A PRESCRIPTION DRUG VIRTUALLY EVERYONE NEEDS

REMARKABLE REVERSAL of BRAIN AGING!

Doctors Overlook Leading Cause of Premature Death

Proven Methods Slash Elevated Glucose
Suppress Inflammatory Joint Damage

PLUS-
Low-carb Diet Slows Tumor Growth
Aspirin Slashes Hereditary Cancer Risk
Fish Oil Reduces Prostate Cell Proliferation
The annual **SUPER SALE** enables members to obtain premium grade supplements at prices substantially below what commercial companies charge.

When members buy products from the Life Extension Foundation Buyers Club, they know that the quality of the products are backed by the organization’s commitment to achieving an indefinitely extended life span. What follows are a few examples of the savings members enjoy during the **SUPER SALE**.

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Retail</th>
<th>Discount Price Per Bottle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super Omega-3 EPA/DHA with Sesame Lignans &amp; Olive Fruit Extract, 120 softgels, Item # 01482</td>
<td>$32</td>
<td>$16.81 (ten-bottle purchase)</td>
</tr>
<tr>
<td>Super-refined EPA/DHA fish oil plus sesame lignans and potent olive fruit extract to provide critical omega-3 fatty acids and essential components of the Mediterranean diet</td>
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</tr>
<tr>
<td>PQQ Caps with BioPQQ™, 10 mg, 30 vegetarian capsules, Item # 01500</td>
<td>$24</td>
<td>$14.85 (four-bottle purchase)</td>
</tr>
<tr>
<td>Promotes mitochondrial biogenesis (generation of new mitochondria) in aging cells.</td>
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</tr>
<tr>
<td>Bone Restore, 150 capsules, Item # 01611</td>
<td>$22.50</td>
<td>$13.16 (four-bottle purchase)</td>
</tr>
<tr>
<td>Highly absorbable forms of calcium combined with other critical bone protecting nutrients.</td>
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</tr>
<tr>
<td>Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™, 100 mg, 60 softgels, Item # 01426</td>
<td>$62</td>
<td>$35.10 (ten-bottle purchase)</td>
</tr>
<tr>
<td>The superior ubiquinol form of CoQ10 plus an organic compound (shilajit) shown to double mitochondrial CoQ10 levels.</td>
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<td></td>
</tr>
<tr>
<td>ArthroMax™ Advanced with UC-II® and AprèsFlex™, 60 capsules, Item # 01618</td>
<td>$36</td>
<td>$21.60 (four-bottle purchase)</td>
</tr>
<tr>
<td>Promotes joint health with two new active ingredients.</td>
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</tr>
<tr>
<td>Super Bio-Curcumin®, 60 vegetarian capsules, Item # 00407</td>
<td>$38</td>
<td>$23.63</td>
</tr>
<tr>
<td>Super-absorbable formulation promotes healthy DNA. Absorbs six times greater than conventional curcumin.</td>
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</tr>
<tr>
<td>Ultra Natural Prostate Formula with AprèsFlex™ &amp; Standardized Lignans, 60 softgels, Item # 01695</td>
<td>$38</td>
<td>$21.60 (twelve-bottle purchase)</td>
</tr>
<tr>
<td>Improve prostate protection with AprèsFlex™ that helps suppress 5-LOX.</td>
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<tr>
<td>Super Zeaxanthin with Lutein, Meso-Zeaxanthin Plus Astaxanthin and C3G, 60 softgels, Item # 01586</td>
<td>$42</td>
<td>$25.65 (four-bottle purchase)</td>
</tr>
<tr>
<td>Supports night vision and macular density.</td>
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<tr>
<td>Life Extension Mix™, 315 tablets, Item # 01655</td>
<td>$98</td>
<td>$46.91 (ten-bottle purchase)</td>
</tr>
<tr>
<td>High-potency multi-nutrient formula now with potent anthocyanins from maqui berry and proanthocyanins from tart cherry at no extra cost.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Super Booster Softgels with Advanced K2 Complex, 60 softgels, Item # 01590</td>
<td>$42</td>
<td>$25.65 (four-bottle purchase)</td>
</tr>
<tr>
<td>A convenient one-per-day softgel that includes optimal potencies of gamma-tocopherol, sesame lignans, lycopene, lutein, ginkgo, selenium, and both forms of vitamin K2.</td>
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</tr>
</tbody>
</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.

The **SUPER SALE** extends to January 31, 2012. Members traditionally take advantage of the **SUPER SALE** to stock up on a year’s supply of their favorite supplements. To place your order, call 1-800-544-4440 or visit www.lef.org (**SUPER SALE** pricing available only to members in the US, Canada, and England.)
7 DOCTORS OVERLOOK LEADING CAUSE OF PREMATURE DEATH

Despite a virtual mountain of scientific data showing the lethal dangers of high blood sugar, mainstream doctors are allowing their patients to needlessly suffer and die. It is not just elevated fasting glucose that leads to diabetic complications in non-diabetics. Startling findings reveal excess after-meal glucose surges inflict frightening damage throughout the body and are involved in the leading causes of death in America.

21 IN THE NEWS

Resveratrol mimics calorie restriction in clinical trial; whey protein prevents muscle loss in dieting older women; fish oil reduces prostate cancer growth; and more.

91 SUPERFOODS: CELEBRATE CILANTRO

From digestive aid and anti-inflammatory to antibacterial and glucose control weapon, cilantro and its seed coriander should become a regular part of your dietary regimen.
There’s no debating the power of omega-3 fatty acids. From support for heart health and brain function to help with inflammation, their broad-spectrum benefits have been firmly established in a wealth of studies.1-9

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

Sesame Lignans and Standardized Olive Fruit Extract for Enhanced Benefits

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

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

Olives also contain the compounds hydroxytyrosol, tyrosol, and oleuropein. Together these nutrients counter the action of free radicals, delay aging in specialized skin cells, prevent undesirable LDL oxidation, and help maintain normal platelet activation.12-15

Super Omega-3 supplies the equivalent content of 6 ounces of extra virgin olive oil. Take two softgels twice daily with meals.

A bottle containing 120 softgels of Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract retails for $32. If a member buys four bottles during Super Sale, the price is reduced to just $18.90 per bottle. If 10 bottles are purchased during Super Sale, the cost is just $16.81 per bottle. (Item #01482)

Introducing a SMALLER SOFTGEL for easier swallowing!

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

A bottle containing 240 half-size softgels of Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract retails for $32. If a member buys four bottles during Super Sale, the price is reduced to just $18.90 per bottle. If 10 bottles are purchased during Super Sale, the cost is just $16.81 per bottle. (Item #01619)

For those with sensitive stomachs, Super Omega-3 is also available with enteric coating and retails for $34. If a member buys four bottles, the price is reduced to $20.93 per bottle. If 10 bottles are purchased during Super Sale, the cost is just $18.90 per bottle. (Item #01484)

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

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

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

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.

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

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Jonathan V. Wright, MD, is medical director of the Tahoma Clinic in Renton, WA. He received his MD from the University of Michigan and has taught natural biochemical medical treatments since 1983. Dr. Wright pioneered the use of bioidentical estrogens and DHEA in daily medical practice. He has authored 11 books and publishes Nutrition and Healing, a monthly newsletter with a worldwide circulation of more than 100,000.
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.1

Combining CoQ10 and shilajit produced a 56% increase in energy production in the brain, and in muscle there was a 144% increase in energy production.2

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

Shilajit boosts CoQ10’s beneficial effects by stabilizing CoQ10 in the superior ubiquinol form, which prolongs its action at the cellular level.1,4 Additionally, shilajit facilitates the more efficient delivery of CoQ10 into the mitochondria, which results in enhanced cellular energy.2,5,9

Shilajit helps the mitochondria convert fats and sugars into the body’s main source of energy, ATP (adenosine triphosphate).5,9

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

**Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™**

The retail price for 60 100 mg softgels of Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™ is $62. If a member buys four bottles during Super Sale, the price is reduced to $37.80 per bottle. Item # 01426

The retail price for 100 50 mg softgels of Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™ is $58. If a member buys four bottles during Super Sale, the price is reduced to $35.78 per bottle. Item # 01425

The retail price for 30 200 mg softgels of Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™ is $62. If a member buys four bottles during Super Sale, the price is reduced to $37.80 per bottle. Item # 01431

**References:**

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Doctors Overlook Leading Cause of Premature Death

BY WILLIAM FALOON

Diabetes is defined as a disease in which a person has high blood sugar.

The problem is that physicians are failing to determine how low blood glucose needs to be to protect against dreaded diabetic complications.

In a series of published studies, the definition of what constitutes diabetes, (or said differently, a person with high blood sugar) is about to be turned upside down.

This is not a trivial matter. The term “diabetic complications” encompasses the most common diseases of aging, ranging from kidney failure and blindness, to heart disease, stroke, neuropathy, and even cancer. This means that most degenerative disease can be traced back to undiagnosed glucose control problems, which we assert will soon become the new definition of diabetes.

High blood sugar appears to be the leading killer today, yet the medical mainstream is not properly diagnosing or treating it. The tragic result is an epidemic of diabetic complications that cripple and kill millions of Americans because simple steps are not being taken to suppress after-meal glucose spikes.

As you are about to learn, it is not just elevated fasting glucose that creates diabetic complications. Excess after-meal glucose surges have turned into a silent diabetes plague, thus mandating new steps be taken to protect against what may be the leading cause of premature death.
Fasting Glucose Is a Delayed Marker of Diabetes

When people take blood tests to measure glucose levels, they are asked to fast for 8 to 12 hours. Doctors ask for this 8-12 hour fast because they want a consistent baseline to measure glucose and lipids in comparison with the general population.

There is one problem with this. A person who suffers from dangerously high blood sugar several hours following a typical meal may artificially drop their fasting glucose to a safe range after fasting 8 or more hours. A person’s ability to clear their blood of excess glucose 8-12 hours after eating may persist for decades, thus masking what may be a dangerous postprandial (after-meal) spike in glucose.

Even tests that measure long-term glycemic control like hemoglobin A1c may not adequately detect these post-meal glucose surges. This means that many of us spend a part of our day in an acute diabetic state. The lethal impact of these multi-hour glucose surges is just now being understood. As you will read, diabetic complications can develop years or even decades before full-blown type 2 diabetes is diagnosed.

Consequences of Post-meal Glucose Surges

What happens in your blood during the first several hours after ingesting a high-carbohydrate meal has a lot to do with your risk of acquiring diabetic complications, even if you have not yet developed diabetes (as defined today).

Glucose levels naturally rise in your blood after a high-carbohydrate meal and if you are healthy, glucose will quickly drop back to pre-meal ranges. If glucose rises too much and stays elevated too long, however, a tremendous amount of tissue damage is inflicted.23-27

Diabetics have sharply higher rates of heart attacks compared to non-diabetics.28-30 Yet even in many not considered diabetic, heart attack rates are 40% higher when fasting glucose levels are above 85 mg/dL.31 In a study where after-meal glucose spikes were impeded, heart attacks rates dropped an astounding 91%.32 Even when someone suffers a heart attack, the amount of damage to the heart muscle is significantly reduced when steps are taken ahead of time to reduce post-meal glucose surges.32-36

The Honolulu Heart Program found that the risk of coronary artery disease correlated with glucose levels measured one hour after a 50-gram oral glucose load. The incidence of coronary artery disease was twice as high in patients with postprandial glucose levels between 157 and 189 mg/dL compared to those with levels under 144 mg/dL.37 Another study showed the incidence of sudden death was doubled with postprandial glucose levels of 225 mg/dL or higher.38

The Whitehall Study of British male civil servants showed that blood glucose levels of 96 mg/dL or higher two hours after a meal were associated with a two-fold increase in mortality from coronary artery disease.39
Another British study, the Islington Diabetes Survey, reported that the incidence of major coronary artery disease was 17% in subjects with impaired glucose tolerance, typically defined as 2-hour postprandial glucose levels of 140-199 mg/dL, compared with 9% in subjects with normal glucose tolerance.40 The Oslo Study indicated that risk of fatal stroke in diabetic patients increased by 13% for each 18 mg/dL elevation in postprandial glucose.41

These studies consistently show sharply higher vascular disease in those with higher postprandial (after-meal) glucose spikes.

**Diabetic Complications Seen in Non-diabetics**

Peripheral neuropathy involves burning, tingling, and loss of sensation, usually of the lower extremities. It is a common diabetic complication that if left unchecked can result in gangrene that requires amputation to save the patient's life.42,43

A study showed that many non-diabetics whose glucose elevates to 140 mg/dL or higher after an oral glucose tolerance test suffered the same type of neuropathy as seen in full-blown diabetics. These patients' fasting glucose and hemoglobin A1c levels were not high, but if their blood glucose levels remained above 140 mg/dL two hours after ingesting 75 grams of pure glucose (a glucose tolerance test), there was a sudden and significant increase in incidence of diabetic neuropathy signs and symptoms.44

Another study found that 56% of neuropathy patients had glucose tolerance levels that fell in the prediabetic range, and these individuals suffered damage to their small nerve fibers.45 It has been anecdotally reported that neuropathic pain in the feet of patients worsens when glucose levels exceed 140 mg/dL and diminish when glucose is dropped below this range.44,46

Retinopathy occurs when high blood sugar damages tiny blood vessels in the retina of the eye. It is one of the most feared diabetic complications as it can lead to blindness. The American Diabetes Association thought that retinopathy did not occur until a glucose tolerance test showed glucose levels well over 200 mg/dL after two hours. However, in a large population study, one out of every twelve people with pre-diabetes showed signs of retinopathic changes occurring in their eyes. This study classified pre-diabetes as fasting glucose between 100-125 mg/dL or two-hour glucose tolerance readings between 150-199 mg/dL. These findings show that postmeal glucose spikes over 150 mg/dL are associated with tiny blood vessel changes that lead to diabetic retinopathy.4

Diabetics have higher rates of cancer that have been attributed to higher blood sugar and insulin levels.47-49 When glucose is elevated, the pancreas secretes excess insulin in an attempt to normalize it. Higher insulin levels are believed to stimulate cancer cell proliferation. A study that tracked 10,000 people for 10 years showed substantial increase in cancer in those with fasting glucose over 110 mg/dL or two-hour postprandial glucose levels over 160 mg/dL.50

Excess glucose also increases triglyceride levels, another vascular risk factor.51 Certain drugs like metformin that lower glucose and insulin also reduce artery-clogging triglycerides.52,53

These and other studies demonstrate that those who are unable to control their glucose peaks are prone to suffer diabetic complications. All of this confirms what Life Extension previously published about the urgent need to protect against after-meal surges of glucose, insulin, and triglycerides.

Clearly, the body does not like to be inundated with after-meal glucose spikes, yet too many Americans suffer from excess postprandial glucose throughout most of the day, and their doctors are not paying attention to the lethal risks this poses.

Not only do glucose spikes acutely damage tissues, but they unfavorably alter gene expression in a way that may accelerate aging processes.34,55 This is one reason why calorie restriction has yielded such robust extensions in life span, along with sharply lower risks of degenerative diseases. Fortunately, there are several proven ways to curb after-meal glucose spikes that do not require severe calorie restriction.
High Glucose Destroys Insulin-producing Cells

Not only do after-meal glucose surges create lethal diabetic complications, but they directly cause the destruction of the insulin-producing beta cells in the pancreas. Once enough beta cells die, there is insufficient insulin to control blood glucose levels. It is usually at this time of spiraling fasting glucose levels that full-blown type 2 diabetes is diagnosed...sometimes decades after high blood sugar has already damaged every tissue in the body.56,57

Beta cells secrete insulin in response to increases in blood glucose. Unfortunately, beta cells are quite sensitive to even slight increases in blood sugar. There is evidence of beta cell dysfunction when glucose levels stay over 100 mg/dL for more than a few hours.58

When analyzing this data further, scientists found that even small incremental increases in glucose over a two-hour period result in detectable beta cell failure. This study showed that more beta cells fail as a person's blood sugar rose even within the so-called “normal range.”58

Another study showed that beta cells start to die off when fasting glucose is over 110 mg/dL—a level that many doctors tell their patients not to worry about.59 This study indicates that people are killing off their vital insulin-producing beta cells by allowing glucose to spike too high after meals. Once enough beta cells have died, people become insulin-dependent diabetics with markedly shortened life spans. As we now know, when someone has fasting glucose over 110, it means they usually spend several hours after meals with sharply higher glucose levels.

Laboratory studies show that prolonged exposure to high sugar levels destroys beta cells. When these beta cells are removed from high-sugar mediums, they can recover, but only if they were removed before a certain amount of time had passed.60,61

A huge portion of the population spends most of their day with glucose levels above those shown to injure or kill insulin-secreting beta cells. This explains how high blood sugar is in itself a direct cause of the destruction of beta cells needed for insulin production. It used to be thought that beta cells “burned out” because they were forced to overproduce insulin to suppress high blood sugar levels. We now know that high blood sugar itself is killing vital beta cells.

Said differently, many type 2 diabetes cases are not caused because of insufficient insulin production. Instead, high blood sugar destroys beta cells, thus causing chronically elevated blood sugar (because of insufficient insulin secretion) that is eventually diagnosed as type 2 diabetes. The obvious solution is to keep after-meal glucose levels suppressed so beta cells don’t die!

A New Definition of Diabetes

Diabetes should be re-defined as “a disease in which a person has acute blood sugar spikes and/or chronically elevated blood sugar levels high enough to increase disease risk.”

The definition could be elaborated to include anyone with fasting glucose above 85 mg/dL and/or a 75-gram oral glucose tolerance test load that shows a rise from fasting glucose greater than 40 mg/dL after two hours. What this means is that if a person’s fasting glucose is 80 mg/dL, and their postprandial level is higher than 120 mg/dL two hours after a glucose tolerance test, they have less-than-optimal glycemic control that should be treated.

The upper-limit number for after-meal glucose (120 mg/dL) in the preceding paragraph reflects ranges sought in people who practice calorie restriction. Others may argue that glucose-suppressing treatment should not be initiated until glucose readings are over 140 mg/dL two hours after an oral glucose challenge.21 This higher upper limit after-meal glucose level (140 mg/dL) is more practical for most aging humans to strive for.
Yet as people age, and pay closer attention to their diets, they still often suffer after-meal glucose surges that result in their bloodstreams being bloated with too much glucose for too many hours. This is caused by a variety of factors, including reduced insulin sensitivity that disables the ability of muscle cells to remove surplus glucose from blood for conversion to energy.

There are other reasons, however, why certain individuals have not been able to reduce their glucose to safe ranges. The Hidden Causes of Glucose Overload

A lesser-known cause of glucose overload is that glucose stored in the body's tissues (primarily the liver) is inappropriately released into the bloodstream. This pathological release of glucose occurs even though there is plenty of sugar in the blood from a meal that was just eaten.

In those with healthy metabolisms, the liver stores glucose (as glycogen) and only releases enough to maintain a constant blood sugar level. It is advantageous for all aging individuals to strive for fasting glucose levels below 86 mg/dL, which may not be feasible in everyone, as some of us are predisposed to higher glucose levels despite aggressive interventions.

In any case, aging humans should view every meal (especially those high in carbohydrates) as a direct threat to their health and longevity. Proven methods should thus be implemented prior to all large meals to blunt postprandial glucose surges. This includes inhibiting amylase and glucosidase enzymes to impede absorption of glucose into the bloodstream, along with special fibers that delay emptying of food into the small intestine where rapid absorption of glucose from carbohydrate foods occurs.

Nutrients, hormones, and drugs (already used by many Life Extension members) improve insulin sensitivity, which facilitates more efficient removal of glucose from the blood.

Despite impeding glucose absorption and improving cellular glucose utilization, too many health-conscious members are not adequately controlling their blood glucose levels.

The good news is that a standardized green coffee bean extract has demonstrated robust after-meal reductions in glucose spikes and functions via novel mechanisms not previously available.

Why Do Aging People Have Too Much Glucose?

We know that overconsumption of calories (especially refined carbohydrates) will acutely spike blood glucose and can eventually result in chronically elevated fasting glucose, which is how diabetes is defined today.

How Excess After-Meal Glucose Causes Vascular Damage

Below are three specific mechanisms by which elevated postprandial glucose inflicts damage to our arteries, which subsequently increases risk of stroke, heart attack, kidney failure and other diabetic complications:

1. Endothelial dysfunction. A consequence of postprandial hyperglycemia is activation of protein kinase C in the endothelium which increases adhesion molecules that facilitate leukocyte uptake into the blood vessel wall. Hyperglycemia also increases expression of the vasoconstrictor endothelin; and induces platelet aggregation, all of which causes or accelerates atherosclerosis.

2. Hypercoagulability. Excess postprandial plasma glucose levels increase hypercoagulability resulting from increased thrombin production and decreased fibrinogen breakdown. These, in turn, result from the overproduction of plasminogen activator inhibitor, which directly inhibits tissue plasminogen activator activity. This sets the stage for an abnormal blood clot forming in an artery that can cause acute heart attack or stroke. Hypercoagulability also facilitates progression of atherosclerotic plaque. Control of postprandial hyperglycemia reverses this hypercoagulable state.

3. Glycation. High postprandial glucose levels result in vascular protein and lipid glycation. Glycated LDL particles are more easily oxidized and taken up by macrophages through the scavenger receptor. This leads to higher foam cell production, and, ultimately, atherosclerotic plaque. The formation of advanced glycation end products in the collagen of the vessel wall directly accelerates the atherosclerotic process.

These mechanisms clearly show the devastating consequences of high blood sugar on the vascular system.
The significance of this process is that it explains how the body can break down any food (protein, fat or carbohydrate) into glucose. *Gluconeogenesis* is what causes some people to have high blood sugar even though they follow a “low-carb” diet.

Elevated *glucose-6-phosphatase* prompts the release and creation of new glucose into the blood, whether or not you consume any carbohydrate calories. This twin phenomenon of *glycogenolysis* (release of stored glucose) and *gluconeogenesis* (creation of new glucose) explains why so many aging people suffer high blood sugar levels.

For some people, even if they follow reduced-calorie diets, their bodies may still create too much glucose internally due to excess *glucose-6-phosphatase*. To understand why excess *glucose-6-phosphatase* is so deadly, aging people barely have the capacity to safely metabolize the calories they ingest throughout the day. As the body creates and releases too much glucose in the presence of excess *glucose-6-phosphatase*, each additional calorie can add to glucose spikes. So when a meal is consumed, glucose flows into the bloodstream. This in turn causes total blood glucose levels to skyrocket not just from the ingested carbohydrates, but also through the twin processes of *gluconeogenesis* and *glycogenolysis*. Blood sugar levels can then remain elevated for most of the day.

**Green Coffee Bean Extract Suppresses Glucose-6-Phosphatase**

A number of population studies identified coffee drinkers (who drank at least five cups a day) as being substantially less likely to get type 2 diabetes.88

Further research has suggested the compound responsible for this beneficial action on glucose metabolism is *chlorogenic acid* that is found abundantly in raw coffee beans.
What **chlorogenic acid** does is inhibit the enzyme **glucose-6-phosphatase**, which reduces the **release** and **creation** of excess glucose in the body.\(^{89,90}\) This unique dual property of **chlorogenic acid** provides a powerful new weapon in our quest to attain optimal fasting and postprandial glucose levels.

In a clinical trial of 56 subjects, 100 grams of glucose was given as an oral glucose challenge test. Study subjects were given escalating doses of **standardized green coffee bean extract** to measure its ability to reduce the postprandial glucose surge. At a dose of 400 mg of **green coffee bean extract**, there was a remarkable **32% reduction** in the postprandial glucose surge.\(^{82}\) This translates into someone who normally suffers a dangerous postprandial blood glucose surge of 160 mg/dL reducing it to a safe **109 mg/dL**.

An article in this month’s issue describes the multi-faceted benefits of **green coffee berry extract** standardized for **chlorogenic acid**. If all it did was suppress after-meal glucose spikes, it would be well worth considering for anyone who has not been able to achieve optimal glucose control. Like so many other natural polyphenols, **chlorogenic acid** has demonstrated a wide range of additional protective properties.\(^{91-95}\)

### Mitigating the Oxidative Flame-thrower

A common complaint amongst newly-diagnosed diabetics is why so many complications develop so quickly. What they fail to understand is their delicate tissues may have been under assault from **after-meal glucose surges** for decades before full-blown **type 2 diabetes** was diagnosed.

In the presence of excess glucose, tissues of the body undergo a hyper-oxidation effect analogous to being torched with a military flame-thrower.

While antioxidants can suppress some of the oxidative flame, it is critical to block the underlying catalysts, which are the **high blood sugar** levels so many aging individuals suffer after every heavy meal.

Scientific studies substantiate that acute damage occurs during **after-meal glucose spikes**, yet mainstream medicine continues to ignore this deadly phenomenon. On page 80 of this issue is an article about nutrients, hormones, and drugs that can help safely suppress fasting and postprandial glucose levels.

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Life Extension members take advantage of the annual **Super Sale** to acquire our most up-to-date nutrient formulations at **extra-discounted** prices.

Virtually every year, we upgrade our formulas to provide even more effective health-sustaining nutrients.

Last year we introduced **PQQ** (pyrroloquinoline quinone) to induce the creation of new mitochondria in aging cells.\(^{96}\) **PQQ** became an overnight blockbuster as **Life Extension** members were astutely aware of the critical importance that healthy mitochondria play in forestalling aging processes. Mitochondrial **insufficiency**, in fact, is involved in the...
promotion of type 2 diabetes via its debilitating effects on cellular glucose utilization.  

In this month’s issue, you’ll discover a missing link that causes aging people to suffer acute post-meal glucose surges that trigger common age-related disorders. The good news is that most of you have been taking steps to shield your bloodstream against these acute glucose spikes. With the introduction of low-cost green coffee bean extract, aging humans can exert greater control over their blood glucose levels than ever before.

**Save Money While Supporting Research**

Every time you purchase a Life Extension product, you contribute to research aimed at extending healthy human life span. The Life Extension Foundation\(^*\) continues to fund a record number of scientific projects, while battling incompetent bureaucrats who seek to suffocate medical innovation.

During the traditional winter Super Sale, all Life Extension formulas are discounted so that members can obtain up-to-date versions at the lowest prices of the year.

Until January 31, 2012, members take advantage of Super Sale discounts to stock up on cutting-edge formulas designed to circumvent the underlying mechanisms of aging.

For longer life,

William Faloon

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**References**

Brain degeneration affects all aging adults. Enhancing communication between neurons may hold the key to maintaining youthful cognition and memory.

Cognitex® provides nine cutting-edge brain boosting ingredients in one exciting formula! Uridine-5'-monophosphate (UMP) is a compound naturally found in the milk of nursing mothers and is essential to humans when their brains are the youngest. UMP also supports superior cognitive function in aging adults and is included in Cognitex®.

To bolster UMP’s impact on brain function, Cognitex® contains Sharp-PS® GOLD to promote normal neuronal cell membrane activities and structure. With this structure in place, vinpocetine enhances circulation and oxygenation of brain cells while phospholipid-grape seed extract improves blood vessel tone and elasticity, thus boosting oxygen flow to the brain.

Wild blueberry extract is included to protect against free-radical damage, and pregnenolone has shown beneficial properties as well.

In order to protect against inflammation to a healthy brain, a proprietary NeuroProtection Complex Blend contains standardized extracts of hops, ginger, and rosemary — all known to have anti-inflammatory capabilities.

With a healthy brain in place, the proper levels of acetylcholine are needed to enable brain neurons to communicate. To maintain these levels, Cognitex® includes alpha-glyceryl phosphoryl choline to boost acetylcholine and Sensoril® ashwagandha extract to inhibit an enzyme that degrades acetylcholine in the aging brain.

The retail price for 90 softgels of Cognitex® (with or without pregnenolone) is $74 (item #00922) and $72 (item #00921), respectively. If a member orders four bottles of either version during Super Sale, the price per bottle is reduced to just $44.96 and $43.20, respectively.

To order Cognitex®, call 1-800-544-4440 or visit www.LifeExtension.com

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

Perluxan® is used with permission. Sensoril® is protected under US Patents Nos. 6,153,198 and 6,713,092, and is a registered trademark of Nutrex, Inc. Sharp-PS® GOLD is a registered trademark of Enzymotec Ltd. US Patent No. 7,935,365

Contains fish (wild herring, blue whiting), soybeans, corn, and rice.

Just three softgels of Cognitex® provide the following nutrients:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Alpha-Glyceryl Phosphoryl Choline (A-GPC)</td>
<td>600 mg</td>
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<tr>
<td>Phosphatidylserine-DHA (PS-DHA)</td>
<td>100 mg</td>
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<tr>
<td>(Sharp-PS® GOLD Conjugated Phosphatidylserine-DHA)</td>
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<tr>
<td>Pregnenolone</td>
<td>50 mg</td>
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<tr>
<td>Vinpocetine</td>
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<tr>
<td>Phospholipid-Grape Seed Extract</td>
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<tr>
<td>Wild Blueberry Extract</td>
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<tr>
<td>(Vaccinium angustifolium)</td>
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<tr>
<td>Sensoril® Ashwagandha Extract</td>
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<td>(Withania somnifera)</td>
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<tr>
<td>Uridine-5'-Monophosphate (disodium)</td>
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<tr>
<td>Proprietary NeuroProtection Complex Blend</td>
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<td>Perluxan® Hops Extract</td>
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<td>Ginger (Zingiber officinale)</td>
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<td>Rosemary (Rosmarinus officinalis)</td>
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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.
Vitamin C’s popularity is undeniable—and so are its benefits! It has been over 80 years since this critical vitamin was isolated, and its importance in our diet cannot be overstated. However, since humans don’t manufacture vitamin C internally, it must be obtained through dietary sources or supplements.

This can be problematic because vitamin C is a water-soluble nutrient that is quickly oxidized and released by the body, which means that for those seeking vitamin C’s optimal health benefits they have to consume the vitamin several times a day.1

Fortunately, a flavonoid antioxidant known as dihydroquercetin functions as a vitamin C “supercharger.” Studies demonstrate that dihydroquercetin acts to inhibit the oxidation of vitamin C, thereby helping to maintain its concentration and to recycle vitamin C throughout the body.2,3 This synergistic relationship between dihydroquercetin and vitamin C greatly enhances the efficacy of both molecules in the body’s organs and tissues.

Vitamin C with Dihydroquercetin was formulated for those seeking to obtain optimal efficacy and antioxidant protection from their vitamin C supplement. The suggested daily dose of one tablet of this formula supplies 1,000 mg of vitamin C (as ascorbic acid), along with 10 mg of dihydroquercetin-3-rhamnoside, a highly bioavailable form of dihydroquercetin derived from grape leaf extract.

A bottle containing 250 tablets of Vitamin C with Dihydroquercetin retails for $25.50. If a member buys four bottles during Super Sale, the price is reduced to just $15.69 per bottle.

References:
Support for 24-Hour-A-Day Healthy Glucose Metabolism

People who take extraordinary steps to limit their carbohydrate exposure may still be experiencing higher-than-desired blood sugar throughout the day. The reason? Blood sugar can surge to dangerously high levels that can last for hours following meals and even the entire day!

Studies show even in people with normal fasting glucose, gaining control of after-meal surges may provide additional support for cardiovascular and metabolic health. To address this widespread problem, a natural compound is now available called CoffeeGenic™ Green Coffee Extract. This next-generation enzyme trigger was shown to induce a remarkable 32% drop in after-meal blood sugar!

Multi-Targeted Defense with Novel Green Coffee Compound

At the core of CoffeeGenic™ Green Coffee Extract's power to favorably modulate after-meal glucose levels is chlorogenic acid, a polyphenol found in the green coffee bean. Chlorogenic acid has been shown to inhibit excess activity of the glucose-6-phosphatase enzyme. This enzyme triggers glucose formation from non-carbohydrate substrates and glycogen release from the liver, both of which can create excess glucose in the blood. Neutralizing excess glucose-6-phosphatase is essential for most people to achieve optimal glucose control.

Another means by which chlorogenic acid supports healthy after-meal glucose levels is by targeting the alpha-glucosidase enzyme. This intestinal enzyme breaks apart complex sugars and enhances their absorption into the bloodstream.

Chlorogenic acid also increases the signal protein for insulin receptors in liver cells.

Patented Extraction Process, Standardized for Maximum Potency

Why green coffee bean extract?

Coffee grows on trees and the fruit is a berry. The berry contains green seeds, which are the “beans.” The outer part of the berry is washed away to get to the seeds. The seed has a higher amount of phenolic acids (50%) than the berry (about 35%).

The problem with the roasted coffee you drink is that much of the beneficial phenolic content of the coffee bean is destroyed during the roasting process.

CoffeeGenic™ Green Coffee Extract is produced through a patented extraction process to deliver an extraordinarily high proportion of chlorogenic acid for maximum potency.

The coffee beans sourced for CoffeeGenic™ Green Coffee Extract are organically grown. For optimal benefit, one vegetarian capsule of CoffeeGenic™ Green Coffee Extract should be taken before heavy meals. Green Coffee Extract is standardized to 50% chlorogenic acid.

CoffeeGenic™ Green Coffee Extract (200 mg) • Item #01604
(Each serving contains approximately 6 mg caffeine)

A bottle containing 200 mg vegetarian capsules of CoffeeGenic™ Green Coffee Extract retails for $25. If a member buys four bottles during Super Sale, the price is reduced to just $14.85 per bottle.

CoffeeGenic™ Green Coffee Extract (400 mg) • Item #01620
(Each serving contains approximately 12 mg caffeine)

A bottle containing 400 mg vegetarian capsules of CoffeeGenic™ Green Coffee Extract retails for $38. If a member buys four bottles during Super Sale, the price is reduced to just $22.95 per bottle.

For those wishing to pursue multi-nutrient strategies to support optimal after-meal glucose control, see additional Life Extension® formulas featuring green coffee bean extract in this issue.

References
Preserve Youthful Cellular ENERGY with Next-Generation LIPOIC ACID

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.

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 Gevonova Research, Inc.

References:

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

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 each day.

Contains rice.

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 THE NEWS

Sugary Drinks May Increase Heart Disease Risks for Women

A presentation at the American Heart Association’s annual meeting in Orlando, Florida stated that women’s risk for developing heart disease and diabetes may increase if they consume two or more sugar-sweetened drinks daily.*

The announcement was based on a study performed by Christina Shay and her colleagues at the University of Oklahoma Health Sciences Center. Shay assessed the drinking habits of over 4,100 women and men aged 45 to 84 from various ethnic groups with questionnaires. None of the participants had heart disease at the start of the program. The researchers evaluated each individual for weight gain, waist circumference, cholesterol levels, triglycerides, and glucose over a five-year span.

The evaluation found that middle-aged women who drank two or more sugary drinks a day were close to four times as likely to have high levels of dangerous blood fats called triglycerides and impaired blood sugar levels, known as prediabetes. The same results were not found in men.

Editor’s Note: Life Extension® has long warned about the dangers of elevated blood sugar and has urged readers to avoid sugary beverages at all costs.

—J. Finkel


Resveratrol Mimics Calorie Restriction’s Effects on Metabolism in Clinical Trial

Patrick Schrauwen and his associates report in Cell Metabolism that men supplementing with resveratrol experienced metabolic effects similar to those observed in animal studies of calorie restriction.* Resveratrol is a compound that occurs in red grapes, wine, and other plant foods. The current trial is the first to evaluate resveratrol’s metabolic effects in humans.

In a randomized, crossover study, eleven obese men received a placebo or 150 milligrams trans-resveratrol for 30 days each. Body mass index, whole-body energy expenditure, lipid storage, plasma markers of metabolic function, and other values were measured before and after treatment.

“We demonstrate beneficial effects of resveratrol supplementation for 30 days on the metabolic profile in healthy obese males, which seems to reflect effects observed during calorie restriction,” the authors write. “Although most of the effects that we observed were modest, they were very consistently pointing toward beneficial metabolic adaptations.”

Editor’s Note: The authors conclude that, “Future studies should investigate the long-term and dose-dependent metabolic effects of resveratrol supplementation in order to further establish whether resveratrol supplementation has the potential to overcome the metabolic aberrations that are associated with obesity in humans.”

—D. Dye

* Cell Metab. 2011 Nov 2;14(5):612-22.
Whey Prevents Loss of Essential Muscle in Dieting Older Women

Age-related loss of muscle mass, called sarcopenia, negatively impacts an aging adult’s ability to function through daily life tasks, such as climbing stairs and lifting grocery bags. During a period of restricted calories, such as experienced while dieting, the loss of muscle mass is often accelerated further.

Whey protein may be able to counter that loss of muscle during a diet. In a recent six-month, double-blind study, 31 post-menopausal obese women were divided into two groups. Both groups followed a 1,400-calorie restricted diet based on the USDA’s recommendations. One group received a 50 g whey protein supplement (2 x 25g) in the morning and evening; the other received carbohydrates in the form of maltodextrin at an equal dose.

This study found that women fed the whey not only lost 3.9% more weight using the whey, but gained 5.8% more thigh muscle vs. the group getting the additional carbohydrates. Whey protein has a number of mechanisms that assist with weight loss and this latest study that finds it may preserve muscle mass adds to the long list of possible benefits of whey.

—W. Brink


Supplementing a Low-Fat Diet with Fish Oil Reduces Prostate Cancer Growth

In an article published in Cancer Prevention Research, William Aronson and his associates report a benefit for a low-fat diet supplemented with fish oil in retarding the growth of prostate cancer.*

The current trial enrolled prostate cancer patients scheduled for surgical removal of the prostate gland. Four to 6 weeks prior to surgery, the men were divided to receive a diet in which 15% of calories were provided by fat, supplemented with 5 grams of fish oil per day.

Men who received fish oil had higher cell membrane levels of omega-3 and reduced omega-6 fatty acids at the end of the treatment period. Examination of the excised prostate glands found a reduced rate of cell proliferation in the fish oil-supplemented group as evidenced by staining with an antibody against a protein involved in cell growth.

Editor’s Note: Fish oil is high in the omega-3 fatty acids eicosapentaenoic acid and docosahexaenoic acid that help combat pro-inflammatory compounds such as 5-lipoxygenase and leukotriene B4 that stimulate prostate cancer cell propagation.

—D. Dye


Regular Aspirin Use Cuts Hereditary Cancer Risk in Half

A study reported in Lancet found that using aspirin on a regular basis reduces the risk of developing hereditary cancers by 50% among those with an inherited disorder known as Lynch syndrome.* Lynch syndrome is caused by defects in genes responsible for detecting and repairing damaged DNA, which significantly increases the risk of cancer (primarily of the colon or uterus) in those affected by the disorder.

Professor Patrick Morrison of Queen’s University in Belfast and his colleagues analyzed data from nearly a thousand men and women with Lynch syndrome for the current study. In a decade of follow-up (sometimes a little longer), approximately 15% of the participants who reported regular aspirin use developed cancer, compared to 30% of those who did not regularly use the drug. The researchers suggest that aspirin could be destroying precancerous cells.

Editor’s Note: Dr. Morrison added that, “We aim now to go forward with another trial to assess the most effective dosage of aspirin for hereditary cancer prevention and to look at the use of aspirin in the general population as a way of reducing the risk of bowel cancer.”

—D. Dye

Long-Term Pomegranate Consumption Associated with Reduction of Cardiovascular Risk Factors in Dialysis Patients

A presentation at the American Society of Nephrology’s Annual Kidney Week revealed the finding of Lilach Shema, PhD, and colleagues of a benefit for pomegranate juice in the prevention of increased heart disease risk factors in patients undergoing hemodialysis for kidney failure.*

One hundred and one dialysis patients were randomized to receive approximately 3.5 ounces pomegranate juice or a placebo three times per week for one year. Blood pressure, antihypertensive drug use, serum lipids, and carotid artery intima-media thickness (which measures atherosclerotic plaque) were assessed before and after the treatment period.

At the study’s conclusion, 22% of those who received pomegranate juice reported using fewer antihypertensive medications, compared with 7.7% of the placebo group. Blood pressure, triglycerides, and high-density lipoprotein cholesterol levels improved over time among those who received pomegranate juice, but not in those who received a placebo.

Editor’s Note: While atherosclerosis increased in half of subjects who received a placebo, just 5% of those who received pomegranate experienced an increase and 25% had a decrease. No placebo patients experienced improvements.

—D. Dye


Reduced Vitamin C Intake Among Heart Failure Patients Associated with Increased Mortality Over One Year

At the American Heart Association’s Scientific Sessions 2011, it was reported that heart failure patients have a greater risk of inflammation and death over follow-up when consuming a diet that provides an inadequate amount of vitamin C.*

Eun Kyeung Song, PhD, and associates measured C-reactive protein (CRP) in 212 men and women diagnosed with heart failure. Food diaries were analyzed for the intake of vitamin C. Participants were followed for a year, during which 61 subjects experienced cardiac events or death due to cardiac causes.

Having a low intake of vitamin C was associated with a 2.4 times greater risk of having elevated CRP levels compared to those whose intake was adequate. Subjects who had reduced dietary vitamin C and high CRP had almost twice the risk of dying from cardiovascular disease over follow-up than those who had a greater intake of the vitamin and lower CRP levels.

Editor’s Note: C-reactive protein (CRP) increases with inflammation and is a risk factor for heart disease.

—D. Dye


N-acetyl Cysteine Helps Reverse DNA Damage Associated with Premature Aging

Human Molecular Genetics published a report concerning the discovery of a possible benefit for N-acetyl cysteine (NAC) in preventing and repairing DNA damage in Hutchinson-Gilford progeria syndrome (HGPS), one of several inherited diseases known as a laminopathies.*

Christopher J. Hutchison and his associates note that, “Fibroblasts from patients with the severe laminopathy diseases, restrictive dermopathy and Hutchinson Gilford progeria syndrome are characterized by poor growth in culture, the presence of abnormally shaped nuclei, and the accumulation of DNA double-strand breaks.” The team determined that the poor growth and double-strand breaks observed in the diseases are caused by high amounts of reactive oxygen species, as well as increased sensitivity to oxidative stress. While tests of normal fibroblasts showed efficient repair of double-strand breaks induced by reactive oxygen species, these breaks were unrepairable in fibroblasts from patients with laminopathy diseases. However, administration of NAC reduced DNA double-strand breaks, eliminated unreparable reactive oxygen species-induced breaks, and improved growth.

Editor’s Note: Hutchinson-Gilford progeria syndrome is a disease of premature aging in children that results in growth failure, the early appearance of degenerative diseases, and death between 8 and 21 years of age. “We’ve found that DNA damage can be controlled and our findings could be an important step to helping both children with progeria and older people to live lives that are less debilitating in terms of health problems,” Dr. Hutchison remarked.

—D. Dye

BPA Levels Rise 1,221% After Five Days Eating Canned Soup

Researchers from the Harvard School of Public Health recently reported in the *Journal of the American Medical Association* that volunteers who had one can of soup per day for five days had urine BPA (bisphenol A) levels rise by over 1,221% compared to people who consumed fresh soup over the same time period.*

Bisphenol A or BPA, is an organic compound that is used to make polycarbonate plastic and epoxy resins. It is added to the lining of foods and drink cans and some studies have shown that it interferes with reproductive development in animals. BPA levels have also been associated with a higher risk of developing several diseases and conditions, including obesity, type 2 diabetes, and cardiovascular diseases.

The lead author, doctoral student Jenny Carwile stated that, “Previous studies have linked elevated BPA levels with adverse health effects. The next step was to figure out how people are getting exposed to BPA. We’ve known for a while that drinking beverages stored in certain hard plastics can increase the amount of BPA in your body. This study suggests that canned foods may be an even greater concern, especially given their wide use.”


Stroke Risk Declines with Greater Number of Healthy Lifestyle Factors

The *Archives of Internal Medicine* reports that the greater number of healthy lifestyle factors one has, the more protection one gains against stroke.*

Gang Hu, MD, PhD, and colleagues analyzed data from 17,287 men and 19,399 women who participated in surveys in 1982, 1987, 1992, 1997, and 2002. Participants were followed through 2007, during which 1,167 ischemic strokes and 311 hemorrhagic strokes occurred.

Lifestyle factors evaluated in the study included being a non-smoker, having a body mass index of less than 25, engaging in light to moderate physical activity, consuming vegetables at least three times per week, and having a light to moderate weekly intake of alcohol. Compared to the risk of stroke experienced by those having one or fewer factors, having two, three, four, and five factors was associated with a 34%, 43%, 49%, and 67% adjusted reduction.


Low-Carb Diet May Slow Tumor Growth

Researchers from the Terry Fox Laboratory in Vancouver, British Columbia recently concluded that a diet low in carbohydrates may slow the growth of tumors.*

During their study, scientists compared the effects of a low-carbohydrate diet to that of a typical “Western” diet in a group of mice. A typical “Western” diet is characterized as being high in carbohydrates and low in protein. The mice were divided into two sub-groups, with one group eating a high-protein, low-carbohydrate diet, and another eating the reverse. Both groups were fed equal calories.

The researchers found that both murine (mice) and human carcinomas grew slower in mice fed diets containing low carbohydrates/high protein compared with a Western diet. Mice fed the lower carbohydrate diet exhibited lower blood glucose, insulin, and lactate levels. In an important development for *Life Extension* readers, mice that were genetically predisposed to develop breast cancer that were fed a Western diet had rates of cancer nearly 50% by the age of one year, whereas no tumors were detected in mice being fed the low-carbohydrate diet over the same time period. This study supports the concept that many cancers may be influenced by chronically elevated blood sugar levels and associated hormones.

In 2008, Life Extension® introduced Berry Complete, a unique, high-potency blend of extracts from Nature’s most powerful free radical fighters. The antioxidant strength of just one capsule equaled more than 50% of the recommended five daily servings of fruits and vegetables.

Last year we introduced an even more powerful antioxidant formula. A single capsule of the new Enhanced Berry Complete with RZD™ Açaí delivers an antioxidant value equivalent to more than 100% of the recommended daily fruit and vegetable intake.

It is also the first antioxidant formula to use a cutting-edge extraction technology called Radiant Zone Drying™. This patented process delivers the most complete nutritional profile of the açaí berry—for a breakthrough in antioxidant defense.

ORAC: A Measure of Antioxidant Power

To measure the antioxidant strength of various foods, scientists use what is known as the ORAC index. While berries score higher than most fruits and vegetables, açaí boasts one of the highest ORAC values known to modern science.

Unfortunately, most commercial products containing açaí do not reflect the full nutritional content of the fruit. Only a fraction of its phenolic content survives industrial processing, handling, and storage.

RZD™ extraction technology allows for optimal delivery of açai polyphenols, including highly beneficial anthocyanins, proanthocyanidins, and flavonoids, along with essential fatty acids and other vital compounds.

Why should this matter to you? It’s more than a matter of antioxidant potency. In 2010, a team of researchers reported for the first time that açai, blueberry, and strawberry polyphenols may provide targeted support for cellular metabolic processes that promote neural and cognitive health in the aging brain. But you need the complete polyphenolic profile to get the benefit.

Enhanced Berry Complete with RZD™ Açaí gives you a convenient way to obtain a broad spectrum of seasonal, hard-to-find, highly perishable foods, for optimal antioxidant value.

A bottle containing 60 vegetarian capsules of Enhanced Berry Complete with RZD™ Açaí retails for $29. If a member buys four bottles during Super Sale, the cost is just $17.55 per bottle.

Contains soybeans. Contains corn.

References

RZD™ and Radiant Zone Drying™ are trademarks of Columbia Phytotechnology, LLC.

To order Enhanced Berry Complete with RZD™ Açaí, 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.
Back in 1983, Life Extension® was the first to introduce CoQ10 as a proven method to enhance mitochondrial energy production. CoQ10 has since gained universal recognition for its role in supporting cellular performance throughout the body.¹⁶

In an unprecedented breakthrough, a compound called PQQ (pyrrolo-quinoline 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.¹³⁻¹⁴ Energy-intensive organs like the heart and brain are dense with mitochondria.

Until recently, the only natural ways for aging individuals to increase the number of mitochondria in their bodies were long-term calorie restriction or exhaustive physical activity—which are difficult or impractical for most people to implement.

PQQ offers a viable alternative.
The Ultimate Cell Rejuvenator

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

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

- **Antioxidant power.** Like CoQ10, PQQ is a highly potent antioxidant. Its extraordinary molecular stability enables it to facilitate thousands of biochemical reactions in the mitochondria, without breaking down, for maximum antioxidant and bioenergetic support.15

- **Favorably modulates gene expression.** PQQ activates genes that promote formation of new mitochondria7—and beneficially interacts with genes directly involved in mitochondrial health. These same genes also support healthy body weight, normal fat and sugar metabolism, and youthful cellular proliferation.16

- **Mitochondrial defense.** Mitochondria possess their own DNA, distinct from the DNA contained in the nucleus. Unfortunately, compared to nuclear DNA, mitochondrial DNA is relatively unprotected. PQQ's antioxidant potency and favorable gene expression profile act to support mitochondrial defense.

Vital Protection for the Aging Heart and Brain

PQQ is an essential nutrient, meaning your body cannot make it on its own. A growing body of research indicates that PQQ’s unique nutritional profile supports heart health and cognitive function—alone and in combination with CoQ10.17,18 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.19 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.20

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 natural fermentation process. The result is the highest quality PQQ available on the market today called BioPQQ™.

A bottle containing 30 10 mg vegetarian capsules of PQQ Caps with BioPQQ™ retails for $24. If a member buys four bottles during Super Sale, the price is reduced to just $14.85 per bottle.

A 10 mg dose of PQQ is also included in the Mitochondrial Energy Optimizer with BioPQQ™ and Mitochondrial Basics with BioPQQ™ formulas.

Contains rice.

To order PQQ Caps with BioPQQ™ standalone or any other PQQ-containing formula call 1-800-544-4440 or visit www.LifeExtension.com

BioPQQ™ is a trademark of MGC (Japan).

References
Anti-Adipocyte Formula with AdipoStat and Integra-Lean® African Mango Irvingia

AdipoStat is the first dietary intervention to support healthy body weight using these innovative approaches.² Through multiple pathways, it targets the mechanisms by which fat-storing cells or adipocytes become bloated and metabolically dysfunctional.

This widely overlooked cellular condition leads to excess fat accumulations in the belly and throughout your body.

After careful scientific analysis of over 1,000 plant extracts,² researchers identified the two species included in AdipoStat that target adipocytes: Sphaeranthus indicus flower (S. indicus) and the mangosteen fruit (Garcinia mangostana).

Optimal results were shown in studies when these two plant extracts were combined.

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.
Three Ways to Fight Fat Cell Derangements

**AdipoStat** functions via the following mechanisms to support healthy body weight:

1. **AdipoStat** targets adipocyte (fat cell) creation.
2. **AdipoStat** impedes adipocyte growth (adipogenesis).
3. **AdipoStat** induces fat in adipocytes to break down (lipolysis).

Success in Clinical Trials

**AdipoStat**’s performance in clinical studies indicates it can safely deliver impressive results.

In a key study, 30 adults with difficulty maintaining healthy body weight ingested 800 mg per day of **AdipoStat** while following a 2,000-calorie-per-day diet and were asked to walk just 30 minutes five days a week. A group of equal size was given placebo.

After just eight weeks, the **AdipoStat** group:

- Lost 4.05 inches of harmful belly fat—2.0 times the placebo group.
- Experienced a 2.05 drop in body mass index (BMI)—3.9 times over placebo.
- Shed 11.4 pounds of total body weight—3.7 times over placebo.

These improvements began to emerge after just 14 days.

After eight weeks, the **AdipoStat** group saw a noticeable drop in waist-to-hip ratio, indicating they experienced fat loss in the abdominal area, where excess fat mass is associated with serious health issues.

They also exhibited favorably elevated levels of a hormone called **adiponectin**.

A second human clinical trial yielded similar results, confirming **AdipoStat**’s beneficial effects.

The **AdipoStat** Formulas

There are two ways you can easily incorporate **AdipoStat** into your daily supplement program.

The first option is to take **AdipoStat** by itself. The daily dose of one vegetarian capsule of **Anti-Adipocyte Formula with AdipoStat** taken 30 minutes before each of the two heaviest meals of the day provides:

**AdipoStat** Proprietary Blend ................................................. 800 mg
(Sphaeranthus indicus extract and Garcinia mangostana extract)

The second option enables consumers to obtain the same dose of **AdipoStat** along with the highly popular **Integra-Lean** African Mango **Irvingia**. **Irvingia** operates via additional mechanisms to combat surplus fat storage, including inhibition of **glycerol-3-phosphate dehydrogenase**, an enzyme involved in the conversion of glucose and triglycerides into adipocyte fat storage.

The **Advanced Anti-Adipocyte Formula with AdipoStat and Integra-Lean** African Mango **Irvingia** supplies 800 mg of **AdipoStat** and 300 mg of proprietary **Irvingia** extract in the same suggested daily serving of one vegetarian capsule 30 minutes before each of the two heaviest meals.

### Anti-Adipocyte Formula with AdipoStat

**Item # 01510**

A bottle containing 60 vegetarian capsules of **Anti-Adipocyte Formula with AdipoStat** retails for $35. If a member buys four bottles during Super Sale, the price is reduced to just $21.60 per bottle.

### Advanced Anti-Adipocyte Formula with AdipoStat and Integra-Lean® African Mango Irvingia

**Item # 01509**

A bottle containing 60 vegetarian capsules of **Advanced Anti-Adipocyte Formula with AdipoStat and Integra-Lean** African Mango Irvingia retails for $39. If a member buys four bottles during Super Sale, the price is reduced to just $24.30 per bottle.

Integra-Lean® Irvingia is protected by U.S. Patent No. 7,537,790. Other patents pending.

**AdipoStat** is a proprietary ingredient derived from natural plant extracts exclusively distributed by InterHealth N.I.

References
2. Results based on initial analyses of unpublished research data.
5. Lipids Health Dis. 2008 Nov 13;7:44.

To order either of the Anti-Adipocyte Formulas call 1-800-544-4440 or visit www.LifeExtension.com

CAUTION: Because this product may lower blood glucose, consult your healthcare provider before taking this product if you are taking glucose lowering medications.

These products are designed to target several critical factors involved in age-related weight gain. Those who ingest more calories than what their body has the metabolic capacity to utilize will not see results. This is because some people are ingesting so many excess calories that no matter how much their metabolic rate is increased, or how much improvement occurs in their after-meal blood sugar and triglyceride levels, or by how much youthful insulin sensitivity and other body fat-regulating systems are restored, they are overwhelming the metabolic capacity to utilize these calories. This will result in excess calories being stored in adipocytes. One cannot consume limitless calories and expect to shed fat pounds by taking drugs, nutrients, and/or hormones that demonstrate weight loss in clinical studies.

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.
Aged people are in the midst of an escalating Alzheimer’s epidemic. It is now the sixth leading cause of death in the United States.

The horrific progression of Alzheimer’s disease from dementia to personal extinction afflicts between 24-30 million people worldwide. Americans account for approximately one-fifth of those cases, which are expected to triple by 2050.

While there is no cure for Alzheimer’s, there is new hope thanks to the work of a team of researchers at Massachusetts Institute of Technology (MIT).

These scientists have identified several correctable factors involved in Alzheimer’s onset—and a novel nutritional intervention that may effectively target them.

In this article, you will learn of the vital role that magnesium plays in protecting the aging brain’s structure and function and why conventional supplements don’t deliver enough magnesium into the brain.

Researchers have found that a new highly absorbable form of magnesium called magnesium-L-threonate concentrates more efficiently in the brain, rebuilds ruptured synapses, and restores the degraded neuronal connections observed in Alzheimer’s disease and other forms of memory loss.

In experimental models, magnesium-L-threonate induced improvements of 18% for short-term memory and 100% for long-term memory.
**Magnesium Deficiency: An Overlooked Cause of Neurologic Decay**

Half of all aging individuals in the developed world are magnesium deficient, a nutritional deficit that worsens over time.

Confirmatory data show that Americans are no exception. For instance, American women consume just 68% of the recommended daily intake of magnesium.

Magnesium has long been known as a key nutrient for optimal brain function. More recently, scientists have found it specifically promotes learning and memory as a result of its beneficial effect on synaptic plasticity and density.

Magnesium works with calcium to modulate “ion channels” that open in response to nerve impulses, which in turn trigger neurotransmitter release. The most important of those channels is controlled by a complex called the NMDA receptor. NMDA receptors play an important role in promoting neural plasticity and synaptic density, the structural underpinnings of memory.

Magnesium deficiency can cause symptoms ranging from apathy and psychosis to memory impairment. Insufficient magnesium slows brain recovery following injury from trauma and in laboratory studies accelerates cellular aging.

Ominously, magnesium deficiency may produce no overt symptoms in its initial stages.

Part of the problem is that it is difficult for the body to maintain sufficiently high concentrations of magnesium in the brain.

For this reason, researchers have long sought ways that higher magnesium brain concentrations might be achieved and sustained.

**A Breakthrough Form of Magnesium**

Scientists have been challenged to find a way to raise magnesium levels in the brain. Even intravenous infusions cause only a modest elevation of magnesium levels in the central nervous system.

An innovative team of researchers from the Massachusetts Institute of Technology (MIT) recently found a way to surmount this obstacle. They formulated a new magnesium compound called magnesium-L-threonate or MgT that in lab tests allows for oral administration while maximizing magnesium “loading” into the brain.

Based on prior research, they meticulously documented that increased levels of magnesium in the brain promote synaptic density and plasticity in the hippocampus. Up until now, however, no widely available forms of magnesium met the criteria needed for rapid absorption and efficient transfer into the central nervous system.

By contrast, MgT yielded compelling results. MgT oral supplements increased magnesium levels in spinal fluid, an index of measurement in brain magnesium by about 15%, while none of the other magnesium compounds tested produced significant elevations. While a 15% increase may not sound like a lot, it induced a profound effect on neurological function.

To evaluate the effects of MgT on memory, the researchers tested it against currently available magnesium compounds. They used a simple assessment of learning and memory called the Novel Object Recognition Test or NORT. A high NORT score means that the animal is good at recognizing and identifying new objects, a skill that is critical in aging humans as well. NORT is a good test of function in the hippocampus, which is rich in the NMDA receptors so closely controlled by magnesium.

The researchers put aged animals through the NORT test, supplementing them with MgT or one of the commercially available magnesium compounds. Only MgT significantly enhanced both short- and long-term memory, boosting scores by 15% for short-term memory and 54% for long-term memory compared to magnesium citrate.
Better Function of Memory-Forming Synaptic Connections

Given the effect of MgT in increasing synaptic density and plasticity in experimental animals (rats), the research team asked the obvious next question, “Do those changes lead to an increase in the number of neurotransmitter release sites, and, subsequently, to enhanced signal transmission?” That, after all, is the hallmark of learning and memory.

Using high-tech microscopic measuring devices, the team demonstrated that the magnesium elevation in brain tissue observed in MgT supplementation increases the number of functioning neurotransmitter release sites. This effect could be likened to increasing the number of soldiers on the battlefield: when the call to action comes, a much larger force is prepared to perform.

The final question to be addressed in this series of studies was whether the increased density of synaptic connections directly correlated with the observed improvements in memory created by MgT supplementation.

The researchers systematically plotted out the time-course of the increase in synaptic density following MgT supplementation, and found that it directly paralleled the improvements in memory. They also found that when MgT supplementation was stopped, the density of synaptic connections dropped back to baseline, further confirming the correlation. They found that MgT supplementation boosted all of the animals’ performance, not just average performance.

Improvement in Spatial Short-Term Memory

Spatial working memory is an essential memory function, helping you remember where things are and where you are in relation to the world over the short term. It is working memory that enables you to find your car keys as you head out the door or return to the correct page in the magazine you were reading a few minutes ago.

The MIT researchers tested spatial working memory in experimental animals. Without treatment, both young and old animals forgot the correct choice about 30% of the time. After 24 days of MgT supplementation, however, both young and old animals had improved this measurement of memory performance by more than 17.8

Even more impressive, by 30 days of supplementation, the older animals’ performance became equal to that of their younger counterparts. Since the older animals were more forgetful at baseline than...
the younger animals that meant that the older animals had a larger percentage memory improvement (nearly 19%) than the younger animals’ more modest 13%. When MgT supplementation was suspended, the memory-enhancing effects persisted in younger animals, but in older animals spatial working memory performance declined dramatically, returning to baseline within 12 days. When MgT supplementation to the older animals was resumed, however, their memory performance was restored in 12 days.

In other words, magnesium-L-threonate improved memory in both old and young animals, but had a substantially greater effect on aged individuals—the very ones most in need of memory enhancements.

Enhanced Spatial Long-Term Memory

Long-term spatial memory is crucial for older individuals. It’s how you remember where you live or how to get to the grocery store. Loss of spatial long-term memory is one of the main reasons that older people with dementia get lost running even simple errands.

To test spatial long-term memory in MgT-supplemented animals, the researchers used a maze that required the animal to swim and find a submerged platform on which to rest. Again, both old and young animals supplemented with magnesium-L-threonate learned significantly faster than untreated animals during the training sessions.

One hour after the training period, the researchers removed the submerged platform, causing the animals to have to search for its last location. Both young and old supplemented and unsupplemented animals remembered where the platform had been over the short term and were searching for it in the correct quadrant of the maze.

But after 24 hours, a remarkable difference was observed. Untreated animals, both young and old, completely forgot where the platform had been hidden, randomly searching in all quadrants of the maze. Supplemented animals, on the other hand, continued to search in the correct part of the maze more than twice as long as they looked in incorrect areas. That translated into improvements in spatial long-term memory of 122% in younger supplemented animals, and nearly 100% in older supplemented animals.

In short, MgT supplementation doubled the accuracy of long-term spatial memory in older animals, and more than doubled it in younger animals.

Better Recall

One critical memory function is the ability to bring up an important memory based on only partial information, a function called pattern completion. You use pattern completion memory to find your way around a familiar neighborhood after dark or following a heavy snowstorm. In both cases, some familiar cues are gone, but a healthy brain will fill in the missing details by completing a recognizable pattern.
As described on the previous page, when researchers removed some of the external visual cues from the water maze, younger animals had no particular difficulty finding their way to the hidden platform during the first 24-hour period. Older animals, on the other hand, demonstrated substantial impairment when familiar cues were missing, spending more than twice as much time searching for the missing platform. When given MgT for 30 days, however, older animals performed as well as the younger ones, quickly finding the platform even when many of the external cues were unavailable.8

In human terms, this kind of improvement could mean the difference between a routine trip to the grocery store at dusk versus getting lost in the dark.

Having successfully demonstrated that magnesium-L-threonate (MgT) improves multiple forms of learning and memory in living animals, the research team sought to explore the cellular and molecular basis of that improvement. They wanted to understand in a detailed fashion just what changes the MgT was producing in the brains of older animals that helped them form stronger, more stable memories.

What they determined was compelling.

The graph above shows memory improvement in young and old animals after only 12 days of magnesium-L-threonate (MgT) supplementation.

The first step was to determine the effects of MgT supplementation on signaling between brain cells mediated by what are known as NMDA receptors. These receptors operate through varying concentrations of calcium and magnesium in brain tissue, making them a logical point of observation.

The first finding was that MgT treatment in animals resulted in stronger signaling at essential brain cell synapses.8 This increase in signaling was accomplished by a 60% increase in production of new NMDA receptors and by increases of up to 92% in related proteins that play essential supporting roles in brain signal transmission.8

Higher Memory-Forming Synaptic Plasticity and Density

Synaptic plasticity, or the ability to rapidly change the number and strength of brain cell synapses, is critical to the brain’s ability to form, retain, and retrieve memories. The research team compared synaptic plasticity in the brains of MgT-supplemented animals versus controls.8 They found that production of a very special subunit of the NMDA receptor, one closely associated with synaptic plasticity, was selectively enhanced by MgT supplementation.8 This molecular change is known to cause potent long-term increases in synaptic strength, and hence a greater capacity for information storage and memory.⁸,²⁴-²⁶

The result of these increases in NMDA receptor numbers was a 52% enhancement in long-term potentiation, which is the cellular equivalent of memory formation in the brain tissues of MgT-supplemented animals.²⁷,²⁸

Memory depends not only on synaptic plasticity, but also on the healthy physical structure of synapses between brain cells. Unfortunately, synaptic connections in the memory-rich hippocampus region of the brain decline with aging, which directly correlates with memory loss.⁸,²⁹,³⁰,³¹

One of the most vital structures to be found at brain cell synapses is the synaptic bouton, from the
Mechanisms of Brain Aging and Memory Loss

Every memory you have, even those you’ve lost, produces physical changes in your brain. Memories form and are stored in multiple brain regions, but the most active and essential area is the hippocampus, a small, sea horse-shaped structure deep in the center of your brain.

Hippocampal memory enables you to recognize and distinguish between old friends and new acquaintances, or to find your way around a well-known floor plan. It is also used to comprehend and navigate new experiences based on old ones.

This puts the hippocampus squarely at the center of your ability to assimilate new information and integrate it with what you already know. As you learn and experience new events, cells in your memory centers tighten and enhance their neuronal connections, known as synapses.29

The ability of brain cells to quickly form new synapses and remove old ones is referred to as neurologic plasticity. Large numbers of synapses, and a high density of specialized synaptic structures called boutons, promote rapid retrieval and processing of the information stored by connected cells.36 In essence, neuronal plasticity is the physical equivalent of learning, while synaptic density is roughly the equivalent of memory.

Young brains exhibit high levels of neurologic plasticity that produce large numbers of interconnected synapses. That’s why young people learn quickly and have strong memories.

With aging, however, the numbers of synapses, and the ability to rapidly form new ones, steadily decline.37 And that’s just in “normal” aging.29 People with Alzheimer’s disease, or its precursor, mild cognitive impairment (MCI) experience more rapid loss of both plasticity and synaptic number.30,38-40 And that’s when memories begin to fade, or worse, to be lost entirely.

Since time immemorial, people have suspected that specific nutrients can positively affect cognitive functions such as learning and memory.41 It’s now known that many nutrients can actually modify aging brain function, in part by increasing formation of brain synapses.42

Magnesium has been established as having a positive impact on both neural plasticity and synaptic density.7,8,12

French word for button. When an electrical impulse reaches a pre-synaptic bouton, and ample calcium and magnesium are present, neurotransmitters are released to transmit the impulse to the next neuron in line. The greater the number and density of synaptic boutons, the stronger the electrochemical signal that the synapse can produce, and the more sustained the memory that is created.32

When the researchers examined the brains of control and MgT-supplemented animals under a high-power microscope, they readily detected much greater densities of synaptic bouton proteins in tissues from the supplemented animals. Those proteins are essential for neurotransmitter release in the several regions of the hippocampus vital for memory formation and retrieval.8 Remarkably, the density of the synaptic boutons was closely correlated with the memory performance of each individual animal on the novel object recognition test.

Near-Term Research

The MIT team is rapidly putting in place two human studies of MgT on memory function, with results expected in the near future. Meanwhile, they have recently discovered several new roles for MgT in managing memory, in this case unwanted memories of the kind associated with post-traumatic stress disorder (PTSD).

Fear memories are expressed in response to objects or events previously linked with a potential danger. Over time, fearful reactions can dissipate when the triggering event is experienced in a safe environment.

Animal studies reveal that MgT enhances this process, so that events which previously caused an emotional response no longer trigger fear.33,34 MgT helps the pre-frontal region of the brain block the return of old fear memories.33,34

Research reveals that MgT works by enhancing neural plasticity in the hippocampus and prefrontal cortex.34 These findings led the researchers to recommend that elevating brain magnesium with MgT be used to dampen traumatic memories and treat PTSD, anxiety, and depression.33,34

Summary

Levels of Alzheimer’s disease and associated memory loss among aging Americans are reaching epidemic levels.

The neurodegenerative processes involved in memory loss result from deterioration of connectivity between brain cells but are not a natural function of aging. Memory loss is now known to be associated
with loss of synaptic density and plasticity in the brain. Low magnesium levels may contribute to such losses.

**Magnesium-L-threonate (MgT),** a new magnesium compound, boosts brain magnesium levels better than standard supplements. Studies reveal that MgT produces dramatic increases in synaptic density and plasticity, resulting in similar improvements in memory function itself.

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

Diminished cellular energy production is an inevitable consequence of aging. As adults mature, the cellular power plants known as the mitochondria become dysfunctional. The resulting slowdown in energy production manifests in numerous health problems.

Nutritional researchers have discovered that the amino acid carnitine promotes the burning of fat for fuel in the mitochondria, thus promoting youthful levels of cellular energy production.* Researchers have now identified several optimized, next-generation forms of carnitine that not only help boost cellular energy production, but also may confer targeted benefits for the brain, heart, muscles, and central nervous system.

Optimized Carnitine with GlycoCarn® combines these advanced forms of carnitine—acetyl L-carnitine, glycine propionyl L-carnitine, and acetyl L-carnitine arginate—in a single formula that provides balanced, broad-spectrum support for cellular energy production throughout the body.

Acetyl L-carnitine readily crosses the blood-brain barrier to combat oxidative stress and promote energy production in critical brain and central nervous system tissues.1 Acetyl L-carnitine also supports healthy brain function by stimulating the release of acetylcholine and dopamine, two neurotransmitters that play vital roles in brain health and communication.*

Acetyl L-carnitine arginate has an added molecule of arginine that enables it to augment the effects of acetyl L-carnitine, promoting the growth of neurites that facilitate communication among nerve cells in the brain.2

GlycoCarn® is a patented form of glycine propionyl L-carnitine that quickly penetrates into heart, endothelial, and muscle cells, with effects that range from protecting heart muscle from lack of blood flow to combating muscle fatigue by increasing muscle energy stores of glycogen.3

To order Optimized Carnitine with GlycoCarn®, call 1-800-544-4440 or visit www.LifeExtension.com

Two capsules of Optimized Carnitine with GlycoCarn® provide:

- Acetyl L-carnitine HCl 800 mg
- ArginoCarn® Acetyl L-carnitine Arginate Di-HCl 300 mg
- GlycoCarn® Glycine Propionyl L-Carnitine HCl 300 mg

A bottle of 60 vegetarian capsules of Optimized Carnitine with GlycoCarn® retails for $29. If a member buys four bottles during Super Sale, the price is reduced to only $17.62 per bottle.

References

CAUTION: For some people, L-carnitine, especially acetyl-L-carnitine, may have a stimulating effect. Therefore, it may be unwise to take it in the evening.

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

A Critical Brain Booster...

Magnesium is needed for more than 300 biochemical reactions in the body. Long known for its role in cardiovascular and bone health, energy metabolism and mood, researchers are now focusing intensely on magnesium’s benefits for cognitive function.

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

**Scientifically Advanced, Lab Tested**

Most commercially available magnesium supplements are not readily absorbed into the central nervous system. To overcome this obstacle, an innovative form of magnesium is being introduced called **Neuro-Mag**™, shown to specifically target the aging brain and nervous system.

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

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

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

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

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

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

A bottle containing 90 vegetarian capsules of **Neuro-Mag**™ Magnesium L-Threonate or 30 scoops of **Neuro-Mag**™ Magnesium L-Threonate with Calcium and Vitamin D3 Powder retails for $40. If a member buys four bottles during Super Sale, the price is reduced to $24.30 per bottle. Contains corn.

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

**References**


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.
Discount Prices for Premium-Quality Products

*Life Extension®* members are longevity enthusiasts, willing to 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 large discounts available to Foundation members enable them to purchase premium-quality supplements at prices substantially 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>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Super Omega-3 EPA/DHA with Sesame Lignans &amp; Olive Fruit Extract</strong></td>
<td>$32</td>
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<tr>
<td>120 softgels, Item # 01482</td>
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<tr>
<td>Super-refined EPA/DHA fish oil plus sesame lignans and potent olive fruit extract</td>
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<td>to provide critical omega-3 fatty acids and essential components of the Mediterranean diet.</td>
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<tr>
<td><strong>Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™</strong></td>
<td>$62</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 an organic compound (shilajit) shown to</td>
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<td>double mitochondrial CoQ10 levels.</td>
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<tr>
<td><strong>Life Extension Mix™ • 315 tablets, Item # 01655</strong></td>
<td>$98</td>
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<tr>
<td>High-potency multi-nutrient formula now with potent anthocyanins from Maqui berry</td>
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<td>and proanthocyanidins from tart cherry at no extra cost.</td>
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<td><strong>Vitamin D3 with Sea-Iodine™ • 5,000 IU, 60 vegetarian capsules, Item # 01372</strong></td>
<td>$14</td>
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<tr>
<td>High-potency vitamin D to assure adequate intake of this essential nutrient plus</td>
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<tr>
<td>1000 mcg of Sea-Iodine™.</td>
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<tr>
<td><strong>Ultra Natural Prostate Formula with AprèsFlex™ &amp; Standardized Lignans</strong></td>
<td>$38</td>
<td>$21.60 (twelve-bottle purchase)</td>
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<tr>
<td>60 softgels, Item # 01695</td>
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<tr>
<td>Improve prostate protection with AprèsFlex™ that helps suppress 5-LOX.</td>
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<td><strong>Calorie Control Weight Management Formula with CoffeeGenic™ Green Coffee Extract</strong></td>
<td>$60</td>
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<td>Natural Blueberry flavor powder, 414 grams, 60 servings, Item # 01693</td>
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<td>Four ingredients to impede glucose-lipid absorption and combat age-associated weight</td>
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<td>gain, plus green coffee bean extract.</td>
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<td>Three forms of vitamin K to help promote arterial health and bone support. One per</td>
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<td>day formula.</td>
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<td><strong>PQQ Caps with BioPQQ™ • 10 mg, 30 vegetarian capsules, Item # 01500</strong></td>
<td>$24</td>
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<td>Promotes mitochondrial biogenesis (generation of new mitochondria) in aging cells.</td>
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<td><strong>DHEA (Dehydroepiandrosterone) • 25 mg, 100 capsules, Item # 00335</strong></td>
<td>$15</td>
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<td>A hormone that declines with aging, benefits overall health.</td>
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<td><strong>Mitochondrial Energy Optimizer with BioPQQ™ • 120 capsules, Item # 01568</strong></td>
<td>$94</td>
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<td>To maintain healthy cellular function, protein structural integrity, and mitochondrial biogenesis.</td>
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<td><strong>SAME • 400 mg, 20 enteric-coated tablets, Item # 00557</strong></td>
<td>$28</td>
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<td>5-adenosylmethionine in double-strength potency for mood elevation.</td>
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<td><strong>Super Zeaxanthin with Lutein, Meso-Zeaxanthin Plus Astaxanthin and C3G</strong></td>
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<td>60 softgels, Item # 01586</td>
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<td>Supports night vision and macular density.</td>
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<tr>
<td><strong>Optimized Resveratrol with Synergistic Grape-Berry Actives</strong></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</td>
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<tr>
<td>to support DNA “longevity genes.” One per day resveratrol formula.</td>
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<tr>
<th>Product Name</th>
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<th>Our Low Retail Price</th>
<th>Member-Volume Discount Price Per Bottle</th>
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<td>Advanced Anti-Adipocyte Formula with AdipoStat &amp; Integra-Lean* African Mango Irvingia*</td>
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<td>01509</td>
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<td>Prelox® Natural Sex for Men®</td>
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<td>300 mg</td>
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<td>ArthroMax™ Advanced with UC-II® and AprèsFlex™</td>
<td>60 caps</td>
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<td>CoffeeGenic™ Green Coffee Extract</td>
<td>200 mg</td>
<td>01604</td>
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<td>30 softgels</td>
<td>01600</td>
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<td>Natural Stress Relief</td>
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<td>Gamma E Tocopherol with Sesame Lignans</td>
<td>60 softgels</td>
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<td>Super Bio-Curcumin®</td>
<td>400 mg</td>
<td>00407</td>
<td>$38</td>
<td>$23.63 (four-bottle purchase)</td>
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<tr>
<td>Super Booster Softgels with Advanced K2 Complex</td>
<td>60 softgels</td>
<td>01590</td>
<td>$42</td>
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<td>Skin Restoring Ceramides with Lipowheat™</td>
<td>30 liquid caps</td>
<td>01502</td>
<td>$25</td>
<td>$15.53 (four-bottle purchase)</td>
</tr>
</tbody>
</table>

* These supplements should be taken in conjunction with a healthy diet and regular exercise program. Results may vary.

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Protect Your Joints from Autoimmune Attack
More than 52 million Americans suffer from some form of arthritis.\(^1\) Conventional medical wisdom has long held that rheumatoid arthritis results from an autoimmune attack on joints, while osteoarthritis was thought to result from age-related “wear-and-tear.”

For the first time, a team of researchers\(^2\) at Stanford University has demonstrated that this is not true!

It turns out that osteoarthritis is accompanied by the same pathological, pro-inflammatory immune factors involved in rheumatoid arthritis. Even more compelling was their finding that, if treatment is initiated before symptoms manifest, osteoarthritis may be entirely prevented.

Unfortunately, the list of available drugs to combat autoimmune disorders—including long-term treatment with corticosteroids like prednisone—is notoriously limited and comes with life-threatening complications, including obesity and diabetes.

The exciting news is a novel intervention has been identified that safely regulates the immune system to protect aging joint tissue from autoimmune attacks.

In this article, you will learn about UC-II\(^*\), a form of undenatured type II collagen. Its unique molecular characteristics prevent immune cells’ overreaction to proteins normally found in cartilage and joint tissue that lead to pain and stiffness in both rheumatoid and osteoarthritis.\(^3-7\)

In multiple clinical trials using this proprietary collagen formulation, scientists at Harvard\(^8\) have been able to achieve relief of arthritic symptoms, with some patients experiencing complete remission!\(^9\)

You will also learn how UC-II\(^*\)’s mode of action may be synergistically enhanced when combined with Boswellia serrata and two other joint-renewing nutrients. > >
The Stanford team’s discovery of the autoimmune link between osteoarthritis and rheumatoid arthritis was first presented in late 2011.

A group of 25 scientists concluded that the development of osteoarthritis is in great part driven by low-grade inflammatory processes. Specifically, the researchers discovered that the body launches an orchestrated, powerful attack on the synovial joints via signaling proteins normally used to fight infections. This autoimmune response, they reported, plays a key role in osteoarthritis onset.

Synovial joints are the most common joint types in the human body. They contain soft-tissue cushioning in addition to cartilage, along with synovial fluid, a natural lubricant. Knees, hips, and shoulders are just a few of the commonly arthritic joints that fall into this category.

What the Stanford team found was that low-grade inflammation is not merely an early symptom of osteoarthritic cartilage destruction in synovial joints—it is the trigger that causes it. The study also revealed that by targeting the autoimmune derangements that occur early on in the development of osteoarthritis, arthritis might be completely preventable.

They went on to point out that drugs intended to inhibit the arthritic reaction (like corticosteroids) paradoxically compromise the immune system. It would be far safer, they reported, if a natural way to turn off the body’s abnormal response were available.

**Novel Method to Target the Pathologic Immune Response**

These compelling new findings coincided with the development of a natural intervention shown to protect tissues in aging joints called undenatured type II collagen.

Here’s how it works.

Joints are lined with cartilage that both lubricates joints and absorbs physical impacts, preserving ease of motion and comfort. The bulk of the cartilage in your joints consists of collagen, a biomolecular protein critical to reducing friction and keeping joints youthful.

Osteoarthritis and rheumatoid arthritis both involve the structural degradation and gradual destruction of cartilage in aging joints. Osteoarthritis was long thought to be a consequence of simple “wear-and-tear” on joints (and hence largely inevitable). Rheumatoid arthritis, on the other hand, was recognized as an inflammatory autoimmune disease that arises when the body mistakenly attacks its own tissues, in this case the joint linings and cartilage.

We now know that both arise from pro-inflammatory immune factors.
PROTECT YOUR JOINTS FROM AUTOIMMUNE ATTACK

UC-II® Triggers Specific Oral Tolerance for Lasting Joint Relief

In both osteoarthritis and rheumatoid arthritis, the chief cause of autoimmune response is exposed collagen and the ensuing attack by sensitized killer T-cells.7,16

Suppose an effective means of regulating killer T-cells before they encountered exposed collagen could be developed? This would “re-train” them to treat exposed collagen as a harmless substance and prevent joint degradation and destruction.

In 2000, the first hint of just such an intervention emerged.

A team of scientists at the University of Nebraska was surprised to find that chicken soup prevented the mobilization of immune system cells to sites of inflammation.17 Upon further analysis, it was not vegetables but a soluble component of the chicken broth itself that exerted this anti-inflammatory activity.

The researchers believe that it was likely the collagen from chicken bones in the broth that was the source of this beneficial anti-inflammatory effect.

Owing to its particular molecular structure, the chicken-derived type II collagen in UC-II® acts as a kind of “reverse vaccine,” one that regulates the immune system so that it stops mobilizing attacks against proteins normally found in healthy joint cartilage.

It does so by inducing what immunologists call specific oral tolerance—the desensitization of immune response to specific agents via an orally administered intervention. This is why UC-II® may be likened to a kind of oral vaccine that reverses T-cell attacks on exposed cartilage.

Scientists at Harvard first studied the effects of UC-II® on human patients with rheumatoid arthritis, long established as an autoimmune disorder. In a randomized, double-blind trial of 60 patients, undenatured type II chicken collagen produced a significant decrease in the number of swollen and painful joints within 3 months, compared to the placebo group. In fact, 14% of patients achieved complete remission.8 No side effects were found.8

Later, a much larger study of 274 rheumatoid arthritis patients confirmed this finding, as did a study on patients with juvenile rheumatoid arthritis, a particularly aggressive form of this disease.18

Turning their attention to osteoarthritis, scientists tested undenatured type II chicken collagen on horses and dogs. They noted a reduction of 88% in measurable pain among horses given this formulation.16 In one study, moderately arthritic dogs given the undenatured collagen formulation were able to...
**Why “Undenatured” Type II Collagen?**

As discussed earlier, immune system **T-cells** are tasked with recognizing and distinguishing between "self" molecules and "foreign" ones. They do this important work by responding to very specific molecular shapes and **3-dimensional structures**. If **T-cells in the blood** are simply exposed, without any "training," to a previously unrecognized protein structure (such as those found on joint collagen) they react violently and trigger a **massive inflammatory response** to destroy the protein.

This is why, when scientists want to create an animal model of arthritis, they inject collagen into their subjects, sensitizing the T-cells **in their blood** to the protein. Those **circulating T-cells** set up inflammation in the animal's joints, with their rich supplies of collagen.

If T-cells are given adequate preparation, however, they can be "taught" that a specific molecule is a **friend** rather than a **foe**. Where does such T-cell "training" take place?

In the **intestinal tract**, specifically the lower end of the small intestine, which is rich in collections of immune tissue called **Peyer's patches**. Peyer's patches act as "training centers" for T-cells, exposing them to all sorts of molecular shapes that are natural components of the food we eat. In that fashion, we **desensitize our immune systems** and develop a natural **tolerance** to new foods without having constant allergic or inflammatory reactions.

So, by providing **native collagen** of the right **3-dimensional structure** to the **digestive tract**, rather than to the bloodstream directly, we can "educate" our T-cells to ignore collagen when they encounter it in joints. Scientists say that this enables people to develop **oral tolerance** to collagen.

And **oral tolerance to collagen powerfully suppresses joint inflammation**, as has been shown in numerous laboratory studies. Oral administration of soluble type II collagen even prevents arthritis induced experimentally by collagen injections.

But **not just any collagen works**. Typical commercial processing causes collagen to become **denatured**, uncoiling from its normal helical shape and **losing** its 3-dimensional structure. Denatured collagen has no beneficial effects on joint inflammation.

A more natural form of collagen, called **undenatured type II collagen**, or **UC-II**, has recently been developed. UC-II is a highly effective product derived from chicken breast cartilage, a rich source of natural collagen. UC-II retains its original 3-dimensional molecular structure, keeping it recognizable by T-cells in Peyer's patches. And UC-II is robust enough to survive the harsh conditions in the stomach and small intestine, arriving at Peyer's patches with **its molecules intact**.

Pain scores on the visual analog scale (VAS) decreased **40%** for the collagen group, while pain scores for the glucosamine/chondroitin group decreased just **15%**.

Finally, using the Lequesne's functional index score—which measures pain during daily activities, such as walking—the study team found that undenatured type II chicken collagen reduced this score by **20%**, while the combination of glucosamine and chondroitin lowered the score by only **6%**. All results were observed in just **90 days**.

So scientific studies have established that a dosage of **40 mg a day** of undenatured type II chicken collagen induces **oral tolerance** to exposed collagen—**inhibiting** the arthritic immune response that inflames joints, degrades cartilage and bone, and as a result, further inflames joints in a vicious and degenerative cycle.
Neutralizing the Pro-inflammatory 5-LOX Enzyme

Incorporating a safe anti-inflammatory agent in a joint protection program may provide an additional layer of defense against arthritic damage and pain, by helping to eliminate the immune trigger.

In traditional Indian medicine, the gum resin of *Boswellia serrata* is associated with alleviating inflammatory diseases such as arthritis. Double-blind, placebo-controlled studies have shown boswellia decreases swelling and pain in patients with osteoarthritis of the knee.20

Various compounds within boswellia exert an anti-inflammatory action that is different from most anti-inflammatory agents: they inhibit the pro-inflammatory enzyme 5-lipoxygenase or 5-LOX. A highly bioactive boswellia compound—called 3-O-acetyl-11-keto-β-boswellic acid, or AKBA—directly binds to and selectively inhibits 5-LOX.21,22 This prevents 5-LOX from facilitating the production of leukotriene, a pro-inflammatory compound that damages cartilage and joints. AKBA also reduces pro-inflammatory *leukocyte elastase* activity.21 The problem up to now has been limited bioavailability of AKBA following oral administration.

Fortunately, researchers have developed a boswellia formulation with enhanced bioavailability. Scientists administering this patented boswellia compound to animals found that it increased the bioavailability of AKBA in the systemic circulation by 52%, compared with a standard boswellia extract.21

The researchers concluded that the AKBA-rich boswellia product “consistently...confers better anti-inflammatory efficacy,” and “provides more potential benefits in recovering articular cartilage damage... due to inflammatory insult in arthritis such as osteoarthritis or rheumatoid arthritis.”21

In a double-blind, randomized, placebo-controlled study on human patients with osteoarthritis, 100 mg of the patented AKBA-enriched boswellia extract inhibited the cartilage-degrading enzyme *MMP-3*, and exhibited an anti-inflammatory action that was superior to a standard boswellia extract. Benefits were seen as early as in the 90-day study as 7 days. The journal-published report described the formulation as a “novel synergistic composition.”23

Additional Nutrients to Rebuild Aging Joints

In addition to inducing oral tolerance in the immune system, and blocking pro-inflammatory 5-LOX enzymes—it is important to support the structure of healthy joints.

Two of these nutrients—glucosamine sulfate and a patented form of boron—round out an effective anti-arthritis program by protecting existing cartilage and synovial fluid in the joint, as well as providing nutritional support for healthy joint structure.

**Glucosamine**

Glucosamine is a component of cartilage that has been shown to be joint-protective. While generally viewed as a partial treatment for osteoarthritis, research suggests it may also be effective against rheumatoid arthritis.24

Inflammatory cytokines are directly implicated in the development and progression of osteoarthritis. In the lab, researchers found that glucosamine produces a four-fold reduction in inflammatory cytokine-induced gene expression.25

In another lab study, glucosamine successfully inhibited a number of pro-inflammatory factors (*nuclear factor-kappaB* activity, *prostaglandin E2*, and the gene expression of COX-2) supporting its use “as
In a review of previous studies, scientists found that boron exerts favorable immunomodulatory effects on the inflammatory process, decreasing joint swelling and improving restricted movement. Boron was also found to inhibit lipoxygenase (LOX)—an enzyme that triggers the inflammatory cascade—and this inhibitory effect on LOX decreases levels of inflammatory leukotrienes.38

In a double-blind pilot study in people with severe osteoarthritis, scientists found that of those who started the trial, 50% of those taking boron improved; and of those completing the trial, 71% of those taking boron improved; but only 10% of those taking placebo improved. No side effects were observed.39

In another study, bone samples were taken from fracture patients and compared to samples from osteoarthritis patients and to control bone samples. Researchers found no differences between fracture and control bone samples, but samples of bone from areas adjacent to osteoarthritic joints showed reduced mineral content, including a lower level of boron. This may indicate that there is a more rapid turnover of bone in these afflicted joints, and that boron—used as a bone-building material—is quickly depleted.40

Scientists have now developed and patented a form of boron that is identical to that found in plants, making it highly bioavailable. A dose of just 1.5 mg of the patented form of boron may provide a key constituent for rebuilding the damaged bones and joints of osteoarthritis patients.

Glucosamine and boron—two natural, joint-supporting nutrients—may be key supporting players for the beneficial effects of undenatured type II chicken collagen and the inflammation-blocking action of the patented, more absorbable form of Boswellia serrata.

**Summary**

A team of Stanford researchers recently demonstrated that both rheumatoid and osteoarthritis are triggered by an abnormal immune response.

Arthritis is traditionally treated with side-effect-prone anti-inflammatory and immune-suppressing drugs. A unique compound has been developed that is capable of safely and naturally desensitizing the immune system so that it “learns” to stop launching the attacks on aging joints that cause arthritis pain and swelling.

Through a pathway known as induced oral tolerance, undenatured type II chicken collagen retrains the immune system to correctly recognize exposed cartilage proteins as the body’s own tissues—instead of attacking them.
of incorrectly seeing them as foreign microbes—thus preventing the inflammatory and destructive attack that causes osteoarthritic joint pain and stiffness.

Supported by the anti-inflammatory action of a novel composition of AKBA-enriched *Boswellia serrata*—and further boosted by the joint-rebuilding nutrients, glucosamine sulfate and boron, **40 mg a day** of undenatured type II chicken collagen may halt the abnormal immune process that strikes arthritis sufferers.

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


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**Complete Relief—Without a Potentially Life-Threatening Procedure**

An 88-year-old female presented with knee cartilage degeneration, severe pain, and bone spurs. Her doctors advised that she undergo **total knee replacement surgery** as the best option.

Total knee replacement comes with significant risks and complications, especially in maturing individuals. These include:

- Blood clots in the legs that can travel to the lungs (pulmonary embolism)
- Urinary tract infection,
- Nausea and vomiting (related to pain medication)
- Chronic knee pain and stiffness
- Bleeding into the knee joint
- Nerve damage
- Blood vessel injury
- Infection of the knee which can require re-operation

Ultimately the patient opted for the recommended **40 mg per day** dose of a proprietary ingredient supplying 10 mg of undenatured type II collagen. Within three years, at age 91, she achieved restored mobility and is able to climb five flights of stairs without aid or rest.

Aging is Characterized by Inflammation, Glycation, and Mitochondrial Decay

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

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

- **CARNOSINE**: As humans age, proteins in their bodies become irreversibly damaged by glycation reactions. Glycation is the cross-linking of proteins and sugar to form non-functioning structures called advanced glycation end products in the body, which can lead to alterations of normal cell function. Carnosine is not only a powerful anti-glycating agent, but it also protects neurons against reactive and cytotoxic protein carbonyl species associated with normal aging.15

- **POQ**: This breakthrough micronutrient has been shown to trigger mitochondrial biogenesis—the growth of new mitochondria in aging cells! POQ also activates genes involved in protecting the delicate structures within the mitochondria.20

- **LUTEOLIN**: Systemic inflammation is involved in most undesirable consequences of aging. Culprits behind inflammatory reactions are pro-inflammatory cytokines, such as interleukin-1 and tumor necrosis factor-alpha. Luteolin is a plant extract that has been shown to modulate these dangerous inflammatory cytokines.11,16

- **BENFOTIAMINE**: Effectively modulates multiple destructive biochemical pathways that are induced by higher than desirable blood glucose levels. Human mortality studies indicate that ideal fasting glucose levels are between 74–85 mg/dL. Yet many aging people have fasting glucose above 90 mg/dL, which is less than optimal.16 Benfotiamine protects endothelial cell integrity from the effects of high glucose levels. In addition, benfotiamine exhibits direct antineoplastic activity and prevents induction of DNA damage.20

- **PYRIDOXAL 5’-PHOSPHATE**: Aging results in the formation of advanced glycation end products throughout the body. Pyridoxal 5’-phosphate is the active form of vitamin B6 that has been shown to protect against both lipid and protein glycation reactions.21-24

**R-LIPOIC ACID**: Destructive free-radical activity in the mitochondria plays a major role in the loss of cellular vitality. A micronencapsulated 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.25-28

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

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

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

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

- **Carnosine**: 1000 mg
- **ArginoCarn™ Acetyl-L-carnitine arginate DIHCl**: 675 mg
- **Bio-Enhanced® R-Lipoic acid**: 150 mg (micronencapsulated)
- **Benfotiamine**: 150 mg
- **Pyridoxal 5’-Phosphate**: 100 mg
- **BioPQQ™**: 10 mg
- **Luteolin**: 8 mg

To order Mitochondrial Energy Optimizer with BioPQQ™, call 1-800-544-4440 or visit www.LifeExtension.com

References:
1. Alcaino/Altman. 2006 Apr-Jun;21(2):125-32

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.
Better Absorption for Optimum Benefit

AprèsFlex™ represents a quantum leap forward in the delivery to aging joints of boswellia, long prized for its ability to help with inflammatory issues. It is a superior inhibitor of the enzyme 5-lipoxygenase or 5-LOX.

Excess activity of 5-LOX results in the accumulation of leukotriene B4, a pro-inflammatory compound that affects aging joints. Boswellia has been shown to bind directly to the 5-LOX enzyme in our bodies, preventing it from facilitating production of pro-inflammatory leukotrienes.1,2

AprèsFlex™ boswellia absorbs into the blood 52% better than previously available forms of boswellia, for superior effectiveness.

ArthroMax™ Advanced with UC-II® and AprèsFlex™

Now with Dual-Action Support for Aging Joints!

As you grow older, age-related stiffness and discomfort in the joints becomes a fact of life. Activities once routine become a challenge as limited mobility hampers your every move.

You now have a more potent option to provide broad-spectrum support for aging joints.

ArthroMax™ Advanced with UC-II® and AprèsFlex™ is a multi-nutrient formula based on the very latest data on natural support for joint health. The new ArthroMax™ formula provides more joint support than ever before, enhanced with two innovative, clinically validated ingredients: AprèsFlex™ and UC-II®.

*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.
ArthroMax™ Advanced with UC-II® and AprèsFlex™

In addition to AprèsFlex™, the new ArthroMax™ contains a novel standardized chicken cartilage: UC-II®. New data show it helps with immune issues that can impact joint discomfort and ease of motion in aging individuals.

Two capsules of the new ArthroMax™ Advanced with UC-II® and AprèsFlex™ provide the following nutrients in one convenient, joint-protecting formula:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC-II® standardised chicken cartilage</td>
<td>40 mg</td>
</tr>
<tr>
<td>Glucosamine sulfate 2KCl (from corn)</td>
<td>1500 mg</td>
</tr>
<tr>
<td>AprèsFlex™ (Boswellia serrata) extract</td>
<td>100 mg</td>
</tr>
<tr>
<td>Boron (calcium fructoborate as patented FruiteX B® OsteoBoron®)</td>
<td>1.5 mg</td>
</tr>
</tbody>
</table>

The retail price of a bottle of 60 capsules of ArthroMax™ Advanced with UC-II® and AprèsFlex™ is $36. If a member buys four bottles during Super Sale, the price is reduced to $21.60 per bottle.

ArthroMax™ with Theaflavins and AprèsFlex™

ArthroMax is also available with Black Tea Theaflavins (without UC-II®) to protect against immune attack in the joints via a separate mechanism.

Inflammatory reactions are regulated by a series of “cytokines” produced in the body. Normal aging results in an unfavorable balance of these cytokines that contributes to persistent inflammatory conditions. Studies have shown that a special fraction found in black tea suppresses proinflammatory cytokines at the genomic level. Scientists have found that these compounds called theaflavins uniquely downregulate the expression of genes and cytokines associated with inflammatory conditions.

ArthroMax™ with Theaflavins formula provides these bioactive theaflavin fractions along with methylsulfonylmethane (MSM), which contains sulfur components that are critically important in maintaining comfortable joint function.* ArthroMax™ with Theaflavins also contains FruiteX B® OsteoBoron®, a patented form of boron that is identical to natural plant forms found in food. Considered more bioavailable than other forms of boron, FruiteX B® OsteoBoron® also supports healthy bones and joints.*

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>AprèsFlex™ (Boswellia serrata) extract</td>
<td>100 mg</td>
</tr>
<tr>
<td>Glucosamine sulfate 2KCl (from corn)</td>
<td>2000 mg</td>
</tr>
<tr>
<td>Methylsulfonylmethane (MSM)</td>
<td>1000 mg</td>
</tr>
<tr>
<td>Black Tea (Camellia sinensis) (decaf.) extract</td>
<td>440 mg</td>
</tr>
<tr>
<td>Boron (calcium fructoborate as patented FruiteX B® OsteoBoron®)</td>
<td>1.5 mg</td>
</tr>
</tbody>
</table>

The retail price of a bottle of 120 vegetarian capsules of ArthroMax™ with Theaflavins and AprèsFlex™ is $44. If a member buys four bottles during Super Sale, the price is reduced to $27 per bottle.

References

*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.
Maintaining healthy, flexible joints is essential to quality of life. Joint stiffness and discomfort can stand in the way of performing even simple everyday tasks.

Most people do not obtain critical nutrients shown to support youthful joint function and mobility.

To meet this urgent need, Life Extension® introduces Krill Healthy Joint Formula, a patent-pending blend of deep-sea whole krill oil sourced in Antarctica, combined with hyaluronic acid and astaxanthin.

In a recent clinical trial involving over 100 maturing individuals, a 55% reduction in joint discomfort was observed in less than three months, with 63% of participants maintaining ease of motion.¹

**THREE SYNERGISTIC COMPOUNDS FOR SUPERIOR BENEFIT**

The data reveals that the fatty acids found in krill oil are particularly effective for joint health.² These unique fatty acids have been shown to specifically target joint tissue.²,³

Hyaluronic acid occurs naturally in the joints,⁴ where it acts to lubricate and cushion against repeated physical impacts.⁵ Because it forms a major component of cartilage and soft tissue,⁴ it is widely used to promote joint health.⁴⁻⁸

The difficulty has been that hyaluronic acid is a large molecule not well absorbed by the body. When combined with krill oil, it has been shown to reach significantly higher levels in the bloodstream than in standalone form.⁸

Krill oil is a natural source of the antioxidant carotenoid astaxanthin. Astaxanthin works in multiple ways, including suppression of free radical activity and enhanced mitochondrial function.⁹ It also maintains krill oil’s molecular stability.

Most commercially available krill oils do not contain significant amounts of astaxanthin because it is nearly eliminated during processing. Krill Healthy Joint Formula is fortified with astaxanthin, for maximum stability and superior benefit.

**JUST ONE SOFTGEL DAILY**

The suggested daily serving of one Krill Healthy Joint Formula softgel daily supplies 353 mg of this proprietary blend.

A bottle containing 30 softgels of Krill Healthy Joint Formula retails for $32. If a member buys four bottles during Super Sale, the price is reduced to $19.58 per bottle. Just one softgel a day of Krill Healthy Joint Formula duplicates successful human clinical trials.

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.

Contains crustacean shellfish (krill).
Licensed from Valensa International.
Zanthin® is a registered trademark of Valensa International, Inc.

Item # 01600

To order Krill Healthy Joint 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.

Those with stubborn problems may consider using Krill Healthy Joint Formula in addition to one of the new ArthroMax formulas described on page 52 of this issue.
Top Off Your TESTOSTERONE Naturally

Low Testosterone Levels May Lead to:
- Reduced Sex Drive • Less Energy
- Cloudy Thinking • Weight Gain
- Cardiovascular Issues

Maintaining healthy testosterone levels is one of the most important steps you can take to regain your health and improve your performance. With research showing that by the time a man is 60 years old, he may produce 60% less testosterone than he did in his 20s, the time is now to add Life Extension’s Super MiraForte with Standardized Lignans to your supplement regimen.

Each daily dose of Super MiraForte contains the following testosterone supporting ingredients:

- 1500 mg Chrysin
- 15 mg Bioperine®
- 850 mg Muira puama
- 282 mg Nettle root
- 50 mg Ginger root
- 15 mg Chelated elemental zinc
- 320 mg Maca
- 33.4 mg HMRlignan™ Norway Spruce lignan extract

The retail price for a bottle of 120 capsules of Super MiraForte with Standardized Lignans is $62. If a member buys four bottles during Super Sale, the price is reduced to $37.80 per bottle.


To order Super MiraForte call 1-800-544-4440 or visit www.LifeExtension.com

Contains corn. Bioperine® is a registered trademark of Sabinsa Corp. HMRlignan™ is a registered trademark used under sublicense from Lineae S.A.

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.
Can a Diabetes Drug Prevent Cancer Death?
With its near-perfect safety record, low cost, and favorable side-effect profile, the anti-diabetic drug **metformin** is one of the few FDA-approved drugs **Life Extension** recommends its members should take every day.\(^1\)

Between 1990 and 2011 alone,\(^1\) over 1,000 published studies have yielded confirmatory data on its numerous anti-aging properties, from weight loss and glucose control to cardiovascular disease and cancer defense.

As the medical establishment continues to *ignore* this mounting body of evidence, ongoing research powerfully validates our position.

In one of the largest studies of its kind, a team of scientists analyzed cancer risk among 8,000 diabetics treated with metformin.\(^2\) Over a 10-year period, they observed a 54% *lower* incidence of all cancers compared to the general population.

Metformin not only exerted a major protective effect against cancer development, but those who developed cancer exhibited a *significantly higher survival rate*, including those with malignant cancers of the lung, colon, and breast. Of equal significance was the finding that the earlier the metformin regimen was initiated, the greater the preventive benefit.

Giving that diabetics are predisposed to a horrifically wide array of cancers—of the breast, colon, liver, pancreas, kidney, endometrium (uterine lining), among others\(^3-8\)—these results have *profound* implications for all maturing individuals.

In this article, the most recent data supporting metformin’s *anti-cancer* mechanisms are detailed. You will learn of its specific mechanisms of action, which shed further light on the link between obesity, diabetes, and cancer initiation. You will also discover how metformin induces cancer cell death at their earliest stages of development via *metabolic* pathways that also promote *weight loss and optimal glucose control.* > >
LIFE EXTENSION | FEBRUARY 2012

Metformin Slashes Cancer Risk in Multiple Clinical Trials

The study cited in the introduction of this article (54% lower risk of cancer) was of such medical importance as to merit an accompanying editorial by noted cancer epidemiologist Bruce B. Duncan, MD, PhD.7 Duncan observed that this was the most compelling amongst a rapidly growing set of studies, all suggesting that metformin might induce profound effects in preventing a wide range of cancers while improving prognosis in people who do develop malignancies.8

Additional supportive studies validate these findings.6 In a cohort study of more than 12,000 patients, metformin users died of cancer 30% less often than those taking another category of drug called sulfonylureas (including DiaBeta® and Glucotrol®).6,7 Of equal and even greater significance, people taking insulin had a 90% greater death rate than the metformin users in that study.6

In a second study of different design, people taking metformin for diabetes control for more than 36 months had a 72% lower risk of developing cancer than those on other regimens.6,8 Similarly, in a third study, metformin users had a 62% lower risk of developing cancer, compared with those who had never used metformin.6,9 Of significance, that study also showed an increased risk of cancer in people who were taking insulin or oral antidiabetes drugs other than metformin.

There’s additional evidence that metformin not only prevents cancer from developing, but also helps to improve the prognosis in patients who do develop tumors. In one study of breast cancer patients on chemotherapy, 24% of those who were also taking metformin had a complete response rate, compared with just 8% for those not taking it.6,10 As a result of these “incidental” findings, scientists have initiated several clinical trials to examine the impact of metformin as formal additional treatment for breast and other cancers.6,11

Numerous recent studies further support a close association between metformin use and substantially reduced cancer incidence, along with improved survival.12,16

These observations raise the question, “Why should a diabetes drug protect against cancer?”6

The answer is both simple and surprising.

Diabetes and Cancer Initiation: How Metformin Works

Years of clinical analysis have confirmed the link between obesity and diabetes, conditions whose co-occurrence has given rise to the term diabesity. Diabesity is a direct causative factor in the development of a wide range of cancers. Diabetics have as much as a 41% increased risk for virtually all cancer types compared to healthy people. Elevated blood sugar alone increases the risk of certain cancers, including those of the kidney, pancreas, and skin (melanoma).6,17,18

Obesity increases cancer risk for more than a dozen different cancers.6 A 59% increase in cancer risk has been documented for every 5-unit increase in body mass index (BMI) alone.6,19 Studies show that obesity is responsible for up to 20% of cancer deaths in women.20

CANCER CELL
The link between diabesity and cancer points to the underlying mechanisms of action by which metformin works as a cancer-preventing agent.

Metformin operates at the molecular level by activating adenosine monophosphate-activated protein kinase or AMPK, a molecule essential to life. AMPK or its molecular analogs are present in virtually all living organisms. It also happens to be intimately involved in cellular processes whose dys-regulation play a central role in both diabesity and cancer initiation.

Diabetes and obesity result from various metabolic derangements. Cancer results from disordered regulation of cell growth. AMPK is critical to normal regulation of both metabolism and cell growth, as a result of millions of years of evolutionary development.

As a fuel-sensor and metabolic master switch, AMPK recognizes and responds to changes in cellular energy levels, determining how fats and carbohydrates will be used in storing or utilizing energy. In metabolic terms, AMPK tells cells to conserve and generate new energy stores. In so doing, it lowers sugar output from the liver, increases glucose uptake from the blood, maintains insulin sensitivity, and ultimately lowers blood sugar.

AMPK exerts similar effects in terms of regulating cell growth and replication, instructing cells to conserve energy, slowing and often shutting down aberrant cell growth entirely. In essence, when AMPK is activated, incipient cancer cells starve themselves to death for lack of adequate energy supplies.

We can naturally activate AMPK in our bodies through several time-honored mechanisms. Calorie restriction lowers cellular energy stores and activates AMPK. Known to increase life span in virtually all species, calorie restriction has been shown to reduce cancer incidence and death in primate studies. And a recent study showed that gastric bypass surgery not only produced sustained weight loss, but also reduced cancer incidence by 42% in women patients (no effect was seen in men).

Exercise is another strong natural activator of AMPK, and studies show that people with the highest levels of physical activity are protected against cancers of the lung and colon by as much as 30%.

Exercise and weight loss are lifestyle changes that most of us need to make, while bariatric surgery and massive calorie restriction have more limited appeal and application as means of activating AMPK and lowering cancer risk.

Metformin Combats Diabesity and Cancer

- The anti-diabetic drug metformin was recently shown to slash risk of all cancers by 54% among 8,000 diabetics over a 10-year period.
- Prognosis among those under study who developed cancer was also significantly improved, including cancers of the lung, colon, and breast.
- Supportive epidemiological studies reveal that people taking metformin for glucose control have markedly reduced rates of cancer, despite the higher cancer risks imposed by diabetes and obesity.
- Detailed molecular analyses are elucidating the mechanisms by which metformin prevents cancer.
- Metformin works through a common mechanism to lower blood glucose and to reduce cancer risk, shedding new light on the intimate relationship between diabetes, obesity, and cancer.
- Laboratory and clinical data now strongly suggest that metformin can prevent cancers of the colon, lung, and breast, even in non-diabetic individuals.
- If you are concerned about lowering your cancer risk and improving your metabolic profile, ask your doctor about starting a metformin regimen at a dose of 250-500 mg twice a day.
Metformin, a natural product of the French lilac,\(^29\) is a safe, readily available, and inexpensive way to activate AMPK and starve cancer cells of their energy supplies.\(^6,30,31\) In doing so, metformin powerfully restores healthy regulation—both of metabolic factors and of those that regulate cell growth.

Let’s now examine how metformin halts incipient cancers by quelling abnormal cellular proliferation, one of the earliest steps in cancer development.

**Metformin’s Anti-Cancer Power Confirmed in Lab Studies**

Healthy, normal people develop incipient cancer cells in their bodies daily; these cells are normally destroyed by a number of natural processes. When those processes break down, the cancer cells are free to proliferate and form a tumor. An ideal anti-cancer drug, then, would eliminate these altered, “precancerous” cells before they could replicate and become invasive and malignant.\(^32\)

Even in their earliest stages, aggressive cancer cells are notoriously energy-hungry, burning calories at a frenetic rate as they grow out of control.\(^33\) For that reason, targeting cancer cell metabolism now stands at the forefront of cancer prevention research.\(^34\) With its potent ability to shut off the cellular energy pipeline by activating AMPK, metformin is showing its value in preventing or slowing a host of cancer types in laboratory studies.

The consequences of AMPK activation by metformin are numerous. Metformin, added to cultures of many different cancer cell types, blocks proliferation by “stalling” cells at one of several phases of the cell replication cycle, preventing them from reproducing.\(^34-37\) Metformin’s ability to starve cancer cells of energy also enhances the rate of cell death by the process known as apoptosis, one of the body’s natural means of cancer control.\(^34,38\)

Perhaps the most detailed picture of metformin’s antiproliferative actions comes from a 2011 study in France.\(^38\) Researchers there added metformin to melanoma skin cancer cells in culture, and monitored the effects. At 24 hours, metformin had starved the cancer cells to the point that their replicative cell cycle was arrested. By 72 hours, the cells underwent autophagy, a mechanism whereby starving cells literally “eat themselves” in a desperate attempt to survive. And by 96 hours, the cancer cells began dying off en masse by apoptosis.

Several additional antiproliferative mechanisms have recently been demonstrated for metformin in addition to its effects on the AMPK energy-sensing pathway.\(^35,39-42\) That ability to act by multiple mechanisms is called pleiotropy. It is powerfully beneficial because it prevents development of resistance to any one pathway. Pleiotropy is seen much more commonly with natural products such as metformin than with mono-targeted pharmaceutical drugs.

Caution

Using metformin may increase the risk of lactic acidosis, a rare but potentially fatal buildup of lactic acid in the blood. Since congestive heart failure, kidney impairment, and liver problems increase the risk of lactic acidosis, individuals with these conditions are advised against using metformin. Individuals with type 1 diabetes should not take the drug.

People who have recently suffered a heart attack or stroke and those who have recently undergone surgery or are severely dehydrated are more vulnerable to lactic acidosis.\(^63-65\) Consult with your doctor if any of these conditions applies to you or if you are pregnant, planning to become pregnant, or breastfeeding.

Lactic acidosis is a medical emergency. Its symptoms include muscle pain, difficulty breathing, sleepiness, feeling extremely weak or tired, and abdominal pain with nausea, vomiting, or diarrhea.\(^63-65\) If you believe you are suffering from lactic acidosis, seek medical attention immediately.
The combined effect of all of metformin’s pleiotropic mechanisms is a marked reduction of tumor growth in lab animals implanted with human cancer cells.36,43 To date, metformin-induced antiproliferative effects have been demonstrated in cancers of the brain, lung, breast, ovary, prostate, and colon.35,38,44,47 And human studies are now showing important reductions in various tumor markers when metformin is provided to breast cancer patients prior to tumor surgery.48 Importantly, in breast cancer cells, metformin is most active against cancer strains that are resistant to standard chemotherapy drugs.46

**Metformin Prevents Cancers in Non-Diabetic Individuals**

Perhaps the most exciting news to come out of the recent surge in interest in metformin is that the drug can prevent cancers from forming in animals and humans who are not diabetic. As a “mimicker” of a calorie-restricted state, that might be expected of metformin, given that calorie restriction is such a potent cancer-preventive strategy.33,49-51

Since 2008, a small explosion of studies has appeared demonstrating how effective metformin can be in this context, ultimately suggesting that it should be taken regularly by anyone who wants to reduce their risk of dying from cancer.

Research now demonstrates that metformin, provided orally to lab animals, prevents deadly colorectal cancers52 (the second leading cause of cancer deaths in the US, and an astonishingly preventable disease).53 Metformin suppresses intestinal polyp growth, a precursor of colorectal cancer, in mice predisposed to that disease.54 And, in a study of chemically induced colon cancer, metformin significantly reduced formation of so-called “aberrant crypt foci,” which in humans represent an early stage in cancer development.55

Those studies led to the first human study of metformin as a cancer preventive agent in non-diabetic people. Researchers studied 26 non-diabetic people with aberrant crypt foci that had been found on routine colonoscopy.56 They randomly assigned them to receive metformin 250 mg per day, or no treatment, and then performed repeat colonoscopy one month later. The metformin group had a significant decrease in the number of aberrant crypt foci, from nearly 9 per patient down to about 5 per patient, while control patients had no change. This represent a 55% reduction in this cancer precursor in patients taking low-dose metformin.

Chemoprevention studies now also demonstrate similar effects in other cancers. Mice supplemented with oral metformin, exposed to a potent tobacco carcinogen, developed 53% fewer lung cancers than did control animals.57 And when metformin was administered by injection, that protection rate rose to 72%.68

Breast cancer prevention would represent a huge forward stride in extending human life span and reducing suffering. There’s encouraging data here as well. Mice given metformin in their drinking water for 13 days prior to injection with a powerful breast carcinogen had significantly delayed onset of tumor development.58 Several other studies have demonstrated that metformin-supplemented mice experience a reduction in proliferation of cancer-prone breast cells and inhibition of tumor growth.31

There is now a tremendous body of literature showing that metformin prevents cancer cells from
proliferating, and moreover it prevents clinically relevant human cancers from developing, even in non-diabetic, non-obese individuals.59 As a result, one might expect to see large clinical trials of metformin in healthy older adults as a cancer chemopreventive agent.

Sadly, even though calls for such studies are gathering strength, to date no trial has been designed, let alone implemented.60-62 Given metformin’s impressive safety record over nearly 50 years of clinical use,43 there is simply no reason for sensible people to wait for an “official” medical establishment recommendation. People who are concerned about their growing risk of cancer should simply speak to their physicians now, and present them with a synopsis of the data, so that they can begin potentially lifesaving use of metformin today.

Summary

The anti-diabetic drug metformin was recently shown to slash risk of all cancers by 54% among 8,000 diabetics over a 10-year period while significantly improving prognosis among those who developed cancer, including cancers of the lung, colon, and breast.

Diabetes and obesity are twin risks for cancer development. Metformin offers powerful protection against cancer in those populations. Aggressive scientific research is revealing that metformin’s action, activating the cellular energy sensor AMPK, is the key to both its metabolic benefits and its cancer chemopreventive capabilities.

Both human and animal studies definitively confirm that metformin lowers cancer risk dramatically while also preventing new cancer formation, in both diabetic and non-diabetic individuals. Metformin’s 50-year safety record, coupled with its low cost and favorable side effect profile, provide an ironclad rationale for most aging humans to consider taking metformin.

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


53. No authors listed. Advances in reducing colorectal cancer risk. Colorectal cancer is the third most common cancer in women and the second leading cause of cancer death. These statistics belie how preventable this disease really is. Harv Womens Health Watch. 2003 May;10(9):1-2.


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

The retail price for a bottle containing **90 softgels** (three-month supply) is $26. If a member buys four bottles during **Super Sale**, the price is reduced to just **$15.53 per bottle**.

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**Super K formula provides in just one daily softgel:**

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin K1</td>
<td>1000 mcg</td>
</tr>
<tr>
<td>Vitamin K2 (MK-4)</td>
<td>1000 mcg</td>
</tr>
<tr>
<td>Vitamin K2 (MK-7)</td>
<td>100 mcg</td>
</tr>
</tbody>
</table>

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 softgels.

Contains tree nuts (coconut).

**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.

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

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References:

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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.
Curcumin is the health-promoting trace compound derived from the Indian spice turmeric. But not all turmeric is alike.

The curcumin found in the vast majority of dietary supplements is derived from turmeric that is nutritionally inferior.

Why? Almost all growers harvest turmeric at the point when the turmeric root turns its signature yellow color, but before it has fully matured.

The turmeric root requires more time in the ground for highly beneficial phytoneutrients called curcuminoids and sesquiterpenoids to attain peak concentrations.

Life Extension’s Super Bio-Curcumin® derives from turmeric that is organic, cultivated to maturity, then specially transported and processed to preserve and deliver the root’s most complete nutritional profile.

In recent studies comparing the effects of standard curcumin against turmeric extracts comparable to Super Bio-Curcumin®, researchers observed:1,2

- Nearly twice the support for immune health.
- Approximately twice the support for inflammatory issues.
- Almost double the antioxidant support.

A separate study indicated that an antioxidant-rich curcumin extract provided powerful support for heart health.

Unrivaled Potency and Absorarbility with BCM-95®

Curcumin is neither absorbed nor retained well in the blood, which is another challenge facing those who wish to maximize its benefits.

The highly popular Super Bio-Curcumin® uses BCM-95®, a patented, bioenhanced preparation of curcumin. It has been shown to reach 7 times higher concentration in the blood than standard curcumin. 4

The graphs on this page illustrate that one 400 mg vegetarian capsule per day of Super Bio-Curcumin® supplies the equivalent of 2,500-2,800 mg of commercial curcumin supplements.

A bottle containing 60 vegetarian capsules of Super Bio-Curcumin® retails for $38. If a member buys four bottles during Super Sale, the price is reduced to only $23.63 per bottle. Contains rice.

References

CAUTION: Do not take if you have gallbladder problems or gallstones. If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

Bio-Curcumin® and BCM-95® are registered trademarks of Dolcas-Biotech, LLC.


To order Super Bio-Curcumin®, call 1-800-544-4440 or visit www.LifeExtension.com

How Much Curcumin Are You Absorbing?

Chart 1. Super Bio-Curcumin® (BCM-95®) showed 6.9 times greater bioavailability (absorption and sustainability over 8 hours) in humans compared with conventional curcumin (as measured by the area under the curve [AUC] in a plot of blood levels against time, that is, the total amount of curcumin absorbed by the body over 8 hours).

Chart 2. Super Bio-Curcumin® (BCM-95®) showed 6.3 times greater bioavailability (absorption and sustainability over 8 hours) in humans compared with plant-bound curcumin with piperine (as measured by the area under the curve [AUC] in a plot of blood levels against time, that is, the total amount of curcumin absorbed by the body over 8 hours).

Chart 3. Bioavailability in rats fed with BCM-95® showed 3.8 times higher than conventional curcumin.

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.
Suppress Deadly After-Meal Blood Sugar Surges
High blood sugar is fast becoming the leading preventable killer of maturing individuals in the United States. In addition to the 26 million Americans with diabetes, the Centers for Disease Control estimate that more than a third of the general population is now pre-diabetic.¹

This may be just the tip of the iceberg.

As Life Extension® members know, recent data confirm that risk for most degenerative diseases and death rise dramatically when fasting blood glucose exceeds 85 mg/dL.²

Yet the medical establishment persists in defining readings up to 99 mg/dL as “safe.” By this measure, virtually all of us are vulnerable to diabetic complications.

Even more alarming is widespread physician ignorance of the stealth danger posed by blood sugar surges after meals that can reach diabetic levels and last for hours—or even days.

These after-meal glucose “spikes” inflict silent damage to cells via multiple mechanisms and have been linked to cardiovascular disease, cancer, Alzheimer’s disease, kidney failure, and retinal damage.³⁻¹⁶

The good news is there are documented ways to suppress deadly after-meal glucose surges.

The most recent is a green coffee bean extract shown to neutralize a key enzyme that facilitates after-meal glucose surges.

When tested on humans in a placebo-controlled study, this natural extract produced an extraordinary 24% drop in after-meal blood sugar in just 30 minutes!¹⁷ > >
Silent Epidemic of High Blood Sugar

The percentage of adults suffering from dangerous, chronically high blood sugar has been vastly underestimated.

Currently, you aren't considered diabetic unless your fasting blood glucose is higher than 125 mg/dL. The range from 100-125 mg/dL is considered “pre-diabetic,” while anything lower is defined as normal.

Unfortunately, your risk for age-related disease is far greater at these “normal levels” than has been previously recognized. Optimal fasting glucose should be within the range of 70-85 mg/dL.

A recent study of 46,000 middle-aged individuals revealed that more than 80% had fasting blood sugar of 85 mg/dL or higher. A similar epidemiological analysis of 11,000 middle-aged and older people found that more than 85% had fasting blood sugar of 85 mg/dL or higher.

As Life Extension® has long warned, a thorough survey of the scientific literature confirms that maturing individuals with blood sugar levels in these ranges—below 100 mg/dL—are nonetheless at substantially increased risk of virtually all degenerative diseases, including:

- Cancer
- Cardiovascular disease
- Alzheimer's disease
- Kidney disease
- Pancreatic dysfunction
- Diabetic retinopathy (which can lead to blindness)
- Neuropathy (nerve pain and dysfunction)

One team of researchers found that the risk of developing diabetes itself was increased more than seven-fold in people with fasting glucose levels of 105-109 mg/dL, compared with people with fasting glucose levels less than 85 mg/dL.

An analysis of 1,800 maturing individuals revealed that coronary artery disease rates over a 10-year period in individuals currently defined as “pre-diabetic” were nearly identical to those with full-blown diabetes.

A similar analysis of 33,230 men found that high glucose within the “normal” range was independently associated with a 38% increase in deaths from digestive tract cancers.

These results underscore the critical need to redefine diabetes as fasting glucose above 85 mg/dL.

Undetected Daily Diabetic Glucose Levels?

Conventional medicine's approach to glucose control goes beyond the problem of outdated reference ranges. Fasting blood glucose concentrations alone do not identify individuals with an increased risk of glucose-related disease onset because they do not detect dangerous after-meal glucose spikes.

Table 1: Increased Health Risks in People with “Normal” Glucose Levels

<table>
<thead>
<tr>
<th>Condition</th>
<th>Glucose Levels (mg/dL)</th>
<th>Increased Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing Type 2 Diabetes</td>
<td>100-104</td>
<td>Up to 283%</td>
</tr>
<tr>
<td>Stomach Cancer</td>
<td>95-105</td>
<td>Up to 130%</td>
</tr>
<tr>
<td>First-time Heart Attack</td>
<td>Above 88</td>
<td>242%</td>
</tr>
<tr>
<td>Need for Coronary Bypass or Stent Procedure</td>
<td>Above 95</td>
<td>73%</td>
</tr>
</tbody>
</table>
SUPPRESS DEADLY AFTER-MEAL BLOOD SUGAR SURGES

The current diagnostic of fasting glucose readings is only a snapshot that does not adequately measure of an aging individual’s hour-to-hour glucose status over the course of the entire day.

By definition, fasting blood glucose tests are conducted eight or more hours or more after your last meal. This method fails to account for a vital risk marker specific to you as an individual: after each meal, your blood sugar rises sharply for at least two hours before returning to normal.

Depending on the number and frequency of meals consumed, an aging individual may sustain dangerously high blood sugar throughout the day that will not be detected by conventional measures.

A mounting body of scientific evidence suggests that after-meal glucose spikes inflict as much or more damage than high fasting blood sugar.43-46

For example, in aging individuals with “normal” blood sugar readings and “normal” glucose-tolerance tests, heart attack risk increases by 58% for a 21 mg/dL increase in after-meal blood sugar.47 And for a similar after-meal increase, risk of cardiac death increases by 26%.48

This means that if your blood sugar surges 63 mg/dL after a meal, your risk of cardiac death increases nearly twofold.

One research team found that risk of stroke increased when fasting glucose rose above 83 mg/dL. And every 18 mg/dL increase beyond 83 mg/dL resulted in a 27% greater risk of dying from stroke!5

This means that an individual with a fasting blood glucose level of 119 mg/dL has a 54% higher risk of stroke-related death compared to an individual whose fasting blood glucose is only 83 mg/dL. If you wonder why stroke continues to disable and kill so many—despite better control of hypertension than ever—look no further than the epidemic of high blood glucose plaguing aging humans.

These alarming data underscore the vital importance of suppressing after-meal glucose surges and controlling fasting blood glucose in order to prolong healthy life span.

The Little-Known Enzyme Behind Chronic Blood Sugar Overload

Most people think blood sugar levels are determined by the amount of carbohydrates or sugar they eat and how well their pancreas is working.

The truth is more complex.

You won’t hear this from most physicians, but your liver also plays a key role in regulating blood sugar, one that contributes directly to dangerous blood glucose surges after heavy meals.

Control After-Meal Glucose Surges

- Elevated blood sugar is a silent danger that increases the risk of cardiovascular disease, cancer, Alzheimer’s, kidney disease, neuropathy, and retinal damage.
- More than a third of the American population is estimated to be pre-diabetic.
- Currently, fasting blood sugar levels higher than 125 mg/dL are considered diabetic and levels between 100-125 mg/dL are considered pre-diabetic.
- Life Extension advises that optimal fasting blood glucose levels are in the range of 70-85 mg/dL. A growing body of evidence shows that tissue damage and disease risk increase when fasting blood glucose levels are above 85 mg/dL.
- Coffee consumption has been associated with a decreased risk of developing type 2 diabetes.
- A beneficial compound in coffee called chlorogenic acid has been credited with coffee’s glucose-lowering effects.
- In a clinical trial, individuals who received 400 mg of a green coffee berry extract containing 50% chlorogenic acid prior to an oral glucose challenge demonstrated a 32% reduction in blood glucose at 2 hours.
How Much Coffee to Drink or Chlorogenic Acid to Take?

Increased coffee consumption results in a substantially reduced risk of diabetes.57-61 The prestigious journal The Lancet published a 2002 population study that included over 17,000 people. The researchers found a 50% lower risk of diabetes among those who consumed 7 cups of coffee a day compared to those who drank only 2 cups a day.51

So why not just drink more coffee?

Coffee “beans” are the seeds contained inside the plant’s fruit, the coffee berry. They possess a significantly higher proportion of beneficial phenolic acids (50%) than the berry (about 35%).

An analysis of the proprietary green coffee bean extract used in clinical studies cited in this article reveals that just 350 mg supplies the same amount of chlorogenic acid found in 14 cups of dark roast coffee. The problem with dark roasted coffees is that the roasting process removes too many beneficial polyphenols such as chlorogenic acid.

Green coffee bean extract also supplies the antioxidant compound ferulic acid, shown to exert a therapeutic anti-glucose effect in tandem with chlorogenic acid.61

After analyzing the blood of subjects given this green coffee bean extract, one 2008 study published in the Journal of Nutrition confirmed the presence in their blood samples of the same major phenolic compounds—including chlorogenic acid—provided by drinking roasted, brewed coffee. The researchers added that the compounds in green coffee bean extract were highly absorbable and readily metabolized in humans.76

In addition to their high absorption rate, the compounds in green coffee bean extract are believed to furnish stronger glucose-lowering protection than roasted coffee. That’s because roasting destroys much of the coffee bean’s beneficial content.

Conventional “lightly roasted” coffee provides about 92 milligrams of chlorogenic acid per cup. Heavily roasted coffee provides far less chlorogenic acid. A cup of a new “polyphenol-retaining” coffee (with chlorogenic acid added back in after roasting) provides 172 mg of chlorogenic acid. So drinking one or two cups of this new polyphenol-retaining coffee provides 172 to 344 mg of chlorogenic acid, which are in ranges shown to demonstrate therapeutic efficacy.

Green coffee bean extracts are available in new dietary supplements that provide either 200 or 400 mg of chlorogenic acid per serving. The typical dose for most people is 200 mg of chlorogenic acid before most meals. Those with higher glucose levels should take 400 mg before most or all meals.

Under normal conditions, the liver keeps a certain amount of sugar in storage. If your blood sugar falls too low, it releases this stored sugar in order to boost blood glucose back to healthy levels in a process called glycogenolysis.

If its stores of sugar are depleted, your liver has another means at its disposal to boost blood sugar: making sugar on its own from other sources, including fats and protein through a process called gluconeogenesis.

Humans evolved this capability to prevent acute, potentially deadly hypoglycemia (low blood sugar) during near-starvation states.

In young, healthy individuals, both these processes—sugar release or glycogenolysis and blood sugar synthesis or gluconeogenesis—are naturally suppressed after a meal to prevent blood sugar from getting too high.

As you age, this balancing mechanism may become impaired. Your liver releases stored sugar and makes additional sugar after you finish a meal—precisely when your body needs additional blood sugar the least.

At the core of pathologic glycogenolysis (release of stored blood sugar) and gluconeogenesis (synthesis of new sugar) is the enzyme glucose-6-phosphatase. Heavy meals can activate this enzyme, which in turn tells your liver to release its sugar stores and helps it to make more sugar, despite the flood of glucose from the meal you just finished.

It is this age-related dysregulation of glucose-6-phosphatase activity that accounts for the difficulty many maturing individuals face in maintaining optimal glucose levels. The dual processes of glycogenolysis and gluconeogenesis triggered by glucose-6-phosphatase can keep blood sugar high even with a lower-calorie or low-carbohydrate diet since glucose can also be synthesized from proteins and fats. (Note those who practice calorie restriction are usually able to keep their fasting glucose below 86 mg/dL and after-meal glucose surges below 120 mg/dL.)

Suppressing the activity of glucose-6-phosphatase is a cornerstone strategy in maintaining control of after-meal blood sugar spikes and limiting their potentially destructive impact.
In the quest to identify compounds that might favorably target the glucose-6-phosphatase enzyme, researchers turned their attention to the fact that heavy coffee drinkers enjoyed dramatically lower risk of diabetes.

**Chlorogenic Acid Combats Excess Glucose**

An abundance of studies confirms that, in addition to protection against various diseases,\textsuperscript{5,51-56} increased coffee consumption results in a substantially reduced risk of diabetes.\textsuperscript{56-61}

The prestigious journal *Lancet* published a 2002 population study that included over 17,000 people. The researchers found a \textbf{50\%} lower risk of diabetes among those who consumed 7 cups of coffee a day compared to those who drank only 2 cups a day.\textsuperscript{61}

Coffee's anti-diabetic benefits are dose-dependent. In other words, the more you drink, the greater the benefit. And therein lies the problem: drinking seven cups or more of coffee every day is impractical for most people. This set researchers on a quest to uncover the specific glucose-lowering agents contained in coffee.

Coffee's contents are complex, containing more than 1,000 discrete compounds.\textsuperscript{62}

Compelling new data reveal that the chlorogenic acid content in coffee is primarily responsible for its glucose-lowering effects via several interesting mechanisms.\textsuperscript{63,64}

Chlorogenic acid inhibits the glucose-6-phosphatase enzyme that stimulates glycogenolysis and gluconeogenesis.\textsuperscript{65,66} As discussed earlier, excessive activity of this enzyme contributes to dangerous after-meal blood sugar spikes and high blood glucose levels between meals.\textsuperscript{67}

Chlorogenic acid directly inhibits glucose absorption from the intestinal tract. Studies show that coffee with a high chlorogenic acid content delays intestinal glucose absorption.\textsuperscript{59}

Chlorogenic acid inhibits the intestinal enzyme alpha-glucosidase that breaks apart complex sugars and enhances their absorption.\textsuperscript{68} Slowing the breakdown of those common sugars (including sucrose, or table sugar), dramatically limits after-meal glucose spikes.

Chlorogenic acid-rich plant extracts have been shown to reduce fasting blood glucose values by more than \textbf{15\%} in diabetic patients with poor response to medication.\textsuperscript{59} A similar effect was seen in healthy volunteers, whose intestinal absorption of glucose was reduced by 7\% following a chlorogenic acid-enriched coffee drink.\textsuperscript{70} And a chlorogenic acid supplement of 1 gram reduced glucose levels by 13 mg/dL, 15 minutes after an oral glucose challenge, demonstrating its ability to \textbf{lower the after-meal spike} in humans.\textsuperscript{71}

**Skyrocketing Rates of Diabetes**

In 2008, there were an estimated 347 million people with diabetes in the world, up from 153 million just 30 years earlier.\textsuperscript{86} Researchers attributed about 70\% of that increase to the global population explosion, but the remaining 30\% are related to the rapid rise in overweight and obesity.\textsuperscript{87}

Another reason for the sharp rise is that epidemiologists are finally recognizing that standard definitions of diabetes are inadequate. Simply measuring fasting blood glucose fails to detect up to 70\% of people with disturbances in blood glucose regulation.\textsuperscript{88} An oral glucose tolerance test is required to detect such disturbances, particularly dangerous after-meal sugar spikes.

What this means for you is that you simply cannot assume that you are not diabetic just because your routine fasting blood sugar measurement was normal. Know the facts, and take proper steps to ensure that you protect your tissues from the twin threats of chronically elevated blood glucose and after-meal sugar spikes.
Disease Risks of High-Normal Blood Sugar

**Cancer:** Numerous studies—including one published in the May 17, 2010, online issue of The Oncologist that was so large that it included half of all type 2 diabetics in Sweden—have found that the risk for cancer increases among diagnosed diabetics. Rising in lock-step with glucose levels as they edged up within the normal range were the risks for cancers of the endometrium, pancreas, colon, and colorectal tumors of a more aggressive nature.

**Cardiovascular disease:** Subjects showed risks for cardiovascular events, cardiovascular disease, and cardiovascular mortality that increased in direct relation to elevated—but still high-normal—glucose levels. One researcher commented that within limits, lower glucose levels, even among those without diabetes, resulted in lower cardiovascular risk. Coronary artery disease risk was twice as high in patients with impaired glucose tolerance, compared with patients with more normal glucose tolerance. While diabetes is defined as experiencing regular after-meal glucose levels of 200 mg/dL, one research team found a risk for stroke that increased as fasting glucose levels rose above 83 mg/dL. In fact, every 18 mg/dL increase beyond 83 resulted in a 27% greater risk of dying from stroke.

**Cognitive impairment:** As blood sugar rose—whether within the normal or the diabetic ranges—the risk for this mild cognitive impairment and dementia increased.

**Kidney disease:** Surges in blood sugar promoted a greater production of fibrous kidney tissue—which causes kidney disease—than a high but constant blood sugar level. The study authors suggested it may be fluctuations in glucose—more than the levels themselves—that produce the vascular complications implicated in kidney damage. Another study found a direct increase in chronic kidney disease as levels of hemoglobin A1c (a marker of long-term glucose control) rose.

**Pancreatic dysfunction:** Beta cells located in the pancreas produce the insulin that helps control blood sugar. But high glucose levels can make these cells dysfunctional, raising the risk of type 2 diabetes. Researchers discovered that mild beta cell dysfunction was already detectable in those whose glucose levels spiked two hours after eating, despite staying completely within the range considered by the medical establishment to be normal.

**Diabetic retinopathy:** High glucose levels precipitate diabetic retinopathy—damage to the retina that can lead to blindness. In one study, retinopathy was diagnosed in 13% of people who later progressed to diabetes and in 8% of those who never progressed to diabetes.

**Neuropathy:** As expected, patients with nervous system damage (neuropathy) whose postprandial (after-meal) glucose readings were above the diabetic threshold, showed damage to their large nerve fibers. However, neuropathy patients whose glucose readings—although elevated—remained well within the normal range still showed damage to their small nerve fibers. Within any blood sugar range, reported the journal Neurology in 2003, the higher the glucose, the greater the involvement of the large nerve fibers. Another nerve damage study in 2006 confirmed these results.

A chlorogenic acid-rich extract of green coffee beans is also effective in animal studies against weight gain, reducing total weight and body fat accumulation by inhibiting fat absorption and preventing new fat production in liver tissue. Chlorogenic acid reduces liver fat content in animal studies as well, a vital factor in reducing the impact of overweight and obesity.

**Compelling Confirmatory Data**

A team of Japanese researchers recorded a 43% drop in blood sugar levels after administering green coffee bean extract to mice after a heavy meal.

In a clinical trial presented in 2011, researchers gave different dosages of standardized green coffee bean extract, each containing 50% chlorogenic acid, to 56 people. Next, they gave the participants 100 grams of glucose in an oral glucose challenge test. The oral glucose tolerance test is a standard method of gauging an individual’s response to after-meal sugar exposure.

Blood sugar levels dropped by an increasingly greater amount as the test dosage of green coffee bean extract was raised, from 100 mg up to 400 mg. At the 400 mg dosage, there was a full 32% decrease in blood sugar—two hours after glucose ingestion.

This means that if you had a dangerous after-meal glucose reading of 160 mg/dL, the proprietary green coffee bean extract would slash it to 109 mg/dL.
These findings are in line with supportive data demonstrating green coffee bean extract’s numerous glucose-fighting mechanisms of action.

Other models reveal that chlorogenic acid favorably modulates gene expression to enhance the activity of liver cells and increase levels of the hormone adiponectin, which enhances insulin sensitivity and exerts anti-inflammatory, anti-diabetic, and anti-atherogenic effects.76

Summary

Twenty-six million Americans are now considered diabetic, while more than one in three are pre-diabetic. Recent data confirm that your risk for degenerative disease and premature death increases substantially when fasting blood glucose exceeds 85 mg/dL. Yet the medical establishment persists in defining readings up to 99 mg/dL as “safe.”

Also overlooked in the effort to combat today’s diabetes epidemic is the insidious process of after-meal blood sugar surges. Regardless of whether your fasting glucose readings are “normal,” these surges can cause a diabetic-like state in the body that lasts for hours, inflicting undetected, system-wide damage to healthy tissues.

Driving this danger is the little-known role your liver plays in creating and releasing additional glucose into the blood. This process, which regulates blood sugar in the absence of food when you’re young, becomes detrimentally stimulated after heavy meals by the enzyme glucose-6-phosphatase as you age. The result is a dangerous flood of sugar into your bloodstream after every meal.

A breakthrough weapon to control these after-meal blood sugar surges has been identified: green coffee bean extract. It contains a compound called chlorogenic acid shown to target glucose-6-phosphatase and blunt post-consumption blood sugar levels by up to 32% in human trials.

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

Understanding Gluconeogenesis

The enzyme glucose-6-phosphatase (G6P) helps to produce dangerous after-meal blood sugar spikes in two ways. It releases glucose from its storage area in the liver, and it promotes formation of new glucose molecules from non-sugar sources. The latter process is called gluconeogenesis.

Traditionally, scientists have assumed that amino acids from proteins were the only precursors of glucose in gluconeogenesis. Recent discoveries, however, suggest that fatty acids are also important precursors of this dangerous source of excess glucose. These discoveries provide further insight into the causes of the deadly after-meal glucose spikes. They also provide further incentives to block the enzymes that participate in gluconeogenesis, such as G6P. Green coffee extracts are an excellent source of G6P-blocking nutrients.


87. Cosson E, Hamo-Tchatchouang E, Banu I, et al. A large proportion of prediabetes and diabetes goes undiagnosed when only fasting plasma glucose and/or HbA1c are measured in overweight or obese patients. *Diabetes Metab.* 2010 Sep;36(4):312-8.
Comprehensive Glucose Control

JUST ONE CAPSULE BEFORE MEALS

Chlorogenic acid found in green coffee bean extract has been clinically shown to limit dangerous after-meal glucose surges.1 Some individuals need additional support for healthy glucose control.

Life Extension® has combined five nutrients into one capsule that provides multi-targeted approaches to glucose control and healthy body weight.

CoffeeGenic™ Green Coffee Extract with Glucose Control Complex contains:

- Green Coffee Bean Extract standardized to 50% chlorogenic acid. Research shows this extract inhibits glucose-6-phosphatase, which results in a significant reduction in after-meal glucose elevations. Take one capsule 20-30 minutes before each meal to obtain optimal benefits.

- InSea2®, a proprietary form of seaweed extract that blocks the action of glucosidase and amylase, enzymes used to break down carbohydrates into glucose, facilitating its transport into the bloodstream. In laboratory animal studies, InSea™ reduced after-meal fluctuations in blood sugar by up to 90% when compared to non-supplemented animals and reduced blood insulin levels by as much as 40%.2

- Chromium optimized with standardized extract of Indian gooseberry and a proprietary form of an adaptogen called shilajit. This state-of-the-art Crominex® 3+ complex also supports healthy cellular glucose utilization.3,7

- Integra-Lean® African Mango (Irvingia gabonensis) extract helps slow the rate of carbohydrate absorption from the intestines, thereby reducing the caloric impact of starchy and sugary foods.8 It also moderates glycerol-3-phosphate dehydrogenase enzyme activity to reduce the amount of ingested starches that are converted to triglycerides and stored as fat.

- Green tea extract to boost resting metabolic rate and inhibit genes involved in adipogenesis.

- Iodine is a trace element involved in the production of thyroid hormones primarily responsible for regulating metabolism, thereby promoting healthy glucose absorption into cells, where it is used to produce energy.

Each vegetarian capsule of CoffeeGenic™ Green Coffee Extract with Glucose Control Complex provides:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose Control Complex</td>
<td>100 mg</td>
</tr>
<tr>
<td>CoffeeGenic™ Green Coffee (Coffea arabica) Extract (bean) [std to 50% Chlorogenic acid (100 mg)]</td>
<td>200 mg</td>
</tr>
<tr>
<td>Iodine [typical value naturally occurring from Ascophyllus nodosum and Fucus vesiculosus]</td>
<td>25 mcg</td>
</tr>
<tr>
<td>Chromium [as Crominex® 3+ chromium stabilized with Capros® (Phyllanthus emblica) Extract (fruit) and Primavie® Shilajit)]</td>
<td>150 mcg</td>
</tr>
<tr>
<td>InSea2® [proprietary composition of demineralized polyphenols from brown seaweeds Kelp (Ascophyllum nodosum) and Bladderwrack (Fucus vesiculosus)]</td>
<td>125 mg</td>
</tr>
<tr>
<td>Integra-Lean® African Mango (Irvingia gabonensis) proprietary Extract (seed)</td>
<td>100 mg</td>
</tr>
<tr>
<td>Green Tea (Camellia sinensis) Decaffeinated Extract (leaf) [std to 98% polyphenols by UV (98 mg), 45% EGCG by HPLC (45 mg)]</td>
<td>100 mg</td>
</tr>
</tbody>
</table>

CoffeeGenic™ Green Coffee Extract with Glucose Control Complex (Each serving contains approximately 7 mg caffeine)

Item #01607

A bottle containing 90 200 mg vegetarian capsules of CoffeeGenic™ Green Coffee Extract with Glucose Control Complex retails for $58. If a member buys four bottles during Super Sale, the price is reduced to just $35.10 per bottle.

CAUTION: Because these products may lower blood glucose, consult your healthcare provider before taking these products if you are taking blood glucose-lowering medication.

References


To order CoffeeGenic™ Green Coffee Extract with Glucose Control Complex, call 1-800-544-4440 or visit www.LifeExtension.com

*These supplements should be taken in conjunction with a healthy diet and regular exercise program. Results may vary.

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.
Rich Rewards
Polyphenol-Retained Coffee

The Healthy Gourmet Choice
Not all coffee provides the same powerful protection. When it comes to obtaining coffee’s full range of health benefits, most people aren’t getting their money’s worth! The reason? Most of the coffee bean’s polyphenol content is destroyed during the roasting process required to create a dark, rich blend.

Among the most beneficial of these polyphenols is chlorogenic acid, a potent antioxidant that promotes optimal health.

A Patented Organic Roast
Life Extension’s new Rich Rewards Breakfast Blend and Decaffeinated Roast are made using a patented, 100% natural process called HealthyRoast™. It delivers a more complete nutritional profile of the coffee bean, yielding chlorogenic acid levels far greater than other premium brands.

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

Comparison of Conventional Coffee to Life Extension’s Rich Rewards Blend

<table>
<thead>
<tr>
<th>Chlorogenic Acid</th>
<th>Chlorogenic Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Coffee (Caffeinated)</td>
<td>92 mg</td>
</tr>
<tr>
<td>Conventional Coffee (Decaffeinated)</td>
<td>52 mg</td>
</tr>
</tbody>
</table>

This chart shows Life Extension’s Rich Rewards Coffee Blend has up to 254% more chlorogenic acid, which can enable one to obtain the benefits of heavy coffee drinking in half the number of cups.
Savory Taste Without Stomach Upset

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

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

Life Extension®’s new Rich Rewards coffees give you a uniquely beneficial brew with superior flavor and up to 254% more chlorogenic acid.

To order either of the new Rich Rewards Antioxidant Coffees call 1-800-544-4440 or visit www.LifeExtension.com

References
* US Patent 6,723,368.*
Proven Methods to Reduce Fasting and Postprandial Glucose Levels

BY WILLIAM FALOON

Scientific studies indicate that any amount of fasting glucose over 85 mg/dL incrementally adds to heart attack risk.¹

Postprandial glucose surges over 140 mg/dL lead to diabetic complications, even in those who are not diabetic.

If you can choose an ideal fasting glucose reading, it would probably be around 74 mg/dL.² We know, however, that some people are challenged to keep their glucose under 100 mg/dL. What this means is that it is critically important for aging individuals to follow an aggressive program to suppress excess glucose as much as possible.

The good news is that many approaches that reduce glucose also lower insulin,³,⁴ LDL,³,⁵-⁷ triglycerides,³,⁸-¹⁰ and C-reactive protein,¹¹ thereby slashing one’s risk of vascular disease,⁸,¹²-¹⁴ cancer,¹⁵-¹⁸ dementia,¹⁹-²³ and a host of other degenerative disorders.

This month’s issue featured an in-depth review of green coffee bean extract that has been shown to reduce postprandial glucose levels by an average of 32%.²⁴ It functions by inhibiting the glucose-6-phosphatase enzyme that enables the body to create new surplus glucose and inappropriately release stored glucose from tissues.

To achieve optimal glucose levels, some people will need to take steps to impede glucose absorption and improve insulin sensitivity. In this section, we succinctly describe drugs, hormones, nutrients, and lifestyle changes that facilitate healthy glucose levels. >>
**Nutrient Options**

Since Life Extension® members know it is best to take dietary supplements with meals, it should not be difficult for them to make it a routine practice to shield their bloodstream from excessive calorie absorption by taking the proper nutrients before most meals.

An efficient way of obtaining nutrients that can impede the impact of carbohydrate and fat foods when taken before meals is a powdered drink mix that provides the nutrients in the box below.

---

**Nutrients that Reduce the Impact of Excess Calorie Intake**

**Propolmannan 2,000 mg**  
**Mechanism(s):** Slows gastric emptying to delay rapid carbohydrate absorption. It also provides a viscous barrier that binds bile acids that normally facilitate fat absorption.25-27

**Phaseolus vulgaris 445 mg**  
**Mechanism(s):** Inhibits the amylase digestive enzyme used to break down carbohydrate foods for eventual absorption into the blood as glucose.10,28

**Irvingia gabonensis 150 mg**  
**Mechanism(s):** Inhibits amylase and functions via three additional mechanisms to internally regulate glucose and triglyceride metabolism.29-31

**Green Tea Extract 100 mg and higher**  
**Mechanism(s):** Inhibits the lipase digestive enzyme used to break down fatty foods and boosts internal utilization of glucose by boosting resting metabolic rate.32,33

We suggest taking a powdered drink mix containing these ingredients before the two heaviest meals of the day.

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**Drug Options**

An anti-diabetic drug that Life Extension suggests normal aging people consider taking to lower glucose is metformin (refer to article on page 56 of this month’s issue about metformin and cancer risk reduction). It is available in low-cost generic form.

Metformin has a long history of safe human use, plus intriguing data to suggest that it may possess anti-aging properties.43,44 We think that those with excess fasting blood glucose (above 80-85 mg/dL) should ask their doctor about metformin even if they are not diagnosed as diabetic.

Some of the side benefits of metformin include weight loss45-47 and triglyceride reduction,48-50 which are in themselves proven heart attack risk-reducers.
Metformin functions to reduce absorption of ingested carbohydrates, suppress appetite, enhance insulin sensitivity, and most uniquely, metformin inhibits the release of stored liver glucose (glycogen) back into the blood.

One of the problems that frustrates so many people who follow a low-calorie diet, yet have persistently elevated glucose levels, is that the liver improperly dumps too much glucose into the blood. This of course is a vital life function in a starvation state, but for aging individuals, excess hepatic release of glycogen (called gluconeogenesis) causes them to suffer chronically high glucose and insulin levels. Metformin inhibits gluconeogenesis.

Another low-cost drug that lowers glucose levels is acarbose, which reduces the absorption of ingested carbohydrates by inhibiting the glucosidase and other sugar absorbing-enzymes in the small intestine. A typical dose is 50-100 mg of acarbose taken before each meal. Some people experience intestinal side effects, but otherwise, acarbose is highly efficacious in reducing blood glucose levels and reducing several cardiac risk markers in the blood.

There are of course other FDA-approved drugs that will lower your glucose levels. Many of these drugs, however, function by mechanisms that carry side effect risks.

Life Extension stands on solid scientific ground in recommending that those with impaired glucose tolerance follow an aggressive program that involves eating healthier and smaller meals, exercising, and taking nutrients before meals that deflect the impact of excess calorie intake. Drugs like metformin may be considered for its multiple benefits that extend beyond mere glucose control. Acarbose should be utilized if glucose levels remain stubbornly high.

Metformin Dosing and Precautions

The dose of metformin varies considerably. The starting dose may be as low as 250-500 mg once a day with a meal. If hypoglycemia (low blood sugar) does not manifest, the dose of metformin may be increased to 500-850 mg taken before two or three meals, all under the supervision of your physician, of course. One side effect of metformin is that it can cause homocysteine levels to elevate. This is less likely to happen to Life Extension members who already take nutrients that suppress homocysteine. Those with impaired kidney function or congestive heart failure may not be able to take metformin.

Methods to Reduce Postprandial Glucose Levels

- Fasting blood glucose levels over 85 mg/dL increase heart attack risk.
- Postprandial glucose levels over 140 mg/dL may lead to complications associated with diabetes—even in those who are not diabetic.
- Nutritional, hormonal, dietary, and lifestyle methods that lower blood glucose can reduce cardiovascular risk factors, lessen cancer risk, and improve markers associated with longevity.
- Plant extracts such as propolmannan, irvingia extract, Phaseolus vulgaris (white bean) extract, green tea, and cinnamon can help reduce glucose levels and promote healthy insulin sensitivity.
- The anti-diabetes drug metformin helps promote healthy blood glucose and lipid levels while supporting weight loss efforts.
- Optimizing DHEA levels in men and women and testosterone levels in men may help promote optimal glucose levels and insulin sensitivity.
- Healthy lifestyle choices such as calorie restriction, exercise, consuming a Mediterranean diet, and avoiding dietary sugars further support healthy blood glucose levels.
Normal aging is accompanied by a sharp decline in hormones that are involved in maintaining insulin sensitivity and hepatic glucose control.

Restoring DHEA (dehydroepiandrosterone) levels to youthful ranges in men and women may help enhance insulin sensitivity and glucose metabolism in the liver.66-70

Progressive doctors are realizing that in men, a testosterone deficiency can induce a serious reduction of insulin sensitivity. For men, restoring youthful levels of testosterone has been shown to be particularly beneficial in facilitating glucose control.71 Blood tests can assess your hormonal status so a man can replenish testosterone (and DHEA) to more youthful ranges. Optimal free testosterone blood levels in men are between 20-25 pg/mL.72

Life Extension has published articles showing that diabetic men can derive enormous benefits by restoring testosterone to youthful ranges, as opposed to overloading the body with excess insulin as mainstream doctors continue to do.73-75

Dietary Options

People can achieve remarkable control over glucose levels by altering their diet and exercising more. Below are three dietary options to consider:

1. Consume a low-calorie diet (often less than 1,400-1,800 calories a day). Most people cannot adhere to this kind of low-calorie diet.76
2. Consume a Mediterranean diet, with lots of fresh fruits and vegetables, fish and beans as protein sources, and omega-3 and monounsaturated fats (olive oil), while avoiding saturated fats, refined carbohydrates, cholesterol-laden foods, excess omega-6 fats, and most animal products. An increasing percentage of health-conscious Americans are adopting this kind of diet.77-79
3. Avoid sugary fruit juices (almost all fruit juices contain too many sugars) and beverages spiked with fructose, sucrose, and/or high-fructose corn syrup.90-94 Consume a low-glycemic index and low-glycemic load diet.95-96

Summary

From a practical standpoint, achieving optimal glucose readings on your next blood test will probably involve a combination of the various approaches described in this section. Each individual will respond differently.

For some, a modest reduction in calorie intake and an increase in physical activity will sufficiently lower fasting and after-meal glucose levels. Most aging individuals, however, will need to take nutrients such as green coffee berry extract and other carbohydrate-enzyme inhibitors before heavy meals to impede the impact of ingested calories. Others should ask their doctor about prescription drugs such as metformin.

When one questions the importance of doing all this, please know that the incidence of pre-diabetes, metabolic syndrome, and type 2 diabetes is increasing at alarming rates. In fact, diseases related to glucose impairment are skyrocketing everywhere in the world that adopts unhealthy Western eating habits.

A medical catastrophe is predicted for the United States as the vast majority of the population is now overweight and suffers frighteningly high levels of glucose, insulin, and triglycerides.

The single most important component of one’s longevity program may be the steps taken before meals to neutralize the toxic effects of excess calories most of us invariably ingest.
Hormone Precautions

Men with pre-existing prostate cancer should avoid testosterone until their cancer is cured. Women with certain types of hormone-related cancers are advised to avoid DHEA until their cancer is cured. Men who replace testosterone are advised to test their blood within 60 days to make sure that their estrogen (estradiol) levels and prostate-specific antigen (PSA) are not increasing. Some men convert (aromatize) testosterone into estradiol. If this happens, there are drugs (like anastrozole) or nutrients that inhibit the aromatase enzyme to keep estradiol in the safe range of between 20-30 pg/mL. These blood tests, taken 60 days after testosterone therapy is initiated, can also detect liver or blood count abnormalities that in rare cases can be exacerbated by testosterone.

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

31. Oben JE, Ngondi JL, Blum K. Inhibition of Irvingia gabonensis seed extract (OB131) on adipogenesis as mediated via down regulation of the PPARgamma and leptin genes and up-regulation of the adipoenectin gene. Lipids Health Dis. 2008 Nov 13;7:44.


Nearly 80% of highly motivated people fail to achieve long-lasting weight loss with diet and lifestyle modifications alone.¹

That’s why the Calorie Control Weight Management Formula was designed.

Clinical studies validate that when overweight humans take just some of the natural ingredients in this formula combined with reduced calorie intake, there is a greater loss of body fat compared to diet alone.²⁻⁴ Calorie Control Weight Management Formula with CoffeeGenic™ Green Coffee Extract can help give you the winning edge when following a calorie-modulated weight loss program.

The new Calorie Control Weight Management Formula comes with a natural blueberry flavor that tastes far smoother than the original version. This powder mix is available in a 60-serving bottle and in individual stick packs that you can conveniently use when away from home.

Most important, each dose has been fortified with 200 mg of CoffeeGenic™ Green Coffee Extract to suppress after-meal glucose surges that can sabotage the best weight management programs.

NEW IMPROVED BLUEBERRY FLAVOR!
Calorie Control Weight Management Formula
Now with Green Coffee Bean Extract

To order any of the new Calorie Control Weight Management Formulas with CoffeeGenic™ Green Coffee Extract, call 1-800-544-4440 or visit www.LifeExtension.com
Comprehensive Calorie Management

The Calorie Control Weight Management Formula with CoffeeGenic™ Green Coffee Extract, is designed to be taken before the two heaviest daily meals to help neutralize the unwanted effects of caloric excess. The ingredients were chosen based on scientific findings that age-associated fat accumulation is at least partially caused by the loss of one's metabolic capacity to utilize ingested calories. Each scoop of this good-tasting powdered drink mix contains:

1. **CoffeeGenic™ Green Coffee Extract** standardized to 50% chlorogenic acid. Research shows this extract inhibits glucose-6-phosphatase,⁶ which results in a significant reduction in *after-meal* glucose elevations.⁵

CoffeeGenic™ Green Coffee Extract also helps impede rapid absorption of starches and sugary foods by neutralizing enzymes that enhance their absorption into the bloodstream.⁷

2. **LuraLean®**. A proprietary fiber, LuraLean® swells in the stomach after ingestion with water to help reduce calorie consumption. LuraLean® binds to *bile acids* in the small intestine and helps transport them out of the body. These bile acids otherwise facilitate the digestion and assimilation of *dietary fat* into the bloodstream. LuraLean® also slows the rapid emptying of ingested food into the small intestine, thereby reducing the surge of *glucose* entering the bloodstream. LuraLean® works better than other fibers because its own enzymes have been removed, thus sparing it from degradation in the digestive tract. This enables LuraLean® to form a stable *viscous barrier* to help impede calorie absorption and maintain its sponge-like activity throughout the digestive tract. In placebo-controlled studies, LuraLean® has induced weight loss along with significant reductions in fasting lipid and post-meal glucose/insulin levels.⁹,¹⁰

3. **White kidney bean extract**. This natural plant extract inhibits the *amylase* enzyme in the digestive tract.¹⁰ *Amylase* breaks down carbohydrates that are then absorbed into the bloodstream as glucose. *White kidney bean extract* has produced weight loss and abdominal fat reductions, along with significant reductions of triglycerides in placebo-controlled trials.⁸,¹⁰

4. **Irvingia gabonensis**. Extracted from the African mango, Irvingia regulates *leptin* to decrease appetite and facilitate triglyceride removal from adipocytes; inhibits *glycerol-3-phosphate dehydrogenase* to reduce the conversion of glucose into glycerol in adipocytes; and up-regulates *adiponectin* to facilitate insulin sensitivity.¹¹,¹² Irvingia has demonstrated favorable weight loss results in placebo-controlled trials.²

5. **Green Tea Phytosome**. This proprietary green tea extract absorbs much better into the bloodstream to boost *resting metabolic rate*.¹³ In a controlled clinical study, this green tea phytosome induced 30.1 pounds of weight loss when combined with a reduced-calorie diet.¹⁴

Importance of Taking Calorie Control Weight Management Formula Before Heavy Meals

Once we accept the fact that weight loss requires more than diet and exercise alone, it becomes easy to understand the importance of taking the Calorie Control Weight Management formula before the two heaviest meals of the day.

Each appetizing blueberry flavored stick pack or scoop of the new Calorie Control Weight Management Formula with CoffeeGenic™ Green Coffee Extract, powder provides:

- **CoffeeGenic™ Green Coffee (Coffea arabica) Extract (bean)** (std to 50% Chlorogenic acid (100 mg))
- **LuraLean®** propolmannan (Amorphophallus konjac K. Koch, ssp. Amorphophallus japonica) fiber Extract (root)
- **Phase 2* Phaseolus vulgaris white kidney (bean) Extract**
- **Integra-Lean® African Mango (Irvingia gabonensis) proprietary extract (seed)**
- **Tea Slender™ Green Tea Phytosome**

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<td>CoffeeGenic™ Green Coffee</td>
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<td>Phase 2*</td>
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<td>Integra-Lean®</td>
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<tr>
<td>Tea Slender™</td>
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*These supplements should be taken in conjunction with a healthy diet and regular exercise program. Results may vary.*
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.

High-Potency Resveratrol with Synergistic Activators

Life Extension members gain access to standardized trans-resveratrol combined with plant extracts that favorably influence longevity gene expression. Unlike many commercial formulas, Life Extension standardizes to trans-resveratrol, which researchers contend is the most active constituent.

A bottle containing 60 vegetarian capsules of Optimized Resveratrol with Synergistic Grape-Berry Actives retails for $46. If a member buys four bottles during Super Sale, the price is reduced to just $27.90 per bottle. The suggested dose of one capsule a day provides:

- Trans-Resveratrol 250 mg
- Grape-Berry Actives 85 mg
- Quercetin 60 mg
- Trans-Pterostilbene 0.5 mg
- Fisetin 10 mg

Contains yeast.

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

To order Optimized Resveratrol, 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.
When you choose to cook with cilantro, or the seeds of the plant that cilantro comes from, known as coriander, the simple act of spicing up your dishes becomes an easy way to spice up your health and boost your longevity. Cilantro is a power-packed flavor enhancer that contains an eye-popping amount of phytonutrients, including borneol, carvone, camphor, elemol, geraniol, and linalool, among the most prominent. It also contains popular flavonoids that *Life Extension*® readers are familiar with, such as quercetin and apigenin. Along with such incredible antioxidant potency, cilantro contains active phenolic compounds and is nutritionally dense in dietary fiber, manganese, iron, and magnesium. 1

With such an impressive array of healthy properties, it’s no wonder that cilantro has been used as a digestive aid, an anti-inflammatory, an anti-bacterial agent, and as a weapon in the fight to control blood sugar levels, cholesterol, and unwanted, lethal free radical production.1,2

Cilantro tea has been used for centuries as both a digestive aid and a cleansing agent to remove toxins from the body.
normal blood sugar was achieved at 6 hours post–dose. The researchers noted that the extract decreased several components of the metabolic syndrome, decreased atherosclerotic indicators, and increased cardioprotective factors, which leads them to believe that coriander extract may have a cardiovascular protective effect.

**Attack Atherosclerosis**

At first glance, the idea that a spice or an herb can help your body defend itself against atherosclerosis may seem hard to believe, but due to the large amount of quercetin in cilantro, a few dashes of this spice may make a big difference for you and your arteries. Because flavonoids like quercetin are not made internally in the human body, we must rely on eating certain foods or ingesting certain supplements to obtain it. In this case, sprinkling cilantro in your recipes or on your dishes can give you an extra quercetin boost in addition to your supplements.

### Benefits

**Diabetes Fighter**

Moroccans have long used coriander as a treatment to combat diabetes, but until recently, very few studies had been done to validate this all-natural strategy against this insidious disease. Recently, a team of researchers from Morocco aimed to investigate the potential hypoglycemic (and hypolipidemic) activity of coriander seeds after a single oral dose and after daily dosing for 30 days in normal and obese-hyperglycemic-hyperlipidemic (OHH) rats.  

In the study, a single dose of coriander extract suppressed hyperglycemia in obese-hyperglycemic-hyperlipidemic rats, and

### Selecting the Right Cilantro

1. Fresh cilantro is available in most farmers markets year-round.
2. Choose bunches of cilantro that are bright in color.
3. The leaves of cilantro can lose their luster quickly, so use it soon after you buy it.
4. If you must store cilantro, keep it attached to its roots, with the roots in water and the leaves covered in plastic.
5. If bought without roots, cover the cilantro with a damp cloth, refrigerate in a plastic bag with holes in it, and use within four or five days.
For a little more information about why quercetin is so important, we need to first examine the evolution of atherosclerosis in the human body. Atherosclerosis occurs when fatty materials or plaque build up in the artery. This usually happens when free radicals oxidize molecules known as low-density lipoprotein (LDL). When oxidized LDL molecules come into contact with a damaged endothelial lining, they stick, which sets off a series of reactions that contributes to the development of plaque build-up in arteries known as atherosclerosis.

Here is where rich sources of quercetin such as cilantro may be highly beneficial. By preventing LDL oxidation, quercetin may help intervene in the build-up of heart attack- and stroke-inducing plaque. A study examining this very topic suggested that death from heart disease could be reduced, as the flavonoid quercetin showed signs that it could protect against damage to artery walls. It also shows promise in helping reduce high blood pressure that occurs as a result of artery narrowing.

Cilantro Tea for Toxin Removal

Cilantro tea has been used for centuries as both a digestive aid and a cleansing agent to remove toxins from the body. To help flush the toxins from your body, the tea can be made with two teaspoons of cilantro leaves steeped in one cup of hot water. For flavor, you may want to add honey, peppermint oil, or orange peel. After steeping, drink the tea as you normally would. Once ingested, cilantro’s power reveals itself, as it has shown in certain studies that it binds with harmful metals like lead and facilitates their removal from the body.

This is important for those seeking a long, healthy life span, because toxic agents like heavy metals have been associated with a wide swath of health issues.

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.
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 a simple process from virtually anywhere in the United States can provide an even more in-depth analysis of your blood test results, Life Extension® believes everyone seeking to maintain optimal blood level values of hormone levels is necessary for women of hormone status, Life Extension has created this panel as an addition to the Male Life Extension Panel. This panel provides valuable information about a testosterone metabolite that can affect the prostate, and the mother hormone that acts as a precursor to all other hormones.

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 5990 North Federal Highway, Ft. Lauderdale, FL, 33308-2633.

![Image](image-url)

**This test requires samples to be shipped to the lab on dry ice for customers using a Blood Draw Kit and will incur an additional $35 charge. If the customer is having blood drawn at a LabCorp facility, this extra charge does not apply.**

**This test is packaged as a kit, requiring a finger stick performed at home.**

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### MOST POPULAR PANELS

**Life Extension Member Pricing**

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<thead>
<tr>
<th>Panel Description</th>
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<td><strong>COMPREHENSIVE PANELS</strong></td>
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<td>To provide an even more in-depth analysis of a man's hormone status, Life Extension has created this panel as an addition to the Male Life Extension Panel. This panel provides valuable information about a testosterone metabolite that can affect the prostate, and the mother hormone that acts as a precursor to all other hormones.</td>
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<td><strong>NOTE:</strong> CBC/Chemistry profile is included in the Male and Female Life Extension panels and Weight Loss Panels.</td>
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<td><strong>HEMOGLOBIN A1C (HBA1C) (LC001453)</strong></td>
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<td>Hemoglobin A1C evaluates long-term blood sugar control. Serum glucose sometimes reacts with important proteins in the body rendering them nonfunctional. Since this process, known as glycation is one of the leading theories of aging, Life Extension™ believes everyone should check their A1C level.</td>
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<td><strong>VITAMIN D (25OH) (LC881950)</strong></td>
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<td>This test is used to rule out vitamin D deficiency as a cause of bone disease. It can also be used to identify hypercalcemia.</td>
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<td><strong>FOOD SAFE ALLERGY TEST (LCMT3001)</strong></td>
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<td>This test measures delayed (IgG) food allergies for 95 common foods.</td>
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<td><strong>CYTOKINE PANEL (LCCTY)</strong></td>
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<tr>
<td>Includes TNF-alpha, IL-6, IL-1 beta and IL-8. cytokines are proteins that modulate the inflammatory response. This panel is used to identify elevated levels of specific cytokines.</td>
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<tr>
<td><strong>OMEGA SCORE™ (LCOMEGA)</strong></td>
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<td>Provides valuable information on your risk of developing heart disease, sudden heart attack, and cardiac death. The Omega Score™ also includes your AA:EPA ratio, allowing you to determine and track a major factor in total body inflammation.</td>
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<td><em><em>COQ10</em> (COENZYME Q10) (LC120251)</em>*</td>
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<td>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.</td>
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</table>

* This test requires samples to be shipped to the lab on dry ice for customers using a Blood Draw Kit and will incur an additional $35 charge. If the customer is having blood drawn at a LabCorp facility, this extra charge does not apply.

** This test is packaged as a kit, requiring a finger stick performed at home.
This test is to measure adrenal function.

This test shows if you are taking the proper amount of DHEA. This test normally costs $100 or more at commercial laboratories.

This test is used to monitor SHBG levels which are under the positive control of estrogens and androgens.

Can predict those at risk of diabetes, obesity, and heart and other diseases.

For men and women. Determines the proper amount in the body.

Indicates growth hormone secretion levels. Low levels have been associated with atherosclerosis and suppressed by androgens.

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 heart-clotting factor that can be lowered with high doses of TMG and vitamin B6.

This ratio correlates with risk of coronary artery disease and is useful in the presence of borderline elevations of cholesterol.

For non-member prices call 1-800-208-3444

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

Life Extension Foundation Members only

MEMBER NO.

Male  Female

Name

Date of Birth (required) / / 

Address

City

State  Zip

Phone

Credit Card No.

Expiry Date / 

Mail your order form to: Life Extension

3600 West Commercial Boulevard

Fort Lauderdale, FL 33309

Phone your order to: 1-800-208-3444

Fax your order to: 1-866-728-1050

ORDER LIFE-SAVING BLOOD TESTS FROM VIRTUALLY ANYWHERE IN THE US!

TERMS AND CONDITIONS

This is NOT a complete listing of LE blood test services. Call 1-800-208-3444 for additional information.
# Buyers Club Order Form

**To order call: 1-954-766-8433 or 1-800-544-4440**

<table>
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<td>ADVANCED LIPOID CONTROL - 60 veg. caps</td>
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<td>01300</td>
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<td>00681</td>
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<td>*46925</td>
<td>ALL= REFILL PACK - 120 caps</td>
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<td>01375</td>
<td>ALOE VERA FORCE** - 60 veg. caps</td>
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<td>00457</td>
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<td>#01510</td>
<td>ANTI-ADIPOCYTE FORMULA w/ADIPOSTAT - 60 veg. caps</td>
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<td>ANTI-ADIPOCYTE FORMULA w/ADIPOSTAT &amp; INTEGRA LEAN**(ADVANCED) - 60 veg. caps</td>
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<td>ARTHROMAXW w/THAFLAVINS &amp; APRESIXFLEX - 120 veg. caps</td>
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<td>00919</td>
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**SUB-TOTAL OF COLUMN 1**

|        |            |             |             |     |       |

**SUB-TOTAL OF COLUMN 2**

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<td>ASTAXANTHIN - 2 mg, .30 softgels</td>
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<td>00920</td>
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<td>00621</td>
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<td>BOSWELLA TOPICAL CREAM - 4 oz</td>
<td>15.00</td>
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**SUPER SALE SAVINGS ON ALL PRODUCTS**

**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**

*February 2012 Life Extension Members receive 25% off the retail price of all products*
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<td>BRANCHED CHAIN AMINO ACIDS - 90 veg. caps</td>
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<td>BREAST HEALTH FORMULA - 60 veg. caps</td>
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<td>00893</td>
<td>BRITE EYES III - 2 vials, 5 ml each</td>
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<td>BROMLAIN POWDER - 100 grams</td>
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<td>0103</td>
<td>BROMLAIN (SPECIALY-CAOITED) - 500 mg, 60 enteric coated tablets</td>
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<td>00884</td>
<td>BUTTERBUREX Extr. w/STANDARDIZED ROSMARINIC ACID - 60 softgels</td>
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<td>CALCIUM CITRATE w/ VITAMIN D - 300 caps</td>
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<td>00535</td>
<td>CALD GLUCARATE - 200 mg, 60 caps</td>
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<td>CALORIE CONTROL WEIGHT MANAGEMENT FORMULA w/ COFFEGENIC ** GREEN COFFEE EXTRACT BLUEBERRY FLAVOR - 414 grams powder</td>
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<td>CARNOSOOTH w/PROCHIPROTECT® - 60 veg. caps</td>
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<td>CARNOXIN (SUPER) - 500 mg, 90 caps</td>
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<td>CDP CHOLINE CAPS - 250 mg, 60 caps</td>
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<td>CELL SENSOR-EMP DETECTION METER</td>
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<td>CHILDREN’S FORMULA LIFE EXTENSION MIX** - 100 chewable tablets</td>
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<td>CHOLARELLA - 500 mg, 200 tablets</td>
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<td>CHLOROPHYLLIN &amp; ZINC - 100 veg. caps</td>
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<td>CHO-LESTM - 90 capsules</td>
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<td>CHOLINE CHLORIDE - 16 oz liquid</td>
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<td>CHROMIUM ULTRA - 100 veg. caps</td>
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**SUB-TOTAL OF COLUMN 3**

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<td>00551</td>
<td>CILANTHRO HERBAL EXTRACT - 1 oz</td>
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<td>CINSULIN® w/INSEAX® &amp; CROMINEX® 3- + 90 veg. caps</td>
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<td>CITRUS BIOFLAVONOID - 100 caps</td>
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<td>CLA BLEND w/SESAME LIGNANS (SUPER) - 1000 mg, 120 softgels</td>
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<td>COD LIVER OIL (EMULSIFIED) - 100 softgels (Emulsified)</td>
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<td>Cognitex® w/ PREGNENOLONE &amp; NEUROPROTECTION COMPLEX - 90 caps</td>
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<td>Cognitex® w/ PREGNENOLONE w/ NEUROPROTECTION COMPLEX - 90 softgels</td>
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<td>01421</td>
<td>Cognitex Basics - 60 softgels</td>
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<td>COMPLETE B-COMPLEX - 180 caps</td>
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<td>01595</td>
<td>COMPREHENSIVE NUTRIENT PACK - 30-day supply</td>
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<td>00119</td>
<td>COPPER CAPSULES - 2 mg, 100 caps</td>
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<td>00949</td>
<td>COQ10® w/ l-LIMONENE (SUPER ABSORBABLE) - 50 mg, 60 softgels</td>
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<tr>
<td>00950</td>
<td>COQ10® w/ l-LIMONENE (SUPER ABSORBABLE) - 100 mg, 60 softgels</td>
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<td>01226</td>
<td>COQ10 (SUPER UBIQUINOL) - 100 mg, 60 softgels</td>
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<td>01426</td>
<td>COQ10 w/THI MITOCHONDIAL SUPPORT™ (SUPER UBIQUINOL) - 100 mg, 60 softgels</td>
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<td>01425</td>
<td>COQ10 w/THI MITOCHONDIAL SUPPORT™ (SUPER UBIQUINOL) - 50 mg, 100 softgels</td>
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<td>01427</td>
<td>COQ10 w/THI MITOCHONDIAL SUPPORT™ (SUPER UBIQUINOL) - 50 mg, 30 softgels</td>
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<td>01431</td>
<td>COQ10 w/THI MITOCHONDIAL SUPPORT™ (SUPER UBIQUINOL) - 100 mg, 30 softgels</td>
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**SUB-TOTAL OF COLUMN 4**

LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE

FEBRUARY 2012

OFFER ENDS JANUARY 31, 2012

To order online visit www.LifeExtension.com/SuperSale

To order online visit: www.LifeExtension.com
**Buyers Club Order Form**

**FEBRUARY 2012 LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS**

<table>
<thead>
<tr>
<th>No.</th>
<th><strong>CONTINUED</strong></th>
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<tr>
<td><strong>01053</strong></td>
<td>CORNULUS SUPER STRENGTH - 600 mg, 150 veg. caps</td>
<td>$99.95</td>
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<td><strong>01440</strong></td>
<td>COSMESIS ADVANCED UNDER EYE SERUM w/STEM CELLS - 33 oz</td>
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<td><strong>01399</strong></td>
<td>COSMESIS AMBER SELF MICRODERMABRASION - 2 oz</td>
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<tr>
<td><strong>01188</strong></td>
<td>COSMESIS ANTI-AGING MASK - 2 oz</td>
<td>72.00</td>
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<td><strong>01344</strong></td>
<td>COSMESIS ANTI-GLYCATION SERUM - 1 oz W/BLUEBERRY &amp; POMEGRANATE EXTRACTS</td>
<td>33.00</td>
<td>24.75</td>
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<td><strong>01327</strong></td>
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<td><strong>01277</strong></td>
<td>COSMESIS ANTI-OXIDANT REJUVENATING FOOT CREAM - 2 oz</td>
<td>45.00</td>
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<td><strong>01258</strong></td>
<td>COSMESIS ANTI-OXIDANT REJUVENATING HAND SCRUB - 2 oz</td>
<td>59.00</td>
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<td><strong>01178</strong></td>
<td>COSMESIS ANTI-OXIDANT REJUVENATING HAND CREAM - 2 oz</td>
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<td><strong>01055</strong></td>
<td>COSMESIS ANTI-REDNESS &amp; BLEMISH LOTION - 1 oz</td>
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<td><strong>01200</strong></td>
<td>COSMESIS CORRECTIVE CLEARING MASK - 2 oz</td>
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<td><strong>01415</strong></td>
<td>COSMESIS DNA REPAIR CREAM - 1 oz jar</td>
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<td><strong>01088</strong></td>
<td>COSMESIS ESSENTIAL PLANT LIPIDS REPARATIVE SERUM - 1 oz</td>
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<td><strong>01233</strong></td>
<td>COSMESIS FACE REJUVENATING ANTI-OXIDANT CREAM - 2 oz</td>
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<td><strong>01075</strong></td>
<td>COSMESIS FINE LINE-LESS - 1 oz</td>
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<td><strong>01314</strong></td>
<td>COSMESIS HAIR SUPPRESS FORMULA - 4 oz</td>
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<td><strong>01317</strong></td>
<td>COSMESIS HEALING FORMULA ALL-IN-ONE CREAM - 1 oz</td>
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<td><strong>01155</strong></td>
<td>COSMESIS HEALING MASK - 2 oz</td>
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<td><strong>01099</strong></td>
<td>COSMESIS HYALURONIC FACIAL MOISTURIZER - 1 oz</td>
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<td><strong>01110</strong></td>
<td>COSMESIS HYALURONIC OIL-FREE FACIAL MOISTURIZER - 1 oz</td>
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<td><strong>01385</strong></td>
<td>COSMESIS HYDRATING ANTI-OXIDANT FACE MIST - 4 oz</td>
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<td><strong>01033</strong></td>
<td>COSMESIS LIFTING &amp; TIGHTENING COMPLEX - 1 oz</td>
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<td><strong>01355</strong></td>
<td>COSMESIS MELATONIN CREAM - 1 oz</td>
<td>33.00</td>
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<td><strong>01144</strong></td>
<td>COSMESIS MILD FACIAL CLEANSER - 8 oz</td>
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<td><strong>01222</strong></td>
<td>COSMESIS NECK REJUVENATING ANTI-OXIDANT CREAM - 2 oz</td>
<td>64.00</td>
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<td><strong>01111</strong></td>
<td>COSMESIS PIGMENT CORRECTING CREAM - 1/2 oz</td>
<td>74.00</td>
<td>55.50</td>
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**SUPER SALE SAVINGS ON ALL PRODUCTS**

To order call: 1-954-766-8433 or 1-800-544-4440

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<th>No.</th>
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<tr>
<td><strong>01096</strong></td>
<td>COSMESIS REJUVENATING SERUM - 1 oz</td>
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<td><strong>01424</strong></td>
<td>COSMESIS RESVERATROL ANTI-OXIDANT SERUM - 1 oz</td>
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<td><strong>01112</strong></td>
<td>COSMESIS SKIN LIGHTENING SERUM - 1/2 oz</td>
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<td><strong>01300</strong></td>
<td>COSMESIS SKIN STEM CELL SERUM - 1 oz</td>
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<td><strong>01116</strong></td>
<td>COSMESIS ULTRA LIP PLUMPER - 1/3 oz</td>
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<td><strong>01011</strong></td>
<td>COSMESIS ULTRA WRINKLE RELAXER - 1 oz</td>
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<td><strong>01113</strong></td>
<td>COSMESIS UNDER EYE REFINING SERUM - 1/2 oz</td>
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<td><strong>01044</strong></td>
<td>COSMESIS UNDER EYE RESCUE CREAM - 1/2 oz</td>
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<td>55.88</td>
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<td><strong>01299</strong></td>
<td>COSMESIS VITAMIN C SERUM - 1 oz</td>
<td>85.00</td>
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<td><strong>01366</strong></td>
<td>COSMESIS VITAMIN D LOTION - 4 oz</td>
<td>36.00</td>
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<tr>
<td><strong>01012</strong></td>
<td>COSMESIS VITAMIN K HEALING CREAM - 1 oz</td>
<td>79.50</td>
<td>59.63</td>
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<tr>
<td><strong>00862</strong></td>
<td>CRAN-MAX® - 300 mg, 60 veg. caps</td>
<td>17.50</td>
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<tr>
<td><strong>01424</strong></td>
<td>CRAN-MAX® with UTIVIZOR® (OPTIMIZED) - 60 veg. caps</td>
<td>18.00</td>
<td>13.50</td>
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<tr>
<td><strong>00609</strong></td>
<td>CREATINE CAPSULES - 120 caps</td>
<td>10.95</td>
<td>8.21</td>
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<tr>
<td><strong>00610</strong></td>
<td>CREATINE POWDER - 500 grams</td>
<td>29.00</td>
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<td><strong>01096</strong></td>
<td>CREATINE WHEY GLUTAMINE POWDER - 1000 grams (vanilla)</td>
<td>50.00</td>
<td>37.50</td>
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<td><strong>00862</strong></td>
<td>CRUCIFERIOR VEGETABLE SOUP - 32 oz. pouch</td>
<td>11.95</td>
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<td><strong>01520</strong></td>
<td>CRUCIFERIOR VEGETABLE SOUP - 32 oz. pouch</td>
<td>11.95</td>
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<tr>
<td><strong>01429</strong></td>
<td>CR MIMETIC LONGEVITY FORMULA - 60 veg. caps</td>
<td>39.00</td>
<td>29.25</td>
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<tr>
<td><strong>00507</strong></td>
<td>CURCUMIN® (SUPER BIRD) - 400 mg, 60 veg. caps</td>
<td>38.00</td>
<td>28.50</td>
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**SUB-TOTAL OF COLUMN 5**

**Deduct an Additional 10% on All Products During Super Sale**

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<tr>
<td><strong>01376</strong></td>
<td>DAILY GINGER® - 90 veg. caps</td>
<td>$21.95</td>
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<td><strong>01313</strong></td>
<td>DERMAWHEY - 400 mg, 60 caps</td>
<td>65.00</td>
<td>48.75</td>
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<td><strong>00995</strong></td>
<td>DHA 240 - 240 mg, 60 softgels</td>
<td>19.00</td>
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<td><strong>00658</strong></td>
<td>7-KETO® DHEA METABOLITE - 25 mg, 100 caps</td>
<td>28.00</td>
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<td><strong>01479</strong></td>
<td>7-KETO® DHEA METABOLITE - 100 mg, 60 veg. caps</td>
<td>40.00</td>
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<td><strong>00607</strong></td>
<td>DHEA - 25 mg, 100 tablets (dissolve in mouth)</td>
<td>14.00</td>
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**SUB-TOTAL OF COLUMN 6**
**LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS**

**FEBRUARY 2012**

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<tr>
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<td>00229</td>
<td>FIBER FOOD CAPS - 200 caps</td>
<td>$15.00</td>
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<td></td>
<td>Buy 4 bottles, price each</td>
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<td>00718</td>
<td>FIBRINOGEN RESIST™ - 30 veg. caps</td>
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<td>Buy 4 bottles, price each</td>
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<td>00873</td>
<td>FLAXSEED POWDER (HI-LIGAN® NUTRI-FLAX™) - 16 oz powder</td>
<td>9.50</td>
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<td>01384</td>
<td>FLORADIX® IRON &amp; HERBS - 17 fl. oz</td>
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<td>01130</td>
<td>FLORASTORY® - 250 mg, 50 caps</td>
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<td>FLORAVITAL® IRON &amp; HERBS - 17 fl. oz</td>
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<td>01212</td>
<td>FLUSH + BE FIT - 2 - week cleanse for women</td>
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<td>FOLATE (OPTIMIZED) (L-METHYLFOLATE) - 1000 mcg - 100 veg. caps</td>
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<td>00347</td>
<td>FOLIC ACID + 812 CAPSULES - 200 caps</td>
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<td>Buy 4 bottles, price each</td>
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<td>FORSKOLIN® - 10 mg, 60 caps</td>
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<td>Buy 4 bottles, price each</td>
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<td>FUCOIDAN w/MARITECH® 926 (OPTIMIZED) - 60 veg. caps</td>
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<td>00993</td>
<td>FUCOXANTHIN-SLIM™ - 90 softgels</td>
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<td>GAMMA E TOCOPHEROL/TOCOTRIENOLS - 60 softgels</td>
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<td>00759</td>
<td>GAMMA E TOCOPHEROL W/SESAIME LIGNANS - 60 softgels</td>
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<td>24.00</td>
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<td></td>
<td>Buy 4 bottles, price each</td>
<td>29.00</td>
<td>21.75</td>
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<td>00390</td>
<td>(OPTIMIZED) GARLIC - 200 veg. caps</td>
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<td>Buy 4 bottles, price each</td>
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<td>GARLIC FORCE™ - 30 softgels</td>
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<td>GELATIN CAPSULES - 1000 empty caps size “00”</td>
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<td></td>
<td>Buy 4 bags, price each</td>
<td>18.00</td>
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<td>01301</td>
<td>GH PITTITARY SUPPORT DAY FORMULA - 120 vegetarian tabs</td>
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**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**

**OFFER ENDS JANUARY 31, 2012**
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**Sub-Total of Column 9**

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**Sub-Total of Column 10**

**Deduction:** An additional 10% off all products during Super Sale
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<td>5.00</td>
<td>3.75</td>
<td></td>
</tr>
<tr>
<td>Memory Upgrade™ - 600 grams powder</td>
<td>26.95</td>
<td>20.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01009</td>
<td>Buy 4 bottles, price each</td>
<td>8.00</td>
<td>6.00</td>
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**SUB-TOTAL OF COLUMN 1**

<table>
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<tr>
<th>No.</th>
<th>Retail Each</th>
<th>Member Each</th>
<th>Qty</th>
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<tbody>
<tr>
<td>L-Methionine - 5 mg, 60 lozenges (vanilla)</td>
<td>9.95</td>
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<td>00536</td>
<td>Buy 4 bottles, price each</td>
<td>8.00</td>
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**SUB-TOTAL OF COLUMN 12**

LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE
<table>
<thead>
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<th>No.</th>
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<th>Member Each</th>
<th>Qty</th>
<th>Total</th>
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<tbody>
<tr>
<td>00673</td>
<td>PGX™ SOLUBLE FIBER BLEND (WELLBETX®) - 180 caps</td>
<td>$34.95</td>
<td>$26.21</td>
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<tr>
<td>00865</td>
<td>PHARMAGABA® - 60 chewable tablets</td>
<td>29.95</td>
<td>22.46</td>
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<tr>
<td>00386</td>
<td>PHOSPHATIDYLSERINE CAPS - 100 mg, 100 caps</td>
<td>54.00</td>
<td>40.50</td>
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<tr>
<td>00561</td>
<td>POLICOSANOL - 10 mg, 60 tablets</td>
<td>24.00</td>
<td>18.00</td>
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<tr>
<td>01423</td>
<td>POMEGRANATE® (FULL-SPECTRUM) - 30 softgels</td>
<td>24.00</td>
<td>18.00</td>
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<tr>
<td>00956</td>
<td>POMEGRANATE EXTRACT - 30 veg. caps</td>
<td>19.50</td>
<td>14.63</td>
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<tr>
<td>00957</td>
<td>POMEGRANATE JUICE CONCENTRATE - 16 oz. liquid</td>
<td>25.95</td>
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<td>00577</td>
<td>POTASSIUM IODIDE - 1 box, 14 tablets</td>
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<tr>
<td>01500</td>
<td>PQO CAPS W/BIOPQQ® - 10 mg, 30 veg. caps</td>
<td>24.00</td>
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<td>00302</td>
<td>PREGNENOLONE - 50 mg, 100 caps</td>
<td>24.00</td>
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<tr>
<td>00700</td>
<td>PREGNENOLONE - 100 mg, 100 caps</td>
<td>26.00</td>
<td>19.50</td>
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<tr>
<td>00733</td>
<td>PRELOX® NATURAL SEX FOR MEN® - 60 tablets</td>
<td>52.00</td>
<td>39.00</td>
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<tr>
<td>00571</td>
<td>PRIMAL DEFENSE™ - 90 caplets</td>
<td>49.95</td>
<td>37.46</td>
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<tr>
<td>01019</td>
<td>PRIMAL DEFENSE™ - 180 caplets</td>
<td>78.95</td>
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<td>01329</td>
<td>PROBIOTIC ALL-FLORA® - 10 veg. caps</td>
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<td>01336</td>
<td>PROBIOTIC ANTI-AGING™ - 90 veg. caps</td>
<td>30.95</td>
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<td>01324</td>
<td>PROBIOTIC CLEANSE™ - 90 veg. caps</td>
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<td>01322</td>
<td>PROBIOTIC COLOR® - 90 veg. caps</td>
<td>30.95</td>
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<tr>
<td>00525</td>
<td>PROBOOST THYMIC PROTEIN A® - 4 mcg, 30 packets</td>
<td>72.00</td>
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<td>00869</td>
<td>PRO FEM CREAM - 2 fl oz (Progesterone Cream)</td>
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<td>01020</td>
<td>PROGRESS® - 15 stick pack</td>
<td>22.50</td>
<td>16.88</td>
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<tr>
<td>01072</td>
<td>PRO M INTERNAL DEODORIZER - 500 mg, 100 veg. caps</td>
<td>28.00</td>
<td>21.00</td>
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<tr>
<td>01094</td>
<td>PROTEIN - NATURAL - (Enhanced Life Extension) - 1000 grams powder</td>
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<td>01095</td>
<td>PROTEIN - BERRY - (Enhanced Life Extension) - 1000 grams powder</td>
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<tr>
<td>00290</td>
<td>PROTEIN - VANILLA - (Designer Whey) 2 lbs powder</td>
<td>42.49</td>
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<tr>
<td>00282</td>
<td>PROTEIN - CHOCOLATE - (Designer Whey) 2 lbs powder</td>
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<td>00283</td>
<td>PROTEIN - NATURAL - (Designer Whey) 2 lbs powder</td>
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<tr>
<td>01508</td>
<td>PTEROPURE™ - 50 mg Pterostilbene 60 veg. caps</td>
<td>32.00</td>
<td>24.00</td>
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</tr>
</tbody>
</table>

**SUB-TOTAL OF COLUMN 13**

**SUPER SALE SAVINGS ON ALL PRODUCTS**

**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**
<table>
<thead>
<tr>
<th>No.</th>
<th>Retail Each</th>
<th>Member Each</th>
<th>Qty</th>
<th>Total</th>
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<tr>
<td>01075</td>
<td>pure plant protein - natural vanilla 450 grams powder</td>
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<td>01209</td>
<td>pumpkin seed extract (water-soluble) - 60 veg. caps</td>
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<td>01210</td>
<td>pumpkin seed extract w/soy isoflavones (water-soluble) - 60 veg. caps</td>
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<td>01031</td>
<td>pyridoxal 5'-phosphate - 60 veg. caps</td>
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<td>01217</td>
<td>pyridoxal 5'-phosphate - 100 mg, 60 veg. caps</td>
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<td>19.80</td>
<td>14.85</td>
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<td>01309</td>
<td>quercetin (optimized) - 250 mg, 60 veg. caps</td>
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<td>01030</td>
<td>red yeast rice (bluebonnet) - 600 mg, 60 veg. caps</td>
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<td>00079</td>
<td>red yeast rice (nature's plus) - 600 mg, 60 veg. caps</td>
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<td>resmin - 60 enteric-coated caps</td>
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<td>rejuvenex® body lotion - 6 oz</td>
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<td>00918</td>
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<td>rejuvenight (ultra) - 2 oz</td>
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<td>00706</td>
<td>rejuvenight w/progesterone (ultra) - 2 oz</td>
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<td>38.00</td>
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<td>01413</td>
<td>resveratrol w/pterostilbene - 20 mg, 60 veg. caps</td>
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<td>18.00</td>
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<td></td>
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<td>22.00</td>
<td>16.50</td>
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<tr>
<td>01410</td>
<td>resveratrol w/pterostilbene - 100 mg, 60 veg. caps</td>
<td>36.00</td>
<td>27.00</td>
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<td>32.00</td>
<td>24.00</td>
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<td>resveratrol w/synergistic grape-berry actives (optimized) - 250 mg, 60 veg. caps</td>
<td>46.00</td>
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<td>41.33</td>
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<td>00889</td>
<td>rhodiola extract - 250 mg, 60 veg. caps</td>
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<td>10.58</td>
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<td>00972</td>
<td>(d) ribose powder - 150 grams</td>
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<td>(d) ribose tablets - 100 veg. tabs</td>
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<td>rich rewards breakfast ground coffee - 12 oz. bag</td>
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<td>01610</td>
<td>rich rewards decaffeinated roast ground coffee - 12 oz. bag</td>
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<td>r-lipoic acid (super) - 300 mg, 60 veg. caps</td>
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<td>rna capsules - 300 mg, 100 caps</td>
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<td>16.16</td>
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<td>rosmarinic acid extract - 60 veg. caps</td>
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<td>44.25</td>
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<td></td>
<td></td>
<td></td>
<td>53.00</td>
<td>39.75</td>
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</table>

**Q. R.**

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<th>Qty</th>
<th>Total</th>
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<tr>
<td>00575</td>
<td>same (s-adenosyl-methionine) - 200 mg, 30 enteric coated tablets</td>
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<td>12.00</td>
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<tr>
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<td>same (s-adenosyl-methionine) - 200 mg, 50 enteric coated tablets</td>
<td>36.00</td>
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<td>00557</td>
<td>same (s-adenosyl-methionine) - 400 mg, 20 enteric coated tablets</td>
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<td>00155</td>
<td>same (s-adenosyl-methionine) - 400 mg, 50 enteric coated tablets</td>
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<td>00143</td>
<td>sea-iodine™ - 1000 mcg, 60 veg. caps</td>
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<td>selenium - 2 oz dropper bottle</td>
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<td>se-methyl l-selenocysteine - 200 mg, 100 caps</td>
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<td>00318</td>
<td>serraflazyme - 100 tablets</td>
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<td>00011</td>
<td>shampoo - 16 fl oz</td>
<td>6.00</td>
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<tr>
<td>00284</td>
<td>shark liver oil (norwegian) - 1000 mg, 30 softgels</td>
<td>16.00</td>
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<td>silymarin - 100 mg, 50 caps</td>
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<td>skin restoring ceramides w/lipowheat™ - 30 liquid caps</td>
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<td>sodzyme® w/elsiGODIN® and wolfberry - 90 veg. caps</td>
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<td>solarsheild sunglasses - 1 pair smoke color</td>
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<td>01097</td>
<td>soy extract (ultra) - 150 veg. caps</td>
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<td>stabilium® 200 - 30 caps</td>
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<td>stevia extract - 100 packets, 1 gram each</td>
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<td>st. john's wort extract (ultra) - 300 mg, 60 caps</td>
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<td>st. john's wort extract (planetary) - 600 mg, 60 tablets</td>
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<td>strontium - 750 mg, 90 veg. caps</td>
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<td>sun protection spray w/beta glucan - spf30 - 6 oz</td>
<td>14.95</td>
<td>11.21</td>
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<td>00748</td>
<td>sunglasses (overxcast polarized) - gray color, medium</td>
<td>27.00</td>
<td>20.25</td>
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</table>

**Life Extension Members Receive 25% Off the Retail Price of All Products**

**February 2012**

**Deduct An Additional 10% on All Products During Super Sale**
<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Retail Each</th>
<th>Member Each</th>
<th>Qty</th>
<th>Total</th>
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</tr>
<tr>
<td>00758</td>
<td>SUPER ABSORBABLE SOY ISOFLAVONES - 60 caps</td>
<td>$28.00</td>
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<tr>
<td></td>
<td>Buy 4 bottles, price each</td>
<td>25.00</td>
<td>18.75</td>
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<td>01381</td>
<td>SUPERCRITICAL OMEGA 7™</td>
<td>56.95</td>
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<tr>
<td>01348</td>
<td>SUPERCRITICAL OREGANOMORFIC™ - 30 softgels</td>
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<td>01408</td>
<td>SUPER SAW PALMETTO/NETTLE ROOT W/BETA-SITOSTEROL 60 softgels</td>
<td>28.00</td>
<td>21.00</td>
<td></td>
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<tr>
<td></td>
<td>Buy 4 bottles, price each</td>
<td>26.00</td>
<td>19.50</td>
<td>24</td>
<td>57.80</td>
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<td>Buy 12 bottles, price each</td>
<td>18.00</td>
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<td>Buy 12 bottles, price each</td>
<td>12.00</td>
<td>9.00</td>
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<tr>
<td>00578</td>
<td>SUPER SELENIUM COMPLEX - 200 mcg, 100 caps</td>
<td>12.00</td>
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<td>Buy 4 bottles, price each</td>
<td>10.00</td>
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<tr>
<td></td>
<td>Buy 12 bottles, price each</td>
<td>9.00</td>
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<tr>
<td>00674</td>
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<td>32.00</td>
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<td>Buy 4 bottles, price each</td>
<td>28.00</td>
<td>21.00</td>
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<td><strong>T</strong> TAL™-SHIP™ COSMETICS • For information please call 1-800-544-4440 or visit <a href="http://www.LifeExtension.com">www.LifeExtension.com</a></td>
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<td>TART CHERRY - 600 mg, 60 caps</td>
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<td>00199</td>
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<td>00133</td>
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<td>16.88</td>
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<td>16.00</td>
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<td>(L) THEAINE - 100 mg, 60 caps</td>
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<td>&quot;01038</td>
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<td>14.00</td>
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<td>00668</td>
<td>THYROID FORMULA™ (METABOLIC ADVANTAGE) - 100 caps</td>
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<td>11.00</td>
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<td>TKG - 500 mg, 180 tablets</td>
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<td>36.00</td>
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<td>TOTAL SUN PROTECTION CREAM W/BETA GLUCAN - 4 oz</td>
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<td>01468</td>
<td>TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT - 60 veg. caps</td>
<td>24.00</td>
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<td>Buy 4 bottles, price each</td>
<td>22.00</td>
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<td>01469</td>
<td>TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT W/RESVERATROL - 60 veg. caps</td>
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<td>00866</td>
<td>TRYPtopure® L-TRYPTOPHAN - 500 mg, 90 veg. caps</td>
<td>38.00</td>
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<td>34.00</td>
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<td>01202</td>
<td>TRYPtopure® PLUS (OPTIMIZED) - 90 veg. caps</td>
<td>40.00</td>
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<td>TWO-PER-DAY - 60 veg. tablets</td>
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<td><strong>SUB-TOTAL OF COLUMN 18</strong></td>
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<td>Total</td>
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<td>00063</td>
<td>VITAMIN E (PURE NATURAL) - 400 IU, 100 caps</td>
<td>$18.75</td>
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<td>Buy 4 bottles, price each</td>
<td>17.25</td>
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<td></td>
<td>Buy 10 bottles, price each</td>
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<td>01225</td>
<td>VITAMIN K2 (LOW-DOSE) - 45 mcg, 90 softgels</td>
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<td>01585</td>
<td>ZEAXANTHIN W/LUTEIN &amp; MESO-ZEAXANTHIN AND C3G (SUPER) - 60 softgels</td>
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<td>19.80</td>
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<td>ZEAXANTHIN W/LUTEIN &amp; MESO-ZEAXANTHIN PLUS ASTAXANTHIN AND C3G (SUPER) - 60 softgels</td>
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<td>38.00</td>
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<td>ZINC LOZENGES - 75 lozenges</td>
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<td>Buy 4 bottles, price each</td>
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<td>01029</td>
<td>ZYFLAMEND EASYCAPS - 180 softgels</td>
<td>31.95</td>
<td>23.96</td>
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**SUB-TOTAL OF COLUMN 19**

* These products are not 25% off retail price.
** Not for sale to wholesalers or retail stores.
*** Not eligible for member discount or member renewal product credit.
† Due to license restrictions, this product is not for sale to wholesalers outside of the USA or Canada.
*† Can only be sold in the USA.
**† Member pricing not valid on this item.
***† Due to license restrictions, this product is not for sale in Canada.
*‡ These products are not 25% off retail price. These products are not for sale to wholesalers or retail stores.
‡‡ Can only be sold in USA and Canada.
^‡‡‡ Not available for sale to Food and Drug Stores.
#‡‡‡ Not available for sale to Chain Grocery and Chain Drug Stores.
##‡‡‡ Not available for sale in Belgium. Not available for sale to Chain Grocery and Chain Drug Stores.
###‡‡‡ Not available for sale outside the US and Canada. Not available for sale to Chain Grocery and Chain Drug Stores.

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 30-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 1,666-page Disease Prevention and Treatment protocol book that contains novel therapies to treat 133 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.

**Four Easy Ways to Join**

1. Call toll-free 1-800-544-4440
2. Go to www.lef.org
3. Fax back to 1-866-728-1050
4. Mail to: Life Extension Foundation® • PO Box 407198
   Ft. Lauderdale, FL 33340-7198 • Local Number: 954-766-8433

**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
Address
City    ST    ZIP
Email    Phone

☐ Check enclosed *(payable to Life Extension Foundation®)*
☐ Charge my cc:

Card #   Exp.
ORDER SUBTOTALS

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ORDER TOTALS

Sub-Total A (Sub-total of Columns 1 through 19)

SUPER SALE DEDUCT 10% (Subtotal x 10%) Ends 01/31/12

Postage And Handling (Any size order, continental U.S.)

C.O.D.s (Add $7 for C.O.D. orders)

Shipping

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

BILL TO ADDRESS

NAME

ADDRESS

CITY/STATE/ZIP-POSTAL CODE

PHONE

VISA/MASTERCARD/AMEX/DISCOVER #

EXP. DATE

SIGNATURE

SHIP TO ADDRESS

NAME

ADDRESS

CITY/STATE/ZIP-POSTAL CODE

PHONE

SIGNATURE

PRICES SUBJECT TO CHANGE WITHOUT NOTICE. PLEASE NOTIFY THE LIFE EXTENSION FOUNDATION® OF ANY ADDRESS CHANGE
**Sub-Total (U.S. Dollars)**

Deduct an additional 10% on all products during Super Sale.

**To order online visit www.LifeExtension.com/SuperSale**

**Offer ends January 31, 2012**

Shipping only $5.50 U.S. • $17.50 Canada • $12.50 Hawaii, Alaska, U.S. Virgin Islands, Puerto Rico • UK Flat rate $25 USD

(Add $7 for C.O.D. • Add $16.00 for UPS overnight • Add $7.00 for UPS 2nd day air • International air mail costs will be added.)

**Prices subject to change without notice. Please notify the LIFE EXTENSION FOUNDATION® of any address change**

---

**LIFE EXTENSION FOUNDATION® MEMBERS ONLY**

**MEMBER NO.**

Print membership no. for member discount

**NOT A MEMBER? JOIN TODAY!**

- I want to join the Life Extension Foundation®.

Enclosed is $75 for annual membership, (Canadians add $7.00, all others outside the U.S. add $85.00. Send me: Disease Prevention & Treatment Protocol Book

---

**Please mail to:**

Life Extension Foundation Buyers Club, Inc.
P.O. Box 407198
Ft. Lauderdale, Florida 33340-7198

Or Call Toll Free 1-800-544-4440 • Fax: 866-728-1050 • Local Number: 954-766-8433

Other International Shipping Restrictions May Apply. Please visit www.lef.org/vitamins-supplements/shipping/shipping-information.htm for details.

**SUPER SALE DEDUCT 10% (subtotal x 10%)** Ends 1/31/12

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**No.** | **Name** | **2011** | **Retail** | **Member Price** | **Qty** | **Total**
---|---|---|---|---|---|---
33835 | PHARMACOCRACY * by William Falcon | 2011 | $24.00 | $9.60 | | |
33837 | WHEAT BELLY * by William Davis, MD | 2011 | $25.99 | $19.99 | | |
33834 | THE FUTURE OF AGING * by Gregory M. Fahy | 2010 | $279.00 | $209.25 | | |
33833 | THE LIFE PLAN * by Jeffry S. Life, MD, PhD | 2011 | $26.00 | $19.50 | | |
33832 | YOUR BONES * by Lara Pizzorno, MA, LMT | 2011 | $12.00 | $9.00 | | |
33829 | THE IMMORTALITY EDGE * by Michael Fossel, MD, PhD, Greta Blackbum, David Wojnarowski, MD | 2011 | $25.95 | $18.17 | | |
33827 | FOREVER YOUNG * by Nicholas Perricone, MD | 2011 | $26.00 | $18.20 | | |
33825 | THE EMPOWERED PATIENT * by Elizabeth Cohen | 2010 | $15.00 | $10.50 | | |
33824 | VITAMIN D SOLUTION | 2010 | $25.95 | $18.17 | | |
33822 | BREAKTHROUGH: EIGHT STEPS TO WELLNESS * by Suzanne Somers (paperback) | 2010 | $15.00 | $10.50 | | |
33836 | WEIGHT LOSS GUIDE * by Steven V. Joyal, MD and William Falcon (hardcover) (3rd Edition) | 2010 | $29.95 | $8.99 | | |
33820 | YOUR BLOOD DOESN'T LIE * by Sergey Ozugan, MD, PhD | 2010 | $24.95 | $17.45 | | |
33819 | BRAIN SURGERY * by Keith Black, MD | 2010 | $24.99 | $18.74 | | |
33816 | FDA: FAILURE, DECEPTION, ABUSE * by Life Extension Foundation | 2010 | $20.00 | $15.00 | | |
33818 | STAY YOUNG & SEXY WITH BIO-IDENTICAL HORMONE REPLACEMENT * by Jonathan Wright, MD | 2010 | $19.95 | $14.96 | | |
33815 | KNOCKOUT * by Suzanne Somers | 2009 | $25.99 | $17.00 | | |
33814 | CHEATING DEATH * by Sanjay Gupta, MD | 2009 | $24.99 | $17.49 | | |
33813 | TIMESHIP * by Stephen Valentine | 2009 | $45.00 | $33.75 | | |
33812 | LIFE OVER CANCER * by Keith Block, MD (hardcover) | 2009 | $25.00 | $17.50 | | |
33811 | THE GREAT AMERICAN HEART HOAX * by Michael Ozner, MD, FACC, FAHA | 2009 | $24.95 | $17.47 | | |
33810 | THE ULTRAMIND SOLUTION * by Mark Hyman, MD | 2009 | $27.50 | $19.25 | | |
33809 | TESTOSTERONE FOR LIFE * by Abraham Morentiner, MD | 2008 | $16.95 | $11.87 | | |
33808 | BREAKTHROUGH: EIGHT STEPS TO WELLNESS * by Suzanne Somers | 2008 | $25.95 | $18.17 | | |
33899 | YOUNGER YOU * by Eric Braverman, MD | 2008 | $24.95 | $15.75 | | |
33898 | AGELESS * by Suzanne Somers | 2008 | $25.00 | $17.50 | | |
33600 | DISEASE PREVENTION AND TREATMENT, EXPANDED FOURTH EDITION (hardcover) | 2003 | $49.95 | $37.46 | | |
35994 | THE EDGE EFFECT * by Eric Braverman, MD (paperback) | 2004 | $12.95 | $9.10 | | |
37007 | ENDING AGING * by Aubrey DeGrey with Michael Rae | 2007 | $28.94 | $17.73 | | |
33488 | FEMALE AND FORGETFUL * by Elisa Lottor, PhD, ND, and Nancy P Bruning | 2002 | $18.99 | $14.24 | | |
36909 | LIFE EXTENSION REVOLUTION * by Philip Lee Miller, MD (paperback) | 2008 | $16.00 | $12.00 | | |
33837 | MAXIMIZE YOUR VITALITY & POTENCY * by Jonathan Wright, MD | 1999 | $14.95 | $11.00 | | |
33610 | MELATONIN * by Russ Reiter, PhD and Jo Robinson, MD | 1996 | $22.95 | $15.00 | | |
36367 | THE METABOLIC PLAN * by Stephen Chemiske, MD | | | | | |
33805 | MIAMI MEDITERRANEAN DIET WITH 300 RECIPES * by Michael D. Ozner, MD, FACC, FAHA (hardcover) | 2008 | $24.95 | $16.25 | | |
33906 | THE MIGRAINE CURE * by Sergiy Ozugan, MD, PhD | 2006 | $24.00 | $15.60 | | |
33026 | MIND FOOD & SMART PILLS * by Ross Peltor, PhD | 1989 | $13.95 | $11.15 | | |
33830 | PRESCRIPTION FOR DISASTER DVD * by Gary Null | 2003 | $18.00 | $12.00 | | |
33670 | A PRIMER ON PROSTATE CANCER (2nd edition) * by Stephen & Strum, MD, and Donna Pogliano | 2002 | $28.95 | $21.71 | | |
33626 | SAVE YOUR SIGHT * by Marc Rose, MD/Michael Rose, MD | 2008 | $13.99 | $8.35 | | |
33804 | STAYING YOUNG: THE OWNER'S MANUAL FOR EXTENDING YOUR WARRANTY * by Mehmet Oz, MD | 2008 | $26.00 | $18.20 | | |
33806 | THE CR WAy * by Paul McGlothin and Meredith Averill | 2008 | $15.95 | $11.25 | | |
33595 | THE SEXY YEARS * by Suzanne Somers (hardcover) | 2004 | $25.00 | $17.00 | | |
33828 | THE SEXY YEARS * by Suzanne Somers (paperback) | 2004 | $15.00 | $10.50 | | |
33676 | THE SIDE EFFECTS BIBLE * by Frederic Vagnini, MD and Barry Fox, PhD | | | | | |
33399 | VOCAL EXCEPTS FROM SCIENTIFIC STUDIES * Audio Tape | | | | $6.00 | $3.50 |
36955 | WE BECOME SILENT * by Kevin Miller | | | | $24.98 | $18.74 |
33803 | WHAT YOUR DOCTOR MAY NOT TELL YOU ABOUT DIABETES * by Steven V. Joyal, MD | 2008 | $14.99 | $10.49 | | |
33700 | JOHN ABDU'S NO EXCUSES WORKOUT DVD | 2008 | $13.30 | $9.98 | | |

**Sub-Total (U.S. Dollars):**
Unleash the Power of the
Milk Thistle Seed

Milk thistle extract has long been thought of as one of nature’s most potent weapons to support human health, but until recently, the technology hasn’t been available to fully harness this plant’s potential. Among the compounds waiting to be unlocked are a slew of nourishing antioxidants and flavonolignans valued for their role in ensuring healthy liver function.¹

Life Extension® has uncovered an advanced extraction technology that has enabled scientists to isolate silymarin constituents and to test their efficacy against various cell lines. Among the compounds tested, silymarin constituents isosilybin A and B proved to be the most efficient in maintaining healthy cell division.²

Certified European Milk Thistle is the first milk thistle extract to contain standardized, high potencies of silymarin, silibinins, and isosilybin A and B—providing the full spectrum of milk thistle’s liver and prostate protective compounds.

Each capsule of this advanced formula provides:

Milk Thistle (Silybum marianum) Extract (seed) 750 mg [std. to 80% Silymarin (600 mg), 30% Silibinins (225 mg), and 8% Isosilybin A and Isosilybin B (60 mg)]

A 60 vegetarian capsule bottle of Certified European Milk Thistle retails for $34. If a member buys four bottles during Super Sale, the cost is reduced to only $20.25 per bottle—a savings of nearly one third! Each bottle will last a healthy person for at least three months.

Compare the price of Certified European Milk Thistle to commercial silymarin supplements, and members will see that this new formula is available at one of the lowest costs per milligram—with standardized concentrations of silibinins and isosilybin A and B not found in other milk thistle extracts! Contains rice.

Reference

*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 Ultimate Two-Per-Day Formula

NOW IN CAPSULES OR TABLETS!

The following table compares the daily dosage of key nutrients included in both the Life Extension Two-Per-Day Formula and Centrum®’s Daily Tablet:

<table>
<thead>
<tr>
<th>Sample Ingredient Comparison</th>
<th>LIFE EXTENSION TWO-PER-DAY</th>
<th>Centrum®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin C</td>
<td>500 mg</td>
<td>60 mg</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>2,000 IU</td>
<td>400 IU</td>
</tr>
<tr>
<td>Vitamin B1</td>
<td>75 mg</td>
<td>1.5 mg</td>
</tr>
<tr>
<td>Vitamin B2</td>
<td>50 mg</td>
<td>1.7 mg</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>75 mg</td>
<td>2 mg</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>300 mcg</td>
<td>6 mcg</td>
</tr>
<tr>
<td>Niacin (as niacinamide)</td>
<td>50 mg</td>
<td>20 mg</td>
</tr>
<tr>
<td>Pantothenic acid</td>
<td>100 mg</td>
<td>10 mg</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>100 IU (natural)</td>
<td>30 IU (synthetic)</td>
</tr>
<tr>
<td>Natural Folate</td>
<td>400 mcg</td>
<td>400 mcg</td>
</tr>
<tr>
<td>Zinc</td>
<td>30 mg</td>
<td>11 mg</td>
</tr>
<tr>
<td>Selenium</td>
<td>200 mcg</td>
<td>55 mcg</td>
</tr>
<tr>
<td>Lutein</td>
<td>5 mg</td>
<td>(none)*</td>
</tr>
<tr>
<td>Lycopene</td>
<td>2 mg</td>
<td>(none)*</td>
</tr>
<tr>
<td>Biotin</td>
<td>300 mcg</td>
<td>30 mcg</td>
</tr>
<tr>
<td>Boron</td>
<td>3 mg</td>
<td>75 mcg</td>
</tr>
<tr>
<td>Chromium</td>
<td>200 mcg</td>
<td>35 mcg</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>100 mcg</td>
<td>45 mcg</td>
</tr>
<tr>
<td>Magnesium</td>
<td>100 mg</td>
<td>50 mg</td>
</tr>
<tr>
<td>Manganese</td>
<td>2 mg</td>
<td>2.3 mg</td>
</tr>
<tr>
<td>Iodine</td>
<td>150 mcg</td>
<td>150 mcg</td>
</tr>
<tr>
<td>Potassium</td>
<td>25 mg</td>
<td>80 mg</td>
</tr>
<tr>
<td>Vitamin A (preformed)</td>
<td>500 IU</td>
<td>1,015 IU</td>
</tr>
<tr>
<td>Vitamin A (as beta-carotene)</td>
<td>4,500 IU</td>
<td>2,485 IU</td>
</tr>
<tr>
<td>Choline (as bitartrate)</td>
<td>20 mg</td>
<td>(none)</td>
</tr>
<tr>
<td>Inositol</td>
<td>50 mg</td>
<td>(none)</td>
</tr>
<tr>
<td>PABA</td>
<td>30 mg</td>
<td>(none)</td>
</tr>
<tr>
<td>Calcium</td>
<td>12 mg</td>
<td>200 mg</td>
</tr>
<tr>
<td>Alpha Lipoic Acid</td>
<td>125 mg</td>
<td>(none)</td>
</tr>
</tbody>
</table>

For many years, Life Extension® members had to rely on commercial “one-a-day” supplements that provide very low potencies.

In response to requests for a science-based multi-nutrient, a special formula was compounded to provide the greatest potencies that can fit into two tablets. When compared to conventional “one-a-day” products, Life Extension Two-Per-Day contains up to 50 times more potency! This Two-Per-Day formula is now available in tablet or capsule form.

The box on this page reveals how much more potent the Two-Per-Day formula is compared to the leading commercial multi-vitamin. Few consumers realize that commercial supplements often contain the cheapest form of nutrients that don’t provide optimal benefits. For example, the 30 IU of synthetic vitamin E contained in Centrum® may provide relatively little vitamin E to the bloodstream. The 100 IU of natural vitamin E contained in Two-Per-Day provides over 3 times more vitamin E activity than does Centrum®.

Compared to Centrum®, Two-Per-Day Tablets or Capsules provide about:
- 5 times more Vitamin D
- 8 times more Vitamin C
- 3 times more Vitamin E
- 10 times more Biotin
- 40 times more Boron
- 4 times more Selenium
- 37 times more Vitamin B6
- 50 times more Vitamin B1
- 50 times more Vitamin B12
- More than twice as much niacin, zinc, and many other nutrients

Life Extension Two-Per-Day Vegetarian Tablets provide much higher potencies of key nutrients and represent a better value than many commercial brands. A bottle of 120 Life Extension 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. (The retail price for 180 tablets of Centrum® is around $14.) (Item# 01615)

A bottle of 120 Life Extension Two-Per-Day capsules retails for $22. If a member buys four bottles during Super Sale, the price is reduced to $13.50. (Item# 01614)

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.

Contains soybeans, rice, and corn.

* Centrum® no longer contains significant amounts of lycopene nor lutein.

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

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

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

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

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

One softgel of Full-Spectrum Pomegranate™ contains:

POMELLA® Pomegranate................................. 400 mg
(Punica granatum) Extract (fruit) [std. to 30%
punicalagins (120 mg)]

PomComplete™ Pomegranate ..................... 137.5 mg
(Punica granatum) Blend [flower extract and
seed oil (standardized to 22% (30 mg) puninic acid)]

Full-Spectrum Pomegranate™

A bottle containing 30 softgels of Full-Spectrum Pomegranate™ retails for $24. If a member buys four bottles during Super Sale, the price is reduced to just $14.18 per bottle. Item # 01423

Contains soybeans.

References:

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Ultra Natural Prostate with AprèsFlex™ and Standardized Lignans softgels combines cutting-edge natural ingredients that have been scientifically substantiated to protect the prostate gland and maintain its healthy function.*

The latest addition to this formula is AprèsFlex™, an extract of *Boswellia serrata* that has been shown in studies to have two times the bioavailability of the leading boswellia extract. AprèsFlex™ inhibits the dangerous enzyme 5-lipoxygenase. Boron is included because of studies showing it may help slow elevation of prostate-specific antigen (PSA).

The formula provides saw palmetto extract and Graminex Flower Pollen Extract™ to interfere with DHT activity and help regulate inflammatory reactions in the prostate.* Lycopene is a carotenoid that is included in the formula to help maintain healthy DNA gene function in prostate cells.

In order to boost its anti-estrogen capabilities, Ultra Natural Prostate Formula incorporates HMRlignan™, derived from Norway spruce, flax lignans, and nettle root extract.

Since normal aging can lead to potentially unsafe levels of prostaglandins in the prostate, *Pygeum africanum* extract is included to help suppress prostaglandins and thereby promote prostate comfort.* Beta-sitosterol has been added because it is the most biologically active component of *pygeum* and enhances its protective effects.

The retail price for one bottle of Ultra Natural Prostate Formula with AprèsFlex™ and Standardized Lignans is $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 reduced to $21.60 per bottle.

Contains soybeans and corn.

To order Ultra Natural Prostate Formula with AprèsFlex™, 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.
30 REVERSAL OF BRAIN AGING
Researchers at the Massachusetts Institute of Technology have identified a highly absorbable form of magnesium that targets correctable factors involved in Alzheimer’s onset. In an experimental model, magnesium-L-threonate induced a 100% improvement in long-term memory!

56 A PRESCRIPTION DRUG VIRTUALLY EVERYONE NEEDS
Recent data validate our position that everyone consider taking the anti-diabetic drug metformin. Numerous studies reveal its efficacy in cancer prevention and treatment. A large cohort study just revealed a 54% reduction in cancer rates over a 10-year period.

66 SUPPRESS DEADLY AFTER-MEAL BLOOD SUGAR SURGES
Surges in blood sugar after each meal can reach deadly diabetic levels that last for hours. In human trials, a novel green coffee bean extract yielded a 24% drop in after-meal blood sugar in just 30 minutes and an average reduction of 32% after two hours.

7 DOCTORS OVERLOOK LEADING CAUSE OF PREMATURE DEATH
Doctors remain ignorant of data showing it is not just elevated fasting glucose that leads to diabetic complications in non-diabetics. Excess after-meal glucose surges inflict system-wide damage that is involved in the leading causes of death.

80 PROVEN METHODS TO SLASH ELEVATED GLUCOSE LEVELS
As people age, they find it increasingly difficult to maintain fasting glucose levels at optimal levels (below 86 mg/dL). Fortunately, specific nutrients, hormones, drugs, and lifestyle changes can help suppress blood glucose levels.

42 PROTECT JOINTS FROM IMMUNE ATTACK
Scientists at Stanford found osteoarthritis is caused by the same autoimmune factors as rheumatoid arthritis. A patented type II collagen shields joints from this kind of immune attack.