



The Science of a Healthier Life™

Life Extension.com

December 2019

FEATURE ARTICLES

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LIFE EXTENSION® MAGAZINE: NEW LOOK—SAME GREAT SCIENCE NEWS

BLUE LIGHT *and* Eye Injury



PLUS: Winterize Your Immune System

40 years

Dear Supporter,

It's hard to imagine that **Life Extension®** is on the verge of **40** consecutive years of scientific publication.

What drove us in **1980** remains our passion today: unparalleled innovation, meticulous research and a science-based approach to developing premium **nutrient formulations**.

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Our team understands that when you put supplements into your body, you should be confident that they'll provide the expected benefits. That is why **owners** of commercial companies so often choose **Life Extension®** for their personal use.

As you can see in this month's magazine, we've developed a new look, including a fresh new logo that ties all we do together. You'll see it on everything—from delivery boxes to catalogs and emails.

Even our bottles have an evolutionary modern look. While you may continue to receive our prior bottles as we transition our branding, rest assured that they'll be the same, premium supplements we've always stood behind.

I hope you'll like all you will see, including this latest evolution of *Life Extension®* Magazine.

For longer life,



William Faloon, Co-Founder Life Extension®





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The Science of a Healthier Life™

What began in 1980 as a science newsletter has since evolved into one of the world's leading organizations devoted to **healthy living**.

Our mission is to translate **science** into practical approaches and empower our customers with the information they need to live their healthiest lives.

Innovation is ever evolving and so are we.

This month's **Life Extension® Magazine** launches a new look, along with graphic changes to our logo, our packaging and more.



EVERYTHING WE DO
BEGINS WITH YOU

4



SCIENCE & RESEARCH
IS OUR PASSION

years



EVER EVOLVING
INNOVATION

Evolutionary New LOOK

In order to make our website more informative and valuable, we have completely overhauled it. Our new Health Basics pages will help you find science and research, as well as products. You will find the navigation intuitive with content and products easy to find.

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- 2 NEW | Health Basics** – A great place to start.
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REPORTS

40 ON THE COVER

 SHIELD EYES FROM
TOXIC BLUE LIGHT

Computer and smart phone screens emit **blue light** that can cause degenerative eye disorders. Natural **carotenoids** have been shown to *filter out* blue light to ease eye strain and reduce risk of **macular degeneration**.



24 PROBIOTIC PROTECTION AGAINST FLU AND COLD VIRUSES

A blend of **probiotics** and a **prebiotic** reduced the number of flu and flu-like respiratory illnesses by **75%** and colds by **39%** in adults.



33 COFFEE REDUCES DNA DAMAGE

DNA damage contributes to accelerated aging. A recent study suggests that **coffee** reduces **DNA damage** by **23%** in people.



50 HOW SAGE PROTECTS BRAIN FUNCTION

A sage extract has been **clinically shown** to *increase* memory performance in older adults by **60%**. Measures of attention improved **2.5-fold** within hours of ingestion.



60 MAGNESIUM AND CARDIOVASCULAR RISK FACTORS

Studies continue to show that boosting magnesium levels can lower blood pressure, promote arterial relaxation, fight arterial calcification, and improve endothelial function. Most Americans are magnesium deficient.

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Commercial “gummy” supplements provide trivial nutrient **potencies** but are loaded with as much as **4,000 mg** of **sugar** per serving! Consumers may be unwittingly harming themselves by relying on sugar-laden “gummies” as dietary supplements.

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Cucumbers’ high content of water, fiber, and caffeic acid rejuvenate skin and support healthy blood sugar and immunity.





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Unhealthy “Gummy” Vitamins

The fastest growing segment of the supplement industry is chewable “gummies.”



WILLIAM FALOON

Consumers view candy-like “gummies” as a pleasant way to obtain **nutrients** without swallowing pills.

But what’s in these **gummies** that enables **vitamins** and **fish oil** to taste so good?

The answer is loads of **sugar** with tiny amounts of **nutrients**.

Sales of **sugar-laden** chewables have grown to the point that advertisements for **gummies** have appeared on CBS News **60 Minutes**. This is expensive airtime often occupied by **prescription drug** ads.

On a visit to a local drug store, I observed striking labels for these **gummy nutrients**. I bought some to find out how they deliver meaningful potencies in a decent taste.

What I read on their labels was appalling. The nutrient **potencies** were outrageously small. The **sugars** contained in the gummies add to this nation’s deadly **glycemic** burden.

Miniscule Potency

A review of a popular gummy product shows that the daily serving provides **47 mg** of **omega-3s**, small amounts of vitamins, minerals, and **4,000 mg** of **sugar**.

Minimum effective doses of **omega-3s** are thought to be around **1,000 mg** a day. Our daily recommendation is over **2,000 mg** of **EPA/DHA**.

Ingesting **47 mg** of **omega-3s** will not make much of an impact. Yet people using this product will assume they are supplementing with **omega-3s** in effective amounts, which may be a lethal misconception.

My concern is with **surveys** that ask consumers if they supplement with **omega-3s**. Users of **omega-3 gummies** will likely answer **YES**.





If they later succumb to a **heart attack**, they are counted as an **omega-3** user who did not benefit. These kinds of misunderstandings can create contradictory reports about the value of **fish oil**.

The reality is people who think they are supplementing with adequate amounts of **omega-3s** are duped into taking a **sugar-laden** candy that happens to contain miniscule **nutrient** potencies.

What surprised me most were **gummy vitamins** made by a quality supplement maker that contained significant amounts of **sugar**.

Sugar addiction is a centuries-long problem whose adverse health ramifications have come to light over the past several decades.

We've published dozens of articles revealing that **sugar** is not fit for human consumption.

Simply stated, most of us are perfectly capable of maintaining healthy blood glucose levels from a balanced diet that contains no added sugars and only modest amounts of starches.

Sugar Should Be Labeled A Carcinogen

The **State of California** mandates that a long list of substances carry a warning they may cause **cancer**.

Omitted from this list may be the most ubiquitous **carcinogen** in the human diet, i.e. **sugar**.

Studies show *higher* rates of many **malignancies** in people with the **highest** glycemic diets (sugars and starches).¹⁻⁵

For instance, researchers at the University of Texas **MD Anderson Cancer Center** analyzed the dietary habits and health history of over **4,000** people.

They found, overall, that compared to people with the lowest glycemic diet, those who ingested a **high glycemic** diet had a **49% greater** risk of contracting **lung cancer**... regardless of smoking habits.⁶

Even for **nonsmokers**, this study found the odds of having **lung cancer** were more than double in those who ingest a **high glycemic** index

diet compared to those with the lowest glycemic index diet.

Foods that rank high on the glycemic scale include **starches** like white bread and rice along with **sugary** foods and drinks that spike **after-meal** glucose levels.

Up to **25%** of people who contract **lung cancer** don't smoke.^{7,8} Many of these individuals would never touch a **cigarette**, yet they don't realize that **glucose** is also a major cancer risk factor.

Glucose provides fuel for rapidly dividing cancer cells. **Insulin** is a hormonal stimulator for **cellular proliferation**.⁹⁻¹²

Those who consume high glycemic diets sharply increase their odds of contracting many forms of cancer.¹³⁻¹⁵

Yet an increasing number of health-conscious consumers may be unwittingly harming themselves by relying on **sugar-laden** "gummies" as dietary supplements.

A Quality Supplement Company's Gummies

Back in the 1990s, a supplement with **anti-depressant** properties called **SAMe** (s-adenosyl-methionine) gained considerable popularity.

The problem was few companies back then knew how to make a stabilized **SAMe**, which meant most brands provided little active ingredient.

Our independent assays revealed that only one other company (and our brand) contained the full label potency of **SAMe**. The others had not yet figured out how to make this sophisticated nutrient.

So, I always viewed the one other company making stabilized **SAMe** as a higher quality supplement maker.

When I bought a bottle of omega gummies from this company, I was disappointed to find the label

revealed **4,000 mg** of **sugar** per serving. Each serving provided just **60 mg** of **EPA/DHA** along with low vitamin and mineral potencies.

The companies selling **sugar-laden gummies** are owned by large **pharmaceutical** conglomerates.

Most of the public is unaware that heavily advertised dietary supplements are owned by **drug companies**.

My hope in writing this is to persuade these companies to substitute **stevia** and safer flavorings in lieu of **high-sugar** concentrates.

Outlandish Prices!

Sugar sells for about 10 cents a pound, thereby costing virtually nothing to use in foods, beverages, and in “gummy” dietary supplements.

The cost of obtaining standardized **EPA/DHA** from **fish oil** is markedly higher than **sugar**.

A bottle of a popular omega-3 “gummy” retails for **\$15.99** and provides a trivial **2,000 mg** of **EPA/DHA** in the **entire** bottle.

A bottle of one of our fish oil soft-gel supplements (**Super Omega-3**) costs **\$24** and provides **72,000 mg** of **EPA/DHA** in the entire bottle.

Consumers using these **omega-3 gummies** are paying **24 times more** for their **EPA/DHA**.

This popular **gummy** omega-3 product provides low potencies of some vitamins and minerals whereas our **Super Omega-3** contains standardized **olive polyphenols** with **sesame lignans**.

Another brand of omega-3 gummies provides **4,200 mg** of **EPA/DHA** in the bottle that retails for **\$25.99**.

This other product costs about **18 times more** per milligram of **EPA/DHA** compared to **Super Omega-3**.

I use our **Super Omega-3** here as a reference, but the price differential is similar when comparing these **sugar-laden** “gummy” omega-3s with virtually *any* other standardized **fish oil softgel** formula.

Consumers using these heavily advertised “gummies” are paying outlandish prices **per milligram** of **EPA/DHA** while exposing their aging cells to thousands of milligrams of glucose-spiking **sugars**.

While some nutrients are suitable for use as **chewable gummies**, this is clearly not the case with **multi-vitamins** and **fish oil**.

To make these nutrients palatable requires loads of sweeteners and potencies so low that they are unlikely to provide benefits.

We Did Not Sell Out

Back in 2013, **Life Extension®** was approached by one of the largest pharmaceutical companies in the world to sell out.

The company bragged about how much **profit** we both would make by diluting nutrient potency, substituting out premium ingredients, and altering supplement designs.

We were not about to betray our supporters by turning over the meticulous design of our supplements to a corporation whose sole mission is to make money.

We argued that aging humans **require** comprehensive nutrient formulas and potencies to sustain their lives. Money-driven drug companies don't care.

Our Relentless Mission

I founded **Life Extension®** on the principle of using cutting-edge science to keep our supporters alive in good health, and with no upper limit age threshold.

We accomplish this not only via the **nutrients** we offer and **medications** we recommend, but also with the **personal assistance** we provide to our supporters.

Our technical advantage comes from relentless interactions with pioneering researchers who are developing methods to counteract human senescence.

This provides us with knowledge to help circumvent degenerative factors using novel approaches.



In This Month's Issue...

We wear protective sunglasses to shield against **solar rays**, but few understand that **blue-light emitting** computer and phone screens also increase the risk of visual damage over time.

This month we are launching a chewable **gummy** supplement to help protect your **eyes** against the deleterious effects of **blue light** emitted from computer and cell phone screens.

These new gummies have no added **sugars**, though there are trace amounts (under **500 mg**) used to deliver the vision-protecting **plant extracts**.

The article on page 40 of this issue describes the importance of protecting against **blue light** spectrums that affect our vision today.

An article on page 24 describes fascinating findings showing a combination of **probiotics** and a **prebiotic** markedly reduced **flu** incidence in a group of older individuals.

Your well being is our priority. I urge you to restrict ingestion of **sugars** (and starches) as more data reveals their devastating health consequences.

For longer life,



William Faloon, Co-Founder
Life Extension Buyers Club

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* Skin Pharmacol Physiol. 2014;27(1):47-55. * Skin Pharmacol Physiol. 2014;27(3):113-9.
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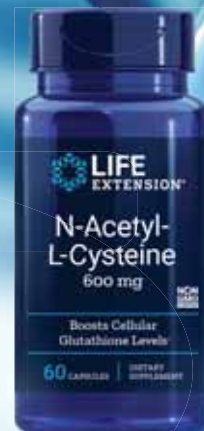
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In the News



Vitamin C Helps Type II Diabetes Patients with Glycemic and Blood Pressure Control

Supplementation with ascorbic acid (vitamin C) was shown to improve glycemic control and reduce blood pressure in patients with type II diabetes, according to an article in the journal *Diabetes, Obesity and Metabolism*.*

Researchers conducted a small, randomized, double-blind, placebo-controlled, cross-over study that included 31 patients with type II diabetes, 27 of whom completed the study.

For four months, participants were given capsules containing **500 mg** of ascorbic acid twice daily, or a placebo. They all wore continuous glucose monitors for 48 hours and ate standardized meals.

Compared to the individuals who received a placebo, the patients who took the vitamin C supplements showed a significant reduction in **glucose** levels after meals, and in time spent daily in hyperglycemia.

Researchers also reported that the patients supplemented with vitamin C experienced decreases of **7 mmHg** in systolic blood pressure and **5 mmHg** in diastolic blood pressure, while those who took a placebo did not.

Editor's Note: The authors concluded that, "These findings offer evidence for the proposed use of ascorbic acid as an adjunct therapy to improve glycemic and blood pressure control in individuals with type II diabetes."

* *Diabetes Obes Metab.* 2019 Mar; 21(3):674-682.

Greater Vitamin A and Carotenoid Intake Linked with Lower Risk of Skin Cancer

An article in *JAMA Dermatology* reported an association between increased intake of vitamin A and carotenoids, and a lower risk of cutaneous squamous cell carcinoma, a type of skin cancer.*

The study included 75,170 women who participated in the Nurses' Health Study from 1984 to 2012 and 48,400 men enrolled in the Health Professionals Follow-Up Study from 1986 to 2012.

Dietary questionnaires completed upon enrollment and approximately every four years during the studies provided information concerning intake of retinol (vitamin A) and carotenoids from food and supplements, from which average intake was calculated.

Among men and women who were the study's top **20%** consumers of total vitamin A (the sum of retinol and carotenoids according to their vitamin A activity), the risk of acquiring squamous cell carcinoma was **17%** lower in comparison with those whose intake was among the lowest **20%**.

Editor's Note: When the nutrients were examined separately, the top **20%** consumers of retinol (vitamin A that did not include carotenoid sources), beta-cryptoxanthin, lycopene, and lutein plus zeaxanthin had risks of developing SCC that were **12%**, **14%**, **13%**, and **11%** less, respectively, than the odds experienced by people in the lowest group.

* *JAMA Dermatology*. 2019 Jul 31.





Benefits of CoQ10 for Insulin Sensitivity

Results from a clinical trial reported in the *Journal of Research in Medical Sciences* revealed improvements in total antioxidant capacity, insulin sensitivity and blood glucose in women with type II diabetes who were given coenzyme Q10 (CoQ10).*

Thirty-four women with diabetes received **100 mg** of CoQ10 and an equal number of diabetic women received a placebo daily for 12 weeks.

At the end of the trial, blood pressure was lower among participants who received CoQ10 in comparison with measurements obtained at the beginning of the intervention. Fasting blood **glucose decreased** in the CoQ10-supplemented group, and there was an increase of serum CoQ10, antioxidant capacity, catalase activity, and **insulin sensitivity**.

Editor's Note: The researchers stated that, "Coenzyme Q10 is an important micronutrient that plays a central role in the mitochondrial electron transport chain and protects the body from damage by reactive oxygen species (ROS)."

* *J Res Med Sci.* 2018 Oct 26; 23:91.

Curcumin Aids Exercise Tolerance After Heart Failure, Animal Study Shows

The outcome of an animal study suggests that curcumin could help **heart failure** patients who experience exercise intolerance, an article in the *Journal of Applied Physiology* reported.*

Using a mouse model of heart failure with reduced ejection fraction (which happens when the heart's left ventricle muscle does not pump an adequate amount of blood) the researchers gave curcumin to one group of mice daily for 12 weeks, while another group received none.

Additional groups of healthy mice received the same regimens. Exercise capacity, muscle function and enzyme expression in muscle fiber samples were examined before and after treatment.

"We hypothesized that reduced expression of nuclear factor E2-related factor 2 (Nrf2) in skeletal muscle contributes to impaired exercise performance," the authors stated. "We further hypothesized that curcumin, a Nrf2 activator, would preserve or increase exercise capacity in heart failure."

Curcumin-treated mice with heart failure experienced improvement in exercise capacity, muscle function, Nrf2 activation, and levels of the antioxidant enzymes heme oxygenase-1 (HO-1) and superoxide dismutase (SOD)2. Curcumin also upregulated Nrf2, HO-1, and SOD2 expression in mice that did not have heart failure, which suggests that curcumin enhances antioxidant defenses in healthy muscle.



Editor's Note: The authors concluded that, "In the present study, we demonstrated that eight weeks of curcumin treatment improved exercise performance, increased whole-body pulling tension, and ameliorated the skeletal myopathy in mice with heart failure with reduced ejection fraction, suggesting a potential application of curcumin in skeletal muscle dysfunction associated with heart failure."

* *J Appl Physiol.* 2019; Feb 1;126(2):477-486.

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Probiotic Protection Against Flu and Cold Viruses

BY JONATHAN RANDALL

Flu can be a killer.

During the most recent flu season, nearly **43 million** Americans got sick and 61,200 died.

The number of flu deaths the year before hit a staggering **79,400**.^{1,2}

Colds may seem like a nuisance, but they can also be serious. Colds can develop into **pneumonia**—especially in those with weakened immune systems.³

Scientists have discovered that a **specific blend of probiotics** can be effective at preventing flu, colds, and other respiratory infections.

In one study, this **probiotic blend** reduced the number of flu and flu-like respiratory illnesses by **75%** and colds by **39%** compared to a **placebo**.⁴

When flu and colds did occur, this same **probiotic blend** reduced duration *and* severity.⁴

The Dangers of Colds and Flu

Influenza affects tens of millions of people each year and kills tens of thousands in the U.S. alone.

Rates are highest during **flu season**, which begins in fall and lasts until spring, peaking between December and February.⁵

Older people, who have weaker immune systems, are particularly susceptible.

During the 2017-2018 flu season, the estimated flu-related deaths were nearly **24 times higher** in people **aged 65** and older than in adults 18 to 49, and **over 9 times higher** than in adults aged 50-64.²

Even more people suffer from **colds**.³ Though they generally go away in 7 to 10 days, these viral infections can lead to secondary bacterial infections like **pneumonia**.⁶

Flu Shots and Probiotics Together

Getting a flu shot provides protection against *some* strains of influenza, but not others, and it does nothing for colds and other viral respiratory infections.

Flu shots often don't work as well in older individuals, due to a decline in immune function. It is the elderly who are most at risk for flu and its complications.¹⁴

In a published meta-analysis,¹⁵ it was found that when older individuals take probiotics and prebiotics as well as get a flu shot, their chances of catching the flu are reduced.

The researchers discovered that taking the probiotics/prebiotics *before* vaccination increased their immune response to the vaccine.

In other words, these individuals were less likely to get the flu, due to a better immune response and increased efficacy of the vaccine than those who did not take the probiotics/prebiotics.

Another interesting point in the study was that the *longer* the individuals supplemented with probiotics, the better the vaccine worked in preventing the flu.

The authors concluded that ideally healthy older adults should take probiotics/prebiotics prior to their flu vaccine.

The best way to fight against these illnesses is to prevent them in the first place.

Frequent hand washing and other measures are important for prevention, but they aren't perfect. Many people remain prone to flu and colds even after seemingly "doing everything right."

In searching for a way to prevent these infections, scientists identified specific **strains** of bacteria known as **probiotics**.

How Probiotics Fight Colds and Flu

Flu and **cold viruses** strike the upper respiratory tract. These are the passageways through which air passes when we breathe, including the **nasal cavity** and **throat**.

The membrane lining these spaces and the sinuses is called the respiratory **mucosa**.

This delicate **mucosa** is prone to invasion by viruses that cause the flu, colds, and other infections (like sinusitis and sore throat).

Healthy bacteria thrive in the secretions lining the **mucosa** of the **upper respiratory tract**, just like they do in the gut.⁷ There, these beneficial bacteria help to fight harmful viruses and bacteria that cause disease.

The **mucosal defense system** is a critical immune factor that defends against invasion by disease-causing bacteria and viruses.



But the immune system, including the **mucosal** defense system, weakens as we age.⁸ This makes it easier for viruses to gain a foothold in susceptible tissues.

People with diabetes, cardiovascular disease, chronic lung disease, and other illnesses may also have weakened immune systems, putting them at even higher risk for respiratory tract infections.

Multiple studies show that a carefully chosen **blend of probiotics** taken orally can *boost* the **mucosal defense**, warding off the harmful viruses that cause upper respiratory tract infections like colds and flu.⁹⁻¹²

Most of these probiotic bacteria end up in the gut. But the **mucosal defenses** they strengthen favorably affect the neighboring respiratory tract as well.^{9,11} They also help boost general immune function.

Combined Probiotic and Prebiotic Reduce Illness

Several small studies and reviews have found that **probiotics** are better than a placebo at reducing the number of **upper respiratory tract** infections, as well as the average length of illness, need for antibiotics, and work absences.^{10,12,13}

Inspired by these findings, scientists set out to develop a select blend of **probiotics** and to design a **placebo-controlled** study to demonstrate its effectiveness.

They used a mix of **five specific strains** of healthy probiotic microorganisms: *B. lactis* BS01, *L. plantarum* LP01, *L. plantarum* LP02, *L. rhamnosus* LR04, and *L. rhamnosus* LR05.

The blend also included **prebiotics** called **galactooligosaccharides** (GOS). **Prebiotics** are nutrients the **probiotic** bacteria can digest, supporting their survival and growth.

In a study conducted over 90 days during flu season, 250 healthy, adult volunteers received either the new **probiotic-prebiotic** blend or a **placebo** daily.⁴

The findings were dramatic.

Compared to the placebo, the number of **flu** and **flu-like** respiratory illnesses was **reduced by 75%** with this **probiotic-prebiotic** blend. The number of colds was **reduced by 39%**.

While the blend couldn't prevent *all* respiratory tract infections, it had clear benefits in those who *did* develop an illness. It led to a **37%** reduction in the severity of flu symptoms and a **19%** reduction in the severity of cold symptoms.

WHAT
YOU
NEED
TO
KNOW



A Probiotic-Prebiotic Blend Fights Flu and Colds

- Winter is the peak period for transmission of **flu, colds**, and other **upper respiratory tract infections**.
- Older adults are at the highest risk of serious complications of these illnesses, including death.
- **Probiotics**, healthy microbes, help defend against infection in the digestive and respiratory tracts by stimulating immunity and boosting mucosal defense systems.
- A select blend of **five probiotic strains** and a **prebiotic** has been shown in a randomized clinical trial to significantly **reduce the number** of flu cases, colds, and similar illnesses.
- This blend also **reduced the duration and severity** of upper respiratory tract infections in those who did get sick.

The **length** of these illnesses was also reduced, by about **one** day on average for colds, about **three** days for cough, and close to **1.5** days for *all* acute upper respiratory tract infections.

Summary

Winter and early spring see a huge increase in the incidence of **flu, colds, and other upper respiratory tract infections**.

Older people are particularly susceptible to respiratory tract infections because they have a lower level of immunity, and they suffer the highest rates of flu-related hospitalizations and death.

Research has found that a specific **probiotic blend** can boost immunity, particularly bolstering **mucosal defenses** in the upper respiratory tract.

A specially designed blend of **five strains of probiotic bacteria**, along with a potent **prebiotic** to support their survival, has been shown to dramatically reduce the incidence of flu, colds, and other upper respiratory tract infections.

This probiotic-prebiotic blend can also reduce the **severity and duration** of these illnesses when they occur. •

What Are Probiotics and Prebiotics?

Probiotics are healthy microorganisms that contribute to a beneficial blend of microbes in the intestines. They're mostly various types of health-promoting bacteria.

A prebiotic is a specially chosen micronutrient that supports probiotic survival and health. In other words, it's "food" for the probiotic organisms.

For example, galactooligosaccharides (GOS) are a specific form of prebiotic that are particularly good at supporting the growth of beneficial gut microbes.

When taken together, a blend of probiotics and a prebiotic provides the best chance for the probiotics to thrive and work optimally.

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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Maintain Endothelial
Plaque Stability with

ARTERIAL PROTECT



Arterial Protect can help stabilize endothelial plaque and promote healthy blood flow throughout the body.*

Just one capsule a day provides the patented French Maritime **pine bark extract** used in clinical studies along with **Gotu Kola**.

Item #02004 • 30 vegetarian capsules

1 bottle **\$33**

4 bottles \$29 each

Reference

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

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

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ZINC ACETATE LOZENGES

FOR WINTER SEASON SUPPORT

Zinc stimulates the activity of about 300 enzymes¹ and fortifies the immune system.²

Taking a zinc lozenge is important for maintaining the body's natural defense system when needed. They are not intended for daily use.

Enhanced Zinc Lozenges is a special "ionic formula" that delivers on the original promise of seasonal immune support and comes in peppermint flavor.

References

1. *J Nutr.* 2000 May;130(5S Suppl):1437S-46S.
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Item #01961 • 30 vegetarian lozenges

1 bottle \$9

4 bottles \$6 each

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



Winter Immune Support

Probiotic/Prebiotic Support during Winter Months

FLORASSIST® Winter Immune Support contains:

- 5 targeted probiotic strains (15 billion CFU)
- 2.5 grams of a specific **pre**-biotic (galacto-oligosaccharide)

This formula combines a **clinically studied** blend of **probiotic strains** and a **prebiotic** to promote a healthy immune response.

Just mix one stick pack of this unflavored powder into a glass of water, smoothie, or your favorite beverage.

Take daily, especially during the **winter** when immune defenses should be on high alert.

Item #02400 • 30 stick packs

1 box **\$29.25**

4 boxes \$26 each



For full product description and to order **FLORASSIST® Winter Immune Support**, call 1-800-544-4440 or visit www.LifeExtension.com



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

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.



Item #02234 • 3 mg, 2 fl. oz

1 bottle \$9

4 bottles \$8.25 each

FOR OCCASIONAL SLEEPLESSNESS.

Life Extension also offers a full range of melatonin in solid forms and a variety of dosages.

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

CAUTION: Do not combine with alcohol. Do not attempt to drive or operate heavy machinery after taking this product.



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

Coffee Protects Against DNA Damage

BY KAREN JAFFE

Coffee consumption has been linked to a reduction in the risk and severity of many diseases.



DNA damage contributes to accelerated aging.¹

There are many causes of damage to DNA, from normal metabolic processes to external factors like exposure to UV light or radiation.

As we age, the damage accumulates, leading to further, more rapid aging of organs and tissues.

Common disorders with links to DNA damage include cardiovascular, diabetes, inflammatory bowel, autoimmune, and cancer.²⁻¹¹

A recent study discovered that coffee **protects our DNA**, the thin stretches of genetic material packed into virtually every cell in the body.

In the trial, published in late **2018**, coffee **reduced DNA damage** by a significant **23%**.¹²

This new study adds to growing evidence recommending consumption of **2-4 cups** of coffee daily to help protect against a host of age-related disorders.

What the Scientists Studied

In the study, published in the *European Journal of Nutrition*, researchers reported on a single-blind, randomized, controlled trial examining the effects of moderate coffee consumption on **DNA damage** in 100 adult coffee drinkers.¹²

All enrolled subjects underwent an initial four-week “preconditioning” period, when coffee and other caffeine-containing beverages were excluded from the diet.

During the following four weeks, subjects were randomly assigned either to a coffee or a warm water consumption group. All participants consumed **500 ml** (about four **4-ounce cups**) of their assigned beverage daily.

Blood specimens were analyzed for evidence of DNA damage at the end of the preconditioning period, and again at the end of the test period.

What the Study Showed

At the end of the study, DNA damage (measured by the amount of broken DNA strands) was *reduced* by **23%** from the start in the coffee group, but remained unchanged in the water control subjects.¹²

This was true even though the mean level of damage at the start of the study was **16%** greater in the coffee group.¹²

When changes from baseline were analyzed, **DNA strand breaks** were reduced by **26%** in women and by **20%** in men, hinting at some biological variability.¹²

Summary

DNA damage is known to contribute to age-associated disorders.

Coffee consumption has been linked to a reduction in the risk and severity of many of these diseases.

Now, it has been shown that moderate coffee consumption reduces the amount of DNA damage in men and women, providing insight into another mechanism that links coffee drinking to healthier outcomes. •

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

More Good News on Coffee

Until recently, coffee was generally considered a “vice” drink, and lumped in with cigarette smoking and alcohol use as having negative health effects—especially on the heart and circulatory system.

As this Research Update shows, however, we’re now finding more and more reasons to celebrate—and consume—coffee as part of a normal day’s activities.

A study presented at the British Cardiovascular Society’s annual conference in Manchester, UK, and funded in part by the British Heart Foundation was led by researcher Kenneth Fung.¹³

Fung’s group studied 8,412 people in the UK, in search of evidence that coffee drinking—especially very high consumption—contributes to arterial stiffening.

When the UK researchers divided their study subjects into three groups, according to daily coffee consumption (less than one, 1-3, and more than 3 cups/day), they found that even in those who consumed five cups of coffee per day—and as many as 25 cups per day!—daily coffee consumption **did not increase arterial stiffness** compared to coffee abstainers.¹³

In the words of Metin Avkiran, professor and associate medical director of the British Heart Foundation, this result “rules out one of the potential detrimental effects of coffee on our arteries.”¹³

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Higher Potency CARNOSINE

Protect Against Aldehyde Damage



Carnosine is a unique dipeptide that can inhibit **glycation** throughout the body, thereby helping to slow normal aging processes. Suggested dose is one **500 mg** Carnosine cap taken twice daily.

Item #01829 • 60 vegetarian capsules

1 bottle **\$27**

4 bottles \$24 each

Life Extension® was the first to introduce high-dose (**500 mg**) carnosine back in **1999**.



Super Carnosine provides 500 mg of carnosine per capsule along with fat-soluble vitamin B1 (**benfotiamine**) to further impede glycation reactions.

Item #02020 • 60 vegetarian capsules

1 bottle **\$30**

4 bottles \$27 each

Life Extension carnosine is available in *three different* formulas to allow you to customize your longevity program.



Mitochondrial Energy Optimizer provides **1,000 mg** of carnosine in each four-capsule dose along with **R-lipoic acid**, **benfotiamine**, **taurine**, and **PQQ** to provide broad-spectrum support.

Item #01868 • 120 capsules

1 bottle **\$51**

4 bottles \$45 each

Each formula provides high doses of **carnosine** to ensure **sustained** benefits.

For full product description and to order **Mitochondrial Energy Optimizer, Carnosine** or **Super Carnosine**, call **1-800-544-4440** or visit **www.LifeExtension.com**



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COMBAT Senescent Cells and AGING

New Science of *Senolytics!*

Senescent cells are old cells that no longer divide but they emit factors that *accelerate* aging.

Senolytic compounds selectively help target senescent cells in the body.

Laboratory studies show evidence of **systemic rejuvenation** when the **senescent cell** burden is reduced.

Once-Weekly Senolytic Formula

Senolytic Activator provides a highly **absorbable** form of **quercetin phytosome** and black tea **theaflavins** designed to enhance the body's ability to manage **senescent cells**.

The suggested dose is to take two capsules of **Senolytic Activator** just **once weekly**.



Item #02301 • 24 vegetarian capsules

1 box \$18

4 boxes \$16 each

(Each box lasts three months.)



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

WAKE UP TO THE HEALTHY COFFEE

Rainforest Blend

POLYPHENOL-RETAINED COFFEE

Most of a coffee bean's **polyphenol** content is **destroyed** during the typical roasting process.

Among the most beneficial of these polyphenols is **chlorogenic acid**.

Rainforest Blend coffee utilizes the patented **Healthy Roast®** process, which retains the naturally occurring polyphenols like **chlorogenic acid**.

A Patented Organic Roast

Life Extension® Rainforest Blends are made using a patented, **100% natural** process consisting of **USDA certified organic arabica** coffee beans.

Savory Taste Without Stomach Upset

The **HealthyRoast®** process also preserves special, naturally occurring compounds in coffee that **soothe** your stomach.

Tasty Decaf

Rainforest Blend is also available in a **decaffeinated** blend. The caffeine is removed through a chemical-free **water process**. It delivers the full flavor, aroma, and body of the *arabica* bean.



Rainforest Blend

Item #02169 • 12 oz bag

1 bag **\$9.75**



Rainforest Decaffeinated Blend

Item #02170 • 12 oz bag

1 bag **\$10.50**

For full product description and to order either of the **Rainforest Blend Coffees**, call **1-800-544-4440** or visit www.LifeExtension.com

FORESIGHT FOR YOUR **EYESIGHT**

MacuGuard® Ocular Support provides lutein, *trans*-zeaxanthin, and *meso*-zeaxanthin to help maintain structural integrity of the macula and retina.¹⁻⁵

Alpha-carotene is included based on new evidence that it helps support the macular pigment.¹

People supplementing with saffron showed an improvement in vision as measured by their seeing an average of two additional lines on the eye chart commonly used by doctors to test vision.¹

This formula provides the optimal dose of saffron along with cyanidin-3-glucoside to support healthy vision.⁶⁻⁸



MacuGuard® Ocular Support with Saffron

Item #01992 • 60 softgels
1 bottle **\$18.75**
4 bottles \$17.50 each

Each bottle lasts for two months.

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

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A Complete Multivitamin for Moms and Developing Infants

Prenatal Advantage provides vitamins and key nutrients recommended for about-to-become-pregnant, pregnant, and nursing women to optimally support their baby's overall health.

Scientifically formulated **Prenatal Advantage** contains:

- **Choline** and **DHA** (docosahexaenoic acid) to promote healthy brain and eye development.
- **Folic acid** and its most *biologically active form*, called **5-MTHF**—to support healthy development.
- **Lutien, zeaxanthin**, and other carotenoids for healthy development of the eyes and brain.
- Full spectrum of vitamins and minerals to ensure against deficiencies.

Take **4** softgels daily, in divided doses with meals, ideally beginning in the months leading up to pregnancy, or as directed by a healthcare practitioner.

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



Item #02319 • 120 softgels

1 bottle \$21

4 bottles \$18 each

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CAUTION: Individuals consuming more than 50 mcg (2,000 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. If you are taking Warfarin (Coumadin®) or related medications, consult your healthcare provider before taking the product.

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



Protect Eyes from Screen-Time Damage

BY JASON MCNEIL

Smartphones. Tablets. Computers. TVs. E-readers.

Screens are *everywhere* these days. And with them comes a danger that few people are aware of:

Most of them emit high amounts of harmful **blue light**.¹

This **blue light** can cause problems like **digital eye strain** and **insomnia**.

Even more worrisome, it can **damage the retina**, the part of the eye that captures light and sends signals to the brain, allowing you to see.²⁻⁷

This damage increases the risk for **macular degeneration**, a leading cause of blindness in older adults.⁸⁻¹¹

Disconnecting from modern technology isn't exactly an option.

Fortunately, scientists have discovered that two nutrients, **lutein** and **zeaxanthin**, filter out the most dangerous wavelengths of **blue light**, acting almost like internal sunglasses.

Increasing intake of these **plant** pigments shields the retina, reducing risk of eye strain and age-related eye disease.¹²

The results can be dramatic: One study found that people with the *highest* dietary intake of **lutein** and **zeaxanthin** had a **41% lower** risk of developing advanced **macular degeneration**.¹³

The Growing Problem of Screen Time

Roughly **96%** of Americans own a cellphone. A vast majority also own a desktop or laptop computer, and many have tablets, e-readers, and LED televisions, as well.¹⁴

These devices are used almost constantly—for work, play, entertainment, and research.^{15,16}

One study found that average users check their smartphones about **52 times per day**.¹⁷ And at least two different, recent studies have shown that the average adult in the U.S. spends more than **nine hours a day** looking at digital media.^{18,19}

The **blue light** emitted from most of these devices can cause three problems:

Digital Eye Strain

Staring at blue-light-emitting screens for long periods of time can cause **digital eye strain**, which often manifests as eye pain, dry eyes, headache, and blurred vision.¹⁵

This condition (once known as **computer vision syndrome**) is becoming more common as people spend more time looking at screens. A few years ago, it was estimated that **65%** of people in the U.S. have symptoms of digital eye strain, and this number is growing.¹⁵

Trouble Sleeping

Being exposed to sunlight during the day and darkness at night helps set our **circadian rhythm**, the natural internal clock that regulates **sleep-wake cycles**. The sun's blue light is an important contributor to these circadian rhythms.

But with increasing screen time, we are exposed to intense blue light well into the evening. To our brains, it's as though the sun is still blazing, even at night.

This dramatic change in light-dark cycles can impair normal circadian rhythms. As a result, the body produces less **melatonin** at night,⁴ leading to difficulty falling asleep and **insomnia**. This loss of sleep can cause drowsiness and problems with attention and alertness.²⁰

Risk for Macular Degeneration

The biggest danger of excess blue-light exposure is that it can *permanently* damage vision.

When blue-light wavelengths hit the **retina**, they set off a cascade of chemical reactions that damage **photoreceptors**, the retinal cells responsible for first detecting light.^{2,3,5-7,21}

The result can be impairment of photoreceptor function and even cell death. Photoreceptors are *not* yet replaceable, and without them, vision is not possible.

In fact, several studies now confirm that chronic exposure to blue light increases the risk of **age-related macular degeneration**,^{2,8-10} a leading cause of blindness.¹¹



Preventing Damage

The retina of the eye has a built-in shield to protect photoreceptors from blue-light damage. The **retinal pigment epithelium** has extremely high concentrations of the carotenoids **lutein** and **zeaxanthin**, along with a slightly different form of zeaxanthin called **meso-zeaxanthin**.³

These pigments help catch and disperse the energy of blue light, significantly reducing the amount that hits the photoreceptors.^{3,22-25} Carotenoids also have free-radical scavenging and **anti-inflammatory** properties, further reducing damage that leads to visual deterioration and macular degeneration.^{3,22,25,26}

But there's a problem: Lutein and zeaxanthin aren't created in the human body. They're produced in plants and must be obtained from the diet or by supplementation.²⁷

Modern Western diets are so lacking in carotenoids that the levels of **lutein** and **zeaxanthin** in most people's retinas are far below what are considered optimal to protect vision.^{27,28}

The carotenoids in the retina can be estimated by measuring the **macular pigment optical density**. (The macula is the central area of the retina.) The *higher* the **density**, the more carotenoids present, and more blue light is blocked.

The average macular pigment optical density in people from Western countries is about **0.3**. Eye health experts agree that optical density measurements **above 0.5** are ideal and most protective against blue-light-induced visual injury.^{29,30}

The good news: Increasing *intake* of lutein and zeaxanthin directly leads to *greater* macular pigment optical **density**.³¹⁻³⁸

One study evaluated a carotenoid formula derived from the **marigold plant**, containing **10 mg** of lutein and **2 mg** of zeaxanthin isomers (zeaxanthin and *meso-zeaxanthin*).³⁷ Subjects taking the carotenoids for 12 months saw their macular pigment optical density increase from below the recommended level up to a healthy range, an average of **0.654**.

Lutein and Zeaxanthin Protect Your Eyes

Several human studies have shown that increasing intake of lutein and zeaxanthin isomers (zeaxanthin and meso-zeaxanthin) **improves visual function** by reducing glare, improving contrast sensitivity, and protecting against visual problems associated with bright lights.³⁷⁻³⁹



WHAT
YOU
NEED
TO
KNOW

Shielding Your Eyes from Blue-Light Damage

- Digital screens emit a high percentage of **blue light**, a major contributor to **digital eye strain**, sleep problems, and the development of **age-related macular degeneration**, a major cause of vision loss in older adults.
- The carotenoid pigments **lutein** and **zeaxanthin** are concentrated in the retina of the eye, where they help shield it from the harmful effects of blue light.
- Most people have levels of these carotenoids that are far below what is recommended by doctors for optimal protection.
- Increasing intake of **lutein** and **zeaxanthin** from **marigold extract** has been shown to significantly boost retinal levels of these pigments, protecting against eye strain and reducing the risk for macular degeneration and vision loss.

Even more striking, taking these carotenoids has been shown to slow the progression of **age-related macular degeneration** and improve visual acuity (the clarity or sharpness of vision) in those who *already* have symptoms of the disorder.^{31,33-35,40,41}

One study of **102,000** people aged 50 and older, conducted over **20 years**, found that those with the *highest* intake of **lutein** and **zeaxanthin** had a **41% lower risk** of progressing to advanced macular degeneration.¹³

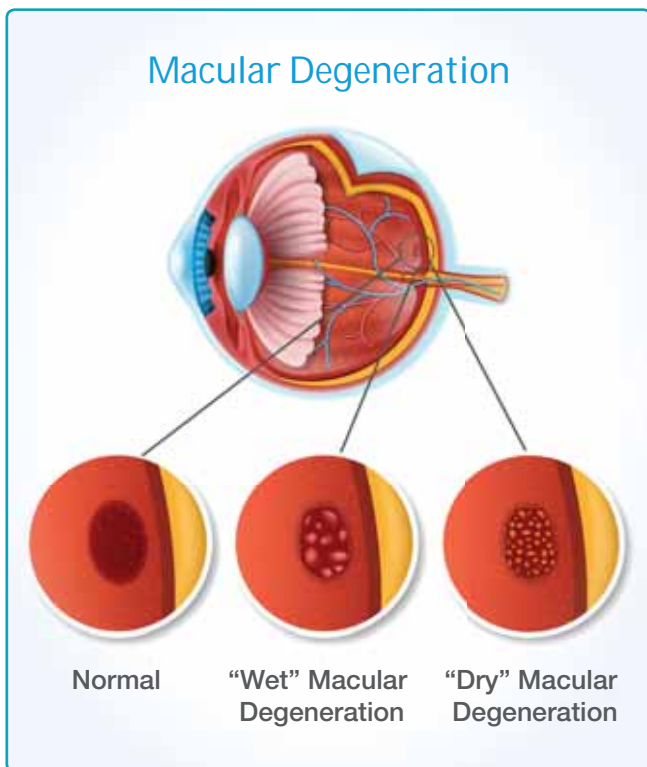
Summary

Digital screens emit a high level of potentially dangerous **blue light**, which can contribute to eye strain and sleep problems.

They are toxic to cells in the retina of the eye, contributing to loss of vision through **age-related macular degeneration**.

Carotenoid pigments **lutein** and **zeaxanthin** defend against blue-light-induced eye problems. But most people don't get enough from their diets to provide optimal protection.

A **marigold extract** has been incorporated into a sugar-free gummy that contains these carotenoids at doses that have proven effective in clinical trials.



Studies have shown that increasing intake of these nutrients boosts the eye's natural defenses against blue light, shielding against eye strain and long-term damage which can lead to macular degeneration. •

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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A close-up photograph of sage leaves, showing their characteristic serrated edges and silvery-green color. The leaves are arranged in a fan-like pattern, with some in sharp focus and others blurred in the background.

BY MICHAEL DOWNEY

Protect Brain Function with Sage Extract

As we age, our cognitive abilities decline.

But it doesn't have to be this way.

Scientists have identified specific **nutrients** that protect the aging brain.¹⁻¹⁰

One of these is a **sage extract** that has demonstrated remarkable **cognitive-enhancing** activities.¹¹

In clinical studies, this **sage** extract increased **memory performance** in older adults by nearly **60%**.

A measure of **attention** improved by about **2.5-fold**—*within hours* of ingestion.¹²

In addition to these human benefits, this **sage extract** has been shown to **increase lifespan** by **12%** in an animal model of aging.¹¹

Together with other nutrients, this **sage extract** can help our **brains function** in a more youthful manner.

Preserving Brain Power

Minor deterioration in brain function is known as **mild cognitive impairment**. It affects memory, attention, and other mental processes.

More severe loss is considered **dementia**, which includes **Alzheimer's disease**.

Alzheimer's and other forms of dementia are characterized in part by lower levels of the neurotransmitter **acetylcholine**.

Losing memory and brainpower is not "a part of life" that everyone must endure.

Research has documented that certain nutrients help maximize brain function. The herb **sage** stands out for its ability to protect neurons and enhance cognitive function.¹³⁻¹⁸

A team of scientists has identified a new **sage extract** that provides powerful brain-protective effects not found in other sage preparations.^{11,12,19}



Cognitive Benefits of Sage

Sage is rich in polyphenols that have demonstrated clinical benefits and fascinating preclinical findings.

But the most compelling benefit of **sage** may be its capacity for **cognitive protection**.

In a series of clinical trials, scientists found that younger individuals who took sage extract benefited *within hours* from improved mood, reduced anxiety, enhanced long-term memory, and reduced mental fatigue.¹³⁻¹⁶

Researchers also documented cognitive benefits in older people with dementia.^{17,18}

In a randomized clinical trial on patients with mild-to-moderate **Alzheimer's**, the cognitive scores of a placebo group *deteriorated* by about **22%** over four months. But the scores of the group that supplemented with **sage extract** *improved* by about **26%**.¹⁸

That's a remarkable result. But even stronger brain protection is available from a new sage extract.

An Improved Form of Sage

A group of European scientists has identified a specific **form of sage** with benefits that go beyond traditional sage extracts.

This extract has a unique chemical fingerprint,¹⁹ one distinctively suited to support **brain function**.

In fact, this newer sage extract has shown, in pre-clinical studies, superior effects to other sage sources and to cognitive drugs.^{11,20}

Scientists enlisted adults over age 64 for a clinical study of its effects on cognition.¹² Brain function tests were conducted both before and after participants were given either the sage extract or a placebo.

Here are the remarkable findings:¹²

- **Memory performance** in those receiving this new sage extract was boosted, compared to placebo, by roughly **60%**.
- A measure of **attention** in sage-supplemented participants was enhanced, compared to placebo, by about **2.5-fold**.

These improvements occurred *within hours* of taking this new **sage extract**.¹²



WHAT
YOU
NEED
TO
KNOW

Sage Boosts Brain Power

- Scientists have identified a **unique sage extract** that increases **memory performance** in older adults by nearly **60%** and improves a measure of **attention** by **2.5-fold**—within hours of ingestion.
- This new extract has **neuroprotective** capabilities not seen in other sage preparations, and it shows the ability to extend lifespan in animal models of aging by **12%**.
- This sage extract can help support brain health, especially if taken with other supplements with proven brain benefits.

How It Works

Life Extension® has collaborated with researchers at a group called **Sibelius** to determine how this particular extract enhances memory and attention.

Traditional sage helps protect the aging brain and supports cognition by:

- Reversing decreases of the neurotransmitter **acetylcholine**,^{12,15-17,21,22} which is critical for attention, memory, and reasoning,²³⁻²⁵
- Boosting levels of **neurotrophins**,²² proteins that encourage creation of new brain cells and repair of damaged brain cells,²⁶⁻²⁷ and
- Reducing **inflammation**²² which is associated with cognitive deficits.²⁸

The **new sage extract** does all this. But scientists have identified several additional ways that this extract, with its different chemical makeup, may deliver cognitive enhancements.

Improved Lipid Metabolism and Insulin Signaling

In a compelling preclinical analytic study, this unique sage extract was found to increase expression of genes related to **lipid metabolism** and **insulin signaling**—which are both tied to enhanced longevity.²¹ Blood tests in aging adults often reveal dangerous increases in glucose, cholesterol, and triglycerides.

In a model of aging using roundworms, this extract resulted in a **12% lifespan increase**. Other sage sources did not extend life.¹¹

Stronger Neurotransmitter Signaling

In addition to the increased **acetylcholine** levels induced by other sage sources, this extract boosts the activity of other neurotransmitters such as **GABA** (gamma-aminobutyric acid) and **glutamate**.²¹

This helps explain the profound cognitive benefits observed in human studies.

Increased Blood Flow to the Brain

As we age, our brain suffers blood flow reductions due to vascular stiffening and damage to delicate capillary beds.

This new sage extract has vasodilation properties, which means it can open vessels that supply vital blood and oxygen to the brain.²¹

The age-related reduction of blood flow is a precursor to memory loss and dementia.²⁹⁻³³

Summary

Scientists have identified a **unique sage extract** that has a biological makeup and **neuroprotective** effects never seen before.

Clinical evidence demonstrates that, within just hours of ingestion, this extract increases **memory performance** in older adults and improves measures of **attention**.

This new extract was also shown to increase **lifespan** by **12%** in an animal model of aging.

Sage offers critical protection against cognitive decline.

Taken with other neuroprotective nutrients, such as phosphatidylserine, blueberry, vinpocetine, pregnenolone, and ashwagandha, it can be part of a **multivitamin for the brain**. •

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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Other Nutrients for Brain Health

Sage is just one of several nutrients known to protect and enhance brain health. By taking it with others that complement its activity, it can maximize cognitive benefits.

Phosphatidylserine

Phosphatidylserine is an essential **phospholipid** component of nerve cell membranes and the myelin sheath that covers and protects nerve cells, including brain cells. The myelin sheath supports the conduction of nerve impulses throughout the nervous system.^{1,34,35}

Taking phosphatidylserine preserves cognitive function and may reduce the structural deterioration in the nervous system that occurs with age. In studies, people who took it scored higher on short-term memory and concentration tests.¹

Blueberry

Blueberries are packed with **anthocyanins**, powerful compounds present in a variety of plants including fruits and vegetables. Anthocyanins exert a broad range of health-promoting effects, including defense against oxidative stress, as well as modulation of gene expression and cell-signaling pathways.³⁶

Recent human trials have demonstrated that blueberries improve memory and other cognitive performance in older subjects, and boost mood and cognition in children and young adults.^{3-5,37,38}

Vinpocetine

Vinpocetine, a compound derived from the **periwinkle** plant, has been reported to have benefits for cognition and degenerative disorders of the brain such as **Alzheimer's** and **Parkinson's** disease. Vinpocetine helps to **dilate** (widen) blood vessels to the brain, improving blood flow and stimulating brain metabolism.⁶

Pregnenolone

Studies in animals and humans have shown that **pregnenolone**, a hormone produced by the adrenal gland, appears to be a **neuroprotectant**, defending the brain from various forms of injury.^{39,40}

It has also been found to have positive effects on mood, memory, and other aspects of cognition.⁷

Ashwagandha

Ashwagandha is an Indian herb, also referred to as "Indian ginseng." It has been used in traditional Indian medicine as a nerve tonic for thousands of years.

In modern research, ashwagandha has demonstrated **neuroprotective** effects and improvements in mood and cognition.^{8,9} One study in patients suffering from mild cognitive impairment found that ashwagandha supplementation led to improvements in memory, attention, and decision making.⁸

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Mg



How MAGNESIUM Lowers Cardiovascular Disease Risk

BY WILLIAM STETON

Cardiovascular disease remains the leading cause of death in the U.S. and worldwide.^{1,2}

It's been that way despite billions of dollars spent developing drugs and surgical treatments.

But there's a simple way to help lower the risk: increasing intake of the mineral **magnesium**.^{3,4}

One large epidemiological study of older men showed that those with the *highest* magnesium blood levels had a **44% lower** risk of heart failure than those with the lowest magnesium levels.⁵

Most Americans fail to consume enough magnesium.

An estimated **64%** of all men and **67%** of all women are **magnesium deficient**. After age 71, those magnesium deficient numbers rise to **81%** of men and **82%** of women.^{3,6}

It's difficult to get enough magnesium from food alone. We also have trouble absorbing magnesium as we age.

Fortunately, **supplementation** with **magnesium** can resolve magnesium deficiency, and contribute to improved health and longevity.



Low Magnesium Increases Heart Disease Risk

Magnesium is a mineral involved in approximately **80%** of known metabolic functions.⁷

Insufficient magnesium in the body means that *enzymes* required for proper metabolism function poorly or not at all.³

Many of these enzyme systems serve essential purposes in **heart muscle** and **blood vessels**. When they become impaired, the risk of **cardiovascular disease** rises.³

For nearly two decades, scientists have recognized that magnesium intake and magnesium blood levels influence formation of **atherosclerosis**.

Magnesium supplementation can *inhibit* atherosclerotic plaque formation in animals on high-fat diets.⁸

More recent human studies have revealed strong associations between *low* magnesium levels and *higher* heart disease risks. This demonstrates that magnesium can be a powerful protective measure to maintain heart health.³

Studies specifically show that the *lower* the dietary intake of magnesium, the *higher* the levels of:

- **Chronic, low-grade inflammation.** This is a contributor to most age-related diseases.
- **Endothelial dysfunction.** This occurs when the cells lining blood vessels (**endothelial cells**) become damaged and initiate and promote formation of artery-blocking lesions.^{9,10}

Chronic inflammation and endothelial dysfunction both *raise* the risk of cardiovascular disease.^{9,10} *Higher* magnesium intake correlates with *lower* blood markers of inflammation and endothelial dysfunction.⁹

An epidemiological study of 3,523 men aged 60-79, with no prior history of cardiovascular disease, demonstrated that risk for heart failure declined steadily with rising magnesium levels.⁵

Those with the *highest* magnesium blood levels had a **44% lower** risk of heart failure than those with the lowest levels, mostly due to the reduced markers of inflammation and endothelial dysfunction.⁵

Lab studies also show that, in cultured human endothelial cells, magnesium *deficiency* activates **NF-kB (nuclear factor kappa B)**. **NF-kB** is a leading regulator of inflammation in cells and is a major facilitator of **atherosclerosis**.¹¹

What Animal Studies Show

Studies in animals have clearly shown the cardiovascular benefits of magnesium supplementation.

In rats, magnesium deficiency raised blood pressure and thickened major arteries, compared to rats with normal magnesium intake. This effect was most pronounced in older animals.^{12,13} In fact, the magnesium-*deficient* rats had significantly **higher death rates**, mostly related to high blood pressure.¹³

On the other hand, rats *supplemented* with magnesium had *lower* blood pressure. As a result, they were *less likely* to die than their magnesium-deficient peers.¹³

And in mice genetically prone to very high cholesterol levels, magnesium-supplemented animals had significantly smaller areas of atherosclerotic plaque than unsupplemented animals, because magnesium reduced blood cholesterol and triglyceride levels.⁸

These studies suggest that magnesium supplementation can help lower blood pressure and lipid levels.

These effects are seen even more dramatically in lab experiments done on intact arterial segments in “organ bath” preparations, which isolate the part of the body being studied.

In these studies, when magnesium was *added* to the organ bath it triggered:

- **Dilation (relaxation) of coronary arteries** that had been damaged by insufficient oxygen. This damage to the arteries that supply blood to the heart is called **hypoxia**, and is often seen before a heart attack. Magnesium enhances the production of **nitric oxide** in the body, which naturally relaxes the arteries, increasing blood flow and reducing heart attack risk.¹⁴
- Enhanced **dilation of pulmonary arteries** (which carry blood from the heart to the lungs) damaged by hypoxia. Poor pulmonary artery relaxation is a factor in heart failure.¹⁵
- **Reduced accumulation of calcium** in segments of rat aortas, compared with segments not treated with magnesium.¹⁶ Calcification of major arteries is a significant contributor to arterial stiffness and reduced blood flow that leads to heart attacks and strokes.

Results of Human Studies

Human trials show that magnesium supplementation plays a part in prevention or mitigation of several dangerous cardiovascular disorders.

Endothelial dysfunction drives up blood pressure and precedes potentially fatal disorders like atherosclerosis, heart attack, stroke, and heart failure. **Diuretic drugs**, the first-line hypertension treatment, can *trigger* magnesium loss in urine, which aggravates the very problems they are meant to solve.¹⁷

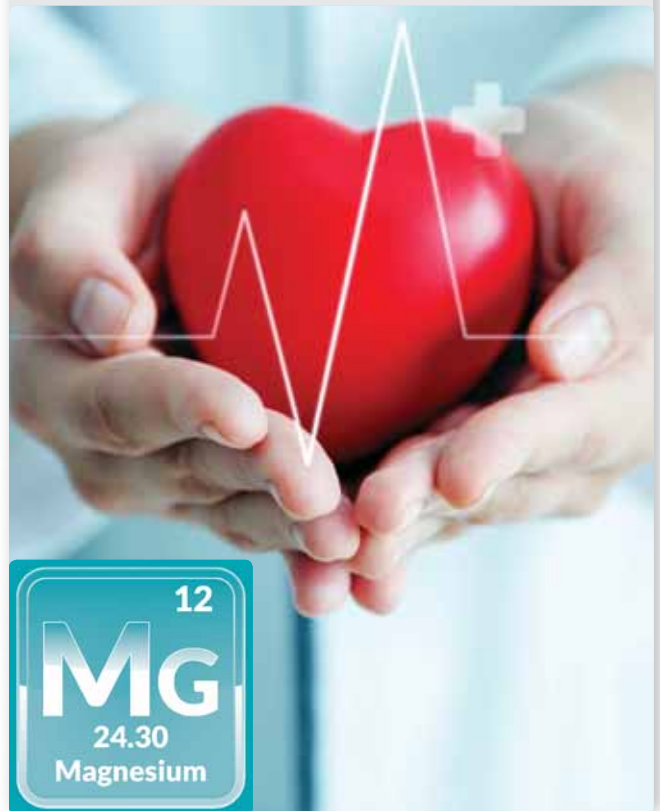
Magnesium supplementation has been shown to help prevent these changes.

In a group of hypertensive women, ages 40-65, on diuretic therapy, oral magnesium-supplementation

Magnesium and Cardiovascular Disease Risk

WHAT
YOU
NEED
TO
KNOW

- **Magnesium**, the fourth most-common mineral in our bodies, is emerging as a critical determinant of heart and blood vessel health.
- More than **80%** of those over 71 have magnesium deficiency, risking serious cardiovascular events.
- Lab studies show that magnesium reduces chronic inflammation and improves endothelial function, two major risk factors for cardiovascular disease.
- Animal and human studies show that regular supplementation with magnesium can lower blood pressure, promote arterial relaxation, and fight arterial calcification.



(600 mg/day) reduced blood pressure, lowering systolic (top number) pressure to **134** from **144 mmHg**, and diastolic (lower number) pressure to **81** from **88**, after six months of therapy.¹⁷

This result was linked to increased blood vessel dilation and significant improvements in endothelial function in supplemented women.

In addition, the thickness of the carotid artery, a measure of unhealthy arterial thickening, rose in placebo patients during the six-month period, but was unchanged in supplemented subjects.

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 **two-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.

A 2018 meta-analysis found that magnesium supplementation **improved endothelial function**.¹⁸

Coronary artery disease occurs when the arteries to the heart muscle develop atherosclerotic plaques, reducing blood flow and raising the imminent risk of heart attack.

Magnesium supplementation improves both heart function and exercise tolerance in people with coronary artery disease. In a study of 53 men suffering from the ailment, **365 mg** of oral magnesium citrate taken *twice daily* for six months resulted in improved oxygen utilization during exercise and greater pumping action of the left ventricle (main pumping chamber) in the heart. This indicates significant improvements in blood flow and oxygen delivery.¹⁹

Heart failure is defined as the inability of the heart muscle to pump sufficient blood to meet bodily needs. It often arises in people who’ve had a heart attack. It can eventually result in the failure of multiple organs and death.

In a study of 22 patients with symptomatic chronic heart failure, an **800 mg/day** dose of magnesium for three months produced a significant *increase* in **arterial compliance** (a measure of how well an artery can relax and contract in response to blood flow).²⁰

This indicates improved **endothelial function** and improved ability of the arteries to deliver oxygen-rich blood to target organs.





Summary

Scientists have determined that having *low magnesium* levels *increases* the risk for conditions that are major risk factors for heart disease and strokes.

New evidence reveals that magnesium lowers cardiovascular risk through reductions in inflammation and improvements in endothelial function.

Magnesium *boosts* output of vessel-relaxing factors, including *nitric oxide*, and *combats* factors that narrow and harden arteries and restrict blood flow. Magnesium also fights the calcification that stiffens arteries.

Human studies demonstrate that regular **magnesium supplementation** has favorable effects on:

- Blood pressure,
- Coronary artery disease, and
- Heart failure.

Higher magnesium consumption, via diet or supplementation, has been demonstrated to provide numerous benefits, including lowering cardiovascular disease risk. •

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

A Summary of Magnesium's Effects on Cardiovascular Health

Cardiovascular disease and its risk factors are complex disorders, with many interwoven threads leading to potentially catastrophic outcomes.

Here's a summary of what is known about magnesium's effects on the heart and blood vessels.

Magnesium:^{3,21}

- Naturally counteracts ill effects of calcium in arterial walls, preventing calcium deposition and maintaining vessel elasticity,
- Promotes production of signaling molecules that trigger vessel dilation (relaxation) to permit increased blood flow,
- Balances effects of acute and chronic stress by modulating the impact of stress-response signaling molecules,
- Regulates turnover of proteins in vessel walls that determine elasticity and flexibility, properties that are lost as atherosclerosis progresses,
- Modulates electrical signaling in the heart muscle to enhance its contractility ("squeeze"),
- Reduces risk factors for thrombosis (clotting inside arteries that blocks blood flow), and
- Regulates migration of cells in arterial walls that overgrow in atherosclerosis, thereby reducing arterial thickness and stiffening.

These properties help to explain why humans with low magnesium intake or blood levels have higher risks for atherosclerosis, coronary artery disease, arrhythmias, and heart failure.²¹

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

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Protein Supplementation

MARIE SPANO, MS, RD, CSCS, CSSD

High-quality proteins contain all essential amino acids, those the body cannot make and therefore must consume.



Most of us know **protein** is vital for building muscle. Adequate protein ingestion also helps protect against **muscle loss** due to aging and dieting, aid in **weight loss** and weight management, and more.

In this exclusive interview, **Marie Spano**, MS, RD, CSCS, CSSD, one of the country's leading sports nutritionists, talks to *Life Extension*[®] about the best protein sources, the proper amount to consume, and how important protein can be for long-term health.

—LAURIE MATHENA



LE: Let's start with the basics. Why is protein so important?

Spano: Dietary protein helps build muscle and is needed for chemical reactions throughout the body. But our need for protein is really a need for **amino acids**, the building blocks that make up protein. The body breaks down proteins to get the amino acids.

LE: What happens if we *don't* get enough protein?

Spano: When people consume a diet with insufficient protein, their bodies will break down skeletal muscle to help meet amino acid needs for critical processes. Over time, this can take a toll. Low protein intake is associated with reduced muscle mass and decreased strength throughout life.^{1,2}

LE: How much protein do we need?

Spano: The Recommended Dietary Allowance (RDA) of protein for adults 19 and older is **0.8 grams** per kilogram of body weight (**0.8 g/kg**). It is now generally recommended that older adults consume from **1.0 to 1.2 g/kg** body weight of protein daily.^{3,4} This corresponds to **82.5-99 grams** (just under three ounces to 3.5 ounces) of protein for an **82.5 kg** (182 pound) person.

A standard four-ounce serving of salmon provides 26 grams of protein.⁵ However, there are some concerns that a higher protein intake may be harmful to those with kidney disease.⁶ People with depressed kidney function should consult with a physician before consuming supplements with protein and amino acids.

LE: Should people try to get that protein in one sitting?

Spano: Definitely not! Protein intake should be evenly spaced throughout the day, in **three or more meals**. There's a limit to the amount of protein a person can use at one time to build skeletal muscle.⁷ When we eat more protein and amino acids than we can use, we don't store them for later use. That is why we must consume protein in "doses" or regular meals throughout the day.

LE: What are the best protein sources?

Spano: High-quality proteins contain all **essential amino acids**, those the body cannot make and therefore must consume. All essential amino acids are needed for muscle protein synthesis. Fall short in one or more, and muscle protein synthesis will not be sustained at the same rate.⁸

Most **animal-based proteins** contain all essential amino acids. **Whey, seafood, and eggs** are good examples.

Many **plant proteins** lack one or more essential amino acids. But some plant proteins, including **pea protein isolate** and **brown rice**, stand out for their higher leucine content. And two or more plant proteins can be *combined* to make a protein-rich product with *all* essential amino acids.⁹ Plant protein can also be fortified with the missing essential amino acids to make it a truly complete protein source.¹⁰

LE: What else should a person look for when choosing a protein supplement?



Spano: If you're using an animal-based protein supplement such as **whey** or **egg**, look for one without a ton of other ingredients that you may not need. If you are lactose intolerant, choose **whey protein isolate**, which is **99%** lactose free.



Ideally, plant proteins should be blended, including two or more types of proteins, or they should have the missing essential amino acids added.

LE: We often think of protein powder as something for bodybuilders. But does taking a protein supplement have benefits for all aging adults?

Spano: It might, if it helps that individual reach the correct amount of dietary protein intake. Muscle mass gradually decreases with age, a process called **sarcopenia**.

Sarcopenia develops around the fourth or fifth decade of life,⁷ and can be worse due to chronic illness, inactivity, or inadequate protein and calorie intake.¹¹ Once sarcopenia starts, a person loses **3%** to **8%** of muscle mass each decade⁶ while strength decreases by **3%** per year after age 60.¹² Simple tasks like opening a container of food or lifting groceries can become difficult, and the risk of dangerous falls increases.¹²

A higher protein intake has been shown in multiple studies to **slow the progression of sarcopenia**, improving quality of life.^{13,14} Regular physical activity, including resistance exercise, is also vital for slowing muscle loss. Protein powders make it easy to get more protein in the diet. •

Marie A. Spano, MS, RD, CSCS, CSSD, is a nutrition communications expert and one of the country's leading sports nutritionists for professional teams.

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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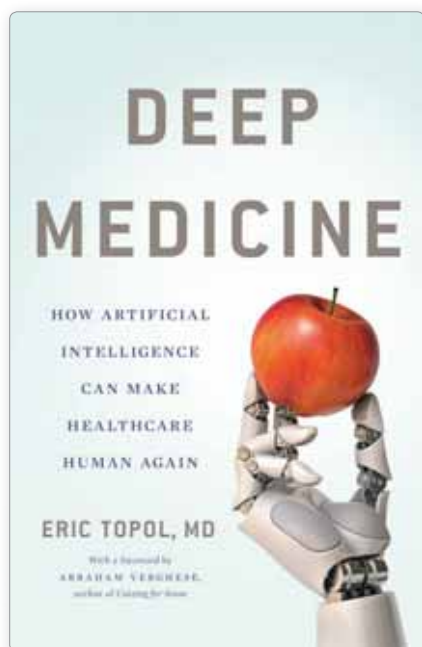
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Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again

BY DR. ERIC TOPOL

Along with the explosive economic growth of healthcare, the practice of medicine has been progressively dehumanized.



The healthcare system is in crisis. Doctors are overworked and burned out, and the lack of time for individualized attention with patients has led to record numbers of misdiagnoses and medical errors.

In his latest book, *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*, Dr. Eric Topol, world-renowned cardiologist and executive vice president of Scripps Research, discusses a surprising solution: artificial intelligence (AI).

While integrating computers into the healthcare system might initially seem less human, Topol explains that the true benefit of AI is its potential to help free doctors from

tasks that interfere with human connection. According to Topol, technology like virtual assistants, smart speakers, and smartphone apps will liberate doctors from keyboards, freeing them to spend the time necessary to restore trust between doctor and patient.

In addition, Topol discusses how AI can help improve aspects of the healthcare system ranging from diagnosing cancer, to helping predict and prevent suicide, to helping seniors live independently. Along the way, he is open about the potential pitfalls of the technology (including privacy and ethics), noting where AI has fallen short and envisioning how it could improve in the future.

In this Q&A with *Life Extension*®, adapted from *Deep Medicine*, Dr. Topol explains in more detail the exciting technological advances that are ushering in a new, improved age of medicine and healthcare.

—Laurie Mathena



LE: Artificial intelligence (AI) seems like science fiction, but it is very much a reality today.

Dr. Topol: AI has been sneaking into our lives. It is already pervasive in our daily experiences, ranging from autocomplete when we type, to unsolicited recommendations on Google searches, to music suggestions based on our listening history, to Alexa answering questions or turning out the lights.

Conceptually, its roots date back more than 80 years, and its name was coined in the 1950s, but only recently has its potential impact in healthcare garnered notice. The promise of artificial intelligence in medicine is to provide composite, panoramic views of individuals' medical data; to improve decision making; to avoid errors such as misdiagnosis and unnecessary procedures; to help in ordering and interpretation of appropriate tests; and to recommend treatment. Underlying all of this are data.

While the data keep pouring out, we've processed only a tiny fraction. Most estimates are less than **5%**, if that much. In a sense, it was all dressed up with nowhere to go—until now. Advances in artificial intelligence are taming the unbridled amalgamation of Big Data by putting it to work.

LE: In your book, you discuss deep learning, which teaches computers to do what comes naturally to humans. Can you give an overview of what deep learning can accomplish?

Dr. Topol: In the past few years, several studies relying on deep learning have been published in leading peer-reviewed medical journals.

Many in the medical community were frankly surprised by what deep learning could accomplish: studies that claim AI's ability to diagnose some types of skin cancer as well as or perhaps even better than board-certified dermatologists; to identify specific heart-rhythm abnormalities

like cardiologists; to interpret medical scans or pathology slides as well as senior, highly qualified radiologists and pathologists, respectively; to diagnose various eye diseases as well as ophthalmologists; and to predict suicide better than mental health professionals.

These skills predominantly involve pattern recognition, with machines learning those patterns after training on hundreds of thousands, and soon enough millions, of examples. Such systems have just gotten better and better, with the error rates for learning from text-, speech-, and image-based data dropping well below **5%**, whizzing past the human threshold.

LE: Let's talk in more detail about a few specific examples. How could AI transform the field of, say, radiology?

Dr. Topol: A radiologist reads about 20,000 studies a year, which equates to somewhere between 50-100 per day, a number that has been steadily increasing. While X-rays are single-digit images per exam, ultrasounds are dozens, and CT scans and MRIs are hundreds, a ratio that keeps increasing. All told there are more than 800 million medical scans a year in the United States, which amounts to about 60 billion images, or one image generated every two seconds.

Some studies suggest that errors in interpretation of medical scans are far worse than generally accepted, with false positive rates of **2%** and false negative rates over **25%**. Given those 800 million annual scans, that means large numbers of readings are at risk of being wrong.

Radiologists, then, would certainly benefit from a machine accuracy booster. For example, a careful study of classifying more than 50,000 chest X-rays as simply either



normal or abnormal achieved algorithmic accuracy of **95%**, which could prove useful for radiologists to triage which ones merit a closer look.

LE: How can AI help with something like a cancer diagnosis?

Dr. Topol: There is one last place so far where cancer could prove amenable to attack by AI: gastroenterology. The accurate diagnosis of colon polyps and cancer lesions during colonoscopy is more difficult than most people are aware. Multiple studies have shown that these lesions are missed in at least **20%** of patients, with some reports considerably higher.

Recently, the idea of using AI to detect these lesions was advanced in a deep-learning study that used 300 features from 30,000 colonoscopy images, magnified 500-fold, and then tested the algorithm in 250 patients with 306 polyps. The **86%** accuracy achieved is promising compared with the literature.

In the first prospective study of colonoscopy with real time AI-processed imaging, the results from 325 patients were very encouraging for accurate diagnosis of tiny (as they are called “diminutive”) polyps. The use of such high magnification and machine pattern review suggests it may ultimately be a very useful adjunct for this important screening procedure.

LE: AI clearly has the potential to help with diagnoses, but can it do anything to help seniors maintain their independence?

Dr. Topol: Apart from elderly patients with an acute illness, there is a concentrated effort to use AI to support seniors’ ability to live and thrive in their home, rather than having to



move into assisted living facilities or even needing to have caregivers make frequent visits.

There’s an extraordinary array of start-ups developing sensors and algorithms that monitor gait, pulse, temperature, mood, cognition, physical activity, and more. Moreover, AI tools to improve vision and hearing can even augment seniors’ sensory perception, which would promote their safety and improve their quality of life.

For example, with the Aipoly app, a senior with significant visual impairment can simply point to an object with a smartphone, and AI will quickly kick in with a voice response identification. It does the same for identifying colors.

Sensors that can detect whether someone has fallen can be embedded in the floor. And robot assistants in the form of pets as well as specially designed Alexa-like voice assistants like ElliQ are examples of hardware AI to promote independent living.

LE: Does AI have the capability of helping someone develop a personalized nutrition plan?

Dr. Topol: AI can also revolutionize other aspects of our lives that are, in one sense or another, upstream from the clinic. A huge one is how we eat. One of the unexpected and practical accomplishments of machine learning to date has been to provide a potential scientific basis for individualized diets. That’s conceivably an exciting advance—the idea of knowing what specific foods are best for any given person.

We can now predict in healthy people, without diabetes, what particular foods will spike their blood sugar. Such advances far outstrip whatever benefits might accrue from following a diet for all people, such as the classic food pyramids, or fad diets like Atkins or South Beach, none of which ever had a solid evidence basis.

Many of these at-home advances will come together in the virtual medical coach. It most likely will be voice mediated, like Siri, Alexa, and Google Home, but unlikely to remain a cylinder or a squiggle on a screen. I suspect they're more apt to come in the form of a virtual human avatar or hologram (but simply text or e-mail if one prefers).

The virtual medical coach is the deep learning of all of one's data, seamlessly collected, continuously updated, integrated with all biomedical knowledge, and providing feedback and coaching. Such systems will initially be condition-specific, say for diabetes or high blood pressure, but eventually they'll offer a broad consumer health platform to help prevent or better manage diseases.

LE: One of the ironies of AI is that you claim this technology will make healthcare human again.

Dr. Topol: Along with the explosive economic growth of healthcare, the practice of medicine has been progressively dehumanized. Rather than all the talk of "personalized" medicine, business interests have overtaken medical care. Clinicians are squeezed for maximal productivity and profits. We spend less and less time with patients, and that time is compromised without human-to-human bonding.

The medical profession has long been mired in inefficiency, errors, waste, and suboptimal outcomes. In recent decades, it has lost its way from taking true care of patients. A new patient appointment averages 12 minutes, a return visit, seven.

One of the most important potential outgrowths of AI in medicine is the gift of time. Time is essential to the quality of care patients receive and to their health outcomes.

AI can help achieve the gift of time with patients. One of the most important effects will come from unshackling clinicians from electronic health records. At the University of Colorado, taking the computer out of the exam room and supporting doctors with human medical assistants led to a striking reduction in physical burnout, from **53% to 13%**.

We need everyone on board, not just leaders. If the heightened efficiency is just used by administrators as a means to rev up productivity, so doctors see more patients, read more scans or slides, and maximize throughput, there will be no gift of time.

LE: Can you give a few specific examples of how AI could help free up time for doctors and nurses?

Dr. Topol: How AI can ease medical workflow is exemplified by a program that MedStar Health, the largest health system in the Washington, DC, region, has initiated in its emergency rooms. The typical ER patient has about 60 documents in his or her medical history, which takes considerable time for clinicians to review and ingest.

MedStar developed a machine-learning system that rapidly scans the complete patient record and provides recommendations regarding the patient's presenting symptoms, freeing doctors and nurses to render care for their patients.

Another example is AI automation of medical images, which isn't simply about reading MRIs. The FDA-approved Arterys algorithm called Deep Ventricle enables rapid analysis of the heart's blood flow, reducing a task that can take an hour as blood is drawn and measured by hand, to a 15-second scan.

LE: The potential of AI to improve so many aspects of healthcare is very exciting.

Dr. Topol: We're still in the earliest days of AI in medicine. The field is long on computer algorithmic validation and promises but very short on real-world, clinical proof of effectiveness.

But with the pace we've seen in just the past few years, with machines outperforming humans on specific, narrow tasks and likely to accelerate and broaden, it is inevitable that narrow AI will take hold. •

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Cucumbers

BY LAURIE MATHENA



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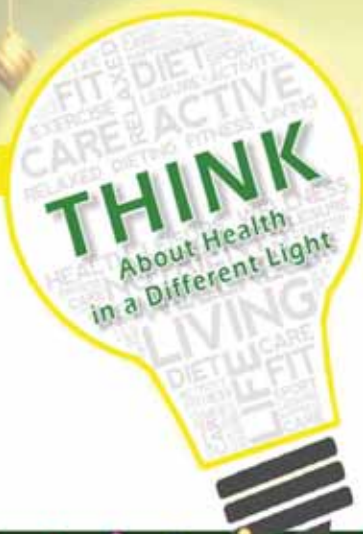
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- 02306 Men's Bladder Control
- 01789 PalmettoGuard® Saw Palmetto with Beta-Sitosterol
- 01790 PalmettoGuard® Saw Palmetto/Nettle Root Formula with Beta-Sitosterol
- 01837 Pomi-T®
- 01373 Prelox® Enhanced Sex for Men
- 01940 Super MiraForte with Standardized Lignans
- 01909 Triple Strength ProstaPollen™
- 02029 Ultra Prostate Formula

MINERALS

- 01661 Boron
- 02107 Extend-Release Magnesium
- 30731 Ionic Selenium
- 01677 Iron Protein Plus
- 01459 Magnesium Caps
- 01682 Magnesium (Citrate)
- 01328 Only Trace Minerals
- 01504 Optimized Chromium with Crominex® 3+
- 02309 Potassium with Extend-Release Magnesium
- 01740 Sea-Iodine™
- 01879 Se-Methyl L-Selenocysteine
- 01778 Super Selenium Complex
- 00213 Vanadyl Sulfate
- 01813 Zinc Caps

MISCELLANEOUS

- 00577 Potassium Iodide
- 00657 Solarshield® Sunglasses

MOOD & STRESS MANAGEMENT

- 02312 Cortisol-Stress Balance
- 00987 Enhanced Stress Relief
- 01074 5 HTP
- 01683 L-Theanine
- 02175 SAmE (S-Adenosyl-Methionine)
200 mg, 30 enteric coated tablets
- 02176 SAmE (S-Adenosyl-Methionine)
400 mg, 30 enteric coated tablets
- 02174 SAmE (S-Adenosyl-Methionine)
400 mg, 60 enteric coated tablets

MULTIVITAMINS

- 02199 Children's Formula Life Extension Mix™
- 02398 Comprehensive Nutrient Packs ADVANCED
- 02354 Life Extension Mix™ Capsules
- 02364 Life Extension Mix™ Capsules without Copper
- 02356 Life Extension Mix™ Powder
- 02355 Life Extension Mix™ Tablets
- 02357 Life Extension Mix™ Tablets with Extra Niacin
- 02365 Life Extension Mix™ Tablets without Copper
- 02292 Once-Daily Health Booster • 30 softgels
- 02291 Once-Daily Health Booster • 60 softgels
- 02313 One-Per-Day Tablets
- 02317 Two-Per-Day Capsules • 60 capsules
- 02314 Two-Per-Day Capsules • 120 capsules
- 02316 Two-Per-Day Tablets • 60 tablets
- 02315 Two-Per-Day Tablets • 120 tablets

NERVE & COMFORT SUPPORT

- 02202 ComfortMAX™
- 02303 PEA Discomfort Relief

PERSONAL CARE

- 01006 Biosil™ • 5 mg, 30 veg capsules
- 01007 Biosil™ • 1 fl oz
- 00321 Dr. Proctor's Advanced Hair Formula
- 00320 Dr. Proctor's Shampoo
- 02322 Hair, Skin & Nails Collagen Plus Formula
- 01278 Life Extension Toothpaste
- 00408 Venotone
- 00409 Xyliwhite Mouthwash
- 02304 Youthful Collagen
- 02252 Youthful Legs

PET CARE

- 01932 Cat Mix
- 01931 Dog Mix

PROBIOTICS

- 01622 Bifido GI Balance
- 01825 FLORASSIST® Balance
- 02125 FLORASSIST® GI with Phage Technology
- 01821 FLORASSIST® Heart Health
- 02250 FLORASSIST® Mood Improve
- 02208 FLORASSIST® Nasal
- 02120 FLORASSIST® Oral Hygiene
- 02203 FLORASSIST® Prebiotic
- 01920 FLORASSIST® Throat Health
- 02400 FLORASSIST® Winter Immune Support
- 52142 Jarro-Dophilus® for Women
- 00056 Jarro-Dophilus EPS® • 60 veg capsules
- 21201 Jarro-Dophilus EPS® • 120 veg capsules
- 01038 Theralac® Probiotics
- 01389 TruFlora® Probiotics

SKIN CARE

- 80157 Advanced Anti-Glycation Peptide Serum
- 80165 Advanced Growth Factor Serum
- 80170 Advanced Hyaluronic Acid Serum
- 80154 Advanced Lightening Cream
- 80155 Advanced Peptide Hand Therapy
- 80152 Advanced Triple Peptide Serum
- 80140 Advanced Under Eye Serum with Stem Cells
- 80137 All-Purpose Soothing Relief Cream
- 80139 Amber Self MicroDermAbrasion
- 80118 Anti-Aging Mask
- 80151 Anti-Aging Rejuvenating Face Cream
- 80153 Anti-Aging Rejuvenating Scalp Serum
- 80133 Anti-Oxidant Facial Mist Hydrator
- 80156 Collagen Boosting Peptide Serum

- 80169 Cucumber Hydra Peptide Eye Cream
- 80141 DNA Support Cream
- 80167 Environmental Support Serum
- 80163 Eye Lift Cream
- 80123 Face Rejuvenating Anti-Oxidant Cream
- 80109 Hyaluronic Facial Moisturizer
- 80110 Hyaluronic Oil-Free Facial Moisturizer
- 80138 Hydrating Anti-Oxidant Facial Mist
- 00661 Hydroderm
- 80103 Lifting & Tightening Complex
- 80168 Melatonin Advanced Peptide Cream
- 80114 Mild Facial Cleanser
- 80172 Multi Stem Cell Hydration Cream
- 80159 Multi Stem Cell Skin Tightening Complex
- 80122 Neck Rejuvenating Anti-Oxidant Cream
- 80174 Purifying Facial Mask
- 01448 Rejuvenex® Body Lotion
- 01621 Rejuvenex® Factor Firming Serum
- 80150 Renewing Eye Cream
- 80142 Resveratrol Anti-Oxidant Serum
- 01938 Shade Factor™
- 02129 Skin Care Collection Anti-Aging Serum
- 02130 Skin Care Collection Day Cream
- 02131 Skin Care Collection Night Cream
- 80166 Skin Firming Complex
- 02096 Skin Restoring Ceramides
- 80130 Skin Stem Cell Serum
- 80164 Skin Tone Equalizer
- 80143 Stem Cell Cream with Alpine Rose
- 80148 Tightening & Firming Neck Cream
- 80161 Triple-Action Vitamin C Cream
- 80162 Ultimate MicroDermabrasion
- 80173 Ultimate Peptide Serum
- 80160 Ultra Eyelash Booster
- 01220 Ultra Rejuvenex®
- 00676 Ultra RejuveNight®
- 80101 Ultra Wrinkle Relaxer
- 80113 Under Eye Refining Serum
- 80104 Under Eye Rescue Cream
- 80171 Vitamin C Lip Rejuvenator
- 80129 Vitamin C Serum
- 80136 Vitamin D Lotion
- 80102 Vitamin K Cream

SLEEP

- 01512 Bioactive Milk Peptides
- 02300 Circadian Sleep
- 01551 Enhanced Sleep with Melatonin
- 01511 Enhanced Sleep without Melatonin
- 02234 Fast-Acting Liquid Melatonin
- 01669 Glycine
- 02308 Herbal Sleep PM
- 01722 L-Tryptophan
- 01668 Melatonin • 300 mcg, 100 veg capsules
- 01083 Melatonin • 500 mcg, 200 veg capsules
- 00329 Melatonin • 1 mg, 60 capsules
- 00330 Melatonin • 3 mg, 60 veg capsules
- 00331 Melatonin • 10 mg, 60 veg capsules
- 00332 Melatonin • 3 mg, 60 veg lozenges
- 02201 Melatonin IR/XR
- 01787 Melatonin 6 Hour Timed Release
300 mcg, 100 veg tablets
- 01788 Melatonin 6 Hour Timed Release
750 mcg, 60 veg tablets
- 01786 Melatonin 6 Hour Timed Release
3 mg, 60 veg tablets
- 01721 Optimized Tryptophan Plus
- 01444 Quiet Sleep
- 01445 Quiet Sleep Melatonin

VITAMINS

- 01533 Ascorbyl Palmitate
- 00920 Benfotiamine with Thiamine
- 00664 Beta-Carotene
- 01945 BioActive Complete B-Complex
- 00102 Biotin
- 00084 Buffered Vitamin C Powder
- 02229 Fast-C® and Bio-Quercetin Phytosome
- 02075 Gamma E Mixed Tocopherol Enhanced with
Sesame Lignans
- 02070 Gamma E Mixed Tocopherol/Tocotrienols
- 01913 High Potency Optimized Folate
- 01674 Inositol Caps Liquid Emulsified
- 02244 Liquid Vitamin D3 • 2,000 IU, 1 fl oz
- 02232 Liquid Vitamin D3 • 2,000 IU, 1 fl oz, mint
- 01936 Low-Dose Vitamin K2
- 01536 Methylcobalamin • 1 mg, 60 veg lozenges
- 01537 Methylcobalamin • 5 mg, 60 veg lozenges
- 00065 MK-7
- 00373 No Flush Niacin
- 01939 Optimized Folate (L-Methylfolate)
- 01217 Pyridoxal 5'-Phosphate Caps
- 01400 Super Absorbable Tocotrienols
- 02334 Super K
- 02335 Super K Elite
- 01863 Super Vitamin E
- 02028 Vitamin B5 (Pantothenic Acid)
- 01535 Vitamin B6
- 00361 Vitamin B12
- 02228 Vitamin C and Bio-Quercetin Phytosome
1,000 mg, 60 veg tablets
- 02227 Vitamin C and Bio-Quercetin Phytosome
1,000 mg, 250 veg tablets
- 01753 Vitamin D3 • 1,000 IU, 90 softgels
- 01751 Vitamin D3 • 1,000 IU, 250 softgels
- 01713 Vitamin D3 • 5,000 IU, 60 softgels
- 01718 Vitamin D3 • 7,000 IU, 60 softgels
- 01758 Vitamin D3 with Sea-Iodine™
- 02040 Vitamins D and K with Sea-Iodine™

WEIGHT MANAGEMENT & BODY COMPOSITION

- 00658 7-Keto® DHEA Metabolite • 25 mg, 100 capsules
- 02479 7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules
- 01509 Advanced Anti-Adipocyte Formula
- 01807 Advanced Appetite Suppress
- 02207 AMPK Metabolic Activator
- 01823 CalReduce Selective Fat Binder
- 02478 DHEA Complete
- 01738 Garcinia HCA
- 29754 HCAActive Garcinia Cambogia Extract
- 01292 Integra-Lean®
- 01908 Mediterranean Trim with Sinetrol™ -XPur
- 01492 Optimized Irvingia with Phase 3™ Calorie Control Complex
- 01432 Optimized Saffron with Satiereal®
- 00818 Super CLA Blend with Sesame Lignans
- 01902 Waist-Line Control™
- 02151 Wellness Code® Appetite Control

WOMEN'S HEALTH

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



Promote Tear Production From The Inside Out



Item #01918 • 30 vegetarian capsules

1 bottle **\$13.50**

4 bottles \$12 each

Everyday factors can lead to dry, itchy, irritated eyes.

Tear Support with MaquiBright® is a unique oral supplement that supports your body's own tear production for continuous, all-day comfort.

The secret is the maqui berry's rich source of **delphinidins**, a source of support for tear-producing glands. When human subjects took just **60 mg** a day of **Maqui berry extract**, there was a **45% increase** in lubricating tear production.^{1,2}



References

1. *Food Chem.* 2013;139(1-4):129-37.
2. *Panminerva Med.* 2014;56(3 Suppl 1):1-6.

MaquiBright™ is a registered trademark of MAQUI NEW LIFE S.A., Chile and ORYZA OIL & FAT CHEMICAL CO., LTD., Japan.



For full product description and to order **Tear Support with MaquiBright®**, call **1-800-544-4440** or visit **www.LifeExtension.com**

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Community Health Heroes



For the past three years, *Reader's Digest's* Nicest Places in America contest has been celebrating acts of kindness and honoring communities where neighbors are helping one another and inspiring those around them to give back.

For the first time ever, we've partnered with Life Extension to shine the spotlight on Community Health Heroes who are committed to supporting and encouraging communities to live happier, healthier lives.

Discover their stories at
rd.com/CommunityHealthHeroes



Camp Sweeney Gainesville, TX

A community-building center dedicated to children with type 1 diabetes



People's Health Clinic Park City, UT

A zero-cost health-care destination servicing the uninsured



Mariano "Nano" Corona Okeechobee, FL

A cancer survivor who created a unique charity to help fight the disease

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Jarro Formulas® is a probiotic pioneer and has a complete line of probiotic products, including **Jarro-Dophilus EPS®**.

For full product description or to order Jarro-Dophilus® EPS call 1-800-544-4440 or visit www.LifeExtension.com

Jarro-Dophilus EPS® 5 Billion Per Capsule 60 Veggie Caps
Item # 00056 \$17.96

Jarro-Dophilus EPS® 5 Billion Per Capsule 120 Veggie Caps
Item # 21201 \$31.46

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FORMULAS®

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NON-STOP

*"Thanks,
Ultra Prostate
Formula."*

Ultra Prostate Formula can help:

- Support healthy urination
- Promote healthy prostate size and function
- Encourage healthy inflammatory response
- Help inhibit PSA activity

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

Item #02029 • 60 softgels

1 bottle **\$28.50**

4 bottles \$26.25 each



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POWERFUL LONGEVITY MECHANISM

Increase **AMPK** to *Lower* **mTOR**

Normal **aging** results in a decline in a cell *enzyme* called **AMPK**.

As **AMPK** levels drop, a cell protein called **mTOR** increases.

Excess **mTOR** is associated with undesirable effects related to normal **aging**.

When **mTOR** is elevated, **weight loss** may be more difficult.

When cellular **AMPK** is increased, excess **mTOR** decreases.

AMPK Metabolic Activator is a dual-nutrient formula to support healthy **AMPK** activation.



Item #02207 • 30 vegetarian tablets

1 bottle **\$28.50**

4 bottles \$24 each



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

Actiponin® is a trademark of TG Biotech Co., Ltd.

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

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

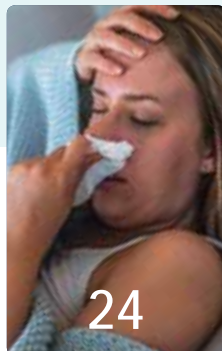


IN THIS EDITION OF *LIFE EXTENSION*[®] MAGAZINE



9 UNHEALTHY “GUMMY” VITAMINS

Commercial “gummy” supplements provide trivial nutrient **potencies** and as much as **4,000 mg** of **sugar** per serving! Sugar-laden “**gummies**” used as dietary supplements may be harmful.



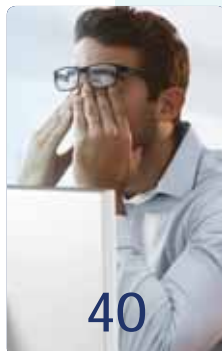
24 PROBIOTIC PROTECTION AGAINST FLU AND COLD VIRUSES

A **blend** of **probiotics** and a **prebiotic** reduced the number of flu and flu-like respiratory illnesses by **75%** and colds by **39%** in adults.



33 COFFEE REDUCES DNA DAMAGE

A recent study suggests that **coffee** *reduces* **DNA damage** by **23%** in people.



40 SHIELD EYES FROM TOXIC BLUE LIGHT

Natural **carotenoids** *filter out* blue light from computer and smart phone screens to ease **eye strain** and reduce **retinal damage**.



50 HOW SAGE PROTECTS BRAIN FUNCTION

A sage extract has been **clinically shown** to *increase* memory performance in older adults by **60%** along with enhanced attention.



60 MAGNESIUM AND CARDIOVASCULAR RISK

Boosting magnesium levels can lower blood pressure, promote arterial relaxation, fight arterial calcification, and improve endothelial function.

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