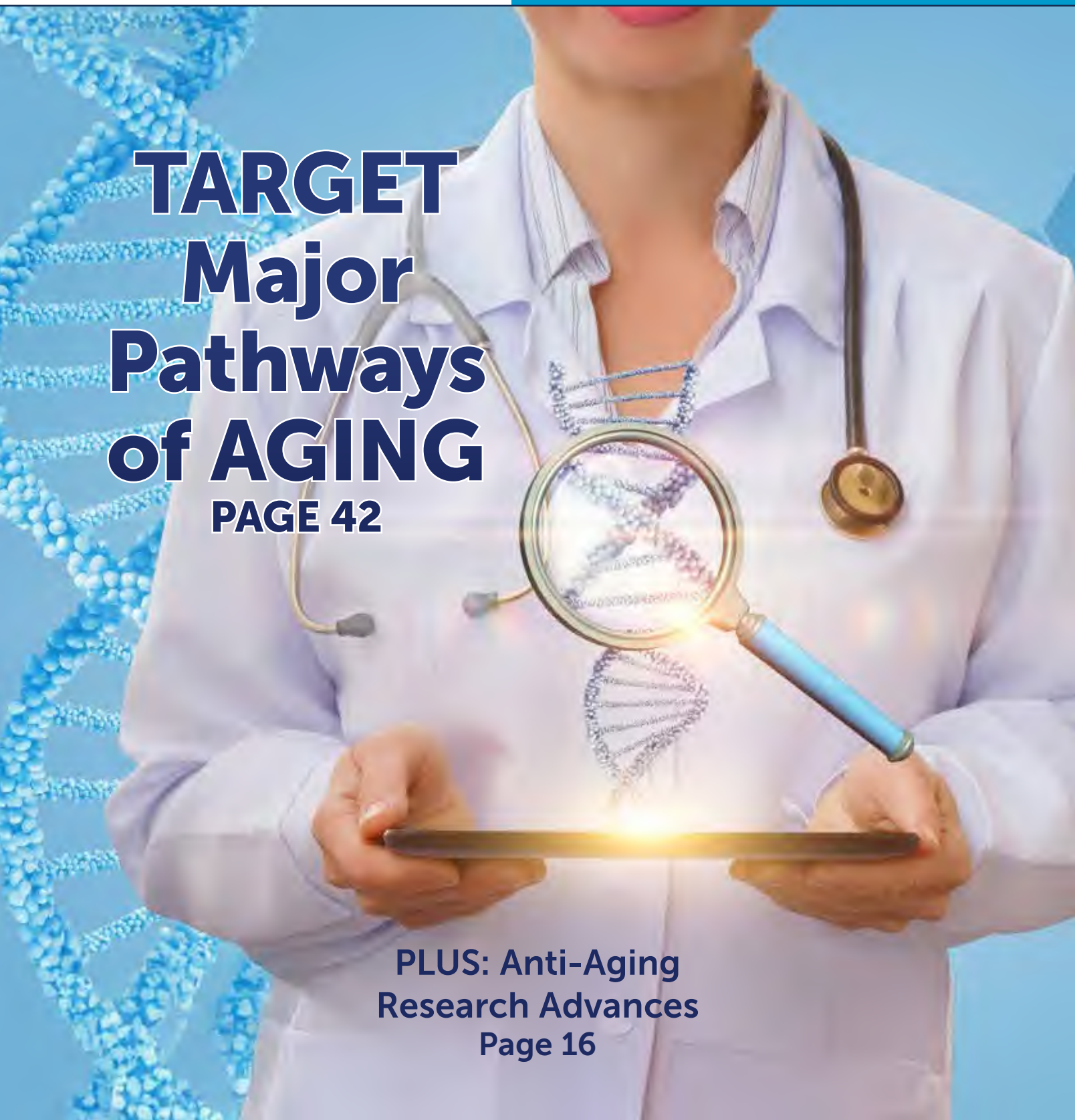
LIFE EXTENSION®
The Science of a Healthier Life®
January/February 2026

FEATURE ARTICLES



TARGET Major Pathways of AGING

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PLUS: Anti-Aging Research Advances

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Protect your cells with this powerful antioxidant and glutathione precursor.

Help your body fight back against free radicals—and encourage liver and respiratory health—with this easily absorbed immune health all-star.

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

CoQ10

When Your Energy Matters Most

Help your hard-working organs produce the energy they need to thrive.

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

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Counteract Five Hallmarks of Biological Aging

Adults taking a standardized plant extract for 12 weeks showed no increase in **epigenetic age,** while preserving **telomere length** and stabilizing **DNA methylation**.

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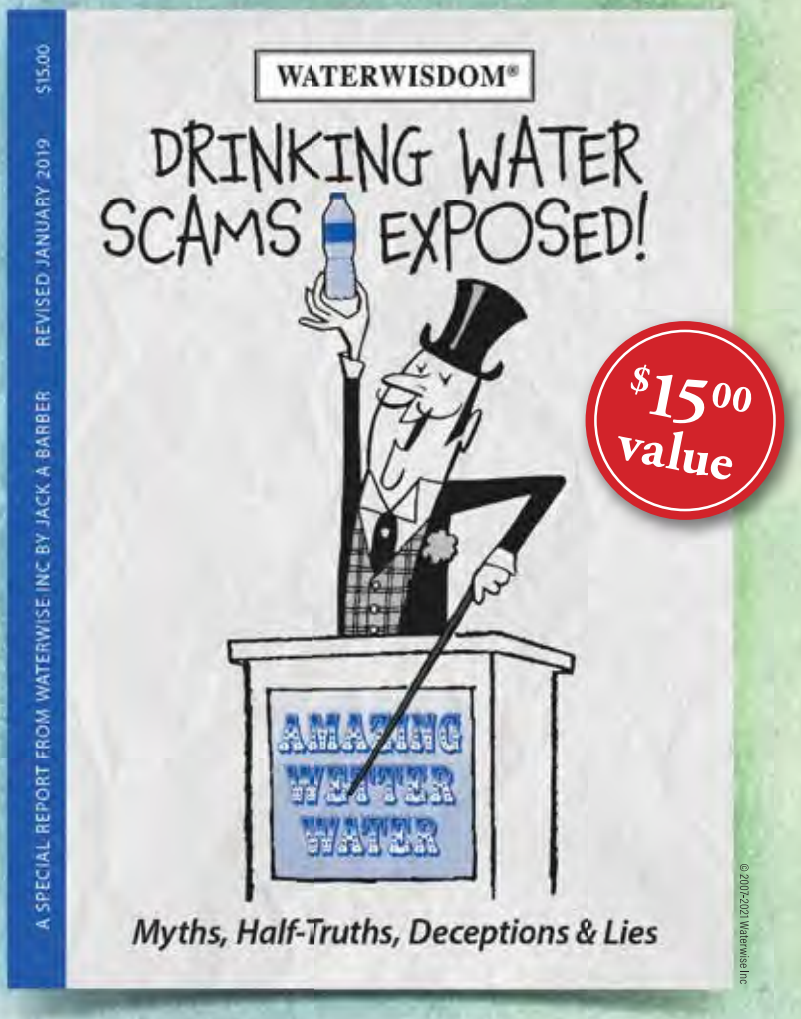

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MEDICAL ADVISORY BOARD

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

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

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In the News

CoQ10 Given Within 24 Hours After Ischemic Stroke May Improve Neuroprotection

Supplementation with coenzyme Q10 (CoQ10), when given within 24 hours after **stroke** onset, may improve certain biomarkers that relate to neuroprotection, according to a study published in *Neurological Research*.[1]

For this randomized, double-blind, placebo-controlled trial, 50 people hospitalized for acute ischemic stroke were given either **600 mg** per day of **CoQ10** or a **placebo**. Treatment started within **24 hours** of the stroke onset and lasted for 30 days.

In the CoQ10 group, there were significant reductions in malondialdehyde (a marker of oxidative stress) and in IL-6 (a marker of inflammation).

The CoQ10 group also had beneficial increases in **superoxide dismutase** (an enzyme that defends against oxidative stress), and **brain derived neurotrophic factor** (BDNF), which is an important protein involved in learning and memory.

Editor's Note: "CoQ10 may be considered a therapeutic option for enhancing neuroprotection and rehabilitation in stroke patients," the authors concluded.

Note that CoQ10 beneficially accumulates in a healthy body at a dose of **100 mg**/day of an absorbable form of CoQ10 when taken with a meal containing some fat. In individuals with underlying conditions, supplemental doses in the range of **200–400 mg/day**[2] have been used to raise CoQ10 blood levels to approximately **4.0–7.0 µg/mL**, a range considered supraphysiological (greater than normally found in the body), yet beneficial.[3] This explains why a much *higher* dose was used in the acute stroke study, as patients likely began with low CoQ10 levels.

References

1. *Neurol Res*. 2025 Apr;47(4):232-241.
2. *Mol Nutr Food Res*. 2023 Jul;67(13):e2200800.
3. *Biofactors.* 2008;32(1-4):119-28.

Taurine Lowers Blood Pressure, Enhances Vascular Function in Type 2 Diabetics

A randomized, double-blind, placebo-controlled trial demonstrated that **taurine** reduced systolic blood pressure and improved endothelial function in individuals with type 2 diabetes.*

The study involved 144 adults aged 18-75 with type 2 diabetes. Participants were randomly assigned to receive either **2.4 grams** of taurine or a **placebo** daily for 12 weeks.

At the end of the trial, those who received **taurine** experienced an average reduction of **7 mmHg** in systolic blood pressure, along with a significant decline in serum uric acid levels compared to baseline.

The **placebo** group had no significant improvements.

Editor's Note: Taurine was additionally found to increase plasma hydrogen sulfide, which helps relax the blood vessels, and inhibit platelet calcium influx.

* *iScience*. 2025 May 21;28(6):112719.

French Maritime Pine Bark Reduces Cellulite in Women

Cellulite is a condition characterized by denting and dimpling of the skin, that most often occurs in the legs, buttocks and abdomens of women.*

In a randomized, double-blind, three-month study, 30 women with moderate cellulite were given **150 mg** French maritime **pine bark** extract per day. Another group of 30 women with moderate cellulite received a **placebo** daily for three months.

The Hexsel Cellulite Severity Score, thigh circumference, and other factors were evaluated at the beginning of the study and at 28, 56, and 84 days.

The authors reported a significant **improvement** in the treated group's clinical cellulite score after two and three months by **12%** and **13.6%** respectively. This was associated with clinical remediation shown by photographs, and a significant decrease in the upper thighs' circumference after three months.

Editor's Note: In addition, there were significant improvements in skin roughness and skin smoothness in the group that received French maritime pine bark. No significant improvements were observed in the placebo group.

* *Phytomed Plus*. 2025 Aug;5(3)100821.

Metabolic Syndrome Increases Early-Onset Dementia Risk

The risk of early onset **dementia** (diagnosed before age 66), is increased in people who have **metabolic syndrome**, according to a study in *Neurology*.*

Metabolic syndrome is a cluster of conditions—including high blood pressure, high blood sugar, belly fat, and high lipid levels—that increase the risk of heart disease, stroke, and diabetes.

Previous research has also tied metabolic syndrome to an increased risk of *late*-onset dementia.

To determine its impact on young-onset dementia researchers studied 1,979,509 people from 40-60 years old who underwent health checkups in 2009 and were followed for an average of 7.75 years.

Results showed that metabolic syndrome was associated with **24%** *higher* risk of young-onset dementia and **21%** increased risk of **vascular dementia**.

Editor's note: While these findings indicate association as opposed to cause and effect, the researchers concluded, "These findings suggest that interventions targeting metabolic syndrome may help mitigate young-onset dementia risk."

* *Neurology.* 2025 May 27;104(10):e213599.

For Oral Health Worth Smiling About

NEW & IMPROVED

FLORASSIST® Probiotic Oral Hygiene

Promote oral health and inhibit unwanted oral bacteria with FLORASSIST® Probiotic Oral Hygiene.

This mint-flavored lozenge contains a unique probiotic strain paired with a postbiotic to maintain healthy gum tissue, help manage dental plaque, inhibit inflammation to support oral health, promote a healthy oral pH and even inhibit the unwanted bacteria that live in your mouth.

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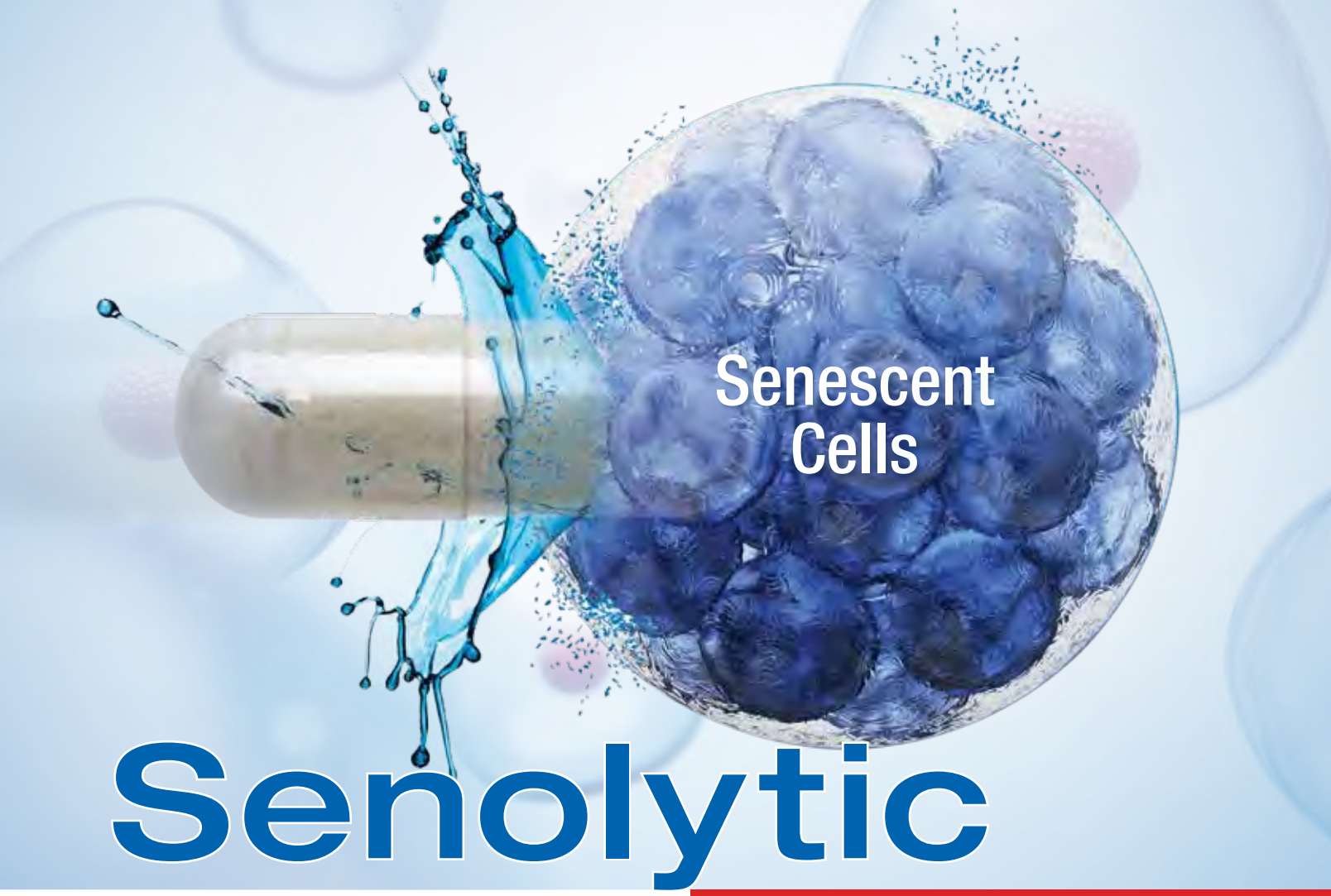
Item #02120

30 vegetarian lozenges

GLUTEN FREE

1 DAILY

This product is available at fine health food stores everywhere.



Senolytic

ACTIVATOR® with BIO-FISETIN®

GLUTEN FREE

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36 vegetarian capsules

"Taking this supplement, I feel I will be healthy for the long haul."

Larry

VERIFIED CUSTOMER REVIEW

This product is available at fine health food stores everywhere.

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

Senolytics are compounds that promote the body's natural processes for clearing senescent cells.

Senolytic Activator® formula provides four ingredients, including a bio-available form of Bio-Fisetin® to support healthy aging.

COMPREHENSIVE SENOLYTIC SUPPORT

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

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

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

**As compared to regular powder fisetin.*

Blueberry EXTRACT

Whole blueberries provide health-boosting benefits shown to:

- Support heart health
- Maintain brain function
- Scavenge free radicals
- Help maintain DNA structure

Blueberry Extract Capsules provide beneficial compounds found in fresh blueberries, helping to support whole-body health in a simple, convenient form.

Item #01214

60 vegetarian capsules

GLUTEN FREE

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"I am very pleased with the product."
Arline
VERIFIED CUSTOMER REVIEW

This product is available at fine health food stores everywhere.

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.

Anti-Aging Research Advances

WILLIAM FALOON

A remarkable number of healthy-longevity findings have been published over the past 18 months.

I presented much of this data at a scientific conference in July 2025. The audience was thrilled to learn how close we may be to significantly *extending* our *lifespans*.

In upcoming issues of ***Life Extension*** *Magazine* I will provide easy-to-understand advances rapidly occurring in the *regenerative medicine* arena.

The good news is that scientists are further validating much of what most of you do now to live longer.

And the progress being made in the fields of *age-delay* and *age-reversal* gives us all hope of longevity *enhancements* that were previously unimaginable.

Our *regenerative research* projects are funded solely from proceeds of *blood tests* and *nutritional supplements* you obtain from us.

Unlike early decades (1970s-1990s) when we were ridiculed for suggesting *humans* could *live* much *longer*, the most influential people today are also pursuing initiatives to restore *youthful* functionality to our *aged* bodies.

In preclinical studies, a plant extract called *luteolin* has demonstrated potential to fight the *aging* process.[1-3]

As you will learn on the next page, a more *bioavailable* form of *luteolin* may enable greater systemic effects.

My gratitude to *Life Extension* supporters who enable us to fund pioneering projects aimed at whole-body *rejuvenation*.

Luteolin and Cellular Integrity

Luteolin is a polyphenol found in foods such as fruits, flowers, and herbs.[4]

It was identified by **Life Extension®** in 1985 and made available as part of a multi-ingredient formula shortly after.

Luteolin may exert its anti-aging benefits by modulating **autophagy**,[3,5] aka **cellular housekeeping**, or the body's ability to remove intracellular waste products.[6]

With age, the cell's ability to clear out its damaged components declines. This results in the accumulation of debris inside our cells that interferes with healthy function.[7]

Autophagy deficits have been implicated in neurodegenerative disorders, cardiovascular diseases, cancer, and more.[7,8]

Luteolin boosts **autophagy** and may also engage the molecular machinery that improves **mitophagy**, which is the selective removal of degraded or damaged **mitochondria**.[9]

Boosting **autophagy** and **mitophagy** has been shown to increase or extend **lifespan** in yeast, nematodes, fruit flies, and mice.[10]

It may do the same in **humans**.

Preclinical research suggests that **luteolin** may provide some protective effects against the following conditions:

- Cancer (liver, breast, lung, GI, bladder, pancreatic)[4,11,12]
- Cardiovascular/Atherosclerosis[4]
- Obesity[4]
- Insulin Resistance[11,13]
- Liver disorders[4]
- Kidney disorders[4]
- Brain injury[14]
- Neurodegenerative disorders[4,15]
- Asthma[4,11,16,17]
- Gastrointestinal (GI) disorders[4,18]
- Depression[19]

The question is whether this preclinical evidence translates into real-world benefits for **aging** humans.

This growing body of data on luteolin has spurred increasing interest from the scientific community. A search for **"luteolin"** in titles on the **National Library of Medicine** (PubMed) returns over **1,300 new results,** with exponentially greater results since the year 2009.

Luteolin Research[20]

The major dilemma with **luteolin** has been its poor **bioavailability**.

In an artificial environment, like a cell culture, luteolin can reach and penetrate cells, but it doesn't do this well when ingested orally. In animal research, its bioavailability is around **26%**.[21]

Researchers have found that the **bioavailability** can be enhanced significantly when **luteolin** is combined with fibers from the **fenugreek plant**.

In fact, in a **human** trial, this **formulated luteolin** achieved **"nearly 14" times** *greater* **bioavailability** than an unformulated version.[22]

Thanks to this bioavailability enhancement, some of the benefits of luteolin observed in preclinical studies may now be replicated in **humans**.

Higher dosages around **500 mg** have been clinically shown to improve testosterone and libido in men, but lower dosages with *higher* bioavailability may be all that's needed to provide benefits for men and women without affecting sex hormones.[22] (More on this will be published in a future issue of *Life Extension®* Magazine.)

Summary

The **longevity sciences** are advancing at a rapid pace.

Our supporters take advantage of interventions available today to live long enough to benefit from discoveries that have *already* occurred in the laboratory.

This may soon include **cellular reprogramming** that has reversed certain molecular and physiological hallmarks of aging in mice.

We at **Life Extension®** are now testing this in **aged monkeys**. (Look forward to research updates on this primate study in future issues of Life Extension magazine.)

In the meantime, I am adding **100 mg/day** of bioavailable **luteolin** to my personal program based on evidence that it may help protect against a range of degenerative processes.

For longer life,

William Faloon, Co-Founder
Life Extension® Group

References

1. Younis RL, El-Gohary RM, Ghalwash AA, et al. Luteolin Mitigates D-Galactose-Induced Brain Ageing in Rats: SIRT1-Mediated Neuroprotection. *Neurochem Res.* 2024 Oct;49(10):2803-20.
2. Sharma A, Ojha A, Rathee S, et al. Exploring the Therapeutic Potential of Plant-Based Natural Products in Combating Aging. *Curr Drug Targets.* 2025 Sep 16.
3. Brimson JM, Prasanth MI, Malar DS, et al. Plant Polyphenols for Aging Health: Implication from Their Autophagy Modulating Properties in Age-Associated Diseases. *Pharmaceuticals (Basel).* 2021 Sep 27;14(10).
4. Zhu M, Sun Y, Su Y, et al. Luteolin: A promising multifunctional natural flavonoid for human diseases. *Phytother Res.* 2024 Jul;38(7):3417-43.
5. Ponce-Mora A, Salazar NA, Domenech-Bendana A, et al. Interplay Between Polyphenols and Autophagy: Insights From an Aging Perspective. *Front Biosci (Landmark Ed).* 2025 Mar 19;30(3):25728.
6. Shabkhizan R, Haiaty S, Moslehian MS, et al. The Beneficial and Adverse Effects of Autophagic Response to Caloric Restriction and Fasting. *Adv Nutr.* 2023 Sep;14(5):1211-25.
7. Tabibzadeh S. Role of autophagy in aging: The good, the bad, and the ugly. *Aging Cell.* 2023 Jan;22(1):e13753.
8. Klionsky DJ, Petroni G, Amaravadi RK, et al. Autophagy in major human diseases. *EMBO J.* 2021 Oct 1;40(19):e108863.
9. Vongthip W, Nilkhet S, Boonruang K, et al. Neuroprotective mechanisms of luteolin in glutamate-induced oxidative stress and autophagy-mediated neuronal cell death. *Sci Rep.* 2024 Apr 2;14(1):7707.
10. Hansen M, Rubinsztein DC, Walker DW. Autophagy as a promoter of longevity: insights from model organisms. *Nat Rev Mol Cell Biol.* 2018 Sep;19(9):579-93.
11. Rakoczy K, Kaczor J, Soltyk A, et al. Application of Luteolin in Neoplasms and Nonneoplastic Diseases. *Int J Mol Sci.* 2023 Nov 6;24(21).
12. Imran M, Rauf A, Abu-Izneid T, et al. Luteolin, a flavonoid, as an anticancer agent: A review. *Biomed Pharmacother.* 2019 Apr;112:108612.
13. Zhang L, Han YJ, Zhang X, et al. Luteolin reduces obesity-associated insulin resistance in mice by activating AMPKalpha1 signalling in adipose tissue macrophages. *Diabetologia.* 2016 Oct;59(10):2219-28.
14. Kempuraj D, Thangavel R, Kempuraj DD, et al. Neuroprotective effects of flavone luteolin in neuroinflammation and neurotrauma. *Biofactors.* 2021 Mar;47(2):190-7.
15. Theoharides TC. Luteolin as a therapeutic option for multiple sclerosis. *J Neuroinflammation.* 2009 Oct 13;6:29.
16. Aziz N, Kim MY, Cho JY. Anti-inflammatory effects of luteolin: A review of in vitro, in vivo, and in silico studies. *J Ethnopharmacol.* 2018 Oct 28;225:342-58.
17. Huang X, Yu H, Zhou Y, et al. Luteolin attenuates type 2 inflammation in asthmatic mice induced by OVA by regulating IL-33/ST2- GSK3beta-M2 macrophage polarization. *Mol Immunol.* 2025 Oct;186:1-12.
18. Taweesap P, Potue P, Khamseekaew J, et al. Luteolin Relieves Metabolic Dysfunction-Associated Fatty Liver Disease Caused by a High-Fat Diet in Rats Through Modulating the AdipoR1/AMPK/PPARgamma Signaling Pathway. *Int J Mol Sci.* 2025 Apr 17;26(8).
19. Yuan NJ, Zhu WJ, Ma QY, et al. Luteolin ameliorates chronic stress-induced depressive-like behaviors in mice by promoting the Arginase-1(+) microglial phenotype via a PPARgamma-dependent mechanism. *Acta Pharmacol Sin.* 2025 Mar;46(3):575-91.
20. Available at: https://pubmed.ncbi.nlm.nih.gov/?term=luteolin%5Btitle%5D&filter=hum_ani.humans&filter=hum_ani.animal&timeline=expanded. Accessed October 9, 2025.
21. Lin LC, Pai YF, Tsai TH. Isolation of Luteolin and Luteolin-7-O-glucoside from Dendranthema morifolium Ramat Tzvel and Their Pharmacokinetics in Rats. *J Agric Food Chem.* 2015 Sep 9;63(35):7700-6.
22. Data On File. Supplier Internal Study; 2024.
23. Nakayama A, Morita H, Nakao T, et al. A Food-Derived Flavonoid Luteolin Protects against Angiotensin II-Induced Cardiac Remodeling. *PLoS One.* 2015;10(9):e0137106.

(References continued on page 11.)

Summary of Noteworthy Preclinical Research Findings on LUTEOLIN

CARDIOVASCULAR

- Exerted *anti-fibrotic* effects in the *heart*. *Fibrosis* is the thickening and scarring of connective tissue that inflicts tissue damage and loss of function.[23]
- Inhibited platelet activation, oxidative stress, and thrombosis in *human platelets*.[24]
- Restored *nitric oxide* production and supported *vascular function* in mice with diet-induced *obesity*.[25]
- Promoted autophagy and cleared out *intracellular cholesterol* from *macrophages*, preventing them from turning into *pro-atherogenic foam cells,* which contributes to the clogging of arteries that causes heart disease.[26]
- Reduced *cardiac damage* caused by hyperlipidemia in rats.[27]

CANCER

- Favorably regulated signaling pathways that suppress *cancer cell survival* and *proliferation*.[28]
- Sensitized tumors to *chemotherapeutic agents* such as cisplatin, oxaliplatin, doxorubicin, and Taxol, while potentially reducing their toxicity.[29,30]
- Disrupted cancer cells' adaptation to *hypoxia*, limiting their ability to survive in low-oxygen environments.[31]
- Had *anti-inflammatory* activity in *keratinocytes* (primary cells in the outer skin layer) and *fibroblasts* (most common cells of connective tissue) as well as several immune cells.[32]
- In plants, flavonoids protect against UV radiation.

BRAIN HEALTH AND COGNITION

- Inhibited *amyloid-beta* (protein associated with Alzheimer's), induced cell death and oxidative stress.[33]
- Suppressed the neuroinflammatory response from *microglia* (immune cells of the brain) and *astrocytes* (helper cells of neurons).[14]
- Protected against *glutamate-induced* neuronal cell death by regulating *autophagy* and *mitochondrial dynamics*,[9] and it may promote the growth of new *astrocytes*.[34]
- *Glutamate is an excitatory neurotransmitter; in excessive amounts it can negatively impact neuronal health and contribute to brain injury.*

OBESITY AND INSULIN RESISTANCE

- Luteolin improved *insulin resistance,* suppressed *obesity*, and reduced inflammatory *macrophage infiltration* in mice fed a high-fat diet.[13]
- Upregulated the expression of genes controlling lipolysis (the breakdown of fat).[35]

AUTOIMMUNE

- Regulated macrophage oxidative stress, which may improve symptoms associated with *lupus*.[36]
- Inhibited mast cells as well as mast cell-dependent T cell activation which is implicated in *multiple sclerosis* pathogenesis.[15]
- *Mast cells play a pro-inflammatory and modulatory role in the pathogenesis of multiple sclerosis.*

KIDNEY

- Delayed the progression of IgA *nephropathy* (the main cause of end stage kidney disease) by attenuating inflammation, oxidative stress, and reducing extracellular matrixaccumulation.[37]
- Improved *renal function* in rats with renal injury by reducing oxidative stress, neutrophil infiltration, inflammation, and renal cell apoptosis.[38]

LIVER

- Reduced *liver lesions* (abnormal growth) through various mechanisms including inhibiting inflammatory factors, reducing oxidative stress, regulating lipid balance, slowing down aggregation of extracellular matrix, and induced both apoptosis and autophagy in liver cells.[39]
- Relieved metabolic dysfunction-associated *fatty liver disease* in rats caused by high-fat diets and reduced levels of markers of oxidative stress.[18]

GI DISORDERS

- Reduced the incidence of *colitis* in a mouse model of disease and demonstrated anti-inflammatory activity.[40]
- Alleviated ulcerative colitis by restoring *intestinal barrier integrity* and inhibiting pro-inflammatory cytokine production in colonic tissues.[40]

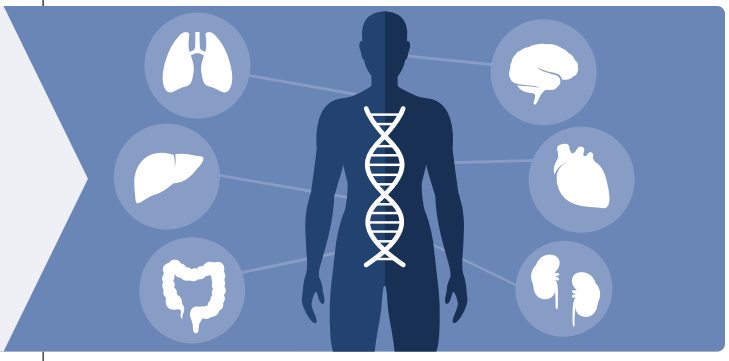
ASTHMA

- Attenuated airway inflammation, hyperresponsiveness, and mucus production in experimental *asthma* models.[17]

DEPRESSION

- Ameliorated chronic stress-induced *depressive-like behaviors* in mice.[19]

Clinical trials urgently needed to see if these laboratory findings translate into people.



24. Ye Y, Yang L, Leng M, et al. Luteolin inhibits GPVI-mediated platelet activation, oxidative stress, and thrombosis. *Front Pharmacol.* 2023;14:1255069.
25. Gentile D, Fornai M, Pellegrini C, et al. Luteolin Prevents Cardiometabolic Alterations and Vascular Dysfunction in Mice With HFD-Induced Obesity. *Front Pharmacol.* 2018;9:1094.
26. Zhang BC, Zhang CW, Wang C, et al. Luteolin Attenuates Foam Cell Formation and Apoptosis in Ox-LDL-Stimulated Macrophages by Enhancing Autophagy. *Cell Physiol Biochem.* 2016;39(5):2065-76.
27. Dong M, Luo Y, Lan Y, et al. Luteolin reduces cardiac damage caused by hyperlipidemia in Sprague-Dawley rats. *Heliyon.* 2023 Jun;9(6):e17613.
28. Singh Tuli H, Rath P, Chauhan A, et al. Luteolin, a Potent Anticancer Compound: From Chemistry to Cellular Interactions and Synergetic Perspectives. *Cancers (Basel).* 2022 Oct 31;14(21).
29. Tang X, Wang H, Fan L, et al. Luteolin inhibits Nrf2 leading to negative regulation of the Nrf2/ARE pathway and sensitization of human lung carcinoma A549 cells to therapeutic drugs. *Free Radic Biol Med.* 2011 Jun 1;50(11):1599-609.
30. Tsai KJ, Tsai HY, Tsai CC, et al. Luteolin Inhibits Breast Cancer Stemness and Enhances Chemosensitivity through the Nrf2-Mediated Pathway. *Molecules.* 2021 Oct 26;26(21).
31. Monti E, Marras E, Prini P, et al. Luteolin impairs hypoxia adaptation and progression in human breast and colon cancer cells. *Eur J Pharmacol.* 2020 Aug 15;881:173210.
32. Gendrisch F, Esser PR, Schempp CM, et al. Luteolin as a modulator of skin aging and inflammation. *Biofactors.* 2021 Mar;47(2):170-80.
33. He Z, Li X, Wang Z, et al. Protective effects of luteolin against amyloid beta-induced oxidative stress and mitochondrial impairments through peroxisome proliferator-activated receptor γ-dependent mechanism in Alzheimer's disease. *Redox Biol.* 2023 Oct;66:102848.
34. Achour M, Ferdousi F, Sasaki K, et al. Luteolin Modulates Neural Stem Cells Fate Determination: In vitro Study on Human Neural Stem Cells, and in vivo Study on LPS-Induced Depression Mice Model. *Front Cell Dev Biol.* 2021;9:753279.
35. Kwon EY, Jung UJ, Park T, et al. Luteolin attenuates hepatic steatosis and insulin resistance through the interplay between the liver and adipose tissue in mice with diet-induced obesity. *Diabetes.* 2015 May;64(5):1658-69.
36. Ding T, Yi T, Li Y, et al. Luteolin attenuates lupus nephritis by regulating macrophage oxidative stress via HIF-1alpha pathway. *Eur J Pharmacol.* 2023 Aug 15;953:175823.
37. Liang DY, Cong SH, Li LH, et al. Luteolin delays the progression of IgA nephropathy by attenuating inflammation, oxidative stress and reducing extracellular matrix accumulation through activating the Nrf-2/HO-1 pathway. *Front Pharmacol.* 2025;16:1530655.
38. Hong X, Zhao X, Wang G, et al. Luteolin Treatment Protects against Renal Ischemia-Reperfusion Injury in Rats. *Mediators Inflamm.* 2017;2017:9783893.
39. Yao C, Dai S, Wang C, et al. Luteolin as a potential hepatoprotective drug: Molecular mechanisms and treatment strategies. *Biomed Pharmacother.* 2023 Nov;167:115464.
40. Xue L, Jin X, Ji T, et al. Luteolin ameliorates DSS-induced colitis in mice via suppressing macrophage activation and chemotaxis. *Int Immunopharmacol.* 2023 Nov;124(Pt B):110996.

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PYCNOGENOL®

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"Been using this for years. Love it."

Gail
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Olive Polyphenols + Fish Oil + Sesame

2,400 mg EPA/DHA in four softgels
Plus Standardized **Olive** Extract and **Sesame** Lignans

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Fish oil is a popular supplement people use to boost **omega-3** levels in the **heart**, **brain**, **eyes**, and other tissues.

Super Omega-3 provides healthy components of the **Mediterranean diet** including highly purified **fish oil**, **sesame lignans**, and standardized **olive extract**.

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

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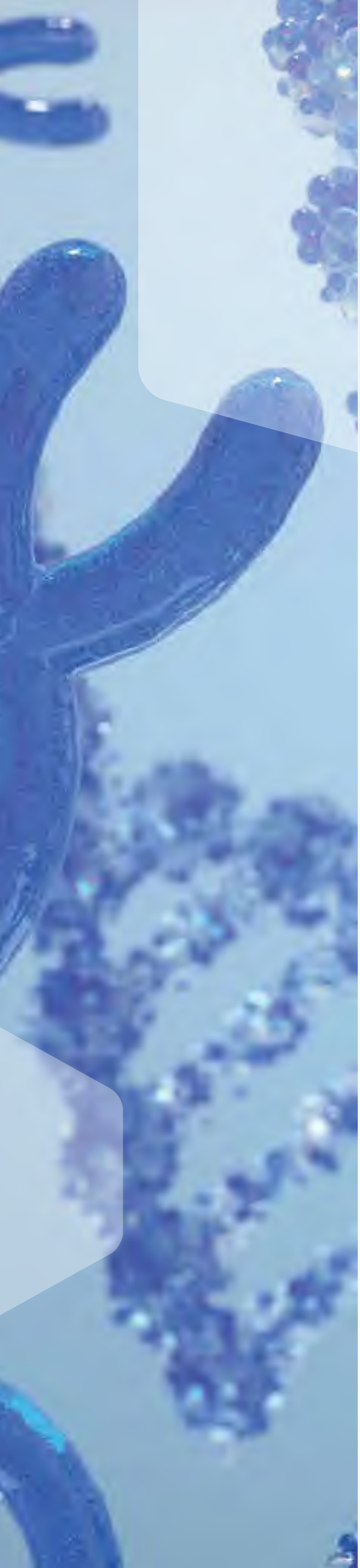
Buffered **ascorbate** encased in <u>two</u> **plant extracts** (liposomes plus hydrogel fenugreek) increases blood (plasma) exposure nearly **seven times** more compared to an equivalent dose of vitamin C as calcium ascorbate.[1]

It also maintains vitamin C levels throughout the day.[2]

Just **<u>one</u>** vegetarian tablet daily provides **around-the-clock** vitamin C support.

This product is available at fine health food stores everywhere.

References 1. Akay Internal Study. Liposomal vitamin C (calcium ascorbate) pharmacokinetics. Data on file. 2021.
2. Akay Internal Study. Liposomal hydrogel vitamin C pharmacokinetics. Data on file. 2021.



VITAMIN D
May Slow Aging by Protecting TELOMERES

BY JOSEPH MEYER

Low levels of **vitamin D** have been linked to most chronic diseases, from cancer to heart disease, as well as increased risk of **early death**.[1-4]

A major new study reveals one possible reason why.

Clinical trial results published in **2025** found that *four years* of daily **vitamin D** intake significantly ***reduced the shortening of telomeres***, the protective caps on the ends of our chromosomes.[5]

Telomere shortening is considered one of the hallmarks of **cellular aging**.[6]

Compared to a placebo, adults who took **vitamin D3** daily for four years reduced telomere shortening to such an extent that it may have prevented the equivalent of about ***three years*** of biological aging as measured in leukocyte immune cells.[5]

By protecting **telomeres**, vitamin D intake may slow certain aging processes and reduce risk for diseases that plague older adults.

Telomeres and Biological Age

Chromosomes are long strands of DNA wrapped around proteins. Found in most cells, chromosomes contain genes that provide life-preserving instructions for our cells.[7]

Telomeres cap the ends of **chromosomes**, protecting and preserving the structure and stability of this genetic material.[6]

In youth, telomeres are long and healthy. With age, they become progressively shorter. This loss of telomeres has been linked to age-related disease and **reduced longevity**.[6,8]

The rate of telomere shortening has been used as a marker of **biological aging** in research studies for years.[6,8-10] In **human** studies, shorter telomeres have been shown to predict a *higher* risk of early **death**.[8]

Protecting telomeres has become an important **anti-aging** target.

The Importance of Vitamin D

Studies have found that individuals with low vitamin D levels are more prone to age-related diseases,[11,12] while those with *higher* levels are at a reduced risk for many common conditions of aging, including:

- Cardiovascular diseases,[13]
- Metabolic disease,[14]
- Cancer,[15,16]
- Dementia,[17]
- Osteoporosis,[18] and
- Infectious disease.[19]

Low **vitamin D** status is common, especially in older adults.[20]

While vitamin D works in many ways, cell studies have suggested that defending **telomere** health is one of its key roles.[5,12,21-23] A breakthrough study published in **2025** indicates that this effect applies to **humans** as well.

Vitamin D Prevents Telomere Shortening

An earlier observational study found that those with **high** vitamin D levels had a **telomere age** approximately **five years** *younger* than those with low D levels.[21]

And in a small clinical trial of overweight adults, the activity of an *enzyme* called **telomerase**, which may extend telomeres, increased by **19%** in those who took **vitamin D** daily for 16 weeks. There was no change in **placebo** recipients.[23]

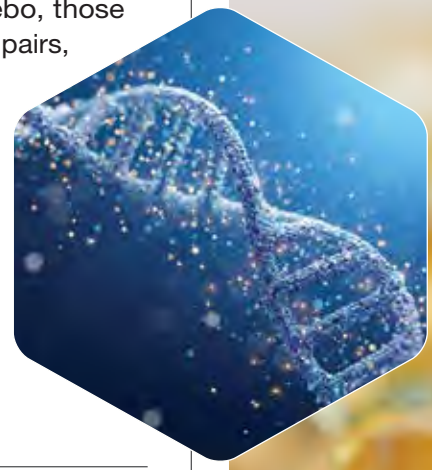
A 2025 study published in *The American Journal of Clinical Nutrition* used data from the randomized placebo-controlled **VITAL trial**. This study randomized adults over age 50 to receive either **2,000 IU** of **vitamin D3** per day or a **placebo**.[5]

Over four years, 1,054 subjects had repeated blood sampling to determine the length of their **telomeres** in white blood cells. As expected, telomeres tended to shorten with age. But the loss of telomeres was *much slower* in those taking vitamin D.[5]

Telomeres consist of repeating patterns of DNA base pairs. Studies estimate that **24** to **45** base pairs of **telomere length** are lost *per year* in adults.[6,24]

In this study, compared to the placebo, those receiving vitamin D lost **140** fewer base pairs, on average, over four years. The authors of this paper stated that this is roughly equivalent to three years of less aging in the vitamin D group.[5]

This is the first time this result was observed in a large, placebo-controlled **clinical trial**.[5] But previous observational studies have also found that *higher* vitamin D levels are associated with longer telomere length.[22]



Reducing Biological Aging

In the context of aging, vitamin D's role is not limited to telomere protection.[12]

Epigenetic changes—which determine how DNA is expressed or turned "on" or "off"—represent another marker of **biological age**.[25] Among individuals of the same chronological age, lower **vitamin D** levels are associated with *higher* (older) **epigenetic age**.[12,26-28]

Other studies show that vitamin D supplementation in deficient individuals slows this process, as measured by **DNA methylation** clocks.[12,26,29,30]

Vitamin D intake clearly provides protection against **telomere loss** and other measures of biological aging.

Summary

Optimal **vitamin D** levels are critical for overall healthy aging.

A recent clinical study in older adults found that **vitamin D3** intake significantly reduced the rate of **telomere** shortening, helping to slow down biological aging as measured by telomere length, and protecting genetic material.

This data and other studies provide convincing evidence that vitamin D may help slow the aging process and reduce risk for age-related chronic disease. ■

What You Need To Know

Vitamin D's Effect on Telomeres

- Low **vitamin D** levels are associated with an increased risk of early death and most age-related chronic diseases, including cancer, cardiovascular disease, and dementia.
- A study published in 2025 reveals that vitamin D3 intake prevented the contraction of **telomeres**, the protective end caps on our chromosomes. Telomere shortening occurs with age and predicts risk of disease and death.
- By protecting telomeres, a marker of biological age, vitamin D may **slow the aging process** and help reduce risk of disease.

References

1. Umar M, Sastry KS, Chouchane AI. Role of Vitamin D Beyond the Skeletal Function: A Review of the Molecular and Clinical Studies. *Int J Mol Sci.* 2018 May 30;19(6).
2. Hu Y, Gao F, Yang Y, et al. Serum 25(OH)D levels and mortality risk among middle-aged and elderly populations in the U.S.: A prospective cohort study. *PLoS One.* 2025;20(7):e0328907.
3. Chowdhury R, Kunutsor S, Vitezova A, et al. Vitamin D and risk of cause specific death: systematic review and meta-analysis of observational cohort and randomised intervention studies. *BMJ*. 2014 Apr 1;348:g1903.
4. Brondum-Jacobsen P, Benn M, Jensen GB, et al. 25-hydroxyvitamin d levels and risk of ischemic heart disease, myocardial infarction, and early death: population-based study and meta-analyses of 18 and 17 studies. *Arterioscler Thromb Vasc Biol.* 2012 Nov;32(11):2794-802.
5. Zhu H, Manson JE, Cook NR, et al. Vitamin D(3) and marine omega-3 fatty acids supplementation and leukocyte telomere length: 4-year findings from the VITamin D and OmegA-3 TriaL (VITAL) randomized controlled trial. *Am J Clin Nutr.* 2025 Jul;122(1):39-47.
6. Ye Q, Apsley AT, Etzel L, et al. Telomere length and chronological age across the human lifespan: A systematic review and meta-analysis of 414 study samples including 743,019 individuals. *Ageing Res Rev.* 2023 Sep;90:102031.
7. Milan M. Chromosomal instability in development and disease: Beyond cancer evolution. Curr Opin Cell Biol. 2025 Aug;95:102537.
8. Bojesen SE. Telomeres and human health. *J Intern Med.* 2013 Nov;274(5):399-413.
9. Shammas MA. Telomeres, lifestyle, cancer, and aging. *Curr Opin Clin Nutr Metab Care*. 2011 Jan;14(1):28-34.
10. Whittemore K, Vera E, Martinez-Nevado E, et al. Telomere shortening rate predicts species life span. *Proc Natl Acad Sci U S A*. 2019 Jul 23;116(30):15122-7.
11. Meehan M, Penckofer S. The Role of Vitamin D in the Aging Adult. *J Aging Gerontol.* 2014 Dec;2(2):60-71.
12. Ruggiero C, Tafaro L, Cianferotti L, et al. Targeting the Hallmarks of Aging with Vitamin D: Starting to Decode the Myth. *Nutrients*. 2024 Mar 21;16(6).
13. Grant WB, Boucher BJ, Cheng RZ, et al. Vitamin D and Cardiovascular Health: A Narrative Review of Risk Reduction Evidence. *Nutrients.* 2025 Jun 25;17(13).
14. Strange RC, Shipman KE, Ramachandran S. Metabolic syndrome: A review of the role of vitamin D in mediating susceptibility and outcome. *World J Diabetes.* 2015 Jul 10;6(7):896-911.
15. Mot CI, Horhat DI, Balica NC, et al. Vitamin D and Clinical Outcomes in Head and Neck Cancer: A Systematic Review. *Nutrients*. 2025 Mar 21;17(7).
16. Munoz A, Grant WB. Vitamin D and Cancer: An Historical Overview of the Epidemiology and Mechanisms. *Nutrients*. 2022 Mar 30;14(7).
17. Ghahremani M, Smith EE, Chen HY, et al. Vitamin D supplementation and incident dementia: Effects of sex, APOE, and baseline cognitive status. *Alzheimers Dement (Amst).* 2023 Jan-Mar;15(1):e12404.
18. Wang D, Yang Y. The Relationship Between Serum 25-Hydroxyvitamin D Levels and Osteoporosis in Postmenopausal Women. *Clin Interv Aging.* 2023;18:619-27.
19. Rebelos E, Tentolouris N, Jude E. The Role of Vitamin D in Health and Disease: A Narrative Review on the Mechanisms Linking Vitamin D with Disease and the Effects of Supplementation. *Drugs.* 2023 Jun;83(8):665-85.
20. Cui A, Zhang T, Xiao P, et al. Global and regional prevalence of vitamin D deficiency in population-based studies from 2000 to 2022: A pooled analysis of 7.9 million participants. *Front Nutr.* 2023;10:1070808.
21. Richards JB, Valdes AM, Gardner JP, et al. Higher serum vitamin D concentrations are associated with longer leukocyte telomere length in women. *Am J Clin Nutr.* 2007 Nov;86(5):1420-5.
22. Zarei M, Zarezadeh M, Hamedi Kalajahi F, et al. The Relationship Between Vitamin D and Telomere/Telomerase: A Comprehensive Review. *J Frailty Aging.* 2021;10(1):2-9.
23. Zhu H, Guo D, Li K, et al. Increased telomerase activity and vitamin D supplementation in overweight African Americans. *Int J Obes (Lond).* 2012 Jun;36(6):805-9.

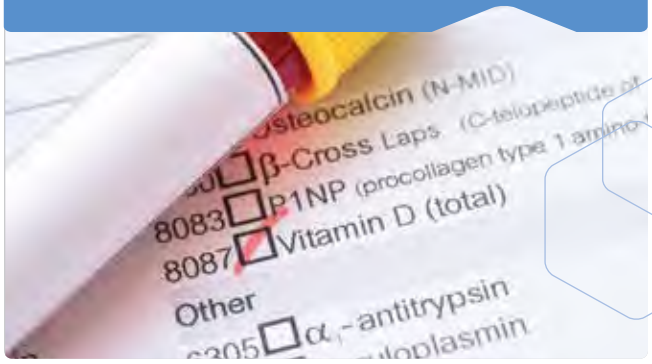
Vitamin D Benefits Breast Cancer Patients

In a recent study, women receiving chemotherapy treatment for **breast cancer** were randomized to receive either **2,000 IU** of **vitamin D3** or a **placebo** daily.[31]

At baseline, both groups tended to have low vitamin D levels, as is often the case in cancer patients.

After six months, **24%** of subjects receiving **placebo** had a "complete pathological response" (meaning there were no longer signs of cancer). But in those receiving **vitamin D**, a robust **43%** of patients had a complete response.

That's a remarkable difference. Overall, women whose **vitamin D** levels were over **20 ng/mL** were over ***three times*** more likely to successfully respond to treatment than those with low levels.



24. Muezzinler A, Zaineddin AK, Brenner H. A systematic review of leukocyte telomere length and age in adults. *Ageing Res Rev.* 2013 Mar;12(2):509-19.
25. Evangelina R, Ganesan S, George M. The Epigenetic Landscape: From Molecular Mechanisms to Biological Aging. *Rejuvenation Res.* 2025 Jun;28(3):93-112.
26. Chen L, Dong Y, Bhagatwala J, et al. Effects of Vitamin D3 Supplementation on Epigenetic Aging in Overweight and Obese African Americans With Suboptimal Vitamin D Status: A Randomized Clinical Trial. *J Gerontol A Biol Sci Med Sci*. 2019 Jan 1;74(1):91-8.
27. Vetter VM, Spira D, Banszerus VL, et al. Epigenetic Clock and Leukocyte Telomere Length Are Associated with Vitamin D Status but not with Functional Assessments and Frailty in the Berlin Aging Study II. *J Gerontol A Biol Sci Med Sci*. 2020 Oct 15;75(11):2056-63.
28. Ong LTC, Booth DR, Parnell GP. Vitamin D and its Effects on DNA Methylation in Development, Aging, and Disease. *Mol Nutr Food Res.* 2020 Dec;64(23):e2000437.
29. Zhu H, Bhagatwala J, Huang Y, et al. Race/Ethnicity-Specific Association of Vitamin D and Global DNA Methylation: Cross-Sectional and Interventional Findings. *PLoS One.* 2016;11(4):e0152849.
30. Vetter VM, Sommerer Y, Kalies CH, et al. Vitamin D supplementation is associated with slower epigenetic aging. *Geroscience.* 2022 Jun;44(3):1847-59.
31. Omodei MS, Chimicoviaki J, Buttros DAB, et al. Vitamin D Supplementation Improves Pathological Complete Response in Breast Cancer Patients Undergoing Neoadjuvant Chemotherapy: A Randomized Clinical Trial. *Nutr Cancer*. 2025;77(6):648-57.

Bioavailability-Enhanced Bio-Luteolin™

In a clinical study, **Bio-Luteolin™** supplements achieved **blood levels** nearly **14 times** higher compared to regular luteolin*![1]

For the first time, the plant flavonoid **luteolin** has been scientifically optimized and clinically studied to have increased bioavailaibility.

Bioavailability refers to the proportion of an orally administered compound that reaches the bloodstream intact and becomes available to produce effects in the body.[2]

Luteolin occurs naturally in foods such as celery, broccoli, peppers, and artichokes, but because it's metabolized in the intestines, it's not easily absorbed by the body.

The new **Bio-Luteolin™** is combined with fenugreek-derived galactomannans that has been clinically studied to greatly boost **bioavailability**.

This product is available at fine health food stores everywhere.

GLUTEN FREE

NON GMO

Item #02547

30 vegetarian capsules

Regular luteolin defined as **98% pure powder luteolin*

1. *Akay.* Data on file. Bio-Luteolin pharmacokinetics study. 2025. 2. *Molecules.* 2023;28(24):8038.

Aging can Wait

Support for a Healthy Lifespan

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

Taurine

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

Lithium

In epidemiological studies higher dietary intake of lithium (drinking water) is associated with lower risk of mortality.[6-8]

Spermidine

In epidemiological studies, higher intake correlates with longer healthspan.[9-11] A one-year study showed that a diet enhanced with **spermidine** daily supports healthy memory scores.[12]

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

New **Healthy Aging Powder** provides the following in one scoop:

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

(0.2% standardization from 1,500 mg Wheat germ extract)

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

Item #02527

7.41 oz.

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

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This product is available at fine health food stores everywhere.

References:
1. *Adv Exp Med Biol*. 2017;975 Pt 1:67-77.
2. *Science*. 2023 ;380(6649) ;eabn9257.
3. *Eur J Pharmacol*. 2020 Oct 15;885:173533.
4. *Nutrients*. 2020 Sep 17;12(9).
5. *Nutrition*. 2022 Sep;101:111706.
6. *J Alzheimers Dis*. 2018;61(1):425-34.
7. *Appl Physiol Nutr Metab*. 2018 Apr;43(4):412-4.
8. *Eur J Nutr*. 2011 Aug;50(5):387-9.
9. *Am J Clin Nutr*. 2018 Aug 1;108(2):371-80.
10. *Front Public Health*. 2022;10:949170.
11. *Cell Rep*. 2021 Apr 13;35(2):108985.
12. *Wien Klin Wochenschr*. 2021 May;133(9-10):484-91.

Contains wheat.

DEFEND Against Biological AGING

NEW

GLUTEN FREE

1 DAILY

NON GMO

Item #02548

30 vegetarian capsules

Scarlet Beebalm Extract

In a clinical study published in **2025**, a standardized extract of the **scarlet beebalm plant** was shown to target **two biomarkers** related to **biological aging**:*

1. **Helps slow the pace of epigenetic aging**
2. **Helps maintain leukocyte telomere length**

One vegetarian capsule daily of **Biological Aging Defense** provides **4 mg didymin** from standardized **scarlet beebalm**.

This product is available at fine health food stores everywhere.

Geroscience. 2025 Jun;47(3):4253-90.


12
Mg
Magnesium

BY RYAN SHORE

How MAGNESIUM Helps You SLEEP

Sleep problems are frustratingly common in Americans.

One in three adults gets less regular quality sleep than the recommended amount.[1]

If this sounds familiar, **magnesium** might help.

This essential mineral supports relaxation, enhances sleep quality and duration,[2-4] and promotes more restorative sleep[5,6] and daytime performance.[2,7]

In a clinical study, elderly adults with insomnia taking **500 mg** of elemental magnesium reported increased overall **sleep time** and **sleep efficiency** (the percentage of time spent asleep while in bed) and decreased **time to fall asleep** and **insomnia severity**.[2]

In another clinical study, adults with sleep problems who took **1,000 mg** of **magnesium-L-threonate** had better **sleep quality** than those taking a placebo, and reported improved **energy**, mood, **mental alertness**, and daytime productivity.

Other forms of magnesium may work similarly.

The Importance of Sleep

Getting enough high-quality **sleep** is essential for maintaining overall health and well-being.

Chronic sleep deprivation doesn't just leave people feeling fatigued, it's also linked to a *higher* risk of serious health issues. Regular sleep duration of less than six hours has been associated with:

- Cognitive decline,[8]
- Increased risk of falls in the elderly,[9]
- Chronic diseases including type 2 diabetes, high blood pressure, and cardiovascular disease,[3,8]
- Depression and anxiety,[9] and
- Overall mortality.[8]

In an observational study of community-dwelling older adults followed for nine years, elderly men experiencing both insomnia and daytime sleepiness had up to a ***three times greater risk of death from any cause***, compared to those without these symptoms.[10]

Insomnia is characterized by persistent problems with sleep. This may include difficulty falling asleep, difficulty staying asleep, or early awakening.

Age-related sleep changes can also harm **sleep quality**, with reductions in deep sleep and REM sleep.[11]

Magnesium and Healthy Sleep

Magnesium is an essential nutrient that is required for the healthy functioning of neurons in the brain and hundreds of enzymes in the body.[12]

In animals, magnesium has been shown to play a role in cellular **timekeeping**.[13]

In the brain, magnesium is essential for maintaining a healthy balance of **excitatory** and **inhibitory** neurotransmission.

It acts as a natural *inhibitor* of **NMDA** channels, one of the most abundant excitatory receptors in the nervous system. And it *boosts* the activity of the neurotransmitter **GABA**, the most abundant relaxation-associated hormones in the brain.[4]

Together, these effects may help reduce anxiety and promote a feeling of **calm**, which may help support sleep.

More Magnesium, Better Sleep

Magnesium deficiency can negatively impact sleep, especially in older adults. It may lead to disorganized sleep patterns and disrupted **sleep-wake cycles**.[14] Chronic insomnia, in turn, may affect mood and contribute to depression and anxiety.[15,16]

One possible explanation is that magnesium deficiency negatively affects hormones that regulate sleep. For example, studies in rodents show that low magnesium levels decrease melatonin—a "sleep hormone"[3] and increase secretion of **cortisol**, the "stress hormone."[16]

These changes can have a drastic negative impact on sleep.

In an observational study of nearly **4,000** adults, those with the *greatest* intake of magnesium had better **sleep quality** and were more likely to sleep at least **seven hours** a night compared to those with the lowest intake.[3]

A systematic review of multiple human studies found that low magnesium levels are associated with increased rates of **daytime drowsiness**, snoring, and **shorter sleep duration**.[4]

In older adults, magnesium supplementation helps improve sleep quality and helps regulate sleep-related hormones by increasing melatonin and reducing cortisol levels.[2]

What Clinical Studies Show

The majority of older adults have lower than the recommended daily intake of **magnesium**.[17,18]

The benefits of magnesium have been shown in additional clinical trials.

In one **clinical trial**, elderly adults with insomnia took either **500 mg** of elemental magnesium in the form of magnesium oxide or a placebo daily for eight weeks. Those taking magnesium had the following results:[2]

- Higher melatonin levels,
- Lower cortisol levels,
- Increased overall sleep time,
- Improved sleep efficiency,
- Reduced time to fall asleep, and
- Lower **insomnia severity index** score.

In this randomized controlled trial of 43 older adults with sleep difficulties, participants who took **500 mg** of elemental magnesium daily (administered as two doses of **magnesium oxide**) for eight weeks, showed increased blood melatonin levels, reduced cortisol concentrations, and also reported improvements in total sleep time, sleep efficiency, and sleep onset latency.[2]

A recent study assessed **magnesium-L-threonate** intake in 80 adults aged between 35 to 55 years with self-assessed sleep problems.[5,6] This form of magnesium has been shown to effectively deliver magnesium into the brain.[19]

In the clinical trial, subjects received either **1,000 mg** of **magnesium-L-threonate** (providing **72 mg** of elemental magnesium) or a placebo daily for 21 days. At the end of the study, compared to the placebo, those receiving magnesium showed improved **sleep quality**, including more time spent in restorative **deep** and **REM sleep** and less time in light sleep.[5]

A Better Night's Sleep with Magnesium

- Getting enough high-quality **sleep** is essential to health and quality of life.
- Sleep problems like insomnia are common, affecting up to **50%** of older adults.
- The mineral **magnesium** plays a critical role in sleep regulation, maintaining healthy levels of hormones that impact sleep such as melatonin and cortisol.
- In **clinical trials**, magnesium intake increased sleep time, reduced the time it takes to fall asleep, decreased insomnia severity, and improved energy, mood, mental alertness, and daytime productivity.

Those taking magnesium also reported improved **energy**, **mood**, **mental alertness**, and daytime **productivity**.

In another study focusing on patients recovering from open-heart surgery, those receiving **500 mg** of **magnesium oxide** daily had improved sleep quality and lower levels of anxiety and depression, compared to patients receiving standard care without magnesium.[20]

Summary

Sleep problems like **insomnia** are very common in adults.

Magnesium is critical to healthy sleep, helping to regulate sleep-wake cycles and balance hormones that affect sleep like melatonin and cortisol.

In clinical trials, magnesium intake improved **sleep quantity** and **quality**, leading to more energy and alertness during the day. ■

References

1. Available at: https://www.nhlbi.nih.gov/health-topics/education-and-awareness/sleep-health. Accessed October 24, 2025.
2. Abbasi B, Kimiagar M, Sadeghniiat K, et al. The effect of magnesium supplementation on primary insomnia in elderly: A double-blind placebo-controlled clinical trial. *J Res Med Sci.* 2012 Dec;17(12):1161-9.
3. Zhang Y, Chen C, Lu L, et al. Association of magnesium intake with sleep duration and sleep quality: findings from the CARDIA study. *Sleep.* 2022 Apr 11;45(4).
4. Arab A, Rafie N, Amani R, et al. The Role of Magnesium in Sleep Health: a Systematic Review of Available Literature. *Biol Trace Elem Res.* 2023 Jan;201(1):121-8.
5. Hausenblas HA, Lynch T, Hooper S, et al. Magnesium-L-threonate improves sleep quality and daytime functioning in adults with self-reported sleep problems: A randomized controlled trial. *Sleep Med X.* 2024 Dec 15;8:100121.
6. Hausenblas HA, Lynch T, Hooper S, et al. Corrigendum/Erratum to "Magnesium-L-threonate improves sleep quality and daytime functioning in adults with self-reported sleep problems: A randomized controlled trial" [Sleep Med: X 8 (2024) 100121]. *Sleep Med X.* 2025 Dec;9:100141.
7. Cao Y, Zhen S, Taylor AW, et al. Magnesium Intake and Sleep Disorder Symptoms: Findings from the Jiangsu Nutrition Study of Chinese Adults at Five-Year Follow-Up. *Nutrients.* 2018 Sep 21;10(10).
8. Mukherjee S, Patel SR, Kales SN, et al. An Official American Thoracic Society Statement: The Importance of Healthy Sleep. Recommendations and Future Priorities. *Am J Respir Crit Care Med.* 2015 Jun 15;191(12):1450-8.
9. Miner B, Doyle M, Knauert M, et al. Insomnia with objective short sleep duration in community-living older persons: A multifactorial geriatric health condition. *J Am Geriatr Soc.* 2023 Apr;71(4):1198-208.
10. Wang YT, Hsu NW, Lin CH, et al. Concurrence of Insomnia and Daytime Sleepiness Predicted 9-Year Mortality Risk in Community-Dwelling Older Adults: The Yilan Study, Taiwan. *J Gerontol A Biol Sci Med Sci.* 2023 Dec 1;78(12):2371-81.
11. Lavoie CJ, Zeidler MR, Martin JL. Sleep and aging. *Sleep Science and Practice.* 2018 2018/02/23;2(1):3.
12. de Baaij JH, Hoenderop JG, Bindels RJ. Magnesium in man: implications for health and disease. *Physiol Rev.* 2015 Jan;95(1):1-46.
13. Feeney KA, Hansen LL, Putker M, et al. Daily magnesium fluxes regulate cellular timekeeping and energy balance. *Nature*. 2016 Apr 21;532(7599):375-9.
14. Mah J, Pitre T. Oral magnesium supplementation for insomnia in older adults: a Systematic Review & Meta-Analysis. *BMC Complement Med Ther.* 2021 Apr 17;21(1):125.
15. Chen PJ, Huang CL, Weng SF, et al. Relapse insomnia increases greater risk of anxiety and depression: evidence from a population-based 4-year cohort study. *Sleep Med*. 2017 Oct;38:122-9.
16. Rawji A, Peltier MR, Mourtzanakis K, et al. Examining the Effects of Supplemental Magnesium on Self-Reported Anxiety and Sleep Quality: A Systematic Review. *Cureus*. 2024 Apr;16(4):e59317.
17. Barbagallo M, Dominguez LJ. Magnesium and aging. Curr Pharm Des. 2010;16(7):832-9.
18. DiNicolantonio JJ, O'Keefe JH, Wilson W. Subclinical magnesium deficiency: a principal driver of cardiovascular disease and a public health crisis. *Open Heart*. 2018;5(1):e000668.
19. Liu G, Weinger JG, Lu ZL, et al. Efficacy and Safety of MMFS-01, a Synapse Density Enhancer, for Treating Cognitive Impairment in Older Adults: A Randomized, Double-Blind, Placebo-Controlled Trial. *J Alzheimers Dis.* 2016;49(4):971-90.
20. Saba S, Faizi F, Sepandi M, et al. Effect of short-term magnesium supplementation on anxiety, depression and sleep quality in patients after open-heart surgery. *Magnes Res.* 2022 Apr 1;35(2):62-70.
21. Costello R, Rosanoff A, Nielsen F, et al. Perspective: Call for Re-evaluation of the Tolerable Upper Intake Level for Magnesium Supplementation in Adults. *Adv Nutr.* 2023 Sep;14(5):973-82.
22. Uberti F, Morsanuto V, Ruga S, et al. Study of Magnesium Formulations on Intestinal Cells to Influence Myometrium Cell Relaxation. *Nutrients.* 2020 Feb 22;12(2).
23. Schuchardt JP, Hahn A. Intestinal Absorption and Factors Influencing Bioavailability of Magnesium-An Update. *Curr Nutr Food Sci.* 2017 Nov;13(4):260-78.
24. Blancquaert L, Vervaet C, Derave W. Predicting and Testing Bioavailability of Magnesium Supplements. *Nutrients.* 2019 Jul 20;11(7).
25. Zhang C, Hu Q, Li S, et al. A Magtein((R)), Magnesium L-Threonate, -Based Formula Improves Brain Cognitive Functions in Healthy Chinese Adults. *Nutrients.* 2022 Dec 8;14(24).
26. Synapharm Internal Study. Efficiency of a magnesium salt (ATA MG® 770mg) on premenopausal syndrome: a clinical study report. Data on file. 2022.

Forms of Magnesium

Life Extension has long emphasized to its readers the importance of this key mineral. While all forms of magnesium are absorbed well, maintaining healthy blood levels depends on consistent intake rather than relying on a single form. The goal should be to ensure daily replenishment through both diet and supplementation.

Magnesium supplements are available in various forms, each offering distinct properties. When selecting a magnesium supplement, the choice depends on individual preference, tolerance, cost, quality brand, and health goals. Oral magnesium comes in a variety of different formulations which are commonly included but are not limited to:

- **Magnesium glycinate** is a well absorbed form of magnesium to support whole-body health.[21] It combines magnesium with the amino acid glycine.[22] Individuals who tend to experience occasional gastrointestinal discomforts when using magnesium supplements prefer magnesium glycinate over others.
- **Magnesium citrate** is another well absorbed form of magnesium.[23] This affordable form is also a good choice for those who experience occasional gastrointestinal discomfort when taking other magnesium supplements.
- **Magnesium oxide** offers a higher percentage of elemental magnesium per single dose. It is often found in multi-ingredient products as it delivers a greater concentration of elemental magnesium without increasing the number of capsules.[24]
- **Magnesium-L-threonate** is a formulation developed by a team of scientists at the **Massachusetts Institute of Technology (MIT)**. It has been shown to effectively deliver magnesium into the body.[25] It is a better option if you are looking for brain health benefits. It has been clinically studied to support quick thinking and working memory, and it promotes overall cognitive health.[19]
- **Magnesium Acetyl-Taurate** combines magnesium with the acetylated form of the amino acid taurine. Preliminary evidence suggests it may help support relaxation and manage occasional anxiety.[26]

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Vitamin B3 (niacinamide, niacinamide ascorbate)	**50 mg NE•**
Vitamin B5 (D-calcium pantothenate)	**50 mg**
Vitamin B6 (pyridoxine HCl, pyridoxal 5'-phosphate)	**75 mg**
Folate (5-MTHF)	**680 mcg DFE°**
Vitamin B12 (methylcobalamin)	**300 mcg**
Biotin	**300 mcg**
Vitamin C (ascorbic acid, calcium and niacinamide ascorbates)	**470 mg**
Vitamin D3 (cholecalciferol)	**(2,000 IU) 50 mcg**
Vitamin E (D-alpha tocopheryl succinate, D-alpha tocopherol)	**67 mg**
Vitamin E (gamma, delta, alpha, beta tocopherols)	**20 mg**
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Magnesium (magnesium oxide)	**100 mg**
Zinc (zinc citrate, L-OptiZinc® zinc mono-L-methionine sulfate)	**25 mg**
Manganese (manganese citrate, gluconate)	**2 mg**
Chromium [Crominex® 3+ chromium stabilized with Capros® amla extract (fruit), PrimaVie® Shilajit]	**200 mcg**
Molybdenum (amino acid chelate)	**100 mcg**
Inositol	**50 mg**
Alpha lipoic acid	**25 mg**
Bio-Quercetin® Proprietary Blend providing 35% quercetin (5 mg) [from Japanese sophora concentrate (flower bud)], 30% galactomannans (4 mg) [from fenugreek (seed)]	**14 mg**
Marigold extract [std. to 5 mg *trans*-lutein, 155 mcg *trans*-zeaxanthin]	**11.12 mg**
Apigenin	**5 mg**
Boron (boron amino acid chelate)	**3 mg**
Lycopene [LycoBeads® natural tomato extract (fruit)]	**1 mg**
Selenium [as sodium selenite, SelenoExcell® high selenium yeast, Se-methyl L-selenocysteine]	**200 mcg**

^ RAE (retinol activity equivalents). °DFE (dietary folate equivalents). •NE (niacin equivalents).

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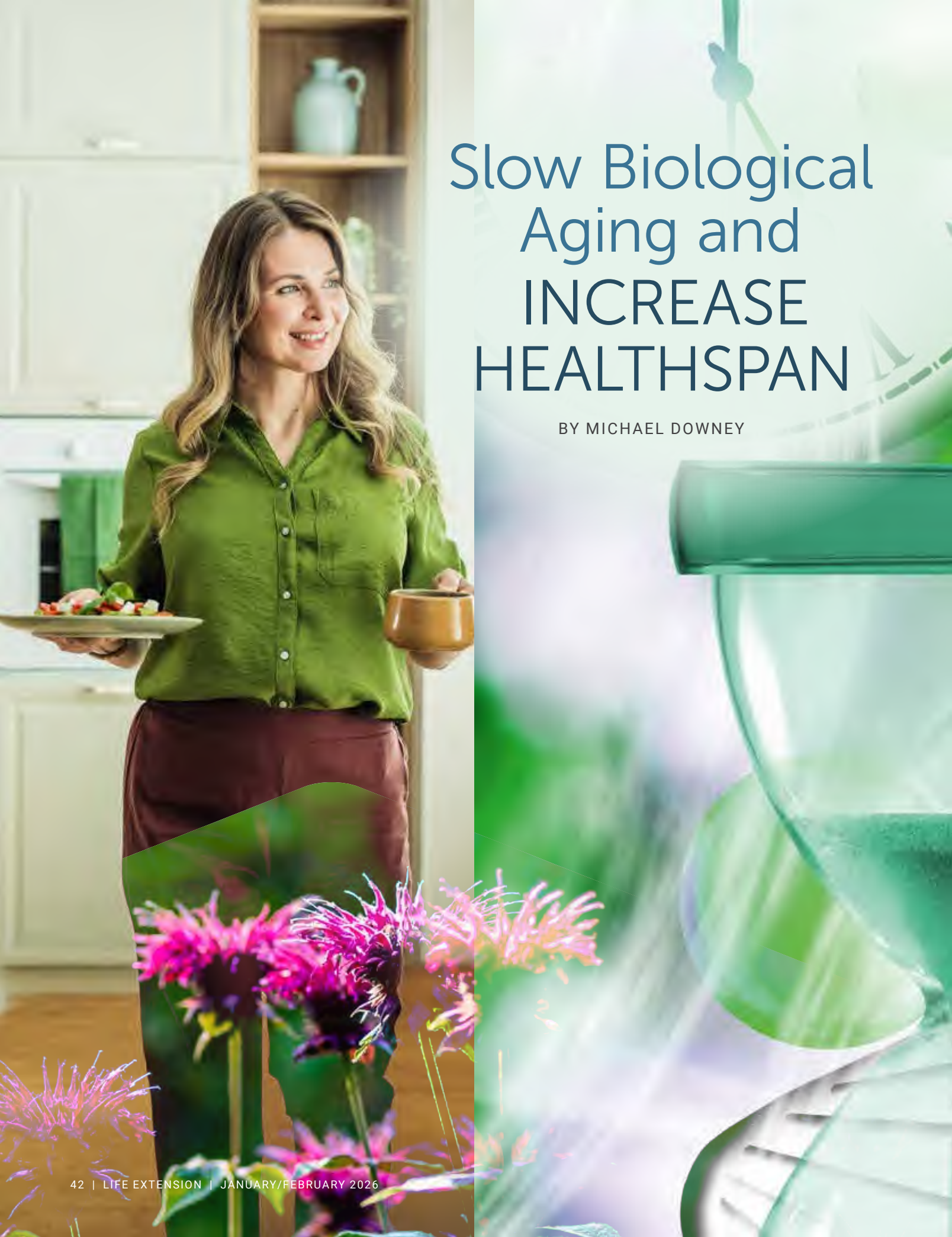
Vitamin K2 (MK7)	100 mcg
Iodine	1,000 mcg

This product is available at fine health food stores everywhere.

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.



Slow Biological Aging and INCREASE HEALTHSPAN

BY MICHAEL DOWNEY

Scientists have identified **12 hallmarks of aging** that contribute to degenerative processes and the risk of age-related disorders.[1-3]

A **plant extract** has been found that targets *five* of the recognized contributors to aging.

In preclinical work, the extract was shown to reduce:[4]

- Telomere shortening,
- Oxidative damage,
- Genomic instability,
- Cellular senescence, and
- Chronic inflammation.

In a clinical study published in **2025**, adults taking this extract for 12 weeks had no significant increase in **epigenetic age**, a major determinant of ***biological age***.

The **epigenetic age** of placebo recipients, on the other hand, increased **1.7 years**.[4] (You don't want an **older** epigenetic age.)

Compared to placebo, the extract led to improvements in leukocyte **telomere length** and stabilization of **DNA methylation** age.

These results indicate the potential for this extract to slow multiple contributors of biological age and increase **healthspan**, the number of years lived in good health.

Biological Vs. Chronological Aging

Many **biological processes** are associated with **degenerative aging**.[5]

Scientists have identified **12** of these biological processes that are called "**hallmarks of aging.**"[1,3]

Over the years, adverse changes in these processes determine our **biological age**.[5,6]

This is different from our ***chronological age***, the number of years we have lived.

Compared to others of the same *chronological age*, those with accelerated ***biological aging*** may seem more frail, are more likely to develop age-related diseases, and have reduced **healthspan**.[5,6]

Researchers have searched for ways to ***slow*** the rate of changes within one or more of these hallmarks of aging, hoping to decrease biological aging and ***increase healthspan***.

After testing other candidates, they identified a plant called **scarlet beebalm**, with abilities to target **five** of the hallmarks of aging.

Beebalm

Scarlet beebalm is an herb native to North America. It has long been used safely by Native Americans to treat respiratory infections and dental disorders.[7]

This herb is abundant with beneficial **flavonoids**, including **didymin**.[8] In preclinical studies didymin is known to boost the function of **mitochondria** (the energy-generating "powerhouses" of cells)[7,9] and of **endothelial cells** lining the insides of blood vessels.[7,10]

An extract of **scarlet beebalm**, standardized to **4% didymin**, has been demonstrated to slow mechanisms of aging.[4]

In lab studies, this extract:

- **Reduced Oxidative Stress.** The extract reduced markers of oxidative damage in stressed cells,[11] and lowered levels of ***protein carbonylation***, a type of damage that occurs in proteins exposed to oxidative stress.[4]

- **Slowed Telomere Shortening.** Telomeres are like "protective caps" that help shield DNA and keep genetic material stable.[12,13] Telomere length and, more importantly, the rate of telomere attrition are strong predictors of species lifespan.[14] Telomere shortening is associated with chronic disease, aging, and higher risk of mortality.[12,15] Cells treated with **scarlet beebalm** extract had a significant ***reduction*** in the rate of telomere shortening compared to untreated cells.[4]

- **Protected Against DNA Damage.** In cells exposed to harmful substances or conditions that damage DNA, the extract reduced markers of DNA damage, showing improved **DNA repair** and genomic stability.[4]

- **Decreased Cellular Senescence.** Dysfunctional senescent cells damage tissues and drive aging.[16] Scarlet beebalm extract decreased a common aging marker in aged human cells, indicating reduced cellular senescence.[4]

- **Reduced Inflammation and Improved Endothelial Function.** The extract reduced pro-inflammatory markers in endothelial cells, and decreased **permeability** (leakage) in microvascular endothelial cells. *Excess* permeability can increase risk for tissue damage and disease.[4]

Together, these results indicate **anti-aging** effects and potential cardiovascular benefits.

Healthier Aging

C. elegans are a type of roundworm that live only two or three weeks, making them ideal to study **aging**.[17,18]

In a study, worms were divided into three groups. One group received no treatment, another was given sulfamethoxazole, a compound known to extend health and lifespan in *C. elegans*, and the third group was treated with the **scarlet beebalm** extract.

Over seven days, the beebalm extract-treated worms showed:[19]

- **Increased time spent moving**,
- **Improved speed**, and
- **Greater distances moved**.

In other words, the extract enhanced **physical activity** and **vitality** over a significant period of the worms' lifetimes.[19]

Clinical Trial

In a **human** study published in **2025**, 81 participants aged 45-65 took either **100 mg** of **scarlet beebalm** extract or a **placebo** daily for **12 weeks**.[4]

Two markers of **biological aging** showed favorable outcomes in those who took the **beebalm** extract:

- **DNA methylation age**, and
- **Telomere length**.

DNA Methylation Age

DNA methylation is a critical **epigenetic** process and considered as a predictor of healthspan. Scientists measure DNA methylation age by analyzing chemical tags (called *methyl groups*) attached to DNA. It is often used to help determine **biological age**.[20]

In this study the **placebo** group's DNA methylation age ***increased by 1.7 years*** in 12 weeks. The scarlet **beebalm** group, on the other hand, showed **no** significant increase.[4]

This **stabilization** of **DNA methylation** aging shows support for cellular function and longer healthspan.

What You Need To Know

Counter Aging Processes with Scarlet Beebalm

- An extract of the **scarlet beebalm** plant addresses ***five*** of the known mechanisms or hallmarks of aging, based on cell-based studies.
- In a recent human trial, those who took scarlet beebalm extract showed no significant **epigenetic aging** during the study, while a placebo group aged epigenetically by **1.7 years**.
- This extract also significantly lengthened **telomeres** (the protective caps on chromosomes) compared to a placebo, and improved quality of life.
- By targeting multiple drivers of aging, this plant extract may ***slow biological aging*** and lead to longer **healthspan**, years of healthy life.

12 Hallmarks of Aging

Scientists have identified **12** aging hallmarks that increase risk of age-related disease and reduced healthspan:[1,6,22]

1. **Oxidative damage**,
2. **Telomere shortening**,
3. **Genomic instability**,
4. **Cellular senescence**,
5. **Chronic inflammation**,
6. **Loss of proteostasis (protein balance)**,
7. **Disabled autophagy (cellular "housekeeping")**,
8. **Deregulated nutrient-sensing**,
9. **Mitochondrial dysfunction**,
10. **Stem cell exhaustion**,
11. **Altered intercellular communication, and**
12. **Dysbiosis (imbalance of gut microbes).**

Researchers have identified a plant called **scarlet beebalm** with abilities to target ***five*** hallmarks of aging in preclinical studies, with clinical findings validating two of these effects.[4]

Telomere Length

Telomere shortening is a biomarker of cellular aging and is associated with age-related disease and mortality.[21]

The **beebalm**-supplemented group showed an ***increase in leukocyte*** (a type of immune cell) ***telomere length*** compared to the **placebo** group, which experienced a decline during the study period.

This suggests that **beebalm** beneficially **lengthened telomeres** rather than merely preventing their loss.[4]

Slowing DNA methylation aging and reducing telomere shortening may contribute to a longer **healthspan**.

In addition, according to a **quality-of-life** questionnaire, those who took the **beebalm extract** engaged in more frequent and vigorous **physical activity**, suggesting they felt healthier as they aged.

Summary

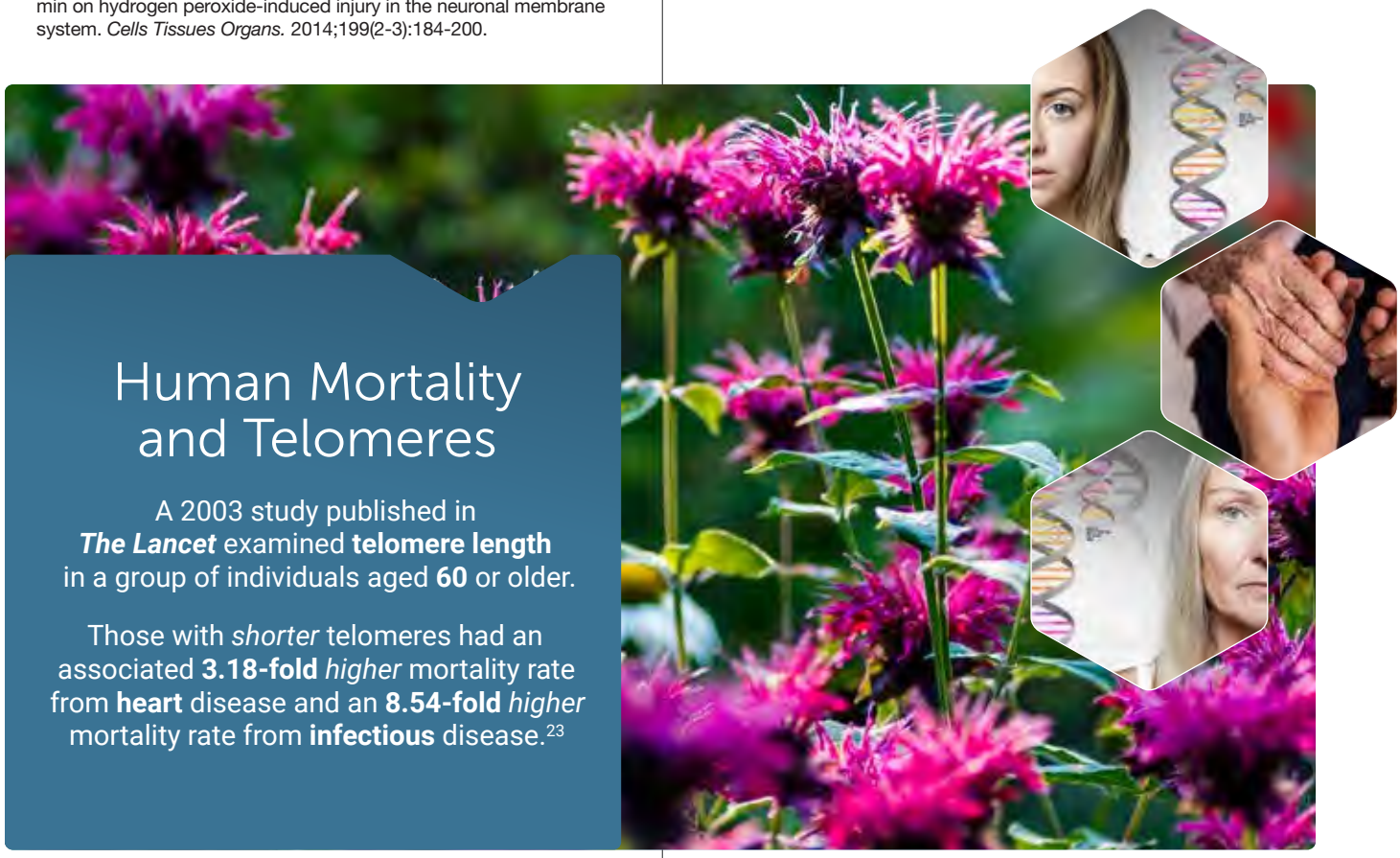
An extract of **scarlet beebalm** has been shown to reduce ***five*** drivers of biological aging, including epigenetic alterations and telomere shortening.

In a clinical study, those who took this extract for 12 weeks had no significant increase in **epigenetic age**, while a placebo group's epigenetic age increased by **1.7 years**.

Leukocyte telomere length *increased* among treated participants compared to the placebo, indicating potential for longer healthspan. ■

References

1. Lopez-Otin C, Blasco MA, Partridge L, et al. Hallmarks of aging: An expanding universe. *Cell.* 2023 Jan 19;186(2):243-78.
2. Lopez-Otin C, Blasco MA, Partridge L, et al. The hallmarks of aging. *Cell.* 2013 Jun 6;153(6):1194-217.
3. Baechle JJ, Chen N, Makhijani P, et al. Chronic inflammation and the hallmarks of aging. *Mol Metab.* 2023 Aug;74:101755.
4. Campisi M, Cannella L, Paccagnella O, et al. Unveiling the geroprotective potential of Monarda didyma L.: insights from in vitro studies and a randomized clinical trial on slowing biological aging and improving quality of life. *Geroscience.* 2025 Jun;47(3):4253-90.
5. Kuiper LM, Polinder-Bos HA, Bizzarri D, et al. Epigenetic and Metabolomic Biomarkers for Biological Age: A Comparative Analysis of Mortality and Frailty Risk. *J Gerontol A Biol Sci Med Sci.* 2023 Oct 9;78(10):1753-62.
6. Elliott ML, Caspi A, Houts RM, et al. Disparities in the pace of biological aging among midlife adults of the same chronological age have implications for future frailty risk and policy. *Nat Aging.* 2021 Mar;1(3):295-308.
7. Yao Q, Lin MT, Zhu YD, et al. Recent Trends in Potential Therapeutic Applications of the Dietary Flavonoid Didymin. *Molecules.* 2018 Oct 6;23(10).
8. Gontar L, Geszprych A, Drutowska A, et al. Essential oil and phenolic compounds in different organs and developmental stages of Monarda didyma L., and their biological activity. *Planta.* 2025 Jan 15;261(2):37.
9. Yang JW, Zou Y, Chen J, et al. Didymin alleviates metabolic dysfunction-associated fatty liver disease (MAFLD) via the stimulation of Sirt1-mediated lipophagy and mitochondrial biogenesis. *J Transl Med.* 2023 Dec 19;21(1):921.
10. Shukla K, Sonowal H, Saxena A, et al. Didymin prevents hyperglycemia-induced human umbilical endothelial cells dysfunction and death. *Biochem Pharmacol.* 2018 Jun;152:1-10.
11. Morelli S, Piscioneri A, Salerno S, et al. Neuroprotective effect of didymin on hydrogen peroxide-induced injury in the neuronal membrane system. *Cells Tissues Organs.* 2014;199(2-3):184-200.
12. Gruber HJ, Semeraro MD, Renner W, et al. Telomeres and Age-Related Diseases. *Biomedicines.* 2021 Sep 27;9(10).
13. Vaiserman A, Krasnienkov D. Telomere Length as a Marker of Biological Age: State-of-the-Art, Open Issues, and Future Perspectives. *Front Genet.* 2020;11:630186.
14. Whittemore K, Vera E, Martinez-Nevado E, et al. Telomere shortening rate predicts species life span. *Proc Natl Acad Sci U S A.* 2019 Jul 23;116(30):15122-7.
15. Chakravarti D, LaBella KA, DePinho RA. Telomeres: history, health, and hallmarks of aging. *Cell.* 2021 Jan 21;184(2):306-22.
16. Zhang L, Pitcher LE, Yousefzadeh MJ, et al. Cellular senescence: a key therapeutic target in aging and diseases. *J Clin Invest.* 2022 Aug 1;132(15).
17. Zhang S, Li F, Zhou T, et al. Caenorhabditis elegans as a Useful Model for Studying Aging Mutations. *Front Endocrinol (Lausanne).* 2020;11:554994.
18. Zavagno G, Raimundo A, Kirby A, et al. Rapid measurement of ageing by automated monitoring of movement of C. elegans populations. *Geroscience.* 2024 Apr;46(2):2281-93.
19. File. SdDo. MonaJuventa Nu significantly improves the healthspan in nematodes. 2025.
20. Unnikrishnan A, Freeman WM, Jackson J, et al. The role of DNA methylation in epigenetics of aging. *Pharmacol Ther.* 2019 Mar;195:172-85.
21. Schneider CV, Schneider KM, Teumer A, et al. Association of Telomere Length With Risk of Disease and Mortality. *JAMA Intern Med.* 2022 Mar 1;182(3):291-300.
22. Belsky DW, Caspi A, Houts R, et al. Quantification of biological aging in young adults. *Proc Natl Acad Sci U S A.* 2015 Jul 28;112(30):E4104-10.
23. Cawthon RM, Smith KR, O'Brien E, et al. Association between telomere length in blood and mortality in people aged 60 years or older. *Lancet*. 2003;361(9355):393-5.



Human Mortality and Telomeres

A 2003 study published in ***The Lancet*** examined **telomere length** in a group of individuals aged **60** or older.

Those with *shorter* telomeres had an associated **3.18-fold** *higher* mortality rate from **heart** disease and an **8.54-fold** *higher* mortality rate from **infectious** disease.[23]

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1. *J Int Soc Sports Nutr*. 2017;14(1):18. 2. *Open Access J Sports Med*. 2017;8:213-26.
3. *Eur J Appl Physiol*. 2013 Apr;113(4):987-96. 4. *Curr Opin Gastroenterol*. 2023;39(2):125-8.

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BY NANCY PEARLSON

VITAMIN K and Your HEART

Vitamin K has long been known to support bone health by helping to keep **calcium** in bones.[1]

It also helps keep calcium *out* of **blood vessels**, where it can lead to **calcified** plaque buildup that contributes to coronary heart disease.[1,2]

Observational studies show that a higher intake of vitamin K is associated with lower risk of **heart disease** and **atherosclerosis**.[3-7] In one observational study, those with the *highest* vitamin K intake had a ***57% lower risk of cardiovascular mortality*** over 10 years.[8]

In clinical studies, vitamin K intake reduced **vascular calcification**[9,10] and stiffness[11-13] and slowed or prevented the progression of **blood vessel** disease.[10,12,14]

Studies suggest that both forms of vitamin K (K1 and K2) play a role in health outcomes, influencing everything from **bone** health[2] to **cardiovascular** risk[2,4] and all-cause **mortality**.[15]

What is Vitamin K?

Vitamin K occurs in two forms:[16]

- **Vitamin K1**, which is primarily found in green, leafy vegetables, and
- **Vitamin K2**, which is found in small amounts in some animal products (like egg yolks and chicken) and in higher amounts in **natto**, fermented soybeans.

While both forms are beneficial, vitamin **K2** has better **bioavailability** and maintains levels in the body for longer.[17,18]

Low levels of vitamin K are commonly seen in older individuals.[19,20] One study estimated that suboptimal levels are found in an astonishing **97%** of older adults.[21]

Vitamin K activates several **vitamin K-dependent proteins**, including ones required for normal clotting of blood after an injury.[22]

Other vitamin K-dependent proteins include **osteocalcin**, **matrix Gla protein**, and **Gas6**.[23] These proteins regulate calcification through different mechanisms, thereby reducing risk of harmful **calcification** in blood vessels[2,24] and in soft tissues.[2,23,25]

Vitamin K and Cardiovascular Disease

The accumulation of calcium in the **arteries** and **heart valves** is a major driver of heart and blood vessel disease. This calcification causes the tissues to stiffen and contributes to atherosclerosis, which narrows the blood vessels and increases risk of **cardiovascular disease**, including stroke.[26]

If this happens in the coronary arteries, an ischemic **heart attack** can result. In the arteries supplying the brain, **stroke** risk increases.[27]

Vitamin K2 improves bone health and protects against cardiovascular risks.

It activates the calcium-binding protein **osteocalcin** in bone to maintain bone strength[28] and **matrix Gla** protein in soft tissues to reduce calcium deposition in areas outside the skeleton, such as **arterial** walls.[29,30] **Matrix Gla** protein and **Gas6** are present in many tissues, including arterial walls, where their active form helps inhibit arterial calcification and may also stabilize existing plaques.[2]

Without enough **vitamin K** present, these proteins cannot be activated in their active form. The result is calcium loss in bones and an *increase* in calcium in arteries, accelerating **atherosclerosis** and increasing the risk of **cardiovascular disease**.[28]

In preclinical models, lack of **matrix Gla** protein activity in mice causes the animals to **die prematurely** due to *massive* arterial calcification and rupture of arteries.[31,32]

What Human Studies Show

Human observational studies consistently find that low vitamin K intake is associated with increased risk of:

- Coronary heart disease,[3,4,6]
- Hospitalization for atherosclerotic cardiovascular disease,[3,5,6]
- Cardiovascular-related death,[7,33,34] and
- Death from any cause.[15,34,35]

In one study of almost **5,000** adults aged 55 and older followed for up to 10 years, those with the *highest* intake of vitamin K2 had a **57%** lower risk of cardiovascular mortality and a **26%** lower risk of **death from any cause** compared to those with the lowest intake.[8]

In another study of over **7,200** subjects followed for a median of **4.8 years**, the risk of all-cause **mortality** was ***45% lower*** in those with the *highest* vitamin K intake compared to those who decreased or did not change their intake.[35]

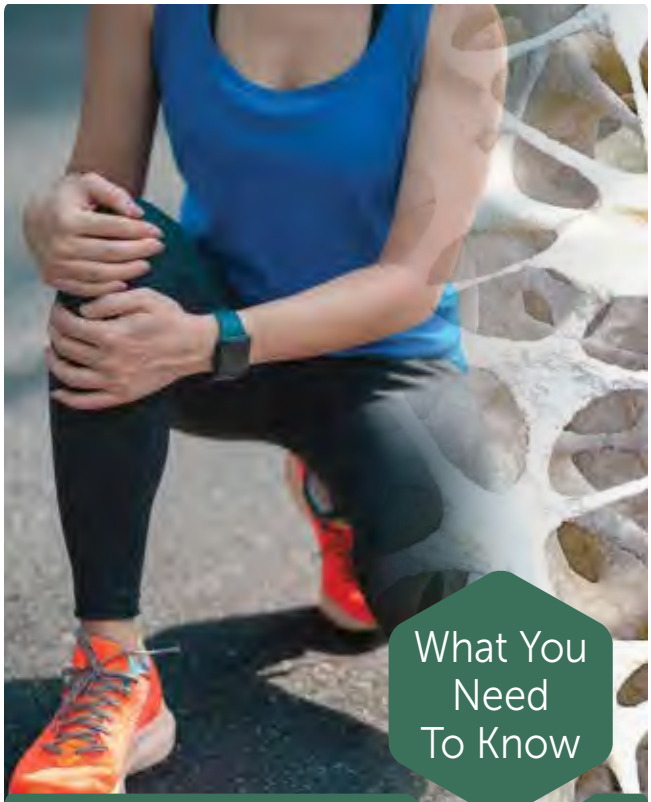
Results from other observational studies are equally impressive:

- In a study of over **16,000** women followed for an average of **eight years**, each additional **10 mcg** of vitamin K2 intake daily was associated with a **9%** reduction in risk for coronary heart disease.[36]
- In a study of more than **36,000** participants followed for an average of **12 years**, those with the *highest* intake of **vitamin K2** had a **41%** lower risk of peripheral artery disease among individuals with high blood pressure and a **44%** lower risk among those with diabetes, compared to participants with the lowest intake.[37]
- In a study involving more than **53,000** participants followed for about **20 years**, higher intake of **vitamin K1** was associated with a **21%** lower risk and the highest intake of vitamin K2 with a **14%** reduced risk of hospitalization for atherosclerotic cardiovascular disease compared to those with the lowest vitamin K intake.[3]
- In a study of over **55,000** subjects followed for up to **21.5 years**, the highest intake of vitamin K1 was associated with a significantly lower risk of **aortic valve stenosis**, as compared to the lowest intake. Aortic valve stenosis is a potentially life-threatening condition that reduces blood flow from the heart to the rest of the body.[38]

Reducing or preventing **calcification** in the arteries can have dramatic benefits.

Dozens of **clinical studies** show that vitamin K intake reduces vascular calcification and the risk of cardiovascular disease.[9,10,14]

For example, in a recent study of post-menopausal women, taking **180 mcg** of vitamin **K2 (as MK-7)** daily for one year, decreased **vascular stiffness**, which is closely associated with the progression of **cardiovascular disease**.[13]



What You Need To Know

Cardiovascular Benefits of Vitamin K

- **Vitamin K** is required for the activation of proteins that keep calcium in bones and prevent abnormal **calcification** in other tissues.
- In the heart and blood vessels, calcification is one of the major drivers of **atherosclerosis**, coronary heart disease, and heart valve disease.
- Large observational studies show an association between higher vitamin K intake and lower risk of heart and blood vessel disease, **cardiovascular-related death**, and death from any cause.
- In clinical trials, vitamin K intake reduced vascular calcification and risk of **cardiovascular disease**.

Chronic kidney **hemodialysis** patients are at an elevated risk of vascular calcification and cardiovascular disease. In a clinical study, **73%** of diabetic hemodialysis patients who took a placebo for 24 weeks had a worsening of **arterial disease**, compared to only **21%** of those who took **375 mcg** of vitamin **K2 (as MK-7)** daily.[12]

Many trials of vitamin K are ongoing, but evidence shows that it may help reduce risk of calcification and progression of **heart disease**.

Summary

Calcification in blood vessels is a major component of **atherosclerosis**, which drives heart disease.

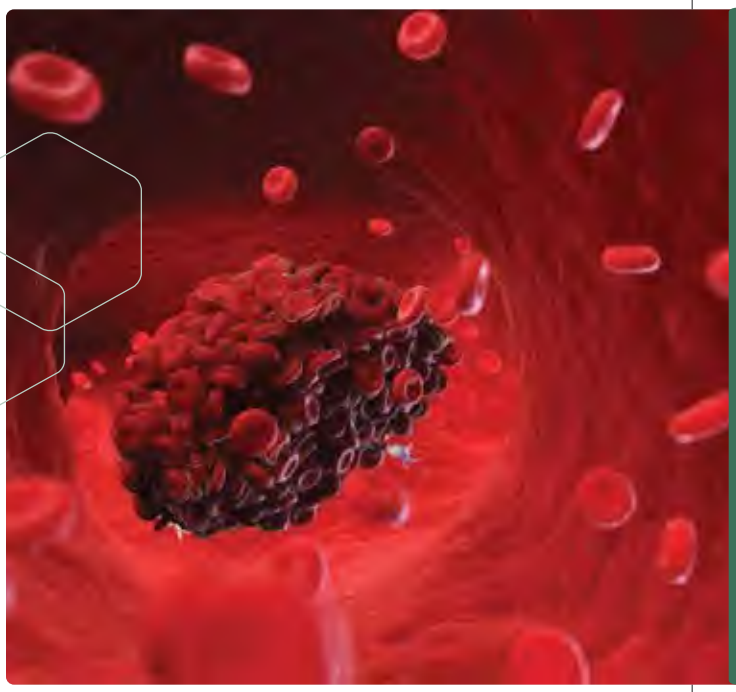
Vitamin K helps keep calcium in bones and *out* of arteries.

Observational studies show a correlation between higher vitamin K intake and lower risk of vascular calcification and stiffness, cardiovascular-related **mortality**, and death from any cause.

Clinical trials also show that vitamin K intake improves vascular health and reduces the risk of **cardiovascular disease**. ■

References

1. Stock M, Schett G. Vitamin K-Dependent Proteins in Skeletal Development and Disease. *Int J Mol Sci.* 2021 Aug 28;22(17).
2. Aaseth JO, Alehagen U, Opstad TB, et al. Vitamin K and Calcium Chelation in Vascular Health. *Biomedicines.* 2023 Nov 27;11(12).
3. Bellinge JW, Dalgaard F, Murray K, et al. Vitamin K Intake and Atherosclerotic Cardiovascular Disease in the Danish Diet Cancer and Health Study. *J Am Heart Assoc.* 2021 Aug 17;10(16):e020551.
4. Haugsgjerd TR, Egeland GM, Nygard OK, et al. Association of dietary vitamin K and risk of coronary heart disease in middle-age adults: the Hordaland Health Study Cohort. *BMJ Open*. 2020 May 21;10(5):e035953.
5. Dupuy M, Zhong L, Radavelli-Bagatini S, et al. Higher vitamin K1 intakes are associated with lower subclinical atherosclerosis and lower risk for atherosclerotic vascular disease-related outcomes in older women. *Eur J Nutr.* 2025 May 3;64(4):171.
6. Chen HG, Sheng LT, Zhang YB, et al. Association of vitamin K with cardiovascular events and all-cause mortality: a systematic review and meta-analysis. *Eur J Nutr.* 2019 Sep;58(6):2191-205.
7. Dupuy M, Radavelli-Bagatini S, Zhong L, et al. Vitamin K1 intake is associated with lower risk for all-cause and cardiovascular disease mortality in community-dwelling older Australian women. *Nutr Metab Cardiovasc Dis.* 2024 May;34(5):1189-97.
8. Geleijnse JM, Vermeer C, Grobbee DE, et al. Dietary intake of menaquinone is associated with a reduced risk of coronary heart disease: the Rotterdam Study. *J Nutr.* 2004 Nov;134(11):3100-5.
9. Lees JS, Chapman FA, Witham MD, et al. Vitamin K status, supplementation and vascular disease: a systematic review and meta-analysis. *Heart.* 2019 Jun;105(12):938-45.
10. Li T, Wang Y, Tu WP. Vitamin K supplementation and vascular calcification: a systematic review and meta-analysis of randomized controlled trials. *Front Nutr.* 2023;10:1115069.
11. Knapen MH, Braam LA, Drummen NE, et al. Menaquinone-7 supplementation improves arterial stiffness in healthy postmenopausal women. A double-blind randomised clinical trial. *Thromb Haemost.* 2015 May;113(5):1135-44.
12. Naiyarakseree N, Phannajit J, Naiyarakseree W, et al. Effect of Menaquinone-7 Supplementation on Arterial Stiffness in Chronic Hemodialysis Patients: A Multicenter Randomized Controlled Trial. *Nutrients.* 2023 May 23;15(11).



Can Taking Vitamin K Increase Clotting Risk?

Because vitamin K promotes healthy **clotting**, some people worry that taking it orally could increase the risk of abnormal blood clots.

This is not the case. Studies of long-term, high-dose vitamin K supplementation have shown that oral intake is safe and does not increase the risk of abnormal clot formation.[39-42] Only those on the drug warfarin (Coumadin®), because it works as a vitamin K antagonist, should be cautious about their vitamin K intake.[43]

13. de Vries F, Bittner R, Maresz K, et al. Effects of One-Year Menaquinone-7 Supplementation on Vascular Stiffness and Blood Pressure in Post-Menopausal Women. *Nutrients.* 2025 Feb 27;17(5).
14. Eelderink C, Kremer D, Riphagen IJ, et al. Effect of vitamin K supplementation on serum calcification propensity and arterial stiffness in vitamin K-deficient kidney transplant recipients: A double-blind, randomized, placebo-controlled clinical trial. *Am J Transplant.* 2023 Apr;23(4):520-30.
15. Shea MK, Barger K, Booth SL, et al. Vitamin K status, cardiovascular disease, and all-cause mortality: a participant-level meta-analysis of 3 US cohorts. *Am J Clin Nutr.* 2020 Jun 1;111(6):1170-7.
16. Schwalfenberg GK. Vitamins K1 and K2: The Emerging Group of Vitamins Required for Human Health. *J Nutr Metab.* 2017;2017:6254836.
17. Koziol-Kozakowska A, Maresz K. The Impact of Vitamin K2 (Menaquionones) in Children's Health and Diseases: A Review of the Literature. *Children (Basel)*. 2022 Jan 5;9(1).
18. Yan Q, Zhang T, O'Connor C, et al. The biological responses of vitamin K2: A comprehensive review. *Food Sci Nutr.* 2023 Apr;11(4):1634-56.
19. Riphagen IJ, Keyzer CA, Drummen NEA, et al. Prevalence and Effects of Functional Vitamin K Insufficiency: The PREVEND Study. *Nutrients.* 2017 Dec 8;9(12).
20. Shea MK, Kritchevsky SB, Loeser RF, et al. Vitamin K Status and Mobility Limitation and Disability in Older Adults: The Health, Aging, and Body Composition Study. *J Gerontol A Biol Sci Med Sci.* 2020 Mar 9;75(4):792-7.
21. Bruno EJ. The prevalence of vitamin K deficiency or insufficiency, and recommendations for increased intake. *J Hum Nutr Food Sci.* 2016;4(1):1077.
22. Berkner KL, Runge KW. Vitamin K-Dependent Protein Activation: Normal Gamma-Glutamyl Carboxylation and Disruption in Disease. *Int J Mol Sci.* 2022 May 20;23(10):5759.
23. Hariri E, Kassis N, Iskandar JP, et al. Vitamin K(2)-a neglected player in cardiovascular health: a narrative review. *Open Heart.* 2021 Nov;8(2).
24. Qiu C, Zheng H, Tao H, et al. Vitamin K2 inhibits rat vascular smooth muscle cell calcification by restoring the Gas6/Axl/Akt anti-apoptotic pathway. *Mol Cell Biochem*. 2017 Sep;433(1-2):149-59.
25. Zhang M, Liu S, Chen Y, et al. Matrix Gla protein suppresses osteoblast senescence and promotes osteogenic differentiation by the PI3K-AKT signaling pathway. *Exp Cell Res*. 2025 Jan 1;444(1):114329.
26. Strauss HW, Nakahara T, Narula N, et al. Vascular Calcification: The Evolving Relationship of Vascular Calcification to Major Acute Coronary Events. *J Nucl Med.* 2019 Sep;60(9):1207-12.
27. Wang X, Chen X, Chen Z, et al. Arterial Calcification and Its Association With Stroke: Implication of Risk, Prognosis, Treatment Response, and Prevention. Front Cell Neurosci. 2022;16:845215.
28. Villa JKD, Diaz MAN, Pizziolo VR, et al. Effect of vitamin K in bone metabolism and vascular calcification: A review of mechanisms of action and evidences. *Crit Rev Food Sci Nutr.* 2017 Dec 12;57(18):3959-70.
29. Machado-Fragua MD, Hoogendijk EO, Struijk EA, et al. High dephospho-uncarboxylated matrix Gla protein concentrations, a plasma biomarker of vitamin K, in relation to frailty: the Longitudinal Aging Study Amsterdam. *Eur J Nutr.* 2020 Apr;59(3):1243-51.
30. Halder M, Petsophonsakul P, Akbulut AC, et al. Vitamin K: Double Bonds beyond Coagulation Insights into Differences between Vitamin K1 and K2 in Health and Disease. *Int J Mol Sci.* 2019 Feb 19;20(4).
31. Luo G, Ducy P, McKee MD, et al. Spontaneous calcification of arteries and cartilage in mice lacking matrix GLA protein. *Nature.* 1997 Mar 6;386(6620):78-81.
32. Bak K, Parashar A, Allgayer R, et al. An inducible model for medial calcification based on matrix Gla protein deficiency. *J Struct Biol*. 2024 Dec;216(4):108144.
33. Juanola-Falgarona M, Salas-Salvadó J, Martínez-González MÁ, et al. Dietary Intake of Vitamin K Is Inversely Associated with Mortality Risk. *The Journal of Nutrition.* 2014 2014/05/01/;144(5):743-50.
34. Palmer CR, Bellinge JW, Dalgaard F, et al. Association between vitamin K(1) intake and mortality in the Danish Diet, Cancer, and Health cohort. *Eur J Epidemiol.* 2021 Oct;36(10):1005-14.
35. Juanola-Falgarona M, Salas-Salvado J, Martinez-Gonzalez MA, et al. Dietary intake of vitamin K is inversely associated with mortality risk. *J Nutr.* 2014 May;144(5):743-50.
36. Gast GC, de Roos NM, Sluijs I, et al. A high menaquinone intake reduces the incidence of coronary heart disease. *Nutr Metab Cardiovasc Dis*. 2009 Sep;19(7):504-10.
37. Vissers LET, Dalmeijer GW, Boer JMA, et al. The relationship between vitamin K and peripheral arterial disease. *Atherosclerosis.* 2016 Sep;252:15-20.
38. Schultz CJ, Dalgaard F, Bellinge JW, et al. Dietary Vitamin K(1) Intake and Incident Aortic Valve Stenosis. *Arterioscler Thromb Vasc Biol.* 2024 Feb;44(2):513-21.
39. Vermeer C. Vitamin K: the effect on health beyond coagulation - an overview. *Food Nutr Res.* 2012;56.
40. Ren R, Liu J, Cheng G, et al. Vitamin K2 (Menaquinone-7) supplementation does not affect vitamin K-dependent coagulation factors activity in healthy individuals. *Medicine (Baltimore).* 2021 Jun 11;100(23):e26221.
41. Mladěnka P, Macáková K, Kujovská Krčmová L, et al. Vitamin K - sources, physiological role, kinetics, deficiency, detection, therapeutic use, and toxicity. *Nutr Rev.* 2022 Mar 10;80(4):677-98.
42. Holbrook A, Schulman S, Witt DM, et al. Evidence-based management of anticoagulant therapy: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest.* 2012 Feb;141(2 Suppl):e152S-e84S.
43. Available at: https://ods.od.nih.gov/factsheets/VitaminK-HealthProfessional/#h20. Accessed November 11, 2025.

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References

1. *Alt Med Rev*. 2009; 14(3):268-77.
2. *J Nutr.* 2006 Feb;136(2):390-6.
3. *Biochim Biophys Acta*. 2006 Nov;1760(11):1741-8.
4. *J Biol Chem.* 2010 Jan 1;285:142-52.
5. *J Nutr Sci Vitaminol.* 2015 July;61: 233-240.
6. *Adv Exp Med Bio*. 2016;923:215-222.
7. *Adv Exp Med Bio*. 2016;876:319-325.
8. *Food Funct*. 2023;14(5):2496-2501.
9. *Biomolecules*. 2021 Sept;11,1441.

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References
1. *Exp Gerontol.* 2018 Jul 15;108:118-24.
2. *J Gerontol A Biol Sci Med Sci.* 2018 Oct 8;73(11):1545-51.
3. *E J Clin Pharmacol*. 2000 June;56:251-257.

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MICRODOSING LITHIUM

BY MARSHA MCCULLOCH, MS, RD

Life Extension has reported for years on the benefits of low-dose **lithium**, including the mineral's potential to reduce **dementia risk**.

In preclinical models, lithium has been shown to favorably modulate several biological processes involved in **aging** and **disease**.[1,2]

A **human** interventional study suggests that it may help reduce depression and anxiety in individuals genetically predisposed to psychiatric conditions such as depression, bipolar disorder, and schizophrenia.[3]

An observational study in Japan found that trace amounts of **lithium** in **drinking water** are associated with lower all-cause mortality.[4]

A groundbreaking experimental study published in the prestigious journal ***Nature*** provides some of the strongest evidence that **lithium** may help ***prevent dementia***.

In the study, low-dose **lithium orotate** nearly *restored* memory in both normal **aging mice** and in mice with an inbred susceptibility to **Alzheimer's**-like changes.[5]

This multi-part study also found that **human brain tissue** from people with dementia was low in **lithium**.[5]

Dietary intake of lithium is considered insufficient in many regions of the world.[6]

An oral **microdose** of **300 mcg** to **2,000 mcg** a day and higher may provide a wide range of potential health benefits.

An Underappreciated Mineral

High-dose prescription lithium has long been a treatment for mood disorders, particularly bipolar disorder.[7]

These doses generally range from **600** to **1,200 mg** of lithium carbonate daily. This is many hundreds of times more **lithium** than the amounts people get in their diet or take as a supplement.[7]

Some experts have suggested a recommended intake of roughly **1,000 mcg**, or just **1 mg** of lithium daily for most adults.[7]

Lithium is found in very small amounts in water and some foods (like grains, legumes, nuts, and leafy vegetables), depending on the soil content of the mineral in the region.[8]

Because the earth's surface lithium content varies from region to region, food and water lithium content also vary, making them unreliable sources of the mineral. Given the growing evidence of lithium's health benefits and psychiatric applications, it has been suggested that international health agencies consider developing guidelines for its recommended daily intake.[6]

Oral **microdoses** (**1 mg/day**) can be taken daily to ensure adequate intake.

New Evidence: Lithium Fights Dementia

Observational studies have linked long-term exposure to higher levels of lithium in drinking water with lower **dementia risk**[9,10] and **Alzheimer's mortality**.[11]

In small clinical trials, long-term low-dose lithium use (in the gluconate or carbonate form, rather than orotate) has been shown to slow cognitive and functional decline in participants with mild cognitive impairment.[12-14] These **human** studies found that lithium favorably affected Alzheimer's-related biomarkers[13] and may offer disease-modifying benefits in early Alzheimer's.[13-15]

A recent multi-part study published in **2025** provides powerful new evidence that lithium could play a role in dementia prevention.[5]

Scientists measured **27** minerals in the brain tissue from hundreds of older adults who died with or without **mild cognitive impairment** or **Alzheimer's**. Lithium was the *only* mineral tested that was significantly reduced in the **brains** of those with mild **cognitive impairment** or **Alzheimer's**, compared to healthy brains.[5]

Neurological Dangers of Lithium Deficiency

The same scientists put aging mice on a **lithium**-deficient **diet** to see how that affected their brain tissue. Some of the mice were genetically altered to develop amyloid plaques and Alzheimer's-like symptoms.[5]

Both the dementia-prone *and* normal mice had significant impairments in some measures of **learning** and **memory** after the deficient **lithium diet**.

Brain changes in lithium-deficient mice compared to mice on a regular diet included:[5]

- Accelerated buildup of **amyloid plaque**,
- Abnormal accumulation of **phosphorylated tau**, which can lead to nerve fiber tangles,
- Increased **neuroinflammation**, impairing the ability to clear amyloid, and
- Loss of **synapses**, **axons**, and **myelin** needed for the transmission of nerve cell messages.

Lithium Orotate Superior to Carbonate

Next, the scientists gave the mice small amounts of either **lithium orotate**, sodium orotate (to test whether it was lithium or orotate that explained any effects), or lithium carbonate (the form commonly used to treat bipolar disorder).[5,16]

Lithium orotate was significantly more effective than **lithium carbonate** in raising lithium levels in needed areas of the brain while avoiding getting trapped in amyloid plaque.[5]

Remarkably, **lithium orotate** greatly reduced plaque buildup, prevented pathological changes and nearly restored memory in dementia-prone mice.

In normal mice, **lithium orotate** treatment similarly improved **memory performance** and reduced **neuroinflammation**. Mice that were treated with either lithium carbonate or sodium orotate had no improvement.[5]

What You Need To Know

Lithium Protects Aging Brains

- **Lithium** is a trace mineral involved in biological processes related to aging and disease.
- A study published in 2025 provides new insight into the potential for microdoses of lithium to stave off **Alzheimer's** and other forms of dementia.[5]
- In the study, **human brain tissue** of people who died with Alzheimer's or mild cognitive impairment was found to have low lithium levels.[5]
- In the same study, mice fed a lithium-deficient diet developed impaired learning and memory. Low doses of lithium orotate nearly **restored memory** in the rodents.
- **Lithium orotate** was shown to deliver lithium more efficiently to the brain in preclinical research.

Lithium and GSK-3

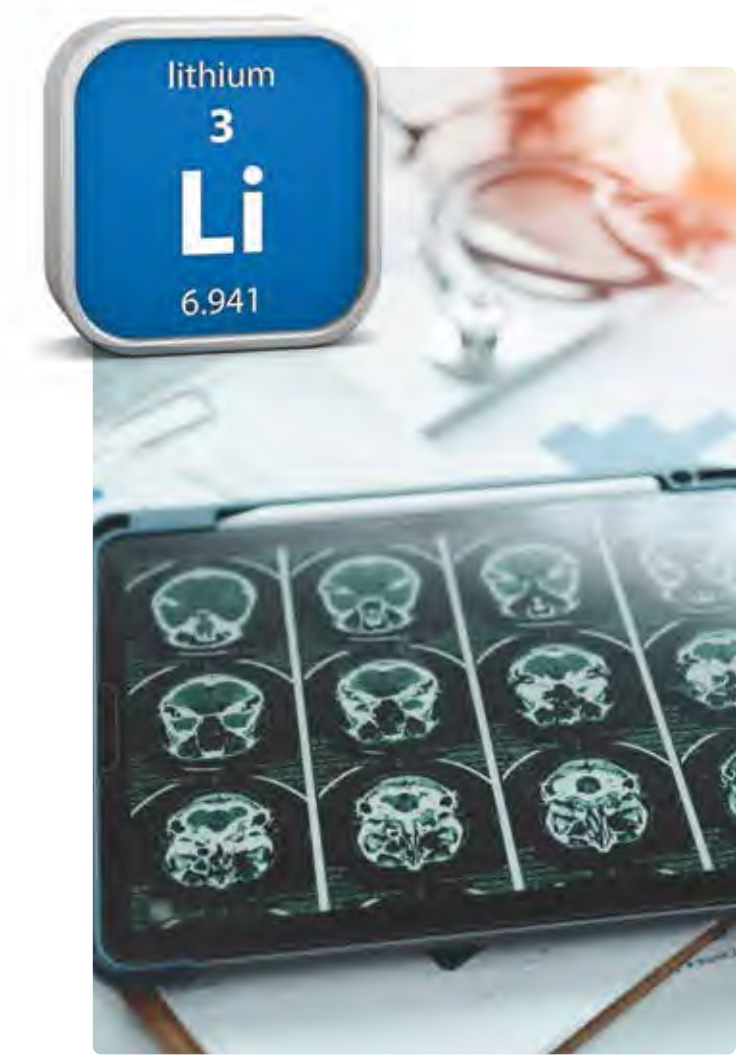
One key way lithium may benefit the brain is by inhibiting the activity of **glycogen synthase kinase-3 (GSK-3)**, a signaling molecule.[17]

Overactivation of **GSK-3** can trigger **cognitive decline**.[18,19]

In the mouse study, **lithium depletion** led to increased activity of **GSK-3**. This led to pathological brain changes, including increased amyloid plaque and phosphorylated tau.[5]

Previous studies have shown increased **GSK-3** expression and activity in the brains of people with **Alzheimer's**.[19,20]

People with **glaucoma**, a major cause of blindness in older people and around the world, also have increased activation of GSK-3. Preclinical research suggests GSK-3 overactivity can lead to **elevated** intraocular **eye pressure,** which damages the optic nerve.[21]



People with glaucoma have a higher risk of developing **dementia**.[22-24] This could mean that low-dose lithium intake may have multiple benefits in this population.[25]

Other Effects of Lithium

Preclinical and observational research shows **low-dose oral lithium** may have several other benefits, including:

- Providing **anti-inflammatory** and **antioxidant** protection,[26,27]
- Supporting **blood vessels**,[28] and **heart function**,[26,29]
- Protecting **bone density** and **muscle mass**,[26,30]
- Promoting **metabolic health**,[26] and
- Reducing **all-cause mortality.**[4]

A daily **microdose of lithium** may provide cognitive benefits and promote overall healthy aging.

Summary

Lithium prescribed in high doses is used to treat bipolar disorder. Emerging evidence suggests that **microdoses** of the mineral may help support brain health in aging adults.

A major multi-part study published in **2025** found that brain tissue from people who died with **dementia** was low in **lithium** and that mice given a **lithium-deficient** diet developed Alzheimer's-like memory problems.

The **lithium orotate** form of the mineral raised lithium levels in the rodents' brains and nearly **restored their memory**.

Taking oral microdoses of **lithium orotate** provides a consistent, dependable source of the mineral. ■

References

1. Hart DA. Lithium Ions as Modulators of Complex Biological Processes: The Conundrum of Multiple Targets, Responsiveness and Non-Responsiveness, and the Potential to Prevent or Correct Dysregulation of Systems during Aging and in Disease. *Biomolecules.* 2024 Jul 25;14(8).
2. Pereira AAR, Pinto AM, Malerba HN, et al. Microdose lithium improves behavioral deficits and modulates molecular mechanisms of memory formation in female SAMP-8, a mouse model of accelerated aging. *PLoS One*. 2024;19(4):e0299534.
3. Dickerson MR, Reed J. Pharmacogenetic testing may benefit people receiving low-dose lithium in clinical practice. *J Am Assoc Nurse Pract.* 2024 Jun 1;36(6):320-8.
4. Zarse K, Terao T, Tian J, et al. Low-dose lithium uptake promotes longevity in humans and metazoans. *Eur J Nutr.* 2011 Aug;50(5):387-9.
5. Aron L, Ngian ZK, Qiu C, et al. Lithium deficiency and the onset of Alzheimer's disease. *Nature*. 2025 Sep;645(8081):712-21.
6. Naeem A, Aslam M, Saifullah, et al. Lithium: Perspectives of nutritional beneficence, dietary intake, biogeochemistry, and biofortification of vegetables and mushrooms. *Sci Total Environ*. 2021 Dec 1;798:149249.
7. Szklarska D, Rzymski P. Is Lithium a Micronutrient? From Biological Activity and Epidemiological Observation to Food Fortification. *Biol Trace Elem Res.* 2019 May;189(1):18-27.
8. Enderle J, Klink U, di Giuseppe R, et al. Plasma Lithium Levels in a General Population: A Cross-Sectional Analysis of Metabolic and Dietary Correlates. *Nutrients.* 2020 Aug 18;12(8).
9. Kessing LV, Gerds TA, Knudsen NN, et al. Association of Lithium in Drinking Water With the Incidence of Dementia. *JAMA Psychiatry.* 2017 Oct 1;74(10):1005-10.
10. Muronaga M, Terao T, Kohno K, et al. Lithium in drinking water and Alzheimer's dementia: Epidemiological Findings from National Data Base of Japan. *Bipolar Disord*. 2022 Dec;24(8):788-94.
11. Fajardo VA, Fajardo VA, LeBlanc PJ, et al. Examining the Relationship between Trace Lithium in Drinking Water and the Rising Rates of Age-Adjusted Alzheimer's Disease Mortality in Texas. *J Alzheimers Dis.* 2018;61(1):425-34.
12. Damiano RF, Loureiro JC, Pais MV, et al. Revisiting global cognitive and functional state 13 years after a clinical trial of lithium for mild cognitive impairment. *Braz J Psychiatry.* 2023 Mar 11;45(1):46-9.
13. Forlenza OV, Radanovic M, Talib LL, et al. Clinical and biological effects of long-term lithium treatment in older adults with amnestic mild cognitive impairment: randomised clinical trial. *Br J Psychiatry.* 2019 Nov;215(5):668-74.
14. Nunes MA, Viel TA, Buck HS. Microdose lithium treatment stabilized cognitive impairment in patients with Alzheimer's disease. *Curr Alzheimer Res.* 2013 Jan;10(1):104-7.
15. Forlenza OV, Diniz BS, Radanovic M, et al. Disease-modifying properties of long-term lithium treatment for amnestic mild cognitive impairment: randomised controlled trial. *Br J Psychiatry.* 2011 May;198(5):351-6.
16. Kang J, Li E, Cui L, et al. Lithium ion specific fluorescent reversible extraction-release based on spiropyran isomerization combining crown ether coordination and its bioimaging. *Sensors and Actuators B: Chemical.* 2021 2021/01/15/;327:128941.
17. Shri SR, Manandhar S, Nayak Y, et al. Role of GSK-3beta Inhibitors: New Promises and Opportunities for Alzheimer's Disease. *Adv Pharm Bull.* 2023 Nov;13(4):688-700.
18. Yu H, Xiong M, Zhang Z. The role of glycogen synthase kinase 3 beta in neurodegenerative diseases. *Front Mol Neurosci.* 2023;16:1209703.
19. Zhao J, Wei M, Guo M, et al. GSK3: A potential target and pending issues for treatment of Alzheimer's disease. *CNS Neurosci Ther.* 2024 Jul;30(7):e14818.
20. Platenik J, Fisar Z, Buchal R, et al. GSK3beta, CREB, and BDNF in peripheral blood of patients with Alzheimer's disease and depression. *Prog Neuropsychopharmacol Biol Psychiatry.* 2014 Apr 3;50:83-93.
21. Vallee A, Vallee JN, Lecarpentier Y. Lithium and Atypical Antipsychotics: The Possible WNT/beta Pathway Target in Glaucoma. *Biomedicines.* 2021 Apr 26;9(5).
22. Pham K, Salowe R, Di Rosa I, et al. The association between glaucoma and dementia in a national cohort of All of Us participants. *Ophthalmology.* 2025 Sep 15.
23. Wang X, Chen W, Zhao W, et al. Risk of glaucoma to subsequent dementia or cognitive impairment: a systematic review and meta-analysis. *Aging Clin Exp Res.* 2024 Aug 20;36(1):172.
24. Sapir T, Augello P, Lee R, et al. Primary Open-Angle Glaucoma Is Associated with Short-Term Memory Decline and Dementia in Individuals of African Ancestry. *J Clin Med.* 2024 Jul 16;13(14).
25. Singh A, Kumar T, Velagala VR, et al. The Actions of Lithium on Glaucoma and Other Senile Neurodegenerative Diseases Through GSK-3 Inhibition: A Narrative Review. *Cureus.* 2022 Aug;14(8):e28265.
26. Hamstra SI, Roy BD, Tiidus P, et al. Beyond its Psychiatric Use: The Benefits of Low-dose Lithium Supplementation. *Curr Neuropharmacol.* 2023;21(4):891-910.
27. Damri O, Agam G. Lithium, Inflammation and Neuroinflammation with Emphasis on Bipolar Disorder-A Narrative Review. *Int J Mol Sci.* 2024 Dec 11;25(24).
28. Bosche B, Molcanyi M, Rej S, et al. Low-Dose Lithium Stabilizes Human Endothelial Barrier by Decreasing MLC Phosphorylation and Universally Augments Cholinergic Vasorelaxation Capacity in a Direct Manner. *Front Physiol.* 2016;7:593.
29. Jiang J, He W, Huang H. Lithium in cardiovascular health and disease: Pharmacological and clinical implications. *Eur J Pharmacol.* 2025 Jul 15;999:177657.
30. Wong SK. Glycogen Synthase Kinase-3 Beta (GSK3beta) as a Potential Drug Target in Regulating Osteoclastogenesis: An Updated Review on Current Evidence. *Biomolecules.* 2024 Apr 21;14(4).

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Link Between Glucosamine and Reduced Mortality

BY RACHEL MORTON

More than **five million** people in the U.S. take **glucosamine** annually, largely to support **joint** health and ease **arthritis** pain.[1]

Recent findings indicate this low-cost compound may provide a stunning range of additional benefits.

In two large observational studies, scientists have found a link between **glucosamine** use and ***reduced risk of death from any cause***.[2,3]

These same studies also found that people taking **glucosamine** had lower rates of several age-related chronic diseases including:

- Cardiovascular disease,[4,5]
- Alzheimer's and other forms of dementia,[6,7]
- Type 2 diabetes,[8] and
- Certain types of cancers,[5]

In addition, glucosamine use was linked to lower **risk of death** from major causes such as heart disease, cancer, respiratory, and digestive disorders.[3]

Glucosamine and Joint Health

Glucosamine is a compound that acts as a precursor or building block for **cartilage**, the tissue that protects and cushions the ends of bones at the joints.[9]

It is commonly taken to maintain joint health and prevent or reduce the severity of **osteoarthritis**.[9]

Clinical trials have confirmed glucosamine's effectiveness in arthritis, whether taken alone or with **chondroitin**, another nutrient often used for joint health.[10] For example, a systematic review of studies found that taking **glucosamine** long-term significantly **reduced pain** in those with knee osteoarthritis compared to a placebo.[11]

Reduced All-Cause Mortality

Though glucosamine is usually taken for joint health, scientists conducting large observational studies made a striking discovery: Its use is associated with a ***reduced risk of overall mortality***.

One population study following 77,510, individuals (ages 50-76) in Washington State over five to eight years found that **regular users** of **glucosamine**, with or without chondroitin, had an **18%** lower risk of **death from *any* cause** than those who did not use glucosamine.[12]

In another large study, analysis of data from the U.S. National Health and Nutrition Examination Survey (NHANES) found that those taking **glucosamine** and **chondroitin** had a remarkable **27%** lower risk of all-cause mortality, after controlling for multiple other factors that could affect risk of death.[2]

A large observational study evaluating the effect of glucosamine on mortality was conducted using data from the **UK Biobank** and followed approximately **495,077** individuals for an average of about **9** years. The analysis revealed a **15%** reduction in the risk of all-cause mortality among **glucosamine users** compared to non-users.[3]

Lower Disease Risk

Studies have also found that **glucosamine** use was associated with a lower risk of many specific disorders and causes of death.

For example, in the Washington state study, those taking glucosamine had a **13%** lower risk of death from cancer and a **41%** lower risk of death from **respiratory diseases**.[12]

In **2025**, another analysis of **glucosamine supplementation** data was published, this one also from the UK Biobank. Over 52,500 glucosamine users were compared to the same number of non-users and followed for nearly **14 years**. Regular glucosamine use was associated with an **8-27% lower risk** of seven different **age-related** chronic diseases.[5]

In the National Health and Nutrition Examination Survey (NHANES) study, regular glucosamine users were **58%** less likely to die of **cardiovascular** causes compared to non-users.[2]

These findings align with other large observational studies. The UK Biobank study and related analyses have shown that regular glucosamine use is linked to lower mortality and a reduced risk of several chronic diseases:

- **18-22%** lower risk of cardiovascular mortality,[3-5]
- **26%** lower risk of respiratory disease and mortality,[3]
- **26%** lower risk of digestive system disease mortality,[3]
- **18%** lower risk of coronary artery disease,[4]
- **17%** lower risk of developing type 2 diabetes,[8]
- **16%** lower risk of developing any type of dementia, including **16%** lower risk of Alzheimer's and **26%** lower risk of vascular dementia,[6,7,13]
- **9%** lower risk of stroke,[4] and
- **6%** lower risk of cancer mortality.[3]

How Glucosamine Works

Glucosamine's role in building cartilage has been well understood for years. But the link to reduced mortality and disease risk in observational studies led researchers to evaluate its other effects in the body.

Animal studies found that glucosamine may work in a number of ways to exert anti-aging effects, including:[14,15]

- **Activating AMPK**. AMP-activated protein kinase (AMPK) is an enzyme that acts as a master regulator of cellular metabolism. In preclinical studies, glucosamine has been shown to help activate AMPK and increase mitochondrial biogenesis—a pathway associated with improved metabolic health and longevity.[15,16]
- **Improving blood glucose levels**. Elevated blood sugar can lead to type 2 diabetes and other metabolic diseases and contribute to accelerated aging. In aging mice, glucosamine intake has been shown to *lower* blood glucose levels, which may reduce metabolic diseases associated with aging.[15]
- **Mimicking a restricted calorie diet**. Restricting calorie intake activates pathways in our metabolism that have anti-aging effects. In animal models, glucosamine intake mimics some of the effects of calorie restriction, which has been linked to longer lifespan in rodents.[14,15]
- **Enhancing mitochondrial health**. The mitochondria are the powerhouses that supply the energy each cell needs to function optimally. Declining mitochondrial function is a major hallmark of aging. In animal models, glucosamine helps *boost* mitochondrial function.[15,16]
- **Improving protein balance**. Animal studies indicate that glucosamine helps cells maintain an optimal, healthy balance between protein synthesis and breakdown.[15,17]

In both worms and mice, adding glucosamine or its related nutrient acetylglucosamine to the diet has been shown to **slow aging** and **extend lifespan**.[15,17]

A **2025** study found **20%** associated reduced risk of sudden **cardiac arrest** in **glucosamine** supplement users in the United Kingdom.[19]

Approximately **19.1%** of the participants in a 2020 UK Biobank study reported regular use of glucosamine supplements.[8]

This large data set indicates that nearly one in five individuals in the United Kingdom regularly uses glucosamine.

In a clinical setting, a 28-day randomized controlled trial found that **1,500 mg** per day of glucosamine along with **1,200 mg** per day of chondroitin lowered levels of the inflammatory marker **C-reactive protein** (CRP) by **23%** in healthy overweight adults.[18]

These studies support the idea that glucosamine may provide benefits beyond joint health. Population studies suggest it could have broader, body-wide effects, but clinical trials are needed to confirm its impact on mortality and disease risk.

Summary

Glucosamine is commonly used to help support joint and cartilage health. Clinical trials have found long-term use may help reduce pain in those suffering from **osteoarthritis**.

Scientists have also found an association between **glucosamine** use and a **lower risk of death** in large observational studies.

Several different observational studies have also shown that people taking glucosamine have a reduced risk of death due to **specific illnesses** like cardiovascular disease, cancer, and respiratory diseases, along with a lower risk of developing coronary heart disease, dementia, type 2 diabetes, and other diseases. •

References

1. Dostrovsky NR, Towheed TE, Hudson RW, et al. The effect of glucosamine on glucose metabolism in humans: a systematic review of the literature. *Osteoarthritis Cartilage*. 2011 Apr;19(4):375-80.
2. King DE, Xiang J. Glucosamine/Chondroitin and Mortality in a US NHANES Cohort. *J Am Board Fam Med.* 2020 Nov-Dec;33(6):842-7.
3. Li ZH, Gao X, Chung VC, et al. Associations of regular glucosamine use with all-cause and cause-specific mortality: a large prospective cohort study. *Ann Rheum Dis.* 2020 Jun;79(6):829-36.
4. Ma H, Li X, Sun D, et al. Association of habitual glucosamine use with risk of cardiovascular disease: prospective study in UK Biobank. *BMJ*. 2019 May 14;365:l1628.
5. He J, Ma Y, Jiang Y, et al. Regular glucosamine supplementation and risk of age-related chronic diseases: evidence from a propensity score-matched cohort study. *Aging Clin Exp Res.* 2025 Aug 29;37(1):259.
6. Zheng J, Ni C, Zhang Y, et al. Association of regular glucosamine use with incident dementia: evidence from a longitudinal cohort and Mendelian randomization study. *BMC Med.* 2023 Mar 29;21(1):114.
7. Xu C, Hou Y, Fang X, et al. The role of type 2 diabetes in the association between habitual glucosamine use and dementia: a prospective cohort study. Alzheimers Res Ther. 2022 Dec 13;14(1):184.
8. Ma H, Li X, Zhou T, et al. Glucosamine Use, Inflammation, and Genetic Susceptibility, and Incidence of Type 2 Diabetes: A Prospective Study in UK Biobank. *Diabetes Care.* 2020 Apr;43(4):719-25.
9. Ma Q, Gao X. Categories and biomanufacturing methods of glucosamine. *Appl Microbiol Biotechnol.* 2019 Oct;103(19):7883-9.
10. Zhu X, Sang L, Wu D, et al. Effectiveness and safety of glucosamine and chondroitin for the treatment of osteoarthritis: a meta-analysis of randomized controlled trials. *J Orthop Surg Res*. 2018 Jul 6;13(1):170.
11. Vo NX, Le NNH, Chu TDP, et al. Effectiveness and Safety of Glucosamine in Osteoarthritis: A Systematic Review. Pharmacy (Basel). 2023 Jul 14;11(4).
12. Bell GA, Kantor ED, Lampe JW, et al. Use of glucosamine and chondroitin in relation to mortality. *Eur J Epidemiol*. 2012 Aug;27(8):593-603.
13. Zhou C, Zhang Y, Yang S, et al. Habitual glucosamine use, APOE genotypes, and risk of incident cause-specific dementia in the older population. *Alzheimers Res Ther.* 2023 Sep 9;15(1):152.
14. Kumar R, Saraswat K, Rizvi SI. Glucosamine Displays a Potent Caloric Restriction Mimetic Effect in Senescent Rats by Activating Mitohormosis. *Rejuvenation Res.* 2021 Jun;24(3):220-6.
15. Weimer S, Priebs J, Kuhlow D, et al. D-Glucosamine supplementation extends life span of nematodes and of ageing mice. *Nat Commun*. 2014 Apr 8;5:3563.
16. A DLR, Olaso-Gonzalez G, Garcia-Dominguez E, et al. Glucosamine Supplementation Improves Physical Performance in Trained Mice. *Med Sci Sports Exerc.* 2022 Mar 1;54(3):466-74.
17. Denzel MS, Storm NJ, Gutschmidt A, et al. Hexosamine pathway metabolites enhance protein quality control and prolong life. *Cell.* 2014 Mar 13;156(6):1167-78.
18. Navarro SL, White E, Kantor ED, et al. Randomized trial of glucosamine and chondroitin supplementation on inflammation and oxidative stress biomarkers and plasma proteomics profiles in healthy humans. *PLoS One.* 2015;10(2):e0117534.
19. Luo H, Zhang Q, Zhou L, et al. Modifiable Risk Factors and Attributable Burden of Cardiac Arrest: An Exposome-wide and Mendelian Randomization Analysis. *Canadian Journal of Cardiology.* 2025;41(7):1387-96.

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

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

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

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

Each capsule of this product contains:

- **Glucoraphanin**—a sulforaphane *precursor*—found in broccoli seed extract that is standardized to a high concentration of glucoraphanin.[3,4]
- **Myrosinase**, an enzyme found in mustard seed that converts **glucoraphanin** to **sulforaphane**.[2-6]
- **Vitamin C**, a cofactor for the myrosinase enzyme for more efficient *enzymatic conversion.*[7]

This product is available at fine health food stores everywhere.

References

1. *Crit Rev Food Sci Nutr*. 2023 5 2:1-19.
2. *PLoS One.* 2015;10(11):e0140963.
3. *Phytother Res.* 2021 10;35(10):5440-5458.
4. *J Oral Maxillofac Pathol.* 2020 May-Aug;24(2):405.
5. *Mol Nutr Food Res.* 2018 Sep;62(18):e1700980.
6. *Supplier Internal Data. Data on File.* 2023.
7. *Biochem J*. 1999 8 1;341 (Pt 3)(Pt 3):725-32.

MUSHROOMS Help Fight Colds and Flu

BY MARSHA MCCULLOCH, MS, RD

Beta glucans, compounds found in mushroom cell walls,[1] can strengthen **immune defenses** against viruses and other harmful agents,[3] while guarding against overactive immune responses.[4]

Beta glucans reduced upper respiratory symptoms like **runny nose** and **sore throat** by as much as **58%** in **human** studies.[5,6]

In separate clinical trials, **mushrooms**[7] and isolated **beta glucans** substantially boosted **IgA (immunoglobulin A)**,[8] an antibody that defends against viral infections.

Combining mushroom extracts with beta glucans from yeast may optimize immune function to protect against **colds** and **flu**.

Balancing Immune Function

An **underactive** immune system increases susceptibility to infections like colds and flu and certain diseases like cancer.[9,10]

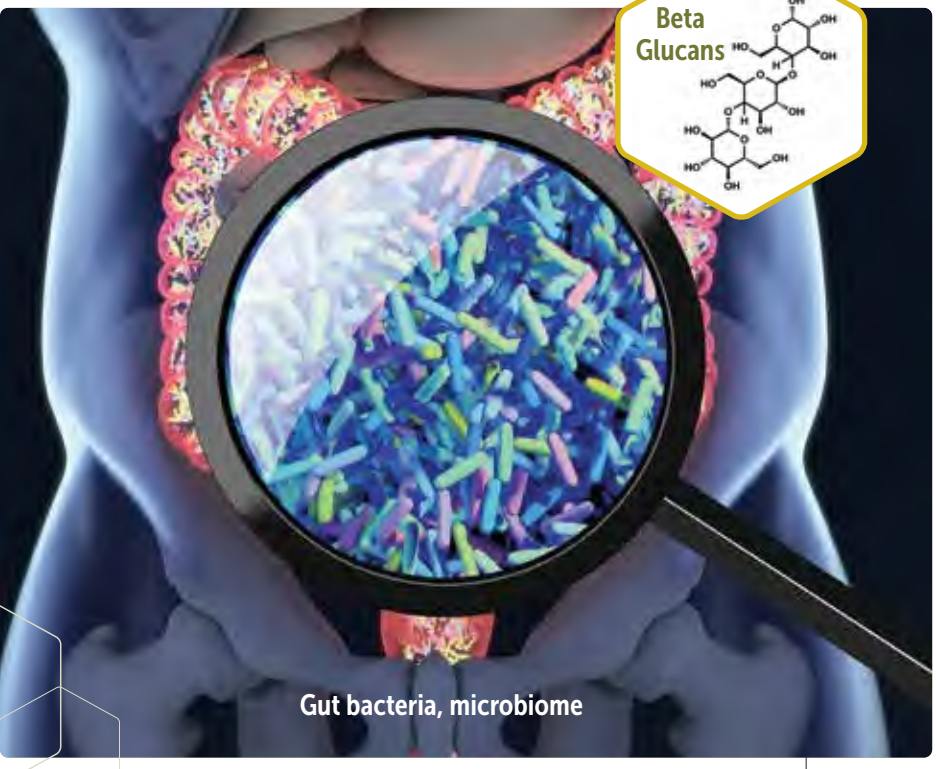
An **overactive** immune system can contribute to recurrent or chronic immune-mediated diseases such as allergies and autoimmune disorders.[11]

Beta glucans are a type of fiber found in **mushrooms** and other **fungi** that can stimulate and help regulate the body's immune cell activity.[3,12]

Beta glucans activate cells involved in the two major types of immune responses:

- **Innate immunity**, the body's first, general line of defense against viruses and other pathogens,[13,14] and
- **Adaptive immunity**, a longer-term, targeted immune response against a specific pathogen.[13,15]

Some of their immune benefits come from how they interact with the **gut microbiome**, an immune system regulator.[16-18] Because beta glucans are indigestible fiber, they serve as **prebiotics** that nourish beneficial bacteria.[19]



Beta glucans also have **anti-inflammatory** effects.[1]

Two top sources of beta glucans are the cell walls of baker's **yeast** and specific species of **mushrooms**.[20,21]

Shiitake Primes Immune Cells

Shiitake is a mushroom source of **beta glucans**.[20,22,23]

Cell studies show that shiitake extract can inactivate some **viruses** and stop them from replicating.[24,25]

In a clinical trial of healthy adults, daily intake of dried shiitake mushrooms for four weeks:[7]

- Increased salivary **IgA**, which protects against upper respiratory infections, by **12%**,
- Reduced **C-reactive protein** (CRP), a marker of harmful chronic inflammation, by **30%**,[7] and
- Increased the number of specific innate immune cells by **60%** to **100%** and boosted the **robustness** of their defense.[7]

Certain components of shiitake, particularly beta glucans, prime **innate immune cells** to be ready for harmful intruders.[26]

Mushroom Synergy

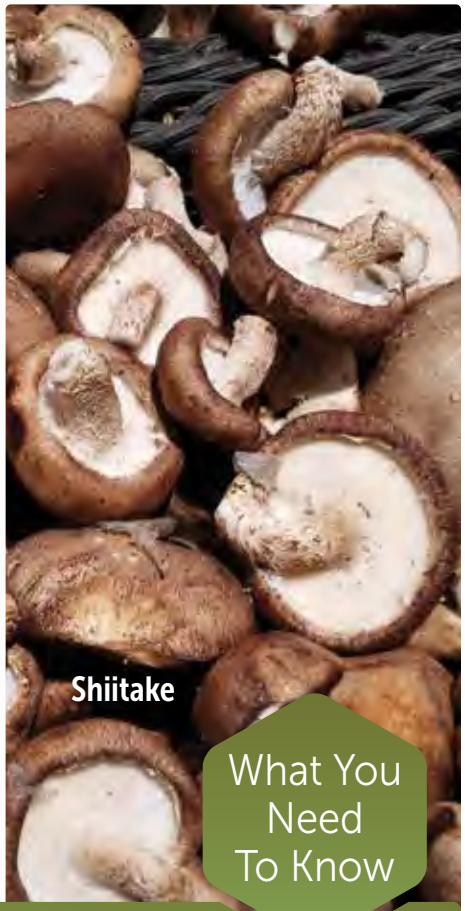
Two other types of mushrooms, **maitake,**[27,28] and **chaga**,[29,30] have also been shown to aid the immune system. They are both high in beta glucans and antioxidants.

In an analysis of medicinal mushroom extracts, **chaga** ranked highest in **antioxidant** activity, followed by **maitake**.[31]

Preclinical research has shown that compounds in **chaga** mushrooms have strong **antiviral** activity, including against **influenza**.[30,32]

Combining different types of mushrooms may **synergistically** enhance their immune system benefits.[33]

In an animal model, the combination of **maitake** and **shiitake** extracts more strongly activated innate immune defenses than either mushroom alone.[28]



Beta Glucans Fight Infections

Mushrooms have many beneficial compounds, but beta glucans are believed to be the most central to viral defense. They are found in mushrooms and can also be isolated from yeast.

In an initial human study, researchers gave beta glucans to healthy adults daily for three months during peak **cold** and **flu season**.[34]

The treatment group developed significantly fewer **fevers** than the **placebo** group.

None of the treatment group **missed work** or school due to colds, while placebo recipients missed an average of **1.4** days.

The immune benefits of beta glucans have been further confirmed in many **clinical trials**.[3,21]

Its effects are especially remarkable in those more susceptible to **upper respiratory infections**, including older adults and people who are mentally or physically stressed.[3,6,35-37]

What You Need To Know

Fungi Fight Immune Challenges

- **Shiitake**, **maitake**, and **chaga mushrooms** contain compounds called beta glucans, which support healthy immunity and help defend against viruses like colds and flu.
- In clinical trials, **beta glucans** from yeast reduced upper respiratory symptoms like runny nose and sore throat by as much as **58%** and reduced the severity of seasonal allergy symptoms by **52%**.
- A blend of shiitake, maitake, and chaga mushroom extracts with beta glucans from yeast can provide substantial immune system support and reduce the impact of **colds** and **flu**.

In **clinical trials**:

- **Middle-aged** to **older adults** taking **250 mg** of yeast beta glucans daily during winter had fewer **colds** and **flu** and a shorter duration of symptoms than placebo recipients.[37]
- **Moderately stressed women** who took **250 mg** of beta glucans daily for three months had a **58%** reduction in **upper respiratory symptoms** compared to a placebo.[6]
- **Runners** who took **250 mg** of beta glucans daily for 28 days after running a marathon (a stressor which can suppress immunity) had a **37%** reduction in the number of days with cold or flu symptoms compared to placebo recipients.[8]
- **Moderately active adults** taking **250 mg** of yeast beta glucans for 10 days had a **32%** increase in immune-protective salivary **IgA** two hours after a strenuous exercise test, compared to a placebo.[8]

A systematic review and meta-analysis of 13 randomized controlled trials found that yeast beta glucans significantly lowered the risk of **upper respiratory tract infections** in healthy people.

Compared to placebo, beta-glucan supplementation reduced the likelihood of developing an **upper respiratory tract infection** by **34%,** decreased the number and duration of episodes by **31%,** and often improved symptom severity.[21]

Other Immune Effects

Infections aren't the only immune system threat. **Allergies** can also arise from a dysfunctional immune system.

In a clinical trial, adults with moderate **ragweed allergies** were given **250 mg** of **beta glucans** from yeast every day for a month during allergy season.[5]

Compared with a placebo, the treatment group had a **28%** reduction in the **number** of allergy symptoms and a **52%** reduction in symptom **severity**, including nasal and eye symptoms.[5]

Combining mushroom extracts and beta glucans may provide comprehensive immune support.

Summary

Shiitake, **maitake**, and **chaga mushrooms** contain **beta glucans**, compounds that support the immune system.

More than a dozen clinical trials have shown that beta glucans help bolster immune defenses against **upper respiratory infections** like colds and flu.

Beta glucans can also help calm overactive immune responses that lead to **allergy symptoms**.

A **combination** of mushroom extracts and beta glucans isolated from baker's yeast may optimize immune system function and help ward off upper respiratory infections. ■

References

1. Cerletti C, Esposito S, Iacoviello L. Edible Mushrooms and Beta-Glucans: Impact on Human Health. *Nutrients.* 2021 Jun 25;13(7).
2. Grundemann C, Reinhardt JK, Lindequist U. European medicinal mushrooms: Do they have potential for modern medicine? - An update. *Phytomedicine.* 2020 Jan;66:153131.
3. Vlassopoulou M, Yannakoulia M, Pletsa V, et al. Effects of fungal beta-glucans on health - a systematic review of randomized controlled trials. *Food Funct.* 2021 Apr 26;12(8):3366-80.
4. Zhong X, Wang G, Li F, et al. Immunomodulatory Effect and Biological Significance of beta-Glucans. *Pharmaceutics.* 2023 May 29;15(6).
5. Talbott SM, Talbott JA, Talbott TL, et al. beta-Glucan supplementation, allergy symptoms, and quality of life in self-described ragweed allergy sufferers. *Food Sci Nutr.* 2013 Jan;1(1):90-101.
6. Talbott SM, Talbott JA. Baker's yeast beta-glucan supplement reduces upper respiratory symptoms and improves mood state in stressed women. *J Am Coll Nutr.* 2012 Aug;31(4):295-300.
7. Dai X, Stanilka JM, Rowe CA, et al. Consuming Lentinula edodes (Shiitake) Mushrooms Daily Improves Human Immunity: A Randomized Dietary Intervention in Healthy Young Adults. *J Am Coll Nutr.* 2015;34(6):478-87.
8. McFarlin BK, Carpenter KC, Davidson T, et al. Baker's yeast beta glucan supplementation increases salivary IgA and decreases cold/flu symptomatic days after intense exercise. *J Diet Suppl.* 2013 Sep;10(3):171-83.
9. Available at: https://www.hopkinsmedicine.org/health/conditions-and-diseases/disorders-of-the-immune-system. Accessed September 22, 2025.
10. Corthay A. Does the immune system naturally protect against cancer? *Front Immunol.* 2014;5:197.
11. Ramirez GA, Cardamone C, Lettieri S, et al. Clinical and Pathophysiological Tangles Between Allergy and Autoimmunity: Deconstructing an Old Dichotomic Paradigm. *Clin Rev Allergy Immunol.* 2025 Feb 11;68(1):13.
12. Edo GI, Mafe AN, Ali ABM, et al. A critical review on the impacts of β-glucans on gut microbiota and human health. *The Microbe.* 2025 2025/06/01/;7:100394.
13. Qi C, Cai Y, Gunn L, et al. Differential pathways regulating innate and adaptive antitumor immune responses by particulate and soluble yeast-derived beta-glucans. *Blood.* 2011 Jun 23;117(25):6825-36.
14. Stothers CL, Burelbach KR, Owen AM, et al. beta-Glucan Induces Distinct and Protective Innate Immune Memory in Differentiated Macrophages. *J Immunol.* 2021 Dec 1;207(11):2785-98.
15. Song L, Yuan J, Ni S, et al. Enhancement of adaptive immune responses of aged mice by dietary intake of beta-glucans, with special emphasis on anti-aging activity. *Mol Immunol.* 2020 Jan;117:160-7.
16. Singh RP, Bhardwaj A. beta-glucans: a potential source for maintaining gut microbiota and the immune system. *Front Nutr.* 2023;10:1143682.
17. Wiertsema SP, van Bergenhenegouwen J, Garssen J, et al. The Interplay between the Gut Microbiome and the Immune System in the Context of Infectious Diseases throughout Life and the Role of Nutrition in Optimizing Treatment Strategies. *Nutrients.* 2021 Mar 9;13(3).
18. Lambring CB, Siraj S, Patel K, et al. Impact of the Microbiome on the Immune System. *Crit Rev Immunol.* 2019;39(5):313-28.
19. Sivieri K, de Oliveira SM, Marquez AdS, et al. Insights on β-glucan as a prebiotic coadjuvant in the treatment of diabetes mellitus: A review. *Food Hydrocolloids for Health.* 2022 2022/12/01/;2:100056.
20. Timm TG, Costa TM, Alberton MD, et al. Mushroom beta-glucans: application and innovation for food industry and immunotherapy. *Appl Microbiol Biotechnol.* 2023 Aug;107(16):5035-49.
21. Zhong K, Liu Z, Lu Y, et al. Effects of yeast beta-glucans for the prevention and treatment of upper respiratory tract infection in healthy subjects: a systematic review and meta-analysis. *Eur J Nutr.* 2021 Dec;60(8):4175-87.
22. Vetter J. The Mushroom Glucans: Molecules of High Biological and Medicinal Importance. *Foods.* 2023 Feb 27;12(5).
23. Bak WC, Park JH, Park YA, et al. Determination of Glucan Contents in the Fruiting Bodies and Mycelia of Lentinula edodes Cultivars. *Mycobiology.* 2014 Sep;42(3):301-4.
24. Ren G, Xu L, Lu T, et al. Structural characterization and antiviral activity of lentinan from Lentinus edodes mycelia against infectious hematopoietic necrosis virus. *Int J Biol Macromol.* 2018 Aug;115:1202-10.
25. Rincao VP, Yamamoto KA, Ricardo NM, et al. Polysaccharide and extracts from Lentinula edodes: structural features and antiviral activity. *Virol J.* 2012 Feb 15;9:37.
26. Zhou G, Liu H, Yuan Y, et al. Lentinan progress in inflammatory diseases and tumor diseases. *Eur J Med Res.* 2024 Jan 3;29(1):8.
27. Wu JY, Siu KC, Geng P. Bioactive Ingredients and Medicinal Values of Grifola frondosa (Maitake). *Foods.* 2021 Jan 5;10(1).
28. Vetvicka V, Vetvickova J. Immune-enhancing effects of Maitake (Grifola frondosa) and Shiitake (Lentinula edodes) extracts. *Ann Transl Med.* 2014 Feb;2(2):14.
29. Lysakowska P, Sobota A, Wirkijowska A. Medicinal Mushrooms: Their Bioactive Components, Nutritional Value and Application in Functional Food Production-A Review. *Molecules.* 2023 Jul 14;28(14).
30. Fordjour E, Manful CF, Javed R, et al. Chaga mushroom: a superfungus with countless facets and untapped potential. *Front Pharmacol.* 2023;14:1273786.
31. Sharpe E, Farragher-Gnadt AP, Igbanugo M, et al. Comparison of antioxidant activity and extraction techniques for commercially and laboratory prepared extracts from six mushroom species. *Journal of Agriculture and Food Research.* 2021 2021/06/01/;4:100130.
32. Camilleri E, Blundell R, Baral B, et al. A brief overview of the medicinal and nutraceutical importance of Inonotus obliquus (chaga) mushrooms. *Heliyon.* 2024 Aug 15;10(15):e35638.
33. Mallard B, Leach DN, Wohlmuth H, et al. Synergistic immuno-modulatory activity in human macrophages of a medicinal mushroom formulation consisting of Reishi, Shiitake and Maitake. *PLoS One.* 2019;14(11):e0224740.
34. Feldman S, Schwartz HI, Kalman DS, et al. Randomized phase II clinical trials of Wellmune WGP(R) for immune support during cold and flu season. *The Journal of Applied Research.* 2009;9(1&2):30-42.
35. Smith AP. Fatigue, susceptibility to the common cold and its behavioural effects. *Medical Research Archives.* 2021;9(4).
36. Dharsono T, Rudnicka K, Wilhelm M, et al. Effects of Yeast (1,3)-(1,6)-Beta-Glucan on Severity of Upper Respiratory Tract Infections: A Double-Blind, Randomized, Placebo-Controlled Study in Healthy Subjects. *J Am Coll Nutr.* 2019 Jan;38(1):40-50.
37. Fuller R, Moore MV, Lewith G, et al. Yeast-derived beta-1,3/1,6 glucan, upper respiratory tract infection and innate immunity in older adults. *Nutrition.* 2017 Jul-Aug;39-40:30-5.

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*Kumar JP. A randomized, double-blind, placebo-controlled study to evaluate the benefit of LI12542F6 supplementation in conjunction with an exercise program to enhance muscle strength in healthy aging subjects. Internal Study Report. 2023.

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References

1. *Eur J Epidemiol.* 2012 Aug;27(8):593-603.
2. *J Am Board Fam Med.* 2020 Nov-Dec;33(6):842-7.
3. *Ann Rheum Dis*. 2020 Jun;79(6):829-36.
4. *Am J Clin Nutr.* 2010 Jun;91(6):1791-800.

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BROCCOLI
Protects the Aging Brain

BY ROGER STANTON

Everyone knows that **broccoli** and other **cruciferous vegetables** are good for you.

One reason is a **cruciferous** nutrient called **sulforaphane** that has been shown to have potent **anti-cancer** activity.[1,2]

Researchers are now finding preclinical evidence indicating **sulforaphane** offers protection for our aging **brain** as well.[3-7]

In animal models it defends against various forms of degenerative brain damage, from **strokes** to **Alzheimer's**.[8-12]

In two studies of healthy older **humans**, it has been shown to improve **mood** and **cognitive function**.[13,14]

Sulforaphane Defends Cells

Broccoli, cabbage, Brussels sprouts, and other **cruciferous vegetables** give off a pungent odor when they are cooking. That's because sulfur-containing compounds are being released, called glucosinolates, such as **glucoraphanin**.[15]

Glucoraphanin is a *precursor* to **sulforaphane**.

When we eat cruciferous vegetables, the precursor mixes with an *enzyme* in the plants called **myrosinase**, producing **sulforaphane**.[16]

Sulforaphane is recognized as an **anti-inflammatory** compound linked to a wide range of health benefits.[3]

Sulforaphane works by activating **Nrf2**, a protein that is involved in cellular detoxification and that switches on **protective genes**, enabling cells to defend against stress and harmful toxins.[17,18]

Preclinical and some clinical evidence has shown some of the other ways **sulforaphane** protects cells and tissues, including:

- **Improving mitochondrial health.** Studies show that it helps restore mitochondrial function in aging tissues, increases ATP output, and protects against oxidative damage. These benefits are linked to better muscle and heart performance, as well as some protection against age-related cognitive decline in animal models.[12,19-21]
- **Reducing inflammation.** Sulforaphane *inhibits* the activity of **NF-kB** (nuclear factor-kappa B), the master regulator of harmful chronic inflammation that drives age-related diseases, as well as cancer.[22,23]
- **Improving insulin sensitivity.** Human and animal studies show that sulforaphane improves cellular metabolism, insulin sensitivity, and blood sugar levels, suggesting its potential as an anti-diabetic nutrient that may help mitigate the effects of high blood sugar.[24-28]
- **Protecting against glycation.** In diabetics *and* healthy adults, glucose can attach to other molecules in the body. This process, called **glycation**, contributes to accelerated aging and risk for disease. Sulforaphane reduces damage from glycation, including in brain cells.[29-31]

Protecting the Brain

All these actions have *direct* benefits for the brain.

Oxidative stress,[32] neuroinflammation,[32] mitochondrial dysfunction,[33] and glycation[32] all contribute to **neurodegenerative disease** and risk for cognitive impairment.

Metabolic dysfunction and insulin resistance in the brain are so closely connected to the development of **dementia** that some researchers refer to Alzheimer's as ***type III diabetes***.[34]

In preclinical models, sulforaphane has been shown to help mitigate these risks.

Cell and animal models indicate that **sulforaphane** provides protection against brain injury and loss of cognitive function.

For example, in rodent models of **neurodegeneration**, including Alzheimer's and Parkinson's, sulforaphane reduces signs of pathology in the brain and **improves cognitive function**.[4,9,35,36]

Researchers have also found that in preclinical models, sulforaphane has been shown to defend against acute and chronic **ischemic brain damage** (impaired blood flow to the brain), including **strokes**.[10,11,37-39]

In models of acute stroke, and chronic vascular impairment in the brain, sulforaphane intake reduces damage done to the brain while protecting against cognitive impairment that normally results from these injuries.

In a piglet model of ischemic injury, for example, giving the animals sulforaphane resulted in an almost **doubling** of **neuron viability** in affected brain regions.[39]

In models of traumatic brain injury and surgical anesthesia, sulforaphane protects against **cognitive dysfunction**.[8,40]

Human Studies

Human studies provide evidence of sulforaphane's effects on the brain and mental function.

In one trial, healthy, older adults took **sulforaphane** or a **placebo** daily for 12 weeks. While the placebo had no effect, taking sulforaphane led to significant improvements on tests of cognitive function, including overall **processing speed** and **memory**.[13]

What You Need To Know

How Broccoli Boosts Brain Power

- Scientists have long recognized the health benefits of **cruciferous vegetables** like broccoli, cabbage, Brussels sprouts, and kale.
- **Sulforaphane**, a sulfur-containing compound derived from these vegetables, has been shown to be responsible for many of these benefits, including anticancer activity.
- Scientists have found in preclinical studies that sulforaphane also supports **brain health** and reduces risk for disease in the brain.
- In animal models, sulforaphane has demonstrated benefits for various neurological conditions, including cognitive decline, **dementia**, and stroke.
- Human trials show that sulforaphane intake can improve **cognitive performance** and **mood**.

Maximize Sulforaphane Delivery

Broccoli contains **glucoraphanin** (a sulforaphane *precursor*) and an enzyme called **myrosinase**, which converts glucoraphanin into sulforaphane.

These two compounds are found in *different parts* of broccoli cells. When we eat the vegetable, they mix together to form **sulforaphane**.

Sulforaphane is unstable, making it difficult to take orally. Inspired by nature, scientists created a formula that includes the precursor **glucoraphanin** from broccoli seeds and a robust and stable form of the enzyme **myrosinase** from mustard seed powder.

When taken this way, the two compounds only ***combine during digestion***, releasing **sulforaphane** in the gut. That allows it to be rapidly absorbed and circulated throughout the body.

In another trial of healthy, older adults, sulforaphane intake led to *improvement* in **cognitive function** and a *decrease* in **negative mood**.[14]

In two clinical studies in patients being treated for the serious psychotic disorder schizophrenia, the addition of **sulforaphane** resulted in some symptomatic improvement, and in one study improved inflammatory status as measured by **C-reactive protein** (CRP) and antioxidant status as measured by superoxide dismutase.[41,42]

In a six-week clinical trial of patients with a recent history of **heart** procedures experiencing mild to moderate **depression**, sulforaphane significantly reduced depressive symptoms, producing a greater drop in depression evaluation scores and higher clinical response rates (**30%** vs. **6.7%**) than placebo.

These results suggest potential benefit and safety in this specific population (heart surgery patients who suffer post-surgery depression) and warrant larger similar studies.[43]

There are currently several ongoing **clinical trials** of sulforaphane in the U.S. for conditions including Alzheimer's,[44] Parkinson's,[45] brain injury,[46] and more. But the compound's neuroprotective benefits are already promising.

Summary

Sulforaphane is a potent cellular defender derived from cruciferous vegetables like **broccoli**.

It has shown beneficial activities in the **brain**, including in animal models of stroke, Alzheimer's, and other neurodegenerative diseases.

In human studies, sulforaphane intake improved **cognitive performance** in healthy adults. Clinical trials for various neurological and psychological conditions are currently in progress. ■

References

1. Asif Ali M, Khan N, Kaleem N, et al. Anticancer properties of sulforaphane: current insights at the molecular level. *Front Oncol.* 2023;13:1168321.
2. Russo M, Spagnuolo C, Russo GL, et al. Nrf2 targeting by sulforaphane: A potential therapy for cancer treatment. *Crit Rev Food Sci Nutr.* 2018 May 24;58(8):1391-405.

3. Calabrese EJ, Kozumbo WJ. The phytoprotective agent sulforaphane prevents inflammatory degenerative diseases and age-related pathologies via Nrf2-mediated hormesis. *Pharmacol Res*. 2021 Jan;163:105283.
4. Kim J. Pre-Clinical Neuroprotective Evidences and Plausible Mechanisms of Sulforaphane in Alzheimer's Disease. *Int J Mol Sci.* 2021 Mar 13;22(6).
5. Santos CL, Weber FB, Bello-Klein A, et al. Glioprotective Effects of Sulforaphane in Hypothalamus: Focus on Aging Brain. *Neurochem Res.* 2024 Sep;49(9):2505-18.
6. Schepici G, Bramanti P, Mazzon E. Efficacy of Sulforaphane in Neurodegenerative Diseases. *Int J Mol Sci.* 2020 Nov 16;21(22).
7. Uddin MS, Mamun AA, Jakaria M, et al. Emerging promise of sulforaphane-mediated Nrf2 signaling cascade against neurological disorders. *Sci Total Environ.* 2020 Mar 10;707:135624.
8. Hua D, Luo A, Wu Z, et al. Sulforaphane improves cognitive dysfunction after surgery and anesthesia in mice: The role of Keap1-Nrf2 signaling. *Brain Res Bull.* 2022 Apr;181:1-11.
9. Khan WU, Salman M, Ali M, et al. Neuroprotective Effects of Sulforaphane in a rat model of Alzheimer's Disease induced by Abeta (1-42) peptides. *Neurochem Int.* 2024 Oct;179:105839.
10. Li Q, Fadoul G, Ikonomovic M, et al. Sulforaphane promotes white matter plasticity and improves long-term neurological outcomes after ischemic stroke via the Nrf2 pathway. *Free Radic Biol Med.* 2022 Nov 20;193(Pt 1):292-303.
11. Li X, Ying H, Zhang Z, et al. Sulforaphane Attenuates Chronic Intermittent Hypoxia-Induced Brain Damage in Mice via Augmenting Nrf2 Nuclear Translocation and Autophagy. *Front Cell Neurosci.* 2022;16:827527.
12. Shimizu S, Kasai S, Yamazaki H, et al. Sulforaphane Increase Mitochondrial Biogenesis-Related Gene Expression in the Hippocampus and Suppresses Age-Related Cognitive Decline in Mice. *Int J Mol Sci.* 2022 Jul 29;23(15).
13. Nouchi R, Hu Q, Saito T, et al. Brain Training and Sulforaphane Intake Interventions Separately Improve Cognitive Performance in Healthy Older Adults, Whereas a Combination of These Interventions Does Not Have More Beneficial Effects: Evidence from a Randomized Controlled Trial. *Nutrients*. 2021 Jan 25;13(2).
14. Nouchi R, Hu Q, Ushida Y, et al. Effects of sulforaphane intake on processing speed and negative moods in healthy older adults: Evidence from a randomized controlled trial. *Front Aging Neurosci.* 2022;14:929628.
15. Agagunduz D, Sahin TO, Yilmaz B, et al. Cruciferous Vegetables and Their Bioactive Metabolites: from Prevention to Novel Therapies of Colorectal Cancer. *Evid Based Complement Alternat Med.* 2022;2022:1534083.
16. Vanduchova A, Anzenbacher P, Anzenbacherova E. Isothiocyanate from Broccoli, Sulforaphane, and Its Properties. *J Med Food.* 2019 Feb;22(2):121-6.
17. Houghton CA, Fassett RG, Coombes JS. Sulforaphane and Other Nutrigenomic Nrf2 Activators: Can the Clinician's Expectation Be Matched by the Reality? *Oxid Med Cell Longev.* 2016;2016:7857186.
18. Cascajosa-Lira A, Prieto AI, Pichardo S, et al. Protective effects of sulforaphane against toxic substances and contaminants: A systematic review. *Phytomedicine*. 2024 Jul 25;130:155731.
19. Jardim FR, Almeida FJS, Luckachaki MD, et al. Effects of sulforaphane on brain mitochondria: mechanistic view and future directions. *J Zhejiang Univ Sci B*. 2020 Apr.;21(4):263-79.
20. Lilley T, Camera DM, Kwa FAA. Repairing muscle with broccoli-derived sulforaphane: A preclinical evaluation for the treatment of mitochondrial myopathies. *Drug Discov Today.* 2025 Jan;30(1):104283.
21. Bose C, Alves I, Singh P, et al. Sulforaphane prevents age-associated cardiac and muscular dysfunction through Nrf2 signaling. *Aging Cell.* 2020 Nov;19(11):e13261.
22. Treasure K, Harris J, Williamson G. Exploring the anti-inflammatory activity of sulforaphane. *Immunol Cell Biol.* 2023 Oct;101(9):805-28.
23. Mazarakis N, Anderson J, Toh ZQ, et al. Examination of Novel Immunomodulatory Effects of L-Sulforaphane. *Nutrients.* 2021 Feb 12;13(2):602.
24. Axelsson AS, Tubbs E, Mecham B, et al. Sulforaphane reduces hepatic glucose production and improves glucose control in patients with type 2 diabetes. *Sci Transl Med*. 2017 Jun 14;9(394).
25. Mthembu SXH, Mazibuko-Mbeje SE, Moetlediwa MT, et al. Sulforaphane: A nutraceutical against diabetes-related complications. *Pharmacol Res.* 2023 Oct;196:106918.
26. Tian S, Wang Y, Li X, et al. Sulforaphane Regulates Glucose and Lipid Metabolisms in Obese Mice by Restraining JNK and Activating Insulin and FGF21 Signal Pathways. *J Agric Food Chem*. 2021 Nov 10;69(44):13066-79.
27. Dwibedi C, Axelsson AS, Abrahamsson B, et al. Effect of broccoli sprout extract and baseline gut microbiota on fasting blood glucose in prediabetes: a randomized, placebo-controlled trial. *Nat Microbiol.* 2025 Mar;10(3):681-93.
28. Tian S, Lei Y, Zhao F, et al. Improving insulin resistance by sulforaphane via activating the Bacteroides and Lactobacillus SCFAs-GPR-GLP1 signal axis. *Food Funct.* 2024 Aug 27;15(17):8644-60.
29. Subedi L, Lee JH, Gaire BP, et al. Sulforaphane Inhibits MGO-AGE-Mediated Neuroinflammation by Suppressing NF-kappaB, MAPK, and AGE-RAGE Signaling Pathways in Microglial Cells. *Antioxidants* (Basel). 2020 Aug 26;9(9).
30. Lv J, Bao S, Liu T, et al. Sulforaphane delays diabetes-induced retinal photoreceptor cell degeneration. *Cell Tissue Res*. 2020 Dec;382(3):477-86.
31. Angeloni C, Malaguti M, Rizzo B, et al. Neuroprotective effect of sulforaphane against methylglyoxal cytotoxicity. *Chem Res Toxicol.* 2015 Jun 15;28(6):1234-45.
32. Li J, Liu D, Sun L, et al. Advanced glycation end products and neurodegenerative diseases: mechanisms and perspective. *J Neurol Sci.* 2012 Jun 15;317(1-2):1-5.
33. Singh A, Kukreti R, Saso L, et al. Oxidative Stress: A Key Modulator in Neurodegenerative Diseases. *Molecules*. 2019 Apr 22;24(8).
34. Gonzalez A, Calfio C, Churruca M, et al. Glucose metabolism and AD: evidence for a potential diabetes type 3. *Alzheimers Res Ther.* 2022 Apr 20;14(1):56.
35. Hou TT, Yang HY, Wang W, et al. Sulforaphane Inhibits the Generation of Amyloid-beta Oligomer and Promotes Spatial Learning and Memory in Alzheimer's Disease (PS1V97L) Transgenic Mice. *J Alzheimers Dis.* 2018;62(4):1803-13.
36. Lee S, Choi BR, Kim J, et al. Sulforaphane Upregulates the Heat Shock Protein Co-Chaperone CHIP and Clears Amyloid-beta and Tau in a Mouse Model of Alzheimer's Disease. *Mol Nutr Food Res*. 2018 Jun;62(12):e1800240.
37. Kapoor S, Kala D, Svoboda J, et al. The effect of sulforaphane on perinatal hypoxic-ischemic brain injury in rats. *Physiol Res.* 2022 Jul 29;71(3):401-11.
38. Mao L, Yang T, Li X, et al. Protective effects of sulforaphane in experimental vascular cognitive impairment: Contribution of the Nrf2 pathway. J *Cereb Blood Flow Metab*. 2019 Feb;39(2):352-66.
39. Wang B, Kulikowicz E, Lee JK, et al. Sulforaphane Protects Piglet Brains from Neonatal Hypoxic-Ischemic Injury. *Dev Neurosci.* 2020;42(2-4):124-34.
40. Dash PK, Zhao J, Orsi SA, et al. Sulforaphane improves cognitive function administered following traumatic brain injury. *Neurosci Lett*. 2009 Aug 28;460(2):103-7.
41. Hei G, Smith RC, Li R, et al. Sulforaphane Effects on Cognition and Symptoms in First and Early Episode Schizophrenia: A Randomized Double-Blind Trial. *Schizophr Bull Open.* 2022 Jan;3(1):sgac024.
42. Zeng J, Zhang W, Lu X, et al. The association of SOD and HsCRP with the efficacy of sulforaphane in schizophrenia patients with residual negative symptoms. *Eur Arch Psychiatry Clin Neurosci*. 2024 Aug;274(5):1083-92.
43. Ghazizadeh-Hashemi F, Bagheri S, Ashraf-Ganjouei A, et al. Efficacy and safety of sulforaphane for treatment of mild to moderate depression in patients with history of cardiac interventions: A randomized, double-blind, placebo-controlled clinical trial. *Psychiatry and Clinical Neurosciences.* 2021;75(8):250-5.
44. Available at: https://clinicaltrials.gov/study/NCT04213391?cond=Alzheimer%20Disease&intr=sulphoraphane&rank=1. Accessed October 1, 2025.
45. Available at: https://clinicaltrials.gov/study/NCT05084365. Accessed October 1, 2025.
46. Available at: https://clinicaltrials.gov/study/NCT04252261? Accessed October 1, 2025.

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30 softgels

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

Low-Cost Biologically Active B COMPLEX

BioActive Complete B-Complex provides *enzymatically active* forms of meaningful potencies of each B vitamin.

This includes the ***pyridoxal 5'-phosphate*** form of vitamin B6 shown to protect lipids and proteins against **glycation** *and* the most biologically active form of **folate** called ***5-methyltetrahydrofolate*** **(5-MTHF)**.*

Item #01945

60 vegetarian capsules

GLUTEN FREE

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

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

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

NEW PRODUCTS

Biohack YOUR DNA

You can't change your chronological age, but your lifestyle and nutritional choices have an impact on your *biological* age.

Biological Aging Defense is a once-daily formula made with a standardized scarlet beebalm extract to help preserve healthy telomere length and DNA methylation age, key biomarkers associated with how aging affects the body's cells, tissues and organ systems.

Take control of how you age with **Biological Aging Defense!**

Item #02548

30 vegetarian capsules

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED

The SUPER AGING Secret

GLUTEN FREE · NON GMO LE CERTIFIED

Luteolin is a flavonoid nutrient that's getting attention for its potential for cellular health and healthy aging benefits.

But like many health-promoting flavonoids, luteolin has low bioavailability. So we combined luteolin with galactomannan fibers from fenugreek seeds to enhance absorption.

The result: our new Bio-Luteolin™ formula, which provides up to 14x increased bioavailability than regular luteolin.*

Item #02547

30 vegetarian capsules

*Than regular luteolin defined as 98% pure powder luteolin

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