The annual Super Sale enables our supporters to obtain advanced nutrient formulas at extra-discounted prices.

Your patronage furthers anti-aging research while providing health-boosting supplements your body needs today.

The quality of these formulas is backed by our 40-year scientific commitment to longer and healthier human lifespans.

Below are some of our most popular formulas:

<table>
<thead>
<tr>
<th>Formula</th>
<th>Four-Unit Per-Bottle Price</th>
<th>Ingredient Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curcumin Elite™ (2-month supply)</td>
<td>$19.80</td>
<td>500 mg, 60 vegetarian capsules • Item #02407 (Just one capsule daily) A patented extract from turmeric root that provides 45 times greater free curcuminoid bioavailability than standardized turmeric powder.</td>
</tr>
<tr>
<td>Super Omega-3 EPA/DHA Fish oil, Sesame Lignans &amp; Olive Extract</td>
<td>$18.90</td>
<td>120 softgels • Item #01982 Highly purified EPA (1,400 mg/day) and DHA (1,000 mg/day), sesame lignans plus potent olive extract, provide essential components of the Mediterranean diet.</td>
</tr>
<tr>
<td>Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™</td>
<td>$35.10</td>
<td>100 mg, 60 softgels • Item #01426 Superior ubiquinol form of CoQ10 (100 mg) plus shilajit shown to double mitochondrial CoQ10 levels.</td>
</tr>
<tr>
<td>Two-Per-Day Multinutrient Formula</td>
<td>$14.40</td>
<td>120 capsules • Item #02314 (2-month supply) High-potency bioactive vitamins, minerals, and plant extracts in just two daily capsules.</td>
</tr>
<tr>
<td>Vitamin D3</td>
<td>$5.85</td>
<td>5,000 IU, 60 softgels • Item #01713 High-potency vitamin D in a softgel to provide greater absorption into the bloodstream.</td>
</tr>
<tr>
<td>FLORASSIST® GI with Phage Technology</td>
<td>$20.25</td>
<td>30 liquid vegetarian capsules • Item #02125 Dual-encapsulation probiotic for optimal delivery to help balance bacteria in the intestines.</td>
</tr>
<tr>
<td>Ultra Prostate Formula</td>
<td>$23.63</td>
<td>60 softgels • Item #02029 Comprehensive support for an aging prostate gland utilizing extracts from pygeum, nettle, flower pollen, and saw palmetto, plus boron, beta-sitosterol, and lycopene.</td>
</tr>
<tr>
<td>AMPK Metabolic Activator</td>
<td>$21.60</td>
<td>30 vegetarian tablets • Item #02207 Dual ingredient plant compounds support youthful AMPK activity and promote cellular health. Just one tablet daily dosing.</td>
</tr>
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</table>

**SUPER SALE ENDS FEBRUARY 3, 2020.**

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.
ON THE COVER

RENEW YOUR OWN STEM CELLS

NAD⁺ is shown to renew existing stem cells, repair broken DNA and extend lifespan.

MAJOR CURCUMIN ENHANCEMENT

A patented form of curcumin absorbs better, lasts longer in the body, and costs less. New benefits extend beyond reduced inflammation and indicate potential lifespan increases.

DRY EYE EASED WITH BERRY EXTRACT

Dry eye prevalence is increasing from computer screen exposure and normal aging. New studies reveal maqui berry extract can improve dry-eye-symptom scores up to 72%.

WIDE-RANGING BENEFITS OF SAMe

SAMe has demonstrated a new anti-aging mechanism via its ability to improve DNA methylation. This adds to previously demonstrated effects of improved mood, reduced joint discomfort, and cartilage regeneration.

HEART ATTACK THREAT FROM MEDICAL RADIATION

CT scans emit ionizing radiation that forms senescent cells in the linings of arteries, increasing cardiovascular risks.

WHOLE-BODY HEALTH

Scientists have discovered vitamin D receptors in nearly every cell in the body that help protect the brain and heart, while increasing lifespan.

SLASH DECADES OFF AGE-RELATED DISEASE BURdens

Striking differences of age-related disease prevalence reveal a huge degree of control Americans exert over how long we live and how old we feel.

IN THE NEWS

Wider use of fish oil drug endorsed by FDA review panel; frailty in older adults linked with decreased nutrient levels; pycnogenol inhibits side effect of anti-depression drug; selenium lowers ICU mortality.

HEALTHY EATING

The Greek Vegetarian Cookbook blends modern and traditional Greek cuisine, stressing simplicity and authenticity. We present four recipes.

AUTHOR INTERVIEW

In his book, Paul Henry Wand, MD, describes a protocol for treating concussions.

WELLNESS PROFILE

Imre Nagy, a 94-year-old practicing naturopath in Hungary, outlines his secrets for longevity.
RE-ENERGIZE

Heart and Brain Cells

SUPER SALES PRICING! • Item #01426 • 60 softgels • 1 bottle $41.85 • 4 bottles $35.10 each

For full product description and to order Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™, call 1-800-544-4440 or visit www.LifeExtension.com

Q+®, Kaneka Ubiquinol™, and the quality seal™ are registered or pending trademarks of Kaneka Corp. PrimaVie® is a registered trademark of Natreon, 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.

<table>
<thead>
<tr>
<th>Name</th>
<th>Specialty</th>
<th>Additional Information</th>
</tr>
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<tbody>
<tr>
<td>Gustavo Tovar Baez, MD</td>
<td>operates the Life Extension Clinic in Caracas, Venezuela. He is the first physician in Caracas to specialize in anti-aging medicine.</td>
<td></td>
</tr>
<tr>
<td>Ricardo Bernales, MD</td>
<td>is a board-certified pediatrician and general practitioner in Chicago, IL, focusing on allergies, bronchial asthma, and immunodeficiency.</td>
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</tr>
<tr>
<td>Mark S. Bezdek, MD, FACCP, FAAHM, FAAEM</td>
<td>is board-certified in internal medicine, emergency medicine, and anti-aging/regenerative medicine. He is the director of Med-Link Consulting, which specializes in bioidentical hormone replacement therapy, natural alternatives, anti-aging, and degenerative diseases. He holds U.S. patents for a multivitamin/mineral supplement, an Alzheimer's/dementia compilation, and a diabetic regimen.</td>
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<tr>
<td>Thomas F. Crais, MD, FACS</td>
<td>a board-certified plastic surgeon, was medical director of the microsurgical research and training lab at Southern Baptist Hospital in New Orleans, LA, and currently practices in Sun Valley, ID.</td>
<td></td>
</tr>
<tr>
<td>William Davis, MD</td>
<td>is a preventive cardiologist and author of <em>Wheat Belly: Lose the Wheat, Lose the Weight and Find Your Path Back to Health</em>. He is also medical director of the online heart disease prevention and reversal program, <em>Track Your Plaque</em> (<a href="http://www.trackyourplaque.com">www.trackyourplaque.com</a>).</td>
<td></td>
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<tr>
<td>Martin Dayton, MD, DO</td>
<td>practices at the Sunny Isles Medical Center in North Miami Beach, FL. His focus is on nutrition, aging, chelation therapy, holistic medicine, and oxidative medicine.</td>
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<tr>
<td>John DeLuca, MD, DC</td>
<td>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.</td>
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<tr>
<td>Sergey A. Dzugan, MD, PhD</td>
<td>was formerly chief of cardiovascular surgery at the Donetsk Regional Medical Center in Donetsk, Ukraine. Dr. Dzugan’s current primary interests are anti-aging and biological therapy for cancer, cholesterol, and hormonal disorders.</td>
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<tr>
<td>Patrick M. Fratellone, MD, RH</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Norman R. Gay, MD</td>
<td>is proprietor of the Bahamas 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.</td>
<td></td>
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<tr>
<td>Mitchell J. Ghen, DO, PhD</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Gary Goldfaden, MD</td>
<td>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.</td>
<td></td>
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<tr>
<td>Miguelangelo Gonzalez, MD</td>
<td>is a certified plastic and reconstructive surgeon at the Miguelangelo Plastic Surgery Clinic, Cabo San Lucas.</td>
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<tr>
<td>Garry F. Gordon, MD, DO</td>
<td>is a Payson, Arizona-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.</td>
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<tr>
<td>Richard Heifetz, MD</td>
<td>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.</td>
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<tr>
<td>Roberto Marasi, MD</td>
<td>is a psychiatrist in Brescia and in Piacenza, Italy. He is involved in anti-aging strategies and weight management.</td>
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<tr>
<td>Maurice D. Marholin, DC, DO</td>
<td>is a licensed chiro-practic physician and board-certified osteopathic family physician. While training at the University of Alabama, he completed fellowships in Clinical Nutrition and Behavioral Medicine. He is currently in private practice in Clermont, FL.</td>
<td></td>
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<tr>
<td>Professor Francesco Marotta, MD, PhD</td>
<td>of Montepolene Medical Center, Milan, Italy, is a gastroenterologist and nutrigenomics expert with extensive international university experience. He is also a consulting professor at the WHO-affiliated Center for Biotech &amp; Traditional Medicine, University of Milano, Italy and honorary resident professor; Nutrition, Texas Women’s University. He is the author of more than 130 papers and 400 lectures.</td>
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<tr>
<td>Philip Lee Miller, MD</td>
<td>is founder and medical director of the Los Gatos Longevity Institute in Los Gatos, CA.</td>
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<tr>
<td>Michele G. Morrow, DO, FAAFP</td>
<td>is a board-certified family physician who merges mainstream and alternative medicine using functional medicine concepts, nutrition, and natural approaches.</td>
<td></td>
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<tr>
<td>Filippo Ongaro, MD</td>
<td>is board-certified in anti-aging medicine and has worked for many years as flight surgeon at the European Space Agency. He is a pioneer in functional and anti-aging medicine in Italy where he also works as a journalist and a writer.</td>
<td></td>
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<tr>
<td>Herbert Pardell, DO, FAAIM</td>
<td>practices internal medicine at the Emerald Hills Medical Center in Hollywood, FL. He is a medical director of the Life Extension Foundation®.</td>
<td></td>
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<tr>
<td>Lambert Titus K. Parker, MD</td>
<td>an internist and a board-certified anti-aging physician, practices integrative medicine from a human ecology perspective with emphasis on personalized brain health, biomarkers, genomics and total health optimization. He serves as the Medical Director of Integrative Longevity Institute of Virginia, a 501(c)3 Non-Profit Medical Research Institute. He also collaborates on education and research for Hampton Roads Hyperbaric Therapy.</td>
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<tr>
<td>Ross Pelton, RPh, PhD, CCN</td>
<td>is scientific director for Essential Formulas, Inc.</td>
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<tr>
<td>Patrick Quillin, PhD, RD, CNS</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Allan Rashford, MD</td>
<td>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.</td>
<td></td>
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<tr>
<td>Marc R. Rose, MD</td>
<td>practices ophthalmology in Los Angeles, CA, and is president of the Rose Eye Medical Group. He is on the staff of Pacific Alliance Medical Center, Los Angeles, and other area hospitals.</td>
<td></td>
</tr>
<tr>
<td>Michael R. Rose, MD</td>
<td>a board-certified ophthalmologist with the Rose Eye Medical Group in Los Angeles, CA, is on the staff of the University of Southern California and UCLA.</td>
<td></td>
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<tr>
<td>Ron Rothenberg, MD</td>
<td>is a full clinical professor at the University of California San Diego School of Medicine and founder of California HealthSpan Institute in San Diego.</td>
<td></td>
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<tr>
<td>Roman Rozencwaig, MD</td>
<td>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.</td>
<td></td>
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<tr>
<td>Michael D. Seidman, MD, FACS</td>
<td>is the director of skull base surgery and wellness for the Adventist Health System in Celebration, FL.</td>
<td></td>
</tr>
<tr>
<td>Ronald L. Shuler, BS, DDS, CCN, LN</td>
<td>is involved in immunoncology for the prevention and treatment of cancer, human growth hormone secretagogues, and osteoporosis. He is board-certified in anti-aging medicine.</td>
<td></td>
</tr>
<tr>
<td>Paul Wand, MD</td>
<td>Fort Lauderdale, FL, is a clinical neurologist with special expertise in treating and reversing diabetic peripheral neuropathy and brain injuries from various causes.</td>
<td></td>
</tr>
</tbody>
</table>
Örn Ádalsteinsson, 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.

Richard Black, DO, is a dedicated nuclear medicine physician practicing as an independent contractor out of Cleveland, Ohio. Dr. Black is board certified in internal medicine and nuclear medicine, and is licensed to practice medicine in multiple states throughout the United States.

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 earned 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 anti-cancer drugs. He conducted his postdoctoral training at Stanford University’s Department of Statistics.

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.

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 University of Central Florida Medical School.

Sandra C. Kaufmann, MD, is a fellowship-trained and board-certified pediatric anesthesiologist as well as the Chief of Anesthesia at the Joe DiMaggio Children’s Hospital in Hollywood, Florida. She is the founder of The Kaufmann Anti-Aging Institute and the author of the book The Kaufmann Protocol: Why we Age and How to Stop it (2018). Her expertise is in the practical application of anti-aging research.

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, 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.

L. Ray Matthews, MD, FACS, is a professor of surgery and director of Surgical Critical Care at Morehouse School of Medicine in Atlanta, GA, and a trauma and critical care surgeon at Grady Memorial Hospital. He has published widely and is known as one of the top vitamin D experts. Dr. Matthews has spoken before the U.S. Food and Drug Administration several times, presenting a recent update about clinical research on vitamin D.

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 more than 1.5 million copies.

Xiaoxi Wei, PhD, is a chemist, expert in supramolecular assembly and development of synthetic transmembrane nanoropes with distinguished selectivity via biomimetic nanoscience. She has expertise in ion channel function and characterization. She founded X-Therma 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.
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® Silver® Adults 50+, Two-Per-Day provides:

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

Life Extension®’s Two-Per-Day contains superior forms of nutrients such as 5-MTHF that is almost 7 times more bioavailable than folic acid. These more bioavailable nutrients provide the body with greater biological activity, which is especially important as people age.

SUPER SALE PRICING!
Two-Per-Day Capsules
Item #02314 • 120 capsules (2-month supply)

1 bottle $16.20
4 bottles $14.40 each

SUPER SALE PRICING!
Two-Per-Day Tablets
Item #02315 • 120 tablets (2-month supply)

1 bottle $15.53
4 bottles $13.95 each

Does your multivitamin measure up? Two-Per-Day beats Centrum® in 10 ways!

For full product description and to order Two-Per-Day Capsules or Tablets, call 1-800-544-4440 or visit LifeExtension.com

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.
Slash Decades from Your Age-Related Disease Burden

Heart Failure has grown to an epidemic involving multi-year suffering, hospital confinement and high medical expenditures.

The map on this page reveals sharply varying heart failure death rates, depending on the region of the United States.

The dark red areas with the highest death rates represent population groups who often engage in dangerous lifestyles and do little to prevent age-related disorders.

This map is corroborated by a study published in The Lancet Public Health showing marked differences in the “age-related disease burden” among countries.¹

In a startling revelation, a 76-year-old in Japan and 46-year-old in Papua, New Guinea have the same level of age-related health problems as an average 65-year-old worldwide.¹

The United States ranked 54th on this list, between Algeria and Iran.¹²

The age-related disease differences among countries, along with maps showing wide discrepancies across different regions in the United States, help validate the degree of control we exert over our personal health.

I’ve copied maps of the United States in this article showing wide variations in disease incidence, much of them having to do with controllable risk factors.

Much more can be done to forestall the disease burden of maturing Americans.

For 40 consecutive years, our Life Extension® group has advocated for nationwide enactment of proven age-delaying strategies.

Death from Heart Failure Varies by Geography

The map to the right shows the rate of death from heart failure by county during 2014-2016.

Reference to specific commercial products, manufacturers, companies, or trademarks does not constitute its endorsement or recommendation by the U.S. Government, Department of Health and Human Services, or Centers for Disease Control and Prevention.

This material is otherwise available on the agency website for no charge.

Content source: Centers for Disease Control and Prevention.³
Some people misunderstand the mission of Life Extension®. They think we only seek to extend the lives of elderly people, regardless of how many degenerative disorders they suffer.

To the contrary, we advocate aggressive, preventive strategies to reduce disease risks.

Epidemiological data reveal most long-lived groups enjoy reduced age-related disease burdens.4,5 Such “healthy aging” usually translates into longer lifespans.

An exception is the United States. We rank number 34 in life expectancy,6 but come in at 54 as it relates to our burden of age-related disease.1,2

This means that while Americans live longer than in many other countries, we suffer more degenerative afflictions that diminish quality-of-life.

Readers of Life Extension® magazine follow healthier lifestyle patterns to reduce their age-related disease burden.

More Money Does Not Always Translate to Better Health

Americans spend more healthcare dollars per capita than people in any other country.

Yet overall health rankings often show the United States coming in last among developed countries.

Some blame conventional medicine for delivering longer lifespans but failing to extinguish our burden of chronic-disorders.

The map on this page, however, depicts sharp contrasts in life expectancy in different regions of the United States.

A lot of this is attributable to socio-economic differences. People live longer in safer neighborhoods with higher-quality health care, a cleaner environment, and better lifestyle choices.

While major problems exist with how medicine is priced and practiced in the United States, much of the higher age-related disease burden (and reduced longevity) is self-inflicted, such as eating an unhealthy diet.
A Mayo Clinic study shows that less than 3% of Americans meet even the basic criteria for a “healthy lifestyle.”

I’d like to think most of you fit into this “healthy lifestyle” category, but we are all challenged to do everything right.

Factors Influencing Longevity

Huge discrepancies of disease burden and life expectancy exist among countries around the world.

A lot has to do with high infant and maternal mortality, infectious disease prevalence, poor sanitation, and lack of access to clean water in less developed countries.

And while these factors appear obvious today, they were met with fierce skepticism in the past.

For instance, it required meticulous research by Dr. John Snow in the mid-1800s to demonstrate that ingesting feces-laden water was the culprit behind cholera and other water-borne infections.

Physicians in 1854 attributed cholera to other factors that characterized London at that time. Dr. Snow spent years proving them wrong.

Rational decision making has not improved much on a relative basis since Dr. Snow’s time. This can be seen in geographic regions where scant attention is paid to healthy living, including high prevalences of obesity and tobacco use.

The penalty for unhealthy choices is a higher burden of age-related diseases and shorter lifespans.

The longevity benefits associated with one’s healthy lifestyle are well documented. Yet most Americans are failing to take meaningful steps to slash their age-related disease burden.

In This Month’s Issue

Despite impressive research findings published over the past 25 years, most Americans have insufficient or deficient vitamin D levels. A review article on page 64 describes new studies revealing the whole-health benefits of this low-cost supplement.

The data on the benefits of curcumin keep growing stronger while the cost of highly absorbable turmeric extract has dropped.

The article on page 32 of this issue describes findings indicating curcumin is even more beneficial than previously thought.

As people age, levels of cellular NAD+ markedly decline. Published findings are uncovering additional mechanisms showing that boosting NAD+ can help thwart multiple age-related disorders.

Female Life Expectancy at Age 50 by County

Male Life Expectancy at Age 50 by County

Longevity Disparity Of Older Americans at Age 50 in United States

These maps show the average number of years a 50-year-old can expect to live.

Note the longevity disparities in regions where people die much sooner compared to those where people are living longer.

The maximal life expectancy differences of about 10 years reflect averages, and do not take into account the aggressive preventative strategies utilized by most readers of Life Extension® Magazine.
Dry eye afflicts 34% of people worldwide. A low-cost berry extract led to a 72% improvement in dry-eye-symptom scores. See the article on page 42 for details.

SAMe was introduced to the United States by Life Extension® in 1997. It became popular among those suffering severe mood disorders. New findings reveal SAMe has anti-aging properties by improving DNA methylation. The article on page 50 describes these data.

Super Sale Prices
Just once a year, we discount prices on all the nutrients used by our supporters. These discounts apply to updated versions of popular formulas that are designed to delay many underlying factors involved in biological aging.

Long-term supporters use the month of January to stock up on nutrients they use throughout the year.

The Super Sale pricing, volume discounts, and rebates on future purchases add up to significant savings.

To order your supplement staples at low Super Sale prices, please call 1-800-544-4440 (24 hours) by February 3, 2020.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club

References


Life Expectancy Inequalities Among U.S. Counties (1980-2014)

A study published in JAMA Internal Medicine concluded:

“Geographic disparities in life expectancy among U.S. counties are large and increasing. Much of the variation in life expectancy among counties can be explained by a combination of socioeconomic and race/ethnicity factors, behavioral and metabolic risk factors, and health care factors. Policy action targeting socioeconomic factors and behavioral and metabolic risk factors may help reverse the trend of increasing disparities in life expectancy in the United States.”

This report published by the American Medical Association is consistent with other data showing remarkable differences in longevity based on factors we largely can control.

Impact Statement

In this U.S. map, prostate cancer incidence rates by state are displayed for diagnosis year 2007. The states are divided into groups based on the rates at which men developed prostate cancer in 2007. The rates are the numbers out of 100,000 men who developed prostate cancer each year.

*Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population.

Reference to specific commercial products, manufacturers, companies, or trademarks does not constitute its endorsement or recommendation by the U.S. Government, Department of Health and Human Services, or Centers for Disease Control and Prevention. This material is otherwise available on the agency website for no charge.

Content source: Centers for Disease Control and Prevention.
HIGHLY PURIFIED FISH OIL

YOUR CHOICE OF HIGHLY CONCENTRATED FORMULAS:

SUPER OMEGA-3 Fish oil
EPA/DHA fish oil, krill, astaxanthin, sesame lignans, and olive extract

SUPER SALE PRICING!
Item # 01988 • 120 softgels
1 bottle $30.38
4 bottles $28.35 each

SUPER OMEGA-3 Fish oil
EPA/DHA fish oil, sesame lignans and olive extract
(Enteric coated for sensitive stomachs)

SUPER SALE PRICING!
Item # 01984 • 120 enteric coated softgels
1 bottle $22.95
4 bottles $20.93 each

SUPER OMEGA-3 Fish oil
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In the News

Advisory Panel Recommends FDA Approve Wider Use of Fish Oil Drug

A study published in the New England Journal of Medicine in early 2019 showed remarkable benefits in people taking higher-doses (4,000 mg/day) of a fish oil drug that consisted only of EPA.¹

There was a 25% reduction in a composite of cardiovascular death, nonfatal myocardial infarction, nonfatal stroke, coronary revascularization, or unstable angina in those using this fish oil drug.

The study observed several other benefits including:¹

- Cardiovascular death reduced by 20%
- Fatal or nonfatal heart attacks reduced by 31%
- Fatal or nonfatal stroke reduced by 28%
- Urgent or emergent coronary revascularization reduced by 35%
- Hospitalization for unstable angina reduced by 32%

This fish oil drug (Vascepa®) is marketed to doctors as fish oil that lowers triglycerides without raising LDL cholesterol.²

To the physician, this may sound appealing compared to a competitive fish oil drug called Lovaza®, which contains EPA and DHA.

What is troubling, however, is that patients taking the EPA-only fish oil drug (Vascepa®) are unlikely to take other fish oil supplements. This ignores the important role of the DHA component of the omega-3 family on life-sustaining processes, especially brain and eye health.

The estimated out-of-pocket cost, assuming no insurance coverage, is about $300 a month for this EPA-only fish oil drug.

This is 7-times higher than what a comparable amount of EPA+DHA can be obtained for from dietary supplements.

A panel of experts unanimously recommended in November 2019 that the FDA allow wider use of this fish-oil-based drug.³

Editor’s Note: The media provided favorable coverage to the FDA’s scientific advisory panel’s endorsement of this fish oil drug, but often omitted that these same omega-3 potencies are available as low cost supplements that don’t require a prescription.

References
Frailty in Older Adults Linked with Decreased Nutrient Levels

Lower blood levels of several nutrients are associated with a greater risk of frailty among older adults, reported an article in The Journal of the American Medical Directors Association.*

Participants included 4,068 people in The Irish Longitudinal Study on Ageing who were aged 50 or older. They underwent frailty assessments using three different instruments, and their blood samples were tested for folate, vitamin B12, vitamin D, lutein, and zeaxanthin.

“Frailty is characterized by multi-system loss of physiological reserve, systemic decompensation in response to stressors, and increased risk of adverse outcomes including falls, disability, and mortality,” the authors stated.

The instruments used to measure participants’ frailty were the Frailty Phenotype, the Frailty Index, and the FRAIL Scale (fatigue, resistance, ambulation, illnesses, and loss of weight).

“Models were adjusted for sociodemographic, lifestyle, health, and seasonal factors,” researchers explained.

Increases in frailty using all three methods of assessment were associated with lower levels of lutein, zeaxanthin and vitamin D. Pre-frailty was associated with lower levels of lutein and vitamin D.

Editor’s Note: “Our data suggest that low micronutrient status has potential as an easily modifiable marker and intervention target for frailty,” the authors concluded.

Increased Omega-3 Linked to Decreased Asthma Symptoms

A study published in the International Journal of Environmental Research and Public Health found that higher levels of omega-3 fatty acids are associated with a lower risk of asthma symptoms.*

The participants were 642 employees of a fish processing factory, who had a higher-than-average intake of fish.

Of these individuals, 8% currently had asthma, 11% had asthma symptoms, and 26% experienced nonspecific bronchial hyperresponsiveness (a hallmark of asthma also associated with COPD).

Participants’ blood samples were analyzed for levels of omega-3 and omega-6 fatty acids.

“We found that certain types of omega-3 (from marine oils) were significantly associated with a decreased risk of having asthma or asthma-like symptoms by up to 62%.

High omega-6 consumption (from vegetable oils), on the other hand, was associated with an increased risk by up to 67%,” said coauthor Dr. Andreas Lopata.

This study corroborates previous data showing most people need to increase omega-3s and reduce dietary intake of omega-6 fats.

Editor’s Note: “Asthma incidence has nearly doubled in the past 30 years and about half of asthma patients do not get any benefit from the drugs available to treat it. So, there’s a growing interest in non-drug treatment options,” Dr. Lopata asserted.

Antidepressant Drug Side Effect Relieved by Pycnogenol

Pycnogenol, a compound occurring in maritime pine bark, helps lower the incidence of sexual dysfunction occurring as a side effect of antidepressant therapy, according to a study reported in Physiology International.*

The investigation included 20 men and 47 women diagnosed with a depressive episode or recurrent depressive disorder who had responded to treatment with escitalopram (sold under brand name Lexapro®), a selective serotonin reuptake inhibitor (SSRI) antidepressant.

Participants were randomized to receive either 50 mg of Pycnogenol daily, in combination with escitalopram, or escitalopram only, for four months.

At the first visit and during subsequent monthly examinations, the subjects were evaluated for depressive episode severity, sexual function, blood pressure and other factors.

During the study, depression significantly declined in both groups. After a month of treatment, those who received Pycnogenol experienced a significant improvement in sexual function scores, while in the group that received escitalopram only, scores remained unchanged.

Editor’s Note: The effects associated with Pycnogenol in this study are based on its ability to improve endothelial function via its antioxidant, vasodilatory, anticoagulant and anti-inflammatory actions, researchers said.

* Physiol Int. 2019 Mar 1;106(1):59-69.
Selenium Lowers Risk of Hospital ICU Mortality

Results of a meta-analysis reported in the journal *Medicine* found a lower risk of mortality among intensive care unit (ICU) patients who were given selenium, an antioxidant mineral.*

For the meta-analysis, researchers selected 19 randomized, controlled trials that included 3,341 critically ill patients. Intravenous selenium was given to 1,694 individuals, while 1,647 were in the control group. Except for four of the trials, daily doses of selenium varied during the duration of each trial. Treatment duration ranged from 4.1 days to more than 28 days.

Patients who received selenium had a 14% lower risk of dying during the trial, compared to those who received a placebo or no treatment.

When the nine trials that reported length of ICU stay were analyzed, no significant difference was observed between those people who received selenium and the control subjects. However, selenium supplementation was associated with a shorter total hospital stay.

Editor’s Note: The authors concluded that, “The current evidence suggests that the use of selenium could cause reduction in overall mortality and may shorten the hospital length-of-stay in critically ill patients.”

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NAD⁺ Promotes Stem Cell Renewal and Regenerates Mitochondria

BY SUSAN GOLDSCHEIN
Life Extension® receives many inquiries about stem cell infusion therapies offered in the United States and other countries.

Our current view from small human trials is that there may be a benefit to infusions of exosomes that are naturally secreted from healthy stem cells.

Stem cell exosomes have regenerative properties that help restore functional cells needed to maintain tissue and organ viability.

Overlooked when considering exosome treatments is the ability to rejuvenate existing stem cell pools utilizing approaches many of you already follow.

This includes activating AMPK and restoring youthful levels of sirtuins and NAD+.

Increasing NAD+ is a promising way to self-renew existing stem cells in order to extend lifespan and prevent disease.1-12

A study published in June 2019 shows how a NAD+ boosting supplement called nicotinamide riboside increased stem cell colonies by 75% in the gut of aging mice.13

Other studies point to the role of NAD+ in restoring circadian rhythms needed for restorative sleep.14

Age-related sleep deterioration and digestive disorders adversely impact quality of life and accelerate degenerative processes in older individuals.

The most critical role of NAD+ is DNA repair. Each day, our DNA sustains numerous breaks that are repaired by NAD+-dependent enzymes.

With age, NAD+ levels plummet. Another study published in 2019 showed that a modest dose of nicotinamide riboside boosted NAD+ levels by 51% in overweight humans.15

We advise holding off on most stem cell infusions until more is known about safety and efficacy.

New data reveal how NAD+ improves functionality of existing stem cells and replenishes mitochondria in cells throughout the body.

### We Retain Stem Cells As We Age

- Stem cells are capable of self-renewal.
- Stem cells differentiate into functional (somatic) tissue cells.
- The number of stem cells may not greatly decrease with age.
- Aging reduces regenerative potential of stem cells.
- Stem cell senescence contributes to age-related conditions.

Nicotinamide Riboside Boosts NAD⁺

Higher levels of NAD⁺ correlate with improved health and a lower occurrence of age-related disorders. Lower NAD⁺ levels contribute to many diseases of older age, including sleep disturbances, metabolic disorders, diabetes, cardiovascular disease, and cognitive decline.⁷⁻¹⁴,¹⁶

An easy way to boost NAD⁺ levels is with nicotinamide riboside, which converts to NAD⁺ in your body. In human subjects, a 300 mg dose of nicotinamide riboside increased cellular NAD⁺ levels by 51%.¹⁵

Nicotinamide riboside is highly absorbable, or bioavailable, when taken orally.²⁷

What is NAD⁺?

Nicotinamide adenine dinucleotide (NAD⁺) is a compound found in every living cell. It is critical for cell energy production. Recent research shows NAD⁺ does much more.⁶,⁸⁻¹¹,¹⁶,¹⁷

Hundreds of different proteins in each cell require NAD⁺ to work properly.¹⁷

The most important proteins are the sirtuins, cellular guardians that protect against DNA damage that leads to many age-related ailments.¹⁸,¹⁹

Sirtuins are an important target for anti-aging interventions.¹⁰,¹¹,²⁰⁻²² Multiple animal studies have demonstrated that increasing sirtuin activity leads to longer life and reduction in age-related loss of function.¹²,²³,²⁴

As NAD⁺ levels decline with aging, there is reduced sirtuin activity. Boosting NAD⁺ helps ramp up sirtuin activity.

Increasing NAD⁺ levels can bring additional benefits tied to healthy longevity including:²⁰,²⁵

- Promoting AMPK activity, an enzyme that improves metabolism and helps protect against obesity and diabetes,
- Modulating p53, a tumor suppressor gene that repairs damaged DNA and protects against cancer initiation,
- Inhibiting NF-kB (nuclear factor-kappa B), a protein that induces the chronic inflammation tied to many diseases and premature aging, and
- Inhibiting mTOR, a molecular complex whose abnormal activation contributes to many chronic diseases of aging.

How Old Stem Cells May Be Rejuvenated

- Boost cellular AMPK
- AMPK lowers excess mTORC1
- Replenish NAD⁺ cell levels
- Activate sirtuins (with resveratrol)

Remarkable New Findings

Recent studies of NAD⁺ and nicotinamide riboside have shown two primary ways in which they improve health.

1. Replacing Old Mitochondria and Improving Mitochondrial Function

Mitochondria are the power suppliers of every cell, breaking down nutrients like sugars and fats into energy the cell can use to do work. When mitochondria age, they become dysfunctional, contributing to many illnesses.

Evidence indicates that sirtuins perform cellular housekeeping that includes replacing old and damaged mitochondria with healthy, new ones.²⁸ This process rejuvenates cells and improves their metabolism while maintaining their optimal function.

Because sirtuin activity is dependent on NAD⁺ (which plummets with age), supplementation with nicotinamide riboside can help preserve cellular functions.

Replenishing NAD⁺ levels with nicotinamide riboside resulted in enhanced mitochondrial function that:

- Rejuvenated aging bone marrow cells, helping to maintain immune function and prevent bone marrow failure and related diseases.²⁹,³⁰
- Improved muscle function and reduced muscle pathology in an animal model of muscular dystrophy,³¹ and
- Lessened liver inflammation and induced mitochondrial biogenesis, the formation of new mitochondria, in mice liver cells.³²

2. Rejuvenating Stem Cells

Healthy stem cells in tissues are needed to replace dead or dying functional cells with new ones. But stem cells age and become dysfunctional over time, causing tissues to deteriorate and increasing risk for disease.³³

Nicotinamide riboside intake can help prevent this. In a study on elderly mice, nicotinamide riboside replenished NAD⁺ levels, which improved mitochondrial function that rejuvenated stem cells in muscles. It also prevented the deterioration of muscle, skin, and brain stem cells.²⁴

This prolonged the lifespan of old mice by approximately 5%. Though this number may not seem huge, the supplementation only began when the mice were already two years old, the equivalent of about 80 years in humans.³⁴
A more significant effect may occur if NAD$^+$ is boosted earlier in life, and combined with interventions like resveratrol that prompts cells to express sirtuin proteins that NAD$^+$ then activates.

New studies corroborate a beneficial impact of NAD$^+$ on other stem cells. In one study, researchers looked at adult mice gut stem cells, which typically dwindle in older age. Injuries to the gut of these older animals have a difficult time healing. Nicotinamide riboside increased these digestive tract stem cell colonies by approximately 75%, improving the ability to recover from injury. This finding has favorable implications for older individuals suffering from digestive tract discomforts.

Wide-Ranging Benefits of NAD$^+$

Booster NAD$^+$ levels can have a positive impact on multiple areas of health.

Longevity

Studying the effect of a supplement on human longevity is difficult, because of the long average lifespan of humans. But many studies show that increasing NAD$^+$ prolongs the life of a variety of organisms. In yeast, a single-cell organism with a short lifespan, nicotinamide riboside increased lifespan as demonstrated by improved cell replicative capacity.

Studies of worms show that nicotinamide riboside can prolong their life by at least 10%. These effects extend to mammals as well.

Physical Performance

In a recent study of older men, levels of NADH, the reduced form of NAD$^+$ were significantly increased by 59% only two hours after taking one dose of nicotinamide riboside, while markers of oxidative stress were decreased.

Brain Health

Studies of mouse models of Alzheimer's disease have shown improvements with nicotinamide riboside supplementation. In the most recent study, it reversed the cognitive deficits in mice, improving memory. The pathology observed in the brains of Alzheimer's disease patients, amyloid plaques, was also reduced in the brains of these animals. A previous study had similar findings.

Obesity and Metabolic Disorders

Sirtuins improve metabolism and can be helpful guardians against weight gain, metabolic syndrome, and type II diabetes.

By boosting sirtuin activity, nicotinamide riboside enhanced metabolism and prevented excessive weight gain in mice.

In animal models of type II diabetes, this improved metabolism helped control blood sugar levels and shield against the damage done by high blood glucose.

Cardiovascular Health

Improved metabolism and lower body weight help to reduce risk for cardiovascular disease.

But nicotinamide riboside does even more to protect the cardiovascular system.

One recent study focused on mice with heart disease that had a 30% reduction in NAD$^+$ levels. Untreated, they typically developed heart failure. But nicotinamide riboside attenuated the decline in cardiac function.
People aged 50 have about 40% less NAD+ whereas 80-year-old people can have 90%-98% lower levels of NAD+ compared to 21-year-olds.

Heart failure risk increases as people grow older.

Recent studies show that nicotinamide riboside protects the organs of the cardiovascular system and protects other tissues from the effects of cardiovascular disease.

Normally, if blood flow to a tissue is compromised due to disease, the tissue dies, as happens in a myocardial infarction or a stroke. Preclinical studies show that nicotinamide riboside improves the response of tissues to this type of injury, reducing damage and encouraging recovery of the tissue.14,

How NAD+ Improves Sleep

It’s no secret that sleep patterns become disrupted with age. Much of this problem is due to a disruption in circadian rhythms that govern our sleep/wake cycle.

NAD+ has shown the ability to rebalance circadian rhythms through its stimulation of a vital cell protein called SIRT1.

In an animal study, mice deficient in SIRT1 experienced decreased quality of sleep.14 Increasing NAD+ levels can help increase SIRT1 and other sirtuins, helping to restore normal sleep/wake cycles.

Summary

NAD+ is a critical component of a healthy aging program.

Every cell requires it for hundreds of processes. These include activity of sirtuins, cellular guardians linked to prolonged lifespan and healthspan.

NAD+ levels and sirtuin expression diminish with advancing age, accelerating aging processes and degenerative disease risk.

Nicotinamide riboside is a compound that increases cellular NAD+ levels, enhancing sirtuin activity. New research has found that maintaining more youthful NAD+ levels can slow certain aspects of biological aging.

NAD+ also improves the health of stem cells that can replace dead and dying cells and keep vital tissues functioning.

This not only extends lifespan, but also helps reduce the risk for metabolic disease, obesity, cardiovascular disease, cognitive dysfunction, and more.

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

References


Essential Factor
to Reduce
Cell Fat Storage

The engine that enabled you to mature from a fertilized egg to an adult is a cell protein called mTOR.

Once we reach maturity, mTOR should turn down and serve only to maintain our structural and functional integrity.

Most people today consume too many excess calories. This results in mTOR constantly running at high gear, which is a factor in unwanted fat storage.

Increase AMPK to Lower mTOR

Studies show that increasing AMPK activity turns down excess mTOR.¹

Scientific studies show that increasing AMPK activity can encourage cells to store less fat and burn it as energy.²,³

AMPK Metabolic Activator was formulated based on data showing reduced belly fat in response to just one of its ingredients (gynostemma pentaphyllum).³

AMPK Metabolic Activator is a dual-nutrient formula designed to support healthy AMPK cellular activation.

References

For full product description and to order AMPK Metabolic Activator, call 1-800-544-4440 or visit www.LifeExtension.com

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NAD+ levels plummet with age but increase in response to nicotinamide riboside.

Optimized NAD+ Cell Regenerator™ combines 300 mg of nicotinamide riboside with resveratrol and other plant extracts.

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Major Advance!
New Highly Bioavailable CURCUMIN
For thousands of years, **turmeric root** has been used as a traditional Indian medicine.

The turmeric spice, which gives **curry** its golden color, has been recognized for wide-ranging health benefits.¹⁻⁵

The most beneficial compounds in turmeric are **curcuminoids**, which include **curcumin** and related compounds.

One animal study showed **lifespan extension** up to **26%** with curcumin supplementation.⁶

But there’s been a major problem that limits practical use: **curcuminoids** have poor oral **bioavailability**.

That means a large portion of curcumin taken orally never gets **absorbed** into the bloodstream and doesn’t reach the tissues.

Scientists have made a major advance in solving this problem. They’ve perfected a **patented** form of **curcumin** that dramatically **boosts** its **bioavailability**.

This allows more curcumin to circulate throughout the body for a longer time.

For the first time, people have the opportunity to realize the potential of **curcumin** to benefit whole-body health, slow certain aging processes, and reduce risks for age-related disorders.
**Major Advance in Curcumin Bioavailability**

In its pure form, curcumin is poorly absorbed into the bloodstream and is quickly metabolized into inactive forms or eliminated from the body. Normal, much of ingested curcumin is rapidly conjugated in the intestines and liver, which means it attaches to another compound. When this happens, most ingested curcumin is not biologically active and very little makes it into the body’s tissues. Studies show that only free curcumin, which remains unconjugated, is bioactive.

In a major advance, scientists used a water extraction process and combined curcumin with components of another traditional Indian medicinal spice, fenugreek. The fenugreek seed contains a unique form of fiber, known as galactomannan, which helps protect curcumin from modifications in the gut and greatly increases its bioavailability, or absorption into the bloodstream.

This novel formulation of curcumin, boosting its bioavailability and efficacy, has been validated in laboratory studies and human trials.

**Improved Bioavailability Demonstrated**

Researchers tested the new curcumin-galactomannan combination’s ability to enhance the bioavailability of curcuminoids in human volunteers. Fifty healthy adults were randomized to receive curcumin from either the new formulation or from a standardized curcumin extract.

The results showed that people who took the new formula had levels of free curcuminoids in the blood more than 45 times greater than those who took pure curcumin alone.

With the new formulation, more than 70% of the curcuminoids remained in the free, bioactive form even five hours after ingestion, allowing it to beneficially permeate tissues throughout the body.

An animal study also evaluated bioavailability and tissue penetration of the new curcumin formula. Like the human study, it demonstrated a major increase in blood levels of free curcuminoids and found that they remained in the bloodstream longer.

This study, done on rats, was able to delve deeper. By testing various organs following supplementation of the animals with this new curcumin, the researchers evaluated the penetration of free curcumin into various tissues. Brain, heart, kidney, and spleen levels were all dramatically enhanced compared with a standard curcumin supplement.

In the brain, curcumin from a standardized turmeric extract only penetrated the tissue in small amounts. With the new formulation, levels of free curcuminoids in the brain were 245% higher. This is vital, since curcumin is known to be one of the most neuroprotective compounds found in turmeric, helping to reduce the risk for age-related brain degeneration and cognitive decline.

Together, the findings from the animal and human studies show that this new curcumin formulation significantly enhances its ability to circulate and work throughout the body.

**Human Studies of the New Formulation**

Multiple human studies have recently been done on the impact of this new curcumin-galactomannan supplement on various ailments. The following are among the impressive results:

- A study of 60 healthy adults found that the new curcumin supplement improved markers of oxidative stress, while symptoms of anxiety, stress, and fatigue were reduced.

- One study of young, obese men found that curcumin-galactomannan improved cardiovascular risk factors. There was a 34% increase in HDL (“good”) cholesterol and a 29% reduction in harmful levels of homocysteine, an amino acid linked to development of heart disease.

- In two other studies, there was also significant improvement in measures of arterial stiffness, a risk factor for cardiovascular mortality.

- In alcoholic adults, the new supplement led to an average 30% reduction in markers of liver damage, an approximately 25% increase in antioxidant status, and a reduction in markers of systemic inflammation, including an approximately 27% reduction in C-reactive protein (CRP).

- In human blood cells, the supplement blocked the production of nuclear factor-kappa B (NF-kB), which is associated with harmful, chronic inflammatory responses. It also protected the cells by reducing dangerous free radicals.
Extending Healthy Lifespan

By improving the absorption and tissue distribution of free curcumin, it is now possible to maximize its benefits in fighting specific diseases. Perhaps the most remarkable ability curcumin has shown in research is to enhance longevity and prolong lifespan. In animal studies, curcumin supplementation leads to longer life. For example, a study of curcumin supplementation in fruit flies resulted in as much as a 26% extension of average lifespan.

How does it work? In studies of longevity, a handful of key mechanisms keep coming up. Each of the following has repeatedly been shown to help slow the aging process and extend healthy lifespan:

- Reducing chronic, low-grade inflammation,
- Increasing activity of sirtuins, specialized proteins that regulate cellular health,
- Decreasing activity of mTOR, a protein associated with rapid aging and cancer,
- Enhancing activity of the enzyme AMPK, which improves metabolism,
- Boosting autophagy, the cellular “recycling” process that helps keep cells rejuvenated, and
- Protecting against tissue damage caused by glycation, when sugars attach to proteins and fats.

Curcumin positively affects every one of these targets.

New, Highly Bioavailable Curcumin

- Animal and clinical human studies have shown that curcumin, the active compound in turmeric root, has a beneficial impact on lifespan extension, weight loss, cardiovascular health, arthritis, protection from neurodegenerative diseases, cancer prevention and treatment, depression, and more.

- Pure curcumin supplements have low bioavailability. They are poorly absorbed and rapidly eliminated from the body.

- A novel, patented technology combining curcumin with components of fenugreek seeds called galactomannans boosts the bioavailability and tissue distribution of bioactive free curcumin far beyond that of other commercially available supplements.

- The new supplement has been shown in human studies to lead to an increase of bioactive free curcumin in the blood at a level more than 45 times greater than in those who took unformulated curcumin alone (a regular turmeric extract standardized to 95% curcuminoids).

- These high levels of free curcumin also circulate in the body longer, allowing for the uptake of curcumin into tissues where it can deliver its whole-body, health-promoting effects.
Curcumin’s Effects on the Diseases of Aging

Curcumin has also been shown to be beneficial against many specific diseases and conditions. Among them are some of the most common and well-studied disorders, including the following:

Neurodegenerative Diseases

Promising research shows that curcumin has protective effects against amyloid proteins, especially beta-amyloid and tau. A buildup of these sticky proteins is associated with several age-related neurodegenerative diseases and dementias, including Alzheimer’s disease.23-29

In one study, curcumin supplementation in healthy, older adults resulted in immediate and long-term improvements in cognition, compared to a placebo.30 Both attention and working memory tasks improved within one hour of intake, and tests of memory and mood showed long-term improvements as well.

Another study in older adults taking curcumin also demonstrated improvements in attention and memory.31 This study used PET scanning to evaluate the buildup of amyloid and tau in the brain over a period of 18 months. Scientists found that these accumulations were reduced or remained stable in the supplemented participants, but they tended to worsen in the group that did not receive curcumin.

Cancer

In addition to reducing chronic inflammation and oxidative damage caused by free radicals, both of which contribute to the development of cancer, curcumin has been shown to have anti-cancer effects. It helps prevent the formation of tumors, induce cell death in existing cancer cells, and block their spread in the body.32-34

In a study on a strain of hairless mice, curcumin protected against the formation of skin cancer, even when the mice were exposed to UV radiation that would normally cause tumors.35

In cell cultures and animal studies, curcumin has shown very promising results in reducing growth and causing cell death in various types of cancer.34

Obesity

Being overweight increases the risks of developing conditions like heart disease, stroke, cancer, and diabetes. Obesity also creates excess inflammation in the body, accelerating the aging process.36

By improving metabolic function and reducing inflammation, curcumin helps ameliorate some of these effects. It has also been found to aid in weight loss, as seen with calorie-restricted diets and exercise.

A recent meta-analysis of 876 subjects randomized to receive curcumin supplementation showed a significant reduction in both body weight and body mass index (BMI).37 On average, subjects lost about 2.5 pounds with curcumin supplementation alone.

Metabolic Syndrome

Metabolic syndrome refers to a group of disorders, including elevated levels of blood sugar, abnormal lipid profiles, high blood pressure, and excess belly fat.38 They can lead to type II diabetes and are risk factors for atherosclerosis, heart attack, and stroke.

Curcumin has a powerful impact on metabolism, helping to reduce many of these risk factors.

A recent clinical trial evaluated a curcumin supplement in overweight adults with elevated glucose levels.39 After eight weeks, many positive changes in markers of metabolic health were noted. Fasting insulin levels, waist circumference, blood pressure, triglycerides, and markers of liver damage were all reduced significantly, while HDL (“good”) cholesterol was elevated.
A recent analysis of several studies found that, on average, pain due to arthritis was reduced by curcumin supplementation.\textsuperscript{42} The WOMAC Index score, widely used in evaluating hip and knee osteoarthritis, was also reduced. That indicates improvement not only in pain control, but also in joint stiffness, limitations of physical functioning, and other symptoms.

Some of these studies compared curcumin to pain medications typically used for arthritis, particularly non-steroidal anti-inflammatory drugs (NSAIDs) like ibuprofen. They found that there was no significant difference in pain control between curcumin and these medications. This is an important finding, since prolonged use of NSAIDs is associated with significant side effects, including gastritis, ulcers, and even kidney damage. In comparison, curcumin is generally considered safe, even at relatively high doses.

Cardiovascular Disease
Curcumin protects the heart and blood vessels in numerous ways. As noted, it can reduce risk factors for cardiovascular disease, like obesity, high blood pressure, and abnormal blood lipid levels.

Curcumin also does much more. Research has shown that it can reduce pathological changes in the blood vessels and heart that contribute to atherosclerosis, aneurysm formation, and heart dysfunction.\textsuperscript{40} And when a cardiovascular event like a heart attack or stroke \textit{does} occur, curcumin can lessen the impact.

Arthritis
A powerful \textit{anti-inflammatory}, curcumin is a way to treat painful ailments related to inflammation. One of the most common of these conditions is osteoarthritis, the degenerative joint disease that occurs frequently in older age.\textsuperscript{41}

### Curcumin’s Many Mechanisms

Most pharmaceutical drugs act by only one or two mechanisms in the body. Curcumin’s remarkable, health-promoting effects result from a long list of abilities, including:

- Powerful \textit{antioxidant} activity, preventing damage done by free radicals.\textsuperscript{45}
- Inhibition of nuclear factor-kappa B (NF-κB), a protein complex associated with harmful, chronic inflammatory responses.\textsuperscript{14,19,32,33}
- Suppression of STAT3, a protein associated with chronic inflammation and some cancers.\textsuperscript{33}
- Reduction of \textit{pro-inflammatory} compounds.\textsuperscript{41,46}
- Improvement in cardiovascular disease risk factors and components of metabolic syndrome, including support for healthy body weight, cholesterol levels, triglycerides, and blood pressure.\textsuperscript{40,47-49}
- Protective effects on aging blood vessels and other \textit{anti-atherosclerotic} activity.\textsuperscript{40}
- \textit{Anti-glycemic} effects, enhancing control of blood sugar levels in metabolic syndrome and diabetes.\textsuperscript{48,49}
- Stimulation of \textit{sirtuins}, proteins associated with lifespan extension.\textsuperscript{3,4,50}
- Inhibition of mTOR activity, associated with rapid aging and cancer.\textsuperscript{19,51}
- Enhanced activity of the enzyme AMPK, supporting healthy metabolism.\textsuperscript{5,52}
- Support for healthy \textit{autophagy}, a natural cellular rejuvenation process.\textsuperscript{45}
- Protection from tissue damage caused by glycation, when sugars attach to proteins and fats in the bloodstream.\textsuperscript{20,53-55}
- \textit{Anticancer} and \textit{antimetastatic} activity, both helping to prevent and remove existing tumor cells.\textsuperscript{33-35}
- Regulation of \textit{apoptosis}, the process of naturally “pre-programmed” cell death to maintain cell populations and prevent overgrowth.\textsuperscript{34,56}
- Protection from abnormal protein, including beta-amyloid and tau, associated with neurodegenerative diseases such as Alzheimer’s disease, and\textsuperscript{23-29}
- Neuroprotective effects that reduce dysfunction and promote recovery from brain, spinal cord, and peripheral nerve injuries.\textsuperscript{57-61}
Depression and Anxiety

Several studies have found that curcumin can help control symptoms of major depression.⁴³

One study randomized patients to receive either 1,000 mg of curcumin daily or fluoxetine (Prozac)⁴⁴. At the end of six weeks, those receiving curcumin had the same response rate to treatment as those receiving the drug, which can cause many side effects.

Some of these studies also evaluated symptoms of anxiety and found a positive response with curcumin as well.⁴³

Summary

Curcumin, the active component of turmeric root, has numerous health benefits.

It has been shown to reduce risk factors for many diseases, protect the function of various tissues and body systems, and bolster many core components of health, including those directly tied to the aging process.

The low bioavailability (how much is absorbed and circulates throughout the body) of curcumin has prevented its more widespread use to prevent and treat various conditions.

By combining curcumin with galactomannans from fenugreek seeds, curcumin’s bioavailability has been boosted to far higher levels than in previously available forms.

The results of lab and human studies demonstrate how this new form of curcumin penetrates diverse tissues in the body.

This provides a unique opportunity for aging individuals to realize the full potential of curcumin’s array of biological benefits aimed at helping to extend healthy lifespans.

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

References

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Most people view dry eyes as an annoyance. Left untreated, this condition can lead to serious infection and visual impairment.\(^1^,2\)

Dry eye prevalence is increasing and affects up to 34% of people worldwide.\(^3\)

Too much time staring at a smartphone, computer, or tablet, increases the risk for dry eyes, as can air pollution, air conditioning, wearing contact lenses, and allergies.\(^2^,4^-^{10}\)

Over-the-counter eye drops, or “artificial tears,” provide relief but aren’t able to address the underlying causes.\(^1^1\)

A prescription drug for dry eye syndrome can cause side effects. These include burning, itching, stinging, redness, and blurred vision\(^1^2\) — the very dry eye symptoms you’re trying to eliminate!

Scientists have found a berry extract that boosts our own tear production. This helps combat dry eyes the natural way.

An initial pilot study showed that taking an oral extract of maqui berry leads to a 72% improvement in dry-eye-symptom scores.\(^1^3\)

A new double-blind, placebo-controlled study — the gold standard in medical research — confirms that maqui berry extract improves dry eye conditions, with rapid and long-lasting effects.\(^1^4\)
The Causes of Dry Eyes

**Dry eye syndrome** occurs for one of two reasons:  
1. Our tear glands don’t produce enough tears, or  
2. Our tears are poor quality, which makes them evaporate too quickly or fail to spread evenly over the **cornea** (the clear front surface of the eye).

It’s become an increasingly common condition in the U.S. and worldwide.  
Key risk factors are aging, and use of computers, smart phones, and tablets. Dry eye is more prevalent in women. Some of the other common risk factors include:
- Allergies,  
- Air-conditioning use,  
- Medications such as antidepressants and high blood pressure drugs,  
- Autoimmune disorders,  
- Flat-screen TV viewing,  
- Wearing contact lenses,  
- Vision-correcting or cataract surgery, and  
- Excessive ultraviolet light exposure.

Potential Eye Damage

Dry eyes cause stinging, itching, inflammation, light-sensitivity, distraction, and difficulty focusing, which can reduce quality of life. Studies show that eye irritation is associated with lower scores on standard mental-health scales.  
Additionally, if left untreated, there’s a risk of **vision impairment** over time. That’s because tears are essential for protecting both the cornea and the **conjunctiva**, a thin membrane that lines the eyeball and inner surfaces of the eyelids.  
Tears provide lubrication and wash away foreign matter. They help heal scratches and other injuries to the cornea or conjunctiva. With untreated dry eyes, injuries linger, which can ultimately impair vision.  
Tears also carry nutrients and **antimicrobial defenses** that help prevent eye infections, which can damage sight.

Dry eye sufferers usually turn to over-the-counter eye drops. When these “artificial tears” don’t work well enough, many individuals try expensive prescription eye lubricants that still fail to deliver effective and lasting relief.  
**Restasis**, a prescription drug specifically approved by the FDA for dry eye syndrome, can cause burning, itching, redness, and blurred vision—the very symptoms it’s designed to eliminate.  
The only true solution for dry eyes is to increase production and quality of **natural tears**.
Several years ago, researchers discovered that, when taken orally, a maqui berry extract boosts production of the body’s own natural tears. This delivers relief for dry, irritated eyes, while also helping to protect the eyes from long-term damage. The active compounds in maqui are pigments called delphinidins. In a preclinical study they showed the ability to protect the eyes by:

- Shielding eye structures from constant exposure to harmful free radicals, and
- Inhibiting damage from light stimulation to the eyes’ delicate tissues, such as the photoreceptor cells, that convert light into signals sent to the brain.

In a preclinical model, delphinidins also prevented low-grade injury to the lacrimal glands, which produce the water layer of tears. This safeguards and restores their ability to produce natural, high-quality tears.

Researchers created a rat model of dry eye by suppressing the animals’ blink reflex, which led to evaporation of tears and corneal damage.

When one group of the rats was pretreated with maqui berry extract, it stopped the loss of tears and prevented corneal damage.

**WHAT YOU NEED TO KNOW**

**Banish Dry Eyes**

- **Dry eye syndrome** is increasingly common, causing burning, eye fatigue, and predisposition to cornea damage and reduced quality of life.
- Commercial drug-store eye drops and lubricants have only a temporary effect and can have bothersome side effects.
- An extract of the maqui berry, taken orally, has been shown to stimulate healthy tear production, improving dry eye symptoms.
- A placebo-controlled human study has confirmed this extract’s ability to offer a safe and effective treatment for dry eye syndrome.

**Importance of Tears’ Quality and Quantity**

People with dry eyes generally don’t produce enough tears, their tears evaporate too quickly, or, most critically, they have a low quality of tear film.

Tear film contains three layers: oil, water, and mucus. The surface of the eye can be lubricated, nourished, and protected with the tiny amount of tears normally produced each day, about 1 mL to 3 mL per eye.

If the water element (the middle layer) evaporates too rapidly, the remaining tear fluid becomes excessively concentrated, which, in turn, impairs many of the tear film’s critical functions.

**Maqui Berry Restores Tears**

Maqui berries, dark purple fruit native to regions of Chile and Argentina, have long been valued for their free radical scavenging and anti-inflammatory properties.
Pilot Study

In 2014, researchers performed a human study on the eye-protecting effects of maqui berry extract. They enlisted 13 participants with moderate eye dryness, which was evaluated by the Schirmer's test. This is a way to assess the amount of fluid produced by the tear glands and whether it is sufficient to keep the eyes moist.

There was no placebo group for this small pilot study. Participants took either 30 mg or 60 mg of maqui berry extract daily for 60 days.

Both dosage groups had an approximately 50% improvement in tear production after 30 days. After 60 days, the lower-dose group’s improvement declined, but the 60 mg group sustained a 45% improvement in tear production.

Patients also completed the Dry Eye-Related Quality-of-Life Score test. This is a questionnaire that consists of six questions about various “bothersome ocular symptoms” and nine questions about their “impact on daily life,” including the mental aspect.

The overall degree of impairment to quality of life is calculated as a score—with a lower score indicating a greater quality of life.

Both dosing groups had a total composite score—eye and daily-life symptoms—of about 40 at the outset of the study. Scores for both groups fell quickly after treatment with maqui berry extract began, indicating a quality-of-life improvement.

Patients taking 30 mg of maqui berry extract daily experienced a reduction (improvement) to a score of almost 22 (from a baseline of 40) after 30 days. However, their score didn’t drop much further by day 60.

The score for patients taking 60 mg of maqui berry extract daily dropped to almost 27 after 30 days.

In contrast to the lower (30 mg) dose group, the dry eye score of those taking 60 mg of maqui continued to fall after 60 days to an astoundingly low 11 points. This constitutes a 72% improvement in dry eye-related quality-of-life symptoms after just two months!

New Clinical Trial

More recently, scientists conducted a randomized, double-blind, placebo-controlled trial. It confirmed that 60 mg of maqui berry extract significantly:

- Reduced eye dryness,
- Alleviated eye fatigue, and
- Improved quality-of-life symptoms.

The team selected 74 healthy participants, aged 30 to 60, who experienced moderate eye dryness and eye fatigue. As in the pilot study, eye dryness was evaluated with the Schirmer's test.

Every day for four weeks, 37 subjects took a placebo, while the other 37 took 60 mg of maqui berry extract.

Both groups started with the same degree of eye dryness. After treatment, however, the group that took the maqui extract showed significantly higher production of tear fluid.

As a result, the maqui group experienced alleviation of eye dryness and reduced eye fatigue.

This clinical trial confirms that taking 60 mg of maqui berry extract daily can help reduce eye dryness and alleviate eye fatigue.
Relief for Dry Eye Symptoms

This recent study also looked at quality-of-life symptoms caused by dry eyes.

Using the Dry Eye-Related Quality-of-Life Score test and a Visual Analog Scale test, subjects specified their level of agreement with a number of statements about their symptoms.14

Following the four-week treatment period, the Dry Eye-Related Quality-of-Life Score test showed that the maqui group had substantially improved total values for bothersome ocular symptoms, compared to the placebo group.

The Visual Analog Scale test showed that the maqui group experienced significant improvements in eye fatigue.14

For those who suffer from dry eyes and eye fatigue, this means there is new hope for a safe and effective way to naturally relieve these symptoms in just a few weeks.

Summary

Dry eyes are an increasingly common condition, especially among aging people and computer and smartphone users.

A deficient amount or poor quality of tears causes eye irritation and fatigue and may damage eye tissue and impair vision over time.

An extract of the maqui berry has been shown to soothe eyes from the inside out by stimulating the production of healthy tears.

Two clinical trials have confirmed this extract’s ability to restore tear production, reversing key symptoms and risks of dry eye syndrome and improving quality of life.

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

References

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References

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Since Life Extension® first introduced SAMe (S-Adenosyl-Methionine) back in 1997, it’s become popular for boosting mood.

In addition to fighting depression, SAMe also stimulates the production of new cartilage in animals and improves symptoms and functioning in osteoarthritis patients.1-3

In a recent study SAMe was shown to increase lifespan of yeast.4

What’s the common link between these benefits and SAMe?

SAMe is a cofactor involved in a process called DNA methylation, which regulates gene expression.5 In doing so, it can help fight against some of the causes of age-related disease—and it may prolong life itself.6,7
Scientists have discovered that abnormal methylation in osteoarthritis patients affects genes that promote inflammation, which in turn promotes the painful swelling that typifies the disease.\(^{17,18}\)

By donating methyl groups and getting the methylation cycle back on track, SAMe may modulate those genes and suppress inflammation.\(^{19}\)

Improper methylation disrupts healthy cartilage cells’ activity, leading to cartilage damage that further erodes bone tissue.\(^{16,20}\)

Numerous studies have shown that SAMe may help treat osteoarthritis. Among the results:

- SAMe stimulates production of new cartilage in animals.\(^3\) This is crucial to slowing or reversing the progress of osteoarthritis.
- In short- and long-term studies, patients reported improvement of symptoms.\(^{21,22}\)
- Osteoarthritis patients treated with SAMe experienced pain relief as strong as that delivered by non-steroidal anti-inflammatory drugs (NSAIDs), with improvement lasting longer after treatment.\(^{1,2,23}\)
- A meta-analysis of 11 studies showed that SAMe improved functioning in arthritis patients and was comparable to NSAIDs for pain, without the side effects common with NSAIDs.\(^{24}\)

In one study, SAMe also reduced the depressive feelings associated with osteoarthritis.\(^{21}\) That is likely because it eased symptoms of the arthritis and because SAMe has a direct impact on mood disorders.
Depression

Clinical depression affects more than 16% of U.S. adults over a lifetime.\textsuperscript{25}

Stress is a contributor to mood and anxiety disorders. Researchers have found that it drives epigenetic changes in the brain that can alter normal methylation patterns.\textsuperscript{26}

In fact, abnormal methylation has been linked to depression and mood disorders in multiple ways:

- Prenatal and early childhood exposure to a mother’s depression affects methylation patterns in the infant’s brain.\textsuperscript{27}

- Childhood trauma leads to methylation defects, which can be related to long-term mood and mental health problems.\textsuperscript{28}

- Altered methylation is seen in people at high genetic risk for mood disorders, including bipolar and major depression, even before they develop symptoms.\textsuperscript{29}

SAMe helps regulate the production of neurotransmitters that produce feelings of well-being, potentially alleviating depression.\textsuperscript{30,31}

Clinical trials have shown that:

- SAMe improves memory-related cognitive symptoms in depressed patients.\textsuperscript{31}

- Over 12 weeks, SAMe (1,600 mg/day-3,200 mg/day) proved superior to both a placebo and the prescription antidepressant escitalopram (20 mg per day) at improving scores on the Hamilton Depression Rating Scale. Remission rates were 34% for SAMe, 23% for escitalopram, and 6% for a placebo.\textsuperscript{32} (Later analysis suggested that the effects were only significant in men, and researchers are exploring the reason for that.)\textsuperscript{33}

- Adding 800 mg of SAMe to antidepressant medications improved results on standard measures of depression.\textsuperscript{34}

Life Extension\textsuperscript{6} encourages individuals interested in adding SAMe to their regimen to discuss it with their treating physician.
Prolonging Life

Methylation isn’t just linked to the development of age-related diseases. It also has a direct impact on lifespan itself.35,36 Studies show that aging is associated with alterations in DNA methylation.35,37 This causes pro-inflammation and disease-causing genes to be expressed and tumor-suppressor genes to be silenced, increasing cancer risk. Studies of long-lived animal strains show that they use SAMe much more efficiently than their shorter-lived relatives, leading to activation of lifespan-extending genes, such as those involved in chemical stress defenses.38,39 Studies have demonstrated just how SAMe might extend life:

- Stimulating SAMe synthesis in yeast extends their lifespan by activating the youthfulness-promoting enzyme AMP-activated protein kinase (AMPK).4 In humans, AMPK helps the body use calories more efficiently, reduces fat accumulation, and enhances cleanup of cellular “junk.”

- Short-term SAMe use in tumor-prone mice prevented liver tumor development, in part by restoring methylation and turning on tumor suppressor genes.40

Summary

The way genes are expressed has a great impact on our health and longevity. DNA methylation is a process that regulates gene expression. SAMe (S-Adenosyl-Methionine) is an essential factor involved in DNA methylation. Defects in methylation can lead to diseases. Increasing SAMe intake provides the body with a critical methylation nutrient, which can help modulate the way genes are expressed. SAMe has so far shown clinical success in treating osteoarthritis and depression. Early studies suggest SAMe’s status as the body’s preferred methylation nutrient may also protect against other diseases and contribute to longer lifespan. •

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

References


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Life Extension® first introduced SAMe in 1997. Since then, researchers around the world have continued to discover its impressive benefits.

While SAMe is largely known for mood support, it has also shown benefits for the liver and joints.

A study by Harvard Medical School and Massachusetts General Hospital cited the impressive benefits of SAMe for mood elevation.\(^1\)

A report published in Germany showed that SAMe may help maintain healthy neurological function. This impressive report found that SAMe:\(^2\)

- **Increased** glutathione levels by 50% and glutathione enzyme activity by 115%,
- **Decreased** a measurement of free radical activity by 46%, and
- **Inhibited** lipid peroxidation by 55% in culture.

In addition to these findings, SAMe also improves brain cell methylation, thereby facilitating youthful **DNA enzymatic actions**, which may help account for SAMe's mood-boosting properties. These enzymatic reactions are required for the healthy conversion of neurotransmitters such as *serotonin* and *dopamine*.

**References**

*CAUTION: SAMe should not be taken by those diagnosed with bipolar disorder.*

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Life Extension®
The Science of a Healthier Life™
A New Cardiovascular Threat: Ionizing Radiation

BY JEAN HALSTEAD

CT scans are routine medical diagnostic tools, but the question about their safety has been a subject of debate for many years.

The ionizing radiation emitted by CT scanners is a cancer risk concern. Mainstream publications argue the majority of exposure levels to ionizing radiation are too low to produce the DNA damage needed to initiate a malignancy.1-4

This is disputed by other researchers.5

An analysis published in Consumer Reports estimated that the 80 million CT scans performed in 2015 will eventually cause an estimated 29,000 cases of cancer.6

Medical imaging is a $100 billion per year industry,7 meaning there are financial incentives to downplay potential risks from radiation-emitting imaging devices.

And cancer is not the only health concern.

Life Extension® has warned for decades8-10 that radiation-emitting diagnostics are also linked to increased heart disease risk.

What’s new is a specific mechanism by which ionizing radiation damages coronary arteries that feed the heart muscle.

In a recent review of preclinical research, scientists have found a possible link between radiation-induced cell senescence and acceleration of cardiovascular disease.11

It is wise to avoid unnecessary radiation exposure, in order to reduce risks of leukemia and other radiation-induced cancers.
Exposure to radiation can either:

1. Kill cells outright (which is the objective when treating cancer),
2. Damage cellular DNA in ways that lead to malignant changes, or
3. Create senescent cells that contribute to degenerative aging.

In this Research Update we’ll review recent findings on how ionizing radiation can create senescent cells that accelerate heart disease and other common disorders.11-13

Cancers arise when particles in a beam of ionizing radiation break DNA strands in a cell’s nucleus.16 This sets off a potential cascade of events that leads from DNA damage to mutated cancer suppressor genes, to chaotic cell replication, and from there to a malignant tumor.

But cancer isn’t the only outcome facing a cell after being exposed to a beam of ionizing radiation.

Another result of radiation exposure is that the cell dies by a normal process called apoptosis. This is the principle behind radiation therapy in cancer treatment, whereby apoptosis is induced in most of the cancer cells, leaving the tumor to shrink and eventually undergo destruction by the immune system.17

If a cell doesn’t turn malignant, or die from apoptosis, it has a third pathway—it can undergo cellular senescence.17

Deadly Impact of Senescent Cells

A senescent cell neither dies nor becomes malignant. Rather, it loses its ability to function normally. These senile cells do not replicate or contribute to normal tissue functions.13

Senescent cells instead are a chronic source of localized and systemic dysfunction.

These “zombie-like” cells linger in tissues throughout our maturing bodies and accelerate pathological aging processes.

Senescent cells secrete a wide range of destructive chemicals, including protein-degrading enzymes that harm surrounding cells,18-20 as well as pro-inflammatory signaling cytokines.13

Threat to Cardiovascular Health

In a review of numerous preclinical studies, researchers found evidence that ionizing radiation plays a significant role in endothelial cell dysfunction preceding the development of cardiovascular disease.11

They found that cells exposed to ionizing radiation are converted to senescent cells at an alarming rate, producing an inordinate number of senescent cells—particularly in the inner lining of our arteries called the endothelium.

Cells lining blood vessels (the endothelium) play active and diverse roles in maintaining health, including detecting and managing circulation and blood pressure.21

In less than a microsecond after exposure to ionizing radiation, endothelial cells undergo a stress response arising from the formation of reactive oxygen species induced by the radiation.11,22

This can cause endothelial cells to undergo premature senescence, which has been linked in preclinical research with early onset of cardiovascular disease.23

Radiation-induced senescent endothelial cells likely contribute to premature cardiovascular problems.
In addition to losing their ability to replicate, senescent endothelial cells develop defects in their ability to sprout, migrate, and form capillaries, meaning that they cannot help repair damage to heart muscle.

Arterial Damage and Blockage

Senescent endothelial cells lose their ability to respond to nitric oxide, the body’s natural signal to relax blood vessel walls. This leaves arteries with a permanent “squeeze” that ultimately drives up blood pressure and reduces blood flow.

These senescent cells in the endothelium also stop producing anticoagulant factors, while increasing secretions of those that promote clotting. This increases the risk of a disastrous thrombosis, or blood-flow-stopping arterial clot.

If all this sounds like a recipe for a heart attack or a stroke, it is.

And what’s worse, all this damage is now understood to happen at radiation exposures far lower even than those known to induce cancers.

How much lower?

Even Modest Doses Concerning

Radiation doses are expressed in grays (Gy). A high dose is defined as greater than 2 Gy. A moderate dose is 0.1 Gy to 2 Gy.

Low dose radiation is at or below 0.1 Gy.

A person can receive as much as 0.1 Gy from a single CT scan. This means that people undergoing repeated CT scans can be hit with 0.2, 0.3, or more Gy of radiation.

That’s well within the moderate range seen in nuclear plant workers and even some survivors of the infamous Chernobyl nuclear power plant disaster.

Avoid Unnecessary Radiation Exposure

An estimated 30% to 50% of imaging tests are believed to be medically unnecessary. That’s an alarming amount of dangerous radiation for patients that could be avoided, especially when there are alternatives such as ultrasound and MRIs.

Be sure to ask your medical professional if either ultrasound or an MRI could provide the diagnostic information they are looking for.

Many times, these are acceptable alternatives that do not expose you to ionizing radiation, or as much radiation.

Life Extension® has been covering the science of senolytics to safely remove senescent cells from the body.

Now that we know that CT scans promote cellular senescence, it becomes more important to learn about senolytics and discuss this with your physician.
CT scans can be lifesaving, and the risk must always be balanced against the benefits. Always discuss with your medical professional whether there are acceptable alternatives that do not expose you to ionizing radiation.

**Summary**

It is wise to avoid unnecessary radiation exposure. This helps reduce risks of leukemia and other radiation-induced cancers.

But new evidence shows that radiation may represent an underrecognized threat as well: premature cellular senescence, especially in endothelial cells, the layer of cells lining our blood vessels.

Unlike cancer-inducing radiation, which damages DNA strands at moderate and high radiation levels, senescence-inducing radiation has been shown at much lower levels, including those plausibly received from several CT scans over the course of a year.

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

**References**


COMBAT Senescent Cells and AGING

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When most of us first learned about vitamins, we were told one thing about vitamin D: It’s good for our bones.

And it is. But in recent years, scientists have found receptors that respond to vitamin D in nearly every cell in the body.1

There’s a reason for that. We now know that vitamin D is vital for the health of our brain and heart, for protecting against premature aging, and for holding off metabolic disorders like type II diabetes.2-6

One preclinical study even showed that vitamin D increased median lifespan by 33%.7

Researchers have also discovered that lower levels of vitamin D in the body are associated with increased risk for many age-related chronic diseases.5,8-11

In other words, getting enough vitamin D appears critical for nearly every aspect of health.

But a vast majority of adolescents and adults in the U.S. and Europe have dangerously low levels of vitamin D in their blood.12-15 Correcting this deficiency by taking 5,000 IU to 8,000 IU of vitamin D daily could help prevent age-related loss of function and many chronic diseases, and prolong a healthy life.
Protecting the Brain

We’ve long known that adequate vitamin D levels are required for normal brain development.19 More recently, scientists have found that vitamin D continues to play a critical role in the brain through old age. Cognitive decline strikes many elderly people, often culminating in Alzheimer’s disease and other forms of dementia. Two of the most studied contributors to neurodegenerative disease are neuroinflammation and buildup of amyloid protein clusters.

In preclinical studies, vitamin D has been shown to prevent and clean up accumulating amyloid protein.20,21 It also supports neurogenesis, the formation of new brain cells.22

Vitamin D is also neuroprotective, helping to protect brain cells from premature aging, including the related conditions Alzheimer’s and Parkinson’s disease.23

In fact, receptors for vitamin D have been found to be widely distributed throughout the brain.24 And studies have consistently shown that:

- Lower levels of vitamin D in the blood correlate with a higher risk of cognitive decline and dementia,2,25-29 and

- Higher levels of vitamin D are linked to better cognitive function and lower rates of cognitive decline and dementia.29-31

Even the size of the brain is affected by vitamin D. In older adults, brain volume tends to diminish, but vitamin D stops this loss. Those with the highest levels of vitamin D have greater brain volume than those with lower levels.30

Aging

Researchers studying the aging process have for years been interested in telomere length. Telomeres cap our chromosomes and maintain the integrity of our genes. As we age, the length of our telomeres decreases and cellular senescence accelerates.32,33

Human studies have found that a higher level of vitamin D correlates with longer telomeres.34-37 This means that on a genetic level, vitamin D helps protect our chromosomes and DNA against the ravages of time.
Other studies confirm that vitamin D can extend lifespan and shield against premature aging.\textsuperscript{38-40} Preclinical studies have demonstrated that higher intake of vitamin D can promote longevity, with one study showing that it increased lifespan by 33\% in roundworms.\textsuperscript{7,41}

Researchers have also found that people with the longest healthspan, such as those who live healthily into their 100s, have the highest blood levels of vitamin D. People who suffered from chronic disease at a younger age, on the other hand, tended to have dramatically lower levels of vitamin D in their blood.\textsuperscript{42}

Cardiovascular Health

Insufficient vitamin D has been linked to increased rates of atherosclerosis, the buildup of plaque in the arteries that leads to cardiovascular disease.\textsuperscript{8,43-45} Low vitamin D in the body is also associated with a higher risk for heart attack and overall death due to cardiac causes.\textsuperscript{10,46-49} One recent study found that in elderly people, a vitamin D deficiency was associated with 12.2 times greater odds for heart failure.\textsuperscript{90}

Low vitamin D levels are also associated with high blood pressure and high blood glucose, conditions that further increase the risk of heart disease.\textsuperscript{51-53}

**WHAT YOU NEED TO KNOW**

Vitamin D’s Many Health Benefits

- **Vitamin D isn’t just good for your bones.** Recent research has found that it is associated with the health of the brain and heart, and in extending healthy lifespan.

- Low levels of vitamin D have been tied to increased risk for many common chronic diseases, including cardiovascular disease, metabolic disorders, and Alzheimer’s.

- High levels of vitamin D often correlate with improved overall health and longer life.

- Vitamin D deficiencies are very common and increase in older age. Life Extension believes that taking 5,000 IU to 8,000 IU daily can effectively raise blood levels and improve nearly every aspect of health.

- Regular blood testing is important to guide adjustments to these doses to achieve the maximum benefits.
But research has gone beyond these observational findings and shown that increasing vitamin D intake can help **reverse the progression of cardiovascular disease**.

**Arterial stiffness** is an emerging marker of blood vessel aging and dysfunction.\(^{54,55}\) It has been linked to cardiovascular disease, and cognitive decline.\(^{56,57}\)

Research has shown that taking vitamin D can reduce arterial stiffness, lowering the risk of cardiovascular disease. One study that used a modest dose of **2,000 IU of vitamin D** daily led to a drop in arterial stiffness of **18%**.\(^{58}\)

**Metabolic Disorders**

**Insulin resistance** is a condition in which cells don’t respond to insulin’s signal to use glucose for energy. This often results eventually in **high blood sugar, type II diabetes** and **metabolic syndrome**.

Over time, these disorders can cause accelerated aging, loss of vision, cardiovascular disease, stroke, nerve damage, and kidney failure.

Some of the most compelling data on vitamin D use in supporting metabolic health come from studies in people at high risk for type II diabetes, or prediabetes.\(^{59}\) Such people have **impaired fasting glucose** (fasting sugar levels between 100 mg/dL and 125 mg/dL), or **impaired glucose tolerance** (an abnormal rise in blood sugar following a metered dose of oral glucose).

In these populations, supplementation with vitamin D daily slowed the rise in fasting blood sugar over time, improved pancreatic insulin secretion, and boosted insulin sensitivity.\(^{60,61}\)

**Bone Health**

The importance of vitamin D to **bone health** has been recognized for decades.\(^{62-64}\) Strong bones require calcium, and vitamin D helps maintain adequate calcium levels in the body.

Without enough calcium and vitamin D, bones are broken down more rapidly than new bone can be built up. This is one of the main causes of **osteoporosis**, the thinning and weakening of bones that increases the risk for fractures, which can be lethal in the elderly.\(^{62,65}\)

**Summary**

Vitamin D was once thought to be important only for **bone health**. Scientists now know that it influences health throughout the body, from the brain to the heart.

Disorders ranging from **cardiovascular disease to Alzheimer's** have been linked to lower levels of vitamin D. Higher vitamin D levels are associated with less risk of those and other diseases.

But it’s difficult to get enough from sunlight (without increasing the risk of skin cancer) or from diet. Studies have found that taking higher doses of vitamin D can help raise blood levels and improve **overall health**.

*Life Extension®* recommends that readers consider doses in the range of **5,000 IU to 8,000 IU** daily. Regular blood testing is important to achieve maximum benefits.

If you have any questions on the scientific content of this article, please call a *Life Extension®* Wellness Specialist at 1-866-864-3027.
WHOLE-BODY HEALTH WITH VITAMIN D

References


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The Greek Vegetarian Cookbook

BY HEATHER THOMAS

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Did you know that... 

Life expectancy at birth in Greece is 81.2 years, placing it at #25 globally.
The proportion of daily smokers in Greece is one of the highest among the European Union countries.
Greece is considered to have one of the lowest levels of socio-economic development in recent years.
A good approach to a healthy, long life includes a balanced diet, exercise, proper supplementation, smoking cessation, and limiting alcohol intake. Research shows that adherence to the Mediterranean diet can have protective effects against active and passive smoking.*


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With the surge in studies showing the health benefits of the Mediterranean diet, Greek food is experiencing a renaissance of its own.

Authentic Greek cuisine consists of the freshest seasonal ingredients, as varied as the topography of the land, ranging from the sea, to the countryside, to the mountains. Staples include olive oil, vegetables, fruit, and pulses (beans, chickpeas, lentils, dry peas), nuts and seeds, and natural grains, among others.

The Greeks tend to practice seasonal eating, consuming primarily locally grown, in-season foods. So, the cuisine is constantly changing, providing variety year-round. This fresh, seasonal diet is believed to be a key reason why Greeks tend to live even longer than their European neighbors.

In The Greek Vegetarian Cookbook, author Heather Thomas blends together the best of both modern and traditional Greek cuisine, with a focus on simplicity and authenticity. The cookbook features more than 100 simple and accessible vegetarian Greek dishes, including soups and salads, meatless breakfasts, healthy snacks, street food, contemporary “meze” dishes, and more.

On the following pages, Life Extension® presents four signature recipes from the book that highlight the flavor and variety of the region.

—LAURIE MATHENA
**Crunchy Greek Islands Salad**

**Preparation time:** 15 minutes  
**Cooking time:** 8-10 minutes  
**Serves:** 4

- 2 garlic cloves, peeled and halved
- 6 slices stale crusty white bread
- olive oil, for drizzling
- 14 oz/400 g juicy plum tomatoes, cut into chunks
- 1 large red or yellow bell pepper, seeded and cut into chunks
- ½ red onion, thinly sliced
- 3 ripe peaches, pitted and quartered
- 1 quantity Classic Greek Salad Dressing
- handful of arugula (rocket) or baby spinach leaves
- 3½ oz/100 g hard goat cheese, coarsely grated or shredded
- sea salt and freshly ground black pepper

1. Preheat the oven to 350°F/180°C/Gas Mark 4.

2. Rub the cut cloves of garlic over both sides of the bread. Tear the bread into pieces, lightly drizzle with olive oil, and place on a baking sheet. Bake for 8-10 minutes, or until the rusks are crisp and golden brown. Let cool.

3. Put the tomatoes, bell pepper, red onion, and peaches into a large bowl. Stir in the rusks and season with salt and pepper. Lightly toss in most of the salad dressing and let stand for 5-10 minutes for the flavors to mingle.

4. Pile the arugula (rocket) or spinach on top and drizzle with the remaining dressing. Sprinkle with goat cheese and serve.

**Variations**

Use quartered fresh figs or chunks of watermelon instead of peaches. Any grated strongly flavored hard cheese is suitable, or alternatively you could use feta. Add some cubed cucumber, capers, or olives to the salad.
Braised Artichoke Hearts and Peas

**Preparation time:** 20 minutes  
**Cooking time:** 30 minutes  
**Serves:** 4

8 fresh artichokes  
1 lemon, halved  
½ cup (4 fl oz/120 ml) fruity green olive oil  
1 onion, chopped  
1 bunch scallions (spring onions), chopped  
2 carrots, sliced  
1 lb 2 oz/500 g podded fresh peas  
2 ripe medium tomatoes  
1 cup (8 fl oz/240 ml) vegetable broth (stock)  
juice of 1 lemon  
bunch of dill, chopped  
salt and pepper

1. Take a fresh artichoke and remove and discard any tough outer leaves and trim the top level. Scoop out the hairy choke from the base with a teaspoon and trim the stalk almost to the base of the choke. Squeeze the lemon juice into a bowl of cold water and put the artichoke heart into it to prevent it discoloring. Prepare the remaining artichokes in the same way and set aside.

2. Heat the oil in a large saucepan over low heat. Cook the onion, scallions (spring onions), and carrots, stirring occasionally, for 10 minutes, or until tender.

3. Add the drained artichoke hearts, peas, tomatoes, broth (stock), and lemon juice. Cover and simmer gently for 20 minutes, or until the vegetables are tender and the liquid has reduced. Stir in the dill and season to taste with salt and pepper. Remove from the heat and let cool.

4. Serve warm or at room temperature, with some crusty bread to mop up the juices.
Halloumi and Lentil Salad

Preparation time: 10 minutes  
Cooking time: 35 minutes  
Serves: 4

1 generous cup (7 oz/200 g) brown lentils, rinsed  
1 vegetable bouillon (stock) cube  
4 tablespoons olive oil  
2 red onions, chopped  
3 garlic cloves, crushed  
2 large carrots, finely chopped  
2 celery stalks, finely chopped  
12 oz/350 g baby plum tomatoes, halved  
juice of 1 lemon  
1 tablespoon balsamic or red wine vinegar  
handful of dill, finely chopped  
6 oz/175 g fine green beans, trimmed  
9 oz/250 g halloumi, cut into 8 slices  
2 tablespoons green pesto  
sea salt and freshly ground black pepper

1. Put the lentils into a saucepan and cover with cold water. Crumble in the bouillon (stock) cube and bring to the boil, then reduce the heat and simmer gently for 20 minutes, or until the lentils are tender but still retain some 'bite.' Drain in a strainer (sieve) and refresh under running cold water.

2. Meanwhile, heat 2 tablespoons of the olive oil in a large skillet (frying pan) over low heat. Cook the onions, garlic, carrots, and celery for 8-10 minutes, stirring occasionally, or until softened.

3. Add the tomatoes and drained lentils and cook for 5 minutes, stirring occasionally. Squash the tomatoes by pressing down on them with a spatula or wooden spoon. If the lentils start to stick, add a little water. Stir in the lemon juice, vinegar, and dill, and season to taste with salt and pepper. Remove from the heat and let cool a little.

4. Cook the green beans in a saucepan of boiling water for 3-4 minutes until tender but not soft. Drain and refresh under running cold water.

5. Dry-fry the halloumi in a nonstick skillet (frying pan) or griddle pan over medium heat for about 2 minutes on each side, or until crisp and golden brown.

6. Stir the remaining olive oil into the lentils and divide between 4 serving plates. Top with the green beans and halloumi. Drizzle with pesto and serve immediately.
Warm Griddled Asparagus Salad

Preparation time: 10 minutes
Cooking time: 30 minutes
Serves: 4

1 lb 2 oz/500 g thin asparagus spears
2 garlic cloves, peeled
pinch of sea salt crystals
4 tablespoons fruity green olive oil, plus extra for brushing
juice of 1 lemon
small bunch of Greek basil, chopped
3 tablespoons chopped shelled pistachios
pinch of red pepper (chilli) flakes
3 oz/80 g feta cheese, crumbled

1. Trim the woody ends off the asparagus or just snap them off with your fingers. Brush them lightly with olive oil.

2. Heat a griddle pan over medium-high heat and, when really hot, add the asparagus in a single layer (cook in batches, if necessary – don’t overcrowd the pan). Cook for 6-8 minutes, turning occasionally, until the asparagus is just tender and starting to char on both sides.

3. In a pestle and mortar crush the garlic and sea salt crystals. Mix with the olive oil and lemon juice in a small bowl until well amalgamated. Stir in the basil.

4. Arrange the asparagus on a large serving platter and drizzle the dressing over the top. Scatter with the pistachios and red pepper (chilli) flakes, and crumble over the feta. Serve immediately while it’s still warm.

Tip
If preferred, you can roast the asparagus in a preheated oven at 400°F/200°C/Gas Mark 6 for about 10 minutes.

Variations
Use toasted flaked almonds instead of pistachios. Top with goat cheese or shavings of Kefalotyri, Graviera, Parmesan or Pecorino.

Omit the feta and serve with fried or griddled halloumi.

Make the salad more substantial by adding tomatoes and griddled zucchini (courgettes).

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

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Each year, 43 million concussions are diagnosed around the world. Victims can suffer debilitating symptoms including headaches, memory loss, confusion, and personality changes.

Paul Henry Wand, MD, has been treating concussion patients for 37 years. Along the way, he made two key discoveries:

1. Most doctors are NOT using the most accurate tests to diagnose brain injuries, and
2. When properly diagnosed, it is possible to reverse the symptoms of a concussion.

Using his three-step method, Dr. Wand has treated thousands of concussion patients. He has witnessed his results, both for recent brain injuries and for those that had gone untreated for years.

Dr. Wand is sharing his discoveries with the world in his new book, *The Concussion Cure: 3 Proven Methods to Heal Your Brain*.

In it, he provides critical information on how to properly diagnose and treat concussions, shares three proven methods for reversing concussion symptoms, and details numerous key dietary supplements that are important for helping to restore proper brain function.

In this exclusive interview with *Life Extension* magazine, Dr. Wand discusses his proven methods, shares stories of dramatic healing, and most importantly—offers hope to all those who have suffered from a brain injury.

—LAURIE MATHENA
LE: Who is at risk of suffering from a concussion?

Dr. Wand: Traumatic brain injuries, or TBIs, can happen anytime, anywhere, to anyone. Whether the injury is minor, from falling off a bicycle, or major, from a devastating car accident, brain injuries can lead to long-term problems and even death if not appropriately treated.

LE: What are some of the symptoms of a concussion?

Dr. Wand: A person who has suffered a concussion might have the typical symptoms of headache, dizziness, impaired memory, ringing in the ears (tinnitus), difficulty performing simple math, speaking and comprehending (aphasia), and have difficulty performing higher cognitive functions such as abstraction, planning, and executive functions (memory, self-control, and mental flexibility).

They may also experience personality changes, irritability, aggressive behavior, depression, anxiety, and left-right confusion, to name the most common symptoms.

LE: What are the best diagnostic tests for evaluating a brain injury?

Dr. Wand: Many types of scans can be performed to evaluate an injury to the brain. However, some scans do not offer any meaningful data, while others offer great detail that would otherwise be overlooked.

I have determined that the most sensitive studies to document an mTBI (mild traumatic brain injury) remain the QEEG (quantitative electroencephalography or computerized EEG), the QEP (quantitative evoked potentials), and the neuropsychological testing, followed by the SPECT scan, with the MRI being the least sensitive.

These tests should be used in all cases of brain trauma to give accurate diagnoses. The tests should always be done with a normative database to ensure an objective evaluation and not depend on anyone’s opinion.

LE: In your book, The Concussion Cure, you discuss your own personal protocol for treating brain injuries. What kind of results have you seen in your patients?

Dr. Wand: As a neurologist, I have treated thousands of brain injuries over more than three decades. During that time, I developed a treatment protocol that has resulted in reversals of the consequences of brain damage. The protocol may even regenerate brain tissue.

From a young man who dropped out of university when his grades declined as a result of several minor concussions as a child, to a young woman who had been confined to a wheelchair for nine years after a severe car accident, my patients come in with injuries that cover the entire range in severity and age.

In every case, their improvements make significant differences in their lives, often dramatically so. After treatment, the man successfully went back to university, and the woman regained some of her vision.

LE: What did you discover that all patients with traumatic brain injury have in common?

Dr. Wand: In 1990, when I first began to order SPECT scans for many of my patients with TBI, I was impressed with what I saw in nearly all of them: they all had varying degrees of hypoperfusion, which is a relative reduction in blood flow in a characteristic pattern.

I hypothesized that if essentially all patients had hypoperfusion, one treatment would be to increase the blood flow. Simple and elegant.

LE: Is there a simple way to increase blood flow to the brain?

Dr. Wand: What I use to successfully treat traumatic brain injuries is a powerful drug called Nimotop® (brand), or nimodipine (generic).
**Nimodipine** relaxes the smooth muscles inside the artery, which facilitates the artery’s dilatation. This, in turn, increases blood flow, so more oxygen is delivered to the cell.

**Nimodipine** works very well to supply blood to the areas of the brain with hypoperfusion, thus leading to improvements, often dramatic. I strongly advocate for its use in most, if not all, TBIs, as its remarkable benefits are undeniable.

I have used nimodipine extensively to treat TBI and other neurological conditions in the outpatient setting with great success and safety.

**LE:** You’ve also experienced great success with neurofeedback. Can you describe how that works?

**Dr. Wand:** Neurofeedback is a specific treatment modality that retrains the brain by taking advantage of the brain’s *neuroplasticity*, the ability of the brain to create new connections between neurons after an injury or other damage to the brain.

Neurofeedback (NFB) changes the brain’s electrical function by using positive reinforcement through repeated sessions. NFB converts the dysfunctional state of the brain into a more normal state. The improvement is verified by a scientifically proven comparison to a normal population (normative database).

**LE:** What kind of results have you seen using neurofeedback?

**Dr. Wand:** I recall a patient who had NFB for many years and continued to show gradual improvement. His problem was a seizure disorder with an underlying abnormal brain structure that predisposed him to having seizures.

As his treatments progressed and various abnormalities were resolved, new ones showed up on post-treatment QEEG tests, necessitating further NFB sessions. The continued treatments, combined with a seizure medication, resulted in successfully eradicating his auras (which are warning signs of impending seizure) and eliminating his seizures.

**LE:** What about hyperbaric oxygen therapy for treating traumatic brain injuries?

**Dr. Wand:** Hyperbaric oxygen therapy, or HBOT, is a treatment that pumps pure oxygen under pressure into the blood and body. The normal air that we breathe contains 20 percent oxygen, but HBOT air is 100 percent oxygen, and thus delivers five times more oxygen to the cells.

The benefits of using HBOT include its unique ability to heal any kind of wound, which means it is beneficial for treating brain injuries in TBI patients. When all factors are considered, the single most important criterion to effect healing is making *oxygen* available to the cells of the body. Without enough oxygen, cells cannot heal or function properly.

**LE:** How does HBOT help heal the brain?

**Dr. Wand:** As previously mentioned, oxygen is the single most important element for the healing of human tissues.

When the diameter of a blood vessel in the brain narrows because of a TBI, the blood flow through it decreases, and stops altogether if the vessel completely closes. When this happens, the oxygen level falls, and then all of the tissues downstream from the point of closure suffer the inevitable fate of dying unless the blood flow is restored. The end result is ischemia (lack of oxygen) and apoptosis (cell death).
The first and most obvious way in which HBOT promotes healing is that it increases the oxygen level in the circulating blood via the respiratory system as the patient simply breathes the enriched air that fills the chamber. There are multiple other mechanisms of action of HBOT, which are described in my book.

**LE:** Have any studies been conducted using HBOT to treat concussions?

**Dr. Wand:** One HBOT human study showed significant improvement of blood flow, an increase of brain tissue seen on MRI scans, and improved results in psychological testing. These included an increase in the speed of thinking, which is always slowed when a brain injury occurs.

SPECT scans were used to document blood flow before and after treatment. The post-treatment scans visually showed a significant increase of blood flow in those areas that had showed significant hypoperfusion.

The authors of this elegant study were able to document for the first time, in humans suffering from persistent post-concussion symptoms (PPCS), that HBOT could induce healing, months or even years after an injury. (This matches my observations using nimodipine.)

They also found improved angiogenesis and an increase in neuroplasticity, which assists in cellular repair and clinical recovery, even years after the injury.

**LE:** You also recommend supplements to help heal the brain. What is one of the most beneficial ones?

**Dr. Wand:** The loss of blood flow, or hypoperfusion, that occurs in a TBI, and that I consider to be the hallmark injury in concussion, can be combated with supplements. Many supplements are thought to increase blood flow in the brain if they are able to pass through the blood-brain barrier, which enables them to act directly within the cells.

Probably the most well-known of these is *Ginkgo biloba*, which comes from one of the oldest known tree species.

*Ginkgo biloba* has many health benefits. It supports healthy circulation, helps to maintain the normal function and tone of blood vessels, supports healthy oxygen and glucose metabolism in the brain, stabilizes capillaries and makes them less fragile, supports normal blood coagulation, and supports healthy aging in the brain.

Ginkgo leaf extract contains several active components, including flavonoids, terpenes, lactones, and organic acids, all of which have neuroprotective and cardioprotective properties.

**LE:** Can all concussions be healed?

**Dr. Wand:** The brain is a remarkable organ, unique in its functions and capabilities. New neurons can grow and new synapses form, thus literally growing new brain matter.

Those who are wheelchair-bound from a head injury may be able to walk again. Poor cognitive function can be repaired. Muscle strength and reflexes can return. In fact, all symptoms can be improved if not totally reversed.

It also depends upon the severity of the injury, but even the worst injuries, as documented in my book, do show significant improvement with my treatment known as “The Wand Protocol.”
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Imre Nagy: Lessons in Longevity from the Mountains of Hungary

BY LAURIE MATHENA

Born in 1925 into a poor, peasant family, Imre Nagy grew up working the fields on the Great Hungarian Plain.

But after leading a very full life, Nagy didn’t find his true calling until he turned 60 years old, when a serious illness changed the course of his life.

Now, Nagy, a subscriber to *Life Extension® Magazine*, continues to take active steps to maintain his health and longevity—and finds fulfillment in helping others do the same.

Changes Over the Years

Nagy worked as a border policeman for a short time after World War II, but he spent most of his adult life as a restaurant manager. During that time, he met and married his first wife, and they had one child together. They ultimately divorced, after which he re-married and had another son.

“I met my wives randomly,” Nagy said. “I never looked for a woman consciously, like today’s young people on the Internet.”

That’s not the only change during his life on which Nagy commented. Over the years, he witnessed inventions like color TV, dishwashers, computers, and even sliced bread—and in his opinion not all of them have been beneficial for our health.

“Technical development changed a lot of things in our life,” said Nagy. “Everything became faster, but people became more stressed.”

He remembers when life was simpler.

In his early childhood, he worked hard in the fields. To help his family earn extra money, he also caught pheasants by trap near his village, and then traveled to Budapest by train, where he sold them in the marketplace.

As an adult, when he wasn’t working at the restaurant, he spent his time beekeeping, breeding rabbits, raising chickens, and growing his own fruit and vegetables.
A Life-Changing Illness

When Nagy turned 60 years old, he began experiencing a burning pain in his stomach, in addition to gas, bloating, and nausea. He had developed gastric and duodenal ulcers, which are open sores that form in the lining of the stomach and the duodenum, the upper part of the small intestine.

Rather than turning to traditional medical treatments, Nagy utilized natural treatments like fasting, consuming herbal teas, and dietary changes. It was during this time that he also discovered bioenergy-increasing exercises, which are breathing exercises designed to increase the oxygen level in the blood.

Studies have shown that increasing blood oxygen levels has health benefits including creating energy, eliminating toxins, strengthening the immune system, boosting mental clarity, reducing stress, and much more.

Nagy's own success using natural remedies to heal his ulcers inspired him to help others do the same. So, at the age of 60, he studied to become a naturopathic doctor (a doctor who uses natural remedies to help the body heal itself).

He started his own practice, and 30 years later, he still spends his days helping patients.

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Treating the “Diseases of Civilization”

Nagy mostly deals with what he calls “diseases of civilization,” which include conditions like high blood pressure, type II diabetes, gastric ulcers, and the like.

And while the recommendations may vary from person to person and condition to condition, he believes every patient can benefit from fasting before and during treatment, taking various herbs and supplements, and doing bioenergy-increasing exercises.

For example, for individuals with high blood pressure, he recommends dietary changes such as cutting out pork and animal fat, and eating more fish, fruit, vegetables, and cold-pressed oil.

He also recommends specific herbal teas such as mistletoe and white horn, and supplements like lecithin, garlic capsules, magnesium, and calcium.

His work as a naturopath led him to discover Life Extension Magazine, which he finds especially valuable because, he said, “I can order products that are not available anywhere else, such as senolytics and NAD+.”

The Daily Climb

At 94, Nagy is still going strong. He wakes up every morning, drinks a glass of lukewarm water, and then runs up a nearby mountain with his dog, Buksi. At the top of the mountain, he does bioenergy-increasing exercises.
Nagy explained that for these exercises, he stands by a tree with his legs spread wide apart. “I bend down and then lift up my body while I breathe in deeply. After that, I circle my arms around while holding my breath. I do 100 repetitions two times a day.”

After coming down from the mountain, he spends his days either tending to his patients, gardening, or resting. He recently returned from a health spa resort, where he spent two weeks walking, swimming, hiking, and exercising.

Nagy is proud of the fact that he doesn’t take any medicine.

The Secret to His Longevity

Nagy believes nutrition plays a key role in health and longevity. He eats mostly fruit and vegetables, drinks 2.5 liters (about 85 ounces) of water per day, and takes supplements including a multivitamin, coenzyme Q10, melatonin, NAD+, senolytic activator, astragalus root extract, and a cereal sprout extract.

“I think nutrition is very important, but not alone,” said Nagy. “Balance, temperance, love, getting enough sleep, and bioenergy-increasing exercise are also essential.”

He admitted that he does enjoy a glass of brandy on occasion—but stresses that it is “within bounds.”

He also emphasizes the importance of being socially active, which studies have consistently shown contributes to a longer life.

That’s why he regularly visits the Naturopath Club in the nearby town of Keszthely, a club Nagy established 25 years ago. Nagy himself still gives lectures for the members, although he often invites different naturopaths and doctors to speak as well.

To those wanting to stay healthy and fit well into their 90s, Nagy has a few key pieces of advice.

“It is essential to eat healthy, to cleanse the body regularly, and do bioenergy-increasing training every day,” he said. “But love and faith are the most important things. Individuals should learn how they can be content in life no matter what the circumstances.”

Nagy has accomplished a lot in his 94 years, but when he thinks back to what he’s most proud of, it comes down to three things: “My cured patients, my family, and my long, healthy life.”

Imre Nagy is a naturopath practicing in Gyenesdiás, Hungary, helping people to heal themselves using natural remedies. He is a founder of the Naturopath Club in the town of Keszthely.

If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.
**DISCOUNT PRICES**

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Life Extension® customers take extraordinary steps to maintain healthy aging.

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These pages reveal the lower prices that our customers enjoy during the annual SUPER SALE.

Each purchase at these discount prices qualifies for valuable Rewards Dollars that reduce the cost of future orders.

<table>
<thead>
<tr>
<th>Product Description</th>
<th>SUPER SALE One Unit</th>
<th>SUPER SALE Four-Unit Per-Bottle Price</th>
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<tr>
<td><strong>Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans &amp; Olive Extract</strong></td>
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<td>120 softgels, Item #01982</td>
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<tr>
<td>Highly purified EPA (1,400 mg) and DHA (1,000 mg), sesame lignans plus potent</td>
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<td>olive extract, provides essential components of the Mediterranean diet in four</td>
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<td>softgels.</td>
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<td><strong>Curcumin Elite™</strong> 500 mg, 60 vegetarian capsules, Item #02407 (Just one capsule daily.) A patented extract from turmeric root that provides 45 times greater free curcuminoid bioavailability than standardized turmeric powder.</td>
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<td>$19.80</td>
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<td><strong>Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™</strong></td>
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<td>Superior ubiquinol form of CoQ10 (100 mg) plus shilajit shown to double mitochondrial CoQ10 levels.</td>
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<td><strong>FLORASSIST® GI with Phage Technology</strong> 30 liquid vegetarian capsules, Item #02125 Dual-encapsulation probiotic for optimal delivery to help balance bacteria in the intestines.</td>
<td>$22.28</td>
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<td><strong>Bone Restore with Vitamin K2</strong> 120 capsules, Item #01727 Helps bone health with skeletal-strengthening nutrients in one highly absorbable formula.</td>
<td>$16.20</td>
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<td><strong>Vitamin D3</strong> 5,000 IU, 125 mcg, 60 softgels, Item #01713 High-potency vitamin D in a softgel to provide greater absorption into the bloodstream.</td>
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<td><strong>Pro-Resolving Mediators</strong> 30 softgels, Item #02223 Supports a healthy relationship with the body’s inflammatory factors to promote whole-body health.</td>
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<td><strong>Ultra Prostate Formula</strong> 60 softgels, Item #02029 Comprehensive support for an aging prostate gland utilizing extracts from pygeum, nettle, flower pollen, and saw palmetto, plus boron, beta-sitosterol, and lycopene.</td>
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<td>Provides two forms of vitamin K2 (1,000 mcg of MK-4 and 100 mcg of trans MK-7), along with 1,500 mcg of K1.</td>
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<td><strong>DHEA (Dehydroepiandrosterone)</strong> • 25 mg, 100 capsules, Item #00335</td>
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<td>A hormone that protects against age-related decline, benefits overall health.</td>
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<td><strong>Pomegranate Complete</strong> • 30 softgels, Item #01953</td>
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<td>Combines extracts from the whole fruit, flower, and seed oil to support system-wide health and combat age-related metabolic changes.</td>
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<td><strong>Mitochondrial Energy Optimizer with PQQ</strong> • 120 capsules, Item #01868</td>
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<td>Glycation-protection formula helps maintain cell function, protein structural integrity, and mitochondrial biogenesis. Provides 1,000 mg of carnosine along with R-lipoic acid, PQQ, benfotiamine, and taurine.</td>
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<td><strong>Neuro-Mag® Magnesium L-Threonate</strong> • 90 vegetarian capsules, Item #01603</td>
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<td>Helps maintain structural integrity of synaptic connections in the brain.</td>
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<td><strong>PQQ Caps</strong> • 10 mg, 30 vegetarian capsules, Item #01500</td>
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<td>Promotes generation of new mitochondria in aging cells.</td>
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<td><strong>Senolytic Activator</strong> • 24 vegetarian capsules, Item #02301 (3-month supply)</td>
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<td>Highly absorbable forms of quercetin phytosome and black tea theaflavins designed to help the body manage senescent cells.</td>
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<td><strong>Memory Protect</strong> • 36-day supply, Item #02101</td>
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<td>Microdose lithium and proline-rich polypeptide to support cognitive health.</td>
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<td><strong>AMPK Metabolic Activator</strong> • 30 vegetarian tablets, Item #02207</td>
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<td>Dual ingredient plant compounds support youthful AMPK activity and promote cellular health. Just one tablet daily.</td>
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<td><strong>Health Booster (Once-Daily)</strong> • 60 softgels, Item #02291 (2-month supply)</td>
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<td>Just one softgel provides five forms of vitamin K, mixed tocotrienols, chlorophyll, lycopene, trans-zeaxanthin, meso-zeaxanthin, and lutein.</td>
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<td><strong>Cognitex® Elite</strong> • 60 vegetarian tablets, Item #02396</td>
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<td>Sibelius™ sage extract, vinpocetine, and other nutrients to improve attention and memory performance.</td>
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<td><strong>MacuGuard® Ocular Support with Saffron</strong> • 60 softgels Item #01992</td>
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<td>Provides lutein, trans-zeaxanthin, and meso-zeaxanthin to help maintain structural integrity of the macula and retina. Just one softgel per day.</td>
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<td><strong>Optimized NAD+ Cell Regenerator™ and Resveratrol</strong> • 30 vegetarian capsules, Item #02348</td>
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<td>NIAGEN® nicotinamide riboside (300 mg), trans-resveratrol, quercetin, phytosome, fisetin, and more to support healthy cellular metabolism.</td>
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<td><strong>SUPER SALE</strong></td>
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<td><strong>Four-Unit</strong></td>
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<td><strong>$24.30</strong></td>
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For pricing available to readers of this magazine call 1-800-544-4440 or visit LifeExtension.com/NAD

Super Sale

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### ACTIVE LIFESTYLE & FITNESS

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<td>02318</td>
<td>Keto Brain and Body Boost</td>
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<tr>
<td>02020</td>
<td>Super Carnosine</td>
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<tr>
<td>02023</td>
<td>Tart Cherry with CherryPURE®</td>
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<tr>
<td>02146</td>
<td>Wellness Bar–Chocolate Brownie</td>
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<td>02147</td>
<td>Wellness Bar–Cookie Dough</td>
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<tr>
<td>02246</td>
<td>Wellness Code® Advanced Whey Protein Isolate Vanilla</td>
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<td>02221</td>
<td>Wellness Code® Muscle Strength &amp; Restore Formula</td>
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<td>02246</td>
<td>Wellness Code® Plant Protein Complete &amp; Amino Acid Complex</td>
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<td>Wellness Code® Plant Protein Complete &amp; Amino Acid Complex</td>
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<td>Endothelial Defense™ Pomegranate Complete</td>
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<td>Endothelial Defense™ with GliSODin®</td>
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<td>HemiMag®</td>
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<td>HemiMag® 120 veg capsules</td>
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<td>Bone Restore with Vitamin K2</td>
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<td>Bone-Up™</td>
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<td>01963</td>
<td>Calcium Citrate with Vitamin D</td>
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<td>01506</td>
<td>Dr. Strum's Intensive Bone Formula</td>
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<td>Focus Tea™</td>
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<td>Forskolin</td>
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<td>Triple Action Thyroid</td>
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</tbody>
</table>

### EYE HEALTH

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Product Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>01923</td>
<td>Astaxanthin with Phospholipids</td>
</tr>
<tr>
<td>00893</td>
<td>Brite Eyes III</td>
</tr>
<tr>
<td>02323</td>
<td>Digital Eye Support</td>
</tr>
<tr>
<td>01514</td>
<td>Eye Pressure Support with Mirtogenol®</td>
</tr>
<tr>
<td>01992</td>
<td>MacuGuard® Ocular Support with Saffron</td>
</tr>
<tr>
<td>01993</td>
<td>MacuGuard® Ocular Support with Saffron &amp; Astaxanthin</td>
</tr>
<tr>
<td>01873</td>
<td>Standardized European Bilberry Extract</td>
</tr>
<tr>
<td>01918</td>
<td>Tear Support with MaquiBright®</td>
</tr>
</tbody>
</table>

### FISH OIL & OMEGAS

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Product Name</th>
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</thead>
<tbody>
<tr>
<td>02311</td>
<td>Clearly EPA/DHA Fish Oil</td>
</tr>
<tr>
<td>00463</td>
<td>Flaxseed Oil</td>
</tr>
<tr>
<td>01937</td>
<td>Mega EPA/DHA</td>
</tr>
<tr>
<td>02218</td>
<td>Mega GLA Sesame Lignans</td>
</tr>
<tr>
<td>01983</td>
<td>Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans &amp; Olive Extract</td>
</tr>
<tr>
<td>Product Code</td>
<td>Product Name</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>01988</td>
<td>Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill &amp; Astaxanthin</td>
</tr>
<tr>
<td>01982</td>
<td>Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans &amp; Olive Extract</td>
</tr>
<tr>
<td>01985</td>
<td>Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans &amp; Olive Extract</td>
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<tr>
<td>01984</td>
<td>Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans &amp; Olive Extract</td>
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<tr>
<td>01986</td>
<td>Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans &amp; Olive Extract</td>
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<tr>
<td>01812</td>
<td>Provinal® Purified Omega-7</td>
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<tr>
<td>01640</td>
<td>Vegetarian DHA</td>
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<tr>
<td>02008</td>
<td>California Estate Extra Virgin Olive Oil</td>
</tr>
<tr>
<td>02170</td>
<td>Rainforest Blend Decaf Ground Coffee</td>
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</tbody>
</table>
## PRODUCTS

### LONGEVITY & WELLNESS
- 00457 Alpha-Lipoic Acid
- 01625 AppleWise Polyphenol Extract
- 01214 Blueberry Extract
- 01438 Blueberry Extract with Pomegranate
- 02270 DNA Protection Formula
- 02119 GEROPROTECT® Ageless Cell™
- 02133 GEROPROTECT® Longevity A.I.™
- 01637 Pycnogenol® French Maritime Pine Bark Extract
- 02210 Resveratrol
- 00070 RNA (Ribonucleic Acid)
- 02301 Senolytic Activator
- 01208 Super R-Lipoic Acid
- 01919 X-R Shield

### MEN'S HEALTH
- 02209 Male Vascular Sexual Support
- 00455 Mega Lycopene Extract
- 02306 Men's Bladder Control
- 01837 Pomi-T®
- 01373 Prelox® Enhanced Sex for Men
- 01940 Super MiraForte with Standardized Lignans
- 01932 Cat Mix
- 01931 Dog Mix

### MINERALS
- 01661 Boron
- 02107 Extend-Release Magnesium
- 03731 Ionic Selenium
- 01677 Iron Protein Plus
- 01459 Magnesium Caps
- 01682 Magnesium (Citrate)
- 01328 Only Trace Minerals
- 01504 Optimized Chromium with Maritech® 926
- 01813 Vanadyl Sulfate
- 01812 Zinc Caps

### MISCELLANEOUS
- 00577 Potassium Iodide
- 00657 Solarshield® Sunglasses

### MOOD & STRESS MANAGEMENT
- 02312 Cortisol-Stress Balance
- 00987 Enhanced Stress Relief
- 01074 5 HTP
- 01683 L-Theanine
- 02175 SAMe (S-Adenosyl-Methionine) 200 mg, 30 enteric coated tablets
- 02176 SAMe (S-Adenosyl-Methionine) 400 mg, 30 enteric coated tablets
- 02174 SAMe (S-Adenosyl-Methionine) 400 mg, 60 enteric coated tablets

### MULTIVITAMINS
- 02199 Children's Formula Life Extension Mix™
- 02498 Comprehensive Nutrient Packs ADVANCED
- 02354 Life Extension Mix™ Capsules
- 02364 Life Extension Mix™ Capsules without Copper
- 02356 Life Extension Mix™ Powder
- 02355 Life Extension Mix™ Tablets
- 02357 Life Extension Mix™ Tablets with Extra Niacin
- 02292 Once-Daily Health Booster - 30 softgels
- 02291 Once-Daily Health Booster - 60 softgels
- 02313 One-Per-Day Tablets
- 02317 Two-Per-Day Capsules - 60 capsules
- 02314 Two-Per-Day Capsules - 120 capsules
- 02316 Two-Per-Day Tablets - 60 tablets
- 02315 Two-Per-Day Tablets - 120 tablets

### NERVES & COMFORT SUPPORT
- 02313 One-Per-Day Tablets
- 02317 Two-Per-Day Capsules - 60 capsules
- 02314 Two-Per-Day Capsules - 120 capsules
- 02316 Two-Per-Day Tablets - 60 tablets
- 02315 Two-Per-Day Tablets - 120 tablets

### PERSONAL CARE
- 01006 BioSil™ - 5 mg, 30 veg capsules
- 01007 BioSil™ - 1 fl oz
- 00321 Dr. Proctor's Advanced Hair Formula
- 00320 Dr. Proctor's Shampoo
- 02322 Hair, Skin & Nails Collagen Plus Formula
- 01278 Life Extension Toothpaste
- 00408 Venotone
- 00409 Xyliwhite Mouthwash
- 02304 Youthful Collagen
- 02252 Youthful Legs

### PET CARE
- 01389 TruFlora® Probiotics

### PROBIOTICS
- 01622 Bifido GI Balance
- 01825 FLORASSIST® Balance
- 02125 FLORASSIST® GI with Phage Technology
- 01821 FLORASSIST® Heart Health
- 02250 FLORASSIST® Mood Improve
- 02208 FLORASSIST® Nasal
- 02120 FLORASSIST® Oral Hygiene
- 02203 FLORASSIST® Prebiotic
- 01920 FLORASSIST® Throat Health
- 52142 Jarro-Dophilus® for Women
- 00056 Jarro-Dophilus EPS® - 60 veg capsules
- 21201 Jarro-Dophilus EPS® - 120 veg capsules
- 01038 Theracol® Probiotics
- 01389 TruFlora® Probiotics

### SKIN CARE
- 80157 Advanced Anti-Glycation Peptide Serum
- 80165 Advanced Growth Factor Serum
- 80170 Advanced Hyaluronic Acid Serum
- 80154 Advanced Lightening Cream
- 80155 Advanced Peptide Hand Therapy
- 80152 Advanced Triple Peptide Serum
- 80140 Advanced Under Eye Serum with Stem Cells
- 80137 All-Purpose Soothing Relief Cream
- 80139 Amber Self MicroDermAbrasion
- 80118 Anti-Aging Mask
- 80151 Anti-Aging Rejuvenating Face Cream
- 80154 Anti-Aging Rejuvenating Scalp Serum
- 80133 Anti-Oxidant Facial Mist Hydrator
- 80156 Collagen Boosting Peptide Serum
PRODUCTS

VITAMINS
- Ascorbyl Palmitate
- Benfotiamine with Thiamine
- Beta-Carotene
- BioActive Complete B-Complex
- Biotin
- Buffered Vitamin C Powder
- Fast C® and Bio-Quercetin Phytosome
- Gamma E Mixed Tocopherol Enhanced with Sesame Lignans
- Gamma E Mixed Tocopherol/Tocotrienols
- High Potency Optimized Folate
- Inositol Caps Liquid Emulsified
- Liquid Vitamin D3 - 2,000 IU, 1 fl oz
- Liquid Vitamin D3 - 2,000 IU, 1 fl oz, mint
- Low-Dose Vitamin K2
- Methylcobalamin - 1 mg, 60 veg lozenges
- Methylcobalamin - 5 mg, 60 veg lozenges
- MK-7
- No Flush Niacin
- Optimized Folate (L-Methylfolate)
- Pyridoxal 5'-Phosphate Caps
- Super Absorbable Tocotrienols
- Super K
- Super K Elite
- Super Vitamin E
- Vitamin B5 (Pantothenic Acid)
- Vitamin B6
- Vitamin B12
- Vitamin C and Bio-Quercetin Phytosome - 1,000 mg, 60 veg tablets
- Vitamin C and Bio-Quercetin Phytosome - 1,000 mg, 250 veg tablets
- Vitamin D3 - 1,000 IU, 90 softgels
- Vitamin D3 - 1,000 IU, 250 softgels
- Vitamin D3 - 5,000 IU, 60 softgels
- Vitamin D3 - 7,000 IU, 60 softgels
- Vitamin D3 with Sea-Iodine™
- Vitamins D and K with Sea-Iodine™

WEIGHT MANAGEMENT & BODY COMPOSITION
- 7-Keto® DHEA Metabolite - 25 mg, 100 capsules
- 7-Keto® DHEA Metabolite - 100 mg, 60 veg capsules
- Advanced Anti-Adipocyte Formula
- Advanced Appetite Suppress
- AMPK Metabolic Activator
- CalReduce Selective Fat Binder
- DHEA Complete
- Garcinia HCA
- HActive Garcinia Cambogia Extract
- Integra-Lean®
- Mediterranean Trim with Sinetrol™ -XPur
- Optimized Irvingia with Phase 3™ Calorie Control Complex
- Optimized Saffron with Satiereal®
- Super CLA Blend with Sesame Lignans
- Waist-Line Control™
- Wellness Code® Appetite Control

WOMEN'S HEALTH
- Breast Health Formula
- Enhanced Sex for Women 50+
- Estrogen for Women
- Femmenessence MacaPause®
- Menopause 731™
- Prenatal Advantage
- Progesta-Care®
- Super-Absorbable Soy Isoflavones
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Bone Restore with Vitamin K2 combines skeletal-strengthening nutrients in one highly absorbable formula.

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4 bottles $14.85 each

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Neuro-Mag® Magnesium L-Threonate

SUPER SALE PRICING!

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1 bottle $27
4 bottles $24.30 each

Item #02032 • 93.35 grams of powder
1 jar $25.65
4 jars $23.40 each

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
22 RENEW YOUR OWN STEM CELLS
NAD+ is shown to renew stem cells, repair DNA and extend lifespan.

32 MAJOR CURCUMIN ENHANCEMENT
A patented form of curcumin is absorbed better, lasts longer in the body, and costs less.

42 DRY EYES EASED WITH BERRY EXTRACT
Maqui berry extract has been shown to significantly improve dry-eye symptom scores.

50 WIDE-RANGING BENEFITS OF SAMe
SAMe has demonstrated a new anti-aging effect via its ability to improve DNA methylation.

59 HEART ATTACK THREAT FROM MEDICAL RADIATION
CT scans emit radiation that forms senescent cells in arteries. This can increase cardiovascular risk.

64 WHOLE-BODY HEALTH
Scientists have discovered vitamin D receptors in nearly every cell in the body that protect the brain and heart—and increase lifespan.

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