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July 2023

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Marigold extract [std. to 5 mg <i>trans</i> -lutein, 155 mcg <i>trans</i> -zeaxanthin]	11.12 mg
Apigenin	5 mg
Boron (amino acid chelate)	3 mg
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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. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

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Maury

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Supplemental Vitamin D Associated with Reduced Melanoma Risk



WILLIAM FALOON

Melanoma is a skin cancer that has a high **cure** rate when detected *early*.¹

Metastatic disease occurs when melanoma cells spread to other organs. **Metastatic melanoma** patients suffer high **fatality** rates.^{1,2}

Incidence of melanoma is increasing, whereas **death** rates are *declining* because of *earlier* detection and improved treatments.¹



Groups most at risk for **melanoma** are non-Hispanic white men and women.¹ The chart on the next page shows melanoma cases *increase* from ages 55 to 74, though it can develop at any age.¹

Annual screening by a dermatologist is the best way to discover melanoma at *an early* stage before it spreads. We believe those at higher risk should be screened every six months.

When **melanoma** is found, the patient is referred to a surgeon who may perform a procedure (Mohs surgery) whereby thin layers of the malignant lesion and surrounding areas are slowly sliced off until no more cancer cells are detected.³

A recent study looked at the correlation between **vitamin D** supplementation and the risk of **skin cancer** in 500 adults from ages 21 to 79. Results showed a **55% reduction** in the odds of past or present **melanoma** associated with *regular* users of vitamin D **supplements** compared to **non-users**.⁴

Based on these findings, regular **vitamin D** supplementation is associated with about half the odds of melanoma, which suggests another benefit correlated with this widely used supplement.

The American Cancer Society predicts **97,600 new** cases of melanoma will be diagnosed in **2023** with about **7,990** deaths.⁵

Incidence of **malignant melanoma** is steadily increasing worldwide.^{5,6}

The primary causes are interactions between individual **genetic** factors and **environmental** risks such as **sun exposure**.⁴

Metastatic disease occurs when melanoma cells spread to other organs through the lymphatic system, circulating blood, and direct invasion of surrounding tissues.²

Ultraviolet radiation from the sun is the most important **environmental** risk factor for the development of **skin cancers**, including melanoma.⁷⁻¹⁰ The use of tanning beds prematurely ages the skin and also increases risk for skin cancers.¹¹

Protection against ultraviolet radiation has long been recognized as an important measure to prevent **skin cancers** and delay **skin aging**.

Vitamin D and Melanoma

Previously published data suggest that **vitamin D** could play a role in **cancer prevention** by exerting **anti-proliferative** cellular effects.

A recent study found considerably fewer cases (**55% reduced odds**) of **melanoma** associated with *regular* users of **vitamin D supplements** compared to non-users.⁴

We advocate for randomized controlled **clinical trials** to corroborate these findings.

While most people associate summer outdoor activities with excessive sun exposure, the reality is that consistent everyday **solar radiation** exposure inflicts significant cumulative damage to exposed skin.^{7,12}

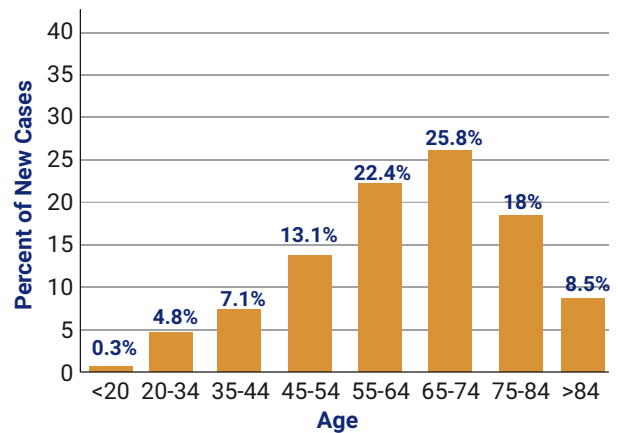
The article on page 38 of this month's issue describes **nutrients** that help protect **skin** against **solar radiation damage**.

For longer life,



William Faloon, Co-Founder
Life Extension®

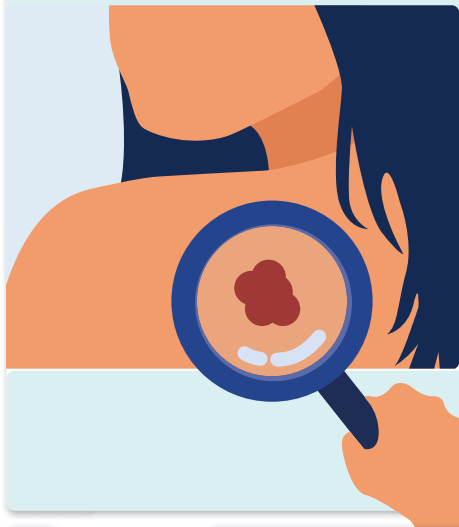
Percentage of New Cases by Age Group: Melanoma of the Skin



SEER 22 2015–2019, All Races, Both Sexes¹



Look for the ABCDEs of Melanoma



A Asymmetry



B Border



C Color



D Diameter



E Evolving



A Personal Note...

In **1968**, at age 13, I stood over the open **coffin** of my grandmother who suffered a horrific lingering **melanoma** death at age **54**.

She had a suspicious lesion on her leg for years before developing metastatic disease symptoms.

Hundreds of people attended her funeral. Some understood that had she had the suspicious lesion surgically removed years before, she would still be **alive**.

This needless death instilled in me an overwhelming need to share information I come across with others (as others have shared with me) that may save human life.

I've had suspicious lesions removed over the decades. Yet I was surprised when three years slipped by between dermatology screenings. Fortunately, no lesions were detected, but it was a wake-up call to not overlook annual head-to-toe dermatology screenings.

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In the News

Nutrients Most Likely to Benefit Cardiovascular Health

A systematic review and meta-analysis identified three supplements—coenzyme Q10, the B vitamin folic acid, and omega-3 fatty acids—as showing the greatest potential to lower cardiovascular disease risk, according to an article in the *Journal of the American College of Cardiology*.*

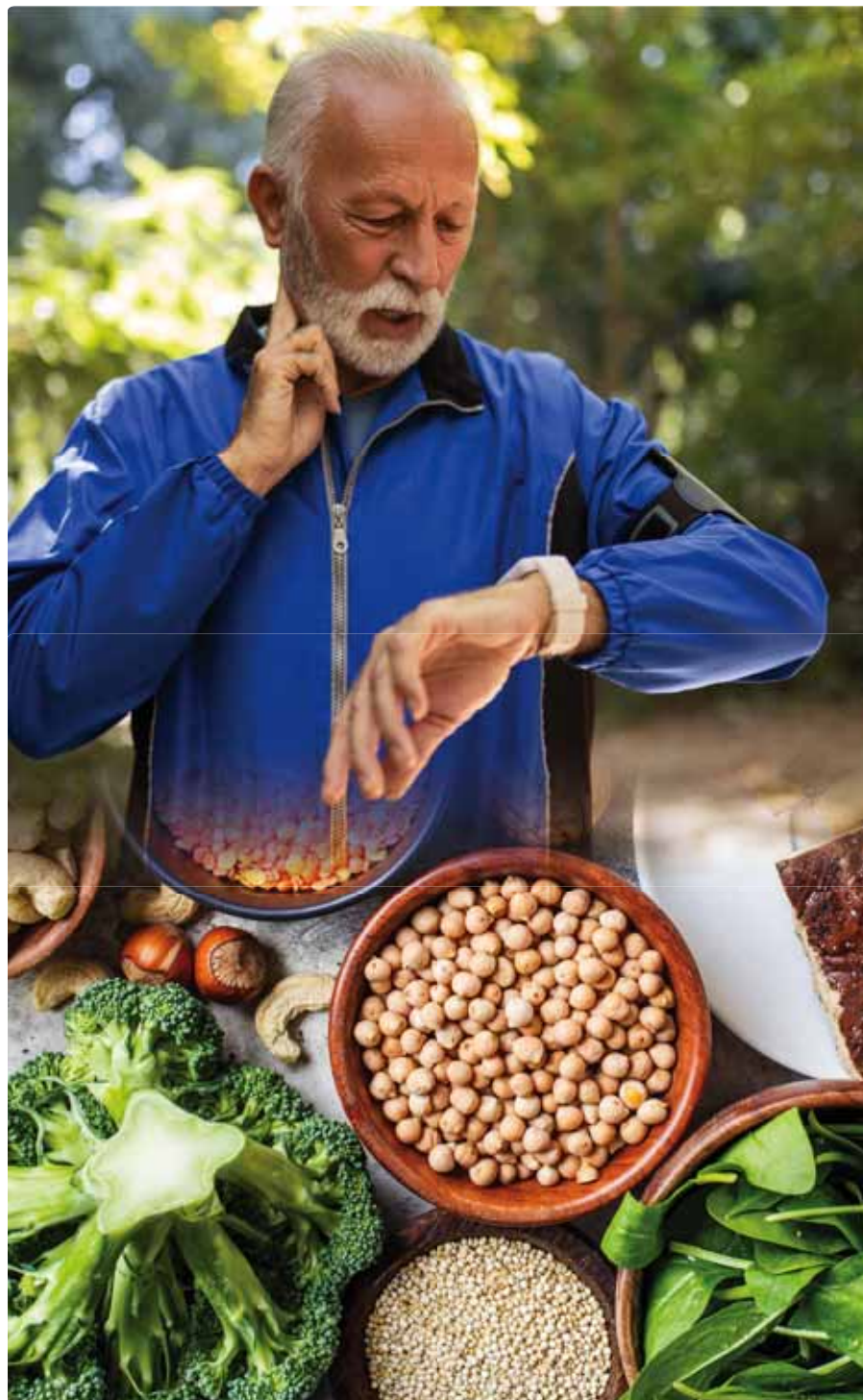
Researchers reviewed 884 clinical trials that evaluated the association between 27 supplements and cardiovascular risk.

Among all the supplements' outcomes examined, **CoQ10** was associated with a reduction in mortality from all causes during the studies' follow-up periods, **folic acid** was linked to a lower risk of stroke, and **omega-3** fatty acids were associated with a decreased risk of heart attack, coronary heart disease events and cardiovascular disease mortality.

Other nutrients were also associated with a reduction in cardiovascular disease risk, though not as great as the top three supplements noted.

Editor's Note: Supplementation of some but not all micronutrients may benefit cardiometabolic health outcomes in diverse populations.

* *J Am Coll Cardiol.* 2022 Dec 13;



Higher Intake of Omega-3s Lowers Diabetics' Mortality Risk

People with diabetes who had a *higher* intake of the omega-3 fatty acids EPA and DHA had a lower risk of all-cause mortality compared to diabetics whose intake was lower, a study published in *Acta Diabetologica* revealed.*

The clinical study included 4,854 diabetic participants in the National Health and Nutrition Examination Survey 1999–2014. Mortality data were obtained through 2015.

During follow-up, 1,102 deaths occurred. People whose intake of EPA plus DHA was among the highest **20%** of participants, at more than **122 mg** per day, had a **25% lower** risk of mortality from any cause compared to those whose intake of the fatty acids was among the lowest **20%**, at **9.5 mg** or less.

When the risks of all-cause mortality associated with EPA and DHA were analyzed separately, greater DHA intake emerged as significantly associated with lower mortality risk.

Editor's Note: "...Adequate intake of omega-3 fatty acids may prevent premature death among the population with diabetes," the authors concluded.

* *Acta Diabetol.* 2023 Mar;60(3):353-362.





Curcumin Shows Benefits for People with Metabolic Dysfunction-Associated Fatty Liver Disease

Curcumin supplementation has beneficial effects in people with metabolic dysfunction-associated fatty liver disease (MAFLD), an updated meta-analysis shows.*

Researchers studied 16 randomized controlled clinical trials and six systemic reviews and meta-analyses that compared the effects of curcumin extracts or turmeric to a placebo or standard treatment in patients with MAFLD, a common cause of chronic liver disease that can progress to nonalcoholic steatohepatitis and cirrhosis.

Curcumin supplementation was associated with significant improvement in the liver enzymes AST and ALT, that are elevated in liver diseases. This association was stronger for bioavailability enhanced forms.

There was also resolution and improvement of hepatic steatosis observed in the group that received curcumin as compared to placebo.

Editor's Note: Significant improvement in liver fat and lower fasting blood glucose, body mass index, and total cholesterol were associated with curcumin supplementation in studies that assessed these factors.

* *Sci Rep.* 2023 Apr 10;13(1):5824.

Higher Brain Levels of Vitamin D Linked to Better Cognitive Function

Research findings published in *Alzheimer's & Dementia* showed that higher brain concentrations of vitamin D were associated with better cognition.*

The cognitive function of 209 participants in the Rush Memory and Aging Project was assessed during the clinical study, and the individuals' brain tissue was examined after their death.

Researchers found a **25%–30%** lower risk of mild cognitive impairment or dementia at the last visit before death among participants who had *higher* levels of 25-hydroxyvitamin D3 levels in the four regions of the brain studied.

Editor's Note: No association was found between vitamin D levels and indicators of brain pathology, including amyloid beta plaque or evidence of strokes.

* *Alzheimer's Dement.* 2022 Dec 7.





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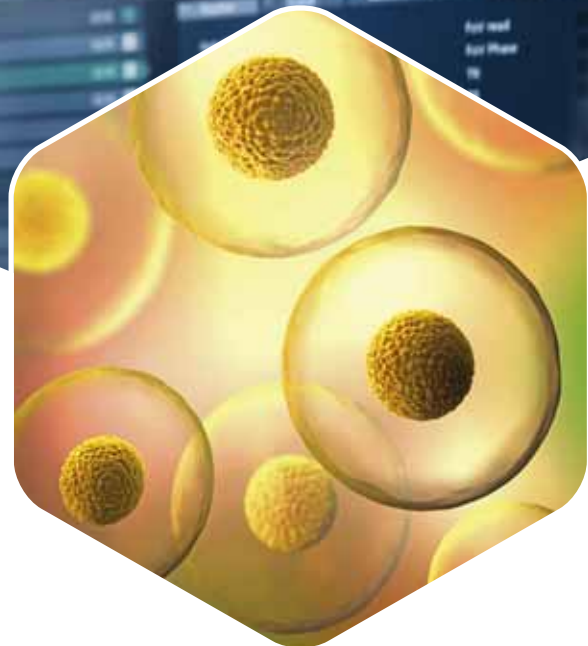
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Remarkable Effects of **TAURINE**





BY JACKSON WILLIAMS

A low-cost **amino acid** facilitates a diverse range of biological functions.¹⁻⁵

Taurine has been shown to improve markers of health implicated in rapid-onset aging,^{3,6-9} along with disorders such as **heart disease**,^{1-5,10,11} **sarcopenia**⁴ and **dementia**.¹²

Normal aging results in a decline of internal taurine production that can be overcome by increased oral intake.

What is Taurine?

Taurine is an **amino acid** found in nearly *all* tissues.^{1,2} Unlike most amino acids in the body, it is not a building block for proteins. Instead, it serves other important functions.

One finding that makes taurine particularly intriguing is that the human body produces **transporter proteins** specifically targeted to this nutrient. These transporters allow most cells in the body to take up and concentrate taurine within them.^{1,2}

That's because cells **need taurine**.

Evidence suggests that increasing taurine supply may have potential benefits for cardiovascular disorders, high cholesterol,^{1,2,5} Alzheimer's, liver conditions,² and **extending lifespan**.⁵

Taurine is produced in small amounts by the body, but production drops with age.²

By adulthood, production of taurine is inadequate to maintain optimal health. The best way to maintain *higher* taurine levels is through diet or supplementation.² Dietary sources include seafood like scallops, mussels, and clams. Dark meat turkey and chicken are also a good source of taurine.¹³



However, most successful clinical studies with taurine have used daily doses of **1,500 mg to 3,000 mg**.^{3,9,11} It is challenging to obtain this amount of taurine from **dietary** sources.

A Key to Healthy Aging

Evidence from animal and human studies suggests that at every stage of life, adequate levels of **taurine** are essential.

- In a rodent study, **depletion** of taurine resulted in accelerated aging processes, affecting the heart, muscle, liver, skin, brain, and more.^{14,15} Overall **lifespan** in taurine-depleted rodents was significantly *shortened*.
- In early developmental stages of the human embryo, **taurine deficiency** can lead to abnormalities of heart, brain and retina.^{2,16}
- Taurine is present in the human **brain** and plays a role in neurotransmission. Perinatal taurine depletion alters learning, memory and neural control of blood pressure in adult life.¹⁷
- In a population study spanning 25 countries and more than **14,000 people**, scientists found that residents of Okinawa in Japan had the *highest* intake of **taurine** along with the *lowest* rate of **heart disease** and the *longest average lifespan*.¹⁰
- Another study looked at Japanese immigrants living in Brazil, where they eat low amounts of taurine-rich seafood. This population had an average **17-year shorter lifespan** than those still living in Japan, where they consume *more* dietary **taurine**.¹⁸
- Low taurine intake has been associated with a higher risk of **dementia**. One observational study determined that older **healthy** adults had about **18%** greater intake of **taurine** in the past than those diagnosed with dementia.¹² The group with the *highest* intake of taurine had the *highest cognitive scores*.
- In another study, on elderly women, **1,500 mg** of taurine daily helped reduce inflammation, protect the health of the blood-brain barrier, and improve cognitive test scores over 14 weeks.⁹

Oral taurine intake has been studied in humans, including in many clinical trials. At doses ranging from about **1500 mg** to **3000 mg** daily, taurine has been found to:

- Reduce inflammation,⁹
- Improve scores on a test of cognitive impairment,¹²
- Improve cholesterol and triglyceride levels,^{1,3,7,19}
- Lower blood pressure,^{1,11,20}
- Improve insulin sensitivity,⁷
- Lower fasting blood glucose,^{3,7} and
- Improve control of diabetes and diabetic complications.^{3,7,19,21,22}

These benefits suggest taurine consumption could play a powerful role in the promotion of healthy aging.

Liver Health

Taurine may support optimal liver health. One of the most common liver issues in the U.S. is nonalcoholic fatty liver disease (**NAFLD**), in which excess fat buildup occurs in the liver. Over time it can lead to liver cirrhosis and failure, as well as to liver cancer.²³

In preclinical studies, it has been shown to prevent liver damage by preventing fat buildup in the liver and promoting energy expenditure.²⁴ Animal and lab studies show that taurine defends liver cells against free radicals and toxins, helping to reduce the severity of oxidative stress-induced liver injury.^{24,25}

Taurine bolsters **antioxidant** defenses in numerous ways. It boosts the production of key antioxidant *enzymes* in the body.^{2,8} One of the most important is **superoxide dismutase (SOD)**, which helps neutralize the superoxide free radical.²⁶

In a clinical trial, women aged 55–70 years were randomized to receive either **1500 mg** of **taurine** or a placebo for 16 weeks. After week 16 oxidative stress markers were evaluated from plasma samples. Taurine supplementation increased **SOD** levels.⁸

In a clinical trial of patients with chronic liver disease, **2 grams** per day of oral supplementation with taurine resulted in a clinically significant reduction in the frequency, duration, and intensity of muscle cramps.²⁷



WHAT
YOU
NEED
TO
KNOW

Taurine's Role in A Healthier Life

- **Taurine** is an amino acid that is vital to overall health.
- Deficiencies of taurine are associated with multiple diseases in different stages of life.
- In a human population study, *higher* intake of taurine correlates with **longer life** and *lower* rates of heart disease.
- In clinical studies, taurine has been shown to support brain function and improve cognitive scores.
- Oral intake of taurine has been shown in **human trials** to reduce inflammation, lower cholesterol and blood pressure, aid in control of diabetes, and more.
- Preclinical studies show that taurine is needed for the optimal functioning of **mitochondria**.
- There is preclinical evidence that taurine is supportive of liver health.

Optimal Mitochondrial Function

Practically all the energy that cells need to grow and thrive comes from the **mitochondria**, the cellular “powerhouses.”

Mitochondrial function diminishes with age.²⁸ Studies show that taurine is needed for the optimal functioning of **mitochondria**.^{1,2,6,29,30}

In animal models, *blocking* taurine uptake in cells resulted in **mitochondrial dysfunction**.² Taurine prevents oxidative damage by inhibiting enzymes and stabilizing mitochondrial membranes.²⁴

Summary

Cells throughout the body require the amino acid **taurine** to function optimally.

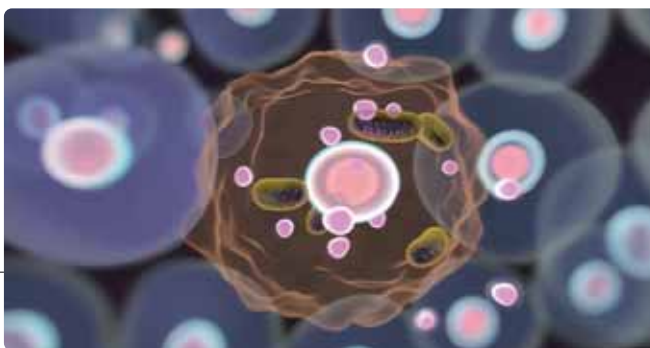
Taurine intake may help prevent age-related disorders such as heart failure, dementia, and diabetes, and was associated with *longer life* in a large human population study. •

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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MAGNESIUM'S Role in Fighting Type II Diabetes



BY MARTIN STEPHENS

Roughly **half** of all adults in the U.S. do not get enough **magnesium**.^{1,2}

And **25%** of Americans are thought to be magnesium-deficient.³

That's a major problem.

Magnesium deficiency is a contributor to metabolic disease, including **type II diabetes**.⁴⁻⁶

Human studies suggests that magnesium supplementation could have favorable effects on **glycemic control** in type II diabetics.⁷

In people with **type II diabetes** or in those at **high risk** of developing it, several clinical trials have demonstrated that supplemental magnesium can:

- Improve glucose/A1C control,⁹⁻¹¹
- Enhance insulin sensitivity,^{9,12} and
- Correct metabolic imbalances.⁸

These actions may reduce damage inflicted by type II diabetes *and* help delay its development.

A Vital Mineral

Magnesium is one of the most abundant minerals in the body. It is a required **cofactor** (“helper molecule”) for hundreds of essential *enzymatic* processes within cells.^{4,5}

These enzymes include many that are involved in cell **metabolism** and **energy** production. Deficiency of magnesium negatively impacts these functions.

Magnesium also interacts in a critical way with other nutrients. For example, magnesium is required for the activation of **vitamin D** in the body.¹³ If you are taking vitamin D but your magnesium levels are low, vitamin D can't deliver all its benefits.

Type II Diabetes Link

Many of the enzymes and proteins that rely on magnesium play a vital role in **insulin** function and the metabolism of **blood glucose**.^{4,5,8}

As a result, the impact that magnesium deficiency has on metabolic health is profound. It contributes to diseases such as **type II diabetes**, metabolic syndrome, and osteoporosis.^{1,4} Magnesium deficiency also increases risk for other chronic disorders, especially **cardiovascular disease**.^{14,15}



Observational studies show that the *lower* the dietary magnesium intake, the *higher* the prevalence of diabetes.^{4,5}

Additionally, individuals who *already* have a diagnosis of **type II diabetes** often have *lower* magnesium levels than healthy individuals.^{5,16}

The connection between magnesium and diabetes is so strong because magnesium affects *multiple* aspects of metabolism.

Magnesium is crucial at practically every step of insulin function and sugar metabolism, including:^{4,5}

- **Insulin secretion.** After a meal, the hormone **insulin** is secreted by the pancreas to help tissues take up and process blood sugar. With magnesium *deficiency*, the mechanism that leads to insulin secretion is impaired, leaving blood glucose levels elevated.¹⁷
- **Glucose metabolism.** Many of the enzymes involved in the metabolism of glucose and other nutrients rely on magnesium to function. Low magnesium impairs cells' ability to process nutrients and extract energy from them.
- **Insulin sensitivity.** Magnesium deficiency contributes to **insulin resistance**. This drop in insulin sensitivity is central to type II diabetes and metabolic syndrome.^{9,18} Studies have found that *higher* magnesium levels correlate with *higher* insulin sensitivity.^{18,19}

Defects in insulin function and glucose metabolism lead to **insulin resistance** and **high blood sugar**. High blood sugar eventually results in complications of diabetes, including kidney failure, eye disease, cognitive decline, and nerve damage.

By preventing or countering these defects, magnesium has shown potential to help prevent or control type II diabetes.²⁰

What Human Trials Reveal

Several clinical trials have shown that oral **magnesium** supplementation improves control of blood glucose and insulin sensitivity in people with **type II diabetes**.^{9,11,20}

Other studies have shown that magnesium can be beneficial in those **at risk** for type II diabetes who do not yet have a diagnosis.



WHAT
YOU
NEED
TO
KNOW

How Magnesium May Counter Type II Diabetes

- The mineral **magnesium** is required for the function of hundreds of essential enzymatic processes within cells.
- Over **25%** of Americans are believed to be magnesium-deficient, while it is estimated that roughly **50%** consume inadequate levels of this essential mineral. Low magnesium levels are tied to risk for several chronic diseases, especially **type II diabetes**.
- Human studies show that oral supplementation with magnesium can improve **insulin sensitivity** and **blood glucose control** in those with **type II diabetes**, which may help control the disease and prevent complications.
- Magnesium can also improve insulin sensitivity and blood glucose control in **non-diabetic** adults who are overweight or have insulin resistance, which may prevent diabetes from developing.

For example, in **non-diabetic** adults who have insulin resistance or are overweight, supplemental magnesium has been shown to improve metabolism, insulin sensitivity, and blood **glucose** control.^{8,12,21,22}

This indicates that increased magnesium intake, specifically with oral supplements, may not only be useful for those already suffering from diabetes, but may also help in preventing progression to type II diabetes in high-risk people.

Summary

Roughly **half** of all adults in the U.S. do not get enough **magnesium**.

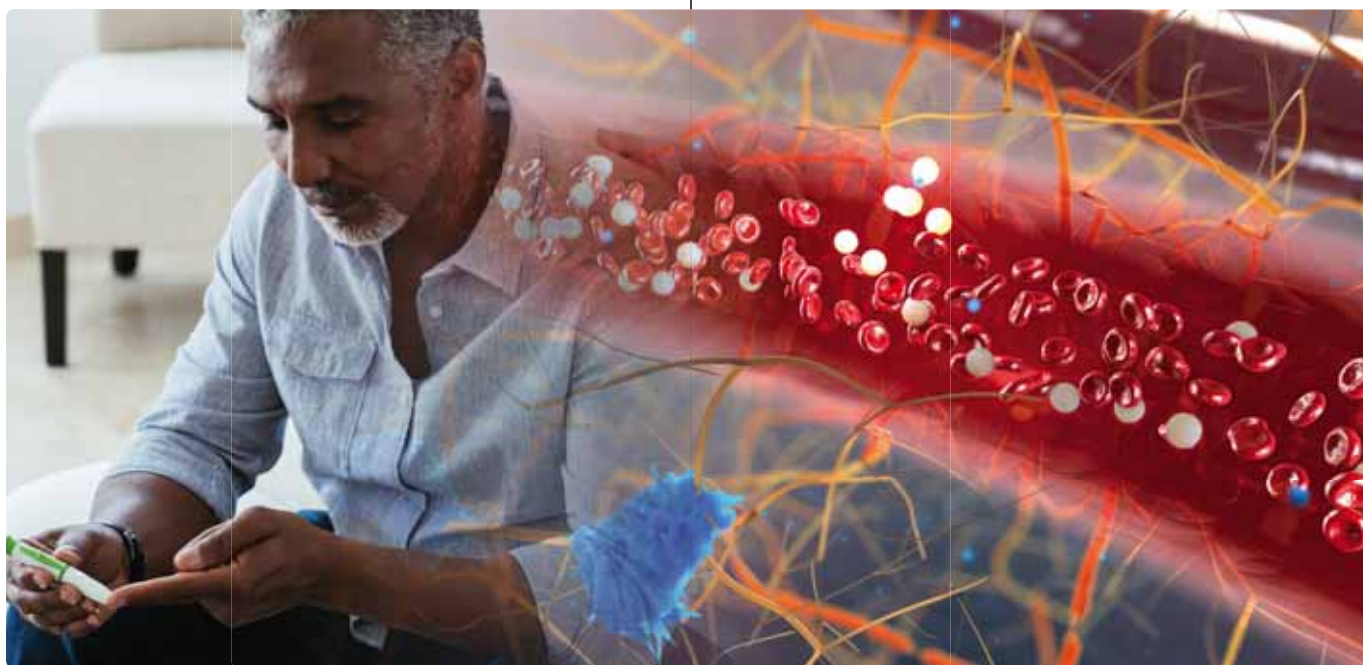
Lower magnesium intake increases the risk for metabolic disease, including **type II diabetes**. Higher magnesium levels correlate with better insulin sensitivity.

Human trials have found that supplementation with oral magnesium can improve metabolism, increase **insulin sensitivity** and improve **blood sugar control** in type II diabetics and those at risk for it. •

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

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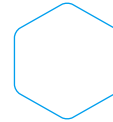
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Sun Protection from the INSIDE OUT





SARAH LOBISCO, ND, IFMCP

The risks of getting too much sun are well known.¹⁻³

Sunscreens help absorb the sun's **ultraviolet (UV)** radiation but offer incomplete protection.^{1,2}

Research has identified oral compounds that can protect against sun damage *from the inside out* to provide more complete shielding.⁴⁻⁷

One clinical study found that an oral extract of the fern ***Polypodium leucotomos*** decreased UV-driven DNA mutations by an astonishing **84%** and mitigated photoaging.⁸

Another nutrient, **nicotinamide**, has been shown to enhance DNA repair and decrease UV-induced skin immune suppression.⁹⁻¹¹ And an extract of **Sicilian red oranges** was found to decrease UV-induced sunburn by **40%**.⁶

Together with topical solutions, these nutrients can greatly enhance **sun protection**.

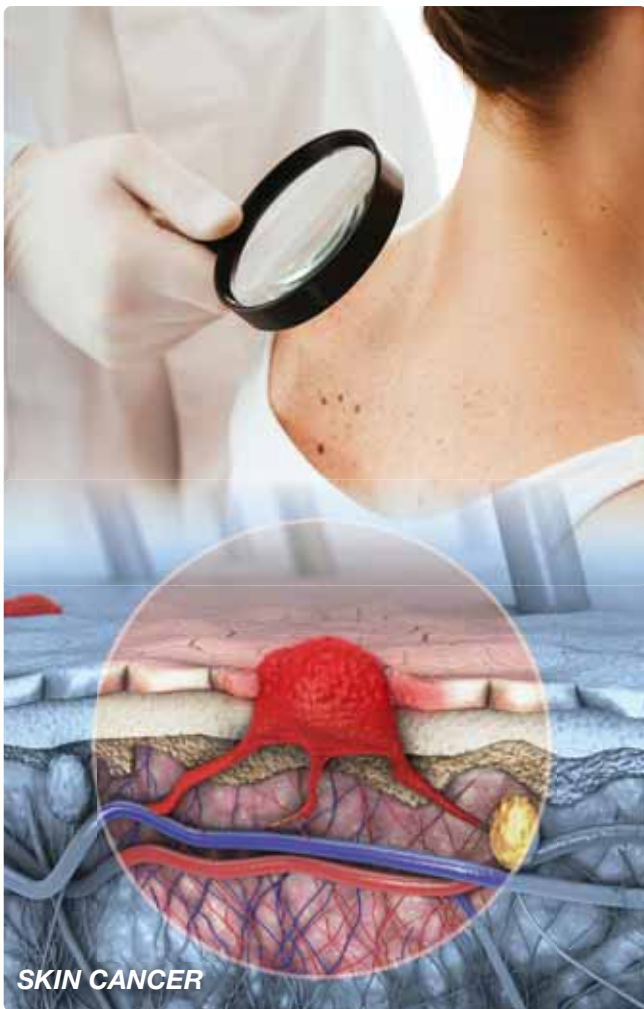
Ultraviolet Radiation and Skin Damage

UVA radiation is associated with premature skin aging, pigmentation, and damage to DNA² leading to some skin cancers.^{1,2}

UVB rays are responsible for sunburn. They also promote oxidative stress and the inflammation that spurs DNA damage, which increases the risk of skin cancer.^{1,2,12}

Sunscreen provides much-needed protection. But it can have several limitations:

- Labeling can be inaccurate,^{13,14}
- It mostly shields UVB rays, *not* UVA,¹⁴
- It washes or rubs off with moisture and clothing,
- Sometimes it degrades with sun exposure,^{13,15} and
- It often contains harmful chemicals.¹⁶



Typically applied titanium dioxide or zinc oxide **sunblocks**¹⁷ and sun-protective clothing¹⁵ can shield individuals from the sun's rays while avoiding chemical exposure. But these are still incomplete barriers, as they may rub off or wash away, and may not cover the skin completely.

Research has identified **plant-derived extracts** and compounds that, when taken orally, safely provide additional protection from damage caused by the sun's radiation.

Polypodium Leucotomos Shields Skin

An extract of a tropical fern called ***Polypodium leucotomos*** contains sun-protective polyphenol compounds.^{4,5,18}

Laboratory evidence shows that *Polypodium* extract:

- Fights **oxidative stress** and increases the body's natural antioxidant, **glutathione**,⁴
- Reduces **inflammation**, decreasing skin redness and inflammatory markers,^{4,18}
- Supports the immune system's **tumor surveillance**, the ability to identify and destroy cancerous cells,^{19,20}
- Inhibits the breakdown of **elastin** and **collagen**, the proteins that keep skin firm, healthy, and youthful looking,^{20,21} and
- Protects the skin's tissue, a vital barrier against infection and environmental toxins.²⁰

In a clinical trial, people who took **240 mg** of oral ***Polypodium leucotomos*** extract two times, eight hours, and two hours before exposure to UV rays, had an astonishing **84% decrease** in a marker of **DNA mutation**.

Those who took a placebo had a **217% increase** in that DNA mutation.⁸

DNA mutations are a main cause of **skin cancer** and one of the causes of prematurely aged skin.

Another clinical study showed that, compared to a placebo, taking ***Polypodium*** extract before UV exposure helped prevent redness and *reduce*:

- Tumor progression markers by **85%-100%**,
- A DNA damage marker by **32%**, and
- An inflammation marker by **78%**.¹⁸



WHAT
YOU
NEED
TO
KNOW

Nicotinamide for Sun Protection

Nicotinamide is a form of vitamin B3.

Preclinical and human studies have demonstrated that **oral nicotinamide** can protect against UV-induced damage by:

- Preventing cellular energy depletion,²²
- Repairing DNA damage,²³
- Reducing skin immune suppression,²²
- Protecting against skin cancer mutations,^{22,24}
- Reducing inflammation,²² and
- Regulating skin barrier function to keep skin hydrated and protected.⁹

These actions can help reduce the risk of **skin cancer**, as clinical trials have shown.

In one human study, taking **500 mg** of **nicotinamide** daily for one week significantly reduced UV-induced skin immune suppression.¹⁰

In another clinical trial, people deemed high risk for skin cancer who took **500 mg** of nicotinamide for 12 months had new, non-melanoma **skin cancers** reduced by **23%**, compared to those taking a placebo.²⁵

Nicotinamide's ability to reduce skin cancer reoccurrence has been confirmed in several other studies.^{9,26,27}

Powerful Protection Against Sun Damage

- The sun's ultraviolet rays damage DNA and increase skin aging and **skin cancer** risk.
- Sunscreen offers incomplete protection and often contains harmful chemicals.
- Oral intake of clinically validated nutrients can help prevent premature skin aging, and decrease cancer risk.
- In clinical studies, an oral extract of a fern called ***Polypodium leucotomos*** decreased UV-driven DNA mutations by **84%** and reduced inflammation by **78%**.
- **Nicotinamide** and **Sicilian red orange extract** provide additional protection against UV-induced redness and skin cancer development.
- Used with sunblock, these oral compounds can provide powerful protection against sun damage.

Additional Nutrients That Provide Sun Protection

Several additional nutrients have been found to help prevent UV-induced skin damage. They include:

Astaxanthin. Preclinical and clinical studies show that this carotenoid pigment helps prevent photoaging, sunburn, skin redness, moisture loss, and wrinkling while enhancing skin elasticity.³⁰⁻³²

Green tea. A Meta-analysis and a systematic review confirmed that green tea extracts containing the compound **epigallocatechin-3-gallate (EGCG)** reduce low-dose UV-induced redness.^{33,34}

Lycopene. A clinical trial of the antioxidant lycopene and lycopene-rich tomato showed significant reductions in UV-driven skin damage and skin reddening.³⁵

Curcumin. A randomized controlled trial showed that curcumin significantly inhibited UVB-induced inflammation and increased facial connective tissue and skin hydration.³⁶ It also prevented melanoma progression in animals.³⁷

Quercetin. In a series of preclinical experiments, this antioxidant prevents the degradation of collagen and lowers inflammation.³⁸

Olive leaf. The antioxidant **oleuropein** in olive leaf inhibited UVB-induced skin damage and accelerated wound-healing activity in preclinical studies.³⁹



Defense with Red Orange

Sicilian red orange is a rich source of bioactive compounds including polyphenols, flavonoids, and anthocyanins, all of which protect cells by fighting oxidative stress and inflammation.^{28,29}

In a **human** cell study, skin cells treated with standardized Sicilian red orange extract were exposed to varying doses and types of harmful ultraviolet radiation. The results were promising:²⁹

- UV-induced damage was prevented.
- Oxidative stress was improved, and internal antioxidants (ones that the body makes itself) were preserved.
- Protection for DNA was provided.
- There was a decrease in the inflammatory markers (TNF- α , IL-6, and NF-kB), and responses related to photoaging.

One lab study found that Sicilian red orange extract reduced inflammatory markers, cell damage, and cell death in skin cells by preventing UV-induced oxidative stress.²⁸

In a clinical study, taking **100 mg** of oral **red orange extract** daily for 15 days reduced UV-induced skin redness and sunburn by **40%** and skin pigment changes by **20%**.⁶

This decrease in sunburn prevalence could substantially reduce **skin cancer** risk over time.

Summary

The sun's ultraviolet rays cause skin damage, premature aging, and skin cancer risk.

Specific nutrients taken orally have been clinically validated to offer protection against sun damage.

Polypodium leucotomos, a fern extract, can support DNA repair, defend against cancer-causing DNA mutations, and decrease skin inflammation.

Nicotinamide and **Sicilian red orange extract** offer additional defense from sun damage.

A **combination** of oral red orange extract, nicotinamide, and *Polypodium leucotomos* may help maximize the protection against sun damage. •

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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Bone Restore with Vitamin K2 combines skeletal-strengthening nutrients in one highly absorbable formula.

Item #01727 • 120 capsules
1 bottle **\$18**
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Caution: Those taking the anticoagulant drug Coumadin® (warfarin) should use Bone Restore without vitamin K2. Fruitex B® and OsteoBoron® are registered trademarks of VDF Futureceuticals, Inc. U.S. patent #5,962,049.



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FREE!***

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Fish oil supports brain and heart health.¹⁻³

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- Sugar free*

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Item #02508

36 gummy bites

1 box \$18

4 boxes \$16 each



* Not a low calorie food.

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Pycnogenol® is a plant extract derived from French maritime pine bark. Its benefits are available in these three formulations:

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1
DAILY



*ARTERIAL PROTECT

Item #02004

30 vegetarian capsules

1 bottle **\$33**

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1
DAILY



†**VENOFLOW™

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30 vegetarian capsules

1 bottle **\$39**

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60 vegetarian capsules

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Provides Pycnogenol® and standardized gotu kola leaf extract to help stabilize endothelial plaque and promote healthy blood flow throughout the body.

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**CAUTION: If you are taking anticoagulant or antiplatelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

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Your Skin from Within

Unique ORAL formula provides *Polypodium leucotomos* fern extract along with nicotinamide and red orange extract.

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"I now have peace of mind knowing I'm doing what I can to protect myself."

Elaine
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For full product description and to order **SHADE FACTOR™**, call 1-800-544-4440 or visit www.LifeExtension.com



This product is not a substitute for topical sunscreens. Red Orange Complex® is a registered trademark of Bionap S.r.l.

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Restore Smoother, Youthful- Looking Skin from the Inside Out

Dryness and loss of firmness are outward signs of normal aging.

One reason is loss of **ceramides** that are required for skin to retain its **moisture** and youthful suppleness.

Skin Restoring Ceramides contains wheat-derived ceramide lipids in an **oral** capsule that **hydrate** the skin and smooth the appearance of fine lines and wrinkles.



Item #02096

30 liquid vegetarian capsules

1 bottle **\$18.75**

4 bottles \$17.25 each

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



Contains wheat. Gluten free.

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What is SAME?

BY LAURIE MATHENA



Aging results in a progressive decline in **functions** of living systems.¹ Factors that influence aging include cell senescence, poor nutrition, and stem cell exhaustion.

A measurable aspect of normal aging is **DNA methylation**, a process that can favorably or unfavorably regulate **gene expression**.²⁻⁴

DNA methylation is so closely connected to age-related changes that one review article called it *"the 'prophet' of age-related outcomes."*⁵

A compound called **SAME (S-Adenosyl-Methionine)** is a cofactor involved in DNA methylation that helps regulate healthy **gene expression**.⁶

By doing so, **SAME** can help combat some common causes of age-related decline and could even play a role in **prolonging life**.^{5,7}

Understanding DNA Methylation

Genes are made up of DNA.

Our bodies turn genes “on” or “off” as necessary. One of the switches that modulates the way genes are expressed is a process called **methylation**.

Methylation happens when methyl groups are added to the DNA without changing the DNA sequence. Methylation is essential for healthy cellular functions.⁸

The science of **epigenetics** studies how and why and whether genes are expressed or not. One of the key types of **epigenetic modification** is **DNA methylation**. DNA methylation is a key switch that usually silences the expression of a gene or “turns it off.”⁹

This occurs when methyl groups are *attached* to the DNA.¹⁰

The compound **SAMe** is found naturally in the body. Although it is required for many biochemical reactions,¹¹ one of the most important processes SAMe is involved in is **methylation**.^{6,7} SAMe is the body’s primary methyl donor.^{10,12}

If we don’t have enough of it, the body cannot methylate properly. That can lead to excessive inflammation, tissue damage, and organ failures.¹³ Healthy methylation patterns can help degenerative disorders and slow certain aging processes.

Alzheimer’s Disease

Disturbances in **DNA methylation** have been identified as one of the potential drivers of **Alzheimer’s disease**.^{14,15}

Research has shown that Alzheimer’s patients have very low levels of SAMe.^{16,17}



In an animal Alzheimer’s model study, **SAMe** improved cognitive impairment in four weeks, by upregulating early overall **DNA demethylation** to reduce **amyloid** pathology.¹

In four patients with Alzheimer’s, **1,200 mg** of **SAMe** daily, in a divided dose for four to eight months, increased the level of SAMe in cerebrospinal fluid by **62.5%**.¹⁶

Osteoarthritis

Improper methylation impacts two hallmarks of **osteoarthritis**: inflammation^{18,19} and cartilage damage.^{20,21}

By getting methylation back on track, **SAMe** may modulate those genes and *suppress* inflammation.²²

In a meta-analysis, scientists found that SAMe was *as effective* as **NSAIDs** (non-steroidal anti-inflammatory drugs) in alleviating pain and optimizing joint function.²³

In two clinical trials, participants with osteoarthritis of the knee were randomized to receive **NSAIDs** or **SAMe (1200 mg)** per day in divided doses. Participants were evaluated

after **8-16 weeks**. It was found that SAMe was as effective as NSAIDs in the management of knee osteoarthritis.^{24,25} There were no significant differences in pain relief or tolerability between the NSAID or SAMe group.²⁴

Remarkably, SAMe was shown in one study to stimulate production of new cartilage in animals.²⁶ This can potentially be beneficial to slowing or *reversing* the progress of osteoarthritis.

Prolonging Life

Studies show that **aging itself** is associated with *alterations* in DNA methylation.^{2,3,27} Methylation isn’t just linked to the development of age-related diseases; it also has direct impact on lifespan itself.^{27,28}

In one study, giving SAMe to tumor-prone mice prevented the development of liver tumors. It did this by restoring methylation and turning on tumor-suppressor genes.²⁹

A study of yeast showed that stimulating SAME synthesis extended lifespan by activating a well-known enzyme called **AMPK** (AMP-activated protein kinase).³⁰

AMPK has been referred to as a “metabolic master switch.” In humans AMPK helps the body utilize calories more efficiently, reduces fat accumulation, and enhances cleaning of cellular junk.³¹

Summary

The way **genes** are expressed has a great impact on our health and longevity.

DNA methylation is a process that regulates gene expression.

SAMe (S-Adenosyl-Methionine) is an essential factor involved in DNA methylation.

Defects in methylation can lead to chronic disorders.

Increasing SAME intake provides the body with a critical methylation nutrient, which can help modulate the way genes are expressed.

SAMe has shown clinical success in cases of **osteoarthritis**. Early studies suggest SAMe’s status as the body’s preferred **methylation** nutrient. It may help contribute to **longer lifespans**. •

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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Optimize Healthy Blood-Sugar Levels

This formula combines **cinnamon** and **seaweed** extracts with a unique **chromium** stabilized with standardized **amla** and **shilajit** to promote healthy blood-sugar levels already in normal range.



Item #01503

90 vegetarian capsules

1 bottle **\$28.50**

4 bottles \$25.50 each

For full product description and to order **CinSulin® with InSea2® and Crominex® 3+**, call 1-800-544-4440 or visit www.LifeExtension.com



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Caution: If you are taking blood glucose lowering medication, consult your healthcare provider before taking this product.

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Repair Your Body With LACTOFERRIN



Lactoferrin is a component of **milk protein** best known for its **immune benefits**.

An array of published studies also describes how **lactoferrin** may provide cell regenerative proprietaries and support bone, cartilage, and tendon health.

Item #01681

300 mg, 60 vegetarian capsules

1 bottle **\$45** • 2 bottles **\$40** each

Two-Month Supply

Contains milk.

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

"Excellent product, high quality."

Gil

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GREAT ALONE,
Better Together



Curcumin helps to promote a healthy inflammatory response.

Pro-Resolving Mediators help remove cellular debris and build new, healthy tissue.

This complementary combo promotes a healthy inflammatory response.

Curcumin Elite™

Item #02407 • 60 500 mg vegetarian capsules

1 bottle \$24 | 4 bottles \$22 each



Pro-Resolving Mediators

Item #02223 • 30 softgels

1 bottle \$21 | 4 bottles \$19 each

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SAMe

FOR HEALTHY METHYLATION

Life Extension® first introduced **SAMe** in 1997. Since then, researchers have continued to discover its impressive benefits in improving cell methylation.

A study by Harvard Medical School and Massachusetts General Hospital cited benefits for SAMe for mood support.¹

It also has shown benefits for the liver and joints.

A report published in Germany found that SAMe helped maintain healthy neurological function.²

SAMe:

- Increased **glutathione** levels by **50%** and glutathione enzyme activity by **115%**,
- Decreased a measurement of **free radical** activity by **46%**, and
- Inhibited **lipid peroxidation** by **55%** in culture.

"I love the SAMe from Life Extension."

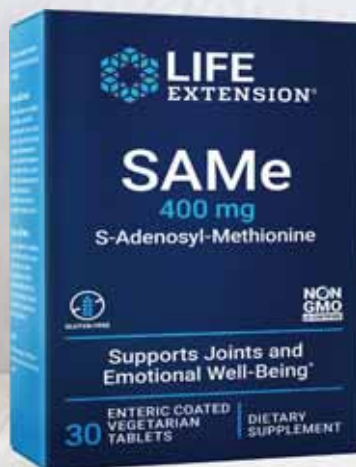
Stephanie

VERIFIED CUSTOMER REVIEW

Item #02176 • 400 mg
30 enteric coated vegetarian tablets

1 box **\$27** • 4 boxes \$24 each

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



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(SAMe is also available in boxes containing 30 200 mg tablets. Price is \$18.75. If you buy four, the price is reduced to \$16.50 per box. **Item #02175**).

CAUTION: SAMe should not be taken by those diagnosed with bipolar disorder.

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Broccoli

THE TREE OF LIFE

Just one daily **Optimized Broccoli and Cruciferous Blend** tablet provides cell-protective compounds found in fresh vegetables.

For maximum absorption each **enteric coated** tablet contains two layers:

- **Myrosinase** to release **sulforaphane** in the small intestine, in one layer,
- **DIM** (3, 3-diindolymethane) to promote healthy estrogen balance, and
- **Glucoraphanin** from broccoli, watercress, cabbage and rosemary (sulforaphane precursors), in the other layer.



Item #02368 • 30 enteric coated vegetarian tablets

1 bottle \$28.50 • 4 bottles \$26.50 each



For full product description and to order **Optimized Broccoli and Cruciferous Blend**, call 1-800-544-4440 or visit www.LifeExtension.com

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Testing for Toxins and Pollutants in Your Body

BY EDWARD R. ROSICK, DO, MPH, DABIHM



Exposure to **environmental toxins** is a fact of modern life.

Numerous studies demonstrate harm.

An easy way to assess one's exposure level is an **Environmental Pollutants Profile Urine Test**.

If results show excess exposure, **detoxification** methods can be initiated.

A Threat to Health

According to the U.S. Environmental Protection Agency (EPA), over **three billion pounds** of toxic chemicals were released into the environment in 2021. These chemicals are used in industry, metal mining, manufacturing, generation of electrical power, and other applications. From there, they can eventually make their way into our food, air, water, and soil.¹

The U.S. Centers for Disease Control (CDC) is so concerned with this problem that they actively monitor for over **400** of these chemicals in human urine, blood, and breast milk, and gauge their health effects.² Many of them contribute to deadly diseases, including diabetes, heart disease, and cancer, by triggering alterations to DNA and the creation of free radicals.³⁻⁶

Assessing Your Toxic Burden

A **urine** test called **The Environmental Pollutants Profile** can be easily collected at home. It checks for some of the most common and potentially harmful chemicals excreted in urine, including:

Xylene. This colorless chemical is well-known for its toxicity.⁷ One study showed that occupational exposure to xylene correlates with an increased risk of **lung cancer**.⁸ A recent study of 17,524 men and women found that xylene exposure was significantly associated with the development of **obesity**.⁹

Toluene. A colorless liquid, toluene is known to be toxic to the nervous system. A study on workers in the printing industry showed that exposure to toluene was associated with memory **impairment**.¹⁰ Another study of 6,070 men and women showed that toluene exposure was associated with a decline in **kidney function**.¹¹

Benzene. One of the most widely used chemicals in multiple industries, benzene is toxic to bone marrow and blood cells. According to the Centers for Disease Control and Prevention (CDC), long-term exposure to high levels can cause **leukemia**.¹² Other studies have implicated benzene exposure in increased rates of **lung cancer** and **non-Hodgkin lymphoma**.^{13,14}

Trimethylbenzene. Exposure causes irritation to the eyes, skin and respiratory passages. This toxin affects the nervous system, causing **fatigue**, **lack of coordination**, and **dizziness**.¹⁵

Styrene. Used extensively in manufacturing styrofoam, packing material, and food containers, styrene has been associated with increased risks of multiple cancers, including **leukemia** and **bladder cancer**.¹⁶

Phthalates. Known as “everywhere chemicals” because they’re found in so many products, from

toys to certain types of clothes, phthalates are known endocrine-disrupting chemicals¹⁷ and have been linked to **breast** and **prostate cancer**.¹⁸

Parabens. Widely used as preservatives in cosmetics and personal care products, parabens also disrupt the endocrine system and have been linked to **thyroid problems**¹⁹ and **breast cancer**.^{20,21}

Methyl Tert-butyl Ether (MTBE). It is a common additive in gasoline. Breathing gasoline with MTBE may cause headaches, nausea or vomiting, dizziness, and coughing.²²

Anyone with elevated levels of these pollutants may benefit from lifestyle changes and intake of nutrients that support detoxification, such as **glutathione**²³ and **lipoic acid**.²⁴ They can also consult with a **Life Extension Wellness Specialist** about how to support healthy **detoxification**.



Summary

Environmental pollutants are implicated in a number of serious health problems, including obesity, memory issues, and multiple forms of cancer.

Specialized urine testing can assess the levels of toxic chemicals in your body, allowing you to make changes to reduce the potential damage they may do. •

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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Sweet DREAMS



Fast-Acting Liquid Melatonin is a popular way to achieve more rapid sleep onset.

The nice-tasting, citrus-vanilla flavor enables convenient “drop” dosing of **Fast-Acting Liquid Melatonin** each night or when needed.

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"Good stuff!"

Steven

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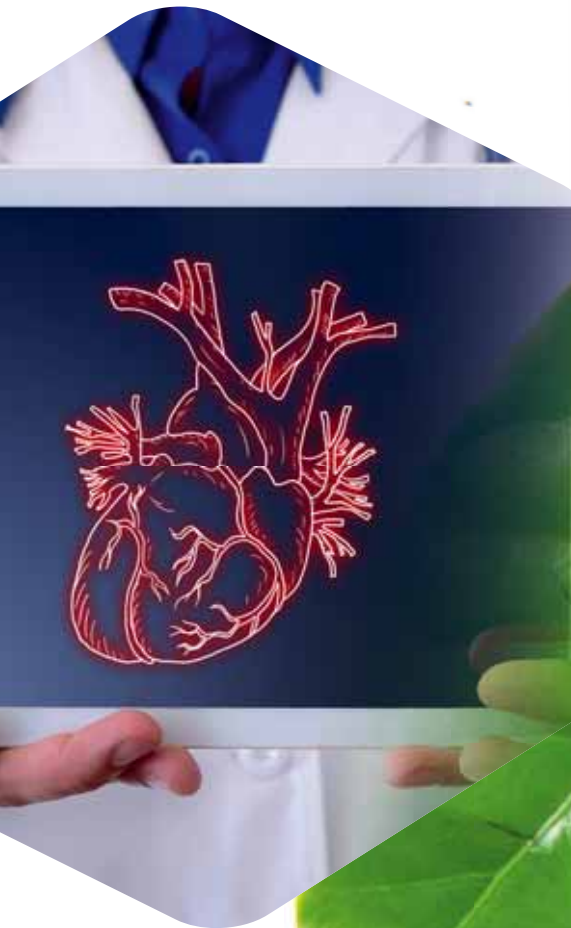


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*European Journal of Nutrition. 2011;50(5):387-389.

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Green Coffee

Supports Metabolic and Heart Health

BY STAN LEWIS

Every day, **62%** of American adults consume **coffee**. On average they drink more than three cups a day.¹

This simple drink contains nutrients that have the potential to improve **metabolic health**² and reduce risk for **cardiovascular disease**.^{2,3}

But there's a problem. Nearly all coffee beans are **roasted**, which *breaks down* many of the beneficial nutrients and reduces their content.⁴

The solution: Unroasted **green coffee**.

The nutrients in coffee that are most protective against **metabolic** and **cardiovascular diseases** are found in greater concentrations in **green coffee**.⁵

Human trials show that taking **green coffee extract** can support healthy metabolism. This has been shown to help restore insulin sensitivity,^{2,6-8} lower blood sugar, and reduce other risk factors for **heart disease**.^{2,12-14}

Metabolic Problems and Cardiovascular Disease

Aging adversely affects metabolism¹⁵ and **metabolic** health issues are widespread. These may include elevated blood glucose, high blood pressure, and abnormal cholesterol and triglyceride levels.¹⁶

When three or more of these issues occur together, the condition is known as **metabolic syndrome**.¹⁷

A stunning one in three adults in the U.S. has metabolic syndrome.¹⁸ This condition greatly increases the risks of **type II diabetes**, **cardiovascular disease**, heart attack, and stroke.

Metabolic abnormalities also accelerate the aging process and increase risk for several other conditions,¹⁹ including cognitive decline and dementia, kidney disease, liver disease, and cancer.

Green Coffee Extract

Coffee beans contain a wide array of health-promoting compounds with potent **antioxidant** and **anti-inflammatory** activity, particularly a polyphenol called **chlorogenic acid**.⁵

Chlorogenic acid is *most* abundant in **green coffee**.⁵

Coffee beans are usually roasted before brewing, which *breaks down* chlorogenic acid. **Green coffee beans** have *not* been roasted, leaving them *higher* in **chlorogenic acid** and other bioactive components.

Population and prospective studies have found associations between *higher chlorogenic acid* intake and *reduced* risk for several chronic diseases, including metabolic syndrome,¹² liver disease,^{8,20} and others.^{2,12}

Chlorogenic acid displays anti-diabetic,¹¹ and blood pressure-lowering effects that may improve health markers associated with metabolic syndrome.^{5,8}

Green coffee extracts are often standardized to contain high levels of chlorogenic acid and other beneficial compounds.

Restoring Insulin Sensitivity

Insulin sensitivity refers to the ability of cells to respond appropriately to the hormone **insulin**, which helps the body use blood sugar for energy.

In metabolic disease, insulin sensitivity *drops*. Cells cannot take up and utilize blood glucose as efficiently. The result is high blood sugar levels and increased risk for **type II diabetes**.

High glucose levels are catastrophic to tissues over time, causing damage that culminates as disorders of the heart, blood vessels, kidneys, eyes, and peripheral nerves.²¹

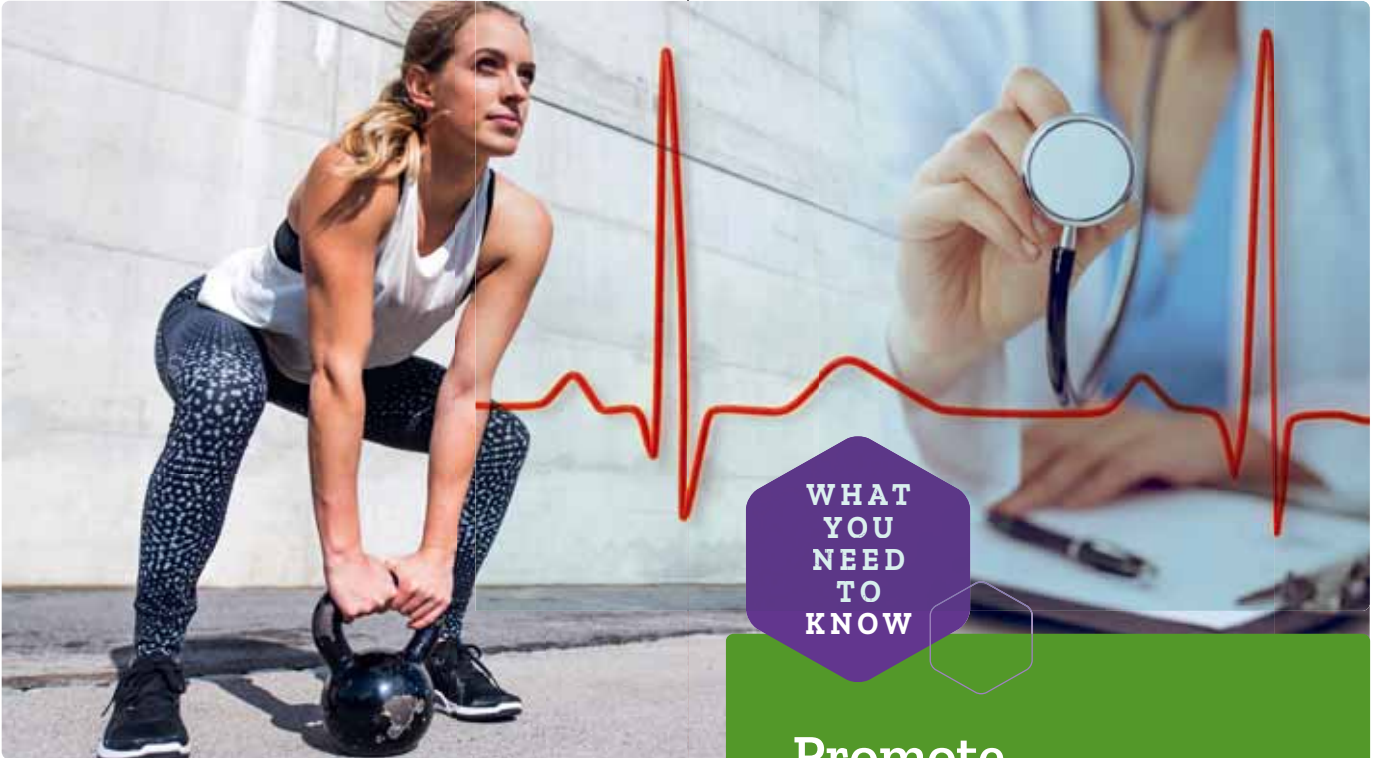
Studies suggest that green coffee and chlorogenic acid can help support healthy insulin function and restore **insulin sensitivity**.

In rodent models of metabolic disease, **green coffee extract** improves cellular energy metabolism, which results in improved blood glucose control and improved sensitivity to insulin.²²⁻²⁴

In **human studies**, green coffee extract intake significantly improved insulin sensitivity and lowered fasting blood glucose levels.^{2,6-8,12-14}

Studies that used at least **400 mg** daily of **green coffee extract** more consistently demonstrated a benefit than studies with lower doses.⁷





WHAT
YOU
NEED
TO
KNOW

Other Effects of Green Coffee Extract

In addition to improved insulin sensitivity and glucose control, taking green coffee extract leads to improvements in many other areas of **metabolic health**.

Animal studies show that green coffee augments cellular energy metabolism and reduces triglycerides and blood pressure.²²⁻²⁴

One mouse study found that green coffee bean extract reversed insulin resistance by reducing expression of genes involved in inflammation.²⁴

Human studies have found that green coffee intake leads to beneficial changes in key markers of metabolism. Among other benefits, taking **green coffee extract**:

- Reduced waist circumference,^{2,8,11,25}
- Lowered total cholesterol, **LDL** (“bad”) cholesterol, and triglyceride levels, while boosting protective **HDL** cholesterol,^{2,6,11,12,14}
- Decreased blood pressure,^{2,9,10,13} and
- Reduced markers of systemic inflammation.^{14,20,26}

All of these effects improve metabolic health and reduce the risk for **cardiovascular disease**.

Promote Metabolic Health with Green Coffee

- **Metabolic disease** is common with aging and increases the risk of type II diabetes, cardiovascular disease, heart attacks, and strokes.
- Markers of metabolic disease include high blood pressure, high blood sugar, and abnormal blood lipid levels.
- **Green coffee extract**, a potent source of the nutrient chlorogenic acid, improves many aspects of metabolic health.
- In animal studies and human trials, taking green coffee extract improved insulin sensitivity, blood glucose levels, lipid levels, and blood pressure.
- These and other improvements help to reduce the risk for **type II diabetes** and **cardiovascular disease**.

Summary

Metabolic disease significantly increases risk for type II diabetes, cardiovascular disease, heart attacks, and strokes.

Green coffee extracts containing **chlorogenic acid** have demonstrated the ability to improve markers of metabolic health in animal studies and human trials.

Oral intake of at least **400 mg** of green coffee extract daily may help increase insulin sensitivity, reduce high blood sugar, lower elevated blood pressure and cholesterol, and improve overall metabolic health. ●

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

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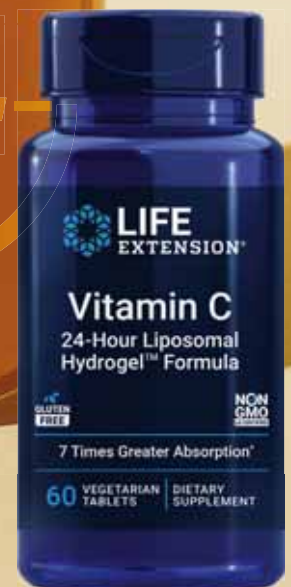
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Paul McCartney Still Making His Mark

BY LAURIE MATHENA



In 2022, McCartney did a 16-show tour in two months, in sold-out venues across the United States.

He easily out-works and out-plays many performers half his age.

These feats leave many people wondering: *How does he do it?*

It turns out he practices many of the top lifestyle habits known to be associated with healthy longevity.

A Lifelong Gift

McCartney's good health and vitality are not a stroke of luck.

For more than 50 years, he has faithfully practiced many of the top lifestyle habits associated with healthy longevity.

At the top of the list is staying active.

In addition to performing 2.5-hour concerts, McCartney does regular cross-training workouts, he runs, and he practices yoga.

"I don't have a trainer," he explained in an interview on the SmartLess podcast. "It's just me."

He does leg stretches, spends time on an elliptical trainer, and ends with "a bit of running." Overall, he says he spends about 5 to 10 minutes per exercise.

"It's not a huge workout, but it's good," said McCartney. "I like it."

And if he's working out at a local gym, he says he likes to show off his headstands, which are part of his regular yoga practice.

McCartney has also been practicing transcendental meditation since his days with the Beatles in the 1960s, when he trained under the yoga guru, Maharishi Mahesh Yogi.

Transcendental meditation involves sitting with eyes closed for 20 minutes, twice a day, repeating a mantra.

In June of 2023, Sir Paul McCartney turned 81 years old. But don't expect the former Beatles singer, songwriter, and musician to retire anytime soon.

As he explained in an interview, "I'm not old, and I'm not retiring."

Indeed, despite his advanced years, McCartney is working harder than ever.

He continues to produce new music, write books, appear on popular television shows like *Saturday Night Live* and *Carpool Karaoke*, and speak out for causes he believes in.

“It was a great gift that Maharishi has given us,” said McCartney at a press conference. “It came during a period at the end of the 60s when we were looking for something that could bring us more stability, and it was a lifelong gift. It’s something you can call on at any time.”

Since then, studies have connected transcendental meditation to reductions in anxiety, depression, and negative emotions,¹ and it has been shown to improve markers of learning and memory.²

Meat-Free Monday

McCartney is a vegetarian, which he credits as a reason why he’s so fit as an octogenarian.

But for McCartney, his meat-free lifestyle is about more than its health benefits. It is about ending animal cruelty, protecting the planet, and conserving natural resources.

“I have been a vegetarian for 40 years,” said McCartney on meatfree-mondays.com. “I like the idea of saving animals, saving people’s health, and saving this beautiful planet of ours.”

In 2009, McCartney spoke before the European Parliament to discuss how meat contributes to the destruction of the planet. Today, that speech is recorded in a book entitled, *Less Meat, Less Heat*.

In it, he points out that, “The livestock industry produces more greenhouse gases than all of the transport sectors put together—cars, planes, trains and trucking.”

He also proposed a solution.

“What I’m here today to suggest is that the first step is a Meat-Free Monday, or a meat-free day. I urge you, each of you, to do your bit for your people, for their children, and

for the planet they will inherit. Go meat-free, one day.”

To that end, McCartney founded a nonprofit campaign called the Meat-free Monday Initiative with his two daughters, Stella and Mary McCartney.

By having at least one plant-based day per week, the initiative claims, people can help slow climate change, conserve natural resources, and improve their health.

According to a recent study by Oxford University’s department of public health, eating meat no more than three times per week could prevent 31,000 deaths from heart disease, 9,000 deaths from cancer, and 5,000 deaths from stroke per year.³

But perhaps McCartney’s biggest secret weapon is his eternal optimism. This longevity factor has been proven to contribute to a **15%** longer lifespan, and a greater likelihood of living beyond age 85.⁴

“I’ve always been an optimistic person because I don’t like the alternative,” said McCartney while answering questions on his official website, paulmccartney.com. “I always try and see the good side—the silver lining—and if you’re lucky, it arrives.”

Got Back

Now into his eighth decade, McCartney continues to write new music and challenge himself creatively.

During COVID-19, he wrote and recorded his latest solo album, *McCartney III*, on his own. This collection of critically acclaimed work earned two Grammy nominations.

He wrote a book called *The Lyrics: 1956 to Present*, which hit #1 on the *New York Times* bestseller list.

He wrote a children’s book called *Grandude’s Green Submarine*, a sequel to the *New York Times*’ best-selling book, *Hey Grandude*.

He starred in the Hulu docuseries *McCartney 3,2,1*.

And he helped produce Peter Jackson’s Beatles documentary, *Get Back*.

These are impressive additions to an already illustrious resume that includes 18 Grammy Awards, an Academy Award, two spots in the Rock and Roll Hall of Fame, and two Grammy Lifetime Achievement Awards (recognizing both his career with the Beatles and his accomplishments as a solo artist).

And in 1997, he was knighted by Queen Elizabeth II for his “service to music,” dubbing him with the title, Sir Paul McCartney.

His mark on music history is undeniable—and ongoing.

In 2022, McCartney performed a sold out 16-show U.S. tour in two months called *Got Back*.

But for McCartney, it’s safe to say that *he never left*. •

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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Gina

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Green coffee beans contain higher amounts of **chlorogenic acid** than regular roasted coffee.¹

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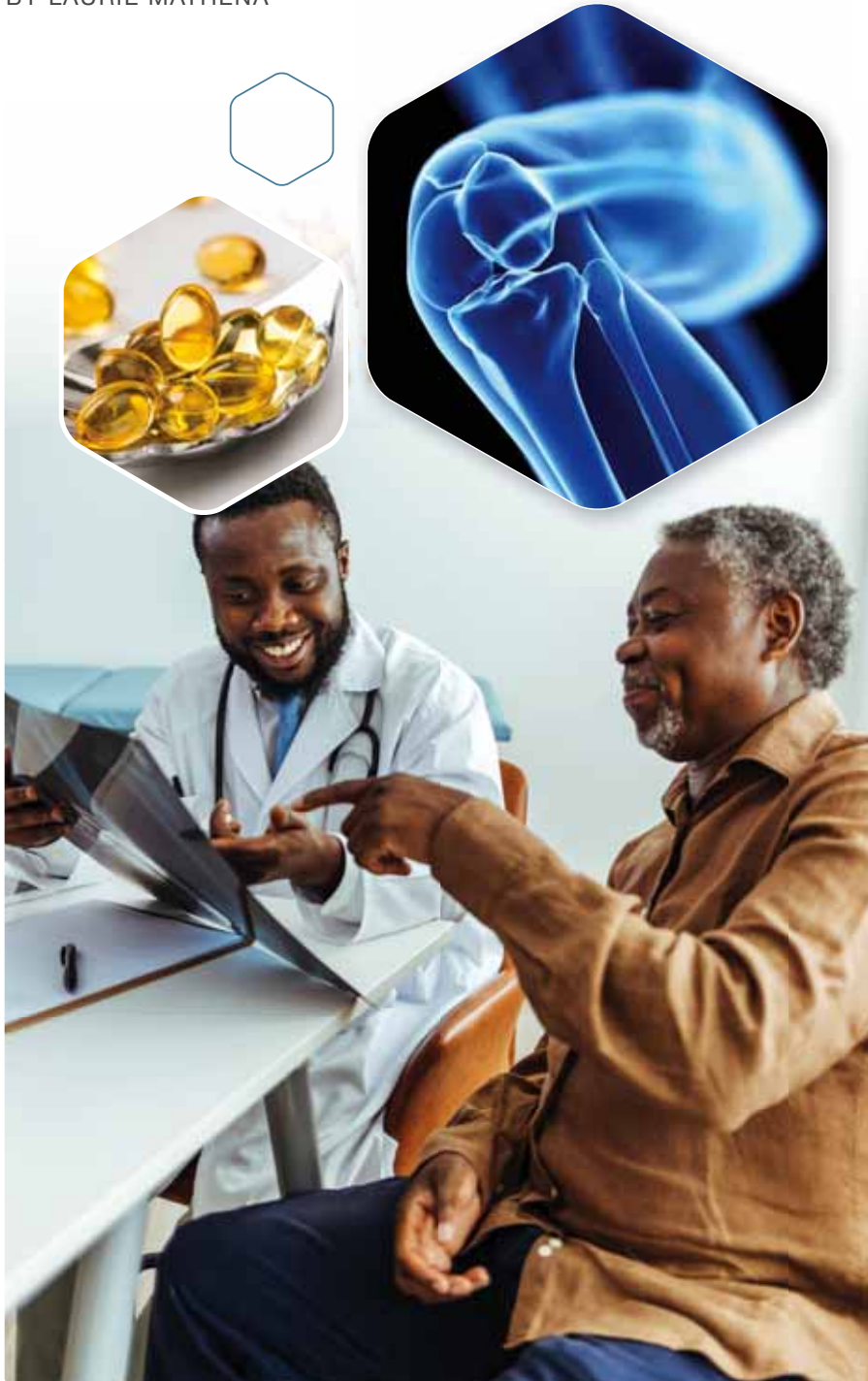
† This product is intended to support testosterone levels but does not contain testosterone. Tesnor® is a trademark of Laila Nutra and Gencor.



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TOCOTRIENOLS to Support Bone Health

BY LAURIE MATHENA



With aging, **bone health** comes under continual attack.

In a condition like **osteoporosis**, weak and brittle bones increase the risk of falls and fractures.¹ Fragility fractures in the elderly are associated with increased mortality rates.^{2,3}

Those stricken with **osteoarthritis** can experience swelling and erosion of joint cartilage that may lead to bone erosion and joint deformity, along with pain, stiffness, and disability.^{4,5}

Rheumatoid arthritis is an autoimmune, inflammatory disease that causes pain, damage, and disfigurement of peripheral joints.⁶

All these conditions contribute to chronic disease burdens that impact quality of life.

Researchers have investigated a form of **vitamin E** called **tocotrienols**, which is found in various **plant oils**. Published findings indicate that **tocotrienols** could help combat destructive joint processes^{5,7-10} and potentially help **prevent bone loss**.^{11,12}

Bone Remodeling

Healthy bones are in a constant state of repair and maintenance. This process is called **bone remodeling**.

Optimal bone remodeling requires a balance of **osteoclasts** (cells that break down older bone tissue—called bone resorption) and **osteoblasts** (cells that help form new bone). If the balance becomes tipped in favor of *osteoclasts*, it gradually leads to cartilage and bone destruction.^{13,14}

This imbalance has been implicated in the development of osteoporosis and arthritis. Oxidative stress and chronic inflammation are notable contributors to irregular bone remodeling and contribute to this imbalance.¹⁴

Research has shown that **tocotrienols** may help combat many of the bone-destructive processes.¹²

OSTEOPOROSIS

Osteoporosis occurs as bone mineral density and bone mass significantly decrease.

This leads to reduced bone strength and increased fracture risk.

Osteoporotic bones become so fragile that fractures can occur spontaneously or as a result of a minor fall or even normal stresses such as bending and lifting.¹

Preventing fractures is of vital importance, as not only can they cause other medical problems, but fractures in elderly are also associated with increased mortality rates.^{2,3}

Osteoporosis involves an imbalance between bone buildup and bone breakdown.

Tocotrienols work in several ways to promote bone density and inhibit bone loss, which suggests they may potentially be beneficial in the fight against osteoporosis.

Preclinical studies have shown that tocotrienols:¹⁴

- Increase **bone mineralization**, a process essential for forming strong, hard bones;
- Promote formation of bone-building **osteoblasts**,
- Suppress formation and development of bone-resorbing **osteoclasts**,
- Reduce oxidative stress and inflammation by downregulating pro-inflammatory cytokines.

In animal models of osteoporosis, tocotrienol intake improves biomarkers of bone formation and bone strength.¹⁴

In animal model studies of postmenopausal osteoporotic rats, tocotrienol supplementation was found to prevent **bone loss** and to promote fracture healing.^{8,9}

A systemic review of preclinical studies suggested **tocotrienols** may potentially be useful for prevention and treatment of bone related diseases involving increased bone loss.¹²

OSTEOARTHRITIS

Osteoarthritis is the most common form of arthritis and is partially caused by mechanical wear and tear on joints. Osteoarthritis typically affects weight-bearing joints and hands.

This disease is characterized by the loss of protective cartilage in joints.⁴ Osteoarthritis treatments generally aim to reduce load (losing weight to remove stress from joints), improve joint support, rebuild cartilage, and relieve pain.

In an animal model study of osteoarthritis, tocotrienols showed joint protective effects by preventing cartilage degradation and leading to favorable changes in the joint histology and serum cartilage markers.⁵

In a **clinical trial**, patients with osteoarthritis of the knee were randomized to receive either **1.5 grams** of oral **glucosamine sulphate** or **400 mg** of palm oil rich in **tocotrienols** for six months. The symptoms were assessed using Western Ontario and McMaster Universities' WOMAC osteoarthritis index and visual analogue scale (VAS).



After six months of treatment, both groups showed a significant improvement in WOMAC scale and significant reduction in the VAS score during standing and walking.¹⁵

This study suggests that daily vitamin E may play a potential role in reducing symptoms of patients with osteoarthritis of the knee. While **tocotrienols** were shown to reduce osteoarthritis symptoms in this human trial, additional studies are needed to confirm these findings.

RHEUMATOID ARTHRITIS

Rheumatoid arthritis is an autoimmune disease in which the body's own immune system attacks the body's joints. The immune attack on joints seen in rheumatoid arthritis causes inflammation and damage to the tissue, which leads to pain and misshapen joints.⁶

One particular pro-inflammatory cytokine that has been shown to be involved in the development of rheumatoid arthritis is **interleukin-17**, or **IL-17**.¹⁶ IL-17 stimulates the production of **RANKL**, a protein that enhances the production and activation of bone-resorbing osteoclasts.¹⁰

Cell studies have shown that tocotrienols help mitigate the bone-destructive processes that contribute to rheumatoid arthritis by:^{10,12}

1. Decreasing the production of RANKL by IL-17, and
2. Preventing IL-17 from forming new osteoclasts.

Tocotrienols also decreased the differentiation of pro-inflammatory cells, called **Th17 cells**, in a recent cell study.¹⁰ This is significant because Th17 cells have been implicated in the development of many autoimmune diseases and inflammation.¹⁷

Researchers concluded that **tocotrienols** could represent a *novel therapeutic option* for treating the bone-destructive processes in rheumatoid arthritis.¹⁰

Summary

A healthy balance of bone buildup and breakdown is important for strong, healthy bones.

An *imbalance* promotes bone destruction and is one of the factors that can lead to conditions such as **osteoporosis** and **arthritis**.

By *reducing* the formation of cells that break down bone and promoting formation of cells that build new bone, **tocotrienols** may help restore healthy balance to the bone remodeling process.

This could potentially help combat the bone-destructive processes seen in rheumatoid arthritis and osteoporosis. However, further studies should be performed to clarify the mechanism of joint protection and its effects on functional parameters before firm conclusions are drawn. •

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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Chia Seeds

BY LAURIE MATHENA



Thousands of years ago, **chia seeds** were offered to Aztec gods in religious ceremonies. The whole and ground version of chia seed with its oil was part of diet, folk medicine, and ancient cosmetics in Aztec communities.¹

Just **1 ounce (2 tablespoons)** of chia seeds packs in over **4 grams** of protein, **11 grams** of fiber, and **7 grams** of unsaturated fat. It also provides **18%** of the RDA for calcium, and trace minerals including zinc and copper.²

They contain all nine essential amino acids that can't be made by the body.²

Chia seeds are a great plant source of omega-3 fatty acids, as they contain high amounts of an omega-3 called alpha linolenic acid (ALA). Sixty-five percent of the oil in chia seeds is from omega-3s.¹

Along with their impressive nutritional profile, studies have shown that chia seeds provide a variety of impressive health benefits.

For example, research has established that chia seeds can play a role in helping to manage diabetes, dyslipidemia, and hypertension. They also have anti-inflammatory, antioxidant, anti-blood clotting, immune-boosting, laxative, antidepressant, and analgesic properties.¹

Chia seeds could be especially valuable for type II diabetics. Studies have shown that consuming **40 grams** of chia seeds per day for 12 weeks helps reduce **systolic blood pressure** in people with hypertension and type II diabetes.³

In another 12-week clinical trial, subjects were randomized to hypertensive drug-treated, hypertensive untreated patients, and placebo groups. Subjects consumed **35 grams** per day of chia flour or a placebo. After 12 weeks it was concluded that Chia flour has the ability to reduce blood pressure in both treated and untreated hypertensive individuals, while no change was observed in the placebo group.⁴

Chia seeds have also been shown to promote increased feelings of fullness and reduced food intake, which can promote **weight loss**.⁵

In a study of obese type II diabetics, adding chia seeds to a reduced calorie diet led to significantly greater weight loss than in those who received a placebo.⁶

Chia seeds can be added to smoothies or baked goods, used as a thickener for sauces, or mixed with your choice of liquid (ex: almond milk) to make a chia pudding. Top it with cacao nibs, shredded coconut, or fruit for a delicious treat. ●

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

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