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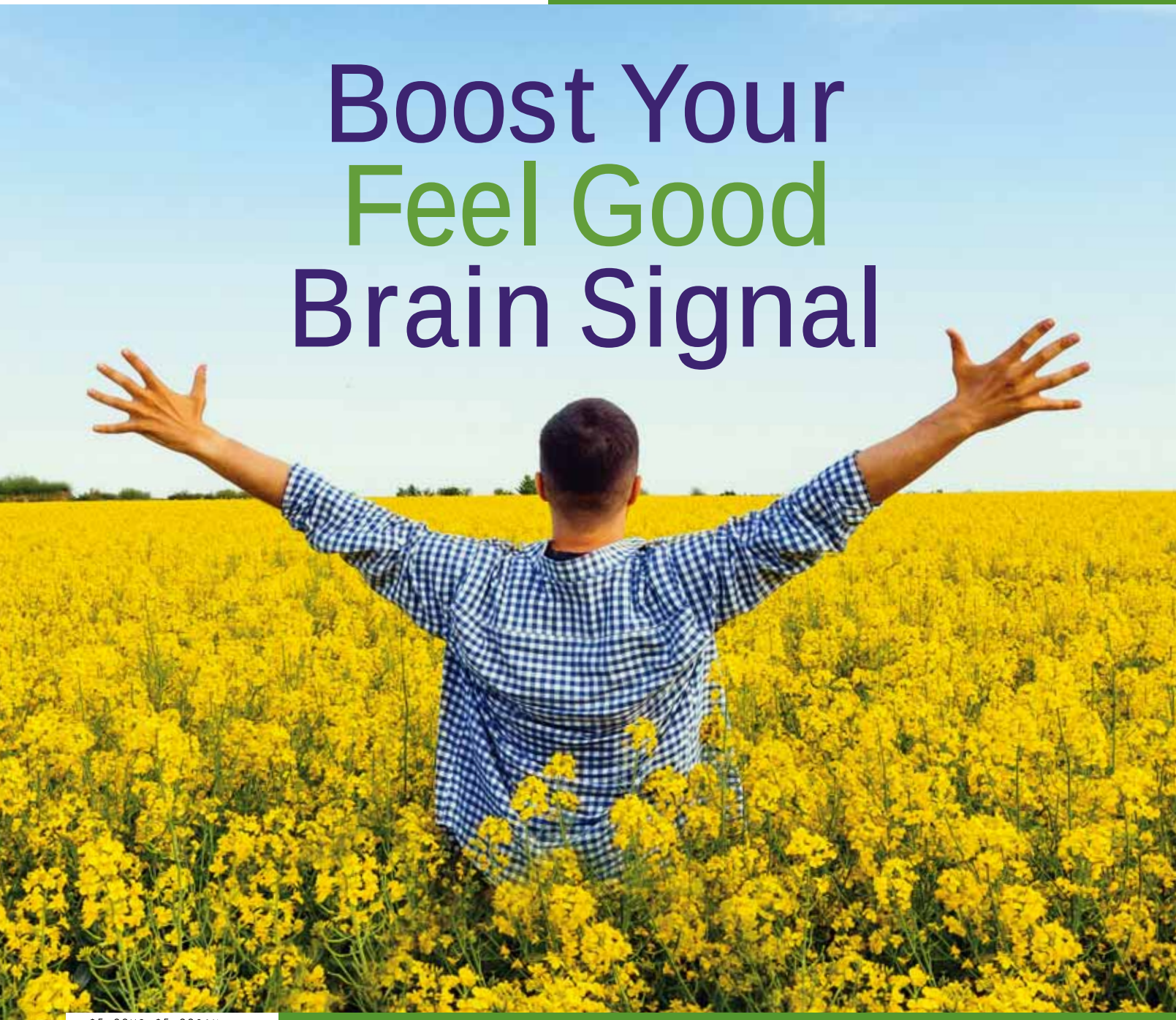

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Surprising Cardiovascular Benefits of Glucosamine *p. 26*

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MEDICAL ADVISORY BOARD

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

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

John Boik, PhD, is the author of two books on cancer therapy, Cancer and Natural Medicine (1996) and Natural Compounds in Cancer Therapy (2001). He earned his doctorate at the University of Texas Graduate School of Biomedical Sciences with research at the MD Anderson Cancer Center, focusing on screening models to identify promising new anti-cancer drugs. He conducted his postdoctoral training at Stanford University's Department of Statistics.

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

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

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

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

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

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

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

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

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

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

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Reference: * *Gerontology.* 1996;42(3):170-80.

Don't Die Trying to Boost Brain Dopamine

WILLIAM FALOON

Dopamine is your main feel-good compound.

Cocaine, nicotine, alcohol, sugar, opioids (and pleasurable emotional experiences) increase **dopamine** levels in the brain.

America's deadly **addictions** are often related to the desire for a **dopamine rush**.

When people binge on sweets, alcohol, or many narcotics, they are often seeking to fulfil their "cravings" for a dopamine **"high."**

Once largely confined to the young, **older** people are now abusing alcohol and drugs, as **aging** reduces their dopamine levels.

Dopamine deficits contribute to a diminished sense of wellbeing. This causes people to turn to **dopamine-boosting** agents, be it sugar, narcotics, or alcohol.

This is particularly hard for smokers, who are addicted to the mild **dopamine release** they get when lighting a **cigarette**.

The brain uses dopamine for more than **mood elevation**. It also enables youthful **cognitive** performance and body coordination.[1]

Dopamine depletion is linked with **neuro-degenerative** diseases (beyond Parkinson's) along with **shortened lifespans**.[2,3]

This article describes a **low-cost** method to safely restore more **dopamine**, without unpleasant up-and-down spikes.

As people age past **45** years, **dopamine** brain levels decline by **13%** each decade thereafter.[4]

Dopamine is produced by specialized cells that **die off** with aging.[5]

When only **30%** of dopamine-producing cells remain, symptoms of **Parkinson's disease** manifest.[6]

If dopamine-producing cells decline to **10%** of normal, the outcome is death.[7,8]

Long before this happens, people feel their youth **shrivel** as they are unable to enjoy the same **feelings** of pleasure and wellbeing as when their **dopamine** levels were **higher**.

There are proven ways to block the *enzyme* that breaks down **dopamine** in the brain and help protect dopamine-producing cells against neurotoxicity.

Inhibiting the Dopamine-Depleting Enzyme

Dopamine is abundantly produced in young brains and then precisely controlled by *enzymes* called **MAOs** (monoamine oxidases).

As people age, levels of the **MAO-B** *enzyme* increase and **deplete** too much dopamine.[9-11] This is partially why people start to feel their age as youthful dopamine levels wane.

A solution is to ingest compounds that inhibit the **MAO-B** *enzyme*.

MAO-B-*inhibiting* compounds enable more **feel-good** dopamine to be available to brain cells.

Prescription drugs like **deprenyl** function as **MAO-B inhibitors** and are used as adjunctive treatment for **Parkinson's disease**.

Parkinson's is characterized by severe **dopamine depletion** and accelerated death of **dopamine-producing** brain cells.

MAO-B Inhibitor Increases Lifespan

Since the **1980s**, ***Life Extension***® has encouraged readers to ask their doctor to consider prescribing a drug called **deprenyl**, which is an **MAO-B inhibitor**.

We made this recommendation based on published studies emanating from **Europe** showing **lifespan** increases in animals given **deprenyl**. [3,12-16]

When elderly rats were treated with **deprenyl**, remaining lifespan doubled.[3]

Aged **dogs** given deprenyl had **twice** the survival rate compared with placebo-treated dogs.[17]

Mice that were immune suppressed lived up to about **200% longer** on **deprenyl**.[18] Most elderly humans suffer **immune senescence**.[19,20]

In addition to longer lifespans, some deprenyl-supplemented animals displayed more ***youthful*** energy levels and dramatically heightened **sexual** activity.[3]

This outpouring of scientific data from Europe had Americans clamoring to get their hands on deprenyl.

While deprenyl had been used in Europe to treat **Parkinson's disease** beginning in the **1970s**, the **FDA** did not approve it for Americans until **1989**.[21]

Life Extension® and **Parkinson's** support groups fought a multi-year battle to force the FDA to approve deprenyl.

Plant-Derived MAO-B inhibitors

Despite losing patent status decades ago, **deprenyl** still costs more than it should in the United States. And most physicians are unwilling to prescribe deprenyl for anti-aging purposes (i.e., "off-label").

In **2016**, **Life Extension®** introduced a **green oat extract** that has demonstrated **MAO-B-inhibiting** properties. This green oat extract was unaffordable for some.

Even with its cost, **green oat extract** remains popular because of its **dopamine-boosting** properties.

The good news is that another plant-derived **MAO-B inhibitor** has been discovered that costs far less.

Medicinal Plant Inhibits MAO-B

One of the top 50 medicinal plants used in Korea and China is the bark of the **Amur cork tree**. It has a difficult-to-pronounce name:

Phellodendron amurense

It's been used for centuries in Asia to treat **infections** of the urinary and digestive tracts, as well as other sources of **acute inflammation**.

When studied *in vitro* against other plants, an extract of the **Amur cork tree** ranked as one of the most potent and selective inhibitors of MAO-B.[22,23] It showed more than **80%** inhibition of the activity of the **MAO-B enzyme**, which is comparable to deprenyl.[23]

Based on these properties, we are suggesting people start off with **500 mg** daily of low-cost **Amur cork tree** bark.

We base this on our direct interactions with the Hungarian inventor of **deprenyl** (Dr. Joseph Knoll). He insisted that deprenyl was being overdosed in Parkinson's patients at **10 mg** a day.

Dr. Knoll recommended that Parkinson's patients take **5 mg** a day (or less) of deprenyl to achieve optimal **MAO-B** inhibition.

He also told us that for **anti-aging** purposes, a dose of **5 mg** of deprenyl **twice a week** would likely yield benefits. **Amur cork tree**, in the dose of **500 mg**, can be taken daily.

Protect Dopamine-Producing Brain Cells

Inhibiting dopamine-degrading **MAO-B** can yield immediate and long-term health benefits.

To guard against eventual loss of dopamine, it is critical to also protect **dopamine-producing** cells in the brain.

Excess activity of MAO-B causes toxic byproducts to form, including hydrogen peroxide, free radicals, and aldehydes.[11,24,25]

These compounds can wreak havoc in brain cells, contributing to neurotoxicity.[24]

Amur cork tree has been shown to be neuro-protective in cell and animal models of neuro-degeneration.[26-28]

Guard Your Brain Against Excess MAO-B

Loss of **dopamine function** plays a primary role in the development of certain **neurodegenerative** disorders.[2,3]

Normal aging results in elevated **MAO-B**, causing our brains to be **dopamine** depleted.[29]

People over age 45 should intervene by taking **5 mg** of the drug deprenyl two to three times a week, **500 mg** of **Amur cork tree** bark powder daily, or **800 mg** of **green oat extract** daily.

An advantage to **Amur cork tree** bark is its low price and centuries of documented medicinal use in Asia.

In this Month's Issue...

Glucosamine has been used for decades to rebuild cartilage and relieve joint discomfort. Recent findings reveal that people supplementing with glucosamine have a **22% lower** risk of **cardiovascular death**.

The article on page 26 of this issue describes beneficial mechanisms of **glucosamine** to support **cartilage regeneration**, and cleanse cells of toxic debris via **autophagy**.

Milk thistle has long been known for its **liver**-protecting properties. Research described on page 56 reveals it also helps lower blood **glucose** levels.

Zinc is taken to boost **immune** function, but it also plays a critical role in maintaining strong **bones**, as the article on page 72 describes.

A detailed article about the **dopamine-enhancing** properties of **Amur cork tree** bark powder can be found on page 46 of this month's issue.

Thank You for Your Support of Research on Aging!

We use proceeds from supplement sales to fund **research** projects aimed at slowing and reversing **biological aging**.

As results from these **clinical trials** are reported, I look forward to enlightening ***Life Extension***® readers about novel methods for living longer and healthier.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club

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Dopamine Advantage provides **500 mg** of **Amur Cork Tree** in each capsule.

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Note: Those who take MAO-B-inhibiting drugs like deprenyl do not need to take phellodendron.

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* *Br J Pharmacol.* 2004 Mar;141(5):825-30.

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- More energy
- Better mood

Say goodbye to "kitchen raids" and say hello to **Optimized Saffron**.

Item #01432 • 60 vegetarian capsules

1 bottle **$27**

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References

1. *Nutraveris*. 2006; unpublished study.
2. *Nutr Res.* 2010 May;30(5):305-13.

This supplement should be taken in conjunction with a healthy diet and regular exercise program. Results may vary and individual results are not guaranteed.

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In the News

Vision Loss in Mice Reversed with Epigenetic Reprogramming

Vision loss due to glaucoma and aging in mice was reversed with the use of epigenetic reprogramming, according to the results of a study published in *Nature*.*

This approach proposes that changes to the body's system that activates and deactivates genes (the epigenome) cause cells to read the wrong genes, leading to degenerative diseases.

Co-author, geneticist Dr. David Sinclair and colleagues at Harvard Medical School, utilized a virus to deliver three of four youth-restoring genes known as Yamanaka Factors into the retinas of mice. The genes were previously found to eliminate epigenetic markers on cells and return cells to the embryonic state from which they can develop into other types of cells.

After receiving the genes, mice with damaged optic nerves experienced nerve regeneration, and vision loss was restored in a mouse model of glaucoma. Vision was also restored in 12-month-old mice that had aging-related visual impairment.

Editor's Note: "These data indicate that mammalian tissues retain a record of youthful epigenetic information—encoded in part by DNA methylation—that can be accessed to improve tissue function and promote regeneration in vivo," the authors stated.

* *Nature.* 2020 Dec;588(7836):124-129.

Metabolic Syndrome Factors Improve with L-Carnitine Supplementation

A review and meta-analysis of randomized, placebo-controlled trials found improvement in factors that characterize metabolic syndrome among people given L-carnitine, according to an article in *Nutrients*.*

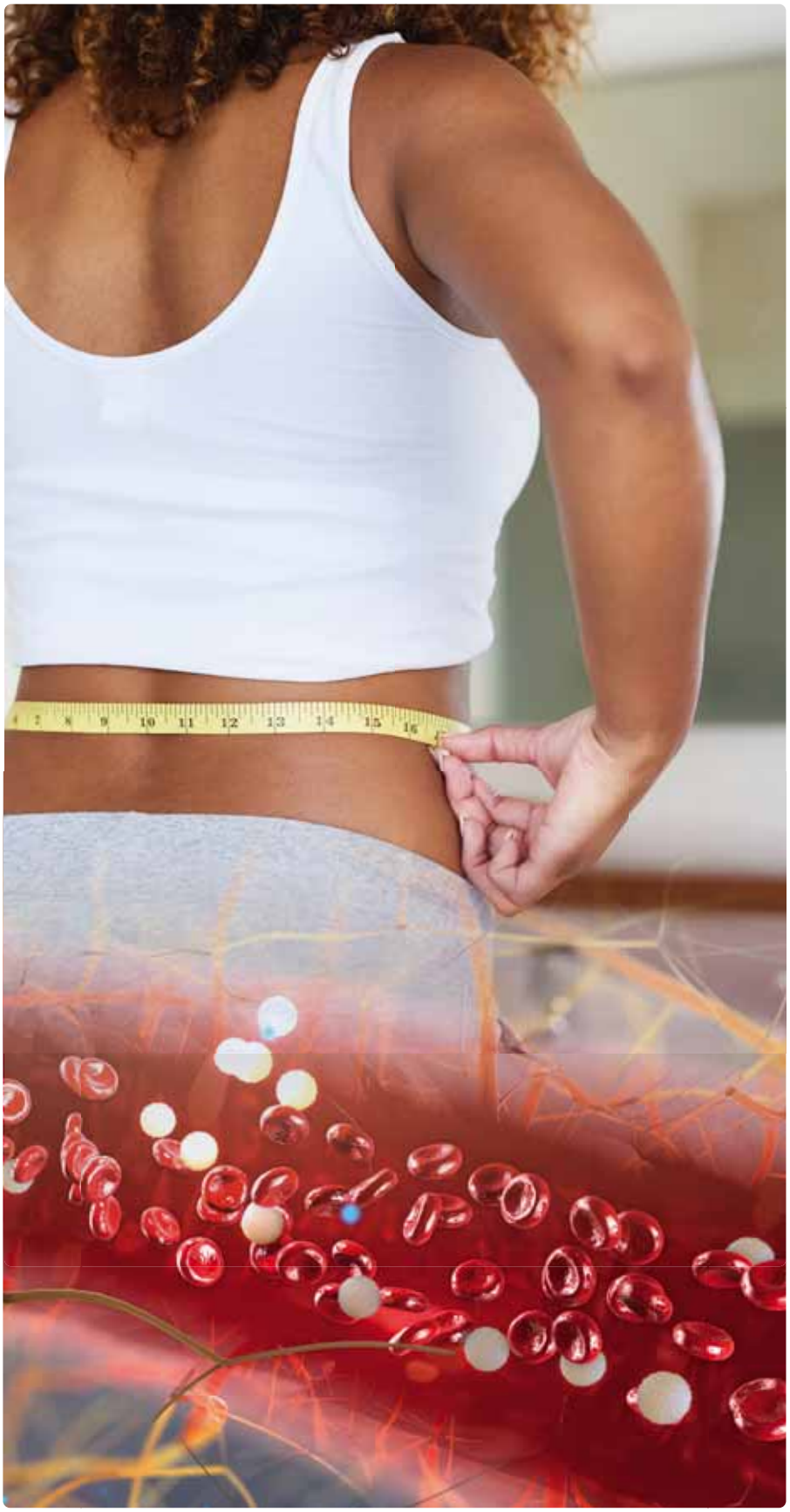
Metabolic syndrome is determined by the presence of three or more factors that include high blood pressure, elevated fasting triglycerides, low levels of HDL cholesterol, increased abdominal circumference and high fasting blood glucose. The presence of metabolic syndrome is associated with an increased risk of developing type II diabetes and cardiovascular disease.

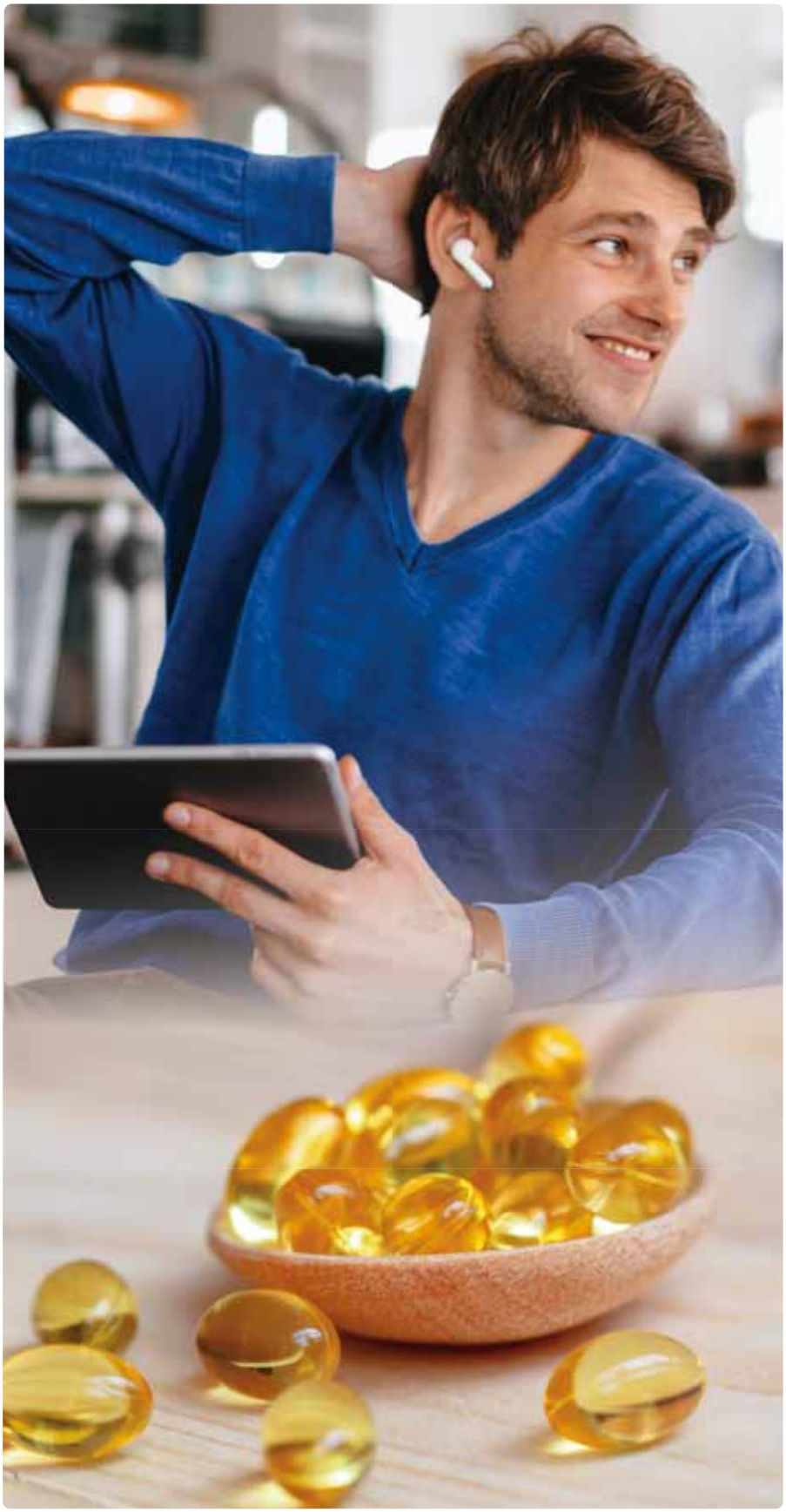
The researchers selected nine articles that reported the findings of trials that evaluated the effects of L-carnitine supplementation among 508 participants and reported data concerning fasting blood glucose, triglycerides, waist circumference, blood pressure, or HDL cholesterol. L-carnitine doses ranged from **750 mg** to **3,000 mg** per day.

Supplementing with L-carnitine was associated with significant reductions in waist circumference and systolic blood pressure in comparison with the placebo groups.

Editor's Note: When studies that tested doses of **one to three grams** were analyzed, L-carnitine was additionally associated with a significant decrease in fasting blood glucose and triglycerides, and an increase in beneficial HDL cholesterol. "Ultimately, **two to three grams** a day of supplemented L-carnitine is recommended," the authors stated.

* *Nutrients*. 2020 Sep 12;12(9):2795.





Severity of Male-Pattern Hair Loss Linked to Decreased Levels of Vitamin D

An association was found between deficient vitamin D levels and greater severity and premature onset of androgenetic alopecia (otherwise known as male-pattern hair loss) in young men, an article in the *International Journal of Dermatology* reported.*

Researchers conducted a case-control study that age-matched 50 men with premature androgenetic alopecia with 50 healthy, control subjects who did not have the condition. Participants were limited to those who were 30 years of age or younger.

Eighty-six percent of the men with hair loss were deficient (**<12 ng/mL**) in the vitamin and **14%** of them had insufficient (**12-20 ng/mL**) levels.

The mean levels of serum vitamin D were significantly lower in men with the condition, compared to the controls (**20.10 ng/mL** vs. **29.34 ng/mL**).

Vitamin D levels were not found to be related to how much sun exposure the men received.

Editor's Note: "Our study showed a significant correlation between vitamin D deficiency and the severity of androgenetic alopecia," the authors concluded. "This suggests that vitamin D may play a role in the premature onset of androgenetic alopecia."

* *Int J Dermatol.* 2020 Sep;59(9):1113-1116.

Lower Alzheimer's Risk Linked to Greater Flavonol Intake

An article in the journal *Neurology* reported an association between consuming more compounds known as flavonols, and a lower risk of developing Alzheimer's disease.*

Flavonols are found in many fruits and vegetables, as well as in tea.

The study included 921 participants with an average age of 81. The subjects did not have Alzheimer's disease at the beginning of the study.

Questionnaires completed at enrollment and then annually during a six-year average follow-up period, provided data on dietary intake that was analyzed for flavonol content. Participants were also evaluated yearly for the presence of Alzheimer's disease.

Over the course of follow-up, 220 individuals developed the disease.

Participants were divided into five groups, according to their level of flavonol intake. Among those whose intake was highest, at an average of **15.3 mg** per day, **15%** developed Alzheimer's disease, compared to **30%** whose intake was lowest, at approximately **5.3 mg** per day—a **48%** lower, adjusted risk.

Editor's Note: The authors stated that, "Eating more fruits and vegetables and drinking more tea could be a fairly inexpensive and easy way for people to help stave off Alzheimer's dementia."

* *Neurology.* 2020 Apr 21;94(16):e1749-e1756.

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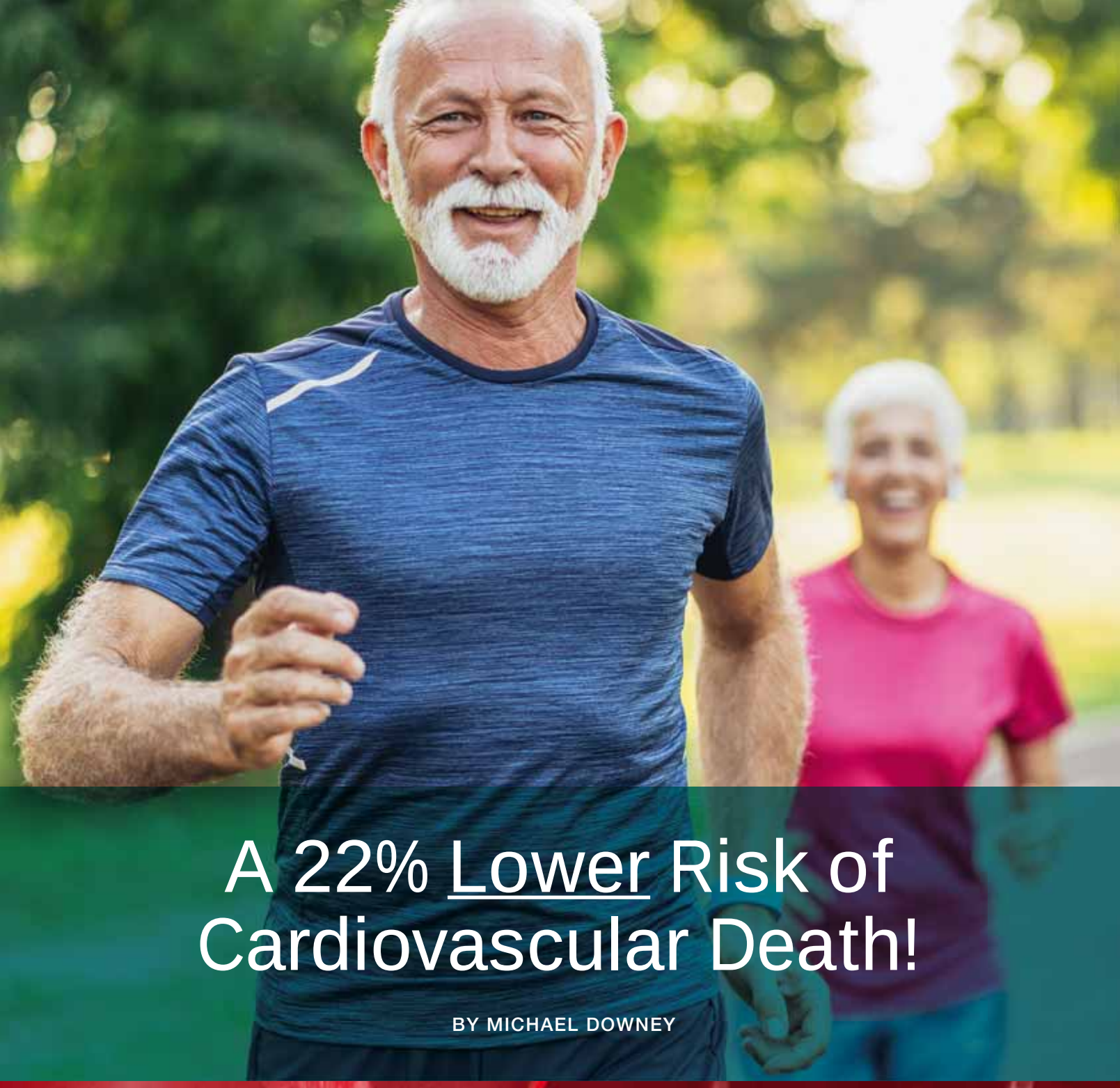

A 22% Lower Risk of Cardiovascular Death!

BY MICHAEL DOWNEY

Glucosamine has been used for decades to rebuild cartilage in aging joints.

An analysis published in **May 2019** found that regular **glucosamine** use was associated with a **22%** lower risk of **cardiovascular death**.[1]

In seeking to ascertain the **anti-death** mechanisms, the **autophagy-boosting** property of **glucosamine** is a candidate, along with its **inflammation-reducing** effects.

Aging cells accumulate metabolic waste products that shorten healthy lifespans. In youth, cells are cleansed of this toxic debris via a natural process called **autophagy**.

The ability of **glucosamine** to "turn back on" beneficial **autophagy** may explain its life-extending properties.

Another beneficial mechanism is glucosamine's ability to turn down **inflammatory** reactions that underlie **cardiovascular** disorders.

Many readers of ***Life Extension***® magazine have supplemented with the **1,500 mg/day** dose of **glucosamine** shown to confer these death-defying benefits.

This article describes the scientific evidence supporting the use of glucosamine to maintain healthy joint structure and function.

It also reviews new data showing reduced **death rates** in those who use **glucosamine**.

Osteoarthritis becomes more common as we age.

One reason is that the structural **cartilage** in joints degrades, resulting in pain, swelling, and loss of motion.

To cope, people often turn to pain relievers that do nothing to repair or restore damaged joint cartilage.

Glucosamine has been shown to relieve joint pain as effectively as **drugs** like ibuprofen—*without* harmful side effects.[2]

Reduced Risk for Heart Disease

Although glucosamine is traditionally used to treat osteoarthritis, studies have shown that it has a wide range of benefits.

One of the most significant findings is that regular glucosamine use is associated with a reduction in **cardiovascular disease**.

A **2019** study used data from **466,039** individuals *without* a history of cardiovascular disease.[1] These subjects were followed for an average of ***seven years***.

Compared to non-users, people who used glucosamine supplements had a **15%** lower risk of total cardiovascular disease events, defined as cardiovascular death, coronary heart disease, and stroke.

When these outcomes were examined individually, glucosamine use was associated with a **22%** lower risk of cardiovascular death, an **18%** lower risk of coronary heart disease and a **9%** lower risk of stroke.

Activating Autophagy

Studies of **glucosamine** in the last several years explain *how* it may improve health and extend lifespan.

One of the most prominent discoveries is that glucosamine induces **autophagy**, or "cellular housekeeping."

Autophagy is the natural process by which cells rid themselves of toxic internal metabolic waste.

With advancing age, autophagy doesn't always work as intended. *Deficits* in autophagy have been implicated in loss of function and risk for **chronic disease**.[3]

Studies in various cell types have found that **glucosamine** is a potent *activator* of **autophagy**.[4-9] Several of these studies demonstrate that it accomplishes this by *inhibiting* **mTOR** signaling in cells. At least one study has found that it induces autophagy through an mTOR-independent pathway.[9] This means that **glucosamine** activates autophagy by more than one mechanism!

The implications for this finding are profound. We can already see evidence that glucosamine use leads to lower rates of cardiovascular disease, cardiovascular-related death, and death by all causes in humans. The augmentation of healthy **autophagy** is one explanation for this remarkable finding.

Joint Deterioration

Two of the most vital components of our **joints** are **cartilage** and **synovial fluid**.

Cartilage covers the surface of the bone, reducing friction at the joint during movement. Synovial fluid lubricates the joint.

Over 32 million Americans are affected by osteoarthritis and it is one of the most common causes of disability.[10]

Osteoarthritis is more than just a wear-and-tear process; it is an **inflammatory** process.

Several factors play a role in the development of osteoarthritis, including:[10]

- Altered biomechanical properties of joint tissue,
- Increased proinflammatory mediators (i.e. cytokines), and
- Destruction of joint tissue via protein-destroying *enzymes* (i.e. matrix metalloproteinases).

WHAT YOU NEED TO KNOW

Glucosamine

- In **osteoarthritis** many structural changes occur, including deterioration of cartilage, leading to joint pain, swelling, and loss of mobility.
- Glucosamine supports healthy cartilage and joint function.
- Clinical studies show that taking **glucosamine** eases joint pain about as well as pain medications.
- In addition, regular use of glucosamine has been associated with a **22%** *lower* risk of **cardiovascular death**.

How Glucosamine Helps

The body uses **glucosamine** to synthesize **cartilage** and **synovial fluid**.[11-13]

It plays a crucial role in maintaining **joint lubrication** and has shown **anti-inflammatory** effects in laboratory studies.[14-16]

Orally administered glucosamine, in doses of **1,500 mg** a day, is easily absorbed into the bloodstream and leads to direct increases of glucosamine levels at the joints.[17]

Decades of clinical trials have demonstrated just how well oral glucosamine works.

The Risks of NSAIDs

Faced with arthritis pain, most people turn to over-the-counter or prescription pain relievers known as **non-steroidal anti-inflammatory drugs** (NSAIDs), which include aspirin, ibuprofen, naproxen sodium, and celecoxib.

But these medications come with serious potential health risks, including ulcers, high blood pressure, and kidney damage.[19]

One study that assessed these risks found that using drugs for the treatment of osteoarthritis was associated with a ***greater mortality risk than surgical treatment of osteoarthritis***. This study specifically found that:[19]

- Mortality risk was highest with **naproxen** (commonly sold as Aleve®),
- Gastrointestinal complications were highest with the prescription NSAID **diclofenac**,
- Kidney problems were highest with **ibuprofen** (Advil®, Motrin®), and
- Cardiovascular risk was highest with **celecoxib** (a prescription NSAID sold under the brand name Celebrex®).

Glucosamine, on the other hand, has a long history of human studies showing safety even when taken daily for years.

In one randomized, double-blind study of patients with **knee osteoarthritis**, scientists compared **1,500 mg** a day of glucosamine to **1,200 mg** a day of ibuprofen for two weeks. The study concluded that glucosamine is **as effective as ibuprofen** in treating symptoms, but without harsh side effects.[2]

Another recent analysis found that glucosamine was clearly superior to a placebo in relieving symptoms of knee osteoarthritis.[18]

Summary

Osteoarthritis becomes more common with age.

Its destructive effects on joints result in painful movement, swelling, loss of motion, and stiffness in knees, hips, hands, and other body parts.

Medications can relieve pain but come with potential side effects and don't address the underlying damage.

Clinical trials show that oral intake of **glucosamine sulfate** supports healthy cartilage and joint function.

An analysis published in **2019** revealed that regular use of **glucosamine** was associated with a **22%** reduced risk of **cardiovascular death**.

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

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Glucosamine and Longevity

Although glucosamine supplementation is most widely appreciated for its impact on joint and cartilage health, recent research suggests that it also has a remarkable impact on whole-body health.

It has long been recognized that a diet that restricts calories activates several pro-longevity pathways in cells and extends life. Some nutrients modulate these same pathways.

In animal models, glucosamine has been found to be just such a compound. In a study of both roundworms and aged mice, glucosamine supplementation was found to prolong the lifespan of these experimental animals.[20] Furthermore, a study of various pro-longevity nutrients and drugs found that glucosamine was one of the few that had ample evidence of life extension in multiple animal models while having one of the lowest potentials for side effects with regular use.[21]

Caloric restriction is one of the best documented means to extend lifespan.[22] In cell and animal models ranging from yeast to mammals, either restricting total calorie intake or introducing periods of intermittent fasting is the best-known method to slow the aging process and increase longevity.

However, caloric restriction in humans can be very difficult to implement and maintain.

In an attempt to find life extending alternatives that are easier to adhere to, scientists have investigated the mechanisms by which caloric restriction protects health. They have revealed several key pathways within cells that are modified by a reduced caloric intake.

There is an ongoing search to identify so-called **caloric restriction mimetics**—nutrients that can impact the same pathways as caloric restriction. Recent research has revealed that **glucosamine** is such a compound.

Several of the cellular pathways affected by calorie restriction have been shown to be similarly affected by glucosamine supplementation:

- **AMPK** activation with induction of fat metabolism and mitochondrial activation[5,8,23]
- Activation of **sirtuins**[24]
- Induction of **autophagy**—cellular "housekeeping" and repair[4,20]

All of this has been shown to translate into life extension in animal models. In a study coming out of Switzerland, glucosamine supplementation extended the life of both worms and aged mice.[20]

Given this newfound property of glucosamine, scientists recently published the results of a study to further investigate glucosamine's anti-aging abilities. In a rat model of accelerated aging, the researchers supplemented some rats with glucosamine and compared them to rats without supplementation.[25]

They looked at several well-established markers of aging, including markers of antioxidant capacity and glycation. In typical aging, antioxidant capacity declines and tissue damage due to glycation is increased.

In the aged animals given glucosamine, antioxidant capacity was increased, cellular antioxidant enzyme activity was increased, and glycation was reduced.

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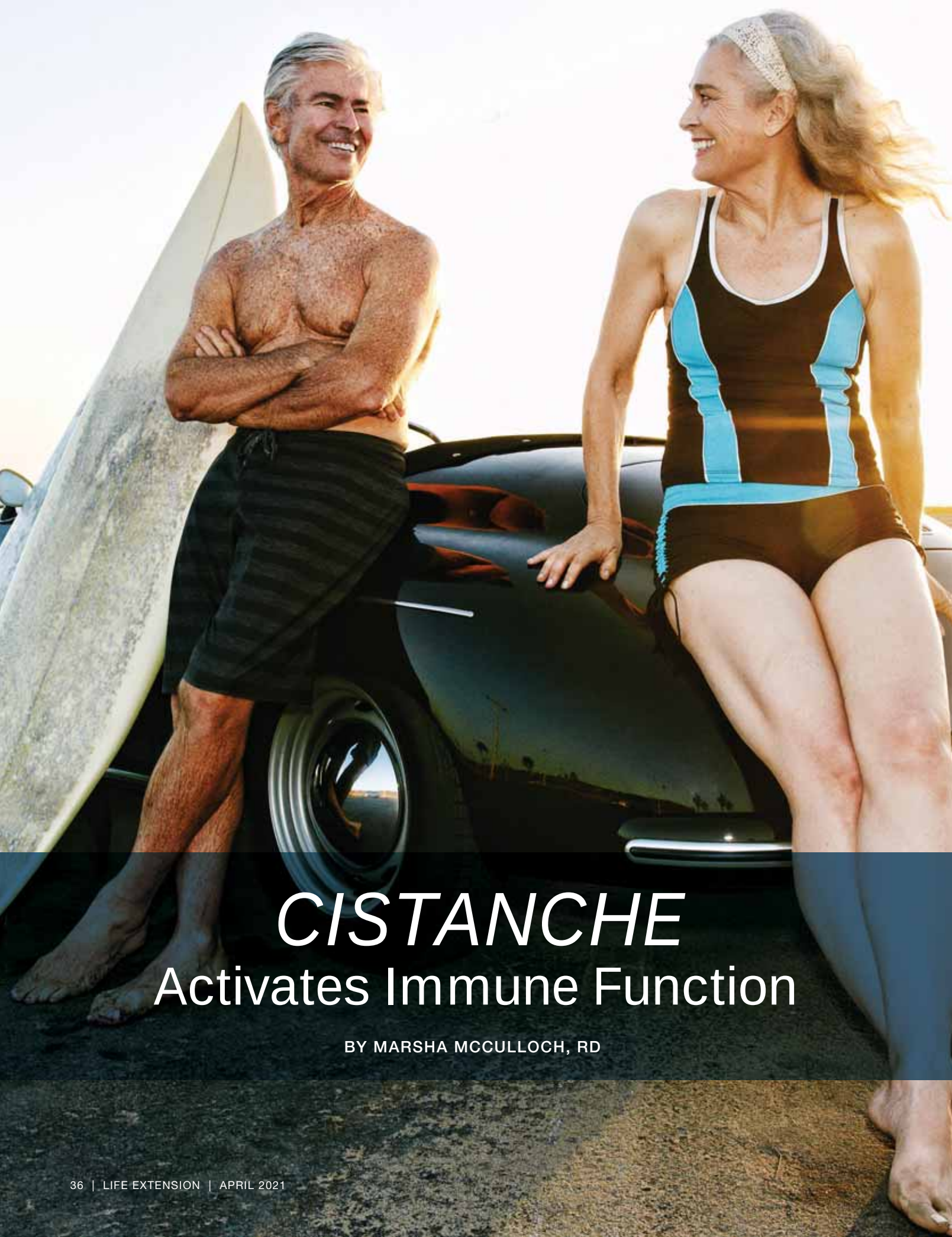


CISTANCHE
Activates Immune Function

BY MARSHA MCCULLOCH, RD

Cistanche

Traditional Chinese-medicine practitioners have long used the herb *Cistanche* to support immunity, brain function, and more.[1,2]

The demand is now growing as scientists identify *Cistanche*'s multiple **anti-aging** effects.[3,4]

Cistanche has been shown, in preclinical research, to activate **immune** functions and help reverse certain aspects of **immune senescence**.[3,5,6]

This research provides insight on how this plant may protect against age-related health concerns, including increased vulnerability to infections, malignancies, and neuroinflammation.[3,4]

Aging and Immune Function

As we age, our organs and tissues are prone to dysfunction. So is our **immune system**.

This **immune senescence** puts us at greater risk of **infections** and **cancer**. It also reduces the effectiveness of **vaccines**.[7]

Some of the deleterious immune changes that accompany **aging** include:[7]

- A *decrease* in available **naïve** (not yet activated) **T cells**, including **CD8+ T cells** needed to kill viral-infected cells and tumor cells,
- A *decrease* in **B cells**, which make **antibodies** to fight specific pathogens,
- A *decrease* in the effectiveness of **memory T cells** that help keep latent (dormant) viruses in check, such as the virus that causes **shingles**,
- An *increase* in pro-inflammatory proteins, including **interleukin-6 (IL-6)**, which is linked to impaired immune function, and
- An *increase* in persistent, low-grade inflammation or **inflammaging**.

Scientists have found that many natural plant compounds, including those in ***Cistanche***, may help slow the rate of **immune senescence** and optimize our immune function.

Bolstering Immune Defenses

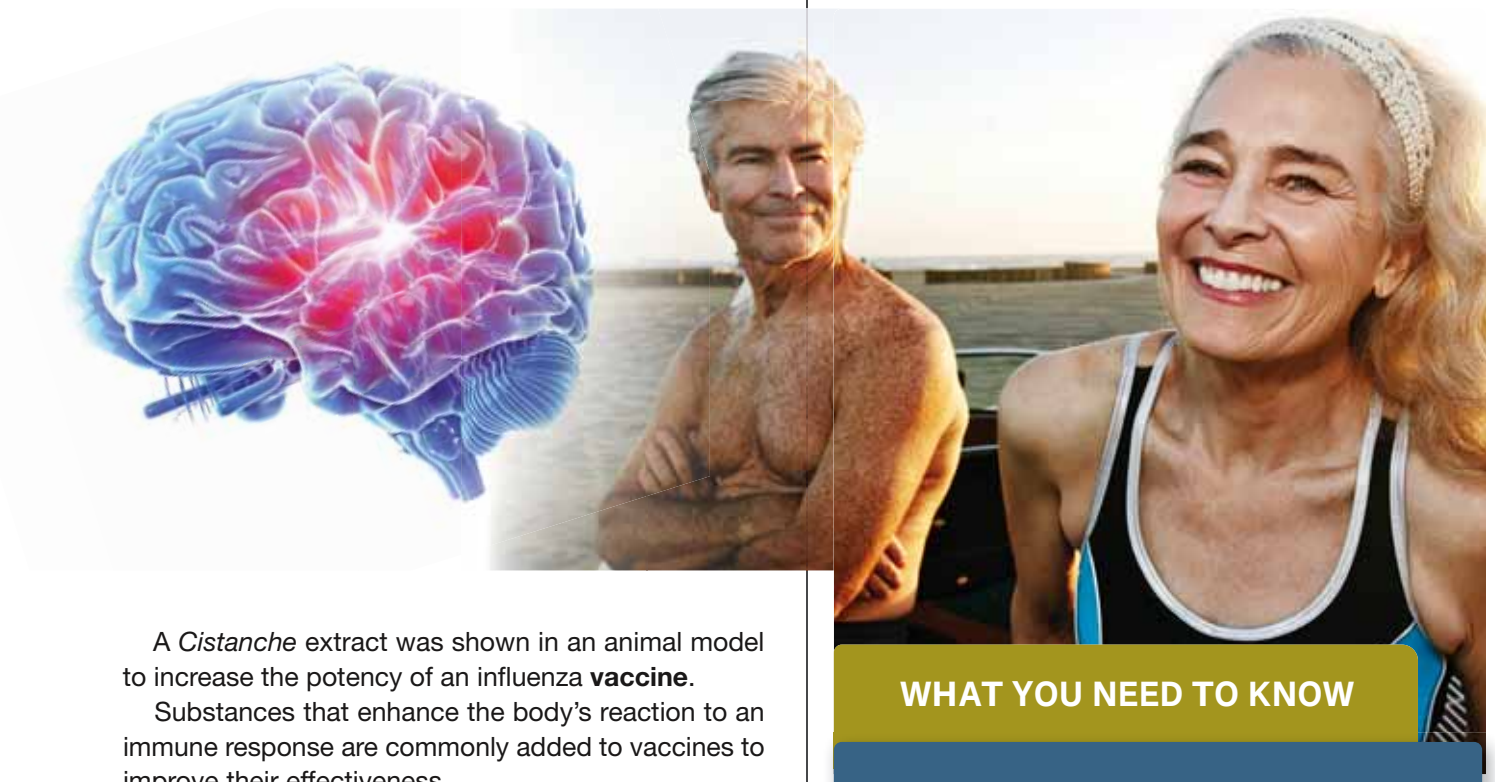
Researchers have performed several cell culture and animal studies to identify how *Cistanche* extract can support the aging immune system.

These studies suggest ***Cistanche*** could help:

- Increase amounts of **natural killer cells**, which help defend against **tumors** and a number of pathogens,[3]
- Promote the production of **naïve T cells and B cells,** also needed to help fight pathogens,[3,5,6]
- Support proper immune system function through its **anti-inflammatory** activities,[5]
- Increase the activity of **dendritic cells**, which help activate **naïve T cells**,[8] and
- Decrease harmful **proinflammatory** cytokine **interleukin-6 (IL-6)**.[3]

Among the most beneficial compounds in *Cistanche* are **polysaccharides** and a class of polyphenols called **phenylethanoid glycosides**, which include **echinacoside**.[5]

Echinacoside is also a key component of *Echinacea*, an herb known for supporting the **immune system**. *Cistanche tubulosa* has a high content of **echinacoside**.[9]



A *Cistanche* extract was shown in an animal model to increase the potency of an influenza **vaccine**.

Substances that enhance the body's reaction to an immune response are commonly added to vaccines to improve their effectiveness.

When *Cistanche* extract was added to an **influenza** vaccine, it elicited more **rapid antibody production** against the flu antigens.[10]

Taming Neuroinflammation

Cistanche's anti-inflammatory activity makes it a good candidate for protecting against the damaging effects of **neuroinflammation**.[11]

In a placebo-controlled pilot study, men and women with moderate **Alzheimer's disease** took **300 mg** of *Cistanche* **three times daily** for nearly a year.[12]

Taking *Cistanche* resulted in significantly lower levels of certain **inflammatory factors** in the fluid surrounding the subjects' brain and spinal cord, compared to the untreated group.

Untreated subjects also had **hippocampus** shrinkage of **4.2%**, while the *Cistanche* group had no change in the volume of their hippocampus. The hippocampus plays a key role in **cognition**, **memory**, and **learning**.

Consistent with these findings, the *Cistanche* group performed significantly better on **cognitive tests** at the end of the study.[12]

In addition, a rat model of Alzheimer's showed that **echinacoside** and other bioactive components of ***Cistanche*** can pass through the blood-brain barrier to protect brain cells.[2]

WHAT YOU NEED TO KNOW

Live Well, Live Long with *Cistanche*

- ***Cistanche*** is an herb with a long history of use in traditional Chinese medicine to treat common concerns of aging, including weakened immunity and heightened inflammation.
- Research supports the anti-aging and longevity benefits of *Cistanche*, which are linked with the herb's ability to promote more **youthful immune function**.
- Preclinical studies suggest *Cistanche* **increases immune cells** needed to fight harmful viruses, bacteria, and cancers. The herb also decreases **inflammatory cytokines**.
- *Cistanche* may help lower **neuroinflammation** and support cognitive function.

Anticancer Activity

Preclinical research suggests *Cistanche* may help fight **cancer** in cells of the **esophagus**, **breast**, **colon**, and **liver**.[13-16]

For example, *Cistanche* has been found to trigger the death of **colorectal cancer** cells.[5]

One laboratory study found that *Cistanche* inhibited the growth of **colon cancer** cells by **60%** within just 72 hours of treatment. This included cancerous cells that had **metastasized**.[15]

In mouse studies, *Cistanche* stimulated the immune system, increasing levels of cancer-fighting **CD8+ T cells**.

Cistanche inhibited the growth of **liver cancer** cells and greatly improved the rodents' **survival rate**.[16,17]

Longevity Promotion

Scientists use species with short lifespans, including fruit flies and roundworms, to quickly test the lifespan effects of compounds.

Though these creatures are tiny, their organ systems and cellular processes have many similarities to our own.[18]

When adult fruit flies were given *Cistanche* for 20 days, it extended their average **lifespan** by as much as **18.9%**.[19]

Another study used small roundworms to test the longevity effects of the **echinacoside** found in *Cistanche*. This compound increased the average lifespan of roundworms by **13.64%**, compared to an untreated group.[20]

These findings are not surprising considering **immune senescence** is a major cause of death in aging people.

Stimulating Growth Hormone

Once we hit puberty, our growth hormone levels drop about **14%** per decade. Declining health and longevity tend to accompany this hormonal downturn.[21]

Cistanche may provide a natural way to promote youthful growth hormone levels.

When rat pituitary cells were exposed to compounds from *Cistanche*, they stimulated the secretion of growth hormone. Echinacoside was especially effective.[22]

Other Benefits of *Cistanche*

Research suggests that *Cistanche* has health benefits beyond promoting longevity mechanisms and improved measures of immune function.

Cell culture studies show that echinacoside stimulates bone-building osteoblast cells to **regenerate**

bone. Postmenopausal rat models of **osteoporosis** have found that *Cistanche* **reverses bone loss** and **improves bone density**.[5,6,23]

Preclinical research suggests *Cistanche* could help improve **insulin resistance**, promote healthy blood sugar levels, prevent depression, and lower cholesterol.[6,24]

Cistanche may also help combat physical fatigue, support reproductive health, alleviate constipation, and reduce the severity of **cataracts**.[5,6,25,26]

This research adds to the growing body of evidence that oral intake of *Cistanche* promotes healthier aging.

Summary

To live a long, healthy life requires healthy immunity.

Immune function and **lifespan** are closely linked.

Immune system dysfunction, or **immune senescence**, brings increased risks of infection, cancer, and chronic inflammatory conditions.

Extracts of the herb ***Cistanche*** contain bioactive compounds that support immune function.

Preclinical studies suggest *Cistanche* could help bolster **immune defenses**, reduce **cancer** risk, and increase **lifespan**.

Human research shows that *Cistanche* can also help reduce **neuroinflammation** and protect brain function.

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

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Cistanche: an ancient herb that has been used for thousands of years as a tonic to support health and promote longevity.[1]

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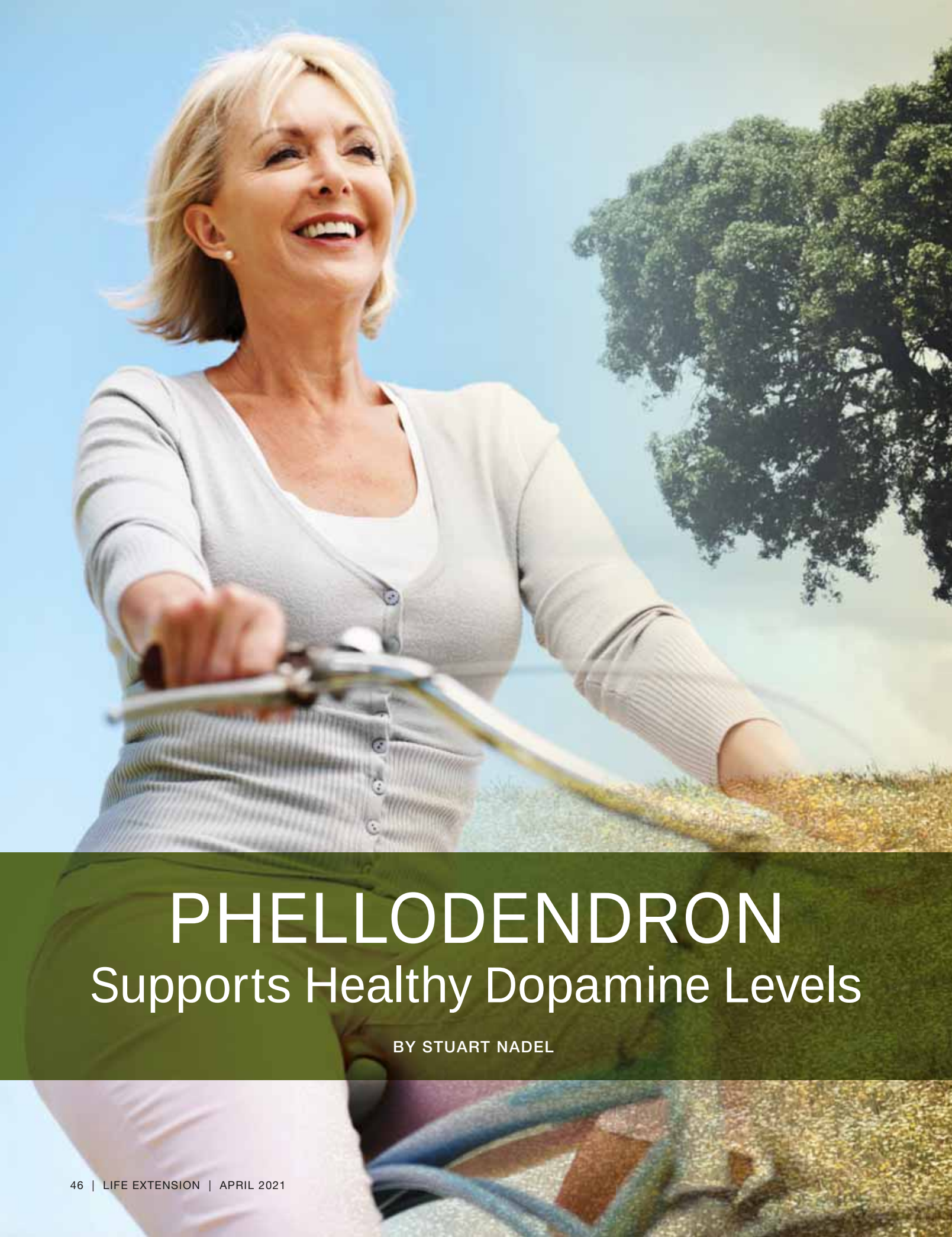


PHELLODENDRON

Supports Healthy Dopamine Levels

BY STUART NADEL

Dopamine is one of the most important neurotransmitters in the **brain**.

It's sometimes called the "feel good" or "pleasure" neurotransmitter.[1]

But it's also central to many different aspects of **cognitive functioning** including an essential role in **motivation**.[2]

As we age, the activity of an enzyme called **monoamine oxidase B** (**MAO-B**) increases. MAO-B breaks down dopamine, reducing vital dopamine levels.[3]

Increased MAO-B activity also has **neurotoxic** effects, contributing to age-related loss of brain function and risk for neurodegenerative diseases.[4-6]

In animal studies, drugs that *inhibit* MAO-B also ***reduce age-related cognitive decline***[7] and even ***increase longevity***.[8-13]

Now scientists have found that components of **phellodendron** tree bark inhibit the **MAO-B** *enzyme* in vitro.[14,15]

Animal studies have already shown that this extract has **neuroprotective** effects.[16-18]

By preserving healthy **dopamine** levels, phellodendron tree bark may help maintain clear thinking, cognitive function, and motivation as well as reduced potential risk for neurodegenerative illnesses.

Dopamine and Brain Aging

Many accept brain fog, slower brain speed, and lack of interest and motivation as a normal part of aging.

Part of the problem may be that brain levels of this *feel-good* **neurotransmitter** decline by about **13%** each decade after **age 45**.[19]

This decline coincides with an increase in **monoamine oxidase B** (MAO-B), an enzyme that *degrades* neurotransmitters like dopamine.[3,5,20,21]

To overcome this age-related brain deficit, scientists screened hundreds of **plants** with **MAO-B-inhibiting** properties. **Phellodendron** tree bark stood out as one of the most potent and selective plant-derived MAO-B inhibitors.[14,15]

Inhibiting MAO-B overactivity *prevents* the breakdown of dopamine, protecting the brain.

Currently, the medical profession uses pharmaceuticals called **MAO-B inhibitors** such as **deprenyl** (also sometimes called selegiline) to stop MAO-B destruction of dopamine, especially in Parkinson's patients.

What is Dopamine?

Dopamine is a crucial **neurotransmitter** that carries "messages" between brain cells.

There are **four** neural pathways in the brain through which **dopamine** acts to elicit behavioral, cognitive, and neurological responses.

It is through these pathways that **dopamine** exerts its effects on movement and learning, emotion and pleasure, cognition and memory, as well as on a hormonal pathway.[22]

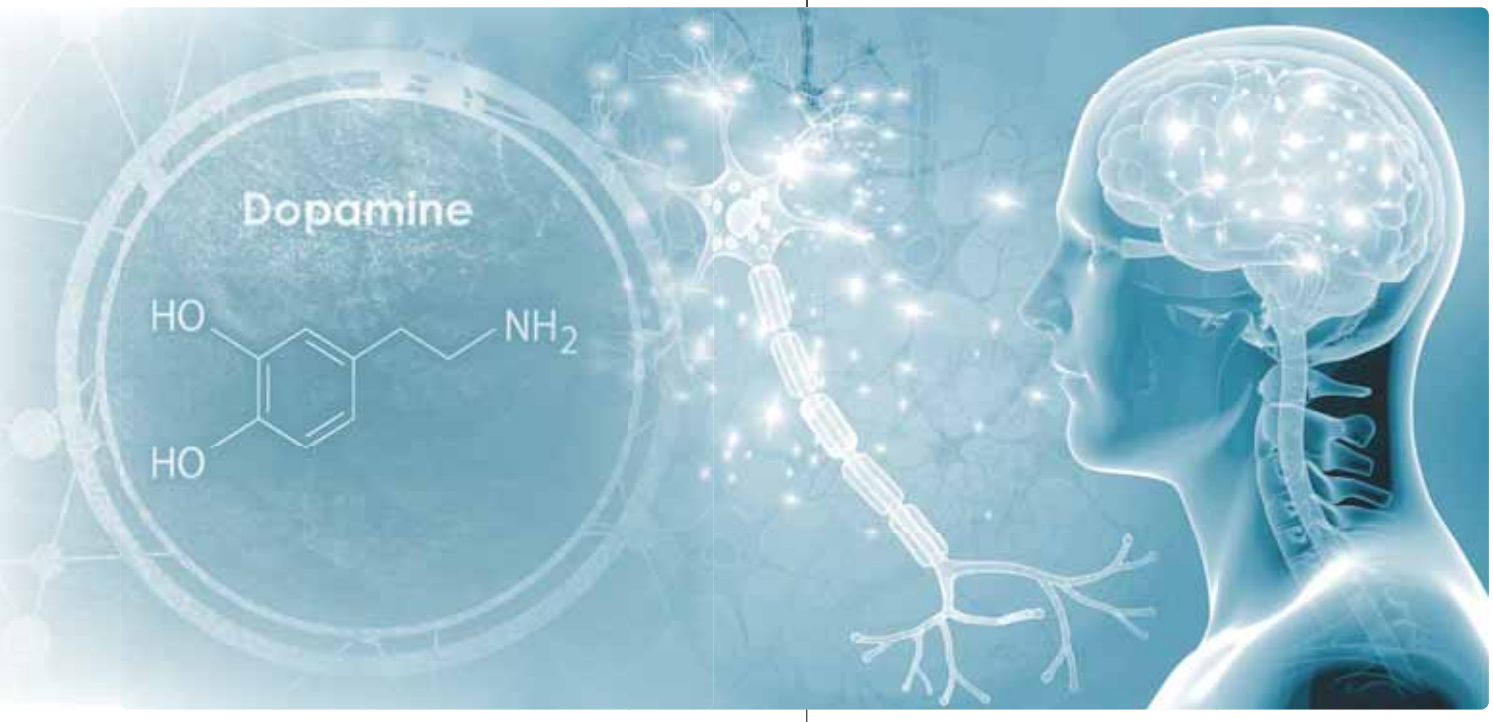
Interestingly, it is believed that the role of dopamine in addiction extends to our troubled relationship with our smart phones and social media. You see people always checking their phone as if they can't live without it for a minute or two.

Researchers claim that this behavior is dopamine driven. We get a "reward" when our phones (and social media) show us laughing faces, positive recognition from our peers, and messages from loved ones. We then become addicted to checking our phones to get a little dopamine reward every time we do.

These social media platforms are designed to activate and elicit a dopamine response and therefore get us hooked on them – even when in many cases we don't get the positive pleasure reinforcement.[23]

Dopamine is known for the many roles it plays in our bodies and in our minds, but has received attention for its role as a "feel-good hormone" and in regulating mood.[24]

The brain releases dopamine during pleasurable activities such as eating or having sex (or using certain drugs).



But beyond pleasure and mood, dopamine levels can affect a person's attention, motivation, and movement. Obviously, these are essential brain functions. We need motivation to make breakfast, to plan out the day, to accomplish tasks. With an adequate supply of dopamine in specific brain regions, we can tackle difficult tasks.[2]

The flip side is that ***low*** dopamine levels in brain reward regions are associated with depression, lack of motivation and pleasure (the latter is known as anhedonia), and the symptoms of drug withdrawal.[25] These are also symptoms of normal aging in some people.

What is more, loss of dopamine function *has* been shown to play a major role in the development of some neurodegenerative diseases.[26]

Dangers of MAO-B Overactivity

Studies in rodents and humans have shown that **MAO-B** activity *increases* in the brain in older age.[5,27-29]

One study that mapped MAO-B activity in humans found an increase in most brain structures starting at age **50** to **60**.[29]

Another study also documented increased MAO-B activity in older humans.[28] This study found that its activity was *higher* in people with **dementia** than in non-impaired individuals of the same age.

That suggests that MAO-B overactivity plays a possible role in **neurodegeneration** through its dopamine-degrading activity.

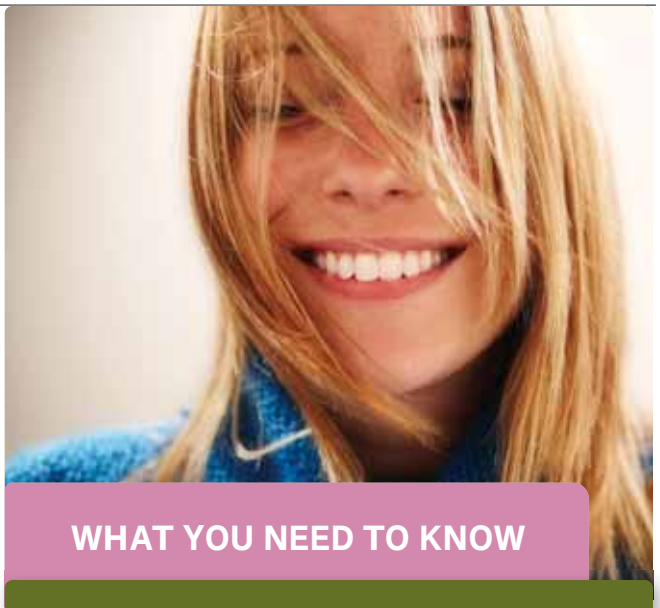
But MAO-B's effects on the brain go far beyond its impact on dopamine.

As MAO-B increases, highly **toxic byproducts** are formed, including hydrogen peroxide, free radicals, and toxic aldehydes.[4-6] These compounds can wreak havoc in cells, leading to disease and dysfunction.

In the brain, these toxic byproducts contribute to **neurotoxicity**—damage to brain cells.[4] This damage has been linked to brain deterioration and the development of age-related neurodegenerative diseases, such as Parkinson's disease, Alzheimer's disease, and others.

When levels of MAO-B activity are normal, these toxic substances are largely neutralized by cellular **antioxidant** defenses. But as MAO-B activity *increases* with older age, antioxidant defenses also tend to *decline*.[4-6]

This leaves an excess of these toxic compounds, which can do significant harm.



WHAT YOU NEED TO KNOW

A Bark Extract That Protects the Brain

- **Monoamine oxidase B** (**MAO-B**) is an enzyme found in the brain and other tissues that degrades the neurotransmitter **dopamine**.
- MAO-B activity tends to *increase* after middle age. This leads to *lower* levels of dopamine, as well as the production of toxic compounds that can damage brain cells.
- This MAO-B overactivity has been implicated in age-related loss of brain function and risk for neurodegenerative disease.
- Drugs that *inhibit* MAO-B are used to treat **Parkinson's** disease and other neurotransmitter-related conditions. In animal models, they help maintain cognitive function into older age and can increase longevity.
- Scientists screened hundreds of plants and identified an extract of **phellodendron** bark as one of the most powerful inhibitors of MAO-B.

Inhibiting MAO-B May Improve Lifespan

Drugs such as deprenyl that *inhibit* MAO-B activity have been used for many years. **Deprenyl** is most commonly prescribed for Parkinson's patients in order to correct their low levels of dopamine, though it is sometimes used in major depression and in attention deficit hyperactivity disorder (ADHD).

By inhibiting or blocking the activity of MAO-B, these medications leave *more* dopamine in our neural circuits.

Studies have found that MAO-B inhibition also has other benefits for the brain.

In various animal models, treatment with deprenyl consistently helps ***preserve cognitive function*** into older age.[7-9]

Even more remarkably, these drugs significantly ***boost longevity*** as well.

Animal studies have found that MAO-B inhibition extends lifespan.[7-13] In two studies, for example, rats given deprenyl lived an average of over **37% *longer*** than untreated rats.[10,12]

In both rat studies, healthy sexual activity was also maintained significantly further into old age in the deprenyl-treated animals, evidence of health benefits beyond cognitive function.

Those who take MAO-B-inhibiting drugs like **deprenyl** do not need to take **phellodendron**.

Phellodendron is not a substitute for physician-prescribed medications.

The typical dose of deprenyl people take for anti-aging purposes is **5 mg** two to three times a **week**. Deprenyl does not need to be taken daily to suppress excess MAO-B in otherwise healthy people over age 45.

A Natural MAO-B Inhibitor

In two different in vitro studies, scientists examined ***hundreds*** of different plant compounds for their abilities to inhibit MAO-B.[14,15]

To screen for this activity, it's common that researchers prepare extracts.

Both concluded that an extract of **phellodendron** bark is one of the most potent and selective inhibitors of MAO-B.[15] It inhibited more than **80%** of the activity of the enzyme, comparable to the drug **deprenyl**.

Phellodendron (which has no relation to the houseplant philodendron) is also known as the **Amur cork tree**.

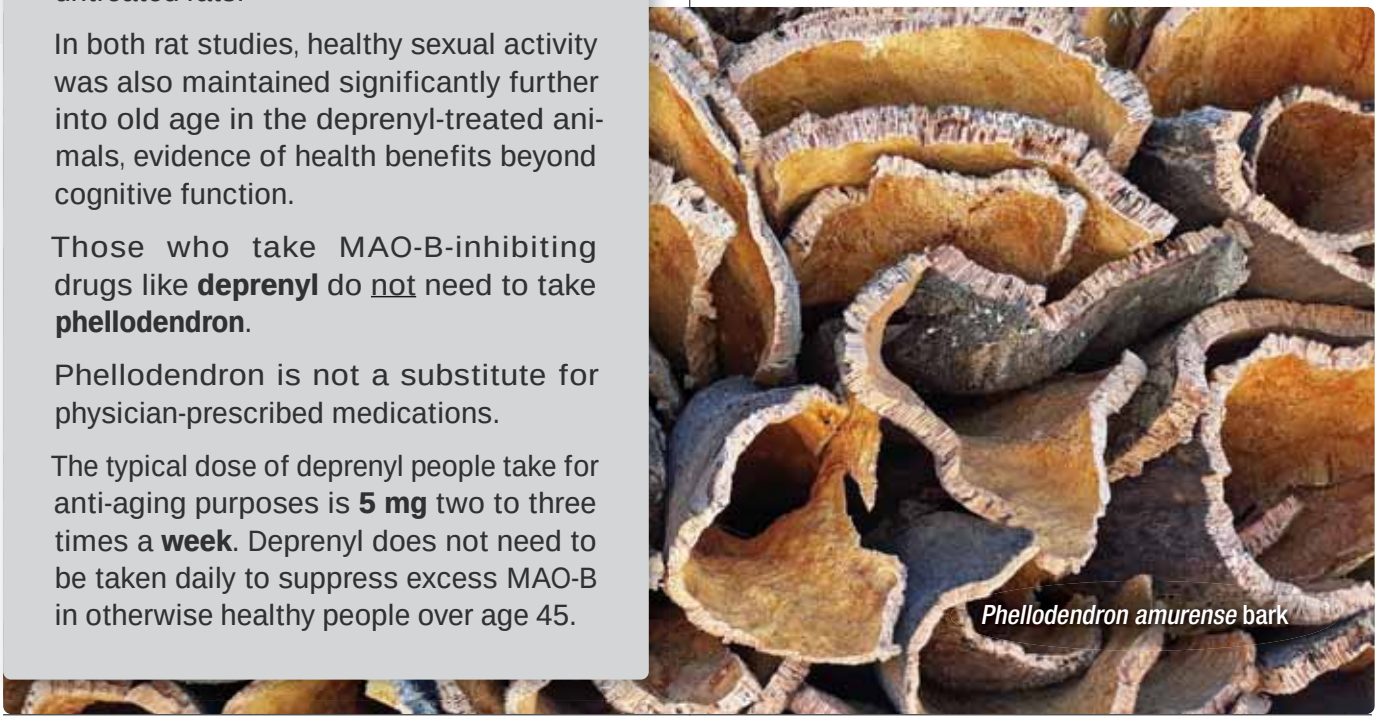
It has been ***safely*** used in traditional Chinese medicine for centuries to treat various ailments, including bacterial infections and chronic inflammatory diseases.

The ability of **phellodendron** to inhibit MAO-B means that it has the potential to maintain dopamine levels and to block the neurotoxic effects of the enzyme's overactivity.

Phellodendron Protects the Brain

Phellodendron has **neuroprotective** properties that go beyond MAO-B inhibition.[16-18]

In one cell model of **Alzheimer's disease**, phellodendron extract was shown to protect against **beta-amyloid toxicity**,[17] which is commonly seen in the brains of people with Alzheimer's.



Phellodendron amurense bark

In rodent models, phellodendron also protects against neuroinflammation, amyloid production, and other changes associated with Alzheimer's.[18] These mechanisms help to **maintain cognitive function** in the animals into older age.

Various studies suggest that **phellodendron** has additional, body-wide benefits. It displays anti-inflammatory, antibacterial, antiviral, and antitumor properties, among others.[15,16]

Along with its ability to protect cognitive function, these effects make this compound a safe way to help protect body *and* brain.

Summary

Overactivity of the enzyme **MAO-B** occurs in the aging brain after middle age.

This may result in *reduced* levels of the critical neurotransmitter **dopamine**. It also produces toxic compounds that damage brain cells and contribute to loss of function and risk for neurodegenerative diseases.

Drugs that *inhibit* MAO-B slow or prevent the breakdown of dopamine.

They are used in **Parkinson's** disease and other neurotransmitter-related conditions and have been shown in animal models to protect the brain and to maintain **cognitive function** into older age.

Animal models have also shown they have an impact on overall **longevity**, significantly prolonging life.

Scientific research has identified **phellodendron** bark extract as an inhibitor of MAO-B.

It may help maintain dopamine levels and prevent the neurotoxicity associated with MAO-B overactivity. In addition, studies show that phellodendron has other neuroprotective and health-promoting properties.

Those who take MAO-B-inhibiting drugs like **deprenyl** do not need to take **phellodendron**.

Phellodendron is not a substitute for physician-prescribed medications.

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

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Physicians in Japan have long used a ***high dose*** of **vitamin K2** to maintain and improve bone density.

Vitamin K2 has been shown to:

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New ***high***-potency **Mega Vitamin K2** provides **45,000 mcg** of MK-4 in a one capsule daily serving.

Mega Vitamin K2 is a perfect complement for those taking supplements like **Bone Restore**. A new formula called **Bone Restore Elite** provides **45,000 mcg** of MK-4 plus highly absorbable **calcium** and other skeletal support nutrients. Those choosing **Bone Restore Elite** do not need to take **Mega Vitamin K2** as each product provides a high potency (45,000 mcg) of **vitamin K2**.

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CAUTION: If you are taking Warfarin (Coumadin®) or related medications, consult your healthcare practitioner before taking this product.

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Pycnogenol® is a plant extract derived from French maritime pine bark.
Its benefits are available in these three formulations:

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1 bottle **$33**
4 bottles $29 each

1 DAILY

†**VENOFLOW™

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1 bottle **$39**
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French Maritime Pine Bark Extract

Item #01637 • 60 vegetarian capsules
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ARTERIAL PROTECT

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VENOFLOW™

For those who sit for long periods while traveling or in the office, this proprietary blend of Pycnogenol® and nattokinase promotes healthy venous blood flow.

PYCNOGENOL®

Numerous published studies describe how concentrated extracts in Pycnogenol® help protect against multiple factors related to normal aging.

For full product descriptions and to order **Pycnogenol®**, **Arterial Protect**, or **VenoFlow™**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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**CAUTION: Consult your healthcare provider before use of VenoFlow™ if taking medication (especially those affecting blood coagulation or blood pressure), being treated for a medical condition (especially bleeding disorders), under the age of 18, pregnant, or lactating.

DOPAMINE

THE "FEEL GOOD" NEUROTRANSMITTER

Feel Better, THINK More Clearly

Dopamine, the "feel good" neurotransmitter, regulates motivation, mood, movement, and cognitive function.

With age, dopamine levels *decline* due to the increase of the **MAO-B enzyme**.

Amur Cork Tree (Phellodendron bark) can help *preserve* **dopamine** by *inhibiting* **MAO-B** activity.

Dopamine Advantage provides **500 mg** of **Amur Cork Tree** in each capsule.

Dopamine Advantage

Item #02413 • 500 mg • 30 vegetarian capsules
1 bottle **$13.50** • 4 bottles $12 each

For full product description and to order **Dopamine Advantage**, call **1-800-544-4440** or **visit www.LifeExtension.com**

NON GMO LE CERTIFIED GLUTEN FREE

Note: Those who take MAO-B-inhibiting drugs like deprenyl do not need to take phellodendron.

MILK THISTLE Reduces Elevated Glucose

BY CINDY RAWSON

Sometimes, no matter how healthy we try to be, we lose our ability to control **blood sugar**.

This is reflected in the fact that estimates of **diabetes** prevalence in people over **age 64** in the U.S. are:

50% *higher* than for those **aged 45-64**,

and

6.3 times *higher* than those **aged 18-44**.[1]

Millions supplement with **milk thistle** today to support healthy **liver** function.

Recent studies show it also helps support healthy **glucose balance** and **insulin sensitivity**.

In one human study, milk thistle *reduced* fasting blood **glucose** by **11%** and *reduced* **insulin** levels by **14%**.[2] (Excess insulin creates metabolic health issues.)

For years, **Life Extension®** has stressed the importance of keeping fasting blood glucose between **70-85 mg/dL** to protect against the many complications of normal aging.

Milk thistle provides another tool to help manage high glucose levels.

Milk Thistle Lowers Blood Sugar

A randomized controlled trial tested **milk thistle** on people with **type II diabetes**.

The study involved 40 diabetic adults, aged 25-50, who were on anti-diabetic medications. They were given either a pill containing **140 mg** of **silymarin** (an extract of milk thistle), or a placebo, three times daily for 45 days.[2]

Compared with the placebo, milk thistle extract:[2]

- Reduced fasting blood **sugar** by **11%**,
- Reduced blood **insulin** levels by **14%**,
- Reduced **insulin resistance**, when cells ignore insulin's signal to remove sugar from the blood, by **26%**,
- Reduced **triglyceride** levels by **24%**,
- Raised **HDL** ("good") cholesterol by **7%**,
- Reduced the **triglyceride-to-HDL** ratio by **28%**, and
- Increased **insulin sensitivity**, how well cells respond to insulin, by **over 5.5%**.

Two other randomized, placebo-controlled clinical trials have shown similar results, indicating that milk thistle extracts–including as part of a multi-herb combination–successfully lowered both fasting blood sugar *and* **hemoglobin A1c**, a test that measures average blood sugar levels over the previous three months.[3,4]

Increasing Milk Thistle Absorption

Silybin, the star component of milk thistle, does not dissolve well in water.[5,6] That makes it difficult for it to reach tissues and cells in the body.[7-10]

Scientists have developed a simple but effective technology to overcome silybin's poor bioavailability. The solution is to mix the silybin with a nutrient called phosphatidylcholine.

Phosphatidylcholine is a major component of cell membranes; it can facilitate transport across the cells lining the intestines, making it an ideal "carrier molecule" for **silybin**.[7,11]

The **silybin-phosphatidylcholine** complex is absorbed nearly **five times better** than silymarin alone, and its ultimate concentration in the liver, its target organ, is **10-fold greater** than silymarin alone.[8-10]

In a study of rats exposed to various liver toxins (including dry-cleaning fluid, acetaminophen, and alcohol), silybin plus phosphatidylcholine protected against the telltale rise in plasma levels of liver enzymes (a marker of liver damage), while the same doses of either nutrient alone had no detectable effect.[12]

A series of human trials has found that this complex also has better results than silymarin or silybin alone, lowering serum levels of liver enzymes and producing clinical improvement in studies of liver cirrhosis and hepatitis caused by alcohol, drugs, and viruses.[5]

Summary

For decades, readers of this magazine have been warned about the dangers of elevated glucose levels.

Diet, exercise, supplements, and medical intervention are all important means to achieve this.

Now scientists have revealed that an herb usually thought of for liver complaints is a valuable tool against diabetes and metabolic problems.

Studies in diabetics have shown that **milk thistle** drives glucose levels down, corrects lipid disturbances, and reduces hemoglobin A1C levels, a marker of blood sugar exposure over the medium term. •

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

WHAT YOU NEED TO KNOW

Support Healthy Glucose with Milk Thistle

- Age is a major risk factor for diabetes, even when we take steps to control our diet and get ample exercise.
- Science reveals that milk thistle, an herb usually used for liver complaints, offers support in metabolic problems.
- Studies on diabetics show improved blood glucose and insulin levels with daily milk thistle use.
- Preclinical and clinical evidence showed that a silybin-phosphatidylcholine complex resulted in almost five-fold greater concentrations of silybin in the bloodstream than silymarin alone.
- Along with diet, exercise, supplements, and medications, milk thistle is another tool to keep blood sugar and insulin resistance under control.

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An array of published studies describes how **lactoferrin** up-regulates innate and adaptive **immune** responses to a variety of antigens.

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Item #01681 • 300 mg, 60 vegetarian capsules

1 bottle **$45** • 2 bottles **$40** each

(Two-Month Supply)

Contains milk.

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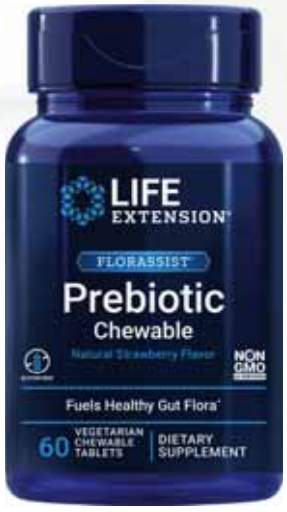

RESTORE YOUTHFUL GUT BALANCE

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- With age, our **bifidobacteria** levels decline to as little as **5%**, creating gut imbalance.[1]
- *Increasing* **bifidobacteria** levels *enhances* digestion and carbohydrate metabolism.
- *Strawberry flavored* **FLORASSIST® Prebiotic Chewable** helps restore healthy **bifidobacteria** levels in as little as 14 days using **XOS** prebiotic.[2]
- **1,000 mg** of **XOS** (xylooligosaccharides) per prebiotic chewable.

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Item #02203 • 60 vegetarian chewable tablets

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For full product description and to order **FLORASSIST® Prebiotic Chewable**, call 1-800-544-4440 or visit www.LifeExtension.com

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ULTIMATE PROTECTION FOR YOUR LIVER

Advanced Milk Thistle contains standardized, top-grade potencies of ***silymarin, silybin, isosilybin A***, and ***isosilybin B***, providing a full spectrum of liver-supportive compounds.

The **silymarin** contained in **Advanced Milk Thistle** is absorbed nearly **5 times** better than silymarin alone, and its bioavailability to the liver is **10 times** better.

Item #01922 • 60 softgels

1 bottle **$21** • 4 bottles $18.75 each

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For full product description and to order **Advanced Milk Thistle**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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BEAT BELLY FAT WITH AMPK

Studies show that *increasing* AMPK activity encourages cells to stop storing fat.

AMPK Metabolic Activator helps trigger cellular AMPK, enabling your body to burn unwanted fat—particularly around your abdomen.

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

This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results are not guaranteed, and results may vary.

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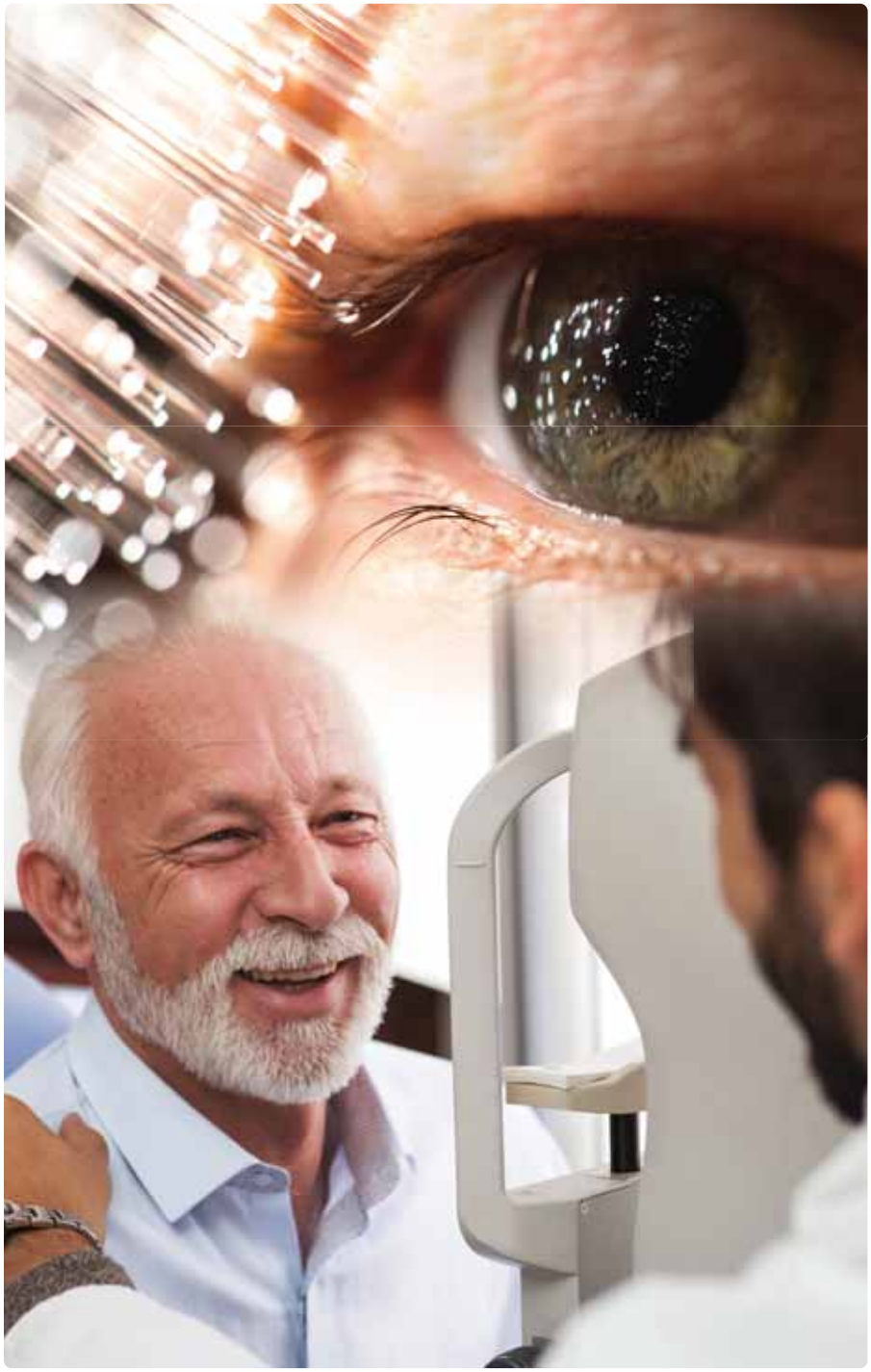
PEA Shows Promise for Glaucoma Treatment

BY LISA HAWKINS



Glaucoma affects **80 million** people around the world.

The cost incurred in the United States due to glaucoma is close to **$3 billion** yearly.[1]

It can't be cured, and is one of the most common causes of **blindness**.[2]

Treatment is usually focused on topical eye drops that help to slow vision loss by reducing the excessive pressure in the eyeball that is an underlying feature of glaucoma.

A recent clinical trial adds to evidence that oral intake of **palmitoylethanolamide (PEA)** improves glaucoma scores alongside prescription eye drops.[3]

In the trial, PEA lowered damaging eye pressure in glaucoma patients and led to **improvements** on tests of retinal function.

Glaucoma and Vision Loss

About **three million** Americans suffer from **glaucoma**, a group of related eye diseases.[1] They often have no symptoms until loss of vision begins.

In glaucoma, there is an increased pressure within the eye, referred to as **intraocular pressure**. This pressure results from a buildup of fluid in the eyeball.

As glaucoma worsens over time, it damages cells in the **retina** of the eye called the **retinal ganglion cells** in the optic nerve. These cells are responsible for passing visual information from the eye to the brain, where it's formed into an image.

When these nerve cells and their fibers deteriorate, the result is gradual vision loss, eventually culminating in complete **blindness** if not successfully treated.

As these retinal cells die, input to the visual centers of the brain is lost.

Prescription eye drops can slow the progression of this vision loss. But nothing can reverse it yet in humans.

What is PEA?

Palmitoylethanolamide (PEA) is a fatty acid produced in the body in response to inflammation.

It is found in trace amounts in some food sources, including egg yolk and peanuts.

PEA has been used clinically for **pain management** and discomfort relief.

As they learn more about PEA, scientists have found that it has beneficial biological activity in other areas.[4-6]

How PEA Fights Glaucoma

PEA can help control glaucoma in different ways.

One of the main causes of glaucoma is the buildup of fluid, known as the **aqueous humor**, in the eye. This buildup leads to an increase in intraocular pressure.

PEA improves the ***outflow*** or drainage of the aqueous humor, reducing fluid levels.[7-11] Human studies have shown that oral intake of **600 mg** of **PEA** daily significantly lowers **intraocular pressure**.[7,11]

In one randomized, placebo-controlled study, **300 mg** of **PEA** twice per day for three months resulted in reduced intraocular pressure and improved endothelial function (measured by flow-mediated dilation).[12]

In addition, animal studies show that PEA has **neuroprotective effects**, shielding nerve cells in the retina and the brain from damage due to various forms of injury.[13-16]

Clinical Improvements

Researchers in Italy recently conducted a clinical trial of **PEA** in **glaucoma** patients.[3]

People who were already taking eye-drop medications for glaucoma were randomized into two groups. One continued the current therapy. The second group also took **600 mg** of **PEA** daily.[3]

A non-invasive test called a **pattern electroretinogram (PERG)** was performed on all subjects. This measures eye health by testing the function of the **retinal ganglion cells** that are damaged by glaucoma.[17,18]

At the end of the study, patients who took PEA had PERG test scores that were approximately **43% improved** compared to their starting values and the values of subjects who did not receive PEA.

The intraocular pressure of all subjects was also recorded. Those taking PEA had significantly lower eye intraocular pressure, (an average reduction of about **1.58** points).[3]

A prior trial of glaucoma patients established that for each **1 mmHg** reduction in intraocular pressure, the risk of progression of loss is **reduced by 10%**.[19] That means that this degree of improvement equates to a potential reduction in the risk of progression of glaucoma symptoms.[3]

Quality-of-life scores were also calculated using a vision-specific questionnaire designed by the **National Eye Institute**. Subjects taking **PEA** scored an average **6.89 points higher** on the quality-of-life exam compared to those not taking PEA.[3]

These results show significant benefits for patients suffering from any stage of glaucoma.

Summary

Glaucoma is a chronic and progressive eye disease. It is one of the most common causes of blindness in adults.

PEA is a compound produced in small amounts in the body. Oral intake of PEA is often used to control pain.

Studies have demonstrated that PEA can help control glaucoma as well, protecting the eyes and vision in several different ways.

In **2020**, a study was published that evaluated the use of **PEA** as an add-on glaucoma therapy to prescription eye drops. It found that a **600 mg** dosage of **PEA** daily *lowered* damaging eye pressure and improved retinal cell function and quality of life.

PEA holds promise as a glaucoma adjuvant alongside conventional medications. •

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

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DHEA Complete delivers **7-Keto® DHEA** (**100 mg**) and regular **DHEA** (**25 mg**), plus extracts from curcumin, green tea, and whole red grapes.

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4 bottles $32 each

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Caution: Consult a physician or licensed qualified health care professional before using this product if you have, or have a family history of breast cancer, prostate cancer, or other hormone-sensitive diseases.

This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results may vary and are not guaranteed.

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FISETIN

The Longevity Flavonoid

Fisetin, a flavonoid found in strawberries and apples, is currently being studied for its effectiveness as a **senolytic** in humans.[1]

In preclinical studies, fisetin:

- Mimics effects of **calorie reduction**[2]
- Targets longevity pathways[2-6]
- Extends lifespan of mice by about **10%**[7]
- Removes **senescent** cells through **senolytic** action[7]
- Suppresses excess **mTOR** activation[8]

Fisetin is poorly *absorbed* due to its breakdown in the small intestines.

Bio-Fisetin solves this problem by enclosing **fisetin** with a compound from the fenugreek herb.

A **human** trial showed **bioavailability** of this new **fisetin** compound increased up to ***25 times*** compared to fisetin by itself.[9]

Just one capsule daily of **Bio-Fisetin** helps manage **senescent cells** and may support overall longevity.

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Item #02414 • 30 vegetarian capsules

1 bottle **$11.25** • 4 bottles $10 each

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For full product description and to order **Bio-Fisetin**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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The Brain & Body Element

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LITHIUM

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Each bottle lasts 100 days.

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

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PEA is a fatty acid found in the body that works at the site of discomfort.

Clinical studies show **PEA** can combat stubborn, minor pain and discomfort within **14-30 days** of supplementation.[1-3]

Each chewable tablet delivers **600 mg** of **PEA** (**palmitoyle-thanolamide**.)

RELIEF

FOR OCCASIONAL MINOR PAIN AND DISCOMFORT*

Take one to two chewables daily as needed.

Item #02303 • 60 Chewable Tablets
1 bottle **$25.50**

4 bottles $23 each

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For full product description and to order **Discomfort Relief**, call 1-800-544-4440 or visit www.LifeExtension.com

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

ZINC'S Role in BONE HEALTH

BY PAZ ETCHEVERRY, PhD

Experts commonly recommend several nutrients to help build strong, healthy **bones**, especially calcium, magnesium, and vitamin D.

But there's another mineral that's also essential for bone health.

Zinc is often overlooked by mainstream bone-building protocols. It is critical for growth and maintenance of healthy bone.

Zinc both prevents the *breakdown* of bone and helps form *new* bone. It's a building block of bone itself. And it reduces the inflammation that can damage bone.

Daily oral intake of zinc in combination with other essential bone nutrients can help maintain strong bones well into older age.

Bone Remodeling

We have more than **200** bones in our body.[1]

About **90%** of bone volume is made up of **minerals** and various **proteins**.[2]

The remaining **10%** is occupied by different kinds of cells, including **osteoclasts** and **osteoblasts**.[2]

Bone is not a static organ. It is constantly going through a process known as **remodeling**.[2,3]

During this process, **osteo*clasts*** break down and remove old and damaged bone, transferring minerals from bone tissue to blood.

Osteo*blasts* use those minerals to form healthy *new* bone.[3]

When this process works the way it's supposed to, our **bone mineral density** or **bone mass** remains at an optimal level.

As we **age**, bone mineral density often begins to *decline*. This problem can be made worse by other factors, including low levels of calcium, vitamin D, vitamin K, and others, as well as a sedentary lifestyle, smoking, and more.[4]

The Threat of Osteoporosis

Osteoporosis is a disease characterized by a *severe* reduction in bone mass. It causes bones to become fragile and prone to **fracture**. It may lead to reduced quality of life, disability, and sometimes death.[5]

It is estimated that about **10 million** Americans over **age 50** have osteoporosis,[6] which literally means "porous bone." People often don't know they have it until they suffer a fracture.

An additional **43 million** Americans have **osteopenia**,[6] a bone mineral density that is lower than normal but not low enough to qualify as osteoporosis.

Physicians routinely recommend increased **calcium** and **vitamin D** intake to maintain and preserve bone mass.[7,8]

This approach is not sufficient. Bone remodeling is a complex process that requires sufficient intake of many other nutrients, including **zinc**, **magnesium** and **vitamin K**.

Zinc is often neglected in discussions of bone health. But without enough zinc, building strong bones is impossible.[9]

Zinc and Healthy Bones

Zinc is an essential mineral that plays diverse roles in the human body. It is needed for proper immune function, cell replication, protein synthesis, and more.[10]

Zinc is also *required* for the growth, development, and maintenance of **healthy bones**.[9]

Low dietary intake and blood levels of zinc are associated with **osteoporosis** in adult men[11] and postmenopausal women.[12]

One study showed that average zinc levels were significantly *lower* in **osteoporotic** women than in either those with osteopenia or normal women.[13]

In one randomized controlled trial, oral intake of zinc *prevented* decreases in bone density in postmenopausal women with low zinc consumption.[14]

Zinc's Role in Bone Formation

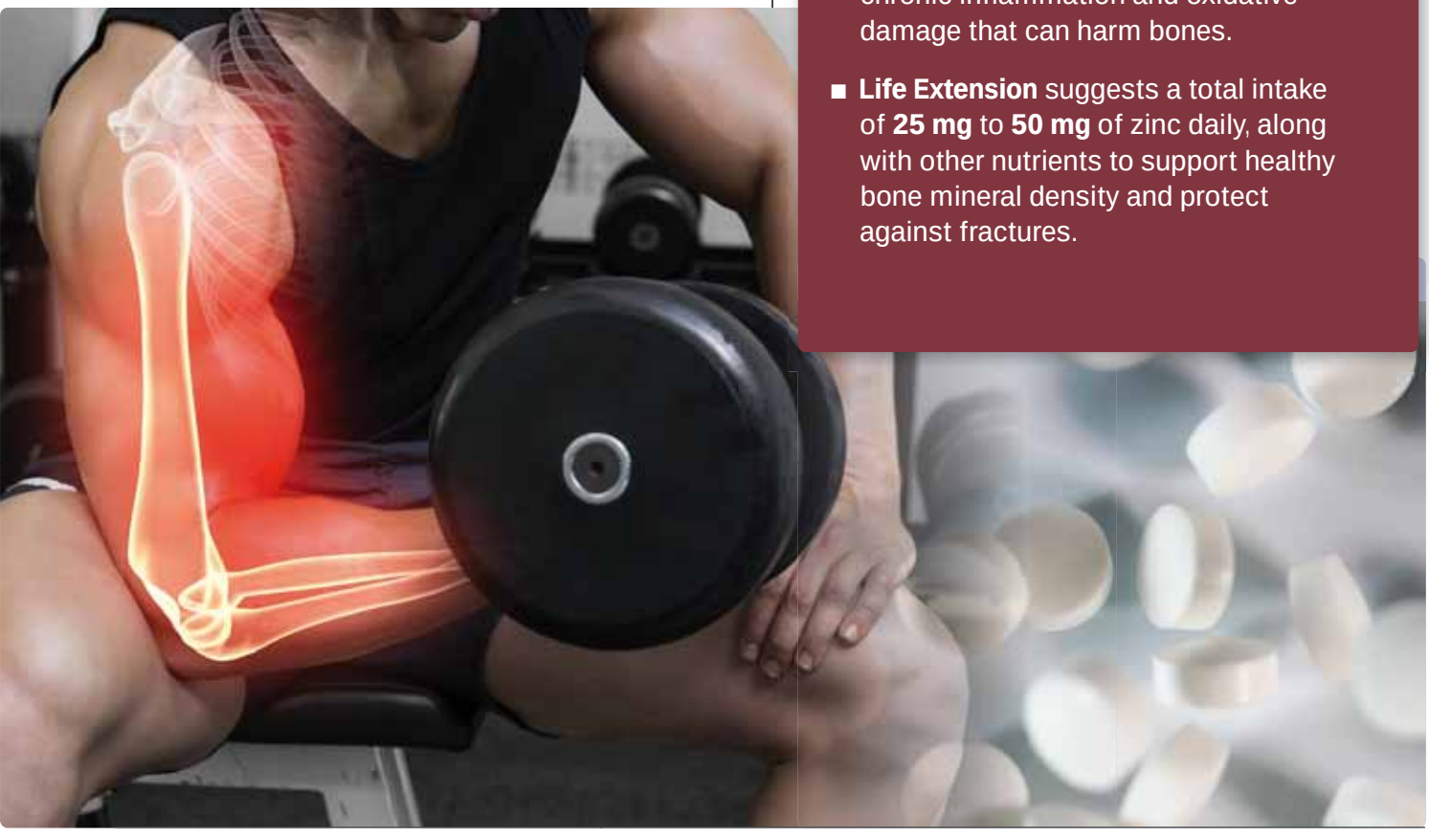
Zinc appears to increase **bone formation** in a few different ways.

It plays a role in the synthesis of **insulin-like growth factor-1 (IGF-1)**, a protein that plays an important part in the maintenance of bone health.[15]

WHAT YOU NEED TO KNOW

Zinc Helps Build Stronger Bones

- As we age, our **bone mineral density** tends to decline. This can eventually lead to **osteoporosis** and fractures.
- Many nutrients, like calcium and vitamin D, are known to be essential for bone health. But the mineral **zinc** is also essential for building strong bones, though it is often overlooked.
- In studies, adults with osteoporosis have *lower* levels of zinc than adults with healthy bones.
- Research shows that zinc inhibits the breakdown of bone, helps in the formation of new bone, and prevents chronic inflammation and oxidative damage that can harm bones.
- **Life Extension** suggests a total intake of **25 mg** to **50 mg** of zinc daily, along with other nutrients to support healthy bone mineral density and protect against fractures.



Nutrients to Promote Bone Health

Bones are a dynamic, living tissue, with all the vulnerabilities to damage as any other tissue. Zinc is important for the maintenance of healthy bones. Other ingredients promoting bone health:

Calcium provides the bulk of the mineral content of bones and **vitamin D3** promotes calcium uptake from the gut.[23]

Magnesium regulates calcium movement into and between bone cells, increasing bone mineral density.[24]

Vitamin K is essential for bone strength.[25,26] Low vitamin K status is associated with *decreased* bone mineral density and *increased* risk of fracture.[27]

Manganese functions as an essential cofactor (helper molecule) for enzymes that promote the growth of bone and prevent damaging oxidative stress.[28]

Silicon improves the quality of **bone matrix** (the non-mineral part of bone composed of collagen and other proteins) and facilitates the bone-building process known as **mineralization**.[29]

Boron is a trace mineral that has beneficial effects for bone and joint strength.[30]

This mineral has also been shown to stimulate the expression of a transcription factor related to the differentiation of stem cells to pre-osteoblast cells (precursor cells that become osteoblasts).[16]

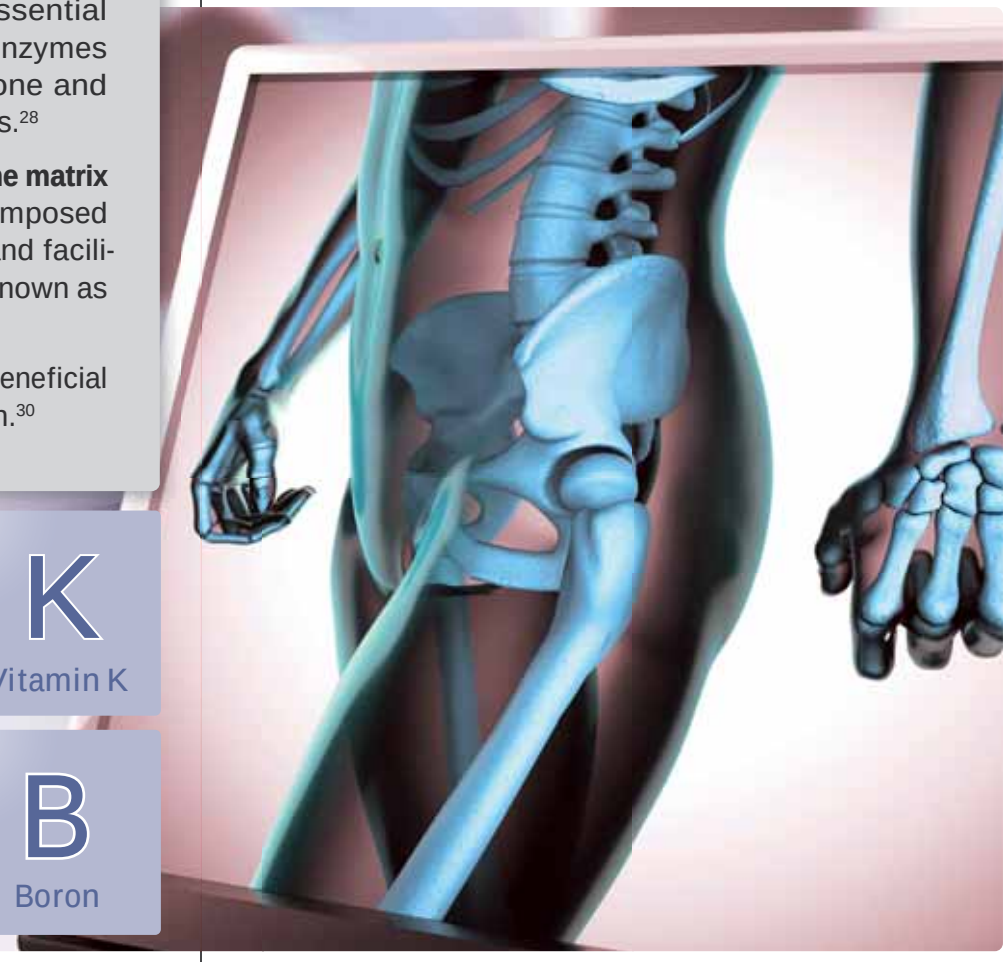
Keep in mind that bone is constantly going through a process known as **remodeling**.[2,3]

Studies also indicate that zinc *increases* the activity of an enzyme called **alkaline phosphatase**, which spurs osteoblasts to begin forming new bone.[16,17]

In one study, patients with **traumatic bone fractures** received either **50 mg** per day of zinc or a placebo.[17]

After 60 days, zinc intake had positive effects on the formation of **callus**, the bony and cartilaginous material that forms on a bone fracture during repair. Zinc also resulted in a significant elevation of alkaline phosphatase activity.[17]

At the same time that zinc helps in bone formation, it *inhibits* bone breakdown by osteoclasts.[18] This helps support the proper balance between old bone and new bone, known as **bone remodeling**.



Stronger, Healthier Bones

Zinc doesn't just help in the process of *formation* of bone. It plays a **structural** role in the skeleton as well.

It is the most abundant *trace* mineral in the human skeleton. (*Macro*minerals like calcium, phosphorus, and magnesium are present in higher amounts.) Roughly **85%** of zinc in the body is found in muscle and bone.[18]

Zinc is crucial for normal development and function of **immune cells**, which help protect against **immune senescence** and **chronic inflammation**.[19] In bone, chronic **inflammation** may disrupt bone remodeling and result in bone loss.[20,21]

Zinc is also required for **vitamin D** to work properly inside cells. Several vitamin D-dependent genes are influenced by zinc concentrations.[22]

Summary

Bone health depends on a variety of nutrients, not just calcium and vitamin D.

The mineral **zinc** is often overlooked, but plays a vital role in building strong, healthy bone, and preventing **osteoporosis**.

It *diminishes* bone breakdown and *stimulates* bone formation, and is also required for the proper functioning of vitamin D.

It is essential to make sure you're getting enough zinc on a daily basis, especially as you age.

Many dietary supplement users receive zinc with their multivitamin formulas. **Life Extension®** suggests a total intake of **25 mg** to **50 mg** of zinc daily.

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

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

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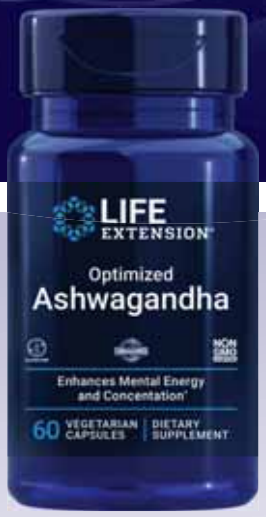

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The End of Mental Illness

How Neuroscience is Transforming Psychiatry and Helping Prevent or Reverse Mood and Anxiety Disorders, ADHD, Addictions, PTSD, Psychosis, Personality Disorders, and More

BY DANIEL G. AMEN, MD

Mental health conditions like anxiety, depression, bipolar disorders, and PTSD are increasing at an alarming rate.

Dr. Daniel Amen, neuroscientist, board-certified psychiatrist, and founder of Amen Clinics, has developed a radical new approach to diagnosing and treating mental illness. It's based on one key idea: *Get your brain right, and your mind will follow*.

In his new book, *The End of Mental Illness*, Dr. Amen presents a radical new paradigm for understanding emotional health. He discusses the use of specific nutraceuticals to heal the brain and improve its function.

In this eye-opening book, Dr. Amen provides evidence that *mental* health is connected to *brain* health.

Utilizing a state-of-the-art, brain-imaging technique called SPECT, Dr. Amen is able to identify the underlying factors causing various mental health issues—which allows him to make use of targeted treatments for true healing.

Over the past 30 years, Amen Clinics has built the world's largest database of SPECT scans for psychiatric issues, totaling nearly 160,000 scans on patients from 121 countries. Researchers there have also published 70 peer-reviewed scientific studies on SPECT.

This vast database of information has shown Dr. Amen that diagnosing and treating mental illness based on symptoms alone often misses the true cause of illness. It has also demonstrated to him that standard, drug-based treatment protocols rarely improve brain function, while more natural, lifestyle-based approaches can be far more effective.

In *The End of Mental Illness*, Dr. Amen details his BRIGHT MINDS approach to addressing the underlying factors revealed by the SPECT scans—and provides more than 100 simple ways to heal your brain.

In this interview with ***Life Extension®***, Dr. Amen talks about the importance of brain imaging, discusses how factors like blood flow and aging impact the brain, and provides practical advice for making improvements in factors that can harm brain health.

—LAURIE MATHENA

LE: Can you talk more about the difference between *mental* health and *brain* health?

Dr. Amen: It has become crystal clear to us that, as psychiatrists, we are not dealing with mental health issues, but we are dealing with brain health issues; and this one idea has changed everything we do to help our patients.

Think of it this way. Your brain can have problems just as your heart can have problems. Most people who see cardiologists, however, have never had a heart attack. They are there because they have risk factors—a family history of heart disease, high blood pressure, or too much abdominal fat—and they want to prevent a heart attack.

To end mental illness, we must develop a similar way of thinking. Reframing the discussion from mental health to brain health changes everything. People begin to see their problems as medical, not moral.

Get your brain right, and your mind will follow. In study after study, improving the physical functioning of the brain improves the mind.

LE: How has using brain imaging transformed your treatment of patients with mental illness?

Dr. Amen: In 1991, I went to a lecture on brain SPECT imaging by Jack Paldi, MD, who was the chief of medicine at the hospital where I worked. Dr. Paldi told us that SPECT was a tool to give psychiatrists more information to help their patients.

SPECT looks at blood flow and activity. It looks at how the brain works. It is different from MRI and CT studies that look at brain structure. SPECT looks at brain function.

SPECT basically tells us three things about the activity in each area of the brain: if it is healthy, underactive, or overactive.

Our brain imaging work has completely disrupted how we help our patients get well, and this information can help you, even if no one ever looks at your brain.

LE: How does using brain imaging differ from the standard method of diagnosis?

Dr. Amen: Experienced clinicians can tell if someone is likely to have attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD), obsessive compulsive disorder (OCD), or bipolar disorder without the benefit of these tools.

But what clinicians cannot do, and will never be able to do, without functional brain imaging, is to know the underlying brain biology of the patients they treat.

Without imaging your brain, your doctor cannot tell if your inattention, depression, or aggression is from factors such as:

- Low blood flow from vascular disease
- An inflammatory process, related to low omega-3 fatty acids or gut problems
- A brain infection
- Nutrient or neurohormone abnormalities
- Blood sugar abnormalities

If we don't look at the brain, we are unnecessarily flying blind. That can lead us to miss important diagnoses, give the wrong treatment plan, and hurt the people entrusted to us to help.

LE: Why isn't the whole of psychiatry on board with brain imaging?

Dr. Amen: Because this new way of thinking completely changes the diagnostic and treatment paradigm that has been taught in medical schools and psychiatric residency training programs for more than 50 years.

Functional brain imaging takes psychiatry from a generalized symptom-cluster diagnostic and treatment specialty without any biological evidence to a more objective specialty, one that is solidly based on using state-of-the-art, brain-mapping tools to help optimize the patient's brain function.

Besides completely changing the way we diagnose brain health/mental health, functional imaging leads to entirely different treatment protocols to improve brain function.

These include strategies that are often more natural and lifestyle-based and more directly accessible to patients. These types of protocols are not taught in medical schools and are not underwritten by the pharmaceutical industry that has dominated the financial support of the psychiatric establishment.

LE: Based on your extensive collection of data using SPECT, you developed an acronym called BRIGHT MINDS to explain the underly factors involved in brain illness. Can you briefly review what those are?

Dr. Amen: In order for your biology to operate at peak efficiency, its machinery (cells, connections, chemicals, energy, blood flow, and waste processing) needs to work right. The brain is like a supercomputer, with both hardware and software.

Think of the biological circle as the hardware. Within it are the BRIGHT MINDS factors:

- Blood Flow
- Retirement/Aging
- Inflammation
- Genetics
- Head Trauma
- Toxins
- Mind Storms (abnormal brain electrical activity)
- Immunity/Infections
- Neurohormone Issues
- Diabesity
- Sleep

When the brain's biology is healthy, all these factors work together in a positive way to maximize your success and sense of well-being. When any of the BRIGHT MINDS risk factors are troubled, you are more likely to suffer with a wide variety of symptoms.

LE: Let's talk a bit more about the first factor: blood flow.

Dr. Amen: Blood flow is critical for life. It transports nutrients, including oxygen, to every cell in your body and flushes away toxins. Anything that damages your blood vessels or impairs blood flow hurts your brain.

Low blood flow on SPECT has been seen with depression, suicide, bipolar disorder, schizophrenia, attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD), traumatic brain injury (TBI), hoarding, murder, substance abuse, seizure activity, and more.

Low blood flow is the number one brain imaging predictor that a person will develop Alzheimer's disease.

Our brain imaging research has taught us that the number one strategy to support your brain and mental health is to protect, nurture, and optimize your heart and blood vessels.

LE: Do you support the use of supplements to improve various factors involved in brain health?

Dr. Amen: At Amen Clinics we are not opposed to medications for your mind and prescribe them when necessary. However, we are opposed to medications being the first and only thing you do to help your brain and your mind.

I first became interested in using nutraceuticals for brain health/mental health issues once I started using SPECT scans. I could see that some of the medications I was taught to prescribe, especially benzodiazepines for anxiety and opiates for pain, were clearly associated with unhealthy looking scans.

I started looking for less toxic options for my patients and was surprised to find a growing body of scientific literature to support the use of supplements for many brain health/mental health issues.

After nearly 40 years as a psychiatrist, I recommend more and more treatments from nature, including foods and nutraceuticals. We want you to use all the tools available, especially if they are science based, effective, and cheaper, and have minimal side effects.

LE: What are a few supplements you recommend for improving blood flow?

Dr. Amen: Cocoa flavanols improve blood flow, support healthy blood pressure, and improve brain functions, even in those who haven't had enough sleep.

Omega-3 fatty acids can improve blood flow, brain function, memory, and mood, as well as reduce inflammation and brain shrinkage from aging. There are two active compounds in omega-3s: EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid). You need both.

LE: What is the surprising connection between infections and brain health?

Dr. Amen: Back in 1991, when I first began using SPECT scans in my practice, I saw many patients who had been diagnosed with conditions like chronic fatigue syndrome and fibromyalgia. Many of these patients' scans looked terrible, showing overall low blood flow caused by undiagnosed infections.

Clinical evidence now shows that chronic fatigue syndrome is an infectious disease, and I hope more physicians will start testing for infections.

LE: What have the SPECT scans revealed about the impact of aging on the human brain?

Dr. Amen: Brain imaging work at the Amen Clinics has also clearly shown the gravity of age. As your skin starts to sag and wrinkle and show other signs of aging, the same type of process occurs in the brain.

Yet your brain doesn't have to deteriorate with age if you remain diligent about your health for as long as you want to have a clear and happy mind!

Too often, elderly (let's say those over 70) people are dismissed with brain health/mental health issues—such as ADD/ADHD, depression, anxiety or memory issues—because they are older; but research has found that no matter what your age, your brain can be better if you put it in a healing environment.

LE: What are some practical ways to combat brain aging?

Dr. Amen: Fasting helps your brain stay healthy because it cleans out the buildup of toxic proteins that damage neurons, reducing inflammation and slowing down aging.

A simple way to do a nightly 12- to 16-hour fast is to eat dinner at 7 p.m., for example, and not eat again until 7 a.m. (or 11 a.m. for a longer fast). Even longer fasts of 24 hours can also be helpful.

LE: What nutraceuticals have you found to be most useful to slow aging's impact on the brain?

Dr. Amen: N-acetylcysteine (NAC) has shown promising results in people with bipolar disorder, schizophrenia, OCD, and addictions. It can also decrease inflammation and may help delay brain atrophy in Alzheimer's disease.

Recent clinical trials have found that saffron helps for depression, bipolar disorder, and anxiety. As a potent antioxidant and nerve protector, saffron enhances memory, protects the hippocampus, boosts blood flow and acetylcholine, and fights toxic buildup of the proteins thought to cause dementia.

LE: How would readers find a brain health practitioner who follows your BRIGHT MINDS approach to ending mental illness?

Dr. Amen: My mission has always been to teach other medical and mental health professionals the techniques we have learned at Amen Clinics. We have trained more than 3,000 brain health certified coaches (www.brainhealthcoaching.com).

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

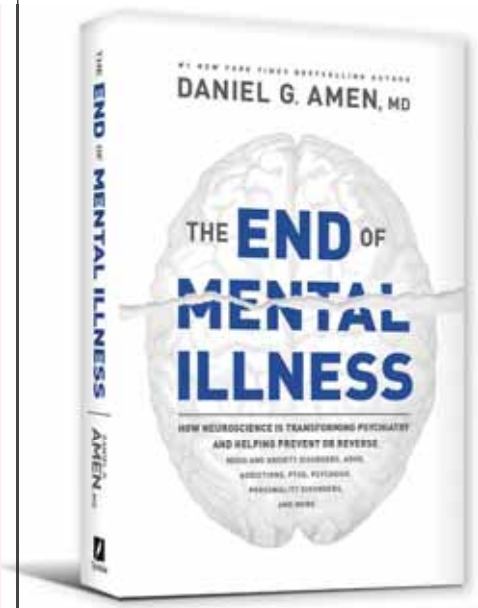
To find professionals who will have a similar integrative mind-set to the one expressed in *The End of Mental Illness*, visit https://referraldirectory.amenuniversity.com/.

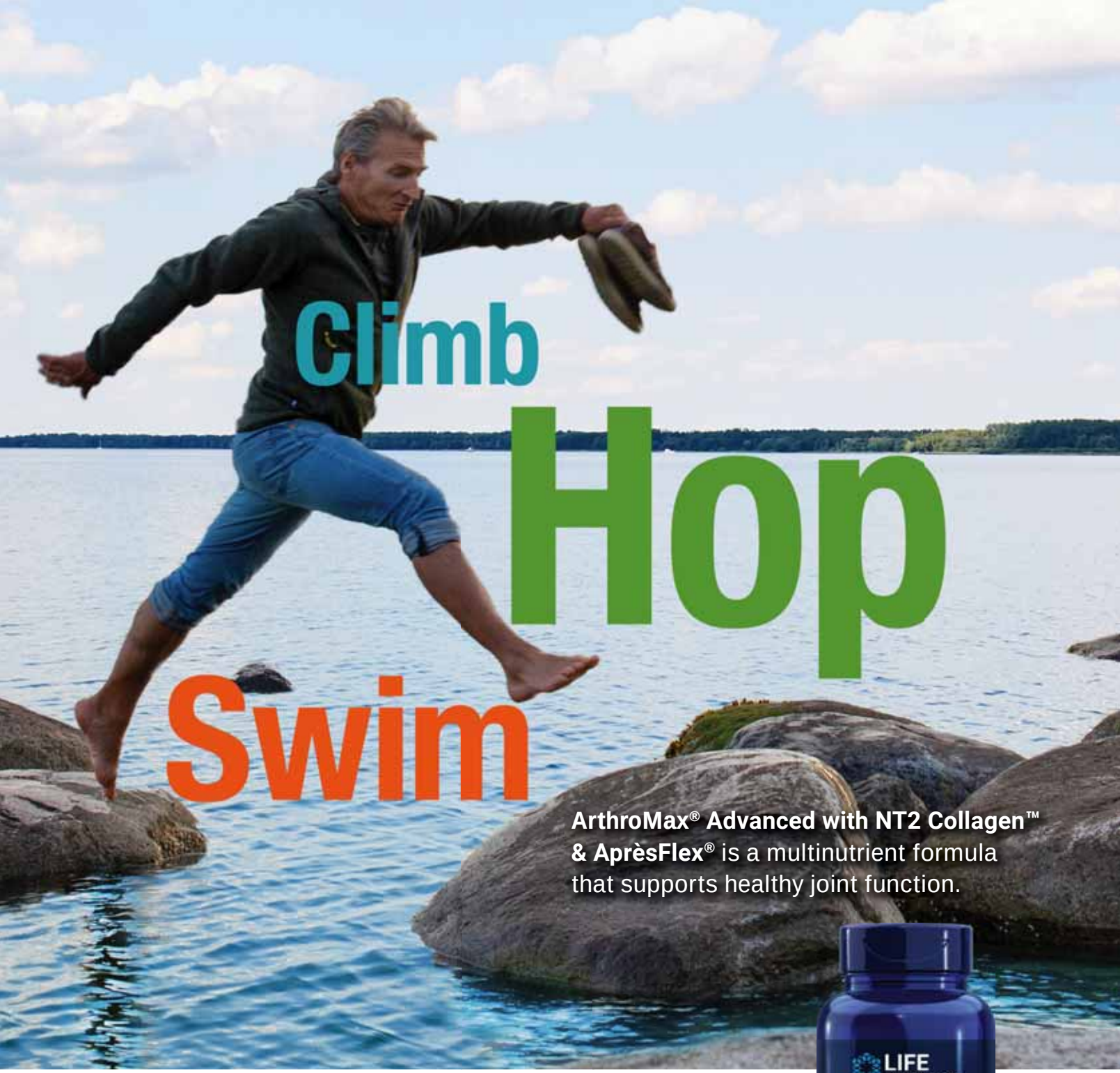
You can also go to the Institute for Functional Medicine (www.ifm.org) or American Academy of Anti-Aging Medicine (www.a4m.com) websites to see if there is a functional medicine doctor near you.

Daniel G. Amen, MD, is a physician, a double board-certified psychiatrist, the founder of Amen Clinics, and a 10-time *New York Times* bestselling author. Dr. Amen has written, produced, and hosted 14 popular public television shows about the brain that have aired more than 110,000 times across North America. His work has been featured in outlets including *Newsweek*, *Time* magazine, the *New York Times*, and *Men's Health*.

To order a copy of *The End of Mental Illness*, call 1-800-544-4440 or visit **www.LifeExtension.com**

Item: #34180 • Price: $19.49





JUST TWO CAPSULES A DAY PROVIDE:

Glucosamine sulfate 2KCl (derived from non-GMO corn)	**1,500 mg**
AprèsFlex® Indian frankincense (*Boswellia serrata*) extract (gum resin) [std. to 20% AKBA$^{\Delta}$]	**100 mg**
NT2 Collagen™ standardized cartilage	**40 mg**
Total Collagen	**10 mg**
Boron (calcium fructoborate as patented FruiteX-B® OsteoBoron®)	**1.5 mg**

NT2 Collagen™ is manufactured by Bioibérica. AprèsFlex® is a registered trademark of Laila Nutraceuticals exclusively licensed to PL Thomas - Laila NUTRA LLC. U.S. Patent No. 8,551,496 and other patents pending. FruiteX-B® and OsteoBoron® are registered trademarks of VDF FutureCeuticals, Inc. U.S. Patent No. 5,962,049.

$^{\Delta}$ 3-O-acetyl-II-ketoB-boswellic acid.

Item #02238 • 60 capsules

1 bottle **$25.50**

4 bottles $22 each

GLUTEN FREE

NON GMO LE CERTIFIED

For full product description and to order **ArthroMax® Advanced with NT2 Collagen™ & AprèsFlex®** call 1-800-544-4440 or visit www.LifeExtension.com

Pistachios

BY LAURIE MATHENA

Pistachios have a history as rich and varied as the nutrients they contain. Archaeological evidence indicates that they were consumed as far back as 7,000 B.C.

They were prized by royalty, like the Queen of Sheba, who decreed them to be an exclusively royal food, and Nebuchadnezzar, the king of Babylon, who had pistachio trees planted in his hanging gardens.

Ancient medicine men also reportedly used pistachios to treat ailments ranging from toothaches to liver problems.

But it wasn't until the 1930s that pistachios made their way to America as a healthy snack food that we enjoy to this day.

Little Nut, Big Benefits

One ounce of pistachios contains more than **5.5 grams** of protein, as well as magnesium, potassium, vitamin B6, and thiamin.

Pistachios are also lower in calories than many other nuts, containing just **159 calories** per ounce, compared to **196** in pecans and **204** in macadamia nuts. However, they boast the highest levels of potassium, tocopherol, vitamin K, phytosterols, and xanthophyll carotenoids of any other nut.[1]

They also contain a higher ratio of amino acids (the building blocks of protein) and a higher percentage of branched chain amino acids than other nuts.

Heart Protection

Pistachios contribute to better heart health in numerous ways. Five randomized trials have shown that consuming pistachios helps promote heart-healthy lipid profiles.[1]

And a meta-analysis of 21 studies showed that eating nuts could reduce blood pressure in people without type II diabetes. Of all the nuts tested, pistachios had the strongest effects on reducing both systolic and diastolic blood pressure.[2]

Blood Sugar Control

Pistachios could be an ideal snack for type II diabetics or those looking to control their blood sugar.

One study showed that consuming **25 grams** of pistachio nuts twice a day for 12 weeks had a beneficial effect on glycemic control, blood pressure, obesity, and inflammation markers in people with type II diabetes.[3]

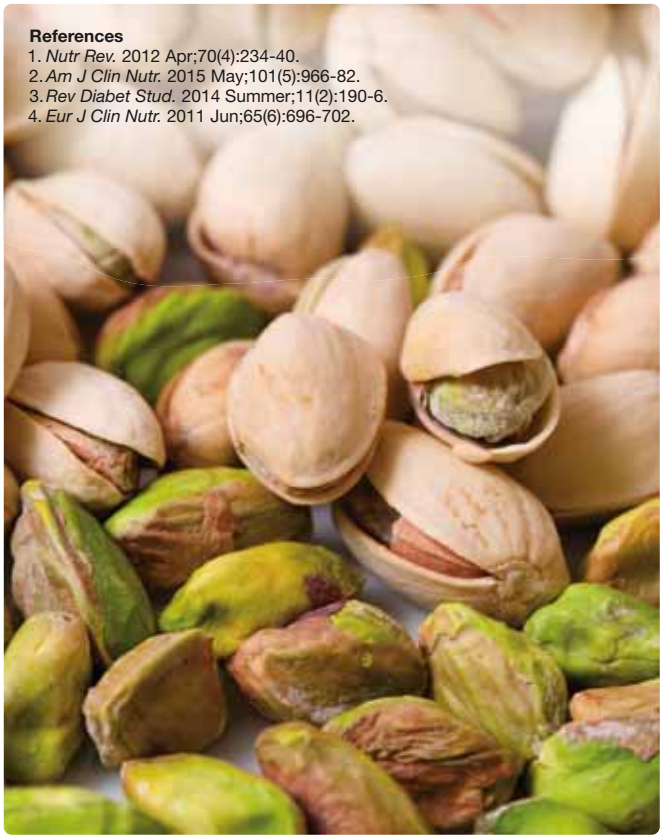
And eating pistachios along with a carbohydrate-rich meal has been shown to reduce the body's glycemic response.[4]

The most common way to enjoy pistachios is by cracking open their shells and eating them whole (just be sure to choose the unsalted variety). But there are many more creative ways to include them in your diet.

Their creamy flavor and crunchy texture make them an excellent nut-based crust (especially when looking for an alternative to flour, eggs, or milk).

Include them in a protein-packed energy ball with oats, dates, almond butter, and ground flax seed. Try a pistachio-crusted cod dish by making a paste of ground pistachios, parsley, garlic, and olive oil to coat the fish.

Or, simply chop up the pistachios and sprinkle them on salads for a tasty crunch.



References
1. *Nutr Rev.* 2012 Apr;70(4):234-40.
2. *Am J Clin Nutr.* 2015 May;101(5):966-82.
3. *Rev Diabet Stud.* 2014 Summer;11(2):190-6.
4. *Eur J Clin Nutr.* 2011 Jun;65(6):696-702.

Broccoli

THE TREE OF LIFE

Just one daily **Optimized Broccoli and Cruciferous Blend** tablet provides you with the same potent cell-protective and hormone health-promoting benefits as fresh vegetables.

For maximum benefits and absorption this enteric-coated tablet contains two layers:

- **Vegetable extracts** from broccoli, watercress, cabbage, and rosemary, and
- Myrosinase to release **sulforaphane** in the small intestine.

GLUTEN FREE

NON GMO
LE CERTIFIED

Item #02368 • 30 enteric coated vegetarian tablets

1 bottle **$28.50** • 4 bottles $26.50 each

For full product description and to order **Optimized Broccoli and Cruciferous Blend**, call **1-800-544-4440** or visit **LifeExtension.com**

TrueBroc® Produced under US patents 5,725,895; 5,968,505; 5,968,567; 6,177,122; and 6,242,018 licensed from Brassica Protection Products LLC; TrueBroc® is a trademark of Brassica Protection Products LLC. BroccoVital® Myrosinase is a registered trademark of Berg Imports, LLC.

Once-Daily HEALTH BOOSTER

WITH TOCOTRIENOLS!

- **Mixed tocotrienols** to support arterial health, cellular apoptosis, and normal lipid profiles.
- **Broad-spectrum Vitamin K** with four vitamin **K2** subtypes (MK-4, MK-6, MK-7, MK-9) plus **vitamin K1** to keep **calcium** in **bones** and out of **arteries**.
- **Macuguard®** including **zeaxanthin**, **lutein**, and ***meso*-zeaxanthin** to support **macular** density.
- **Lycopene** to maintain healthy cell division.
- **Chlorophyllin** to protect against environmental **DNA damage**.
- **Saffron** to support visual health.

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

Item #02291 • 60 softgels

1 bottle **$45**

4 bottles $40 each

(two-month supply)

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED

For full product description and to order **Once-Daily Health Booster**, call 1-800-544-4440 or visit www.LifeExtension.com

Caution: If you are taking warfarin (Coumadin®) or related medications, consult with your healthcare provider before taking this product.

Lyc-O-Mato® is a registered trademark of Lycored, Corp. LuteinPlus® and Mz® are registered trademarks of NutriProducts LTD., UK, licensed under U.S. patent 8,623,428.

PRODUCTS

ACTIVE LIFESTYLE & FITNESS

01529 Creatine Capsules
02318 Keto Brain and Body Boost
02020 Super Carnosine
02023 Tart Cherry with CherryPURE®
02146 Wellness Bar–Chocolate Brownie
02147 Wellness Bar–Cookie Dough
02246 Wellness Code® Advanced Whey Protein Isolate Vanilla
02221 Wellness Code® Muscle Strength & Restore Formula
02127 Wellness Code® Plant Protein Complete & Amino Acid Complex
02261 Wellness Code® Whey Protein Concentrate Chocolate
02260 Wellness Code® Whey Protein Concentrate Vanilla
02243 Wellness Code® Whey Protein Isolate Chocolate
02242 Wellness Code® Whey Protein Isolate Vanilla

AMINO ACIDS

01039 Arginine & Ornithine Capsules
00038 Arginine Ornithine Powder
01253 Branched Chain Amino Acids
01829 Carnosine
01671 D,L-Phenylalanine Capsules
01624 L-Arginine Caps
01532 L-Carnitine
00345 L-Glutamine
00141 L-Glutamine Powder
01678 L-Lysine
01827 Taurine
00133 Taurine Powder
00326 Tyrosine Tablets

BLOOD PRESSURE & VASCULAR SUPPORT

01824 Advanced Olive Leaf Vascular Support
02004 Arterial Protect
70000 Blood Pressure Monitor Arm Cuff
02497 Endothelial Defense™ Pomegranate Plus
02320 NitroVasc™ Boost
00984 Optimal BP Management
01953 Pomegranate Complete
00956 Pomegranate Fruit Extract
02024 Triple Action Blood Pressure AM/PM
02102 VenoFlow™

BONE HEALTH

01726 Bone Restore
02123 Bone Restore Chewable Tablet
02416 Bone Restore Elite with Super Potent K2
01727 Bone Restore with Vitamin K2
01725 Bone Strength Collagen Formula
00313 Bone-Up™
01963 Calcium Citrate with Vitamin D
01506 Dr. Strum's Intensive Bone Formula
02417 Mega Vitamin K2
01476 Strontium Caps

BRAIN HEALTH

01524 Acetyl-L-Carnitine
01974 Acetyl-L-Carnitine Arginate
02321 Cognitex® Basics
02396 Cognitex® Elite
02397 Cognitex® Elite Pregnenolone
01540 DMAE Bitartrate (dimethylaminoethanol)
02006 Dopa-Mind™
02413 Dopamine Advantage
02212 Focus Tea™
01658 Ginkgo Biloba Certified Extract™
01527 Huperzine A
00020 Lecithin Granules
02101 Memory Protect
00709 Migra-Eeze™
01603 Neuro-Mag® Magnesium L-Threonate Caps
02032 Neuro-Mag® Magnesium L-Threonate Powder
00888 Optimized Ashwagandha
01676 PS (Phosphatidylserine) Caps
02406 Quick Brain Nootropic
01327 Vinpocetine

CHOLESTEROL MANAGEMENT

01828 Advanced Lipid Control
01359 Cho-Less™
01910 CHOL-Support™
01030 Red Yeast Rice
01304 Theaflavins Standardized Extract
00372 Vitamin B3 Niacin Capsules

DIGESTION SUPPORT

53348 Betaine HCl
54160 Black Vinegar
02412 Bloat Relief
30747 Digest RC®
07136 Effervescent Vitamin C - Magnesium Crystals
02021 Enhanced Super Digestive Enzymes
02022 Enhanced Super Digestive Enzymes and Probiotics
02033 EsophaCool™
01737 Esophageal Guardian
01706 Extraordinary Enzymes
02100 Gastro-Ease™
01122 Ginger Force™
00605 Regimint
01386 TruFiber®

ENERGY MANAGEMENT

01628 Adrenal Energy Formula • 60 veg capsules
01630 Adrenal Energy Formula • 120 veg capsules
01805 Asian Energy Boost
00972 D-Ribose Powder
01473 D-Ribose Tablets
01900 Energy Renew
01544 Forskolin
00668 Metabolic Advantage Thyroid Formula™
01869 Mitochondrial Basics with PQQ
01868 Mitochondrial Energy Optimizer with PQQ
01904 NAD^+ Cell Regenerator™ • 100 mg, 30 veg capsules
02344 NAD^+ Cell Regenerator™ 300 mg, 30 veg capsules
02348 NAD^+ Cell Regenerator™ and Resveratrol
01500 PQQ Caps • 10 mg
01647 PQQ Caps • 20 mg
00889 Rhodiola Extract
02003 Triple Action Thyroid

EYE HEALTH

01923 Astaxanthin with Phospholipids
00893 Brite Eyes III
02323 Digital Eye Support
01514 Eye Pressure Support with Mirtogenol®
01992 MacuGuard® Ocular Support with Saffron
01993 MacuGuard® Ocular Support with Saffron & Astaxanthin
01873 Standardized European Bilberry Extract
01918 Tear Support with MaquiBright®

FISH OIL & OMEGAS

02311 Clearly EPA/DHA Fish Oil
00463 Flaxseed Oil
01937 Mega EPA/DHA
02218 Mega GLA Sesame Lignans
01983 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract
01988 Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin

01982 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 softgels
01985 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 60 enteric coated softgels
01984 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 enteric coated softgels
01986 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 240 softgels
01812 Provinal® Purified Omega-7
01640 Vegetarian DHA

FOOD

02008 California Estate Extra Virgin Olive Oil
02170 Rainforest Blend Decaf Ground Coffee
02169 Rainforest Blend Ground Coffee
02171 Rainforest Blend Whole Bean Coffee
00438 Stevia™ Organic Liquid Sweetner
00432 Stevia™ Sweetener

GLUCOSE MANAGEMENT

01503 CinSulin® with InSea²® and Crominex® 3+
01620 CoffeeGenic® Green Coffee Extract
02122 Glycemic Guard™
00925 Mega Benfotiamine
01803 Tri Sugar Shield®

HEART HEALTH

01066 Aspirin (Enteric Coated)
01842 BioActive Folate & Vitamin B12 Caps
01700 Cardio Peak™
02121 Homocysteine Resist
02018 Optimized Carnitine
01949 Super-Absorbable CoQ10 Ubiquinone with *d*-Limonene • 50 mg, 60 softgels
01951 Super-Absorbable CoQ10 Ubiquinone with *d*-Limonene • 100 mg, 60 softgels
01929 Super Ubiquinol CoQ10
01427 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 30 softgels
01425 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 100 softgels
01437 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 30 softgels
01426 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 60 softgels
01431 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 200 mg, 30 softgels
01733 Super Ubiquinol CoQ10 with PQQ
01859 TMG Liquid Capsules
00349 TMG Powder

HORMONE BALANCE

00454 DHEA (Dehydroepiandrosterone) 15 mg, 100 capsules
00335 DHEA (Dehydroepiandrosterone) 25 mg, 100 capsules
00882 DHEA (Dehydroepiandrosterone) 50 mg, 60 capsules
00607 DHEA (Dehydroepiandrosterone) 25 mg, 100 vegetarian dissolve in mouth tablets
01689 DHEA (Dehydroepiandrosterone) 100 mg, 60 veg capsules
02368 Optimized Broccoli and Cruciferous Blend
00302 Pregnenolone • 50 mg, 100 capsules
00700 Pregnenolone • 100 mg, 100 capsules
01468 Triple Action Cruciferous Vegetable Extract
01469 Triple Action Cruciferous Vegetable Extract with Resveratrol

IMMUNE SUPPORT

02411 5 Day Elderberry Immune
00681 AHCC®
02302 Bio-Quercetin
02410 Black Elderberry + Vitamin C
01961 Enhanced Zinc Lozenges
01704 Immune Modulator with Tinofend®
00955 Immune Protect with PARACTIN®
02005 Immune Senescence Protection Formula™
29727 Kinoko® Gold AHCC
24404 Kinoko® Platinum AHCC
00316 Kyolic® Garlic Formula 102
00789 Kyolic® Reserve
01681 Lactoferrin (Apolactoferrin) Caps
01903 NK Cell Activator™
01394 Optimized Garlic
01309 Optimized Quercetin
01811 Peony Immune
00525 ProBoost Thymic Protein A
01708 Reishi Extract Mushroom Complex
01906 Standardized Cistanche
13685 Ten Mushroom Formula®
01097 Ultra Soy Extract
01561 Zinc Lozenges

INFLAMMATION MANAGEMENT

01639 5-LOX Inhibitor with AprèsFlex®
02324 Advanced Curcumin Elite™ Turmeric Extract, Ginger & Turmerones
01709 Black Cumin Seed Oil
02310 Black Cumin Seed Oil and Curcumin Elite™
00202 Boswella
02467 Curcumin Elite™ Turmeric Extract • 30 veg capsules
02407 Curcumin Elite™ Turmeric Extract • 60 veg capsules
01804 Cytokine Suppress® with EGCG
02223 Pro-Resolving Mediators
00318 Serraflazyme
01203 Specially-Coated Bromelain
00407 Super Bio-Curcumin® Turmeric Extract
01254 Zyflamend™ Whole Body

JOINT SUPPORT

02404 Arthro-Immune Joint Support
02238 ArthroMax® Advanced NT2 Collagen™ & AprèsFlex®
01617 ArthroMax® with Theaflavins & AprèsFlex®
02138 ArthroMax® Elite
00965 Fast-Acting Joint Formula
00522 Glucosamine/Chondroitin Capsules
02420 Glucosamine Sulfate
01600 Krill Healthy Joint Formula
01050 Krill Oil
00451 MSM (Methylsulfonylmethane)
02231 NT2 Collagen™

KIDNEY & BLADDER SUPPORT

00862 Cran-Max® Cranberry Whole Fruit Concentrate
01424 Optimized Cran-Max® with Ellirose™
01921 Uric Acid Control
01209 Water-Soluble Pumpkin Seed Extract

LIVER HEALTH & DETOXIFICATION

01922 Advanced Milk Thistle • 60 softgels
01925 Advanced Milk Thistle • 120 softgels
02240 Anti-Alcohol Complex
01651 Calcium D-Glucarate
00550 Chlorella
01571 Chlorophyllin
01522 Milk Thistle • 60 veg capsules
02402 FLORASSIST® Liver Restore™
01541 Glutathione, Cysteine & C

01393 HepatoPro
01608 Liver Efficiency Formula
01534 N-Acetyl-L-Cysteine
00342 PectaSol-C® Modified Citrus Pectin Powder
01080 PectaSol-C® Modified Citrus Pectin Capsules
01884 Silymarin
02361 SOD Booster

LONGEVITY & WELLNESS

00457 Alpha-Lipoic Acid
01625 AppleWise Polyphenol Extract
02414 Bio-Fisetin
01214 Blueberry Extract
01438 Blueberry Extract and Pomegranate
02270 DNA Protection Formula
02405 Endocannabinoid System Booster
02119 GEROPROTECT® Ageless Cell™
02415 GEROPROTECT® Autophagy Renew
02133 GEROPROTECT® Longevity A.I.™
02401 GEROPROTECT® Stem Cell
02211 Grapeseed Extract
00954 Mega Green Tea Extract (decaffeinated)
00953 Mega Green Tea Extract (lightly caffeinated)
01513 Optimized Fucoidan with Maritech® 926
02230 Optimized Resveratrol
01637 Pycnogenol® French Maritime Pine Bark Extract
02210 Resveratrol
00070 RNA (Ribonucleic Acid)
02301 Senolytic Activator
01208 Super R-Lipoic Acid
01919 X-R Shield

MEN'S HEALTH

02209 Male Vascular Sexual Support
00455 Mega Lycopene Extract
02306 Men's Bladder Control
01789 PalmettoGuard® Saw Palmetto and Beta-Sitosterol
01790 PalmettoGuard® Saw Palmetto/Nettle Root Formula with Beta-Sitosterol
01837 Pomi-T®
01373 Prelox® Enhanced Sex for Men
01940 Super MiraForte with Standardized Lignans
01909 Triple Strength ProstaPollen™
02029 Ultra Prostate Formula

MINERALS

01661 Boron
02107 Extend-Release Magnesium
30731 Ionic Selenium
01677 Iron Protein Plus
02403 Lithium
01459 Magnesium Caps
01682 Magnesium (Citrate)
01328 Only Trace Minerals
01504 Optimized Chromium with Crominex® 3+
02309 Potassium with Extend-Release Magnesium
01740 Sea-Iodine™
01879 Se-Methyl L-Selenocysteine
01778 Super Selenium Complex
00213 Vanadyl Sulfate
01813 Zinc Caps

MISCELLANEOUS

00577 Potassium Iodide
00657 Solarshield® Sunglasses

MOOD & STRESS MANAGEMENT

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

MULTIVITAMINS

02199 Children's Formula Life Extension Mix™
02498 Comprehensive Nutrient Packs ADVANCED
02354 Life Extension Mix™ Capsules
02364 Life Extension Mix™ Capsules without Copper
02356 Life Extension Mix™ Powder
02355 Life Extension Mix™ Tablets
02357 Life Extension Mix™ Tablets with Extra Niacin
02365 Life Extension Mix™ Tablets without Copper
02292 Once-Daily Health Booster • 30 softgels
02291 Once-Daily Health Booster • 60 softgels
02313 One-Per-Day Tablets
02317 Two-Per-Day Capsules • 60 capsules
02314 Two-Per-Day Capsules • 120 capsules
02316 Two-Per-Day Tablets • 60 tablets
02315 Two-Per-Day Tablets • 120 tablets

NERVE & COMFORT SUPPORT

02202 ComfortMAX™
02303 PEA Discomfort Relief

PERSONAL CARE

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

PET CARE

01932 Cat Mix
01931 Dog Mix

PROBIOTICS

01622 Bifido GI Balance
01825 FLORASSIST® Balance
02125 FLORASSIST® GI with Phage Technology
01821 FLORASSIST® Heart Health
02250 FLORASSIST® Mood Improve
02208 FLORASSIST® Immune & Nasal Defense
02120 FLORASSIST® Oral Hygiene
02203 FLORASSIST® Prebiotic
01920 FLORASSIST® Throat Health
02400 FLORASSIST® Winter Immune Support
52142 Jarro-Dophilus® for Women
00056 Jarro-Dophilus EPS® • 60 veg capsules
21201 Jarro-Dophilus EPS® • 120 veg capsules
01038 Theralac® Probiotics
01389 TruFlora® Probiotics

SKIN CARE

80157 Advanced Anti-Glycation Peptide Serum
80165 Advanced Growth Factor Serum
80170 Advanced Hyaluronic Acid Serum
80154 Advanced Lightening Cream
80155 Advanced Peptide Hand Therapy
80175 Advanced Probiotic-Fermented Eye Serum
80177 Advanced Retinol Serum
80152 Advanced Triple Peptide Serum
80140 Advanced Under Eye Serum with Stem Cells

80137 All-Purpose Soothing Relief Cream
80139 Amber Self MicroDermAbrasion
80118 Anti-Aging Mask
80151 Anti-Aging Rejuvenating Face Cream
80153 Anti-Aging Rejuvenating Scalp Serum
80176 Collagen Boosting Peptide Cream
80156 Collagen Boosting Peptide Serum
02408 Collagen Peptides for Skin & Joints
80169 Cucumber Hydra Peptide Eye Cream
80141 DNA Support Cream
80163 Eye Lift Cream
80123 Face Rejuvenating Anti-Oxidant Cream
80109 Hyaluronic Facial Moisturizer
80110 Hyaluronic Oil-Free Facial Moisturizer
80138 Hydrating Anti-Oxidant Facial Mist
00661 Hydroderm
55495 Instensive Moisturizing Cream
80103 Lifting & Tightening Complex
80168 Melatonin Advanced Peptide Cream
80114 Mild Facial Cleanser
80172 Multi Stem Cell Hydration Cream
80159 Multi Stem Cell Skin Tightening Complex
80122 Neck Rejuvenating Anti-Oxidant Cream
80174 Purifying Facial Mask
80150 Renewing Eye Cream
80142 Resveratrol Anti-Oxidant Serum
01938 Shade Factor™
02129 Skin Care Collection Anti-Aging Serum
02130 Skin Care Collection Day Cream
02131 Skin Care Collection Night Cream
80166 Skin Firming Complex
02096 Skin Restoring Ceramides
80130 Skin Stem Cell Serum
80164 Skin Tone Equalizer
80143 Stem Cell Cream with Alpine Rose
80148 Tightening & Firming Neck Cream
80161 Triple-Action Vitamin C Cream
80162 Ultimate MicroDermabrasion
80173 Ultimate Peptide Serum
80178 Ultimate Telomere Cream
80160 Ultra Eyelash Booster
80101 Ultra Wrinkle Relaxer
80113 Under Eye Refining Serum
80104 Under Eye Rescue Cream
80171 Vitamin C Lip Rejuvenator
80129 Vitamin C Serum
80136 Vitamin D Lotion
80102 Vitamin K Cream

SLEEP

01512 Bioactive Milk Peptides
02300 Circadian Sleep
01551 Enhanced Sleep with Melatonin
01511 Enhanced Sleep without Melatonin
02234 Fast-Acting Liquid Melatonin
01669 Glycine
02308 Herbal Sleep PM
01722 L-Tryptophan
01668 Melatonin • 300 mcg, 100 veg capsules
01083 Melatonin • 500 mcg, 200 veg capsules
00329 Melatonin • 1 mg, 60 capsules
00330 Melatonin • 3 mg, 60 veg capsules
00331 Melatonin • 10 mg, 60 veg capsules
00332 Melatonin • 3 mg, 60 veg lozenges
02201 Melatonin IR/XR
01787 Melatonin 6 Hour Timed Release 300 mcg, 100 veg tablets
01788 Melatonin 6 Hour Timed Release 750 mcg, 60 veg tablets
01786 Melatonin 6 Hour Timed Release 3 mg, 60 veg tablets
01721 Optimized Tryptophan Plus
01444 Quiet Sleep
01445 Quiet Sleep Melatonin

VITAMINS

01533 Ascorbyl Palmitate
00920 Benfotiamine with Thiamine
00664 Beta-Carotene
01945 BioActive Complete B-Complex
00102 Biotin
00084 Buffered Vitamin C Powder
02229 Fast-C® and Bio-Quercetin Phytosome
02075 Gamma E Mixed Tocopherol Enhanced with Sesame Lignans
02070 Gamma E Mixed Tocopherol/Tocotrienols
01913 High Potency Optimized Folate
01674 Inositol Caps Liquid Emulsified
02244 Liquid Vitamin D3 • 2,000 IU, 1 fl oz
02232 Liquid Vitamin D3 • 2,000 IU, 1 fl oz, mint
01936 Low-Dose Vitamin K2
00065 MK-7
00373 No Flush Niacin
01939 Optimized Folate (L-Methylfolate)
01217 Pyridoxal 5'-Phosphate Caps
01400 Super Absorbable Tocotrienols
02334 Super K
02335 Super K Elite
01863 Super Vitamin E
02028 Vitamin B5 (Pantothenic Acid)
01535 Vitamin B6
00361 Vitamin B12 Methylcobalamin
01536 Vitamin B12 Methylcobalamin • 1 mg, 60 veg lozenges
01537 Vitamin B12 Methylcobalamin • 5 mg, 60 veg lozenges
02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 60 veg tablets
02227 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets
01753 Vitamin D3 • 25 mcg (1,000 IU), 90 softgels
01751 Vitamin D3 • 25 mcg (1,000 IU), 250 softgels
01713 Vitamin D3 • 125 mcg (5,000 IU), 60 softgels
01718 Vitamin D3 • 175 mcg (7,000 IU), 60 softgels
01758 Vitamin D3 with Sea-Iodine™
02040 Vitamins D and K with Sea-Iodine™

WEIGHT MANAGEMENT & BODY COMPOSITION

00658 7-Keto® DHEA Metabolite • 25 mg, 100 capsules
02479 7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules
01509 Advanced Anti-Adipocyte Formula
01807 Advanced Appetite Suppress
02207 AMPK Metabolic Activator
02478 DHEA Complete
01738 Garcinia HCA
01292 Integra-Lean®
01908 Mediterranean Trim with Sinetrol™ -XPur
01492 Optimized Irvingia with Phase 3™ Calorie Control Complex
01432 Optimized Saffron
00818 Super CLA Blend with Sesame Lignans
01902 Waist-Line Control™
02151 Wellness Code® Appetite Control

WOMEN'S HEALTH

01942 Breast Health Formula
01626 Enhanced Sex for Women 50+
01894 Estrogen for Women
01064 Femmenessence MacaPause®
02204 Menopause 731™
02319 Prenatal Advantage
01441 Progesta-Care®
01649 Super-Absorbable Soy Isoflavones

SUPPORT HEALTHY **URIC ACID** LEVELS

URIC ACID CONTROL

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***

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

Item #01921 • 60 vegetarian capsules

1 bottle **$18**

4 bottles $16.50 each

GLUTEN FREE

NON GMO LE CERTIFIED

Ayuric® is a registered trademark of Natreon, Inc. with patents pending.

For full product description and to order **Uric Acid Control**, call 1-800-544-4440 or visit www.LifeExtension.com

HIGHLY PURIFIED

Fish Oil

EPA/DHA FISH OIL + SESAME LIGNANS + OLIVE EXTRACT + KRILL + ASTAXANTHIN

SUPER OMEGA-3 PLUS
EPA/DHA Fish Oil, Sesame Lignans,
Olive Extract, Krill & Astaxanthin
(**2,520 mg** of **EPA + DHA** in four softgels)

Item #01988 • 120 softgels
1 bottle **$33.75** • 4 bottles $31.50 each

Super Omega-3 provides components found in **Mediterranean diets**, including **sesame lignans** to extend the stability of **DHA** in the blood.

EPA/DHA FISH OIL + SESAME LIGNANS + OLIVE EXTRACT

SUPER OMEGA-3*
EPA/DHA Fish Oil,
Sesame Lignans & Olive Extract
(**2,400 mg** of **EPA + DHA** in four softgels)

Item #01982 • 120 softgels
1 bottle **$24** • 4 bottles $21 each

For full product description and to order **Super Omega-3**, or **Super Omega-3 Plus**, call **1-800-544-4440** or **visit www.LifeExtension.com**

GLUTEN FREE NON GMO LE CERTIFIED

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

* Highest Independent 5-star rating, International Fish Oil Society For Over Nine Years.
IFOS™ certification mark is a registered trademark of Nutrasource Diagnostics, Inc.

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