

How Carnosine Delays Aging

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Will Magnesium Become the Next Vitamin D?



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Will Magnesium Become the Next Vitamin D?



BY WILLIAM FALOON

Vitamin D has emerged as a nutrient with astonishing value in disease prevention. Its **low cost** enables virtually everyone to supplement with enough potency to obtain broad-spectrum benefits.

Magnesium has similar attributes since it provides robust health effects, costs very little, and most Americans don't get enough.

The best way to summarize vitamin D is that people who are deficient suffer more degenerative illness and premature death. The same holds true for magnesium.

Scientists recognize **magnesium** mostly as it relates to protection against cardiovascular disorders. Higher magnesium intake is associated with reduced risks of sudden cardiac death,¹⁻³ stroke,⁴⁻⁶ type II diabetes,⁷⁻⁹ asthma,¹⁰ metabolic syndrome,^{11,12} heart disease,^{13,14} hypertension,¹⁵⁻¹⁹ and osteoporosis.^{20,21}

What few publications discuss are findings showing **cancer risk reductions** in those who ingest **higher** amounts of magnesium.²²⁻²⁴

The challenge when assessing **dietary** magnesium intake is the inconsistency of the amount of magnesium contained in food.

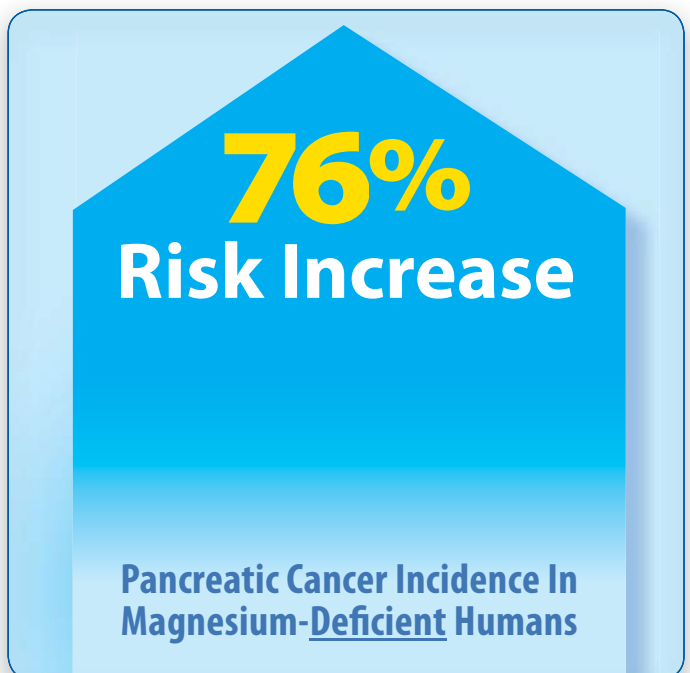
Magnesium is not manufactured inside plants like disease-fighting polyphenols. This means the quantity of **dietary** magnesium is largely dictated by the amount of magnesium in the **soil** the food is grown in, or the mineral content of the **water** one drinks, both of which are highly variable.

In a landmark human study, there were marked reductions in **pancreatic cancer** risk in those who ingested

higher amounts of **magnesium** primarily in dietary supplements. Other studies show **colon cancer** risk reductions in response to **higher** magnesium intake.

The totality of evidence supporting **magnesium's** systemic benefits may soon transform this mineral into the next **vitamin D** as far as widespread public use is concerned.

This is great news for Americans, who face a phalanx of degenerative disorders that **magnesium** has been shown to protect against. It's regrettable that it has taken so long for this realization to manifest.



Before the sun sets today, about **145 Americans** will learn they have **pancreatic cancer**.²⁵ It will likely be the worst day of their lives.

There are no “good” treatment options. The newly diagnosed cancer patient faces a litany of “bad” choices that are unlikely to be curative, but will inflict horrific side effects.

In recognition of lack of curative therapies, **Life Extension Foundation**[®] is funding clinical studies aimed at identifying better treatments for this malignancy that kills more than **40,000** Americans every year.²⁵

Until a treatment breakthrough emerges, the best way to avoid becoming a casualty of **pancreatic cancer** is to not develop it in the first place.

Diabetics at Higher Risk for Pancreatic Cancer

A high percentage of **pancreatic cancer** patients also have **type II diabetes**.²⁶⁻²⁸ Research has shown that about **80%** of pancreatic cancer patients had diabetes or

glucose intolerance upon their cancer diagnosis.^{29,30}

These findings support current research showing elevated cancer risks in people with *higher* blood **glucose** levels.³¹ In response to excess glucose, more **insulin** is secreted, which in turn fuels growth of malignant cells.³²

An interesting finding we reported several years ago showed that **type II diabetics** that used the drug **metformin** had a **62% lower** pancreatic cancer risk compared to those who had not taken the drug.³³ One of metformin’s properties is to improve insulin sensitivity by activating a cell-energy enzyme, **AMPK**.³⁴

The risk of contracting **type II diabetes** is lower in those with *higher* intakes of **magnesium**. A meta-analysis of human studies found that for every **100 mg increase** in magnesium intake, risk of developing type II diabetes decreased by **15%**.⁷

This understanding has led researchers to investigate whether people who consume more **magnesium** have lower **pancreatic cancer** incidence.

Higher Magnesium Intake Lowers Pancreatic Cancer Risk

A landmark study meticulously evaluated data from a large group of adults and found that a modest increase in assessed **magnesium** intake from a combination of diet and supplements resulted in profound reductions in **pancreatic cancer** risk.³⁵

What struck us about this study’s findings is that it did not require a *large* amount of additional magnesium to produce a meaningful reduction in pancreatic cancer risk.

Researchers found that pancreatic cancer risk increased by **24%** for every **100 mg decrease** in **magnesium** intake below the recommended daily allowance (RDA). For example, an individual with a daily magnesium intake of **200 mg** has a **24%** increased risk of pancreatic cancer compared to a person who ingests **300 mg** a day. Both of these intakes (**200 mg** and **300 mg** a day) of magnesium are considered deficient even by government standards.





This study, published in late 2015, evaluated data from the *VITamins And Lifestyle* (VITAL) trial involving more than 66,000 men and women aged 50-76 years who were followed for an eight-year period. The subjects were divided into the following three groups based upon their magnesium intake:

- 1. Optimal Intake** - Defined as ingesting greater or equal to **100%** of the government RDA for magnesium (**420 mg** a day for males and **320 mg** a day for females)
- 2. Sub-optimal Intake** - Daily intake of **75%** to **99%** of the government RDA for magnesium
- 3. Deficient Intake** - Less than **75%** of the government RDA for magnesium (less than **315 mg** a day for males and less than **240 mg** a day for females)

Those who ingested **75%-99%** of the government's RDA for **magnesium** (sub-optimal intake) had a **42%** greater risk of **pancreatic cancer** incidence compared with those ingesting greater than or equal to **100%** of the magnesium RDA.

Those who ingested **less** than **75%** of the government's RDA for magnesium (deficient intake) had a

striking **76%** greater risk of **pancreatic cancer** incidence compared to those whose intake of magnesium was equal to or greater than the government's (optimal intake) RDA.

When analyzing those who met or exceeded the government's RDA for total magnesium intake, only those who took **dietary supplements** containing **magnesium** were able to consistently achieve the benefits.

This led the authors to state that to gain the benefit of magnesium at least at the recommended daily allowance (RDA) level, that "**dietary magnesium intake alone may not be sufficient.**"³⁵

What's striking about these findings is that the amount of added magnesium needed to meet the government's RDA was exceedingly small. For most people,

taking one magnesium capsule a day, or obtaining it in a scientifically formulated multinutrient formula is all that is needed to produce this robust preventive effect against pancreatic cancer.

This and other studies you're about to learn about are why we think that **magnesium supplementation** is destined to become as prevalent as **vitamin D** is today.

Prior Studies on Magnesium and Pancreatic Cancer

Previous studies sought to establish a link between magnesium ingestion and pancreatic cancer. Ascertaining the precise amount of magnesium ingested was challenging due to variability of magnesium content of food/water.



Urgent Need for Widespread Magnesium Supplementation

In the recent analysis, the researchers found that the beneficial relationship between magnesium intake and the incidence of pancreatic cancer disappeared in study volunteers not using supplements.

The researchers hypothesized that this lack of association was likely due to both a reduced magnesium dose and narrower range of achieved dietary magnesium intake, to which the researchers reasoned: "**...to gain the benefit of magnesium intake... dietary magnesium intake alone may not be sufficient.**"³⁵

Most striking was the calculation that only a few hundred extra milligrams of magnesium taken each day markedly reduced pancreatic cancer risk. This small amount is readily available with low-cost supplements.

Two initial case-control studies showed an association between higher magnesium intake and lower pancreatic cancer rates,^{36,37} whereas a similar case-control study found no association.³⁸

Other studies found a reduced rate of pancreatic cancer only in heavier men, which is significant because **obesity** is a pancreatic cancer risk factor.³⁹ One of these studies published in **2010**

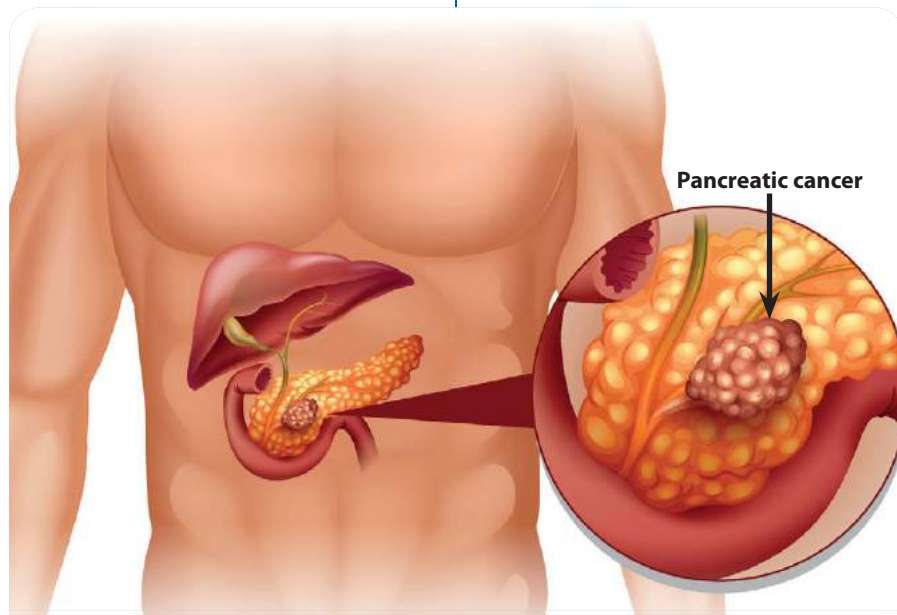
showed a reduction in pancreatic cancer in men with a body mass index (BMI) of **25 kg/m²** or more who consumed *higher* amounts of magnesium.⁴⁰

This study showed a **33% reduced** pancreatic cancer risk in overweight men whose average daily magnesium intake was **423 mg** compared to **281 mg**.⁴⁰ Another study showed that for each **100 mg** increase in magnesium intake amongst overweight men, there was a **21% decreased** risk.³⁹

Once again, a relatively small amount of magnesium supplementation would have placed all these men into the higher protective category.

Since the majority of aging men are **overweight**, this finding has significant public health implications.⁴¹

These findings corroborate the **2015** report showing only a small increase in ingested magnesium significantly reduces pancreatic cancer risk.



Lethal Nature of Pancreatic Cancer

Pancreatic cancer is the fourth leading cause of cancer-related mortality in the United States.⁴²

Pancreatic cancer is rapidly fatal with little long term effective treatment and a 5-year survival rate of **7%**.⁴³

Factors associated with pancreatic cancer risk include cigarette smoking,⁴⁴⁻⁴⁶ diabetes,^{47,48} obesity,^{49,50} unhealthy dietary practices,⁵¹⁻⁵³ and low intake of specific nutrients such as vitamins E, C, B6, B12, carotenoids, folate, lycopene, and selenium.⁵⁴⁻⁵⁶

Until a cure is discovered, identification of modifiable risk factors is crucial to reduce pancreatic cancer mortality.

In observational studies, type II diabetes has been consistently associated with an elevated risk of pancreatic cancer.^{26-28,57-60} Current findings support a role for glucose intolerance,⁶¹⁻⁶³ insulin resistance,^{63,64} and excess blood insulin (hyperinsulinemia) in the development of pancreatic cancer.^{65,66}

Studies with long follow-up periods have consistently found an association between elevated after-meal or fasting **glucose** levels and higher pancreatic cancer risk.^{67,68}

Given that, the totality of studies on pancreatic cancer risk, dietary factors (such as magnesium) and drugs (such as metformin) that improve insulin sensitivity may exert a major impact on pancreatic cancer risk reduction.^{33,35,69-71}

Magnesium and Colorectal Cancer

Colorectal cancer is expected to be diagnosed in almost **135,000** Americans and to cause about **50,000** deaths this year.⁷² It is less feared than pancreatic cancer because treatments are less mutilating and cure rates far higher.

A large study evaluating Japanese men found that those with the highest dietary intake of **magnesium** were over **50% less** likely to contract **colon cancer**.²²

A study emanating from the Netherlands showed that for each extra **100 mg** increase in magnesium intake, there was a **19% reduction** in colorectal adenomas (precursors to colon tumors).²⁴ The second part of this study found



that for each additional **100 mg** of magnesium, there was a **12% reduction** in colorectal cancer risk. Again, we're seeing a relatively modest increase in magnesium ingestion inducing meaningful cancer risk reductions.

Magnesium plays essential roles in regulating genome stability,^{73,74} cell signaling,^{75,76} insulin sensitivity,⁷⁷ systemic inflammation,⁷⁸⁻⁸¹ and DNA maintenance and repair.^{73,74} It is therefore not surprising that low intake of magnesium is associated with increased risk of certain cancers.

Food Sources of Magnesium Are Not Reliable

A website for medical professionals lists magnesium-rich foods as "**Leafy vegetables, nuts, legumes, whole grains, fruits and fish.**"⁸²

While these fit into the "healthy food" category, one cannot reliably expect to obtain consistent and sufficient amounts of magnesium by ingesting them.

Magnesium content in vegetables has seen huge declines since pre-1950 levels.⁸³⁻⁸⁷ Typical grain refining processes for bread and pasta remove **80%-95%** of total magnesium.⁸³

There needs to be sufficient soil concentration of magnesium for plants to absorb it in the first place. In some instances, soils have too much potassium which competes for absorption of magnesium into the plant.

There are certain bottled waters that naturally contain high amounts of magnesium, but these are rare on the commercial marketplace.⁸⁸

Urgent Need for Magnesium Supplementation

Life Extension first advocated for higher-dose magnesium supplementation in **1981**. Back in those days, **calcium** supplements were very popular, but few of them contained enough magnesium. Overlooked was the vital role that **magnesium** played in overall health including maintaining **bone density**.^{20,21,89}

Most people today associate **magnesium** as a mineral that

reduces **cardiovascular** risk. A wealth of published scientific data supports this.

With accumulating data showing that **magnesium** can slash risks of common **cancers**, we think the use of magnesium supplements will soon rise to the level of "**must have**" nutrients like **vitamin D**.

Similar to vitamin D, **magnesium** costs so little that it is readily affordable by almost everyone, which has huge implications in improving public health.

This month's issue contains an article that pays tribute to an early pioneer who advocated for higher magnesium ingestion. We also provide an update of the latest findings demonstrating the vital importance of obtaining sufficient magnesium to diminish risk of degenerative illness.

For longer life,

William Faloon



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The National MAGNESIUM Crisis

The medical community does not yet understand the life-sustaining properties of **magnesium**.

In today's world of high drug prices, it's hard for physicians to conceive how an **inexpensive** mineral can provide such **diverse** health benefits.

Volumes of studies show that those with **higher** magnesium intake have sharply lower rates of hypertension¹ and heart disease,² fewer strokes,³ better blood sugar control,⁴ lower rates of kidney disease,⁵ less risk of cognitive decline,⁶ healthier bones and teeth,⁷ and even lower risk of migraine headache.⁸ As if this weren't enough, magnesium has also been linked to longevity.⁹

The majority of Americans do not obtain enough **magnesium** from dietary sources.¹⁰ The result is an epidemic deficiency of a nutrient vital to protecting against degenerative aging.

Magnesium and Longevity

Magnesium is the fourth most abundant mineral in the human body. More than 300 enzymes require magnesium in order to function properly.¹¹

Magnesium is crucial for converting chemical energy from food into useful energy for our bodies, and it has unique functions in regulating blood sugar, blood vessel health, heart function, and brain electrical activity. About half of our total body stores of magnesium are found in bone, which contributes to its strength and integrity.^{7,11}

In fact, virtually every system in the body requires magnesium for its function.

Despite this fact, most of us are not getting enough magnesium to support good health. When humans got their water the old-fashioned way, from natural springs and wells, it was easy to get enough of this naturally-occurring mineral. But today's world of municipal water supplies and bottled, purified water has left us woefully deficient.

Of people over age 70, **80%** of men and **70%** of women fail to get the estimated average requirement (**350 mg/day** for men and **265 mg/day** for women) of magnesium from their diets.^{12,13} Compounding the problem, magnesium levels decline with age, and low magnesium levels are commonly seen in age-related disorders.^{6,14}

To make matters still worse, many common drugs are known to deplete the body of magnesium, further contributing to low levels.¹⁵ Of these, the **proton-**

pump inhibitors (PPIs)—drugs used by millions for heartburn relief—are the most notorious and widespread.^{16,17}

Americans' low magnesium intake—coupled with declining magnesium status with age—represent major obstacles to optimal health and longevity.¹¹

In fact, the risk of death from any cause is significantly **higher** in people 65 and older who have **lower** levels of magnesium intake or low blood levels of magnesium.^{18,19} Basic lab studies show that low magnesium levels *accelerate the aging process* at the cellular level, increasing the number of senescent cells incapable of further replication or participation in healing.^{9,20}

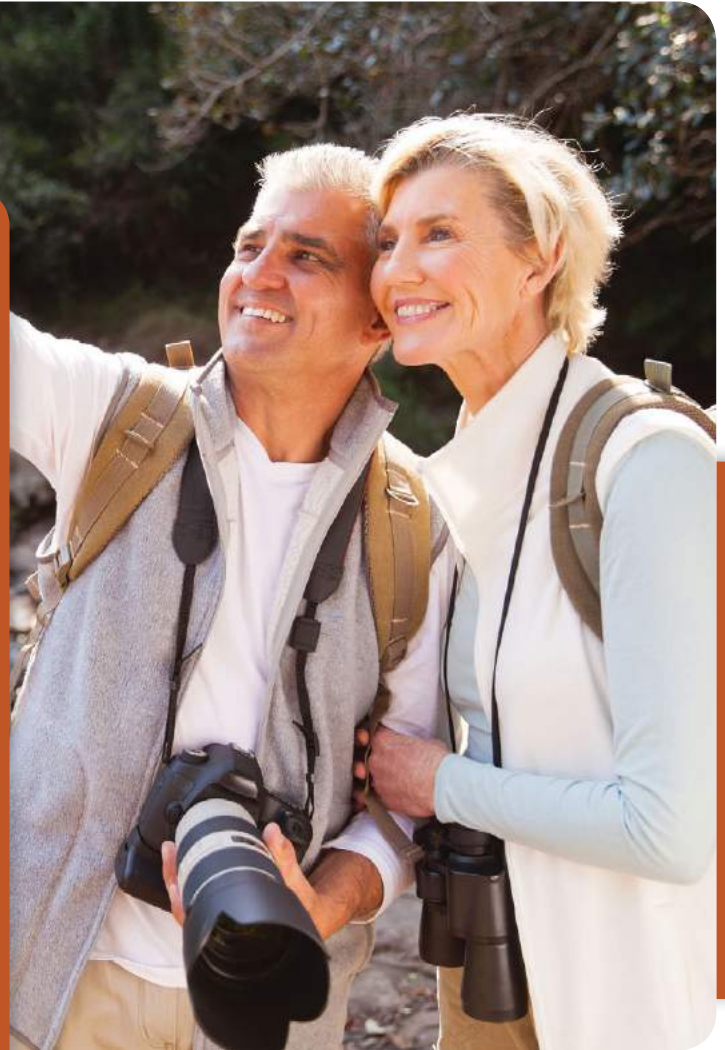
The good news is that ample magnesium intake and blood levels have been associated with **reduced** mortality. In one study, higher magnesium blood levels appeared to predict better outcomes among hospitalized patients who were critically ill. While **55%** of those who had **low** blood levels when they were admitted died, that figure was only **35%** in those with **normal** levels.²¹ (Optimal levels may have conferred greater-life-protective effects.)

Magnesium has been long-neglected by mainstream physicians, much like higher-dose vitamin D. Like vitamin D, however, magnesium is suddenly coming into its own as a result of a multitude of recent studies showing its ability to promote cardiovascular health,² lower stroke risk,³ regulate blood sugar levels,⁴ help prevent osteoporosis,⁷ and more.⁸



The Benefits of Magnesium

- Magnesium is the fourth most common mineral in our bodies.
- Although it has been overlooked for years, magnesium is now emerging as a multi-targeted nutrient with myriad functions throughout the body.
- Magnesium is particularly important in electrically active cells, such as those in the brain, heart, muscles, and artery linings.
- 70% to 80% of Americans fail to meet the estimated average requirements of magnesium from their diet, leaving them vulnerable to disorders linked to its deficiency.
- Studies now show that ample magnesium intake is protective against a host of age-related disorders, including cardiovascular disease and stroke, diabetes, osteoporosis, and more.
- For reliable, consistent daily intake of magnesium, look for a supplement that offers both immediate and extended release.



What You Need to Know

Magnesium Promotes Cardiovascular Health

One of magnesium's most critical benefits is its ability to protect against the number one killer of Americans: cardiovascular disease. Studies show that people with the highest dietary intake of magnesium are **37% less** likely to die from a sudden cardiac death.²² Even better, compared to those with the lowest intake, those with the highest intake were found to be **34% less likely** to die from any cause at all.²³

Magnesium has numerous mechanisms of action that explain its ability to protect against cardiac deaths. The cardioprotective actions include magnesium's role in maintaining heartbeats and preventing arrhythmias, and in protecting blood vessels against the accumulation of calcium. This can help lower the risk of atherosclerosis, which is a well-known predictor of heart disease, stroke, and death.^{22,24,25}

Studies show that for each **50 mg** increase in daily magnesium intake, calcification of the heart's main arteries decreased by **22%**, and calcification of the aorta—the body's main artery—fell by **12%**. As a result, those with the highest magnesium intake were **58%** less likely to have any calcification of the coronary arteries and **34%** less likely to have any calcification of the abdominal aorta.²⁶

On the other hand, low dietary intakes and blood levels of magnesium are associated with elevated risk for cardiovascular diseases in general, and of **arterial calcification** specifically.^{2,25,27,28} One study showed that those with the lowest levels of serum magnesium were **2.1 times more** likely to have coronary artery **calcification**.²⁹

These studies showing the dangers of low magnesium levels—and the incredible benefits of obtaining adequate magnesium levels—make it clear that magnesium is an essential component of cardiovascular health.

Magnesium Supplements Vary

There is no single “optimal” form of magnesium for supplementation. Instead, it is important to consider the **reason** for the supplement.

One approach for ideal magnesium supplementation is to use a **2-part supplement** composed partly of *magnesium citrate* in a **quick-release form** and magnesium oxide in an **extended-release form**.

Magnesium oxide is highly concentrated, allowing a lot of magnesium to go into a relatively small pill. Because magnesium oxide is somewhat less bioavailable, it is ideal for an extended-release formulation, which gradually makes its way into the circulation.

Magnesium citrate, on the other hand, is less concentrated but is highly bioavailable, which allows for quick release of the mineral in a form that is readily absorbed.

This kind of innovative combination provides extended magnesium benefits in a single supplement.

Magnesium Lowers Stroke Risk

There are numerous factors that can lead to a stroke. For example, strokes can occur when blood pressure is too high, weakening cerebral arteries in a way that can induce bleeding in the brain (hemorrhagic stroke).

More common strokes occur when artery linings are damaged, setting up conditions for an artery-blocking clot (ischemic stroke). They also commonly occur when a heart arrhythmia or artificial heart valve creates a blood clot that travels into a cerebral artery and blocks vital blood flow (ischemic stroke).^{30,31}

Maintaining consistent magnesium levels may help to prevent all of these processes.

In one study, men with the highest magnesium intake had significantly lower blood pressure and total cholesterol, and were **41% less** likely to have a stroke than those with the lowest magnesium intake.³

And according to a 24-year-long study of nearly 43,000 men, subjects with the highest supplemental magnesium intake had a **26%** lower stroke risk than those with the lowest intake.³²

Studies in women have also shown the dangers of having low blood levels of this mineral. In one of these studies, women with the lowest blood levels of magnesium were found to be **34%** more likely to have an **ischemic stroke** than those with higher levels.³³



NATURAL MAGNESIUM

And in another study, low blood magnesium levels were associated with an approximate **50%** greater likelihood of developing **atrial fibrillation** (a type of irregular heartbeat that can cause a blood clot that can lead to a stroke) compared to those with higher levels.³⁴

Magnesium is so critical for helping maintain a regular heartbeat that hospitals use intravenous magnesium to prevent atrial fibrillation following heart bypass surgery.³⁵

Magnesium Improves Blood Sugar Control

Aging and obesity induce *insulin resistance*, which elevates blood sugar levels. High, or even “borderline high,” blood sugar inflicts glycation damage to proteins throughout the body that prevents them from functioning properly. Controlling blood sugar—even in *nondiabetic people*—is a critical approach to preventing age-related diseases.

Magnesium supplementation improves the body’s response to insulin, which takes sugar out of the bloodstream.

A comprehensive review of 21 smaller clinical trials showed that magnesium supplementation led to significant improvements in insulin resistance.⁴ For example, after just four months, those supplementing with magnesium had an average of **13 mg/dL** lower blood sugar levels compared with placebo recipients. The longer the subjects took the magnesium, the greater the improvements in insulin resistance. The effects were greatest in those subjects whose magnesium levels were lowest at the beginning of the study.

Importantly, these improvements were seen in both diabetic and nondiabetic patients. This is critical because nondiabetics with borderline elevated blood sugar are at increased risk for developing diabetes. This study showed that magnesium is effective both for treating and for preventing diabetes.

Magnesium and Kidney Protection

The kidneys take a beating every day as they filter out waste products from blood. This leaves them particularly vulnerable to the effects of blood pressure and endothelial dysfunction, as well as the ravages of borderline or high glucose levels. Sustained over a lifetime, those factors raise the risk of serious kidney disease.

Kidney disease itself weakens the kidney's ability to regulate magnesium. This contributes to ongoing losses of magnesium and makes magnesium supplementation that much more critical.³⁶

Researchers studied more than 13,000 middle-aged adults for over 20 years to find out if there was a connection between magnesium levels and kidney disease. They discovered that low magnesium levels are a strong, *independent* risk factor for chronic kidney disease.⁵

What they found was that, compared with those with the highest magnesium levels, those with the lowest magnesium levels had a **58% greater** risk of developing chronic kidney disease, and a nearly **2.4-fold** greater risk of developing end-stage renal disease, requiring dialysis to sustain life.⁵

Magnesium Supports Bone and Dental Health

While calcium is a well-known bone-protecting nutrient, few people recognize the important role magnesium plays in maintaining healthy bones. In fact, about half of total body magnesium is stored in bones.^{7,11}

Because of that, low levels of magnesium directly lead to **osteoporosis** by depriving bone tissue of one of its most essential structural components.

Low magnesium also indirectly weakens bones by stimulating inflammatory cytokines that contribute to osteoporosis by increasing the breakdown of bones.^{37,38}

The fact that **70%-80%** of Americans don't meet the daily average requirements of magnesium from their diet puts the large majority of the population at risk for this serious condition. Fortunately, assuring good magnesium intake helps protect against osteoporosis.

A large study of women demonstrated that those whose daily magnesium intake exceeded **423 mg** had greater hip and whole-body bone mineral density compared with those getting less than **207 mg** daily.³⁹

This protection extends to teeth as well. Like bones, **teeth** also have high magnesium content and rely on its presence for their structure.⁴⁰ Because of this connection, magnesium supplementation has been found to improve **tooth attachment** and help subjects retain more teeth.⁴¹

Magnesium and Migraines

Low levels of magnesium are associated with increased risk for migraines.^{8,42-45} This connection could be related to a genetic inability to properly manage magnesium in the gut and kidneys.⁴²

While there is no cure for migraines, supplementing with magnesium has numerous benefits for those suffering from the condition.

A study of 81 migraine sufferers found that supplementing with magnesium for 12 weeks reduced the frequency of migraines by **41.6%**, decreased the number of days with a migraine, and slightly reduced the duration and intensity of the attacks.⁴⁶

Other studies have shown that oral magnesium may prevent migraines, and that intravenous magnesium may be an effective treatment.⁴⁵

Researchers have stated: "*Intravenous and oral magnesium should be adapted as parts of [a] multimodal approach to reduce migraine.*"⁸



How It Works

Magnesium is an absolute requirement for energy production from fats and carbohydrates and for synthesis of new proteins in our body.⁴⁷ Magnesium helps regulate the flow of other mineral ions in and out of cells in skeletal and heart muscle, in artery walls, and in brain and nerve cells.

As a result, it is related to conditions as diverse as **depression** (involving brain cells), **muscle cramps** (involving skeletal muscle), **heart arrhythmias** (involving heart muscle cells), and **hypertension** (often involving cells in arterial walls).^{1,48-52}

Magnesium also fights against the chronic, low-grade **inflammation** associated with aging and unhealthy lifestyles.⁵³⁻⁵⁵ This effect has been traced to magnesium's ability to reduce the activity of the "master inflammation regulator" called **NF- κ B**, which results in downstream shutdown of cytokines and other pro-inflammation signaling molecules.⁵⁶

Inflammation is a major contributor to a wide range of chronic, age-related diseases. This explains in part why poor magnesium status is so closely associated with diabetesity (diabetes and obesity) and metabolic syndrome, with cardiovascular disease, and neurodegenerative disorders such as Alzheimer's.⁵⁷⁻⁵⁹

The role of magnesium deficiency in chronic inflammatory stress led researchers to conclude that it should be considered a significant nutrient for health and well-being.⁵⁴

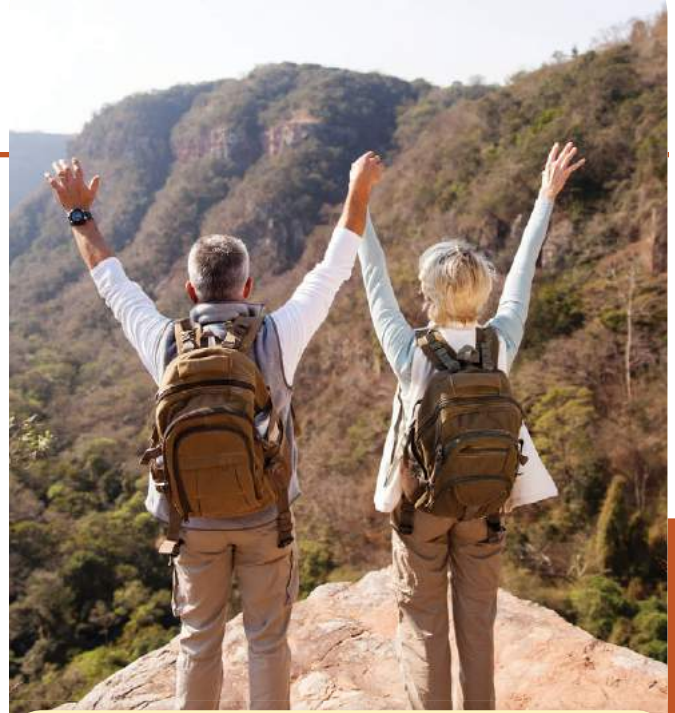
Summary

Magnesium has been described as an "orphan nutrient," because so few people really understand its importance. Yet it is involved in hundreds of critical body processes.

Few Americans get adequate magnesium to support all of those processes, leaving them vulnerable to a host of potentially serious diseases. Fortunately, magnesium is a **low-cost** supplement available without the need of a doctor's prescription.

Magnesium is emerging as this generation's **vitamin D**—an overlooked nutrient that favorably alters human disease risk and improves quality of life. ●

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



Magnesium's Underappreciated Role in Healthy Longevity

When **Life Extension®** raised awareness of the need for higher-dose vitamin D, it was thought of only as a nutrient added to milk for strong bones and teeth.

Physicians are just now realizing that vitamin D plays a key role in everything from immunity and brain function to heart disease and diabetes.

Today, **Life Extension** continues to raise awareness of the essential nature of another nutrient that is vastly underappreciated, i.e., magnesium.

Since 1981, **Life Extension** has recommended higher magnesium intake, despite conventional medical authorities seeing little or no value to it.

This is regrettable, since magnesium is perhaps the most deficient mineral in the American diet.

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BY MICHAEL DOWNEY

AN AMERICAN HERO...

Paul Mason's Mission to Educate Humanity about **MAGNESIUM**

For the past 25 years, **Paul Mason's** life mission has been to persuade the world to consume more **magnesium**.

His campaign is reminiscent of the slow battle to educate mainstream medicine that higher **vitamin D** levels are needed to reduce all-cause mortality.

Recently, Mason talked to **Life Extension Magazine**® about his tireless efforts and how he discovered America's only known source of natural, magnesium-abundant, high-pH mineral water.

Paul Mason is an American hero who has tirelessly exposed the huge numbers of needless deaths caused by **magnesium deficiency** in the United States. One way Paul accomplished this was to amalgamate a number of published studies to show the lethal impact on human populations when there is insufficient magnesium in their drinking water.



Paul Mason

Mason loves to point to recently published evidence demonstrating that universally increased magnesium intake could prevent an astounding **4.5 million deaths** worldwide, annually.¹ In an effort to stop this epidemic, he has distributed up to 15 million gallons of naturally sourced, magnesium-rich mineral water each year for the last 20 years from his Adobe Springs Water Company in the mountains of central California.

“And I’m now working to develop an additional 50 million gallons per year of magnesium-rich water from nearby lands,” he told us.

For many years, he has tried to convince the FDA—to no avail—and producers of bottled water and soft drinks worldwide that simply adding magnesium to their beverages would provide most people with at least the government’s recommended intake of this lifesaving mineral. If bottlers prefer to market bottled water that is naturally rich in magnesium, he will gladly supply them with bulk water from his state-licensed and inspected springs.

Discovering America’s Richest Water-Source of Magnesium

Paul first began investigating how thoroughly widespread magnesium deficiency is—and collecting a vast online library of studies showing how magnesium greatly reduces the risk of cardiovascular disease—shortly after he accidentally discovered the magnesium-rich springs near Patterson, California. Crunching the numbers, he estimates his water saves about 90 lives a year by preventing heart attack and stroke.



It all started in 1992 when Paul bought a property in Central California named Adobe Canyon, which he says resembles a miniature Grand Canyon. After he cleared the property, he discovered it contained a huge underground spring. He had the water lab-tested to ensure it was safe. When the test came back showing high levels of magnesium, he asked the chemist, “Is that good or bad?” The chemist responded, “Oh that’s good, but unheard of.”

So Paul started emailing magnesium researchers that the Adobe Springs had unheard-of magnesium abundance of **110 mg** per liter, combined with an extremely low **6.3 mg/L** sodium content and a healthy pH of **8.4** and great flavor, too. Then the researchers started coming to see the Adobe Springs as a wonder of the world, and they convinced Paul Mason of the lifesaving benefits of magnesium.

It took five years of work at Adobe Springs to install tanks and 6” pipes, build a loading dock, and find the first bottler, which was

challenging in 1992 when few people drank bottled water.

Paul notes that, in 2009, the World Health Organization finally recommended that all drinking water should contain at least **25 mg** of magnesium per liter to prevent heart attacks and stroke.²

Gathering the Evidence

Mason’s online library now provides access to over 300 studies on magnesium, documenting that even small amounts of magnesium in drinking water—often just **5-20 mg** per liter—can reduce the incidence of mortality and heart disease. The underlying reason for this is the widespread magnesium deficiency that results from increased consumption of processed foods, water purification processes that remove natural minerals, and mineral-depleted soil.

For about 20 years, he has financially supported researchers worldwide who investigate magnesium and the critical need for

this mineral. He names several scientists who receive monthly grants from him and then adds:

“...in 2015, I created the Magnesium For Health Foundation and also brought together 12 magnesium scientists from all over the world to exchange knowledge at a conference in San Francisco—I hope to do the same thing in 2017.”

Studies continue to validate Mason’s urgent advice to the world that consuming more magnesium could save millions of lives every year. Regrettably, few have bothered to pay attention.

Public Awareness: “There Is a Long Way to Go”

Low blood levels of magnesium are considered to be one of the most underdiagnosed blood chemical deficiencies in modern medicine.³ For this reason, it is important to have blood magnesium levels tested regularly and to supplement when necessary.

“*Life Extension Magazine* has certainly helped raise public awareness,” explains Mason. “But there is a long way to go.”

Some pharmaceuticals change the way magnesium is utilized by the body by inhibiting nutrient absorption, synthesis, transport, metabolism, and excretion.^{4,5} Processed and snack foods often have the magnesium processed right out of them.⁶ Aging itself has been linked with declining magnesium in human cells.⁷ And as Mason stresses, many Americans drink filtered or bottled water, which in the US contains only **10%** as much magnesium as bottled water in the rest of the world.⁸

Most Americans ingest an average of about **270 mg** of magnesium a day, well below the modest RDA

levels—**420 mg** for adult males and **320 mg** for adult females—which will generate a substantial cumulative deficiency over months and years.⁹ Older individuals are at elevated risk of becoming magnesium-depleted,¹⁰ and substantial deficiency is common by age 50. Deficiency can reach severe levels among those with any condition that causes frequent loose stools, including celiac disease and bowel resection surgery. And as Mason points out, insufficient vitamin D levels can exacerbate magnesium deficiency.¹¹

Compelling research shows that for each **0.25 mg/dL** increase in plasma magnesium, the risk of sudden cardiac death falls by **41%**.¹³ Another study found that adults with a magnesium intake lower than the recommended amount were up to **1.75** times more likely to have elevated C-reactive protein,¹⁴ a blood marker for inflam-

mation that predicts the likelihood of a heart attack or stroke. Among adults already at high risk of cardiovascular disease, those who had the highest magnesium intakes were demonstrated to have a **34%** reduction in mortality risk relative to those having the lowest intake.¹⁵

Accumulating evidence also suggests that low magnesium intake and levels drastically accelerate the aging process and affect lifespan.^{13,16-18} Lab culture studies show that low magnesium accelerates the senescence of some human cells,¹⁹ prompting the scientists behind one study to write, “...we propose that broadly correcting nutritional intakes of Mg might contribute to healthier aging and the prevention of age-related diseases.”¹⁹ In fact, research suggests that magnesium is absolutely essential for repairing telomeres, the aging-timers found on DNA strands.²⁰

Magnesium: Deficiency Symptoms and Dosage Information

Magnesium is the fourth most abundant electrolyte in the human body.²² The recommended dietary allowance, or RDA, for magnesium is **420 mg** a day for adult men and **320 mg** a day for adult women. The magnesium RDA refers to elemental magnesium, defined as the amount of magnesium, regardless of its source or form.

Most people fail to achieve the RDA, which can cause magnesium deficiency.⁹ Older individuals are at higher risk of deficiency.¹⁰ Deficiency symptoms can include abnormal heart rhythms, restless leg syndrome, sleep disorders, insomnia, muscle spasm, confusion, and even seizures.²³

The mineral water available at Adobe Springs contains **110 mg** of magnesium a liter, unparalleled among America-sourced mineral waters. Mineral water is defined by the FDA as water from a natural, protected, underground source that contains at least 250 parts per million, or **ppm**, (**mg/L**) of total dissolved solids consisting of minerals and trace elements—Adobe Springs water contains **500 ppm (mg/L)** of total dissolved solids.²⁴

Magnesium supplements are among the least expensive nutrient. The most common adverse reaction from the use of magnesium supplements is diarrhea.²³

Preventing 150,000 Deaths

According to the US National Academy of Sciences (1977), there have been more than 50 studies in nine countries that have indicated an inverse relationship between water hardness and mortality from cardiovascular disease. That is, people who drink water that is deficient in magnesium and calcium generally appear more susceptible to this disease. The US National Academy of Sciences has estimated that a nationwide initiative to add calcium and magnesium to soft water might reduce the annual cardiovascular death rate by 150,000 in the United States.²⁴

Scientists have associated higher magnesium levels with a **40%** lower risk of death from cardiovascular disease,¹² a **77%** reduced risk of sudden cardiac death,¹³ a **50%** decreased risk of cancer,¹² and **40%** lower risk of death from all causes.¹²

Reduced Magnesium Bioavailability from Food

These shocking statistics strongly support Mason's mission to increase magnesium intakes—especially in light of research reporting that, *“In developed countries, the magnesium intake is often marginal.”*²¹ But focusing on different dietary choices does not appear to be the answer.

“Magnesium in food is less bioavailable than from water because of interference from dietary fat, fiber, competing minerals, and so

on,” he explains. Research backs him up. One published study found that magnesium is more quickly and better absorbed from magnesium-rich **water** than from food.²¹

Most Americans don't have Mason's access to his Adobe Springs mineral water and the coffee he makes from it each day. But he added, “I also take **Life Extension**[®] magnesium supplements when I'm traveling,” and he suggested that all Americans without access to his water do the same. He also invited readers who find themselves in the area to bring their own bottles to the Adobe Springs **free** spigot near Patterson, California, and load up on magnesium-rich water.

For most of us, however, mineral supplements are critical. Fortunately, they're among the least expensive on the market. Maybe that's why they're not generally promoted as the lifesaving nutrient they represent. And as Mason has experienced firsthand,

the federal government has repeatedly suppressed magnesium's importance in countering today's heart attacks and strokes.

Although cheap magnesium supplements are an easy solution, this unsung hero would love to see more people with daily access to magnesium-rich, low-sodium, high-pH water. Both Mason and his staff have taken a vow to maintain modest lifestyles so that resources can stay focused on developing magnesium-rich water sources worldwide.

“I live in a 40-year-old doublewide and drive a 12-year-old pickup,” he adds.

“I think there will be an increasing demand for magnesium-rich water, so I'm hoping to develop more sources from magnesium-rich aquifers. My fine crew at the Adobe Springs is onboard...and if any reader knows of a spring, creek, or aquifer having at least **25 mg** of magnesium per liter, I'd like to know about it—so we can save even more lives.” ●

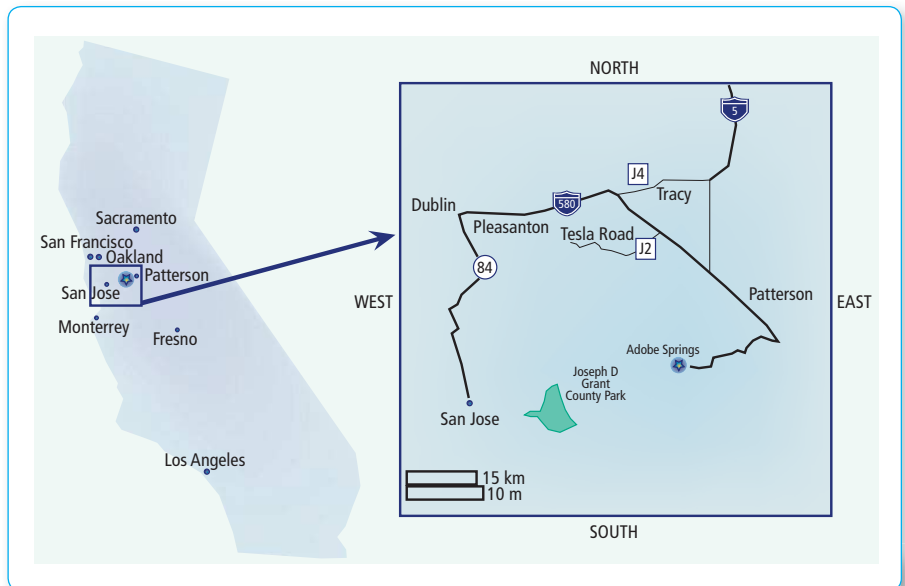


Readers can access Paul Mason's vast online collection of magnesium studies at <http://www.mgwater.com/> and if in the area, can pick up Adobe Springs water at the free roadside spigot at 19,000 Del Puerto Canyon Road, Patterson, CA. See the map for directions.

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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Paul Mason invites readers to haul away all the personal-use, magnesium-rich water they want from the free spigot at Adobe Springs. For those who find themselves in that area, here is a map.

