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December 2022

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Deliver More
RESVERATROL
into Your Body



ANNUAL
SuperSale

SAVE ON ALL
LIFE EXTENSION
SUPPLEMENTS

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Life Extension®

Super\$Sale

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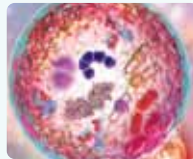
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References

1. *Anticancer Agents Med Chem.* 2013 Sep;13(7):967-70.
2. *Nutr J.* 2016;15:6.
3. *Obesity (Silver Spring).* 2014;22(1):63-71.

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



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

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Resveratrol in the Prevention of Aging



WILLIAM FALOON

In **2003**, a plant compound called **resveratrol** emerged as the hottest topic in anti-aging medicine.

The sizzling enthusiasm came from a **Harvard** study showing an astounding **70% increase** in the **lifespans** of yeast given **resveratrol**.¹

Several follow-up studies supported **lifespan** benefits in **resveratrol**-supplemented model organisms.²

What got scientists fired up are **mechanisms** behind resveratrol's **age-delaying** effects.

It turned out that **resveratrol** induced some of the favorable **gene expression** changes seen with **calorie restriction**.¹



This has led to **resveratrol** appearing in thousands of published papers about the multiple disorders that it might protect against.

For example, a PubMed® search for "**resveratrol**" yields **16,000** citations over the past four decades, including 260 **clinical trials** since year 2002.

A review article published in **2021** concluded:

"Resveratrol could be an effective and safe compound for the prevention and treatment of aging and age-related diseases."³

We at **Life Extension** funded costly laboratory studies aimed at identifying what dose of **resveratrol** might enable **humans** to live *longer* and healthier lives.

The challenge, however, was finding a way to make resveratrol **bioavailable** to the **human** body.

Resveratrol is rapidly metabolized in the liver, kidneys, and other tissues despite relatively good intestinal absorption.^{4,5}

This helps explain the **longevity-enhancing** effects of **resveratrol** found in flies, fish, worms, and yeast, but inconsistent benefits when tested in mammals.²

Intensive research has uncovered a way to protect **resveratrol** from rapid metabolic degradation.

It is now possible to better explore the potential of **resveratrol** to combat degenerative disorders and assist in the **prevention and treatment of aging**.



In **1997**, a paper was published describing the biological effects of **resveratrol** as it relates to the prevention of **cancer** and other illnesses.⁶

This led to intensive investigations, thousands of published papers, resveratrol-focused conferences, and patents on resveratrol analogs.

The public reacted to the media blitz by ingesting **resveratrol** supplements and increasing their consumption of **red wine**, despite there being little resveratrol in red wine (and other foods).

Longevity Impact of Resveratrol

Published studies document the ability of **resveratrol** to **extend lifespans** in laboratory models.

A meta-analysis of 19 published papers indicated that resveratrol acts as a **life-extending** agent.⁷ The species studied were yeast, roundworms, mice, fruit flies, and turquoise killifish.

Resveratrol has been shown to induce **autophagy** in **human** cells in test tubes (*in vitro*) and in the bodies of roundworms (*in vivo*).³

Autophagy is a cleansing process that promotes the clearance of internal cellular debris.

The induction of **autophagy** by **resveratrol** is thought to be a longevity-enhancing mechanism.

Bees fed with **resveratrol syrup** live longer than controls.⁸ Depending on **resveratrol concentration**, mean and maximum lifespan of these bees increased by **33%** to **38%** respectively.

Short-lived **flies** fed with different resveratrol concentrations had mean lifespan extension of **10%** to **29%**, while other models found **resveratrol** also conveyed **neuroprotective** benefits.^{2,9,10}

Resveratrol-fed **fish** lived **longer** and demonstrated better cognitive ability and locomotor function than the control fish group.¹¹ The fish fed **resveratrol** showed reduced markers of **senescent cells** and less buildup of a wear-and-tear residue called **lipofuscin**.

In a genetically altered strain of **mice** predisposed to neurodegenerative disease and accelerated aging, oral administration of **resveratrol** increased the median survival of these mice from 32 days to 42 days.¹² Resveratrol additionally helped preserve motor function and protect against degenerative changes in the brain.

Not all studies demonstrate these kinds of elongated lifespans. One study found that **resveratrol** delayed **vascular aging** in **rats** but had no effect on overall survival.¹³

Another study found that in **mice** fed a standard diet, resveratrol did not enhance lifespan.¹⁴ In mice eating a **high-calorie** diet, however, resveratrol reduced the **risk of death** by **31%** and improved **insulin sensitivity**, suggesting it helps protect against diet-related metabolic diseases.¹⁵

Effect on Neurodegenerative Disorders

The aging brain is afflicted with neuroinflammation, autophagy defects, mitochondrial dysfunction, cell loss, and elevated oxidative status. This all contributes to memory loss and motor impairments.^{16,17}

A large body of data shows how **resveratrol** protects against **neurodegenerative** disorders in rodents.³

Resveratrol-supplemented animals demonstrate improved **memory** performance, enhanced secretion of **neurotransmitters**, and increased production of new brain cells with beneficial decreases in **inflammation** and **oxidative stress**.¹⁸⁻²¹

A **human** trial using **200 mg** a day of **resveratrol** showed enhanced **memory performance** accompanied with improved glucose metabolism and hippocampal functional connectivity.²²

Effect on Cardiovascular Disorders

Aging is associated with **endothelial dysfunction** that leads to arterial blockages and increased risks of cardiovascular diseases.²³

In animal models, resveratrol was shown to exert a cardioprotective effect mainly through enhancing the production of endothelial **nitric oxide**, improving blood vessel **dilation**, reducing **blood pressure**, and ameliorating **oxidative stress**.²⁴⁻²⁶

Effect on other Disorders

Research findings show how resveratrol may help protect against **cancer**, **osteoporosis**, **sarcopenia** and possibly even **infertility**.²⁷⁻³⁰

What impresses scientists are the many **pathological** mechanisms of **aging** that resveratrol has been shown to thwart.

The challenge up to now has been how to deliver enough **bioavailable resveratrol** to the bloodstream to induce systemic (whole-body) effects.

Up to 10 Times Greater Bioavailability

Orally ingested resveratrol is rapidly metabolized and transformed primarily in the digestive tract and the liver.^{4,5} This leaves very little *free* resveratrol in circulation.

Scientists found a solution to this by combining **resveratrol** with **galactomannan** fibers from **fenu-greek seed**. This creates a **hydrogel** coating that allows greater resveratrol bioavailability.

Compared to unformulated resveratrol, this **resveratrol-galactomannan** hydrogel showed **up to 10 times greater bioavailability**.³¹

The graph on this page shows the magnitude of **resveratrol** increase and the longer period this proprietary **hydrogel** formulation of **resveratrol** remained in the blood compared to unformulated resveratrol.

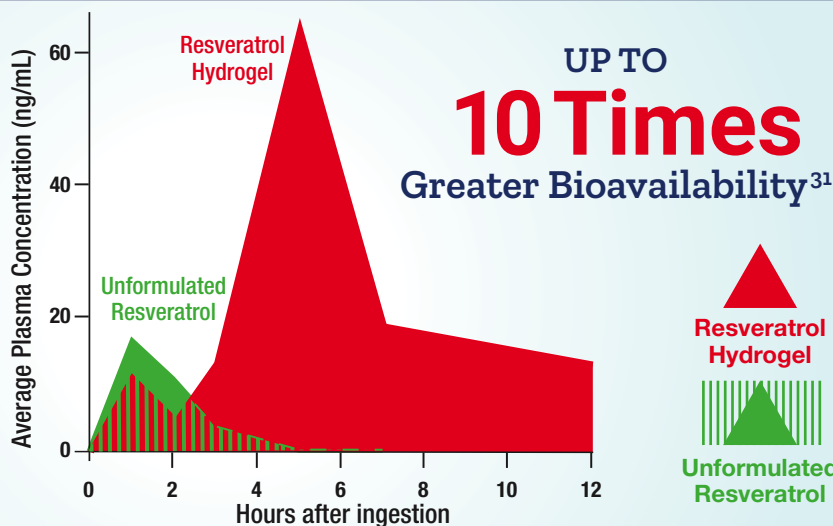
It's Time for More Clinical Research!

Resveratrol is a widely studied **plant extract** in the health and longevity fields.

Physician-scientists have been frustrated with **resveratrol research** because most of what is **orally** ingested is quickly degraded in the **human** body.

After oral administration in humans, a **resveratrol hydrogel** formula boosted plasma concentration (ng/mL) about **10-fold higher** than unformulated resveratrol.

530 mg of Resveratrol Hydrogel providing 80 mg of *trans*-resveratrol (red)
380 mg of unformulated resveratrol providing 80 mg of *trans*-resveratrol (green)



Adapted from: Joseph A, Balakrishnan A, Shanmughan P, et al. Micelle/Hydrogel Composite as a "Natural Self-Emulsifying Reversible Hybrid Hydrogel (N'SERH)" Enhances the Oral Bioavailability of Free (Unconjugated) Resveratrol. *ACS Omega*. 2022 Apr 19;7(15):12835-45.

With the advent of a **new bioavailable resveratrol**, far better dosing schedules can be tested, and consistently **higher** blood levels achieved.

The good news for consumers is **lower** cost, as fewer milligrams of resveratrol need to be ingested to achieve **higher** circulatory levels.

I look forward to this new **bioavailable resveratrol** being used in upcoming clinical trials that seek to extend healthy human longevity.

Your ongoing support enables us to fund many of these **human** studies.

For longer life,



William Faloon,
Co-Founder, Life Extension®

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*ACS Omega. 2022 Apr 19;7(15):12835-45.

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In the News

Grape Powder Could Extend Lifespan by 4-5 Years

In a study the authors called “remarkable,” researchers found that giving grape powder to mice reduced the risk of non-alcoholic fatty liver disease and **extended lifespan**.

To see if grape powder could modulate the harmful effects of a high-fat diet, researchers fed mice a typical Western (high-fat) diet. Half then received **5% standardized grape powder** while the other half didn't.

Compared to mice not fed the grape powder, the mice given grape powder saw beneficial increases in antioxidant genes, reductions in fatty liver, and extended lifespans.

The lead author estimated that when translated to humans, the extended lifespan would correspond to an additional **4-5 years** in the life of a human.

The grape powder used in this study was composed of fresh red, green and black grapes that were freeze-dried to retain their **bioactive** compounds.

Editor's Note: The researchers concluded: “These results suggest the potential of dietary grapes to modulate hepatic gene expression, prevent oxidative damage, induce fatty acid metabolism, ameliorate NAFLD (non-alcoholic fatty liver disease), and increase longevity when co-administered with a high-fat diet.”

Foods 2022, 11(13), 1984.

Greater Potassium Intake May Lower Blood Pressure in Women with High-Sodium Diets

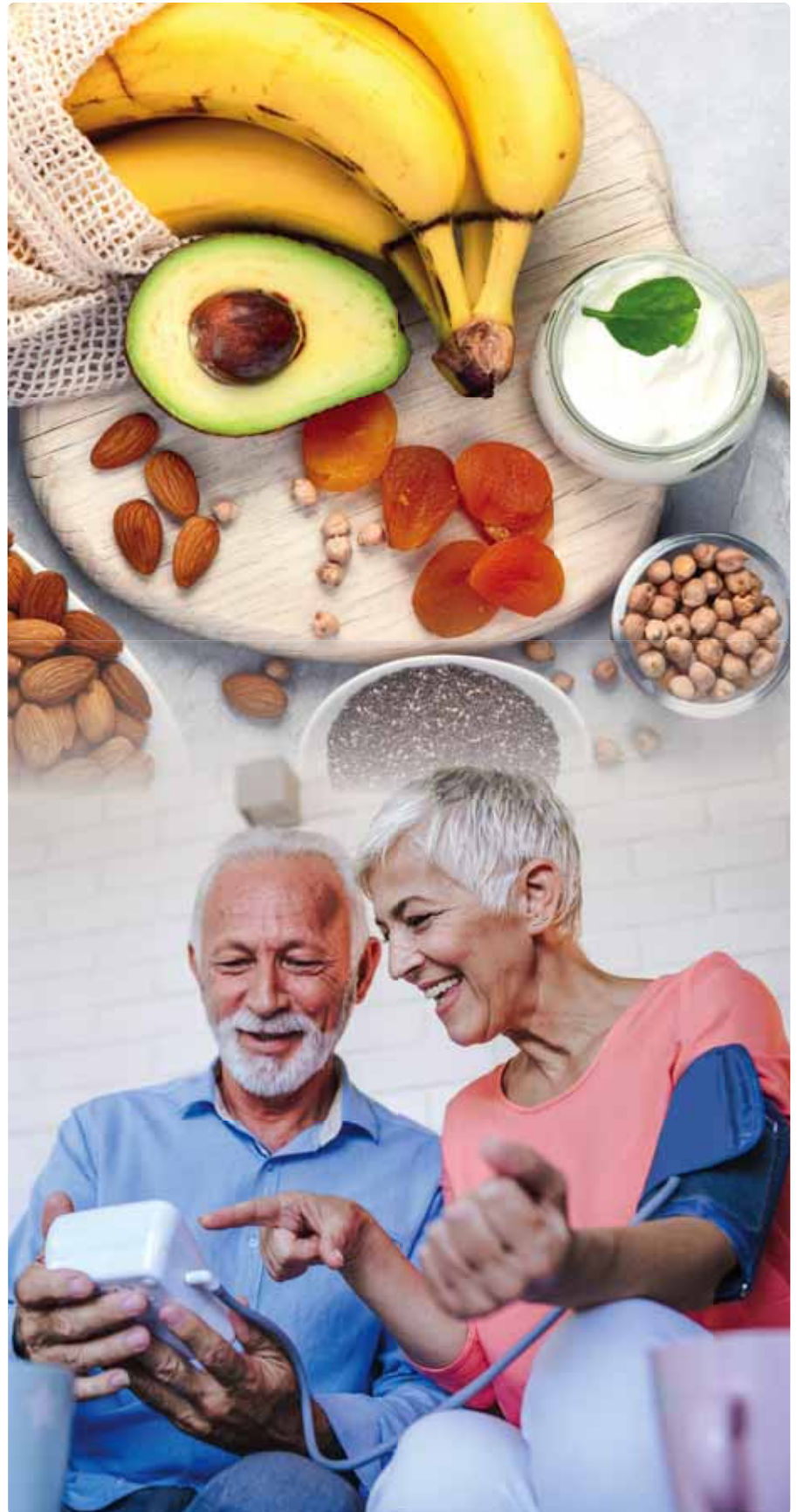
A study published in the *European Heart Journal* found a link between consuming a greater amount of potassium and lower blood pressure among women with a high intake of sodium.*

The participants were 11,267 men and 13,696 women enrolled in England’s EPIC-Norfolk study. Sodium and potassium intake were estimated from urinary levels of these minerals.

Increased potassium intake was associated with declining blood pressure among women with high sodium intake. Each **1 gram** increase in potassium consumption was associated with a **2.4 mmHg** decrease in systolic blood pressure.

Editor’s Note: “...in view of various studies showing that women are more sodium-sensitive—i.e., having a larger change in blood pressure in response to changes in sodium consumption—women with high sodium intake might specifically benefit more from an increase in potassium intake,” the authors stated.

* *Eur Heart J.* 2022 Aug 7;43(30):2867-2875.





Taurine Supplementation Benefits Diabetes Patients

People with diabetes who received taurine supplements experienced improvements in glucose and other factors, according to the results of a review and meta-analysis of clinical trials, published in *Food Chemistry: Molecular Sciences*.*

Researchers analyzed five controlled trials including 209 participants, that evaluated the effects of taurine on individuals with type I or type II diabetes. Taurine doses ranged from **500 mg** daily to **1,000 mg** three times per day.

Participants who received taurine had lower fasting blood glucose, hemoglobin A1c (HbA1c, a marker of long-term glucose control), and insulin resistance, compared to those given a placebo.

Editor's Note: "Taurine emerges as a new option for the management of patients with diabetes," the scientists asserted.

* *Food Chem (Oxf)*. 2022 Jul 30;4:100106.

Vitamin D Deficiency Linked to Breast Cancer

Most women with **breast cancer** were found to be deficient in **vitamin D**, according to the results of a study published in the journal *Progress in Nutrition*.*

Researchers analyzed the vitamin D status of 561 women, average age 55, with non-metastatic breast cancer.

In this group, **81%** of the women were *deficient* in vitamin D, and **11%** had *insufficient* levels of the vitamin.

Median *25-hydroxyvitamin D* blood levels were only **13.91 ng/mL** in this group of Turkish women.

Optimal ranges by U.S. standards are **30-80 ng/mL**. **Life Extension's** minimal target for *25-hydroxyvitamin D* is around **50 ng/mL**.

A significant portion of the world's population where supplementation is uncommon and sun exposure limited have very low blood levels of vitamin D.

Editor's Note: The researchers concluded that vitamin D levels should be measured in breast cancer patients and low levels should be corrected whenever diagnosed.

* Available at: <https://www.mattioli1885journals.com/index.php/progressinnutrition/article/view/10428>.





Clinical Trial Will Evaluate Form of Vitamin B1 in Alzheimer's Treatment

The Alzheimer's Disease Cooperative Study at the University of California San Diego (ADCS), in collaboration with Burke Neurological Institute, and Columbia University Irving Medical Center, plans to evaluate the effect of a high-dose form of thiamin (vitamin B1) known as **benfotiamine** in individuals with Alzheimer's disease, the ADCS announced.*

"The trial addresses tissue deficiency of thiamine-regulated metabolic pathways linked to Alzheimer's," the announcement stated.

Approximately 400 participants with mild Alzheimer's disease or mild cognitive impairment due to the disease will be enrolled at up to 50 U.S. clinical trial sites and will be evaluated during an 18-month period.

Editor's Note: A \$45 million grant from the National Institutes of Health and National Institute on Aging is supporting this clinical trial, which is slated to begin in early 2023.

* Available at: <https://ucsdnews.ucsd.edu/pressrelease/novel-treatment-approach-to-alzheimers-disease-uses-vitamin-b1-derivative> Accessed September 21, 2022.

Sweet DREAMS



Fast-Acting Liquid Melatonin is a popular way to achieve more rapid sleep onset.

The nice-tasting, citrus-vanilla flavor enables convenient “drop” dosing of **Fast-Acting Liquid Melatonin** each night or when needed.

Life Extension also offers a full range of melatonin in solid forms and a variety of dosages.

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CAUTION: Do not consume alcohol, drive or operate heavy machinery after taking this product.



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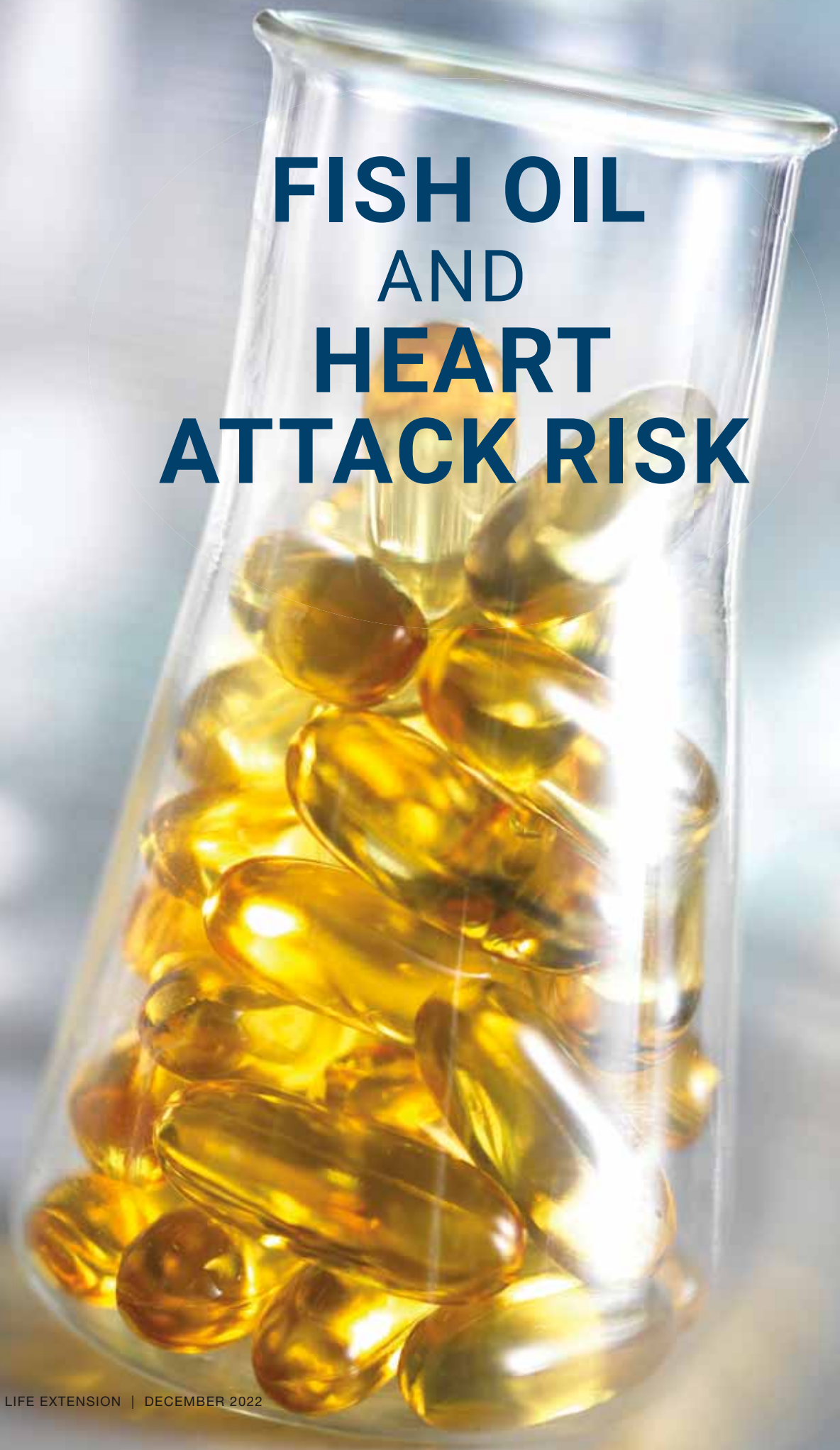


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FISH OIL AND HEART ATTACK RISK





BY STAN FREEDMAN

Ingestion of omega-3s is associated with lower rates of **heart attack** and **cardiac-related death**.¹

An observational study found that those with the *highest* blood levels of **omega-3s** live almost **five years longer** than those with the lowest blood levels.²

The average dietary intake of **EPA** and **DHA** for typical Americans is too low.³⁻⁵

Eating cold-water fish and/or supplementing with **fish oil** is a smart, heart-healthy move.

How Fish Oil Prevents Heart Disease

Omega-3 fatty acids are healthy fats that serve multiple roles.

They are particularly concentrated in **brain** and **heart muscle**.^{6,7}

Omega-3 fatty acids are essential for balancing **inflammatory** responses.⁸

Getting enough omega-3s helps counter several major contributors to heart and blood vessel disease, including:

- 1. Elevated triglycerides.** High levels of these fats in the blood correlate with an *increased* risk of heart disease. Taking omega-3s *reduces* triglyceride levels.⁹⁻¹¹ The **American Heart Association** has issued a science advisory that **EPA** and **DHA** doses of **2,000–4,000 mg** per day are recommended for lowering triglycerides.¹²
- 2. High blood pressure.** Increasing intake of omega-3 fatty acids can modestly reduce blood pressure, a major risk factor for heart disease.^{13,14}
- 3. Insulin resistance.** When cells do not respond to the hormone insulin appropriately, the body cannot optimally manage blood sugar. Fish oil intake is associated with *improved* insulin sensitivity in people with some existing degree of metabolic disease.^{11,15}
- 4. Blood clotting.** Heart attacks and strokes are frequently caused by abnormal clotting (thrombosis) within blood vessels.¹⁶ Higher intake of omega-3s can *reduce* the formation of blood clots.¹⁷⁻¹⁹
- 5. Chronic inflammation.** Persistent inflammation is a major driver of **atherosclerosis**, the buildup of plaque in arteries. Omega-3s reduce the production of pro-inflammatory compounds and serve as precursors to *anti*-inflammatory compounds.^{6-8,20,21}

The above actions may help slow or *halt* the development and progression of **cardiovascular disease**.

Observational Studies

The **omega-3 index** is a blood test that measures the percentage of omega-3s in the blood. The *higher* the number, the *more omega-3s* in the body.

An index of **8%** or higher is considered ideal.²²

In an observational study that evaluated close to **30,000 individuals**, having an **omega-3 index** of **8%** or greater predicted about a **30% lower risk of death** due to **coronary artery disease** than an omega-3 index below **4%**.²²

The **Framingham Heart Study** is one of the largest and longest-running observational studies in existence.^{2,23} It has consistently found that a *higher* omega-3 index is associated with significantly *lower* risk of **total mortality** and cardiovascular-related events such as **stroke** and **heart attack**.

The Framingham study even found that the **omega-3 index** is as good at predicting risk of death as factors like smoking, high blood pressure, diabetes, and age.² Those with a *higher* index live almost **five years longer** on average than those with a low index.

In one of the papers from the Framingham study, people with the highest omega-3 index levels compared to those with the lowest, had a **34%** lower risk of all cause mortality and their risk of developing cardiovascular diseases was **39%** lower.²³



WHAT YOU NEED TO KNOW



Omega-3s Promote Heart Health

- Low intake of **omega-3 fatty acids** is associated with increased risk for cardiovascular disease and death.
- Daily intake of fish oil is associated with reduced rates of heart disease, and cardiovascular disease outcomes like heart attack and stroke.
- **Life Extension** suggests daily supplementation with about **2,000 mg** of EPA + DHA from highly purified fish oil.

Results from Clinical Studies

Data from many **clinical trials** show that increased intake of fish oil correlates with reduced risk for **heart disease** and cardiac-related **mortality**.¹

The Food and Drug Administration (FDA) published a **Qualified Health Claim** stating that increased consumption of EPA and DHA may reduce risk for high blood pressure and coronary heart disease.²⁴

Oral intake of **omega-3** has been linked with:²⁵

- **Prevention of the development of heart disease, and**
- **Improved outcomes for those who already suffer from heart disease.**

One recent, large meta-analysis²⁶ found that taking fish oil was associated with reduced development of **coronary heart disease** compared to those who did not receive fish oil.

Another meta-analysis found that **fish oil** is associated with a *reduced* risk of developing **coronary heart disease** and all **cardiovascular disease**, and **cardiovascular mortality**.¹

These newer studies add to decades of evidence showing that fish oil helps protect the **heart**.

Boosting the Benefits of Fish Oil

Olive extract and **sesame lignans** add to the health benefits of fish oil.

OLIVE EXTRACT

Research shows that people who consume the most **olive oil** have a lower risk of dying from *cardiovascular* events.²⁷⁻²⁹

Olive oil contains unique **polyphenols** including *oleuropein*, *tyrosol*, and *hydroxytyrosol*.³⁰⁻³² High-phenolic **extra virgin olive oil** is the best food source of these compounds.

In a study in people over age 65, those who ingested the *highest* amount of **hydroxytyrosol** from virgin olive oil and wine lived **9.2 years longer** on average.³³

Extracts of the **olive leaf**, concentrated and standardized to provide maximum polyphenol content, have been shown to protect cultured heart-muscle cells from destruction caused by **oxidative damage**.³⁴

SESAME SEEDS

Sesame seeds contain high concentrations of polyphenols called **lignans**. They have demonstrated activity related to lowering blood lipid levels, fighting inflammation and cancer, neutralizing free radicals, and enhancing **vitamin E** bioavailability.^{35,36}

Metabolism of **sesame lignans** by intestinal microflora creates the compounds *enterolactone* and *enterodiol*, both of which may have protective effects against **hormone-related diseases** such as breast cancer.^{37,38}

Sesame lignans may help enhance the effects of **omega-3s** in the body.

Summary

Modern Western diets are usually lacking in **omega-3 fatty acids** like **DHA** and **EPA**.

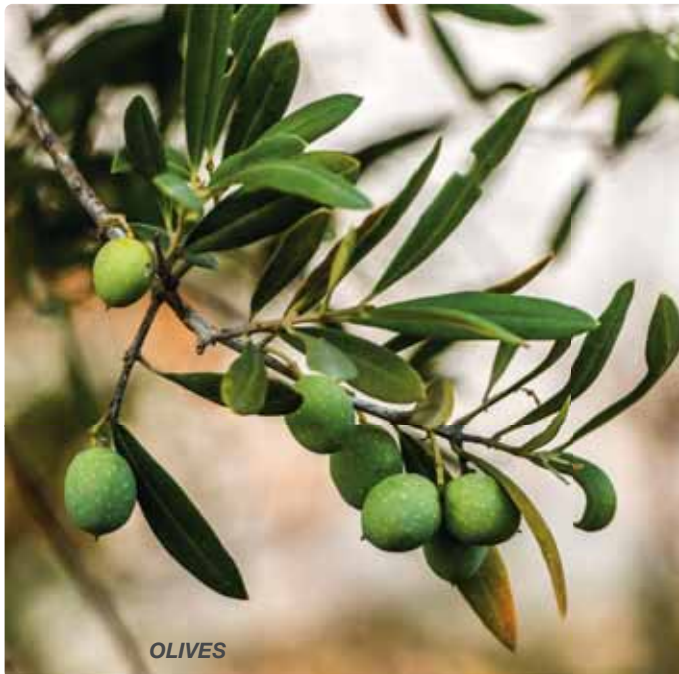
Lower blood levels of omega-3s have been correlated with increased risk for coronary artery occlusion and cardiovascular events like **stroke** and **heart attacks**.

Life Extension suggests most readers supplement with about **2,000 mg** of EPA + DHA each day from highly purified fish oil. •

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

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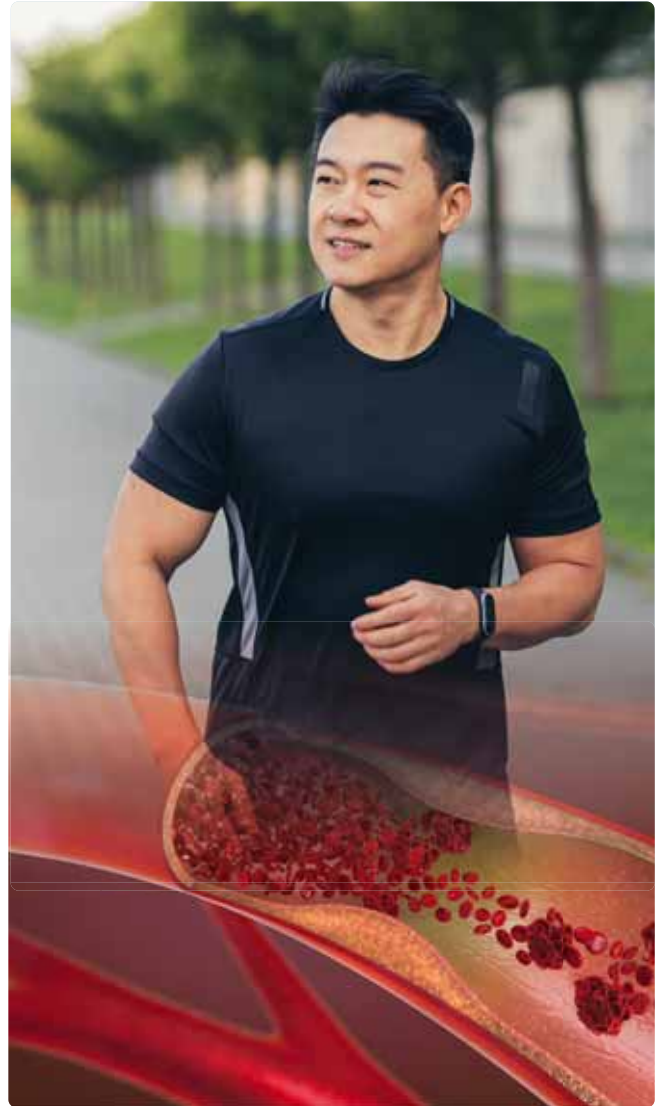


OLIVES



SESAME SEEDS

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"My gift to my heart."

Donna

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Superior
Ubiquinol CoQ10
Mitochondrial
Delivery System**



100 mg CoQ10

SUPER SALE PRICE

Item #01426 • 100 mg, 60 softgels

1 bottle **\$42.53**

4 bottles \$36 each



200 mg CoQ10

SUPER SALE PRICE

Item #01431 • 200 mg, 30 softgels

1 bottle **\$40.50**

4 bottles \$34.65 each



100 mg CoQ10 + 10 mg PQQ

SUPER SALE PRICE

Item #01733 • 100 mg, 30 softgels

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4 bottles \$27 each

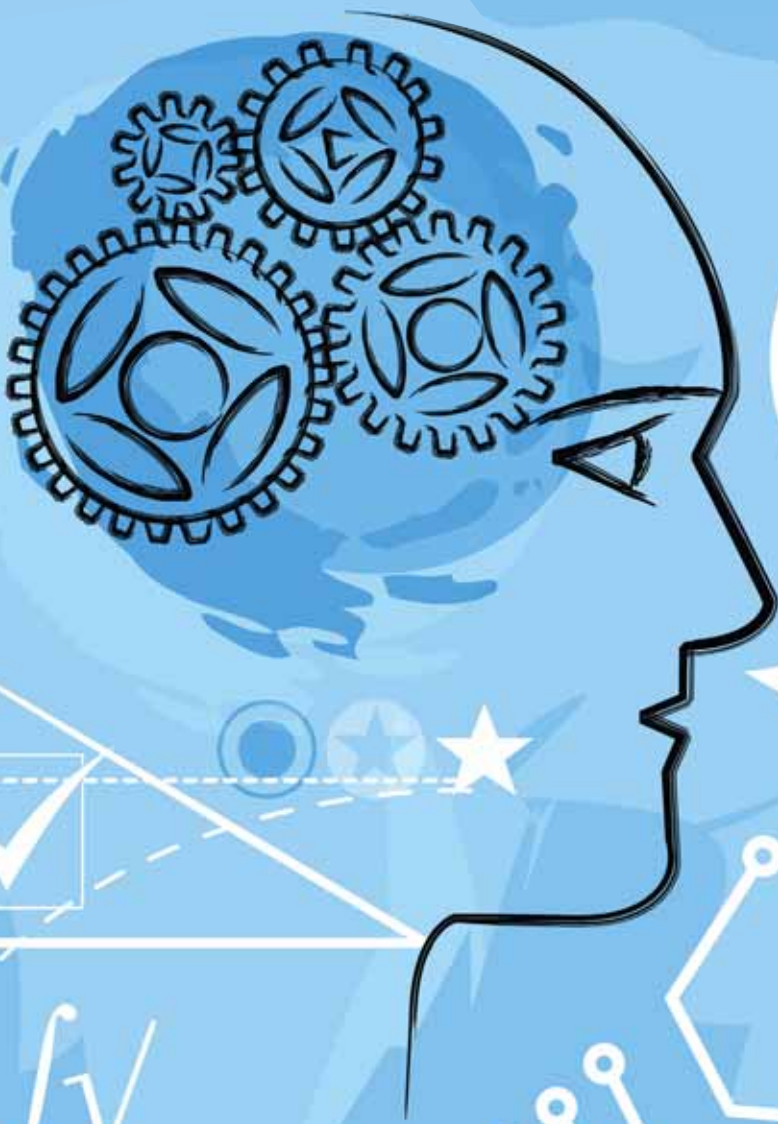
For full product description and to order **Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™**,
or **Super Ubiquinol CoQ10 with PQQ**, call 1-800-544-4440 or visit www.LifeExtension.com

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Keep Your Heart Healthy & Your Brain Sharp



Taurine is one of the most abundant amino acids in your body, but levels decline over time. Be proactive and give your heart and brain powerful support with high-quality Taurine from **Life Extension!**

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*Also available in an unflavored powder that mixes easily into your favorite healthy beverage.

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D EFEND YOUR HEALTH

VITAMIN D3

Systemic support for immune function, bone health, and normal blood-sugar levels.



SUPER SALE PRICE

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125 mcg (5000 IU) • 60 softgels

1 bottle \$6.75 • 4 bottles \$5.85 each

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

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HIGHLY PURIFIED

Fish Oil

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



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

SUPER SALE PRICE

Item #01988 • 120 softgels

1 bottle **\$31.05**

4 bottles \$28.80 each



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

SUPER SALE PRICE

Item #01982 • 120 softgels

1 bottle **\$22.28**

4 bottles \$19.80 each

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



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

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HOW MAGNESIUM HELPS REVERSE BRAIN AGING

BY DAVID CAMERON

Around **65%** of U.S. adults consume inadequate amounts of **magnesium** in their diet.^{1,2}

Magnesium is especially important in the **brain**.

It plays key roles in cognitive function, including **learning** and **memory**.³

There are different forms of magnesium, but not all are effective at getting into the brain.

Scientists at the **Massachusetts Institute of Technology (MIT)** developed a form called **magnesium L-threonate** that boosts brain levels quickly and efficiently.^{3,5}

In animal models, increasing brain magnesium helps ward off cognitive decline and dementia.^{3,6}

In a human study of adults with cognitive impairment, **magnesium L-threonate** *reversed* measures of **brain aging** by an astonishing **nine years**.⁷



A Form for the Brain

Magnesium is essential for bone density, nerve function, and much more.^{1,8-10}

Magnesium enables **brain cell communication**, particularly in areas critical for learning and formation of memories. Magnesium deficiency is associated with loss of **cognitive function**.^{1,10-13}

MIT researchers developed **magnesium L-threonate** to more effectively elevate levels of magnesium in the brain.³

In a rodent study, **magnesium L-threonate** raised cerebral spinal fluid levels of **magnesium** by **54%**.¹⁴

How It Helps the Brain

Once in the brain, **magnesium** contributes to its healthy function in numerous ways.

For example, magnesium protects **synapses**, the **structural** communication connection points between brain cells.¹¹

In animal studies, increasing brain levels of magnesium *increased* the total **number of synapses**, *improved synaptic plasticity* (the ability of synapses to adapt), and *stimulated* growth of new **brain cells**.^{3-6,14,15}

This improved **cognitive function**, including **learning** and **memory**.

Animal models of brain aging, dementia, Parkinson's disease, and brain injury *all* show that magnesium intake results in improvements in **cognition**.^{3,4,6,14-18}

Magnesium L-threonate leads to *greater* improvements in memory, number of synapses, and other cognitive functions than other forms tested.^{5,14}

Reversing Human Brain Aging

Scientists have long known that a **magnesium deficiency** can result in **cognitive** problems. Studies are now starting to demonstrate that *replenishing* magnesium can *improve* cognitive abilities.

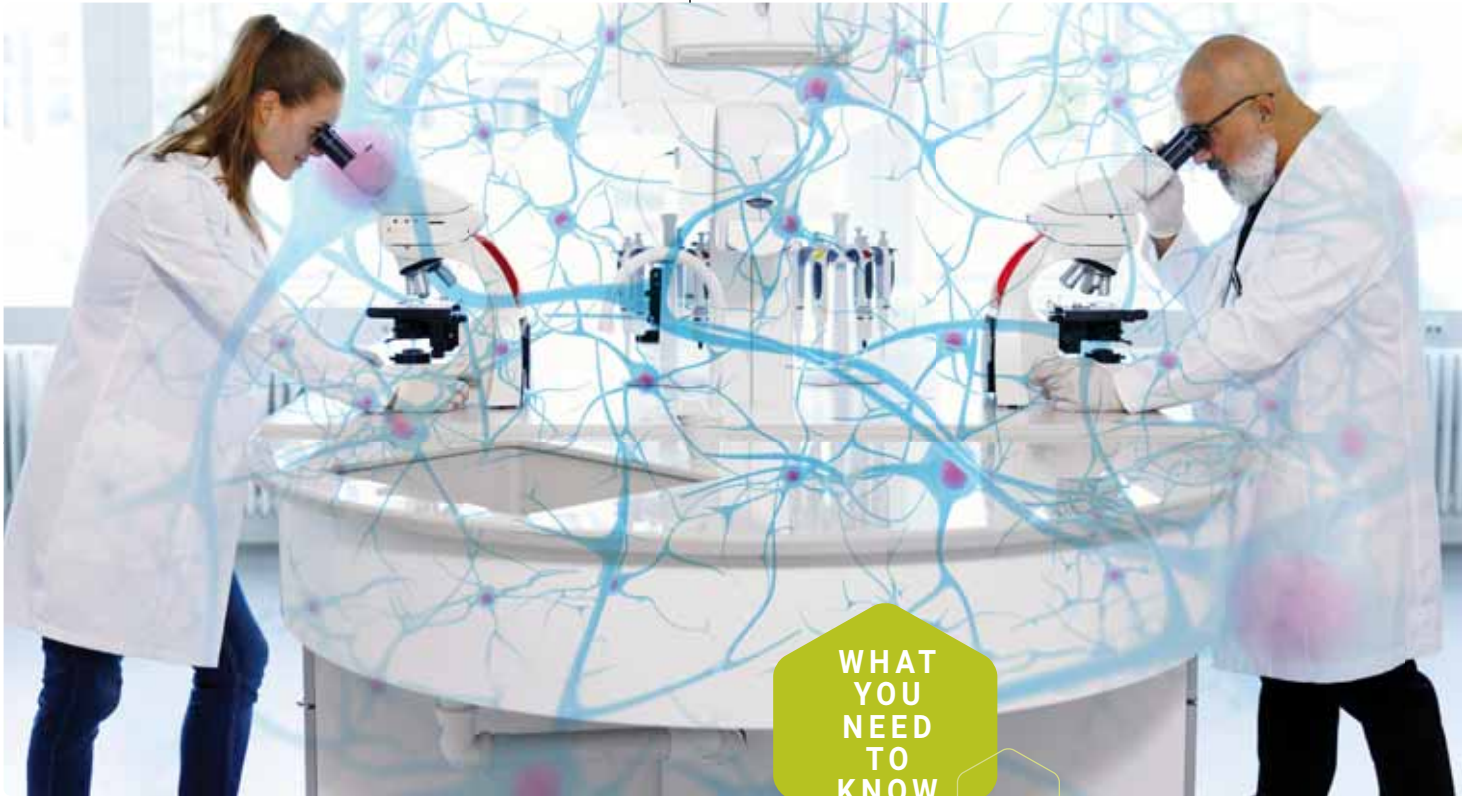
In one clinical study, researchers gave older people with early cognitive impairment **1,500-2,000** mg (depending on body weight) of **magnesium L-threonate** or a **placebo** daily for 12 weeks.⁷ Subjects began with some impairment in **executive functioning**, the ability to plan, adapt, focus, and make decisions.

At the beginning of the study, the participants averaged **57.8** years of age. However, their brain age based on cognitive functioning was **68.3** years old. By the end of the trial, those receiving magnesium L-threonate decreased their **brain age** a remarkable **nine years**.

Another human trial showed promising preliminary results in patients diagnosed with mild to moderate **dementia**. Even at this more advanced stage of cognitive decline, magnesium L-threonate led to improvements in **cognition** and **executive function**.¹⁹

Scientists have started to evaluate magnesium for neuropsychiatric conditions as well.





WHAT YOU NEED TO KNOW

In a **2021** open-label, pilot study, 15 adults with moderate **ADHD** (attention deficit hyperactivity disorder) received **magnesium L-threonate** for up to 12 weeks.

Nearly half of the participants displayed clinical **improvements**. The authors concluded that supplementation was effective and well-tolerated.²⁰

Summary

Magnesium deficiency is tied to health conditions including **cognitive decline**. Yet most adults do not get enough magnesium from their diets.

In the brain, magnesium is needed for the proper functioning of **synapses** involved in complex tasks such as learning and memory.

Magnesium L-threonate is easily absorbed and taken up into the brain, providing cognitive benefits as shown by animal and human studies. ●

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

Magnesium That Protects the Brain

- **Magnesium** is a mineral required for the function of hundreds of enzymes throughout the body.
- In the brain, it is needed for critical brain cell communication linked to cognitive functions like **learning** and **memory**.
- In animal models and human trials, magnesium L-threonate is tied to improvements in **cognitive function** and mental health.
- In one clinical study, magnesium L-threonate *reversed* measures of **brain aging by nine years**.



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TWO WAYS TO GET

K

FOR HEALTHY BONES + HEALTHY HEART



MEGA VITAMIN K2

Japanese physicians use **high-dose vitamin K2** for maintaining healthy bone density.



1
DAILY

Vitamin K2 (MK-4) 45,000 mcg
(for bone & vascular health)

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Mega Vitamin K2 Item #02417 • 30 capsules
1 bottle \$25.65 • 4 bottles \$23.40 each

"I have been using this for bone building, and my bone density tests have improved."

Dolores

VERIFIED CUSTOMER REVIEW

SUPER K

The best-selling **vitamin K** formula for bone and heart health.



1
DAILY

Vitamin K1 1,500 mcg
(converts to K2 in some people)
Vitamin K2 (MK-4) 1,000 mcg
(for bone & vascular health)
Vitamin K2 (MK-7) 100 mcg
(long-acting protection)

SUPER SALE PRICE

Super K Item #02334 • 90 softgels
1 bottle \$20.25 • 4 bottles \$18.23 each
(3-month supply)

For full product description and to order these **VITAMIN K** formulas
call **1-800-544-4440** or visit www.LifeExtension.com

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



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"Mainstay in my
prostate
health regimen."

Rick
VERIFIED CUSTOMER
REVIEW

PROSTATE HEALTH

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YOU in the picture.

Ultra Prostate Formula was created to help maintain prostate health. It contains a dozen ingredients to:

- Support healthy urination
- Promote healthy prostate function
- Support healthy prostate cell division

Ultra Prostate Formula is the most comprehensive *standardized*-ingredient prostate-health supplement.



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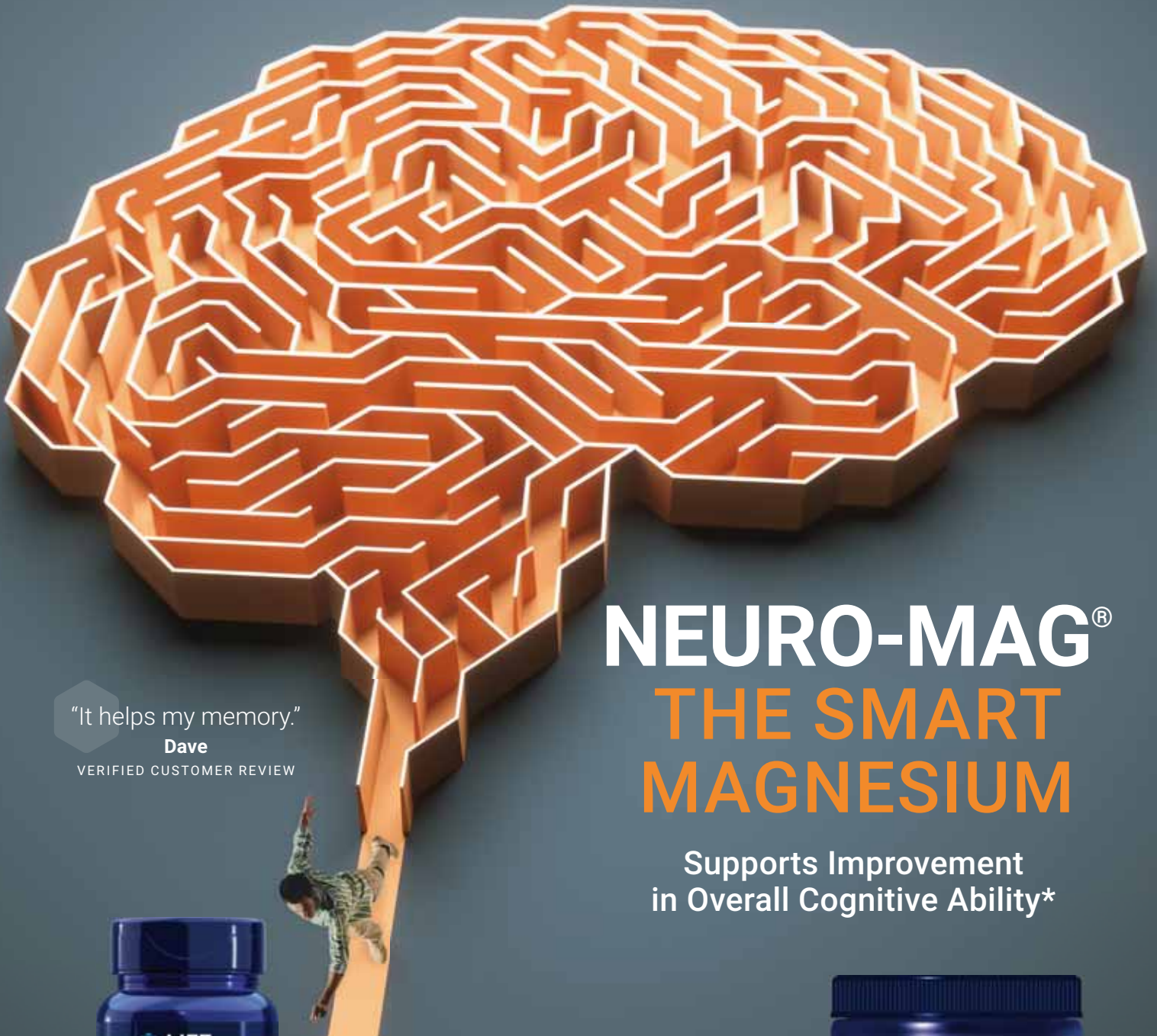
Item #02029 • 60 softgels

1 bottle **\$26.33** • 4 bottles \$24.30 each

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

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"It helps my memory."

Dave

VERIFIED CUSTOMER REVIEW

NEURO-MAG[®] THE SMART MAGNESIUM

Supports Improvement
in Overall Cognitive Ability*



With age, **synapses** that connect our brain cells wither.

Formulated by MIT scientists, **Neuro-Mag[®] Magnesium L-Threonate** has been shown to improve **synaptic density** and other structural components of the brain.



SUPER SALE PRICE

Item #01603 • 90 vegetarian capsules

1 bottle \$27.68 • 4 bottles \$24.75 each



SUPER SALE PRICE

Item #02032 • 93.35 grams of powder

1 jar \$25.65 • 4 jars \$23.40 each

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

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

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	SUPER SALE One Unit	SUPER SALE Four-Unit Per-Bottle Price
BioActive Complete B-Complex • 60 vegetarian capsules • Item #01945 Enzymatically active forms of B vitamins to help lower homocysteine, energize cells, and protect against glycation.	\$8.10	\$7.20
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Vitamin D3 • 5,000 IU, 60 softgels • Item #01713 High-potency vitamin D supports immune function.	\$6.75	\$5.85
Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract 120 softgels • Item #01982 Highly purified EPA and DHA , sesame lignans, plus olive extract .	\$22.28	\$19.80
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Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™ 100 mg, 60 softgels • Item #01426 Superior ubiquinol form of CoQ10 (100 mg) plus shilajit shown to enhance mitochondrial energy production.	\$42.53	\$36.00 \$33.30 <i>(six-unit per-bottle price)</i>
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Ultra Prostate Formula • 60 softgels • Item #02029 Comprehensive support for an aging prostate gland utilizing extracts from pygeum, nettle, flower pollen, and saw palmetto, plus boron, beta-sitosterol, and lycopene.	\$26.33	\$24.30 \$22.50 <i>(ten-unit per-bottle price)</i>

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SUPER SALE
One Unit

SUPER SALE
Four-Unit
Per-Bottle Price

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<p>Bone Restore w/ Vitamin K2 • 120 capsules • Item #01727</p> <p>Skeletal-strengthening nutrients in one highly absorbable formula.</p>	\$16.20	\$14.85
<p>NAC (N-Acetyl-L-Cysteine) • 600 mg, 60 capsules • Item #01534</p> <p>Supports glutathione levels for healthy immune function.</p>	\$10.13	\$9.00
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<p>Mitochondrial Energy Optimizer with PQQ • 120 vegetarian capsules • Item #01868</p> <p><i>Glycation-protection</i> and <i>mitochondrial</i> biogenesis formula. Provides 1,000 mg of carnosine along with R-lipoic acid, taurine, benfotiamine, and PQQ.</p>	\$45.90	\$40.50
<p>Vitamin C 24-Hour Liposomal Hydrogel™ Formula</p> <p>60 vegetarian tablets • Item #02501</p> <p>Two plant extracts increase blood exposure nearly seven times more compared to regular vitamin C.</p>	\$22.95	\$20.70
<p>Arterial Protect • 30 vegetarian capsules • Item #02004</p> <p>Helps stabilize endothelial plaque and promote healthy blood flow.</p>	\$29.70	\$26.10
<p>Senolytic Activator • 24 vegetarian capsules • Item #02301 (3-month supply)</p> <p>Highly <i>absorbable</i> forms of fisetin, quercetin, black tea theaflavins, plus apigenin designed to help manage senescent cells.</p>	\$17.55	\$16.20
<p>Super R-Lipoic Acid • 240 mg, 60 vegetarian capsules • Item #01208</p> <p>Superior efficacy compared to alpha-lipoic acid—supplies 240 mg of stabilized R-lipoic acid.</p>	\$33.08	\$30.38
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<p>NAD+ Cell Regenerator™ with Resveratrol Elite™</p> <p>30 vegetarian capsules • Item #02348</p> <p>NIAGEN® <i>nicotinamide riboside</i>, new <i>bioavailable resveratrol</i>, and more to support healthy cellular metabolism.</p>	***	***

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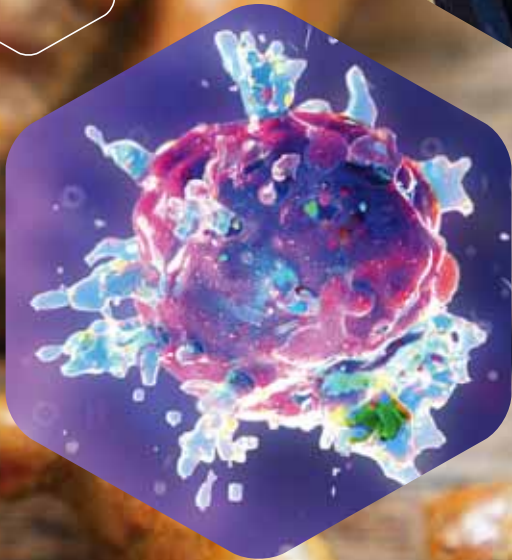
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Longevity Effects of **CURCUMIN**



BY JIM RYDER



The spice **turmeric** has been used in Indian cooking and traditional medicine for *thousands* of years.¹

There is some evidence from epidemiological studies that populations that regularly consume turmeric have *lower* rates of **Alzheimer's** as well as better-preserved cognition.²

A large body of scientific evidence reveals that turmeric's benefits are mainly attributable to the compound known as **curcumin**.

Research shows that **curcumin** helps *prevent* processes that drive **aging** and **chronic disorders**, including **cell senescence** and **chronic inflammation**.³⁻⁵

The overall effect may be to improve healthy **longevity**.

The Power of Curcumin

Curcumin is a yellowish pigment found in **turmeric**, a plant in the ginger family.

In studies, curcumin intake has been shown to **extend lifespan** of diverse species, from roundworms to mice.⁶⁻¹¹ In a study of fruit flies, for example, it increased the average lifespan by **26%**.⁹

In addition, research suggests it can help in the management of many conditions including metabolic syndrome, elevated lipids, arthritis, and more.¹²

A number of studies have found that curcumin supplementation led to improvements in **cognition** and **memory**.¹³

How does curcumin deliver its benefits? Science has identified several drivers of aging and chronic disease. **Curcumin** affects many of them³⁻⁵ in ways that improve health.

Protecting Telomeres

Every strand of **DNA** in our body has protective end caps, called **telomeres**, that help maintain the stability and function of the genetic material.

As we age, these telomeres **shorten**. When they are too short, the cell becomes dysfunctional or die. Shortened telomeres limit regeneration and stem cell function.

Telomerase is an enzyme that *builds up* the **length** of existing **telomeres**.

Curcumin has been shown in preclinical studies to give a boost to this anti-aging enzyme. It can enhance the expression and activity of **telomerase**, increasing the health and life of cells.^{14,15}

Support Brain Function

Research has identified specific brain benefits for curcumin.

In animal studies, curcumin has been shown to:¹⁶⁻¹⁸

- **Form new neurons in the hippocampus,**
- **Improve performance on memory tests,**
- **Reduce neuroinflammation, and**
- **Protect against memory loss.**

But the benefits of curcumin go beyond just neuroprotection.

Fighting Glycation

Glycation occurs when sugars attach to proteins, fats, or nucleic acids, causing deleterious structural and functional changes. It is a major contributor to accelerated aging and many diseases of older age.^{19,20}

This process even occurs in people with normal blood glucose. In diabetics and prediabetics, glycation is accelerated, leading to faster aging and higher risk for chronic disorders.

Preclinical studies have shown that curcumin protects cells and tissues from the damage caused by **glycation**.²¹⁻²⁵

One team of researchers has shown that, in cell culture models, curcumin can also block harmful effects when glycation has already occurred, preventing the inflammation and cellular dysfunction caused by **advanced glycation end products**.²⁵

Reducing Senescent Cells

As cells age, some become **senescent**. These cells are dysfunctional and emit protein degrading enzymes but refuse to die off to make room for healthy cells. Senescent cells also secrete inflammatory compounds that damage surrounding tissues.²⁶

Curcumin has demonstrated **senolytic** activity in preclinical studies,^{27,28} which means it has the potential to *reduce* the number of senescent cells in tissues. In other similar models, it has also been shown to help favorably modulate the secretion of inflammatory compounds from these cells.⁴



Regulating Vital Proteins

Maladaptive activity of various essential structural and functional proteins in cells has been tied to accelerated aging, metabolic abnormalities, and chronic inflammation.³⁻⁵

Curcumin modulates their activity in ways that reverse age-related changes and protect cells against age-related damage. It can:³⁻⁵

- Inhibit **nuclear factor-kappa B (NF-κB)**, a protein complex associated with chronic inflammation,
- Reduce activity of **mTOR**, a protein linked to rapid aging and metabolic abnormalities that contribute to chronic disease,
- Boost activity of **AMPK**, an enzyme that supports healthy metabolism,
- Enhance function of **sirtuins**, proteins critical for maintaining health and longevity, and
- Support activity of **Nrf2**, a protein that regulates the body's defenses against oxidative stress.

Other Anti-Aging Mechanisms

There are many more anti-aging actions of curcumin. Among other benefits, curcumin:

- Acts as a potent **free-radical scavenger**, helping to prevent the oxidative stress that accompanies most age-related chronic disease,²⁹
- Triggers production of the body's *own* antioxidant enzymes,³⁻⁵
- Reduces chronic inflammation,³ another driver of aging and age-related disease,
- Supports healthy mitochondrial function,³⁰ and
- Activates **autophagy**, cellular "house-keeping," to rejuvenate cells and keep them functioning optimally.³¹

These and other actions can help reduce risk for disease and prevent accelerated aging.

WHAT
YOU
NEED
TO
KNOW



An Anti-Aging Nutrient

- Scientists have identified processes that drive **aging** and risk for disease, including oxidative stress, chronic inflammation, glycation, cellular senescence, telomere loss, and more.
- **Curcumin**, a polyphenol in turmeric, has been found to influence every one of these processes in ways that improve health and may slow aging.
- In animal studies, curcumin intake is associated with **longevity** and reduced risk for chronic age-related disease.
- Human studies show that curcumin use improves **cognition** and memory.

Summary

Curcumin is a potent anti-inflammatory compound. Research over the last few decades reveals that curcumin favorably influences known contributors to **aging** and **chronic disease**.

In animal studies, curcumin extends **lifespan** while reducing risk for many age-related disorders. •

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

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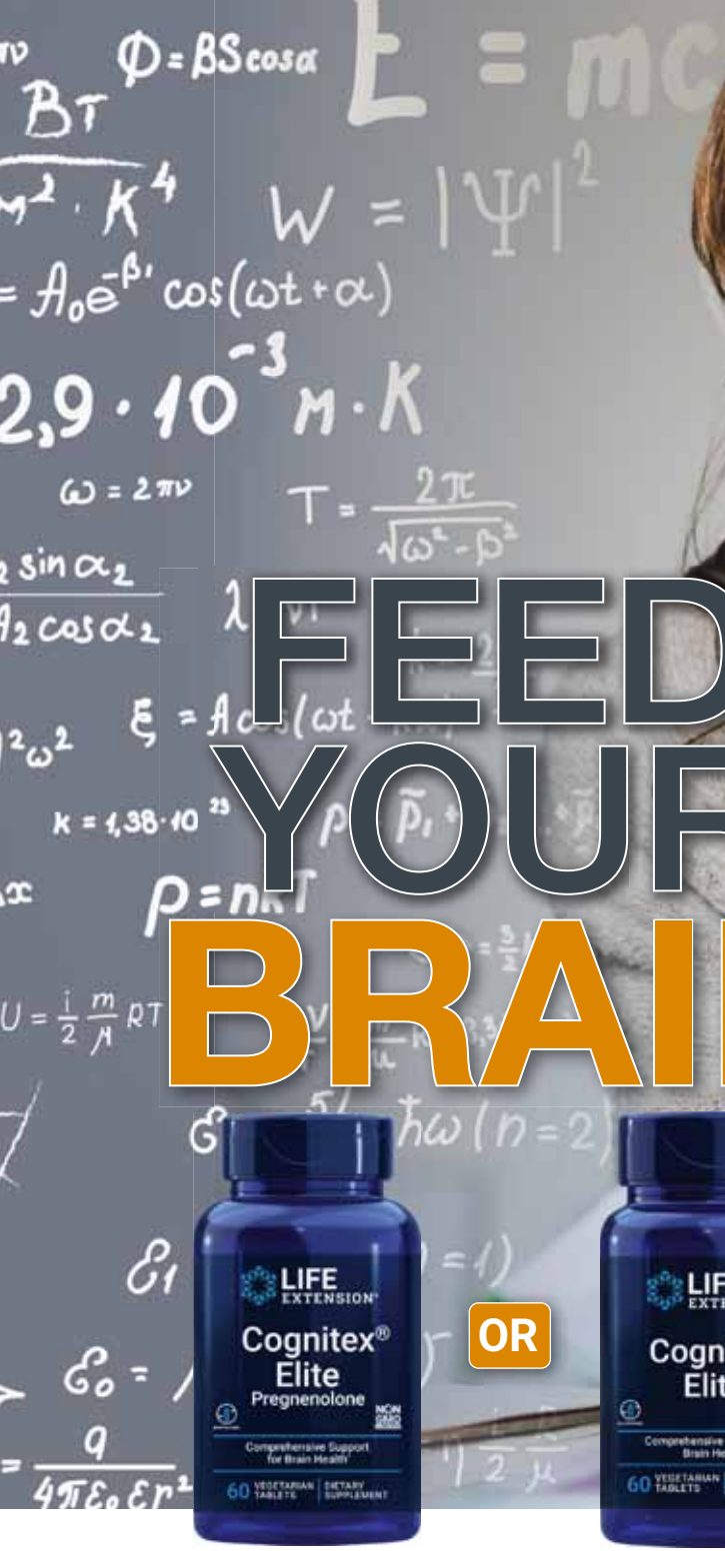
Boosting Bioavailability

On its own, curcumin has **low bioavailability**. Much of the curcumin you consume is not absorbed into the bloodstream.

Scientists discovered that combining curcumin with galactomannans, from the spice fenugreek, **boosts bioavailability** by more than **45 times** compared to unformulated curcumin.³²

Combining curcumin with other nutrients, including **turmerones** from turmeric and **gingerols** from ginger root, may further increase its bioavailability and health benefits.

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

† This product is intended to support testosterone levels but does not contain testosterone. Tesnor® is a trademark of Laila Nutra and Gencor.



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Fight Aging by Boosting Autophagy

BY LAURIE MATHENA



Autophagy is a process cells use to remove old, damaged parts.

One way to help fight aging is by activating **autophagy**.

This “housekeeping” process improves cellular functionality.¹

With age, we experience *lower* rates of **autophagy**,² which accelerates degenerative processes and increases the risk for **chronic diseases**.³

In several preclinical models, *stimulating* autophagy has been shown to improve healthy longevity.⁴⁻⁶

Scientists at **Life Extension**®, in collaboration with the **Insilico Medicine**® research group, identified two nutrients that promote autophagy: **luteolin** and **piperlongumine**.

Boost Lifespan and Healthspan

Several animal studies have demonstrated that *stimulating* autophagy leads to increased **longevity**.⁴⁻⁶

In one, activating autophagy in mice extended the average lifespan by **17.2%**.⁶ This would be the equivalent of increasing the average **human lifespan** in the U.S. from **78.5 years** to **92 years**.

These animals didn’t just live longer. They were also healthier. They maintained lower body weight, increased insulin sensitivity, and had better musculoskeletal functioning.

When scientists *inhibited* autophagy, certain beneficial properties associated with autophagy enhancement *disappeared*.

How to Stimulate Autophagy

Two regulatory proteins play key roles in controlling autophagy: **mTOR** and **AMPK**.

- When **mTOR** is activated, it **shuts off** autophagy.⁷ *Inhibiting* excess **mTOR activity**, on the other hand, can *increase* autophagy.⁸
- **AMPK activates** autophagy. Boosting cellular AMPK has been shown to improve metabolic health and lifespan.^{9,10}

The nutrients **luteolin** and **piperlongumine** have each been shown to induce **autophagy** by influencing these proteins.

Luteolin

Luteolin is a **flavonoid** found in several vegetables and herbs, including celery, broccoli, and parsley.¹¹

It has been shown in pre-clinical models to both increase **AMPK** activity and inhibit **mTOR** signaling.¹²⁻¹⁵ These actions activate **autophagy**, improving cellular metabolism.¹⁶

In animals and cell culture, treatment with **luteolin** protects the brain, heart, and tested cells.¹⁷⁻²⁰

For example, when animals with a **brain injury** were given **luteolin**,¹⁹ autophagy was activated, inflammation was reduced, and the outcome and recovery from the injury were improved.

Piperlongumine

Piperlongumine is a compound isolated from the **long pepper** plant.

In pre-clinical studies, piperlongumine was shown to activate autophagy as indicated by increases in a cellular marker called **LC3** on

autophagosomes, structures involved in initiation of autophagy within a cell.^{21,22}

Piperlongumine activates **Beclin-1**, a gene that triggers formation of these autophagosome structures.²³

In an animal study, **Beclin-1**-dependent autophagy helped protect delicate mitochondria and helped inhibit inflammation to support cardiovascular health.²³

Dietary Methods

Another way people today are inducing autophagy is **intermittent fasting** also known as **time restricted eating**.

This usually involves fasting around 16 hours most days and eating in a window of about 8 hours.

During the fasting period, cells sense food scarcity and turn down **mTOR**, which then activates autophagy.

Summary

Autophagy declines with age. This means cellular “housekeeping and cleanup” slows down, which leads to accelerated aging and increased risk for **chronic disease**.

The nutrients **luteolin** and **piperlongumine** *activate* autophagy, which can help keep cells functioning youthfully for improved health and longevity. •

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

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Raymond
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Fisetin

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

In preclinical studies, fisetin:

- Mimics effects of **calorie reduction**²
- Targets longevity pathways²⁻⁶
- Extends lifespan of mice by about **10%**⁷
- Removes **senescent** cells through **senolytic** action⁷
- Suppresses excess **mTOR** activation⁸

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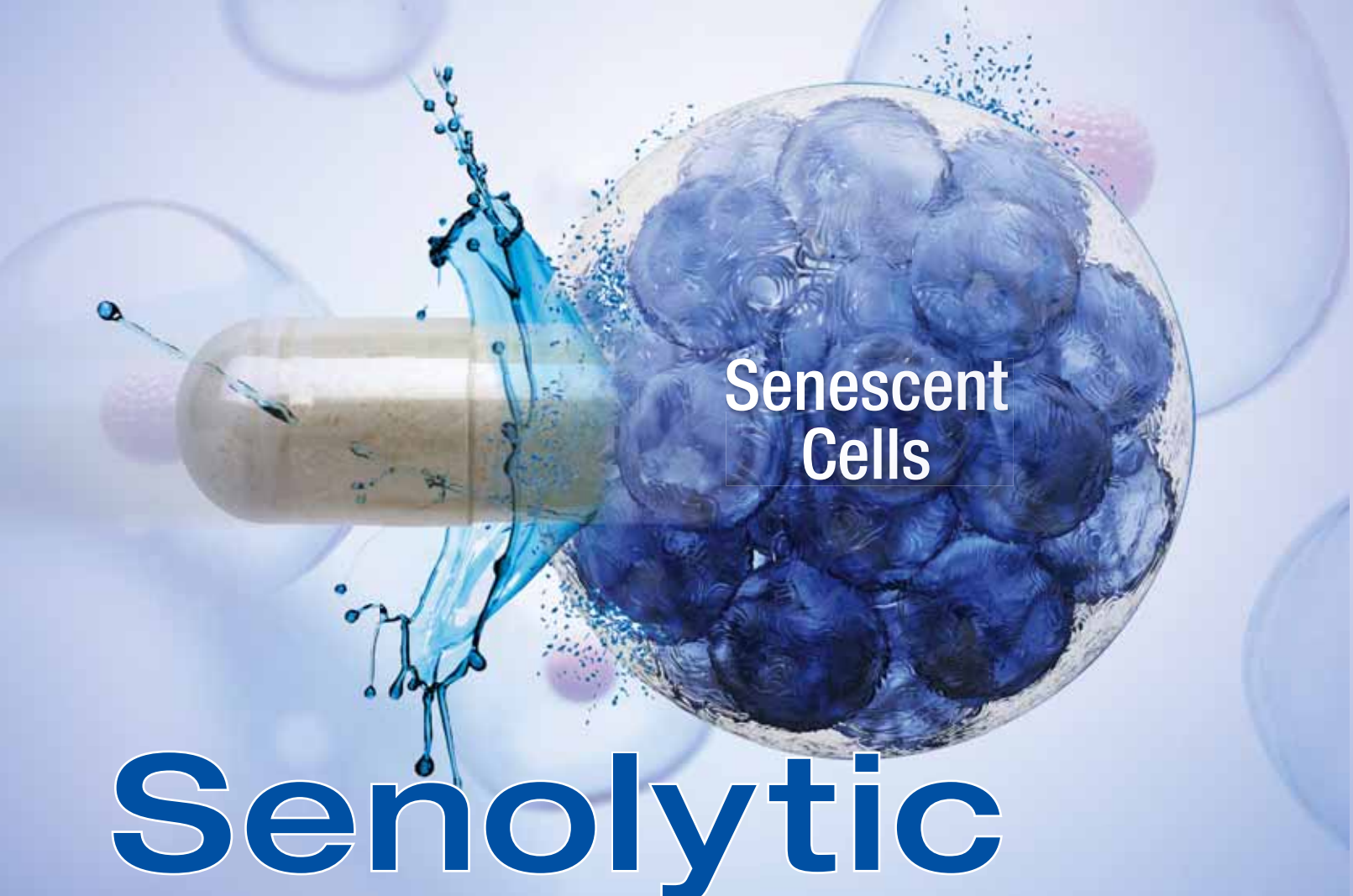
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Larry

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

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Selenium

BY LAURIE MATHENA



When researchers studied a population of people 90 years old and above, they found that the **OLDEST** inhabitants—*those over 100 years old*—all had something in common: They had the *highest* levels of the trace mineral **selenium**.¹

There's a reason selenium levels are connected to longevity. **Selenium** is *required* for the proper function of cellular **enzymes**.²

Past studies have shown that selenium-containing proteins provide defense against **DNA damage**,^{3,4} facilitate removal of **toxins** from the body,⁵ support **thyroid** function,⁶ and maintain **immune system** activity.^{7,8}

The science about selenium continues to stack up. Here, we report on recent selenium studies.

Benefits of Boosting Selenium Intake

Selenium, in combination with other **antioxidants**, helps **reduce risk of death**.⁹

In a meta-analysis of 43 studies, researchers found a decreased risk of **cardiovascular mortality** and **all-cause mortality** when selenium was included in antioxidant supplement mixtures. No association was seen when selenium was absent from the mix.

Protecting Against Radiation

Selenium reduces **side effects** of **radiotherapy**.¹⁰

After reviewing six studies, researchers found that selenium intake (**300-500 mcg/day** for 10 days to 6 months) reduced the side effects of radiotherapy without reducing effectiveness.

Researchers recommended that **cancer patients** who are deficient in selenium consider supplementation.

Risks Associated with Selenium Deficiency

Selenium deficiency poses danger to **heart failure** patients.¹¹

A study in the *European Journal of Heart Failure* found that selenium deficiency in patients with **heart failure** was associated with lower exercise tolerance and a **50% higher mortality rate**. Low selenium was also linked to impaired mitochondrial function in cell cultures of human heart muscle cells.



Selenium deficiency is associated with dangerously **low blood sugar**.¹²

A study of healthy adults found that serum selenium concentrations were strongly associated with glucose levels in people who were deficient in selenium.

Hypoglycemia (serum glucose **<50 mg/dL**) was observed in **19.2%** of individuals deficient in selenium, but in just **1.4%** of those with sufficient levels. This suggests that adequate selenium is important for maintaining healthy glucose levels.

Selenium deficiency induces **inflammation** in the **brain**.¹³ In a study of healthy pigs, a selenium-deficient diet activated a pathway that induced inflammation, which led to pathologic lesions in the brain.

Guard Against Selenium Deficiency

Selenium levels are *suboptimal* in many people in the industrialized world.¹⁴

While the mineral is found in foods such as Brazil nuts and pinto beans, the amount of selenium that can be obtained from diet is highly uneven. That's because the amount of natural selenium in the soil fluctuates from region to region.

Many areas of the U.S. have selenium-deficient soil.¹⁵

Consider using multiple forms of selenium—including Se-Methyl L-Selenocysteine, L-selenomethionine, and sodium selenite—to obtain comprehensive protection. •

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

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

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

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ACHIEVING *SUSTAINED*



VITAMIN C BLOOD LEVELS



BY MICHAEL DOWNEY

Vitamin C supports the **immune system** and other aspects of health.

The human body cannot produce vitamin C.¹

Daily intake is required to sustain vitamin C levels.

At doses above **200 mg**, however, **vitamin C** is only partially **absorbed** and rapidly meta-bolized by the body.²

By combining it with plant-based compounds, more **vitamin C** can be **absorbed** and **maintained**.

Consumers can achieve nearly **seven times** greater vitamin C **bioavailability** compared to an equivalent dose of regular (unformulated) **vitamin C**.³



Absorbing More Vitamin C

Studies show that **higher levels** of vitamin C enhance immune function and may help reduce cardiovascular risks.^{4,5}

At doses over **200 mg**, unformulated vitamin C is only *partially absorbed* and rapidly used by the body.

A new delivery system circumvents this problem. It elevates blood levels of vitamin C nearly **seven times more** than unformulated vitamin C—and it delivers higher levels **over an extended period**.³

This improved delivery of vitamin C was achieved by combining two different **plant-based** formulation methods. Both have been used in the past to enhance **bioavailability** (absorbability) of other nutrients.

- The first method involves **liposomes**. These are small structures made of plant-derived **phospholipids**, the same types of compounds making up cell membranes of all living cells. Encapsulating vitamin C in liposomes improves its **absorption** into the bloodstream.
- But liposomes themselves can degrade. The second method uses a compound known as a **hydrogel** to *protect* the liposomes. A hydrogel is comprised of fiber called **galactomannans**, derived from fenugreek seeds. It surrounds and shields the liposomes, allowing for **sustained absorption** of the vitamin C released in the intestines.

Together, these techniques enable *more* **vitamin C** to be absorbed over a *longer* period of time.

Sustained Vitamin C Blood Levels

When regular, *unformulated* vitamin C is taken, blood levels peak about **one hour** after ingestion and then rapidly drop back to baseline.

When **liposomal hydrogel vitamin C** is taken, blood levels continue to rise up to **four** hours after ingestion *and* reach a **much higher** level. Taking this formulation just once a day leads to high around-the-clock vitamin C levels in the blood.

A recently **published** clinical study measured blood plasma levels of vitamin C and found:³

Taking **400 mg** of vitamin C in the **liposomal hydrogel** formula increased average *overall* body exposure to vitamin C over a 12-hour period by close to **seven times** compared to the same dose of unformulated vitamin C.

At **12 hours** after ingestion, this **liposomal hydrogel** formula maintained **higher** blood levels than the same dose of regular, unformulated vitamin C.

Defense Against Infections

Maintaining high levels of vitamin C can help it achieve its benefits, which include helping to improve **cardiovascular health**, initiate **tissue-healing** processes,^{6,7} and reduce the risk, duration, and severity of the common cold.^{8,9}



Vitamin C's most important function may be helping the **immune system** to defend against **viral** and other **infections**.¹⁰

Vitamin C fights infection by:

- Helping **neutrophils**, a first line of immune defense, reach an infection. In a study of participants with inadequate vitamin C status, daily vitamin C intake led to a **20% increase** in neutrophil migration.¹¹ In another study, vitamin C intake (with vitamin E) enhanced neutrophils' ability to kill infectious agents.¹²
- Promoting the growth, maturation, antibody production, and survival of **lymphocytes**.¹³⁻¹⁶ Lymphocytes include B cells, T cells, and natural killer (NK) cells, all vital parts of the immune system's ability to recognize and attack foreign invaders.
- Providing **infection barrier support**. Vitamin C is required for the synthesis of **collagen**, a structural protein providing strength and durability to barrier tissues that prevent viruses, bacteria, and other infectious agents from entering the body in the first place.¹⁷

Liposomal hydrogel vitamin C makes it easier to achieve these and other health benefits.

Summary

Higher vitamin C levels can improve immune function and provide other benefits.

However, at doses greater than **200 mg**, unformulated vitamin C is partially absorbed and rapidly metabolized.

A **liposomal hydrogel** delivery system yields approximately **seven times** higher vitamin C plasma levels and maintains higher levels **all day long**. •

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



More Efficient, Longer-Lasting Vitamin C

- **Vitamin C** is critical for immune function, protection against infection, cardiovascular health, and more. It is not made by the body and must be taken orally.
- Doses above **200 mg** of *unformulated* vitamin C are only partially absorbed and metabolize quickly.
- A new **liposomal hydrogel** formula protects the vitamin C, allowing *more* of it to be absorbed over a *longer* period of time. This results in significantly *higher* blood levels of vitamin C that persist for **24 hours**.



The Importance of High-Dose Vitamin C

- Maintaining optimal levels of **vitamin C** throughout the day delivers wide-ranging benefits, including:
- **Immune support.** Immune cells need vitamin C for activation and proper function, including fighting infections, reducing risk, duration, and severity of colds, and reducing breathing difficulties associated with airway irritation and asthma.^{8,10-18}
- **Wound healing and tissue strengthening.** Vitamin C is required for the synthesis of **collagen**, which provides strength to connective tissues throughout the body (including skin, bones, and cartilage) and helps accelerate wound healing after injury.¹⁹⁻²¹
- **Cardiovascular protection.** Compared to those with the lowest levels, people with the *highest* blood levels of vitamin C may be **less likely to die** from all causes, cardiovascular disease and ischemic heart disease and have a **42% lower risk of stroke**.^{2,22-25}
- **Antioxidant activity.** Vitamin C can help prevent or reduce **oxidative damage**, a major contributor to aging and age-related disease.²⁶

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1. Akay Internal Study. Liposomal hydrogel vitamin C pharmacokinetics. Data on file. 2021.



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* *Int Angiol.* 2014 Feb;33(1):20-6.

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The Complete Salad Cookbook:

A Fresh Guide to 200+ Vibrant Dishes Using Greens, Vegetables, Grains, Proteins, and More



The *Complete Salad Cookbook*, from America's Test Kitchen, showcases the beauty and versatility of salads.

In addition to utilizing standard leafy greens and lettuce, the recipes in *The Complete Salad Cookbook* feature hearty ingredients such as farro and barley, beans and grilled vegetables, and salmon and scallops.

Many of the recipes contain purely vegetarian combinations that are built around vegetables, beans, and grains. Others pair greens and vegetables with proteins like chicken, salmon, and scallops.

In addition to its 200+ recipes, *The Complete Salad Cookbook* also provides techniques and tips for building your own salad combinations.

For example, in the chapter called "The Architecture of a Green Salad" you'll read tips on mixing and matching ingredients, flavors, and textures. And "The Salad Bar" chapter provides an assortment of dressings, toppings, and spice blends to liven up any salad.

The three recipes featured here show that salads can be just as satisfying as they are beautiful and deserve a spot as the centerpiece of your meal. Enjoy.

—LAURIE MATHENA

Salmon, Avocado, and Watercress Salad

SERVES 4

- 1 (2-pound) skin-on center-cut salmon fillet, 1 inch thick
- 1 teaspoon plus 3 tablespoons extra-virgin olive oil, divided
- 1 teaspoon table salt, divided
- ¼ teaspoon pepper
- 2 red grapefruits
- 1 tablespoon minced shallot
- 1 teaspoon white wine vinegar
- 1 teaspoon Dijon mustard
- 4 ounces (4 cups) watercress, torn into bite-size pieces
- 1 ripe avocado, halved, pitted, and sliced ¼ inch thick
- ¼ cup fresh mint or cilantro leaves, torn
- ¼ cup blanched hazelnuts or almonds, toasted and chopped

1. Adjust oven rack to lowest position, place aluminum foil-lined rimmed baking sheet on rack, and heat oven to 500 degrees.

2. Cut salmon crosswise into 4 fillets. Pat salmon dry with paper towels, rub with 1 teaspoon oil, and sprinkle with ½ teaspoon salt and pepper. Reduce oven temperature to 275 degrees. Carefully place salmon skin side down on prepared sheet. Roast until center is still translucent when checked with tip of paring knife and registers 125 degrees (for medium-rare), 6 to 8 minutes.



Let salmon cool completely, about 20 minutes. Using 2 forks, flake salmon into 2-inch pieces.

3. Cut away peel and pith from grapefruits. Holding fruit over bowl, use paring knife to slice between membranes to release segments. Measure out 2 tablespoons grapefruit juice and transfer to medium bowl.

4. Whisk shallot, vinegar, mustard, and remaining ½ teaspoon salt into grapefruit juice bowl. Whisking constantly, slowly drizzle in remaining 3 tablespoons oil until emulsified. Arrange watercress in even layer on serving platter. Arrange salmon pieces, grapefruit segments, and avocado on top of watercress. Drizzle dressing over top, then sprinkle with mint and hazelnuts. Serve.

Quinoa Taco Salad

SERVES 4 TO 6

- ¾ cup prewashed white quinoa
- 3 tablespoons extra-virgin olive oil, divided
- 1 small onion, chopped fine
- ½ teaspoon table salt, divided
- 2 teaspoons minced canned chipotle chile in adobe sauce
- 2 teaspoons tomato paste
- 1 teaspoon anchovy paste (optional)
- ½ teaspoon ground cumin
- 1 cup chicken or vegetable broth
- 2 tablespoons lime juice
- ¼ teaspoon pepper
- 1 head escarole (1 pound) or frisee, trimmed and sliced thin
- 2 scallions, sliced thin
- ½ cup chopped fresh cilantro or parsley, divided
- 1 (15-ounce) can black beans, rinsed
- 8 ounces cherry or grape tomatoes, quartered
- 1 ripe avocado, halved, pitted, and chopped
- 2 ounces queso fresco or feta cheese, crumbled (½ cup)

1. Toast quinoa in large saucepan over medium-high heat, stirring often, until fragrant and quinoa makes a continuous popping sound, 5 to 7 minutes; transfer to bowl.

2. Heat 1 tablespoon oil in now-empty saucepan over medium heat until shimmering. Add onion and ¼ teaspoon salt and cook until onion is softened and lightly browned, 5 to 7 minutes.

3. Stir in chipotle, tomato paste, anchovy paste, if using, and cumin and cook until fragrant, about 30 seconds. Stir in broth and quinoa, increase heat to medium-high, and bring to simmer. Cover; reduce heat to low; and simmer until quinoa is tender and liquid has been absorbed, 18 to 22 minutes, stirring halfway through cooking.

Let sit off heat, covered, for 10 minutes. Spread quinoa onto rimmed baking sheet and let cool completely, about 20 minutes.

4. Whisk lime juice, pepper, remaining 2 tablespoons oil, and remaining ½ teaspoon salt together in large bowl. Add escarole, scallions, and ¼ cup cilantro and toss to combine. Gently fold in beans, tomatoes, and avocado. Transfer to serving platter and top with quinoa, queso fresco, and remaining ¼ cup cilantro. Serve.



Arugula, Roasted Red Pepper, and White Bean Salad

SERVES 4 TO 6

1/3 cup red wine vinegar

1/4 cup extra-virgin olive oil

1/4 cup chopped fresh parsley or cilantro

2 tablespoons minced shallot

3/4 teaspoon table salt

1/2 teaspoon pepper

Recipe, roasted bell peppers, cut into 2 by 1/2 inch strips (recipe follows)

1 (15-oz) can small white or cannellini beans, rinsed

1/3 cup pitted olives, chopped coarse

5 ounces (5 cups) arugula or baby spinach

1. Whisk vinegar, oil, parsley, shallot, salt, and pepper together in large bowl. Add bell peppers, beans, and olives and stir gently until well coated. Let sit until flavors meld, about 15 minutes.

2. Set aside 1 1/2 cups bell pepper mixture. Add arugula to remaining bell pepper mixture and toss to combine. Transfer to serving platter and top with reserved bell pepper mixture. Serve.



Roasted Bell Peppers

MAKES 1½ CUPS

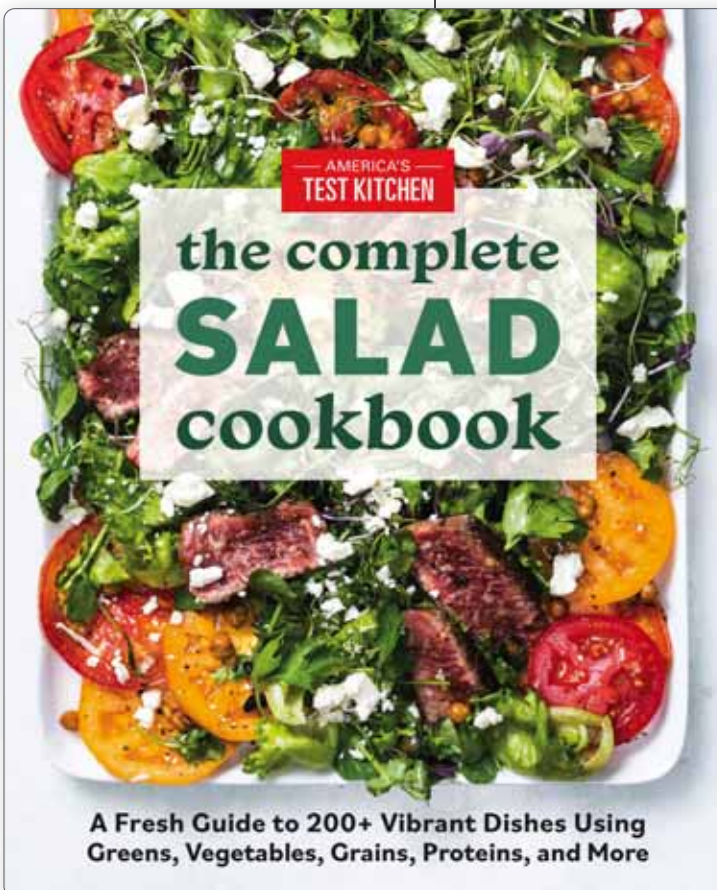
3 large bell peppers
(about 1½ pounds)

1. Line rimmed baking sheet with aluminum foil and spray with vegetable oil spray. Slice ½ inch from tops and bottoms of bell peppers. Gently remove stems from tops. Twist and pull out each core, using knife to loosen at edges if necessary. Cut slit down 1 side of each bell pepper.

2. Turn each bell pepper skin side down and gently press so it opens to create long strip. Slide knife along insides of bell peppers to remove remaining ribs and seeds.

3. Arrange bell pepper strips, tops, and bottoms skin side up on prepared sheet and flatten all pieces with your hand. Adjust oven rack 3 to 4 inches from broiler element and heat broiler. Broil until skin is puffed and most of the surface is well charred, 10 to 13 minutes, rotating sheet halfway through broiling.

4. Using tongs, pile bell peppers in center of foil. Gather foil over bell peppers and crimp to form pouch. Let steam for 10 minutes. Open foil packet and spread out bell peppers. When cool enough to handle, peel bell peppers and discard skins. (Bell peppers can be refrigerated for up to 3 days.)



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

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References

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

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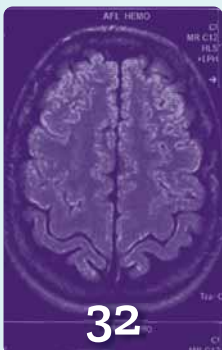
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22 FISH OIL AND HEART ATTACK

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32 REVERSE BRAIN AGING BY NINE YEARS

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42 LONGEVITY EFFECTS OF CURCUMIN

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51 ENHANCE CELLULAR HOUSEKEEPING

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