LIFE EXTENSION®
The Science of a Healthier Life®
May/Junel 2024

FEATURE ARTICLES

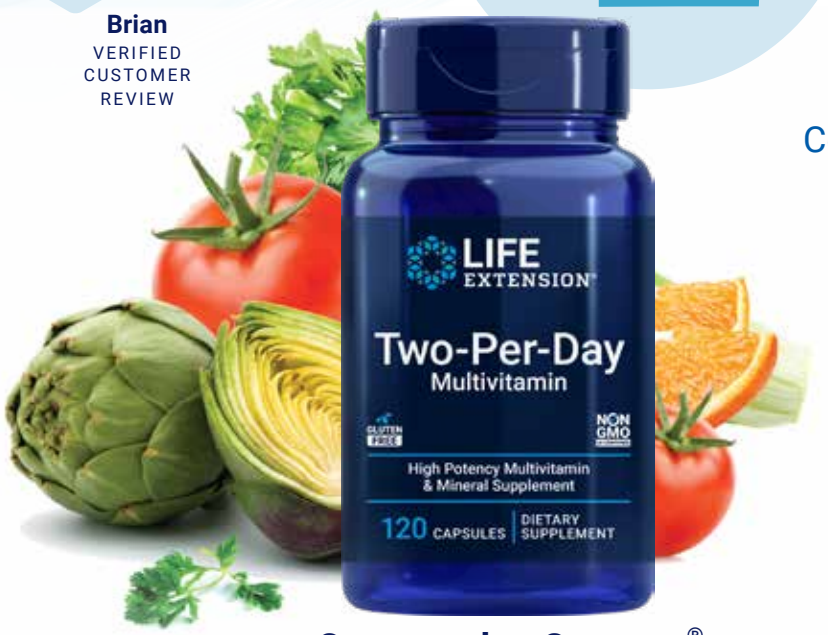
3 Nutrients That Promote HEALTHY AGING

PLUS
Botanical Support for Aging Eyes

VOTED #1 MULTIVITAMIN

"Covers all the bases."

Brian
VERIFIED CUSTOMER REVIEW



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Item #01603

90 vegetarian capsules

Item #02032

93.35 grams of powder

References:
1. *Nutrients.* 2018 Jun 6;10(6):730.
2. *Nutrients*. 2022 12; 14(24): 5235.
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4. *Innov Aging.* 2017 Jul; 1(Suppl 1): 170.
5. *Neuron.* 2010 Jan 28;65(2):165-77.

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Laura

VERIFIED CUSTOMER REVIEW

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Alicia

VERIFIED CUSTOMER REVIEW

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May/June 2024

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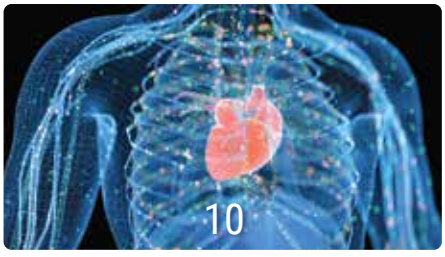
ON THE COVER

Target Multiple Aging Pathways

Scientists have identified nutrients that correlate with reduced mortality and greater healthspan by modulating multiple *mechanisms of aging*.



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Editorial offices: 954-766-8433 • fax: 954-491-5306

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In the News

Taurine Ranked as Top Supplement

Longevity and regenerative medicine doctor Neil Paulvin identified **taurine** as the top anti-aging supplement in an article published on CNBC.[1] He said he has been taking it daily for the past several years and has noticed its benefits.

Taurine is one of the most abundant amino acids in the body. It is found in most tissues, including the heart, liver, kidneys, and brain. Its presence in these areas helps promote a healthy heart and brain, cell membrane stability, healthy insulin response and nervous system function, and more.[2]

Studies show that taurine promotes vasodilation, which helps improve blood flow and reduces blood pressure levels. It helps the body's mitochondria function properly. It can also boost brain function, support healthy muscles, and help repair DNA damage.

One population study of 25 countries found that people living in Okinawa, Japan, had the highest intake of taurine.[2] They also had the *lowest rate of heart disease* among the countries studied—and the longest lifespan.

Although the body produces a small amount of taurine, production declines with age and is insufficient to maintain optimal health.[3]

Editor's Note: "I personally take about **2,000 mg** per day," Dr. Paulvin said, "but for those new to taurine supplements, I recommend starting with a lower dosage—around **500** to **1,000 mg**—and then working your way up. Of course, it's always best to consult with a physician before starting any new supplement."[1]

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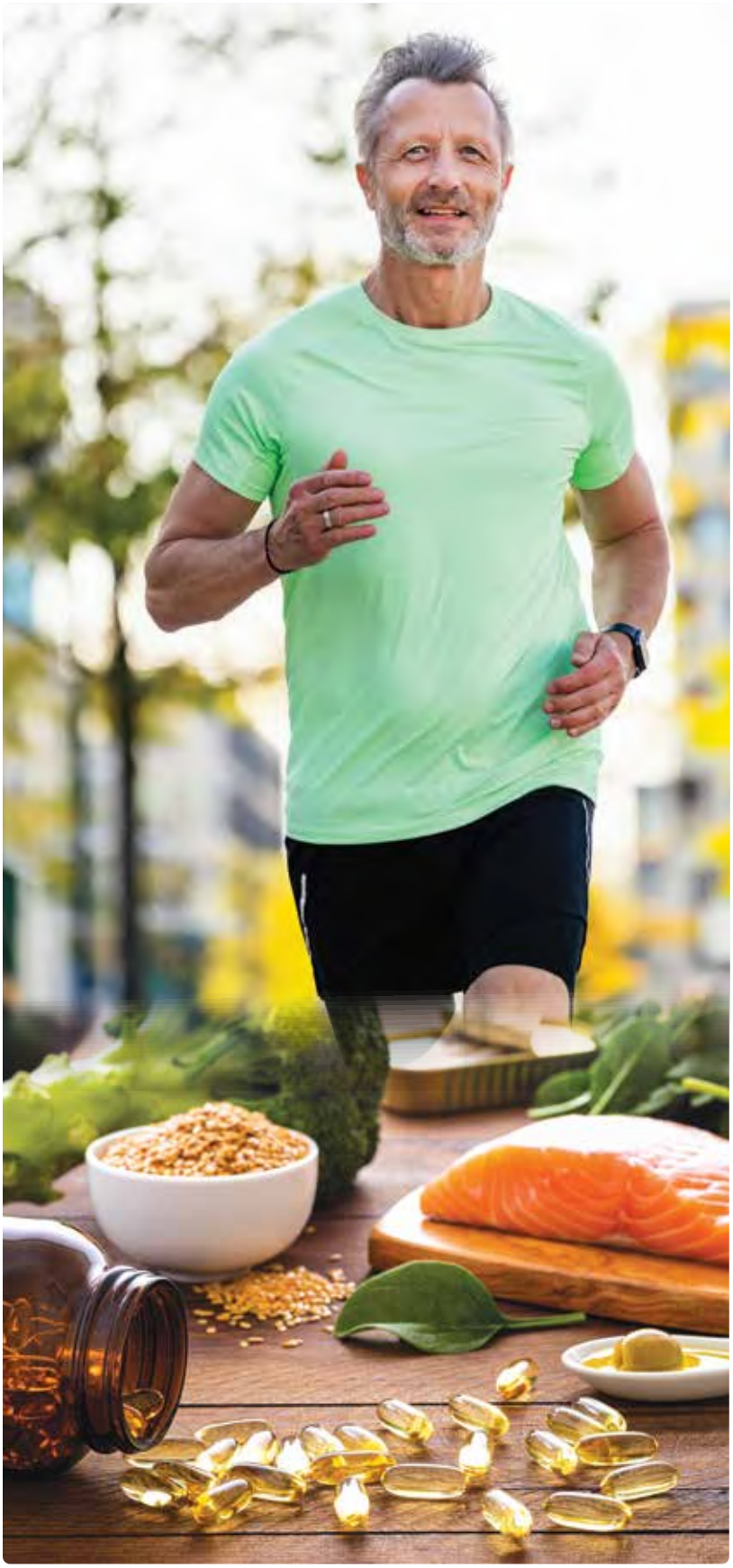

Omega-3 Helps Support Healthy Inflammatory Response in Long-Distance Runners

Intake of omega-3 fatty acids by long-distance runners offers protection against an increased inflammatory response to exercise-induced injury, a recent study found.* The authors noted that marathon runners are at risk of muscle injury and heart arrhythmias and dysfunction.

The study included 24 long-distance runners who received **3,000 mg** omega-3 fatty acids or a placebo daily for three weeks. Cardiac markers and inflammatory cytokines were measured in blood obtained before, immediately after, one hour after, and 24 hours after exercise tests that were conducted prior to and at the end of the three-week treatment period.

In the **omega-3** group, the Omega-3 Index, erythrocyte membrane omega-3 and HDL levels were higher, and triglycerides were lower after three weeks, compared with before the treatment period. Following treatment, in this group, compared to post-exercise levels measured prior to the treatment period, inflammation mediators and markers of cardiac damage were lower and adiponectin increased following the exercise test.

Editor's Note: Research has found that endurance training is associated with a reduction in erythrocyte (red blood cell) omega-3 fatty acids. Omega-6 polyunsaturated fatty acid-derived lipid mediators released in response to exercise-induced muscle damage promote inflammation. Additionally, indicators of cardiac damage increase following marathon participation. Although these markers return to normal within 48 hours, repetitive increases may have long-term adverse effects.

* *J Hum Kinet.* 2023 Oct 27:89:123-138.

Vitamin B6 Reduces Adverse Reactions from *H. pylori* Treatment

Findings from a recent clinical trial suggest that vitamin B6 could help decrease adverse reactions associated with the main eradication therapy for *Helicobacter pylori* (*H. pylori*) infection.*

The two-week trial included 280 men and women diagnosed with *H. pylori*. Half of the participants were randomized to receive the standard "quadruple therapy treatment" which consists of a proton pump inhibitor, a bismuth agent, tetracycline, and metronidazole. The other 130 participants received the same treatment with the addition of **20 mg** of vitamin B6 twice per day. At the end of the treatment period, participants were given a breath test to determine whether treatment for *H. pylori* was successful.

The percentages of *H. pylori* eradication in each group were statistically similar. But while **74.62%** of the group that received *H. pylori* treatment alone experienced adverse reactions, these effects occurred among only **56.92%** of those whose treatment was combined with vitamin B6. Dizziness, headache, and loss of muscle coordination occurred in **58.7%** of the group that did not receive vitamin B6 and in only **14.63%** of the B6 group. None of those who received B6 experienced any moderate or severe gastrointestinal symptoms, compared with a third of the group that did not receive the vitamin.

Editor's Note: "*H. pylori* infection is one of the most common bacterial infections, affecting approximately **50%** of the global population," the authors stated.

* *BMC Infect Dis.* 2023 Sep 11;23(1):590.

Coffee, Tea Drinking at Midlife Linked with Less Frailty in Later Years

A study revealed an association between drinking coffee or tea during middle-age and less physical frailty in older age, in a dose-response relationship.*

The study included 12,583 men and women, average age 53 on enrollment, from 1993–1998. Questionnaires obtained information concerning their intake of caffeinated beverages. Participants were weighed at the second follow-up, during 2006–2010. At the third follow-up, during 2014–2017, energy levels and handgrip strength were evaluated and timed up-and-go testing was conducted.

The results showed that the odds of physical frailty at the third year follow-up were **46%** lower for coffee drinkers compared to the odds of frailty in those who drank no coffee. The odds of frailty were also **18%** lower among daily tea drinkers compared to the odds of frailty in those who consumed it less than once a month.

Editor's Note: "…physical frailty was assessed using a modified version of the Cardiovascular Health Study frailty phenotype that included weight loss, exhaustion, slowness, and weakness," the authors stated.

* *J Am Med Dir Assoc*. 2023 Jul 21:S1525-8610(23)00575-3.

Iron Deficiency, Iron-Deficiency Anemia Prevalent in U.S. Females 12-21

A recent study found that the prevalence of iron deficiency and anemia in teen girls and young women is high enough to warrant routine screening of this group for these conditions. Iron deficiency is not routinely checked in this age group and instead, only non-pregnant female adolescents and women are screened every 5-10 years for anemia by measuring hemoglobin.*

The study was comprised of 3,490 girls and women aged 12–21 who were enrolled in the National Health and Nutrition Examination Survey (NHANES). Iron deficiency was defined as a ferritin level of less than **25 mcg/L** and iron-deficiency anemia was defined as ferritin of less than **25 mcg/L** and hemoglobin of less than **12 mg/dL**.

Iron deficiency was found in **38.6%** of the group, and **6.3%** had iron-deficiency anemia. While menstruation was a risk factor for both conditions, over **25%** of the girls who were not yet menstruating were deficient.

Editor's Note: "Although screening for anemia by measurement of hemoglobin level is recommended, there is benefit in identifying and treating iron deficiency in those without anemia because supplementation improves exercise performance and reduces fatigue, and iron deficiency is associated with increased all-cause mortality," the authors wrote.

* *JAMA.* 2023 Jun 27;329(24):2191-2193.

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Item #01923

30 softgels

This product is available at fine health food stores everywhere.

References
1. *Mol Nutr Food Res*. 2012 Sep;56(9):1385-97.
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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.

OPTIMIZED RESVERATROL ELITE™

Up to 10 Greater Times Bioavailability

Highly bioavailable fenugreek **hydrogel resveratrol** formula in one daily capsule.

Item #02230

60 vegetarian capsules

"I love this product."

Susan

VERIFIED CUSTOMER REVIEW

- Hundreds of published studies describe **resveratrol's** healthy aging potential.[1]
- The challenge has been achieving sustained **blood levels** of **resveratrol**.
- In a **human** trial, a patented *plant-based* coating increased **bioavailability** up to **10 times**.[2]

Optimized Resveratrol Elite™ provides **bioavailable resveratrol** plus highly *absorbable* **quercetin** to provide complementary biological functions.

References

1. *Med Res Rev.* 2019;39(5):1851-1891.
2. *ACS Omega.* 2022 Apr 19;7(15):12835-45.

This product is available at fine health food stores everywhere.

GLUTEN FREE · NON GMO LE CERTIFIED · VEGETARIAN LE CERTIFIED

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VITAMIN

"I like the fact that it's high potency and so small and easy to swallow."

Barbara

VERIFIED CUSTOMER REVIEW

FOR LASTING HEALTH

Strong bones and a healthy heart—two incredible benefits of adding vitamin K to your routine. This essential vitamin helps maintain your body's calcium balance and, in turn, supports everything from your arterial health to healthy bone density.

But even if your diet is healthy, you may not be getting enough to maximize vitamin K's benefits. Fortunately, you can ensure you're getting enough of this important nutrient by supplementing with exactly as much—or as little—vitamin K as you need.

Super K*	**Low Dose Vitamin K***	**Mega Vitamin K2***
Item #02334	**Item #01936**	**Item #02417**
90 softgels	90 softgels	30 capsules

* **CAUTION:** If you are taking a vitamin K antagonist (e.g. warfarin), consult your healthcare practitioner before taking a vitamin K supplement.

These products are available at fine health food stores everywhere.

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"Very good stuff."
Cecil
VERIFIED CUSTOMER REVIEW

UNINTERRUPTED Dreamzzz

When nature calls… You answer. Even in the middle of an amazing dream. **Men's Bladder Support** can help inhibit your urge to urinate while asleep.

It's packed with nutrients to support your prostate and bladder, and melatonin encourages healthy sleep patterns.

In one study, healthy older men took Men's Bladder Support Formula every night before bed and an incredible **60% reported relief**.* You can too!

Enjoy your dreams without interruptions. Try Men's Bladder Support today.

Item #02306

30 vegetarian capsules

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED · VEGETARIAN LE CERTIFIED

This product is available at fine health food stores everywhere.

* Submitted by BMC Complementary and Alternative Medicine 2019.

CAUTION: Do not consume alcohol, drive or operate machinery after taking this product.
Lycored LycoBeads® is a registered trademark of Lycored; Orange, New Jersey.

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Support for a Healthy Lifespan

Item #02527
64 oz. powder

In recent years, three **nutrients** have emerged as having healthy **lifespan-enhancing** potential:

Taurine

Functions via a range of *anti-aging* mechanisms[1-5]

Lithium

People tend to *live longer* in areas where **lithium** is abundant in the drinking water.[6-8]

Spermidine

In epidemiological studies, higher intake correlates with longer healthspan.[9-11] A clinical study showed **spermidine** supplementation *improved* memory scores.[12]

Consumers have used some of these **nutrients** for decades, albeit at lower **potencies** than what may be optimal.

Rather than swallowing **8** or more capsules daily, the new **Healthy Aging Powder** provides the following in one scoop:

- **Taurine** **5,000 mg**
- **Lithium** **2,000 mcg**
- **Spermidine** **3,000 mcg**

(0.2% standardization from 1,500 mg Wheatgerm extract)

These nutrients may promote **healthy aging** by supporting cardiovascular health, exercise performance, and cognitive function.

The cost of taking these nutrients separately is more than this new **Healthy Aging Powder**.

The full dose is one scoop daily mixed with water or juice.

Some people may start with a half scoop of **Healthy Aging Powder**, which enables each bottle to last **60** days.

Even a half scoop provides meaningful **potencies** at considerable **savings**.

This product is available at fine health food stores everywhere.

References:
1. *Adv Exp Med Biol*. 2017;975 Pt 1:67-77.
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NON GMO LE CERTIFIED

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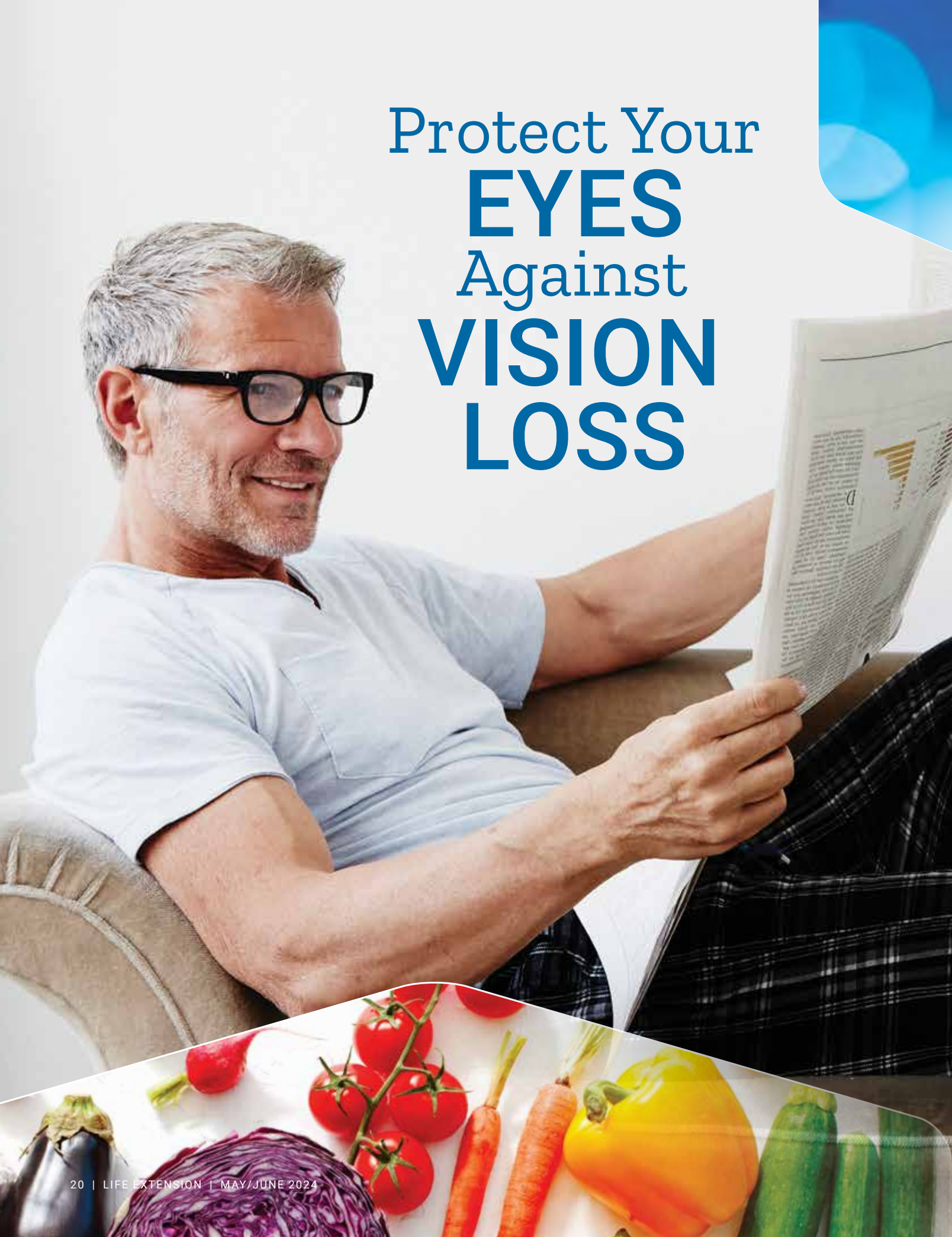
Protect Your EYES Against VISION LOSS



BY JOSEPH LICHT

Every day, your **eyes** are bombarded by various harmful biological and environmental factors.

Ultraviolet light, oxidative stress, and high blood sugar are among the most damaging causes of premature ocular disorders.[1]

Two carotenoid pigments, **lutein** and **zeaxanthin**, protect eye tissues from multiple types of injury.[2-6]

Humans cannot make **carotenoids**.[7] Modern diets don't always provide enough for optimal protection.[8,9]

The importance of **lutein** and **zeaxanthin** cannot be overlooked.

They are capable of guarding against drivers of age-related visual loss, including **macular degeneration**, **diabetic retinopathy**, **cataracts**, and **glaucoma**.[10-14]

Intake of abundant amounts of a range of carotenoids is one of the healthiest proactive steps you can take to maintain vision.

Support Healthy Vision

Eyes *actively* take up **lutein** and **zeaxanthin**, concentrating these carotenoids in the retina and other ocular areas.[15-18]

Carotenoids serve multiple purposes. For one, they ***filter out*** potentially harmful wavelengths of light, capturing their energy and safely dissipating it.[2-6]

Light rays are a form of electromagnetic **radiation** that can inflict significant damage.

Lutein and zeaxanthin protect against the oxidative damage and inflammation that contribute to chronic eye disease, including **cataracts** and **macular degeneration**.[19,20]

Oral intake of lutein and zeaxanthin has been shown to *boost* their content in the eyes, protecting against common age-related disorders that cause **vision loss**.

Age-Related Macular Degeneration

The **macula** is the most important part of the retina. It is where most **photoreceptors** reside and is responsible for crisp, high-resolution vision.

When consumed in adequate amounts, **lutein** and **zeaxanthin** build an effective barrier in a layer of the retina called the **retinal pigment epithelium**. There they help filter out harmful ultraviolet light while reducing oxidative stress and inflammation.

These effects may help prevent the *development* of **macular degeneration**.

One study conducted over more than **20 years** found that people with the *highest* intake of lutein and zeaxanthin have a stunning ***41% lower risk*** of advanced **macular degeneration**.[21]

In clinical studies, older adults who *already* have macular degeneration, taking **lutein** and **zeaxanthin** has been shown to slow its progression and **improve visual function**, including:[11,16,17,22,23]

- Reducing nighttime glare,
- Improving visual contrast, and
- Boosting visual acuity (sharpness).

Poor **night vision** is a common early warning sign of macular degeneration.[24] In a clinical trial of older adults with poor night vision, daily intake of a **lutein-zeaxanthin** blend *improved* multiple markers of nighttime visual function.[25]

Cataracts

Cataract is the clouding of the lens that is common in older individuals. Diabetes, smoking, and ultraviolet rays from sunlight exposure are also associated with cataract formation.[26] This impedes vision and is the leading cause of **vision loss** in the United States.[27]

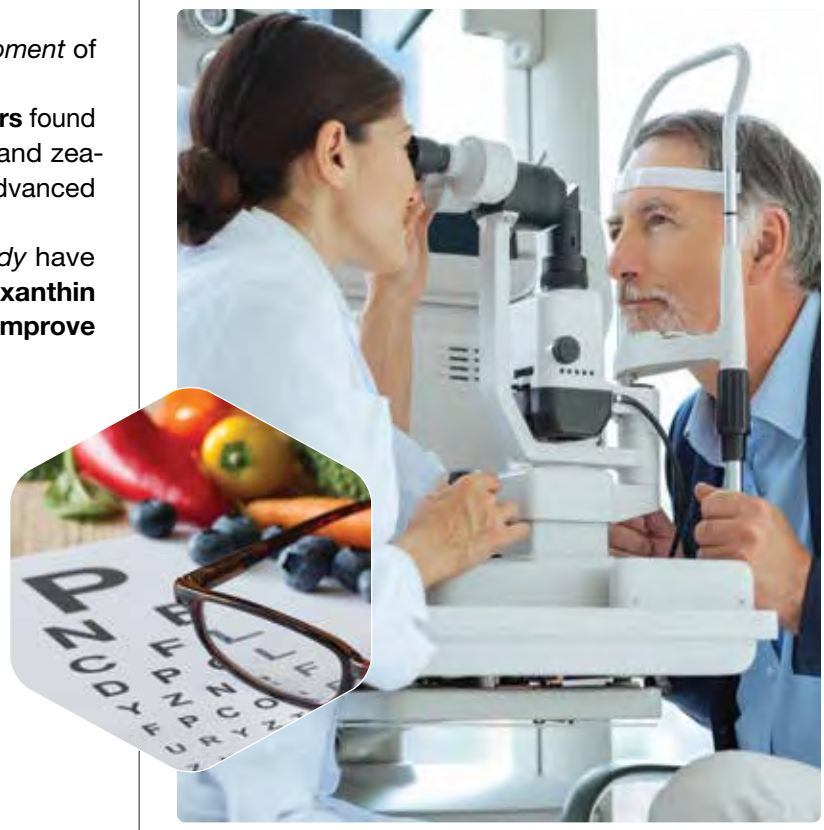
Carotenoids can filter out harmful light in the lens. Studies have found that individuals with a *higher* intake of **lutein** have *lower* rates of cataracts.[13]

Glaucoma

Glaucoma can damage the optic nerve, leading to vision loss and blindness in older adults. It is an abnormality of the drainage system of the eyes that causes excess pressure in the eyes due to fluid retention.

A *higher* dietary intake of carotenoids, including **lutein** and **zeaxanthin**, is associated with a *lower* risk of glaucoma.

In human studies a protective trend was observed in individuals consuming *higher* dietary carotenoids who had lower risk of glaucoma.[14] In clinical studies of glaucoma patients, oral intake of carotenoids helps protect against the progression of vision loss and *improves* **visual performance**.[14,28,29]



Lutein and Zeaxanthin Guard Against Eye Damage

- Oxidative stress, elevated blood sugar, and ultraviolet light from the sun can damage the eyes.
- With increasing age, damage from these factors accumulates and can lead to eye disease and **vision loss**.
- **Carotenoid** pigments can protect against these factors. They can only be obtained through diet or direct oral intake.
- Studies show that higher intake of the carotenoids **lutein** and **zeaxanthin** improves visual function and helps reduce the development and progression of **macular degeneration**, **cataracts**, **glaucoma**, and other disorders.

Diabetic Eye Disease

Diabetic **retinopathy**, eye disease resulting from poor blood glucose control, has become one of the most common causes of vision loss.

Patients with diabetic eye disease typically have *lower* levels of **lutein** and **zeaxanthin** than healthy adults. In these patients, taking carotenoids *improves* visual function, boosting **visual clarity** and **contrast**.[14,30]

Digital Eye Strain

LED lights and screens emit much more harmful blue light than natural sunlight.[31]

While most eye damage accumulates over time, chronic long exposure to digital screens can also cause short-term symptoms known as **digital eye strain**.[32]

These symptoms may include blurred vision, headaches, dry eyes, neck, shoulder, and back pain. An estimated **six out of 10** people in the U.S. suffer from some of these symptoms.[32]

Lutein and **zeaxanthin** act as a **blue light filter** in the eyes, safely absorbing the wavelengths associated with long hours spent looking at digital displays.[3-5]

Summary

Oral intake of carotenoids can help reduce the risk of long-term vision loss and eye disease, and protect the eyes from modern digital eye strain.

Free radical stress, high blood sugar, and ultraviolet light damage eye tissues and can lead to vision loss.

Consumed orally, the carotenoids **lutein** and **zeaxanthin** are taken up by eye tissues to act as shields against these damaging factors.

Studies show that increasing levels of these carotenoids can improve visual function while defending against the development and progression of **macular degeneration**, **cataracts**, **glaucoma**, and other eye diseases. •

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Other Compounds That Promote Eye Health

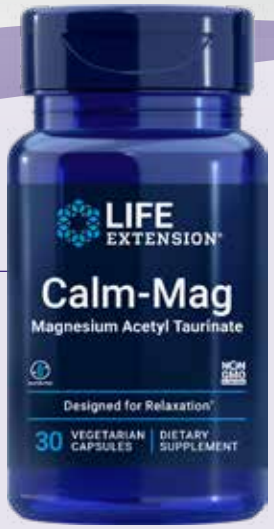
Other nutrients can support eye health, including:

Astaxanthin, a carotenoid responsible for the reddish-pink coloration of salmon, flamingos, and crustaceans. It has been found to have protective effects in the eyes and may help prevent the progression of eye disease.[33,34]

Saffron, a spice that has been used for centuries, if not longer, for various ailments. It improves visual function and can help improve symptoms of macular degeneration.[35,36]

with CALM-MAG

A special form of **MAGNESIUM** has been shown to target **stress** where it starts—in the **brain**.



Item #02434
30 vegetarian capsules

Magnesium assists in the maintenance of healthy **cortisol** levels and production of **serotonin**.[1]

Calm-Mag contains **magnesium acetyl-taurinate** which has been shown in preclinical studies to increase **brain tissue** magnesium levels.

In a clinical study of women with a magnesium poor diet,[2] this form of **magnesium**:

- Promoted a **calm**, relaxed state of mind
- Contributed to healthy **mood**

Calm-Mag provides **45 mg** of elemental magnesium in each daily capsule. It may be used with other forms of magnesium.

GLUTEN FREE · NON GMO LE CERTIFIED · VEGETARIAN LE CERTIFIED

This product is available at fine health food stores everywhere.

References: 1. *Nutrients.* 2020 Nov 28;12(12).
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‘B’SMART

BODY & BRAIN

BIOACTIVE FORMS OF VITAMIN B12

B12 Elite provides both:

ADENOSYLCOBALAMIN

- Active in brain cell mitochondria.
- Preclinical evidence suggests that it may support already healthy levels of dopamine.
- Supports cellular energy production.

METHYLCOBALAMIN

- Supports cognition within brain cells.
- Promotes red blood cell production.
- Helps maintain healthy homocysteine levels.

Dissolve in the mouth or chew one vegetarian **lozenge** daily.

Item #02419
60 vegetarian lozenges

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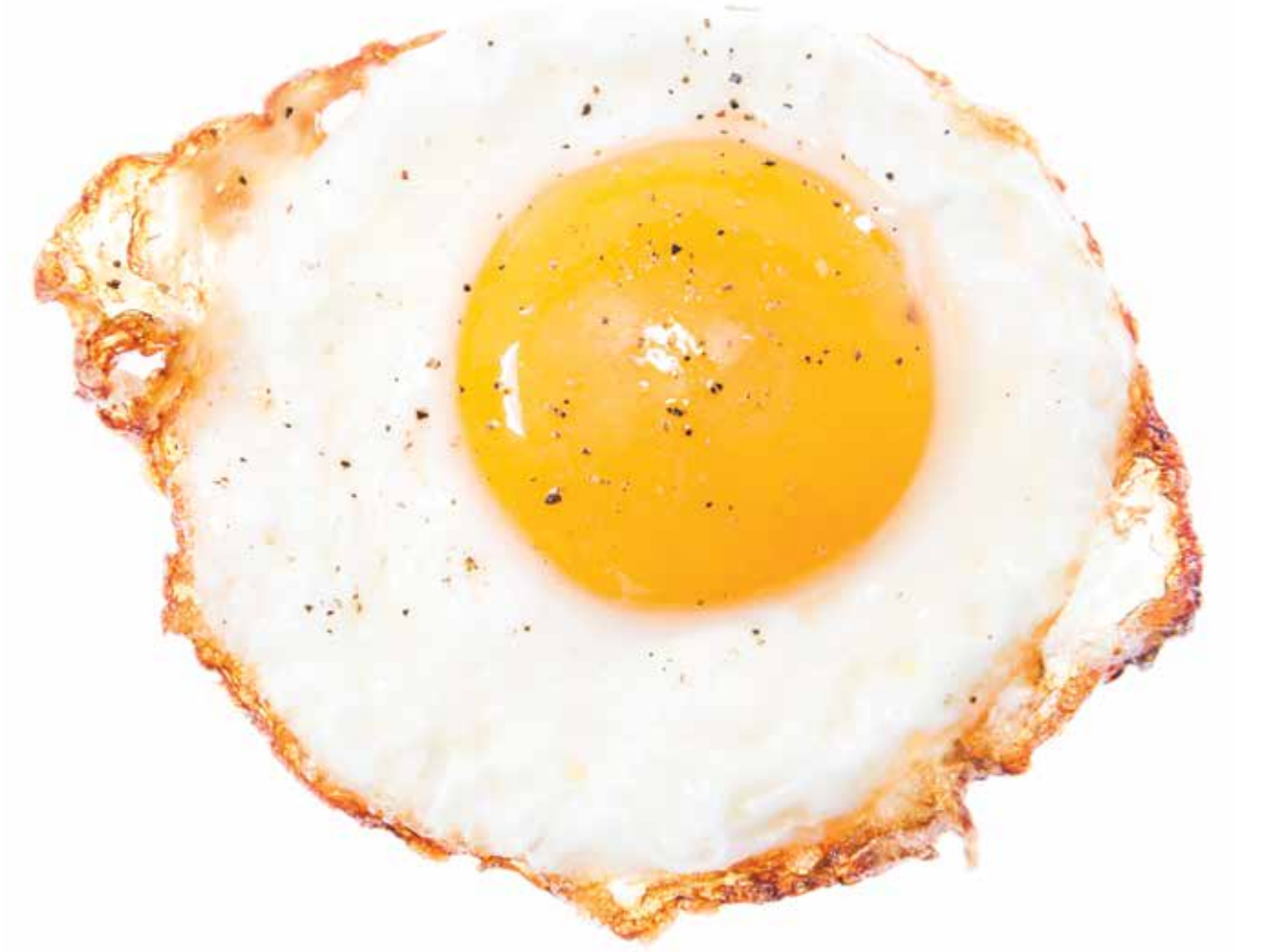

Feeling Fried?

If you experience general fatigue, it may be due to the decline of NAD+, an important coenzyme found in every cell.

NAD+ facilitates the production of ATP, which your body uses for fuel.

NAD+ Cell Regenerator™ formulas help maintain *healthy* levels of NAD+.

NAD+ Cell Regenerator™ and Resveratrol Elite™

Nicotinamide riboside (300 mg), bioavailable resveratrol and other cell-energizing nutrients in one capsule.

Item #02348 • 30 veg. caps.

NAD+ Cell Regenerator™

300 mg of nicotinamide riboside per capsule.

Item #02344 • 30 veg. caps.

NIAGEN® is a registered trademark of ChromaDex, Inc., Patents see: www.ChromaDexPatents.com

NAD+ Cell Regenerator™ has met ConsumerLab.com standards for ingredient and product quality for Nicotinamide Riboside in independent testing. More information at **www.consumerlab.com**.

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Pomegranate
The Fruit of Life

Pomegranate Complete combines extracts from the **whole fruit**, **flower**, and **seed oil**.

Pomegranate plant compounds support **heart** health.

Item #01953
30 softgels

GLUTEN FREE
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This product is available at fine health food stores everywhere.

POMELLA® extract is covered under U.S. Patent 7,638,640 and POMELLA® is a registered trademark of Verdure Science, Inc.

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45 Times Greater Bioavailability

Curcumin

Item #02407

500 mg, 60 vegetarian capsules

GLUTEN FREE · NON GMO LE CERTIFIED · VEGETARIAN LE CERTIFIED

Patented **turmeric** and **fenugreek blend** (500 mg) results in **45 times** greater bioavailability of free **curcuminoids**.

This product is available at fine health food stores everywhere.

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Three NUTRIENTS that Drive HEALTHY AGING

BY MICHAEL DOWNEY

As we age, cellular damage accumulates, chronic conditions crop up, and mortality risks skyrocket.[1]

In recent years, three nutrients were independently shown to **delay aging** processes and support **healthy lifespan** in cell and animal studies:

- The amino acid **taurine**,
- The polyamine **spermidine** from wheat-germ, and
- The mineral **lithium**.

Seeking confirmation in **humans**, scientists turned to large epidemiological observational studies.

They found that *higher* dietary intake correlates with lower **mortality** and reduced **risk** of several **age-related conditions** (also known as increased **healthspan**).[2-7]

These findings suggest that supplementation with **taurine**, **lithium**, and **spermidine** may promote **healthy aging** and longevity.

Taurine

Taurine is an amino acid found in nearly all tissues.[8,9]

It is produced in small amounts by the body, but levels drop with age. In epidemiological studies, by human adulthood, **taurine** production may be *inadequate* to maintain optimal health.[9,10]

In the large, over 25-year-long epidemiological study EPIC-Norfolk, researchers found a correlation between *higher* blood **taurine** levels and lower risks of various age-associated pathologies.[11,12]

Another large population study, coordinated by the **World Health Organization** and spanning 24 populations in 16 countries, showed that *higher* urinary levels of taurine were associated with **lower mortality** rates from ischemic **stroke**.[2,13]

In human randomized controlled studies, oral taurine intake has been shown to improve markers of health implicated in **rapid-onset aging**,[14-17] along with supporting multiple aspects of cardiovascular health, like blood pressure,[18-20] lipid profile,[18] fasting glucose,[15,21,22] athletic performance,[19,23] and cognition.[17,24]

In animal studies, taurine extends lifespan. Taurine intake:[11]

- Increased median lifespan in worms by **23%**,
- Increased median lifespan in mice by up to **12%**,
- Increased life expectancy in *elderly* mice by up to **25%**, and
- Improved multiple biomarkers of aging in middle-aged monkeys.

Spermidine

Spermidine is a polyamine (a compound having two or more amino groups) found in all living organisms and many foods, including mushrooms, legumes, corn, and whole grains.[25] It is commonly extracted from **wheat germ**.

Spermidine is also known to mimic the anti-aging effects of **caloric restriction**, such as support of **autophagy** (the recycling of old or damaged cell parts, often referred to as "cellular housekeeping").[26]

In humans, levels of spermidine decline with aging.[27]

This is a potential problem. Human epidemiological observational studies show *higher* dietary intake of spermidine is correlated with lower risk of chronic diseases and reduced mortality.

Spermidine is considered an age-delaying agent that helps protect against chronic disorders and reduce mortality.[6,26]

Several **human** observational studies found a correlation between *higher* dietary intake of spermidine and:[5,7,28-30]

- Lower **mortality** risk,
- Decreased risk of cardiovascular issues and related mortality,
- Reduced **cognitive** impairment risk, and
- Lower **blood pressure**.

Pre-clinical studies have demonstrated that spermidine may help dissolve **amyloid plaques** in the brain by **autophagy**. This may help with age-related memory decline.

A **clinical trial** of participants aged 60-100 years found that oral spermidine supplementation at doses of **0.9 - 3.3 mg/d** (wheat germ extract) improved **memory** scores as compared to **placebo**.[31]

Pre-clinical and clinical evidence has shown that functions aided by **spermidine** include:[6,27,30,32,33]

- Metabolism of lipids,
- Regulation of cell growth,
- Lowering of inflammation levels,
- Neuroprotection,
- Cardioprotection,
- Enhanced anticancer immune response (in rodent models), and
- Autophagy.

In animal studies, **spermidine** intake increases median **lifespan** by:[28,33-37]

- **3-fold** in yeast,
- **30%** in flies,
- **15%** in worms, and
- **10%** in old mice.

Lithium

Lithium is a mineral found in rocks and subsoil in some geographical areas. Some natural water sources contain small amounts of this element.

Pre-clinical evidence has shown that **lithium** can:[38-43]

- Inhibit **GSK-3** (**glycogen synthase kinase-3**), an age-accelerating enzyme,
- Help maintain *longer* **telomeres** (protective caps on the ends of chromosomes tied to increased longevity),
- Regulate **genes** related to healthy DNA,
- Help protect against dysfunctional **senescent cells** that contribute to age-related disease and accelerated aging,
- Increase activity of beneficial neurotransmitters,
- Increase **brain-derived neurotrophic factor**, a signaling molecule that protects brain cells and augments their function, and
- Reduce buildup of **beta-amyloid**, a plaque associated with Alzheimer's disease.

Studies indicate that lithium can promote healthy overall **aging** and reduce **mortality**.

Lithium administration was shown to increase **lifespan** in both roundworms[38] and fruit flies.[39] In one study, lithium increased the lifespan of worms by an astonishing **46%**.[44]

WHAT YOU NEED TO KNOW

Age the Healthy Way

- Animal and human studies show that higher dietary intake of the nutrients **taurine**, **spermidine**, and **lithium** is correlated with lower mortality, better health, and increased longevity.
- In animal studies, each of these compounds substantially increases median **lifespan**.
- Human data show that these nutrients inhibit a broad range of age-related diseases and promote **healthy aging**.

In **humans**, people taking high-dose lithium for medical reasons generally have lower **mortality** rates, including lower rates of death due to cardiovascular disease.[45,46]

Other human observational data revealed that the rates of **death** from **Alzheimer's** are *higher* in areas with *low* levels of lithium in the water.[47]

Two other observational studies showed that people living in areas with lithium in the drinking water tend to **live longer**.[3,4]

How They Work

These three nutrients may beneficially influence the hallmarks of **aging** in multiple ways.

Taurine promotes **DNA repair** processes in the body, which help protect against mitochondrial dysfunction, inflammation, and cell senescence.[48,49]

Spermidine helps regulate **autophagy**, helps promote anti-inflammatory activity, and suppresses harmful compounds produced by senescent cells.[28,32,50-52]

Lithium may help prevent the shortening of **telomeres** associated with aging. By inhibiting the age-accelerating enzyme **GSK-3**, it supports cell defense and synthesis of the energy source glycogen.[38,53]

Together, these actions may help reduce the risk of age-associated disorders and promote healthy aging.

Summary

The compounds **taurine**, **spermidine**, and **lithium** have been shown to potentially **slow the aging process**, inhibit development of age-related disease, and extend longevity.

Large observational **human** studies suggest that each of these nutrients prolongs healthy human **lifespan**.

Taken *together*, taurine, spermidine, and lithium may have significant mechanistic benefits on **healthy aging**. •

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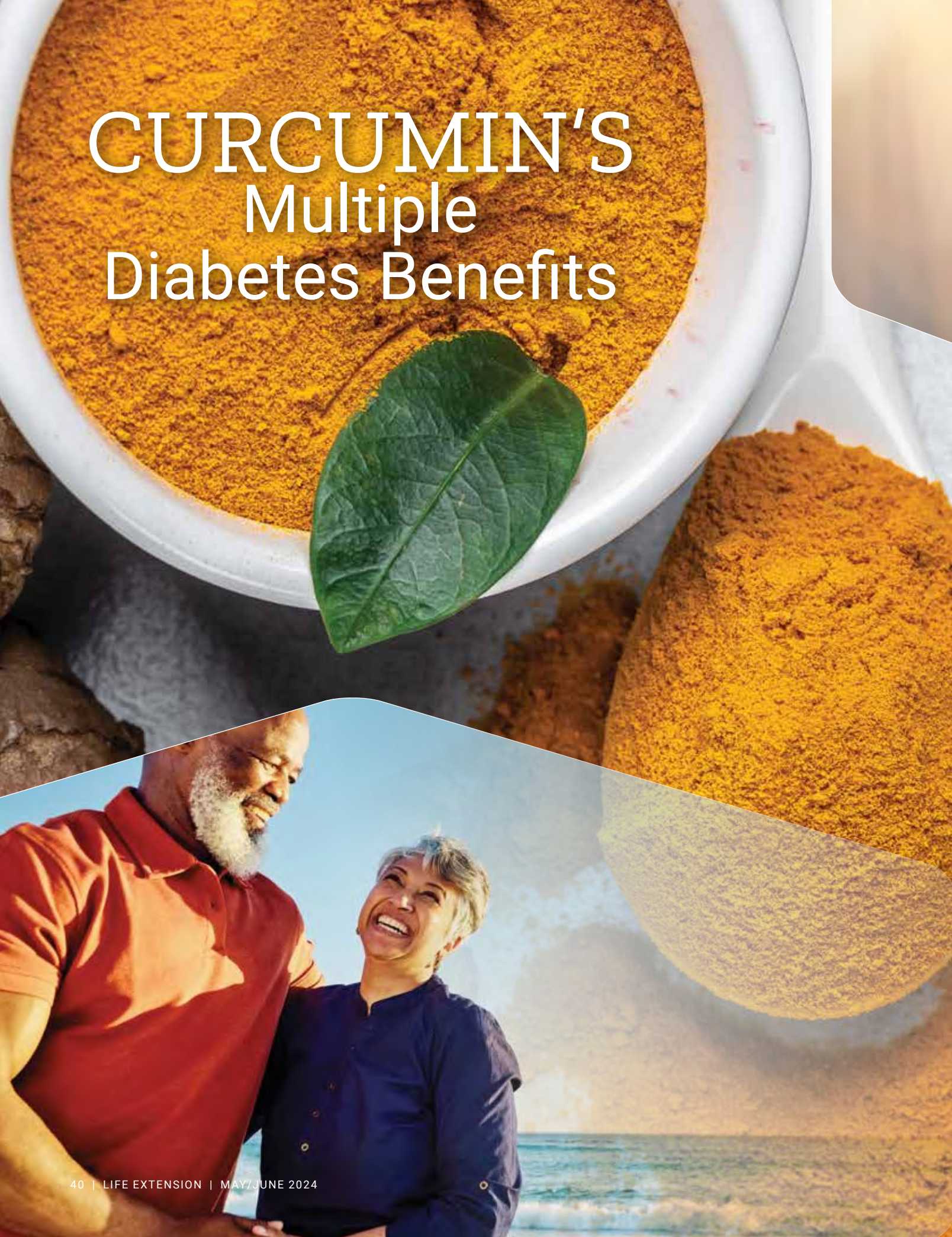
CURCUMIN'S Multiple Diabetes Benefits



BY SARAH A. LOBISCO, ND, IFMCP

An estimated **537 million** adults worldwide have **type II** diabetes, and the numbers are rising.[1]

The **high blood sugar** that defines diabetes can lead to a host of dangerous conditions including heart disease, vision loss, kidney failure, and other major health problems.[2] All of which significantly contribute to *accelerated aging*.[3]

Curcumin, derived from the turmeric root, has been **clinically** shown to help reduce multiple risk factors for **type II diabetes** *and* to lower elevated blood sugar in those with diabetes or prediabetes.[4-6]

Managing type II diabetes can be challenging for both patient and doctor. While physicians usually recommend diet, exercise, and medications for treating patients with type II diabetes, research is showing that **curcumin** can provide additional support.[6]

Insulin Resistance and Diabetes

When we take in food, our blood sugar rises. That signals the pancreas to release a hormone called **insulin**, which helps cells use that glucose for energy. As a result, blood sugar falls again.

Type II diabetes results from ***insulin resistance*** when cells don't respond properly to the hormone. Blood sugar levels stay elevated, which is known as **hyperglycemia**.[7]

Hyperglycemia can lead to systemic complications including diseases of the heart, blood vessels, kidneys, eyes, and nervous system, and an increased risk for cancer.[2]

How Diabetes Harms the Body

Inflammation likely contributes to the development of **insulin resistance**, and worsens hyperglycemia, in diabetes.[8,9]

That high blood sugar triggers *more* inflammation, which drives accelerated aging[10] and risk for chronic illness, including heart disease and cancer.[9,11,12]

Excess glucose also leads to **oxidative stress**, which can severely damage cells and tissues.[8,13] Among other problems, oxidative stress results in:[14]

- Decreased glucose transport and insulin secretion,
- Protein and DNA damage,
- Increased **vascular permeability**.

How Curcumin Helps

For thousands of years, **turmeric root** has been used as a traditional Asian medicine.

The most studied compounds in turmeric are **curcuminoids**, which include **curcumin** and related compounds.[15-17]

Scientists have discovered that curcumin has multiple molecular targets that make it ideal for modulating certain molecular pathways to help reduce the risk of elevated blood sugar.[18,19]

Specifically, curcumin has many health-promoting properties, including **antioxidant**, **anti-inflammatory** and **blood sugar lowering** effects.[18,19]

Curcumin can help protect against the development of diabetes and the harm diabetes can do in multiple ways, including:[18]

- Activating **PPAR-gamma**, a metabolic regulator that increases insulin sensitivity and *lowers* insulin resistance,[18,20]
- **Anti-inflammatory** actions, including inhibiting signaling molecules that increase inflammation,[18]
- Improving the function and health of cells that ***make insulin***,[18,21]
- Reducing the formation of **advanced glycation end products** and protecting against the damage they can do,[22,23]
- **Antioxidant** activity, which reduces oxidative stress, and
- Improving **lipid** levels, reducing some markers of metabolic dysfunction and heart disease.

In animal models, curcumin extract shows promise in helping to prevent diabetes development and decreases insulin resistance.[15,18,19,24]

WHAT YOU NEED TO KNOW

Help Prevent and Control Diabetes

- High blood sugar and **type II diabetes** cause damage throughout the body.
- **Curcumin**, derived from the turmeric root, can reduce multiple risk factors for developing diabetes, including oxidative stress and inflammation.
- Curcumin also reduces insulin resistance and lowers **high blood sugar**, helping to prevent the worst damage diabetes can do.

Human Trials

Clinical trials and meta-analyses have shown that curcumin intake can benefit those with **type II diabetes** or **prediabetes**, and even those who are completely healthy.[6,21,25-27]

In a randomized controlled trial of overweight people with **type II diabetes**, taking **1,500 mg** of **curcumin** for **10 weeks** resulted in significantly *lower* fasting blood glucose of **7 mg/dl** in those taking the curcumin supplements as compared to the baseline group.

In the **placebo** arm of this study, a **3 mg/dl** *rise* was observed as compared to baseline. Additionally, there was a decline in body weight by **1.4 lbs**. in average body weight in the group that received curcumin as compared to the baseline.[25]

Another trial of patients with **type II diabetes** found that taking **1,500 mg** of curcumin for **10 weeks** decreased **triglycerides** and **inflammatory** markers. Interestingly, it also increased levels of **adiponectin**, a hormone that *enhances* insulin sensitivity.[26] *Low* levels of adiponectin are associated with type II diabetes and obesity.[28]

Wide-Ranging Antidiabetic Benefits

Many reviews and analyses of **clinical trials** have also concluded that **curcumin** can be a beneficial support to help manage diabetes and metabolic health.

In a review of seven clinical studies of people with type II diabetes, taking curcumin at doses ranging from **80 mg** to **1,500 mg** led to improvements across a range of health markers related to type II diabetes:[6]

- Improvement in lipid levels, including reductions in total cholesterol, LDL cholesterol, a lipid that increases risk of heart disease, and
- Reduction in HbA1c levels (frequently used to diagnose prediabetes and diabetes) on average **0.42 mg/dl** in treatment groups as compared to baseline.

Additional reviews of trials in people with **type II diabetes** and **prediabetes** found that taking curcumin led to improvements in insulin and blood sugar levels, increased levels of adiponectin, the hormone that improves insulin sensitivity, liver enzymes, lipid levels, and more.[5,29]

Taken together, these studies and reviews show that **curcumin** may lower the chances of developing type II diabetes to begin with and can reduce some of its consequences in those who already suffer from diabetes.

A Better Curcumin

Taken orally, traditional curcumin is difficult to absorb.[30-32]

Scientists found a way around this problem by combining **curcumin** with **galactomannan**, a form of fiber derived from the spice **fenugreek**. This prevents modification of curcumin in the gut and increases its **bioavailability**.

This form of curcumin has been shown to increase bioactive free curcumin in human and laboratory studies.[30-32] In one clinical trial, this unique extract increased curcumin levels in the blood more than ***45 times higher*** than unformulated curcumin.[31]

Summary

Type II diabetes is an escalating epidemic.

Curcumin has shown an ability to help prevent its development.

It also lowers damaging **high blood sugar** and prevents some of its unhealthy effects in those who already have type II diabetes or prediabetes. •

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A More Restful Sleep

Serene Sleep contains <u>two</u> plant extracts that in independent clinical studies were shown to support restorative, high-quality sleep for ***occasional sleeplessness***.

Clinical trials have demonstrated that:

- A standardized **black cumin** extract encouraged sleep efficiency and supported healthy sleep patterns.[1] Additionally, **black cumin extract** maintained restorative sleep along with sleep efficiency, latency, and total sleep time.[2]
- **Ashwagandha** maintained measures of restorative sleep,[3] reduced stress measures,[3] and maintained healthy levels of the stress hormone *cortisol*.[4]

Take just <u>one</u> softgel **20** to **30 minutes** before bed.

For Occasional Sleeplessness

References:
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Item #02526

30 softgels

This product is available at fine health food stores everywhere.

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The Cherry on Top

Magnesium is a sweet way to prioritize whole-body health—especially the heart and bones.

With two different forms that provide immediate-and longer-lasting benefits, you'll savor **Extend-Release Magnesium** long after you've taken it.

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Item #02107
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This product is available at fine health food stores everywhere.

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

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Crunch Digest Your Lunch

(Or breakfast, or dinner...)

Uncomfortable after eating?

Digestive enzymes are specialized proteins that help you break down the foods you eat.

Enhanced Super Digestive Enzymes combines 10 vegetarian-friendly enzymes to help you break down hard-to-digest foods and encourage a healthy gastrointestinal balance...so you can feel good after you eat!

Item #02021

60 vegetarian capsules

NON GMO LE CERTIFIED VEGETARIAN LE CERTIFIED

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Contains wheat, soybeans.

"This product is very good, and I will continue with it."

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Life Extension® DOG: For years of mischief, adventures, and everything in between.

Multivitamin & Probiotics
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Stress & Behavior
Item #02525 • 120 soft chews

Hip & Joints
Item #02523 • 90 soft chews

Skin & Coat
Item #02522 • 90 soft chews

These products are available at fine health food stores everywhere.

REDUCE NIGHTTIME BATHROOM VISITS

BY MICHAEL DOWNEY

At least **half** of all men over **age 50** wake up once or more during the night to **urinate**.[1]

The need to urinate twice or more nightly increases with age, affecting up to **62%** of those aged 70-80.[2]

Known as **nocturia**, waking to use the bathroom at night is one of the most common **lower urinary tract symptoms** in older men. It disrupts sleep and can leave people exhausted and irritable.[3]

Many men assume it's an inevitable part of aging. But it doesn't have to be.

A clinical study by **Life Extension** scientists combined **five** compounds that have shown beneficial effects on **nocturia** and other urinary tract issues.

At the end of the study, not a single participant was left waking at night more than once. And the number of men suffering from nocturia at all dropped by an astonishing **64%**.[4]

Nocturia and Other Male Urinary Symptoms

Prevalence of nocturia increases with age.[3]

It is just one of many urinary problems, known as **lower urinary tract symptoms** (or **LUTS**), that plague aging men.[5]

Others include increased urinary frequency, urgency, incontinence, incomplete bladder emptying, hesitancy, prolonged urination, dribbling, and a weak urine stream.[5]

Many changes that occur with age drive these symptoms, including enlargement of the **prostate gland** or **overactive bladder.**[5]

Five Helpful Compounds

Some drugs are meant to control bladder overactivity and urine-flow problems. However, they are more effective in controlling daytime symptoms and have little impact on **nocturia**.[6]

To identify a possible solution, **Life Extension** scientists reviewed substances previously shown to help **reduce nocturia**.

They selected **five** ingredients with the most potential to help men with nocturia:[4]

- **Beta-sitosterol**,
- **Pygeum bark extract**,
- **Lycopene**,
- **Boron**, and
- **Melatonin**.

BETA-SITOSTEROL

The compound **beta-sitosterol** is isolated from certain nut and vegetable oils.

Preclinical evidence shows that it has a broad range of **anti-inflammatory** properties.[7-10]

In animal studies, beta-sitosterol inhibits an enzyme in the prostate gland that converts testosterone to **dihydrotestosterone**, a growth-promoting hormone that drives **prostate enlargement**.[11]

In a study of men with enlarged prostates, **beta-sitosterol**:[12]

- Reduced urinary symptom severity by **50%**, and
- Improved quality-of-life scores by **42%**.

PYGEUM BARK EXTRACT

The bark of the African cherry tree, or *Pygeum africanum*, has been used to improve urinary symptoms and bladder discomfort.

Since the **1970s**, men in France with **benign prostatic hypertrophy** (**BPH**), enlargement of the prostate, have been given pygeum extract.[13] It is used today to treat BPH-related lower urinary tract symptoms.[14]

Studies show that **pygeum bark extract** helps:[13,15-19]

- Control bladder overactivity,
- Reduce prostate enlargement, and
- Improve nocturia.

In one clinical trial, pygeum extract led to a **32% reduction** in the frequency of nighttime urination.[20]

LYCOPENE

A carotenoid pigment found in tomatoes and some other plants, **lycopene** is a well-known **anti-inflammatory** and **antioxidant**.[21]

By naturally concentrating in the **prostate** gland, lycopene can deliver its anti-inflammatory effects *exactly* where needed to help reduce nocturia.[22]

Preclinical evidence suggests that lycopene may inhibit prostate enlargement due to its **antiproliferative** properties, which help prevent abnormal growth of cells. Lab studies show that lycopene slows down prostate-cell division.[23]

Other preclinical research has shown that lycopene may benefit prostate health by improving androgen receptor signaling.[24]

In a clinical trial, giving lycopene-rich tomato products to prostate cancer patients significantly decreased **PSA** (**prostate-specific antigen**) levels. These levels rise as the prostate enlarges or develops malignant cells.[25]

BORON

The mineral **boron** offers layers of protection by:

- Reducing markers of inflammation,[26]
- Modulating sex-hormone production and reducing the impact of growth factors that may contribute to prostate enlargement,[26] and
- Blocking growth factors necessary for **tumor** development.[27]

Boron given to mice in which human prostate tumors had been implanted *reduced* those tumors by **38%** and lowered serum PSA levels by **89%**.[27]

Compared to those with the lowest dietary **boron** intake, men with the *highest* intake have a **54%** *lower* risk of **prostate cancer**.[28]

MELATONIN

The hormone **melatonin** is often taken to improve sleep.[29]

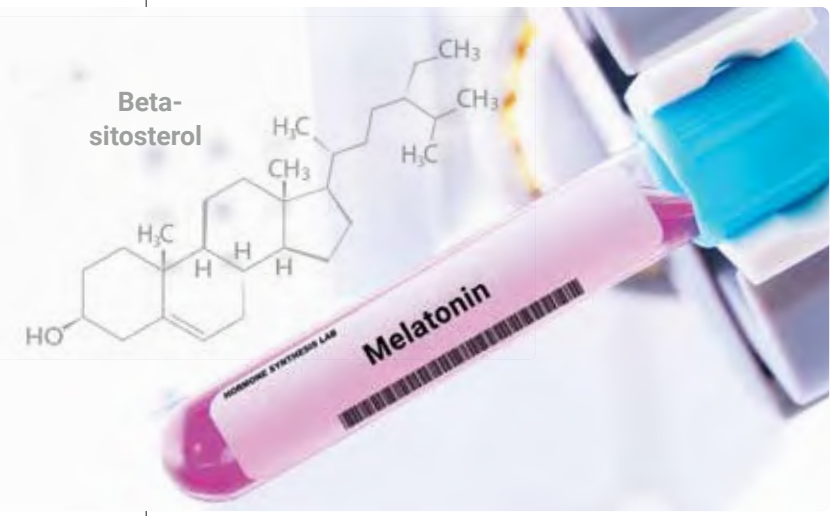
While a need to urinate can cause men to wake up, men occasionally get up to urinate simply because their sleep is *already* disrupted.[30]

Melatonin also has potent **anti-inflammatory** effects and may reduce oxidative stress and blood pressure.[31-33]

In men suffering from **severe nocturia**, defined as waking on average three times a night to urinate, **2 mg** of **melatonin** before bed improved symptoms.[34] In one study, it reduced frequency of nighttime urination from an average of **3.4 times** to **2.6 times**.[35]

Relief for Nocturia

- The need to wake up once or more nightly to urinate, known as **nocturia**, is common in men over 50.
- A specific combination of five ingredients—**beta-sitosterol**, **pygeum bark extract**, **lycopene**, **boron**, and **melatonin**—has been shown to reduce nighttime urination frequency.
- In a clinical trial, a combination of these compounds reduced nocturia in **64%** of study subjects. *No* men were left waking more than once a night.



An Effective Combination

Life Extension scientists conducted a pilot clinical study to test whether a **combination** of these compounds could reduce nighttime urination.[4]

Results were published in the journal *Global Advances in Health and Medicine*.

Every night before bedtime, 30 healthy men with mild **lower urinary tract symptoms**, aged 45 to 75 years, took a single capsule that contained a blend of:

- Beta-sitosterol (**180 mg**),
- Pygeum bark extract (**100 mg**),
- Lycopene (from **15 mg** of natural tomato fruit extract),
- Boron (**10 mg**), and
- Melatonin (**2 mg**).

At baseline, **87%** of participants reported *some* degree of **nocturia**. After **60 days** of treatment, only **23%** still reported any nocturia—a reduction of **64%**.

Even in the **37%** of men with **severe nocturia** – those who, before treatment, were waking two to three times nightly – the formula reduced the symptoms so that they were at a mild level only. That means **all men** suffering from **severe nocturia** had a substantial reduction in symptoms.

In fact, after treatment, **no participants** in the study woke up more than once a night.

This study demonstrated how powerful this nutrient combination is for reducing or relieving nocturia symptoms in men, leading to improvements in sleep and quality of life.

Summary

Nocturia is a major quality-of-life issue in aging men.

In a clinical study, a blend of **beta-sitosterol**, **pygeum bark extract**, **lycopene**, **boron**, and **melatonin** significantly reduced the frequency of nighttime urination.

The number of men suffering from nocturia *at all* was reduced by **64%**, and no one was left waking more than **once** a night. •

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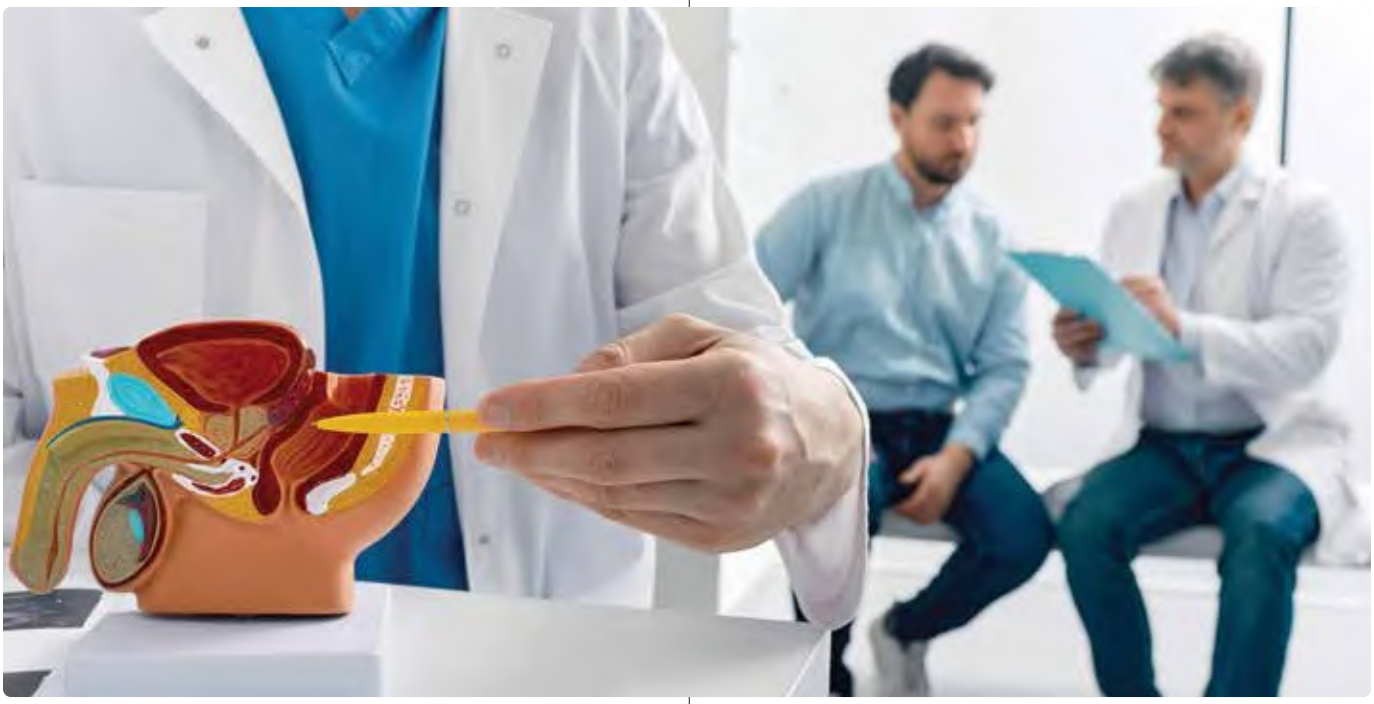

"Love the combination of ingredients in this supplement."

Amy

VERIFIED CUSTOMER REVIEW

RELEASE the POWER of BROCCOLI

Many of broccoli's benefits come from **sulforaphane**—a compound that is *activated* when the plant is cut or chewed.[1-3]

Mature broccoli provides relatively little **sulforaphane precursor** compared to broccoli sprouts. Cooking further depletes the sulforaphane precursor.[2,4]

Optimized Broccoli with Myrosinase improves conversion of the precursor into **sulforaphane,** and its absorption into the bloodstream.[2,5,6]

Each capsule contains:

Glucoraphanin, a sulforaphane *precursor* found in broccoli seed extract, that is standardized to a high concentration.[3,4]

Myrosinase, an enzyme found in mustard seed that converts **glucoraphanin** to **sulforaphane**.[2-6]

Vitamin C, a cofactor for the myrosinase enzyme for more efficient *enzymatic conversion*.[7]

Item #02368

30 vegetarian capsules

This product is available at fine health food stores everywhere.

References:
1. *Crit Rev Food Sci Nutr*. 2023 5 2:1-19.
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The Vitamin B Family is Complex.

So is our formula.

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There's also better vitamin Bs—forms of each nutrient that are easier for your body to use, absorb…or both.

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CAUTION: Temporary flushing, itching, rash, or gastric disturbances may occur.

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TAURINE

Boosts Brain Cell Regeneration & Supports Whole-Body Health

"Does the job."
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Taurine levels in the *young* are **abundant** but decline with older age.[1]

A study published in ***Science*** showed that elderly **humans** have about **80%** less **taurine** in their blood than teenagers.[2]

Taurine is a low-cost **amino acid** that provides **whole-body** support.[3]

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1000 mg
90 vegetarian capsules

Item #00133

300 grams

References:
1. *Mol Med Rep.* 2021 Aug;24(2).
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Whey protein, packed with vital amino acids, promotes **glutathione** synthesis.[1,2]

Glutathione plays an important role in supporting **immune** balance in the body.[1,2]

Whey fractions help modulate a full range of healthy bodily functions.[1-5]

References
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What is PQQ?

BY LAURIE MATHENA

Mitochondria are tiny powerplants that supply energy to the cells throughout your body.[1]

With age, your body produces less mitochondria, and existing ones can become damaged and dysfunctional.[1,2]

This results in a cellular "energy shortage" that contributes to age-related problems like insulin resistance,[2,3] cognitive decline,[4] and macular degeneration.[5,6]

A compound called **pyrroloquinoline quinone (PQQ)** has the potential to ward off health issues by stimulating the creation of healthy, ***new mitochondria***.[7-10]

Additionally, animal studies have shown that boosting **PQQ** levels improves eye health, while guarding against metabolic disease, liver damage, and kidney damage.

One animal model showed that PQQ increased **lifespan** by an average of **30%**.[11,12]

In a **human trial** of individuals with age-related cognitive decline, supplementing with **21.5 mg** of **PQQ** for 12 weeks resulted in improvement of composite memory, reaction time, and cognitive flexibility compared to placebo.[13]

Another study showed that supplementing with PQQ leads to improvements in attention and working memory.[14]

Aging and Mitochondrial Dysfunction

The body is a complex machine that requires an incredible amount of energy to run efficiently. That energy comes from energy factories called **mitochondria** that convert food into energy the body can use.

Healthy mitochondria divide on their own to replenish their numbers. This is a remarkable process known as **mitochondrial biogenesis**. Mitochondrial biogenesis is critical for protecting cells from premature aging.[2,15,16]

But with age, this process slows.

When mitochondria become damaged and die off, it creates a cellular energy shortage that accelerates aging and disease.

Mitochondrial dysfunction is *especially* damaging to the organs and tissues that have the greatest energy requirements, like our brain, heart, retina, pancreas, and liver.[17,18]

Fortunately, with the right boost, mitochondria can continue to grow, repair, and replenish themselves even in later life.

That's where **PQQ** comes in.

PQQ Creates New Mitochondria

PQQ (pyrroloquinoline quinone) is a water-soluble, vitamin-like compound found in plants, yeast, and certain bacteria.

PQQ helps mitochondria in three important ways:

- By promoting the creation of healthy, new mitochondria,[16,19-24]
- By clearing out defective mitochondria,[19,25] which helps ensure cell survival,[15] and
- By boosting the energy production of existing mitochondria.[20,26,27]

In a human study, a single dose of PQQ (equaling **13 mg** for an average-sized adult) led to improved measurements of urinary oxidant levels (indicators of mitochondrial efficiency).

This team of scientists also evaluated the impact of a higher daily dose of PQQ supplementation after three days (equaling about **20 mg** per day for an average-sized adult) and found that measurements of **inflammation** (such as **C-reactive protein** and **interleukin-6**) were decreased.[8]

In a study of healthy men who completed a six-week aerobic training program, those given **20 mg** of **PQQ** daily more than ***doubled*** their **PGC-1 alpha** levels (mitochondrial-generating protein) as compared to placebo.[7]

Brain Protection

The brain uses more energy than any other organ in the body,[28] so it is one of the hardest hit when mitochondrial function declines.

Aging, dysfunctional mitochondria are known as contributors to age-related **brain** disorders, including **Alzheimer's** and **Parkinson's** disease.[15,23,29]

By helping mitochondria perform more efficiently and by promoting the development of *new* mitochondria, PQQ may help prevent these and other disorders.[19,23,29,30]

In a human study, participants aged 20–65 years received **20 mg** of PQQ or placebo for 12 weeks. Supplementing with PQQ led to **improvements** in **memory test scores** after eight weeks. In older adults, at the end of 12 weeks, further improvements in complex and verbal memory were observed.[31]

Researchers have found preclinical evidence that PQQ may slow the progression of both conditions—or possibly even prevent them altogether.[30,32-37]

That's because, in addition to boosting mitochondrial function, PQQ has been found to *prevent* the accumulation of abnormal proteins (such as **beta-amyloid** and **alpha-synuclein**) associated with neurodegeneration.[32-34]

Prevent Metabolic Issues

Mitochondrial dysfunction contributes to metabolic issues like obesity, insulin resistance, and type II diabetes, as well as cardiovascular disease.[24,38,39]

PQQ helps improve many factors that contribute to metabolic syndrome. PQQ affects insulin signaling via multiple pathways. That is why studies suggest that PQQ may be beneficial in insulin resistance and type II diabetes.[41]

In an animal study of metabolic syndrome, obese rats treated with PQQ for five weeks experienced the following benefits (compared to the untreated group):[24,40]

- Significant improvements in blood sugar control, insulin levels, and insulin sensitivity,
- Reductions in harmful inflammatory cytokines, and
- Healthier blood lipid levels, including total cholesterol, triglycerides, LDL ("bad") cholesterol, and HDL ("good") cholesterol.

Kidney and Liver Health

Two serious side effects of metabolic issues like obesity and diabetes are kidney and liver damage. PQQ has considerable potential for remedying metabolic diseases including diabetes, nonalcoholic fatty liver disease (NAFLD), and chronic kidney disease.[41]

In rodent models of diabetes, the kidneys show signs of significant damage and **fibrosis** (scarring). Kidney function is decreased and there are signs of oxidative stress and **inflammation** seen in the tissues.[42,43]

In an animal model of diabetes, giving animals PQQ significantly reduced the structural damage to their kidneys, while improving kidney function.[42,43]

And in a preclinical study of NAFLD (nonalcoholic fatty liver disease), PQQ protected the liver from fat accumulation by supporting the creation of ***new*** mitochondria, improving lipid metabolism, and boosting antioxidant protection.[44]

Eye Protection

Abnormal mitochondrial function is often found in three of the leading causes of blindness: macular degeneration, glaucoma, and diabetic retinopathy.[6,9]

Cell studies from eyes of human donors with macular degeneration show ***under-functioning*** **mitochondria** in the **retinal pigment epithelium**. Researchers used PQQ to treat **retinal pigment epithelial cells** from human organ donors who had age-related macular degeneration.[9]

In half of the tissue samples, administering PQQ led to a **50%-350%** improvement in the mitochondrial function of these critical retinal cells.

The treated cells also had a **59%** increase in the production of ATP, which is the form of energy that the cells use.

Summary

PQQ helps promote healthy aging by promoting the production of healthy, new mitochondria.

Enhancing the body's cellular energy with PQQ has the potential to improve memory and eye health, while protecting against metabolic, liver, and kidney disease.

PQQ also has the potential to increase lifespan.

Taking **10** to **20 mg** of PQQ daily is a practical way to support healthy aging. •

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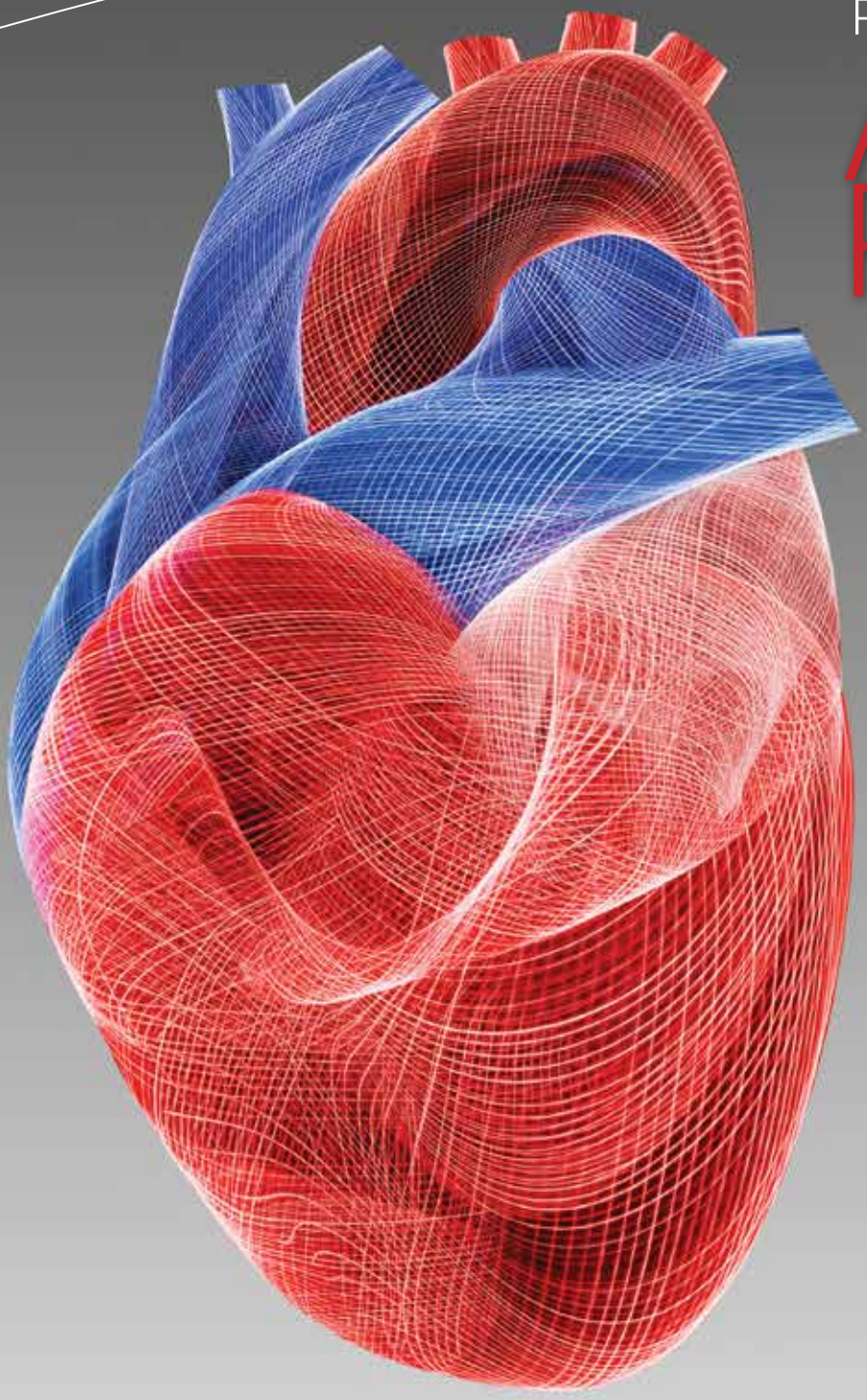

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Effects of DIETARY PROTEIN on Muscle Mass and Frailty

BY LAURIE PERKINS

Many older adults do not consume enough **protein** in their diet.[1-3]

Insufficient protein intake can cause loss of **muscle** and **bone mass**,[4] which can lead to weakness and **frailty**.[1,5-9]

Diminished **muscle** can result in decline of physical function and independence, along with increased risk of falls. It is also associated with *early* **mortality**.[10]

Increasing **protein** intake has been clinically shown to increase **muscle strength**, **muscle mass**, and **physical performance** in frail elderly people.[3,11-13]

Why We Need Protein

Many people associate protein powders and bars with athletes trying to build muscle. They may not realize that **older adults** also need abundant **protein** to maintain optimal health.[1,5,6,14]

Proteins are made of long chains of chemical units called **amino acids**. Cells can produce some of these protein building blocks, but others—termed **essential amino acids**—cannot be synthesized in the human body and must be acquired in the diet.[15]

Proteins serve many purposes. About **50%-70%** of all proteins in the body are found in **muscles**.[4,16]

Studies show that after the age of **30**, muscle is lost at a rate of about **3% to 5%** per decade, and that accelerates with advancing age.[17]

Dangers of Low Protein Intake

Many older adults are at risk of suboptimal protein nutrition.[3,18,19]

The most profound impact of inadequate protein is on **muscle** and **bone**. With time, too little protein may eventually contribute to:

- **Sarcopenia**, loss of muscle mass and strength,[17,20] and
- **Osteopenia**, loss of bone density and strength.[4,7]

Although loss of muscle mass may be the first thing that comes to mind regarding poor protein intake, bones are also profoundly affected.[4]

Bones require calcium and other nutrients for optimal mineralization, and the scaffolding of bone tissue requires **protein** as well. Maintenance of healthy bone structure requires adequate protein intake, and it suffers when protein availability is insufficient.

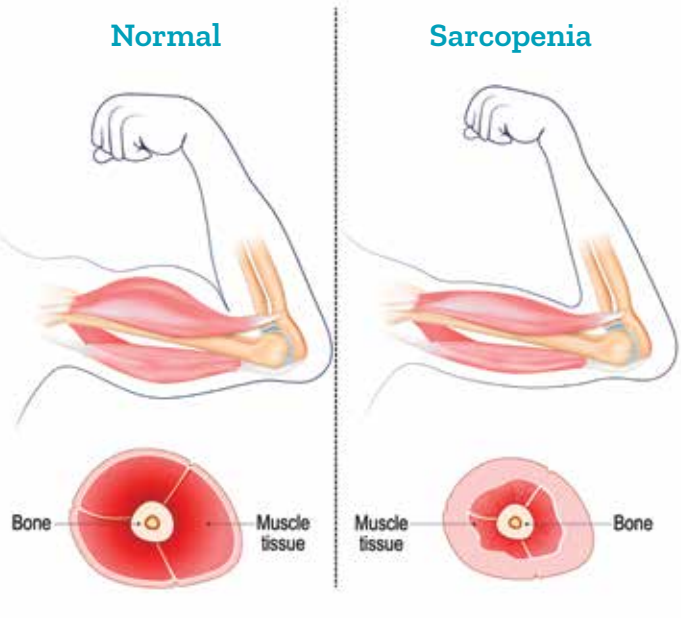
Both sarcopenia and osteopenia can occur without any symptoms in their early stages. But as they progress, they are a major contributor to declining health in older adults.

Loss of muscle and bone are closely associated with **frailty** and **functional disability**.[4,7] Both these conditions are associated with an increased risk of falls, fractures, and other injuries, and increased risk of **death**.

How Much Do You Need?

Although the official **Recommended Dietary Allowance (RDA)** for protein intake is only **0.8 grams/kg** per day, modern scientific, nutritional, and medical researchers generally agree that for elderly individuals and people with many medical conditions, a correct nutritional target is in the range of **1.0 to 1.5 grams/kg** per day.[3,13,21,22]

A 180-pound older individual concerned about maintaining or building muscle and bone mass should aim for approximately **80 – 120 grams of protein per day**



from diet and protein supplements. Since two scrambled eggs provide only **12 grams** of protein, and a serving of nonfat Greek yogurt delivers just **16 grams**, it is apparent that **protein supplementation** may be crucial for some.

For instance, **whey protein** concentrate powders can deliver **20 grams** of high-quality protein per scoop. This can make a big difference for those having trouble meeting their daily protein quotient.

Human Studies of Protein Intake

Observational and clinical studies confirm the impact that adequate **protein intake** has on overall health.

These studies have demonstrated benefits of consuming good amounts of protein – and many of these studies used **protein supplementation** to augment dietary intake.[4-7,14,18,20,23-34]

The Framingham Offspring study followed thousands of participants for an extended period of time. Over nine years of observation, individuals who consumed **more protein** were found to maintain a **greater muscle mass**. Moreover, in physically active subjects, *higher* protein intake was linked to an impressive **35%** reduction in risk of **functional decline**.[20]

In a clinical trial, poorly nourished elderly individuals who were frail or prefrail were assigned to protein-supplement interventions that augmented diet to provide **1.2 or 1.5 grams/kg** protein per day. Placebo recipients consumed **0.8 grams/kg/day**, the usual RDA. After 12 weeks, those in the **1.5 gram/kg** group, compared to the **0.8 gram/kg** group, had greater muscle mass in their arms, legs, and body overall, as well as improved walking speed.[13]

Multiple reviews and analyses of the scientific literature have concluded that protein consumption higher than the RDA, in the range of approximately **1.0 – 1.5 grams/kg** of body weight, including through the use of whey protein supplementation, results in better muscle and physical function outcomes. Notably, several of these scientific papers concluded that better **vitamin D** status leads to better results with **dietary protein** optimization.[3,11,12]

WHAT YOU NEED TO KNOW

Increase Protein to Fight Frailty

- Older adults require a good intake of **protein** to support healthy muscles, prevent frailty and functional decline, and support healthy aging.
- Studies show that low protein intake is associated with **frailty**, risk for falls and other injuries, bone fractures, and other negative health outcomes in the elderly.
- Increasing protein intake can help maintain **muscle mass** and **bone density**. That can prevent frailty, loss of function, and other age-related health problems.

Boost Your Protein Intake

Protein bars provide a convenient way to increase daily protein intake.

The problem is that many supposedly "healthy" bars are just candy with a protein serving added.

Some popular bars have as much as **12 grams** of **sugar** per serving!

When choosing a protein bar, look for one with:

- **No added sugar** and only **1-3 grams** of total sugar,
- A healthy serving of **fiber**, around **8 grams** and,
- At least **12 to 16 grams** of **protein**.

Many people use whey protein or plant protein powder to increase their daily protein intake.

Look for a protein powder with no artificial sweeteners (stevia is okay) which provides between **18-20 grams** of protein per scoop. These powders can be mixed into numerous recipes or used as a basis for a healthy smoothie.

Summary

Many older adults consume inadequate amounts of **protein** in their diet.

Low protein intake is associated with loss of **muscle mass** and **strength** in the elderly, along with increased risk for weak bones, falls, and fractures.

Several age-related health issues are also more common with insufficient protein intake, including age-related muscle loss (sarcopenia) and frailty.

Increasing intake of protein in the diet as well as through supplementation has been shown to help support **muscle mass** and physical functioning. Some studies also suggest that proper vitamin D status is essential to reap the benefits of protein nutrition.

This can help ward off functional decline, frailty, and premature death. •

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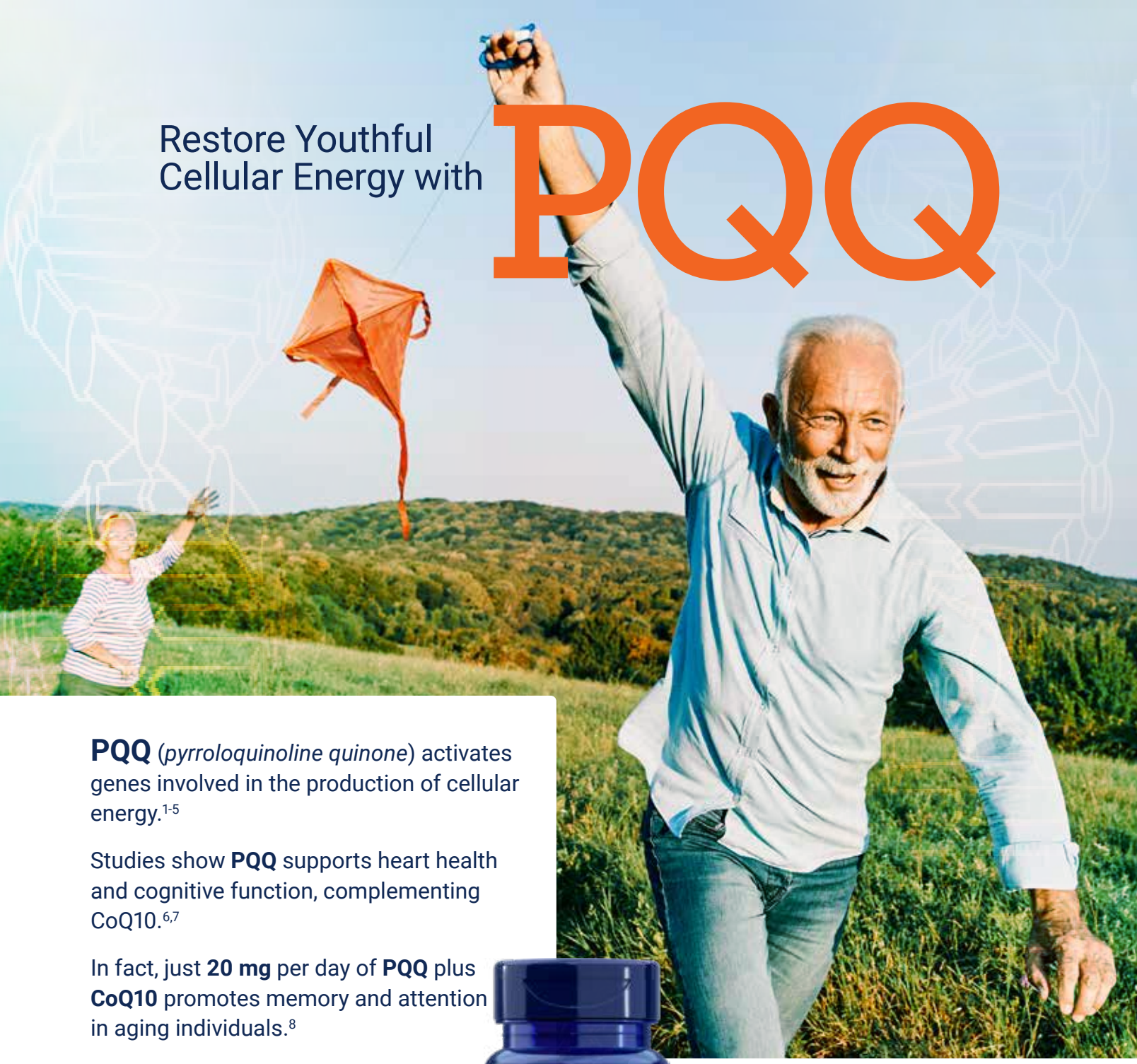
Restore Youthful Cellular Energy with PQQ



PQQ (*pyrroloquinoline quinone*) activates genes involved in the production of cellular energy.[1-5]

Studies show **PQQ** supports heart health and cognitive function, complementing CoQ10.[6,7]

In fact, just **20 mg** per day of **PQQ** plus **CoQ10** promotes memory and attention in aging individuals.[8]

This formulation contains **20 mg** of **PQQ** per capsule, which is the recommended daily dose.

These products are available at fine health food stores everywhere.

Item #01647

30 vegetarian capsules

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Also available are **10 mg PQQ caps** (Item #01500) and **100 mg Super Ubiquinol CoQ10 with PQQ** (Item #01733).

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Get More FIBER the *Easy* Way

ENJOY FIBER BENEFITS *with* SMALLER DOSES

Item #02514
167 G (0.368 lb. or 5.89 oz.)

Most soluble fiber products contain ***psyllium*** husk that requires higher doses to deliver benefits.

The side effect is often unpleasant bloating.

Konjac root contains a soluble fiber that provides benefits at smaller doses than psyllium, so it's much less filling.

New **Easy Fiber** provides **1,000 mg** of ***glucomannan*** from **konjac root** in each dose to support:[1-5]

- **Satiety and weight management†**
- **Regularity**
- **Digestion**
- **Heart health and already healthy cholesterol levels**
- **Prebiotic fiber**
- **Already healthy blood sugar and insulin levels**

Natural orange flavor with other natural flavors and sugar free!
Do not take if you have difficulty swallowing.

GLUTEN FREE · NON GMO LE CERTIFIED · SUGAR FREE

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

This product is available at fine health food stores everywhere.

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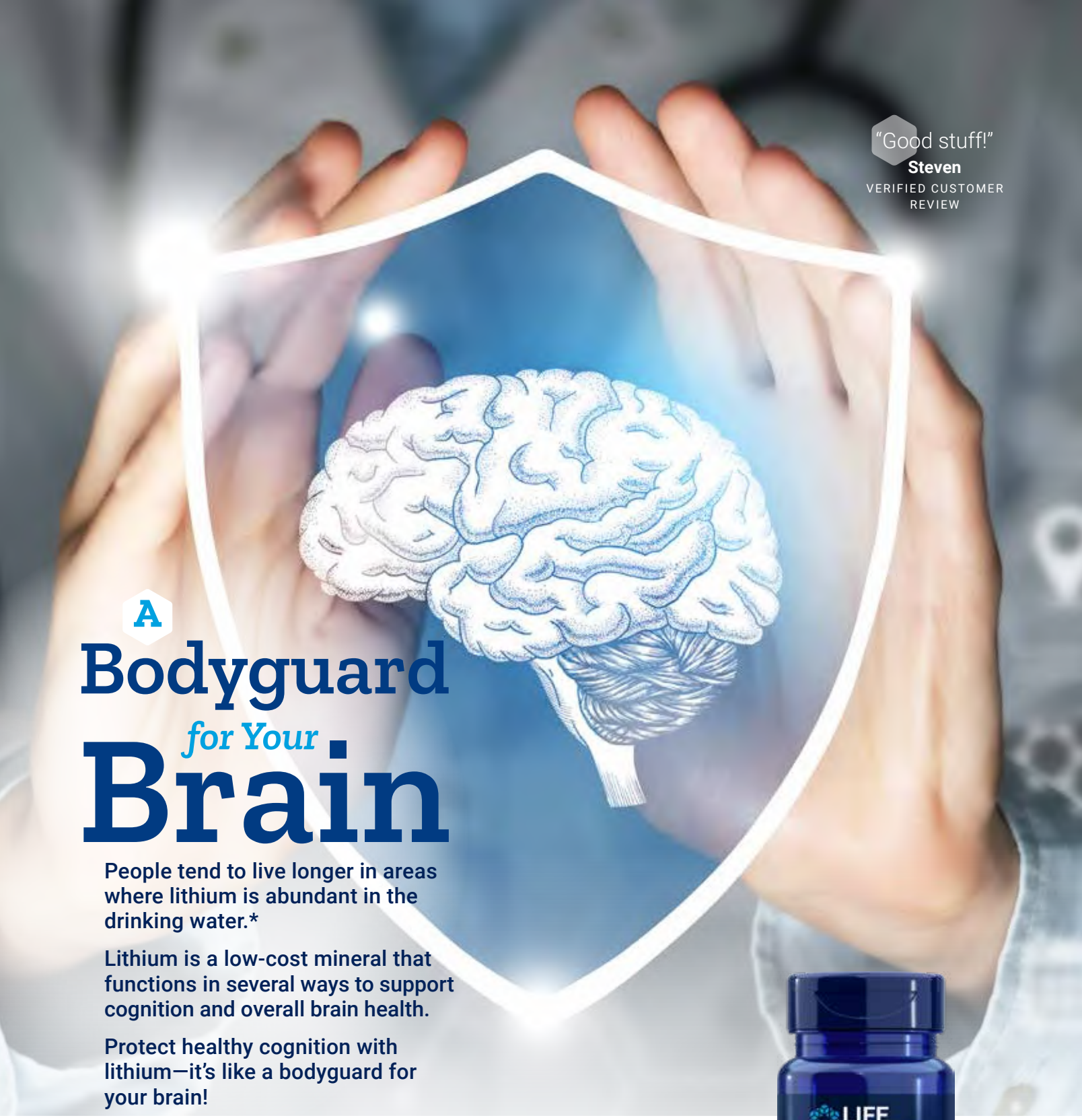

"Good stuff!"
Steven
VERIFIED CUSTOMER REVIEW

A Bodyguard *for Your* Brain

People tend to live longer in areas where lithium is abundant in the drinking water.*

Lithium is a low-cost mineral that functions in several ways to support cognition and overall brain health.

Protect healthy cognition with lithium—it's like a bodyguard for your brain!

This product is available at fine health food stores everywhere.

GLUTEN FREE
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(**1,000 mcg** of **lithium** per tiny cap)

Item #02403

100 vegetarian capsules

Each bottle lasts 100 days.

European Journal of Nutrition. 2011;50(5):387-389.

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SUPPORTS **HEALTHY** GLUCOSE METABOLISM IN THE **BRAIN**

Maintaining healthy blood sugar levels is essential for whole-body health.

Benfotiamine promotes and protects brain function while supporting healthy blood sugar metabolism.[1,2]

Item #00925

120 vegetarian capsules

GLUTEN FREE · NON GMO LE CERTIFIED · VEGETARIAN LE CERTIFIED

This product is available at fine health food stores everywhere.

References

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"I take it daily because it does help."

Spencer

VERIFIED CUSTOMER REVIEW

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ANTI-CANCER PROPERTIES of VITAMIN D

BY MARTIN STEIN

Vitamin D plays a variety of roles in cells throughout the body.[1,2]

One of its functions is to help prevent abnormal growth that could transform into **cancer**.[1,3-5]

Some observational studies have noted a clear association of cancer incidence and vitamin D deficiency.[5-7]

In a subset analysis of a six-year **clinical trial**, people taking **vitamin D3** had a lower risk of developing **metastatic** or **fatal cancer** than those who received **placebo**.[8]

Dangers of Low Vitamin D

In a study based on the well-known **NHANES** survey of Americans and their health, more than **40%** of Americans are estimated to have insufficient levels of **vitamin D** in their blood.[9]

In this study, vitamin D deficiency was seen in all age groups, and was higher in women and individuals with darker skin color. In people aged **20-29 years** the rates of deficiency were even greater.[9]

The damaging effects of these kinds of low **vitamin D** levels are underappreciated. Vitamin D is more than a vitamin. It is also a very important **prohormone**—a kind of hormone precursor.[10]

Adequate **vitamin D** levels are critical for bone health, immune function, glucose metabolism, and more.[11] Vitamin D can also regulate the growth, development, and death of certain cells—in ways that may slow the development and progression of malignancies.[1]

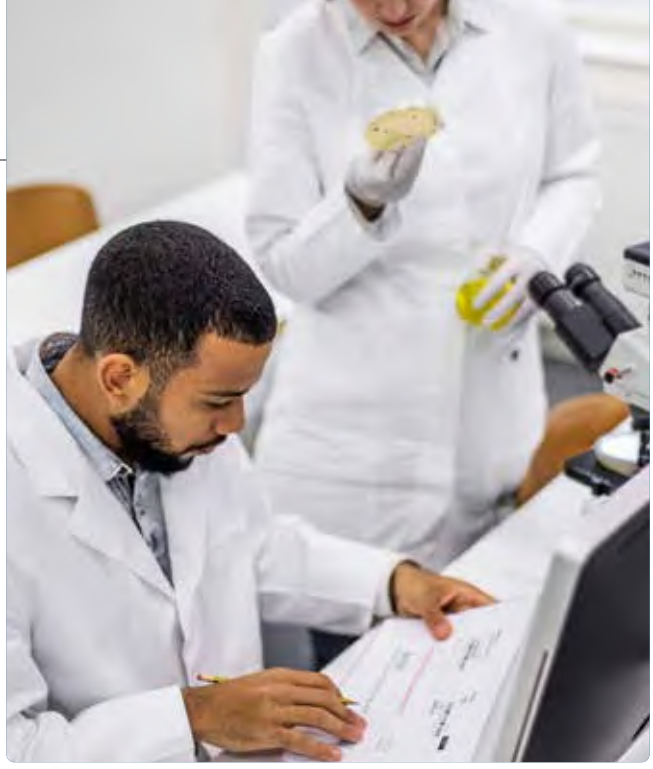
Anti-Cancer Activity

Cancer is caused by mutations that allow cells to grow and spread uncontrollably.

Vitamin D can help limit the ability of cancer cells to reproduce, grow, and spread.[1,5,12]

Here are just a few of vitamin D's known anti-cancer mechanisms:[1,3,5,12]

- **Impeding Cancer Cell Growth.** Vitamin D helps prevent the abnormal, excessive growth of cancer cells by arresting its **cell cycle**, the process that can allow cancer cells to divide out of control.
- **Promoting Cancer Cell Death.** Apoptosis is a process by which cells shut down and die, ridding the body of aged or damaged cells. Cancer cells can evade apoptosis and propogate out of control. Vitamin D *reverses* this, promoting beneficial apoptosis.
- **Starving Cancer of Nutrients.** Vitamin D helps block **angiogenesis**, the formation of blood cells that deliver nutrients to cancers. This reduces the nutrient supply to cancer cells and limits their growth.
- **Reducing Metastasis.** Aggressive cancers can invade surrounding tissue and eventually **metastasize**, spreading through the body. Vitamin D interferes with cancer cells' ability to invade and metastasize.



The Cancer, Low Vitamin D Link

Human observational studies have shown an association between low **vitamin D** levels and increased risk for many **cancers**.[5,13,14]

Vitamin D deficiency is typically defined by the **World Medical Association (WMA)** as having a 25-hydroxyvitamin D blood level below **20 ng/mL**.[15] This is quite common in cancer patients.[6,7,16] Multiple observational studies have found a high rate of vitamin D deficiency in cancer patients, often in the range of **62%-67%** of patients.[17-19]

In studies evaluating *specific* cancer types, the same pattern is seen: Those with lower circulating levels of vitamin D have the highest rates of cancer, including breast, lung, head and neck cancers, melanoma, colorectal cancers, and bladder cancers.[20-28]

Here are a few examples:

- In a meta-analysis of **11** observational studies, individuals with the *highest* circulating vitamin D levels had a **39%** lower risk of developing **colorectal cancer** than those with *lower* vitamin D levels.[21]
- A combined analysis of **three clinical studies** found that a *25-hydroxyvitamin D* blood level greater than **60 ng/mL** was associated with an **80%** lower risk of **breast cancer** compared to individuals who had vitamin D deficiency **(<20ng/ml).**[23]
- Vitamin D may not only help reduce the risk of cancer development, but it may also impact how **aggressively** cancers behave.

- In one observational study of men with **prostate cancer**, their levels of vitamin D were found to be inversely associated with a tumor proliferation marker. This lends credence to the hypothesis that vitamin D may protect against tumor progression.[26]

Clinical Trials

Many experts, including those at **Life Extension**, recommend daily intake of **5,000 to 8,000 IU** of **vitamin D3**. It is widely available to Americans in high potency capsules at modest cost.

Unfortunately, clinical trials evaluating vitamin D's effect on cancer have mostly used doses of **2,000 IU** or below. In people with low levels, these doses are unlikely to bring their blood levels into what many consider an optimal range (over **50 ng/mL**).

Researchers often give the same dose of vitamin D to all study participants. This is an error, because overweight/obese people and those with absorption challenges need *higher* doses of vitamin D.[29,30] A dose that might properly elevate serum vitamin D in a normal weight person can have little effect on someone with a high body mass index (BMI). In many cases, this may mean researchers are failing to give adequate vitamin D to people who need it the most.

Even so, benefits have been shown.

A **six-year**, multicenter clinical trial called VITAL enrolled more than **25,000** adults who were randomized to receive **2,000 IU** of **vitamin D** and / or **1 gram omega–3** fish oil supplementation, or placebo.

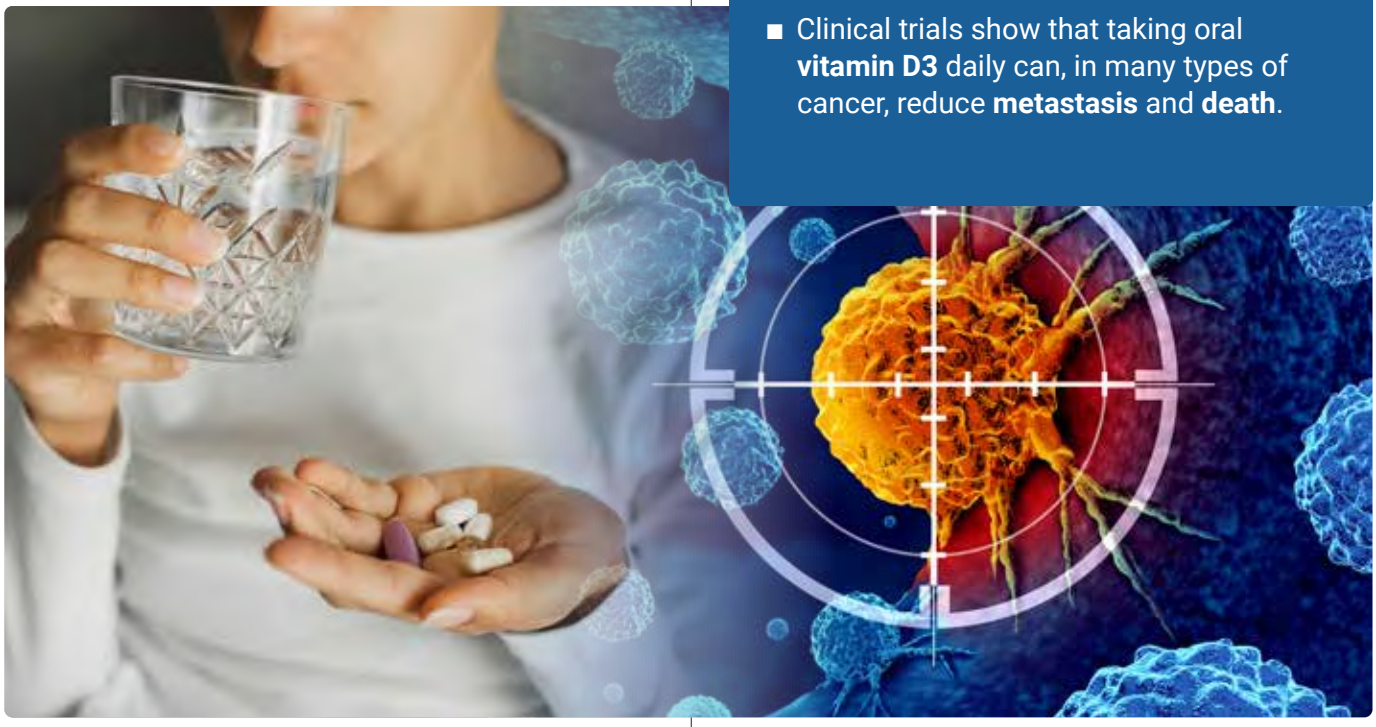
Participants were randomized into four groups:

- Active vitamin D and fish oil
- Active vitamin D and placebo instead of fish oil
- Placebo instead of vitamin D and active fish oil
- Placebo pills instead of either vitamin D or fish oil

WHAT YOU NEED TO KNOW

Vitamin D's Role in the Fight Against Cancer

- Low levels of vitamin D are extremely common. Observational studies have often shown that low vitamin D status is associated with increased risk of cancer development.
- Clinical trials show that taking oral **vitamin D3** daily can, in many types of cancer, reduce **metastasis** and **death**.



A significant **17%** reduction in advanced cancer (metastatic or fatal) incidence was found in those who received vitamin D.

When analyzed by BMI (body mass index) categories of normal weight, overweight, and obese, a significant **38%** risk reduction was seen in the vitamin D group that had normal BMI **(25-<30).**[8] This may indicate that study participants with a *higher* BMI should have received more vitamin D than **2,000 IU/day.**

Another double-blind, placebo-controlled trial evaluated patients with **digestive tract cancers**, including esophagus, stomach, small intestine, colon, and rectum, administering oral vitamin D supplementation at a dose of **2,000 IU/day** beginning two to four weeks after cancer surgery.[31]

This trial did not show a change in five-year relapse-free survival. But a later analysis of the trial data examined whether mutations in the **p53** tumor suppressor gene, in the tumors themselves, predicted the likelihood of a beneficial response to vitamin D supplementation.[32] **P53** is the most commonly mutated gene in human cancers[33]

When considering the **p53** mutation status, the results of vitamin D supplementation were quite remarkable. In people with **p53 mutations**—meaning their cells had lost an innate ability to suppress tumor cell proliferation–relapse or death was **73%** less likely to occur in those supplemented with vitamin D compared to placebo.

The follow-up period in this study was over **five years** and results indicate that cancer patients with **p53 mutations** may be more likely to respond favorably to vitamin D.

In a meta-analysis of five randomized controlled trials, vitamin D supplementation conferred a **13%** lower risk of cancer death. This benefit was largely attributable to daily vitamin D dosing rather than bolus dosing.[34]

This evidence shows that vitamin D supplementation reduces cancer death, that it is especially effective in those whose tumors carry the most common cancer-promoting mutations, and that overweight and obese individuals probably require *higher* doses of vitamin D to gain these benefits.

Summary

Vitamin D has been shown to defend against the development and progression of **cancer** in multiple ways.

In many observational studies, people with *low* levels of vitamin D have often been found to have *higher* rates of many types of cancer.

Several clinical trials show that taking daily oral **vitamin D3** can help reduce the risk of cancer **metastasis** and **death**. •

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MORE ZEN, SHARPER FOCUS

Ashwagandha Plus Calm & Focus *reduces* stress while increasing **alertness-focus**.

Each capsule contains:

- Standardized **ashwagandha** root and leaf extract clinically shown to decrease feelings of **stress** by **71%.**[1]
- Patented polyphenol-rich **spearmint** extract clinically shown to *improve* **alertness** and sustained **attention**.[2-4]

Item #02519

60 vegetarian capsules

References:

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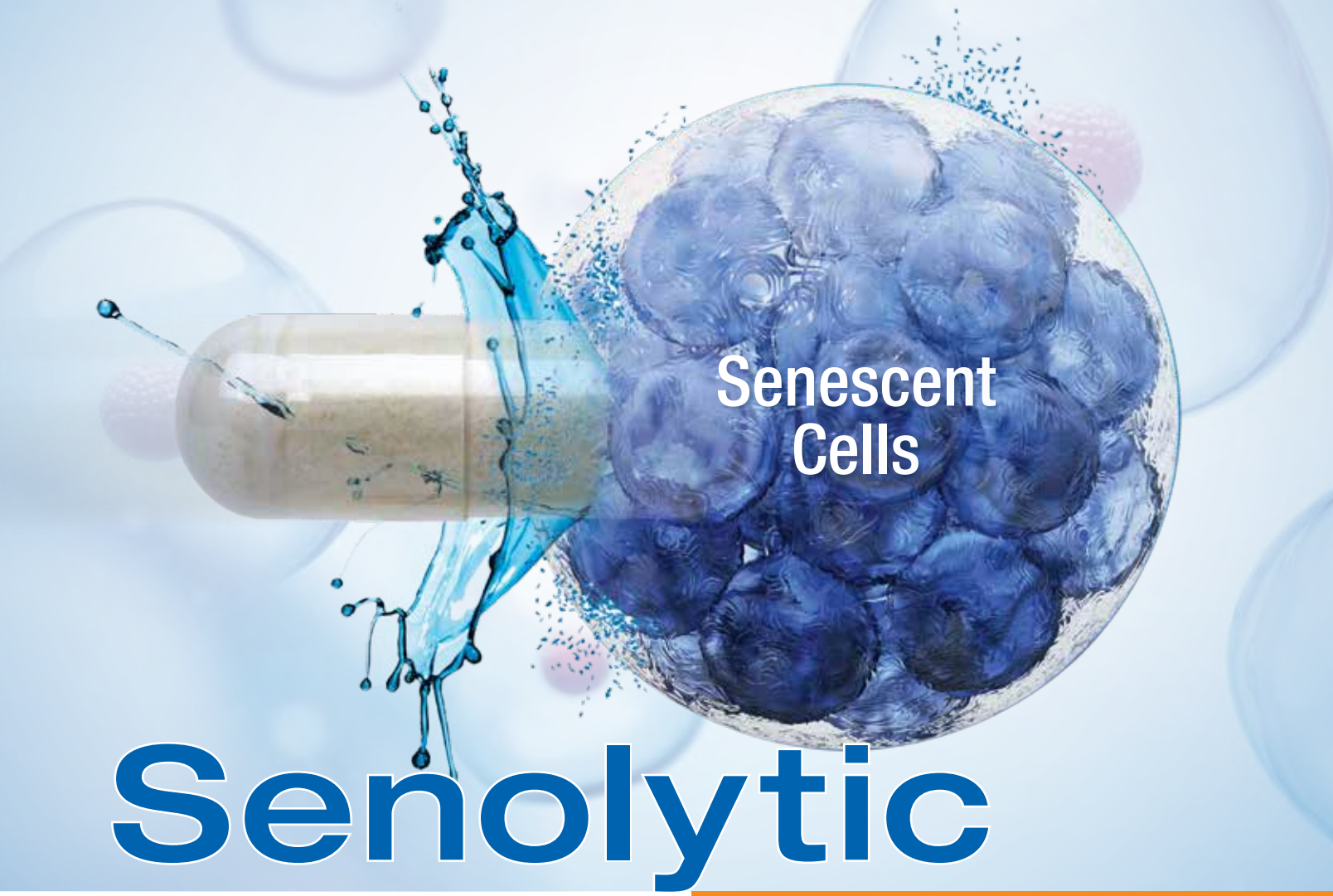

Senolytic

ACTIVATOR® with BIO-FISETIN™

GLUTEN FREE

NON GMO LE CERTIFIED

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Item #02301
36 vegetarian capsules

"Taking this supplement, I feel I will be healthy for the long haul."
Larry
VERIFIED CUSTOMER REVIEW

This product is available at fine health food stores everywhere.

With age, our body accumulates **senescent cells** that affect the day-to-day function of the healthy cells around them.

Senolytics are compounds that selectively remove senescent cells.

Senolytic Activator® contains nutrients designed to target senescent cells for normal elimination.

This formula contains a patented **fisetin** that is more **bioavailable** than regular fisetin.

COMPREHENSIVE SENOLYTIC SUPPORT

The **Senolytic Activator®** formula provides the following nutrients:

- **THEAFLAVINS** (polyphenols from black tea)
- **BIO-QUERCETIN** (ultra-absorbable form)
- **APIGENIN** (a natural flavonoid)
- **BIO-FISETIN™** (up to **25 times** greater bioavailability)

The suggested dose of the **Senolytic Activator®** is **3 capsules** once a week. Each bottle lasts 3 months and costs very little.

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PreticX®
IN A TASTY
STRAWBERRY
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RESTORE YOUTHFUL Gut BALANCE

With Strawberry Flavored FLORASSIST® Prebiotic Chewable

- 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.

Item #02203

60 vegetarian chewable tablets

This product is available at fine health food stores everywhere.

References
1. *Front Microbiol.* 2016;7:1204.
2. *Korean J Nutr.* 2007;40(2):154-61.

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THE VERSATILE BENEFITS OF PYCNOGENOL®

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

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Item #02004
30 vegetarian capsules

†VENOFLOW™**
Item #02102
30 vegetarian capsules

†PYCNOGENOL®
French Maritime Pine Bark Extract
Item #01637
60 vegetarian capsules

ARTERIAL PROTECT
Provides Pycnogenol® and standardized gotu kola leaf extract to help stabilize endothelial plaque and promote healthy blood flow throughout the body.

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.

These products are available at fine health food stores everywhere.

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Use of this product may be protected by one or more U.S. patents and other international patents.

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****CAUTION:** If you are taking anticoagulant or antiplatelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

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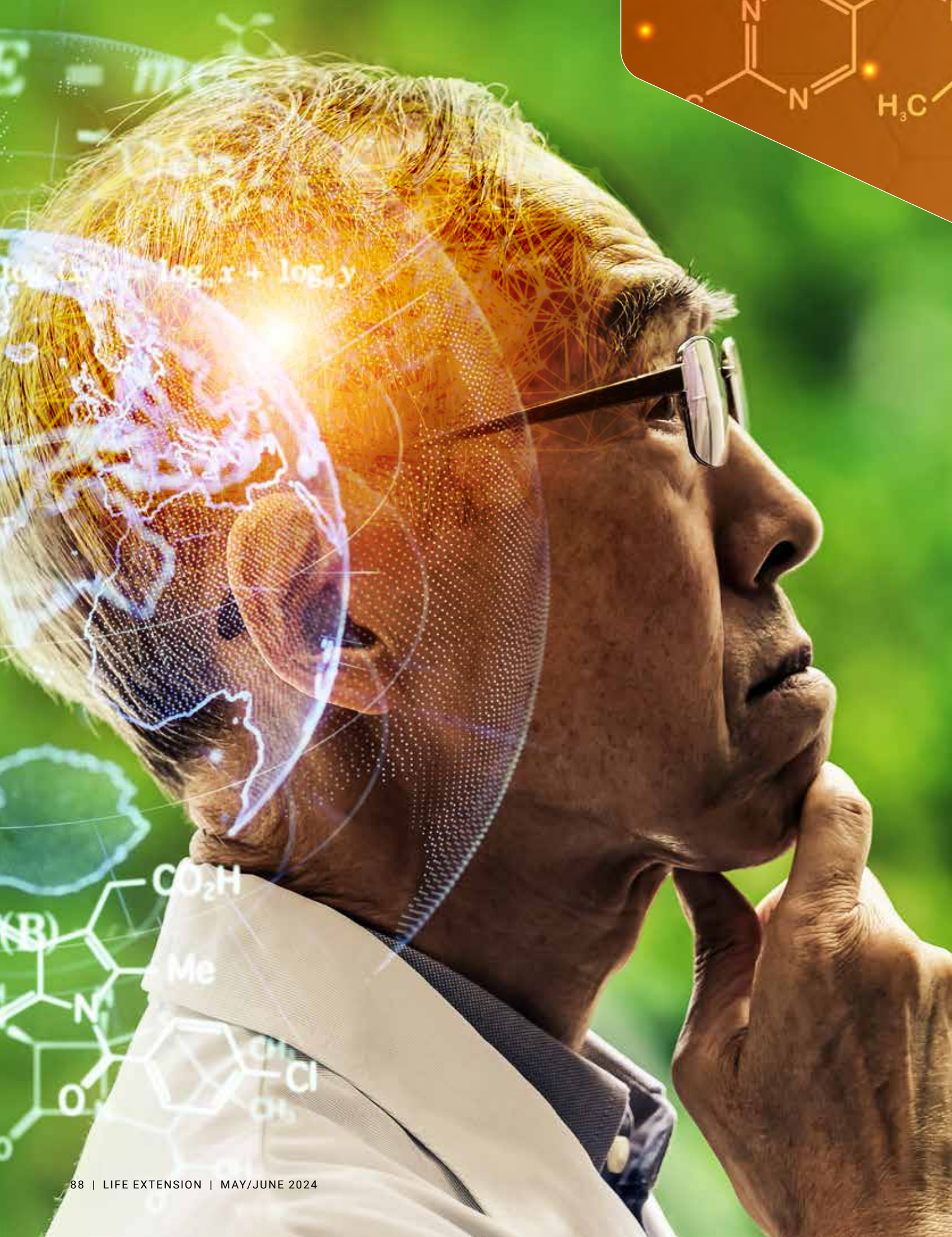
N
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BY WALTER REGENTS

Benfotiamine's Effects on Measures of BRAIN AGING

Many people know how damaging **high blood sugar** can be to the heart, nerves, and kidneys.

What most don't know is that it can be *especially* harmful to the brain.[1-4]

Metabolic disorders, including **insulin resistance** and **high blood glucose**, are major risk factors for the deterioration of **brain function** and development of **dementia**.[1,5-8]

Scientists have found that a compound called **benfotiamine** (fat-soluble form of vitamin B1) can not only help against the destructive effect of high blood sugar and metabolic disease but also help slow **neurodegeneration**.[9-11]

Human studies show that benfotiamine intake can slow the progression of **Alzheimer's disease** and boost **cognitive function**.[12,13]

In one **clinical study**, individuals with mild cognitive impairment or early Alzheimer's disease who took **benfotiamine** experienced **77% *less decline*** in their clinical dementia rating over a year than those receiving a **placebo**.[12]

Metabolic Abnormalities Harm the Brain

Advanced glycation end products are toxic compounds formed when the body's proteins, fats, and nucleic acids irreversibly bind with sugars.

They can potentially impact several aspects of health, including blood sugar levels that can provoke and worsen diabetes, cardiovascular, and neurodegenerative diseases.[14] Glycation happens in normal individuals but in diabetics the process is *accelerated*.[15]

Not only does glycation damage brain structures, but accumulation of advanced glycation end products **(AGEs)** in the brain is a mechanism that has linked diabetes to cognitive impairment.[1,16,17]

The link between metabolic disease and brain disease is so close, doctors often refer to Alzheimer's disease as **type III diabetes**.[1] Individuals with **diabetes**, for example, have ***double the risk of developing dementia***.[18,19]

The *higher* the blood glucose levels, the *higher* the risk. But diabetics are not the only ones in danger.

Alarmingly, even *slight elevations* in glucose increase the risk of **cognitive decline**.[5,20-22] Individuals with **prediabetes** have an **18%** greater chance of developing dementia than those with normal glucose.[5]

Thiamine and Healthy Brain Function

Thiamine is an essential nutrient also known as **vitamin B1**. It is required for cellular metabolism.[9-11]

Thiamine is particularly crucial in the **brain**, where it is neuroprotective and helps mitigate glycation and AGE-related tissue damage.[9,23]

Without adequate thiamine, the brain's metabolism is compromised, and the damage done by glycation is accelerated. Studies have found that thiamine function is significantly *diminished* in those with neurodegenerative disorders such as **Alzheimer's** and **Parkinson's** disease.[9,10,24]

Benfotiamine is a **fat-soluble** form of thiamine that is far *more* **bioavailable** than regular thiamine and provides additional mechanisms of brain protection.[10]

Brain Benefits of Benfotiamine

Benfotiamine is converted into **thiamine** in the body. Oral intake of benfotiamine has been shown to rapidly restore body levels of thiamine.[9-11]

But benfotiamine isn't *just* a more **bioavailable** thiamine. It has been shown to offer benefits to **brain health** that are not seen with thiamine alone.[9,10]

Animal models of neurodegenerative disease have found that benfotiamine helps prevent **brain damage** and improve **cognitive function**.[9-11,25-27]

It does this in multiple ways, including by:

- **Restoring thiamine levels**. Benfotiamine converts into thiamine, which ensures that there is enough available for thiamine-dependent enzymes to function optimally.[10]
- **Anti-glycation activity**. Glycation in the brain diminishes the function of vital proteins, contributing to disease. Benfotiamine is a potent anti-glycation nutrient.[10-12,23]
- **Anti-inflammatory activity**. Oxidative stress and chronic inflammation in the brain accompany metabolic disease and cognitive dysfunction. Benfotiamine shields the brain from both of these threats.[9-11]
- **Improving metabolic health**. Excess activity of the enzyme GSK-3 (glycogen synthase kinase-3) has been implicated as a potential target in insulin resistance and metabolic abnormalities in the brain.[28,29] Preclinical studies suggest benfotiamine reduces GSK-3 activity, which could help protect brain function.[9-11,25]

Human Studies of Benfotiamine

The neuroprotective properties of **benfotiamine** have been demonstrated in studies of adults with early cognitive impairment or Alzheimer's disease.[12,13]

In one **placebo-controlled trial study**, individuals with a diagnosis of mild cognitive impairment or early Alzheimer's disease were randomized to receive either **300 mg** of **benfotiamine** twice daily for a year or a **placebo**. Patients were assessed on the *Alzheimer's Disease Assessment Scale-Cognitive Subscale* and *Clinical Dementia Rating score*.[12]

Those in the **benfotiamine** group experienced better preservation of **cognitive function** as well as a **77%** ***less decline*** in the Clinical Dementia Rating Scale than those receiving the **placebo**.

The Alzheimer's Disease Assessment Scale-Cognitive Subscale score was **43%** lower in the **benfotiamine** group as compared to placebo.[12] (Lower by this measure means improved cognitive function.)

WHAT YOU NEED TO KNOW

In addition, while **glycation** increased by almost **10%** in the **placebo** group, it *decreased* by more than **5%** in those receiving **benfotiamine**.[12]

An earlier pilot study recruited five patients with mild-to-moderate Alzheimer's disease, assessing their cognitive status at baseline with the Mini Mental Status Examination **(MMSE)**.

Prior to treatment, participants also underwent brain scans to detect the toxic protein ***beta-amyloid***, and its presence was confirmed in all of them. Study participants received **300 mg** of **benfotiamine** per day over the course of 18 months.[13]

At the end of the study period, they retook the **MMSE** and underwent another **PET** scan to see if the benfotiamine supplementation led to any improvements. The results were impressive. Four out of five patients demonstrated **cognitive improvement** on the **MMSE**. Over that time, the five subjects *improved* by an average of **3.2 points** on the **Mini-Mental State Exam (MMSE)**, a common screening tool for cognitive impairment.[13]

Even a one-point change in **MMSE** is considered meaningful, though the usual expected change is a decrease.[30] That makes this 3.2 point average improvement not only highly clinically meaningful but also remarkable.

These studies indicate that benfotiamine can slow cognitive deterioration and even improve cognitive function in those with early signs of dementia.

Guard Against Cognitive Decline

- Elevated blood sugar and the resulting toxic glycation increase the risk for **cognitive decline** and **dementia**. Even slightly elevated blood glucose significantly increases the risk of dementia.
- **Thiamine** is a vitamin that is crucial for energy metabolism in cells.
- While thiamine absorption is limited, its precursor **benfotiamine** has superior bioavailability and rapidly increases thiamine levels in the body.
- **Benfotiamine** improves brain cell metabolism, fights harmful glycation, and defends against cognitive decline in multiple other ways.
- In **human studies**, benfotiamine slows the progression of, or even reverses, cognitive decline in those with early signs of dementia.

Summary

Elevated blood sugar and toxic glycation contribute to decline in cognitive function and risk for dementia.

Thiamine is a vitamin that is crucial to normal metabolism in the brain. The thiamine precursor **benfotiamine** protects the brain against damage done by metabolic disease and high blood sugar.

Human studies of benfotiamine have demonstrated its ability to **slow** or **reverse cognitive decline** in individuals with early dementia. •

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