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FEATURE ARTICLES

- 7 Simple Strategy to Delay Aging
- 22 Astaxanthin and Brain Function
- 32 New Approach to Intestinal Health
- 44 Vitamin D Combats Depression
- 56 Benefits of Blueberries
- 63 Metformin Slows Aging in Primates
- 69 Parkinson's Reversal Protocol

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REPORTS



A New Approach to Improve Intestinal Health

In individual **clinical trials**, a novel **postbiotic**, two **probiotics**, and four **phages** helped *alleviate* various aspects of **gastrointestinal discomforts**.

22 ASTAXANTHIN AND YOUR BRAIN

Clinical data show that taking **astaxanthin** significantly *improved* **cognitive function, memory, and learning**. In other studies, daily astaxanthin protected against neuronal cell death.

44 VITAMIN D REDUCES SYMPTOMS OF DEPRESSION

Clinical trials found that oral **vitamin D** may improve outcomes or reduce symptoms of **depression** and improve **brain connectivity**.

56 BENEFITS OF BLUEBERRY

Clinical results reveal that **blueberries** *improved* **cardiovascular** health, metabolic status, blood **sugar**, and brain function. Another **human** study found they may protect aging **bones**.

63 METFORMIN SLOWS AGING IN MONKEYS

For the first time in a primate model, **metformin** was found to improve markers of senescence across various body tissues, and regress **brain aging** by about 6 years compared to controls.



DEPARTMENTS

7 SIMPLE STRATEGY TO DELAY BIOLOGICAL AGING

A study in the journal *Nature Aging* showed that simple nutrient and lifestyle interventions slowed biological aging, even when started later in life.

15 IN THE NEWS

Pro-inflammatory foods increase frailty risk in older adults; mushroom extract slows prostate tumor growth; probiotic lowers gastrointestinal injury risk in cardiac bypass patients; vitamin K2 reduces vascular stiffness in postmenopausal women.

69 WELLNESS PROFILE

After her husband's **Parkinson's** diagnosis 14 years ago, **Jenny Enslein** became an active leader in the **Rock Steady Boxing program**. Research shows it substantially improves walking, balance, and fall risk.



73 SUPERFOODS

Garlic has antibacterial, antifungal, anti-aging, and anti-cancer properties that help boost the immune system and reduce the risk of diabetes, cardiovascular disease, and more.



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

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Simple Strategy to Delay Biological Aging



WILLIAM FALOON



An analysis of a trial in the journal ***Nature Aging*** shows how **aging** could be slowed by a simple **nutrient** and **lifestyle** intervention, even when that intervention is started late in life—in people averaging **75 years** old.¹

Researchers found that rather than aging processes continuing over the course of the three-year study, participants experienced a slowdown of **biological aging** (approximately 2.9–3.8 months) measured by DNA methylation clocks.

Advances in fields of biologics and cellular reprogramming may one day result in complete control of **degenerative aging**.

In the interim, cost-effective and accessible strategies exist **today** to slow biological aging processes.

Enlightened individuals may thus gain **additional life years**, during which time scientists are actively working to develop therapies to delay, halt or even reverse pathological processes.

I describe this study, published in ***Nature Aging*** (Feb 3, 2025) that further corroborates the value of consistent science-based **health maintenance**.



The following interventions were shown to slow estimated biological aging:¹

- 1) Strength training for **30 minutes—3x per week**
- 2) **Vitamin D3 (2,000 IU/day)**
- 3) **Omega-3 (1,000 mg/day)**

Subgroup analysis of the individual interventions revealed that **omega-3** supplementation had the overall *single* greatest effect on slowing biological aging. Combining all three interventions (vitamin D, omega-3s and home exercise program) had additive benefits for reducing the rate of biological age in one out of the four biological aging clocks.

Vitamin

D



What You
Need
To Know

Life Extension® Perspective

- Even greater benefits in reducing the rate of biological aging would likely have been achieved if the dosages of vitamin D3 and omega-3 were raised.
- The optimal blood level of **25-hydroxyvitamin D** is likely between **50-80 ng/mL**^{2,3} and an **omega-3 index score** ideally above **8%**.^{4,5} To achieve these ranges, **Life Extension** suggests regular blood testing, and supplementing with **5,000-8,000 IUs (125-200 mcg)** of vitamin D and **2,000-4,000 mg** of omega-3 daily.

Suboptimal Dosages in Nature Paper

Published studies consistently validate the critical importance of physical activity, vitamin D and omega-3 fatty acids.

Compelling research published in *Nature Aging* demonstrates the age-reduction value of combining these nutrients with exercise.

We commend the researchers for evaluating the benefits of these supplements and easy-to-follow exercise program.

It's important, however, to address one point of disagreement based on **Life Extension's** multi-decade review of tens of thousands of blood tests and consumer supplement programs.

Daily intake of **2,000 IUs** of vitamin D and **1,000 mg** of omega-3 is usually insufficient to achieve optimal blood status. Had the study participants received optimal doses, the impact on biological aging may have been more profound.

A daily intake of **2,000 IUs** of vitamin D3 typically yields a *25-hydroxyvitamin D* blood level of above **30 ng/mL**.^{13,14} While this dose is generally effective in preventing insufficiency, research shows that individuals may require *higher* doses to maintain optimal blood levels.

Research indicates that blood levels of at least **40 ng/mL** are necessary to reduce disease risks, while **Life Extension®** maintains that the ideal **blood level** range is **50-80 ng/mL**. For most people **5,000-8,000 IU's (125-200 mcg)** of daily supplemental vitamin D3 are required to achieve these levels.

Breakdown of the Nature Aging Study

When a groundbreaking study is published in the journal **Nature Aging**, the media often turns it into a headline news report.

On February 25, 2025, an analysis of a **randomized-controlled trial** of 777 people (average age 75 years) was published in **Nature Aging**. It garnered widespread attention.

In the trial, the elderly people were split into multiple groups to evaluate separately or all together a three-year intervention that consisted of strength training for 30 minutes 3x a week, and/or daily supplementation of **2,000 IU** of vitamin D3, and/or **1,000 mg** of omega-3 fatty acids.

The researchers assessed **biological ages** by evaluating "**epigenetic**" changes to their DNA.

Epigenetic age is an estimate that reflects biological aging and is associated with age-related disease and all-cause mortality. It is evaluated by changes in cellular **DNA methylation** patterns.⁶

Measures of **epigenetic age** are considered reliable indicators that help assess whether individuals are **aging** faster or slower than their chronological age.^{6,7} (You don't want to age "faster.")

Slower (younger) **epigenetic age** has been found among long-lived individuals.⁸

Older (worsening) epigenetic age has been associated with lower levels of **physical functioning** and declines in **cognitive functioning** even among long-lived individuals.⁹⁻¹¹

In this *Nature Aging*-published study, researchers measured biological age by **four** different validated epigenetic "clocks" or tests.¹

After three years, instead of **aging** at the expected rate, the group that underwent the **strength training** routine and supplemented with **vitamin D3 + omega-3** showed a trend towards slowed biological aging, in three of the four aging "clocks."

Particularly interesting were some of the results from analysis using the PhenoAge clock, in which the combination of omega-3s plus exercise, and the combination of omegas, vitamin D, and exercise, *significantly slowed* biological aging.¹

PhenoAge is a second-generation biological age estimator designed to predict various aging-related outcomes, including all-cause mortality, cancer, Alzheimer's disease, and overall lifespan.¹²

When tested in isolation or in different combinations with the other interventions, it was revealed that **omega-3** supplementation was the most responsible for reducing the rate of biological aging,¹ highlighting its potential role in promoting longevity at the molecular level.



In a meta-analysis of **three randomized controlled trials** conducted in people with prediabetes, achieving a blood level of 25-hydroxyvitamin D of at least **50 ng/mL** reduced the risk of diabetes over the next three years by **18%** compared to those with levels of **20-29 ng/mL**.¹⁵

This is critical because, in 2021 alone, diabetes directly caused 1.6 million deaths—and nearly half (**47%**) of those occurred before the age of 70.¹⁶ Optimizing vitamin D status could dramatically improve longevity and overall health.

In a study of **2,240 people** from the *Framingham Offspring Cohort* study, achieving an omega-3 index over **6.8%** resulted in **4.7 years** of additional **life expectancy** compared to those who had an omega-3 index under **4.2%**.¹⁷

A dose-response study showed that about **1,300 mg** of **EPA/DHA** daily is needed to raise an **omega-3 index** blood level from **4.2%** to **6.8%**.¹⁸ However, further benefits have been shown by raising the omega-3 index to around **8%**.³ Some experts/researchers believe that the desirable omega-3 blood range is between **8%-12%**.³

A higher **omega-3 index** correlates with lower **triglycerides**, reduced **blood pressure**, decreased **platelet aggregation**, and improved **heart rate stability**^{17,19}—all factors that significantly lower mortality risk.¹⁷

Life Extension® recommends supplementing with **2,000-4,000 mg** of omega-3 daily, depending on dietary intake. The best way to determine your ideal dose is through regular Omega-3 Index blood testing.

The takeaway is clear: while this latest research confirms the anti-aging potential of vitamin D3 and omega-3s, and moderate strength training, **higher** doses and additional forms of physical activity may be essential to unlocking their full life-extending benefits.

My Push to Push Yourselfs

From 2003 to 2016, data from over 30,000 U.S. adults from the **National Health and Nutrition Examination Survey (NHANES)** showed that sedentary behavior increased from approximately **5.5 to 6.4 hours**.²⁰

A more recent study of over 2,500 U.S. adults in 2019 indicated that people were spending an average of **9.5 hours** per day in sedentary behavior.²¹ A sedentary lifestyle—closely linked to rising rates of hypertension, heart failure, metabolic disorders and overall mortality^{22,23}—has contributed to an alarming increase in cardiovascular disease, mirroring the steady rise in sedentary behavior.^{22,23}

The scientific evidence is irrefutable—boosting physical activity reduces disease risk.^{24,25} and slows biological aging.^{26,27} Yet, despite these well-documented benefits, a staggering **80%** of Americans fail to meet even the most basic physical activity guidelines.²⁸

Health authorities agree on what's needed:²⁹

- Adults need to get at least **150-300 minutes** of moderate-intensity aerobic activity or **75-150 minutes** of vigorous-intensity aerobic activity per week, and
- **Muscle-strengthening** activities at least **two** or more days per week.



Physical activity alone has been shown repeatedly to lower the rate of biological aging.

A large study on about **2,435** people showed that walking **1,500** more steps or cutting **three sedentary** hours per day was associated with more than **10 months** lower **epigenetic age**, as measured by the methylation clock (GrimAge). In this study, every five extra minutes more per day of **moderate to vigorous physical activity** was associated with a slower rate of biological aging by **19-79 days**.³⁰

A 2025 predictive analysis that evaluated mortality data in the U.S. population from the National Center for Health Statistics determined that a remarkable amount of years of life could be gained from increased amounts of physical activity. Based on the findings the authors stated:

*"If all individuals were as active as the top **25%** of the population, Americans over the age of 40 could live an **extra 5.3 years** on average."³¹*

Stalling For More Time

As I write this, I am **70 years old**.

For those of us in this age bracket—or older—time is a critical factor. The scientific breakthroughs needed to fully halt, or reverse aging may not arrive soon enough unless we take proactive steps to extend our healthspans.

Fortunately, we have tools at our disposal right now. Strategic interventions, such as regular exercise and targeted nutrient supplementation (notably vitamin D3 and omega-3 fatty acids), have been shown to counteract key **aging mechanisms**. These include epigenetic alterations that elevate disease risk and mortality.

By implementing these measures, we may gain the additional years necessary to benefit from the next wave of longevity advancements—where aging itself can be systematically defeated.

Achieving **full-scale age reversal** will require a multi-pronged approach, addressing all facets of biological decline.

The most important step, however, is taking action today. Regardless of age, optimizing health now not only improves quality of life but also maximizes the chances of reaching the era where degenerative aging is rendered a relic of the past.

For longer life,



William Faloon, Co-Founder
Life Extension



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

* Studied against powder fisetin (98% purity).

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

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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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French maritime pine bark.

Its benefits are available in these three formulations:



1
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4 bottles \$29 each

Provides Pycnogenol® and standardized gotu kola leaf extract to help maintain endothelial structure and function and promote healthy blood flow throughout the body.



1
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***VenoFlow™‡**

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30 vegetarian capsules
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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®†

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

For full product descriptions and to order **PYCNOGENOL®**, **ARTERIAL PROTECT**, or **VENOFLOW™**, call 1-800-544-4440 or visit www.LifeExtension.com

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***CAUTION:** 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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In the News



Frailty Risk in Older Adults Increased by Pro-Inflammatory Diet

Regularly eating pro-inflammatory foods increases the likelihood of frailty in older adults, according to a study published in the *American Journal of Clinical Nutrition*.*

Based on the food frequency questionnaires of around 1,700 healthy adults from the Framingham Heart Study, researchers found that a pro-inflammatory diet was linked with an increased odds of frailty over a 12-year period. A one-point higher **DII score** (a score that assesses the impact of diet on inflammation status) was associated with **16%** greater odds of developing frailty over that time period.

The **25%** of participants who had the greatest consumption of *pro-inflammatory* foods were more than **twice** as likely to develop frailty, compared to the **25%** who had the greatest consumption of *anti-inflammatory* foods.

Editor's Note: "...dietary strategies to reduce pro-inflammatory foods (simple carbohydrates and high-fat foods) and increase anti-inflammatory foods (dietary fiber and dietary antioxidants) may have a significant role in prevention of frailty," the authors concluded.

* *Am J Clin Nutr.* 2021 Sep 24;nqab317.

White Button Mushrooms Slow Prostate Tumor Growth

According to a report published in *Clinical and Translational Medicine*, research findings suggest a benefit of white button mushrooms in both animal and human models of prostate cancer.*

Researchers studied the effects of white button mushrooms in mouse models of prostate cancer and in men under active surveillance for the disease who participated in a clinical trial.

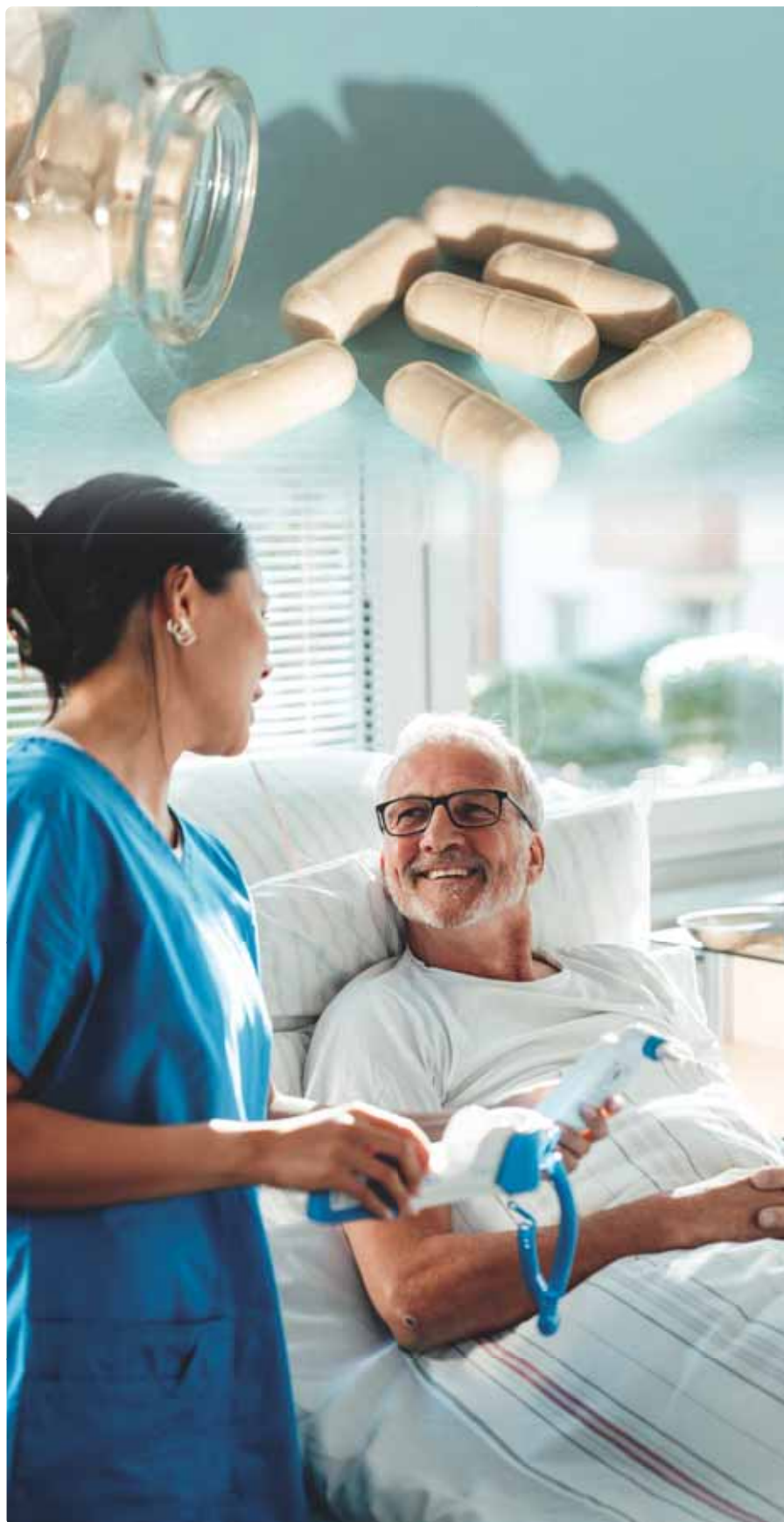
In mice, the consumption of white button mushroom powder suppressed tumor growth and decreased the number and function of myeloid-derived suppressor cells, which are associated with cancer development and spread. This reduction led to an increase in T cell and natural killer cell anti-tumor immune responses.

Among men, blood samples collected from eight participants at the beginning of the trial and at three months after white button mushroom supplementation revealed similar findings.

Editor's Note: White button mushroom powder enhanced the efficacy of immune checkpoint inhibitors in mouse models of prostate cancer, thereby suggesting its potential adjuvant role in immunotherapy regimens for prostate cancer.

* *Clin Transl Med.* 2024 Oct;14(10):e70048.





Probiotic Reduces Gastrointestinal Injury Risk in Cardiac Bypass Patients

Supplementing with probiotics prior to heart valve replacement with cardiopulmonary bypass can help reduce the risk of acute gastrointestinal injury, according to a randomized, double-blind, placebo-controlled trial published in *BMC Medicine*.*

For the study, 52 people were assigned to receive either a multi-strain probiotic or a placebo daily for seven days prior to surgery.

During a 30-day follow-up period, **42%** of the placebo group developed acute gastrointestinal injury, compared to **15%** in the probiotic group, an absolute risk reduction of **27%**.

Editor's note: The probiotic group also had a lower incidence of developing an infection in the hospital (**12%** vs. **35%**), and a one-day shorter average hospital stay (five vs. six days).

* *BMC Med.* 2025 Apr 23;23(1):238.

Vitamin K2 Reduces Blood Vessel Stiffness in Postmenopausal Women

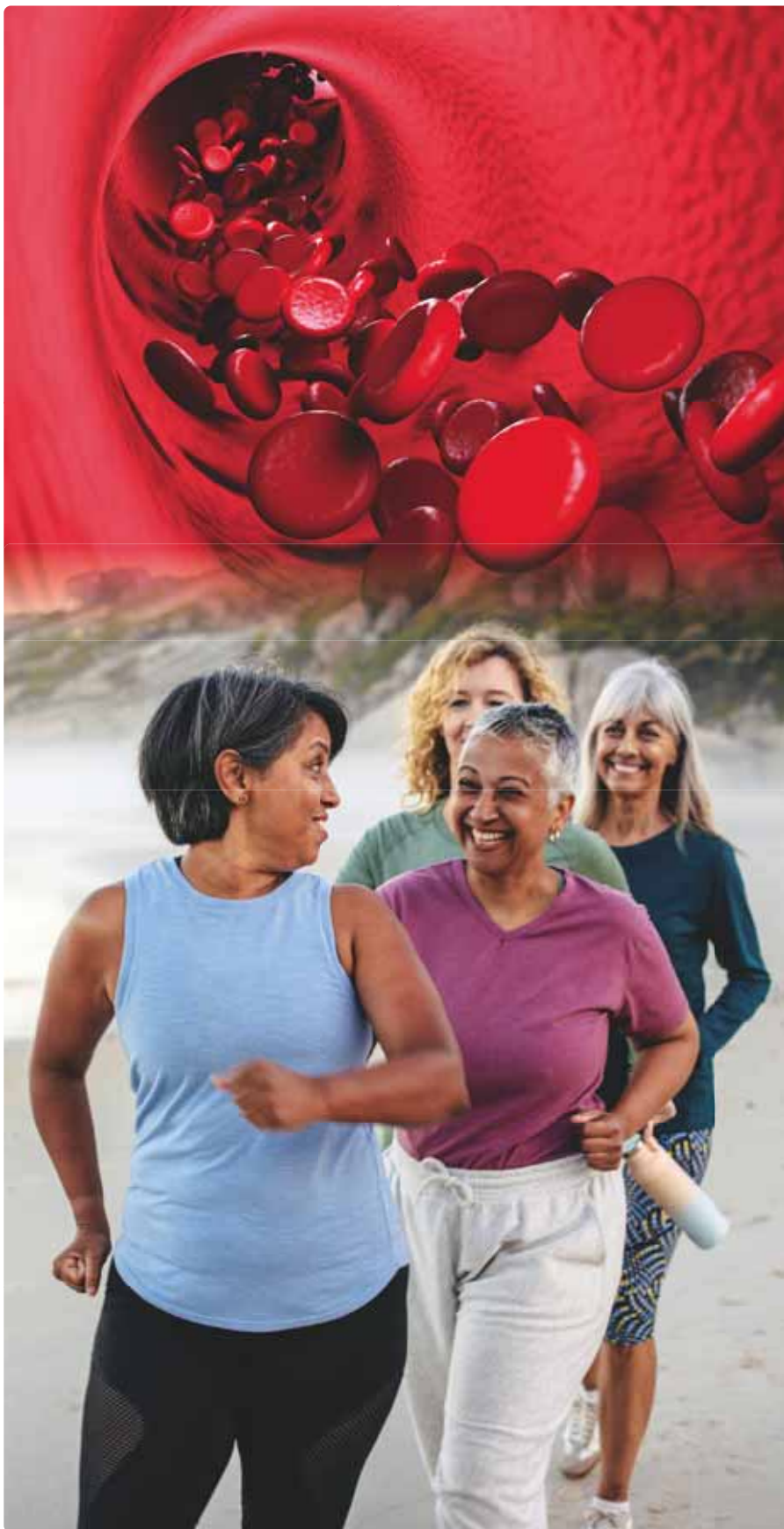
A study that included women with low vitamin K status found less blood vessel stiffness among those who were postmenopausal and who received menaquinone-7 (MK-7), a form of vitamin K2.*

The study analyzed 165 premenopausal, perimenopausal, and postmenopausal women with low vitamin K status who had participated in a previous trial, and about half received **180 mcg** MK-7 or a placebo for one year.

Women who received MK-7 showed improved vitamin K status at the end of one year. Among postmenopausal women, who had worse vascular factors at the beginning of the study than premenopausal and perimenopausal women, vascular stiffness was significantly reduced in the group that received MK-7 compared with the placebo.

Editor's Note: The women were subsequently evaluated according to whether they had high or low vascular stiffness at the beginning of the study. Postmenopausal women with a high stiffness index who received MK-7 had improved blood vessel markers, including lower arterial systolic blood pressure and improved indicators of blood vessel elasticity at the end of the trial.

* *Nutrients*. 2025 Feb 27;17(5):815.



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Super Ubiquinol provides a highly *absorbable* form of **CoQ10** to promote **heart health** and youthful cellular energy production.

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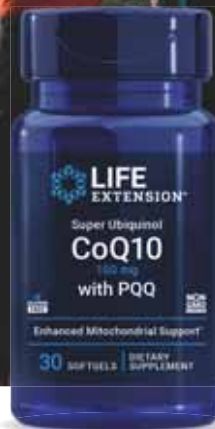
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general fatigue fighter

100 mg ubiquinol + 10 mg PQQ
30 softgels
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Item #01431

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dose ubiquinol

200 mg • 30 softgels
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*Ratings based on results of the 2024 ConsumerLab.com Survey of Supplement Users.

More information at www.consumerlab.com/survey.



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"Excellent product."

Ingrid

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REVIEW

For those who find themselves sitting for long periods of time at the office, in daily commutes, or when traveling by plane, the proprietary blend of nutrients in **Veno-Flow™** promotes healthy venous blood flow.

Just one capsule of **Veno-Flow™** provides **nattokinase** (providing 2,000 fibrinolytic units) and **procyanidins** derived from French maritime pine bark (Pycnogenol®).

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30 vegetarian capsules

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4 bottles \$37 each



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

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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Restore Youthful Cellular Energy with PQQ

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

PQQ helps support mitochondrial health, which produces cellular energy.¹⁻⁴

Studies show PQQ supports heart health and cognitive function, complementing CoQ10.⁵⁻⁸

PQQ helps protect against oxidative stress and encourages whole-body health.⁹



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For full product description and to order PQQ or any other PQQ-containing formulas, call 1-800-544-4440 or visit www.LifeExtension.com

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Astaxanthin and Your BRAIN

BY BRIAN THOMPSON

Vegetable **carotenoids** are known to provide systemic benefits, including helping to maintain ocular and cardiovascular functions.¹

But one carotenoid has a unique structure that sets it apart: **astaxanthin**.

Preclinical data has shown that astaxanthin can promote **brain health**.²⁻⁴

Clinical research suggests that astaxanthin's **neuroprotective** properties may help reduce **dementia** risk factors.⁴⁻⁶

In human studies, taking astaxanthin daily led to significant improvements in cognition, including tests of **memory** and **learning**.^{4,7}

What Is Astaxanthin?

Astaxanthin is a red pigment in the **carotenoid** family, which also includes lutein, zeaxanthin, and lycopene.⁸

It is produced by **microalgae** and **phytoplankton** in the ocean.⁸

The pinkish-red color of shrimp, lobsters, crabs, and salmon is due to their astaxanthin-rich diet. Even pink flamingos' color comes from the astaxanthin in the crustaceans they eat.⁸

As evidence mounts about its multiple biological properties, it is being included in more nutritional regimens designed to counteract degenerative aging processes.

What Makes Astaxanthin Unique?

Astaxanthin's unique structure makes it **one of the most powerful antioxidants known**.⁹

Its exceptional structure allows it to **penetrate** deep within **cell membranes**. It blends well with cell membrane fats and remains **stable** in its form. This makes astaxanthin highly effective at neutralizing harmful free radicals.⁹

Oxidative damage to cell membranes is a driver of many degenerative disorders including the development of **Alzheimer's**.¹⁰

Protecting the Brain

Myelin is a protective covering on **nerve fibers** that helps brain signals to be properly transmitted. Damage to the myelin sheath is related to neurodegenerative diseases.¹¹

Astaxanthin's ability to wedge itself into these cell membranes provides strong protection against myelin damage. *Few other antioxidants* defend cell membranes in this particular way.

Preclinical studies have shown that astaxanthin has potent **anti-inflammatory** and **neuroprotective** properties that may contribute to protection against brain-related disorders,¹² as well as potential brain benefits including adult neurogenesis (formation of new brain cells).¹³

In preclinical studies, it has even helped prevent the accumulation of **beta-amyloid plaques**. These abnormalities in the brain are associated with the development of Alzheimer's.^{2,14,15}

Preclinical studies suggest that astaxanthin may offer neuroprotective benefits, as it can cross the blood-brain barrier when taken orally—an ability that sets it apart from many other compounds.¹³

Diverse Brain Benefits

Astaxanthin has been studied in many cell and animal models of neurological conditions.

In mouse models of **Alzheimer's disease**, astaxanthin *prevented* accumulation of toxic **beta-amyloid** and **tau** proteins in the brain and *reduced* inflammation and oxidative stress. These effects led to improvements in **cognitive function**.^{14,15}

In mouse models of **vascular dementia**, a common form of dementia that occurs due to reduced blood supply to the brain, astaxanthin *prevented neuron cell death*, resulting in improved cognitive function and motor behavior.^{16,17}

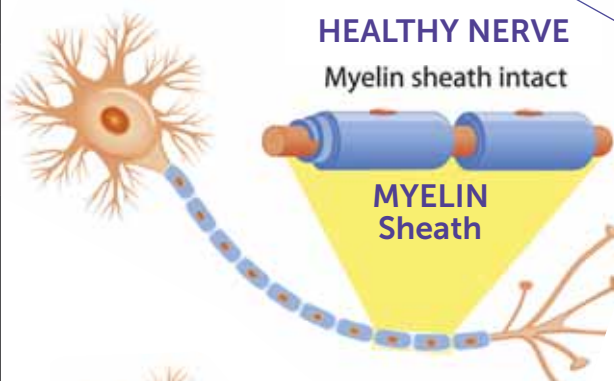
Astaxanthin also could protect against general **brain aging**. A model of accelerated aging in mice typically leads to rapid cognitive decline and neurodegenerative disease. Astaxanthin intake significantly *delayed* brain aging and decline in brain function.¹⁸

Brain Neurons



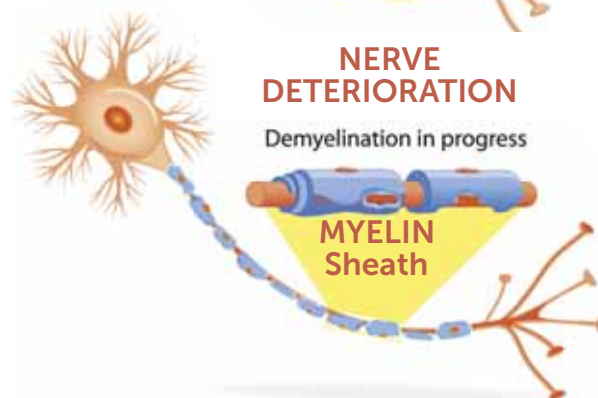
HEALTHY NERVE

Myelin sheath intact



NERVE DETERIORATION

Demyelination in progress



ASTAXANTHIN


 What You
Need
To Know

Support Cognitive Function

- **Astaxanthin** is a red-pigmented carotenoid and powerful antioxidant formed primarily in microalgae.
- Its ability to cross the blood-brain barrier and to be inserted into cellular membranes makes it particularly beneficial in the brain, where it can protect against **oxidative damage**.
- Preclinical studies show that astaxanthin defends **brain health** and protects against loss of cognitive function.
- Human trials of astaxanthin show that it can boost **cognitive function** and reduce markers of dementia.

Researchers found that some of this anti-aging effect could be attributed to enhanced **autophagy** in the brain,¹⁸ “cellular housekeeping” that rejuvenates cells and helps maintain healthy function.

Preclinical studies have shown that **astaxanthin** benefits the **brain** in a wide range of additional ways, including by:⁴

- Improving blood flow,
- Reducing neuroinflammation,
- Increasing brain antioxidant capacity,
- Improving mitochondrial function,
- Preventing brain cell death, and
- Inhibiting abnormal protein accumulation.

Insights from Human Studies

Human studies of astaxanthin have demonstrated protective potential.

One study showed that astaxanthin lowered levels of oxidative stress in the form of **phospholipid hydroperoxides**. These compounds reach abnormal concentrations in the red blood cells of dementia patients. Taking astaxanthin reduced levels of these hydroperoxides in the red blood cells of middle-aged and **elderly adults** compared to placebo.¹⁹



A **clinical trial** in adults has shown that taking astaxanthin significantly improves **cognitive function** after eight weeks of supplementation.²⁰

Other aspects of health have also been explored in separate clinical trials. In one study, a daily dose of **12 mg** of astaxanthin was shown to reduce **fatigue**²¹ while another trial reported improvements in mood, including reductions in depression.²²

Astaxanthin is emerging as a valuable nutrient to promote optimal brain health into older age.

Summary

Astaxanthin is a carotenoid produced by certain microalgae. The body inserts it into **cellular membranes**, where it protects against oxidation.

In animal and cell studies, astaxanthin exhibits neuroprotective activity that may guard against neurodegenerative disease, including **Alzheimer's disease**.

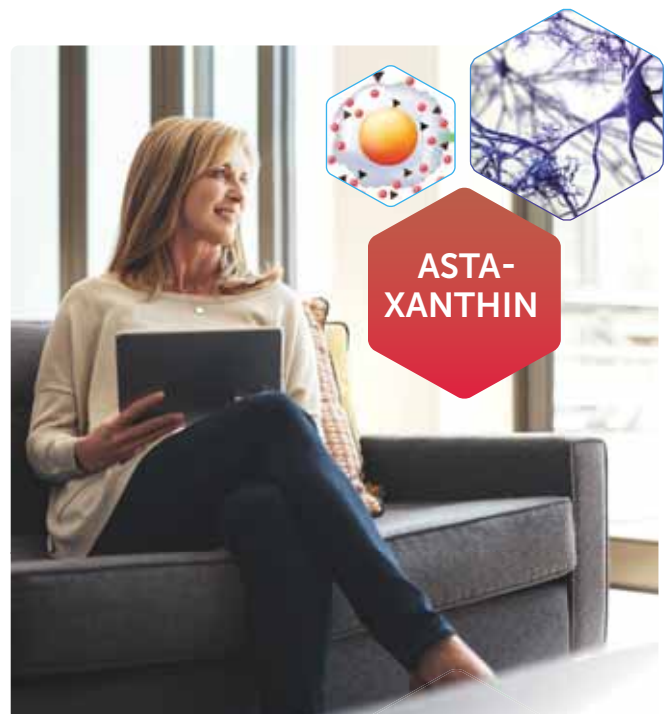
Human trials show astaxanthin can boost **cognitive function** and reduce markers of dementia. ■

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

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1
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Super K*

Vitamin K1 2,000 mcg
Vitamin K2 (MK-4) 1,000 mcg
Vitamin K2 (trans MK-7) 180 mcg

Item #02334 • 90 softgels

1 bottle **\$24**

4 bottles \$22 each



Low Dose Vitamin K2*

45 mcg

Item #01936 • 90 softgels

1 bottle **\$13.50**

4 bottles \$12 each



Mega Vitamin K2*

45 mg

Item #02417 • 30 capsules

1 bottle **\$28.50**

4 bottles \$26 each



Strong bones and a healthy heart are two 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**.

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.

For full product description and to order **Vitamin K**, call **1-800-544-4440** or visit **[www. LifeExtension.com](http://www.LifeExtension.com)**

* **CAUTION:** If you are taking a vitamin K antagonist (e.g. warfarin), consult your healthcare practitioner before taking a vitamin K supplement. MenaQ7® is a registered trademark of Lesaffre et Compagnie, France.

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Healthy Aging Amino Acid

NEW 25 mg Dose!

L-ergothioneine an amino acid found in **mushrooms** is delivered directly to our cells and mitochondria

Mega L-Ergothioneine provides a powerful dose of highly bioavailable¹ **L-ergothioneine** and may support healthy aging by:

- Promoting plasma ergothioneine levels¹
- Providing sustained ergothioneine levels¹ with **high bioavailability** and efficient absorption
- Supporting overall well-being²
- Offering cellular protection against oxidative stress^{1,3}

Just one daily vegetarian capsule of **Mega L-Ergothioneine** provides a full **25 mg** of **L-ergothioneine**.

This new strength provides **25 mg** of **L-ergothioneine** per capsule, which is equivalent to the amount found in approximately **10 to 23** cups of white button mushrooms.³⁻⁵



Item #02540
30 vegetarian capsules
1 bottle **\$28.50**
4 bottles \$26 each

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

ErgoActive® is a registered mark of Blue California.

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2. *Food Chem*. 2017 Oct 15;233:429-433.

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4. *FEBS Lett*. 2018 Oct;592(20):3357-66.

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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.

STAY STRONG STAY YOUNG

"It definitely makes
a difference."

Joseph

VERIFIED CUSTOMER
REVIEW

Promote Healthy
Muscle Strength
at any Age

Muscle Strength & Restore Formula provides ingredients that can enhance **muscle strength** while helping reduce loss of muscle mass that occurs with normal aging. It contains:

- **HMB** (Beta-hydroxy beta-methylbutyrate): increases and preserves muscle mass in adults of all ages.
- **Vitamin D3 • 25 mcg** (1,000 IU): supports muscle strength and performance.

Mix one scoop with approximately **8 oz.** of cold water or other beverage, preferably a protein shake, and drink once daily or as recommended by a health practitioner.

CAUTION: Individuals consuming more than 50 mcg (2000 IU)/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 10000 IU per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

Uses of CaHMB and Vitamin D are licensed under U.S. Patent Nos. 8,815,280, 9,259,430, 9,539,224 and 9,707,241.



Item #02221

About 30 servings

94.2 g (3.32 oz) Container

1 container **\$24.75**

4 containers \$22.50 each



For full product description and to order
Wellness Code® Muscle Strength & Restore Formula,
call 1-800-544-4440 or visit www.LifeExtension.com

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SAY

HELLO

TO AN EVEN FLOW!



Ultra Prostate Formula is designed to address the essential factors of prostate health! Packed with a dozen scientifically-studied ingredients, it supports your flow and helps promote prostate health.

Item #02029

60 softgels

1 bottle **\$29.25**

4 bottles \$27 each



For full product description and to order **Ultra Prostate Formula**,
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HIGHLY ABSORBABLE ASTAXANTHIN

Supports Whole-Body Health

ASTAXANTHIN is a carotenoid that benefits the eyes, immune system and cognitive functions. Research suggests that astaxanthin can play a role in promoting cardiovascular health.¹⁻⁴

Found naturally in seafood and algae, as little as **50%** of **astaxanthin** is normally **absorbed** in the blood-stream.⁵

Life Extension combines **4 mg** of **astaxanthin** with a blend of four different **phospholipids**, which has been shown to enhance carotenoid **absorption**.⁵

References

1. *J Trad Med.* 2002;19(5):170-173.
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3. *Molecular.* 2012 Feb;17:2030-2048.
4. *Nutrients.* 2024;16:826.
5. *Eur J Pharm Sci.* 2003 Jul;19(4):299-304.

For full product description and to order **ASTAXANTHIN 4 mg with Phospholipids**, call **1-800-544-4440** or visit **www.LifeExtension.com**



Item #01923
30 softgels
1 bottle **\$12**
4 bottles \$10.50 each



"I love this supplement for all benefits that it gives you."

Maria

VERIFIED CUSTOMER
REVIEW

A close-up photograph of a person's midsection. They are wearing a white t-shirt under a blue denim shirt. Their hands are placed on their hips. Overlaid on the white t-shirt is a faint, stylized graphic of a microbiome, showing various blue and purple shapes representing bacteria.

A Triple Approach to Improved INTESTINAL HEALTH





BY MICHAEL DOWNEY

The impact of the **microbiome** on gut health is well established.

An imbalance, marked by an increase in **harmful** gut microbes, can lead to gastrointestinal **discomfort**, including abdominal **pain**, **diarrhea**, and **bloating**.^{1,2}

Probiotics are a well-established way to introduce beneficial gut bacteria.³

Some probiotics, however, struggle to compete with aggressive microbes.

An improved approach involves adding **bacteriophages** or **phages**, selected to safely target and eliminate *specific harmful bacteria*, allowing **beneficial microbes** to flourish.^{4,5}

As a new way to improve the **microbiome**, researchers have focused on **postbiotics** which, in specific cases and strains, may offer comparable benefits to probiotics along with improved stability.^{6,7}

In a recent **human** study, one specific **postbiotic** significantly reduced **abdominal pain** in an astonishing **88%** of subjects and reduced days with **diarrhea** by **65%**.⁸

Scientists have developed a unique combination of two **probiotics**, four **phages**, and a novel **postbiotic**, all shown to alleviate gastrointestinal discomfort and promote digestive health in individual clinical studies.

Dysbiosis and Intestinal Health

Many people have **dysbiosis**, a microbiome imbalance that can contribute to **stomach distress**. This condition tends to worsen with age.⁹

A survey of 71,000 people found that over **60%** of Americans suffer from one or more **gastrointestinal symptoms** weekly, including:¹⁰

- Abdominal **pain**,
- Abdominal **bloating**,
- **Diarrhea**, and
- **Constipation**.

Microbiome imbalance is also linked to **irritable bowel syndrome**,¹² colon infections,^{11,12} autoimmune disease,^{13,14} allergies,^{14,15} and obesity.^{12,14,15}

Improving the microbiome by shifting it away from dysbiosis and towards a healthy profile can reduce **gastrointestinal symptoms and disease risk**.^{11,12,16}

Probiotics Restore Beneficial Bacteria

Probiotics are live bacteria that can improve the microbiome.

In preclinical studies, two strains of ***Lactobacillus probiotics***, ***L. paracasei* IMC502** and ***L. rhamnosus* IMC501**, provide antimicrobial effects against:^{17,18}

- **Candida**, a fungus that can cause health issues when it overgrows,
- ***S. aureus***, a bacterium that triggers diarrhea and abdominal cramps, and
- ***E. coli***, a common cause of diarrhea and other digestive problems.

In two randomized **clinical trials**, a blend of these probiotic strains was shown to improve intestinal regularity and **bowel habits**.^{19,20}

The gut is a complex place, and offering probiotics for extra support could be key to dealing with the more aggressive microbes that create dysbiosis in the first place.

A more comprehensive approach involves using probiotics *with* another therapy, one that **selectively targets** and reduces the dangerous bacteria taking over the microbiome.²¹

This is where **phages** come into play.

Phages Support Probiotics

The word **bacteriophage** (phage for short) means “bacteria eater.”

Phages are tiny packages of DNA or RNA, enclosed in a protein envelope, that actively seek out and kill specific bacteria—and *only* those bacteria.

Different phage strains target different bacteria. They pose no harm to any other life form, including humans.

By selectively destroying potentially harmful bacteria, **phages** may allow **probiotics** to more effectively restore *beneficial* bacteria.²² This may help return the microbiome to a healthy state.²¹

Scientists identified **four phages** that help decrease intestinal populations of undesirable bacteria. They are:²³

- **LH01-Myoviridae**,
- **LL5-Siphoviridae**,
- **T4D-Myoviridae**, and
- **LL12-Myoviridae**.





What You
Need
To Know

A Blend for Digestive Health

- Harmful microbes have been associated with **gastrointestinal symptoms** like diarrhea, bloating, and stomach pain.
- The probiotics ***L. paracasei* IMC502** and ***L. rhamnosus* IMC501** reduced harmful bacteria in preclinical studies, while demonstrating improved bowel habits in clinical trials.
- Adding bacteria-killing **phages** may enhance probiotics' effectiveness and restore a more balanced microbiome.
- In a clinical study, the heat-treated **postbiotic *B. longum* ES1** improved symptoms in adults with irritable bowel syndrome, reducing abdominal pain in **88%** of subjects and reducing days with diarrhea by **65%**.
- Researchers have combined this **postbiotic** with two **probiotics** and four **phages**, all shown in separate clinical trials to be effective against gastrointestinal symptoms, for optimal digestive health.

In a randomized clinical trial of 32 healthy adults with self-reported gastrointestinal issues, after 28 days, participants who took a **blend** of these phages, compared to a placebo, had:²³

- Increases in **beneficial bacteria** in the gut,
- Decreases in harmful ***E. coli*** bacteria, and
- Decreases in interleukin-4, a marker of **inflammation**, compared to baseline.

Postbiotics Deliver Superior Benefits

Probiotics are live microorganisms.

Postbiotics are their non-living versions that may contain intact inanimate cells, or their components or metabolites.

Postbiotics are deactivated, usually by **heat treatment**. However, in specific strains, they can confer benefits similar to their live *probiotic* counterparts: modulating the microbiome, promoting gut barrier function, and regulating inflammation.^{6,7}

Postbiotics offer key advantages over probiotics, such as easier standardization, and suitability for vulnerable groups. Unlike probiotics, they do not require live cultures to be effective, eliminating storage and stability concerns.^{7,24}

Scientists identified a specific **postbiotic** strain, heat-treated ***Bifidobacterium longum* ES1**, that improves **gastrointestinal** symptoms.

To evaluate this postbiotic, researchers conducted a **randomized, double-blind, placebo-controlled** trial involving 200 adults with moderate to severe diarrhea-predominant IBS. Participants were randomly assigned to one of three groups:

- Live ***B. longum* ES1** (*probiotic*),
- Heat-treated ***B. longum* ES1** (*postbiotic*), or
- Placebo.

Participants who took **heat-treated *B. longum* ES1** daily for 84 days had remarkable improvements, including:⁸

- **Reduced symptom severity.** A remarkable **85%** of the **postbiotic** group had a significant reduction in IBS symptom severity. The mean severity decreased from “moderate-severe” to “mild,” and **17%** fell from “severe” to **symptom-free**.
- **Reduced stomach pain.** An extraordinary **88%** of postbiotic users had a reduction of over **30%** in **abdominal pain** severity.
- **Fewer days with diarrhea.** In the postbiotic group, days with loose or watery stools decreased **65%**, from **5.87** to **2.06** days weekly. Subjects reported more normal stool types, but *without* a shift towards constipation.
- **Improved quality of life.** Quality of life impacted by IBS improved by about **30%**, as measured by a questionnaire that assesses interference with activity, food avoidance, social reaction, sexual and relationship issues, and other areas.

Compared to *live* probiotics, **postbiotics** demonstrate greater stability and longer shelf life.⁸

Evidence from preclinical studies suggests that **heat-treated *B. longum* ES1** may deliver these benefits by enhancing immune modulation and gut barrier function.²⁵⁻²⁸

Researchers have combined two probiotics, four phages, and this powerful **postbiotic** into an innovative formula for improved gastrointestinal health.



Probiotics, Phages, and Postbiotics: What's the Difference?

- **Probiotics** are **live** beneficial microorganisms, such as certain bacteria and yeast. Different strains have different health benefits.³
- **Phages** (short for bacteriophages) are non-living packages of DNA or RNA, enclosed in a protein envelope, that target and kill specific bacteria. Different phage strains target different bacteria.^{4,5}
- **Postbiotics** are **non-living** (heat-treated) probiotics or their cellular components or metabolites that provide health benefits. Although not alive, these bioactive compounds still improve your gut's bacteria population and confer health benefits.^{6,7}

Summary

Probiotics help introduce beneficial gut bacteria, improving **gastrointestinal symptoms** and potentially reducing disease risk.

The effectiveness of probiotics may be enhanced by the addition of **phages**—targeted DNA or RNA packets that safely eliminate specific harmful bacteria.

Scientists are now boosting results even further by adding **postbiotics**, which are inactivated microbes or their cellular components or metabolites.

In a clinical trial, the postbiotic ***B. longum* ES1** reduced **abdominal pain** in **88%** of IBS patients and improved quality of life by **30%**.

Together, these ingredients can help reduce unpleasant gastrointestinal issues and promote digestive health. ■

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

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Tears of Joy

"I'm happy with it!"

Mary

VERIFIED CUSTOMER
REVIEW

**Tears are a good thing—
until you don't have enough.**

Maqui berries (*Aristotelia chilensis*) produce compounds called **delphinidins** that encourage tear production—an up to **45%** increase after 30 days in one study. So where can you get a Maqui Extract with delphinidin?
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- Promoted focus and attention, and
- Promoted working memory

PEPPERMINT OIL:³

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1. *J Ethnopharmacol.* 2020 Oct 5;260:112996.
2. *Nutrients.* 2020 Jul 23;12(8).
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1 bottle **\$21** • 4 bottles \$19 each

For full product description and to order **BRAIN FOG RELIEF** call 1-800-544-4440 or visit www.LifeExtension.com

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Pro-Resolving Mediators

Item #02223

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1. Gut Microbes. 2024 Jan-Dec;16(1):2338322. 2. Int J Food Sci Nutr. 2014 Dec;65(8):994-1002. 3. Lett Appl Microbiol. 2011 Jun;52(6):596-602.

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BY GERALD FELDEN

VITAMIN D

Reduces Symptoms of Depression

In recent years, a growing body of research has revealed a consistent pattern:

*Lower levels of **vitamin D** are strongly associated with an *increased* risk of developing symptoms of **depression**.*¹⁻⁴

This suggests that maintaining sufficient **vitamin D** levels may help reduce vulnerability to depression and perhaps other mood-related conditions.

Clinical trials have found that taking daily oral **vitamin D** may improve outcomes for people with mild to moderate **depression** and help **reduce** their **symptoms**.⁴⁻⁷

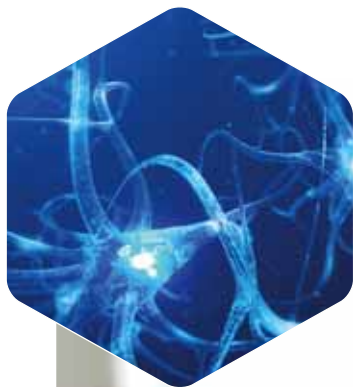


The Vitamin D-Depression Link

Depression is a mood disorder marked by persistent sadness, loss of interest in activities once enjoyed, and a range of emotional and physical symptoms. These may include changes in appetite or sleep, irritability, difficulty concentrating, fatigue, and feelings of guilt or worthlessness. When these symptoms persist and interfere with daily life, it's important to consult a health-care professional.^{8,9}

Depression is common.¹⁰ According to a **2023** national survey of U.S. adults, **29%**—nearly three in 10 adults—reported having been diagnosed with **depression** at some point in their lives.¹¹

Among the many contributing factors to depression, **vitamin D deficiency** stands out as both common and modifiable. Studies have found that individuals with depression often have notably lower levels of vitamin D.^{2,3,12,13}



Interestingly, symptoms of depression tend to rise during the winter months—when sunlight exposure, and therefore vitamin D synthesis, is at its lowest. This seasonal trend has been observed in both major depressive disorder and **seasonal affective disorder (SAD)**, further highlighting the potential role of vitamin D in mood regulation.¹⁴⁻¹⁶

How Vitamin D Affects Mood

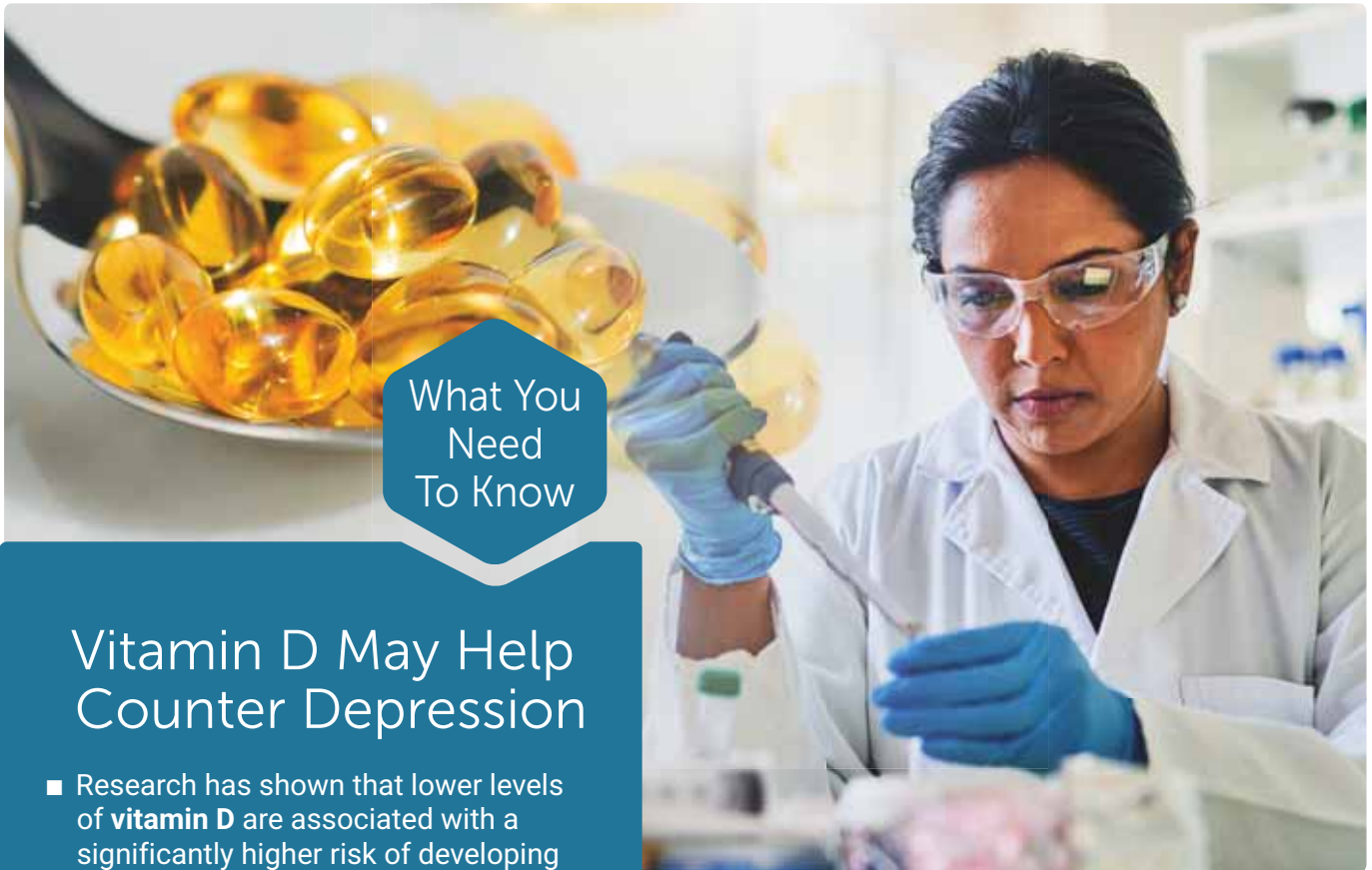
The human brain has receptors for vitamin D just like nearly every tissue in the body.¹⁷

Preclinical and clinical evidence demonstrate that vitamin D is essential for a wide range of **brain functions**, including cognition, emotional regulation, and mood.¹⁸⁻²¹

All these functions support general **brain health** and help explain the link between low vitamin D levels and increased risk of **depression**.^{19,20,22}

Research has shown that vitamin D may help prevent depression or reduce its symptoms by:

- **Enhancing neuroplasticity** (the brain's ability to adapt and change).^{17,23}
- **Modulating neurotransmission and activating serotonin production.** Vitamin D may help spur serotonin synthesis, supporting healthy levels.^{17,24,25}
- **Maintaining circadian rhythms.** Abnormalities in the brain's biological clock have been tied to the risk of depression. Both clinical and preclinical evidence demonstrate that vitamin D contributes to the maintenance of healthy circadian rhythms.^{26,27}
- **Upregulating protective genes.** Vitamin D also supports brain health by upregulating the production of neurotrophic factors, which support neuron growth and survival such as **brain-derived neurotrophic factor (BDNF)**.^{28,29}
- **Reducing oxidative stress and neuro-inflammation.** Higher rates of oxidative stress and inflammation in the brain decrease neuroprotection and are associated with an increased risk of depression.^{1,17,30}



What You
Need
To Know

Vitamin D May Help Counter Depression

- Research has shown that lower levels of **vitamin D** are associated with a significantly higher risk of developing **depression**.
- Depression rates are highest in the **winter** when people are exposed to less sunlight, and vitamin D levels are typically at their lowest.
- **Clinical trials** have found that taking oral vitamin D may significantly reduce the risk of depression and the severity of depressive symptoms.

Fighting Depression in Human Studies

Multiple **clinical trials** have found that taking oral vitamin D can help prevent or reduce symptoms of depression—an effect that is highly likely to reflect a vitamin D deficiency or insufficiency.^{4-6,31}

A meta-analysis of 29 clinical studies involving over **4,500** people concluded that vitamin D intake could help reduce the incidence of depression and improve symptoms in those already experiencing it.

A daily supplemental dose of more than **2,800 IU**, and intervention durations longer than eight weeks were found to be particularly effective in both preventing and treating depression. The evidence for benefits was strongest in individuals who had low vitamin D levels below **20 ng/mL** (or below **50 nmol/L** when using another reporting method) for **25-hydroxyvitamin D**.⁶

A paper published in 2023, reviewing **10 meta-analyses** of clinical trials, found that those taking daily vitamin D had a significant reduction in **depression symptoms** compared to those taking a placebo. Four of the meta-analyses reported that individuals with low vitamin D levels had a **60%** greater risk of depression compared to those with *higher* levels of vitamin D. Most of these studies used daily doses between **1,500 IU** and **2,800 IU**.⁵

A clinical study published in **2024** added further insight. The researchers evaluated 46 people with major depressive disorder already receiving standard treatment and randomized to receive **1,600 IU** vitamin D or placebo daily. After seven months, both groups showed similar improvements in depression and anxiety symptoms.

Types of Vitamin D: D3, Calcifediol, Calcitriol—What's the Difference?

Not all vitamin D is created equal. There are three key forms, each suited to different needs. Here's a quick guide to help you understand your options:

- **D3 (Cholecalciferol)³³**
Everyday Maintenance/OTC

The most common over-the-counter form. It requires healthy liver and kidney function to become active. Ideal for general use and daily supplementation.

- **Calcifediol (25-hydroxyvitamin D3)^{34,35}**
Faster Acting / For Deficiencies / Rx required

A prescription form that's already one-step activated. Useful for people with liver issues or those needing quicker results, as it skips the liver activation step.

- **Calcitriol (1,25-dihydroxyvitamin D3)³³**
Fully Active / Special Cases/Rx only

The final, fully active form. It's prescribed when both liver and kidney activation are compromised, such as in advanced kidney disease.

However, brain scans revealed that the vitamin D group maintained healthier brain connectivity and white matter integrity, while the placebo group showed disruptions. In the vitamin D group, more substantial increases in vitamin D levels were linked to greater symptom improvement.³² The dose used in that study **(1,600 IU)** was modest. Many individuals require between **5,000-8,000 IU (125-200 mcg) daily** to reach optimal blood levels.

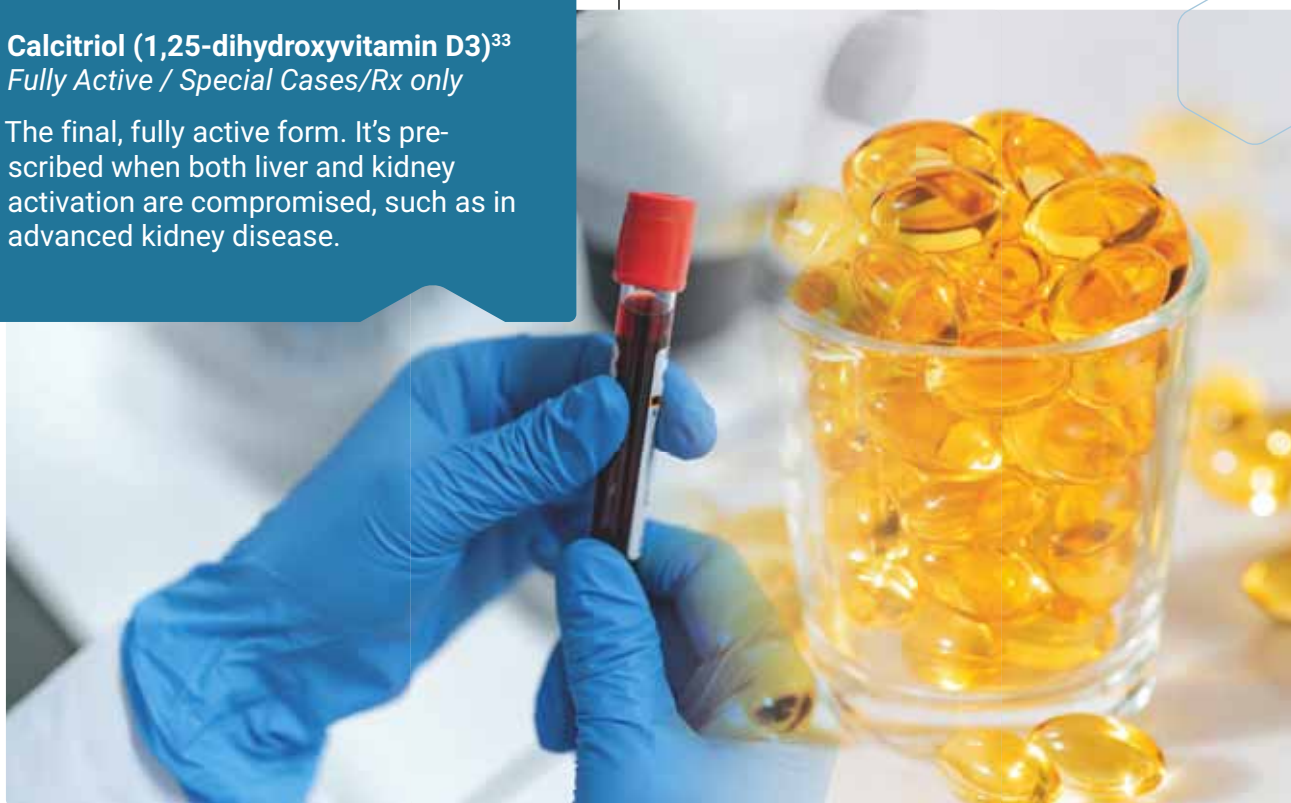
Summary

In people with low levels of **vitamin D**, symptoms of **depression** are much more likely to occur.

Depressive symptoms are also often worse during **winter**, when days are shorter and vitamin D levels tend to be at their lowest.

Clinical trials have found that taking daily doses of oral vitamin D may help prevent or reduce symptoms of depression. ■

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



How Much Vitamin D Should You Take Daily?

Vitamin D is essential for many aspects of health. Blood levels of vitamin D can vary depending on your sun exposure, body weight, and skin tone. **Life Extension** recommends **50–80 ng/mL**³⁶ for optimal health. Here's what to know about effective supplementation and how to monitor your levels:

- **Monitor Your Vitamin D Status Regularly**

Vitamin D is fat-soluble and stays in the body longer than water-soluble vitamins. Use the 25-hydroxyvitamin D blood test to monitor your vitamin D status. Your physician may test your vitamin D levels during your annual physical.

- **Deficient Levels vs. Optimal Levels**

- **Deficiency:** Less than **20 ng/mL**
- **Insufficiency:** **20–30 ng/mL**
- **Sufficiency:** Over **30 ng/mL**
- **Optimal** (per Life Extension): **50–80 ng/mL**³⁶

- **Typical Dosage Guidelines**

- Most people need **5,000–8,000 IU (125–200 mcg)** per day to reach optimal levels.³⁷
- People with **darker skin** may require more due to lower natural vitamin D production.³⁸
- Individuals with a high body mass index (BMI) require **higher doses** of vitamin D to achieve the same 25(OH)D concentrations as those with a normal BMI.³⁹



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Don't Let **PMS** Cramp Your **Style**

Daily PMS Relief is a nutrient blend designed to help relieve premenstrual syndrome (PMS) symptoms.

This formula includes a **ginger extract**, standardized to contain at least **26% gingeroids**—**five times** the amount in standard ginger.

In a clinical study, taking **200 mg** of this extract daily resulted in an average **84% reduction** in menstrual-cramp discomfort score.

It also eased period-related nausea, fatigue, and low back pain.¹

Magnesium and **vitamin B6** are included in this nutrient blend.

Taken together daily, in clinical studies, the combination helped alleviate PMS related irritability and mood swings.^{2,3}

Item #02537

60 vegetarian capsules

1 bottle **\$15**

4 bottles \$13.50 each



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

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Stay your fabulous self all month long with **Daily PMS Relief**.

Ginfort® is a registered trademark of Olene Life Sciences Pvt. Ltd.

"I'm a big fan
of it."

Sue

VERIFIED CUSTOMER
REVIEW

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**Multi-Action
Support for
Aging Joints!**

JUST TWO CAPSULES A DAY PROVIDE:

Glucosamine sulfate 2KCl (derived from corn)	1,500 mg
AprèsFlex® Indian frankincense (<i>Boswellia serrata</i>) extract (gum resin) [std. to 20% AKBA ^Δ]	100 mg
NT2 Collagen™ standardized cartilage providing 10 mg Total Collagen	40 mg
Boron (calcium fructoborate as patented FruiteX-B® OsteoBoron®)	1.5 mg

NT2 Collagen™ is manufactured by Bioibérica. AprèsFlex® is a registered trademark of PLT Health Solutions-Laila Nutraceuticals LLC. Fruitex B® and OsteoBoron® are registered trademarks of VDF Futureceuticals, Inc. Pat. Fcpatent.com

^Δ 3-O-acetyl-11-keto-β-boswellic acid.

Item #02238 • 60 capsules

1 bottle \$25.50

4 bottles \$22 each



GLUTEN
FREE

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LE CERTIFIED

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

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VOTED #1 MULTIVITAMIN

"Covers all the bases."

Brian
VERIFIED
CUSTOMER
REVIEW

Compare **Two-Per-Day Multivitamin** to the Leading Brand

The **Two-Per-Day** multinutrient formula is superior because it provides vastly **higher** potencies of **vitamins, minerals** and **plant extracts**.



#1 Rated
Multivitamins | 11 Time Winner!†

Compared to **Centrum® Silver Adult 50+**
Two-Per-Day Provides:

50 TIMES THE VITAMIN B1

25 TIMES THE VITAMIN B6

12 TIMES THE VITAMIN B12

10 TIMES THE BIOTIN

10 TIMES THE SELENIUM

7 TIMES THE VITAMIN C

2 TIMES THE VITAMIN E

2.5 TIMES THE VITAMIN B3

2 TIMES THE VITAMIN D

2 TIMES THE ZINC

Includes bioactive nutrients such as the **5-MTHF** form of **folate**, **methylcobalamin (B12)**, **alpha lipoic acid**, and **plant extracts**.

Two-Per-Day Multivitamin Capsules

Item **#02314** • 120 capsules (two-month supply)
1 bottle \$19.13 • 4 bottles \$17 each

Two-Per-Day Multivitamin Tablets

Item **#02315** • 120 tablets (two-month supply)
1 bottle \$18.38 • 4 bottles \$16.25 each

For full product description and to order
TWO-PER-DAY MULTIVITAMIN,
call **1-800-544-4440** or
visit **www.Life Extension.com**

CAUTION: Individuals consuming more than 50 mcg (2000 IU)/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

† Ratings based on results of the 2024 ConsumerLab.com Survey of Supplement Users. More information at www.consumerlab.com/survey.

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You've Gut This

Rejuvenate Your Microbiome for Healthy Aging

Youthful Gut contains:

PoZibio® HT § *L. paracasei* D3-5,
L. plantarum ECGC 13110402,
L. rhamnosus IMC 501,
and *L. paracasei* IMC 502
(9 Billion CFU†)



Item #02539

30 vegetarian capsules

1 bottle **\$22.50**

4 bottles \$20.50 each

Florassist® Probiotic Youthful Gut promotes a healthy lifespan with three targeted **probiotics** and a **postbiotic**.¹

In **clinical trials**, these three **probiotics**:²⁻⁵

- ▶ Encouraged a more “**youthful**” gut microbiome
- ▶ Promoted a healthy inflammatory response to support **healthy aging**
- ▶ Helped support cholesterol levels already within the normal range

For full product description and to order
Florassist® Probiotic Youthful Gut, call **1-800-544-4440**
or visit www.LifeExtension.com



PoZibio® is protected under US Patent No.11,622,981 and is a registered trademark of Postbiotics, Inc.

LPLDL is a trademarked ingredient developed and produced by ProBiotix Health.

† Colony forming units

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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.

"Works great!"

Eric

VERIFIED CUSTOMER
REVIEW



Let the Sunshine In

D3, the sunshine vitamin, is key to strong bones and immune health

Vitamin D3 is the ultimate whole-body health supporter. A daily dose of D3 also helps maintain healthy cardiovascular function.

Item #01713 • 125 mcg (5000 IU) • 60 softgels

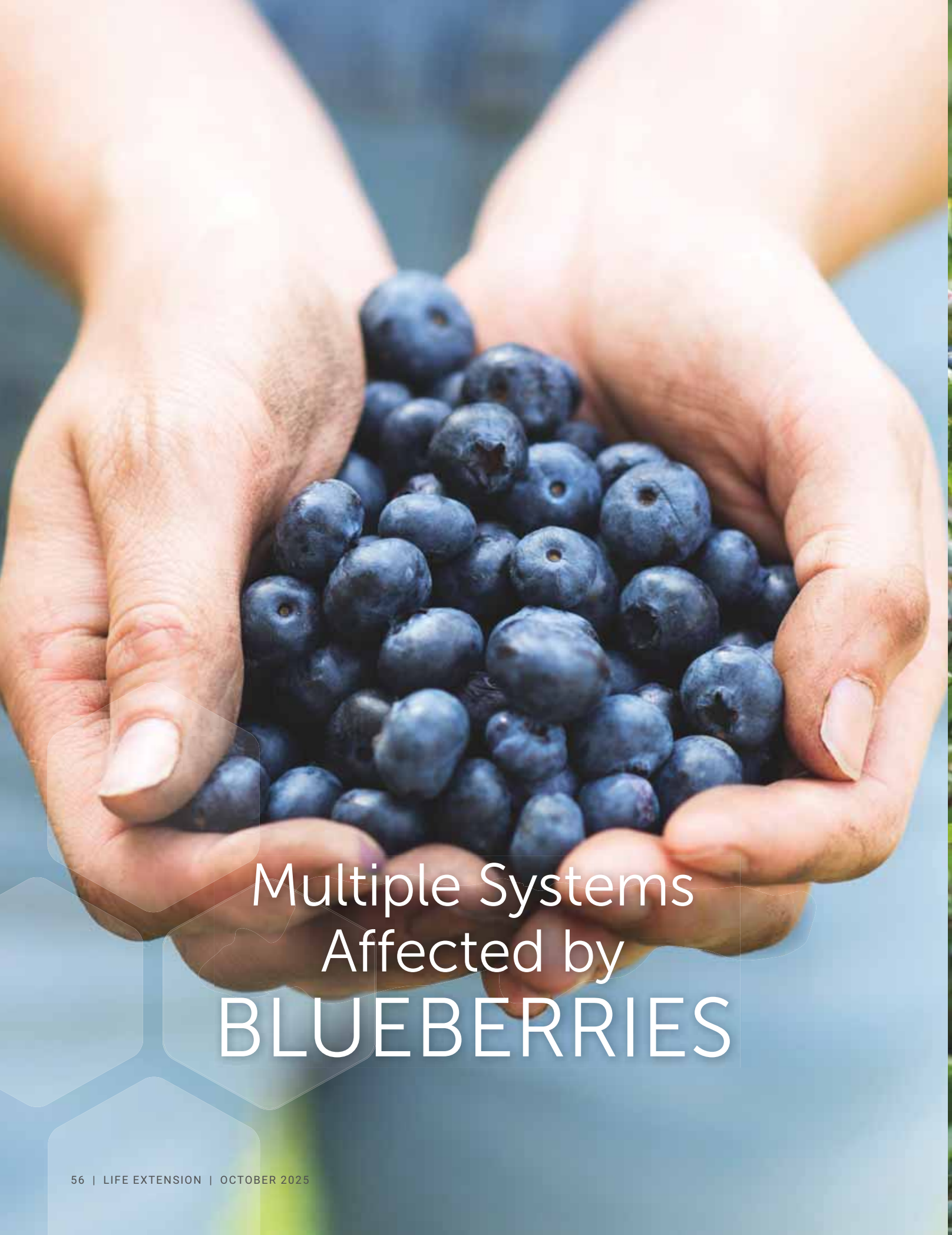
1 bottle \$7.50 • 4 bottles \$6.50 each



For full product description and to order **Vitamin D3**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Caution: Individuals consuming more than 50 mcg (2000 IU)/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 10000 IU per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

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.

A close-up photograph of a pair of hands cupped together, holding a large quantity of fresh, dark blue blueberries. The berries are piled high in the palms, filling most of the frame. The hands are light-skinned, and the background is a soft, out-of-focus blue. The text 'Multiple Systems Affected by BLUEBERRIES' is overlaid on the lower half of the image in white, with 'BLUEBERRIES' in a larger, bold font.

Multiple Systems Affected by BLUEBERRIES



BY MARSHA MCCULLOCH, MS, RD

Blueberries have gained a reputation as a “super-fruit” because of research into their **anthocyanins** and the powerful benefits they provide.¹

In clinical trials published over the last several years, blueberries:

- Boosted **brain processing speed**,²
- Reduced **blood pressure**³ and improved **blood lipids**,⁴ and
- Stabilized **blood sugar** and **insulin** levels.^{5,6}

Preclinical research and a human trial have also shown that blueberries could help bolster **bone health**.⁷

Daily intake of **blueberry extract** is a convenient way to get the full benefits of this remarkable fruit.

Health-Promoting Properties

Blueberries are one of the richest sources of plant compounds called **anthocyanins**, which give the fruit its color.¹

Anthocyanins are the key bioactive compounds associated with reduced risk of **cardiovascular** disease, **metabolic syndrome**, and **cognitive decline**, as supported by both epidemiological and clinical evidence.^{1,5,8}

Wild blueberries have higher total **anthocyanins** than regular, cultivated blueberries.^{1,9}

Some of the likely mechanisms behind the benefits of anthocyanins include:

- Mitigating **inflammation** and **oxidative stress**, drivers of aging and most chronic diseases,^{1,10,11}
- Shifting the **gut microbiome** to include more beneficial bacteria,^{11,12} and
- Fueling the production of **beneficial byproducts** from gut bacteria.¹³

Studies show that a range of blueberry forms, including fresh berries, freeze-dried powder, and extracts, all have health benefits.^{1,3,5,10}



Energizing the Brain

Brain processing speed refers to how quickly your brain takes in, understands, and responds to information. It impacts memory, task completion, and other areas of cognitive function.²

Processing speed typically slows with age, beginning at **midlife**.¹⁴

In a trial of 86 older adults with **mild cognitive decline**, they took either an amount of **wild blueberry** powder equal to about **1.5 cups** of whole blueberries or a placebo daily.²

After six months, cognitive testing and brain imaging showed that the **blueberry** group's **information processing speed** was faster than the **placebo** group's. Remarkably, their speed had increased to match a comparison group of older adults **without cognitive issues**.²

Blueberries may improve cognitive function by promoting healthy blood vessel function and increasing **blood flow** to the brain.^{15,16}

Lowering Blood Pressure

Optimal blood vessel function also promotes healthy **blood pressure**.

In a trial, 61 healthy older adults took wild blueberry powder equal to **one cup** of blueberries or a placebo daily for three months.³

According to 24-hour ambulatory blood pressure monitoring (the gold standard for evaluating blood pressure), the extract group had a **3.6 mmHg** drop in **systolic blood pressure** compared to the placebo.^{3,17}

This level of reduction translates to a **7% lower** risk of major **cardiovascular events** like heart attacks and strokes.³

It is not, however, enough for most people with **hypertension** who seek to target blood pressure below 120/80. Achieving this target either requires lifestyle modifications such as diet management, aggressive weight loss (in overweight individuals) or use of a prescribed anti-hypertension drug(s).¹⁸





Metabolic Benefits

Blueberries may have immediate benefits for people with **metabolic syndrome**, a cluster of cardiovascular risk factors including high blood sugar, insulin resistance, and abnormal blood lipids.⁵

In a study, adults with metabolic syndrome were given a high-fat, high-sugar milkshake as a meal. The milkshake had 969 calories and was roughly equivalent to eating a large burger and fries and drinking a cola.⁵

Half the subjects received freeze-dried blueberry powder equal to **one cup of blueberries** with the milkshake, while the others received a placebo powder.

The blueberry group had a better metabolic response than the **placebo** group, including:

- Lower blood sugar three hours later (**77 mg/dL** vs. **92 mg/dL** for placebo), and
- Lower insulin three hours later (**3.4 µIU/mL** vs. **7.6 µIU/mL** for placebo).

Lower **insulin** blood levels indicate better glucose control in metabolic syndrome patients. Lower insulin indicate less cellular “insulin resistance.”

In this study, the blueberries offset some of the harmful metabolic effects of the high-fat/high-sugar milkshake.

Boost Health with Blueberry Extract

- **Blueberries** are rich in anthocyanins that help reduce inflammation, provide antioxidant defense, and interact with gut microbes to promote health.
- In clinical trials, blueberry intake boosts **brain function**, improves markers of **cardiovascular** health, and promotes **blood sugar** control.
- Additional research, including a human trial, suggests blueberries may help reduce age-related **bone loss**.
- Many forms of blueberry have shown health benefits. **Blueberry extracts** are particularly convenient and affordable.

In a longer trial, 52 older men with **type 2 diabetes** were given freeze-dried blueberries (equal to about a cup) or a placebo in a split dose with their usual morning and evening meals.¹⁹

After two months, the blueberry group had significantly lower **hemoglobin A1c** (a marker of blood sugar over two to three *months*) and **fructosamine** (which indicates blood sugar over the past two to three weeks).

In addition, the blueberry group had about **10%** lower **triglycerides** than the placebo group.¹⁹

Bolstering Bone Health

Preclinical studies indicate that blueberries could help support **bone health**.²⁰⁻²² This prompted scientists to conduct a human trial.⁷

Researchers recruited 13 healthy women without osteoporosis who were at least four years into **menopause**, past the most rapid phase of menopausal bone loss.⁷

At the start of the study, the women were given **calcium** with a “tracer” to help monitor bone breakdown.

Next, they took **wild blueberry powder** for **six weeks**, alternating with six-week periods of no treatment.

When the women took the blueberry powder daily (equal to about **2/3 cup** of whole blueberries), they retained **6% more calcium** in their bones, compared to no treatment.⁷

Taking daily blueberry extract can help provide a wide range of benefits that are instrumental to healthy aging.

Summary

Clinical trials show that blueberry interventions may improve **brain** function, **cardiovascular** health, and **metabolic** status, including blood **sugar** levels.

Research also suggests this superfruit could help protect **bone** health in aging.

Blueberry extract provides these benefits in a convenient, affordable form. ■

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

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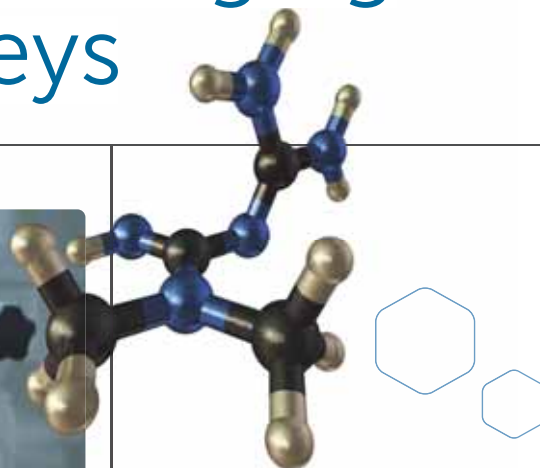
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Metformin Slows Aging in Monkeys

BY BRETT CHAFIN



What is Metformin?

Metformin is a synthetic drug developed from compounds found in an herb known as goat's rue or French lilac. It has been used in Europe to treat **type 2 diabetes** since the **1950s** and was approved by the U.S. Food & Drug Administration (FDA) in **1994**.⁸

Metformin is the recommended first-line treatment for type 2 diabetes,⁹ as well as for diabetes prevention in high-risk individuals with prediabetes.¹⁰ Metformin may reduce appetite and can lead to modest weight loss,¹¹ but it is not an FDA-approved treatment for obesity, nor is it commonly used for weight loss.

Since metabolic dysfunction is linked to accelerated aging,^{12,13} metformin has been extensively studied as a potential **anti-aging** treatment due to its effects on aging-related molecular pathways.^{4,6,14}

Retrospective studies suggest it may reduce mortality and improve survival in patients with type 2 diabetes.¹⁵⁻¹⁸ Current and upcoming trials may provide further insight into the anti-aging benefits of metformin in **humans**.¹⁹

Life Extension has written about the potential anti-aging benefits of **metformin** for decades.¹⁻³

A medication used to manage type 2 diabetes, **metformin** has been shown to **slow aging** in animals such as worms,^{4,5} fruit flies,^{5,6} and rodents.⁵

Now, in a first-of-its-kind study published in the medical journal *Cell*, metformin has demonstrated similar effects in male **primates**, close relatives of humans.⁷

Several markers of aging were significantly affected, apparently **reducing the biological age** of aging macaque monkeys.

The effects were particularly striking in the brain: the male monkeys receiving metformin had a **brain age** (as estimated by a methylation/epigenetic clock) that was nearly **six years younger** than monkeys that did not receive the drug.⁷

The metformin-treated monkeys also performed significantly better on tests of **cognitive function**.

This study adds to the growing evidence that metformin may have significant **anti-aging** effects.

In-Depth Primate Study

Metformin's anti-aging effects had never been evaluated in **primates**—until now.⁷ Because they are genetically closer to **humans**, primate models may offer a more representative view of how anti-aging interventions could affect people.²⁰

Researchers set out to study the effects of **metformin** in aging male **macaque monkeys**. Older monkeys were given metformin daily for **40 months** (approximately equivalent to more than a **decade** of **human life**) and were compared to age-matched controls that did not receive the medication.⁷

The scientists evaluated multiple **markers of aging**, including changes in metabolism and gene expression, cellular senescence (when aged cells become dysfunctional), fibrosis, tissue atrophy, and inflammation.⁷

They used these data to create "**aging clocks**" that estimate how rapidly an animal is aging. These clocks have been validated in various animal models, as well as in **humans**, to give estimates of the rate of the aging process.^{21,22}

Slowing the Aging Process

The results of the study provided strong evidence that **metformin** had an **anti-aging** effect.⁷

In tissues throughout the body, markers of aging—including some for cellular senescence, fibrosis, and chronic inflammation—were **reduced** in the monkeys receiving metformin.

Models of aging that included metabolic, protein, genetic, and epigenetic data also showed changes that indicated a **slower progression** of aging in the treated monkeys.⁷

For example, **DNA methylation clocks** are a measure of chemical changes in genetic material that occur over time. They have been found to be a reliable marker of aging across various species, including humans.^{21,22} The researchers created a special DNA methylation clock to estimate biological age across multiple organs in monkeys and used it to assess the effects of metformin.⁷

In this study, the DNA methylation age of several organs, including the **kidneys**, **lungs**, and **liver**, was **reduced** in the **metformin** group. The DNA methylation age of the **brains** of monkeys receiving metformin was about **six years younger** than that of untreated animals.

The researchers also developed their own novel monkey aging clock that incorporated metabolic, protein, and gene expression data along with the DNA methylation data. This clock found that the treated animals had a "biological age" that was **significantly younger** than the non-treated monkeys.

Metformin also slowed structural changes associated with aging, **reducing** both periodontal **bone loss** and atrophy of the **frontal lobes** of the brain.

The study also showed that these cellular and tissue changes correlated with improved function. Monkeys receiving metformin performed significantly better on tasks that evaluate cognitive functions like **learning** and **memory** than monkeys that did not receive metformin.

How It Works

While this study was not designed to fully evaluate how metformin exerts its anti-aging effects, the researchers found evidence that it enhances the activity of **Nrf2**, a protein that protects against damaging **oxidative stress**.⁷

Although not evaluated in this study, compounds such as sulforaphane, curcumin, resveratrol, and apigenin have demonstrated Nrf2-activating properties in laboratory models²³—a pathway that metformin has also appeared to influence.

Previous studies have focused on the possibility that metformin may activate the protein **AMPK**,²⁴ part of a metabolic "switch" that shifts the body's energy metabolism pathways.

Many other molecular and biological pathways affected by metformin have been suggested to account, at least in part, for its observed benefits. Through these various mechanisms, it is believed that metformin may act as a whole-body anti-aging drug.^{7,25}

Summary

Metformin is a drug used to treat type 2 diabetes and related conditions. It is increasingly being studied as an **anti-aging** intervention.

A new study has evaluated metformin as an anti-aging drug in a **primate** model for the first time.

In male macaque monkeys, metformin was found to **slow the aging process**.

Multiple markers of aging across various body tissues were improved in monkeys receiving metformin, slowing their "aging clocks." **Brain function** was also improved in the monkeys receiving metformin.

Metformin decelerates aging clock in male monkeys



▶ Metformin prevents brain atrophy, elevating cognitive function in aged male primates

▶ Metformin slows the pace of aging across diverse male primate tissues

▶ Metformin counteracts neuronal aging, delivering geroprotection in male primates

<https://doi.org/10.1016/j.cell.2024.08.021>

Results in Cynomolgus monkeys at human age equivalent 40–50 years:



“In a rigorous 40-month study, we evaluated the geroprotective effects of metformin on adult male cynomolgus monkeys...The results highlighted a significant **slowing of aging** indicators, notably a roughly **6-year regression in brain aging**...”

Further studies will be required to confirm these benefits in humans. But this breakthrough primate study highlights metformin’s potential to slow aging, ward off age-related loss of function, and improve health throughout the body. •

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

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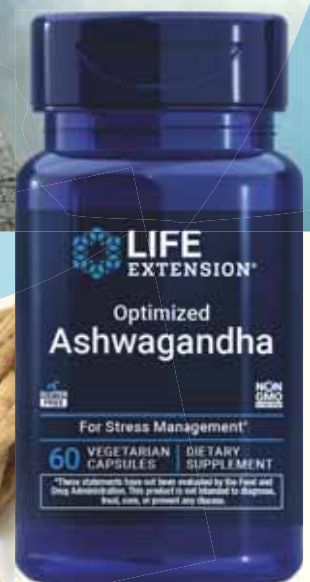


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Rock Steady Boxing

Fighting Back Against Parkinson's

BY LAURIE MATHENA



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When Jenny Enslein's husband received a Parkinson's diagnosis in 2011 at age 59, she knew life was about to change forever.

But not in the way she expected.

As Jenny searched for ways to help her husband, she discovered Rock Steady Boxing, a fitness program scientifically proven to help relieve symptoms and improve quality of life for people living with Parkinson's.¹⁻³

Five years later, she opened her own Rock Steady Boxing affiliate program in North Miami Beach, Florida, where she has since helped hundreds of patients fight back against Parkinson's... including her husband, Spencer.

Prescription for Exercise

Three days a week, 52 weeks per year, Jenny transforms the gym at the Michael-Ann Russell Jewish Community Center into a specialized boxing gym. She offers her classes 52 weeks per year, because, as Jenny says, "Parkinson's doesn't stop, so neither do we."

In a one-hour circuit, this non-contact, boxing-based program utilizes stretching, shadow boxing drills, footwork, strength training, balance exercises, and more.

“The beauty of the program,” said Jenny, “is that in one hour, these exercises address core issues related to Parkinson’s, including movement, balance, posture, coordination, and breathing difficulties.”

Parkinson’s is characterized by loss of dopamine-producing nerve cells in the brain, which leads to its characteristic movement problems. Increasing dopamine levels in the brain can help with the symptoms of the disease—and exercise is one of the important complementary therapies to do that.⁴

Research has shown that the Rock Steady Boxing program provides benefits like improved walking⁵ and balance, and decreased risk of falls.^{2,6} One study found that high-intensity interval training programs, such as Rock Steady Boxing, were associated with a slower progression of the disease.⁷

Since it was founded in 2006, Rock Steady Boxing has grown to include over 800 affiliates in all 50 states and in 14 countries around the world.

Jenny Enslein’s gym, Rock Steady Boxing at the MAR-JCC, is the largest single Rock Steady Boxing affiliate. It is also the only affiliate to offer the program at no cost to any of the participants.

“These people have enough burden just dealing with their disease,” said Jenny. “I work hard to offer this program free of cost so that they can feel that the community is doing something for them.”

This is possible thanks to Jenny’s tireless fundraising efforts, which include donations from the community, multiple grants (including one from the Parkinson’s Foundation), and dozens of volunteers.

Impressive Results

In her nine years with Rock Steady Boxing, Jenny has witnessed firsthand the difference it can make in someone’s life.

“We have boxers who come with walkers and graduate to canes. We have boxers who come with canes and graduate to no cane,” said Jenny. “Our youngest boxer, who’s 43 years old, came to us with a walker and had difficulty speaking. He now runs and is fully able to speak.”

Jenny recalled another boxer named Marc, who was in a wheelchair when he first started the program.

“Marc was able to transition from a wheelchair to a walker, and then from a walker to a cane. And then one remarkable day, Marc walked—by himself—several times back and forth across the basketball court. It was quite a sight!” said Jenny. *“Marc’s courage and resilience are immeasurable.”*

Beyond the physical benefits of Rock Steady Boxing, Jenny says that what she loves most about the program is the sense of community.

“It’s like a family,” she said. “The ones who regularly attend maintain and improve not just their physical health, but their cognitive health as well.”

In fact, one observational study, in people with Parkinson’s disease, found that Rock Steady Boxing was associated with greater self-reported quality of life, higher exercise confidence, and perceived improvements across several areas compared to non-participants.¹

These impressive results have caught the attention of the medical community.

“When I first started recruiting patients, my head coach Dany Weil and I visited every neurologist in Miami-Dade,” said Jenny. “I didn’t have much success. I recruited our first 12 patients on my own.”

Now, *all* of Jenny’s new patients come from neurologists’ referrals.

“Although these physicians have never set foot in our facility, they see firsthand the improvement and patient testimonials,” said Jenny. “Now, any new patient diagnosed with Parkinson’s is prescribed PD medication and is referred to our program as a recommended part of their comprehensive PD treatment.”

Beyond Exercise

Jenny’s influence on the Parkinson’s community has extended far beyond the 290 boxers who have participated in her program.



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In 2022, the Parkinson's Foundation, a national organization that funds research and provides educational resources, partnered with Jenny's affiliate to conduct a genetic testing study.

Their results showed that out of 250 patients, only five came back positive for the Parkinson's gene.

"This made me think, what happens to the other 245, like my husband, who did not test positive for the gene?" said Jenny. "So, I dug deeper. I went through the intake paperwork of each of my boxers, and I found what Dr. Mark Hyman (my husband's doctor) had been telling him for years: Environmental exposure could be an underlying cause of Parkinson's."⁸

Jenny found that the largest group of boxers were former dentists, who had worked with mercury for years. The second largest group were golfers, who are exposed to pesticides.

After that came hairdressers, Vietnam vets, and those growing up on farms.

Jenny has presented these findings—and about the success of Rock Steady Boxing—on numerous occasions as a guest speaker for the Parkinson's Foundation.

"The presentation blows the minds of some of these neurologists because conventional doctors are not in tune with all of this," said Jenny. "They treat the symptoms, but they don't try to analyze the root."

This is also why Jenny believes that following a healthy diet and taking supplements is important for supporting their overall health.

For example, she says that **melatonin** can be helpful for sleep issues that many Parkinson's patients experience. She also tells them about the benefits of magnesium, vitamin D, fish oil, and zinc for addressing issues such as sleep quality, mood, and constipation.

"Exercise is a big part of the puzzle, but it's not the only piece," said Jenny.

This has been true for Jenny's husband, Spencer.

Fourteen years into his Parkinson's diagnosis, Spencer is doing remarkably well. He uses a cane for balance, but he is still able to maintain his independence and quality of life.

In addition to doing Rock Steady Boxing twice a week, Spencer does a number of other alternative therapies, including nutritional IV therapy (Myer's cocktail), OsteoStrong therapy, hyperbaric oxygen therapy, acupuncture, yoga, massage, and more.

Spencer also takes more than 26 supplements.

"My husband's neurologist has told him several times that if he hadn't done everything he's done, he would now be in a wheelchair."

Spencer—and others like him—are living proof of the powerful mantra they repeat at the end of every Rock Steady Boxing session:

***I am not a patient.
I am a boxer.
Impossible is nothing.***

Jenny continues to broaden her impact on the Parkinson's community. Since 2022, she has served as a member of the Board of Directors of Rock Steady Boxing Indiana. And in 2026, she will become chairperson of the board, where she will help to oversee the entire Rock Steady Boxing organization.

"When I found Rock Steady Boxing, I knew it was going to be the tool to offer my husband a better quality of life and to give him hope. Now it's gone beyond that," said Jenny. "It has given me an opportunity to turn my husband's medical challenge into an opportunity to help others." •



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

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Adela

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Item #02207 • 30 vegetarian tablets

1 bottle \$28.50 • 4 bottles \$24 each

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

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

Actiponin® is a trademark of TG Biotech Co., Ltd.



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.

Garlic

BY LAURIE MATHENA

Garlic has a long history of medicinal use in societies around the world. Even Hippocrates, known as the 'Father of Medicine,' prescribed garlic to treat a range of health conditions.¹

Today, modern science has proven that garlic is not only bursting with flavor, but with a myriad of medicinal properties. Garlic has antibacterial, antifungal, anti-aging, and anti-cancer properties, helping to boost the immune system while reducing the risk of diabetes, cardiovascular disease, and more.²

Clinical trials have shown that consuming garlic can help reduce the number, duration, and severity of upper respiratory infections.³

In a study of 20 newly diagnosed **type 2 diabetics**, half ate three small garlic cloves every morning before breakfast for 30 days. Compared to those not eating garlic, the garlic eaters experienced a significant reduction in blood glucose levels and improvements in lipid metabolism, improvements in antioxidants like superoxide dismutase, catalase, and glutathione peroxidase, decreases in serum cholesterol, triglycerides, and LDL (bad) cholesterol, and beneficial increases in HDL (good) cholesterol.⁴

In another study, 40 patients with **metabolic syndrome** consumed **100 mg/kg** of body weight of raw, crushed garlic twice a day for four weeks. Doing so significantly reduced multiple measures of metabolic syndrome, including waist circumference, systolic and diastolic blood pressure, and fasting blood glucose. They also experienced a significant beneficial increase in HDL cholesterol.⁵

Numerous observational studies have tied consuming raw garlic to a reduced risk of some specific cancers:

- Eating it at least twice a week was associated with lower odds of **liver cancer**, compared to those who ate it less than twice week.⁶
- Consuming raw garlic more than twice a week was associated with a lower risk of **lung cancer**.⁷
- Eating it at least once a week was associated with lower odds of **esophageal cancer** in smokers and drinkers, who have an increased risk of this type of cancer.⁸

Garlic consumption has also been linked to increased longevity. In a study of over 27,000 people who lived to be over 80 years old, researchers found that those who consumed garlic at least once a week lived *longer* than those who ate it less than once a week.⁹

To get more garlic in your diet, you can add raw garlic to salad dressings, marinades, guacamole, or hummus, or sauté garlic in olive oil when cooking vegetables, stews, or rice. Let garlic sit for 10-15 minutes after crushing or chopping it to activate its beneficial compounds. •

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4. Mirunalini S. KM, Ambily V., Professor A. Effects of raw garlic (*Allium sativum*) on hyperglycemia in patients with type 2 diabetes mellitus. 2011.
5. Choudhary PR, Jani RD, Sharma MS. Effect of Raw Crushed Garlic (*Allium sativum* L.) on Components of Metabolic Syndrome. *J Diet Suppl*. 2018 Jul 4;15(4):499-506.
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Get More Out of Life



Item #02230
60 vegetarian capsules
1 bottle **\$26.25**
4 bottles \$22.75 each

"I love this product!"

Susan

VERIFIED CUSTOMER
REVIEW

Striving for healthy aging? Start by protecting every cell in your body.

Resveratrol is a legendary nutrient that's good for your heart, mind, and cellular health.

Optimized Resveratrol Elite™ contains *trans*-resveratrol in a hydrogel coating—acting to improve bioavailability to cells throughout your body.

For full product description and to order **Optimized Resveratrol Elite™**, call 1-800-544-4440 or visit www.LifeExtension.com



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

Vitamin D
+ Vitamin K
+ Sea Iodine
= Convenience
+ Cost Savings



Item #02040

60 capsules

1 bottle \$18

4 bottles \$16.50 each



Vitamins D and K as well as Iodine perform multiple functions for heart and bone health.

Life Extension brings these three nutrients together in one convenient capsule.

Just one capsule daily provides:

Vitamin D3	125 mcg (5,000 IU)
Vitamin K1	1,000 mcg
Vitamin K2 (MK4)	1,000 mcg
Vitamin K2 (MK7)	100 mcg
Iodine	1,000 mcg

For full product description and to order Vitamins D and K with Sea-Iodine™, call 1-800-544-4440 or visit www.LifeExtension.com

CAUTION: Individuals consuming more than 50 mcg 2,000 IU/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 250 mcg per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels. If you have a thyroid condition or are taking antithyroid medications, do not use without consulting your healthcare practitioner. If you are taking a vitamin K antagonist (e.g. warfarin), consult your healthcare practitioner before taking this product.

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.

ACTIVE LIFESTYLE & FITNESS

01529	Creatine Capsules
02543	Creatine Powder
02020	Super Carnosine
02532	Creatine & Acetyl-L-Carnitine Energy Plus
02023	Tart Cherry with CherryPURE®
02186	Wellness Bar - Chocolate Brownie
02518	Wellness Bar - Peanut Butter Chocolate Chip
02246C	Wellness Code® Advanced Whey Protein Isolate Vanilla
02221	Wellness Code® Muscle Strength & Restore Formula
02127	Wellness Code® Plant Protein Complete & Amino Acid Complex
02261C	Wellness Code® Whey Protein Concentrate Chocolate
02260	Wellness Code® Whey Protein Concentrate Vanilla
02243C	Wellness Code® Whey Protein Isolate Chocolate
02242	Wellness Code® Whey Protein Isolate Vanilla

AMINO ACIDS

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

BLOOD PRESSURE & VASCULAR SUPPORT

01824	Advanced Olive Leaf Vascular Support
02004	Arterial Protect
56885	Natto Activ Cardiovascular & Respiratory Support
02320	NitroVasc™ Boost
01953	Pomegranate Complete
00956	Pomegranate Fruit Extract
02024	Triple Action Blood Pressure AM/PM
02102	VenoFlow™

BONE HEALTH

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

BRAIN HEALTH

01524	Acetyl-L-Carnitine
01974	Acetyl-L-Carnitine Arginate
02419	B12 Elite
02510	Brain Fog Relief
01659	CDP Choline
02321	Cognitex® Alpha GPC
02396	Cognitex® Elite

02397	Cognitex® Elite Pregnenolone
01540	DMAE Bitartrate
02006	Dopa-Mind™
02413	Dopamine Advantage
01658	Ginkgo Biloba Certified Extract™
01527	Huperzine A
00020	Lecithin
02101	Memory Protect
00709	Migra-Eeze™
01603	Neuro-Mag® Magnesium L-Threonate Caps
02032	Neuro-Mag® Magnesium L-Threonate Powder
02520	Neuro-Mag® Magnewum L-Threonate Gummies
00888	Optimized Ashwagandha
01676	PS (Phosphatidylserine) Caps
02406	Quick Brain Nootropic®
01327	Vinpocetine

CHOLESTEROL MANAGEMENT

01828	Advanced Lipid Control
01910	CHOL-Support™
01304	Theaflavins Standardized Extract
00372	Vitamin B3 Niacin Capsules

DIGESTION SUPPORT

02412	Bloat Relief
02514	Easy Fiber
01736	Effervescent Vitamin C - Magnesium Crystals
02021	Enhanced Super Digestive Enzymes
02022	Enhanced Super Digestive Enzymes and Probiotics
02033	EsophaCool™
01737	Esophageal Guardian
01706	Extraordinary Enzymes
02533	Food Sensitivity Relief with Diamine Oxidase
02100	Gastro-Ease™

ENERGY MANAGEMENT

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

EYE HEALTH

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

FISH OIL & OMEGAS

01937	Mega EPA/DHA
02218	Mega GLA Sesame Lignans
01983	Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 60 softgels
01988	Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin
01982	Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 softgels
01985	Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 60 enteric coated softgels
01984	Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 enteric coated softgels
01986	Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 240 softgels
01812	Provinal® Purified Omega-7
01640	Vegetarian DHA

FOOD

02008	California Estate Extra Virgin Olive Oil
02170	Rainforest Blend Decaf Ground Coffee
02169	Rainforest Blend Ground Coffee
02171	Rainforest Blend Whole Bean Coffee

GLUCOSE MANAGEMENT

01503	CinSulin® with InSea ² ® and Crominex® 3+
01620	CoffeeGenic® Green Coffee Extract
02122	Glycemic Guard™
00925	Mega Benfotiamine
01803	Tri Sugar Shield®

HEART HEALTH

02530	Aged Black Garlic
01066	Aspirin (Enteric Coated)
01842	BioActive Folate & Vitamin B12 Caps
02531	Cardio Peak™
02121	Homocysteine Resist
02508	Omega-3 Fish Oil Gummy Bites
02018	Optimized Carnitine
01949	Super-Absorbable CoQ10 Ubiquinone with d-Limonene • 50 mg, 60 softgels
01951	Super-Absorbable CoQ10 Ubiquinone with d-Limonene • 100 mg, 60 softgels
01929	Super Ubiquinol CoQ10
01427	Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 30 softgels
01425	Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 100 softgels
01437	Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 30 softgels
01426	Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 60 softgels
01431	Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 200 mg, 30 softgels
01733	Super Ubiquinol CoQ10 with PQQ
01859	TMG Liquid Capsules
00349	TMG Powder

HORMONE BALANCE

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

IMMUNE SUPPORT

02302	Bio-Quercetin®
02433	Echinacea Elite
01961	Enhanced Zinc Lozenges
02425	Immune Packs with Vitamin C & D, Zinc and Probiotic
02005	Immune Senescence Protection Formula™
01681	Lactoferrin (Apolactoferrin) Caps
02426	Mushroom Immune with Beta Glucans
01903	NK Cell Activator™
01394	Optimized Garlic
01309	Optimized Quercetin
01811	Peony Immune
01708	Reishi Extract Mushroom Complex
01906	Standardized Cistanche
01561	Zinc Lozenges

INFLAMMATION HEALTH SUPPORT

01639	5-LOX Inhibitor with AprèsFlex®
02324	Advanced Curcumin Elite™ Turmeric Extract, Ginger & Turmerones
01709	Black Cumin Seed Oil
02310	Black Cumin Seed Oil and Curcumin Elite™
02467	Curcumin Elite™ Turmeric Extract 30 veg capsules
02407	Curcumin Elite™ Turmeric Extract 60 veg capsules
01804	Cytokine Suppress® with EGCG
02223	Pro-Resolving Mediators
56886	Restore Activ Joint Muscle & Tissue
01203	Specially-Coated Bromelain
00407	Super Bio-Curcumin® Turmeric Extract

JOINT SUPPORT

02238	ArthroMax® Advanced NT2 Collagen™ & AprèsFlex®
00965	Fast-Acting Joint Formula
02430	Fast Acting Relief
00522	Glucosamine/Chondroitin Capsules
02420	Glucosamine Sulfate
02424	Joint Mobility
01600	Krill Healthy Joint Formula
02529	Lower Back Relief
00451	MSM (Methylsulfonylmethane)
02231	NT2 Collagen™

KIDNEY & BLADDER SUPPORT

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

LIVER HEALTH & DETOXIFICATION

- 01922 Advanced Milk Thistle • 60 softgels
- 01925 Advanced Milk Thistle • 120 softgels
- 02240C Anti-Alcohol Complex
- 01651 Calcium D-Glucarate
- 01571 Chlorophyllin
- 02402 FLORASSIST® Liver Restore™
- 02521 Glutathione
- 01541 Glutathione, Cysteine & C
- 01393 HepatoPro
- 01608 Liver Efficiency Formula
- 01522 Milk Thistle • 60 veg capsules
- 01534 N-Acetyl-L-Cysteine
- 01884 Silymarin
- 02361 SOD Booster

LONGEVITY & WELLNESS

- 00457 Alpha-Lipoic Acid
- 01625 AppleWise
- 02414 Bio-Fisetin®
- 01214 Blueberry Extract
- 01438 Blueberry Extract and Pomegranate
- 02431 Essential Youth - L-Ergothioneine
- 02119 GEROPROTECT® Ageless Cell™
- 02415 GEROPROTECT® Autophagy Renew
- 02401 GEROPROTECT® Stem Cell
- 02211 Grapeseed Extract
- 02527 Healthy Aging Powder
- 00954 Mega Green Tea Extract (decaffeinated)
- 00953 Mega Green Tea Extract (lightly caffeinated)
- 02540 Mega L-Ergothioneine
- 01513 Optimized Fucoidan with Maritech® 926
- 02230 Optimized Resveratrol Elite™
- 01637 Pycnogenol® French Maritime Pine Bark Extract
- 02210 Resveratrol Elite™
- 02301 Senolytic Activator®
- 01208 Super R-Lipoic Acid
- 01919 X-R Shield

LUNG HEALTH

- 02512 Healthy Lungs

MEN'S HEALTH

- 02538 Hair Growth for Men
- 02209 Male Vascular Sexual Support
- 00455 Mega Lycopene Extract
- 02306 Men's Bladder Support
- 02515 Men's Vitality Packs
- 01789 PalmettoGuard® Saw Palmetto and Beta-Sitosterol
- 01790 PalmettoGuard® Saw Palmetto/Nettle Root Formula and Beta-Sitosterol
- 01373 Prelox® Enhanced Sex for Men
- 01940 Super MiraForte with Standardized Lignans
- 02500 Testosterone Elite
- 01909 Triple Strength ProstaPollen™
- 02029 Ultra Prostate Formula

MINERALS

- 01661 Boron
- 02107 Extend-Release Magnesium
- 01677 Iron Protein Plus
- 02403 Lithium
- 01459 Magnesium Caps
- 01682 Magnesium (Citrate)
- 02535 Magnesium Glycinate
- 01328 Only Trace Minerals
- 01504 Optimized Chromium with Crominex® 3+
- 02309 Potassium with Extend-Release Magnesium
- 01740 Sea-Iodine™
- 01879 Se-Methyl L-Selenocysteine
- 01778 Super Selenium Complex
- 00213 Vanadyl Sulfate
- 01813 Zinc Caps

MISCELLANEOUS

- 00577 Potassium Iodide

MOOD & STRESS MANAGEMENT

- 02519 Ashwagandha Plus
- 02434 Calm-Mag
- 02312 Cortisol-Stress Balance
- 00987 Enhanced Stress Relief
- 02542 GABA
- 01683 L-Theanine
- 02175 SAME (S-Adenosyl-Methionine)
200 mg, 30 enteric coated vegetarian tablets
- 02176 SAME (S-Adenosyl-Methionine)
400 mg, 30 enteric coated vegetarian tablets
- 02174 SAME (S-Adenosyl-Methionine)
400 mg, 60 enteric coated vegetarian tablets
- 02429 Theanine XR™ Stress Relief

MULTIVITAMINS

- 02199 Children's Formula Life Extension Mix™
- 02354 Life Extension Mix™ Capsules
- 02364 Life Extension Mix™ Capsules without Copper
- 02356 Life Extension Mix™ Powder
- 02355 Life Extension Mix™ Tablets
- 02357 Life Extension Mix™ Tablets with Extra Niacin
- 02365 Life Extension Mix™ Tablets without Copper
- 02292 Once-Daily Health Booster • 30 softgels
- 02291 Once-Daily Health Booster • 60 softgels
- 02313 One-Per-Day Tablets
- 02317 Two-Per-Day Capsules • 60 capsules
- 02314 Two-Per-Day Capsules • 120 capsules
- 02316 Two-Per-Day Tablets • 60 tablets
- 02315 Two-Per-Day Tablets • 120 tablets
- 02428 Whole Food Multivitamin

NERVE & COMFORT SUPPORT

- 02202 ComfortMAX™
- 02303 Discomfort Relief

PERSONAL CARE

- 02322 Hair, Skin & Nails Collagen Plus Formula
- 01278 Life Extension Toothpaste
- 00408 Venotone
- 02252 Youthful Legs

PET CARE

- 01932 Cat Mix
- 01931 Dog Mix

PROBIOTICS

- 01622 Bifido GI Balance
- 01825 FLORASSIST® Balance
- 02421 FLORASSIST® Daily Bowel Regularity
- 02125 FLORASSIST® GI with Phage Technology
- 01821 FLORASSIST® Heart Health
- 02250 FLORASSIST® Mood Improve
- 02208 FLORASSIST® Immune & Nasal Defense
- 02120 FLORASSIST® Oral Hygiene
- 02203 FLORASSIST® Prebiotic
- 02505 FLORASSIST® Probiotic Women's Health
- 02539 FLORASSIST® Probiotic Youthful Gut

SKIN CARE

- 02423 Daily Skin Defense
- 01938 Shade Factor™
- 02129 Skin Care Collection Anti-Aging Serum
- 02130 Skin Care Collection Day Cream
- 02096 Skin Restoring Ceramides
- 02528 Vegan Pro Collagen

SLEEP

- 01512 Bioactive Milk Peptides
- 01511 Enhanced Sleep without Melatonin
- 02234 Fast-Acting Liquid Melatonin
- 01669 Glycine
- 02308 Herbal Sleep PM
- 01722 L-Tryptophan
- 01668 Melatonin • 300 mcg, 100 veg capsules
- 01083 Melatonin • 500 mcg, 200 veg capsules
- 00329 Melatonin • 1 mg, 60 capsules
- 00330 Melatonin • 3 mg, 60 veg capsules
- 00331 Melatonin • 10 mg, 60 veg capsules
- 00332 Melatonin • 3 mg, 60 veg lozenges
- 02201 Melatonin IR/XR
- 01787 Melatonin 6 Hour Timed Release
300 mcg, 100 veg tablets
- 01788 Melatonin 6 Hour Timed Release
750 mcg, 60 veg tablets
- 01786 Melatonin 6 Hour Timed Release
3 mg, 60 veg tabs
- 01721 Optimized Tryptophan Plus
- 01445 Quiet Sleep Melatonin • 5 mg, 60 veg capsules
- 02502 Rest & Renew
- 02526 Serene Sleep

VITAMINS

- 01533 Ascorbyl Palmitate
- 00920 Benfotiamine with Thiamine
- 01945 BioActive Complete B-Complex
- 00102 Biotin
- 00084 Buffered Vitamin C Powder
- 02229 Fast-C® and Bio-Quercetin®
- 02075 Gamma E Mixed Tocopherol Enhanced with
Sesame Lignans
- 02070 Gamma E Mixed Tocopherol & Tocotrienols
- 01913 High Potency Optimized Folate

- 01674 Inositol Caps
- 02244 Liquid Vitamin D3 • 50 mcg (2000 IU)
- 02232 Liquid Vitamin D3 (Mint) • 50 mcg (2000 IU)
- 01936 Low-Dose Vitamin K2
- 00373 No Flush Niacin
- 01939 Optimized Folate (L-Methylfolate)
- 01217 Pyridoxal 5'-Phosphate Caps
- 01400 Super Absorbable Tocotrienols
- 02334 Super K
- 01863 Super Vitamin E
- 02422 Vegan Vitamin D3
- 02028 Vitamin B5 (Pantothenic Acid)
- 01535 Vitamin B6
- 00361 Vitamin B12 Methylcobalamin
- 01536 Vitamin B12 Methylcobalamin
1 mg, 60 veg lozenges
- 01537 Vitamin B12 Methylcobalamin
5 mg, 60 veg lozenges
- 02228 Vitamin C and Bio-Quercetin®
60 veg tablets
- 02227 Vitamin C and Bio-Quercetin®
250 veg tablets
- 01753 Vitamin D3 • 25 mcg (1000 IU), 90 softgels
- 01751 Vitamin D3 • 25 mcg (1000 IU), 250 softgels
- 01713 Vitamin D3 • 125 mcg (5000 IU), 60 softgels
- 01718 Vitamin D3 • 175 mcg (7000 IU), 60 softgels
- 01758 Vitamin D3 with Sea-Iodine™
- 02040 Vitamins D and K with Sea-Iodine™

WEIGHT MANAGEMENT & BODY COMPOSITION

- 02479 7-Keto® DHEA Metabolite
100 mg, 60 veg capsules
- 02207 AMPK Metabolic Activator
- 02504 Body Trim and Appetite Control
- 02478 DHEA Complete
- 02506C Mediterranean Weight Management
- 01432 Optimized Saffron
- 02511 Thermo Weight Control
- 02509 Waistline Control™

WOMEN'S HEALTH

- 01942 Breast Health Formula
- 02537 Daily PMS Relief
- 02534 Estrogen Balance Elite
- 01894 Estrogen for Women
- 02541 Hair Growth for Women
- 02204 Menopause Relief
- 02319 Prenatal Advantage
- 02536 Sexual Health for Her
- 01649 Soy Isoflavones
- 02513 Women's Bladder Support

Some Things
Get Better With Age

Aged Black Garlic

FOR HEART HEALTH



Black garlic is created through a patent-pending, solvent-free aging process that can take up to 90 days.

This produces a high content of s-allyl-cysteine, a phytochemical associated with **cardiovascular** health.¹⁻⁴

Clinical research has shown that **aged black garlic** provides targeted support for healthy serum triglycerides, blood pressure, and cholesterol within normal range.⁴



Item #02530

30 500 mg vegetarian capsules

1 bottle **\$18**

4 bottles \$17 each



References

1. *Molecules*. 2021 Aug 19;26(16):5028.
2. *Journal of Functional Foods*. 107(2023):105657.
3. *Molecules*. 2017 Jun 1;22(6) : 919.
4. *OAJCAM*. September 20, 2023;6(1).

For full product description and to order **Aged Black Garlic Odorless Extract**,
call **1-800-544-4440** or visit **www.LifeExtension.com**

Garlzac® is a registered trademark of Olene Life Sciences Pvt. Ltd.

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.

FEED YOUR BRAIN

Neuro-Mag® Magnesium L-Threonate

"It is my goal
to never run out
of this. Ever!"

Rusty

VERIFIED CUSTOMER
REVIEW



Item #01603 • 90 vegetarian capsules
1 bottle **\$31.50** • 4 bottles \$28.50 each

SUPPORTS OVERALL COGNITIVE ABILITY

Neuro-Mag Magnesium L-Threonate helps maintain working (short-term) memory, encourages healthy processing speed, and supports overall cognitive function.^{1,2}



Item #02032 • 93.35 grams of powder
1 jar **\$31.50** • 4 jars \$28.50 each

For full product description and to order **Neuro-Mag® Magnesium L-Threonate** or **Neuro-Mag® Magnesium L-Threonate Powder**, call **1-800-544-4440** or visit **www.LifeExtension.com**

References: 1. *Nutrients*;14:5235.10.3390/nu14245235. 2. *J Alzheimers Dis.* 2016;49(4):971-90.

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The Science of a Healthier Life®

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FORT LAUDERDALE, FLORIDA 33340-7198



IN THIS EDITION OF *LIFE EXTENSION MAGAZINE*®



7 DELAY BIOLOGICAL AGING

A study in the journal *Nature Aging* showed that simple nutrient and lifestyle interventions slowed **biological aging**, even when started **later in life**.

22 ASTAXANTHIN AND YOUR BRAIN

Clinical data show **astaxanthin** significantly *improved* **cognitive** function, **memory**, and **learning**.



32 NEW APPROACH FOR INTESTINAL HEALTH

In various **clinical trials**, a novel **postbiotic**, two **probiotics**, and four **phages** helped *alleviate* **gastrointestinal discomforts**, and improved digestion.

44 VITAMIN D REDUCES DEPRESSION SYMPTOMS

Clinical trials found that oral **vitamin D** may help *prevent* or reduce symptoms of **depression** and improve **brain connectivity**.



56 BENEFITS OF BLUEBERRY

Clinical results reveal that **blueberries** *improved* **cardiovascular** function, blood **sugar**, and **brain** health.

63 METFORMIN SLOWS AGING IN MONKEYS

In a primate model, **metformin** was found to *slow* the **aging process**, improve markers of senescence, and enhance **brain function**.

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