CREATING IMMORTAL GENES

Novel Method Regenerates Aging Cells

Moisturize Your Skin From Within

Safeguard Your Precious Endothelium

Exclusive Report From Anti-Aging Symposium In Sochi, Russia

George HAMILTON
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For Total Body Cellular Support

Astaxanthin has long been shown to promote eye health. More recent findings indicate that this member of the carotenoid family has benefits for the entire body, including the brain, heart, skin, and immune system.

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A bottle containing 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.

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Since 2001, Life Extension® has been seeking a way to reverse a mechanism of aging that may not be adequately addressed by healthy lifestyles. NAD+, a compound found in young cells, turns “off” genes that accelerate degenerative processes. After 13 years of research, an effective and affordable method of boosting cellular NAD+ is finally available.

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The skin on the top of the hands reveals your real age. But it’s possible to turn back “the hands of time” with a new, topical serum that comprises six novel compounds that reduce hyperpigmentation, restore plumpness, and smooth wrinkles.

7 AS WE SEE IT: CREATING IMMORTAL GENES
When aging bodies lose their ability to repair DNA damage, the result is illness and death. In a recent study, scientists cultured E. coli bacteria to resist high-intensity radiation, enabling DNA repair to increase to the point it could withstand 1,000 times the radiation that would kill humans. This study indicates how we may be able to engineer our own human genes to ward off degenerative aging processes.

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In their book, Toxin, Toxout, leading environmentalists and best-selling authors Rick Smith and Bruce Lourie lay out practical and often surprising advice for removing dangerous environmental chemicals from our homes—and ourselves.
The optimal dose of **PQQ** is **20 mg** each day. Members taking **Mitochondrial Energy Optimizer**, **Mitochondrial Basics**, or **PQQ 10 mg caps** obtain this optimal PQQ dose when taking the new **Super Ubiquinol CoQ10 with BioPQQ**.

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

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Ralph W. Moss, PhD, is the author of books such as Antioxidants Against Cancer, Cancer Therapy, Questioning Chemotherapy, and The Cancer Industry, as well as the award-winning PBS documentary “The Cancer War.” Dr. Moss has independently evaluated the claims of various cancer treatments and currently directs The Moss Reports, an updated library of detailed reports on more than 200 varieties of cancer diagnoses.

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

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**Better Absorption For Optimum Benefit**

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

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

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

**ArthroMax® Advanced With UC-II® And AprèsFlex®**

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

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

- **UC-II®** standardized chicken cartilage 40 mg
- Glucosamine sulfate 2KCl (from corn) 1500 mg
- AprèsFlex® Indian frankincense (Boswellia serrata) extract 100 mg
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The retail price of a bottle of 60 capsules of **ArthroMax® Advanced with UC-II® and AprèsFlex®** is $36. If a member buys four bottles, the price is reduced to **$24** per bottle.

**References**


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When we talk about radically extending the human life span, few scientists understand how easy it may be to accomplish this.

A new study done on the *E. coli* bacteria provides a fascinating insight as to how humans could be transformed into virtually invulnerable super-beings.

**Radiation** is incredibly dangerous to living processes. It can kill acutely or damage DNA and later cause cancer and atherosclerosis.

Through a relatively simple process, *E. coli* were cultured to resist destruction caused by high-intensity radiation. By the end of the study, these bacteria could withstand 1,000 times the radiation dose that kills most humans.

What excites us is the mechanism by which these bacteria were able to avoid radiation destruction.

The bacteria in this study were able to elude death from extreme radiation by dramatically accelerating their DNA repair processes.

The significance of this finding is profound. Cellular DNA suffers relentless injury through internal and external factors. A fundamental problem with pathological aging is faulty DNA repair. When we lose our ability to repair DNA damage, illness and death ensues.

If we can amplify our DNA repair genes, we could become as invulnerable to degenerative diseases as the *E. coli* bacteria were to radiation.

By genetically engineering humans to accelerated DNA repair capability (as was done in the *E. coli* bacteria), humans could theoretically be 1,000 times more resistant to aging and death.

We at Life Extension® are not the only proponents of this ambitious concept. As we report in this month’s issue, still another billionaire has set up a new company to figure a way to genetically engineer humans to live longer. We say “still another billionaire” because there are already a number of wealthy individuals pouring money into research aimed at markedly extending healthy life spans.
In a landmark study emanating from the University of Wisconsin, E. coli bacteria were made invulnerable to extreme radiation. What intrigues us is that only a handful of favorable genetic changes were required to enable dramatically accelerated DNA repair, which is how the E. coli were able to survive the radiation onslaught.

What the scientists who conducted this study did was remarkably simple. They exposed a colony of E. coli to a dose of ionizing radiation that killed 99% of the bacteria. The 1% that survived were cultured and then exposed to a still higher dose of ionizing radiation. This process was repeated 20 more times until a strain of E. coli emerged that was able to withstand what would be the equivalent of about 1,000 times the median lethal human dose of ionizing radiation (assuming whole body exposure).

**Magnitude Of The Radiation Dose**

Ionizing radiation causes damage to DNA and increases cancer risk. At high doses, it is acutely lethal. The absorbed dose of ionizing radiation on biological tissue is measured in a unit called the gray (Gy).

The median human lethal dose of whole body ionizing radiation is calculated based upon young adults inside reinforced concrete buildings that remained standing in Nagasaki after detonation of the atomic bomb. Exposure to about 3 Gy caused acute death.

To understand the magnitude of protection conferred on the E. coli bacteria by University of Wisconsin researchers, the strain of E. coli they created was resistant to an ionizing radiation dose of an astounding 3,000 Gy, which equates to 1,000 times the median human lethal dose.

To place into context the type of extreme radiation resistance exhibited by this strain of E. coli, the dose of 3,000 Gy is about 1 million times the breast tissue exposure of a mammogram, 150,000 times the stomach tissue exposure of an abdominal CT scan, and about 200,000 times the tissue exposure to the colon from a Barium enema.

**How These Findings Pertain To Humans**

The genes that allow some organisms to survive extreme radiation doses are important because several of the DNA repair pathways found in microbes also exist in humans. A remarkable amount of research is being done on the human genome with the objective of discovering cures for today’s killer diseases. But this science is still in relative infancy.
It may only require, however, a small advance in our understanding of the genome to create humans with virtual immortality genes. An argument can be made that finding a way to reverse aging by turning on DNA repair genes may be simple compared to creating bacteria that can withstand 1,000 times the lethal human dose of ionizing radiation.

What Can Be Done Today To Facilitate DNA Repair?

People seeking to extend their life spans today avoid toxins (such as tobacco smoke and overcooked food) that damage DNA. Vitamin D has been shown to play an important role in DNA repair, which helps explain why people with higher levels of vitamin D show lower rates of most degenerative diseases. Folic acid is also critical in maintaining DNA repair mechanisms.

Many of the supplements we take daily have been shown to help facilitate DNA repair. The box on this page provides a partial listing. Until recently, however, there has been relatively little we can do to facilitate the meaningful DNA repair needed to completely stave off age-related disease.

No therapy today can accelerate DNA repair to the magnitude that was shown in the University of Wisconsin study on E. coli. Yet we may be only a few breakthroughs away from being able to engineer our genes to transform us into super-beings, capable of warding off all degenerative aging processes.

The first article in this month’s issue describes a new way to accelerate DNA repair by increasing the amount of nicotinamide adenine dinucleotide (NAD+) in our cells.

Creating Immortality Genes

Before the successful study at the University of Wisconsin, it was hard to point to an example of genetic manipulation that resulted in the creation of living matter resistant to something as deadly as high-intensity radiation. Skeptics challenged our assertions that finding a way to slow and reverse human aging may be as simple as identifying and correcting adverse gene expression changes that occur as we age.

By way of analogy, newborn humans usually remain in a stable healthy state for close to 25 years before outward senescent changes manifest. This means that the mere passage of time does not automatically condemn humans to degenerative aging.

When we can program our genes as easily as we do computers, humans might not need to suffer degenerative aging. They could possibly live in a long-term state of robust biological youth.

Your support has enabled Life Extension® to fund novel gene expression research. The encouraging news is that others (such as the founders of Google) are recognizing the importance of this field of study and are contributing their own money and resources to advance the science.
In this month’s issue, we profile Dr. J. Craig Venter, a billionaire who is building the largest human DNA sequencing operation in the world, capable of processing 40,000 human genomes a year. Dr. Venter is seeking to use DNA sequencing to identify the molecular causes of aging and age-related illnesses so that humans can live longer and healthier.

For longer life,

William Faloon

How Radiation Doses Are Measured

To understand the dose impact of ionizing radiation upon tissue, scientists utilize a unit of measurement called the “gray,” named in honor of British physicist Louis Harold Gray. The “gray” is abbreviated as “Gy,” which is the international system unit of radiation dose expressed in terms of absorbed energy per unit mass of tissue.

For perspective, the median lethal dose in humans of whole body ionizing radiation calculated from data based upon young adults inside reinforced concrete buildings that remained standing in Nagasaki after detonation of the atomic bomb in World War II is about 3 Gy. For comparison with medical diagnostic imaging procedures, the organ/local tissue dose to the breast from routine mammography is about 3 mGy (3 milligray), or 3/1,000 of a gray, to the stomach from a typical abdominal CT scan is about 20 mGy, and to the colon from a Barium enema is about 15 mGy.

In the recent study that exposed multiple generations of the bacteria *Escherichia coli* (E. coli) to potent, lethal doses of ionizing radiation, the researchers created a strain of *E. coli* that exhibited a substantial increase in resistance to ionizing radiation at a dose of 3,000 Gy.

References


All brains decline with age, but numerous studies show that the proper nutrients can promote more youthful cognition and enhanced memory.

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Cognitex® with Pregnenolone & Brain Shield® is the most advanced neuro-enhancing formula on the market.

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- **Lutein**: This carotenoid helps maintain healthy cell division, supports eye health, and protects the endothelial lining of the arteries.

- **Gamma tocopherol**: Taking only alpha tocopherol displaces the critically important gamma tocopherol from cells in the body. Gamma tocopherol also quenches a dangerous free radical (peroxynitrite) that plays a major role in age-related decline. It is vital that those taking vitamin E supplements also consume at least **200 mg** a day of gamma tocopherol.

- **Sesame lignans**: Help boost tissue levels of **gamma tocopherol** via several different mechanisms.

- **Lycopene**: Evidence suggests those who ingest this carotenoid enjoy healthier prostate function. Lycopene also helps guard against LDL oxidation.

- **Ginkgo**: Hundreds of studies substantiate how *Ginkgo biloba* promotes healthy circulation and brain function.

- **Chlorophyllin**: Scientific studies indicate chlorophyllin may protect against environmentally induced DNA damage.

**Super Booster** saves consumers big money by combining a variety of costly nutrients into one softgel. If you add up the price of the individual ingredients in **Super Booster**, you would spend **two to three** times more.

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- Ginger: a close relative of curcumin with overlapping, complementary health benefits.
- Phospholipids: an emulsifying molecule that greatly enhances absorption.

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

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<th>Turmeric Phospholipid Blend</th>
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<td>Phospholipids</td>
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| Ginger CO₂ extract (root) [providing 60 mg gingerols]           | 200 mg |

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

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Contains soybeans.

References

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Caution: Do not take if you have gallbladder problems or gallstones. If you are taking anticoagulant or antiplatelet medications, or have a bleeding disorder, contact your healthcare practitioner before taking this product.

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Omega-3s May Reduce Risk Of Lou Gehrig's Disease

An article published in the *Journal of the American Medical Association Neurology* reports that those who consumed high levels of omega-3 fatty acids had a dramatically reduced risk of developing amyotrophic lateral sclerosis (ALS, or Lou Gehrig’s disease) in a meta-analysis of five large studies.*

The researchers analyzed the diets of over a million participants for a period of nine to 24 years. During this time, 995 individuals were detected with ALS. Omega-3 fatty acids have been shown to reduce inflammation and oxidative stress on cells and both of those processes damage nerve tissue and have been linked with ALS.

In the study, “individuals with higher dietary intakes of total omega-3 fatty acids had a reduced risk for ALS,” said lead researcher Kathryn Fitzgerald, of the Harvard School of Public Health in Boston.

Those in the top 20% in terms of their omega-3 fatty acid consumption reduced their risk of developing ALS by one-third, compared to those in the bottom 20%.

**Editor’s Note:** “We also found that higher dietary intake of alpha-linolenic acid, a type of omega-3 fatty acid found in vegetable oils and nuts, is associated with lower ALS risk,” Kathryn Fitzgerald added.


Vitamin D Boosts Survival Rates Of Colon Cancer Patients

The results of a study reported in the *Journal of Clinical Oncology* found that colon cancer patients with the highest levels of vitamin D in their blood had half the risk of dying when compared with patients with the lowest levels.*

Researchers at the Medical Research Council Human Genetics Unit at the University of Edinburgh studied almost 1,600 patients who had surgery for colorectal cancer.

The study is the first to link long-term survival predictions of colon cancer patients after diagnosis with total blood levels of vitamin D. Vitamin D is known to boost calcium absorption and bone growth. Previous studies have suggested a correlation between low vitamin D levels and an increased risk of many diseases including osteoporosis, cancer, and cardiovascular diseases.

The researchers, led by Professor Malcolm Dunlop of the University of Edinburgh and Western General Hospital, UK, tested blood samples from almost 1,600 patients after surgery for colon cancer. They found the greatest benefit of vitamin D in patients with stage II cancers, when the tumor is large, but hasn’t yet spread.

Three-quarters of the patients with the highest vitamin D levels were still alive after five years, compared with less than two-thirds of those with the lowest levels, they found.

**Editor’s Note:** A 2011 study published in the *Anticancer Research* journal by researchers at the Department of Family and Preventive Medicine, University of California, San Diego, found that breast cancer patients with high blood levels of vitamin D are twice as likely to survive the disease as women with low levels.

Increased Fiber Intake Linked To Lower Risk Of Premature Mortality In Heart Attack Survivors

An article published on April 29, 2014, in the British Medical Journal reveals an increase in the number of years lived by heart attack survivors who consumed a greater amount of fiber.*

Shanshan Li and colleagues of Harvard School of Public Health, Boston, utilized data from 1,840 men enrolled in the Health Professional Follow-Up Study and 2,258 women from the Nurses’ Health Study who had survived an initial adverse heart event of myocardial infarction (MI) during the studies’ follow-up periods. Dietary questionnaires, completed every four years, provided information on fiber intake before and after MI. In a pooled analysis of all subjects, those whose post-MI intake of fiber was among the top one-fifth of participants had a 25% lower risk of dying from any cause in comparison with those whose intake was among the lowest fifth over a nine-year average follow-up.

Editor’s Note: When fiber was analyzed by source, cereal fiber emerged as significantly protective.  
* BMJ. 2014 Apr 29.

Low Bone Mineral Density Linked To Heart Failure

An analysis published in the Journal of the American College of Cardiology suggests that lower bone mineral density may lead to a higher risk of developing heart failure.*

The study, which measured bone mineral density in the heel as broadband ultrasound attenuation (BUA) in over 13,000 healthy individuals, saw a 23% drop in heart failure risk with every one-standard-deviation rise in BUA, even after adjusting for factors such as age, sex, physical activity, blood pressure, diabetes, smoking, alcohol consumption, and body mass index.

“Our findings give support for cardiac assessment in people with reduced bone mineral density and warrant further exploration of underlying biological mechanisms,” said lead author; Dr. Roman Pfister of the Heart Center of the University of Cologne, Germany. “This is of major clinical interest because osteoporosis and low bone density are common, particularly in the elderly, affecting approximately 52 million persons in the United States, and screening for osteoporosis is recommended for all women 65 years of age or older and all younger women with a similar disease risk.”

Editor’s Note: Vitamin K2 may also decrease osteoporosis risk and thereby lower heart failure risk. Vitamin K2 helps promote strong bones by binding calcium and other minerals to bone. A two-year Japanese study published in the Journal of Bone and Mineral Research in 2000 found that patients supplemented with vitamin K2 (MK-4) had 52% fewer incidences of vertebral fractures, compared with patients who did not receive this nutrient.  

Omega-3 Supplements Ease Osteoarthritis Pain In Mice

A study by Duke University researchers published in the Annals of the Rheumatic Diseases found that mice fed omega-3 fatty acid supplements had healthier joints than those fed diets high in saturated fats and omega-6 fatty acids, suggesting that certain dietary fats, and not simply body weight, can lead to osteoarthritis.*

Four-week-old mice were fed a low-fat diet or one of three high-fat diets: a diet high in saturated fat, a diet high in omega-6 fatty acids, or a diet high in omega-6 fatty acids plus a supplement of omega-3 fatty acids. At 16 weeks, the mice had surgery to induce osteoarthritis of the knee. The animals that ate an unhealthy high-fat diet developed severe arthritis and joint inflammation compared to mice fed the regular diet or the high-fat diet supplemented with omega-3 fatty acids.

“Our results suggest that dietary factors play a more significant role than mechanical factors in the link between obesity and osteoarthritis,” said Farshid Guilak, senior study author.

Editor’s Note: The researchers also tested the mice for how quickly small ear punch wounds healed. The wounds healed much more quickly in the mice given omega-3 fatty acids than they did in the mice that did not receive the supplement.  
Severe Calorie Restriction Suspends Worm Development

The journal *PLOS Genetics* published the discovery of researchers from Duke University about an arrest in the development of the roundworm *C. elegans* when its calories were severely restricted.* Although the semi-starved worm continued to forage, its cells and organs entered a quiescent state during which development paused. Upon regaining access to food, development was resumed, yet life span can be twice as long as that of normal worms.

“There seems to be enough evidence that people who are considering aspirin use to reduce the risk for cardiovascular disease can feel positive that their use might also lower their risk for pancreatic cancer, and quite certainly wouldn’t raise it,” researcher Harvey A. Risch commented.

*Editor's Note:* "Because about one in 60 adults will get pancreatic cancer and the five-year survival rate is less than 5%, it is crucial to find ways to prevent this disease," Dr. Risch observed.

* *PLOS Genetics. 2014 June 19.*

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**Low-Dose Aspirin Associated With Pancreatic Cancer Risk Reduction**

A study described in *Cancer Epidemiology, Biomarkers & Prevention* uncovered an association between long-term use of low-dose aspirin and a decreased risk of pancreatic cancer.* Utilizing data from 362 men and women with pancreatic cancer matched to 690 control subjects enrolled in the Connecticut Pancreas Cancer Case-Control Study, researchers at Yale University determined that regular use of aspirin was associated with a 48% lower risk of cancer of the pancreas in comparison with nonuse. Each increasing year of regular aspirin use was associated with a 2% lower risk of the disease and each year of low-dose use with a 6% lower risk.

“There seems to be enough evidence that people who are considering aspirin use to reduce the risk for cardiovascular disease can feel positive that their use might also lower their risk for pancreatic cancer, and quite certainly wouldn’t raise it,” researcher Harvey A. Risch commented.

*Editor's Note:* "Because about one in 60 adults will get pancreatic cancer and the five-year survival rate is less than 5%, it is crucial to find ways to prevent this disease," Dr. Risch observed.

* *Cancer Epidemiol Biomarkers Prev. 2014 Jun 26.*

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**Lycopene Supplementation Aids Blood Vessel Function In Heart Disease Patients**

On June 9, 2014, *PLOS One* reported a benefit for lycopene in improving endothelial function in cardiovascular disease patients.* In a double-blind trial, Joseph Cheriyan and colleagues randomized 36 cardiovascular disease patients treated with statin drugs and an equal number of healthy control subjects to receive either 7 mg oral lycopene or a placebo daily for two months. Forearm blood flow assessments of endothelium-dependent and independent vasodilation, as well as basal nitric oxide synthase activity, were conducted before and after treatment.

In the cardiovascular disease group, endothelial-dependent vasodilation improved by 53% in those who received lycopene compared to those who received placebo. Although it averaged 30% lower in cardiovascular disease patients in comparison with healthy volunteers at the beginning of the study, by the end of the treatment period the endothelial-dependent vasodilation of participants with cardiovascular disease who received lycopene was comparable to that of the healthy subjects at the study’s onset.

*Editor's Note:* Lycopene is an antioxidant that is found in tomatoes, watermelon, and other red fruits, in addition to being available as an over-the-counter supplement.

* *PLOS One. 2014 Jun 9.*

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*PLOS Genetics. 2014 June 19.*
Cinnamon Could Stop Parkinson’s In Its Tracks

An article appearing in the *Journal of Neuroimmune Pharmacology* indicates that cinnamon could one day be used by Parkinson’s disease patients to prevent the disease from progressing.*

Saurabh Khasnavis and Kalipada Pahan, PhD, of Rush University Medical Center, studied the effects of the spice in a mouse model of Parkinson’s disease. They found that when cinnamon is metabolized into sodium benzoate in the blood and brain, the loss of beneficial proteins known as Parkin and DJ-1 was halted, while neurons that produce dopamine, a neurotransmitter that is reduced in Parkinson’s, were protected. Motor function, which can be significantly impaired by the disease, was improved in animals that received cinnamon.

“Understanding how the disease works is important to developing effective drugs that protect the brain and stop the progression of Parkinson’s disease,” Dr. Pahan remarked. “It is known that some important proteins like Parkin and DJ-1 decrease in the brain of Parkinson’s disease patients.”

*Editor’s Note:* “If these results are replicated in Parkinson’s disease patients, it would be a remarkable advance in the treatment of this devastating neurodegenerative disease,” Dr. Pahan added.


Calcium+Collagen Combo = Better Bone Benefits

The Experimental Biology 2014 Annual Scientific Meeting was the site of a presentation of research that suggests a superior effect for a combination of calcium, collagen, and vitamin D in preventing a decline in bone mineral density among older women.*

Bahram H. Arjmandi, PhD, and colleagues from the Department of Nutrition, Food, and Exercise Sciences at Florida State University, evaluated the long-term effects of a calcium-collagen chelate dietary supplement known as KoACT® in 39 postmenopausal women with osteopenia (bone mineral density that is lower than normal but not as low as in osteoporosis). Participants received an amount of KoACT® that contained 500 mg elemental calcium and 200 IU vitamin D3 per day, or a control supplement that provided equal amounts of vitamin D and calcium for one year. Total body, lumbar spine, and hipbone mineral density were measured, and markers of bone turnover were assessed at the beginning of the trial, and at six and 12 months. At the study’s conclusion, women receiving KoACT® had significantly less bone mineral density loss than the control subjects.

*Editor’s Note:* Tartrate-resistant acid phosphatase (a marker of bone resorption; increased levels of this enzyme indicate increased bone loss) and sclerostin (a protein that has anti-anabolic effects on bone formation) were lower and the ratio of bone specific alkaline phosphatase (a marker of bone formation) to tartrate-resistant alkaline phosphatase was higher after six months in the KoACT® group, while the control group experienced no change.

*Experimental Biology 2014 Annual Scientific Meeting. 2014 Apr.*
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.
Validated in Huge New Study: Vascular Benefits of a Mediterranean Diet

A large, rigorous study published in the New England Journal of Medicine confirmed the health benefits of those who switch to a Mediterranean diet rich in omega-3 fish oil as well as protective nutrients called polyphenols found in olive oil, fruits, vegetables, nuts like walnuts, and wine. The study ended early because the benefits were so overwhelming, with startling benefits for vascular health, that it was considered unethical to continue to deprive the control group.

In addition to the health-promoting benefits of vegetables and fruits with their abundance of polyphenol nutrients, the Mediterranean diet group took at least 4 tablespoons of polyphenol-rich extra-virgin olive oil a day.

Life Extension® Members Benefited Long Ago

Starting in 2005, Life Extension members began taking a supplement (Super Omega-3) that provided potent concentrations of fish oil and olive polyphenols like hydroxytyrosol and oleuropein.

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

The sesame lignans not only direct the omega-3s fatty acids toward more effective pathways in the body, but guard the delicate fish oil from oxidation.

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.

A bottle containing 120 softgels of Super Omega-3 EPA/DHA with Sesame Lignans & 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
- Typical DPA (docosapentaenoic acid) 156 mg
- Olive Extract (fruit and leaf) providing [39 mg polyphenols, 10.4 mg hydroxytyrosol/tyrosol, 8.8 mg verbascoside/oleuropein]
- Sesame Seed Lignan Extract 20 mg

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.
Profound loss of connections between nerve cells in the brain is one of the major hallmarks associated with neurodegeneration and memory impairment. Previous research has shown that magnesium is a critical factor in controlling synaptic density.¹

To combat this, an innovative form of magnesium called Neuro-Mag™ has been developed. The magnesium-L-threonate contained in Neuro-Mag™ has been shown to specifically target multiple areas of the aging brain. In fact, pre-clinical models show that the magnesium-L-threonate contained in Neuro-Mag™ boosted levels of magnesium in spinal fluid by 15% versus no increase from conventional magnesium.²

**New Cognitive Benefits Revealed!**

Although research into the role of magnesium in the brain dates back 70 years, scientists continue to uncover its comprehensive benefits for cognitive function.¹,² Studies using magnesium-L-threonate show this unique form of magnesium maintains the quantity of synaptic connections between brain cells and inhibits the dysregulation of signaling pathways.¹

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

The suggested daily dose of three Neuro-Mag™ Magnesium-L-Threonate Capsules provides 2,000 mg of Magnesium-L-Threonate. While supplying a modest 144 mg of elemental magnesium, its superior absorption into the bloodstream and nervous system make it a preferred choice for maturing individuals to supplement with. This same brain-health supporting magnesium is also available in a natural lemon flavor called Neuro-Mag™ Magnesium-L-Threonate with Calcium and Vitamin D3 Powder. In addition to its fresh lemon flavor, the one-scoop per day serving supplies the same amount of magnesium as the capsules plus 500 mg of highly soluble calcium and 1,000 IU of vitamin D3.

A bottle containing 90 vegetarian capsules of Neuro-Mag™ Magnesium-L-Threonate or a jar containing 30 scoops of Neuro-Mag™ Magnesium-L-Threonate with Calcium and Vitamin D3 Powder retails for $40. If a member buys 4 units, the price is reduced to $27 per unit.

**References**
Since the year 2001, Life Extension® has been seeking a way to reverse a mechanism of aging that may not be adequately addressed by the healthy lifestyle choices most members currently follow.

Normal aging is accompanied by a noticeable increase in fatigue and loss of motivation. The tiredness we outwardly feel reflects inward impairment of cellular functions critical to sustaining life.

NAD+ is the term used in the scientific literature to describe a cellular compound called nicotinamide adenine dinucleotide. NAD+ is found in every cell in the body and is essential to life.\(^1,2\) NAD+ enables the transfer of energy from the foods we eat to vital cell functions. It is also required to "turn off" genes that accelerate degenerative aging processes.\(^3,4\)

As NAD+ levels decline, mitochondrial function is impaired, resulting in fewer mitochondria surviving.\(^3,5\) This vicious cycle of mitochondrial depletion results in many of the physical symptoms of aging.

The challenge we at Life Extension have faced over the past 13 years is finding an efficient way for aging humans to affordably boost their NAD+ cellular levels.

In 2001, one of our researchers developed an effective NAD+ boosting sublingual lozenge, but it only maintained stability for a short time period. As you’ll read in this article, an effective NAD+ cell boosting technology has finally become available.
Prominent universities have been investigating NAD+ as a potential therapy for age-related degenerative disease. Compelling research shows that NAD+ has a unique ability to protect tissues, induce DNA repair, and increase life span.

It has long been known that NAD+ plays an important role in transferring energy released from glucose and fatty acids to the mitochondria so that it can be converted into cellular energy. Without sufficient NAD+, energy transfer in the cells breaks down, resulting in age-accelerating mitochondrial dysfunction.

NAD+ is an essential cofactor of key enzymes responsible for longevity called sirtuins. While resveratrol is well known for sirtuin activation, evidence indicates it does so indirectly, whereas NAD+ directly activates sirtuins to regulate the genes of aging.

Sirtuins, specifically SIRT1 and SIRT3, are intimately related to longevity through their control of gene expression and require NAD+ for their activity.

Research into the sirtuins continues to yield substantial information on how to control aging. By activating these sirtuins, we’re able to gain control over one of our body’s anti-aging “switches.” SIRT enzymes “turn off” certain genes that promote aging, such as those involved in inflammation, in fat synthesis and storage, and in blood sugar management.

SIRT enzymes are activated by calorie restriction, the proven means of reliably extending life span in all organisms. The way calorie restriction activates anti-aging sirtuins is by increasing cellular NAD+. 

...
A Natural NAD+ Booster

Researchers have discovered a form of vitamin B3 that converts in the body to NAD+.\textsuperscript{40,41} Vitamin B3 is involved in over 400 enzymatic reactions throughout the body and is essential for production and management of cellular energy.\textsuperscript{42} A new patented form of this vitamin called nicotinamide riboside has been found to increase NAD+ levels and in the process, provide an extraordinary range of longevity benefits that promises to change how we combat aging.

Directly boosting NAD+ with nicotinamide riboside presents a new and effective strategy for preventing the natural decline in cellular energy as we age by promoting youthful vitality.

Studies have shown that nicotinamide riboside switches “off” the genes of aging, extends life span, increases endurance, improves cognitive function, activates sirtuins, and enhances cellular energy.\textsuperscript{3,43} These benefits add up to a system-wide slowing and reversal of certain aging processes. Nicotinamide riboside accomplishes this NAD+ boosting effect without the irritating skin flushing and rash caused by the standard forms of vitamin B3.\textsuperscript{41}

Consequences Of Falling NAD+ Levels

NAD+ is found in every single cell in the body,\textsuperscript{1} and is essential for efficient energy transfer from foods to tissues. NAD+ is also required for turning off genes that accelerate aging.\textsuperscript{4}

From a cellular energy standpoint, lower levels of NAD+ reduce mitochondrial function, with fewer energy-rich ATP molecules being produced, and fewer mitochondria produced.\textsuperscript{5,11} This vicious cycle results in many of the physical symptoms of aging.

The age-related decrease in NAD+ causes defects in both energy- and gene-related functions to accumulate. These defects feed on one another to produce the disorders we typically identify as aging.\textsuperscript{10} The consequences of a decline in NAD+ levels and subsequent reduction in SIRT 1 and SIRT 3 enzymes are:

- **Neurodegeneration** in the brain,\textsuperscript{10,27,28}
- **Vascular inflammation**, producing damage to blood vessels that can result in stroke or heart attack,\textsuperscript{27,29,30}
- **Increased fat storage** in the liver, which can lead to nonalcoholic fatty liver disease (NAFLD),\textsuperscript{31-33}
- **Increased fat production and deposition** in white adipose tissue, the primary fat storage form found in dangerous belly fat,\textsuperscript{34,35}
- **Insulin resistance**, preventing cells from appropriately removing glucose from blood, producing higher blood sugar levels and leading directly to metabolic syndrome,\textsuperscript{30,36,37}
- **Fatigue, loss of muscle strength, and fatty infiltration of muscles**, resulting in reduced fatty acid oxidation (“burning”), thereby depriving muscles of their normal sources of energy.\textsuperscript{38,39}

To avoid these degenerative processes, it is essential that steps be taken to optimize the amount of NAD+ in our bodies.

By increasing intracellular NAD+ levels, age-related mitochondrial dysfunction can be reversed.\textsuperscript{5} One of the ways to accomplish this is by engaging in major calorie restriction, which has been proven to raise NAD+ levels and in experimental organisms tested to date, to extend life span.\textsuperscript{5,25} But most people find significant calorie restriction to be nearly impossible in practice.

Fortunately, a method has been developed to increase NAD+ levels without having to alter dietary patterns, though Life Extension remains a strong advocate of calorie restriction for those able to consistently do it.
Initial Studies On Nicotinamide Riboside

In their investigations into the effects of nicotinamide riboside on life span, scientists used a strain of yeast known to have a relatively short average life span of about 8.3 generations. When the yeast was treated with nicotinamide riboside, the average life span nearly doubled, to 16.1 generations. On this model of life span extension, ordinary vitamin B3 had no effect compared to the dramatic longevity benefit shown with nicotinamide riboside.

Nicotinamide riboside is a dynamic compound that works through multiple mechanisms to promote life extension. Most dramatic are its effects on longevity and metabolism, as shown by recent laboratory studies.

One critical mechanism in oxygen-consuming organisms is mitochondrial function. Mitochondria, the tiny, intracellular “furnaces” that power cellular processes, are sites of intense electrical and chemical activity. They can readily “burn out,” contributing to the aging of tissues, and hence, of organs and entire organisms.

In a model commonly used to study life span modifications, the roundworm *C. elegans* could be made to survive as much as 16% longer when supplemented with nicotinamide riboside. This life span extension was demonstrated to result from a roughly 50% increase in healthy mitochondrial oxygen consumption, a measure of mitochondrial efficiency.

These benefits are what one would predict from nicotinamide riboside supplementation, which raises levels of the NAD+ needed to safely move electrons through the mitochondria. We have long known that ineffective mitochondrial electron transport is an age-accelerating process.

When pursuing additional lab studies, scientists found that supplementing mice with nicotinamide riboside reduced many dangerous factors of aging. The mice showed increased energy and improved insulin sensitivity, both factors indicating optimal vitality. In this study, scientists also demonstrated that nicotinamide riboside supplementation increased energy metabolism while protecting the animals against the metabolic abnormalities induced by a high-fat diet.

For the study, the mice were fed a high-fat diet with either no supplementation (control), or nicotinamide riboside for 12 or 16 weeks.

On a treadmill test, the supplemented animals fed a high-fat diet ran more than 33% further than the control mice, demonstrating a dramatic increase in muscle endurance and performance.

The supplemented mice also gained significantly less weight while on the high-fat diet compared to control animals. And in supplemented animals fed...
Alzheimer’s disease were treated with nicotinamide riboside beginning at middle age (5 to 6 months) and lasting into old age (10 to 11 months). The supplemented animals had significant improvements in their cognitive function in challenging laboratory tests of exploring new objects.9 This improvement was shown to be associated with significantly reduced brain levels of beta-amyloid plaques, the abnormal protein that triggers much of the neuronal death and dysfunction in Alzheimer’s disease. Intriguingly, supplementation had the added benefit of raising levels of the metabolic regulatory complex called PGC-1-alpha. Studies have shown that low levels of PGC-1-alpha have been associated with increased dangerous beta-amyloid deposition.9 The mechanisms by which these effects were achieved were found to include significant increases in brain levels of NAD+ (the result of supplementation with nicotinamide riboside), and consequently activated enzymes involved in cellular energy production and energy release from glucose.9

In a similar study of neuroprotection, nicotinamide riboside was shown to delay the degeneration of axons, the “communication cables” of nerve cells that carry impulses over long distances.53,54 When these communication cables deteriorate, tingling, weakness, numbness, and loss of motor function can occur as a result.55-57 The mechanism behind this either the high-fat or a normal diet, insulin sensitivity (the ability to remove sugar efficiently from the blood) was greatly improved, compared with control animals.

Remarkably, these results were all attained without any differences in food intake or total physical activity between supplemented and control mice.43 The supplemented animals lost weight, performed better at exercise, and managed their blood glucose better purely as a result of nicotinamide riboside-induced increases in calorie-burning (measured by increased oxygen consumption rates). This was confirmed by the observation that when the supplemented mice were exposed to prolonged cold conditions, they had significantly less body temperature loss compared to controls, the result of increased conversion of calories to heat.

Detailed analysis of the mice in this study revealed that supplementation with nicotinamide riboside had produced a significant increase in essential NAD+ levels, resulting in the activation of the critical life span-extending enzymes SIRT1 and SIRT3.43 Supplementation with nicotinamide riboside also improved the numbers and function of mitochondria, the intracellular powerhouses that release energy from food; poor mitochondrial function is a known age-accelerator.

Nicotinamide Riboside Protects Brain Cells

As cases of dementia and Alzheimer’s reach epidemic proportions in the aging population, pharmaceutical companies are aggressively researching brain protective compounds.51,52 Nicotinamide riboside with its ability to directly increase NAD+ is providing promising brain benefits.

A recent lab study demonstrated the ability of nicotinamide riboside to protect brain cells in advanced age.9 For the study, mice engineered to develop
benefit was shown to be a significant 20-fold increase in the enzyme that converts nicotinamide riboside to NAD+.54

Other studies in mammalian cells in culture demonstrate that nicotinamide riboside treatment increases NAD+ concentrations inside of cells by up to 2.7-fold,58 and that administering nicotinamide riboside can improve NAD+ related deficiencies in animal and yeast cells.24

Studies have shown that nicotinamide riboside switches “off” the genes of aging, extends life span, increases endurance, improves cognitive function, activates sirtuins, and enhances cellular energy.

As we age, and our NAD+ levels dramatically decline, we begin to experience fatigue and are more susceptible to neurodegeneration and cellular dysfunction. What makes the nicotinamide riboside form of vitamin B3 so unique is that once it is processed by the body it immediately converts into the powerful molecule NAD+.

Nicotinamide riboside accomplishes this NAD+ boosting effect without the irritating skin flushing and rash caused by the standard forms of vitamin B3.

If you feel increasingly lethargic or unmotivated as you age, you can probably blame your falling NAD+ levels, which result in reduced cellular energy production.

Directly boosting NAD+ with nicotinamide riboside presents a new and effective strategy for preventing the natural decline in cellular energy as we age by promoting youthful vitality.

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.
How NAD+ Drives Longevity-Promoting SIRT Enzymes

SIRT enzymes regulate how genes are expressed from the DNA on our chromosomes in part by influencing chromosomal proteins called histones.56 Research indicates SIRT enzymes have a “slot” capable of binding to one NAD+ molecule and one chemical acetyl (AC) group from the histone.61 This binding triggers the SIRT enzyme to remove the acetyl group and bind the histone proteins more closely to their DNA strands, thereby regulating the expression of genes.4,13,16,2 This is shown schematically below.

So, just as a coin in a parking meter slot adds time to the meter with each turn of the handle, a NAD+ molecule binding to a SIRT enzyme, with each “turn” of the enzymatic cycle, manipulates DNA expression in a way that adds time to one’s life!

NAD+ levels decline with aging and represent a fundamental, systemic cause of aging.5 Falling NAD+ levels mean fewer “coins” in the “parking meter” represented by SIRT enzymes, which in turn means reduced life span, as age-accelerating genes are expressed without regulation.

Nicotinamide riboside has been scientifically proven to maintain robust levels of NAD+ in cells, thereby both supporting vital cellular energy functions and activating the anti-aging enzymes SIRT1 and SIRT3.43 Research has demonstrated that nicotinamide riboside supplementation is capable of reversing many of the age-accelerating changes induced by falling NAD+ levels.43 This is why the discovery nicotinamide riboside is so essential for any serious longevity regimen.

References


WE ARE RECRUITING FOR STUDY PARTICIPANTS!

MALE SEXUAL HEALTH STUDY
Life Extension® Clinical Research, Inc. is conducting a trial to assess the effect of a nutritional supplement in supporting erectile function and sexual health in men who are 50-70 years of age.

If you or someone you know:
• Is able to travel to the Broward County research facility for the scheduled visits over a 30-day period,
• Is in a stable sexual relationship for at least six or more months, 50-70 years of age, and able to comply with all study procedures and visits, then
• Please contact us for further information and to see if you qualify.

Qualified participants receive:
• Blood pressure evaluations and blood tests, including a male hormone panel at no cost to you during the trial.
• Compensation for time and travel up to $100 upon successful completion of the trial.

OVERWEIGHT AND MILDLY ELEVATED BLOOD SUGAR STUDY
Life Extension® Clinical Research, Inc. is conducting a trial to measure the effects of nutritional supplementation on blood sugar and blood vessel health.

If you or someone you know:
• Is able to travel to the Broward County research facility for the scheduled visits over a 90-day period,
• Is overweight, 25-65 years of age, and has mildly elevated blood sugar with no previous diagnosis of diabetes, then
• Please contact us for further information and to see if you qualify.

Qualified participants receive:
• Blood tests and blood vessel health evaluations at no cost to you during the trial.
• Compensation of $200, a Life Extension® $100 gift card and up to $50 for travel expenses upon successful completion of the trial.

REGISTER OR CONTACT US FOR MORE INFORMATION
Phone: (866) 517-4536 • Website: www.lef.org/ClinicalResearch
E-mail: LEClinicalResearch@LifeExtension.com
Advanced Defense Against Cellular Aging

**NAD+ Cell Regenerator**

If you are experiencing fatigue and lack of motivation, it may be due to the age-related decline in NAD+ levels and subsequent impairment of healthy cellular metabolism.

NAD+ (nicotinamide adenine dinucleotide) promotes systemic youthful functions and is found in every cell in the body. In addition, NAD+ plays an essential role in regulating genes that control aging.

**How To Boost NAD+ Levels Within Your Cells**

Newly patented nicotinamide riboside increases cellular levels of NAD+ in the body. For the first time, aging humans have an effective and affordable method to boost the critical NAD+ enzyme for refreshed vitality.

Nicotinamide riboside represents an innovative advance to combat aging that functions via unique mechanisms not found in typical dietary supplements. It has emerged as a front-line weapon in Life Extension’s ongoing war against premature aging.

The name of this new nicotinamide riboside formulation is NAD+ Cell Regenerator™.

**Multiple Benefits Of Increasing NAD+ Cellular Levels**

Nicotinamide riboside has been documented to help replenish cellular NAD+ and in the process:

- Promote sirtuin (SIRT1 and SIRT3) gene activation,
- Enhance growth and efficiency of mitochondria—supporting energy levels and physical performance,
- Favorably modulate metabolism,
- Contribute to neuronal health—supporting cognitive function during aging,
- Promote insulin activity—supporting healthy blood sugar in those within the normal range.

**References**


Life Extension® NAD+ Cell Regenerator™ contains the patented ingredient NIAGEN™, the first commercially available form of nicotinamide riboside.

The suggested daily dose of one NAD+ Cell Regenerator™ capsule provides:

- NIAGEN™ Nicotinamide Riboside 100 mg

**Advanced NAD+ Technology At A Low Price**

A bottle of 30 vegetarian capsules of NAD+ Cell Regenerator™ retails for $54. If a Life Extension member buys four bottles, the price is reduced to $19.50 per bottle—a 43% savings over the retail price. The suggested dose is just one small capsule daily.

NIAGEN™ is a trademark of ChromaDex, Inc.

To order NAD+ Cell Regenerator™, 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.
Researchers are discovering how important probiotics are to overall health. Beyond improving digestive health, probiotics provide a broad spectrum of benefits throughout the body.

**FlorAssist® Heart Health Probiotic** contains a novel probiotic—*Lactobacillus reuteri* 30242—that has been shown in clinical trials to safely support healthy cholesterol in adults already within the normal range.1,2 Additionally, *L. reuteri* 30242 has been shown to support healthy CRP (a marker for inflammation), fibrinogen (involved in clot formation), apoB-100 (a marker for LDL particle size, a known cardiovascular risk factor), and vitamin D levels (important for cardiovascular health) for those within normal range.3

**FlorAssist® Heart Health Probiotic** has been carefully formulated for convenient use as a safe, easy-to-swallow capsule with no unpleasant aftertaste. One capsule with food twice daily is the perfect addition to a heart-healthy lifestyle.

The suggested daily dose of two vegetarian capsules of **FlorAssist® Heart Health Probiotic** provides:

- **FlorAssist®**
  - 5 Billion CFU*
  - *Lactobacillus reuteri (NCIMB 30242)*

*Colony Forming Units

A bottle of 60 vegetarian capsules of **FlorAssist® Heart Health Probiotic** retails for $32. If a member buys four bottles, the price is reduced to $21 per bottle.

**References**


To order **FlorAssist® Heart Health Probiotic**, 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.
Tart cherries are packed with unique compounds that have been shown to block the COX-1 and COX-2 inflammatory enzymes. The benefits of tart cherry include rapid muscle recovery after exercise and fast 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 4%.

**Anthocyanins**

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

**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 dose of anthocyanins in each capsule.

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

- CherryPURE® Tart cherry (Prunus cerasus) extract (skin) 615.5 mg (std to 6.5% anthocyanins (40 mg))

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.

**To order Tart Cherry Extract with Standardized CherryPURE®, 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.*
Phytoceramides
Skin Rejuvenation From The Inside Out

BY MICHAEL DOWNEY
As you age, your skin progressively loses natural lipids called ceramides.\textsuperscript{1-4} The result is visible aging that includes wrinkles, age spots, and rough, uneven skin.\textsuperscript{5-8}

Ceramides are major skin components that help form the “glue” that holds surface cells together.\textsuperscript{9,10} Depletion of these molecules not only causes skin to wrinkle, but also makes it more susceptible to moisture loss, environmental allergens, skin diseases such as atopic dermatitis, and possibly cancer.\textsuperscript{5,11-13}

For these reasons, ceramides have long been a key ingredient in expensive skin creams. The problem is that topical application may not penetrate deeply enough into the skin to effectively block wrinkle formation and skin aging.

Fortunately, plant-derived ceramides—or phytoceramides—have been developed that can be taken orally, ensuring that these potent molecules are absorbed into the bloodstream.\textsuperscript{14} Once absorbed, they are carried to the cells of the inner layer of the skin and subsequently seep to the outermost layer.\textsuperscript{14,15} These rejuvenating molecules reach skin all over the body, not just where creams are applied.

Oral phytoceramides effectively work from the inside out to hydrate, smooth, and rejuvenate aging and wrinkled skin.\textsuperscript{14,15}
Your Skin’s Natural Regeneration Molecules

As the years pass, ceramide production declines dramatically. Without substantial replenishment of ceramides, the mortar that holds the skin-cell bricks together deteriorates, and the skin moisture barrier becomes greatly compromised.\(^9,14,16\)

The result is a thinning of your skin—with noticeable wrinkles, dryness, roughness, and even infection.\(^14,17,19\)

Although ceramides are present in many of the foods we eat, including rice and wheat, they do not naturally occur in sufficient quantities to optimally rejuvenate aging skin.\(^14\) This means that slowing and reversing skin aging requires effective supplementation.

The Phytoceramide Breakthrough

To solve this problem, researchers turned their attention to oral ceramides. Initially, research focused on identifying potentially useful oral ceramides only from animal sources.\(^14\) Then scientists switched to using a number of different ceramides available in grains such as rice, corn, and wheat.\(^14,21\) These plant-based ceramides are called phytoceramides.

In an important breakthrough, scientists developed a proprietary wheat-derived phytoceramide extract. Taken orally, it can reach the skin’s outer layer through the natural route—delivery by the bloodstream to the deepest skin-cell layers, then gently nudged into the extracellular matrix.\(^14\) There, it restores the barrier function.\(^14\)

This innovation was achieved by using natural, nongenetically modified wheat as the raw material and producing an extract containing only purified oils.\(^14\) This extract is so purified it is classified as gluten-free by current government standards. A number of studies now validate the effectiveness of this novel phytoceramide.\(^14,15,22\)

In a laboratory cell study, this wheat-derived extract was shown to hydrate human skin and restore its youthful structure after the skin cells’ protective barrier function had been disrupted.\(^22\)

This study also found that wheat phytoceramides reduced levels of free radicals in the skin and inhibited elastase enzymes, which would ordinarily destroy elastin and contribute to loss of skin flexibility and increased wrinkling.\(^23\)
Ceramides have also been shown to inhibit melanogenesis, the process by which the skin produces the hyperpigmentation behind age spots and other discolorations of the skin. This suggests that by replacing ceramides from the inside out, oral wheat-derived phytoceramides may inhibit or reverse the uneven pigmentation of skin aging.7,8,24

Scientists realized that if clinical trials validated these effects in humans, it would at last be possible to rejuvenate aging skin—simply by swallowing a capsule.

**Phytoceramides’ Effectiveness Validated In Clinical Trials**

To demonstrate wheat-derived phytoceramides’ effectiveness, investigators conducted experiments of the scientifically most rigorous type: double-blind, placebo-controlled, clinical studies.

In the first study, women with dry to very dry skin were given 200 mg daily of either a placebo or a powdered phytoceramide extract for three months. Skin hydration was then evaluated using three distinct methods: a special testing machine, a dermatologist’s examination, and the subjects’ own subjective scores.15

The women taking the phytoceramide extract experienced significant improvement in skin hydration as assessed by all three of these testing methods. Additionally, in the ceramide group, participants experienced significantly reduced dry patches, roughness, and itching.15 These changes were not seen in the placebo arm of the study. This placebo-controlled human data provided scientists with a clear indication that the phytoceramides had made their way through the bloodstream to the skin cells, where they provided a powerful rehydrating and rejuvenating effect.15

To confirm these remarkable results, another clinical trial evaluated the wheat-derived phytoceramide extract in its oil form.14 For the study, women with dry to very dry skin took 350 mg daily of the wheat ceramide oil, or a placebo, in a double-blind trial. Results were assessed after just three months of supplementation.14

First, researchers objectively measured skin hydration using a special technique known as corneometry. The supplement, but not the placebo, was shown to significantly increase skin hydration of the arms, legs, and the body overall. On the arms, skin hydration increased by more than 35%, compared to less than 1% in the placebo group.14

Second, researchers asked participants to rate their own perceptions of the effects of the supplement or placebo treatments. At all points of measurement...
in the study, the wheat phytoceramide oil extract provided greater improvement in all factors—facial skin hydration, leg skin hydration, suppleness, roughness, uniformity of complexion, itchiness, and overall state of the skin—without any significant adverse effects and with a superior level of acceptability.

These controlled clinical trials delivered clear confirmation that orally taken wheat-derived phytoceramides substantially boost skin hydration, smoothness, suppleness, and other levels—reflecting reversal of age-related skin wrinkling, drying, and decline.

**Why You Need To Replace Age-Diminished Ceramides**

Because ceramides are bioactive lipids, they are involved in much more than the appearance of the skin—and their age-related decline represents more than a mere cosmetic problem. Full functionality of the skin—which requires adequate ceramides and intact barrier function—helps regulate body temperature, synthesize optimum amounts of vitamin D, and provide critical sensory input from the environment.

By contrast, falling ceramide levels expose one to health risks due to greater susceptibility to contact dermatitis from environmental chemicals, infectious microorganisms, and altered permeability to topically administered drugs. As shown in research, the

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**What Are Ceramides?**

Ceramides are components of specialized lipid molecules called sphingolipids, an essential element of human skin. The presence of ceramides as a category within sphingolipids was first discovered in the human brain in 1884. The ceramides that are found in both plants and the human body are now known to be structurally similar.

All four layers of the epidermis contain ceramides, and they play a critical role in skin health by creating a barrier that reduces infection and helps to retain the skin’s moisture and smoothness.

Over a period of four weeks, new cells created at the deepest epidermal layer migrate upwards to form the top layer of the skin (the stratum corneum) where extracellular matrix lipids inhibit loss of water. By the time skin cells reach the skin’s surface, they become corneified or horn-like, transforming into protein-rich bricks tightly bound together by a layer of mortar composed of various lipids, up to 50% of which are ceramides.

The primary function of the epidermis is to generate a relatively impermeable layer to protect the skin from dehydration and environmental stress. Ceramides play a critical role in this barrier function and in the retention of water by the stratum corneum.

The aging process reduces the content of ceramides in the epidermal skin layers. This contributes to dry skin and dermatitis, and is a major cause of skin wrinkling.

Research has shown that optimal amounts of ceramides, in relation to other lipids, in the top layer of the skin are required to maintain youthful and healthy skin. Wrinkled, dry, irritated, and sensitive skin often lacks ceramides. Topical application of ceramides has shown limited benefit. However, orally taken wheat-derived phytoceramides—both in powdered and oil form—have been clinically demonstrated to hydrate skin and promote more youthful appearance and smoothness.
Research suggests that the decline in ceramide content in mature skin may stem from a decline in the enzyme activity that normally promotes the delivery of ceramides in a usable form to the skin.

To inhibit the loss of skin ceramides—and the wrinkling, moisture loss, and multiple health risks that occur as a result—it is essential to boost ceramide levels not just on the surface where lotions sit, but deep inside the skin cells beneath the stratum corneum.

In addition, maintaining youthful levels of ceramides in all layers of the skin promotes more than better appearance and feel—it powerfully blocks skin infections and other skin diseases.

**The Skin’s Structure**

The outer layer of your skin (epidermis) plays a key role in maintaining homeostasis, the internal process that automatically modulates internal conditions to keep them constant and stable throughout your body. The skin surface, or stratum corneum, serves as a barrier between the external environment and the internal body. This barrier prevents water loss due to evaporation and inhibits foreign insults.

Scientists often describe the structure of the stratum corneum as “bricks and mortar.” About 90% of the stratum corneum surface is made up of cells called keratinocytes. These are the “bricks” of the skin barrier.

Between those cells are intercellular lipids that are made up of ceramides, free fatty acids, and cholesterol, all of which constitute the “mortar” that holds the “bricks” of your stratum corneum together. Ceramides comprise up to 50% of this vital intercellular material.

This brick-and-mortar structure effectively prevents transepidermal water loss, unless impaired by damage to the stratum corneum, a tragic effect of skin aging.

A scientific investigation into the pathogenesis of allergic contact dermatitis and other inflammatory skin conditions found that repairing the breakdown in the ceramide barrier, while continuing topical medications, could greatly alleviate atopic dermatitis. This is especially significant, because the topical corticosteroids and other immunosuppressive agents of mainstream therapy involve toxicity risks.

**Summary**

Ceramides are natural skin-based lipid molecules that have shown critical importance in preserving skin’s youthful appearance and texture, as well as providing strong defenses against skin diseases.

Their essential role is in the maintenance of water-retaining properties of the skin, protecting against water loss of both physical trauma and aging.

With age, the presence of ceramides in the skin decreases. However, topical creams that contain ceramides have shown only modest effectiveness.

When taken orally, phytoceramides are transported deep into the cells of all layers of the skin and work from the inside out.
Rigorous clinical studies show that oral wheat-derived phytoceramides increase skin hydration, smoothness, suppleness, and other measures of youthful skin. Ceramides may also protect against skin-based infections and diseases.

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
The anatomy of the female urinary tract differs greatly from men, resulting in the need for additional nutritional support for women.

A wealth of published studies indicates that cranberry polyphenols may help to support a healthy urinary tract.1-5

Of particular importance is the flavonoid content of the cranberry, including anthocyanins and proanthocyanidins. These natural compounds exert powerful antioxidant effects that can reduce oxidative stress.

Recent clinical data suggest that the proanthocyanidins found only in cranberries also possess unique molecular features that specifically promote urinary system health.6-8

A Synergistic Compound Available Only in Europe—Until Now

In a significant advance, Life Extension® has identified a unique compound available overseas but little-known in the United States that provides a synergistic complement to the whole cranberry’s phytonutrient profile.

UTIRose™ is derived from Hibiscus sabdariffa, a species native to Europe, Asia, and Africa. Scientific analysis has shown that this species’ flower and calyx (the green floral envelope surrounding the blossom) are rich in active polyphenols, including flavonoids, sambubiosides, and anthocyanins.

Life Extension® uses a unique, patented process in the manufacture of Optimized Cran-Max® with UTIRose™. Each daily serving supplies the complete phenolic profile of the whole cranberry plus hibiscus polyphenols in a standardized, highly absorbable, concentrated form. Two capsules of Optimized Cran-Max® with UTIRose™ contain:

-UTIRose™ Hibiscus extract (flower, calyx) [std to 45% total phenolics (45 mg)]
-Cranberry whole fruit concentrate

The suggested daily amount of Cran-Max® in this formula alone (500 mg) was demonstrated to provide the anthocyanin equivalent of seven 8-oz glasses of Ocean Spray® Cranberry Juice Cocktail.9

The price for one bottle of Optimized Cran-Max® with UTIRose™ containing 60 vegetarian capsules is $18. If a member buys four bottles, the price is reduced to $12 per bottle.

References

Ceramides are essential for preserving healthy-looking skin.\textsuperscript{1,2} They play an important role in maintaining the skin’s moisture balance and protecting the skin’s surface.\textsuperscript{3}

Unfortunately, your body’s production of ceramides declines with age.\textsuperscript{4} Many anti-aging face creams include ceramides. The problem is that \textit{topical application} cannot penetrate deeply enough into the skin to have a long-term impact on your skin’s appearance.

Researchers have discovered that the ceramides naturally produced by young skin are identical to those present in \textit{wheat}—and that these wheat-derived oils can be taken \textit{orally}.

Life Extension® has brought together these skin-nourishing oils in a concentrated \textit{oral formula} called \textbf{Skin Restoring Phytoceramides with Lipowheat®}.

\textbf{Skin Restoring Phytoceramides with Lipowheat®} can reach the deepest layers of skin all over the body—\textit{not just where creams are applied}—where it can offset the visible impact of the body’s gradual decline in ceramides. The hydrating action of Lipowheat® ceramides has proved effective in clinical trials.

One bottle containing 30 \textbf{350 mg} vegetarian liquid capsules of \textbf{Skin Restoring Phytoceramides with Lipowheat®} retails for \textbf{$25}. If a member buys four bottles, the price is reduced to \textbf{$17.25}.

\begin{itemize}
  \item Contains wheat.
\end{itemize}

\textbf{References}

Lipowheat® is a registered trademark of LAVIPHARM Group of Companies.
When veteran actor George Hamilton says, “Health is my passion,” he really means it. In an exclusive interview with Life Extension® Magazine, the 75-year-old star reveals his extensive and highly impressive knowledge regarding diet, supplements, exercise, longevity—and his strategy to live a natural life span of at least 120 years.
Hamilton’s Early Life And Career

It’s a pleasant surprise to discover that George Hamilton is nothing like his suntanned playboy image, although his life has included plenty of fun and laughs. Born in 1939 to well-known bandleader George “Spike” Hamilton and Anne Stevens, Hamilton spent his early years in the small town of Blytheville, Arkansas, attended school in Palm Beach, Florida, and has always considered himself to be a Southerner.
Hamilton’s extensive resume started in 1952 when he was 13. While many of his movies weren’t box office smashes, he has had his share of critical acclaim, beginning with the teenage classic Where The Boys Are (1960), which led to a Golden Globe Award as Most Promising Newcomer (male).

This was followed by Your Cheatin’ Heart in 1964, in which Hamilton portrayed country music legend Hank Williams (and which was linked to his very public relationship with President Lyndon Baines Johnson’s daughter Lynda Bird Johnson). In 1990, Hamilton was cast in the coveted role as the Corleone family lawyer in The Godfather, Part III. Hamilton’s box office successes, Love at First Bite (1979) and Zorro, The Gay Blade (1981), presented the star significant opportunities to display a notable talent for comedy.

Hamilton has worked with such prestigious directors as Vincente Minnelli and Louis Malle and had friendships with many Hollywood elite, including Elizabeth Taylor, Cary Grant, Brigitte Bardot, Judy Garland, and Sammy Davis, Jr.

Beginning in 1959 with an appearance on The Donna Reed Show, Hamilton’s long career in television continues to the present. In his 2008 book, Don’t Mind If I Do, he writes with great humor about coming in fifth place during his 2006 appearance in “Dancing With the Stars,” despite leg injuries that seriously hampered his mobility.

Theatrical appearances include several runs in the Broadway smash Chicago and a recent national tour of La Cage Aux Folles. He has also performed one-man shows and plans to tour in another in the near future, with performances in England and across the US.

Hamilton’s extensive resume is a tribute to his unusual energy, which he attributes to his constantly evolving health program.

A Passion For Health

At an age when most actors lack the energy and desire to continue working, Hamilton stands out as youthful, energetic, and eager to try new projects. He ascribes much of his zest for life to long-term healthy practices and a keen desire to learn everything he can about natural health and longevity.

“I grew up in a small Southern town where my grandfather was the town doctor,” he explains. “I was fascinated by him and even from a very young age, he would take me with him on house calls. I watched what he did and he also showed me the basics of how to assess someone’s health. He’d point out specific things to look for, such as puffiness under the eye or a thyroid band around the neck, that were quick clues to what was wrong. And then, without exception, after we left the patient, he would ask me ‘What do you think is wrong?’”

These diagnoses included social and psychological aspects, since doctors at that time were also therapists, which taught Hamilton that maintaining good health can be a very complex science.

As he grew up and began working in Hollywood, Hamilton was influenced by many well-known experts, including nutritionist and naturopathic physician Paavo Airola, nutritional experts Carlton Fredericks and Adelle Davis, Henry Bieler, MD, author of Food Is Your Best Medicine, Swiss physician and cellular therapy pioneer Paul Niehans, and Roy Walford, MD, an early advocate of caloric restriction (CR). Hamilton also learned much from fellow actors Gloria Swanson and Merle Oberon, both of whom were involved in innovative health therapies early on.

In his book, Hamilton writes, “Merle, like Gloria Swanson, was a health nut, and she got me interested in alternative medicine... It was Gloria who got me one step further, out into the twilight zone of longevity. No one treasured youth more than Gloria Swanson, whose Rolls-Royce was filled with health foods, vitamin supplements, and blenders that she was constantly buying.”
Health Practices

Hamilton meditates every day. “The minute you meditate,” he says, “you go back into homeostasis and can check yourself,” and see if you are agitated, angry, or in any other state of imbalance. Hamilton feels the benefits of meditation are both spiritual and physical, and allow him to achieve an awareness of what is going on in both body and mind.

When it comes to his health, Hamilton again refers to his grandfather’s words of wisdom: “In many cases, doctors administer things that are basically poisonous to the health. The body, when allowed to heal, will correct itself. If you have an offending substance, remove it and the body will heal itself.” Hamilton says he has tried to follow this advice by never allowing anything to get to the point where “the insult or offense to the body is irreversible.”

His health program is multilevel and complex, but there’s every sign it is working exceptionally well. His physical exercise includes regular half-hour walks and stretching exercises to prevent injuries, maintain balance, and keep ligaments, cartilage, and tendons from deteriorating—practices he recommends for everyone.

When it comes to diet, Hamilton has maintained his svelte appearance all his life by following healthy eating habits. He refers to CR advocate Roy Walford’s ideas, saying, “The only thing that we know that slows down aging is systematic undereating. It’s interesting that gluttony, and any excess, creates much more strain on the system and there’s more for the body to do. We’re not in sync with our appestat when we eat, and we don’t allow the body to catch up.” He adds that many people eat for emotional needs, but such habits can be changed.

“The worst offender is sugar,” Hamilton emphasizes. “Sugar is a terrible thing for us and getting rid of sugar is the single most important thing you can do.” He tries to eat as much as possible of greens, berries, fruits, and brightly colored vegetables, making a daily shake with such ingredients as kale, goji berries, almonds, bananas, and anything else he needs to ensure he’s getting the necessary vitamins and enzymes. Hamilton also eats a lot of fish, which he says “will regrow white and gray matter” in the nerves and brain. He uses only organic produce, citing problems with soil depletion, pesticides, and GMOs (Genetically Modified Organisms), which we should all avoid.

Don’t Mind If I Do chronicles a life of heavy drinking and all-night parties, but today Hamilton has very different ideas. “I don’t think drinking is good,” he explains. “It’s a form of poison, a nerve toxin, and I had to learn to change my ways. The latest research shows alcohol is damaging to the brain. I looked at it and realized I’ve had all I need.”

Hamilton’s list of supplements is very long, including some taken daily and others as needed when there is a specific problem that needs short-term treatment. His regular supplements include vitamins E, C, A, D, B12, B6, B complex with minerals, rutin, folic acid, selenium, zinc, TMG, CoQ10, fish oil, flaxseed, and melatonin.

While he recognizes the importance of all the supplements on his list, Hamilton feels that “the most important vitamin is vitamin E, especially for the
and I also make it my habit every morning when I wake up to get out on the other side of the bed. If I usually brush my teeth first, instead I take my shower first. I do my rituals backwards and forwards.” Hamilton emphasizes that it’s urgent to not only keep your brain alert, but to develop and nurture a sense of humor, which he demonstrated with hearty laughter throughout the interview. “The first sign of a declining brain,” he notes, “is when there’s no humor.”

Another key factor is sleep. “I try to get seven to eight hours sleep each night,” he says, “which is essential. I believe it’s anticancer and anti-Alzheimer’s.” Hamilton mentions that regular use of melatonin from Life Extension® helps him attain uninterrupted sleep each night.

A Story Of Healing

Although it’s not widely known, Hamilton lost the hearing in his left ear as a result of childhood measles, (even though his grandfather gave him penicillin). At 40, Hamilton was informed by a traditional doctor that he had damaged his auditory nerve and would not hear in that ear again.

Hamilton’s good friend Gloria Swanson advised him to go to Switzerland and see Dr. Niehans, who administered 11 syringes of an early form of organ-specific stem cells. A month later, his hearing improved and today, Hamilton has 95% hearing in this ear.

Keeping the liver clean is also important to Hamilton. “The liver is such an important organ,” he says, crediting Dr. Bieler, who advised such things as alkaline juices, string beans, and zucchini for cleansing. “Let that liver have nothing to clean or work on—you work on the liver. When you do that, it’s amazing how problems, such as bad headaches, resolve.” Cleansing the liver, he adds, gives you a sense of euphoria and can even help longtime alcoholics.

Hamilton also cleanses his colon four times a year by detoxing with herbs. “I try to keep myself as squeaky clean as I can,” he explains. He adds that most people eat the same foods day after day and may be seriously lacking in nutrients. “They are basically gaining weight and starving to death at the same time,” he says, but due to habit and lack of knowledge, most people continue these practices for a lifetime. And even when they gain some knowledge, he states, “it’s very hard to get off this system that we have, which is all done for profit.”

It’s also vital to keep the brain active, and here Hamilton recommends such methods as solving daily crossword puzzles and doing new things you are not used to. “I’m studying Spanish right now,” he explains, “and I also make it my habit every morning when I wake up to get out on the other side of the bed. If I usually brush my teeth first, instead I take my shower first. I do my rituals backwards and forwards.” Hamilton emphasizes that it’s urgent to not only keep your brain alert, but to develop and nurture a sense of humor, which he demonstrated with hearty laughter throughout the interview. “The first sign of a declining brain,” he notes, “is when there’s no humor.”

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Recent And Current Projects

In 1971, Hamilton starred in a film about daredevil Evel Knievel and is now one of the producers of a documentary about him. Currently preparing his upcoming one-man show, Hamilton looks forward to traveling in Europe and throughout the US performing it.

Continuing offers keep coming in for Hamilton to star in various reality shows or situation comedies, and he carefully considers all of them. It’s likely he may soon be on the small screen with a new series.

“I’m at an age where if I don’t want to work, I don’t work,” explains Hamilton. “I will work at the things that excite me, but you also have to spark these things yourself. You can’t wait for someone else to call you.”

But Hamilton’s main focus at the moment is on two films, one a documentary and the other a fictionalized version of the life of his close friend Sean Flynn, son of swashbuckling film star Errol Flynn. Sean Flynn was a photojournalist who disappeared in Cambodia in 1970 during the Vietnam War. A known daredevil and legendary character of the time, Flynn’s body was never found, but many people who knew him have never forgotten his charismatic personality and willingness to risk his life to get a story and photos, especially in dangerous situations.

What Makes Life Worthwhile

As a lifelong student of health, Hamilton notes, “I feel like I’m a doctor in that I’m always researching. I read so much on health and medicine that many friends call to ask me to help them find the best doctors in the world or doctors who might help them with specific conditions. I feel like it’s my calling [and] that I would have been a doctor if I hadn’t become an actor.

“My advice is to find a practitioner who knows and can diagnose your deficiencies and start balancing everything out. We’re not meant to die at 100; we’re meant to die at 120, so there’s no reason not to extend [life], no reason as long as you stay healthy.”

He adds, “My life has been blessed.”

At the age of 75, Hamilton loves spending time with his two sons, Ashley, 38, from his marriage to Alana Collins, and George Thomas, 14, from a relationship with Kimberly Blackford. When it comes to assessing his life so far, nothing seems to give him more joy.

“I may win by default,” jokes Hamilton. “There may not be any other actors around and I may get the role. Most of the guys I know flame out around this period or earlier. They don’t look good, they don’t feel good, and they close up shop. But I listen to myself and do physically what I know is necessary to make everything work.

“My life is wonderful,” he says in conclusion. “I’m really delighted.”

Summary

George Hamilton’s long career began in 1952 when he was only 13 years old and continues today. Noteworthy films include Where the Boys Are, Love Bites, and The Godfather, Part III. He has two new projects in the pipeline, a documentary and a fictionalized version of the life of his close friend Sean Flynn, son of swashbuckling film star Errol Flynn. A lifelong student of health, the 75-year-old star takes numerous supplements, believes in caloric restriction and meditation, and plans to live to the age of 120.

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

From Grass-Fed, Free Range Cows not treated with Growth Hormone (rBST)

As people age, they become more susceptible to muscle deterioration and a declining immune system. Fortunately, whey protein can have a positive impact on muscle construction and immunity due to its branched-chain amino acid profile (BCAAs) and naturally occurring lactoferrin and immunoglobulins.

Unlike many commercial brands on the market, New Zealand Whey Protein Concentrate is uniquely derived from grass-fed, free-range cows living healthy lives in New Zealand and not treated with growth hormone (rBST).

Life Extension’s New Zealand Whey Protein Concentrate offers the following:

• Non-GMO Whey Protein Concentrate!
• Naturally high levels of essential branched-chain amino acids!
• High-quality muscle-building protein!
• Easily mixes into water or milk!
• Great Taste! – Available in both natural chocolate and natural vanilla flavors.

The retail price for an 18.34 ounce container of New Zealand Vanilla Flavored Whey Protein Concentrate (Item # 01770) or for a 23.28 ounce container of New Zealand Chocolate Flavored Whey Protein Concentrate (Item # 01771) is $30. If a member purchases four bottles, the price is reduced to $19.95 per bottle. Contains milk.

To order New Zealand Whey Protein Concentrate, call 1-800-544-4440 or visit www.LifeExtension.com

References
3. Available at: http://www.innovatewithdairy.com/

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

**Vitamin D3 Softgels**

For Superior Absorption

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

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

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60 capsules (non-softgel) • Retail: $14
Four-bottle Member Price: $9.38 ea.
Most people, especially those seeking to reduce their salt intake, do not ingest enough iodine. Combining 5,000 IU of vitamin D3 with 1,000 mcg of iodine into one capsule makes taking these two nutrients economical and convenient. Due to the source of kelp, this product may contain fish and shellfish. Item # 01758

**Vitamin D3 • 2,000 IU (Natural Mint Flavor)**

1 ounce • Retail: $28
Four-bottle Member Price: $18.75 ea.
Great for travel and for those individuals who have difficulty absorbing enough vitamin D3 from softgels, this liquid vitamin D is ideal. Item # 01732
Also available without mint. (Item # 00864)

**Vitamin D3 • 7,000 IU**

60 softgels • Retail: $14
Four-bottle Member Price: $9.45 ea.
For those already obtaining 1,000-3,000 IU of vitamin D in their multi-nutrient formulas, this 7,000 IU potency is what may be needed to achieve optimal blood levels. Item # 01713

To order any of these high-potency vitamin D3 supplements, call 1-800-544-4440 or visit www.LifeExtension.com

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

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

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.
Enhance ENDOTHELIAL HEALTH

How Pomegranate Protects Against Atherosclerosis

Despite billions of dollars spent every year on cholesterol-lowering statin drugs like Lipitor® and Crestor®, cardiovascular disease continues to be the leading killer worldwide.\(^1\)\(^2\) Clearly, just lowering your cholesterol is not the entire solution, otherwise, the epidemic of heart disease would be over.

Overlooked by mainstream medical practice is the essential role that the endothelium plays in protecting cardiovascular health. The endothelium is the one-cell-thick layer that lines all of your blood vessels, down to the smallest capillaries.\(^3\)\(^4\)

Pomegranate extracts are proving to be an effective means of protecting our delicate endothelium. Studies show that pomegranate works on a number of levels to ensure cardiac health by reducing cellular cholesterol accumulation, protecting LDL from oxidation, and in lab studies, shrinking atherosclerotic plaque.\(^5\)\(^7\) In addition, pomegranate promotes supple arteries that maintain healthy blood flow and pressure to all of your tissues and organs.\(^7\)\(^8\)

Best of all, research concludes that by improving endothelial health, pomegranate supplementation lowers risk factors for heart attacks, strokes, and other cardiovascular events.\(^8\)\(^{-10}\)
Your chances of having a heart attack or a stroke depend a great deal on the health of your **endothelium**. The endothelial cells use **nitric oxide** to signal the need for relaxation to arterial muscle cells.

As we age and develop pathological conditions such as atherosclerosis, our ability to produce and respond to **nitric oxide** rapidly diminishes. Aging humans generate more oxidative and inflammatory molecules that deplete nitric oxide production.

The result is **endothelial dysfunction**, a serious condition that leads to arteries “stiffening” and losing their ability to respond to changes in blood flow and pressure. Endothelial dysfunction is often initiated as a result of oxidative stress. A major cause of damage in arterial walls is **oxidation** of **LDL** (low-density lipoprotein). Oxidized LDL is taken up by specialized receptors on endothelial cells to form atherosclerotic plaques.
In a vicious cycle, chronic inflammatory reactions cause further oxidant damage, which results in further reduction in nitric oxide availability, and finally, further reduction of endothelial control over blood flow and pressure. This cycle sets the stage for high blood pressure and all the cardiac events that can result from this condition.

Statin drugs are prescribed by physicians to reduce overall cholesterol production, thereby lowering LDL levels and helping to prevent further growth of plaques and inflammatory changes. Too often, however, statin therapy is initiated after dangerous changes have occurred in the endothelium and muscular walls of arteries.

Fortunately, extensive research demonstrates that pomegranate extracts enhance the body’s natural protective responses to prevent endothelial dysfunction, promote healthy mechanisms, and even remove oxidized LDL from arterial walls.

### Factors Of Reduced Endothelium-Dependent Dilation

Listed below are the factors that contribute to impaired endothelial-dependent dilation, resulting in arteries that are stiff and relatively unresponsive to changes in blood flow and pressure, which ultimately triggers stroke and heart attack.

- Increased production of superoxide and other reactive oxygen species in aging
- Upregulation of oxidant-producing enzymes (e.g., NADPH oxidase)
- Increased bioactivity of artery-constricting endothelin-1
- Reduced endothelial production of/responsiveness to artery-dilating compounds
- Development of vascular inflammation
- Formation of advanced glycation endproducts (AGEs)
- Increased rate of endothelial cell apoptosis (programmed cell death)
- Reduced expression of estrogen receptor alpha (in postmenopausal women)

### Pomegranate Boosts Your Body’s Defenses

Your body has natural mechanisms to protect your cardiovascular health, but they become weakened and ineffective over time.

For example, your body is equipped with specialized mechanisms that move cholesterol from tissues back to the liver for clearance. It also has specialized protein complexes that protect cholesterol from oxidizing to cause plaques. It even has its own specialized mechanisms for mopping up destructive free radicals like superoxide that promote oxidation and inflammation, and reduce vital supplies of artery-dilating nitric oxide.

Pomegranate extracts directly aid your own body’s defense mechanisms and prevent catastrophic outcomes. Pomegranate extracts:

- **Enhance** cholesterol outflow from inflammatory white blood cells, helping to reduce the risk of plaque formation.
- **Protect** vulnerable LDL molecules from the oxidation that leads to arterial wall inflammation and promotes plaque generation.
- **Boost** natural antioxidant systems, particularly superoxide dismutase (SOD), protecting vital nitric oxide and allowing the endothelium to recover from the effects of chronic oxidative and inflammatory stresses. (See sidebar on page 56 for additional benefits of supplementing directly with SOD.)
Pomegranate’s Endothelial Defense Mechanisms

Pomegranate contains a number of extremely potent antioxidant molecules including tannins and anthocyanins, which have been shown to exert important endothelial-protective, anti-atherosclerosis effects. Pomegranate’s multiple therapeutic targets include those dangerous oxidized LDL particles and the inflammatory white blood cells that stream into developing plaques, eventually causing them to block arteries and cause heart attacks or strokes.

Pomegranate contains particularly potent polyphenols that protect against LDL and HDL oxidation, which helps minimize endothelial dysfunction in its earliest stages.

A unique property of pomegranate is its ability to boost activity of a beneficial enzyme called paraoxonase-1 (PON-1), which is found in beneficial HDL and accounts for many of its “good cholesterol” features by breaking down oxidized lipids, even those that have already been taken up into plaques.

In a mouse model of coronary heart disease, treatment with pomegranate extract had a number of benefits to reduce atherosclerotic plaque. The size of atherosclerotic plaques in the animals’ aortas shrank, and the proportion of coronary arteries clogged with plaques was markedly reduced. Inside the plaques, researchers found substantial reduction in oxidative stress, inflammatory signaling molecules, and inflammatory white blood cells. And treated animals’ hearts remained normal in size, not enlarging and developing electrocardiogram (ECG) abnormalities as in control animals.

In a rat study, researchers administered the cancer chemotherapy drug doxorubicin, which has cardiotoxic effects that mimic some of the damage seen following a heart attack. Doxorubicin also produces intense oxidative stress. The group given doxorubicin plus a whole-fruit extract of pomegranate had less pronounced ECG abnormalities and beneficial reductions in heart rate compared to the group that was only given the drug. Chemical analysis of their blood revealed significant decreases in the markers of muscle damage creatine kinase (CK-MB) and lactate dehydrogenase (LDH). Levels of the beneficial antioxidant glutathione rose significantly in treated animals as well. Microscopic examination of heart tissue demonstrated protection against muscle cell damage caused by the drug.

The previous two studies show pomegranate’s great promise in preventing atherosclerosis and protecting heart muscle from oxidant damage. A third study, however, illustrates that pomegranate juice can, in fact, slow development of even advanced athero-

What You Need To Know

Endothelial Dysfunction

- Your endothelium is a super-thin layer of cells lining the arteries that control blood flow and pressure.
- But the endothelium’s regulatory abilities fade with age, the victims of ever-present oxidant stress and inflammation.
- Poor endothelial health is the primary factor in the development of stiff, unresponsive, atherosclerotic arteries, which leads to heart attacks and strokes.
- Pomegranate extracts contain a host of natural molecules that gently assist your body in restoring its own natural endothelial defense mechanisms.
- Pomegranate extracts protect LDL cholesterol from dangerous oxidation, and enhance activity of the body’s antioxidant mechanisms.
- Studies show that pomegranate supplementation improves endothelial health, which may reduce the risk for heart attacks, strokes, and other cardiovascular events.
- Adding an oral superoxide dismutase (SOD) supplement further promotes endothelial defense by bolstering natural antioxidant mechanisms.
- Some members use formulas that provide standardized pomegranate and a special SOD-boosting compound that is protected against degradation in the digestive tract.
Sclerosis. Here, scientists used young mice genetically programmed to develop atherosclerosis, treating them with pomegranate juice or placebo for two months. Pomegranate juice intake led to increased PON-1 activity, which protects the function of HDL in transporting cholesterol out of arteries and back to the liver for disposal. PON-1 also reduced the amount of oxidized LDL taken up by 31% in certain inflammatory white blood cells compared with controls.

Remarkably, pomegranate supplementation also increased the rate of cholesterol flow out of those immune cells by 39%. Compared with placebo-treated mice, supplemented animals had a reduction in the size of plaques in their arteries of 17%. This is the first study to show so clearly that pomegranate juice supplementation is capable of attenuating the development of even advanced atherosclerosis.

A late 2013 study reveals still more about the potential role of pomegranate juice and extracts in protecting endothelial health. An early stage in the development of atherosclerosis is the accumulation of oxidized LDL in inflammatory cells called macrophages. Israeli scientists found that by adding pomegranate juice to such inflammatory cells in combination with a statin drug (simvastatin), they could significantly improve the statin’s ability to block production of cholesterol in the cells. Moreover, pomegranate increased the statin’s ability to diminish oxidative stress. These results reveal the tremendous potential for pomegranate to supplement existing benefits of statins, perhaps allowing lower doses of these synthetic drugs.

Superoxide Dismutase
For Supercharged Antioxidant Protection

Your body is equipped with many self-defense mechanisms to protect itself from endothelial dysfunction. Among these is a set of antioxidant enzyme systems that can help convert dangerous reactive oxygen species into water and oxygen molecules. Among the most prominent of these enzymes is superoxide dismutase, or SOD. SOD is found throughout the body, especially in tissues exposed to the most extreme oxidant stresses, but it is used up in the process of fighting those stresses.

Pomegranate supplementation can boost SOD levels as part of its self-healing actions, but you can also supplement directly with SOD. SOD has been used for years as an injection to benefit people with joint disorders, such as arthritis, and those receiving radiation therapy for cancer. Oral supplementation with SOD was not practical until recently, because the enzyme is rapidly digested in the stomach.

A form of the SOD enzyme has been invented that protects it from stomach digestion. This form is known as GliSODin®, since it contains grain-derived gliadin proteins that envelop the SOD and keep it from destruction.

Studies show that oral supplementation with GliSODin® significantly elevates circulating antioxidant enzyme activities and increases cellular resistance to oxidative damage. At the same time, GliSODin® prevented oxidative destruction of mitochondria, the cellular energy sources.

In human studies, GliSODin® was effective in controlling the intima-media thickness of the carotid artery (the main artery to the brain and an important predictor of cardiovascular risk) and in boosting antioxidant activity and controlling inflammation in athletes during a high-intensity workout. And in mice undergoing restraint stress (a model of the impact of stress on endothelial function), animals treated with GliSODin® had better spatial learning memory than control animals, demonstrating the value of controlling oxidant stress throughout the body.
Human Studies Support Pomegranate

Pomegranate’s ability to mobilize the body’s own self-defense forces against endothelial dysfunction are validated by human studies. A dose of 150 mL of fresh pomegranate juice once daily for two weeks in patients with hypertension demonstrated reductions in both systolic (top number) and diastolic (bottom number) blood pressures. These changes were accompanied by significant decreases in levels of vascular cell adhesion molecule-1 (VCAM-1), an important endothelial-produced inflammatory protein.8,34 These changes after such a short period indicate the potential for long-term benefit of pomegranate supplementation on blood pressure and the inflammation that raises risk for heart attack and stroke.8

One common way of determining endothelial function and early atherosclerosis risk is to measure the thickness of inner and middle layers of the arterial wall, where the endothelium and muscle layers lie, respectively.55 This measure, called intima-media thickness (IMT) after the names of those layers, is an excellent predictor of future cardiovascular events.36 Increased IMT is associated with vascular risk factors and cardiovascular diseases.36

In a study of pomegranate juice supplementation in a group of people who already had increased IMT, the results showed those who did not consume the pomegranate had a 9% increase in IMT over one year. Those who did drink pomegranate juice had an average reduction in IMT of up to 30%.9 This was

Enhancing HDL’s Ability To Remove Arterial Plaque

Scientists long ago documented the ability of HDL (high-density lipoprotein) to remove cholesterol affixed to arterial walls and transport it to the liver for safe disposal. This is why it is so important to maintain HDL levels above 50 mg/dL of blood and follow steps Life Extension® has outlined to ensure optimal reverse cholesterol transport of lipids away from the arterial wall. HDL does more than just cleanse arterial walls of plaque. It also protects LDL against oxidation, while inhibiting chronic inflammation, vascular adhesion molecules, and platelet activation—factors that can all lead to atherosclerosis.

For HDL to perform its vital functions, an enzyme called paraoxonase-1 (PON-1) is attached to its surface. As humans age, PON-1 levels markedly decline, thereby reducing the ability of HDL to protect against heart attack and stroke. This phenomenon helps explain the onset of accelerated atherosclerosis, where within a period of only a few years, an aging person’s healthy arteries rapidly occlude with plaque.

The age-related reduction in PON-1 may also explain studies showing that statin drugs lose their benefit in certain aging populations, since the effects of statins are no longer sufficient to protect against the multiple factors involved in the development of atherosclerosis in the elderly.52-54 Lipid peroxidation is a free-radical reaction that severely damages cell membranes and is implicated in a host of degenerative diseases. PON-1 blocks destructive lipid peroxidation reactions,55-58 making it a crucial enzyme for aging humans to maintain. PON-1 is anchored to the surface of HDL and is emerging as a formidable defense against atherosclerosis, diabetes, stroke, arthritis, and certain forms of cancer.

Pharmaceutical companies would pay a king’s ransom for a drug that elevates PON-1 levels in the body. Fortunately, scientists have discovered low-cost natural methods to elevate PON-1, such as consuming pomegranate.
accompanied by an 83% increase in the patients’ levels of the beneficial antioxidant enzyme PON-1. Additionally, levels of oxidized LDL dropped by 90%, further reducing risk of heart attack or stroke, probably related to the fact that total antioxidant status was increased by 130% after a year of pomegranate supplementation. These beneficial changes were accompanied by a 12% reduction in systolic blood pressure over one year.9

A subsequent study revealed that pomegranate supplementation also reduced progression of IMT thickening in those subjects with the worst oxidative stress and highest triglyceride/lowest HDL groups. These studies provide direct evidence of how pomegranate ramps up the body’s protective responses to reduce the risk of cardiovascular disease.

In a remarkable 2014 study, researchers found that adding pomegranate extract to the cholesterol-lowering drug simvastatin lowered dangerous production of reactive oxygen species in white blood cells from patients with high cholesterol by 30%, compared with only an 18% decrease in those on the drug only.37 Similarly, the pomegranate-plus-simvastatin group saw a significant 48% reduction in triglyceride levels, which did not fall in the drug-only group.37

Pomegranate seed oil contains punicic acid, a beneficial fatty acid unique to pomegranate. Lab studies have shown it to have powerful anti-atherogenic effects.38 A human study demonstrated that after four weeks of pomegranate seed oil, 400 mg twice daily in people with high cholesterol, their triglyceride levels fell from 306 mg/dL to 244 mg/dL, and their ratios of triglyceride to HDL cholesterol (an important measure of cardiovascular risk) fell from 7.5 to a safer 5.7. Supplemented patients also had a beneficial increase of 5 mg/dL in HDL-cholesterol, which fell by 0.77 mg/dL in placebo recipients.38

Editor’s note: Triglyceride levels should optimally be below 100 mg/dL. Fish oil and the prescription drug metformin can sharply lower triglyceride levels.

Summary

Your endothelium, the thin layer of cells lining your blood vessels, is the major regulator of blood flow and pressure, communicating with the smooth muscle cells via signaling molecules including nitric oxide.

Aging increases oxidant stresses that destroy nitric oxide, while simultaneously reducing protective antioxidant mechanisms. This leads to atherosclerosis, formerly known as “hardening of the arteries,” which in turn, is the major cause of heart attack and stroke. Pomegranate extracts act via several different, but complementary mechanisms to restore the body’s endothelial defenses, lowering risk factors for a cardiovascular event, and helping to keep arteries supple and youthful. Pomegranate extracts have been shown to promote cholesterol outflow from macrophages, to enhance natural antioxidant systems like superoxide dismutase (SOD), and to directly protect LDL from oxidant damage and resulting inflammation.

A robust form of the antioxidant enzyme SOD has been developed that enhances SOD activity beyond what is provided by pomegranate. Studies show that this product, GliSODin®, survives passage through the stomach to boost SOD levels, which may reduce cardiovascular risk by improving endothelial health.48
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


A bottle of 60 vegetarian capsules of Advanced Olive Leaf Vascular Support with Celery Seed Extract retails for $36. If a member buys four bottles, the price is reduced to $24 per bottle.

References
1. Phytother Res. 2008 Sep;22(9):1239-42.

Benolea® is a registered trademark of Frutarom Netherlands B.V.
Celery3nB™ is a trademark of Anderson Global Group, LLC.
The retail price for a bottle containing 90 softgels is $30. If a member buys four bottles, the price is reduced to $20.25 per bottle. Each bottle lasts for three months.

The same Super K formula consisting of vitamin K1, vitamin K2 (MK-4), and vitamin K2 (MK-7) can be found in the Life Extension® Super Booster. If you take the Super Booster, you do not need additional Super K with Advanced K2 Complex.)

References

Warning to Coumadin® (warfarin) Drug Users: Patients prescribed vitamin K-antagonist anticoagulant prescription drugs like warfarin should consult their physician before taking vitamin K supplements like Super K and Super Booster. There is evidence, however, that users of drugs like warfarin could benefit from a consistent low dose of supplemental K. Ask your doctor if you can take a low dose (45 mcg a day) of vitamin K2 in the long-acting MK-7 form for the purpose of stabilizing your INR levels and also protecting your body against long-term vitamin K deficit. Do not initiate any form of vitamin K supplementation without full cooperation of your treating doctor, as your doctor may need to increase your dose of warfarin to compensate for your vitamin K supplement. Life Extension® provides several forms of low-dose vitamin K for physician consideration.
Optimal heart health, including circulation, depends on the functioning of our **endothelium**—the thin layer of cells that lines the heart and its blood vessels.

Research has shown that **pomegranate** and **superoxide dismutase** can help maintain healthy endothelial function and circulation.

**POMEGRANATE POWER—THE NEXT GENERATION**

**Endothelial Defense™** provides **Full-Spectrum Pomegranate™** with active constituents of seed, flower, and fruit along with a proprietary **superoxide dismutase** (SOD) that survives stomach acids for absorption into the bloodstream.¹⁻⁸

The unique blend of **pomegranate** polyphenols in **Endothelial Defense™** promotes youthful lipid and glucose metabolism while regulating inflammatory factors.⁹

A bottle containing 60 softgels of **Endothelial Defense™ with Full-Spectrum Pomegranate™** retails for $56. If a member buys four bottles, the price is reduced to $39 per bottle. Contains soybeans and wheat.

**References**

The 2014 Genetics of Aging and Longevity conference was held in Sochi, Russia, shortly after the 2014 Winter Olympics had been held in that city. The conference attracted many of the world’s leading researchers whose work is devoted to fighting the disease known as aging.
Frailty Index

Arnold Mitnitski, PhD, (Professor, Dalhousie University, Halifax, Canada) has spent much of his career seeking to study and validate a quantitative measure similar to biological age: a frailty index. A high frailty index would indicate a high probability of increasing health problems and a high probability of becoming institutionalized.8

Although people are living longer, their health span has not increased to the same extent. In Europe, men spend about one-fifth and women spend about one-quarter of their lives in a state of disability.9 In the United States, 95% of Medicare costs are spent treating persons with two or more chronic diseases.10

Dr. Mitnitski’s frailty index is a quantified composite of scores related to strength, mobility, cognition, nutrition, sleep, emotion, etc.11 He found that the first activities of daily living to become impaired with increasing frailty are bathing, cooking, and managing medication.12 He also found that for any frailty index value, the mortality rate among men is higher than the mortality rate among women.11 Women tolerate stress resulting from health deficits better than men. Long-lived males are those who do not accumulate health deficits.13

Low Temperature Organ Preservation

Gregory Fahy, PhD, (Vice President and Chief Scientific Officer, 21st Century Medicine, Fontana, California) is one of the world’s leading authorities on preserving organs at extremely low temperatures. Many people who are otherwise healthy die because of the failure of a single bodily organ—most often the heart, lung, kidney, or liver. Dr. Fahy believes that replacement of failed cells, tissues, or organs could cause over 30% of all deaths in the United States to be substantially postponed—increasing the chance of living to age 90 by more than 10 times.14

Unfortunately, the supply of transplantable organs is much less than the demand. There are long waiting lists of potential organ transplant recipients, most of whom die before an organ becomes available. In the United States, it estimated that only about 25% of the potentially needed organ transplants are carried out.14 Even when organs are transplanted, they may be poorly matched to the recipient, requiring immune suppression measures that decrease the quality and quantity of life of the recipient.15
Dr. Fahy mentioned progress in tissue engineering, which should result in creation of organs from recipient stem cells.\(^{16}\) This would eliminate problems with immune system compatibility. Transplantable organs are highly perishable—having a four- to 48-hour storage limit.\(^{17}\)

Many organs deteriorate too much before they can be used. Dr. Fahy’s work is devoted to developing means to preserve transplantable organs for decades (if not centuries) by cooling to extremely low temperatures.

Freezing normally occurs when tissues or organs become too cold, but since 1984, Dr. Fahy has pioneered the use of cryoprotectant (medical-grade antifreeze) solutions that result in vitrification (glass) rather than freezing (ice).\(^{18}\) His first success was vitrification of mouse embryos.\(^{19}\) Unfortunately, many cryoprotectants are too toxic to be of use for preserving animal tissues or organs.\(^{20}\)

After nearly 20 years of research, Dr. Fahy and his colleagues were able to develop a vitrifying cryoprotectant solution that is nontoxic enough for preserving large organs.\(^{21}\) Using his new cryoprotectant solution, Dr. Fahy’s team was able to cool a rabbit kidney to \(-130^\circ\text{C} (-200^\circ\text{F})\), rewarm the kidney, and transplant the kidney back into the rabbit such that the rabbit was able to survive with only the rewarmed kidney.\(^{22}\) The kidney was not completely undamaged, however. Blood flow rates in the inner part of the kidney are much less than in the outer part, which means there will be much less saturation of vitrifying cryoprotectant into the tissue of the inner kidney when the kidney is perfused. Also, ice can form more readily on rewarming than upon cooling.\(^{23}\) Dr. Fahy described methods he and his team have developed to overcome these problems, such that he is hopeful that they can demonstrate more successful cryopreservation of kidneys in the near future. The Life Extension Foundation\(^*\) has funded much of Dr. Fahy’s research.

**Organs From Stem Cells**

Shay Soker, PhD, (Professor, Wake Forest School of Medicine, Winston-Salem, North Carolina) is attempting to create transplantable artificial organs from stem cells. Creating a scaffold for the stem cells is much less difficult than creating a network of blood vessels within the scaffold. He has nonetheless had some preliminary success in experiments with animal livers.\(^{24,25}\)

About one-fifth of human kidneys obtained for transplant become unusable and are disposed of.\(^{26}\) Dr. Soker has experimented with removing cells from pig kidneys to create a scaffold for stem cells. The pig kidneys from which he had removed the pig cells retained functional blood vessels. He hopes that this procedure can be applied to discarded human kidneys because his process removes antigens, thereby reducing problems of immune system incompatibility that usually accompanies transplantation.\(^{26}\) Because of the immune system suppressant drugs that kidney transplant recipients must take, those patients are vulnerable to infection, and 40\% of those who took the immune system suppressants for 20 years developed cancer.\(^{27}\)

Dr. Soker has also removed cells from pig pancreases to obtain a pancreas scaffold that can be used for seeding with stem cells. He is hopeful that similar decellularized pig pancreases could be transplanted into human diabetes patients.\(^{28}\) In addition, Dr. Soker has been working to develop a completely artificial cornea—having a scaffold of gelatin, which would eliminate the need to obtain corneas from human cadavers.\(^{29}\)

**Asymmetric Cell Division**

Mikolaj Ogrodnik (Graduate student, Newcastle University, United Kingdom) has been studying asymmetric cell division (where cells divide without both sides being the same) as a means of rejuvenation. Single-celled organisms like yeast and bacteria can...
rejuvenate when damaged proteins go into one of the new cells created by cell division, allowing the other cell to be rejuvenated.\textsuperscript{30} More recently it has been shown that stem cells in fruit flies are rejuvenated by a similar method.\textsuperscript{31} Ogrodnik was able to determine that this also occurs in mammalian cells.\textsuperscript{32} Gaining control of this process could facilitate tissue rejuvenation in humans.

**Molecular Mechanisms Of Hormesis**

Alexey Moskalev, DSc, (Professor, Syktyvkar State University, Syktyvkar, Russia) was one of the conference organizers. His research has been focused on studying the molecular basis of hormesis: The fact that a small amount of stress can lead to greater resistance to stress in the future.\textsuperscript{33} For example, a person who undergoes the stress of exercise becomes more generally resistant to harmful effects of many forms of stress.\textsuperscript{34}

Dr. Moskalev has shown that low-dose radiation produces a hormesis effect in fruit flies. He has studied the molecular basis of this hormesis, which includes induction of heat shock proteins and improved DNA repair.\textsuperscript{35} He believes that a stress-induced hormesis response can result in changes in the way genes are expressed, leading to improved likelihood of longevity.\textsuperscript{36}

**Databases And Computation For Aging Research**

Joao Pedro de Magalhães, PhD, (Senior Lecturer/Associate Professor, University of Liverpool, Liverpool, United Kingdom) is a leading proponent of the use of massive amounts of data and computational resources to understand and prevent aging.\textsuperscript{37,38} He described the Human Ageing Genome Resources website (www.genomics.senescence.info) he and his colleagues created, which is a collection of databases and other resources to assist those researching aging. GenAge is a database of genes related to aging; AnAge is a database of other data related to aging from thousands of species; GenDR is a database of genes associated with calorie restriction; and LongevityMap is a database of human genetic variants associated with longevity.\textsuperscript{39,40}

Dr. de Magalhães has also created a website called www.senescence.info, which has a wide variety of information related to aging, including suggested books and book reviews, advice to students regarding aging research, a Who’s Who in gerontology, an anti-aging medicine page, and much more.

Dr. de Magalhães not only collects data, he analyzes it. In one study, he found 56 genes that become increasingly expressed with age, and 17 genes that are decreasingly expressed.\textsuperscript{41} He believes that many of the genes that are increasingly expressed with age are an adaptation to aging deficits rather than a cause of aging—such as genes that produce enzymes to degrade the increasing number of malformed proteins that accumulate with age.\textsuperscript{41} On the other hand, genes that are less expressed with age are more likely to actually cause aging—such as genes that produce components of the energy-producing mitochondria of cells.\textsuperscript{41}

Dr. de Magalhães received a grant from the Life Extension Foundation\textsuperscript{®} that enabled him to sequence the genome of the bowhead whale. The bowhead whale is the longest-living mammal, having a life span of 200 years or more.\textsuperscript{42}

**Human Artificial Chromosomes**

Ksenia Yuryeva, MD, (Research Fellow, Human Stem Cells Institute, Moscow, Russia) has been working on the development of human artificial chromosomes as a means of gene therapy. Gene therapy attempts to correct diseases due to inherited genetic defects.

Gene therapy most often uses viruses to transport desired genes into the cell nucleus of the subject being treated. There are two problems with this approach. First, viruses are unable to carry very much genetic material due to their small size.\textsuperscript{43,44} Second, using a virus to transport a gene into the DNA of the subject’s chromosome reduces control over where in the target chromosome the gene would be inserted. Insertion in the wrong location could cause cancer or have other undesirable consequences.\textsuperscript{43}

The use of human artificial chromosomes overcomes both of these problems by providing a new chromosome in addition to the ones that already exist in the cells of the subject. Dr. Yuryeva reported on the use of artificial human chromosomes to deliver large genes to correct muscular dystrophy in mice that have the disease due to genetic defects.\textsuperscript{45} Human artificial chromosomes have also been used to create induced...
pluripotent stem cells.\textsuperscript{46,47} The development of human artificial chromosomes creates the possibility of easily delivering to everyone many beneficial genes that could greatly increase health and longevity.

**Roundtable Discussions**

In addition to the formal presentations, this conference also held roundtable discussions. This was literally a round table of about 30 participants, with an additional 20 or more participants sitting to the side. I will attempt to summarize some of the comments made in these discussions without identifying individual commentators.

**Theories Of Aging**

Not surprisingly, there was much discussion about theories of aging. Aging in animals isn’t simply a matter of wear-and-tear as with an automobile. Animals, unlike cars, have built-in repair mechanisms, such as DNA repair enzymes or the ability to degrade defective proteins. Aging is as much a matter of defective repair as of wear-and-tear.

One researcher suggested that aging isn’t only a loss of function, it is a loss of control, such that some functions become excessive. The chronic inflammation of old age is an example of a beneficial biological response that has gone out of control. Another researcher said that chronic inflammation is due to an increase in garbage in cells and tissues. The inflammatory response to the garbage results in the creation of even more garbage.

Another researcher noted that aging is drying because babies are soft and wet, whereas the elderly are hard and dry. Someone else commented that aging is unpleasant and unattractive, and that anyone claiming otherwise is just attempting to rationalize out of despair. Someone else said that chronic diseases drive the aging process as much as aging results in chronic diseases.

**Personalized Medicine**

There was also a roundtable on personalized medicine. The phrase “personalized medicine” has recently come to mean genomic information to diagnose and treat patients, as well as to assess probable future risks of disease.\textsuperscript{48} A physician complained that geneticists have hijacked the phrase “personalized medicine” because for him treating his patients has always been a very personal matter. A researcher said that personalized medicine should include not just genetic information, but blood tests along with signs and symptoms.

There was a discussion of the November 2013 letter from the Food and Drug Administration (FDA) to 23andMe (23andMe.com) telling that company to stop marketing their product until receiving FDA approval to do so. 23andMe was providing genetic and health information on the basis of DNA analysis of saliva samples.\textsuperscript{49} Someone said that the FDA’s action is contrary to the “My Body, My Rights” campaign by Amnesty International, which states everyone has a right to unrestricted access to information regarding their own health. On this basis, governmental and medical paternalism is interfering with those rights.

The FDA’s position is that the 23andMe tests had not been adequately validated, and that the FDA must protect consumers from misinformation that could damage their health.\textsuperscript{49} There was also concern that consumers might misuse information they were receiving in the absence of professional help with medical decisions.\textsuperscript{50} Questions were raised about what people should and should not be told, but no agreement was reached.

“Quantified Self-Improvement” was mentioned in reference to the growing number of health-monitoring devices on the market that are providing increasing amounts of personal health and activity data to consumers, as well as in reference to the fact that there is no stopping consumers from attempting self-diagnosis and treatment on the basis of information they find on the Internet.

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


As we get older, our eyes become vulnerable to a variety of insults that can cause irritation and dry eye. With just a few drops of the proper eye lubricant, eye irritation stemming from dryness may be alleviated.

**Brite Eyes** provides a powerful dose of two well-established lubricants in every drop, soothing eye discomfort without irritation.

Hydroxymethyl-cellulose and glycerin are FDA-approved for ophthalmic use and are uniquely preserved with potent antioxidants and anti-glycating agents.

The **Brite Eyes** formula is buffered in a way to make it soothing to the eye. The suggested use of **Brite Eyes III** is to apply 1 to 2 drops in each eye every day.

Each box of **Brite Eyes III** contains two individual vials that provide 5 mL each. The reason for putting **Brite Eyes** into individual vials is to reduce the risk of bacterial contamination. Having small vials also makes it convenient for consumers to keep **Brite Eyes** readily accessible at home, the office, in one’s purse or pocket, and other places where access to a soothing eye drop is needed.

The retail price for a box containing two 5 mL vials of **Brite Eyes III** is $34. If a member buys four boxes, the price is reduced to $24 per box.

To order **Brite Eyes III**, call 1-800-544-4440 or visit www.LifeExtension.com
ULTIMATE PROSTATE PROTECTION

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

**Ultra Natural Prostate** formula provides the latest scientifically validated, standardized botanical extracts shown to promote healthy prostate function. No other prostate protection formula provides such a broad array of nutrients to support the multiple factors involved in promoting the aging prostate gland. Here are the ingredients in the **Ultra Natural Prostate** formula:

- **Standardized lignans** convert to enterolectone in the intestine, which is then absorbed into the bloodstream to provide support for prostate cells against excess estrogen levels.1,3
- **AprèsFlex** supports normal inhibition of S-lipoxygenase or S-LOX, an enzyme that is associated with undesirable cell division changes.4,5
- **Stinging and Dwarf nettle root extracts** help support prostate cells against excess estrogen levels.6,7
- **Saw Palmetto CO2 extract** helps inhibit dihydrotestosterone (DHT) activity in the prostate, helps support normal urinary flow, and helps regulate inflammatory reactions in the prostate.8,9
- **Pygeum** (**Pygeum africanum**) extract helps suppress prostate-glandin production in the prostate and supports healthy urination patterns.9,13
- **Pumpkin seed oil**, from select pumpkins, enhances the composition of free fatty acids and augments saw palmetto’s benefits.14,16
- **Beta-sitosterol** enhances the protective effects of other botanical extracts and helps improve quality of life.17,19
- **Graminex** Flower Pollen Extract™, has been shown to help relax the smooth muscles of the urethra and help regulate inflammatory reactions.20,22
- **Boron** has been shown to slow elevation of prostate-specific antigen (PSA).20,25
- **Lycopene** supports efficient cellular communication, helps maintain healthy DNA, regulates hormonal metabolism, and promotes healthy prostate size and structure.26,32

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

- **Saw Palmetto CO2 extract** (fruit) [providing 272 mg total fatty acids] 320 mg
- **Graminex Flower Pollen Extract**™ (from rye) 252 mg
- **Stinging and Dwarf nettle extracts** (root) 240 mg
- **Beta-Sitosterol** (from pine) 180 mg
- **Phospholipids** 160 mg
- **Pygeum extract** (bark) 100 mg
- **Pumpkin seed oil** [providing 170 mg total fatty acids] 200 mg
- **AprèsFlex** Indian frankincense (**Boswellia serrata**) extract (gum resin) [providing 14 mg AKBA®] 70 mg
- **Proprietary Enterolactone Precursors Blend** (HMRlignan™ Norway spruce (Picea abies) (knot wood) and Flax (seed) lignin extracts) 20.15 mg
- **Lycopene** [from natural tomato extract (fruit)] 10 mg
- **Boron** (as Albion® bororganic glycite) 3 mg

*3-O-acetyl-11-keto-ß-boswellic acid

A bottle of 60 softgels of **Ultra Natural Prostate** retails for $38. If a member buys four bottles, the price is reduced to $26.25 per bottle. If a member buys 12 bottles, the price is $24.

Contains soybeans.

To order Ultra Natural Prostate, call 1-800-544-4400 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.
Milk thistle extract is one of nature’s most potent weapons to support liver health. Until recently, however, the technology hasn’t been available to fully harness this plant’s full benefits. The problem has been that the star component of milk thistle, called silybin, does not dissolve well in water. This makes it difficult for your body to absorb all of it.

Scientists have developed a novel technology to overcome silybin’s poor bioavailability. The solution is to mix silybin with a nutrient called phosphatidylcholine. Phosphatidylcholine facilitates transport across the intestinal lining into the bloodstream, making it an ideal “carrier molecule” for silybin. Scientists believe that phosphatidylcholine molecularly bonds to silybin, ushering it through the membranes of cells in the intestinal tract.

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

The suggested twice daily dosage of one softgel provides:

- **Milk Thistle Phospholipid Proprietary Blend**
  - Milk Thistle Extract (seed) [std. to 80% silymarin (480 mg), 30% Silybin (180 mg), and 8% Isosilybin A and Isosilybin B (48 mg)], Phospholipids
  - **760 mg**

- **SILIPHOS® Phytosome Milk Thistle Extract** (seed) [providing 47.52 mg silybin]
  - **160 mg**

A bottle containing 60 softgels of the new absorption-enhanced Milk Thistle retails for $28. If a member buys four bottles, the cost is reduced to $18.75 per bottle—a savings of nearly one-third!

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

Contains soybeans.

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

To order European Milk Thistle with Advanced Phospholipid Delivery call 1-800-544-4440 or visit www.LifeExtension.com

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

The skin on the top of your hands can reveal your true age. Yet, it often remains an afterthought in most skin-care routines.

Over time, daily activities and unprotected exposure to sunlight and environmental factors wreak havoc on the thin skin on the hands. The resulting damage manifests itself as age spots, wrinkles, dryness, and crepiness that make you look older than you are.¹

Scientists have formulated innovative ingredients that address the underlying causes of these aforementioned tell-tale signs of aging. These topical compounds have been combined in a unique serum to provide an effective, comprehensive approach that can potentially turn back the “hands of time.”
Fade Unsightly Pigmentation

Aging hands often display the cumulative effects of sun exposure, such as hyperpigmentation. Sun-damaged skin stimulates the overproduction of the pigment melanin, which leads to discoloration and age spots. The good news is that two ingredients, N-acetyl glucosamine and retinol, are clinically proven to defend against the relentless assault of UV rays and help fade unwanted pigmentation.

Based on these studies, it is clear that N-acetyl glucosamine and retinol effectively repair sun-damaged skin and lighten hyperpigmented spots to give aging hands a youthful appearance.

While glucosamine is well-known for its joint-protective properties, it has gained attention for its ability to inhibit a key processing step in melanin formation. Since glucosamine is unstable in topical preparations, scientists have turned to a more stable form, N-acetyl glucosamine, for human research. In a study involving 50 women aged 25 to 55, topical N-acetyl glucosamine was shown to be superior to a placebo in decreasing hyperpigmentation after eight weeks as assessed by an image analysis technique. The researchers also noted the treatment was well-tolerated.

Another compound that has shown promise in protecting the skin on the top of the hands is a form of vitamin A called retinol. In humans, topical retinol was found to promptly start the repair process of aged skin by reducing matrix metalloproteinases and enhancing collagen synthesis in just seven days.

Longer-term studies are equally impressive. In one study, participants using topical retinol for eight to 12 weeks improved skin brightness and elasticity while decreasing skin roughness compared to baseline. Additionally, researchers reported that 80% of the participants experienced marked reductions in hyperpigmentation.

Based on these studies, it is clear that N-acetyl glucosamine and retinol effectively repair sun-damaged skin and lighten hyperpigmented spots to give aging hands a youthful appearance.

Restore Volume And Youthful Plumpness

As we get older, the loss of subcutaneous fat on the top of the hands gives way to a skeletal-like appearance, with increased visibility of tendons and veins. Although procedures exist for transferring fat from one part of the body to the hand, they are not an option for many due to high cost. Scientists have discovered that two plant-based extracts, sarsasapogenin and macelignan, work synergistically to favorably target fat cell (adipocyte) development in aging hands.

Topical Compounds For Younger-Looking Hands

- N-acetyl glucosamine modulates melanin production to reduce hyperpigmentation and lighten age spots.
- Retinol stimulates collagen synthesis and prevents its degradation to promptly repair sun-damaged skin.
- Sarsasapogenin and macelignan promote fat cell formation in aging hands to restore fullness and plumpness.
- Macadamia oil contains palmitoleic acid, squalene, and vitamin E to hydrate the skin and retain moisture for reducing dryness.
- Acetyl octapeptide-3 attenuates muscle contraction to smooth out skin crepiness and wrinkling on the top of the hands.
Sarsasapogenin is a compound isolated from the roots of the plant *Anemarrhena asphodeloides*. It has a long history of use in traditional Chinese medicine for combating depression and diabetes.\(^8,9\) In the laboratory, researchers found that sarsasapogenin stimulated the differentiation of adipocytes (fat cells) by 201% and proliferation by nearly 32%.\(^10\) This is important in restoring structural support for tissues in the hands.

**Macelignan**, a polyphenolic compound from nutmeg seeds, has been shown to switch on genes that traffic fatty acids into these newly formed adipocytes for storage.\(^11,12\) This mechanism increased adipose tissue volume by an average of 12% compared to a placebo in 30 human volunteers after 28 days.\(^13\)

Together, sarsasapogenin and macelignan promote fat accumulation in newly formed adipocytes. The topical application of these two compounds may restore the fullness and plumpness usually seen in youthful hands.

**Hydrate Dry Skin**

The top of the hands is a common site for dry and flaky skin. One solution for this condition is macadamia oil, which contains a high concentration of hard-to-find **palmitoleic acid**.\(^14\) This monounsaturated fatty acid is a component of sebum, an oily substance secreted by the sebaceous glands that nourishes and hydrates the skin.\(^15\) Macadamia oil also contains **squalene**, a natural emollient,\(^16,17\) as well as the potent polyphenol vitamin E, which plays a crucial role in retaining moisture to reduce dryness.\(^18,19\)

**Smooth Out Wrinkles And Crepiness**

Peptides, derived from biological molecules, are quickly becoming mainstay ingredients in skin-care products due to their ability to penetrate more deeply into the layers of the skin where they exert a wide range of biological effects.\(^20\) Among peptides, **acetyl octapeptide-3** stands out for resolving the issue of wrinkles and crepiness on the top of the hands.

Excessive muscle contractions is one mechanism leading to the formation of wrinkles.\(^21\) Acetyl octapeptide-3 works by interfering with the function of the SNARE protein complex, which triggers the release of neurotransmitters that signal muscles to contract.\(^21\) By modulating muscle contraction, this unique peptide smooths out crepiness and diminishes the appearance of wrinkles.

In a clinical trial with 17 volunteers, daily application of acetyl octapeptide-3 for 28 days reduced wrinkle depth by up to 63%.\(^22\)
Summary

Scientists have formulated a new serum with all these ingredients to repair skin damage seen on the top of the hands. These topical compounds, including N-acetyl glucosamine, retinol, sarsasapogenin, macelignan, macadamia oil, and acetyl octapeptide-3, have been scientifically proven to lighten age spots, reduce dryness and crepiness, and diminish wrinkles, all of which promote the appearance of younger-looking hands.

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

The retail price for a bottle of 120 capsules of Super MiraForte with Standardized Lignans is $62. If a member buys four bottles, the price is reduced to $42 per bottle.

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

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.
Occasional constipation is one of the most frequent gastrointestinal complaints in the United States, particularly among women and the elderly. To address this issue, Life Extension® offers a dose-adjustable nutritional solution—Effervescent Vitamin C-Magnesium Crystals—to provide immediate relief from occasional constipation.

**THE PROBLEM**

A series of rhythmic muscle contractions move food through the digestive tract. But highly processed foods and a lack of quality nutrition can occasionally result in normal but temporarily ineffective movement of waste through the colon.

**NUTRITIONAL SUPPORT**

Vitamin C is an antioxidant that scavenges free radicals in the body and protects tissues from oxidative stress. Vitamin C is a vital cofactor to the formation of collagen, the connective tissue that supports arterial walls, skin, bones, and teeth. Magnesium is a cofactor in hundreds of enzymatic processes within cells. It helps maintain healthy blood pressure levels already within normal range, improves the metabolic profile and, beneficially impacts insulin resistance and inflammation. Research shows many Americans do not obtain adequate magnesium in their diets.

Effervescent Vitamin C-Magnesium Crystals has been developed to help provide relief from occasional constipation.

Effervescent Vitamin C-Magnesium Crystals can be used in varying doses depending on individual need. The suggested starting dose should be one (1) level teaspoon of Effervescent Vitamin C-Magnesium Crystals, taken on an empty stomach, mixed in 8 ounces of water. Follow immediately with drinking 8 additional ounces of water.

Each level teaspoon (approx 6 grams) provides:

- **4,500 mg** of vitamin C (as ascorbic acid)
- **4 mg** of vitamin B6 (as pyridoxine hydrochloride) and
- **250 mg** of magnesium (as magnesium carbonate)

Some people will need to take one teaspoon of Effervescent Vitamin C-Magnesium Crystals on an empty stomach up to three times per week. Always follow by drinking an additional 8 ounces of water.

A bottle of 180 grams of Life Extension® Effervescent Vitamin C-Magnesium Crystals retails for $20. If a member buys four bottles, the price is reduced to only $13.50 per bottle.

To order Life Extension® Effervescent Vitamin C-Magnesium Crystals, 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.
Anti-Aging
HAND CREAM

Over time, daily activities and unprotected exposure to sunlight and environmental factors wreak havoc on the thin skin on the hands. The damage manifests as unsightly age spots, wrinkles, dryness, and crepiness that make people look older than they are.¹

**Cosmesis Advanced Peptide Hand Therapy** is a new formulation containing six natural compounds that help rejuvenate the appearance of aging hands by *lightening dark spots, minimizing the crepe-like look of wrinkles, hydrating the skin, and correcting skin tone.*

**N-ACETYL GLUCOSAMINE AND RETINOL**

Aging-increased pigment production causes age spots, discolored patches, and uneven skin tone. N-acetyl glucosamine slows down pigment production, and was clinically shown to even out skin tone and soften brown spots in just eight weeks.² Retinol, a form of vitamin A, was demonstrated to support skin health after sun exposure.³

**SARSASAPogenin AND MACELIGNAN**

With age, hands lose subcutaneous fat, causing a skeletal-like appearance and increasingly visible tendons and veins. The plant compound sarsasapogenin was found to promote factors involved in adipocyte differentiation by 201%—a process supportive of the formation of subcutaneous adipose tissue and plumping of the skin. The nutmeg compound macelignan was shown to increase lipid storage within adipocytes, indicating support for plumping of the skin and minimizing wrinkles.⁴

**MACADAMIA OIL**

Aging hands are commonly dry and flaky. Macadamia oil is among the richest sources of palmitoleic acid—a key component of sebum that supports hydration—enabling it to moisturize and soften dry, mature skin. It also provides natural moisturizers squalene and vitamin E.⁵-⁷

**ACETYL OCTAPEPTIDE-3**

Years of hand muscle contractions result in wrinkles. By modulating the neuronal excitability behind muscle contractions, acetyl octapeptide-3 was shown to reduce wrinkle depth up to 63%.¹¹

**Cosmesis Advanced Peptide Hand Therapy** incorporates all six of these compounds into one synergistic formula that noticeably rejuvenates the appearance of aging hands.

A four-ounce bottle of **Cosmesis Advanced Peptide Hand Therapy** retails for $46. If a member buys two bottles, the price is reduced to **$29.25** per bottle.
COOL DOWN AGING

Recently, scientists have identified one of the main culprits responsible for premature aging: rogue protein galectin-3. When galectin-3 is elevated due to aberrant cell growth, tissue injury, aging, or other factors, it stimulates an imbalanced inflammation response and triggers a cascade of consequences for cellular and cardiovascular function, joint and skin health, and more.¹⁻³

But there is an answer. Derived from the pith of citrus fruits and modified to meet patented molecular specifications, PectaSol-C® Modified Citrus Pectin is the most researched natural galectin-3 inhibitor.¹ The molecular features of PectaSol-C® allow it to enter the circulation with optimal bioactivity, so that it can bind to excess galectin-3 and block its pro-aging effects.⁴ PectaSol-C® is also shown to support immune function, as well as safe elimination of toxins and heavy metals such as lead, mercury, and arsenic.⁵⁻⁶

Cool down aging with PectaSol-C®, the only clinically proven Modified Citrus Pectin delivering versatile anti-aging benefits.⁷⁻⁻

Clinically researched PectaSol-C® delivers comprehensive anti-aging benefits:
- Supports Cellular and Cardiovascular Health*
- Safely Removes Heavy Metals and Toxins*
- Promotes Immune Health*
- Supports Healthy Galectin-3 Levels*

Available in Powder and Capsules

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References

To order PectaSol-C® Modified Citrus Pectin, 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.
Massive Database Planned To Crack The Secrets Of Aging

Billionaire scientist J. Craig Venter has launched an ambitious and expensive commercial venture to amass and electronically analyze the medical, genomic, microbiomic, and metabolic data of 40,000 individuals every year. And eventually, 100,000 individuals a year. The goal? To identify biologically relevant patterns in these interconnected data—patterns that may eventually reveal different ways to block the complex interactions that trigger age-related diseases and even aging itself.

Revealing The Origins Of Disease And Death

J. Craig Venter, PhD, is best known as the biologist who, with just a fraction of the funding and in far less time, tied the United States government’s Human Genome Project in mapping the world’s first whole genome sequence in the early 2000s. More recently, he laid claim to creating what has been called the first self-replicating synthetic cell.
Thirteen years ago, Venter’s own genome was sequenced over a nine-month period at a cost of $100 million. But for the same total amount of money, it is now possible to map the genomes of 100,000 individuals. This astonishing accomplishment—getting the cost of a single genome down to the $1,000 price point—has been the Holy Grail of medical research, considered the tipping point in the pace of genetic discovery. Why? Scientists realize that they will need to sequence hundreds of thousands, maybe even millions, of individuals to truly understand how genes influence disease and aging—so that more specifically targeted drugs, treatments, and preventive strategies can be developed. In order to make such massive sequencing studies financially feasible, $1,000 genomes are absolutely essential.

Venter’s new company, Human Longevity, Inc., is building the largest human genome-sequencing database in the world. By sequencing the genomes of people who are healthy, sick, young, and old, the database is expected to eventually offer insights into the aging process. But even at $1,000 a genome, that’s no easy task.

The reason is that in order to achieve this price point, you need a powerful DNA-scanning sequencer known as the HiSeq X. Each unit costs $1 million, and the company that makes them, Illumina, won’t sell you fewer than 10 of them.

So Human Longevity, Inc. bought 20.

To attain the $1,000 genome cost, you also need to keep these machines running constantly, which requires a constant volume of human samples to sequence. To that end, Venter has set up a collaborative program with the Moores Cancer Center. Soon, the genome of every single patient passing through the center—along with the genome of the patient’s tumor—will be sequenced at Human Longevity on an opt-out basis. The data will be stored and used to find new therapeutic targets, pathways, and biomarkers. Even this supply of data will only make a dent in the 40,000-genome annual capacity of Venter’s new enterprise, and he is actively seeking new individuals for genetic material.

Eventually, the project may be mapping the genomes of 100,000 people a year. How long can the secrets behind cancer’s origins continue to hide from this ongoing accumulation of DNA analyses?

Personalized Prevention Of The Diseases Of Aging

Human Longevity, Inc. considers cancer the most likely area of genomic research to deliver immediately actionable results.

“Today, people with cancer must wage war on two fronts, battling their disease and fighting for advanced treatments,” said Human Longevity co-founder and stem cell pioneer, Robert Hariri, MD, PhD, at a recent conference. “The oncology field is changing rapidly. Every tumor is different and every patient is different. Human Longevity believes the time is now to incorporate every individual’s genetic code as the starting point of care and therapeutic development.”

Cancer is just an initial focus. With preliminary funding of $70 million in hand, mostly from wealthy investors, Human Longevity plans to also concentrate on diabetes, heart disease, dementia, and liver disease—diseases that the company views as, “some of the most difficult to treat, let alone cure, [the] diseases affecting people as they age.”

To jump-start this lofty mission, Venter has hired a panel of scientific luminaries, a diverse crew of experts in genomics, stem cells, cancer, translational medicine, the microbiome, and emerging technologies. He plans to collaborate with companies in the genetics and stem cell arena, with large hospital systems and clinics that will utilize his firm’s services, with pharmaceutical companies that can discover and develop new therapeutics, and with academia.

This exciting genome-mapping venture seems extremely ambitious by itself. But it’s just one leg of Venter’s broader strategic plan.

Matching Genomes, Metabolomes, And Microbiomes To Disease

In addition to sequencing the genomes of an anticipated 40,000 individuals a year, Human Longevity will use mass spectrometry to document individuals’ metabolomes—the constantly changing array of small molecules of biochemicals and lipids circulating throughout participants’ bodies.

While genome sequencing can reveal information about inherited risk of disease or hint at how long a person will live, metabolic data can clarify how environment, diet, and other factors affect an individual’s health and life span. Metabolic data also help researchers interpret genomic information. Pinpointing a particular gene as important in a disease or a normal cellular process does not, in itself, clarify what
that gene actually does. But if a particular metabolite is found to correlate with a particular genetic signal, then researchers can zero-in on the function of the gene. The relevance of blood biochemistry is underscored by the fact these metabolites change as we age—to such an extent that an analysis of blood metabolites can reveal a person’s specific age.

However, aging and human cell behavior changes are not the only cause of changes in blood metabolites. The microbes in our bodies—which outnumber human cells 10 to one—generate metabolites that can be detected in the blood.

For this reason, Human Longevity will also be mapping the microbiome—the complete makeup of the trillions of bacteria, viruses, and fungi living in each individual’s gut, mouth, and other body sites, as well as on the skin.

With aging and disease, the microbiome is believed to alter its composition, leading to changes in what molecules are produced. For instance, an August 2014 online study by Cancer Prevention Research found that analysis of the gut microbiome allowed scientists to distinguish between healthy participants and those with precancerous polyps or invasive colorectal cancer.* By better understanding how each person’s microbiome interrelates with his overall genetic and metabolic map, the company hopes to develop better probiotics—as well as better diagnostics and drugs to improve health and wellness.

Bringing hard relevance to these complex genetic, metabolic, and microbiomic data sets, Human Longevity will also collect the clinical medical history of every individual whose genome it sequences. Each participant’s complex data can be intricately compared with critical medical information.

Imagine the engineering feat involved in incorporating each participant’s clinical records with the rest of his or her amassed, personal data at the planned rate of over 100 human genome sequences a day. But Venter is looking beyond this technological challenge: He has his eye on nothing less than changing the face of medicine and human biological decline.

Will 100 Be The New 60?

First, Venter plans to deliver predictive and preventive medicine on a revolutionary scale by discovering the very earliest warning signs for susceptibility to chronic illnesses such as cancer, Alzheimer’s, and heart disease. Second, he envisions blocking the interconnected pathways of these diseases with specific, new interventions tailored to each individual’s distinct profile.

Just one way Venter aspires to accomplish this is by translating a web of personalized data into stem cell therapies. He expects to use techniques developed at his existing company, Synthetic Genomics, to rewrite the genetic code of stem cells to correct errors and use stem cell therapy as one of the key adjuvants to changing long-term health and aging outcomes. It’s an example of how his mission seems to be based on a Granite-like conviction that a host of emerging and complementary fields are ready to mature at once.

While the upfront costs and complexities may seem overwhelming, Venter says, “[Human Longevity] is going to change the way medicine is practiced by helping to shift to a more preventive, genomic-based medicine model, which we believe will lower healthcare costs.”

When people reach 100 years of age, they are often suffering from multiple diseases and cannot care for themselves. Venter wants these people to reach 100 years for the simple reason that they remain in good health and are therefore, self-sufficient.

Extending the number of healthy years will require focusing, not on individual diseases, but on aging. Why aging?

“The easiest answer is that aging is a central component of every disease that we want to address therapeutically,” said Hariri. “We believe that many of the processes at the cellular and the genomic level that we call aging are related and connected.”

The sheer volume and diversity of the data being assembled virtually guarantees that this project will yield revolutionary new clues to the mysteries of aging and disease. Optimistically, Dr. Venter and his team expect a lot more. As Human Longevity co-founder and vice-chairman, Peter Diamandis, summarized it:

“Our goal is to make 100 years old the new 60.”

* Available at: http://cancerprevention-research.aacrjournals.org/content/early/2014/08/06/1940-6207.CAPR-14-0129.abstract. Accessed August 21, 2014.


If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.
Emerging research suggests that different sources of omega-3 fatty acids, such as fish oil and krill oil, provide complementary effects upon cellular targets throughout the body.¹

Scientists suggest that combining fish oil and krill oil may provide enhanced support for cardiovascular health and the brain due to the different ways that fish oil and krill oil are taken up by our cells.²

Fish oil and krill oil share many important similarities, such as reducing levels of omega-6 relative to beneficial omega-3 fatty acids.³ Most Americans consume too many omega-6 polyunsaturated fatty acids and not enough omega-3s.⁴

Evidence suggests that by combining both fish and krill oil, you can maximize uptake and the protective benefits of a wide spectrum of omega-3 fatty acids.⁵

To provide enhanced coverage, a new Super Omega contains a potent concentration of fish oil, olive fruit, and sesame lignans, plus krill and astaxanthin.

**Combined Benefits Of Fish And Krill Oils**

Human studies suggest that omega-3 fatty acids from fish oil result in a more rapid uptake into plasma triglyceride and platelet phospholipids, which specifically benefit the cardiovascular system.⁶

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The omega-3s found in krill appear to be more rapidly incorporated into red blood cell phospholipids, which are rapidly absorbed into brain cells.1

When combined, krill and fish oil appear to offer enhanced benefits for both the cardiovascular and nervous system than either form by itself.

**Astaxanthin: Super-Antioxidant**

Astaxanthin protects cells by controlling free-radical activity and boosting mitochondrial function.2 This potent antioxidant carotenoid has been shown to help optimize joint, immune,5,6 brain,7,8 cardiovascular,9,10 DNA,11,12 and mitochondrial13,14 health. Astaxanthin also supports healthy blood sugar levels for those already in the normal range.15,16 And astaxanthin crosses the blood-eye barrier, supporting vascular health within the eye17 and protecting the eyes’ sensitive cells.18-21

In **Super Omega with Krill & Astaxanthin**, the natural astaxanthin content of krill is fortified with additional astaxanthin for maximum stability and benefit.

**Newly Documented Benefits Of Mediterranean Diet**

In 2013, the results of a huge trial of people who followed a Mediterranean diet were published in the *New England Journal of Medicine*. Those who supplemented this diet either with olive oil or nuts showed such a huge reduction in primary cardiovascular problems that the trial was stopped early to spare the lives of those on the control diet.22

The Mediterranean diet—rich in omega-3 fatty acids, monounsaturated fatty acids found in olive oil, and antioxidant-rich fruits, vegetables, and herbs—has long been associated with cardiovascular health and increased life span.19-21

To help emulate a Mediterranean diet, **Super Omega with Krill & Astaxanthin** provides a standardized olive fruit polyphenol extract to protect normal LDL from oxidation.22-25 Research shows that a combination of olive oil and fish oil supplements helps with inflammation better than a placebo or fish oil alone.26 The daily dose of Super Omega softgels provide the equivalent polyphenol content of 4 to 6 tablespoons of extra virgin olive oil.

**Sesame Lignans Extend Fish Oil’s Benefits**

The unstable nature of fatty acids like fish oil limits their biological efficacy in the body. Scientific studies show that when sesame lignans are supplemented with fish oil, the beneficial effects are augmented.28,29

**Sesame lignans** help guard against lipid peroxidation, thereby extending the stability of DHA in the body. These lignans also direct fatty acids toward pathways that can help with inflammatory reactions. **Super Omega** provides standardized sesame lignans to enhance the overall benefits of EPA/DHA marine oils.

Experts believe that taking both fish oil and krill oil together offers overlapping coverage to powerfully boost your health—with benefits that add to and amplify those of fish oil alone.

**The suggested daily dose of four softgels of Super Omega with Krill & Astaxanthin provides:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure-™ Wild Fish Oil Concentrate</td>
<td>4,050 mg</td>
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<tr>
<td>Yielding:</td>
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<tr>
<td>EPA (eicosapentaenoic acid)</td>
<td>1,400 mg</td>
</tr>
<tr>
<td>DHA (docosahexaenoic acid)</td>
<td>1,000 mg</td>
</tr>
<tr>
<td>Typical DPA (docosapentaenoic acid)</td>
<td>158 mg</td>
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<tr>
<td>Antarctic Krill (Euphausia superba) oil</td>
<td>300 mg</td>
</tr>
<tr>
<td>Polyphenyl-™ Olive extract (fruit and leaf)</td>
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<tr>
<td>[providing 90 mg polyphenols, 20.50 mg verbascoside/oleuropein, 15 mg hydroxytyrosol]</td>
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</tr>
<tr>
<td>Sesame seed lignin extract</td>
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<tr>
<td>Natural Astaxanthin</td>
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</tr>
<tr>
<td>(from CO2 extract of Haematococcus pluvialis algae)</td>
<td></td>
</tr>
<tr>
<td>Contains crustacean shellfish (krill).</td>
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A bottle of 120 softgels of **Super Omega with Krill & Astaxanthin** retails for $45. If a member buys four bottles, the price is reduced to $31.50 per bottle.

**Super Omega-3 Still Available**

Life Extension members still have access to our premium Super Omega-3 with Olive Fruit Extract and Sesame Lignans. This formula costs less since it does not contain krill oil or astaxanthin.

**References**

A high percentage of men will endure some form of prostate-induced discomfort over the course of their lifetimes.¹

A placebo-controlled, double-blind trial presented September 2013 reported that a specific blend of pomegranate, green tea, turmeric, and broccoli—formulated together in a capsule called Pomi-T®—powerfully maintained healthy levels of prostate specific antigen (PSA).²

Life Extension® offers this same capsule for men who are serious about supporting and protecting their prostate as they age—by targeting PSA. The four foods in Pomi-T® have healthful benefits for your entire body. But their constituent molecules, naturally present in food, have now been shown to concentrate within prostate tissue and provide a rich array of complementary, prostate-supporting, PSA-modulating mechanisms.³⁴⁻¹⁹

**POMEGRANATE**
- Specifically concentrates in prostate tissue³
- Supports healthy apoptosis, your body’s system of removing senescent cells when needed⁴⁻⁶
- Promotes healthy levels of inflammatory response, inhibits androgen receptor expression, and inhibits abnormal cell migration.⁷⁻⁸

**GREEN TEA**
- EGCG, a green tea catechin, specifically concentrates in prostate tissue where it regulates PSA (prostate specific antigen) production to maintain healthy PSA levels⁹⁻¹⁰
- Helps modulate genetic expression and activity of androgen receptors¹¹
- Supports body’s natural defenses against oxidation.¹²

**TURMERIC**
- Promotes a healthy level of inflammatory response, chiefly due to its main component, curcumin¹³
- Helps modulate cell signaling mechanisms, inhibiting abnormal cell adhesion and migration.¹⁴
- Promotes healthy cell proliferation and apoptosis.¹⁵

**BROCCOLI**
- Helps regulate enzymes (phase II detoxifying enzymes) in gut and liver tissue that helps render harmful dietary molecules harmless¹⁶
- Helps promote healthy PSA levels¹⁷
- Supports regulation of cell growth and transcription factors and normal production of apoptosis-inducing proteins.¹⁸⁻¹⁹

The novel and scientifically validated blend of food in Pomi-T® represents the next generation of targeted support for the aging prostate!

The suggested daily dosage of two vegetarian capsules of Pomi-T® provides:

<table>
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<tr>
<th>Pomi-T® Super Foods Proprietary Blend</th>
<th>960 mg</th>
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</thead>
<tbody>
<tr>
<td>Broccoli (florets and stalks) powder</td>
<td></td>
</tr>
<tr>
<td>Turmeric (root) powder</td>
<td></td>
</tr>
<tr>
<td>Pomegranate (whole fruit) powder</td>
<td></td>
</tr>
<tr>
<td>Green Tea (leaf) extract 5:1</td>
<td></td>
</tr>
</tbody>
</table>

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

**References**

Breast Cancer Screening Alternatives

Q. Are there any other options for breast cancer screening besides mammography? I am concerned about radiation exposure and I’d like to explore alternative imaging techniques.

A. Yes, there are. But doctors are still trying to figure out how to best use alternative breast imaging. So let’s take a look at your options.

More and more women are asking about mammography and radiation exposure. It turns out this is a good question to ask. Studies have shown that one mammogram exposes a woman to 0.4 mSv of radiation, the equivalent of seven weeks of background radiation from the earth and space. Let’s compare this to other imaging tests.

A chest X-ray, for instance, exposes you to 0.1 mSv of radiation. That’s the equivalent of 10 days of background radiation. A CT scan of your chest is 7 mSv, or two years of background radiation.

A CT of your abdomen is 10 mSv, or the equivalent of three years of background radiation. A CT image of your brain produces 2 mSv of radiation, or eight months outside. As you can see, a mammogram falls in the lower range of radiation exposure.1,2
Only in the last few years have clinical trial results suggested that MRI may have a role as a first-line technology for detecting breast tumors. These preliminary studies show that MRI is more sensitive at detecting invasive breast cancers than mammography. However, mammography is still the only imaging method that is proven to decrease mortality from breast cancer.

Although MRI is generally considered more sensitive than mammography, it can produce false-positives. This is when MRI detects a “suspicious mass,” which often results in a biopsy that turns out not to be cancer. To be fair, this also happens with mammography.

MRI—A Mammography Alternative

Let’s take a look at the first alternative—magnetic resonance imaging. MRI uses magnetic fields rather than ionizing radiation to create an image of the breast. It helps detect malignancies since it provides excellent soft tissue contrast.

Mammography + MRI

Currently, breast MRI is not recommended as a routine screening tool for all women. However, it is recommended for screening women who are at high risk for breast cancer, usually due to a strong family history and/or a mutation in genes such as BRCA1 or BRCA2.

Yearly mammograms plus breast MRI screening are typically recommended for women who are at higher-than-average risk of developing breast cancer—greater than the average 13% lifetime risk for all women. According to the American Cancer Society, a woman is considered high risk if she has a:

- BRCA1 or BRCA2 gene mutation,
- First-degree relative with a BRCA1 or BRCA2 gene mutation,
- Lifetime risk of breast cancer of 20% or greater, according to clinical history,
- History of radiation therapy,
- Genetic disease such as Li-Fraumeni syndrome, Cowden syndrome, or Bannayan-Riley-Ruvalcaba syndrome, or has a first-degree relative with one of them.

If you fall into a high-risk category, there’s plenty of support for using MRI. In a study published in the New England Journal of Medicine in 2004, Dutch researchers followed 1,900 women with a risk of breast cancer greater than 15% due to genetic mutations or family history. For nearly three years, the women received yearly MRIs as well as semiannual clinical breast exams and yearly mammograms. Mammography detected 18 cancers but missed 22 that were found on MRI. MRI found 32 cancers and missed only eight that showed up on mammograms.

An Italian study showed similar results for a comparable group of high-risk women. In that study, 278 women were given annual clinical breast exams, mammograms, MRIs, and ultrasounds. In the first two years, 18 cancers were found—17 showed up on MRI, including six that all other methods had missed.

A third study, completed at six US medical centers, compared MRI, mammography, and ultrasound in
171 women over age 25 whose lifetime risk of developing breast cancer was very high (20% or more).

Sixteen biopsies were performed and six cancers were diagnosed; MRI detected all six, mammography only two, and ultrasound only one. Neither mammography nor ultrasound found any tumors that MRI missed.9

So here’s what we know: MRI does not use ionizing radiation; it’s established as an effective screening tool for high-risk patients; and it’s more sensitive at detecting breast cancer than mammography. So why isn’t it considered for first-line screening?

One answer goes back to those “false positives.” Breast MRI is sensitive for detecting cancers but not specific for cancers. This means that it can’t always tell the difference between a benign and malignant mass. The biggest impediment, however, may be that an MRI costs much more than a mammogram. We checked prices locally in South Florida and found the average out-of-pocket expense for a mammogram is $125, whereas the average price for a breast MRI is $760. Some insurance companies pay for mammograms, but not for an MRI when used as a primary screening tool.

A second option is breast ultrasound. Unlike mammography, which has low sensitivity in detecting breast cancer in young women,9 ultrasound is primarily used in younger women with dense breast tissue.10 However, it hasn’t been shown to be sensitive enough as a stand-alone screening tool.

Gaining in popularity is a third option called thermography. It detects changes in surface temperatures associated with breast abnormalities. Unfortunately, it has a low sensitivity for detecting breast cancer.11

Standard mammograms use two beams of radiation to identify suspicious lesions. These are called 2D mammograms.

Newer mammograms are using three beams of radiation and pick up more lesions while reducing the “false positive” rate. Performed with digital mammography using the same scanner, 3D mammography (breast tomosynthesis) takes multiple images and reconstructs them to create a 3D view of the entire breast. These 3D devices may emit more radiation and they cost an average of $200 compared to the standard 2D price of $125.

So what does all of this mean? We definitely want to minimize our exposure to ionizing radiation. Yet, breast cancer screening is still the best-known preventative strategy we can offer.

It’s clear that women at high risk of breast cancer should utilize a combination of mammography and MRI. This will provide the highest sensitivity for detecting suspicious masses and the highest specificity for avoiding false positives.
Young women with dense breast tissue should be screened using ultrasound, with MRI as a secondary screening tool if suspicious masses are identified. Mammography is a poor screening tool for dense breasts, leaving ultrasound and MRI as the best weapons for early detection in this population of women.

But what about women at average risk who have breast tissue that’s normal density? Well, the verdict is still out. More sensitivity and specificity research is needed utilizing MRI.

Interestingly, preliminary reports using dynamic MRI imaging (a method that allows analysis of blood vessels generated by a tumor) show promise for improving MRI as an initial screening tool for all women. But we can’t draw any definite conclusions at this time.

So here’s what I suggest for women concerned about radiation exposure: If you’re at average risk for breast cancer and your breast tissue is normal density, use MRI as an initial screening tool. If a suspicious mass is identified, then use mammography to verify the mass. This way you’ll only expose yourself to ionizing radiation if it’s absolutely necessary.

Is what I am suggesting feasible? Clinically speaking, yes it is. But is what I suggest cost effective enough to be covered by insurance companies? Well, that’s something for you to discuss with your insurance carrier.

Dr. Smith, a graduate of the University of Texas Southwestern Medical School, is senior health scientist and online personality for Life Extension®. Often described as “the country doctor with a city education,” Dr. Smith is an author, blogger, and lecturer who has created and conducted numerous health-related webinars, as well as scripted and hosted a variety of informative online videos.

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

Scientists continue to discover healthful benefits—including DNA protection—in cruciferous vegetables such as broccoli, cauliflower, cabbage, watercress, and Brussels sprouts. Unfortunately, no matter how healthy you eat, cooking destroys many of these protective plant extracts.

**Triple Action Cruciferous Vegetable Extract** combines cruciferous plant extracts into a comprehensive formula for optimal DNA protection.

Protective compounds found in cruciferous vegetables like I3C (indole-3-carbinol) and DIM (di-indolyl-methane) encourage liver detoxification to help neutralize dangerous xenoestrogens (estrogen-like environmental chemicals that damage the body’s hormonal system), as well as beneficially modulate estrogen metabolism.¹⁻⁴

Extracts of broccoli, watercress, and rosemary also provide bioactive compounds that have a multitude of favorable effects on estrogen metabolism and healthy cell division.⁵⁻⁸ **Apigenin**, a powerful plant flavonoid found in plants such as parsley and celery, boosts cell protection.⁹

For those weighing less than 160 pounds, just one capsule a day provides optimal potencies. Those weighing over 160 pounds should consider taking two capsules a day. A bottle containing 60 vegetarian capsules of **Triple Action Cruciferous Vegetable Extract** retails for $24. If a member buys four bottles, the price is reduced to **$16.50 per bottle**.

Those who want the added benefits of trans-resveratrol can order **Triple Action Cruciferous Vegetable Extract with Resveratrol**. Each capsule provides 20 mg of trans-resveratrol in addition to the vegetable extracts and retails for $32 per 60-capsule bottle. If a member buys four bottles, the price is reduced to **$22.20 per bottle**.

References

To order Triple Action Cruciferous Vegetable Extract, 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.
The retail price for 60 capsules of Breast Health Formula is $34. If a member buys four bottles, the price is reduce to $22.50 per bottle. Contains soybeans.

To order Breast Health 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 their 2010 best-selling book *Slow Death by Rubber Duck: How the Toxic Chemistry of Everyday Life Affects Our Health*, authors and leading environmentalists Rick Smith and Bruce Lourie exposed their readers to the dangerous toxins hidden in everyday items by exposing themselves to the chemical compounds lurking in soaps, stain-blockers, plastic containers, and more.

For their next project, the two set out to answer the logical follow-up question: How do we get these toxins out of us? By once again becoming human guinea pigs, as well as researching the data and interviewing experts, the pair set out to prove which detox treatments really work, which don’t, and why. Throughout the book, they give practical and often surprising advice for removing toxic chemicals from our bodies and homes.
Here, in an exclusive interview with *Life Extension®,* they discuss their latest book *Toxin, Toxout.*

**LE:** In your first book, *Slow Death by Rubber Duck,* you discuss the synthetic chemicals that are found in everything from the sofa we sit on to the pots we cook in to the personal care products we put on our bodies. Remind us of the dangers of the more than 80,000 synthetic chemicals that are in so many of our products.

**BL and RS:** The scientific evidence linking these chemicals to human disease has become even more convincing than it was when *Slow Death* was released. Exposure is widespread. A recent study by the Environmental Working Group found 232 toxic chemicals in the umbilical cord blood of 10 babies. EWG has found 553 different industrial chemicals, pollutants, and pesticides in 149 Americans [they tested in] 27 different states.

**LE:** Can you give us some examples of these dangerous chemicals?

**BL and RS:** *BPA* [found in plastic containers that store food and beverages] has been linked with elevated risk of heart disease, infertility, and diabetes-like effects, among others. *Triclosan,* the antibacterial ingredient in everything from personal-care products to footwear, has been linked to increasing rates of allergies. *PFOA,* used to make Teflon and other nonstick and stain-resistant coatings, has been linked to pregnancy-induced hypertension, pre-eclampsia, testicular cancer, kidney cancer, ulcerative colitis, thyroid disease, and high cholesterol.

*LE:* In 2008, Congress permanently banned three types of *phthalates* (DEHP, DBP, BBP) in an amount greater than 0.1% in children’s toys and child-care products. But there are a lot more phthalates than those three, and they’re prevalent in the personal-care products we use. What are phthalates and why should we be so concerned?

**BL and RS:** Phthalates are hormone-disrupting chemicals. Once in our bodies, they’re mistaken for estrogen and can create all the changes that estrogen achieves.

**LE:** There have been a lot of studies recently about phthalates. What health concerns have these studies found?

**BL and RS:** Given that phthalates surround us every day, virtually every human on the planet has the stuff coursing through their veins. And to further compound the creepiness, elevated levels have been found in breast milk and umbilical cord blood, meaning that moms aren’t just polluting themselves; they’re passing phthalate pollution on to their fetuses and nursing babies.

Recent science points to negative health effects [like] childhood allergy and asthma, higher occurrence of pregnancy loss, metabolic disorders, behavioral changes, and reproductive disorders in male children and male adults.

**LE:** You wrote this book following the huge success of the first book and started it while you were on a book tour. What prompted it?

**BL and RS:** Right off the bat, the need to focus on detox was obvious. Every audience and interviewer quizzed us about the hazards of toxic chemicals and how they’re linked to human disease. And all of these people were pre-occupied with the same question: How do we get this stuff out of our bodies? Finding out honest, specific responses became the purpose of *Toxin, Toxout.*

**LE:** In your first book, *Slow Death by Rubber Duck,* you go into great detail about the work of Dr. Stephen Genuis, of the University of Alberta, Canada. What impressed you so greatly about his work?

**BL and RS:** Dr. Genuis is one of the few medical doctors who writes about clinical detox in medical journals. He has conducted what may be the first study that looks simultaneously at the levels of toxic chemicals in the blood, sweat, and urine of the same individuals.

**LE:** In his research, what has he found that works and doesn’t work?

**BL and RS:** Proven to work are chelation therapy and sauna therapy. Ionic footbaths and colon cleanses have no detox effectiveness.

**LE:** What role do supplements have in detox treatments?

**BL:** I was a vitamin skeptic before I began this research, but I’m now convinced that a vitamin C supplement ... is quite likely beneficial for its antioxidant and generic detox properties. Vitamins A, D, E, and K are also important for detoxification, but they need to be taken with greater caution because they’re fat soluble. If there was one health supplement all people would benefit from, it’s vitamin D. And all the health experts I spoke with recommend taking *N-acetyl cysteine* (NAC) supplements. NAC works by helping our bodies produce *glutathione* (GSH), a powerful antioxidant that neutralizes free radicals. GSH is manufactured in our liver as a natural detoxing agent, and low levels can prevent us from detoxing effectively. In sufficient quantities, it even protects our cells from mercury damage.
LE: I keep reading about detox diets. It seems every celebrity has something to say about eating this or that. What are your thoughts about them?

BL and RS: Skip expensive cleanse diets. There is any number of snake-oil salesman out there waiting to sell you the latest detox fad. Don’t buy it. Avoiding further exposure to toxins when possible, and giving your body what it needs to get rid of the toxins already in you is the basis of an effective detox lifestyle. Guaranteed.

LE: You provide 10 easy-to-do tips to start the detox process, like avoiding perfumes and purchasing personal-care products that only use safe ingredients. Can you share some more of these tips?

BL and RS: Drink water—and lots of it. On average, we’re made up of two-thirds water by weight. Making sure you’re well hydrated helps flush toxins from your body.

Hit the gym and the sauna. When you exercise or take saunas, toxic chemicals like BPA and phthalates leave through your sweat. And because a lot of toxins are deposited in fat, recent research has shown that exercising and losing weight can speed up the rate at which you excrete pollutants from your body.

Get involved with organizations advocating for a healthy, nontoxic future. Support politicians who believe in a greener economy. Good governments pass laws to reduce pollution, resulting in fewer pollutants in your body. It’s as simple as that.

LE: Let’s end on a positive note. You believe there’s hope for the future.

BL and RS: The speed of debate surrounding environment and health is exciting, and as a consequence of strong recent scientific evidence linking toxic chemicals to serious human disease, there has been a marked and positive change in the public’s everyday behavior.

And as a result, governments are acting. Laws governing BPA are a good example. Following a Canadian ban in baby bottles, the European Union followed in 2010, and in 2011 China did as well. In 2013, France banned the use of BPA in plastic food containers.

Though progress is slow on a federal level in the US, BPA bans relating to plastic baby products are now in place in 12 states.

Of course, there’s no perfect recipe for being toxin-free. But by following these guidelines, you’ll make a huge difference. The key is to start.

Life Extension specifies that container suppliers utilize BPA- and phthalate-free bottles with all Life Extension dietary supplement products.

Bruce Lourie is a leading environmentalist, author, and speaker. He is president of the Ivey Foundation, a private charitable foundation that focuses on environmental policy change; a director of the Ontario Power Authority; a director of the Ontario Trillium Foundation; and a Chair of the Board of Environmental Defence Canada.

Rick Smith is a prominent author and environmentalist. He is currently the executive director of the Broadbent Institute and was the executive director of Canada’s Environmental Defence for almost 10 years.

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

To order Toxin, Toxout, call 1-800-544-4440 or visit www.LifeExtension.com
Item #33868
Retail Price $25.99
Member Price $19.49
LIFE EXTENSION MIX™

Scientists have identified multiple mechanisms by which green tea extract helps protect against LDL oxidation, neuronal oxidation, and a host of other structural and functional age-related changes. LIFE EXTENSION MIX™ provides more green tea extract than found in commercial formulations.

**Broccoli** is one of the vegetables best documented to protect healthy DNA. The broccoli concentrate in LIFE EXTENSION MIX™ is standardized to provide sulforaphane and other glucosinolates, compounds responsible for broccoli’s protective benefits.

**Olive polyphenols** help protect against LDL oxidation, quench free radicals, and stabilize cell membranes. LIFE EXTENSION MIX™ contains an olive extract standardized to provide the best-documented polyphenol called hydroxytyrosol.

**Luteolin** is a flavonoid found in parsley, artichoke, basil, celery, and other foods. It has the ability to help protect against DNA oxidative damage. When measured against 27 other citrus flavonoids, luteolin proved one of the most beneficial at maintaining healthy DNA. Luteolin also suppresses excess levels of interleukin-6 and interleukin-1β. LIFE EXTENSION MIX™ contains a standardized dose of 8 mg of luteolin.

**Lycopene** is the red carotenoid in tomatoes that supports a healthy prostate and helps promote healthy lipid profiles for those already within a normal range.

**Pomegranate** may be the most effective plant to help maintain optimal endothelial function. This pomegranate extract is standardized to provide the punicalagins and other polyphenols found in up to 2.6 ounces of pomegranate juice.

**Sesame lignans** increase tissue levels of vitamin E, including gamma tocopherol, and inhibit the formation of an inflammatory precursor called arachidonic acid.

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

**Pterostilbene** is a compound naturally found in blueberries and grapes that has been shown to have beneficial, anti-aging effects.

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

**Pyridoxal 5’-phosphate** helps protect against glycation reactions, a toxic process in which sugars bind to lipids and proteins to form non-functional structures in the body.

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

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
## The Most Complete Multivitamin Available Today

Published scientific studies document that people who eat the most fruits and vegetables have much lower incidences of health problems. Few people, however, consistently eat enough plant foods to protect against common age-related decline, and commercial multivitamins do not provide all of the vital plant components needed to maintain good health. Life Extension Mix™ provides a broad array of vegetable/fruit extracts.

Life Extension Mix™ now contains an upgraded vitamin B12 that offers superior absorption compared to other forms of B12.

### Fat-Soluble Vitamins

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<th>Vitamin</th>
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<tr>
<td>Vitamin D3 (cholecalciferol)</td>
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<td>Vitamin C (as calcium ascorbate, ascorbic acid, ascorbyl palmitate, magnesium ascorbate, niacinamide ascorbate, acerola extract)</td>
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<td>Vitamin E (natural α-tocopherol succinate and α-tocopherol)</td>
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<td>Natural mixed tocopherols (producing gamma, delta, alpha, and beta tocopherols)</td>
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### Amino Acid Complex

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

### Mineral Complex

- Selenium (from Se-methyl L-selenocysteine): 100 mcg
- Selenium (from L-selenomethionine—SelenoPure™): 50 mcg
- Selenium (from sodium selenite): 50 mcg
- Zinc (as zinc citrate): 20 mg
- Zinc (monomethionine) (OptiZinc®): 15 mg
- Boron (Albion® bororganic glycine): 3 mg
- Calcium: 218 mg
- Copper (as copper bisglycinate chelate TRAACS®): 1 mg
- Chromium (as Cominex® 3+ chromium stabilized with Capros® and PrimaVie® Shilajit): 500 mcg
- Potassium chloride (37.4 mg elemental): 71.3 mg
- Molybdenum (sodium molybdate): 125 mcg
- Manganese (gluconate): 1 mg
- Iodine (potassium iodide): 150 mcg
- Magnesium oxide (335.96 mg elemental): 360 mg
- Magnesium citrate (35.28 mg elemental): 261.3 mg
- Magnesium glycinate (11.74 mg elemental): 100 mg
- Magnesium taurinate (7.83 mg elemental): 100 mg
- Magnesium arginate (5.87 mg elemental): 100 mg
- Magnesium ascorbate (3.40 mg elemental): 58.1 mg

### Cholinergic Complex

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

### Vitamin D3 helps maintain healthy bone density and DNA. There is five times more vitamin D in LIFE EXTENSION MIX™ compared to conventional multivitamins.

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

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

### Life Extension Mix™ contains the sodium selenite, selenomethionine, and Se-methyl L-selenocysteine forms of selenium. Some scientific evidence suggests that consumption of selenium may reduce the risk of certain forms of cancer; however, the FDA has determined that this evidence is limited and not conclusive.

### Zinc is often poorly absorbed, but LIFE EXTENSION MIX™ provides two of the most bioavailable forms of zinc.

### Boron is not only needed to maintain healthy bone density but may also help promote healthy prostate cell function.

### LIFE EXTENSION MIX™ provides a high amount of an optimal form of chromium to help maintain arterial wall structure and already normal glucose levels.

### Magnesium helps protect arteries and heart valves, and supports heart and brain cells. LIFE EXTENSION MIX™ provides high potencies of six different forms of magnesium to fully saturate the body with this life-saving mineral.

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

Contains soybeans. Contains fish (Tilapia).

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1. Betatene® is a registered trademark of BASF SE. 2. Delphinidin® is a registered trademark of MNL protected by U.S. patent application US 13/076,117 and WPO PCT/IB2010/002698. 3. OptiZinc® is a registered trademark of InterHealth Nutraceuticals, Inc. 4. SelenoPure™ is a trademark of Nutrition, Inc. 5. Leucoscept™ is a registered trademark of Indena S.p.A. 6. BioVin® is a registered trademark of Cyrex Nutrition. 7. Tomat-O-Red® is a registered trademark of LycoRed LTD. 8. POMELLA® Extract is covered under U.S. Patent 7,638,640 and POMELLA® is a registered trademark of Venture Sciences, Inc; 9. PrioloPure™ is a trademark of ChromaDex, Inc. 10. Metisolv® is a registered trademark of Indena, S.p.A., Milan, Italy. 11. TRAACS® and Albion® are registered trademark of Albion Laboratories, Inc. 12. CherryPure® is a registered trademark of Shoreline fruit LLC.

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**References**


**To order call toll-free 1-800-544-4440 or visit www.LifeExtension.com**

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These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Nearly 6,000 studies have been published on the broad-spectrum health benefits of **green tea**. Research shows that green tea favorably influences cardiovascular health, lipid clearance, glucose tolerance, healthy body weight, DNA repair, prostate and breast health, and healthy cell division. Scientists have identified the polyphenol **EGCG** as the key compound for green tea's multimodal health benefits.

Life Extension® has created a high-potency, standardized **98% polyphenol green tea extract**. These highly concentrated **Mega Green Tea Extract Capsules** contain **725 mg** of either lightly caffeinated or decaffeinated **98%** standardized green tea extracts.

The retail price for **100** vegetarian capsules of **Mega Green Tea Extract** is **$30**. If a member buys four bottles of **725 mg Mega Green Tea Extract** capsules, the price is reduced to **$18 per bottle**. Each bottle will last over **three months** at the typical dose of **one** capsule daily. So the monthly cost to members is only **$5.45**—an incredible value!

**References**

To order **Mega Green Tea Extract**, 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.
SWIVEL offers a special incentive for WOMEN.

Why a Special Focus on Women?  ♥♥

Men outnumber women throughout the various levels of the life extension community. SWIVEL would like to reach out to those women who share a serious interest in the science of extending life. And yes, men are also invited. We just want to even out the playing field.

What Are These Levels of Life Extension?  ♥♥

1) **Squaring the Curve.** The standard path is to be born, enjoy a vigorous, healthy period and then start to deteriorate until death. Those seeking to square the curve wish to take advantage of evidence based medical and technological science to stay healthy and vigorous right up until the end. It’s called “Health Extension.” This is the largest level.

2) **Extend the Maximum Lifespan.**
Currently, the maximum human lifespan is about 120 years. Some individuals are going further and looking to evidence based science and technology to extend this period to 150 years or 200 years or...... Their goals vary. This is the next largest level.

3) **Indefinite Lifespan.** The smallest group seeks an indefinite lifespan. Some call themselves immortalists. They also look to evidence based science to conquer all diseases of aging. Some have made arrangements to be cryo-preserved should they deanimate (legal death) before mankind conquers death.

**Incentive for Women**  ♥♥

An extended flyer is being sent to relevant organizations. It is our hope that one or two women from each will say, “Yes, that’s me.” All women receive a 50% discount. The regular price is $800 for 8 full days. Women will be charged $400 (includes a daily buffet lunch). **Early registration discounts are available.**

**Program**  ♥♥

Our program will run from 10 am to 6 pm each day and will break for a healthy buffet lunch from 1pm - 2 pm. This is Vegas and we know that you just might be up late.

Unstructured events alone do not actually lead to everyone getting to meet those with whom they might have a shared interest. Therefore, several **getting acquainted exercises, introductions** and **breakout groups** have been designed to maximize your chance of meeting the “right” date, friends and colleagues. Evenings are **unstructured.** We will provide **announcements** for those who wish to organize specific evening events. “Everyone who wants to........ meet here...... at .....pm.”

**SWIVEL**  ♥♥

a device joining two parts so that one or both can pivot freely

Come look around.

**WHY A FULL 8 DAYS?**  ♥♥

SWIVEL's goal is very specific. We want to reach those individuals who identify with maximizing their healthy lifespan **at any level** and then help them to meet each other. Community support follows.

SWIVEL wants more than brief introductions. We want **enough time** for you to ask YOUR questions in a **no pressure environment.** We want YOU to have **enough time** to actually get to know each other - **enough time** to decide if you wish to spend more time getting to know someone. We want to be **effective.**

Healthy lifespan enthusiasts generally want to find a like minded partner.

**WHY VEGAS?**  ♥♥

Easy to reach. Lodging to fit every budget.

**LODGING**  ♥♥

Our event site, **The Orleans,** is offering these attractive rates for single or double occupancy until 6-24-15. Resort Fee = $12.99. Taxes = 12%.

Sunday through Thursday. ............... $41
Friday and Saturday. ..................... $95

Search “Vegas lodging” for additional sites.

To request your Registration Form (early registration discounts until October 31), along with more detailed information, please e-mail us at: SWIVELclub@aol.com  ♥♥
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.

**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.**

### MOST POPULAR PANELS

#### Life Extension Member Pricing

**COMPREHENSIVE PANELS**

**MALE LIFE EXTENSION PANEL (LC322582)**

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

DHEA-S Homocysteine

TSH for thyroid function Free Testosterone

Estradiol Total Testosterone

Vitamin D 25-hydroxy PSA (prostate-specific antigen)

Hemoglobin A1c

**$269**

**FEMALE LIFE EXTENSION PANEL (LC322535)**

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

DHEA-S Homocysteine

TSH for thyroid function Free Testosterone

Estradiol Total Testosterone

Progestrone Vitamin D 25-hydroxy

Hemoglobin A1c

**$269**

**WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028)**

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

**$275**

**WEIGHT LOSS PANEL-BASIC (LC100027)**

CBC/Chemistry profile (see description above right), DHEA-S, free and total Testosterone, Estradiol, Progesterone, Cortisol, TSH, Free T3, Free T4, Insulin, and Hemoglobin A1c.

**$130**

**MALE HORMONE ADD-ON PANEL (LCADDM)**

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

**$155**

**FEMALE HORMONE ADD-ON PANEL (LCADDF)**

Pregnenolone and Total Estrogens To provide an even more in-depth analysis of a woman’s hormone status, Life Extension has created this panel as an addition to the Female Life Extension Panel. This panel provides valuable information about total estrogen status, and the mother hormone that acts as a precursor to all other hormones.

**$125**

**LIFE EXTENSION THYROID PANEL (LC304131)**

TSH, T4, Free T3, T4, T3.

**$75**

**FEMALE COMPREHENSIVE HORMONE PANEL (LC100011)**

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

**$299**

**MALE COMPREHENSIVE HORMONE PANEL (LC100010)**

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

**$299**

**THE CBC/CHEMISTRY PROFILE (LC381822)**

Note: This CBC/Chemistry Profile is included in many Life Extension panels. Please check panel descriptions. **$35**

**CARDIOVASCULAR RISK PROFILE**

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

**$125**

**LIVER FUNCTION PANEL**

AST (SGOT) Total Bilirubin ALT (SGPT) Alkaline Phosphatase

**$80**

**BLOOD PROTEIN LEVELS**

Total Protein Globulin Albumin Albumin/Globulin Ratio

**$199**

**BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE**


**$131.25**

**BLOOD MINERAL PANEL**

Calcium Sodium Potassium Chloride Phosphorus Iron

**$199**

**COMPREHENSIVE THYROID PANEL (LC100018)**

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

**$249**

**FOOD SAFE ALLERGY TEST** (LCM73001)

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

**$198**

**ADRENAL FUNCTION PANEL (LC100021)**

DHEA-S, AM/PM Cortisol, Glucose, Insulin, Lipid Panel, RBC magnesium

**$136**

**OMEGA SCORE** (LCMOMEGA)

Provides valuable information on your risk of developing heart disease, sudden heart attack, and cardiac death. The Omega Score™ also includes your AACE ratio, allowing you to determine and track a major factor in total body inflammation.

**$131.25**

**HEALTHY AGING PANEL-COMPREHENSIVE** (LC100026)

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

**$249**

**HEALTHY AGING PANEL-BASIC** (LC100025)

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

**$149**

**VAP™ TEST** (LC804500)

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

**$90**

**VAP™ PLUS** (LC100009)

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

**$330**
Other Popular Tests and Panels

**Life Extension Member Pricing**

- **GLUCOSE OVER THE PAST 2 WEEKS**
- **TOTAL AND FREE TESTOSTERONE, DHEA-S, FREE T3, FREE T4**, and RBC magnesium.
  - **This test measures your average maximum amount in the body.**

**TERMS AND CONDITIONS**

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

**For non-member prices call 1-800-208-3444**
AMINO ACIDS
Acetyl-L-Carnitine
Acetyl-L-Carnitine-Argetine
Branched Chain Amino Acids
D, L-Phenylalanine Capsules
Glycine Capsules
L-Arginine Capsules
Arginine/L-Omithine Capsules
L-Carnitine Capsules
L-Glutathione, L-Cysteine & C
L-Glutamine Capsules
L-Glutamine Powder
L-Lysine Capsules
L-Tyrosine Tablets
Mega L-Glutathione Capsules
N-Acetyl-L-Cysteine Capsules
Optimized Carnitine with GlycoCarn®
Pharma GABA®
Super Carnosine Capsules
Taurine Capsules

BONE & JOINT HEALTH
ArthroMax® with Theaflavins and AprèsFlex®
ArthroMax® Advanced with UC-II® and AprèsFlex®
Bone-Up™
Bone Restore
Bone Restore w/Vitamin K2
Bone Strength Formula w/KoAct™
Dr. Strum’s Intensive Bone Formula
Fast Acting Joint Formula
Glucosamine Chondroitin Capsules

BRAIN HEALTH
Acetyl-L-Carnitine
Acetyl-L-Carnitine-Argetine
Brain Shield®
Cognitex® with Brain Shield®
Cognitex® with Pregnenolone & Brain Shield®
Cognitex® Basics
Cognizin® CDP Choline Capsules
DMEA Bitartrate
Ginkgo Biloba Certified Extract™
Huperzine A
Lecithin Granules
Methylcobalamin Lozenges
Migra-Mag with Brain Shield®
Neuro-Mag™ Magnesium L-Threonate
Optimized Ashwagandha Extract
Phosphatidylserine Capsules
Prevgan®
Rhodiola Extract
Super Ginkgo Extract
Vinpocetine

DIGESTIVE
Bifido GI Balance
Carnosoothe w/PicroProtect
Digest RC™
Esophageal Guardian
Enhanced Super Digestive Enzymes
Extraordinary Enzymes
FlorAssist® Probiotic
Gutsy Chewy Digestive Tablets
Pancreatin
Regimint
Theralac Probiotics

DURK AND SANDY PRODUCTS
Blas™
Inner Power™

EYE CARE
Bilberry Extract
Brite Eyes III
Eye Pressure Support with Mirto regain®
MacuGuard™ Ocular Support
MacuGuard™ Ocular Support with Astaxanthin
Solarshield Sunglasses

FIBER
AppleWise Polyphenol
Fiber Food
Frufiber®
WellBetX PGX® plus Mulberry

FOOD
Rich Rewards™ Black Bean Vegetable Soup
Rich Rewards™ Spicy Cruciferous Vegetable Soup
Rich Rewards™ Cruciferous Vegetable Soup
Rich Rewards™ Lentil Soup
Rich Rewards™ Mung Bean Soup with Turmeric
Rich Rewards® Coffee
(Available in mocha, vanilla and decaffeinated)
Rich Rewards® Protein Creamer
Rich Rewards® Whole Bean Coffee

HAIR CARE
Dr. Proctor’s Advanced Hair Formula
Dr. Proctor’s Shampoo
Super-Absorbable Tocotrienols

HEART HEALTH
AppleWise Polyphenol
Advanced Lipid Control
Advance Olive Leaf Vascular Support
w/Celery Seed Extract
Aspirin (Enterico-Coated)
Cardio Peak™ w/Standardized Hawthorn and Arjuna
Cho-Less™
D-Ribose Tablets
D-Ribose Powder
Endothelial Defense™ with Full-Spectrum Pomegranate™
Fibrinogen Resist
Forskolin
Homocysteine Resist
Natural BP Management
Peak ATP® with GlycoCarn®
PhosphoOmega®
Policosanol
PROVINAL® Purified Omega-7
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 Omega with Krill & Astaxanthin
Super Ubiquinol® CoQ10
Super Ubiquinol CoQ10 with BioPQQ®
Super Ubiquinol CoQ10 with Enhanced Mitochondrial™ Support
Theaflavin Standardized Extract
TMG Powder
TMG Liquid Capsules

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

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Advanced Natural Sex for Women® 50+
7-KETO® DHEA
DHEA
DHEA Complete
GH Pituitary Support Day Formula
GH Pituitary Support Night Formula
Liquid Melatonin
Melatonin
Melatonin Timed Release
Natural Estrogen with Pomegranate Extract
Pregnenolone
Progesterone for Women
Super Miraforte with Standardized Lignans

IMMUNE ENHANCEMENT
AHCC® (Active Hexose Correlated Compound)
Black Cumin Seed Oil
Black Cumin Seed Oil w/Bio-Curcumin®
Buffered Vitamin C Powder
Echinacea Extract
FlorAssist™ Probiotic
i26 Hyperimmune Egg
Immune Modulator w/Tinofend®
Immune Protect with PARACTIN®
Lactoferrin
Norwegian Shark Liver Oil
Optimized Fucoidan w/Maritech® 926
Peony Immune
ProBoost™ Thymic Protein A
Reishi Extract Mushroom Complex
Vitamin C with Dihydroquercetin
Zinc Lozenges

INFLAMMATORY REACTIONS
Arthro-Immune Joint Support
ArthroMax® with Theaflavins
Boswellia
Bromelain (Specially-coated)
Cytokine Suppress™ with EGCG
DHA (Vegetarian Sourced)
Fast Acting Joint Formula
Ginger Force
Krill Healthy Joint Formula
5-LOX Inhibitor w/AprésFlex®
Mega EPA/DHA
Mega GLA with Sesame Lignans
MSM
Organic Golden Flax Seed
SerraEnzyme
SODzyme™ with GliSODin® and Wolfberry
Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract
Tart Cherry w/Standardized CherryPURE®
Zyflame® Whole Body

LIVER HEALTH
Branch Chain Amino Acids
Certified European Milk Thistle
N-Acetyl Cysteine
Liver Efficiency Formula
European Milk Thistle
Hepatoprot
SAMe
Silymarin

Optimized Quercetin
Resveratrol with Synergistic Grape-Berry Actives
Rhodiola Extract
Silymarin
SODzyme™ with GliSODin®
Stevia Extract
Advanced Bio-Curcumin®
with Ginger & Turmerones
Super Bio-Curcumin®
Super Ginkgo Extract
Triple Action Cruciferous Vegetable Extract
Venotone
Whole Grape Extract

Mega Lycopene Extract
Mega Green Tea Extract (Decaffeinated)
## Buyers Club Order Form

To order call: 1.954.766.8433 or 1.800.544.4440

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<th>Member Each</th>
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**SUB-TOTAL OF COLUMN 4**

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

NOVEMBER 2014

To order online visit: www.LifeExtension.com
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**To order call: 1.954.766.8433 or 1.800.544.4440**

**SUB-TOTAL OF COLUMN 5**

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**SUB-TOTAL OF COLUMN 6**

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**NOVEMBER 2014**

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

NOVEMBER 2014

To order online visit: www.LifeExtension.com

Buyers Club Order Form
**Buyers Club Order Form**

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**SUB-TOTAL OF COLUMN 9**

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**SUB-TOTAL OF COLUMN 10**

To order call: 1.954.766.8433 or 1.800.544.4440

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

To order online visit: www.LifeExtension.com

**NOVEMBER 2014**
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**SUB-TOTAL OF COLUMN 14**
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**SUB-TOTAL OF COLUMN 15**

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**SUB-TOTAL OF COLUMN 16**

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

**NOVEMBER 2014**
## Buyers Club Order Form

**NOVEMBER 2014**

**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>VITAMIN B12 - 500 mcg, 100 lozenges</td>
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<td></td>
<td>Buy 4 bottles, price each</td>
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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.
A FULL SPECTRUM PHOSPHOLIPID—OMEGA-3 COMPLEX

KRILLPOWER

HEALTHY LIPID MANAGEMENT*  BRAIN NUTRITION*  METABOLIC HEALTH*

KRILL OIL: A UNIQUE & POWERFUL ALTERNATIVE TO FISH OIL

Jarrow Formulas® Krill Oil, produced from shrimp-like crustaceans abundant in the Antarctic (Euphausia superba), is not only rich in EPA and DHA but contains other valuable and unique constituents like phospholipids. Phospholipid-bound Omega-3s are better absorbed and utilized than the ethyl ester (EE) or triglyceride (TG) forms of Omega-3s found in regular fish oil.

Jarrow Formulas® Krill Oil also includes astaxanthin, a powerful carotenoid antioxidant, for additional antioxidant support to enhance the benefits of Omega-3s.

For more information visit us at www.Jarrow.com

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To order call 1-800-544-4440 or visit www.LifeExtension.com
Discover the **Force** of the Whole Herb

Our delicate, whole-herb approach to extraction helps deliver Nature's Wisdom.

**Time-Honored Herbs**

Ginger Force® supports blood platelet health and cardiovascular function *in vitro.* Active ingredients support the growth of beneficial intestinal microorganisms, which are vital for intestinal health.* In addition, the Ginger Force formula includes supercritical Rosemary for its unique phytonutrients.

Ginger has been used for thousands of years in the most revered traditional herbal systems. In the Chinese herbal tradition, Ginger is known as *jiang,* meaning ‘defend.’ In Ayurveda it is called *vishwabhesaj,* meaning ‘universal medicine.’ Rosemary also has traditional significance. Since the times of the ancient Egyptians and Greeks, Rosemary has symbolized love, loyalty, friendship, and remembrance.

**Full-Spectrum Extraction: Our Difference**

Many companies isolate elements from an herb, concentrate them, and add the label “whole herb.” New Chapter aims to deliver Nature’s **whole wisdom.** Using only natural supercritical CO₂ or traditional techniques of extraction, our potent Force extracts guarantee the fullest spectrum of beneficial phytonutrients in their natural profile.

The innovative supercritical process uses natural carbon dioxide to gently extract delicate plant compounds, including beneficial oils. The method can also highly concentrate phytonutrients, so the constituents of the finest whole herbs can be delivered in just one or two softgels.

**Nature’s Profile of Beneficial Compounds**

We select only the finest and most pure whole herbs for our concentrated extracts. We do not isolate out single ingredients or spike our extracts with synthesized additives. In this way, we are Delivering the Wisdom of Nature by preserving the herb’s innate nuances, many of which may be lost or discarded when herbs are fractionated or altered.

Ginger Force® 60 Softgels Item# 01228
Retail Price: $31.95  Member Price: $23.96
To order Ginger Force, call 1-800-544-4440 or visit www.LifeExtension.com

Learn more at newchapter.com

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Super Potent Multi-Nutrient Formula

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

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

When compared to conventional “one-a-day” products, Life Extension Two-Per-Day contains up to 50 times more potency of specific nutrients.

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

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

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 #01815)

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 #01814)

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.

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

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

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

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7  CREATING IMMORTAL GENES
Extending the human life span may be easier than previously believed. Recently, scientists enabled enhanced DNA repair so that *E. coli* bacteria can withstand 1,000 times the radiation dose that kills humans. We may soon be able to engineer our own DNA genes to ward off degenerative aging.

34  REVITALIZE SKIN FROM THE INSIDE OUT
Ceramide loss with age results in wrinkles and age spots, but studies verify that an oral ceramide extract enters the bloodstream to produce moist, supple, and more youthful appearing skin.

52  POMEGRANATE PROTECTS ENDOTHELIAL HEALTH
Mainstream medicine overlooks the critical role the *endothelium* (inner arterial lining) plays in maintaining vascular health. Studies show that pomegranate protects the endothelium via multiple mechanisms.

22  “TURN OFF” GENES THAT ACCELERATE AGING
Since 2001, Life Extension® has been seeking a method to “turn off” genes that accelerate degenerative processes. After 13 years of research, an effective method of boosting cellular NAD+ is finally available to restore youth-sustaining life functions.

44  GEORGE HAMILTON’S LONGEVITY SECRETS
Hollywood legend George Hamilton reveals his plan to live 120 years or more with his lifestyle that includes calorie restriction and aggressive attention to detail.

74  HELP FOR AGING HANDS
A new, topical serum containing six novel compounds reduces hyperpigmentation, and smooths wrinkles in aging hands.