

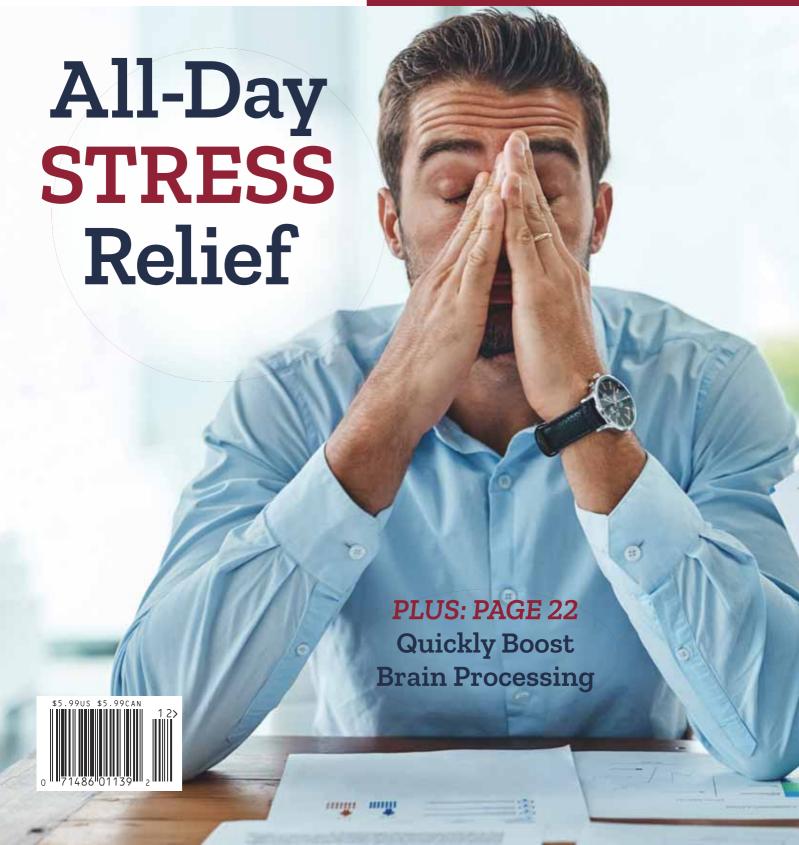
The Science of a Healthier Life®

LifeExtension.com

December 2021

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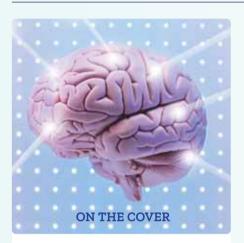




#### The Science of a Healthier Life®

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#### The Science of a Healthier Life

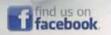
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John Boik, PhD, is the author of two books on cancer therapy, Cancer and Natural Medicine (1996) and Natural Compounds in Cancer Therapy (2001). He earned his doctorate at the University of Texas Graduate School of Biomedical Sciences with research at the MD Anderson Cancer Center, focusing on screening models to identify promising new anti-cancer drugs. He conducted his postdoctoral training at Stanford University's Department of Statistics.



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



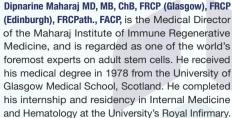
Deborah F. Harding, MD, is founder of the Harding Anti-Aging Center. She is double board-certified in internal medicine and sleep disorder medicine. She also earned the Cenegenics certification in age management medicine. She is a faculty member of the University of Central Florida Medical School.

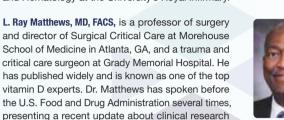


Steven B. Harris, MD, is president and director of research at Critical Care Research, a company that grew out of 21st Century Medicine in Rancho Cucamonga, CA, Dr. Harris participates in groundbreaking hypothermia, cryothermia, and ischemia research. His research interests include antioxidant and dietary-restriction effects in animals and humans.



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

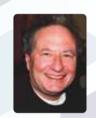






Ralph W. Moss, PhD, is the author of books such as Antioxidants Against Cancer, Cancer Therapy, Questioning Chemotherapy, and The Cancer Industry, as well as the award-winning PBS documentary The Cancer War. Dr. Moss has independently evaluated the claims of various cancer treatments and currently directs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

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Michael D. Ozner, MD, FACC, FAHA, is a board-certified cardiologist who specializes in cardiovascular disease prevention. He serves as medical director for the Cardiovascular Prevention Institute of South Florida and is a noted national speaker on heart disease prevention. Dr. Ozner is also author of The Great American Heart Hoax, The Complete Mediterranean Diet and Heart Attack Proof. For more information visit www.drozner.com



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



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





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# Rapid Recognition of Healthy Aging



WILLIAM FALOON

The *Financial Times* is a respected business journal based in London.

Earlier this year, the *Financial Times* published an article recognizing what *Life Extension* readers long ago understood:

Aging is a disease that can be decelerated!

The Financial Times predicts that:

"Some anti-aging therapies could prove as important in the 21st century as antibiotics were in the 20th."

In the last century, the advent of **antibiotics** made the leading causes of death (bacterial diseases) virtually disappear from the top of mortality charts.<sup>2</sup>

Nowadays, **age-related** disorders are the main killers.



A similar change may happen this century as it did with **antibiotics**. Scientists worldwide are making advances to control the causes of pathological aging.

Public interest in this science is <u>not</u> being overlooked by big business.

The **Wall Street Journal** published an article describing how corporate behemoths like **Nestlé** and **Colgate-Palmolive** are launching products aimed at consumers who are:

#### "increasingly interested in aging well."3

These companies have set up **healthy-aging** units to accelerate research into how "**nutrition impacts cognition and mobility**."

Contrast this with recent decades when normal **aging** was viewed as inevitable.

Ditto for regulatory agencies that claimed **nutrition** had nothing to do with one's risk of degenerative illnesses.

While enormous resources are being spent to fortify foods with **nutrients**, I am pleased that an armada of researchers are spearheading clinical trials aimed at **reversing aging** in elderly **humans**.

The key today is to **preserve your youth** to benefit from advances in **healthy longevity** that are rapidly nearing fruition.



#### **Nestlé Launches Anti-Aging Functional Food**

Swiss-based Nestlé is the largest food and beverage company in the world.

In December 2020, Nestlé announced plans to launch a functional food for middle-aged and elderly consumers in China consisting of:

"A unique combination of ingredients to support bone health, muscle strength, and joint functionality."4

The approval of these claims by the Chinese government is based on a human study of a fortified milk powder that has been "clinically proven to enhance mobility during aging."

It is one of the first products with functional-food claims allowed in China.

This fortified milk product was developed in collaboration with Beijing University Third Hospital. According to the lead Nestlé researcher:

"The results of the clinical study showed that the product in combination with tailored physical activity led to a significant increase in mobility of Chinese seniors with joint discomfort and thus improved their quality of life."5

In addition to this functional milk powder, another product named Yiyang Probiotic Protein Powder to boost immunity also received formal Chinese approval.6

It takes a long time to register and apply for "health food" status in China. Compared to the United States. there are far more advertising restrictions in China.

#### What's in this **Functional Milk Powder?**

As our Life Extension group learned nearly 41 years ago, inserting healthy nutrients into flavored powders or liquids is challenging. Most nutrients don't taste good.

When I first learned of this functional milk powder, I thought it might contain trivial potencies of nutrients that would not confer its purported benefits.

While Nestlé did not reveal the ingredients in their press releases, our investigation of patent office records indicates that this new milk powder provides in two daily servings:

INGREDIENT	MY COMMENTS
Glucosamine, 1,500 mg	This potency improves joint function.
Vitamin D, 800 IU	Confers some, but not optimal benefit.
Vitamin C, 35 mg	Not much, but more would cause bad taste.
Zinc, 6.5 mg	Better than nothing, but higher potencies needed.
Calcium, 850 mg	Good potency for bones.

I was pleasantly surprised to see this milk formula provides sufficient glucosamine to fulfill the claim of improved mobility.

In addition, a study published in 2019 found that people who supplement with 1,500 mg of glucosamine daily have a 22% lower risk of cardiovascular death.7

My compliments to Nestlé for validating and delivering a palatable drink mix that will improve healthy longevity of people living in China.

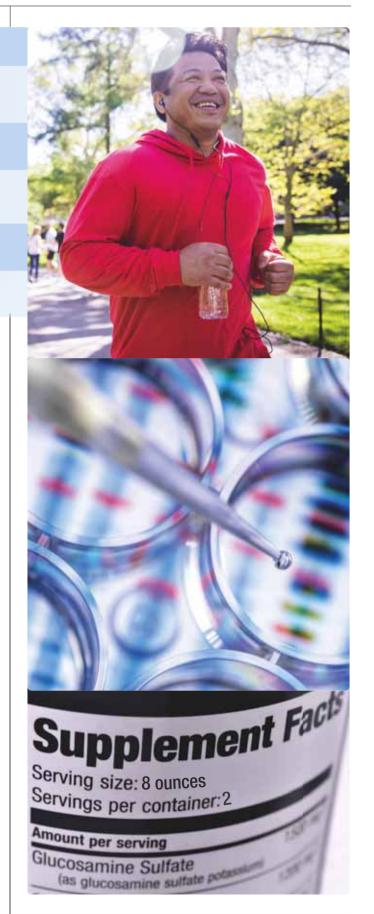
#### In this Month's Issue...

The role of dietary choices on human health continues to be validated in large-scale population studies. The article on page 66 of this month's issue reveals new findings on how what we eat can slash disease risks.

Elevated **triglycerides** are an independent risk factor for coronary artery disease. Page 56 reminds readers how easy it is to drop triglycerides to optimal safe ranges.

Record numbers of Americans are complaining of stress-related mental issues, yet the Japanese learned long ago how to use an extract from green tea to stay calm all day long. Page 34 of this month's issue describes this low-cost method.

New findings on the benefits of **DHEA** continue to appear in the published literature. Life Extension was the first to recommend DHEA as a low-cost supplement back in 1981. Page 51 provides updates on this natural hormone that declines in our bodies with normal aging.





#### **Rapid Recognition of** a Disease called "Aging"

In 1977, I incorporated what we now refer to as the Life Extension group of organizations that all seek to extend healthy human lifespans.

I garnered a lot of media coverage in those early days because no one thought it possible to delay biological aging.

I argued back then that published data showed that lifespans could be extended in animals, so why not emulate this for people?

The change in perception about controlling aging that occurred since 1977 is nothing short of astounding.

The FDA is increasingly recognizing aging as a disease and clinical trials are going on now to enable older people to grow biologically younger.

I expect rapid-fire advances, but to personally benefit, we must take steps now to remain healthy and alive.

Most of you are doing that. For those who are falling into the traps of unhealthy diets and lifestyles, I urge you to make a resolution to slowly cease bad habits and initiate actions to reduce degenerative risks.

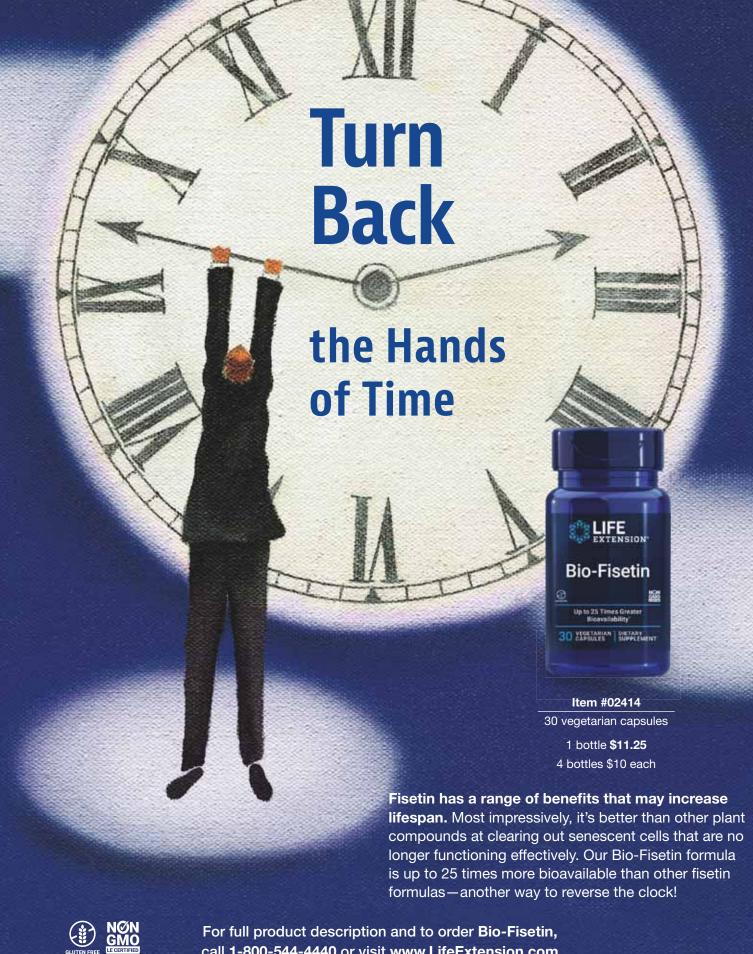
For longer life,

William Faloon, Co-Founder Life Extension Buyers Club

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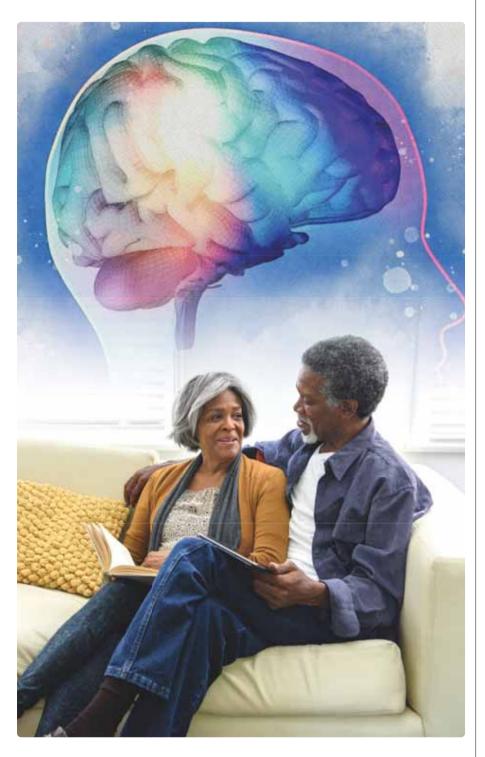
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<sup>†</sup>Developed in collaboration with Insilico Medicine, Inc.

### In the News



#### **Better Cognitive Function with POO**

Individuals who received supplements containing pyrrologuinoline 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 agingassociated 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.



#### **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.wsi.com/articles/astrazenecabreast-cancer-drug-found-to-reduce-risk-of-dying-11632146777. Accessed September 24, 2021.



#### **Supplements Improve Sleep Quality**

A systematic review and metaanalysis 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.

#### **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.







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**PQQ** (pyrroloquinoline quinone) activates genes involved in the production of cellular energy.<sup>1-5</sup>

Studies show **PQQ** supports heart health and cognitive function, complementing CoQ10.<sup>6,7</sup>

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

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

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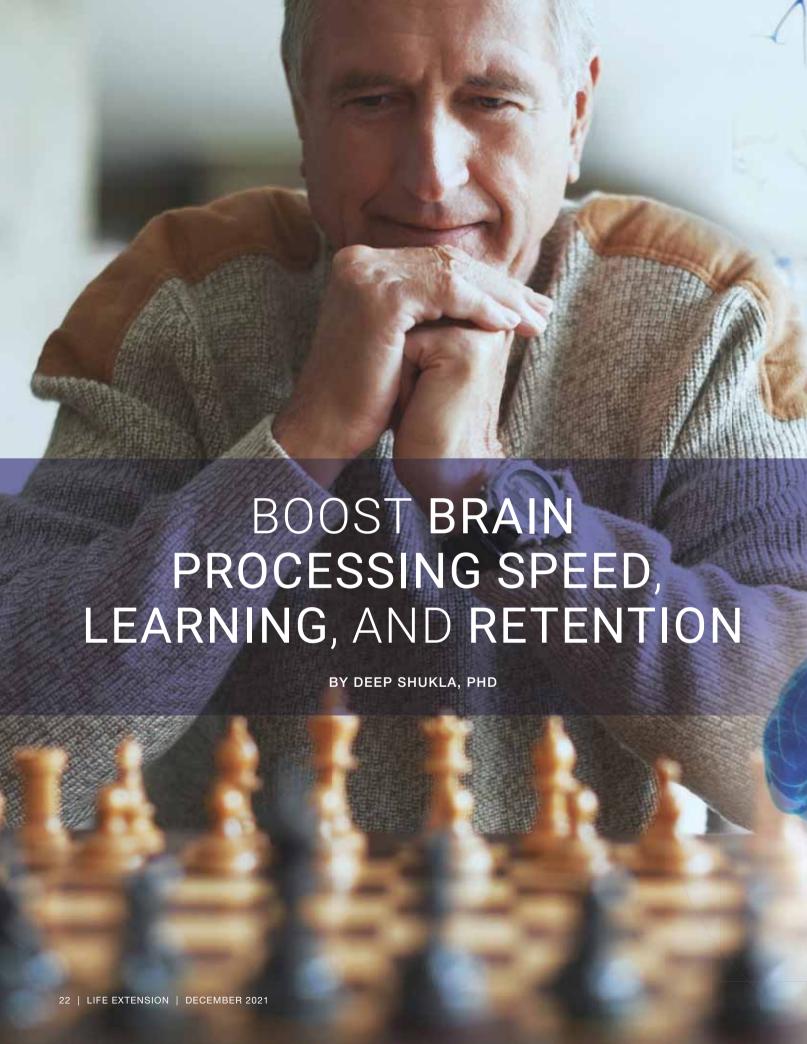


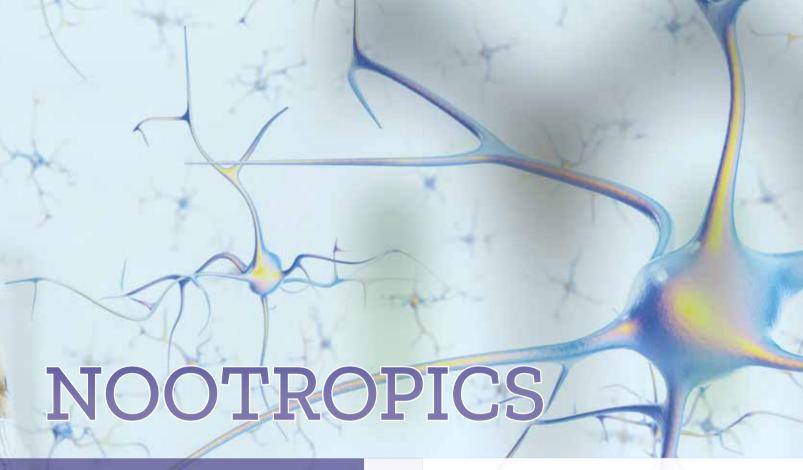
Also available are 10 mg PQQ caps (Item #01500) and 100 mg Super Ubiquinol CoQ10 with PQQ (Item #01733).

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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 shortterm 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.<sup>14</sup>



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,<sup>2,20</sup>
- Modulating neurotransmitter production,<sup>21</sup> 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.<sup>26</sup>

Clinical studies suggest that gotu kola can enhance cognitive functioning in healthy adults.<sup>26,27</sup>

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.<sup>27</sup>

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.<sup>28,29</sup>

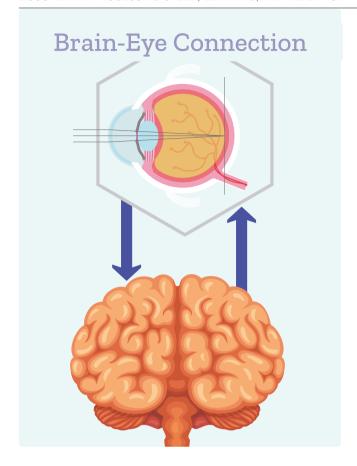
Treatment with gotu kola extract also stimulated the growth and maturation of nerve cells and the formation of synapses in lab cultures of nerve cells from the rat hippocampus.30

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.



#### 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.



#### **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.<sup>57,58</sup>

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.

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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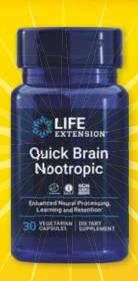
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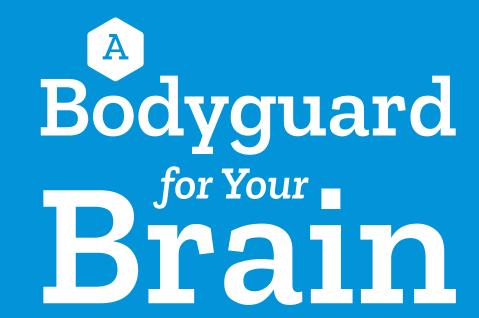


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# All-Day Stress Relief from L-THEANINE

BY CAROLINE MILLER





# **Chronic Stress and Burnout**

Surveys and studies in recent years show that **stress** is extremely common in the U.S.<sup>4,5</sup>

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

Ongoing, chronic stress increases the risk for anxiety disorders and depression.<sup>6</sup>

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

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.<sup>7</sup>

**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.<sup>1</sup>

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."

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.<sup>9</sup>

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**. <sup>10-13</sup>

Numerous studies have shown that L-theanine is effective at **reducing stress**.<sup>2,8,14,15</sup>

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.<sup>3</sup>

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 <u>improves</u> **cognitive performance** under **stress**.<sup>11,16</sup>

# **Reduce Stress and Fight Burnout**

Several clinical trials have found that **L-theanine** relaxes the mind without inducing sleep or sedation.<sup>2,8,14,15</sup> 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.<sup>17</sup> Those taking L-theanine reported feeling significantly **less stress** than the placebo group.

Because **burnout** results from work-related stress, <sup>18</sup> 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.

# 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. •

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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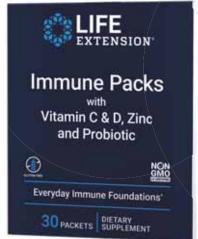
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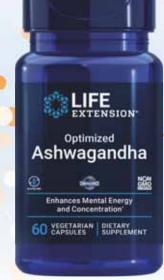
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BY MARINA MACDONALD, MS, PHD



# Importance of Bifidobacteria

Bifidobacteria are an important part of the gut microbiome and play a valuable role in whole-body health.

Healthy bifidobacteria are estimated to account for about 60% of gut microbes in infancy.4

Researchers have suggested that by adulthood, bifidobacteria levels decline to 30%-40% of total gut microbes, then to about 10% in late middle age, and drop to less than 5% by old age.4

This is where **prebiotics** play an important role. Replenishing intestinal bifidobacteria restores their multiple healthful effects, while limiting room for harmful bacteria to live and grow.7

Bifidobacteria have been of great interest to researchers due to their ability to modulate so many areas of health, particularly immunity.8

A variety of research models, from animal to clinical trials, have found that bifidobacteria levels are reduced in some digestive disorders, infections, and in autoimmune arthritis.9

Bifidobacteria may be protective against an underlying mechanism of diabetes and obesity, along with improving blood sugar metabolism. An animal model found that bifidobacteria supplementation suppressed colon cancer.9

Just as bifidobacteria levels decrease over time, the incidence of degenerative diseases increases with age.

Scientists have discovered a prebiotic called xylooligosaccharide or XOS that increases the bifidobacteria population, helping to support a healthy gut microbiome and all the benefits that come with it.



# What are Prebiotics?

The gut microbiota is made up of the trillions of microorganisms in your digestive tract. They impact immunity, metabolism, the endocrine system, mood, and cardiovascular health. 10-14

Foods that specifically nourish and promote healthy gut flora are called *prebiotics*. 15,16 Very few people ingest enough prebiotics from food sources to help foster a healthy gut microbiota filled with bifidobacteria.

For a food ingredient to be classified as a prebiotic, it must:17

- Resist digestion.
- Be fermented by intestinal microorganisms,
- Stimulate growth and/or activity of beneficial bacteria, and
- Enable healthy bacteria to grow and thrive.

Most commercial **prebiotics** require large doses to provide optimal digestive health support. This can cause excessive flatulence, bloating and general digestive discomfort.18

The XOS prebiotic is different, requiring only small doses.

# **Advantages of XOS**

Xylooligosaccharides (XOS) are prebiotics usually made from corn cobs. They feed healthy bifidobacteria and help them grow and multiply.

XOS has demonstrated the following advantages:

- Human studies: XOS consumption created rapid increases in bifidobacteria in as little as two weeks.6,19
- Culture studies: Fermentation of XOS by bifidobacteria inhibited the growth of harmful bacteria Clostridium difficile, which can cause fever, diarrhea, and serious or fatal gastrointestinal disease.20
- **XOS** works at *lower doses*, minimizing gastrointestinal discomforts like gas and bloating that are often associated with other prebiotics that require higher doses.6,18



- The gut microbiota plays a pivotal role in gut, immune, and overall health.
- Lower levels of *bifidobacteria* have been associated, in a range of research models, with characteristics of several age-related diseases, and in many cases with the diseases themselves.
- Xylooligosaccharide or XOS is a prebiotic that specifically targets and boosts bifidobacteria. It has been validated in human studies to work in relatively low doses, without side effects, in as little as two weeks.
- XOS has also been shown to lower cholesterol, triglycerides, and blood sugar-risk factors for cardiovascular disease and diabetes, respectively.
- Taking XOS daily increased levels of butyrate in human subjects.<sup>21</sup> Butyrate is a short-chain fatty acid that is the food for the cells that line the colon. In animal models, butyrate has been linked with gut and brain health.<sup>22</sup>
- In a study of type II diabetics, taking XOS daily for eight weeks modestly improved blood sugar and cholesterol levels.23

# **Boosting Bifidobacteria with XOS**

In an eight-week study conducted at UCLA School of Medicine, XOS significantly boosted levels of bifidobacteria.6

Researchers divided 32 healthy subjects into one of three groups:

- Placebo
- Low-dose XOS
- High-dose XOS

The preparation contained 70% XOS, so that the total amount of XOS ingested in the two study groups was one gram or two grams, respectively.

Both treatment groups had increases in bifidobacteria, but those taking two grams daily of XOS had significantly *larger* increases than the lower-dose group.

To achieve similar increases using another common prebiotic, FOS (fructooligosaccharides), you'd have to take 10 to 20 grams, which could cause cramps and other digestive problems.6

What the study showed was that XOS is an effective way to repopulate the gut with healthy bifidobacteria. By using the prebiotic XOS, researchers showed that they could rejuvenate an aging gut microbiome.

In another study using the same dose, those taking two grams of XOS daily achieved rapid increases in bifidobacteria in just 14 days.<sup>19</sup>

A **2020** rat study found that **XOS** supplementation modulates gut flora and reduces colon inflammation caused by high-fat-diet-induced obesity.<sup>24</sup>

# **Wide-Ranging Health Benefits**

XOS provides a way to improve bifidobacteria levels in the gut without the digestive discomforts often associated with other common prebiotics. One study found that taking two grams of XOS:19

- Increased fecal acidity, likely reflecting the presence of higher amounts of beneficial short chain fatty acids, produced by beneficial intestinal microbes including bifidobacteria.9
- Decreased blood sugar, an effect which could reduce the risk of metabolic syndrome and type II diabetes.
- Decreased blood cholesterol and triglycerides, while these were increased in stool, suggesting that excess lipids were removed from blood and transferred to the feces for excretion.

Research shows that bifidobacteria feed on precisely the types of carbohydrates that humans cannot digest, especially the group known as oligosaccharides. XOS (xylooligosaccharide) is an example of this oligosaccharide group of prebiotics.25

These findings add up to a viable method to rejuvenate the bifidobacteria of the gut microbiome.

# Summary

The health benefits of *bifidobacteria* are well-known. By the time we reach an advanced age, however, this beneficial organism will have declined to just 5% of youthful levels.

Xylooligosaccharides (XOS) are prebiotics that can boost bifidobacteria populations.

In human studies, daily consumption of XOS increased numbers of bifidobacteria in as little as two weeks.

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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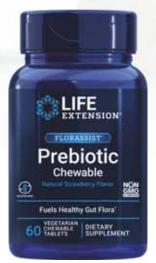
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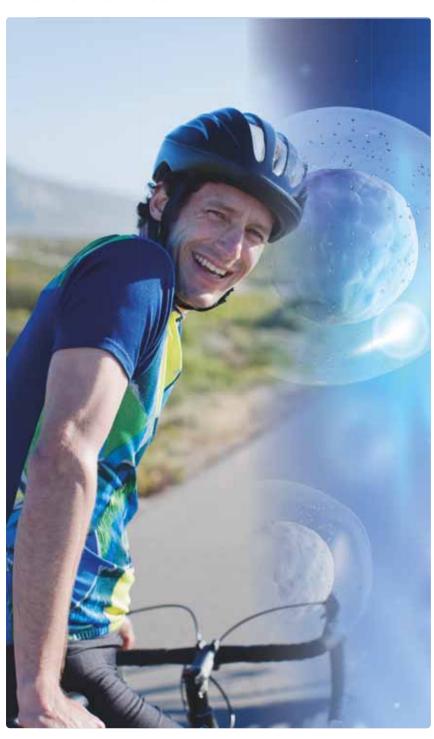
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# What is **DHEA**?

BY CHANCELLOR FALOON



**DHEA** (dehydroepiandrosterone) is a hormone that has been shown to help:1

- Improve immune function
- Maintain bone density
- Reduce cardiovascular risk
- Enhance sexual well-being

Like most hormones, **DHEA** declines with age.

From a peak in our 20s, DHEA levels fall 80%-90% as we reach our 70s 1

Improved measures of healthy longevity have been reported when DHEA is restored to more youthful ranges for men and women.

# Research Supporting Men's Health:

- In a large-scale study of older men followed for 12 years, higher circulating levels of **DHEA-S** (a metabolite of DHEA) were associated with a reduced risk of death from any cause by 36%.2
- In a study of non-diabetic patients followed for an average of four years, men (but not women) with the highest DHEA-S levels had a significantly reduced risk of developing type II diabetes.3

# Research Supporting Women's Health:

- A pooled analysis of randomized, controlled trials concluded that "DHEA therapy may be an effective approach for preserving bone and muscle mass in women."<sup>4</sup>
- In an observational study of premenopausal women, DHEA use was associated with significantly improved parameters of sexual function in those who had the lowest scores on a sexual function index.<sup>5</sup>
- In a study of women with diminished ovarian reserve who were trying to conceive by in vitro fertilization, DHEA intake was associated with increased pregnancy rates.<sup>6</sup>

Multiple other studies have found benefits that apply equally to men and women.

One clinical trial showed that DHEA intake can improve mood and emotional health by enhancing connectivity between the **amygdala** (the brain region that involves emotion) and the **hippocampus** (the region central to memory).<sup>7</sup>

Another human trial showed that just six months of DHEA use can decrease insulin resistance and pro-inflammatory cytokines in elderly patients.<sup>8</sup>

An important observational study published in **December 2020** found that *low* DHEA-S levels were associated with an *increased* risk for **subclinical myocardial injury**, **heart failure hospitalization**, and **death**. The study evaluated more than 11,000 men and women, following some for 15 years.

Published studies continue to support the value of maintaining youthful DHEA levels. •

# Restoring DHEA Levels

A cost-effective way to raise DHEA levels in the blood in older adults is by taking it orally.

For women, an ideal DHEA-S blood level is 275 ug/dL-400 ug/dL.

For men, it's 350 ug/dL-500 ug/dL.

A **DHEA-S** blood test can be used to assess levels three to four weeks after starting daily supplementation. The results can provide individual guidance to optimize dosage.

Women often need only 15 mg/day of oral DHEA whereas men usually take 25-50 mg daily.

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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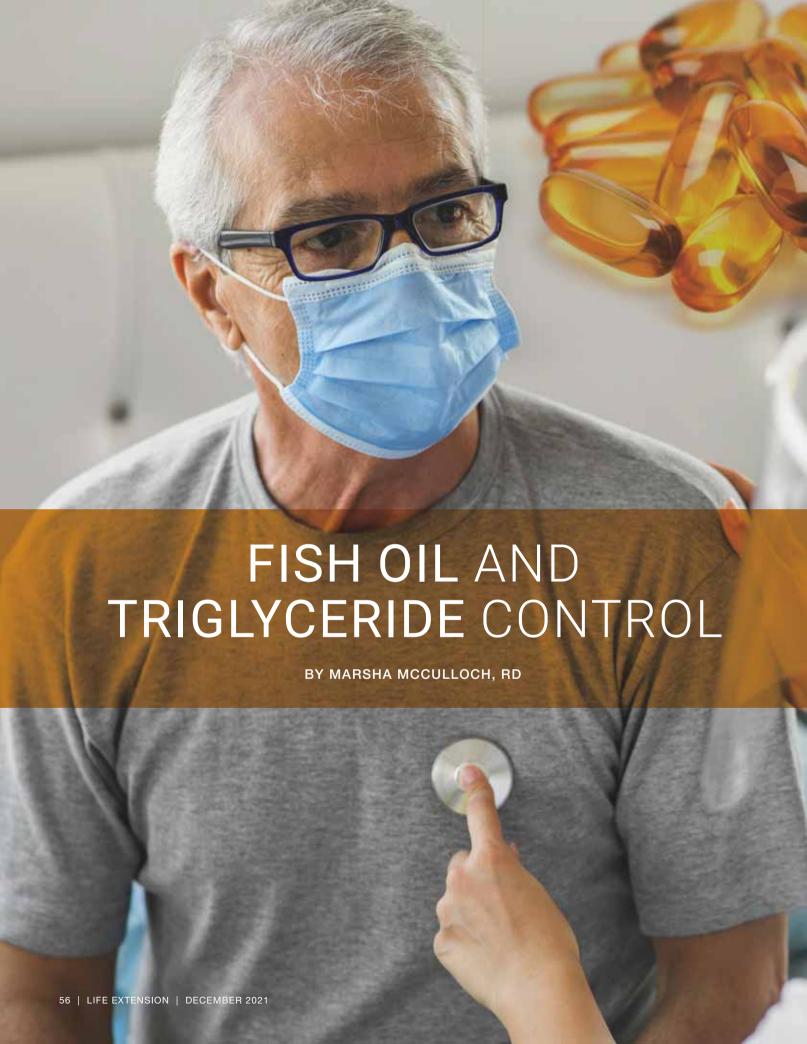


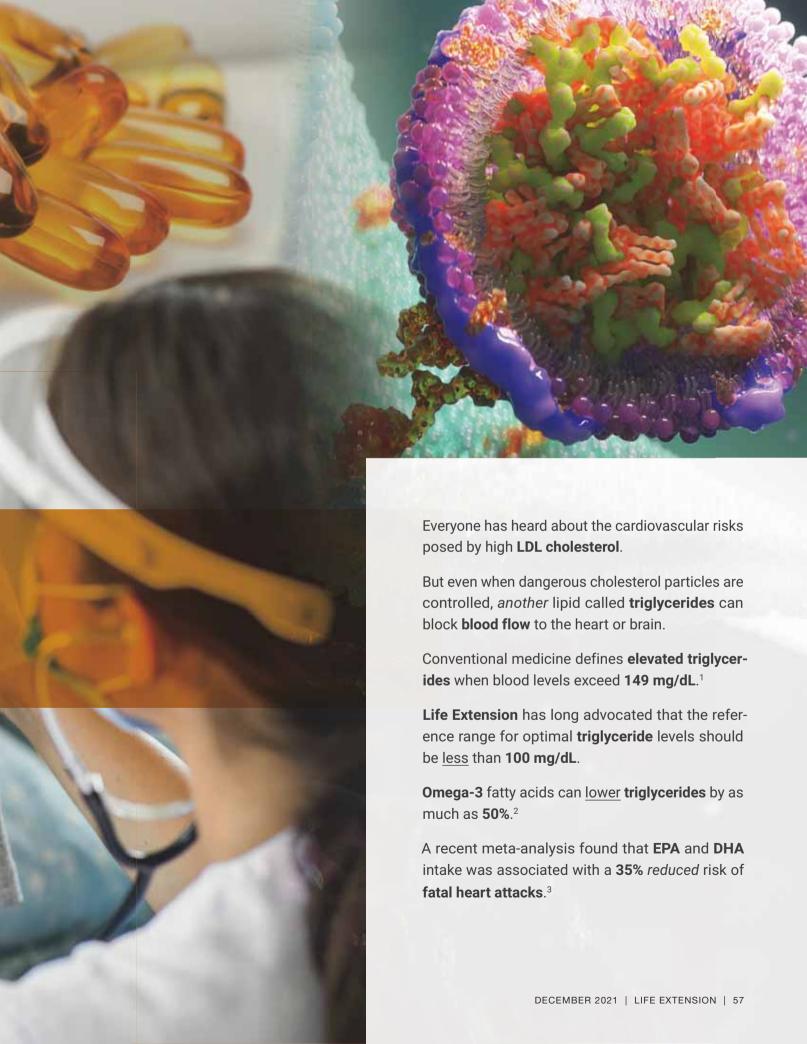
This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results are not guaranteed, and results may vary.

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# 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. 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**

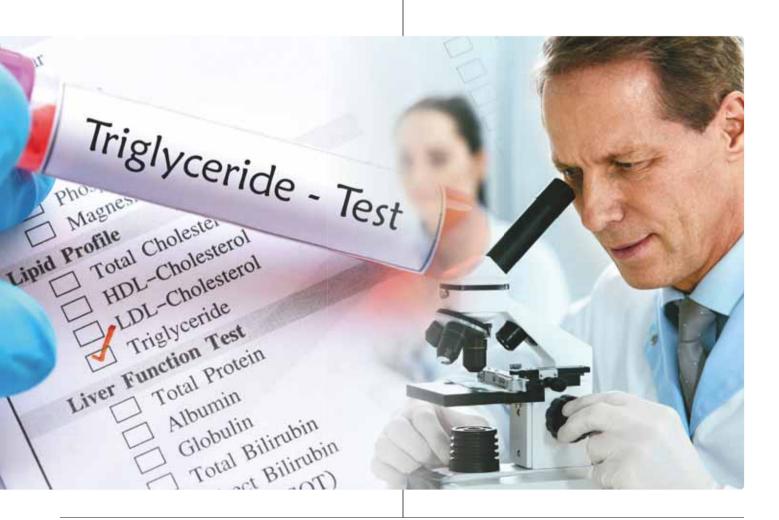
Oral intake of fish oil containing the omega-3 fatty acids EPA and DHA is a proven way to bring trialycerides down.

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





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

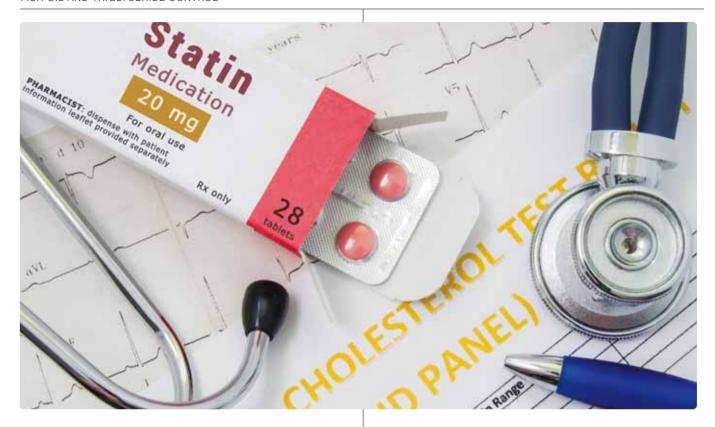
Specifically, this study found that EPA and DHA supplementation is associated with a reduced risk of:

- 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.

# 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.<sup>18</sup>
- One meta-analysis found that EPA and DHA intake was associated with a 35% reduced risk of fatal heart attacks.3



# **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 nonalcoholic fatty liver disease, is associated with an increased incidence of cardiovascular disease.<sup>22</sup>

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 highrisk 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.

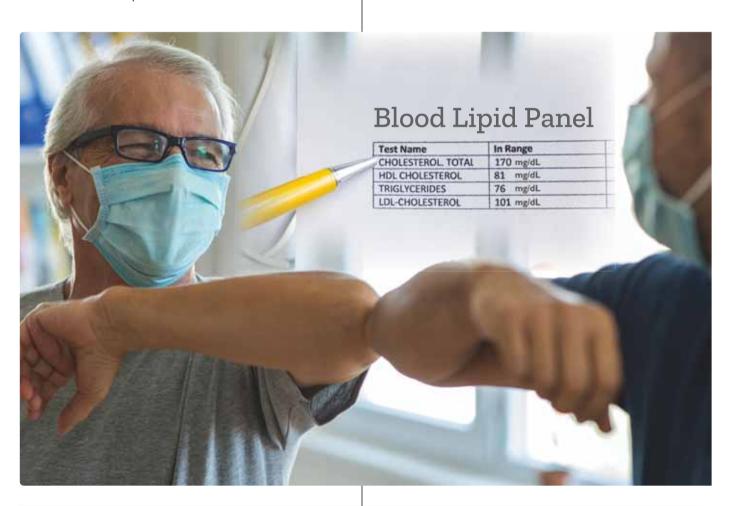
Fish oil containing the omega-3 fatty acids EPA and **DHA** can significantly *lower* triglycerides when consumed in sufficient amounts.

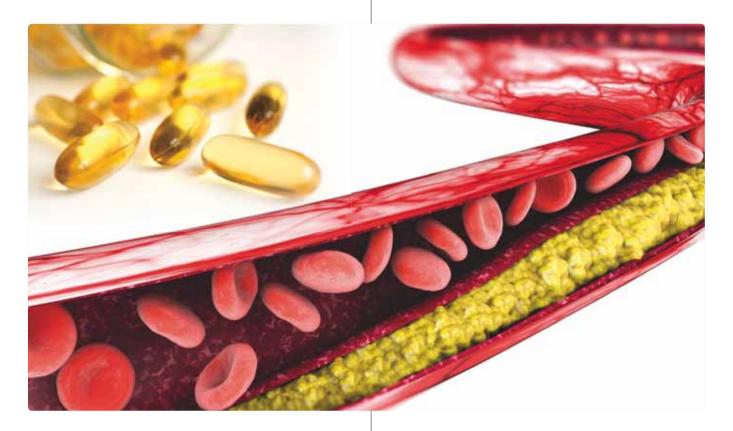
To promote healthy triglyceride levels, Life Extension suggests daily consumption of at least 2,000 mg of EPA/DHA from high-quality fish oil and/or regular consumption of cold-water fish. •

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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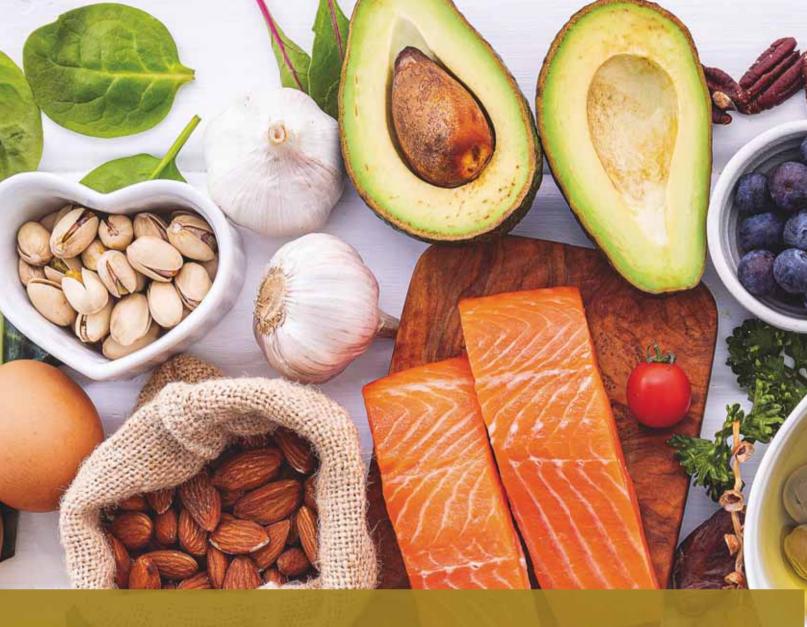
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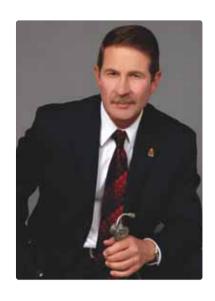


# THE MEDITERRANEAN DIET:

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.<sup>5-7</sup>

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 peerreviewed 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,<sup>10</sup>
- Reduce chronic inflammation,<sup>11</sup>
- Fight damaging oxidative stress, 12,13
- Reduce blood clot formation,<sup>14</sup>
- Reduce high blood pressure,<sup>9</sup>
- Aid in preventing breast cancer,<sup>15</sup>
- Help prevent arrythmias,<sup>16</sup>
- Lower heart attack and stroke risk,<sup>16</sup>
- Help lower risk of Alzheimer's disease,<sup>17</sup>
- Reduce risk of depression, 18



# WHAT YOU NEED TO KNOW

# The Benefits of the Mediterranean Diet

- Medical and nutritional experts have voted the Mediterranean diet 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 healthrelated 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:<sup>28,29</sup>

- 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:<sup>30</sup>

- 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:<sup>31</sup>

- 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 extravirgin 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 Mediterraneantype diet had an approximately 50% to 70% lower risk of recurrent heart disease than those on a control diet.33

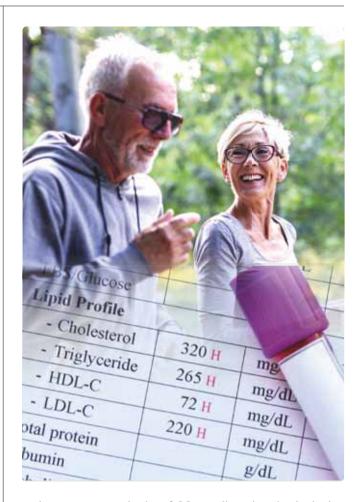
#### **Fighting Other Diseases**

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*.<sup>38</sup>

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

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.<sup>40</sup>

**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.<sup>41</sup>

These benefits, along with its proven diseasepreventing 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. •

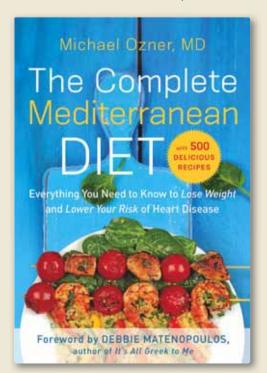
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Michael Ozner, MD, FACC, FAHA, is one of America's leading advocates for heart disease prevention. He is a board-certified cardiologist, a Fellow of the American College of Cardiology and of the American Heart Association. Medical Director of Wellness & 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.

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## Tom Brady

NFL Quarterback Shares His Secrets to Peak Performance and Longevity

BY LAURIE MATHENA HOW TO DO WHAT YOU LOVE, **BETTER AND FOR LONGER** TOM BRADY

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 agewho 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 savs 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 antiinflammatory 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% animalbased 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 multivitamin, 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

"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." •

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

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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# Capers

BY LAURIE MATHENA



Sometimes the smallest foods pack the biggest health punch. That is the case with capers, the pea-sized flower buds of the caper bush.

Capers are the star ingredient in modern-day dishes like chicken piccata and smoked salmon, but they have been consumed for thousands of years. Archaeological evidence of capers has been found in soil deposits from Stone Age cave dwellings in Greece and Israel.

In traditional Avurvedic medicine. capers were used to promote healthy liver function. Modern research supports this use.

In one clinical trial, 44 people with non-alcoholic fatty liver disease who ate 40-50 grams of caper fruit pickles with their meals for 12 weeks experienced reduced disease severity and a reduction in two markers of liver damage (ALT and AST).1

Capers are also being studied for their potential anti-diabetic and anti-inflammatory properties.

In a rat study, caper extracts had antidiabetic effects, such as reducing high blood sugar levels, lowering LDL cholesterol levels, improving liver functioning, and increasing HDL cholesterol.2

They have also been found to exert significant anti-inflammatory activity in rats, supporting their traditional use as a treatment for inflammatory conditions like rheumatism, arthritis, and gout.3

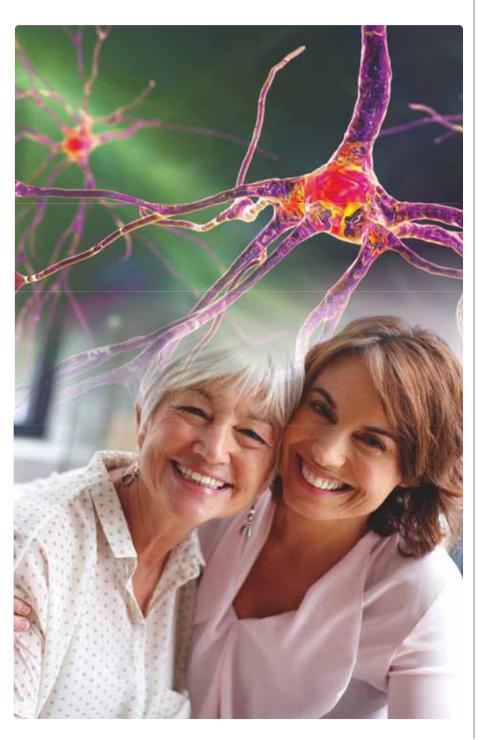
Capers are typically pickled, which brings out their tangy, lemon-like flavor and adds a burst of texture and flavor to dishes like fish, stews, and sauces.



## Oxidative Stress and Dietary Antioxidants in Neurological Diseases

EDITED BY COLIN R. MARTIN AND VICTOR R. PREEDY

BY LAURIE MATHENA



Oxidative stress is an underlying feature of neurological diseases like Alzheimer's, Parkinson's, and multiple sclerosis.

Dietary antioxidants can help combat oxidative stress, providing valuable tools for helping protect the brain against aging and disease.

Currently, there is a divide between physicians and clinical workers, on the one hand, and nutritionists and dietitians, on the other.

Physicians understand the processes in neurological disease and associated conditions but are less knowledgeable about the science of nutrition and dietetics.

Nutritionists and dietitians on the other hand aren't as familiar with the molecular and cell science of neurological disease.

This divide needs to be bridged so that medical science can advance, and preventive and treatment strategies can be devised.

The book Oxidative Stress and Dietary Antioxidants in Neurological Diseases aims to help bridge that

It provides a comprehensive overview of the role of oxidative stress in neurological diseases. Then it goes on to discuss the therapeutic use of antioxidants via diet and supplementation to combat oxidative stress.

This evidence-based book brings together leading experts in this area to showcase cutting-edge research. It is sure to be an invaluable text for professionals working in the field, as well as for individuals who seek to take proactive steps for their health.

Here, Life Extension® highlights some of the key concepts from the book that bring together both the basic processes involved in neurological disease—and nutrient strategies that aim to combat it.



#### Oxidative Stress and **Neurological Diseases**

PART I: Oxidative Stress and Neurological Diseases, covers the basic processes of oxidative imbalance, including topics such as molecular biology, blood-brain barrier, neuroinflammation, aging, neuroprotection, and other areas.

The body produces reactive, unstable agents known as free radicals during normal metabolism, and following exposure to environmental toxins. Antioxidants serve as natural antidotes to these free radicals. While internally produced antioxidants are abundant in youth, their levels decline with age.

The imbalance between free radicals and the antioxidants needed to inactivate, or "quench" them, leads to a generalized state of oxidative stress that can damage lipids, proteins, DNA, and mitochondria throughout the body.

The brain is particularly susceptible to oxidative damage because of its high rate of oxygen consumption. Numerous chapters in the book delve into studies showing that oxidative stress plays a critical role in the initiation and progression of neurodegenerative diseases such as Alzheimer's, Parkinson's, and Huntington's, which are characterized by a slow, progressive loss of neurons.1

Data from people with mild cognitive impairment provide evidence that oxidative stress usually precedes the development of Alzheimer's disease.2 Furthermore, alterations in the levels of antioxidants and antioxidant enzyme activities has been reported in Alzheimer's disease and other neurodegenerative disorders.3

The book also details the impact of oxidative stress on the bloodbrain barrier, the protective barrier that regulates the transport of molecules between the brain and the circulation.

Evidence has indicated that the breakdown of the blood-brain barrier is involved in the pathogenesis of neurodegenerative diseases like Parkinson's disease. Alzheimer's disease, ALS (amyotrophic lateral sclerosis), and MS (multiple sclerosis), as well as neurovascular disorders like stroke and vascular dementia.4

Oxidative stress in the brain also triggers neuroinflammation, another damaging factor often present during neurological disorders. In addition, aging itself is associated with a chronic state of inflammation known as inflammaging that has been associated with age-related neurological diseases.

The body has a natural signaling ability to ward off oxidative stress and neuroinflammation. But in neurological disease, pathways such as the endogenous antioxidant response pathway, and uncoupling pathway, are altered, preventing proper control of oxidative stress and neuroinflammation.

#### **Antioxidant Therapy in Neurological Disorders**

PART II: Antioxidants and Neurological Diseases, covers numerous antioxidants found in plants, vitamins, and various compounds that have been found to have therapeutic potential for various aspects of neurological disorders.

Antioxidants are beneficial because they delay or prevent oxidation. Because oxidative stress is well documented as a factor in the initiation and progression of neurological diseases and neurodegenerative disorders, it is rational to

consider the use of antioxidants to help alleviate the negative effects of oxidative stress.

Antioxidant properties are found in dietary compounds such as polyphenols (flavonoids), beta-carotene, vitamin C, and vitamin E (alphatocopherol).

Epidemiological and clinical studies have demonstrated that polyphenols and flavonoids exert a protective effect against neurodegenerative diseases.5 And numerous studies have shown that diets that include fruits and vegetables rich in antioxidants (such as carrots, blueberries, strawberries, and spinach) can produce a beneficial effect against age-related decline in cognitive functions in old rats.

The book features in-depth information on the following nutrients and compounds:

- Mediterranean oils like argan oil, olive oil, and milk thistle seed oil
- Aspidosperma pyrifolium Mart.
- Carnosic acid and carnosol
- Curcumin
- Ginkgo biloba
- Morinda citrifolia Linn. (Noni) fruit
- Naringin and naringenin
- · Nigella sativa L. and thymoquinone
- Resveratrol
- Saffron
- Sulforaphane

Here, we will expound on two key nutrients discussed in the book: curcumin and ginkgo biloba.

#### Curcumin

Curcumin, the main, biologically active component of the spice turmeric, has well-documented antioxidant and anti-inflammatory properties.6

Studies have demonstrated that curcumin exerts antioxidant effects by scavenging free radicals, alleviating lipid peroxidation, modulating antioxidant defense systems such as catalase and SOD, activating the Nrf2 pathway, and more.

In one in vitro study, curcumin protected glial cells (important brain cells that make up the white matter in your brain) against oxidative stress and inflammation caused by numerous damaging toxins.7

Curcumin could also be a key agent in the treatment of Alzheimer's disease.8 Both in vitro and in vivo studies have shown that curcumin improves cognitive decline and synaptic functions and restores synaptic plasticity.9

Through its antioxidant effect, curcumin therapy has been proven to have beneficial effects in additional neurodegenerative disorders such as Parkinson's, Huntington's, and multiple sclerosis.

In addition, studies have shown that curcumin can help:

- Alleviate anxiety and depression,10
- Improve cerebral ischemic injury,11
- Protect the brain during traumatic brain injury, 12
- Treat neuropathic pain,13 and
- Enhance memory and learning.14



#### Ginkgo Biloba

Ginkgo biloba extract is known to have antioxidant properties, making it ideal for combating the oxidative stress that contributes to neurotoxicity and dysfunction in the brain.

Ginkgo biloba contains natural flavonoids (such as quercetin) that are free-radical scavengers, and metal chelators, and that enhance cellular antioxidant systems.

Ginkgo biloba has been shown to exert its neuroprotective effects through mechanisms such as combating inflammation,15 improving blood flow, inhibiting amyloid-beta aggregation, regulating neurotransmitters, and improving mitochondrial function.

Mitochondria help turn energy from food into energy your cells can use. These cells are particularly vulnerable to attack by reactive oxygen species (ROS), which leads to mitochondrial dysfunction.

These mitochondrial changes in the brain can contribute to the impairment of synaptic function and neuronal loss that manifests as cognitive deficits in oxidative stressrelated neurodegenerative diseases such as Alzheimer's disease.

Studies show that ginkgo biloba extract exerts protective effects against mitochondrial oxidative injury, helping maintain mitochondrial function.16

#### **Summary**

Oxidative stress is a feature of neurological disease and other associated conditions. It can arise due to molecular and cellular processes, or as a result of nutritional imbalances, either before the onset of disease or during its development.

Oxidative Stress and Dietary Antioxidants in Neurological Diseases provides a comprehensive overview of oxidative stress in neurological diseases, as well as the potentially therapeutic uses of natural antioxidants such as curcumin, ginkgo biloba, and others.

Since diseases are often multifactorial, the book does not describe oxidative stress in isolation, but in concert with other processes such as apoptosis, cell signaling, receptor-mediated responses, and others.

In the forward to the book, Professor Una Macleod, Dean of the Hull York Medical School and Professor of Primary Care Medicine, in the United Kingdom, writes, "Oxidative stress, antioxidant status and function, and the impact of dietary antioxidants within the context of neurological disease represent an exciting area of research which may ultimately contribute to improved quality of life in those experiencing neurological disease,

particularly as the area matures and penetrates direct clinical care more extensively than at present."

The book was designed for nutritionists, dietitians, food scientists, physicians and clinical workers, neurologists, healthcare workers, and research scientists.

We believe informed Life Extension® readers will also benefit from this comprehensive look at neurological diseases, as it provides both the background knowledge and specific practical applications for protecting against brain aging and neurodegeneration.

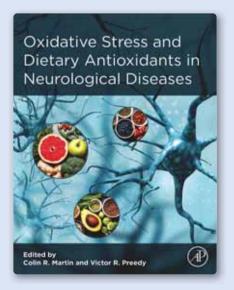
If you have any questions on the scientific content of this article, please call a Life Extension Wellness Specialist at 1-866-864-3027.

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To order a copy of Oxidative Stress and Dietary Antioxidants in Neurological Diseases, visit www.elsevier.com



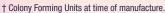


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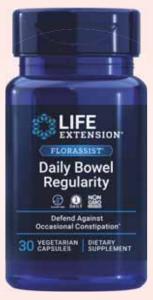
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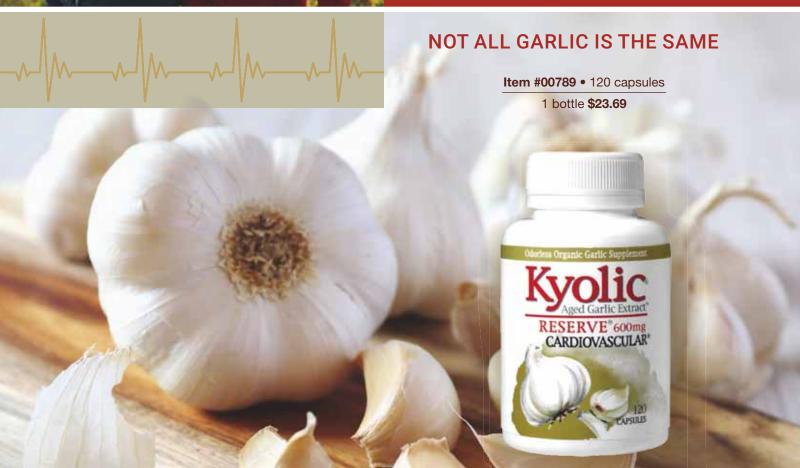
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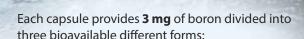
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- 00818 Super CLA Blend with Sesame Lignans

#### **WOMEN'S HEALTH**

- 01942 Breast Health Formula
- 01626 Enhanced Sex for Women 50+
- 01894 Estrogen for Women
- 01064 Femmenessence MacaPause®
- 02204 Menopause 731™
- 02319 Prenatal Advantage
- 01441 Progesta-Care®
- 01649 Super-Absorbable Soy Isoflavones



**Promotes Healthy Prostate** Function and Healthy Bones



- · Boron citrate
- · Boron aspartate
- Boron glycinate

There are **3 mg** of boron in the daily dose of <u>each</u> of the following **Life Extension**® formulas:

- Two-Per-Day
- Bone Restore
- · Ultra Prostate Formula
- Life Extension Mix™

The suggested daily dose for most adults is 6-9 mg of boron.<sup>1,2</sup> If you are already obtaining this potency in your multi-nutrient formulas, you may not need additional boron.

**Item #01661 •** 100 vegetarian capsules

1 bottle **\$4.46** 

4 bottles \$3.94 each

#### References

- Open Orthop J. 2012;6:143-9.
   Altern Med Rev. 2004 Dec;9(4):434-7.

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







Boron

**Advanced Chelate Complex** 100 VEGETARIAN DIETARY SUPPLEMENT

# RESTORE Connections Between YOUR NEURONS



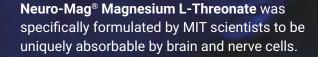
Item #01603 • 90 vegetarian capsules

1 bottle **\$30** • 4 bottles \$27 each



Item #02032 • 93.35 grams of powder

1 jar \$28.50 • 4 jars \$26 each



The number of **synapses** that connect brain cells decline with aging.

Magnesium L-Threonate has been shown to improve synaptic density and other structural components of the brain.\*

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

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

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The Science of a Healthier Life®

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#### IN THIS EDITION OF LIFE EXTENSION MAGAZINE®













#### 7 RAPID RECOGNITION OF HEALTHY AGING

Major food companies are funding research and designing functional foods to extend healthy longevity in older people.

#### 22 BOOST BRAIN PROCESSING SPEED

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

#### 34 ALL-DAY STRESS RELIEF

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

#### **42 FEED YOUR BENEFICIAL BACTERIA**

With age, beneficial gut bacteria sharply decline. A unique prebiotic quickly repopulates health-promoting intestinal bacteria.

#### 51 HEIGHTENED RISK FOR HEART FAILURE HOSPITALIZATION

A study found that people with low **DHEA** had an *increased* risk for heart failure hospitalization and cardiac death.

#### 56 CONTROL YOUR TRIGLYCERIDES

The Mayo Clinic Proceedings links higher EPA/DHA omega-3 intake to a 35% lower risk of fatal heart attacks.