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MARCH/APRIL 2022

FEATURE ARTICLES

Curb Hunger AND BURN FAT

PLUS: PAGE 18
The Longevity Power of Mushrooms

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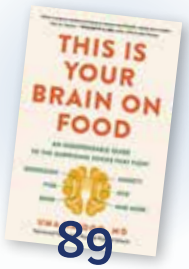

LIFE EXTENSION®
The Science of a Healthier Life®
LifeExtensionRetail.com March/April 2022

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In the News

Vitamin C and E Supplementation Lowers Risk of Cognitive Decline

Supplementation with vitamins C and E may lower the risk of cognitive decline in people 65 and over, according to a study published in *The Annals of Pharmacotherapy*.*

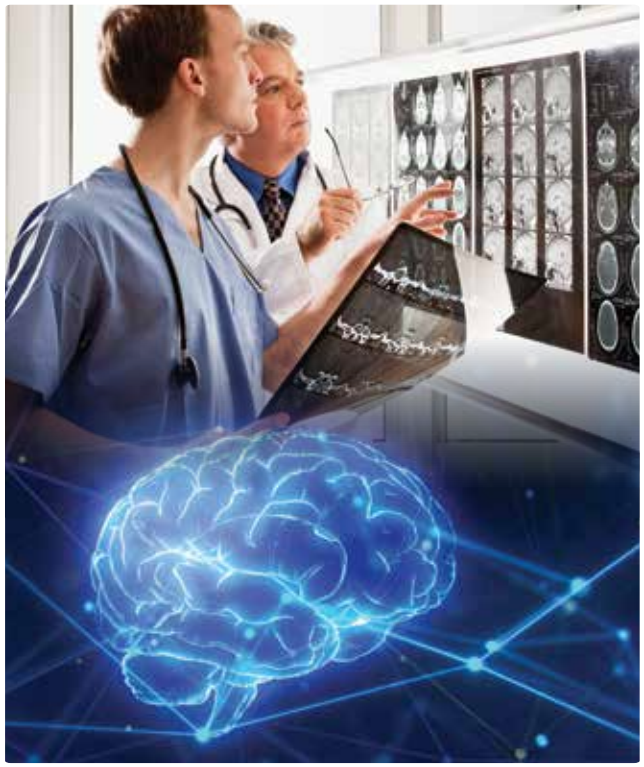
Researchers analyzed 5,269 men and women who were free of dementia at the start of the study, and followed them for 11 years.

Compared to non-supplementers, those who supplemented with vitamin C and/or vitamin E had a **38%** lower adjusted risk of **all-cause dementia** and a **40%** lower risk of **Alzheimer's disease**.

They also had a **23%** lower risk of developing cognitive impairment without dementia.

Editor's Note: The study authors concluded, "This study supports a protective role of vitamin E and C supplements in the risk for Alzheimer's disease and all-cause dementia. In addition, these supplements may contribute to a reduced risk of CIND [cognitive impairment, not dementia]. Overall, these findings indicate additional support for the use of antioxidants as a preventive strategy against cognitive decline."

* *Ann Pharmacother*. 2017 Feb;51(2):118-124.



NAD+ Boosts Cognitive Function in Animal Study

The *Journal of Neuroinflammation* reported that **nicotinamide adenine dinucleotide** (**NAD+**) improved **cognitive function** and inhibited neuroinflammation in an animal model of **chronic cerebral hypoperfusion**, an underlying cause of vascular **dementia**.*

In this study, rats with reduced **circulation** to their **brains** were given daily injections of NAD+ for eight weeks. Researchers found that the NAD+ improved **cognitive function** and inhibited *neuroinflammation*.

The relevance of this study is that normal aged humans suffer significant cerebral **circulatory deficits**.

Maintaining more youthful **NAD+** levels might circumvent some of the pathologies associated with deficient **brain** blood flow (hypoperfusion).

Editor's Note: NAD+ treatment alleviated CCH-induced neuronal death, microglial activation, and pro-inflammatory factor expressions in the cerebral cortex and hippocampus, the authors stated.

* *J Neuroinflammation*. 2021 Sept 16; 18(1):207.

Resveratrol Helps Modulate Glycemic Control in Diabetics

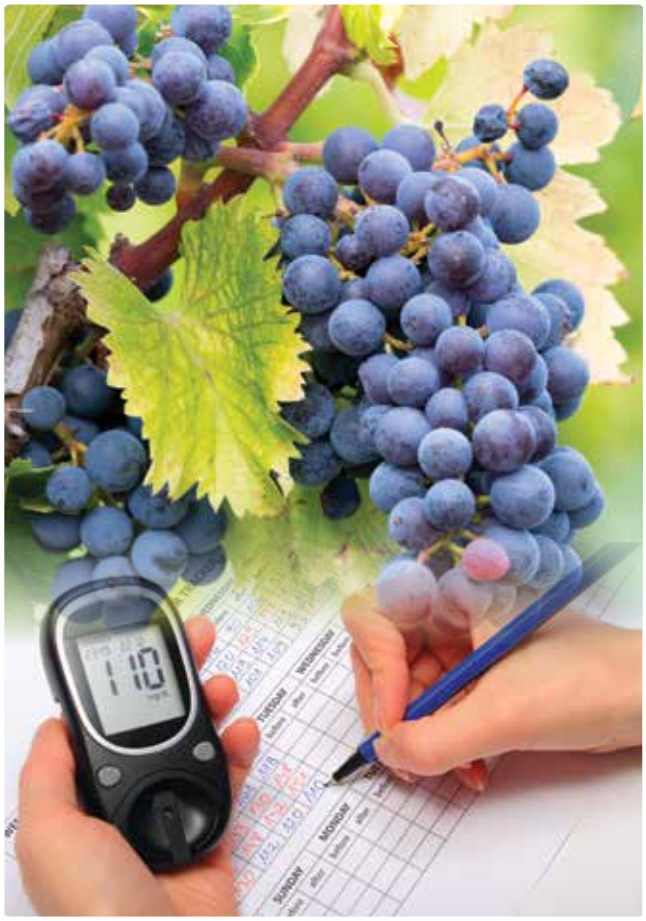
Supplementing with resveratrol was found to be associated with improvements in diabetics' glycemic control, according to findings from a meta-analysis of clinical trials published in *Medicina Clinica (Barcelona)*.*

The trials compared resveratrol to a placebo with or without concurrent antidiabetic medications or other drug treatment.

Resveratrol doses of **500 mg** or more were associated with lower fasting blood glucose, fasting serum insulin, insulin resistance, total cholesterol, LDL cholesterol, and diastolic blood pressure, compared to a placebo.

Editor's Note: Resveratrol was associated with a greater reduction in hemoglobin A1c (a marker of long-term glucose control) compared to a placebo in trials of three months duration.

* *Med Clin (Barc)*. 2021 Oct 16;S0025-7753(21)00472-3.



Mediterranean Diet Can Lower Risk of Sudden Cardiac Death by 25%-26%

A lower risk of sudden cardiac death is associated with greater adherence to a Mediterranean diet, a study in the *Journal of the American Heart Association* reported.* The study also found a trend toward a *higher* risk of sudden cardiac death associated with greater intake of a Southern dietary pattern.

The **Mediterranean diet** foods included vegetables, fruits, legumes, cereals, and fish.

The **Southern** pattern included added fats, fried food, eggs and egg dishes, organ meats, processed meats, and sugar-sweetened beverages.

Among 21,069 men and women aged 45 years and older, 401 sudden cardiac deaths occurred during an average 9.8 years of follow-up. People whose Mediterranean diet scores placed them among the top one-third of participants had a **25%-26%** lower risk of sudden cardiac death than subjects whose scores were among the lowest third.

People whose Southern dietary pattern score was among the top quarter of participants had a **46%** *higher* risk of sudden cardiac death than those among the lowest quarter.

Editor's Note: The protective effect of the Mediterranean diet was limited to participants with no history of coronary heart disease at the beginning of the study.

* *J Am Heart Assoc.* 2021 Jul 6;10(13): e019158.

Better Response to Stress with French Oak Wood

A group of nurses who received supplements containing an extract of French oak wood showed improvement in their responses to stress, according to a pilot study reported in *Minerva Medica*.*

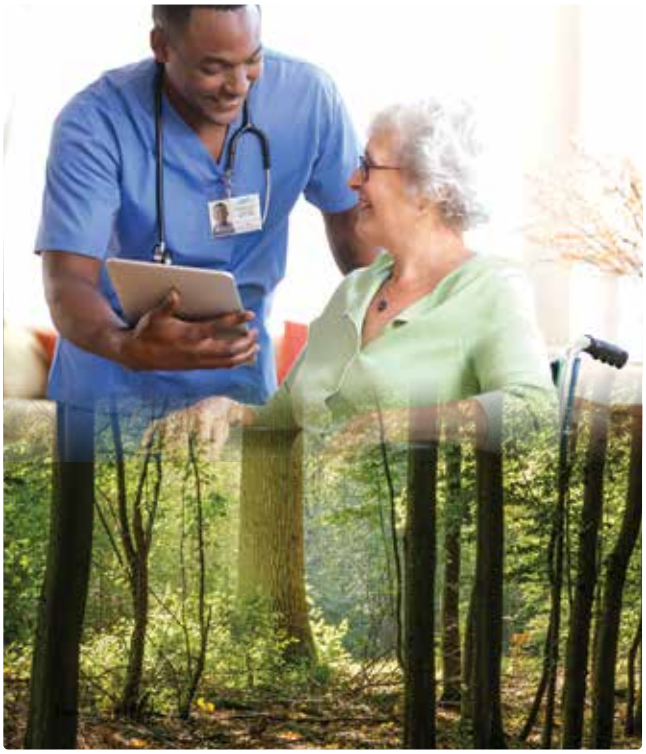
Participants were evaluated for signs of stress and fatigue in addition to levels of oxidative stress.

After four weeks, assessed stress factors significantly improved in the group that received **300 mg** per day of French oak wood compared to the beginning of the study, and compared to the matched control group.

"The supplementation significantly improved the objective perception of fatigue in comparison with controls. A practical professional score evaluation provided an indication of professional attitude and stamina, in difficult, stressful working conditions under continuous pressure," researchers stated.

Editor's Note: The nurses were evaluated as part of a cardiovascular screening program.

* *Minerva Med*. 2021 Sep 20.



How Omega-3 Helps Protect Against Depression

Research reported in *Molecular Psychiatry* contributes to an understanding of omega-3 fatty acids' ability to combat **depression**.*

In cells derived from the brain's hippocampus, treatment with the omega-3 fatty acids EPA and DHA prevented the increase in cell death and decrease in neuron formation that would have otherwise resulted from exposure to inflammatory cytokines.

An in vitro study was replicated in a clinical study among a small sample of 22 individuals with Major Depressive Disorder. They received **3 grams** of EPA or **1.4 grams** of DHA daily for 12 weeks.

Either fatty acid (EPA or DHA) was associated with an increase in lipid mediator metabolites and improvement in depressive symptoms.

Editor's Note: "In summary, our study confirms and extends previous evidence for the antidepressant, anti-inflammatory and neuroprotective abilities of EPA and DHA," the authors stated.

* *Mol Psychiatry.* 2021 Jun 16.

Dietary Supplements Linked to Improved Prognosis for Breast Cancer Patients

A meta-analysis published in the journal *Cancers* found associations between *improved* breast cancer outcomes and the intake of multivitamins and other nutrients.*

Sixty-three studies including a total of 120,167 breast cancer patients were analyzed.

For participants in studies that evaluated the effects of multivitamins, the risk of mortality was **12%** lower, and **17%** lower among those who took antioxidant supplements.

Studies that examined vitamin C's effects on breast cancer-specific mortality showed that vitamin C intake amount among the top **25%** was associated with an **18%** lower risk of death.

Editor's Note: "Furthermore," the authors concluded, "we performed subgroup analyses by menopausal status and dietary or supplementary micronutrient intake. Most trends were similar to the main findings; in particular, the vitamin C, vitamin D, and vitamin E supplements decreased the risk of mortality."

* *Cancers.* 2021 Oct 23.

Fast-food Restaurant Availability Linked to Type II Diabetes

A nationwide study found that living in a neighborhood with a higher availability of fast-food restaurants could increase the risk of developing type II diabetes.*

Researchers analyzed data from more than four million veterans seen at 1,200 health facilities around the country who were followed for an average of 5.5 years.

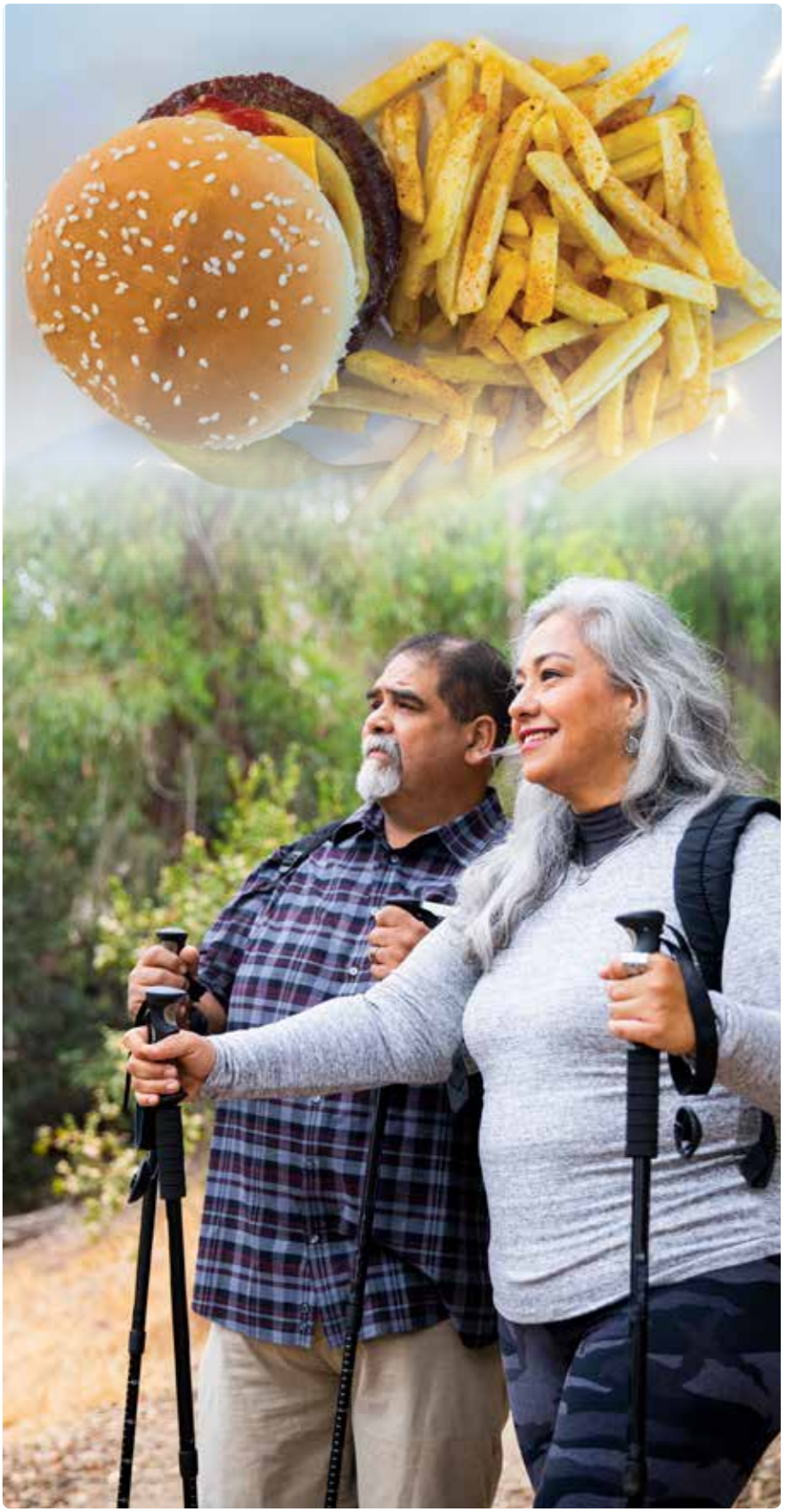
They examined the relationship between the "built food environment" and its connection to chronic disease. The *built food environment* indicates the physical buildings in a community in which people can make decisions about food, such as fast-food restaurants, grocery stores, and other food options.

The researchers found that there was a link between the built food environment and the likelihood of developing chronic diseases like heart disease, type II diabetes, and certain types of cancers.

This association has been examined previously on a small scale. This was the first nationwide study—using data from people living in **98%** of the US census tracts across the country—to confirm the connection.

Editor's Note: The researchers concluded, "The more we learn about the relationship between the food environment and chronic diseases like type II diabetes, the more policy-makers can act by improving the mix of healthy food options sold in restaurants and food outlets, or by creating better zoning laws that promote optimal food options for residents."

* *JAMA Network Open*, 2021; 4(10): e2130789.



What's in MUSHROOMS That Supports Healthy Aging?

BY JULIE RICH

A landmark study published in **April 2021** followed the dietery patterns of 15,000 Americans for nearly **20 years**.[1]

Compared to no consumption, those who consumed **mushrooms** in their diet had a **16%** lower overall **mortality** risk.

When one serving a day of **mushrooms** was ingested in place of processed or red meats, there was a **35%** reduction in all-cause mortality.

A trend toward even lower **mortality** was found in people who consumed *higher* amounts of **mushrooms**.

So, what's in **mushrooms** that enables people to **live longer**?

It turns out that **mushrooms** contain more of an amino acid called **L-ergothioneine** than other food sources.[2,3]

This has spurred researchers to find out how **L-ergothioneine** works in the body.

As you will read, **L-ergothioneine** appears to protect **DNA** and reduce the shortening of **telomeres**.

The article describes the longevity benefits observed in humans who consume edible mushrooms, which contain the amino acid **L-ergothioneine**!

What is L-Ergothioneine?

L-ergothioneine is an amino acid not produced by the human body.[5]

L-ergothioneine levels peak in early adulthood and steadily decline with age.[6]

It is found in the *highest* concentration in **mushrooms** and other fungi. Miniscule amounts are found in plants that have taken it up from the soil.

To obtain meaningful quantities, **L-ergothioneine** must be acquired through **diet** (eating lots of mushrooms) or as a standardized supplement.[7-9]

Unfortunately, L-ergothioneine is not commonly found in the American diet. This is largely due to low consumption of mushrooms and industrial farming practices, making supplementation the best option. It would take about 2-5 cups of the common white button mushrooms to equal **5 mg** of L-ergothioneine.[10,11]

When L-ergothioneine intake in America was compared with intake in Europe, researchers found that Europeans had greater longevity possibly due to higher L-ergothioneine intake.[12]

Most tissues of the body contain L-ergothioneine.[7,8] It is concentrated in *higher* degrees in cells at greatest risk of injury due to **oxidative stress** and **inflammation**, including blood, bone marrow, eye lens, brain, liver, and skin.[7,8]

L-ergothioneine ***transporters*** are also found in the placenta and mammary glands, suggesting its importance in the early development of the embryo and newborn children.[7]

Scientific Findings

A major finding catapulted **L-ergothioneine** into the scientific spotlight.

Humans produce a **transporter protein** that takes up **L-ergothioneine** from the diet and distributes it into cells throughout the body.[4]

Although this protein can carry other compounds, it transports L-ergothioneine ***100 times*** more efficiently than other **nutrients**.

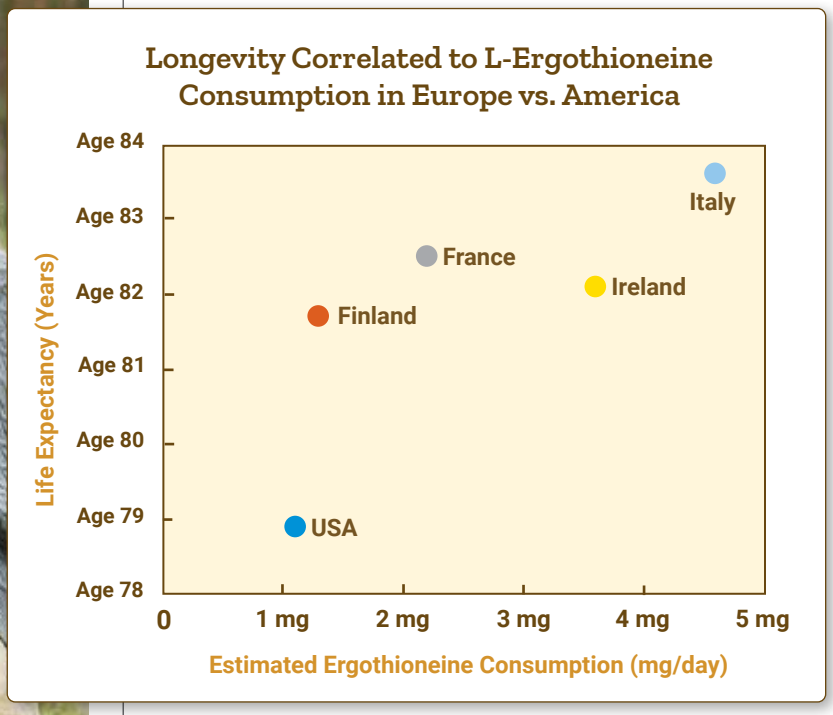
This preferential treatment given to **L-ergothioneine** indicates the important role it plays in the body.

Promising Studies

Observational studies have found evidence that **L-ergothioneine** may be critical to healthy aging. They have even shown a correlation between blood levels and overall **life expectancy.**

One study compared the average daily intake of L-ergothioneine among several developed countries.[12]

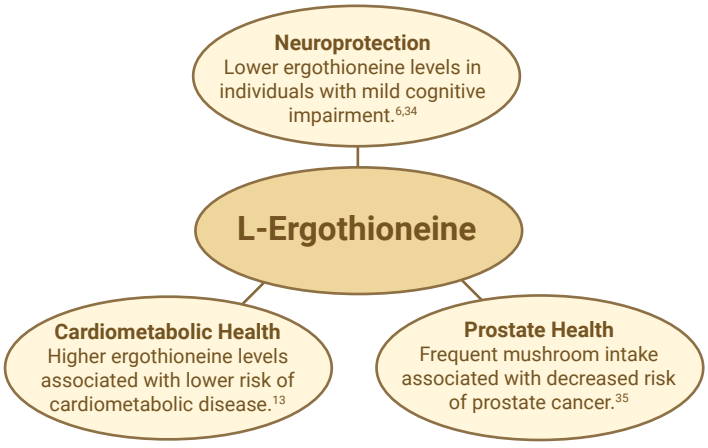
The countries with the *lowest* intake, such as the United States, had a lower average life expectancy.



* Figure adapted from Beelman et al. 2020.

WHAT YOU NEED TO KNOW

L-Ergothioneine: Potential Health Benefits



Countries with the *highest* intake have a considerably *longer* average **lifespan**.

Italians, on average, ingest more than **four times** *greater* amounts of **L-ergothioneine** daily compared to people in the United States.[12]

Studies are finding that *higher* blood levels of **L-ergothioneine** are associated with lower incidence of:

- Cardiovascular disease[13]
- Cognitive decline/mild cognitive impairment[6]
- Parkinson's disease[14]
- Crohn's disease (an inflammatory bowel disease)[15]
- Frailty[16]
- Death from cardiovascular disease or ***death from any cause***[13]

Defend Cells and Tissues Against Harm

- **L-ergothioneine** is an amino acid that is found in mushrooms and other fungi.
- The human body cannot produce L-ergothioneine, but human cells express a **transporter** that is highly specific for L-ergothioneine, facilitating its transport into cells and mitochondria.
- The existence of this specific transporter is highly suggestive that L-ergothioneine is an essential compound in the body. And because it has been found to play an important role in **cellular protection**, this has led to an explosion of medical research into the nutrient in recent years.
- Observational studies show that *higher* L-ergothioneine intake and blood levels correlate with *longer* **life expectancy** and *reduced* risk for several age-related conditions, including heart disease and cognitive decline.

Levels of **L-ergothioneine** also appear to be depleted in tissues that have undergone age-related injury and loss of function.

For example, people with **cataracts** have *lower* levels of L-ergothioneine than those with healthy eye lenses. The degree of the compound's depletion correlates with the severity of **cataract formation.**[17]

L-ergothioneine intake is thought to be very limited in the typical U.S. diet.[12] Levels also tend to decline with advancing age.[6,18,19] Oral intake can effectively raise blood levels.[20]

Potential Mechanisms of Protection

L-ergothioneine appears to be a normal component of a tissue's defense against injury.[7,8]

L-ergothioneine has a sulfur-containing group that puts it in a class related to **glutathione**, one of the most powerful **antioxidants** produced in the body.[21,22]

In cells, L-ergothioneine concentrates in the **mitochondria**, an organelle vulnerable to oxidative stress. Preclinical evidence shows that L-ergothioneine can help neutralize oxidizing compounds *before* they damage mitochondria and other cellular structures.[23,24]

Protecting Against DNA Damage

The amount of **damage** inflicted on cellular **DNA** is underestimated.

Be it background radiation or normal metabolic processes, our DNA is constantly "**broken**" and then "**repaired**" utilizing specialized *coenzymes* that are depleted with normal aging.

Failure to **repair** damaged DNA can result in cells transforming into a malignant or senescent state.

The ability of L-ergothioneine to **protect DNA** is promising.

For example, **ultraviolet (UV) radiation** damages the **DNA** of skin cells and accelerates **aging** of the skin and risk of skin cancers.

L-ergothioneine has been shown to ***absorb UV light*** at the same wavelengths that DNA does.[8,25,26] This suggests that it can act as a kind of built-in "sunscreen" in skin cells. This mechanism may help prevent DNA damage and help **DNA repair** processes in cells exposed to UV radiation.[27]

Maintaining *Longer* Telomeres

Another contributor to the aging process is the loss of **telomere** structure, the protective caps on the ends of chromosomes.[28]

With advancing age, these structures are shortened, which is a marker of cellular aging, loss of function, and eventual cell death.

Protecting **telomeres** to maintain vitality has long been a focus of anti-aging research.

A study published in **2020** found that L-ergothioneine significantly *reduced* the rate of **telomere shortening** and *decreased* the number of short telomeres in cells exposed to oxidative-stress conditions.[29]

These and other mechanisms explain why L-ergothioneine may help promote healthy longevity.

Bruce Ames and Longevity

One of the world's pre-eminent nutritional biochemistry researchers, **Dr. Bruce Ames**, has brought increased attention to the benefits and potential of **L-ergothioneine**.

Dr. Ames' career has spanned decades, encompassing over 550 scientific publications and numerous scientific awards and honors.[32,33]

In 2018, he published a ground-breaking review paper on the longevity-supporting promise of a number of nutritional compounds, including **L-ergothioneine**. This pushed L-ergothioneine toward the forefront of the list of innovative nutrients being investigated to **prolong lifespan** and healthspan.[9]

Summary

L-ergothioneine is an amino acid found predominantly in mushrooms. It cannot be produced in the body and must be acquired through the diet or direct oral intake.

Cells of mammals, including humans, contain **transporter proteins** that specifically facilitate the transport of **L-ergothioneine** throughout the body.

This suggests that **L-ergothioneine** plays an essential role in the body, for cellular defenses and more.

L-ergothioneine shields against **DNA damage** from UV radiation and **telomere shortening** in cells under oxidative-stress conditions.

Through these actions, it may help slow the **aging** process and defend the body against age-related disorders, including **cardiovascular disease** and **cognitive decline**.

Observational studies have found that *higher* intake and blood levels of **L-ergothioneine** are associated with *reduced* rates of many age-related conditions and *increased* **life expectancy**. •

In 2005, scientists made a striking discovery:

Human cells produce a **transporter protein** that serves largely as a **carrier** for one ***particular compound*** to cells throughout the body.

That *carrier* compound is:

L-ergothioneine.[4]

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Essential Youth with L-Ergothioneine

The Mushroom 'Longevity' Amino Acid

L-ergothioneine is an amino acid found in **mushrooms**.

Studies suggest that **L-ergothioneine** may support healthy longevity by:

- Protecting against oxidative stress[1]
- Delaying ***telomere*** shortening[2]
- Supporting **DNA function** in cells subjected to UV exposure[3]

One daily capsule of **Essential Youth** provides **5 mg** of **L-ergothioneine**.

This **5 mg** potency exceeds the ***L-ergothioneine*** contained in 2 cups of white button mushrooms, depending on growing conditions.[4,5]

Item #02431

5 mg • 30 vegetarian capsules

GLUTEN FREE

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This product is available at fine health food stores everywhere.

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Sleep Loss and Weight Gain

WILLIAM FALOON

Two **trends** are simultaneously **worsening**.

As **sleep deprivation** rates surge ***higher***, so do the numbers of **overweight** and **obese** people.

Human research links **sleep loss** with **weight gain**.[1,2]

Published reports associated **sleep loss** with a **15%** decrease in **life expectancy**.[3-5]

What's stumped everyone are effective **solutions** for chronic **sleep disorders**.

Over the past three years, four studies have been published that reveal a partial solution in the form of a low-cost supplement.[6-9]

Differing doses of the herb ***ashwagandha*** have been used by Americans for decades. Its ability to **improve sleep** was recently validated.

A **2019** placebo-controlled study showed that a lower potency ashwagandha extract taken twice a day reduced stress and anxiety, and demonstrated "***significant improvement in sleep quality***."[6]

A more impressive **2020** placebo-controlled study used a new **ashwagandha** that is more **concentrated** and taken only once at bedtime.[8]

The results found **improvements** as high as **72%** across a wide spectrum of **sleep measures**.[8]

Those challenged with getting enough quality sleep should consider novel approaches being uncovered in the published scientific literature.

The ability to reduce one's **calorie intake** and **disease risk** in response to **better sleep** makes achieving **restorative** nocturnal rest a **New Year's** priority.

This might happen with the proper use of **ashwagandha** and other approaches that yield ancillary **health benefits**.

Impact of Sleep on Hunger

Most of us who suffer a night of **non-restorative sleep** tend to **eat** more the next day.

Epidemiologic evidence links **sleep loss** with **obesity**.[10]

An underlying cause involves changes in **brain activity** that increase our desire for high-calorie foods that cause weight gain.

Other factors linking **weight gain** to **sleep deprivation** are increases in hormones like **ghrelin** that **stimulate hunger**, and decreases in **leptin** that **suppress appetite**.[11]

One epidemiological study found that older adults **sleeping** less than five hours per night are at approximately **40%** *greater* risk of becoming **obese** compared to those sleeping seven to eight hours per night.[12]

Sleep-Deprived People Age Faster

Age-related disorders accelerate in response to **insufficient sleep**.

Harvard University Medical School published a report revealing the many health problems associated with **sleep loss** including:[4]

- Hypertension
- Immune impairment
- Cardiovascular disease
- Type II diabetes
- Common colds
- Obesity

The **Harvard** report referred to a study showing those who slept **less than seven hours** a night are nearly **three times** more likely to develop **cold symptoms** compared to those who slept **eight or more hours**.

Those with good sleep "**quality**" were the least likely to contract a **common cold**.[4,13]

This **Harvard** report described three separate studies suggesting that insufficient sleep may increase mortality (death) risk by **15%**.[3,4]

The Whitehall II Sleep Study

The world woke up to the importance of **sleep** with the publication of a huge, **multi-decade** study conducted in Britain.

The study found that as people aged and their **sleep duration** shortened, risk of **cardiovascular death** more than doubled.[5]

The **Whitehall II** study has been referred to in numerous articles as demonstrating the **lethal** dangers of **sleep deprivation**. Newly published research supports many of its findings.

Impact of Sleep on Cardiovascular Risks

A recent study published online in the *Journal of Preventive Cardiology* analyzed data from the National Health and Nutrition Examination Survey (NHANES).[14]

A total of **17,635** eligible participants were followed for a median of **7.5 years** to determine if they died from a **heart attack**, **heart failure** or **stroke**–in other words, to determine their cardiovascular mortality.

Researchers divided participants into three groups depending on their average sleep as follows:

1) Less than six hours,

2) Six to seven hours, and

3) More than seven hours.

These people were tracked to ascertain how many in each group died from cardiovascular causes.

Those who slept less than **six hours** a night had a **45%** increased risk of **cardiovascular death** compared to those who slept **six to seven hours** each night.

What confused people about this study is that it showed that those who slept **more than seven hours** each night also had an increased death risk.

We at **Life Extension** received calls about this and explained that this study measured **sleep duration** (number of hours) and not **sleep quality**.

We opined that people with underlying degenerative illnesses tend to require *longer* sleep periods, often because their "**sleep quality**" is impaired.

Measuring "Quality" Sleep

Restorative sleep is a critical aspect of the overall sleep experience yet many people are challenged to obtain **restful sleep**.

Early research focused on **number of hours** slept and not as much on the "**quality**" of sleep architecture.

Sleep **quality** can now be assessed with **monitors** as small as **wristwatches**.

This enables scientists to conduct **clinical trials** that precisely measure a variety of sleep parameters.

Highly Standardized Ashwagandha

Non-restorative sleep is an indicator of poor sleep "quality**"** that goes beyond mere **number of hours** slept.

Studies published in **2019**, **2020**, and **2021** describe the ability of **ashwagandha extracts** to improve the overall sleep experience.[6-9]

The results from these studies provide consistent data about **ashwagandha's** ability to enable a better night's rest.

A new *highly* concentrated **ashwagandha** extract may have demonstrated more comprehensive enhancements to both sleep **quantity** and **quality**.

In a randomized, double-blind, placebo-controlled trial published in **2020**, 150 people scoring high on **non-restorative** sleep measures were given a new *highly* standardized **ashwagandha extract** at bedtime.[8]

Using a validated **monitor** worn on the wrist like a wristwatch, the following six **sleep measures** were assessed:

- Onset of sleep (how long it took to fall asleep)
- Sleep efficiency (percentage of time asleep while in bed)
- Total sleep time (number of hours slept)
- Average number of awakenings during the night
- Average times waking after sleep onset
- Total bedtime

At the end of the six-week study, the **ashwagandha group** showed a significant *increase* in **total sleep time** compared to **placebo**.[8]

Compared to placebo, the **time to fall asleep** and **waking after sleep onset** in the **ashwagandha** group were significantly reduced.

Sleep efficiency significantly **improved** in the ashwagandha arm of the **2020** published study. This means more time was spent asleep while in bed.[8]

Overall **improvement** in **restorative sleep** was **72%** in the **ashwagandha** arm of this study, indicating a meaningful enhancement of nightly rest.[8]

Quality-of-Life Benefits

The improvements demonstrated by the **wrist monitors** were clinically significant in the 2020 **ashwagandha** sleep study.

A second measure of perceived benefits also yielded intriguing findings.[8]

Questionnaires to evaluate **quality of life** were used at baseline, and six weeks later in both the **placebo** and **ashwagandha extract** groups.

Compared to baseline, the **ashwagandha** group showed **quality-of-life** improvements, which is expected in response to enhanced **sleep quality** and quantity.

Comparing Ashwagandha Sleep Studies

Consistent findings from **human** trials support a role for **standardized ashwagandha** in enabling more restful sleep.

The primary active constituents of ashwagandha are **withanolides**.

Three of the recent sleep studies used two daily **ashwagandha** doses providing up to **30 mg** of **withanolides**.[6,7,9]

The fourth study used a *higher* concentration **ashwagandha extract** that provided **42 mg** of **withanolides** in one nighttime dose.[8]

What jumped to my attention is that the new ***higher*** concentrated **ashwagandha** (**42 mg**) yielded robust results with once nightly dosing, rather than having to take it twice daily like in other studies.

Wrist-monitor data from the *higher* concentrated **ashwagandha** (**42 mg** of **withanolides**) taken once nightly indicated better **sleep** improvements.

In This Month's Issue…

Many of you are determined to **shed body fat** to reduce your risk of degenerative illnesses. This might be impossible if you also suffer chronic **sleep deprivation**.

The article on page 34 of this issue describes how highly standardized **ashwagandha + melatonin** can enable more restorative sleep and an improved sense of wellbeing.

While there are no miraculous weight loss pills, a novel formulation described on page 44 enabled **5% weight loss** to occur in obese individuals over a two-month period.

Combining standardized **ashwagandha + melatonin** at bedtime with more sensible eating, regular physical activity, and **5%** weight loss can improve healthy longevity.

I want to thank readers of ***Life Extension*** **Magazine®** for their generous support in **2021**.

As we aim to reverse human aging processes, improved **sleep** and reduced **body fat** are side benefits we plan to assess in upcoming clinical trials.

For longer life,

William Faloon, Co-Founder
Life Extension

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Associations between Inadequate Sleep and Obesity in United States Adults 1977–2009

A startling **73%** of the U.S. population are defined medically as being **overweight** or **obese**.[15]

This means the **excess pounds** they carry increase their risk of degenerative disorders.

A 2014 published study looked at **sleeping habits** and **obesity** incidences starting in **1977**. At the time, Americans did not have 24/7 television and computers and digital entertainment and electronic information. Time spent in front of display screens, especially late at night, was dramatically less back then than it is now.[16]

When the study period (**1977** to **2009**) ended, the following figures were observed in the United States:

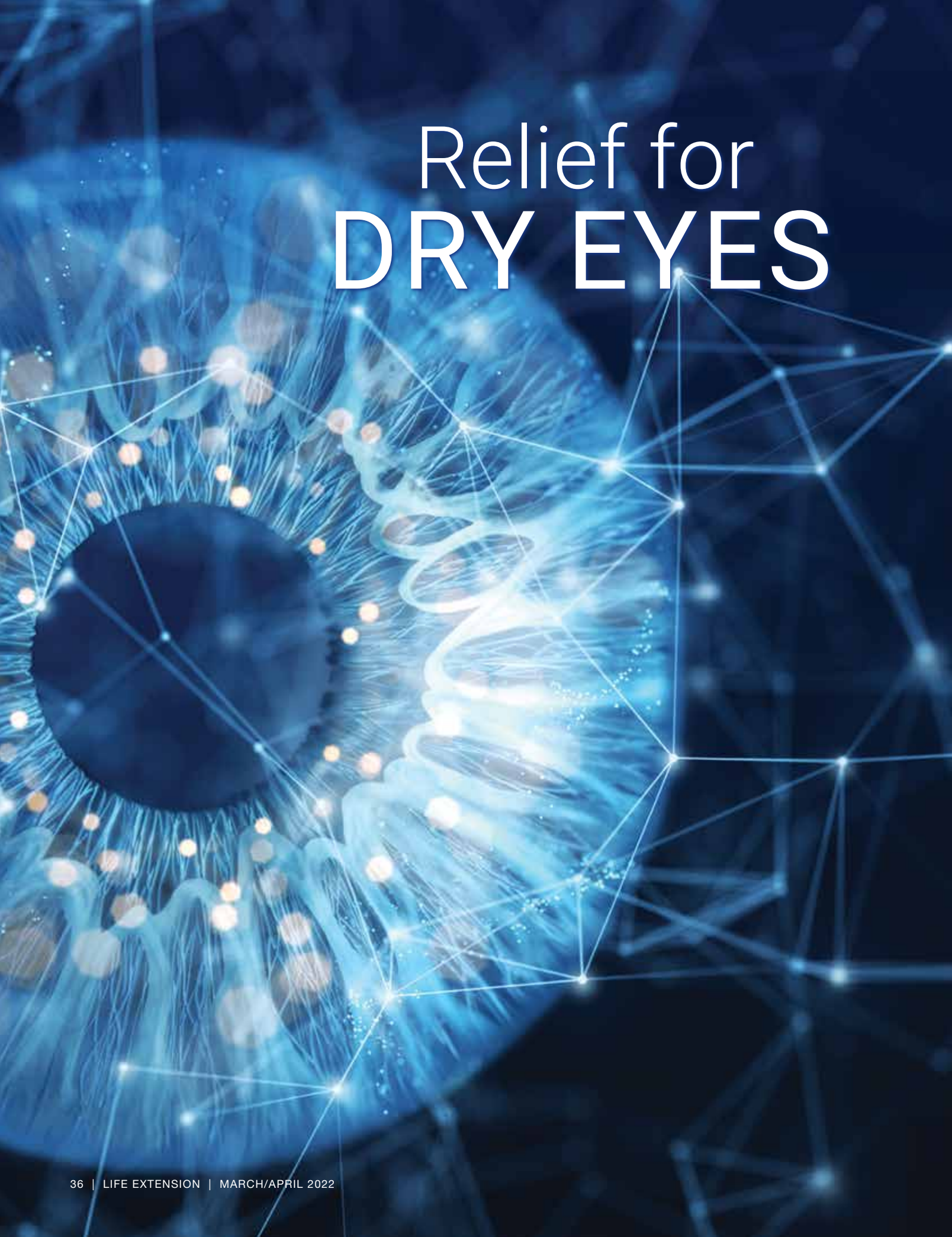
	1977	2009
Prevalence of **Obesity**	10.2%	27.7%
Prevalence of **Overweight**	31.2%	36.9%
Prevalence of **Very Short Sleep** (<5 hours)	1.7%	2.4%
Prevalence of **Short Sleep** (5-6 hours)	19.7%	26.7%
Prevalence of **Long Sleep**	11.6%	7.8%

Analyses of these data showed that relative to **seven to eight hour** sleepers, **very short** sleepers had **30%** *greater* odds of being **overweight** or were **twice as likely** to be **obese**.

Likewise, **short sleepers** had **20%** *greater* odds of being overweight or **57%** *greater* odds of being obese. (**Long sleepers** had **20%** greater odds of being obese, but no greater odds of being overweight.)

These findings are not surprising. Prevalence of very short and short sleep has gradually increased in recent decades. The authors of this study concluded:

"Inadequate sleep was associated with overweight and obesity for each available year."



Relief for DRY EYES

BY MICHAEL DOWNEY

Dry eye syndrome affects up to **49 million** Americans.[1,2]

Widespread use of smart phones, tablets, computers, and other digital **screens** contributes to the condition.[3]

Left untreated, **dry eye** syndrome can lead to **permanent eye damage**.[4] It also can affect work productivity and contributes to automobile accidents.[3,5]

Over-the-counter eye drops provide **short-term** relief.[6] Prescription medications for dry eye syndrome can be very costly and have side effects including itching, stinging, burning, and redness.[7,8]

Scientists have identified a **berry extract** that, taken ***orally***, can boost the body's own production of **natural tears**.[9,10]

A pilot study showed that an oral extract of **maqui berry** provides a **72% improvement** in dry eye symptoms.[10]

A larger clinical trial confirmed that **maqui berry** increases tear production and reduces **eye dryness** and **eye fatigue**, delivering long-lasting effects.[11]

Discomfort and Eye Damage

Dry eyes are a daily annoyance for those who experience this problem. This includes stinging, itching, light sensitivity, difficulty focusing, and more.

Studies show that dry eye irritation is associated with lower scores on standard **mental health scales** and a **lower quality of life**.[12,13]

Without treatment, dry eyes can eventually cause **eye damage**.[4]

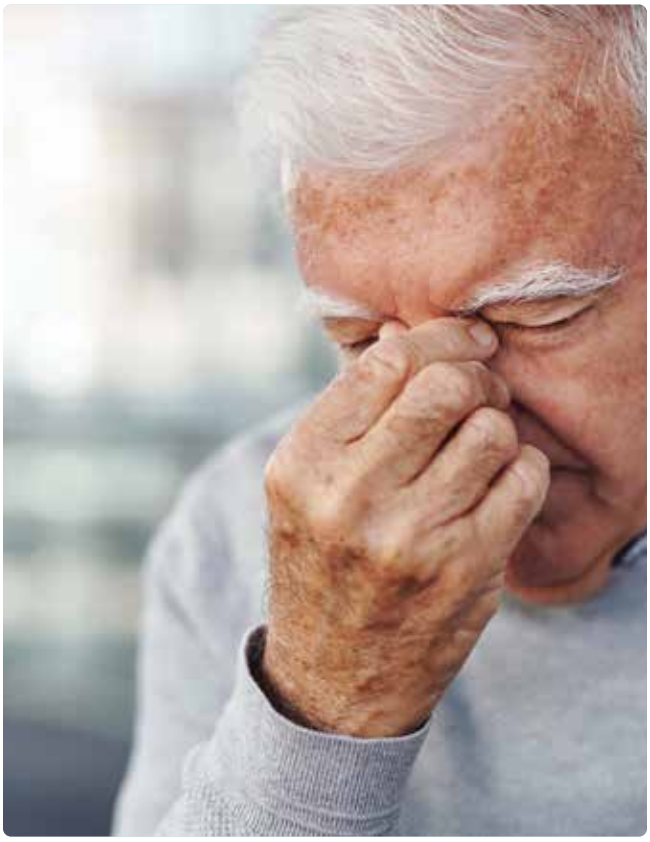
Tears are essential for lubricating and protecting the **cornea**, the front central surface of the eye. They protect the eye from infection, wash away foreign matter, and deliver critical nutrients to its surface.[14,15]

People suffering from **dry eye syndrome** often produce either *too few* tears or tears that are *poor quality*.[15,16]

As a result, the **cornea** can become damaged, and vision can become **impaired**.

Rates Are Rising

In addition to advancing age, the widespread use of devices such as smart phones, tablets, computers, and other screens may be a factor leading to increased dry eye symptoms.[3]



Use of these devices can result in a decreased blink rate and a fast rate of tear evaporation. Unfortunately for many, including children and young adults, screen time has increased multifold in recent years.

Other underlying causes of dry eyes include:[17]

- Environmental factors (pollution, wind, smoke, low humidity),
- Medications (antihistamines, antidepressants, anxiolytic drugs, estrogens),
- Wearing contact lenses,
- Cataract or vision-correcting surgery,
- Air conditioning,
- Hormone changes,
- Nutritional deficiencies (e.g., vitamin A deficiency).

Eye drops do not always deliver satisfactory relief and do not address the long-term risks of dry eyes. The reason is that it's virtually impossible to replicate the complex structure of **real tears**.

Why Real Tears Are Superior

Our natural tears are composed of:[14,15]

- An outer **oily** layer, which keeps tears from drying up too quickly,
- A middle **watery** layer, which wets and nourishes eye tissue, especially the cornea, which has no blood vessels, and
- An inner **mucus** layer, which helps the tear film stick to the eye surface and draw moisture into the cornea.

The health of the cornea and conjunctiva (the thin layer of protective tissue lining the eye) require tears to include all **three layers** and for *each* layer to have an adequate amount of these essential substances.

To relieve **dry eye syndrome** and nourish the eyes, scientists searched for a way to boost the body's *own* production of real tears.

WHAT YOU NEED TO KNOW

How Maqui Berry Works

Researchers found the solution in **maqui berries**, a fruit native to Chile and Argentina.

When taken **orally**, an extract of these berries *boosts* natural tear production.[9,10]

It delivers fast, lasting relief for dry and irritated eyes, which can help protect against long-term eye and vision damage.[10]

Maqui berries contain bioactive anthocyanidin pigments called **delphinidins**. Researchers found that these compounds:[9,19]

- Protect eye structures, including the tear-producing lacrimal gland, by reducing levels of **free radicals**,
- Inhibit damage from **light exposure** to the eye's delicate cells and tissues, such as the ***photoreceptor cells*** that convert light into signals sent to the brain, and
- Help restore the production of natural, high-quality tears.

In these ways, ***delphinidins*** can not only reduce damage to the **lacrimal glands**, which produce the **watery layer** of tears, but they also may help protect the cells of our eyes that are critical for vision.

Reversing Dry Eye Syndrome

- **Dry eye syndrome** causes daily discomfort and can increase the risk of infection and damage to the eye surface.
- Eye drops don't help long-term. Only ***real tears*** can fully nourish and protect the eye.
- Scientists have discovered that **maqui berry extract**, taken orally, dramatically boosts the body's own natural tear production.
- In a pilot study, this extract provided a **72% improvement** in dry eye symptoms in just two months.
- A controlled clinical trial confirmed that it **boosted tear production** by **89%** and reduced **eye discomfort** and **eye fatigue** in a matter of weeks.

In a rat model of dry eye, researchers suppressed the animals' ability to blink. This led to evaporation of tears and corneal damage. But in rats that were given the **maqui berry extract**, both the **loss of tears** and **corneal damage** were dramatically reduced.[9]

Impressive Results

In the pilot clinical study, scientists enlisted 13 volunteers with moderate eye dryness.[10] Participants took either **30 mg** or **60 mg** of **maqui berry extract** daily. This small study had no placebo group.

Eye dryness was evaluated using the **Schirmer's test**, which measures how much fluid is produced by the tear glands and whether it's sufficient to keep the eyes moist.

This study found that:[10]

- After 30 days, both dosage groups had about a **50% improvement** in tear production.
- After 60 days, the **30 mg** group's tear production slightly declined to a **26% improvement**, while the **60 mg** group continued to have about a **45% improvement** in tear production.

Subjects also completed a **Dry Eye-Related Quality-of-Life Score** test, which consists of questions about "bothersome ocular symptoms" and "impact on daily life."

A ***lower*** score means fewer problems and a ***better*** quality of life.

Scores for both groups substantially **improved** by 30 days after starting on **maqui berry extract**:[10]

Here are the results from dry eye sufferers who took two different doses of **maqui berry**:

- The **30 mg** group's score improved from **41** to **22** after **30 days** and dropped to **19** by **day 60**.
- The **60 mg** group's score improved from **40** to about **27** after **30 days** and continued dropping to an astoundingly low score of **11** by **day 60**.

A lower **Dry Eye-Related Score** reflects improved **quality of life**.

The group taking **60 mg** of the **maqui berry** had a **72%** improvement in dry eye symptoms after just ***two months***.[10]

Controlled Clinical Trial

Scientists next moved on to the gold standard type of human study, a **randomized**, **controlled trial**.

They enlisted 74 healthy participants (aged 30 to 60) who had moderate eye dryness and eye fatigue and were exposed to at least four hours of screen exposure daily. Both groups started with the same degree of eye dryness, measured again with the standardized Schirmer test.

Half the volunteers took **60 mg** of **maqui berry extract** daily, while the other half took a **placebo**. After **four weeks**, the Schirmer's test showed that the maqui group had significantly *higher* production of **tear fluid** in both eyes, with an average increase of **89%**.[11]

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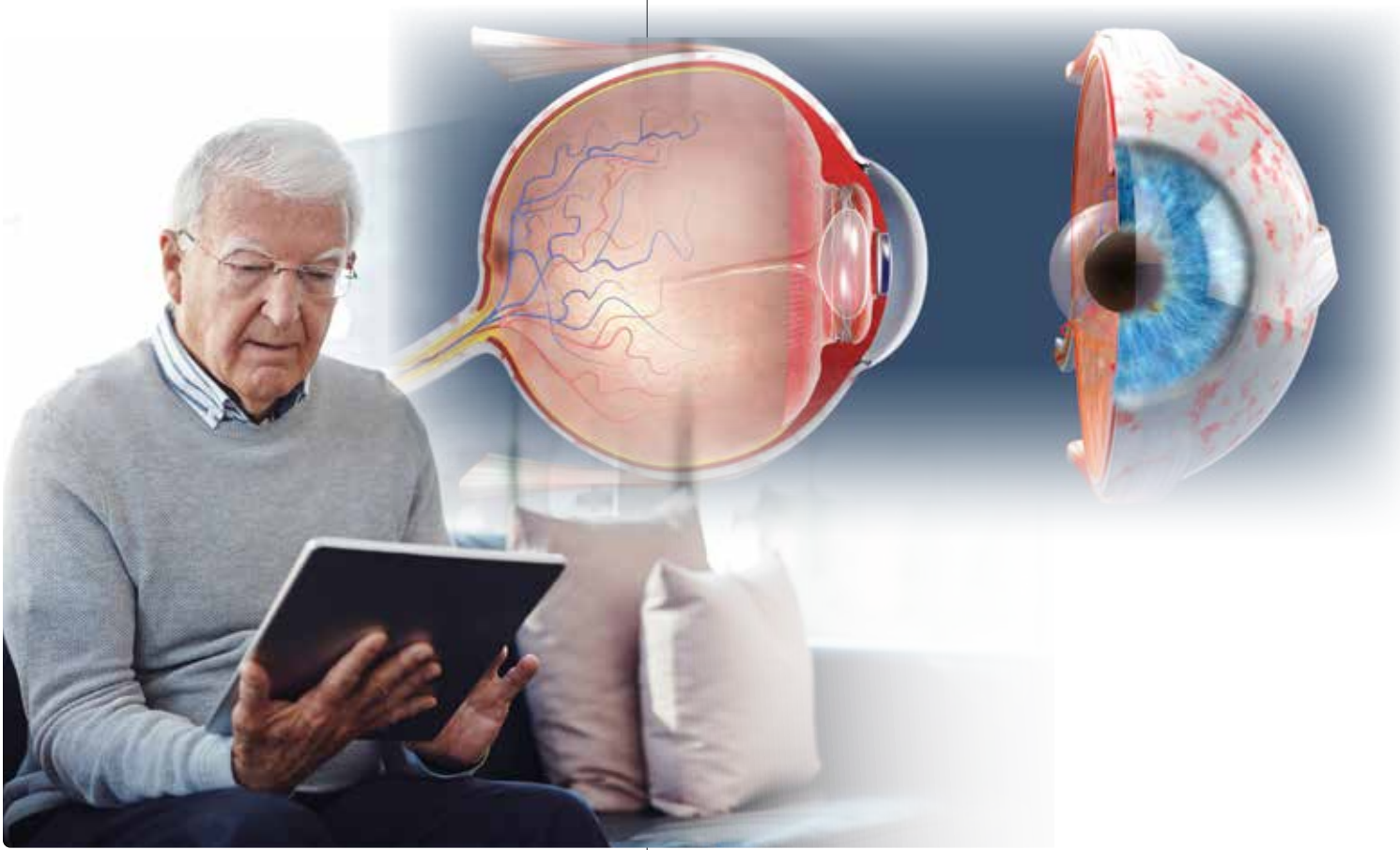

OMEGA-3s *INCREASE HUMAN* LIFESPANS

BY ERIC CORTEZ

Fish oil rich in **omega-3s** has been shown to *lower* triglycerides, *reduce* the risk of cardiovascular events, and *protect* against cognitive decline.[1-3]

But the benefits don't stop there.

A **2021** study found that *higher* omega-3 **blood levels** are associated with an increase in **life expectancy** of **4.7 years**.[4]

Another study found that having the *highest* omega-3 blood levels, compared to the lowest, was associated with a **34%** lower **risk of death** from *any* cause.[5]

For the past *four* decades **Life Extension** has educated consumers about the importance of consuming enough omega-3 fatty acids.

Recent data indicate the benefits exceed original expectations.

Omega-3 Fatty Acids in Diet

The two most important omega-3 fatty acids, **DHA** and **EPA**, are found primarily in **fish oil**.

The modern Western diet, which is heavy in beef, pork, and poultry, is extremely low in omega-3s.

At the same time, our diets tend to be very high in **omega-6 fatty acids**, which are found in many processed foods.

An excess of **omega-6** oils increases chronic **inflammation** throughout the body, accelerates the development of **atherosclerosis**, elevates risk for blood clots, and increases risk for **obesity**.[6,7]

Omega-3 fatty acids from fish oil and/or regular consumption of cold-water fish can help counter this omega-6 excess.

New Findings About Fish Oil and Lifespan

The **Framingham Heart Study** is one of the longest-running and most influential medical studies in history. Since it began in **1948**, it has followed thousands of people for decades and is now on its third generation of subjects.

Much of what modern medicine knows about the risk factors for **heart disease** has come from following Framingham study subjects.

The Framingham study, which has been extended by studying the children of the original participants, continues to be a valuable source of information about chronic disease and overall health.

In the past few years, two medical reports examined data on the Framingham offspring cohort and presented remarkable findings about the impact of **omega-3 fatty acids** on heart health and longevity.[4,5]

The first paper, published in **2018**, focused on the impact of the **omega-3 index** blood test on health outcomes.[5]

The **omega-3 index** is a measure of the percentage of total fats in red blood cells that are EPA and DHA. Prior studies have determined that an omega-3 index of around **8%** is optimal. Most people consuming a modern Western diet have a far lower omega-3 score.[8,9]

Researchers found that a *higher* **omega-3 index** was associated with a significantly *lower* risk of **all-cause mortality**.[5]

Having *more* omega-3s in the blood reduced non-cardiac and non-cancer causes of death, along with **cardiovascular events** like stroke and heart attack.

Compared to individuals with the lowest **omega-3 index** score, those with the *highe*st had:[5]

- A **34%** lower risk of **death from any cause**, and
- A **39%** lower rate of developing **cardiovascular disease**.

A more recent analysis, published in **2021** in the *American Journal of Clinical Nutrition*, found that the **omega-3 index** was as good at predicting **risk of death** during an **11-year** follow-up as age, smoking, blood pressure, diabetes, and other well-established risk factors.[4]

This study also found that having the *highest* blood levels of **omega-3** fatty acids, compared to the lowest, was associated with increases in **life expectancy** of **4.7 years.**

Whole-Body Health

Most people associate **omega-3 fatty acids** with **heart health**.

There's good reason for that. Published data support *higher* intake of omega-3 for both the prevention and management of **cardiovascular conditions**.[10-16]

Higher levels of the omega-3 index *and* regular intake of omega-3s have both been found to reduce risk of **cardiovascular events** like heart attack and stroke, and to reduce **mortality** from heart disease.[15,17,18]

Beyond heart health, maintaining high levels of **omega-3s** contributes to a healthier and longer life.

The following pages describe some of the ways that omega-3s favorably impact longevity.

WHAT YOU NEED TO KNOW

Omega-3s Promote a Longer, Healthier Life

- The fish-oil-derived **omega-3 fatty acids** DHA and EPA are vital nutrients that impact many aspects of health.
- *Higher* blood levels of omega-3 fatty acids are associated with improved **brain** and **cardiovascular health**, along with reductions in chronic **inflammation**.
- Recently published analyses from the Framingham Heart Study offspring cohort found links between omega-3 levels and **longevity**.
- These reports show that the **highest** levels of omega-3 fatty acids, compared with the lowest, were associated with a **34%** lower risk of **dying from any cause** and with increases in **life expectancy** by almost ***five years***.
- The highest levels of omega-3s in the blood were also associated with a **39%** lower rate of developing **cardiovascular disease**.

Omega-3 Index Complete At-Home Finger Stick Test

The **Omega-3 Index Complete** test evaluates your omega-3 index, trans fat index, omega-6: omega-3 ratio, arachidonic acid: EPA ratio, and also includes a full fatty acid profile.

#LC100066 • Regular Price: $99
Sale Price: $74.25 (Until July 11, 2022)

To order this at-home test, please call **1-800-544-4440** or visit **www.LifeExtension.com**

Metabolic Health

Elevated **triglycerides** are associated with metabolic disturbances that increase heart attack and ischemic stroke risk.[19]

Increased cardiovascular risks are also associated with **small-dense LDL particles**,[20] **very low density lipoproteins** (VLDL),[21] and **remnant lipoprotein particles**.[22] These are all known promoters of **atherosclerosis**.[23-25] Supplementation with **fish oil** has positive effects on these and other markers of cardiovascular risk.[26-30]

Fish oil lowers **triglycerides** and other atherosclerosis-inducing **lipoproteins** by:[31-35]

- 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.

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.

Brain Health

Omega-3 fatty acids play a critical role in the **brain**.

One reason is that they are a key component of brain cell membranes.

Brain cell membranes generate and conduct the electrical *signals* that play a role in everything from simple movement, to language, reasoning, and memory formation and recall.

These *signals* cannot be conducted properly without myelin, which insulates the fibers of nerve cells.[31] **Myelin sheaths** that cover nerve fibers require **omega-3s** to function optimally.[37]

Omega-3 intake also impacts levels of **brain growth factors** that support the survival, development, and adaptability of neurons.[38-41]

One study in an animal model of **Alzheimer's disease** found that even short-term **omega-3** intake improved the function of brain cells in animals that had not yet developed dementia symptoms.[42]

Mental Health

The benefits of omega-3s in the brain extend to mental health. Studies show that lower fish oil or omega-3 intake is associated with a greater prevalence of **depression**.[41,43-45]

In a **2020** study, pregnant women—who are at risk for post-partum depression—were randomized to take either omega-3 fatty acids (containing **1,206 mg** EPA and **609 mg** DHA) or a **placebo**.[46] Those taking the fish oil saw a decrease in symptoms of **depression**, while no change was observed in the **placebo** group.

Chronic Inflammation

Chronic inflammation drives nearly all forms of chronic disease, including cancer, obesity, diabetes, cardiovascular disease, cognitive decline, and dementia.

Maintaining a healthy level of omega-3 fatty acids in the body can reduce and help **resolve** chronic inflammation.[6,7,47] That can help lower risk for most age-related chronic illnesses.

Summary

Omega-3 fatty acids are vital for whole-body health.

The most abundant and efficient way to deliver them into your body is through **fish oil**.

The vast majority of Americans have inadequate intake of these healthy oils in their diet.

Numerous studies show a correlation between *higher* levels of omega-3 fatty acids in the body and better health. Other studies show that a high daily dose of **fish oil** can improve a variety of health outcomes.

A recent report links *higher* omega-3 levels in the blood with a **4.7-year increase in life expectancy**.

Importance of Omega-3 Testing

The best way to know for sure if you are getting enough **omega-3** fatty acids is to test your blood levels. The **Omega-3 Index** is a blood test that can measure the **percent** of omega-3 fatty acids in red blood cells.

Omega-3 testing is easy with a simple at-home finger stick test.

Ideally, your **Omega-3-Index** score should be *greater than* **6.8%**

One dose-response study estimated that it would take about **1,300 mg** of added **EPA/DHA** from fish or supplements to increase the **omega-3 index** from *less than* **4.2%** to *greater than* **6.8%**.[48]

An analysis from the Framingham offspring cohort reveals a red blood cell **omega-3 index** over **6.8%** is associated with **4.7 years** additional **life expectancy** compared with an **omega-3 index** under **4.2%**.[4]

In another study, people with **omega-3** scores *greater than* **6.8%** compared with those *less than* **4.2%** have:[5]

- **39%** lower risk for **cardiovascular** disease
- **34%** lower risk of **death** from *any* cause

The typical Japanese omega-3 index is greater than **8.0%** and that may correlate with a **five-year** *longer* life expectancy in **Japan**.[4]

To order the at-home **Omega -3 Index** test, call **1-800-544-4440** or visit **www.LifeExtension.com**

#LC100066 • Regular Price: $99
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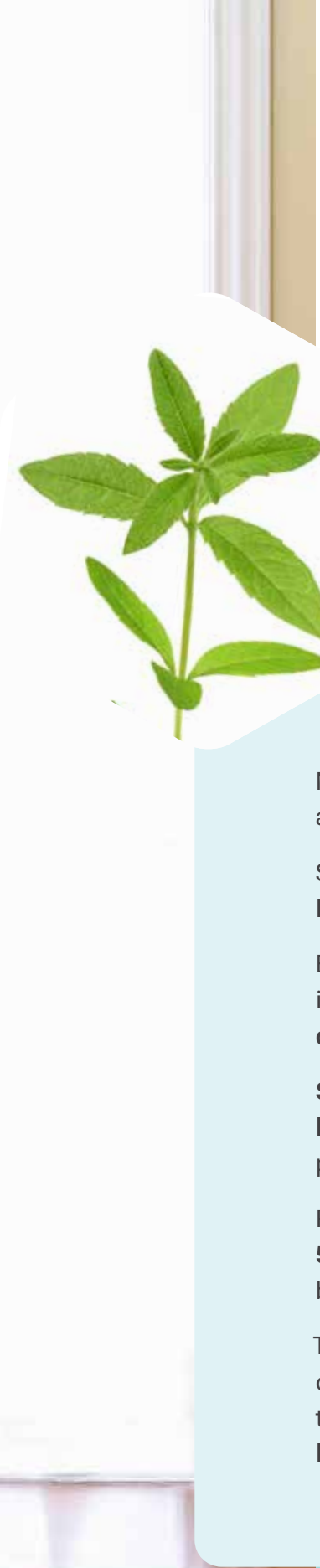


CURB Hunger and Burn More Fat

BY MARSHA MCCULLOCH, MS, RD

Many people want to **lose weight** to look and feel better.[1,2]

Shedding extra pounds also supports **healthier aging**.

Excess body weight is associated with an increased risk of **heart disease**, **type II diabetes**, and several types of **cancer**.

Sleep apnea, **osteoarthritis**, and **high blood pressure** are directly related to surplus body mass.[3,4]

Research shows that losing as little as **5%** of body weight can provide health benefits.[5]

The wrong kind of **dieting** causes biological changes that can make it challenging to lose weight, including an *increase* in **hunger hormones**.[6]

But it doesn't have to be so difficult.

Researchers have identified a blend of extracts from **lemon verbena** leaf and **hibiscus** flower that can reduce ***hunger signals*** and promote **satiety** (a feeling of fullness).[7-10]

Two clinical trials have shown that these extracts can almost ***double the amount of weight loss*** compared to a **placebo**, when used in conjunction with a healthy diet and exercise.[7,8]

To improve compliance and support healthy weight loss, a lifestyle app has been developed that further facilitates losing weight with these extracts. Over **85%** of the app users taking the supplement reduced their body weight, losing an average of **12.6 pounds** in three months.[11]

Why Weight Loss Is So Hard

Shedding pounds is rarely easy.

Dieting causes changes in metabolism and appetite-related hormones that can make it harder to lose weight and keep it off.[6]

For example, weight loss leads to a rise in circulating **ghrelin**, a hunger hormone that *increases* **appetite**.[12]

Weight loss also causes the body to secrete *less* **glucagon-like peptide-1** (**GLP-1**), a hormone that increases satiety.

Furthermore, a decrease in body weight reduces resting energy expenditure, or what we commonly refer to as metabolic rate.[6]

Lemon Verbena and Hibiscus

Hibiscus is known for a bright red herbal tea made from its flower.

Lemon verbena is an herb beloved for its lemony aroma and flavor.

Both plants are rich in **polyphenols** that can help promote weight loss—without the unwanted side effects of drugs.[7,13,14]

In a preclinical cell study, **hibiscus extract** was shown to significantly *inhibit* the creation of new **fat** cells. It also reduced the accumulation of **triglycerides** in fat cells.[15]

When excess triglycerides build up in fat cells, it leads to **oxidative stress**. That can trigger the **inflammation** that promotes diseases associated with **obesity**.[16]

In the cell study, **hibiscus** extract led to a **30%** reduction in the generation of damaging **reactive oxygen species**.[15]

Preclinical research has shown that **lemon verbena** extract can decrease **triglyceride** accumulation in fat cells.[17]

Triglycerides are the most common type of **fat** in your body. They come from foods like butter, oils, other fats and glucose-boosting foods (starches) and sugary beverages.

Triglycerides not needed for energy production circulate in the blood and are **stored** in our cells as **fat**.

Curbing Appetite

A blend of **lemon verbena leaf** and **hibiscus flower** extracts was tested in a rigorous, placebo-controlled trial of 47 overweight and obese women.[7]

All subjects were advised to ingest approximately

2,200-calories a day. They were also encouraged to walk at least half an hour daily during the two-month study.

Roughly half the participants took **500 mg** of the **plant extracts** 20 to 30 minutes before breakfast every day. The other half were given a **placebo**.

Those taking the **lemon verbena-hibiscus** combination had a **56.4%** decrease in feelings of hunger, on average. They also experienced a significant increase in the satiety-promoting hormone **GLP-1**, accompanied by an increase in food intake-related satisfaction.

Decreased appetite may have been one factor that led to greater weight loss. In two months, the treatment group lost **7.7 pounds**, while the placebo group lost only **4.6 pounds**.

If this does not sound like much weight, it represents the real-world challenges people face when attempting to shed excess body weight.

Controlling Calorie Intake

In another trial, scientists gave 33 overweight and obese men and women **500 mg** of **lemon verbena-hibiscus extract** or a **placebo** daily before breakfast.[9]

After 60 days, both groups returned to the lab and were fed a standardized breakfast. A few hours later, they were served a buffet-style lunch.

The group taking the extracts ate almost **10%** fewer **calories** at lunch than the **placebo** group did and reported a significant improvement in **satiety**.

After taking the **lemon verbena-hibiscus** extract, the men and women had a **12%** increase in **GLP-1** after breakfast and a **22%** increase after lunch, promoting a feeling of fullness.

Trimmer Waistlines

Shedding pounds promotes **metabolic health**.[18]

In a placebo-controlled clinical trial of overweight or obese **women**, scientists tested whether **500 mg** of **lemon verbena-hibiscus extract** could increase weight loss.[8]

All the women were instructed to walk at least 30 minutes daily and encouraged to consume **2,200** calories a day.

After two months of taking the **plant extracts**,[8]

WHAT YOU NEED TO KNOW

Herbal Appetite Control for Weight Loss

- Losing as little as **5%** of body weight can reduce the risk of many chronic diseases, including heart disease and type II diabetes.
- Difficulty controlling **appetite** is a major obstacle for people trying to lose weight.
- Extracts from a blend of **lemon verbena** leaf and **hibiscus** flower can increase satiety hormones to help curb appetite.
- Clinical trials of a combination of lemon verbena and hibiscus extracts have shown that it can reduce body weight by **5%** within two months and trim the waistline by more than **2.5 inches**.
- These extracts work best when combined with a healthy diet and regular exercise. Studies have shown that a **digital app** can help keep weight loss efforts on track and promote a healthier lifestyle.

overweight participants with an average **body mass index** (BMI) of **27 kg/m²**:

- Lost over **eight pounds**, or **5.4%** of their starting weight,
- Decreased their body mass index (BMI) by **1.5 points**,
- Trimmed their waistline by **2.7 inches**,
- Reduced their percentage of body fat by **1.3%**,
- Lowered their **systolic** blood pressure (top number) by **20.6 mmHg**, and
- Decreased their resting heart rate by **8.5 beats per minute**.

These changes were all significantly better than the changes in subjects given a **placebo**.

Most notably, the extract group lost about **twice as much weight** and almost **four times as many inches** from their waistline as the placebo group.

Obese participants (average BMI of **34 kg/m²**) taking the extracts lost over **10 pounds**, or **5.3%** of their body weight.

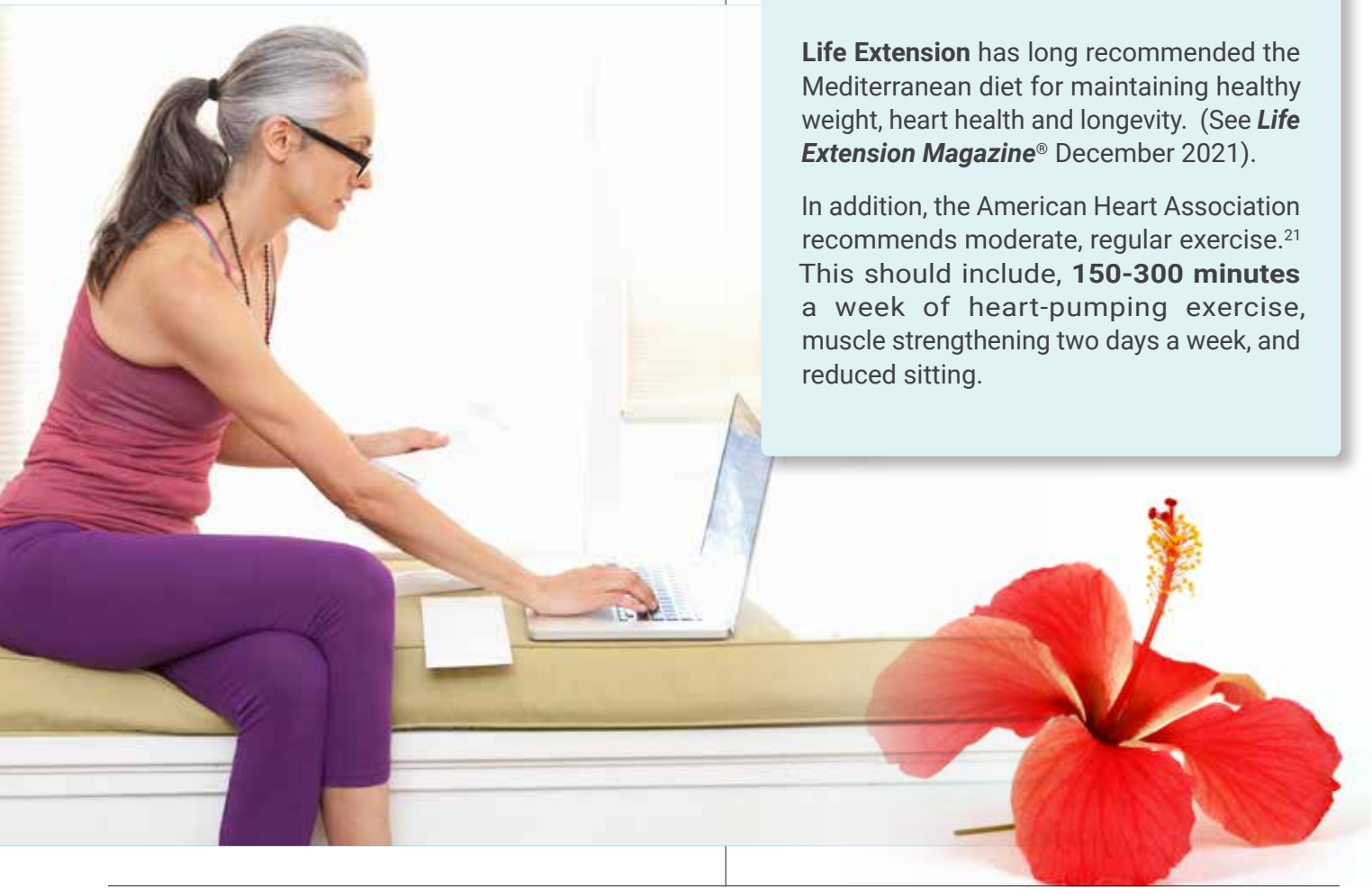
They also lowered their heart rate by **eight beats per minute** and reduced systolic **blood pressure** by **18.4 mmHg**.

A reduction in heart rate is significant because an elevated resting heart rate is one of the predictors of both **cardiovascular and all-cause mortality**.

LIFESTYLE TIPS FOR ACHIEVING HEALTHY WEIGHT

Life Extension has long recommended the Mediterranean diet for maintaining healthy weight, heart health and longevity. (See ***Life Extension Magazine***® December 2021).

In addition, the American Heart Association recommends moderate, regular exercise.[21] This should include, **150-300 minutes** a week of heart-pumping exercise, muscle strengthening two days a week, and reduced sitting.



Summary

A combination of **lemon verbena** and **hibiscus** extracts has been shown to promote fat burning and shift appetite hormones in ways that make it easier to eat less and lose weight.

Controlled clinical trials of overweight adults have found that taking **500 mg** of combined lemon verbena-hibiscus extracts for two months can produce an average of **5% reduction** in body weight.

Modest, sustainable weight loss like this can go a long way toward reducing the risk of common cardiovascular and metabolic diseases. ●

Boost Motivation with a Mobile App

As our phones become increasingly integrated into our lives, many people are relying on mobile apps to improve their health. There are apps with exercise programs, sleep-tracking programs, and now an app that was especially designed to improve weight loss in conjunction with the **lemon verbena-hibiscus** extract.

Mobile **apps** can support a more comprehensive approach to weight loss, which could help with managing weight over the long term.[19,20]

In a 90-day real-world study, 397 volunteers took **500 mg** of a **lemon verbena-hibiscus extract** blend daily, administered in a yogurt drink.[11]

They also used a custom **app** designed to help them develop a healthier lifestyle.

The interactive app:[11]

- Gradually introduced healthy behavior changes,
- Provided reminders to take the extract blend,
- Encouraged water, vegetable, and fruit intake,
- Tracked exercise, food, and water intake,
- Helped track weight changes, and
- Provided motivational messages and incentives.

In those completing the study, the app boosted **adherence** to the extracts by more than **five times** compared with typical dietary supplements.[11]

The participants' lifestyle improved, too. They **doubled** their water intake and fruit and vegetable consumption. And they increased their **exercise** by **33%** over baseline.

These changes paid off.

Over **85%** of the users reduced their body weight, losing an average of **12.6 pounds** in three months.[11]

(A similar **app** is available at no charge to **lemon verbena-hibiscus extract** users.)

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Prevent Bone Loss *with* High-Dose Vitamin K2

BY MICHAEL DOWNEY

You slip and take what seems like a minor tumble—and feel pain and possibly hear a crack.

For adults over age 50, it's a shockingly common occurrence, and often the first sign they have the bone disease **osteoporosis**.[1]

About **50%** of American women and **25%** of American men over 50 will break a bone due to osteoporosis.[1]

Fractures are a leading cause of disability in older adults.

Within a year of suffering a **hip fracture**, more than ***20% of patients may die***.[2,3]

For decades, physicians in **Japan** have used **high doses** of **vitamin K2** to prevent bone loss and protect against **fractures**.[4]

Vitamin K2 is available in the U.S. at the same doses—*without* a prescription.

Clinical trials show that **45 mg (45,000 mcg)** of **vitamin K2** helps to:[5-10]

- **Slow bone loss,**
- **Reduce fracture risk, and**
- **Build new bone.**

A study of older **osteoporosis** patients showed that **high-dose** vitamin K2 cut the number of new vertebral **fractures** by more than **half**.[10]

Other nutrients taken with vitamin K2, such as **vitamin D** and **calcium**, provide further support for skeletal health.

Osteoporosis Increases Mortality Risk

The impact of osteoporosis-related **bone fractures** is staggering. After suffering one fracture, the risk of *future* fractures increases by a whopping ***86%***.[2]

Fractures of the **hip** and **vertebra**, in particular, are associated with loss of mobility and risk of death. People who suffer a **vertebral fracture** have an **eight-fold** increase in mortality compared to other individuals their age.[2]

But almost *any* kind of broken bone increases the risk of death in older people.[11] That's why it is imperative not just to slow, but to ***reverse*** bone loss as soon as it begins.

Creeping Bone Loss

When we're young, our bones are tightly packed with calcium and other minerals in an intricate structure that looks like a honeycomb.[1]

Even before age 40, **bone density** starts to ***decrease***.[12] This decline continues into old age. In women, the speed of bone loss accelerates with the onset of menopause.

This drop in bone-mineral density causes bones to become weak, brittle, and prone to **fractures**. Bone breaks may result from minor injuries. **Stress fractures** may even occur during normal movement.

The early stage of weakening bones is called **osteopenia**. As bone density continues to fall, **osteoporosis** develops. Osteoporosis means "***bone full of pores or holes***."

Suffering a fracture, especially if it occurs during normal movement, is when many people first discover they have **osteoporosis**.

The good news is that we can do something to prevent age-related bone loss and risk of fractures.

High-Dose Vitamin K2

In *low* doses, vitamin K promotes normal blood clotting. This small amount of vitamin K is normally obtained from dietary sources.

But as far back as **1999**, scientists at **Life Extension** recognized that *higher* doses of vitamin K could better keep **calcium in bones** and help prevent **calcification** of soft tissues such as heart values, arteries, and brain cells.

It's important to understand that high doses of vitamin K do *not* cause greater coagulation.

Japanese doctors have long been treating **osteoporosis** by prescribing a specific form of **vitamin K2** called **menaquinone-4** (or **MK-4**), without any clotting issues.[7]

In high doses of ***45,000 mcg*** or **45 mg**, they have found that vitamin K2 safely improves bone health and helps prevent **fractures** in older adults.[5,6,8-10]

Boosting Bone Density

To study **vitamin K2** under the most challenging circumstances, scientists tested high doses on older people who had already developed **osteoporosis**.

In one study, Japanese researchers randomized older osteoporosis patients into two groups. One received **150 mg** a day of **calcium** alone. The other received the same calcium dose plus **45 mg** of **vitamin K2** (as **MK-4**) daily.[10]

Over a two-year period:[10]

- Patients who received only calcium continued to lose bone density in their lumbar spine, which dropped by about **3%**.
- Patients also receiving **45 mg** of vitamin K2 plus 150 mg of calcium maintained their bone mineral density.

That's a ***life-saving difference***.

A **10%** drop in bone density more than ***doubles*** the risk for **fractures** of the vertebra and hip.[13]

Patients in this study treated with calcium-only had an increased **risk of fracture**.

Adding **vitamin K2** largely arrested bone loss, reducing **fracture risk**.[10]

Build Stronger Bones with Vitamin K2

- Age-related bone loss can lead to **osteoporosis** and **fractures**, significantly increasing risk of disability in people over 50.
- **High-dose vitamin K2** (in the form of **MK-4**) has been used as a prescription treatment for osteoporosis in Japan for decades. These doses are available in the U.S. *without a prescription*.
- Vitamin K2 improves **bone health** by restoring balance to the process of bone breakdown and formation, favoring new bone growth.
- Human trials show that daily intake of **45 mg** of **vitamin K2** maintains or *increases* bone density while *reducing* fracture risk. In a two-year study on older adults with osteoporosis, it cut the number of new **vertebral** fractures by more than **half**.
- Other nutrients, including **calcium** and **vitamin D**, support bone health by other mechanisms and can be taken with vitamin K2.

Preventing Fractures

The same study also assessed the effect of **high-dose vitamin K2** on the incidence of bone **fractures**.

During the two-year study, the group receiving calcium alone sustained **35** fractures, compared to only **14** fractures in the vitamin K2 group.[10] And these study subjects were not treated with other critical bone supporting nutrients like **magnesium**, **boron**, and **vitamin D**.

In another clinical trial on postmenopausal women with **osteoporosis**, taking **45 mg** of oral vitamin K2 daily:[6]

- Maintained mineral **density** to a significantly greater degree than in control women, and
- Reduced the incidence of vertebral **fractures** to a degree similar to the drug etidronate.

Bisphosphonate drugs like risedronate (Actonel®) and alendronate (Fosamax®) are medications commonly used to treat **osteoporosis**.[14]

These medications are associated with various, though rare, side effects. These include osteonecrosis of the jaw, low blood calcium, reflux, ulcers, and more.[15,16]

Vitamin K2, on the other hand, is *not* associated with significant side effects, even at high doses.

How Vitamin K2 Keeps Bones Strong

Vitamin K2 works by restoring a healthy balance between the two types of bone cells that influence **bone density**.

Osteo*clasts* break down old bone, while **osteo*blasts*** build new bone. Healthy bone relies on a *balance* of activity between these two types of skeletal cells.

As we age, osteo*clast* activity begins to outstrip osteo*blast* activity. Bone is broken down faster than new bone is built up. Bone density drops and **osteopenia** and **osteoporosis** develop.

In preclinical studies, **vitamin K2** was shown to promote:[17,18]

- An increase in bone-building osteoblast activity, and
- A reduction in bone-destroying osteoclast activity.

With this balance restored, more bone is built, less is destroyed, and **bone mineral density** is maintained or even *increased*.

Additionally, in order to build bone, osteoblasts need a protein called **osteocalcin**. This protein binds to **calcium**, helping osteoblasts turn this mineral into healthy new bone. Vitamin K2 helps convert **osteocalcin** into its *active* form, which is required for its bone-building activities.[18,19]

In the Japanese study of older osteoporosis patients, the group receiving vitamin K2 had a significant *increase* in levels of **active osteocalcin,** which may be a mechanism by which the vitamin reduced fracture incidence.[10]

Vitamin K2 May *Enhance* Osteoporosis Drugs

Bisphosphonates are drugs prescribed to slow the bone loss of osteoporosis. They include medications such as **alendronate** (Fosamax®) and **risedronate** (Actonel®).

Vitamin K2 does *not* interfere with bisphosphonates and can safely be used at the same time.

Research even suggests that they may have an ***additive*** effect, protecting bone density better together than either one does alone.[17]

Nutrients That Support Vitamin K2

The powerful bone-rebuilding effects of vitamin K2 may be even greater when combined with other **nutrients** that support strong and healthy bones.

Calcium is the major mineral that forms the hard matrix of bone. Adequate calcium intake substantially *decreases* the rate at which bone breakdown and mineral loss occur.[20,21]

Vitamin D helps the body absorb calcium from the gut after a meal and stimulates the production of **osteocalcin**.[19] Research suggests vitamin D also facilitates the transfer of calcium to the bones, which may further support bone strength.[22]

Magnesium, like calcium, makes up the mineral matrix of bone and is needed to maintain healthy bone density.[23] About **half** of all magnesium in the body is stored in bone.[23]

Zinc, manganese, silicon, and **boron** are minerals that play important roles in optimal bone formation and health. *Low* levels of each of these minerals may contribute to bone *loss*, and increased intake improves bone health in animal and/or human studies.[24]

Taken with these nutrients, **vitamin K2** can provide powerful protection against bone loss and fractures.

Summary

As our bones become thinner and weaker with age, the risk of life-threatening **fractures** increases.

High-dose vitamin K2 has successfully and safely been used for decades in Japan to treat the bone disease **osteoporosis**.

Human trials demonstrate that daily intake of **45 mg** of vitamin K2 maintains or increases **bone-mineral density** and reduces the risk of **fractures**.

Along with other nutrients crucial for bone health, vitamin K2 can help build stronger, healthier bones. •

Vitamin K2 May Provide Cardiovascular Benefits

Vitamin K2 promotes new bone growth in part by increasing **calcification**, the buildup of calcium deposits, in the bone.

In soft tissues, however, **calcification** can be extremely dangerous. In blood vessels, it contributes to the buildup of atherosclerotic plaque associated with **cardiovascular disease**.

Research has shown that while vitamin K2 *causes* beneficial calcification in bones, it *prevents* harmful calcification in soft tissues, including blood vessels.[25,26] This occurs because it activates **matrix Gla protein**, which *inhibits* **calcification** of blood vessels.[27]

For this reason, vitamin K2 may be protective against cardiovascular disease.[26,28]

Vitamin K2 has been shown to be safe to use in healthy, older osteoporotic patients not taking oral **vitamin K antagonist** anticoagulants (**e.g. warfarin**), without having an adverse impact on clotting.[29]

Even studies with high doses of vitamin K have demonstrated its safety, without any adverse events.[7-9,30]

Still, anyone taking **warfarin**, a powerful anticoagulant, should consult a physician before taking *any* form of vitamin K.

Warfarin functions by blocking vitamin K activity in the body, which means warfarin users are to avoid vitamin K supplements and foods high in vitamin K. Newer drugs such as **Eliquis®**, **Pradaxa®**, and **Xarelto®** provide anticoagulant effects without the need to restrict vitamin K intake.

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Medications That *Promote* Osteoporosis

Many common drugs can contribute to **osteoporosis** risk and bone loss, including:

- **Cancer-fighting drugs** that inhibit sex hormones, such as anti-androgen therapy (which reduces levels of testosterone) and aromatase inhibitors (which reduce estrogen activity).[31,32]
- **Corticosteroids** such as prednisone, hydrocortisone, dexamethasone, and many others.[33,34]
- **Warfarin** (Coumadin®), which is used to treat blood clots.[35,36]
- **Proton-pump inhibitors** such as Nexium®, Prilosec®, and Prevacid®, which are used to decrease stomach acid.[37,38]

Do *not* stop taking these drugs unless directed by your doctor. But people taking these medications may want to carefully monitor their bone mineral status.

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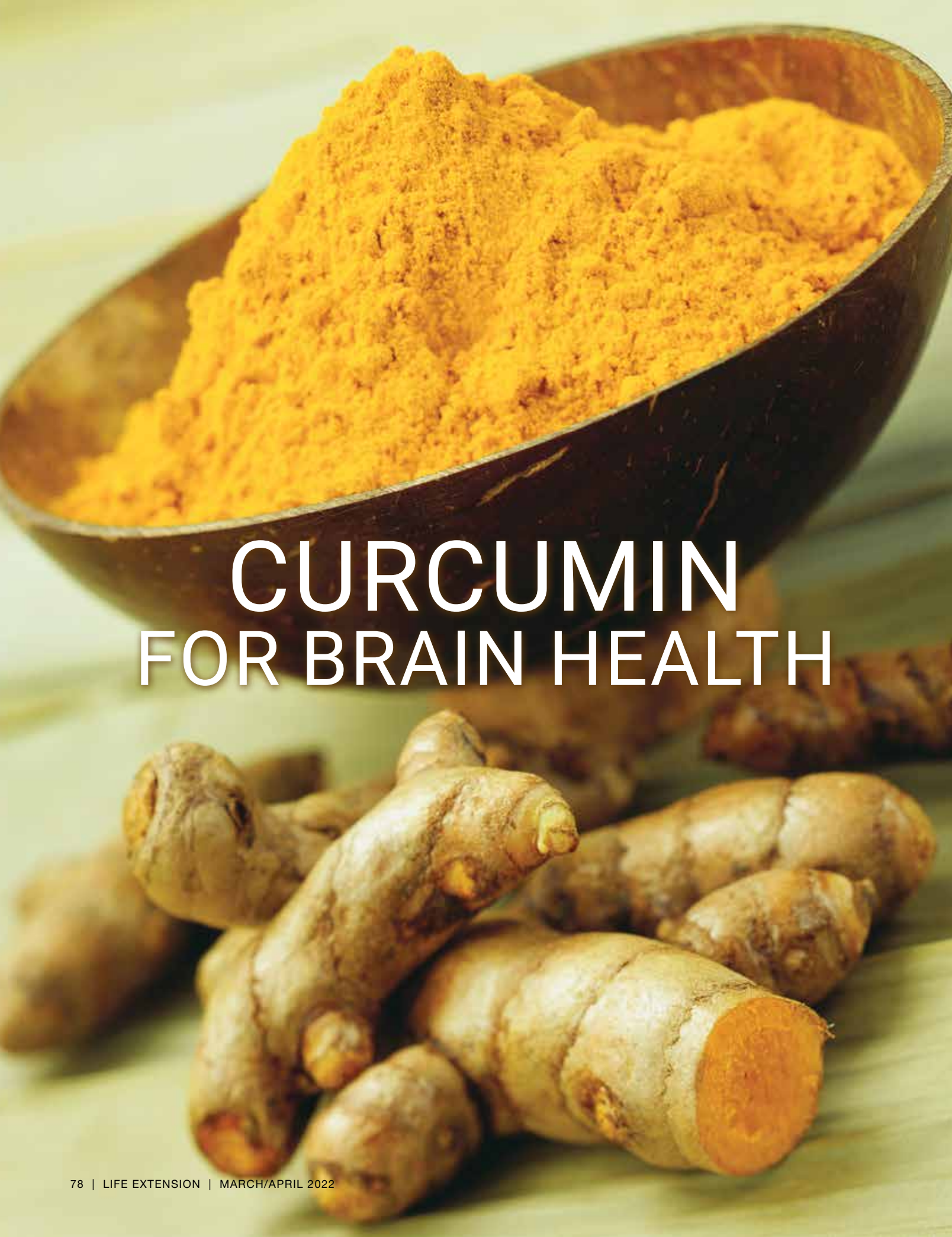

CURCUMIN FOR BRAIN HEALTH

BY DEEP SHUKLA, PHD

Curcumin is best known for its anti-inflammatory and anti-cancer properties.

Interestingly, research has identified added benefits for curcumin, specifically for the **brain**.

In animal and human studies, curcumin has been shown to:[1-5]

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

It is challenging to derive these full benefits because curcumin is **poorly absorbed**.[4]

Scientists have found that combining curcumin with fenugreek **galactomannan** increases its **bioavailability** (absorbability) by up to **45.5 times greater** compared to regular curcumin.[6]

Increasing Curcumin Bioavailability

Curcumin is the main active ingredient in the spice **turmeric**.

It has potential benefits in combating a range of conditions such as diabetes, arthritis, cancer, and cardiovascular disorders.[7,8]

But curcumin itself has poor **bioavailability**. Only a small fraction of the amount consumed is *absorbed* into the bloodstream. And most of it is metabolized in the body into *other compounds* or eliminated from the body.[9-11]

Curcumin's use for **brain** disorders is also hindered by its limited ability to cross the **blood-brain barrier**.

Scientists have discovered a way around these problems.

They found that supplementation with curcumin combined with **galactomannans** from the herb fenugreek resulted in levels of **free curcuminoids** in the blood up to ***45.5 times greater*** *compared* to standard curcumin alone.[6]

This **curcumin-galactomannan** complex is able to easily cross the blood-brain barrier to deliver more curcuminoids than unformulated curcumin.[6,12]

A **2021** animal study shows that this **curcumin-galactomannan** complex delivered more curcuminoids to the brain's *hippocampus* than unformulated curcumin.[12]

The **hippocampus** is a region of the brain that has a major role in learning and memory.

Two **human** studies confirm the brain benefits of this novel **curcumin-galactomannan** complex.

In one, this formulation was effective at reducing **stress**, **anxiety**, and **fatigue**.[13]

In a **2020** human study, oral intake of **500 mg** of the **curcumin-galactomannan** complex twice daily resulted in positive changes in **brain activity** levels and improved performance in **audio-visual** and **memory** tests.[4]

Electroencephalogram (EEG) results verified the **curcumin-fenugreek** complex's penetration of the **blood-brain barrier**, providing brain benefits previously unavailable.

Preventing Cognitive Decline

Neurodegeneration is characterized by the progressive damage and loss of function of neurons that occurs with aging and neurodegenerative diseases.

Some of the common mechanisms underlying these diseases include:

- Chronic **inflammation**, which can damage brain cells,[14]
- **Oxidative stress**, which leads to cell damage and death,[15,16] and
- Accumulation of **misfolded proteins**, which are toxic to neurons.[16]

Curcumin targets *all* these problems.

Preclinical research shows that curcumin can *reduce* **neuroinflammation**.[2,3]

Other work in preclinical models shows that curcumin could protect the brain against **oxidative stress** by activating the protein **Nrf2**,[17,18] which is involved in increasing antioxidant levels in the brain.[19]

Curcumin also activates antioxidant enzymes such as **superoxide dismutase (SOD)** and **glutathione peroxidase**[17] and directly neutralizes free radicals.[20]

Studies in rats show that curcumin can ***reverse memory loss*** caused by aging.[12,21]

Besides its antioxidant and anti-inflammatory effects, curcumin spurs the **formation** of new **neurons** in a brain region called the **hippocampus**.[5]

A population-level study of elderly Asian individuals showed that regular curcumin intake in the form of curried food was associated with protection against **cognitive decline**.[22]

WHAT YOU NEED TO KNOW

Protecting the Brain with Curcumin

- Curcumin is an active compound in turmeric, the spice. It has potent anti-inflammatory, antioxidant, and anti-cancer properties.
- By reducing inflammation, oxidative stress, and the buildup of toxic proteins, curcumin may prevent cognitive decline.
- Lab and animal research shows this compound may also reduce damage from strokes, prevent Parkinson's disease, relieve symptoms of multiple sclerosis, and ease diabetic neuropathy.
- Combining curcumin with a fiber called galactomannans makes it up to 45.5 times more bioavailable than standard curcumin. It can also more easily pass through the blood-brain barrier, enabling it to exert its neuroprotective effects.

Fighting Parkinson's Disease

Parkinson's disease is a common neurodegenerative disorder that leads to tremors, muscular rigidity, slowness of movement, and difficulty maintaining balance.[23]

These symptoms are caused by the loss of **dopamine** neurons in a brain region called the **substantia nigra**, which plays an important role in movement and motivated behaviors.[24]

While the underlying cause of Parkinson's disease is not clearly understood, both **mitochondrial dysfunction** and **oxidative stress** have emerged as major contributors to the neurodegeneration seen in Parkinson's disease.[25]

Curcumin *alleviates* both oxidative stress and mitochondrial damage in animal models of Parkinson's.[26,27]

In human patients with Parkinson's disease, low levels of the antioxidant **glutathione** are observed in dopamine neurons from the substantia nigra. Curcumin activates antioxidant enzymes to *prevent* the depletion of **glutathione**.[28]

Parkinson's also involves the formation of clumps of the misfolded protein **alpha-synuclein**.[29] These protein aggregates have toxic effects on dopamine neurons.

Preclinical studies show that curcumin can inhibit the accumulation of **alpha-synuclein** and prevent the death of dopamine neurons.[30,31] This may help slow the development of Parkinson's disease.

Relieving Multiple Sclerosis Symptoms

Multiple sclerosis is an autoimmune disorder that afflicts over **2.5 million** people worldwide.[32] Severe cases can lead to vision loss, paralysis, and impaired brain function.

Multiple sclerosis occurs when the immune system causes **neuroinflammation** in the central nervous system and interruption of the blood-brain barrier.[33]

This inflammation damages the protective **myelin sheath** that covers nerve fibers. The resulting harm to neurons hinders their ability to communicate.

Curcumin has been shown, in animal models, to *lower* levels of pro-inflammatory proteins and aid in **myelin repair**. This *reduced* the severity of multiple sclerosis symptoms.[33-35]

Easing Diabetic Nerve Pain

Neuropathic pain is caused by damage to the nerves that relay pain signals from the muscles and skin to the spinal cord and brain. It often affects patients with **diabetes**.[36]

Studies in mice show that curcumin can *reduce* diabetes-related **hyperalgesia** (increased sensitivity to pain).[37,38]

Various inflammatory cytokines, such as **nuclear factor-kappa B (NF-kB)** and **TNF-alpha,** are responsible for the pain associated with diabetic neuropathy.[39] Curcumin *reduces* levels of these pro-inflammatory cytokines to relieve hyperalgesia.[38]

In a rat model of diabetic neuropathy, curcumin reduced the **oxidative stress** that contributes to the dysfunction of neurons.[40]

Reducing Damage from Strokes

There are two major types of **strokes**: **ischemic** and **hemorrhagic**.

Ischemic strokes account for almost **90%** of all strokes. They are caused by a blood clot or obstruction in an artery. The disruption in blood flow to the brain leads to oxygen deprivation, brain cell death, and damage to the blood-brain barrier.[41]

Animal studies show that curcumin reduces the size of the ischemic injury and prevents behavioral impairment. Curcumin exerts these **neuroprotective** effects by:

- Preventing damage to the blood-brain barrier,[42]
- Inhibiting cell death,[43]
- Counteracting oxidative stress,[44] and
- Reducing the inflammatory response.[45]

The other main kind of stroke is caused by **intracerebral hemorrhage**, in which there is a bursting or leaking of a blood vessel. One of its major complications is a **cerebral edema**, when fluid builds up around the brain. The increased pressure and lower cerebral blood flow can damage brain cells.

Curcumin alleviates edema and reduces behavioral impairments in animal models of intracerebral hemorrhage. It does this by modulating the expression of proteins called **aquaporins** that reduce brain water content.[46]

Traumatic **brain injuries** caused by external mechanical force also result in inflammation, cerebral edema, blood-brain barrier damage, and oxidative stress.[47,48] Rodent models show that curcumin can reduce the **brain damage** caused by trauma by countering these adverse effects.[49-51]

Summary

Most **neurodegenerative** diseases share common features, including the accumulation of toxic proteins, inflammation, and oxidative stress.

Curcumin helps reduce or prevent all of these.

Studies have shown that it may help reduce or slow the development of a wide variety of brain disorders.

A **curcumin-galactomannan complex** is highly ***absorbable*** and easily crosses the blood-brain barrier.

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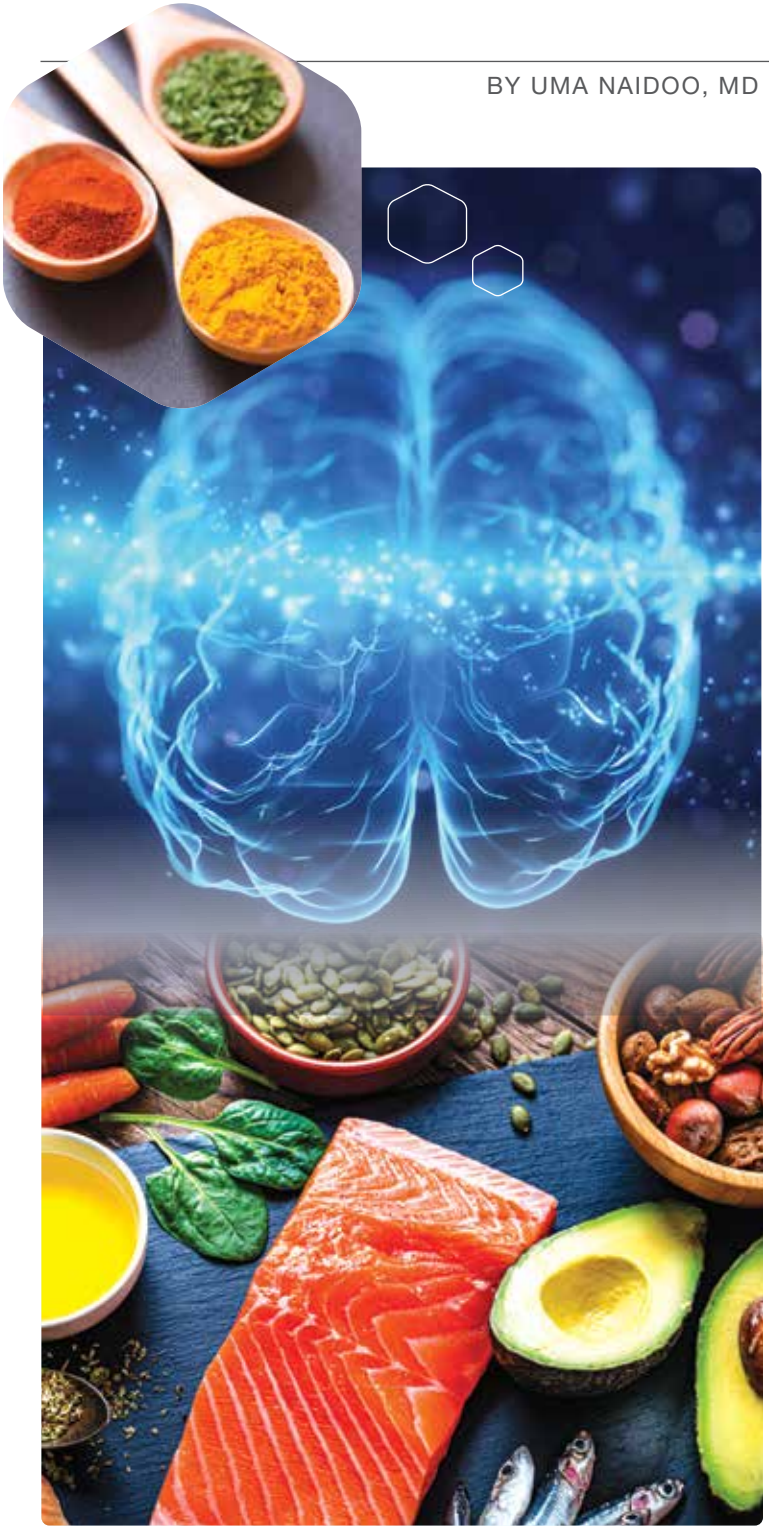
This is Your Brain on Food

An Indispensable Guide to the Surprising Foods that Fight Depression, Anxiety, PTSD, OCD, ADHD, and More

BY UMA NAIDOO, MD



Food has a profound effect on **mental health**. It impacts your risk of depression, brain fog, and Alzheimer's, and plays a role in libido, sleep, OCD, and much more.

In *This is Your Brain on Food,* board-certified psychiatrist, nutrition specialist, and professionally trained chef Uma Naidoo reveals cutting-edge research on the direct connection between the gut and the brain.

Naidoo says that because many doctors overlook this connection, they are missing a key component to successful treatment and recovery.

"Until we solve nutritional problems, no amount of medication and psychotherapy is going to be able to stem the tide of mental issues in our society," said Naidoo.

In this book, Naidoo explains how you can use diet to achieve well-being in every aspect of your mental health. She offers practical advice on what to eat (and what not to eat) to improve your cognitive function, mood, energy, concentration, libido, and more.

She also highlights key nutrients and supplements that help build the foundation of healthy brain function.

In this interview with ***Life Extension*** Dr. Naidoo explains the critical gut/brain connection, and offers practical tips to help with depression, memory, sleep problems, and more.

—LAURIE MATHENA

LE: How does food influence your brain?

Dr. Naidoo: Food influences your brain directly and indirectly. When food is broken down by the microbiota into fermented and digested materials, its components directly influence neurotransmitters such as serotonin, dopamine, and GABA, which travel to the brain and change the way you think and feel.

When food is broken down, its constituent parts can also pass through the gut wall into the bloodstream, and certain metabolites can act on the brain that way as well.

Food's most profound effect on the brain is through its impact on your gut bacteria. Some foods promote the growth of helpful bacteria, while others inhibit this growth.

Because of that effect, food is some of the most potent mental health medicine available, with dietary interventions sometimes achieving similar results to specifically engineered pharmaceuticals, at a fraction of the price and with few, if any, side effects.

On the other hand, food can also made you sad—certain food groups and eating patterns can have a negative effect on your gut microbiome and your mental health.

The idea of using food as medicine for mental health is central to nutritional psychiatry, and in my opinion, it's crucial to finding meaningful, lasting solutions to mental health problems.

Until we solve nutritional problems, no amount of medication and psychotherapy is going to be able to stem the tide of mental issues in our society.

LE: How can something as basic and natural as eating be as potent as a drug that cost millions of dollars to develop and test?

Dr. Naidoo: The primary reason gut bacteria have such a profound effect on mental health is that they are responsible for making many of the brain chemicals.

If normal gut bacteria are not present, production of neurotransmitters such as dopamine, serotonin, glutamate, and gamma-aminobutyric acid (GABA)—all critically important for the regulation of mood, memory, and attention—is impacted.

Many psychiatric disorders are rooted in deficits and imbalances of these chemicals, and many psychiatric drugs are tasked with manipulating their levels.

Therefore, if your gut bacteria are intimately involved with producing these vital chemicals, it stands to reason that when your gut bacteria are altered, you risk doing damage to this complex web of body and brain function.

That's a lot of responsibility for a group of microscopic organisms!

LE: Does this mean that your diet can impact your risk of depression?

Dr. Naidoo: When discussing depression and the gut with my patients, I often use the phrase "blue bowel," a lighthearted name for the very serious relationship between depression and your gut.

Food changes the types of bacteria present in your gut microbiome. Your gut bacteria may become less diverse as a result of your diet, which may cause the bad bacteria to outgrow the good bacteria, triggering a cascade of negative health effects.

Studies in humans appear to confirm this hypothesis. In 2019, psychiatrist Stephanie Cheung and her colleagues summarized findings from six studies that looked at gut health in patients with depression.

They reported that patients with major depressive disorder had at least 50 types of bacterial species in their gut microbiome that were different from those of control subjects without major depressive disorder.

Recent research suggests that bacterial species associated with higher quality-of-life indicators are depleted in depressed subjects, while bacteria that cause inflammation are often found in higher numbers in people suffering from depression.

This tells us that inflammation and depression are closely linked.

LE: If you're suffering from gut-induced depression, how do you reset your gut microbiome to help achieve a healthy mental state?

Dr. Naidoo: The key is to increase probiotics and prebiotics in your diet. Probiotics are live bacteria that convey health benefits when eaten. Probiotic-rich foods contain beneficial bacteria that help your body and brain.

In 2010, Michael Messaoudi and his colleagues studied 55 healthy men and women who were randomly assigned to receive either a daily probiotic formula or a placebo for 30 days.

Compared to the placebo group, those in the probiotic group reported less depression, and urinary levels of cortisol (the body's main stress hormone) were lower, indicating that their brains were less depressed and less stressed.

Why was this the case? Certain species of gut bacteria have the ability to boost levels of brain chemicals such as gamma-aminobutyric acid, which may speed relief from depression and other mental health conditions.

Magnesium is also important for proper brain function. Countless studies have suggested that depression is related to magnesium deficiency. Several case studies, in which patients were treated with **125-300 mg** of magnesium, have demonstrated rapid recovery from major depression, often in less than a week.

LE: Another issue people struggle with as they get older is memory. Why is the typical Western diet so bad for memory?

Dr. Naidoo: High-fat and high-glycemic-index (high-GI) foods can alter brain pathways necessary for learning and memory, with neurons in the hippocampus and prefrontal cortex especially affected.

The hippocampus is the part of the brain most involved in forming relational memories.

High-fat and high-GI diets can affect the hippocampus in a variety of ways. First, the Western diet can hamper the expression of critical growth factors like brain-derived neurotrophic factor and other hormones that promote healthy function in the hippocampus.

Second, poor diets can affect insulin signaling and insulin sensitivity in the body's tissues. It's unclear exactly what insulin's role is in the hippocampus, but studies have indicated that it likely impacts memory.

One recent study showed that high saturated fat intake in male rats interfered with insulin signaling in the hippocampus, which led to interference with hippocampal function and corresponding relational memory abilities.

Third, a diet high in saturated fat and refined sugar in male rats showed increased oxidative stress, which damages brain cells and reduces the efficacy of cell-to-cell communication in the hippocampus.

Dietary components such as saturated fat may also exacerbate inflammation in the brain, which has been linked to cognitive decline in aging and risk of developing Alzheimer's disease.

Inflammation disrupts many of the chemical pathways instrumental in memory formation, such as those that rely on dopamine and glutamate. The nerves themselves become sluggish and information travels far more slowly.

LE: Besides cutting out high-fat and high-GI foods, what nutrients can someone take to improve memory?

Dr. Naidoo: Curcumin has antioxidant, anti-inflammatory, and neurotrophic activities. In fact, one recent review of 32 animal and laboratory studies showed that it can reverse some brain damage caused by Alzheimer's.

A 2019 review of curcumin studies also showed improvement in attention, overall cognition, and memory.

Another is saffron. In 2010, Shahin Akhondzadeh and his colleagues tested whether saffron could impact cognition. They administered either **15 mg** capsules of saffron or a placebo twice daily to people with mild to moderate Alzheimer's disease.

After 16 weeks, saffron produced a significantly better outcome on cognitive function than placebo.

LE: Many of our readers struggle with getting adequate sleep. How can you eat for better sleep?

Dr. Naidoo: The best recipe for sleep often lines up with a healthy diet. For example, in 2014, Ryoko Katagiri and her colleagues reported that women who ate more noodles and sweets and less vegetables and fish had worse sleep than those with healthier diets.

Broadly speaking, I recommend you follow a healthy, whole-foods diet like the Mediterranean eating pattern, and make sure to include or exclude certain foods based on how they affect your sleep.

LE: What is one specific nutrient that's been proven to help improve sleep?

Dr. Naidoo: You can add improved sleep to the long list of benefits of omega-3 polyunsaturated fatty acids. A number of studies in animals demonstrate that omega-3s decrease inflammation and normalize sleep, and that they protect the brain from memory impairment in sleep-deprived mice.

There are also an increasing number of studies that demonstrate the beneficial effects of omega-3s on human sleep.

For instance, in 2018 Leila Jahangard and her colleagues conducted a study on 50 depressed patients. Compared to those on a placebo, the participants who received omega-3s improved their depression, anxiety, and emotional control, and over time they improved their sleep as well.

LE: What are some ways to help clear up brain fog?

Dr. Naidoo: "Brain fog" occurs when you cannot think clearly, when you cannot concentrate or multitask, or when you lose short-term and long-term memory.

In 2015, Theoharis Theoharides and his colleagues showed that luteolin, a type of flavonoid, has numerous neuroprotective properties that decrease brain fog. As an antioxidant and anti-inflammatory agent, this substance prevents toxic destruction of nerve cells in the brain.

In 2018, Lucy Harper and her colleague Justine Bold showed that gluten can cause brain fog. After consuming gluten, some people find themselves thinking less clearly and wanting to sleep all day. If you are suffering from brain fog, cut out gluten to see if you improve. It may turn out that you have celiac disease or non-celiac gluten sensitivity.

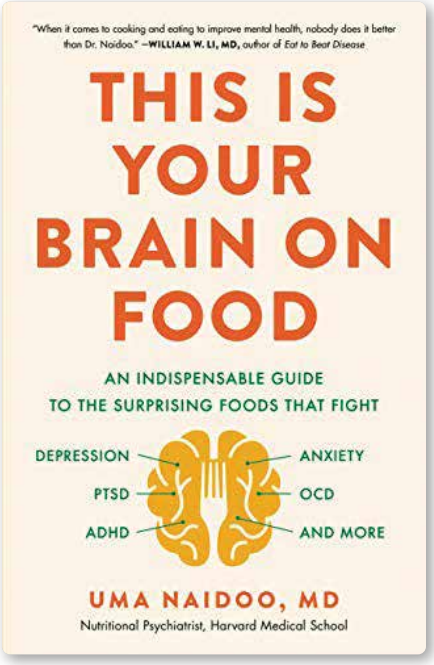
Phosphatidylserine (PS) is required for healthy nerve cell membranes and coverings, and its protective effects can prevent brain fog. In 2010, Akito Kato-Kataoka explained that six months of soybean-derived PS improved memory function in elderly Japanese adults.

LE: What are your thoughts on taking drugs to treat mental health issues?

Dr. Naidoo: Modern mental health medications can be a godsend to patients who struggle with a variety of disorders, and I don't want to downplay their importance as a therapy in many circumstances.

But what sometimes gets lost in discussions about mental health is a simple truth: the food you eat can have just as profound an effect on your brain as the drugs you take.

It's important to work with a mental health professional to develop the right mix of psychotherapy and antidepressant medication when necessary. But no matter what, the food you eat will be an important part of the puzzle. •



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Apples

BY LAURIE MATHENA

When it comes to superfoods, it doesn't get much more nutrient-dense, tasty, portable, or versatile than apples.

Eating just *one* apple per day has been associated with a lower risk of dying from **cardiovascular disease**, **cancer**, or **all-cause mortality**.[1]

But eating **more** could be even better.

According to a study published in the *American Journal of Clinical Nutrition*, eating **two apples** per day reduced LDL cholesterol and triglyceride levels in people with slightly elevated levels.[2]

Higher apple consumption has been tied to a lower risk of numerous types of cancer,[3] along with a lower risk of cardiovascular disease, asthma, and type II diabetes.[4]

A review of human, culture, and animal studies has also demonstrated that frequent apple consumption has beneficial effects on lipid metabolism, vascular function, and inflammation.[5]

This could be due in part to their high level of phytochemicals such as quercetin, flavonoids, and carotenoids.[4]

These studies prove the truth of the popular adage: An apple a day really can keep the doctor away. •

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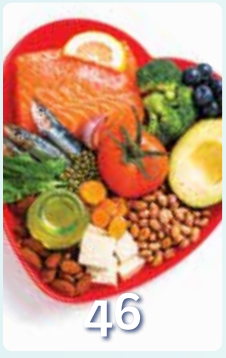

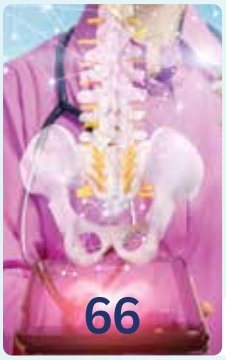

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