



The Science of a Healthier Life®

JANUARY/FEBRUARY 2022

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Magnesium Can Help



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- Encourages cells to recycle waste material
- Helps maintain cellular energy balance



[†]Developed in collaboration with Insilico Medicine, Inc.

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20 mg • 30 vegetarian capsules



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

References

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a bodyguard for
your brain!

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



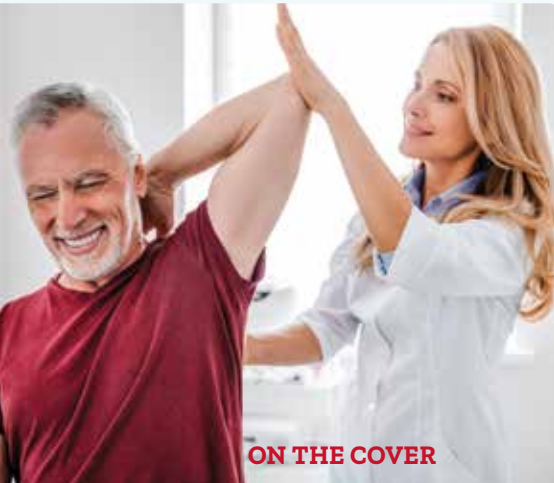
GLUTEN FREE



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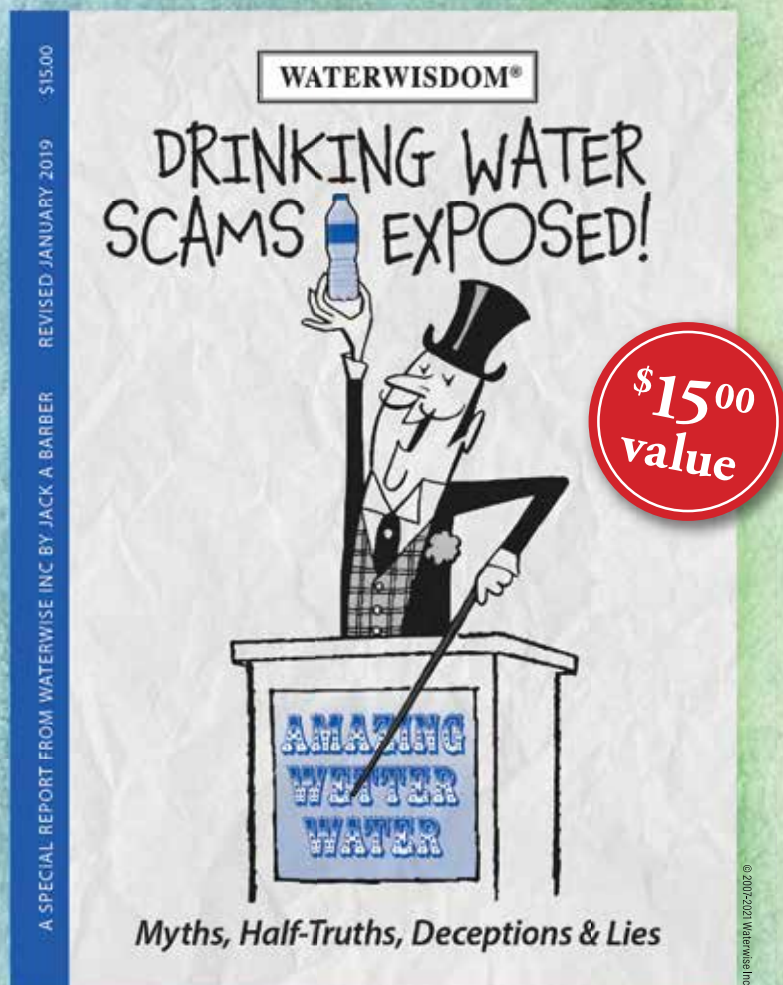
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In the News



Better Cognitive Function with PQQ

Individuals who received supplements containing pyrroloquinoline quinone (PQQ) had better cognitive function compared to those given a placebo, according to the results of a trial published in the *Journal of the American College of Nutrition*.*

The trial included 58 participants, 40 to 80 years old, with aging-associated cognitive impairment, who received either **21.5 mg** of PQQ per day for 12 weeks, or a **placebo**.

In the group that received **PQQ**, improvement was observed in composite memory, verbal memory, reaction time, complex attention, cognitive flexibility, executive function (judgement), and subjective forgetfulness, compared to the placebo group.

Editor's Note: PQQ supports the growth of new mitochondria to promote cellular energy.

* *J Am Coll Nutr.* 2021 Aug 20;1-14.

Supplements Improve Sleep Quality

A systematic review and meta-analysis published in the *Postgraduate Medical Journal* found benefits for supplemental **vitamin D**, **melatonin**, and **amino acids** in improving people's quality of sleep.*

Researchers studied 15 randomized, controlled trials that examined the association between subjective sleep quality and supplementation with amino acids, the hormone melatonin, and vitamin D.

Pooled data for the two studies involving amino acid supplements, seven studies involving melatonin, and four studies involving vitamin D each showed significant differences between supplemented and control groups, with **more favorable sleep scores** occurring among those who received the supplements.

Editor's Note: Sleep quality was assessed by using the Pittsburgh Sleep Quality Index.

* *Postgrad Med J.* 2021 Jan 13.





Breast Cancer Drug Reduces Risk of Dying

The breast cancer drug **Enhertu®**, made by AstraZeneca PLC, has been found to significantly reduce the risk of dying or of tumor progression in women with advanced disease, according to a *Wall Street Journal* report.*

A phase 3 clinical trial called DESTINY-Breast03 compared Enhertu® to Kadcyla®, the current standard of care, in 500 women with metastatic breast cancer whose cancers didn't respond to earlier treatment, and whose tumors produced high levels of the **HER2** protein.

HER2 stands for **human epidermal growth factor receptor 2**. It can be put into remission with drugs like Herceptin®, but often returns and requires further treatment. Mortality rates are high for **HER2 positive** cancers compared to **estrogen-receptor positive** breast tumors that respond better to curative therapy.

This study found that compared to the drug Kadcyla®, **Enhertu®** reduced the risk of death or of tumor progression by **72%**.

After one year, **75.8%** of women treated with Enhertu® had no disease progression, compared to **34.1%** of women treated with Kadcyla®.

According to the trial's lead investigator, metastatic breast cancer patients typically experience disease progression in less than one year.

"We've never seen a magnitude of benefit like this in metastatic breast cancer before," said Dave Fredrickson, AstraZeneca's head of oncology.

Enhertu® works by tracking down cancer cells and delivering a dose of chemotherapy at the site of the tumors, leaving healthy tissue unharmed.

Editor's Note: Enhertu® is currently used as a third-line treatment, which means it's only used after two previous treatments have failed. These results suggest that Enhertu® would be beneficial earlier on in the treatment process. AstraZeneca is hopeful that the drug could also be used to treat or cure early-stage disease.

* Available at: <https://www.wsj.com/articles/astrazeneca-breast-cancer-drug-found-to-reduce-risk-of-dying-11632146777>. Accessed September 24, 2021.



Multivitamin Lowers Risk of Hip Fracture

A meta-analysis reported in the *Archives of Osteoporosis* found a link between the use of multivitamin supplements and a lower risk of sustaining a fragility hip fracture, a complication of osteoporosis.*

A fragility fracture is one that results from low-level trauma.

In eight studies that reported multivitamin use among a total of 80,148 men and women with osteoporotic hip fracture, multivitamin use was associated with a **51% lower** risk of fragility hip fracture compared to non-use.

Editor's Note: "The protective effect of **calcium** and **vitamin D** supplementation on hip fracture risk has been a popular topic of study for decades," the authors observed. "In recent years, this focus has been extended to numerous other supplements such as **carotenoids**, **fatty acids**, **minerals**, and **vitamins A, C, and E**."

* *Arch Osteoporos*. 2021 Feb 11;16(1):29.

Whey Protein Improves Microvascular Function in Heart Failure Patients

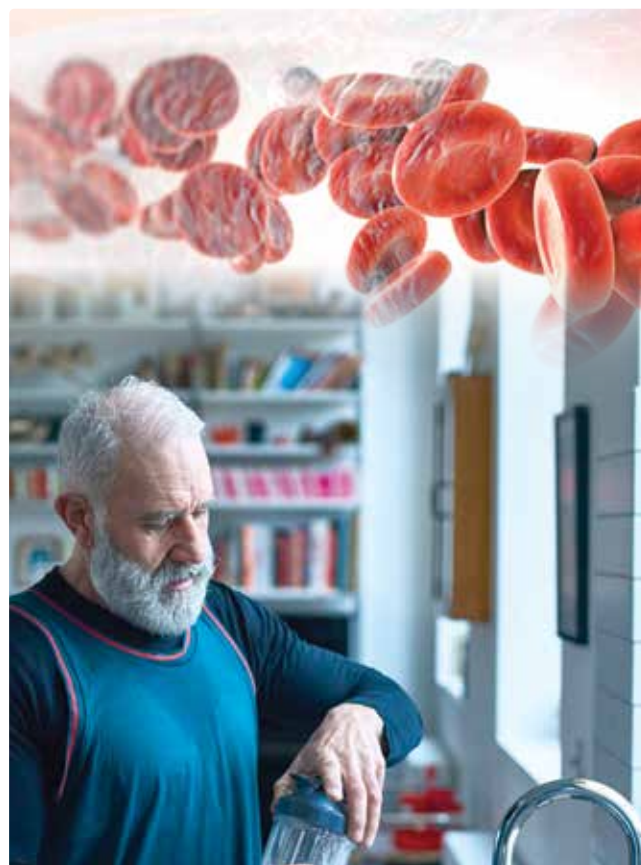
Heart failure patients supplemented with whey protein showed improvement in systemic microvascular circulation, according to a report in the *Brazilian Journal of Medical and Biological Research*.*

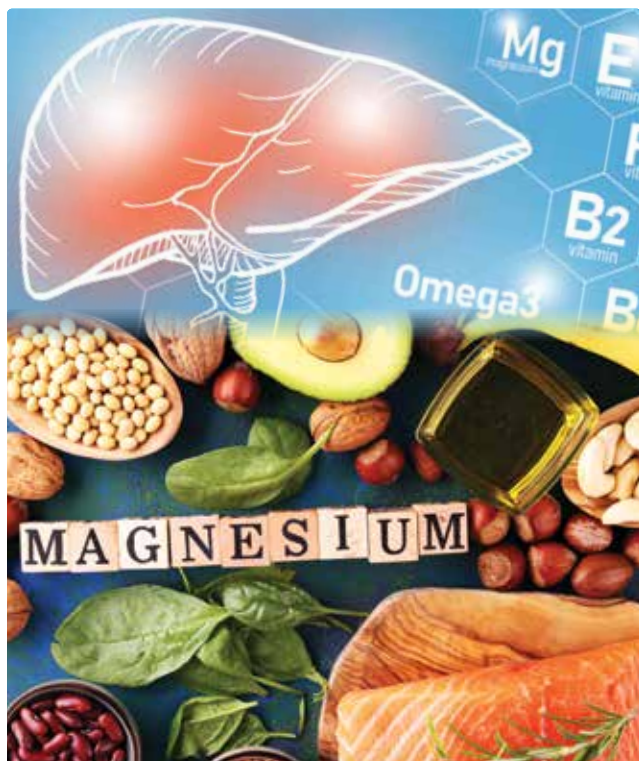
A randomized, placebo-controlled trial included 25 participants, average age 66, who had New York Heart Association class I or II heart failure. Participants received whey protein or a placebo for 12 weeks.

"Our results suggested that dietary supplementation with whey protein improved microvascular endothelial function and possibly smooth muscle structure in patients with heart failure," the authors concluded.

Editor's Note: The endothelium is the lining of the body's arteries, whose function may be impaired in cardiovascular diseases, thereby reducing the arteries' ability to relax, which adversely affects circulation.

* *Braz J Med Biol Res*. 2021 Apr 19;54(6):e10577.





Greater Magnesium Intake Linked with Lower Liver Cancer Risk

Increased intake of magnesium has a protective effect against the risk of developing liver cancer, an article published in *The American Journal of Clinical Nutrition* reported.*

Researchers at Vanderbilt University Medical Center examined data from 536,359 participants in the National Institutes of Health-American Association of Retired Persons (NIH-AARP) Diet and Health Study cohort. Food-frequency questionnaire responses during 1995 to 1996 were analyzed for total magnesium intake from supplements and food. The subjects were followed through 2011.

Among those whose total magnesium intake was among the top **25%** of participants, there was a **35%** lower adjusted risk of developing liver cancer in comparison with participants whose intake was among the lowest **25%**.

Editor's Note: During the time of the study, 1,067 cases of liver cancer were diagnosed among the participants.

* *Am J Clin Nutr.* 2021 Mar 11;113(3): 630-638.

Time-Restricted Eating May Help Prevent and Manage Chronic Metabolic Disease

A form of intermittent fasting called time-restricted eating may have a role in the prevention of chronic metabolic diseases, according to an article in *Endocrine Reviews*.*

Time-restricted eating is a technique in which all daily calories are consumed within a period of eight to 10 hours or less. Maintaining a long overnight fast is one way to conceptualize time-restricted eating. Long fasting periods have been associated with reduced chronic disease risk.

Research suggests that adopting a short window of feeding daily helps support healthy circadian rhythms. Circadian rhythms dictate the activity of genes, hormones, and metabolism at different times during a 24-hour day. Aligning when we eat with the body's internal clock optimizes health.

Editor's Note: "Intermittent fasting can improve sleep and a person's quality of life as well as reduce the risk of obesity, diabetes and heart disease," said senior author Dr. Satchidananda Panda.

* *Endocr Rev.* 2021 Sep 22;bnab027.



B Vitamins Benefit Stroke Patients

A meta-analysis of randomized, controlled trials revealed lower combined risk of stroke, heart attack and vascular death, as well as a reduction in homocysteine levels, in stroke patients who received supplements containing B vitamins, compared to a placebo.*

Researchers selected eight trials that included a total of 8,513 stroke patients. Trials were limited to those that evaluated homocysteine levels and recurrence of stroke, recurrence of cardiovascular disorders, and vascular death (separately or combined) among participants who received a placebo or vitamin B6, vitamin B12 and folate.

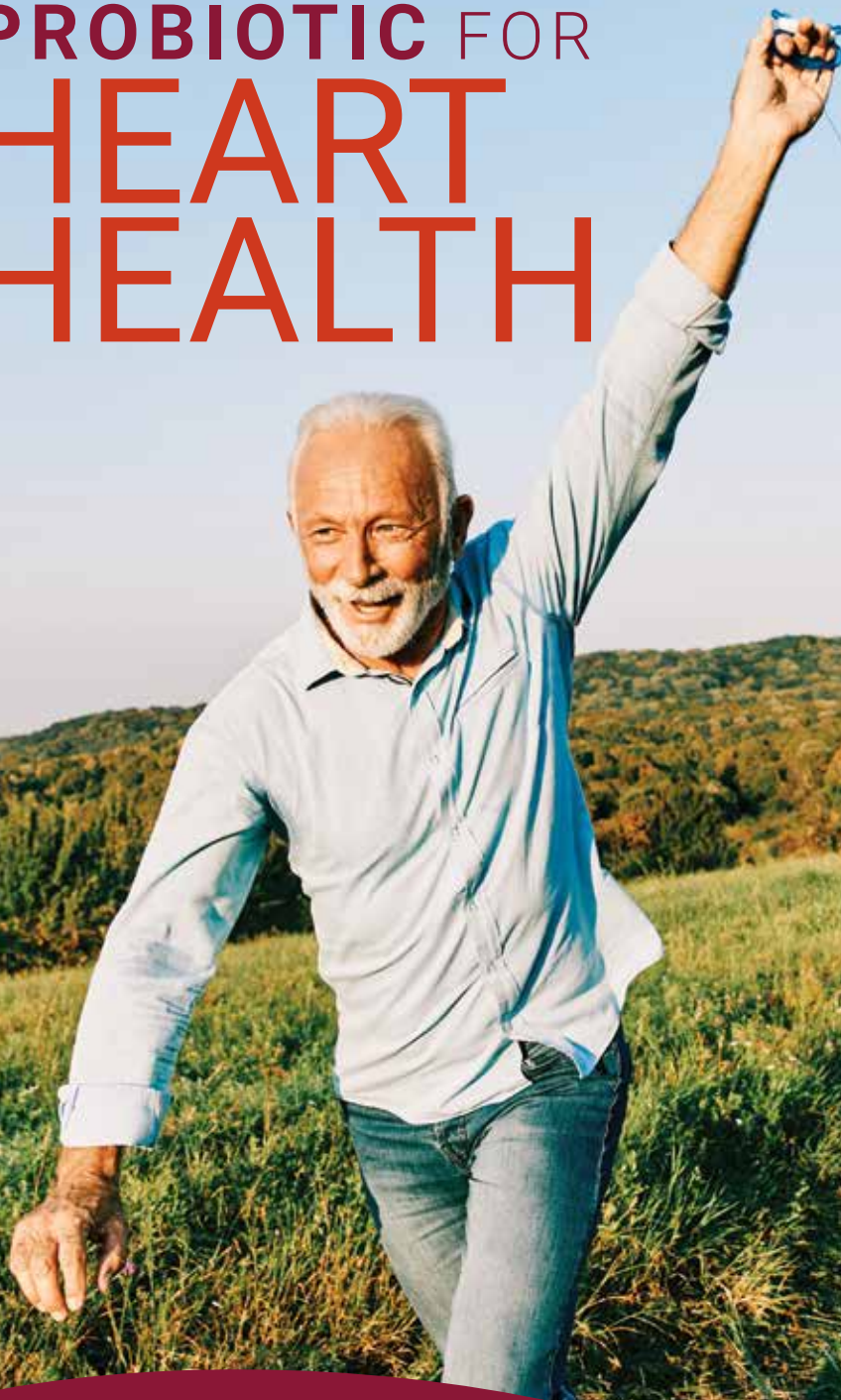
Analysis of the trials' results found a significant reduction in average homocysteine levels among B-vitamin-supplemented participants compared to those who received placebo. When the combined risks of heart attack, stroke and vascular death were examined, there was an **11%** lower risk among participants who received the vitamins compared to the placebo.

Editor's Note: Homocysteine is an amino acid formed in the body which, when elevated, is a risk factor for cardiovascular disease and numerous other conditions.

* *Cureus*. 2021 May 11;13(5):e14958.



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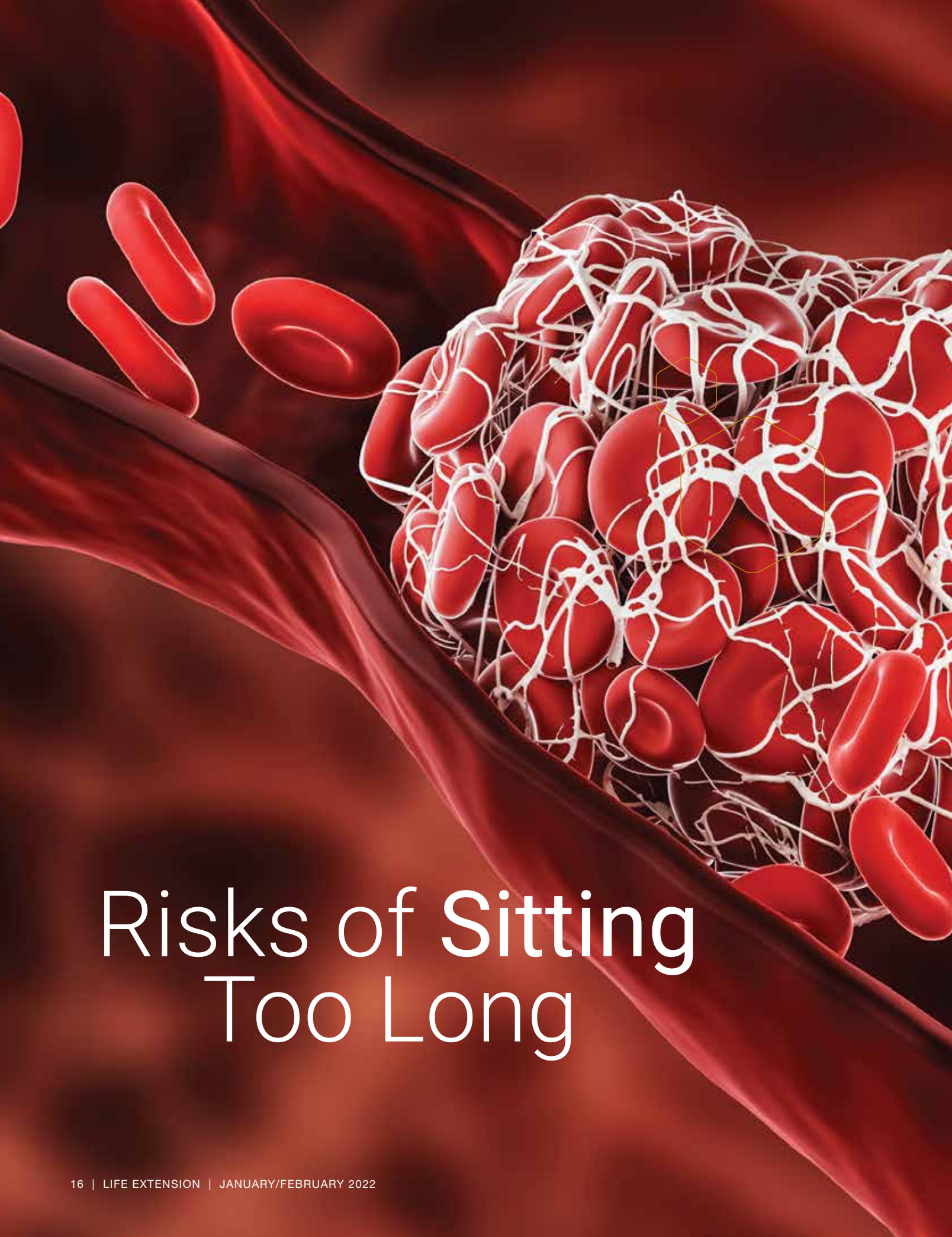


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1. Eur J Clin Nutr. 2012 Nov;66(11):1234-41.
2. Br J Nutr. 2012 May;107(10):1505-13.
3. Eur J Clin Nutr. 2012 Nov;66(11):1234-41

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Risks of Sitting Too Long



BY MARSHA MCCULLOCH, MS, RD



According to a study that evaluated sedentary behaviors, Americans spend **more than half** their waking hours sitting, whether at work, commuting, or at home.¹

Any extended period of sitting increases the risk of **deep vein thrombosis**.²

These dangerous clots commonly develop in the legs,^{3,4} but can break loose and travel to the lungs. They cause as many as **300,000 deaths** in the U.S. annually.⁵

Scientists have identified two ingredients—the enzyme **nattokinase** and an extract of **French maritime pine bark**—that help prevent clotting and break down clots that start to form.⁶⁻⁹

A combination of these compounds has been proven in **clinical studies** to help prevent **venous clots** even in high-risk individuals.¹⁰

Sitting Too Long Can Be Deadly

Long, uninterrupted periods of sitting are a health hazard, even for those who exercise daily.¹¹

When we sit, our calf muscles aren't contracting to help propel spent blood in the veins back up to the heart.¹²

Prolonged sitting can **reduce blood flow** by up to two-thirds in the legs.¹³ When blood collects in the blood vessels of the legs, a **thrombus** (clot) is more likely to form.¹⁴

A clot that develops in the deep veins of the body is called **deep vein thrombosis** (DVT).³

If the clot breaks free and lodges in the arteries of the lungs, it can cause a **pulmonary embolism**, sometimes signaled by shortness of breath or chest pain. This urgent medical condition is **fatal** in up to **10%** of cases.^{4,15}

About **half** of individuals with deep vein thrombosis don't have warning symptoms,¹⁶ like leg swelling or pain. That doesn't mean they're not in danger.¹⁷

The Risk Factors

Deep vein thrombosis can be triggered by long hours traveling in cramped conditions, such as those found on **airplanes**.¹³ This increased risk is highest within the **two weeks** after a long flight.¹⁸

Deep vein thrombosis may also develop after hours spent sitting at the **computer**.¹⁹



Other risk factors include recent orthopedic surgery, limited mobility, acute infections, taking estrogen or contraceptive pills, diabetes, hypertension, elevated cholesterol and homocysteine, dehydration, smoking, obesity, and pregnancy.²⁰

Though anyone can be affected, the risk of deep vein thrombosis increases after age **40**.³

As we get older, our *clot-formation* systems start to outpace our *clot-breakdown* systems, making us more prone to clots.²¹

Researchers have found a potential solution to this problem: a combination of **nattokinase** and **French maritime pine bark extract**.

Anti-Clotting Activity of Nattokinase

Nattokinase is an *enzyme* extracted from fermented soybeans (**natto**).⁷

Scientists found that the **anti-clotting** power of nattokinase is **stronger than any other enzyme** in 173 different natural foods tested.²²

Nattokinase combats unwanted clotting in several different ways, including by:^{6-8,23,24}

- Decreasing the activation of **pro-clotting factors**,
- Breaking apart **fibrin**, the main protein in clots,
- Reducing the conversion of **fibrinogen** (a fibrin precursor) to fibrin, and
- Inhibiting **platelets** from clumping to form a clot.

These actions add up to powerful defense against deep vein thrombosis.

Putting Nattokinase to the Test

In a placebo-controlled study, 12 healthy men were given a single dose of **2,000 fibrinolytic units** of **nattokinase**.²³

Markers of the anti-clotting and clot-disrupting properties of nattokinase were detected in the subjects' blood samples **within two hours** of just one single dose.

Other placebo-controlled human studies have shown that nattokinase can help decrease **high blood pressure**.^{25,26} In addition to increasing the risk of heart attacks and strokes, high blood pressure may raise the risk of clots.^{27,28}

WHAT
YOU
NEED
TO
KNOW

Defend Against Deep Vein Thrombosis

- Prolonged periods of sitting increase the risk of **deep vein thrombosis** or clots, particularly in the legs.
- These clots can break free and move to the lungs, where they can be **fatal**.
- A combination of the enzyme **nattokinase** and **French maritime pine bark extract** provides a safe, natural approach to combating leg swelling and clotting.
- This plant-based duo works in several different ways to inhibit **clot formation**, disrupt existing clots, decrease **edema**, and support circulation.
- In a controlled trial of people prone to deep vein thrombosis, a blend of nattokinase and French maritime pine bark extract **completely prevented** thrombotic events on a long flight, while **5.4%** of the placebo group developed deep vein clots.



Complete Relief

In a recent study, researchers tested nattokinase in 153 adults who sought medical treatment for **deep vein thrombosis** or related vascular disorders.⁶

All subjects took a daily dose of **2,000 fibrinolytic units** of nattokinase, either after a month-long course of an anticoagulant drug or after vascular surgery.

Nattokinase reduced symptoms *beyond* the previous drug or surgical treatment. It led to **complete remission** of subjects' remaining vascular symptoms.

The nattokinase produced these benefits **without side effects**.⁶ By contrast, medications for thrombosis carry a risk of adverse events like internal bleeding.^{29,30}

How French Maritime Pine Bark Helps

Extracts of **French maritime pine bark** are rich in plant compounds called **procyanidins**.³¹

These components provide **antioxidant**, **anti-inflammatory**, and **platelet-regulating** benefits, which help protect blood vessels.^{10,31-33}

Another way the extract may help support veins is by promoting **nitric oxide** production.³¹

This gaseous molecule is found in the **endothelium** (lining) of blood vessels. It promotes healthy blood flow.³⁴

In a preclinical screening of 13 polyphenol-rich plant extracts, *only* French maritime pine bark *improved* nitric oxide availability in both healthy and dysfunctional endothelial cells of veins.³⁵

Stop Swelling

Edema (swelling) in the lower legs is a common problem for individuals with **deep vein thrombosis**.

Normally, the one-way valves in leg veins prevent blood from flowing backwards and pooling in the lower legs. These valves also help move venous blood back to the heart. In people with deep vein thrombosis, the valves become damaged.³⁶

Doctors commonly recommend **compression stockings** to help reduce edema, but many people find them uncomfortable.³⁷

In a 12-month study, 156 patients with a history of a single, major thrombotic event were assigned either to take **French maritime pine bark extract** daily, wear compression socks, or do both.³⁸

The extract was significantly more *effective* than compression socks, from six months onward, for decreasing **leg edema**.

Two new incidents of **deep vein thrombosis** developed in the compression-sock group within three to six months. **No** new thrombosis happened in the groups taking the **pine bark extract**.³⁸

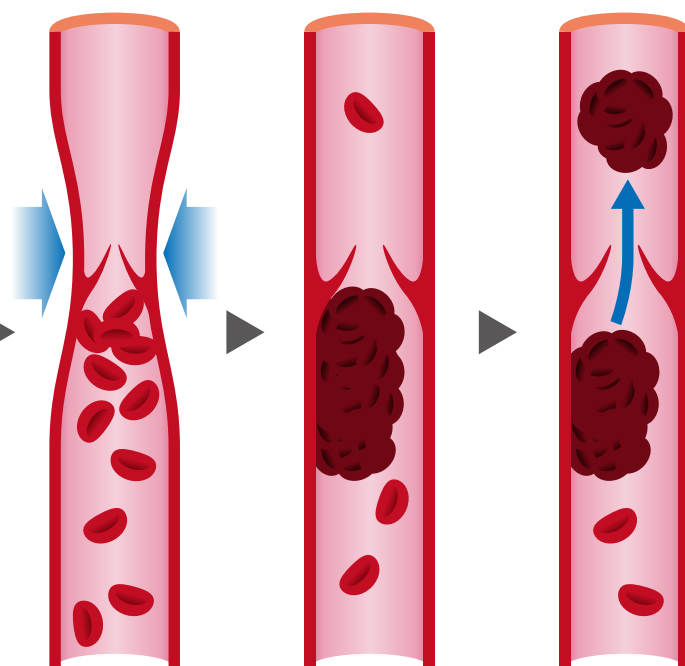
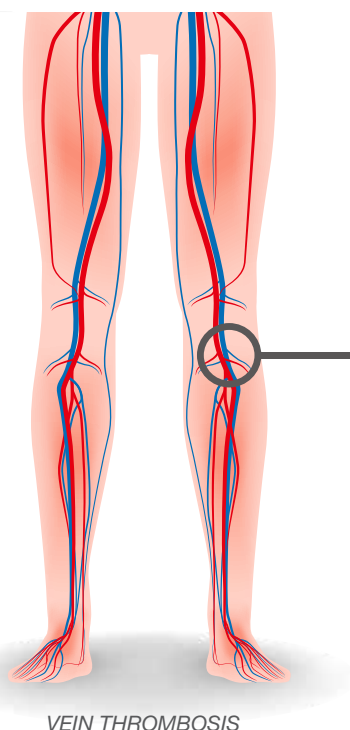
Prevent DVT Recurrence

Approximately **one-third** of people who experience deep vein thrombosis have another episode within 10 years.³⁹

The highest risk of recurrence is within the first year. But a heightened risk remains for the **rest of a person's life**.³⁹

Lingering symptoms after recovery from deep vein thrombosis, called **post-thrombotic syndrome**, also occur in **43%** of cases within two years. These symptoms can include **chronic leg pain**, swelling, discoloration, and new varicose veins.^{3,40}

In an extensive study, scientists tested 815 people every six months for **six years** after their initial deep vein thrombosis.⁴¹





All participants followed a standard lifestyle regimen of compression socks, weight control, and regular exercise.

Some participants also took **pine bark extract**, aspirin, or prescription drugs to prevent blood clots.

Only **3.6%** of those who took the extract developed recurrent deep vein thrombosis and post-thrombotic syndrome, while in the group that followed only the standard management, **14.9%** did.

Pine bark extract was significantly more effective than medications. Recurrent deep vein thrombosis and post-thrombotic syndrome occurred in **12.9%** of those using aspirin and in **6.7%** and **10.7%** of those treated with prescription anticoagulants (but only in **3.6%** of those taking pine bark extract).

More Powerful Together

Combining nattokinase and French maritime pine bark extract provides defense against deep vein thrombosis.¹⁰

In a randomized, controlled study of 204 people taking long international flights, researchers gave half the group a blend of **nattokinase** and **French maritime pine bark extract** two hours before their flight, and again six hours later. The other half were given placebos.¹⁰

All subjects were at **high risk** for deep vein thrombosis, based on their past medical history, including previous episodes of the condition. Preflight, the two groups had equal levels of leg edema.

Exercise and hydration suggestions were given to both groups. The exercise plan consisted of mild, mainly isometric exercise including standing and moving legs for 5 to 10 minutes every hour. The hydration suggestion was to drink **3.4 to 5 oz.** of water every hour.

While **5.4%** of the placebo group developed flight-related deep vein thrombosis, the treatment group had **no** cases.

In addition, the placebo group had a **12% increase** in ankle edema while the treatment group had a **15% decrease**.

This study demonstrates the ability of the combination of nattokinase and French maritime pine bark extract to prevent edema and thrombosis.

Summary

The **deep veins** of our legs are prone to develop clots when we sit for long periods of time, such as on airplanes or at work.

Besides causing uncomfortable leg swelling, **deep vein thrombosis** carries the risk of the clot breaking free, traveling to the lungs, and causing a potentially fatal embolism.

Nattokinase and **French maritime pine bark extract** work together to promote healthy blood flow and inhibit venous blood clots.

Clinical trials have proven the protective circulatory benefits of these plant compounds in high-risk groups, including people on long flights and those with a history of deep vein thrombosis. •

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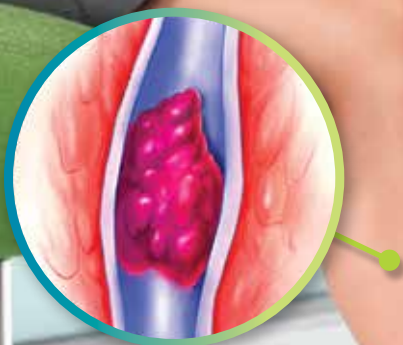
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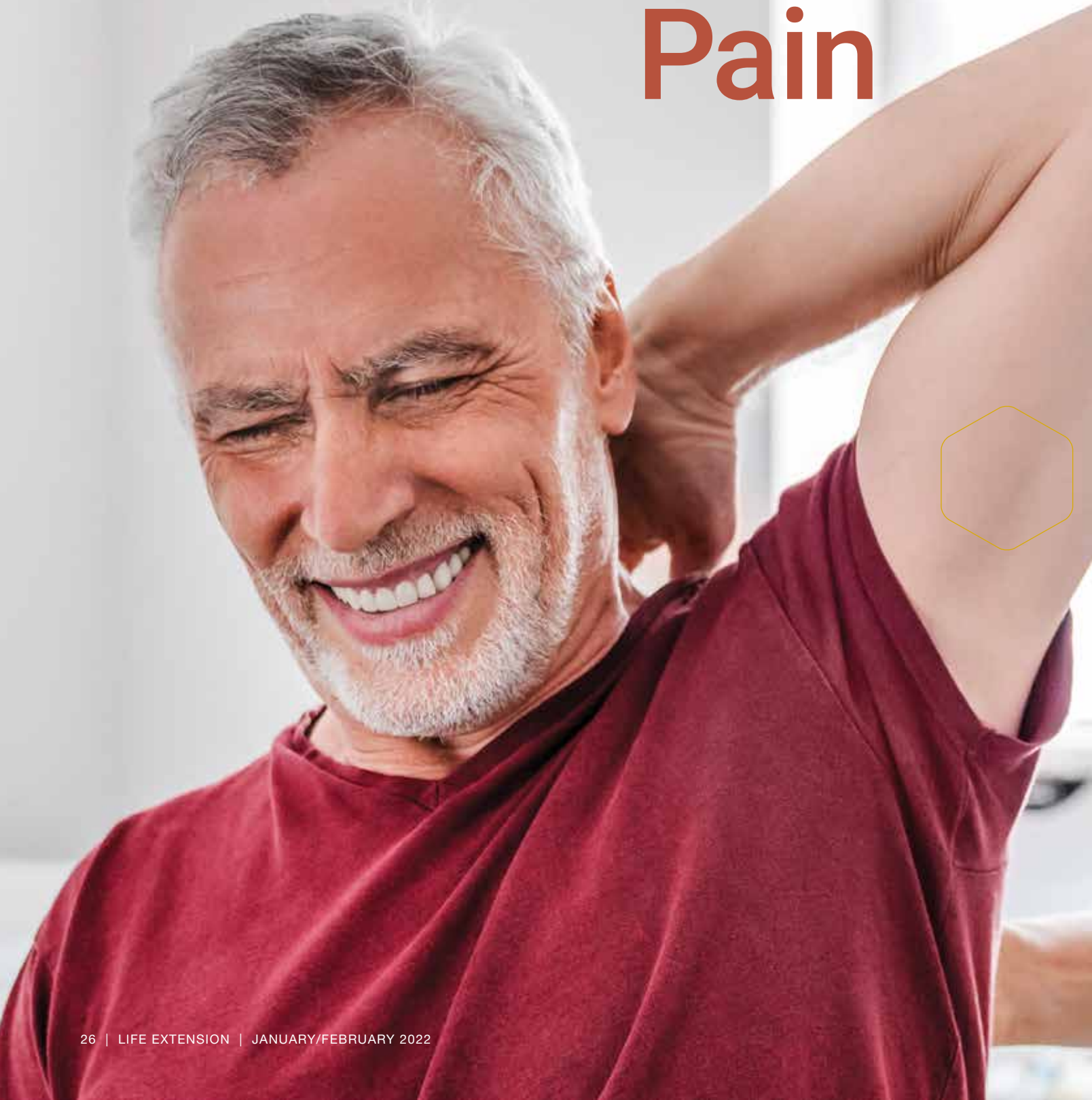


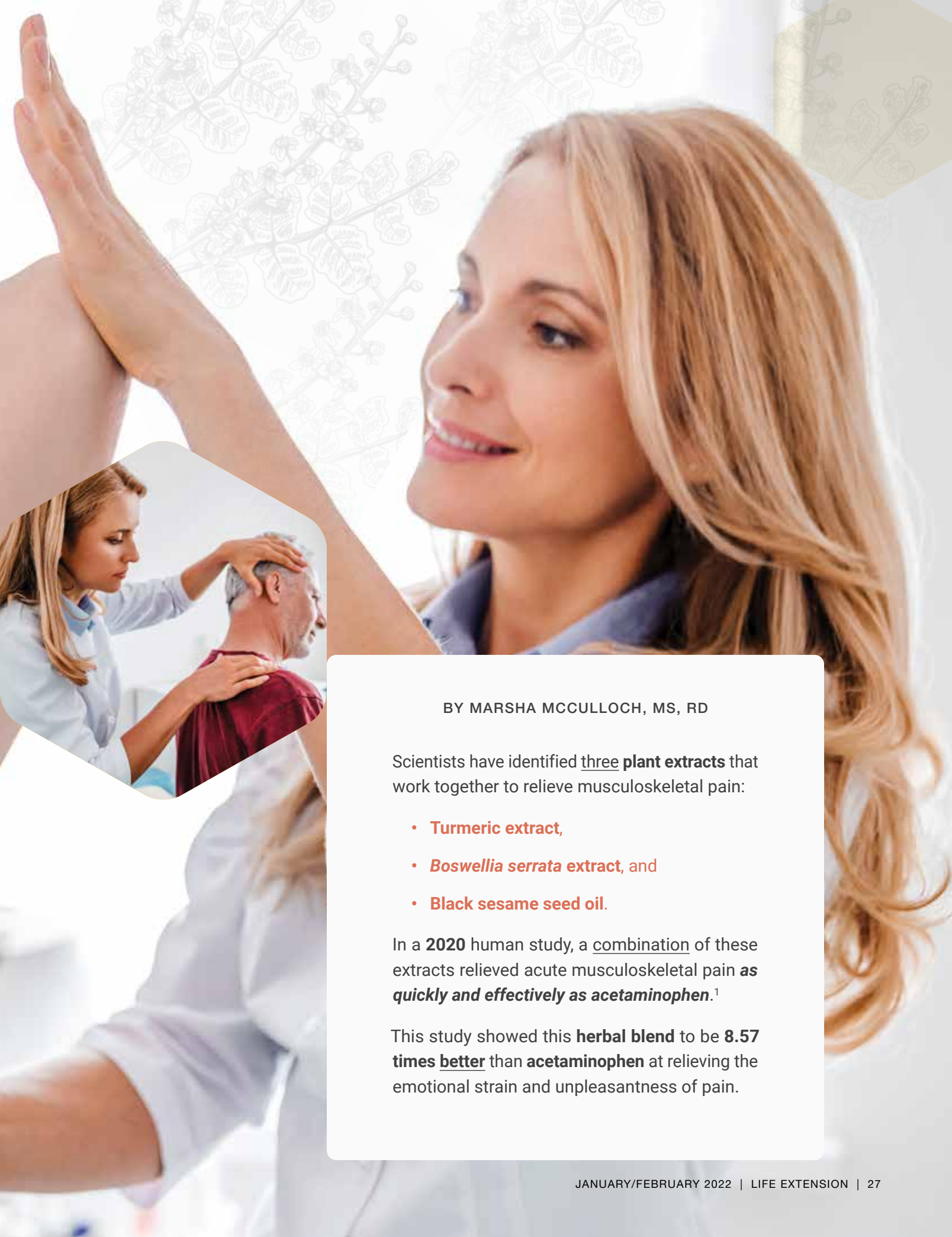
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FAST RELIEF for **Acute** **Pain**





BY MARSHA MCCULLOCH, MS, RD

Scientists have identified three plant extracts that work together to relieve musculoskeletal pain:

- **Turmeric extract,**
- ***Boswellia serrata* extract, and**
- **Black sesame seed oil.**

In a **2020** human study, a combination of these extracts relieved acute musculoskeletal pain **as quickly and effectively as acetaminophen**.¹

This study showed this **herbal blend** to be **8.57 times better** than **acetaminophen** at relieving the emotional strain and unpleasantness of pain.

Acute Musculoskeletal Pain

Acute musculoskeletal pain refers to stiffness or aching in the muscles, bones, joints, ligaments, or tendons that develops suddenly and is caused by something specific.²

Causes may include falls, repetitive strain, incorrect posture, sudden exertion (like lifting something heavy), or simple wear and tear over time.³

People have turned to herbal remedies for pain relief since ancient times.

Modern science has now verified three plant extracts that effectively relieve musculoskeletal inflammation and pain:

- **Black sesame seeds** are rich in bioactive compounds, including **sesamin**, which has anti-inflammatory actions.^{1,4}
- **Turmeric** is a spice rich in **curcumin**, a compound known for its anti-inflammatory and free-radical-scavenging properties.^{5,6}
- ***Boswellia serrata*** is a tree resin long used as a traditional Ayurvedic pain remedy.⁷ Also known as **Indian frankincense**, it contains the anti-inflammatory compound **AKBA** (3-O-acetyl-11-keto-beta-boswellic acid).¹

Pain-Relieving Plants

Researchers have conducted **human studies** to individually evaluate turmeric, *Boswellia*, and black sesame seed for their pain-relief benefits.^{1,5,8}

In a meta-analysis of eight randomized controlled trials involving 606 patients, scientists found that **curcuminoids** from turmeric significantly reduced **pain severity** from a variety of causes, including arthritis and exercise-induced muscle soreness.⁶

A meta-analysis of seven trials involving 545 osteoarthritis patients showed that ***Boswellia serrata*** extract relieved **pain** and **stiffness** and improved **joint function** better than a placebo.⁸

In a controlled two-month trial of 50 patients (ages 50-70) with mild to moderate **knee osteoarthritis**, *black sesame seeds* significantly improved the **signs** and **symptoms** of knee pain. Scores on a standard test of **mobility** also significantly improved.⁹

Encouraged by these and other studies, scientists began testing a **combination** of the three plant extracts for acute pain.

In preclinical research, the three ingredients relieved acute pain and inflammation better **together** than the individual components did at a similar dosage.¹



*Boswellia
serrata*



Turmeric



Black
Sesame Seeds

Testing the Combination

People need pain relief **fast**. Scientists conducted the first randomized controlled human trial of a combination of **turmeric**, ***Boswellia serrata***, and **black sesame seed oil** extracts.¹

This study lasted **seven days**, and it was designed to determine if the herbal combination was as effective as the commonly used pain medication **acetaminophen**.

Researchers recruited 88 healthy men and women (ages 18-65) who had developed **acute musculo-skeletal pain** within the past 24 hours and hadn't taken any treatment.¹

People with arthritis or other **chronic** pain were excluded. In some cases, the pain was caused by musculoskeletal injuries, though in most of the cases it was simply described variously as muscle aches, neck pain, limb pain, low back pain, or joint pain.

Safe and Effective Pain Relief

- Over-the-counter pain medicines like **acetaminophen** and **ibuprofen** can harm vital organs.
- Scientists have identified **plant extracts** that can quickly and effectively relieve acute pain *without* unwanted side effects.
- **Turmeric**, ***Boswellia serrata***, and **black sesame seed oil** contain anti-inflammatory, pain-relieving compounds that are especially potent when combined.
- In healthy adults with **acute musculo-skeletal pain**, a proprietary blend of these three plants was as **fast and effective as acetaminophen** at relieving pain.
- The herbal blend was **8.57 times better** than acetaminophen at relieving the **emotional** suffering of acute pain.

WHAT
YOU
NEED
TO
KNOW

At the start of the study, subjects rated their pain intensity on a scale from **0** (no pain) to **10** (the worst pain imaginable).

All participants started with a “**distressing**” level of pain that was **5 or above**. That reflects a level they couldn't stop thinking about and that interfered with their daily activities.

The treatment group received **1,000 mg** of the proprietary **herbal blend** daily for **one week**. The control group received **1,000 mg** of **acetaminophen** daily.

The **plant extract combination** worked **as fast** and **as effectively** as **acetaminophen** in relieving acute pain, starting on day one!



Fast-Acting Relief

In the study, the herbal blend and the acetaminophen groups followed a similar time course for reducing pain.¹

Using validated questionnaires, subjects rated their level of pain intensity and pain relief every 30 minutes for up to six hours after taking their first dose of the assigned treatment.

The group taking the proprietary plant extracts began to feel pain relief as soon as **one hour** after the initial treatment. This was similar to the onset of pain relief in the acetaminophen group.

Subjects started to report **pain relief** within about **2.5 hours** in both groups. **Meaningful pain relief** (a 30% pain score reduction per hour from baseline) was achieved within about **4.5 hours** in both groups, on average.

The pain reduction continued similarly in both groups over the course of the study, as assessed on the **third** and **seventh** day.

Reduced Pain Intensity

In this study, the proprietary **herbal combination** and **acetaminophen** groups also experienced a similar reduction in **pain intensity**.

Both acetaminophen and the plant extract combination achieved this result. Compared to baseline, **66%** of subjects in the herbal group achieved **at least 50% pain relief** within six hours on the first day of treatment, which was similar to the **acetaminophen** group.¹

Based on the degree of pain relief in the study, about **73%** of subjects in the proprietary **herbal combination** group were considered **positive responders** to the treatment, which was similar to that of the **acetaminophen** group.

What stands out about this human trial is that acetaminophen is a toxic drug that can acutely kill when combined with alcoholic beverages. Its destructive effects are too long to list but include kidney and liver failure in long-term users.¹⁰⁻¹³

Yet there are few warning labels on acetaminophen drugs and those who suffer acute or chronic pain often take large doses of acetaminophen not realizing it generates tissue-damaging free radicals.

Superior To Medication

Pain is more than just a *physical* experience. It also causes **emotional strain**.¹⁴

In this study, the short-form **McGill Pain Questionnaire** was used to evaluate the physical *and* emotional experience of pain on days **one**, **three**, and **seven** of the study.¹

The questionnaire asks subjects to evaluate their pain experience on a scale of **0** (none) to **3** (severe) in terms of 15 descriptive words in two categories:¹⁵

- **Sensory (physical):** throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, and splitting.
- **Affective (emotional):** tiring-exhausting, sickening, fearful, and punishing-cruel.

Both groups in the study experienced equivalent **physical** pain relief, according to the McGill score.

But the **plant extract** combination was **8.57 times better** than **acetaminophen** at relieving the **emotional distress** and unpleasantness of acute pain.¹

How It Works

Researchers chose the **turmeric**, ***Boswellia***, and **sesame seed extracts** based on their previous history of effective pain relief, as well as their mechanisms of action.

Curcumin in turmeric and **AKBA** in *Boswellia* both inhibit **5-lipoxygenase (5-LOX)**.

5-LOX is the key *enzyme* that converts the omega-6 fatty acid **arachidonic acid** into proinflammatory **leukotrienes**.¹

Curcumin also indirectly inhibits **cyclooxygenase-2 (COX-2)**, an enzyme that promotes the production of inflammatory **prostaglandins**.

Black sesame seed oil works to inhibit **delta-5-desaturase**, an enzyme that produces arachidonic acid from omega-6 fats.¹ That decreases the amount of arachidonic acid *available* to make inflammatory cytokines in the first place.

The herbal combination was better at reducing pain and inflammation compared with each individual component when tested in animals. The combination inhibits multiple pro-inflammatory pathways in the body that produce **prostaglandins** and **leukotrienes**. These are the two main inflammatory facilitators that can trigger pain symptoms.

The **sesamin** in sesame oil may also promote the body's **absorption** of the other pain-relieving components in the blend.¹

Free From Side Effects

The use of **acetaminophen** and **non-steroidal anti-inflammatory drugs (NSAIDs)** like aspirin and ibuprofen has been associated with adverse effects.

For example, NSAIDs use can affect the gastric mucosa, the cardiovascular, hepatic, hematologic (blood), and renal systems.¹⁶

The best-known danger of acetaminophen is the potential for **acute liver damage**.¹⁷ It is also extremely easy to **overuse** because it comes in many over-the-counter and prescription medications, including some used for coughs and colds.¹⁸ Long-term use increases risk of kidney cancer and organ damage.¹⁹⁻²¹

In the study that used the proprietary plant extract blend, **"There was no adverse event reported by any subject in the study."**¹

The combination of **turmeric**, ***Boswellia***, and **black sesame seed oil** extracts provides a plant-based option for rapid pain relief.



Summary

People reach for acetaminophen or NSAIDs like ibuprofen to treat acute aches and pains.

These painkillers carry the risk of harmful side effects.

A controlled clinical study has shown that a combination of **turmeric**, ***Boswellia serrata***, and **black sesame seed oil** extracts is **as fast and effective** as a standard dose of **acetaminophen** for reducing acute pain in healthy adults.

This proprietary herbal blend was **superior** to **acetaminophen** for relieving the emotional strain and unpleasantness aspects of pain. ●



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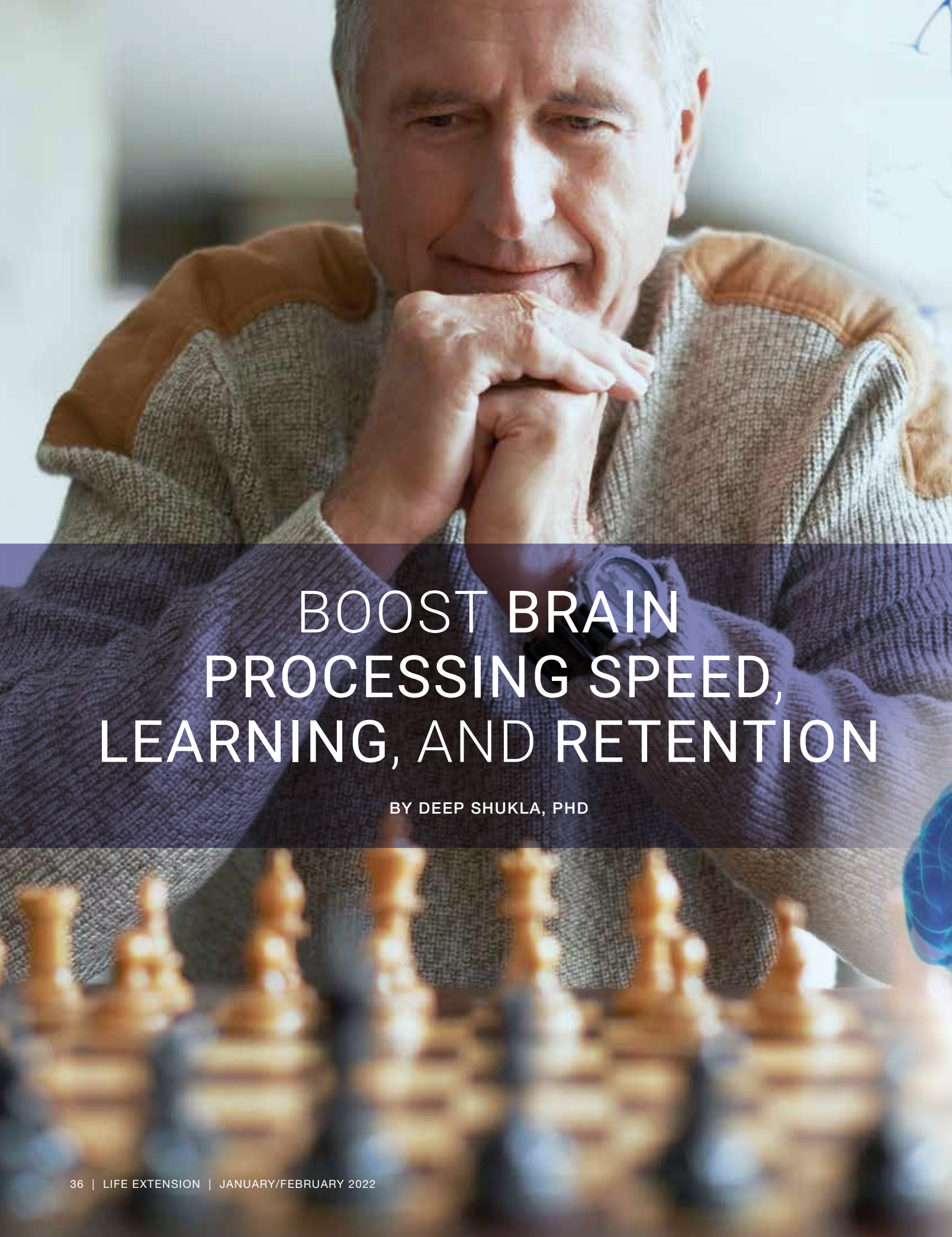
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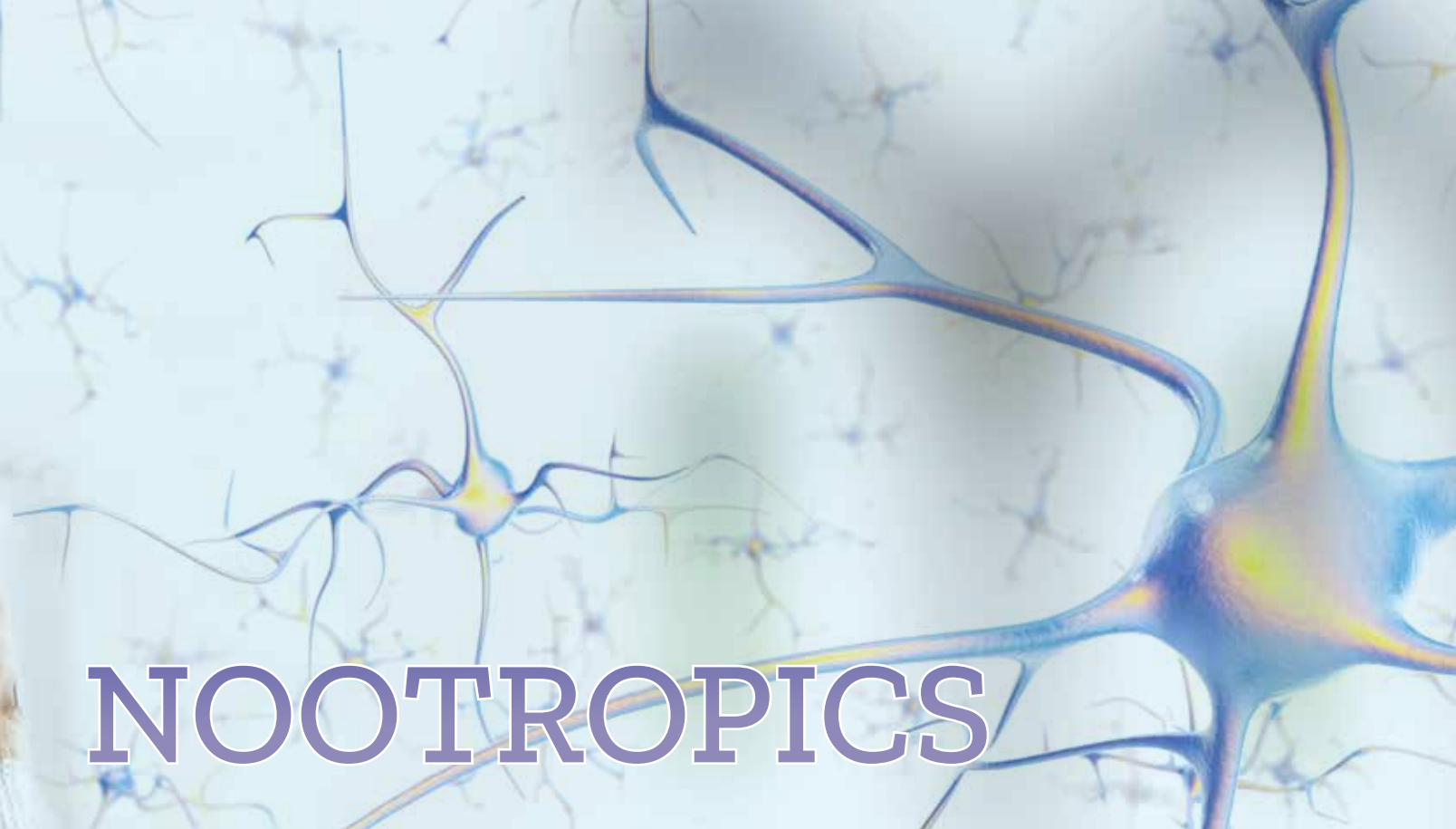
* *Medicine (Baltimore)*. 2020;99(28):e20373.

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BOOST BRAIN PROCESSING SPEED, LEARNING, AND RETENTION

BY DEEP SHUKLA, PHD



NOOTROPICS



Nootropics are often called “*smart drugs*.”

They enhance brain processing speed, learning, and alertness.

Many nootropics used today are off-label **drugs** that can have unwanted stimulating effects.

Those preferring a more tranquil approach may consider **plant-based** nootropics that have demonstrated cognitive-enhancing properties.

These clinically studied **plant extracts** have been shown to boost memory, enhance brain processing speed, and improve concentration and alertness.

What Are Nootropics?

Nootropics are *different* from compounds that *protect* against brain aging or cognitive decline.

They quickly boost cognitive performance, brain processing speed, mental alertness, and attention in healthy adults.

They may achieve this by increasing blood flow to the brain, combating inflammation, modulating levels of **neurotransmitters**, and increasing the number or effectiveness of **synapses** (that enable neurons to communicate).¹⁻³

Scientists have identified **plant-based** compounds shown in **human** studies to improve cognitive function, processing speed, and memory.

Bacopa Monnieri Improves Cognition

Bacopa monnieri, is an herb traditionally used in Ayurvedic medicine to treat inflammation, pain, asthma, and dementia.⁴

Ancient texts dating back to the sixth century indicate that *Bacopa monnieri* was used to enhance **memory** and sharpen the **intellect**.³

Clinical studies suggest that *Bacopa monnieri* can improve **cognitive performance** in healthy young and elderly individuals.⁵⁻¹³

These studies indicate that *Bacopa monnieri* extracts may enhance:

- Acquisition of new memories
- Ability to retain and recall memories
- Ability to sustain attention and speed of attention
- Rate of learning
- Working memory
- Speed of information processing

One human study found that daily intake of *Bacopa monnieri* extract for 12 weeks led to an improvement in **working memory** (the ability to store and use short-term information).⁸

Measurements of brain activity showed that those taking *Bacopa* had a **more rapid onset** of activity patterns associated with **attention** and **information processing**.⁸

Bacopa monnieri use also resulted in a *decline* in activity of the enzyme **acetylcholinesterase**.⁸ This enzyme breaks down the neurotransmitter **acetylcholine**, which is involved in memory and attention.¹⁴



Laboratory experiments suggest that *Bacopa monnieri* may also improve cognitive function by:

- Generating new nerve cells in the **hippocampus**,¹⁵ a brain region that plays a critical role in learning and memory,¹⁶
- Enhancing the branching and length of **dendrites** (nerve cell extensions that receive signals from other nerve cells)^{1,17,18}
- Improving cerebral blood flow,¹⁹
- Inhibiting the release of inflammatory cytokines and blocking enzymes involved in **inflammation**,^{2,20}
- Modulating **neurotransmitter** production,²¹ and
- Improving the activity and levels of enzymes and nerve growth factors that are involved in maintaining and creating new **synapses**.^{3,15,22,23}

Gotu Kola Boosts Brain Function

Gotu kola (*Centella asiatica*) is a flowering plant native to Asia.^{24,25} It has long been used in Ayurvedic medicine to boost memory and cognition.²⁶

Clinical studies suggest that gotu kola can enhance **cognitive functioning** in healthy adults.^{26,27}

One study of adults ages 35 to 50 showed that intake of gotu kola daily for two months improved cognitive performance, including the retrieval of **memories** and speed of **information processing**.²⁷

In another study, daily intake of gotu kola extract for two months improved the **reaction time** and accuracy of **working memory** in healthy older adults.²⁶ Researchers also found an increase in brain activity associated with **attention** during a cognitive task.²⁶

Animal studies confirm that **gotu kola** can increase the number of synapses, reduce oxidative stress, and improve the function of energy-producing **mitochondria** in the hippocampus.^{28,29}

Treatment with gotu kola extract also stimulated the **growth** and **maturation** of nerve cells and the formation of synapses in lab cultures of nerve cells from the rat hippocampus.³⁰

Like *Bacopa*, gotu kola enhances the elongation and branching of **dendrites** in the hippocampus and the amygdala in adult rats.^{31,32} These changes are associated with improvements in learning and memory.

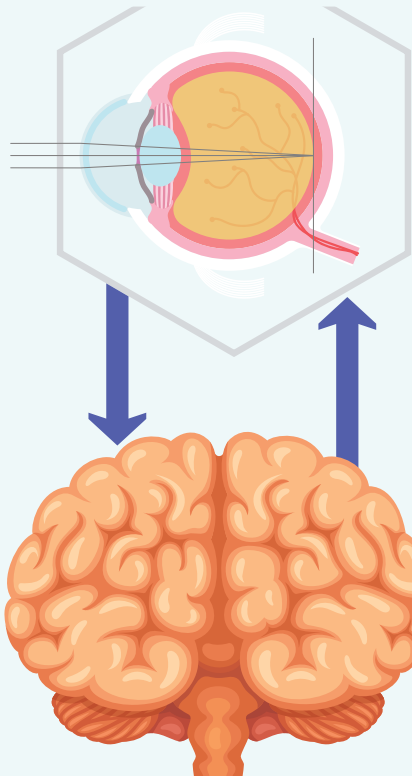


WHAT YOU NEED TO KNOW

Enhance Cognitive Function

- **Nootropics** are compounds that can enhance cognitive performance in healthy adults.
- Clinical trials show that extracts of the plants *Bacopa monnieri* and *gotu kola* and the carotenoids **lutein** and **zeaxanthin** can safely improve memory, learning, concentration, and information processing speed.
- These compounds reduce oxidative damage and inflammation in the brain and improve communication between brain cells.

Brain-Eye Connection



Carotenoids and the Brain-Eye Connection

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

Lutein and **zeaxanthin** are closely related carotenoids that play a vital role in maintaining healthy **vision**. They help protect the **macular density** necessary for visual function.³³⁻³⁸

A majority of the lutein and zeaxanthin obtained from the diet is taken up by the **retina**, the innermost layer of the eye, and concentrated in a region near the center of the retina known as the **macula**.

The retina is composed of nerve cells and is an **extension of the brain**. Researchers have discovered that lutein and zeaxanthin also accumulate in the brain and play an important role in cognitive function.^{39,40}

Scientists are able to easily measure levels of lutein and zeaxanthin in the macula and have found that they correlate with levels in the brain.^{41,42}

They have also determined that levels of lutein and zeaxanthin in the macula and blood serum are associated with **cognitive function**.⁴³⁻⁴⁶ For instance, individuals with mild cognitive impairment or Alzheimer's disease have *lower* levels of these carotenoid pigments in the macula or blood serum.^{43,47}

Lutein and Zeaxanthin Enhance Mental Performance

Numerous clinical trials have explored the effects of **lutein** and **zeaxanthin** intake on **cognitive performance** in healthy young and older adults.⁴⁸⁻⁵¹

These **human** studies show that lutein and zeaxanthin intake can improve:

- Speed of information processing,^{48,49}
- Reasoning ability,⁵⁰
- Memory,^{50,52}
- Visual motor reaction,⁴⁹
- Attention,^{45,51}
- Verbal and visual performance,^{50,53} and
- Cognitive flexibility, the ability to shift mental strategies according to the task.⁵¹

A review of previous studies published in **2020** found that **lutein** and **zeaxanthin** were consistently effective in improving **attention** and long-term recollection of events, situations, and experiences.⁵⁴

Using brain scanning, scientists have found that lutein and zeaxanthin levels in the serum and macula are associated with increased integrity of **white matter** (which consists of nerve fibers that connect brain cells) in older individuals.⁵⁵

Carotenoids can also enhance the expression of proteins that form **gap junctions**.³⁹ Gap junctions are channels that allow neighboring cells to directly communicate with each other. *Increasing* gap junction communication may enhance cognitive performance.⁴⁰

Lutein and zeaxanthin appear to increase cooperation between brain regions that previously functioned in isolation,⁵⁶ to increase blood flow to the brain,⁵³ and to combat **oxidative damage** in the brain.^{57,58}

All of these actions can help improve cognitive performance.

Combining these **carotenoids** with **Bacopa monnieri** and **gotu kola** may help maximize the brain's full potential.

Summary

Nootropics can enhance cognitive performance in healthy individuals.

Animal and human studies show that the carotenoids **lutein** and **zeaxanthin** and extracts of the herbs **Bacopa monnieri** and **gotu kola** enhance various aspects of cognition in healthy young and old adults.

These natural nootropics have anti-inflammatory properties that protect nerve cells.

Natural nootropics can also modulate the connections between nerve cells to enhance **learning** and **memory**. ●

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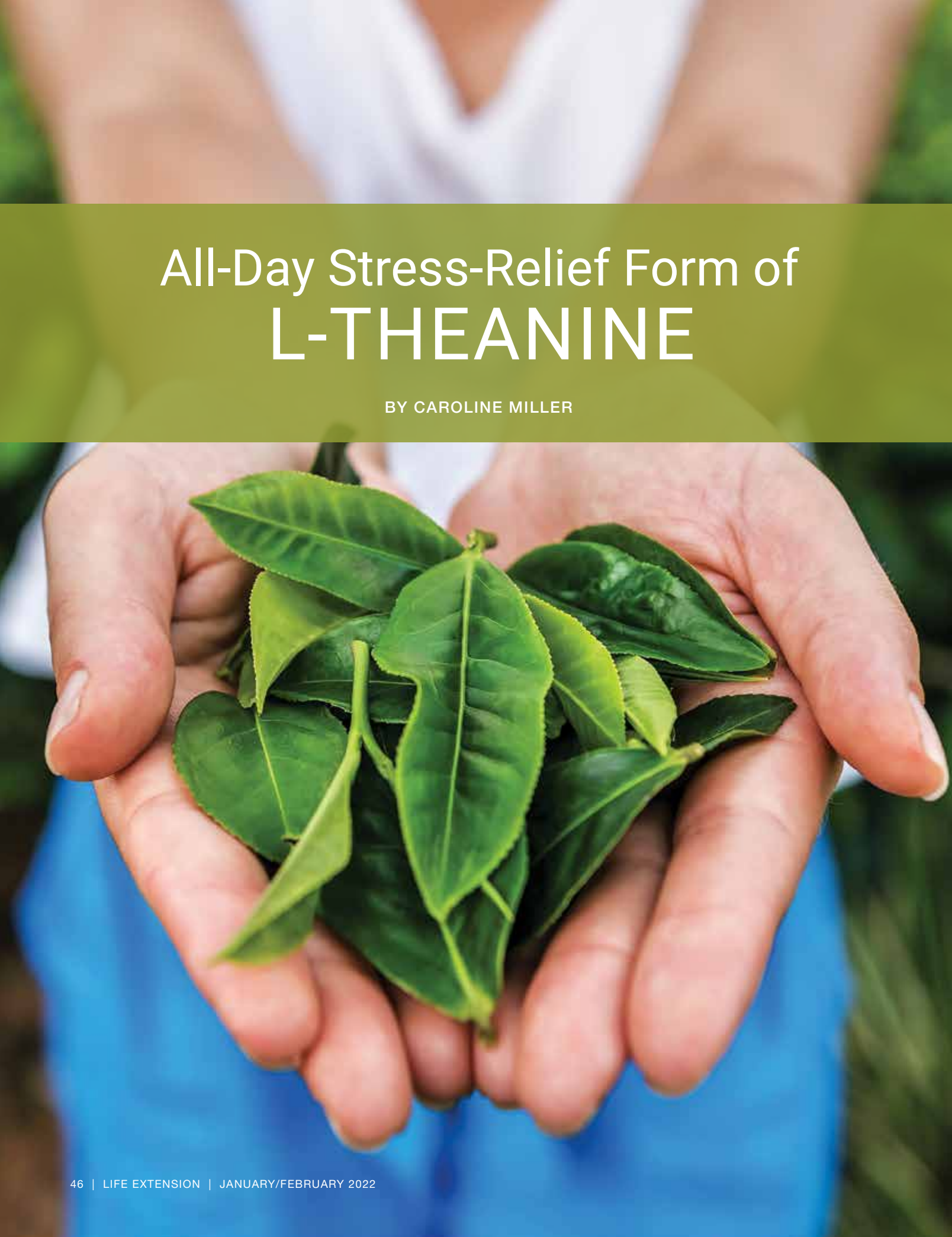
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A close-up photograph of a person's hands holding a small cluster of fresh, vibrant green tea leaves. The person is wearing a white V-neck shirt and blue pants. The background is a soft-focus green, suggesting an outdoor tea plantation setting. The lighting is bright and natural, highlighting the texture and color of the leaves.

All-Day Stress-Relief Form of L-THEANINE

BY CAROLINE MILLER



A majority of people today report frequent **work-related stress** and other anxiety issues that can lead to **burnout**.

Drugs designed to reduce stress and anxiety can **sedate** users and have addictive side effects that preclude long-term use.¹

A compound found in green tea, **L-theanine**, promotes relaxation and **stress relief** *without* drowsiness.²

L-theanine is rapidly metabolized in humans. Due to this rapid breakdown, multiple doses of L-theanine are needed throughout the day.³

Delivering L-theanine with a **sustained-release technology** helps overcome this problem, allowing its calming benefits to be spread out for **stress relief**.

Chronic Stress and Burnout

Surveys and studies in recent years show that **stress** is extremely common in the U.S.^{4,5}

Besides work-related stress, relationships, health, and finances can be additional sources of anxiety.⁴

Ongoing, chronic stress increases the risk for anxiety disorders and depression.⁶

Some reports found that as many as **80%** of workers experience **job-related stress**.⁵

Recently, the **World Health Organization (WHO)** recognized the impact of **chronic workplace stress** on an occupation-related syndrome called **burnout**, and the need for evidence-based guidelines to address it.⁷

Burnout is marked by:⁷

- Feelings of low energy or exhaustion,
- Increased “mental distance from one’s job,” or having cynical or negative feelings about work, and
- Reduced ability to perform well at work.

A Superior Stress Reliever

Most medications designed to reduce stress and anxiety also **sedate** users or have other side effects that preclude their long-term use.¹

L-theanine is an amino acid primarily found in **green tea**. It has long been recognized for its ability to calm the mind and produce a state of “**alert relaxation**.”⁸

Its benefits are in large part due to its close resemblance to **glutamate**, an **excitatory** neurotransmitter in the brain which *rises* during times of stress.⁹

L-theanine *inhibits* the activity of glutamate by blocking it from binding to receptors in the brain, tamping down stress-related brain stimulation. L-theanine also *stimulates* production of the relaxing neurotransmitter **GABA**.¹⁰⁻¹³

Numerous studies have shown that L-theanine is effective at **reducing stress**.^{2,8,14,15}

There has been a problem in that L-theanine is rapidly metabolized. That means, after consumption, it stays in your system for a short period of time.³

To get all-day stress relief benefits from L-theanine, people needed to take multiple doses spaced throughout the day.

Technology has solved this issue.

Using a **sustained-release delivery system**, a *single* dose of L-theanine can provide potent stress relief all day long.

Unlike anti-anxiety **drugs** that can compromise brain functions, studies suggest that L-theanine improves **cognitive performance** under **stress**.^{11,16}

Reduce Stress and Fight Burnout

Several clinical trials have found that **L-theanine** relaxes the mind without inducing sleep or sedation.^{2,8,14,15} In one study, pharmacy students starting high-stress clinical training were randomized to receive **200 mg** of L-theanine twice per day or a placebo.¹⁷ Those taking L-theanine reported feeling significantly **less stress** than the placebo group.

Because **burnout** results from work-related stress,¹⁸ the ability of L-theanine to help prevent and reduce burnout is promising.





Physical Benefits

L-theanine doesn't just make people *feel* less stressed. It has physical benefits as well.

During times of stress and anxiety, for example, the heart beats faster. Studies have shown that the **heart rate** response to a stressful task is *reduced* after consuming L-theanine,¹⁹ suggesting a reduction in stress.

Cortisol is often referred to as a “stress hormone” because its levels tend to rise with stress. Chronically elevated cortisol and other stress hormones can contribute to weight gain, heart disease, impaired memory, and other problems.⁶

A study measuring cortisol levels in saliva found that it was *reduced* after intake of a nutrient drink containing L-theanine.²⁰

Alpha waves are a type of brain wave that can be seen on an **electroencephalogram (EEG)**. Their presence is associated with a relaxed but **alert** mental state which is necessary for focused **attention**.²¹

Studies of L-theanine have found that it *increases* **alpha-wave** activity in the brain, especially in individuals having high levels of anxiety.^{15,20,22,23}

These results show that L-theanine not only reduces feelings of stress, but also reduces the physical signs of stress in the body. This is an important indication that this amino acid may reduce the toll that chronic stress can take on overall health.

WHAT YOU NEED TO KNOW

A Safe Way to De-Stress

- Chronic **stress** affects a large majority of adults. It contributes to poor general health and increased risk for anxiety and depression.
- Most available medications to manage stress cause **sedation** or other side effects and may be addictive.
- **L-theanine** is an amino acid found in green tea that has long been known to relax the mind and **reduce stress**, while maintaining alertness.
- Regular L-theanine is rapidly metabolized in humans, requiring repeat dosing throughout the day.
- A new **sustained-release** formulation provides continuous L-theanine to help manage stress and maintain productivity all day long.

Summary

Chronic, long-standing **stress** affects much of the adult population.

Most stress or anxiety drugs cause **sedation** and other negative side effects and may be addictive.

L-theanine, an amino acid found in green tea, has long been known to induce a state of **alert relaxation**. It relieves stress while maintaining mental clarity and sharpness.

L-theanine is rapidly metabolized in humans, requiring repeat dosing throughout the day to manage stress.

A novel **sustained-release formulation** of L-theanine solves this problem, providing continuous L-theanine to help maintain an alert but relaxed mind all day long. •

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THE MEDITERRANEAN DIET: A Prescription for Healthy Aging and Longevity

BY MICHAEL OZNER, MD





MICHAEL OZNER, MD
PREVENTIVE CARDIOLOGIST

In thousands of published studies, the Mediterranean diet has proven again and again to be one of the best lifestyle strategies for **extending longevity** and **avoiding** common disorders of **aging**, including heart disease and cancer.

A **2021** clinical trial showed that those who adhered most closely to a traditional Mediterranean diet appeared less likely to suffer **sudden cardiac death** than those who least adhered to this diet.¹

This landmark trial showed that a **Mediterranean diet** rich in extra-virgin **olive oil** *reduced* the risk of major **cardiovascular events** (including heart attack, stroke, and cardiovascular death) by **31%**.²

In an observational study, greater adherence to a Mediterranean diet in midlife was related to a **46%** better chance of **healthy aging**, defined as living to **70 years** or older with no major physical or mental impairments.³

Of all the many diets currently recommended, the **Mediterranean diet** is clearly the winner for achieving longevity and heart health.

What Is the Mediterranean Diet?

As a cardiologist, I've become convinced that we need to focus on **prevention of heart disease** rather than waiting for this deadly disease to strike. Our first goal as doctors should be to prevent disease with a healthy lifestyle.

The **Mediterranean diet** is a vital part of that.

It can help prevent cardiovascular disasters such as heart attacks and strokes. It has also been shown to lower cancer risk and reduce the likelihood of developing Alzheimer's disease and chronic inflammatory disorders.

The traditional Mediterranean diet is characterized by:⁴

- High consumption of extra virgin olive oil, vegetables, cereals, fruits, legumes, and nuts
- Moderate intake of fish
- Low intake of dairy products, poultry, meat and meat products, and sweets
- Red wine in moderation, consumed with meals

In the early 1990s, a non-profit group called the Oldways Preservation Trust, in cooperation with the Harvard School of Public Health and the World Health Organization, created the first Mediterranean diet pyramid.⁵⁻⁷

Then, in 1995, in an article in the *American Journal of Clinical Nutrition*, Walter Willet, MD, who was the Chairman of Nutrition at the Harvard T.H. Chan School of Public Health until 2017, published the first peer-reviewed paper on the Mediterranean diet pyramid.

It was based on food patterns seen in the Mediterranean region including Greece (especially the island of Crete) and southern Italy in the 1960s, where, he has noted:

“adult life expectancy was among the highest in the world and rates of coronary heart disease, certain cancers, and other diet-related chronic diseases were among the lowest.”⁸

Why This Diet Works

There are several components to the Mediterranean diet with proven health benefits.

Extra Virgin Olive Oil

Rather than butter or margarine, extra virgin **olive oil** is consumed in a Mediterranean diet. Studies have shown it can:

- Improve lipid profiles, including *decreasing LDL* (“bad”) and *increasing HDL* (“good”) cholesterol,⁹
- Lower post-meal glucose levels,¹⁰
- Reduce chronic inflammation,¹¹
- Fight damaging oxidative stress,^{12,13}
- Reduce blood clot formation,¹⁴
- Reduce high blood pressure,⁹
- Aid in preventing **breast cancer**,¹⁵
- Help prevent arrhythmias,¹⁶
- Lower heart attack and stroke risk,¹⁶
- Help lower risk of **Alzheimer's disease**,¹⁷
- Reduce risk of depression,¹⁸
- Reduce risk of **ulcerative colitis**, an inflammatory bowel disease, and¹⁹
- Lower risk of pancreatitis²⁰ and liver disease.²¹



WHAT YOU NEED TO KNOW

The Benefits of the Mediterranean Diet

- Medical and nutritional experts have voted the **Mediterranean diets** the **best overall diet**.
- The diet focuses on eating **high** amounts of extra virgin olive oil, whole grains, vegetables, fruits, nuts, beans, and fish and other seafood. Red meat and sweets are avoided.
- Studies have found that adhering to this diet can *reduce* risk of many **chronic illnesses**, including heart disease, some cancers, diabetes, metabolic syndrome, and Alzheimer's disease.
- This diet has also been shown to extend **longevity**. One study found that older individuals who followed the Mediterranean diet, were physically active, consumed alcohol only in moderation, and didn't smoke had a more than **65% lower rate of death** from all causes.

Omega-3 Fatty Acids

A Mediterranean diet is abundant in marine and plant sources of essential **omega-3 fatty acids**.

Fish oil contains the omega-3s **EPA** and **DHA**, which are both critical for optimal health. Plants contain **ALA**, another omega-3 fat, which is converted in small amounts to EPA and DHA.

Unfortunately, most Americans are *deficient* in EPA and DHA,²² potentially leading to a number of health-related issues.



Among many **cardiovascular benefits**, omega-3s can:²³

- Lower **triglycerides** (a fat found in the blood),
- Reduce inflammation and oxidative stress,
- Reduce high blood pressure,
- Lower resting heart rate,
- Reduce the risk of fatal **arrhythmias**,
- Improve insulin sensitivity,
- Mildly inhibit platelet function, preventing clotting,
- Improve endothelial function, vital to the health of heart and blood vessels, and
- Reduce inflammatory atherosclerotic plaque.

Vegetables and Fruits

Eating a wide variety of colorful plants provides:²⁴⁻²⁷

- Dietary **fiber**, which helps with weight control, can help to maintain a healthy gut, and reduces risk of colorectal cancer, and
- A range of **polyphenols**, plant nutrients that help fight a wide array of diseases, including heart disease, cancer, type II diabetes, and dementia.

Whole Grains

Brown rice, quinoa, oats, and whole wheat or whole grain breads and pastas are sources of **whole grains**. These types of grains:^{28,29}

- Contain a variety of important nutrients, including vitamins, minerals, protein, and fiber,
- Lower the risk of **cardiovascular disease**,
- Contribute to satiety (feeling full) and lower the risk of obesity, and
- Reduce the risk of diabetes.

Nuts

Regular consumption of unprocessed **nuts** is recommended in any healthy diet. Among the reasons:³⁰

- Five large studies found that increased nut consumption reduces **coronary heart disease risk**.
- Most fats in nuts are mono- and polyunsaturated fats, which lower **LDL** ("bad") cholesterol levels.
- Substitution of nut fat for saturated fat was associated with a **45%** reduction in **coronary heart disease risk**.

Red Wine

Red wine is often consumed in moderation with the main meal of the day. Studies have shown that it can:³¹

- Lower risk of cardiovascular disease,
- Raise protective **HDL** cholesterol levels,
- Reduce inflammation,
- Lower oxidative stress,
- Prevent harmful blood clots, and
- Decrease post-meal blood sugar levels.



Preventing Cardiovascular Disease

Clinical and observational studies have found particularly strong evidence that the Mediterranean diet protects the **heart** and lowers the risk of **heart attacks**, **strokes**, and **cardiovascular death**.

A landmark study of 7,447 participants (ages 55 to 80 years) found that a Mediterranean diet rich in extra-virgin olive oil **prevented 31%** of major **cardiovascular events** (including heart attack, stroke, and cardiovascular death) in high-risk individuals over nearly 10 years of follow-up.²

The **REGARDS** (Reasons for Geographic and Racial Differences in Stroke) study, for example, found a trend indicating those who adhered most closely to a traditional Mediterranean diet appeared less likely to suffer **sudden cardiac death** than those with least adherence to this diet.¹

Those who have *already* suffered heart attacks can find powerful protection in following the diet.

In a study of more than 11,000 men and women with a history of heart attacks, those who most closely adopted a Mediterranean diet had the **lowest risk of death** over the next 6.5 years.³²

And in the 46-month **Lyon Diet Heart Study**, a randomized, controlled trial of people who had suffered a first heart attack, those who followed a Mediterranean-type diet had an approximately **50% to 70%** lower risk of **recurrent heart disease** than those on a control diet.³³

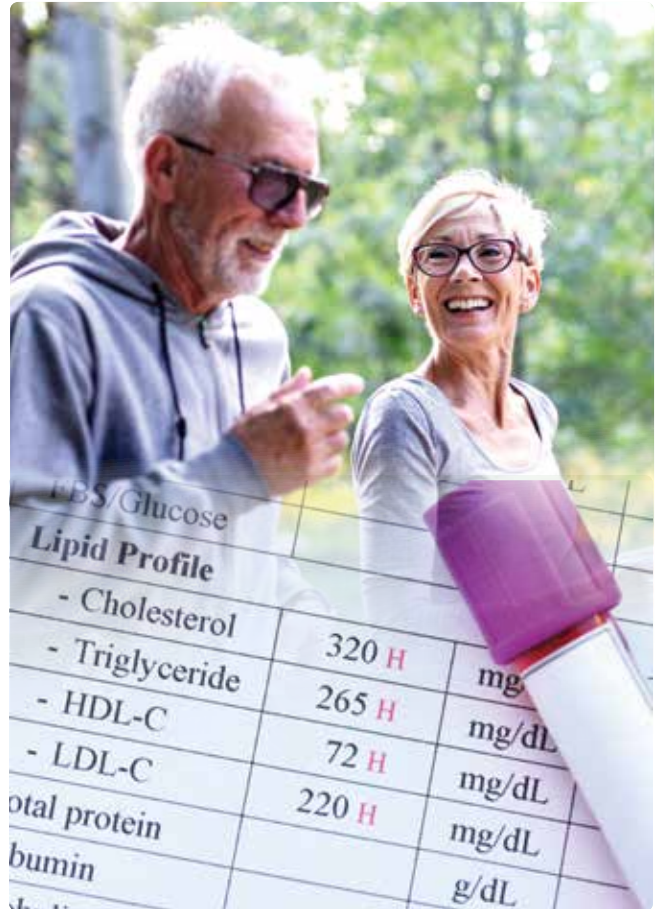
Fighting Other Diseases

Published medical studies show that the diet can reduce risk for a wide range of other age-related diseases.

A meta-analysis of 50 studies including nearly **535,000** people found that following the Mediterranean diet was associated with reduced risk of **metabolic syndrome**. The diet *increased* **HDL** (“good”) cholesterol and *reduced* waist circumference, high blood pressure, high glucose levels, and elevated triglyceride levels.³⁴

Another study of subjects at high cardiovascular risk showed that a Mediterranean diet reduced the risk of developing **diabetes** by **52%** compared to a low-fat diet.³⁵

In a study lasting **four years**, in patients showing no signs of dementia at baseline, greater adherence to the Mediterranean diet was associated with a significant *reduction* in risk of developing **Alzheimer’s disease**.³⁶



In a meta-analysis of 83 studies that included a whopping **2,130,753** subjects, the highest adherence to a Mediterranean diet was associated with the lowest rates of many **cancers**, including of the colon, breast, stomach, liver, and prostate.³⁷

Those who most closely followed the diet also had the **lowest risk of cancer mortality**. The study authors’ data analysis found that the diet’s benefits mostly likely resulted from intake of fruits, vegetables, and whole grains.³⁷

Promoting Longevity

Preventing heart disease, cancer, diabetes, and other causes of death can obviously increase overall **lifespan**.

Several studies have specifically shown that this diet increases **longevity**.

One study analyzed the diets of 10,670 women in mid-life (with a median age of 59 years). Greater adherence to the **Mediterranean diet** was related to **46%** greater odds of surviving to 70 years or older with no major impairments in physical function or mental health.³



The **HALE** study of people aged 70 to 90 years found that a Mediterranean diet and healthful lifestyle (including physical activity, moderate alcohol use, and not smoking) was associated with a more than a **65%** lower rate of **death from all causes**.³⁸

Another study of adults 65 and over also found that closer adherence to the Mediterranean diet was associated with **prolonged survival**.³⁹

There are a few ways in which this diet promotes longevity.

Chronic inflammation is so closely tied to accelerated aging that it is sometimes referred to as **inflammaging**. Many staples of the Mediterranean diet, including **omega-3 fatty acids** from fish oil and **polyphenols** from fruits and vegetables, **reduce** chronic inflammation.⁴⁰

Telomeres are protective caps on DNA that shorten as we age. Telomere length is believed to be closely associated with lifespan. High adherence to a Mediterranean diet has been found to be associated with longer telomeres, and greater activity of an enzyme that maintains telomere length.⁴¹

These benefits, along with its proven disease-preventing capabilities, explain why doctors so often recommend the Mediterranean diet.

Summary

The **Mediterranean diet** is a highly palatable eating pattern that has been shown to control body weight, improve cardiovascular health, and lower the risk of diabetes, metabolic syndrome, cardiovascular disease, Alzheimer's disease, and cancer.

It has also been shown to increase overall **longevity**.

Everyone should follow a healthy lifestyle which includes optimal nutrition and regular physical activity. The Mediterranean diet should be at the center of that. Don't wait—the time to act is now. ●

Michael Ozner, MD, FACC, FAHA, is one of America's leading advocates for heart disease prevention. He is a board-certified cardiologist, a Fellow of the American College of Cardiology and of the American Heart Association, Medical Director of Wellness & Prevention at Baptist Health South Florida, and a well-known regional and national speaker in the field of preventive cardiology. Dr. Ozner is on the Scientific Advisory Board of **Life Extension Magazine®** and is the Symposium Director for "Cardiovascular Disease Prevention," an annual international meeting highlighting advances in preventive cardiology and dedicated to treatment and prevention of heart attack and stroke. He is also the author of *The Great American Heart Hoax*, *Heart Attack Proof*, *The Complete Mediterranean Diet*, and *Heart Attacks Are Not Worth Dying For*.

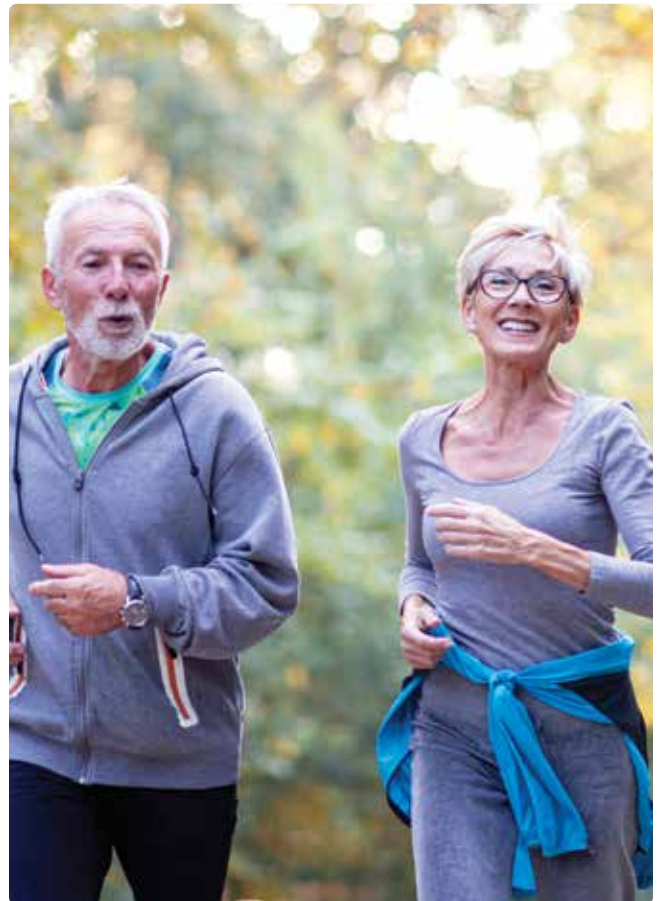
Dr. Ozner's definitive book, *The Complete Mediterranean Diet*, explains the vast health benefits of the Mediterranean Diet and provides over 500 easy-to-follow recipes.

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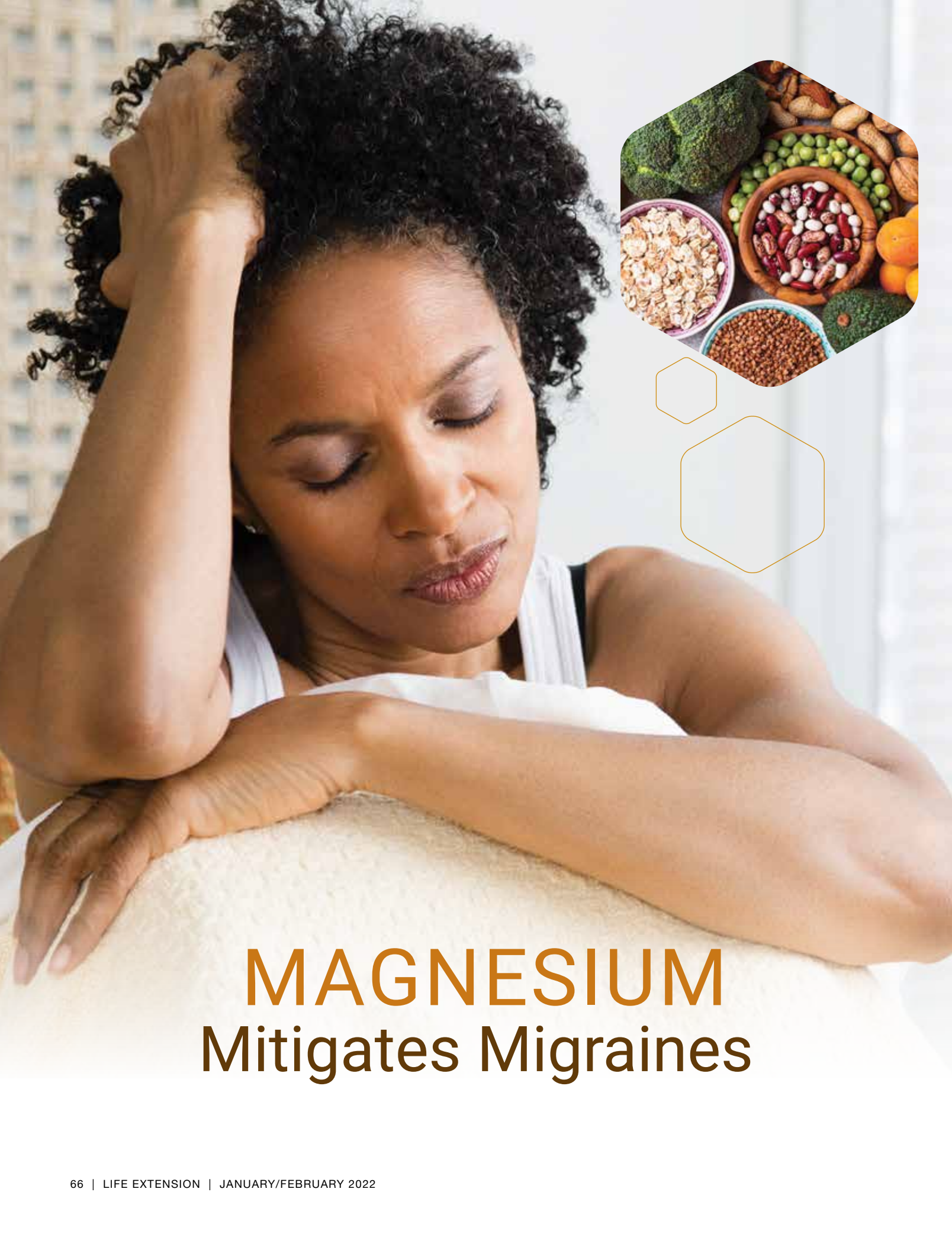


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MAGNESIUM

Mitigates Migraines



BY CHANCELLOR FALOON

Migraines are among the leading causes of disability worldwide.¹

Roughly **\$78 billion** is spent annually in medical costs for treatment.²

People who suffer from migraine commonly have low **magnesium** levels, especially during an attack.³⁻⁵

According to the **National Health and Nutrition Examination Survey**, about **48%** of Americans are not reaching their magnesium minimum daily requirements.⁶

Magnesium helps to reduce arrhythmia, heart disease, and stroke risks, and helps maintain better bone density.^{7,8} Over **300 enzymes** in the body rely on magnesium to function.⁹

New clinical trials have uncovered encouraging evidence for magnesium's role in reducing **migraine** headaches.

Magnesium vs Conventional Medication

Two clinical trials published in **2021** compared the effect of **magnesium** to that of different types of conventional migraine medications.

In the first study, people with frequent migraines were randomized to receive either **valproate sodium**, a drug used to prevent migraines or **500 mg** of oral **magnesium** every 12 hours for eight weeks.¹⁰

The number of migraine attacks, days, and the mean duration significantly decreased in both groups, leading the authors to conclude that magnesium *“appears to be effective in migraine prophylaxis similar to valproate sodium without significant adverse effect.”*

A second trial compared **intravenous magnesium** to two conventional *intravenous* migraine medications, **prochlorperazine** and **metoclopramide**.¹¹

This study evaluated 157 patients, most of them female, who had to visit an emergency department due to the severity of their migraines.

Results showed that **migraine pain** decreased in *all* groups after 60 minutes, with none of the treatments showing clear superiority over the others.

Women are disproportionately affected by migraines¹², and a new analysis of data suggests that increasing magnesium intake is particularly effective for treating migraines in women.¹³

A Successful Combined Approach

Preventing and treating migraines sometimes requires a multifaceted approach.

Several nutrients that work via different mechanisms have shown clinical benefits.

Riboflavin (vitamin B2) and **coenzyme Q10** have shown good results in people who suffer frequent migraines.

Riboflavin's migraine benefits have been known for decades, and a comprehensive review of the medical literature concluded that **riboflavin** reduces **migraine frequency**.¹⁴

CoQ10 lowers levels of **calcitonin gene-related peptide**, which is a neuropeptide that causes the progression of migraines.^{15,16}

In a clinical trial of patients suffering three or more migraines a month, patients were randomized to receive either a placebo or an oral combination of **600 mg** magnesium, **400 mg** riboflavin, and **150 mg** CoQ10 daily along with a multivitamin with minerals for three months.¹⁷

Compared to those taking the **placebo**, patients receiving the **nutrient combination** reduced the number of days with migraines by almost two and had significantly **reduced intensity of migraine pain**.

Taken together, the data suggest that for many people, increasing **magnesium** intake could help prevent migraine attacks, and lessen their duration and severity.



WHAT
YOU
NEED
TO
KNOW

Summary

Migraines are debilitating headaches that can last up to **three days**.

Clinical trials have shown that **magnesium** can prevent and relieve migraines and is even more beneficial when combined with **riboflavin** and **CoQ10**.

Magnesium is one of the most important minerals in the human body, but almost half of all Americans are not getting enough.

Increasing magnesium intake may help many people prevent migraines and lessen their severity and duration. •

Migraine Relief at Last

- **Migraines** are severe, throbbing headaches that can last from a few hours to as long as three days.
- Oral **magnesium** has been shown to decrease the number of migraine attacks as well as their duration and severity.
- In two clinical trials, oral and intravenous magnesium were found to be as effective as different conventional migraine treatments.
- A combination of **magnesium, riboflavin** (vitamin B2) and **CoQ10** led to significantly decreased migraine pain intensity.

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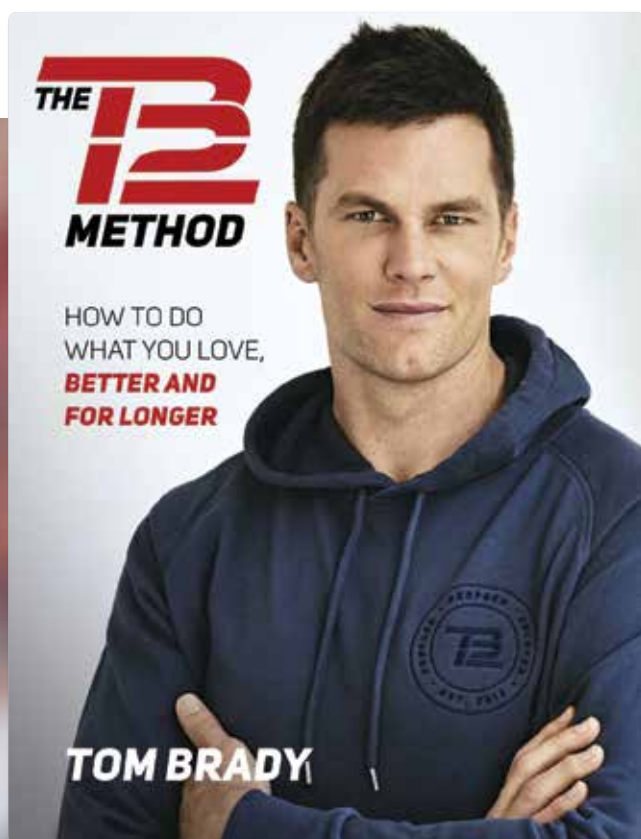
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Tom Brady

NFL Quarterback Shares His Secrets to Peak Performance and Longevity

BY LAURIE MATHENA



Some say Tom Brady has found the Fountain of Youth.

Earlier this year, at age 43, he secured his seventh NFL Super Bowl victory during his 20th season of professional football—two impressive records in a sport where the average career is just 3.3 years.

But he is far from slowing down. In fact, according to Brady, “Not only do I feel as healthy as I ever have, but I’m proud to still be playing at the highest level and standard for my game” said Brady in his book, *The TB12 Method*.

He doesn’t credit his longevity to good luck or good genes.

Instead, Brady recognizes his holistic lifestyle, strategic supplement use, a novel muscle therapy—and an unwavering commitment to hard work—for his unparalleled longevity and success in professional football.

More importantly, he believes these same strategies can be effective for anyone—of any age—who wants to defy aging and live their best life for as long as possible.

The Underdog

Brady is the first to acknowledge that his sports successes have not come easy for him.

During college, he didn't become the starting quarterback at the University of Michigan until his senior year.

In the 2000 NFL draft, the New England Patriots chose him as the NFL's 199th draft pick. That means he was passed over by every team in the NFL about five times.

And it's no wonder.

While his scouting report listed many positives, it ultimately described him as "a system-type player who's not what you're looking for in terms of physical stature, strength, arm strength, and mobility."

Brady's response to this description?

They were right.

But none of that discouraged Brady; it drove him to work even harder.

In his book, he discusses hard work as the key to his success.

"In my first season with the Patriots, I was mostly the fourth quarterback on the depth chart. As usual, it was because I didn't have the natural ability some athletes had at that age. In order to compete, I had to work harder than ever before."

Even as a New England Patriot, Brady didn't get a chance to play until starting quarterback Drew Bledsoe was injured.

But Brady's hard work and competitive drive prepared him for the challenge, and during that Cinderella season, he led his team to victory at Super Bowl XXXVI.

That year he earned the first of 17 division titles, 13 AFC Championship Games, and seven Super Bowl titles.

But behind the scenes during those early years, Brady was in pain and at risk of losing everything—until a meeting with a body coach changed his approach to fitness, peak performance, and healthy longevity.

The Pliability Technique

Brady was no stranger to pain—something he had been taught was just part of playing the game. But by his late 20s, the tendonitis in his elbow was severe enough to potentially end his career.

With his coach, Brady utilized targeted, deep-force muscle work that lengthened and softened the muscles surrounding Brady's elbow joint.

This stopped his muscles from tugging on his tendons and allowed his muscles to work in a more relaxed, optimal state.

Ultimately, these pliability treatments eliminated Brady's pain—and it hasn't returned since.

Now, pliability work makes up roughly half of Brady's training sessions (which also includes strength and conditioning), and he does a pliability training regimen before and after every workout.

Brady says pliability techniques—which can be done by a practitioner, or by utilizing tools like vibrating balls or rollers that can target your body's trigger points—can help resolve existing pain while preventing future injury as well.

This applies whether you're a professional athlete or a weekend golfer, and can be used to help resolve common issues like tennis elbow, plantar fasciitis, and lower back pain.

Discipline On and Off the Field

As Brady enters his 21st year in the NFL, he has more than doubled the length of a good NFL career.

When he led the Tampa Bay Buccaneers to victory earlier this





year at Super Bowl LV, Brady became the oldest player to win a Super Bowl as a starting quarterback and the oldest player to be named Super Bowl MVP. He is also the only quarterback to win a Super Bowl in three separate decades.

Yet he continues to get better with age.

He says he has been faster every year for the last six years, and he has broken his own personal bests in agility and functional strength tests.

“Over the same period, according to conventional wisdom, this doesn’t happen to athletes in their late thirties and early forties,” said Brady.

Pliability is a big part of these impressive results, but it’s just one piece of the puzzle.

Over the years, Brady and his coach developed a holistic regimen that has become Brady’s secret weapon to his success. It includes healthy nutrition, proper hydration, supplementation, promoting oxygen-rich blood flow, promoting anti-inflammatory responses in the body, and more.

“Once I began understanding that the things I put inside my body had a direct effect on my performance on and off the field, I took a long look at my diet and the nutritional choices I was making or not making,” said Brady. “Hydration and nutrition are the foundation of healthy

muscles, and if your muscles aren’t healthy, it’s that much harder to attain optimal pliability.”

Brady eats an anti-inflammatory diet of fresh, seasonal, organic foods from local sources. He eats **80%** plant-based and **20%** animal-based foods, and lots of fiber and essential fatty acids. He doesn’t eat refined carbohydrates or unhealthy fats, and limits inflammatory foods and alcohol.

“Eating healthy is an investment I make in myself,” said Brady. “We all have one body and one life. I’ve made it a priority to treat that body and life as respectfully as possible.”

He drinks a minimum of half his body weight in ounces of water every day. And for the past 20 years, Brady has used supplements to help boost his performance and recovery.

“It would be great if everyone had the benefits of a mostly plant-based, real-food nutritional regimen, but that often doesn’t happen because of our busy lives,” said Brady. “The right supplements can’t take the place of proper nutrition, but they can help ensure that you get the daily vitamins, minerals, and nutrients your body may be lacking.”

Every day, Brady takes electrolytes and trace mineral drops, a multi-vitamin, vitamin D, vitamin B complex, an antioxidant, essential fish oils, protein powder, and a probiotic.

It’s all part of a program designed to optimize his performance on and off the field.

“I define good health and being healthy as vitality—and feeling it. That means I have the energy to do the things I want to do and love to do,” said Brady. “It also means doing all those activities without pain, and with energy, enthusiasm, passion, and endurance.”

His principles aren’t just for athletes but are valuable for anyone who wants to live a healthy, holistic lifestyle.

“I’m proud of playing football and of our team, and I’m also excited to educate people and inspire a movement that can change the lives of people from many walks and stages of life,” said Brady. “If I’ve learned one thing as I go into my 21st NFL season, it’s how important it is to devote yourself to an attitude oriented toward longevity and extended peak performance that never wavers in its longer-term perspective.” •

Tom Brady is a quarterback in the National Football League (NFL) who played 20 seasons with the New England Patriots and started his second season with the Tampa Bay Buccaneers in 2021. He holds numerous career quarterback records, including passing yards, completions, touchdown passes, games started, and pro bowl selections. He is also the NFL leader in career quarterback wins, regular-season wins, playoff wins, and Super Bowl MVP awards.

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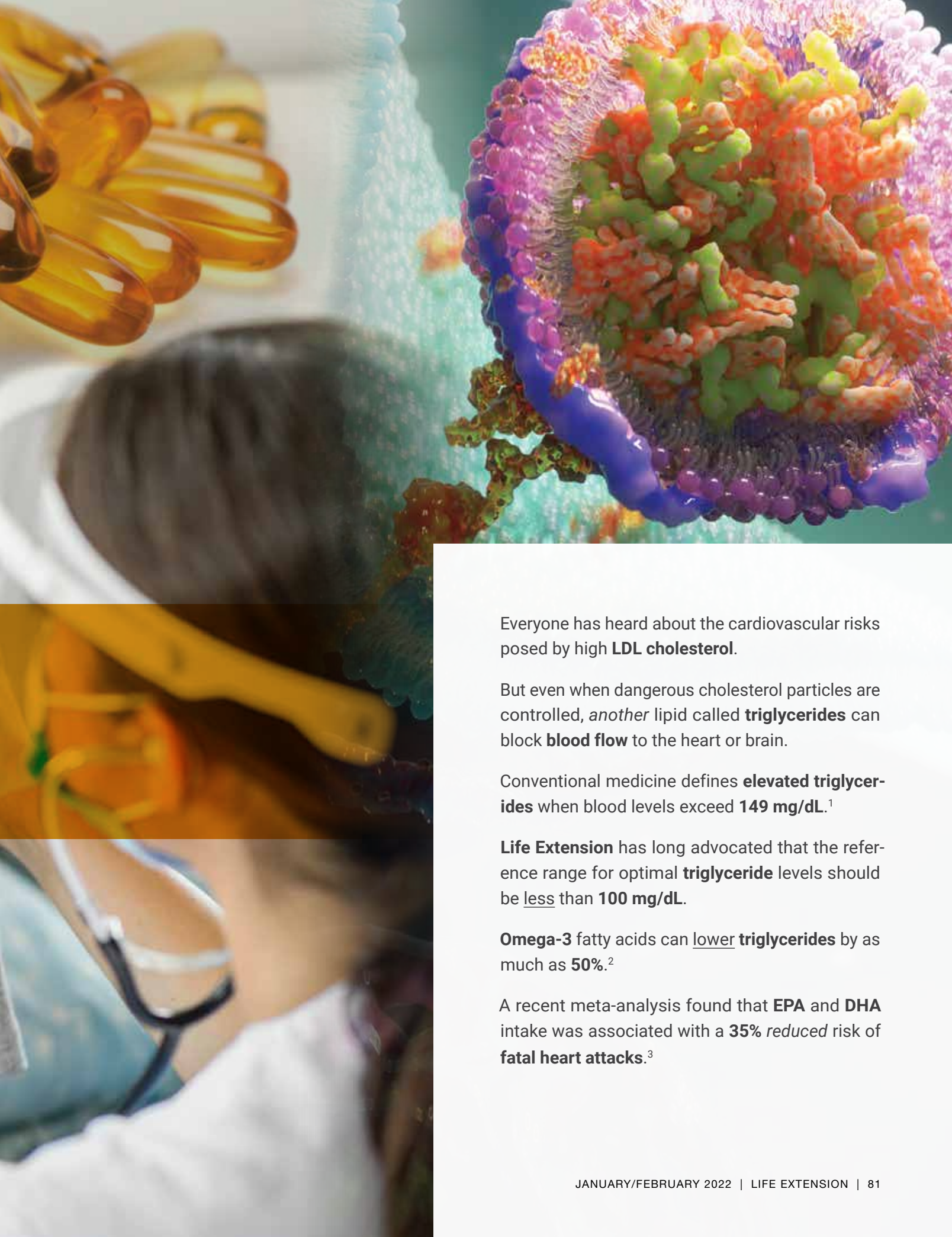
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FISH OIL AND TRIGLYCERIDE CONTROL

BY MARSHA MCCULLOCH, RD



Everyone has heard about the cardiovascular risks posed by high **LDL cholesterol**.

But even when dangerous cholesterol particles are controlled, *another* lipid called **triglycerides** can block **blood flow** to the heart or brain.

Conventional medicine defines **elevated triglycerides** when blood levels exceed **149 mg/dL**.¹

Life Extension has long advocated that the reference range for optimal **triglyceride** levels should be less than **100 mg/dL**.

Omega-3 fatty acids can lower **triglycerides** by as much as **50%**.²

A recent meta-analysis found that **EPA** and **DHA** intake was associated with a **35% reduced** risk of **fatal heart attacks**.³

Why Triglycerides Matter

Triglycerides consist of three (“tri”) fatty acids attached to a **glycerol** (sugar alcohol) backbone. They are in food and in our body fat.^{4,5}

After eating, your body converts some calories it doesn’t need to **triglycerides** that are stored in fat cells. Triglycerides are released from fat storage for energy production between meals. Your body also makes triglycerides.

High triglyceride levels are strongly associated with metabolic disturbances that increase **heart attack** and ischemic **stroke** risk.⁶

Elevated levels are also associated with dangerous **small-dense LDL particles**,⁷ **very low-density lipoproteins** (VLDL),⁸ and cholesterol-enriched **remnant lipoprotein particles**.⁹ These are all known promoters of **atherosclerosis**.¹⁰⁻¹²

Life Extension considers optimal fasting **triglyceride** levels to be below **100 mg/dL**. Individuals at high risk for cardiovascular events should strive for even *lower* levels.

How Fish Oil Lowers Triglycerides

Oral intake of fish oil containing the omega-3 fatty acids EPA and DHA is a proven way to bring triglycerides down.

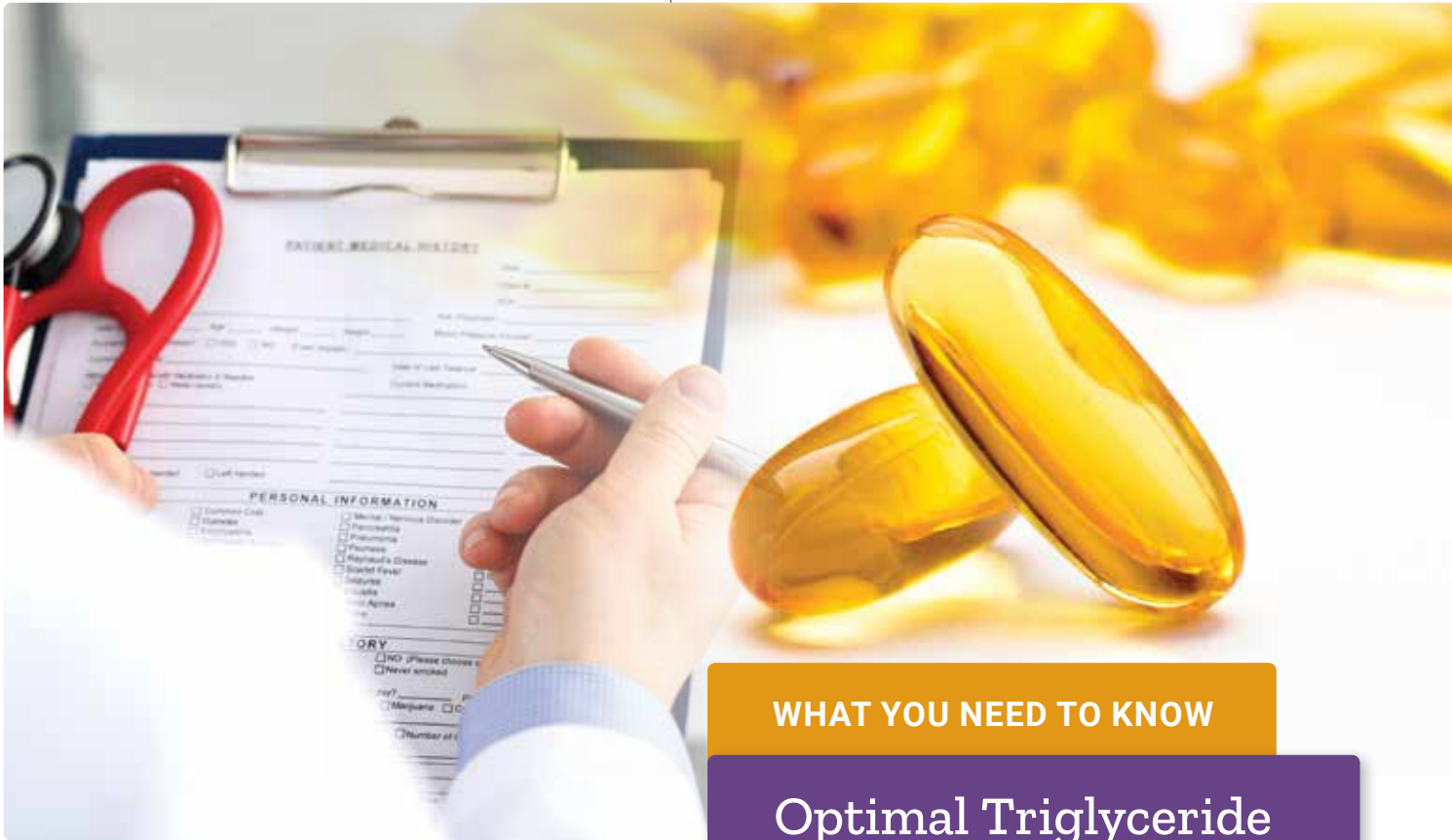
Fish oil lowers triglycerides by:¹³⁻¹⁷

- Increasing the clearance of triglyceride-rich lipoproteins from the bloodstream,
- Decreasing the liver’s production and secretion of triglyceride-rich lipoproteins, and
- Increasing the activity of lipoprotein lipase, which breaks down triglycerides so the body’s tissues can use the fatty acids.

Fish Oil for Prevention

Scientists reviewed 22 clinical trials of EPA and/or DHA use in 1,637 healthy adults with normal or borderline-high triglycerides.¹⁸





WHAT YOU NEED TO KNOW

Optimal Triglyceride Control with Fish Oil

- Elevated **triglycerides** promote atherosclerosis and **cardiovascular disease**.
- **Life Extension** considers optimal fasting triglyceride levels to be well below **100 mg/dL**.
- **Fish oil**, which includes the omega-3 fatty acids **EPA** and **DHA**, lowers triglycerides by increasing their removal from the bloodstream and decreasing their release from the liver.
- Omega-3 fatty acids can reduce triglycerides by **up to 50%** in people with high levels. They also lower triglycerides in people with moderately elevated levels.¹⁸
- One meta-analysis found that EPA and DHA intake was associated with a **35%** reduced risk of **fatal heart attacks**.³

In studies ranging from two weeks to a year, daily oral intake of 300-4,900 mg of omega-3s reduced fasting triglyceride levels by **4%-51%**.¹⁸

*Higher doses and longer time periods of taking fish oil generally produced greater benefits.*¹⁸

A recent meta-analysis of 40 clinical trials found that **EPA** and **DHA** intake was associated with significant reductions in the risk for cardiovascular disease death.³

Specifically, this study found that EPA and DHA supplementation is associated with a reduced risk of:

- Fatal heart attack (**35%**)
- Heart attack (**13%**)
- Coronary heart disease events (**10%**)
- Coronary heart disease mortality (**9%**)

The study, published in the **Mayo Clinic Proceedings**, concluded that supplementation with EPA and DHA reduced the risk of coronary heart disease, including heart attack.



Triglycerides in Obesity

Triglycerides tend to rise with increasing body weight. Fish oil helps combat this.

When 210 overweight or obese adults supplemented with **3,000 mg** of omega-3 daily for six weeks, fasting triglycerides decreased by **15%** in men and **17%** in women.¹⁹

In a longer, 16-week placebo-controlled trial of 152 overweight or obese older adults, daily oral intake of fish oil reduced triglycerides by **24%**.²⁰

In these studies, fish oil helped bring triglycerides closer to optimal levels.

Benefits in Other Conditions

High triglycerides are often related to type II diabetes and non-alcoholic fatty liver disease.

Insulin resistance, which contributes to diabetes, is associated with an increase in the liver's secretion of triglycerides. Clearance of triglycerides from the circulation tends to be slower in people with insulin resistance.²¹

In a three-month trial of 64 overweight/obese adults at increased risk for type II diabetes, oral intake of **2,000 mg** fish oil daily led to a **16.54%** decrease in fasting triglyceride levels.²¹

Excess fat buildup in the liver, such as in non-alcoholic fatty liver disease, is associated with an increased incidence of cardiovascular disease.²²

Recently, scientists reviewed 18 placebo-controlled trials of fish oil in individuals with non-alcoholic fatty liver disease. Fish oil significantly lowered triglycerides in an impressive **89%** of the trials.²³

Fish Oil with Statins

Some drugs that lower **LDL cholesterol** also decrease triglycerides. But they may not do enough.^{17,24,25}

About **one-third** of all patients taking **statin** medications still have fasting triglyceride levels **over 150 mg/dL**. This leaves them vulnerable to cardiovascular problems.²⁶

Fish oil has proven to be effective for reducing major adverse cardiovascular events.²⁷

A major trial called REDUCE-IT included **8,179** high-risk heart patients who had **LDL cholesterol** controlled by statins yet still had **elevated triglycerides**. They were given **4,000 mg** of a prescription **EPA-only** fish oil or a placebo daily for about **five years**.²⁸

The fish oil group had a median reduction from baseline in fasting triglycerides of **19.7%** within one year

compared to placebo. The placebo group had a slight *increase* in triglycerides.

The fish oil group also had a **25% reduction** in the risk of **major cardiovascular events** (*beyond* that provided by statin treatment), compared to the **placebo** group.

Summary

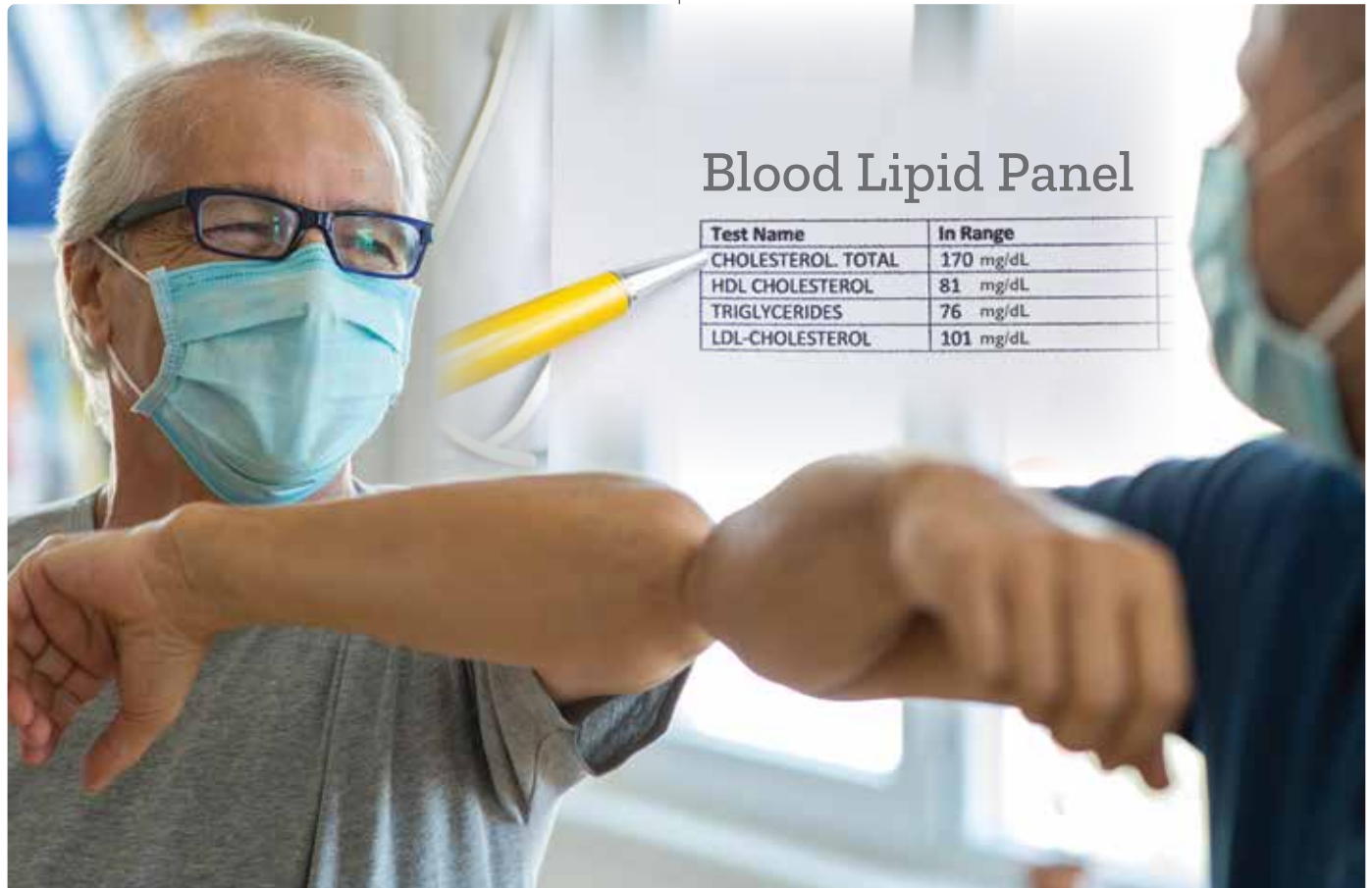
Elevated **triglycerides** increase risk of **heart attack** and **stroke**.

Fish oil containing the omega-3 fatty acids **EPA** and **DHA** can significantly *lower* triglycerides when consumed in sufficient amounts.

To promote healthy triglyceride levels, **Life Extension** suggests daily consumption of at least **2,000 mg** of **EPA/DHA** from high-quality fish oil and/or regular consumption of cold-water fish. ●

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*Int J Med Sci. 2019;16(6):845-53.



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VINPOCETINE

Improves Hearing Capacity

BY CHANCELLOR FALLOON



Vinpocetine is a derivative of a compound found in the **periwinkle** plant.¹

It has demonstrated benefits for a range of conditions, including cerebral vascular disorders, seizures, and hearing loss.^{1,2}

In a clinical study published in **2021**, vinpocetine was tested on patients with **sensorineural hearing loss**, which is caused by damaged hair cells in the inner ear.² Twelve months of vinpocetine intake (**30 mg/day**) significantly *reduced* the rate of deterioration and **improved hearing capacity**.

The effects of vinpocetine on increasing brain blood flow, reducing injury to blood vessels, and enhancing cerebral metabolism were uncovered decades ago.¹

In preclinical models, **vinpocetine** has shown protective effects against **ischemia-reperfusion injury**, the damage that occurs to tissues and organs when, following blockage of an artery, the oxygen-rich blood flow is restored.¹

Research to improve stroke outcomes, in two randomized, controlled trials, showed that intravenous (IV) **vinpocetine** combined with conventional therapy significantly improved outcomes following an **acute ischemic stroke** compared to conventional therapy alone.^{3,4}

Patients were given IV vinpocetine daily for **one to two weeks** after diagnosis of a stroke. In both studies, vinpocetine treatment led to a greater **improvement** on a range of outcomes such as mental state, inflammatory response, and neurological function.

Vinpocetine also displayed remarkable benefits for those with **seizure disorder**.

In a clinical trial, patients were treated with conventional anti-epileptic drugs and were randomized to receive either daily vinpocetine or a placebo.⁵ After eight weeks, **69%** of the vinpocetine-treated patients had a **50%** reduction in seizures, compared to only **13%** of the placebo group.

New studies are now paving the way for further investigations into vinpocetine:

- In a cell culture study, vinpocetine **reduced inflammation** caused by the bacteria responsible for **otitis media** (middle ear infection).⁶
- In an animal model of **Alzheimer's disease**, vinpocetine protected against deterioration in certain brain regions and reduced levels of **beta-amyloid** and **phosphorylated tau** proteins, both associated with Alzheimer's disease severity.⁷

Vinpocetine provides wide-reaching benefits for brain and nervous system health. Research continues to uncover additional uses. •

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Fennel

BY LAURIE MATHENA

Fennel is an herb that originated from the Mediterranean region. It is commonly used in Greek cooking for its licorice-like flavor, and its favorable effects on digestive, endocrine, reproductive, and respiratory issues.¹

Benefits can be derived from both the fennel bulb and the seeds.

Fennel is a rich source of health-promoting plant compounds, including the polyphenols rosmarinic acid, quercetin, and apigenin.

In-vitro and in-vivo studies show that these compounds have antimicrobial, antiviral, anti-inflammatory, anti-mutagenic, anti-spasmodic, anti-thrombotic, hypoglycemic, memory-enhancing, and stress-relieving properties.¹

People in many cultures chew fennel seeds after meals to help with digestion and eliminate bad breath. And in Ayurvedic medicine, fennel seeds are used as a laxative, because they help move food through the intestines and promote excretion.

Fennel may be eaten raw in salads and snacks, and it can be stewed, boiled, grilled, or baked. It can also be used in the preparation of herbal teas or as an essential oil.



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Americans spend more than half their waking time sitting, which can lead to **deep vein thrombosis**.



26 SAFE RELIEF FROM ACUTE PAIN

A **2020** human study shows a **plant extract** combination relieved **musculoskeletal pain** as quickly as **acetaminophen**.



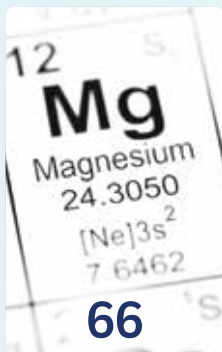
36 BOOST BRAIN PROCESSING SPEED

Four **plant extracts** improve brain processing speed, memory, learning, and concentration.



46 ALL-DAY STRESS RELIEF

Clinical studies show a **tea extract** enables calming relaxation. A sustained-release tea formula can help manage stress all day.



66 MAGNESIUM MITIGATES MIGRAINES

Magnesium combined with **riboflavin** and **CoQ10** helps prevent migraines and lessens their duration and severity.



80 CONTROL YOUR TRIGLYCERIDES

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