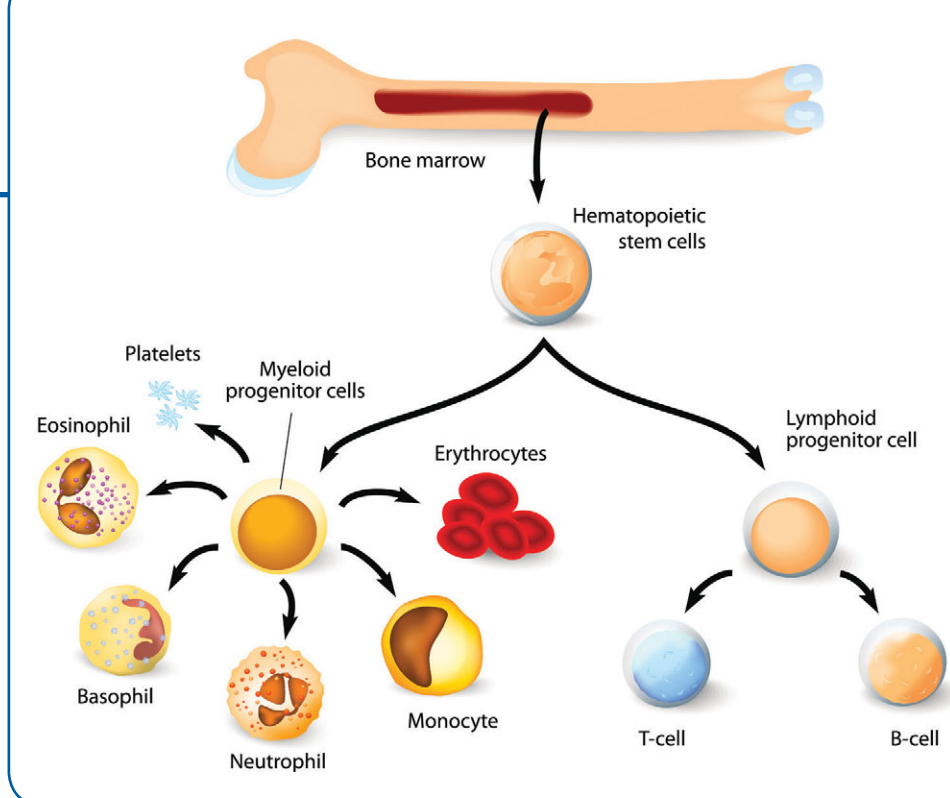
## How Cistanche Boosts T Cell Production and Healthy Longevity

*Cistanche* helps restore **progenitors** of peripheral **naïve T cells**, which explains the increase seen in these vital **immune cells** in response to *Cistanche*.<sup>43</sup>

Animals supplemented with *Cistanche* have **increased life spans**, which would be expected by a compound that counteracts **immune senescence**.<sup>43</sup>

*Cistanche* is one of the most popular Chinese herbal medicines and is listed in the Chinese herbal pharmacopeias as having “**anti-aging**” properties.

One reason Chinese physicians see such impressive therapeutic results is that *Cistanche* restores one of the most prominent bone marrow biomarkers of immune cell formation called **stem cell antigen-1**.<sup>43</sup>



Senile **bone marrow** loses its ability to produce fresh **naïve immune cells**, which are launched into the bloodstream to differentiate into mature **naïve T** and **natural killer cells**. Bone marrow **stem cell antigen-1** represents the body's main source of **naïve T cells** in the blood.<sup>43</sup> *Cistanche* appears to have a rejuvenating effect on the bone marrow, something that is generally only available through expensive recombinant drugs.<sup>52-54</sup>

The beneficial impact of *Cistanche* was demonstrated in an open-label pilot trial of elderly people. This study combined a low-dose of *Cistanche* (**100 mg**) with zinc, vitamin E, vitamin B6, fucoidan, and coenzyme Q10. Not only were markers of **immune senescence reversed**, but the test subjects reported **improvements in quality of life**, such as not “**feeling tired all the time**.” This makes sense in light of the multiple adverse effects **immune senescence** inflicts on the body, which includes increased levels of **frailty**.<sup>55,56</sup>

There are other factors that weaken immune function in the elderly that *Cistanche* has been shown to counteract. These will be described in depth in the

article beginning on page 34 of this month's issue.

*Cistanche* represents an important advance in our ability to restore vital components of our aging immune systems. Its **low cost** makes it readily affordable.

## Suppressing Deadly Impact of IL-6

One way of describing “aging” is that beneficial factors (such as **naïve T cell** production) **decrease** while detrimental ones (like **interleukin-6**) **increase**.

**IL-6** levels are especially high in patients with autoimmune conditions where an out-of-control immune system attacks one's own tissues. High serum **IL-6**, as seen in **rheumatoid arthritis**, for instance, is regarded as a reliable biomarker of high-grade **inflammation**.<sup>57-59</sup>

When it comes to “normal” aging, elevated **IL-6** contributes to the chronic destruction of our bone, heart valves, neurons, and other tissues, while the DNA damage it inflicts accelerates aging processes and malignant transformation of healthy cells.<sup>60-66</sup>

“We conclude that CHF (chronic heart failure) patients show a higher degree of immunosenescence than age-matched healthy controls. T-lymphocyte differentiation and IL-6 levels are increased in patients with an advanced clinical status and may contribute to disease impairment through a compromised adaptive immune response due to accelerated aging of their immune system.”

Publication:  
**International Journal of Cardiology** – July 1, 2014

Article title: **Immunosenescence and inflammation characterize chronic heart failure patients with more advanced disease.**

Life Extension® has published a number of articles over the past several decades about the critical need for aging humans to suppress chronic inflammatory inducers like interleukin-6.

I am pleased to announce that a potent new weapon to reduce **IL-6** has been added to an immune-restoration formula that many of our customers take daily. The cost of this novel **tea extract** is so low that the price of this blend of beneficial immune nutrients remains the same as last year.

When this tea extract was given by itself to a group of 90 patients (30-65 years) with **metabolic syndrome**, the following reductions in **inflammatory** markers were observed:<sup>67</sup>

- **C-reactive protein (CRP)** was reduced by **26%**
- **Tumor necrosis factor (TNF-α)** was reduced by **23%**
- **Interleukin-6 (IL-6)** was reduced by **21%**

In addition to suppressing **IL-6** and other inflammatory factors, this **tea extract** was shown to favorably alter genes (such as mutant p53) involved in tumor cell growth.<sup>68</sup>

### Making Major Strides...

We are rapidly entering a new paradigm in counteracting age-related disease.

Scientific studies document how certain nutrients that **Life Extension®** supporters have taken for decades (like DHEA and zinc) help protect against immune decline, while guarding against chronic inflammatory factors.<sup>70-75</sup>

Consumers now have access to an arsenal of novel compounds



to counteract the underlying factors that characterize **immune senescence**.

An impressive array of clinical research is being investigated to induce systemic **age reversal** in elderly humans by utilizing bone marrow-mobilized factors from young blood donors.<sup>76</sup>

Your purchases of these nutrient formulas from **Life Extension®** help to fund avant-garde research at prestigious medical facilities aimed at gaining control over pathological aging processes.

### Obtain Latest Formulas at Year's Lowest Prices

This is the time of year when we **discount** prices on *every* one of our advanced nutritional formulas. Longtime supporters know to take advantage of this once-a-year **Super Sale** to stock up on their favorite supplement formulas.

What should comfort supporters more than anything else are the three novel methods to counteract **aging** we have introduced over the past 12 months.

One involves activating a cellular enzyme (**AMPK**) that declines with aging and is responsible for myriad of age-related disorders.

The second (introduced three weeks ago) suppresses an enzyme (**MAO-B**) that accelerates brain aging and causes maturing people to lose their sense of well-being.

The third is an enhancement to an **immune-protection** formula that suppresses deadly inflammatory factors such as IL-6, TNF-α, and C-reactive protein.

### Our Commitment to Your Health

No organization is more dedicated to combatting disease, senescence, and premature mortality than **Life Extension®**. Your support via supplement purchases enables us to contribute to scientists involved in unprecedented biomedical research endeavors.

To order nutrients you need today at **Super Sale** prices, call **1-800-544-4440**.

For longer life,

William Faloon



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### Inflammatory Markers Predict Human Mortality

A study of community-dwelling people over age 80 was done to investigate whether **interleukin-6 (IL-6)**, **C-reactive protein (CRP)**, and **tumor necrosis factor-alpha (TNF-α)** levels predict all-cause mortality.

Baseline levels of these **inflammatory markers** were taken and the subjects followed up for a period of four years.

After adjusting for potential confounders, those with **high** levels of **IL-6** were **2.18 times more** likely to die, while study subjects with **high CRP** were **2.58 times more** likely to die.

While **TNF-α** by itself did not increase mortality rates, those with all **three** inflammatory markers above the median had the **highest mortality** risk during the four-year study period. The doctors who conducted this study concluded:

**"Low levels of inflammatory markers are associated with better survival in elderly, independently of age and other clinical and functional variables."**<sup>69</sup>

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LIFE EXTENSION'S BEST-SELLING  
**DHEA** PRODUCT!

# DHEA

## Supports Total-Body Health

**DHEA** is a critically important hormone, but its production declines sharply as we age. By the time you reach 70, your DHEA levels are likely to be **75-80% lower** than when you were at your peak.<sup>1-4</sup>

Scientists are discovering numerous health benefits when aging people restore their **DHEA** to *youthful ranges*.

**DHEA** therapy has been shown to:

- Support healthy arterial structure and function<sup>5,6</sup>
- Support endothelial health by helping with blood flow<sup>7</sup>
- Promote insulin sensitivity<sup>8,9</sup>
- Benefit the normal aging brain<sup>10-12</sup>
- Improve mood and alleviate melancholy<sup>13</sup>
- Protect hip bone and spine bone mineral density<sup>14</sup>
- Enhance the increases in muscle mass and strength in the elderly with resistance exercise<sup>15</sup>
- Boost a broad array of immune system cells and signaling molecules<sup>16</sup>

By supplementing with DHEA, you can get your levels back to youthful values. An ideal daily dose of **DHEA** for many healthy aging people is **25 mg**. Life Extension's® convenient, economical **25 mg** capsules are a popular way to consume the **precise amount** of DHEA your body may need.



### DHEA 25 mg

Item #00335 • 100 capsules

	Retail Price	Super Sale Price
1 bottle	\$16	<b>\$10.80</b>
4 bottles		<b>\$9.90 each</b>

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Each bottle lasts a typical user over **three months!**

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

**CAUTION:** Do not use DHEA if you are at risk for or have been diagnosed as having any type of hormonal cancer, such as prostate or breast cancer.

**Non-GMO**

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





### Aspirin Use Associated with Improved Gastrointestinal Cancer Survival

The 2015 European Cancer Congress was the site of a presentation on the finding of longer overall survival associated with use of aspirin following diagnosis of gastrointestinal cancer.\*

Martine Frouws, MD, analyzed data from 13,715 men and women diagnosed with a GI cancer from 1998 to 2011. Aspirin was used prior to cancer diagnosis by **30.5%** of the subjects and by **8.3%** after being diagnosed.

Nearly **28%** of the patients were still alive for at least five years over a median follow-up period of 48.6 months. Among those who used aspirin after diagnosis, the chance of surviving was double that of nonusers.

According to European Society for Medical Oncology spokesperson Nadir Arber, MD: **"Aspirin may serve as the magic bullet because it can target and prevent ischemic heart disease, cancer, and Alzheimer's disease, the three major health catastrophes in the third millennium."**

**Editor's Note:** "Medical research is focusing more and more on personalized medicine, but many personalized treatments are expensive and only useful in small populations," Dr. Frouws observed. "We believe that our research shows quite the opposite. It demonstrates the considerable benefit of a cheap, well-established, and easily obtainable drug in a larger group of patients, while still targeting the treatment to a specific individual."

\* European Cancer Congress. 2015 Sep 25-29.

### Junk-Food Diet May Shrink the Brain

An article in *BMC Medicine* reports that older individuals who eat an unhealthy Western diet have smaller brains, which researchers say is further proof that junk food has a terrible impact on health.\*

The results of the study, conducted by researchers at Deakin University and the Australian National University, suggest that older adults who consume more junk foods, such as sweet drinks, salty snacks, and processed meats, have smaller left hippocampi. It also shows that older adults who eat healthier foods, such as vegetables, fruits, and fish, have larger left hippocampi. These relationships existed over and above other factors that may explain these associations, such as gender, levels of physical activity, smoking, education, or depression.

The researchers used magnetic resonance imaging to measure the size of hippocampus in Australian adults aged 60-64 years. They also measured the participants' regular diets and took into account a range of other factors that could affect the hippocampus. These findings that consuming **junk foods** accelerates **brain atrophy** have substantial relevance for both dementia prevention and mental health.

**Editor's Note:** "This study sheds light on at least one of the pathways by which eating an unhealthy diet may influence the risk for dementia, cognitive decline, and mental disorders such as depression and anxiety in older people," said lead author Felice Jacka. "However, it also points to the importance of diet for brain health in other age groups. As the hippocampus is critical to learning and memory throughout life, as well as being a key part of the brain involved in mental health, this study underscores the importance of good nutrition for children, adolescents, and adults of all ages."

\* *BMC Medicine* 2015;13:215.

## Controlling Blood Sugar May Prevent Dementia

A study presented at the European Association for the Study of Diabetes conference in Stockholm shows that those with poor blood sugar control have **50%** higher risk for dementia.\*

The study included almost 350,000 people with type II diabetes who were registered in the Swedish National Diabetes Registry between January 2004 and December 2012. Participants, with a mean age of 67 when the study began, had no history of dementia when they were diagnosed with type II diabetes.

Volunteers were tracked until the study ended in 2012 or when they were hospitalized for dementia or died. Using a computer model, the researchers calculated the link between average blood sugar levels and dementia. Average blood sugar levels were based on the results of hemoglobin A1C tests (HbA1C). This test provides doctors with a several-month average of blood sugar levels. Dementia risk was sharply elevated in those with higher hemoglobin A1c readings.

**Editor's Note:** Say study authors: "The positive association between HbA1c and risk of dementia in fairly young patients with type II diabetes indicates a potential for prevention of dementia with improved blood sugar control."

\* European Association for the Study of Diabetes Conference. 2015 Sep 14.



## Chronic Diseases May Increase Risk of Dementia

In a new study of older adults published in the *Journal of the American Geriatric Society*, having multiple chronic conditions was linked with an increased risk of mild cognitive impairment (MCI) or dementia.\*

Researchers assessed 2,176 cognitively normal participants with an average age of 78.5 years who were followed for a median of four years. Participants with more than one chronic condition were **38%** more likely to develop MCI/dementia. Participants with four or more conditions had a **61%** increased risk compared with those with one or no condition. Men also had a higher risk than women.

"We were not able to investigate the specific mechanisms by which multimorbidity contributes to cognitive impairment; however our findings are consistent with the hypothesis that multiple etiologies may contribute to late-life cognitive decline and thus emphasize the importance of prevention," said study author Dr. Rosebud Roberts. "They also emphasize that chronic diseases, once diagnosed, should be efficiently managed."

While the researchers are confident about the link between chronic illness and cognitive impairment, they note they are uncertain about why it occurs, but offer different theories. "An important potential mechanism is through cardiovascular diseases: hypertension, hyperlipidemia, and cardiac diseases, specifically CAD," the authors wrote. They add that chronic conditions such as arthritis limit mobility and physical activity, leaving people more susceptible to cardiovascular disease, which in turn may increase cognitive impairment. Aging people with concurring chronic conditions are also more likely to have harmful interactions with an increasing number of medications, which may leave them vulnerable to dementia.

**Editor's Note:** The findings suggest that the prevention of chronic diseases may help aging adults maintain their mental health.

\* *J Am Geriatr Soc.* 2015;63:1783-90.

## Omega-3 Fatty Acid Levels Predict Decreased Arterial Stiffness

In an article published in the *Journal of Nutrition*, Ilse Reinders and colleagues report an association between higher plasma phospholipid **omega-3** polyunsaturated fatty acids (PUFAs) and lower pulse wave velocity, a measure of arterial stiffness which, when increased, has been correlated with a greater risk of cardiovascular disease and related mortality.\*

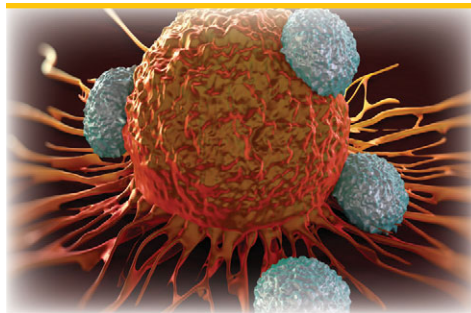
The study involved participants in the ongoing Age, Gene/Environment Susceptibility-Reykjavik (AGES-Reykjavik) Study. Of those who had plasma phospholipid polyunsaturated fatty acids measured upon enrollment, 501 subjects had carotid-femoral pulse wave velocity measured at a five-year follow-up examination.

Higher total plasma omega-3 polyunsaturated fatty acids and individual omega-3 fatty acids EPA and DHA were associated with lower pulse wave velocity. In contrast, subjects whose total plasma omega-6 fatty acids and the omega-6 fatty acid linoleic acid were higher had increased carotid-femoral pulse wave velocity measurements.

**Editor's Note:** "Our results for plasma phospholipid omega-3 PUFAs are confirmed by a recent randomized, controlled trial showing that omega-3 supplementation resulted in lower carotid-femoral pulse wave velocity," the authors remark. "The effect of omega-3 PUFA supplementation on carotid-femoral pulse wave velocity might be explained by improved endothelial function and a decrease in inflammatory markers."

\* *J Nutr.* 2015 Aug 26.





### Inflammation Drives Colorectal Cancer Metastasis

An article published in *Gastroenterology* reports the results of research that uncovered an effect for the inflammatory mediator prostaglandin E2 (PGE2) as a driving force in the metastasis of colorectal cancer.\*

“The normal role of PGE2 is to come to the rescue when you do something like cut your finger,” explained lead researcher Raymond N. DuBois, MD, PhD. “It attracts the body’s immune cells and stimulates pathways that heal the wound site. The level of PGE2 goes up and then goes down within a few days of healing the wound. But in cancer, the cells keep making PGE2 chronically, so it’s like this wounding process that never heals. In doing so, it generates these cancer stem cells that promote cancer progression and metastatic spread.”

By measuring levels of prostaglandin E2 in colorectal carcinoma specimens and normal tissues, Dr. DuBois and associates found a correlation between the compound and colon cancer stem cell markers.

**Editor’s Note:** “We’ve long known that simple things like taking aspirin or other anti-inflammatory drugs (called nonsteroidal anti-inflammatory drugs, or NSAIDs), have beneficial effects on reducing the risk of colorectal cancer,” Dr. DuBois observed. “But non-aspirin NSAIDs can cause serious cardiovascular side effects when taken over a long period of time, so we’ve needed to discover better drug targets. This study points us in the right direction.”

\* *Gastroenterology*. 2015 Aug 7.

### Low Vitamin D Levels Linked to Memory Loss

A study published in *JAMA Neurology* found that older adults with low **vitamin D** levels may lose their memories and thinking abilities faster than those with normal levels, especially when it comes to memory loss related to Alzheimer’s disease and dementia.\*

Dr. Joshua W. Miller and colleagues at University of California, Davis, Alzheimer’s Disease Center, looked at the association between blood levels of vitamin D and changes in memory and thinking ability in 318 adults over an average of five years.

The researchers defined adequate blood levels of **25-hydroxyvitamin D**—the form of vitamin D generated when the body converts the vitamin D made in the skin by sunlight and consumed from foods like eggs, oily fish, and milk—to be in the range of **20 ng/mL** to **50 ng/mL**. Insufficient levels are **12 ng/mL** to less than **20 ng/mL**, and levels below **12 ng/mL** are deficient.

Study participants had a mean age of 76 and were cognitively normal, had mild cognitive impairment, or dementia. Researchers found that more than **60%** had low vitamin D levels, including more than a quarter who had a deficiency. Individuals with dementia had lower vitamin D levels (about **16.2 ng/mL**) than those with mild cognitive impairment (average **20 ng/mL**) or whose memory was normal (**19.7 ng/mL**). Over the course of the study, those with low vitamin D levels showed an accelerated decline in executive function—working memory, reasoning, task flexibility, problem solving, planning, and execution—and in the ability to remember their own past personal experiences. These rates of decline were similar for individuals who had normal brain function at the beginning of the study and for those who already had dementia or mild cognitive impairment.

**Editor’s Note:** Among people with cognitive impairment, an estimated **70% to 90%** have insufficient vitamin D. “This work, and that of others, suggests that there is enough evidence to recommend that people in their 60s and older discuss taking a daily vitamin D supplement with their physicians,” Miller said.

\* *JAMA Neurology*. 2015 Sep. 14.

### Resveratrol Benefits Those with Alzheimer’s

The results of a trial reported in *Neurology* reveal an association between supplementation with **resveratrol** and improvement in markers of Alzheimer’s disease.\*

One hundred-nineteen men and women diagnosed with probable Alzheimer’s disease were randomized to receive a placebo or **500 mg** synthetic resveratrol daily, with a dose increase of **500 mg** every 13 weeks that ended with a **1,000 mg** dose twice per day at the end of the 52-week study. Plasma and cerebral spinal fluid were analyzed for resveratrol and its metabolites, and amyloid beta 40 and 42 at the beginning and end of the study.

While plasma and cerebrospinal **amyloid beta** 40 levels had significantly decreased among the placebo group by the end of the study, they remained relatively stable among those who received resveratrol. “A decrease in amyloid beta 40 is seen as dementia worsens and Alzheimer’s disease progresses,” explained lead author R. Scott Turner, MD, PhD.

**Editor’s Note:** “It does appear that resveratrol was able to penetrate the blood brain barrier, which is an important observation,” Dr. Turner noted. “Resveratrol was measured in both blood and cerebrospinal fluid.”

\* *Neurology*. 2015 Sep 11.



## Olive Oil Reduces Breast Cancer Among Women at Risk of Cardiovascular Disease

A trial reported in *JAMA Internal Medicine* found a significantly lower risk of invasive breast cancer among women who consumed a Mediterranean diet supplemented with extra virgin olive oil in comparison with women assigned to a control diet who were given advice to eat a reduced fat control diet.\*

The trial included 4,282 women enrolled in the PREDIMED study who were at increased cardiovascular disease risk due to the presence of diabetes or other factors. Subjects were assigned to a Mediterranean diet supplemented with olive oil or nuts, or a control diet.

After a median follow-up of 4.8 years, 35 cases of invasive breast cancer were identified. While both Mediterranean diets were associated with a reduced risk of the disease, the diet supplemented with olive oil was associated with the lowest risk, which was **68% less** (after adjustment) than the control group.

**Editor's Note:** The authors suggest several mechanisms for extra virgin olive oil's anticarcinogenic effect. They observe that while all olive oil provides a high amount of monounsaturated fatty acids (mainly oleic acid) as well as squalene, extra virgin olive oil also provides biologically active compounds that include the polyphenols oleocanthal, oleuropein, hydroxytyrosol, and lignans. The combined effects of oleic acid's antiproliferative property, squalene's beneficial effect on intracellular oxidative stress, and polyphenols' anticancer properties could be responsible for the protection associated with olive oil observed in this study.

\* *JAMA Internal Medicine*. 2015 Sep 14.

## Organs Age Differently

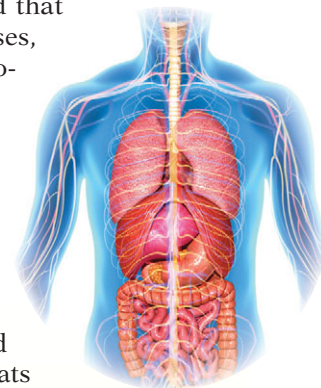
Aging may be one thing to your liver and another to your brain, according to research published in *Cell Systems*.\*

Researchers compared brain and liver cells of 6-month-old rats to those of 24-month-old animals. They found that aging equally affected immune and stress responses, as well as inflammation. However, metabolic processes were mainly impacted in the liver, and aging mainly affected signaling processes in the brain. "We chose to compare brain and liver because these two organs have very different capacities for self-renewal," stated co-corresponding author Martin Hetzer.

"We found that in the brain, age-related changes very often have to do with the loss of molecules that help signals to spread among neurons," reported lead researcher Martin Beck. "This could explain why old rats have a reduced ability to form new connections between neurons, as well as other traits observed in the aging brain."

**Editor's Note:** "This research may shed new light on the molecular mechanisms underlying age-related diseases, enabling the identification of risk factors to predict which individuals are most susceptible based on their genetic makeup," Dr. Beck noted. "In the end, a better understanding of the molecular mechanisms of aging could lead to the development of novel therapies to prevent or treat a range of age-related diseases."

\* *Cell Systems*. 2015 Sep 17.



## Hypertension Drug Reduces Inflammation from Traumatic Brain Injury

According to a new animal study published in *The American Journal of Pathology*, traumatic brain injury affects the body as well as the brain, and treatment with hypertension drugs blocks the production of proteins related to inflammation.\*

Researchers from the Georgetown University Medical Center found that in an animal model, brain injury produces an inflammatory response in the blood as well as body's organs, especially the liver. The liver responds with up to a **1,000-fold** increased production of a protein that increases inflammation in the brain, leading to chronic inflammation, nerve cell death, and reduced blood flow.

In a mouse model, researchers found that small doses of the blood pressure drug **telmisartan** blocked production of one of the molecules in the protein's biological pathway, which leads to a dramatic decrease in inflammation. The brain can then possibly heal, says study author Sonia Villapol, PhD.

"This study established a connection between the peripheral regions and the brain, highlighting the importance of regulating the peripheral damage when trying to mitigate the consequences of brain injury," said Villapol.

In earlier research, the same team found that telmisartan and another hypertension drug, candesartan, had beneficial effects in mice with traumatic brain injury several hours after injury.

**Editor's Note:** According to the American College of Cardiology, telmisartan "keeps blood vessels from narrowing, which lowers blood pressure and improves blood flow." Telmisartan was recommended in the March 2015 edition of *Life Extension* magazine as the ideal anti-hypertensive medication.

\* *Am J Path*. 2015 Sep 21.



# "TURN ON" Your Body's Longevity Genes!

## Optimized Resveratrol with Nicotinamide Riboside for Cellular Vitality

In aging individuals, the accumulation of **nonfunctional cells** parallels a decline in natural immune function, which is linked to problematic outcomes in normal aging.<sup>1</sup>

Scientists have found that the flavonol **quercetin** supports the body's normal ability to perform "cellular housekeeping" to selectively break down these nonfunctional cells—promoting their removal.<sup>2</sup>

**Optimized Resveratrol with Nicotinamide Riboside** now includes **150 mg** of **quercetin**, which is **2.5 times** the previous amount.

**Quercetin** supports cell-regulating systems that produce beneficial apoptosis (cell death) in aged, dysfunctional cells.<sup>2</sup> It also supports immune response by inhibiting inflammation-causing substances.<sup>3</sup>

**Optimized Resveratrol with Nicotinamide Riboside** is a complex of key *cellular support* ingredients formulated to promote the body's longevity mechanisms:

- **Resveratrol** favorably alters genes that help slow the aging process and triggers some of the same beneficial youthful gene expression activated by calorie restriction.<sup>5</sup>
- **Quercetin** enhances the longevity-supporting enzyme SIRT1, which is also activated by both resveratrol<sup>4</sup> and nicotinamide riboside.<sup>6</sup>
- **NIAGEN® nicotinamide riboside** supports mitochondrial health and promotes longevity pathways.<sup>5</sup>
- **Pterostilbene** and **fisetin**, specific compounds found in berries, work together with resveratrol to "turn on" the body's own longevity genes.<sup>7,8</sup>

### Just one vegetarian capsule of Optimized Resveratrol provides:

<b>Trans-Resveratrol</b> (most biologically active form)	<b>250 mg</b>
<b>Quercetin</b>	<b>150 mg</b>
<b>NIAGEN® Nicotinamide Riboside</b>	<b>100 mg</b>
<b>Red grape (fruit) and wild blueberry (fruit) blend</b>	<b>40 mg</b>
<b>Fisetin</b>	<b>10 mg</b>
<b>Trans-Pterostilbene</b> (from pTeroPure®)	<b>0.5 mg</b>

### Optimized Resveratrol with Nicotinamide Riboside

Item #02031 • 30 vegetarian capsules

	<b>Retail Price</b>	<b>Super Sale Price</b>
1 bottle	\$42	<b>\$28.35</b>
4 bottles		<b>\$24.30 each</b>



### For Those Who Want Higher Dose Quercetin

The new **Optimized Resveratrol with Nicotinamide Ribosome** (described above) provides an ideal daily maintenance dose (**150 mg**) of **quercetin**. (Item #02031)

For those seeking to sweep away excess accumulated senescent cells, additional potencies of quercetin may be considered for a two- to four-month period. **Optimized Quercetin** provides **250 mg** of a quercetin food blend from apples, onion, and buckwheat. One to two capsules of **Optimized Quercetin** a day may be taken in addition to the Optimized Resveratrol formula over a two- to four-month month period.

### Optimized Quercetin

Item #01309 • 60 vegetarian capsules

	<b>Retail Price</b>	<b>Super Sale Price</b>
1 bottle	\$22	<b>\$14.85</b>
4 bottle		<b>\$13.50 each</b>



To order **Optimized Resveratrol with Nicotinamide Riboside** or **Optimized Quercetin**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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# Restore Youthful MENTAL ACUITY

## Replenish Youthful Dopamine

**Dopa-Mind™** is a standardized **wild green oat extract** for aging individuals who wish to maintain more youthful cognitive health and performance.

With age, our brain's levels of **dopamine**—which regulates mood and cognition—begin to diminish,<sup>1,2</sup> leading to a corresponding decline in mental performance.<sup>3</sup>

This dopamine depletion is largely caused by rising levels of an *enzyme* called **monoamine oxidase-B (MAO-B)**.

Published studies show that by inhibiting **MAO-B**, this bio-active **wild green oat extract** promotes healthy **dopamine** levels. This MAO-B inhibiting mechanism has been shown to support mental acuity and longevity.<sup>4</sup>

In a double-blind, randomized, placebo-controlled trial in aging volunteers, researchers demonstrated that **1,600 mg** of the same **wild green oat extract** found in **Dopa-Mind™** produced a **74%** improvement on a standard test of mental acuity.<sup>4</sup> In soon-to-be published research, **800 mg** of the same extract supported mental processing time and speed.<sup>5</sup> In other research, this extract exhibited support for cerebral vasodilator function, as well as endothelial function—both of which play roles in brain health.<sup>6</sup>

The **wild green oat extract** in **Dopa-Mind™** has been shown to promote more youthful cognitive performance and may support longevity. The suggested dose is one tablet of **Dopa-Mind™** daily for the first month. If desired results do not manifest, increase the dose to two tablets daily.

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#### Non-GMO

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visit **www.LifeExtension.com**

### Dopa-Mind™

Item #02006 • 60 vegetarian tablets

	Retail Price	Super Sale Price
1 bottle	\$48	<b>\$32.40</b>
4 bottles		<b>\$28.80 each</b>



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# AMPK ACTIVATOR

## A PARADIGM IN CONTROLLING AGING

Found in every cell,<sup>1,2</sup> **AMPK** promotes **longevity factors** that have been shown to extend life span in numerous organisms.<sup>3,4</sup> Increasing AMPK signaling "turns off" many damaging effects of aging, thus enabling cells to return to their youthful vitality.<sup>5</sup>

### Importance of AMPK

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

### Gynostemma Pentaphyllum

An extract of the plant *Gynostemma pentaphyllum* promotes **AMPK** activation!<sup>8-10</sup> 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.<sup>11</sup>

### Trans-Tiliroside

*Trans*-tiliroside, extracted from plants such as **rose hips**, boosts **AMPK** activation, but triggers different downstream metabolic benefits than *G. pentaphyllum*.<sup>12-14</sup> 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.<sup>15</sup>

### 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:

<b>ActivAMP®</b>	
<i>Gynostemma pentaphyllum</i> extract	<b>450 mg</b>
<b>Rose hip extract</b>	<b>1,119 mg</b>
Standardized to 5% <i>trans</i> -tiliroside	<b>56 mg</b>

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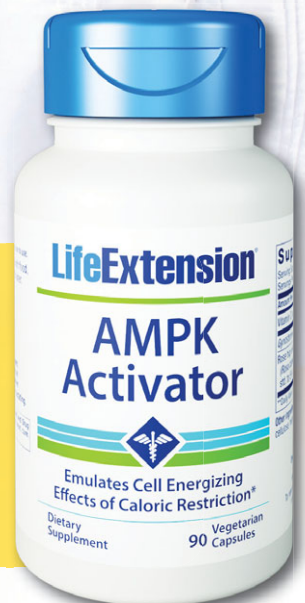
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# Innovative Solution for *ORAL HEALTH*

For many people, strict adherence to brushing and flossing twice daily may not be enough. The consequence is deterioration of gums and teeth with invariable **periodontal** disease.<sup>1,2</sup>

Researchers have discovered a unique solution to ensure healthier gums and teeth as we age. It comes in the form of a targeted **probiotic** that has been found to work specifically in the mouth. This unique probiotic helps destroy disease-causing bacteria and replaces them with **beneficial bacteria** that protect teeth and gums.

In a revealing human study, subjects receiving the **oral probiotic** showed an impressive reduction in indicators of plaque buildup, gingivitis, bleeding gums, and pocket depth between gums and tooth roots.<sup>3</sup>

Americans have an alarmingly high rate of gum disease. Beyond the potential for tooth loss, gum disease is associated with health problems throughout the entire body, including cardiovascular, brain, kidney, and bone diseases.<sup>4,10</sup>

A major factor in the development of tooth and gum disease is an imbalance in the normal oral **microbial community** of the mouth, in which disease-causing organisms overwhelm those that contribute to good health.

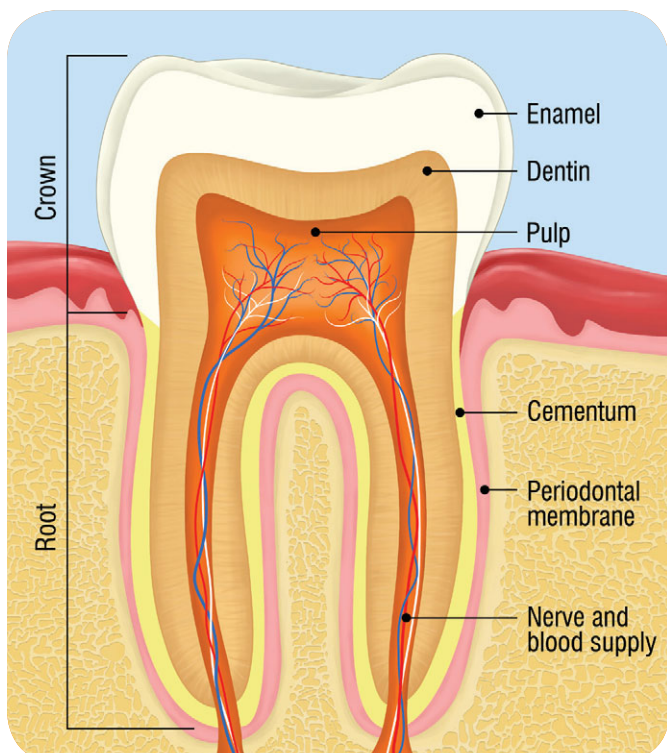
Researchers have discovered a targeted **oral probiotic** that is able to “safeguard” the oral cavity, help minimize bad bacteria, and replace it with beneficial bacteria instead.

Studies have shown that oral probiotics improve gum health and reduce risk factors for dangerous periodontal (gum) disease. That risk reduction, in turn, translates into substantially lower risk for a host of systemic disease processes commonly associated with aging.<sup>11</sup>

## How Oral Health Impacts the Entire Body

Disorders involving the teeth are among the most common health problems in US adults, with **96%** of those 65 and older having cavities in their permanent teeth and about **20%** of adults 65 and older having untreated tooth decay.<sup>12</sup>

**Periodontal** (gum) disease is an even more serious and potentially dangerous problem in aging adults.<sup>13</sup> More than **70%** of adults 65 and older have



**periodontitis**, a term that includes a range of conditions from simple **gingivitis** (inflammation of the gums without destruction of bone or tooth structures) to **aggressive periodontitis**, which can lead to bone loss, weakening of the ligaments that hold teeth in place, and eventual tooth loss.

The consequences of periodontal disease are grave, and considerably more threatening than dental cavities. And, while many have to face the expense of dental work or dentures, tooth loss alone can lead to serious malnutrition as the act of chewing becomes increasingly difficult.<sup>14,15</sup>

What many people might not know is that periodontal disease is a **major threat** to health throughout the body.<sup>10,16</sup>

The degree of periodontal inflammation and the presence of pathogenic bacteria has long been linked to coronary artery disease and atherosclerosis.<sup>4,17-19</sup> Periodontal pathology also contributes to:

- **Cancers** of the oral cavity and other regions caused chronic infections and inflammation.<sup>5-6</sup>
- **Alzheimer's disease** and other forms of dementia as a result of **inflammatory** changes. Accumulation of neuron-destroying **amyloid beta** increases in adults with periodontal disease.<sup>16,20</sup>
- A variety of **lung disorders**, which are associated with periodontal disease, including pneumonia and chronic obstructive pulmonary disease (COPD).<sup>21-23</sup>
- **Nonalcoholic fatty liver disease (NAFLD)** and **viral hepatitis**, which are likely to be associated with inflammatory periodontal disease.<sup>24,25</sup>
- **Kidney diseases**, including renal insufficiency and chronic kidney disease, show close associations with periodontal problems.<sup>26,27</sup>

## The Underlying Cause of Gum Disease

How can something as seemingly simple as gum disease have such potentially drastic health effects throughout the body? The answer comes down to one of the underlying causes of gum disease, which is the excessive growth of pathogenic (disease-causing) organisms in the oral cavity. This creates the twin threats of **infection** and **inflammation**, which feed on each other in a vicious cycle and can have disastrous effects on many body systems.<sup>28</sup>



Present in everyone, the **oral microbiome**, is a complex set of interacting microbial populations, which when in a healthy balance, support and protect the delicate mucous membranes as well as the surfaces of the teeth themselves.<sup>29</sup>

Shifts in the normal microbial community, however, lead to a host of problems, ranging from dental caries (“cavities”) that arise from excessive acid-producing bacteria, to gum disease that contributes to tooth loss and diseases in parts of the body far removed from the mouth itself.<sup>30</sup>

Our growing recognition of both the severity of periodontal disease and its relationship to an imbalance in the oral microbial populations have led to calls for use of **oral probiotics** as effective preventive measures, in an effort to re-establish a healthy microbial community in the mouth.<sup>30,31</sup> The results are extremely promising.

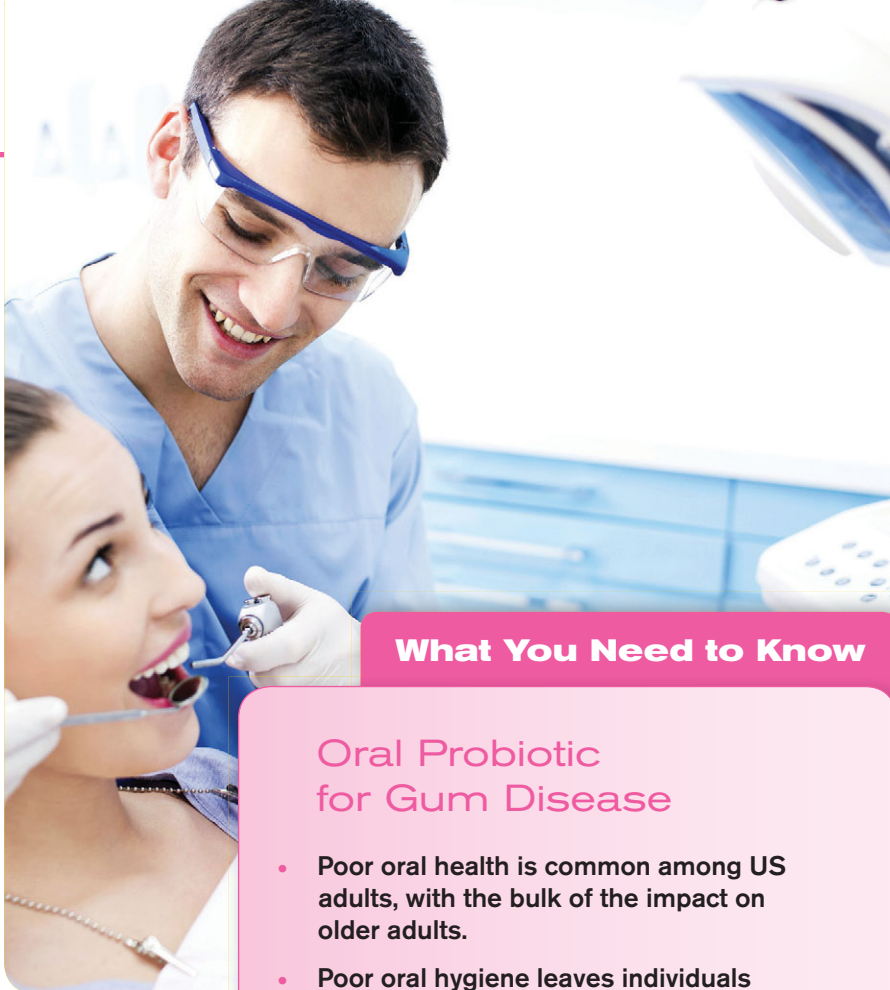
### Beneficial Organisms Destroy Dangerous Germs

The principle behind all probiotics is simple: Replace unhealthful or dangerous organisms with those that contribute directly or indirectly to human health. The end result should be a reduction in the population of the “bad guys,” and the establishment of a more protective environment.

**S. salivarius strain BLIS M18** is one of the “good guys.” It competes with dangerous oral bacteria that cause or exacerbate periodontal disease, and has been shown to prevent and improve parameters of gingivitis and periodontitis.<sup>9</sup> It accomplishes this through numerous mechanisms of action.

First, *S. salivarius* produces enzymes that help break down dental **plaque**, which is a major threat to both tooth and gum health.<sup>32</sup> Plaque is the sticky film of bacteria that forms on teeth, and it’s the main cause of tooth decay and gum disease. When plaque hardens, it becomes **tartar**, a mineralized substance with a rough surface that can become home to still more plaque and more dangerous microbes.

Another benefit of *S. salivarius* is that it has been shown to *neutralize* acids to maintain a healthy **oral pH**. A healthy oral pH is important because having a low pH demineralizes teeth, which creates an environment in which bad bacteria thrive.<sup>32,33</sup>



### What You Need to Know

#### Oral Probiotic for Gum Disease

- Poor oral health is common among US adults, with the bulk of the impact on older adults.
- Poor oral hygiene leaves individuals vulnerable to an imbalance of the billions of microbes living in our mouths, allowing formation of plaque, development of inflammation, and eventually gum disease and tooth loss.
- As gum disease (periodontitis) progresses, it can have disastrous effects on other organ systems, including the heart, brain, lungs, kidneys, and bones, as a result of the chronic, low-grade inflammation it causes.
- Rebalance oral microbial population through the use of a novel probiotic bacterial strain, *S. salivarius* BLIS M18.
- Studies show that regular supplementation with *S. salivarius* BLIS M18 results in significant improvements in measures of oral and gum health.
- The addition of a second probiotic organism, *Bacillus coagulans* GBI-30, 6086, provides extra support against the germ most commonly associated with dental caries.
- Oral health is much more than a cosmetic consideration. To sustain healthy teeth, gums, and total body health, it’s time to include a daily supplement with these powerful beneficial probiotic organisms.

Unlike many other probiotic formulations, *S. salivarius* is capable of **colonizing** the mouth and gums (rather than simply sticking around until the entire applied dose is gone).<sup>32,34</sup> Once it has established its colonies in the mouth, *S. salivarius* competes with the harmful bacteria that cause tooth decay and periodontal disease to reduce their relative abundance.

It accomplishes this as a result of its ability to secrete **bacteriocin-like inhibitory substances** (BLIS) known as **lantibiotics**. Technically, lantibiotics are bacterially produced antimicrobial substances that kill competing organisms, but think of them as the weapons the bacterium uses to keep less savory organisms at bay.<sup>35</sup> And although *S. salivarius* is a common bacteria in the mouth, the more beneficial BLIS strains are only found in **2%** of individuals.<sup>36</sup>



### Systemic Disease Can Emanate in the Mouth

In many ways, the mouth is the first line of defense against disease. According to the **National Institutes of Health**:

***“The mouth is also a portal of entry for pathogens and toxins, which can affect the mouth and, if not cleared by the many defense mechanisms that have evolved to protect the oral cavity, may spread to the rest of the body.”***<sup>40</sup>

Laboratory studies show that colonies of *S. salivarius*-producing lantibiotics can inhibit the growth of oral disease-causing bacteria associated with **periodontitis**.<sup>37-39</sup>

One important study showed that in addition to inhibiting the growth of dangerous bacteria, *S. salivarius* BLIS M18 can also reduce levels of **inflammatory cytokines** associated with gingivitis and periodontitis.<sup>41</sup> This is an important characteristic in breaking the infection-inflammation-infection cycle that accelerates gum disease and threatens the rest of the body.

### Oral Probiotic Improves Gum Disease

Once scientists knew that oral probiotics produced such beneficial antibacterial actions in lab and pre-clinical studies, they were ready to test their effects in real life. A number of human trials have now been completed, with exciting results that demonstrate the positive impact of regular supplementation with an oral probiotic.

A randomized, controlled clinical trial was conducted to determine the effects of *S. salivarius* BLIS M18 on a number of the most important clinical parameters of periodontal health. This study evaluated indicators that dental hygienists use to determine the health of gums:<sup>9</sup>

- **Plaque index score:** a 0-to-3 scale ranging from no plaque to an abundance of soft matter within the gingival pocket (the pocket of soft tissue between gum and tooth).<sup>42</sup>
- **Gingival index score:** a 0-to-3 scale ranging from normal gingiva (gums) to severe inflammation with marked redness and swelling, including ulceration and tendency of spontaneous bleeding.<sup>43</sup>
- **Sulcular bleeding index:** a 0-to-5 score grading tendency of the gums to bleed on probing, ranging from healthy-looking gums with no bleeding on probing to spontaneous bleeding, change in color, and marked swelling.<sup>43</sup>
- **Probing pocket depth:** the depth to which a dental probe can be passed between the inner margin of the gum and the tooth root. The deeper the pocket depth, the worse the evidence of periodontal disease.<sup>44</sup>

The study involved both male and female patients with moderate and severe **gingivitis** (scores of 2 or 3 on gingival index score), and moderate **periodontitis**





## Don't Stop Brushing and Flossing

Most people find it difficult to comply with the American Dental Association's recommendation for twice-daily brushing and at least once daily interdental cleansing (using floss or a water flosser), even though adherence to these recommendations has been shown to support better tooth and gum health.<sup>47</sup>

That's why the advent of a powerful **oral probiotic lozenge** to sustain and improve the health of the oral microbial community is a genuine breakthrough in medical and dental care.

But don't stop aggressive oral cleansing with a brush, and continue or increase the use of an interdental cleaner. These activities can work in tandem with the new, healthier oral microbial community to suppress plaque and maintain healthy gums.

(probing pocket depth of up to **6 mm**). In order to optimize the subjects' periodontal health, subjects underwent a thorough cleaning and scraping of the teeth to remove plaque and tartar at the outset of the study.

After the initial visit, half of the subjects received a lozenge containing *S. salivarius* BLIS M18, while the other half received no treatment, acting as a control group. The subjects took lozenges daily for 30 days, though the researchers observed them for a total of 60 days in order to determine if the supplement would continue to have beneficial effects after subjects stopped taking it.

In all four parameters measured, the supplemented group showed **improvement** over the control group at 30 days—with continued benefits even at 60 days.

- The **plaque index score** was reduced by **44%** by day 30, and by **37%** at day 60.
- The **gingival index score** was reduced by **42%** by day 30, and by **35%** at day 60.
- The **sulcular bleeding index score** was reduced by **53%** at day 30, and by **51%** at day 60.
- The **probing pocket depth** decreased by **20%** by day 30, and by **22%** at day 60.

This study demonstrated the ability of the **probiotic lozenge** to significantly improve all four of the commonly used assessments of periodontal health. *S. salivarius* BLIS M18's ability to colonize the oral cavity contributed to the sustained benefits seen even after the supplementation period ended.

## Further Reduce Tooth Decay and Inflammation

A companion organism has been identified that provides additional oral health support to *S. salivarius* BLIS M18.

This probiotic strain called *Bacillus coagulans* has been shown to competitively inhibit the growth of *Streptococcus mutans*, a bacterium that contributes to tooth decay.<sup>45</sup>

A patented strain of this organism, **GBI-30, 6086** (GanedenBC30®) helps increase the body's natural resistance to pathogenic organisms by boosting the immune system and reducing production of inflammatory cytokines that promote the inflammatory response.<sup>46</sup>

## Summary

Poor oral health is widespread among maturing individuals, with the highest rates of gum disease prevailing among older adults. Gum disease leads to tooth loss and expenses related to dental work and dentures.

Worse than tooth loss, however, are the total body health implications of gum disease. The chronic presence of inflamed tissue contributes to the chronic, low-grade inflammation associated with so many of the disorders we associate with aging, including cancer, cardiovascular, brain, kidney, and bone diseases.

A major factor in the development of tooth and gum disease is an imbalance in the normal oral **microbial** community of the mouth, in which disease-causing organisms predominate and sideline those that contribute to good health.

By rebalancing the oral microbial community with *S. salivarius* strain BLIS M18, individuals can turn the tables on the pathogens in the mouth, marginalizing them and allowing healthy organisms to predominate. This natural probiotic strain produces powerful **lantibiotics**, which are germ-killing molecules that act locally within the mouth to suppress more harmful germs.

Studies show that regular supplementation with *S. salivarius* BLIS M18 can improve multiple measures of gum health and reduce inflammation in the oral cavity. Further inflammation control is provided by addition of beneficial *Bacillus coagulans* another probiotic strain that inhibits the germs that cause dental caries and helps to reduce the inflammatory response. ●

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

### Suggested Usage

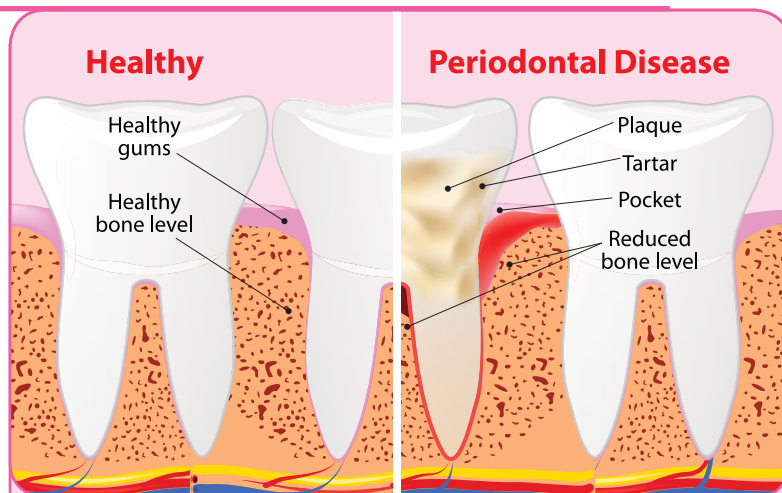
To emulate the successful clinical findings described in this article, make an appointment with your dentist for a thorough cleaning and scraping of your teeth to remove plaque and tartar. This will help reduce colonies of dangerous bacteria your mouth harbors.

Then immediately initiate daily use of a lozenge containing *S. salivarius* and *Bacillus coagulans*.

Based on the clinical study results, some people may only need to use this lozenge every other month.

Those with serious oral health issues should consider using the lozenge continuously at least until clinical and symptomatic improvements in oral health manifest.

The objective is to rebalance the communities of bacteria that live in your mouth, promoting not just improved oral health, but the health of the entire body.



### Healthy and Diseased Teeth and Gums

**Left:** Healthy teeth and gums, with a “bud” of robust, gum tissue rising above a strong, healthy bone. Note the absence of a “pocket” adjacent to the tooth, indicating a strong attachment. **Right:** Teeth and gums in periodontal disease. Note accumulated plaque (a biofilm containing protein and infectious microbes), tartar (hardened plaque), and a periodontal pocket where diseased gum tissue is pulled away from the tooth root. Inflamed gums bleed readily, and their attachment to the tooth root weakens. Still worse, chronic inflammation at the site causes bone resorption, leading to reduced bone level around the tooth root. Studies show that periodontitis leads to diseases associated with aging throughout the body.





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Contains milk.

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IMPROVED FORMULA!

# 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<sup>1</sup> and promoting new brain cell formation.<sup>2</sup>

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.<sup>3-7</sup>
- **PQQ:** This micronutrient has been shown to trigger the growth of **new** mitochondria in aging cells!<sup>8</sup> PQQ also activates genes involved in protecting the delicate structures within the mitochondria.<sup>9-12</sup>
- **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.<sup>13-17</sup>
- **BENFOTIAMINE:** Benfotiamine blocks multiple destructive biochemical pathways, including AGEs' formation pathway,<sup>18-22</sup> which is induced by higher than desirable blood glucose levels.<sup>23</sup> Benfotiamine can activate glucose metabolism and promote already healthy blood glucose levels. In addition, benfotiamine exhibits direct antioxidative capacity and supports DNA function.<sup>24</sup>
- **PYRIDOXAL 5'-PHOSPHATE:** Aging results in the formation of **advanced glycation end products** throughout the body. **Pyridoxal 5'-phosphate** is the active form of vitamin B6 that has been shown to protect against both lipid and protein **glycation** reactions.<sup>25-28</sup>
- **R-LIPOIC ACID:** Destructive free radical activity in the **mitochondria** plays a major role in the loss of cellular vitality. A microencapsulated Bio-Enhanced® R-lipoic acid facilitates youthful **mitochondrial energy output** while guarding against **free radicals**.<sup>29-33</sup>
- **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.<sup>1</sup>

### Mitochondrial Energy Optimizer with BioPQQ®

Item #01868 • 120 capsules

	Retail Price	Super Sale Price
1 bottle	\$72	<b>\$48.60</b>
4 bottles		<b>\$43.20 each</b>



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

Carnosine	1,000 mg
L-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

### Non-GMO

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

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# MAINTAIN YOUTHFUL MITOCHONDRIA FUNCTION



## The Most Effective Form of CoQ10

### CoQ10 Energizes Aging Cells by Enhancing Mitochondria Activity

Published studies on CoQ10 absorption clearly show that **ubiquinol** CoQ10 is superior to the conventional ubiquinone form. In middle-age mice, **ubiquinol** proved **40%** more effective in slowing measurements of aging compared to ubiquinone.<sup>1</sup>

A 2014 study further validates that **ubiquinol** activates mitochondrial functions to slow aging in mouse models.<sup>2</sup>

**Life Extension®** goes one step further and adds **shilajit** to its ubiquinol formula in a product called **Super Ubiquinol CoQ10**. Shilajit has been shown to promote mitochondrial metabolism, helping mitochondria convert fats and sugars into ATP—the main source of cellular energy.<sup>3-8</sup> When combined with **ubiquinol**, it has been shown to **double** levels of CoQ10 in the mitochondria.<sup>9</sup>

The latest studies reveal that when **shilajit** is combined with CoQ10, cellular energy substantially increases. Combining the two ingredients produced a **56%** increase in energy production in the brain—**40%** more than CoQ10 alone! In the muscles, there was a **144%** increase!<sup>10</sup>

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PrimaVie® is a registered trademark of Natreon, Inc.

Life Extension® combines these two energy-activating ingredients in an exclusive **ubiquinol-shilajit** formulation available in three different potencies:

#### Super Ubiquinol CoQ10

Item #01425 • 100 50 mg softgels  
Non-GMO

	Retail Price	Super Sale Price
1 bottle	\$58	<b>\$39.15</b>
4 bottles		<b>\$31.05 each</b>
10 bottles		<b>\$28.35 each</b>



Item #01426 • 60 100 mg softgels

Non-GMO

	Retail Price	Super Sale Price
1 bottle	\$62	<b>\$41.85</b>
4 bottles		<b>\$35.10 each</b>
10 bottles		<b>\$32.40 each</b>



Item #01431 • 30 200 mg softgels

Non-GMO

	Retail Price	Super Sale Price
1 bottle	\$62	<b>\$41.85</b>
4 bottles		<b>\$35.10 each</b>
10 bottles		<b>\$32.40 each</b>



To order **Super Ubiquinol CoQ10**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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STOP ACCELERATED AGING!

# **STOP ACCELERATED AGING!**

**The Importance  
of Rebuilding  
the Immune System**





A major factor underlying **accelerated aging** is a phenomenon known as **immune senescence**.

This marked decline in **immune function** strikes as we age past **60 years** and leaves us vulnerable to a host of opportunistic diseases.

Not only do we lose the ability to defend against cancers and infections, but our failing immune cells create a state of **hyper-inflammation** that destroys neurons, endothelium, and joints.<sup>1,2</sup>

**Life Extension®** is funding research projects aimed at reversing the immune imbalance that causes chronic inflammatory disorders while failing to protect us from common pathogens. Once this research becomes clinically available, it may be possible to restore immune function back to youthful functionality.

The encouraging news is that maturing individuals can initiate steps today to improve immune surveillance while suppressing the degenerative fires of chronic inflammation.

**Immune senescence** makes us vulnerable to all the diseases of aging.

Recognition of this universal disorder has motivated scientists to identify solutions to compromised immune function through innovative pharmaceuticals and gene therapies. The dilemma is that translating these advances into clinical practice is still a few years away.

Fortunately, researchers have identified **three** specific natural compounds that have each been shown to **reverse** a broad spectrum of harmful changes that occur in the immune system with advancing age.

These three compounds are extracts of **Pu-erh tea**, **Cistanche**, and **Reishi mushrooms**.

Each of these natural compounds has a millenniums-old history in traditional Asian medical systems, and is prized for their properties of improving quality of life and health, while promoting longevity. Each one also has its own unique profile of immune system-modulating effects that directly oppose the pathologic components of immune senescence.

Together, these nutrients help put the aging immune system back on a more youthful track, which in turn should help lower the risks for infections, malignancies, autoimmune disorders, and chronic inflammation.

### How Aging Affects the Entire Immune System

Young people have a vigorous and well-regulated immune system that constantly patrols the body in search of potential threats to the healthy functioning of the body.<sup>3</sup>

But as people age, the immune system begins to lose its potency and effectiveness<sup>1,2</sup> in a process called **immune senescence**. This aging in the immune system results in potentially devastating loss of the three main weapon systems against foreign invaders and cancer cells:

1. Reduction of **bone marrow** production of immune system cells,
2. Reduction of the supply and potency of **circulating immune cells**, and
3. Loss of control over the production of the inflammatory and anti-inflammatory **cytokines** that maintain a safe and natural balance between sufficient and excessive inflammation.

As a result of these three changes, older adults become much more vulnerable to genuine threats, such as bacteria, viruses, and cancers, and at the same time are more likely to succumb to autoimmune disorders.<sup>1</sup>

Immune senescence can lead to a constant inflammatory state, in which the immune system is always “on” and often ends up attacking the body. This vicious cycle raises the risk for chronic conditions associated with aging, including arthritis, atherosclerosis, osteoporosis, and cancers.<sup>1</sup>

The good news is that extracts of **Pu-erh tea**, **Reishi mushrooms**, and **Cistanche** can help us fight back against the various factors of immune senescence. As beneficial as each individual component is, they have overlapping immunomodulatory activities that make the sum greater than the parts.

This article examines the immune benefits of each ingredient.

### Pu-erh Tea Extract

**Pu-erh tea** (fermented, ripened leaves of *Camellia sinensis*) was historically prescribed to the emperors of China to provide them with longevity. It is native to the Upper Mekong River region of China’s Yunnan province, a land of rain forests, rushing mountain rivers, and some of the world’s most spectacular scenery.

A major new study shows that **Pu-erh tea extract** contributes to **reversing** multiple components of immune senescence.

The study involved a widely used animal model of human aging, the **senescence-accelerated mouse strain P8**, or SAMP8 mouse.<sup>4</sup> These SAMP8 mice are ideal for this kind of study because they have a shorter life span than normal mice and they demonstrate all of the immunological dysfunction seen in human immune senescence.







For the study, male SAMP8 mice and control mice that had normal aging and life spans were given either oral supplements of Pu-erh tea extract at various doses or a placebo for 28 days.<sup>4</sup> The animals' blood was then tested for various markers of immune dysfunction.

At the beginning of the study, the age-accelerated mice showed all of the features of immune senescence that occur in humans. For example, they had significantly lower bone marrow production of the vital **stem cell antigen-1** (Sca-1), a cell marker that indicates a robust, active production of healthy white blood cells. They also had lower proportions of versatile naïve T cells, natural killer cells, and activated cytotoxic T cells, while memory T cells were higher, as would be expected. In addition, levels of the powerful pro-inflammatory cytokine IL-6 were markedly elevated in the senescence-accelerated mice, compared with controls.

After supplementing with **Pu-erh tea** extract for four weeks using a dose equivalent in humans to **650 mg** per day, all of these features were reversed:

- In **bone marrow**, the proportion of Sca-1 stem cells rose approximately **42%**, suggesting a much broader and faster immune response to challenges.
- In **circulating white blood cells**, the proportion of natural killer (NK) cells rose by an approximate **7%**, while the percentage of versatile naïve T cells had an increase of about **10%**, and the proportion of activated T cells rose close to **9%**. This increase indicates enhanced protection against viral infections and cancers.
- **IL-6 levels**, a pro-inflammatory cytokine, fell by a significant **43%**, reducing the risks associated with high IL-6 and chronic inflammation.

## Rebuilding Immune Defense

- Immune senescence is the gradual fading of all branches of the immune system with aging.
- Age-related changes occur in the **bone marrow**, which stops making as many and as potent immune system cells, in the size and composition of the **circulating immune cell** population, and in the balance of **cytokines** that maintain ample, but not excessive, inflammatory potential.
- As a result, older adults face a devastating array of infections, malignancies, and inflammation-aggravated disorders, all of which are life-shortening and reduce quality of life.
- A group of three natural extracts long used in traditional Asian medical systems, has been identified that provide overlapping coverage to oppose the destructive effects of immune senescence.
- Pu-erh tea extracts stimulate bone marrow activity, enhance the constituents of the circulating immune cells, and lower inflammatory cytokine levels while raising those of anti-inflammatory molecules.
- Reishi mushroom extracts enhance the circulating white blood cell pool and modulate cytokines, while also enhancing antibody-producing cells and stimulating activity of cells that devour bacteria and guide other immune cells to their targets.
- *Cistanche deserticola* extracts stimulate bone marrow and circulating white blood cells, lower inflammatory cytokine levels, and prolong life span in animal models of aging and immune senescence.
- The combination of all three ingredients provides broad-spectrum coverage to support the immune system and help protect against the triple threat of infection, inflammation, and cancer.

## Powerful Anti-Inflammatory Effects in Humans

A **human** study of Pu-erh tea extract further emphasizes its role in reversing **inflammatory cytokine levels**. The study was performed among a group of patients with **metabolic syndrome**, a common condition defined by central obesity, borderline or high fasting glucose, and elevated triglycerides and cholesterol.<sup>5</sup> Those with metabolic syndrome have higher levels of inflammation and are at an increased risk of having low naïve and high memory T cell populations.<sup>6</sup>

Subjects were given either Pu-erh tea extract twice daily or a placebo. They were instructed to exercise and observe a healthy diet during the study period, but were permitted no medicines that might otherwise affect the results.



After three months, patients provided blood samples for analysis of **inflammatory cytokines** and other markers of inflammation.

As expected, placebo recipients showed no significant changes in blood levels of TNF- $\alpha$  or IL-6 (pro-inflammatory cytokine), IL-10 (an anti-inflammatory cytokine), or C-reactive protein (CRP, a marker of total body inflammation).

Subjects supplemented with **Pu-erh tea extract** showed robust improvements in immune status, including a marked reduction in inflammatory markers such as:

- **21% reduction in IL-6,**
- **23% reduction in TNF- $\alpha$ ,**
- **26% reduction in CRP,** indicating significant decreases in their overall inflammatory status, and
- **34% increase of inflammation-quelling IL-10,** further demonstrating the overall reduction in inflammation.

Clearly, Pu-erh tea extract offers multiple benefits to prevent the progress of immune senescence. But, just as a good roof provides multiple, overlapping structures to prevent leaks, good immune system coverage should offer multiple, overlapping mechanisms to ensure that no possible holes are left to allow untimely infections, inflammation, or cancers to progress.

As we will now see, **Reishi** mushrooms provide an ideal complement to **Pu-erh** (pronounced “Poo-air”) tea extract.

### Skyrocketing Death Risks with High Levels of IL-6 and CRP

Elevated IL-6 and/or C-reactive protein is associated with a host of life-threatening conditions as shown in the table below:	BIOMARKERS	
	IL-6	CRP
Increased risk of dying from any cause in people with a mean age of 61 <sup>65</sup>	25%	
Increased risk of dying from any cause in people older than 80 <sup>66</sup>	118%	158%
Increased risk of death following acute heart attack <sup>67</sup>	30%	30%
Increased risk of sudden cardiac death <sup>68</sup>	63%	
Increased risk of dying from any cause in patients with obstructive airway disease <sup>69</sup>	37%	
Increased risk of congestive heart failure following acute heart attack <sup>67</sup>	40%	40%
Increased risk of poor functional outcome after stroke <sup>70</sup>	210%	90%
Increased risk of knee osteoarthritis <sup>71</sup>	174%	
Increased risk of developing the blindness-inducing eye disease age-related macular degeneration (AMD) <sup>72</sup>	78%	118%



## Reishi Mushrooms Teach Cells about Antigens, Antibodies

Reishi mushrooms (*Ganoderma lucidum*) have long been used in traditional Asian medical systems for the prevention and treatment of numerous human diseases.<sup>7</sup> These myriad benefits stem from Reishi's multiple classes of *bioactive molecules*, including polysaccharides, triterpenoids, sterols, and alkaloids. Each of these different components has a slightly different mechanism of action, resulting in very broad-spectrum immune system coverage.<sup>7</sup>

Like Pu-erh tea extract, Reishi extracts resurrect youthful patterns of *circulating white blood cells*, including NK and T cells.<sup>8-10</sup> Reishi also helps *raise* protective *IL-10* levels and *lower* pro-inflammatory *IL-6* levels in animal studies.<sup>11,12</sup>

However, while Reishi lacks the *bone marrow-stimulatory* effects of Pu-erh tea extract, it has other benefits that Pu-erh tea does not, such as stimulating activities of immune circulating cells and stimulating energy production and transfer required by the frenetic metabolic activity of active immune cells.<sup>13</sup>

In addition, Reishi enhances numbers and activities of the *B cells*. These B cells make antibodies and the *macrophage/monocyte* line of cells that engulf and destroy bacterial invaders. B cells also process foreign molecules (antigens), "presenting" them to T and B cells as examples of enemies in need of destruction.<sup>7,9,14-18</sup>

In this way, Reishi exerts subtle but powerful effects that reverse many of the impacts of immune senescence.<sup>1</sup>

## Reishi Protects against Deadly Microorganisms

Based on laboratory and animal studies, there's now evidence that Reishi's cellular and molecular mechanisms directly protect against a deadly array of microorganisms that threaten the health of aging individuals. More human studies need to be done, but based on a number of published studies the potential benefits of Reishi are extremely promising.

- Components in Reishi have been found to block infection with **Herpes simplex** (the virus that causes cold sores and genital herpes) and **Herpes zoster** (the virus responsible for painful **shingles** infections).<sup>19</sup> They accomplish this by activating natural killer cells and stimulating their proliferation, triggering them to label and destroy cells infected with the virus,<sup>19</sup> and by directly binding to the viruses, preventing them from attaching to and penetrating healthy body cells prior to setting up an infection.<sup>20</sup>

- Reishi extracts have been shown to *reduce* the painful effects of the viral outbreak in patients with *postherpetic neuralgia*, an excruciating condition often resistant to standard pain management.<sup>21</sup> As with so many natural therapies, Reishi is most effective against herpes viruses when it is administered *prior* to the outbreak infection.<sup>20,22</sup>
- **Influenza viruses** are also targets of Reishi mushroom extracts, which are rich in trace elements essential for preventing influenza infections and mitigating their severity.<sup>23</sup>
- Reishi extracts potently inhibit the **Epstein-Barr virus**,<sup>24,25</sup> which causes both the relatively mild mononucleosis in young people and also several kinds of aggressive lymphomas in older ones.<sup>26</sup>
- Reishi mushroom extracts are effective against the dangerous **hepatitis B virus** (HBV), a major cause of liver disease worldwide. Studies show that the extracts can inhibit viral replication, reducing the organism's ability to express itself in liver cells.<sup>27,28</sup>
- Finally, Reishi extracts have an important role in combating one of the major scourges of the modern world, the **human immunodeficiency virus** (HIV), which causes the **acquired immune deficiency syndrome** (AIDS). Reishi extracts produce a dramatic drop in the viral "load" (number of active virus particles) in monkeys infected with simian acquired immune deficiency syndrome (SAIDS), a model of human HIV/AIDS disease.<sup>29</sup> Laboratory studies now demonstrate that active compounds from Reishi mushrooms act by inhibiting HIV enzymes called *proteases*, an action *identical* to that of some of the most successful anti-HIV drugs on the market, but with vastly lower toxicity.<sup>30</sup> In this context, Reishi mushrooms have been said to have "*huge potential for HIV drug discovery*."<sup>30</sup>

All of these actions ultimately reflect the importance of Reishi mushroom extracts in reversing immune senescence by strengthening the aging immune system, while at the same time exerting direct destructive effects against some of humanity's most relentless microbial foes.

But the beneficial effects of these remarkable mushrooms go still further, into the complex world of cancers and their interactions with the immune system.



REISHI MUSHROOMS

### Reishi Combats Cancer

Reishi mushroom extracts help prevent cancer before it starts by activating and modulating patrolling T cells and natural killer cells. These are the cells that identify abnormal cancerous tissue and attack it before it has a chance to develop into a full-blown tumor.<sup>31,32</sup> This is primarily the result of interactions of **Reishi polysaccharide molecules** with immune system cells, especially those in the spleen and the thymus, both of which are sources of aggressive cancer-killing cells.<sup>33-35</sup>

In mice bred to carry human cancers, Reishi has been found to inhibit tumor growth and prolong life span by stimulating normal immune function. Importantly, this effect was seen even when the animals were treated *after* tumors had developed.<sup>36</sup>

A similar extract of Reishi polysaccharides was found to markedly increase the ability of immune system cells to proliferate, engulf, and destroy tumor cells in mice bearing a variety of human cancers.<sup>34</sup> In addition, Reishi polysaccharides have been found to inhibit the adhesion of the “coating” protein, *fibrinogen*, to cancer cells, thereby stripping malignant cells of the protection naturally afforded by fibrinogen, and making the cells directly accessible to NK cells that destroy them.<sup>37</sup>

With all of this evidence in hand, it is easy to see why Reishi mushroom extract makes an ideal companion to **Pu-erh tea extract** in providing broad-spectrum protection aimed at preventing and reversing immune senescence and its infectious and malignant consequences.

But there's one additional compound called *Cistanche* that adds still another layer of immune system-potentiating proprieties.

### Cistanche Enhances Immune Responses

*Cistanche deserticola* is a resilient desert plant commonly used in traditional Chinese medicine to enhance longevity and treat many different health problems.<sup>38</sup> *Cistanche* extracts have been found to combat immune senescence by enhancing healthy immune responses while suppressing deleterious inflammatory ones.

Its extracts reduce **inflammatory changes** in animal models of intestinal inflammation, while also boosting the numbers of **circulating white blood cells** such as macrophages (“eating cells”) and NK cells, particularly in the spleen, in ways that Pu-erh tea extracts do not, though this activity does overlap constructively with that of Reishi.<sup>38,39</sup>

*Cistanche* supplementation in animals also increases numbers of versatile **naïve T cells**, and reduces numbers of inflexible, committed memory T cells, while lowering **pro-inflammatory IL-6** levels in blood.<sup>39</sup> *Cistanche* stimulates **bone marrow production** of white blood cells, an effect found in Pu-erh tea extract, but lacking in Reishi.<sup>39</sup>



CISTANCHE



*Cistanche's* anti-inflammatory effects deserve some additional notice, given the importance of inflammation in most age-related diseases. Increased inflammation itself is a clear-cut consequence of immune senescence, as the body's immune regulatory systems begin to fail, releasing pro-inflammatory processes from their normal, youthful levels of control.

In animal studies, supplementation with *Cistanche* extracts reduces the inflammatory overgrowth in the intestines of cancer-prone mice (these animals, like humans, develop increased intestinal inflammation prior to development of cancers).<sup>38,40</sup> And *Cistanche* components known as **phenylethanoid glycosides** have been credited with multiple anti-inflammatory actions through their impact on a host of inflammatory molecular processes.<sup>41,42</sup>

These unusual molecules have been shown to have the following anti-inflammatory actions:

- Inhibition of pro-inflammatory signaling.<sup>42</sup>
- Reduced production of inflammatory cytokines including TNF- $\alpha$  and IL-4.<sup>43</sup>
- Reduced allergic responses related to decreased production of histamine and other contributors to allergy, which is in essence an inflammatory overreaction of the immune system.<sup>43,44</sup>

### ***Cistanche* Increases Life Span**

The combination of *Cistanche's* ability to enhance healthy immune responses while suppressing deleterious inflammatory ones has been credited with extending life span in mouse models of aging.<sup>39</sup> Here are the intriguing details.

A group of Chinese researchers used a special strain of laboratory mice bred to age faster than normal mice (the same SAMP8 mice mentioned earlier), to study the effects of *Cistanche* supplementation on life span.<sup>39</sup> The accelerated aging of these animals produces accelerated immune senescence as well.<sup>39</sup>

The first finding in this study was significant reductions in the supplemented animals' "memory T cells," which are immune system cells that can only respond to one kind of threat that they have experienced in the past.<sup>39</sup> An increased proportion of senile memory T cells is a classic feature of immune senescence because these cells have lost their flexibility to respond to new threats.

At the same time, *Cistanche*-supplemented mice had increased numbers of so-called "**naïve T cells**," which are immune cells that have *not* yet encountered any threat, and are therefore capable of rapid responses to any **new** abnormal cell, such as an infecting organism or a potentially cancerous cell.



### **What Makes Pu-erh Tea Extract Unique?**

Pu-erh tea extract fights against immune senescence by stimulating bone marrow activity, enhancing the constituents of circulating immune cells, and lowering inflammatory cytokine levels while raising those of anti-inflammatory molecules.

How does it do it?

Its unique quality and benefits can be distinguished from other types of tea by the degree of fermentation that each undergoes.<sup>46-48</sup>

- Green and white teas are made from dried but **unfermented** leaves of *Camellia sinensis*, the tea plant.
- Oolong tea is **partially fermented**.
- Black tea is **fully fermented**, but then used without further post-fermentation activity.
- Pu-erh tea is different from these other teas because it is a "**post-fermented**," or "**ripened**" tea. It is allowed to undergo a natural microbial fermentation process under controlled conditions, which enhances the availability of beneficial bioactive molecules.<sup>47,49</sup>

Extracts from Pu-erh tea are rich in polyphenols and other bioactive molecules that develop during the unique post-fermentation process, including a unique group of phenolic compounds known as **theabrownins**.<sup>46,48,50-52</sup> In comparison with green and black teas, Pu-erh tea is also especially rich in the polyphenol **gallic acid**, a product of the fermentation process by which epigallocatechin gallate (EGCG), an active component in green tea, is broken down.<sup>53</sup>

These unique features make Pu-erh tea especially beneficial in supporting a strong, healthy immune system.

*Cistanche*-supplemented mice also had increased numbers of natural killer (NK) cells, which respond to T cell signals and apply the death blow to the new invader.

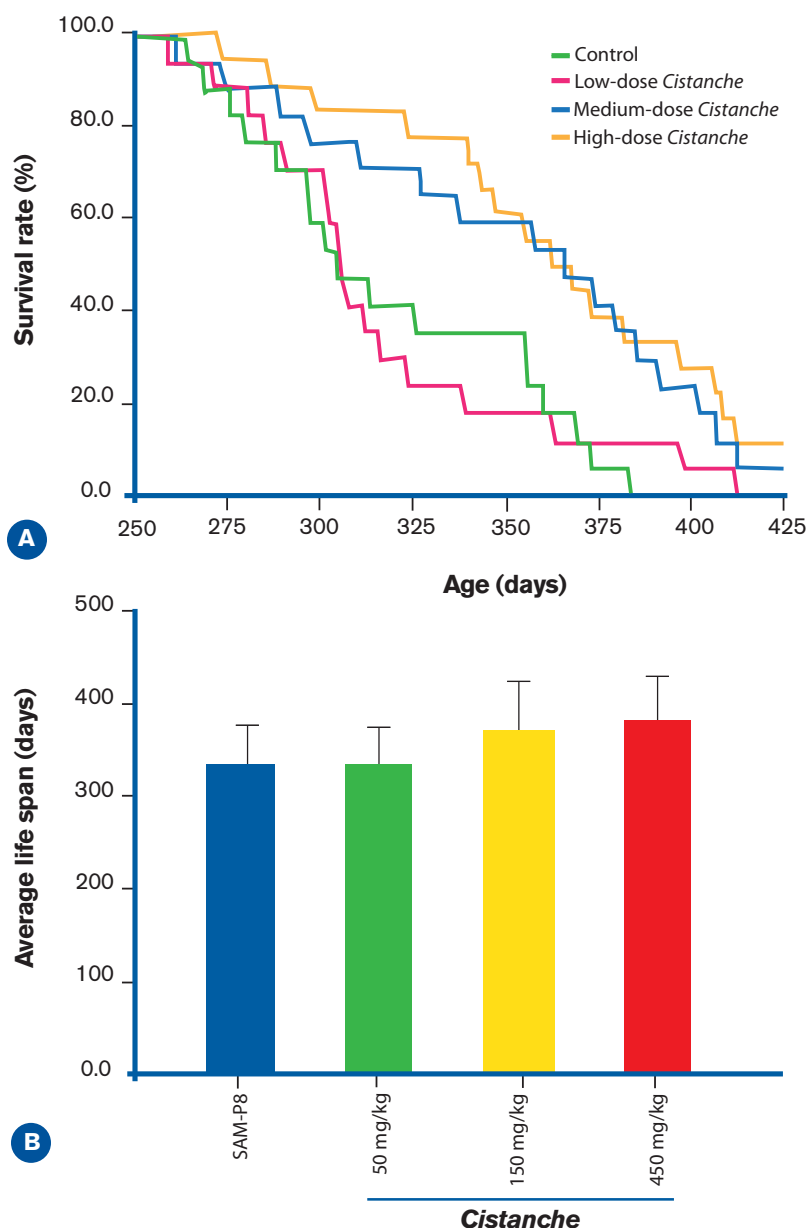
One of the most exciting feature of this study is the impact of *Cistanche* supplementation, and the reversal of immune senescence, on the animals' life spans.

In this study, while control mice lived on average about 325 days, mice supplemented with *Cistanche* lived to an average of about 375 days.<sup>39</sup> That's a **15.4%** increase in life span!<sup>39</sup> (See Figure 1) If this increase were applied to the human life span, the average

American female's life expectancy would jump from 81 to more than 93 years, while that of the average American male would jump from 76 to 88 years.<sup>39,45</sup>

Read the preceding paragraphs again carefully, and you'll discern the emergence of a new paradigm for fighting aging. In addition to focusing on preventing or repairing heart disease, Alzheimer's disease, stroke, cancer, and other disease processes that shorten life span, an overall improvement in the **immune function** seems capable of promoting longevity all by itself!

**FIGURE 1: Life Span Extension in Mice Supplemented with *Cistanche*.<sup>39</sup>**



**A)** *Cistanche* increased survival of age-accelerated mice. Control mice (green line) were all dead by about 382 days, and low-dose (pink) *Cistanche* mice had all died by about 413 days. About **5%** of mice supplemented with medium (blue) and about **10%** of mice supplemented with high (gold) doses of *Cistanche* were still alive by the end of the study, at 425 days.

**B)** *Cistanche* increased average life span of mice. Control age-accelerated mice (blue) lived on average about 325 days, as did mice supplemented with low-dose *Cistanche* (green). Mice supplemented with medium (yellow) and high (red) doses of *Cistanche*, however, had longer life spans compared with control mice, at about 350 and 375 days, respectively.<sup>39</sup>



## Summary

**Immune senescence** is a consequence of normal aging. It is a major cause of the ill effects associated with growing older.

Immune senescence is accompanied by the devastating loss of three main weapons systems against foreign invaders and cancer cells including:

1. **Bone marrow** production of immune system cells.
2. Potency of **circulating immune cells**.
3. Control over **signals** that maintain a youthful balance between sufficient and excessive inflammation.

The cumulative impact of **immune senescence** is seen in the high rates of infections and cancers, the poor response to vaccines, and the chronic inflammatory state that predominates among older adults who might otherwise be in excellent health.



It's now possible to fight back against immune senescence with help from three natural ingredients. Extracts of **Pu-erh** tea, **Reishi** mushrooms, and **Cistanche** have demonstrated their own suite of immune senescence-fighting properties that help restore more youthful immune function.

Maturing individuals face health threats posed by immune senescence. Major breakthroughs may be around the corner, but taking steps now to rebuild aging immune systems is a critical component of a science-based longevity program. ●

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 continue on page 45.)

## Overlapping Immunomodulatory Activities of Three Natural Extracts

Extract	Stimulates Bone Marrow	Stimulates Circulating White Blood Cells	Lowers IL-6 Levels	Boosts IL-10 Levels	Enhances Antibody Production	Stimulates Macrophage-Monocyte Cells
Pu-erh Tea	X	X	X	X		
Reishi Mushrooms		X	X	X	X	X
Cistanche	X	X	X			

## Three Immune System Weapons

The following is a more detailed look at the three aspects of the immune system that are positively impacted by Pu-erh tea, Reishi, and *Cistanche* extracts. Scientists have now identified many of the specific problems that occur during immune senescence. These problems arise in all three of the immune weapons systems.<sup>1,2</sup>

### Bone Marrow

**Bone marrow** is where circulating white blood cells are made, along with red cells that carry oxygen and platelets that stop bleeding.<sup>54</sup> All bone marrow-derived cells originate from a common predecessor, the blood-forming **stem cells** that differentiate into a wide variety of circulating white blood cells, with a bewildering array of names and functions.

Immune senescence causes a reduction in bone marrow stem cell activity, leaving us with reduced numbers of all the circulating cell lines. Scientists use a cell marker called **Sca-1** to measure bone marrow activity in animals: The higher the Sca-1 levels, the more vigorously new white blood cells are being produced. In aging bone marrow, levels of Sca-1 cells fall off significantly, resulting in a sharp, age-related reduction in bone marrow-derived white blood cells and their chemical weaponry, and the subsequent age-associated increase in infections and cancers.<sup>55,56</sup> Current animal research has demonstrated valuable stem cell concepts that are relevant to human health and disease.<sup>56</sup>

### Circulating White Blood Cells

**Circulating white blood cells** are the mature, bone marrow-derived cells that recognize and destroy invading or abnormal cells. Among those most directly affected by immune senescence are **natural killer (NK)** cells, which directly attack and destroy infecting organisms and tumor cells,<sup>1,2,57,58</sup> and a variety of **T cells**, which are involved in recognizing new threats, remembering old threats, stimulating direct action against invaders or malignancies, and suppressing the immune response appropriately when the invader has been neutralized.<sup>59</sup> These cells prevent serious infections, keep a constant patrol out for emerging cancers, and boost immunity after a vaccine.

Immune senescence specifically reduces the numbers and function of fresh young NK cells.<sup>1,2,57,58</sup> This is now thought to explain the high rate in older people of many cancers and leukemias, as the malignant cells fly under the impaired NK cells' radar.<sup>1,2,58</sup> In fact, rejuvenation of NK function is being explored as a promising means of preventing the spread of breast cancer.<sup>60</sup>

Similarly, age-related loss of NK function is implicated in the development of viral infections such as influenza, an annual killer of thousands of older adults.<sup>61</sup> Studies show

the importance of energetic NK cell function in producing vigorous responses to influenza and other vaccines.<sup>62</sup>

Immune senescence also reduces the numbers and changes the function of circulating T cells, shifting their population from a youthful one predominated by **naïve T cells** capable of recognizing and responding to new threats, towards an aging one predominated by **memory T cells** that have committed themselves to fighting just one specific type of insurgent.

Such a shift in T cell patterns makes us unnecessarily vulnerable, for example, to each season's new influenza virus or emerging threats like West Nile virus, and at the same time less capable of responding to a host of vaccines.<sup>2,63</sup>

### Inflammatory Cytokines

**Inflammatory cytokines** are signaling molecules that immune systems use to notify their various components of a need for attack, cleaning up an infection, and repair after tissue damage.<sup>64</sup> Among the most prominent and potent inflammatory cytokines is **interleukin-6 (IL-6)**.<sup>59</sup>

In youth, exquisite control systems regulate production of IL-6 and other cytokines to limit their actions only to active trouble sites, shutting down their production once a threat has been neutralized, and boosting production of other cytokines that contribute to resolution of inflammation (e.g., IL-10).<sup>59,64</sup>

But during immune senescence, these systems fail to operate properly, resulting in chronic elevations of IL-6, along with chronic suppression of anti-inflammatory cytokines.<sup>59,64</sup> This state of immune senescence has been aptly referred to as "inflamm-aging."<sup>59,64</sup>

Studies show that people who seem to be undergoing "healthy aging," not succumbing to the inflammatory state, have lower levels of IL-6, and higher levels of anti-inflammatory cytokines, such as IL-10.<sup>59</sup>

Those with higher levels of IL-6 are much more likely to demonstrate **frailty**, which renders some older individuals especially vulnerable to falls, fractures, and infections.<sup>64</sup>

Immune senescence poses a major threat to longevity and quality of life by degrading three major defenses against outside attack or inside malignancies. Loss of bone marrow function, deleterious changes in circulating natural killer and T cells, and sharp increases in IL-6 and other inflammatory cytokines set one up for disability and death from infections, inflammation, and cancer.

Fortunately, breakthroughs in nutritional science now offer means of **reversing immune senescence** by providing a restructuring of the aging immune system's three primary bulwarks: restoring bone marrow function, shifting circulating cell populations back towards a more youthful pattern, and reducing deadly elevations of IL-6.



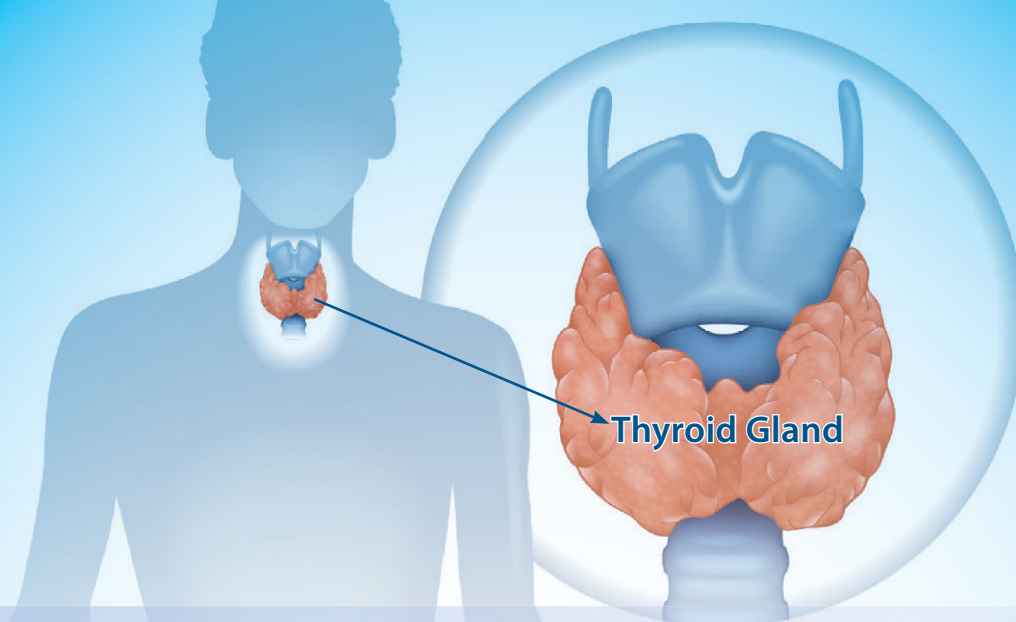
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The following *additional* nutrients are included in **Triple Action Thyroid** to further enhance benefits:

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	Retail Price	Super Sale Price
1 bottle	\$36	<b>\$24.30</b>
4 bottles		<b>\$21.60 each</b>



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The cultivation of Pu-erh tea began over 2,000 years ago and was historically consumed by emperors to provide them with longevity. Pu-erh tea is rich in polyphenols and other bioactive molecules, including theabrownins, a unique group of compounds developed during the post-fermentation process.<sup>3</sup>

Modern science has shown that **Pu-erh tea extract** may support healthy **bone marrow** function, which helps to rebuild the peripheral immune cellular components.<sup>4</sup> An animal study demonstrated that **Pu-erh tea extract** supports immune balance by decreasing interleukin-6 (IL-6) by a remarkable **43%**, as well as increasing natural killer (NK) cells by **7%** and naïve T cells by **10%**.<sup>4</sup>

## Cistanche

**Cistanche** plant extract promotes development of naïve T cells and supports a reduced number of memory T cells, helping to balance the immune response.<sup>5</sup> It also supports NK cell activity—resulting in a **15%** life span increase in animal research.<sup>5</sup> In a human study, a supplement containing standardized **Cistanche** produced improved immune factors, including an **11.7%** increase in NK cell activity and a **20.2%** improvement in the ratio of CD4 to CD8 cells—which is indicative of healthy, youthful immune function.<sup>6</sup>

To order **Immune Senescence Protection Formula™**,  
call **1-800-544-4440** or  
visit **www.LifeExtension.com**



## Reishi Mushroom

Numerous **Reishi** mushroom components help reverse many factors of immune senescence.<sup>7</sup> Reishi extract boosts the function of innate immune cells, the immune system's first line of defense.<sup>7</sup> The unique polysaccharides, triterpenes, and other constituents enhance the body's hematopoietic stem cells,<sup>8</sup> macrophages, and other crucial immune factors<sup>9,10</sup>—broadly supporting immune function and longevity.<sup>11</sup>

Just two vegetarian tablets of the new **Immune Senescence Protection Formula™** provide comprehensive daily immune support.

## Immune Senescence Protection Formula™

Item #02005 • 60 vegetarian tablets

	Retail Price	Super Sale Price
1 bottle	\$40	<b>\$27</b>
4 bottles		<b>\$24.30 each</b>



Non-GMO

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<b>Health Booster</b> • 60 softgels, Item #01989 Just <u>one</u> softgel (formerly called Super Booster) contains a variety of valuable nutrients, including vitamins K1 and K2, blueberry extract, gamma tocopherol, sesame lignans, chlorophyllin, lycopene, and a carotenoid phospholipid blend that contains <i>trans</i> -zeaxanthin, <i>meso</i> -zeaxanthin, and lutein. Taken individually these ingredients would cost <b>2 to 3 times</b> more!	\$52	<b>\$32.40</b> (four-bottle purchase)
<b>FLORASSIST® Probiotic</b> • 30 liquid vegetarian capsules, Item #01825 Dual-encapsulation technology delivers potent doses of the <u>six</u> most important <b>probiotic</b> strains.	\$32	<b>\$18.90</b> (four-bottle purchase)
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<b>MacuGuard® Ocular Support</b> • 60 softgels, Item #01885 Offers triple eye protection with <i>meso</i> -zeaxanthin, lutein, and <i>trans</i> -zeaxanthin. This product is not needed by those already taking Health Booster, which contains these same ingredients.	\$22	<b>\$13.37</b> (four-bottle purchase)

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



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Retail Price

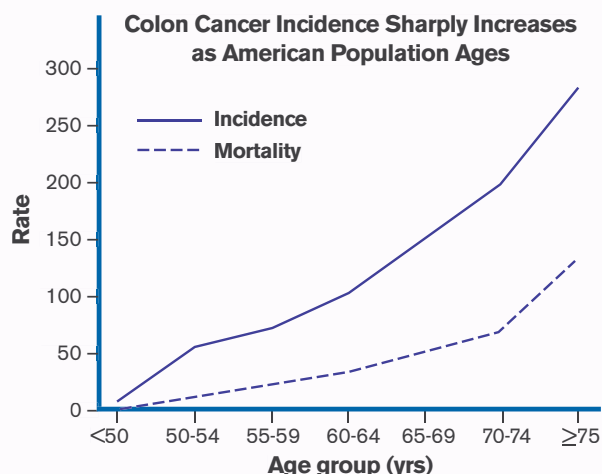
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<b>Mitochondrial Energy Optimizer with BioPQQ</b> ® • 120 capsules, Item #01868 This glycation-protection formula helps maintain healthy cellular function, protein structural integrity, and mitochondrial biogenesis. It now contains taurine, a free amino acid that boosts new brain cell formation in the area of the brain connected to learning and memory. New Lower Price!	\$72	<b>\$43.20</b> (four-bottle purchase)
<b>Mega Green Tea Extract</b> (lightly caffeinated) • 725 mg, 100 vegetarian capsules, Item #00953 A highly concentrated <b>98%</b> polyphenol extract delivering <b>45%</b> of the health-promoting catechin EGCG.	\$30	<b>\$16.20</b> (four-bottle purchase)
<b>Life Extension Mix™</b> • 315 tablets, Item #02055 This upgraded high-potency multi-nutrient formula contains <b>5-methyltetrahydrofolate</b> (5-MTHF), the biologically active form of folate that is up to <b>7 times</b> more bioavailable than folic acid.	\$80	<b>\$46.80</b> (four-bottle purchase) <b>\$39.38</b> (ten-bottle purchase)
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<b>Enhanced Super Digestive Enzymes with Probiotics</b> • 60 vegetarian capsules, Item #02022 Contains amylase, protease, lipase, cellulase, and lactase to break down protein, starch and short sugar chains, fat, cellulose, and lactose. It has the added benefit of the probiotic <i>Bacillus coagulans</i> , which creates a coating that resists digestion in the stomach, allowing it to fully colonize in the intestines.	\$28	<b>\$16.20</b> (four-bottle purchase)
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<b>Skin Restoring Phytoceramides</b> • 350 mg, 30 vegetarian capsules, Item #01596 Oral phytoceramides derived from wheat can reach the skin's deepest layers to offset the body's natural decline with age.	\$25	<b>\$15.53</b> (four-bottle purchase)
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<b>FLORASSIST® Oral Hygiene</b> • 30 lozenges, Item #02011 This unique blend of two powerful, oral probiotics— <i>S. salivarius</i> and <i>Bacillus coagulans</i> —inhibits harmful bacteria that develop in your mouth, affecting your teeth, gums, and overall health.	\$20	<b>\$12.15</b> (four-bottle purchase)
<b>Advanced Bio-Curcumin® with Ginger and Tumerones</b> • 30 softgels, Item #01808 Triple-action formula acting on multiple signaling pathways to deliver broad-spectrum protection against inflammation.	\$30	<b>\$18.23</b> (four-bottle purchase)
<b>Neuro-Mag® Magnesium L-Threonate</b> • 90 vegetarian capsules, Item #01603 Optimal form of magnesium to protect synaptic density of neurons.	\$40	<b>\$24.30</b> (four-bottle purchase)

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# What Strikes *TERROR* in the Citadels of the Pharmaceutical Industry



Source: Centers for Disease Control and Prevention (cdc.gov)

Higher vitamin D levels may reduce colon cancer incidence by **50%** according to a meta-analysis.\*

\* Am J Prev Med. 2007 Mar;32(3):210-6.

## PREAMBLE

In response to medical reports that are misinterpreted by the media, **Life Extension**® has historically issued point-by-point rebuttals when the study's methodologies/analyses are scientifically flawed and/or the findings blatantly false.

In response to sensationalized headlines appearing earlier this year about a flawed **vitamin D** study, **Life Extension** reached out to a medical doctor who has been fighting the establishment almost as long as we have.

Before you read Dr. Dean's detailed rebuttal to this study published by the **American Medical Association**, it's important for you to know **why** these kinds of reports garner so much media attention.

In pharmaceutical corporate boardrooms, charts are routinely presented showing how many people are projected to contract a terrible disease. Data about the potential benefits of a patented drug follows the chart projection. Then a financial calculation is done to show how much money will be made if the pharmaceutical company pushes this drug through the FDA's arduous approval process.

An uncertainty has arisen regarding the lucrative financial projections coveted by drug companies. What if the chart showing growing numbers of aging Americans contracting a degenerative disease goes the other way...in other words declines? This destroys the profit expectation and incentive to spend hundreds of millions if not billions on new drug candidates.

The greatest threat to the profitability of Big Pharma may be **vitamin D**. This vitamin costs virtually nothing and has an incredible amount of data showing its ability to decimate the financial projections of drug companies who look forward to lots of aging Americans being diagnosed with some form of cancer every year. (Refer to chart on this page.)

Drug company ads dominate media advertising the way tobacco ads did in the 1950s through 1960s. It is in the economic interests of Big Pharma for the media to air headlines warning Americans to avoid **vitamin D** (and other supplements). The more people who believe these flawed reports, the more money the pharmaceutical industry makes.

As you will read, not only is this analysis attacking vitamin D without scientific merit, but newly published data reveals **vitamin D** to be even more effective in **preventing death** and disability than previously known. Drug companies would prefer that you not read these reports on vitamin D.



## REBUTTAL TO JAMA INTERNAL MEDICINE REPORT:



Ward Dean, MD

## “Vitamin D Ineffective for Hypertension”

On March 15, 2015, the journal *JAMA Internal Medicine* published a systematic review and meta-analysis titled “**Effect of Vitamin D Supplementation on Blood Pressure.**”<sup>1</sup>

The authors of the article stated that their purpose was to conduct a systematic review of clinical trials to evaluate whether vitamin D supplementation reduces blood pressure compared to placebo. In their meta-analysis, they included studies that reported *any* baseline 25-hydroxyvitamin D blood levels, *any* blood pressure levels, studies that lasted as little as four weeks, and which involved supplementation with a variety of forms of vitamin D, including vitamin D2, vitamin D3, calcitriol (1,25-hydroxyvitamin D3), and 1-alpha-hydroxylated versions of vitamin D (paricalcitol and doxercalciferol). The primary results the authors were looking for were changes in office-measured systolic or diastolic blood pressure readings.

The meta-analysis included 46 trials involving a total of 4,541 participants. After analyzing participant data, the authors proclaimed, “**Vitamin D supplementation is ineffective as an agent for lowering blood pressure, and thus should not be used as an antihypertensive agent.**”

Two days later, on March 17<sup>th</sup>, **CBS News** jumped on the bandwagon and trumpeted, “Vitamin D useless for lowering blood pressure.”<sup>2</sup> CBS News medical contributor Dr. David Angus stated that although vitamin D was “the second most prescribed or taken vitamin in the country, there is no benefit that anybody derives... it doesn’t work in anybody,” and cautioned that “it may cause significant harm.” Dr. Angus went on to allege that “too much vitamin D in the blood can be harmful, causing nausea, constipation, and even damage to the kidneys.”

I was surprised at the conclusions reached by the *JAMA Internal Medicine* article, and even more dismayed by the off-the-wall “analysis” by CBS News. I knew of the multiple benefits of higher doses and increased blood levels of vitamin D, as well as the dangers to health of *low* levels,<sup>3,4</sup> and that lower blood levels of vitamin D are associated with higher blood pressure levels in cross-sectional studies,<sup>5,6</sup> and with increased rates of hypertension.<sup>7,8</sup>

Nevertheless, the above-cited meta-analysis on the surface sounded pretty definitive—followed by the drubbing from the CBS News medical commentator. A rational person would assume that the studies involved in the meta-analysis were studies of hypertensive patients who had deficient or low levels of vitamin D, and who were treated with therapeutic doses of vitamin D or placebo for an adequate period of time.

However, when I examined the individual studies that comprised the meta-analysis, a different picture emerged. Very few of the studies met these presumptive criteria. What I found was a mishmash of studies that used varying doses of vitamin D, ranging from **30 IU** to **7,000 IU** per day (including several studies which used doses as high as **300,000 IU**, given as a single injectable dose administered to subjects who were, for the most part, neither hypertensive nor deficient in vitamin D).

Like many long-time readers of *Life Extension*®, I believe that an optimal blood level of vitamin D should be higher than **50 ng/mL**, and for most people to attain this level, it is necessary to consume between **5,000** to **10,000 IU** per day.

Vitamin D blood levels were considered by the “meta-analyzers” to be “deficient” if less than **10 ng/mL**, “insufficient” (**10-20 ng/mL**), and “adequate” (greater than **20 ng/mL**). In contrast, *Life Extension*®’s recommended optimal blood level for vitamin D is **2.5 times** higher than the blood level considered adequate by the meta-analysis authors.

### Study Design and Details

The analysis included 46 studies. Of these, only 16 of the studies included participants who had mean systolic blood pressure greater than **140 mmHg** (1,361 subjects), while 30 of the studies’ participants had mean systolic blood pressure less than **140 mmHg** (3,180 subjects). Thus, nearly **75%** of the participants in the study were *not* hypertensive. It is not surprising that vitamin D in *any* amount had little or no effect on those with *normal* blood pressure—in fact, it is reassuring that vitamin D does not further lower blood pressure in *normotensives*. A potential problem with most antihypertensive drugs is that too high a dose can

cause dangerously low blood pressure—whether one is hypertensive or not. Correcting a nutritional deficiency should not be expected to lower *normal* blood pressure.

### Inappropriate Study Selection

It became increasingly clear that the problem with this meta-analysis was the selection of the studies on which the analysis was based. Few of the studies directly addressed the key question the meta-analysis was designed to answer: i.e., does supplemental vitamin D have a positive effect on hypertensive subjects with low levels of vitamin D? Few of the studies specifically included hypertensive subjects or subjects who suffered from vitamin D deficiency (or insufficiency). In fact, many of the studies included only “healthy” subjects, and several specifically excluded those who were hypertensive. In addition, there was no standard form of vitamin D or range of vitamin D used.

As mentioned previously, forms of vitamin D included vitamin D2 (ergocalciferol), vitamin D3 (cholecalciferol), calcitriol (1,25-hydroxyvitamin D3), paricalcitol, and doxerocalciferol. Length of the studies varied from as short as four weeks to as long as 18 months. Most significant was the fact that only a few of the studies actually used blood pressure as a major end-point of the study. Most were primarily concerned with other parameters, and considered blood pressure as a secondary or incidental event.







## What You Need to Know

### Rebuttal to Study That Declared Vitamin D Ineffective for Hypertension

- *JAMA* published a meta-analysis titled “Effect of Vitamin D Supplementation on Blood Pressure,” and concluded supplementation is ineffective as an agent for lowering blood pressure, and thus should not be used as an antihypertensive agent.
- *CBS News* issued a report agreeing, and their medical contributor went on to say, “there is no benefit that anybody derives [from vitamin D]...it doesn’t work in anybody,” and “it may cause significant harm.”
- The problem with this meta-analysis was the selection of the studies on which the analysis was based.
- The meta-analysis was a collection of studies that used varying doses of vitamin D, ranging from **30 IU** to **7,000 IU** per day (including several studies that used monthly doses as high as **300,000 IU**) and was administered to subjects who were, for the most part, neither hypertensive nor deficient in vitamin D. The studies in the analysis also used varying types of vitamin D.
- Studies that were not included in the meta-analysis published by *JAMA* found that vitamin D is a useful adjunct to help normalize blood pressure in vitamin D-deficient hypertensives.

Consequently, the 46 papers that were included in the meta-analysis were a poorly selected mélange of studies investigating a hodge-podge of unrelated physiological phenomena. The only unifying characteristics seemed to be that *some* dose of *some* form of vitamin D was used to evaluate *some* physiological functions that happened to include a measurement of blood pressure.

For example, one of the studies evaluated the effects of small doses of vitamin D3 (**0, 200, 400, or 600 IU**) in *healthy* (i.e., not hypertensive nor D-deficient) young (20-40) and older (over 64) men and women.<sup>9</sup> Not surprisingly, the researchers found *no significant effects of vitamin D on cardiovascular risk factors*. What did they expect from these *normal* volunteers? The researchers conceded: “*Putative effects of vitamin D on cardio-metabolic health will only be evident at higher intakes than the current RDA.*”

Another study involved healthy (not hypertensive) subjects, with vitamin D levels that were either normal or not checked. Subjects in this study were given **200,000 IU** of vitamin D3 per month for two months, followed by **100,000 IU** per month for the next sixteen months. Not surprisingly, the authors found that vitamin D supplementation “*had no effect on systolic or diastolic blood pressure in predominantly white, healthy adults without severe vitamin D deficiency.*”<sup>10</sup>

Of all the studies in the meta-analysis, the study that administered the highest dose of vitamin D3 (**300,000 IU** via intramuscular injection) specifically **excluded** subjects with known clinical deficiency of vitamin D.<sup>11</sup>

Another study reported no benefit from vitamin D supplementation in depressed people with low levels of serum vitamin D, to whom **40,000 IU** of vitamin D3 were administered each week for six months. This study specifically **excluded** subjects with hypertension from the trial.<sup>12</sup>

Another shortcoming in many of the trials was the limited length of the trial itself. For example, one study tested the effect of a single oral dose of **100,000 IU** vitamin D3 on patients with *peripheral arterial disease* (PAD), and hoped for positive changes after only *one month*!<sup>13</sup> PAD does not come on overnight—and is not likely to be reversed in one month with a single dose of *anything*.

Another trial studied the effect of high-dose vitamin D3 (**50,000 IU** per week) for six months in patients suffering from *heart failure*.<sup>14</sup> Over **60%** of the subjects were classified as NYHA Class II, which means that the patients had cardiac disease resulting in slight limitation of physical activity, were comfortable at rest, but *ordinary* physical activity resulted in fatigue, palpitation, shortness of breath (dyspnea), or anginal pain. The remaining patients (**36%**) were in Class III, which means that they had *severe* cardiac disease with marked limitation of physical activity. Less-than-ordinary activity caused fatigue, palpitation, dyspnea, or angina. These were all *very sick people*, suffering from a serious chronic disease. Again, it is not surprising that increasing their vitamin D levels—even for six months—did not reverse their condition.



It is obvious that the articles selected for this meta-analysis were all over the map. It was a collection of miscellaneous studies grouped together and “analyzed” to produce what appeared to be a previously determined outcome—i.e., that vitamin D was not an effective treatment for hypertension for *anyone*—even though that premise was not the focus of the majority of studies included in the meta-analysis. This reminded me of the old computer dogma, GIGO—garbage in, garbage out.

### Positive Results Nonetheless

Despite the pattern of inappropriate study selection for this analysis, a number of the studies reported positive results.

In one study, 34 type II diabetics with low serum vitamin D levels (less than **20 ng/mL**), were given **100,000 IU** of vitamin D2 (ergocalciferol) or placebo, and monitored for eight weeks. **Vitamin D2 “significantly decreased systolic blood pressure by 14 mmHg.”**<sup>15</sup>

One of the earliest studies in the meta-analysis used daily doses of **1 mcg** of alfacalcidol (a synthetic vitamin D analog, roughly equivalent to **40 IU** of vitamin D3) in 29 hypocalcemic patients. After six months, the authors reported a **significant reduction of both systolic and diastolic blood pressures**, compared with placebo. They concluded that **a physiologic amount of active vitamin D has hypotensive effects and can be beneficial for patients with high blood pressure.**<sup>16</sup>

In another study by the same team, 33 patients with primary hyperparathyroidism, mild hypercalcemia, and elevated diastolic blood pressure were given **1 mcg** of alfacalcidol or placebo for six months. The scientists

found a significant reduction of diastolic blood pressure, and concluded: **“Vitamin D can lower blood pressure in hypercalcemic patients.”**<sup>17</sup>

In yet another study, 148 women with vitamin D insufficiency (25OHD less than **20 ng/mL**) received daily doses of either **800 IU** vitamin D3 plus **1,200 mg** of calcium or **1,200 mg** of calcium for eight weeks. The results showed that **81%** of the subjects in the vitamin D3 plus calcium group compared with only **47%** in the calcium group showed a **decrease in systolic blood pressure (SBP) of 5 mmHg** or more. The scientists concluded that *“short-term supplementation with vitamin D3 and calcium is more effective in reducing SBP than calcium alone.”*<sup>18</sup>

Paradoxically, the senior author of the meta-analysis (which claimed that vitamin D was ineffective as an antihypertensive agent) authored an earlier paper, in which he demonstrated that single doses of **100,000** or **200,000 IU** of vitamin D3 administered to 39 diabetics with 25OHD levels less than **40 ng/mL** resulted in **significant lowering of systolic blood pressure** after eight weeks, causing him to conclude that *“high-dose vitamin D3 improved systolic blood pressure... in patients with type II diabetes.”*<sup>19</sup>

African-Americans are known to have significantly higher rates of hypertension than whites. Scientists from Brigham and Women’s Hospital, Boston, conducted a double blind study of 283 African Americans, using doses of vitamin D3 as high as **4,000 IU** a day, which resulted in **significantly lowered systolic pressure.**<sup>20</sup>

Scientists from the University of Verona, Verona, Italy, administered **4,000 IU** of vitamin D3 per day to 13 of 23 patients who suffered from chronic heart failure. The patients’ mean age was 74, and all had vitamin D



levels less than **30 ng/mL**. After six months, systolic blood pressure was **lower** in those treated with D3, and ejection fraction was improved.<sup>21</sup>

### Other Studies (Not Included in Meta-Analysis)

In 2009, German scientists investigated the effect of vitamin D (calcitriol—the active form of vitamin D) levels on mortality in a cohort of 510 patients with serious, life-threatening illnesses: **67.7%** with heart failure (two-thirds in end stage), **64.3%** with hypertension, **33.7%** with coronary heart disease, **20.2%** with diabetes, and **17.3%** with renal failure.

Many of these patients had multiple co-morbidities. The scientists assessed vitamin D (calcitriol) status at the beginning of the study, and assigned the patients to the following quintiles: **<16.7 ng/L**, **16.7-25.2 ng/L**, **25.3-33.2 ng/L**, **33.3-43.4 ng/L**, and **>43.4 ng/L**.

No supplementation was provided, although the patients were administered standard medications, and were followed for one year.

Broken down by quintiles, the probability of survival was: **66.7%** in the lowest quintile, **82.2%** in the second quintile, **86.7%** in the third quintile, **88.8%** in the fourth quintile, and **96.1%** in the highest quintile. (See Figure 1.) These survival improvement percentages in those with higher vitamin D blood levels are nothing short of astounding.

Significantly, none of the patients with calcitriol concentrations **>58.5 ng/L** died during follow-up.<sup>22</sup>

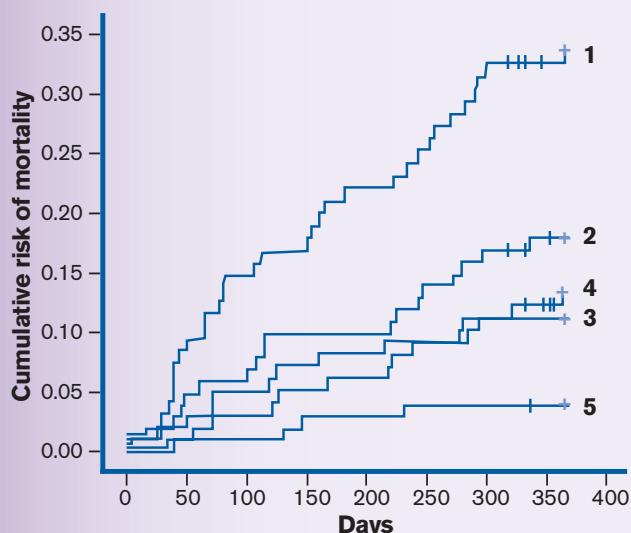


Figure 1. Freedom from one-year mortality according to quintile of circulating calcitriol.<sup>22</sup>

More recently, in 2013, scientists from Johns Hopkins University, Baltimore, MD, examined 10,170 participants using National Health and Nutrition Examination Survey data to estimate hazard ratios (HRs) for all-cause and cardiovascular disease mortality for each 10-unit increase in serum 25OHD. The authors concluded that there is “an inverse association between 25OHD and all-cause and cardiovascular disease mortality in healthy adults with serum 25OHD levels of **≤21 ng/mL**.” Said differently, 25-hydroxyvitamin D blood levels below **21 ng/mL** in this study increased the risk of dropping dead! (See Figure 2)<sup>23</sup>

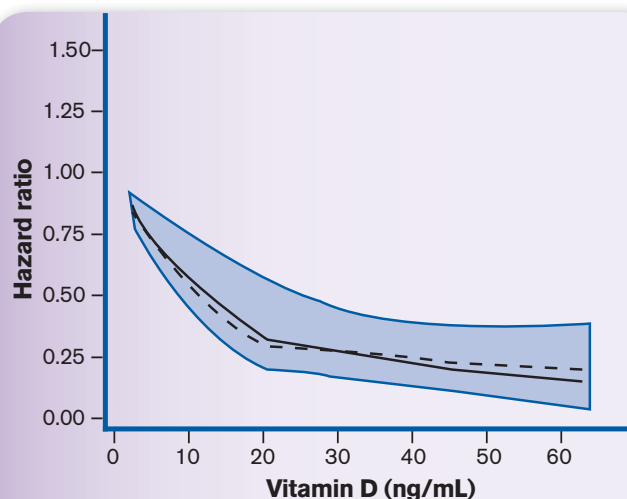


Figure 2. Relationship in the risk of all-cause (solid line) and cardiovascular disease (dotted line) mortality with increasing serum 25OHD levels. Note the steep increased risk in those with 25OHD levels less than **21 ng/mL**.<sup>23</sup>

### Why Interventionist Vitamin D Meta-Analyses Appear to Fail

This pattern of arriving at erroneous conclusions about vitamin D from an analysis of inappropriately selected studies has happened before. For example, a recent paper reported the positive effects of high-dose (**300,000 IU** over eight weeks) vitamin D2 (ergocalciferol) on vascular endothelial function and flow mediated dilation.<sup>24</sup>

The authors conceded that only three other studies had arrived at a similar (positive) conclusion<sup>15,25,26</sup> while the rest failed to find any benefit. The authors explained, “The studies where vitamin D therapy was unable to show improvement often used low-dose vitamin D supplementation...,” and “...vitamin D was supplemented even when the baseline levels [of vitamin D]

were within normal limits.”<sup>24</sup> A third major reason may have been that flow mediated dilation or endothelial function (like blood pressure) was not abnormal.

While reviewing papers in the meta-analysis, I encountered another recently published article that was also *not* included in the meta-analysis. Appearing in the journal *Blood Pressure Monitoring*, it was titled “**The Effect of Vitamin D Supplementation on Blood Pressure in Patients with Elevated Blood Pressure and Vitamin D Deficiency.**”<sup>27</sup> This was exactly the type of study that should have been the *prototype* for the meta-analysis. This was a straightforward double-blind placebo-controlled study of 42 patients with elevated blood pressure who suffered from vitamin D deficiency (defined by authors as serum 25-hydroxyvitamin D levels less than **30 ng/mL**). Half of the subjects were treated with **50,000 IU** vitamin D3 each week for eight weeks, while the other half were given an identical-appearing placebo. Both groups continued their use of conventional antihypertensive medications.

The findings of the study showed a significant reduction in systolic, diastolic, and mean arterial pressure in those in the vitamin D group. Despite improved blood pressure, **42%** of the vitamin D group still had systolic blood pressure in excess of **140 mmHg**, and **68%** had diastolic blood pressure over **90 mmHg**. However, **95%** (i.e., *twice* as many) of those in the **placebo** group (whose blood pressure did *not* change) remained over **140/90**.

This study shows that while vitamin D supplementation reduces blood pressure readings, hypertensives often need additional support to achieve **optimal** readings, which are considered to be in the range of **115/75** for most individuals.



## Summary

Rather than being a meta-analysis of relevant studies of the effect of therapeutic doses of vitamin D or placebo on vitamin D-deficient hypertensive patients, the *JAMA Internal Medicine* article was a selection of unrelated, often irrelevant studies, which *appeared* to indicate that vitamin D had no effect on blood pressure.

However, the authors were often not just comparing apples to oranges—they were comparing apples and oranges to the whole fruit basket!

What the meta-analysis *did* show was that high-dose vitamin D will not lower *normal* blood pressure, nor affect blood pressure of hypertensives with normal serum vitamin D. Furthermore, if one “reads between the lines,” and analyzes the studies that were relevant, it becomes clear that vitamin D appears to be a useful adjunct to help normalize blood pressure in vitamin D-deficient hypertensives. ●

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

**Editor’s Note:** People take **vitamin D** supplements for a variety of reasons including reduced risks of certain **cancers** and suppression of **chronic inflammation**. Published reports over the past 10 years indicate that higher vitamin D levels may help protect against virtually all degenerative diseases.

**Hypertension**, however, has not been a primary reason people supplement with vitamin D as it does not reduce blood pressure enough in most individuals to achieve **optimal** ranges.

Optimal blood pressure readings for most people are about **115/75 mmHg**.

Life Extension’s recommended anti-hypertensive drug is a generic called **telmisartan** taken in the dose of **40 to 120 mg** once daily.\* In addition to lowering blood pressure, **telmisartan** improves markers of **endothelial function** and has demonstrated some impressive **longevity benefits**.

The next article reports on remarkable new studies showing huge improvements in ischemic **stroke outcomes** in those with **higher** vitamin D blood levels.

\* *Drugs*. 2001;61(10):1501-29.



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# Why Isn't Everyone Supplementing *with* VITAMIN D?

Popular **multivitamin** supplements still don't provide enough **vitamin D** to yield optimal health benefits. Most commercial multivitamins contain **400** to **600 IU** of **vitamin D**, a potency that provides little real-world benefit.

With evidence showing reduced mortality in those with **higher** vitamin D blood levels, an urgent need exists to alert the public about the importance of taking the proper **dose** of this low-cost vitamin. Failure to properly supplement contributes to a host of premature illnesses along with increased national health care costs.

Compelling research has demonstrated that vitamin D blood levels in the range of **50** to **80 ng/mL** are associated with reduced mortality and a lower risk of common diseases.<sup>1,2</sup>

A considerable volume of published literature documents a connection of insufficient or deficient **25-hydroxyvitamin D** blood levels<sup>3</sup> with **higher** risks of cancer,<sup>4-6</sup> vascular disease,<sup>7-10</sup> and chronic inflammation.<sup>11-13</sup>

Low vitamin D status has long been associated with loss of **bone density**. This limited view of vitamin D's biological effects is still taught in many medical textbooks, leading some doctors to view vitamin D only for its value in reducing **osteoporosis** risk.

Yet **vitamin D** has clinical applications for a vast array of health conditions. This article reviews some recent findings that reveal an even wider range of protective benefits conferred by this readily available dietary supplement.

## Reduced Mortality in Hospital Patients

Some of the most impressive research discovered on **vitamin D** has been on ICU (intensive care unit) patients. The *New England Journal of Medicine* first reported in **2009** a striking **45%** mortality (death) rate in vitamin D-deficient ICU patients compared to only a **16%** mortality rate in sufficient vitamin D patients. This study showed that vitamin D deficiency results in almost **3-times** more patients dying in the ICU.<sup>14</sup>

Vitamin D deficiency is an all-cause mortality risk factor and since the publication of this study in 2009, there has been even more data released to substantiate this claim.<sup>15-17</sup>

A fascinating study reported in **2015** showed very similar results to the aforementioned study. This study entailing 135 ICU patients revealed a **32.2%** risk of mortality when vitamin D levels were below **12 ng/mL** compared to a **13.2%** risk of mortality if levels were greater. This finding shows that vitamin D deficient patients die at a **2.4-fold** greater rate.<sup>18</sup>

Not all studies of seriously ill patients in the intensive care units (ICU) show lifesaving effects of vitamin D. Giving ICU patients large doses of vitamin D has not consistently reversed their life-threatening conditions.<sup>19</sup> This indicates that to benefit from the life-protective effects of vitamin D, higher blood levels should be maintained on a constant basis. Overall, patients armed with higher levels of vitamin D *before* they enter ICU show better clinical outcomes than those who do not.<sup>20-22</sup>

## Post Stroke Functional Outcome

**Stroke** is the leading cause of serious **long-term disability**. An estimated **6.8 million** Americans (**2.8%** of the entire adult population) are living after having had a stroke.<sup>23,24</sup>

When a stroke occurs, **40%** of its victims experience moderate to severe debilitation requiring special care, and **15%** die shortly thereafter.<sup>25</sup>

Vitamin D deficiency is pervasive among stroke victims, and those with the lowest levels of vitamin D have been shown to have the poorest functional outcomes. In fact, a recent study showed that for each **10 ng/mL decrement** in vitamin D, the odds of a poor 90-day post stroke functional outcome doubled.<sup>26,27</sup>

To put this in perspective, those who don't supplement with high doses of vitamin D typically have **25-hydroxyvitamin D** levels under **20 ng/mL**. Those who properly supplement should strive to obtain levels of 25-hydroxyvitamin D over **50 ng/mL**. Based on this study's findings, people with these *higher* vitamin D levels would be far more likely to avoid permanent institutional confinement if they suffered an ischemic stroke.

Another recent study involving 818 stroke patients showed very similar results. Those with an adequate vitamin D level of **30 ng/mL** or above showed a **90%** better improvement in functional outcomes compared to those who were severely deficient (**<10 ng/mL**).<sup>28</sup>

Experts believe that in order to prevent many of the age-related diseases, people should maintain a vitamin D blood level between **50 to 80 ng/mL**.<sup>1,2</sup>





These stroke studies are showing robust improvement in functional outcome with just a **sufficient** vitamin D blood level. Based on the number of studies showing vascular protective benefits of vitamin D, those who maintain optimal vitamin D levels, along with comprehensive **blood testing** to correct other risk factors, will likely decrease their stroke risk and reduce the odds of permanent disability in the event one of their cerebral arteries becomes occluded (ischemic stroke).<sup>29</sup>

### Support for Diabetics

**Beta cells** are insulin-producing cells in the pancreas. When the beta cells die, people become insulin-dependent diabetics. Without insulin, there is nothing to deliver glucose into cells for energy production. This leads to high circulating glucose blood levels that contribute to a long list of deadly disorders that include heart disease,<sup>30</sup> Alzheimer's,<sup>31</sup> and cancer.<sup>32</sup>

Vitamin D has been documented to prevent high glucose-induced beta cell apoptosis (death). This is because beta cells contain active receptors for vitamin D, just like every other cell in the body.<sup>33-35</sup>

### A Link between Vitamin D and Multiple Sclerosis

It is well known that there are higher rates of vitamin D deficiency in **colder climates** of the world due to the lack of sun. This has caused a greater chance of having an immune system-related illness.

**Multiple sclerosis** (MS) is an autoimmune disease caused when the body's own T lymphocytes, B lymphocytes, and macrophages attack the **myelin sheath** of neurons.<sup>36</sup> Those living in the northern part of the United States are twice as likely to develop multiple sclerosis, and those in Canada have a **5-times** greater risk compared to people residing in the southern US. This geographical data, along with a multitude of studies that explain the mechanisms and causation, has led many researchers to believe that MS is heavily influenced by vitamin D deficiency.<sup>37</sup>

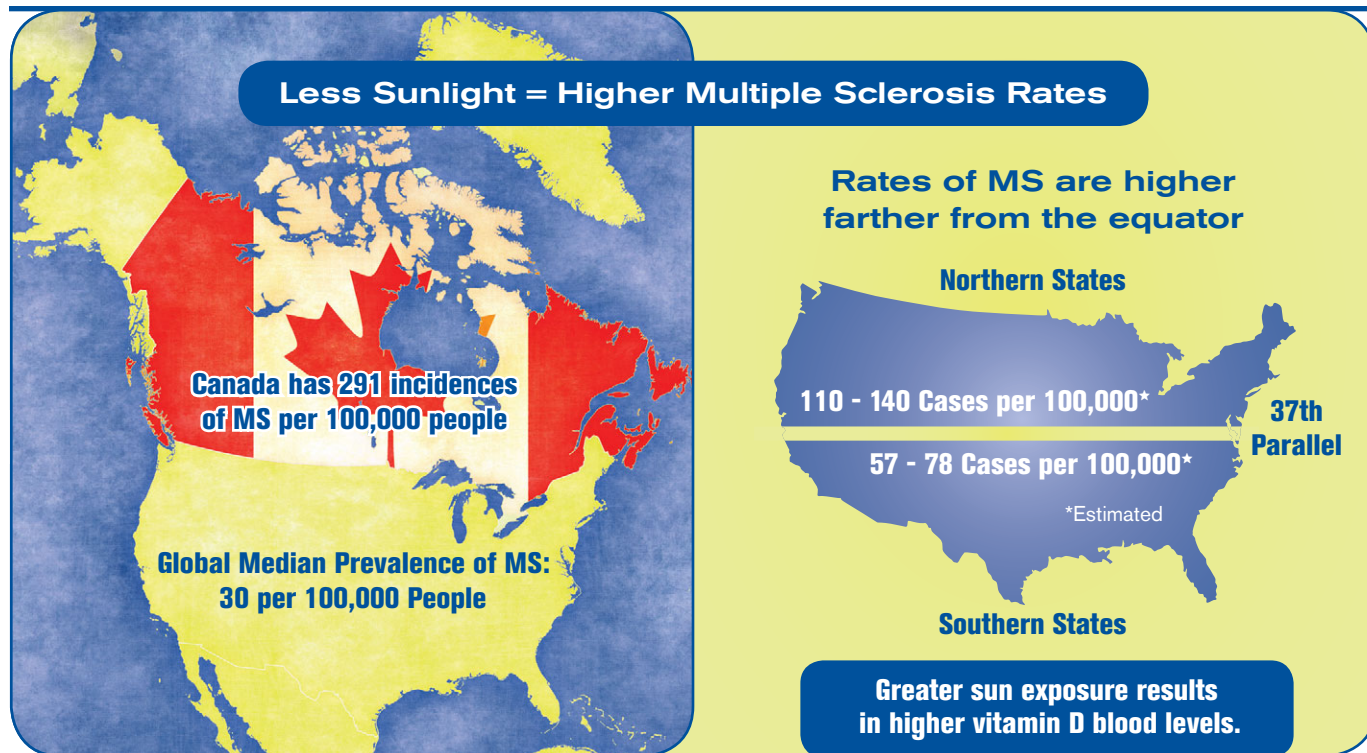
A study published by *PLOS Medicine* identified single nucleotide polymorphisms that were strongly associated with lower **25-hydroxyvitamin D** levels.<sup>38</sup> The researchers studied the odds of MS on those with genetically lower vitamin D levels from the International Multiple Sclerosis Consortium study. Considered the largest genetic association study to date for MS, it included **14,498** subjects with MS and **24,091** healthy controls. The authors concluded that genetically lowered vitamin D levels were strongly associated with an increased risk for MS.<sup>38</sup>



### What You Need to Know

#### Why Supplementing with Vitamin D Is Vital to Good Health

- Most doctors still associate vitamin D with bone loss and osteoporosis, but numerous studies reveal vitamin D blood levels in the range of **50 to 80 ng/mL** are associated with reduced mortality and a lower risk of common diseases.
- Further research documents a connection of insufficient or deficient vitamin D with sharply higher risks of cancer, vascular disease, and chronic inflammation.
- The *New England Journal of Medicine* first reported in 2009 a striking **45%** mortality rate in vitamin D-deficient ICU patients compared to only a **16%** mortality rate in sufficient vitamin D patients.
- Vitamin D deficiency is also linked to stroke. Studies show that those with optimal vitamin D levels decrease their stroke risk and reduce the odds of permanent disability in the event of a stroke.
- Lower vitamin D levels are associated with an increased risk for the autoimmune disease MS, and more than **90%** of people with MS have deficient vitamin D levels. Low levels are also linked with psychiatric disorders, such as ADHD and schizophrenia.



This new data heavily reinforces the statistics and research on vitamin D for MS. Trials show that more than **90%** of people with MS have deficient vitamin D.<sup>39</sup> Deficient is defined at a level below **20 ng/mL**.<sup>3</sup>

Vitamin D can even mediate the direct effects of the immune cells that attack the myelin sheath, a hallmark pathological mechanism of MS. When these **aggressive** immune cells were extracted from MS patients and exposed to vitamin D, their division was slowed. This signifies the imposing control vitamin D can have on autoimmune diseases such as MS.<sup>40</sup>

### Vitamin D Lowers Inflammatory Biomarkers

**Interleukin-6** (IL-6) is an inflammatory cytokine. At high levels, this cytokine has been linked with several types of cancers.<sup>41</sup> Overweight individuals have much higher rates of inflammatory cytokines like interleukin-6.<sup>42</sup>

A compelling study documented marked reductions of interleukin-6 when vitamin D is combined with weight loss. The study involved 218 overweight post-menopausal women who were divided into two groups. Both groups had weight loss interventions, but one group was given **2,000 IU** per day of oral vitamin D3.

Both groups achieved a **5%** to **10%** weight loss, but the group that received the vitamin D supplement showed an impressive **37.3%** reduction in **interleukin-6** levels compared to the placebo which only had a **17.2%** reduction.<sup>43</sup>

### Psychiatric Disorders

Interesting research is showing higher levels of vitamin D play an important role during **pregnancy** for preventing many different psychiatric disorders.<sup>44,45</sup>

The vitamin D receptor **emerges** in the **brain stem** through the **embryonic** development of rats. This indicates and reinforces the idea that vitamin D is important for gestational development.<sup>46,47</sup> Additional studies have shown that vitamin D deficiency in the mother can lead to impaired growth of the fetus.<sup>48</sup>

#### Attention Deficit Hyperactive Disorder (ADHD)

A fascinating study analyzing vitamin D blood levels in **1,650** mothers showed that for each **10 ng/mL** increment in vitamin D levels, their children had **11%** less ADHD-like symptoms.<sup>45</sup>

This type of research has heavily influenced the demand for prenatal vitamins. However, most multivitamins only contain a fraction of the vitamin D that is needed to be therapeutic. The trivial amount of vitamin D in most prenatal vitamins is **not** enough to raise a vitamin D level by **10 ng/mL**.<sup>1,2</sup>

#### Schizophrenia

An imbalance of **dopamine** has been hypothesized to be a cause of schizophrenia.<sup>49</sup> The vitamin D **receptor** emerges in the brain stem at the same time as the peak period of dopamine cell birth in rat embryos.<sup>47</sup>



There has been a high correlation between vitamin D deficiency and schizophrenia.<sup>50,51</sup> The correlation has influenced a study to show if vitamin D deficiency was prevalent in those having an acute episode.<sup>52</sup>

The study subjects were divided into three groups: 40 patients who were reported to be having an acute episode, 41 patients in remission, and 40 healthy controls.<sup>52</sup>

Those who reported to be having an onset of schizophrenic episodes had far lower levels of vitamin D compared to schizophrenics in remission. The healthy controls had the highest levels of vitamin D.

### Ignored Age-Related Panacea

Life Extension® has been writing about the health benefits of vitamin D for many decades. Fortunately, researchers are finally catching up with these findings and devoting resources to discovering and documenting new applications of vitamin D. What might be surprising is that the new research discussed in this article was released just within this last year.

There is an immense archive of literature documenting the health benefits of this single vitamin. Every day, more research findings are being published. In fact, by the time this article is published, there will be even more noteworthy studies released.

Current medical teachings need to be updated to include evidence that vitamin D provides support to not just bone health, but also to reducing all-cause mortality through its system-wide benefits. Vitamin D is the only vitamin that has receptors for it located on every cell. With the cumulative and consistent evidence backing its efficacy, this vitamin should be an essential part of everyone's daily health regimen.

The cost of conventional treatment for age-related diseases is staggering and Medicare is on the hook for a huge unfunded liability.<sup>53</sup>

People today have an unprecedented opportunity to reduce their risk of needing conventional treatment using a low-cost vitamin supplement. The typical dose range is **5,000 to 8,000 IU** of vitamin D3 daily taken with a meal for better absorption.

Annual blood tests can enable one to know if they are taking the proper dose of vitamin D they need to achieve optimal levels of *25-hydroxyvitamin D*.

### Summary

While the use of vitamin D has increased dramatically, levels in common commercial multivitamins (**400 to 600 IUs**) are still far too low to provide real-world benefits.

Extensive research has demonstrated that higher vitamin D blood levels are associated with reduced mortality risk and specific diseases such as diabetes, stroke, and multiple sclerosis, along with other autoimmune diseases and psychological disorders.

Vitamin D dosing in the range of **5,000 to 8,000 IU** each day should be taken with a meal for better absorption. ●

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

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# THE 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.<sup>1-3</sup>
- **AprèsFlex®** supports normal inhibition of 5-lipoxygenase or 5-LOX, an enzyme associated with undesirable cell division changes.<sup>4,5</sup>
- **Stinging and Dwarf nettle root extracts** help support prostate cells against excess estrogen levels.<sup>6,7</sup>
- **Saw Palmetto CO<sub>2</sub> extract** helps inhibit dihydrotestosterone (DHT) activity in the prostate, helps support normal urinary flow, and helps regulate inflammatory reactions in the prostate.<sup>8-11</sup>
- **Pygeum extract** helps suppress prostaglandin production in the prostate and supports healthy urination patterns.<sup>12,13</sup>
- **Pumpkin seed oil**, enhances the composition of free fatty acids and augments saw palmetto's benefits.<sup>14-16</sup>
- **Beta-sitosterol** enhances the protective effects of other botanical extracts and helps improve quality of life.<sup>17-19</sup>
- **Graminex® Flower Pollen Extract™**, has been shown to help relax the smooth muscles of the urethra and help regulate inflammatory reactions.<sup>20-22</sup>
- **Boron** has been shown to slow elevation of prostate-specific antigen (PSA).<sup>23-25</sup>
- **Lycopene** supports efficient cellular communication, helps maintain healthy DNA, regulates hormonal metabolism, and promotes healthy prostate size and structure.<sup>26-32</sup>
- **Phospholipids** enhance absorption of active compounds.

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## Ultra Natural Prostate

Item #01928 • 60 softgels

	Retail Price	Super Sale Price
1 bottle	\$38	\$25.65
4 bottles		\$23.63 each



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

<b>Saw Palmetto CO<sub>2</sub> extract</b> (fruit) [std. to 85% total fatty acids]	<b>320 mg</b>
<b>Graminex® Flower Pollen Extract™</b> (from rye)	<b>252 mg</b>
<b>Stinging and Dwarf nettle extracts</b> (root)	<b>240 mg</b>
<b>Beta-Sitosterol</b>	<b>180 mg</b>
<b>Phospholipids</b>	<b>160 mg</b>
<b>Pygeum extract</b> (bark)	<b>100 mg</b>
<b>Pumpkin oil</b> (seed) [std. to 85% total fatty acids]	<b>200 mg</b>
<b>AprèsFlex® Indian frankincense</b> ( <i>Boswellia serrata</i> ) extract (gum resin) [std. to 20% AKBA*]	<b>70 mg</b>
<b>Proprietary Enterolactone Precursors Blend</b> [HMRlignan™ Norway spruce ( <i>Picea abies</i> ) (knot wood) and flax lignan (seed) extracts]	<b>20.15 mg</b>
<b>Lycopene</b> [from Tomat-O-Red® natural tomato extract (fruit)]	<b>10 mg</b>
<b>Boron</b> (as Albion® bororganic glycine)	<b>3 mg</b>

\* 3-O-acetyl-11-keto-β-boswellic acid

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



Despite a healthy diet and exercise, aging individuals often find themselves under assault from rising **blood sugar** levels due to a multitude of factors such as:

- Excess **gluconeogenesis**, (glucose produced in the liver from protein)<sup>1</sup>
- Rapid conversion of any **starch**—including whole grains—into **glucose**<sup>2</sup>

An all-natural, **multi-pronged** approach has been designed to support the natural balance of key **glucose pathways**!

**Tri Sugar Shield®** is designed to support healthy glucose metabolism in aging individuals within the normal range.

### TRI SUGAR SHIELD® THREE ACTIVE NUTRIENTS

#### Sorghum Extract

Sorghum helps maintain healthy blood sugar levels among those in normal range by:

- Balancing the rate of sugar manufacture in the liver<sup>3</sup>
- Promoting insulin sensitivity<sup>4</sup>
- Regulating *PPAR-gamma*, a metabolic thermostat that controls glucose metabolism<sup>4,5</sup>
- Regulating *alpha-amylase*, which controls the release of sugar from starch<sup>6</sup>

#### Mulberry Leaf Extract

Mulberry leaf extract targets **two** different mechanisms by:

- Supporting glucose transporter *GLUT4* that moves glucose out of the bloodstream and into muscle and liver cells<sup>8</sup>
- Promoting insulin sensitivity<sup>9</sup>

#### Phloridzin

Phloridzin helps maintain healthy blood sugar levels among those in the normal range by:

- Regulating carrier protein *SGLT1*, helping to block absorption of glucose into the bloodstream<sup>10</sup>
- Regulating carrier protein *SGLT2*, in turn supporting glucose elimination via urine<sup>11</sup>

By targeting **all** of these diverse glucose pathways, **Tri Sugar Shield®** delivers **broad-spectrum support** to help naturally stabilize already healthy glucose levels!

# Tri Sugar Shield®

Supports  
Healthy  
Blood Glucose  
Levels



To order  
**Tri Sugar Shield®**, call  
**1-800-544-4440**  
or visit  
**www.LifeExtension.com**

#### Tri Sugar Shield®

Item #01803 • 60 vegetarian capsules

	Retail Price	Super Sale Price
1 bottle	\$36	<b>\$24.30</b>
4 bottles		<b>\$21.60 each</b>

Take **one** capsule twice daily immediately before the heaviest carbohydrate or sugar containing meals/drinks.

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#### Non-GMO

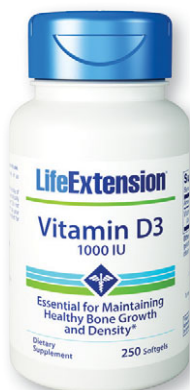
**Caution:** If you are taking blood glucose-lowering medication, consult your health care provider before taking this product.



# D<sub>3</sub>

## HIGHER-POTENCY VITAMIN D<sub>3</sub>

New research on the vital benefits of **vitamin D** emerges on a daily basis. Studies confirm that **optimal** levels of vitamin D are in the range of **50-80 ng/mL** of **25-hydroxy vitamin D**. **Life Extension®** has created a large selection of highly *absorbable* **vitamin D** supplements in softgels to help you to achieve your individual **vitamin D goals**. Keep in mind that you may already be getting **1,000-3,000 IU** of **vitamin D** in your current multi-nutrient formulas.



### Vitamin D<sub>3</sub> • 1,000 IU

250 softgels • Retail: \$12.50

**Super Sale Four bottles: \$7.60 ea.**

For most people, a **1,000 IU** potency is insufficient to attain optimal **vitamin D** blood levels. However, this potency may be suitable for smaller individuals who obtain **2,000-3,000 IU** in their multi-nutrient formulas (and children). **Item # 01751**

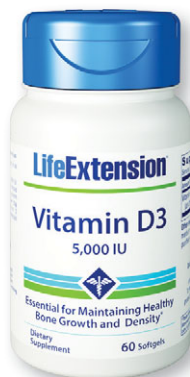


### Vitamin D<sub>3</sub> • 5,000 IU With Sea-Iodine™\*

60 capsules (non-softgel) • Retail: \$14

**Super Sale Four bottles: \$8.44 ea.**

Most people, especially those seeking to reduce their salt intake, do not ingest enough iodine. Combining **5,000 IU** of **vitamin D<sub>3</sub>** with **1,000 mcg** of **iodine** into one capsule makes taking these two nutrients economical and convenient. **Item # 01758**

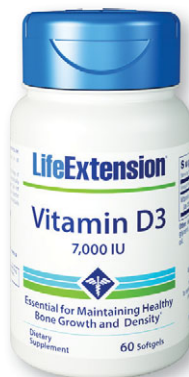


### Vitamin D<sub>3</sub> • 5,000 IU

60 softgels • Retail: \$10

**Super Sale Four bottles: \$5.85 ea.**

For those already obtaining **1,000-3,000 IU** of **vitamin D** in their multi-nutrient formulas, this **5,000 IU** potency is what may be needed to achieve optimal blood levels. **Item # 01713**



### Vitamin D<sub>3</sub> • 7,000 IU

60 softgels • Retail: \$14

**Super Sale Four bottles: \$8.51 ea.**

Some people (such as those weighing more than 180 pounds) may require even more **vitamin D**. When combined with **1,000-3,000 IU** taken in a multi-nutrient formula, this **7,000 IU** softgel should enable these individuals to attain blood levels above **50 ng/mL**. **Item # 01718**



### Vitamin D<sub>3</sub> Liquid • 2,000 IU (Natural Mint Flavor)

1 ounce • Retail: \$28

**Super Sale Four bottles: \$16.88 ea.**

Great for travel and for those individuals who have difficulty absorbing enough vitamin D<sub>3</sub> from softgels, this liquid vitamin D is ideal. **Item # 01732**

Also available without mint. (Item # 00864)

**To order any of these high-potency vitamin D<sub>3</sub> supplements, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)**

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

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





# Innovative FIBER Improves METABOLIC HEALTH

**After-meal** elevations in blood sugar concentrations are a significant risk factor for the development of diabetes, cardiovascular disease, and certain cancers.<sup>1-5</sup> Post-meal **glucose** spikes are also linked to Alzheimer's disease, kidney failure, and retinal damage.<sup>6-19</sup> Ingestion of simple sugars and starchy foods are primary causes of these postprandial glucose changes.

The good news is that researchers have identified a unique fiber called **alpha-cyclodextrin** that significantly reduces deadly glucose surges.<sup>20,21</sup>

Research demonstrates that volunteers who take alpha-cyclodextrin before consuming a carb food, such as bread, experienced a much lower blood sugar spike. Insulin increases were also significantly delayed and dramatically decreased.<sup>20,21</sup>

For 30 years, Japanese researchers have investigated another benefit of alpha-cyclodextrin.<sup>22</sup> What they discovered is that this compound also selectively absorbs and eliminates bad fats, such as *trans fats* and *saturated fats*, before reaching the bloodstream, while sparing good fats, such as omega-3s, to deliver their benefits.<sup>23</sup> Not only does this "fat reduction" reduce calories absorbed, it also reduces the harmful effects of "bad" fats along with cholesterol levels in the bloodstream.

Together, the ability of this innovative fiber to remove harmful fats from the bloodstream and reduce dangerous after-meal blood sugar spikes makes it an important addition for anyone who wishes to improve their metabolic health and reduce their risk of a wide spectrum of deadly diseases.

### Alpha-Cyclodextrin's Proven Metabolic Benefits

Sharp after-meal (postprandial) spikes in glucose are associated with a **51%** increase in the risk of a cardiovascular event and an **89%** increase in the risk of dying.<sup>24</sup> Many people, especially older individuals, are challenged to find a way to reduce these dangerous after-meal rises in blood sugar that can lead to both weight gain and serious impairment.

Researchers designed a controlled human study on the metabolic effects of alpha-cyclodextrin on healthy volunteers. Following an overnight fast, some subjects were given **100 grams**, or approximately 3.5 ounces, of white bread with water, while others were given the same amount of white bread with **10 grams** alpha-cyclodextrin in water. Glucose and insulin responses following bread consumption were recorded in both groups over a three-hour period.<sup>20</sup>

The control group that was not taking alpha-cyclodextrin had a dramatic post-meal rise in both glucose and insulin levels. Contrasting this, the alpha-cyclodextrin group showed a much reduced rise in post-meal glucose levels, as well as a delayed and much reduced rise in post-meal insulin.<sup>20</sup>

Similar results were obtained in a double-blind, randomized, crossover study conducted on 10 healthy human volunteers.<sup>21</sup>

Alpha-cyclodextrin, at doses of **2, 5, and 10 grams**, was directly mixed with boiled white rice. At **5 and 10 grams** of alpha-cyclodextrin, the amount of glucose that was absorbed by the participants was significantly reduced, and the volunteers experienced a greater feeling of satiety.<sup>21</sup>

The study found that alpha-cyclodextrin reduced the glycemic response to standard carbohydrate meals and may be useful for reducing the glycemic response to carbohydrates.<sup>21</sup>

But preventing glucose spikes forms just one part of the overall, longer-term benefits of alpha-cyclodextrin.

### A Unique and Safe Fat Blocker

Ingestion of too many carbohydrates, with the following postprandial blood sugar spikes that result, is just one dietary contributor to obesity and chronic disease. Equally as dangerous to one's health and longevity is the presence of "bad" fats in the bloodstream.

Excess saturated fat in the diet is a leading cause of lipid disturbances, an ongoing epidemic of obesity, and the resulting high incidence of cardiovascular disease. Even with the most dedicated commitment to limit unhealthy fats, many individuals find it difficult to balance their blood lipid profiles, lose weight, and reduce their risk of dying early. Also, ingestion of saturated fats and trans fats (as well as simple sugars) contributes to increased levels of systemic inflammation, which accelerates the diseases of aging.<sup>25</sup>

Alpha-cyclodextrin *selectively* absorbs and eliminates trans fat and saturated fat before they can enter the bloodstream, while leaving healthy polyunsaturated fats (such as omega-3 fats) available to deliver their benefits.<sup>26</sup>

In fact, this fiber binds up to **9 times** its weight in health-threatening dietary fat from the intestinal tract.<sup>23</sup> Studies show that, for people who eat two fat-heavy meals a day,<sup>27</sup> **2 grams** of alpha-cyclodextrin taken





before these meals can remove up to **320 calories** from the body before absorption.

Alpha-cyclodextrin has the ability to engulf excess dietary fat, especially pro-inflammatory saturated fat, within the intestine. This fiber has been shown to lower the dangerous apolipoprotein B (apoB) type of cholesterol, elevated levels of which have been shown to contribute to atherosclerosis.<sup>26</sup>

There have been fat-blocking drugs on the market, but they have been plagued by noncompliance—in other words, users have generally given up on them. Problems with these drugs make them difficult to use.

Fat-blocking drugs such as *orlistat*, which is marketed as Alli® or Xenical®, rely on inhibiting the lipase enzyme that breaks down triglycerides, the major form of dietary fat, into single fatty acid molecules.<sup>28</sup> These drugs leave triglycerides “loose” in the colon. There, they may undergo digestion or fermentation to produce gas and fluids, leading to flatulence, urgency, cramping, loose stools, and possibly diarrhea or release of oily material from the rectum.<sup>28</sup>

Aside from these distressing side effects, there is a nutrition problem related to these fat-blocking drugs. They remove *all* types of fats, regardless of whether they are good fats or bad fats.

Alpha-cyclodextrin, on the other hand, typically does not have these side effects. Instead of leaving undigested triglycerides “loose” in the colon, this novel compound isolates dietary fatty acids away from the rest of the intestinal contents, thereby reducing the risk of digestive problems.

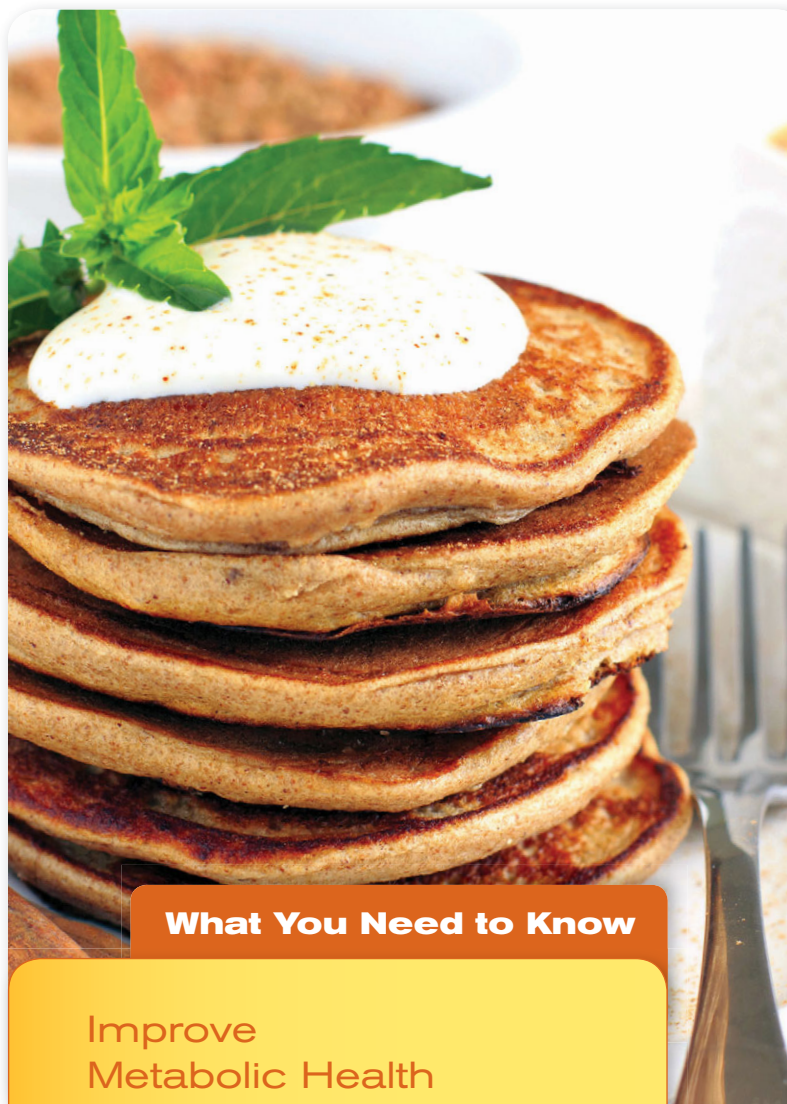
Because alpha-cyclodextrin does not typically have digestive side effects, there is an increased compliance in taking the product, which translates into reduced markers of cardiovascular and metabolic risk.

### Alpha-Cyclodextrin Reduces Unhealthy Fats

Japanese researchers have been investigating alpha-cyclodextrin for 30 years since they first established that this novel fiber, when fed to young rats, can effectively modulate lipid metabolism. The result was reduced levels of triglycerides in both blood and liver tissue. The rats also experienced less weight gain and decreased body fat deposition relative to controls that did not receive alpha-cyclodextrin.<sup>22</sup>

Realization that alpha-cyclodextrin can preferentially reduce unhealthy dietary fats, while leaving healthy fats alone, began when scientists undertook a 14-week study conducted on laboratory mice.<sup>26</sup>

Scientists fed the mice a high-fat, Western-style diet, but the diets of the test group were supplemented with alpha-cyclodextrin. The supplemented mice



### What You Need to Know

#### Improve Metabolic Health

- Due to excess ingestion of unhealthy sugars, starches, and fats, many Americans carry too much abdominal fat.
- Scientists have demonstrated that a natural fiber called alpha-cyclodextrin, when taken before meals, significantly lowers after-meal glucose and insulin increases.
- This novel fiber also *selectively* blocks absorption of pro-inflammatory fats such as trans fats and saturated fats—without interfering with beneficial polyunsaturated fats such as omega-3s.
- Taken with meals, alpha-cyclodextrin powerfully improves blood lipids, metabolic and cardiovascular risks, and reduces absorption of calories from fat.

showed decreases of **15.3%** in total cholesterol, **20%** in free cholesterol, and **14%** in cholesterol esters (a bound form of cholesterol). The majority of the cholesterol that was decreased was the dangerous apoB type, known to be increased with the intake of dietary saturated fats and associated with a higher risk of atherosclerosis.<sup>26</sup>

Critically, measuring the animals' fatty acid blood levels indicated an even greater reduction in the risk of atherosclerosis and cardiovascular disease. Supplementation with alpha-cyclodextrin had boosted levels of beneficial unsaturated fats by **2.5%** while decreasing pro-inflammatory saturated fats and trans fat levels by **4.5%** and **11%**, respectively.<sup>26</sup>

In another compelling study, rats were fed diets supplemented with either alpha-cyclodextrin or control supplements. Then, each group was given a diet including radioactively labeled saturated and unsaturated fats. Compared to control animals, the alpha-cyclodextrin group experienced a **7-fold increase** in excretion of saturated fats, with no increase in the excretion of beneficial polyunsaturated fats such as omega-3s.<sup>29</sup>

Following this, a similar experiment provided even further evidence of alpha-cyclodextrin's preference for blocking the ingestion of unhealthy dietary fats while enhancing beneficial fats.<sup>11</sup>

In the next section, we'll examine these impressive findings.

## Selective Fat-Blocking Effects

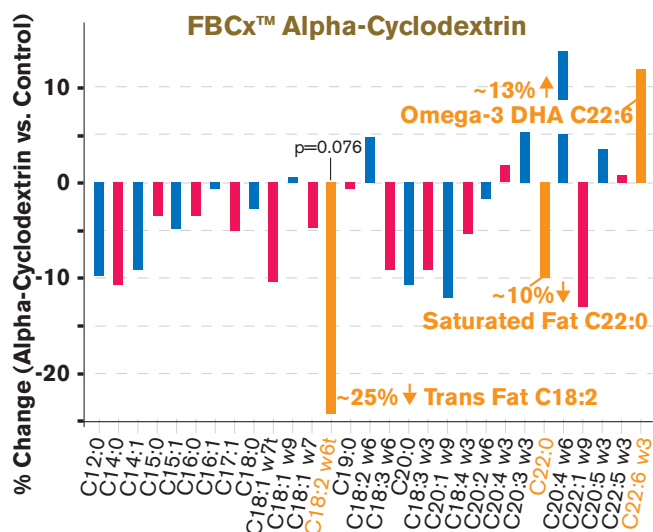
Added confirmation that alpha-cyclodextrin has the novel ability to block saturated fats, without interfering with the absorption of healthy fats, was reported by the journal *Metabolism*.<sup>26</sup>

Scientists fed mice either a standard Western diet laden with fat or the same diet with the addition of alpha-cyclodextrin supplementation. The supplemented subjects showed major reductions in blood levels of almost all fatty acids, indicating that alpha-cyclodextrin had removed these fats from the body. However, it was the determination of exactly what fats were decreased, and what fats were increased, that was most compelling.

In the alpha-cyclodextrin group, deadly trans fats were slashed by **25%**. Unhealthy saturated fats were reduced by a significant **10%**. Yet there was a roughly **13% increase** in beneficial omega-3 DHA. Furthermore, the ratio of LDL (bad) cholesterol to HDL (good) cholesterol was decreased by nearly **5%**.<sup>26</sup>

This relative reduction in LDL is especially important because previous studies have shown that LDL promotes not only cardiovascular events but also the spread of cancer throughout the body.<sup>30</sup>

The different absorption or blocking effects of alpha-cyclodextrin on different dietary fats occurred entirely without any reduction in the treatment group's dietary intake of dangerous fats and without any increase in this group's intake of omega-3 or other beneficial fats.<sup>26</sup>



**Figure 1.** Animals were fed a high-fat diet with or without alpha-cyclodextrin supplementation. The alpha-cyclodextrin-supplemented animals experienced a nearly **25%** reduction in deadly trans fats, as well as a significant **10%** reduction in saturated fats. Supplemented animals also experienced a **13%** increase in the beneficial omega-3 fatty acid DHA.





### How Alpha-Cyclodextrin Fiber Molecules Work

The capacity of the natural fiber alpha-cyclodextrin to selectively absorb saturated and trans fats is due to the unique structure of this molecule.

Conventional fiber molecules are linked in large, bulky chemical chains that bind fat non-selectively. But each molecule of alpha-cyclodextrin is composed of much more streamlined chemical chains that are linked, head-to-tail, to form a doughnut-like shape. The outer section of the alpha-cyclodextrin doughnut-like shape dissolves readily in the water found in the intestinal tract. The inner walls—the walls of the “doughnut hole”—repel water and selectively cling to fat molecules.

The molecular structure of saturated fats is such that these pro-inflammatory fats are strongly attracted to the soluble alpha-cyclodextrin molecules. Once the saturated fats are bound in the “doughnut hole,” the cyclodextrin/fat complexes become insoluble in water, so they form tiny clumps of material that are readily excreted from the body before entering the bloodstream.<sup>39</sup>

As millions of small alpha-cyclodextrin doughnut-like molecules mix in the intestine, they rapidly and selectively suck up unhealthy, pro-inflammatory fat molecules such as trans fats and saturated fats—and safely carry them out of the body in fecal matter. Unlike conventional dietary fiber, which non-selectively binds fat in about a 1:1 ratio, a single gram of alpha-cyclodextrin is able to bind up to approximately **9 grams** of fat.<sup>23</sup>

The alpha-cyclodextrin itself caused these favorable shifts in lipid profiles through its remarkable ability to selectively bind and eliminate destructive lipid molecules.

Blocking the absorption of significant quantities of dietary saturated and trans fats and moving this unabsorbed high-calorie fat through the intestinal tract and out of the body would be expected to both promote weight loss and consequently enhance markers of metabolic syndrome. And a further study on rats clearly demonstrated this effect.<sup>31</sup>

Researchers fed rats a high-fat diet that was supplemented with alpha-cyclodextrin. They found that, as expected, these test animals had a **30%** reduction in plasma triglycerides, a **9%** reduction in cholesterol, and an increased amount of fat excretion in their feces, again demonstrating successful elimination of unabsorbed fat from the intestine. But additionally, the supplemented animals showed significantly less weight gain despite the high-fat diet than the unsupplemented control animals, all of which gained weight.<sup>31</sup>

Notably, in this study, the alpha-cyclodextrin group was also found to have improved insulin sensitivity and normalization of serum leptin, the satiety hormone that signals the body that it's time to turn off feelings of hunger.<sup>31</sup>

Next, scientists set out to confirm these remarkable effects using the gold standard of scientific evidence: randomized, placebo-controlled human trials.

### Human Studies Show Beneficial Effects

In a well-designed study conducted on obese patients with type II diabetes, participants gained an average of 2.2 pounds each over a 30-day period prior to the intervention phase. Then, a select group of these participants were randomly assigned to take **2 grams** of alpha-cyclodextrin with each fat-containing meal. The rest were given placebos. All volunteers were asked not to change their regular eating habits or daily routine.<sup>32</sup>

Once the supplementation period began, the placebo group continued to gain weight, but the alpha-cyclodextrin group experienced no further significant weight gain.<sup>32</sup>

Additionally, the two groups showed notable differences in lipid profiles by the end of the study. Among those who started the study with elevated lipids, the placebo group saw their total cholesterol increase by a substantial **5.2%**. In sharp contrast, the alpha-cyclodextrin-supplemented group had a remarkable **8.2% reduction** in total cholesterol.<sup>32</sup>

Furthermore, scientists documented increased levels of *adiponectin*, a hormone that regulates glucose levels and promotes fatty acid breakdown,



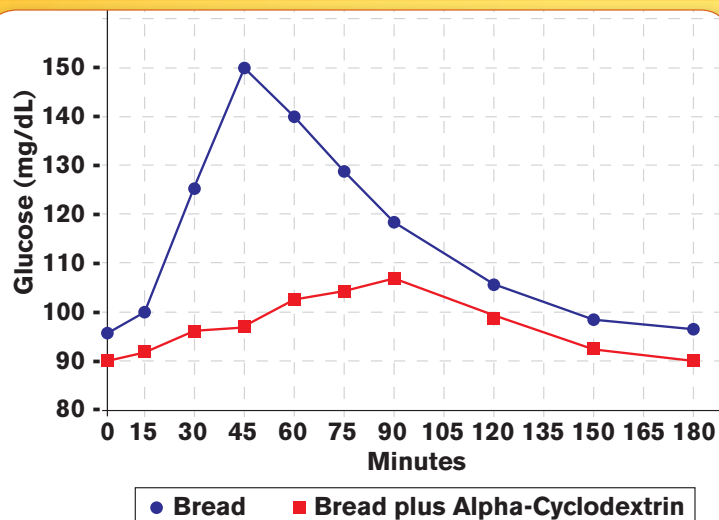
in the alpha-cyclodextrin group, while levels of this beneficial substance fell in the placebo group.<sup>32</sup>

Additional evidence of alpha-cyclodextrin's powerful cardiovascular benefits came from a study enlisting the help of a group of overweight people with a body mass index of **25 to 30 kg/m<sup>2</sup>**. They were randomly assigned a placebo or **2 grams** of alpha-cyclodextrin with each meal, amounting to **6 grams** per day.<sup>33</sup>

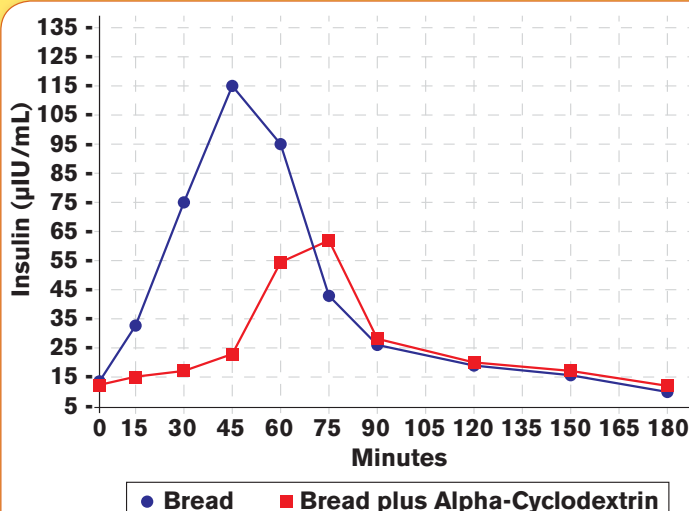
After two months, the supplemented individuals showed an array of metabolic benefits. Those taking alpha-cyclodextrin realized an average **5.3%** decrease in total cholesterol and an average **6.7%** decrease in LDL cholesterol. Compared to controls, supplemented patients' levels of apoB, an atherosclerosis-promoting protein, fell **5.6%**, and their serum insulin levels fell **9.5%**.<sup>33</sup>

The beneficial effects shown in these human studies cannot be overstated. Blood triglyceride levels tend to rise very sharply after a fat-heavy meal, and the degree of that increase is a strong predictor of cardiovascular risk. Reducing post-meal triglyceride levels is a critical component of any program for reducing heart disease.<sup>34-37</sup>

In another study, alpha-cyclodextrin was demonstrated to absorb many times its weight in fat and to sustain its beneficial effects over a prolonged period. Sixty-six obese diabetic patients were randomly assigned to receive either placebo or



**Figure 2.** Blood sugar levels following “meal” of **100 grams** of bread alone or with **10 grams** of alpha-cyclodextrin in healthy volunteers. Note the peak rise of blood sugar to **150 mg/dL** in control subjects, with gradual rise not reaching **110 mg/dL** in supplemented group.



**Figure 3.** Blood insulin levels following “meal” of **100 grams** of bread alone or with **10 grams** of alpha-cyclodextrin in healthy volunteers. Note the sharp and early peak in insulin in control subjects, with much lower, later, and less-prolonged elevation in supplemented subjects.



two **1-gram** tablets of alpha-cyclodextrin with each meal for three months—a total of **6 grams** daily.<sup>23</sup>

More weight was lost by those with the highest intakes of total and saturated fats than those with lower intakes. This further confirms that alpha-cyclodextrin preferentially blocks the more dangerous saturated fats and leaves healthy fats alone. Careful analysis also showed that the amount of fat that was excreted by these volunteers was about **9 times** the amount of alpha-cyclodextrin that they had ingested, confirming previous laboratory studies.<sup>23</sup>

While these benefits for obese and diabetic volunteers are certainly compelling, the fat-blocking benefits of alpha-cyclodextrin were just as dramatic in *healthy* individuals.<sup>38</sup>

Scientists randomly assigned healthy adult volunteers to take either **2 grams** of this novel fiber or a placebo, immediately following a commercially prepared high-fat breakfast rich in saturated fats. Compared to placebo recipients, patients supplemented with this one-time dose of alpha-cyclodextrin absorbed **69%** less of the fat provided in the test meal.<sup>38</sup>

### Chewable Tablet

Both the studies on alpha-cyclodextrin's carb-blocking effects and on its fat-blocking effects underscore a critical fact. Taking alpha-cyclodextrin before meals can allow individuals to gain control of their metabolic and weight-gain risks as well as their blood lipid and cardiovascular risks.

Alpha-cyclodextrin is best taken in a chewable tablet that allows this unique fiber to be masticated and ready to work once it hits the stomach. Also, in contrast to other less selective, fat-blocking drugs, alpha-cyclodextrin typically has no or few side effects.

### Summary

Americans typically ingest too many unhealthy sugars, starches, and fats. As a result, they frequently carry around excess abdominal fat, sometimes in spite of their exercise and weight-loss programs.

Scientists have identified a natural fiber called alpha-cyclodextrin that lowers after-meal glucose and insulin surges.

Alpha-cyclodextrin also *selectively* blocks absorption of unhealthy fats such as trans fats and saturated fats—while leaving beneficial, polyunsaturated fatty acids, such as omega-3s, available to deliver their benefits.

Chewed as a tablet prior to fat-containing meals, alpha-cyclodextrin powerfully improves blood lipids, metabolic and cardiovascular risks, as well as reducing absorption of calories from fat. ●



### Sharp Reductions in After-Meal Glucose/Insulin Surges

One of the several potentially deadly vascular risk factors is the sharp **after-meal** surge in **glucose** and **insulin** that occurs in response to ingestion of carbohydrates like starches and simple sugars. To counter this pathological effect, **Life Extension®** has long advocated for the use of a prescription drug called **acarbose** to be taken before carbohydrate-containing meals. A dietary supplement formula called **Tri-Sugar Shield** contains ingredients that have a similar mechanism of action as acarbose. Furthermore, a human clinical trial on **alpha-cyclodextrin** reveals robust reductions in **after-meal** glucose/insulin surges after eating just 3.5 ounces of bread. What is so startling about **Figures 2 and 3** on the previous page is how sharply glucose blood levels increase (from **95 mg/dL** to **150 mg/dL**) after the ingestion of a relatively small amount of bread. The take-home lesson for those seeking to avoid degenerative disease is to significantly reduce the ingestion of starches/sugars, *or* take something at mealtime to diminish the potentially deadly surge of glucose and insulin they induce.

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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# PROMOTE HEALTHY ARTERIAL BLOOD FLOW

As one ages, lipids in combination with inflammatory cells, cellular waste products, and calcium build up within the walls of the blood vessels to form **arterial plaque**.

If this plaque becomes unstable, it can rupture, potentially affect the vascular endothelium.

The extracts in **Arterial Protect** have been documented to support the body's ability to control plaque formation. This plaque can become unstable, potentially affecting the *vascular endothelium*.<sup>1</sup>

Patented and clinically tested, **Arterial Protect** is a combination of **Pycnogenol**® French maritime pine bark extract and **Centellicum**® Gotu Kola leaf extract.

- **Pycnogenol**® has been demonstrated in controlled research to improve endothelial function and arterial blood flow.<sup>2</sup> It also significantly reduces oxidative stress. Additionally, Pycnogenol® is known to help modulate healthy inflammation and to help inhibit platelet aggregation.<sup>3</sup>

- **Gotu Kola** has been shown in placebo-controlled studies to result in enhanced stability of arterial plaque.<sup>4,5</sup> Gotu Kola modulates production of collagen, which is found in the composition of the cap holding plaque in place.<sup>4,5</sup> It also supports free radical defense mechanisms and helps promote healthy inflammation levels.

When human volunteers were supplemented with *both* Pycnogenol® and Gotu Kola—the two ingredients in **Arterial Protect**—progression of arterial plaque was substantially reduced, and this was associated with a reduction in oxidative stress.<sup>1</sup>

For those seeking enhanced arterial protection, take just one vegetarian capsule daily of **Arterial Protect** to naturally stabilize endothelial plaque and promote healthy blood flow.

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To order **Arterial Protect**,  
call **1-800-544-4440** or  
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#### Arterial Protect

Item #02004 • 30 vegetarian capsules

	Retail Price	Super Sale Price
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**Enhanced Super Digestive Enzymes** provides specific **enzymes** required to support the natural reactions that break down food—demonstrated to optimize digestion and nutrient absorption.<sup>5-8</sup> Here is the broad array of **enzymes** contained in this formula:

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- **Amylase** to break down starch and short sugar chains called oligosaccharides,
- **Lipase** to break down fats,
- **Cellulase** to break down the indigestible polysaccharide in dietary cellulose, and
- **Lactase** to break down lactose.

**Enhanced Super Digestive Enzymes with Probiotics** provides the same enzymes that are in **Enhanced Super Digestive Enzymes**—but with the added benefits of the **probiotic** *B. coagulans*.

This **probiotic** creates a natural protective shield that resists digestion in the stomach allowing it to fully colonize in the intestines.<sup>9</sup> Probiotics such as *B. coagulans* support digestive health and suppress less beneficial bacteria to improve digestive comfort.<sup>9-10</sup>

To order **Enhanced Super Digestive Enzymes** or **Enhanced Super Digestive Enzymes with Probiotics**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)



## Enhanced Super Digestive Enzymes

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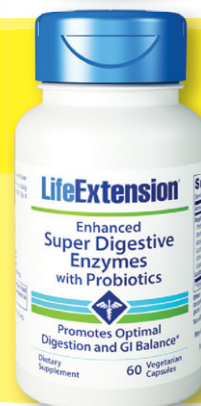
	Retail Price	Super Sale Price
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4 bottles		<b>\$13.50 each</b>



## Enhanced Super Digestive Enzymes with Probiotics

Item #02022 • 60 vegetarian capsules

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1 bottle	\$28	<b>\$18.90</b>
4 bottles		<b>\$16.20 each</b>



### References

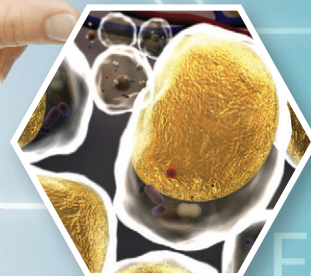
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# SAFELY IMPROVE METABOLIC HEALTH WITH INNOVATIVE FIBER



After-meal elevations in blood sugar pose a significant risk for the different metabolic challenges that affect millions of Americans today. For those whose changes in diet and lifestyle are not enough to curb after-meal blood sugar spikes, researchers have identified a unique fiber called **alpha-cyclodextrin** that substantially maintains healthy glucose levels within normal range. In human studies, subjects given **alpha-cyclodextrin** before carbohydrate consumption showed both healthy blood glucose and insulin response.<sup>1,2</sup>

Japanese researchers have identified yet another impressive metabolic benefit of **alpha-cyclodextrin**.<sup>3</sup> This unique fiber *selectively* absorbs and eliminates bad fats like trans fats and saturated fats before reaching the bloodstream, without affecting the beneficial fats, like omega-3s.<sup>4</sup>

In fact, this fiber binds up to **9 times** its weight in unhealthy dietary fat from the intestinal tract.<sup>4</sup>

**Alpha-cyclodextrin** safely improves metabolic health by maintaining healthy blood sugar levels within normal range and removing harmful fats from the bloodstream.

#### References

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3. *J Nutr Sci Vitaminol (Tokyo).* 1985 Apr;31(2):209-23.
4. *Nutrition and Dietary Supplements.* 2013;(5):9-15.



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# Health Risks of Common ACID REFLUX MEDICATIONS

Heartburn is defined medically as **gastroesophageal reflux disease** (GERD).

**GERD** is caused by the incomplete closure of the **sphincter valve** between the stomach and the esophagus. This incomplete closure allows harsh stomach contents to reflux back up into the delicate lining of the esophagus, throat, and other tissues.

GERD usually manifests as occasional or chronic pain in the center of the chest and can progress to esophagitis, premalignant changes (Barrett's esophagus), and esophageal cancer.

Contrary to popular belief, excess **stomach acid** is not the cause of GERD. Since the advent of drugs such as Nexium®, Prilosec®, and Prevacid®, however, the public thinks all that needs to be done to protect against GERD is to block stomach acid production. This misconception can have deadly consequences.

While **proton-pump inhibiting** drugs (like Prilosec®) provide merciful relief from the symptoms and some of the pathological effects of GERD, chronic use of these drugs can lead to nutritional deficiencies, bone fractures, and heart disease.

While proton-pump inhibiting drugs impede **acid** production, they don't stop the reflux of **digestive enzymes, bile**, and corrosive **food/drinks** into the esophageal lining.

**Adenocarcinoma** of the esophagus has been climbing at an alarming rate and cures elude the majority of patients. Interestingly, this increase in esophageal cancer comes at a time when tobacco use has plummeted.

Tobacco use sharply increases risk of **squamous cell carcinoma**, but the more prevalent **adenocarcinoma** is thought to be more related to **obesity**, which exacerbates the volume of stomach contents that reflux back up into the esophagus.

This article identifies the health risks associated with the overuse of **proton-pump inhibiting** drugs and provides some alternative treatment considerations.

About **40%** of Americans suffer from heartburn attacks every month (with more than **20%** experiencing attacks weekly). Long-term therapy is needed for those with more than occasional heartburn.<sup>1,2</sup>

The danger is that, after prolonged exposure to harsh stomach contents, the cells of the lower esophagus undergo precancerous changes that can lead to esophageal cancer, a growing cause of cancer deaths in older adults.<sup>3,4</sup>

For chronic GERD sufferers, most physicians prescribe oral drugs that reduce acid secretion in the stomach. Prominent among such drugs are the **proton pump inhibitors**, which include omeprazole, lansoprazole, pantoprazole, esomeprazole, and rabeprazole, sold under a variety of trade names such as Nexium®, Prilosec®, and Prevacid®.

Unfortunately for GERD victims, long-term use of these drugs brings with them a host of side effects, all related to the drugs' successful lowering of stomach acid production.

These complications, while not immediately life-threatening, are beginning to concern experts because of their potential impact on quality of life and on long-term health ranging from the heart to the bones and even to the risk for infection, particularly among older adults.

### GERD, Proton Pump Inhibitors, and Long-Term Health

The human stomach is an extreme environment, constantly churning with muscular action, boiling with hydrochloric acid at a pH near 1, and laden with protein-destroying enzymes. This environment is essential for proper breakdown of large food molecules in

preparation for further digestion and absorption in the small intestine. Fortunately, the stomach is well protected against these threats, producing a thick lining of mucus that separates the stomach contents from the delicate walls of the stomach itself.

But the esophagus, the long, flexible tube that connects the mouth to the stomach, lacks protection against acid and other digestive contents. Instead, the esophagus is protected by gravity and a relatively weak **sphincter** muscle at the lower end of the esophagus to keep stomach contents in place.

After a heavy meal, particularly a fat-rich one that can slow stomach emptying, the pressure in the stomach can overwhelm the lower esophageal sphincter, allowing highly corrosive stomach contents to **reflux**, or wash back, into the esophagus.<sup>5</sup> And many people suffer from transient relaxation of this sphincter, which permits reflux to occur unpredictably.

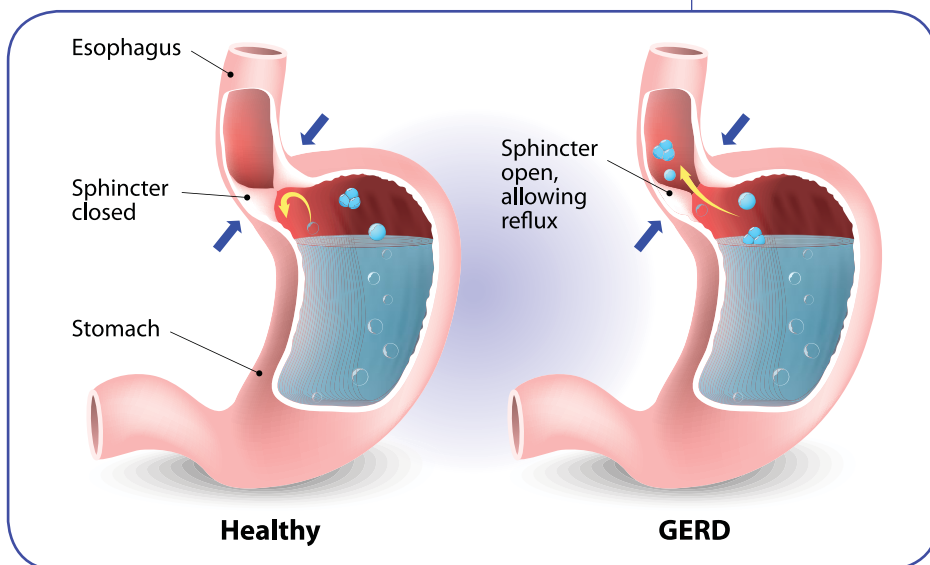
Symptoms of reflux include the burning sensation referred to as heartburn and are often accompanied by uncomfortable belching and a sour taste in the mouth.

Whether it is called heartburn, reflux, or GERD, the condition is both painful and potentially dangerous. The danger is that, after prolonged exposure to the acids and protein-digesting enzymes in stomach fluid, the cells of the lower esophagus undergo precancerous changes. A so-called **Barrett's esophagus**, with a large number of abnormal cells in it, is a precursor to esophageal cancer, a growing cause of cancer deaths in older adults.<sup>6,7</sup>

### Modern Day Relief

As a result of all this pain, discomfort, and risk, drug companies, physicians, and patients have eagerly sought a way to reduce the symptoms and cancer threats of GERD. One way of mitigating GERD is to reduce stomach acid production. A number of medications have been developed to do just that, with the category of **proton pump inhibitors** (PPIs) clearly in the lead.

PPIs work by blocking the action of the cellular "proton pump" in stomach lining cells.<sup>8</sup> That pump generates protons (hydrogen ions) from the bloodstream and pushes them out into the stomach.<sup>8</sup> The harder that pump works, the more acidic the stomach contents become.





Using one of the PPI drugs reduces the amount of acid that goes into the stomach, which in turn reduces the amount of acid that can reflux, or wash back, into the esophagus to produce heartburn or GERD.<sup>9</sup>

Proton pump inhibitors do a very good job of reducing *symptoms* of acid reflux. Such a good job, in fact, that they are the third largest-selling class of drugs, with more than 119 million prescriptions written annually. They generate nearly \$14 billion in sales.<sup>2,9,10</sup>

Originally marketed as prescription drugs for intermittent use, these drugs have been available over the counter for more than a decade, and, though still clearly labeled for limited duration use, many patients with moderate to severe GERD take them as long-term maintenance drugs.<sup>2</sup>

But, because PPI drugs are so effective at reducing symptoms, and because they are so widely used for such extended periods, some findings are now being reported that were not apparent when these drugs first hit the market.

We should note here that none of the PPI side effects pose immediate, urgent health threats, so it is important that each patient consult with his or her physician about the balance of risks and benefits. Nonetheless, many of the effects of PPIs can, over the long term, raise the risk for significant diseases, such as cardiovascular disease, osteoporosis, infections, and others.<sup>2,9,11</sup>



## What You Need to Know

### Health Risks of Proton Pump Inhibitors

- Heartburn or gastroesophageal reflux disease (GERD) is a major problem affecting millions of older Americans.
- The condition is caused by reflux of acidic, enzyme-rich stomach contents flowing backwards out of the stomach and into the esophagus.
- Chronic exposure to stomach contents can alter the esophageal lining, eventually making it cancer-prone.
- Reduction of GERD symptoms and effects is therefore an important part of modern medicine.
- A highly effective class of drugs called proton pump inhibitors (PPIs) has emerged. PPIs are capable of suppressing stomach acid production and mitigating symptoms.
- Large numbers of people are now using PPI therapy for prolonged periods, leading to unanticipated consequences.
- These consequences include diminished absorption of vitamins and minerals, poor bone quality, and an increased risk for fracture and even cardiovascular abnormalities that can increase the risks of heart attack or stroke.
- Several natural supplements are now available for people who take PPIs but want to reduce their risk.
- Other supplements may help individuals avoid use of PPIs entirely, because they suppress GERD symptoms effectively on their own.

## PPIs Interfere with Vitamin and Mineral Absorption

**Vitamin B12**, like most vitamins, must be obtained from the diet, where it is bound to proteins.<sup>2,12,13</sup> Deficiencies in vitamin B12 can produce anemia, depression, and disrupted nerve signaling (including decreased taste and numbness or tingling in the extremities).<sup>14</sup>

But an *acidic* stomach environment is essential for proper vitamin B12 absorption because the acid is required to break down dietary proteins to which the vitamin is bound, and release it for absorption.<sup>2,15</sup> Reducing stomach acid, especially by proton pump inhibitors, is likely to interfere with our ability to extract vitamin B12 from our foods.

Studies show that most oral acid-suppressing medications, including PPIs, decrease absorption of vitamin B12 from foods.<sup>2,12</sup> In one compelling study, **75%** of PPI users were deficient in vitamin B12, compared with just **11%** in non-users, a significant difference.<sup>2,16</sup> Other studies document a nearly **4-fold** increase in the risk of B12 deficiency among users of oral acid suppressant drugs, both PPIs and H2 blockers, now a second-line drug.<sup>2,17</sup>

Experts recommend that, based on current information, people taking PPI therapy for long periods should have their vitamin B12 levels checked and consider supplementation.<sup>18,19</sup> Vitamin B12 supplied as a crystal-line supplement appears to be better absorbed in people taking PPIs than is vitamin B12 supplied in food.<sup>2,18</sup> That is because it does not have to be separated from foods in the stomach.

**Iron** is an essential nutrient, especially for formation of red blood cells and proper muscle function. Like vitamin B12, stomach acid is an important requirement for proper absorption.<sup>20</sup> That's because about one-third of our iron intake comes from non-animal sources, where it is bound to plant chemicals that inhibit its absorption, while stomach acid breaks down those inhibitory molecules.<sup>20</sup> This problem is especially important in people who eat little to no meat, since obviously the proportion of iron from plant sources they receive is considerably larger.

Furthermore, studies show that people with conditions that naturally produce low stomach acid concentrations, a condition known as hypochloridia, have difficulty absorbing iron, and are more prone to developing iron-deficiency anemia.<sup>20</sup> And animal studies verify that PPI treatment decreases iron absorption, particularly in animals on a low-iron diet.<sup>2,20</sup> Some human studies demonstrate that long-term PPI use reduces iron absorption and produces the expected biochemical disturbances in blood tests.<sup>2,21</sup> Indeed, for patients with a problem storing too much iron, which results in



tissue toxicity, PPI therapy has been deliberately used to reduce dietary iron absorption, demonstrating the potency with which these drugs can interfere with iron metabolism.<sup>2,13</sup>

**Magnesium** is another essential mineral that is important for the functioning of numerous enzyme systems, energy management, and nerve conduction. Deficiency of magnesium is surprisingly common, with just **32%** of Americans meeting their daily recommended intake.<sup>22</sup> There have been reports of low blood magnesium levels in chronic PPI users.<sup>2,23-25</sup> One review study found severe symptoms of low magnesium, including fatigue, unsteadiness, numbness/tingling, seizures, heart rhythm disturbances, and hospitalization, in people who had been taking PPIs for an average of just over eight years. When PPI therapy was stopped in these patients, magnesium levels returned to normal and symptoms resolved, but when therapy was once again started, low levels and symptoms recurred.<sup>26</sup>

## PPIs Increase Risk of Bone Fractures

Possibly as a result of disturbances in calcium absorption from the diet under conditions of low stomach acid, a growing number of studies show an increased risk of bone fractures in long-term PPI users.<sup>2</sup>

It is known that stomach acid secretion can boost calcium absorption, while acid-suppressive therapy, including PPIs, reduces such absorption, with a negative impact on bone mineral density.<sup>2,27-29</sup> As with the other nutrients, stomach acid facilitates release of calcium from its dietary form, allowing it to be absorbed, so reducing acid levels will reduce the amount of dietary calcium that reaches the bloodstream and eventually the bones.<sup>2,28,29</sup>



In one study of people older than 50, the use of PPIs for more than a year was associated with a **44%** increase in hip fracture risk.<sup>29</sup> In that study, the risk of fractures was significantly higher (**165%**) in people taking doses above **35 mg** (the average daily dose is **20 mg**), and the risk continued to escalate the longer the patients took the PPI medication.<sup>29</sup>

Another study showed similar results on the risk of hip fractures (increased by **45%**), though neither dose nor duration appeared to have an effect in this case.<sup>30</sup> And a still more strongly designed study demonstrated, among postmenopausal women, a **3.1-fold** increased risk for spinal fractures in PPI users compared to non-users.<sup>31</sup>

Taken together, these studies and others have led the US Food and Drug Administration (FDA) to warn users of PPIs of a “...possible increased risk of fractures of the hip, wrist, and spine with high doses or long-term use of a class of medications called proton pump inhibitors.”<sup>32</sup> The required product labeling was also changed to reflect this increased risk.<sup>2,32</sup>

### PPIs and Cardiovascular Risk

Despite some encouraging trends in recent years, cardiovascular disease (heart attacks, heart failure, strokes) remains the leading cause of death in American men and women.<sup>33,34</sup> The use of PPI medications is emerging as one such risk factor.

There are two major ways that PPI therapy raises cardiovascular risk. The first has to do with PPI effects on blood clotting systems, particularly on platelets, the tiny cell fragments that initiate a clot. Most patients who are known to be at elevated risk for heart attack

or stroke are placed on some kind of **antiplatelet** medication to lower their likelihood of developing an artery-blocking clot.<sup>11,35</sup>

Because antiplatelet medications raise the risk for bleeding and ulcer formation in the stomach, however, most such patients are also advised to use a PPI to suppress stomach acid and decrease the risk of catastrophic bleeding.<sup>11,35</sup> But recent studies now suggest that the PPI medications may inhibit the effectiveness of the antiplatelet drugs themselves, defeating the entire purpose of this multidrug cocktail.<sup>11</sup>

This effect is especially important with the antiplatelet drug **clopidogrel** (Plavix®), which requires activation in the liver by a specific enzyme (CYP2C19).<sup>11,36,37</sup> PPI drugs, particularly **omeprazole**, interfere with that enzyme’s activity, hence reducing the amount of active clopidogrel available to prevent platelet clotting.<sup>11</sup>

These biochemical effects have real impact on human lives. Studies now reveal a variety of negative effects among people with heart attack risk who take PPI medication along with antiplatelet therapy:<sup>11,38</sup>

- Increased risk of cardiovascular “events” (e.g., heart attacks, need for interventional surgery),
- Increased risk of dying from a major acute cardiac event (in high-risk patients),
- Increased risk for recurrent attacks of acute coronary syndrome (angina, heart attacks), and
- Increased risk of re-infarction (death of heart tissue) after treatment for a first infarction.



The second, independent way that PPI drugs may increase risk of cardiovascular disease is their impact on production of artery-relaxing **nitric oxide**. The cells that line the blood vessels (endothelium) produce nitric oxide as a signaling molecule that tells arterial wall muscles to relax, allowing increased blood flow to oxygen-hungry tissues, particularly the brain and heart. Healthy nitric oxide production means brisk and efficient control of blood flow in these vital organs.

Recent studies show that PPI drugs lead to a reduction in **nitric oxide**, producing sluggish responses by arteries to the need to increase blood flow, and an increase in the risk of an infarction, ultimately producing a heart attack, stroke, or other catastrophe.<sup>9</sup>

### How Nutritional Supplementation Can Help

Clearly, one needs to balance the benefits provided by effective heartburn medications against the risks of long-term use. For some people, the decision may be to continue using PPI medications periodically, while attempting to lower some of the risks we've identified above. Some ways to do that include:

- Having a vitamin B12 level checked regularly, and supplementing with B12 in the event of low or borderline levels. Remember that, unlike B12 from foods, reduced stomach acid does not appear to impair absorption of crystalline B12 from supplements.<sup>2</sup> A blood test for B12 should nonetheless be done when using PPIs and if there is a B12 deficiency, then ask your doctor to prescribe a B12 shot (**1 mg**) to be injected into a muscle two to three times a week.

- Periodically checking iron and magnesium levels, and supplementing with these minerals if levels are borderline or low.
- Monitoring bone mineral density for evidence of developing osteoporosis, with appropriate supplementation with calcium and vitamin D as required.
- Taking pomegranate extracts to protect nitric oxide from oxidative destruction, and thus improving otherwise impaired endothelial function resulting from PPI use.<sup>39</sup>

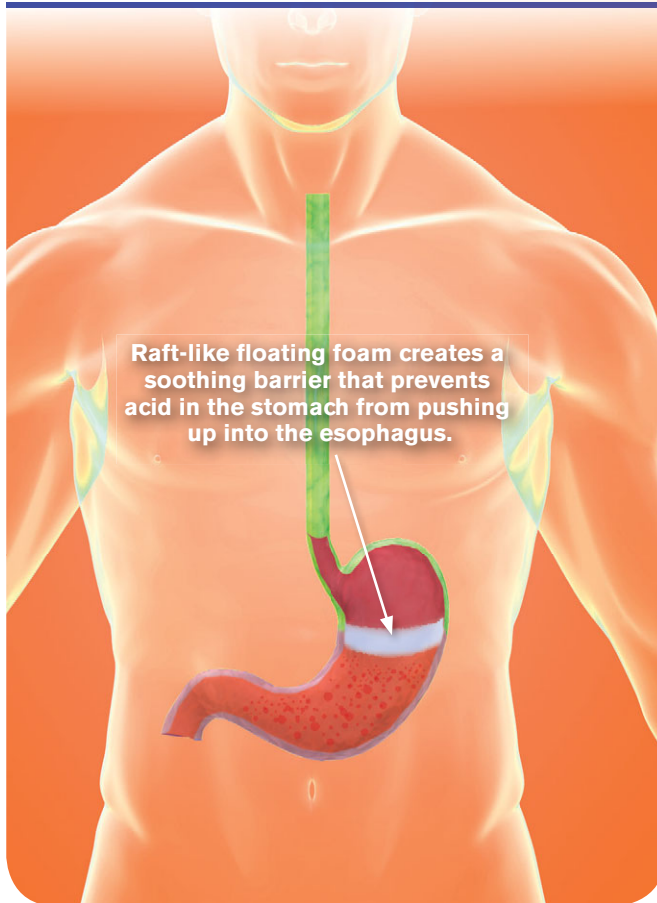
Other people, particularly those with milder or more intermittent episodes of heartburn/GERD, should explore natural alternatives to PPI medication. This may help them sidestep the increased risks entirely.

Among good choices are:

- **Raft-forming alginates.** These are acid-activated gels that form a foamy “raft” that floats on top of stomach contents. They have the advantage of blocking not only stomach acid, but also destructive protein-degrading enzymes from rising into the esophagus.<sup>40-42</sup> Use raft-forming alginates to take a break from PPIs, while also sparing the esophagus from other corrosive digestive stomach contents (enzymes, bile, food and drink).







- Avoid foods and beverages associated with GERD symptoms.** This includes coffee, chocolate, spicy foods, carbonated beverages, and alcohol. Additional foods that may cause symptoms include tomatoes (cooked and raw), milk, cheese, citrus foods, cakes, and pastries.<sup>43-48</sup>
- Quit smoking.** According to a long-term study, daily long-term (20 plus years) smoking resulted in a **70%** increase in the occurrence of reflux episodes compared to those who smoked less than a year.<sup>49</sup>
- Lose weight.** Increased body mass and abdominal adiposity increases pressure on the stomach and lower esophagus. This can stress the lower esophageal valve, hampering its ability to maintain a seal against gastric reflux. Sustained abdominal pressure can also increase the risk of hiatal hernia.<sup>50</sup> Based upon a survey of seven studies, overweight individuals averaged a **43%** increase and obese individuals a **94%** increase in GERD symptoms over individuals with a normal body mass.<sup>51</sup> Esophageal adenocarcinoma incidence was more frequent in overweight individuals in most of these studies.
  - Monitor meal size and macronutrient composition.** Dietary fat delays gastric emptying, which may increase the probability of reflux in susceptible patients. High-fat meals are also associated with increased risk of esophageal cancer.<sup>52</sup> Whereas high-calorie, high-fat meals appear to elicit GERD,<sup>53,54</sup> reducing fat content in meals has had beneficial effects in some studies.<sup>55,56</sup> Low-carbohydrate (**< 20 gram**) meals reduced some reflux symptoms in a small trial in obese subjects.<sup>57</sup> Aside from their direct effects on GERD, limitation of fat, carbohydrate, and total calorie intake are effective methods for weight reduction, which itself is an effective anti-reflux strategy. Weight reduction is also an effective way to positively impact many additional aspects of health and potentially enhance longevity.
  - Avoid eating close to bedtime.** GERD patients have long been advised to avoid eating close to bedtime in order to give the stomach adequate time to empty before lying down.<sup>58</sup> Clinical studies, however, have had mixed results regarding the minimization of GERD symptoms.<sup>59-61</sup>
  - Elevate the head of the bed while sleeping.** Several studies have suggested that raising the head of the bed 8-11 inches, or sleeping on a “wedge,” can reduce the number and duration of reflux episodes.<sup>62</sup> This approach uses gravity to help keep stomach contents out of the esophagus. Left lateral recumbency (sleeping on the left side) may also reduce GERD symptoms by potentially keeping the lower esophageal sphincter above the level of the stomach and reducing pressure on the valve.<sup>62</sup>
  - Limit aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs).** Some evidence suggests that NSAID use is associated with GERD.<sup>63</sup> NSAIDs exert their anti-inflammatory activity by inhibiting the activity of pro-inflammatory cyclooxygenase (COX) enzymes. However, the COX-1 enzyme is also important for promoting the formation of the protective mucus lining of the stomach.

## Summary

Loss of control of the lower esophageal sphincter muscle results in painful heartburn, also known as GERD. GERD affects millions of people, particularly older adults, and most of those people turn to oral acid suppressive medications for relief.

The leading acid-suppressing drugs are in the category of **proton pump inhibitors**, which are known to be highly effective at reducing heartburn symptoms.

But these drugs, called PPIs, are proving to have concerning side effects, particularly when used over the long term. Reduced acid secretion in the stomach can impair absorption of essential nutrients like vitamin B12, and minerals, such as iron, magnesium, and calcium.

Poor calcium absorption and other effects of PPI use raises the risk for bone fractures, already a major concern among older adults.

And, by at least two independent mechanisms, PPIs are associated with elevated risk for cardiovascular disease and even death from these conditions. PPIs impair the actions of antiplatelet drugs used to reduce the risk of clotting, and they also inhibit normal production of nitric oxide, a signaling molecule vital for normal blood vessel function.

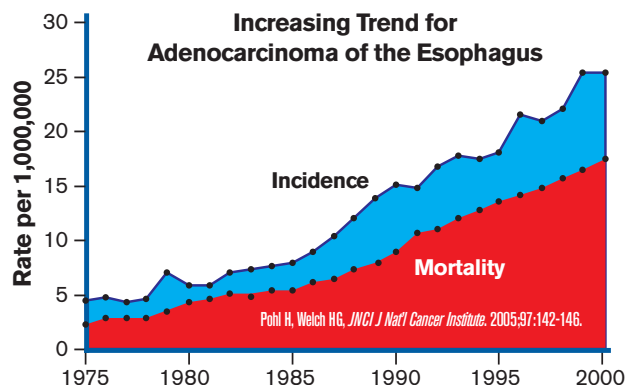
Some people may choose to accept the risk of PPI medication in light of their substantial symptom relief. For those people, supplementing with vitamin B12 and pomegranate may help to offset some of the risks.

Other people may wish to use heartburn-reducing therapy that does not involve PPI medications at all. Such therapies include **raft-forming alginates**, which physically block stomach contents from rising up the esophagus. ●

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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**Mortality from adenocarcinoma of the esophagus has been sharply increasing. Overconsumption of calories may be to blame. The consequence of food, drinks, acids, and other digestive juices backing up into the esophagus is inflammation and damage to the delicate esophageal lining.**

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# MAGNESIUM BOOSTS BRAIN HEALTH

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

	Retail Price	Super Sale Price
1 bottle	\$40	\$27
4 bottles		\$24.30 each



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

	Retail Price	Super Sale Price
1 jar	\$40	\$27
4 jars		\$24.30 each



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

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# Immediate Relief for **Esophageal Distress**

Nearly **60%** of adult Americans suffer some form of gastroesophageal upset<sup>1</sup>—and find little relief in commercial products.

Fortunately, a unique compound known as **raft-forming alginate** produces a temporary physical barrier between the stomach and the esophagus,<sup>2</sup> helping to protect the delicate esophageal tissue from harsh stomach acids.

A unique blend of ingredients in **Esophageal Guardian**, including **alginic acid** and **potassium bicarbonate**, produces both a gel and bubbles to form a safe, protective floating foam layer that sits above the contents of the stomach.<sup>2</sup>

Two other ingredients in the formulation—**calcium carbonate** and **magnesium carbonate**—react with the stomach acid to help neutralize it.<sup>2</sup>

Clinical studies show this temporary foam barrier provides maximum support for delicate esophageal tissues.<sup>2,3</sup>

This barrier develops in **under a minute**, yet relief lasts up to **four hours!**

The suggested dose of two **Esophageal Guardian Natural Berry Flavor** chewable tablets provides:

<b>Alginic Acid</b>	<b>1,000 mg</b>
<b>Calcium</b> (as calcium carbonate)	<b>80 mg</b>
<b>Magnesium</b> (as magnesium carbonate)	<b>40 mg</b>
<b>Potassium</b> (as potassium bicarbonate)	<b>40 mg</b>
<b>Strawberry extract</b> (fruit)	<b>416 mg</b>
<b>Ellagic acid</b> (from pomegranate extract [hull] and strawberry extract [fruit])	<b>35 mg</b>

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#### Esophageal Guardian

Item #01737 • 60 chewable tablets

	<b>Retail Price</b>	<b>Super Sale Price</b>
1 bottle	\$36	<b>\$24.30</b>
4 bottles		<b>\$21.60 each</b>

To order **Esophageal Guardian Natural Berry Flavor**, call **1-800-544-4440** or visit **www.LifeExtension.com**



Support Healthy Metabolic Factors

## Omega-7

### With Highly Purified Provinal® Fish Oil

As a Life Extension® customer, you most likely take an **omega-3** supplement. Scientists are increasingly excited about the newly discovered effects of **another** family of beneficial fats—**omega-7 fatty acids**.

Omega-7 palmitoleic acid powerfully complements omega-3 fatty acids with cellular-signaling properties that support healthy metabolic factors associated with:

- Superior cardiovascular health<sup>1,2</sup>
- A healthy inflammatory response<sup>1,3,4</sup>
- Optimum normal metabolism of glucose and insulin<sup>1,5,6,</sup>
- Beneficial management of hunger and satiety<sup>7,8</sup>

Scientific studies show that palmitoleic acid promotes healthy levels of **triglycerides**, **total cholesterol**, **LDL**, and **HDL** for those already in normal range—after just one month of supplementation at **210 mg**.<sup>9</sup>

Further studies have found within normal range, palmitoleic acid can help balance **C-reactive protein** levels,<sup>10</sup> optimize insulin sensitivity,<sup>1,10,11</sup> and regulate hunger-promoting gastric hormones.<sup>7,8</sup>

**Life Extension®**'s omega-7 supplement contains **Provinal®**—a highly refined anchovy and/or menhaden oil that is **non-GMO**. Conventional processing methods result in products with only **25%** palmitoleic acid. **Life Extension®**'s **Provinal® Purified Omega-7** is concentrated to **50%** palmitoleic acid.



#### Provinal® Purified Omega-7

Item #01812 • 30 softgels

	Retail Price	Super Sale Price
1 bottle	\$27	<b>\$18.23</b>
4 bottles		<b>\$16.20 each</b>



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## Cheryl Martin

### Mind/Body Connection

Cheryl Martin faced death four times, yet managed to survive. Perhaps it was these experiences that eventually led to a life of helping others get healthy. And while her childhood dream of practicing medicine was put aside for marriage and children, her love of healing was always waiting in the background. Today Martin is the owner and director of the Gardens Wellness Center in Palm Beach Gardens, Florida, where she lives a fulfilling life restoring good health to her many patients.

#### Beginning

Martin was born premature and as an infant, almost didn't survive. Martin's mother was advised not to get too attached to her daughter since she was probably not going to live. Martin surprised everyone by coming through, despite clinically dying several times.

But being born premature was only the first of Martin's many near-death experiences: She almost died from a misdiagnosed thyroid problem, suffered a carotid aneurysm, and was one inch from being killed in a head-on auto collision. If anything, she is a true survivor.

The dynamic and multitalented Martin has worked in numerous professions during her adult life, including real estate, marketing, web design, TV host, and executive producer. She became involved in the Gardens Wellness Center prior to its opening and decided it was the one place she desperately wanted to be. Over the years, Martin acquired expert education and training in a variety of disciplines, including neuro-linguistic programming, hypnotherapy, massage, cognitive behavioral therapy, and life coaching. She also trained as a midwife and periodically works as a doula or a midwife's assistant. She radiates boundless energy and a true gift for healing.

### Gardens Wellness Center

A one-stop facility for a wide variety of holistic approaches, the Gardens Wellness Center focuses on not only alleviating symptoms but on finding and treating the cause of a person's illness. The practice provides acupuncture, chiropractic care, functional medicine, hormone replacement therapy, colon hydrotherapy, nutritional counseling, herbal prescriptions, detoxification, hypnotherapy, reiki, massage, reflexology, and more. Common conditions that are treated include endocrine and hormone disorders, infertility, migraines, pain management, and orthopedic and sports issues. The majority of patients have been referred by their doctors, while others have come because they are disillusioned with the traditional treatments they've received. The Center's aims are to prevent disease and heal or improve existing conditions, bringing patients to the healthiest state possible.

"The typical patient comes in with a modality already in mind," says Martin. "They will say, 'I'm in pain, so I want acupuncture,' or 'I had a car accident and I need chiropractic.'" On every initial visit, Martin reviews the health history of new patients and consults with a health practitioner regarding a treatment plan. She continues to follow up by going over patient charts, diagnoses, and treatments to make sure each person is healing and progressing. She and her team work harmoniously to provide for each patient's optimal outcome. Every person that comes through the door is evaluated physically, mentally, nutritionally, and spiritually. The team at Gardens Wellness Center embraces the patient's unique needs and treats the patient for each of the deficiencies they present with.

"For example," Martin says, "if someone is on a medication with the side effect of decreasing bone mass, I'll explain that they need a very high calcium supplement. Then I explain that if [they] take the calcium, it may not absorb properly in the bones and might get into the

soft tissue, so [they] also need vitamins D3 and K2 to transport the calcium, break it down, and make it available to the bone. They'll also need magnesium or the body won't be able to utilize it. In a case like this, the patient will go home with Life Extension® Bone Restore and won't have to buy many different separate products.

"We do not take someone for just one treatment, unless they're only coming in to treat stress," Martin adds. She tells people who think they can fix everything in one visit, "We're not going to take your money, because it may have taken you seven years to develop your condition and one treatment is not going to fix it. You will need seven to 14 treatments before we see changes in your body." Once they understand, patients almost always comply.

### Cheryl Martin's Supplements

Two-Per-Day (multivitamin)  
Super Ubiquinol CoQ10  
Super Bio-Curcumin®  
Bone Restore  
FlorAssist® Probiotic  
BioSil™





Acupuncture for chronic pain is very popular at the Center and Martin explains how the body and acupuncture work together to heal an old injury. “When something acute happens in your body,” she tells patients, “your body immediately [focuses] its attention on repairing that injury. But after some time, your body will get busy with fighting an illness or tending to another problem and will ignore and forget your first injury.” The result, she explains, can be permanent pain, inflammation, and loss of motion. Acupuncture treatment at the site of chronic pain re-stimulates your body to go back and heal old injuries, as well as restore motion and wellness.

One of Martin’s favorite referrals following treatment was from a recent patient who told her that he felt like the Tin Man from “The Wizard of Oz,” and that every movement hurt. “He told me, ‘I feel like you guys added oil to my joints. I’m working out at the gym now, which I couldn’t do a month ago.’”

### Treating Specific Health Conditions

Other common conditions seen at the Center include diabetes and high cholesterol, which are both treated with nutritional counseling, supplements, and functional medicine. “High cholesterol is controversial now,” comments Martin, noting the uncertainty about whether or not it is always dangerous. “Some people have chronic high cholesterol, but they don’t have clogged arteries, so it really depends on the person.” She adds that some people can have very healthy diets and still have high cholesterol levels, which is sometimes a side effect of an inherited disorder. Therefore, a cause has to be found first.



Counseling diabetics to stay away from sugar is also complex, Martin notes, because carbohydrates turn into sugar and “a diabetic has to know that you can’t eat a 12-inch sub and potato chips and think that’s [better than] eating two pieces of cake, because they both end up having the same result.” The Center teaches patients carb counting and to consume enough carbs before exercising, especially if patients are on insulin, and how to get obesity under control, which often cures adult onset diabetes. They also recommend that some people, regardless of weight, take insulin because their bodies simply do not produce enough naturally.

“A lot of diabetics are in complete denial,” Martin observes, “and it’s so important for them to understand how to manage their condition properly.”

Martin recalls a diabetic who told her, “I’ve tried to change my diet, but I can’t, so I’m just going to live this way and die early because I can’t control myself. I like my cakes and cookies too much.”

Using hypnotherapy, Martin induced the patient to choose healthy snacks instead of sweets, and after a few treatments, the patient stopped eating sweets nightly.

Martin’s favorite story is about her first stroke patient who came on a referral from a neurologist who believed hypnotherapy could restore some movement in her curled arm and fingers, which were barely moving. Martin says that each patient receives an individualized treatment plan, and in this case, she was uncertain about how to proceed. Her research found information that “you can use the mind to tell the arm that it is lifting weights or heavy objects and that will actually strengthen the muscles.”

During a hypnotherapy session, Martin had the patient imagine lifting her purse with her affected arm. Martin observed the patient’s fingers moving in a way they had not moved before hypnosis. “I’m watching her fingers [move] and the muscles tighten in her arm,” she says, “and I’m thinking that

this is phenomenal.” This patient made remarkable improvements and Martin says she feels elated at being able to change a life so profoundly.

Martin also mentions the powerful effect that stress can have on physical health. “Emotions can make you sick,” she explains. “The same hormones, cortisol and adrenaline, that are responsible for motivating us to run from real danger can cause damage when we experience emotional problems. In the former case, they can save your life, while in the latter case, they can kill you.”

Many people develop what’s called a stress belly, Martin explains. The body stores fat in the abdomen because it’s saving its use as energy to fight whatever is elevating stress hormones. The danger comes when the body cannot find a cause for the elevated hormone levels so it starts to search the DNA. When that happens, it can trigger damaged dormant cells like cancer cells. All of this is due to stress. “Living a stressful life will eventually kill you,” Martin concludes.

For overly stressed patients, Martin recommends acupuncture, life coaching, hypnosis, cognitive behavioral therapy, and bio-feedback to help patients learn calmness and retrain their thinking. Martin mentions that all these therapies are blended, each mode combining with the others, strengthening one another. Ultimately, the mind soothes the body.

### Martin’s Personal Care

Martin herself eats a low-carbohydrate diet, avoiding bread, sugar, and processed foods. Her diet consists of fruit, vegetables, lots of fish, and some poultry. Martin recommends that her patients avoid the center aisles of a grocery store where all of the processed and packaged items exist. Sticking to the outer perimeter provides everything your body needs.

A strong advocate of Life Extension, Martin takes a variety of products, including those for healthy hair and skin. For exercise, she gets to the gym whenever

possible and loves taking long walks after dinner.

Martin also takes her own advice and seeks regular care from both Western and alternative practitioners to be certain that her body is in optimal condition. She mentions that the staff at the Wellness Center often treat each other and that there is a wonderful feeling of harmony as they strive to bring good health to all their patients and to each other.

### Advice to Others

“People take less care of themselves than they do of their vehicles or their homes,” Martin observes. She says many people spend enormous amounts of money on vacations, eating out, and buying clothes, then tell themselves they can’t afford to go to a doctor or dentist. She hopes people will examine how they are living and realize that health comes before anything and everything else.

“People assume that if they’re feeling okay, nothing’s wrong. But you have to take care of your body the same way you would get an oil change in your car. The biggest thing I could tell anyone is take care of your health, take care of your body, take care of your teeth.” This means regular, frequent checkups with both Western and holistic practitioners. “Take care of yourself.” ●

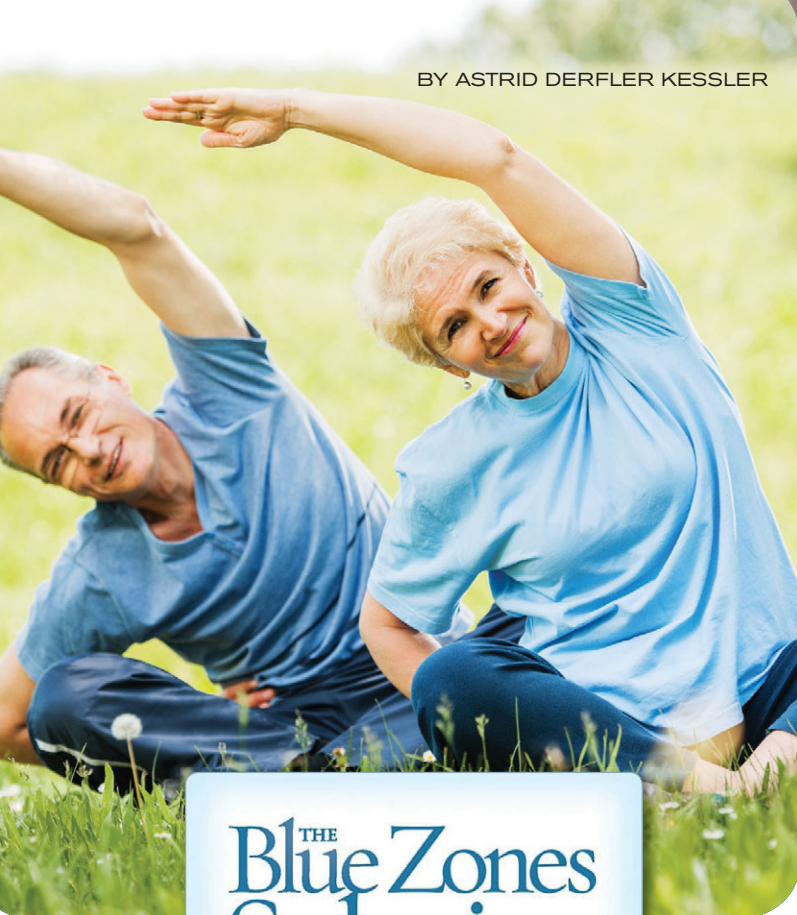
If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

For more information or to contact Cheryl Martin, visit [www.gardenswellness.com](http://www.gardenswellness.com)

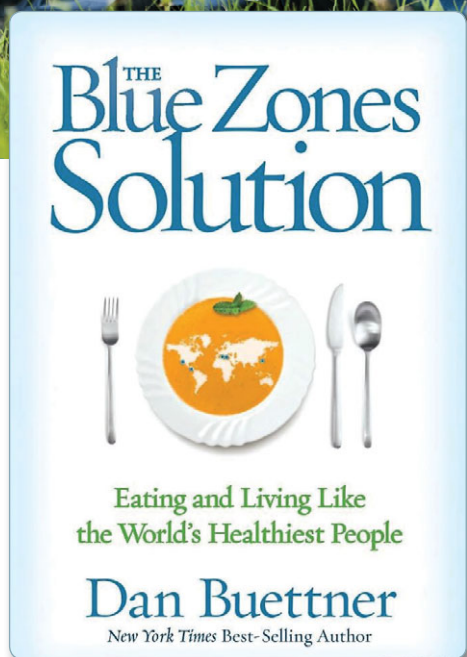




BY ASTRID DERFLER KESSLER



AUTHOR INTERVIEW



# The Blue Zones Solution

Eating and Living Like the World's Healthiest People

With Dan Buettner

Author, journalist, explorer, and health activist Dan Buettner has traveled the world investigating unique areas—known as Blue Zones—where people live extraordinarily long and healthy lives. In his new book *The Blue Zones Solution: Eating and Living Like the World's Healthiest People*, a follow-up to his bestselling book *The Blue Zones: Lessons for Living Longer From the People Who've Lived the Longest*, Buettner describes the eating habits and lifestyle choices that allow people from these five areas—including locations such as Okinawa, Japan, Sardinia, Italy, the Nicoya Peninsula of Costa Rica, Ikaria, Greece, and Loma Linda, California—to live well into their 80s, 90s, and 100s—all the while enjoying vibrant good health and a full and happy life.

Most people living in Blue Zones enjoy physical activity incorporated naturally into their daily lives (like gardening or walking), a sense of purpose (like caring for grandchildren or volunteer work), low stress levels and a slower pace of life, strong family and community connections, and a diet characterized by moderate caloric intake, mostly from plant sources.

While there are certain key characteristics that comprise a Blue Zone, such as eating a plant-based diet and engaging in daily activity, “It’s not a silver bullet,” said Buettner, in an interview with CBS news. “It’s silver buckshot. We found nine common denominators of the world’s longest living. When it comes to diet, there’s a big argument for having a vegan diet, but we find that by looking at data from 100,000 Americans, the Adventist health study, that adding a little bit of fish to your diet, being a pescatarian, is actually better for you.

“If you can articulate your sense of purpose, it’s worth about eight extra years of your life expectancy.”

**LE:** Longevity—as well as the good health to enjoy those extra years—is vital to *Life Extension*® readers. You’ve explored the earth finding pockets of healthy longevity and the secrets that make these people some of the longest-lived on the planet.

**DB:** For more than a decade, I’ve been working with the National Geographic Society to identify hot spots of longevity around the world—areas we called Blue Zones because a team of researchers had once circled a target region on a map with blue ink. Teaming with demographer Michel Poulain, I set out to find the world’s longest-lived people. We wanted to locate places that had not only high concentrations of 100-year-olds but also clusters of people who’d grown old without diseases like heart problems, obesity, cancer, or diabetes. We found five places.

1. Ikaria, Greece, an island eight miles off the coast of Turkey that has one of the lowest rates of middle-age mortality and the lowest rates of dementia,

2. Okinawa, Japan, home to the world’s longest-lived women,
3. Ogliastra Region, Sardinia, Italy, the mountainous highlands of an Italian island that boasts the world’s highest concentration of centenarian men,
4. Loma Linda, California, a community with the highest concentration of Seventh-Day Adventists in the US, where some residents live 10 more healthy years than the average American,
5. Nicoya Peninsula, Costa Rica, in Central America where residents have the world’s lowest rates of middle-age mortality and the second highest concentration of male centenarians.

**LE:** Despite the fact that these locales are spread around the globe, there must have been one or more common denominators. What longevity factors did these five location have in common?

**DB:** Remarkably, no matter where I found long-lived populations, I found similar habits and practices at work. When we asked our team of experts to identify these common denominators, they came up with nine lessons, which we call the Power Nine. They include moving naturally, purpose, downshift, the **80%** rule, plant slant, wine at 5:00, right tribe, community, and loved ones first.

**LE:** Please explain each of these nine rules in more detail.

**DB:** [The first] is **move naturally**. The world’s longest-lived people don’t pump iron, run marathons, or join gyms. Instead, they live in environments that constantly nudge them into moving. They grow gardens and don’t have

mechanical conveniences for house and yard work. Every trip to work, to a friend’s house, or to church occasions a walk.

**Purpose**—the Okinawans call it *ikigai* and the Nicoyans call it *plan de vida*, which both translate to “why I wake up in the morning.” In all Blue Zones, people had something to live for beyond just work. Research has shown that knowing your sense of purpose is worth up to seven years of extra longevity.

Even people in the Blue Zones experience stress, which leads to chronic inflammation associated with every major age-related disease. These people have routines to shed that stress [or **downshift**]. The Okinawans take a few moments each day to remember their ancestors, Adventists pray, Ikarians nap, and Sardinians do happy hour.

The **80%** rule reminds people to stop eating when their stomachs are **80%** full. *Hara hachi bu* is a 2,500-year-old Confucian mantra said before meals on Okinawa [to remind themselves of this]. The **20%** gap between not being hungry and feeling full could be the difference between losing weight and gaining it. People in the Blue Zones eat their smallest meal in the late afternoon or early evening, and then they don’t eat any more the rest of the day.

Meat—mostly pork—is eaten on average five times a month in a serving of three to four ounces, about the size of a deck of cards. Beans, including fava, black, soy, and lentil—the **plant slant**—are the cornerstone of most centenarian diets.

**Wine at 5:00.** People in all Blue Zones (even some Adventists) drink alcohol moderately and regularly. Moderate drinkers outlive nondrinkers. The trick is to drink one or two glasses per day with friends and/or food. And no, you cannot save up all week and have 14 drinks on Saturday!



The world's longest-lived choose or were born into social circles, the **right tribe**, that support healthy behaviors. Okinawans create *moais*—groups of five friends that commit to each other for life. Research shows that smoking, obesity, and even loneliness are contagious. By contrast, social networks of long-lived people favorably shape their health behavior.

All but five of the 263 centenarians interviewed belonged to a faith-based **community**. Denomination doesn't seem to matter. Research shows that attending services four times a month will add four to 14 years of life expectancy.

Successful centenarians in Blue Zones put family or **loved ones first**. They keep aging parents and grandparents nearby or in the home, which lowers disease and mortality rates of their children. They commit to a life partner (which can add three years of life expectancy) and they invest in their children with time and love, which makes the children more likely to be caretakers when the time comes.

**LE:** Let's delve into some of the unique health habits of each Blue Zone area. The Mediterranean Diet is something Life Extension® has long recommended as a key to good health and an increased life span. It's a diet that the centenarians on the Greek island of Ikaria have followed for centuries.



**DB:** Like other Blue Zones, Ikaria is remote and people have stuck to their traditions, which have enabled them to avoid the influence of modern Western eating habits. Their tradition of preparing the right foods, in the right way, has a lot to do with the island's longevity.

The island's diet, like much of the Mediterranean, includes lots of vegetables and olive oil, smaller amounts of dairy and meat products, and moderate amounts of alcohol. What sets it apart from other places in the region is an emphasis on goat's milk, legumes (especially garbanzo beans, black-eyed peas, and lentils), wild greens, some fruit, and relatively small amounts of fish.

**LE:** What is it specifically about eating or not eating these foods that increases longevity?

**DB:** Low dairy consumption has been associated with reduced heart disease. Olive oil, especially unheated, is believed to lower bad cholesterol and increase good cholesterol. Goat's milk contains serotonin-boosting tryptophan. And wine, in moderation, helps the body absorb more of the flavonoids from the food eaten with it. Black-eyed peas, rich in protein and fiber, have been found to contain some of the strongest anticancer, antidiabetes, and heart-protective substances in nature.

**LE:** Wild greens and lemons are also on the list of top longevity foods from Ikaria.

**DB:** Wild greens, such as purslane, dandelion, and arugula, grow all over the island. These wild mountain greens are a great source of minerals like iron, magnesium, potassium, and calcium

as well as carotenoids [that] the body converts to vitamin A. Eating a cup daily seemed to be one of the keys to longer life in Ikaria.

Ikarians put lemon juice on everything. They eat the whole fruit, skin and all. The high acidity of lemon peels may have a beneficial impact on blood sugar, helping control or prevent diabetes.

**LE:** You traveled to Okinawa, Japan, where you interviewed a centenarian you describe as having the flexibility of a yogi and the frenetic energy of a Chihuahua. It took some doing, but you finally convinced her to share her secrets.

**DB:** It took two days to convince [104-year-old] Gozei Shinzato to show me her arsenal of longevity supplements, but in the end she delivered. She showed me one supercharged supplement with carotenoids, flavonoids, and saponins, and another that fights breast cancer by reducing blood estrogen. [She showed me] a proven antimalarial agent to keep her stomach healthy, another to help regulate metabolism, maintain low blood pressure, and treat gallstones. [Another] lowers blood sugar to help stave off diabetes.

The "supplements" on display were Okinawan sweet potatoes, soybeans, mugwort, turmeric, and goya, a bitter melon. All grew 15 feet from her house.

**LE:** Another top longevity food of the Okinawans is seaweed. Along with turmeric and sweet potato, these three foods provide additional benefits for delaying aging. Can you please explain?

**DB:** They mimic calorie restriction, a digestive survival mode with longevity benefits. As food is digested, mitochondria in our cells convert calories to energy.

A by-product of this process are free radicals, oxidizing agents that deteriorate the body from the inside out. Free radicals stiffen arteries, shrink the brain, and wrinkle skin. In calorie restriction mode, our cells protect themselves by producing less energy but also throwing off fewer free radicals and thus slowing the aging process.

Recent research...has shown that regular consumption of turmeric, sweet potato, and seaweed can provide some of the benefits of caloric restriction, tripping genetic triggers that minimize production of free radicals without causing hunger.

**LE:** You mentioned bitter melon as a staple of the Okinawan diet. What is this?

**DB:** It's not a fruit—it's a long, knobby gourd. It's often served with other vegetables in a stir-fry. Recent studies found it an effective antidiabetic as powerful as pharmaceuticals in helping regulate blood sugar. Like the sweet potato, turmeric, and seaweed, it contains chemicals that may slow the production of corrosive free radicals. It's becoming more and more available in American gourmet produce markets [and] there is nothing quite like it as a substitute.

**LE:** I was somewhat surprised that an American community is included in the Blue Zones. Yet the Seventh Day Adventists in Loma Linda, California, live an average of 10 years longer than the typical American life span of 79 years.

**DB:** These are Americans... They live among us, drive by the same fast-food restaurants, shop in the same grocery stores, breathe the same air, and work the same jobs. But they're living a decade longer!

The first Adventist Health Study, the AHS-1, funded by the National Institutes of Health, followed 34,000 Adventists in California for 14 years. In that study, [it was found] that Adventists who most strictly followed the religion's teachings lived longer than people who didn't. The practices most likely to yield that longevity, each adding about two years to life expectancy, are eating a plant-based diet with only small amounts of dairy or fish, not smoking, maintaining medium body weight, eating a handful of nuts four to five times a week, and doing regular physical exercise.

**LE:** Adventists support their diet by citing Genesis 1:29: "And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in which is the fruit of a tree yielding seed; to you it shall be for meat."

**DB:** The Adventist encourage a well-balanced diet including nuts, fruits, and legumes, low in sugar, salt, and refined grains. Their diet prohibits foods deemed unclean by the Bible, such as pork or shellfish. The only beverage endorsed is water—at least six glasses a day.

**LE:** What are some more of the Adventists' top-longevity foods?

**DB:** Avocados, which may help reduce blood pressure and the risk of stroke. Salmon—people who eat one to two three-ounce servings weekly of fish rich in omega-3 fatty acids reduced their chance of dying from a heart attack by a third. A [1990's] study found that Adventists who ate a handful of nuts at least five times a week lived two to three years longer than people who didn't eat nuts. More research since

then found links between nut eaters and lower rates of cholesterol, blood pressure, chronic inflammation, diabetes, and a myriad of other troubles that add up to cardiovascular disease. Beans and other legumes represent [their] daily protein source, and a staple is slow-cooked oatmeal, [which] provides a balanced portion of fats, complex carbohydrates, and plant protein, along with good doses of iron and B vitamins. Its high fiber makes it filling, and nuts and dried fruits add fiber, flavor, and variety. Whole-wheat bread and soy milk are also included.

**LE:** Research has found that Costa Ricans living on the Nicoyan peninsula have the longest life expectancy of anyone in the world.

**DB:** Today, [Nicoyan] middle-aged people—especially men—reach a healthy, vital age of 90 at rates of up to **2.5 times** greater than those in the US. In other words, residents here elude heart disease, many types of cancer, and diabetes better than Americans by an order of magnitude. And they spend one-fifth of what the US spends on health care.

My colleagues and I concluded that the secret lies partly in their strong faith community, in their deep social networks, and their habit of doing regular, low-intensity physical activity. They also benefited from a healthy daily dose of vitamin D from sunlight and extra calcium in the water. Diet also plays a big role.

**LE:** Like residents of other Blue Zones, people here eat a low-calorie, low-fat, plant-based diet. What foods are unique to the Nicoyan peninsula that Life Extension® readers can incorporate into their own diets?



**DB:** The big secret of the Nicoyan diet was the “three sisters” of Mesoamerican culture: beans, corn, and squash. A combination of beans and squash, eaten with corn tortillas, is rich in complex carbs, protein, calcium, and niacin. It naturally helps reduce bad cholesterol and increase good cholesterol. Nutritionist Leonardo Mata told me he thought the most significant component of the diet was how they prepared their corn [tortillas]. To prepare the dough, they soak whole corn kernels in calcium hydroxide—lime and water—which infuses the grain with **7.5 times** more calcium and unlocks certain amino acids otherwise unavailable in corn.

**LE:** What are some other foods eaten on the peninsula that contribute to a long life span?

**DB:** Squash—available in several varieties—provides high levels of useful carotenoids. Papayas grow like weeds in Nicoya, so people eat it, both green and ripe, almost every day. Its rich orange flesh contains vitamins A, C, and E, plus an enzyme called papain that counters inflammation. Yams have been a staple for the past century. Although these yams are similar in appearance, they are unrelated botanically to North American sweet potatoes. They are true yams, available in the US in produce markets serving Latin American communities. Their flesh is firm and white, even cooked, and they are a rich source of vitamin B6. Black beans, bananas, and *pejivalles*, or peach palms, round out their top longevity foods.

**LE:** What are peach palms and are they available in the US?

**DB:** A staple for Costa Rica, they are rarely seen for sale in the United States. One prominent Costa Rican researcher believes they may interact with a bacterium—*Helicobacter pylori*—that is closely associated with stomach cancer. Peach palms may explain why Nicoyans have the lowest rates of stomach cancer in Costa Rica.

**LE:** Thank you for sharing this important and useful information with our readers. I’m sure they’ve learned even more ways to increase the longevity and vitality of their own lives. ●

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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Dan Buettner is an internationally recognized researcher, explorer, bestselling author, and National Geographic Fellow.

His books include  
*The Blue Zones: Lessons for Living Longer From the People Who've Lived the Longest and Thrive: Finding Happiness the Blue Zones Way*. He founded Blue Zones®, a company that puts the world's best practices in longevity and well-being into practice.

## SPICY BEAN BURGERS

Yields 4 burgers.

4 cups cooked and drained pinto beans or drained and rinsed canned pinto beans  
¾ cup fresh whole-grain bread crumbs  
Up to 1 tablespoon bottled hot red pepper sauce, such as Tabasco®  
2 teaspoons minced garlic  
½ tablespoon Worcestershire sauce  
½ teaspoon ground cumin  
½ teaspoon salt  
Nonstick spray  
4 whole-grain hamburger buns  
½ cup pico de gallo  
4 small Romaine lettuce leaves  
4 green bell pepper slices (optional)  
4 thin red onion rings (optional)

1. Put the beans, bread crumbs, hot red pepper sauce, garlic, Worcestershire sauce, cumin, and salt in a large bowl. Use a potato masher to blend these ingredients into a smooth paste. Cover and refrigerate for 30 minutes to firm up.
2. Spray the grate of an outdoor gas grill with nonstick spray, cover, and heat to high. Or spray a large grill pan with nonstick spray and set over medium-high heat for a few minutes until hot.
3. Meanwhile, use clean, wet hands to form the bean mixture into four even patties, each about 5 inches in diameter and ½-inch thick. Grill the patties until hot and a little crisp, about 6 minutes, turning once.
4. Place the patties on the bottom of the buns and top each with 2 tablespoons pico de gallo, as well as the lettuce and the tops of those buns. Garnish with pepper slices and onion rings as desired.

## IKARIAN STEW

Yields 4 servings.

- 2 cups dried black-eyed peas**
- ½ cup extra-virgin olive oil**
- 1 large yellow or white onion, diced (about 1½ cups)**
- 1 medium fennel bulb, trimmed, halved, and sliced into thin strips**
- 2 teaspoons minced garlic**
- 3 large carrots, peeled and chopped (about 1 cup)**
- 1 large red globe, beefsteak, or heirloom tomato, diced (about ¾ cup)**
- 2 tablespoons tomato paste**
- 2 bay leaves**
- 1 teaspoon salt**
- 4 large kale leaves, slivered**
- ½ cup chopped fresh dill**

1. Spread the black-eyed peas on a large baking sheet and pick over to remove any damaged peas or debris. Put the peas in a large pot, add enough cool tap water to submerge by 2 inches, and bring to a boil over high heat. Boil for 1 minute. Set aside off the heat and soak for one hour. Drain in a colander set in the sink.

2. Warm ¼ cup oil in a large pot or Dutch oven set over medium heat. Add the onion and fennel; cook, stirring often, until soft, about 8 minutes. Add the garlic and cook until fragrant, about 20 seconds. Stir in the black-eyed peas, carrots, tomato, tomato paste, bay leaves, and salt until the tomato paste dissolves. Add enough water just to cover the vegetables. Raise the heat to medium-high and bring to a boil.
3. Cover, reduce the heat to low, and simmer slowly until the black-eyed peas are tender, about 50 minutes.
4. Stir in the kale leaves and dill. Cover and cook until the kale is tender, 5 to 10 minutes. Discard the bay leaves. Ladle into four bowls. Drizzle 1 tablespoon olive oil on top of each helping.



## HOMEMADE GRANOLA

Yields 6 cups or 12 servings.

- 3 cups rolled oats (do not use quick-cooking or steel-cut oats)**
- ½ cup chopped unsalted nuts, such as walnuts, pecans, and/or almonds**
- ⅓ cup honey**
- ¼ cup walnut oil, pecan oil, or olive oil**
- 2 teaspoons vanilla extract**
- ½ teaspoon ground cinnamon**
- ½ teaspoon grated nutmeg**
- ¼ teaspoon salt**
- ½ cup dried berries or other chopped dried fruit, such as apples, pears, or pitted dates**

1. Position the rack in the center of the oven and heat the oven to 350°F.
2. Mix the oats, nuts, honey, oil, vanilla, cinnamon, nutmeg, and salt in a large bowl until well combined. Spread onto a large-lipped baking sheet.
3. Bake for 10 minutes. Stir and continue baking until golden brown, about another 10 minutes. Place the baking sheet on a wire rack. Sprinkle the dried berries or fruit on top and stir well. Cool to room temperature, about an hour.





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- **Biotin:** Biotin is an essential co-factor in the synthesis of fat and **protein** molecules that are prominent in skin, hair, and nails.<sup>5</sup> Studies demonstrate that biotin supplementation supports strength, hardness, and integrity of the nail.<sup>6</sup>

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#### References

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# Blood Testing The Ultimate Information

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- |  |  |
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| <p><b>○ COMPREHENSIVE PANELS</b></p> <p><b>○ MALE LIFE EXTENSION PANEL (LC322582) \$269</b><br/> <b>Chemistry Profile</b> includes glucose, cholesterol, LDL, HDL, triglycerides, liver and kidney function tests PLUS 20 additional tests. <b>CBC</b> includes immune (white) cell count, red blood cell count and platelet count. Also includes:<br/> <b>DHEA-S</b><br/> <b>TSH</b> for thyroid function<br/> <b>Estradiol</b><br/> <b>Vitamin D 25-hydroxy</b><br/> <b>Hemoglobin A1c</b></p> | <p><b>○ MALE COMPREHENSIVE HORMONE PANEL* \$299</b><br/> <b>(LC100010)</b> CBC/Chemistry Profile (see description above right), DHEA-S, Estradiol, DHT, PSA, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3, Free T4, Cortisol.</p>   |
| <p><b>○ FEMALE LIFE EXTENSION PANEL (LC322535) \$269</b><br/> <b>Chemistry Profile</b> includes glucose, cholesterol, LDL, HDL, triglycerides, liver and kidney function tests PLUS 20 additional tests. <b>CBC</b> includes immune (white) cell count, red blood cell count and platelet count. Also includes:<br/> <b>DHEA-S</b><br/> <b>TSH</b> for thyroid function<br/> <b>Estradiol</b><br/> <b>Progesterone</b><br/> <b>Hemoglobin A1c</b></p>  | <p><b>○ THE CBC/CHEMISTRY PROFILE (LC381822) \$35</b><br/> <b>Note:</b> This CBC/Chemistry Profile is included in many Life Extension panels. Please check panel descriptions.</p> <p><b>CARDIOVASCULAR RISK PROFILE</b><br/>           Total Cholesterol<br/>           HDL Cholesterol<br/>           LDL Cholesterol<br/>           Triglycerides<br/> <b>LIVER FUNCTION PANEL</b><br/>           AST (SGOT)<br/>           ALT (SGPT)<br/>           LDH<br/> <b>KIDNEY FUNCTION PANEL</b><br/>           BUN<br/>           Creatinine<br/> <b>BLOOD PROTEIN LEVELS</b><br/>           Total Protein<br/>           Albumin<br/> <b>BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE</b><br/>           Red Blood Cell Count<br/>           White Blood Cell Count<br/>           Eosinophils<br/>           Basophils<br/>           Polys (Absolute)<br/>           Lymphs (Absolute)<br/>           Monocytes (Absolute)<br/>           Eos (Absolute)<br/>           Baso (Absolute)<br/>           RDW<br/> <b>BLOOD MINERAL PANEL</b><br/>           Calcium<br/>           Potassium<br/>           Phosphorus</p> |
| <p><b>○ WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028) \$275</b><br/>           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.</p>   | <p><b>○ MALE ELITE PANEL* (LC100016) \$575</b><br/>           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</p>   |
| <p><b>○ FEMALE ELITE PANEL* (LC100017) \$575</b><br/>           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</p>  | <p><b>○ COMPREHENSIVE THYROID PANEL \$199</b><br/> <b>(LC100018)</b><br/>           TSH, T4, Free T4, Free T3, Reverse T3, TPO, ATA</p>  |
| <p><b>○ MALE HORMONE ADD-ON PANEL (LCADDM)* \$120</b><br/> <b>Pregnenolone and Dihydrotestosterone (DHT)</b><br/>           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.</p>                        | <p><b>○ FOOD SAFE ALLERGY TEST** (LCM73001) \$198</b><br/>           This test measures delayed (IgG) food allergies for 95 common foods.</p>  |
| <p><b>○ FEMALE HORMONE ADD-ON PANEL (LCADDF)* \$125</b><br/> <b>Pregnenolone and Total Estrogens</b><br/>           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.</p>   | <p><b>○ STRESS MANAGEMENT PROFILE (LC100043) \$125</b><br/>           Cortisol AM/PM, DHEA-S, Glucose, Insulin, Progesterone, Free T3, Lipid Panel</p>   |
| <p><b>○ LIFE EXTENSION THYROID PANEL (LC304131) \$75</b><br/>           TSH, T4, Free T3, Free T4.</p>   | <p><b>○ HEALTHY AGING PANEL-COMPREHENSIVE* (LC100026) \$249</b><br/>           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.</p>  |
| <p><b>○ FEMALE COMPREHENSIVE HORMONE PANEL* (LC100011) \$299</b><br/>           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.</p>   | <p><b>○ HEALTHY AGING PANEL-BASIC* (LC100025) \$149</b><br/>           CBC/Chemistry profile (see description above), C-Reactive Protein (high sensitivity), Vitamin B12, Folate, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Ferritin, and Insulin.</p>  |
|  | <p><b>○ VAP™ TEST* (LC804500) \$90</b><br/>           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.</p>  |
|  | <p><b>○ VAP™ PLUS* (LC100009) \$330</b><br/>           VAP, C-Reactive Protein (high sensitivity), Homocysteine, Fibrinogen, PLAC® Test (Lp-PLA2), Vitamin D 25-hydroxy.</p>   |





## Other Popular Tests and Panels

- |   |              |   |                |
|---|--------------|---|----------------|
| <input type="radio"/> <b>NUTRIENT PANEL* (LC100024)</b>   | <b>\$349</b> | <input type="radio"/> <b>HORMONES</b>   |                |
| Vitamin B12, Folate, Vitamin D 25-hydroxy, Vitamin C, Vitamin A, Selenium, Zinc, CoQ10, and RBC Magnesium.  |              | <input type="radio"/> <b>DHEA-SULFATE (LC004020)</b>  | <b>\$61</b>    |
|   |              | This test shows if you are taking the proper amount of DHEA. This test normally costs \$100 or more at commercial laboratories.   |                |
| <input type="radio"/> <b>CHRONIC FATIGUE PROFILE (LC100005)</b>   | <b>\$375</b> | <input type="radio"/> <b>MALE BASIC HORMONE PANEL (LC100012)</b>  | <b>\$75</b>    |
| 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. |              | <input type="radio"/> <b>FEMALE BASIC HORMONE PANEL (LC100013)</b>  | <b>\$75</b>    |
|   |              | DHEA-S, Estradiol, Free and Total Testosterone, Progesterone  |                |
| <input type="radio"/> <b>ANEMIA PANEL* (LC100006)</b>   | <b>\$79</b>  | <input type="radio"/> <b>DIHYDROTESTOSTERONE (DHT)* (LC500142)</b>  | <b>\$50</b>    |
| CBC/Chemistry Profile (see description previous page), Ferritin, Total Iron Binding Capacity (TIBC), Vitamin B12, Folate  |              | Measures serum concentrations of DHT.   |                |
| <input type="radio"/> <b>AUTOIMMUNE DISEASE SCREEN* (L100041)</b>   | <b>\$199</b> | <input type="radio"/> <b>ESTRADIOL (LC004515)</b>   | <b>\$33</b>    |
| ANA screen, hs-CRP, TNF, Immunoglobulins, IgA, IgG, IgM   |              | For men and women. Determines the proper amount in the body.  |                |
| <input type="radio"/> <b>DIABETES MANAGEMENT PROFILE – COMPREHENSIVE (LC100040)</b>   | <b>\$129</b> | <input type="radio"/> <b>INSULIN FASTING (LC004333)</b>   | <b>\$29.90</b> |
| Hemoglobin A1C, Glucose, Insulin, Lipid Panel, Glycomark  |              | Can predict those at risk of diabetes, obesity, heart and other diseases.   |                |
| <input type="radio"/> <b>DIABETES MANAGEMENT PROFILE – BASIC (LC100039)</b>   | <b>\$39</b>  | <input type="radio"/> <b>PREGNENOLONE* (LC140707)</b>   | <b>\$116</b>   |
| Hemoglobin A1C, Glucose, Insulin  |              | Used to determine ovarian failure, hirsutism, adrenal carcinoma, and Cushing's syndrome.  |                |
| <b>ADVANCED CARDIAC BIOMARKERS</b>  |              | <input type="radio"/> <b>PROGESTERONE (LC004317)</b>  | <b>\$55</b>    |
| <input type="radio"/> <b>ADVANCED OXIDIZED LDL PANEL* (LC100035)</b>  | <b>\$285</b> | Primarily for women. Determines the proper amount in the body.  |                |
| 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.  |              | <input type="radio"/> <b>SEX HORMONE BINDING GLOBULIN (SHBG) (LC082016)</b>   | <b>\$33</b>    |
|   |              | This test is used to monitor SHBG levels which are under the positive control of estrogens and thyroid hormones, and suppressed by androgens.                               |                |
| <input type="radio"/> <b>OXIDIZED LDL PANEL* (LC100034)</b>   | <b>\$175</b> | <b>GENERAL HEALTH</b>   |                |
| 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.   |              | <input type="radio"/> <b>VITAMIN D (25OH) (LC081950)</b>  | <b>\$47</b>    |
|   |              | This test is used to rule out vitamin D deficiency as a cause of bone disease. It can also be used to identify hypercalcemia.   |                |
| <input type="radio"/> <b>OXIDIZED LDL* (LC817472)</b>   | <b>\$75</b>  | <input type="radio"/> <b>FERRITIN (LC004598)</b>  | <b>\$28</b>    |
| OxLDL is a powerful initiator of inflammatory changes in the artery wall, which eventually lead to the formation of plaque.   |              | Ferritin levels reflect your body's iron stores and is also a biomarker for insulin resistance.   |                |
|   |              | <input type="radio"/> <b>VITAMIN B12/FOLATE* (LC000810)</b>   | <b>\$39.68</b> |
|   |              | 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. |                |
|   |              | <input type="radio"/> <b>PSA (PROSTATE SPECIFIC ANTIGEN) (LC010322)</b>   | <b>\$31</b>    |
|   |              | Screening test for prostate disorders and possible cancer.  |                |



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Peak ATP® with GlycoCam®  
PQQ Caps with BioPQQ®  
Rhodiola Extract  
RiboGen™ French Oak Wood Extract  
Triple Action Thyroid

### 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  
Provincial® 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® Decaf Roast  
Stevia Sweetener

### Glucose Management

CinSulin® with InSea2® and Crominex® 3+  
CoffeeGenic® Green Coffee Extract  
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 GlycoCam®  
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  
Boswellia  
Cytokine Suppress™ with EGCG  
Nervia®  
Serrafazyme  
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  
Optimized Resveratrol with Nicotinamide  
Riboside  
pTeroPure®  
Pycnogenol® French Maritime  
Pine Bark Extract  
Resveratrol with Pterostilbene  
RNA (Ribonucleic Acid)  
Super Alpha-Lipoic Acid  
Super R-Lipoic Acid  
X-R Shield

### Men's Health

Mega Lycopene Extract  
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

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, Skin & Nail Rejuvenation Formula  
w/VERISOL®

Hair Suppress Formula  
Life Extension Toothpaste  
Sinus Cleanser  
Venotone  
Xylwhite Mouthwash

### Pet Care

Cat Mix  
Dog Mix

### Probiotics

Bifido GI Balance  
BroccoMax®  
FlorAssist® Heart Health Probiotic  
FlorAssist® Oral Hygiene  
FlorAssist® Balance  
FlorAssist® Throat Health  
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  
BioActive Complete B-Complex  
Biotin  
Buffered Vitamin C Powder  
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  
HCAActive™ Garcinia 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

# SUPER SALE SAVINGS ON ALL PRODUCTS

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: [www.LifeExtension.com/SuperSale](http://www.LifeExtension.com/SuperSale)

ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
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			
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			
02004	ARTERIAL PROTECT • 30 veg. caps	48.00	36.00	33.00			
01617	ARTHRONAX® W/THEAFLAVINS & APRÈSFLEX® 120 veg. caps	44.00	33.00	30.00			
01618	ARTHRONAX® 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							

JANUARY 2016

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
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			
26576	BROCCO MAX® • 60 veg. caps	26.95	20.21				
01203	BROMELAIN (Specially-coated) 500 mg, 60 enteric coated tablets	21.00	15.75	14.25			
<b>C</b>							
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			
01932	CAT MIX • 100 grams powder	14.00	10.50	8.25			
01899	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			
<b>SUBTOTAL OF COLUMN 2</b>							

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**



# OFFER ENDS FEBRUARY 1, 2016

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: [www.LifeExtension.com/SuperSale](http://www.LifeExtension.com/SuperSale)

ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
01945	COMPLETE B-COMPLEX (BioActive) • 60 veg. caps	12.00	9.00	8.00			
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/BIOPOQQ® (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/BLEUBERRY & 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							

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE

ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
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	16.00	12.00	11.00			
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			
02021	DIGESTIVE ENZYMES (Enhanced Super) • 60 veg. caps	22.00	16.50	15.00			
02022	DIGESTIVE ENZYMES w/PROBIOTICS (Enhanced Super) • 60 veg. caps	28.00	21.00	18.00			
01671	D, L-PHENYLALANINE • 500 mg, 100 veg. caps	18.75	14.06	12.00			
SUBTOTAL OF COLUMN 4							

JANUARY 2016

# SUPER SALE SAVINGS ON ALL PRODUCTS

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: [www.LifeExtension.com/SuperSale](http://www.LifeExtension.com/SuperSale)

ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
01540	<b>DMAE BITARTRATE</b> • 150 mg, 200 veg. caps	18.00	13.50	11.25			
00059	<b>DMG</b> • 125 mg, 60 tablets	24.80	18.60	17.02			
01570	<b>DNA PROTECTION FORMULA</b> • 60 veg. caps	34.00	25.50	24.00			
01831	<b>DOG MIX</b> • 100 grams powder	18.00	13.50	11.25			
02006	<b>DOPA-MIND™</b> • 60 veg. tabs	48.00	36.00	32.00			
00321	<b>DR. PROCTOR'S ADVANCED HAIR FORMULA</b> • 2 oz	39.95	29.96	24.00			
00320	<b>DR. PROCTOR'S HAIR SHAMPOO</b> • 8 oz	24.95	18.71	16.50			
00899	<b>DUAL-ACTION MICRODERMABRASION ADV. EXFOLIATE</b> • 2.4 oz	39.95	29.96	29.21			
<b>E</b>							
01528	<b>ECHINACEA EXTRACT</b> • 250 mg, 60 veg. caps	14.35	10.76	9.38			
01997	<b>ENDOTHELIAL DEFENSE™ w/FULL-SPECTRUM POMEGRANATE™ AND CORDIART™</b> • 60 softgels	68.00	51.00	46.50			
00997	<b>ENDOTHELIAL DEFENSE™ w/GLISODIN®</b> • 60 veg. caps	54.00	40.50	36.00			
00625	<b>EPA/DHA (Mega)</b> • 120 softgels	19.95	14.96	13.50			
01737	<b>ESOPHAGEAL GUARDIAN</b> (Berry flavor) • 60 chewable tablets	36.00	27.00	24.00			
01042	<b>EUROPEAN LEG SOLUTION DIOSMIN 95</b> 600 mg, 30 veg. tabs	20.00	15.00	13.50			
01706	<b>EXTRAORDINARY ENZYMES</b> • 60 caps	26.00	19.50	18.00			
01514	<b>EYE PRESSURE SUPPORT W/MIRTOGENOL®</b> • 30 veg. caps	38.00	28.50	25.50			
<b>F</b>							
*01054	<b>FACE MASTER® PLATINUM</b> • Facial Toning System	199.00	199.00				
00965	<b>FAST-ACTING JOINT FORMULA</b> • 30 caps	39.00	29.25	27.00			
01717	<b>FAST-C® W/DIHYDROQUERCETIN</b> • 120 veg. tabs	26.00	19.50	18.00			
20053	<b>FEM DOPHILUS®</b> • 30 caps	25.95	19.46				
20055	<b>FEM DOPHILUS®</b> • 60 caps	39.95	29.96				
01064	<b>FEMMENESSENCE MACAPAUSE®</b> • 120 veg. caps	34.99	26.24				
01728	<b>FERNBLOCK® W/RED ORANGE COMPLEX</b> (Enhanced) 30 veg. caps	42.00	31.50	28.50			
00718	<b>FIBRINOGEN RESIST™</b> • 30 veg. caps	49.00	36.75	33.00			
01749	<b>FLAX SEED</b> (Organic golden) • 14 oz	11.67	8.75				
01821	<b>FLORASSIST® HEART HEALTH PROBIOTIC</b> • 60 veg. caps	32.00	24.00	21.00			
02011	<b>FLORASSIST® ORAL HYGIENE</b> • 30 lozenges	20.00	15.00	13.50			
01825	<b>FLORASSIST® BALANCE</b> • 30 liquid veg. caps	32.00	24.00	21.00			
01920	<b>FLORASSIST® THROAT HEALTH</b> • 30 lozenges	20.00	15.00	13.50			
01913	<b>FOLATE</b> (Optimized) • 5,000 mcg, 30 veg. tablets	25.00	18.75	16.50			
01939	<b>FOLATE</b> (Optimized) • 1,000 mcg, 100 veg. tablets	19.00	14.25	12.75			
01841	<b>FOLATE + VITAMIN B12 CAPS</b> • 200 veg. caps	10.50	7.88	7.13			
01544	<b>FORSKOLIN</b> • 10 mg, 60 veg. caps	16.00	12.00	10.50			
01513	<b>FUCOIDAN W/MARITECH® 926</b> (Optimized) • 60 veg. caps	36.00	27.00	24.75			
<b>G</b>							
00559	<b>GAMMA E TOCOPHEROL/TOCOTRIENOLS</b> • 60 softgels	42.00	31.50	27.75			
00759	<b>GAMMA E TOCOPHEROL W/SESAME LIGNANS</b> • 60 softgels	32.00	24.00	21.75			
01394	<b>GARLIC</b> (Optimized) • 200 veg. caps	24.95	18.71	15.75			
**01122	<b>GINGER FORCE®</b> • 60 liquid caps	34.95	26.21				
01658	<b>GINKGO BILOBA CERTIFIED EXTRACT™</b> 120 mg, 365 veg. caps	46.00	34.50	31.50			
01648	<b>GINKGO EXTRACT 28/7</b> (Super) • 120 mg, 100 veg. caps	29.00	21.75	19.88			
00756	<b>GLA WITH SESAME LIGNANS</b> (Mega) • 60 softgels	19.50	14.63	13.50			
<b>SUBTOTAL OF COLUMN 5</b>							

ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
00345	<b>(L-) GLUTAMINE CAPSULES</b> • 500 mg, 100 caps	14.95	11.21	10.13			
00141	<b>(L-) GLUTAMINE POWDER</b> • 100 grams	22.00	16.50	15.00			
00522	<b>GLUCOSAMINE/CHONDROITIN CAPSULES</b> • 100 caps	38.00	28.50	24.00			
01541	<b>GLUTATHIONE, CYSTEINE &amp; C</b> • 100 veg. caps	20.00	15.00	13.50			
00314	<b>L-GLUTATHIONE</b> (Mega) • 250 mg, 60 caps	39.64	29.73				
01669	<b>GLYCINE</b> • 1,000 mg, 100 veg. caps	12.00	9.00	8.10			
01411	<b>GRAPE SEED EXTRACT W/RESVERATROL &amp; PTEROSTILBENE</b> 100 mg, 60 veg. caps	36.00	27.00	25.50			
01604	<b>GREEN COFFEE EXTRACT COFFEEGENIC®</b> 200 mg, 90 veg. caps	22.00	16.50	15.00			
01620	<b>GREEN COFFEE EXTRACT COFFEEGENIC®</b> 400 mg, 90 veg. caps	32.00	24.00	21.00			
00953	<b>GREEN TEA EXTRACT</b> (Mega) • lightly caffeinated, 100 veg. caps	30.00	22.50	18.00			
00954	<b>GREEN TEA EXTRACT</b> (Mega) • decaffeinated, 100 veg. caps	30.00	22.50	18.00			
<b>H</b>							
01074	<b>5 HTP</b> • 100 mg, 60 caps	27.95	20.96				
*02002	<b>HAIR, SKIN &amp; NAIL REJUVENATION FORM W/VERISON®</b> 90 tabs	32.00	24.00	22.00			
01738	<b>HCA</b> (Garnicia) • 90 veg. caps	17.00	12.75	11.25			
29754	<b>HCACTIVE™ GARCINIA CAMBOGIA EXTRACT</b> • 90 caps	30.00	22.50				
01393	<b>HEPATOPRO</b> • 900 mg, 60 softgels	50.00	37.50	34.50			
01527	<b>HUPERZINE A</b> • 200 mcg, 60 veg. caps	40.00	30.00	27.00			
00661	<b>HYDRODERM®</b> • 1 oz	79.95	59.96	49.00			
<b>I</b>							
*01060	<b>I26 HYPERIMMUNE EGG</b> • 140 grams powder	54.99	46.75				
01704	<b>IMMUNE MODULATOR W/TINOFEND®</b> • 60 veg. caps	17.00	12.75	11.25			
00955	<b>IMMUNE PROTECT W/PARACTIN®</b> • 30 veg. caps	29.50	22.13	19.91			
02005	<b>IMMUNE SENESCENCE PROTECTION FORMULA™</b> • 60 veg. tabs	40.00	30.00	27.00			
01049	<b>INNERPOWER™</b> • 530 grams powder	42.00	31.50				
01674	<b>INOSITOL CAPSULES</b> • 1,000 mg, 360 veg. caps	62.00	46.50	43.50			
01292	<b>INTEGRA-LEAN® AFRICAN MANGO IRVINGIA</b> 150 mg, 60 veg. caps	28.00	21.00	18.00			
01248	<b>IODINE COMPLETE</b> (Advanced) • 12.5 mg, 180 tablets	46.00	36.50				
01677	<b>IRON PROTEIN PLUS</b> • 300 mg, 100 caps	28.00	21.00	19.50			
01492	<b>IRVINGIA W/PHASE 3™ CALORIE CONTROL COMPLEX</b> (Optimized African Mango) • 120 veg. caps	56.00	42.00	36.00			
<b>J, K, L</b>							
00056	<b>JARRO-DOPHILUS EPS®</b> • 60 veg. caps	22.95	17.21				
01759	<b>JARRO-DOPHILUS EPS®</b> • 30 caps	39.95	29.96				
01834	<b>K W/ADVANCED K2 COMPLEX</b> (Super) • 90 softgels	30.00	22.50	20.25			
01600	<b>KRILL HEALTHY JOINT FORMULA</b> • 30 softgels	32.00	24.00	21.75			
01050	<b>KRILL OIL</b> • 60 softgels	33.95	25.46				
00316	<b>KYOLIC® GARLIC FORMULA 102</b> • 200 veg. caps	26.45	19.84				
00214	<b>KYOLIC® GARLIC FORMULA 105</b> • 200 caps	27.45	20.59				
00789	<b>KYOLIC® RESERVE</b> • 600 mg, 120 caps	27.95	20.96				
01681	<b>LACTOFERRIN</b> • 60 caps	52.00	39.00	36.00			
00020	<b>LECITHIN</b> • 16 oz granules	18.00	13.50	12.00			
02055	<b>LIFE EXTENSION MIX™</b> • 315 tablets	80.00	60.00	52.00	43.75		
02057	<b>LIFE EXTENSION MIX™ W/EXTRA NIACIN</b> • 315 tablets	80.00	60.00	52.00	43.75		
<b>SUBTOTAL OF COLUMN 6</b>							

JANUARY 2016

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**



# OFFER ENDS FEBRUARY 1, 2016

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: [www.LifeExtension.com/SuperSale](http://www.LifeExtension.com/SuperSale)

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
02054	LIFE EXTENSION MIX™ • 490 caps	90.00	67.50	58.00	47.50		
02056	LIFE EXTENSION MIX™ POWDER • 14.81 oz	80.00	60.00	52.00	43.75		
02065	LIFE EXTENSION MIX™ • 315 tablets w/o copper	80.00	60.00	52.00	43.75		
02064	LIFE EXTENSION MIX™ • 490 caps w/o copper	90.00	67.50	58.00	47.50		
02066	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			
<b>M</b>							
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			
<b>N</b>							
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			
<b>SUBTOTAL OF COLUMN 7</b>							

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
01626	NATURAL SEX FOR WOMEN® 50+ (Advanced) • 90 veg. caps	59.00	44.25	34.00			
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™ • 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			
<b>O</b>							
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		
01989	ONCE-DAILY HEALTH BOOSTER • 60 softgels	52.00	39.00	36.00			
02001	ONE-PER-DAY • 60 tablets	22.00	16.50	15.00			
01328	ONLY TRACE MINERALS • 90 veg. caps	15.00	11.25	9.38			
<b>P</b>							
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	PHOSPHATIDYL SERINE 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			
<b>SUBTOTAL OF COLUMN 8</b>							

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

JANUARY 2016

**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**

# SUPER SALE SAVINGS ON ALL PRODUCTS

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: [www.LifeExtension.com/SuperSale](http://www.LifeExtension.com/SuperSale)

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
**01373	PRELOX® NATURAL SEX FOR MEN® • 60 tablets	52.00	39.00	36.00			
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			
01928	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® Pterostilbene • 50 mg, 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			
<b>Q, R</b>							
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			
02031	RESVERATROL W/NICOTINAMIDE RIBOSIDE (Optimized) • 30 veg. caps	42.00	31.50	27.00			
02030	RESVERATROL (Optimized) • 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				
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			
<b>SUBTOTAL OF COLUMN 9</b>							

		YOUR PRICE					
ITEM No.	PRODUCT	Retail Each \$	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			
01935	SAMe (S-ADENOSYL-METHIONINE) 200 mg, 30 enteric coated tablets	25.00	18.75	16.50			
01933	SAMe (S-ADENOSYL-METHIONINE) 400 mg, 30 enteric coated tablets	36.00	27.00	24.00			
01934	SAMe (S-ADENOSYL-METHIONINE) 400 mg, 60 enteric coated tablets	66.00	49.50	45.00			
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 liquid veg. 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			
02003	TRIPLE ACTION THYROID • 60 veg. caps	36.00	27.00	24.00			
01803	TRI SUGAR SHIELD® • 60 veg. caps	36.00	27.00	24.00			
01386	TRUFIBER™ • 180 grams	32.95	24.71				
01389	TRUFLOA® 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			
SUBTOTAL OF COLUMN 10							

JANUARY 2016

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**



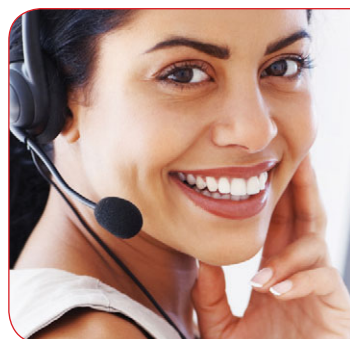
**OFFER ENDS FEBRUARY 1, 2016**

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ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
02016	<b>TWO-PER-DAY</b> • 60 tablets	10.50	7.88	7.13			
02015	<b>TWO-PER-DAY</b> • 120 tablets	20.00	15.00	13.50			
02014	<b>TWO-PER-DAY</b> • 120 caps	22.00	16.50	15.00			
00326	<b>L-TYROSINE</b> • 500 mg, 100 tablets	12.98	9.74				
<b>V</b>							
00213	<b>VANADYL SULFATE</b> • 7.5 mg, 100 veg. tablets	15.00	11.25	9.38			
00408	<b>VENOTONE</b> • 60 caps	18.95	14.21	12.00			
01327	<b>VINPOCETINE</b> • 10 mg, 100 veg. tablets	18.00	13.50	10.50			
00372	<b>VITAMIN B3 NIACIN</b> • 500 mg, 100 caps	7.65	5.74	4.99			
00098	<b>VITAMIN B5</b> • 500 mg, 100 caps (Pantothenic Acid)	10.50	7.88	7.04			
01535	<b>VITAMIN B6</b> • 250 mg, 100 veg. caps	12.50	9.38	8.25			
00361	<b>VITAMIN B12</b> • 500 mcg, 100 lozenges	8.75	6.56	5.44			
01634	<b>VITAMIN C w/DIHYDROQUERCETIN</b> 1,000 mg, 60 veg. tablets	10.00	7.50	6.75			
00927	<b>VITAMIN C w/DIHYDROQUERCETIN</b> 1,000 mg, 250 veg. tablets	25.50	19.13	17.44			
00084	<b>VITAMIN C POWDER</b> (BUFFERED) • 454 grams	23.95	17.96	16.50			
01736	<b>VITAMIN C-MAGNESIUM CRYSTALS</b> (EFFERVESCENT) 180 grams	20.00	15.00	13.50			
01732	<b>VITAMIN D3</b> • 2,000 IU, 1 fl oz, Mint flavor	28.00	21.00	18.75			
01753	<b>VITAMIN D3</b> • 1,000 IU, 90 softgels	7.00	5.25	4.50			
01751	<b>VITAMIN D3</b> • 1,000 IU, 250 softgels	12.50	9.38	8.44			
01713	<b>VITAMIN D3</b> • 5,000 IU, 60 softgels	10.00	7.50	6.50			
01718	<b>VITAMIN D3</b> • 7,000 IU, 60 softgels	14.00	10.50	9.45			
01758	<b>VITAMIN D3 W/SEA-IODINE™</b> • 5,000 IU, 60 caps	14.00	10.50	9.38			
00864	<b>VITAMIN D3 LIQUID EMULSION</b> • 2,000 IU, 1 oz.	28.00	21.00	18.75			
01840	<b>VITAMINS D AND K W/SEA-IODINE™</b> • 60 caps	24.00	18.00	16.50			
01763	<b>VITAMIN E</b> (Natural) • 400 IU, 100 softgels	30.00	22.50	21.00	19.50		
01225	<b>VITAMIN K2</b> (Low-dose) • 45 mcg, 90 softgels	18.00	13.50	12.00			
<b>W</b>							
01902	<b>WAIST-LINE CONTROL™</b> • 120 veg. caps	42.00	31.50	28.50			
<b>X, Y</b>							
01919	<b>X-R SHIELD</b> • 90 veg. caps	15.00	11.25	9.75			
00409	<b>XYLIWHITE™ MOUTHWASH</b> • 16 oz	10.00	7.50				
<b>Z</b>							
01813	<b>ZINC HIGH POTENCY</b> • 50 mg, 90 veg. caps	7.95	5.96	5.25			
01561	<b>ZINC LOZENGES</b> • 60 veg. lozenges	9.00	6.75	6.00			
01961	<b>ZINC LOZENGES</b> (Enhanced) • 30 veg. lozenges	12.00	9.00	6.00			
**01051	<b>ZYFLAMEND® WHOLE BODY</b> • 120 softgels	64.95	48.71				
<b>BOOKS</b>							
33885	<b>THE BLUE ZONES SOLUTION</b> by Dan Buettner • 2015	34.95	26.21				
33880	<b>OUTSTANDING HEALTH: THE 6 ESSENTIAL KEYS TO MAXIMIZE YOUR ENERGY AND WELL BEING</b> by Michael Galitzer, MD & Larry Trivieri Jr. • 2015	24.95	18.71				
33878	<b>TESTOSTERONE REPLACEMENT THERAPY</b> by Dr. John Crisler • 2015	19.99	14.99				
33877	<b>THE TRUTH ABOUT MEN AND SEX</b> by Abraham Morgentaler, MD, FACS • 2015	16.99	12.74				
33876	<b>TOX-SICK</b> • by Suzanne Somers • 2015	26.00	19.50				
<b>SUBTOTAL OF COLUMN 11</b>							

ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
33875	<b>DOCTORED: THE DISILLUSIONMENT OF AN AMERICAN PHYSICIAN</b> • by Sandeep Jauhar • 2015	26.00	19.50				
33874	<b>MISSING MICROBES</b> • by Martin J. Blaser, MD • 2014	28.00	21.00				
33873	<b>EATING ON THE WILD SIDE</b> • by Jo Robinson • 2014	16.00	12.00				
33872	<b>GET SERIOUS</b> • by Brett Osborn, MD • 2014	24.95	18.71				
33868	<b>TOXIN TOXOUT: GETTING HARMFUL CHEMICALS OUT OF OUR BODIES AND OUR WORLD</b> • by Bruce Lourie and Rick Smith • 2014	25.99	19.49				
33867	<b>THE COMPLETE MEDITERRANEAN DIET</b> by Michael Ozner, MD • 2014	19.95	14.96				
33869	<b>UNLEASH THE POWER OF THE FEMALE BRAIN</b> by Daniel Amen, MD • 2014	16.00	12.00				
33870	<b>MAGNIFICENT MAGNESIUM</b> by Dennis Goodman, MD • 2014	14.95	11.21				
DPT05	<b>DISEASE PREVENTION AND TREATMENT, EXPANDED FIFTH EDITION</b> (Hardcover) • 2014	69.95	39.95	36.00			
33865	<b>THE RESTORATION OF THE HUMAN BODY [IN 7 PARTS]</b> by Sergey A. Dzigan, MD, PhD • 2014	29.95	22.46				
33862	<b>I'M TOO YOUNG FOR THIS</b> • by Suzanne Somers • 2013	26.00	19.50				
33835	<b>PHARMOCRACY</b> • by William Faloon • 2011	24.00	9.60	8.00			
33854	<b>THE GREAT CHOLESTEROL MYTH</b> • by Jonny Bowden, PhD, CNS and Stephen Sinatra, MD • 2012	19.99	14.99				
33958	<b>THE VITAMIN D SOLUTION</b> by Michael F. Holick, PhD, MD (Paperback) • 2013	16.00	12.00				
33838	<b>YOUR GUIDE TO HEALTHY SKIN THE NATURAL WAY</b> by Gary Goldfaden, MD • 2012	26.00	15.00				
33815	<b>KNOCKOUT</b> • by Suzanne Somers • 2009	25.99	17.00				
33809	<b>TESTOSTERONE FOR LIFE</b> by Abraham Morgentaler, MD • 2008	16.95	11.87				
33696	<b>LIFE EXTENSION REVOLUTION</b> by Philip Lee Miller, MD (Paperback)	16.00	12.00				
33805	<b>MIAMI MEDITERRANEAN DIET WITH 300 RECIPES</b> by Michael D. Ozner, MD, FACC, FAHA (Hardcover) • 2008	24.95	16.25				
33906	<b>THE MIGRAINE CURE</b> • by Sergey Dzigan, MD, PhD • 2006	24.00	15.60				
33803	<b>WHAT YOUR DOCTOR MAY NOT TELL YOU ABOUT DIABETES</b> by Steven V. Joyal, MD • 2008	14.99	10.49				
<b>SUBTOTAL OF COLUMN 12</b>							

- \* These products are not 25% off retail price.
- \*\* Due to license restrictions, this product is not for sale to customers outside of the USA.
- \*\*\* Due to license restrictions, this product is not for sale to Canada.
- † Due to license restrictions, this product is not for sale to customers outside of the USA and Canada.



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which supplements  
you need?**

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Health Advisor  
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1-800-226-2370**

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JANUARY 2016

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## ORDER SUBTOTALS

SUBTOTAL COLUMN 1	
SUBTOTAL COLUMN 2	
SUBTOTAL COLUMN 3	
SUBTOTAL COLUMN 4	
SUBTOTAL COLUMN 5	
SUBTOTAL COLUMN 6	
SUBTOTAL COLUMN 7	
SUBTOTAL COLUMN 8	
SUBTOTAL COLUMN 9	
SUBTOTAL COLUMN 10	
SUBTOTAL COLUMN 11	
SUBTOTAL COLUMN 12	
<b>ORDER TOTALS</b>	
SUBTOTAL OF COLUMNS 1 - 12	
<b>SUPER SALE DEDUCT 10% (Subtotal x 10%)</b> <b>Ends 02/01/16</b>	
<b>POSTAGE &amp; HANDLING</b> (Any size order, in the U.S. includes Alaska & Hawaii)	<b>\$5.50</b>
<b>C.O.D.s</b> (ADD \$7 FOR C.O.D. ORDERS)	
<b>SHIPPING</b> UPS OVERNIGHT add \$16, UPS 2nd DAY AIR add \$7. For Puerto Rico, US Virgin Islands, add \$7. CANADA UPS EXPRESS Flat rate \$17.50, UK Flat rate \$25 USD. ALL OTHER INTERNATIONAL AIR WILL BE ADDED.	
<b>GRAND TOTAL</b> (MUST BE IN U.S. DOLLARS)	

**PLEASE MAIL TO: Life Extension**  
**P.O. Box 407198 • Ft. Lauderdale, Florida 33340-7198**  
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## INTRODUCING



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For **\$49.95**, you get an immediate **\$50 LE Dollar** enrollment bonus, double LE Dollars (4%) back on purchases, complimentary CHOICE unlimited standard shipping service†, and more. Your Healthy Rewards *Premier* is the ultimate way to earn LE Dollars and enjoy exclusive *Premier*-only perks! At the annual rate of just **\$49.95 US/\$59.95 International**, *Premier* pays for itself.

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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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ADDRESS

CITY/STATE/ZIP-POSTAL CODE COUNTRY

PHONE FAX

VISA/MASTERCARD/AMEX/DISCOVER #

EXP. DATE

SIGNATURE

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ADDRESS

CITY/STATE/ZIP-POSTAL CODE

COUNTRY

PHONE FAX

SIGNATURE

Prices subject to change without notice.  
Please notify Life Extension of any address change.



# Why You Want an *Enzymatically Active* **B-VITAMIN B-COMPLEX**

Maintaining optimal **vitamin B** status becomes critical as we age.

Not only are B vitamins required to support normal metabolic function, but they also support healthy homocysteine levels and help facilitate cognitive function.<sup>12</sup>

B vitamins must be replenished *daily* because they are water soluble and easily depleted from the body. Stress,<sup>3</sup> alcoholic beverages,<sup>4</sup> and some medications<sup>5</sup> can also quickly deplete B vitamins.

## Enzymatically Active B Vitamins

When conventional B vitamins are ingested, they must be **enzymatically** converted in the body to metabolically **active** forms.

The new **BioActive Complete B-Complex** provides *enzymatically active* forms of meaningful potencies of each B vitamin. This includes the **pyridoxal 5'-phosphate** form of vitamin B6 (the metabolically active form, shown to protect lipids and proteins against glycation reactions) and the most biologically active form of folate called **5-methyl-tetrahydrofolate (5-MTHF)**.

**5-MTHF** is up to **7 times** more bioavailable than folic acid and requires no enzymatic conversion to become metabolically active.<sup>6</sup> Studies show **5-MTHF** achieves optimal blood levels of active folate<sup>7</sup>—and more importantly, supports healthy **homocysteine** levels in those within the normal range,<sup>8</sup> while promoting **survival** in human study subjects.<sup>9</sup> And unlike folic acid, **5-MTHF** can cross the blood-brain barrier to facilitate **cognitive function**.<sup>10,11</sup>

The meaningful potencies and enzymatically active vitamins in **BioActive Complete B-Complex** deliver a full spectrum of key effects that most commercial B-complex supplements do not.

Non-GMO

## BioActive Complete B-Complex

Item #01945 • 60 vegetarian capsules

	Retail Price	Super Sale Price
1 bottle	\$12	<b>\$8.10</b>
4 bottles		<b>\$7.20 each</b>

The suggested daily dose of **two** vegetarian capsules of **BioActive Complete B-Complex** provides:

<b>Thiamine</b> (vitamin B1) (thiamine HCl)	<b>100 mg</b>
<b>Riboflavin</b> (vitamin B2) (riboflavin and riboflavin 5'-phosphate)	<b>75 mg</b>
<b>Niacin</b> (niacinamide and niacin)	<b>100 mg</b>
<b>Vitamin B6</b> (pyridoxine HCl and pyridoxal 5'-phosphate)	<b>100 mg</b>
<b>Folate</b> (L-5-methyltetrahydrofolate calcium salt)	<b>400 mcg</b>
<b>Vitamin B12</b> (methylcobalamin)	<b>300 mcg</b>
<b>Biotin</b>	<b>1,000 mcg</b>
<b>Pantothenic acid</b> (D-calcium pantothenate)	<b>500 mg</b>
<b>Calcium</b> (D-calcium pantothenate, calcium sulfate, dicalcium phosphate)	<b>60 mg</b>
<b>Inositol</b>	<b>100 mg</b>
<b>PABA</b> (para-aminobenzoic acid)	<b>50 mg</b>

## References

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2. *N Engl J Med.* 2002 Feb 14;346(7):476-83.
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To order **BioActive Complete B-Complex**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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

# MacuGuard®

Provides  
Powerful  
Eye Protection



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:<sup>1-7</sup>

- Supports lutein concentration in the eye
- Supports efficient absorption of lutein in the bloodstream
- Provides phospholipids to enhance lutein in the cell membrane
- Maintains zeaxanthin concentrations in the eye
- Provides *meso*-zeaxanthin, which is difficult to obtain from dietary sources
- Contains cyanidin-3-glucoside, shown to help with night vision.
- Provides astaxanthin to protect against free radical-induced DNA damage, which may play a protective role against eye fatigue.

**Contains soybeans.**

**LuteinPlus®** and **Mz®** are registered trademarks of Nutriproducts Ltd., UK, licensed under U.S. Patent 8,623,428.

## MacuGuard® Ocular Support with Astaxanthin

Item #01886 • 60 softgels

	Retail Price	Super Sale Price
1 bottle	\$42	<b>\$28.35</b>
4 bottles		<b>\$25.65 each</b>

Suggested dose is one softgel daily with or without food. Each bottle of **MacuGuard** provides a **two-month** supply.

### References

1. *Photochem Photobiol.* 2002;68(1):39-44
2. *Nutrients.* 2013 April;5(4):1169-1185.
3. *Nutr Res.* 2009;29(8):588-95.
4. *Nutrition.* 2011 Sep;27(9):960-6.
5. *Lipids.* 2009 Sep;44(9):799-806.
6. *Mol Cell Biochem.* 2006 Jan;281(1-2):103-10.
7. *J Pharm.* 2011 Jun 30;412(1-2):99-105.



To order **MacuGuard® Ocular Support with Astaxanthin**, call **1-800-544-4440** or visit **[www.LifeExtension.com](http://www.LifeExtension.com)**



# ZINC ACETATE LOZENGES

## FOR WINTER SEASON SUPPORT

Zinc stimulates the activity of about 300 enzymes<sup>1</sup> and fortifies the immune system.<sup>2</sup>

Taking the best zinc lozenge is important for maintaining the body's natural defense system during the cold season—and throughout the year.

**Enhanced Zinc Lozenges** is a special "ionic formula" that delivers on the original promise of seasonal immune support.

### IMMUNE SUPPORT FOR SEASONAL CHANGES

Scientific evidence is accumulating that **zinc acetate** is the preferred zinc compound to provide enhanced seasonal immune support.

**Zinc acetate** releases **100%** of its zinc as **ionic zinc**—positively charged zinc ions. **Zinc acetate** lozenges have been shown to strongly support immune function.<sup>3-5</sup>

Life Extension® **Enhanced Zinc Lozenges** provide **zinc acetate** with no other ingredients that could reduce the delivery of these immune-supportive, positively charged zinc ions. **Enhanced Zinc Lozenges** come in a naturally flavored peppermint lozenge.

### SUGGESTED USE

The suggested serving size of one vegetarian lozenge of **Life Extension® Enhanced Zinc Lozenges** provides:

**ZINC** (zinc acetate)

**18.75 mg**

These special **zinc lozenges** are not meant for daily use. Only a few of these lozenges are usually required when extra support is needed for seasonal changes. It's good to keep a bottle close by at home or work for immediate access.



### Zinc Lozenges

Item #01961 • 30 vegetarian lozenges

	Retail Price	Super Sale Price
1 bottle	\$12	<b>\$8.10</b>
4 bottles		<b>\$5.40 each</b>

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

### References

1. *J Nutr.* 2000 May;130(5S Suppl):1437S-46S.
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4. *Ann Intern Med.* 2000;133:245-52.
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# 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**.<sup>1,3</sup> Data supports value of K1 in addition to the K2 forms.<sup>4-7</sup>



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



**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.<sup>10-11</sup> Those who take **alpha**-tocopherol should also take **gamma** tocopherol.



**Blueberry extract** boosts DNA function and sustain healthy blood sugar levels already within normal range.<sup>12,13</sup>



**Sesame lignans** increases tissue levels of **gamma tocopherol**, which plays a pivotal role in quenching certain kinds of inflammation.<sup>14</sup>



**Lycopene** supports prostate health, protect against free radical activity, and guard against LDL oxidation.<sup>15,16</sup>



**Chlorophyllin** offers protection against environmentally induced DNA damage from toxins like smoke, emission particles, and foods cooked at high temperatures.<sup>17</sup>



**Black currant extract (C3G)** anthocyanins promotes eye health and help ease eye fatigue.<sup>18</sup>



**Vitamin B12** helps maintain a healthy nervous system and metabolism.<sup>19</sup> Vitamin B12 levels decrease with age.<sup>20</sup>



## Each Bottle Of Health Booster Lasts Two Months

### Super Cost Effective!

Just one softgel of the new **Health Booster** taken with a meal provides optimized potencies of **fat-soluble** vitamins, carotenoids, and other plant extracts. If these nutrients were taken separately, one would have to swallow many capsules and spend **2-3 times** more money.

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

### Once-Daily Health Booster

Item #01989 • 60 softgels (two-month supply)

	Retail Price	Super Sale Price
1 bottle	\$52	<b>\$35.10</b>
4 bottles		<b>\$32.40 each</b>

### One daily Health Booster softgel provides:

<b>Vitamin K1</b>	1,500 mcg	<b>MacuGuard® Carotenoid Phospholipid Blend</b>	145 mg
<b>Vitamin K2 (MK-4)</b>	1,000 mcg	Phospholipids, marigold extract (flower)	
<b>Vitamin K2 (MK-7)</b>	200 mcg	[providing 10 mg free lutein,	
<b>Vitamin B12</b>	300 mcg	4 mg <i>meso</i> -zeaxanthin & <i>trans</i> -zeaxanthin]	
<b>Chlorophyllin</b>	100 mg	<b>C3G (Cyanidin-3-glucoside)</b>	2.2 mg
<b>Gamma E Mixed Tocopherols</b>	359 mg	[from European black currant extract (fruit)]	
Gamma tocopherol 197.45 - 269.25 mg		<b>Lycopene proprietary blend</b>	10 mg
Delta tocopherol 71.8 - 107.7 mg		[from Micronized Lycopene and Tomat-O-Red®	
Alpha tocopherol 30.52 - 43.08 mg		natural tomato extract (fruit)]	
Beta tocopherol < 17.95 mg		<b>Sesame Seed Lignan Extract</b>	20 mg
		<b>Wild Blueberry Whole Extract (fruit)</b>	100 mg

### References

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

**Tomat-O-Red®** is a registered trademark of Lycopodium, LTD. **LuteinPlus®** and **Mz®** are registered trademarks of NutriProducts Ltd., UK, licensed under U.S. Patent 8,623,428.



## Compare CENTRUM® to TWO-PER-DAY:

Sample Ingredient Comparison	Centrum® Silver® Adults 50+	Life Extension® Two-Per-Day
Vitamin A (as beta-carotene)	1,000 IU	4,500 IU
Vitamin A (preformed)	1,500 IU	500 IU
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 (cyanocobalamin)	300 mcg (methylcobalamin)
Niacin	20 mg	50 mg
Pantothenic acid	10 mg	100 mg
Vitamin E	50 IU (synthetic)	100 IU (natural)
Folate	400 mcg (folic acid, synthetic)	400 mcg (L-5-MTHF, active)
Zinc	11 mg	30 mg
Selenium	19 mcg (one form)	200 mcg (three forms)
Lutein	250 mcg	5,000 mcg
Lycopene	300 mcg	1,000 mcg
Biotin	30 mcg	300 mcg
Chromium	50 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
Choline	(none)	20 mg
Boron	(none)	3 mg
Inositol	(none)	50 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

# Are You Getting the Maximum Potency from Your Daily Vitamin?

Life Extension®'s **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.

Compared to **Centrum®** (the leading multivitamin), **Two-Per-Day** provides:

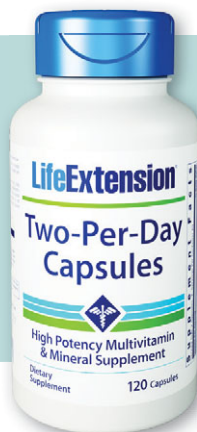
- 50 times more vitamin B1
- 12 times more vitamin B12
- 25 times more vitamin B6
- 10 times more biotin
- 10 times more selenium
- 8 times more vitamin C
- 2 times more vitamin D
- 2 times as much vitamin E
- 2.5 times as much vitamin B3
- 3 times as much zinc

Life Extension®'s **Two-Per-Day** contains **5-methyltetrahydrofolate (5-MTHF)**, the active form of folate that is up to **7 times more bioavailable** than **folic acid**. This greater bioavailability is especially important in people with a genetic enzyme deficiency since it requires no conversion to become metabolically active.

## Two-Per-Day Capsules

Item #02014 • 120 capsules (2 month supply)

	Retail Price	Super Sale Price
1 bottle	\$22	<b>\$14.85</b>
4 bottles		<b>\$13.50 each</b>



## Two-Per-Day Tablets

Item #02015 • 120 tablets (2 month supply)

	Retail Price	Super Sale Price
1 bottle	\$20	<b>\$13.50</b>
4 bottles		<b>\$12.15 each</b>



To order **Two-Per-Day Tablets** or **Two-Per-Day Capsules**, call **1-800-544-4440** or visit **www.LifeExtension.com**

For the complete list of ingredients, trademarks, cautions, references, dosage and use, please visit [www.LifeExtension.com](http://www.LifeExtension.com).  
\*Two-Per-Day provides a small amount of gamma tocopherols as part of natural mixed tocopherols, which include natural vitamin E.  
\*\*NIAGEN® is a registered trademark of ChromaDex, Inc., Patents see: [www.ChromaDexPatents.com](http://www.ChromaDexPatents.com).

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



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