Reversal of Alzheimer’s Memory Loss

PQQ Grows New Nerve Cells

Impact of Diet on Neurodegeneration

Novel Fiber Boosts Immune Function

Blueberries Reduce Frailty Symptoms

PLUS—
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References

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

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

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

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

Thomas F. Crais, MD, FACS, 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.

William Davis, MD, is a preventive cardiologist and author of Wheat Belly: Lose the Wheat, Lose the Weight and Find Your Path Back to Health. He is also medical director of the online heart disease prevention and reversal program, Track Your Plaque (www.trackyourplaque.com).

Martin Dayton, MD, DO, 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.

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

Garett A. Dzugan, MD, PhD, 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.

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

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

Norman R. Gay, MD, 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.

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

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

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

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

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

Roberto Marasi, MD, is a psychiatrist in Brescia and in Piacenza, Italy. He is involved in anti-aging strategies and weight management.

Maurice D. Marholin, DC, DO, is a licensed Chiropractic 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, Fla.

Prof. Francesco Marotta, MD, PhD, Montenapoleone Medical Center, Milan, Italy. Gastroenterologist and nutrigenomics expert with extensive international university experience, Consulting Professor, WHO-affiliated Center for Biotech & Traditional Medicine, University of Milano, Italy. Hon. Res. Professor, Human Nutrition Dept, TWU, USA. Author of over 130 papers and 400 congress lectures.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

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

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

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

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

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

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

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

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

Xiaoxi Wei, PhD, is a chemist expert in supramolecular assembly and development of synthetic transmembrane nanopores with distinguished selectivity via biomimetic nanoscience. She has expertise in ion channel function and characterization. She founded XTherma Inc., a company developing a radical new highway towards nontoxic, hyper-effective antifreeze agents to fight unwanted ice formation in regenerative medicine and reduce mechanical icing.
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How to Delay Brain Aging by 11 Years

At a lecture I attended two years ago, I was shown *age-reversal* case histories that I had never before witnessed.

The lecture was called “Reversing Alzheimer’s.” The medical case histories were compelling. Many of the underlying mechanisms of *reversing* dementia were long ago postulated in this magazine.

This lecture was not put on by a *neurologist*, but by a charity consisting of three educated women who volunteered their time. They presented evidence that unhealthy diets, nutrient/hormone deficits, inflammation, and avoidable toxins were causing people to needlessly develop *Alzheimer’s disease*.

Right around the time of this lecture, researchers from *UCLA* and the *Buck Institute for Research on Aging* announced the results of a study in which *nine out of 10 subjects diagnosed with dementia saw meaningful reversals of memory loss*. The protocol used included many of the healthy dietary choices long advocated by this magazine (and by the three charitable women who presented at the lecture I had attended).

The unprecedented results from the *UCLA/Buck Institute* study drew widespread media coverage. No “drug” had ever achieved this level of *cognitive improvement*.

The *UCLA/Buck Institute* study author admitted, however, that the program’s downside is its complexity. While supplementing with *melatonin, fish oil, coenzyme Q10, methylcobalamin, and vitamin D3* were easy, the dietary/lifestyle changes were so difficult that none of the 10 participants were able to stick to the entire protocol.

That was year 2014. Move forward to 2015 and the results of two larger *human trials* revealed easier methods to prevent Alzheimer’s and protect cognitive function even into our advanced years.

You are about to learn how even modest dietary changes can slash *Alzheimer’s* risk by 35% when a healthy diet is consistently followed.
Normal aging is associated with mild cognitive impairment that too often progresses to full-blown Alzheimer’s.

By the time a typical American reaches age 85, their risk of displaying clinical indications of Alzheimer’s rises to a startling 45%.²

No one has yet ascertained how this nation’s already strained health care resources will deal with this impending epidemic.

The fantastic news is that decades of human and animal research has led to nutritional approaches that aging individuals can adopt to drastically reduce their senility risk. This means that nursing homes don’t need to fill up with demented individuals who have lost their cognitive and functional independence.

**Powerful Role of Diet on Brain Health**

Diet is a powerful environmental factor that affects our thinking abilities in youth and impacts whether we develop dementia as we age.

Study data published in 2015 corroborates the brain-boosting benefits that occur in response to healthier dietary choices.³⁻⁵ I suspect most of you reading this have been following at least some of these beneficial eating patterns.

What impressed us about these new clinical studies is that they showed reversals of cognitive dysfunction mostly in the elderly. These individuals would have been expected to already suffer permanent neurodegeneration that was considered “incurable.”

In one study conducted at Rush University, the average age of the subjects was 81, showing that it may never be too late to alter one’s dietary patterns to protect brain function.

**The Rush University Project**

Researchers at Rush University studied over 900 participants, ages 58 to 98 years, and followed them on average for 4.5 years. Three different dietary interventions were evaluated, including the Mediterranean diet, the DASH diet, and a hybrid of the Mediterranean-DASH diets called the MIND diet. The researchers then looked at the effects of these three diets on the risk of Alzheimer’s disease.⁶

The MIND diet emphasized the nutritional components linked to neuroprotection and dementia prevention, uniquely specifying the consumption of polyphenols from berries and green leafy vegetables.

Researchers at Rush University comprehensively adjusted for potential confounding factors in their dietary intervention study analysis such as age, sex, education, APOE4 (genetic risk factor for Alzheimer’s disease), pre-existing cardiovascular problems, physical activity, and total dietary energy intake.

Results of their study analysis showed remarkable benefits for each of the diets, in particular for those subjects who closely followed the MIND diet with its emphasis upon polyphenols from berries and green vegetables.

The highest level of compliance with the MIND diet conferred a highly significant 52% reduction in the rate of developing Alzheimer’s disease compared with participants with the lowest level of MIND dietary compliance.
Benefits Found for Other Healthy Diets

Although not as highly significant as the results achieved with the MIND diet, participants with the highest level of compliance with the Mediterranean diet also had a significant reduction in Alzheimer’s risk in comparison with the lowest level of Mediterranean diet compliance. For the DASH diet, the highest level of compliance resulted in a 40% reduction in Alzheimer’s disease risk that very nearly achieved statistical significance.

Even study subjects with “middle-of-the-road” compliance with the MIND diet, such as ingesting just some of the constituents of a brain-healthy diet like berries, had their dementia risk reduced by 35%.6

These huge risk reductions in response to healthier eating patterns represent game changers as it relates to the dire predictions of tens of millions of Americans suffering agonizing dementia-related deaths.

The problem is that relatively few people can stick solely to healthy dietary patterns. The encouraging news is that it may not matter because just ingesting some of the constituents of the MIND diet was shown to confer considerable protection against neurodegenerative disease.

These findings are revolutionary and physicians should wake up to the fact that dementia is not always an irreversible disorder.

Brain-Destroying Eating Patterns

It took many decades for the multiple dangers of tobacco smoking to be realized, along with its economic costs to society.

The carnage from making the wrong dietary choices may exceed that of tobacco. Yet there is little talk of banning the advertising of toxic foods and no requirement to warn consumers that ingesting them increases dementia risk.

It is up to individuals to educate themselves about which foods protect against neurodegenerative diseases and the dietary patterns that contribute to brain destruction.

The Magnitude of the Difference

Certain foods like polyphenol-rich berries (blueberries, strawberries) and leafy green vegetables provide benefits for the brain.6-17 Foods typically consumed in Western diets, as you will see on the next page, are proving harmful.18-21

The new studies I discuss in this editorial corroborate previous reports showing the devastating impact of poor dietary patterns throughout the body.22-25

What is remarkable, however, is the magnitude of protection conferred when following the proper nutritional program. By adhering to healthy dietary patterns, one researcher was quoted as saying during a 2015 scientific presentation:

“It was about the equivalent of being 11 years younger in age.”6,26,27

This represents an enormous percentage of cognitively proficient time that elderly individuals can enjoy.
Similar to the Mediterranean and DASH diets, the MIND diet emphasizes natural plant-based foods and limited intake of animal and high-saturated-fat foods. Some of the unique aspects of the MIND diet are that it specifies the consumption of berries and green leafy vegetables, but does not suggest high fruit consumption.

Researchers found that greater adherence to the MIND diet resulted in a markedly slower rate of cognitive decline. The incredible finding from this Rush University study was that strict adherence to the MIND diet reduced Alzheimer’s incidence by 52%.

These findings reveal the robust impact that dietary choices have in maintaining brain health.

**Constituents of the MIND Diet**

When creating the “MIND” diet, researchers sought to identify the constituents of the well-studied Mediterranean and DASH diets that possessed the greatest neuroprotective properties.

The MIND diet consists of 15 dietary components shown to powerfully impact neurological function for the good or bad.

The ten brain-healthy food groups are:

1. Green leafy vegetables
2. Other vegetables
3. Nuts
4. Berries
5. Beans
6. Whole grains
7. Fish
8. Poultry
9. Olive oil
10. Wine (moderate drinking)

Consuming lots of the 10 healthy food groups above conferred significant protection against Alzheimer’s and mild cognitive impairment.

The five dangerous food groups are:

1. Red meats
2. Butter and stick margarine
3. Cheese
4. Pastries and sweets
5. Fried/fast food

By reducing one’s intake of the five brain-damaging foods listed above, significant protection against Alzheimer’s and mild cognitive impairment was conferred.

This does not mean one can never consume any of the five bad food groups. Individuals can still follow a MIND diet if they reduce consumption of these brain-damaging foods listed on the next column:

**Components of the MIND Diet**

The name of the MIND diet study is:

“MIND diet associated with reduced incidence of Alzheimer’s disease.”

It investigated the role of diet in the development of Alzheimer’s disease in 923 people ages 58 to 98 years for an average period of 4.5 years.

**Brain-Damaging Foods**

Here are the five brain-damaging foods to reduce or avoid:

1. Pastries and sweets to under five servings per week
2. Red meat to under four servings per week
3. Cheese to under one serving per week
4. Butter or margarine to under one tablespoon per day
5. Fried/fast foods to under one serving per week

On a personal note, I don’t find the above restrictions confining, and I don’t think many readers of this magazine will either.

**Overcoming Compliance Difficulties**

Strict adherence to either a MIND or Mediterranean diet produced enormous benefits, such as a 50% or more reduction in Alzheimer’s incidence.

Since most Americans ingest a wide range of foods, some good and some bad, the researchers were concerned that their findings would have little real-world value to the
general population because of compliance difficulties.

Researchers then scrutinized the components of various “healthy” diets to identify which foods provided meaningful protection against age-related cognitive deficits and Alzheimer’s disease.

They then sought to identify if ingesting only isolated constituents from Mediterranean or MIND diets would be effective. They were not able to identify specific components of the Mediterranean diet that were effective in isolation.

The researchers did discover that by ingesting just modest amounts of the MIND diet constituents, such as berries, a significant (35%) reduction in Alzheimer’s disease risk was observed.6

The brain health benefits of berries (like strawberries and blueberries) have been demonstrated in other large human observational studies such as the famous Nurses’ Health Study.29

These findings are also corroborated by a number of rodent studies showing better memory performance and brain protection in response to eating berries.11,30-33

Memory Loss Associated with Alzheimer’s Reversed for First Time

In the introduction of this editorial, I briefly described a study of 10 elderly people that showed memory loss associated with Alzheimer’s disease could be reversed.1

This is of particular significance to those already suffering from early- to mid-stage Alzheimer’s dementia.

The approach used in this UCLA/Buck Institute study was personalized to each patient, based on extensive testing to determine what is affecting the brain’s plasticity signaling network. Here is a sample of some of the strategies used on the therapeutic program to reverse memory loss in nine out of 10 of the patients:

• Eliminating all simple carbohydrates, gluten, and processed food from the diet, and eating more vegetables, fruits, and non-farmed fish
• Meditating twice a day and beginning yoga to reduce stress
• Sleeping seven to eight hours per night, up from four to five
• Taking melatonin, methylcobalamin, vitamin D3, fish oil, and coenzyme Q10 each day
• Optimizing oral hygiene by using an electric flosser and electric toothbrush
• Reinstating hormone replacement therapy, which had previously been discontinued
• Fasting a minimum of 12 hours between dinner and breakfast, and a minimum of three hours between dinner and bedtime
• Exercising a minimum of 30 minutes, four to six days per week

The one patient that failed to show improvement was unable to comply with all of the components of UCLA/Buck Institute protocol. Nine out of 10 people in this study who did comply showed reversals in measurements of memory loss.

The lead researcher of this study admits that the program’s downsides are its complexity and that the burden falls on patients and caregivers to follow it.

It’s interesting to note that three of the dietary supplements used in this study (CoQ10, methylcobalamin, and melatonin) where first introduced to Americans by Life Extension* 28

The more encouraging news comes from the study done at Rush University on a much larger group of elderly people that shows even modest improvements in dietary patterns dramatically reduce Alzheimer’s risk.
Not Everyone Can Afford Blueberries

Buying blueberries in stores can be quite expensive. A prime factor keeping prices high is the shipping of the heavy blueberries and the high rate of spoilage if they are not sold and eaten quickly.

A more cost-effective way of obtaining the active components in blueberries is to take a standardized blueberry extract supplement each day. These are remarkably inexpensive because spoilage and high shipping costs are not an issue.

This magazine has published numerous articles extolling the neuroprotective effects of blueberries and their extracts. This information has also garnered popular media reports based on scientific studies that found blueberries improve cognitive performance and protect against senile structural changes in the brain.

We urge our customers to include berries as part of their regular diet, and if this is not possible, take advantage of the convenience and low cost of standardized blueberry extract capsules.

After I wrote this article, several more studies were published showing markedly lower dementia risk in those who adhered more to a Mediterranean diet.

The incredible message is that senility of the brain is largely optional. If people follow even modestly healthy dietary patterns, the risk of losing their mind can be greatly reduced.

For longer life,

William Faloon

References


Immediate Deleterious Brain Impact of Consuming Unhealthy Foods

We usually think it takes a lifetime of poor dietary choices to impair our neurological function and brain structure. A recent study found significant indicators of brain damage occur just four weeks after eating the wrong kinds of food.

This study evaluated 78 older adults and first fed them a diet high in simple sugars and saturated fats (a high-glycemic index/high-fat diet). After only four weeks, study subjects experienced impaired measures of cognitive function and higher spinal fluid markers indicating brain damage and development of Alzheimer’s pathologies (such as tau protein).

When these same individuals were put on a diet low in simple sugars and saturated fats (a low-glycemic index/low-saturated-fat diet), measures of cognitive function and spinal fluid indicators of brain damage/Alzheimer’s improved.

These findings corroborate observational studies showing that high consumption of simple carbohydrates and saturated fats are risk factors for pathological brain aging and symptomatic mild cognitive impairment.

These findings also help substantiate the remarkable data obtained from the MIND diet study (2015), the UCLA/Buck Institute for Research on Aging study (2014), the 2014 presentation made by the three women from the Sharp Again Naturally (sharpagain.org) charity, and what has long been espoused in this and other health publications.

The take-home lesson from these studies is to follow a dietary pattern consisting of a high intake of berries, monounsaturated and unsaturated fatty acids, and fish, combined with a low intake of simple sugars and saturated fats (especially those derived from beef and dairy).
Arterial Protect provides a combination of patented and tested ingredients documented to support the body's ability to control arterial plaque formation.

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

Pycnogenol® inhibits platelet aggregation and improves endothelial function and arterial blood flow.2,3

Centellicum® enhances desired stability of existing arterial plaque and promotes production of collagen, which is found in the composition of the caps holding plaque in place.4,5

Just one vegetarian capsule daily of Arterial Protect helps stabilize arterial plaque and promote healthy blood flow.

Arterial Protect
Item #02004 • 30 vegetarian capsules

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Non-GMO

References

Note: Do not change dosing or discontinue cardiovascular medications unless advised to do so by your physician.

Pycnogenol® and Centellicum® are registered trademarks of Horphag Research and the use of this product is protected by international patents.

To order Arterial Protect, call 1-800-544-4440 or visit www.LifeExtension.com

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

Polyphenols contained in berries are the focus of intense research into brain health. Obtaining berries from food sources can be expensive, but standardized berry extracts are remarkably cost effective.

Here are two berry extracts used by Life Extension® consumers:

**Blueberry Extract** contains three different sources of blueberry in each 500 mg capsule, providing a broad-spectrum of active polyphenols.

- The suggested supplemental dose for most individuals is one capsule daily.

**Enhanced Berry Complete with Acai** provides in each 700 mg capsule, extracts of 12 berries including blueberries and strawberries.

- The suggested supplemental dose for most individuals is one capsule daily.

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

Non-GMO
Contains soybeans.

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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.
Neuro-Mag® Magnesium L-Threonate contains a highly absorbable form of magnesium that promotes synaptic plasticity, a hallmark of brain health and functioning. The magnesium L-threonate in this product:

- Supports the brain’s structure and ability to form, retain, and retrieve memories
- Promotes the number of functioning neurotransmitter release sites
- Supports natural repair of ruptured synapses and degraded neuronal connections
- Enhances the strength of the electro-chemical signal that synapses produce
- Helps inhibit dysregulation of signaling pathways

The same brain-health supporting magnesium is available in a fresh lemon flavor powder. The one-scoop-per-day serving supplies the same amount of magnesium L-threonate plus 500 mg of highly soluble calcium and 1,000 IU of vitamin D3.

To order Neuro-Mag® Magnesium L-Threonate or Neuro-Mag® Magnesium L-Threonate with Calcium and Vitamin D3, call 1-800-544-4440 or visit www.LifeExtension.com

References

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IN THE NEWS

Aspirin Lowers Risk of Advanced Prostate Cancer

According to a new study presented at the American Society of Clinical Oncology Genitourinary Cancers Symposium in San Francisco, men who took greater than three aspirin a week reduced their risk of dying from prostate cancer. In the beginning of the study, the patients were taking a 325 mg dose three times a week; however, later on some patients switched to the 81 mg dose.*

Among patients in the early stages of the disease, aspirin helped decrease the risk of developing advanced prostate cancer by 24%. It also lowered the risk of dying from prostate cancer by 39%. In the study, the researchers examined over 22,000 men enrolled in the Physicians' Health Study, which began in 1982.

A total of 3,193 men were diagnosed with prostate cancer over the almost 30-year study. Just over 400 men developed lethal prostate cancer. Lethal prostate cancer was defined as either death from prostate cancer or the spread of prostate cancer to other organs.

In addition to alleviating pain and inflammation, aspirin prevents platelets from binding together during the blood clotting process. Because of this, the researchers believe that the common pain reliever may help fight prostate cancer progression by preventing tumor cells from metastasizing to bone.

Editor's Note: "It was after diagnosis of prostate cancer that there appeared to be a benefit," said study author Christopher Allard, adding that aspirin "doesn't affect the incidence, but it affects the progression."

Breast Cancer Risk Linked to High-Sugar Diet

A new study published in Cancer Research claims that a diet high in sugar may increase the likelihood of breast cancer as well as hasten the spread of the disease to the lungs.*

Study co-author Lorenzo Cohen and colleagues set out to assess how sugar intake influenced breast cancer development in mice that were randomized to various diets, including a sucrose-enriched diet, a fructose-enriched diet, and a starch-control diet.

According to the researchers, the amount of sucrose and fructose the mice consumed was comparable to that found in a typical Western diet, characterized by a high intake of refined sugars, saturated fat and red meat, and a low intake of fresh fruits, vegetables, and whole grains.

Compared with mice fed the starch-control diet, those fed the sucrose- and fructose-enriched diets were more likely to develop breast cancer. The team found 30% of the mice fed the starch-control diet had breast cancer tumors at 6 months of age, compared with 50% to 58% of mice fed the sucrose-enriched diet.

The researchers found that those fed a sucrose-or fructose-enriched diet had significantly more tumors on the lungs than those fed the starch-control diet, suggesting high sugar intake speeds up breast cancer metastasis.

The team found that dietary fructose and sucrose increased 12-lipoxygenase (12-LOX) signaling, which increased production of 12-hydroxy-5Z,8Z,10E,14Z-eicosatetraenoic acid (12-HETE) to raise the risk of breast cancer development and metastasis.

Editor's Note: "We determined that it was specifically fructose, in table sugar and high-fructose corn syrup, ubiquitous within our food system, which was responsible for facilitating lung metastasis and 12-HETE production in breast tumors," said Professor Cohen, of the University of Texas MD Anderson Cancer Center.


Low Vitamin D Levels Linked to Increased Leukemia Rates

On December 4, 2015, *PLOS One* reported the findings of an increased risk of leukemia in environments with a lower level of ultraviolet B (UVB) irradiance, which reduces the amount of vitamin D manufactured by the body.*

The researchers utilized leukemia incidence rates from the International Agency for Cancer Research and cloud cover data from the NASA International Satellite Cloud Climatology Project for 172 countries. They found a correspondence between higher leukemia rates and residence in countries closer to the poles, including Australia, the United States, Ireland, Canada, and New Zealand, while equatorial countries, including Bolivia, Nigeria, and Samoa had lower rates.

“These results suggest that much of the burden of leukemia worldwide is due to the epidemic of vitamin D deficiency we are experiencing in winter in populations distant from the equator,” commented co-author Cedric Garland, DrPH.

**Editor’s Note:** “People who live in areas with low solar ultraviolet B exposure tend to have low levels of vitamin D metabolites in their blood,” Dr. Garland explained. “These low levels place them at high risk of certain cancers, including leukemia.”

*PLOS One. 2015 Dec 4.

Walnuts Have 21% Fewer Calories than Previously Believed

A new study published in the *Journal of Nutrition* found that a 1-ounce (or 28.35 grams) serving of walnuts has 146 calories, or 21% fewer than the 185 calories listed in the USDA Nutrient Database.*

The calorie value for walnuts was traditionally determined using the 19th century Atwater factors system, which calculates metabolizable energy (ME), or energy available to the body, for many foods. The study, led by Dr. David J. Baer at the US Department of Agriculture, used the bomb calorimetry method to calculate calories of walnuts metabolized by the study participants.

In the study, the research team looked at 18 healthy adults. Each was randomly assigned a sequence of two diets: a controlled American diet without walnuts for a three-week period and a controlled diet with 1.5 servings of walnuts (42 grams) for another three-week period. Total calorie levels were consistent for individual participants across both treatment periods. Administered diets, walnuts, and fecal and urine samples were collected and subject to bomb calorimetry to measure calories, and the resulting data were used to calculate the metabolizable energy of the walnuts.

**Editor’s Note:** “Given the potential health benefits of consuming walnuts, including the reduced risk for cardiovascular disease, it is worthwhile to understand the calorie content of walnuts in the human diet and potentially reduce the barriers to their consumption,” said Dr. Baer.

*J Nutr. 2015 Nov. 18.

Low Testosterone Linked with Alzheimer’s Disease Risk

The December 7, 2015, issue of the *Journal of Clinical Oncology* published the results of a case-control study that found the risk of Alzheimer’s disease was significantly higher among men who were prescribed androgen deprivation therapy for prostate cancer compared to those who did not receive it.*

Kevin T. Nead and colleagues evaluated medical records from the Stanford health system and New York’s Mount Sinai Hospital for 16,888 nonmetastatic prostate cancer patients, of whom 2,397 received androgen deprivation therapy. Men treated with androgen deprivation therapy for various lengths of time were matched with control patients who did not receive the therapy. Researchers discovered that men who received the therapy were 88% more likely to develop Alzheimer’s over follow-up. Longer androgen deprivation therapy duration (equal to or greater than 12 months) was associated with more than double the risk of developing Alzheimer’s.

**Editor’s Note:** “Based on the results of our study, an increased risk of Alzheimer’s disease is a potential adverse effect of androgen deprivation therapy, but further research is needed before considering changes to clinical practice,” Dr. Nead noted. It is regrettable that this therapy must be employed to save the lives of certain prostate cancer patients. These findings help reinforce a strategy that men with advancing prostate cancer who need to block testosterone production should consider intermittent androgen deprivation therapy, in which therapy is stopped after the PSA falls to a low level, usually after 3-9 months. Androgen deprivation therapy is resumed only if the PSA increases significantly. By carefully monitoring PSA blood levels, androgen deprivation can often be used sparingly to control PSA levels while maintaining quality of life.

Vitamins C and E Associated with Decreased Inflammation in Diabetics

The November-December 2015 issue of *Avicenna Journal of Phytomedicine* published the findings of a trial conducted by Iranian researchers regarding the anti-inflammatory effects of vitamin C and vitamin E in male diabetics. Elevated blood sugar in overweight diabetics results in higher levels of inflammation, which contributes to insulin resistance.*

In the study, 80 men with type II diabetes were randomized to receive 1,000 mg ascorbic acid or 300 mg alpha-tocopherol daily for four weeks. Tumor necrosis factor-alpha (TNF-α), high-sensitivity C-reactive protein (hs-CRP), leptin, serum amyloid A (SAA, expressed in the liver in response to inflammatory stimuli), insulin resistance, and other factors were assessed before and after treatment.

At the end of four weeks, both groups experienced a similar decrease in tumor necrosis factor-alpha, serum amyloid A, and high-sensitivity C-reactive protein, indicating a reduction in inflammation. Leptin levels were also lowered in both groups. Vitamin C supplementation was associated with reduced insulin resistance and fasting insulin.

*Editor’s Note:* The authors observe that it is the first time that oral administration of vitamin C or E was shown to decrease serum leptin levels in diabetic subjects. (Diabetics become leptin resistant, thereby developing higher-than-normal leptin levels.)


Osteoporosis Drug Protects Stem Cell DNA

An article published in *Stem Cells* reveals that the bone-loss prevention drug zoledronate protects DNA and extends the life span of mesenchymal stem cells: multipotent connective tissue cells that can differentiate into a number of cell types, including bone, fat, and cartilage cells.*

Mesenchymal stem cells undergo a decline in function following expansion or exposure to radiation. Acting on the finding that zoledronate treatment was associated with improved survival in patients with low-trauma hip fracture versus untreated patients, Ilaria Bellantuono and colleagues at England’s University of Sheffield sought to determine whether the drug could extend the life span of human stem cells in culture and, if so, if the mechanism involved protection against DNA damage.

The team found that, not only did zoledronate-treated cells survive longer following expansion and exposure to radiation, but the cells’ DNA was better protected.

*Editor’s Note:* “The drug enhances the repair of the damage in DNA occurring with age in stem cells in the bone,” reported Dr. Bellantuono. “It is also likely to work in other stem cells. Now we want to understand whether the drug can be used to delay or revert the aging in stem cells in older people and improve the maintenance of tissues such as the heart, muscle, and immune cells, keeping them healthier for longer. We want to understand whether it improves the ability of stem cells to repair those tissues after injury, such as when older patients with cancer undergo radiotherapy.”

*Stem Cells. 2015 Dec 17.

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Vitamin D Tied to Surgical Outcome

An article published online December 14, 2015, in the journal *Obesity Science & Practice* reports the findings of researchers at Johns Hopkins University of an association between increased vitamin D status and improved outcome following bariatric surgery for obesity.*

Leigh Peterson, PhD, MHS, and colleagues analyzed data from 932,091 bariatric surgery patients, among whom 64.8% had surgeries that occurred in northern US latitudes at least 37 degrees. They found that patients who underwent the surgery in the south and in the summer had fewer complications than those whose procedure took place in the north or winter, which suggests a protective role for vitamin D. Just over 70% of the cases involving an extended length of stay, defined as over three days in the hospital, occurred in northern latitudes, and extended stays were more common in winter than in the spring, fall, or summer. Wound infection and dehiscence (rupture of a sutured wound) were also more common during winter months.

*Editor’s Note:* “Vitamin D supplementation, an easy and inexpensive treatment, may mitigate these risks and prevent adverse outcomes following bariatric surgery,” the authors conclude.

“A prospective study measuring preoperative 25(OH)D concentration would strengthen the case for causality in adverse surgical outcomes.”


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**Omega-3 Linked with Improved Survival Following Breast Cancer**

The results of an investigation of breast cancer patients found a lower risk of mortality from all causes over a median period of 14.7 years among women with a higher intake of **omega-3 fatty acids** and fish.*

Nikhil K. Khankari, PhD, MPH, and colleagues analyzed data from 1,463 women with breast cancer enrolled in the Long Island Breast Cancer Study Project. Dietary questionnaires completed within three months after diagnosis were analyzed for the intake of fish, omega-3, and omega-6 polyunsaturated fatty acids.

Over a median follow-up period of 14.7 years, there were 485 deaths, of which 210 were attributed to breast cancer. Compared to those who never consumed baked or broiled fish, women whose intake was among the highest one-fourth of subjects had a 25% lower adjusted risk of dying from any cause over follow-up, and for tuna, the risk was 29% lower.

*Editor’s Note: Women among the top 25% of DHA intake had a 29% lower risk of death, and for DPA (another fatty acid found in fish), the risk was 34% and 16% lower for those among the third and fourth highest groups.*

*Cancer. 2015 Jul 1;121(13):2244-52.

**Vitamin K2 Show Promise as Rheumatoid Arthritis Treatment**

The August 2015 issue of the *European Journal of Pharmacology* reports a positive outcome for treatment with **menaquinone-7**, a form of **vitamin K2**, among rheumatoid arthritis (RA) patients.*

The trial included 24 male and 60 female rheumatoid arthritis patients. For the three-month study, 42 subjects received 100 micrograms MK-7 per day in addition to their rheumatoid arthritis medications, while the remainder received only their normal therapeutic regimens. Clinical and biochemical markers—including disease activity score, erythrocyte sedimentation rate, serum undercarboxylated osteocalcin (a bone metabolism marker that is elevated with low vitamin K status), C-reactive protein, and matrix metalloproteinase, an enzyme that degrades collagens and other tissue components correlated with systemic inflammation of rheumatoid arthritis—were assessed before and after the treatment period.

Among those who received MK-7, disease activity score, erythrocyte sedimentation rate, serum undercarboxylated osteocalcin, C-reactive protein, and matrix metalloproteinase decreased significantly from baseline levels.

*Editor’s Note: The authors remark that MK-7 is significantly less toxic than antirheumatic drugs and it has the additional benefit of protecting against osteoporosis. The longer half-life of MK-7 compared to MK-4 enables the vitamin to be administered in a once-daily low dose.*


**DHEA Eases Common Postmenopausal Complaint**

An article in the March 2016 issue of *Menopause* reports a role for **dehydroepiandrosterone (DHEA)** in relieving vaginal symptoms such as dryness and painful sex in postmenopausal women.*

The phase III trial included 482 postmenopausal women, among whom 84% had moderate to severe vaginal dryness. For 12 weeks, researchers gave 325 women a daily intravaginal DHEA suppository and 157 women were given a placebo. Vaginal symptoms were scored before and after treatment.

Among those who received DHEA, there was an 8.44% average increase in cells lining the vagina and a 27.7% decrease in immature precursors to these cells, indicating a reduction in thinning that occurs in the vaginal lining during menopause. Moderate to severe dryness also improved in the DHEA group. Vaginal secretions, tissue color, and vaginal lining integrity and thickness improved on average from 86% to 121% among women who received DHEA.

*Editor’s Note: The group also experienced a reduction in vaginal pH, indicating greater acidity. (A healthy vagina has an acidic pH.)*

*Menopause. 2015 Mar;23(3).
Find the Formula That’s Right for You!

New research on vitamin D emerges daily. A simple, cost-effective blood test can help you identify your individual vitamin D needs. Life Extension’s huge selection of vitamin D supplements allows you to customize your dosage.

To order Vitamin D3 supplements, call 1-800-544-4440 or visit www.LifeExtension.com

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

*If you have a thyroid condition or are taking anti-thyroid medications, do not use without consulting your health care practitioner.

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Beneficial bacteria called *S. salivarius* K12 sustain throat health. Each FLORASSIST® Throat Health lozenge has 2 billion colony-forming units of *S. salivarius* K12 that:

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- Maintain overall good health

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• Blueberry extract to sustain healthy neurological function.

• Gamma tocopherols to quench oxidation missed by conventional vitamin E.

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• Black currant extract to promote eye health.

• Methylcobalamin form of B12 to better support healthy nerve function.

Once-Daily Health Booster
Item #01989 • 60 softgels (two-month supply)

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The same nutrients sold separately would cost 2-3 times more money!

Non-GMO

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

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PQQ remains a little-known essential component of all living things.\textsuperscript{1,2} It has not become a popular supplement because there currently is a limitation on the amount of PQQ that can be produced. Only a tiny fraction of the American population is able to access it now. That has not stopped scientific exploration into its biological effects.

Researchers are uncovering how PQQ functions as a neuroprotective agent that can help protect memory and cognition. While only discovered about 50 years ago, scientists have been actively exploring the benefits of PQQ in healing the brain.\textsuperscript{3,4} In an exciting new discovery, PQQ has been found to increase the formation of new nerve cells.\textsuperscript{5}

In addition, researchers have found that PQQ can promote growth of new mitochondrial.\textsuperscript{6,7} This is an important longevity strategy that can help prevent the diseases of aging.

During the life span, the brain suffers from multiple sources of damage. As these effects accumulate, the result is often the development of neurodegenerative disorders, as well as the risk of stroke from progressive injury to brain blood vessels. Brain trauma is yet another way that the delicate microstructure of brain cells is disrupted, leading to loss of cognition and function.

PQQ has been found to help guard the brain against these major brain-threatening processes by a variety of mechanisms related to improving brain energy metabolism.

\textbf{HOW PQQ Protects the BRAIN}

\textbf{PQQ is the acronym for pyrroloquinoline quinone.}
**HOW PQQ PROTECTS THE BRAIN**

**Threats to the Brain**

While **dementia**, **stroke**, and **brain injury** may appear to be unrelated events, they all share fundamental processes that contribute to the eventual **loss of brain cells** and the decline in cognitive abilities.

Mainstream medicine tends to focus on managing each condition after it has emerged. By that time, much of the damage has already occurred. A more effective approach is to attack the underlying degenerative processes all at once, **before** irreversible damage is done.

That’s what PQQ does.

By launching an all-out attack on underlying pathologic processes, PQQ has been shown to help protect the brain from neurodegenerative diseases, stroke damage, and even the effects of traumatic brain injury.

Let’s examine the most common factors that contribute to aging brains and the impact that PQQ supplementation has against each of those factors. This provides an understanding as to how this molecule functions.

**PQQ Promotes New Mitochondrial Formation**

Recent studies corroborate the unique ability of PQQ to stimulate the formation of new mitochondria and improve the function of existing mitochondria.6,7

It would be difficult to overstate the dramatic impact this has on the entire body, especially the brain. Mitochondria are responsible for converting the food we eat into the energy that powers cells to perform at peak function. Unfortunately, mitochondrial function declines with age. This decline has been linked to virtually all killer diseases of aging, including Parkinson’s and Alzheimer’s.8,9

Creating new mitochondria is an important longevity strategy that can help ward off the diseases of aging.10,11

Numerous preclinical studies show that PQQ rejuvenates mitochondrial function and restores mitochondria numbers.12,13 Importantly, this has led to the prevention of cognitive impairments, and was also shown to improve the **gait** disturbances seen in Parkinson’s disease.7,14,15

An exciting human study has further demonstrated that PQQ supplementation improves mitochondrial function.16 A single dose of PQQ (equaling **13 mg** for an average-sized adult) led to improved measurements of urinary oxidant levels (indicators of mitochondrial efficiency).

This team of scientists also evaluated the impact of a higher daily dose of PQQ supplementation after three days (equaling about **20 mg** per day for an average-sized adult) and found that measurements of inflammation (such as **C-reactive protein** and **interleukin-6**) were decreased.

**PQQ Promotes Nerve Cell Growth**

In a stunning development, PQQ was found to stimulate previously unknown healing processes in the brain, leading to the formation of **brand-new nerve cells**. Nerve cells transmit messages throughout the body in order to regulate everything from the nervous system to organ function.

Laboratory experiments have determined that one of the ways PQQ promotes the development of new nerve cells is through stimulation of **nerve growth factor (NGF)** in brain cells.17,18 In fact, PQQ proved to be far superior to other molecules aimed at stimulating nerve growth factor in cultures of brain cells.18

**Nerve growth factor** is a small protein molecule that is required for the development and maintenance of nerve cells, including many of the cells that are critical for memory, cognition, and learning.19

Nerve growth factor is particularly important for maintaining nerve **plasticity**, the process by which nerve cells form connections in order to communicate with each other. Essentially, this is what allows us to engage in the process of learning and memory.

By stimulating the production and release of nerve growth factor in cells that support neurons,17 PQQ has been found to protect memory and cognition in aging animals and humans.20,21
Lab experiments have shown PQQ’s ability to promote the healing of injured nerves. In one study, scientists inserted tubes containing PQQ into areas where nerves had been severed. New nerve tissue eagerly filled the gaps, increasing the number and diameter of individual fibers, effects not seen in control animals.

Another means by which PQQ impacts new nerve cell development is by protecting nerve stem and progenitor cells from oxidative damage. This allowed these cells to survive and potentially form new brain cells.

PQQ Protects against Oxidative Damage

Numerous studies demonstrate that PQQ improves brain function. Improvements in learning ability and memory were seen in rats supplemented with PQQ. Researchers attribute this to PQQ’s ability to reduce oxidative damage.

These results were confirmed in a later study of healthy older rats. In this study, PQQ was found to boost the ability of older rats to learn new information and help the animals use that memory after a prolonged period. The researchers attributed this increase both to relief of oxidative damage and also to enhanced production of nerve growth factor.

What You Need to Know

PQQ Provides Potent Neuroprotection

- The current global epidemic of cognitive decline and dementia threatens everyone’s hopes for healthy aging. There is also an increase in strokes and traumatic brain injury.
- The unique chemical compound called PQQ shows the ability to slow or reverse cognitive decline and dementia by targeting a variety of mechanisms.
- Lab studies and animal experiments demonstrate that PQQ promotes brain cell survival and improves cognitive function by protecting cellular metabolic processes and enhancing nature’s own healing and protective mechanisms.
- PQQ should form an important part of a supplementation regimen for those concerned about supporting and preserving brain health.
This was clearly demonstrated in an animal model of ischemic stroke. When PQQ supplementation was given before ischemia was induced, it significantly reduced the size of the damaged brain tissue region. Surprisingly, PQQ had a similar protective effect even when it was administered after the ischemia was induced.26

Another study showed similar neuroprotective effects. It also showed that PQQ led to significantly improved neurobehavioral scores after the stroke.27 These findings are tremendously exciting for those working in the area of human stroke prevention and treatment. The implication is that stroke patients could be given PQQ in the emergency room and reduce paralyzing brain damage.

**PQQ Reduces Harmful Neuroinflammation**

Neuroinflammation directly damages brain cells and accelerates the aging process.28,29

Chronic, low-grade inflammation of the brain is common to many neurodegenerative diseases. It also occurs following a stroke and traumatic brain injury. Other causes of neuroinflammation include infection, oxidative damage, and the effects of high glucose levels.

Studies show that PQQ supplementation markedly reduces harmful neuroinflammation. One of the ways it does this is by inhibiting the production of two pro-inflammatory signaling molecules.30

**Neurodegenerative Diseases**

Oxidative damage is one of the key factors leading to neurodegenerative diseases. Studies have demonstrated that PQQ’s ability to fight oxidative damage makes it of special interest in treating Parkinson’s disease.

Lab studies show that in the presence of PQQ, cells exposed to a toxin that induces oxidative damage are protected against death and fragmentation of their DNA.25 This demonstrates its potential use against Parkinson’s.

**Ischemic Stroke**

PQQ could also play an important role in protecting the brain from the devastation of a stroke.

An ischemic stroke occurs when the loss of blood supply to a specific area of the brain deprives the brain of the essential nutrients/oxygen it needs. The result is brain cell death and loss of function reflected in the region of the brain where the damage occurred. Depending on the area affected, this can result in paralysis, memory impairment, and even death.

In lab studies, PQQ reduced ischemic damage, potentially improving the quality of life following a stroke.
Neuroinflammation is especially damaging following a traumatic brain injury. In a recent study conducted at the University of Maryland School of Medicine, the researchers argued that inflammation is to blame for many of the symptoms of traumatic brain injury, including brain atrophy and cognitive decline.31

Fortunately, an animal study published in the Journal of Neurotrauma shows that by protecting against neuroinflammation, PQQ can help to protect against some of the effects of traumatic brain injury.32

**PQQ Protects against Excitotoxicity**

Excessive glutamate stimulation of brain cells, or excitotoxicity, is a major factor in the development of long-term neurodegenerative disorders, stroke, and schizophrenia.33,34 Glutamate-induced excitotoxicity triggers undesired programmed cell death (apoptosis).35

Fortunately, not only can PQQ help protect against the damaging effects of excitotoxicity, it can also help prevent it from occurring to begin with.

Studies of cultured cells from the hippocampus (the brain’s major memory-processing center) reveal that PQQ reverses oxidative damage caused by excitotoxicity. PQQ accomplishes this by turning on protective genes and signaling molecules that protect brain cells.35,36 PQQ also modulates the cellular receptor that triggers an excitatory response. This helps to prevent these dangerous responses from occurring in the first place.37

In a powerful study demonstrating PQQ’s protective effects against excitotoxicity, researchers directly injected rat brains with glutamate.38 As expected, oxidative damage rose abruptly and brain cells began to die off because of the glutamate surge.

However, when rats were given glutamate and PQQ at the same time, it produced an entirely different picture. The presence of PQQ significantly reduced cell death and decreased oxidative damage. As an added benefit, PQQ increased the expression of a host of intracellular protective systems and growth factor regulators, resulting in both protection from damage and a head start on recovery.38

**PQQ Prevents Glucose-Induced Brain Damage**

One of the least-known consequences of the diabetes epidemic is damage to brain cells from chronic exposure to elevated blood sugar levels. It is alarming that people with diabetes are 60% more likely to develop dementia.39 In addition, the elevated insulin levels associated with diabetes may also contribute to neurological damage. This has led many scientists to refer to Alzheimer’s disease as “type III diabetes.”40,41

PQQ can help protect the brain against the damage caused by high blood sugar. When researchers exposed cells from brain blood vessels in the lab to high blood sugar concentrations, it resulted in high rates of cell death.42 However, when PQQ was added to the cells’ growth medium, it reversed the high-glucose damage, suppressed cell death, and reduced the production of dangerous reactive oxygen species.

These protective effects were also seen in animal studies.43,44 In fact, PQQ, at a dose equivalent to about 100 mg in a human, significantly reversed brain cell damage in diabetic mice.44 The recommended dose of PQQ supplementation for aging humans is 20 mg each day.
PQQ Inhibits Malformed Brain Proteins

One of the main contributing factors in the development of Alzheimer’s and Parkinson’s diseases is the accumulation of malformed proteins. In Alzheimer’s, these are collectively referred to as beta amyloid. Beta amyloid proteins cause a tremendous amount of damage and ultimately kill brain cells.45

When PQQ was applied to brain cells in culture, it showed impressive abilities to save and revive dying cells. PQQ reversed the toxicity of beta amyloid proteins, prevented the death of brain cells, reduced oxidative damage caused by this malformed protein, and revived those cells that had begun to die.45

In Parkinson’s disease, the abnormal protein deposits in the brain contain tangled fibrils of a protein called alpha-synuclein that is toxic to brain tissue. PQQ prevents the formation of these cell-killing fibrils, which helps protect cells against oxidative damage.46

Excitement is growing in the scientific community about PQQ’s ability to inhibit the formation of toxic protein fibrils in both Alzheimer’s and Parkinson’s diseases.47

Summary

Loss of brain function leads to cognitive decline, memory loss, and a gradual diminution of the self.

While neurodegenerative diseases, strokes, and brain injury appear to be different processes, a look at the cellular events involved show remarkable similarities.

Mainstream medical practice believes these degenerative processes are inevitable. The result is most physicians focus only on clinical endpoints, which is rarely successful in restoring lost cognitive function.

A more rational approach is to address the fundamental problems of neurodegeneration together, with the aim of preventing further damage and restoring what can still be repaired.

PQQ has demonstrated robust effects against major brain-aging pathological processes. ●

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

References


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PQQ (pyrroloquinoline quinone) activates genes involved in the production of cellular energy.\textsuperscript{1,5}

Studies show PQQ supports heart health and cognitive function, complementing CoQ10.\textsuperscript{6,7}

In fact, just 20 mg per day of PQQ plus CoQ10 promotes memory and attention in aging individuals.\textsuperscript{8}

BioPQQ\textsuperscript{®} is the highest quality PQQ available on the market today.

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References
Super Bio-Curcumin® features BCM-95®, a patented curcumin that absorbs up to 7 times better than standard curcumin, making this product ideal for those seeking to:

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Life Extension® also provides Advanced Bio-Curcumin® with Ginger & Turmerones for those seeking the additional benefits of added ginger:

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- Nearly twice the immune health support, and
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References

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Scientists have known that when blood sugar combines with fats and proteins, the result is known as glycation and it produces accelerated aging.\(^1\) Even those with blood sugar levels within normal range experience the impact of systemic glycation on a daily basis.\(^2\)

Fortunately, researchers in Japan developed benfotiamine, a unique form of vitamin B1 (thiamine) that supports healthy blood sugar metabolism and protects against glycation.\(^3\)-\(^5\)

What makes benfotiamine especially effective is that unlike ordinary vitamin B1, it is fat soluble and can easily penetrate the inside of cells.\(^6\) Regular vitamin B1 is water soluble and has a short life span in the body.\(^7\)

**Mega Benfotiamine** helps inhibit the formation of advanced glycation end products (AGEs) to maintain healthy endothelial, retinal, kidney, and nerve cell function.\(^8\)-\(^12\)

Each capsule provides **250 mg** of benfotiamine and **10 mg** of vitamin B1 (as thiamine HCl). The suggested dose is 1-2 capsules a day for most individuals. Each bottle therefore lasts **2-4 months**.

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References
\(^3\) J Biochem. 1954;41:219-44.
\(^9\) Diabetes Care. 2006 Sep;29(9):2064-71.

To order **Mega Benfotiamine**, call **1-800-544-4440** or visit **www.LifeExtension.com**

The Mitochondrial Energy Optimizer formula provides **150 mg** of benfotiamine, which when combined with other antiglycation agents like carnosine and pyridoxal-5-phosphate, provides substantial protection at different checkpoint opportunities in the glycation process. Item #01868

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Bridging the Fiber Gap
Over 2,000 years ago, Hippocrates said that all disease begins in the gut.

Modern science is proving how right he was. Scientists are discovering that fiber not only boosts digestive health but also contributes to our immune function.¹ This makes sense, considering 70% to 80% of the cells of the immune system are located in the gastrointestinal tract.²

Studies show that dietary fiber has multiple properties that improve cardiovascular and metabolic biomarkers—and even extend life span.

Despite its importance, few Americans get the recommended intake of fiber per day through diet alone, making what is called the “fiber gap” a public health concern.

To help fill this dietary “gap,” researchers have created a broad-spectrum formula by combining three different fibers that offer immune support and improved intestinal health.

The primary component is a unique fiber called beta-glucan. Derived from baker’s yeast, beta-glucans are essential for boosting the intestine’s immune system function. Beta-glucans have a unique molecular structure that captures the attention of cells in the immune system of the intestine.³⁻⁵

When beta-glucans are blended with two other fiber sources, psyllium and fruit from the African Baobab tree, the combination offers powerful immune metabolic, and intestinal support.
Human Studies

Marathon runners are especially good subjects for the study of immune-boosting supplements because they are particularly susceptible to developing upper respiratory tract infections (colds) after a run.9,10

Beta-glucans have been found to reduce the severity and duration of cold symptoms in marathon runners, demonstrating their ability to activate immune cells.

In one study, a daily dose of 250 or 500 mg of beta-glucans was found to reduce reports of upper respiratory tract infections in the four weeks following a marathon.11 That improvement was also associated with better overall health and decreased confusion, fatigue, tension, and anger, as well as increased vigor, based on a standard profile of mood state survey.

A subsequent study showed that marathon athletes who supplemented with beta-glucans demonstrated a significant 37% reduction in the number of days they presented with cold or flu symptoms in the 28-day period following a marathon, compared with placebo recipients. Levels of salivary antibodies (immunoglobulin A) were also increased by 32% at two hours following exercise, compared with placebo recipients.9

Beta-Glucans Revive Exhausted Immune Systems

Beta-glucans are crucial weapons in the fight for health and longevity. These molecules naturally boost the immune system by optimizing its response to diseases and infection.9

While beta-glucans can be obtained from sources such as shiitake mushrooms and cereal grains, beta-glucans that come specifically from baker’s yeast have a unique molecular structure that grabs the attention of cells in the immune system of the intestine.3,5

Beta-glucans “prime” the immune system to be ready to respond to threats throughout the entire body. Such priming helps increase the immune system’s responsiveness to foreign molecules, such as those found on bacteria and viruses. In addition, it can assist in the fight against cancer by enhancing the immune system’s ability to detect and destroy malignant cells.6

Beta-glucans have numerous actions that help supercharge the immune system:

- Beta-glucans promote the emergence of T cells,7 which are white blood cells that help the body fight diseases or harmful substances.

- Beta-glucans have been shown to increase the body’s antitumor immune response, while decreasing immune-suppressive cells that cancer cells use as protection against immune detection and destruction.3

- Beta-glucans promote the production of interferon-gamma, a powerful antiviral and immune-modulating signaling protein with specific actions against many viruses that cause human disease.8

- Finally, beta-glucans from baker’s yeast have been found to increase the salivary levels of immunoglobulin A (IgA) antibodies. Immunoglobulin A antibodies are the first line of defense against cold and flu viruses and may help prevent worsening of symptoms.9

All of these immune-boosting benefits seen at the cellular level have been shown to have real-world effects. Human studies demonstrate how beta-glucan supplementation can rejuvenate the immune systems of those who need it most.
What You Need to Know

Any form of strenuous exercise temporarily weakens the immune system. For the next study, recreationally active men and women supplemented with 250 mg per day of beta-glucans. After 10 days, the subjects experienced significant increases in microbe-destroying white blood cells and signaling molecules that promote immune system detection and destruction of viruses and bacteria.

The likely explanation for the reduction in cold or flu symptoms seen in such subjects is that immunoglobulin A is vital in preventing viruses from attaching to the mucous membranes of the mouth, nose, and throat.

**Beta-Glucans Battle the Impacts of Stress**

Stress also lowers the immune system’s resistance to cold symptoms. Beta-glucans from baker’s yeast, dosed at 250 or 500 mg per day for four weeks, reduced such symptoms. Again, these benefits were accompanied by an improvement in overall health and vigor and a reduction in tension, fatigue, and confusion, based on the profile of mood states standard survey.

In a group of healthy women with moderate psychological stress, just 12 weeks of supplementation with 250 mg of beta-glucans per day significantly reduced upper respiratory symptoms by 66% compared to placebo. Additionally, the women taking beta-glucans experienced a boost in overall well-being scores by more than 8% and mental/physical energy levels by 21%.

Another group of people known to be under a tremendous amount of stress are university students. A study published in *Nutrition* analyzed healthy university students at the peak of the cold season for 90 days. In students who developed symptoms during this time, the ones taking 250 mg per day of beta-glucans showed a clinically relevant reduction in the total number of days with symptoms compared with placebo recipients. The supplemented students also had a statistically significant increase in the ability to “breathe easily.”

Protection against an Overactive Immune Response

Allergies are at the other end of the spectrum of immune system disturbances. They are characterized by an overactive immune response to foreign matter. Evidence of the comprehensive immune modulating effect of beta-glucans comes from a study of ragweed allergy sufferers who are otherwise healthy.
An array of research has shown the beneficial effects on the immune system in those that supplement with beta-glucans derived from baker’s yeast. Fiber supplementation with psyllium and Baobab fruit offers an added layer of immune and health-boosting properties as we are about to learn.

**Why Is Fiber So Important?**

The secret to fiber’s dramatic impact on the immune system isn’t the fiber itself but what happens to it once it enters the body. Since fiber cannot be broken down by human digestive enzymes, it passes unchanged through the upper parts of our digestive tract. That undigested fiber is then fermented by beneficial bacteria living in part of the large bowel known as the colon.

Fermentation itself has many benefits, including supporting beneficial gut bacteria. However, it is the breakdown products of the fermentation process that are now recognized as holding the key to improved digestive and total body health.

Those byproducts are primarily short-chain fatty acids, specifically acetate, propionate, and butyrate, which nourish and protect the cells lining the colon wall.

In addition to serving as beneficial nutrients for cells that line the intestines, recent studies demonstrate that the short-chain fatty acids produced from soluble fiber are crucial for normal immune function. These are a few of their most potent immune-boosting mechanisms of action:

- They regulate the activity of intestinal white blood cells, modulating their inflammatory responses to potential invaders such as disease-causing bacteria and viruses.
- They help those white cells produce the chemical signals (cytokines, prostaglandins, and interferons) that direct other immune system cells to sites of infection where they destroy dangerous microbes.
- They promote the development of regulatory T cells that either increase or decrease the immune response, depending on the nature of the microbe.

It has recently been shown that the effects of these fiber-derived short-chain fatty acids go even further, powerfully modifying the expression of genes involved in immune function and longevity.
Two fibers, psyllium and Baobab fruit, have been found to have specific benefits against metabolic syndrome. In addition, psyllium is rich in soluble fiber, which ferments the short-chain fatty acids that are so critical to maintaining a strong immune system. Let’s look at each one of these fibers.

**Psyllium Fiber**

Psyllium is the fiber obtained from the seed husks of a plantain (unrelated to the edible plantains found in many markets). When compared to the fiber in wheat bran, psyllium leads to greater production of beneficial short-chain fatty acids (specifically butyrate, propionate, and acetate) throughout the colon, perhaps because it is more rapidly fermented by colonic bacteria.40

Butyrate has vital anti-inflammatory properties.41,42 In an experimental rat model of ulcerative colitis (an inflammatory bowel disease), psyllium fiber supplementation reduced colonic inflammation, while decreasing the concentrations of important pro-inflammatory signaling molecules, such as leukotriene B4 and tumor necrosis factor alpha.42

While perhaps most known for its ability to combat constipation, recent human studies have revealed that psyllium is a proven weapon in the fight against metabolic syndrome and its devastating consequences.37 When used regularly, psyllium has been shown to beneficially impact cholesterol, blood sugar, and digestive health.

**Cholesterol**

Studies have shown that increased psyllium fiber intake translated into reductions in plasma triglycerides and low-density (“bad”) cholesterol.37,43,44 In a study involving type II diabetics, 12-week supplementation with 15 grams of psyllium daily significantly reduced plasma triglycerides by 25.5%, total cholesterol by 9.3%, and LDL cholesterol by 15.71%, while significantly raising levels of high-density (“good”) cholesterol in comparison to the placebo group.37 Small doses show benefits as well, with a 6-gram per day dose of psyllium leading to a 6% reduction in LDL cholesterol.32

**Blood Sugar**

On the blood sugar front, a daily dose of 15 grams (three 5-gram doses) produced a reduction in fasting blood glucose levels in patients with type II diabetes.37 Another study found reductions in all-day glucose levels (11%) and after-lunch glucose levels (19%) among psyllium recipients, compared with placebo.45
A similar dose of psyllium, **14 grams** per day, reduced glucose absorption from a meal by more than 12%, contributing to a reduction in blood sugar.44

In type II diabetics specifically, two months of psyllium treatment effectively optimized metabolic control, significantly reducing body mass index, waist circumference, hemoglobin A1c (a measure of long-term glucose control), and fasting blood sugar levels.43

**Digestive Health**

Psyllium is best known for its ability to combat constipation. The seed husks swell greatly in water, which aids patients with constipation by providing bulk and retaining water in stools. Animal studies show that psyllium fiber increases fecal weight and water content more effectively than twice the dose of wheat bran fiber, while also increasing the water content of feces.40

And human studies have demonstrated psyllium fiber’s ability to reduce fecal incontinence by more than 50% compared with placebo, while increasing fecal water-holding capacity.46-48 In addition, it has been shown to effectively lower symptom severity in patients with irritable bowel syndrome (IBS) significantly better than placebo or bran.49

**Baobab Fruit Powder:**

**Unique and Novel Source of Fiber**

The powdered, dried fruit of the **Baobab tree** complements this protective fiber trio. Like psyllium, it has the ability to promote gut health while also defending against metabolic syndrome.

Baobab fruit has a long history of health-promoting effects on the gastrointestinal tract, particularly in the treatment of infantile diarrhea.50 But Baobab fruit pulp may also have unique prebiotic properties. This was demonstrated by a study showing that a 4% solution of the fruit pulp promoted growth of the probiotic *Lactobacillus rhamnosus*, an organism important in human intestinal health.51

Fiber has long been viewed simply as a way to support regular, normal bowel movements (i.e., to overcome constipation).55 However, recent studies show a strong association between insufficient dietary fiber intake and the risk of dying from any cause. A large meta-analysis with nearly a million subjects showed that, compared with people with the lowest one-third of fiber intake, those in the highest third had a 16% reduction in the risk of death. Each 10-gram per day increase in fiber led to an additional 10% reduction in the risk of death.56

And a study conducted by the National Institutes of Health (NIH) and the American Association of Retired Persons (AARP) revealed that, compared with the lowest one-fifth, those with the highest one-fifth of fiber intake had a 22% reduction in the risk of dying from any cause.57 This study also showed reductions in the risk of dying from cardiovascular disease, infections, and respiratory diseases of 34% to 59% in women and 24% to 56% in men.

The United States Department of Agriculture (USDA) recommends daily fiber intakes of **28 grams** per day for men over 50 and **22 grams** per day for women in that age group.58 However, the average American’s fiber intake is a meager **16 grams** per day, a shortfall of 43% for men and **27%** for women.59

The problem is that it is difficult to get the recommended amounts of fiber purely from food. And, while many people believe that whole-grain foods and nuts are a good fiber source, few such foods in fact supply the recommended **3 grams** or more per serving of fiber.55

Because of the health benefits that dietary fiber has on human health, this “fiber gap” has been identified as a major public health concern.55

In response to the fiber gap that is so pervasive in the American diet, scientists have formulated a fiber combination aimed at closing that gap, a combination that includes **beta-glucans**, **psyllium**, and **Baobab fruit**.

This unique combination of fibers provides **6 grams** of fiber per serving. The recommended daily fiber intake for men and women are **28 and 22 grams** per day, respectively.58 Given the average American’s daily fiber intake of **16 grams**, one serving for women and two servings for men would bring total fiber consumption up to the daily recommendation by the USDA for men and women over 50.

Increasing fiber intake to and above recommended values can provide many health benefits, including reductions in risks for metabolic syndrome, cardiovascular disease, diabetes, cancer, and more.
Psyllium fiber is a rich source of soluble fiber that produces beneficial short-chain fatty acids. It is a proven weapon in the fight against metabolic syndrome and its devastating consequences.

The powdered, dried fruit of the Baobab tree completes this protective trio, offering a boost to beneficial gut bacteria and slowing the surge of glucose into the bloodstream that occurs after a carbohydrate meal, helping to further defend against metabolic syndrome and diabetes.

Without ample fiber intake, people risk more than constipation. Rather, they place themselves in unnecessary peril of serious but preventable immune, cardiovascular, and metabolic disorders. Using these three sources of fiber together can help close the fiber gap in order to ensure total body health.

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

References


Published studies have shown the critical importance of **lipoic acid** in supporting healthy mitochondrial function.

Unlike other forms of lipoic acid, **Super R-Lipoic Acid** is more bioavailable, stable, and potent, achieving **10-30 times** higher peak blood levels than pure R-lipoic acid.1 This unique sodium-R-lipoate can help you reach peak plasma concentrations within just 10-20 minutes’ of supplementation.

**Super R-Lipoic Acid** provides more of the active “R” form of lipoic acid than any other supplement.

Suggested dose is one to two capsules daily.

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

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**References**

CAUTION: If you are taking glucose-lowering medication, consult your health care provider before taking this product.

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Clinical studies demonstrate the benefits of Fiber-Immune Support to enhance:

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- Beneficial gut bacteria²
- Immune system modulation,³
- Responsiveness to foreign molecules, and⁴
- Healthy blood-sugar⁵ and cholesterol levels⁶ already within normal range.

Fiber-Immune Support is formulated to contain the clinically validated dose of beta-glucans, a novel fiber derived specifically from baker’s yeast, as well as an efficacious dose of soluble fiber from the unique fruit of the African Baobab tree and psyllium.

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References

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NEUROLOGICAL BENEFITS FROM ALGAE
Researchers long ago verified the important eye benefits of the carotenoid astaxanthin found in algae and other natural sources. Given the direct connection between the eye and the brain, it is not surprising that scientists are discovering that astaxanthin also has important brain health benefits.

Continued exploration into the biological properties of this carotenoid has resulted in the discovery of an array of unexpected brain benefits, including protecting neuronal memory centers against glucose damage.

What separates astaxanthin from most other oxidant scavengers is that it can easily cross the blood-brain barrier. This allows the nutrient greater access to difficult-to-reach parts of the brain.1

A multitude of data shows that astaxanthin can circumvent many diseases through a broad range of functions. In fact, almost every cell of the body, including those in the eyes, heart, and kidney can benefit.2,3

There is now substantial research showing that astaxanthin may provide even greater protection against neurodegeneration.4,5
Protection in the Hippocampus

Glucose-induced cognitive deficits occur in both nondiabetics and diabetics.\(^6,7\)

The overload of excess glucose passing through the bloodstream causes inflammation and oxidative stress throughout the body. The brain, however, is particularly sensitive to this glut of glucose. Excess glucose damages precious brain cells and leads to neurological diseases such as Alzheimer’s and Parkinson’s.\(^7,8\)

Scientists have noted that the hippocampus, the part of the brain that stores memory, is highly vulnerable to damage from glucose.\(^7,9\)

Astaxanthin plays a variety of beneficial roles in the hippocampus. Animal studies show that this unique carotenoid can mitigate diabetes-induced neuronal damage in the hippocampus.\(^9,10\)

In one study, diabetic mice given astaxanthin had significantly lower amounts of neuronal loss in the hippocampus than mice who didn’t receive astaxanthin. The group that received astaxanthin also recorded inhibition of the master inflammatory molecule NF-kappaB and reduction of pro-inflammatory TNF-alpha.\(^9\)

Several studies have shown that astaxanthin supplementation decreases oxidative stress and the overexpression of a deadly protein called caspase-3.\(^11-13\)

The caspase protein is nicknamed the “executioner” protein because of the role it plays in apoptosis (cellular death), necrosis, and inflammation. Caspase-3 has a specific role in executing apoptosis. This protein benefits the body when it is expressed in the correct amount. Overexpression of caspase-3 caused by poor health factors, such as high glucose levels, is harmful because it causes neuronal cell death.\(^14,15\)

An underappreciated aspect of excess glucose is the acceleration of brain aging it inflicts. Life Extension\(^5\) has long argued that ideal fasting glucose levels should be below 86 mg/dL. This is a challenging target to achieve as people age and develop metabolic disturbances that cause glucose levels to remain too high. The ability of astaxanthin to protect against glucose-induced neural toxicity is especially important for those unable to achieve optimal glucose control.

Human Cognitive Enhancement Studies

Two separate, yet similar, studies on astaxanthin were released in the Journal of Clinical Biochemistry and Nutrition. Researchers demonstrated that supplementation with astaxanthin provided a cognitive boost in the elderly. These human studies further vindicate the role of astaxanthin to increase overall brain health.\(^21,22\)

The first study was implemented on 10 older males who complained of having age-related forgetfulness. After six weeks of taking oral astaxanthin, there was significant reduction in response time for divided attention tasks (the ability to execute more than one action at a time). After 12 weeks, there was improvement in all cognitive areas with significant improvement in the subjects’ working memory.\(^21\)

The later study was more comprehensive. The researchers conducted a double-blind placebo-controlled study on 96 subjects, men and women between the ages of 52 and 59. The subjects were tested by card games on a computer.\(^22\)

Astaxanthin Promotes Cell-Regulating Pathway

The PI3K/AKT pathway is a regulator of various cellular functions throughout the body. The survival of cells is dependent on the expression of this PI3K/AKT pathway.

When the PI3K/AKT pathway becomes dysfunctional, it allows for greater amounts of unwanted cell death. It is now associated with a multitude of human diseases.\(^16-19\) Researchers have been aiming their efforts towards finding ways to increase the regulation and expression of the PI3K/AKT pathway to fight many diseases.\(^20\)

A number of studies have revealed that astaxanthin can promote the PI3K/AKT pathway.\(^10,13\) In many of these studies, the researchers proposed that the positive results seen on astaxanthin were largely attributed to its ability to increase the expressions of AKT protein and PI3K.
They tested the subjects’ working memory by asking whether a card was the same as the previous card. Subjects were also tested on their delayed recall by seeing if they could remember if overturned cards had appeared previously.

After a period of 12 weeks, those who received oral astaxanthin showed significant improvements in both working memory and delayed recall compared to a group that received a placebo.

Preventing Brain Cell Death in Stroke

Astaxanthin is also exhibiting potential to reduce brain damage inflicted by ischemic stroke.

In a compelling study on astaxanthin, thrombosis (the formation of a blood clot inside a blood vessel) was measured in hypertensive rats. The results showed that astaxanthin was able to inhibit thrombosis from occurring in cerebral vessels.23

The researchers also observed that the usual increase of systolic blood pressure in these stroke-prone rats was suppressed by the astaxanthin treatment. The antihypertensive benefits of astaxanthin were explained by its ability to preserve nitric oxide levels by lowering oxidative stress in the arterial lining.23

In the US, ischemic strokes account for approximately 87% of all strokes.24 When ischemic stroke is left untreated, the patient typically loses 1.9 million neurons per minute. Poor post-stroke functional outcome is attributed to the amount of brain cell death that occurred.25
Striking results on astaxanthin were also observed in another study. Astaxanthin was able to reduce ischemic brain injury in adult rats by preventing neuronal damage and death.26

Intracerebroventricular injection, a direct injection into the brain, of astaxanthin was administered to an experimental group prior to ischemia-induced injury. The rats given astaxanthin exhibited improved post-stroke locomotor activity and reduced cerebral infarctions compared to the placebo. Upon analysis of brain tissue, there was less free radical damage, excitotoxicity, and neuronal brain cell death.26

A subarachnoid hemorrhage is a type of stroke that is usually caused when an aneurysm ruptures in the area between the membranes that cover the brain. An aneurysm is a balloon-like dilation in a weak area of an artery wall that can rupture and cause hemorrhaging. Blood spills out on the circumference of the brain causing massive damage, painful headaches, and cell death (apoptosis) in the brain.

Anti-apoptotic therapies, or treatments to stop cell death in the body, are gaining recognition from researchers as a way to lower the death rate in the event of a subarachnoid hemorrhage.13 Since astaxanthin has been shown to greatly weaken expression of caspase-3 (apoptosis-inducing protein), it would make sense that it would provide such a benefit. In the past few years, studies on astaxanthin have been published showing that it lowered oxidative stress, inflammation, blood brain barrier disruption, brain edema, and neuronal apoptosis from subarachnoid hemorrhage.27-30 These studies pave the way for the therapeutic use of astaxanthin in the treatment of subarachnoid hemorrhage.

The mortality rate six months after a subarachnoid hemorrhage is 50%. A startling 10% to 15% die before ever making it to the hospital.31 In a recent animal study, astaxanthin was shown to reduce brain injury and brain cell death. In addition, the group that did not receive astaxanthin had almost double the mortality rate of 21.1% compared to 11.8% in the group that did receive astaxanthin within 24 hours.13

Astaxanthin’s Eye Health Advantages

Some of the most admired information on astaxanthin has been on its wide variety of benefits to the eyes. Along with the carotenoids zeaxanthin and lutein, astaxanthin has the ability to cross not only the blood-brain barrier but also the blood-eye barrier.32

New research on astaxanthin now provides evidence against cataract formation. An interesting human study was conducted on 35 human patients who had a cataract formation in both eyes. The patients first underwent surgery for one eye without astaxanthin. Later the same surgery was performed on the other eye after the patients supplemented with astaxanthin for two weeks.33

The researchers measured oxidative stress in the aqueous humor, which is the transparent fluid between the lens and cornea. After the initial surgery, patients showed elevated oxidative stress. However, oxidative stress was significantly lower with supplementation of astaxanthin prior to the second surgery.33

In a more recent study, astaxanthin was tested against steroid-induced cataract formation in chick embryos. The researchers tested the opacity (lack of transparency) of the lenses 48 hours after astaxanthin was administered.

Lens opacity was seen in 63% of the group that received no treatment compared to only 26% in the astaxanthin group. Clearly, astaxanthin slashed the chances of eye cloudiness from the steroid.34

Ultraviolet rays, smoking, and a deficiency of vitamins C and E are the greatest risk factors for cataracts.35-37 Since these risk factors can cause an increase in oxidative stress, it is proposed that astaxanthin would be of great value in preserving eye health.34 The results of these studies add greater evidence to support astaxanthin’s role in benefiting those affected by cataracts.33,34
Potential Usage for Epilepsy

Research has shown that oxidative stress contributes to epilepsy and causes severe neuronal damage induced by epilepsy.\textsuperscript{38,39} There is a wealth of data showing that nutrients such as omega-3s are effective in the prevention and treatment of epilepsy.\textsuperscript{40-42} However, astaxanthin provides an additional unique benefit to epilepsy patients by crossing the \textbf{blood-brain barrier} to target oxidative stress directly. Astaxanthin’s oxidant-scavenging benefits have intrigued many researchers for its use in the fight against epilepsy.

The \textbf{amygdala} is the part of the brain that controls emotions. Overexcitement, or \textit{kindling}, of this brain region may directly cause a seizure if there is sufficient neurological damage. \textbf{Amygdala kindling} is the most commonly used form of testing in epilepsy research. It involves the use of a machine that releases an electrical stimulation in the center of the brain.\textsuperscript{43}

In an amygdala-kindling test on rats, astaxanthin was shown to significantly weaken the neuronal damage from the electrical stimulation. The results suggest that astaxanthin was able to guard the brain against this damage by lessening oxidative damage and lipid peroxidation, as well as preventing mitochondrial death.\textsuperscript{11}

It is important to note that this is a recent study and the first to show astaxanthin’s direct benefit for epilepsy. However, there has been significantly more research that shows the ability of \textbf{omega-3s} to prevent epilepsy.\textsuperscript{40-42} In fact, a recent study involving 70 \textit{medically resistant} epileptic children demonstrated the benefits of omega-3 on reducing epilepsy. Before the study, all the children averaged four seizures per month. Half of the children received \textbf{1,200 mg} of \textit{fish oil} daily and the other half received a placebo. Results showed that \textbf{57\%} of the supplemented group experienced no seizures after three months. Those children receiving a placebo had no appreciable difference in the number of seizures.\textsuperscript{41}

Summary

Astaxanthin has many lifesaving qualities. One is to protect against cognitive decline. The brain consumes 20\% of the body’s oxygen, which makes it more vulnerable to oxidative damage.

Interestingly, astaxanthin can also protect the brain from \textbf{hypoxia} (lack of oxygen). This demonstrates astaxanthin’s ability to help the brain maintain oxygen balance.\textsuperscript{52}

Cognitive decline is experienced by some degree in all aging individuals. Some of the risk factors include oxidative stress,\textsuperscript{53-55} inflammation,\textsuperscript{56} decline in hormones,\textsuperscript{57} endothelial dysfunction,\textsuperscript{58} insulin resistance,\textsuperscript{59} and suboptimal nutrition.\textsuperscript{60} Astaxanthin and omega-3s have been shown to circumvent many of these risk factors.\textsuperscript{4,9,23,61-63}

Supplementing with astaxanthin benefits almost every cell in the body and the research about its value to \textbf{neurological function} is rapidly expanding.\textsuperscript{3-5,6}

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


The Synergistic Combination of Astaxanthin and Omega-3s

Lipid peroxidation is the oxidation of fats (lipids), rendering them useless by the body. Omega-3s can be vulnerable to lipid peroxidation unless certain nutrients are taken alongside it. Several studies have demonstrated sesame lignans and vitamin E prevent lipid peroxidation, especially for omega-3s. Astaxanthin is also showing strong evidence in preventing oxidation of omega-3s in this same way. In addition, studies are showing more beneficial effects when these nutrients are taken together.

One of the many markers produced to reduce oxidative stress is glutathione. A study tested the amount of glutathione released in response to supplementation with astaxanthin and omega-3, both separately and in combination. The results of the study showed that the combination of astaxanthin and omega-3 not only worked better to increase the amount of glutathione, but it also increased the ratio of active glutathione to oxidized (inactive) glutathione 6-fold.

Additional studies show that astaxanthin and omega-3s complement each other and create greater reductions in oxidative stress. Since these two compounds are found naturally together in crustaceans, algae, and small fish, it would make sense that they should be taken together.


A properly functioning thyroid helps support:

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

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

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

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**References**


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

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Astaxanthin has long been shown to promote proper eye health, and more recent studies indicate it can also benefit the brain and:

- Heart,
- Skin, and
- Immune system.

Life Extension®’s proprietary blend has been shown to enhance carotenoid absorption by several-fold.¹

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Reference

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Support Healthy Uric Acid Levels

A tannin-rich extract derived from the edible fruit of the *Terminalia bellerica* tree helps keep uric acid levels within healthy range.*

This patent-pending, standardized extract from *Terminalia bellerica* supports healthy expression of two critical enzymes involved in uric acid metabolism:

- **Xanthine oxidase,**
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The name of this standardized *Terminalia bellerica* extract is **Ayuric®**. The suggested dose is one capsule twice a day.

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To order **Uric Acid Control**, call 1-800-544-4440 or visit www.LifeExtension.com

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When we were in our mid-40s, our lifestyle became the center of media attention. It happened as word got out that a husband and wife, calorie restriction practitioners, were successful in slowing, and possibly even reversing aging.

Before long, we were featured on every major television network including NBC, CBS, ABC, and FOX, as well as on many special programs about life extension, including 60 Minutes, Oprah, Barbara Walters Special: Live to 150, Can You Do It? Today, Good Morning America, and CBS This Morning.

Soon, the international media found their way to our door. We were featured on numerous BBC specials, 60 Minutes Australia, Germany’s Der Spiegel, and more.

Moreover, the news reports weren’t anecdotal: Our lab results showed that we were on track. Following guidance from years of testing with scientists and doctors, we were able to set personal standards for health that may seem like science fiction to some.

In this article, you will learn what inspired the creation of The CR Way® to Great Glucose Control and why glucose control should be fundamental to your approach to optimal health and life extension.

- **Heart function:**
  Age-related loss of heart cells slows. Blood pressure averages 90/60.

- **Arterial plaque:** Accumulation remains static or reverses.

- **Muscle strength:** Maintains or increases with no lasting soreness or pain from exertion. Age-related loss of muscle cells slows.

- **Cellular energy production increases:** More energy to do what you want, when you want.

- **Improved immune function:** Quick reaction to immune challenges. Inflammation markers at low end of reference ranges.

- **Youthful hormones:** Secretion levels are preserved.

- **Stronger skeletal system:** Bone density increases gradually, likely with stronger matrix.

- **Improved feeling of well being:** The less we ate, the better we felt.

In this article, you will learn what inspired the creation of The CR Way® to Great Glucose Control and why glucose control should be fundamental to your approach to optimal health and life extension.
After months of study and work, Paul tried the low-glucose approach and we almost couldn’t believe the results. His brain-training scores rocketed upward and mental capabilities from a younger age began to come back. We had discovered a new way to increase calorie restriction’s brain benefits.

This new low-glucose approach to calorie restriction was clearly worth writing about and so The CR Way® to Great Glucose Control was born. We included glucose-control secrets we had learned—about meal timing, foods that work best, and cooking methods. One by one, we created the recipes in our own kitchen. Each recipe’s effect on blood glucose was personally tested by the two of us. We excluded difficult gourmet recipes that took lots of time to prepare. Every recipe is quick and easy. The point was to make learning the principals of glucose control and applying them to your own food preparation fun. And if you are working and on the go, healthful eating is easier this way.

Then we put it all together in lifestyle plans. We say lifestyle plans rather than meal plans because for glucose control to be truly “great,” it needs to be a round-the-clock program, starting from the time you wake up until the time you go to sleep. These lifestyle plans suggest glucose ranges for every part of the day so you have goals to aim for.

Taking advantage of internet technology, we designed The CR Way® to Great Glucose Control as an online adult education course that provides live, caring instruction to participants wherever they live.
Recognizing that the classes could benefit health conscious people, Life Extension® partnered with *The CR Way® to Great Glucose Control* and helped get the word out.

Thus, *The CR Way® to Great Glucose Control* became established as the resource for people who want to keep their blood glucose at optimal levels and increase their chances for living longer and better.

**The CR Way® to Great Glucose Control—Makeover**

After teaching glucose control to hundreds of people, we have learned a lot about the variety of challenges people face as they learn to control their blood sugar. For example, some of our participants have very busy schedules and cannot attend long classes. So the class schedule has been reworked into separate sessions that are taught over a number of weeks. Each session is about 30 minutes long, which is enough time to share key points without requiring too big a commitment from already busy days.

Instructional videos, describing key elements of glucose control, are integrated with five beautifully illustrated e-books that have been updated with new recipes, food suggestions, and even ideas for improving the gut microbiome.

**The CR Way® to Great Glucose Control—The Curriculum**

- Introduction: Risks, Benefits, and Science
- Steps to Great Glucose Control
- Foods and Recipes
- Low-Glucose Lifestyle Plans for Optimal Health and Reversing Diabetes
- What If My Glucose Is Still Too High?

This core curriculum is provided to each participant along with summaries of the main points covered in each class and action items to facilitate glucose control as a routine part of life.

**Prediabetes Reversal!**

A few years ago, Mary, a LivingTheCRWay® member, got a diagnosis of prediabetes from her doctor. At 5.6, her HbA1c (which evaluates long-term blood sugar control) was a bit high. Other than that, she was in great health with a perfect weight and good all-around numbers on blood tests, including cardiovascular assessments.

Her higher-than-normal fasting glucose was understandable. A busy schedule had kept her from following some of the all-natural things she had been doing to keep glucose low, like eating complex low-glycemic index (GI) carbs slowly and finishing her last meal of the day as early as possible. When she asked for help, we suggested she try to reset the memory of her pancreatic beta cells. The function of these cells is to secrete insulin, which guides glucose out of the blood into the cells, thus returning the blood glucose to fasting levels.

**Improve Your Glucose and Your Life**

- Calorie restriction slows, and possibly reverses, aging.
- But to regain the cognitive effects of youth, glucose control is key. Studies found that mice with very low glucose levels from fasting scored better on tests than controls and better even than mice whose calorie intake was restricted.
- After merging two concepts, calorie restriction and intermittent fasting, *The CR Way® to Great Glucose Control* was born.
- The program consists of instructional videos that describe key elements of glucose control, which are integrated with five e-books that include recipes, food suggestions, and ideas for improving the gut microbiome.
She had participated in The CR Way® to Great Glucose Control sessions and was aware that the fifth part of the Great Glucose Control e-book focuses on resetting beta cell memory. But she was having a hard time, so we worked with her: helping reorganize her eating schedule and adding exercise at strategic glucose-lowering times like after meals. At first, it was slow going. Her fasting glucose stubbornly remained above 100, which is a risk factor for many diseases.

It took months to reset her levels into the 90s. And she stayed with it, finally getting her glucose into the 80s and eventually the 70s, which is perfect for activating longevity signaling in her cells. Her success showed up in other ways too. She had better blood pressure, improved eyesight, and better memory. All this was evidence that her glucose control was activating beneficial brain biochemistry.

At this point, her persistence allowed her to achieve fasting glucose levels that anyone would be happy with.

Graduates of The CR Way® to Great Glucose Control often let us know that it has made a difference in their lives. In August 2014, Dianne, a professional physiotherapist in Australia wrote that the difference to her is “life changing.”

“This practical advice for glucose control is easy to read and, more importantly, to apply. We do need to measure our glucose levels so we can make informed decisions.”

—Posted by Dianne in Store.LivingTheCRWay.com on August 3, 2014

We were also very pleased when we heard from Thomas, who wrote that he experienced “less post-meal glucose surging.”

“We are very pleased when we heard from Thomas, who wrote that he experienced ‘less post-meal glucose surging.’

With Paul and Meredith’s advice, I have already begun to see benefits in my post-meal glucose levels. I used to get really tired after my lunch at the office and it seemed to be due to a prediabetic condition that had my glucose surging in some cases. With healthier meal choices, understanding what affects my sugar levels, and a quick 15-minute walk after lunch, my glucose levels have never been better. And I feel both the positive physical and mental effects.”

—Posted by Thomas in Store.LivingTheCRWay.com on April 24, 2014

Postprandial glucose or post-meal glucose surges, as Thomas appropriately describes them, can be extremely dangerous. We help participants plan meals that avoid this.

In October 2013, Cliff wrote, “In a word: superb.”

“The CR Way® to Great Glucose Control eBook has been invaluable to me. More than just basic meal planning or a simple diet designer, this book has given me a framework and foundation for how to live healthier. When you really understand how the biology works and what you are doing to your body with your food choices, then you can begin to truly control your blood glucose (and your underlying health).”

—Posted by Cliff in Store.LivingTheCRWay.com on October 10, 2013

Improving Gut Health

The 2016 edition of The CR Way® to Great Glucose Control goes beyond glucose control and integrates new ideas for whole-body health. For example, we frequently write blog posts about practical ways to improve gut health and other health topics. This cutting-edge information is integrated into the new diet and lifestyle plans, so participants can improve many aspects of their health.
Live Classes Inspire
Making Glucose Control a Reality

“We like talking with people and teaching the live sessions,” explains Meredith. “Learning to control glucose ultimately helps people live longer and better, and interacting with participants is part of that. It helps build positive social networks that have been shown over and over to lead to longer, healthier lives.⁶

“If we help participants feel good, they are inspired to put healthy ideas into practice. That’s a prescription for longer life that anyone can follow.”

Summary

The CR Way® to Great Glucose Control features live online classes for people who want to keep their blood glucose at optimal levels. Since it was introduced in 2009, hundreds of people have benefited from the caring, personalized instruction.

The CR Way® to Great Glucose Control program has now been expanded:

• Four live 30-minute classes that are easy to work into busy schedules.
• Instructional videos that describe key elements of glucose control.
• Five beautifully illustrated and updated e-books with new easy-to-follow recipes, food suggestions, and ideas for improving the gut microbiome.

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

Paul McGlothin and Meredith Averill are co-authors of The CR Way® (HarperCollins, 2008) and they lead The CR Way® Longevity Center. To learn more about the CR Way® or the CR Society International, visit www.LivingTheCRWay.com or www.CRSociety.org.

References

**Tri Sugar Shield®** contains three active ingredients—Sorghum, Mulberry Leaf, and Phloridzin—that help support glucose metabolism by promoting:¹⁻⁸

- Beneficial glucose metabolism in the liver
- Insulin sensitivity and favorable blood glucose transport in cells and tissues
- Favorable balance of enzymes in the digestive tract and kidneys involved in the control of glucose
- The movement of glucose out of the blood and into muscles and the liver
- Healthy absorption of glucose from the bloodstream into muscle cells

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**References**

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Caution: If you are taking blood glucose-lowering medication, consult your health care provider before taking this product.

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**Tri Sugar Shield®**
Item #01803 • 60 vegetarian capsules

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

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Since it was introduced in 2009, hundreds of The CR Way to Great Glucose Control participants have benefited:

“…my glucose levels have never been better. And I feel both the positive physical and mental effects.”
– Thomas, April 24, 2014

“…easy to read and, more important, easy to apply.”
– Dianne, August 3, 2014

“…a framework and foundation for how to live healthier.”
– Cliff, October 10, 2013

Take advantage of the new, expanded The CR Way to Great Glucose Control:

• Four live 30-minute teleconference classes—easy to work into your busy schedule.

• Glucose control experts Paul McGlothin and Meredith Averill teach the classes—live!

• Instructional videos, describing key steps to get great glucose control.

• Five beautifully illustrated, updated e-books with new recipes, food suggestions, and even ideas for improving your gut microbiome.

Live, Personal Guidance at an Affordable Price!
Personal guidance by experts can cost thousands of dollars. To make it possible for Life Extension® supporters to participate, The CR Way to Great Glucose Control program is offered for an introductory price of just $159. Act now to join Paul McGlothin and Meredith Averill for the live classes, the five beautifully illustrated e-books, and the instructional videos—before the price increases next month.

Don’t risk the suffering and financial ruin that comes with memory loss, heart disease, diabetes, cancer, Alzheimer’s disease, and shorter life span—all associated with high blood glucose.

Take advantage of this lifesaving opportunity to lower your glucose and live better longer!

The CR Way to Great Glucose Control CD
Item #38840

Retail Price $189
Your Price $159 (for a limited time only)

To order The CR Way to Great Glucose Control, call 1-800-544-4440 or visit www.LifeExtension.com/CRWay

Meredith Averill and Paul McGlothin
Founders of The CR Way Longevity Program
Researchers at Harvard Medical School and Cleveland Clinic have been investigating omega-7, a fatty acid with body-wide benefits. Their focus has been on how omega-7 promotes a healthy metabolism.

Provinal® Omega-7 is becoming a popular nutrient used to enhance omega-3s by providing the following systemic effects:

- Supports a healthy, stable weight
- Increases satiety hormones
- Regulates fat production within fat cells
- Helps smooth arterial walls
- Supports cardiovascular health
- Supports cellular glucose shuttling
- Supports insulin sensitivity
- Supports healthy triglyceride and cholesterol levels already within normal range

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To order Provinal® Purified Omega-7, call 1-800-544-4440 or visit www.LifeExtension.com

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Does your multivitamin measure up?

Two-Per-Day beats Centrum® in 10 ways!

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

Life Extension®’s Two-Per-Day contains superior forms of nutrients such as 5-MTHF that is up to 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.

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

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

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L-Theanine helps control overstimulation of brain cells—promoting relaxation without diminished daytime alertness or other side effects.\(^1\)

The L-Theanine in this product:

- Inhibits excitatory stimuli at glutamate receptors in the brain\(^2,3\)
- Stimulates production of relaxing neurotransmitter GABA\(^4\)
- Beneficially influences gene expression in brain areas related to memory and mood\(^4\)
- Supports blood pressure control under stress for those within normal levels\(^2\)

**Non-GMO**

**References**


Suntheanine\(^*\) is a registered trademark of Taiyo International, Inc. Use of Suntheanine\(^*\) is protected by U.S. Trademark Reg. No. 2548957.

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Newly Discovered Benefits of BLUEBERRIES

Frailty is the medical term used to describe weakness, immobility, and loss of coordination that afflicts the elderly. Frailty and osteoporosis are major causes of the falls and bone fractures that can terminate independent living for senior citizens.

Blueberries have been found to improve mobility in the elderly, which can play a significant role in reducing the risk of life-threatening falls.9

Published research reveals that blueberries favorably impact cells throughout our bodies. Ingestion of blueberry polyphenols facilitates critical DNA repair needed to maintain youthful cell integrity.1-8

This Research Update describes recent studies that confirm broad-spectrum benefits associated with blueberry polyphenols.

Enhanced Mobility in Frail Elderly

As we age, we tend to lose mobility due to factors such as obesity, lack of physical activity, and neuronal impairment, along with chronic diseases like arthritis or diabetes.9 This lack of mobility in the elderly is often accompanied by other disorders including incontinence, which can lead to a greater risk of a urinary or skin infection.10

A study published in Applied Physiology, Nutrition, and Metabolism found that when elderly subjects with poor mobility consumed two cups of blueberries a day for six weeks, they showed significant improvement in their movement.11

The researchers observed the most improvement in their gait, or manner (steadiness) of walking. As one ages, the gait test is especially important because it measures the risk of falling.12 Over 700,000 Americans a year are hospitalized due to injuries caused by a fall.13

In the study, those who consumed the blueberries for six weeks had increased speed, fewer step errors, better foot placement, and improved balance on the gait test compared to the control group.9
These findings have implications for aging humans who have risk factors for atherosclerosis.

**Retina Protection**

Light-induced damage can lead to debilitating ocular conditions such as age-related macular degeneration, a major cause of blindness in the elderly population. Part of what happens when there is excessive light damage is the oxidation of fatty acids that compromise health and threaten retinal cells.

Researchers evaluated the impact that daily visible light exposure had on retinal fatty acids and then assessed the benefits of supplementation with blueberries and their impact on lipid peroxidation. In this study, blueberries were shown to reduce lipid peroxidation, confirming their protection to the retina.

**Blueberries and Nutrients for the Brain**

Over the years, numerous studies have shown blueberries support overall brain health. Significant results reveal that blueberries can reduce many of the risk factors for Alzheimer’s, such as the aggregation of beta amyloid and oxidative stress.

When beta amyloid plaques accumulate in the brain, they interfere with the cell-to-cell signaling of neurons, which is believed to be a main cause of Alzheimer’s. This build up begins growing in the hippocampus (part of the brain that stores memory), and if left untreated, spreads to other areas of the brain.

A recent mouse model for Alzheimer’s disease evaluated the brain support provided by blueberries in combination with omega-3 and phosphatidylserine.
Two-month-old animals were divided into three groups—a control group, a group given a low-dose supplement, and a group given a high-dose supplement. After seven months, the control group developed an increase in the number and volume of amyloid plaques as expected. Conversely, mice in the low and high-dose supplement (blueberry, phosphatidylserine and omega-3) groups showed fewer plaques, suggesting that the nutrient combination can provide protection against the development of amyloid plaques. Markers of oxidative stress were also decreased in the supplemented mice.

A noteworthy result was that the mice who received the nutrient combination (blueberry, phosphatidylserine, and omega-3) showed an increased amount of acetylcholine, which is a neurotransmitter that facilitates the transmission of impulses between neurons.

Acetylcholine deficiency has been linked in the development of Alzheimer’s. The drug memantine (Namenda®), for example, is a widely used drug to treat Alzheimer’s that works by inhibiting the enzyme that breaks down acetylcholine. This type of medication may reduce the symptoms of Alzheimer’s, but is accompanied by unfavorable side effects.

**Summary**

Blueberries have even more health benefits than previously believed, including the ability to improve mobility and reduce the risk of life-threatening falls in the elderly.

New evidence shows that blueberries can help protect the retina, reduce risk factors involved in atherosclerosis, and protect against structural changes in the brain that lead to Alzheimer’s dementia.

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

**References**


Scientists have discovered that quercetin, a compound found in certain foods, can safely remove tired, aging (senescent) cells from the body, thereby making room for younger, more vital cells.

A number of studies suggest that quercetin may slow aging and reduce the risk of age-related factors.\(^1\)\(^,\)\(^2\)

Optimized Quercetin
Item #01309 • 60 vegetarian capsules

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Endothelial function is closely associated with male sexual capacity.\(^1\)

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

**A Powerful Combination to Support Sexual Health**

This patented blend positively affects the male physiology in three ways:

1. **PYCNOGENOL\(^a\)** (standardized French maritime pine bark extract) activates *endothelial nitric oxide synthase*,\(^7\) the enzyme required to make nitric oxide. Nitric oxide relaxes the vessels that enable efficient blood flow—the key to healthy male sexual activity and overall vascular health.

2. **L-ARGININE** is the biological precursor to nitric oxide synthesis in the endothelium\(^7\) and sustains nitric oxide levels sufficient for healthy sexual function.

3. **ICARIIN** is a natural botanical extract shown to *deactivate* the enzyme responsible for winding down male sexual response, further promoting sustained activity.\(^8\)

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**References**


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To order Prelox® Natural Sex For Men®, call 1-800-544-4440 or visit www.LifeExtension.com

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Studies show that blueberries delay the aging process through a variety of mechanisms, including maintaining healthy DNA structure and favorably modulating genes associated with aging.1,2 Chockfull of anthocyanins, the blueberry provides health-boosting benefits shown to:

• Enhance heart health1
• Maintain brain function3-5
• Sustain healthy blood sugar levels already within normal range6
• Support smooth firm skin7
• Improve movement and coordination8

Blueberry extract is more potent than the whole berry, providing greater metabolic support throughout the body and without the excess sugar of raw fruit.9

Blueberry Extract Capsules consist of concentrated extracts from wild blueberries, which possess up to 10 times the antioxidant capacity of cultivated berries.

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Enhance Eyelashes Naturally
Aging can take a heavy toll on the eyelashes, making them noticeably thinner, shorter, and more brittle. Many people resort to commercial products to create an illusion of improvement, but they fail to address the underlying causes. Current treatments include drugs originally developed to treat glaucoma. The hefty price tag and side effects associated with these drugs prompted scientists to search for safer alternatives.

In this article, you’ll learn how scientists uncovered natural compounds that work in complementary ways to protect and strengthen the structural foundation of eyelashes—naturally making them healthier, longer, and thicker.
As a person ages, exposure to ultraviolet (UV) radiation compromises the regenerative capacity of hair follicle stem cells. Keratin production also diminishes in hair follicles. Together, these age-associated changes lead to the outward appearance of weak, thin, and short eyelashes.

Fortunately, scientists have uncovered compounds that effectively target these changes to improve the appearance of eyelashes.

**Novel Plant Extract Safeguards against Ultraviolet Radiation**

Ultraviolet radiation induces oxidative stress in hair follicle stem cells that reduces their vitality and activity, in turn diminishing the health and longevity of the eyelashes. Scientists began investigating safe and effective compounds that protect hair follicle stem cells against the consequences of sun exposure. Plant stem cells derived from a rare grape variety quickly stood out.

Gamay Teinturier Fréaux grapes grow in an east-central region of France. They have red flesh and juice that signifies a high content of anthocyanins, flavonoids that combat oxidative stress through...
potent free radical scavenging activity. The unique synergy between anthocyanins and other metabolites present in the grape provides frontline defense against ultraviolet damage.

The capacity of stem cells to form colonies, known as colony-forming efficiency, is a key measure of their vitality and activity. Ultraviolet radiation has been shown to decrease colony-forming efficiency. Researchers conducted a laboratory experiment in which skin stem cells were treated with or without grape stem cell extract before exposure to ultraviolet radiation. While untreated cells experienced a 58% decrease in colony-forming efficiency, no changes were seen in treated cells. This demonstrated that treated cells were safeguarded against harmful ultraviolet radiation.

Let's now take a look at how a recently developed peptide significantly enhances eyelash growth.

**Myristoyl Pentapeptide-17 Stimulates Eyelash Growth**

The formation of keratin in the anagen phase is essential for eyelash growth and density. With advancing age, this process fails to run smoothly. To combat age-related decline in keratin synthesis, scientists developed a peptide called myristoyl pentapeptide-17. It has been shown in laboratory experiments to increase the expression of keratin genes by up to 160%, thereby boosting keratin production. This has translated into striking results in human clinical studies.

In a recent trial, 15 human volunteers ranging in age from 24 to 82 applied an eyeliner serum containing myristoyl pentapeptide-17 to the roots of their lashes. The researchers used computer-assisted image analysis software to assess eyelash characteristics. They observed a 25% increase in eyelash length and thickness in just 14 days!

Even more impressive, another study revealed that participants applying an eyeliner serum with myristoyl pentapeptide-17 to the target area increased eyelash thickness and length by 72% after six weeks. Both studies reported no adverse side effects.

**Glycoproteins Support Hair Follicle Formation**

Glycoproteins are large molecules composed of carbohydrate and protein. They form a vital part of the extracellular matrix that provides a proper environment for the development of new hair follicles. In fact, research indicates that glycoproteins act as powerful chemical messengers between the layers of the skin to jumpstart eyelash growth.
Panthenol Exerts Powerful Moisturizing Effects

Panthenol has been a mainstay ingredient in hair products for the past two decades and for good reason. It is a derivative of pantothenic acid (vitamin B5), a vital component of coenzyme A that assists in metabolic functions such as protein and lipid synthesis. Panthenol is converted into pantothenic acid in the hair shaft where it effectively binds water molecules, thereby improving eyelash moisture.20

Summary

Current treatments to improve aging eyelashes come with a steep price and substantial side effects, making them an unattractive option for many people. Fortunately, scientists have identified a network of complementary compounds, including a novel plant extract, myristoyl pentapeptide-17, glycoproteins, and panthenol, which protect and strengthen hair follicles to naturally deliver healthier, longer, and thicker eyelashes.●

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

• Mitochondrial dysfunction is linked to accelerated brain aging.
• CoQ10 energizes aging cells and enhances mitochondrial function.
• Shilajit works with CoQ10 to increase cellular energy.

Super Ubiquinol CoQ10 combines the energy-activating power of shilajit into a formula that's more potent than a stand-alone CoQ10.

Retain Youthful Mitochondrial Activity
with
CoQ10

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FISH OIL + OLIVE EXTRACT + SESAME LIGNANS

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

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- Provides the polyphenol equivalent of 8 to 12 tablespoons of heart-healthy extra virgin olive oil.
- Specialized support against free radical oxidation with sesame lignans, a novel component of the heart-healthy Mediterranean diet.

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

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Unleash the power of plant stem cells, peptides, glycoproteins, and panthenol for more youthful-looking eyelashes!

These natural ingredients, studied in the lab and clinic, support:

- More youthful skin stem cells,
- Increased eyelash thickness and length by up to 72% within just six weeks,
- Eyelash growth, and
- Eyelash moisture.

Simply apply to clean lashes morning and night.

References
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Each cost-effective bottle lasts over three months!

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Non-GMO

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

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Non-GMO

Note: EGCG is the acronym for epigallocatechin gallate, which is the polyphenol in green tea that has demonstrated the most robust health benefits.

References

To order Mega Green Tea Extract, call 1-800-544-4440 or visit www.LifeExtension.com

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“Clearly,” says Tieraona Low Dog, MD, “many Americans are not getting everything they need in their diet as seen by the deficiencies noted by the US Centers for Disease Control data.”

Of Cherokee descent, Dr. Low Dog is an integrative medicine specialist practicing in Pecos, New Mexico. “Many of my patients,” she notes, “benefit from a high-quality multivitamin that is specific for age, gender, and lifestyle.” She also prescribes a wide array of minerals, herbal remedies, and other supplements, especially to older patients.

An internationally recognized authority on integrative medicine and dietary supplements, Dr. Low Dog has chaired two committees on dietary supplements for the US Pharmacopeia and served as adviser to both the White House and the National Institutes of Health. She’s also the author of *Fortify Your Life* (National Geographic Books), a recently published guide to vitamins, minerals, and other key supplements. Dr. Low Dog says that a major reason that she wrote this book is that, “Very few health care professionals are routinely checking nutrient levels, and even fewer discuss the potential for deficiencies with their patients, with the exception of potassium and diuretic use.”
**Drug-Induced Nutrient Deficiencies**

Dr. Low Dog and her physician colleagues are seeing various drug-related nutrient-deficiency problems on the rise. For instance, “We are seeing more people having difficulty with absorption of nutrients due to broad use of proton pump inhibitors, or PPIs, which are drugs that inhibit the proton, or acid-producing, pumps in the stomach,” she says. “Sold under such brand names as Prilosec®, Nexium®, and Protonix®, these are used to treat acid reflux and are, in my opinion, overprescribed.”

Dr. Low Dog relates that a person’s level of CoQ10, “which is very important for heart and neurological health, can be depleted by numerous prescription drugs.” These include such widely prescribed drugs as statins and beta-blockers.

“We are also seeing more people having difficulty with absorption of nutrients due to the prevalence of autoimmune disease and the aging population,” says Dr. Low Dog. “Digestive enzymes can be useful in this regard because they stimulate the body’s production and/or release of stomach acid, bile, and pancreatic enzymes.”

Dr. Low Dog points out that bitter foods (arugula, radicchio, endives) and bitter herbs (dandelion root, artichoke leaf, gentian root, angelica) can be added to the diet to enhance the stimulation of stomach acid, bile, and pancreatic enzymes.

“For some people, digestive enzymes may be necessary,” says Dr. Low Dog. “While you can take enzymes that are derived from plants or animal sources, I generally recommend the former. Look for products that provide Food Chemical Codex (FCC) units. In the US, Food Chemical Codex is the national standard for evaluating activity and potency of enzymes.”

As a physician who views public health issues as major influences upon the fate of the nation, “I’m deeply concerned about the mixed messages in the media regarding the current state of nutrition in the US,” says Dr. Low Dog. She objects to the oft-repeated mantra, “If you just eat right, you’ll get everything you need.” As she notes in *Fortify Your Life*, this is contradicted by unassailable research findings that some of the most widely prescribed drugs in the US deplete the body of vital nutrients.

In Dr. Low Dog’s opinion, the science of drug-nutrient depletions and interactions “are totally off the radar” in US medical school curricula. “Drug companies should be required to list potential nutrient depletions in their commercials and advertisements,” she asserts. “While I am not in favor of direct-to-consumer advertising of drugs, until it is banned, I believe that this should be mandatory.

“We should increase the training for medical doctors, nurse practitioners, pharmacists, registered dietitians, psychologists, and many other health professionals so that we can all be advocates on our patient/client’s behalf.” Dr. Low Dog continues.

*Fortify Your Life* is filled with the kind of practical and actionable news that everyone can use. For instance, while it’s estimated that 30 million people take Prozac® and other antidepressant SSRIs, these drugs have been proven to deplete the body of vital nutrients like iodine, selenium, and vitamin B9 (folate) and hormones like melatonin. “Around 60% of Americans take at least one prescription drug,” Dr. Low Dog notes, “and 15% take five or more every day.” Thus, the risk for drug-induced nutrient depletions in the majority of the population “further increases the risk of nutrient deficiencies.” Fortunately, *Fortify Your Life* contains a lengthy, detailed, and easy-to-understand Appendix of Drug-Nutrient Depletions and Interactions.
With more than 30 million Americans deficient in vitamin B6, which can cause depression and poor cognition, and roughly the same number of people taking antidepressant medications, “It concerns me that health care providers don’t ever think to check B6 levels,” says Dr. Low Dog. “If we never think about it,” she continues, “we may never look and thus we may remain unaware of the deficiency.

“I do not always order blood tests,” explains Dr. Low Dog, “but I do if I suspect deficiency based upon a thorough history and physical exam.” If a nutrient deficiency is noted, “We make recommendations accordingly and then recheck generally in eight to 12 weeks.”

If the follow-up blood test shows that supplement levels have made little improvement, Dr. Low Dog carefully considers various factors related to the nutrient deficiency in question.

**Best Way to Take Supplements**

“Are we using the correct form of a nutrient (e.g. pyridoxal-5-phosphate instead of pyridoxine for vitamin B6)?” Dr. Low Dog asks. “Would a liquid or capsule be superior to a tablet? Do we have the partner nutrients that are necessary for activation, use, and transport by the body?”

For instance, she says, “Iron is needed to correct iron deficiency anemia, but you need vitamin A to move the iron into the hemoglobin and vitamin C is necessary to absorb non-heme forms of iron.” Then again, “You need vitamin A to see in dim light at night, but you must have zinc to transport it from the liver (where it is stored) to the retina.” Noting that vitamin D insufficiency is very common in the US population, Dr. Low Dog offers this compelling advice about supplementing with vitamin D: “Taking vitamin D with the dinner meal can increase absorption by 50% more than taking with breakfast (dinner meals generally contain more fat).”

**More Health-Enhancing Facts**

Noting that immunity begins in the gut, Dr. Low Dog says, “Probiotics and prebiotics, whether in supplement form or in foods, are vitally important in a society where one in three babies are born by C-section and the average 21-year-old [person] has typically taken 17 rounds of antibiotics. We are just in our infancy when it comes to fully realizing the vital importance of the human microbiome and health.”

Fortify Your Life brims with many other potentially health-enhancing facts on often-overlooked benefits of basic nutrients such as magnesium. For instance: “When blood sugars rise, magnesium is excreted in the urine. Up to a third of people with diabetes are deficient in magnesium, further complicating their ability to maintain good blood sugar control: a vicious cycle. Magnesium may also protect us from stroke by making our platelets less likely to form blood clots.”

Dr. Low Dog also takes a multivitamin and vitamin D every day. “I take probiotics three to four times per week and eat culture-rich yogurts on the other days. I take a high quality cod liver oil two to three times per week. During cold and flu season, I take vitamin C, zinc, and elderberry.”
an emeritus professor of biochemistry and molecular biology at the University of California, Berkeley, has done extensive research on mitochondria and aging,” Dr. Low Dog relates in *Fortify Your Life*. “Dr. Ames discovered that if you want to maintain a healthy heart, brain, and nervous system, there is probably no better combination than the antioxidant alpha-lipoic acid and acetyl-L-carnitine, a potent [amino acid].” These enhance the energy production of the mitochondria, the powerhouse of our cells. Dr. Low Dog believes that many people 50 and over “would benefit from taking a supplement that provides 500 to 1,500 mg of acetyl-L-carnitine in addition to alpha-lipoic acid.”

**Cognitive Protection**

As Dr. Low Dog writes in *Fortify Your Life*, “Since alpha-lipoic acid easily crosses the blood-brain barrier, its antioxidant effects may be particularly important in protecting the central nervous system from illness, disease, and DNA damage. Thus, it may play a role in helping protect us against Alzheimer’s disease, dementia, and Parkinson’s disease. One small, double-blinded, placebo-controlled 12-month study published in 2014 in the *Journal of Alzheimer's Disease* found that the combination of fish oil (975 mg of EPA and 675 mg of DHA) and 600 mg of alpha lipoic acid slowed both cognitive and functional decline in people with dementia.”

Although Dr. Low Dog emphasizes that we are only in the “very early stages of research, and neurodegenerative diseases are complex, based upon what we know so far, alpha-lipoic acid may play an important role in the healthy aging of our brain.” Anyone aged 65 or older, diabetics, and those with a family history of dementia or other neurodegenerative diseases may want to consider supplementing with alpha-lipoic acid. Dr. Low Dog recommends 200 to 400 mg a day for most users and 600 mg two times per day in case of neuropathy or cognitive decline.

These and other highly nuanced insights into maximizing our nutrient intake for well-being and optimum aging makes *Fortify Your Life* such a worthwhile book to read and refer to as you manage your health.

Dr. Tieraona Low Dog is an internationally recognized expert in the fields of dietary supplements, herbal medicine, women’s health, and natural medicine. In 2000, she was appointed by President Bill Clinton to serve on the White House Commission of Complementary and Alternative Medicine and she recently completed a three-year term as a member of the Advisory Council for the National Institutes of Health National Center for Complementary and Alternative Medicine (NCCAM). She has published 45 peer-reviewed articles, written 22 chapters for medical textbooks, and authored three National Geographic books, including *Healthy at Home* and *Life Is Your Best Medicine*. She has also co-authored the *Guide to Medicinal Herbs*.

For more information, or to contact Dr. Low Dog, visit www.drlowdog.com.

To order *Fortify Your Life*, call 1-800-544-4440 or visit www.LifeExtension.com

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Healthy sleep is one of the best ways to feel revitalized and maintain optimal health. Increasingly, research has shown the health benefits of a good night’s sleep. Melatonin is one of the most popular supplements for supporting sleep.

Now, pick the right melatonin for your needs with doses ranging from 300 mcg to 10 mg. For optimal results, melatonin should be taken within 30-60 minutes of going to sleep.

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Magnesium is the most important mineral in the body, yet most Americans do not obtain sufficient magnesium from their diet. Magnesium is required for more than 300 biochemical reactions and many of the body’s critical functions are dependent upon it. Magnesium helps:1, 2

- Maintain normal muscle and nerve function.
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The recommended intake of magnesium to maintain vascular health is 500 mg or more a day. With Life Extension® Magnesium Caps, you can easily obtain 500 mg of elemental magnesium for less than 7 cents a day!

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Caution: If taken in high doses, magnesium may have a laxative effect. If this occurs, divide dosing, reduce intake, or discontinue use.

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References
**LE:** I’m concerned about Alzheimer’s disease, as it “runs” in my family. Am I at risk?

**HL:** Characterized by a decline in cognitive function, Alzheimer’s disease is a neurodegenerative disorder that affects millions of individuals and families worldwide. Research finds this devastating disease to be the consequence of multiple factors including inflammation, mitochondrial dysfunction, accumulation of toxic proteins, and oxidative stress. Others stress the implications of chronic infection both in the development and progression of Alzheimer’s disease. In addition, age-related changes in vascular function and declining hormone levels are thought to contribute to the disease.

It is clear that multiple factors influence the risk of Alzheimer’s disease. Some of the factors associated with Alzheimer’s disease like obesity and nutrient deficiencies are modifiable, but others, such as carrying the ApoE4 gene, are not. Family history, aging, and certain infections, as well as diseases like diabetes and hypertension, also increase the risk. This is just a small list of the most common factors associated with an increased risk of Alzheimer’s disease.

More important is to look at the specific individual when it comes to the risk factors, such as if an aging adult has a parent with Alzheimer’s disease and/or if this person has a history of high blood pressure. The appropriate approach would be to look at blood pressure first. What usually happens at this point when the causes of high blood pressure are explored, risk factors like elevated cholesterol or homocysteine arise.

**Q:** What are some suggestions to reduce the risks?
The next step is to identify additional risk factors by looking at blood work. Life Extension®’s Male and Female Panels do a great job as they are comprehensive tests that look at different areas including markers for diabetes (glucose and HbA1c) and inflammation (C-reactive protein and homocysteine) as well as male/female hormones, lipid panel, vitamin D, complete blood count (CBC), and blood chemistry.

Let’s assume that the results from the blood test reveal elevated homocysteine and cholesterol levels, blood markers associated with an increased risk for both high blood pressure and Alzheimer’s disease. The proper approach for this individual would be to correct nutrient deficiencies caused by a medication (as this might be related to the increase in homocysteine due to depletion of B vitamins) followed by strict blood pressure control, dietary modifications, an exercise program, and nutrients like red yeast rice and omega-3s to aid healthy cholesterol metabolism. Due to the individual’s family history of Alzheimer’s disease, preventive approaches with nutrients like acetyl-L-carnitine, vitamin D, CoQ10, N-acetyl cysteine (NAC), curcumin, and R-lipoic acid could be suggested.

LE: I have been told that my memory is good, so how can I preserve it?

HL: Nutritional approaches should be combined together with diet and exercise to successfully preserve memory in aging adults. Remember that cognitive decline if left unchecked can develop into more serious conditions like Alzheimer’s disease.
If someone does an internet search for memory and supplements, they would be overwhelmed with the amount of information that is provided. For those concerned about memory, the top nutrients to incorporate into a regimen may include:

**Fish oil:** Helps ease inflammation and support the integrity of cell membranes that are crucial for brain function. Numerous studies indicate that supplementation optimizes cognitive health.

**Phosphatidylycerine (PS):** Important for cell membrane integrity and facilitates cell communication between neurons in the brain.

**Alpha-glyceryl phosphoryl choline (A-GPC):** This form of choline supports healthy acetylcholine levels, an essential neurotransmitter that allows brain cells to communicate and is involved in memory and learning.

**Vinpocetine:** Derived from the periwinkle plant, it supports healthy cerebral blood flow.

**Acetyl-L-carnitine:** This form of carnitine crosses the blood-brain barrier and supports mitochondrial health.

**Taurine:** Promotes new brain cell formation.

**Ashwagandha:** Targets the enzyme that breaks down acetylcholine in the brain.

Be aware that these are not the only nutrients that may support brain function. The most important component of any supplement regimen is to identify the underlying factors that contribute to the problem and correct it. Other key nutrients that aging adults may consider and that are specific to Alzheimer's disease are summarized in the table below.

**LE:** Are there any dietary or lifestyle strategies to reduce the risk of Alzheimer's?

**HL:** Several studies have demonstrated a reduction in neurodegenerative diseases including Alzheimer's disease in those that follow a Mediterranean or MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay) diet. Incorporating “good fats,” especially omega-3s and olive oil, multi-colored vegetables and fruits, nuts, legumes, and fish along with a lower intake of sweets, meats, and high-fat dairy may help reduce the risk of Alzheimer's disease and several other diseases. Other researchers have reported that a low-calorie diet is also beneficial to reduce the risks of cognitive decline and Alzheimer's disease.

Physical exercise is known to enhance cognitive function in humans. Research has identified a signaling protein called brain-derived neurotrophic factor that is key to brain health as it facilitates the growth of new neurons (brain cells). Regular exercise is associated with an increase in brain-derived neurotrophic factor.

For those concerned about cognitive decline and Alzheimer's disease, a combination of a low-calorie Mediterranean/MIND diet along with an exercise regimen that includes 30 minutes of physical activity at least three or four times a week may be useful.

Remember that addressing the underlying cause(s) of Alzheimer's disease is perhaps the most valuable and important approach to prevent such a devastating disease. Currently, there is no magic bullet to reduce the risk for this condition and it is crucial to build a multi-targeted regimen around diet, exercise, and nutrients to reduce the risks.

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

Hernando Latorre, MD, MSc, is the medical editor for Life Extension® magazine.

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<td><strong>Nutrients with Strong Evidence from Human Studies</strong></td>
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Milk thistle extract—rich in silymarin—is one of nature's most powerful weapons to support liver health. Scientific studies demonstrate silymarin's ability to provide potent protection for your liver.  

Life Extension's European Milk Thistle contains standardized, top-grade potencies of silymarin, silybin, isosilybin A, and isosilybin B, providing a full spectrum of liver-supportive compounds. This unique formula includes phosphatidylcholine, a nutrient that promotes better absorption of milk thistle extract.

The silymarin contained in European Milk Thistle is absorbed 5 times better than silymarin alone, and its concentration in the liver is 10 times better.

References

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- **40 mg** of Hyal-Joint®, cushions joint cartilage and protects against normal joint wear and tear.

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Taurine, a free amino acid, has been described by scientists as "one of the most essential substances in the body." But as we age, taurine levels decline.

**Cognitive Function and Brain Cell Regeneration**

The benefits of taurine on brain cell growth are especially evident in those with a taurine deficiency, which includes aging individuals.

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Taurine also enhances neurites, the tiny projections that help brain cells communicate with each other.

**Whole-Body Health**

Past research has also shown the ability of taurine to maintain and support:³⁻⁹

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- Insulin sensitivity,
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- Liver function,
- Eye health, and
- Hearing function.

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**References**


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

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Have you ever imagined what it would be like to live 100 years from now? Life sciences entrepreneur David Kekich of Newport Beach, California, stretches imagination into reality by hosting parties around the time-traveling premise that the future is now.

Kekich's end-of-the-year 2015 bash drew an all-star cast of PhD evolutionary biologists, anti-aging researchers, wellness executives, gene therapy entrepreneurs, and other super-centenarian seekers. One wall of the room featured a huge television that silently screened the original Star Wars film. Partygoers clad as characters out of iconic science fiction series such as Star Trek (as well as those in chic Californian ensembles) debated such questions as:

- What anti-aging research breakthroughs will occur in 2016?
- Where in the world is gene therapy research progressing the fastest? What cures will be the first to become widely affordable?
- How should CRISPR-cas9, the bacterial system discovered in 2012 that allows for quick and easy changing of the DNA of nearly any organism, (including humans) be regulated?
According to Kekich, “The main point of the party was to enjoy catching up with each other, as well as to celebrate how the search for an enhanced human life span is picking up speed.”

Kekich, clad in a sleek silver jumpsuit reminiscent of Flash Gordon, has been confined to a wheelchair for decades due to a spinal cord injury. Due to the synergistic effects of disciplined workouts, careful eating, nutritional supplementation, and innate curiosity, Kekich is nevertheless a highly engaging avatar of anti-aging. Brimming with radiant health, compelling conversation, and high energy, Kekich is the author of *Smart, Strong and Sexy at 100*, a how-to guide that summarizes evidence-based medical research into remedies for aging, along with action plans for cultivating optimum health and maximum life span.

**Good News Ahead**

There is plenty of marvelous medical health news to celebrate at this moment in history, Kekich said. “With each passing year,” he noted, “science comes closer to finding remedies for slowing the onset of aging.”

Kekich, who defines aging variously as “a disease” or as “an undesirable, but not necessarily inevitable, byproduct of the evolutionary process,” has devoted decades of energy to the anti-aging business and to studying anti-aging research. “I specialize in raising funding and providing management for life sciences-related technologies that aim to enhance quality of life and human life span,” he added. “Talking to research scientists and working with them is endlessly fascinating, which fills my life with ongoing exploration and surprises.”

**Supplementation Tips**

David Kekich suggests that an anti-aging specialist monitor your blood panels, as he has done, if you want to take a scientific approach to supplementation. Kekich looks forward to the day when everyone can customize a vitamin, mineral, and nutraceutical supplement regimen with scientific precision across a life span. “I am hoping that we will soon be able to affordably map personal genomes and learn what to do with all the data rather than rely on educated guesswork,” he said.

Given that everyone has unique body biochemistry and health issues, Kekich added, “I never suggest any particular dosages for specific supplements. One size does not fit all. For optimal health, and before starting any supplement protocol, I recommend that you see a qualified anti-aging physician.”

Kekich buys almost all of his supplements from Life Extension®. “I have been a customer of Life Extension for 25 years,” he says. “I agree with its list of the 12 essential steps for streamlining one’s longevity protocol.”

Life Extension®’s recommendations for achieving optimal health include the following:

- Life Extension Mix™ (in my opinion, the world’s most complete and most potent multi-vitamin/mineral formula)
- Super Omega EPA/DHA with Sesame Lignans and Olive Fruit Extract
- Super Ubiquinol CoQ10
- Vitamin D3
- Mitochondrial Energy Optimizer with BioPQQ®
- DHEA (see an anti-aging physician or speak to a Life Extension® Health Advisor for more information)
- Cognitex® with Pregnenolone & Brain Shield®
- Bone Restore
- Ultra Natural Prostate
- Advanced Bio-Curcumin® with Ginger & Turmerones
- Low-Dose Aspirin (Enteric Coated)
- Once-Daily Health Booster

In addition, Kekich also takes probiotics for intestinal health, a full range of vitamins and other supplements including vitamin C, vitamin E (mixed tocopherols alpha/gamma), vitamin K, acetyl-L-carnitine, alpha lipoic acid, anthocyanins, astaxanthin, and melatonin. (Melatonin production declines with age in humans. As Kekich notes in his book, some anti-aging physicians and functional medicine specialists suggest that increased dosages may be helpful for those experiencing insomnia as time goes by.)
Kekich’s Background and History

In 1999, Kekich founded the Maximum Life Foundation, a 501(c)(3) not-for-profit corporation dedicated to reversing human aging and aging-related diseases. Since then, the Foundation, in collaboration with leading researchers, has developed scientific action plans for helping slow the onset of aging while fostering optimal mental and physical health. The CEO of SciCog Systems, Inc. and Age Reversal, Inc., Kekich also serves as a board member of the American Aging Association and Alcor Foundation Patient Care Trust Fund.

“I first became intrigued with the concept of life extension in 1977 after founding the largest life insurance master general agency in the United States,” Kekich said. “This raised $3.1 billion of premium income for First Executive Corp. and the experience exposed me to many sobering facts and figures related to death from unhealthy lifestyles and death from aging.” It also prompted him to seek out and work with expert researchers in the field. Paraphrasing evolutionary biologist, author, and party guest Michael Rose, PhD, Kekich explained, “It appears that the evolutionary process loses power with each year that we live past the onset of our reproductive age until 'the force' (as Dr. Rose calls it) finally fades to black.”

On the upside, “I am encouraged by Dr. Rose’s precedent-setting experiments that substantially postponed aging in fruit flies,” Kekich said. “These were the first to demonstrate that longevity can be genetically modulated.” Dr. Rose is a professor and director of the Network for Experimental Research on Evolution (NERE), Ecology and Evolutionary Biology in the School of Biological Sciences at the University of California, Irvine. (Fulfilling Kekich’s mandate to dress for anti-aging success, Dr. Rose came cloaked in the ageless vampire elegance of Count Dracula, costumed in formal eveningwear topped off by a billowing black silk cape.)

Telomerase and a Longer Life Span

Along with other life extension research that suggests it may be possible to extend human existence beyond the maximum life span of 120 years, telomerase research fills Kekich with hope. “Publication of peer-reviewed scientific research on telomerase gene therapy and other scientific projects indicates that we are getting closer to the goal of extending human life span,” he said.

A 1998 article in the journal Science identified telomerase as a protein that is capable of extending cell life span. Telomerase is now recognized as capable of immortalizing human somatic cells. The idea of potentially extending life span using telomerase is derived from research done by the laboratory of Spanish scientist Maria Blasco, PhD.

In 2012, Dr. Blasco demonstrated that telomerase gene therapy could extend the life span of mice by as much as 20%. “It is breakthroughs such as these that make [now] such an exciting time to be alive,” Kekich noted. Expert researchers in the field share Kekich’s enthusiasm for telomerase, including the venerable George Church, PhD, Professor of Genetics at Harvard Medical School and director of personalgenomes.org, which provides the world’s only open-access information on human Genomic, Environmental and Trait data. In October 2015, at a meeting of the National Academy of Sciences organized to discuss US policy on genetic interventions, Dr. Church proposed that telomerase deserves close consideration for its potential to enhance the human life span.

Yet another reason why telomerase looms large in the minds of research scientists and life sciences entrepreneurs like Kekich is because the molecule is present in those cells that can continue to divide indefinitely. As Kekich stated, “This includes stem cells, which are simple cells in the body that are able to develop into any one of various kinds of cells, such as blood cells, skin cells, etc.”
More Anti-Aging Research

Actively participating in other anti-aging avenues, Kekich is an investor in BioViva, a US company founded in 2014. “The founders view aging as a disease and believe that aging lies at the root of pathology. Gene therapies are being tested around the world and some are available to treat such conditions as macular degeneration,” Kekich said. “These new therapies are relatively expensive. BioViva believes everyone should have access to cutting-edge medical treatments, not just those in the highest income brackets,” Kekich added. “BioViva aims to invent gene therapies that are affordable to the masses.”

One inexpensive therapy that will hopefully result from BioViva’s laboratories involves the use of telomerase as a possible remedy for skin aging. As the BioViva website (www.bioviva-science.com) states, “It is likely the first telomerase therapy we will develop that will focus on rejuvenating aging skin and restoring youthful elasticity. The skin represents an easily accessible target for therapy. We now propose to move forward with this therapy to regenerate skin and dermal tissue using telomerase induction and in doing so return skin to a youthful state.”

Kekich is also the co-founder of SciCog Systems, Inc., “which is working on creating an automated artificial intelligence (AI) research assistant. The first application, Kekich explained, “will accelerate biomedical science progress by deploying advanced artificial intelligence technology, with initial focus on the biology of healthy longevity.” Artificial intelligence pioneers such as inventor and author Ray Kurzweil influence Kekich’s philosophy and business.

Kurzweil’s thinking and writings are important and inspiring “because he reminds us how fundamental measures of information technology follow predictable and exponential trajectories,” Kekich said. “I would imagine that most scientists, as well as everyone else in the realm of anti-aging product research and development, are encouraged because of Kurzweil’s law of accelerating returns.” As Kekich summarized, “Kurzweil’s law states that information technology progresses exponentially. Because of this assured exponential growth in the intelligence of information technology, it is just a matter of time before we have the computing power to find solutions to various scientific problems such as how to radically slow down or reverse aging, or remedy a specific disease.”

It is worth noting that Kurzweil’s law of accelerating returns springs from “Moore’s Law,” named for Intel co-founder Gordon Moore. “Moore predicted in 1965 that the number of transistors incorporated in a chip will approximately double every 24 months,” Kekich said. “While computers have downsized from room-sized to pocket-sized, they have become massively more powerful. History validates the accuracy of Moore’s prediction, and I’m betting that the accuracy and action plan for radically extending human life span will be revealed in the near future.”

Quoting Dr. Rose, Kekich concluded, “It is still reasonable to hope that eventually the great mass of people will be able to control their aging through pharmaceuticals and medicine.”

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

David Kekich, CEO of SciCog Systems, Inc., is a recognized authority on longevity science. He founded Maximum Life Foundation, a not-for-profit corporation dedicated to reversing human aging. He also serves as a board member of the American Aging Association and Alcor Foundation Patient Care Trust Fund.

He authored Smart, Strong and Sexy at 100: New Skin, New Hair, New You: 7 Simple Steps to Thrive at 100... and Beyond, a how-to book for extreme life extension. He has appeared on numerous TV and radio shows and publishes a widely read newsletter.

For more information about the Maximum Life Foundation or contact information, visit www.maxlife.org or call 1-949-706-2468.
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- **Biotin**—Supports nail strength and integrity
- **Silicon**—For the formation of collagen and keratin molecules

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

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Chlorophyllin
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PectaSol-C®
Silymarin
SODzyme® with GliSODin® & Wolfberry

Longevity & Wellness
AMPK Activator
AppleWise Polyphenol Extract
Berry Complete
Blueberry Extract
Blueberry Extract with Pomegranate
CR Mimetic Longevity Formula  
DNA Protection Formula  
Enhanced Berry Complete with Acai  
Essential Daily Nutrients  
Grapeseed Extract with Resveratrol & Pterostibine  
Mega Green Tea Extract (decaffeinated)  
Mega Green Tea Extract (lightly caffeinated)  
Optimized Fucoidan with Maritech® 926  
Optimzed Resveratrol  
Optimized Resveratrol with Nicotinamide  
Ribosome  
pTeroPure®  
Pycnogenol® French Maritime  
Pine Bark Extract  
Resveratrol with Pterostibine  
RNA (Ribonucleic Acid)  
Super Alpha-Lipoic Acid  
Super R-Lipoic Acid  
X-R Shield  

**Men’s Health**  
Mega Lycopene Extract  
PalmettoGuard® Saw Palmetto with Beta-Sitosterol  
PalmettoGuard® Saw Palmetto/Nettle Root Formula with Beta-Sitosterol  
Pomi-T™  
Prelox® Natural Sex for Men®  
Super MiraForte with Standardized Lignans  
Triple Strength ProstaPollen™  
Ultra Natural Prostate  

**Minerals**  
Boron  
Chromium Ultra  
Iron Protein Plus  
Magnesium (Citrate)  
Magnesium Caps  
Only Trace Minerals  
Optimized Chromium with Crominex® 3+  
Sea-Iodine™  
Se-Methyl L-Selenocysteine  
Super Selenium Complex  
Vanadyl Sulfate  
Zinc Caps  

**Miscellaneous**  
SolarShield® Sunglasses  

**Mood & Stress Management**  
5 HTP  
LTheanine  
Natural Stress Relief  
SAMe (S-Adenosyl-Methionine)  

**Multivitamins**  
Children’s Formula Life Extension Mix™  
Comprehensive Nutrient Packs ADVANCED  
Life Extension Mix™ Capsules without Copper  
Life Extension Mix™ Capsules  
Life Extension Mix™ Powder without Copper  
Life Extension Mix™ Powder  
Life Extension Mix™ Tablets with Extra Niacin  
Life Extension Mix™ Tablets without Copper  
Life Extension Mix™ Tablets  
Once-Daily Health Booster  
One-Per-Day Tablets  
Two-Per-Day Capsules  
Two-Per-Day Tablets  

**Personal Care**  
Anti-Aging Rejuvenating Scalp Serum  
Bosil  
Dr. Proctor’s Advanced Hair Formula  
Dr. Proctor’s Shampoo  
European Leg Solution Featuring Certified Diosmin 95  
Face Master Platinum  
Facial Toning System  
Hair, Skin & Nail Rejuvenation Formula w/VERISOL®  
Hair Supressor Formula  
Life Extension Toothpaste  
Sinus Cleanser  
Venotone  
Xylitol White Mouthwash  

**Pet Care**  
Cat Mix  
Dog Mix  

**Probiotics**  
Bifido GI Balance  
BrocoMax®  
FLORASSIST® Heart Health Probiotic  
FLORASSIST® Oral Hygiene  
FLORASSIST® Balance  
FLORASSIST® Mood  
FLORASSIST® Throat Health  
Theracal® Probiotics  
TruFlora® Probiotics  

**Skin Care**  
Advanced Anti-Glycation Peptide Serum  
Advanced Lightening Cream  
Advanced Peptide Hand Therapy  
Advanced Triple Peptide Serum  
Advanced Under Eye Serum with Stem Cells  
Amber Self MicroDermAbrasion  
Anti-Aging Face Oil  
Anti-Aging Mask  
Anti-Aging Rejuvenating Face Cream  
Anti-Glycation Serum with Blueberry & Pomegranate Extracts  
Antioxidant Facial Mist  
Anti-Oxidant Rejuvenating Foot Cream  
Anti-Oxidant Rejuvenating Foot Scrub  
Anti-Oxidant Rejuvenating Hand Cream  
Anti-Redness & Adult Blemish Lotion  
Bioflavonoid Cream  
Broccoli Sprout Cream  
Collagen Boosting Peptide Serum  
Corrective Clearing Mask  
DNA Repair Cream  
Dual-Action MicroDermAbrasion  
Enhanced FemBlock® with Red Orange Complex  
Essential Plant Lids Reparative Serum  
Face Rejuvenating Anti-Oxidant Cream  
Fine Line-Less  
Healing Formula  
Healing Mask  
Healing Vitamin K Cream  
Hyaluronic Facial Moisturizer  
Hyaluronic Oil-Free Facial Moisturizer  
Hydrating Anti-Oxidant Facial Mist  
Hydromer®  
Lifting & Tightening Complex  
Lycopene Cream  
Melatonin Cream  
Mild Facial Cleanser  
Multi Stem Cell Skin Tightening Complex  
Neck Rejuvenating Anti-Oxidant Cream  
Piogment Correcting Cream  
Rejuvenating Serum  
Rejuvenex® Body Lotion  
Rejuvenex® Factor Firming Serum  
Renewing Eye Cream  
Resveratrol Anti-Oxidant Serum  
Skin Lightening Serum  
Skin Restoring Phytoceramides with Lipowheat®  
Skin Stem Cell Serum  
Stem Cell Cream with Alpine Rose  
Tightening & Firming Neck Cream  
Ultra Eyelash Booster  
Ultra Lip Plumper  
Ultra Rejuvenex®  
Ultra RejuvenNight®  
Ultra Wrinkle Relaxer  
Under Eye Rejening Serum  
Under Eye Rescue Cream  
Vitamin C Serum  
Vitamin D Lotion  
Vitamin E Essential Cream  
Youth Serum

**Sleep**  
Bioactive Milk Peptides  
Enhanced Natural Sleep® with Melatonin  
Enhanced Natural Sleep® without Melatonin  
Fast-Acting Liquid Melatonin  
Glycine  
L-Theophyllin  
Melatonin  
Optimized Tryptophan Plus  

**Sports Performance**  
Creatine Capsules  
Creatine Whey Glutamine Powder (Vanilla Flavor)  
New Zealand Whey Protein Concentrate (Natural Chocolate and Vanilla Flavor)  
Pure Plant Protein  
Tart Cherry Extract  
Whey Protein Isolate (Chocolate and Vanilla Flavor)  

**Vitamins**  
Ascorbyl Palmitate  
Benfotiamine with Thiamine  
Beta-Carotene  
BioActive Complete B-Complex  
Biolin  
Buffered Vitamin C Powder  
Daily C+  
Fast-C® with Dihydroquercetin  
Gamma E Tocopherol with Sesame Lignans  
Gamma E Tocopherol/Tocotrienols  
High Potency Optimized Folate  
Inositol Caps  
Liquid Emulsified Vitamin D3  
Liquid Vitamin D3  
Low-Dose Vitamin K2  
Methylocobalamin  
MK-7  
Natural Vitamin E  
No Flush Niacin  
Optimized Folate (L-Methylfolate)  
Pantothenic Acid (Vitamin B-5)  
Pyridoxal 5'-Phosphate Caps  
Super Absorbable Tocotrienols  
Super Ascorbate C Capsules  
Super Ascorbate C Powder  
Super K with Advanced K2 Complex  
Vitamin B12  
Vitamin B6  
Vitamin C with Dihydroquercetin  
Vitamin D3 with Sea-Iodine™  
Vitamin D3  
Vitamins D and K with Sea-Iodine™

**Weight Management**  
7-Keto® DHEA Metabolite  
Advanced Anti-Adipocyte Formula  
Advanced Natural Appetite Suppress  
CalReduce Selective Fat Binder  
DHEA Complete  
Garcinia HCA  
HCActive™ Garcinia Cambogia Extract  
Integra-Lean®  
Mediterranean Trim with Sinetrol™-XPur  
Optimized Irvingia with Phase 3rd Calorie Control Complex  
Optimized Saffron with Satireal®  
Super Citrimax®  
Super CLA Blend with Guarana and Sesame Lignans  
Super CLA Blend with Sesame Lignans  
Wast-Line Control™  

**Women’s Health**  
Advanced Natural Sex for Women® 50+  
Breast Health Formula  
Femmemessence MacaPause®  
Natural Estrogen without Soy Isoflavones  
Natural Estrogen  
ProgestaCare® for Women  
Super-Absorbable Soy Isoflavones  
Ultra Soy Extract
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<td>BRITE EYES III • 2 vials, 5 ml each</td>
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<td>BROMELAIN (Specialty-coated) 500 mg, 60 enteric coated tablets</td>
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<td>CHOL-SUPPORT™ • 60 liquid veg. caps</td>
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<td>CHROMIUM ULTRA • 100 veg. caps</td>
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<td>CITRIMAX® (Super) • 180 veg. caps</td>
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<td>CLA BLEND W/SESAME LIGNANS (Super) 1,000 mg, 120 softgels</td>
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**COSMESIS**

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TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 • TO ORDER ONLINE VISIT: www.LifeExtension.com

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

APRIL 2016
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**SUBTOTAL OF COLUMN 5**

**SUBTOTAL OF COLUMN 6**

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

APRIL 2016

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440

TO ORDER ONLINE VISIT: www.LifeExtension.com
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<td>34.00</td>
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<td>23.25</td>
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<td>OMEGA-3 EPA/DHA w/SESAME LIGNANS &amp; OLIVE EXTRACT (Super) • 240 small softgels</td>
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<td>OMEGA 3 EPA/DHA w/SESAME LIGNANS &amp; OLIVE EXTRACT (Super) • 60 enteric coated softgels</td>
<td>20.50</td>
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<td>32.00</td>
<td>24.00</td>
<td>21.00</td>
<td>17.25</td>
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<td>01989</td>
<td>ONCE-DAILY HEALTH BOOSTER • 60 softgels</td>
<td>52.00</td>
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<td>02001</td>
<td>ONE-PER-DAY • 60 tablets</td>
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<td>ONLY TRAINE MINERALS • 90 veg. caps</td>
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<td>01789</td>
<td>PALMETTOGUARD® SAW PALMETTO W/Beta-SITOSTEROL (Super) • 30 softgels</td>
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<td>PALMETTOGUARD® SAW PALMETTO/NETTLE ROOT W/BETA-SITOSTEROL • 60 softgels</td>
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<td>01323</td>
<td>PEAK ATP® w/GLYCOCAM® • 60 veg. caps</td>
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<td>00342</td>
<td>PECTA SOL-C® MODIFIED CITRUS PECTIN • 454 grams powder</td>
<td>109.95</td>
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<td>PECTA SOL-C® MODIFIED CITRUS PECTIN • 270 veg. caps</td>
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<td>01811</td>
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<td>PDX® PLUS MULBERRY (WellBet®) • 180 veg. caps</td>
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<td>01953</td>
<td>POMEGRANATE COMPLETE • 30 softgels</td>
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<td>01500</td>
<td>PQQ CAPS W/BIOPOQ® • 10 mg, 30 veg. caps</td>
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<td>01647</td>
<td>PQQ CAPS W/BIOPOQ® • 20 mg, 30 veg. caps</td>
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<td>PREGNENOLONE • 50 mg, 100 caps</td>
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<td>00709</td>
<td>PREGNENOLONE • 100 mg, 100 caps</td>
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<td>01337</td>
<td>PRELOX® NATURAL SEX FOR MEN • 60 tablets</td>
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<td>01576</td>
<td>PREVAGEN® • 30 caps</td>
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<td>01577</td>
<td>PREVAGEN® ES • 30 caps</td>
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**SUBTOTAL OF COLUMN 7**
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<tr>
<th>ITEM No.</th>
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<tr>
<td>01309</td>
<td>QUERCETIN (optimized) • 250 mg, 60 veg. caps</td>
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<td>01030</td>
<td>RED YEAST RICE (Bluebonnet) • 600 mg, 60 veg. caps</td>
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<tr>
<td>00605</td>
<td>REGIMINT • 60 enteric-coated caps</td>
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<td>01708</td>
<td>REISHI EXTRACT MUSHROOM COMPLEX • 60 veg. caps</td>
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<tr>
<td>01448</td>
<td>REJUVENEX® BODY LOTION • 6 oz</td>
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<tr>
<td>01621</td>
<td>REJUVENEX® FACTOR FIRMING SERUM • 1.7 oz</td>
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<tr>
<td>01220</td>
<td>REJUVENEX® (Ultra) • 2 oz</td>
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<tr>
<td>00676</td>
<td>REJUVENIGHT® (Ultra) • 2 oz</td>
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<td>0410</td>
<td>RESVERATROL W/PTEROSTILBENE • 100 mg, 60 veg. caps</td>
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<td>02031</td>
<td>RESVERATROL W/PTEROSTILBENE • 100 mg, 60 veg. caps</td>
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<td>02030</td>
<td>RESVERATROL (optimized) • 60 veg. caps</td>
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<td>00889</td>
<td>RHODIOLA EXTRACT • 250 mg, 60 veg. caps</td>
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<td>01900</td>
<td>RIBOGEN® FRENCH OAK WOOD EXTRACT</td>
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<tr>
<td>00972</td>
<td>(D) RIBOSE POWDER • 150 grams</td>
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<td>01473</td>
<td>(D) RIBOSE TABLETS • 100 veg. tabs</td>
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<tr>
<td>01609</td>
<td>RICH REWARDS® BREAKFAST GROUND COFFEE • 12 oz bag</td>
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<td>RICH REWARDS® BREAKFAST BLEND GROUND COFFEE Natural Mocha • 12 oz bag</td>
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<td>01729</td>
<td>RICH REWARDS® BREAKFAST BLEND GROUND COFFEE Natural Vanilla • 12 oz bag</td>
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<td>01612</td>
<td>RICH REWARDS® BREAKFAST BLEND WHOLE BEAN COFFEE 12 oz bag</td>
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<td>01610</td>
<td>RICH REWARDS® DECAFFEINATED ROAST GROUND COFFEE 12 oz bag</td>
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<td>01208</td>
<td>R-LIPOIC ACID (Super) • 240 mg, 60 veg. caps</td>
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<td>00070</td>
<td>RNA CAPSULES • 500 mg, 100 caps</td>
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<td>01432</td>
<td>SAFFRON W/SATIEREAL* (optimized) • 60 veg. caps</td>
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<td>01935</td>
<td>SAMe (S-ADENOSYL-METHIONINE) 400 mg, 30 enteric coated tablets</td>
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<td>SAMe (S-ADENOSYL-METHIONINE) 400 mg, 60 enteric coated tablets</td>
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<td>SAMe (S-ADENOSYL-METHIONINE) 400 mg, 60 enteric coated tablets</td>
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<td>01740</td>
<td>SEA-IODINE™ • 1,000 mcg, 60 veg. caps</td>
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<td>SELENIUM • 2 fl. oz dropper</td>
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<td>01679</td>
<td>SE-METHYL L-SELENOCYSTEINE • 200 mcg, 100 veg. caps</td>
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<td>00318</td>
<td>SERRAFLAZYME • 100 tablets</td>
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<td>01884</td>
<td>SILYMARIN • 100 mg, 90 veg. caps</td>
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<td>SINUS CLEANSER • 4 oz bottle</td>
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<td>01596</td>
<td>SKIN RESTORING PHYToceramides w/LIPOWheat® 30 liquid veg. caps</td>
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<td>00961</td>
<td>SODZYME® w/GLISODIN® &amp; WOLFBERY • 90 veg. caps</td>
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<td>00657</td>
<td>SOLARSHIELD® SUNGLASSES • Smoke color</td>
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<td>01097</td>
<td>SOY EXTRACT (Ultra) • 150 veg. caps</td>
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<td>00432</td>
<td>STEVIA® (Better) • 100 tablets, 1 gram each</td>
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<td>00438</td>
<td>STEVIA® ORGANIC LIQUID SWEETENER (Better) • 2 oz</td>
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<td>01476</td>
<td>STRONTIUM • 750 mg, 90 veg. caps</td>
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<td>01649</td>
<td>SUPER-absorbable SOY ISOFlavones • 60 veg. caps</td>
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<td>01778</td>
<td>SUPER SELENIUM COMPLEX • 200 mcg, 100 veg. caps</td>
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<td>01723</td>
<td>TART CHERRY EXTRACT W/STANDARDIZED CHERRYPURE® 60 veg. caps</td>
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<td>01827</td>
<td>TAURINE • 1,000 mg, 90 veg. caps</td>
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<td>01918</td>
<td>TEAR SUPPORT w/MAQUIBRIGHT® • 60 mg, 30 veg. caps</td>
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<td>L-TAURINE POWDER • 300 grams</td>
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<td>13685</td>
<td>TEN MUSHROOM FORMULA® • 120 veg. caps</td>
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<td>01304</td>
<td>THEAFLAVIN STANDARDIZED EXTRACT • 30 veg. caps</td>
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<td>01683</td>
<td>(L) THEANINE • 100 mg, 60 veg. caps</td>
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<td>THERALAC® PROBIOTICS • 30 caps</td>
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<td>00668</td>
<td>THYROID FORMULA (Metabolic Advantage™) • 100 caps</td>
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<td>TMG POWDER • 50 grams</td>
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<td>TMG • 500 mg, 60 liquid veg. caps</td>
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<td>01400</td>
<td>TOCOTRIENOLS (Super-absorbable) • 60 softgels</td>
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<td>01278</td>
<td>TOOTHPASTE • 4 oz (Mini) tube</td>
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<td>01917</td>
<td>TRANQUIL TRACT™ • 60 veg. caps</td>
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<td>01468</td>
<td>TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT 60 veg. caps</td>
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<td>01469</td>
<td>TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT w/RESVERATROL • 60 veg. caps</td>
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<td>02003</td>
<td>TRIPLE ACTION THYROID • 60 veg. caps</td>
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<td>01803</td>
<td>TRI SUGAR SHIELD® • 60 veg. caps</td>
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<td>01386</td>
<td>TRUFIBERTM • 180 capsules</td>
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<td>01389</td>
<td>TRUFLORA® PROBIOTICS • 32 veg. caps</td>
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<td>L-Tryptophan • 500 mg, 90 veg. caps</td>
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<td>L-Tryptophan PLUS (Optimized) • 90 veg. caps</td>
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<td>TWO-PER-DAY • 60 tablets</td>
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<td>TWO-PER-DAY • 120 tablets</td>
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**SUBTOTAL OF COLUMN 9**
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<td>TWO-PER-DAY • 120 caps</td>
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<td>L-TYROSINE • 500 mg, 100 tablets</td>
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<td>01921</td>
<td>URIC ACID CONTROL • 60 veg. caps</td>
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<td>02213</td>
<td>VANADYL SULFATE • 7.5 mg, 100 veg. tablets</td>
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<td>00408</td>
<td>VENOTONE • 60 caps</td>
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<td>VINCOPETINE • 10 mg, 100 veg. tablets</td>
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<td>00372</td>
<td>VITAMIN B3 NIACIN • 500 mg, 100 caps</td>
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<td>00098</td>
<td>VITAMIN B5 • 500 mg, 100 caps (Pantothenic Acid)</td>
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<td>VITAMIN B6 • 250 mg, 100 veg. caps</td>
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<td>00361</td>
<td>VITAMIN B12 • 500 mcg, 100 lozenges</td>
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<td>VITAMIN C w/DIHYDROQUERCETIN • 1,000 mg, 60 veg. tablets</td>
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<td>VITAMIN C w/DIHYDROQUERCETIN • 1,000 mg, 250 veg. tablets</td>
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<td>VITAMIN C POWDER (BUFFED) • 454 grams</td>
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<td>VITAMIN C-MAGNESIUM CRYSTALS (EFFERVESCENT) • 180 grams</td>
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<td>VITAMIN D3 • 2,000 IU, 1 fl oz, Mint flavor</td>
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<td>VITAMIN D3 • 1,000 IU, 1 softgel</td>
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<td>VITAMIN D3 • 1,000 IU, 250 softgels</td>
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<td>VITAMIN D3 W/SEA-IODINE™ • 5,000 IU, 60 caps</td>
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<td>VITAMINS D AND K W/SEA-IODINE™ • 60 caps</td>
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<td>VITAMIN E (Natural) • 400 IU, 100 softgels</td>
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<td>VITAMIN K2 (Low dose) • 45 mcg, 90 softgels</td>
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<td>01902</td>
<td>WAIST-LINE CONTROL™ • 120 veg. caps</td>
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<td>X-R SHIELD • 90 veg. caps</td>
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<td>00409</td>
<td>XYLWHITE™ MOUTH WASH • 16 oz</td>
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<td>ZINC HIGH POTENCY • 50 mg, 90 veg. caps</td>
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<td>ZINC LOZENGES • 60 veg. lozenges</td>
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<td>ZYFLAMEND® WHOLE BODY • 120 liquid veg. caps</td>
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**SHUTTLE OF COLUMN 12**

* These products are not 25% off retail price.
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