Three-Step Strategy To Reverse Mitochondrial Aging

Why Medical Advances Aren’t Occurring Faster

Coffee’s Surprising Heart Benefits

Rejuvenate Skin Around Your Eyes

New Studies Validate Efficacy of Vitamin D

SUMMER SANDERS BEATS VENOUS INSUFFICIENCY
PROTECT SKIN AGAINST DAMAGE FROM INSIDE OF YOUR BODY

Sunscreens do not always offer complete protection against ultraviolet exposure.\(^1\)

Scientists have discovered that an extract of the fern *Polypodium leucotomos* helps inhibit cellular changes in the skin that can lead to premature aging due to sun exposure.\(^2\)

Taken orally, **Enhanced FernBlock** with Red Orange Complex provides an additional layer of support for the body’s ultraviolet-light defenses.

Best of all, *Polypodium leucotomos* offers this protection from the inside out. The result is an oral photoprotective agent that provides uniform, systemic, total-body surface protection (including the eyes, lips, and the scalp), without the problems associated with sunscreen.\(^3,4\)

**Oral Sun Defense**

**FernBlock** has shown remarkable effectiveness in promoting skin defenses against harmful solar radiation.\(^5\-^9\)

**FernBlock** in this oral formulation works by promoting the body’s ability to inhibit absorption of ultraviolet rays and to quench the free radicals that this type of radiation can generate.\(^6,10\) In one clinical study, *Polypodium leucotomos* offered significant protection against the sun’s rays, even for those taking medication that causes increased sun sensitivity.\(^10\) The study subjects experienced an almost three-fold increase in the amount of time they spent in the sun before their skin began to burn, compared to when they weren’t using any form of UV protection.\(^10\)

**Enhanced FernBlock Formula**

This product has been upgraded to contain Red Orange Complex, a standardized extract that is obtained from three red orange varieties—Citrus sinensis var. Moro, Tarocco, and Sanguinello.

The main active phenolic compounds include anthocyanins, flavonones, and hydroxycinnamic acids. It also includes vitamin C,\(^11\) which works together to support the body’s natural photoprotection against ultraviolet radiation,\(^12,13\) by helping to balance the body’s normal inflammation response,\(^14\) free-radical defense mechanism,\(^15\) and healthy apoptotic (cell death) activity.\(^15\)

In a controlled human trial, 15 days of oral supplementation with Red Orange Complex was demonstrated to measurably support natural skin defenses against ultraviolet radiation.\(^15\)

**More Comprehensive Sun Protection**

**Enhanced FernBlock** with Red Orange Complex is designed to complement topical sunscreens for sun exposure. Taken orally, FernBlock supplements the effectiveness of topical sunscreens by protecting the entire skin surface and has an obvious advantage in that it cannot be removed by perspiring or bathing.

If taken daily, just one capsule should provide everyday protection. Each vegetarian capsule of Enhanced FernBlock with Red Orange Complex provides:

- **FernBlock** *Polypodium leucotomos* extract (leaf) 240 mg
- Red Orange Complex (Sicilian red oranges—Citrus sinensis var. Moro, Sanguinello, and Tarocco) extract (fruit and peel) 100 mg
- Vitamin C (as ascorbic acid from Red Orange Complex) 5.5 mg

A bottle of 30 vegetarian capsules of Enhanced FernBlock with Red Orange Complex retails for $42. If a member buys four bottles, the price is reduced to $28.50 per bottle.

To order Enhanced FernBlock with Red Orange Complex, call 1-800-544-4440 or visit www.LifeExtension.com

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**References**


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

FernBlock is a registered trademark of Industrial Farmaceutica Cantabria, S.A.

Note: This product is not a sunscreen.

If you have questions about this supplement, please call 1-800-544-4440.

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24 THREE-STEP STRATEGY TO REVERSE MITOCHONDRIAL AGING
According to cell biologists, the health of your mitochondria determines how long you will live. Research confirms how three compounds not only reduce damage to mitochondrial DNA but generate new, healthy mitochondria.

38 NEW STUDIES VALIDATE VITAMIN D
Nearly every tissue and cell type in your body has receptors for vitamin D, thereby increasing the amounts needed for optimal health. No longer known as just the “bone vitamin”, vitamin D also protects against cancer, heart disease, Alzheimer’s, and diabetes. Knowing your vitamin D levels based on blood testing is one of the most important health investments you can make.

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If you’re one of the 150 million Americans who drink coffee, two new studies show that coffee can reduce the risk of stroke by 36% by improving endothelial function and lowering your chances of heart failure. Beyond heart health, coffee shows benefits in reducing occurrences of diabetes, cancer, and neurodegeneration.

70 MEDIA BIAS IN REPORTING CARNITINE’S BENEFITS
A study at the Mayo Clinic found that carnitine supplementation was associated with a 27% reduction in all-cause mortality, a 65% reduction in ventricular arrhythmias, and a 40% reduction in angina symptoms in heart attack patients. Yet recent media headlines would have consumers believe that L-carnitine is detrimental to vascular health! This meticulous rebuttal exposes the media’s deception and reveals the truth about carnitine’s heart health benefits.

84 REJUVENATE THE SKIN AROUND YOUR EYES
The delicate skin around the eyes is constantly exposed to environmental oxidative stresses that break down the fibrous network composed of proteins elastin and collagen. In a remarkable clinical study, three unique ingredients reduced wrinkle depth around the eyes by 17% in 28 days—equaling a skin rejuvenation effect of 6 years in just 4 weeks!

7 AS WE SEE IT: Why Medical Advances Aren’t Occurring Faster!
Cancer patients are often treated with technologies developed during the first part of last century. Innovative treatments remain bogged down in regulatory quagmire. Those who dare to bring them to the surface risk financial ruin and incarceration by regulators protecting pharmaceutical interests. Life Extension* has long sought to persuade Congress to allow individuals to try drugs shown to be safe but not yet approved. In a free-market environment, lethal diseases will succumb to less expensive cures and greater competition will eliminate today’s health care cost crisis.

17 IN THE NEWS
Folate and B12 reduce macular degeneration risk; calorie-restricted diets delay neurodegeneration; preoperative supplemental omega-3 protects against atrial fibrillation; ginger benefits asthmatic patients; fish oil reduces mental stress; antioxidants improve breast cancer survival; and more.

93 ASK THE DOCTOR: IMPROVE VEIN HEALTH
Varicose veins are not just a cosmetic issue but can indicate more serious circulation problems such as chronic venous insufficiency. Ariel Soffer, MD, talks about specific supplements available for vein problems, as well as the latest non-surgical treatments, including lasers and sclerotherapy.
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 phytonutrients called curcuminoids and sesquiterpenoids to attain peak concentrations.

Life Extension’s Super Bio-Curcumin® derives from turmeric that is grown with organic practices, 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:

- 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 Absorbability 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 up to 7 times higher concentration in the blood than standard curcumin.

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

A bottle containing 60 vegetarian capsules of Super Bio-Curcumin® retails for $38. If a member buys four bottles, the price is reduced to only $26.25 per bottle.

To order Super Bio-Curcumin®, 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.
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**SCIENTIFIC ADVISORY BOARD**

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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.
Advanced RESVERATROL Formula

In 2003, the Life Extension Foundation® introduced a standardized resveratrol extract shown to favorably alter genes implicated in the aging process—many of the same genes that respond to calorie restriction.

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

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

High-Potency Resveratrol with Synergistic Activators

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

A bottle containing 60 vegetarian capsules of Optimized Resveratrol with Synergistic Grape-Berry Actives retails for $46. If a member buys four bottles, the price is reduced to $31 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

To order Optimized Resveratrol with Synergistic Grape-Berry Actives, 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.

References
10. Xenobiotica. 2008 Sep;38(9):857-66

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 “RULES” Are Broken

The people you see throughout this article were the most powerful group in the world.

They now share one common problem... they’re all dead.

These individuals are partially responsible for their demise because they inadvertently created and maintained rules that interfere with medical progress.

The catastrophic result has been needless suffering and deaths of tens of millions of Americans.

This article describes the development of what was considered a technological impossibility. The only reason this breakthrough happened was the willingness of an individual to break the rules, which put his personal liberty in jeopardy.

This rule breaker is now a hero and is credited for saving lives.

The dilemma is that most brilliant individuals today lack the confidence to risk prison and lose everything they have. They instead adhere to rules that strangle the kind of advances humans need to reverse age-related disease.

We will send this article to every member of Congress. Our objective is to persuade Representatives/Senators to recognize their power to amend archaic rules that impede scientists from curing old age disease.
Jet Engine Controversy

When World War II broke out, nations rushed to develop weapons that would give them a tactical advantage. When a group of British scientists proposed expending research funds to develop a jet engine for aircraft, the consensus of their opposition was that this was impossible and would be a waste of scarce wartime resources.¹

What the British did not know was that the Germans were already pursuing jet engine technology. Fortunately, it came to fruition too late in the war to produce a Nazi victory.

As you’ll read next, narrow-minded limitations on this kind of technology are not limited to the 1930s.

The Battle to Build Iron Dome

Israel is a tiny country surrounded by enemies that routinely fire rockets and missiles into it. Israel responds to these attacks with its own bombs and missiles, along with land invasions that cost many lives.

In late 2012, thousands of missiles and rockets were fired into Israeli population centers from the Gaza strip. While not particularly accurate, the volume of this weaponry would normally inflict many Israeli injuries and deaths.²

This time around something unexpected happened. A new technology called Iron Dome resulted in 84% of these deadly projectiles destined to hit Israeli population centers being destroyed in mid-air.¹

If you are not impressed by what Iron Dome accomplished, what you read in this article will enlighten you to a scientific achievement the world has never witnessed.

Perhaps the most fascinating aspect of Iron Dome is that it would have never been developed had an Israeli general and defense minister not broken bureaucratic rules.²

We at Life Extension contend these same kinds of advances would occur in the medical arena if Congress would abolish rules restricting the development of life-saving medical therapies.

Bureaucratic Opposition to Iron Dome

The Israeli military establishment did not believe Iron Dome had a chance of working and was vehemently opposed to it. So-called “experts” at the US Pentagon voiced similar opposition and dismissed Iron Dome as doomed to fail.

Despite these bureaucratic obstacles, a lone Israeli general pushed the project through, breaking laws and rules in the process that could have landed him and others in serious personal trouble.²

Technical Challenges

The pessimism of the military bureaucrats was nothing compared to the technological difficulties faced by the Iron Dome creators.
Rockets and missiles of all types are fired into Israel from only a few miles away. They fly erratically and can hit Israeli communities within seconds. Most are just a few feet long and a few inches wide. In some years thousands rain down (over 4,000 in the year 2008 alone).2

To counter this armada of rockets, a system had to be developed that could continuously scan enemy territory, detect a rocket the instant it was fired no matter how big or small, pinpoint its likely strike location and calculate if it was likely to hit a population center, and finally, if it was going to hit a city, blast it out of the sky with a missile. The system needed to do all that within about 15 seconds.

Additionally, interceptor missiles would need to cost about one-tenth of an average air-to-air missile, or else Israel’s rocket-flinging foes would be able to bankrupt Israel. And instead of taking 10 years or more to develop, typical for new weapons systems, Iron Dome needed to deploy in half that.

These daunting challenges deterred most from even considering this project, but not General Daniel Gold, who was director of Israel’s new weapon’s research department. General Gold has a PhD in mathematics and took up the rocket’s challenge with enthusiasm seen in very few individuals.

**Bypassing the Establishment**

Almost none of Israel’s military experts believed this kind of rocket defense could work. Enemy rockets of varying sizes fly erratically and rapidly hit nearby Israeli communities.

Drawing inspiration from other types of weapons defense systems, General Gold and his team in March 2005 agreed on a patched-together concept for what would become the Iron Dome.2

General Gold called up an Israeli weapons maker to head the project, bypassing required approvals from the military’s general staff, the defense minister, and the Israeli government. An audit by the Israeli state controller criticized this step, which led to years of heated condemnation of the project. If regulatory or criminal actions had been taken against General Gold, the highly controversial Iron Dome missile defense system would have likely never happened.

**Senator Warren Rudman**
died at age 82 from cancer.

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**Senator Ted Kennedy**
died at age 77 from glioblastoma multiforme (brain tumor).

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**Senator Jesse Helms**
died at age 86 of vascular dementia.

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General Gold disputed allegations that he broke rules, saying he simply sidestepped red tape. Said the General, “I just canceled all the unnecessary bureaucracy...I left only the most crucial bureaucracy needed for success.”

Another problem was that no one in government agreed to pay for the project. That left General Gold once again having to think outside the box. By using funds from his research budget and others in the private sector, he secured enough monies to cover early stage development costs.

Even after war with Hezbollah broke out in Lebanon, resulting in thousands of rockets being fired into northern Israel, the military establishment and Israel’s prime minister refused to divert government funds for Iron Dome.

**General Gold Breaks More Rules**

Without government funding, it is difficult to imagine a military project continuing. Instead of scaling back, General Gold directed a private Israeli defense contractor to begin full-scale development of the Iron Dome project when there was no order or appropriation to do so. According to the Israeli comptroller’s audit report, “The directive was not under his (Dr. Gold’s) authority.”

The defense contractor agreed that there was no legal basis to advance this system’s development and was quoted, “But if you want to achieve something in a very short time...you have sometimes to bypass the bureaucracy.”

The risk taken by General Gold and a handful of others paid off. The Ministry of Defense finally committed some funding to keep Iron Dome alive. (Government auditors later found the Ministry of Defense violated regulations by committing these funds without military or government approval for the project.)

Despite engineering miracles in the developmental process, Israel did not have the funding to quickly move Iron Dome forward. Israel sought out aid from the United States. After US military experts thoroughly reviewed the project, the American team concluded that, “This is something that cannot be done.”

Finally, the Israeli government became convinced enough to provide the first large cash infusion to Iron Dome with more funds likely to be appropriated later. This event, however, set off another attack against General Gold, mainly by rivals who feared losing out to the improved technology General Gold had expeditiously pushed through.

**General Gold Investigated Again by Israeli Authorities**

In response to increasing recognition that General Gold had pioneered a breakthrough technology, Israel’s government auditors initiated a new investigation of the project and issued a report accusing General Gold of launching a billion-dollar project without the necessary approvals. According to the auditor’s report:

“Brigadier General Gold decided on the development of Iron Dome, determined the timetables and ordered predevelopment and full development before the relevant authorities had approved the project.”

Fortunately for General Gold, Iron Dome was making rapid progress. A team of engineers assembled from across Israeli defense companies worked around the clock. Even pensioners were called out of retirement. In 2009, during the first field test, an Iron Dome prototype successfully intercepted an incoming rocket.
**Iron Dome Revolutionizes Military Defense...**
**But Still No Cancer Cure Breakthrough**

Intercepting supersonic projectiles in midflight was once considered science fiction. Engineers pulled off the feat by combining cutting-edge tracking radar with electro-optic sensors and mounting them on highly mobile, all-weather air defense systems. Iron Dome can hit multiple types of rockets and missiles at ranges up to 43 miles. It can be relocated quickly to new sites with totally different terrain. Iron Dome determines within split seconds whether an incoming rocket will land in an open field or a population center.

From drawing board to deployment, Iron Dome was completed in a few brief years. If you wonder why these kinds of breakthroughs aren’t happening in the medical field, look no further than an archaic regulatory system that suffocates innovation. That’s unfortunate for about 577,000 Americans who die from cancer alone each year.5

Within three days it shot down eight more rockets. It wasn’t until the Gaza flare-up in late 2012 that Iron Dome made its mark on the public consciousness.2

The result was a quick ending to this conflict, where Iron Dome knocked down 421 rockets launched from Gaza and bound for Israeli cities, an 84% success rate, according to the Israeli military.2

Iron Dome limited Israeli casualties to six during the seven days of intense bombardment. As a result, there was markedly less political pressure on Israel’s decision makers to invade, and a cease fire was implemented.2

There would be no Iron Dome had General Gold not broken rules that enabled him to push the system’s development forward.

Regrettably, there are few heroes in the medical arena today willing to risk their personal liberty to bring these kinds of technological breakthroughs to those dying of chronic degenerative diseases.

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**United States Finally Recognized Iron Dome**

The Pentagon sent a team of experts to Israel in late 2009 to re-evaluate Iron Dome—a concept they earlier deemed as something “that cannot be done.”3

In its final report, the Pentagon team declared Iron Dome a success. Field tests showed it was hitting 80% of the targets, up from the low teens in the earlier US assessment. This prompted the United States to provide roughly $200 million in Iron Dome funding.2

**Lives Saved**

Iron Dome went operational in March 2011. It shot down its first Palestinian rocket on April 7.

Every day in America, more than 1,500 people perish from cancer.5 Many of these patients are treated with surgery and radiation, technologies developed during the first half of last century. Others receive toxic chemotherapy drugs approved in the 1970s, ’80s, or ’90s.

While more Americans are being cured of cancer, they often are left with horrific side effects, and the survival rate for certain cancers has not appreciably improved since the 1950s.13-18
We have today, advanced imaging techniques (e.g., PET/CT scans) that can detect exactly where tumors are throughout a patient’s body. Genetic testing of tumor cells enables us to know what enables them to uncontrollably proliferate and how they may be evading therapeutic eradication. Yet about \textbf{577,000} of these patients die each year surrounded by oncology experts.\textsuperscript{5}

Effective treatments remain bogged down in regulatory quagmire.\textsuperscript{19,20} Those who risk bringing them to the surface prematurely risk financial decimation and incarceration by regulators determined to protect gigantic pharmaceutical interests.

The corrupt influence of pharmaceutical behemoths is so widespread that innovators fear the only way to get new therapy approved is to meticulously follow regulatory channels that were long ago proven inefficient. In this process that can take a decade and countless millions of dollars, potentially effective therapies are lost forever in a bureaucratic labyrinth.

\textbf{Real-World Solutions}

This article has been laced with depictions of former members of Congress and presidents who share a common tragedy of all \textit{dying} before technology could evolve to prevent their death. \textit{Life Extension} has long sought to persuade Congress to amend the Food, Drug and Cosmetic Act to allow individuals to “opt-out” of FDA’s regulatory stranglehold and allow companies to provide innovative products that are clearly marked, “Not approved by the FDA—Use at your own risk.”

This approach will allow companies to offer drugs that have demonstrated safety and a reasonable likelihood of effectiveness, which are labeled “Not Approved by the FDA.” Patients who wish can still use only FDA-approved drugs, while those willing to take a risk, in consultation with their doctors, will be allowed to try drugs shown to be safe that are still not approved.

We believe that this initiative will result in a \textit{renaissance} in the practice of medicine similar to the computer technology revolution of the past four decades. In the liberated environment we envision, lethal diseases will succumb to cures that are less expensive than is presently the case. And greater competition will help eliminate the health care cost crisis that exists today.

Today’s broken system results in terminally ill people learning of scientific discoveries that might well cure their disease, but sadly hearing their newscaster say the therapy is years away from FDA approval. We think that seriously ill people, in consultation with their doctors, should be able to make up their own minds about what drugs they are willing to try.

Outside-the-box thinkers like \textbf{General Gold} are repressed in today’s hostile regulatory environment because Congress has failed to amend the law.

Americans should not face prison for accelerating medical progress, yet that is how the law is written and the reason why so few cures for lethal diseases have been found over the past 60+ years.

We at \textit{Life Extension} have long contended that any person with a serious illness should have the individual right to choose therapies that have not yet received official approval. Under this personal choice initiative, the \textit{marketplace}, rather than government regulators, would determine which medical technologies are safe, efficacious, and cost effective.
The result will be the rapid emergence of medical therapies analogous to the Iron Dome missile defense system that came into existence because of General Gold’s willingness to break rules that made no sense.

For longer life,

William Faloon

References

SUPER OMEGA-3 WITH SESAME LIGNANS AND OLIVE FRUIT EXTRACT

To ensure the purest, most stable, and easy-to-tolerate fish oil, Super Omega-3 EPA-DHA is molecularly distilled. It enjoys the highest 5-star rating for purity, quality, and concentration from the renowned International Fish Oil Standards program. The sesame lignans not only direct the omega-3s toward more effective pathways in the body, but guard the delicate fish oil from oxidation.

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

The daily dose (four regular size softgels) of Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract provides:

- EPA (eicosapentaenoic acid) 1,400 mg
- DHA (docosahexaenoic acid) 1,000 mg
- Olive Fruit Extract (std. to 6.5% polyphenols (39 mg), 1.73% hydroxytyrosol/tyrosol (10.4 mg), 0.5% verbascoside/oleuropein (3 mg)) 600 mg
- Sesame Seed Lignan Extract 20 mg

References

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

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

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Overlooked in the effort to support sexual function in aging men is the health of the vascular system. Blood flow through the delicate lining of the arteries (the endothelium) is essential to sexual arousal, so it should come as no surprise that endothelial function is closely associated with male sexual capacity.

Life Extension® has discovered supportive clinical research for a scientifically validated, dietary supplement formula to promote endothelial function and blood flow to the place men need it most—for maximum performance.

The ingredients found in Prelox® Natural Sex for Men® have yielded compelling and highly satisfactory results in five independent clinical studies.2-6

Our analysis also confirms that unlike some performance enhancement supplements marketed as “natural,” Prelox® Natural Sex for Men® is not adulterated with trace amounts of prescription drugs.

A Powerful Synergy to Support Sexual Health

The patented blend of the following ingredients positively affects the male physiology in three ways, to provide optimal support:

1. PYCNONEOL® (standardized French maritime pine bark extract) activates endothelial nitric oxide synthase (eNOS),7 the enzyme required to make nitric oxide. Nitric oxide (NO) relaxes the vessels that enable efficient blood flow—the key to healthy male sexual activity and overall vascular health. Pycnogenol® further amplifies this relaxing effect by extending the amount of time nitric oxide remains in the bloodstream.

2. L-ARGININE is the biological precursor to nitric oxide synthesis in the endothelium.7 It interacts synergistically with Pycnogenol® to sustain nitric oxide levels sufficient for healthy sexual function.

3. ICAVIN—from a natural botanical extract used in traditional Chinese medicine—has been shown to deactivate the enzyme normally responsible for winding down male sexual response, further promoting sustained activity.7 Prelox® Natural Sex for Men® contains a standardized extract providing a proprietary form of high-quality icariin.

The suggested dose of two Prelox® Natural Sex for Men® tablets each day provides:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prelox® Proprietary Blend</td>
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</tr>
<tr>
<td>L-Arginine HCl, Aspartic Acid, Pycnogenol® Dried French Maritime Pine (Pinus pinaster) Extract (bark)</td>
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</tr>
<tr>
<td>Icarin [Natural Sex® Epimedium sagittatum Extract (aerial parts)]</td>
<td>60 mg</td>
</tr>
</tbody>
</table>

A 60-tablet bottle of Life Extension® Prelox® Natural Sex for Men® retails for $52. If a member buys four bottles, the price is reduced to just $36 per bottle.

References

Prelox® and Pycnogenol® are registered trademarks of Horphag Research Ltd. Prelox® is protected by U.S. patent #6,565,851B2. Pycnogenol® is protected by U.S. patents 5,720,956 and 6,372,266 and other international patents. Cannot be sold outside the USA.

To order Prelox® Natural Sex For Men®, 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.
With nearly 40 scientific studies published on the wide-ranging benefits of tart cherries, scientists are now discovering important new health applications for this American fruit.

Tart cherries are packed with unique beneficial compounds that have been shown to block COX-1 and COX-2 enzymes, as well as maintain muscle function and promote rapid muscle recovery after exercise, bringing faster relief from the minor aches, discomfort, and stiffness that can follow everyday muscle exertion.

Clinically Proven

In human studies, researchers have scientifically confirmed the muscle-supporting benefits of tart cherries. For example, a randomized controlled trial found that consuming tart cherry juice twice daily produced a substantial decrease in muscle symptoms related to exercise. In the same study, the exercise-induced loss of strength over the four days following a workout was reduced from 22% to only 49%. In another randomized controlled trial, marathon runners given tart cherry juice for 5 days before a race, on race day, and for 2 days after a race experienced significantly faster recovery of isometric strength and muscle function. And in yet another controlled trial, tart cherry juice taken twice daily for 7 days prior to a race produced a significantly smaller increase in post-race pain, according to a standard pain assessment scale, compared to the placebo group.

Anthocyanins

Anthocyanins are powerful flavonoids that provide the dark pigmentation to blueberries, raspberries, and bilberries. In addition to being potent antioxidants, anthocyanins have been extensively studied for their numerous health benefits that include heart, cellular, and cognitive health. What has drawn the attention of scientists is the fact that tart cherries contain a higher content of anthocyanins than other fruits.

To allow members to take full advantage of these discoveries, Life Extension® now offers 100% natural Tart Cherry Extract, a supplement that opens the door to the remarkable benefits of continued physical activity—at any age!

This formulation provides all the muscle-supporting benefits of tart cherries and mimics the anthocyanin dose used in successful clinical trials by providing a standardized 40 mg anthocyanins per capsule!

The serving size of one vegetarian capsule of Tart Cherry Extract with Standardized CherryPURE® contains:

<table>
<thead>
<tr>
<th>CherryPURE® Tart cherry (Prunus cerasus) extract (skin)</th>
<th>615.5 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>(std to 6.5% anthocyanins (40 mg))</td>
<td></td>
</tr>
</tbody>
</table>

A bottle of 60 vegetarian capsules of Tart Cherry Extract with Standardized CherryPURE® retails for $22. If a member buys four bottles, the price is reduced to $15 per bottle.

References

CherryPURE® is a registered trademark of Shoreline Fruit, LLC.

To order Tart Cherry Extract with Standardized CherryPURE®, call 1-800-544-4440 or visit www.LifeExtension.com
High Homocysteine, Low Folate, and B12 Predict Macular Degeneration

An article published in the American Journal of Clinical Nutrition reports the finding of a protective effect for higher levels of vitamin B12 and folate against the risk of developing age-related macular degeneration (AMD).* The study also revealed a greater risk of AMD in association with higher levels of homocysteine.

Paul Mitchell and his colleagues analyzed data from 1,390 participants in the Blue Mountains Eye Study of common eye diseases. Eye examinations were conducted upon enrollment and at five, ten, and fifteen years. Serum homocysteine, folate, and vitamin B12 levels were measured and dietary questionnaires were completed at the five-year follow-up visit.

From the five-year through the fifteen-year follow-up visit, 219 subjects were diagnosed with AMD. In comparison with those with lower homocysteine levels, participants whose levels were greater than 15 micromoles per liter had an up to 56% greater risk of AMD.

Editor’s Note: Among those with deficient folate levels, the risk of AMD was up to 89% higher in comparison with the risk experienced by subjects with greater levels. Vitamin B12 deficiency also increased risk.

—D. Dye

Critically Ill Have Reduced Levels of CoQ10

An article published in the Journal of Critical Care revealed lower levels of coenzyme Q10 (CoQ10) in critically ill patients in comparison with healthy men and women.*

The study compared 36 adult intensive care unit patients with 18 healthy controls. Septic shock was present in 12 of the critically ill subjects. While the lowest levels of plasma CoQ10 occurred in septic shock patients, levels were lower in critically ill patients both with and without septic shock in comparison with healthy subjects. Reduced levels of CoQ10 were also associated with increased age and with a decline in the ability to perform activities of daily living after hospital discharge. Authors Andrea Coppadoro and colleagues remark that CoQ10 supplementation has been associated with improvement in activities of daily living scores, neuromuscular function, and other long-term outcomes in certain groups, suggesting that supplementation could also benefit the outcome of the critically ill.

Editor’s Note: The authors conclude that, “The data provide a rationale for further...clinical studies to define CoQ10 insufficiency and evaluate the safety and efficacy of CoQ10 supplementation in critically ill patients.”

—D. Dye


Activation of SIRT1 Through Calorie Restriction or Drug Treatment Delays Neurodegeneration in Experimental Model

A recent issue of the *Journal of Neuroscience* reports an association between a calorie-restricted diet and a delay in the decline in brain function that occurs in a mouse model of neurodegeneration.*

The study utilized a breed of mice in which neurodegeneration is induced by administration of the drug doxycycline. Li-Huei Tsai, PhD, and associates fed the animals a diet that reduced by 30% the amount of calories that would have been normally consumed by mice given unlimited food access. A control group of the same breed was allowed unlimited feeding.

After three months on the diet, tests revealed not only less neurodegeneration but better cognitive function in the mice that received restricted diets. Examination of the animals’ brains revealed a reduction in the loss of neurons and greater brain mass and synaptic density in the restricted animals in comparison with those provided with unrestricted diets. **Editor’s Note:** The researchers found an increase in the expression of a protein believed to regulate life span known as SIRT1 in the hippocampus area of the calorie restricted animals’ brains as well as an increase in SIRT1 activity, which is consistent with other studies involving calorie restriction. When a separate group of mice were given a SIRT1-activating compound, benefits similar to those elicited by calorie restriction were observed.

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**Gamma-Tocopherol Supplementation Boosts Smoking Cessation Benefits**

The results of a study reported at the annual *Experimental Biology* meeting suggest a cardiovascular benefit for the form of vitamin E known as gamma-tocopherol among individuals who had recently given up smoking.*

The study included 30 participants who had smoked at least 10 cigarettes per day for one year. Subjects were randomized to receive a solution containing 500 mg of gamma-tocopherol or a placebo for seven days. Ultrasound evaluation of brachial artery flow-mediated dilation (a measure of blood vessel function) was conducted, and plasma levels of cotinine, vitamin E, malondialdehyde, and pro-inflammatory mediators were measured before and after the treatment period.

Flow-mediated dilation responses increased significantly among those receiving the supplement in comparison with subjects who received a placebo. While the placebo group experienced a 2.8% average increase in flow-mediated dilation by the end of one week, supplementation with gamma-tocopherol resulted in a 4.2% increase.

**Editor’s Note:** Subjects who received gamma-tocopherol also experienced a decline in myeloperoxidase and tumor necrosis factor-alpha, indicating a reduction in inflammation.

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**Hypothalamus Found to Play Important Role in Aging**

A small gland in the brain appears to have a powerful role in the aging process, according to research reported online in the journal *Nature.*

Dongsheng Cai, MD, PhD, and his colleagues at Yeshiva University evaluated inflammatory changes in the hypothalamus that have been associated with metabolic syndrome, a cluster of symptoms including glucose intolerance and central obesity. They found that activation in the hypothalamus of a protein known as nuclear factor kappa-beta (NF-kB), which is involved in inflammation, accelerated aging in mice.

The researchers determined that activation of NF-kB reduced the synthesis of gonadotropin-releasing hormone (GnRH, which is involved with reproduction) by the gland. By injecting GnRH into the hypothalamus of older mice, the animals were protected from age-related impairment of neurogenesis. Long-term peripheral administration of the hormone resulted in a reduction in some of the signs of aging, including cognitive decline.

**Editor’s Note:** In another experiment with mice in which the NF-kB pathway was inhibited, signs of aging were slowed in comparison with normal mice, and the modified animals experienced a 23% longer median life span and a 20% longer maximum life span in comparison with normal animals. Curcumin is a popular nutrient that inhibits NF-kB.

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* Experimental Biology Meeting 2013.


Phosphatidylserine Holds Promise for Brain Disorders

In an article published in the journal *Human Molecular Genetics*, researchers at Tel Aviv University report that phosphatidylserine could be of benefit to individuals with familial dysautonomia, a disorder that occurs in Ashkenazi Jewish men and women. Familial dysautonomia is caused by a mutation that results in the inhibition of the manufacture of I B kinase complex-associated protein (IKAP), which is believed to be involved in genetic transcription.*

Gil Ast and colleagues administered phosphatidylserine to cells derived from familial dysautonomia patients and observed an increase in gene function as well as higher levels of IKAP. The team then fed the supplement every two days for three months to mice genetically engineered with the mutation that causes the disease in humans. “We found a significant increase of the protein in all the tissues of the body, including an eight-fold increase in the liver and 1.5-fold increase in the brain,” reported Dr. Ast.


Ginger May Benefit Asthmatic Patients

The American Thoracic Society's 2013 International Conference in Philadelphia was the site of a presentation concerning the ability of compounds that occur in ginger to relax airway smooth muscle tissue, which is constricted during asthma attacks.*

Elizabeth Townsend, PhD, of Columbia University and her colleagues studied the effects of 6-gingerol, 8-gingerol and 6-shogaol in human airway smooth muscle tissue samples treated with acetylcholine, a neurotransmitter that causes bronchoconstriction. The compounds or a control substance were combined and administered with the beta-agonist bronchodilator drug isoproterenol.

Combining the drug with ginger compounds resulted in greater airway tissue relaxation than administering the drug alone. The ginger compound 6-shogaol elicited the strongest effect. The researchers determined that the compounds help inhibit phosphodiesterase 4D (PDE4D, an enzyme that negatively impacts processes involved in the relaxation of airway smooth muscle tissue). Additionally, 6-shogaol was found to dissolve F-active filaments that are involved in bronchoconstriction.


Meta-Analysis Reaffirms Protective Effect of Preoperative Omega-3 Fatty Acids Against Postoperative Atrial Fibrillation

The results of an updated meta-analysis published in the *Journal of Thoracic and Cardiovascular Surgery* indicate that preoperative supplementation with omega-3 fatty acids provides significant protection against atrial fibrillation in open heart surgery patients.*

The analysis included eight clinical trials evaluating the efficacy of omega-3 fatty acids for the prevention of atrial fibrillation following coronary artery bypass graft surgery and/or heart valve surgery in 2,687 men and women. A total of 398 atrial fibrillation events were documented postoperatively. Among subjects who received omega-3 fatty acids, there was a 16% lower risk of atrial fibrillation in comparison with those who received a placebo. When the analysis was limited to coronary artery bypass graft surgery patients, the reduction in risk associated with omega-3 supplementation increased to 34%.

The authors remark that the benefit of omega-3 fatty acids observed in this study could be due to their anti-inflammatory property or a direct antiarrhythmic effect.


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**Editor’s Note:** Atrial fibrillation is the most common type of heart arrhythmia that occurs after heart surgery and can result in longer hospitalization and an increased risk of postoperative mortality.

—D. Dye

Fish Oil Supplementation Could Lower Stress Response

The *American Journal of Physiology—Regulatory, Integrative, and Comparative Physiology* published the results of a trial that found a reduction in the response to mental stress in men and women given fish oil.*

The study included 67 men and women whose age averaged 24 years. The participants were divided to receive 9 grams of fish oil or 9 grams of olive oil daily for eight weeks. Before and after the treatment period, the subjects underwent assessment of resting heart rate, blood pressure, muscle sympathetic nerve activity, and forearm and calf blood flow, followed by reassessment during a situation created to induce mental stress.

While resting assessments did not differ significantly between the groups by the end of the study, those who received fish oil experienced reductions in heart rate reactivity and total muscle sympathetic nerve activity in response to stress in comparison with the olive oil group.

*Editor’s Note:* The finding suggests that fish oil could help protect the cardiovascular system during stress and may be one of several reasons why it helps maintain heart health.

—D. Dye


Study Results Indicate Benefits of Antioxidants Following Breast Cancer Therapy

An article published in *Breast Cancer Research and Treatment* reports that supplementation with antioxidants after treatment for breast cancer is not only safe, but may help improve survival.*

Elizabeth M. Poole of Harvard University and her associates analyzed data from 12,019 breast cancer survivors enrolled in one of four studies included in the After Breast Cancer Pooling Project. The analysis examined the use of supplements at least one year after diagnosis. Over follow-up, 1,298 deaths occurred, of which 65% were due to breast cancer.

Sixty percent of the women reported using supplements from one-to-five years following diagnosis. The use of any antioxidant supplement, categorized as vitamins C, E, or a multivitamin supplement in this study, was associated with a 16% lower adjusted risk of dying from any cause over follow-up, and for those who used all three supplements, the risk was 21% lower.

The risk of breast cancer recurrence was 36% lower in association with the use of vitamin D among women with estrogen receptor-positive tumors.

—D. Dye


Vitamin D May Protect Against the Development of Uterine Fibroids

A recent issue of *Epidemiology* published an article that reports the finding of vitamin D researcher Bruce W. Hollis and his colleagues of a lower risk of uterine fibroid tumors in women with sufficient levels of vitamin D.*

The study evaluated 620 African American women and 416 Caucasian women between the ages of 35 to 49 who were enrolled in the National Institute of Environmental Health Sciences Uterine Fibroid Study. Serum 25-hydroxyvitamin D levels were measured in blood samples collected upon enrollment, and ultrasound examinations ascertained the presence and size of fibroids.

Subjects with sufficient serum levels of the vitamin, which the researchers classified as 20 ng/mL or higher, had a 32% lower risk of having fibroids in comparison with those whose levels were sufficient. Each 10 ng/mL increase in vitamin D was associated with a 20% reduction in fibroid risk.

*Editor’s Note:* The authors remark that treatment of cultures of human uterine fibroid tissue with a form of vitamin D results in decreased cell proliferation accompanied by inhibition of molecular pathways for fibrosis. They conclude that the current findings provide evidence for a causal relationship between sufficient vitamin D and protection against fibroids that warrants further investigation.

—D. Dye

*Epidemiology.* 2013 May;24(3):447-53.
ARE YOU TAKING THE OPTIMAL FORMS OF VITAMIN E?

According to the Proceedings of the National Academy of Sciences, alpha tocopherol (vitamin E) displaces critically important gamma tocopherol in the cells.\(^1\) While alpha tocopherol inhibits free-radical production, gamma tocopherol is required to trap and neutralize existing free radicals.\(^2\)

Prestigious scientific journals have highlighted gamma tocopherol as one of the most critically important forms of tocopherols, which includes d-alpha tocopherol (natural vitamin E) for those seeking optimal health benefits.

Most commercial vitamin E supplements contain little, if any, gamma tocopherol. They instead rely on alpha tocopherol as the primary ingredient. However, it is gamma tocopherol (not the alpha form) that quenches peroxynitrite, the free radical that plays a major role in the development of age-related decline.\(^2,3\)

**SESAME LIGNANS: THE NATURAL VITAMIN E BOOSTER**

Life Extension\(^*\) has uncovered research suggesting that adding sesame lignans to gamma tocopherol may significantly enhance its beneficial effects. Sesame and its lignans have been shown to boost antioxidant levels and help maintain already-normal blood pressure.\(^*\)

In a human study that combined gamma tocopherol with sesame lignans, gamma tocopherol/sesame was 25% more effective than gamma tocopherol/tocotrienols in suppressing tissue measurements for free-radical and inflammatory damage.\(^4,5\) Since tocotrienols are considered nature's most potent antioxidants, the fact that low-cost gamma tocopherol with sesame is more effective is a remarkable finding.

Life Extension fortified the popular Gamma E Tocopherol supplement with standardized sesame lignans extract long ago. Consumers thus obtain superior benefits at a much lower cost.

**WORLD'S MOST COMPREHENSIVE VITAMIN E FORMULA!**

The Gamma E Tocopherol with Sesame Lignans formula provides potent doses of critically important gamma tocopherol along with sesame lignans to augment its antioxidant effects. Suggested dose is one softgel once or twice daily.

The retail price for 60 softgels of Gamma E Tocopherol with Sesame Lignans is $32. If a member buys four bottles, the price is reduced to only $21.75 per bottle.
Hundreds of studies document the importance of protecting against blood glucose surges.1
What the public doesn't realize is that a huge source of blood sugar emanates from dietary starch.2,3 This includes bread, pasta, potatoes, and rice. But even so-called healthy carbohydrates such as whole-grain bread and brown rice can induce undesirable glucose spikes.4

In a breakthrough development, scientists have shown that an enzyme called transglucosidase converts starches into prebiotic fiber—within your own digestive tract!5,6 Taking this enzyme with starchy meals helps avoid the flood of glucose into the bloodstream that results from eating carbohydrates.

COMPELLING HUMAN RESEARCH DATA

Published studies show that transglucosidase limits the amount of SUGAR released from STARCH, especially in the critical after-meal period. It does this by converting dietary starch into a beneficial indigestible prebiotic fiber.5,6

Transglucosidase has been demonstrated in humans to reduce the level of rapidly digested starch in a carbohydrate food item by 31%.7 This helps maintain healthy blood glucose, cholesterol, and insulin levels for those whose levels are already in the normal range.8-11

SHIELD AGAINST AFTER-MEAL GLUCOSE SURGES

Each vegetarian capsule of the new Glycemic-Pro™ Transglucosidase contains a full 450,000 TG (transglucosidase activity units) of transglucosidase.

Just one capsule taken with starchy meals helps limit the release of sugar from starch. Those who consume a low-starch diet may need to take only one Glycemic-Pro™ Transglucosidase capsule daily with their starch-containing meal.

A bottle of 60 vegetarian capsules of Glycemic-Pro™ Transglucosidase retails for $54. If a member buys four bottles, the price is reduced to $37.50 per bottle.

References

Contains soybeans. Contains tree nuts (coconut).
CAUTION: If you are taking blood glucose lowering medication, consult your healthcare provider before taking this product.

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.
To order GlycemicPro™ Transglucosidase, call 1-800-544-4440 or visit www.LifeExtension.com
Three-Step Strategy to Reverse Mitochondrial Aging

Have you ever wondered how long you're going to live? The potential answer can be found in the energy-producing cellular powerhouses called mitochondria.

According to a growing number of cell biologists, the number and functionality of the mitochondria specifically determine an individual’s life span.1-3

When we’re young, we are relatively protected against mitochondrial deterioration. As we age, however, changes within our cells lead to the destruction of mitochondria—paving the way for aging and disease.4-8

In 2007 scientists made a remarkable age-reversal discovery:

Damage to mitochondrial DNA becomes permanent a decade after mitochondrial dysfunction begins—and in the early stages, this damage remains reversible.9

In this article, you’ll learn about a 3-step program aimed at restoring your body’s vital mitochondrial health:

Step 1: Boost your body’s natural mitochondrial-DNA defenses with CoQ10.

Step 2: Stimulate the creation of new mitochondria with PQQ.

Step 3: Support your body’s mitochondrial defense system with shilajit.

This strategy to reduce damage to existing mitochondrial DNA and create new mitochondria—is essential to inhibit a destructive cycle believed to be a root cause of aging. >
**Why We Need Mitochondria**

Found inside the body’s cells, mitochondria are responsible for producing our primary source of energy, *adenosine triphosphate* (ATP). ATP provides at least 95% of the cellular energy that powers all living functions.

Unfortunately, a byproduct of this energy generation is the formation of a huge stream of free radicals.\(^4\)\(^-\)\(^7\) Free radicals are molecules that possess a free electron—a property that makes them react with other molecules in volatile and highly destructive ways.\(^10\)\(^-\)\(^12\)

Free radicals attack the structure of our cell membranes, creating metabolic waste products that disturb DNA and RNA production, interfere with the synthesis of protein, and destroy important cellular enzymes. Vital tissues and molecules decay under the assaults of free radicals.\(^10\)\(^-\)\(^14\) In addition, free-radical disruption of cell mechanics creates mutant cells, which are linked to cancer and cellular aging.\(^15\)\(^,\)\(^16\)
Mitochondria are the easiest targets of free-radical injury for two reasons:

1. They are located exactly where these free radicals are produced, and

2. They lack most of the antioxidant defenses found in other parts of the cell.\textsuperscript{17,18}

Evidence strongly indicates that over time, accumulated damage to the DNA of the mitochondria in particular leads directly to metabolic disorders (such as diabetes) and degenerative disorders (such as Alzheimer’s).\textsuperscript{4-8,19-23}

Mitochondrial dysfunction is primarily seen in organs and tissues that have a high demand for energy—explaining why cardiovascular tissue and brain neurons are among the most susceptible.\textsuperscript{24}

When we’re young, we are largely protected against mitochondrial deterioration because our bodies produce substances to defend mitochondria from the onslaught of free radicals. However, as we age, that protection wanes, setting us up for a destructive cycle that accelerates aging and disease. As a result of this rapidly accelerating process, mitochondria in the cells of elderly people are mostly dysfunctional, whereas young individuals have virtually no mitochondrial damage.\textsuperscript{8,25-27}

\textbf{The Mitochondrial Theory of Aging}

Over time, there are three devastating changes within our cells that lead to the destruction of mitochondria—paving the way for aging and disease:\textsuperscript{4-7}

- The rate of cellular production of two free radicals—\textit{superoxide anions} and \textit{hydrogen peroxide}—significantly increases, attacking mitochondria the most.

- At the same time, intracellular levels of endogenous \textit{antioxidants} that help prevent the harmful effects of free radicals decrease. There’s also a reduction in activities of free radical-scavengers that neutralize free radicals before they can attach themselves to other molecules. These decreases diminish the mitochondria’s normal defenses.

- The accumulated oxidative damage to the mitochondrial DNA and other mitochondrial components (as well as the cell as a whole) leads to decay of the mitochondria—and from that decay, the release of even more free radicals!

According to the mitochondrial theory of aging, this ever-increasing spiral is—in itself—an \textit{aging} process.\textsuperscript{4-8, 25,26} In fact, a growing number of cell biologists have suggested that the number and functionality of the mitochondria can specifically determine an individual’s longevity.\textsuperscript{1-3}
Based on this body of scientific evidence, scientists determined that a key to slowing—and even reversing—a “natural” aging process would be a substance aimed at revitalizing youthful mitochondrial protection from free radicals.27

They discovered this mitochondrial solution in a substance that may already be in your nutrient regimen...coenzyme Q10.

Coenzyme Q10 Protects Mitochondria

Scientists have established that coenzyme Q10 (CoQ10) is an essential nutrient for normal mitochondrial function (namely, the production and transfer of energy).28-30 When CoQ10 levels fall, mitochondrial dysfunction skyrockets.28 Studies have found that boosting CoQ10 levels via supplementation increases mitochondrial electron transport—whether the cells are deficient in CoQ10 or not.29,30

CoQ10’s ability to protect the vital mitochondria helps put an end to the vicious cycle that underscores a critical aspect of pathological aging. In fact, research with laboratory models has suggested that CoQ10 may be one of our most potent anti-aging nutrients. Studies have found that when cells or organisms are deficient in CoQ10, mitochondrial oxidative stress increases and aging is accelerated.28,31 However, supplementation triggers a significant slowing down of the aging process and an extended life span.32,33

One study showed that rats supplemented with CoQ10 experience a 24% increase in maximum life span and an 11.7% increase in average life span.34 In human terms, based on today’s life expectancy of 78.5 years, this mean increase translates to a more than 9-year increase in life span!35

CoQ10 also seems to work via a multi-targeted set of epigenetic mechanisms that not only slow aging—but that also protect against a variety of mitochondria-related diseases.36-38 Epigenetic mechanisms involve changes in gene function that do not relate to changes in gene structure.39 Studies have shown that CoQ10 protects against neurodegenerative diseases40-42 and mental health disorders,43 enhances lung function,44,45 guards against the effects of elevated glucose in diabetes and metabolic syndrome,46-48 and offers impressive defense against cardiovascular disease, one of the primary diseases of aging.49-51

Animal studies demonstrate that supplementation with CoQ10 reduces oxidative stress and reduces the buildup of amyloid-beta plaque (associated with Alzheimer's disease)40,42,52,53—resulting in a significant improvement in cognitive performance and memory.53

What You Need to Know

Block Mitochondrial Aging

- Daily damage to mitochondrial DNA appears to be a root mechanism of aging.
- If caught before it becomes permanent, early stage mitochondrial dysfunction can be reversed!
- Levels of CoQ10—the body’s natural mitochondrial defense—decline rapidly with age. But breakthrough research has found that supplemental CoQ10 blocks mitochondrial aging.
- Shilajit works synergistically with CoQ10 by replenishing its electron supply and increasing CoQ10 levels.
- PQQ powerfully supports the protection afforded by CoQ10 and shilajit by triggering the creation of new mitochondria.
- Taken together, CoQ10, PQQ, and shilajit offer a potent program to inhibit the intensely destructive cycle believed to be one of the root sources of aging!
In human studies, 4 weeks to 6 months of CoQ10 supplementation at 60-300 milligrams a day was shown to improve cardiac systolic function and ejection fraction.49,50 One study showed that 8 weeks of CoQ10 supplementation at 300 milligrams a day improved heart-muscle systolic function by enhancing both mitochondrial performance and endothelial function.50 And in a 5-year, randomized, double-blind, placebo-controlled trial among elderly individuals, CoQ10 combined with selenium slashed the death rate from cardiovascular disease by more than half!54

In fact, the authors of one study recognized CoQ10 as a “scientific breakthrough in the management of chronic heart failure.”55

CoQ10 offers a powerful way to help slow—or even reverse—a natural aging process by restoring youthful mitochondrial protection from free radicals.27,56

**POQ Creates New Mitochondria**

While coenzyme Q10 optimizes mitochondrial function and protects them from free radical damage, scientists have found another coenzyme that triggers the creation of new mitochondria altogether.

A huge research advance in 2012 showed that the coenzyme pyrroloquinoline quinone (or PQQ) activates genes that induce mitochondrial biogenesis—the spontaneous formation of new mitochondria in aging cells.57

This represents a major breakthrough in battling the mitochondrial destruction that underlies aging.

**CoQ10: Potential Therapy for Inherited Mitochondrial Disorder**

Newly released research underscores the vital importance of coenzyme Q10 (CoQ10) to mitochondrial health.

A study released ahead of print in April 2013 by the journal *Mitochondrion* has found that patients with mitochondrial DNA depletion syndrome (MDS) have significantly deficient levels of CoQ10.85 MDS is a hereditary condition characterized by grossly reduced cellular levels of mitochondrial DNA in infancy. MDS involves various progressive disorders that are often fatal in childhood.86

Currently, there are no effective therapies available for MDS—but this recent finding indicates that CoQ10 could represent a candidate therapy for this condition.

The suggestion that CoQ10 may constitute a therapeutic hope for treating this serious mitochondrial-deficiency disorder demonstrates just how powerfully CoQ10 protects mitochondria.

This also underscores CoQ10’s vital importance in slowing or reversing the “natural” aging process in healthy individuals.

PQQ deficiency has a profound effect on your genes—especially those involved in cellular stress, cell signaling, transport of metabolites, and of course, the creation of new mitochondria.57 Specifically, PQQ deficiency negatively affects the expression pattern of 438 genes—but research has found that this effect is reversed after supplementation with PQQ.57

Prior to this breakthrough, some of the only scientifically validated ways to reliably stimulate the creation of new mitochondria were sustained caloric restriction or strenuous physical activity—both of which are too rigorous and impractical for most aging people.58,59 PQQ now provides the most practical means of reversing the deadly decline in functional mitochondria that is the underlying cause of premature aging and degenerative disease.

Earlier findings repeatedly indicated PQQ’s central role as a potent growth factor.60,61 In preclinical trials, when animals were deprived of dietary PQQ, they exhibited stunted growth, impaired conception rates, and most importantly, fewer mitochondria.62-64 However, re-introducing PQQ into the diet reversed these effects—while simultaneously increasing mitochondrial number and energetic efficiency.62,63
Like CoQ10, PQQ also actively supports the energy transfer within the mitochondria that supplies the body with most of its bioenergy. Its exceptional stability allows it to carry out thousands of these transfers without undergoing molecular breakdown. PQQ has been proven especially effective in neutralizing two of the most potent free radicals, the superoxide and hydroxyl radicals.65

**5,000 Times More Effective than Vitamin C!**

Research demonstrates that PQQ is 30 to 5,000 times more efficient at reducing oxidation than other common antioxidants such as vitamin C.60

In a revealing 2010 study, scientists reported that similar protection of mitochondrial function that is seen with some other compounds (such as quercetin, hydroxytyrosol, and resveratrol) at high dietary concentrations measured in millimoles occurs with PQQ at dietary concentrations measured in nanomoles.66 In other words, it takes a million times more of these other compounds to have a mitochondria-protective effect equivalent to PQQ!

The revelation of its ability to favorably affect system-wide cell development, metabolism, and mitochondrial biogenesis helps explain the wealth of data on PQQ’s neuroprotective and cardioprotective benefits.

PQQ has now been shown to block the development of abnormal proteins linked with neurodegenerative diseases. For example, it prevents cellular damage and demise due to accumulation of amyloid beta protein associated with Alzheimer’s disease,67,68 and of the alpha-synuclein protein that is associated with Parkinson’s disease.57,69

In humans, supplementation with 20 milligrams a day of PQQ significantly improved cognitive function in middle-aged and elderly people. These results were amplified when the subjects also took 300 milligrams per day of CoQ10.70

In animal studies, researchers investigating its impact on cardiovascular disease have demonstrated that PQQ reduces the size of the heart area damaged by acute heart attack and favorably decreases lipid peroxidation.71 PQQ also helps heart muscle cells resist acute oxidative stress—specifically by preserving and enhancing mitochondrial function.72

Neither humans nor the bacteria that colonize the human digestive tract have demonstrated the ability to synthesize PQQ,73 which has led researchers to classify it as an essential micronutrient. This means that the body can’t make enough of it for good health—and that supplementation is essential.74

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**Shilajit Revitalizes CoQ10**

We’ve already learned that CoQ10 protects mitochondria from free radical damage. It does this by “depleting” itself—by donating its own electrons to (and thus neutralizing) the flood of free radicals generated during cellular energy production. Of course, this results in depleted stores of active CoQ10.

Studies have detailed how shilajit, a phyto-mineral pitch substance found in the Himalayas,75-77 stabilizes, revitalizes, and preserves CoQ10 in its active (ubiquinol) form, boosting the levels of CoQ10 available to protect against mitochondrial aging.78-81

Cutting-edge scientific evidence has demonstrated that components of shilajit serve as electron reservoirs, replenishing electrons lost by CoQ10 and allowing this vital coenzyme to remain active longer.78-80

Shilajit’s potent support of CoQ10’s mitochondrial protection against aging was validated when laboratory mice were subjected to strenuous and stressful physical exercise. The combination of shilajit and CoQ10 resulted in 27% greater ATP energy production in muscle cells—and in 40% greater energy production in brain cells—than the energy increase measured in these tissues with CoQ10 alone.80

In other research, mice were initially supplemented with oral CoQ10 alone. As expected, CoQ10 levels rose in heart, liver, and kidney tissue. Remarkably, when components from shilajit were added to the supplement, CoQ10 levels rose even further—as much as 29% in liver tissue.81
Another element of shilajit—fulvic acid—has been shown to further support this process by channeling other electron-rich shilajit components into the mitochondria to support CoQ10 and electron transfer.82 Fulvic acid also works independently to stimulate mitochondrial energy metabolism and protect mitochondrial membranes from oxidative damage.82,83

In an unpublished study, people who took 200 milligrams of shilajit once daily for 15 days registered an increase in ATP levels in the blood after exercise.84 Ultimately, the synergistic effects of shilajit plus CoQ10—combined with the capacity of PQQ to create new mitochondria—offer an unparalleled option to protect mitochondrial DNA and combat aging!

Summary

According to the mitochondrial theory of aging, damage to mitochondrial DNA from the massive free-radical assault of cellular energy production is a root mechanism of aging. The body produces CoQ10 to protect mitochondrial DNA, but levels decline rapidly with age.

Scientists have discovered that it can take almost a decade for this aging damage to become permanent. The good news is that early stage mitochondrial dysfunction can be reversed!

Breakthrough research found that two coenzymes (CoQ10 and PQQ) can work together to protect mitochondria against free radical assaults—and to create new mitochondria in the process.

Supplemental coenzyme Q10 blocks mitochondrial aging, while PQQ triggers the creation of new mitochondria. In addition, shilajit works synergistically with CoQ10, replenishing its electrons and prolonging its antioxidative effectiveness.

Taken together, CoQ10 and PQQ and shilajit offer a potent program to inhibit—and reverse—the intensely destructive cycle that is believed to be a root source of aging!

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

THREE-STEP STRATEGY TO REVERSE MITOCHONDRIAL AGING

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THREE-STEP STRATEGY TO REVERSE MITOCHONDRIAL AGING


87. Age difference of bioavailability. Unpublished data, Kaneka Corp.


Bone Restore combines critical bone boosting nutrients into one superior formula.

Bone Restore includes highly absorbable forms of calcium and boron, along with vitamin D3, magnesium, zinc, manganese, and silicon. Bone Restore is now available with or without vitamin K2 (MK-7).

Bone Restore now contains 300 mg of magnesium. The retail price for 120 capsules of Bone Restore is $24. If a member buys four bottles, the price is reduced to $16.50 per bottle. (Item# 01727)

The same Bone Restore formula without vitamin K2 (MK-7) is available as well. The retail price for 120 capsules is $22. If a member buys four bottles, the price is reduced to $14.25 per bottle. (Item# 01726)

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

Just four capsules of Bone Restore provide:

- Highly Absorbable Calcium (as DimaCal® dicalcium malate, TRAACS® calcium glycinate chelate, calcium fructoborate) 700 mg
- Vitamin D3 1,000 IU
- Vitamin K2 (as menaquinone-7) 200 mcg
- Magnesium (as magnesium oxide) 300 mg
- Boron (calcium fructoborate as patented FruiteX B® OsteoBoron®) 3 mg
- Zinc (as zinc amino acid chelate) 2 mg
- Manganese 1 mg
- Silicon 5 mg

Item #01727

To order Bone Restore, call 1-800-544-4440 or visit www.LifeExtension.com

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
Cardiotonics have traditionally been used to improve heart function and vitality. Formulated for optimum heart muscle health, Cardio Peak™ with Standardized Hawthorn and Arjuna provides dual cardiotonic support. Extensive research demonstrates that the botanical extracts Hawthorn and Arjuna deliver optimum support for normal heart muscle function and coronary artery health.¹⁻¹⁷

**Hawthorn: Peak Cardiotonic Support**

Used for centuries in Europe for heart health, the cardiotonic effects of Hawthorn extract have been well documented in numerous clinical trials.¹⁻⁷ Hawthorn contains specific bioflavonoid complexes targeted to help promote normal circulation and efficient heart function.²⁻⁵ Studies indicate that the constituents in Hawthorn powerfully support:

- Strong contractile force of human heart muscle.³
- Protection for heart muscle cells from oxidant damage.¹²
- Normal gene expression to promote cardiovascular health.²⁻⁴⁻⁵
- Improved cardiovascular performance.¹¹

**Arjuna: Boosting Heart-Health Benefits**

Traditionally used for cardiovascular health, arjuna extract complements the effects of hawthorn in support of enhanced heart function.¹⁶⁻¹⁷ A number of scientific studies have shown that arjuna delivers strong support for:

- Enhanced heart muscle tone, improving its "squeeze" and increasing the amount of blood it can pump each second without exhaustion.¹⁶
- Healthy endothelial function.⁸
- Improved exercise endurance.¹⁷

A comprehensive program that includes diet, exercise, and lifestyle changes is important to your cardiovascular health. For unique cardiotonic support for a strong and healthy heart, Cardio Peak™ with Standardized Hawthorn and Arjuna may become a key element in your daily regimen!

To order Cardio Peak™ with Standardized Hawthorn and Arjuna, call 1-800-544-4440 or visit www.LifeExtension.com

The suggested twice daily dosage of 2 capsules of Cardio Peak™ with Standardized Hawthorn and Arjuna provides:

- **Rejuna™ Arjuna** (Terminalia arjuna) 1,500 mg
  10:1 extract (bark) (std. to 40% polyphenols (600 mg))

- **Hawthorn-Derived Oligomeric Proanthocyanidins (OPCs)**
  60 mg
  [from standardized Hawthorn (Crataegus monogyna and Crataegus laevigata) extract (leaf and flower)]

A bottle of 120 vegetarian capsules of Cardio Peak™ with Standardized Hawthorn and Arjuna retails for $36. If a member buys four bottles, the price is reduced to $24 per bottle.

**References**


Rejuna™ is a trademark of Verdure Sciences, Inc.
in middle-aged mice, ubiquinol was shown to be 40% more effective in slowing measurements of aging, compared to ubiquinone. Life Extension offers this highly bioavailable ubiquinol form of patented CoQ10 in an advanced delivery system, providing an unparalleled absorption level.

2. ENHANCED SUPPORT WITH SHILAJIT

PrimaVie® shilajit has been shown to double levels of CoQ10 in mitochondria. Combining CoQ10 and shilajit produced a 56% increase in energy production in the brain—40% better than CoQ10 alone. And in muscle, there was a 144% increase in energy production—27% better than CoQ10 alone.

Shilajit boosts CoQ10’s beneficial effects by stabilizing CoQ10 in the superior ubiquinol form. Additionally, shilajit facilitates more efficient delivery of CoQ10 into the mitochondria, which results in greater cellular energy production. Shilajit itself is rich in essential compounds that help the mitochondria convert fats and sugars into ATP (adenosine triphosphate), the body’s main source of energy.

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.

Life Extension® continues to develop increasingly potent mitochondria-boosting formulations.

The new Super Ubiquinol CoQ10 With BioPQQ® contains shilajit (which studies have shown doubles CoQ10 levels in the mitochondria), plus the breakthrough compound PQQ (shown to support the spontaneous generation of new mitochondria in aging cells). This represents a three-way strategy for enhanced mitochondrial support!

1. SUPER UBIQUINOL COQ10

CoQ10 is required to convert the energy from fats and sugars you eat into usable cellular energy. More people are supplementing with CoQ10 than ever before. A key reason is increased awareness that the body’s production of CoQ10 declines significantly with advancing age. “Statin” drugs also deplete CoQ10 levels in the blood, and possibly, tissues. For example, statin drugs reduce plasma CoQ10 by almost 40%—but the aging process itself reduces CoQ10 levels in the heart muscle wall by 72%!

Scientific studies show that absorption of the ubiquinol form of CoQ10 is far greater than the conventional ubiquinone form. In middle-aged mice, ubiquinol was shown to be 40% more effective in slowing measurements of aging, compared to ubiquinone. Life Extension offers this highly bioavailable ubiquinol form of patented CoQ10 in an advanced delivery system, providing an unparalleled absorption level.

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.
PQQ activates

- Promotes mitochondrial biogenesis.
- Mitochondrial defense. Mitochondria possess their own DNA, distinct from those contained in the cell nucleus. Unfortunately, compared to nuclear DNA, mitochondrial DNA are relatively unprotected—and yet situated at the source of both energy and free-radical production! PQQ’s antioxidant potency and favorable gene-expression profile powerfully boost mitochondrial defense.
- Antioxidant power. PQQ is a potent antioxidant. Its extraordinary molecular stability enables it to facilitate thousands of antioxidant reactions in the mitochondria—without breaking down—for maximum antioxidant and bioenergetic support.

PQQ is an essential nutrient, meaning that your body cannot make it on its own. A wealth of research demonstrates that—alone and especially in combination with CoQ10—its unique nutritional profile supports heart health and brain function. This should be no surprise, given how much energy these vital organs need.

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

**BREAKTHROUGH WEAPON IN THE BATTLE AGAINST AGING!**

Super Ubiquinol CoQ10 With BioPQQ® combines:

- **CoQ10** in a super-absorbable ubiquinol form.
- **Shilajit** to synergistically boost mitochondrial CoQ10 levels and youthful cellular energy.
- **PQQ** to support spontaneous generation of new mitochondria in aging people.

The suggested dosage of one (1) softgel daily of Super Ubiquinol CoQ10 With BioPQQ® provides:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
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<tr>
<td>Ubiquinol (as Kaneka QH® Ubiquinol)</td>
<td>100 mg</td>
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<tr>
<td>PrimaVie® Shilajit fulvic acid complex</td>
<td>100 mg</td>
</tr>
<tr>
<td>BioPQQ® Pyrroloquinoline quinone disodium salt</td>
<td>10 mg</td>
</tr>
</tbody>
</table>

A bottle of 30 softgels of Super Ubiquinol CoQ10 With BioPQQ® retails for $54. If a member buys four bottles, the price is reduced to $37.50 per bottle.

**References**

20. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2722922/.
21. To order Super Ubiquinol CoQ10 With BioPQQ®, call 1-800-544-4440 or visit www.LifeExtension.com

To order Super Ubiquinol CoQ10 With BioPQQ®, call 1-800-544-4440 or visit www.LifeExtension.com
Just a few years ago, vitamin D was simply known as the “bone vitamin.” Thanks to the hard work of many scientists, especially Michael Holick, MD, a pioneer in vitamin D research, the data show that nearly every tissue and cell type in the body has receptors for vitamin D. As a result of this discovery, much higher doses are required for optimal functioning. This discovery has radically changed how we understand the role of vitamin D in the body.

Unless your body is at optimal levels, you are opening the door to a host of disorders, ranging from heart disease and Alzheimer’s to weak bones and diabetes. In fact, even if you have normal blood sugar today, a vitamin D deficiency makes you 91% more likely to progress to insulin resistance, or “pre-diabetes,” and it more than doubles your risk for progressing to active, type II diabetes.

Unfortunately, vitamin D deficiency is a global epidemic. An estimated 1 billion people do not have adequate vitamin D levels. And 64% of Americans don’t have enough vitamin D to keep all of their tissues operating at peak capacity.

The results of this deficiency are catastrophic. Studies have now shown that vitamin D deficiency is associated with increased risk of a long list of diseases that span all systems in the body. In fact, low levels of vitamin D increase the risk of non-Alzheimer’s dementia almost 20 times!

While checking for vitamin D levels is still not standard of care for many physicians, you will realize from reading this article that assessing vitamin D status is one of the most important health-protecting steps you can take. Fortunately, achieving optimal levels of vitamin D is easy, inexpensive, and highly protective against a range of lethal diseases. >
Why Vitamin D is so Vital

While humans can make some vitamin D in their bodies, most of us require additional amounts from our diet, the sun, or from supplements in order to maintain adequate levels.

Once vitamin D has been ingested in the diet or produced in the skin, the liver and kidneys convert it to its active form, called 1,25-dihydroxyvitamin D, or vitamin D3.

Virtually every tissue type in your body has receptors for vitamin D, meaning that they all require vitamin D for adequate functioning. The very presence of specific receptors define vitamin D as a hormone, rather than a vitamin. It interacts with receptors throughout the body and has a number of different effects.

It’s becoming evident that higher doses of vitamin D are required to support its other activities in tissues such as heart muscle, brain cells, and fat tissue, to name just a few. Additionally, vitamin D regulates genes that control cell growth and development, immune function, and metabolic control.
Studies have now shown that vitamin D deficiency is associated with increased risk of numerous chronic disorders, including type II diabetes, cancer, infections, and cardiovascular, autoimmune, and neurological diseases (See the table on page 45 for greater detail).

The Global Vitamin D Deficiency

The problem is that most of us are simply not getting enough vitamin D to allow our bodies to work optimally at all of the functions that vitamin D supports. An estimated 1 billion people (that’s about a seventh of the global population) have inadequate vitamin D supplies in their bodies.

According to mainstream medical standards, there are three levels of vitamin D status: sufficient, insufficient, and deficient.

- People who are considered vitamin D “sufficient” have blood levels of at least 30 ng/mL. However, optimal vitamin D status is achieved with a minimum of 50 ng/mL.

- Those considered “insufficient” (meaning their bodies aren’t at optimal vitamin D capacity) have levels between 21 and 29 ng/mL.

- And those who are “deficient” are defined as having levels at or below 20 ng/mL.

By those criteria, 25% of Americans are insufficient, and 39% are outright deficient. In other words, fully 64% of Americans don’t have enough vitamin D to keep all of their tissues operating at peak capacity. It’s hardly any wonder we are plagued with so many chronic diseases.

Vitamin D Supports Cardiovascular Health

Vitamin D deficiency is common in people with cardiovascular disease; almost all people with heart failure have reduced levels. It is now recognized as an independent predictor for diseases of the heart and blood vessels, including heart attacks and strokes.

One study published this year found that women with vitamin D levels in the top one-third of the population had 68% lower risk of heart attacks compared with those in the lowest third; men in the top third had a 44% lower risk. Conversely, if your vitamin D level is in that lower range, you have a 42% increased risk of dying of cardiovascular disease and a 49 to 64% increased risk of a stroke. The risk of having clogged coronary arteries (the precursor of a heart attack) is more than doubled for people with vitamin D deficiency (less than 20 ng/mL).

Why does vitamin D deficiency lead to such a dramatic increase in the risk for having America’s #1 killer disease?

It’s because the heart muscle, blood vessels, and other circulatory system components are rich in vitamin D receptors, which means they depend heavily on vitamin D for optimum function.

Animals bred to have no vitamin D receptors have cardiovascular disease at an early age and end up with enlarged, dysfunctional hearts. These effects are likely due to vitamin D’s role in increasing protective signaling pathways in those tissues, while preventing harmful ones. In addition, vitamin D is required to prevent the excessive buildup of collagen and other fibrotic proteins that stiffen heart muscle and artery walls, reducing blood flow and raising blood pressure.

Human Studies Verify D’s Heart Benefits

There’s no shortage of compelling human studies of vitamin D and cardiovascular risk. One study found that a daily supplement of 3,320 IU reduced triglycerides by 13.5% (vs. a 3% increase with a standard weight-loss program) and also reduced tumor necrosis factor-alpha, a major marker of inflammation that
contributes to atherosclerosis. Supplementation has also been shown to relax blood vessels, helping to reduce blood pressure and improve blood flow.

In a study of African-American teens (a group at very high risk for hypertension and cardiovascular disease), vitamin D supplements of 2,000 IU/day boosted blood levels into the sufficient range. The supplemented group also saw a significant and beneficial decrease in aortic stiffness, a measure of cardiovascular risk.

In another study of African-American adults (also at high risk for cardiovascular disease), 60,000 IU/month for 4 months (about 2,000 IU/day) improved endothelial function, an essential property of blood vessels that allows them to provide adequate blood flow at safe pressures. Similar effects have been shown in stroke survivors, who really need to optimize their endothelial function.

In a study of vitamin D supplementation in obese and overweight women (with an average age of 38 years), supplementing with 1,000 IU/day significantly raised protective HDL-cholesterol levels and significantly lowered body fat mass after 12 weeks.

Vitamin D deficiency is also implicated in peripheral arterial disease, in which hardened, narrowed arteries fail to provide enough blood to the extremities, especially the legs. People with lower vitamin D levels are more likely to develop peripheral artery disease, in direct proportion to how low their levels are. And in fact, amputation, the worst consequence of this condition, is much more likely among those with the lowest levels.

It’s clearer than ever that you need vitamin D to maintain your cardiovascular health—but it’s important to make sure you’re taking the proper dose. Studies of cardiovascular patients who use only 400 to 600 IU/day in general show no benefits, whereas those using 2,000 IU or more do. One study demonstrated that 2,000 IU/day is the minimum needed to ensure that people reach the minimum target of 30 ng/mL of vitamin D in their blood.

Vitamin D Lowers Diabetes Risk

Vitamin D can also play a critical role in diabetes. People with diabetes (both types I and II) have even lower levels of vitamin D than the general population. A vitamin D deficiency makes you 91% more likely to progress to insulin resistance, or “pre-diabetes” (even for those with normal blood sugar). Additionally, a vitamin D deficiency more than doubles your risk for progressing to full-blown type II diabetes.

What You Need to Know

Vitamin D: Essential Hormone

- Most people think of vitamin D as the “bone vitamin,” but recent discoveries show that vitamin D is essential for a tremendous number of normal body processes.
- Virtually every tissue type in the body possesses receptors for the activated vitamin D molecule, defining it as a true hormone.
- Low vitamin D levels are associated with increased risks of cardiovascular and neurological disease, cancer, diabetes, and autoimmune disorders.
- The majority of Americans have vitamin D levels below the minimum recommended concentration of 50 ng/mL, explaining in part the high prevalence of these diseases.
- Fortunately, supplementation with vitamin D3 has been shown to be protective for all of these conditions, when taken at the dose of at least 2,000 IU/day. (Most people need 5,000 to 7,000 IU/day of vitamin D3 to achieve optimal blood levels.)
This close connection between vitamin D and diabetes is due to **vitamin D receptors**, which are found in the pancreas’s insulin-producing cells and in liver, fat, and muscle tissue, all of which influence the fate of glucose in your blood.²⁸

For example, white blood cells called **macrophages** have vitamin D receptors. When macrophages are taken from diabetics, they display a high level of fat content, which contributes to diabetics’ increased cardiovascular risk. However, when those cells are treated in the lab with vitamin D, they stop their pathological fat uptake—ultimately helping reduce cardiovascular risk.³⁰

Similarly, compared to healthy controls, diabetic lab animals have decreased numbers of insulin and vitamin D receptors in their brains; they have more body fat and higher levels of inflammation and DNA damage; and they perform poorly on tests of memory and cognition (remember that Alzheimer’s disease has been called “diabetes of the brain”).³¹,³² But vitamin D supplementation **restored** all of those functions to near-normal levels—including improved cognitive performance.³¹,³³ This is an especially important finding, since it shows the potential of vitamin D to help reverse the process of diabetes.

The inflammatory changes in diabetic animals, as in humans, lead to increased fat in the liver, a condition known as **non-alcoholic fatty liver disease** (NAFLD). This condition further degenerates due to a vitamin D deficiency.³⁴ But when human diabetics with similar elevated inflammatory markers are supplemented with **1,000 IU/day** of vitamin D, the inflammation is substantially reduced.³⁵

Perhaps the most remarkable news about vitamin D in this context, however, is that it **slows the progression from pre-diabetes to diabetes**. When obese, non-diabetic adults supplemented with **2,000 IU/day** of vitamin D or placebo for 16 weeks, the vitamin D group had significantly improved glucose clearance from their blood, improved insulin secretion from the pancreas, and a trend to lower levels of hemoglobin A₁c (the marker of long-term glucose exposure). Control subjects instead saw a worsening of all those parameters.³⁶

Vitamin D supplementation also benefits those who already have diabetes. Diabetics receiving **1,000 IU/day** of vitamin D in yogurt saw significant decreases in fasting blood sugar, hemoglobin A₁c, insulin resistance, waist circumference, and body mass index, compared with controls receiving no vitamin D.³⁷
Studies show that supplementation with vitamin D3 can reduce blood pressure, total cholesterol, and LDL-cholesterol—all risk factors for the heart and kidney diseases for which diabetics are at increased risk. Treatment with active vitamin D3 also significantly reduces protein levels in urine, a marker of kidney disease.

With few exceptions, doses of vitamin D of less than 1,200 IU/day have not been shown to be as effective as doses of 2,000 IU/day at lowering blood sugar, hemoglobin A1c, lipid levels, and other disease markers in diabetic patients.

**Vitamin D Protects Brain Cells**

Vitamin D is especially powerful against neurodegenerative diseases such as Alzheimer's and Parkinson's. Long-term studies show that low vitamin D levels increase the risk of cognitive decline of any kind by 41 to 60%; increase the risk of Alzheimer's dementia by 77%; and increase the risk of non-Alzheimer's dementia by nearly 20-fold. And higher vitamin D concentrations are correlated with lower severity in Parkinson's disease.

Even though existing treatments for neurodegenerative diseases can only treat symptoms and temporarily slow their progression, vitamin D has been found to reverse neurodegenerative decline. A recent study showed that adding vitamin D to a standard memory drug, memantine, for 6 months in newly diagnosed Alzheimer's patients produced significant gains in cognition, suggesting a synergism between vitamin D and the drug.

Supplementation with vitamin D has such potent benefits for the brain because the brain relies on vitamin D receptors for protection against a variety of destructive processes. Vitamin D has been shown to have a critical role in nerve cell growth and differentiation, nerve transmission, and the “plasticity” of connections that’s so essential for normal learning and memory. Without adequate vitamin D, all of those functions suffer, and some fail.

In Alzheimer's disease, that failure is manifested as increased amounts of the abnormal, inflammatory protein called amyloid beta (or Abeta). Studies show that when vitamin D is added to cultures of cells from Alzheimer's patients, it speeds the clearance of Abeta.

When laboratory animals bred to spontaneously develop Abeta plaques are supplemented with vitamin D, they show a decrease in brain inflammation, an increase in protective nerve growth factor, and they develop fewer Abeta plaques compared to control animals.
Vitamin D Blocks Cancer

Low levels of vitamin D in the blood are strongly associated with elevated cancer risk. Compared to people with higher vitamin D levels, those with low levels have an 83 to 150% increased risk of developing cancer.53-55

This strong correlation is due to vitamin D receptors, which regulate a number of signaling pathways involved in inflammation, tumor growth, and immune system surveillance for cancer—especially in the epithelial cells of the skin, breast, prostate, and colon (tissues that are prone to cancer development).56-58

The problem is that in cancer cells, the vitamin D receptor is dramatically decreased, leaving cells unregulated and prone to reproduce in an out-of-control fashion.57 Treating cancer cells in culture with vitamin D, however, produces a number of actions that help fight against cancer: it decreases tumor cell proliferation, quells inflammation, reduces invasiveness, and increases tumor cell death (apoptosis).57,59,60

The benefits of these actions are especially seen in cancers of the breast, prostate, and colon.

Breast Cancer

In animals with experimentally induced breast cancer, for example, these effects of vitamin D reduced the incidence, number, and size of tumors, particularly when vitamin D was combined with EPA and DHA from fish oil.59,61

In vivo studies have shown that activated vitamin D3 has some benefits specific to estrogen-dependent breast cancer. It reduces overall tumor-promoting estrogen effects by decreasing the expression of the aromatase enzyme that makes estrogen in breast tissue and by decreasing the expression of the alpha form of estrogen receptor that aggravates certain malignancies.60

Human studies are now pointing in a similar direction. In the large Women’s Health Initiative study, even a low dose of 400 IU/day of vitamin D combined with calcium was associated with an up to 20% decrease in breast cancer in women who had not taken supplements previously.62,63

Prostate Cancer

Cancers of the prostate also respond to vitamin D supplementation, as shown by a study in which men with early prostate cancer received 4,000 IU/day for a year.64 Fifty-five percent of supplemented subjects showed a decrease in tumor-positive biopsies or a decrease in the Gleason tumor score, while an additional 11% showed no change (meaning the cancer had not progressed). Since prostate cancer is often such a slow-growing malignancy, it is ideal for prevention with vitamin D.65

Colorectal Cancer

Cancers of the colon and rectum usually start as benign polyps (or adenomas), which progress to malignancy as a result of chronic inflammation. Colorectal adenoma patients who took 800 IU/day of vitamin D3 experienced a significant 77% decrease in
Fortunately, studies show that restoring vitamin D levels to the healthy range through supplementation can help patients with autoimmune diseases. Supplementation has been shown to increase the number of regulatory T-cells that restore immune system activity to its normal state, preventing the overactive response characteristic of autoimmune diseases.73

The increase in vitamin D levels through supplementation has a number of disease-specific benefits:

- It causes a decline in the disease activity of rheumatoid arthritis and lupus.71,72
- It reduces the risk of developing type I diabetes and preserves insulin-producing pancreatic cells once the disease has started.74
- It suppresses the development of multiple sclerosis in animal models of the disease, and a large human trial has shown that supplementation was associated with a 40% reduction in the risk of developing multiple sclerosis.70,75

Vitamin D and Autoimmune Disease

Vitamin D is essential for maintaining a balanced immune system. Immune system cells are well-supplied with vitamin D receptors, which along with vitamin D itself, help the system modulate its response: from “attack mode” in the face of pressing threats to “cleanup and wind-down” mode once the threat is past and tissue damage becomes a concern.67-69

Vitamin D plays a role in the onset and progression of autoimmune diseases, including type I diabetes, lupus, rheumatoid arthritis, psoriasis, and multiple sclerosis.68,70-72

Vitamin D and Inflammatory Markers

Vitamin D also plays a role in inflammatory markers that can promote cancer development.56 In a similar group of patients, 800 IU/day of vitamin D3 produced marked decreases in levels of the tumor promoter beta-catenin, with an increase in the tumor suppressor known as APC.66

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>RISK INCREASE WITH LOW VITAMIN D LEVELS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoimmune: Multiple Sclerosis78</td>
<td>61%</td>
</tr>
<tr>
<td>Autoimmune: Psoriasis79</td>
<td>189%</td>
</tr>
<tr>
<td>Autoimmune: Rheumatoid Arthritis80</td>
<td>24% (Patients taking vitamin D supplements had 24% lower risk.)</td>
</tr>
<tr>
<td>Cancer, Bladder54</td>
<td>83% overall; 494% for invasive tumors</td>
</tr>
<tr>
<td>Cancer, Breast53</td>
<td>150%</td>
</tr>
<tr>
<td>Cancer, Thyroid55</td>
<td>100%</td>
</tr>
<tr>
<td>Cognitive Decline7</td>
<td>41 to 60%</td>
</tr>
<tr>
<td>Cardiovascular: (Risk of Heart Attack)12,13,15</td>
<td>38 to 192%</td>
</tr>
<tr>
<td>Dementia, Alzheimer’s43</td>
<td>77% increase for lowest vitamin D intake</td>
</tr>
<tr>
<td>Dementia, Non-Alzheimer’s7</td>
<td>Almost 20-fold increase</td>
</tr>
<tr>
<td>Infection, Respiratory81</td>
<td>36%</td>
</tr>
<tr>
<td>Metabolic: Diabetes4,82</td>
<td>91% for insulin resistance, 38 to 106% for type II diabetes</td>
</tr>
<tr>
<td>Metabolic: Risk of progression from normal blood glucose to diabetes83</td>
<td>77%</td>
</tr>
<tr>
<td>Stroke13,84</td>
<td>22 to 64%</td>
</tr>
</tbody>
</table>

* Defined either as serum levels less than 30 ng/mL (75 nmol/L), or as lowest percentiles vs. highest; risk expressed as percent increased for those with normal or highest levels.
The Vitamin D Solution

With over 1 billion people worldwide faced with insufficient levels of vitamin D, it’s easy to see why so many of these life-threatening diseases are skyrocketing to epidemic proportions.

Fortunately, the solution is straightforward. Start by taking a high quality vitamin D3 supplement of at least 2,000 IU daily (small children need at least 400 to 1,000 IU). Next, get your vitamin D level checked as soon as possible. Be sure the lab tests for “25-hydroxyvitamin D,” which is the best measure of vitamin D status. To get your blood concentration up to the sufficient level, you’ll need to take 100 IU of additional D3 for each 1 ng/mL you need to raise it.

So if your level comes in at a low 20 ng/mL, you’ll need to take an additional 3,000 IU (100 IU x 30 ng/mL) to get yourself up to 50 ng/mL. Recheck the level in 2 to 3 months. Once you are in the sufficient range, you might be able to maintain that level by taking 2,000 IU daily, though most people nowadays are taking doses of 5,000 IU and higher to get their levels closer to high optimal range of 80 ng/mL. Confirm this with repeat testing at least once a year. Many people, especially those with pre-existing chronic illness, find they need more to boost their levels adequately.

Summary

Despite reams of evidence to the contrary, mainstream medicine continues to mainly regard vitamin D as essential only for healthy bone maintenance. But the discovery that the vitamin D receptor is found in virtually all human tissues has suggested to many that the vitamin (actually a hormone) is vital for most human functions.

Frighteningly, though, the majority of Americans have insufficient vitamin D levels to support good health, resulting in an increase in a host of chronic diseases.

Supplementing with 2,000-8,000 IU/day of vitamin D3 is the best way to get your levels back to normal and to promote your body’s maintenance—not just of bone health, but of robust cardiovascular, metabolic, neurologic, and immune function, while also preventing cancers of the breast, prostate, and colon, and likely many others.

Remember to take your vitamin D with the meal of the day that contains the most fat, as this greatly enhances vitamin D absorption.

You owe it to yourself to get your vitamin D level tested now—but don’t wait for the results. Odds are that you haven’t got enough vitamin D in your body for optimal health, so you should begin a vitamin D3 supplement today.

On page 49 is a description of a special offer for a blood test panel that includes 25-hydroxyvitamin D, glucose, cholesterol, LDL, HDL, triglycerides, and a host of other health markers. The cost of this panel is only $56 for Life Extension members.

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


Chua GT, Chan YC, Cheng SW. Vitamin D status and peripheral arterial disease: evidence so far. Vasc Health Risk Manag. 2011;7:671-5.


THE OVERLOOKED IMPORTANCE OF VITAMIN D RECEPTORS


The CBC/Chemistry Panel includes measurements of cholesterol, glucose, LDL, HDL, triglycerides, liver/kidney function, and blood counts including important immune cells.

The 25-hydroxyvitamin D test assesses your vitamin D status, enabling you to increase or decrease your dose based on how close you are to achieving optimal ranges of 50-80 ng/mL.

The regular member price for the CBC/Chemistry and 25-hydroxyvitamin D tests is $82.

For the next two months, we are offering this CBC/Chemistry plus the 25-hydroxyvitamin D blood test for only $56 to Life Extension® members…a 32% discount off the normal price of these two tests. Sale price effective July 1 to September 3, 2013.

Life Extension’s CBC/Chemistry Profile Plus 25-hydroxyvitamin D includes the following tests—for just $56:

- Fasting Glucose (blood sugar)
- Uric acid
- BUN (blood urea nitrogen): Measures liver and kidney function
- Creatinine: A test used to measure kidney function
- BUN/Creatinine Ratio: For diagnosis of impaired renal function
- Estimated glomerular filtration rate (eGFR)
- Sodium
- Potassium
- Chloride
- Calcium
- Carbon Dioxide
- Phosphorus
- Total Protein
- Albumin
- Globulin
- Albumin/Globulin Ratio
- Bilirubin: Evaluates kidney and liver function
- Alkaline Phosphatase: Evaluation of liver and bone diseases
- LDH (lactate dehydrogenase)
- AST (SGOT): Evaluates liver function
- ALT (SGPT): Evaluates liver function
- Iron (serum)
- Lipid Profile: Evaluates the risk for developing atherosclerosis (arterial plaque) and coronary heart disease.
  - Total Cholesterol
  - Triglycerides
  - HDL Cholesterol
  - LDL Cholesterol
  - VLDL
  - Total Cholesterol/HDL Ratio
  - Estimated CHD Risk
- Complete Blood Count:
  - Red blood cell count
  - Hemoglobin
  - Hematocrit
  - Red blood cell indices
  - Mean corpuscular hemoglobin
  - Mean corpuscular hemoglobin concentration
  - Red blood cell distribution
  - White blood cell count
  - Immune cell differential count
  - Platelet count
  - 25-Hydroxyvitamin D

To obtain this special CBC Chemistry Profile + Vitamin D blood panel at this low price, call 1-800-208-3444 to order your requisition forms. Then – at your convenience – you can visit a blood-drawing facility in your area. (Restrictions apply in NY, NJ, RI, MA, MD).

To order these important blood tests at these special low prices, call 1-800-208-3444 (24 hours a day).
Shielding your eyes from destructive ultraviolet sun rays is one of the most effective means of protecting against ocular disease.

Consumers often spend hundreds of dollars on just one pair of so-called “designer” sunglasses. Life Extension® members can obtain superior protection against damaging solar radiation at a fraction of the price of commercially sold sunglasses.

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Compare these low prices to sunglasses sold in stores and see savings exceeding 90%!

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To order **SolarShield®** or **OveRxCast** sunglasses, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)
Scientists have discovered that nearly every tissue and cell type in the human body has receptors for vitamin D. This means that vitamin D plays a more essential role in our total health than previously known.

Based on this research, achieving optimal systemic health requires larger doses of vitamin D than what most people take today.

Life Extension’s Liquid Vitamin D3 2,000 IU with Natural Mint Flavor provides another way to maintain healthy vitamin D levels with just a few daily drops. These new drops have a cool mint taste that helps you refresh while you replenish your D supply!

One bottle of Life Extension Liquid Vitamin D3 2,000 IU with Natural Mint Flavor costs $28. If a member buys four bottles, the price is reduced to $18.75 per bottle. Each drop contains 2,000 IU of vitamin D3 and there are over 1,000 drops in each bottle.

To order Life Extension Liquid Vitamin D3 2,000 IU with Natural Mint Flavor, call 1-800-544-4440 or visit www.LifeExtension.com

References
SUMMER SANDERS
The Olympic Champion Carries the Torch for Varicose Vein Awareness

Twenty years ago, in the pristine water of the Bernat Picornell Olympic swimming pool on the mountain of Montjuic, in Barcelona, Spain, the world fell in love with Summer Sanders. It was the 1992 Olympic Games, and as the NBA’s Dream Team dominated the headlines on land, Sanders’ grit and grace stole headlines in the water.

Fresh off winning an NCAA National Championship with her Stanford University swim team, Sanders won four medals at the 1992 games, including a gold medal in the 200 meter butterfly and the 4 x 100 meter relay. As the most decorated US swimmer of the Barcelona games, almost overnight, she found herself the focus of the national media. Fortunately, she was ready for prime time. >
She used her swimming success as a launch pad to a television career that included an eight-year run as co-host of NBA Inside Stuff with Ahmad Rashad, as well as work as a correspondent for Good Morning America, The Rachael Ray Show, and NBC’s Olympic coverage.

Long retired from competitive swimming, Sanders currently hosts the award-winning web series “Elite Athlete Workout for Yahoo! Sports.” More importantly, however, is the work that she’s doing as a health and fitness advocate, which includes her latest partnership with Rethink Varicose Veins.

Nobody Is Immune

Sanders’ partnership with Rethink Varicose Veins isn’t one of those collaborations where a celebrity becomes a hired gun and has no knowledge of the actual cause. In this case, varicose veins were a serious problem for Sanders.

“I was pregnant with my son when I had my first varicose vein,” Sanders says. “I had always associated varicose veins with someone older than me, or someone who wasn’t active, so when I got mine, I thought, ‘Oh my gosh, I’ve turned into my mother.’”

Following her initial reaction, Sanders did some research and discovered what many women in her shoes have come to understand about what they once thought was a mere ‘cosmetic’ problem. The basics were that varicose veins happen when the valves in the leg no longer function, causing blood to pool. While many women are first concerned about the unsightly appearance, a true health risk lurks beneath the surface.

If varicose veins are untreated, they can lead to much more serious forms of venous disease called CVI, which stands for Chronic Venous Insufficiency. CVI can snowball into a host of symptoms that can progress over time, including leg fatigue, swelling, restlessness, pain, and in the worst cases, ulcers, skin damage, and an increase in the risk of developing a blood clot called a deep venous thrombosis (DVT). This blood clot can form in the deep veins of the leg and then travel to other parts of the body, including the lungs, resulting in a potentially fatal condition called pulmonary embolism (PE).

“Once I started to learn more about it, I realized that the constant pain I was having in my legs might be CVI,” she says. “My tipping point was when I was on my way home from Disneyland with my family and I was driving. We had to stop three times because my calves were so sore. It was just an annoying, annoying ache. You can’t help but massage it. When I started to think about it, I realized I was experiencing this kind of pain almost every night.”

As a world-class athlete, Sanders was conditioned to push through pain, but after reading the literature, she realized this wasn’t something you just tough out.

“My mother suffered from varicose veins for most of her life,” Sanders says. “She was a flight attendant and was on her feet all the time. She always talked about how much pain she’d be in on long trips. Well, I developed varicose veins 25 years before my mom had hers.”

In fact, when Sanders’ mother went to have her legs examined by a specialist, that’s when Sanders decided to have her legs looked at as well.

“I had myself checked out, and as I was reading the literature, I became more knowledgeable and I started calculating how I felt after long days on my feet and after long flights and I thought my varicose veins might be causing some of my symptoms,” she says.
"When Rethink Varicose Veins contacted me to get involved, I thought someone was messing with me because my mom was having a laser procedure the next day!" she says.

**Having a Game Plan**

As far as Sanders’ own varicose vein issue, she was determined to nip it in the bud.

"There is a new way to look at varicose veins," she says. "Don’t wait until your leg is full of varicose veins to have them checked out."

Sanders opted for **Radiofrequency Ablation**, which uses radiofrequency energy to force the vein walls to collapse and seal off.

"In layman's terms, I had a vein that wasn’t working, so I just shut it off," she explains.

Other minimally invasive treatments include laser ablation, which uses a focused laser to close off a diseased vein, and sclerotherapy, which involves a chemical injection into a diseased vein.

Natural solutions may include the plant-based nutrient **diosmin**, which is derived from the sweet orange. This extract is delivered rapidly to the blood stream via a vegetarian tablet and may help maintain healthy blood flow as well as vascular tone and elasticity.

Following her procedure, Sanders says she feels **100%**, and after successfully running in this past year’s Chicago Marathon, she hopes to qualify for and run in the prestigious Boston Marathon next year.

"I don’t have any other kinds of veins or an achy feeling anymore," she says. "My calf feels so much lighter on a daily basis. This is why I think it's important to be the face of varicose veins. I wanted to show that you can be an active, healthy person."

In terms of prevention and/or reducing some symptoms, Sanders says that, of all things, her doctor suggested swimming as a fantastic exercise to combat varicose veins.

"My doctor was telling me that swimming is a great exercise to help alleviate varicose veins," she says. "Exercise is great, but it is hard on your veins. With swimming, you’re not upright and it’s easier on your body."

Diet, as always, plays a pivotal role in overall health, and when it comes to what Sanders puts in her body, she tries to stick with fruits, vegetables, and protein.

"In our house, we try to look at our plates like they’re an empty canvas and we try to put as much color on them as possible," she says. "We load it up with reds and greens and oranges and as many fresh vegetables as we can. I also love blueberries. You can add them to anything. They’re chock full of antioxidants, like nature’s little miracle food."

Sanders also makes fruit smoothies for her and her kids and includes frozen spinach for its high content of vitamins A, K, C, and folate.

"I put it in shakes and you don’t even taste it," she says.

**Full Circle**

With her healthy diet in place and her legs no longer bothering her, Sanders celebrated the 20th anniversary of her success at the Barcelona Games with a special honor at the 2012 Olympic Games in London: she represented the United States and carried the Olympic torch through London.

"I was beyond excited when I found out," she says. "I was chosen by Coca-Cola as one of the athletes and I think I just screamed when I heard the news."

Last summer, Sanders not only carried the torch for the US, but for all the women who now have the knowledge to overcome varicose veins.

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For more information on Rethink Varicose Veins, please visit www.rethinkvaricoseveins.com.
For more information on Summer Sanders, please visit www.summersanders.net.

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.
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Discover the European “Secret” to Youthful, Healthy Legs

Combat Unsightly Veins with This High-Potency Extract

30 YEARS OF CLINICAL EVIDENCE BRINGS LONG-AWAITED RELIEF

It is estimated that half of all women in the United States will develop unsightly veins by age 50. While dermatologists often suggest surgery to correct this “age-related” issue, European women have enjoyed access to a natural solution for 30 years!

Life Extension® offers American women the same extract without a prescription. No more compression bandages or stockings. Instead, experience the same beautifying effects European women have been raving about for three decades—naturally!

Derived from the sweet orange, European Leg Solution featuring Certified Diosmin 95 contains a flavonoid called diosmin and is available in a one tablet per day formula.

MICRONIZED FOR GREATER EFFECTIVENESS

In order to derive any significant benefit, bioactive diosmin extract must be able to reach veins directly.

Life Extension®’s proprietary extract undergoes a complex, highly purified process called micronization. It yields the only form of diosmin clinically proven to support healthy vascular function in the legs.1,2

This scientifically controlled, multi-phase technique radically reduces the size of the standard diosmin particles contained in each tablet, from 100 microns to less than 45 microns. The result is an optimally bioavailable standardized extract. This ensures rapid, efficient delivery of diosmin to the bloodstream, enabling enhanced penetration of the delicate inner lining of the veins.

As with so many age-related conditions, inflammation3 is the chief culprit behind the presence of unsightly veins.

European Leg Solution featuring Certified Diosmin 95 offers effective protection by disrupting this inflammatory response.

THE PREFERRED TREATMENT AMONG EUROPEAN WOMEN FOR BEAUTIFUL LEGS IS HERE

Life Extension’s European Leg Solution featuring Certified Diosmin 95 provides the same pharmaceutical-grade extract used by millions throughout Europe. The retail price for a bottle containing 30 600 mg vegetarian tablets is $20. If a member buys four bottles, the cost is only $13.50 per bottle.

Contains corn.

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

Six Ways Life Extension’s European Leg Solution featuring Certified Diosmin 95 Works for You

1. Maintains healthy blood flow through your capillaries—the most fragile of your blood vessels.
2. Maintains tone and elasticity of your veins—the key to sustained vascular health.
3. Eases the effects of circulating cytokines that promote inflammation.
4. Safeguards collagen and elastin against oxidative damage.
5. Enjoys an outstanding safety record.
6. Produces results in just 1–2 weeks, with a single 600 mg tablet taken each morning.2

*Product not for sale outside the United States.

To order European Leg Solution featuring Certified Diosmin 95, call 1-800-544-4440 or visit www.LifeExtension.com

References:

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
If you’re one of the 150 million Americans that drink coffee on a daily basis, we have good news for you. Despite decades of medical advice from organizations like the American Heart Association that coffee may be bad for your heart, breaking research has proven that moderate coffee consumption offers powerful protection against heart failure and stroke.

Two exciting new studies provide dramatic insight into coffee’s health-giving benefits. Together, these studies show that coffee reduces the risk of both hemorrhagic and ischemic stroke by improving endothelial function (the mechanisms by which blood vessels retain their control over blood flow and pressure). Strokes, like heart attacks, are the consequences of disruptions in endothelial function that lead to sudden loss of blood flow, with devastating effects on surrounding tissues.

Stroke is among the top three causes of death in the United States. Drinking 5 or more cups of coffee a day has been found to reduce risk of death from a stroke by 36%. With more than 140,000 people dying from stroke each year, that 36% risk reduction could save the lives of more than 50,000 people a year.

But there are plenty of other healthy reasons to have your daily cup of coffee. Coffee reduces your risk of dying from heart disease, prevents diabetes, cuts cancer risk, and even reverses cognitive impairment in Alzheimer’s patients.
Despite decades of medical advice that coffee was “bad for your heart,” new evidence is demonstrating just the opposite: Moderate coffee consumption can protect against heart attacks and subsequent heart failure.\textsuperscript{6,8}

As with strokes, this is largely due to coffee’s favorable impact on \textit{endothelial function}. Poor endothelial function increases your risk of \textbf{heart attack} (when the heart gets too little blood to meet its own needs) and \textbf{heart failure} (when the heart can no longer pump out enough blood to meet the body’s needs).\textsuperscript{9,10}

Because coffee helps improve endothelial function, it not only helps protect you from a heart attack to begin with—but can also protect you from dying from cardiovascular disease.

A large study of more than 59,000 people conducted over 19 years provides powerful evidence of coffee’s protective effects against heart failure. The study found that women who consumed at least \textbf{1 cup} of coffee per day had a reduction in heart failure of roughly \textbf{27\%} compared to those drinking no coffee.\textsuperscript{11} Another study found that \textbf{4 cups per day} provides the strongest protection against heart failure in both men and women.\textsuperscript{12}
Researchers found among women, drinking at least **2 cups** of coffee per day was associated with protection of up to **25%** against dying from cardiovascular disease. And in a group of patients (men and women) who had suffered the most common kind of heart attack, **96%** of patients who were given coffee during their stay in the coronary care unit had a favorable increase in their heart rate variability, a measure of protection against premature cardiovascular death.

Diabetic patients are at exceptionally high risk for heart attacks, largely because of the poor endothelial function induced by years of exposure to high glucose levels. A study of type II diabetics showed that those who consumed **5 or more cups** of coffee daily were about **31%** less likely to die from all causes and about **30%** less likely to die from cardiovascular diseases, compared to those who drank no coffee.

**Coffee Drinking Slashes Stroke Risk**

Endothelial dysfunction is a major risk factor for strokes because it impairs blood flow through the brain’s major arteries. Strokes, like heart attacks, are the consequences of disruptions in endothelial function that lead to sudden loss of blood flow, with devastating effects on surrounding tissues. People who’ve had strokes lose function in the affected brain regions, resulting in disorders of speech, balance, coordination, motor strength, and often cognition.

But recent evidence has indicated that coffee can improve endothelial function, reducing your risk of stroke. Studies show that coffee consumption is powerfully associated with reduced risk of both major kinds of stroke, **ischemic** (not enough blood to the affected areas of the brain) and **hemorrhagic** (bleeding from a major brain artery).

A study of hemorrhagic stroke, conducted among patients with no prior stroke history, demonstrated that being a coffee drinker was associated with a **36%** reduced risk of hemorrhage, compared with being a non-coffee drinker.

Ischemic stroke is the more common variety. Compared with drinking **0 to 2 cups** daily, people who drink **3 to 4 cups** of coffee per day have a **23%** lower risk of dying from a stroke. That risk reduction climbs to **36%** in those who drink **5 to 6 cups** a day. Similar studies found that women who consume **2 or more cups** of coffee per day (caffeinated or decaf) have an overall **20%** reduction in stroke risk.

Animal studies help explain the reason behind this powerful protection against ischemic stroke. When scientists applied coffee-containing water to tiny blood vessels in mice, they discovered that it slows the time it takes for chemically stimulated platelets to block arteries, from just over 12 minutes to 46 minutes. That extra half-hour window could be the time it takes for a stroke victim to reach urgent medical care and avert a catastrophe.

**Coffee Reduces the Risk and Impact of Diabetes**

We’ve already seen that coffee can reduce the risk of cardiovascular disease in diabetics. But there’s strong evidence to show that moderate coffee consumption can lower your risk of developing diabetes in the first place.

This benefit is especially seen among women. In a recently published study, for example, women consuming regular coffee (**3 or more cups** daily) had a **34%** lower risk of developing diabetes than those who drank less than one cup per day, while men had only a borderline risk reduction.

However, men can benefit from coffee consumption as well. An interventional study of men showed...
that drinking 5 cups of caffeinated coffee daily for 16 weeks decreased after-meal glucose concentrations by an average of 13% and total exposure to glucose by nearly 8%, along with a decrease in waist circumference.24 There were no changes in this study among the decaf or no coffee groups.

Interestingly, both of these studies only showed benefits in the groups drinking caffeinated coffee—and not in the decaf groups. However, at least one large study from researchers at Harvard Medical School found significant risk reductions for diabetes in women who consumed either caffeinated or decaffeinated coffee. This effect was not seen in those who consumed caffeinated soft drinks, indicating the protective effect of the components in coffee itself.25

Both caffeinated and decaffeinated coffees contain the ingredients that account for coffee’s health benefits, namely chlorogenic acid and trigonelline, a compound related to niacin (vitamin B3). In one study, both substances reduced blood glucose by 9 to 12 mg/dL; they also lowered insulin concentrations following an oral glucose tolerance test.26

Coffee’s non-caffeine components are associated with coffee’s anti-inflammatory actions, which likely contribute to the decreased diabetes risk. They have been shown, for example, to reduce levels of the inflammatory cytokines IL-18 and 8-isoprostane, while increasing the protective cytokine adiponectin.20,27

Unfortunately, at this point, there isn’t enough information to make a firm recommendation about whether you should drink regular or decaffeinated coffee to lower diabetes risk.

Coffee Cuts Cancer Risk

Cancer researchers bashed coffee-drinking for years because they believed it contributed to the growth of tumors.28 But now there’s substantial epidemiological evidence showing that coffee consumption in fact reduces the risk of many tumors.29 This is especially true of breast cancer.

Breast cancer is a very well-studied malignancy in terms of its relationship to coffee, in part because the same liver enzymes are involved in the metabolism of coffee compounds and estrogen, as well as the breast cancer drug tamoxifen.30,31

Coffee helps prevent the development of breast cancer by favorably increasing the ratio of estrogen’s protective metabolite 2-hydroxyestrone compared to its more dangerous metabolite called 16-hydroxyestrone. An increase in 2-hydroxyestrone and reduction in 16-hydroxyestrone results in a hormonal environment less favorable to breast cancer development.32

What You Need to Know

Health Benefits of Coffee

- Coffee is the most widely-consumed pharmacologically-active beverage in the world.
- Long suspected to be associated with poor health outcomes, coffee has now been shown to have a myriad of health benefits when consumed in moderation.
- Drinking up to five cups of coffee daily can protect you against many chronic, age-related diseases.
- Recent studies highlight coffee’s ability to boost endothelial function and reduce the risks of stroke and heart disease.
- Coffee and its components offer protection against diabetes, itself the cause of degraded endothelial function and cardiovascular diseases and cancer.
- Coffee helps protect against cancer and neurodegenerative disorders like Alzheimer’s and Parkinson’s diseases.
- In today’s world, there’s every reason to drink coffee liberally, not only without guilt, but secure in the knowledge that you are improving your health and preventing disease with every cup.
Studies have now shown that coffee consumption slows the growth of treatable estrogen receptor-positive breast cancer, resulting in an older age at diagnosis. In one study, intake of at least 5 cups of coffee per day reduced breast cancer risk by 29%, reduced the risk of difficult-to-treat estrogen receptor-negative tumors by 59%, and reduced postmenopausal breast cancer by 37%. This study found no impact of other caffeine-containing beverages, again highlighting the importance of the non-caffeine components of coffee. Although research into other cancers and their association with coffee drinking is less detailed, the available evidence is still encouraging. Take a look:

- Studies reveal a decrease in the risk of endometrial cancer of up to 39% in women drinking at least 1 to 2 cups/day, and 62% in women drinking 3 or more cups/day.
- The risk of localized esophageal cancer was reduced by 60% among coffee drinkers in one study.
- People with either hepatitis B or C infections or both (a high-risk population), who drink at least 3 cups of coffee daily reduce their risk of developing liver cancer by up to 39%.
- Even those without such viral infections have a 44% lower risk of developing hepatocellular carcinoma, the most common liver cancer, when they drink 3 or more cups/day.
- And the risk of localized prostate cancer has now been shown to decrease by 3% per cup of coffee per day, with higher risk reductions among overweight or obese men.
Neurodegenerative Diseases Yield to Coffee

Neurodegenerative diseases in the US are rising at an alarming rate. A study published in April 2013 in the New England Journal of Medicine found that nearly 15% of Americans older than 70 suffer from dementia. The total monetary costs of dementia in the US as a whole is around $215 billion per year.

There’s now very strong epidemiological evidence that people who drink more coffee are protected against developing Parkinson’s and Alzheimer’s diseases, the most common forms of dementia. Studies show that coffee consumption lowers the risk for Parkinson’s by up to 74% and cuts the risk of Alzheimer’s and general cognitive decline by up to 51%.

Animal studies reveal some of the basic mechanisms behind this powerful protection. One of the most important ways coffee produces this effect is by preventing type II diabetes. Since diabetes is a known risk factor for developing Alzheimer’s, preventing diabetes ultimately helps prevent Alzheimer’s. One study showed that decaffeinated green coffee improved insulin sensitivity and improved brain energy metabolism, both important factors in Alzheimer’s disease prevention.

Caffeine appears to be one of the most important components of coffee that is responsible for this dramatic risk reduction. For example, when mice that were engineered to be at high risk for Alzheimer’s disease were given caffeine, they were protected from cognitive impairment. This protective effect was also seen in older mice that were already showing signs of cognitive impairment from Alzheimer’s, demonstrating an actual reversal of cognitive impairment and improvement in learning and memory.

Caffeine also reduces both brain and plasma levels of the toxic Abeta protein (sometimes called the “Alzheimer’s protein” because it’s found in such high concentrations in the brains of Alzheimer’s patients). Remarkably, in both mice and humans, a single dose of caffeine (equivalent to 5 cups of coffee/day) quickly reduced both brain and plasma levels of toxic Abeta protein. This finding may represent the first true disease-modifying treatment of Alzheimer’s. (Current drug therapies can only reduce symptoms; they don’t produce changes in the disease process itself.)

But other components of coffee in addition to caffeine are essential and have been shown to work synergistically with caffeine to protect brain health and function, which means you can’t simply take caffeine pills (a bad idea for many reasons). One study demonstrated this dramatically: only caffeinated coffee—and neither caffeine alone nor decaffeinated coffee—protected against Alzheimer’s. Similarly, crude caffeine (a byproduct of coffee decaffeination that still retains non-caffeine components) but not caffeine itself, reduced Abeta levels and microscopic damage to brain memory centers.

Chlorogenic acid, a major non-caffeine coffee constituent, protected animals against chemically induced memory impairment—and also reversed cognitive impairments. And eicosanoyl-5-hydroxytryptamide, another coffee component, has anti-inflammatory and antioxidant activities that can protect against Parkinson’s disease in animal models.

Can Drinking Coffee Help You Live Longer?

People who live well into their 90s are evidently doing something right, even if they are also blessed with good genes. Several studies have examined the dietary practices of centenarians and those who live to be 90-100 years seeking for clues to their surprising longevity. Coffee drinking stands out among the dietary practices that correlate with great age.

A study comparing centenarians with sexagenarians and octogenarians found that centenarians consumed coffee significantly more frequently than the two younger groups. A second study among very elderly people in Rome found that consuming strong espresso coffee more than once a week reduced the risk of dying within 5 years by 79%; and more than 2 cups/week reduced that risk by 65%.

In light of other studies showing that people of all ages who drink more coffee are less likely to die prematurely compared with those who drink less (or none), it’s hard to put down that coffee cup knowing it could earn you an extra five years of healthy, vigorous life even well into old age!
NEW FINDINGS ON COFFEE’S CARDIOVASCULAR BENEFITS

How to Boost Coffee’s Benefits

There’s now compelling evidence that a combination of coffee consumption and green tea offers superior protection than either alone. A 2013 Japanese study found that people who drink **1 or more cups** of coffee per day **and** who drink **2 or more cups** of green tea daily have about a **23%** lower risk of all strokes, **20%** lower risk of ischemic strokes, and about **29%** lower risk of hemorrhagic strokes, compared with those who drink neither beverage.³

Fortunately, there are excellent extracts available that contain the green tea polyphenols that confer protection.⁷¹,⁷²

Summary

Coffee has undergone a dramatic scientific rehabilitation in the past decade, going from feared pariah to welcome ally in the quest for better health and longer life.

New studies provide dramatic insight into coffee’s health-giving benefits, with a special focus on its role in improving **endothelial function**, the mechanisms by which blood vessels retain their control over blood flow and pressure. By improving endothelial function, coffee can reduce your risk for stroke and heart attack.

Other benefits include a reduced risk for developing diabetes, cancer, and neurodegenerative diseases.

Protect yourself from the ravages of aging. Enjoy that next cup of coffee secure in the knowledge that you are not only producing no harm, but in fact are helping your body fend off some of the most dreaded consequences of aging. ●

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

CAUTION: Caffeine consumption can transiently increase blood pressure and heart rate, though most individuals who regularly consume caffeine develop tolerance to these effects. Nevertheless, in very sensitive individuals, caffeine consumption can increase blood pressure significantly (e.g. **10 mmHg** or more). Caffeine appears to have a more pronounced blood pressure effect on overweight people older than age 70 years.⁸⁷ To see if caffeine may be raising your blood pressure, check your blood pressure within 30 to 60 minutes of drinking a cup of caffeinated coffee or another caffeinated beverage. If your blood pressure increases by **10 mmHg** or more, you may be sensitive to the blood pressure raising effects of caffeine and may want to cut down on caffeine consumption and substitute decaffeinated coffee.

References

New Polyphenol-Retaining Coffees Boost Health Benefits

In their green, unroasted state, coffee beans are an incredibly rich source of health-promoting polyphenols, particularly chlorogenic acid. However, before these beans are consumed as brewed coffee, they are subjected to varying degrees of roasting—often at very elevated temperatures ranging from 375 to 440 degrees Fahrenheit. These extreme temperatures destroy an enormous amount of the beneficial polyphenols, leaving the standard coffee found on supermarket shelves substantially less healthful than it could be.

In order to preserve the green coffee bean’s original polyphenol content, a new, patented technique has been developed. Under controlled temperature conditions, the green coffee beans are first soaked in water and then drained before roasting.

Because many polyphenols, including chlorogenic acid, are water-soluble compounds, soaking the beans before roasting provides an opportunity to “capture” the polyphenols at a controlled temperature before the beans are exposed to polyphenol-destroying high-temperature roasting. After roasting, the beans are “quenched,” meaning that they are placed back in the polyphenol-rich water retained from the pre-soaking phase before roasting. The result is that the beans reabsorb the polyphenols from the water, and much of their original polyphenol content is “rescued.”

This process results in a roasted coffee bean displaying all the desired flavor and richness of traditional roasted coffee, but with a substantial increase in its content of polyphenols, especially chlorogenic acid. In fact, the final brewed beverage has been found to contain as much as a 120% increase in polyphenols overall, and up to an astonishing 250% increase in chlorogenic acid content versus standard roasting procedures.

Studies show that, for maximum health benefit, you would need to drink anywhere from 4 to 12 cups of conventional coffee daily. That’s a lot of coffee to drink and for many people, consuming that much may result in unpleasant side effects. The advantage of these newer “polyphenol-retaining” coffees, with twice the chlorogenic acid content, is their potential to deliver similar benefits in only half the number of cups.

NEW FINDINGS ON COFFEE’S CARDIOVASCULAR BENEFITS


NEW FINDINGS ON COFFEE’S CARDIOVASCULAR BENEFITS

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Each pack contains the following supplements:

- Two-Per-Day Multi-Nutrient Tablets (2 tablets)
- Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract (2 softgels, yielding 700 mg EPA and 500 mg DHA)
- Super Bio-Curcumin® (1 capsule provides 400 mg of Bio-Curcumin® that can provide blood levels equal to 2,500-2,800 mg of commercial curcumin supplements)
- Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support (1-100 mg softgel)
- Super Booster Softgels with Advanced K2 Complex (1 softgel)

The Best Way to Manage Your Daily Supplement Regimen

These vital nutrients, bundled at no extra cost into a single packet, combine convenience with superior value when compared to buying each product separately.

A box containing a 30-day supply of Comprehensive Nutrient Packs Advanced retails for $90. If a member buys four boxes, the cost is just $61.50 per box. Item# 01796

For people on the go, it’s easy to forget to take your supplements. Life Extension® has created daily Comprehensive Nutrient Packs Advanced with five protective formulas—in one convenient grab ‘n go pack.

Specially designed by Life Extension, the Comprehensive Nutrient Packs Advanced provides you with broad-spectrum nutrient protection—at no additional cost when compared to buying each product separately!

To order Life Extension® Comprehensive Nutrient Packs Advanced, call 1-800-544-4440 or visit www.LifeExtension.com

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
In a recently published study, researchers found that those living on the Greek island of Ikaria had a healthier and longer life span due to their daily intake of strong coffee.¹

The researchers also report that the healthy endothelial function supported by coffee compounds may play a major role in this longevity effect.¹

Polyphenol-Retained Coffee

Not all coffee delivers the same powerful health benefits and longevity dividend.²-⁶ When it comes to obtaining coffee's full range of health benefits, most people aren't getting their money's worth! The reason? Most of the coffee bean's polyphenol content is destroyed during the roasting process.

Among the most beneficial of these polyphenols is chlorogenic acid, a potent inhibitor of the glucose-6-phosphatase enzyme that stimulates gluconeogenesis. (Excess gluconeogenesis results in too much glucose produced in the liver that can cause elevations of blood glucose.)

Life Extension’s Rich Rewards® Breakfast Blend is made using a patented, 100% natural process called HealthyRoast™.⁷ This process delivers a more complete nutritional profile of the coffee bean, yielding chlorogenic acid levels far greater than other premium brands—up to 87% more chlorogenic acid than conventional coffees!

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

Natural Flavored Options!

To make your morning cup of coffee even more enjoyable, Life Extension® now offers our Rich Rewards® Breakfast Blend Ground Coffee in two delicious flavors:

- Natural Vanilla Flavor
- Natural Mocha Flavor

And like our regular, unflavored Rich Rewards® coffee, these flavored ground coffees are roasted using the same HealthyRoast™ process—which preserves special, naturally occurring compounds in coffee that soothe your stomach. This unique process also guarantees a higher content of healthy polyphenols.

Now those who prefer a flavored coffee—as well as those who find that ordinary coffee brands upset their stomach—can enjoy the potent longevity support that daily coffee consumption delivers!

Life Extension® Rich Rewards® Breakfast Blend Ground Coffee provides it all:

- Savory taste—regular coffee taste or 2 natural flavored options!
- Far higher percentage of chlorogenic acid than conventional coffees!
- Certified 100% organic!
- Special, naturally occurring compounds that soothe your stomach!

A 12 oz bag of Life Extension® Rich Rewards® Breakfast Blend Ground Coffee retail for $15. Members pay $11.25 per bag.

To order either of the natural flavored Rich Rewards® Breakfast Blend Ground Coffee options or the regular unflavored Rich Rewards® Breakfast Blend Ground Coffee, call 1-800-544-4440 or visit www.LifeExtension.com

Note: Rich Rewards Breakfast Blend Antioxidant Coffee regular caffeinated (Item# 1609) and decaffeinated (Item# 1610) are still available.

References
7. US Patent 6,723,368.

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.
On April 13, 2013, a meta-analysis performed by the Mayo Clinic was released that looked at 3,600 patients and found huge cardiac benefits in those who supplemented with L-carnitine.¹ This study represented the largest, most powerful scientific review of carnitine’s cardiovascular benefits to date.

The Mayo Clinic study found carnitine supplementation was associated with a 27% reduction in all-cause mortality, a 65% reduction in ventricular arrhythmias, and a 40% reduction in angina symptoms in patients who had experienced a heart attack.¹ The media largely overlooked this favorable report, however.

Instead, headline news stories were created based on a report released a week earlier that had asserted that carnitine (found in red meat) may react with certain gut bacteria in certain individuals to promote a compound (TMAO) that could then cause heart disease.²

These carnitine findings were based on a sub-study of 10 people.² They were obscure, theoretical, and preliminary. Yet the media ignored hundreds of studies showing significant cardiovascular benefits to carnitine, choosing instead to use this study in isolation to bash anything that contained carnitine.

Life Extension® has thoroughly analyzed the report used by the media to attack carnitine, reviewed the published literature on carnitine and heart disease, and conducted a survey of our members using carnitine. It may not surprise you to learn that our findings contradict the mainstream’s propagandized carnitine attack. This article contains a scientific rebuttal to this recent attack on carnitine.

As a Life Extension member, I hope you appreciate discovering the facts behind misleading reports spewing from today’s headline-frenzied media.
A recent investigational study published in the journal *Nature Medicine* examined levels of a compound called *trimethylamine-N-oxide* (TMAO) in relationship to microbial metabolism of carnitine in the gut. The researchers cite very recent, limited research suggesting TMAO may be a risk factor for cardiovascular disease. They then provocatively propose that carnitine consumption may increase cardiovascular risk in some individuals due to increasing TMAO levels following microbial metabolism of the compound.

The authors report the intestinal bacterial flora of people who consume red meat, a significant source of dietary carnitine, was conducive to TMAO production in the presence of carnitine, whereas vegetarians produced little to no TMAO under the same circumstances. They concluded that alterations in the intestinal microbiota associated with meat consumption may promote the formation of TMAO from dietary carnitine, and therefore suggested that the high carnitine content of red meat may be one of the reasons it is linked to heart disease.

Following publication of this study, mainstream media outlets propagated misleading headlines blaming carnitine for heart disease without explaining that these findings were very preliminary and that red meat consumption was required for the observed effect.

*Life Extension* members are well aware of the potential health threats associated with red meat consumption, such as exposure to saturated fats and advanced glycation end products, and may already consume heart-healthy, fish/plant-based foods contained in the Mediterranean diet.
The authors describe carnitine as an inexpensive therapy with an “excellent safety profile” which could potentially be used in patients with angina or who are at risk for angina after suffering from a heart attack. Based on the results of this meta-analysis, the authors suggest L-carnitine as a potential future therapy for heart attack and secondary coronary prevention and treatment, including angina. The scientists state: “Further study with large randomized controlled trials of this inexpensive and safe therapy in the modern era is warranted.” Unfortunately they also note: “However, a large trial may never be performed because L-carnitine is an over-the-counter supplement available to the public, which decreases the potential revenue compared with a synthesized [pharmaceutical] product.”

Carnitine’s benefits are well established and Life Extension has written about them at length over the years. The next several paragraphs describe some of the key health benefits associated with carnitine.

Carnitine Reduces Death Rates

The heart muscle uses fat as its primary energy source. Carnitine is a fat-transporting compound that is absolutely essential for normal heart function. Over time, the decline of carnitine plays a role in the weakening of the heart’s muscles. People with heart muscle damage due to heart attacks or heart failure have especially low carnitine levels. Fortunately, carnitine supplementation has proven to be remarkably effective in fighting and even reversing the heart-weakening effects of that drop.

In one study, 160 male and female heart attack survivors between 39 and 86 years old received either 4 grams/day of L-carnitine or a placebo for 12 months. The patients taking L-carnitine experienced significant favorable decreases in heart rate and blood pressure; they also had improved blood lipid profiles. Most importantly, those supplementing with carnitine had a dramatically reduced death rate compared to those not taking carnitine. These effects were thought to occur through multiple mechanisms, including improved energy metabolism in the mitochondria, decreased ischemia, and enhanced left ventricle function.

New Mayo Clinic Meta-Analyses: Carnitine Improves Outcomes in Heart Attack Patients

Ironically, days after publication of the carnitine article in *Nature Medicine*, a meta-analysis of the research on **carnitine and heart health** was published by researchers from the Mayo Clinic. This large systematic review provides strong evidence for carnitine’s benefits in heart health. This article examined 13 controlled trials that enrolled, collectively, 3,629 participants, representing the largest, most powerful scientific review of carnitine’s cardiovascular benefits to date.

The authors of the Mayo Clinic study found carnitine supplementation was associated with a 27% reduction in all-cause mortality, a 65% reduction in ventricular arrhythmias, and a 40% reduction in angina symptoms in patients experiencing a heart attack. These effects were thought to occur through multiple mechanisms, including improved energy metabolism in the mitochondria, decreased ischemia, and enhanced left ventricle function.

These deceptive media headlines have generated concern that supplemental forms of L-carnitine may be detrimental to heart health. This notion flies in the face of numerous published, peer-reviewed studies showing L-carnitine promotes cardiovascular health in a variety of ways. The media’s effort to generate outrageous headlines has undermined decades of scientific research on the heart-health benefits of carnitine.
People with angina, an early sign of impaired blood flow (ischemia) to the heart muscle, benefited from carnitine supplements. A natural derivative of L-carnitine, propionyl-L-carnitine, at a dose of 500 mg 3 times daily, increased the average time patients could exercise without EKG signs of ischemia by an impressive 450%.\(^\text{10}\) That result indicated improved blood flow to heart muscle cells following ischemia, an effect amply demonstrated in animal studies.\(^\text{13,14}\)

Carnitine also increases concentrations of nitric oxide, which helps endothelial cells relax and increase blood flow, an effect that can help lower blood pressure.\(^\text{15-17}\) Three weeks of supplementation with 2 grams of L-carnitine improved blood flow by 17% during the critical after-meal period in a group of people fed a high-fat meal; placebo patients had a 12% decrease in blood flow.\(^\text{18}\) And a daily 6-gram intravenous dose of propionyl-L-carnitine for one week improved walking distance in people with peripheral arterial disease by 28%.\(^\text{19}\)

**Carnitine Fights Diabesity**

As obesity rates skyrocket, more and more Americans are developing type II diabetes as a result, producing a syndrome called “diabesity.”\(^\text{20,21}\)

Since carnitine helps the mitochondria utilize energy, it plays a critical role in reducing the occurrence and impact of diabesity.\(^\text{22,23}\) Studies show that in addition to helping the mitochondria burn fat as energy, carnitine is also vital for removing waste
products from mitochondria. This is important, because we now recognize that the buildup of mitochondrial waste products is one of the most important contributors to insulin resistance, which further promotes high blood sugar and obesity.

Obesity and aging contribute to low carnitine levels, which compromises mitochondrial performance and increases insulin resistance, promoting further obesity and carnitine reduction. Restoring carnitine levels to their youthful values is an effective way to break this deadly cycle.

Human volunteers who took L-carnitine 3 grams/day for 10 days had favorable changes in body composition. Supplemented patients used their fat for energy, burning it 22% faster than control patients, without any increase in muscle protein breakdown. Another study, using 2 grams/day for 6 months, demonstrated a loss of total fat mass of 4 pounds, with a gain in lean muscle mass of 8.4 pounds.

Animal studies confirm and extend these findings, showing that propionyl-L-carnitine decreases body weight gain, food intake, and fat composition, while improving insulin resistance.

Carnitine also has multiple favorable effects on blood sugar and insulin resistance, the hallmarks of type II diabetes. Animals fed a high fat diet develop the same symptoms and signs that humans do: obesity, insulin resistance, abnormal lipid profiles, and liver damage, which are known as metabolic syndrome. Just 4 weeks of treatment with L-carnitine reversed all of those abnormal parameters.

Similar effects have been found in diabetic humans. Two grams of L-carnitine twice daily for 10 days improved insulin sensitivity and reduced insulin levels. L-carnitine supplementation of 2 grams/day caused a significant reduction in plasma free fatty acids, which contribute to insulin resistance. Three grams/day were shown to reduce simulated after-meal blood sugar spikes from 157 mg/dL to 132 mg/dL (oral glucose tolerance test). A significant number of studies document the deadly impact of elevated after-meal glucose levels.

Carnitine Protects Against Heart Disease

Research suggests that a specific form of carnitine, called propionyl-L-carnitine (PLC), plays an important role in protecting the function and health of endothelial cells. Studies also indicate that PLC may act as a nutritional corrective agent, relieving clinical symptoms of cardiovascular conditions such as peripheral arterial disease, angina, coronary artery disease, cardiomyopathy, intermittent claudication, ischemic heart disease, atherosclerosis, and congestive heart failure.

PLC passes across the mitochondrial membrane to supply L-carnitine directly to the mitochondria, the energy-producing organelles of all cells. This is important because heart muscle cells and endothelial cells burn fatty acids rather than glucose for 60% of their energy.
Carnitine deficiency has been associated with congestive heart failure. 45 PLC supplementation has been reported to increase exercise capacity, optimize energy production, and reduce ventricular size in patients with congestive heart failure.38

The myocardium, the muscular substance of the heart, comprises cells called cardiomyocytes. A study of cardiomyocytes found that PLC helped to correct an imbalance between the production and utilization of adenosine triphosphate (ATP), the energy currency used throughout the body. This suggests that PLC may improve cardiac performance by improving energy metabolism and optimizing ATP levels.46

An animal study suggests PLC may help to prevent or decrease the severity of atherosclerosis. In rabbits fed a high-cholesterol diet, which normally induces endothelial dysfunction and subsequent atherosclerosis, supplementation with PLC resulted in reduced plaque thickness, markedly lower triglyceride levels, and reduced proliferation of foam cells, thereby preventing the progression of atherosclerosis.41

PLC has been shown to have a protective role against vascular cell inflammation that other carnitines do not. When rodents were exposed to irritating chemicals, PLC protected their vascular cells from this source of damage, but L-carnitine and acetyl-L-carnitine did not, leading the study authors to support “a specific protective role of PLC in the vascular component of the inflammatory process.”34

PLC improves endothelial function by increasing nitric oxide production in animals with normal blood pressure and in animal models of hypertension. The increased nitric oxide production induced by PLC is related to its antioxidant properties; PLC reduces reactive oxygen species and increases nitric oxide production in the endothelium in the presence of superoxide dismutase (SOD) and catalase.47

Oxygen-deprived endothelial cells produce large amounts of free radicals. Laboratory findings suggest that PLC protects these cells during periods of oxygen deprivation. When blood flow is restored, PLC also allows the cells to regain their lost energy charge much faster.55

An animal study indicates that PLC prevents abnormal heart muscle function associated with diabetes. The researchers found that PLC significantly increased both fatty acid and glucose utilization while restoring cardiac muscle function. These findings suggest PLC prevents diminished cardiac function associated with diabetes, possibly by promoting a favorable shift in glucose and fatty acid metabolism.46

Life Extension Conducts Survey of Members Using Carnitine Supplementation

As part of a thorough evaluation of this issue, Life Extension’s Health Advisors spoke to a representative sample of 115 members who supplement with carnitine and inquired as to their experience with the compound. Not surprisingly, not one member reported having a cardiovascular event such as a heart attack or stroke after initiation of carnitine supplementation.

Summary Examination of the Media-Hyped Carnitine Article Exposes Several Problems

Despite the media attention given to the negative carnitine study published in Nature Medicine, caution must be used when applying the results to cardiovascular risk. Life Extension has carefully examined this study and identified the following factors with this study that are summarized below.

1. Limited research on TMAO and associated effects on human health prevents causal interpretation at this time. A search of the peer-reviewed literature using terms “TMAO” and “atherosclerosis” yields only 4 results, with the first suggestion of a potential association in 2011.48 Correlation is not causation, and in fact, TMAO is found in relatively large quantities in fish, a food that is linked to a markedly reduced risk of cardiovascular events. In contrast, components of red meat such as saturated fat raise
LDL cholesterol, and a search of the peer-reviewed literature using the terms “LDL,” “cholesterol,” and “atherosclerosis” returns over 10,500 results.

2. Only 10 human subjects examined in carnitine supplementation substudy. The researchers used only 10 subjects in their small substudy of carnitine supplementation and TMAO levels. This is a very small data set with which to make such sweeping conclusions. Since so few humans were directly examined in this context, the validity and applicability of the scientists’ findings are questionable at best.

3. Published, peer-reviewed research demonstrates L-carnitine prevents the progression of atherosclerotic lesions. The recent negative study published in Nature Medicine focused upon the metabolic conversion of L-carnitine to TMAO by gut bacteria and the differences in the gut microbiome between red meat eaters and vegetarians. In fact, many studies show that L-carnitine has a variety of beneficial effects upon cardiovascular function, including prevention of the progression of atherosclerotic lesions. For example, one study reported that in the context of hypercholesterolemia, L-carnitine supplementation “completely prevented the progression of atherosclerotic lesions induced by hypercholesterolemia in both aorta and coronaries.” In another study, supplementation with propionyl-L-carnitine (PLC), a derivative of carnitine used as a drug in Europe for treatment of atherosclerosis, “induced a marked lowering of plasma triglycerides, very low density lipoprotein (VLDL) and intermediate density lipoprotein (IDL) triglycerides...” while plasma cholesterol was slightly and transiently reduced. In addition, PLC treatment “...exhibited a reduction of plaque thickness and extent...and a reduction of the number of both proliferating macrophage- and smooth muscle cell-derived foam cells.” Foam cells are precursors to atherosclerotic lesions.

4. Published, peer-reviewed evidence shows L-carnitine effectively treats peripheral artery disease caused by atherosclerosis. Intermittent claudication (IC) is a painful, atherosclerotic syndrome that is known to be caused by peripheral artery disease. A 2013 systematic review of 40 articles on IC found that L-carnitine demonstrates a benefit in functional performance with carnitine supplementation. The authors suggest routine supplementation with carnitine “may therefore be a useful adjunct therapy for management of intermittent claudication.”

5. Heavy red meat consumption is a known, well-validated risk factor for atherosclerosis in contrast to plant-based diets. In the recent study, L-carnitine alone did not raise TMAO levels—the increases in TMAO were observed when L-carnitine was exposed to the bacterial gut microbiome of red meat eaters in comparison with vegetarians’ gut microbiome. Extrapolation of these preliminary test results involving the gut microbiome in heavy red meat eaters is not representative of health conscious individuals who typically limit red meat consumption given the known adverse health effects associated with a diet rich in red meat.

6. Heart-healthy salmon is associated with high TMAO levels. Consistency of association is critical in order to draw conclusions from study data across the published literature. The fact that heart-healthy fish consumption is associated with an increase in TMAO levels is challenging to reconcile with the idea that TMAO necessarily causes atherosclerosis. For example, one research team reported that consumption of salmon, a food known for cardiovascular health benefits, led to an increase in TMAO levels in human test subjects. In another study, it was also observed that TMAO levels increased in individuals consuming large amounts of seafood products.

7. Carnitine decreases LDL and VLDL cholesterol, established risk factors for cardiovascular disease. Unlike TMAO, LDL, and VLDL cholesterol blood levels are widely recognized risk factors for cardiovascular disease. Carnitine supplementation has been shown to reduce both LDL and VLDL cholesterol levels.
8. The gut microbiome of red meat eaters is different from vegetarians. In this study vegans had almost no increase in TMAO levels.² It was suggested that this was due to a different gut microbiota that develops in vegetarians compared to omnivores.

9. Probiotic supplementation may modulate gut microbiota and suppress formation of TMAO. Not all gut bacteria strongly generate TMAO. On the contrary, certain strains of commensal bacteria have been shown to manipulate the gut microbiome in a manner favorable to human health. Specifically, members of the Lactobacilli species were inversely associated with TMAO in the human subjects examined.² Also, Lactobacilli spp. have been shown to increase the ratio of genus Bacteroidetes to genus Firmicutes in the human intestine following oral administration; this is important because many species of the Firmicutes genus were shown to produce TMAO (though the associations were not consistent across all species of Firmicutes tested).²,55 In addition, the current study showed that antibiotics, by suppressing intestinal bacterial colonization, virtually abolished TMAO formation.² While antibiotic prophylaxis is not an ideal method for reducing TMAO formation since it also eliminates beneficial intestinal bacteria, evidence suggests that certain members of the probiotic species Bifidobacterium and Lactobacilli may generate antibiotic-like metabolic byproducts called short-chain fatty acids that modify the intestinal microbiota in a favorable way.⁵⁶

Summary

In the wake of a single negative study, deceptive media headlines have generated concern that supplemental forms of L-carnitine may be detrimental to heart health. This notion flies in the face of numerous published, peer-reviewed studies showing L-carnitine promotes cardiovascular health in a variety of ways. The media’s effort to generate outrageous headlines has undermined decades of scientific research on the heart-health benefits of carnitine.

Carnitine is a vital nutrient for health. The discovery of carnitine’s ability to maximize cellular fuel efficiency and minimize the impact of normal cellular metabolism on delicate cellular machinery has led to a revolution in the way scientists think about some of the most troubling age-related conditions. Supplementing with carnitine can help preserve cell energy levels, enhance heart muscle strength, reduce the impact of obesity and diabetes, and protect heart attack victims from dying.

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

References


Life Extension® Pycnogenol® French Maritime Pine Bark Extract is a natural botanical extract containing procyanidins, bioflavonoids, and other health-giving molecules that synergistically support the body’s natural defenses against 5 major processes that characterize premature aging. Its effectiveness is backed by 40 years of study.

Life Extension® Pycnogenol® French Maritime Pine Bark Extract is designed to counteract premature-aging-related changes by providing support for the following mechanisms:

**MEMBRANE FUNCTION:** Pycnogenol® promotes the integrity and normal characteristics of cell membranes.3-4

**DNA FUNCTION:** Pycnogenol® helps support normal DNA function through antioxidant activity and possibly other mechanisms.5-8

**EASE INFLAMMATION:** Pycnogenol® helps ease inflammation by normal modulation of inflammatory cytokine molecules.9-13

**OXIDATIVE STRESS:** Pycnogenol® supports the normal functioning of healthy antioxidant systems to help suppress free radicals and protect DNA.14-19

**GLYCATION:** Pycnogenol® supports cellular metabolism of sugar, healthy fasting, and post-meal blood sugar levels already within normal range, and normal sugar absorption in the intestine.20-25

Unlike other forms of pine bark extract, Pycnogenol® is a superior patented and standardized ingredient that has undergone extensive human clinical research to substantiate its numerous anti-aging properties. A bottle of Life Extension® Pycnogenol® French Maritime Pine Bark Extract containing 60 vegetarian capsules retails for $45. If a member buys four bottles, the price is reduced to $35 per bottle. The dose for most people is one capsule daily, so each bottle lasts two months.

Each capsule of Life Extension® Pycnogenol® French Maritime Pine Bark Extract provides:

- Pycnogenol® dried French maritime pine (Pinus pinaster) extract 100 mg
  (bark)[std. to 65% procyanidins (65 mg)]
- Vitamin C (as ascorbyl palmitate) 4 mg

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

References

6. Drug Dev Ind Pharm. 1998 Feb;24(2):139-44.
19. Drug Dev Ind Pharm. 1998 Feb;24(2):139-44.

Pycnogenol® is a registered trademark of Horphag Research Ltd. Use of this product may be protected by one or more U.S. patents and other international patents. Supported by over 40 years of research.

To order Pycnogenol® French Maritime Pine Bark Extract, call 1-800-544-4440 or visit www.LifeExtension.com
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. 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 AminoCarnitine® that is molecularly bonded to the amino acid glycine and 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

A bottle of 60 vegetarian capsules of **Optimized Carnitine with GlycoCarn®** retails for $36. If a member buys four bottles, the price is reduced to only $24 per bottle.

**References**

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

The macular pigment is composed of lutein, zeaxanthin, and meso-zeaxanthin. The density of the macula is essential to proper vision. Macular density declines naturally over time.

Eating lots of lutein- and zeaxanthin-containing vegetables can help maintain the structural integrity of the macula. However, since meso-zeaxanthin is not part of the typical diet, it cannot be easily replaced. Young people convert lutein into meso-zeaxanthin inside their macula. Some aging people, however, lose their ability to convert lutein into meso-zeaxanthin.

The Super Zeaxanthin formula provides zeaxanthin, lutein and meso-zeaxanthin to help maintain macular density.

Falling down is responsible for 70% of accidental deaths in older people. Poor lighting conditions are often the culprit.

Fortunately, C3G derived from black currant extract supports eyesight in dark conditions by promoting the healthy function of delicate structures within the retina that support night vision.

Super Zeaxanthin contains a potent dose of C3G to nourish cells throughout the body.

Comprehensive Ocular Protection in One Daily Softgel

The Super Zeaxanthin formula provides ingredients that have been shown to promote healthy eyesight. Just one softgel of Super Zeaxanthin with Lutein, Meso-Zeaxanthin and C3G provides:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
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<tr>
<td>OptiLut®, Lutein Plus® and MZ®</td>
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<tr>
<td>Marigold (Tagetes erecta) extract</td>
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<tr>
<td>(flower) [free lutein equivalent 10 mg]</td>
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<tr>
<td>Zeaxanthin &amp; Meso-zeaxanthin blend</td>
<td>3.75 mg</td>
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<tr>
<td>[Paprika (capsicum annuum) extract (fruit), OptiLut®, Lutein Plus® and MZ® Marigold Extract (flower)]</td>
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</tr>
<tr>
<td>C3G (Cyanidin-3-glucoside)</td>
<td>2.2 mg</td>
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<tr>
<td>[from European black currant (Ribes nigrum) extract (fruit)]</td>
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</table>

The retail price for a bottle containing 60 softgels of Super Zeaxanthin with Lutein, Meso-Zeaxanthin and C3G is $22. If a member buys four bottles, the price is reduced to $14.85 per bottle.

OptiLut® is a registered trademark of NutriScience Innovations, LLC.
LuteinPlus® and MZ® are registered trademarks of Nutriproducts Ltd., 7 Marfleet, CB22 5LA, UK, licensed under US Patents 6,218,436 & 6,329,432.

References

To order Super Zeaxanthin with Lutein, Meso-Zeaxanthin and C3G, 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.
Astaxanthin is a fat-soluble carotenoid compound. The challenge to deriving maximum benefits is its normally limited absorption—as low as about 50%. Assimilation of astaxanthin is impeded by limited uptake and intestinal degradation.

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

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

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

ASTAXANTHIN

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

A bottle of 30 softgels of Astaxanthin 4 mg with Phospholipids retails for $16. If a member buys four bottles, the price is reduced to $10.50 per bottle. Contains soybeans.

References

To order Astaxanthin 4 mg with Phospholipids, call 1-800-544-4440 or visit www.LifeExtension.com

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
The delicate features around the eye are among the attributes focused on to estimate a person’s age.¹ This finding has encouraged maturing individuals to seek skin care specifically designed for this prominent area of the face.

This article will detail how topically applied compounds effectively target the natural recycling process of skin cells to promote skin renewal and rejuvenation to the area around the eye.

When tested in a clinical study with 80 female volunteers aged 31 to 50, this unique combination reduced wrinkle depth in the optical facial area by an average of 17% in just 28 days. This translates into a remarkable skin rejuvenation effect of 6 years in just 4 weeks!²
Aging Changes in the Eye Area

The skin around the eyes is naturally thin and is constantly exposed to oxidative stress from environmental stressors such as sunlight, smoking, and air pollution. This constant assault gradually breaks down the fibrous network composed of proteins, elastin, and collagen, resulting in thinner skin in the eye region as you age. Facial expressions like laughing and frowning further contribute to the destruction of the skin proteins and stimulate the formation of wrinkles (crow’s feet), dark circles, and bags under the eyes.

Let’s first take a look at one of the primary underlying causes of skin aging: loss of function of the proteasome.

Proteasomal Dysfunction Contributes to Skin Aging

Skin cells are continuously synthesizing proteins to maintain their structural integrity and proper functioning. Some of these proteins are damaged by free radicals during normal metabolism and as a result are tagged for destruction by the molecule ubiquitin. The marked proteins are subsequently directed to a multi-protein structure known as the proteasome, which contains enzymes that degrade and recycle the unwanted proteins. This tightly regulated balance between the formation of new proteins and the disposal of damaged ones is vital for healthy, youthful-looking skin.

As you age, the function of the proteasome declines, and the removal of damaged proteins slows. This leads to a toxic accumulation of unnecessary proteins within skin cells that eventually clump together to form protein aggregates, which disrupt normal cellular functions and further impair the activity of the proteasome. Over time, this process results in the outward signs of aging, such as age spots and wrinkles.

Fortunately, scientific evidence indicates that several nutrients can combat the occurrence of damaged proteins and directly activate the proteasome, along with restoring moisture to inhibit cellular skin aging.

Jujube Seed Extract Boosts Antioxidant Defense

In traditional Chinese medicine, the jujube fruit (Ziziphus jujube Mill) has been recommended as a treatment for a variety of health conditions. These beneficial effects are believed to be due to its impressive array of antioxidant compounds, including flavonoids, phenolics, and vitamin C. The antioxidant potency of jujube seed extract provides an excellent tool for guarding the skin against free radical damage, particularly in the sensitive area around the eyes.

Although free radicals are a normal product of cellular metabolism, excessive production of these molecules can overwhelm the antioxidant system in place to counteract them and leave vital skin proteins in the cell vulnerable to attack. Jujube seed extract strengthens the antioxidant protection system and inhibits the occurrence of damaged proteins by neutralizing free radicals.

Another skin benefit of jujube seed extract can be attributed to its tonic properties, which helps revitalize the skin and ensure a more vibrant, healthier look.
Olive Leaf Extract Activates the Proteasome

As the mainstay of the Mediterranean diet, the olive fruit contains compounds that are responsible for its well-known antioxidant and anti-inflammatory effects. One of these compounds, *oleuropein*, is found in high concentration in the olive’s leaf and appears to have anti-aging potential.¹⁰

In an in-vitro study, researchers examined the impact of olive leaf extract with oleuropein on proteasome activity in human keratinocytes—the most common type of skin cell in the upper layer of the skin (epidermis). After exposing keratinocytes to olive leaf extract with oleuropein, they found a significant increase in proteasome activity. In fact, the extract doubled the activity compared to the control.²

This improved action of the proteasome causes damaged proteins to be degraded more efficiently, thereby preventing the buildup of proteins that promote cellular aging.

Levan Exerts Powerful Moisturizing Effects

Moisture loss promotes dry, flaking, and sagging skin. It can cause fine lines and wrinkles to be more visible. This is especially apparent in the skin around the eyes, since it naturally has very few sebaceous glands and produces less oil as you age.¹¹ Levan is a polymer that has been utilized for a number of applications (including cosmetics) and by the pharmaceutical industry.¹² It has shown promise as an effective topical ingredient in cosmetics due to its ability to attract water molecules into the skin, thereby helping restore lost moisture by improving hydration and tightening of the skin.²,¹¹,¹²

Topical Nutrients To Rejuvenate the Aging Skin of the Eyes

- Since it’s naturally thin, the facial area around the eyes is often the first place to show visible signs of aging, such as age spots, dark circles, and crow’s feet.
- The proteasome is a multi-protein structure within skin cells that degrades or removes damaged proteins, which helps maintain healthy, youthful-looking skin.
- As you age, proteasome activity decreases, and this leads to a toxic accumulation of damaged proteins that accelerates skin aging in the form of age spots and wrinkles.
- A novel cream has been formulated with clinically proven anti-aging ingredients to specifically target proteasome activation.
- Jujube seed extract has beneficial antioxidant compounds that strengthen the antioxidant protection system and reduce the occurrence of damaged proteins induced by free radicals.
- Olive leaf extract directly activates the proteasome, improving its activity and ability to efficiently degrade damaged proteins.
- Levan has potent moisturizing effects, which hydrates and tightens the skin.
- In a controlled clinical study, these ingredients reduced wrinkle depth in the eye area by an average of 17% in just 28 days, a remarkable skin rejuvenation effect of 6 years.
Rejuvenates the Eye Area in Humans

Scientists evaluated the efficacy of these ingredients on wrinkle depth in 80 women between the ages of 31 and 50. In this controlled clinical study, participants applied the nutrient-dense combination twice daily to the eye area for 28 days. Wrinkle depth was measured at day 14 and 28. At the end of the study, the findings revealed that wrinkle depth was reduced by an average of 17% in just 4 weeks.2

The results became even more impressive when scientists calculated the rejuvenation effect of the decrease in wrinkle depth in subjects with the average age of 44. The subjects exhibited the wrinkle depth expected in an individual with the average age of 38, a remarkable anti-aging effect of 6 years.2

Summary

The facial area around the eyes is the first place to show visible signs of premature aging such as age spots and wrinkles. A topical eye cream has been designed specifically for targeting this delicate area of tissue. The three ingredients, jujube extract, olive leaf extract, and levan, have scientific data supporting their ability to enhance the antioxidant protection system and activate the proteasome, along with properly hydrating the skin, all of which slows down cellular skin aging. In a controlled clinical study, a formulation of these ingredients was shown to reduce wrinkle depth by an average of 17%, translating to a skin rejuvenation of the eye area by 6 years.2

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

High Potency FAT-SOLUBLE NUTRIENTS in ONE Softgel

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

Just one SUPER BOOSTER provides:

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

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

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

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

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

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

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

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

**JUST ONE SOFTGEL OF SUPER BOOSTER SUPPLIES:**

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<tr>
<td>Vitamin K2 (as menaquinone-7)</td>
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<tr>
<td>Vitamin K2 (as menaquinone-4)</td>
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<td>Vitamin C</td>
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To order Super Booster, call 1-800-544-4440 or visit www.LifeExtension.com

Contains soybeans.

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

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

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

Another Breakthrough in Antioxidant Defense!

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.

We then introduced an even more powerful antioxidant formula. A single capsule of the new Enhanced Berry Complete with Açai delivers an antioxidant value equivalent to more than 100% of the recommended daily fruit and vegetable intake.

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, açai boasts one of the highest ORAC values known to modern science.

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

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 Açai 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 Açai retails for $29. If a member buys four bottles, the cost is just $19.50 per bottle. contains soybeans.

To order Enhanced Berry Complete with Açai, call 1-800-544-4440 or visit www.LifeExtension.com

References

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
TARGET AND REJUVENATE THE AGING SKIN AROUND YOUR EYES!

The thin, delicate skin area around your eyes is extremely susceptible to the visible impacts of aging, such as wrinkles, crow's feet, fine lines, and bags. Oxidative and environmental stress gradually breaks down the elastin and collagen, resulting in more fragile skin around the eye area.

Researchers have combined three natural ingredients into a formula to promote skin renewal and rejuvenation for the tender skin surrounding the eye.

UNIQUE SCIENTIFIC FORMULATION

Specifically designed for the eye’s delicate skin, Renewing Eye Cream combines several complementary compounds that have been generating interest among dermatologists for their beautifying effects. Renewing Eye Cream contains:

- **Jujube seed extract**—a skin tonic rich in jujubosides, flavonoids, phenolics, and vitamin C.¹²
- **Olive leaf extract**—packed with potent compounds, notably oleuropein, to help with inflammation.³
- **Levan**—a polymer that attracts water molecules into the skin with powerful moisturizing effects.⁴

Renewing Eye Cream promotes firmer skin and helps maintain natural hydration. It also smooths and minimizes the appearance of fine lines and wrinkles.

In a controlled clinical study, twice-daily application of the active compounds contained in Renewing Eye Cream to the area around the eye was demonstrated to have softened the appearance of wrinkles by an average of 17%.² This result was translated by the scientists to have provided the overall appearance of being 6 years younger—in just 28 days!²

One 1/2-ounce jar of Cosmesis Renewing Eye Cream retails for $65. If a member buys two jars, the price is reduced to $42.75.

References
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Discover Hormone Optimization

HGH & Testosterone

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Celebrating 10 Years

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AAGHEALTH.COM

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“We Believe Everyone, Regardless Of Age, Can Accomplish Their Dreams”
The Importance of Maintaining Optimal Vein Health

**Q:** What causes most vein symptoms?

**A:** Venous Reflux Disease, also known as Chronic Venous Insufficiency (CVI), affects the circulation of your blood. The main role of your veins is to return blood to the heart, but if the valves inside the veins fail, they will give way to the forces of gravity and not return blood to the heart. This backward flow is called reflux. This blood can become acidic from accumulation of metabolic waste, causing an intense inflammatory reaction resulting in symptoms such as pain and swelling.¹ Venous reflux disease can lead to spider veins or thick, bulging varicose veins. Typically, varicose veins are an indicator of venous reflux, which can cause serious circulatory problems if not treated properly.
Q: What are the most common symptoms of Venous Insufficiency (VI)?
A: According to most reports, these are the five most common symptoms:2-4

- Leg pain
- Leg heaviness
- Leg throbbing
- Leg, ankle, or foot swelling
- Leg itching

Q: Can Restless Leg Syndrome be related to veins?
A: Restless Leg Syndrome causes a person to always feel the urge to move his or her legs. Restless Leg Syndrome can make it uncomfortable to do normal activities, such as sleeping through the night or traveling long distances in the car or on a plane. While there are other causes of Restless Leg Syndrome, it is a common complaint by people who have vein disease. Legs often tend to feel achy, cramped, and tired because of broken vein valves. Treatment of venous insufficiency is often very helpful in dealing with Restless Leg Syndrome.5

Q: What are “spider veins” and are they purely a cosmetic problem?
A: Spider veins are tiny, thin veins that can be seen very close to the skin’s surface caused by pooling blood. These are tiny, red, purple, and/or blue veins found on the surface of the skin. They often are found in combination with slightly larger “reticular” veins, which tend to be green or blue in color. Spider veins are thought to be the result of a miniature version of the same process as varicose veins and may or may not be associated with obvious underlying varicose veins. If there is significant venous insufficiency present, which is caused by broken valves that can be identified with a simple ultrasound, any treatment is unlikely to provide lasting results. Therefore, an experienced practitioner should carefully examine a patient’s legs before attempting treatment. Spider veins, without corresponding venous insufficiency, are typically simple cosmetic issues and are relatively easily treated by experienced practitioners with injections of new mild vein irritants such as polidocanol or sotradecol.6 Laser treatment of spider veins on the...
inhibiting the breakdown of vein walls and improving venous contractility.\textsuperscript{18,19}

The active ingredient in horse chestnut seeds is a chemical called escin.\textsuperscript{18} Studies suggest that twice-daily horse chestnut extract, containing \textbf{50 mg} escin, is as effective as standard therapy with compression stockings in the early stages of chronic venous insufficiency.\textsuperscript{20,21} (The corresponding dose of horse chestnut extract is \textbf{250 mg} taken twice daily, standardized at \textbf{20\%} [\textbf{50 mg}] escin.)

Q: What do the new lasers and injectables do for vein problems?
A: Endovenous Laser Treatment. Endovenous Laser Treatment (EVL) is a technology used to treat varicose veins, which involves heating the inside of the vein, causing it to seal shut and disappear.\textsuperscript{22} During Endovenous Laser Treatment, a very thin laser fiber is inserted into the damaged vein. It is largely painless and can be performed on an outpatient basis, allowing patients to go back to work the very same day. In capable, experienced hands, this technology has been extremely successful and has largely eliminated the need for the more invasive vein-stripping surgery.\textsuperscript{22}

To ensure satisfactory long-term results, most Endovenous Laser Treatment patients will require some sclerotherapy in conjunction with Endovenous Laser Treatment to treat their varicose and smaller veins. The result is often a complete resolution of symptoms and a vast improvement in aesthetic appearance.

Sclerotherapy. Sclerotherapy is an injection treatment used to eliminate small to medium size varicose veins and spider veins.\textsuperscript{23} Sclerotherapy is affordable, does
not require anesthetic, and there is no downtime associated with this simple procedure. Sclerotherapy utilizes a very fine needle to inject a solution, known as a sclerosant, into the varicose or “spider vein.”23 Most patients compare the discomfort of the needle to an ant bite. The location of the vein determines if this procedure is done with or without ultrasound guidance. Different solutions are used, depending on the type of the vein, and different strengths of the solutions are used, based on the size of the vessel. Once injected, the cells that line the vein wall (endothelium) will become irritated, inflamed, and damaged.23 External pressure is applied using cotton balls, tape, and support hose. The compression causes the vein walls to seal together, sealing the vein off from the rest of the vein network in your leg, and the vein can no longer transport blood. Your body will then break down and absorb the damaged vein, and naturally redirect the blood flow to healthy veins. Upon the completion of healing, the vein is no longer visible. It should be noted that the same vein may have to be treated more than once during your sclerotherapy sessions. The process is very similar to how your body heals a bad bruise. Spider veins do not have any known useful function and eliminating them will not affect your circulation. Reducing or eliminating varicose veins can improve your circulation and symptoms of heaviness, aching, and fatigue.

Ultrasound-guided Sclerotherapy. Ultrasound-guided Sclerotherapy is used for larger and deeper varicose veins that cannot be treated with the laser for varying reasons, including their visibility, location, and/or morphology.24 The ultrasound offers your physician the ability to precisely target the exact location to optimize treatment results.25 Ultrasound guided sclerotherapy is similar to traditional sclerotherapy. The only difference is that the doctor uses ultrasound technology to see the veins beneath the skin. Using the ultrasound image as a guide, the doctor can place sclerosing foam directly into the abnormal vein, thereby redirecting blood flow to healthy veins.24,25 The treated vein closes and, over weeks or months, becomes an imperceptible thread beneath the skin.

Conservative Treatment. The objective of the conservative approach in treating varicose veins is to help support the venous circulation of the legs in order to slow the development of new veins and to minimize symptoms. These treatment methods will not cure or eliminate existing vein problems; however, they will help slow the progression of the disease and alleviate symptoms such as swelling, aching, and cramping. As a result, conservative treatment is most suitable for people who are sick, elderly, or pregnant. Some of the more popular conservative treatments are:9,16,26

- Support compression stockings provide external graduated counter-pressure to aid in venous blood flow to the heart. They reduce pooling and pressure in the veins and may also reduce the risk of forming a deep vein blood clot. Consider wearing them during long plane or car rides.
none of the treatments requires hospitalization or surgery. All procedures are done in our office and patients can be back on their feet doing their normal routine that very same day.

Q: How do you measure progression of your treatment?
A: Clinical photography is one of the most important tools a phlebologist may use to easily illustrate the progress of treatment to the patient. Because every patient responds to treatments at different rates, clinical photography also assists practitioners in adjusting their treatment strategy. Additionally, since improvement is gradual over time in certain instances, the use of clinical photography is a wonderful tool for practitioners to better manage their patients’ expectations by easily showing the progress of their veins when compared to a baseline. Most experienced practitioners utilize clinical photography in some form, and recent improvements in digital equipment technology make it easily accessible to the patient.

While there are a number of different treatment options available for varicose and spider veins, in our experience, we have found that a treatment consisting of a combination of the treatments above has proven to be most effective in the treatment of varicose and spider veins and related symptoms. Our refined use of sclerotherapy, combined with thermal laser treatments, allows us to uniquely address the needs of our patients by treating the smallest spider vein to the largest ropelike varicose vein. The great news is that

Making lifestyle changes, including losing weight and increasing activity and exercise.

Preventative measures. There is no known scientific method for preventing varicose veins, but there are ways of improving your circulation and muscle tone, thereby reducing the risk of developing varicose veins or getting additional ones. Some of the more popular preventive measures are:

— Elevating your legs. Elevate your legs when possible by keeping your feet positioned higher than your heart level to reduce pooling and pressure on your legs.

— Exercising daily. Walking, climbing stairs, cycling, and swimming keep your calf muscles in motion to activate the calf muscle pump. This reduces pooling and pressure in the veins.

— Maintaining a healthy body weight. Maintaining your ideal body weight will reduce excess pressure on your legs.

— Actively moving. On long car or plane trips, activate your calf muscle pump by flexing your ankles periodically to pump the blood out of your legs (simulating walking). During periods of prolonged sitting or standing, flex your ankles 10 times and repeat this every 10 minutes. You should also consider stopping for short walks every few hours.

— Avoiding sitting extensively. Try to avoid sitting for extended periods throughout your day.

— Avoiding excessive heat. Try to avoid excess heat on your legs, such as hot tubs and hot baths. Heat tends to increase vein distention and lead to more pooling of blood.

— Nutraceutical treatment: As explained in greater detail above.

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— Exercising daily. Walking, climbing stairs, cycling, and swimming keep your calf muscles in motion to activate the calf muscle pump. This reduces pooling and pressure in the veins.

— Maintaining a healthy body weight. Maintaining your ideal body weight will reduce excess pressure on your legs.

— Actively moving. On long car or plane trips, activate your calf muscle pump by flexing your ankles periodically to pump the blood out of your legs (simulating walking). During periods of prolonged sitting or standing, flex your ankles 10 times and repeat this every 10 minutes. You should also consider stopping for short walks every few hours.
Dr. Soffer is a Board Certified Cardiovascular Specialist, Member of the American College of Phlebology and Fellow of the American College of Cardiology. He is also the Medical Expert for ABC News-Miami and where he has the weekly segment “Dr. Soffer’s Second Opinion” on 5pm ABC-Miami News. The Soffer Health has Private Offices in Dade and Broward County www.sofferhealth.com

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

References

Join us in Los Angeles for the 2013 Prostate Cancer Conference, September 6-8, at the Marriott Los Angeles Airport Hotel. This year’s conference will focus on “Quality of Life” issues for men dealing with prostate cancer. PCRI has collected an outstanding faculty to discuss important subjects ranging from new treatments, active surveillance, nutrition and fitness, immunotherapy, hormone treatments, radiation, chemotherapy and much more!

**CONFERENCE HIGHLIGHTS**

- **Presentations on:**
  - Treatment-Related Side Effects
  - Advanced Disease
  - Radiation Oncology
  - Surgery vs. Observation
  - The PSA Screening Controversy
  - New Treatments
  - Women’s Issues
- **Featuring a live on stage Prostate Biopsy**
- **Round Table Discussions:** Listen to real clinical cases and obtain answers to your questions during this multi-disciplinary panel discussion.
- **Opportunities to interact with speakers after their presentations**

**CONFERENCE FACULTY**

Duke Bahn, MD, Charles Drake, MD, PhD, Steven Finkelstein, MD, Mark Kawachi, MD, John Kurhanewicz, MD, Mark Moyad, MD, Charles Myers, MD, Mack Roach III, MD, Mark Scholz, MD, Andrea Singer, MD, Jeff Turner, MD, Nicholas Vogelzang, MD, and Timothy Witt, MD

**Register Early and Save!**

www.pcri.org or 310.743.2116

Sponsorship Opportunities are available! Email Cathy@pcri.org or call 310.743.2116
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® introduced 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.2,3 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.6-8

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, the price is reduced to $21.75 per bottle. Just one softgel a day of Krill Healthy Joint Formula duplicates a successful human clinical trial.

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.

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.
In a healthy vascular system, veins in the lower body must work against gravity to pump blood back to the heart. They are helped by one-directional valves, which prevent back-flow of blood into lower parts of the leg. Good skin elasticity and muscle tone are also needed to allow the veins to contract and ensure smooth blood return.

Venous circulation can often become compromised with aging. Over time, vein walls, which lack the characteristic strong muscle lining of arteries, weaken, leading the valves to fail. The result is collection of sluggish blood in the veins, causing the characteristic red and blue veins to appear on the skin’s surface. The increased pressure on the veins also makes them more permeable and they begin to leak fluid into the surrounding tissues, which swell, causing bulges and twists in surface veins.

**Horse chestnut seed extract**, an herbal treatment widely used in Europe, has been shown in clinical studies to counteract these undesirable changes in blood vessel walls. Horse chestnut restores the ability of veins to contract appropriately at any given pressure,1 allowing blood to flow back to the heart more easily. It also supports a healthy fluid balance by reducing fluid leakage from stressed vessel walls.2 In addition, horse chestnut has shown a general vasoprotective role by blocking the release of a capillary wall-damaging enzyme called **hyaluronidase**, thus strengthening blood vessels that have lost their elasticity.4

Furthermore, horse chestnut has been shown to provide the same relief from lower leg swelling as compression (support) stockings, considered the primary treatment for circulation problems.3,5

**Venotone** is an extract of horse chestnut seed extract, which contains the active ingredient **Escin**. **Venotone** has been standardized to provide 20% Escin, a dose that has been found to be effective for keeping aging veins fit and healthy.

A bottle containing 60 capsules of Venotone retails for $18.95. If a member buys four bottles, the price is reduced to $12 per bottle.

**References**
Blood testing provides the ultimate information regarding correctable risk factors that may predispose you to disorders such as cancer, diabetes, cardiovascular disease, and more. Information about general health and nutritional status can also be gained through standard blood analysis. Standing behind the belief that blood testing is an essential component of any program designed to attain optimal health and longevity, Life Extension® offers this innovative and convenient service at a very affordable price. Not only is comprehensive blood testing an important step in safeguarding your health, it is a simple process from virtually anywhere in the United States.

**Five Easy Steps:**
1. Call 1-800-208-3444 to discuss and place your order with one of our knowledgeable health advisors. (This order form can also be faxed to 1-866-728-1050 or mailed). Online orders can also be placed at www.lifeextension.com.
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.

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<table>
<thead>
<tr>
<th>Most Popular Panels</th>
<th>Life Extension Member Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMPREHENSIVE PANELS</strong></td>
<td><strong>$269</strong></td>
</tr>
<tr>
<td>MALE LIFE EXTENSION PANEL (LC322582)</td>
<td>includes glucose, cholesterol, LDL, HDL, triglycerides, liver and kidney function tests PLUS 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: C-Reactive Protein, Homocysteine, Free Testosterone, Total Testosterone, Vitamin D 25-hydroxy, PSA (prostate-specific antigen)</td>
</tr>
<tr>
<td>FEMALE LIFE EXTENSION PANEL (LC322535)</td>
<td>includes glucose, cholesterol, LDL, HDL, triglycerides, liver and kidney function tests PLUS 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: C-Reactive Protein, Homocysteine, Free Testosterone, Total Testosterone, Vitamin D 25-hydroxy, PSA (prostate-specific antigen)</td>
</tr>
<tr>
<td>MALE WEIGHT LOSS PANEL (LCWLM)</td>
<td><strong>$299</strong></td>
</tr>
<tr>
<td>includes glucose, cholesterol, LDL, HDL, triglycerides, liver and kidney function tests PLUS 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: C-Reactive Protein, Insulin, Free Testosterone, Total Testosterone, Vitamin D 25-hydroxy, Homoglobin A1c</td>
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</tr>
<tr>
<td>FEMALE WEIGHT LOSS PANEL (LCWLF)</td>
<td>includes glucose, cholesterol, LDL, HDL, triglycerides, liver and kidney function tests PLUS 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: C-Reactive Protein, Progesterone, SHBG, Free Testosterone, Total Testosterone, Vitamin D 25-hydroxy, Homoglobin A1c</td>
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<tr>
<td>MALE HORMONE ADD-ON PANEL (LCADDF)*</td>
<td><strong>$155</strong></td>
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<tr>
<td>Pregnenolone and Dihydrotestosterone (DHT)</td>
<td>To provide an even more in-depth analysis of a patient's hormone status, Life Extension has created this panel as an add-on 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>
</tr>
<tr>
<td>FEMALE HORMONE ADD-ON PANEL (LCADDF)*</td>
<td><strong>$125</strong></td>
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<tr>
<td>Pregnenolone and Total Estrogens</td>
<td>To provide an even more in-depth analysis of a woman's hormone status, Life Extension has created this panel as an add-on to the Female Life Extension Panel. This panel provides valuable information about total estrogen status, and the mother hormone that acts as a precursor to all other hormones.</td>
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<tr>
<td>LIFE EXTENSION THYROID PANEL (LC304131)</td>
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<td>TSH, T4, Free T4, Free T3, T4</td>
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<tr>
<td>FEMALE COMPREHENSIVE HORMONE PANEL* (LC100011)</td>
<td><strong>$299</strong></td>
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<tr>
<td>CBC/Chemistry Profile</td>
<td>(see description above), DHEA-S, Estradiol, Total Estrogens, Progesterone, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3</td>
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<tr>
<td>MALE COMPREHENSIVE HORMONE PANEL* (LC100010)</td>
<td><strong>$299</strong></td>
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<tr>
<td>CBC/Chemistry Profile</td>
<td>(see description above), DHEA-S, Estradiol, DHT, PSA, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3</td>
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<tr>
<td>THE CBC/CHEMISTRY PROFILE (LC381822)</td>
<td><strong>$35</strong></td>
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<tr>
<td>Note: This CBC/Chemistry Profile is included in all Life Extension panels. Please check panel descriptions.</td>
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<tr>
<td><strong>CARDIOVASCULAR RISK PROFILE</strong></td>
<td><strong>Total Cholesterol</strong>/HDL Ratio</td>
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<tr>
<td><strong>LDL Cholesterol</strong></td>
<td>Estimated CHD Risk</td>
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<td><strong>Triglycerides</strong></td>
<td>Iron</td>
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<td><strong>LIVER FUNCTION PANEL</strong></td>
<td><strong>AST (SGOT)</strong></td>
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<td><strong>ALT (SGPT)</strong></td>
<td>Alkaline Phosphatase</td>
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<td><strong>LDH</strong></td>
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<td><strong>BLOOD PROTEIN LEVELS</strong></td>
<td><strong>Total Protein</strong></td>
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<td><strong>Globulin</strong></td>
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<tr>
<td><strong>Albumin</strong></td>
<td>Albumin/Globulin Ratio</td>
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<td><strong>BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE</strong></td>
<td><strong>Red Blood Cell Count</strong></td>
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<td><strong>White Blood Cell Count</strong></td>
<td>Monocytes</td>
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<td><strong>Eosinophils</strong></td>
<td>Lymphocytes</td>
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<td><strong>Basophils</strong></td>
<td>Platelet Count</td>
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<td>Hematocrit</td>
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<td><strong>Lymphocytes</strong></td>
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<td><strong>Eosinophils</strong></td>
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<td><strong>Basophils</strong></td>
<td>Polynucleated Cells</td>
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<td><strong>Potassium</strong></td>
<td>Sodium</td>
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<td><strong>Chloride</strong></td>
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<tr>
<td><strong>Phosphorus</strong></td>
<td>Iron</td>
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<tr>
<td><strong>COMPREHENSIVE THYROID PANEL</strong></td>
<td><strong>$199</strong></td>
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<tr>
<td><strong>TSH, T4, Free T4, Free T3, Reverse T3, TPO, ATA</strong></td>
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</tr>
<tr>
<td><strong>FOOD SAFETY TEST</strong> (LCM73001)</td>
<td><strong>$198</strong></td>
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<tr>
<td>This test measures delayed (IgG) food allergies for 95 common foods.</td>
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<tr>
<td><strong>ADRENAL FUNCTION PANEL (LC100021)</strong></td>
<td><strong>$136</strong></td>
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<td>DHEA-S, AM/PM Cortisol, Glucose, Insulin, Lipid Panel, RBC magnesium</td>
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<tr>
<td><strong>OMEGA SCORE</strong> (LCOMEGA)</td>
<td><strong>$131.25</strong></td>
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<tr>
<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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<tr>
<td><strong>MITOCHONDRIAL FUNCTION PANEL</strong> (LC100020)</td>
<td><strong>$159</strong></td>
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<tr>
<td>Carnitine (Free with Total), CoQ10, Glucose</td>
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<tr>
<td><strong>VAP™ TEST</strong> (LC384500)</td>
<td><strong>$90</strong></td>
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<td>The VAP™ cholesterol test provides a more comprehensive coronary heart disease (CHD) risk assessment than the conventional lipid profile. Direct measurements, not estimations, are provided for total cholesterol, LDL, HDL, VLDL, and cholesterol subclasses.</td>
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</tr>
</tbody>
</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 used to check the blood level of DHEA. This test normally costs $100 or more at commercial laboratories.

DIABETESIY PANEL (LC100019)
Glucose, Insulin, HbA1c, VAP™, Cortisol, C-Reactive Protein

MALE BASIC HORMONE PANEL (LC100012)
DHEA-S, Estradiol, Free and Total Testosterone, PSA

FEMALE BASIC HORMONE PANEL (LC100013)
DHEA-S, Estradiol, Free and Total Testosterone, Progesterone

DIHYDROTESTOSTERONE (DHT)† (LC500142)
Measures serum concentrations of DHT.

 estradiol (LC004515)
For men and women. Determines the proper amount in the body.

insulin fasting (LC004333)
Can predict those at risk of diabetes, obesity, and heart and other diseases.

PREGNENOLONE† (LC140707)
Used to determine ovarian failure, hirsutism, adrenal carcinoma, and Cushings syndrome.

PROGESTERONE (LC004317)
Primarily for women. Determines the proper amount in the body.

SEX HORMONE BINDING GLOBULIN (SHBG) (LC800106)
This test is used to monitor SHBG levels which are under the positive control of estrogens and thyroid hormones, and suppressed by androgens.

BONE HEALTH
VITAMIN D (25OH) (LC800150)
This test is used to rule out vitamin D deficiency as a cause of bone disease. It can also be used to identify hypercalcemia.

OSTEOCALCIN® (LC100249)
Osteocalcin is often used as a biochemical marker, or biomarker, for the bone formation process. It has been routinely observed that higher serum osteocalcin levels are relatively well correlated with bone diseases characterized by increased bone turnover, especially osteoporosis.

D-PD CROSS LINK URINE TEST (LC511105)
The deoxypyridinoline (D-PD) urine test can be used to measure bone re-absorption rates in healthy individuals and in those with enhanced risk of developing metabolic bone diseases. Deoxypyridinoline can be used to monitor therapies (which may include bisphosphonate drugs) in people diagnosed with osteoporosis.

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

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Male Female

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City

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Phone

Credit Card No.

Expiration Date / /

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L-Glutamine Powder
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ArthroMax® Advanced with UC-II® and AprèsFlex®
Bone-Up™
Bone Restore
Bone Restore w/Vitamin K2
Bone Strength Formula w/KoAct™
Fast Acting Joint Formula
Glucosamine Chondroitin Capsules

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Acetyl-L-Carnitine
Acetyl-L-Carnitine-Arginate
CDP Choline Capsules
Cognitex® with NeuroProtection Complex
Cognitex® with Pregnenolone & NeuroProtection Complex
Cognitex® Basics
DMEA Bitartrate
Ginkgo Biloba Certified Extract™
Huperzine A
Lecithin Granules
Methylcobalamin Lozenges
Neuro-Mag™ Magnesium L-Threonate
Optimized Ashwagandha Extract
Phosphatidylserine Capsules
Rhodiola Extract
Super Ginkgo Extract
Vinpocetine

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Bifido GI Balance
Carnosoothe w/PicroProtect
Digest RC™
Enhanced Super Digestive Enzymes
Extraordinary Enzymes
Life Flora™
Natural Esophaguard
Pancreatin
Probiotic All-Flora®
Regimint
Theralac Probiotics

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Inner Power™

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Brite Eyes III
Eye Pressure Support with Mirtogenol®
Overcast Polarized Sunglasses
Solarshield Sunglasses
Super Zeaxanthin with Lutein & Meso-Zeaxanthin Plus Astaxanthin and C3G
Super Zeaxanthin with Lutein & Meso-Zeaxanthin and C3G

FOOD
Rich Rewards™ Black Bean Vegetable Soup
Rich Rewards™ Spicy Cruciferous Vegetable Soup
Rich Rewards™ Cruciferous Vegetable Soup
Rich Rewards™ Lentil Soup
Rich Rewards™ Coffee

HAIR CARE
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Dr. Proctor’s Shampoo
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Aspirin (Enteric Coated)
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Cho-Less™
D-Ribose Tablets
D-Ribose Powder
Endothelial Defense™ with Full-Spectrum Pomegranate™
Fibrominogen Resist
Forskolin
Homocysteine Resist
Krill Healthy Joint Formula
Natural BP Management
Olive Leaf Vascular Support
Peak ATP® with GlycoCarn®
PhosphOmegas
Policosanol
Pycnogenol® French Maritime Pine Bark Extract
Red Yeast Rice
Super Absorbable CoQ10® with d’Limonene
Super Omega-3 EPA/DHA with Sesame Lignani & Olive Fruit Extract
Super Ubiquinol CoQ10
Super Ubiquinol CoQ10 with BioPQQ®
Super Ubiquinol CoQ10 with Enhanced Mitochondrial™ Support
Theflavin Standardized Extract
TMO Powder
TMO Tablets

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Blueberry Extract w/Pomegranate
Butterbur Extract w/Standardized Rosmarinic Acid
Calcium D-Glucarate
Enhanced Berry Complete with Acai
Full-Spectrum Pomegranate™
Grapeseed Extract with Resveratrol & Pterostilbene
Huperzine A
Kyolic® Garlic Formula 102 + 105
Kyolic® Reserve
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Mega Green Tea Extract (Decaffeinated) (also w/CoffeeGenic® Green Coffee Extract)
Mega Lycopene Extract
Optimized Ashwagandha Extract
Optimized Garlic
Pomegranate Extract
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Pycnogenol
Optimized Quercetin
Resveratrol with Synergistic Grape-Berry Actives
Rhodiola Extract
Silmarin
SODzyme™ with GLiSODin®

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Krill Oil
5-LOX Inhibitor w/AprèsFlex®
Tart Cherry w/Standardized CherryPURE®
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N-Acetyl Cysteine
Liver Efficiency Formula
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Hepatopro
SAMe
Silmarin

MINERALS
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Bone-Up™
Boron Capsules
Calcium Citrate with D3
Chromium Ultra
Copper
Iodoral
Iron Protein Plus
Toothpaste

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- Amber Self MicroDermAbrasion
- Anti-Aging Mask
- Anti-Glycation Serum
- Antioxidant Rejuvenating Foot Cream
- Antioxidant Rejuvenating Hand Cream
- Antioxidant Rejuvenating Foot Scrub
- Antioxidant Rejuvenating Hand Scrub
- Anti-Redness & Blemish Lotion
- Bio-Collagen w/Patented UC-II®
- Bioflavonoid Cream
- Broccoli Sprout
- Corrective Clearing Mask
- DNA Repair Cream
- Dual-Action MicroDermAbrasion
- Essential Plant Lipids Reparative Serum
- Face Master® Platinum
- Face Rejuvenating Antioxidant Cream
- Enhanced FernBlock® w/ Red Orange Complex
- Fine Line-Less Hair Suppression Formula
- Healing Formula All-In-One Cream
- Healing Mask
- Hyaluronic Facial Moisturizer
- Hydrating Anti-oxidant Face Mist
- Hydroderm®
- Lifting & Tightening Complex
- Lyocapene Cream
- Melatonin Cream
- Mild Facial Cleanser
- Neck Rejuvenating Antioxidant Cream
- Peel Off Cleansing Mask
- Pigment Correcting Cream
- (Ultra) Rejuvenex®
- Rejuvenex® Body Lotion
- Rejuvenex® Factor Firming Serum
- Rejuvenating Serum
- Renewing Eye Cream
- Resveratrol Anti-Oxidant Serum
- Skin Lightening Serum
- Skin Restoring Phytoceramides w/Lipowheat®
- Skin Stem Cell Serum
- Stem Cell Cream w/Alpine Rose
- Super critical Omega 7™
- Ultra Rejuvenex®
- Ultra RejuveNight® w/o Progesterone
- Ultra Lip Plumper
- Ultra Wrinkle Relaxer
- Under Eye Refining Serum
- Under Eye Rescue Cream
- Vitamin C Serum
- Vitamin D Lotion
- Vitamin E Essential Cream
- Vitamin K Healing Cream
- Youth Serum

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- (also w/Glucose control)
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- Optimized Cran Max™ w/UTI-Rose™
- 5-LOXIN®
- (Water-Soluble) Pumpkin Seed Extract
- Super Saw Palmetto with Beta-Sitosterol
- Super Saw Palmetto/Nettle Root Formula w/Beta-Sitosterol
- Ultra Natural Prostate Formula

**MISCELLANEOUS**

- Blood Pressure Monitor Arm Cuff
- CR Way Edition Advanced Dietary Software

**MITOCHONDRIAL SUPPORT**

- Acetyl-L-Carnitine
- Acetyl-L-Carnitine-Arsenate
- Mitochondrial Basics w/BioPQQ®
- Mitochondrial Energy Optimizer w/BioPQQ®
- Optimized Carnitine w/GlycoCarn®
- Optimized Chromium w/Crominex® 3+
- Only Trace Minerals
- OptiZinc
- Optimized Cran-Max® with UTI
- Optimized Tryptophan Plus
- Optimized Carnitine with GlycoCarn®
- Optimized Chromium w/Crominex® 3+
- Optimized Cran-Max® with UTI
- Optimized Tryptophan Plus
- Optimized Mitochondrial Support™

**MOUTH CARE**

- Advanced Oral Hygiene
- Mouthwash w/Pomegranate Toothpaste

**MULTIVITAMIN**

- Booster
- Children’s Formula Life Extension Mix™
- Comprehensive Nutrient Packs Basic
- Comprehensive Nutrient Packs Advanced
- Life Extension Mix™ Capsules
- Life Extension Mix™ Powder
- Life Extension Mix™ Tablets
- Life Extension Mix™ w/o Copper Capsules
- Life Extension Mix™ w/o Copper Tablets
- Life Extension Mix™ w/Extra Niacin
- Life Extension Mix™ w/Extra Niacin w/o Copper
- Life Extension Mix™ w/Stevia Powder
- Life Extension Mix™ w/Stevia w/o Copper Powder
- Life Extension One-Per-Day
- Life Extension Two-Per-Day
- Super Booster Softgels w/Advanced K2 Complex

**PET CARE**

- Cat Mix
- Dog Mix

**WEIGHT MANAGEMENT**

- All® Refill Pack
- Advanced Anti-Adipocyte Formula
- w/Adipostat & IntegraLean®
- Calorie Control Weight Management™ Formula
- w/CoffeeGenic® Green Coffee Extract
- CoffeeGenic® Weight Management™ with Green Coffee Extract
- 7-Keto DHEA®
- DHEA® Complete
- Fucoidan Slim™
- HCA
- IntegraLean® Irvingia
- LuraLean® Caps Special Propolmannan
- Particle Size
- Optimized Irvingia w/Phase 3™ Calorie Control Complex
- Optimized Saffron with Satiereal®
- Natural Appetite Control
- Natural Glucose Absorption Control
- Super CLA Blend w/ guarana and Sesame Lignans
- Super CLA Blend w/Sesame Lignans
- WellBetX PGX® plus Mulberry
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<th>Member Each</th>
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**SUB-TOTAL OF COLUMN 1**

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<td>BONE RESTORE w/VITAMIN K2 - 120 caps</td>
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<td>BONE STRENGTH FORMULA w/KOACT® - 120 veg. caps</td>
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</table>

**SUB-TOTAL OF COLUMN 2**

*August 2013*  
LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

To order call: 1.954.766.8433 or 1.800.544.4440
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<td>BRUTE EYES III - 2 vials, 5 ml each</td>
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<td>BUTTERBUR EXT. w/STANDARDIZED ROSMARINIC ACID - 60 softgels</td>
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<td>BLUEBERRY FLAVOR - 414 grams powder</td>
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<td>BLUEBERRY FLAVOR - 60 individual packs</td>
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<td>Buy 4 bottles, price each</td>
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**SUB-TOTAL OF COLUMN 3**

LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS  
AUGUST 2013
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**SUB-TOTAL OF COLUMN 8**

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

**AUGUST 2013**

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

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<td>5 HTP - 100 mg, 60 caps</td>
<td>$27.95</td>
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<td>01675</td>
<td>HCA - 90 veg. caps</td>
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<td>HEPATOPRO - 900 mg, 60 softgels</td>
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<td>HOMOCYSTEINE RESIST - 100 caps</td>
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<td>HUPERZINE A - 200 mcg, 60 veg caps</td>
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<td>HYDRODERM® - 1 oz</td>
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<td>&quot;I26&quot; HYPERIMMUNE EGG - 140 grams powder</td>
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<td>IMMUNE MODULATOR W/TIOFEND® - 60 veg. caps</td>
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<td>00955</td>
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<td>01049</td>
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<td>01674</td>
<td>INOSITOL CAPSULES - 1000 mg, 360 veg. caps</td>
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### SUB-TOTAL OF COLUMN 9

| J, K |
|-----|-------------|-------------|-------------|-----|-------|
| 00056 | JARRO-DOPHILUS EPS™- 60 veg. caps | $22.95 | $17.21 |  |       |
| 01387 | JARRO-DOPHILUS ORAL PROBIOTIC GUM - Pom-Berry flavor, 8 pieces | $4.95 | $3.71 |  |       |
| 01388 | JARRO-DOPHILUS ORAL PROBIOTIC LOZENGE - Pom-Berry flavor, 8 pieces | $4.95 | $3.71 |  |       |
| 01724 | K w/ADVANCED K2 COMPLEX (SUPER) - 90 softgels | $30.00 | $22.50 |  |       |
| 01600 | KRILL HEALTHY JOINT FORMULA - 30 softgels | $32.00 | $24.00 |  |       |
| 01050 | (NK) KRILL OIL PHOSPH OMEGA - 60 softgels | $33.95 | $25.46 |  |       |
| 00316 | KYOLIC® GARLIC FORMULA 102 - 200 caps | $26.45 | $19.84 |  |       |
| 00214 | KYOLIC® GARLIC FORMULA 105 - 200 caps | $27.45 | $20.59 |  |       |
| 00789 | KYOLIC® RESERVE - 600 mg, 120 caps | $27.95 | $20.96 |  |       |
| 01611 | LACTOFERRIN (APOLACTOFERRIN) CAPS - 60 caps | $48.00 | $36.00 |  |       |
| 00020 | LECITHIN - 16 oz. granules | $15.00 | $11.25 |  |       |
| 01755 | LIFE EXTENSION MIX™ - 315 tablets | $98.00 | $73.50 |  |       |
| 01757 | LIFE EXTENSION MIX™ W/EXTRA NIACIN - 315 tablets | $98.00 | $73.50 |  |       |
| 01754 | LIFE EXTENSION MIX™ - 490 caps | $110.00 | $82.50 |  |       |
| 01756 | LIFE EXTENSION MIX™ POWDER - 14.81 oz | $98.00 | $73.50 |  |       |
| 01765 | LIFE EXTENSION MIX™ - 315 tablets w/o copper | $98.00 | $73.50 |  |       |
| 01767 | LIFE EXTENSION MIX™ W/EXTRA NIACIN 315 tablets w/o copper | $98.00 | $73.50 |  |       |
| 01764 | LIFE EXTENSION MIX™ - 490 caps w/o copper | $110.00 | $82.50 |  |       |
| 01766 | LIFE EXTENSION MIX™ POWDER - 14.81 oz w/o copper | $98.00 | $73.50 |  |       |
| 00263 | LIFE FLORA™ - 300 mg, 120 caps | $20.50 | $15.38 |  |       |
| 01608 | LIVER EFFICIENCY FORMULA - 30 veg. caps | $18.00 | $13.50 |  |       |
| 01639 | 5-LOX INHIBITOR W/APRESFLEX® - 100 mg, 60 veg. caps | $22.00 | $16.50 |  |       |
| 01678 | L-LYSINE - 620 mg, 100 veg. caps | $9.00 | $6.75 |  |       |

### SUB-TOTAL OF COLUMN 10

AUGUST 2013

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

To order call: 1.954.766.8433 or 1.800.544.4440
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Retail Each</th>
<th>Member Each</th>
<th>Qty</th>
<th>Total</th>
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<td>01470</td>
<td>LURALEAN® CAPS SPECIAL PROPOLMANNIAN</td>
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<td>PARTICLE SIZE - 120 veg. caps</td>
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<td>00455</td>
<td>LYCOPENE EXTRACT (Mega) - 15 mg, 90 softgels</td>
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<tr>
<td></td>
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<td>$18.75</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Buy 4 bottles, price each</td>
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<tr>
<td>01459</td>
<td>MAGNESIUM CAPS - 500 mg, 100 veg. caps</td>
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<td>01682</td>
<td>MAGNESIUM CITRATE - 160 mg, 100 veg. caps</td>
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<tr>
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<tr>
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<td></td>
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<tr>
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<td>$8.25</td>
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<td>Buy 4 bottles, price each</td>
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<td>$18.00</td>
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<td>$6.88</td>
<td>$5.16</td>
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<tr>
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<td>MELATONIN TIME RELEASE - 300 mcg, 100 veg. tabs</td>
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<td>$9.00</td>
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<tr>
<td></td>
<td>Buy 4 bottles, price each</td>
<td>$11.00</td>
<td>$8.25</td>
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<tr>
<td>01788</td>
<td>MELATONIN TIME RELEASE - 750 mcg, 60 veg. tablets</td>
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<td>Buy 4 bottles, price each</td>
<td>$7.00</td>
<td>$5.25</td>
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<tr>
<td>01536</td>
<td>METHYLCOBALAMIN - 1 mg, 60 lozenges (vanilla)</td>
<td>$9.95</td>
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<td>$6.00</td>
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<tr>
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<td>METHYLCOBALAMIN - 5 mg, 60 lozenges (vanilla)</td>
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<td>$24.00</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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<tr>
<td></td>
<td>Buy 10 bottles, price each</td>
<td>$23.00</td>
<td>$17.25</td>
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<tr>
<td>00709</td>
<td>MIGRA-EZZEE™ (BUTTERBUR) - 60 softgels</td>
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<td>MILK THISTLE (CERTIFIED EUROPEAN) - 750 mg, 60 veg. caps</td>
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<td>MILK THISTLE (CERTIFIED EUROPEAN) - 120 veg. caps</td>
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<td>MIRAFORTE w/STANDARDIZED LIGNANS (SUPER) - 120 caps</td>
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<td>MITOCHONDRIAL BASICS w/BIOPOQ® - 30 caps</td>
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<td>MK-7 - 90 mcg, 60 softgels</td>
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<td>01279</td>
<td>MOUTHWASH W/POMEGRANATE - 16 oz</td>
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<td>$17.00</td>
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<td>MSM (METHYLSULFONYLMETHANE) - 1000 mg, 100 caps</td>
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<td>Buy 4 bottles, price each</td>
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**SUB-TOTAL OF COLUMN 11**

**SUB-TOTAL OF COLUMN 12**

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

AUGUST 2013
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<td>01485</td>
<td>OMEGA 3 EPA/DHA W/SESAME LIGANDS &amp; OLIVE FRUIT EXTRACT (SUPER) - 60 enteric coated softgels</td>
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<td>18.00</td>
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<td></td>
<td>Buy 10 bottles, price each</td>
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<td>OMEGA 3 EPA/DHA W/SESAME LIGANDS &amp; - 240 softgels</td>
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<td>OLIVE FRUIT EXTRACT (SUPER) (SMALL SOFTGEL)</td>
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<td>OMEGA-3 LEMON WHIRL - 16 oz bottle</td>
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<td>OMEGA-3 TROPICAL WHIRL - 16 oz bottle</td>
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<td>01070</td>
<td>ORGANIC TOTAL BODY CLEANSER™ - 14-day supply</td>
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**CONTINUED**

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<th>Qty</th>
<th>Total</th>
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<td>PEAK ATP® WITH GLYCOCARN® - 60 veg. caps</td>
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<td>PECTA SOL-C® MODIFIED CITRUS PECTIN - 454 grams powder</td>
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<td>PGX™ PLUS MULBERRY (WELLTEX®) - 180 caps</td>
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<tr>
<td>00865</td>
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**SUB-TOTAL OF COLUMN 13**

**SUB-TOTAL OF COLUMN 14**

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To order call: 1.954.766.8433 or 1.800.544.4440
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**Buyers Club Order Form**

To order call: 1.954.766.8433 or 1.800.544.4440

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* These products are not 25% off retail price.
** Not eligible for member discount or member renewal product credit.
*** Due to license restrictions, this product is not for sale to customers outside of the USA.
† Member pricing not valid on this item.
†† Due to license restrictions, this product is not for sale to Canada.
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Name

Address

City  ST  ZIP

Email  Phone

☐ Check enclosed (payable to Life Extension Foundation®)

☐ Charge my cc:

Card #  Exp.

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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.

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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

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Name

Address

City  ST  ZIP

Email  Phone

☐ Check enclosed (payable to Life Extension Foundation®)

☐ Charge my cc:

Card #  Exp.
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- Postage And Handling (Any size order, continental U.S.): $5.50
- C.O.D.s (Add $7 for C.O.D. orders)

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

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- CHECK HERE FOR UPS RED LABEL (OVERNIGHT)

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Super Potent Multi-Nutrient Formula

Compare CENTRUM® to TWO-PER-DAY:

<table>
<thead>
<tr>
<th>Sample Ingredient Comparison</th>
<th>LIFE EXTENSION® TWO-PER-DAY</th>
<th>Centrum® Silver® Adults 50+</th>
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<tr>
<td>Vitamin C</td>
<td>500 mg</td>
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<tr>
<td>Vitamin D</td>
<td>2,000 IU</td>
<td>500 IU</td>
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<td>Vitamin B1</td>
<td>75 mg</td>
<td>1.5 mg</td>
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<td>Vitamin B2</td>
<td>50 mg</td>
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<td>Vitamin B6</td>
<td>75 mg</td>
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<tr>
<td>Vitamin B12 (as methylcobalamin)</td>
<td>300 mcg</td>
<td>25 mcg</td>
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<tr>
<td>Niacin (as niacinamide)</td>
<td>50 mg</td>
<td>20 mg</td>
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<tr>
<td>Pantothenic acid</td>
<td>100 mg</td>
<td>10 mg</td>
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<tr>
<td>Vitamin E</td>
<td>100 IU (natural)</td>
<td>50 IU (synthetic)</td>
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<tr>
<td>Natural Folate</td>
<td>400 mcg</td>
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<td>Zinc</td>
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<td>Biotin</td>
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<td>Potassium</td>
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<td>Vitamin A (as beta-carotene)</td>
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<td>Vitamin A (preformed)</td>
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<td>Choline (as bitartrate)</td>
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<td>Inositol</td>
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<td>Calcium</td>
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<tr>
<td>Alpha Lipoic Acid</td>
<td>125 mg</td>
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Commercial “one-a-day” supplements provide very low potencies.

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

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

Commercial supplements often contain the cheapest form of nutrients that don’t provide optimal benefits. For example, the 50 IU of synthetic vitamin E contained in Centrum® Silver® Adults 50+ may provide relatively little vitamin E to the bloodstream compared to the 100 IU of natural vitamin E in Two-Per-Day.

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

A bottle containing 120 tablets of Two-Per-Day Tablets retails for $20. If a member buys four bottles, the price is reduced to $13.50 per bottle. (Item #01714) A bottle containing 120 capsules of Two-Per-Day Capsules retails for $22. If a member buys four bottles, the price is reduced to $15 per bottle. (Item #01715)

Each bottle of Two-Per-Day lasts 60 days, so members can obtain the benefits of this high-potency formula for as little as $6.75 per month.

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

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

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