Boost Cellular Benefits of CoQ10

Naturally Reduce Arterial Plaque

Strengthen Your Hair, Nails, and Skin

Protection Against Environmental Threats

Halt Progression of Macular Degeneration

PLUS—
Omega-3s Preserve Cognitive Function
Coenzyme Q10 Improves Gum Health
Higher Vitamin D Slashes Cancer Mortality
Life Extension®’s annual SUPER SALE enables clients to obtain premium-grade nutrient formulas at the year’s lowest prices. The quality of these products is backed by our total commitment to extending the healthy human life span. Below are a few examples of the savings available during the SUPER SALE:

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Retail Price</th>
<th>SUPER SALE Discount Price Per Bottle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Super Omega-3 EPA/DHA with Sesame Lignans/Olive Extract</strong></td>
<td>$32</td>
<td>$15.35 (ten-bottle purchase)</td>
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<tr>
<td>120 softgels • Item #01982</td>
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<tr>
<td>A highly refined, super purified Alaskan fish oil blend plus sesame lignans</td>
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<tr>
<td>and potent olive (fruit and leaf) extract provides essential omega-3 fatty</td>
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<td>acids and vital components of the Mediterranean diet.</td>
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<tr>
<td><strong>Super Bio-Curcumin®</strong></td>
<td>$38</td>
<td>$23.63 (four-bottle purchase)</td>
</tr>
<tr>
<td>60 vegetarian capsules • Item #00407</td>
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<tr>
<td>Super absorbable formulation promotes healthy lipids, joint function, and DNA.</td>
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<tr>
<td>Absorbs up to 7 times greater than conventional curcumin. Each bottle lasts</td>
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<td>two months.</td>
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<tr>
<td><strong>Vitamin D3 5,000 IU</strong></td>
<td>$10</td>
<td>$5.85 (four-bottle purchase)</td>
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<tr>
<td>60 softgels • Item #01713</td>
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<tr>
<td>High-potency vitamin D in a softgel to provide greater absorption into the</td>
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<td>bloodstream.</td>
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<tr>
<td><strong>AMPK Activator</strong></td>
<td>$48</td>
<td>$29.70 (four-bottle purchase)</td>
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<tr>
<td>90 vegetarian capsules • Item #01907</td>
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<tr>
<td>Activating AMPK “turns off” many of the destructive factors of aging,</td>
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<tr>
<td>enabling cells to return to their youthful vitality. Research shows that</td>
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<tr>
<td>the two plant extracts contained in this formula promote AMPK activation.</td>
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<tr>
<td><strong>Two-Per-Day Multi-Nutrient Formula</strong></td>
<td>$22</td>
<td>$13.50 (four-bottle purchase)</td>
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<tr>
<td>120 capsules • Item #02014</td>
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<tr>
<td>Compared to commercial formulas like Centrum®, Two-Per-Day has up to 50</td>
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<td>times higher potency, plus unique ingredients. Two-Per-Day provides</td>
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<tr>
<td>biologically active nutrients such as the 5-MTHF form of folate. Each bottle</td>
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<td>lasts two months.</td>
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<tr>
<td><strong>Optimized Resveratrol with Nicotinamide Riboside</strong></td>
<td>$42</td>
<td>$24.30 (four-bottle purchase)</td>
</tr>
<tr>
<td>30 vegetarian capsules • Item #02031</td>
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<tr>
<td>This high-potency trans-resveratrol formula provides synergistic plant</td>
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<tr>
<td>extracts pterostilbene, fisetin and quercetin along with nicotinamide riboside</td>
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<td>that converts to NAD+ to energize cells.</td>
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<tr>
<td><strong>Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™</strong></td>
<td>$62</td>
<td>$32.40 (ten-bottle purchase)</td>
</tr>
<tr>
<td>60 100 mg softgels • Item #01426</td>
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<tr>
<td>The superior ubiquinol form of CoQ10 plus a natural compound (shilajit)</td>
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<tr>
<td>shown to double mitochondrial CoQ10 levels. Each softgel provides 100 mg of</td>
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<tr>
<td>ubiquinol and 100 mg of shilajit.</td>
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<tr>
<td><strong>MacuGuard® Ocular Support</strong></td>
<td>$22</td>
<td>$13.37 (four-bottle purchase)</td>
</tr>
<tr>
<td>60 softgels • Item #01926</td>
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<tr>
<td>Offers triple eye protection with meso-zeaxanthin, lutein, and trans-zeaxanthin.</td>
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<tr>
<td><strong>Ultra Natural Prostate</strong></td>
<td>$38</td>
<td>$21.60 (ten-bottle purchase)</td>
</tr>
<tr>
<td>60 softgels • Item #01928</td>
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<tr>
<td>Comprehensive support for the aging prostate gland providing nettle root,</td>
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<td>flower pollen, lignans, plus boron and phospholipids for enhanced</td>
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<td>absorption.</td>
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The SUPER SALE extends to February 1, 2016.

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

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
36  BEAUTY FROM WITHIN
Wrinkled skin, brittle nails, and dry hair indicate a decline in our internal structural proteins. Replenishing these proteins through bioavailable keratin, collagen, and other micronutrients can revitalize skin, hair, and nails from the inside out.

46  SLOW DEVELOPMENT OF ATHEROSCLEROSIS
Long before a heart attack/stroke occurs, fatty plaques form in the arteries. In a significant advance, two nutrients have been shown to dramatically slow the worsening of atherosclerotic plaque (by 95%), reduce unstable plaque, and improve endothelial function (by 66%).

60  PROTECT AGAINST AGE-RELATED VISION LOSS
New evidence corroborates that lutein and zeaxanthin strongly maintain the eye’s macula, enabling aging adults to reduce the risk of macular degeneration by 40%. Other studies show that these plant carotenoids protect against cataracts and other degenerative disorders.

70  IMPACT OF ENVIRONMENTAL TOXINS ON CANCER INCIDENCE
We are surrounded by environmental toxins that lead to DNA damage and cancer. Compelling studies show how specific nutrients can protect and help counteract these harmful chemicals.

86  A LEADING CAUSE OF AVOIDABLE DEATH
Recently, The New England Journal of Medicine reported that smoking raises the risk of nearly every known disease, from kidney and liver disease to diabetes and Crohn’s disease. For those who do not smoke, avoiding second- and thirdhand smoke is imperative.

24  ENHANCE CoQ10 PERFORMANCE
When coenzyme Q10 is combined with shilajit there is an even greater improvement in mitochondrial function and conversion of food into energy. Shilajit plus CoQ10 synergistically boosts cellular energy, which is vital to safeguarding one’s health.

17  IN THE NEWS
CoQ10 supports periodontal health; vitamin D slashes cancer mortality up to 52%; cranberries boost vascular function; metabolic syndrome increases vitamin E requirement; vitamin C has benefits similar to exercise; vitamin D maintains muscle; calcium reduces ICU mortality; omega-3 slows cognitive decline, and much more.

101  WELLNESS PROFILE
Sandy and Stewart Levine have supported each other in their health program throughout their 46-year marriage. As Life Extension® proponents, they explain the diet, supplements, and exercises that make up their ongoing health and longevity choices.
Blood Testing and Analysis

The Most Complete Line of Life Extension Supplements

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“Turn On” Your Body’s Longevity Genes!

Optimized Resveratrol supports longevity mechanisms four different ways:

- **Resveratrol** facilitates youthful gene expression analogous to some longevity functions of calorie restriction.¹

- **NIAGEN® nicotinamide riboside** helps replenish cellular NAD+ to enhance energy efficiency of mitochondria to support physical performance.²

- **Quercetin* helps purge the body of inflammation-inducing senescent cells and augment the beneficial gene expression effects of resveratrol.³

- **Pterostilbene, fisetin, and other fruit compounds** work synergistically with resveratrol to facilitate youthful gene expression and mimic calorie restriction.²⁴

* The new Optimized Resveratrol with Nicotinamide Riboside provides 2.5 times the previous amount of quercetin.

Just one vegetarian capsule of Optimized Resveratrol provides:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trans-Resveratrol (most biologically active form)</td>
<td>250 mg</td>
</tr>
<tr>
<td>Quercetin</td>
<td>150 mg</td>
</tr>
<tr>
<td>NIAGEN® Nicotinamide Riboside</td>
<td>100 mg</td>
</tr>
<tr>
<td>Red grape (fruit) and wild blueberry (fruit) blend</td>
<td>40 mg</td>
</tr>
<tr>
<td>Fisetin</td>
<td>10 mg</td>
</tr>
<tr>
<td>Trans-Pterostilbene (from pTeroPure®)</td>
<td>0.5 mg</td>
</tr>
</tbody>
</table>

Non-GMO

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

References

Optimized Resveratrol with Nicotinamide Riboside
Item #02031 • 30 vegetarian capsules

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>1 bottle</td>
<td>$42</td>
</tr>
<tr>
<td>4 bottles</td>
<td>$28.35</td>
</tr>
<tr>
<td>4 bottles</td>
<td>$24.30 each</td>
</tr>
</tbody>
</table>

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Gustavo Tovar Baez, MD, operates the Life Extension Clinic in Caracas, Venezuela. He is the first physician in Caracas to specialize in anti-aging medicine.

Ricardo Bernales, MD, is a board-certified pediatrician and general practitioner in Chicago, IL, focusing on allergies, bronchial asthma, and immunodeficiency.

Mark S. Bezzer, MD, FACP, FAARM, FAAEM, is board certified in internal medicine, emergency medicine, and anti-aging/regenerative medicine. He is the director of Med-Link Consulting, which specializes in boidentical hormone replacement therapy, natural alternatives, anti-aging, and degenerative diseases. He holds US patents for a multivitamin/mineral supplement, an Alzheimer’s/dementia compilation, and a diabetic regimen.

Anna M. Cabeca, DO, FACOG, ABAARM, is a board certified Gynecologist and Obstetrician, as well as board certified in Anti-Aging and Regenerative Medicine, an expert in Functional Medicine, and an expert in women’s health. She specializes in boidentical hormone replacement therapy and natural alternatives, successful menopause and age management medicine.

Thomas F. Crais, MD, FAC, a board-certified plastic surgeon, was medical director of the micro-surgical research and training lab at Southern Baptist Hospital in New Orleans, LA, and currently practices in Sun Valley, ID.

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John DeLuca, MD, DC, is a 2005 graduate of St. George’s University School of Medicine. He completed his Internal Medicine residency at Monmouth Medical Center in Long Branch, NJ, in 2008 and is board certified by the American Board of Internal Medicine. Dr. DeLuca is a Diplomate of the American Academy of Anti-Aging Medicine and has obtained certifications in hyperbaric medicine, pain management, nutrition, strength and conditioning, and manipulation under anesthesia.

Serger A. Dzun, MD, PhD, was formerly chief of cardiovascular surgery at the Donetsk Regional Medical Center in Donetsk. Ukraine. Dr. Dzun’s current primary interests are anti-aging and biological therapy for cancer, cholesterol, and hormonal disorders.

Patrick M. Fratellone, MD, RH, is the founder and executive medical director of Fratellone Associates. He completed his Internal Medicine and Cardiology Fellowship at Lenox Hill Hospital in 1994, before becoming the medical director for the Atkins Center for Complementary Medicine.

Carmen Fusco, MS, RN, CNS, is a research scientist and clinical nutritionist in New York City who has lectured and written numerous articles on the biochemical approach to the prevention of aging and degenerative diseases.

Norman R. Genn, MD, is proprietor of the Bahama Anti-Aging Medical Institute in Nassau, Bahamas. A former member of the Bahamian Parliament, he served as Minister of Health and Minister of Youth and Sports.

Mitchell J. Ghen, DO, PhD, holds a doctorate in holistic health and anti-aging and serves on the faculty of medicine at the Benemerita Universidad Autonoma De Puebla, Mexico, as a professor of cellular hematopoietic studies.

Gary Goldfaden, MD, is a clinical dermatologist and a lifetime member of the American Academy of Dermatology. He is the founder of Academy Dermatology of Hollywood, FL, and COSMESIS Skin Care.

Miguelangel Gonzalez, MD, is a certified plastic and reconstructive surgeon at the Miguelangelo Plastic Surgery Clinic, Cabo San Lucas.

Garry F. Gordon, MD, DO, is a Payson, AZ-based researcher of alternative approaches to medical problems that are unresponsive to traditional therapies. He is president of the International College of Advanced Longevity Medicine.

Richard Heifetz, MD, is a board-certified anesthesiologist in Santa Rosa, CA, specializing in the delivery of anesthesia for office-based plastic/cosmetic surgery, chelation therapy, and pain management.

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Philip Lee Miller, MD, is founder and medical director of the Los Gatos Longevity Institute in Los Gatos, CA.

Michele G. Morrow, DO, FAAFP, is a board-certified family physician who merges mainstream and alternative medicine using functional medicine concepts, nutrition, and natural approaches.

Filippo Ongaro, MD, is board-certified in anti-aging medicine and has worked for many years as flight surgeon at the European Space Agency. He is considered a pioneer in functional and antiaging medicine in Italy where he also works as a journalist and a writer.

Herbert Pardell, DO, FAAIM, practices internal medicine at the Emerlad Hills Medical Center in Hollywood, FL. He is a medical director of the Life Extension Foundation.

Lambert Titus K. Parker, MD, practices internal medicine at the Integrative Longevity Institute of Virginia in Virginia Beach, VA.

Ross Pelton, RPh, PhD, CCN, is director of nutrition and anti-aging research for Intramedicine, Inc.

Patrick Quillin, PhD, RD, CNS, is a clinical nutritionist in Carlsbad, CA, and formerly served as vice president of nutrition for Cancer Treatment Centers of America, where he was a consultant to the National Institutes of Health.

Allan Rashford, MD, graduated from the University of Iowa Medical School. Upon completing medical training, he became chief of medicine at St. Francis Hospital in South Carolina, and he was later named president of the Charleston Medical Society.

Marc R. Rose, MD, practices ophthalmology in Los Angeles, CA, and is president of the Rose Eye Medical Group. He is on the staffs of Pacific Alliance Medical Center, Los Angeles, and other area hospitals.

Michael R. Rose, MD, is a board-certified ophthalmologist with the Rose Eye Medical Group in Los Angeles, CA, is on the staffs of the University of Southern California and UCLA.

Ron Rothenberg, MD, is a full clinical professor at the University of California San Diego School of Medicine and founder of California HealthSpan Institute in San Diego, CA.

Roman Rozencwaig, MD, is a pioneer in research on melatonin and aging. He practices in Montreal, Canada, as research associate at Montreal General Hospital, Department of Medicine, McGill University.

Michael D. Seidman, MD, FACS, is involved in otolaryngology-head and neck surgery for the Bloomfield satellite of Henry Ford Health System (HFHS), Detroit, MI, co-director of the Tinnitus Center, and co-chair of the Complementary/Alternative Medicine Initiative for HFHS.

Ronald L. Shuler, BS, DDS, CCN, LN, is involved in immunoncology for the prevention and treatment of cancer, human growth hormone secretagogues, and osteoporosis. Board certified in Anti-Aging medicine.

Paul Wand, MD, Fort Lauderdale, FL, is a clinical neurologist with special expertise in treating and reversing diabetic peripheral neuropathy and brain injuries from various causes.
Örn Adalsteinsson, PhD, is chairman of the Life Extension® Scientific Advisory board. He holds a master’s and doctorate from the Massachusetts Institute of Technology (MIT). He has specialized in human therapeutics including vaccines, monoclonal antibodies, product development, nutraceuticals, formulations, artificial intelligence, hormones, and nutritional supplementation. He has also authored articles and contributed to peer-reviewed publications and served as an editor for the Journal of Medicinal Food.

Aubrey de Grey, PhD, is a biomedical gerontologist and Editor-in-Chief of Rejuvenation Research, the world’s highest-impact peer-reviewed journal focused on intervention in aging. He received his BA and PhD from the University of Cambridge in 1985 and 2000 respectively. Dr. de Grey is a Fellow of both the Gerontological Society of America and the American Aging Association and sits on the editorial and scientific advisory boards of numerous journals and organizations.

John Boik, PhD, is the author of two books on cancer therapy, Cancer and Natural Medicine (1996) and Natural Compounds in Cancer Therapy (2001). He obtained his doctorate at the University of Texas Graduate School of Biomedical Sciences with research at the MD Anderson Cancer Center, focusing on screening models to identify promising new anticancer drugs. He conducted his postdoctoral training at Stanford University Department of Statistics. He is currently president of New Earth BioMed, a nonprofit cancer research corporation that studies mixtures of natural products.

Frank Eichorn, MD, is a urologist specializing in prostate cancer for 10 years. He has a private practice in Bad Reichenhall, Germany, and is prostate cancer consultant at the Urologische Klinik Castringius, Planegg, Munich. In his integrative approach to prostate cancer he is working together with an international network of experts to improve treatment outcomes for prostate cancer patients with a special focus on natural and translational medicine.

Deborah F. Harding, MD, is founder of the Harding Anti-Aging Center. She is double board-certified in internal medicine and sleep disorder medicine. She also earned the Cenegenics certification in age management medicine. She is a faculty member of the new University of Central Florida Medical School.

Steven B. Harris, MD, is president and director of research at Critical Care Research, a company that grew out of 21st Century Medicine in Rancho Cucamonga, CA. Dr. Harris participates in groundbreaking hypothermia, cryothermia, and ischemia research. His research interests include antioxidant and dietary-restriction effects in animals and humans.

Peter H. Langsjoen, MD, FACC, is a cardiologist specializing in congestive heart failure, primary and statin-induced diastolic dysfunction, and other heart diseases. A leading authority on coenzyme Q10, Dr. Langsjoen has been involved with its clinical application since 1983. He is a founding member of the executive committee of the International Coenzyme Q10 Association, a fellow of the American College of Cardiology, and a member of numerous other medical associations.

Dipnarine Maharaj MD, MB, ChB, FRCP (Glasgow), FRCP (Edinburgh), FRCPath, FACP Dr. Dipnarine Maharaj is the Medical Director of the South Florida Bone Marrow Stem Cell Transplant Institute and is regarded as one of the world’s foremost experts on adult stem cells. He received his medical degree in 1978 from the University of Glasgow Medical School, Scotland. He completed his internship and residency in Internal Medicine and Hematology at the University’s Royal Infirmary.

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

Michael D. Ozner, MD, FACC, FAHA, is a board-certified cardiologist who specializes in cardiovascular disease prevention. He serves as medical director for the Cardiovascular Prevention Institute of South Florida and is a noted national speaker on heart disease prevention. Dr. Ozner is also author of The Great American Heart Hoax, The Complete Mediterranean Diet and Heart Attack Proof. For more information visit www.drozner.com.

Jonathan V. Wright, MD, is medical director of the Tahoma Clinic in Tukwila, WA. He received his MD from the University of Michigan and has taught natural biochemical medical treatments since 1983. Dr. Wright pioneered the use of bioidentical estrogens and DHEA in daily medical practice. He has authored or co-authored 14 books, selling over 1.5 million copies.

Xiaoxi Wei, PhD, is a chemist expert in supramolecular assembly and development of synthetic transmembrane nanopores with distinguished selectivity via biomimetic nanoscience. She has expertise in ion channel function and characterization. She founded XTherma Inc., a company developing a radical new highway towards non-toxic, hyper-effective antifreeze agents to fight unwanted ice formation in regenerative medicine and reduce mechanical icing.
Cognitex® is designed to improve cerebral performance and protect against neurological problems over the long term.

Scientifically formulated Cognitex® contains validated ingredients shown at two weeks to improve:

- Spatial short-term memory 42%
- Recall 15%
- Recognition 11%
- Attention 12%
- Visual learning 33%
- Activities of daily living by over 10%

*C J Diet Suppl. 2011 Jun; 8(2):158-68

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The Most Sought-After Anti-Aging Drug

BY WILLIAM FALOON

In the 1980s-1990s, published studies in Europe showed remarkable life span increases in animals given a drug called deprenyl.1-6

In elderly rats treated with deprenyl, remaining life span doubled in response to the drug.2 Aged dogs given deprenyl had twice the survival rate compared with placebo-treated dogs.7 Mice that were immune-suppressed lived up to about 200% longer on deprenyl.8 (Most elderly humans suffer immune suppression).9,10

Not only were life spans lengthened, but some deprenyl-supplemented animals displayed more youthful energy levels, as related to sexual activity.2

This outpour of scientific data from Europe had aging Americans clamoring to get their hands on deprenyl. It started being used in Europe to treat Parkinson’s disease in the 1970s, but the FDA did not approve deprenyl until 1989.11

When deprenyl was finally approved, it cost Americans 4 times more money than what Europeans were paying for the identical drug.12 Unwilling to pay this extortionist price, Americans began ordering personal-use supplies from Europe.

The FDA struck back and launched criminal investigations against those seeking to make deprenyl more affordable.13 The FDA did this at the behest of the drug company that owned the patent on deprenyl.

One individual made a liquid form of deprenyl that sold quite well until he was arrested by the FDA and sent to prison for almost 13 years.12,14 Back in those days, deprenyl was the most sought-after anti-aging drug.

Some of our supporters still use deprenyl, though getting a physician to prescribe it for anti-aging purposes is sometimes impossible. This article will describe how Americans can now derive the anti-aging mechanism of deprenyl in a low-cost nutrient.
Deprenyl is a drug the FDA approved to treat early-stage Parkinson’s disease. It was enthusiastically greeted by neurologists when first approved in the United States, but its therapeutic effect on advanced Parkinson’s patients was disappointing.15,16

That’s because a significant drop in dopamine occurs before symptoms of Parkinson’s disease become evident. Therefore, most Parkinson’s patients have already lost so many dopamine-producing neurons that deprenyl is of little value.17,18

Deprenyl enhances the anti-Parkinson effects of standard drugs.19,20 Its primary mechanism is to inhibit an enzyme in the brain that destroys dopamine.

Longevity enthusiasts realized 30 years ago that if low-dose deprenyl is initiated before the onset of Parkinson’s symptoms, the brain might be protected against Parkinson’s and other neurodegenerative diseases.

By inhibiting this dopamine-degrading enzyme, it was theorized, people might not only live longer, but behave younger.

This same enzyme (MAO-B) may be involved in the destruction of dopamine-producing neurons.

**Dopamine Levels in the Brain**

Prior to age 45 in people, dopamine levels remain fairly stable.21 After that, dopamine in the human brain decreases by about 13% each decade.22

When the dopamine-producing neuron content in the brain reaches about 30% of normal, Parkinson’s symptoms may be present.20

When dopamine levels reach 10% of normal, death ensues.21,23

This has led to the hypothesis that if we live long enough, we will all develop Parkinson’s symptoms due to dopamine depletion in our brains.24,25

**How Deprenyl Works in the Brain**

**Monoamine oxidase B** (MAO-B) is an enzyme in the brain that degrades neurotransmitters like dopamine.26

As humans age, MAO-B levels begin to increase and degrade precious dopamine and other neurotransmitters.27-29

Deprenyl is a selective inhibitor of MAO-B.22,28,30 As little as 5 mg twice a week of deprenyl is all aging humans may need to maintain their dopamine at youthful levels.31,32

Parkinson’s patients were prescribed 10 mg a day of deprenyl. The inventor of the drug (Dr. Joseph Knoll) believed this dose was too high.31,33-35

It was long ago hypothesized that low-dose deprenyl might help prevent degenerative brain diseases and improve the quality of life.36,37

This is evidenced by increased “mounting frequency” in old male rats treated with deprenyl compared to untreated controls.38-41

Dopamine is a primary “feel-good” neurotransmitter that progressively depletes as humans age.42,43 By restoring dopamine and other neurotransmitter levels using low-dose deprenyl, aging humans may regain some of their youthful sense of well-being.44

Deprenyl has demonstrated intriguing anti-aging properties.1,45 Animals given relatively low doses of the drug live much longer than control groups not receiving deprenyl.

**Need to Suppress MAO-B in Aging Brains**

The enzyme **monoamine oxidase B** (MAO-B) serves a function in youth by keeping neurotransmitter levels from elevating too high.46 As we age past 45 years, however, MAO-B levels begin a steady rise that results the depletion in dopamine seen in elderly individuals.21,22,29,47

MAO-B also may inflict toxic damage to brain cells via several well-defined mechanisms.29,48-50

Excess MAO-B not only depletes us of our youthful emotions by
depleting dopamine, but also impairs cognitive functions by decreasing acetylcholine while simultaneously accelerating brain aging.\textsuperscript{51-55}

People today should take steps to suppress MAO-B levels as they age past 45 years. Those who are already taking low-dose deprenyl (5 mg twice a week) may be deriving enormous benefits by protecting against MAO-B toxicity.\textsuperscript{21}

The problem is that most doctors will not prescribe deprenyl to non-Parkinson’s patients. Insurance companies are unlikely pay for “off-label” use.

MAO-B-Inhibiting Nutrient

A unique extract from a wild variety of green oat has demonstrated MAO-B-inhibiting properties. Randomized, placebo-controlled, double-blind crossover studies have confirmed green oat’s neurological benefits.\textsuperscript{56,57}

One study of 20 people aged 30 to 60 years showed increases in electrical brain activity during concentration tests in response to supplementation with this green oat extract. At two hours, there was about a 38% increase in delta activity and about a 25% increase in theta activity compared to placebo.\textsuperscript{57} Enhanced delta and theta activity is associated with increased focus and concentration, perceptual speed, and executive functioning.\textsuperscript{58}

A second human clinical trial involved 36 elderly people with average to below-average levels of cognitive performance. Those taking the green oat extract showed a 65% improvement in a test of cognitive function compared to the placebo arm of the study. Even study subjects with mild cognitive impairment showed greater than 26% improvement on the overall cognitive test score.\textsuperscript{56}

Green Oat Helps Facilitate Smoking Cessation

Nicotine addiction can be so difficult to overcome that some smokers who develop lung disease still cannot stop and slowly suffocate themselves to death with emphysema or chronic obstructive pulmonary disease (COPD).\textsuperscript{61-63}

FDA-approved smoking cessation drugs like Chantix\textsuperscript{®} are laden with so many horrific side effects that few patients can tolerate them.\textsuperscript{64-66}

One of the many mechanisms of nicotine addiction is its effect on dopamine levels in the brain.\textsuperscript{67-69} Without nicotine, dopamine levels rapidly drop in smokers,\textsuperscript{70} making quitting deadly tobacco habits unbearable for many individuals.

Green oat extract was studied on a group of male smokers. The result showed that self-reported number of cigarettes smoked per day dropped from an average of 19.5 to 8.9—a more than 50% decrease.\textsuperscript{71}

These smoking-reduction results are thought to occur in response to the improvement in dopaminergic transmission induced by the green oat extract.
A third study involved 42 people with self-reported age-related cognitive decline. The mean age of this group was about 59 years. In response to supplementation with this green oat extract, a test called “global speed of performance” increased by about 180% compared to the placebo arm of the study. This same clinical trial showed small but statistically significant improvements in executive function, episodic memory, and working memory.59

After a series of successful animal studies, these human trials are showing promising results in neurological performance in response to supplementation with green oat extract.60

Winning the War against Biological Aging

There are mechanisms of aging that health conscious individuals have been able to circumvent with proper use of hormones, nutrients, lifestyle modifications, and certain prescription drugs.

A missing gap in our quest to protect against neurological aging was the inability to persuade more physicians to prescribe low-dose deprenyl to their patients over age 45. We certainly tried, running full page ads in major newspapers in the early 1990s attacking the FDA for delaying approval of deprenyl. We also berated the FDA for enabling deprenyl to become so expensive when Americans were finally allowed access to it.

With new research supporting the MAO-B-inhibiting effects of this novel green oat extract, Americans can now safely and affordably reduce their brain levels of this dopamine-degrading enzyme.

Annual Super Sale

It was back in 1988 that I realized our supporters needed an extra discount once a year so they can stock up on supplements they use throughout the year.

The response to our annual Super Sale is so overwhelming that those who wait to call on the last day are often put on hold for many minutes, something that almost never happens during any other day of the year.

Our scientific team continues to develop better products at lower overall prices.

The discounts when purchasing four or more bottles are enormous, as are the valuable Reward Dollars that are automatically credited with every purchase.

It is during the Super Sale period, however, when prices on all of our advanced nutrient formulas are most sharply discounted.

Your support enables many research projects aimed at slowing and reversing biological aging to continue and grow.

To order your supply of nutrients for the upcoming year, call us any time of the day or night at 1-800-544-4440.

For longer life,

William Faloon

References

A culprit is an imbalance that involves a deficit of naïve T cells and a surplus of memory T cells. This produces a less vigilant immune response—or immune senescence, which has been linked to problematic outcomes in normal aging.

Life Extension researchers have developed an innovative formula that provides three potent ingredients designed to work in a complementary fashion to help rebalance the major arms of the aging immune system.

**Pu-erh Tea**

**Immune Senescence Protection Formula™** now includes *Pu-erh tea extract*—providing additional and unique protection.

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

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

**Cistanche**

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

**Reishi Mushroom**

Numerous *Reishi* mushroom components help reverse many factors of immune senescence. *Reishi* extract boosts the function of innate immune cells, the immune system’s first line of defense. The unique polysaccharides, triterpenes, and other constituents enhance the body’s hematopoietic stem cells, macrophages, and other crucial immune factors—broadly supporting immune function and longevity.

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

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**Immune Senescence Protection Formula™**

Item #02005 • 60 vegetarian tablets

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Non-GMO

References

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
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Prices subject to change without notice. Cannot be combined with any other offer.
RESTORE YOUTHFUL COGNITIVE HEALTH

Dopamine, a neurotransmitter that regulates cognition, declines in the aging brain due to increasing levels of the MAO-B enzyme. Wild green oat extract inhibits this MAO-B enzyme to promote healthy dopamine levels.1-4

The wild green oat extract in Dopa-Mind™ is for aging individuals who wish to:

- Maintain youthful mental performance
- Revive cognitive health
- Support longevity

References

To order Dopa-Mind™, call 1-800-544-4440 or visit www.LifeExtension.com

Dopa-Mind™ Item #02006 • 60 vegetarian tablets

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Are You Getting The Maximum Potency From Your Daily Vitamin?

Life Extension®’s Two-Per-Day formulas are the highest potency multivitamins on the market. Compared to Centrum® (the leading multivitamin), Two-Per-Day provides:

- 50 times more vitamin B1
- 12 times more vitamin B12
- 25 times more vitamin B6
- 10 times more biotin
- 10 times more selenium
- 8 times more vitamin C
- 2 times more vitamin D
- 2 times as much vitamin E
- 2.5 times as much vitamin B3
- 3 times as much zinc

Two-Per-Day Capsules
Item #02014 • 120 capsules (2-month supply)

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Two-Per-Day Tablets
Item #02015 • 120 tablets (2-month supply)

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Life Extension®’s Two-Per-Day contains a superior form of folate that is up to 7 times more bioavailable than folic acid. This greater bioavailability is especially important in people with a genetic enzyme deficiency since it requires no conversion to become metabolically active.

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

For the complete list of ingredients, trademarks, cautions, references, dosage and use, please visit www.LifeExtension.com. Two-Per-Day provides a small amount of gamma tocopherols as part of natural mixed tocopherols, which include natural vitamin E. NIAGEN® is a registered trademark of ChromaDex, Inc. Patents see: www.ChromaDexPatents.com.

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.
Higher Vitamin D Levels Reduce Cancer Death Rates up to 52%

The Journal of Clinical Endocrinology & Metabolism published a meticulous analysis of past trials showing that patients with colorectal cancer, breast cancer, and lymphoma experienced a significantly reduced risk of mortality with higher serum vitamin D levels at diagnosis compared to those with low levels.*

Researchers selected 25 studies involving 17,332 cases of cancer for their meta-analysis. Compared to lowest quartile, those with vitamin D levels in the top 25% range at the time of diagnosis had far better survival outcomes. For each of the following cancers, the risk of dying decreased by:

- 37% for breast cancer patients
- 45% for colorectal cancer patients
- 52% for lymphoma patients

“By reviewing studies that collectively examined vitamin D levels in 17,332 cancer patients, our analysis demonstrated that vitamin D levels are linked to better outcomes in several types of cancer,” stated Dr. Hui Wang, MD, PhD, Professor of the Institute for Nutritional Sciences at the Shanghai Institutes for Biological Sciences at the Chinese Academy of Sciences in Shanghai. “The results suggest vitamin D may influence the prognosis for people with breast cancer, colorectal cancer, and lymphoma, in particular.”

Researchers found the strongest links between vitamin D levels and survival in breast cancer, lymphoma, and colorectal cancer. There was less evidence of a connection in people with lung cancer, gastric cancer, prostate cancer, leukemia, melanoma, or Merkel cell carcinoma.

Editor’s Note: Meta-analysis shows 4% reduction in death for all causes for every 4 ng/mL increase in circulating 25-OH vitamin D levels within the range the researchers examined. Serum vitamin D levels in those who don’t supplement are often below 13 ng/mL. By increasing vitamin D intake to 5,000 to 8,000 IU a day, optimal serum levels of 50 to 80 ng/mL can be achieved.

* JCEM. 2014 Apr 29.

CoQ10 Can Improve Periodontal Health

An article published in the Journal of Clinical and Diagnostic Research found that supplementing with CoQ10 reduces gingivitis and improves periodontal health.*

In the randomized, double-blind trial, 30 patients (average age 33 years) with plaque-induced gingival inflammation were divided into two groups. The first group was given CoQ10 supplements following scaling and root planing (a deep cleaning to remove plaque and tartar), while the second group received a placebo following their cleaning. Plaque index, gingival index, and probing depth were recorded at baseline, one month, and three months.

After three months, researchers noted a significant reduction in gingival inflammation in patients who supplemented with CoQ10 compared to subjects taking the placebo.

Editor’s Note: Previous studies have shown that CoQ10 doses of just 50 to 75 mg daily can halt deterioration of the gums, sometimes within just days of starting treatment. For maintaining cardiac and brain health in aging individuals, recommended doses of the ubiquinol form of CoQ10 are usually 100 mg a day and higher.

New Survey Says US Obesity Rates Continue to Climb

According to a recent survey of 5,000 participants conducted by the Centers for Disease Control and Prevention, obesity rates rose to approximately 37.7% for adults in the US, up from 32% in 2003 to 2004, despite a major push to raise awareness about healthy eating.*

Lead author Cynthia Ogden says women are more likely to be obese. To date, 38% of women are obese compared to 34% of men.

Age is also a factor, researchers say, since the older Americans get, the more likely they are to be classified as obese. Compared to younger adults in their 20s and 30s, who had a 32% obesity rate, the rate for middle-aged people in their 40s and 50s climbed to 40%.

Race and ethnicity are also factors. Just 11.7% of adult Asian Americans are obese, while African Americans struggle with a 48% obesity rate.

Experts say medical providers should rethink how they approach talking to patients about a healthy diet and lifestyle. Lisa Cimperman, a registered dietitian at University Hospitals Case Medical Center, said in the past people did heed warnings to not eat certain products but didn’t add healthy food to their diets.

“The best example we have is we got this message out that we need to reduce fat consumption and [people] reduced their fat intake [but] replaced it with refined carbohydrates,” Cimperman said. “The intake of refined carbohydrates was just as bad as a high-fat diet.”

New initiatives attempting to focus on a more holistic approach to eating healthy with an emphasis on eating fresh, unprocessed foods may be too new to show any results in the report, Cimperman said.

Editor’s Note: Obesity increases the risk of a number of health problems, including heart disease, high blood pressure, stroke, type II diabetes, osteoarthritis, and certain kinds of cancer. Those with a BMI of 40 or higher may lose 6.5 to 13.7 years of life as a result of obesity.


Cranberries Protect the Heart

Research presented at the annual Berry Health Benefits Symposium 2015 revealed an association between cranberry juice intake and improved vascular function in healthy men.*

In a randomized trial, 10 men received juice concentrate mixed with water in varying concentrations. Flow-mediated vasodilatation (an evaluation of endothelial function), blood pressure, and arterial stiffness were measured before intake and at one, two, four, six, and eight hours post-consumption. Urine and plasma samples were analyzed for levels of 60 cranberry polyphenols and their metabolites.

Researchers found improvement in flow-mediated dilation in association with all concentrations of cranberry juice. Benefit was noted as early as one hour with a duration of up to six hours. Systolic blood pressure was reduced among those who received the highest concentration.

Editor’s Note: Plasma and urine polyphenol concentrations varied in accordance with the compound evaluated and the amount consumed by each individual.

* Berry Health Benefits Symposium. 2015 Oct 12.

Obesity Prevalence of Adults in 2014 across the US and Territories**

- No state had a prevalence of obesity less than 20%.
- Five states and the District of Columbia had a prevalence of obesity between 20% and <25%.
- Two territories plus 23 states had a prevalence of obesity between 25% and <30%.
- Nineteen states had a prevalence of obesity between 30% and <35%.
- Three states had a prevalence of obesity of 35% or greater.
- The Midwest had the highest prevalence of obesity (30.7%), followed by the South (30.6%), the Northeast (27.3%), and the West (25.7%).

**Vitamin D Linked with Reduced Breast Cancer Risk in Hormone Replacement Users**

An article published in the *American Journal of Clinical Nutrition* reveals the finding of an association between vitamin D supplementation and a lower risk of developing invasive breast cancer among postmenopausal users of hormone replacement.*

The study included 57,403 postmenopausal subjects between the ages of 40 to 65 years upon recruitment in 1990. Questionnaires completed every two to three years provided information concerning vitamin D intake, menopausal hormone therapy use, and other factors.

From 1995 to 2008, 2,482 invasive breast cancers were diagnosed. Women who were currently supplementing with vitamin D had an 18% lower adjusted risk of developing breast cancer than those who had never supplemented with the vitamin. Further analysis revealed that current supplementation was associated with a lower risk of postmenopausal breast cancer only among those who had used hormone replacement therapy.


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**Metabolic Syndrome May Increase Vitamin E Need**

An article published in the *American Journal of Clinical Nutrition* reveals that in those with metabolic syndrome, the need for vitamin E could be greater than among those without it.*

Researchers gave 10 healthy participants and 10 subjects with metabolic syndrome a natural alpha-tocopherol supplement. Dr. Richard S. Bruno and associates determined that those with metabolic syndrome absorbed less vitamin E than those without the syndrome. However, the researchers found that drinking milk, which contains fat that aids in vitamin E absorption, increased the amount absorbed to between 26.1% and 29.5%, depending upon the health status of the participant.

The researchers found that a lipoprotein in the liver that secretes vitamin E into the bloodstream and another lipoprotein generated by the small intestine contained lower levels of vitamin E in participants with metabolic syndrome compared to healthy subjects.


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**Vitamin C Supplements Provide Exercise Benefit**

Researchers at the 14th International Conference on Endothelin: Physiology, Pathophysiology, and Therapeutics in Savannah, Georgia, presented a paper stating the cardiovascular benefit for supplementing with vitamin C is similar to that elicited by exercise in overweight and obese adults.* The discovery could be of benefit for people who fail to engage in recommended physical activities on a regular basis, as is the case with over half of those who are overweight or obese.

Postdoctoral research fellow Caitlin Dow, PhD, and colleagues at the University of Colorado compared a regular walking program to the effects of 500 mg timed-release vitamin C per day in 35 sedentary, overweight, or obese men and women for three months. They determined that supplementing with the vitamin decreased vasoconstriction due to endogenous ET-1 activity as much as walking does.

*14th International Conference on Endothelin: Physiology, Pathophysiology, and Therapeutics. 2015 Sep 2-5.*
IN THE NEWS

Vitamin D Helps Older Women Maintain Muscle

The 2015 Annual Meeting of The North American Menopause Society featured a presentation of research conducted at Sao Paulo State University in Brazil, which found that supplementing with vitamin D was associated with improved maintenance of muscle mass and increased strength in women up to 12 years past the menopausal transition.*

In a double-blind trial, 160 women with a history of falls during the previous year received 1,000 IUs vitamin D3 per day or a placebo for nine months. Total-body dual energy X-ray absorptiometry (DXA) scanning assessed muscle mass and hand-grip strength and a chair-rising test evaluated strength at the beginning and end of the study.

Among those who received vitamin D, muscle strength increased by an average of 25.3%. Those who received a placebo experienced a 6.8% decline in muscle mass and were nearly twice as likely to undergo a fall as the vitamin D-supplemented group.

Editor’s Note: The North American Menopause Society Executive Director Wulf H. Utian, MD, PhD, DSc (Med), noted: “While this study is unlikely to decide the debate over vitamin D, it provides further evidence to support the use of vitamin D supplements by postmenopausal women in an effort to reduce frailty and an increased risk of falling.”


Reduced Mortality in Calcium-Supplemented Patients

The journal SpringerPlus reported the outcome of a study of critically ill adults, which found that supplementation with calcium lowered the risk of mortality within 28 to 90 days after intensive care unit (ICU) admission.*

Researchers at Jinhua Hospital of Zhejiang University in Zhejiang, China, analyzed data from 32,551 ICU patients admitted to Boston’s Beth Israel Deaconess Medical Center from 2001 to 2008. Supplemental calcium used during the patients’ stays included such forms as calcium carbonate, calcium chloride, calcium gluconate, and others.

Within the 28 days of ICU admission, there were 4,489 deaths. Patients who consumed supplemental calcium had an adjusted 49% lower risk of dying compared to those who did not supplement during the 28 days following ICU admission. A reduction in 90 day mortality was also observed in association with calcium supplementation.

Editor’s Note: Calcium plays a vital role in maintaining normal physiologic function, particularly signal transduction, and that severely low blood calcium levels have been associated with an increased risk of death. “Since hypocalcemia is independently associated with increased mortality, it is not surprising that calcium supplementation is associated with improved outcome,” the authors write.


Increased Omega-3 Correlates with Lower Rate of Cognitive Decline

An article published in the Journal of Alzheimer’s Disease reveals a decreased rate of cognitive deterioration in Alzheimer’s disease patients who had higher levels of omega-3 fatty acids.*

The study included 174 men and women with Alzheimer’s disease who were randomized to receive a low-dose supplement that provided 150 mg EPA and 430 mg DHA per day or a placebo for six months, followed by a six month period during which all participants were supplemented with omega-3. Plasma omega-3 fatty acid levels and cognitive performance were assessed at the beginning of the study, and at six and 12 months.

Increasing plasma eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and docosapentaenoic acid (DPA) levels over time were associated with preservation of cognitive function. Associations were significant for word recall and delayed word recall, which are categorized as episodic memory functions.

Editor’s Note: “Since our study suggests a dose-response relationship between plasma levels of omega-3 fatty acids and preservation of cognitive functioning, future omega-3 fatty acid trials in patients with mild Alzheimer’s disease should consider exploring graded (and body weight-adjusted) doses of omega-3 fatty acids,” suggest authors Maria Eriksdotter of the Karolinska Institutet and colleagues.

* J Alz Dis. 2015 Sep 4.
A properly functioning thyroid helps support:

- Energy Levels
- Motivation
- Concentration
- Metabolism and
- Healthy Weight Management

**Triple Action Thyroid** includes three all-natural herbs, **Ashwagandha**, **Guggul**, and **Korean Ginseng**, to provide comprehensive support by optimizing the thyroid hormones T3 and T4.13

The addition of **vitamin B12**, **iodine**, **tyrosine**, and **vitamin A** further enhances its benefits.

**References**

Due to the source of kelp, this product may contain fish and shellfish.

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Fat-Soluble Nutrients Missing From Most Multi-Vitamin Formulas

Life Extension®’s Health Booster is a cost-effective formula that combines a variety of valuable nutrients in just one softgel. Health Booster provides the following nutrients:

Vitamin K1 is found in plants. It is often bound to plant fiber and requires intestinal conversion to transform into bioactive vitamin K2. Data supports value of K1 in addition to the K2 forms.4,7

Vitamin K2 is the active form that keeps calcium in bone and out of arteries. MK-4 is rapidly absorbed,1,8-10 while MK-7 provides 24-hour bioavailability of vitamin K2.9

Trans-zeaxanthin, meso-zeaxanthin, and lutein supports eye health and healthy vision.

Sesame lignans increases tissue levels of gamma tocopherol, which plays a pivotal role in quenching certain kinds of inflammation.24

Blueberry extract boosts DNA function and sustain healthy blood sugar levels already within normal range.20,21

Gamma tocopherol is a form of vitamin E that quenches the damaging peroxynitrite free radical.10-11 Those who take alpha-tocopherol should also take gamma tocopherol.

Lycopene supports prostate health, protect against free radical activity, and guard against LDL oxidation.12,16

Chlorophyllin offers protection against environmentally induced DNA damage from toxins like smoke, emission particles, and foods cooked at high temperatures.17

Black currant extract (C3G) anthocyanins promote eye health and help ease eye fatigue.28

Vitamin B12 helps maintain a healthy nervous system and metabolism.19 Vitamin B12 levels decrease with age.20

Super Cost Effective!
Just one softgel of the new Health Booster taken with a meal provides optimized potencies of fat-soluble vitamins, carotenoids, and other plant extracts. If these nutrients were taken separately, one would have to swallow many capsules and spend 2-3 times more money.

Each Bottle Of Health Booster Lasts Two Months

To order Once-Daily Health Booster, call 1-800-544-4440 or visit www.LifeExtension.com

One daily Health Booster softgel provides:

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MacuGuard® Carotenoid Phospholipid Blend 145 mg
- Phospholipids, marigold extract (flower) [providing 10 mg free lutein, 4 mg meso-zeaxanthin & trans-zeaxanthin]
- C3G (Cyanidin-3-glucoside) [from European black currant extract (fruit)] 2.2 mg
- Lycopene proprietary blend [from Micronized Lycopene and Tomat-O-Red® natural tomato extract (fruit)] 10 mg
- Sesame Seed Lignan Extract 20 mg
- Wild Blueberry Whole Extract (fruit) 100 mg

References

Caution: if taking anticoagulant or antiplatelet medication, consult your health care provider before taking this product.

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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-hydroxy vitamin D. Life Extension® has created a large selection of highly absorbable vitamin D supplements in softgels to help you to achieve your individual vitamin D goals. Keep in mind that you may already be getting 1,000-3,000 IU of vitamin D in your current multi-nutrient formulas.

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250 softgels • Retail: $12.50
Super Sale Four bottles: $7.60 ea.
For most people, a 1,000 IU potency is insufficient to attain optimal vitamin D blood levels. However, this potency may be suitable for smaller individuals who obtain 2,000-3,000 IU in their multi-nutrient formulas (and children). Item # 01751

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60 capsules (non-softgel) • Retail: $14
Super Sale Four bottles: $8.44 ea.
Most people, especially those seeking to reduce their salt intake, do not ingest enough iodine. Combining 5,000 IU of vitamin D3 with 1,000 mcg of iodine into one capsule makes taking these two nutrients economical and convenient. Item # 01758

**Vitamin D3 Liquid • 2,000 IU**
(Natural Mint Flavor)
1 ounce • Retail: $28
Super Sale Four bottles: $16.88 ea.
Great for travel and for those individuals who have difficulty absorbing enough vitamin D3 from softgels, this liquid vitamin D is ideal. Item # 01732
Also available without mint. (Item # 00864)

**Vitamin D3 • 5,000 IU**
60 softgels • Retail: $10
Super Sale Four bottles: $5.85 ea.
For those already obtaining 1,000-3,000 IU of vitamin D in their multi-nutrient formulas, this 5,000 IU potency is what may be needed to achieve optimal blood levels. Item # 01713

**Vitamin D3 • 7,000 IU**
60 softgels • Retail: $14
Super Sale Four bottles: $8.51 ea.
Some people (such as those weighing more than 180 pounds) may require even more vitamin D when combined with 1,000-3,000 IU taken in a multi-nutrient formula, this 7,000 IU softgel should enable these individuals to attain blood levels above 50 ng/mL. Item # 01718

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-hydroxy vitamin D measurement. Do not exceed 10,000 IU per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

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

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.
SHILAJIT BOOSTS COQ10 EFFICIENCY
Coenzyme Q10 (CoQ10) fuels cellular energy by boosting mitochondrial function.\(^1\)\(^-\)\(^3\)

As we age, our internal production of CoQ10 declines and we face an energy crisis.

When cells are deficient in CoQ10, the result is accelerated aging.\(^1\)\(^,\)\(^4\) Studies have shown that CoQ10 can help protect against a host of degenerative illnesses.\(^5\)\(^-\)\(^9\)

Ever since CoQ10 was discovered in 1957, scientists have strived to find ways to make it work more efficiently in the body.

A major advance occurred when Life Extension® introduced the ubiquinol form of CoQ10 in 2006. Compared to the previous version, ubiquinol better absorbs into the bloodstream and markedly slows aging in the animal model.

As if this weren’t enough, researchers have shown that a nutrient-rich biomass called shilajit can boost CoQ10 efficiency.\(^10\) Found in the Himalayas, shilajit is prized for its ability to carry energy and nutrition into the body.\(^11\)

When CoQ10 and shilajit are combined, scientists have discovered improved mitochondrial function, enhancement of the mitochondria’s ability to convert food into energy, and increased energy available to tissues.\(^10\)\(^,\)\(^12\)

The combination of CoQ10 and shilajit has been shown to result in elevated levels of the body’s primary source of energy: ATP (adenosine triphosphate).\(^10\)\(^,\)\(^12\)

Shilajit plus CoQ10 enhances mitochondrial health, which is a vital factor in preventing aging and disease at the cellular level.
So how does it work?

It's simple. Shilajit restores and sustains cellular energy by enhancing the production of the body's primary source of energy: adenosine triphosphate, or simply ATP. ATP is the usable energy that is formed when organelles called mitochondria convert energy from food. As people age, this conversion process becomes sluggish, resulting in a body-wide energy deficiency.

Mitochondria and Aging

It would be impossible to overstate the importance mitochondria play in overall health and longevity. Mitochondria are cellular generators responsible for producing the body's primary source of energy, called adenosine triphosphate (ATP). ATP provides at least 95% of the cellular energy that powers all living functions, from muscle contractions to hormone production, and everything in between.

Unfortunately, mitochondria function less and less efficiently as we age, causing a ripple effect of health consequences throughout the entire body. Less available energy means organs and tissues function less efficiently. This makes mitochondrial dysfunction especially damaging for the heart and brain, since they have the highest energy demands in the body.

It should come as no surprise, then, that mitochondrial dysfunction has been linked to numerous degenerative illnesses, ranging from diabetes to neurological disorders to heart failure.

The high energy output of mitochondria makes them highly vulnerable to oxidative damage. Evidence strongly indicates that over time, accumulated damage to the DNA of the mitochondria leads directly to metabolic disorders (such as diabetes) and degenerative disorders (such as Alzheimer's).

Ultimately, the downstream effects caused by mitochondrial dysfunction speed aging and death. The scientific evidence on this point is so strong that a growing number of cell biologists believe that the number and functionality of the mitochondria can specifically determine an individual's longevity.

The good news is that it's not only possible to slow this cellular aging process but reverse it. The key lies in a nutrient you're already familiar with: coenzyme Q10.

CoQ10 and Mitochondria

CoQ10 is already well-known for its ability to protect cells from damage, and for its remarkable effects against common heart ailments and neurological disorders.
What you might not know is that CoQ10 is absolutely essential for normal mitochondrial function (namely, the production and transfer of energy).¹⁻³

Studies have found that when cells or organisms are deficient in CoQ10, it results in increased mitochondrial oxidative stress and accelerated aging.¹⁻⁴ Supplementation with the right form of CoQ10 has been shown to slow aging in the animal model and extend life span.⁵,⁶

One study showed that rats supplemented with CoQ10 experience an 11.7% increase in average life span.⁴⁰ In human terms, based on today’s life expectancy of 78.8 years, this translates to a more than nine-year increase in life span.⁴¹

The surge of available energy made possible by CoQ10 is especially beneficial for the heart. Studies have found that CoQ10 supplementation improves cardiac systolic function and ejection fraction.⁴²,⁴³ Another study showed that when combined with selenium, CoQ10 slashed the death rate from cardiovascular disease by more than half.¹⁴ The science is so strong that one of the study authors proclaimed CoQ10 to be a "scientific breakthrough in the management of chronic heart failure."⁴⁵

CoQ10 has two primary ways of protecting mitochondria from age-related decay and death. First, it plays an essential role in the electron transport chain, facilitating the efficient transfer of electrons into ATP.⁴⁶ Second, it acts as a powerful scavenger of free radicals, neutralizing their lethal action and dramatically reducing oxidative damage.⁴⁶

Mitochondria and Aging

- Our bodies face an energy crisis as we age because our mitochondria begin to succumb to the ravages of high chemical and electrical stresses.
- Aging mitochondria and low output of the energy-carrying molecule ATP are associated with accelerated aging of the brain, heart, and other organs.
- Mitochondrial aging can be slowed, and their energy production restored, by administration of nutrients that smooth the flow of energy down the mitochondrial electron transport chain.
- Shilajit, an ancient remedy sourced from minerals and organic substances from the Himalayas, contains compounds that shuttle electrons along that chain, reducing the damage to mitochondria to preserve their function.
- Studies show that shilajit administration boosts ATP production, reduces mitochondrial damage, and protects heart and brain from age-associated energy loss.
- When combined with CoQ10, shilajit may prove to be the ideal mitochondrial nutrient combination, and should be used in combination to optimally enhance your energy supply and protect your organs.

As a result, CoQ10 offers a powerful way to help slow, or even reverse, a natural aging process by restoring youthful mitochondrial protection against free radicals.⁴⁷,⁴⁸

There’s just one problem. CoQ10 can quickly become depleted in the body because it donates its own electrons in order to neutralize the flood of free radicals. That makes ensuring the body’s continued supply of CoQ10 critical.

And that’s why there continues to be so much excitement about shilajit. While practically unheard of in modern medicine, this ancient Ayurvedic adaptogen has been found to stabilize, revitalized, and preserve CoQ10 in its active (ubiquinol) form, boosting the levels of CoQ10 that are critical for protection against mitochondrial aging.¹⁰,¹⁴,¹⁷,⁴⁹
When used along with CoQ10, the combination produces benefits above and beyond what each nutrient offers individually, providing a powerful synergistic effect that boosts energy, protects mitochondria, and reduces aging at the cellular level.

As you’re about to read, one particular breakthrough study demonstrates this perfectly.

**Powerful Duo Produces Dramatic Results**

A team of researchers published a compelling study showing how *shilajit plus CoQ10* preserves and protects energy function. The researchers engaged mice in strenuous and stressful physical activity for two hours each day for seven days.

Subjecting laboratory animals to obligatory exercise is one of the most direct ways to study energy balance. In a forced swim test, the animals swim to a state of exhaustion, and their blood is drawn both before and after exercise to measure energy markers. In unsupplemented animals, the expected outcome is a reduction in ATP, as mitochondria fail to keep up.

For this study, the animals were divided into groups that either received no supplements, CoQ10 alone, shilajit alone, or a combination of both shilajit and CoQ10. After subjecting the mice to the forced swim test, the researchers measured the ATP content in muscle, brain, and blood.

The unsupplemented group showed significant reductions in ATP content of muscle, brain, and blood. This was expected, since the exercise demanded ATP for energy, which was eventually exhausted as mitochondria failed to keep up.

Remarkably, all three supplemented groups maintained higher levels of ATP in muscle, brain, and blood. Individually, both shilajit and CoQ10 by themselves produced significant elevations of ATP compared with the unsupplemented animals. But the key discovery was that the combination of these two nutrients had a synergistic effect, producing greater ATP recovery than seen with either nutrient alone.

In fact, in the brain and blood, the shilajit/CoQ10 combination brought ATP levels back nearly to those of un-exercised control animals! As an added benefit, supplementation with shilajit prevented significant drops in CoQ10 levels in the blood of exercised mice.

Ultimately, the synergistic effects of *shilajit plus CoQ10* offer an unparalleled option to protect mitochondrial DNA and combat aging.

In a similar experiment, mice were induced to develop chronic fatigue syndrome by undergoing daily forced swimming for 21 days, and then subjected to a series of stress tests that evaluated their mobility and anxiety levels. Shilajit was administered prior to the induction of chronic fatigue syndrome in some of the animals.

The results of this study showed that unsupplemented animals experienced prolonged immobility, decreased climbing behaviors, and increased anxiety. Supplemented mice did not demonstrate these deleterious changes. The supplemented animals also showed no signs of the chronic fatigue syndrome-induced mitochondrial oxidative stress seen in control animals. This study provides further demonstration of shilajit’s energy-boosting capabilities, and hints at the exciting neuro-behavioral effects seen in other studies.
**Why Such Dramatic Results?**

The answer lies in components found in shilajit that work synergistically with CoQ10 such as fulvic acid and related humic substances.

**Fulvic acid** stimulates mitochondrial energy transfer and makes mitochondrial extraction of energy more efficient, while **humic substances** speed the transfer of electrons along the electron transport chain, enhancing its efficiency.

Ultimately, these actions give shilajit properties similar to a fuel supplement for a car engine: They make the entire energy-production apparatus run more efficiently, with fewer waste products and destructive effects. This keeps mitochondria in a youthful, more potent condition that allows them to deliver cleaner energy, in larger amounts, and with less wear and tear. This powerfully opposes the age-promoting effects of mitochondrial burnout.

Shilajit’s energy-boosting, mitochondrial-protecting capabilities translate into meaningful results in animal studies of two of the body’s biggest energy-consumers: the brain and heart.

**Shilajit and the Aging Brain**

One devastating consequence of mitochondrial aging and loss of ATP production is deterioration of the central nervous system function.

In fact, poor mitochondrial energy production is considered both a cause and a consequence of memory loss and neurodegenerative diseases like Alzheimer’s and Parkinson’s. A growing body of evidence shows that shilajit has the potential to reverse many of these neurological changes.

Numerous studies have shown that shilajit fights Alzheimer’s on multiple fronts. First, the neurotransmitter acetylcholine is known to be deficient in patients with Alzheimer’s disease. Acetylcholine is a brain chemical that is important for memory and attention. It is believed that maintaining healthy acetylcholine could help prevent the worsening of Alzheimer’s symptoms. That’s where shilajit comes in: It helps produce a beneficial increase in acetylcholine in the brain by reducing levels of an enzyme that breaks it down.

Another hallmark of Alzheimer’s disease is the buildup of abnormal proteins called tau (within brain cells) and beta-amyloid (outside of cells), which appear to induce neuronal dysfunction and early cell death. Inhibiting these abnormal protein deposits is a promising target of Alzheimer’s drug therapy, though no drug has yet emerged that effectively reduces such aggregates.

But shilajit has succeeded where drugs have failed: Lab studies demonstrate that one of the principal substances in shilajit (fulvic acid) inhibits the buildup of dangerous tau proteins. It even goes one step beyond that. In an exciting discovery, shilajit was found to significantly untangle filaments of the offending protein, an apparent reversal of the progression of Alzheimer’s!

Shilajit exerts beneficial effects on Parkinson’s disease by increasing levels of essential neurotransmitters (brain signaling molecules) such as dopamine, which is reduced in Parkinson’s. In addition, an early study on rats in mazes showed that shilajit significantly improved performance and reduced anxiety levels.

**Shilajit and Heart Function**

Ayurvedic practitioners have traditionally used shilajit as a treatment for hypertension and improving heart function. Recent studies have validated shilajit’s heart-healthy benefits, specifically for those with high blood pressure or other cardiac stressing conditions.
The Cellular “Bucket Brigade”

Mitochondria are minuscule organelles that are responsible for converting energy from the food one ingests into usable energy. Without a consistent supply of that chemical energy, cells rapidly lose their viability, tissues function poorly, and organs begin to fail—all hallmarks of accelerating aging.

Mitochondria break down food into usable energy called ATP. This is a complex multi-step process that occurs along the electron transport chain, which serves as a “power line” through which chemical energy is released and transferred into ATP.

Like an aging power plant, mitochondria function less efficiently with time, causing them to work harder in order to produce the energy the body needs to function. As a result, the mitochondria gradually deteriorate, leading to a decrease in vital ATP production and an increase in free radical generation. Over time, this continuous free-radical onslaught destroys the mitochondria.

Left unchecked, this fatal cycle speeds the general decline in overall function that accompanies aging and contributes to the onset of degenerative disease.

Think of the energy chain as an old-fashioned bucket brigade, with each enzyme and co-factor in the chain handing its electron burden on to the next in line. There are three ways to make the brigade more effective: You can provide more members, speed the transfer of buckets from hand to hand, and make more water available to fill the buckets.

The combination of CoQ10 and shilajit support all three of these important steps. CoQ10 provides more energy chain “members” to move electrons down the line to increase ATP production. Shilajit’s components speed electron transfer down the energy chain, making it more efficient and also make more electrons available to CoQ10, preserving CoQ10 in its active form.

These important actions rejuvenate aging mitochondria, boost ATP output, and free up energy for vital cellular processes.

The first study evaluated a tiny marine organism called Daphnia. Although they are invertebrates, Daphnia have hearts that respond similarly to those of humans when exposed to a variety of cardiac medications, making them an ideal test organism. When Daphnia were treated with low doses of shilajit, their heart rates fell significantly, an effect frequently sought in patients with high blood pressure or other cardiac stressing conditions, suggesting a use for shilajit in humans with these conditions.

Similar reductions in heart rate and blood pressure were seen in laboratory rats. One particular study showed that shilajit has important effects that mimic the parasympathetic nervous system. This is the system that goes into action to induce the opposite of the “fight-or-flight” reflex, producing a state of calm, with low heart rate and blood pressure. Healthy rats treated with shilajit showed significant reductions in blood pressure, heart rate, and respiratory rate, suggesting a beneficial energy-conserving status.

Many people are excited to learn that shilajit helps protect against the kind of heart muscle injury that occurs during a heart attack. This was demonstrated in a study of rats that were divided into two groups: one served as a control group and the other received shilajit supplementation for seven days prior to treatment with a drug (isoproterenol) that induces heart muscle injury. Following treatment with isoproterenol, unsupplemented animals developed areas of heart muscle damage and a loss of pressure generated by heart contractions. By contrast, shilajit-supplemented rats maintained pumping pressure, had smaller and less severe areas of muscle damage, and displayed lower levels of injury-marking heart muscle enzymes.

Mitochondrial dysfunction is linked to a broad range of degenerative illness, from diabetes and neurological disorders to heart and kidney failure.

Shilajit helps combat mitochondrial dysfunction-induced aging. Working synergistically with CoQ10, shilajit boosts energy, protects mitochondria, and reduces aging at the cellular level.

Studies show that shilajit acts like a fuel supplement in a race car, boosting efficiency and reducing wear and tear on essential structures. These effects are showing great promise in preventing the aging of energy-intensive tissues like the heart and brain.

Most readers of this magazine have enjoyed the synergistic effects of shilajit and ubiquinol CoQ10 for the past eight years in the supplements they use daily.
Energy Availability in Forced-Swim Mice

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Energy availability from ATP in muscle, brain, and blood of mice. ATP levels plunge from control to swim-only groups, reflecting exhaustion of unsupplemented mitochondria unable to produce more ATP, but animals supplemented with either CoQ10 or shilajit have moderate increases in ATP, and dually supplemented animals have highest ATP levels of all, reflecting synergistic effect of both nutrients.

References

HOW SHILAJIT BOOSTS COQ10 EFFICIENCY


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 support, prostate and breast health, and healthy cell division.¹⁻⁷ Scientists have identified the polyphenol EGCG as the key compound for green tea’s multimodal health benefits.⁸

Life Extension® has created a 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.

Each bottle will last over three months at the typical dose of one capsule daily.

Non-GMO

References

Mega Green Tea Extract Decaffeinated
Item #00954 • 100 vegetarian capsules

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Mega Green Tea Extract Lightly Caffeinated
Item #00953 • 100 vegetarian capsules

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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.
Highly Purified Alaskan Fish Oil

Super Omega-3

Fish Oil + Olive Extract + Sesame Lignans

Broad-spectrum, Mediterranean health benefits of fish oil, olive oil polyphenols, and sesame lignans for heart and brain health.

- Pure fish oil from sustainable sources in pristine waters in Alaska®, highest 5-star rating by leading independent third-party testing organization (IFOS).
- Provides the polyphenol equivalent of 8 to 12 tablespoons of heart-healthy extra virgin olive oil.
- Specialized support against free radical oxidation with sesame lignans, a novel component of the heart-healthy Mediterranean diet.

Super Omega-3
Item #01982 • 120 softgels

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* Wild caught. Gently processed in the US. Non-GMO.

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

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

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.
CoQ10 Energizes Aging Cells by Enhancing Mitochondria Activity

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

A 2014 study further validates that ubiquinol activates mitochondrial functions to slow aging in mouse models.2

Life Extension® goes one step further and adds shilajit to its ubiquinol formula in a product called Super Ubiquinol CoQ10. Shilajit has been shown to promote mitochondrial metabolism, helping mitochondria convert fats and sugars into ATP—the main source of cellular energy.3,6 When combined with ubiquinol, it has been shown to double levels of CoQ10 in the mitochondria.6

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

References

Kaneka QH Ubiquinol® is a registered trademark of Kaneka Corporation.
PrimaVie® is a registered trademark of Natreon, Inc.

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

**Super Ubiquinol CoQ10**
Item #01425 • 100 50 mg softgels
Non-GMO

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**Super Ubiquinol CoQ10**
Item #01426 • 60 100 mg softgels
Non-GMO

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**Super Ubiquinol CoQ10**
Item #01431 • 30 200 mg softgels
Non-GMO

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

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People today go to extreme lengths to cover up tired, dull, lifeless skin, nails, and hair. What few understand is that outward appearances of skin wrinkles, brittle nails, and dry hair are more than superficial cosmetic issues. They are indicators of the aging of connective tissue throughout our body.1-3

Connective tissue provides support to hair, skin, and nails. As we mature, a decline in the production of structural proteins causes deterioration of the body’s connective tissues.

Fortunately, many of these surface changes can be thwarted using an ingestible combination of bioavailable keratin and collagen.

Clinical studies document reversals in markers of superficial aging in response to replenishing the body’s structural proteins.

These improvements are reflected through more lustrous hair, stronger nails, and vibrant skin.
Why Cosmetics Fail

As we age, our bodies produce less keratin and collagen, two key structural proteins that are essential to the health of the tissues that comprise hair, skin, and nails.

On the outside of our body, this breakdown results in hair loss, dry and wrinkled skin, and dull, brittle nails.

However, these “cosmetic” changes are reflective of more serious problems on the inside, including changes in blood vessel walls, bone, connective tissues, and other vital organs where these essential structural proteins are predominant.

The Keratin Connection

For many who have cosmetic problems that occur due to the decline in the body’s keratin supply, the logical solution is to replace the essential keratin in the body.

The problem with many commercial keratin preparations is that they are made from hooves, horns, and feathers. As a result, they lack biological activity in humans because they have been overprocessed during exposure to heat and other harsh conditions.4

Scientists have developed a patented process that makes keratin soluble, preserves its bioactivity, and makes it digestible. Solubilized keratin contains highly bioavailable protein-forming building blocks, including sulfur-containing amino acids, to replace the keratin that is lost in the aging process.4,5

The result is the delivery of high-quality keratin proteins directly to the cells that help form hair, nails, and skin.4 Solubilized keratin has a high bioavailability, meaning that it can rapidly start replenishing depleted keratin.6

Laboratory studies have shown that soluble keratin stimulates skin cells to proliferate at a rate up to 160% greater than they would without the protein, permitting cells to then increase their own production of structural proteins.4 This results in an increase in the thickness of the epidermis, which translates to a reduction in fine lines and depth of wrinkles. Furthermore, promotion of healthy skin cells also reduces water loss by improving the skin’s barrier function and providing firmness and elasticity.4,7

Chronic oxidative stress and ultraviolet light exposure can lead to a decline in skin vitality.8 In preclinical research, supplementation with this new keratin has shown to rebuild the natural enzyme systems in cells, including glutathione and superoxide dismutase.4
What You Need to Know

**Evidence of Clinical Efficacy**

Clinical studies have demonstrated real-world benefits of supplementing with solubilized keratin. In 2010, scientists revealed the results of their study on female subjects who had damaged, fragile, and stressed hair to determine if an oral keratin supplement would be effective in strengthening hair and facilitating hair growth. The women took daily supplements of 500 mg of solubilized keratin, along with zinc, vitamin B3, copper, vitamin B5, vitamin B6, and biotin for 90 days.

The subjects’ hair was tested for integrity and strength using three standard ways of measuring hair quality: scanning electron microscopic photos (shows hair appearance), number of hairs lost after washing (indicates hair strength), and mechanical force on individual hairs (shows hair strength).

First, electron microscope photos showed dramatic healing of individual hair shafts. At the beginning of the study, the photos indicated elevated, uneven cuticle surfaces, but by day 90 the photos showed a smooth, interlocking, watertight cuticle. This change translates into smoother, shinier hair.

In addition, the number of hairs lost during washing was significantly reduced by 30% and hair strength increased by 12%. The researchers concluded that the keratin supplement strengthened hair, promoted hair growth, and improved hair appearance.

**Beauty from Within**

- Deteriorating hair, nails, and skin appearance is not only unsightly, but is a visible sign of aging connective tissue proteins throughout the body.
- This occurs as a result of a decline in the body’s production of keratin and collagen.
- Insufficient intake of specific vitamins and minerals further contributes to the loss of essential structural proteins.
- Many of these changes can now be prevented, slowed, or even reversed with a novel combination of bioavailable keratin and collagen, along with specific vitamins and minerals.

**Hair and Nail Improvements**

A 2014 randomized controlled trial found that the same keratin formulation was effective for decreasing the rate and amount of hair loss and improving the strength and appearance of nails in adult women. Subjects were women between 40 and 71 years old who had clinical signs of damaged hair and nails. They took two capsules of solubilized keratin or a placebo daily for 90 days.

By day 90, the researchers observed the following improvements:

- **47.1%** subjective improvement in hair appearance
- **5.9%** improvement in hair strength
- **9.2%** increase in hair follicles in the growth phase (the placebo group had no significant increase)
- **47%** reduction in the number of hairs that could be removed from the scalp in a hair-pull test, an evaluation in which 20 to 60 hairs are grasped between the fingers and firmly tugged away from the scalp to see how many can be removed.

At the structural level, the amino acid composition of hair protein changed favorably in the supplemented group. By day 90, all four amino acids tested had a statistically significant increase showing the bioavailability of solubilized keratin.

Nail parameters were also significantly improved in the test group. Supplemented subjects showed an **87.5%** improvement in the tendency of their nails to break, compared with **28.5%** in the placebo group.
Why Keratin Is Important

Keratin is an important component of hair, skin, and nails.

The hair shaft is made primarily of keratin. The age-related decline in keratin synthesis leads to deterioration of stability and flexibility of the hair shaft, leaving hair vulnerable to dryness and breakage with brushing and the use of styling products and tools.

Similarly, the human fingernail is made almost entirely of keratin. As we age and produce less keratin, fingernails become brittle, resulting in splitting and fissuring. Nails can also develop yellow or gray discoloration and become dull or opaque in appearance.

These changes can occur as a result of various factors, such as circulatory changes that reduce the delivery of nutrients to the nail bed, exposure to the sun’s ultraviolet radiation, which damages the cell replication process, repetitive cycles of wetting and drying, and exposure to cosmetic and other chemicals. These and other factors, in addition to loss of keratin content, result in impairment of the intercellular adhesion that maintains the integrity of the nail plate.

Keratin is also largely responsible for making skin strong, waterproof, supple, and flexible. Skin strength and resistance to tearing and penetration comes from an abundance of tough, but flexible fibers of keratin in the epidermis, the outer layer of the skin. Keratin cells and fibers also maintain the moisture content of the skin by providing a waterproof yet water-retaining barrier.

As we age, the cells that produce keratin are slower to renew themselves and progress through the skin layers to the surface. This causes the skin to become vulnerable and much of the waterproofing and water-retaining properties of the protective outer layer are lost. The result is a dry and dull appearance.

Dry skin associated with lower keratin content creates more than just appearance problems. Dry skin causes itching and irritation that can lead to scratching and excoriation, further compromising the health and integrity of skin.

The age-related decline in keratin production makes supplementing with this compound extremely important for preventing or reversing many of these seemingly cosmetic signs of age.

Five additional nail health parameters showed significant improvements for the supplemented group compared with baseline:

- Hardness improved 50%
- Resistance to bending and breaking increased 54.2%
- Maintenance of overall nail integrity improved 33.2%
- Nail smoothness increased 37.5%
- The white, or natural, appearance of the nail improved 20.8%

Keratin Improves Skin Appearance

In 2013, the same keratin formulation was evaluated in a randomized, double-blind, placebo-controlled clinical trial to determine its effectiveness in improving skin health and appearance.

Subjects were females between 40 and 71 years old who already showed signs of skin aging. They took two capsules of solubilized keratin or a placebo daily for 90 days. Researchers determined that the supplement improved skin moisture, reduced wrinkle depth, and improved skin elasticity.

By day 30, subjects had already achieved a statistically significant 13.3% improvement in skin moisture. By day 60, there was a 22.2% improvement, and by day 90, there was up to 30.4% improvement in skin moisture. Interestingly, placebo recipients showed a decrease in skin moisture at these times.
Women taking the keratin supplement also experienced almost a 12% reduction in wrinkle depth after taking the keratin supplement for 90 days. This translated to visible improvements in wrinkle depth in 58.3% of subjects, significantly more than the placebo group.

By day 90, skin elasticity was improved 16.8%, skin smoothness improved 17.9%, and skin roughness decreased almost 9% when compared to the placebo group.

Supporting Healthy Skin from Within

In addition to keratin, collagen is vital for healthy, vibrant skin. Collagen makes up 70% of the weight of the dermis,12 the inner layer of the skin, and provides supple flexibility and supports elastin, the protein that allows the skin to stretch and return to its original shape.

As with keratin, there is an age-related decline in the number of collagen fibers in the dermis. With time, the cells that produce collagen fibers slow down, and the remaining fibers stiffen, break, and begin to lose shape. Elastin fibers begin to fray and lose elasticity. This deterioration of collagen and elastin leads to a wrinkled and sagging appearance.3

In order to combat this problem, scientists have developed Bioactive Collagen Peptides® that provide building blocks for collagen synthesis and stimulate the production of new collagen and elastin in the extracellular matrix of the skin.13 This provides increased suppleness and elasticity to aging skin.

Animal studies show that hydrolyzed (partially broken-down) collagen peptides increase the expression of collagen, helping to produce stronger, suppler skin.

Additionally, these collagen peptides reduce activity of metalloproteinase 2, a “protein-melting” enzyme that degrades collagen and hastens skin aging.14

In 2014, scientists conducted a double-blind, placebo-controlled study to evaluate the effectiveness of a collagen peptide oral supplement on clinical signs of aging skin.15 Subjects supplemented with either 2.5 or 5 grams of Bioactive Collagen Peptides® or a placebo for eight weeks, and researchers measured skin elasticity, moisture content, and roughness.

Both doses of the Bioactive Collagen Peptides® resulted in a 7% improvement in skin elasticity. Even four weeks after the last supplementation dose, the supplemented group retained higher skin elasticity than the placebo group. The improvement in skin elasticity was markedly greater in the subgroup of women aged 50 years and older.

Improves Wrinkles

A second double-blind, placebo-controlled study of the effectiveness of Bioactive Collagen Peptides® oral supplement was published in 2014.13 The primary focus of this study was to evaluate the effect on skin wrinkles and synthesis of the dermal matrix. Subjects were 114 women aged 45 to 65 years old. Skin wrinkles were measured regularly during the eight-week trial of daily oral supplementation of 2.5 grams.

At four weeks, the volume of eye wrinkles for the supplemented group had decreased significantly by 7.2%, compared with placebo recipients. At eight weeks, that difference had risen to 20.1%, a one-fifth reduction in the size of unsightly eye wrinkles.

The researchers for this study also measured the amount of texture- and flexibility-preserving structural proteins in the dermal matrix. The greater the content of these proteins, the healthier and suppler the skin appears. Supplemented subjects had a 65% increase in the accumulation of essential type-I procollagen and an 18% increase in elastin fibers.
Biotin Improves Nail Health

Animal studies have demonstrated that biotin supplementation is especially beneficial for healthy nails and leads to improvement in the hardness and integrity of the nail structure.16

Biotin’s beneficial effects on the health and appearance of fingernails have been established for more than 25 years. As far back as 1989, a study of the effect of biotin on aged and damaged fingernails showed that daily supplementation with 2.5 mg of biotin yielded firmer and harder fingernails for 91% of treated subjects after approximately 5.5 months.17

A year later, a group of women with brittle, splitting, or soft fingernails received biotin supplements and were then compared to a control group with healthy nails.18 In the supplemented group, fingernail thickness increased by 25%, reaching the same degree of thickness as in the control group. Nail splitting was also reduced for the supplemented group. Electron microscopy revealed that the irregular arrangement of cells on the nail surface of brittle nails became more regular.

Finally, a small retrospective study in 1993 found that when 44 adults with brittle and splitting nails took 2.5 mg per day of biotin for at least one month, 63% of subjects experienced a clinical improvement in nail integrity, as shown by a decrease in the brittleness and splitting of the nail.19

Additional Collagen Support

Silicon is an essential trace element involved in the metabolism of connective tissue.20-22 It plays an important role by activating the hydroxylation enzymes for crosslinking collagen, supporting its elasticity and strength.23 Better collagen ultimately translates into better hair, skin, and nails.

Summary

The health and vitality of hair, nails, and skin begins with the health of the tissues that comprise them. Expensive cosmetics will only temporarily cover the telling signs of a tired and aging body.

An entirely different approach is to nourish the aging body’s vital structural proteins from within by strengthening the essential keratin and collagen needed to sustain structural integrity and an attractive appearance.

References

INCREASE SKELETAL STRENGTH AND BOOST BONE DENSITY

It takes more than calcium to build strong bones...a host of skeletal-promoting nutrients are needed.

Bone Restore supplies a highly absorbable form of calcium in a combination of critical bone-building compounds:

- Boron,
- Vitamin D3,
- Magnesium,
- Manganese,
- Zinc,
- Silicon, and
- Vitamin K2 (long-acting MK-7 form).

Vitamin K2 is essential to maintain skeletal integrity.

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Bone Restore without Vitamin K
For those taking Super K or the Health Booster formulas, additional vitamin K2 is not needed. Bone Restore (without vitamin K) is available as Item #01726 at a slightly lower price.

To order Bone Restore with Vitamin K2, call 1-800-544-4440 or visit www.LifeExtension.com

Non-GMO
Note: Those taking anticoagulant drug Coumadin® (warfarin) should use Bone Restore without K2.

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Revitalize Hair, Skin, and Nail Beauty from Within

The quickest way to betray age is through tired, unhealthy hair, skin, and nails.

Working from the inside out, orally ingested nutrients are demonstrating clearly visible outward benefits. Clinical studies reveal these nutrients promote the structural proteins of collagen and keratin that keep hair, skin, and nails looking vibrant.

Here are the nutrients contained in a novel rejuvenation formula:

- **Cynatine® HNS Plus**: This ingredient combination provides solubilized keratin, zinc, vitamins B3, B5, and B6, copper, and biotin—the raw materials needed for keratin formation for strong hair, skin, and nails. Clinical studies using Cynatine® showed an impressive 11.5% reduction in the appearance of wrinkles and a marked improvement of almost 50% in hair brightness and luster.¹²

- **VERISOL® Bioactive Collagen Peptides®**: This patented bioavailable composition of Bioactive Collagen Peptides® supports the skin extracellular matrix by stimulating the formation of new collagen and elastin to promote the suppleness and elasticity of aging skin.¹ Clinical studies on women demonstrated an average 20% reduction in eye wrinkle volume after just eight weeks, an 18% increase in elastin,¹ and a 7% increase in skin elasticity—affect even more pronounced in women over 50.²

- **Biotin**: Biotin is an essential co-factor in the synthesis of fat and protein molecules that are prominent in skin, hair, and nails.³ Studies demonstrate that biotin supplementation supports strength, hardness, and integrity of the nail.⁵

- **Silicon**: Silicon is required for the formation of the protein cross-links that hold collagen and keratin molecules in their unique, functional shapes.⁷

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**Hair, Skin & Nails Rejuvenation Formula with VERISOL®**

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To order Hair, Skin & Nails Rejuvenation Formula with VERISOL®, call 1-800-544-4440 or visit www.LifeExtension.com

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References

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**Atherosclerosis** is the term used to describe damage and obstruction to the linings of the arteries.¹ When blood flow is impeded or blocked, the result can be death or disability from a stroke or heart attack.¹

A study on this topic published in *The Lancet* attracted worldwide attention. It documented that mummified human bodies dating back 4,000 years suffered clogged arteries.²

As *Life Extension* has long argued, atherosclerosis is a disease of aging that has always been prevalent.

It took MRI imaging to document clear signs of heart disease in 34% of mummified humans whose estimated mean age at death was 43 years. Those who died at an estimated mean age of 32 years were less likely to show signs of atherosclerosis.²

The prevalence and severity of atherosclerosis worsens with aging. We at *Life Extension* receive calls from people who suffer 70% to 95% blockage in their coronary arteries. These individuals often have several stents that prop open the most occluded part of their arteries. These stents or bypass surgery do nothing to slow the deterioration and further narrowing of their atherosclerotic blood vessels.

In a significant advance, two nutrients have been shown to dramatically slow the worsening of atherosclerotic plaque (by 95%), reduce unstable plaque, and improve endothelial function (by 66%).

Those with pre-existing coronary or cerebral atherosclerosis should read this article carefully. It describes the unique ways these two nutrients slash markers of heart attack and stroke risk in controlled human studies.
Urgent Need to Increase Plaque Stability

There is more to preventing atherosclerosis than simply preventing the formation of plaque. Much of the danger posed by plaque occurs when it becomes unstable.

Early on in the process, plaques are soft on the inside but covered with a hard, thick, fibrous cap on the plaque surface that faces the blood flow.

As long as these plaques remain thick, they are stable, meaning they are firm enough to not pose a major risk of rupturing. Over time, the cap begins to thin and weaken, making the plaque more vulnerable to rupturing. This is a catastrophic event that leads to sudden heart attack and stroke.

An important step in lowering acute cardiovascular risk therefore is to help stabilize plaques. That’s exactly what *Centella asiatica* does. Stable plaques stay where they are and don’t break loose to cause a tragic outcome.

*Centella asiatica*, an Asian aquatic plant long used in traditional medicine, helps stabilize thin-capped fibroatheromas, and in doing so reduces the potential for a rupture. It works by promoting the formation of collagen.

While we typically associate collagen with the skin, this structural protein is also a prominent component of thick fibroatheromatous plaques that helps reinforce them, making them less likely to rupture.

The active constituents of *Centella asiatica* are triterpenoid molecules that improve the synthesis of collagen.

By boosting the production of collagen, *Centella asiatica* extracts promote wound healing. This is key in stabilizing plaques because a plaque lesion is essentially a wound inside an arterial wall. Ultimately, by promoting collagen synthesis, *Centella asiatica* promotes remodeling of thin-capped, soft plaques into thicker-capped, harder, and more stable structures that are less likely to rupture and cause a heart attack or stroke.

In addition to stabilizing plaque lesions by enhancing collagen production, basic lab studies show that *Centella asiatica* also has the potential to help stop the progression of atherosclerosis. To achieve this, *Centella asiatica* reduces the adhesion of monocytes, which are immune system-derived cells that infiltrate artery linings to promote progression of atherosclerosis.

Human Studies on *Centella Asiatica*

Human studies have now been performed that demonstrate *Centella asiatica*’s ability to help increase the stability of soft, thin-capped lesions in the arteries of patients with known vulnerable plaques.

A two-part study was conducted in order to examine if *Centella asiatica* extract could help stabilize plaque lesions in the carotid arteries (the main arteries that lead to the brain). The first part was a pilot study in which patients with known high-risk plaque (meaning soft, thin-capped plaque lesions that were more likely to rupture) supplemented with 60 mg of *Centella asiatica* extract three times a day. After 12 months, the *Centella asiatica* extract significantly increased the density, or hardness, of plaques in the carotid arteries by an average of 30%.

The second part of the study was a randomized, placebo-controlled trial using the same dose of *Centella asiatica* or placebo. Once again, after 12 months, the density (a measure of collagen content and stability of the plaques) was assessed by ultrasound. The results showed that the plaques’ density increased 33% in the supplemented group, with no significant changes in placebo subjects. The *Centella asiatica*-supplemented subjects also experienced a significant improvement in plaque texture (meaning hardness).

Just to clarify, the existing plaque density in the *Centella asiatica* group increased, which improved the stability of the plaque. There was no increase in the occlusion of the carotid arteries, just an improvement in the stability of existing plaque. Perhaps most significantly, subjects taking *Centella asiatica* experienced half as many cardiovascular events (angina, heart attack, etc.) as the placebo recipients. In addition, while images from magnetic
resonance imaging (MRI) revealed evidence of reduced blood flow in brain areas in 17% of the control subjects, this occurred in only 7% of supplemented individuals. This is a significant difference, and one that would sharply reduce the risk of a future stroke.6

**Benefits in High-Risk Patients**

A similar but more detailed study was carried out in individuals with high-risk (softer, thin-capped) atherosclerotic plaques in their femoral (main leg) arteries.5 The same parameters were followed in this study, with individuals receiving 60 mg of *Centella asiatica* extract three times daily, or placebo, for 12 months. This group was made up of high-risk individuals with softer, thin-capped atherosclerotic lesions in their femoral arteries.

The results were measured using ultrasound scans. The virtue of ultrasound is that it emits sound waves that can detect whether atherosclerotic plaque is “soft” or “hard.” Soft tissue reflects back a darker image because this softer plaque absorbs more of the ultrasound wave. Conversely, more desirable “hard” arterial plaque bounces back brighter because it reflects back more sound waves. Prior studies have shown that darker plaques are associated with increased risk of stroke because these soft plaques are more likely to rupture.5

By the end of this study, there was a significant 63% increase in the brightness of the ultrasound echo returned from the lesions in the *Centella asiatica*-supplemented group. This indicated a lower risk for rupture. Once again, no significant change was seen in placebo recipients.5

In addition, while plaque size increased in control subjects by 23%, *Centella asiatica*-supplemented patients experienced no change in plaque size.5

Ultimately, treatment with *Centella asiatica* reduced the risk of plaque thinning, rupture, and subsequent blockage of arteries through stabilization and hardening of plaque lesions.

Now, let’s look at how this natural plaque-stabilizing extract is complemented by **Pycnogenol®,** which reduces the progression of atherosclerosis.

**Pycnogenol® Slows Atherosclerosis Progression**

**Pycnogenol®** is a standardized extract derived from the French maritime pine, *Pinus pinaster*. It consists of a mixture of bioactive compounds called procyanidins and phenolic acids,10,11 which have been shown to slow the progression of atherosclerosis.12

**What You Need to Know**

- Atherosclerotic plaques, which are now known to begin in early life, continue to progress even after symptoms develop.
- While reducing blood lipids, getting exercise, and watching your diet are important parts of a cardiovascular prevention regimen, it is now clear that those are not enough to prevent plaque progression and ultimate rupture, which causes an acute heart attack, stroke, or other cardiovascular event.
- Two natural botanicals have now been shown to have complementary properties: Pycnogenol® slows plaque progression, while *Centella asiatica* stabilizes plaque lesions, thickening their caps and reducing their vulnerability to rupture.
- The combination of the two supplements has undergone clinical trials in more than 2,000 people with atherosclerotic plaque, and has demonstrated a significant reduction, not only in plaque progression and texture, but also in prevention of new cardiovascular symptoms.
- Each supplement has been tested individually, and both are now available in a single vascular health-promoting formula.
Pycnogenol® helps slow this progression by reducing the development of fat cells and cellular signaling molecules that specifically contribute to the formation of plaque.

It does this by suppressing the production of adipose-differentiation-related protein. This protein is crucial for the development of both fat cells and the production of various inflammatory cytokines (signaling molecules) that contribute to plaque formation and progression.\(^{13,14}\) Pycnogenol® achieves this by reducing a major inflammation-signaling molecular complex called nuclear factor kappaB (NF-kappaB). This results in lower levels of inflammation.\(^{13,14}\) As we know, this is critical because chronic inflammation is a major factor in the development of atherosclerosis.

In addition, animal studies show that Pycnogenol® reduces areas of plaque and lipid deposition in mice with atherosclerosis, accompanied by reductions in total cholesterol and triglyceride levels and increases in protective high-density lipoprotein (HDL) cholesterol.\(^{13}\)

### Improving Endothelial Function

Improving endothelial function is also an important step in reducing the development and progression of atherosclerotic plaque.\(^{15,16}\)

Lab experiments show that Pycnogenol® stimulates a vital enzyme called endothelial nitric oxide synthase (eNOS). This action is critical to the health of blood vessels because endothelial nitric oxide synthase produces nitric oxide, the signaling molecule that endothelial cells use to communicate with the smooth muscle cells in arterial walls, helping them to relax and open up arteries.\(^{17}\)

This ability was demonstrated in lab experiments in which scientists constricted tissue from the aorta, which is the main blood vessel leading from the heart. The aortic constriction was done using norepinephrine and epinephrine that are normally released in response to stress. This technique mimics what happens in human arteries when blood flow is reduced.

What they discovered is that when the aorta was pre-treated with Pycnogenol®, it prevented this dangerous constriction of the blood vessels. This beneficial effect occurred as a result of increased nitric oxide synthesis, which signals arterial wall cells to relax, producing a wider artery and increasing blood flow. In addition, scientists found that increasing nitric oxide levels also decreases platelet aggregation and stickiness to vessel walls, reducing the risks of blood clots and enlarging plaques.\(^{17}\)

All of these complementary actions have been found to be especially beneficial in humans with coronary artery disease, as we’re about to see.

### How Pycnogenol® Benefits Coronary Artery Disease

The coronary arteries are critical because they supply the heart with blood, oxygen, and nutrients. Coronary artery disease develops because of plaque and inflammation that narrow the arteries, decreasing blood flow to the heart.

A human controlled trial demonstrated that Pycnogenol® was able to improve endothelial function in patients with coronary artery disease, an effect that helps to limit the progression of atherosclerosis.\(^{18}\)

In this randomized, placebo-controlled crossover study, 23 patients with coronary artery disease received...
either placebo or Pycnogenol® (200 mg per day) for eight weeks, followed by a two-week "washout" period. After that, the patients received the reverse (crossover) assignment for another eight weeks.18

In order to determine Pycnogenol®’s effect, the scientists assessed the patients’ endothelial function at the start of the study and after each treatment period by measuring flow-mediated dilation (a measure of how much arteries dilate in response to changes in blood flow) in the brachial artery (main artery to the forearm).

What they found was that treatment with Pycnogenol® produced a significant 32% increase in flow-mediated dilation and in endothelial function while placebo treatment produced no significant changes. Furthermore, levels of isoprostanes (an index of how much oxidized fat is present and a measure of overall oxidant stress) fell 7% in treated subjects with no change in placebo recipients.18

This study provides support for Pycnogenol®’s ability to slow the fundamental, early arterial changes leading to plaque formation and progression.

New Study Corroborates Pycnogenol®’s Benefits

Still greater improvements in endothelial function were demonstrated in a 2015 study by leading Pycnogenol® researchers in Italy.19 The study is especially important because it involved people with only borderline high blood pressure, blood lipids, and blood sugar, who as yet had no obvious atherosclerotic changes in their blood vessels and no existing coronary artery disease. In other words, these patients were like most people. They had definitive risk factors, but had not yet developed any clinically relevant disease. They thus were in an ideal situation for early, preventive intervention.

As in the preceding study, the main outcome measure was flow-mediated dilation. In this study, 93 individuals with borderline risk factors were enrolled, including 32 with hypertension, 31 with elevated blood lipids, and 30 with elevated blood sugar.19 All participants continued their use of the best available medical management for their symptoms, while half of the subjects in each group also took 150 mg of Pycnogenol® per day. Measurements of flow-mediated dilation were made at baseline, at eight weeks, and again at 12 weeks.

By the eight-week mark, flow-mediated dilation had increased in the supplemented subjects by 55%, and at 12 weeks by a total of 66%. During the same time period, control patients who had not supplemented with Pycnogenol® showed no significant changes in flow-mediated dilation. Measurements of blood flow by a different method, laser Doppler flux, demonstrated similar increases in blood flow at eight and 12 weeks, with flow at 12 weeks no different from normal values.19

Interpretation of this study suggests, in the authors’ own words, "... an important preventive possibility for borderline hypertensive, hyperglycemic, and hyperlipidemic subjects."19 Again, it’s essential to point out that the borderline status of these patients reflects the situation in which most people find themselves, that is, with only mild or no symptoms but at growing risk for endothelial dysfunction leading to plaque formation and ultimately, a cardiovascular catastrophe.

Clearly, both Pycnogenol® and Centella asiatica extracts have value individually in reducing plaque progression and promoting plaque stability, with additional early protection by Pycnogenol® from endothelial dysfunction. However, two compelling studies show that when these two supplements are used together, they provide even more powerful benefits.

Combined Benefits of Pycnogenol® and Centella Asiatica

Two studies of the Pycnogenol® plus Centella asiatica extract supplement were performed by the same research group at a prestigious university. Both were
designed to explore the impact of this combination of ingredients in subjects with two classifications of atherosclerotic lesions.

The first group had mild atherosclerotic lesions that were producing no symptoms and that were not yet blocking arteries (class IV). The second group had more advanced lesions that extended more than 50% to 60% into arteries (class V). Critically, both studies were carried out in people who, at the time of enrollment, had relatively early cardiovascular disease. This is vital because we know that prevention is always superior to attempts to cure these chronic, age-related disorders and because most readers fall into that category.

Let's take a look at the first study.

**Reduced Risk of Progression of Plaques**

The first study was performed among 1,363 subjects aged 45 to 60, who appeared healthy and had no conventional cardiovascular risk factors. All subjects had plaques that did not yet narrow the diameter of the carotid or femoral arteries by more than 50%, as seen on ultrasound, and no subjects were experiencing signs or symptoms of cardiovascular disease.

After enrollment, subjects were divided into six different groups:

- Controls, who received only education, exercise, diet, and lifestyle recommendations (which were also given to the subjects in all of the treatment groups)
- Pycnogenol® 50 mg daily (low-dose)
- Pycnogenol® 100 mg daily (higher-dose)
- Aspirin, 100 mg daily or ticlopidine (a prescription antiplatelet drug) for aspirin-intolerant subjects
- Aspirin, 100 mg daily plus Pycnogenol® 100 mg daily
- Pycnogenol® 100 mg plus Centella asiatica extract 100 mg daily.

All subjects underwent an ultrasound measurement every six months for 30 months in order to determine arterial wall structure and number of plaques that progressed from not blocking blood flow (class IV) to blocking blood flow (class V).
Once again, in all groups not receiving 100 mg of Pycnogenol®, the plaque lesions increased significantly, but they did not meaningfully increase in any of the groups receiving 100 mg of Pycnogenol®. The following is a breakdown of each group's percentage of plaques that worsened from class V (meaning symptom-free) to class VI (those with symptoms):

- 48% of control subjects (worst responding group)
- 21% of the aspirin/ticlopidine group
- 10% of Pycnogenol® 100 mg alone
- 11% in Pycnogenol® plus aspirin
- 6.5% of the Pycnogenol® and Centella asiatica group (best responding group)

Remember that in this study, progression was defined as going from a symptom-free state to one in which symptoms occurred. These were not minor symptoms, but rather those of significant loss of blood flow to the brain, such as numbness, tingling, or loss of function on the same side of the brain (for those with carotid artery plaque), or to the leg, such as pain, pallor, or numbness in the leg (for those with femoral artery plaque).

In other words, these figures for the Pycnogenol® and Centella asiatica combination reflect a 7.4-fold reduction in risk of developing profoundly disturbing symptoms of cardiovascular disease compared with controls, and a 3.22-fold reduction compared with the antiplatelet (aspirin/ticlopidine) group.
Even more exciting is that when compared to the control group, those in the Pycnogenol® and Centella asiatica group had a nearly **4-fold** reduction in the risk of being hospitalized for a full-blown cardiovascular event.

**Summary**

Cardiovascular disease, including heart attacks, strokes, and peripheral vascular disease, remains the leading cause of disability and death in Americans and others around the world. We’ve focused for years on lowering blood cholesterol and other lipids, but that turns out to be only part of the story.

New findings show that a person’s risk for having a cardiovascular “event” is highest for those with the most advanced arterial plaques, particularly those with thin caps and soft cores that are vulnerable to rupture, and then catastrophically block the artery.

Two supplements in particular have been found to help prevent dangerous atherosclerosis. **Pycnogenol®** has been demonstrated to slow the progression of atherosclerotic plaques. **Centella asiatica** preserves the hard, thick cap on atherosclerotic plaques. Such thick-capped plaques are less likely to rupture and produce a potentially fatal cardiovascular event.

When used together, these two supplements help to prevent plaque progression in those with milder atherosclerosis, and to reduce the development of symptoms in those with more severe disease.

In addition to efforts to lower lipid/glucose levels, a combination of Pycnogenol® and Centella asiatica provides the backup that most adults need for more comprehensive cardiovascular protection.

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**Atherosclerosis Begins Early in Life**

Long before a heart attack or stroke occurs, dangerous fatty plaques begin to form in the arteries, starting as early as the teen years. Progression to vascular disease can occur slowly over decades. The hidden danger is that the symptoms of cardiovascular problems are not always apparent until it’s too late.

Despite the billions of dollars spent on statin drugs and surgical interventions such as stents and bypass, heart disease remains the number one cause of death for Americans. More needs to be done to reduce this epidemic.

Researchers have identified two specialized botanicals compounds, **Centella asiatica** and **Pycnogenol®** that have been shown in university studies to slow the progression of dangerous arterial plaques, while also stabilizing existing plaques.

In one human study, the risk of plaque progression in the group taking Pycnogenol® and **Centella asiatica** was **95% lower** than in the control group. In addition, **Pycnogenol®** has been shown to improve **endothelial function** by **66%** in just 12 weeks.

When used together, both of these extracts help reduce two of the major causes of heart disease in those with milder atherosclerosis, while reducing the development of symptoms in those with more severe disease.
### Ultrasonic Classes of Atherosclerotic Lesions

<table>
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<tr>
<th>Ultrasonic Class</th>
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<td>Normal artery</td>
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<td>CLASS II</td>
<td>Intimal irregularities ± medial granulation</td>
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<td>Intimal surface is irregular and/or adventitia appears granular; separation of intima media and adventitia is not clear; intima-media thickness (IMT) &lt;1 mm</td>
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<td>CLASS III</td>
<td>Intima media thickening (&gt;1 mm)</td>
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<td>Appearances as in Class II, but intima-media thickness &gt;1 mm</td>
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<td>CLASS V</td>
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<td></td>
<td>As in Class V but associated with ipsilateral cerebral hemispheric symptoms or lower limb ischemic symptoms</td>
</tr>
</tbody>
</table>

Intima refers to the innermost layer of the artery, composed of endothelial cells, while media refers to the smooth muscle layer that comprises the artery wall, and adventitia is the loose connective tissue surrounding the artery. IMT: intima-media thickness, a long-term measure of atherosclerosis that is predictive of future cardiovascular events (thicker is more severe disease). Statistic measures means measurable narrowing of the blood flow channel inside the artery. All classes lower than VI occur without symptoms.

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AMPK ACTIVATOR

A PARADIGM IN CONTROLLING AGING

Found in every cell,12 AMPK promotes longevity factors that have been shown to extend lifespan in numerous organisms.3,4 Increasing AMPK signaling “turns off” many damaging effects of aging, thus enabling cells to return to their youthful vitality.3

Importance of AMPK

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

Gynostemma Pentaphyllum

An extract of the plant Gynostemma pentaphyllum promotes AMPK activation.9 In one of many studies showing a wide variety of benefits, researchers documented a 1-inch reduction in abdominal circumference in overweight individuals who took 450 mg daily of G. pentaphyllum extract for 12 weeks.10

Trans-Tiliroside

Trans-tiliroside, extracted from plants such as rose hips, boosts AMPK activation, but triggers different downstream metabolic benefits than G. pentaphyllum.12,14 Among its many benefits, a low equivalent dose of 56 mg daily trans-tiliroside has been shown by researchers in preclinical studies to promote healthy blood glucose levels and body weight already within normal range.15

Activate Your AMPK!

Over 7,500 published studies document the role that AMPK plays in protecting critical cellular functions. Those seeking healthy aging should prioritize re-activating their AMPK cellular enzyme. AMPK Activator provides nutrients shown to significantly boost AMPK activity. The suggested daily dosage of AMPK Activator is to take two capsules with the first meal of the day and one capsule with the second meal. Three capsules provide:

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

References

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
The accumulation of arterial plaque is a normal consequence of aging, but this plaque can become unstable—potentially affecting the vascular endothelium.¹

**Arterial Protect** provides a combination of patented and tested ingredients documented to support the body’s ability to control arterial plaque formation.

- **Pycnogenol®** French maritime pine bark extract improves endothelial function and arterial blood flow.²

- **Pycnogenol®** also helps modulate healthy inflammation and inhibit platelet aggregation.³

- **Centellicum®** *Centella Asiatica* leaf extract enhances desired stability of existing arterial plaque.⁴,⁵

- **Centellicum®** *Centella Asiatica* promotes production of collagen, which is found in the composition of the caps holding plaque in place.⁴,⁵

When the two ingredients in **Arterial Protect** were given to human volunteers, progression of arterial plaque was substantially reduced.¹

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

**References**

To order **Arterial Protect**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)
### Advanced Bio-Curcumin® with Ginger and Tumerones • 30 softgels, Item #01924

Triple-action formula acting on multiple signaling pathways to protect against inflammation.

**Retail Price:** $30  
**SUPER SALE Price Per Bottle:** $18.23  
(four-bottle purchase)

### Optimized Resveratrol with Nicotinamide Riboside • 30 vegetarian capsules, Item #02031

High-potency trans-resveratrol formula provides synergistic plant extracts that "turn on" the body's longevity genes, to support cell-regulating systems, and boost NAD+ cell energy.

**Retail Price:** $42  
**SUPER SALE Price Per Bottle:** $24.30  
(four-bottle purchase)

### Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™
100 mg, 60 softgels, Item #01426

The superior ubiquinol form of CoQ10 plus a natural compound (shilajit) shown to double mitochondrial coenzyme Q10 levels.

**Retail Price:** $62  
**SUPER SALE Price Per Bottle:** $32.40  
(ten-bottle purchase)

### AMPK Activator • 90 vegetarian capsules, Item #01907

Activating AMPK "turns off" many of the destructive factors of aging, enabling cells to return to their youthful vitality. Research shows that the two plant extracts contained in this formula (Gynostemma pentaphyllum and trans-tiliroside), promote AMPK activation.

**Retail Price:** $48  
**SUPER SALE Price Per Bottle:** $29.70  
(four-bottle purchase)

### Super Omega-3 EPA/DHA with Sesame Lignans & Olive Extract • 120 softgels, Item #01982

A highly refined fish oil blend derived from pristine waters off the coast of Alaska is formulated to remain exceptionally fresh. This purified EPA/DHA from Alaskan Pollock, plus sesame lignans and potent olive (fruit plus leaf) extract, provide essential components of the Mediterranean diet clearly differentiating this omega-3 formula from commercial fish oil.

**Retail Price:** $32  
**SUPER SALE Price Per Bottle:** $18.90  
(four-bottle purchase)

### Two-Per-Day • 120 tablets, Item #02015

Compared to commercial multivitamin/multi-nutrient products like Centrum®, Two-Per-Day has up to 50 times the potency of specific nutrients, as well as unique ingredients. The newly formulated product contains 5-MTHF, that is up to 7 times more bioavailable than folic acid. Each bottle lasts for two months. (Also available in capsule form at a slightly higher price.)

**Retail Price:** $20  
**SUPER SALE Price Per Bottle:** $12.15  
(four-bottle purchase)

### Health Booster (formerly labeled Super Booster) • 60 softgels, Item #01989

Just one softgel contains a variety of valuable nutrients, including vitamins K1 and K2, blueberry extract, gamma tocopherol, sesame lignans, chlorophyllin, lycopene, and a carotenoid phospholipid blend that contains trans-zeaxanthin, meso-zeaxanthin, and lutein. Taken individually these ingredients would cost 2 to 3 times more! (Two-month supply!)

**Retail Price:** $52  
**SUPER SALE Price Per Bottle:** $32.40  
(four-bottle purchase)

### MacuGuard® Ocular Support • 60 softgels, Item #01926

Offers triple eye protection with meso-zeaxanthin, lutein, and trans-zeaxanthin. This product is not needed by those already taking Health Booster, which contains these same ingredients.

**Retail Price:** $22  
**SUPER SALE Price Per Bottle:** $13.37  
(four-bottle purchase)

### Vitamin D3 • 5,000 IU, 60 softgels, Item #01713

High-potency vitamin D in a softgel to provide greater absorption into the bloodstream.

**Retail Price:** $10  
**SUPER SALE Price Per Bottle:** $5.85  
(four-bottle purchase)

### Ultra Natural Prostate • 60 softgels, Item #01928

Comprehensive support for an aging prostate gland utilizing standardized lignans, plus boron and phospholipids for enhanced absorption.

**Retail Price:** $38  
**SUPER SALE Price Per Bottle:** $21.60  
(ten-bottle purchase)

### FLORASSIST® Balance • 30 liquid vegetarian capsules, Item #01825

Dual-encapsulation technology delivers potent doses of the six most important probiotic strains.

**Retail Price:** $32  
**SUPER SALE Price Per Bottle:** $18.90  
(four-bottle purchase)
<table>
<thead>
<tr>
<th>Product Description</th>
<th>Retail Price</th>
<th>SUPER SALE Price Per Bottle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Super K with Advanced K2 Complex</strong>• 90 softgels, Item #01834</td>
<td>$30</td>
<td>$18.23 (four-bottle purchase)</td>
</tr>
<tr>
<td>Comprehensive formula providing 1,500 mcg of vitamin K1, 1,000 mcg of immediate-acting MK-4 vitamin K2 and 200 mcg of long-acting MK-7 vitamin K2 in a base of extra-virgin olive oil. This same vitamin K formula is included in Health Booster.</td>
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<tr>
<td>**PQQ Caps with BioPQQ®• 10 mg, 30 vegetarian capsules, Item #01500</td>
<td>$24</td>
<td>$12.15 (four-bottle purchase)</td>
</tr>
<tr>
<td>Promotes mitochondrial biogenesis (generation of new mitochondria) in aging cells.</td>
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<tr>
<td>**DHEA (Dehydroepiandrosterone)• 25 mg, 100 capsules, Item #00335</td>
<td>$16</td>
<td>$9.90 (four-bottle purchase)</td>
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<tr>
<td>A hormone that declines with aging, benefits overall health.</td>
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<tr>
<td>**Mitochondrial Energy Optimizer with BioPQQ®• 120 capsules, Item #01868</td>
<td>$72</td>
<td>$43.20 (four-bottle purchase)</td>
</tr>
<tr>
<td>This glycation-protection formula helps maintain healthy cellular function, protein structural integrity, and mitochondrial biogenesis. It now contains taurine, a free amino acid that boosts new brain cell formation in the area of the brain connected to learning and memory. New Lower Price!</td>
<td></td>
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<tr>
<td><strong>Mega Green Tea Extract</strong> (lightly caffeinated) • 725 mg, 100 vegetarian capsules, Item #00953</td>
<td>$30</td>
<td>$16.20 (four-bottle purchase)</td>
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<tr>
<td>A highly concentrated 98% polyphenol extract delivering 45% of the health-promoting catechin EGCG.</td>
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<tr>
<td>**Life Extension Mix™• 315 tablets, Item #02055</td>
<td>$80</td>
<td>$46.80 (four-bottle purchase)</td>
</tr>
<tr>
<td>This upgraded high-potency multi-nutrient formula contains 5-methyltetrahydrofolate (5-MTHF), the biologically active form of folate that is up to 7 times more bioavailable than folic acid.</td>
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<tr>
<td>**Bone Restore• 120 capsules, Item #01726</td>
<td>$22</td>
<td>$12.83 (four-bottle purchase)</td>
</tr>
<tr>
<td>Highly absorbable forms of calcium and FruiteX B® OsteoBoron®, magnesium, zinc, and vitamin D3. Also available with vitamin K2 at a slightly higher price. (Those taking Super K or Health Booster don't need additional vitamin K.)</td>
<td></td>
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<tr>
<td>**Cognitex® with Brain Shield® (Gastrodin)• 90 softgels, Item #01896</td>
<td>$60</td>
<td>$35.10 (four-bottle purchase)</td>
</tr>
<tr>
<td>Optimal support for the brain. Includes gastrodin, alpha-glyceryl phosphoryl choline, vinpocetine, phosphatidylserine, uridine-5’-monophosphate, and more. Available with or without pregnenolone.</td>
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<tr>
<td>**Enhanced Super Digestive Enzymes with Probiotics • 60 vegetarian capsules, Item #02022</td>
<td>$28</td>
<td>$16.20 (four-bottle purchase)</td>
</tr>
<tr>
<td>Contains amylase, protease, lipase, cellulase, and lactase to break down protein, starch and short sugar chains, fat, cellulose, and lactose. It has the added benefit of the probiotic <em>Bacillus coagulans</em>, which creates a coating that resists digestion in the stomach, allowing it to fully colonize in the intestines.</td>
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<tr>
<td>**Immune Senescence Protection Formula™• 60 vegetarian tablets, Item #02005</td>
<td>$40</td>
<td>$24.30 (four-bottle purchase)</td>
</tr>
<tr>
<td>Standardized full-spectrum <em>Reishi</em> mushroom extract with <em>Cistanche</em> and <em>Pu-erh tea</em> extracts to help restore youthful immune balance.</td>
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<tr>
<td>**Triple Action Thyroid• 60 vegetarian capsules, Item #02003</td>
<td>$36</td>
<td>$21.60 (four-bottle purchase)</td>
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<tr>
<td>A combination of ashwagandha, guggul, and Korean ginseng extract work in synergy to combat many of the ailments arising from a poorly functioning, suboptimal thyroid.</td>
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<tr>
<td>**European Milk Thistle• 60 softgels, Item #01922</td>
<td>$28</td>
<td>$16.88 (four-bottle purchase)</td>
</tr>
<tr>
<td>High-absorption phospholipid-enhanced formula delivers nearly 5 times more active components to the bloodstream to support detoxification processes as well as promote liver health and function.</td>
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<tr>
<td>**Skin Restoring Phytoceramides• 350 mg, 30 liquid vegetarian capsules, Item #01596</td>
<td>$25</td>
<td>$15.53 (four-bottle purchase)</td>
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<tr>
<td>Oral phytoceramides derived from wheat can reach the skin’s deepest layers to offset the body’s natural decline with age.</td>
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</tr>
<tr>
<td>**ArthroMax® Advanced with UC-II® and AprèsFlex®• 60 capsules, Item #01618</td>
<td>$36</td>
<td>$21.60 (four-bottle purchase)</td>
</tr>
<tr>
<td>Promotes joint health and may promote comfortable joint structure and function.</td>
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</tr>
<tr>
<td>**FLORASSIST® Oral Hygiene• 30 lozenges, Item #02011</td>
<td>$20</td>
<td>$12.15 (four-bottle purchase)</td>
</tr>
<tr>
<td>This unique blend of two powerful, oral probiotics—<em>S. salivarius</em> and <em>Bacillus coagulans</em>—inhibits harmful bacteria that develop in your mouth, affecting your teeth, gums, and overall health.</td>
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</tr>
<tr>
<td>**Super Bio-Curcumin®• 400 mg, 60 vegetarian capsules, Item #00407</td>
<td>$38</td>
<td>$23.63 (four-bottle purchase)</td>
</tr>
<tr>
<td>Super-absorbable formulation promotes healthy lipids, joint function, and DNA. Absorbs up to 7 times greater than conventional curcumin. Each bottle lasts two months.</td>
<td></td>
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</tr>
<tr>
<td>**Neuro-Mag® Magnesium L-Threonate• 90 vegetarian capsules, Item #01603</td>
<td>$40</td>
<td>$24.30 (four-bottle purchase)</td>
</tr>
<tr>
<td>Optimal form of magnesium to protect synaptic density of neurons.</td>
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</table>

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
The two leading causes of blindness are age-related **macular degeneration** and **cataract** formation.1-3

While declining vision is devastating in and of itself, new research shows that **macular degeneration** is linked to development of **Alzheimer’s disease**.4

Fortunately, two potent plant compounds, **lutein** and **zeaxanthin**, have been found to not only **reduce** incidences of **macular degeneration** and **cataracts**, but may also **reduce** **Alzheimer’s** risk.5-9

According to a recent study, people with the **highest** intakes of lutein and zeaxanthin had a **40% reduced** risk of developing **advanced macular degeneration**!9

When combined with a third carotenoid called **meso-zeaxanthin**, the three have been found to provide even greater benefits for people with early age-related macular degeneration.10

These low-cost natural compounds are readily available so that everyone can benefit from their potential to protect against vision loss and dementia.
Protection against Age-Related Macular Degeneration

Age-related macular degeneration is a progressive, chronic disease of the macula, which is the pigmented area near the center of the retina. The macula is responsible for central vision. It is the part of the eye that enables an individual to see fine details necessary for everyday activities, such as reading, driving, and telling time.

When the macula deteriorates, it can lead to everything from blurred vision to the distortion of central vision, and even to the complete loss of central vision.

Sadly, macular degeneration is projected to affect almost 300 million people worldwide in the next 25 years. Prescription medications offer nothing in terms of preventing macular degeneration.

The good news is that a recent article in *JAMA Ophthalmology* confirms previous findings on two natural compounds, lutein and zeaxanthin, and their ability to significantly reduce the risk of developing this debilitating eye disease.

Lutein and zeaxanthin are carotenoids, natural compounds found in vegetables that give them their color. Out of the hundreds of carotenoids in nature, only lutein, zeaxanthin, and meso-zeaxanthin are selectively present in high concentrations in the macula, giving this part of the eye its distinctive yellow color.

Even more significantly, these three carotenoids play a significant role in protecting the macula against UV light that causes oxidative stress, a key culprit in the damage caused to the macula during macular degeneration. In essence, these carotenoids function as natural “sunglasses” for the eye, protecting it from harmful light and maintaining the function of the macula.

As a result, multiple research studies have demonstrated those who have the highest intakes of these eye-protective carotenoids have the lowest risk of developing macular degeneration. Let’s take a look at the studies.

A 40% Reduced Risk of Macular Degeneration

The research detailed in the *JAMA* article previously mentioned was a decades-long prospective cohort study that began in 1984 and ended in 2010. During this time period, data from 69,443 women and 38,603 men who participated in the Nurses’ Health Study and the Health Professionals Follow-up Study were analyzed. All the participants were 50 years old or older and did not have macular degeneration at the start of both studies. Intake of carotenoids, including lutein and zeaxanthin, were calculated from food intake data sheets and repeated food questionnaires at baseline and follow-up.

At the end of the study, researchers identified 1,361 cases of intermediate macular degeneration and 1,118 cases of advanced macular degeneration. When the authors of the article compared these numbers with the established levels of lutein and zeaxanthin, they found that those participants, men and women alike, who had the highest intake of these carotenoids, decreased their risk of developing advanced macular degeneration by a significant 40% compared to those who had the lowest intake.

Benefits for Those with Early Macular Degeneration

In addition to reducing the risk of developing macular degeneration, other recent studies have demonstrated the beneficial impact of lutein and zeaxanthin for those who already have early macular degeneration. A randomized, double-blind, placebo-controlled trial examined the effects of lutein and zeaxanthin on macular pigmentation and visual performance in 112 men and women, aged 68 to 78, with early age-related macular degeneration.
During the study, participants received lutein only, a combination of lutein plus zeaxanthin, or a placebo daily. Scientists evaluated the following important parameters of vision health:

- **Serum concentrations of lutein and zeaxanthin** (the amount in the blood).
- **Macular pigment optical density**, which is a measurement of the thickness of the macular pigment: Higher density reduces the risk of macular degeneration, while lower density increases the risk.\(^{19}\)
- **Best-corrected visual acuity**, a test that measures the sharpness or clarity of vision (not overall quality of vision). This determines the degree to which vision can be corrected with glasses or contact lenses.
- **Contrast sensitivity**, a test that measures the ability to distinguish between an object and its background. Having low contrast sensitivity can lead to problems with night driving and can increase the risk of falling.
- **Vision-related quality of life**.

After two years, researchers were able to show that serum concentrations of lutein, zeaxanthin, and macular pigment optical density significantly increased for all treatment groups receiving either lutein or the combination of lutein-zeaxanthin. There were no adverse side effects. In terms of visual performance, there was an increase in contrast sensitivity in the active treatment groups. Compared to placebo, those taking lutein and zeaxanthin showed a significant increase in the vision-related quality of life score.

While there were no improvements seen in best-corrected visual acuity, this study demonstrated that supplementation with lutein and zeaxanthin have multiple benefits for those suffering from early macular degeneration.

### How to Enhance the Benefits of Lutein and Zeaxanthin

As beneficial as these two nutrients are, their impact is even more dramatic when combined with a third compound: *meso*-zeaxanthin. Formed in the macula from zeaxanthin, *meso*-zeaxanthin is one of the three carotenoids we mentioned earlier that is present in the macula.

Because all three are present in the macula, it only makes sense that all three together offer the most benefits to eye health, which is exactly what this next study found.

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**What You Need to Know**

**Prevent Age-Related Macular Degeneration**

- Age-related macular degeneration is the leading cause of blindness in the Western world for those aged 60 and older.
- High levels of lutein and zeaxanthin, as well as *meso*-zeaxanthin, can safely and effectively reduce the risk of developing macular degeneration while slowing visual loss in people with macular degeneration.
- Other natural compounds high in free radical scavenging activity, such as astaxanthin and cyanidin-3-glucoside, have been shown in laboratory studies to have significant potential in preventing macular degeneration.
- Lutein and zeaxanthin have also been shown in multiple studies to be effective in helping to prevent cataracts, another leading cause of vision loss.
- Having macular degeneration has been linked with Alzheimer’s, but studies have shown that people with high levels of lutein and zeaxanthin have better cognition than those with lower levels, in addition to having a lower chance of developing Alzheimer’s.
Vision was assessed using two of the testing parameters we mentioned earlier: macular pigment optical density and best-corrected visual acuity. While there were significant improvements in vision in both groups at the end of the study, the most statistically significant improvements were seen in the group taking the combination of *meso-zeaxanthin* along with *lutein* and *zeaxanthin*.

The same researchers did a three-year follow-up of the original participants, and as in the first study, they found that those taking *meso-zeaxanthin* in addition to *lutein* and *zeaxanthin* had the most significant improvements in vision, specifically in terms of enhancing contrast sensitivity and increasing macular pigment. This led the authors to conclude that taking these three carotenoid nutrients together provided the most benefits for those suffering from early age-related macular degeneration.

Protection against Cataracts

In addition to battling age-related macular degeneration, *lutein* and *zeaxanthin* have been found to significantly reduce the risk of another cause of vision loss: cataracts. A cataract is a clouding of the lens of the eye and is caused in large part by oxidative stress and glycation. In America alone, it is projected that 50 million people will have cataracts by 2050.

A study out of Melbourne, Australia, examined the relationship between *lutein*, *zeaxanthin*, and the risk of cataracts in 3,271 people aged 40 or greater over a two-year period. What they found is that the men and women who ate a diet with foods high in *lutein* and *zeaxanthin* had a statistically significant lower risk of developing cataracts.

This was confirmed in a more recent meta-analysis published in 2014. After analyzing data from studies with 41,999 total participants, 4,416 of whom had cataracts, the authors of the study determined that the intake of dietary *lutein* and *zeaxanthin* was associated with a reduced risk of developing age-related cataracts.

The Link between Macular Degeneration and Alzheimer's

Scientists have long known that the retina is a direct extension of the brain. With this knowledge, researchers have been examining the eyes, retina, and macula to determine if changes in the macular pigment optical density might be an indicator of something more than vision problems. Specifically, they wanted to determine if these changes might reflect pathological processes, like Alzheimer's disease, and cognitive impairments in the brain.
readings of multiple serum carotenoids, including lutein and zeaxanthin. At follow-up, researchers found that low lutein concentrations were significantly associated with Alzheimer’s disease. This led the researchers to conclude that maintaining higher amounts of lutein in the blood could moderately decrease the risk of Alzheimer’s.5

It is important to point out that the association between macular degeneration and onset of Alzheimer’s may relate to the lack of brain activity that occurs in aging individuals who lose their eyesight. One method of staving off dementia is to keep one’s neurons highly active via mental and physical exercises. The blinding impact of advanced macular degeneration limits one’s ability to maintain healthy stimulation of one’s neurons.28

The first study examined whether or not macular pigment optical density, along with lutein and zeaxanthin, is related to cognitive functioning in older adults.24 Researchers tested 108 men and women with an average age of 77 years for serum carotenoid levels, macular pigment optical density, and cognition, including memory and brain processing speed. Results of the study showed that macular pigment optical density was significantly associated with cognition. Those with higher macular pigment optical density showed better cognition, as well as verbal learning and fluency, recall, and processing speed. Higher serum levels of lutein and zeaxanthin were associated with a statistically significant level to verbal fluency.

Other research has shown a link between macular degeneration and the risk of developing Alzheimer’s specifically. In an eight-year-long population-based cohort study, researchers examined 4,993 men and women aged 65 or older with macular degeneration. For the control cohort, they recruited 24,965 participants matched for age and gender. At a mean follow-up time of 4.4 years, the researchers discovered that the patients with macular degeneration had a statistically higher risk of developing Alzheimer’s than those participants without macular degeneration.4

Because of studies like this, scientists are now investigating whether or not increasing lutein and/or zeaxanthin intake could be beneficial in decreasing the risk of developing Alzheimer’s. While more research needs to be done, a recent study from France provides evidence that these carotenoids could do just that.5

French researchers followed 1,092 men and women, aged 65 or older, for up to 10 years and took baseline

In addition to lutein and zeaxanthin, two natural compounds have also been found to be key players in preventing the underlying damage that can lead to the development of age-related macular degeneration. One is astaxanthin, a red carotenoid found in seafood and algae, and the other is cyanidin-3-glucoside (C3G), a purple plant-based pigment in the class of compounds called anthocyanins.

In a study, researchers examined the protective effect of astaxanthin against light-induced retinal damage.25 This is the kind of damage that is a key component of damage to the macula, ultimately leading to macular degeneration.

In this study, scientists gave mice astaxanthin and then exposed them to very bright light (8,000 lux) for three hours in order to induce retinal oxidative damage. The researchers found that astaxanthin protected the retina against light-induced oxidative damage. This led them to conclude that dietary astaxanthin could help prevent and inhibit the progression of dry macular degeneration, as well as retinitis pigmentosa, a group of inherited diseases that cause retinal damage.

In another recently published study on the protective effects of anthocyanins, specifically C3G, on light-induced retinal pigment epithelial cell damage, researchers determined that multiple anthocyanins protected human retinal pigment epithelial cells against oxidative damage and found C3G to be significantly superior. The study authors concluded that anthocyanins in general, and C3G specifically, are promising candidates for the prevention of pathological changes in the retina.26

Additional Ways to Protect against Macular Degeneration

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Summary

Age-related macular degeneration and cataracts are two of the leading causes of vision loss in the elderly. **Lutein and zeaxanthin**, carotenoids found in high quantities in the macula of the eye, have been shown in multiple studies to reduce the risk of developing both of these eye diseases. Adding a third carotenoid, **meso-zeaxanthin**, has been found to produce even greater benefits.

Now, research has shown that having macular degeneration puts people at higher risk for developing Alzheimer’s disease. Fortunately, studies have shown that one of the nutrients that helps protect vision, **lutein**, may also reduce the risk of developing Alzheimer’s.

Ultimately, the carotenoids lutein, zeaxanthin, and meso-zeaxanthin may not only help people protect their vision, but could also help protect cognitive function.

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


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 III** 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 III** formula is buffered in a way to make it soothing to the eye. The suggested use of **Brite Eyes III** is to instill 1 to 2 drops in the affected eye as needed.

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

To order **Brite Eyes III**, call 1-800-544-4440 or visit www.LifeExtension.com
According to the *Proceedings of the National Academy of Sciences*, alpha tocopherol (vitamin E) displaces critically important gamma tocopherol in the cells.\(^1\) While alpha tocopherol inhibits free radical production, gamma tocopherol is required to trap and neutralize existing free radicals.\(^2\)

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

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

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

Life Extension\(^\text{®}\) has uncovered research suggesting that adding sesame lignans to gamma tocopherol may significantly enhance its beneficial effects. Sesame and its lignans have been shown to protect against oxidation and help maintain already-normal blood pressure.\(^*\)

In a human study that combined gamma tocopherol with sesame lignans, gamma tocopherol/sesame was 25% more effective than gamma tocopherol/tocotrienols in suppressing tissue measurements for free radical and inflammatory damage.\(^4,5\)

Life Extension\(^\text{®}\) fortified the popular Gamma E Tocopherol supplement with standardized sesame lignans extract long ago. Consumers thus obtain superior benefits at a much lower cost.

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

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

**References**


*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.*
MacuGuard® Ocular Support with Astaxanthin contains the nutritional building blocks necessary to maintain the structural integrity of your eyes.¹⁻⁷

- Supports **lutein** concentration in the eye
- Supports **lutein** absorption in the bloodstream
- Provides **phospholipids** to enhance **lutein** in cell membranes
- Maintains **zeaxanthin** concentrations in the eye
- Provides **trans-zeaxanthin** and **meso-zeaxanthin**, which are difficult to obtain from diet alone
- Contains **cyanidin-3-glucoside** to help with night vision
- Provides **astaxanthin** to protect against free radical-induced DNA damage

To order MacuGuard® Ocular Support with Astaxanthin, call 1-800-544-4440 or visit www.LifeExtension.com

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**References**

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These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
The chemicals in our water, air, and food, the materials in our home, and nonionizing radiation present cancer risks.\textsuperscript{1-5}

But that doesn’t mean that we are defenseless. Researchers have identified several mechanisms by which most cancer-producing toxins disrupt our body’s defense systems. Compelling evidence reveals how we can defend against these carcinogenic mechanisms.

After reading this article, you’ll be able to select protective approaches that best fit your individual exposure to help counteract some of the highest risks in your own environment.
How Toxins Produce Cancer

While we once thought of “cancer” as a single devastating disease, we now recognize that a range of cells, in various tissues, can undergo “malignant transformation” to become cancer.6

In fact, the body’s natural defenses are repeatedly inhibiting processes involved in cancer development through a series of targeted responses, much like a nation’s security forces.

On occasion, however, a precancerous or malignant cell slips through all of those defenses and may proceed to start a tumor.

In the worst case, the tumor can release tiny clumps of malignant cells that spread cancer to distant parts of the body. Metastatic cancer is almost always a predictor of death as a result of the disease.7

Despite the vast number and diversity of cancer types, there are a relatively small number of events that typically occur in the progression from healthy cell to malignancy. Toxic environmental chemicals, electromagnetic fields,8,9 and ionizing radiation may initiate and/or promote malignancy, operating along a number of mechanisms. Some of these mechanisms include:10-22

- DNA damage,
- Liver detoxification impairment,
- Immune impairment,
- Endocrine disruptors, and
- Loss of apoptosis.

Powerful Cancer Prevention from Mother Nature

It is easy to become fearful about the vast numbers of toxic chemicals and other influences all around us, lurking to produce catastrophic cancers. Fortunately, there are solutions in the form of specific nutrients with powerful cancer-preventing effects.

Compelling scientific studies show that specific nutrients counteract major processes by which toxic compounds and radiation promote malignancies.

By discussing the five major pathways through which toxins initiate cancer, and the nutrients that specifically counteract each of those cancer-promoting processes, we can put together a rigorous cancer chemoprevention regimen.

DNA Damage

The first way toxins may lead to cancer is by breaking DNA strands. Damage to DNA is a major initiating factor in cellular transformation to cancer. DNA damage can be caused by toxins that break DNA strands (such as pro-oxidant chemicals or ionizing radiation).10,23

Such damage can induce mutations in the DNA that trigger cancer.24-27 That is why nutrients that prevent DNA damage, or ones that promote its repair, are so potent in protecting against cancer.

Given the role of oxidative stress in causing such damage, nutrients that reduce DNA damage (i.e. vitamins C and E and the trace mineral selenium), are often considered as a first line of defense.28-33

Surprisingly, probiotics, which are normally associated with improved gastrointestinal function, have been found to be effective at reducing DNA damage specifically in the colon. This may help to prevent colon cancer, the third cause of cancer-related deaths in the US.34,35

And, while sunlight exposure can boost vitamin D levels, such exposure also raises DNA skin damage, but vitamin D supplementation can protect against DNA damage throughout the body.36,37

Nearly a dozen nutrients have been found to prevent DNA damage, resulting in a positive impact on cancers of the prostate, colon, breast, skin, liver, and more.

Table 1 above lists just a few of the nutrients known for their DNA-protective effects.

**TABLE 1: Nutrients That Reduce DNA Damage**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Cancers Affected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carotenoids</td>
<td>Prostate, colon</td>
</tr>
<tr>
<td>(lutein, astaxanthin, lycopene)</td>
<td></td>
</tr>
<tr>
<td>Coenzyme Q10</td>
<td>Colon, head-and-neck</td>
</tr>
<tr>
<td>Fish oil (omega-3 fats)</td>
<td>Colon, skin</td>
</tr>
<tr>
<td>Genistein (from soy)</td>
<td>Leukemia</td>
</tr>
<tr>
<td>Plant polyphenols</td>
<td>Multiple</td>
</tr>
<tr>
<td>Probiotics (Lactobacillus rhamnosus)</td>
<td>Colon</td>
</tr>
<tr>
<td>Quercetin</td>
<td>Head-and-neck</td>
</tr>
<tr>
<td>Selenium</td>
<td>Colon, breast</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Breast, colon, skin</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Colon, skin</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Liver, breast</td>
</tr>
</tbody>
</table>

*These are only a few of the types of cancers affected by these nutrients.
Liver Detoxification Systems

The second way environmental toxins cause cancer is through their detrimental impact on liver detoxification systems. Liver detoxification systems play a major role in managing ingested toxins because blood from the digestive tract goes to the liver before being pumped around to the remainder of the body.

The liver has two major detoxification pathways: Phase I and Phase II. Phase I enzymes convert toxic chemicals into compounds that may be more toxic than the parent compound. Unfortunately, if the toxic load is too heavy, it can cause overactivity of Phase I enzymes, which can have the reverse effect of converting relatively harmless substances into potential DNA-damaging carcinogens.

Making matters worse, the worst offenders of overactive Phase I enzymes are substances some people encounter on a daily basis, including alcohol, saturated fats, and exhaust fumes, among others.

In Phase II detoxification, the liver adds another substance to the toxic chemical in order to make it more water soluble. This allows your body to excrete the toxin through bile or urine, helping remove the potentially carcinogenic substance from the body.

For these reasons, cancer-preventive nutrients that influence liver metabolism are generally those that regulate toxin-enhancing Phase I reactions, promote toxin-neutralizing Phase II reactions, or, in many cases, do both. Nutrients that regulate these liver detoxification systems come largely from dietary plants and their extracts.

Several nutrients have this dual action on liver enzymes, including curcumin, folic acid, and garlic, among others. Research suggests this may have a positive impact on preventing some of the most common and deadly cancers.

See Table 2 for a list of nutrients that prevent cancer by regulating the liver’s detoxification enzymes.

Immune Surveillance

The third way environmental toxins can cause cancer is through their impact on immune surveillance. Immune surveillance refers to the immune system’s continual search for cells bearing signs that they have become cancerous. A number of environmental toxins can suppress immune surveillance, raising the risk that a malignant cell will slip under the radar, form a tumor, and successfully spread to other parts of the body.

Nutrients that enhance immune surveillance are only now being recognized as powerful contributors to the body’s lifelong fight against cancer. These nutrients boost those components of the immune system that are
responsible for recognizing the unique tumor “markers” displayed on the surface of malignant cells, and then destroying those cells.

Nutrients that enhance immune surveillance may stimulate growth and proliferation of tumor-detecting lymphocytes, promote a vigorous attack on tumor cells by so-called “natural killer cells,” and/or stimulate antibody production, which aids in immobilization and destruction of malignant cells. Table 3 lists nutrients capable of activating one or more components of the immune system in order to destroy developing cancers.

**Endocrine Disruptors**

The fourth way environmental toxins can cause cancer is through their impact on endocrine disruptors. Endocrine disruptors are chemicals that interact with sex hormones and/or their receptors to promote cancer development.17-19,118

Not surprisingly, nutrients that inhibit endocrine disruptors show promise in preventing hormone-dependent cancers such as those of the breast, uterus, and prostate. Although scientists don’t yet fully know how these nutrients work to inhibit endocrine disruptors, it may involve enhanced excretion or reduced absorption of toxins from the intestinal tract.119,120 Table 4 lists nutrients capable of inhibiting endocrine-disrupting pollutants. In addition, there are also a number of plant flavonoids (i.e. chrysin, genistein, quercetin) that are effective against endocrine-disrupting toxins.

They appear to reduce the activity of estrogen-producing enzymes such as aromatase, thereby reducing overall sex hormone predominance and starving hormone-dependent tumors of their vital growth factors.89

**Loss of Apoptosis**

Another way environmental toxins are associated with cancer is through inducing a loss of apoptosis, or programmed cell death. Loss of apoptosis refers to the “immortality” typical of cancer cells. Normal body cells are programmed to die off when appropriate.130 Cancer cells have lost this ability (often as a result of DNA damage), which allows them to reproduce essentially without limit.131 A number of chemical toxins, particularly aflatoxin, a potent inducer of liver damage, can switch off the gene responsible for producing apoptosis,132 which results in cancer promotion.20-22

**Nutrients that restore cells’ natural ability to die by apoptosis** represent the final category in our listing of nutrients that help fight against cancers caused

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**TABLE 2: Nutrients That Regulate Liver Detoxification Enzymes**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Impact on Liver Enzymes</th>
<th>Cancers Affected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorophyllin72</td>
<td>Inhibit Phase I; boost Phase II</td>
<td>Liver, colon, prostate</td>
</tr>
<tr>
<td>Curcumin73-78</td>
<td>Inhibit Phase I; boost Phase II</td>
<td>Breast, colon, prostate, pancreas</td>
</tr>
<tr>
<td>Folic acid79-81</td>
<td>Inhibit Phase I; boost Phase II</td>
<td>Breast, pancreas</td>
</tr>
<tr>
<td>Garlic82-86</td>
<td>Inhibit Phase I; boost Phase II</td>
<td>Breast, liver, prostate</td>
</tr>
<tr>
<td>Genistein87</td>
<td>Boost Phase II</td>
<td>Colon</td>
</tr>
<tr>
<td>Isothiocyanates (sulforaphane, PEITC) from cruciferous vegetables</td>
<td>Inhibit Phase I; boost Phase II</td>
<td>Liver, colon, breast, prostate</td>
</tr>
<tr>
<td>Plant flavonoids (i.e. chrysin, genistein, quercetin)</td>
<td>Inhibit Phase I; boost Phase II</td>
<td>Multiple</td>
</tr>
<tr>
<td>Silymarin (milk thistle)91</td>
<td>Boost Phase II</td>
<td>Liver</td>
</tr>
</tbody>
</table>

*These are only a few of the types of cancers affected by these nutrients.
by environmental toxins. These nutrients typically act by modifying various signaling pathways. This means that they can activate genes that become suppressed when cells become cancerous, including genes that normally support the graceful death of a cell that is no longer useful or poses a threat.\textsuperscript{133}

By restoring the natural self-destruction program initiated by apoptosis genes, these nutrients put a sharp roadblock in the way of a developing tumor. This allows other anticancer mechanisms such as immune surveillance to clear the remainder of the battlefield.\textsuperscript{133}

Nutrients known to promote apoptosis include coffee extract, quercetin, pine bark extract, and selenium. Research shows they have a positive impact on bladder, colon, and ovarian cancers, among others. See Table 5 for a more detailed list of nutrients that promote or restore apoptosis capabilities in malignant cells.

### TABLE 3: Nutrients That Boost Immune Surveillance

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Immune Mechanism</th>
<th>Cancers Affected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enzymatically modified rice bran\textsuperscript{94-97}</td>
<td>Increases natural killer cell activity</td>
<td>Leukemia, Multiple Myeloma, Liver</td>
</tr>
<tr>
<td>\textit{Cistanche} extracts\textsuperscript{98-101}</td>
<td>Increases naïve T-cells, increased expression of transforming growth factor beta, decreases inflammation</td>
<td>Colon</td>
</tr>
<tr>
<td>Grape seed proanthocyanins\textsuperscript{102}</td>
<td>Induction of immunoregulatory cytokines; stimulation of tumor-destroying T cells</td>
<td>Skin</td>
</tr>
<tr>
<td>Green tea polyphenols (EGCG) \textsuperscript{102-107}</td>
<td>Activation of tumor-killing T-lymphocytes and natural killer cells; induction of immunoregulatory cytokines</td>
<td>Colon, skin, lung, prostate, breast</td>
</tr>
<tr>
<td>Probiotics (lactic acid bacteria)\textsuperscript{108-110}</td>
<td>Decrease inflammation; increase immunoregulatory cytokines; increased interferon-gamma production</td>
<td>Colon, skin</td>
</tr>
<tr>
<td>Reishi mushroom (\textit{Ganoderma lucidum})\textsuperscript{111-114}</td>
<td>Enhanced proliferation of tumor-killing T-lymphocytes, antibody-producing B-lymphocytes, and natural killer cells</td>
<td>Liver, lymphoma, lung</td>
</tr>
<tr>
<td>Resveratrol\textsuperscript{115,116}</td>
<td>Sensitizes tumor cells to killing by cytokine-induced killer cells; enhances cytokine-induced killer cell activity</td>
<td>Leukemia</td>
</tr>
<tr>
<td>Silymarin\textsuperscript{102}</td>
<td>Induction of immunoregulatory cytokines; stimulation of tumor-destroying T cells</td>
<td>Skin</td>
</tr>
<tr>
<td>Vitamin D\textsuperscript{117}</td>
<td>Reduced inflammation</td>
<td>Colon</td>
</tr>
</tbody>
</table>

*These are only a few of the types of cancers affected by these nutrients.*
Sources of Cancer-Inducing and Cancer-Promoting Toxins

While it is impossible to avoid all cancer-causing environmental toxins, it is important to be aware of some of the most prominent sources. We have compiled a list of common toxins broken down by their environmental sources. As you’ll see from this list, these can be found in sources we interact with on a daily basis, including our food, water, plastic, cell phones, and even sunlight.

- **Aflatoxins** are toxic chemicals produced by *Aspergillus* fungi growing on grains and peanuts, particularly those stored improperly. Chronic exposure induces cancer by multiple mechanisms.155,156

- **Polycyclic aromatic hydrocarbons** are chemical structures composed of carbon, hydrogen, and occasionally other atoms. They are products of fossil fuel combustion, particularly petrochemicals, and are a major source of cancer-causing chemicals in polluted air.157,158

- **Bisphenol A (BPA)** is one of the highest-volume toxic chemicals found worldwide.159 It is used in making all kinds of plastics and resins, including water bottles and food containers.

- **Heavy metals** (including cadmium, arsenic, nickel, lead, and mercury) are naturally occurring components of the earth’s crust.160 Human exposure results from mining,161 smelting,162 and petroleum manufacturing,163 all of which release heavy metals into the air, water, and soil.

- **Pesticides and herbicides**,164 especially those containing organic chemicals bonded to chlorine or bromine, are found in agricultural settings, where they make their way into the food chain. Sadly, even after the highly toxic dichlorodiphenyltrichloroethane (DDT) was banned, risks still abound, both because of persistent DDT in the environment and because newer compounds intended to replace DDT (such as methoxychlor) are turning out to have their own cancer-inducing properties.18

- **Dioxins** and dioxin-like chemicals such as polychlorinated biphenyls (PCBs) are commonly found in foods of animal origin (meat, dairy, and fish,165,166 depending on the country of origin).167

- **Heterocyclic amines** are chemicals that form when meat is cooked at high temperatures (e.g., grilled or broiled).72

- **Ultraviolet radiation** is a natural component of sunlight, but serves as a powerful source of many of the changes that lead to cancer.168

- **Electromagnetic field radiation**, especially the kind produced by cellular phones and their transmitting stations,169 are only now emerging as potential environmental threats. Such radiation is associated with DNA damage,170-172 potentially leading to cancer.173,174

### TABLE 4: Nutrients That Inhibit Endocrine Disruptors

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Toxin Inhibited</th>
<th>Cancers Affected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorella pyrenoidosa</td>
<td>Dioxin (a polychlorinated biphenyl [PCB]), perfluorinated compounds (PFCs)</td>
<td>Breast, prostate</td>
</tr>
<tr>
<td>(More efficiently obtained as chlorophyllin)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Folic acid</td>
<td>Bisphenol A (BPA), phthalates</td>
<td>Breast, prostate</td>
</tr>
<tr>
<td>Genistein</td>
<td>BPA, phthalates</td>
<td>Breast, prostate</td>
</tr>
<tr>
<td>Probiotics</td>
<td>BPA</td>
<td>Breast, prostate</td>
</tr>
<tr>
<td>(Lactobacillus, Bifidobacterium)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>119,128,129</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Heavy metals (lead, copper, iron)</td>
<td>Liver, lung, prostate</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Heavy metals (lead, copper, iron)</td>
<td>Liver, lung, prostate</td>
</tr>
</tbody>
</table>

*These are only a few of the types of cancers affected by these nutrients.*
This is by no means an exhaustive listing of cancer-related environmental toxins. Toxins are ubiquitous, particularly in our highly industrialized society. They are, therefore, nearly impossible to avoid, but as we have read, we know that we are not helpless. We can arm ourselves with knowledge about natural products capable of offsetting much of the increased cancer risk posed by environmental toxins.

**Summary**

We are awash in a sea of toxins and invisible radiation that constantly promotes malignant transformation of our cells, leading to persistently high rates of cancer.

Despite the seemingly immeasurable amount of environmental toxins, there are five mechanisms through which they typically work to promote cancer. This allows us to identify nutrients that have cancer-fighting properties that work specifically against these mechanisms.

Just as the chemicals that cause cancer do so by multiple mechanisms, natural products offer multiple, overlapping, and complementary approaches to cancer prevention.

By becoming familiar with the major cancer-inducing and cancer-promoting toxic influences in your world, you can then develop a supplement regimen that covers all five mechanisms by which we know that toxins and radiation induce cancerous changes.

By choosing carefully from among the nutrients listed in this article, you can establish a solid cancer-fighting base in your own body—one that works with your natural defenses to defeat cancers before they get established.

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

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**Table 5: Nutrients That Promote Apoptosis**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Cancers Affected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorophyllin&lt;sup&gt;134,135&lt;/sup&gt;</td>
<td>Bladder</td>
</tr>
<tr>
<td>Coffee extract&lt;sup&gt;136&lt;/sup&gt;</td>
<td>Colon</td>
</tr>
<tr>
<td>Curcumin&lt;sup&gt;25,137,138&lt;/sup&gt;</td>
<td>Leukemia, colon</td>
</tr>
<tr>
<td><em>Emblica officinalis</em> (amla; Indian gooseberry)&lt;sup&gt;139&lt;/sup&gt;</td>
<td>Ovary</td>
</tr>
<tr>
<td>Green tea extract (EGCG)&lt;sup&gt;140-144&lt;/sup&gt;</td>
<td>Leukemia, lymphoma, head-and-neck</td>
</tr>
<tr>
<td>Lycopene&lt;sup&gt;38&lt;/sup&gt;</td>
<td>Prostate</td>
</tr>
<tr>
<td>Phenyl isothiocyanate (PEITC) from cruciferous vegetables&lt;sup&gt;67&lt;/sup&gt;</td>
<td>Bladder, lung</td>
</tr>
<tr>
<td>Pine bark extract (Enzogenol)&lt;sup&gt;145,146&lt;/sup&gt;</td>
<td>Leukemia</td>
</tr>
<tr>
<td>Prebiotics (fermentable fiber, which produces butyrate, induces apoptosis)&lt;sup&gt;136&lt;/sup&gt;</td>
<td>Colon</td>
</tr>
<tr>
<td>Probiotics (<em>Lactobacillus salivarius</em>)&lt;sup&gt;147&lt;/sup&gt;</td>
<td>Oral</td>
</tr>
<tr>
<td>Propolis&lt;sup&gt;136,148&lt;/sup&gt;</td>
<td>Colon</td>
</tr>
<tr>
<td>Quercetin&lt;sup&gt;139&lt;/sup&gt;</td>
<td>Ovary</td>
</tr>
<tr>
<td>Red clover isoflavones&lt;sup&gt;145&lt;/sup&gt;</td>
<td>Prostate</td>
</tr>
<tr>
<td>Rosemary (carnosol)&lt;sup&gt;150, 151&lt;/sup&gt;</td>
<td>Prostate, colon, skin, breast, kidney, liver</td>
</tr>
<tr>
<td>Sarsaparilla (<em>Smilax glabra</em>)&lt;sup&gt;152&lt;/sup&gt;</td>
<td>Multiple</td>
</tr>
<tr>
<td>Selenium&lt;sup&gt;153&lt;/sup&gt;</td>
<td>Colon, lung, prostate</td>
</tr>
<tr>
<td>Soy isoflavones (genistein, daidzein)&lt;sup&gt;38,154&lt;/sup&gt;</td>
<td>Prostate</td>
</tr>
</tbody>
</table>

*These are only a few of the types of cancers affected by these nutrients.
Toxins That Induce or Promote Cancer*

<table>
<thead>
<tr>
<th>Basic Mechanism</th>
<th>Toxins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased DNA damage</td>
<td>Aflatoxin A1, Air pollutants (polycyclic aromatic hydrocarbons, tobacco smoke)</td>
</tr>
<tr>
<td></td>
<td>Arsenic, Bisphenol A (BPA), Cadmium chloride, Dioxin, Microwave radiation, Mobile phone radiation, Nickel salts, Paraquat (an herbicide)</td>
</tr>
<tr>
<td>Suppress immune surveillance</td>
<td>Dioxin, Mercury, Mycotoxins (e.g., aflatoxins, fumonisins, and deoxynivalenol), Perfluorinated hydrocarbons, Tobacco smoke, Ultraviolet light</td>
</tr>
<tr>
<td>Endocrine disruption</td>
<td>BPA, Cypriotin (a fungicide related to polycyclic aromatic hydrocarbons), DDT, Dioxin, Heavy metals (arsenic, cadmium, lead, mercury)</td>
</tr>
<tr>
<td>Loss of apoptosis</td>
<td>Aflatoxins, Heavy metals, Pesticides/herbicides, UV light</td>
</tr>
</tbody>
</table>

*These are only a few of many toxins that induce/promote a wide range of cancers.

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64. Liska DJ. The detoxification enzyme systems. Toxicol In Vitro. 2004 May;18(5):765-72.


89. Gopalakrishnan R, Sundaram J, Battu A, Thiruvengadam D. Dietary supplementation of silymarin is associated with decreased cell proliferation, increased apoptosis, and activation of detoxication system in hepatocellular carcinoma. Mol Cell Biochem. 2013 May;377(1-2):163-76.


Ultra Natural Prostate formula provides the latest scientifically validated botanical extracts shown to promote healthy prostate function.

No other prostate protection formula provides such a broad array of nutrients to support the multiple factors involved in the health of the aging prostate gland. Ultra Natural Prostate contains:

- **Standardized lignans** provide support for prostate cells against excess estrogen levels.1,3
- **AprèsFlex®** supports normal inhibition of 5-lipooxygenase or 5-LOX, an enzyme associated with undesirable cell division changes.4-10
- **Stinging and Dwarf nettle root extracts** help support prostate cells against excess estrogen levels.6,7
- **Saw Palmetto CO2 extract** helps support dihydrotestosterone (DHT) activity in the prostate, helps support normal urinary flow, and helps regulate inflammatory reactions in the prostate.8,11
- **Pygeum extract** helps suppress prostaglandin production in the prostate and supports healthy urination patterns.12,13
- **Pumpkin seed oil**, enhances the composition of free fatty acids and augments saw palmetto’s benefits.14,15
- **Beta-sitosterol** enhances the protective effects of other botanical extracts and helps improve quality of life.16-19

**Ggraminex® Flower Pollen Extract™**, has been shown to help relax the smooth muscles of the urethra and help support normal urinary flow.20-22

**Boron** has been shown to slow elevation of prostate-specific antigen (PSA).23,24

**Lycopene** supports efficient cellular communication, helps maintain healthy DNA, regulates hormonal metabolism, and promotes healthy prostate size and structure.25-32

**Phospholipids** enhance absorption of active compounds.

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

- Saw Palmetto CO2 extract (fruit) [std. to 85% total fatty acids] 320 mg
- Graminex® Flower Pollen Extract™ (from rye) 252 mg
- Stinging and Dwarf nettle extracts (root) 240 mg
- Beta-Sitosterol 180 mg
- Phospholipids 160 mg
- Pygeum extract (bark) 100 mg
- Pumpkin oil (seed) [std. to 85% total fatty acids] 200 mg
- AprèsFlex® Indian frankincense (Boswellia serrata) extract (gum resin) [std. to 20% AKBA*] 70 mg
- Proprietary Enterolactone Precursors Blend (HMRLignan™ Norway spruce (Picea abies) (knot wood) and flax lignan (seed) extracts) 20.15 mg

**Lycopene** (from lomat-O-Red™ natural tomato extract (fruit)) 10 mg

**Boron** (as Albion® bororganic glycine) 3 mg

*3-O-acetyl-11-keto-beta-boswellic acid

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ARM YOURSELF AGAINST ENVIRONMENTAL TOXINS with DNA PROTECTION FORMULA

Every day, environmental toxins damage the body’s cells. But certain nutrients are known to bolster the body’s natural defenses against this DNA damage.

DNA Protection Formula provides:

- **Turmeric**—**curcuminoids** protect gene expression against toxic **heterocyclic amines** from cooked foods.

- **Chlorophyllin**—supports defenses against toxins binding to DNA and promotes expression of the protective **p53** gene.

- **Wasabi**—promotes immune recognition of damaged cells and the detoxification enzyme **glutathione S-transferase**.

- **Broccoli**—**glucosinolate** and **sulforaphane** support the detoxification enzyme **quinone reductase**.

DNA Protection Formula

Item #01570 • 60 vegetarian capsules

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Non-GMO

* Contains BCM-95®, a patented curcumin formulation that is up to 7 times more absorbable than conventional curcumin.

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In a recent study published in *The New England Journal of Medicine*, researchers found that smoking was responsible for diseases *beyond* those traditionally linked to smoking such as lung cancer and heart disease.¹

Tobacco smoke contains more than 7,000 *chemicals*, including cancer-causing chemicals, toxic metals, and poisonous gases.²

New studies show that smoking increases risks of infection, intestinal ischemia, and kidney and liver disease.¹ These disorders were not previously connected with tobacco use.

With more than 42 million Americans smoking, causing approximately half a million deaths a year, smokers will clog our medical system and drain it of resources as they face a spectrum of diseases.³

It is important that you take steps to avoid inhaling *secondhand* smoke and to clean up lingering toxins that are referred to as *thirdhand* smoke. Thirdhand smoke is defined as “*residual tobacco smoke contamination that remains after the cigarette is extinguished*.”
and important concept in both the environmental and public health fields. Thirdhand smoke is defined by experts as “residual tobacco smoke contamination that remains after the cigarette is extinguished.”

Tobacco smoke contains more than 7,000 chemicals, including cancer-causing chemicals, toxic metals, and poisonous gases (see sidebar). With so many deadly molecules in just one puff, it is no wonder that tobacco use raises levels of the two major sources of aging in the body: oxidant stress and inflammation.

To make matters worse, researchers have studied the epigenetic influence of inhaled toxins from tobacco smoke. Epigenetics is the field that studies the biological mechanisms that turn genes on and off. It is believed that lung cancer, chronic obstructive pulmonary disease, asthma, and cardiovascular disease are linked with epigenetic changes due to tobacco smoke. It is believed that one DNA mutation is introduced into the genome for every 15 cigarettes smoked.

The good news is that stopping smoking benefits all smokers, regardless of their age or how long they have smoked. It also benefits those around them who are exposed to the secondhand smoke and thirdhand residual tobacco toxins that remain after the cigarette is extinguished.

Lung Conditions Caused by Smoking

While smoking clearly raises the risk of lung cancer, both active and passive smoking also produce numerous other lung disorders that can shorten life span.

Smoking radically raises the risk of developing pneumonia, a condition that remains a leading killer of older adults. In one study, smokers were 5 times more likely to die from pneumonia than nonsmokers, and at a substantially younger age.

Smoking’s powerful pro-inflammatory effects can be seen in a study of patients with chronic obstructive pulmonary disease who continued to smoke. Two measures of inflammation, high-sensitivity C-reactive protein (hs-CRP) and fibrinogen, rose sharply after a single cigarette, with the effects lasting up to 35 minutes. Such constant exposure to an acute inflammatory stimulus wreaks havoc on delicate lung tissue.

Unfortunately, many smokers who develop chronic obstructive pulmonary disease believe that the damage is done, and that there is little point in trying to quit. However, this is not the case. According to a study published in 2014, nonsmokers with the disease had vastly better lung function than did current smokers. The authors concluded that "tobacco cessation is warranted in smokers with chronic obstructive pulmonary disease."
Smoking Damages Endothelial Cells

The impact of smoking on cardiovascular disease remained controversial until the early 1960s, when the giant Framingham heart disease study showed smoking’s heart-related dangers.62 By 1964, the results of that study were so alarming that the Surgeon General issued the first of the now-familiar warnings about smoking.4,5 Today smoking is known as an independent and entirely preventable risk factor for atherosclerosis and cardiovascular disease.63

No doubt these cardiovascular impacts are due to a number of harmful toxins found in cigarette smoke. In addition to nicotine and carbon monoxide, cigarette smoke contains countless cardiac toxins, including the toxic metal cadmium, which some researchers believe contributes directly to the increased cardiovascular risk experienced by smokers.64

Smoking is especially damaging to the delicate endothelial cells lining arterial walls.65 These cells are critical in maintaining the health of blood vessels and controlling blood flow and pressure. They are also extremely sensitive to oxidant stress. Multiple components of cigarette smoke conspire to harm endothelial cells, and damaged endothelial cells lay the groundwork for formation of cholesterol-laden, inflammatory plaque.65

Smoke-induced inflammation in and around plaque triggers swelling that can block arteries and increase the stickiness of platelets. This leads to clot formation that can abruptly stop blood flow, producing a heart attack or stroke.65

Smoking also induces “tissue remodeling,” a process that encourages overgrowth of smooth-muscle cells that form artery walls, resulting in thickening and stiffening of the arteries.65

Smoking has even greater negative effects on the heart and blood vessels of people with high blood pressure.66 One recent study showed that hypertensive people who smoked less than 20 pack-years (one pack-year is defined as 20 cigarettes smoked every day for one year) had a 19% increase in cardiovascular death compared with those who never smoked, and those who smoked more than 20 pack-years had a 33% increase in death risk from cardiovascular disease.66

What You Need to Know

The Age-Accelerating Dangers of Smoking

- More than 50 years after the Surgeon General’s first report found smoking harmful for health, researchers are still discovering numerous ways in which tobacco harms the human body.
- All forms of tobacco, smoked or otherwise, raise the risk of almost every disease or chronic condition known.
- Hypertensives that smoke have an increased risk (19% to 33% depending on pack-years) of dying from cardiovascular disease.66
- Smoking raises the risk of serious stomach conditions by 132% over that of nonsmokers.88
- Diabetes and obesity are exacerbated and potentially even caused by smoking.
- It’s never too late. Quitting now benefits all smokers and those exposed to them.51,57
Cigarette smoking has a profoundly harmful effect on blood cholesterol levels as well, causing a reduction in beneficial HDL (“good”) cholesterol levels. It does this by damaging enzymes that normally assure proper fat loading into the HDL cholesterol complex.63

Unfortunately, smokers using conventional cholesterol-lowering treatments such as a statin remain at a high cardiovascular risk. In fact, one study showed that smokers taking statin drugs had an 86% increase in the risk of having a “major cardiovascular event” such as a heart attack, stroke, or death compared with nonsmokers on statins.67

The good news is, it’s never too late to receive the benefits of quitting smoking, especially when it comes to cardiovascular disease. According to a study published in the *European Heart Journal*, those who stopped smoking after having a heart attack reduced their risk of dying by 36% over just two years.57

### Smoking Doubles Diabetes Risk

Smoking creates a double risk when it comes to diabetes. Not only does it increase a person’s risk of developing diabetes, it dramatically exacerbates the age-accelerating effects of having diabetes.19,68-73

There’s a good reason for this. High blood sugar damages blood vessels and components of tobacco smoke further aggravate that damage, raising the risk of diabetic complications such as kidney and eye disease.68

In addition, smoking is known to be associated with insulin resistance, inflammation, and disturbances of blood lipids, all of which are already increased by having diabetes.68

Smoking has a negative effect on blood sugar control and insulin requirements.69 Studies show that a marker of long-term glucose level (hemoglobin A1c) was significantly higher in type I diabetics that smoked than in nonsmokers, and smokers required higher insulin doses to control their blood sugar.69

The study also showed that diabetics who smoked had lower levels of protective HDL cholesterol (which further confirms the cholesterol effect discussed earlier), and they also had a significantly increased amount of protein in their urine, a marker of early kidney damage.69

The grave cardiovascular effects of smoking in diabetics are highlighted by a 2015 study showing that smoking sharply raises the risk of having dangerously thickened carotid arteries.19 Importantly, *these risks occurred in both active and passive smokers*. Having thickened carotid arteries is a serious risk because the carotids are the brain’s main source of blood. If they become blocked, the result is a catastrophic and often fatal stroke.

Unfortunately, secondhand (passive) smoke can be just as dangerous as smoking itself for diabetics. Compared to diabetics with no exposure to secondhand smoke, women diabetics exposed to secondhand smoke experienced a 3.5-fold increased risk of cardiovascular disease and a 2.2-fold increased risk of having plaque in their carotid arteries.19

Male active and passive smokers had thicker carotid arteries as well, and male active smokers had a 2.9-fold increase in the risk of having carotid plaque.19

Smoking also complicates other diabetes-related health risks. For example, type II diabetics who are heavy smokers (but who don’t drink) are at a 64% increased risk of having a large waist circumference, a 78% increased risk for having elevated blood triglycerides, and a more than 200% increased risk for having low protective HDL-cholesterol levels.73

### What Is a Pack-Year?

A pack-year is how scientists measure how much a person has smoked over a long period of time. Pack-years are calculated by multiplying the number of packs of cigarettes smoked per day by the total number of years the person has smoked. For amounts less than a whole pack, that number is first divided by 20 (the number of cigarettes in a pack) and then multiplied by the number of years smoked.114 For example, 10 pack-years means a person has smoked a pack of cigarettes every day for 10 years, two packs of cigarettes per day for five years, or 10 cigarettes a day for 20 years.
Smoking and Obesity

Smokers already have an elevated risk of developing type II diabetes, but that risk is even greater in smokers who are overweight or obese. In one study, men of normal weight who smoked had a nearly 3.5-fold increase in the risk of developing diabetes compared to normal-weight nonsmokers, while obese smokers had a nearly 4-fold increased risk of developing diabetes compared with obese nonsmokers. While a 4-fold increase is bad enough, remember that this increased risk is in addition to the increased risks of diabetes presented by obesity itself. Increasing that risk by a factor of four therefore has an outsized impact on diabetes risk.

Worldwide, the combination of smoking and obesity produces excess death and disability. Smoking has been associated with the presence of abdominal obesity in patients with type II diabetes. Thus, smoking exacerbates the already high health risks posed by obesity and diabetes (often called “diabesity”). This directly contradicts the myth that smoking contributes to weight loss.

Tobacco Causes Intestinal Problems

Smoking is a major risk factor for a host of gastrointestinal disorders, including peptic ulcers, inflammatory bowel diseases such as Crohn’s disease and ulcerative colitis, and cancers of the gastrointestinal tract. A study published in *International Journal of Molecular Medicine* showed that there are numerous factors involved in the connection between smoking and gastrointestinal disorders. First, cigarette smoke wreaks havoc on the vital mucosal cells that line the entire gastrointestinal tract. In a healthy body, these cells normally replace themselves every few days. Not only does smoking inhibit this critical cell renewal, it can outright kill them.

In addition, this study found that smoking reduces blood flow to the intestine, potentially impairing nutrient uptake and waste disposal, and also damages the intestinal immune system, which is a vital factor in preventing both infections and cancers. But by far, the most fundamental cancer-inducing and cancer-promoting impacts of smoking seem to be damage to DNA, stimulation of new blood vessel growth to tumors, and loss of normal immune surveillance for malignant cells.

Tobacco Use and Body Weight

Many smokers, especially younger ones, feel that smoking helps them either lose weight or keep from gaining it. A recent study proved that notion completely wrong, and in fact demonstrated that people who have smoked for more than 20 years were 54% more likely to be overweight than nonsmokers. Use of oral tobacco (like snuff or chewing tobacco) also increases the risk of obesity.
These effects can be seen in the clear link between smoking and cancer risk. The longer a person has smoked, and the more that person smoked, the higher the risk. For instance:

- People who have smoked at any point in their lives have a **19%** increased risk of colorectal cancer, especially rectal cancer.\(^7\)
- Those who have smoked for more than 20 years have a **26%** increased risk of these cancers.\(^7\)
- People who smoke about a pack a day have a **30%** increased risk.\(^7\)
- And those who have smoked more than a pack daily or smoked for more than 30 years have a **48%** increased rectal cancer risk.\(^7\)

In addition to their increased cancer risk, current cigarette smokers have a **132%** increased risk of developing a painful and potentially serious stomach condition called **peptic ulcer disease**.\(^8\)

Nicotine itself increases the likelihood of another painful condition, **gastrointestinal reflux disease** (GERD), because it relaxes the sphincter muscle at the lower end of the esophagus. This allows damaging stomach contents to wash into the esophagus where they cause pain and increase cancer risk.\(^7,8\) Even infants exposed to secondhand smoke are significantly more likely to develop gastrointestinal reflux disease.\(^7,8\)

In addition to increasing the risk of developing gastrointestinal reflux disease, animal studies show that cigarette smoke can accelerate the damage done by gastrointestinal reflux disease, which is especially concerning since it increases the risk of a precancerous condition called **Barrett’s esophagus**.\(^7\) In fact, human studies reveal that smokers with gastrointestinal reflux disease have a **44%** increased risk of Barrett’s esophagus compared with nonsmokers with gastrointestinal reflux disease.\(^30,82\)

With its powerful pro-inflammatory effects, it is hardly surprising that smoking increases the risk of **inflammatory bowel disease**.\(^8\) Specifically, studies show that current smokers have a **1.7-fold** increased risk of Crohn’s disease, while former smokers have a **3-fold** elevated risk of ulcerative colitis.\(^8\)

Smoking increases the likelihood of complications from **diverticulitis**, including intestinal perforations and recurrent episodes of diverticulitis even after surgical treatment.\(^86\)

It also increases the risk of developing **colonic polyps**, which are small growths in the lining of the colon that are often an early stage in the development of colorectal cancers. Current smokers have a **70%** elevated risk of developing polyps, while former smokers have a **31%** greater risk than that of people who have never smoked.\(^85\)

**Smoking’s Impact on the Kidneys**

The kidney is not an organ most people think about as a target of smoking-induced damage, but both active and passive smoking can cause substantial damage to kidney function.\(^13-15,89-95\)

Smoke induces powerful oxidant stresses on kidney cells.\(^14\) Two specific elements of cigarette smoke, cadmium and lead, are directly toxic to the structures that clear the kidney of metabolic waste.\(^14\) These microscopic filters are called **glomeruli**, and each kidney has about a million of them.\(^96\)
The impact of smoking on the kidney is known to be greater in men than in women, with one study showing a 29% increase in the risk of kidney failure in male smokers compared to people who never smoked.

But perhaps the most alarming part about smoking’s dangerous impact on the kidneys is that you don’t have to be a smoker to experience serious smoke-induced kidney damage.

Multiple studies have shown that nonsmokers exposed to secondhand tobacco smoke have a substantially elevated risk for malignancies in the kidney. One possible reason for this is that exposure to smoke produces potentially cancer-inducing DNA damage in kidney cells.

In addition, an animal study found that passive cigarette smoke leads to significant fibrosis (thickening) of the glomeruli (the kidney’s filters), which causes the kidneys to be less functional. A human study verified the dangers, showing that both active and passive smoke exposure produces kidney damage. This was demonstrated when urinalyses from both groups showed early loss of protein in the urine, a powerful sign of impending kidney disease.

Unfortunately, adults aren’t the only ones impacted. A large national study demonstrated increasingly poor function of the kidney’s filtration system in teens exposed to smoke, clearly showing that the dangerous effects of secondhand smoke begin as early as adolescence. Even school-aged children show alarming signs of kidney problems if they are exposed to secondhand smoke. One study found that children exposed to secondhand smoke have a 164% higher risk of having protein in the urine, compared to those not exposed.

Fortunately, it’s never too late to reduce the risks associated with smoking. Researchers found a protective effect on the kidneys in people who had stopped smoking for more than 10 years.

**Tobacco Damages the Liver**

The liver is the body’s primary detoxification organ. It performs thousands of chemical reactions daily to neutralize toxins from the environment. Smoking-induced DNA damage has been linked to abnormal expression of toxin-metabolizing enzymes in the liver.

The metabolic detoxification that occurs in the liver starts with phase I enzymes that convert a toxic chemical into a less harmful chemical that can be metabolized by phase II enzymes. Unfortunately, if the toxic load is too heavy, it can induce or cause overactivity of phase I enzymes, resulting in high levels of free radicals.

Smoking increases the expression of phase I enzymes, which results in an increased risk of cancer in other parts of the body, such as the lungs. Here we see the impact of the close interrelationships between organs and systems: Smoking induces liver damage that can raise the risk for lung cancer.

Another dangerous liver disease that’s on the rise is nonalcoholic fatty liver disease (NAFLD), a condition in which fat accumulates in the liver. This silent disease produces no symptoms, but can continue to grow until it progresses into a potentially deadly disorder known as nonalcoholic steatohepatitis. Nonalcoholic steatohepatitis can progress to liver fibrosis, a state in which most liver tissue is replaced by the equivalent of scar tissue, and in which liver failure becomes imminent.

Recent studies show that cigarette smoking is associated with an acceleration of nonalcoholic fatty liver disease progression, putting smokers at a massively elevated risk for catastrophic liver failure. Compared to people who have never smoked, former smokers had a 45% increase, heavy smokers had a 129% increase, and obese smokers had a shocking 800% increase in their risk of developing this liver disorder.

With the growing number of obese children, the risk of pediatric nonalcoholic fatty liver disease is also rising. If these children are exposed to secondhand smoke, they are 4 times as likely to develop nonalcoholic fatty liver disease compared to kids in nonsmoking households.
Osteoporosis affects men as well as women and studies show that the longer a man has smoked, the greater his risk of developing osteoporosis. A study of otherwise healthy young male military recruits demonstrated that relatively short durations of smoking produce significant loss of bone mineral density, highlighting the fact that a person doesn’t have to be a lifetime smoker to have bone loss.

In animal studies, even secondhand smoke exposure had numerous negative effects on bones, including decreasing bone mineral content and density, inhibiting new bone formation while increasing bone resorption, decreasing the thickness of the hard outer layer (cortex) of the bone, and producing weaker, more easily fractured bones.

Researchers studied secondhand smoke exposure in a group of postmenopausal women who had never smoked. Among those women who had lived with family members who actively smoked, the risk of developing hip osteoporosis was increased more than 3.5-fold, while those who lived with smokers who consumed more than 20 cigarettes per day had a more than 5-fold increased risk of low back osteoporosis, and a more than 4-fold risk of osteoporosis of the hip.

Smoking Damages Brain Cells

Smoking has been found to have a negative impact on brain cells, increasing the risk of devastating diseases such as amyotrophic lateral sclerosis (Lou Gehrig’s disease) and Alzheimer’s.

The many toxins in cigarette smoke, particularly the production of formaldehyde in smoke, is thought to damage the delicate lipid (fat) membranes of brain cells, which results in the loss of brain cells and function. In one study, the risk of dying from amyotrophic lateral sclerosis, a neurodegenerative disease that can strike even in early middle age, was increased by nearly 2-fold in smokers compared with people who had never smoked.

As always, the more smoke exposure, the higher the risk: For every additional pack per day smoked in the home, the risk of nonalcoholic fatty liver disease rises an additional 80%.

Although most people tend to think of liver cirrhosis as a disease related to alcohol consumption, recent studies show that smoking has a surprisingly strong impact as well. Compared with people who never smoked, women smokers are more than twice as likely, and men are 40% more likely, to develop liver cirrhosis. And the combination of tobacco and alcohol use is even more damaging, with laboratory studies showing that the two together substantially increase the risk of both liver and pancreatic damage.

Smoking also nearly doubles the risk of developing hepatocellular carcinoma, the most common liver cancer among men. And for male smokers who are also infected with hepatitis C, the risk of developing this cancer increases by nearly 140-fold.

Tobacco Smoke Damages Bones

Osteoporosis, a condition in which the bones become weak and brittle, is on the rise in all societies as people are living longer. While age is one of the contributing factors, smoking is also a known risk for osteoporosis. It interferes with sex hormone production, intestinal calcium absorption, adrenal hormone metabolism, and the normal bone remodeling process.
Active or former smokers are also at an increased risk for Alzheimer’s disease. And even if a person doesn’t develop Alzheimer’s outright, laboratory studies reveal that smoking can induce pathological brain changes similar to the disease. Studies suggest that oxidative stress is one of the primary mechanisms behind damage to brain cells in smokers.109

While epidemiological studies point clearly to an increased risk for Alzheimer’s disease in smokers, the data are less clear in Parkinson’s disease. In fact, studies have indicated that smoking could have a small protective effect against Parkinson’s, possibly due to drug-like effects of nicotine.110-112 Nevertheless, the many other toxic compounds in cigarettes make smoking a poor preventive strategy for these neurodegenerative diseases.113

**Summary**

Cigarette smoking is the leading avoidable cause of death worldwide. Even after 50 years of public service announcements, tobacco companies still rake in billions of dollars in profits. While it is common knowledge that smoking causes lung cancer, most people are still unaware of the fact that smoking—indeed, any tobacco use—dramatically accelerates aging in all body systems.

Tobacco smoke contains thousands of chemical compounds that can do substantial damage to almost every organ and system in the body. Tobacco use sharply raises levels of oxidant stress and inflammation, increasing the risk for a plethora of diseases and serious conditions.

You should avoid contact with secondhand smoke and thoroughly clean walls, ceilings, and other places where smokers have left their toxic waste behind. This “thirdhand” smoke is emerging as an important concept in environmental and public health fields,28-30 and is defined as “residual tobacco smoke contamination that remains after the cigarette is extinguished.”31

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

**Health Consequences Causally Linked to Smoking**

Cancers and diseases in red are new conditions causally linked to smoking in the latest 2014 Surgeon General’s report.5

**CANCERS**
- Oropharynx
- Larynx
- Esophagus
- Trachea, bronchus, and lung
- Acute myeloid leukemia
- Stomach
- Liver
- Pancreas
- Kidney and ureter
- Cervix
- Bladder
- Colorectal

**CHRONIC DISEASES**
- Stroke
- Blindness, cataracts, age-related macular degeneration
- Congenital defects-maternal smoking: orofacial clefts
- Periodontitis
- Aortic aneurysm, early abdominal aortic atherosclerosis in young adults
- Coronary heart disease
- Pneumonia
- Atherosclerotic peripheral vascular disease
- Chronic obstructive pulmonary disease, tuberculosis, asthma, and other respiratory effects
- Diabetes
- Reproductive effects in women (including reduced fertility)
- Hip fractures
- Ectopic pregnancy
- Male sexual function – erectile dysfunction
- Rheumatoid arthritis
- Immune function
- Overall diminished health

References


Profound shrinkage of synaptic connections between nerve cells is one of the major hallmarks associated with brain aging. Magnesium is a critical factor in controlling synaptic density in the brain.¹

An innovative form of magnesium called Neuro-Mag® has been shown to specifically target multiple areas of the aging brain. In fact, preclinical 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 This means that this form of magnesium is passing through the blood-brain barrier for assimilation into the brain.

### Comprehensive Cognitive Benefits

Scientists continue to uncover magnesium’s comprehensive benefits for cognitive function.³ 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

### Neuro-Mag®...Capsules or Powder

The suggested daily dose of three Neuro-Mag® 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 powder called Neuro-Mag® Magnesium-L-Threonate with Calcium and Vitamin D₃. 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.

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**References**


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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+ levels1 and subsequent impairment of healthy cellular metabolism.2

NAD+ (nicotinamide adenine dinucleotide) promotes systemic youthful functions and is found in every cell in the body.2 In addition, NAD+ plays an essential role in regulating genes4,5 that control aging.6

How To Boost NAD+ Levels Within Your Cells

Newly patented nicotinamide riboside increases cellular levels of NAD+ in the body.7,8

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,6
• Enhance growth and efficiency of mitochondria—supporting energy levels and physical performance,6
• Favorably modulate metabolism,6
• Contribute to neuronal health—supporting cognitive function during aging,9-11
• Promote insulin activity—supporting healthy blood sugar in those within the normal range.6

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™ vegetarian capsule provides:

NIAGEN® Nicotinamide Riboside 100 mg

NAD+ Cell Regenerator™
Item #01904 • 30 vegetarian capsules

Retail Price Super Sale Price
1 bottle $34 $22.95
4 bottles $17.55 each

Non-GMO
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It isn’t often that you find a long-married, health-conscious couple like Sandy and Stewart Levine. Together, they exemplify that rare union almost everyone seeks: a seamless blend of individuality and alliance, independence and connection, all with a strong component of mutual love and respect.

Throughout their 46-year marriage, the Levines have consistently worked to learn as much as possible about how to live a long, active, healthful life. Strong proponents of Life Extension®’s philosophy, products, and state-of-the-art information, the Levines are a perfect illustration of how couples with a mutual interest in good health can successfully help and support one another for a lifetime.
Origins of Getting Healthy

Now 68 and 72, Sandy and Stewart grew up in New Jersey, but moved to Florida 32 years ago and have been happy there ever since.

“I was always athletic,” says Stewart, recalling that he started boxing when he was just 8. “I was a skinny kid and small,” he explains, “and boxing helped me defend myself.”

He also earned brown belts in karate and jiu-jitsu, while playing baseball and basketball. He trained as a weightlifter while still in his teens, an activity he continues to this day. Stewart mentions that most people don’t realize that Olympic weightlifters were found to be the second most flexible athletes after gymnasts. He also had an interest in bodybuilding and entered contests as a young man. He notes that he no longer carries the weight he had then, largely due to changes that he and his wife made in their diets.

“I grew up as a meat-and-potatoes man,” he recalls, “but when I was 17 and got into supplements and protein to help build muscle, I also got healthier.”

In his 20s, Stewart started running just prior to joining the Army.

“I’ve been running ever since,” he remarks, “10 miles a week, rain or shine.”

Certified as a personal trainer nine years ago, Stewart, now retired from the business world, works part time in a local country club gym as a personal trainer. He has found that he is uniquely able to help many older people because he understands their physical needs and issues better than most younger trainers.

Sandy, a teacher straight out of college, taught elementary school for 16 years. Married at 22 after Stewart returned from the Army, she recalls that they were not healthy eaters, making poor food choices due to lack of knowledge. Then Sandy got sick.

Suffering from stomach pain, which was later diagnosed as leaky gut, Sandy kept getting worse until she discovered holistic medicine. “That’s how I changed my life around,” she says, “and Stewart, of course, followed.”

After becoming macrobiotics and switching to a vegetarian diet, Sandy’s condition improved dramatically. But it wasn’t until she found a doctor who used an allergy program with meridian points that she says she was finally cured.

A Healthy Diet

“We try to eat whatever comes naturally from the ground,” Sandy explains, noting that they are very oriented toward whole food.

“We don’t eat out much anymore,” she explains. “We eat a lot of raw foods and salads. In Florida, raw foods feel right, lots of fresh fruit and vegetables.”

While their diet is plant based, they now also include some organic poultry and fish.

Both Sandy and Stewart enjoy reading Life Extension® magazine and discovering ways to improve their diets. One of the major changes they’ve made is eliminating all added sugar.

“It’s very challenging to give up something like sugar,” Sandy explains, “but people who do that find tremendous improvement in their ability to eat well and change their whole lifestyle.”

The Levines also avoid anything made with white flour:

“We’ve been eating healthy for about 40 years now,” says Stewart, “no red meat [either].”

Sandy and Stewart Levines’ Supplements

- AMPK Activator
- Bone Restore
- Glucosamine/chondroitin/MSM
- Immune Senescence Protection Formula™
- Krill Oil
- Magnesium
- Melatonin
- Probiotics
- Strontium Caps
- Super K with Advanced K2 Complex
- Super Bio-Curcumin®
- Rhodiola Extract (3% Rosavins)
- Taurine
- Vitamin C
- Vitamin D3
Choosing Supplements

Discovering which supplements felt right for them has been a long ongoing process for the Levines. They both pay close attention to articles in Life Extension® magazine and sometimes agree to add a supplement to the ones they both already take.

“The one we started taking most recently is taurine,” notes Stewart. “We read an article that pointed out that as you grow older, your brain cells start diminishing, and it seemed like something we could benefit from.”

The right supplements, says Sandy, reversed her osteopenia (reduced bone mass or density), which she was diagnosed with about 10 years ago. Although she had been lifting weights for many years, Sandy discovered her bone density was not great.

“My gynecologist said I’m a poster child for osteoporosis,” because, she explains, she is small and thin. Her mother had painful osteoporosis and Sandy, not wanting to follow suit, began doing research and pinpointed the supplements that completely reversed her condition: strontium, vitamin D, Life Extension®’s Bone Restore, and vitamin K. Sandy adds that Stewart also was found to have lost some bone density, but after taking these supplements, he is now “perfect again.”

Sandy says that sometimes after reading an article regarding a new supplement, something resonates. “I talk to Stewart and we agree that this [new product] is something we should both use.” She adds that “I have found over the years that I’m leaning more and more toward Life Extension® products. They really work. They are excellent quality.”

Daily Exercise

Keeping active and exercising is vital to both Sandy and Stewart. For Stewart, it’s something that he does with regularity and enjoyment. He’s been weightlifting and running for most of his life, and now uses equipment at the gym where he works. Exercise is second nature to Stewart, and he needs no reminders or encouragement to exercise his body.

For Sandy, it’s been a learning experience over many years, what she calls a journey. “I came from a very nonathletic family,” she says, “so watching Stewart as an example and seeing how he metabolized food and how much easier it was for him to deal with weight issues, that motivated me.”

Sandy has been exercising regularly for 30 years, lifting weights, running, doing water workouts, using gym equipment, and walking. Her youthful illness served as a warning and once she became healthy, she wanted to continue doing everything she could to stay that way.

Sandy and Stewart added meditation to their health routines 35 years ago and continue to practice it daily, finding a sense of peacefulness and presence conducive to better overall health.

An Eye on Longevity

“People see me and they don’t believe I’m 72 years old,” remarks Stewart. “They think I’m at least 15 years younger.” But he adds that the goal is not just looking younger, but also feeling younger.

“When you change your lifestyle, eat right, exercise, and do all the right things, you feel much younger,” he explains. “You can only take care of your own life, travel your own road. The benefits soon become obvious.

“Your genetic makeup has something to do with your longevity,” Stewart continues, “but they also found that it’s only 25%. The other 75% is you making lifestyle changes, and that is what will prolong your life.”
He explains that his brother died at 55 from a heart attack and his mother at 67 from a stroke. “That helped sway me to change my life and do the kind of living I’m doing now. I’m 72 and I’ve never had anything major wrong with me.”

But he cautions that it’s not longevity alone, but “longevity with quality.” He feels he and Sandy are doing everything they can to stay healthy and live long lives.

Sandy’s Hypnosis Practice

While Stewart focuses on his work as a personal trainer, Sandy is a licensed real estate broker, selling homes and condos in Naples, Florida. She also practices hypnosis, where she concentrates on helping people, often women, achieve weight loss, in addition to treating smoking and sleep problems. A member of Toastmasters, Sandy enjoys giving talks on both health and hypnosis.

Her interest in diet and supplements has greatly helped Sandy understand the problems many people have with addictive, emotional eating. “It’s re-evaluating what you do with food and how you look at food and how you reward yourself with food,” she explains. For some people, one session can be sufficient, but many come back several times, and still others may do well for a while and then come back for a “tune-up.”

She sees herself as a facilitator and insists that any improvement comes from people doing it for themselves.

Advice from the Levines

After 46 years of sharing their lives, Sandy and Stewart have learned enough to effectively help others in their everyday lives and work. When asked what advice they would give Life Extension® readers, here’s what they had to say in their own words:

• If you change your lifestyle, exercise, take the right supplements, and eat the right foods, your body will be strong and will ultimately take care of you.

• Change your priorities about food and stop thinking about what tastes good going down or thinking of food as a reward. You can love to eat and still get all the benefits by eating wholesome food.

• Your desire to change must be conscious and strong. If you are truly willing to make important changes, you will maintain them.

It’s never too late to change, regardless of where you are in life. There’s always a benefit if you switch to healthy eating habits, exercise, take supplements, and relieve stress, which are all vital for good health.

• If you follow good health practices, longevity will probably increase, but you never know what might happen each day, so remember to enjoy your life while you’re living it.

• Share your story with others and help them find better health.

Working Together

When asked if they would be the same person today if they had grown older separately, Stewart and Sandy both immediately answered “no.” It’s clear that their love and respect for each other and their shared desire to live as healthy a life as possible has added immeasurably to their active, happy lives today and to their excellent outlook for continuing to be in good health tomorrow. Their openness to new ideas and constant search to improve their lives are an inspiration to everyone who meets them.

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

For more information, you can email Sandy and Stewart Levine at sandylevine@aol.com
Normal aging and related health issues can decrease production of digestive enzymes, resulting in a bloated feeling and other discomforts after eating a large meal.

**Enhanced Super Digestive Enzymes** provides specific enzymes required to support the natural reactions that break down food—demonstrated to optimize digestion and nutrient absorption. Here is the broad array of enzymes contained in this formula:

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

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

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

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

**References**


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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:
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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 Customers:
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.

COMPREHENSIVE PANELS

**MALE LIFE EXTENSION PANEL** (LC22582) $269
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

**FEMALE LIFE EXTENSION PANEL** (LC322535) $269
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 Progesterone Vitamin D 25-hydroxy Hemoglobin A1c

**WEIGHT LOSS PANEL-COMPREHENSIVE** (LC100029) $275
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.

**MALE ELITE PANEL** (LC100016) $575
Chem/CBC profile, Free and Total Testosterone, Total Estrogens, Estradiol, DHEA-S, Progesterone, Pregnenolone, DHT, FSH, LH, TSH, Free T3, Free T4, Reverse T3, Free and Total PSA, IgG-1, SHBG, Vitamin D 25-DH, hs-CRP, Ferritin, Homocysteine

**FEMALE ELITE PANEL** (LC100017) $575
Chem/CBC profile, Free and Total Testosterone, Total Estrogens, Estradiol, DHEA-S, Progesterone, Pregnenolone, DHT, FSH, LH, TSH, Free T3, Free T4, Reverse T3, IgF-1, SHBG, Vitamin D 25-DH, hs-CRP, Ferritin, Homocysteine

**MALE HORMONE ADD-ON PANEL (LCADDM)** $120
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.

**FEMALE HORMONE ADD-ON PANEL (LCADDF)** $125
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.

**COMPREHENSIVE THYROID PANEL** (LC100018) $199
TSH, T4, Free T4, Free T3, Reverse T3, TPO, ATA

**LIFE EXTENSION THYROID PANEL** (LC304131) $75
TSH, Free T4, Free T3

**THYROID PANEL WITH REVERSE T3** (LC100044) $94
TSH, T4, Free T4, Free T3, Reverse T3

**FEMALE COMPREHENSIVE HORMONE PANEL** (LC100010) $299
CBC/Chemistry Profile (see description above right), DHEA-S, Estradiol, Cortisol, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3, Free T4, Cortisol.

**THE CBC/CHEMISTRY PROFILE** (LC381922) $35
Note: This CBC/Chemistry Profile is included in many Life Extension panels. Please check panel descriptions.

**CARDIOVASCULAR RISK PROFILE**
Total Cholesterol Cholesterol/HDL Ratio
HDL Cholesterol Estimated CHD Risk
LDL Cholesterol Glucose
Triglycerides Iron

**LIVER FUNCTION PANEL**
AST (SGOT) Total Bilirubin
ALT (SGPT) Alkaline Phosphatase
LDH

**KIDNEY FUNCTION PANEL**
BUN BUN/Creatinine Ratio
Creatinine Urine Acid

**BLOOD PROTEIN LEVELS**
Total Protein Globulin
Albumin Albumin/Globulin Ratio

**BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE**
Red Blood Cell Count Monocytes
White Blood Cell Count Lymphocytes
Eosinophils Platelet Count
Basophils Hemoglobin
Polys (Absolute) Hematocrit
Lymphs (Absolute) MCV
Monocytes (Absolute) MCH
Eos (Absolute) MCHC
Baso (Absolute) Polynucleated Cells

**RDW**

**BLOOD MINERAL PANEL**
Calcium Sodium
Potassium Chloride
Phosphorus Iron

**FEMALE COMPREHENSIVE HORMONE PANEL** (LC100011) $299
CBC/Chemistry Profile (see description above right), DHEA-S, Estradiol, Total Estrogens, Progesterone, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3, Free T4, Cortisol.

**FOOD SAFE ALLERGY TEST** (LCM73001) $198
This test measures delayed (IgG) food allergies for 95 common foods.

**STRESS MANAGEMENT PROFILE** (LC100043) $125
Cortisol AMPF, DHEA-S, Glucose, Insulin, Progesterone, Free T3, Lipid Panel

**HEALTHY AGING PANEL-COMPREHENSIVE** (LC100026) $429
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, Urimination, Fibrinogen, and Insulin.

**HEALTHY AGING PANEL-BASIC** (LC100025) $149
CBC/Chemistry profile (see description above), C-Reactive Protein (high sensitivity), Vitamin B12, Folate, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Ferritin, and Insulin.

**VAP** (LC804500) $90
The VAP™ cholesterol test provides a more comprehensive coronary heart disease (CHD) risk assessment than the conventional lipid profile. Direct measurements, not estimations, are provided for total cholesterol, LDL, HDL, VLDL, and cholesterol subclasses.

**VAP™ PLUS** (LC100009) $330
VAP, C-Reactive Protein (high sensitivity), Homocysteine, Fibrinogen, PLAC™ Test (LP-PLA2), Vitamin D 25-hydroxy.
Other Popular Tests and Panels

**NUTRIENT PANEL*** (LC100024)
Vitamin B12, Folate, Vitamin D 25-hydroxy, Vitamin C, Vitamin A, Selenium, Zinc, CoQ10, and RBC Magnesium.

**CHRONIC FATIGUE PROFILE** (LC100005)
CBC/Chemistry Profile (see description previous page), Epstein – Barr Virus antibodies (IgG and IgM), Cytomegalovirus Antibodies (IgG and IgM), Ferritin, Total and Free Testosterone, DHEA-S, Ferritin, Total, F, Free F, T3, T4, Cortisol, C-Reactive Protein (high sensitivity), Vitamin B12, Folate, Insulin.

**ANEMIA PANEL** (LC100006)
CBC/Chemistry Profile (see description previous page), Ferritin, Total Iron Binding Capacity (TIBC), Vitamin B12, Folate

**AUTOIMMUNE DISEASE SCREEN** (LC100041)
ANA screen, hs-CRP, TNF, Immunoglobulins, IgA, IgG, IgM

**DIABETES MANAGEMENT PROFILE – COMPREHENSIVE** (LC100040)
Hemoglobin A1C, Glucose, Insulin, Lipid Panel, Glycmark

**DIABETES MANAGEMENT PROFILE – BASIC** (LC100039)
Hemoglobin A1C, Glucose, Insulin

**ADVANCED CARDIAC BIOMARKERS**

**ADVANCED OXIDIZED LDL PANEL*** (LC100035)
This panel looks at vascular inflammatory biomarkers, beginning with lifestyle choices to the development of metabolic as well as cardiovascular disease and the formation of vulnerable plaque. The panel contains the following tests: F2-Isoprostanes, Myeloperoxidase, and Oxidized LDL.

**OXIDIZED LDL PANEL** (LC100034)
This panel looks at vascular inflammatory biomarkers, beginning with the development of metabolic as well as cardiovascular disease and the formation of vulnerable plaque. The panel contains the following tests: Myeloperoxidase and Oxidized LDL.

**OXIDIZED LDL** (LC817472)
OxLDL is a powerful initiator of inflammatory changes in the artery wall, which eventually lead to the formation of plaque.

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**HORMONES**

**DHEA-SULFATE** (LC004020)
This test shows if you are taking the proper amount of DHEA. This test normally costs $100 or more at commercial laboratories.

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

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

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

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

**INSULIN FASTING** (LC004333)
Can predict those at risk of diabetes, obesity, heart and other diseases.

**PREGNENOLONE*** (LC140707)
Used to determine ovarian failure, hirsutism, adrenal carcinoma, and Cushing’s syndrome.

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

**SEX HORMONE BINDING GLOBULIN (SHBG)**

**VITAMIN D (25OH)** (LC081950)
This test is used to monitor SHBG levels which are under the positive control of estrogens and thyroid hormones, and suppressed by androgens.

**GENERAL HEALTH**

**VITAMIN B12/FOLATE** (LC000810)
Measurements of B12 and Folate help evaluate your general health and nutritional status since the B vitamins are important for cardiac health as well as energy production.

**PSA (PROSTATE SPECIFIC ANTIGEN)** (LC010322)
Screening test for prostate disorders and possible cancer.

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*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.

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Fort Lauderdale, FL 33309

Phone your order to: 1-800-208-3444
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- L-Carnitine
- L-Glutamine
- L-Glutamine Powder
- L-Lysine
- L-Taurine Powder
- L-Tyrosine Powder
- Super Carnosine
- Taurine

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- Arterial Protect
- Blood Pressure Monitor Arm Cuff
- Endothelial Defense™ with Full-Spectrum Pomegranate™ and CORDIART™
- Endothelial Defense™ with Glisodin®
- Full-Spectrum Pomegranate™
- Natural BP Management
- NitroVasc with CORDIART™
- Pomegranate Complete
- Pomegranate Extract Capsules

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- Bone Restore with Vitamin K2
- Bone Strength Formula with KoAct™
- Bone-Up™
- Calcium Citrate with Vitamin D
- Dr. Strum’s Intensive Bone Formula
- Strontium Caps

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- Acetyl-L-Carnitine
- Acetyl-L-Carnitine Arginate
- Blast
- Brain Shield® Gastrodin
- Cognitex® Basics
- Cognitex® with Brain Shield®
- Cognizin® CDP-Choline Caps
- DMAE Bitartrate (dimethylaminoethanol)
- Dopamine
- Ginkgo Biloba Certified Extract™
- Huperzine A
- Lecithin Granules
- Migra-Eeze™
- Migra-Mag with Brain Shield®
- Neuro-Mag® Magnesium L-Threonate
- Neuro-Mag® Magnesium L-Threonate with Calcium and Vitamin D3
- Optimized Ashwagandha Extract
- Prevagen™
- PS (Phosphatidylserine) Caps
- Super Ginkgo Extract 28/7
- Vinpocetine

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- NAD+ Cell Regenerator™
- Peak ATP® with GlycoCarn®
- PQG Caps with BioPQQ®
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- Ribosomal Extract
- French Oak Wood Extract
- Triple Action Thyroid

**Eye Health**
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- Brite Eyes III
- Certified European Bilberry Extract
- Inflammation Management
- Eye Pressure Support with Mirtogenol®
- MacuGuard® Oral Support
- MacuGuard® Oral Support with Astaxanthin
- Tear Support with MaquiBright®

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- Mega GLA with Sesame Lignans
- OMEGA FOUNDATIONS™ Super Omega-3
- EPA/DHA with Sesame Lignans & Olive Extract
- OMEGA FOUNDATIONS™ Super Omega-3 Plus EPA/DHA with Sesame Lignans, Olive Extract, Krill & Astaxanthin
- Organic Golden Flax Seed
- ProVen® Purified Omega-7
- Vegetarian Sourced DHA

**Food**
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- Rich Rewards® Breakfast Blend Natural Mocha Flavor
- Rich Rewards® Breakfast Blend Natural Vanilla Flavor
- Rich Rewards® Decaf Roast
- Stevia Sweetener

**Glucose Management**
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- Natural Glucose Absorption Control
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- Optimized Carotin with GlycoCarn®
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- Super Ubiquinol CoQ10 with BioPQQ®
- Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support®
- Super-Absorbable CoQ10 Ubiquinone with d’Limonene
- TMG Powder
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**Immune Support**
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- 26 Hyperimmune Egg
- Immune Modulator with Tinofend®
- Immune Protect with PARAQUIN™
- Immune Defense Protection Formula™
- Kinoko® Gold AHCC
- Kyolic® Garlic Formula 102
- Kyolic® Garlic Formula 105
- Kyolic® Reserves
- Lactoferrin (apolactoferrin) Caps
- NK Cell Activator™
- Optimized Garlic
- Optimized Quercetin
- Peony Immune
- ProBoost Thymic Protein A
- Reishi Extract Mushroom Complex
- Standardized Cistanche
- Ten Mushroom Formula®
- Zinc Lozenges

**Inflammation Management**
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- Black Cumin Seed Oil
- Boswellia
- Cytokine Supress™ with EGCG
- Nervia®
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- Super Bio-Curcumin®
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**Joint Support**
- Artho-Immune Joint Support
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- ArthoMax® with Theaflavins & AprèsFlex®
- Bio-Collagen with Patented UC-II®
- Fast-Acting Joint Formula
- Glucosamine/Chondroitin Capsules
- Krill Healthy Joint Formula
- MSM (Methylsulfonylmethane)

**Kidney & Bladder Support**
- Cran-Max® Cranberry Whole Fruit Concentrate
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- Water-Soluble Pumpkin Seed Extract

**Liver Health & Detoxification**
- Anti-Alcohol Antioxidants with HepatoProtection Complex
- Calcium D-Glucarate
- Chlorella
- Chlorophyllin
- European Milk Thistle
- Glutathione, Cysteine & C
- HepatoPro
- Liver Efficiency Formula
- Mega L-Glutathione Capsules
- N-Acetyl-L-Cysteine
- PectaSol-C®
- Silymarin
- SODzyme® with GliSODin® & Wolfberry

**Longevity & Wellness**
- AMPK Activator
- AppleWise Polyphenol Extract
- Berry Complete
- Blueberry Extract
- Blueberry Extract with Pomegranate
### A

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**SUBTOTAL OF COLUMN 1**

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**SUBTOTAL OF COLUMN 2**

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**SUPER SALE SAVINGS ON ALL PRODUCTS**

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: www.LifeExtension.com/SuperSale

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

### COSMESIS

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<th>PRODUCT</th>
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<th>10 Unit Each</th>
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<td>ANTI-AGING FACE OIL • 1 oz</td>
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### SUBTOTAL OF COLUMN 3

### SUBTOTAL OF COLUMN 4

OFFER ENDS FEBRUARY 1, 2016

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: www.LifeExtension.com/SuperSale
## TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: www.LifeExtension.com/SuperSale

### TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: www.LifeExtension.com/SuperSale

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

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### ITEM No. | PRODUCT
---|---
00150 | DMAE BITARTRATE • 150 mg, 200 veg. caps
00209 | DMG • 125 mg, 60 tablets
00270 | DNA PROTECTION FORMULA • 60 veg. caps
00311 | DOX MIX • 100 grams powder
00348 | DOPA-MIND™ • 60 veg. tabs
00399 | DR. PROCTOR’S ADVANCED HAIR FORMULA • 2 oz
00439 | DR. PROCTOR’S HAIR SHAMPOO • 8 oz
00489 | DUAL-ACTION MICRODERMABRASION ADV. EXFOLIATE • 2.4 oz

### ITEM No. | PRODUCT
---|---
01528 | ECHINACEA EXTRACT • 250 mg, 60 veg. caps
01979 | ENDOTHELIAL DEFENSE™/FULL-SPECTRUM POMEGRANATE™ AND CORDIART™ • 60 softgels
00997 | ENDOTHELIAL DEFENSE™/GLISODIN® • 60 veg. caps
00629 | EPA/DHA (Mega) • 120 softgels
01737 | ESOPHAGEAL GUARDIAN (Berry flavor) • 60 chewable tablets
01042 | EUROPEAN LEG SOLUTION DIOSMIN 95
01706 | EXTRAORDINARY ENZYMES • 60 caps
01514 | EYE PRESSURE SUPPORT W/MIRTGENOLS™ • 30 veg. caps

### ITEM No. | PRODUCT
---|---
01054 | FACE MASTER® PLATINUM • Facial Toning System
00965 | FAST-ACTING JOINT FORMULA • 30 caps
00553 | FEM DOPHILUS® • 30 caps
00555 | FEM DOPHILUS® • 60 caps
01064 | FEMMENESSENCE MACAPAUSE™ • 120 veg. caps
01728 | FERNBLOCK® W/RED ORANGE COMPLEX (Enhanced) • 30 veg. caps
00718 | FIBRINOGEN RESIST™ • 30 veg. caps
01748 | FLAX SEED (Organic golden) • 1 oz
01821 | FLORASSIST® HEART HEALTH PROBIOTIC • 60 veg. caps
02011 | FLORASSIST® ORAL HYGIENE • 30 lozenges
01825 | FLORASSIST® BALANCE • 30 liquid veg. caps
01920 | FLORASSIST® THROAT HEALTH • 30 lozenges
01913 | FOLATE (Optimized) • 5,000 mcg, 30 veg. tablets
01939 | FOLATE (Optimized) • 1,000 mcg, 100 veg. tablets
01842 | FOLATE + VITAMIN B12 (Bio Active) • 90 veg. caps
01544 | FORSKOLIN • 10 mg, 60 veg. caps
01513 | FUCOIDAN W/MARITECH® 925 (Optimized) • 60 veg. caps

### ITEM No. | PRODUCT
---|---
00559 | GAMMA E TOCOPHEROL/TOCOTRIENOLS • 60 softgels
00759 | GAMMA E TOCOPHEROL W/SESAME LIGNANS • 60 softgels
01349 | GARLIC (Optimized) • 200 veg. caps
01122 | GINGER FORCE™ • 60 liquid caps
01658 | GINKGO BILOBA CERTIFIED EXTRACT™ 120 mg, 365 veg. caps
01648 | GINKGO EXTRACT 24/7 (Super) • 120 mg, 100 veg. caps
00756 | GLA WITH SESAME LIGNANS (Mega) • 60 softgels

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**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**
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<tr>
<th>ITEM No.</th>
<th>PRODUCT</th>
<th>Retail Each</th>
<th>1 Unit</th>
<th>4 Unit</th>
<th>10 Unit</th>
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**SUBTOTAL OF COLUMN 7**

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE

FEBRUARY 2016

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<th>10 Unit</th>
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<th>YOUR PRICE</th>
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**SUBTOTAL OF COLUMN 8**
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<th>10 Unit Each</th>
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<td>Saffron W/Satireal® (Optimized) • 60 veg. caps</td>
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<td>Same (S-Adenosyl-Methionine) • 400 mg, 30 enteric coated tablets</td>
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<td>Se-Methyl L-Selemocene • 200 mcg, 100 veg. caps</td>
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<td>Silmyran • 100 mg, 50 veg. caps</td>
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<td>Sodzyme® w/Orisolthin® &amp; Wolfberry • 90 veg. caps</td>
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<td>Solarshield® Sunglasses • Smoke color</td>
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<td>Stevia® (Better) • 100 packets, 1 gram each</td>
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<td>Super Selenium Complex • 200 mcg, 100 veg. caps</td>
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<td>Tart Cherry Extract w/Standardized CherryPure® • 60 veg. caps</td>
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<td>Tear Support w/Maquibright® • 60 mg, 30 veg. caps</td>
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**SUBTOTAL OF COLUMN 10**

**DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE**
**Due to license restrictions, this product is not for sale to customers outside of the USA and Canada.**

**These products are not 25% off retail price.**

**Due to license restrictions, this product is not for sale to customers outside of the USA.**

**Due to license restrictions, this product is not for sale to Canada.**

† Due to license restrictions, this product is not for sale to customers outside of the USA and Canada.

---

### SUBTOTAL OF COLUMN 12

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<th>Product Description</th>
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Not sure exactly which supplements you need? Talk to a Health Advisor toll-free at 1-800-226-2370

FEBRUARY 2016

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS
**ORDER SUBTOTALS**

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| SUBTOTAL OF COLUMNS 1 - 12 |   |

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UPS OVERNIGHT add $16, UPS 2nd DAY AIR add $7, For Puerto Rico, US Virgin Islands, add $7, CANADA UPS EXPRESS Flat rate $17.50, UK Flat rate $26 USD. ALL OTHER INTERNATIONAL AIR WILL BE ADDED.

**SHIPPING** (MUST BE IN U.S. DOLLARS)

**GRAND TOTAL**

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* Prices subject to change without notice. Please notify Life Extension of any address change.

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---
Published studies have shown the critical importance of lipoic acid in supporting healthy mitochondrial function.

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

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Preserve Youthful CELLULAR ENERGY with Next-Generation LIPOIC ACID

Super R-Lipoic Acid

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Suggested dose is one to two capsules daily.

Non-GMO

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

Bio-Enhanced® is a registered trademark of Geronova Research, Inc.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Regular brushing and flossing are often not enough to achieve optimal oral health. Since the mouth is the major gateway to the body, maintaining good oral hygiene is important for overall health.

Researchers have developed an innovative approach to achieving maximum oral health. The beneficial bacteria in FLORASSIST® Oral Hygiene helps inhibit harmful bacteria that develop in the mouth and can affect the health of your teeth and gums. FLORASSIST® Oral Hygiene complements any oral care program.

FLORASSIST® Oral Hygiene contains a unique blend of two powerful oral probiotics:

- The beneficial probiotic strain—*S. salivarius* BLIS M18™
- An additional healthy probiotic—*B. coagulans* GanedenBC™

FLORASSIST® Oral Hygiene provides healthy bacteria that colonize the mouth and inhibit the growth of problematic mouth bacteria. This helps create a healthy environment in the oral cavity.

Because FLORASSIST® Oral Hygiene comes in lozenge form, it quickly provides healthy, targeted probiotics to the oral cavity.

Dissolving one lozenge of FLORASSIST® Oral Hygiene in your mouth daily can maximize your oral health by optimizing oral pH, easing inflammation, and supporting healthy bacterial colonization throughout the mouth.

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

Promote Oral Health with Targeted Probiotic Blend

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References
6. IADR/AADR/CADR 89th General Session and Exhibition, 16–19 March 2011, San Diego, CA, USA.

Contains milk.

BLIS M18™ (*S. salivarius*) is the trademark of BLIS Technologies Limited.

GanedenBC™ is a registered trademark of Ganeden Biotech, Inc.
European Milk Thistle
Provides The Ultimate Protection For Your LIVER

Milk thistle extract—rich in silymarin—is one of nature’s most powerful weapons to support liver health. Numerous scientific studies have demonstrated silymarin’s ability to provide potent protection for your liver. 1,2

Life Extension’s European Milk Thistle contains standardized, top-grade potencies of silymarin, silybin, isosilybin A, and isosilybin B, providing a full spectrum of liver-supportive compounds.

This unique formula includes phosphatidylcholine, a nutrient that promotes better absorption of all the health-providing benefits of milk thistle extract.3

European Milk Thistle, containing 480 mg of silymarin, is a unique complex that is absorbed nearly 5 times better than silymarin alone, and its concentration in the liver is 10 times better.

References

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

European Milk Thistle
Item #01922 • 60 Softgels

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To order European Milk Thistle
call 1-800-544-4440 or visit www.LifeExtension.com
FLORASSIST® Throat Health is an oral probiotic that provides novel beneficial bacteria to colonize the throat and is clinically shown to support throat health.¹-³

Just one lozenge of FLORASSIST® Throat Health contains 20 mg of BLIS K12®, a proprietary oral probiotic known as S. salivarius K12, which delivers 2 billion colony-forming units. These organisms survive naturally in the throat, maximizing their potential to promote throat health by helping to regulate inflammation and reduce the damage caused by unfavorable organisms that originate there.

FLORASSIST® Throat Health—naturally flavored with spearmint and cherry—can significantly maintain throat health,¹-³ support healthy inflammatory response, and help maintain good health.⁴ And because these unique compounds act locally in the throat, clinical study participants supplementing with S. salivarius K12 have reported excellent tolerability without systemic side effects.⁵

Contains milk.

BLIS K12® is the registered trademark of BLIS Technologies Limited.

References

To order FLORASSIST® Throat Health, call 1-800-544-4440 or visit www.LifeExtension.com
Used medicinally for over 4,000 years, curcumin benefits almost every organ in the body. The challenge is that most curcumin supplements are poorly absorbed into the bloodstream and are not well retained in the body.

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

Studies comparing standard curcumin to **Super Bio-Curcumin®** and **Advanced Bio-Curcumin® with Ginger & Turmerones** found:

- **Nearly 2 times** the support for **immune health**,
- **Nearly twice** the support for **healthy inflammatory** response, and
- **Approximately double** the **free-radical fighting** support.

**Life Extension** offers the choice of two super-absorbing curcumin formulas that require only **once daily dosing**:

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

**OR**

**Advanced Bio-Curcumin® with Ginger & Turmerones** provides the following **additional** nutrients for those seeking more comprehensive support for prolonged functional inflammatory responses:

- **Ginger** to complement curcumin’s health benefits,
- **Turmerones** to increase the amount of curcumin inside cells, and
- **Phospholipids** to further enhance absorption.

**References**

36 BEAUTY FROM WITHIN
Bioavailable keratin, collagen, and other micronutrients have been shown in clinical studies to revitalize skin, hair, and nails from the inside out. The result is a reduction in the appearance of dry hair, brittle nails, and wrinkled skin.

7 MOST SOUGHT-AFTER ANTI-AGING DRUG
For those unable to obtain the longevity drug deprenyl, compelling research shows that a novel green oat extract similarly preserves dopamine levels. In clinical trials, green oat extract improves cerebral circulation and cognitive function.

60 GUARD AGAINST AGE-RELATED VISION LOSS
New evidence corroborates that lutein and zeaxanthin strongly maintain the eye’s macula, enabling aging adults to reduce the risk of macular degeneration by 40%.

46 SLOW THE DEVELOPMENT OF ATHEROSCLEROSIS
A natural approach has been shown to slow the worsening of atherosclerotic plaque (by 95%), reduce unstable plaque, and improve endothelial function (by 66%).

24 ENHANCE COQ10 PERFORMANCE
Shilajit plus CoQ10 synergistically boosts cellular energy while improving mitochondrial function for safeguarding one’s health.

70 PROTECTION FROM ENVIRONMENTAL TOXINS
Find out how to protect yourself from environmental toxins that lead to DNA damage and cancer.