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December 2023

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to Reduce Dementia and Obesity Risk

PLUS:

Phages Improve Probiotic Function



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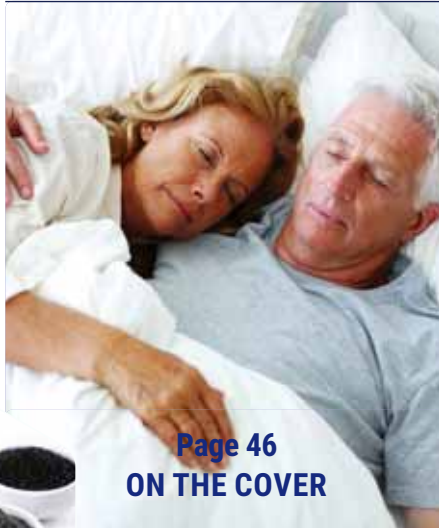
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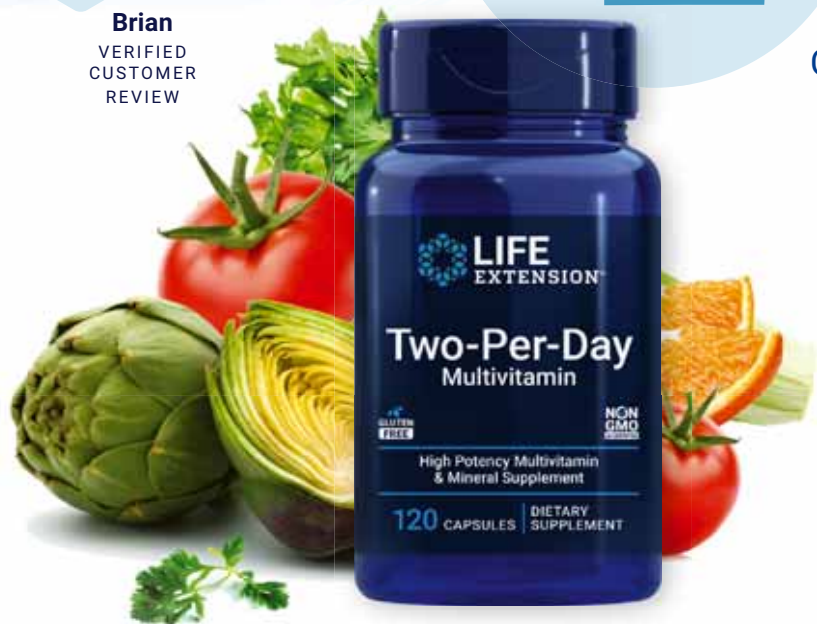
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Sleep, Obesity, and Dementia



WILLIAM FALOON

Those with **impaired sleep** suffer a tsunami of disorders, including *higher dementia* rates and unwanted **weight gain**.

In **January 2022**, I described data supporting a relationship between less-than-optimal **sleep** and **obesity**.¹

Throughout **2022-2023**, similar reports linking **sleep disorders** with excess **body fat**²⁻⁴ and **cognitive** deficits were published.⁵⁻⁸

Sleep deprivation harms overall health and increases **all-cause mortality**.^{9,10}

Research published in **2023** reveals how lack of **quality sleep** can inflict structural **brain damage**.¹¹

The lead author of this study was quoted as saying that insufficient **restorative sleep** accelerated an indicator of **brain aging** by as much as **4.6 years**!¹²

This **2023** study helps corroborate prior data linking decreased **slow-wave sleep** to **cognitive** decline and structural changes indicative of **Alzheimer's**.¹³⁻¹⁵

The challenge is what to do if you are unable to readily fall or stay asleep.

Encouraging news has emerged of **non-drug** approaches that have been shown to provide substantial help to sleep-challenged people in randomized controlled trials.

Widespread enhancements of **restorative sleep** would help reduce the epidemic burdens inflicted by **aging**. These include surplus body fat, neurodegeneration, and cardiovascular disorders.

SLOW-WAVE Sleep

Slow-wave sleep, also called deep sleep, is a **stage of sleep** that plays an influential role in **growth** and **memory**.⁴⁹



The media relentlessly report on growing numbers of Americans not getting enough **sleep** hours.

One of every three American adults are **sleep deprived**.¹⁶

With aging, it's not just sleep **quantity**, but also sleep **quality** that matters.

Any intervention that improves **restorative sleep** can have major impacts on overall health and longevity.

Rising Prevalence of Sleep Disorders

Official statistics show that **50 to 70 million** Americans are afflicted with chronic or ongoing **sleep disorders**.¹⁶ About **9% to 15%** of the U.S. adult population suffer from insomnia.¹⁷

In older adults, however, the number suffering from **sleep disorders** surges to between **40% and 70%**.¹⁸

Inadequate sleep is not just about feeling miserable the next day. It significantly increases risks of lethal disorders.

Five-Fold Rise in Stroke Risk

Stroke continues to be a leading cause of long-term disability and death, striking 795,000 Americans each year.¹⁹

More than half of stroke survivors over age 64 suffer reduced mobility including **paralysis**.²⁰

A study published in April **2023** linked multiple sleep problems to a **five-fold** increase in the odds of



having a **stroke**.²¹ The nocturnal disorders included short, fragmented sleep, insufficient restful hours, and sleep apnea that impair the body's ability to regulate metabolism, inflammation, and blood pressure.

These findings are consistent with prior research linking unhealthy sleep to chronic conditions leading to blood vessel impairment associated with **stroke**.²²

Increased Heart Disease Associated with Sleep Problems

A February **2022** study found that having more self-reported sleep problems was associated with a **54% increased** risk of **heart disease**.²³

When a sleep monitoring device (actigraph*) was added as part of a combination assessment, sleep problems were associated with a startling **141% higher** risk of **heart disease**.²³

These data suggest that **heart disease** is correlated with sleep problems, including poor quality sleep. This helps identify sleep **quality** as an underappreciated **risk factor** associated with **heart disease**.²³

The *Harvard Heart Letter* reported on this study in August **2022**.²⁴

Although additional studies are needed to confirm correlation and cause, these data suggest that **cardiologists** should inquire about patient **sleep quality** in addition to other cardiovascular risk factors.

* An actigraphic device looks like a wristwatch, and measures changes in movement which are correlated with sleep parameters.

Sleep-Disordered Breathing

A May **2023** study published in the journal *Neurology* showed that severe **sleep apnea** markedly accelerates **aging**.¹¹

What surprised me is the impact of even small reductions in deep (slow-wave) sleep. In an interview, the authors of this study said a mere **10% decline** in deep (slow-wave) **sleep** is equivalent to **2.3 years** of **brain aging**.²⁵

Sleep apnea is complete cessation of breathing.

Sleep-disordered breathing refers to a wide spectrum of conditions including increased resistance to airflow in the upper airway, heavy snoring, and marked reduction in airflow.

A March **2023** article published by the **American College of Cardiology** describes "**sleep-disordered breathing**" as being linked with **obesity**, **type II diabetes**, and premature **death**.²⁶



The researchers emphasize that this is a growing, but under-recognized **crisis** that provides an opportunity for physicians to reduce cardiovascular disease and improve quality of life by correcting sleep-breathing disorders.

Yale Researchers Concur

A report emanating from **Yale University** in March **2023** describes specific mechanisms by which **poor sleep** contributes to **diabetes** and **obesity**.²⁷

They point out that **sleep deprivation** creates an imbalance in hormones that regulate appetite (ghrelin and leptin).

Leptin helps induce satiety (feeling full) while **ghrelin** makes people hungry.

During sleep **leptin** typically rises. With insufficient sleep, **leptin** levels decrease, making one feel hungrier and more likely to excessively eat and gain weight.

Sleep disruptions of *any* kind can increase **ghrelin**, which makes people hungrier for more **calories**.

This 2023 Yale report points out that people who are more **sleep-deprived** tend to **gain weight** and develop **type II diabetes**.

This Yale report concludes by stating:

“Sleep, obesity, and diabetes are all linked, and improvements to one aspect can benefit others. For example, significant weight loss can treat and, in some cases, eliminate sleep apnea, a disruptive sleep disorder in which breathing stops and starts at night.”²⁷

Defying Conventional Wisdom

Traditional factors such as excess **calorie intake** and lack of **physical activity** do not fully explain today’s high prevalence of unwanted body fat, metabolic syndrome, and obesity.

Insufficient sleep and **poor-quality sleep** promote **weight gain** and predispose people to metabolic disorders like **type II diabetes**.²⁸

A February **2023** report describes a growing recognition that **insufficient sleep**, misalignment of **sleep/wake cycles**, and altered feeding contributes to a constellation of factors behind today’s **obesity epidemic**. The authors conclude that:

“Efforts are needed to highlight the importance of optimal sleep and circadian health in the maintenance of metabolic health and body weight regulation.”²⁹



Sleep Well and Reduce Dementia Risk

People who slept six hours or less per night in mid-life are **30% more** likely to develop **dementia** as they age. Those who sleep less than five hours have been shown to **double** their **dementia risk** in later life.³⁰

The adverse impact of **sleep deprivation** is no longer hidden. Numerous published studies show increased risks of:

- **Alzheimer's**³¹⁻³³
- **Parkinson's**^{34,35}
- **Multiple sclerosis**³⁶
- **Stroke**^{21,22}
- **Frequency of epileptic seizures**^{37,38}
- **Behavioral changes in Autism Spectrum Disorder**^{39,40}
- **Progression of glioma**⁴¹
- **Pain (neuropathic)**^{42,43}

The problem is that nearly **50%** of older adults have some kind of **sleep disturbance**, and no single, complete solution exists for many of them.⁴⁴

All validated lifestyle methods shown to improve sleep should be considered by those unable to achieve optimal quantity and quality nightly rest.

In this month's issue...

Researchers isolated two plant extracts that have been shown to improve *every* measured component of the sleep cycle.

Compared to **placebo**, people taking one of these **plant extracts** showed significant sleep enhancements at seven⁴⁵ and 60 days.⁴⁶

Two randomized controlled trials, one for each of these two ingredients, demonstrated improvements in the ability to fall asleep, stay asleep, and perhaps most important, enhance overall **sleep quality**.^{47,48}

Page 46 of this month's issue describes the science behind this new botanical combination that may provide partial or substantial relief for those not attaining sufficient nightly rest.

You may note that most reports cited in this editorial are published this year (2023).

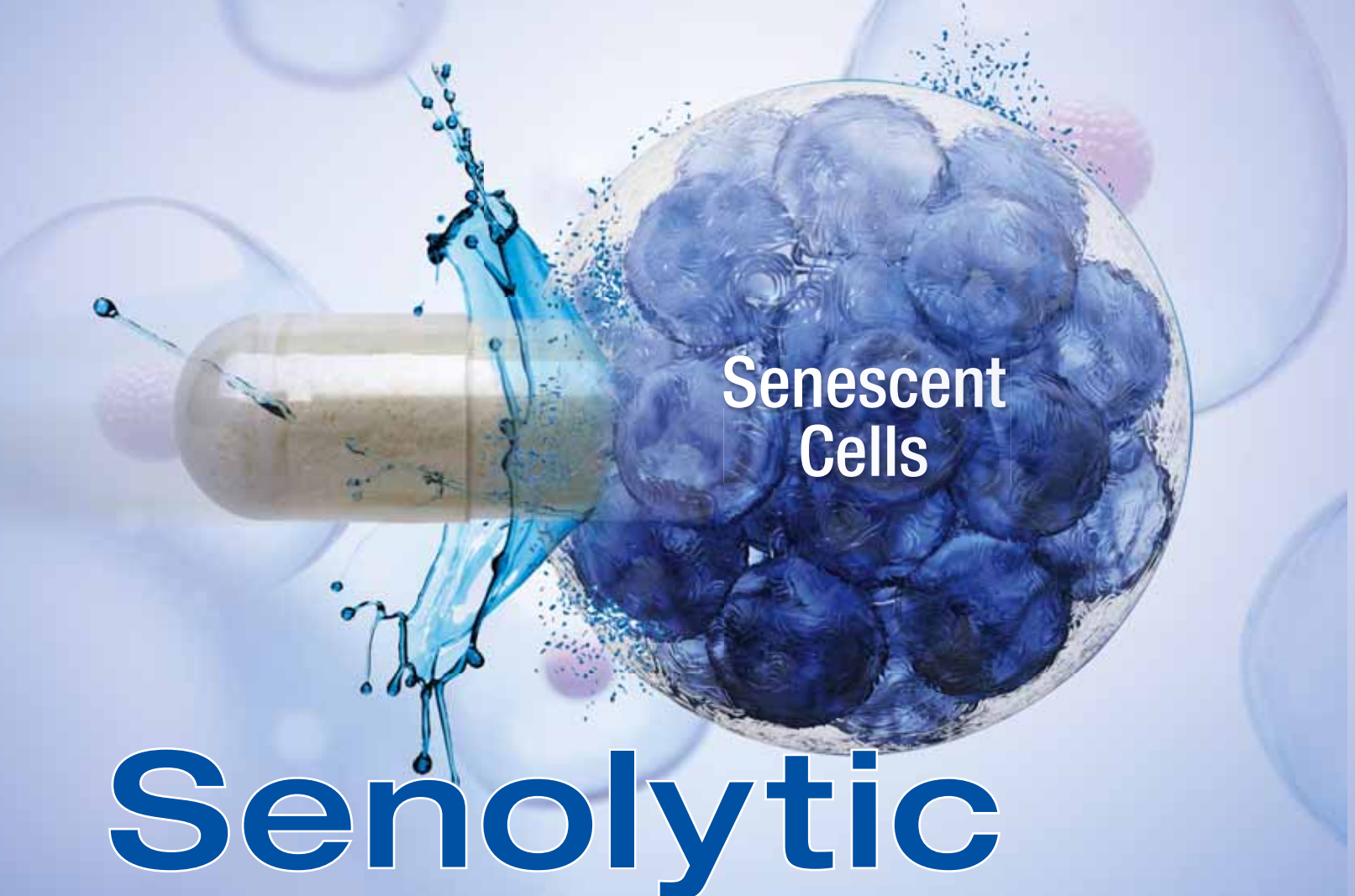
They provide near-universal consensus that common disorders afflicting aging **humans** may be curtailed in response to healthier **sleep** patterns.

For longer life,

William Faloon, Co-Founder,
Life Extension®

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VERIFIED
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REVIEW

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

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

In the News



Consuming More Flavonols, Like Broccoli, May Slow Cognitive Decline

Consuming more flavonols was associated with a slower rate of cognitive decline among older men and women, according to a clinical study published in *Neurology*[®], the medical journal of the American Academy of Neurology.*

When individual flavonols were evaluated, participants with the highest intake of kaempferol and quercetin exhibited slower rates of cognitive decline, compared to people with the lowest intake. Kaempferol, found in significant amounts in kale, beans, tea, spinach and broccoli, was associated with the greatest benefit.

Global cognitive test scores of those whose intake of flavonols was among the highest **20%** of participants indicated a slower rate of decline during follow-up than participants whose intake was among the lowest **20%**.

Editor's Note: There were 961 participants in the study, enrolled in the Rush Memory and Aging Project, average age 81, with no dementia. They responded to yearly dietary questionnaires administered during a 6.9-year average follow-up period, providing information about flavonol intake and completed annual cognitive and memory tests.

* *Neurology*[®]. 2023 Feb 14;100(7):e694-e702.

Higher Omega-3 Levels Linked with Better Lung Health

A study reported in the *American Journal of Respiratory and Critical Care Medicine* suggests that people with higher levels of omega-3 may have a better chance of maintaining lung function over time.*

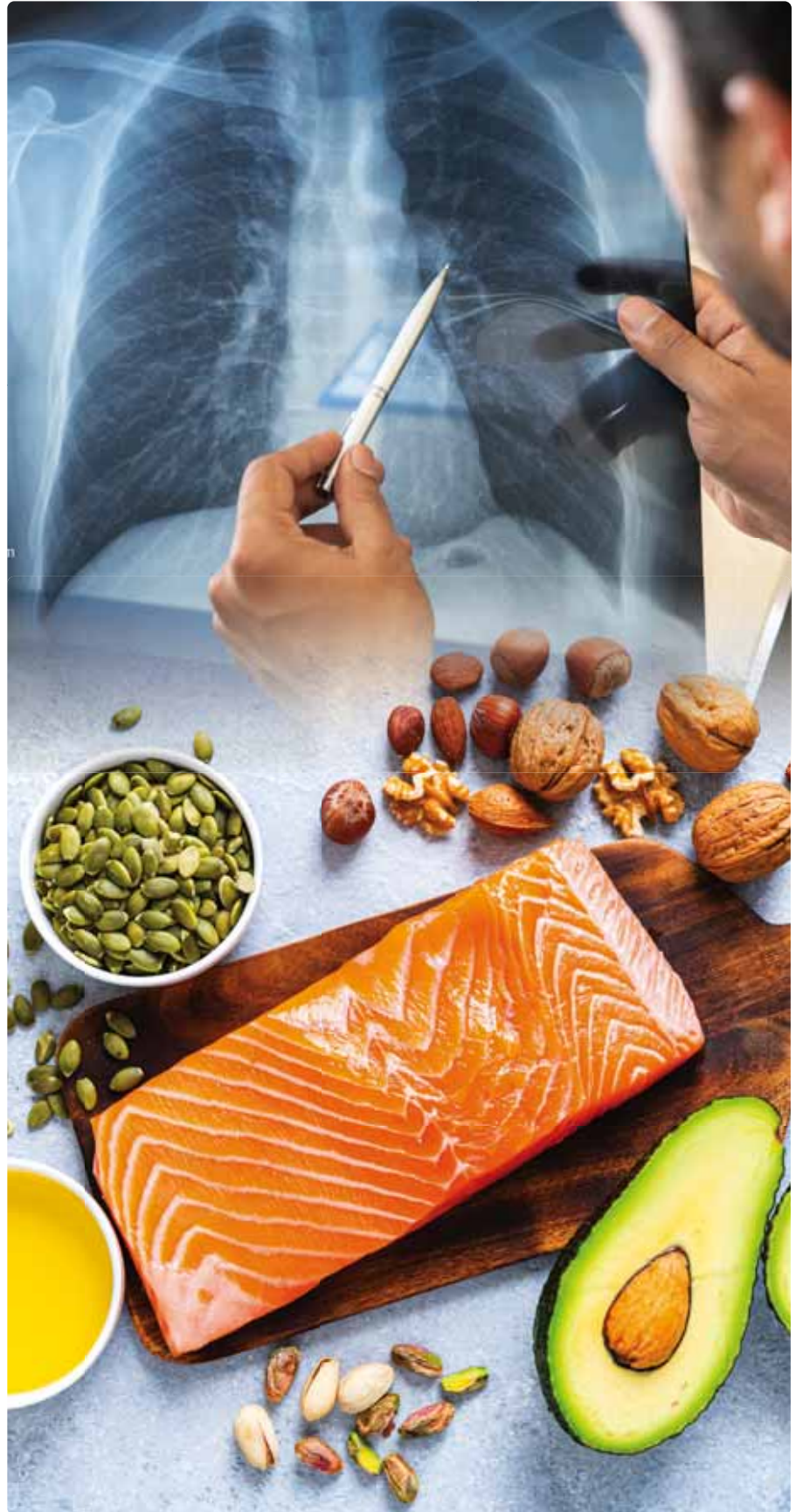
“Inflammation contributes to lung function decline and the development of chronic obstructive pulmonary disease. Omega-3 fatty acids have anti-inflammatory properties and may benefit lung health,” the researchers stated as the rationale for the study.

Participants were 15,063 healthy men and women enrolled in the National Heart, Lung, and Blood Institute (NHLBI) Pooled Cohorts Study. They were followed for up to 20 years, during which repeated measures of lung function were obtained. Genetic data were also collected from more than half a million UK Biobank participants to investigate potential associations between genetically predicted omega-3 levels and lung function.

The results showed that people with *higher* plasma omega-3 fatty acid levels had a lower risk of declining lung function during follow-up. Those with higher genetically predicted omega-3 fatty acid levels also had better lung function over time.

Editor’s Note: The study also found that the omega-3 fatty acid DHA appeared to be the most protective.

* *Am J Respir Crit Care Med.* 2023 Jul 20.



Nicotinamide Boosts Muscle Cells' Energy Production

In a clinical study involving adult twins, a form of vitamin B3 known as nicotinamide riboside (NR) was found to increase the number and density of energy-producing mitochondria within muscle cells.*

Nicotinamide riboside is a precursor of NAD⁺, a coenzyme found in every cell that supports cellular energy production. NAD⁺ declines with aging.

For the study 20 sets of twins were recruited to receive NR or a placebo. The NR dosage was **250 mg** at the beginning of the study and gradually increased to **1,000 mg** per day for five months. Blood, muscle tissue, and other samples were obtained from all participants at the beginning and end of the trial.

At the end of the trial NR improved systemic NAD⁺ metabolism, muscle mitochondrial number, myoblast differentiation, and gut microbiota composition as compared to the placebo group.

Editor's Note: "NR supplementation is a potential treatment option to be tested in individuals with decreased muscle mitochondrial biogenesis and dysbiosis," the authors stated.

* *Sci Adv.* 2023 Jan 13;9(2):eadd5163.



Old Drug May Offer New Hope for People with ALS

An FDA-approved medication may be repurposed to aid in the management of **amyotrophic lateral sclerosis (ALS)**, a neurodegenerative disorder, a preclinical study found.*

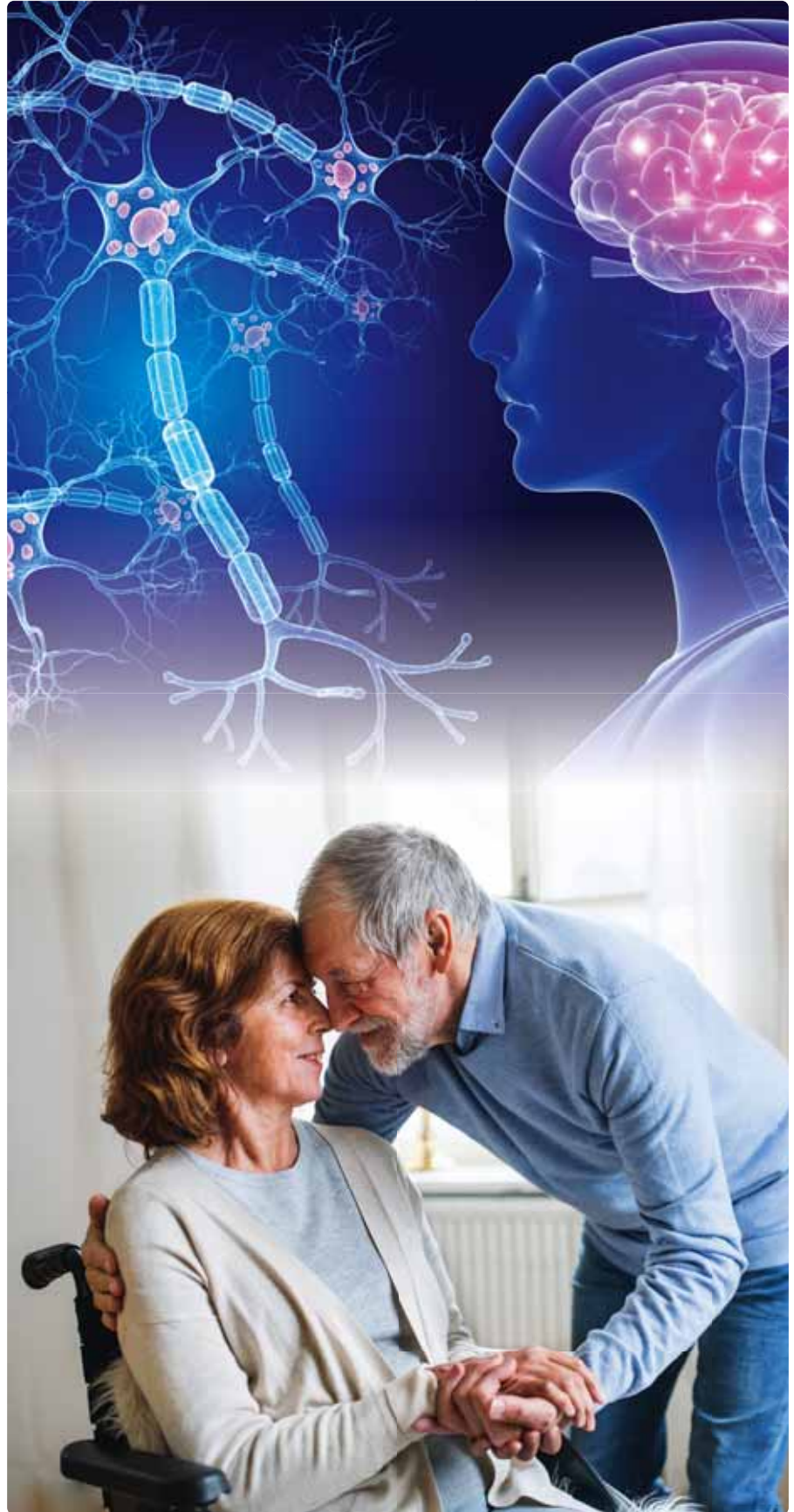
Terazosin is an alpha-blocker drug that has been around for decades, mostly used to treat high blood pressure and the symptoms of an enlarged prostate. Recently, researchers discovered that terazosin also binds to the enzyme **PGK1** and increases its activity.

The metabolic pathway that PGK1 is part of is dysfunctional in ALS, and typically causes the progressive death of motor neurons in both the brain and spinal cord—causing paralysis.

Scientists utilized multiple models of ALS—both in cell culture and in various animal models—to show that treatment with **terazosin** was neuroprotective, defending motor neuron cells from the typical changes and cell death that would otherwise occur.

Editor’s Note: “Repurposing terazosin therefore has the potential to increase the limited therapeutic options across all forms of ALS, irrespective of disease cause,” the authors of the study stated.

* *EBioMedicine*. 2022 Sep;83:104202.



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

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Protect
TELOMERES
from Premature
Shortening





BY MARK FIELDS

In **March 2023**, the *Wall Street Journal* reported on a study showing that people over age 60 with **shorter telomeres** were **three times more** likely to die from **heart disease** and **eight times more** likely to die from **infections**.¹

Shortened **telomeres** are associated with accelerated **aging** and higher risk of all-cause **mortality**.²

For decades, scientists have searched for ways to slow the shortening of **telomeres**.

An easy way to reduce the progression of telomere shortening has now been discovered.

Results of a **clinical study** showed that, in those who took a **selenium-CoQ10** combination for four years, there was a

remarkable **49% lower** rate of death due to **cardiovascular** causes compared to **placebo**.³

A recent sub-study utilizing data from these participants was published in the medical journal *Nutrients*. Scientists found that the combination of **selenium** and **coenzyme Q10** significantly reduced the attrition of **telomeres** in subjects' cells.⁴

This is a potentially game-changing development and adds evidence to the benefits of **selenium** and **coenzyme Q10**. Halting telomere shortening, on top of the known benefits, would be huge.

Most readers of this magazine have supplemented with CoQ10 and selenium for many decades.

What Are Telomeres?

Telomeres are protective caps for your genetic material. Every **chromosome**—long, elaborately folded strings of DNA found in every cell—has telomeres on both ends. They help shield the **DNA** structure and keep the genetic material stable.^{2,5}

Early in life, telomeres tend to be long and healthy. But with time, as cells age, telomeres **shorten**. When they become *too* short, the chromosomes are prone to damage and dysfunction. This causes cells to age and eventually die.^{5,6}

Scientists have shown that longer, intact telomeres are associated with excellent cellular health, and may be associated with **longevity**. On the other hand, shortening of telomeres is associated with **aging** and chronic disease.^{2,6,7}

For these reasons, the **prevention of telomere shortening** is a major interest of **anti-aging** research.

Selenium and CoQ10

Selenium is a trace mineral and is essential to the proper function of certain **enzymes**, specifically those involved in defense against oxidative stress and the damage it causes to proteins and cellular DNA.

Many older adults have *low* selenium levels.⁸ Observational studies have shown low levels of selenium are associated with increased risk of **cardiovascular disease**.⁹

Coenzyme Q10 (CoQ10) is a lipid-soluble anti-oxidant naturally found in every cell of our body. It is

critical to the health of **mitochondria**, cellular powerhouses that supply the energy cells need to survive and function.¹⁰ After age 20, production of CoQ10 begins to *drop*, and older people often suffer from inadequate levels.^{10,11}

Although selenium and CoQ10 play distinct roles in promoting health, they have an intimate connection. In other words, they are better together.

As **CoQ10** provides energy to the body, it becomes *inactive*. One of the enzymes that can convert the inactive CoQ10 back to the *active* form—called **ubiquinol**—requires **selenium**.¹⁰

At the same time, CoQ10 is required for selenium to be properly incorporated into essential body proteins.¹²

Impede Telomere Shortening

Several trials in the past have assessed the impact of selenium and CoQ10 on mitochondrial, cardiovascular, and metabolic health.

One such trial was of 675 older adults with low selenium levels who were randomized to receive either a placebo or a combination of **200 mcg** of selenium and **200 mg** of **coenzyme Q10** for four years. A significant reduction in cardiovascular mortality was seen in the treatment group as compared to placebo.¹¹

A recent sub-study of this trial was conducted, and **telomere length** of those in the earlier study evaluated.⁴

In the **selenium-CoQ10** group, the rate of **telomere shortening** was **significantly reduced** compared to placebo.



While telomeres in the **placebo** group continued to shorten, the average length in **selenium-CoQ10** users was stable or even slightly *increased*.

The ability to halt telomere shortening over a four-year period in elderly adults is an extraordinary finding. Even more impressive is that, in this study, shorter telomeres were associated with more cardiovascular disease and a shorter life, while selenium and CoQ10 supplementation preserved telomere length and resulted in less cardiovascular death.

Better Heart Health

A clinical trial found that older people who took a combination of selenium and coenzyme Q10 for a period of four years experienced a lower rate of **death** due to **cardiovascular causes** (including heart attack, stroke, and heart failure), which was reduced by more than half.¹²

Researchers continued to collect data from participants, and results of two subsequent sub-studies have been consistent in regard to cardiovascular mortality.

Ten years after the end of this trial, the selenium-CoQ10 group was still **49% less** likely to die from cardiovascular causes.¹¹

Even 12 years after the end of the treatment period, the benefit persisted. A **41% lower** risk in the active treatment group, as compared to placebo, was found in the second follow-up analysis.¹³ These benefits remained when looking at subgroups who had preexisting conditions, including heart disease, diabetes, and high blood pressure.

Summary

A study of elderly adults has demonstrated that taking **selenium** and **coenzyme Q10** can impede telomere shortening.

Telomeres protect genetic material in cells. Their shortening is associated with increased risk of disease and death.

Protection against telomere shortening in those receiving the selenium-CoQ10 was accompanied by **lower rates of death** due to cardiovascular causes during follow-up of up to **12 years**. This was true even in those with preexisting conditions. •

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



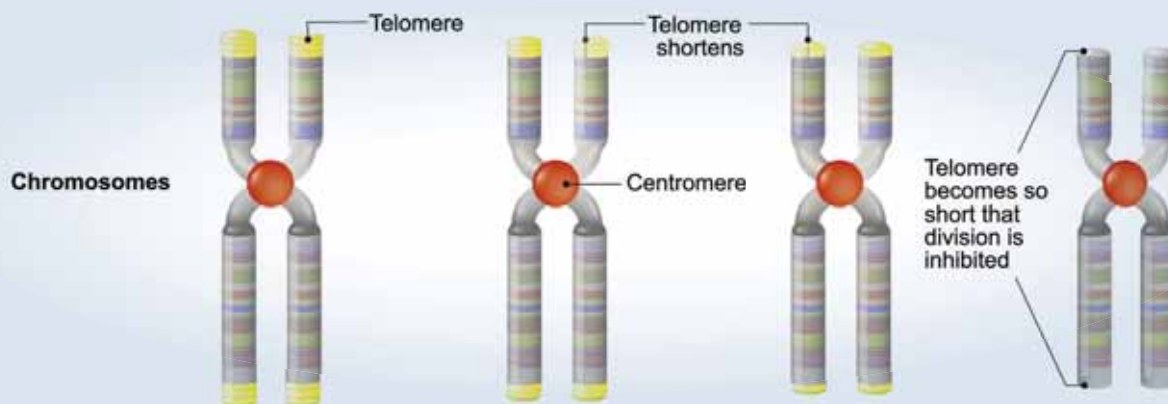
WHAT
YOU
NEED
TO
KNOW

Preserve Telomeres and Reduce Cardiovascular Death

- **Telomeres** protect the genetic material in every human cell. With aging, they tend to shorten, and this change is associated with increased risk for chronic disease.
- A study in older adults with low selenium found that oral intake of **selenium** and **coenzyme Q10 (CoQ10)** could slow or stop the shortening of telomeres over a four-year study period.
- Those receiving the treatment had significantly **lower rates of death** due to cardiovascular causes during a follow-up period of **12 years**.

THE WALL STREET JOURNAL. March 12, 2023¹

- ▶ The **WSJ** cited several studies associating **telomere length** with health outcomes in older people.
- ▶ Shorter **telomeres** were associated with **depression** and **cognitive** problems in people aged 60-79.
- ▶ People over 60 with shorter telomeres were **three times** more likely to die from **heart disease** and **eight times** more likely to die from **infections**.
- ▶ “Smoking, excessive drinking, pollution, stress, social isolation and eating processed foods...causes telomeres to **shorten faster**.”



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SUPER SALE PRICE

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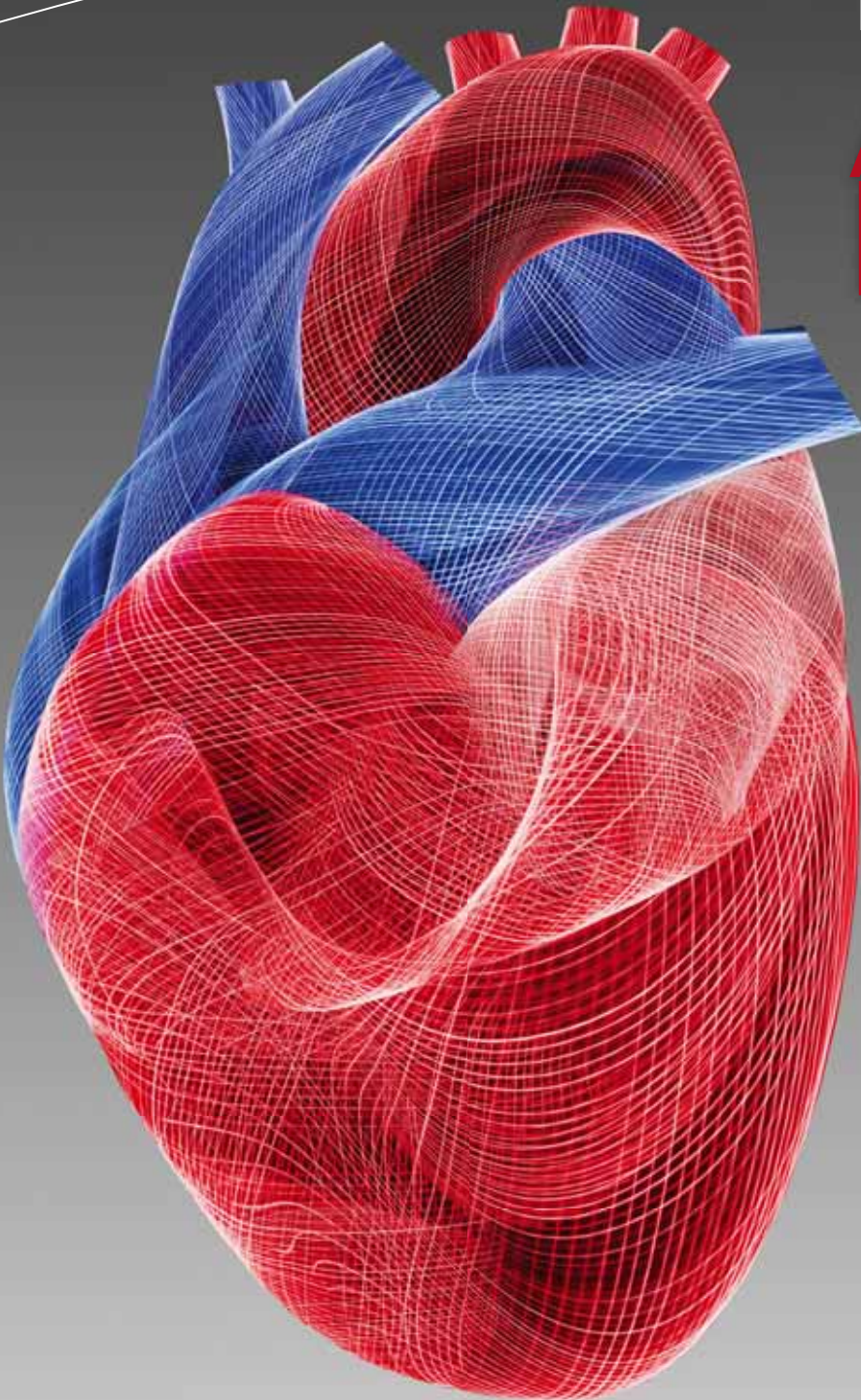
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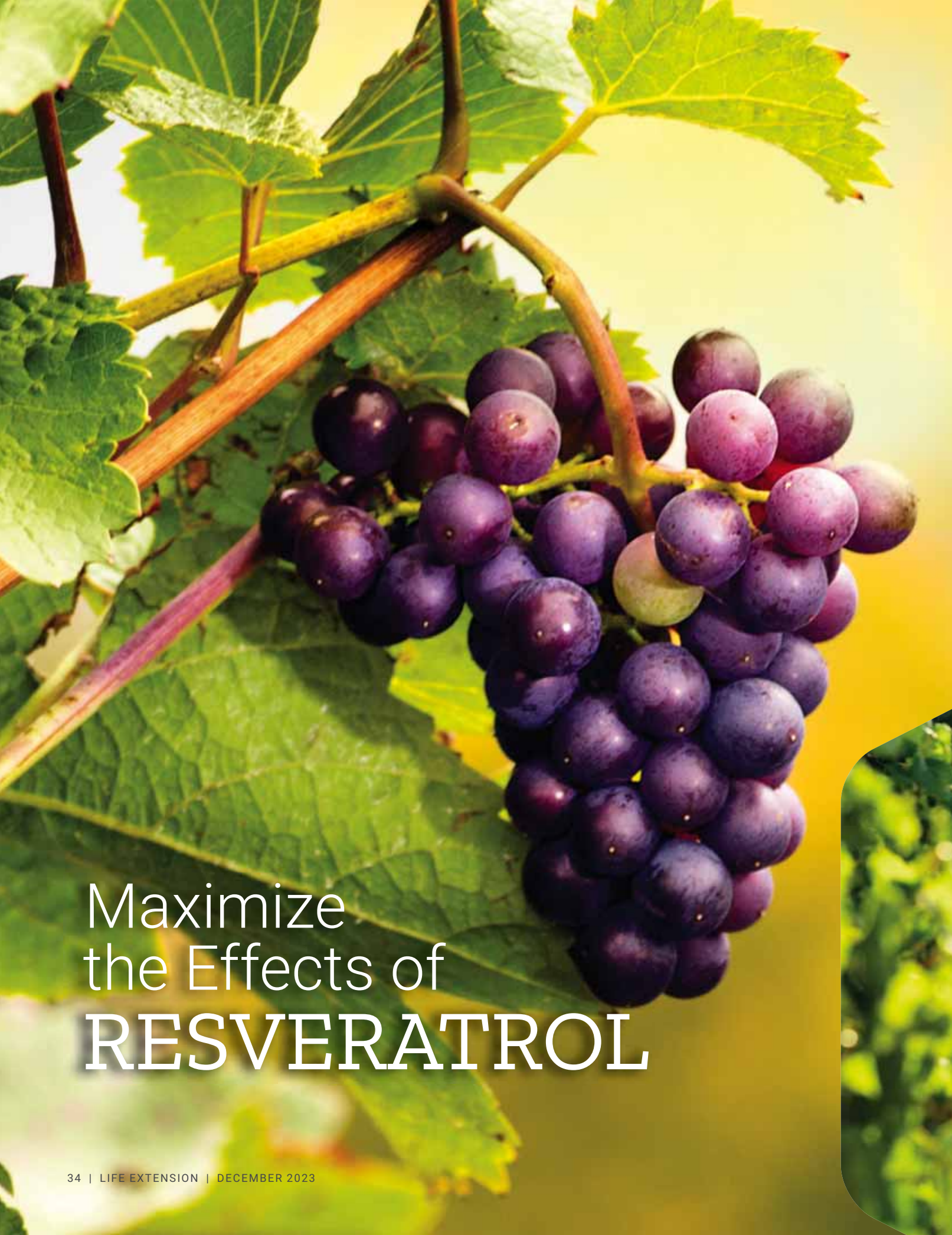


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* *Int Angiol.* 2014 Feb;33(1):20-6.

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Maximize
the Effects of
RESVERATROL



BY JOHN JOHNSON



The potential of **resveratrol** to beneficially impact our health and longevity has been studied for many years.

Research in animals and cells has shown it can delay certain aging processes.¹⁻⁵

Human studies of resveratrol over the past decade have shown its beneficial effects.^{6,7}

Resveratrol, however, has poor **bioavailability**.

Scientists developed a formula that allows **10 times** as much resveratrol to make it to cells, where it can exert an array of benefits.⁸

With this innovation, it is thought that resveratrol can better combat the effects of aging.



Activating Anti-Aging Processes

Resveratrol is a polyphenol compound found in red grapes, some berries, and several other plants.

Preclinical studies have shown that resveratrol activates multiple **anti-aging** processes.^{1-3,5}

Some of the protective mechanisms demonstrated by resveratrol include:

- **Anti-inflammatory** support,
- Increased activity of **sirtuins**, cellular protector proteins linked to longer life,
- Improvements in **insulin sensitivity** and other areas of metabolic health,
- Preventing harmful changes to **DNA** associated with cellular dysfunction,
- Improved function of energy-generating **mitochondria**,
- Activating **autophagy**, cellular “house-keeping,” and
- Promoting a healthy mix of microorganisms to improve **gut health**.

Resveratrol has demonstrated beneficial effects on all the above anti-aging factors.^{1-3,5}



Extending Life

Resveratrol can exert body-wide protection to help protect the heart, muscles, bones, and kidneys.

It has also been shown to prolong overall life. In numerous studies of organisms from yeast to mice, resveratrol **extends lifespan**.^{2,3,9}

For example, giving resveratrol to short-lived flies resulted in mean lifespan extension of up to **29%**.^{9,10} In honeybees, it increased the maximum lifespan by **38%**.¹¹

Because of the long lifespan of humans, it is difficult to evaluate a nutrient’s ability to extend life in clinical trials. However, human studies do indicate that resveratrol can reduce major contributors to premature aging.

Fighting Metabolic Disease

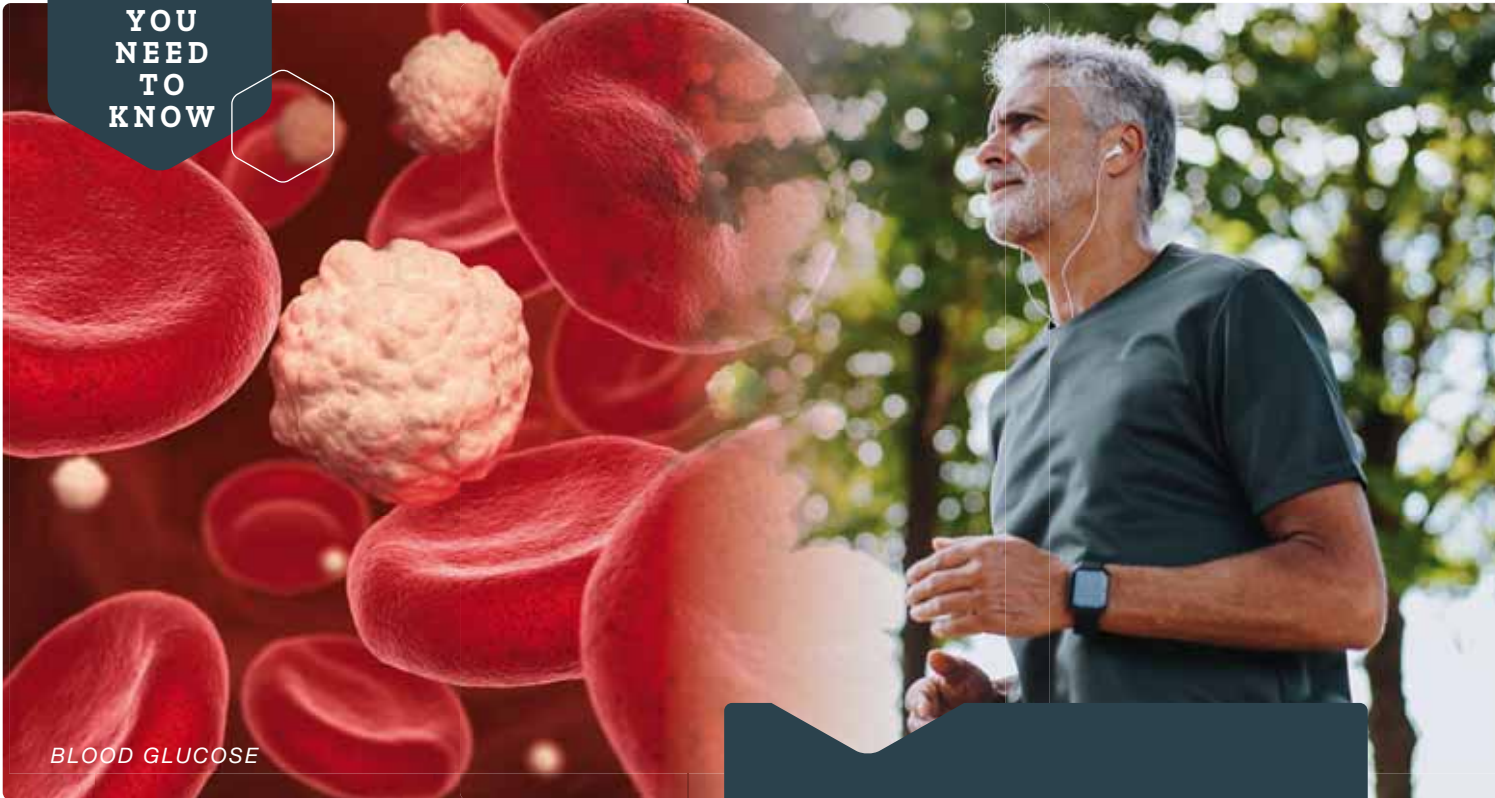
Low **insulin sensitivity** and poor **glucose control** are major contributors to the aging process. They can lead to **type II diabetes** and increased risk for cardiovascular disease, cancer, and dementia.

Human trials show that **resveratrol** intake benefits **metabolic health** in adults with diabetes or other signs of metabolic disease. Doses from **150 to 1,500 mg** daily led to improvements in markers of healthy aging, including:¹²

- Increased insulin sensitivity and improvements in a marker of insulin function,¹²⁻¹⁸
- Better blood glucose control,¹⁹ including lower levels of fasting glucose, post-meal glucose,^{14,18,20} and glycated hemoglobin HbA1c (a marker of long-term blood sugar control),^{12,15-19,21}
- Reduction in markers of nonalcoholic fatty liver disease,^{17,20}
- Improved cholesterol levels,^{16,21}
- Reduction in signs of oxidative stress^{13,22} and markers of inflammation,^{17,23,24}
- Increased sirtuin activity,¹²
- Lower blood pressure,^{12,16,21} and
- Reduction in body weight, waist circumference, and body mass index.¹⁵

Being **overweight** or **obese** is associated with metabolic disease and contributes to rapid aging and risk for disease.

WHAT
YOU
NEED
TO
KNOW



BLOOD GLUCOSE

In a clinical trial of diabetics (type II) participants on oral blood sugar medications were recruited. One group received **200 mg** of resveratrol daily for 24 weeks and another received a placebo. At the end of the trial, the resveratrol recipients had reductions in glucose and insulin, as well as reduced insulin resistance, compared to the beginning, and to the **placebo** group.²⁴

In a double-blinded crossover trial of healthy obese men, with a four-week washout period, taking **150 mg** of resveratrol daily for 30 days resulted in beneficial changes to fat tissue, including **decreasing the size of fat cells**.^{17,25}

One human placebo-controlled study found that **1 gram** of resveratrol per day for **45 days**, compared to a placebo, provided antidiabetic effects in patients with **type I diabetes**, a lifelong condition with no cure.²²

Not only did resveratrol improve metabolic health, but it also helped guard against complications of metabolic disease in a clinical trial of diabetics with foot ulcers.

For example, nonhealing **foot ulcers** are a frequent problem in those with type II diabetes. Resveratrol *increased* the healing rate. In a clinical trial of diabetics with foot ulcers **50 mg** of resveratrol two times per day for **60 days** promoted reduction in foot ulcer size in the treatment group as compared to placebo.²⁶

Protect Against Accelerated Aging

- **Resveratrol** is a polyphenol found in red grapes and other plants. It helps defend cells against accelerated aging and risk for disease.
- In animal models and cell experiments, resveratrol was capable of significantly **extending lifespan**.
- In **human trials**, resveratrol countered many factors associated with rapid aging, including reducing oxidative stress and chronic inflammation, improving insulin sensitivity and glucose control, and enhancing heart function.
- Encasing resveratrol in a **hydrogel** of plant-derived fiber boosts its bioavailability by more than **10 times**.

In another trial, diabetics suffering from chronic **gum** and **tooth disease** who took **480 mg** resveratrol **per day** for four weeks had a significant improvement in periodontal status along with improved insulin sensitivity as compared to the **placebo**.²⁷

Cardiovascular Benefits

Preliminary studies have shown that resveratrol can support metabolic health associated with cardiovascular disease risk. And it may protect against the development of **atherosclerosis** (buildup of plaque in arteries) and other **heart disease**.⁷ Now, clinical studies are confirming these findings.

One clinical trial published in **2023** included 80 patients with high blood pressure who were randomized to receive either **400 mg** resveratrol or placebo for six months. Results showed that resveratrol protected the heart against **remodeling** (harmful changes in size and shape that affect cardiac functioning), while also protecting against left ventricular function **fibrosis** (scarring).²⁸

In a double-blind, placebo-controlled trial, 40 heart attack patients were randomized to receive a **10 mg** resveratrol capsule daily for three months or a placebo. After three months the resveratrol group showed improved heart function, blood vessel function, and LDL cholesterol levels as compared to placebo.²⁹ Platelet aggregation, which can lead to abnormal blood clotting, was also reduced.

Better Bioavailability

Many researchers have long believed that resveratrol's effectiveness is limited by its poor **bioavailability**. The body's metabolism of unformulated resveratrol causes it to be rapidly cleared from the bloodstream and eliminated.

Scientists have discovered that encasing resveratrol in a **hydrogel** made of indigestible plant-derived fiber called **galactomannans** shields it from this process and makes it more bioavailable.

In a **human trial**, this hydrogel boosted the bioavailability of resveratrol by more than **10 times** compared to that of standard resveratrol.⁸ That means **10 times** more resveratrol stayed in the bloodstream to get delivered to cells.

It also stayed in the bloodstream longer, with a **four-fold** greater half-life than standard resveratrol.

That may help resveratrol to fully achieve its many benefits throughout the body.

Summary

Resveratrol counters many of the factors that contribute to accelerated aging and risk for disease.

Animal models have shown that it **extends life** and reduces risk of disease.

Human trials have found that resveratrol improves insulin sensitivity, reduces chronic inflammation, helps protect the heart, and more.

Encasing resveratrol in a **hydrogel** of plant-derived fiber improves the **bioavailability** of this nutrient. •



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

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01945	BioActive Complete B-Complex • 60 vegetarian capsules Enzymatically active forms of B vitamins to support healthy homocysteine levels, energize cells, and protect against glycation.	1 bottle	\$9.00	\$8.10	10%
		4 bottles	—	\$7.20 ea.	20%
01713	Vitamin D3 • 125 mcg (5,000 IU) • 60 softgels High-potency vitamin D supports immune function.	1 bottle	\$7.50	\$6.75	10%
		4 bottles	—	\$5.85 ea.	22%
01982	Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans and Olive Extract • 120 softgels Highly purified EPA and DHA sesame lignans, plus olive extract.	1 bottle	\$28.50	\$25.65	10%
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		10 bottles	—	\$18.90 ea.	34%
02407	Curcumin Elite™ Turmeric Extract • 60 vegetarian capsules Patented turmeric extract provides 45x <i>greater</i> free curcuminoid bioavailability.	1 bottle	\$24.00	\$21.60	10%
		4 bottles	—	\$19.80 ea.	18%
01426	Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™ 100 mg • 60 softgels Superior ubiquinol form of CoQ10 plus shilajit shown to enhance mitochondrial energy production.	1 bottle	\$47.25	\$42.53	10%
		4 bottles	—	\$36.00 ea.	24%
		6 bottles	—	\$33.30 ea.	30%
02403	Lithium • 1,000 mcg • 100 capsules A low-cost mineral that functions in several ways to support cognition and overall brain health.	1 bottle	\$12.00	\$10.80	10%
		4 bottles	—	\$9.45 ea.	21%
02029	Ultra Prostate Formula • 60 softgels Comprehensive support for an aging prostate gland utilizing extracts from pygeum, nettle, flower pollen, and saw palmetto, plus boron, beta-sitosterol, and lycopene.	1 bottle	\$29.25	\$26.33	10%
		4 bottles	—	\$24.30 ea.	17%
		10 bottles	—	\$22.50 ea.	23%

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		4 bottles	—	\$26.10 ea.	19%
01727	Bone Restore with Vitamin K2 • 120 capsules Skeletal-strengthening nutrients in one highly absorbable formula.	1 bottle	\$18.00	\$16.20	10%
		4 bottles	—	\$14.85 ea.	18%
01534	NAC (N-Acetyl-L-Cysteine) • 600 mg • 60 capsules Supports glutathione levels for healthy immune function.	1 bottle	\$12.00	\$10.80	10%
		4 bottles	—	\$9.68 ea.	19%
02414	Bio-Fisetin • 30 vegetarian capsules A highly <i>absorbable</i> form of the plant flavonoid fisetin supports cell health in multiple ways.	1 bottle	\$11.25	\$10.13	10%
		4 bottles	—	\$9.00 ea.	20%
01868	Mitochondrial Energy Optimizer with PQQ • 120 vegetarian capsules <i>Glycation-protection</i> and <i>mitochondrial</i> biogenesis formula. Provides 1,000 mg of carnosine along with R-lipoic acid, taurine, benfotiamine, and PQQ.	1 bottle	\$51.00	\$45.90	10%
		4 bottles	—	\$40.50 ea.	21%
02501	Vitamin C 24-Hour Liposomal Hydrogel™ Formula 60 vegetarian tablets • Two plant extracts increase blood (plasma) exposure nearly <u>seven</u> times more compared to an equivalent dose of regular vitamin C.	1 bottle	\$25.50	\$22.95	10%
		4 bottles	—	\$20.70 ea.	19%
02526	Serene Sleep • 30 softgels • Supports restorative, high-quality sleep for <i>occasional sleeplessness</i>.	1 bottle	\$15.00	\$13.50	10%
		4 bottles	—	\$12.15 ea.	19%
02301	Senolytic Activator • 24 vegetarian capsules (3-month supply) Highly <i>absorbable</i> forms of fisetin, quercetin, plus apigenin and theaflavins designed to help manage senescent cells.	1 bottle	\$19.50	\$17.55	10%
		4 bottles	—	\$16.20 ea.	17%
01208	Super R-Lipoic Acid • 240 mg • 60 vegetarian capsules Superior efficacy compared to alpha-lipoic acid—supplies 240 mg of stabilized R-lipoic acid.	1 bottle	\$36.00	\$32.40	10%
		4 bottles	—	\$29.25 ea.	19%
01778	Super Selenium Complex • 200 mcg • 100 vegetarian capsules Three forms of selenium promote the body's production of glutathione.	1 bottle	\$10.50	\$9.45	10%
		4 bottles	—	\$8.10 ea.	23%
		10 bottles	—	\$7.43 ea.	29%
01603	Neuro-Mag® Magnesium L-Threonate • 90 vegetarian capsules Helps maintain structural integrity of synaptic connections in the brain	1 bottle	\$30.75	\$27.68	10%
		4 bottles	—	\$24.75 ea.	20%
02125	FLORASSIST® GI with Phage Technology • 30 liquid vegetarian capsules • Dual-encapsulation probiotic for optimal delivery to help balance bacteria in the intestines.	1 bottle	\$24.75	\$22.28	10%
		4 bottles	—	\$20.25 ea.	18%
02348	NAD+ Cell Regenerator™ and Resveratrol Elite™ 30 vegetarian capsules • NIAGEN® nicotinamide riboside, new bioavailable resveratrol, and more to support healthy cellular metabolism.				

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Levels of glutathione decline with **age**.^{3,4}

Research has shown that supplementation may help support glutathione levels.^{5,6}

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SUPER SALE PRICE

Item #02521 • 500 mg
30 vegetarian capsules

1 bottle **\$20.25**

4 bottles \$18 each



OPITAC® is the trademark for L-Glutathione of Mitsubishi Corporation Life Sciences Limited.

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SUPER SALE PRICE

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† Colony Forming Units at time of manufacture.
1. *Scand J Gastroenterol.* 2011;46:1057-64.

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VERIFIED CUSTOMER
REVIEW



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Optimized Resveratrol Elite™ provides **bioavailable resveratrol** plus highly *absorbable quercetin* to provide complementary biological functions.

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

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Improve
SLEEP
Efficiency and
Duration



BY MICHAEL DOWNEY

Nearly a third of U.S. adults get less sleep than they should.¹

Those who rely on **medications** confront **tolerance** whereby even *higher* doses fail to enable **restorative sleep**.

In an effort to improve sleep *without* drugs, researchers conducted randomized **clinical trials** on **plant-derived** extracts used in traditional medicine.

One of these extracts improved **sleep efficiency** by **74%**,² while another enhanced **restorative sleep** measures by **72%**.³

This article describes findings from **placebo-controlled** studies in sleep-challenged **humans**.



Sleep Deprivation and Human Longevity

Experts recommend that adults get **seven or more hours** of sleep each night.^{1,4}

Yet around **40%** of elderly adults suffer from some form of sleep problem.⁵

For every **one-hour** reduction in sleep per night, there's about a **6%** increase in risk of **death** from any cause.⁶

Effects of Plant Extracts

Two extracts have been individually tested in randomized placebo-controlled clinical trials to promote deep, **restorative sleep**:

1) Black cumin is an herb long used in Indian and Arab traditional medicine. Its health properties come from the seed oil, which contains the active compound **thymoquinone**.⁷

Scientists developed a **black cumin seed extract** standardized to **5% thymoquinone**, higher than other cumin extracts.

In a small pilot study of healthy subjects with sleep disturbances, it improved **sleep quality** and **duration**, and relieved stress and anxiety.⁷ This result was confirmed in a larger trial in healthy people with self-reported unsatisfactory sleep (discussed later).²

2) Ashwagandha is an herb used for thousands of years in traditional Indian medicine that has been shown to have anxiety-reducing effects.⁸⁻¹⁰ Its roots and leaves contain active compounds called **withanolide glycosides**.⁹

One clinical trial showed that an extract standardized to **35% withanolide glycosides** lowered the stress hormone **cortisol**, which may help promote sleep.¹¹

Clinical Trials with Black Cumin

A study published in **2023** enlisted healthy volunteers who reported **non-refreshing sleep**. This included waking multiple times nightly or being unable to achieve sound sleep.

Participants were given a placebo or **200 mg of black cumin extract** nightly, 20-30 minutes before bedtime. All subjects refrained from caffeine, alcohol, and tobacco.²

Beneficial effects were reported by **62%** of the black cumin group after a **single dose**. This rose to an astonishing **88%** on day 90.

After **90 days**, compared to placebo, the **black cumin** users were evaluated using a validated self-reported sleep questionnaire. They reported not only better, longer sleep but also improved functioning during the day.

Researchers reported the following improvements of sleep parameters:²

- **74%** in sleep efficiency (time asleep out of total time in bed),
- **56%** in sleep latency (time needed to fall asleep after going to bed),
- **49%** in sleep quality,
- **45%** in daytime function,
- **22%** in sleep disturbance, and
- **20%** in sleep duration.

BLACK CUMIN



ASHWAGANDHA




 WHAT
YOU
NEED
TO
KNOW

Unlike those using prescription sleep meds, these people performed better the next day without drowsiness.

In a second trial, subjects with non-refreshing sleep took a placebo or **200 mg of black cumin** extract nightly, 10-30 minutes before bedtime.¹²

All participants wore an **actigraphy** wristwatch sensor that monitors rest/activity, a validated objective evaluation of sleep quality and duration.

After **just seven days**, extract users had meaningfully improved their sleep duration, efficiency, and time to fall asleep, as evaluated by the objective actigraphy sensor. Compared to the placebo group, researchers reported improvements of sleep parameters:¹²

- **69%** in restorative sleep,
- **35%** in sleep latency, (amount of time to fall asleep),
- **23%** in time spent awake *after* sleep onset, (wakefulness time after defined sleep onset),
- **19%** in total sleep time, (from an average 6.4 hours to >7 hours, as recommended by the CDC), and
- **8%** in sleep efficiency (time asleep out of total time in bed).

Compared to the baseline there was **75%** improvement in **restorative** sleep in the group that received the extract. This specific **black cumin seed extract**, standardized to **5% thymoquinone**, safely promoted deeper, more healthful sleep.

Get Deep, Stress-Free Sleep

- Over a third of Americans get insufficient or poor-quality **sleep**. This increases the risk of many chronic diseases, including heart disease, dementia, and some cancers, and of **all-cause mortality**.
- Clinical studies show that two plant extracts safely promote high-quality **sleep** and reduce **stress** and **anxiety**, *without* compromising daytime functioning.
- A **black cumin seed extract** improved sleep efficiency by **74%** and reduced the time needed to fall asleep by **56%**.
- An **ashwagandha extract** improved restorative sleep by **72%**, reduced stress by **62%**, and lowered levels of cortisol (the “stress hormone”) by **67%**.
- Together, these extracts offer a **melatonin-free** choice for those seeking stress relief and a deeper, more restorative sleep.

Clinical Trials with Standardized Ashwagandha

To test an **ashwagandha extract** standardized to **35% withanolide glycosides**, scientists enlisted 150 volunteers suffering from non-restorative sleep. Half the subjects took a **placebo** and half took **120 mg of ashwagandha** each night for six weeks.³

All participants wore an **actigraphy** wristwatch that monitors rest/activity and evaluates sleep duration, efficiency, and latency.

Those taking **ashwagandha** had improvements of:³

- **72%** in restorative sleep,
- **27%** in sleep latency,
- **15%** in time spent awake *after* sleep onset,
- **5%** in total sleep time, and
- **5%** in sleep efficiency.

A second clinical study enlisted volunteers with moderate **anxiety** and elevated **cortisol**, which can lead to sleep issues. Participants were randomized to receive either ashwagandha **60 mg** or **120 mg**, or a placebo. They were evaluated at baseline and after 15, 30, 45 and 60 days.¹³

After 60 days, those taking **120 mg of ashwagandha** had:¹³

- **67%** reduced cortisol levels,
- **59%** reduced anxiety, and
- **62%** reduced stress.

Standardized to **35% withanolide glycosides**, this novel **ashwagandha extract** safely lowered anxiety and promoted more restful sleep.

Black cumin and ashwagandha extracts have been shown to improve parameters of **restorative sleep**.

Summary

Many Americans turn to medications to cope with poor sleep, but they come with side effects.

Two plant extracts have been shown to improve sleep onset, efficiency, and **total sleep time**, and reduce **anxiety** without compromising daytime function.

In clinical studies, a **black cumin seed extract** improved sleep efficiency by **74%** and perceived stress by **44%** – leading to improved daytime functioning.

An **ashwagandha extract** improved restorative sleep by **72%** and lowered stress by **62%**.

These **plant extracts** together provide an opportunity for more Americans to achieve healthy **restorative sleep**. •

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

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Bio-Quercetin is encased in a **phytosome** that makes it 62 times more **absorbable** than standard quercetin supplements.

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FORESIGHT FOR YOUR EYESIGHT

MacuGuard® Ocular Support provides:

- > **Lutein, trans-zeaxanthin, and meso-zeaxanthin** help maintain structural integrity of the **macula** and **retina**.¹⁻⁵
- > **Saffron** has been shown to help support **vision** as demonstrated by doctors' eye exams.¹
- > **Alpha-carotene** further helps support **macular density**.¹



For full product description and to order either of these **MacuGuard®** formulas, call 1-800-544-4440 or visit www.LifeExtension.com

MacuGuard® Ocular Support with Saffron + Astaxanthin

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Item #01993 • 60 softgels

1 bottle **\$29.03** • 4 bottles \$26.10 each

MacuGuard® Ocular Support with Saffron

SUPER SALE PRICE

Item #01992 • 60 softgels

1 bottle **\$16.20** • 2 bottles \$15.30 each

(Each bottle lasts for two months.)

MacuGuard® Ocular Support is available with or without astaxanthin.

References

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



"I believe this product is another arrow in my quiver of products I use to be my best."

Raymond

VERIFIED CUSTOMER REVIEW

Fisetin

The Longevity Flavonoid

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

In preclinical studies, fisetin:

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

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

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

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

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

SUPER SALE PRICE

Item #02414

30 vegetarian capsules

1 bottle **\$10.13**

4 bottles **\$9 each**

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

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ADVANCED LIPID CONTROL
CAN HELP SUPPORT
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ADVANCED LIPID CONTROL contains a standardized **500 mg** extract of **amla** in each capsule.

Researchers have discovered that **amla** improves various markers of **cardiovascular** health.

In a **placebo-controlled** clinical trial* **amla extract** supported healthy levels of:

- ▶ **LDL**
- ▶ **HDL**
- ▶ **Triglycerides**
- ▶ **CRP (C-reactive protein)**

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Item #01828

60 vegetarian capsules

1 bottle **\$20.25**

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

* *BMC Complement Altern Med.* 2019;19:97. Capros® is patent protected and a registered trademark of Natreon, Inc.



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A More Restful Sleep



Serene Sleep contains two plant extracts that in independent clinical studies were shown to support restorative, high-quality sleep for **occasional sleeplessness**.

Clinical trials have demonstrated that:

- A standardized **black cumin** extract encouraged sleep efficiency and supported healthy sleep patterns.¹ **Black cumin extract** was shown in a separate study to maintain restorative sleep along with sleep efficiency, latency, and total sleep time.²

- **Ashwagandha** maintained measures of restorative sleep,³ reduced stress measures,³ and maintained healthy levels of the stress hormone *cortisol*.⁴

Take just one softgel **20 to 30 minutes** before bed.

References

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SUPER SALE PRICE

Item #02526

30 softgels

1 bottle **\$13.50**

4 bottles \$12.15 each




For Occasional Sleeplessness

For full product description and to order **Life Extension® Serene Sleep**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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How **MAGNESIUM** & **VITAMIN D** Work **TOGETHER**

BY BRIAN MCKNIGHT

Magnesium^{1,2} and **vitamin D**³⁻⁵ are vital to overall health.

But if you're taking either one *alone*, you're not getting the full benefits.

Research has shown that these two nutrients rely on each other to provide systemic benefits.⁶

Magnesium is critical for converting vitamin D to its *active* form in the body and aids its transport in the blood.⁷

At the same time vitamin D promotes magnesium *absorption* in the intestines.^{6,7}

Given their inter-reliance, taking them together is a sound nutritional strategy.

Observational studies show that both **vitamin D** and **magnesium** intake is associated with improved protection against insulin resistance, type II diabetes, and even death from any cause.

In **clinical studies**, taking both vitamin D and magnesium led to lower blood pressure, improved strength and muscle function, and reduced markers of **inflammation**.

Whole-Body Health

Magnesium is required for the function of 300-600 enzymes in the body.^{1,6}

Magnesium deficiency has been tied to many common health conditions, including osteoporosis,¹ high blood pressure,^{1,8} risk for cardiovascular disease,^{1,8} metabolic disease,^{1,2,8} cognitive decline,⁸ and dementia.⁸

Vitamin D impacts a range of bodily functions. People with low levels of vitamin D have been found to have higher rates of cardiovascular disease,^{3,5} dementia,⁴ cancer,³ bone thinning,^{4,5} and more.³⁻⁵

Recent estimates show that as many as **50%** of all adults may have suboptimal **magnesium** levels⁹ and over **40%** of adolescents and adults in the U.S. have low **vitamin D** levels.¹⁰

Working Together

These two nutrients are *not* independent. Inadequate intake of one can impact the levels and function of the other.

Here's how:^{6,7}

- **Vitamin D supports intestinal magnesium absorption.** Vitamin D supports optimal absorption of magnesium in the intestines. If you consume oral magnesium but *don't* get enough vitamin D, your magnesium levels may remain low.
- **Magnesium is required for vitamin D activation.** Whether consumed or obtained by exposure to sunlight, vitamin D must be modified into its active form in the body to exert its beneficial effects. The *enzymes* that convert **vitamin D** to its active form *require* **magnesium** to function.
- **Vitamin D transport and delivery rely on magnesium.** Almost all vitamin D in the blood is transported and delivered to tissues by a protein called the **vitamin D-binding protein**. This protein also *requires* magnesium to function.

In short, inadequate magnesium compromises vitamin D activation and delivery.

And inadequate vitamin D compromises magnesium *absorption* and can contribute to low magnesium status.

If either nutrient is lacking, the other suffers as well. It's vital to get enough of *both*.



Benefits of Combined Intake

Over the last decade, *observational studies* have documented this interdependent relationship between **magnesium** and **vitamin D**, including how it relates to several common chronic diseases of aging.¹¹⁻¹⁴

For example, *higher* **vitamin D** levels in the body are associated with a *lower* likelihood of insulin resistance, pancreas dysfunction, type II diabetes, high blood pressure, and **overall mortality**.¹¹⁻¹⁵

Higher intake of **magnesium** has been shown to improve vitamin D levels.¹⁶ It appears that magnesium may also allow the body to properly utilize vitamin D in order to protect against these chronic conditions.

In one large, observational study, those with *higher* levels of **vitamin D** had *lower* risk for **insulin resistance**, a condition that often leads to type II diabetes. **Magnesium** intake supports this association. That suggests that people with *higher* vitamin D levels and higher magnesium intake may have the *greatest* *protection* against insulin resistance.¹⁵

In a separate analysis of that same observational dataset, vitamin D was associated with better pancreatic beta-cell function, and magnesium helped strengthen this effect.¹²

An analysis of data from another large observational cohort (over 10,000 participants), showed that high magnesium intake was associated with a modest reduction in incidence of type II diabetes, compared to low magnesium intake. The analysis also found that better vitamin D levels helped strengthen this association.¹⁴

Another observational study found that elevated systolic **blood pressure** was associated with lower vitamin D levels. Higher intake of magnesium strengthens the protective effect of vitamin D against high blood pressure.¹³

Clinical Trials

Clinical trials have further confirmed the link between magnesium and vitamin D.

In one randomized controlled trial, oral magnesium supplementation successfully raised vitamin D levels in subjects with *low* blood vitamin D concentrations.¹⁷

Another double-blind, controlled trial in obese or overweight individuals found that the combination of both magnesium and vitamin D resulted in greater increases in blood levels of vitamin D compared to those who took vitamin D alone.¹⁸

In a similar study, healthy postmenopausal women were randomized to receive either **500 mg of magnesium** daily or a placebo.¹⁶ At baseline, over **80%** of these women were vitamin D deficient. Taking magnesium resulted in a significant *increase* in **vitamin D** levels.

Placebo-controlled clinical studies have also explored how taking both **magnesium** and **vitamin D** can affect various areas of health, including:

- **High blood pressure.** In a study referenced above, in obese or overweight adults with elevated systolic blood pressure at baseline, taking **360 mg** of magnesium with **1,000 IU** vitamin D resulted in greater serum concentrations of vitamin D.

- **Mental health.** Magnesium and vitamin D have each been shown to benefit mental health, including anxiety and depression.¹⁹⁻²¹
- **Muscle strength and function.** In a clinical study, 83 healthy, middle-aged, vitamin D-deficient women were randomized to receive a combination of **50,000 IU** of **vitamin D** weekly and **250 mg** of **magnesium** daily for eight weeks, or placebo. Results showed that the vitamin D and magnesium group had a significant *increase* in **handgrip strength** and overall **mobility**, compared to the placebo group. The treatment group also had a *decrease* in an important inflammatory marker, compared to the beginning of the study.²²

WHAT
YOU
NEED
TO
KNOW

Magnesium and Vitamin D Need Each Other

- Getting enough **magnesium** and **vitamin D** is critical to overall health. A deficiency in either is associated with increased risk for a wide range of chronic health conditions.
- Magnesium and vitamin D rely on each other. Studies have found that adequate levels of either one are necessary for the other to function properly and to reach optimal levels.
- In observational studies, taking both **vitamin D** and **magnesium** is associated with increased protection against insulin resistance, and better metabolic health.
- In clinical studies, taking both **vitamin D** and **magnesium** is associated with improved mental health, muscle strength, and blood pressure.





Together with a wealth of observational studies, these trials show the benefits of ensuring adequate intake of both vitamin D and magnesium.

Summary

Magnesium and **vitamin D** are inextricably linked. The levels of one impact the levels and function of the other.

The body needs magnesium to activate and transport vitamin D. In return, vitamin D can *enhance* magnesium absorption and retention.

Working together, **magnesium** and **vitamin D** can benefit musculoskeletal, metabolic, and heart health. ●

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

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

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Reduce Cartilage Loss in Osteoarthritis

BY LAURIE MATHENA



Osteoarthritis is the most common cause of joint pain, affecting more than 30 million adults in the U.S.¹

Most standard approaches address its *symptoms*,^{2,3} such as pain and stiffness.

But osteoarthritis damages and ultimately destroys the **cartilage** that allows the joint to function.¹

Targeting only the pain and stiffness risks letting **cartilage damage** and **joint degeneration** continue *unabated*.

A novel solution may address not only pain and stiffness, but also underlying damage and destruction.

In two animal models, **three botanical extracts** demonstrated the ability to relieve pain and swelling and reduce **damage to cartilage**.^{4,5}

Human studies have demonstrated that these plant extracts can provide symptomatic relief as well as benefits for joint structure.^{6,7}

How They Work

Pain relief is the immediate goal of anyone suffering from osteoarthritis and the limitations it imposes.

But protecting against joint damage and improving joint **structure** is just as important.

Separate studies have shown that a combination of **Chinese skullcap**, **cutch tree**, and **white mulberry** tree extracts makes it possible to support *both*.

All three extracts help fight **inflammation** and maintain comfortable joints.

Cutch trees are rich in *catechins*,⁸ compounds that inhibit pro-inflammatory signaling molecules. They suppress major pro-inflammatory molecules, such as COX-2, 5-LOX, and “master inflammatory promoter” **nuclear factor-kappa B (NF-kB)**.^{7,9}

The root and bark of the **mulberry tree** are similarly rich in compounds with anti-inflammatory properties.^{10,11}

Chinese skullcap (*Scutellaria baicalensis*) is rich in a compound called baicalin, with known anti-inflammatory properties that complement those in **cutch tree**.^{4,12}

Reduced Joint Damage

Researchers conducted a randomized controlled clinical trial to compare two **non-drug** treatments to **placebo**.

This study enrolled 135 subjects aged 35-75 with mild to moderate **knee osteoarthritis**. Subjects had to have had symptoms for at least **six months** before the start of the study, and for at least 15 out of the previous 30 days at admission. They received one of three treatments for 12 weeks:⁷

1. **Cutch tree** and **white mulberry extracts (400 mg/day)**,
2. Glucosamine (**1,500 mg/day**) and chondroitin (**1,200 mg/day**), or
3. Placebo.

The botanical extracts appeared to protect against **joint damage** and potentially **stop the progression** of the disease.

This was seen by measuring urinary levels of **C-terminal crosslinking telopeptide (CTX-II)**, a urinary biomarker of cartilage breakdown. **Higher CTX-II** levels in urine indicate *more joint damage*.

CTX-II rose sharply in the **placebo** group during the study (indicating additional joint damage), while there was little change in those taking glucosamine/chondroitin.

In the group taking cutch tree and white mulberry, there was a **significant decrease** in **CTX-II** levels.

This finding indicates that the plant extracts were protecting the joint against damage and could help reduce osteoarthritis progression over time.⁷

Clinical Study Shows Pain Relief

A randomized, placebo-controlled **90-day** trial in 60 subjects aged 40-75, with symptomatic osteoarthritis of the knee or hip tested the effect of a different herbal combination supplement, made of **Chinese skullcap** and **cutch tree**.

The patients were randomized to receive either a placebo, 200 mg/day of the drug celecoxib (Celebrex®), or one of two doses of the combination **herbal** supplement (**250** or **500 mg/day** of **Chinese skullcap + cutch tree**).

Subjects were followed-up for pain, stiffness, functional impairment, and physical function using standard measurement scales.⁶

Both doses of the dual-ingredient herbal supplement significantly **reduced pain scores** by the end of the 90 days.

Stiffness and **functional impairment** were significantly **reduced** in both herbal dosage groups, compared to baseline, and at all time points. These measures did **not** significantly improve in the celecoxib or placebo groups.

A measure of **physical function** significantly **improved** at all time points in the **herbal-supplemented** groups compared to **placebo**.⁶



Cartilage and Bone Protection

Animal and laboratory research confirms the results of the clinical trial that showed that the **cutch tree-white mulberry** combination preserves joint health.

An animal model showed that when used together, **cutch tree + white mulberry** reduced cartilage breakdown by nearly **55%** with a **41% reduction in sensitivity to pain** after five weeks.⁵

A similar animal model showed this same combination (cutch tree + white mulberry) resulted in an improvement in pain and **inflammation** much like that of a commonly used over-the-counter and pain medication, **ibuprofen**.¹³

Comparison to Common Medications

Many people suffering from joint pain turn to **nonsteroidal anti-inflammatory drugs (NSAIDs)**.

Unfortunately, this standard care manages only the symptoms,^{2,3} such as pain and stiffness, overlooking damage to cartilage and bone.

A combination of **cutch tree** and **white mulberry** extracts was found in an animal study to be similar to ibuprofen in its ability to reduce pain and swelling.¹⁴

Chinese skullcap is also rich in anti-inflammatory compounds.

A blend of **Chinese skullcap** and **cutch tree** extracts was tested head-to-head against the drug **celecoxib** in people with severe knee osteoarthritis.⁶

After 90 days, the cutch tree-Chinese skullcap blend was **more effective** than the drug at relieving pain, reducing stiffness, and improving physical function.

The combination was evaluated in animal and lab studies and has been shown to inhibit production and activity of inflammatory signaling molecules and significantly reduced pain and swelling.^{4,15-17}

Summary

In addition to causing pain, stiffness, and loss of mobility, **osteoarthritis** causes progressive **cartilage damage** and **joint degradation**.

The three herbs—**Chinese skullcap, cutch tree, and white mulberry**—have been shown to reduce markers of inflammation, joint destruction, and cartilage degradation...indicating their potential to change the osteoarthritis landscape.

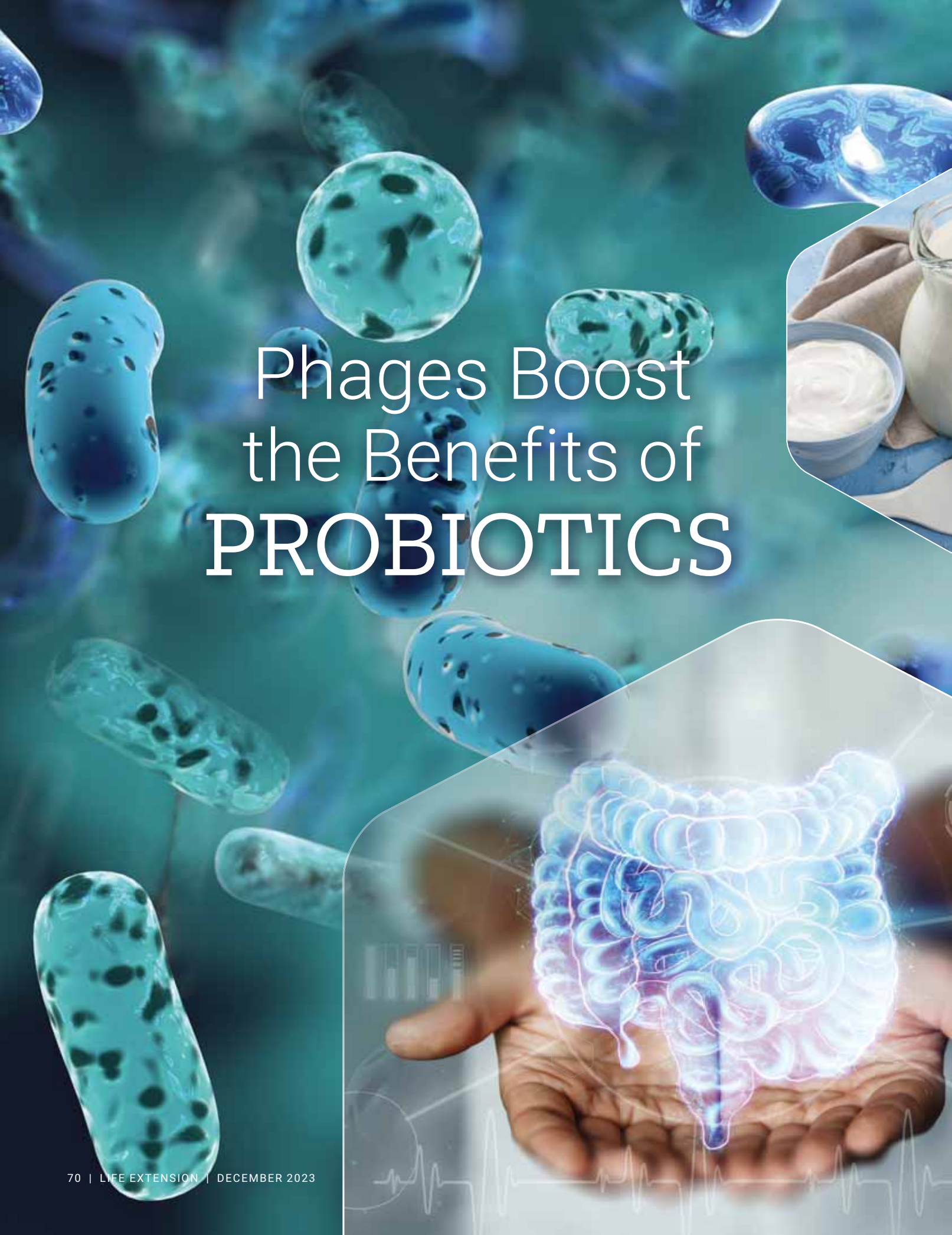
Studies indicate that combinations of these extracts are equal or superior to common medications at relieving pain, swelling, and stiffness.

As with any approach that offers prevention and relief of symptoms, the earlier you start, the better the long-term protective effect. •

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

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Phages Boost the Benefits of **PROBIOTICS**



BY PATRICIA WEISER, PHARM.D

The impact of the **gut microbiome** influences our entire body.

Imbalances in microbiome composition have been linked to a host of common disorders including **inflammation**, autoimmunity, metabolic conditions, brain chemistry, and more.¹⁻³

The good news is that the balance of the gut microbiome can be shifted towards one associated with **better health**.⁴⁻⁶

One way to do this employs the combined use of probiotics and bacteriophages or “phages.”

Phages are tiny packages of DNA or RNA wrapped in protein.

Each type of phage naturally attacks *only specific* types of bacteria.⁷⁻⁹ By selecting specific phages, it is possible to target specific, potentially harmful bacteria in the digestive tract.

This allows a dual-approach strategy of using **probiotics** for their beneficial effects, while reducing competition from bacteria, of which we want less.

How Gut Health Impacts Overall Health

Gut bacteria affect almost *all* aspects of human health.

Researchers have estimated that a healthy adult individual's intestines host about **160** distinct bacterial species.⁵ The presence or absence of certain species can have dramatic consequences.^{10,11}

An enormous range of gut bacteria is necessary for optimal health. One important health-promoting property of some bacteria in the gut is the ability to produce **short-chain fatty acids**, compounds that have shown anti-inflammatory, immune-supportive, and neuroprotective activity, among other benefits.¹²

Certain factors, including advancing age,¹³ poor diet,¹³ stress,¹³ antibiotic use,¹³ and lack of physical activity,¹⁰ can cause our microbiomes to become **imbalanced**, a state known as **dysbiosis**.¹⁴

This imbalance is associated with worse health.⁴ Scientists have linked dysbiosis to colon infections, antibiotic-associated diarrhea, irritable bowel syndrome, autoimmune disease, allergic conditions, and obesity.^{15,16}



Other harmful microbes in the gut can cause infections, inflammation, and gastrointestinal discomfort, and appear to contribute to the risk for chronic disease.^{13,17}

Even in otherwise healthy individuals, a gut bacteria imbalance can trigger the development of digestive symptoms like **diarrhea, gas, bloating, and abdominal pain**.¹⁸

Gut bacteria even appear to play a role in the metabolism of **neurotransmitters** such as serotonin, a mood-regulating hormone.¹⁹ That could help explain why people with certain gastrointestinal disorders have a higher risk of mental health conditions like **depression and anxiety**.^{1,20}

Shifting the gut microbiota toward a healthy balance can ease digestive issues and improve overall health.

The Benefits of Probiotics and Phages

Research has established the many and varied benefits of taking oral probiotics. **Lactobacillus** and **Bifidobacterium**, two of the most common probiotics, help ease symptoms of certain gastrointestinal diseases.²¹

Bacteriophages are lesser-known tools that help promote **gut and overall health**.²²

The term “bacteriophage” literally means “**bacteria eater**.” Phages are **selective killers**, only targeting and destroying specific bacteria.^{7,9,23}

The phages can allow *beneficial* bacteria to flourish and grow at a greater rate by removing competing harmful species.²⁴

Phages were discovered almost a century ago and were recognized by the FDA as early as 1958 as safe to use to help protect foods against the growth of undesirable bacteria.²⁵ Because they exclusively target bacteria and not animals or humans, and as suggested by their safety to use in the food supply, phages pose no health threat to humans.

However, research into phages as therapeutic agents in human infections fell out of favor with the discovery of antibiotics.²⁶ Today, as the threat of **antibiotic-resistant infections** and superbugs has become more concerning, medical research is refocusing on the potential of **phage therapy**.

Phages have now been used in numerous human trials and therapeutic settings with **no reports of adverse effects**.²⁷⁻³²

Combining probiotics with phages holds great promise for gut health and other areas impacted by the gut microbiome.

Human Trials

Researchers developed a targeted **four-phage blend** that can help rapidly decrease intestinal populations of the *unfavorable* bacteria ***E. coli***, while boosting growth of beneficial bacteria.^{33,34}

In a **clinical study**, scientists tested the impact of these bacteriophages on the gut microbiome and gastrointestinal inflammation. Healthy adults received either the **four-phage blend** (*LH01-Myoviridae*, *LL5-Siphoviridae*, *T4D-Myoviridae*, and *LL12-Myoviridae*) or a **placebo** daily for 28 days.³⁴

Compared to placebo, the **phage** blend was associated with:³⁴

- **Increases** in **beneficial bacteria** in the gut,
- **Decreases** in *Escherichia coli* (***E. coli***) bacteria, a common cause of diarrhea and other digestive problems, and
- **Decreases** in interleukin-4, a marker of **inflammation**.

This shows that phages can beneficially modify gut bacteria.

In another clinical study, researchers tested whether adding the **four-phage blend** to a common probiotic bacterium, ***Bifidobacterium lactis***, could enhance the effects of the probiotic.³³

Healthy adults received either *B. lactis* or that probiotic with the four-phage blend for four weeks. Compared to the probiotic-only group, the group that consumed ***B. lactis*** plus the **phage blend** had:³³

- Improvement in symptoms of **gastrointestinal inflammation**,
- Reduction in **colon pain**,
- A six-fold increase in beneficial ***Lactobacillus*** bacteria, and
- Decreases in the gastrointestinal tract in the amount of *Citrobacter* and *Desulfovibrio*, and a trend toward a decrease of *E. coli*, intestinal bacteria associated with inflammation, gastrointestinal dysfunction, infections, and other potentially serious health problems.

These observations suggest adding **phages** to **probiotics** could support probiotic benefits and aid in the shift toward a more favorable gut microbiome.



WHAT
YOU
NEED
TO
KNOW

Improve the Microbiome with a Phage-Probiotic Blend

- The mix of microbes in our gut has a huge impact on digestive and overall health.
- Taking beneficial bacteria called **probiotics** can improve the balance of the gut microbiome.
- Bacteriophages, called **phages** for short, are packages of DNA or RNA wrapped in protein. They can selectively kill harmful bacteria, allowing probiotic bacteria to flourish.
- **Combining** phages with probiotics may boost the beneficial impact of the probiotic.

Summary

An unhealthy imbalance of bacteria in the gut can negatively affect gut and overall health.

Probiotics taken as supplements have helped balance intestinal flora.

Taking an oral combination of **probiotics** and **bacteriophages** may improve the health of the gut microbiome.

Phages show promise in relieving the functional changes caused by gut microbiome imbalance. This may be especially valuable for aging individuals. •

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

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GAME ON

Clinical trials demonstrate that the plant extracts in once-daily **ArthroMax® Elite** help:

- Support a healthy inflammatory response
- Maintain healthy connective cartilage tissue
- Promote comfortable joint function

Take advantage of the benefits of **Mobile-Ease™ Chinese skullcap, catch tree and white mulberry** TODAY!

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



SUPER SALE PRICE

Item #02138

30 vegetarian tablets

1 bottle **\$20.25**

4 bottles \$18 each



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



LIFE EXTENSION® MIX™ POWDER



SUPER-CHARGE YOUR SMOOTHIE

Back in **1983**, our supporters asked us to formulate a comprehensive **nutrient powder** they could conveniently drink by itself or add to a smoothie.

We complied and our overall sales quadrupled the month we introduced **Life Extension® Mix™ Powder**.

GNC asked us to ship a case (12 bottles) of **Life Extension® Mix™ Powder** to every one of their stores.

Back then, we could barely keep up with client demand. We had to turn down **GNC** and other companies who wanted to offer their customers **Life Extension® Mix™ Powder**

51 INGREDIENTS IN ONE POWDER BLEND

What generated so much enthusiasm was the ability of **Life Extension® Mix™ Powder** to deliver a wide range of **higher**-potency **nutrients** at a far lower price than taking them individually.

It also reduced the need for people to swallow so many pills.

Life Extension® Mix™ Powder contains the **vitamins** and **minerals** found in multi-nutrient tablets, but at higher concentrations and more effective forms when warranted.

Plant extracts include **lutein, lycopene, luteolin, apigenin, silymarin, quercetin** and other botanicals people want to ingest as part of a healthy diet.

COMPREHENSIVE, CONVENIENT, COST EFFECTIVE

Three scoops of **Life Extension® Mix™ Powder** deliver meaningful potencies of **vitamins, minerals,** and **plant extracts** that would otherwise require swallowing dozens of tablets and capsules.

A one-month supply costs \$54 during the annual **Super Sale**. This price is reduced to **\$48.60** when four bottles are purchased...a fraction of the cost of taking these standardized **nutrients** separately.

For those seeking to ensure daily intake of healthy **fruits** and **vegetables**, along with the higher potencies + better forms of vitamins and minerals, **Life Extension® Mix™ Powder** delivers all this in a **comprehensive, convenient, and cost-effective** manner.

Life Extension® Mix™ Powder can be combined with smoothies, fruit-vegetable juices, or consumed by itself in water. View the entire **Life Extension® Mix™ Powder** formula on the next page.

Beyond the vitamins and minerals, the daily dose of **Life Extension® Mix™ Powder** provides a wide spectrum of **plant extracts** and **amino acids** such as:

NAC (n-acetyl-cysteine)	600 mg	Pomegranate Extract	85 mg
Broccoli concentrate	525 mg	Cherry Extract	85 mg
Green Tea Extract (decaffeinated)	325 mg	Grape Extract (seed & fruit)	50 mg
Bioflavonoids (citrus)	200 mg	Bilberry Extract	30 mg
Blueberry Extract	150 mg	Olive Fruit Extract	12.5 mg



Complete LIFE EXTENSION® MIX™ POWDER Formula

Vitamin C (as calcium ascorbate, ascorbic acid, ascorbyl palmitate, magnesium ascorbate, niacinamide ascorbate, acerola extract)	970 mg
Vitamin D3 (as cholecalciferol)	2,000 IU
Vitamin A (as beta-carotene and acetate)	5,000 IU
Thiamine (vitamin B1) (as thiamine HCl)	125 mg
Riboflavin (vitamin B2) (as riboflavin, riboflavin 5'-phosphate)	50 mg
Niacin (as 61% niacinamide, 38% niacin, 1% niacinamide ascorbate)	190 mg*
Vitamin B6 [as pyridoxal 5'-phosphate (100 mg), pyridoxine HCl (5 mg)]	105 mg
Folate (as L-5-methyltetrahydrofolate calcium salt)	680 mcg*
Vitamin B12 (as methylcobalamin)	600 mcg
Biotin	3000 mcg
Pantothenic acid (as D-calcium pantothenate with 5 mg pantethine)	600 mg
Vitamin E (as D-alpha tocopheryl succinate, D-alpha tocopherol) (100 IU)	67 mg
Magnesium (as magnesium oxide, citrate, arginate, glycinate, taurinate, ascorbate)	420 mg
Selenium [as sodium selenite, SelenoExcell® ⁴ high selenium yeast, Se-methyl L-selenocysteine]	200 mcg
Zinc (as zinc citrate, L-OptiZinc® ³ zinc mono-L-methionine sulfate)	35 mg
Calcium (as Ca ascorbate, D-calcium pantothenate, dicalcium phosphate)	140 mg
Iodine (as potassium iodide)	150 mcg
Copper [as copper bisglycinate chelate]	1 mg
Manganese (as manganese citrate, gluconate)	1 mg
Chromium [as Crominex® ⁵ 3+ chromium stabilized with Capros® amla extract (fruit), PrimaVie® Shilajit]	500 mcg
Molybdenum (as molybdenum amino acid chelate)	125 mcg
Potassium (as potassium citrate)	35 mg
N-acetyl-L-cysteine (NAC)	600 mg
Taurine	200 mg
Broccoli concentrate blend [broccoli powder, extract (sprout, floret, seed) (providing glucosinolates, sulforaphane)]	525 mg
Green tea extract (leaf-decaffeinated) [std. to 45% epigallocatechin gallate (EGCG)]	325 mg
Acerola extract 4:1 (berry)	300 mg
Inositol	250 mg
Bitter orange citrus bioflavonoids (peel, fruit) [std. to 50% hesperidin]	200 mg
Fruit/berry proprietary blend [European elder, blackberry, blueberry, sweet cherry, cranberry, plum, persimmon (<i>Diospyros kaki</i>) powders]	200 mg
Wild blueberry anthocyanin extract (fruit)	150 mg
Sensoril®¹² Ashwagandha extract (root, leaf) [std. to 32% oligosaccharides, 10% glycoside conjugates]	125 mg
Silymarin [from milk thistle extract (seed)]	100 mg
Trimethylglycine (TMG) (as betaine anhydrous)	100 mg
CherryPure®¹ sour cherry (tart cherry) proanthocyanidin powder (skin)	85 mg
POMELLA®⁹ pomegranate extract (fruit) [std. to 30% punicalagins]	85 mg
Natural mixed tocopherols (providing gamma, delta, alpha, beta tocopherols)	60 mg
MirtoSelect®¹¹ bilberry extract (fruit)	30 mg
BioVin®⁷ grape proanthocyanidin extract (whole grape)	25 mg
Leucoselect®⁶ grape seed proanthocyanidin extract	25 mg
Bio-Quercetin phytosome (providing 5 mg quercetin [from Japanese sophora concentrate (flower bud)], phosphatidylcholine complex [from sunflower])	15 mg
Bromelain [from pineapple (stem)] (2400 gelatin digestive units/gram)	15 mg
Lutein [from marigold extract (<i>Tagetes erecta</i>) (flower)] (providing 465 mcg <i>trans</i> -zeaxanthin)	15 mg
Olive extract (fruit) (providing polyphenols, hydroxytyrosol, tyrosol, oleuropein)	12.5 mg
Sesame seed lignan extract	10 mg
Luteolin [from Japanese sophora (flower bud)]	8 mg
Apigenin	5 mg
Boron (as boron amino acid chelate)	3 mg
Lycopene [from LycoBeads® ⁸ natural tomato extract (fruit)]	3 mg
Delphinidins [from Delphinol® ² maqui berry (<i>Aristotelia chilensis</i>) extract (fruit)]	2 mg
Cyanidin-3-glucoside (C3G) [from black currant extract (fruit)]	1.25 mg



For full product description and to order Life Extension® Mix™ Powder call 1-800-544-4440 or visit www.LifeExtension.com

Other ingredients: maltodextrin, natural orange flavor, stevia extract, silica, modified food starch, luo han guo extract.

*RAE (retinol activity equivalents). *DFE (dietary folate equivalents). *NE (niacin equivalents).

1. CherryPURE® is a registered trademark of Shoreline Fruit, LLC.

2. Delphinol® is a registered trademark of MNL.

3. L-OptiZinc® is a Lonza trademark, registered in USA.

4. SelenoExcell® is a registered trademark of Cypress Systems Inc.

5. Crominex® 3+, Capros® and PrimaVie® are registered trademarks of Natreon, Inc.

6. Leucoselect® is a registered trademark of Indena S.p.A.

7. BioVin® is a registered trademark of Cyvex Nutrition dba Bioriginal.

8. Lycored LycoBeads® is a registered trademark of Lycored; Orange, New Jersey.

9. POMELLA® Extract is covered under U.S. Patent 7,638,640 and POMELLA® is a registered trademark of Verdure Sciences, Inc.

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11. Sensoril® is protected under US Patent No. 7,318,938 and is a registered trademark of Natreon, Inc.

12. TRAACS® is a registered trademark of Albion Laboratories, Inc.

SUPER SALE PRICE

Item #02356

Life Extension® Mix™ Powder, 12.70 oz

1 bottle \$54

4 bottles \$48.60 each

(Each bottle lasts 30 days)

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A Therapeutic Foot Massage with every step

Wearing Kenkohs daily, even for short periods, can help improve blood circulation, keep your body aligned, relieve pain in the feet, ankles, knees, legs, hips and back, reduce swelling, relieve stress and enhance your overall mood. Kenkoh revitalizes and rejuvenates your whole body!

Chai V Champagne



"Massage aids muscle recovery and speeds recovery times..."

McMASTER UNIVERSITY, ONTARIO

When wearing a Kenkoh, the soles of your feet will rest on roughly 1000 natural rubber "fingers" that will massage and stimulate key reflex points. This targeted therapy, known as reflexology, has long been practiced in Eastern cultures as a way of reducing pain, stress and anxiety.

Relieve pain & improve your health now!

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Take the
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“I have taken this supplement for a long time. It works!”

Ingrid

VERIFIED CUSTOMER REVIEW

Tilt Your Bacteria Ratio for a Healthy Digestive Tract

Phages target bad intestinal bacteria, allowing beneficial strains to flourish.

FLORASSIST® GI provides a 7-strain blend of **probiotics** in a **dual encapsulation** formula to deliver beneficial bacteria and **phages** where you need them the most.



Dual-Encapsulation Delivery



SUPER SALE PRICE

Item #02125

30 liquid vegetarian capsules

1 bottle **\$22.28**

4 bottles \$20.25 each



For full product description and to order **FLORASSIST® GI with Phage Technology**, call 1-800-544-4440 or visit www.LifeExtension.com

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D EFEND YOUR HEALTH



"One of my main daily 'go to' supplements."

Lew

VERIFIED CUSTOMER REVIEW

Vitamin D3

Systemic support for immune function and bone health.

SUPER SALE PRICE

Item #01713

125 mcg (5000 IU)
60 softgels

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

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



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

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NEURO-MAG[®]

THE SMART MAGNESIUM

Supports Improvement in
Overall Cognitive Ability*



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

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



SUPER SALE PRICE

Item #01603 • 90 vegetarian capsules

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



SUPER SALE PRICE

Item #02032 • 93.35 grams of powder

1 jar **\$27.68** • 4 jars \$24.75 each

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

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

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IN THIS EDITION OF *LIFE EXTENSION* MAGAZINE®



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Sleep disturbances can lead to unwanted **weight gain** and increased **dementia** risk. In clinical trials, **non-drug** approaches improved sleep quality.

22 PROTECT TELOMERE LENGTH

Shortened telomeres are associated with accelerated aging. **Selenium** + **CoQ10** were clinically shown to **reduce** the **shortening** of telomeres.



34 MAXIMIZE EFFECTS OF RESVERATROL

Researchers have discovered how to increase **resveratrol** bioavailability.

46 IMPROVE SLEEP EFFICIENCY

Two plant extracts have been shown to promote **restful sleep**. In **clinical trials**, one improved **sleep efficiency** by **74%** while the other enhanced **restorative sleep** by **72%**.



56 HOW MAGNESIUM AND VITAMIN D WORK TOGETHER

When taken together, **magnesium** and **vitamin D** enhance each other's benefits by boosting nutrient activation, absorption, and delivery.

70 PHAGES BOOST IMPACT OF PROBIOTICS

In a clinical study, a **probiotic** blend combined with bacteria-killing **phages** *improved* gastrointestinal inflammation symptoms and *reduced* colon pain.