



LIFE EXTENSION®

The Science of a Healthier Life®

COLLECTOR'S EDITION 2021

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Dear Valued Customer,

For **41** years we've introduced novel methods to protect against **age-related** disorders.

Our publications are based on scientific studies that are often overlooked by mainstream medicine.

The ***Collector's Edition*** contains articles of particular importance we published the prior year.

We print this book to ensure you don't miss out on an important health-improving discovery.

The **Table of Contents** on the next page provides a quick preview of articles in this year's ***Collector's Edition***.

Thank you for your support that enables us to continue uncovering methods to combat degenerative aging.

For longer life,

A handwritten signature in black ink, appearing to read 'W Faloon', written in a cursive style.

William Faloon, Co-Founder
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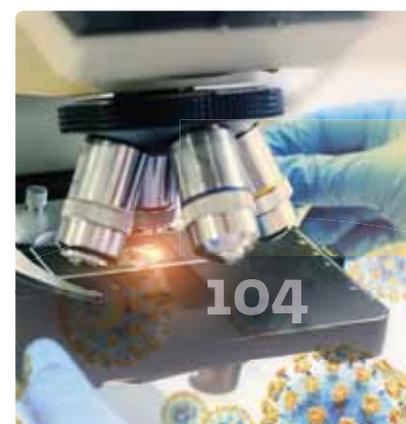
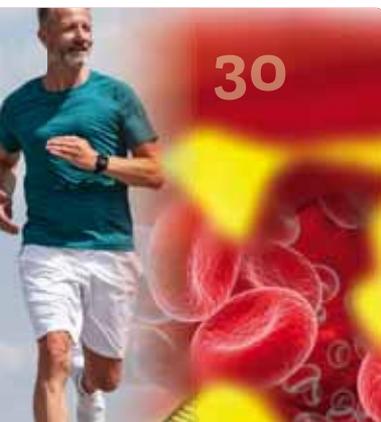
Oral intake of *clinically effective* doses of **collagen peptides** and **hyaluronic acid** restores skin hydration and elasticity, reducing eye wrinkle depth up to **20%**.

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BY WILLIAM FALOON

Improvement in Curcumin Bioavailability

Curcumin has the potential to transform medical practice.

Scientific studies reveal how curcumin **functions** to reduce risk for a range of **age-related** effects.¹⁻⁶

But curcumin is poorly **absorbed** into the bloodstream.⁷

In order to garner its benefits, better **forms** of **curcumin** are needed to enhance its **bio-availability**.

Improvements Began in the 1990s

Over the last three decades, different curcumin compounds were developed that are better **absorbed** compared to regular **curcumin**.

Before reaching the blood, **curcumin** undergoes changes in the **digestive tract** that decrease the amount of active **curcuminoids**. This deprives cells throughout the body of **optimal** effects.

A giant leap forward occurred with a new formulation of **curcumin** that protects against digestive changes.

Turmeric and Curcumin

Turmeric is a spice that has been used for thousands of years in South Asian cuisine.

Curcumin is the most biologically active compound in the turmeric plant.

Data about curcumin's benefits motivated researchers to find better ways to deliver more active "**free curcuminoids**" into the bloodstream.



In the **1990s**, this was accomplished by adding **piperine**, an extract that increased curcumin absorption by mildly irritating the stomach lining.

A decade or so later, this method was improved upon by adding turmeric oil to boost curcumin absorption about **seven-fold**.

A new patented **curcumin** has been developed that is better **protected** against changes in the intestines. It also **absorbs** far better than previous forms.

This enables more **free curcuminoids** to reach cells throughout the body.

Clinically Studied Improvements

To assess the efficacy of this novel **curcumin**, several clinical trials have measured its effects on age-related factors that shorten healthy lifespans.

Some highlights from **human** studies using this new curcumin include:^{5,6,8-11}

- Reduced fatigue, stress relief
- Improved quality-of-life scores
- Arterial protection
- Reduced homocysteine (**30% lower**)
- Increased HDL (**34% higher**)
- Improvement in liver enzymes (**30% lower**)
- Increased antioxidant enzymes (**25% higher**)
- Healthy inflammatory support (**27% lower CRP** and **15% lower IL-6**)
- **45.5-fold increase** in relative plasma bioavailability of free **curcuminoids**

What is the significance of these **improvements**? They represent potential **reversal** of several **aging biomarkers**.

These include reducing homocysteine, promoting arterial health, and improving inflammatory responses, along with increases in beneficial HDL cholesterol and quality-of-life scores.

These improvements correlate with published studies revealing curcumin’s potential to reduce the burden of **age-related** effects.

Delivering Curcumin to the Brain

Curcumin has demonstrated effects in preclinical and animal trials that have led scientists to speculate that it might help protect memory function¹²⁻¹⁸ in humans.

The challenge up until now has been to deliver adequate quantities of **curcuminoids** to brain cells. The **intestinal environment** alters curcumin’s composition in a way that reduces its **bioavailability**.^{7,8}

Even after **absorption** into the blood, curcumin then needs to cross the **blood-brain barrier** to provide neurological benefits.

In a **human** study published in **December 2020**,¹⁹ oral administration of this curcumin formulation was found to influence brain waves in a manner consistent with penetration through the blood-brain barrier.

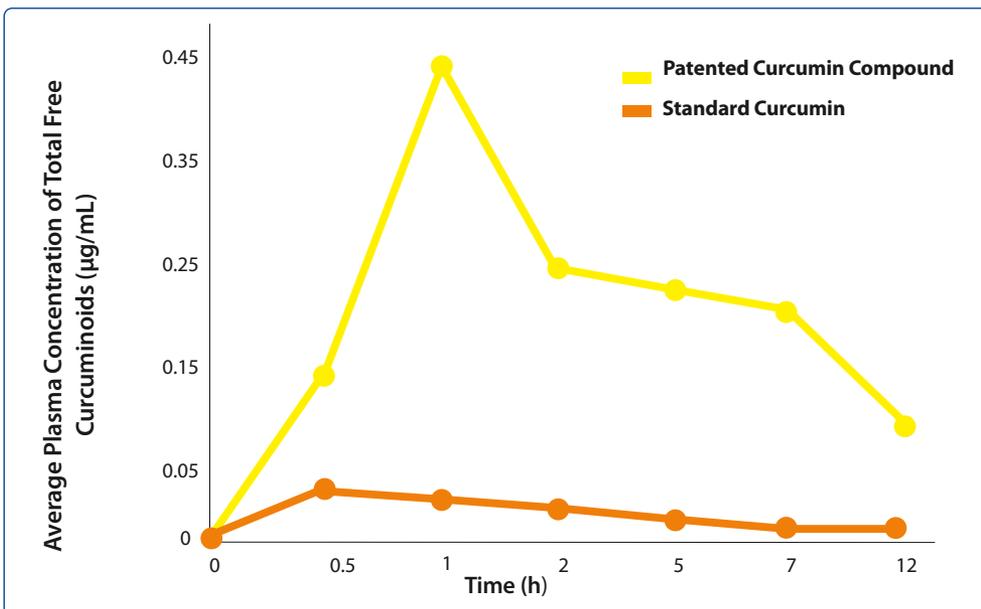
The scientists noted an improvement in audio and visual reaction times and working memory using this new patented **curcumin**. Unformulated curcumin did not appear to be effective.

Bioavailability of Free Curcuminoids

A novel form of curcumin has been shown to deliver the **highest** amounts of **free, active curcuminoids** to the bloodstream, and broadest **tissue penetration** including the brain, liver, kidney, heart, intestine, and spleen.²⁰

A randomized, double-blind, crossover trial of 50 healthy adults reveals the superior **bioavailability** of this patented curcumin compound, as depicted in the graph to the right.⁸

Reference: *J Funct Foods*. 2016;22:578-87.



- **45.5-fold increased total free curcuminoids** in plasma vs. standardized turmeric powder.
- More than **70%** of total plasma curcuminoids are in the active **free form** five hours after dosing.



These recent findings support research **Life Extension**® published 18 months ago revealing unique biological functions of this curcumin formulation.

Validating Tissue Penetration

To authenticate systemic **bioavailability**, an animal study measured **free curcuminoids** in heart, brain, kidney and other vital organs after supplementation with the new curcumin preparation.²⁰

This type of study would be impossible to conduct in people.

The findings reveal markedly **higher** tissue levels of **free curcuminoids** throughout the animal's body using this novel formulation, compared to regular curcumin.²⁰

The study also showed that **five hours** after ingestion, more than **70%** of **total plasma curcuminoids** were in the **active form** that can reach tissues.²⁰

To put this into **human** perspective, the graph on the previous page shows a **45.5-fold increase** in plasma **free curcuminoids** in people after ingesting this **new curcumin**.⁸

Both the human and animal data were obtained by comparing turmeric standardized to **95% curcuminoids**, with this **new** highly **bioavailable curcumin** compound.

Taken together, these findings suggest this new curcumin formulation delivers **systemic** benefits that were previously unattainable.

Lower Curcumin Prices

The good news for **consumers** is that this **patented** form of curcumin competes in a **free market**.

Instead of costing more, like new pharmaceuticals do, **Life Extension** supporters obtain this **improved** curcumin at a reduced price compared to previous curcumin formulas.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club

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

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Item #01945 • 60 vegetarian capsules

1 bottle \$9 • 4 bottles \$8 each

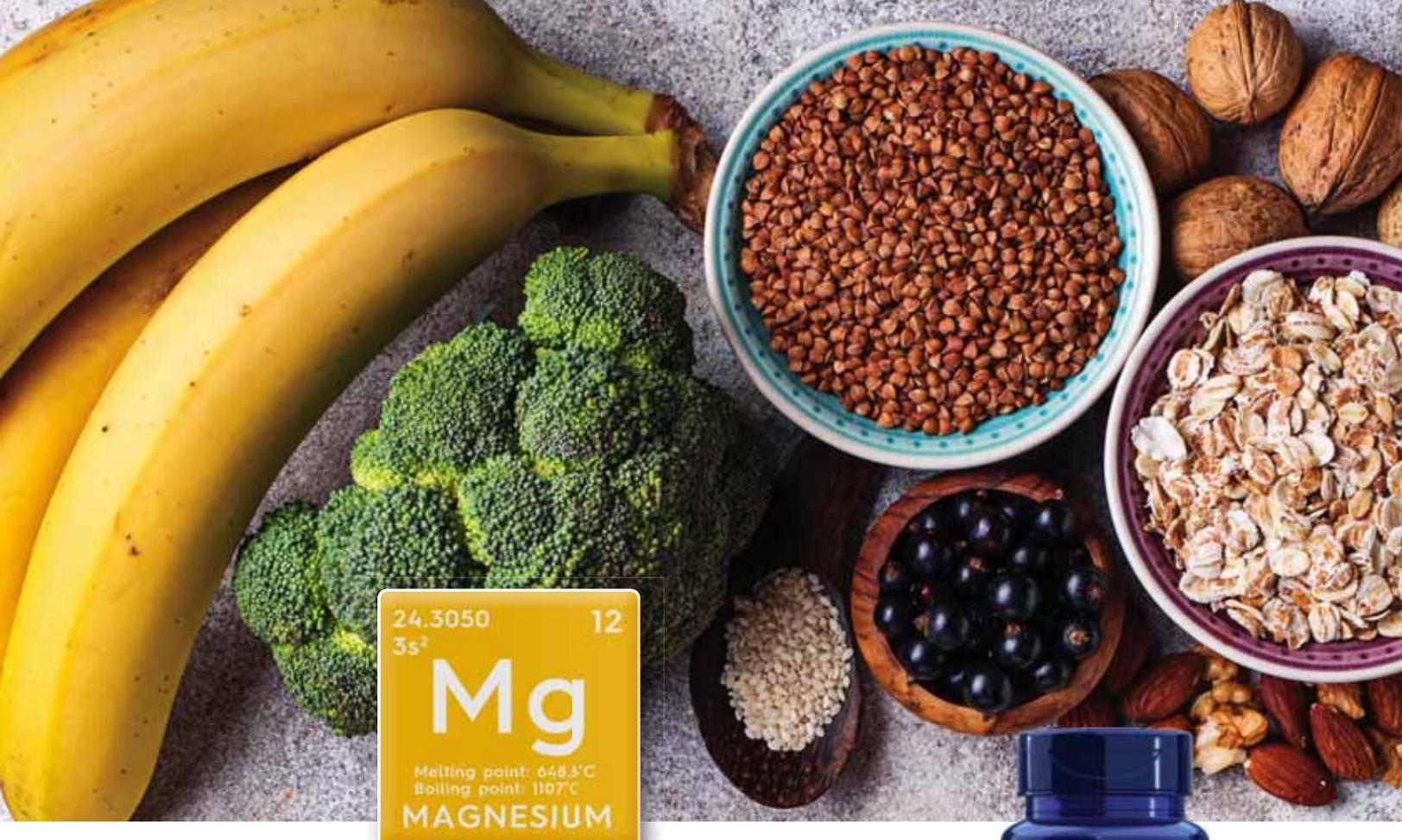


For full product description and to order **BioActive Complete B-Complex**, call **1-800-544-4440** or visit www.LifeExtension.com

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

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

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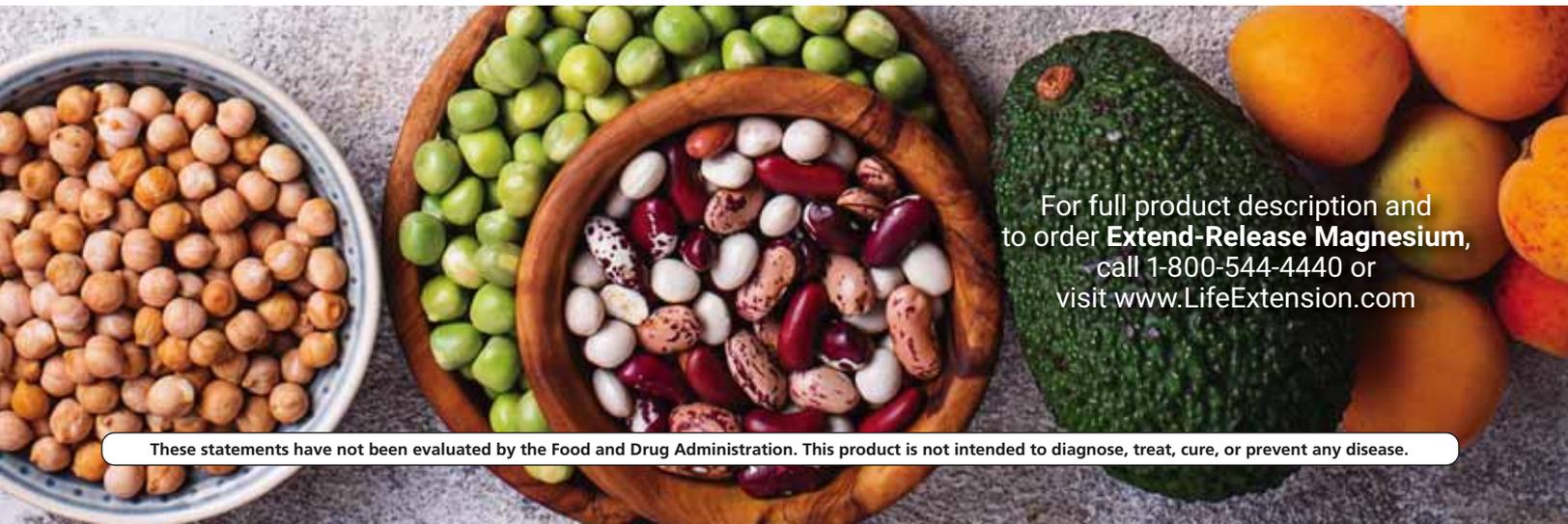
CAUTION: If taken in high doses, magnesium may have a laxative effect. If this occurs, divide dosing, reduce intake, or discontinue product.

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Item #02107 • 60 vegetarian capsules

1 bottle **\$9.75** • 4 bottles \$8.75 each



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Give the Old You a Helping Hand

Experience should build us up, not tear us down.

Life is a journey with bumps in the road. We move on wiser, prouder—but the marks remain. Marine oil contains compounds called specialized pro-resolving mediators. These “SPMs” support tissue rejuvenation, clear debris so healthy cells can flourish, and help maintain the balance between cytokine compounds that keep your body in harmony. Pro-Resolving Mediators. **Feel like you again.**

Item #02223 • 30 softgels

1 bottle **\$21** • 4 bottles \$19 each



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



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45 Times Greater Bioavailability Curcumin



Patented **turmeric extract** (500 mg) results in **45 times** greater bio-availability of free curcuminoids.

Item #02407

500 mg, 60 vegetarian capsules

1 bottle **\$24** • 4 bottles \$22 each



Same 500 mg potency patented **turmeric extract** with added benefits of ginger and other turmeric actives.

Item #02324

500 mg curcumin + gingerol, 30 softgels

1 bottle **\$20** • 4 bottles \$18 each



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

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Lithium

6.941

3

[HE]2s¹

Li

Melting point (°C): 180.54

Boiling point (°C): 1347



BY WILLIAM FALOON

Most years do not uncover a **nutrient** with so much longevity potential that it deserves a special award.

My enthusiasm about a nutrient that deserves a trophy extends beyond the scientific data. I also consider the consumer **affordability** factor.

Melatonin was my previous favorite. We introduced melatonin in **1992** and had a monopoly for a while. Yet we charged only **\$8** for a two-month supply.

This garnered us nationwide media coverage after the **New York Academy of Sciences** validated **melatonin's** ability to improve **immunity** and its **affordability** was recognized.

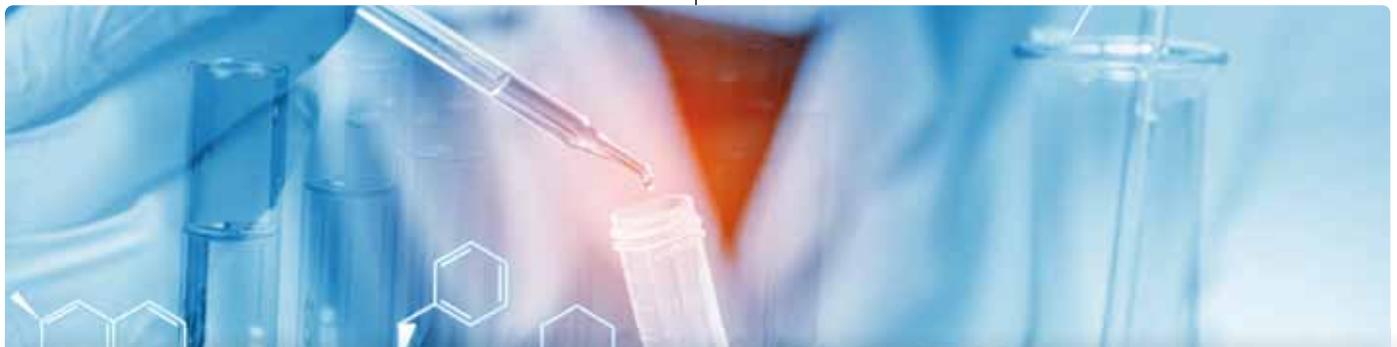
Accumulated data have uncovered a **nutrient** that costs less than melatonin and may provide **greater** overall benefits.

Prevent Cognitive Decline and Extend Longevity

In the **July 2020** issue of *Life Extension*® magazine, you read how **modest-dose lithium** may protect against **age-related** disorders and extend **healthy lifespan**.

This important information bears repeating. I therefore summarize here what **lithium** has been shown to do:¹⁻¹³

1. **Humans** in areas with *higher lithium* in drinking water **live longer**;
2. Long term, lithium may help maintain *longer telomeres*;
3. **Lithium** has been shown to regulate **genes** related to healthy **DNA structure**;
4. **Lithium** appears to slow the rate of **brain aging**;
5. People with *higher lithium* intake show **improved mood**;
6. **GSK-3** is an *enzyme* that plays a powerful role in regulating metabolism. *Dysfunctional GSK-3* activity raises the risk of many chronic diseases of older age including Alzheimer's, type II diabetes, mood disorders, cancer, and others. **Lithium** has been shown to inhibit overactivity of **GSK-3**;
7. By itself, **lithium** extended fruit fly lifespan by an average of **11%**; and
8. Combined with two other compounds, **lithium** extended fruit fly lifespan by an average of **48%**.



Rapamycin¹ + Senolytic² + Lithium³

= Fruit Fly Lifespan Extension by 48%

1. Rapamycin benefits can partially occur when AMPK is activated.
2. Health-conscious people today are utilizing senolytics.
3. Scientists are seeking optimal dose for human lifespan extension.

A triple drug combination targeting components of the nutrient-sensing network maximizes longevity.¹⁰



Combination Treatments are Essential

When fruit flies received **lithium**,
rapamycin, **senolytic**
separately and/or in combination:



- Each compound individually extended lifespan by 11%.
- Pairing two extended lifespan roughly 30%.
- Three combined extended lifespan by 48%.¹⁰

What I Discovered During Live Presentations

In my live presentations, I urge audiences to initiate supplementation with about **1,000 mcg** of **lithium** a day. The response from those in the audience who try, on the spot, to order it using their cell phones is that no one offers this lithium **dose**.

This motivated me to investigate. I was pleased to find that lithium's **low cost** makes it consumer friendly, analogous to **melatonin** in **1992**.

Its game-changing longevity potential, along with its affordability, causes me to nominate **LITHIUM** as the **2020 nutrient** of the year.

Those seeking the benefits discovered about **lithium** may want to add about **1,000 mcg** each day to their supplement program.

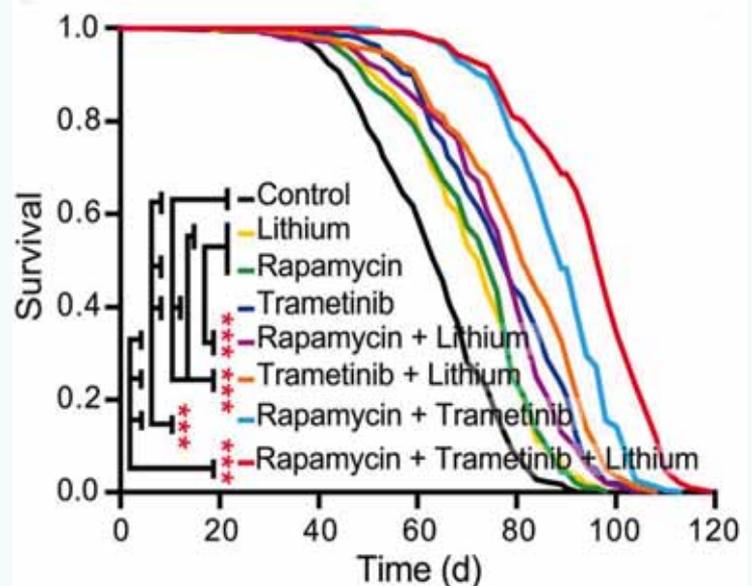
The three slides in this article are from Power Point presentations I give to live audiences, suggesting that they supplement with **lithium**, which up until now, no one seemed to offer in what may be an ideal potency. •

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

PNAS – September 30, 2019

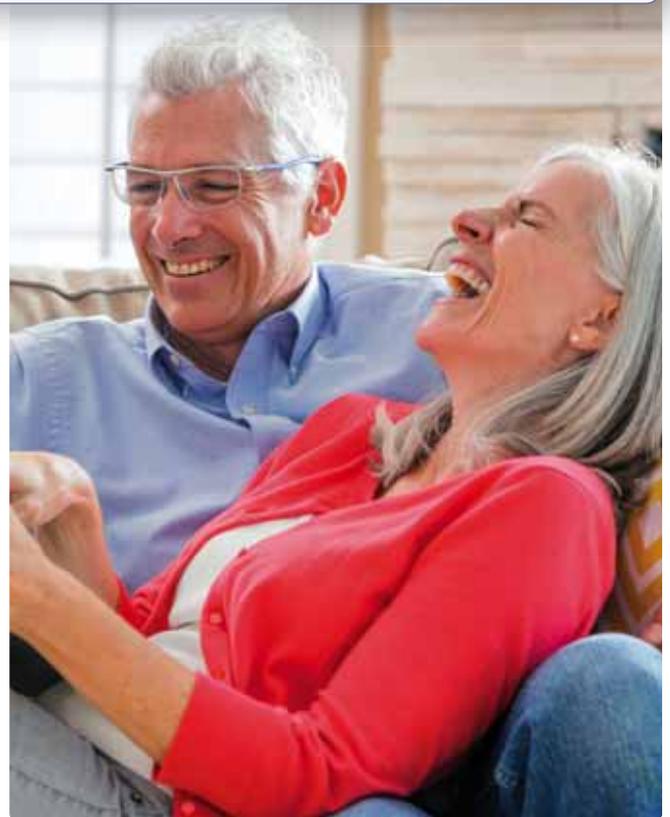
“Previous studies in fruit flies have achieved lifespan extensions of about 5-20% ...so we found it was quite remarkable that this drug combination enabled them to live 48% longer.”

Combined Interventions Are More Effective than Single Agent Therapy¹⁰



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PQQ

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

Studies show **PQQ** supports heart health and cognitive function, complementing CoQ10.^{6,7}

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

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

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



Item #01647 • 30 vegetarian capsules
1 bottle **\$24** • 4 bottles \$18 each



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

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

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.

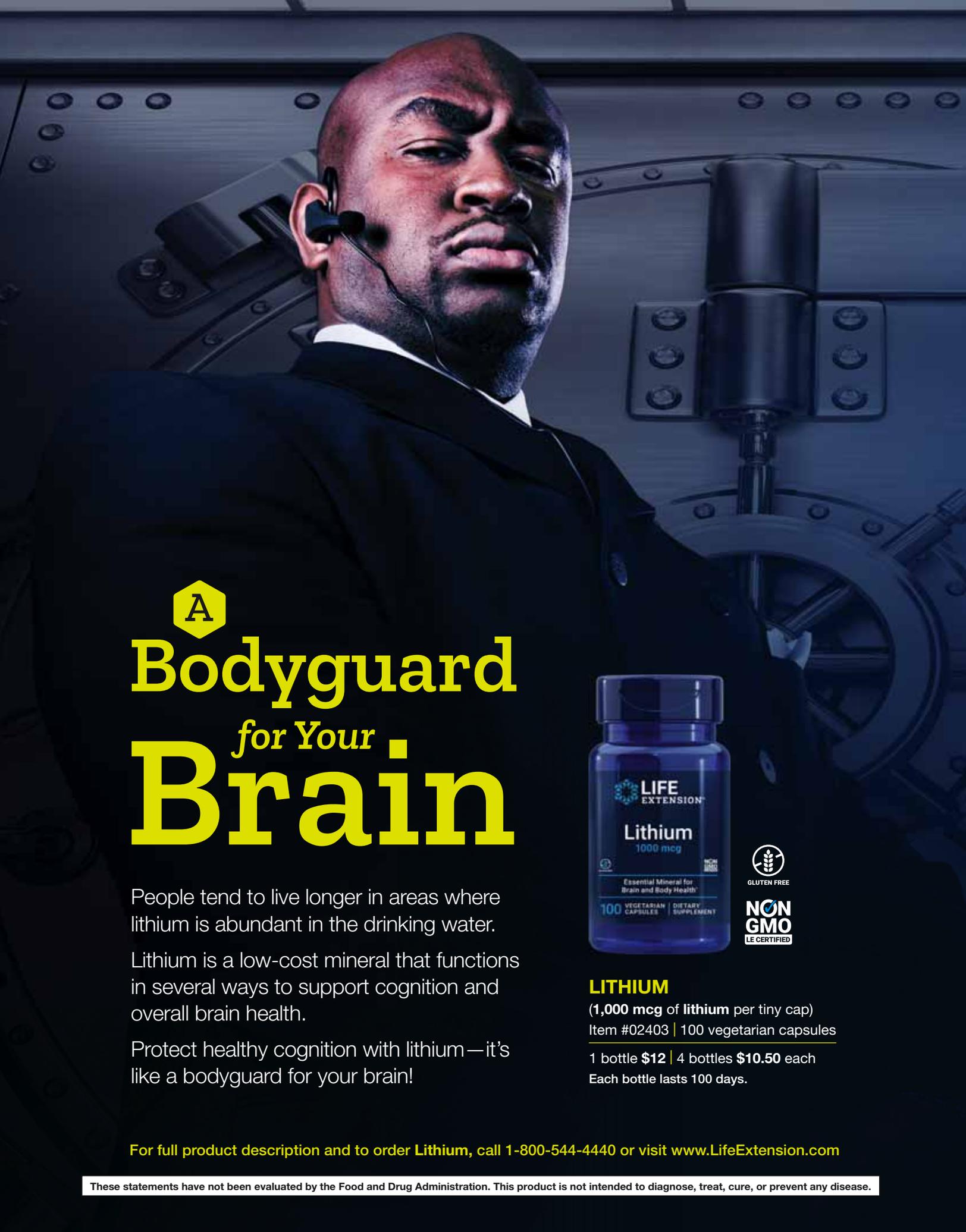
Enhanced Super Digestive Enzymes combines 10 vegetarian-friendly enzymes to help you break down hard-to-digest foods and encourage a healthy gastrointestinal balance...so you can feel good after you eat!

Item #02021 • 60 vegetarian capsules

1 bottle **\$16.50** • 2 bottles \$15.75 each

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Brain

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GLUTEN FREE



LITHIUM

(1,000 mcg of lithium per tiny cap)

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Each bottle lasts 100 days.

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Taurine

Boosts Brain Cell
Regeneration &
Supports
Whole-Body Health



Item #01827 • 90 vegetarian capsules

1 bottle **\$9.75**

4 bottles \$9 each

Research has found that taurine can promote **new cell formation** in the area of the brain associated with **learning and memory**.

Taurine also enhances **neurites**, tiny projections that help brain cells communicate with each other.



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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.

Are We Finally Reaching Consensus About Fish Oil?

Consumer access to fish oil has more to do with federal court rulings than findings from human studies

WILLIAM FALOON

In **2019**, the **FDA** sought the advice of an expert panel to review new data about a **fish oil** drug.

By a vote of **16-0**, the panel recommended that the **FDA** allow broader claims about its ability to reduce **cardiovascular** risks.

In **December 2019**, the **FDA** acted on this recommendation by expanding the “approved use” of this **fish oil** drug to reducing risk of **heart attack, stroke, and death**, in high-risk patients.¹

This decision was largely based on a study published in the **New England Journal of Medicine** showing remarkable benefits in people taking *high* doses of a **fish oil drug** that consisted of the **EPA** omega-3 fraction.²

Compared with placebo, there was a **25% reduction** in a composite of cardiovascular death, nonfatal myocardial infarction, nonfatal stroke, coronary stents/bypass surgeries, or unstable angina in the **fish oil** drug group.

The study observed several other benefits including:²

- Cardiovascular death reduced by **20%**
- Fatal or nonfatal heart attacks reduced by **31%**
- Fatal or nonfatal stroke reduced by **28%**
- Urgent or emergency coronary revascularization reduced by **35%**
- Hospitalization for unstable angina reduced by **32%**

This **fish oil** is marketed to doctors as a **drug** that lowers **triglycerides** without raising **LDL** cholesterol.³

To the physician, this may sound appealing compared to a competitor fish oil drug that contains both **EPA and DHA**.

What troubles us, however, is that patients taking the **EPA-only** fish oil drug (Vascepa®) are unlikely to take other fish oil supplements.

This ignores the critical role of the **DHA** component of the **omega-3** family on life-sustaining processes, especially **brain** and **eye** health.

The estimated out-of-pocket cost, assuming no insurance coverage, is over **\$300** a month for this **EPA-only** fish oil drug. This is about **seven times higher** than what a comparable amount of **EPA+DHA** can be obtained for when using **dietary supplements**.

This editorial describes **legal battles** that took place over decades regarding **fish oil**, and introduces new data that corroborate the benefits of consuming **higher** omega-3 potencies.⁴



Many of you may take for granted your ability to purchase affordable **fish oil** supplements, but it was not always this way.

On **February 26, 1987**, the **FDA** conducted an armed raid against **Life Extension®**.⁵

The **FDA** seized our **fish oil** and brochures describing fish oil's potential to reduce cardiovascular risk.

We fought a multi-year legal battle that resulted in the government dismissing all charges against **Life Extension®**, marking the first time in the FDA's 88-year history that it has been forced to give up on a criminal prosecution.

Seven years later, Congress passed legislation that allowed consumers to access a variety of affordable dietary supplements.⁶

This helped curb the FDA's appetite for overly aggressive and frankly police-state-like enforcement actions. The FDA nonetheless continued to **censor** lifesaving data about **fish oil** and other healthy foods (such as walnuts and cherries).^{7,8}

This prompted another lawsuit filed in **1994** by Durk Pearson and

Sandy Shaw that sought to force the FDA to allow the following health claim on fish oil supplement labels:⁹

“Consumption of omega-3 fatty acids may reduce the risk of coronary heart disease.”

The FDA rejected this one-sentence claim, and multi-year litigation ensued based on scientific and constitutional grounds.

The **FDA** contended this health claim was not adequately backed by scientific studies and that the agency had the legal authority to ban these kinds of health claims.

After seven years of extensive litigation, the FDA capitulated and said it would permit the following claim:⁹

“Consumption of omega-3 fatty acids may reduce the risk of coronary heart disease. FDA evaluated the data and determined that although there is scientific evidence supporting the claim, the evidence is not conclusive.”

Challenging FDA's Restricted Health Claim

The FDA's compromise claim that the evidence was **“not conclusive”** did not satisfy us. We viewed the scientific literature back then as providing evidence that consuming fish or fish oil could lower **heart attack risk**—the nation's leading killer.

Life Extension® and **Wellness Lifestyles, Inc.** filed a health-claim petition against the FDA on June 23, 2003. The petition urged the FDA to allow the following revised claim:

“Consumption of omega-3 fatty acids may reduce the risk of coronary heart disease.”

To substantiate this position, a document enumerating the **scientific studies** backing the benefits of **omega-3** fatty acids was filed, along with arguments supporting the **constitutional** right to disseminate truthful, non-misleading information.

Everything I am describing has to do with what “words” the **FDA** allows to be on a fish oil label.





FDA Partially Capitulates

On September 8, 2004, the FDA decided to allow an expanded health claim on products containing the omega-3 fatty acids **EPA** and **DHA** as follows:

“Supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.”¹⁰

The **FDA** went on to recommend that consumers not exceed more than **3,000 mg** per day of EPA and DHA omega-3 fatty acids, with no more than **2,000 mg** per day derived from **dietary supplements**.¹¹

Life Extension[®] argued that many studies show that **higher** amounts of **EPA** and **DHA** are often needed to obtain benefits, such as reduction of **triglycerides**.^{12,13}

Our position continues to be vindicated in studies showing benefits when **higher** potencies of **omega-3s** are consumed.

FDA Suffers Major Defeat in Federal Court

The FDA strictly **regulates** what drug makers are permitted to say about their products. Until recently, what could be said was limited to what the FDA allowed.

A major victory over **FDA** censorship occurred when a maker of prescription-drug **fish oil** sued the **FDA** to make a health claim about fish oil’s potential to reduce **cardio-vascular disease** risk.¹⁴

The FDA insisted it was **illegal** for the maker of this **fish oil drug** to state a **coronary disease** prevention claim until the FDA said so.

After years of costly litigation and thousands of pages of documents produced, a **federal court** ruled that a qualified health claim could be made for a **fish oil drug** called Vascepa[®].

The court based this **2015** ruling on the facts that:

- The claim is truthful and non-misleading.
- FDA accepted this phrasing elsewhere in its regulatory labyrinth.

- The First Amendment to the U.S. Constitution allows it.

Here is the revised claim the federal court ruled could be made to doctors about this fish oil drug in **2015**:¹⁴

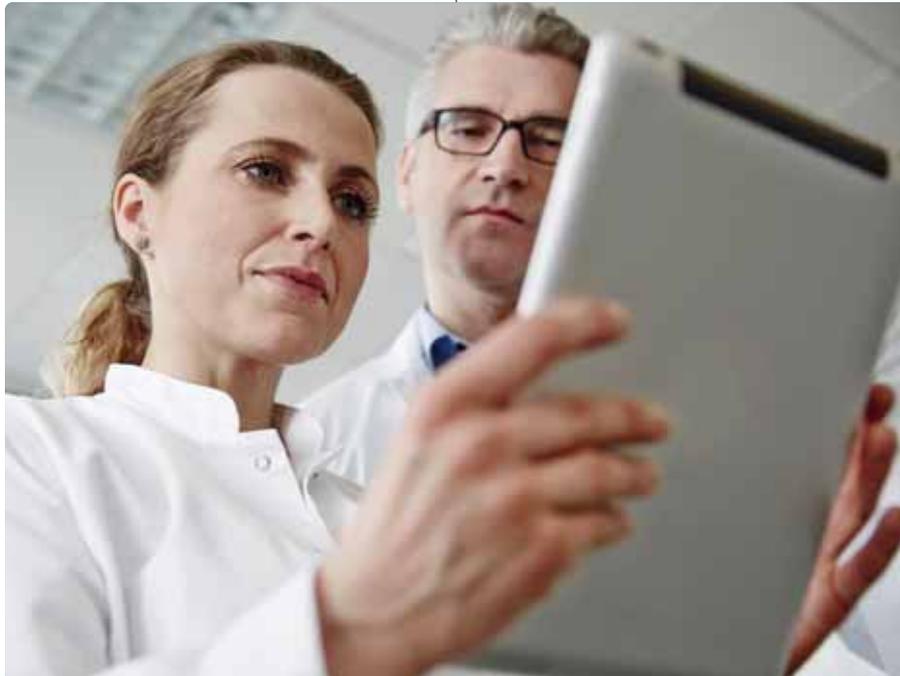
“Supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease. Vascepa[®] should not be taken in place of a healthy diet and lifestyle or statin therapy.”

After years of protracted disagreement that led to full-blown litigation, the above statement is the primary outcome of this legal victory over **FDA censorship**.

In the ruling, the judge quoted from prior cases that:

“Securing First Amendment rights is in the public interest” and “the government does not have an interest’ in the unconstitutional enforcement of a law.”¹⁴





Battling the Medical Mainstream

The **fish oil** controversy did not end with the **FDA**.

Defenders of conventional medicine like the **American Medical Association** and **American Heart Association** issued contradictory proclamations about fish oil's benefits or purported lack thereof.^{15,16}

The back-and-forth was based largely on studies with huge **variations** in **EPA/DHA** potencies and/or unrealistic expectations of fish oil monotherapy.

Studies using **higher** omega-3 doses generally demonstrated fish oil's efficacy, whereas **lower**-dose studies were often disappointing and resulted in mainstream medicine questioning fish oil's value.

The media parroted conventional medicine's vacillating positions, running tabloid-like headlines touting fish oil's cardio-protective benefits or attacking it as worthless, depending on the study released that day.

There were some contradictions, such as a study showing

low-dose fish oil (**1,000 mg** a day of **EPA/DHA**) markedly reducing **fatal heart attack** risk while other studies showed little value using this **low** dose.^{17,18}

Overlooked in much of this were **dietary patterns** in countries that had **higher** omega-3 intake in foods, and thereby needed *less* supplemental fish oil. These population groups might have benefited from a **low-dose** EPA/DHA supplement whereas dietary **omega-3** consumption in much of the **United States** is woefully **insufficient**.

The **American Heart Association** confused matters more in **2017** by recommending **fish oil to heart failure** patients, but not to the general population.¹⁹ This ignores the importance of heart attack **prevention**.

Life Extension[®] published a rebuttal in **February 2018** titled "**An Illogical Position of the American Medical Association**" to describe the absurdity of recommending people wait to develop **heart failure** before ensuring optimal **omega-3** intake.²⁰

Is a Consensus Being Reached?

Results from recent, large studies continue to validate the need for **higher-dose omega-3** intake.

As mentioned in the introduction of this article, and in the **November 2019** edition of **Life Extension**[®] magazine, robust benefits were found when a high dose (**4,000 mg/day**) of an **EPA-only** fish oil drug (Vascepa[®]) was used. The study found a **25% reduction** across a broad spectrum of **cardiovascular** disorders.²

In this same issue, we described why **1,000 mg** a day of an **EPA/DHA** supplement (and only **2,000 IU/day** of **vitamin D**) failed in its primary endpoint, but did yield meaningful risk reduction in several subgroups including:^{17,21}

- **25% reduction** in **cancer deaths** in the **vitamin D** group when the first two years of follow-up were excluded,
- **28% reduction** in **heart attack risk**, and **50%** reduction in fatal heart attack risk, in the **fish oil** group, and
- **22% reduction** in **angioplasty** procedures (opening a narrowed coronary blood vessel, often with a stent) in the **fish oil** group.

At the **American Heart Association** annual meeting in **November 2019**, a presentation on a study that administered about **3,300 mg** of an **EPA/DHA** fish oil drug called Lovaza[®] revealed striking improvements in **cognitive functions** in older individuals.²²

What made this study compelling is that **blood levels of EPA/DHA** were carefully **measured**. The **cognitive benefits** occurred in those with an **omega-3 index over 4%**. Here is the conclusion from this presentation made at the **American Heart Association** meeting:²²

“High dose EPA and DHA prevented cognitive decline in cognitively healthy coronary artery disease subjects, with younger subjects, nondiabetic subjects, and those achieving an omega-3 fatty acid index $\geq 4\%$ having greatest benefit. These findings are especially important for coronary artery disease patients as coronary artery disease is a risk factor for dementia.”

What I continue to observe in the published data is **consensus** that **higher-dose omega-3** intake is what enables meaningful risk-reduction benefits.

Overlooked Role of Dietary Omega-3s

No one argues with the idea that eating two to three **cold-water fish meals** a week reduces cardiovascular and other disease risks. This is nearly universally agreed upon and accepted, including in the medical profession and among researchers.

Yet missing from virtually all research on **fish oil supplements** is each study subject's **dietary intake of EPA/DHA-rich foods**.

To put this into perspective, a 4-ounce can of **wild salmon** contains about **2,000 mg** of total **omega-3s** providing about **1,800 mg** of **EPA/DHA**.

So, a clinical trial using only **1,000 mg** of supplemental **EPA/DHA** in people who regularly consume canned **wild salmon** might yield benefits because the total daily consumption of **EPA+DHA** is around **2,800 mg**.

On the flip side, individuals consuming typical Western **dietary patterns** that are nearly devoid of

omega-3s may require far **higher** amounts of supplemental **EPA/DHA (3,300 mg to 4,000 mg)** to achieve the same results.

The significance of these differences cannot be overstated, both from a public health standpoint and on huge **savings** on fish oil drugs and supplements.

People whose diets *already* provide ample quantities of **EPA/DHA** will likely require lower potencies of fish oil drugs or supplements.

Yet a **one-size-fits-all** approach is the current protocol. The FDA now allows certain high-risk patients to be prescribed a **4,000 mg/day** potency of an expensive EPA-only **drug**—but advises against the same potencies of lower-cost **fish oil supplements!**

How This Impacts You

The importance of achieving optimal **EPA/DHA** status is substantial. It impacts a person's risk of multitudes of disorders, many that are life threatening.



Your blood ratio of **omega-3 fats** to **omega-6 fats**—which can be measured with the **omega-3 index** blood test—is an important determinant of overall health status.

The good news is that pricing keeps dropping for the **omega-3 index** comprehensive fatty acid blood panel.

Results from this test can enable you to precisely determine how many **fish oil capsules** you need a day to achieve an optimal **omega-3 index**, which by most standards is over **8%**.

The study presented at the 2019 **American Heart Association** conference found meaningful **cognitive benefits** when omega-3-index scores were over **4%**.

I'll describe soon how you can obtain low-cost **omega-3/omega-6** blood tests that might enable you to reduce the number of fish oil capsules you take a day, saving you money over the long term.

Life Extension's Position on Fish Oil Dosing

For many decades, we've suggested most of our readers supplement with about **2,400 mg** of **EPA + DHA** each day from highly purified **fish oil**.

We know most of you consume **omega-3s** in your **diet** by eating cold-water **fish** meals and/or via **plant** sources like walnuts, flax, and other foods.

So, our typical reader may, on average, obtain over **3,000 mg-4,000 mg** each day of **EPA/DHA** from their **fish oil** supplement plus omega-3-rich dietary components.

We caution, however, that not all people, and perhaps very few, convert plant-based omega-3s to EPA/DHA. This is what makes **fish oil** so important but presents a dilemma for vegans.

People with stubbornly high **triglyceride** levels are advised to increase their fish oil intake to

target a triglyceride **blood level** below **100 mg/dL**.

Based on published studies showing benefits with **higher** intake of **EPA/DHA**, more doctors are prescribing expensive **fish oil drugs**, often without considering an individual patient's **dietary** intake of the omega-3s.

Common-Sense Approaches

Supplementation with quality **fish oil** can cost about **\$300** a year whereas fish oil **drugs** can cost over **\$3,600** a year.

The **Omega-3 Index Complete** blood test includes the following measures:

- Omega-3 Index Percent (it should ideally be over **8%**)
- Trans Fat Index
- Omega-6: Omega-3 ratio
- Arachidonic acid: EPA ratio
- Full fatty acid profile

Results from this blood test provide a guideline for dietary changes and fish oil supplementation for each person's individual biochemistry.

Those who obtain few dietary omega-3s in their diet may want to boost their supplemental fish oil intake over **3,000 mg** a day, whereas those who eat **lots** of cold-water fish may reduce their supplemental dose below **2,400 mg** a day.

While these common-sense approaches are obvious to me and **Life Extension's** scientific staff, many hurried physicians are likely to stick with the labeled high doses of FDA-approved fish oil drugs, i.e. the *one-size-fits-all* approach.



ARE YOU TAKING ENOUGH FISH OIL?

- With a simple finger-stick test, you can determine if your **omega-3** intake is sufficient.
- This test reveals your **omega-6 to omega-3** ratio, often a cause of **inflammation** when out of balance.
- It provides an **Omega-3 Score** that you want target in the range of **8%-12%**.
- Plus, it alerts you to the presence of harmful trans fats and provides a full fatty acid profile.

OMEGA-3 INDEX COMPLETE (LC100066) \$74.25 (Sale Price)**

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***This test is packaged as an at-home kit.*

Too Many Needless Heart Attacks

Growing consensus about **fish oil**, along with the new claims allowed by the FDA, will help enable more Americans to benefit from *higher* consumption of omega-3 fatty acids.

The tragedy is that it took so long for the benefits of omega-3s to be widely recognized.

Cardiovascular disease remains the leading cause of disability and death in the United States, especially in elderly population groups.

Armed raids by the **FDA** against those who recognized fish oil's benefits in the **1980s** resulted in countless numbers of cardiovascular events and astronomical medical costs for bypass procedures, stents and prescription drugs.

We look forward to science prevailing over the kinds of actions one might expect in an authoritarian, police state.

The box at the top of this page describes how you can obtain an **omega-3 index** at the lowest price of the year.

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|--|------------------|
| Vitamin K1 (converts to K2 in some people) | 1,500 mcg |
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| Vitamin K2 (MK-7) (long-acting protection) | 100 mcg |

SUPER K ELITE

Super K Elite provides 2 additional forms of vitamin K and even **higher** potencies of K1, MK4, and MK7. **Super K Elite** costs **60 cents** a day and provides in one capsule:

| | |
|--|------------------|
| Vitamin K1 (converts to K2 in some people) | 2,000 mcg |
| Vitamin K2 (MK-4) (for bone & vascular health) | 1,500 mcg |
| Vitamin K2 (MK-7) (long-acting protection) | 181 mcg |
| Vitamin K2 (MK-9) (added cardiovascular support) | 43 mcg |
| Vitamin K2 (MK-6) (added cardiovascular support) | 11 mcg |

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Japanese physicians use **high-dose vitamin K2** for those with challenges in maintaining healthy bone density. **Mega Vitamin K2** costs **95 cents** a day and provides in one daily capsule:

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|--|-------------------|
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|--|-------------------|



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SUPER K ELITE Item #02335 • 30 softgels
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MEGA VITAMIN K2 Item #02417 • 30 capsules
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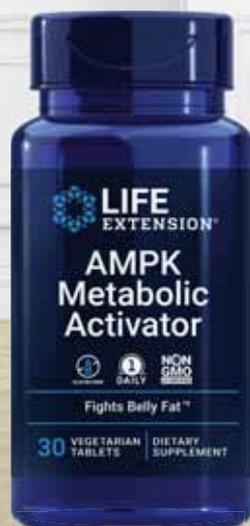
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Cardiologist Observes Improved Patient Outcomes & Reversal of **Calcification** and **Atherosclerosis**



JOEL KAHN, MD

I have devoted my career as a cardiologist to finding ways to treat **atherosclerosis**—the buildup of **plaque** in artery walls.

I've relied primarily on healthy lifestyle changes, diet, and supplements.

A few years ago, a **human** study found that a combination of two **plant extracts** significantly reduced **arterial plaque** in the carotid arteries when added to diet, exercise, and healthy lifestyle counseling.¹

I have recommended these plant extracts to thousands of patients and have seen the favorable results firsthand.

Larger studies provide new evidence that arterial **calcification** and blockages are reversible.



My Clinical Practice

I spent seven years after medical school completing my training in **interventional cardiology** or using catheters to treat heart disease.

Much of my practice involved inserting **stents** to prop open **coronary arteries** that were occluded with **atherosclerotic** plaque.

But three weeks into my first job, I decided there was a better, more comprehensive approach.

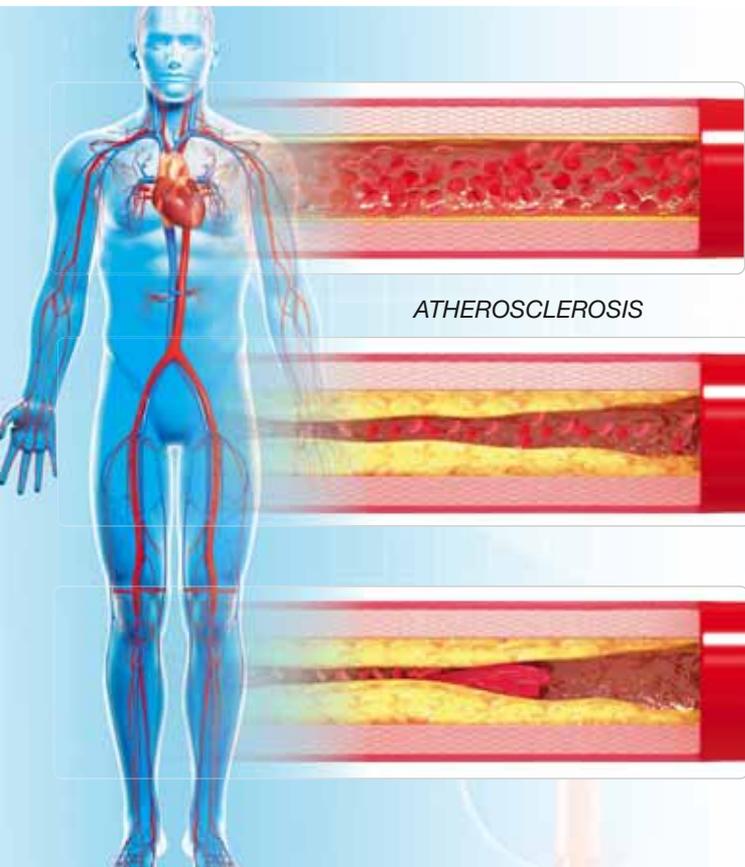
At that time, I read a study in a respected medical journal focusing on **atherosclerosis**, which often leads to heart attacks and strokes.

The study reported that atherosclerosis had been reversed using lifestyle and diet changes.²

Since then, I've combined **interventional cardiology** with a search for lifestyle and supplement-based methods to stabilize and reverse plaque buildup.

I was particularly impressed by a published study that reported on a combination of extracts of **French maritime pine bark** and an herbal extract called **Centella asiatica**.

When added to standard diet, exercise, and lifestyle counseling, these two **plant extracts** improved plaque stability and reduced size and numbers of **arterial plaques**.¹



The study involved 50 patients with plaque in the **carotid arteries**, which supply blood to the brain, neck, and face. These patients had no history of cardiovascular events, and did not have diabetes or metabolic problems.¹

Over the three-month study period, **pine bark + Centella asiatica** extracts reduced **carotid artery plaque** and lowered the **number of plaques** compared to a control group.

After these scientific findings were published, this **pine bark-Centella** extract combination became a routine part of my atherosclerosis reversal program.

The Evidence Mounts

I grew more convinced of the effectiveness of this plant combination when a larger, longer-term study was published in **2017**.³

This time, 391 subjects were followed for **four years**.

All had asymptomatic atherosclerosis of either the **carotid artery** or the **femoral artery** (which provides blood to the leg). Atherosclerotic lesions extended **50%-60%** into the arteries in at least one location.

Three treatment groups were formed. One was treated with extract of **pine bark** alone, another was treated with **pine bark** and **Centella asiatica**, and a third control group received no extracts. All groups received standard diet, exercise, and lifestyle counseling.

The rate of plaque progression, measured by ultrasound, was significantly lower in both treatment groups than in the control group. The group that took the combination of the two extracts had the greatest reduction in progression of plaque thickness and length.

The extracts also had a favorable impact on cardiovascular outcomes as follows:

- The occurrence of **angina**, chest pain caused by reduced blood flow to the heart, was less than **3%** in the two **extract** groups, compared with **6.25%** in control patients.
- The rate of **heart attacks** was significantly lower for the combination therapy.
- Events requiring **hospital admission** occurred in **16.4%** of control subjects, **8.9%** of subjects using only French maritime **pine bark** extract, and **just 3.3%** of patients using the combination of **pine bark** and **Centella extracts**.

Pine Bark - *Centella* Extracts in Practice

I have used this combination with countless patients in my clinic who have plaques clogging their carotid arteries.

I use the **carotid intima-media thickness** (ultrasound) test to identify and track carotid plaque status.

This test measures the thickness of the inner layers of the carotid artery, the **intima** and the **media**.⁴

Increased plaque means *greater* thickness, enabling this carotid ultrasound test to reveal atherosclerosis even in people with no symptoms.

I routinely observe reversal of plaque in patients taking the **pine bark + *Centella* extract** combination. I have even seen **arterial age** drop **10 to 20 years** after only one or two years of therapy.

Preventing Arterial Plaque Progression

My use of these extracts has recently expanded *again*, based on data published in **2020**.

This Italian trial involved 84 normal weight to mildly overweight subjects with asymptomatic **atherosclerosis** in their **carotid** and **femoral arteries**, determined by high-resolution ultrasound.

These atherosclerotic subjects were treated with similar interventions as the studies already discussed. The duration of this trial was three years.⁵

Patients with an atherosclerotic plaque that was blocking less than **50%** of an artery and those with an atherosclerotic plaque blocking more than **50%** of an artery were included in this trial.

All patients were given diet, exercise, and lifestyle counseling.

One group received no additional treatment, a second took **100 mg** a day of **aspirin**, and a third received the aspirin plus the combination of extracts of French maritime **pine bark (150 mg/day)** and ***Centella asiatica* (450 mg/day)**.

At the end of the three years, more than **20%** of patients in the **standard management** and the **aspirin** group had progressed to more severe and extensive atherosclerotic plaque.

Among patients treated with **aspirin + pine bark + *Centella***, only **5.3%** of patients experienced **plaque progression**.

In the diet, exercise, and lifestyle-counseling group, **22%** suffered a cardiovascular event requiring hospitalization. That number declined to **12%** in the **aspirin** group and to just **3.5%** in the group taking aspirin plus the two **plant extracts**.



WHAT YOU NEED TO KNOW

Reducing and Reversing Plaque Progression

- **Atherosclerosis** is the buildup of **plaque** in artery walls.
- A combination of two **plant extracts** significantly reduced **arterial plaque** in the carotid arteries.
- **French maritime pine bark-*Centella asiatica*** extracts prevent plaque progression.
- This combination of plant extracts may reverse the progression of **atherosclerosis**.

Oxidative stress, a driver of atherosclerosis, was measured in the blood of all subjects and was lower in the group taking the **pine bark** and ***Centella*** extracts. This makes sense since both these plant nutrients are free-radical scavengers.

Decrease of Coronary Artery Calcification

The same research team evaluated the efficacy of the **pine bark-*Centella*** combination in asymptomatic atherosclerotic patients with coronary artery **calcifications**.⁶

Patients with atherosclerosis in the **coronary arteries**—those that supply the heart with blood—can experience angina, shortness of breath, and even a heart attack.⁷

The study included three groups of 30 men each with asymptomatic **coronary artery calcifications**. Although they didn't have angina or shortness of breath, the **calcification** in their arteries indicated progressive atherosclerosis.

All subjects received standard diet, exercise, and lifestyle counseling and took **100 mg/day** of aspirin.

The first group received no additional treatment. The second added **150 mg/day** of French maritime pine bark extract. The third used the combination of **150 mg/day pine bark** and **450 mg/day** of ***Centella asiatica*** extracts.

After one year, there was a **35% increase** in the number of coronary artery calcifications in the group that received diet, lifestyle, and exercise counseling plus aspirin. In those also taking **pine bark** alone, new **calcifications** were **halted**.

In those using the **pine bark + *Centella*** there was a significant **10% decrease** in the number of **calcifications**, a remarkable result.

Testing in Patients with Stents

To evaluate the impact of **pine bark** and ***Centella asiatica*** extracts on atherosclerotic plaque progression in **stented arteries**, 160 stented patients with partial arterial blockage due to atherosclerotic changes (as determined by ultrasound) were grouped into one of three treatment arms.⁸

The study began 6-10 months after successful **stent** procedures, and patients were followed for 12 months.

All groups received diet, exercise, and lifestyle advice along with anti-platelet medication and low-dose statin. A second group received, in addition, the **pine bark extract**; and a third group received extracts of **pine bark** and ***Centella***.

After 12 months, progression of atherosclerotic lesions on inner artery walls occurred in **6.7 times more** patients in the diet, exercise, lifestyle, and medication-only group compared to the group that **also** received the combined **pine bark + *Centella*** extracts.

In fact, in just one year, **nearly 60%** of patients in the group that did **not** receive the **plant extracts** had marked progression of their **atherosclerosis**.

By contrast, among subjects who received the additional **pine bark extract** without ***Centella***, only **18.5%** experienced atherosclerosis progression.

Most remarkable of all, though, were the results in the **pine bark + *Centella*** extracts group. Just **8.9%** of these patients had progression of **atherosclerotic plaques**.

In both groups that received extracts, there was a significant reduction in oxidative stress. No side effects or tolerability problems were observed with the plant extracts.

Summary

These studies consistently show that the combination of **French maritime pine bark** and ***Centella asiatica*** extracts slows and may reverse the progression of **atherosclerosis**.

The published findings reveal significant **reductions** in adverse **cardiovascular outcomes**.

I've observed these powerful results in my clinic as well.

The combination of these **plant extracts (pine bark + *Centella*)** has promise for millions of people with atherosclerosis. •

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

Joel Kahn, MD, is the founder of the Kahn Center for Cardiac Longevity in Bingham Farms, Michigan.

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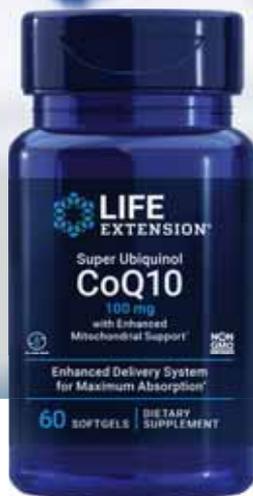
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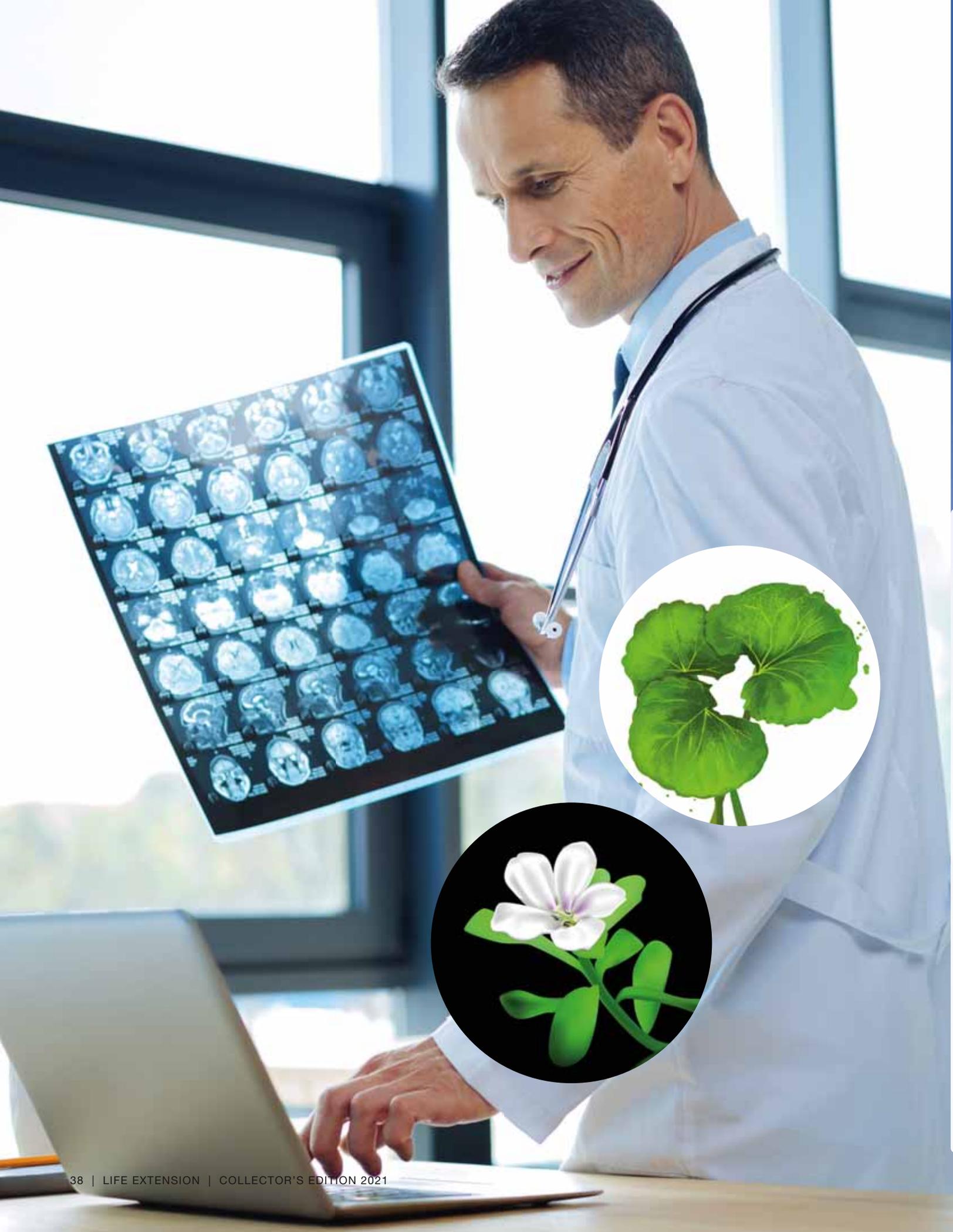
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* *Int Angiol.* 2014 Feb;33(1):20-6.

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Nutrients to Charge Up BRAIN FUNCTION

BY JASON MCNEIL

Nootropics are compounds that *enhance cognition* and facilitate **learning**.

They differ from nutrients that protect against **brain aging**.

Nootropics are for people seeking to *improve* brain **processing speed** and **mental alertness**.

Nutrients with **nootropic** properties have become popular for people of all ages to improve thinking speed and accuracy.

Nootropics Tune Up Your Mind

Nootropics are a different type of brain and cognition supplement. Their goal is to boost cognitive performance *now*.

Nootropics are meant to improve and recall recent and old memories.

Nootropic compounds boost cognitive efficiencies by helping brain cells operate at **peak power**.

Scientists have identified nutrients shown in clinical (human) studies to improve cognitive function, processing speed, and memory.





Bacopa Monnieri Improves Learning

As we age, our ability to process and absorb new information begins to decline.

In seeking to create a plant-based nootropic, researchers focused on compounds associated with **cognitive enhancement** in **human** studies. One key aspect of improved cognition is improving the brain's ability to **learn** and **retain** information.

Research on the flowering herb **Bacopa monnieri** reveals improved memory. In ancient times, the herb was given to scholars to improve their learning and memorization of vast religious texts that were orally handed down from generation to generation.¹

In several **clinical trials**, *standardized* extracts of *Bacopa* have been shown to sharpen several aspects of cognitive function, specifically learning rate and retention of information.²⁻⁹

These human studies also show that *Bacopa* improved additional aspects of cognitive functions such as:

- Auditory verbal learning speed,
- Speed of visual processing,
- Working memory,
- Formation of new memories,
- Recall of memories, and
- Power and speed of attention.

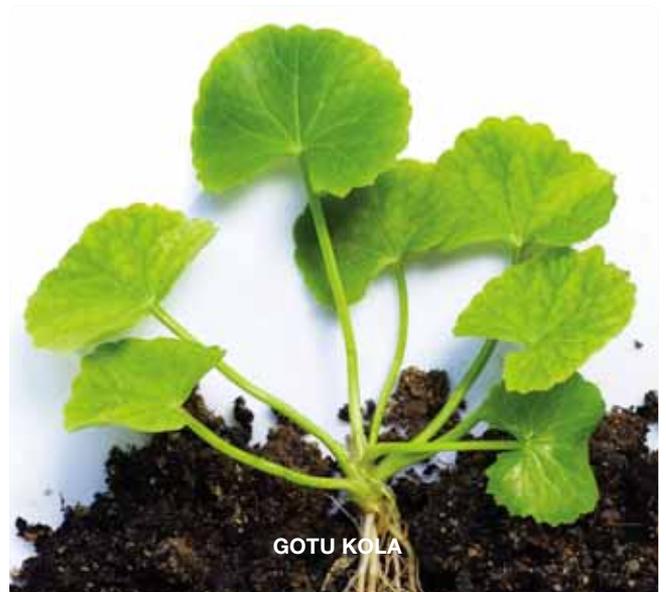
In animal studies, *standardized* extract of *Bacopa* also improved brain activity by promoting the growth of neuron connections in the **hippocampus** and amygdala, another part of the brain involved in perception of emotions.¹⁰⁻¹² The hippocampus is one of the most important brain regions for the formation of new memories. Other benefits included:^{1,12,13}

- Improved spatial learning,
- Increased dendritic length and branching,
- Modulation of neurotransmitter production,
- Increased synaptic concentration,
- Reduced brain inflammation,
- Increased cerebral blood flow, which reduces oxygen and nutrient deficits, and
- Increased nourishment of neurons.

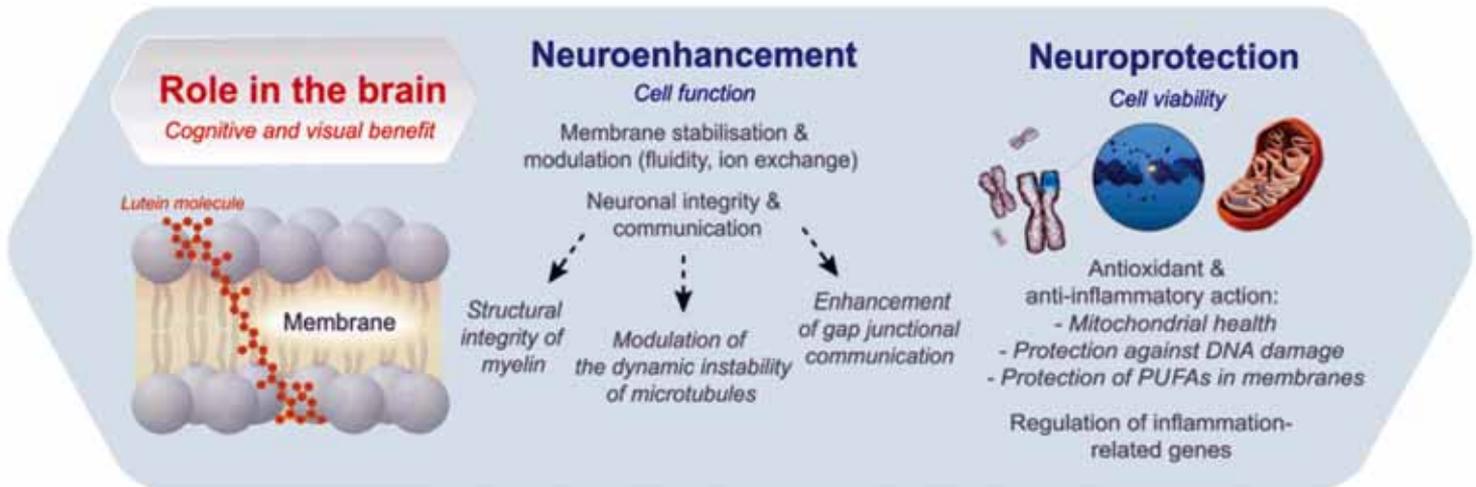
Gotu Kola Improves Reaction Time and Accuracy

The next step in creating a multi-function nootropic was investigating the herb **gotu kola**.

Gotu kola is a flowering herb native to Asia. It has also been used to boost brain power in traditional Eastern medicine for centuries.



Lutein + Zeaxanthin Supports Neuronal Communication



Lutein and zeaxanthin: The possible contribution, mechanisms of action and implications of modern dietary intake for cognitive development in children. *HRB Open Res.* 2019;2:8.

In one clinical trial of healthy, older adults, daily intake of standardized extract of **gotu kola** for two months led to significant improvements in several aspects of brain function.¹⁴

Using **electroencephalography** (EEG), the electrical activity of the brain was recorded and combined with cognitive testing. Researchers saw evidence of improved **attention** and **reaction time** in mental tasks just one hour after supplementation. These improvements in reaction time indicate improved brain processing speed.

By the end of the two-month study, other improvements in cognitive function were seen, including short-term **working memory**, **word recognition**, **spatial memory** and **picture recognition**, and **alertness**.

Gotu kola also improved **mood** and **calmness**. This has implications for managing anxiety and depression, which can interfere with peak mental clarity.¹⁵

In another study, patients with generalized anxiety disorder who supplemented with **gotu kola** noted significantly improved levels of anxiety and stress.¹⁶

Gotu kola has also demonstrated benefits in animal studies.^{17,18} In a mouse model of **dementia**, animals given extracts of **gotu kola** performed significantly better than untreated animals in tests of **learning** and **memory**.¹⁸

WHAT YOU NEED TO KNOW

A Powerful Nootropic Formula

- **Nootropics** are compounds and nutrients meant to enhance cognitive abilities in healthy individuals.
- **Life Extension®** scientists have identified four such plant nutrients, which have *individually* demonstrated the ability to **improve brain function**.
- The carotenoids **lutein** and **zeaxanthin** and standardized extracts of the flowering herbs **gotu kola** and **Bacopa monnieri** have each been shown in clinical trials to enhance cognitive abilities, improve memory and learning, brain processing speed, and more.

The Eye-Brain Connection

Carotenoids are a group of pigments found in many fruits and vegetables.

Two closely related carotenoids, **lutein** and **zeaxanthin**, are taken up and concentrated in the **retina** of the eye, the tissue that senses light and sends information to the brain for visual recognition via the optic nerve.

Lutein and zeaxanthin have long been shown to protect **macular density** necessary for **visual function**.¹⁹⁻²⁴ These carotenoid pigments help maintain sharp sight while protecting the retina from damage due to blue light, chronic inflammation, and other threats.

Scientists have discovered that significant amounts of **lutein** and **zeaxanthin** also concentrate in the **brain**.

This isn't very surprising, since the **retina** is technically an **extension of the brain** that contains **nerve cells** similar to those found in the brain itself.²⁵⁻²⁹

Levels of **lutein** and **zeaxanthin** in the eye and the brain are directly correlated.²⁵⁻²⁹ That means testing their levels in the eye, which is easier to do, allows scientists to also estimate the levels of lutein and zeaxanthin in the brain.

People with the *highest* plasma and macular levels of **lutein** and **zeaxanthin** also have the *highest cognitive function*.^{27,30-35}

Using advanced MRI imaging technology, researchers were able to show that *higher* levels of **carotenoids** in the **brain** were associated with better **efficiency of the brain cells** during tests of learning, memory, perception, decision-making, and motor coordination.³³

Human Studies of Lutein and Zeaxanthin

Based on findings that **lutein** and **zeaxanthin** function as **nootropics**, researchers identified a source derived from marigold flowers.

The combination of **lutein** and **zeaxanthin** has been tested in **nine human** studies on brain function in a wide age range.³⁶⁻⁴⁴

Scientists found that oral intake of lutein-zeaxanthin leads to improvements in brain speed, efficiency, and overall cognitive function.

Research shows that lutein and zeaxanthin improved **brain function** through:^{43,45}

- Improved neuronal communication,
- Increased neural integrity,
- Enhanced memory retention, and
- Increased processing of visual signals.

In healthy young adults, **10 mg of lutein** and **2 mg of zeaxanthin** daily resulted in *significant improvements* in **memory**, **reasoning**, and **complex attention**—the ability to hold complicated ideas in the mind, assess them, and quickly act on them.⁴¹

This improvement in complex attention indicates that brain processing speeds were increased, allowing individuals to better assess complex stimuli and react appropriately.





Similar findings have been seen in older adults. The same dosage of lutein and zeaxanthin improved complex attention and other aspects of cognition in subjects averaging **73.7 years** of age.⁴⁰

In another study of older adults, oral lutein and zeaxanthin helped maintain learning and memory while improving brain blood flow, while these functions deteriorated in participants who received a placebo.³⁹

Scientists believe lutein and zeaxanthin work, in part, by wedging themselves into the walls of brain **cell membranes**.^{25,45-48} This may boost the membrane's functional properties and improve other aspects of membrane integrity.

Summary

The field of **nootropics** research aims to find compounds and nutrients that can boost cognitive performance.

A combination of nootropic compounds has been formulated to enhance **brain function**.

The carotenoids **lutein** and **zeaxanthin**, which are concentrated in the eye and brain, can improve and protect visual *and* mental function.

Standardized extracts of **gotu kola** and **Bacopa monnieri** each enhanced several aspects of cognitive function and mood in clinical trials.

This combination may help people of all ages achieve their full neurological potential. •

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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“C”

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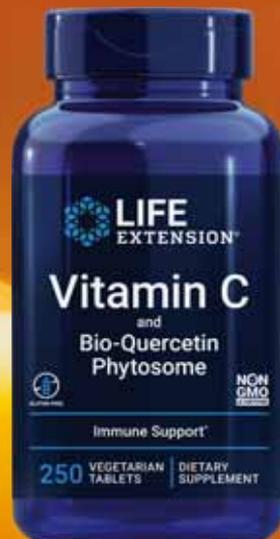


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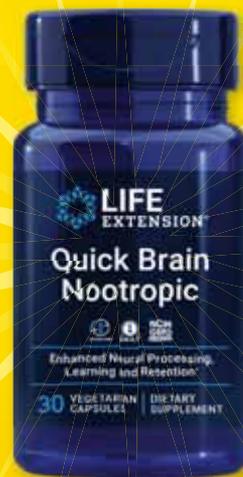
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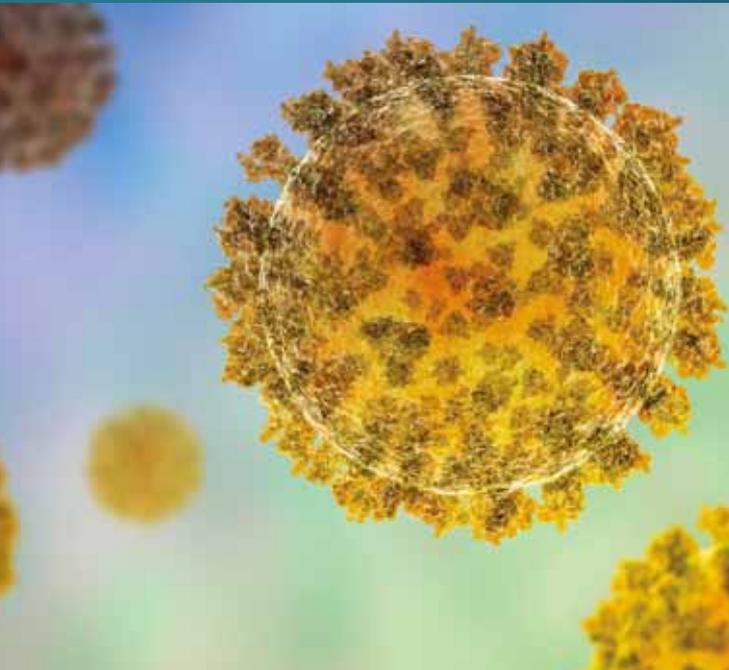
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Protect Your Respiratory Tract During Winter Season

BY ROBERTA STANTON





N-acetyl-L-cysteine is an amino acid derivative that breaks down excess mucus in air passages.

Used by physicians for decades, **N-acetyl-L-cysteine** has a wide variety of benefits, especially helping to protect the lungs and airways of the **respiratory tract**.

Known by many as **NAC**, N-acetyl-L-cysteine has been shown to reduce the number of harmful **pathogens**, including bacteria *and* viruses.¹⁻⁶

Clinical studies have shown that **NAC** can help treat or prevent worsening of **chronic bronchitis** and **acute respiratory distress syndrome**, an often fatal complication in patients with pneumonia or other severe lung infections.⁷⁻¹²

In patients with **chronic obstructive pulmonary disease (COPD)**, N-acetyl-L-cysteine has been associated with lower rates of exacerbations (periods of worsening of symptoms) and fewer days spent in the hospital.^{4,13-18}

Most individuals gain benefits from using **600 mg** to **1,800 mg/day** in divided dosages.

What Is N-Acetyl-L-Cysteine?

N-acetyl-L-cysteine (NAC) is a precursor of **L-cysteine**, the amino acid cells need to produce one of the most powerful antioxidants in the body, **glutathione**.^{19,20}

Found in every cell in the body, glutathione fights the **oxidative stress** that is closely associated with many age-related chronic diseases.²¹

But scientists have found that N-acetyl-L-cysteine does much more than this. It also protects the **respiratory system** from a number of different pathogens and diseases.

Controlling Excess Mucus

Healthy lungs have a built-in cleaning and protection system.

A small amount of **mucus** is secreted to coat the walls of the airways. This mucus traps inhaled particles, many of which can be irritants, infectious, or worse. Then, tiny projections called **cilia** on the surface of cells lining the airways sweep away the mucus and trapped particles, keeping airways clear and protecting the lungs from potential pathogens.

Many conditions, from allergies to infection to lung disease, can cause this system to become dysfunctional, leading to the secretion of large amounts of mucus.²²

When **excess mucus** accumulates, it becomes sticky and hard to remove, leading to difficulty breathing. This complicates many lung conditions, including

bronchitis, emphysema, asthma, cystic fibrosis, and lung infections.²²

Doctors have been using inhaled **N-acetyl-L-cysteine** to reduce mucus since the 1960s.²³ It breaks down mucus secretions, making them less dense and sticky.

N-acetyl-L-cysteine also reduces the *thickness* of the mucus.³ It does this by reacting with bonds within the mucus proteins and thinning the mucus.^{4,24}

This helps clear the airways *and* makes it easier for the cilia to sweep away mucus and trapped particles.³

Reducing Oxidative Stress

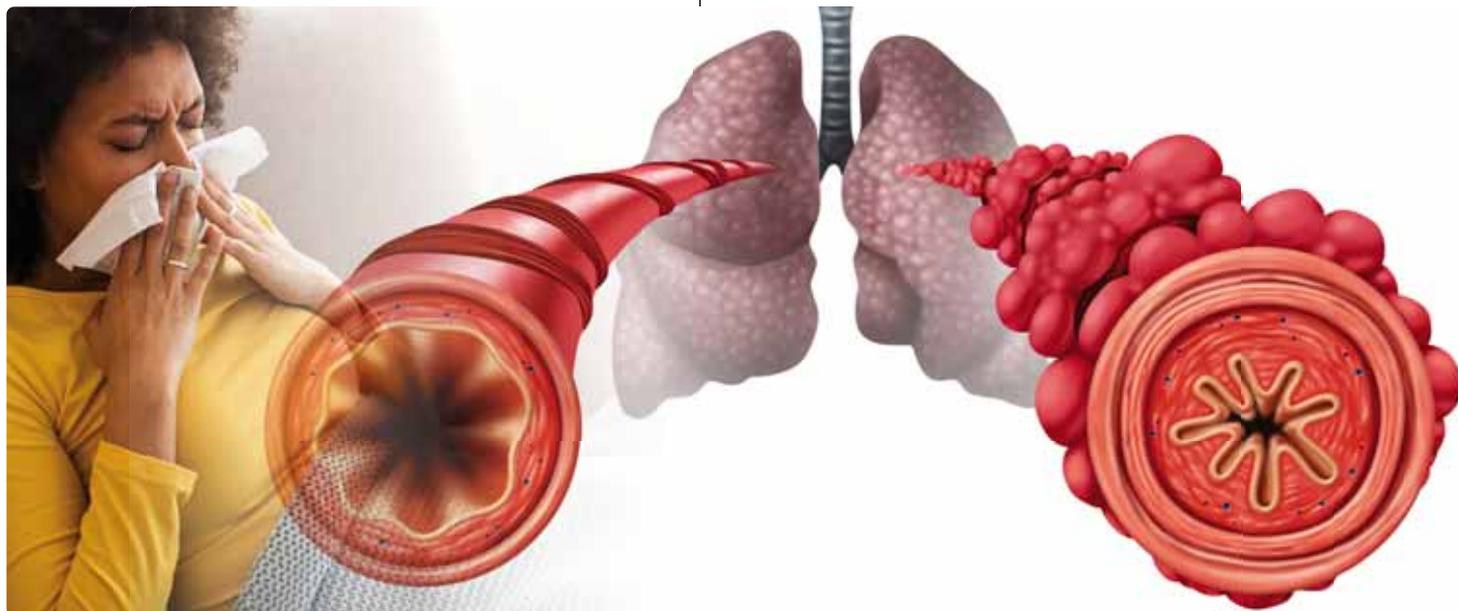
N-acetyl-L-cysteine is a highly effective precursor to the antioxidant **glutathione**, which reduces oxidative stress and free-radical tissue damage.^{3,4,24}

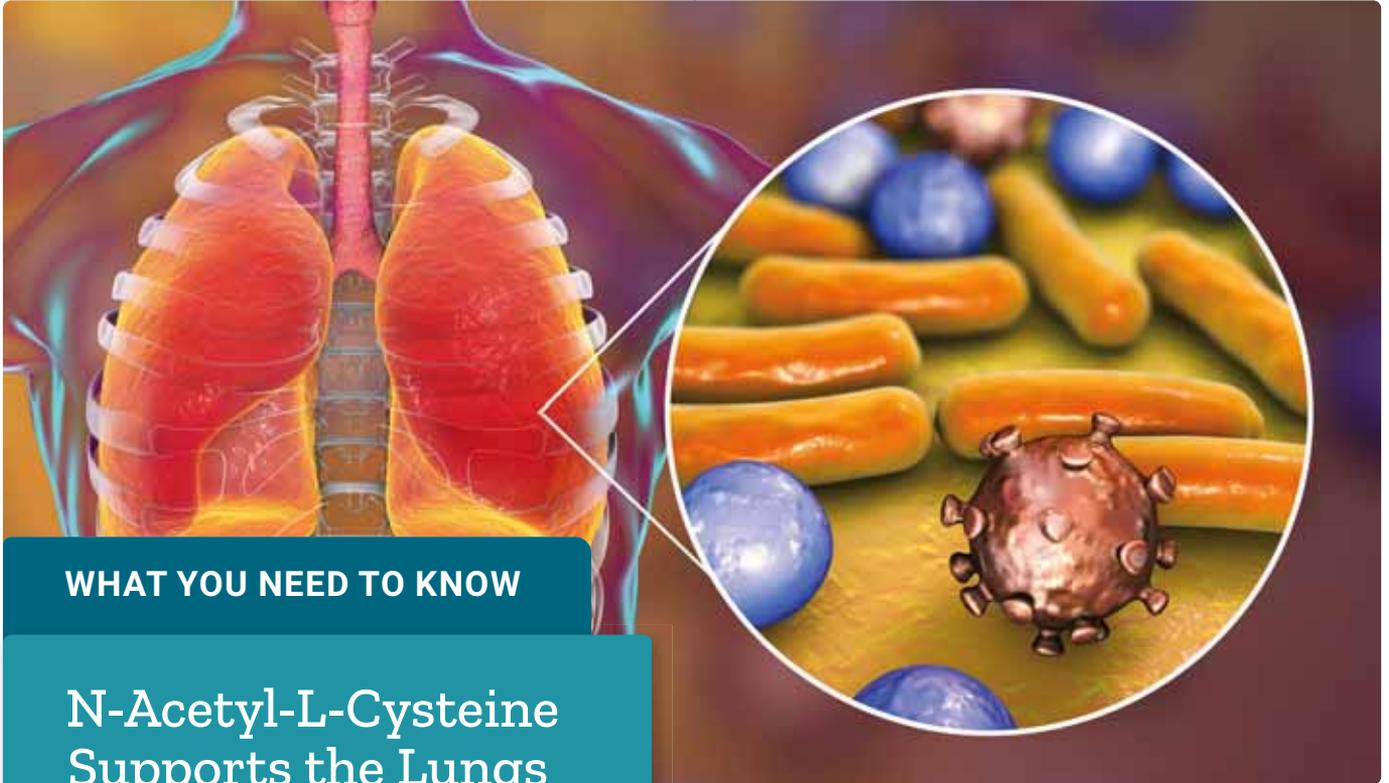
Taken orally, NAC is rapidly absorbed and distributed throughout the body, where it provides the building blocks for cells to produce their own glutathione.

N-acetyl-L-cysteine is also a **direct antioxidant** itself. Even before conversion into glutathione, it scavenges free radicals that could otherwise cause damage.⁴

Oxidative stress is a common contributor to many disorders of the respiratory system, from **infection** to **chronic obstructive pulmonary disease (COPD)**, disorders of the lungs that cause difficulty breathing.⁴

By bolstering antioxidant reserves, and thus reducing oxidative stress, N-acetyl-L-cysteine offers powerful protection to the lungs.





WHAT YOU NEED TO KNOW

N-Acetyl-L-Cysteine Supports the Lungs and Airways

- N-acetyl-L-cysteine is a precursor to **glutathione**.
- It reduces and thins excess **mucus** production in the airways, which can be a major contributor to lung problems in infection and other conditions.
- N-acetyl-L-cysteine also reduces harmful inflammation and could help prevent colonization by **viruses** and **bacteria** in the lungs.
- Through all these mechanisms, N-acetyl-L-cysteine supports healthy **respiratory tract** function and may prevent or treat bronchitis, chronic obstructive pulmonary disease, acute respiratory distress syndrome, and respiratory tract infections.
- Typical daily doses of N-acetyl-L-cysteine range from **600 mg** to **1,800 mg** in divided doses.

For example, in COPD such as **emphysema**, oxidative stress in the lungs contributes to inflammation, abnormal constriction of the airways, fluid in the lungs, excess mucus secretion, and other tissue damage.⁴ N-acetyl-L-cysteine reduces oxidative stress and the damage it does while also reducing mucus volume and thickness.

Stopping Infectious Pathogens

N-acetyl-L-cysteine has been shown to reduce the number of harmful **pathogens**, including bacteria and viruses.

In the case of harmful **bacteria**, N-acetyl-L-cysteine makes it hard for them to gain a foothold and cause infection.

In vitro experiments show that N-acetyl-L-cysteine prevents bacteria from adhering to cells lining the airways.^{5,6}

One of the ways it accomplishes this is by disrupting **biofilms**, slimy coverings that many disease-causing bacteria form around themselves. These films prevent immune cells from recognizing and gaining access to the bacteria. They also make it difficult for antibiotics, antibodies, and other helpful compounds to get to the bacteria.



N-acetyl-L-cysteine blocks the formation of biofilms and destroys existing ones, impeding the ability of bacteria to survive in the airways.^{2,3}

The protection from pathogens also extends to **viruses**.

One cell study evaluated **respiratory syncytial virus**. Normally, this virus invades the cells lining the airways, growing rapidly and causing damage to the structure of the airways.

But treatment with N-acetyl-L-cysteine **blocks the reproduction of the virus** while restoring the normal structure and function of the cells lining the airways.¹

Reducing Harmful Inflammation

By preventing free-radical damage, reducing pathogen colonization, and other mechanisms, N-acetyl-L-cysteine decreases harmful **inflammation**, which contributes to the symptoms of most respiratory disorders.

Preclinical studies show that N-acetyl-L-cysteine reduces the production of pro-inflammatory compounds and decreases the production of compounds that initiate **fibrosis** in the lung tissue, scarring that makes it difficult for the lungs to work properly.²⁵⁻²⁷

Respiratory Tract Disorders

N-acetyl-L-cysteine has shown success in treating a number of different respiratory conditions.

Chronic bronchitis is longstanding inflammation in the airways of the lungs caused by irritation and tissue damage. It's common in smokers but can also be caused by secondhand smoke, air pollution, and other inhaled irritants.

Several human studies have shown that oral intake of N-acetyl-L-cysteine reduces **exacerbations** (worsening or flare-ups) of chronic bronchitis *and* significantly improves symptoms.^{11,12}

Chronic obstructive pulmonary disease (COPD) refers to disorders of the lungs that restrict airflow in the lungs, making it hard to breathe. It includes chronic bronchitis, emphysema, and severe asthma.^{28,29}

Oxidative stress, inflammation, and excessive secretion of airway-clogging mucus play major roles in these conditions. Knowing that N-acetyl-L-cysteine helps prevent or treat *all three* of these problems, scientists have tested it to treat COPD.

In COPD patients, N-acetyl-L-cysteine use has been associated with clinical improvements. These include lower rates and decreased severity of exacerbations, and fewer days spent in the hospital for COPD exacerbations.^{4,13-18}

Acute respiratory distress syndrome (ARDS) is a form of severe lung inflammation that causes fluid to leak into the lungs, preventing oxygen from getting into the body.

It occurs in critical illness, particularly in patients suffering from **pneumonia** or other serious lung infections. It often requires mechanical ventilation and typically results in a high mortality rate.

Animal studies show that N-acetyl-L-cysteine protects the lungs from injury and leads to significant improvements.^{30,31} In clinical studies, patients with acute respiratory distress syndrome who were given N-acetyl-L-cysteine had shorter intensive-care-unit stays, and clinical improvements.⁷⁻¹⁰

Summary

N-acetyl-L-cysteine (NAC) is a precursor to the antioxidant **glutathione**. It helps prevent harmful oxidative damage and reduces inflammation.

In the lungs and airways of the **respiratory tract**, it reduces and thins excess **mucus** secretion and could help prevent colonization by harmful **bacteria** and **viruses**.

Through these mechanisms and more, N-acetyl-L-cysteine supports healthy respiratory function and provides protection against lung diseases, including **acute respiratory distress syndrome**, infections, and **chronic obstructive pulmonary diseases** like bronchitis and emphysema.

Most individuals gain benefits from using **600 mg to 1,800 mg/day** of N-acetyl-L-cysteine in divided dosages. •

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

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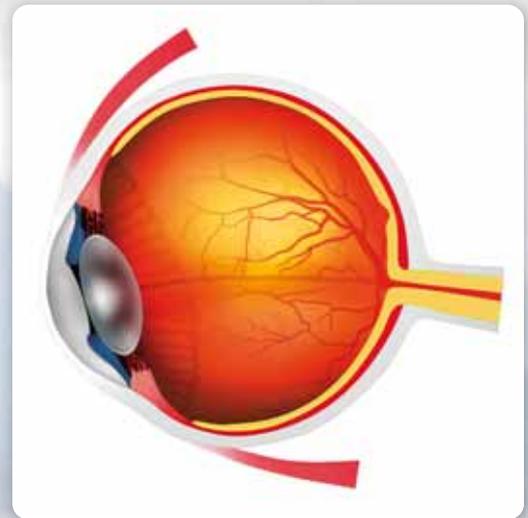
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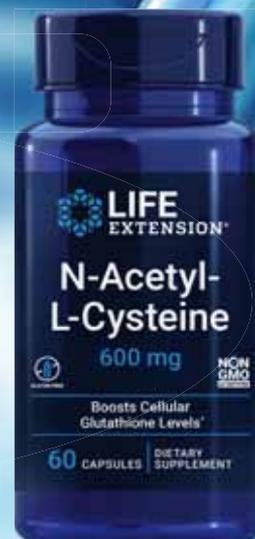
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CAUTION: Those who supplement with NAC should drink 6 to 8 glasses of water daily in order to prevent cysteine renal stones. Cysteine renal stones are rare but do occur.



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Resurgence of Diabetes Complications

WILLIAM FALOON

The increase in healthy longevity that Americans have enjoyed is deteriorating in those with less-than-optimal glucose control.

This is regrettable because treatments like **metformin** led to marked improvements for **type II diabetics** starting in **1995**.

Back in the *early* 1990s, diabetics died **7 to 10 years** sooner than non-diabetics and had a:^{1,2}

- **3.7-fold** increased risk for sudden **heart attack**
- **14-fold** increased risk for **kidney failure**
- **18.8-fold** increased risk for **lower-extremity amputation**

Advances initiated in the **1990s** resulted in these risk differences between **diabetics** and non-diabetics plummeting up to **68%** by year **2010**.^{1,3} This translates into fewer blood-sugar-related complications.

New challenges have sabotaged these improvements.

A recent review reveals a **resurgence** of some **diabetic complications** in some populations between **2009** and **2015**.

This uptick in **diabetic disorders** has begun to reverse decades of hard-won improvements as follows:^{2,4,5}

1. **Lower-extremity amputations** are soaring;
2. **Emergency room** visits caused by **hyperglycemic** (high blood sugar) **crisis** have almost doubled;
3. **Hospitalizations** due to hyperglycemic crisis increased by **73%**;
4. **Deaths** due to hyperglycemic crisis increased by **55%**.

Long-term improvements in Americans aged 18-64 for end-stage **kidney failure**, **heart attack**, and hospitalization for **stroke**, stalled after **2010**.^{2,5}

None of this should surprise readers of **Life Extension**[®] magazine. We long ago predicted an epidemic of **sugar-related** diseases caused by factors that are finally being recognized by the medical establishment.

This editorial describes what's behind the upsurge in **diabetic complications** and how to protect yourself.



Those afflicted with **type II diabetes** are frequently overweight or obese, and typically do not obtain adequate levels of physical activity.

This results in **insulin resistance**, a hallmark characteristic of type II diabetes.

Insulin resistance occurs when cells in muscle, the liver, and other parts of the body do not respond appropriately to insulin.

As a compensatory mechanism, the body increases the secretion of insulin from the pancreas, resulting in **higher** insulin blood levels.

But resistance to insulin means too much blood sugar remains in circulation. This leads to **damage** inflicted by high **blood glucose** levels, by after-meal glucose spikes, and by high insulin levels.

Microvascular diabetic complications develop as a result of years of poor glycemic control. This means that even **before type II diabetes** is clinically diagnosed, silent damage can result in loss of vision, kidney damage, and painful nerve disease (**neuropathy**).

There is little mystery behind the spiraling epidemic of diabetic complications.

Sky-High Obesity Prevalence

A staggering **42%** of Americans are obese and nearly **32%** are overweight.^{6,7}

Less than **30%** of Americans are at a healthy weight. The new “normal” for Americans is overweight or obese.

Excess body weight and inadequate physical activity are associated with higher **blood pressure**, elevated **lipids**, and increased levels of **chronic inflammation**.

As the **maps** on the next page depict, there is direct correlation between excess body mass and type II diabetes prevalence.

There is typically a lag between deteriorating **glycemic control** linked with excess body weight (and inadequate physical activity) and full-blown **type II diabetes**.

Yet during this **prediabetic** period, damage to the eyes, kidneys, and nerves begins.

What makes this regrettable is that poor glucose control, increasing blood lipids, and inflammation can be detected **early** with simple **blood tests**.

Stagnation in Preventive Care

A viewpoint article published in the **Journal of the American Medical Association (JAMA)** identified several factors contributing to surging increases in **diabetes-related** complications.²

In addition to high **body mass** and failure to control **blood lipids** and **blood pressure**, the **JAMA** authors believe there may be **stagnation** in overall **preventive care**, most prominently in young adults.

This eye-opening **JAMA** viewpoint states:

“After encouraging reductions in hemoglobin A1c levels among patients with diabetes through most of the 2000s, the proportion meeting individualized HbA1c targets declined...”²

This translates into fewer Americans achieving targeted glycemic control blood levels.

High “Normal” Glucose

Hemoglobin A1c is a **blood test** that measures long-term **glucose** control. To reduce risk of diabetic complications, optimal glycemic control is critical.

For younger patients with type II diabetes, more stringent glucose control can help reduce diabetes-related microvascular damage.

In addition, some observational data suggest that blood markers (glucose and hemoglobin A1c) in high “normal” ranges are associated with an increased risk for heart attack⁸⁻¹⁷ and some types of cancer.¹⁸⁻²⁴



Age-Adjusted Prevalence of Obesity and Diagnosed Diabetes Among U.S. Adults

These maps reveal striking *increases* in **obesity** (BMI ≥ 30 kg/m²) and **diabetes** that occurred between 1994 and 2015. This is not mere correlation but reflective of the causative impact of excess body weight on one's ability to maintain optimal (lower reference range) fasting insulin and glucose blood levels.

The material is available on the agency website at no charge.

Reference to specific commercial products, manufacturers, companies, or trademarks does not constitute its endorsement or recommendation by the U.S. Government, Department of Health and Human Services, or Centers for Disease Control and Prevention.

Content source:

Centers for Disease Control and Prevention.

https://www.cdc.gov/diabetes/statistics/slides/maps_diabetesobesity_trends.pdf



For older patients, frail patients, and those with type I diabetes, lower blood sugar targets must be balanced with the risk of hypoglycemia (low blood sugar).

Unpredictable Health Care Coverage

The *JAMA* Viewpoint authors describe how uncertainties related to **health insurance** coverage are causing **diabetic complications** to increase, especially in younger and lower-income groups.²

Even those with **employer-paid** insurance plans face higher **deductibles** that translate into potentially lethal delays in treating and pursuing preventive care in diabetic patients.

The *JAMA* authors express concern about the continually increasing price of **insulin** and other anti-diabetic drugs. These high drug prices lead some people to cut back on treatment.

The authors mentioned that perhaps most concerning are the social and economic factors behind the

increase in **middle-age mortality** that may have preventable causes—including the complications of **diabetes**.

What's Behind the Resurgence?

Most of you remember a time when deciding whether to visit a doctor was not a major financial issue.

You may also recall being able to afford the prescribed diagnostic and medication.

As this nation suffocates under greater **regulatory** burdens, the cost of medical care is increasingly being borne by **consumers** who cannot afford it.

The tragic result is that gains made decades ago in protecting against **diabetic complications** have been thrown into reverse.

As more Americans develop diabetic disorders, the burden on today's healthcare system worsens, and costs continue spiraling out of control.

I warned decades ago that this medical fiasco was imminent, in

books, articles, and national media appearances. What I predicted is now recognized by mainstream publications like the *Journal of the American Medical Association*.

What's particularly scary is that *JAMA* is only identifying a resurgence in complications among **diagnosed** diabetics.

It fails to mention that anyone with **less-than-optimal** glucose control is also at higher risk for blood-sugar-related disorders.

Free-Market Solutions

The cornerstone of a diabetes prevention or management program is frequent **blood testing**.

You need to know your **glucose**, **fasting insulin** and **hemoglobin A1c** levels.

With appointment delays, crowded waiting rooms, and high costs, it is challenging even for financially well-off individuals to get real-time updates on their underlying state of glucose control.

We at **Life Extension®** resolved part of the problem 24 years ago by offering comprehensive **blood tests** direct to consumers at **low cost** with convenient walk-in blood-draw stations in most regions.

If a blood test reveals **higher-than-optimal** ranges for a diabetic or metabolic marker (like **C-reactive protein** or dangerous **lipids**), retests for these specific markers can be done at **affordable** prices soon after **corrective interventions** (such as diet, nutrient, drug, behavior, and lifestyle modifications) are initiated.

Annual Lab Test Sale

The most popular **blood tests** utilized by our readers are the **Male and Female Panels**.

These comprehensive panels provide insight into one's underlying state of health and provide a road map to better **disease prevention**.

Just once a year we discount the Male or Female Panel down to **\$224**.

Commercial labs charge over **\$2,000** for these tests and do not provide follow-up answers to questions one might have about the **results**.

This year we add a **ferritin** test to the **Male and Female Blood Panels** to enable better individualized control over one's **iron** status.

To order the comprehensive panels described on the next page, call **1-800-208-3444** (24 hours) or log on to: www.LifeExtension.com/blood

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Commercial labs charge **over \$2,000** for blood tests needed to evaluate cardiac, inflammatory, immune, and other degenerative risk factors.

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MALE PANEL

METABOLIC PROFILE

Glucose

Insulin

Hemoglobin A1c

NEW Ferritin (measure of iron status)

Serum Magnesium

Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio

Liver function tests: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase

Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron

Blood proteins: albumin, globulin, total protein, albumin/globulin ratio

CARDIAC MARKERS

Apolipoprotein B (ApoB)

Homocysteine

C-Reactive Protein (high sensitivity)

LIPID PROFILE

Total Cholesterol

LDL (low-density lipoprotein)

HDL (high-density lipoprotein)

Triglycerides

COMPLETE BLOOD COUNT (CBC)

Red Blood Cell count including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW

White Blood Cell count including: lymphocytes, monocytes, eosinophils, neutrophils, basophils

Platelet count

CANCER MARKER

PSA (Prostate Specific Antigen)

HORMONES

Free and Total Testosterone

DHEA-S

Estradiol (an estrogen)

TSH (thyroid function)

Vitamin D

FEMALE PANEL

METABOLIC PROFILE

Glucose

Insulin

Hemoglobin A1c

NEW Ferritin (measure of iron status)

Serum Magnesium

Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio

Liver function tests: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase

Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron

Blood proteins: albumin, globulin, total protein, albumin/globulin ratio

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Platelet count

HORMONES

Progesterone

Estradiol (an estrogen)

Free and Total Testosterone

DHEA-S

TSH (thyroid function)

Vitamin D

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After you order and receive our form, you can visit a blood-draw facility we suggest at your convenience in your area or the **Life Extension Nutrition Center** in Ft. Lauderdale.

Lab tests are available in the continental United States and Anchorage, AK, only. Not available in Maryland. Restrictions apply in MA, NY, NJ, and RI. Kits not available in PA. The Blood Test Super Sale expires on **July 12, 2021**.



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LACTOFERRIN Helps Protect Against Viruses

BY TOM MILLER

From the common cold and flu to newer threats, **viral infections** are a major cause of disease and death worldwide.

The protein **lactoferrin** has shown potent **antiviral activity** in preclinical and clinical (human) studies.

It attacks viruses at several points in their lifecycle, through various mechanisms.¹⁻⁴

While some **lactoferrin** is produced in the body, it can also be absorbed from oral intake, bolstering the body's defenses.⁵

The best ways to avoid viral illnesses remain the standard precautions:

- Avoid contact with sick individuals.
- Wash your hands with soap and water frequently, for at least 20 seconds.
- If soap and water aren't available, use a hand sanitizer with at least **60%** alcohol.
- Avoid touching your eyes, nose, and mouth.
- Clean and disinfect frequently touched objects and surfaces.

Lactoferrin should not replace these tried-and-true preventive measures. However, it may provide an *additional layer* of defense to reduce the risk of contracting viral illnesses and to diminish their severity.

A Constituent of Mother's Milk

Lactoferrin is a protein found naturally in milk.

It's also produced in other bodily secretions, including tears and saliva, and by some immune system cells.⁴

Lactoferrin is found in highest amounts in **colostrum**, the first type of mother's milk produced after a baby is born. It has remarkable powers to shield infants from infection before their own immune systems have fully developed.

In adults, it is an important component of defenses against infections.

In mucous, saliva, and other secretions, lactoferrin helps prevent pathogens from gaining entry through the linings of the oral cavity, nasal cavity, airways, and digestive system.

One unusual feature of **lactoferrin** is the diversity of viruses it can shield against. It has been shown to possess robust **antiviral** activity against different types of virus, from those that cause the common cold and flu, to HIV and hepatitis B and C viruses.⁴

Inhibiting Viruses from Entering Cells

The most important way lactoferrin defends against viral infections is by **disrupting viruses from binding to cells**.^{1-3,6}

This can **stop the virus in its tracks**, before it has a chance to cause any problems. If the virus cannot attach to and enter cells, it cannot cause illness.

Lactoferrin does this in two different ways:

- It **binds** to the **virus** directly, blocking the viruses' surface proteins' ability to recognize binding sites on the surface of cell membranes.
- It **binds** to surface sites on the **cell's** outer membrane that are targeted by viruses.

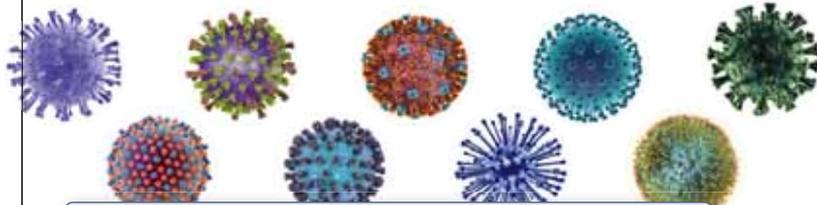
For example, a compound found on cell surfaces, called **heparan sulfate**, is a common target for various viruses.

Several studies have shown that lactoferrin **binds** to structures containing **heparan sulfate**, which can prevent viruses from recognizing and entering the cell.^{6,7}

Activating the Immune System

Lactoferrin also has *indirect* antiviral effects. It helps the body fight against a virus by **activating immune defenses**.

Lactoferrin activates **natural killer** cells and increases their number.^{5,8} These immune cells are equipped to recognize abnormal cells, including those infected by viruses, and eliminate them. This can help prevent the spread of a virus in the body.



Lactoferrin Defends Against a Wide Range of Viruses

Lactoferrin has been shown in laboratory, animal, and preclinical research to help protect against a huge list of viruses, including:

- Various viruses that cause the common cold,⁴
- Various viruses that cause flu, including several different strains of influenza A (even the H1N1 subtype that caused a global outbreak in 2009),^{4,9}
- Various viruses that cause gastroenteritis (stomach flu),⁴
- Herpes simplex virus,^{4,10}
- Human immunodeficiency virus (HIV), which causes AIDS,^{1,2,4}
- Hepatitis B virus,^{1,3,7}
- Hepatitis C virus,^{1,2,7}
- Cytomegalovirus (CMV),^{1,4}
- Poliovirus,^{4,7}
- Respiratory syncytial virus (RSV),^{1,9}
- Hantavirus,^{1,9}
- Dengue virus, the cause of dengue fever,^{6,7}
- Enteroviruses,^{2,7}
- Echovirus,^{1,6,7}
- Coxsackieviruses,¹¹ and
- Epstein-Barr virus (EBV).¹⁰



WHAT YOU NEED TO KNOW

Fighting Viruses with Lactoferrin

- **Lactoferrin** is a protein produced in milk and bodily secretions like saliva. It's also produced by some immune system cells.
- Research shows that lactoferrin is active against a wide assortment of **viruses**.
- Its **antiviral activity** has been shown to aid in the battle against viruses that cause the common cold, flu, stomach flu, and other illnesses.
- **Oral lactoferrin** may reduce both the incidence and severity of disease caused by viruses.

Lactoferrin also stimulates the production of other antiviral compounds, including the signaling proteins known as **interferons**.^{2,4} One of the important ways that interferons promote immunity is to signal to surrounding cells that viruses are present, and help activate antiviral mechanisms to prevent growth and spread of those viruses.

Lactoferrin may also help block the ability of viruses to **reproduce** even if they're already inside cells.^{1,4}

This helps limit the spread of the virus, potentially reducing the severity of the resulting illness.

Fighting Common Viral Illnesses

Lactoferrin has been shown, in laboratory, animal, and human studies, to have potent activity against a number of viruses.^{1-4,6,7,10,11}

This includes common viruses such as those that cause the **common cold**, the **flu**, and **gastroenteritis** (stomach flu).

There are several different types and strains of virus that cause these illnesses. Although the common cold and viral gastroenteritis are usually mild, influenza can prove deadly in young children, the elderly, and those with other health issues.

Some strains of the viruses that cause influenza are covered by annual flu vaccines, but many others are not. The extra protection afforded by **lactoferrin** could make a difference in helping to lessen the impact of these illnesses.

In one study, healthy women taking **oral lactoferrin** experienced a reduced onset of both common-cold-like and gastroenteritis symptoms.¹²

In other clinical studies, **lactoferrin** was effective for reducing the symptoms of viral gastroenteritis, including those caused by **rotavirus** and **norovirus**. Oral lactoferrin reduced the incidence and severity of the symptoms of these illnesses.⁴

People taking **100 mg** of lactoferrin six or seven days a week had an approximately **4-fold reduction** in the incidence of viral gastroenteritis compared to people who took it only once a week.⁴



Lactoferrin's Other Immunity-Boosting Benefits

Lactoferrin has benefits beyond fighting viruses.

Studies have demonstrated that it can boost healthy immune function, which protects against a variety of pathogen types.

Various disease-causing bacteria have been found to be susceptible to the actions of lactoferrin.^{2,3}

The immune system is also important in monitoring for abnormal cells which could develop into cancer. Lactoferrin improves this ability, demonstrating potent anticancer effects in many studies.⁵

Summary

Lactoferrin is a protein produced in milk, saliva, and other secretions.

Laboratory, animal, and clinical research demonstrates lactoferrin's activity against a wide range of viruses, including those that cause the **common cold** and **flu**.

It works by helping to block viral invasion of cells and by amplifying the immune system's power to eliminate viral infection from the body.

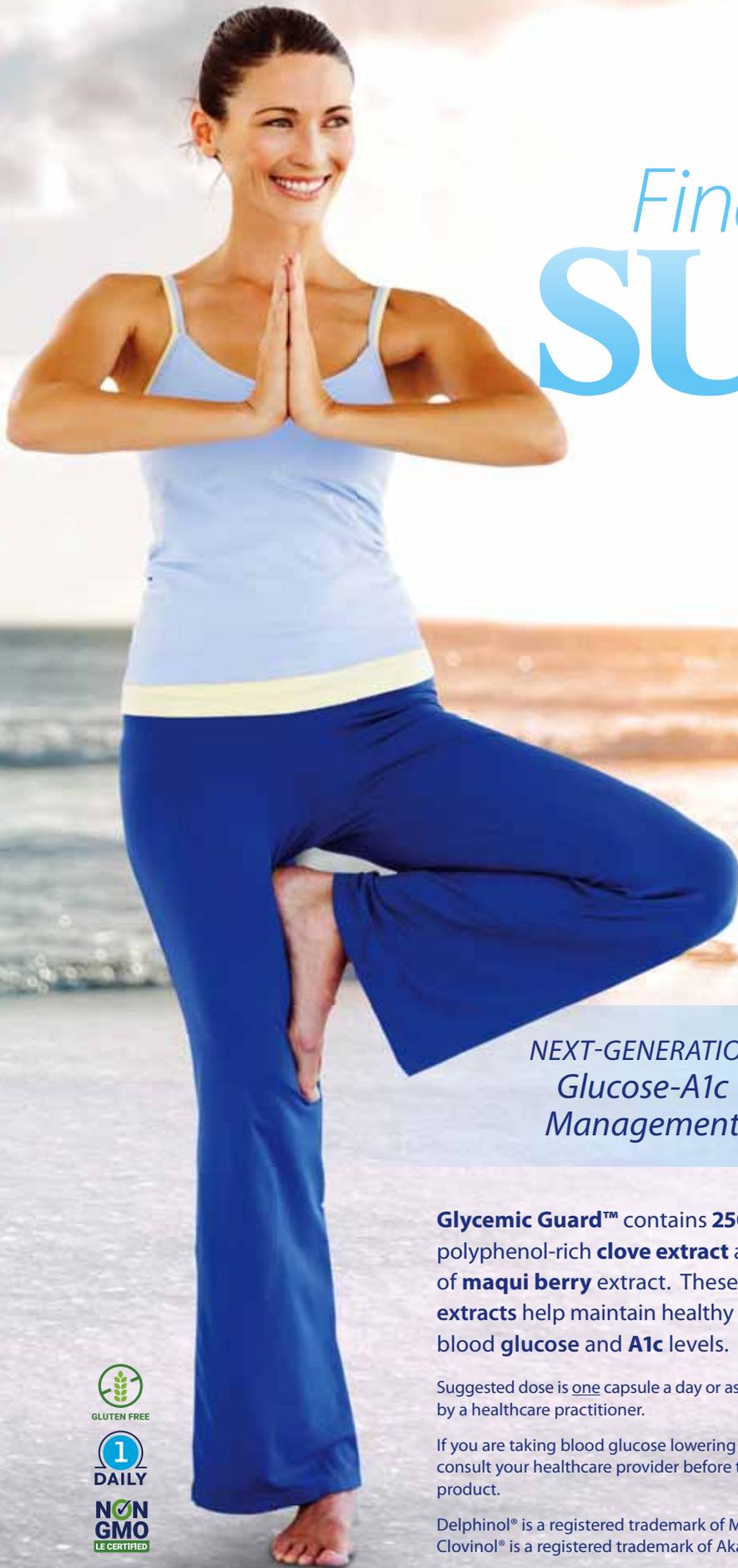
Taken orally, lactoferrin is readily absorbed and can play an important role in bolstering defenses against viral illnesses. •

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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| DAY 3 | | | |
| DAY 4 | | | |
| DAY 5 | | | |

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Add Five More Years with One Therapy

WILLIAM FALOON

My 40-year quest to persuade supporters to keep their blood pressure in lower ranges continues to fail!

I'll never forget a call I received from a **Life Extension**[®] supporter who suffered an ischemic **stroke**.

He was fortunate to fully recover.

My first question was about his **blood pressure**. It was elevated.

This supporter recalled our warning to keep blood pressure below 120/80 mmHg. He nonetheless thought that his healthy diet and supplements protected against the effects of **hypertension**.

I instantly responded that we never implied that *anything* could protect the brain against the destructive impact of **high blood pressure**.

Despite my many articles and live presentations, I continue to interact with readers of this magazine who don't **optimize** their blood pressure.

One study shows total **life expectancy** is **five years longer** in

people with blood pressure below 120/80 mmHg compared to people at **140/90** mmHg and above.¹

More recent data confirm the magnitude of **heart attacks** and **strokes** occurring in those who fail to target **systolic** blood pressure below 120-130 mmHg.

This editorial describes the lost **life years** that have occurred because of this single health issue and discusses how easy it is to take corrective actions.

I also reveal anti-hypertension **drugs** that have side benefits, like reduction in risk of certain **cancers** and improved **endothelial function**.



Each time your **heart beats**, it generates **systolic pressure** that enables oxygenated blood to circulate throughout your body.

Normal aging usually results in elevation of systolic **blood pressure** that **damages** arteries and delicate capillary beds.

Excess systolic blood pressure causes or contributes to:²⁻⁵

- Coronary artery disease
- Aortic valve stenosis
- Cerebral vascular disease
- Kidney failure
- Retinopathy and other eye disorders
- Dementia

Blood pressure is increasing worldwide due to ever-growing numbers of **overweight** and **obese** individuals.

If effective medications were not available, I would not be as adamant in urging *everyone* to achieve **optimal** blood pressure readings.

To use a simple analogy, imagine the sprinkler head on your garden hose is turned to the “off” position.

Would your vinyl hose remain intact longer if there were a small amount of water **pressure** coming from the spigot or if the spigot were turned all the way up, meaning your vinyl hose would have to contain high water **pressure**?

I hope the answer is obvious, i.e., lower pressure inflicts less damage!

The Framingham Heart Study

You may recall reading about the **Framingham Heart Study** but may not realize its significance.

Prior to Framingham, there were no strong and reliable data about heart attack and stroke prevention. This meant that doctors lacked the necessary evidence to optimally reduce the heart attack and stroke risk.

Findings from **Framingham** have averted hundreds of millions of cardiovascular events, yet the majority of the public overlooks these remarkable data sets.

Elevated **blood pressure** is a major modifiable risk factor for **cardiovascular disease** and mortality.^{6,7}

According to a 2002 *World Health Organization* report, suboptimal blood pressure (defined as systolic blood pressure over **115 mmHg**) was estimated to be responsible for **62%** of cerebrovascular disease and **49%** of coronary heart disease.⁸

The relationship between blood pressure and cardiovascular disease is well established.⁹

These data are consistent with our longstanding definition of **optimal** blood pressure of **115/75 mmHg**.

Based on this, when **systolic blood pressure** is over **115 mmHg**, this means it is **suboptimal**. Typical aging people often have systolic readings far above **140 mmHg**.

Older people with preexisting vascular disease or circulatory deficits, however, often need *higher* **systolic** pressure (around **130 to 140 mmHg**) to ensure adequate circulation to their brain and kidneys.¹⁰

The irony of this is that **hypertension** in *early* life damages capillary beds that then require *higher*-than-optimal **systolic** pressure to obtain adequate blood flow to critical organs (e.g. brain, kidneys).

Such *higher* systolic pressure—despite being necessary in these types of cases—also inflicts more vascular damage.

Impact of Blood Pressure on Lifespans

Although many past studies have attempted to estimate the impact of **hypertension** on **heart attack** and **stroke** risk, relatively few studies have looked at the impact of blood pressure on **life expectancy**.





In addition, the life expectancy effects of elevated blood pressure in people without cardiovascular disease was not well-studied in the past.

One of the first studies to estimate the relative impact of different blood pressure ranges/targets upon life expectancy used data from the **Framingham Heart Study**.¹

The participants in this study were allocated in the following blood pressure groups:

- **Group 1:** Blood pressure below 120/80 mmHg
- **Group 2:** Systolic blood pressure between **120-139 mmHg**
- **Group 3:** Blood pressure over 140/90 mmHg

Average follow up was **27.5 years**, which is an impressive amount of time for human studies.

There was an overall increase in risk of **heart attacks** and **strokes** in **Group 2** (systolic blood pressure between **120-139 mmHg** and

Group 3 (blood pressure over 140/90 mmHg) compared to **Group 1**.

Significant increases in mortality (deaths) were observed in **Group 3** (systolic over 140 mmHg), but not **Group 1** and **2**.

This is somewhat encouraging for those who require a *higher* systolic pressure of around **130 mmHg** as there was not a significant overall mortality increase.

The **life expectancy** differences between **Group 1** (below **120/80 mmHg**), **Group 2** (systolic **120-139 mmHg**) and **Group 3** (systolic over **140 mmHg**), however, were substantial.

Compared to **Group 1** (below **120/80 mmHg**), **Group 3** (over **140/90 mmHg**) had a decrease in total **life expectancy** of about **five years**.

Group 2 (systolic pressure between **120-139 mmHg**) had a decrease in total **life expectancy** that was about half as much as **Group 3** (over **140 mmHg**).

These observational data reveal the long-term **damage** inflicted by the *higher* blood pressure seen in **Group 2** and **Group 3** compared to **Group 1** (systolic blood pressure below 120 mmHg).

A conclusion by the authors of this observational study is that **blood pressure control** should be initiated as soon as age 40.¹

We at **Life Extension** have urged this for people of all ages (especially overweight and obese individuals) since elevated blood pressure in early life can inflict irreversible circulatory damage.

Confirmatory Results From 2017 and 2019 Studies

The study I just described was published in **2005** using **Framingham** data that were **observational** and had limitations.

More recent tightly **controlled** studies validate the risks of **sub-optimal** blood pressure control.

Findings published in **2017** led to massive changes in conventional guidelines. These new recommendations target **systolic** pressure below 120 mmHg in most people. This study was widely publicized and showed a **25% reduction** in risk of **cardiovascular events** when **systolic** blood pressure is targeted below 120 mmHg.¹¹

Studies presented at the **American Heart Association’s** annual meeting in **November 2019** clarified some of these findings and suggest that **additional years of life** can be added with aggressive blood pressure control.¹¹

According to the president of the American Heart Association:¹¹

*“... this analysis suggests that a 50-year-old person with systolic pressure under 120 mmHg could expect to live almost **3 years longer**.”*

By age **65**, the lifespan increase in response to **systolic** pressure targeted below 120 was **more than a year**. The lifespan increase

dropped to **10 months** when optimal blood pressure control was not initiated until age **80**.¹¹

To put the findings in terms of their real-world significance, data from the **Centers for Disease Control and Prevention** show that nearly **1,300 Americans** die **each day** with **high blood pressure** as a primary or contributing cause.¹²

This prompted our **Life Extension®** scientific team to estimate how many Americans may have needlessly died of hypertensive-related disorders since **1980** when **LifeExtension®** started publishing a health newsletter.

Unprecedented Human Carnage

Beginning around **1980**, blood pressure levels and cardiovascular risks began to show that **low normal** was better.

In **2003** the cumulative data suggested that blood pressure guidelines needed to be lowered.

It was not until **2017** that **Life Extension’s** suggestions dating

back to the early **1980s**—(that optimal blood pressure is below 120/80 mmHg)—were formally implemented in standard clinical practice.¹³

To roughly estimate how many lost American “life years” occurred because of this delay in lowering blood pressure guidelines, **Life Extension’s** scientific staff amalgamated relevant published data beginning in the year 1980.

Here is the Executive Summary of our findings:

*“On the basis of the available scientific evidence, we can roughly estimate years of life lost attributable to hypertension. From the data we were able to collect and analyze, we estimate that approximately **37,712,740 years of life may have been lost between 1980 and 2014** due to hypertension as an underlying cause in adults aged 45 to 85+ years.”*

In case the number is confusing, assume that each person who died from **less-than-optimal** blood pressure between 1980 and 2014 lost on average five years of life. This prompts us to estimate that roughly **37 million** years of life were needlessly lost from **hypertensive-related** causes during this 34-year period (1980-2014).

If you cut our estimate by **80%**, it still comes to over **seven million** years of life lost due to hypertension.

Findings from the studies described in this editorial provide stark evidence of why you need to look beyond conventional medicine guidelines when seeking to extend your healthy longevity.

And what I like so much nowadays is that you can type into Google or www.pubmed.gov search terms like “**hypertension and mortality risk**” and read the scientific reports yourself.



Refocusing Priorities

In today's soundbite media world, a catastrophic event involving the death of as little as ONE person generates headline news.

Meanwhile, over **1,600** American **cancer** patients perish every day and even more suffer and die from **cardiovascular** disorders.^{14,15}

My perturbation about excess media coverage of these rare catastrophic occurrences is that it distracts from what needs to be done to address the **5,000** Americans dying each day from degenerative diseases of aging.



A Solution to the Hypertension Crisis

The prevalence and severity of today's hypertension crisis cannot be overstated. Too many people over ages 65 and 75 have dangerously elevated systolic blood pressure.

Yet **drugs** that can safely drop blood pressure into safer ranges are grossly underutilized.

At-home blood pressure monitors are accurate and inexpensive. They allow for far more careful and precise monitoring of blood pressure than visiting a doctor several times a year.

That's because blood pressure readings vary dramatically in response to a range of factors such as time of day or night, stress levels, and various other routine circumstances. By checking one's blood pressure at home, one can identify when systolic "spikes" are occurring and adjust their anti-hypertensive drug intake, in consultation with a medical professional.

Physician Assistants and Nurse Practitioners

More physician assistants and nurse practitioners should be on the front lines in curbing the epidemic of hypertension plaguing older and overweight individuals.

Under this scenario, you would bring a history of your at-home blood pressure readings to a physician's assistant or nurse practitioner, who can then prescribe low doses of drugs like telmisartan, an angiotensin receptor blocker (ARB) drug, a beta-blocker like carvedilol, and/or a diuretic.

Following the advice of this medical professional, you would begin taking the prescribed low doses of these drugs and continue monitoring your blood pressure.

If this approach failed to lower your blood pressure to optimal levels (**115/75 mmHg**), your medical professional could adjust the dose of anti-hypertensive medication.

Under this scenario, those who don't like going to doctors could monitor themselves, keeping records of blood pressure readings at various times of the day and bring the reports to a physician assistant or nurse practitioner so that other low-dose anti-hypertensive drugs could be tried, and thus achieve improved blood pressure control.

This could also be accomplished via convenient telemedicine conferences with the medical professional. The net effect would reduce medical outlays and improve patient outcomes.

Contrast the cost-effective scenario I propose to one in which people have an annual exam, one blood pressure reading, are prescribed one dose of one drug and then wait another 3-12 months to reevaluate.

Empowering patients to take control of their own blood pressure could spare millions of Americans each year from the multitude of diseases that hypertension silently inflicts.

Easy Ways to Lower Blood Pressure

The risks posed by even modest blood pressure spikes were long ago quantified. Yet too many aging and obese Americans have dangerously high **blood pressure**.

Nutrients (like garlic,¹⁶⁻¹⁹ melatonin,²⁰⁻²² and fish oil²³⁻²⁵) can lower systolic pressure a few points, but most **hypertensives** need to either lose weight and/or take **drugs**, some that have **side benefits**.

A common drug class used to reduce blood pressure are **beta-blockers**. The beta-blocker drug **carvedilol** has been associated with lower cancer risk in some studies.²⁶⁻²⁹

A drug called **telmisartan** is a different class of medication that has been shown to improve **endothelial function**, in addition to reducing stubbornly high blood pressure.³⁰⁻³³

Please initiate measures to bring your blood pressure into optimal ranges.

I hope to reach a point where no supporter suffers a **hypertensive-related** disorder that was easily preventable.

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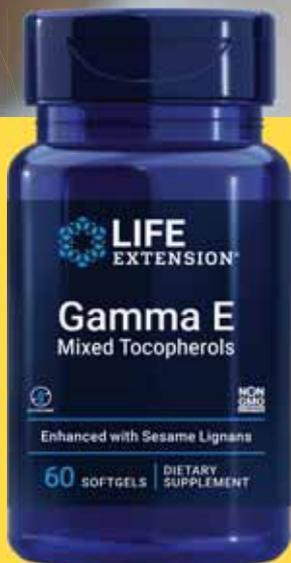
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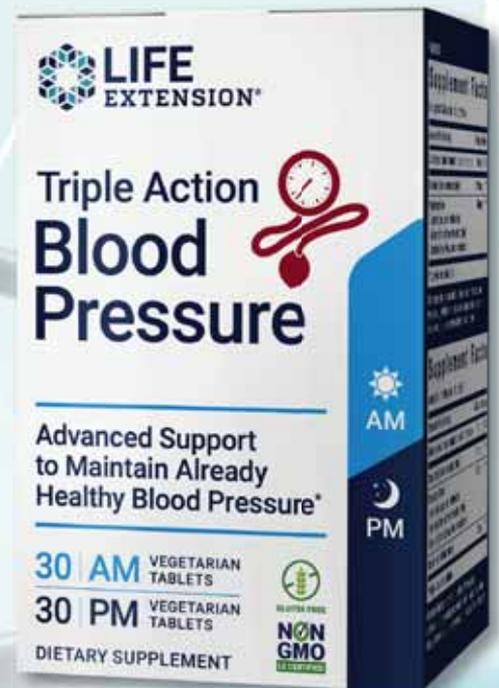
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COLLAGEN PEPTIDES Reverse Skin Aging from the *Inside*

BY MICHAEL DOWNEY

As we age, our skin loses two natural compounds that keep it smooth, moisturized, and youthful looking:

1. **Collagen** and
2. **Hyaluronic acid**.^{1,2}

The loss of these skin components leads to **wrinkles**, **sagging**, and **dryness**.^{1,2}

But there's a way to prevent and even *reverse* these changes. Scientists have clinically demonstrated that:

- **Oral** use of a **collagen peptide** improves **skin elasticity** by an average of **7%**³ and reduces the volume of **eye wrinkles** by **20%**.⁴
- **Oral** use of **hyaluronic acid** significantly increases skin moisture in those with chronically dry, rough skin after just **3-6 weeks**.¹

Researchers have now devised a way to deliver clinically effective doses of these two nutrients together in a tasty, fruit-flavored gummy. Working from the inside out, they can rejuvenate the skin and return it to optimal health.

Collagen Keeps Skin Youthful

The word **collagen** comes from the Greek *kola*, “glue.” Essentially, collagen—the most abundant **protein** in the human body—is the glue that holds the entire body together.

It's the main component of most connective tissues, like tendons and muscle, and makes up **70%** of the inner layer of skin by weight.^{5,6}

Collagen provides strength and resilience and is integrated with **elastin** fibers, the protein that gives skin flexibility and elasticity. Elastin allows the skin to return to its original shape after it's been stretched.⁷

But collagen production begins to decline around age **25**. The cells that produce collagen fibers slow down, and the remaining fibers can stiffen, break, and lose proper shape over time. Elastin fibers also begin to fray and lose elasticity.

It is no coincidence that visible skin aging occurs in many people around **age 25**, which is when **collagen production** begins to drop.

Adults lose about **1%** of their skin collagen *each year*.⁸ While this may not seem like a lot, after several decades, we may have lost **half** the skin collagen we had at age **18**.^{8,9}

This decline accelerates faster in women after **menopause**. Factors such as smoking, high blood sugar, and sun exposure also decrease collagen levels.¹⁰⁻¹⁴

Reduced collagen production has a devastating effect on the skin, resulting in thinning, sagging, and wrinkles.^{8,9}

To solve this problem, scientists developed **collagen peptides** that provide the building blocks for collagen.

Taken orally, they stimulate the production of *new* collagen and elastin in the skin. This leads to increased suppleness and elasticity and **reduces wrinkles**.⁴

Oral Collagen Research

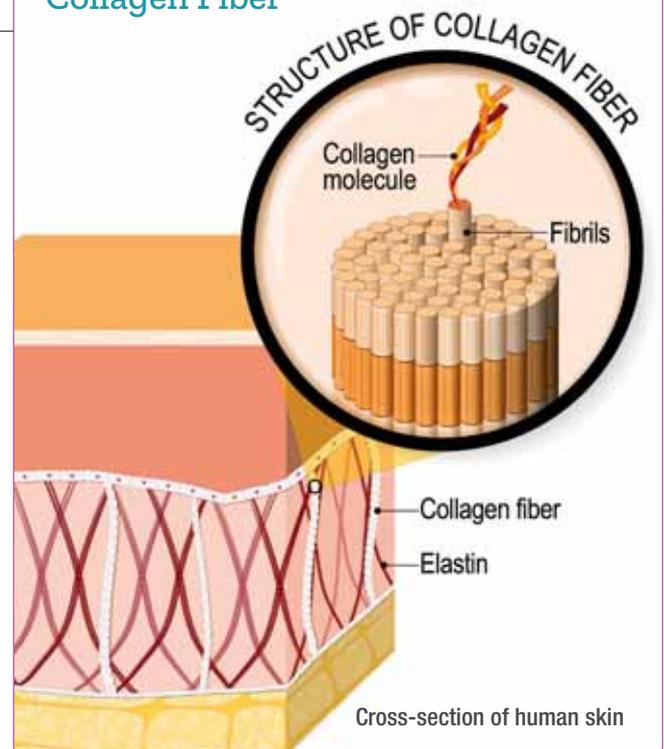
In animal studies, scientists showed that **hydrolyzed** (or partially broken-down) **collagen peptides** *boosted* the creation and activity of collagen.¹⁵ This produces stronger, more supple skin.

Collagen peptides also *decreased* the activity of a “protein-melting” enzyme (**matrix metalloproteinase 2**) that degrades collagen and hastens skin aging.¹⁵

Human trials have now demonstrated that an oral collagen peptide is clinically effective in improving skin appearance.^{3,4}

Scientists evaluated the effectiveness of collagen peptides on **skin elasticity**. One group of volunteers

Collagen Fiber



received **2.5 grams** of oral collagen daily, one received **5 grams** daily, and a third received a placebo.³

After eight weeks, both groups taking the oral **collagen** had an average **7% improvement** in skin elasticity. Remarkably, those subjects retained higher elasticity than the placebo group even four weeks *after* the last dose. The improvement in skin elasticity was found to be *greater* in **women** over age 49.³

Next, researchers tested collagen on **skin wrinkles**. In a double-blind, placebo-controlled trial, they gave oral collagen peptides to 114 women, aged 45 to 65, in daily doses of **2.5 grams**.⁴

Results from Human Study

After four weeks, the volume of eye wrinkles for the collagen group had decreased by **7.2%**, compared with placebo recipients. After the full eight-week trial, those taking oral collagen peptides showed a stunning **20.1% reduction** in the size of eye wrinkles.⁴

In the same trial, scientists studied how **collagen peptides** affected the **synthesis of the dermal matrix**, the structural framework responsible for skin renewal and vitality. They did so by measuring structural proteins in the matrix. The more proteins, the healthier and more youthful the skin appears.⁴

The study found that subjects taking collagen had a **65% increase** in essential type-I **pro-collagen** and an **18% increase** in **elastin fibers**.⁴

Hyaluronic Acid Moisturizes Skin

Hyaluronic acid is equally critical for maintaining and restoring youthful-looking skin.

It's a carbohydrate present in most body tissues. More than **50%** of it is found in the skin, where it helps hold in moisture.^{1,16} In fact, hyaluronic acid can hold up to **1,000 times** its weight in water.¹⁷

Hyaluronic acid is an essential part of the **extracellular matrix**, a network that provides structural integrity and cohesion to skin.¹⁸ It supports skin hydration,¹⁹ stimulates synthesis of collagen and elastin,²⁰⁻²² promotes tissue repair,²³⁻²⁶ and combats the effects of ultraviolet radiation.²⁶

In other words, the skin needs **hyaluronic acid** to maintain a healthy and youthful appearance.

But the body produces *less* of it as we age. This problem is worsened by environmental stress, particularly chronic sun exposure.²⁷⁻³⁰ The result is wrinkling, dryness, and sagging.

In a dramatic finding, however, scientists have demonstrated that **oral hyaluronic acid** can slow—and even *reverse*—these effects.

Oral Hyaluronic Acid Rehydrates Skin

Scientists conducted an in-depth analysis of several previous studies of **hyaluronic acid**. In most, volunteers had been diagnosed with “chronically rough and dry skin,” which was not substantially improved by moisturizers or other treatments.¹

But hyaluronic acid made a radical difference. Compared to volunteers who received a placebo, those taking **oral** hyaluronic acid had a significant **increase** in skin moisture after just **three to six weeks**. And the moisturizing effects continued for a full **two weeks** after they stopped taking it.¹

Hyaluronic acid also **reduced itching** that comes with dry skin.¹

WHAT YOU NEED TO KNOW

Get Healthier, Younger-Looking Skin

- **Collagen and hyaluronic acid** are two nutrients vital to the health and youthful appearance of our skin. The body produces *less* of them as we age, causing wrinkling, sagging, and dryness.
- Taking **oral collagen peptides** spurs the synthesis of new collagen, improving skin elasticity, boosting essential structural proteins, and reducing the size of eye wrinkles by as much as **20%**.
- **Hyaluronic acid** taken orally has been shown to *reverse* the loss of moisture in aging skin, effectively treating dry, itchy skin and helping to restore a more youthful appearance.
- Taking these two nutrients together at clinically effective doses can lead to healthier, smoother, and younger-looking skin.





Summary

Collagen and **hyaluronic acid** keep our skin smooth, supple, moisturized and youthful looking. But, as we age, we lose both these nutrients.

Taking **oral collagen peptides** boosts the synthesis of *new* collagen in the skin. That improves skin structure and elasticity, reduces eye wrinkle depth up to **20%**, and increases levels of proteins that provide strength and resilience to the **dermal matrix**.

Oral hyaluronic acid also protects and nourishes skin by boosting moisture content. That can help treat dry, itchy skin, and make it healthier and younger looking.

Both of these nutrients can now be taken together in clinically effective doses, quickly providing noticeable improvements in the appearance of aging skin. •

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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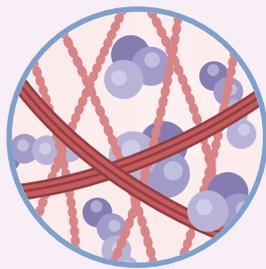
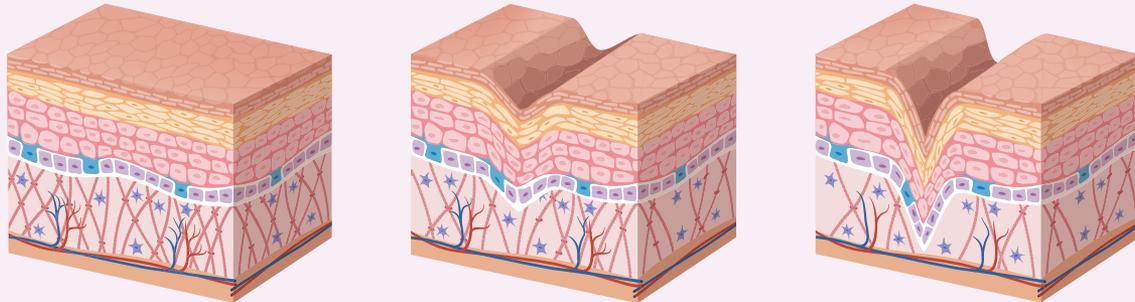
In fact, the scientists concluded that skin dryness is *caused* by a decrease in hyaluronic acid due to aging, sun exposure, smoking, and other factors. Their study found that hyaluronic acid safely and effectively moisturizes the skin and improves its health.¹

You can now orally replenish the skin's diminishing supplies of both collagen *and* hyaluronic acid. These two nutrients have been shown to:

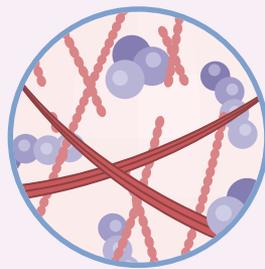
- Increase skin moisture,
- Improve elasticity,
- Decrease wrinkle depth,
- Boost levels of the skin's structural proteins, and
- Provide more youthful-looking skin.

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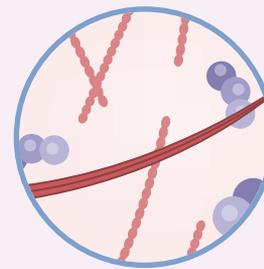
SKIN AGING AND COLLAGEN LEVELS



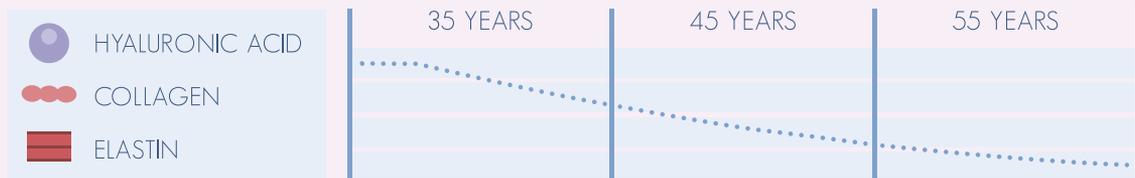
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Protect Against Fatty Liver with Targeted Probiotics

BY KAREN NEWTON



Alcohol abuse and viral hepatitis are well-known causes of liver disease.

Few people are aware that **nonalcoholic fatty liver disease (NAFLD)** and its more severe form, **nonalcoholic steatohepatitis (NASH)**, are responsible for a large share of chronic liver disease cases.¹⁻⁴

The rates of both **NAFLD** and **NASH** have grown exponentially and are expected to increase by **21%** and **63%**, respectively, by the year **2030**.⁵

NAFLD shows no obvious symptoms until potentially irreversible liver damage has occurred. And there are no medications currently available to treat it.

But researchers have discovered a close link between the health of the **liver** and the health of the **gut**.⁶

They found that unhealthy gut bacteria contribute to NAFLD and beneficial bacteria protect against it, when combined with a healthy lifestyle.⁶⁻⁸

Recent clinical trials have shown that a specialized blend of **probiotics**, in combination with a healthy lifestyle, can reduce the severity of NAFLD and even **stop** the harm it does to the liver.^{7,8}

In one study, probiotic supplementation plus following healthy lifestyle advice led to a remarkable **54% reduction** in **C-reactive protein** levels, a measure of inflammation.⁷

The Threat of Nonalcoholic Fatty Liver Disease

The most common sources of chronic liver damage and liver failure used to be alcohol abuse, and infection of the liver by viruses such as hepatitis B and C.

In recent years, however, liver disease *not* associated with alcohol or infection has skyrocketed. In this condition, known as **nonalcoholic fatty liver disease (NAFLD)**, high levels of fatty tissue build up in the liver, slowly destroying it.

NAFLD currently affects approximately **25%** of the entire U.S. population, accounts for over **75%** of all chronic liver disease, and is a major contributor to the incidence of advanced liver disease.^{5,9-11}

Those people most at risk are the **obese** and individuals who suffer from high **blood sugar**.

Men and women with NAFLD usually have no symptoms. It is diagnosed through a combination of blood tests and medical scans. In cases where the diagnosis is not clear,¹² a biopsy may be necessary.

Few people give their liver a second thought, but it works tirelessly to filter the blood and detoxify the body.

In the long term, NAFLD can cause **fibrosis** (scarring) of the liver, significantly impairing normal liver function.¹³⁻¹⁵ *Advanced* scarring, known as liver **cirrhosis**, is irreversible and can lead to liver failure, that is eventually fatal. The only treatment at that point is a liver transplant.¹⁶

The Gut-Liver Connection

The microorganisms that live in our intestines, or **gut**, have a critical impact on overall health throughout the body.

An *unhealthy* mix of gut microbes is increasingly common in populations that consume a modern Western diet. This imbalance has been found to be tied to many chronic ailments.¹⁷⁻¹⁹

Improving **gut health** through diet and the use of **probiotics** may help reduce the risk of some of these diseases.

The impact of gut microbiota is particularly profound for liver health—so much so that the link is known as the **gut-liver axis**.¹⁸

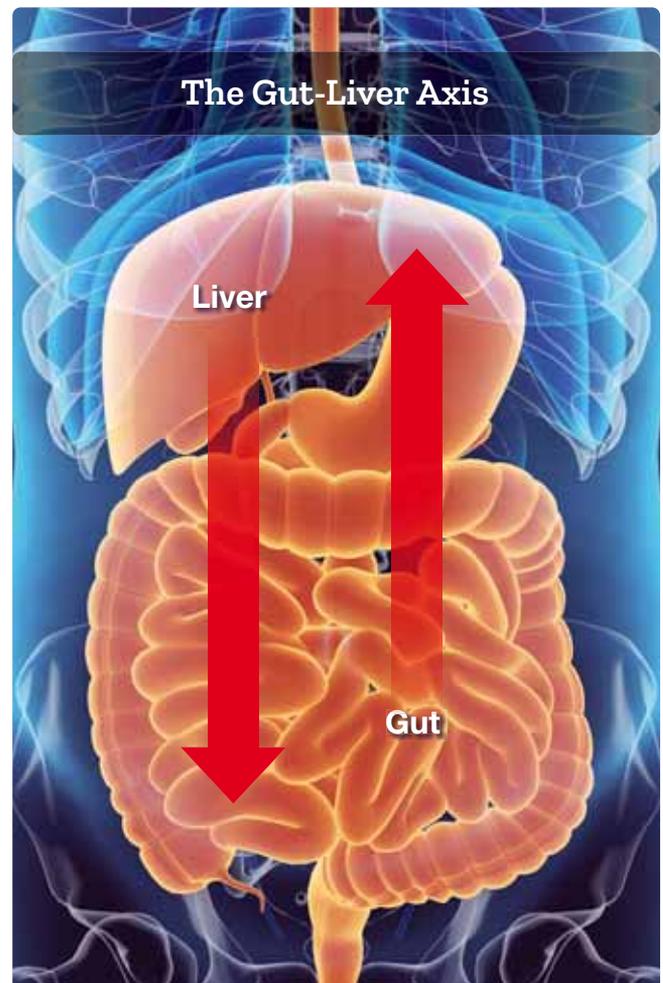
Here's why: The majority of blood that circulates away from the **intestines** feeds *directly* into the liver through a large vessel called the **portal vein**. This vein then splits into tiny capillaries that run throughout the liver.

What this means is that most blood-borne substances coming from the digestive system pass through the liver *before* circulating to other organs and tissues, giving the liver a first shot at processing nutrients, and filtering out and neutralizing toxins.

But this gut-liver axis has a downside: It makes the liver particularly susceptible to harmful compounds and microorganisms coming from the gut. While the liver neutralizes most of these harmful substances, it can be damaged in the process.

With an *unhealthy* mix of **gut microbes**, damage occurs to the lining of the intestines, *increasing* the number of harmful compounds and cells that get into the portal vein and make their way to the liver.¹⁸

The makeup of the **gut microbiota** therefore has a dramatic impact on **liver health**. While beneficial bacteria are protective, the wrong microbes can do a huge amount of damage to the liver. Researchers believe this is one of the major contributing factors to nonalcoholic fatty liver disease.⁶





Probiotics Protect Against NAFLD

Due to the rapid increase in NAFLD rates, scientists have been scrambling to find ways to shield the liver against the damage it causes.

Because of the strong link between gut microbes and NAFLD, they decided to focus on **probiotics**.

Scientists designed a blend of microorganisms they believed was ideal to improve gut health and favorably impact the liver, reducing risk *and* severity of non-alcoholic fatty liver disease (NAFLD).

This probiotic blend consists of **seven beneficial bacteria** that are considered to be a part of a healthy gut microbiome. They are:

- *Lactobacillus casei* PXN® 37,
- *Lactobacillus rhamnosus* PXN® 54,
- *Streptococcus thermophilus* PXN® 66,
- *Bifidobacterium breve* PXN® 25,
- *Lactobacillus acidophilus* PXN® 35,
- *Bifidobacterium longum* PXN® 30, and
- *Lactobacillus bulgaricus* PXN® 39.

But probiotic organisms can only work if they survive and thrive in the intestines, outcompeting *harmful* bacteria. Combining the **probiotics** with **prebiotics**, compounds that help support the health and functioning of the bacteria, give the probiotic organisms an added boost.

WHAT YOU NEED TO KNOW

Synbiotics Combat NAFLD

- **Nonalcoholic fatty liver disease (NAFLD)** is the most common cause of chronic liver damage. It affects **25%** of the U.S. population, and much higher rates of older adults and people who are overweight.
- There are generally no warning signs or symptoms of NAFLD until damage to the liver is already severe and irreversible. No drugs are currently approved to treat it.
- Scientists have discovered that the health of the liver is closely related to **gut microbiota**, the mix of bacteria in the digestive tract.
- Clinical trials have shown that a carefully designed **probiotic and prebiotic blend**, combined with following dietary and lifestyle advice, can significantly reduce several markers of NAFLD severity, and even appears to stop the damage it does to the liver.

The blend of probiotics and prebiotics is often referred to as **synbiotics** because of their **synergistic** activity in improving gut health.

Results of Human Trials

Two randomized clinical trials have evaluated the impact of this new **probiotic-prebiotic blend** on nonalcoholic fatty liver disease.

The first study recruited volunteers who were overweight or obese and had a diagnosis of NAFLD. Patients were randomized to receive either the **synbiotic** blend or a placebo for 28 weeks.⁷ Both groups were advised to follow recommendations for physical activity and balanced diet.

To determine the effectiveness, researchers evaluated different markers of **NAFLD** severity. The first was levels of two **liver enzymes**, **ALT** (alanine aminotransferase) and **AST** (aspartate aminotransferase), which spill into the bloodstream when there's damage to the liver. *Higher* levels in the blood indicate *more* liver damage.

The subjects in this study all started out with **elevated** liver enzyme levels due to NAFLD. At the end of the study, both groups saw a decline in liver enzymes,

but those who received the **probiotic** had a *greater* drop in levels of **ALT** and **AST** of such magnitude that they returned to a **normal range**.

By the end of the study, another marker of NAFLD severity, the **fibrosis score** (showing how much scarring is present in the liver), dropped, on average, into the **normal** range in the **probiotic-prebiotic** group.

Lastly, this study looked at **C-reactive protein**, a marker of the inflammation resulting from NAFLD. The **probiotic-prebiotic** group had a **54% reduction** in C-reactive protein levels by the end of the study.

The second study tested the same **probiotic-prebiotic** blend plus healthy lifestyle advice on people with nonalcoholic fatty liver disease who were *not* overweight or obese.⁸

In these subjects, those taking the **probiotic-prebiotic** blend saw a larger average drop in liver enzymes, including a significant **17%** reduction in AST. The fibrosis score also dropped significantly in the **synbiotic** group, falling into the normal range, on average, and C-reactive protein was **reduced by 46%**.

The outcomes of these trials indicate that the new **probiotic-prebiotic blend** significantly reduces signs of nonalcoholic fatty liver disease (NAFLD) severity, regardless of body weight.





Summary

Nonalcoholic fatty liver disease (NAFLD) occurs in **25%** of the U.S. population, and in much higher rates in older and in overweight people.

Over time, without dietary and lifestyle changes, it can progress and damage the liver, potentially leading to liver cirrhosis and liver failure.

There are currently no FDA-approved medical treatments to prevent or reduce liver damage. However, scientists have discovered that liver health is tied to a healthy mix of **gut microbes**.

A carefully chosen blend of **probiotic microorganisms**, combined with a **prebiotic** to support their survival, has been shown in clinical trials to reduce the severity of liver disease caused by NAFLD. •

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

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1 bottle \$34.50 • 4 bottles \$31.50 each

For full product description and to order **Bone Restore Elite with Super Potent K2**, call 1-800-544-4440 or visit www.LifeExtension.com

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Probiotic-
Prebiotic
blend for

Liver Health

FLORASSIST® Liver Restore™ contains **7 strains** of beneficial **probiotic** bacteria—plus a supporting **prebiotic**—to provide *targeted* liver support.

When clinically studied, the **probiotic-prebiotic** blend in **FLORASSIST® Liver Restore™** was found to:

- Support healthy levels of liver enzymes
- Inhibit inflammatory factors to support liver health

Take **2 capsules** daily as recommended by a healthcare practitioner.

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

Item #02402

60 vegetarian capsules

1 box **\$15**

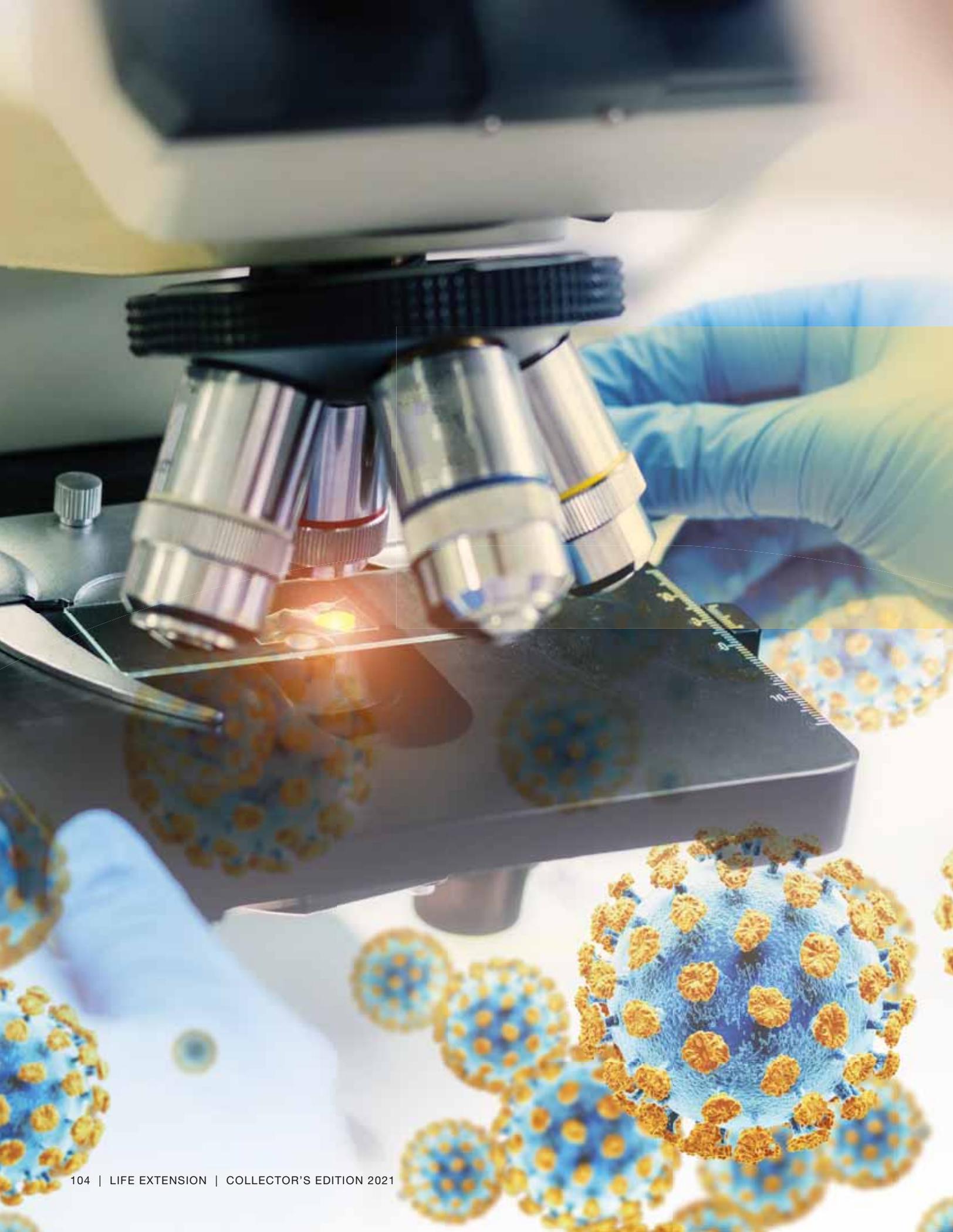
4 boxes \$13.50 each

PXN® is the registered trademark of ADM Protexin Limited. All rights reserved.

Contains milk and soybeans.



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The background of the page is a dense field of yellow, oval-shaped capsules, likely representing vitamin D supplements. On the left side, there is a vertical strip showing a blue, spherical virus particle with a textured surface, possibly representing an acute respiratory infection. The text is centered in the upper half of the page.

VITAMIN D'S Immune Benefits

BY JULIE MYERS

Vitamin D has shown promise against winter illness because it plays a critical role in supporting the **immune system**.

Low vitamin D levels have been associated with *higher* rates of many chronic diseases.¹⁻⁶

This includes an *increased* risk for acute communicable diseases, including **viral infections** in **vitamin D deficient** people.^{7,8}

A meta-analysis of randomized, controlled clinical trials showed a protective effect against **acute respiratory infections** with vitamin D supplementation.⁹

More than **40%** of Americans have been found to have **insufficient** blood levels of vitamin D (defined as levels between **20-30 ng/mL**).

An additional nearly **30%** of Americans have lower vitamin D levels (**below 20 ng/mL**) that qualify as **deficiency**.¹⁰

This factor may be especially important among adults aged 60 and over.¹⁰

Life Extension® supporters have long been advised of the importance of maintaining an optimal vitamin D level between **50-80 ng/mL**.

Oral intake of **vitamin D** to ensure healthy levels may help protect against winter-season conditions.

Impact on Immune Function

For the body to produce its own **vitamin D**, we need direct skin exposure to sunlight.

But we spend most of our time indoors or covered up by clothes and sunscreen. And spending more time in the sun raises the risk of skin cancer and accelerated skin aging.

The other way to get vitamin D is through diet, but most foods contain only modest amounts.

As a result, a majority of people are getting too little of this crucial vitamin.

Having low levels of vitamin D is associated with a greater risk for many health problems, from cognitive decline to heart disease.¹⁻⁶

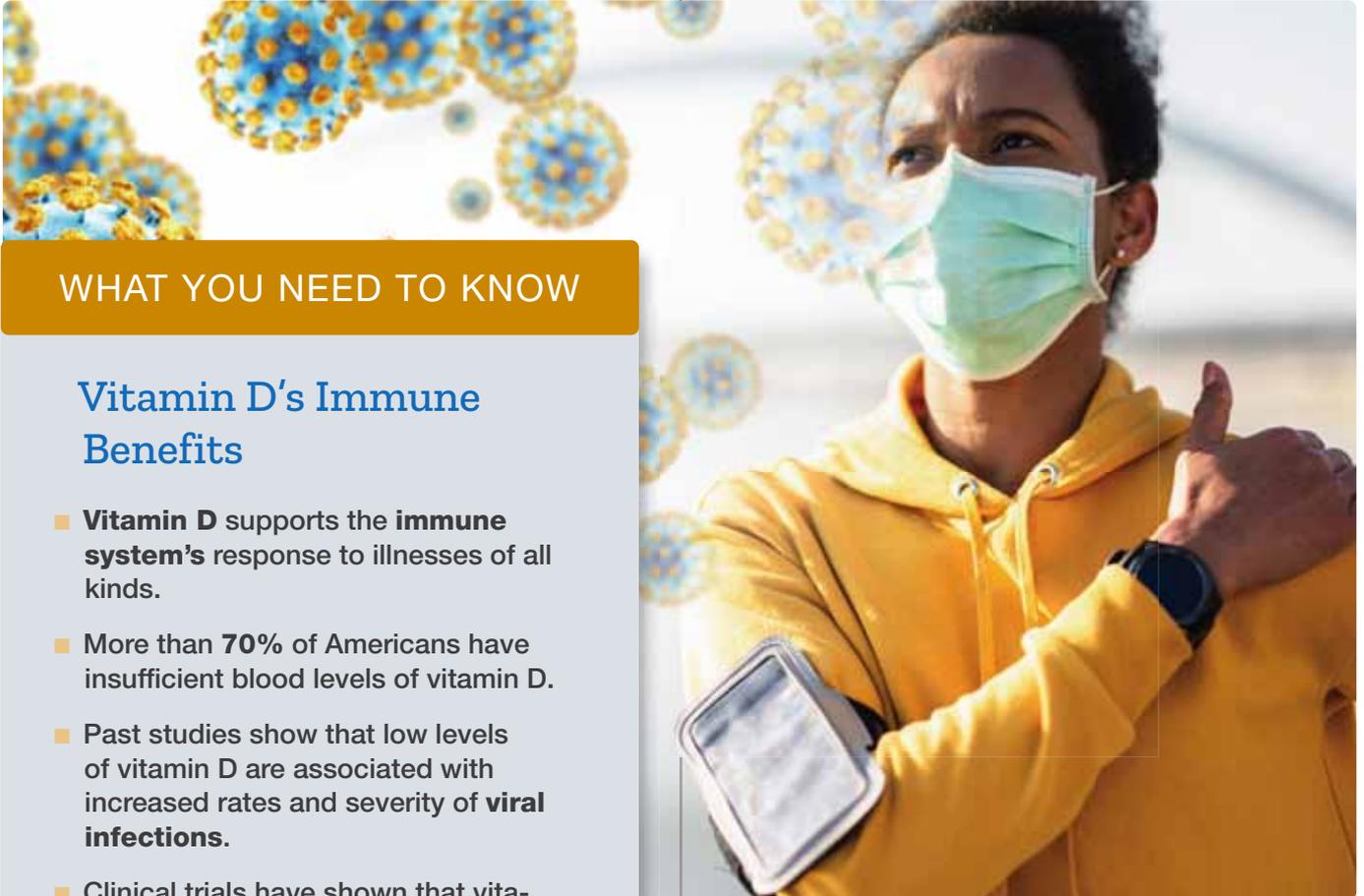
Vitamin D supports **immune health** by helping:^{7,8}

- Optimize immune function that protects us from infectious disease.
- Control *overly* aggressive inflammatory immune responses, which can inflict systemic damage.

When excessive levels of immune-system proteins called **cytokines** provoke attacks on healthy tissues, the result is called a "**cytokine storm**."

This is a dangerous reaction that can lead to **acute respiratory distress syndrome (ARDS)**, an often-fatal complication in which fluid collects in the lungs.





WHAT YOU NEED TO KNOW

Vitamin D's Immune Benefits

- **Vitamin D** supports the **immune system's** response to illnesses of all kinds.
- More than **70%** of Americans have insufficient blood levels of vitamin D.
- Past studies show that low levels of vitamin D are associated with increased rates and severity of **viral infections**.
- Clinical trials have shown that vitamin D has a protective effect against **respiratory tract infections**.

Vitamin D and Viral Illness

Viral respiratory tract infections, such as the flu, are more common during winter.

One of the reasons for this may be **seasonal variations** in our vitamin D levels. During winter, we get less sun, leading to lower vitamin D production.^{11,12} That puts us at increased risk for viral infection.

Research shows that infections are *more* common and more severe in those with vitamin D *deficiency*.^{12,13}

Low vitamin D is also a risk factor for more severe lung disease, including acute respiratory distress syndrome (**ARDS**).^{14,15} Research suggests that those with insufficient vitamin D are at increased risk of a **cytokine storm**.¹⁶

This hyperproduction of inflammatory factors leads to worsening disease severity and increased risk of death. Low vitamin D levels may be associated with the dangerous inflammation that occurs in ARDS.^{14,15}

Vitamin D's Protective Actions

Vitamin D contributes to many functions that help shield the body from infections and lessen their severity. Maintaining adequate levels of **vitamin D**:^{14,17-20}

- Interferes with the ability of viruses to **replicate** and produce *more* viruses,
- Helps support and repair healthy cellular linings in the body, including in the airways of the **lungs**,
- Increases production of proteins that shield against **bacteria and viruses**, enhancing the ability of cells to protect themselves from infection,
- Improves the ability of **immune cells** to mount an effective attack against specific viruses, and
- Helps prevent the immune system from going overboard and producing *excessive* pro-inflammatory compounds in the lungs.

Oral Vitamin D Reduces Risk

Many studies have evaluated whether daily **oral intake** of vitamin D can reduce rates of **viral respiratory illness**.

Meta-analyses of clinical trials have shown that vitamin D has a protective effect against **respiratory tract infections**.^{9,21}

The impact of vitamin D treatment is greatest in those who, to begin with, have *low* levels of vitamin D.⁹

Life Extension® supporters have long been advised of the importance of maintaining an optimal vitamin D level between **50-80 ng/mL**, and yearly blood testing.

Summary

Vitamin D supports the **immune system** in many different ways, helping to shield the respiratory tract from **viral illness**.

A large majority of adults have vitamin D levels below the optimal level.

Trials have shown that **oral vitamin D** intake modestly *decreases* rates of **viral respiratory tract infections**. ●

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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Blood Testing Vitamin D Levels

There are no universal guidelines for frequency of vitamin D testing. However, given the high prevalence of vitamin D deficiency and the strong association of low vitamin D levels with several health issues, annual testing and supplementation to achieve adequate blood levels is highly recommended.

Annual blood tests can let people know whether they are taking the correct dosage to ensure optimal blood levels of vitamin D.

If you do not already maintain an optimal blood level of **25-hydroxyvitamin D** of **50 to 80 ng/mL**, then take between **5,000 to 8,000 IU** of vitamin D daily with meals.

DOPAMINE

THE “FEEL GOOD”
NEUROTRANSMITTER

Feel Better, THINK More Clearly

Dopamine, the “feel good” neurotransmitter, regulates motivation, mood, movement, and cognitive function.

With age, dopamine levels *decline* due to the increase of the **MAO-B enzyme**.

Amur Cork Tree (Phellodendron bark) can help *preserve dopamine* by *inhibiting MAO-B* activity.

Dopamine Advantage provides **500 mg** of **Amur Cork Tree** in each capsule.

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

Note: Those who take MAO-B-inhibiting drugs like deprenyl do not need to take phellodendron.



Dopamine Advantage

Item #02413 • 30 vegetarian capsules
1 bottle **\$13.50** • 4 bottles \$12 each



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ZINC

UP

YOUR BONE HEALTH



Item #01813

50 mg • 90 vegetarian capsules

1 bottle **\$6.75** • 4 bottles \$6 each



OptiZinc® is a registered trademark of InterHealth Nutritionals, Inc.

You know zinc is good for you—but are you getting enough?

Zinc promotes critical **immune** functions and healthy **bones**.

This formula provides **50 mg** of zinc in a convenient, vegetarian capsule.

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

Caution: Supplemental zinc can inhibit the absorption and availability of copper. If more than 50 mg of supplemental zinc is to be taken daily for more than four weeks, 2 mg of supplemental copper should also be taken to prevent copper deficiency.

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DEFEND YOUR HEALTH

VITAMIN D3

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



Item #01713 • 5,000 IU • 60 softgels
1 bottle \$7.50 • 4 bottles \$6.50 each

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



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

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BOOST BRAIN FUNCTION

Mega Green Tea Extract



Mega Green Tea Extract provides powerful beneficial compounds called **catechins** including **EGCG** that support brain and whole-body health.

- EGCG supports new brain cell growth¹
- Promotes brain plasticity²
- Improves cognitive performance³
- Enhances brain wave activity⁴

Each cost-effective bottle lasts over three months!

Each **725 mg** capsule of **Mega Green Tea Extract** is standardized to 98% polyphenols that provide **326 mg** of **EGCG***.

An average cup of green tea contains about **150 mg** to **300 mg** of **polyphenols**.⁵ Each capsule of this supplement provides **725 mg** of green tea extract, standardized to **98%** polyphenols. That means you'd have to drink about **3 cups** of green tea to get the same number of polyphenols as one capsule of **Mega Green Tea Extract**.

Mega Green Tea Extract Decaffeinated

Item #00954 • 100 vegetarian capsules
1 bottle **\$22.50**
4 bottles \$18 each

Mega Green Tea Extract Lightly Caffeinated

Item #00953 • 100 vegetarian capsules
1 bottle **\$22.50**
4 bottles \$18 each



* **EGCG** is the acronym for **epigallocatechin gallate**, which is the polyphenol in green tea that has demonstrated the most robust health benefits.

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For full product description and to order either **Mega Green Tea Extract**, call 1-800-544-4440 or visit www.LifeExtension.com

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FISETIN

The Longevity Flavonoid



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

Fisetin is poorly *absorbed* due to its breakdown in the small intestines.

Bio-Fisetin solves this problem by enclosing **fisetin** with a compound from the fenugreek herb.

A **human** trial showed **bioavailability** of this **new fisetin** compound increased up to **25 times** compared to fisetin by itself.⁹

Just **one** capsule daily of **Bio-Fisetin** helps manage **senescent cells** and may support overall longevity.

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Item #02414 • 30 vegetarian capsules

1 bottle **\$11.25** • 4 bottles \$10 each



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



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- FISH OIL RECOGNIZED BY MEDICAL ESTABLISHMENT
- NAC PROTECTS RESPIRATORY FUNCTION
- CARDIOLOGIST OBSERVES ARTERIAL PLAQUE REVERSAL
- NOOTROPICS CHARGE UP BRAIN FUNCTION
- VITAMIN D REDUCES RESPIRATORY INFECTIONS
- BLOOD TESTS IDENTIFY EARLY-STAGE DIABETES
- IMMUNE-BOOSTING PROPERTIES OF LACTOFERRIN
- BLOOD PRESSURE CONTROL ADDS MORE LIFE YEARS
- COLLAGEN PEPTIDES RESTORE SKIN HYDRATION
- REDUCE SEVERITY OF FATTY LIVER DISEASE