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50 HOW BLOOD SUGAR ACCELERATES AGING
The CR Way is a lifestyle that emphasizes delicious, low-calorie meals designed to help control glucose and insulin levels. Studies now indicate that the CR Way approach to calorie restriction activates genes that are specifically associated with longevity.

58 OVERCOME FATIGUE WITHOUT STIMULANTS
Fatigue is one of the most common complaints among aging humans. Rather than turn to stimulant drugs or excessive caffeine use, you can now safely boost cellular energy by increasing your ATP energy storehouse. A potent combination of cordyceps and fermented ginseng raises ATP to optimize energy production without jittery side effects.

68 BIO-ENHANCED COMPOUNDS BLOCK INFLAMMATORY PATHWAYS
Scientists have identified three compounds—curcumin, ginger, and turmeric oil—that powerfully inhibit the multiple underlying factors behind inflammation. A bio-enhanced process enables the delivery of almost seven times more of these extracts to your bloodstream.

82 BRAIN TUMOR TREATMENT BREAKTHROUGH
Perhaps the most frightening malignancy is a brain cancer called glioblastoma multiforme. A recent study published in the New England Journal of Medicine may represent the most significant advance yet discovered in glioblastoma multiforme treatment.

7 AS WE SEE IT: DOCTORS FAIL TO RECOGNIZE LEADING CAUSE OF DEATH
Excess glucose damages the delicate endothelium that lines our arteries, setting the stage for coronary and cerebral vascular disease. Reducing after-meal glucose levels has the potential to prevent far more death and disease than lowering cholesterol. A recent discovery can make a significant difference in after-meal glucose levels by inhibiting overproduction of glucose in the liver, impeding glucose absorption, and improving glucose clearance from the bloodstream.

19 IN THE NEWS
High magnesium reduces insulin resistance; beta-carotene, vitamin C, and magnesium improve protection against hearing loss; calcium with vitamin D protects against bone density loss in men; wild blueberries may inhibit effects of metabolic syndrome; compounds in rosemary and spearmint may reduce cognitive decline; resveratrol improved factors associated with diabetes and cardiovascular disease; and more.

95 SUPER FOODS—SWEET AS SUGAR: HEALTH BENEFITS OF STEVIA AND XYLITOL
Two natural substances—stevia and xylitol—are known as safe sweeteners that provide alternatives to sugar. Studies show that both stevia and xylitol protect against typical after-meal glucose surges and reduce insulin needs. Stevia may also lower high blood pressure while xylitol helps prevent cavities and ear infections and may strengthen bones.
Since Life Extension® introduced CoQ10 in 1983, our scientists have continued to develop increased potency and absorbability. Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™ contains PrimaVie® shilajit that doubles levels of CoQ10 in the mitochondria.

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

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Shilajit helps the mitochondria convert fats and sugars into the body’s main source of energy, ATP (adenosine triphosphate).

Combining ubiquinol CoQ10 with shilajit generates a powerful synergy that supports more youthful cellular energy production than CoQ10 alone.

To order Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™ call 1-800-544-4440 or visit www.LifeExtension.com

References

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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.

**EYE PROTECTION FORMULA**

**Ocular Circulation Support**

Lutein is one of the major components of macular pigment and it is essential to proper vision. Eating large quantities of lutein- and zeaxanthin-containing vegetables can help provide the nutritional building blocks necessary to maintain the structural integrity of the macula. It’s difficult, however, to increase systemic circulation of these important nutrients through food alone. Now there is an easier way to bolster your eye integrity.

**MacuGuard™ Ocular Support** contains phospholipids, which are an integral part of the cell membrane. In addition to mixing well with other important fat-soluble components of the eye such as lutein, phospholipids have been shown to help support efficient absorption of dietary lutein in the blood stream as well. Phospholipids have been shown in scientific research to improve systemic circulation and accumulations of lutein in the retina of the eyes, making them a potent all-around weapon in your arsenal for eye health.

**MacuGuard™ Ocular Support offers TRIPLE EYE PROTECTION:**

- Supports concentration of lutein in the eye.
- Supports efficient absorption of lutein in the blood stream.
- Phospholipids enhance lutein in the cell membrane.
- Supports zeaxanthin concentrations in eye.
- Provides meso-zeaxanthin which is difficult to obtain from dietary sources.

**Comprehensive Ocular Protection in One Daily Softgel**

This formula provides ingredients that have been shown to promote healthy eyesight. Just one softgel of MacuGuard™ Ocular Support provides:

- **MacuGuard™ Carotenoid Phospholipid Blend** 145 mg
  - Phospholipids, marigold extract (flower)
  - [providing 10 mg free lutein, 4 mg meso-zeaxanthin & trans-zeaxanthin]
  - C3G (Cyanidin-3-glucoside)
    - [from European black currant extract (fruit)]

The retail price for a bottle containing 60 softgels of MacuGuard™ Ocular Support is $22. If a member buys four bottles during Super Sale, the price is reduced to $13.37 per bottle.

Contains soybeans.

**References**


**To order MacuGuard™ Ocular Support call 1-800-544-4440 or visit www.LifeExtension.com**
When Will Doctors Recognize This Leading Cause of Death?

BY WILLIAM FALOON

Today’s cardiologists understand that oxidized cholesterol plays a role in the development of atherosclerosis.¹

What may surprise you was the debate that raged last century as to whether one’s blood lipid levels had any relationship to heart attack risk.

In 1951, the first book that connected LDL cholesterol to heart disease was published by a group that included one of our early members, John Gofman, MD, PhD.² The medical establishment at the time rebelled against this concept and issued an armada of withering criticisms against Dr. Gofman.³

In 1959 and 1965, the FDA proclaimed it illegal to promote foods low in saturated fat and cholesterol as being potentially protective against artery disease.⁴

Medical schools back then taught doctors that atherosclerosis was an inevitable accompaniment of aging about which nothing could be done. Despite epidemic numbers of middle-aged men succumbing to sudden death heart attack, very little was being done. Vocal opposition to the cholesterol theory of vascular disease continued into the 1980s.³

The purpose of this article is to remind Life Extension® members of a correctable risk factor that significantly increases risk of vascular and other diseases, but is not being taken seriously by mainstream physicians. >
Excess glucose damages the delicate endothelium that lines our arteries, setting the stage for coronary and cerebral vascular disease. Previous articles published in Life Extension magazine have shown the deadly impact in response to high after-meal glucose levels.

Acarbose is a prescription drug that inhibits the alpha-glucosidase enzyme in the intestines. People taking acarbose with meals reduce the amount of ingested carbohydrates that absorb into their bloodstream. Acarbose blunts deadly after-meal glucose surges that occur in response to eating sugars and starches.

Results from seven long-term studies suggest acarbose may reduce heart attack risk by up to 64%. The initial data is so impressive that a study of 7,500 cardiac patients titled the Acarbose Cardiovascular Evaluation Trial has been initiated to see if acarbose can prevent heart attacks in people with impaired glucose tolerance and type II diabetes. Results from this study are expected to be released by 2016.

What has us excited about this research is that reducing after-meal glucose levels has the potential to prevent far more death and disease than lowering LDL-cholesterol. One reason is that elevated glucose not only promotes vascular disease, but is also associated with an increased risk of dementia, an increased risk of developing cancer, and worse outcomes in patients with cancer.

**Doctors Are Failing To Warn Their Patients**

Aging people today are being told by their physicians that their glucose is “normal” when it’s usually at dangerously high levels. It is analogous to the 1960s-1970s when doctors viewed cholesterol levels of 300 mg/dL as normal. Doctors in the 1960s-1970s were correct that diets rich in animal fat made high blood cholesterol quite normal, but at a cost of heart attack rates in middle-aged men much greater than today.

It took many decades before mainstream medicine reduced the reference range of cholesterol considered safe to under 200 mg/dL.

Today we have the same problem with glucose, where doctors tolerate fasting levels up to 110 mg/dL as “normal” in their aging patients. To optimally protect against degenerative disease, fasting glucose should be under 86 mg/dL.

Even more insidious is data showing that blood sugar “spikes” that occur after meals dramatically increase the risk of cardiovascular disease, retinal damage, and cancer.

Unless steps are taken to suppress after-meal sugar surges, the elevated glucose levels triggered by most large meals will incite a dangerous metabolic cascade that results in cell damage and accelerated aging.

I am grateful to report that improved natural methods have been discovered to suppress deadly after-meal glucose surges.

**Epidemic Of High Blood Sugar**

Most adults suffer from elevated blood sugar levels. One report evaluated 46,000 middle-age individuals and found more than 80% had fasting blood sugar of 85 mg/dL or greater. Another study involving over 11,000 middle-age and older individuals showed nearly 85% had fasting blood sugar of 85 mg/dL or greater.

Since incidence of disease starts to increase when fasting blood sugar rises above 85 mg/dL, this means the majority of aging humans today endure chronic cellular damage associated with elevated blood sugar, along with the accumulation of surplus fat pounds.
Glucose Fuels Breast Cancer Risk

Life Extension’s analysis of the published scientific literature has identified strong data suggesting increased breast cancer risk amongst women with so-called “normal” blood glucose levels. For example, pre-menopausal women with a blood sugar above 84 mg/dL had more than two-times the risk of developing breast cancer compared to those with a blood sugar below 84 mg/dL.44

Another study compared women with a fasting glucose under 100 mg/dL with those whose blood glucose was between 100-125 mg/dL. Women with the higher glucose readings had a 32% increased risk of breast cancer after multivariate analysis.61

A study of 10,633 women from Italy found significant relationships between blood sugar levels and breast cancer risk. In this study, women in the highest glucose quartile (median 96 mg/dL) had a 63% increased risk for breast cancer compared to those in the lowest quartile (median 73 mg/dL) after being “fully adjusted” for multiple variables. The authors stated in the discussion:

“…we found that elevated fasting glucose levels were significantly associated with subsequent occurrence of breast cancer. The association was significant both in pre- and post-menopausal women.”

An abundance of published research links high-normal blood glucose levels to increased breast cancer risk.44,46 This fact alone emphasizes the importance of maintaining glucose at safe low-normal ranges.

In response to reports showing that type II diabetics suffer greater incidence and mortality from breast cancer,47-51 Life Extension conducted an analysis of the scientific literature to ascertain if there was a connection between higher “normal” blood glucose and breast cancer risk.

We identified twelve separate studies that examined blood glucose levels in relationship to incidence of breast cancer.47-58 Out of these twelve studies, nine showed an association of higher fasting glucose or other indicators of poor glycemic control with increased cancer risks.47,52,54,56,57

The take-home message in examining this data is to initiate steps to lower glucose (which also reduces insulin) in order to help prevent the most prevalent malignancy striking women today.

While glucose provides fuel for rapidly dividing cancer cells, insulin is a hormonal stimulator for cell growth and differentiation.44,48 The role of elevated glucose and insulin on cancer incidence and progression is being increasingly recognized and was the subject of a report on the CBS news magazine show 60 Minutes.59

A recent study looked at the risk of overall cancer death in relation to blood glucose levels. Those with fasting glucose averaging around 100 mg/dL had 49% increased cancer death risk. Those with after-meal glucose above 199 mg/dL had 52% increased cancer death risk. This 19-year study of 2,438 people shows that elevated glucose levels markedly increase one’s risk of dying from cancer.60

High “Normal” Sugar Levels Shrink Brain Volume

In September 2012, Australian researchers published findings showing blood glucose at the high end of normal resulted in significant brain shrinkage.62,63 The shrinkage occurred in regions of the brain (hippocampus and amygdala) involved in memory and other critical functions. Atrophy (shrinkage) in these brain areas worsens memory.62,63

For this study, neuroscientists at Australian National University in Canberra studied 249 people in their early 60s. Each of them had blood sugar levels in the normal range. The study subjects’ brains were scanned at the beginning of the study, and again four years later.

Comparing the before and after images, the researchers found

This epidemic of elevated blood sugar will continue to cause age-related disease until the medical profession realizes that their test values for defining “normal” blood sugar are antiquated.

The Glucose-Cancer Connection

In the United States, over 200,000 women are diagnosed with some form of breast cancer each year. Around 41,000 die from it.42 Most breast cancer victims’ lives are spared, but at the cost of surgical mutilation, radiation injury, systemic chemotherapy damage, and acute menopause caused by estrogen-blocking drugs.

With 12% of all American women destined to develop breast cancer,41 taking preventive steps make sense, especially if the same approach also slashes risk of dementia and heart attack…and helps shed fat pounds.
through vital arteries, which can ultimately lead to a heart attack or stroke.65

Fortunately, you’re about to learn about new natural methods that significantly reduce the surge of glucose into your aging arteries. And while you may not entirely eliminate after-meal sugar surges, Life Extension members should feel assured that steps they long ago initiated confer protection against some of the damage glucose inflicts to their cardiovascular systems. For example, a landmark study showed that gamma tocopherol limits the artery damaging impact of an after-meal glucose burst. This human study, published in January 2013, showed an expected 30-44% decrease in endothelial function in men after consuming 75 grams of pure glucose. Men who took gamma tocopherol five days in a row before the glucose challenge showed no significant loss of endothelial function.66

This well-designed study revealed how gamma tocopherol protected the arterial endothelium against glucose damage. Foundation members have supplemented with gamma tocopherol since as early as 1996. It’s still critical, however, to take steps before carbohydrate-containing meals to reduce the amount of glucose that enters your bloodstream.

**Novel Approaches To Glucose Management**

As mentioned in the beginning of this article, the drug acarbose functions by inhibiting the alpha-glucosidase enzyme.15 This limits the amount of glucose available for rapid absorption from dietary starch and sugar.

Initial studies indicate that acarbose may dramatically reduce cardiovascular risk.16 We’ll know definitively how well acarbose works when the results of a large human trial are released around 2016. You don’t have to wait until year 2016 to benefit.

Instead of taking the drug acarbose (which Life Extension has advocated for the past 7 years), consumers now have access to low-cost nutrients that have demonstrated alpha-glucosidase inhibiting properties.67-74

Scientists have identified three natural agents that when combined not only inhibit alpha glucosidase, but function by additional mechanisms to impede glucose absorption, reduce glucose over-production in the liver, and enhance clearance of excess glucose from the bloodstream.72-77

A discovery that has us very excited is a nutrient that in laboratory studies increases glucose uptake from the bloodstream into energy producing cells by up to 54%.78 It does this by stimulating an energy transporter called GLUT4 in cells, which is a mechanism by which the drug metformin beneficially lowers glucose.79
Another of these novel nutrient extracts inhibits a transport system in the small intestines that enables glucose to enter the bloodstream.\(^{75}\) The name of this glucose transport protein is sodium-dependent glucose transporter-1 or SGLT1 for short.\(^{80}\) A nutritional SGLT1 inhibitor impedes the ability of glucose to enter the bloodstream, thus providing another shield to guard your body against deadly after-meal sugar spikes.\(^{75,80}\)

Few people realize that most of the glucose in our bloodstream after fasting comes from its production in the liver. This process is called gluconeogenesis and is an underlying culprit behind the difficulty in controlling many cases of type II diabetes.\(^{81}\) One of these novel nutrients has been shown to interfere with excess gluconeogenesis, which is a property by which the drug metformin beneficially helps lower insulin and glucose levels.\(^{77,82}\)

Another of these nutrients has demonstrated effects that naturally increase the expression of beneficial PPAR-gamma in cells, which enables blood sugar levels to drop without stimulating excess insulin release.\(^{83}\)

These nutrients, which function by four different mechanisms, have been combined into one low-cost formula to be taken before meals that contain glucose-spiking starches (bread, pasta, potatoes, and rice) or sugars.

Overwhelming evidence shows excess glucose to be a leading killer of Americans. Doctors are failing to recognize that even high normal blood sugar predisposes us to virtually all killer diseases.\(^{35,36,38}\) It is thus critical that consumers take steps to protect their aging bodies against the deadly impact of glucose overload.

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**Don’t Wait For A Diabetes Diagnosis**

It might not surprise you to learn that some people are diagnosed with type II diabetes in a hospital emergency room. This can occur in response to a heart attack when a hospital blood lab reveals an ER patient’s glucose levels are very high.

What people fail to understand is that glucose-induced arterial damage starts long before sugar levels rise to where diabetes or pre-diabetes is clinically diagnosed.

A study released in 2013 showed that individuals with impaired fasting glucose levels (around 110 mg/dL) have similar cardiovascular risk factors as diabetic patients (fasting glucose over 126 mg/dL). This study showed that 36% of patients with impaired fasting glucose had coronary artery disease compared to 42% of those with frank diabetes.\(^{86}\)

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**It’s Not Your Fault...**

Your body has evolved potent enzymes to rapidly break down ingested foods for immediate absorption into your body. If it were not for these enzymes, your ancestry lineage would have perished eons ago from famine.

Not only do you readily break down the foods you eat, but surplus calories are stored as body fat. Almost 70% of Americans suffer from excess fat storage and experts believe this will become the leading cause of preventable disability and death.\(^{84}\)

Glucose-spiking starches and sugars dominate modern dietary patterns.\(^{85}\) A life saving countermeasure is to inhibit specific enzymes that enable starches-sugars to readily covert to glucose that is excessively absorbed into the bloodstream. Fortunately, these carbohydrate enzyme inhibitors are available in a low-cost dietary supplement form.
The study also showed that those with impaired glucose tolerance or diabetes had nearly double the rate of hypertension and high cholesterol when compared to people with normal glucose. The authors of this study stated:

“...it is recommended to identify and treat impaired fasting glucose early since impaired fasting glucose patients’ distribution in coronary artery disease is comparable to diabetes mellitus.”

Another 2013 study showed that people drinking just one 12-ounce sugar-sweetened soda a day increased their risk of developing type II diabetes by 18%. This study indicates that only a small amount of excess sugar ingestion each day creates havoc in one’s body over the long term.67

Some of you might smugly think that you haven’t touched a sugary soda in years, but the reality is that it’s hard to avoid consuming glucose-spiking foods and drinks. Even whole grains convert to glucose, and healthy fruit juices can saturate your bloodstream with more glucose than a 12-ounce soda.

Unless you zealously follow a diet devoid of starches and sugars, you likely will derive enormous benefit by taking nutrients before meals that impede glucose absorption, reduce liver over-production of glucose (gluconeogenesis), and facilitate efficient removal of glucose from the blood.

We discuss a novel glucose-regulating nutrient blend in the first article of this month’s issue. Price-conscious consumers will be impressed about the broad-spectrum protection against glucose overload they can obtain at a very modest cost.

## Most Advanced Formulas At Year’s Lowest Prices

Every time you purchase a Life Extension product, you contribute to biomedical research aimed at extending your healthy life span. Life Extension funds pioneering scientists seeking to reverse degenerative disease. We do this while simultaneously battling mindless bureaucrats who want to suffocate medical innovation.

During our 25th annual winter Super Sale, all Life Extension formulas are discounted so that members can obtain the newest ingredients and most up-to-date versions at the lowest prices of the year.

Members traditionally take advantage of Super Sale discounts to stock up on cutting-edge formulas designed to circumvent the underlying causes of aging, such as the spiraling increase in glucose that most physicians today accept as normal.

For longer life,

William Faloon

## References


58. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2617168/


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.
Critical Importance of Mitochondria

In 1983, Life Extension® was the first to introduce CoQ10 as a proven method to enhance mitochondrial energy production. CoQ10 has since gained universal recognition for its role in supporting cellular performance throughout the body.1,4

In an unprecedented breakthrough, a compound called PQQ (pyrroloquinoline quinone) has been shown to support mitochondrial biogenesis—the spontaneous generation of new mitochondria in aging cells.7 PQQ is available as a low-cost dietary supplement.

Mitochondria are cellular energy generators that supply virtually all the power your body requires for a healthy life span. An abundance of published studies underscores the critical importance of the mitochondria to overall health, especially as we age.6,9 Energy-intensive organs like the heart and brain are dense with mitochondria.

Until recently, the only natural ways for aging individuals to increase the number of mitochondria in their bodies were long-term calorie restriction or exhaustive physical activity. PQQ offers a viable alternative.

The Ultimate Cell Rejuvenator

The enormous amount of energy generated within the mitochondria exposes them to constant free radical attack. The resulting mitochondrial decay is a hallmark of aging.

PQQ protects and augments delicate mitochondrial structures to promote youthful cellular function in three distinct ways:

- Antioxidant power.
- Favorably modulates gene expression.
- Mitochondrial defense.

Vital Protection for the Aging Heart and Brain

PQQ is an essential nutrient, meaning your body cannot make it on its own. A growing body of research indicates that PQQ’s unique nutritional profile supports heart health and cognitive function—alone and in combination with CoQ10.15,16

This comes as no surprise, given how much energy these vital organs need.

Research shows that PQQ supports heart cell function in the presence of free radicals and promotes blood flow in heart muscle.5

When taken in combination with CoQ10, just 20 mg per day of PQQ has been shown to promote memory, attention, and cognition in maturing individuals.16

A Breakthrough Weapon in the Battle Against Aging

Life Extension® has identified a purified, highly potent form of PQQ from Japan that is produced through a unique fermentation process. The result is the highest quality PQQ available on the market today called BioPQQ®.

A bottle containing 30 20 mg vegetarian capsules of PQQ Caps with BioPQQ® retails for $40. If a member buys four bottles during Super Sale, the price is reduced to $24.30 per bottle.

The recommended daily dose for PQQ is 20 mg. Those taking Mitochondrial Energy Optimizer or Mitochondria Basics only require an additional 10 mg of PQQ since these formulas already provide 10 mg of PQQ. The retail price for 30 10 mg PQQ caps is $24. If a member buys four bottles during Super Sale, the price is reduced to only $14.85 per bottle. (Item #01500)

BioPQQ® is a registered trademark of MGC (Japan).

References

To order PQQ Caps with BioPQQ®, standalone or any other PQQ-containing formula call 1-800-544-4440 or visit 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.
Published studies have shown the critical importance of lipoic acid in supporting healthy mitochondrial function.

Unlike other forms of lipoic acid, Super R-Lipoic Acid is more bioavailable, stable, and potent, achieving 10-30 times higher peak blood levels than pure R-lipoic acid. This unique sodium-R-lipoate can help you reach peak plasma concentrations within just 10-20 minutes of supplementation.

Super R-Lipoic Acid provides more of the active “R” form of lipoic acid than any other supplement.

To order Super R-Lipoic Acid, call 1-800-544-4440 or visit www.LifeExtension.com

Preserve Youthful CELLULAR ENERGY with Next-Generation LIPOIC ACID

A bottle of Super R-Lipoic Acid containing 60 vegetarian capsules retails for $49. If a member buys four bottles during Super Sale, the cost is only $30.38 per bottle. Each capsule contains 300 mg of stabilized, Bio-Enhanced® Super R-lipoic acid supplying 240 mg of R-lipoic acid. Suggested dose is one capsule daily.

References

CAUTION: Because this product may lower blood glucose, consult your healthcare provider before taking this product if you are taking glucose lowering medication. Bio-Enhanced® is a registered trademark of Geronova Research, Inc.

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.
Bone Restore combines critical bone boosting nutrients into one superior formula. Bone Restore includes highly absorbable forms of calcium and boron, along with vitamin D3, magnesium, zinc, manganese, and silicon. Bone Restore is available with or without vitamin K2 (MK-7).

Bone Restore now contains 300 mg of magnesium. The retail price for 120 capsules of Bone Restore is $24. If a member buys four bottles during Super Sale, the price is reduced to $14.85 per bottle. (Item# 01727)

The same Bone Restore formula without vitamin K2 (MK-7) is available as well. The retail price for 120 capsules is $22. If a member buys four bottles during Super Sale, the price is reduced to $12.83 per bottle. (Item# 01726)

Note: Those who take Super Booster or Super K usually do not need additional vitamin K2. They should order Bone Restore without vitamin K2. Those taking the anti-coagulant drug Coumadin® (warfarin) should use BONE RESTORE without vitamin K2.

To order Bone Restore, call 1-800-544-4440 or visit www.LifeExtension.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.
Increased Magnesium Intake Associated With Reduced Insulin Resistance In Men And Women With Metabolic Syndrome

The journal *Nutrients* published the finding of an association between greater magnesium intake and improved insulin resistance in adults with metabolic syndrome.*

The study included 234 nondiabetic trial participants who exhibited three or more metabolic syndrome components. Dietary assessments conducted at the beginning of the study and at six and twelve months provided data concerning the intake of magnesium. Blood samples collected at these time points were analyzed for plasma insulin and glucose in order to evaluate insulin resistance.

Among subjects whose magnesium intake over the course of the study was among the top 25% of participants, the adjusted odds of having insulin resistance was 71% lower than those whose intake was among the lowest 25%. For those whose intake of magnesium over time met the US RDA, the risk of insulin resistance was 63% lower than the risk experienced by those whose intake was inadequate.

**Editor’s Note:** Metabolic syndrome is characterized by the presence of several cardiovascular disease and diabetes risk factors that include increased waist circumference, high blood pressure, elevated blood glucose, and disordered lipids. Previous research findings suggest that supplementation with magnesium could improve insulin sensitivity or insulin resistance in diabetics; however, there are few longitudinal studies that have investigated the protective effects of magnesium in nondiabetics with metabolic syndrome.

—D. Dye


Greater Intake Of Beta-Carotene, Vitamin C, And Magnesium Associated With Lower Risk Of Hearing Loss

An article in the *American Journal of Clinical Nutrition* describes the finding of a protective effect for vitamin C, beta-carotene, and magnesium against hearing loss, which frequently occurs during aging and affects approximately 17% of US adults.*

The current study included 2,592 participants in the National Health and Nutrition Examination Survey (NHANES) 2001-2004. Dietary recall interview responses were analyzed for the intake of beta-carotene, vitamin C, vitamin E, and magnesium from food and supplements. Audiometric examinations evaluated hearing thresholds at speech frequencies and high frequencies.

Increased intake of beta-carotene, vitamin C, or magnesium was associated with better hearing at both speech and high frequencies. When the joint effects of high versus low nutrient intake were considered, the combination of high beta-carotene or vitamin C with high magnesium was associated with increased protection against hearing loss at high frequencies.

**Editor’s Note:** Authors Yoon-Hyeong Choi and colleagues remark that free radical formation in the inner ear is a key mechanism for hearing loss, and that animal studies have shown a protective effect for antioxidants against noise-induced free radical formation in this area.

—D. Dye

Increased Calcium Intake Linked With Lower Risk Of Death From All Causes Over Median Of Nine Years

The journal *PLoS ONE* reported the finding of Hong Kong researchers of an association between increased calcium intake and a lower risk of mortality from all causes over a median of 9.1 years of follow-up.  

The study included 3,139 Chinese men and women aged 65 years or older upon enrollment in a prospective study that examined risk factors for osteoporosis. Dietary questionnaire responses were analyzed for calcium intake from food consumed over the previous year. The subjects were additionally queried concerning whether or not they used calcium supplements.

Over a 9.1 year median, 529 deaths occurred, of which 114 were attributed to cardiovascular disease. A 37% lower risk of dying from any cause was observed among subjects whose calcium intake was among the top 25% of participants in comparison with subjects whose intake was among the lowest 25% of participants.

*Editor’s Note:* An insignificant reduction in cardiovascular mortality was also associated with increased calcium intake. Additionally, a lower risk of dying from any cause over follow-up was found to be associated with calcium supplement use.

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Reduced Vitamin B12 Levels Linked To Increased Progression Of White Matter Lesions

The journal *PLoS ONE* reports the discovery of a protective effect for higher vitamin B12 levels against the progression of periventricular white matter lesions, a common feature of cerebral small vessel disease.

The study included 107 men and women diagnosed with a first time lacunar stroke. Blood samples obtained within three months of the event were assayed for plasma vitamin B12 levels. Magnetic resonance imaging of the brain at the beginning of the study and after two years was used to evaluate periventricular and deep white matter lesions.

The researchers observed a 42% greater risk of periventricular white matter lesion progression for every 50 picomole per liter decrease in vitamin B12. Subjects whose B12 levels were considered deficient had an approximately three times greater risk of periventricular white matter lesion progression in comparison with those whose levels were higher.

*Editor’s Note:* Progression of the lesions has been associated with cognitive impairment, urinary disturbances and gait abnormalities.

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Calcium And Vitamin D Improve Bone Density As Well As Fracture-Preventing Drug In Men

The results of a trial reported in *Epilepsia* reveal a beneficial effect for calcium and vitamin D in helping to protect against the loss of bone density that is associated with the use of antiepileptic drugs.

Fifty-three men treated with antiepileptic drugs for at least two years prior to enrollment in the Anti-Epileptic Drug and Osteoporosis Prevention Trial (ADOPT) were randomized to receive risedronate (a drug that helps prevent fractures) or a placebo for 12 weeks. All participants received 1,000 to 1,500 mg calcium and 500 to 750 IU vitamin D per day. Bone mineral density was assessed by dual energy x-ray absorptiometry before treatment, and at one and two years.

While participants who received risedronate experienced a 70% improvement in bone density in comparison with values obtained prior to treatment, the improvement in the group that received calcium and vitamin D only (the placebo arm) was nearly as great, at 69%.

*Editor’s Note:* Although risedronate provided superior results in the current study, the authors caution that treatment with the drug should be limited to five years if possible, in order to avoid the associated risks of jaw osteonecrosis and atypical femoral fractures.

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* *PLoS ONE. 2013 Nov 5.*

* *Epilepsia. 2013 Sep 6.*
Blueberries Could Help Protect Against Metabolic Syndrome Effects

Researchers from Maine report a protective effect for wild blueberries against some of the adverse effects related to metabolic syndrome, which increases the risk of heart disease and diabetes.

The study tested the effect of a blueberry-enriched diet in a rat model of metabolic syndrome. Thirty-six obese rats and an equal number of lean animals received a diet containing blueberries or a control diet for eight weeks. Aortic vessel vasoconstriction and vasorelaxation, which evaluate endothelial function, were assessed at the end of treatment.* "Endothelial dysfunction is a landmark characteristic of metabolic syndrome, and the obese Zucker rat, an excellent model to study the metabolic syndrome, is characterized by vascular dysfunction," noted lead researcher Dorothy Klimis-Zacas.

Obese rats underwent improvements in the balance between constricting and relaxing factors, indicating better endothelial function. Dr. Klimis-Zacas concluded that, "By normalizing oxidative, inflammatory response and endothelial function, regular long-term wild blueberry diets may also help improve pathologies associated with the metabolic syndrome."

Editor's Note: Metabolic syndrome is a cluster of cardiovascular and diabetes risk factors that include central obesity, hypertension, dyslipidemia, and elevated fasting glucose.

—D. Dye


Mediterranean Diet Associated With Lower Risk Of Mortality Over 7 Years Of Follow-up In Men And Women With Cardiovascular Disease

An article published in the American Journal of Clinical Nutrition reports a protective effect for the Mediterranean diet against the risk of premature death from all causes in cardiovascular disease patients.*

The study included 6,137 men enrolled in the Health Professionals Follow-Up Study initiated in 1986 and 11,278 women participating in the Nurses’ Health Study established in 1976. Subjects in the current study were limited to those who had experienced a nonfatal cardiovascular event. Dietary questionnaire responses provided by the participants in 1980, 1984, 1986, 1990, 1994, 1998, 2002, and 2006 were used to score adherence to the Mediterranean diet.

Pooled analysis of the subjects revealed a 19% lower risk of death from any cause among those whose adherence to the Mediterranean diet was among the top one-fifth of participants in comparison with those whose adherence was among the lowest fifth.

Editor's Note: The diet, which is characterized by a relatively high amount of fruit and vegetables, legumes, nuts, fish, and monounsaturated fatty acids, and a lower intake of meat and meat products, has been associated with several long-term benefits, including protection against cardiovascular disease, however, its effects in individuals with established disease had not been well studied.

—D. Dye


Resveratrol Regenerated Following Metabolism

Science Translational Medicine reports the finding of researchers at England’s University of Leicester that resveratrol, a compound that occurs in red grapes, is regenerated after being metabolized into other compounds in the body.*

"It has been known for many years that resveratrol is rapidly converted to sulfate and glucuronide metabolites in humans and animals – meaning the plasma concentrations of resveratrol itself quickly become very low after administration," explained lead researcher Karen Brown. "It has always been difficult to understand how resveratrol is able to have activity in animal models when the concentrations present are so low, and it has made some people skeptical about whether it might have any effects in humans. Researchers have hypothesized for a long time that resveratrol might be regenerated from its major metabolites in whole animals but it has never been proven."

“Our study was the first to show that resveratrol can be regenerated from sulfate metabolites in cells,” she announced.

Editor's Note: “Importantly, we did all our work with clinically achievable concentrations so we are hopeful that our findings will translate to humans,” Dr. Brown noted.

—D. Dye

Trial Finds Reduced Inflammation In Heart Disease Patients Supplemented With Coenzyme Q10

The results of a randomized trial reported in *Nutrition Journal* found a reduction in inflammation and an increase in antioxidant enzyme activities in individuals with coronary artery disease who were supplemented with coenzyme Q10 (CoQ10).*  
Researchers in Taiwan divided 42 men and women who were being treated with statin drugs for coronary artery stenosis to receive 300 milligrams CoQ10 per day or a placebo for twelve weeks. Blood samples collected at the beginning and end of the trial were analyzed for CoQ10, inflammation markers including C-reactive protein, tumor necrosis factor-alpha (TNF-alpha), and interleukin 6, and the antioxidant enzymes superoxide dismutase (SOD), catalase, and glutathione peroxidase.  

Subjects who received CoQ10 experienced a reduction in interleukin-6 and TNF-alpha, indicating a decline in inflammation, as well as elevations in SOD, catalase, and glutathione peroxidase that resulted in a significant increase in comparison with the placebo group.  

**Editor’s Note:** The authors conclude that, “Coronary artery disease patients might benefit from using coenzyme Q10 supplements to increase their antioxidant and anti-inflammation capacity during statins therapy.”

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Can Certain Herbs Stave Off Alzheimer’s Disease?

A recent study performed at Saint Louis University found that enhanced extracts made from special antioxidants in spearmint and rosemary improve learning and memory.*  
“We found that these proprietary compounds reduce deficits caused by mild cognitive impairment, which can be a precursor to Alzheimer’s disease,” said Susan Farr, PhD, research professor of geriatrics at Saint Louis University School of Medicine.  
Farr presented the early findings at Neuroscience 2013, a meeting of 32,000 people. She tested a novel antioxidant-based ingredient made from spearmint extract and two different doses of a similar antioxidant made from rosemary extract on mice that have age-related cognitive decline.  
She found that the higher dose rosemary extract compound was the most powerful in improving memory and learning in three tested behaviors. The lower dose rosemary extract improved memory in two of the behavioral tests, as did the compound made from spearmint extract.  

—M. Richmond  

Resveratrol Improves Glucose And Other Factors in Clinical Trial

A report published in the journal *Evidence-Based Complementary and Alternative Medicine* documents a randomized, double-blind, placebo-controlled trial which determined that supplementation with resveratrol was associated with a reduction in a number of factors associated with diabetes and cardiovascular disease.*  

The trial enrolled 66 type II diabetic men and women residing in Iran, a country that has a high prevalence of diabetes. Participants were supplemented with 1 gram resveratrol or a placebo daily for 45 days. At the study’s conclusion, subjects who received resveratrol had experienced lower systolic blood pressure, fasting blood glucose, hemoglobin A1C, insulin and insulin resistance, and demonstrated an increase in HDL cholesterol. While glucose declined by an average of 34.9 mg/dL among those who received resveratrol, subjects who received the placebo experienced an average increase of 9.89 mg/dL as well as a rise in LDL.  

**Editor’s Note:** “The present study supports the strong antidiabetic effect of resveratrol reported in numerous animal studies, as well as the effects observed in the human studies,” authors Ali Movahed and colleagues write. “It also supports the case for resveratrol supplementation over a short-term.”

—D. Dye  
* Evid Based Complement Alternat Med. 2013 Sep 1.
A large, rigorous study published in the New England Journal of Medicine confirmed the health benefits of those who switch to a Mediterranean diet rich in omega-3 fish oil as well as protective nutrients called polyphenols found in olive oil, fruits, vegetables, nuts like walnuts, and wine. The study ended early because the benefits were so overwhelming, with startling benefits for vascular health, that it was considered unethical to continue to deprive the control group. In addition to the health-promoting benefits of vegetables and fruits with their abundance of polyphenol nutrients, the Mediterranean Diet group took at least 4 tablespoons of polyphenol-rich extra-virgin olive oil a day.

LIFE EXTENSION® MEMBERS LONG AGO BENEFITED

Starting in 2005, Life Extension members began taking a supplement (Super Omega-3) that provided potent concentrations of fish oil and olive polyphenols like hydroxytyrosol and oleuropein. This supplement also provided standardized sesame lignans to support the beneficial effect of omega-3 fatty acids in the body.

Olive oil contains polyphenol nutrients that have demonstrated wide-ranging health benefits. The recommended twice daily dose of Super Omega-3 supplies a similar polyphenol content to that found in 4 to 6 tablespoons of olive oil.

References

CAUTION: If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product. Supportive but not conclusive evidence shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease. IFOS® certification mark is a registered trademark of Nutrasource Diagnostics, Inc. These products have been tested to the quality and purity standards of the IFOS® program conducted at Nutrasource Diagnostics, Inc.

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

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.
Study after study confirms the vital importance of maintaining optimal levels of vitamin D. Research often indicates that a blood level between 50–80 ng/mL of 25-hydroxyvitamin D is ideal. Because people have individual requirements, Life Extension® has created a large selection of vitamin D supplements to ensure that you achieve your vitamin D3 goals.

Keep in mind that you may already be getting 1,000-3,000 IU of vitamin D in your multi-nutrient formulas. Vitamin D is now available in superior absorbing softgels. A recent study demonstrated that the use of one 5,000 IU vitamin D softgel daily resulted in a near 30% increase in vitamin D levels in just 60 days.

VITAMIN D3 7,000 IU
60 softgels
Retail: $11
Four-bottle Member Price during Super Sale: $8.44 ea.
For those already obtaining 1,000-3,000 IU of vitamin D in their multi-nutrient formulas, this 7,000 IU potency of vitamin D3 softgel should enable these individuals to attain 25-hydroxyvitamin D blood levels above the desired range of 50 ng/mL. Item # 01713

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

* If you have a thyroid condition or are taking antithyroid medications, do not use without consulting your healthcare practitioner.
Systemic inflammation is involved in most undesirable effects of aging. Culprits behind these inflammatory reactions are pro-inflammatory cytokines, such as interleukin-1 and tumor necrosis factor-alpha. Luteolin is a flavonoid that has been shown to help suppress these inflammatory cytokines.17-21

\[ \text{Mitochondrial Energy Optimizer with BioPQQ} \]

is designed to counteract age-related structural and functional changes by providing the following unique ingredients:

- **CARNOSINE**: As humans age, proteins in their bodies become irreversibly damaged by glycation reactions. Glycation is the cross-linking of proteins and sugar to form non-functioning structures called advanced glycation end products in the body, which can lead to alterations of normal cell function. Carnosine is not only a powerful anti-glycating agent, but it also protects neurons against reactive and cytotoxic protein carbonyl species associated with normal aging.22-26

- **PQQ**: This breakthrough micronutrient has been shown to trigger mitochondrial biogenesis—the growth of new mitochondria in aging cells.27 BioPQQ® activates genes involved in protecting the delicate cellular structures and enables cells to perform life-sustaining metabolic processes.

- **PYRIDOXAL 5'-PHOSPHATE**: An active form of vitamin B6 that has been shown to protect against both oxidative and genotoxic stress.28-31

- **R-LIPOIC ACID**: Destructive free-radical activity in the mitochondria plays a major role in the loss of cellular vitality. A microencapsulated Bio-Enhanced® R-lipoic acid facilitates youthful mitochondrial energy output while guarding against free radicals. Two forms of lipoic acid are sold on the supplement market, but R-lipoic acid is far more potent.29-32

- **ACETYL-L-CARNITINE**: The amino acid L-carnitine is required to transport fats into the mitochondria to be burned for cellular energy. Acetyl-L-carnitine arginate is a patented form of carnitine that also supports neurites in the brain.29

A bottle of Mitochondrial Energy Optimizer with BioPQQ® containing 120 capsules retails for $94. If a member buys four bottles during Super Sale, the price is reduced to $56.70 per bottle.

FIGHT BACK AGAINST AGING!

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

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

- Carnosine 1,000 mg
- Luteolin 8 mg
- Calcium 230 mg
- Benfotiamine 150 mg
- R-lipoic acid 150 mg
- Acetyl-L-carnitine arginate (as microencapsulated Bio-Enhanced®) 675 mg
- Pyridoxal 5'-phosphate 100 mg
- BioPQQ® 10 mg

**References**

The research is conclusive—the longer you wait to tame age-related blood sugar increases, the greater your odds of succumbing to diabetes and its associated increased risk of heart attack, stroke, kidney failure, cancer, and blindness.1-3 For the majority of aging individuals, urgent action is needed.1,2

The public has not yet recognized the magnitude of damage inflicted after consumption of what most consider only a moderate amount of starch or sugar.

A widely publicized study showed that drinking just one 12-ounce sugar-sweetened soda daily resulted in an 18-22% increased risk of type II diabetes.4 While health-conscious people may avoid sodas, there are so many glucose-spiking foods in our diets that virtually none of us are immune.

Hard science reveals that fasting blood sugar above 85 mg/dL is associated with increased risks of death and disease. Unfortunately, most adult glucose levels are well above this range.1,2,5

Aging humans should take assertive steps before eating carbohydrates to impede the absorption of glucose into their bloodstream. Just as important, however, is the need to suppress excess production of glucose in our liver and to improve uptake of blood glucose into our muscle cells as opposed to it being stored as fat.

The breaking news for those who want to avoid drugs is the discovery of three plant-derived nutrients that target underlying reasons why 80% of American adults today have higher than optimal glucose levels.6
The July 3, 2013 issue of the Journal of the American Medical Association (JAMA) examined the impact of fructose on human health.\(^7\)

High-fructose corn syrup represents over 40% of caloric sweeteners added to foods and beverages. It’s often the sole caloric sweetener in soft drinks in the United States.\(^8\)

The digestion and metabolic effects of fructose differ from that of glucose.\(^7\) Fructose is metabolized in the liver in a way that favors formation of new fat (lipogenesis).\(^7\) Unlike glucose, fructose does not induce normal satiety signals. Fructose thus contributes to overeating that can lead to weight gain.\(^7\) The increased use of high-fructose corn syrup in the US mirrors the rapid increase in obesity.\(^9\)
The *JAMA* review of fructose first explained the mistaken belief in the 1990s that obesity was caused by over-consumption of dietary fat. Back then, high sugar intake was considered neutral and possibly even protective against obesity by displacing dietary fat.

A decade later, the American Heart Association urged drastic reductions in sugar consumption because of concern it was contributing to weight gain. Experts now argue that sugar intake is the most important cause of what has become a worldwide epidemic of diabetes and obesity.

Focusing on fructose, the *JAMA* review described the adverse impact of high fructose consumption that includes fatty liver, insulin resistance, elevated triglycerides, and fat deposition into tissue. The *JAMA* review then discussed how fructose contained in fruit has not shown these unfavorable effects. They report that even when human subjects consume huge amounts of fructose in fruit, there have been beneficial effects seen on blood pressure, lipids, insulin, and body weight. The reason is the slow digestion rate of whole fruit compared to a sugar-sweetened beverage.

The *JAMA* review pointed out that excess intake of refined sugars and high-glycemic starches plays a significant role in obesity and concluded that “…public health efforts should focus on reducing intakes of all highly refined processed carbohydrates, not just refined sugar.”

This review, published in an internationally recognized medical journal, accompanied by corroborating research data from other studies, is a wakeup call for aging humans to initiate definitive steps to impede the rapid absorption of sugar into their bloodstream.

### Why Most of Us Have Too Much Glucose

Elevated blood sugar is blamed on eating too many sweets. Yet type II diabetes can be caused by excess production of glucose internally as well as overconsumption of high-glycemic carbohydrates.

To put this in perspective, look at the primitive conditions that existed throughout 99% of human history. Ancestral human diets typically consisted of low levels of refined carbohydrates…mainly just protein and fat from whatever the day’s hunt yielded along with fibrous vegetables. Yet our bodies require a continuous supply of glucose to sustain brain cell energy production.

Once blood glucose levels drop below 50 mg/dL we become severely hypoglycemic and are at significantly increased risk for adverse clinical outcomes and death! So we adapted a survival mechanism by which our liver produces glucose from protein (and sometimes fat) in a process called gluconeogenesis.
Gluconeogenesis served us well when food was scarce, but in today's world of boundless calorie abundance, this glucose-generator conspires to spike our blood sugar to dangerous levels.

The medical profession has yet to recognize the magnitude of this epidemic problem. Conventional doctors wait until fasting glucose crosses the 125 mg/dL threshold to label you as diabetic and only then recommend treatment. That is, if you’re lucky enough to have a watchful physician. According to the Centers for Disease Control, the incidence of type II diabetes remains dangerously underreported and underdiagnosed.14

It is thus up to individuals to take control of their bodies and incorporate proven methods to reduce and protect against the devastating impact of surplus blood glucose.

Fortunately, researchers have identified three natural ingredients that can safely reduce the amount of extra sugar produced in the liver, reduce the rate of sugar absorption, and facilitate transporting sugar out of the bloodstream into energy-producing cells. Each of these three natural ingredients acts independently and complementarily to protect against age-related increases in blood sugar and insulin levels.

Together with lifestyle and behavioral changes, compounds that target mechanisms involved in excess blood sugar are vital if we are to achieve optimal longevity.

**NATURAL INGREDIENT #1: Mulberry Leaf Extract**

An extract from the mulberry leaf has been used in Chinese traditional medicine to treat various problems, particularly those involving blood sugar control. Scientists have discovered evidence to validate this traditional use. It turns out that mulberry works to support healthy blood sugar levels via several effective mechanisms.

**Inhibiting The Alpha-Glucosidase Enzyme**

*DNJ* (1-deoxynojirimycin) is a component found in mulberry that can fool the body into believing that it is a sugar molecule. By “mimicking” sugar, DNJ binds to the alpha-glucosidase enzyme whose job is to “look” for starches in your intestines to break them down into sugars. When DNJ binds to alpha-glucosidase, the body can’t process as much starch, so this starch (and its calories) passes through the intestine, rather than being absorbed into your blood as sugar.
The binding of DNJ to alpha-glucosidase thus allows you to reduce the sugar load in your bloodstream that is created every time you eat a starchy meal. Mulberry inhibits starch-related blood sugar rise in a similar fashion as acarbose, a prescription medication used for blood sugar control. Acarbose helps reduce after-meal blood sugar spikes by inhibiting alpha-glucosidase. Studies demonstrate that mulberry leaf extracts reduce after-meal rises in glucose.

Daily use of mulberry leaf extracts can even delay the onset of type II diabetes in experimental models, significantly lowering after-meal insulin and glucose levels and delaying the development of diabetes.

The DNJ in mulberry also reduces the production of excess glucose in the liver (gluconeogenesis) as does the anti-diabetic drug metformin. Because around 47% of fasting sugar (after 14 hours of fasting) comes from the liver pumping out glucose, this inhibition can significantly lower the amount of excess glucose circulating in your bloodstream.

A human study compared mulberry with a leading anti-diabetic drug called glyburide. This drug lowers glucose by boosting pancreatic production of insulin. We at Life Extension have long warned against this sulfonylurea drug because excess insulin boosts cancer risk and damages cells throughout the body.

In this experiment, 24 people with type II diabetes were treated either with mulberry extract or with glyburide for 30 days. The researchers found that mulberry leaf extract lowered fasting blood sugar significantly more than glyburide. The patients in the mulberry-supplemented group had an impressive 27% drop in their fasting blood sugar, from 153 mg/dL down to 111 mg/dL. Those taking glyburide saw only an 8% drop in their fasting blood sugar levels, from 154 mg/dL to 142 mg/dL.

Patients taking mulberry saw their hemoglobin A1c blood level (a long-term measure of blood sugar levels) fall 10%. Those taking glyburide showed no decrease at all.

And the health benefits of mulberry did not stop with reducing blood sugar levels. The study showed that mulberry also had a positive impact on lipid profiles such as cholesterol that affect cardiovascular health. Those treated with mulberry saw their hemoglobin A1c blood level (a long-term measure of blood sugar levels) fall 10%. Those taking glyburide showed no decrease at all.

The patients in the mulberry-supplemented group had an impressive 27% drop in their fasting blood sugar, from 153 mg/dL down to 111 mg/dL. Those taking glyburide saw only an 8% drop in their fasting blood sugar levels, from 154 mg/dL to 142 mg/dL. Patients taking mulberry saw their hemoglobin A1c blood level (a long-term measure of blood sugar levels) fall 10%. Those taking glyburide showed no decrease at all.

And the health benefits of mulberry did not stop with reducing blood sugar levels. The study showed that mulberry also had a positive impact on lipid profiles such as cholesterol that affect cardiovascular health. Those treated with mulberry showed a 12% decrease in total cholesterol and a 16% decrease in triglycerides. In the glyburide group, there was no real improvement in any of the lipid measurements from baseline.

Patients taking mulberry saw their protective HDL levels rise by a significant 18%, compared to just 3% in the glyburide group. Raising protective HDL levels has been a huge research target for the leading phar-
pharmaceutical companies and so far their efforts have failed. Mulberry clearly demonstrated its ability to improve both metabolic and cardiovascular markers without boosting insulin levels, in contrast to the insulin-boosting drug glyburide.

In another impressive human trial, volunteers were given a mulberry leaf extract enriched with additional DNJ content. After taking the mulberry extract, the patients drank water containing 50 grams (nearly 2 ounces) of sugar. Mulberry extract suppressed the expected rise in glucose and kept insulin levels safely low, even in the face of this impressive ingestion of pure table sugar.

Additional human research shows that mulberry extract improves lipid profiles in non-diabetic volunteers as well. One study of non-diabetic people focused on those with mild lipid abnormalities who had tried to improve their lipids with diet and failed. The results showed that 280 mg of mulberry leaf extract three times a day decreased triglycerides by 10.2% at 4 weeks and 12.5% at 8 weeks. By the end of the 12-week study, total cholesterol was down by 4.9%, triglycerides had fallen by 14.1%, and LDL had decreased by 5.6% from baseline values. Furthermore, beneficial HDL was increased by 19.7%.

A similar study involved a group of subjects who started out with very high triglycerides averaging 312 mg/dL, more than double the upper limit of optimal. In this study, subjects took the DNJ-rich mulberry extract (12 mg three times daily) before meals for 12 weeks. By the end of the study, the mean triglyceride level had fallen to 252 mg/dL, which is still in the danger range. In 20% of the subjects, however, triglycerides fell to below 150 mg/dL—a reduction greater than 50%. There was a significant lowering in small or very low density LDL-cholesterol particles, which are especially dangerous because they are readily oxidized and are strongly associated with atherosclerosis.

Mulberry Increases Insulin Sensitivity Via GLUT4

In addition to suppressing gluconeogenesis and alpha-glucosidase, mulberry leaf extract functions in another important way. By enhancing insulin sensitivity, mulberry helps shuttle sugar out of the bloodstream and into cells where it can be utilized more readily. It accomplishes this improvement in insulin sensitivity and lowering of blood sugar levels by stimulating a cellular transporter called GLUT4.

Mulberry increases not only the number of GLUT4 transporters but also facilitates their movement to the surface of the cell membrane, thus insulin sensitivity improves since glucose molecules are more readily moved into the cells of the body to enhance energy output. In fact, metformin, one of the most impressive and well studied anti-diabetes drugs, works in part by increasing GLUT4 in cells.

In a laboratory study, researchers showed that they could increase glucose uptake in cells by as much as 54% with mulberry leaf extract.

Anti-diabetic drugs such as Actos® can sometimes induce unwanted weight gain. An intriguing experiment with lab animals showed that mulberry leaf extract eliminated the body weight gain caused by pioglitazone (Actos®) treatment. In the same study, mulberry leaf extract also increased the beneficial hormone adiponectin, which regulates glucose levels, reduces fat accumulation, and lowers damaging inflammatory mediators.

Mulberry’s Mechanisms of Action

Mulberry helps control blood sugar levels by:

- Acting as a sugar mimic to prevent starch from turning into sugar by inhibiting alpha-glucosidase activity.
- Stimulating GLUT4 to transport sugar out of the bloodstream.
- Enhancing insulin sensitivity.
- Reducing the manufacture of excess glucose in the liver (gluconeogenesis).
Sorghum’s Mechanisms Of Action

Sorghum helps control blood sugar levels by:

- Reducing the release of sugar found in starch by inhibiting the enzyme, alpha-amylase.\(^{38,39}\)
- Improving insulin sensitivity.\(^{41}\)
- Reducing the manufacture of excess glucose in the liver (gluconeogenesis).\(^{19}\)
- Activating the PPAR-gamma receptor to take up more blood glucose into energy producing cells.\(^{11}\)

Sorghum provides another important benefit—it has been shown to reduce body fat. In an experimental study involving a high-fat diet, sorghum resulted in reductions of both blood sugar and insulin. The animals that were fed sorghum lost body fat and had reduced blood levels of lipids.\(^{38}\) Animals not receiving sorghum did not show the notable drops in blood sugar and insulin.\(^{38}\)

This weight loss effect may be due in part to sorghum’s inhibition of fat cell development—an effect opposite to that produced by PPAR-activating drugs.\(^{42,43}\)

Further research needs to better clarify if sorghum has potent weight-loss effects in adult humans.

Sorghum Reduces Excess Sugar Production In The Liver

Your liver can significantly raise your blood sugar level by producing excess glucose even though there is already enough sugar in your bloodstream. Sorghum slows down the liver-induced gluconeogenesis—a process that can be especially problematic for diabetics.\(^{19}\) The result is less new glucose entering the blood.\(^{19}\) This beneficial mechanism of controlling sugar production in the liver is similar to the anti-diabetes drug metformin.\(^{30}\)

In experimental studies, sorghum not only reduces the amount of blood sugar entering the bloodstream, but helps improve performance on glucose tolerance tests.\(^{19}\) One such study gave sorghum to both healthy and experimentally-induced diabetic animals, while another group of diabetic animals were treated only by the anti-diabetic drug glyburide, which acts by increasing insulin secretion.\(^{19}\)

NATURAL INGREDIENT #2:

Sorghum Extract

Sorghum, a grass plant eaten in Egypt some 4,000 years ago and now cultivated in Africa and Asia, complements the sugar control benefits of mulberry by further improving insulin sensitivity and reducing gluconeogenesis, the creation of excess sugar molecules in the liver.\(^{19,37,38}\)

At the earliest stages of starch digestion, sorghum inhibits the alpha-amylase enzymes that break down starch into sugar for absorption.\(^{39,40}\) This means that less starch ends up as sugar in your bloodstream. Sorghum has also been shown to reduce the digestibility of starch molecules thus minimizing uptake as sugar.\(^{41}\)

Researchers have recently discovered another mechanism behind sorghum’s ability to reduce blood sugar levels. Sorghum activates the beneficial metabolic “thermostat” called PPAR-gamma. In the body, PPAR-gamma is a receptor that regulates glucose metabolism.\(^{38}\) When sorghum activates PPAR-gamma, glucose is removed from the bloodstream and more effectively utilized by muscle cells and the liver.\(^{38}\) PPAR-gamma also reduces the over-production of insulin by the pancreas, causing blood sugar levels to drop without an increase in insulin secretion.\(^{38}\)

Sorghum extract appears to target PPAR-gamma to help support blood sugar levels somewhat differently than “glitazone” drugs. While glitazone drugs activate existing PPAR-gamma, sorghum increases its genetic expression, which then naturally results in more beneficial PPAR-gamma in the body’s tissues.\(^{38}\) More PPAR-gamma might equal better blood sugar control.
Both the sorghum group and the glyburide group had reduced glucose levels, bringing glucose tolerance test results down to the healthy levels seen in non-diabetic animals. Sorghum, however, did not raise insulin levels like the sulfonylurea drug did.

Excess insulin levels are associated with increased disease and mortality risk, including cardiovascular disease and certain cancers. This showed that sorghum provided glucose control similar to the prescription sulfonylurea drug glyburide without boosting insulin levels.

Other research has shown that a compound found in sorghum reduces hemoglobin A1c, a critical marker of long-term glucose control.

**NATURAL INGREDIENT #3: Phloridzin**

Phloridzin is a natural polyphenol heavily concentrated in the skin of an apple. Phloridzin lowers blood sugar and enhances insulin sensitivity in several unique ways that complement the actions of mulberry and sorghum extract.

Phloridzin, has been used in diabetes research and has a low incidence of side effects.

**Phloridzin Inhibits SGLT1 And SGLT2**

One of the ways in which phloridzin reduces sugar in your blood is to inhibit the “carrier proteins” that absorb glucose from your intestine and kidney. By stopping these carrier molecules from absorbing sugar into your bloodstream, the sugar is safely passed out of the body without being used.

Phloridzin inhibits two of these sugar carrier molecules called SGLT1 and SGLT2. Blocking SGLT1 prevents glucose absorption from the intestine, while blocking SGLT2 prevents it from being returned to the blood from urine forming in the kidney.

Phloridzin primarily inhibits SGLT1 in the intestine, thereby preventing glucose from being absorbed and entering the bloodstream. Eventually, the undigested sugar is flushed away.

Inhibiting SGLT1 lowers the glycemic impact right from the beginning of the digestive process and reduces the dangerous after-meal glucose spike that’s associated with increased cardiovascular risk. Since phloridzin blocks sugar uptake from the intestine, the sugar never gets a chance to spike in your blood following a meal. Experimental data show that phloridzin causes significant reductions in postprandial (after-meal) blood sugar levels, with a reduction in the excessive drinking and urination that are typical in diabetes.

Phloridzin normalizes blood glucose in experimental models of diabetes, restoring insulin sensitivity in cells and living tissues. Phloridzin also inhibits SGLT2 in the kidney, but to a far lesser extent than many pharmaceutical drugs currently undergoing intensive research and development. Phloridzin has been shown to decrease food consumption and body weight in diabetic animals. Future research needs to evaluate if phloridzin’s weight loss effects are also effective in humans.

**Phloridzin’s Mechanisms Of Action**

Phloridzin helps control blood sugar levels by:

- Blocking SGLT1 in the intestine, which then eliminates unabsorbed glucose from the body.
- Blocking SGLT2 in the kidney, which eliminates glucose through the urine.
TABLE: Sugar-Slashing Nutrients And The Drugs That Imitate Them

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Mechanism Of Action</th>
<th>Beneficial Result</th>
<th>Drug(s) With Similar Mechanism</th>
<th>Potential Drug Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>SORGHUM</td>
<td>Reduces starch breakdown to sugar in intestine by inhibiting amylase and alpha-glucosidase&lt;sup&gt;36,40&lt;/sup&gt;</td>
<td>Prevents glucose from reaching bloodstream</td>
<td>Acarbose&lt;sup&gt;27&lt;/sup&gt;</td>
<td>Gastrointestinal symptoms (pain, gas, bloating)&lt;sup&gt;50&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Activates PPAR-gamma&lt;sup&gt;38&lt;/sup&gt;</td>
<td>Increases insulin sensitivity, does not boost insulin secretion&lt;sup&gt;38&lt;/sup&gt;</td>
<td>Thiazolidinediones (<em>glitazones</em>)&lt;sup&gt;38&lt;/sup&gt;</td>
<td>Fluid retention (edema), cardiovascular risk (rosiglitazone), bladder cancer (pioglitazone)&lt;sup&gt;51,52&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Reduces new sugar manufacture in liver (inhibits hepatic gluconeogenesis)&lt;sup&gt;15&lt;/sup&gt;</td>
<td>Reduces contribution of newly-made sugar to fasting blood glucose&lt;sup&gt;19&lt;/sup&gt;</td>
<td>Metformin&lt;sup&gt;53&lt;/sup&gt;</td>
<td>Metformin and the potential risk of lactic acidosis is controversial but evolving. At present, more recent research suggests that metformin may be used cautiously by those with pre-existing heart, liver, kidney, or pulmonary disease assuming diligent medical monitoring, but should be avoided by those with severe end-organ disease (e.g. heart failure, kidney failure).&lt;sup&gt;51&lt;/sup&gt; Metformin decreases vitamin B12 and folate levels, causing an increase in homocysteine level; research also indicates that supplementing with folate and vitamin B12 can protect against homocysteine increase caused by metformin. Metformin may decrease testosterone level in some individuals;&lt;sup&gt;54&lt;/sup&gt; aging males should know their testosterone blood levels and take steps to restore testosterone to youthful ranges. Metformin may cause mild gastrointestinal upset (nausea, flatulence) in some individuals which can be minimized by consuming frequent, small, protein-rich meals with limited carbohydrate content.&lt;sup&gt;55-57,59,60&lt;/sup&gt;</td>
</tr>
<tr>
<td>MULBERRY LEAF EXTRACT, RICH IN DNJ</td>
<td>Stimulates GLUT4 transport of glucose out of blood and into working cells&lt;sup&gt;21&lt;/sup&gt;</td>
<td>Reduces blood sugar and improves insulin sensitivity&lt;sup&gt;24&lt;/sup&gt;</td>
<td>Metformin&lt;sup&gt;53&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduces new sugar manufacture in liver (inhibiting hepatic gluconeogenesis) without increasing insulin secretion&lt;sup&gt;29&lt;/sup&gt;</td>
<td>Reduces contribution of newly-made sugar to fasting blood glucose&lt;sup&gt;29&lt;/sup&gt;</td>
<td>Metformin&lt;sup&gt;53&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DNJ mimics glucose and binds to alpha-glucosidase, blocking breakdown of starch and sugars&lt;sup&gt;24&lt;/sup&gt;</td>
<td>Prevents glucose from reaching bloodstream&lt;sup&gt;24&lt;/sup&gt;</td>
<td>Acarbose&lt;sup&gt;27&lt;/sup&gt;</td>
<td>Gastrointestinal symptoms (pain, gas, bloating)&lt;sup&gt;50&lt;/sup&gt;</td>
</tr>
<tr>
<td>PHLORIDZIN</td>
<td>Primarily inhibits glucose absorption (SGLT1; intestine) and to a lesser extent re-absorption (SGLT2; kidney)&lt;sup&gt;46&lt;/sup&gt;</td>
<td>SGLT1 inhibition traps sugar in intestine, SGLT2 inhibition prevents sugar re-absorption from urine&lt;sup&gt;46&lt;/sup&gt;</td>
<td>Canagliflozin (primarily inhibits SGLT2 in the kidney)&lt;sup&gt;38&lt;/sup&gt;</td>
<td>Urinary tract infection&lt;sup&gt;58&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
Summary

As we age, most of us experience rising blood sugar levels that cause or contribute to the development of degenerative disease.1

Using data collected from around the world, researchers have identified three natural glucose management ingredients: mulberry leaf extract, sorghum extract, and phloridzin. When combined, these plant extracts offer a broad spectrum of glucose control mechanisms.

Mulberry leaf extract contains the compound DNJ that impedes sugar-starch from being broken down as readily by the alpha-glucosidase enzyme.24 Additionally, mulberry reduces the formation of excess glucose in the liver.20

Another way that mulberry extract lowers blood sugar levels is by stimulating the sugar transport molecule known as GLUT4, a similar mechanism manifested by the anti-diabetes drug metformin.21,35 GLUT4 beneficially facilitates glucose uptake by critical cells and tissues of the body for energy.

Sorghum is a grass found in Asia that naturally activates PPAR-gamma thereby regulating glucose metabolism.18 Sorghum can reduce the amount of excess sugar molecules that your liver creates (glucose-neogenesis), which further limits the amount of sugar entering your bloodstream.19

Phloridzin, which is found in the bark of certain fruit trees, inhibits sugar carrier proteins SGLT1 and SGLT2.46 Both SGLT1 and SGLT2 are the intense focus of new drug development. By inhibiting the activity of these two sugar carrier molecules, phloridzin impedes absorption and promotes elimination of sugar from the body.23,46-48

Combined, mulberry leaf extract, sorghum extract, and phloridzin work on numerous key mechanisms to improve insulin sensitivity, reduce blood glucose levels, safely escort glucose out of the body, and reduce the creation of new glucose in the liver.

If your fasting glucose blood level is over 85 mg/dL, hemoglobin A1c over 5.0%, or a glucose tolerance test reads over 120 mg/dL, these three nutrients would be an important addition before every carbohydrate-containing meal. ●

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

References


Milk thistle extract is one of nature’s most potent weapons to support liver health. Until recently, however, the technology hasn’t been available to fully harness this plant’s full benefits.¹

The problem has been that the star component of milk thistle, called silybin, does not dissolve well in water.²,³ This makes it difficult for your body to absorb all of it.²,³,⁴

Scientists have developed a novel technology to overcome silybin’s poor bioavailability. The solution is to mix silybin with a nutrient called phosphatidylcholine.

Phosphatidylcholine facilitates transport across the intestinal lining into the bloodstream, making it an ideal “carrier molecule” for silybin.⁵,⁶ Scientists believe that phosphatidylcholine molecularly bonds to silybin, ushering it through the membranes of cells in the intestinal tract.⁶

This new silybin-phosphatidylcholine complex is absorbed nearly 5 times better than silymarin alone, and its concentration in the liver, its target organ, is 10-fold greater than silymarin alone.⁶,⁷,⁸

The suggested twice daily dosage of one softgel provides:

<table>
<thead>
<tr>
<th>Milk Thistle Phospholipid Proprietary Blend</th>
<th>760 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk Thistle Extract (seed)</td>
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</tr>
<tr>
<td>(std. to 80% silymarin (480 mg), 30% Silybin (180 mg), and 8% Isosilybin A and Isosilybin B (48 mg)), Phospholipids</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SILIPHOS® Phytosome Milk Thistle Extract (seed)</th>
<th>160 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>(std to 29.7% silybin (47.52 mg))</td>
<td></td>
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</tbody>
</table>

A bottle containing 60 softgels of the new absorption-enhanced Milk Thistle retails for $28. If a member buys four bottles during Super Sale, the cost is reduced to only $16.88 per bottle—a savings of nearly one third!

This novel Milk Thistle extract with phosphatidylcholine contains standardized concentrations of silybin and isosilybin A and B not found in other milk thistle extracts! Compare the price of Milk Thistle to commercial silymarin supplements, and members will see that this new formula is available at one of the lowest costs per milligram.

Contains soybeans.

SILIPHOS® is a registered trademark of Indena S.p.A., Italy.

To order European Milk Thistle with Advanced Phospholipid Delivery call 1-800-544-4440 or visit 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.
Most people don’t get enough oil-based nutrients like vitamin K, lycopene, and gamma tocopherol. This problem is solved with a one-per-day softgel called Super Booster. It provides high potencies of fat-soluble compounds lacking in dry powder formulas, along with other nutrients.

**Just one SUPER BOOSTER provides:**

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

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

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

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

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

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

### JUST ONE SOFTGEL OF SUPER BOOSTER SUPPLIES:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin K2 (as menaquinone-7)</td>
<td>200 mcg</td>
</tr>
<tr>
<td>Vitamin K2 (as menaquinone-4)</td>
<td>1000 mcg</td>
</tr>
<tr>
<td>Vitamin K1 (as phytonadione)</td>
<td>1000 mcg</td>
</tr>
<tr>
<td>Ginkgo extract</td>
<td>120 mg</td>
</tr>
<tr>
<td>Sesame lignans</td>
<td>20 mg</td>
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<tr>
<td>Chlorophyllin</td>
<td>100 mg</td>
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<tr>
<td>Gamma Tocopherol</td>
<td>197.45-296.25 mg</td>
</tr>
<tr>
<td>Lycopene</td>
<td>10 mg</td>
</tr>
<tr>
<td>Lutein</td>
<td>2 mg</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>300 mcg</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>95 mg</td>
</tr>
</tbody>
</table>

A bottle of 60 Super Booster softgels retails for $42. If a member buys four bottles during Super Sale, the price is reduced to $25.65 per bottle.

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

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

Contains soybeans.

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

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Many aging individuals find themselves under assault from rising blood sugar levels.

Despite a healthy diet and exercise, blood sugar levels can rise due to a number of factors including excess gluconeogenesis whereby the liver produces glucose from protein. Another issue is the rapid conversion of any starch, including whole grains, into glucose. The result is that even health-conscious, active people can experience higher-than-desired blood sugar levels as they age.

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

**Tri Sugar Shield™** provides three plant-derived nutrients that—through their **rich array of complementary mechanisms**—afford an unrivalled level of optimal, broad-spectrum support for healthy glucose metabolism in aging individuals within normal range.

**MULTI-PRONGED APPROACH**

Life Extension® Tri Sugar Shield™ contains the following three nutrients:

**Sorghum Extract**

Sorghum has long been cultivated in Asia (and now is grown in Africa, India, China, Australia and the USA) and helps maintain healthy blood sugar levels, among those in the normal range, by modulating **four** different mechanisms:

- Balances the rate of sugar manufacture in the liver (**gluconeogenesis**).\(^5\)
- Promotes insulin sensitivity.\(^6\)
- Regulates PPAR-gamma, a metabolic thermostat controlling glucose metabolism.\(^7,8\)
- Regulates the enzyme alpha-amylase, which in turn controls the release of sugar found in starch.\(^9,10\)

**Mulberry Leaf Extract**

Mulberry leaf has been used in Chinese traditional medicine for centuries. Like sorghum, mulberry leaf extract targets **three** different mechanisms:

- Targets the alpha-glucosidase enzyme to regulate conversion of starch into glucose.\(^11,12\)
- Supports glucose transporter GLUT4 that moves glucose out of the bloodstream and into muscle and liver cells.\(^13,14\)
- Promotes insulin sensitivity.\(^15\)

**Phloridzin**

Phloridzin is a natural polyphenol found in various fruit trees.\(^16\) Phloridzin helps maintain healthy blood sugar levels, among those in the normal range by:

- Targeting carrier protein SGLT1, in turn helping to block the absorption of glucose into the bloodstream.\(^17,18\)
- Targeting carrier protein SGLT2, in turn supporting glucose elimination via urine.\(^19,20\)

By targeting **all** of these diverse glucose pathways, Life Extension® Tri Sugar Shield™ delivers the **widest possible support** to help naturally stabilize already healthy glucose levels!

The suggested daily dose of one vegetarian capsule taken before the heaviest carbohydrate or sugar containing meals/drinks of the new Tri Sugar Shield™ provides:

- **Sorghum bran** (Sorghum bicolor) extract 600 mg
  - [providing proanthocyanidins (540 mg)]
- **White mulberry extract** (leaf) 300 mg
  - [providing 1-deoxynojirimycin (DNJ) (15 mg)]
- **Phloridzin** [from apple extract (root bark)] 100 mg

A bottle of 60 vegetarian capsules of Life Extension® Tri Sugar Shield™ retails for $36. If a member buys four bottles during **Super Sale**, the price is reduced to **$21.60** per bottle.

**References**


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.
Obesity is a rising global epidemic with over 1 billion adults already overweight.\(^1\)

Inducing \textit{weight loss} is one of modern medicine’s greatest challenges.

When \textit{appetite hormones} are out of balance, achieving meaningful \textit{fat reduction} can be extremely difficult.

Appetite hormone imbalance can potentially lead to \textit{weight gain} caused by increased hunger leading to snacking, a lack of feeling full, and unhealthy food choices.\(^1\) Your body wants to keep eating because your \textit{hormones} continue to send hunger signals.

Results from groundbreaking human studies demonstrate that a proprietary extract of the \textit{Italian Lamon} variety Borlotto bean reduces appetite, increases feelings of fullness, and likely modulates appetite hormones, such as \textit{ghrelin}.\(^2,3\)

The reason \textit{ghrelin} control is essential is that this hormone \textit{increases} hunger urges and results in weight gain.\(^4\) Therefore, controlling \textit{ghrelin} can block hunger, increase feelings of fullness, and facilitate weight loss.

An anti-obesity \textit{vaccine} that attacks \textit{ghrelin} is now being tested, but you don’t have to wait for it to be approved as a drug.\(^5\) This \textit{ghrelin-suppressing} effect is available now in an \textit{Italian Lamon} variety Borlotto bean extract nutritional supplement.
In addition to regulating hunger hormones, this Italian Lamon variety Borlotto bean extract inhibits the alpha-amylase enzyme that converts dietary carbohydrates into sugars.\(^3\) This slows down and limits the absorption of glucose from the intestine.\(^2,3\)

By safely rebalancing hunger hormones like ghrelin, this novel Italian Lamon variety Borlotto bean extract reduces nagging feelings of hunger, the desire to overeat, and limits glucose absorption to promote healthy weight reduction. >
Bariatric surgery like the Roux-en-Y gastric bypass is costly, uncomfortable, and carries with it substantial risks. So scientists recognized a need for a non-surgical alternative.

Fortunately, researchers have discovered a natural method to mimic many of the favorable hormonal effects of certain types of bariatric surgery without the need for undergoing this procedure.

A novel Italian Lamon variety Borlotto bean extract mimics the typical hormonal effect of some types of bariatric surgery by rebalancing the appetite hormones. This unique bean extract suppresses ghrelin while promoting CCK, GLP1, GLP2, and PYY. This in turn reduces food intake, body weight, accumulation of blood lipids, glucose, and the impulse that drives snacking. Ghrelin suppression may also reduce the inappropriate addiction-like reward response when excess calories are consumed.

As you will read next, supplementation with this proprietary Italian Lamon variety Borlotto bean extract has produced impressive weight loss effects. It reduces fat accumulation without loss of muscle mass, in a fashion similar to that produced by some types of bariatric surgery, which is the most effective means of facilitating meaningful weight loss.

How Hunger Hormones Contribute To Obesity

Normally, as our stomach and intestines fill up with a meal, they secrete “satiety hormones” that circulate to the brain to shut off the desire to continue to eat.

Satiety hormones include cholecystokinin (CCK), glucagon-like peptide-1 (GLP-1) and peptide YY (PYY). These satiety hormones subside as the gut empties and the body’s need for additional calories rises.

Conversely, the hunger-inducing hormone ghrelin is secreted in response to an empty stomach, which stimulates feeding behavior. Ghrelin acts on the same brain receptors that incite pleasurable rewards. When ghrelin is over-activated, it induces food cravings.

A key factor in many cases of obesity is loss of sensitivity to appetite-regulating hormones, which can lead to increasing food intake despite what should be normal “stop” signals. In many obese individuals trying to lose weight, ghrelin levels increase, which triggers more eating, less satiety, and provides the brain a feeling of reward for bad behavior.

An approach to healthy weight loss is to lower ghrelin to reduce appetite, while restoring sensitivity to satiety-inducing hormones CCK, GLP1, and PYY. That way, there would be reduced hunger — and reduced psychological reward for consuming excess calories.

Restoring Appetite Hormone Balance

To date there are few available methods that can safely and effectively suppress ghrelin. Studies have shown that the surgical procedure known as bariatric surgery induces massive weight loss, making it one of the most effective forms of weight reduction.

Some types of bariatric surgery, in particular a type of gastric bypass surgery known as Roux-en-Y gastric bypass, also reduce ghrelin levels, likely contributing to the reduced hunger in these bariatric surgery patients following the procedure.

For many years, physicians believed that bariatric surgery facilitated weight loss only because it reduces the volume of the stomach. The idea being that the stomach takes in less food and therefore patients lose weight. But scientists have recently found that, in addition to limiting the volume of food intake, certain types of the most successful forms of bariatric surgery like Roux-en-Y gastric bypass can reduce much of the ghrelin-producing tissue in the stomach and increase the appetite-suppressing hormones CCK, GLP1, and PYY.

Patients also typically experience healthful food preferences due to this hormonal re-balancing.
Remarkable Findings
In Human Studies

In 2013, a brand new randomized-crossover study examined the effects of eating a meal of just the Italian Lamon variety Borlotto beans—not the extract—and compared the results to a meal of white wheat bread containing the same amount of available starch.25

Compared to the control meal, the bean meal resulted in decreased levels of the appetite-promoting hormone ghrelin and reduced hunger. Additionally, the people eating Italian Lamon variety Borlotto beans had 15% lower glucose and 16% lower insulin levels.25

Scientists then reasoned that a concentrated and standardized Italian Lamon variety Borlotto bean extract should produce a much more potent effect.

So, in a study published the same year as the bean experiment, researchers enlisted 12 healthy, non-overweight human volunteers for a randomized, double-blind, placebo-controlled study. Each subject took either a placebo or 100 milligrams of Italian Lamon variety bean extract after a 12-hour overnight fast. The study subjects then ate a normal meal made up of various food items.2

As expected, the Italian Lamon variety Borlotto bean extract produced a significant impact on appetite signaling.2 Within three hours, levels of the appetite-promoting hormone ghrelin and the desire to eat were both significantly lower in the Italian Lamon variety Borlotto bean extract group compared to the placebo arm.2 Correspondingly, the sensation of satiety (fullness) after three hours was higher in the Italian Lamon variety Borlotto bean extract group.2

In the Italian Lamon variety Borlotto bean extract supplemented group, the increase in blood sugar was 41% lower than the placebo group thirty minutes after the meal. The increase in insulin between 45 and 120 minutes after the meal was 26% lower.2 Reducing after-meal levels of glucose and insulin is important not only for weight management, but also for slashing the risk of a number of degenerative and potentially fatal diseases.29,34

Next, researchers investigated the weight-loss effects of Italian Lamon variety Borlotto bean extract on overweight individuals. In a not-yet published study, 60 participants with a body-mass index (BMI) between 25 and 30 took either placebo or a total of 200 milligrams of extract daily, in two divided doses.3 All participants were instructed not to make any dietary changes or start any new exercise routines. Subjects were assessed for changes in weight, waist size, and an established measurement of appetite and satiety.

What You Need To Know

Modulating Appetite Hormones To Reduce Weight

- Successful weight loss can literally be a matter of life and death.
- But disordered appetite hormones sabotage weight loss—increasing hunger, reducing satiety, and promoting cravings for poor food choices.
- In breakthrough clinical studies, a proprietary Italian Lamon variety Borlotto bean extract was shown to be a safe, effective nutritional supplement that modulates appetite hormones—blocking hunger and increasing feelings of food satisfaction and fullness.
- This remarkable extract also inhibits the enzyme that converts carbohydrates into sugar, inhibiting the lethal glycemic effects of carbohydrates—which can include metabolic syndrome, diabetes, Alzheimer’s, cardiovascular disease, cancer, and kidney failure.
- It is now possible for aging individuals to achieve healthy body weight and optimal glucose control—resulting in reduced disease risks, improved appearance, and longer life!
All of the indicated benefits of **Italian Lamon variety Borlottto bean extract** in these human trials (reduced appetite, cravings, body weight levels, blood sugar, and insulin) are linked with decreased risks of a variety of potentially fatal diseases. No significant adverse events or side effects were reported in any study.

**Animal Data Supports Lamon Extract**

The early studies on the Italian Lamon variety Borlottto bean extract were conducted on laboratory animal models.

Different rat groups were supplemented with very high doses of Lamon variety bean extract and then provided with access to regular food pellets, a starch-enriched diet, and a highly palatable chocolate-flavored beverage. The results showed that there were decreases in blood glucose levels, food intake, and body weight gain, all varying by the dose of Italian Lamon variety Borlottto bean extract.

In one of these experiments, scientists pretreated rats with a drug that interferes with receptors for the appetite-suppressing hormone **CCK**. The drug blocked Lamon bean extract's food reduction effect, demonstrating that Lamon extract works in part by modulating **CCK signaling**.

To learn more about the hunger-reducing effects of Italian Lamon variety Borlottto bean extract, scientists...
conducted additional studies. Rats were trained to press a lever to receive as much of a chocolate-flavored beverage as they wished. Then Lamon variety bean extract was administered in differing dosage ranges. In a dose-dependent manner, Lamon bean extract reduced lever-pressing by up to 40% indicating that the rats had a sense of satiety and did not want more of the chocolate-flavored beverage.

This finding was repeated in two almost-identical studies, one of which also found an up to 30% reduction in food intake—a reduction that persisted for a full 24 hours.

This appetite-suppressing effect was further tested on obese rats. They were weighed after each of three separate rounds of 5-day treatment periods followed by a 20-day washout period. After each treatment period, in a dose-dependent manner, the different doses of Italian Lamon variety Borlotto bean extract reduced daily food intake by an average of 20-35% and resulted in reduced body weight.

When rats are fed carbohydrates, they experience blood sugar spikes—just as humans do. Researchers reported that the Italian Lamon variety Borlotto bean extract effectively blocks absorption of carbohydrates in animals by inhibiting the alpha-amylase enzyme.

In one experiment on after-meal glucose response, scientists first put obese rats through a food-deprivation period. Then, they were given different doses of the Italian Lamon variety Borlotto bean extract and immediately allowed access to a fixed amount of starch-enriched chow. Testing after the meal showed that in a dose-dependent manner, the Italian Lamon variety Borlotto bean extract suppressed carbohydrate-induced after-meal glucose spikes.

The doses used in these rat studies were far higher than needed in the successful human clinical trials. This helped demonstrate the safety of the Italian Lamon variety Borlotto bean extract. The impressive human studies only required 100 mg of the Italian Lamon variety Borlotto bean extract taken two times daily.

**Inhibiting Carbohydrate Absorption**

Appetite hormones are not the only factor in weight gain. Excess carbohydrate calories in the modern Western diet undermine the best efforts to maintain healthy levels of body weight.

Excess blood glucose leads to increased insulin—and increased insulin contributes to greater difficulty burning stored body fat as fuel. It is also involved in the body storing more excess carbohydrate calories as unsightly fat. Rapid sugar absorption contributes to after-meal glucose surges, impaired sugar control, and sharply increased disease risk.
The good news is that in addition to its ability to rebalance appetite hormones, Italian Lamon variety bean extract also impedes the enzyme alpha-amylase which breaks down dietary starch into simple sugars that are rapidly absorbed in the small intestine. Blocking alpha-amylase inhibits the breakdown of starches and slows the rate at which free sugars are absorbed, thereby blunting glucose spikes. This provides a practical approach to help lower glucose levels, improve age-related markers of health, and regain glycemic control.

**Italian Lamon variety Borlotto bean extract** helps counteract undesired weight gain through two distinct mechanisms: it rebalances appetite signaling hormones and it inhibits excess carbohydrate absorption.

**Summary**

Since obesity involves a higher mortality risk than being of normal weight, successful weight loss can be a matter of life and death.

But disordered appetite hormones sabotage weight loss by causing chronic hunger, a reduced feeling of satiety, and greater cravings for unhealthy food choices. The most effective option to regulate appetite hormones is gastric bypass surgery—which is costly, uncomfortable, and substantially risky.

Clinical studies now demonstrate that a proprietary extract from the Italian Lamon variety Borlotto bean is a safe, effective nutritional supplement that modulates ghrelin and other appetite hormones, effectively blocking hunger while increasing feelings of food satisfaction and fullness.

**References**


If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.
Tender, sensitive joints can limit everyday activities. As you age and continue to put stress on your joints, you can compromise joint cartilage—which exposes small collagen fibers. Your body’s immune system mistakenly identifies these collagen fibers as “foreign cells.” This triggers an inflammatory response against the collagen-containing cartilage in your own joints. Inflammation and joint discomfort can soon follow. Data shows that a patented collagen provides targeted support for the immune issues related to joint discomfort.

To meet this urgent need, Life Extension® offers Bio-Collagen with Patented UC-II®—a novel form of undenatured type II collagen from chicken cartilage. Taken orally, UC-II® travels to the intestinal tract, where it “introduces” the immune system to the same type of collagen molecules found in joint cartilage.

**ADVANCED MOLECULAR STRUCTURE**

Not just any form of collagen will do. Normally, when chicken collagen is processed, its molecular shape is changed. It loses bioactivity and becomes denatured—which researchers found has no beneficial effect on the immune system. Fortunately, a unique processing technique preserves the correct molecular shape of the collagen—and preserves its bioactivity—producing a form known as undenatured collagen. The result of this innovative process is an undenatured chicken collagen called Bio-Collagen with Patented UC-II®.

**SCIENTIFICALLY VALIDATED**

Scientific studies have found that UC-II® reduced sensitive joint discomfort and eased joint function. One double-blind, placebo-controlled study on patients found that UC-II® provided relief by 33% and decreased joint discomfort scores by a remarkable 40%—in just 90 days!

**CONVENIENT ONE-PER-DAY DOSE**

The suggested daily serving of one capsule of Bio-Collagen with Patented UC-II® supplies 40 mg of UC-II® standardized chicken cartilage. The retail price of a bottle of 60 capsules of Bio-Collagen with Patented UC-II® is $36. If a member buys four bottles during Super Sale, the price is reduced to $21.60 per bottle.

To order Life Extension® Bio-Collagen with Patented UC-II®, call 1-800-544-4440 or visit www.LifeExtension.com

UC-II® is a registered trademark of InterHealth N.I. U.S. Patents 7,846,487; 7,083,820 and EPO patent EP 1435906B1; Canadian patent CA 2459981C; and Japanese patent JP 480057A2.

**REFERENCES**


UC-II® is a registered trademark of InterHealth Nutraceuticals, Inc. US Patent No. 6,649,631; 6,477,201; 6,292,864; 7,055,444; 7,883,120; 7,484,487; EP1435906; and worldwide patents pending.

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.
Excess calorie consumption has become epidemic in the United States. The invariable result is more overweight Americans and a litany of associated health problems.

A crucial component of a longevity or weight loss program is reducing portion size and the quantity of ingested calories.

A natural supplement has been developed to help tame hunger and promote satiety so more people can adhere to lower-calorie diets.

**The Body’s Appetite Hormones**

Hunger and satiety are controlled by hormones. Advanced Natural Appetite Suppress contains a Italian Borlott variety bean extract that helps support normal levels of the gut hormones that control appetite and satiety. The result is reduced desire for food and less food intake.

The stomach hormone ghrelin produces feelings of hunger, while the hormones cholecystokinin (CCK), glucagon-like peptide-1 (GLP1), and peptide YY (PYY) produce feelings of food satisfaction and fullness.

Advanced Natural Appetite Suppress provides a potent dose of a novel Italian Borlott variety bean extract. Studies show this proprietary extract helps the body modulate levels of ghrelin and the satiety hormones CCK, GLP1, and PYY. This helps reduce food intake and supports normal, healthy levels of hunger and fullness.

This extract also modulates alpha-amylase, the enzyme that converts dietary starch into simple sugars. This can affect the rate at which free sugars are absorbed from the digestive tract into the blood stream.

**Remarkable Clinical Research**

In a recent human trial in which all overweight participants avoided making intentional dietary or exercise changes, those taking this Italian Borlott variety bean extract lost 9 pounds on average in 12 weeks—versus only one-third of a pound in those taking placebo!

The supplemented subjects also lost 2.5 inches in waist size—a 4.2 times greater reduction than the placebo subjects.

The supplemented participants had reduced appetite levels and increased satiety, and no significant side effects were reported.

Advanced Natural Appetite Suppress contains the identical Italian Borlott variety bean extract used in this study.

The suggested twice daily dosage of one (1) vegetarian capsule of Advanced Natural Appetite Suppress provides:

<table>
<thead>
<tr>
<th>European (Italian Borlott variety) white kidney bean extract</th>
<th>200 mg</th>
</tr>
</thead>
</table>

A bottle of 60 vegetarian capsules of the new Advanced Natural Appetite Suppress retails for $38. If a member buys four bottles during Super Sale, the price is reduced to $22.95 per bottle.

Beanblock® is a registered trademark of Indena S.p.A

References

Are you happy with the color of your eyes? Your eye color and many other physical characteristics that give you your own distinctive look are determined by genes, inherited from your parents. Genes are powerful. They control how cells function and when those functions are carried out. While influencing all the genes that regulate cellular function is not yet possible, you can control many genes that affect your disease risk, as well as length of life – just by managing glucose (blood sugar) levels.

The CR Way, the holistic lifestyle for living better and longer, calls for keeping blood glucose low for optimal health. Fasting glucose in the 80s (mg/dL) or below and postprandial (post-meal) glucose below 120 mg/dL are the goal levels.

Maintaining glucose in these lower ranges has long been suggested in the CR Way to Great Glucose Control classes and is strongly advocated by Life Extension.

What most doctors don’t yet know is that controlling glucose within these lower levels helps activate genes associated with longevity and reduced disease risk. Here we introduce some of these genes and explain how glucose and insulin mediate life and death by turning them on or off.
Some genetic activity can be altered beneficially by diet and lifestyle.\textsuperscript{5,6} When long-term, serious calorie-restricted humans were tested at Washington University School of Medicine, their fasting glucose and insulin levels were lower than sex- and age-matched cohorts of runners and of subjects who followed a standard western diet.\textsuperscript{7}

A later study, made possible in part by the Life Extension Foundation\textsuperscript{®}, found that long-term calorie restriction in humans activates longevity genes proven to be associated with the insulin/IGF-I pathway.\textsuperscript{8}
Insulin

Insulin is a well-known hormone. Most people think of it as part of managing glucose. It promotes the absorption of fatty acids and amino acids into cells, as well. Moreover, it facilitates cellular replication and, thus, growth.

When blood glucose rises, usually after eating, pancreatic beta cells produce insulin. It circulates through the blood—binding to insulin receptors on cell surfaces, where it moves glucose into the cells. Insulin stimulates the body to store excess glucose as glycogen and promotes the synthesis of fatty acids which are stored in the fat cells of adipose tissues.

Food becomes glucose
Glucose stimulates insulin
Insulin facilitates cellular access to energy
Glycogen generation and storage, fat storage
Access to energy leads to
Cell division and growth and sometimes cancer

Some of the following paragraphs will appear technical to the lay reader, but it is important for the scientists who rely on Life Extension magazine to understand the important genes influenced by blood glucose levels:

Pdx-1 (pancreatic and duodenal homeobox-1) directly regulates signals that trigger insulin production. Pdx-1 also activates glucose transporter-2, which helps transport glucose from the blood into the cell. NeuroD1 (neurogenic differentiation 1) helps regulate brain cell differentiation and insulin release. Defects in NeuroD1 have been implicated in diabetes. MafA (Beta cell nuclear MusculoAponeurotic Fibrosarcoma oncogene family A) interacts with Pdx-1 and NeuroD1, and stimulates pancreatic B-cells to produce insulin—particularly when glucose levels are high.

Genetic and other insulin-regulating signals can be turned “down or off” when exposed chronically to high glucose levels. This is thought to be a potential cause of type II diabetes.

Insulin And IGF-I

Like insulin, IGF-I regulates growth-related functions, which are essential for life. However, insulin and IGF-I levels are also linked to cancer and accelerated aging. Genetic manipulations that reduce the intensity of insulin and IGF-I signaling consistently extend life span in worms, flies, and mice.

When insulin binds to its receptor, it activates a chain reaction of signals, beginning with the insulin receptor itself and including key enzymes involved in glucose homeostasis. These enzymes include Protein Kinase B (PKB/Akt), which regulates many signals,
such as the FoxO (Forkhead box O) family of transcription factors (proteins that control whether a gene becomes active).18

FOOD ➔ GLUCOSE ➔ INSULIN
INSULIN ➔ PKB/AKT ➔ FOXO

FoxO transcription factors play a pivotal role in metabolism and life span. “Glucose reduction and/or calorie restriction causes FoxO factors to take over to determine the fate of a cell: long-term survival in a quiescent state, or programmed cell death.”21

When food is scarce, FoxO factors shuttle from the cytoplasm back into the nucleus and activate longevity genes, which help the organism make it through lean times until food is available. When food is plentiful, FoxO stays in the cytoplasm of the cell and thus cannot perform its longevity enhancement.22

One member of the FoxO family, FoxO3A, is associated with extended life span and has been identified in centenarian research.23

Preserving Cellular Energy Producers With SIRT3

Mitochondria, the cellular energy producers that provide the fuel for the cells’ function(s), are very vulnerable to age-related decline.24 Glucose restriction may slow age-related mitochondrial deterioration by activating the SIRT3 gene,25 a member of the sirtuin family of genes – known to protect against age-related hearing loss.26 SIRT3 hooks up with FoxO3A and the ancient enzyme and energy sensor, AMPK (AMP-activated protein kinase), to form an energy-producing complex in mitochondria.26 This facilitates the energy-enhancing formation of new mitochondria.27,28

Low Glucose: Different Reactions In Genes Of Healthy Vs. Cancer Cells

Cancer cells are glucose gluttons because they need this simple form of energy to fuel their rapid growth rates. So, making energy easily available by maintaining high glucose levels increases both cancer risk and rate of metastasis.29

Maintaining low glucose levels has been shown to extend the life span of healthy cells.30

Low blood glucose also provides the benefit of activating hTERT (human telomerase reverse transcriptase) an enzyme that keeps telomeres from shortening when cells divide. Longer telomeres are associated with increased life span in animal and human studies.31 Protection of mitochondria under mild stress is another important benefit of hTERT.32

Glucose And Your Genes

• Genes exert powerful control over how cells function and when those functions are carried out.
• Some genetic activity can be altered beneficially by diet and lifestyle.
• Excess blood glucose causes unfavorable gene expression that can lead to excess insulin production, sustained activation of inflammatory pathways, and increased risk of developing disease complications.
• Genetic and other insulin-regulating signals can be turned “down or off” when exposed chronically to high glucose levels.
• Low blood glucose provides the benefit of activating hTERT (human telomerase reverse transcriptase) an enzyme that keeps telomeres from shortening when cells divide.
• Maintaining low glucose levels has been shown to extend the life span of healthy cells.
Glucose And Dementia:
Can One Gene Restore Memory?

As people age, they become increasingly vulnerable to dementia. This usually means memory loss, along with impaired judgment and/or reduced language skills. Loss of everyday skills, such as the ability to manage a bank account or drive safely, is demoralizing.

The RbAp48 gene became famous instantly when it was linked to memory restoration. Scientists at Columbia University knocked out RbAp48 in mice and found that they experienced memory loss. When the researchers increased the level of RbAp48 in old mice – their memories returned to the level of much younger mice!

Apparently, the dentate gyrus, a part of the hippocampus region of the brain, is important for memory formation and is targeted during aging. RbAp48 is less abundant in the dentate gyrus of older mammals versus younger ones. Moreover, the dentate gyrus is extremely sensitive to damage by high blood glucose levels, which may result in dementia.

Summary

Making dietary mistakes that send glucose and insulin soaring is easy to do. So living a lifestyle that is fun, easy to follow, and known to activate longevity genes that are associated with longer life makes a big difference. This drove the development of the CR Way, which emphasizes delicious, low-calorie meals that help control glucose and insulin levels. Published and soon-to-be-published studies indicate that the CR Way approach to calorie restriction activates genes, associated with longer life and reduced disease risk.

References

Further Resources For Glucose Control

Glucose Control Can Be Easy. Life Extension, October 2012, p. 44-49

The Benefits of a CR Way Diet. Life Extension, March 2011, p. 64-68

Discount Prices For Premium-Quality Products

Life Extension® members are longevity enthusiasts who take extraordinary steps to stave off disease, aging, and death. When members buy products from the Life Extension Foundation Buyers Club, they are assured of receiving the highest quality products based on the latest scientific studies that demonstrate benefits.

The discounts available to Foundation members enable them to purchase premium-quality supplements at prices below those charged by commercial companies.

Here are some examples of savings members enjoy during the annual Super Sale:

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Our Low Retail Price</th>
<th>SUPER SALE Member-Volume Discount Price Per Bottle</th>
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<tr>
<td>Super Omega-3 EPA/DHA with Sesame Lignans &amp; Olive Fruit Extract</td>
<td>$32</td>
<td>$16.81 (ten-bottle purchase)</td>
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<tr>
<td>120 softgels, Item # 01482</td>
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<tr>
<td>Super purified EPA/DHA fish oil plus sesame lignans and potent olive (fruit and leaf) extract to provide critical omega-3 fatty acids and essential components of the Mediterranean diet.</td>
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<tr>
<td>Optimized Resveratrol with Synergistic Grape-Berry Actives</td>
<td>$46</td>
<td>$27.90 (four-bottle purchase)</td>
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<td>250 mg, 60 vegetarian capsules, Item # 01430</td>
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<tr>
<td>High potency trans-resveratrol with quercetin, plus trans-pterostilbene and fisetin to support DNA “longevity genes.” One per day resveratrol formula.</td>
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<td>Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™</td>
<td>$62</td>
<td>$35.10 (ten-bottle purchase)</td>
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<td>100 mg, 60 softgels, Item # 01426</td>
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<tr>
<td>The superior ubiquinol form of CoQ10 plus a natural compound (shilajit) shown to double mitochondrial CoQ10 levels.</td>
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<tr>
<td>Life Extension Mix™ • 315 tablets, Item # 01855</td>
<td>$98</td>
<td>$46.91 (ten-bottle purchase)</td>
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<td>High-potency multi-nutrient formula now with the bioactive methylcobalamin form of B-12 and Wild Maqui extract to provide a boost of powerful delphinidin anthocyanins.</td>
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<tr>
<td>Vitamin D3 • 5,000 IU, 60 softgels, Item # 01713</td>
<td>$11</td>
<td>$6.68 (four-bottle purchase)</td>
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<td>High-potency vitamin D in a softgel to provide greater absorption into the bloodstream.</td>
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<td>Ultra Natural Prostate</td>
<td>$38</td>
<td>$21.60 (twelve-bottle purchase)</td>
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<td>60 softgels, Item # 01895</td>
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<td>Comprehensive support for an aging prostate gland utilizing botanical extracts plus boron and now with ThymoQ™ Phospholipid Complex for enhanced absorption.</td>
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<td>MacuGuard™ Ocular Support • 60 softgels, Item # 01885</td>
<td>$22</td>
<td>$13.37 (four-bottle purchase)</td>
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<td>Provides zeaxanthin, meso-zeaxanthin, and lutein to help support healthy ocular circulation. Now with enhanced absorption with phospholipids.</td>
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<tr>
<td>Super K with Advanced K2 Complex • 90 softgels, Item # 01724</td>
<td>$30</td>
<td>$18.23 (four-bottle purchase)</td>
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<tr>
<td>More potent formula includes 200 mcg of long-acting MK-7 form of vitamin K2 plus 1,000 mcg of K1 and 1,000 mcg of the MK-4 form of vitamin K2.</td>
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<tr>
<td>PQQ Caps with BioPQQ® • 10 mg, 30 vegetarian capsules, Item # 01500</td>
<td>$24</td>
<td>$14.85 (four-bottle purchase)</td>
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<tr>
<td>Promotes mitochondrial biogenesis (generation of new mitochondria) in aging cells.</td>
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<td>DHEA (Dehydroepiandrosterone) • 25 mg, 100 capsules, Item # 00335</td>
<td>$18</td>
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<tr>
<td>A hormone that declines with aging, benefits overall health.</td>
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<tr>
<td>Mitochondrial Energy Optimizer with BioPQQ® • 120 capsules, Item # 01768</td>
<td>$94</td>
<td>$56.70 (four-bottle purchase)</td>
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<td>To maintain healthy cellular function, protein structural integrity, and mitochondrial biogenesis.</td>
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<tr>
<td>Super Bio-Curcumin® • 400 mg, 60 vegetarian capsules, Item # 00407</td>
<td>$38</td>
<td>$23.63 (four-bottle purchase)</td>
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<tr>
<td>Super-absorbable formulation promotes healthy lipids, joint function, and healthy DNA. Absorbs up to seven times greater than conventional curcumin.</td>
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<tr>
<td>Tri Sugar Shield™ • 60 vegetarian capsules, Item # 01803</td>
<td>$36</td>
<td>$21.60 (four-bottle purchase)</td>
</tr>
<tr>
<td>Supports healthy blood sugar levels using three novel ingredients that function via multiple mechanisms.</td>
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</table>

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.
### Bone Restore with Vitamin K2 • 120 capsules, Item #01727
Highly absorbable forms of calcium plus FruiteX® B OsteoBoron®, magnesium, zinc and K2. Available with or without vitamin K2.

- **Price:** $24
- **Member-Volume Discount Price:** $14.85 (four-bottle purchase)

### Cognitex with Pregnenolone and Brain Shield™ • 90 softgels, Item #01897
Optimal support for the brain. Includes gastrodin, alpha glyceryl-phosphoryl-choline, vinpocetine, phosphatidylserine, uridine 5'-monophosphate, and more. Available with or without pregnenolone.

- **Price:** $62
- **Member-Volume Discount Price:** $35.78 (four-bottle purchase)

### Brain Shield™
300 mg, 60 vegetarian capsules, Item #01802
Gastrodin provides unparalleled, multi-factorial support for cognitive and circulatory brain function.

- **Price:** $33
- **Member-Volume Discount Price:** $20.25 (four-bottle purchase)

### Reishi Extract Mushroom Complex • 60 vegetarian capsules, Item #01708
Standardized mushroom extract to restore and regulate immune system function.

- **Price:** $30
- **Member-Volume Discount Price:** $18.23 (four-bottle purchase)

### Triple Action Cruciferous Vegetable Extract
60 vegetarian capsules, Item #01468
Comprehensive cruciferous plant extract formulation, with I3C, DIM, apigenin, and other DNA-protecting vegetable concentrates.

- **Price:** $24
- **Member-Volume Discount Price:** $14.85 (four-bottle purchase)

### Rejuvenex® Factor Firming Serum • 1.7 ounce (two-month supply) pump, Item #01621
Provides 28 bioactive rejuvenating agents for the skin in deep-penetration light serum format.

- **Price:** $65
- **Member-Volume Discount Price:** $26 (eight-bottle purchase)

### Super R-Lipoic Acid • 300 mg, 60 vegetarian capsules, Item #01208
Superior efficacy compared to alpha-lipoic acid—supplies 240 mg of stabilized R-lipoic acid.

- **Price:** $49
- **Member-Volume Discount Price:** $30.38 (four-bottle purchase)

### ArthroMax® Advanced with UC-II® and AprèsFlex® • 60 capsules, Item #01618
Promotes joint health and may promote comfortable joint structure and function.

- **Price:** $36
- **Member-Volume Discount Price:** $21.60 (four-bottle purchase)

### FlorAssist™ Probiotic Liquid Vegetarian Capsules
30 liquid vegetarian capsules, Item #01806
Supports digestive health by utilizing a novel "capsule in a capsule" delivery system to provide 15 billion CFU of six clinically validated strains of beneficial bacteria to all areas of the digestive tract.

- **Price:** $33
- **Member-Volume Discount Price:** $20.25 (four-bottle purchase)

### Advanced Bio-Curcumin® with Ginger and Tumerones • 30 softgels, Item #01808
Triple action formula acting on multiple signaling pathways to deliver broad-spectrum protection against inflammation.

- **Price:** $30
- **Member-Volume Discount Price:** $18.23 (four-bottle purchase)

### Natural Stress Relief • 30 vegetarian capsules, Item #00987
With lemon balm extract to help relieve stress and sleeplessness, and L-theanine to promote relaxation without drowsiness.

- **Price:** $28
- **Member-Volume Discount Price:** $16.20 (four-bottle purchase)

### Gamma E Tocopherol with Sesame Lignans • 60 softgels, Item #00759
Provides the critical gamma tocopherol form of vitamin E plus sesame lignans to enhance the free radical scavenging benefits of alpha and gamma tocopherols.

- **Price:** $32
- **Member-Volume Discount Price:** $19.58 (four-bottle purchase)

### Cytokine Suppress™ with EGCG • 30 vegetarian capsules, Item #01804
Combines mung bean seed coat and EGCG from green tea to modulate a healthy inflammatory response and support immune function.

- **Price:** $30
- **Member-Volume Discount Price:** $18.23 (four-bottle purchase)

### Super Booster Softgels with Advanced K2 Complex • 60 softgels, Item #01680
A convenient one per day softgel that includes optimal potencies of gamma-tocopherol, sesame lignans, lycopene, lutein, ginkgo, chlorophyllin, and both forms of vitamin K2.

- **Price:** $42
- **Member-Volume Discount Price:** $25.65 (four-bottle purchase)

### Neuro-Mag™ Magnesium L-Threonate • 90 vegetarian capsules, Item #01603
Optimal form of magnesium to protect synaptic density of neurons.

- **Price:** $40
- **Member-Volume Discount Price:** $24.30 (four-bottle purchase)

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*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.*
Do you ever wish you could just recharge your batteries? Most of us do, especially as we grow older.

Fatigue is a major problem in American adults, accounting for millions of office visits each year.¹ The complaints are similar: groggy for much of the morning, can’t sleep well or long enough at night, lack the energy for daily tasks and even enjoyable diversions.

Doctors hear these complaints all the time, and are nearly as frustrated as their patients at their powerlessness to do anything about it.

What’s worse, the only drugs available to combat fatigue have a daunting side effect profile, including the real possibility of dependence (addiction).²³ Caffeine-laden “energy drinks” are now on the market, and while modest amounts of caffeine are likely to be harmless,⁴ large doses, especially in combination with sugar and other additives, can result in caffeine toxicity or overdose-related side effects.⁵⁷

Surprisingly, drugs and caffeine don’t truly provide meaningful energy; they temporarily squeeze adrenaline from your adrenal glands and in the long run can wear down your defenses still further.⁸

But you can, in fact, literally recharge your batteries, with a pair of new supplements that work in combination to restore your natural energy levels. Cordyceps and fermented ginseng, both age-old life-giving supplements, are capable of boosting your body’s levels of adenosine triphosphate, or ATP.⁹¹⁰
ATP molecules store energy in their chemical bonds, similar to the way a battery stores energy when it is charged up. Whether you are moving, thinking, speaking, relaxing—literally everything you do depends on a full charge of ATP. And when we slow down with aging, it's now clear that we are simply running low on ATP. We make ATP in our mitochondria, where we burn fuel for energy, but that process grows increasingly inefficient with age.\textsuperscript{11} While fatigue has many causes, both biological and psychosocial, insufficient ATP is a key factor in aging: either we don’t make it as efficiently as we did in youth, or we use more of it to do simple tasks that we could previously do with less effort.
And cordyceps reduces accumulation of toxic lactic acid, the substance that produces fatigue in overstressed muscles. Our muscles produce lactic acid when they are forced to burn glucose without sufficient oxygen, such as when we sprint or do other intense exercise without enough time to breathe. This has direct bearing on exercise capacity; when rats are forced to swim until exhaustion, they show lower lactic acid levels, and swim longer, if they are supplemented first with cordyceps. Studies show that supplementation can increase swimming time by as much as 88%.18-20

Another way that cordyceps enhances your available energy is by increasing insulin sensitivity. The more sensitive your cells are to insulin, the faster and more completely they take up sugar from your blood. That has the short-term effect of allowing your cells access to more energy, and the long-term effect of lowering your risk of diabetes, heart disease, and other chronic conditions.

Cordyceps has been demonstrated to increase both immune cell production and heart muscle mitochondrial ATP production.14,22

Let’s take a hard look at cordyceps and ginseng to understand how they work in tandem to recharge your ATP levels, restore your energy, and beat fatigue. You don’t have to take aging lying down!

**Cordyceps**

*Cordyceps sinensis* is considered one of the most valuable medicinal fungi in China. The fungi live on, and ultimately kill caterpillars of the “ghost moth” and other insects, replacing the dead caterpillar’s tissues with their own fungal structures. Formerly collected only in the wild at great expense, cultured, fermented versions are now available that have equal potency.13,14

Cordyceps has historically been used in traditional Chinese medicine, among other purposes, for its metabolic and energy-producing effects. A standardized, fermented extract of the fungus called “Cordyceps” is now available to consumers.

Studies show that cordyceps extract increases available energy in muscle and other tissues by boosting levels of ATP, the tiny “batteries” that our bodies use to store and move energy. Mice given cordyceps supplements, for example, demonstrated an 18.4% increase in liver ATP levels. This was accompanied by a drop in the building blocks of ATP, indicating that the body was using them up to create new energy-rich ATP molecules.

Cordyceps is especially effective at raising ATP levels under conditions of stress that produce fatigue. For example, in animals with iron deficiency anemia, a common cause of fatigue in humans, cordyceps boosted both ATP levels and blood flow, another measure of energy metabolism.9

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**TABLE: The Many Causes Of Age-Related Fatigue**

<table>
<thead>
<tr>
<th>Biological Causes</th>
<th>Psychosocial Causes</th>
</tr>
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<tbody>
<tr>
<td>Changes in skeletal muscle function</td>
<td>Depression</td>
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<tr>
<td>Cardiovascular impairment</td>
<td>Anxiety</td>
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<tr>
<td>Anemia</td>
<td>Pain</td>
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<tr>
<td>Dehydration and electrolyte disorders</td>
<td>Interpersonal conflict</td>
</tr>
<tr>
<td>Increased inflammatory mediators (cytokines)</td>
<td>Stress</td>
</tr>
<tr>
<td>Nutritional deficiencies</td>
<td>Cognitive impairment</td>
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</tbody>
</table>
In an impressive human study, 20 healthy adults aged 50-75 were supplemented with cordyceps extract, **333 mg** three times daily for 12 weeks, or a matching placebo. Every day they performed exercise testing on a stationary bicycle to maximal levels, and had their physiological parameters measured continuously. By the end of the study period, the placebo patients performed no better than at baseline, but the supplemented subjects had a **10.5%** improvement in the time until muscle fatigue was perceived (as measured by lactic acid levels in muscle). Their ability to work out until they were “out of breath,” increased by **8.5%** as well.

Cordyceps makes a contribution to energy levels by supporting maximal quantities of energy-storing ATP, the little “batteries” that run our bodies. Let’s turn now to ginseng to see how it is the ideal complement to cordyceps.

**Ginseng**

Like cordyceps, ginseng has a long history of traditional use in China, where it is considered to have “qi-invigorating” properties. The concept of “qi” is that of “energy flow” or “vital energy;” its deficiency is associated with heart disease and lethargic blood flow.

Not surprisingly, then, studies show that ginseng increases ATP production in the mitochondria, in this case in part because of powerful antioxidant effects that shield mitochondria from the fierce energy-rich environment in which they must function. It has recently been demonstrated that ginseng activates multiple enzymes in the so-called tricarboxylic acid cycle (or Krebs cycle), enabling mitochondria to extract maximum energy (in the form of ATP) from their glucose fuel in the presence of oxygen.

Ginseng is also considered an adaptogen, namely, a compound that helps the body adapt to a wide variety of stresses and extremes. Unfortunately, most forms of ginseng require fermentation in the human intestine before they can be absorbed, which can limit their potential usefulness. An advanced formulation of ginseng, GS15-4, surmounts that obstacle by naturally fermenting premium *Panax ginseng*, which has been shown to increase absorption of the essential compound K (a ginsenoside metabolite) by more than 15-fold.

In the laboratory, rats treated with a single dose of energy-boosting ginseng increased the time they could run on a treadmill by **132%;** after 7 days it had increased by **179%**. This study traced the source of the benefit to enhanced adaptation of the pituitary-adrenal gland system, enabling production of appropriate...
amounts of stress hormones until the animals’ bodies had adapted to the exercise regimen. In fact, studies of chronically stressed animals demonstrate that ginseng supplementation beneficially lowers plasma levels of the stress hormone cortisol, and reverses disturbances in neurotransmitter precursor balance and fatty acid metabolism that contribute to stress-induced fatigue.\textsuperscript{34,35}

Multiple other studies have now confirmed that ginseng supplements prolong aerobic exercise endurance in even untrained animal models.\textsuperscript{26,34,36-38} Some of this effect appears to arise from a reduction in fatigue of the diaphragm, the large, sheet-like muscle that we use to draw in breath;\textsuperscript{39} fatigue of the diaphragm is a sure way of ending an exercise session.

Studies of the effects of ginseng in depression reveal potent antidepressant effects that contribute to improved energy.\textsuperscript{37} And studies of obese animals demonstrate down-regulation of a host of genes involved in lipid and energy metabolism, an important finding in light of the fact that obesity contributes to fatigue.\textsuperscript{1,40}

In human subjects, fermented ginseng reduces anxiety and improves sleep, which of course makes for improved energy levels. One study showed that a total dose of \textbf{1,845 mg/day} of fermented ginseng (three capsules of \textbf{205 mg} each, three times daily for 8 days) improved the so-called “first night effect” in which sleep in an unfamiliar environment is disturbed.\textsuperscript{41}

The same researchers identified an anti-anxiety effect produced by improvements in levels of the calming neurotransmitter GABA, suggesting that the sleep improvements may have been related to reductions in anxiety, another cause of fatigue.\textsuperscript{41}

In a similar fashion, stressful cognitive tasks can produce mental fatigue (perhaps through anxiety production), and a single \textbf{200 mg} dose of a standardized ginseng extract significantly reduced mental fatigue while improving cognitive performance on mental arithmetic tasks in a group of healthy volunteers.\textsuperscript{42}

In a subsequent study, researchers gave healthy volunteers either \textbf{200 mg} of the ginseng extract, or a placebo, immediately followed by a battery of cognitively demanding tasks, and then 30 minutes later by either \textbf{25 grams} (nearly an ounce) of glucose or a placebo.\textsuperscript{43} While both ginseng and glucose improved performance on arithmetic and reduced feelings of fatigue, there was no synergistic effect.\textsuperscript{43} However, because ginseng lowered blood sugar, while the glucose obviously raised it, the researchers concluded that ginseng was both glucoregulatory and provided the mental stamina necessary to engage in extended cognitive processes.\textsuperscript{43}

\textbf{Why You Need Fermented Ginseng}

Ginseng has numerous health benefits, but it is poorly absorbed from the digestive tract in its native form. It is not absorbed in the stomach or small intestine (sites where we normally absorb nutrients and drugs), requiring fermentation by microbes in the human large intestine (colon) to be converted into a bioavailable form.\textsuperscript{45-48} But because our colonic bacterial populations shift as we age, we potentially lose the ability to efficiently convert and absorb the active ginsenoside molecules.\textsuperscript{49}

Innovative research in Korea, home to the world’s most potent ginseng supplies, has now demonstrated the utility of fermenting premium ginseng in customized fermenters.\textsuperscript{50} Studies in humans reveal that, compared with standard ginseng extracts, GS15-4 fermented ginseng extract is absorbed \textbf{15.5 times} as much in 24 hours, achieves a \textbf{27-fold} higher peak concentration in blood, and reaches that peak in roughly a quarter of the time.\textsuperscript{32}

Fermented ginseng is so potent that it can almost be considered a different biological product, one that can bring the myriad laboratory-proven benefits of ginseng to ordinary people who could use a little more energy in their lives.
And in still another study, a standardized ginseng extract, **400 mg/day** for 8 days, improved feelings of calmness in healthy young adults, compared with placebo recipients. On both the first and the 8th day, supplemented subjects also performed better on mental arithmetic tasks as well.

**Summary**

Fatigue is like pain—it has many different causes, is difficult for others to assess objectively, leading to undertreatment, and is potentially debilitating. Yet fatigue, both mental and physical, can be traced to insufficient levels of the tiny battery-like ATP molecules in which we store the energy our bodies derive from foods, mainly fats and sugars. By restoring ATP levels, we literally “recharge our batteries,” relieving fatigue and restoring more youthful energy levels. Cordyceps and ginseng work in a complementary fashion to boost ATP levels and charge up our bodies’ energy stores.

If you are one of the millions of Americans whose batteries seem chronically run down, who could use a safe, non-addictive, and biologically-proven energy boost, don’t turn to caffeinated energy drinks or prescription drugs, laden as they are with toxic side effects. Instead, choose a natural energy-restoring combination of cordyceps and fermented ginseng to optimize energy production and re-invigorate both body and mind.

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

**References**


**Astaxanthin** is a fat-soluble carotenoid compound. The challenge to deriving maximum benefits is its normally limited absorption—as low as about 50%. Assimilation of astaxanthin is impeded by limited uptake and intestinal degradation.

**Astaxanthin 4 mg with Phospholipids** combines 4 milligrams of natural astaxanthin with a proprietary blend of phospholipids.

By incorporating phospholipids, scientific study shows that carotenoid absorption may be enhanced several-fold.3

**Astaxanthin 4 mg with Phospholipids** uses four different phospholipids to facilitate maximum absorption of astaxanthin into the bloodstream, where it is transported to cells throughout the body.

**ASTAXANTHIN**

Each softgel of **Astaxanthin with Phospholipids** provides 4 mg of natural astaxanthin along with 80 mg of proprietary phospholipid blend. Just one softgel a day provides tremendous systemic cellular support!

A bottle of 30 softgels of **Astaxanthin 4 mg with Phospholipids** retails for $16. If a member buys four bottles during Super Sale, the price is reduced to $9.45 per bottle.

Contains soybeans.

References
Your Skin’s Internal Moisturizer

Ceramides are essential for preserving healthy-looking skin. That’s why they’re included in so many anti-aging face creams.

Your body’s production of ceramides declines with age. That’s bad news, since ceramides make up 35-40% of the binding matrix that maintains moisture balance and protects the skin’s surface. It’s therefore critical that ceramides lost to aging are replaced.

Restore Ceramides Naturally from Within!

The ceramides that young skin naturally produces to retain its supple appearance are identical to those present in wheat! Wheat-derived oils have been used topically for centuries as a natural moisturizer. But you can’t get enough ceramides from topically applied wheat oil to have a long-term impact on your skin’s appearance. And they don’t appear in sufficient concentration in your diet.

That’s why Life Extension® brought together these skin-nourishing oils in a concentrated oral formula called Skin Restoring Phytoceramides with Lipowheat®.

Lipowheat® is a proprietary ceramide blend that offers nutritional support for aging skin to complement the topical products you may already be using.

The Moisturizing Pill the Japanese Have Enjoyed for a Decade!

Lipowheat® ceramides have been available to Japanese women as a functional food since 2000. The hydrating action of Lipowheat® ceramides have proven effective in clinical trials.

Aging Americans can now offset the visible impact of the gradual decline in their ability to produce enough ceramides by using Skin Restoring Phytoceramides with Lipowheat®.

One bottle containing 30 350 mg vegetarian liquid capsules of Skin Restoring Phytoceramides with Lipowheat® retails for $25. If a member buys four bottles during Super Sale, the price is reduced to $15.53. Contains wheat.

Life Extension® is a registered trademark of LAVIPHARM Group of Companies.

References

To order Skin Restoring Phytoceramides with Lipowheat®
call 1-800-544-4440 or visit 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.
Stimulant-Free Natural Energy

ASIAN ENERGY BOOST

Most people rely on stimulants, particularly caffeine, to boost sagging energy levels during the day. The result is often a roller coaster of intense energy followed by deep lulls that can lead to further exhaustion. But there is a better way. For sustained vigor, the secret is to boost the body’s own energy source, ATP (adenosine triphosphate).

**Asian Energy Boost** is specifically designed to provide all-natural support for cellular and physical energy levels to help you stay alert without negative effects, such as crashing or uncomfortable jitters.

**Support for Energy Homeostasis**

Your body’s natural mechanism of **homeostasis** maintains normal balance during daily challenges, helping you remain energized and focused—when properly supported. Ongoing stress, however, means your body seldom gets time to restore your natural equilibrium.

For individuals seeking optimum homeostasis and sustainable energy, **Asian Energy Boost** combines the potent Asian mushroom *Cordyceps sinensis* and a specially fermented form of the *Panax ginseng* root. Combined, they deliver potent energy support.

**Cordyceps sinensis**

One of the most valued medicinal mushrooms in China, *Cordyceps sinensis* has been revered traditionally for its multiple benefits, including support for energy and endurance. Studies show that the *Cordyceps* in **Asian Energy Boost** supports energy levels by promoting healthy levels of ATP—the energy currency used throughout the body.

*Cordyceps* also supports healthy insulin sensitivity in those already within normal range, allowing your cells to efficiently take up sugar from your blood to enable stable energy output.

In one study, healthy adults age 50-75 took 333 milligrams of *Cordyceps* extract three times daily for 12 weeks. These study subjects were able to perform a stationary bicycle exercise at maximal levels for over 10% longer before muscle fatigue could be scientifically detected.

**Panax ginseng**

*Panax ginseng* is an important adaptogenic herb that can improve our ability to manage stress. Recognized as one of the most beneficial ginsengs available, it is the species traditionally used in China and Asia. For enhanced potency, **Asian Energy Boost** uses *Panax ginseng* that has been naturally fermented, a process shown to increase absorption of the active compound—*Compound K* (*Ginsenosides metabolite*)—by over 15-fold.

Evidence indicates that ginseng supports ATP production in the mitochondria. Studies have shown that this extract promotes both physical and mental energy, including cognitive performance.

**Complementary Effects**

The *Cordyceps* and fermented *Panax ginseng* in **Asian Energy Boost** work in a complementary fashion to help maintain ATP levels and your body’s energy stores.

*Cordyceps* extract supports ATP production when oxygen availability is insufficient. *Panax ginseng* supports ATP production at the much higher levels possible when more sufficient oxygen is available—such as a challenging but prolonged task.

The suggested daily dosage of three vegetarian capsules of **Asian Energy Boost** provides:

<table>
<thead>
<tr>
<th>Ingrediant</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cordyceps <em>(Paeoniomyces heriali)</em> extract (mycelia)</td>
<td>1,000 mg</td>
</tr>
<tr>
<td>(providing 70 mg cordycepic acid)</td>
<td></td>
</tr>
<tr>
<td>GS15-4™ Fermented Asian ginseng extract (root)</td>
<td>165 mg</td>
</tr>
</tbody>
</table>

A bottle of 90 vegetarian capsules of **Life Extension® Asian Energy Boost** retails for $24. If a member buys four bottles during Super Sale, the price is reduced to $14.85 per bottle. Contains soybeans.

**References**


To order Life Extension® Asian Energy Boost, call 1-800-544-4440 or visit 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.
Bio-Enhanced TURMERIC COMPOUNDS Block Multiple Inflammatory Pathways

Millions of Americans suffer from chronic pain caused by inflammation, while millions more suffer diseases caused by chronic inflammation such as cancer and atherosclerosis.1,2

Prescription options—non-steroidal anti-inflammatory drugs (NSAIDs) and glucocorticoids—target only part of the overall chronic inflammatory response. Worse, they have substantial side effects and are not meant for long-term use.3,4

After combing through scores of nutrients, scientists have identified three compounds: curcumin, ginger, and turmeric oil that inhibit multiple underlying factors behind inflammation—safely reducing both chronic pain and long-term disease risk.

Numerous studies have confirmed that—by targeting the inflammatory origins—these natural extracts reduce the symptoms, risk profiles, and mediating factors of arthritis,5-12 cardiovascular disease,5,13-17 cancer,18-22 and other diseases…and some of these effects are observable in a matter of weeks!9,16,18,23

Even more exciting, scientists have discovered a novel way to deliver more of these three extracts to your bloodstream—almost seven times as much!24-27 These groundbreaking discoveries enhance the ability of these compounds to block the origins of chronic inflammation.>
An All-Out Assault On Chronic Inflammation

When levels of certain cellular enzymes are increased, the result is chronic inflammation created by a complex “domino effect” of signaling molecules known as prostaglandins and leukotrienes. As scientists now know, the more inflammation, particularly chronic inflammation, you have, the more rapidly your body ages.¹

In fact, we know that almost all chronic diseases—from arthritis, to heart disease, to diabetes, to Alzheimer’s disease—have one thing in common: destructive, unchecked inflammation.²
Doctors have long known of individual compounds that can inhibit one of the steps involved in chronic inflammation, producing some anti-inflammatory response. For example, NSAIDs inhibit the production of prostaglandin signaling molecules by blocking enzymes known as COX-1 and COX-2. But they are not well characterized in terms of their ability to inhibit production of leukotriene signaling molecules, which requires blocking the LOX enzyme.32

Researchers sought natural compounds that could inhibit the multiple steps behind prostaglandin and leukotriene production to deliver broad-spectrum protection against chronic inflammation.

Unlike current medications, turmeric oil, ginger oil, and curcumin work through multiple mechanisms to block multiple pathways of the inflammation-signaling process.5,32-40

It makes sense that these extracts have similar anti-inflammatory effects—they belong to the same plant family, known as Zingiberaceae.41

**Turmeric Root Compounds**

Curcumin is packed with potent chemicals, collectively known as curcuminoids.42 Turmeric oil - the liquid produced during curcumin extraction43,44 - is rich in compounds known as aromatic turmerones.

**Ginger Root Compounds**

Ginger oil contains gingerols, shogaols, and sesquiterpenes, which are powerful anti-inflammatory active compounds.45

To illustrate a key element of their dramatically broader effectiveness against inflammation, these natural ingredients deliver a potent benefit that no currently available drug can—they block both COX and LOX enzymes, which in turn inhibits synthesis of both prostaglandin and leukotriene signaling molecules!32-40

This is of vital importance, because scientists have now discovered that agents that trigger dual inhibition of COX and LOX enzymes potentially provide “a better therapeutic profile” and produce almost no side effects compared to NSAIDs.32

Remarkably, when these three extracts are combined, they help prevent chronic inflammation by favorably modulating the activity of the following pathways. They:

- Inhibit COX-1 and COX-2 enzymes33,35
- Inhibit LOX enzyme36-38
- Inhibit inducible nitric oxide (iNOS)33,36-38
- Inhibit NF-kappaB34,37,46
- Inhibit degradation of IkappaB-alpha46
- Exert potent antioxidant activity—scavenging superoxide and hydroxyl radicals and reducing lipid peroxidation, early steps in the inflammation cascade,5,37 and inhibiting transcription of cell surface receptors for oxidized LDL cholesterol47
- Inhibit stimulated increase of prostaglandin E2 (PGE2)33

How these natural ingredients work at the cellular level may seem technical, but what you need to remember is that they are not synthetic drugs that are alien to your body’s systems. Instead, they work with your body’s own processes to help bring back natural function. Before we look at the many health benefits of
these extracts, let’s learn how scientists have **combined all three**—in a novel formulation that also delivers a **further potent advantage**: it naturally **enhances absorption**.

**Enhanced-Absorption Formula**

Curcumin has long been known to have poor bioavailability, requiring high doses to achieve desired blood levels.48-59 A new formulation solves this problem in two ways:

Instead of using standard curcumin, this formulation utilizes a curcumin extract that provides better bioavailability than ever thought possible. This *next generation curcumin* is far more readily absorbed. Its potency is the synergy between the standard extracted curcuminoids plus the *added-back*, original turmeric compounds that are often removed in commercial processing. These novel, lipid-soluble active compounds called **turmerones** have been shown in human research to enhance curcumin absorption.27 In fact, two studies showed that it increases curcumin absorption almost **7-fold** over a standard curcumin supplement.25,26

The second way this formulation boosts absorption is by including a special kind of molecule called **phospholipids**. They act as emulsifiers—agents that help oil molecules mix with water—and have been shown to enhance absorption of various nutrients.60 A study confirmed that phospholipids boost curcumin absorption into intestinal cells.61

Let’s now examine some of the health benefits of curcumin, ginger, and turmeric that result from their ability to block the **multiple** pathways of deadly chronic inflammation.

**Cancer**

Cancer is the second leading cause of death in the United States,62 and according to the American Cancer Society,63 **one of every three** women in the US risks developing some form of cancer over the course of their lives. For men, that number rises to **one in two**. And inflammation is a major trigger.64

When normal inflammation continues over time and becomes prolonged or chronic, it can cause a multitude of pathologies—including cancers.63 Your body has a natural ability to fight cancer through the activity of tumor-suppressing **genes**. The science of epigenetics now indicates that both **curcumin** and **gingerol** (a key compound in ginger) can—in addition to inhibiting inflammation and modulating cell signaling pathways—reawaken these tumor-suppressing genes, **turning them back on to block cancer**.65,66

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**What You Need to Know**

**Blocking Chronic Inflammation**

- **Millions of Americans endure the pain of chronic inflammation; even when pain is not apparent, millions more run the risk of serious diseases triggered by subclinical levels of chronic inflammation.**
- **Mainstream medicine offers only drugs that typically target a single aspect of acute inflammatory pain, and that are typically not suitable for long-term use due to substantial side effects.**
- **Researchers have found three natural ingredients that block inflammation at multiple stages of the process—inhibiting chronic inflammation at its root.**
- **A wealth of clinical trials demonstrates that curcumin, ginger, and turmeric oil safely reduce both chronic pain and slash long-term disease risk, often in only a few weeks.**
- **These three extracts have now been combined in a groundbreaking formulation that boosts absorption as much as 7-fold!**
Over two thousand published studies have evaluated the effects of curcumin on many cancers—such as those of the breast, prostate, liver, skin, colon, and lung cancer—by interfering at every stage of the complex sequence of their development, progression, and spread. While anticancer drugs often weaken the immune system, curcumin modulates it, serving as an “immune-restorer.”

In just one of many curcumin studies on animals, scientists grafted human prostate-cancer cells onto special mice that subsequently developed tumors. The mice were fed curcumin or placebo five days weekly for four weeks. Afterward, curcumin-fed mice were divided into three groups: one continuing to receive curcumin alone, a second receiving curcumin plus the cancer chemotherapy drug, gemcitabine, and the third receiving curcumin plus radiation treatment. Curcumin inhibited cancer growth and enhanced antitumor effects of the drug and radiation. And in an exciting breakthrough, researchers traced these results to a newly discovered mechanism! They found that curcumin reduces expression of a molecule called MDM2—a gene that promotes cancer development, survival, and growth. This mechanism “may be essential for its chemopreventive and chemotherapeutic effects.”

Curcumin inhibited cancer growth and enhanced antitumor effects of the drug and radiation. And in an exciting breakthrough, researchers traced these results to a newly discovered mechanism! They found that curcumin reduces expression of a molecule called MDM2—a gene that promotes cancer development, survival, and growth. This mechanism “may be essential for its chemopreventive and chemotherapeutic effects.”

In another study, the active ginger compound 6-gingerol suppressed growth of colorectal cancer cells and tumors in mice by inhibiting synthesis of the signaling molecule leukotriene A4.

When turmeric oil was combined with curcumin in a novel complex, it enhanced bioavailability and completely abolished tumor formation in a mouse model of inflammation-associated colon carcinogenesis.

These studies demonstrate that the three natural ingredients effectively block multiple pathways of cancer in animals. The real challenge, however, was whether these same plant extracts would be as effective in humans.

Curcumin was given to five patients with Crohn's disease; an inflammatory condition associated with increased colorectal cancer risk. In all but one patient, both disease activity scores and sedimentation rates—a measure of inflammation—improved.

In familial adenomatous polyposis (FAP), hundreds of colonic polyps form, some of which progress to colorectal cancer. Scientists gave five patients with familial adenomatous polyposis 480 milligrams of...
curcumin plus 20 milligrams of quercetin three times daily for an average of six months. There was an average 51% decrease in the size of the polyps, and 60% decrease in the number of polyps.83 There was no noticeable toxicity.

Curcumin combined with either soy isoflavones or placebo was given to 85 men and those with high levels of prostate-specific antigen (PSA) were assessed separately. High PSA reflects inflammation and potential prostate cancer risk. After six months, PSA levels were significantly suppressed in the curcumin-isoflavones group.85

Ginger extract was given to one group of healthy volunteers in dosages of 2 grams daily, while others took placebo. On day 28, a colonic biopsy was taken on all participants. There was substantial reduction in average colonic mucosal levels of the inflammation signaling molecule prostaglandin E2 in the ginger subjects. They also had decreased average levels of an intermediate compound called 5-HETE, which is a potent survival factor that certain cancers use to escape destruction.18,125

Turmeric oil in dosages of 600 milligrams, mixed with 3 grams of turmeric extract, was given daily to patients with aggressive premalignant mouth lesions (oral submucous fibrosis), in a pilot study. Subjects showed a substantial decrease in the number of damaged, premalignant cells in both the mucous-membrane mouth lining and in circulating lymphocytes.19

Cardiovascular Disease

Inflammation plays a key role in the development of cardiovascular disease, which is responsible for almost one-in-four American deaths every year.87 Curcumin given to animals on a high-cholesterol diet decreased their total serum cholesterol 21% and their harmful low-density lipoprotein (LDL) by almost 43%, but increased their beneficial high-density lipoprotein (HDL) by 50%!15 Its lipid modulating effects have not been shown to work this well in humans.88

How To Know If You Have Chronic Inflammation

A growing consensus among scientists is that numerous common disorders are caused in part by chronic inflammation.31 For example, when inflammatory cytokines destroy joint cartilage and synovial fluid, arthritis results.89 If cytokines induce an autoimmune attack, they can trigger lupus.90 The target of the chronic inflammatory response determines the disease risk. For instance, inflammation can result in brain cell damage and death (resulting in neurodegenerative disease), heart muscle wasting (contributing to congestive heart failure), or coronary atherosclerosis (potentially triggering a heart attack).117-119

Even obesity is related to chronic inflammation.120

Taking action to reduce chronic inflammation can dramatically minimize cellular aging and risk for lethal, age-related diseases.

Testing Inflammation Levels

So how do you know—before it’s too late—if your body is in a state of chronic inflammation?

Life Extension® long ago advised members to have an annual C-reactive protein blood test to detect potentially high levels of systemic inflammation that may be boosting your risk of a host of age-related diseases.31,121

If testing results show your C-reactive protein level is over 1.0 milligrams per liter (1.0 mg/L), this likely indicates that you have inflammatory activity occurring in your body and may be at increased risk for any number of serious medical conditions.122,123
Ginger extract given to diabetic rats, significantly suppressed—in just seven weeks—cholesterol and triglycerides, high levels of which contribute to cardiovascular disease. It also significantly lowered blood sugar levels. In another study, ginger extract injected intravenously into rats was shown to significantly lower blood pressure and in a dose-dependent fashion.

Stents that slowly release turmeric oil were implanted in dogs with blocked arteries. Scientists found that this turmeric-laced stent inhibited the infiltration of dangerous inflammatory cells. It also reduced various factors that often cause new arterial blockages to occur (restenosis). After these compelling findings, scientists turned their attention to human trials.

Given to clinical trial volunteers in dosages of 500 milligrams daily, curcumin showed a remarkable 29% increase in HDL cholesterol levels after just seven days. Even a one percent increase in this “good” form of cholesterol can reduce heart disease risk—so this finding is important.

Ginger was shown to enhance efficacy of the anti-hypertensive drug nifedipine (Procardia) in human subjects. Combining one gram of ginger with 10 milligrams of the drug daily significantly boosted the anti-platelet aggregation effect in both normal and hypertensive persons. This is the tendency of blood cells to clump together, potentially producing a dangerous clot and pathological cardiovascular and cerebrovascular complications.

### Blocking Inflammation Can Prevent Obesity And Diabetes

In a study released June 18, 2013, ahead of print publication in the journal Molecular Therapy, scientists at the University of Georgia have demonstrated that blocking inflammation can prevent obesity and the early, obesity-related symptoms of diabetes.

To block inflammation in test animals, researchers sometimes inject interleukin 10 (IL10), an immune-regulating molecule naturally produced by the body to control inflammation.

In this experiment, two groups of mice were fed the same amounts of a high-fat diet. One group was also treated with injections of IL10.

While untreated mice fed a high-fat diet gained weight quickly and began to show the early symptoms of diabetes, those on the diet that were treated with IL10 maintained healthy fat levels and showed no signs of insulin resistance.

This finding illustrates that lowering chronic inflammation levels in the body may inhibit two of the greatest epidemics of our time—obesity and diabetes—as well as the many other conditions associated with each of these diseases.

### Arthritis

People over age 65 make up 65% of all American arthritis patients. The hallmarks of the most common form of this joint disease, osteoarthritis, are inflammation and cartilage destruction. Fortunately, while both ginger and curcumin block inflammation—curcumin also inhibits cartilage breakdown by the body—it does this by protecting the cells found in cartilage called chondrocytes from the inflammatory compounds (IL-1beta and MMP-3) that break them down in arthritis, as well as via other pathways.

Curcumin strongly blocked rheumatoid arthritis symptoms in animal studies by inhibiting joint inflammation as effectively as methotrexate, a drug with serious and sometimes fatal side effects. Curcumin improved arthritis scores in mice and suppressed osteoarthritis inflammation in dogs.

Ginger extract blocked inflammatory mediators in a cell culture study—notably the signaling molecule prostaglandin E2—and reduced inflammatory swelling (edema). Researchers described the results as, “a potent suppressive effect on acute and chronic inflammation.”
Clinical trials have now confirmed these results in 
**humans.**

**Curcumin** in doses of 500 milligrams daily was given to one group of rheumatoid arthritis patients. The NSAID drug *diclofenac* in doses of 50 milligrams daily was given to a second group. And a combination of the two was given to a third group. The group receiving curcumin-only had the greatest reduction in joint pain and swelling, with no adverse effects. By contrast, nearly 14% of participants in the drug-only group dropped out due to adverse effects!18

**Ginger** or placebo was given to 29 patients with symptomatic knee arthritis in dosages of four daily capsules of 250 milligrams each. After three months, those taking placebo switched to ginger and those taking ginger switched to placebo, and then the study continued for an additional three months. After a total of six months, the patients experienced significantly less pain and handicap during their ginger-supplemented months than during their placebo months—and reported improvements on a standardized scale used to assess mobility.12

Also, ginger extract given to osteoarthritis patients in doses of 340 milligrams daily for 4 weeks proved equally as effective as 100 milligrams of the drug *diclofenac.*9 However, the drug group experienced an increase in digestive pain (dyspepsia) and degeneration of their stomach mucosa.9

**Diabetes**

Among Americans 65 or over, 26.9% have diabetes.96 Diabetics are at risk for pain associated with nerve damage (neuropathic pain),27 accelerated brain aging and cognitive decline (diabetic encephalopathy)98,99 and, of course, high blood sugar. However, the powerful plant extracts we’ve been discussing have the potential to prevent or reverse many of these complications.

**Curcumin** successfully attenuated experimentally-induced neuropathic pain response—recognized as one of the most difficult types of pain to treat—to mild stimuli (hyperalgesia) in diabetic rats.100 This powerful action is likely due to curcumin’s ability to reduce inflammation signaling molecules called cytokines, reduce the activation of pain signaling molecules and receptors, and reduce the depressive effect of pain.101-107 Also, chronic curcumin treatment reversed much of the extreme inflammation and oxidative damage in the brains of diabetic rats and substantially boosted their performance on memory and cognition tasks.99

**Ginger** extract was given to diabetic rats, and after just seven weeks, their fasting glucose levels—the blood sugar reading between meals — were significantly reduced.16 The researchers suggested that “ginger may be of great value in managing the effects of diabetic complications of diabetes in human subjects.”16

**Dementia**

Memory and cognitive decline often starts about age 50, and by age 80, it is estimated nearly half of all individuals will have some form of cognitive change or dementia.108 As you’ll see, curcumin and ginger offer great promise to stave off this tragedy.

**Curcumin** administered in animal models of Alzheimer’s has been shown to enhance clearance of amyloid-beta from the brain. This is a malformed protein, the accumulation of which is strongly associated with Alzheimer’s. Curcumin crosses the blood-brain barrier and appears to directly bind to the plaque!109

Scientists fed ginger extract to rats for two weeks before they blocked (occluded) an artery in the brain, and for three weeks afterward. Cognitive testing was done at the end of each of the three weeks following arterial blockage. Researchers found that the ginger extract significantly increased cognitive function and neuron density (in the brain area known as the hippocampus) while significantly decreasing the area of damaged brain tissue—or brain infarct.110

A study team incubated curcumin with macrophages (immune cells) taken from human Alzheimer’s patients. These macrophages are immune cells that normally identify, engulf, and destroy amyloid-beta, but in Alzheimer’s patients these macrophages failed to handle this function.111 In the laboratory, after being treated with curcumin, macrophages from half of the patients significantly increased the amount of amyloid-beta they were able to absorb (uptake).112 These data demonstrate that curcumin may be able to defend against—and even reverse—the Alzheimer’s disease process.

**Ginger** was tested in a study of 60 healthy middle-aged women who were given 400 or 800 milligrams of the extract, or placebo, daily for two months. Their working memory and cognition were tested before supplementation and after one and two months. The ginger participants showed significantly enhanced working memory, and brain activity consistent with boosted cognitive capability. This suggests that ginger may defend against, and reverse middle-aged cognitive function.113

**Turmeric oil** was found to exhibit powerful and broad antioxidant activity,5 and data suggest it may suppress neuroinflammation in neurodegenerative diseases, including Alzheimer’s.46,114
Even when pain is not initially apparent, **chronic inflammation** can eventually lead to serious diseases such as cancer.1,2

Drugs that target **acute** inflammation are often not suitable for long-term use, and may involve substantial side effects.3,4

In a significant breakthrough, three natural ingredients have been identified that powerfully block the signaling molecules that trigger chronic inflammation.5,32-40

**Ginger, curcumin, and turmeric** oil block inflammation at multiple points of the process, safely minimizing long-term disease risk.5,32-40

Multiple studies demonstrate that these three extracts combat an array of disorders, including cancer, cardiovascular disease, and arthritis.5-22

These three extracts have been combined in a groundbreaking formulation that greatly boosts absorption12,25,27,60,61.

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-886-3027.

### References


4. Dixon WG, Bansback N. Understanding the side effects of glucocorticoids have been identified that powerfully block the inflammation at multiple points of the process, safely minimizing long-term disease risk.5,32-40


TURMERIC COMPOUNDS BLOCK MULTIPLE INFLAMMATORY PATHWAYS


52. Hoehle SI, Pfeiffer E, Solyom AM, Metzler M. Metabolism of curcuminoids in tissue slices and subcellular fractions from rat liver. J Agric Food Chem. 2006;54:756-64.


Reishi mushroom has been traditionally used to boost immune system vitality. Its broad-spectrum benefits have been demonstrated in thousands of studies. An advanced extraction technology has resulted in a new Reishi extract that makes its active compounds even more bio-available.

REISHI SUPPORTS A HEALTHY IMMUNE SYSTEM
An abundance of evidence demonstrates that Reishi constituents enhance the protective activity of the body’s hematopoietic stem cells, T-cells, and other crucial immune factors. Reishi’s immune-supporting compounds include an array of unique polysaccharides, triterpenes, and other constituents, many of which assist activation of the cell surface receptors that modulate normal immunity. The Reishi mushroom also supports the body’s production of endogenous antioxidant enzymes such as superoxide dismutase (SOD), catalase, and glutathione—which, in turn, support the body’s natural immune defenses against free radical damage.

ADVANCED EXTRACTION TECHNOLOGY
Reishi Extract Mushroom Complex delivers powerful compounds and represents the next generation of natural immune support. Reishi extracts standardized to polysaccharides have been available for years, but most do not standardize for triterpenes and include the spores. This full-spectrum extract has multiple components that have shown to support healthy immune function and enhanced longevity in a natural experimental aging model.

The suggested 2 capsules a day of Reishi Extract Mushroom Complex provide:

- **Reishi mushroom (Ganoderma lucidum) extract (Fruit body)** 980 mg (standardized to 13.5% polysaccharides (132.3mg) and 6% triterpenes (58.8mg))
- **Shell-broken Reishi mushroom (Ganoderma lucidum) spore** 150 mg

A bottle containing 60 vegetarian capsules of Reishi Extract Mushroom Complex retails for $30. If a member buys four bottles during Super Sale, the price reduced to $18.23.

References
15. FASEB. 2012;26;373.2.

To order Reishi Extract Mushroom Complex, call 1-800-544-4440 or visit 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.
In 2003, the Life Extension Foundation® introduced a standardized resveratrol extract shown to favorably alter genes implicated in the aging process—many of the same genes that respond to calorie restriction.

Since then, we have identified additional compounds that simulate calorie restriction’s ability to trigger youthful gene expression—the process by which genes transmit signals that slow certain aspects of aging.

Compelling evidence reveals that certain compounds found in berries, such as pterostilbene and fisetin, possess potent “longevity gene” activators that work in synergy with resveratrol. For example, fisetin (found in strawberries) has been shown to stabilize resveratrol in the body by shielding it from metabolic breakdown, thus extending its beneficial effects.

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

References
10. Xenobiotica. 2000 Sep;30(9):857-66

The suggested dose of one capsule a day provides:

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To order Optimized Resveratrol with Synergistic Grape-Berry Actives, call 1-800-544-4440 or visit www.LifeExtension.com
**Curcumin** is an active compound derived from the Indian spice *turmeric*. It has been widely acclaimed for its diverse health-promoting effects on nearly every organ system in the body, including its support for the body’s natural inflammatory response system. But most curcumin is neither absorbed well nor retained well in the blood—posing a challenge to those who wish to maximize its benefits.

**Life Extension** took the lead in resolving this issue several years ago by introducing *Super Bio-Curcumin* containing BCM-95®, a patented, bioenhanced preparation of curcumin that has been shown to reach up to 7 times higher concentration in the blood than standard curcumin.

Now, an exciting *next generation* curcumin formula has become available! The new Advanced Bio-Curcumin® with Ginger & Turmerones provides additional compounds that further boost absorption of curcumin’s highly beneficial phytonutrients.

### UNRIVALED POTENCY AND ABSORBABILITY

In addition to BCM-95®, this new curcumin formula contains:

1. **Turmerones**: After curcumin is extracted from turmeric, what remains is *turmeric oil* rich in compounds called *turmerones*. Combining BCM-95® with a high content of turmerones provides health consumers with more beneficial *turmeric* compounds that further multiply absorption. Scientists have shown that these potent turmerones not only support curcumin absorption, but significantly increase the amount of curcumin inside the cell as well!

2. **Ginger**: Curcumin and ginger are close botanical relatives. Research demonstrates that they have overlapping and complementary health benefits, and scientists are focusing on the therapeutic effects of *combining* these two plants. Advanced Bio-Curcumin® with Ginger & Turmerones provides a supercritical extract of ginger standardized to the greatest concentration of ginger compounds—including beneficial gingerols and shogaols.

3. **Phospholipids**: This new curcumin formula also contains phospholipids, a type of emulsifying molecule known to greatly enhance absorption of poorly soluble active compounds.

The powerfully enhanced bioavailability and potency of Advanced Bio-Curcumin® with Ginger & Turmerones is superior to conventional curcumin supplements. This product represents the most powerful and cost-effective way to supplement with—and receive the full benefits of—this very critical nutrient.

The suggested daily dosage of one softgel of Advanced Bio-Curcumin® with Ginger & Turmerones provides:

- **Turmeric Phospholipid Blend**: 630 mg
  - BCM-95® Bio-Curcumin Turmeric 25:1 extract (rhizome) [total curcuminoids complex with essential oils (380 mg)], Turmeric oil (rhizome) [providing 60 mg total turmerones], Phospholipids
  - Ginger CO₂ extract (root) [providing 60 mg gingerols]

Each softgel of Advanced Bio-Curcumin® with Ginger & Turmerones provides 400 mg of BCM-95® Super Bio-Curcumin plus an array of turmerones and phospholipids.

A bottle of 30 softgels of Advanced Bio-Curcumin® with Ginger & Turmerones retails for $30. If a member buys four bottles during Super Sale, the price is reduced to $18.23 per bottle. Contains soybeans.

To order Life Extension® Advanced Bio-Curcumin® with Ginger & Turmerones, call 1-800-544-4440 or visit www.LifeExtension.com

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**References**


Perhaps the most frightening malignancy one can be diagnosed with is a form of brain cancer called glioblastoma multiforme.

This type of brain cancer has a dismal prognosis, with median overall survival of 12 to 15 months, and a 2-year survival rate of 15% to 26%.1

You may remember that Senator Ted Kennedy was diagnosed with glioblastoma multiforme in May 2008. Despite intervention by brain tumor experts, Sen. Kennedy died in August 2009 — a mere 15 months later.

We at Life Extension® have long-been evaluating new approaches to treat this deadly malignancy. We’ve been frustrated by the paucity of meaningful progress and our inability to make better treatment recommendations.

A study published in the September 5, 2013 edition of the New England Journal of Medicine may represent the most significant advance yet discovered in treating glioblastoma multiforme.

What follows is an overview of this therapy that is available right now to brain tumor patients:

- The cytomegalovirus has been suspected as facilitating the initiation and promotion of brain cancers.2-4 From 50% to as many as 80% of adults in the United States show exposure to cytomegalovirus, but relatively few harbor active viral infection.5

- Doctors followed 75 glioblastoma multiforme patients and found the median overall survival of those with low-grade cytomegalovirus infection was 33 months. In patients with high-grade cytomegalovirus infection, median overall survival was only 13 months.1

- All but one of the 75 glioblastoma multiforme patients studied had active cytomegalovirus infection, indicating that this virus may be involved in the development of this lethal malignancy.1

- In glioblastoma multiforme patients with high-grade cytomegalovirus infection, median 2-year survival was 17.2%. Patients with low-grade cytomegalovirus infection had median 2-year survival rates of 63.6%. This suggests that high-grade active cytomegalovirus infection accelerates tumor progression.1

- Valganciclovir (Valcyte®) is an FDA-approved drug used to treat cytomegalovirus infection.1

- In a double-blind clinical trial of valganciclovir involving 42 patients with glioblastoma, an exploratory analysis of 22 patients receiving at least 6 months of antiviral therapy showed 50% overall survival at two years compared with 20.6% of
contemporary controls. This study showed that valganciclovir-treated patients have a median overall survival of 24.1 months compared to 13.7 months in patients not treated with valganciclovir.1

- Owing to the promising results of this pilot study, glioblastoma multiforme patients at the world famous Karolinska University Hospital received valganciclovir and results were then compared to a control group. Both groups received standard conventional therapy and both groups had a similar disease stage and surgical-resection grade.1

  - The researchers retrospectively analyzed the data on 50 of these brain cancer patients and found the 2-year rate of survival in the valganciclovir group was 62%, whereas 2-year survival was only 18% in the control group.1

  - In 40 glioblastoma multiforme patients who received valganciclovir for at least 6 months, the 2-year survival rate was 70%, with a median overall survival of 30.1 months.1

  - 25 glioblastoma multiforme patients that received continuous valganciclovir treatment after the first 6 months had a 2-year survival rate of 90%, with median overall survival of 56.4 months (4.7 years).1

  - Recall that current median survival of glioblastoma multiforme patients is only 12–14 months.1

  - Also recall the efforts made to prolong Sen. Kennedy’s life and the best the experts at Duke University Medical Center could do was 15 months.1

The implication from these findings is that treating active cytomegalovirus infections may dramatically reduce progression, and significantly increase survival time, in patients suffering from the deadly brain cancer glioblastoma multiforme. Most exciting is the intriguing data from this retrospective study that valganciclovir treatment in patients with active cytomegalovirus produced an unheard of median survival of 56.4 months (4.7 years) in glioblastoma multiforme patients.1

Not only does this retrospective data involving the continuous use of valganciclovir extend survival in glioblastoma multiforme patients, but it provides an opportunity to add in additional complementary therapies (like metformin) that could improve outcomes even more!

**What Brain Tumor Patients Should Do**

At the time of surgical resection of the brain tumor, a specimen should be sent for immunohistochemical analysis to evaluate presence and activity of cytomegalovirus.

In glioblastoma multiforme patients with evidence of cytomegalovirus-positive tumor tissue, those who wish to follow the protocol that resulted in unprecedented survival improvements should consult with their oncologist and consider 900 mg of valganciclovir twice a day for three weeks followed by a maintenance dose of 450 mg twice a day indefinitely to be adjusted for side effects such as kidney impairment and bone marrow suppression.1

Valganciclovir should be taken with fatty meals to enhance its absorption/bioavailability.

The price of valganciclovir is beyond outrageous, with the annual cost being around $50,000.

Those who have already had surgery should have their blood tested to help determine cytomegalovirus activity. Patients whose blood test reveals active cytomegalovirus (CMV) infection, which appears to be an important risk factor in some
The benefits reported in the *New England Journal of Medicine* represent the most significant survival advance against this deadly brain malignancy in history, yet these findings were virtually ignored by the mainstream media even though the life-sparing drug (valganciclovir) is available right now.

It is illegal for the maker of valganciclovir to promote it as a treatment for brain cancer. The regulatory system in the United States requires that the maker of a drug conduct extensive clinical trials for each disease a drug is claimed to treat and then submit the trial results to the FDA for approval.

While it is legal for doctors to prescribe valganciclovir off-label—that does not protect a doctor's medical license if a patient has an adverse reaction. So many oncologists may refuse to prescribe valganciclovir despite findings that it may improve survival of glioblastoma multiforme patients more than three-fold.

So there is the real possibility 12,000 Americans will continue to perish from glioblastoma multiforme each year despite impressive findings showing that valganciclovir could spare many of them from premature death.

Glioblastoma multiforme patients whose tumor specimen reveals immunohistochemical evidence of active CMV infection, or whose blood test is CMV positive for active infection, should ask their oncologist to consider valganciclovir.

My greatest concern is that this valganciclovir study published in the *New England Journal of Medicine* will be relegated to medical archives and not be utilized to save cancer patients, just as hundreds of published studies on metformin, aspirin, and cimetidine have been ignored by the medical establishment for the past four decades.

The article on the next page provides a more in-depth review of the role that CMV infection plays in the development and progression of brain and other cancers.

For longer life,

William Faloon
Common Virus Linked to Deadly Brain Cancer

BY LISA ANTONE

Few people would ever suspect that one of the most deadly forms of brain cancer is caused by a common virus carried by the majority of people. Yet that’s exactly the case, according to a number of new studies in prestigious medical journals.

In the same way that cervical cancer and head and neck cancer has been linked to certain strains of the HPV virus, the most common and deadly type of brain cancer, glioblastoma, has been linked to a virus in the herpes family called CMV (short for cytomegalovirus).6,7

A diagnosis of glioblastoma means certain death, with population studies indicating typical overall survival rates of less than a year.8 And unfortunately, this deadly form of brain cancer is the most common malignant brain tumor in the US.8

Establishing a link between this deadly cancer and a common virus is an enormous step in understanding how to treat, and potentially to prevent, early and unnecessary deaths. And more importantly, it led to the discovery of a drug that can quadruple the life span of those who have already been diagnosed with this deadly disease!!

The Dangers Of The CMV Virus

Cytomegalovirus, or CMV, may be the most important virus you’ve never heard of. The prevalence of latent CMV infection is up to 100% in most populations of adults worldwide with increasing prevalence in the elderly, and is now considered to play multiple roles in immunosenescence, the gradual fading of immune function with age.9,10

This is a serious problem. Latent CMV infections are strongly associated with frailty in the elderly and dramatically increases mortality risk.11,12 CMV has also been associated with accelerated aging in general, and even with shortening of telomeres (the age-regulating bits of DNA that govern each cell’s lifespan).13 Indeed, a 2013 study found disturbing early signs of immunosenescence in young people who tested positive for CMV, compared with their CMV-negative peers.14

And of course, waning immune function also opens the door for cancers to develop, freed of the ever-present surveillance carried out by a younger, more robust immune system.

And that’s just with the latent form of the virus; the active form is far worse. Active CMV disease in older patients or in those with compromised immune

What You Need To Know

CMV And Brain Cancer: The Deadly Connection

- The deadly brain cancer, glioblastoma, has now been convincingly linked to a common virus, cytomegalovirus (CMV).
- Most people are infected with CMV, but latent disease carries no symptoms.
- Strong evidence suggests that CMV lying latent can become reactivated and trigger cancerous growth in the brain and other organs.
- A dramatic pair of recent studies shows that treating CMV in glioblastoma patients significantly prolongs survival, nearly doubling it at 6 months and more than quadrupling it with prolonged treatment.
- Antiviral drug treatment, however, is not for otherwise healthy people; it is hideously expensive and produces major side effects.
- But healthy people can take major steps: get tested for CMV, and then start one or more of the supplements known to support healthy immunity and resistance to re-activation of CMV.
systems is a devastating disease. It can cause hepatitis leading to liver failure, retinitis leading to blindness, severe colitis (large bowel inflammation), pneumonitis (viral pneumonia), esophageal inflammation, and disorders of the central and peripheral nervous systems.15,16

But unlike other herpes viruses, CMV rarely produces detectable symptoms in otherwise healthy people.16 That makes it difficult to diagnose, and dangerously easy to spread. Diagnosing CMV often requires two separate blood tests, several weeks apart, as well as a high index of suspicion by both patient and provider (see sidebar on the next page for an understanding of test results).17 CMV spreads the way other herpes viruses do: by contact with bodily secretions, especially saliva.18

The ease of spread and the absence of symptoms in healthy adults accounts for the very widespread prevalence of CMV.18 Estimates vary, depending on geography, socioeconomic status, and other variables, but at least 35%, and up to 100% of people in some communities, will test positive for CMV.19-21

CMV: The Cancer Connection

Over the past decade, scientists have become increasingly concerned at the growing association of CMV with certain cancers. While it is too early to label CMV a true cancer-causing virus,22 evidence implicating CMV as a contributor to cancer comes from several observations:

- Studies show a strong correlation between cancer incidence and the percentage of adults who test positive for CMV.23,24
- CMV proteins and DNA have been found in 90-100% of malignant cells from a variety of cancers, especially those of the brain, breast, prostate, liver, lung, and colon.1,25-33
- CMV genes, once inserted into the host’s own DNA, increase inflammation-generating genes that promote cancer growth.34,35
- CMV genes are known to induce mutations in host tumor-suppressor genes, increasing the risk that a new cancer will develop.36
- CMV may help cancer cells avoid detection by the immune system by several mechanisms including increased secretion of immune suppressive cytokines.22
- CMV-infected cells produce more of the growth factors and chemical receptors needed for tumor development and invasion, compared to non-infected cells.32,33,37
The evidence for a direct connection between CMV and malignancy is by far the greatest in the case of the deadly brain tumor called glioblastoma multiforme (often simply “glioblastoma”). This tumor is the most common and aggressive brain cancer, and it carries a dismal prognosis.38,39

Most patients die within the first 15 months of diagnosis, with few surviving past 3 years.40-42

Glioblastomas occur most commonly in the frontal and temporal (side) lobes of the brain, where they produce disturbing symptoms that include persistent headaches, double or blurred vision, vomiting, changes in mood and personality, changes in cognition, seizures, and speech difficulty.42

In addition to their aggressive growth, glioblastomas are notoriously difficult to treat because of their location within the brain, where efforts to extract them are complicated by their deep invasion of healthy brain tissue and the brain’s limited ability to repair itself.40,42

Patients with glioblastomas frequently experience a number of clinical complications including seizures, blood clots, fluctuating neurological symptoms as well as side effects from powerful corticosteroids and chemotherapeutic drugs.43

Cytomegalovirus (CMV) is part of the herpes virus family, which means that this virus is almost never completely cleared from the body following infection.77 The maintenance of suppression of viral infection is dependent upon a strong immune system.

Cytomegalovirus can lie dormant in your body for decades before emerging in response to a weakening of the immune system.77

The steps that aging Life Extension members take to protect against immunosenescence such as maintaining youthful levels of DHEA, suppressing oxidative stress, and taking immune boosters like garlic and reishi mushroom extracts should help keep cytomegalovirus in check. But each individual is different, and reemergence of CMV infection is often asymptomatic in normally aging people.

The regular member price for the blood test called CMV IgM that detects acute, initial cytomegalovirus infection is $125. The antibody test for past/prior infection is called CMV IgG and it normally costs Life Extension members $59. We’re making both of these tests available to members for a limited time for only $169. When calling about this, please mention code: BTA422D so the operator knows to give you this special price.

If you order any CMV tests, we’ll include at no additional charge, a comprehensive blood count and blood chemistry test that includes glucose, cholesterol, LDL, HDL, triglycerides, liver-kidney, immune cell counts, and many other tests.

To ascertain if you have evidence of acute, initial, or past/prior cytomegalovirus infection, you should order both the CMV IgM and IgG tests. At the discounted price of $169 plus the free CBC/Chemistry panel you save $50 compared to if all three tests were ordered separately. When ordering these tests, call 1-800-208-3444 (24 hours). Please mention code: BTA422D.

Testing Your Blood For CMV

Understanding Your CMV Test Result

The most-commonly used test for CMV is a blood test looking for evidence that your body has encountered the virus. The test for prior infection looks for the antibody called IgG. If it is negative, you don’t have (and never had) CMV infection.77

If the IgG test is positive, however, it only indicates that your body has, at some time in the past, been invaded.77 It means the virus is still latent in your body, but is not active at present. To identify active infection, you need to test your blood for the antibody called IgM.77

If you test positive for IgM, you may be recently infected with CMV, or you may recently have been re-exposed to the virus. Or, your body may be experiencing re-activation of the virus as a consequence of immunosenescence or another cause of reduced immunity. But IgM alone is not used to diagnose active CMV infection.77

Instead, test for both IgG and IgM. If both are negative, your body has never seen CMV. If IgG is positive, and IgM negative, you’re carrying the virus but it isn’t active. If both are positive, it suggests either a recent first-time exposure to CMV, or a reactivation of a latent infection. In this case you can confirm the result with an additional IgG test in 4-6 weeks. A 4-fold or greater rise in IgG level makes it near-certain that active CMV infection is going on in your body and valganciclovir drug therapy should be considered.78

If you have questions, call a Life Extension Health Advisor at 1-866-864-3027.
Glioblastomas leak fluid, increasing the pressure on brain tissue; they also disrupt the blood supply, making it difficult for anti-cancer drugs to reach them.\textsuperscript{42} All of this accounts for the fact that, despite three decades of research, we have managed to increase overall survival in cases of glioblastoma by only about 3 months.\textsuperscript{42,44} Making matters worse, the tumor strikes at the prime of life, occurring mainly in adults between 45 and 70, with a median age at death of 64 years.\textsuperscript{42}

The high incidence of glioblastoma, coupled with the difficulty of its treatment, has made the search for causes and preventive measures paramount. That’s why this emerging evidence about the link between CMV and malignant brain tumors is exciting to so many researchers.\textsuperscript{34}

**Strong Link Between CMV And Brain Cancer**

There are a number of lines of evidence closely linking CMV with glioblastomas specifically, as well as to cancer in general. Virtually all glioblastomas have been found to contain CMV particles, proteins, and DNA (in one study of 250 patients, only one was CMV-negative).\textsuperscript{1,2,45} In fact, the amount of CMV in a glioblastoma is closely correlated with the tumor stage: More advanced tumors contain more CMV.\textsuperscript{22} Recent studies show that the amount of CMV in a tumor can accurately predict survival time in glioblastoma victims, with those carrying the most virus dying significantly earlier (average 13 months) than those with lower viral burden (average 33 months).\textsuperscript{45,46}

Ironically, and tragically, further evidence of CMV involvement in glioblastoma comes from treatment misadventures with the cancer chemotherapy drug temozolomide. This drug, one of the few approved for treating glioblastoma, is powerfully immunosuppressive.\textsuperscript{47} In glioblastoma patients being treated with temozolomide, reports are now appearing of the emergence of active and devastating CMV disease, indicating that the virus had lain dormant until the patients’ immune systems were suppressed by this chemo drug.\textsuperscript{47,48}

There’s a glimmer of hope on the horizon, however, the direct result of our understanding of the CMV/glioblastoma connection.

**Antiviral Drug Quadruples Life Span!**

Researchers at the internationally acclaimed Karolinska Institute in Sweden recently made medical headlines with their findings about the use of an antiviral drug quadrupling the lives of patients with glioblastomas.\textsuperscript{1} The drug, valganciclovir, is widely used in treatment of active CMV infection in immunocompromised patients.

Beginning with an animal model, the researchers found that they could reduce the growth of medulloblastomas (the main group of brain tumors to which glioblastomas belong) by 72\% using a drug combination including valganciclovir to combat CMV infection.\textsuperscript{34}

Next, they wanted to determine how effective valganciclovir would be as an add-on to chemotherapy. In a double-blind clinical trial, researchers gave valganciclovir to 42 glioblastoma patients already receiving standard chemotherapy.\textsuperscript{49} Although tumor sizes were smaller in treated than in non-treated patients, the difference was not statistically significant. There were no significant differences in survival over the 6 months of the study period.

However, that all changed when patients were allowed to continue taking the drug after the study phase. Analyses showed that patients taking valganciclovir for longer than 6 months had an overall survival of 24.1 months, compared with just 13.1 months (a typical survival time) in patients taking the drug for 0 to 6 months.\textsuperscript{49} By 4 years (an eternity for glioblastoma patients), 27.3\% of long-term valciclovir patients survived, compared with just 5.9\% of controls.

Encouraged by these results, the researchers immediately undertook another study, again providing valganciclovir as add-on to regular chemotherapy—but this time, extending the study period beyond the original 6-month time frame.\textsuperscript{1} Fifty patients were treated and compared with controls who received only standard care. In the authors’ own words, “The rate of survival of treated patients was remarkably high”—an understatement considering the facts. Take a look:

- At 2 years, 62\% of all treated patients were still alive, compared with just 18\% of controls with comparable cancers.\textsuperscript{1} Median overall survival was 25 months, vs. 13.5 months in controls (Figure 1A).
- Among those who received at least 6 months of valganciclovir, the 2-year survival rate was 70\% and median overall survival was 30.1 months (Figure 1B).\textsuperscript{1}
- And, among the 25 patients who received continuous valganciclovir treatment after the first 6 months, 90\% of patients were alive at 2 years, and median overall survival was an incredible 56.4 months—that’s more than 4½ years, or a 4.2-fold increase over the 13.5 months in control patients.\textsuperscript{1} (Figure 1C)

In other words, even short-term treatment with valganciclovir nearly doubled overall survival.
time; medium-term therapy nearly **tripled** survival time, and long-term, continuous therapy more than **quadrupled** it.

These are compelling results. At this point, anyone with a diagnosis of glioblastoma and a desire to extend their lives as much as possible should demand therapy with oral valganciclovir, at **900 mg/day** twice daily, followed by a maintenance dose of **450 mg** twice daily, with adjustments as needed for impaired kidney function and bone marrow suppression.

### What About The Rest Of Us?

As exciting as the results of this study were for those battling glioblastoma, valganciclovir is prohibitively expensive to use as a preventive drug. It can cost upwards of **$50,000/year** and has myriad side effects, including plummeting white blood cell counts.50

There are no known drugs or supplements that can prevent primary infection with CMV in humans. However, if you are CMV-positive (like so many Americans), there are a number of ways you can protect yourself against the effects of the virus, including protecting against immunosenescence, the immune aging that triggers CMV activation.
**Fight CMV-Related Immunosenescence Naturally**

Although no human data exist yet, there’s striking evidence that certain natural compounds can inhibit the replication and spread of CMV in animal and basic lab studies.

These include *Urtica dioica* (stinging nettle), garlic extract, *Terminalia chebula* (an Asian tree), ginger extracts, flavones from ginger-like *Kaempferia parviflora*, a variety of seaweed extracts, and oil from *Nigella sativa* (black cumin seed).\(^{51-58}\) Black cumin seed oil in particular was so effective in mice that, after 10 days of treatment, no virus was detected in treated animals, while it was readily detectable in control mice.\(^{55}\)

Other nutrients can fight the CMV that may already be in your body by enhancing your immune system’s resources to fight CMV, as well as other infections that arise when immunosenescence sets in. These include the following:

- **Probiotics** and **prebiotics**, by balancing the intestinal microbial population, have powerful immune-stimulating properties.\(^{59,60}\) Studies show that probiotic/prebiotic therapy produces improvements in natural killer cell activity, activated T-lymphocytes (including “memory” cells responsible for recognizing old enemies), and cell signaling molecules called cytokines.\(^{61-64}\)

- Elderly people are more likely to be deficient in zinc, a trace element absolutely required for normal immunity.\(^{65}\) Zinc supplementation fights immunosenescence by enhancing the appropriate immune response to stress in older humans and by increasing appropriate cytokine signaling to mobilize response to infection.\(^{66,67}\)

- Sulfur-containing antioxidants such as **N-acetylcysteine** help replenish the body’s normal stores of natural antioxidants, which helps keep immune system cells fresh and vigorous. These supplements improve white blood cell function, increasing their ability to track and attack invaders, and increasing white cell proliferation in response to infection.\(^{68}\) Aged mice fed a diet rich in N-acetylcysteine and thioproline for 5 weeks showed an improvement in all immune functions, with values becoming close to those of young adult animals.\(^{69}\)

- **Spirulina**, a blue-green algae, increases the microbe-eating activity of white blood cells called macrophages, while stimulating antibody production and activating killer T-cells that destroy viruses and fungi.\(^{70,72}\)

- Finally, the prescription drug **metformin** (which is in fact a natural derivative of the French lilac) has shown great promise in reducing immunosenescence and fighting CMV and CMV-related cancers.\(^{73}\) Metformin has shown surprisingly beneficial results in combination with standard treatments for breast cancer,\(^{74}\) and is now being closely investigated as an additional treatment for glioblastoma. Similar studies showed that metformin inhibits growth and migration of glioblastoma cells, a property that would reduce the tumor’s invasiveness in patients’ brains.\(^{75}\) Excitingly, metformin has now also been shown to promote differentiation of glioblastoma-initiating cells into non-cancer-producing cells in lab cultures.\(^{76}\)

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**Summary**

Recent research has established a surprising connection between a common virus, **CMV**, and a deadly brain tumor, **glioblastoma**. This relationship opens the door to a variety of forms of treatment and prevention of brain and other cancers.

At present, even with chemotherapy, survival in glioblastoma patients is rarely more than 15 months after diagnosis.\(^{42}\)

But CMV proteins and DNA are found in the vast majority of glioblastomas removed at surgery, and the amount of CMV has been found to correlate closely with the severity of the tumor.\(^{1,2,22,45}\) This suggests that anti-CMV treatment might ameliorate glioblastoma and improve prognosis.

Indeed, treatment with valganciclovir, a specific anti-CMV drug, has been shown to dramatically increase overall survival in two studies of glioblastoma patients—as much as quadrupling life span.\(^{11,49}\)

However, for those with the CMV virus, but without glioblastoma, there are a few supplements that may help fight CMV infection and can mitigate its impact on your body.\(^{51-58}\)

You should consider being tested for CMV, by means of a blood test described in the sidebar on page 87. If you test positive, then start some of the recommendations made in this article.

The comforting news for **Life Extension®** members is that they have been supplementing with immune boosting nutrients for many decades.
If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

References


Super Potent Multi-Nutrient Formula

Commercial “one-a-day” supplements provide very low potencies.

The chart to the left reveals how much more potent Two-Per-Day is compared to the leading commercial multi-vitamin.

Compared to “one-a-day” products, Life Extension® Two-Per-Day contains up to 50 times more potency! This Two-Per-Day formula is available in tablet or capsule form.

Commercial supplements often contain the cheapest form of nutrients that fail to provide optimal benefits. For example, the 50 IU of synthetic vitamin E contained in Centrum® Silver® Adults 50+ may provide relatively little vitamin E to the bloodstream compared to the 100 IU of natural vitamin E in Two-Per-Day.

Two-Per-Day provides the three most effective forms of selenium which are sodium selenite, L-selenomethionine, and Se-methyl L-selenocysteine, plus alpha lipoic acid.

* 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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( Providing gamma, delta, alpha, and beta tocopherols)

Compare CENTRUM® to TWO-PER-DAY:

To order Life Extension Two-Per-Day Tablets or Two-Per-Day Capsules, call 1-800-544-4440 or visit www.LifeExtension.com

A bottle containing 120 tablets of Two-Per-Day Tablets retails for $20. If a member buys four bottles during Super Sale, the price is reduced to $12.15 per bottle. (Item #01814)

A bottle containing 120 capsules of Two-Per-Day Capsules retails for $22. If a member buys four bottles during Super Sale, the price is reduced to $13.50 per bottle. (Item #01815)

Each bottle of Two-Per-Day lasts 60 days, so members can obtain the benefits of this high-potency formula for as little as $0.67 per month.

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. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

* The new two-per-day provides a small amount of gamma tocopherol as part of natural mixed tocopherols which includes natural vitamin E.


Contains soybeans. Due to the source of the kelp, this product may contain fish and shellfish.
ULTIMATE PROSTATE PROTECTION

Now With Thymoquinone

At Life Extension®, we continually update our formulas to reflect the latest research findings.

**Ultra Natural Prostate** formula, now upgraded to include **thymoquinone**, provides the latest scientifically validated, standardized botanical extracts shown to promote healthy prostate function. No other prostate protection formula standardized botanical extracts shown to promote healthy prostate function. No other prostate protection formula standardized botanical extracts shown to promote healthy prostate function.

**Thymoquinone** targets prostate cells to promote healthy apoptosis (orderly removal of senescent cells), which is then absorbed into the bloodstream to provide support for prostate cells against excess estrogen levels.10-12

**Standardized lignans** convert to enterolactone in the intestine, which is then absorbed into the bloodstream to provide support for prostate cells against excess estrogen levels.13,14

**AprèsFlex™**, supports normal inhibition of 5-lipoxygenase or 5-LOX, an enzyme that is associated with undesirable cell division changes.13,14

**Stinging and Dwarf nettle root extracts** help support prostate cells against excess estrogen levels.15,16

**Saw Palmetto CO2 extract** helps inhibit dihydrotestosterone (DHT) activity in the prostate, helps support normal urinary flow, and helps regulate inflammatory reactions in the prostate.17-20

**Pygeum** (Pygeum africanum) extract helps suppress prostaglandin production in the prostate and supports healthy urination patterns.21,22

**Pumpkin seed oil**, from select pumpkins, enhances the composition of free fatty acids and augments saw palmetto’s benefits.23-25

**Beta-sitosterol** enhances the protective effects of other botanical extracts and helps improve quality of life.26-28

**Graminex® Flower Pollen Extract™**, has been shown to help relax the smooth muscles of the urethra and help regulate inflammatory reactions in the prostate.29-31

**Boron** has been shown to slow elevation of prostate-specific antigen (PSA).32-34

**Lycopene**, supports efficient cellular communication, helps maintain healthy DNA, regulates hormonal metabolism, and promotes healthy prostate size and structure.35-41

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

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<td>Lycopene (from natural tomato extract (fruit))</td>
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*3-0-acetyl-11-keto-β-boswellic acid

A bottle of 60 softgels of **Ultra Natural Prostate** retails for $38. If a member buys four bottles during **Super Sale**, the price is reduced to $23.63 per bottle. If a member buys 12 bottles during **Super Sale**, the price is $21.60.**

Contains soybeans.

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To order Ultra Natural Prostate, call 1-800-544-4440 or visit 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.

References
Sweet As Sugar
Health Benefits Of Stevia And Xylitol

In 1991, reacting to an anonymous trade complaint, the US Food and Drug Administration (FDA) deemed the sweetener stevia unsafe and issued an Import Alert, banning all stevia from entering the United States.1-3 While the FDA cited inadequate toxicological evidence of its safety, the ban was not based on any consumer complaints or reported adverse effects.2

Extracts of the South American stevia plant, called steviol glycosides, are up to 300 times sweeter than sugar and have little aftertaste, zero calories, and no effect on blood sugar.3 At the time of the FDA ban, supporters of stevia argued without success that stevia, with its long history of food use, should qualify as having GRAS (Generally Recognized as Safe) status in the same manner as coffee, tea, sugar, fruit, etc. A history of safe use is one condition that must be met to qualify for GRAS, and this was actually acknowledged in the FDA’s Import Alert for stevia!4 The FDA not only banned a safe and natural sweetener in stevia, but one that appears to provide health benefits as well, most notably for regulating blood sugar and blood pressure.3,5
**Health Benefits**

While stevia has been documented to have medical purposes as an antimicrobial, anti-diarrheal, anti-tumor, diuretic, anti-inflammatory, and immunomodulatory actions, the scientific evidence is strongest, and its use is most promising for two indications: (1) high blood sugar/insulin resistance and (2) high blood pressure.3,5,8

**Stevia May Help Control Blood Sugar And Insulin Levels**

Extracts from stevia leaves have been used for centuries as a medicinal herb in the traditional treatment of diabetes in South America.5,9 Today, scientific evidence on stevia supports its historic precedent in the regulation of blood sugar and insulin.

Avoiding excess elevation of blood sugar and insulin after meals is perhaps the most important dietary measure you can take to reduce your risk for heart disease, cancer, and other age-related disorders. In a recent study in type II diabetic subjects, stevioside, one of the stevia extracts, reduced after-meal blood glucose levels by an average of 18%.10

When compared to sugar, stevia consumption before meals results in far lower after-meal glucose and insulin levels.11 Even when compared to aspartame, stevia resulted in lower post-prandial insulin levels.11 The comparison with aspartame is more impressive because the change in glucose and insulin levels cannot be due to a difference in calories, as with sugar. A key finding from this study was that participants eating stevia felt satisfied with fewer calories and did not eat more food throughout the day to compensate.11 This is an indication of stable blood sugar and insulin levels.

At the root of many cases of chronically elevated glucose and insulin levels is insulin resistance. In rats fed a fructose-rich diet for four weeks to induce insulin resistance, stevioside lowered high blood glucose levels in a dose-dependent manner and delayed the development of insulin resistance.12

Studies have evaluated the effects of stevioside on animal models of both type I and type II diabetes: elevated blood glucose levels were lowered, and less insulin medication was needed for the same effect. This research clearly demonstrates that stevia has the ability to increase cellular insulin sensitivity and help reverse insulin resistance.12,13

Interestingly, the mechanism for stevioside’s hypoglycemic effect in the latter group of rats with insulin dependent type I diabetes was determined to be slowing down gluconeogenesis (the synthesis of glucose in the liver from non-carbohydrate sources).11 Another plant compound very familiar to readers of Life Extension magazine®, chlorogenic acid from coffee beans, also down-regulates gluconeogenesis. Coffee sweetened with stevia may pack quite a one-two punch for blood sugar control!

The effect of stevia on blood sugar has only been observed when plasma glucose levels are elevated. It does not lower normal blood sugar levels in healthy individuals.5

Stevia is not just a safe sugar substitute, but a natural insulin sensitizer that may help maintain normal sugar and insulin levels in diabetics and nondiabetics alike. Since stevia extract also decreases oxidized LDL cholesterol14 and...
Stevia May Lower Blood Pressure

A double-blind, placebo-controlled study demonstrated that oral stevioside taken at doses of 250 mg, three times a day for one year resulted in significant, last-
ing decreases in both systolic and diastolic blood pressure in patients with mild to moderate hypertension.16 A longer, subsequent study by
with the same research team that lasted
years and with an increased dose of stevioside (1,500 mg) replicated the decreases in blood pressure found in the initial study.17

The stevioside treatment was well-tolerated and no side effects were reported or detected. Moreover, the stevioside treatment group reported significantly higher quality of life scores than the placebo group.17 On the other hand, it was noted that more patients in the placebo group developed left ventricular hypertrophy,17 an abnormal thickening of the heart muscle often caused by high blood pressure.

Though the effect of stevioside was not better than drugs, it appears comparable and nearly everyone taking stevioside had significant lowering of blood pressure. As in the case of blood sugar, stevioside lowers elevated blood pressure, but not normal blood pressure.5

As a natural plant compound with no demonstrated side effects, stevia may offer an alternative or supplementary therapy for high blood pressure, and with possibly better compliance.

Xylitol: A Sweetener That’s Good For Your Teeth

Another sugar substitute with beneficial health properties that is growing in popularity is xylitol. While xylitol is a natural substance found in fruits and vegetables, it is also naturally produced in our bodies during normal carbohydrate metabolism. An average-size adult makes up to 15 grams of xylitol daily.18,19

Xylitol is classified as a sugar alcohol (like sorbitol, mannitol, erythritol, etc) because its chemical structure partially resembles sugar and partially resembles alcohol.20 It is actually a carbohydrate that looks and tastes remarkably like table sugar with 40% fewer calories and practically no after-taste.21 It is used as a sweetener in chewing gums, mints, beverages, sweets, toothpaste and in tabletop granular form. It has been approved for use in foods, pharmaceuticals and oral health products in more than 35 countries worldwide, including the US.21

Xylitol Fights Cavities

Though largely preventable, tooth decay (cavities) is one of the most prevalent chronic diseases among both adults and children, with 1 in 5 Americans reported to have untreated cavities according to the Centers for Disease Control (CDC).22 In 2010, roughly $108 billion dollars were spent on dental services in the US.23

By providing fuel for acid-forming bacteria in the mouth, sugar consumption sets up an

History Of Stevia

Stevia is a perennial shrub with over 200 species belonging to the Aster (sunflower) family and indigenous to South America.46 For centuries, the Guarani tribes of Paraguay and Brazil used the leaves of stevia, which they called ka’a he’e (“sweet herb”) to sweeten yerba mate tea and various foods. It was also used medicinally as a treatment for diabetes,47 hypertension, and obesity.5

Stevia has been used in Europe and Asia since the sixteenth century when it was discovered by the Spanish Conquistadors.48 The particular species used as a sweetener, Stevia rebaudiana Bertoni, was named after botanist Moses Santiago Bertoni, who “rediscovered” stevia and scientifically classified the plant in 1899, describing its sweet taste in detail. The compounds in the stevia leaf that give the plant its sweet taste, stevioside and rebaudioside A, were isolated in 1931 by French chemists.2

During World War II, England began to investigate stevia as an alternative to sugar, which was in short supply.49 In the 1970s, the Japanese began to use stevia to replace the banned artificial sweetener, saccharin. It became their chosen sugar alternative to sweeten food and beverages, so much so that Japan is now the largest consumer of stevia.2 Today, stevia can be found growing in China, South America, India, South Korea, Taiwan, and Israel, and is used in many countries around the globe.
ideal acidic condition that promotes decay and demineralization of teeth. Xylitol, conversely, is non-fermentable and does not feed acid-forming oral bacteria. Regular use of xylitol causes cavity-forming bacteria, most notably *Streptococcus mutans (S. mutans)*, to starve and die off by as much as 73%, decreasing the level of acidic byproducts formed when bacteria ferment sugars.24 Xylitol also increases salivary flow which helps to buffer these acids.25 A more alkaline environment is created, leading to less tooth decay and plaque, and enhanced tooth remineralization. Untreated cavities, especially small decay spots, can harden and become less sensitive from exposure to xylitol.26

Considerable research conducted since the early 1970s has established that consuming xylitol products results in reduction in tooth decay rates ranging from 30% up to levels in excess of 80%.27 What’s more, the protective effects of xylitol are long-lasting. In a study of nearly 300 children who chewed xylitol gum habitually for over two years and then stopped, some experienced a reduction in their tooth decay rate over the next five years.28 Xylitol-sweetened gum even reduces transmission of cavity-causing bacteria from mother to child.29

According to newer research, the number of exposures to xylitol throughout the day is more important than the quantity of xylitol.30 Consider chewing xylitol gum after each meal, sweetening your tea or coffee with xylitol granules and using xylitol toothpaste once or twice a day. Several dental associations, including the American Dental Association31 and the American Academy of Pediatric Dentistry,32 support the use of xylitol in caries control and prevention.

### Xylitol Benefits Diabetes And Metabolic Syndrome

Because xylitol is slowly emptied from the stomach, and only about 50% of it is absorbed, it has negligible effects on blood sugar and insulin secretion.33,34 Xylitol has a considerably lower glycemic index (13) when compared with sucrose (65) and glucose (100).33 It even compares favorably with foods such as legumes and milk.35

In a recent animal study examining the antidiabetic potential of xylitol, animals fed xylitol had significantly better glucose tolerance (more stable blood sugar levels), less weight gain and significantly lower food intake (suppressed appetite) than both the sugar and control groups.36 Data from this study and others confirm that xylitol is an ideal low-calorie sweetener for people with diabetes, metabolic syndrome, obesity, and other metabolic disorders.34,36,37

Of course, like stevia, xylitol can be used by anyone to help maintain low blood sugar and insulin levels, thereby reducing risk to age-related disease.

### Xylitol Helps Prevent Ear And Upper Respiratory Infections

Xylitol not only suppresses *S. mutans*, the cavity-promoting bacterium, but it also inhibits the growth of *Streptococcus pneumoniae (S. pneumoniae)*, a major cause of middle ear infections and sinusitis.38,39 Owing to its unique structure, xylitol also has the ability to interfere with *S. pneumoniae*’s ability to stick to tissues and form colonies of bacteria called biofilms, making the germ more vulnerable to treatment.40

In clinical trials, xylitol given in the form of chewing gum or syrup reduced middle ear infections in daycare children by 30-40%.38,41,42 This safe and great-tasting sweetener offers the possibility of preventing ear infections in children and thus lessening the need for antibiotics.

### Xylitol Strengthens Bone

Since xylitol appears to induce remineralization of tooth enamel, researchers are also now investigating its ability to remineralize bone tissue. Several animal studies show that xylitol increases bone density,43-45 suggesting that xylitol shows promise in the treatment or prevention of osteoporosis. Clinical trials are needed to confirm these potential benefits.

### Summary

Stevia and xylitol are not only safe and tasty sugar alternatives, but also potent natural compounds that provide multiple health benefits.3,5,8,27,34,36-38,43-45 While both sweeteners improve glucose tolerance and reduce insulin needs, stevia can also lower elevated blood pressure while xylitol can help prevent cavities and ear infections, and possibly strengthen bones.3,5,8,27,34,36-38,43-45 Add some stevia to your favorite beverage and chew xylitol gum after meals. Enjoy the sweet taste and gain important health dividends as well. ●

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

Health Benefits

While stevia has been documented to have medical purposes as an antimicrobial, anti-diarrheal, anti-tumor, diuretic, anti-inflammatory, and immunomodulatory actions, the scientific evidence is strongest, and its use is most promising for two indications: (1) high blood sugar/insulin resistance and (2) high blood pressure.3,5,8

Stevia May Help Control Blood Sugar And Insulin Levels

Extracts from stevia leaves have been used for centuries as a medicinal herb in the traditional treatment of diabetes in South America.5,9 Today, scientific evidence on stevia supports its historic precedent in the regulation of blood sugar and insulin.

Avoiding excess elevation of blood sugar and insulin after meals is perhaps the most important dietary measure you can take to reduce your risk for heart disease, cancer, and other age-related disorders. In a recent study in type II diabetic subjects, stevioside, one of the stevia extracts, reduced after-meal blood glucose levels by an average of 18%.10

When compared to sugar, stevia consumption before meals results in far lower after-meal glucose and insulin levels.11 Even when compared to aspartame, stevia resulted in lower post-prandial insulin levels.11 The comparison with aspartame is more impressive because the change in glucose and insulin levels cannot be due to a difference in calories, as with sugar. A key finding from this study was that participants eating stevia felt satisfied with fewer calories and did not eat more food throughout the day to compensate.11 This is an indication of stable blood sugar and insulin levels.

At the root of many cases of chronically elevated glucose and insulin levels is insulin resistance. In rats fed a fructose-rich diet for four weeks to induce insulin resistance, stevioside lowered high blood glucose levels in a dose-dependent manner and delayed the development of insulin resistance.12

Studies have evaluated the effects of stevioside on animal models of both type I and type II diabetes: elevated blood glucose levels were lowered, and less insulin medication was needed for the same effect. This research clearly demonstrates that stevia has the ability to increase cellular insulin sensitivity and help reverse insulin resistance.12,13

Interestingly, the mechanism for stevioside’s hypoglycemic effect in the latter group of rats with insulin dependent type I diabetes was determined to be slowing down gluconeogenesis (the synthesis of glucose in the liver from non-carbohydrate sources).11 Another plant compound very familiar to readers of Life Extension magazine® chlorogenic acid from coffee beans, also down-regulates gluconeogenesis. Coffee sweetened with stevia may pack quite a one-two punch for blood sugar control!

The effect of stevia on blood sugar has only been observed when plasma glucose levels are elevated. It does not lower normal blood sugar levels in healthy individuals.5

Stevia is not just a safe sugar substitute, but a natural insulin sensitizer that may help maintain normal sugar and insulin levels in diabetics and nondiabetics alike. Since stevia extract also decreases oxidized LDL cholesterol14 and
Stevia May Lower Blood Pressure

A double-blind, placebo-controlled study demonstrated that oral stevioside taken at doses of 250 mg, three times a day for one year resulted in significant, last-
during increases in blood pressure.16 A longer, subsequent study by
the same research team that lasted two years and with an increased
dose of stevioside (1,500 mg) replicated the decreases in blood pres-
sure found in the initial study.17

The stevioside treatment was well-tolerated and no side effects were reported or detected. Moreover, the stevioside treatment
group reported significantly higher quality of life scores than the pla-
cebo group.17 On the other hand, it was noted that more patients
in the placebo group developed left ventricular hypertrophy,17 an
abnormal thickening of the heart muscle often caused by high blood
pressure.

Though the effect of stevioside was not better than drugs, it
appears comparable and nearly everyone taking stevioside had
significant lowering of blood pressure. As in the case of blood sugar,
stevioside lowers elevated blood pressure, but not normal blood
pressure.5

As a natural plant compound
with no demonstrated side effects, stevia may offer an alternative or
supplementary therapy for high blood pressure, and with possibly
better compliance.

Xylitol: A Sweetener
That’s Good For Your Teeth

Another sugar substitute with
beneficial health properties that
is growing in popularity is xylitol. While xylitol is a natural substance
found in fruits and vegetables, it is also naturally produced in our
bodies during normal carbohydrate metabolism. An average-size
adult makes up to 15 grams of xylitol daily.18,19

Xylitol is classified as a sugar
alcohol (like sorbitol, mannitol, erythritol, etc) because its chemi-
ical structure partially resembles sugar and partially resembles alco-
hol.20 It is actually a carbohydrate that looks and tastes remarkably
like table sugar with 40% fewer calories and practically no after-
taste.21 It is used as a sweetener in
chewing gums, mints, beverages,
sweets, toothpaste and in table-
top granular form. It has been
approved for use in foods, pharma-
aceuticals and oral health products
in more than 35 countries world-
wide, including the US.21

Xylitol Fights Cavities

Though largely preventable,
tooth decay (cavities) is one of the
most prevalent chronic diseases
among both adults and children,
with 1 in 5 Americans reported to
have untreated cavities according
to the Centers for Disease Control
(CDC).22 In 2010, roughly $108
billion dollars were spent on den-
tal services in the US.23

By providing fuel for acid-
forming bacteria in the mouth,
sugar consumption sets up an

History Of Stevia

Stevia is a perennial shrub with over 200 species belonging to the
Aster (sunflower) family and indigenous to South America.46 For
centuries, the Guarani tribes of Paraguay and Brazil used the leaves of
stevia, which they called ka’a he’e (“sweet herb”) to sweeten yerba
mate tea and various foods. It was also used medicinally as a treat-
ment for diabetes,47 hypertension, and obesity.5

Stevia has been used in Europe and Asia since the sixteenth century
when it was discovered by the Spanish Conquistadors.48 The particu-
lar species used as a sweetener, Stevia rebaudiana Bertoni, was
named after botanist Moises Santiago Bertoni, who “rediscovered”
stevia and scientifically classified the plant in 1899, describing its sweet
taste in detail. The compounds in the stevia leaf that give the plant its
sweet taste, stevioside and rebaudioside A, were isolated in 1931 by
French chemists.2

During World War II, England began to investigate stevia as an
alternative to sugar, which was in short supply.49 In the 1970s, the
Japanese began to use stevia to replace the banned artificial sweet-
ener, saccharin. It became their chosen sugar alternative to sweeten
food and beverages, so much so that Japan is now the largest con-
sumer of stevia.2 Today, stevia can be found growing in China, South
America, India, South Korea, Taiwan, and Israel, and is used in many
countries around the globe.
ideal acidic condition that promotes decay and demineralization of teeth. Xylitol, conversely, is non-fermentable and does not feed acid-forming oral bacteria. Regular use of xylitol causes cavity-forming bacteria, most notably Streptococcus mutans (S. mutans), to starve and die off by as much as 73%, decreasing the level of acidic byproducts formed when bacteria ferment sugars. Xylitol also increases salivary flow which helps to buffer these acids.

A more alkaline environment is created, leading to less tooth decay and plaque, and enhanced tooth remineralization. Untreated cavities, especially small decay spots, can harden and become less sensitive from exposure to xylitol.

Considerable research conducted since the early 1970s has established that consuming xylitol products results in reduction in tooth decay rates ranging from 30% up to levels in excess of 80%. What’s more, the protective effects of xylitol are long-lasting. In a study of nearly 300 children who chewed xylitol gum habitually for over two years and then stopped, some experienced a reduction in their tooth decay rate over the next five years. Xylitol-sweetened gum even reduces transmission of cavity-causing bacteria from mother to child.

According to newer research, the number of exposures to xylitol throughout the day is more important than the quantity of xylitol. Consider chewing xylitol gum after each meal, sweetening your tea or coffee with xylitol granules and using xylitol toothpaste once or twice a day. Several dental associations, including the American Dental Association and the American Academy of Pediatric Dentistry, support the use of xylitol in caries control and prevention.

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**Xylitol Benefits**

**Diabetes And Metabolic Syndrome**

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Of course, like stevia, xylitol can be used by anyone to help maintain low blood sugar and insulin levels, thereby reducing risk of age-related disease.

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**Xylitol Helps Prevent Ear And Upper Respiratory Infections**

Xylitol not only suppresses S. mutans, the cavity-promoting bacterium, but it also inhibits the growth of Streptococcus pneumoniae (S. pneumoniae), a major cause of middle ear infections and sinusitis. Owing to its unique structure, xylitol also has the ability to interfere with S. pneumoniae’s ability to stick to tissues and form colonies of bacteria called biofilms, making the germ more vulnerable to treatment.

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**Summary**

Stevia and xylitol are not only safe and tasty sugar alternatives, but also potent natural compounds that provide multiple health benefits. While both sweeteners improve glucose tolerance and reduce insulin needs, stevia can also lower elevated blood pressure while xylitol can help prevent cavities and ear infections, and possibly strengthen bones.

Add some stevia to your favorite beverage and chew xylitol gum after meals. Enjoy the sweet taste and gain important health dividends as well.
Better Stevia™ Extract
1 gram 100 packets - Item# 00432

Stevia extract (stevioside) is an extract of *Stevia rebaudiana*, a small plant native to Paraguay and Brazil. Stevioside is 250 times sweeter than table sugar,¹ and is a safe supplement for the human diet.²⁻⁶ Stevia Extract granules has been shown to promote healthy blood sugar levels in those already within normal range.⁷⁻¹¹

A box containing 100 1 gram packets retails for $9.95. During Super Sale, members pay $6.72 per box.

References

Look at the labels of foods you use every day and see how many harmful ingredients they contain. There is no reason to continue injuring yourself. Consumers now have access to natural ingredients with documented health benefits.

Better Stevia™ Organic Liquid
2 oz • Item# 00438

BetterStevia™ Organic Liquid is a delicious addition to your favorite beverages. It is a low-calorie, gluten-free sweetener and is especially suited for sweetening coffees and teas.


Xyliwhite™ Mouthwash
16 fl. oz. (473 mL) • Item# 00409

Xyliwhite™ Mouthwash is a fluoride-free oral rinse that works in unique ways to help you achieve a smile that’s healthier and brighter than ever before! Xyliwhite™ Mouthwash gets its cleansing properties from xylitol — a naturally occurring sugar alcohol that has been shown in clinical studies to help promote dental health; effectively rinsing debris, such as food particles containing bacteria from mouth surfaces. Xylitol also helps safeguard healthy tooth enamel surfaces. By preventing the mouth’s pH levels from falling below their normal range, Xyliwhite™ Mouthwash protects the enamel surface of teeth.

A 16 ounce bottle of Xyliwhite™ retails for $10. During Super Sale, members pay $6.75 per bottle.

Ingredients: De-ionized Water, Xylitol, Vegetable Glycerin, Natural Essential Oil Flavor Blend (Peppermint Oil, Eucalyptus Oil, Thyme Oil, Tea Tree Oil, Natural Menthol Crystals, Spearmint Oil, Wintergreen Oil), Aloe Leaf, Grapefruit Seed Extract and Citric Acid

Rich Rewards™ Dark Chocolate
Item# 01809

Rich Rewards™ Dark Chocolate is a unique 70% dark chocolate that is 100% sweetened with nature’s own sweetener — xylitol — without the harmful sugar. Unlike many carbs, natural xylitol sweetener does not cause rapid rises in blood glucose.* The caloric impact of xylitol is typically about 40% lower than other carbohydrates. In addition, xylitol may reduce the risk of tooth decay, making it a healthy addition to any diet.*

Rich Rewards™ Dark Chocolate is made using only USDA organic certified cocoa butter and organic cocoa liquor. The retail price for a 15-piece bag is $15. If a member buys four or more bags during Super Sale, the price is reduced to $8.75 per bag of delicious xylitol-sweetened dark chocolate.


To order any of these naturally sweet foods and chlorogenic acid-fortified coffees call 1-800-544-4440 or log on to www.LifeExtension.com
Rich Rewards® Premium Coffees

Rich Rewards® Premium Coffees are made from organic Arabica beans using a patented, 100% natural process called HealthyRoast™ which delivers a more complete nutritional profile of the coffee bean, yielding chlorogenic acid levels far greater than other premium brands. And all without sacrificing a drop of rich gourmet flavor!

Rich Rewards® coffee beans are roasted gently and precisely in small batches with no additives or preservatives. And the HealthyRoast™ process preserves the special, naturally occurring compounds found in coffee beans that make it easy on your stomach.

The 100% USDA Organic Certified Arabica beans used in Rich Rewards® are grown deep in the rainforests of Central America using traditional and ecologically sustainable coffee-growing practices. Then they’re hand-picked and Rainforest Alliance certified.

### COMPARISON OF CONVENTIONAL COFFEE TO LIFE EXTENSION’S RICH REWARDS® BLEND

<table>
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<tr>
<th>Chlorogenic Acid</th>
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**NATURAL MOCHA FLAVOR**

Rich Rewards® Decaf Roast
12 oz. • Item# 01610
Retail: $14
Super Sale Member Price: **$9.45**

Rich Rewards® Breakfast Blend
12 oz. (340 grams) • Item# 01609
Retail: $13
Super Sale Member Price: **$8.78**

Rich Rewards® Natural Mocha Flavor
12 oz. (340 grams) • Item# 01730
Retail: $15
Super Sale Member Price: **$10.13**
Blood testing provides the ultimate information regarding correctable risk factors that may predispose you to disorders such as cancer, diabetes, cardiovascular disease, and more. Information about general health and nutritional status can also be gained through standard blood analysis. Standing behind the belief that blood testing is an essential component of any program designed to attain optimal health and longevity, Life Extension® offers this innovative and convenient service at a very affordable price. Not only is comprehensive blood testing an important step in safeguarding your health, it is a simple process from virtually anywhere in the United States.

Five Easy Steps:
1. Call 1-800-208-3444 to discuss and place your order with one of our knowledgeable health advisors. (This order form can also be faxed to 1-866-728-1050 or mailed.)
2. After your order is placed, you will be mailed either a requisition form to take to your local LabCorp Patient Service Center or a Blood Draw Kit; whichever is applicable (Please note: If a blood draw kit is used, an additional local draw fee may be incurred.)
3. Have your blood drawn.
4. Your blood test results will be sent directly to you by Life Extension.
5. Take the opportunity to discuss the results with one of our knowledgeable health advisors by calling 1-800-226-2370; or review the results with your personal physician.

It’s that simple! Don’t delay—call today!

For Our Local Members:
For those residing in the Ft. Lauderdale, Florida area, blood-draws are also performed at the Life Extension Nutrition Center from 9:00 am to 2:00 pm Monday through Saturday. Simply purchase the blood test and have it drawn with no wait! Our address is 9900 North Federal Highway, Ft. Lauderdale, FL, 33308-2633.

Most Popular Panels

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<td>$269</td>
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<td>Chemistry Profile includes glucose, cholesterol, LDL, HDL, triglycerides, liver and kidney function tests PLUS 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: THA-S, TSH for thyroid function, Estradiol, Vitamin D 25- hydroxy, Hemoglobin A1c</td>
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This test is used to check the blood level of CoQ10 and will enable more precise dosing for anyone seeking to achieve and maintain high levels of this critical antioxidant.

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

Measures inflammation factors in arteries. This test is used to rule out vitamin D deficiency as a cause of bone disease. It can also be used to identify hypercalcemia.

**Fibrinogen**

High levels of this blood-clotting factor increase the risk of heart attack and stroke.

**Homocysteine**

Can indicate if you are likely to have a heart attack or stroke. Even if you take folic acid, you still may have dangerously high levels of this artery-clotting metabolic debris that can be lowered with high doses of TMG, vitamin B6, and vitamin B12.

**Male Health**

PSA (Prostate-Specific Antigen)

Can provide an early warning sign for prostate disorders and possible cancer.

**Free-PSA (includes total PSA)**

Recommended to determine if an elevated PSA is indicative of prostate cancer.

This blood test service is for informational purposes only and no specific medical advice will be provided. National Diagnostics, Inc., and the Life Extension Foundation contract with a physician who will order your test(s), but will not diagnose or treat you. Both the physician and the testing laboratory are independent contractors and neither National Diagnostics, Inc., nor the Life Extension Foundation will be liable for their acts or omissions. Always seek the advice of a trained health professional for medical advice, diagnosis, or treatment. When you purchase a blood test from Life Extension/National Diagnostics, Inc., you are doing so with the understanding that you are privately paying for these tests. There will be absolutely no billing to Medicare, Medicaid, or private insurance. I have read the above Terms and Conditions and understand and agree to them.

**Signature of Life Extension Member**

X

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**Member No.**

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Date of Birth

(required) /

/ 

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L-Carnitine Powder Natural Lemon Flavor
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L-Lysine Capsules
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Mega L-Glutathione Capsules
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Arthrodex® Advanced with UC-II® and AprèsFlex®
Bone-Up®
Bone Restore
Bone Restore w/Vitamin K2
Bone Strength Formula w/KoAct™
Dr. Strum’s Intensive Bone Formula
Fast Acting Joint Formula
Glucosamine Chondroitin Capsules

BRAIN HEALTH
Acetyl-L-Carnitine
Acetyl-L-Carnitine-ArGINate
Brain Shield™
CDP Choline Capsules
Cognitex™ with Brain Shield™
Cognitex™ with Pregnenolone & Brain Shield™
Cognitex® Basics
DAME Bitartrate
Ginkgo Biloba Certified Extract™
Huperzine A
Lecithin Granules
Methylcobalamin Lozenges
Migra-Mag with Brain Shield™
Neuro-Mag™ Magnesium L-Threonate
Optimized Ashwagandha Extract
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Carminosoothe w/PicroProtect
Digest RC™
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Enhanced Super Digestive Enzymes
Extraordinary Enzymes
FlorAssist™
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DURK AND SANDY PRODUCTS
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FOOD
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Rich Rewards™ Spicy Cruciferous Vegetable Soup
Rich Rewards™ Cruciferous Vegetable Soup
Rich Rewards™ Lentil Soup
Rich Rewards™ Mung Bean Soup with Tumeric
Rich Rewards™ Coffee
(available in mocha, vanilla and decaffeinated)
Rich Rewards™ Dark Chocolate

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Dr. Proctor’s Shampoo
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Cardio Peak™ w/Standardized Hawthorn and Arjuna
Cho-Less™
D-Ribose Tablets
D-Ribose Powder
Endothelial Defense™ with Full-Spectrum Pomegranate™
Fibrinogen Resist
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Homocysteine Resist
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Olive Leaf Vascular Support
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Red Yeast Rice
Super Absorbable CoQ10™ with d-Limonene
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Super Ubiquinol CoQ10 with BioPQQ®

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Astaxanthin w/Phospholipids
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Blueberry Extract
Blueberry Extract w/Pomegranate
Butterbur Extract with Standardized Rosmarinic Acid
Calcium D-Glucarate
Enhanced Berry Complete with Acai Full-Spectrum Pomegranate™
Grapeseed Extract with Resveratrol & Pterostilbene
Huperzine A
Kyorin® Garlic Formula 102 + 105
Kyorin® Reserve
Mega Green Tea Extract
Mega Green Tea Extract (Decaffeinated)
(also w/CoffeeGenic® Green Coffee Extract)
Mega Lycopene Extract
Optimized Ashwagandha Extract
Optimized Garlic
Pomegranate Extract
Pomegranate Juice Concentrate
Pycnogenol
Optimized Quercetin

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Black Cumin Seed Oil w/Bio-Curcumin®
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FlorAssist™ Probiotic
26 Hyperimmune Egg
Immune Modulator w/Tinofend®
Immune Protect with PARACTIN®
Lactoferrin
Norwegian Shark Liver Oil
Optimized Fucoidan w/Maritech® 926
ProBoost™ Thymic Protein A
Reishi Extract Mushroom Complex
Vitamin C with Dihydroquercetin
Winter Wellness™
Zinc Lozenges

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Boswellia
Bromelain (Specially-coated)
Cytokine Suppressor® with EGCg
DHA (Vegetarian Sourced)
Fast Acting Joint Formula
Ginger Force
Kril Healthy Joint Formula
5-LOX Inhibitor w/AprèsFlex®
Mega EPA/DHA
Mega GLA with Sesame Lignans
MSM
Omega-3 Whirl
Serrafflazyme®
SODzyme™ with GilSODin® and Wolfberry
Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract
Tart Cherry w/Standardized CherryPURE®
Zyflamend® Whole Body

LIVER HEALTH
Branch Chain Amino Acids
N-Acetyl Cysteine
Liver Efficiency Formula
European Milk Thistle
Advanced Phospholipid Delivery
Hepatopro
SAMe
Silymarin

RESVERATROL WITH SYNERGISTIC GRAPE-BERRY ACTIVES
Rhodiola Extract
Silymarin
SODzyme™ with GilSODin®
Stevia Extract
Advanced Bio-Curcumin® with Ginger & Turmerones
Super Bio-Curcumin®
Super Ginkgo Extract
Triple Action Cruciferous Vegetable Extract
Venotone
Whole Grape Extract

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7-KETO® DHEA
DHEA
DHEA Complete
GH Pituitary Support Day Formula
GH Pituitary Support Night Formula
Liquid Melatonin
Melatonin
Melatonin Timed Release
Natural Estrogen with Pomegranate Extract
Pregnenolone
ProgestaCare for Women
Super Miraforte with Standarized Lignans

LIVER HEALTH
Branch Chain Amino Acids
N-Acetyl Cysteine
Liver Efficiency Formula
European Milk Thistle
Advanced Phospholipid Delivery
Hepatopro
SAMe
Silymarin

RESVERATROL WITH SYNERGISTIC GRAPE-BERRY ACTIVES
Rhodiola Extract
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SODzyme™ with GilSODin®
Stevia Extract
Advanced Bio-Curcumin® with Ginger & Turmerones
Super Bio-Curcumin®
Super Ginkgo Extract
Triple Action Cruciferous Vegetable Extract
Venotone
Whole Grape Extract

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7-KETO® DHEA
DHEA
DHEA Complete
GH Pituitary Support Day Formula
GH Pituitary Support Night Formula
Liquid Melatonin
Melatonin
Melatonin Timed Release
Natural Estrogen with Pomegranate Extract
Pregnenolone
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<th>Member Each</th>
<th>Qty</th>
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**SUB-TOTAL OF COLUMN 1**

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**SUB-TOTAL OF COLUMN 2**
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<td>BUTTERBUR EXT w/STANDARDIZED ROSEMARIC ACID - 60 softgels</td>
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<td>01653</td>
<td>CALCIUM CITRATE w/VITAMIN D - 300 caps</td>
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<tr>
<td>00916</td>
<td>CARNITINE w/GLYCOCAR® (OPTIMIZED) - 60 veg. caps</td>
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<tr>
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<td>CARNOSINE (SUPER) - 500 mg, 90 veg. caps</td>
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<td>CHROMIUM ULTRA - 100 veg. caps</td>
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<tr>
<td>01503</td>
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<tr>
<td>00818</td>
<td>CLA BLEND w/SESAME LIGNANES (SUPER) - 1,000 mg, 120 softgels</td>
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<td>$27.00</td>
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<tr>
<td>00819</td>
<td>CLA BLEND w/GUARANA &amp; SESAME (SUPER) - 1,000 mg, 120 softgels</td>
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<td>01896</td>
<td>COGNITEX® w/BRAN SHIELD® - 90 softgels</td>
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**SUB-TOTAL OF COLUMN 3**

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<td>COGNITEX® BASICS - 60 softgels</td>
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<td>COMPLETE B-COMPLEX - 60 veg. caps</td>
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<td>COPPER CAPSULES - 2 mg, 100 caps</td>
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<tr>
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<tr>
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<td>COSMESIS ANTI-OXIDANT REJUVENATING FOOT CREAM - 2 oz</td>
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**SUB-TOTAL OF COLUMN 4**
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<td>COSMESIS ANTI-OXIDANT REJUVENATING FOOT SCRUB - 2 oz</td>
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<tr>
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<td>COSMESIS ANTI-OXIDANT REJUVENATING HAND CREAM - 2 oz</td>
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<td></td>
<td>Buy 2 bottles, price each</td>
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<td>COSMESIS ANTI-OXIDANT REJUVENATING HAND SCRUB - 2 oz</td>
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<td>Buy 2 jars, price each</td>
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<td>COSMESIS ANTI-REDNESS &amp; ADULT BLEMISH LOTION - 1 oz</td>
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<td>COSMESIS BIOLAVOIROID CREAM - 1 oz jar</td>
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<td>COSMESIS CORRECTIVE CLEARING MASK - 2 oz</td>
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<tr>
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<td>COSMESIS FINE LINE-LESS - 1 oz</td>
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<td>80131</td>
<td>COSMESIS HAIR SUPPRESS FORMULA - 4 oz</td>
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<tr>
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<td>COSMESIS HYALURONIC FACIAL MOISTURIZER - 1 oz</td>
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<td>COSMESIS HYALURONIC OIL-FREE FACIAL MOISTURIZER - 1 oz</td>
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<td>Buy 2 bottles, price each</td>
<td>51.04</td>
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<tr>
<td>80138</td>
<td>COSMESIS HYDRATING ANTI-OXIDANT FACE MIST - 4 oz</td>
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<td>COSMESIS LIFTING &amp; TIGHTENING COMPLEX - 1 oz</td>
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<td>55.88</td>
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<td>Buy 2 tubes, price each</td>
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**SUB-TOTAL OF COLUMN 5**

**Deduct an additional 10% on all products during super sale**

**SUB-TOTAL OF COLUMN 6**
To order online visit www.LifeExtension.com/SuperSale

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**SUB-TOTAL OF COLUMN 7**

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**SUB-TOTAL OF COLUMN 8**

Life Extension Members receive 25% off the retail price of all products.

Deduct an additional 10% on all products during Super Sale.
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**SUB-TOTAL OF COLUMN 9**

**SUB-TOTAL OF COLUMN 10**

**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**
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| LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS |

| OFFER ENDS FEBRUARY 3, 2014 |

| To order online visit: www.LifeExtension.com/SuperSale |

| SUB-TOTAL OF COLUMN 12 |    |             |     |        |

<p>| DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE |    |             |     |        |</p>
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**SUB-TOTAL OF COLUMN 13**

**SUB-TOTAL OF COLUMN 14**
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<td>SKIN RESTORING PHYTOCEMADIES w/LIPOWHEAT® - 30 veg. liquid caps</td>
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**Sub-Total of Column 15**

**Total**

**Sub-Total of Column 16**

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*Offer ends February 3, 2014*

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*** Due to license restrictions, this product is not for sale to customers outside of the USA.
† Member pricing not valid on this item.
†† Due to license restrictions, this product is not for sale to Canada.

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February 2014

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GRAND TOTAL (Must be in U.S. dollars)

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### Not a Member? Join Today!

- I want to join the Life Extension Foundation®.

Enclosed is $75 for annual membership. (Canadians add $70.00; all others outside the U.S. add $35.00). Send me: Disease Prevention & Treatment Protocal Book

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FREE Gift to New Members

This 2014 edition of Disease Prevention and Treatment provides 1,400 pages of information about therapies that are documented in the scientific literature, but are not routinely used in clinical medical practice. Gaining access to this knowledge enables one with a medical disorder to take advantage of these advanced modalities immediately, rather than waiting years for conventional medicine to catch on.

To order a copy of Disease Prevention and Treatment, visit www.LifeExtension.com

HOW TO JOIN THE LIFE EXTENSION FOUNDATION®

As a member of the Life Extension Foundation®, you have the opportunity to participate in a great scientific endeavor. We are the world’s premier organization dedicated to stopping and reversing aging.

Our 33-year track record shows that we have been five to ten years ahead of conventional and alternative medicine in making new life-saving therapies available to our members.

When you join the Life Extension Foundation®, we update you on the latest published medical research by sending you FREE books. Our most impressive publication is the 1,400-page Disease Prevention and Treatment protocol book that contains novel therapies to treat 130 common diseases of aging. Disease Prevention and Treatment is the only book that combines conventional and alternative therapies in order to implement a treatment regimen for fighting the multiple processes involved in degenerative disease.

Each month, Life Extension Foundation® members receive a magazine packed with the latest medical findings from around the world. Members also can call a toll-free phone number to talk to our knowledgeable health advisors about their health issues.

If your number one priority is good health and a long life, please join our not-for-profit organization.

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MEMBERSHIP APPLICATION

I want to contribute to your research efforts to extend the healthy human life span. Enclosed is my first year’s membership donation of $75 to join the most elite group of longevity enthusiasts in the world. (Canadians add $7, all others outside the U.S. add $35) Item code: MEMB1. Call for multiple year membership rates.

Name

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City    ST    ZIP

Email

Phone

☑ Check enclosed (payable to Life Extension Foundation®)

☑ Charge my cc:

Card #       Exp.
A high percentage of men will endure some form of prostate-induced discomfort over the course of their lifetimes.²

A placebo-controlled, double-blind trial presented September 2013 reported that a specific blend of **pomegranate**, **green tea**, **turmeric**, and **broccoli**—formulated together in a capsule called **Pomi-T™**—powerfully maintained healthy levels of prostate specific antigen (PSA)³

Life Extension⁴ now offers this same capsule for men who are serious about supporting and protecting their prostate as they age—by targeting PSA. The four foods in **Pomi-T™** have healthful benefits for your entire body. But their constituent molecules, naturally present in food, have now been shown to concentrate within prostate tissue and provide a rich array of complementary, prostate-supporting, **PSA-modulating** mechanisms.⁵-¹⁹

**Target PSA!**

*Breakthrough Research*

**POMEGRANATE**
- Specifically concentrates in prostate tissue³
- Supports healthy *apoptosis*, your body’s system of removing senescent cells when needed⁶-⁷
- Promotes healthy levels of inflammatory response, inhibits androgen receptor expression, and inhibits abnormal cell migration,⁸-¹⁰

**GREEN TEA**
- *EGCG*, a green tea catechin, specifically concentrates in prostate tissue where it regulates PSA (prostate specific antigen) production to maintain healthy PSA levels¹⁰-¹²
- Helps modulate genetic expression and activity of androgen receptors¹¹
- Supports body’s natural defenses against oxidation.¹²

**TURMERIC**
- Promotes a healthy level of inflammatory response, chiefly due to its main component, *curcumin¹³*
- Helps modulate cell signaling mechanisms, inhibiting abnormal cell adhesion and migration.¹⁴
- Promotes healthy cell proliferation and apoptosis.¹⁵

**BROCCOLI**
- Helps regulate enzymes (*phase II detoxifying enzymes*) in gut and liver tissue that helps render harmful dietary molecules harmless¹⁶
- Helps promote healthy PSA levels¹⁷
- Supports regulation of cell growth and transcription factors and normal production of apoptosis-inducing proteins¹⁸-¹⁹

The novel and scientifically validated blend of food in **Pomi-T™** represents the *next generation* of targeted support for the aging prostate!

**NEW**

*Four-Food Formula*

The suggested daily dosage of two vegetarian capsules of **Pomi-T™** provides:

**Pomi-T™ Super Foods Proprietary Blend** 960 mg
- Broccoli (florets and stalks) powder, Turmeric (root) powder
- Pomegranate (whole fruit) powder, and Green Tea (leaf) extract 5:1

A bottle of 60 vegetarian capsules of **Pomi-T™** retails for $33.33. Members of the Life Extension Foundation pay only **$22.50** per bottle during **Super Sale**.

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

---

**References**

ARE YOU TAKING THE OPTIMAL FORMS OF VITAMIN E?

According to the Proceedings of the National Academy of Sciences, alpha tocopherol (vitamin E) displaces critically important gamma tocopherol in the cells. While alpha tocopherol inhibits free-radical production, gamma tocopherol is required to trap and neutralize existing free radicals.

Prestigious scientific journals have highlighted gamma tocopherol as one of the most critically important forms of tocopherols, which includes d-alpha tocopherol (natural vitamin E) for those seeking optimal health benefits.

Most commercial vitamin E supplements contain little, if any, gamma tocopherol. They instead rely on alpha tocopherol as the primary ingredient. However, it is gamma tocopherol (not the alpha form) that quenches peroxynitrite, the free radical that plays a major role in the development of age-related decline.

SESAME LIGNANS:
THE NATURAL VITAMIN E BOOSTER

Life Extension® has uncovered research suggesting that adding sesame lignans to gamma tocopherol may significantly enhance its beneficial effects. Sesame and its lignans have been shown to boost antioxidant levels and help maintain already-normal blood pressure.

In a human study that combined gamma tocopherol with sesame lignans, gamma tocopherol/sesame was 25% more effective than gamma tocopherol/tocotrienols in suppressing tissue measurements for free-radical and inflammatory damage. Since tocotrienols are considered nature's most potent antioxidants, the fact that low-cost gamma tocopherol with sesame is more effective is a remarkable finding.

Life Extension fortified the popular Gamma E Tocopherol supplement with standardized sesame lignans extract long ago. Consumers thus obtain superior benefits at a much lower cost.

WORLD’S MOST COMPREHENSIVE VITAMIN E FORMULA!

The Gamma E Tocopherol with Sesame Lignans formula provides potent doses of critically important gamma tocopherol along with sesame lignans to augment its antioxidant effects. Suggested dose is one softgel once or twice daily.

The retail price for 60 softgels of Gamma E Tocopherol with Sesame Lignans is $32. If a member buys four bottles during Super Sale, the price is reduced to only $19.58 per bottle.

Contains soybeans.
Antioxidant Vitamins & Cancer. Some scientific evidence suggests that consumption of antioxidant vitamins may reduce the risk of certain forms of cancer. However, the FDA does not endorse this claim because this evidence is limited and not conclusive.

NOTE: Those taking Super Booster do not usually require additional gamma tocopherol.

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

References

Contains soybeans.
Antioxidant Vitamins & Cancer. Some scientific evidence suggests that consumption of antioxidant vitamins may reduce the risk of certain forms of cancer. However, the FDA does not endorse this claim because this evidence is limited and not conclusive.

NOTE: Those taking Super Booster do not usually require additional gamma tocopherol.

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

References

To order Gamma E Tocopherol with Sesame Lignans, call 1-800-544-4440 or visit 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.
The retail price for a bottle containing 90 softgels is $30. If a member buys four bottles during Super Sale, the price is reduced to $18.23 per bottle. Since each bottle lasts for three months, members pay as little as $6.08 a month for this high-potency blend of all three active forms of vitamin K during the Super Sale. (The same Super K formula consisting of Vitamin K1, K2 (MK-4) and K2 (MK-7) can be found in the Life Extension® Super Booster. If you take the Super Booster, you do not need additional Super K with Advanced K2 Complex softgels.)

Warning to Coumadin® (warfarin) Drug Users
Patients prescribed vitamin K-antagonist anti-coagulant prescription drugs like warfarin should consult their physician before taking vitamin K supplements like Super K and Super Booster. There is evidence, however, that users of drugs like warfarin could benefit from a consistent low dose of supplemental vitamin K. Ask your doctor if you can take a low dose (45 mcg a day) of vitamin K2 in the long-acting MK-7 form for the purpose of stabilizing your INR levels and also protecting your body against long-term vitamin K deficit. Do not initiate any form of vitamin K supplementation without full cooperation of your treating doctor, as your doctor may need to increase your dose of warfarin to compensate for the vitamin K you supplement with. Life Extension provides several forms of low-dose vitamin K for physician consideration.

There are three forms of vitamin K that the human body can utilize to promote arterial health and bone support.1-8 Life Extension®’s Super K with Advanced K2 Complex provides the dynamic trio of vitamin K forms in one softgel, including vitamin K1, vitamin K2 (MK-4), and vitamin K2 (MK-7).

VITAMIN K1 is the form of vitamin K that is found in green vegetables. K1 is tightly bound to plant fiber, so only a fraction is absorbed into the bloodstream. Supplementation ensures ample K1 blood levels. VITAMIN K2 is usually found in meats, dairy, and egg yolks. Since you may be avoiding these foods for health reasons, ingesting a K2 supplement is essential. MK-4 is the most rapidly absorbed form of K2, and MK-7 boasts a very long half-life in the body, making both forms the perfect complement to any vitamin K regimen.9

Super K formula provides in just one daily softgel:

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin K2 (MK-7)</td>
<td>200 mcg</td>
</tr>
<tr>
<td>Vitamin K2 (MK-4)</td>
<td>1000 mcg</td>
</tr>
<tr>
<td>Vitamin K1</td>
<td>1000 mcg</td>
</tr>
</tbody>
</table>

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To order Super K with Advanced K2 Complex or Super Booster, call 1-800-544-4440 or visit www.LifeExtension.com

References
Your brain is under constant onslaught from environmental and stress-related challenges, as well as normal aging processes.\textsuperscript{1,2} Fortunately, our brain cells have built-in, \textit{self-healing} systems that provide natural defenses against these ongoing threats.\textsuperscript{1} Even more remarkable, molecular science is revealing that the human brain has the capacity to \textit{preserve} the neurons involved in brain remodeling (plasticity).\textsuperscript{3}

Scientists in China and Singapore have found that \textit{gastrodin}, a compound typically derived from a traditional Chinese orchid (\textit{Gastrodia elata}), provides powerful support for the brain's normal defenses and regenerative mechanisms.\textsuperscript{4,5}

To make these benefits available to members, \textit{Life Extension\textsuperscript{®}} introduces \textit{Brain Shield\textsuperscript{™}}, providing 300 mg of \textit{gastrodin} in each capsule for maximum brain support.

\textbf{MULTI-FACTORIAL BENEFITS!}

Recent studies confirm that the \textit{gastrodin} in \textit{Brain Shield\textsuperscript{™}} is one of the most powerful compounds for supporting healthy brain function at any age! \textit{Gastrodin} works by the following mechanisms:

- To retain normal function, the aging brain relies on adequate \textit{blood flow} to get sufficient oxygen and fuel.\textsuperscript{1} It has been repeatedly shown that formulas containing \textit{gastrodin} beneficially support normal, healthy levels of brain blood flow in both animals and in humans.\textsuperscript{4,5}

- The body maintains a delicate balance of \textit{neurotransmitters}, such as GABA, which is of tremendous importance to healthy brain function. Studies show that alone or in combination the active compounds in \textit{gastrodin} help maintain healthy levels of vital neurotransmitters in those whose levels are already within the normal range.\textsuperscript{6-10}

- With aging, short-term \textit{memory} function is often impaired. Studies show that \textit{gastrodin} and its active constituents help support the healthy body's normal defenses against the mild memory problems associated with aging.\textsuperscript{12}

- Scientists have shown that the breakdown metabolites of \textit{gastrodin} help provide support against the normal stress and tension of daily life.\textsuperscript{13,14}

- And \textit{Brain Shield\textsuperscript{™}} helps alleviate the occasional \textit{cranial pain} associated with daily life.\textsuperscript{15}

**Brain Shield**\textsuperscript{™} supports healthy cognitive and circulatory function in aging individuals.

Those seeking maximum benefit should start with one 300 mg capsule of \textit{Brain Shield\textsuperscript{™}} taken twice daily.\textsuperscript{35} After thirty days, one \textit{Brain Shield\textsuperscript{™}} (gastrodin) capsule daily may be sufficient based upon the experience of gastrodin as an over-the-counter (OTC) pharmaceutical agent. Those taking Cognitex\textsuperscript{®} are obtaining 50 mg of gastrodin in the daily dose along with complementary nutrients. As additional research continues on gastrodin, better clarification on optimal dosing for a wide range of neurovascular and neu-inflammatory conditions should be available.

A bottle of 60 300 mg vegetarian capsules of \textit{Brain Shield\textsuperscript{™}} retails for $20.25 per bottle. If a member buys four bottles during Super Sale, the price is reduced to $20.25 per bottle.

To order \textit{Life Extension\textsuperscript{®}} \textit{Brain Shield\textsuperscript{™}}, call 1-800-544-4440 or visit www.LifeExtension.com

References


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.
7 WIN THE BATTLE AGAINST HIGH BLOOD SUGAR
Excess glucose increases risks of cancer, obesity, dementia, and vascular disease. A low-cost triple action program has been developed to counteract the underlying factors behind today’s epidemic of excess blood sugar.

50 HOW CALORIE RESTRICTION SLOWS GENETIC AGING
Studies now indicate that the CR Way approach to calorie restriction activates genes that are specifically associated with longevity and disease prevention.

68 NATURAL COMPOUNDS BLOCK INFLAMMATORY PATHWAYS
Scientists have identified three compounds—curcumin, ginger, and turmeric oil—that powerfully inhibit the multiple underlying factors behind inflammation.

40 MODULATING APPETITE HORMONES TO BLOCK FOOD CRAVINGS
Groundbreaking human studies demonstrate that the Italian Lamon variety of Borlotto bean modulates appetite hormones, such as ghrelin, to reduce hunger signals and facilitate body fat loss.

58 OVERCOME FATIGUE WITHOUT STIMULANTS
You can safely boost energy at the cellular level by increasing your ATP energy storehouse without jittery side effects.

82 BRAIN TUMOR TREATMENT BREAKTHROUGH
A study in the New England Journal of Medicine may represent the most significant advance yet discovered in delaying the progression of glioblastoma multiforme.