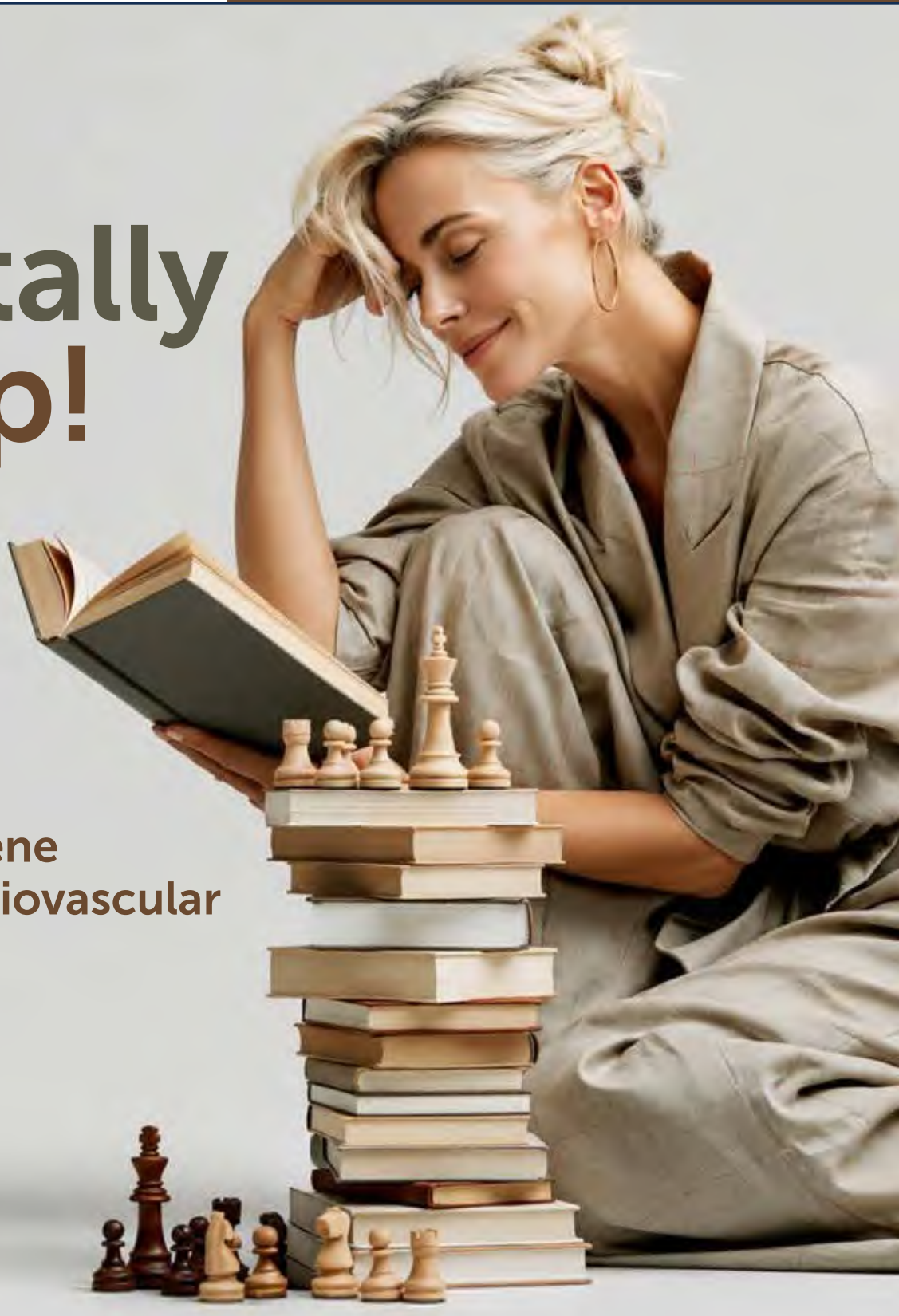
LIFE EXTENSION®
The Science of a Healthier Life®
September/October 2026

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

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Contributors
Michael Downey • Jack Filmore • Laurie Mathena
Marsha McCulloch, MS, RD • Samuel Rutger • Richard Templeton
Stephen Wright

Advertising
Chief Marketing Officer • Rey Searles • rsearles@lifeextension.com
National Advertising Manager • JT Hroncich • 404-709-2324

Vice President, Business Development
Ryan Thompson • rythompson@lifeextension.com • 954-202-7685

Circulation & Distribution
Life Extension • 3600 West Commercial Blvd., Ft. Lauderdale, FL 33309
Editorial offices: 954-766-8433 • fax: 954-491-5306

Customer Service: 800-678-8989 • Email: customerservice@LifeExtension.com
Wellness specialists: 800-226-2370 • Email: wellness@LifeExtension.com

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MEDICAL ADVISORY BOARD

Mark S. Bezzek, MD, FACP, FAARM, FAAEM, is board-certified in internal medicine, emergency medicine, and anti-aging/regenerative medicine. He holds U.S. patents for a multivitamin/mineral supplement, an Alzheimer's/dementia compilation, and a diabetic regimen.

William Davis, MD, is a preventive cardiologist and author of *Wheat Belly: Lose the Wheat, Lose the Weight* and *Find Your Path Back to Health*.

Thomas F. Crais, MD, FACS, a board-certified plastic surgeon, was medical director of the microsurgical research and training lab at Southern Baptist Hospital in New Orleans, LA, and currently works in Hailey, ID.

Martin Dayton, MD, DO, has a private practice and his focus is on nutrition, aging, chelation therapy, holistic medicine, and oxidative medicine.

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

Sergey A. Dzugan, MD, PhD, was formerly chief of cardiovascular surgery at the Donetsk Regional Medical Center in Donetsk, Ukraine. Dr. Dzugan's current primary interests are anti-aging and biological therapy for cancer, cholesterol, and hormonal disorders.

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

Mitchell J. Ghen, DO, PhD, holds a doctorate in holistic health and anti-aging and practices at Dr. Mitch's Total Health.

Gary Goldfaden, MD, is a clinical dermatologist and a lifetime member of the American Academy of Dermatology. He is the founder of Academy Dermatology of Hollywood, FL, and has a skin care line.

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

Ingo Mahn, DDS, AIAOMT, is the founder of Natural Dental Partners in North Scottsdale, AZ. A 1985 graduate of Marquette University School of Dentistry, he also earned a degree in Integrative Medicine from Capital University in Georgetown in 2004. Dr. Mahn is on the board of the International Academy of Oral Medicine and Toxicology (IAOMT) and serves as the chairman of the IAOMT Ozone committee. He is the author of *A Healthy Mouth - The Missing Link to Optimal Health*, and *A Breath of Health*.

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

Maurice D. Marholin, DC, DO, is a licensed chiropractic physician and board-certified osteopathic family physician.While training at the University of Alabama, he completed fellowships in Clinical Nutrition and Behavioral Medicine. He is currently in private practice in Clermont, FL.

Professor Francesco Marotta, MD, PhD, of Montenapoleone Medical Center, Milan, Italy, is a gastroenterologist and nutrigenomics expert with extensive international university experience. He is also a consulting professor at the WHO-affiliated Center for Biotech & Traditional Medicine, University of Milano, Italy and honorary resident professor, Nutrition, Texas Women's University. He is the author of more than 130 papers and 400 lectures.

Philip Lee Miller, MD, is founder and medical director of California Age Management in Los Gatos, CA.

Michele G. Morrow, DO, FAAFP, is a board-certified family physician who merges mainstream and alternative medicine using functional medicine concepts, nutrition, and natural approaches.

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

Lambert Titus K. Parker, MD, an internist and a board-certified anti-aging physician, practices integrative medicine from a human ecology perspective with emphasis on personalized brain health, biomarkers, genomics and total health optimization. He also collaborates on education and research for Hampton Roads Hyperbaric Therapy.

Ross Pelton, RPh, PhD, CCN, is scientific director for Essential Formulas, Inc.

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

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

Ron Rothenberg, MD, is a former Clinical Professor in Family and Preventive Medicine at UCSD School of Medicine and founder of California HealthSpan Institute in San Diego.

Roman Rozencwaig, MD, is a pioneer in research on melatonin and aging. He practices in Montreal, Canada.

Michael D. Seidman, MD, FACS, is the director of skull base surgery and wellness for the Adventist Health System in Celebration, FL.



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



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



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.



Joel Kahn, MD, FACC of Detroit, Michigan, is a practicing cardiologist, and a Clinical Professor of Medicine at Wayne State University School of Medicine. He graduated Summa Cum Laude from the University of Michigan Medical School. Known as "America's Healthy Heart Doc", Dr. Kahn has triple board certification in Internal Medicine, Cardiovascular Medicine and Interventional Cardiology. He was the first physician in the world to certify in Metabolic Cardiology with A4M/MMI and the University of South Florida. He founded the Kahn Center for Cardiac Longevity in Bingham Farms, MI.



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



Dipnarine Maharaj MD, MB, ChB, FRCP (Glasgow), FRCP (Edinburgh), FRCPath., FACP, is the Medical Director of the South Florida Bone Marrow Stem Cell Transplant Institute 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.



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



Michael D. Ozner, MD, FACC, FAHA, is a board-certified cardiologist who specializes in cardiovascular disease prevention. He serves as medical director for the Cardiovascular Prevention Institute of South Florida and is a noted national speaker on heart disease prevention. Dr. Ozner is also author of *Heart Attacks Are Not Worth Dying For, The Great American Heart Hoax*, and *The Complete Mediterranean Diet*. For more information visit www.DrOzner.com.



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



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

In the News

New Data on Health Benefits of Multivitamin/Mineral Supplement Use

A review of 19 meta-analyses that included 214 studies with a total of about 5.5 million people, consolidated the evidence for the health benefits of multivitamin/mineral use.*

Analysis of randomized, controlled trials found that multivitamin/mineral use was associated with better global cognition, episodic memory, and immediate recall in cognitively intact or older adults.

The scientists also found decreased psychologic symptoms in healthy individuals, and lower systolic blood pressure among people with high blood pressure or chronic diseases.

In observational studies, multivitamin/mineral use was associated with lower risks of cataracts, coronary heart disease, colorectal cancer, and hip fracture in adults.

Editor's Note: Meta-analyses of studies that evaluated the use of multivitamin/mineral formulas among pregnant women found reductions in the risks of giving birth to infants who were small for their gestational age, had neural tube defects, or developed cancer.

* *Ageing Res Rev.* 2026 Jan:114:102965.



CoQ10 Effects Against Statin Induced Muscle Symptoms

CoQ10 has been studied as a possible treatment for statin-associated muscle symptoms since the late 1980's, with mixed results in clinical trials. A new systematic review and meta-analysis of clinical trials concluded that CoQ10 may be more likely to have a benefit.*

Statin-associated muscle symptoms include muscle pain, cramps, weakness, stiffness, and, less often, a condition characterized by muscle tissue breakdown. Because CoQ10 is depleted by statin drugs, the addition of CoQ10 to a nutritional regimen has been suggested for statin users to protect against statin-associated muscle symptoms and other side effects.

The meta-analysis included seven randomized, controlled trials that enrolled a total of 389 patients. Trial duration ranged from 30 to 90 days and daily CoQ10 doses ranged from **100 mg** to **600 mg**. Statin dosages ranged from **10 mg** to **80 mg** per day. The meta-analysis showed that the pooled results found a significant reduction in statin-associated muscle side effects in CoQ10-treated individuals.

Editor's Note: CoQ10 is a molecule that is made by the body and occurs in some foods. It is essential for producing energy by the cells' "power plants" known as mitochondria, but declines with aging.

* *J Nutr Sci.* 2025 Oct 10:14:e72.





Gotu Kola Increases Macular Pigment Optical Density

A randomized, controlled trial found that *Centella asiatica* (known as gotu kola) significantly improved **macular pigment optical density**, a biomarker of macular antioxidant status, among middle-aged adults.*

The researchers hypothesized that gotu kola would enhance macular pigment optical density by improving the retinal antioxidant environment.

The clinical trial included men and women between the ages of 45 to 65 years. A total of 80 people were split to receive **300 mg** per day of a standardized gotu kola extract or a placebo for 180 days. Macular pigment optical density was measured before the treatment period, on the 60th and 120th days, and at the end of the trial.

Significant improvements were shown beginning at 120 days in the participants who received gotu kola for macular pigment optical density in the left eye, right eye, and the average of both eyes compared with the placebo. An even greater improvement was shown at the 180-day mark.

Editor's Note: The participant selection included middle-aged adults with relatively low baseline MPOD.

* *Nutrients.* 2026 Mar 12;18(6):905.

Fish Oil Shown to Help Protect Kidney Dialysis Patients from Cardiovascular Events

A randomized, controlled trial revealed a significantly lower risk of serious cardiovascular events among individuals undergoing hemodialysis who received fish oil supplements, compared with those who received a placebo.*

The trial included **1,228** dialysis patients who received **4 grams** of omega-3 polyunsaturated fatty acids or a placebo daily with a median follow-up of 3.5 years.

During a median 3.5 years of follow-up, the rate of serious cardiovascular events was **43%** lower among participants who received fish oil compared with those who received a placebo.

Participants who received fish oil had a **44%** lower risk of fatal and nonfatal heart attack, a **43%** lower risk of peripheral vascular disease that led to amputation, a **63%** lower risk of fatal and nonfatal stroke, and a **27%** lower risk of a first cardiovascular event or death from any cause, compared with the placebo recipients.

Editor's Note: Noncardiac deaths were **33%** lower and cardiac deaths were **45%** lower among those who received fish oil.

* *N Engl J Med.* 2026 Jan 8;394(2):128-137.



The SUPER AGING Secret

Have you heard? Luteolin is a flavonoid that may be the key to healthy aging.

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This new, highly-bioavailable formula:

- Supports cellular health and healthy aging
- Has been shown to provide up to 14x increased bioavailability in a clinical study*
- Is formulated with innovative fenugreek fiber coating to enhance absorption

Absorb the healthy aging benefits of Bio-Luteolin™

Item #02547

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*Than regular luteolin defined as 98% pure powder luteolin

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Say "goodbye" to belly fat and "hello" to a trimmer waist with Gummy Science™ Mediterranean Weight Management!

MKBRPR250201

Inspired by the healthy weight benefits of the Mediterranean diet, these gummies promote both fat and weight loss when combined with diet and exercise. This formula targets not just belly fat but the visceral fat that surrounds your organs.

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SUGAR FREE

*Not a low-calorie food.

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

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LE

Oh-Mg!

105 mg



Bioavailable

MAGNESIUM GLYCINATE

For Whole-Body Health

Magnesium is involved in over **600** biochemical reactions in the human body.

Each capsule of **Magnesium Glycinate** provides **105 mg** of elemental magnesium. This can enable healthy magnesium levels to be achieved throughout the body.

Item #02535

90 vegetarian capsules

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FOUR PHAGES
TWO PROBIOTICS
ONE POSTBIOTIC



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When it comes to digestion, "millions & billions" isn't always better. Instead, choose a formula built with clinically studied ingredients:

4 bacteriophages to help inhibit unwanted bacteria in the gut.

2 probiotics *L. paracasei* IMC 502 and *L. rhamnosus* IMC 501 for optimal digestive health and regularity.

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Food Sensitivity Relief with Diamine Oxidase is formulated to encourage healthy metabolism of histamine-rich foods like cured meats, cheeses and wine, so you can make friends with your favorite foods again.

Put digestive comfort back on the menu with our plant-based formula!

This product is available at fine health food stores everywhere.

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Enhance FEMALE Sexual Health and Libido











BY MARSHA MCCULLOCH, MS, RD

Female sexual health issues affect about **40%** to **50%** of all women.[1-3]

Frequent concerns include low sexual desire, physical discomfort, and reduced pleasure.[1,2,4,5]

Many women are uncomfortable mentioning these concerns to healthcare providers, and current available medical treatments are limited and not appropriate for all women.[6]

Plant-based solutions for sexual health concerns are available for women seeking alternatives.

Scientists have developed two standardized botanical extracts **clinically shown** to support female sexual function:

- **Fenugreek seed** extract increased sex hormone levels, arousal, and more than ***doubled*** the frequency of sexual activity in women in stable relationships.[7]
- **Saffron** extract improved scores in sexual function measures, including desire and satisfaction, by **62%** from baseline in a study of married women.[8]

The two extracts have been studied separately and promote healthy sexual function in different ways.[7,8]

Sexual Dysfunction in Women

Women of all ages may have sexual health issues.[2]

A meta-analysis of **95** observational studies conducted across the globe found that **41%** of *younger* (premenopausal) women struggle with sexual health issues.[9]

One of the most commonly reported concerns is low desire or **libido**.[10]

In one U.S. study, about **27%** of premenopausal women and **52%** of menopausal women reported **low sexual desire**.[11]

Female sexual function is impacted by complex interactions among:

- **Sex hormones**, including estrogen and testosterone,[12]
- **Medical conditions**, including diabetes, thyroid disorders, and other chronic ailments,[13-15]
- **Medications**, such as antidepressants, beta blockers, opioids, and birth control pills,[16-18]
- The **autonomic** (involuntary) **nervous system** that regulates sexual responses,[19] and
- **Mental outlook**, such as depression, anxiety, stress, and fatigue.[20,21]

Changes in these factors may contribute to concerns with sexual desire, lubrication, and relationship satisfaction.[3]



Hormones and Female Sexual Health

Estrogen (particularly a form known as **estradiol**) and **testosterone** play key roles in female sexual health.

When estrogen levels drop during menopause, **vaginal dryness** and **discomfort** are more likely.[22,23]

Testosterone also plays a significant role in vaginal lubrication and sexual desire in women.[24,25]

Testosterone levels decline steadily across adulthood, including the **premenopausal** years, which may contribute to reduced sexual desire.[24,26]

Some birth control pills also lower testosterone levels.[27,28]

Fenugreek Supports Healthy Sexual Desire

The herb **fenugreek** is listed as an aphrodisiac in ancient Indian Ayurvedic medical texts.[29]

Fenugreek is rich in **saponins**, compounds that are believed to be responsible for its effects.[30,31]

Scientists have developed a **fenugreek seed** extract standardized to contain at least **50%** saponins.[7]

In a clinical trial, 80 healthy women (ages 20 to 49) in stable relationships but with a low sex drive took **300 mg** of this standardized fenugreek extract or a placebo twice daily for eight weeks.[7]

The results were stunning.

Those taking fenugreek reported **significant improvements** across all five domains measured on a recognized **sexual function** questionnaire. These domains include sexual thoughts, arousal, activity, orgasm, and drive/relationship, compared to placebo.[7]

Overall, those taking fenugreek increased their frequency of **sexual activity** from one or two times per month to ***once per week***.

These sexual health improvements in the fenugreek group corresponded with statistically significant increases in **estradiol** levels (**66%**) and in free (biologically active) **testosterone** levels (**24%**). These improvements are based on mean changes reported in the study, in women with hormone levels within the normal range.

Sexual function measures improved a similar amount in women using **birth control** pills and in those who were not.[7]





Saffron Supports Sexual Arousal

Saffron, which comes from flowers of the *Crocus sativus* plant, has been studied for multiple components of mood and mental functioning, including **sexual function**.[32,33]

Two of the main beneficial components of saffron are **safranal** and **crocins**.[32]

Standardized **saffron** extract was tested in a **placebo-controlled** trial of 74 married women, ages 18 to 55, with low sexual function.[8]

The treatment group took **15 mg** of standardized **saffron extract** twice daily for six weeks. Compared to baseline, total scores on a recognized sexual function questionnaire improved by **62%** at six weeks in the saffron group.

In addition, the saffron group reported improvements in domains related to **desire**, **lubrication**, and **satisfaction** aspects of their sexual relationships, compared to placebo.[8]

Combining fenugreek seed and saffron extracts in an oral formula provides a multipronged approach to supporting female sexual health.

Get Your Libido Back

- About **27%** of premenopausal and **52%** of menopausal American women report struggling with **low sexual desire**.
- A range of factors can lower female sexual function, including age, sex hormone imbalances, some medications, and mental distress.
- **Fenugreek extract** has been clinically shown to improve sex hormone levels and double the frequency of sexual activity of women in stable relationships.
- Daily intake of **saffron extract** improved sexual desire, lubrication, and satisfaction in women with low sexual function in one clinical trial.
- Fenugreek and saffron extracts offer multifaceted support for women's sexual health.

Summary

Sexual health issues, including low desire and reduced enjoyment, are common in women of any age.

Scientists have developed two standardized herbal extracts to support **sexual vitality** and **desire**.

Fenugreek seed extract has been clinically found to improve sexual arousal and more than **doubled** sexual activity frequency in women in stable relationships.

Saffron extract has been clinically shown to improve desire, lubrication, and sexual satisfaction in women with low sexual function.

These extracts work in different ways to support sexual health. ■

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The Best B12 for the Job









BY MARSHA MCCULLOCH, MS, RD

Low energy. Tingling or numbness in the feet. Brain fog. Poor balance.

These are just a few possible symptoms of low **vitamin B12**. Some signs are subtle and may be overlooked, potentially resulting in serious damage.[1]

Taking **oral B12** may help provide a safety net by ensuring adequate B12 status.[2] However, *not* all forms are the same.

Only two types of B12 are active in cells:

Adenosylcobalamin and **Methylcobalamin**.[3]

These bioactive forms may help address common age-related conditions, including neurological dysfunction:

- In preclinical models of **Parkinson's** disease, **adenosylcobalamin** helped protect dopamine-producing neurons.[4]
- In a human study, oral **methylcobalamin** was associated with improvements in **nerve pain** in adults with diabetic peripheral neuropathy, which is commonly experienced by people with diabetes.[5]

Together, oral **methylcobalamin** and **adenosylcobalamin** can help optimize the body's vitamin B12 status.

The Importance of B12

Vitamin B12 is critical for the development and maintenance of the central nervous system. A *deficiency* can lead to neurological concerns, including nerve damage, balance issues, cognitive impairment, and dementia.[6]

Vitamin B12 is found primarily in foods of animal origin, including meat, poultry, some eggs, and dairy products.[7]

The need for supplementation is rising as more people move to **plant-based** diets,[8,9] and the decreased absorption of food-based B12, which many people face as they **age**.[8-10]

Two bioactive forms of **vitamin B12** are:

- **Adenosylcobalamin**, which is active in the mitochondria, the energy powerhouse within each cell,[11] and
- **Methylcobalamin**, which is active in the cytosol (gel-like fluid) inside the body's cells.[11,12]

B12 is needed to form healthy red blood cells, DNA, and the myelin covering of nerves.[12,13]

Some individuals have **genetic variants** that can impair the body's ability to convert vitamin B12 into its active forms. That may make the bioactive B12 forms preferable.[14]

People generally don't know their B12-related genetics. Oral intake of both **adenosylcobalamin** and **methylcobalamin** may help support B12 levels.[14]

Adenosylcobalamin Against Parkinson's Disease

Low levels of vitamin B12 have been associated with progression of **Parkinson's** disease.[15]

Parkinson's involves the progressive loss of **neurons** that produce the neurotransmitter **dopamine** in the brain.[16] This gradually impairs muscle control, balance, mobility, and cognitive function.[17]

A mutation resulting in overactivity of the **LRRK2 enzyme** and destruction of **dopamine-producing neurons** is a top genetic cause of Parkinson's disease.[18]

In preclinical research, scientists discovered that **adenosylcobalamin** inhibited LRRK2 activity and reduced markers of neurotoxicity in experimental models involving dopamine neurons.[4]



In these studies, scientists tested adenosylcobalamin in roundworms genetically modified to express the LRRK2 gene mutation. These worms exhibited symptoms (age-dependent dopaminergic neurodegeneration and behavioral deficits) similar to human Parkinson's disease.[4]

When the young worms were given **adenosylcobalamin**, it prevented the destruction of **dopamine neurons** and related symptoms when they became adults. Similar neuroprotection was found in fruit flies.

In mice, adenosylcobalamin alleviated deficits in dopamine release sustainability caused by LRRK2 disease variants.[4]

Methylcobalamin and Neurological Health

Older adults with elevated levels of **homocysteine** are at increased risk of **stroke**[19] and **dementia**.[20,21]

Vitamin B12 serves as a cofactor to help lower homocysteine levels.[22,23]

Clinical (human) research has shown benefits of methylcobalamin for **diabetic peripheral neuropathy**, a condition marked by painful tingling, burning, or hot/cold sensations in the arms, legs, hands, and feet.[5]

Peripheral neuropathy commonly affects people with **diabetes** and can occur in **prediabetes**.[24] The nerve pain and other symptoms can also be triggered by physical injuries[25] and insufficient **vitamin B12** levels.[25,26]





What You Need To Know

In a one-year clinical trial, researchers gave **1,000 mcg** of **oral methylcobalamin** or a placebo daily to 90 adults with **type 2 diabetes** who had diabetic **neuropathy** and vitamin B12 blood levels below **400 picomoles (pmol)/L**.[5]

All subjects had been taking **metformin**—a diabetes drug that can impair B12 absorption—for at least four years. In the **methylcobalamin** group, neuropathy pain scores significantly **improved**, while the **placebo** group's pain scores significantly **worsened**.

In addition, the B12 treatment group raised their serum B12 levels from **232.0 pmol/L** at baseline to **776.7 pmol/L**. B12 levels did not significantly change in the **placebo** group.[5]

Though vitamin B12 levels below **148 pmol/L** are typically used as the threshold for diagnosing deficiency,[27] neurological dysfunction can occur even in individuals with levels higher than this.[27,28]

A randomized, double-blind, placebo-controlled trial enrolled patients with type 2 diabetes on metformin who had B12 levels below **400 pmol/L** and demonstrated that **B12 supplementation** improved neuropathy outcomes, suggesting that even levels considered "sufficient" by conventional standards may be suboptimal in this population.[5]

Bioactive Forms of B12 for Neurological Health

- With aging and low intake of animal-based foods, risk of **vitamin B12** deficiency rises. Food sources of B12 can also be challenging to absorb.
- Not all oral B12 is the same. **Adenosylcobalamin** and **methylcobalamin** are the only two readily active forms of B12. Each has unique functions that support neurological and overall health.
- Preclinical research suggests that adenosylcobalamin may help support **dopamine-related pathways**. Low dopamine levels are tied to Parkinson's disease.
- In a human trial, methylcobalamin significantly improved **peripheral neuropathy pain scores** in adults with **diabetic peripheral neuropathy** and **low vitamin B12 levels**. Nerve pain is common in diabetes.
- A combination of adenosylcobalamin and methylcobalamin may help support optimal vitamin B12 levels for neurological and overall health.

Additional research published in **2025** found that even vitamin B12 levels within the normal range were linked to markers of neurological injury and reduced function in healthy older adults, suggesting that current definitions of optimal **B12** levels may need to be re-evaluated.[28]

Oral intake of **1,000 mcg** of a combination of **adenosylcobalamin** and **methylcobalamin** may help support vitamin B12 status and neurological health.

Summary

Vitamin B12 is critical for maintaining **neurological health** and other essential functions.

Several forms of oral vitamin B12 are available. **Methylcobalamin** and **adenosylcobalamin** are the two forms used directly by enzymes in the body.

Preclinical data show that **adenosylcobalamin** may help preserve **dopamine** levels. Loss of dopamine is tied to the development of **Parkinson's disease**.

In a clinical study, oral **methylcobalamin** improved peripheral neuropathy pain in adults with diabetic **peripheral neuropathy**.

Combining these two bioactive forms of B12 may help support optimal levels for brain and nerve function, as well as overall health. ■

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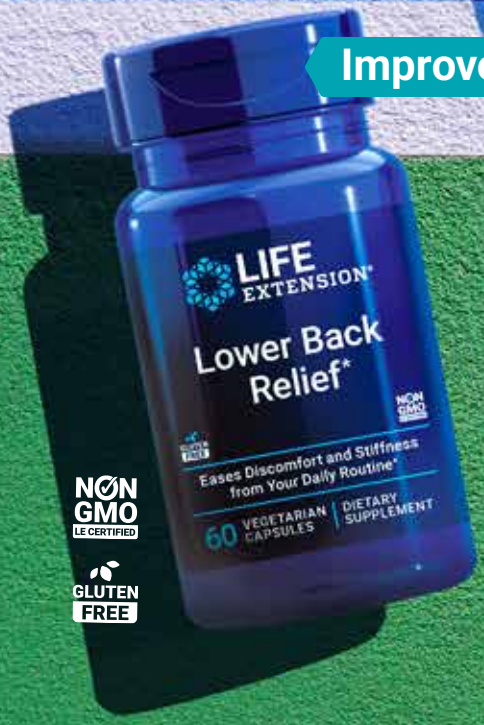
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What is Olive Leaf?

BY LAURIE MATHENA





Olive oil is a key component of the **Mediterranean diet**.

Higher consumption has been associated with a reduced risk of dying from heart disease,[1-3] cancer,[3,4] or from any cause at all.[1,2,4]

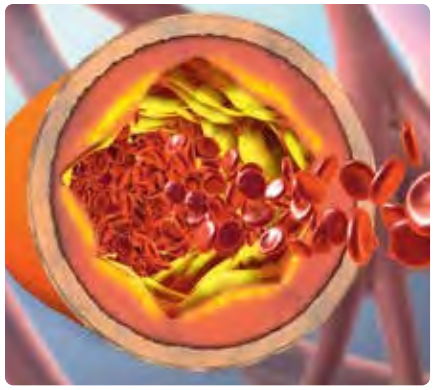
But olive trees also provide another component that could be more beneficial: the olive *leaves*.

Much of olive oil's benefits come from its high concentration of **polyphenols**, the most abundant of which is *oleuropein*. This is the compound that gives unprocessed olives their characteristic bitter taste.[5]

Among all parts of the olive plant, olive leaves contain the highest levels of **oleuropein**, exceeding the concentrations found in branches, roots, buds, flowers, or any other plant tissues.[5] This suggests that the leaves themselves may offer additional health-related properties.

Research on oleuropein spans cardiovascular, anti-inflammatory, antioxidant, and anti-tumor domains, with the cardiovascular effects being the most clinically studied in human trials.

Preclinical studies indicate that **oleuropein** exhibits anti-inflammatory, antioxidant, and anti-tumor effects.[5] The strongest body of evidence relates to cardiovascular health outcomes, including blood pressure regulation,[6-8] lipid profile,[6-8] and inflammatory markers.[9]



Heart-Healthy Benefits

In a 12-week randomized placebo-controlled clinical trial involving 60 hypertensive patients aged 30–60, those receiving **olive leaf extract** showed significantly lower levels of the inflammatory markers IL-6, IL-8, and TNF-α compared with those receiving **placebo**.[9]

In a meta-analysis of 12 randomized controlled trials (819 participants), supplementation with **olive leaf extract** was associated with reduction in systolic blood pressure and triglycerides in *overall* pooled analysis. People with hypertension experienced even larger reductions in systolic blood pressure as well as reductions in total cholesterol and LDL cholesterol.[8]

Taking a closer look, this study showed the following reductions:

- **Blood pressure:** Systolic blood pressure dropped by about **3.9 mmHg** overall. People with hypertension had an even larger decrease, with systolic (top number) BP decreasing by **4.8 mmHg** and diastolic (bottom number) BP decreasing by **2.5 mmHg**. Normal weight individuals experienced the largest reductions, with a decrease in systolic BP of **7.1 mmHg**.
- **Cholesterol:** Total cholesterol dropped by about **9.1 mg/dL** in people with hypertension and by **6.7 mg/dL** in normal weight individuals. LDL-C dropped by **4.6 mg/dL** in hypertensive patients.
- **Triglycerides:** Triglyceride levels fell by about **9.5 mg/dL** on average in the whole group, and by **14.4 mg/dL** in hypertensive individuals.

A **2025** multicenter, 12-week randomized controlled trial in 621 patients *already* on blood pressure **medication** found that **olive leaf extract** was associated with a greater reduction in systolic blood pressure than placebo.[7]

It was also associated with improvements in metabolic and inflammatory markers, including **blood sugar**, **triglycerides**, and **C-reactive protein (CRP)**, with no significant safety concerns reported. Overall, the findings suggest it may be a useful adjunct for supporting cardiovascular health.[7]

How it Works

Laboratory and animal studies suggest several potential mechanisms through which olive leaf extract may support cardiovascular health:

- **Promotes nitric oxide.** Oleuropein has been shown to enhance nitric oxide production,[10] and to induce vasodilation in blood vessels (likely involving nitric oxide pathways),[11] which may help support healthy blood flow.
- **Improves vascular function.** Experimental evidence indicates that olive leaf extract may help support vascular function, which may contribute to overall blood vessel health.[12,13]
- **May help reduce platelet aggregation.** Olive leaf extract has anti-platelet activity,[14,15] which may help support normal blood flow.



- **Supports healthy cholesterol.** Olive phenols, including oleuropein, have been shown to inhibit HMG-CoA reductase activity in rat hepatocytes,[16] which inhibits intracellular cholesterol production.

Together, these mechanisms may contribute to cardiovascular support.

Summary

Many of olive oil's benefits are linked to the polyphenol, *oleuropein*. Olive *leaves* contain high concentrations of oleuropein, which has led researchers to investigate their potential health benefits.

Across clinical trials and meta-analysis discussed in this article, **olive leaf extract** was associated with reductions in blood pressure, cholesterol, and inflammatory markers.



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BY STEPHEN WRIGHT

Lycopene Lowers Cardiovascular Risk

Cardiovascular disease is the number one killer on the planet.[1] By 2030 it is projected to affect a staggering **44%** of the U.S. adult population.[2]

Lycopene has caught the attention of researchers for its potential cardiovascular benefits.

In preclinical studies, lycopene has demonstrated the ability to slow harmful changes that can lead to **stroke** and **heart attack**.[3-5]

A review and meta-analysis of dozens of **human** population studies found that those with the *highest* intake or **blood levels** of l**ycopene** had a:[6]

- **14%** lower risk of cardiovascular disease,
- **26%** lower risk of stroke, and
- **37%** lower risk of ***death from any cause***.

A human study published in **2025** demonstrated that consumption of **lycopene-rich** tomato juice ***improved a marker of endothelial dysfunction*** that threatens to progress into cardiovascular disease.[7]

Arteries and Heart Health

Arteries carry blood from the heart to the rest of the body where it is needed.

When healthy, arteries actively direct blood flow, dilating when more blood is needed and constricting when less is required.[8]

This regulation of blood flow is largely controlled by a layer of cells, the **endothelium**, lining the inside walls of the blood vessels.[9]

Several risk factors can lead to damage to arteries, including diet, smoking, high blood pressure, insulin resistance, high blood glucose, and abnormal blood lipid levels.[9,10]

This damage can result in **endothelial dysfunction**, arterial stiffness, and the buildup of **atherosclerotic plaque**. The results: increased risk of cardiovascular diseases, peripheral vascular disease, blood clots causing **heart attacks** and **strokes**, and more.[9]

Maintaining healthy endothelial function is a critical step in preventing progression to atherosclerosis and cardiovascular disease.[9,10]

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

Better Blood Vessel Function

Lycopene is a carotenoid with **antioxidant**, **anti-inflammatory**, and **anti-glycation** properties.[11]

It is a naturally occurring red pigment found in plants, particularly in fruits and vegetables such as tomatoes, pink guava, papaya, pink grapefruit, and watermelon.[12]

Humans cannot synthesize carotenoids. Therefore, they must be obtained through diet and/or by taking supplements.[13]

Preclinical evidence suggests that when present in ample amounts, lycopene may help protect arterial health by reducing oxidative stress,[4,12] attenuating inflammation,[4,14] and inhibiting **glycation**—a harmful process in which sugar molecules attach to proteins or fats in the body that can cause widespread tissue damage,[15] including kidney injury.[16]

Lycopene may also improve **endothelial function**, thereby supporting the ability of blood vessels to dilate in the face of various circulatory challenges.[7,17]

A human study published in **2025** demonstrated that consumption of lycopene-rich tomato juice ***improved a marker of endothelial dysfunction*** that threatens to progress into cardiovascular disease.[7]

In that study, researchers in Japan recruited healthy adults with signs of early arterial dysfunction. They determined this using ultrasound to measure **flow-mediated dilation**, the ability of arteries to dilate in response to increased blood flow. Poor flow-mediated dilation is a marker of risk for future cardiovascular disease.

In this clinical study, participants had flow-mediated dilation in the **borderline** range of **4-7%**.[7] Normal function is considered above **7.1%**, with a *higher* percentage indicating better function.[18]

One group received a placebo juice with barely any lycopene, another took **15 mg** of lycopene as tomato juice, and a third took **26.7 mg** of lycopene from high-lycopene tomato juice daily.

After 12 weeks, those receiving either of the tomato juices had significant **improvements** in arterial function. While the placebo group had an average score of **5.4%**, the lower-dose lycopene group improved to an average of **6.1%** and the higher-dose lycopene group was almost normal at **7%**.[7]

Lycopene intake improved **arterial function**, which is associated with better cardiovascular health.





In another trial, male participants were randomized to receive **6 mg** or **15 mg** of lycopene or a placebo. After eight weeks, the **15 mg** lycopene group showed a significant **23% improvement** in **endothelial function** from baseline, along with significant reductions in **inflammatory** markers and a beneficial increase in **LDL particle** size—effects not observed in the low-dose or placebo groups.[19]

The findings are consistent with the results of prior human studies showing that lycopene intake may help improve **endothelial dysfunction** and maintain cardiovascular health.[20]

Improved Cardiovascular Outcomes

These protective effects could have dramatic results.

In human observational studies, higher lycopene intake has been associated with lower rates of **cardiovascular disease** and cardiovascular events.

One review and meta-analysis of population studies totaling more than **100,000 subjects** found that those with the highest intake or blood levels of lycopene had a:[6]

- **14%** lower risk of cardiovascular disease,
- **26%** lower risk of stroke, and
- **37%** lower risk of death from any cause.

What You Need To Know

Lycopene's Benefits for Heart Health

- **Cardiovascular disease** is the leading cause of death worldwide. It is expected to affect up to **44%** of adults in the U.S. by 2030.
- **Lycopene** is a carotenoid found in tomatoes, watermelon, and some other fruits and vegetables. Research suggests that it may support blood vessel function and favorably affect several cardiovascular risk factors.
- In a **2025** clinical trial, taking oral lycopene *improved* flow-mediated dilation, a measure of endothelial **function**, in adults with impaired vascular function.
- Observational human studies have found that higher lycopene intake or blood levels are associated with lower risk of cardiovascular disease, stroke, and overall **mortality**.

Evidence from preclinical, clinical, and observational studies suggests that lycopene may support arterial and cardiovascular health and may favorably affect several cardiovascular disease risk factors.[6,12,17,20-24]

How Lycopene Helps

Lycopene may improve arterial function, which also protects the heart. Preclinical evidence indicates that higher lycopene blood levels or intake may have these effects through the following mechanisms:

- Help protect against **oxidative damage** and **chronic inflammation**,[4,12]
- Help reduce damage caused by high blood **sugar**—including protecting blood vessel cells and blocking harmful chemical reactions (called **glycation**) linked to diabetes, and metabolic disease,[15,25]
- Help inhibit abnormal proliferation of smooth muscle cells in the arterial walls that contribute to stiffness and arterial dysfunction,[17,26]
- Help modulate factors associated with abnormal blood clotting,[27]
- May help improve blood **lipid** levels,[3,28-30]
- Help slow the progression of **atherosclerosis**,[17,21,31] and
- Help protect heart muscle from damage and preserve heart function following ischemic injury.[5,32,33]

Human observational studies suggest that higher lycopene intake and circulating levels are associated with a lower prevalence of **metabolic syndrome**.[34-36] An observational study in a Chinese population reported that individuals in the *highest* quartile of **serum lycopene** concentrations had **61%** *lower* odds of having **metabolic syndrome** compared to those in the *lowest* quartile.[34]

Human observational studies also suggest that higher lycopene intake, or consumption of lycopene-rich foods such as tomatoes, may be associated with *lower* **blood pressure**.[20,37-39]

In addition, a meta-analysis of 34 trials found that lycopene significantly *reduced* levels of malondialdehyde, a marker of **oxidative stress**.[40]



Summary

Cardiovascular disease is the most common cause of death worldwide.

The carotenoid **lycopene** has been shown to improve endothelial function in clinical studies and has demonstrated antioxidant, anti-inflammatory, and vascular protective effects in preclinical research.

In clinical studies, lycopene improved measures of **endothelial function** in individuals with impaired vascular function. ■

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HUMAN
SYNAPSE



Stay MENTALLY Sharp

BY MARSHA MCCULLOCH, MS, RD

Cognitive decline during aging is well documented, with age being the strongest risk factor for **dementia**.[1]

In the U.S., an estimated **10%** of adults aged 65 and older have dementia and **22%** have mild cognitive impairment.[1,2]

Specific **plant** compounds have demonstrated neuroprotective effects.[3]

In preclinical studies, **green oat extract** promoted faster **learning performance** and reduced markers of brain **inflammation**.[4,5]

In a clinical trial, a combination of ***Boswellia*** tree resin and **haritaki** fruit extract significantly improved measures of **short-term** *and* **long-term** memory.[6]

In another clinical trial, standardized **green oat extract** showed significantly better performance than a placebo.[4]

Combining these ingredients is a science-based strategy to optimize cognitive function and promoting long-term **brain health**.



Understanding the Aging Brain

Inside the brain, billions of **neurons** (nerve cells) communicate with each other at junctions called **synapses**.[7]

Neurons use **neurotransmitters** to send messages across synapses.[7]

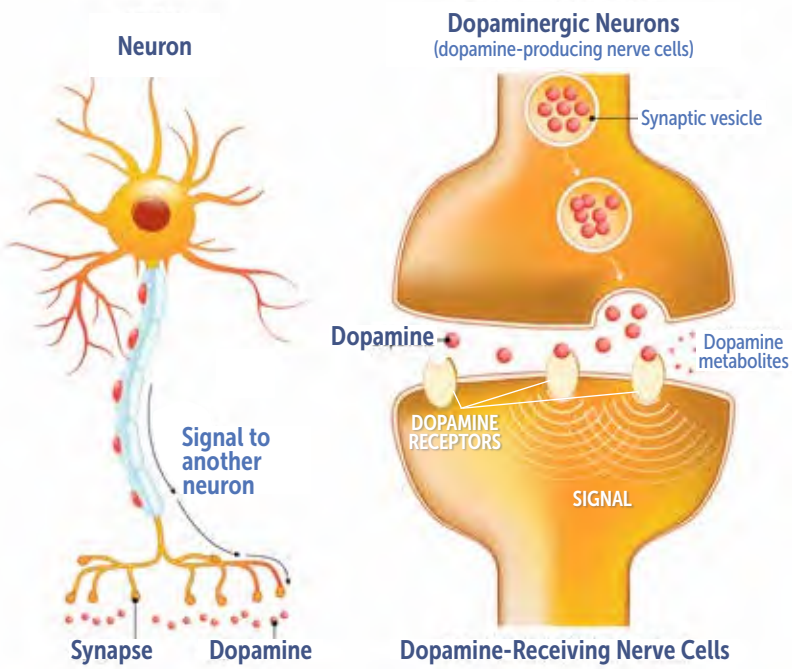
As we age, cognitive function gradually declines. One reason is decreased production and release of neurotransmitters, including **acetylcholine** and **dopamine**.[8]

Acetylcholine is essential for learning and memory, including **episodic memory**, the recall of life events.[8,9]

Dopamine helps regulate **synaptic plasticity** (the ability to form new synaptic connections) and **neurogenesis** (the ability to generate new neurons), both of which are also critical for learning and memory.[8,10]

With aging, levels of **brain-derived neurotrophic factor (BDNF)** also fall. This protein promotes the growth of neurons and synapses and supports acetylcholine-associated memory processes.[11] Therefore, BDNF plays a crucial role in **learning** and **memory**.[11,12]

Scientists have identified botanicals that target these and other mechanisms of cognitive aging and help keep the brain sharp.





Brain Botanicals

Ayurveda, an ancient holistic medical system, has traditionally used ***Boswellia serrata*** (Indian frankincense) resin[13,14] and **haritaki** (*Terminalia chebula*), a fruit from Southeast Asia,[15-17] for various medicinal purposes.

Modern preclinical research has since explored the neuroprotective potential of ***Boswellia***[18-20] and **haritaki** plants,[21,22] including their effects on **cognitive function**.

Preclinical research shows that ***Boswellia***[20,23,24] and **haritaki**[25] may help inhibit the activity of the *enzyme* responsible for breaking down the neurotransmitter acetylcholine.

In a randomized, double-blind, placebo-controlled study, 100 adults aged 40–65 with subjective memory complaints received either **300 mg** of a standardized ***Boswellia serrata*** and **haritaki extract** or placebo daily for 120 days.[6]

Cognitive function was assessed using the **Rey Auditory Verbal Learning Test**, where participants listen to and recall word lists several times, then remember them again after short and longer delays, and finally recognize the words from a larger list.

Compared to **placebo**, the treatment group showed statistically significant improvements in:[6]

- **Immediate** (short-term), and **delayed recall**,
- **Overall learning**, and **learning rate**,
- **Total learning capacity**, and
- **Recognition memory**.

Some improvements were observed as early as **15 days** after treatment initiation.

An additional battery of **computerized tests** was used to assess non-verbal cognition. Compared to placebo, the treatment group demonstrated significant improvements in **visual learning, processing speed** and **task accuracy.**

The intervention also significantly improved **sleep** quality and increased **serum brain-derived neurotrophic factor (BDNF)** levels, a biomarker associated with neuronal health and synaptic plasticity.[6]

Green Oat Supports Cognition

Green oat (*Avena sativa*) has been traditionally used as an antispasmodic, diuretic, and neurotonic agent. Its extract is rich in avenanthramides, flavonoids, triterpenoid saponins, and sterols.[26]

Preclinical research suggests that a standardized **green oat extract** may help reduce markers of brain inflammation and improve measures of cognitive function.[5]

It exerts these effects through multiple mechanisms, including:[5]

- Activating the **Nrf2/HO-1 antioxidant defense** pathway, which mitigates oxidative stress-related neuronal damage,
- Inhibiting the **NF-κB/MAPK neuroinflammatory signaling** pathway in microglial cells, reducing inflammatory responses, and
- Upregulating the **CREB/BDNF** pathway, which supports neuroprotection and memory formation.

In an animal model of **mild cognitive impairment (similar to Alzheimer's symptoms)**, mice were given a standardized green oat extract for 14 days, while a control group received no treatment.[5]

The extract attenuated **spatial memory learning impairments**, as assessed by maze tests.

Improve Memory and Multitasking

The benefits of green oat extract have been seen in human studies as well.

In a clinical trial of 132 healthy adults (ages 35 to 65), those who took **430 mg** of standardized **green oat extract** daily for 29 days showed significantly better performance than a placebo group on a computerized test of visuospatial working **memory**.[4]

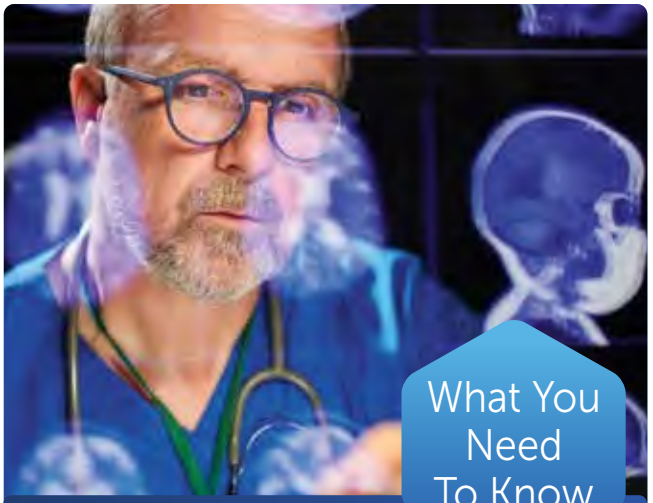
This test requires a participant to reproduce a sequence of blocks in the same order as they were presented, with difficulty increasing over time.

In everyday life, visuospatial working memory is important for tracking locations of moving objects and navigating dynamic environments, such as when driving.

Participants also completed a **multitasking** test that involved performing serial subtraction while simultaneously tracking an asterisk moving across a screen.[4]

Participants taking **430 mg** of standardized green oat extract demonstrated improved tracking performance without compromising subtraction accuracy, suggesting improved divided attention.

This may translate to better performance in real-world situations that require managing multiple tasks at once, such as driving while holding a conversation.



What You Need To Know

Supporting Healthy Cognitive Aging

- **Age-related memory loss** and **cognitive dysfunction** are *not* inevitable.
- Preclinical studies suggest that extracts from ***Boswellia serrata*** resin, **haritaki** fruit, and **green oat** may help preserve **acetylcholine activity**, a neurotransmitter involved in learning and memory.
- ***Boswellia*** and **haritaki extracts** increased serum **brain-derived neurotrophic factor** (**BDNF**) levels in one clinical trial, which supports the brain's ability to adapt and form new connections.
- In a clinical trial of adults with subjective memory complaints, intake of ***Boswellia*** resin and **haritaki** fruit extracts increased **BDNF** levels while improving measures of short- and long-term memory.
- Another clinical trial of healthy adults found that intake of **green oat extract** improved performance on tests of visuospatial working memory and multitasking.

Taking a **combination** of *Boswellia*, haritaki, and green oat extracts daily may help support cognitive performance and long-term brain health.

Summary

Specialized botanical extracts may help support cognitive performance and promote healthy brain aging.

Boswellia tree resin, **haritaki** fruit, and **green oat** extracts have been studied for their effects on acetylcholine activity and BDNF levels, which are involved in cognitive function.

In clinical trials, daily intake of these extracts was associated with improvements in several measures of **memory**, **learning** performance, and improvements in **multitasking** ability. ■

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Systemic Effects of FISH OIL







BY JACK FILMORE







As far back as the **1970s**, studies have shown cardiovascular benefits of **fish oil** rich in **omega-3** fatty acids.[1-3]

Omega-3s, however, have shown wide-ranging effects throughout the body.[4-6]

In **human** studies, taking fish oil or omega-3s has:

- Been associated with improvements in aspects of metabolic health, including triglycerides and inflammatory markers, in diabetics,[7,8] and non-diabetics[9]
- Shown potential cognitive benefits, particularly in mild cognitive impairment,[10-12]
- Lowered risk for heart disease and cardiac-related death.[13,14] and
- Reduced headaches,[15,16]

A major observational study found that people with the *highest* blood levels of **omega-3**s lived almost ***two years longer*** than those with the lowest levels.[17]

Modern diets are often low in omega-3s.[18] Oral intake of **fish oil** is a method to fill this dietary gap.

Why Are Omega-3s So Important?

Fish oil-derived omega-3 fatty acids, **DHA** (docosahexaenoic acid) and **EPA** (eicosapentaenoic acid),[19,20] are required for numerous biological functions.

Fatty acids are building blocks of all human **cell membranes**.[20] These structures are critical to cellular function.

In the **brain**, for example, cell membranes make cellular communication possible.[21,22]

Omega-3 fatty acids are also precursors to **signaling** compounds throughout the body that help fine-tune immune function and regulate inflammation. Some of these, called **specialized pro-resolving mediators**, help *resolve inflammation* that could otherwise continue and become chronic, contributing to rapid aging and disease.[23]

Omega-3s can also regulate **gene expression** in ways that reduce inflammation[24] and lower inflammatory markers.[25,26] Fish oil consumption is associated with reduced triglyceride levels[27,28] and modest reductions in blood pressure.[27,29]

As a result, omega-3 fatty acids may help ward off various ailments, both acute and chronic, from headaches to heart disease.

Headache Relief

Noting that omega-3s help control inflammation and regulate pain pathways, researchers investigated whether increasing their dietary intake could relieve **headaches**.[15,30-32]

In clinical trials in patients with **migraine**, dietary interventions increasing omega-3 fatty acid intake significantly reduced headache frequency and severity,[15,30,32] while also improving sleep quality.[33]

One meta-analysis even found that fish oil was associated with greater preventative benefits than ***pharmaceutical competitors*** included in the analysis.[34] The study authors suggested that EPA and DHA could be considered a promising option for **migraine** prevention.

Data also suggest that fish oils benefit other headache types. In one trial of frequent headache sufferers, a diet high in omega-3 fatty acids led to significant reductions in the **number** and **duration** of headaches.[30]

Improved Metabolic Health

Metabolic disorders are associated with accelerated aging[35,36] and increased risk for age-related disease.[37]

Numerous human studies have found that fish oil intake can improve metabolic health.[38-40]

A meta-analysis of 30 human studies suggested that omega-3 supplementation may help improve fasting blood **glucose** levels and markers of **insulin resistance** in subjects receiving omega-3 for diabetes treatment or prevention.[41]

In another randomized, double-blind, placebo-controlled trial, 8 weeks of DHA-rich fish oil supplementation significantly decreased **waist circumference** and body fat mass in patients with type 2 diabetes.[42]



Protection from Pollution

From wildfires to traffic jams, sources of **air pollution** seem to be everywhere.

In China, where particulate air pollution is a major issue, scientists gave healthy young adults **2.5 grams** of **fish oil** or a **placebo** daily for four months.[43]

Compared to those who did not receive fish oil, the fish oil group showed protection from some of the negative impacts of air pollution. Markers of inflammation, blood vessel health, oxidative stress, and stress responses were generally better in those receiving fish oil.

Boosting Brain Function

Multiple human studies suggest that fish oil intake may help preserve cognitive function, especially in individuals with mild cognitive impairment.[12,44,45] In one small clinical study of adults with mild cognitive impairment, for example, fish oil improved multiple aspects of **memory** and **recall**.[44]

These benefits may be due, in part, to the ability of omega-3s to boost **brain-derived neurotrophic factor**, as confirmed by a meta-analysis of 12 randomized control trials.[46]

Fish oil may also help protect **mental health**. In a meta-analysis of 31 observational studies involving over 255,000 individuals, higher fish consumption and omega-3 fatty acid intake were associated with a significantly reduced risk of **depression**.[47]

In a meta-analysis of 67 randomized controlled trials, omega-3 supplementation at approximately **1.5 grams/day** significantly improved depressive symptoms in adults with existing **depression**.[48]

Cardiovascular Benefits

Fish oil intake benefits **heart** and **blood vessel health** in many ways, including by:

- Maintaining healthy heart structures after myocardial infarction,[49]
- Preventing abnormal blood clot formation,[50] and
- Protecting blood vessel function.[51]



What You Need To Know

Body-Wide Benefits of Omega-3s

- Fish oil-derived omega-3 fatty acids are valuable nutrients with numerous biological functions throughout the body. Life extension suggests a daily intake of at least 2,000 mg of EPA and DHA from fish oil may help ensure adequate levels.
- Fish oil intake has been associated with reduced risk for cardiovascular disease, stroke, heart attack, and cardiovascular-related death.
- Studies have demonstrated a wide range of additional benefits, including metabolic health, cognitive function, headache, and more.

Fish oil also contributes to cardiovascular health by lowering **triglyceride** levels and may modestly reduce blood pressure when consumed at higher doses.[27,52,53]

Among its cardiovascular benefits, fish oil has shown particular promise in the management of elevated **triglycerides**.[54-56] Omega-3 fatty acids help lower triglycerides and raise **HDL ("good") cholesterol levels**.[56]

Clinical studies have demonstrated that fish oil supplementation at doses of **≥4 grams/day** can effectively lower elevated triglyceride levels, with reductions of up to **45%** in individuals with severe **hypertriglyceridemia**.[57,58]

Evidence further suggests that higher circulating levels of omega-3 fatty acids are associated with a lower risk of **cardiovascular disease**,[59] coronary **heart disease**,[59] **stroke**,[60] and **mortality**.[59,61]

Consistent with these findings, meta-analyses of randomized controlled trials have reported that omega-3 supplementation is associated with reduced risks of myocardial infarction and coronary heart disease events, with benefits appearing to increase with dose.[13,14]

Notably, one meta-analysis of randomized controlled trials with 135,267 participants found that **EPA** and **DHA** intake was associated with a ***35% lower risk of fatal myocardial infarction***.[13]

The **Framingham Heart Study**, a prospective cohort study of 2,692 older U.S. adults followed for up to 16 years, found that individuals in the *highest* quintile of plasma omega-3 fatty acid levels lived an average of about 2 more years after age 65 than those in the lowest quintile.[62]

Life Extension® suggests daily intake of at least **2,000 mg** of EPA and DHA from highly purified fish oil.

Summary

The **omega-3 fatty acids** DHA and EPA, found in **fish oil**, serve as building blocks for critical biological structures and compounds in the body.

Studies have found significant benefits to fish oil intake, including supporting **brain health**, controlling **inflammation**, improving **metabolism**, and reducing risk for **cardiovascular disease**. ■

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





Oral Plant Extracts Protect Against PHOTOAGING



BY MICHAEL DOWNEY

Chronic exposure to **sunlight** damages the **skin** in several ways,

"Collectively contributing to a prematurely aged appearance that exceeds the skin's chronological age."[1]

Topical sunscreens are widely used to protect against ultraviolet radiation,[2] but many people apply an insufficient amount, and don't reapply often enough.[3-5]

Although sunscreens help prevent sunburn, they may not fully protect against UV-related damage and immune suppression.[6]

Fortunately, certain oral nutrients may provide adjunctive support as part of your skincare routine.

Preclinical studies suggest that an oral extract of the fern ***Polypodium leucotomos*** may help support the skin's defenses against UV-related damage from within.[7-10]

Two additional oral compounds, **Sicilian red orange extract**[11] and **nicotinamide**,[12] have shown additional protective effects in separate clinical studies against damage from the sun's harmful rays.

While it's still important to use a safe, high-SPF sunscreen and wear protective clothing, these nutrients may offer adjunctive oral photoprotection support.

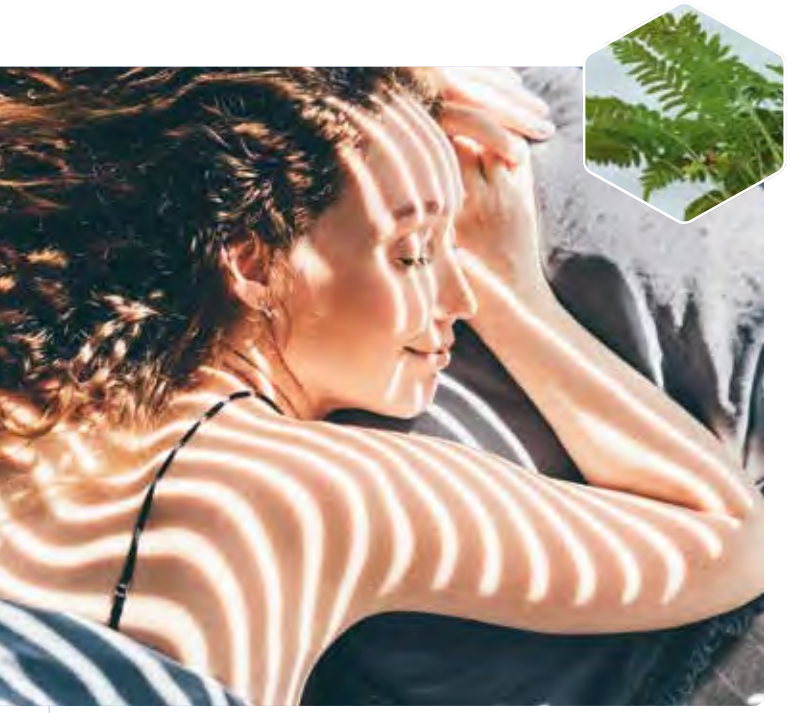
How Sunlight Contributes to Skin Aging

The glow of sunlight on your skin may feel good. But those ultraviolet (UV) rays penetrate *beneath* the surface, causing your skin to **age faster** while also increasing the risk of skin cancers.[13-15]

Preclinical studies have shown that, left unchecked, this solar onslaught:

- **Damages DNA** directly or indirectly through free radical formation, which can lead to skin cancer,[15,16]
- Causes mitochondrial damage and dysfunction,[15,16]
- Promotes cellular **senescence** (dysfunctional, growth-arrested cells) in skin cells,[15]
- Degrades collagen and contributes to the loss of skin elasticity,[15-17] and
- Triggers inflammation and exacerbates **chronic inflammation**.[16]

Skin damage from **ultraviolet (UV) radiation** begins at an early age and accumulates over time, with effects such as **premature aging** becoming apparent later in life. That's why early defense is advised.



Why Sunscreen Alone is Not Enough for UV Protection

Apart from sun avoidance, sunscreen provides the best alternative protection.[18] It's important to wear sunscreen or sunblock.[2] However, **topical** products have certain limitations because they:

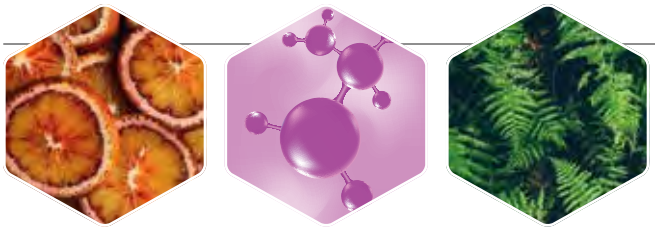
- May block **UVB** (responsible for sunburn) more effectively than **UVA** (which contributes to DNA damage and skin aging) so hidden skin damage can still occur even without visible sunburn.[19]
- May leave commonly missed areas—such as the ears, scalp, neck, and tops of the feet—under-protected if not applied carefully, and must be reapplied after swimming or sweating to maintain effectiveness.[18]
- Are often applied in insufficient amounts,[4] and not reapplied as recommended,[18]
- May be labeled incorrectly and have lower actual SPF and UVA protection than "labeled values."[6]
- Some clothing allows UV rays to pass through depending on fabric, color, and environmental conditions.[20]
- Can degrade with sun exposure,[21,22] and
- May contain chemicals that can irritate sensitive skin.[18]

Researchers have evaluated adjunctive **oral** photoprotective compounds.

Novel Oral Plant Extract Provides Photoprotection

Scientists identified an extract from the fern ***Polypodium leucotomos***, which may complement topical sunscreens as an adjunctive photoprotection strategy.

Evidence from preclinical studies suggests that extracts from ***Polypodium leucotomos*** protect skin cells against sunlight-induced **DNA damage** and may help modulate **inflammatory responses.**[8,9,23]



Lab Data: Polypodium Tested in Skin Cells

Researchers conducted lab tests in which ***Polypodium leucotomos*** was applied to skin cells to study its general anti-aging effects on skin elasticity and structure.

In these lab tests, researchers found that the **Polypodium** extract:[7]

- Directly *inhibited* enzymes that break down **collagen**, and proteins required for skin's structural framework, helping to maintain a youthful appearance, and
- *Protected* the **extracellular matrix** and **collagen** that make up the structural framework of skin tissue.

These laboratory findings suggest that ***Polypodium leucotomos*** may influence mechanisms associated with **skin aging.**

Animal Studies: Polypodium Protected DNA

Next, scientists gave oral ***Polypodium leucotomos*** to hairless mice, which were then exposed to UV radiation.

The extract was associated with reduced inflammation, enhanced DNA repair, and reduced mutagenesis (DNA changes).[8]

Remarkably, **Polypodium** was associated with decreased skin DNA damage, not only during—but also ***before***—UV exposure.

Other preclinical data showed that ***Polypodium leucotomos*** extract may:

- Defend against harmful UV-generated oxidative stress,[9] and
- Research in experimental models suggests it may help modulate immune responses, including the beneficial activation of NK and T lymphocyte immune cells.[10,24,25]



What You Need To Know

Protect Against Photoaging

- The sun's ultraviolet (UV) rays damage DNA, accelerating **photoaging** of the skin and increasing skin cancer risk.
- Taken orally, an extract of the fern ***Polypodium leucotomos*** has shown potential to help protect DNA and skin structure in preclinical studies.
- **Nicotinamide** and **red orange** extract may provide additional sun protection support.
- These ingredients can be taken orally to provide adjunctive systemic support against UV exposure, but they do not replace topical sunscreen, protective clothing, shade, or sun avoidance.
- In addition to these adjunctive oral nutrients, a high-quality topical sunscreen should be used for prolonged sun exposure.

Additional Protection: Nicotinamide

Nicotinamide, a form of vitamin B, was shown in preclinical studies to protect the skin against UV-induced damage by:

- Promoting **DNA repair**,[26-28]
- Inhibiting UV-induced immune suppression in the skin,[26,27,29]
- Boosting **skin barrier** function (which keeps skin hydrated and protected),[28,30]
- Preventing cellular energy depletion and restoring energy levels after UV exposure,[28,31] and
- Supporting genomic stability and DNA-repair pathways after UV exposure.[32]

In a phase 3 randomized trial in adults at high risk for non-melanoma skin cancer—defined as having at least two non-melanoma skin cancers in the previous five years—**500 mg** of **nicotinamide** twice daily for 12 months was associated with a **23%** *lower rate* of new non-melanoma skin cancer versus **placebo** during the intervention period.[12]



Even Further Defense: Red Orange

Sicilian red orange contains anthocyanins, flavonoids, and other free radical scavenger constituents which have been associated with protection of cells against inflammation and oxidative stress.[33]

In an *in vitro* model of skin photoaging using two human skin cell lines, cells pre-treated with **Sicilian red orange extract** before UV radiation exposure showed:[34]

- Reduced UV damage,
- Reduced DNA damage,
- Reduced oxidative stress, and
- Decreased markers related to **photoaging** and **inflammation**.

In a clinical study, taking **100 mg** of oral red orange extract daily for 15 days was associated with a **40%** reduction in UV-induced skin **redness** and **sunburn,** along with a decrease in melanin content in age spots from **27%** to **7%.**[11]

Over time, reducing UV-induced erythema and oxidative stress may help support skin appearance and defenses against photoaging related changes.

Summary

Ultraviolet rays cause cellular damage that accelerates **skin aging**, while increasing skin cancer risk.

Polypodium leucotomos, a fern extract, has been shown in preclinical studies to help protect DNA and support against **photoaging**.

Nicotinamide and **Sicilian red orange** extract may offer additional sun protection.

Taken orally, these three nutrients may provide adjunctive systemic support against UV-related damage when used with topical sunscreen and other sun-protective measures. ■



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These products are available at fine health food stores everywhere.

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

* The IFOS™ product certification is a registered trademark of SGS Nutrasource. This product has been tested to verify quality and purity per the IFOS™ standard.

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This product is available at fine health food stores everywhere.

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LITHIUM'S
Link to Reduced Cancer Risk

BY SAMUEL RUTGER

The mineral lithium has long interested scientists.

At higher doses, lithium, in the form of lithium carbonate, has been used as a pharmaceutical to help those with bipolar disorder.[1]

Low-dose lithium has shown promise in slowing cognitive decline in people with mild cognitive impairment, an early stage that often precedes Alzheimer's.[2-4]

Animal studies in invertebrates have shown that lithium may extend lifespan.[5,6]

On another front, scientists have investigated an *enzyme* in the body, that may be involved in processes linked to certain cancers.[7,8]

Lithium has been shown to inhibit this enzyme called **glycogen synthase kinase-3** or **GSK-3**.



Lithium, a mineral found in trace amounts in some foods and drinking water, is known to *inhibit* **GSK-3** activity.[1,7,9]

A recent observational study of over **252,000** men and women found higher exposure to **lithium** was associated with lower risk of ***every type of cancer*** studied.[9]

Those in the highest **20%** of estimated lithium ingestion in drinking groundwater had a **71%** *lower* overall cancer risk compared to those with the lowest intake.

GSK-3's Role in Cancer

The enzyme **GSK-3 (glycogen synthase kinase-3**) can be thought of as a master regulator that turns the **activity** of many cellular functions "on" or "off".[10]

Preclinical studies have shown that ***overactivity*** of **GSK-3** is associated with processes involved in several chronic illnesses, including neurological disorders like Alzheimer's,[11] inflammatory disorders like asthma[12] and arthritis,[13] and psychiatric disorders such as bipolar disorder.[7,14]

When it comes to **cancer**, preclinical research has linked **dysregulated GSK-3** activity to multiple aspects of development and progression of malignancies, including cancer cell growth and proliferation, avoidance of cancer cell death, and metastatic spread.[8,15]

Scientists have set out to identify nutrients and medications that inhibit **GSK-3**, which could potentially help slow cancer progression in certain tumor types.[8,16] That's where **lithium** comes in.



Lithium Inhibits GSK-3

Lithium is a trace element that is generally needed only in small amounts. Preclinical research has shown that it is an inhibitor of **GSK-3**.[17]

It has been proposed that by taming GSK-3's overactivity in this way, lithium may influence pathways involved in multiple chronic diseases, including **cancer**.

Lithium has also been found to inhibit other enzymes that may be involved in cancer progression, including **inositol monophosphatase**.[9,18]

Lithium and Cancer

Trace amounts of **lithium** are naturally present in some water sources. That allows researchers to perform population studies examining the correlation between lithium intake and health.[19-21]

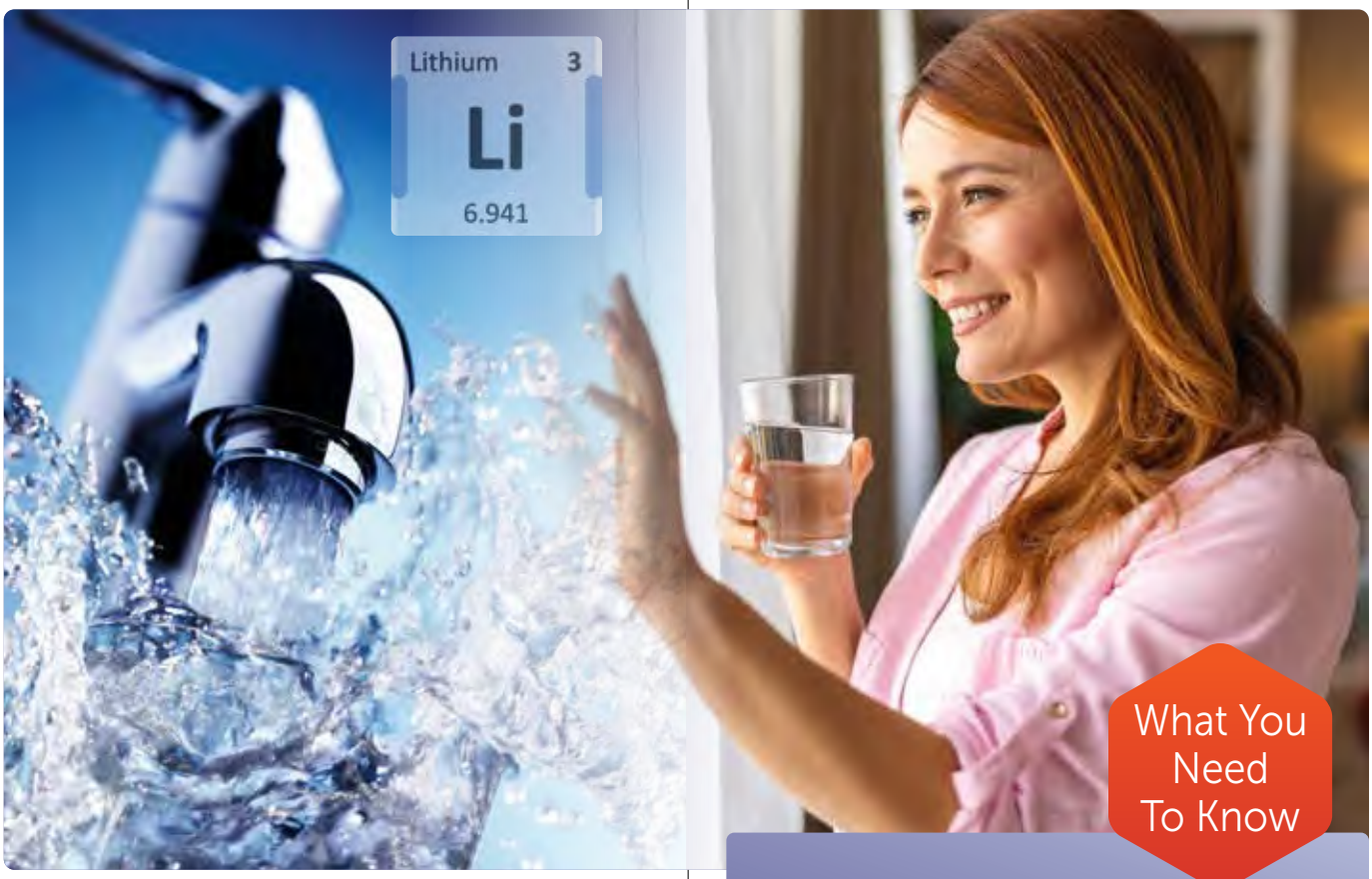
Several ecological studies have found that among people who are exposed to *higher* lithium concentrations in drinking water, there are lower risk associations with certain health outcomes:

- Metabolic disorders like **diabetes** and **obesity**,[21,22]
- Death due to **Alzheimer's**,[22] and
- ***Death from any cause***.[23]

A study published in **2025** in a *Journal of the American Medical Association* publication focused specifically on the link between **lithium exposure** and **cancer risk**.[9]

Researchers used U.S. Geological Survey data from over **4,700** groundwater wells across the U.S. to estimate lithium concentrations in drinking water by geographic area. They also followed **252,178** participants for a median of nearly ***four years***. What they found was striking: Those living in areas with *higher* estimated lithium levels had a **lower incidence of cancer.**[9]

The greater the estimated exposure to lithium, the greater the reduction in cancer incidence. Compared to the lowest exposure group, those in the highest quintile of estimated lithium exposure had a ***71% lower risk of developing cancer***.



Higher lithium intake was associated with reduced risk of ***all cancer types*** investigated in both men and women, including:[9]

- Breast,
- Prostate,
- Bladder and urinary,
- Central nervous system,
- Kidney,
- Colorectal,
- Leukemia,
- Non-Hodgkin's lymphoma, and
- Thyroid cancer.

These results suggest a possible association with cancer-related outcomes.

What You Need To Know

Lithium and Cancer Risk

- Overactivity of the enzyme **GSK-3** has been tied to risk for several common chronic illnesses, including **cancer**, in preclinical research.
- Researchers are investigating the potential role of **GSK-3 inhibitors** in modulating pathways involved in cancer development and spread.
- **Lithium** inhibits **GSK-3** and has also been shown to affect other enzymes tied to cancer progression.
- In an observational study published in 2025, people with the highest lithium exposure from drinking water had a **71%** lower risk of developing cancer than those with the lowest exposure.

Summary

In preclinical research, overactivity of the enzyme **GSK-3** has been tied to several common chronic diseases, including **cancer**.

These studies suggest that *reducing* GSK-3 activity may influence several pathways of tumor formation and progression.

The mineral **lithium** inhibits **GSK-3** activity. One population-based observational study found that people with the *highest* **lithium exposure** from their drinking water have much **lower rates** of all cancers examined. ■



How Much Lithium Do You Need?

At high doses (from **600 mg** to **1,500 mg**), lithium **carbonate** is widely used to treat mood disorders, particularly bipolar disorder.[1]

The trace amounts of lithium found in some regions' drinking water are associated with **lower cancer** rates and other health benefits.[9,26] Daily microdoses of lithium (**1,000 mcg/1 mg**) may help promote healthy aging, cognitive health, and more.[1,27]

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Additional Benefits of Lithium

Researchers are investigating potential new benefits of low-dose lithium ranging from longevity to neuroprotection—specifically in Alzheimer's and dementia.

Initial observational studies suggest that lithium may be a contributor to healthy longevity. For example, an ecological study of over 1.2 million people in Japan found that trace amounts of **lithium in drinking water** were associated with lower overall mortality. The same study showed that low-dose lithium exposure also extended lifespan in *C. elegans*.[23]

In another study using a *C. elegans* model, lithium exposure throughout adulthood **extended lifespan**—by as much as **46%**.[6]

Some of the exciting work with lithium is related to its potential role in protecting against cognitive decline and Alzheimer's. In 2025, the prestigious journal *Nature* published evidence that lithium was the only metal significantly reduced, out of 27 minerals measured, in the brains of over 150 people with mild cognitive impairment and Alzheimer's. In the same study, low-dose **lithium orotate** was associated with preserved **memory** performance in both normal **aging mice** and in mice with an inbred susceptibility to **Alzheimer's**-like changes.[24]

In one controlled clinical study, 113 patients with **Alzheimer's** who received a daily dose of **300 mcg** of lithium for 15 months experienced less **cognitive decline** compared to those receiving placebo.[4]

Currently, there are around 50 clinical trials in the works regarding the benefits of the mineral lithium. **Life Extension** eagerly awaits emerging, promising data about the brain and body benefits of this powerful mineral over the next few years.[25]

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* Studied against powder Sophora japonica extract standardized to 98% quercetin.

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- **LDL**
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† For those already within normal range.

* *BMC Complement Altern Med.* 2019;19:97.

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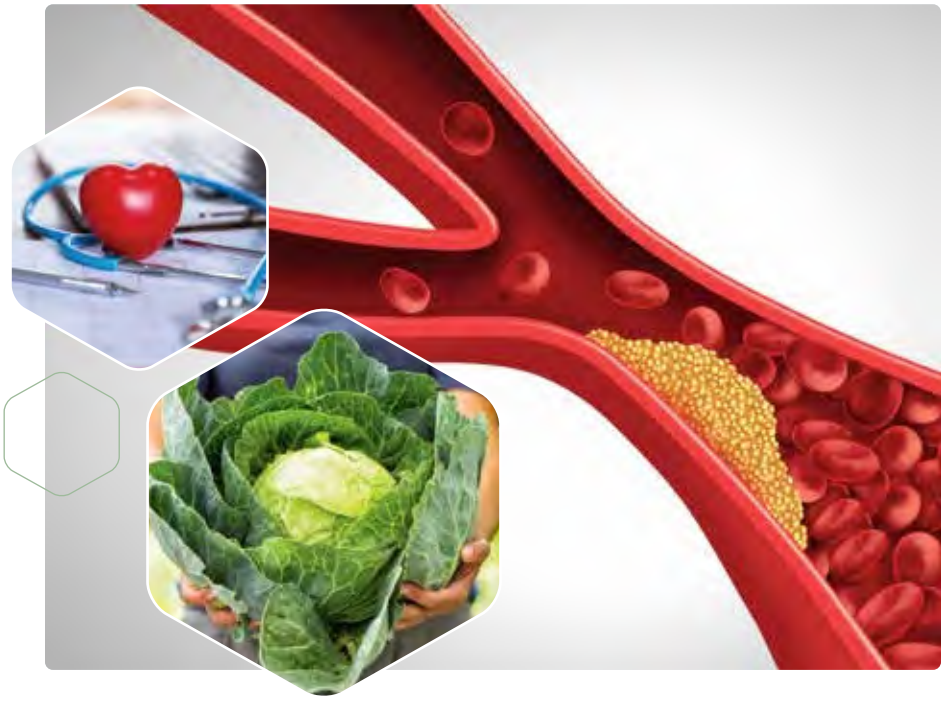
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Quercetin Reduces Atherosclerosis

BY RICHARD TEMPLETON



It's difficult to overstate just how dangerous and common **atherosclerosis** is.

Atherosclerosis is the progressive buildup of plaque in the arteries and is a leading cause of cardiovascular disease, including coronary artery disease (CAD), peripheral artery disease (PAD), and cerebrovascular disease.[1]

Preclinical research over the last few years has shown that **quercetin** can play a role in mitigating the development and progression of atherosclerosis, helping to protect the heart and potentially reduce risk for these dangerous conditions.

How Atherosclerosis Drives Cardiovascular Disease

Atherosclerosis-driven coronary artery disease develops over time as lipids, inflammatory cells, smooth muscle cells, and dead cell debris accumulate beneath the vessel's inner endothelial lining.

Its major complications, including myocardial infarction and stroke, substantially contribute to morbidity, loss of independence, and reduced quality of life.[2]

Nearly half of U.S. adults have at least one major risk factor for coronary heart disease[3]—high blood pressure, high lipids or smoking, while **12%** have diabetes, a serious risk factor, and 115 million adults have prediabetes, yet another potential contributor.[4]

As plaque accumulates, several pathological changes can occur:[2]

- **Endothelial dysfunction**, in which the endothelium loses its protective role, leading to reduced vasodilation, increased inflammation, and endothelial cell senescence.[5] Endothelial dysfunction is also the first step in the process that initiates atherosclerosis.[6]
- **Narrowing of blood vessels** (often **> 50%**), which reduces blood flow and causes angina, particularly during physical exertion or stress,[2] and
- **Blood clot formation** can be triggered by rupture-prone fat and inflammation-rich plaques, blocking blood flow to the heart, causing a heart attack, or traveling to the brain resulting in stroke.[2]

Emerging preclinical research suggests that quercetin may influence several biological processes involved in atherosclerosis progression.



What Is Quercetin?

Quercetin is a naturally occurring compound found in a variety of plant foods, including onions, leafy green vegetables such as kale, cruciferous vegetables like broccoli and cabbage, as well as tea, berries, and certain herbs.[7]

Quercetin has been studied for its role in mitigating against age-related deterioration and disease, largely because of its **antioxidant** and **anti-inflammatory** effects.[7] Preclinical studies also suggest quercetin may have **senolytic activity**, meaning it may help target **senescent cells**, though this has primarily been demonstrated in experimental models.[8,9]

Recent research suggests that quercetin may influence key biological processes involved in atherosclerosis. Evidence from animal and human cell studies indicates that quercetin reduces plaque formation and improves vascular health.

Activating Cellular Defenses

Preclinical studies suggest that quercetin's antioxidant[10] and anti-inflammatory effects[11,12] target key processes involved in atherosclerotic plaque formation.

Quercetin also activates specific cell pathways critical to cellular defense and rejuvenation in blood vessels.

One way quercetin may support cellular defenses is by increasing activity of a protein called **Nrf2**. When activated, Nrf2 *switches on protective genes* that defend cells against threats like oxidative damage.[13,14]

Nrf2 activity can be suppressed when it binds to another protein, **KEAP1**. A study found that quercetin binds to KEAP1 and causes it to separate from Nrf2, allowing Nrf2 to activate cellular defenses. As a result, Nrf2 activation helps reduce inflammatory cell death in macrophages.[13]

Quercetin also increases the production and activity of another cellular defender, **SIRT1**.[15-17] SIRT1 and other sirtuins are proteins vital to cellular defense and rejuvenation.

Activating SIRT1 has been associated with prolonged cellular lifespan in experimental models.[15,18] Quercetin boosts SIRT1 expression and activity, which may contribute to its observed effects in atherosclerosis.[17]

In preclinical studies, quercetin has also been shown to increase the activity of **AMPK**, an enzyme that plays a key role in metabolic regulation (including blood sugar, lipids, and insulin resistance).[15,19,20] *Reduced* AMPK activity is tied to insulin resistance and metabolic syndrome, major risk factors for cardiovascular disease including atherosclerosis.[21]

Through all these actions, quercetin can further block the oxidative damage and inflammation that contribute to atherosclerosis.

For example, it impedes the **oxidation of LDL cholesterol**, which contributes to fat deposits in arterial plaques.[14,15]

These effects of quercetin have been associated with protection against atherosclerosis in animal models.

Blocking Dangerous Abnormalities

Several types of cells are damaged or altered in **atherosclerosis**, worsening the condition.

Quercetin has been shown in preclinical studies to protect against damage to:

- **Macrophages**. A type of immune system cell, damaged macrophages can invade arterial plaques and transform into **foam cells**, which rapidly accelerate plaque buildup. Quercetin has been shown to *reduce* transformation of macrophages into forms that promote atherosclerosis.[13,15,22]
- **Endothelial cells**. These cells line the inside of arteries and are critical to healthy blood flow. When these cells become damaged, they drive atherosclerosis. Quercetin has been shown to *block* endothelial cell damage and death.[12,14,15]
- **Vascular smooth muscle cells**. Smooth muscle cells in arterial walls allow the vessel to constrict or dilate to regulate blood flow. In atherosclerosis, these cells spread and migrate to abnormal locations within the vessel. This is associated with inflammation, calcification, and thickening of the plaque.[23] Quercetin has been shown to *inhibit* the harmful proliferation and migration of these cells.[24,25]

Improving Gut Health

A healthy mix of gut microbes benefits the heart and overall health.[26]

In preclinical models, quercetin intake has been associated with improvements in gut microbial

composition.[27-29] In turn, healthy gut microbes metabolize quercetin into bioactive compounds that circulate throughout the body.

Higher levels of these metabolites have been linked to reduced atherosclerosis in experimental animals.[26] In one animal study quercetin intake not only altered the gut microbiota but also reduced harmful lipid metabolites.[30]

A review of 30 preclinical studies suggests that quercetin supplementation, across a range of doses, may exert cardioprotective effects in experimental high-fat diet models.[31] Clinical trials are needed to determine whether these findings translate to human atherosclerosis.

Summary

Cardiovascular disease is the leading killer in the world. Atherosclerotic **plaque** in blood vessels is its most common driver.

Quercetin has been studied for its potential effects on atherosclerosis formation and progression. By boosting cellular defenses and blocking damaging processes that contribute to atherosclerosis in cell and animal models, it shows promise for lowering the burden of atherosclerosis in humans. •

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A Bodyguard for Your BRAIN

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

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

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

GLUTEN FREE

NON GMO LE CERTIFIED

(**1000 mcg** of **lithium** per tiny cap)
Item #02403 | 100 vegetarian capsules
Each bottle lasts 100 days.

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

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.

Stressed?

"I do believe this works."
Carolyn
VERIFIED BUYER

"Won't want to be without it."
Donna
VERIFIED BUYER



Stress releases the hormone **cortisol** throughout the body. Maintaining healthy cortisol levels promotes healthy **mood** and **stress response**.

Cortisol-Stress Balance provides a proprietary blend of magnolia, phellodendron, lychee, and green tea extracts for a greater sense of calm.

Item #02312
30 vegetarian capsules

This product is available at fine health food stores everywhere.

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED

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Munch

Crunch, Digest Your Lunch

(Or breakfast, or dinner...)



Uncomfortable after eating?

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

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

Item #02021

60 vegetarian capsules

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

* *Curr Drug Metab.* 2016;17(2):187-93.

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Crack the Aging Code

Mega L-Ergothioneine



The must-have amino acid for healthy aging.

L-ergothioneine helps protect cells from oxidative stress. Why is that important? Because oxidative stress is considered a key factor in aging—and L-ergothioneine levels decline with age.

Age well with L-ergothioneine. **Now available in 25 mg doses**.

Item #02540

30 vegetarian capsules

NON GMO LE CERTIFIED

GLUTEN FREE

This product is available at fine health food stores everywhere.

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NEW PRODUCTS

You lived it. Don't lose it.



Introducing new Ultra Memory & Recall™

A healthy brain learns, retains, and retrieves information quickly.

Once-daily Ultra Memory & Recall™ provides advanced support for a sharp mind and strong memory with a *Terminala chebula* and *Boswellia serrata* combo paired with a standardized green oat extract.[1-3]

These nutrients have been shown to produce positive changes in multitasking, verbal and visual memory scores and other cognitive benchmarks.[1,2]

The *Terminala chebula* and *Boswellia serrata* combo in this formula also produced positive changes in brain-derived neurotrophic factor (BDNF) levels in a clinical study.[3] Brain-derived neurotrophic factor is a special protein that plays a crucial role in brain health.

This new formula is our most advanced mind and memory support formula ever. **Try Ultra Memory & Recall™ today!**



GLUTEN FREE

1 DAILY

NON GMO LE CERTIFIED

Item #02560

30 vegetarian capsules

References

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