



The Science of a Healthier Life®

LifeExtension.com

December 2020

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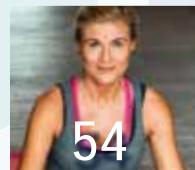
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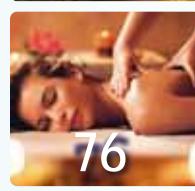
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December 2020

Volume 26 • Number Twelve
Publisher • LE Publications, Inc.



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13. Publication Title	14. Issue Date for Circulation Data Section	
LIFE EXTENSION		OCTOBER 7, 2020
15. Extent and Nature of Circulation:		
a. Total Number of Copies (Net print Art)	366,071	364,867
b. Post Distribution (By Mail and Outside the Mail)		
(1) Mailed Outside County Paid Subscription Stated on PB Form 3541 (Include paid distribution above nominal rate, advertiser's profit copies, and exchange copies)	316,210	348,679
(2) Mailed In-County Paid Subscription Stated on PB Form 3541 (Include paid distribution above nominal rate, advertiser's profit copies, and exchange copies)	4,722	5,176
(3) Post Distribution—Outside the Mail—Including Issues Through Dealers and Commissions, Street Vendors, Counter Sales, and Other Paid Distribution Outside U.S. (e.g., First-Class Mail)	41,123	18,895
(4) Post Distribution by Other Classes of Mail Through the USPS (e.g., First-Class Mail)	74	68
c. Total Paid Distribution (Sum of 15b (1), (2), (3), and (4))	362,129	372,818
d. Free or Nominal Rate Distribution (By Mail and Outside the Mail)		
(1) Free or Nominal Rate Outside County Copied Included on PB Form 3541	48,459	10,781
(2) Free or Nominal Rate In-County Copies Included on PB Form 3541	703	163
(3) Free or Nominal Rate Copies Mailed at Other Classes Through the USPS (e.g., First-Class Mail)	950	74
(4) Free or Nominal Rate Distribution Outside the Mail (Carriers or other means)	0	0
e. Total Free or Nominal Rate Distribution (Sum of 15d (1), (2), (3), and (4))	50,112	11,018
f. Total Distribution (Sum of 15b and 15d)	412,241	383,836
g. Copies Not Distributed (See Instructions to Publishers #4 [page 42])	59,000	5,000
h. Total (Sum of 15f and g)	471,241	388,836
i. Percent Paid (Total Paid / Total Distribution)	78.74%	97.12%

* If you are claiming electronic copies, go to line 15 on page 3. If you are not claiming electronic copies, skip to line 17 on page 3.

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Circulation & Distribution

Life Extension • 3600 West Commercial Blvd., Ft. Lauderdale, FL 33309

Editorial offices: 954-766-8433 • fax: 954-491-5306

Customer Service: 800-678-8989 • **Email:** customerservice@LifeExtension.com

Wellness specialists: 800-226-2370 • **Email:** wellness@LifeExtension.com

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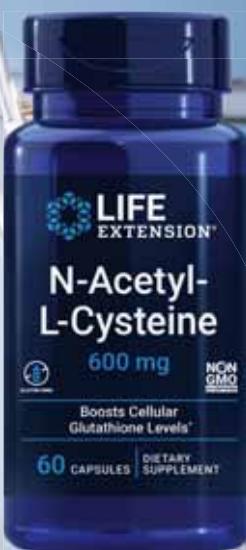
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When Drugs Become Dietary Supplements



WILLIAM FALOON

Politicians pretend to know how to make healthcare affordable. The realities tell a different story.

I used to pay **\$340** for an FDA-approved **drug** called **Cerefolin®** that contained:

- **5-MTHF**
(L-methylfolate) 5,635 mcg
- **Vitamin B12**
(cyanocobalamin) 1,000 mcg
- **Vitamin B6**
(pyridoxine) 50 mg
- **Vitamin B2** (riboflavin) 5 mg

I needed this prescription drug to reduce **homocysteine** blood levels. My insurance company refused to pay the outlandish price, so I had to cover it myself.

Move forward a few years and the superior **5-MTHF** form of **folate** became available as a **dietary supplement**. You can now obtain better homocysteine-reducing formulas for less than **\$20** that provide:

- **5-MTHF**
(L-methylfolate) 5,000 mcg
- **Vitamin B12**
(methylcobalamin) 1,000 mcg
- **Vitamin B6** (pyridoxal-5-phosphate) 100 mg
- **Vitamin B2** (riboflavin) 25 mg



5-MTHF is the activated form of **folate** that supports **methylation** in your DNA. The chart on this page shows the processes required to convert **folic acid** into active **5-MTHF**.

Pyridoxal-5-phosphate is the biologically active form of **vitamin B6**.¹

Methylcobalamin is one of the most **active** forms of vitamin B12.

To enlighten **politicians** about slashing **high drug costs**, tell them to reduce the **FDA's** authority and let the public access low-cost generic brands of all off-patent **drugs**—including **nutrients** that should not require a doctor's prescription.

Enzymatic Conversions
Required to Obtain
Biologically Active 5-MTHF

Synthetic Folic Acid

Dihydrofolate

Tetrahydrofolate

10-Formyl-THF

5,10 Methenyl-THF

5,10 Methylene-THF

5-MTHF

(Active Form of Folate)

Folic acid found in most supplements must undergo many **enzymatic** processes in your body before converting to its active **5-MTHF** (5-methyltetrahydrofolate) form. Many people are unable to convert folic acid into enough 5-MTHF, which is why supplementing with 5-MTHF (instead of folic acid) makes sense.

In youth, all our body systems are expected to function well all the time.

This changes with aging.

An underlying culprit of degenerative aging is disrupted **methylation**.

Optimal **methylation** enables *youthful* reactions to occur throughout the body, including in our **brain**, **heart**, and critical **liver** detoxification systems.

Methylation controls **genes** that must precisely turn “on” and “off” in order to maintain cellular health.

Distorted **DNA methylation** is involved in a host of age-related disorders.

The good news is that **nutrients** most of you take, including activated **B vitamins** like **5-methyltetrahydrofolate** (5-MTHF), **vitamin D**, and **magnesium** facilitate healthy **methylation**.^{2,3}

Measures of **DNA methylation**, called “**epigenetic clocks**,” are today’s premier predictors of **human longevity**.

Life Extension® has published many articles about **methylation**, but readers still find it challenging to understand.

According to research in mice, **20%-40%** of age-related changes that are measured by **epigenetic clocks** can be favorably influenced by lifestyle changes such as **calorie restriction**.⁴

Evidence also suggests that, for many people, nutrients such as **5-MTHF** and **methylcobalamin** can favorably influence healthy **methylation** patterns.

Widespread Methylation Deficits

Methylation is an essential process for internal biochemical reactions. With aging, **methylation patterns** become disrupted.⁵

The MTHFR gene is responsible for the activity of the *enzyme* that enables **folate** to be converted into the bioactive form (called **5-methyltetrahydrofolate**) that facilitates healthy **methylation**.

Approximately half the population carries a variant of the **MTHFR** gene that affects the activity of the enzyme, resulting in disrupted DNA methylation.^{6,7}

To fulfill its role in maintaining proper **methylation**, folate (or **folic acid**) needs to convert to bioactive **5-MTHF** in the body.

Methylation Deficits Cause Excess Homocysteine

Homocysteine is an amino acid that, when elevated, has been associated with circulatory and neurological problems.⁸ Excess **homocysteine** creates **inflammation** of the endothelium (the inner wall of the arteries) which results in increased cardiovascular risks.⁹

Proper methylation is needed to detoxify homocysteine and reduce high levels of it.

Age-related homocysteine increases are often caused by disrupted **methylation**.¹⁰ One reason for homocysteine buildup is that older people do not convert dietary





folate or folic acid in supplements into biologically active **methylated folate** (5-MTHF).⁷

The solution is to use the **5-MTHF** form of folate, which is a low-cost **dietary supplement** and no longer an outlandishly priced **prescription drug**.

Methylation Vital for Gene Expression

The **5-MTHF** form of **folate** is necessary for a compound in the body called **S-Adenosyl-Methionine** (SAMe) to **methylate** genetic material, including DNA.

Methylation is a critical way the transcription (activation) of **genes** is controlled. Without proper **methylation**, harmful genes can be overly expressed.

Epigenetic age is an emerging scientific concept that involves analysis of **methylation patterns** to determine biological age.¹¹

“**Epigenetics**” refers to external modifications that occur in **gene expression** as a result of what we do to our bodies, as opposed to the genetic code we are born with.

Cigarette smoke, for example, causes deleterious epigenetic changes to our cellular DNA.¹²

Vitamin D and **omega-3** fatty acids, on the other hand, induce beneficial epigenetic effects.¹³⁻¹⁶

Published research shows that measuring **epigenetic age** can predict future disease and mortality.¹¹

Scientists have invented tests they call **epigenetic clocks** that have been shown to be accurate predictors of lifespan, healthspan, and all-cause mortality.¹⁷

We expect to discuss more about **epigenetic tests** in future issues of *Life Extension*® magazine.

The B Vitamin That Became a Drug

Vitamin B6 comes in several forms that have shown varying degrees of beneficial effects.

Like folate and B12, **vitamin B6** plays a role in reducing levels of **homocysteine**. It does this via a different detoxification pathway than by methylation.^{1,8}

Pyridoxal-5-phosphate is the biologically active form of B6 that is obtainable today.¹

Pyridoxamine may be a better form of vitamin B6 that is currently unobtainable.¹⁸

In **1999**, a pharmaceutical company filed an application with the **FDA** to investigate **pyridoxamine**’s ability to treat diabetic nephropathy (kidney disease).¹⁹

In **2005**, the same company asked the FDA to remove pyridoxamine as a supplement.

In **2009** the FDA complied with this drug company’s request.

Eleven years later **pyridoxamine** is not approved either as drug or supplement.

Fortunately, consumers have access to low-cost **pyridoxal-5-phosphate**, which many believe to have comparable benefits to the **pyridoxamine** form of vitamin B6 the **FDA** claims is a “drug.”

Consumers Won the Big War

For many decades, the **FDA** tried to convert low-cost dietary supplements into **prescription drugs**.¹⁹

This was done at the behest of pharmaceutical companies who stood to make a fortune charging consumers outlandish **drug prices** for what are low-cost nutrients.

Life Extension® initiated a political and legal campaign in the late 1980s that resulted in passage of the **Dietary Supplement Health and Education Act in 1994**. This law denies the ability of the FDA to classify most nutrients as drugs and allows truthful, non-misleading health claims.²⁰

Consumers won a huge victory **26 years ago** by inundating Congress with letters demanding that the FDA never be allowed to take away their supplements.²⁰

This editorial reveals how much money consumers have saved by now paying less than **\$20** for a **B vitamin** formula that cost **\$340** when sold as a **prescription drug**.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club

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What is Methylation?

Genes are stretches of DNA that determine our traits, from hair and eye color to susceptibility to certain diseases and even lifespan potential.

Genes can also be active or inactive. The science of **epigenetics** studies how and why genes are expressed, or not.²¹

One of the main "switches" that modulates the way genes are expressed is **methylation**, which occurs when methyl groups are added to our genetic material.²²

SAMe (S-Adenosyl-Methionine) is a nutrient found naturally in the body that serves as the primary **methyl donor**. That means it's involved in practically *all* methylation reactions.²²⁻²⁵

If we don't have enough of it, the body cannot methylate properly. That can lead to excessive oxidative stress, chronic inflammation, tissue damage, and disease.^{26,27}

B vitamins and SAMe offer a way to maintain healthy methylation.

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

SAMe

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Life Extension® first introduced SAMe in 1997. Since then, researchers around the world have continued to discover its impressive benefits.

While SAMe is largely known for mood support, it has also shown benefits for the liver and joints.

A study by Harvard Medical School and Massachusetts General Hospital cited the impressive benefits of SAMe for mood elevation.¹

A report published in Germany showed that SAMe may help maintain healthy neurological function. This impressive report found that SAMe:²

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

In addition to these findings, SAMe also improves brain cell methylation, thereby facilitating youthful DNA enzymatic actions.

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

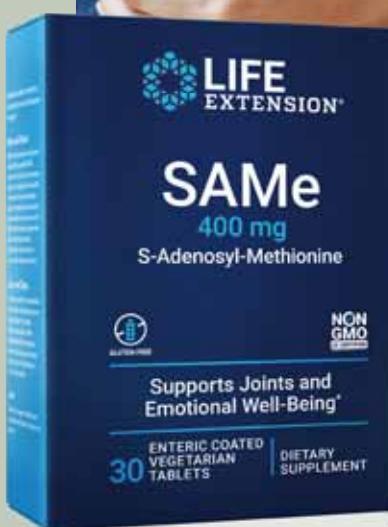
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1. *Am J Psychiatry*. 2010 Aug;167(8):942-8.
2. *Naunyn Schmiedebergs Arch Pharmacol*. 2000 Jan;361(1):47-52.



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

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

In the News



Nutrients Strengthen the Immune System Against Viral Infections

A review published in the *Archives of Physiology and Biochemistry* found evidence for nutrients including protein, vitamins, minerals, and fatty acids, that strengthen the human immune system against viral infections.*

Fifty-one articles were reviewed, which focused on the effects of nutrients in immunity and viral infections. They included reports of randomized trials, case-control studies, *in vivo* studies, and randomized-trial meta-analyses.

These studies identified **protein, omega-3 fatty acids, vitamins A, B1, B6, B12, C, D and E, iron, selenium, and zinc** as having a role in strengthening the immune system and supporting immune function.

Among the mechanisms discussed are:

- The role of amino acids in the immune system's antiviral actions,
- Vitamin A's involvement in maintaining mucosal integrity,
- Vitamin C's anti-inflammatory effect in sepsis,
- Vitamin D-associated reduction of viral replication rates and inflammatory cytokine levels,
- Vitamin E's ability to help maintain T-cell membrane integrity, and
- Zinc's ability to impair viral replication.

Editor's Note: In some of the studies, nutrient supplementation was associated with improved health status of infected individuals. "Supplementation with some nutrients may support the body's natural defense system by enhancing the immunity, epithelial barriers, cellular immunity, and antibody production," the review's authors wrote.

* *Arch Physiol Biochem.* 2020 Jul 9:1-10.

Probiotic Supplementation Can Help Improve Depressive Symptoms

People who have symptoms of depression may benefit from supplementation with probiotics with or without prebiotics, according to a systematic review published in the journal *BMJ Nutrition Prevention & Health*.*

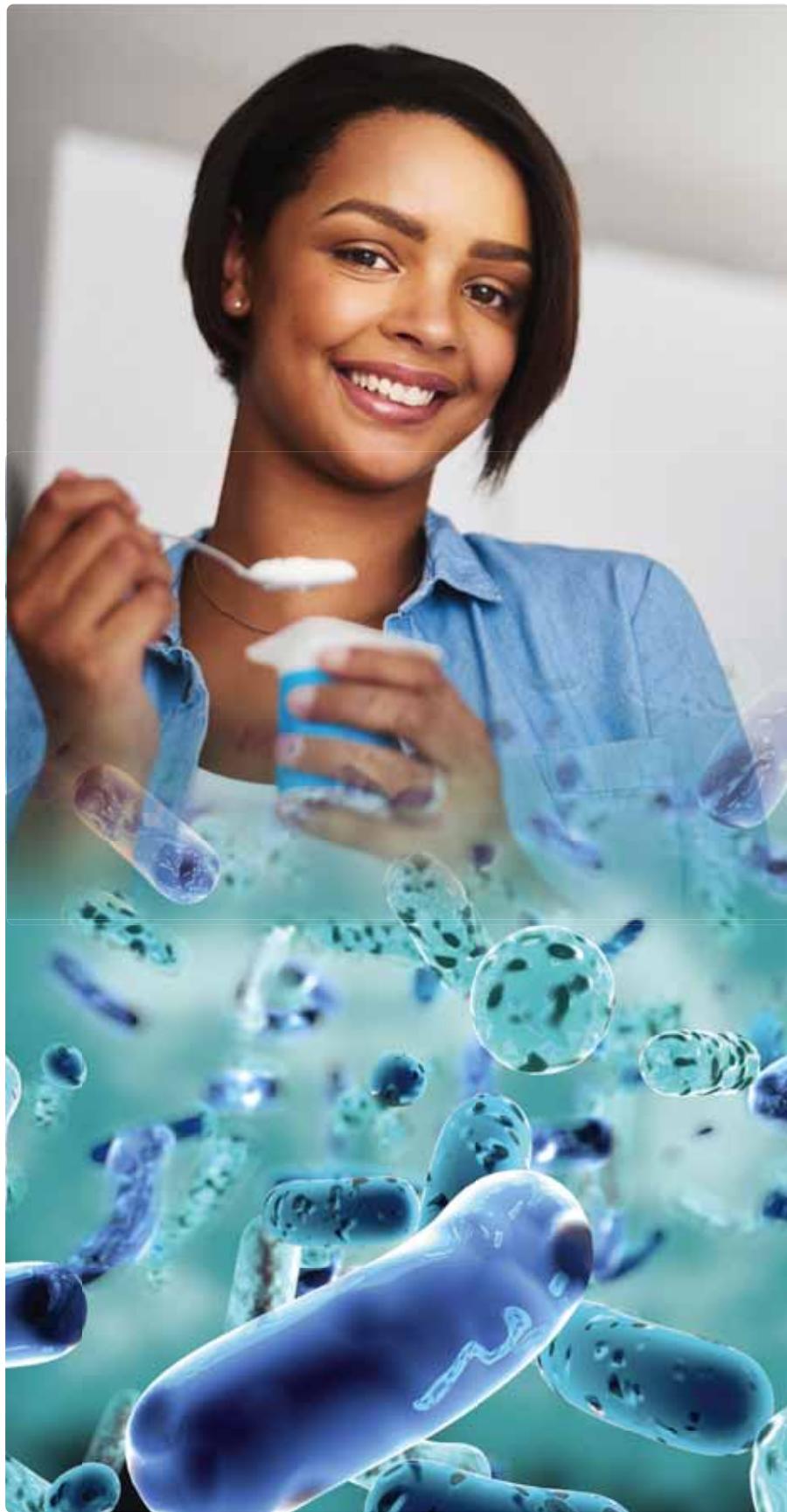
For their review, the researchers selected seven studies that enrolled a total of 361 men and women. The studies examined the effects of at least one probiotic bacteria strain on anxiety or depression.

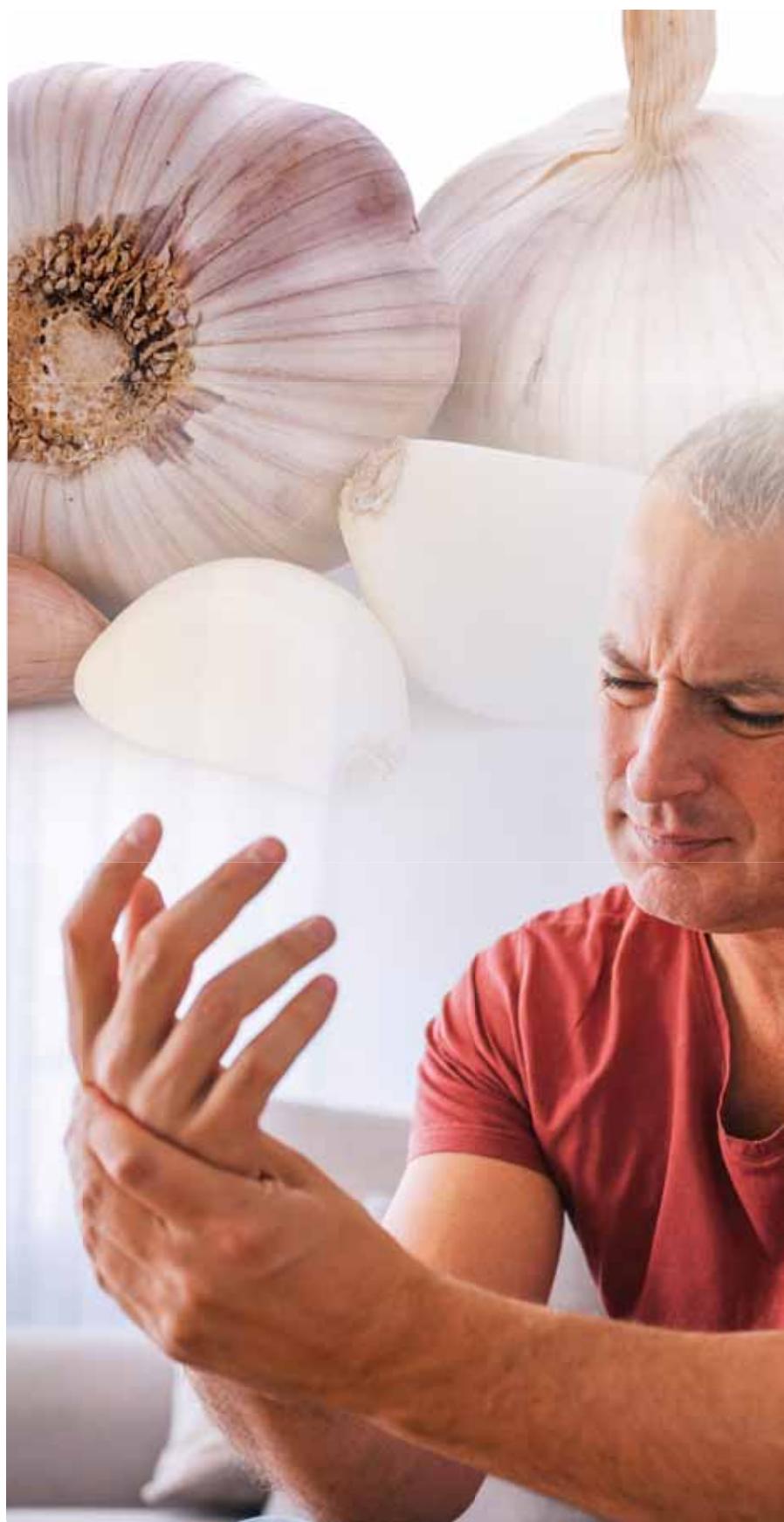
"Every study demonstrated a significant, quantitatively evident, decrease/improvement of symptoms and/or biochemically relevant measures of anxiety and/or depression for probiotic or combined prebiotic-probiotic use," the authors reported.

The authors concluded that the effects of prebiotic and probiotic therapy against depression and anxiety warrant further investigation in larger populations.

Editor's Note: Probiotics are helpful bacteria residing in the intestinal tract that help in digestion and other aspects of health. Prebiotics are nutrients that support the growth of these microorganisms.

* *MJ Nutrition, Prevention & Health*. 2020:bmjnph-2019-000053.





Garlic May Benefit Rheumatoid Arthritis Patients

Results from a trial reported in *Phytotherapy Research* revealed improvements in pain, inflammation, tender joint count, disease activity score and fatigue among rheumatoid arthritis patients who were supplemented with **1,000 mg** of garlic daily, compared to patients who received a placebo.*

The trial included 70 women with active rheumatoid arthritis who received **500 mg** garlic powder tablets twice per day (equivalent to **2.5 grams** fresh garlic) or a placebo for eight weeks.

At the beginning and end of the study, clinical symptoms and fatigue were assessed and biomarkers of inflammation including erythrocyte sedimentation rate, C-reactive protein (CRP), and tumor necrosis factor-alpha (TNF-a) were measured.

At the trial's conclusion, serum CRP and TNF-a were significantly reduced among participants who received garlic in comparison with the placebo group, indicating decreased inflammation. Pain intensity, tender joint count, fatigue, and disease activity scores all improved in association with treatment compared to the placebo.

Editor's Note: The authors observed that garlic is rich in bioactive compounds that include allicin and diallyl sulfide, which have been found, in several studies, to have anti-inflammatory effects. Other studies have reported pain-relieving and anti-fatigue benefits in association with garlic intake. Additionally, garlic may help protect against joint cartilage destruction.

* *Phytother Res*. 2020 Jun 1.

Passive Stretching is Good for Heart Health

Passive stretching could improve heart health by boosting blood flow, according to a study published in the *Journal of Physiology*.*

Unlike active stretching, passive stretching involves using an external force, such as gravity or another person, to help achieve a deeper stretch.

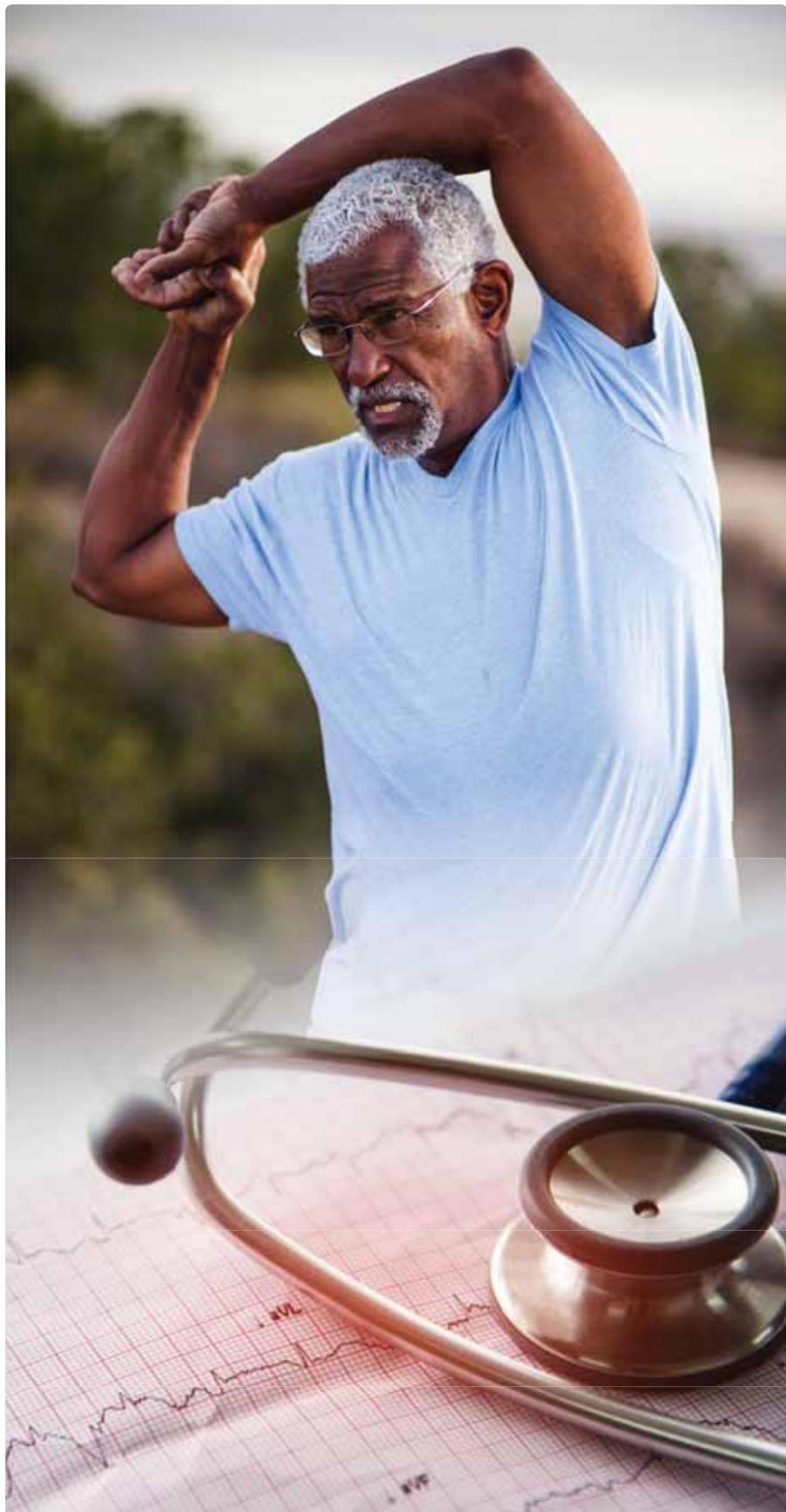
For this study, 39 people were divided into two groups: one that performed leg stretches **five times a week** for 12 weeks, and one that did no stretching.

The researchers found that stretching helped to increase blood flow and dilation—and decreased stiffness—in the arteries in the upper arm and lower leg.

According to one of the study's authors, "This new application of stretching is especially relevant in the current pandemic period of increased confinement to our homes, where the possibility of performing beneficial training to improve and prevent heart disease, stroke, and other conditions is limited."

Editor's Note: This study indicates that stretching could potentially represent a drug-free way to improve vascular health and reduce disease risk, as changes in blood flow due to an impaired vascular system are characteristics of diseases such as heart disease, stroke, and diabetes.

**The Journal of Physiology*, 2020.





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References

1. *J Immunol Res.* 2015; 2015: 401630.
2. *Cytometry.* 2002 Aug 1;48(4):209-15.



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Life Extension® combines **4 mg** of **astaxanthin** with a blend of four different **phospholipids**, which has been shown to enhance carotenoid **absorption** by **several-fold**.³

References

1. *Mol Nutr Food Res.* 2012 Sep;56(9):1385-97.
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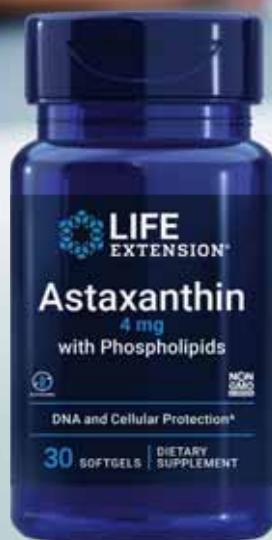
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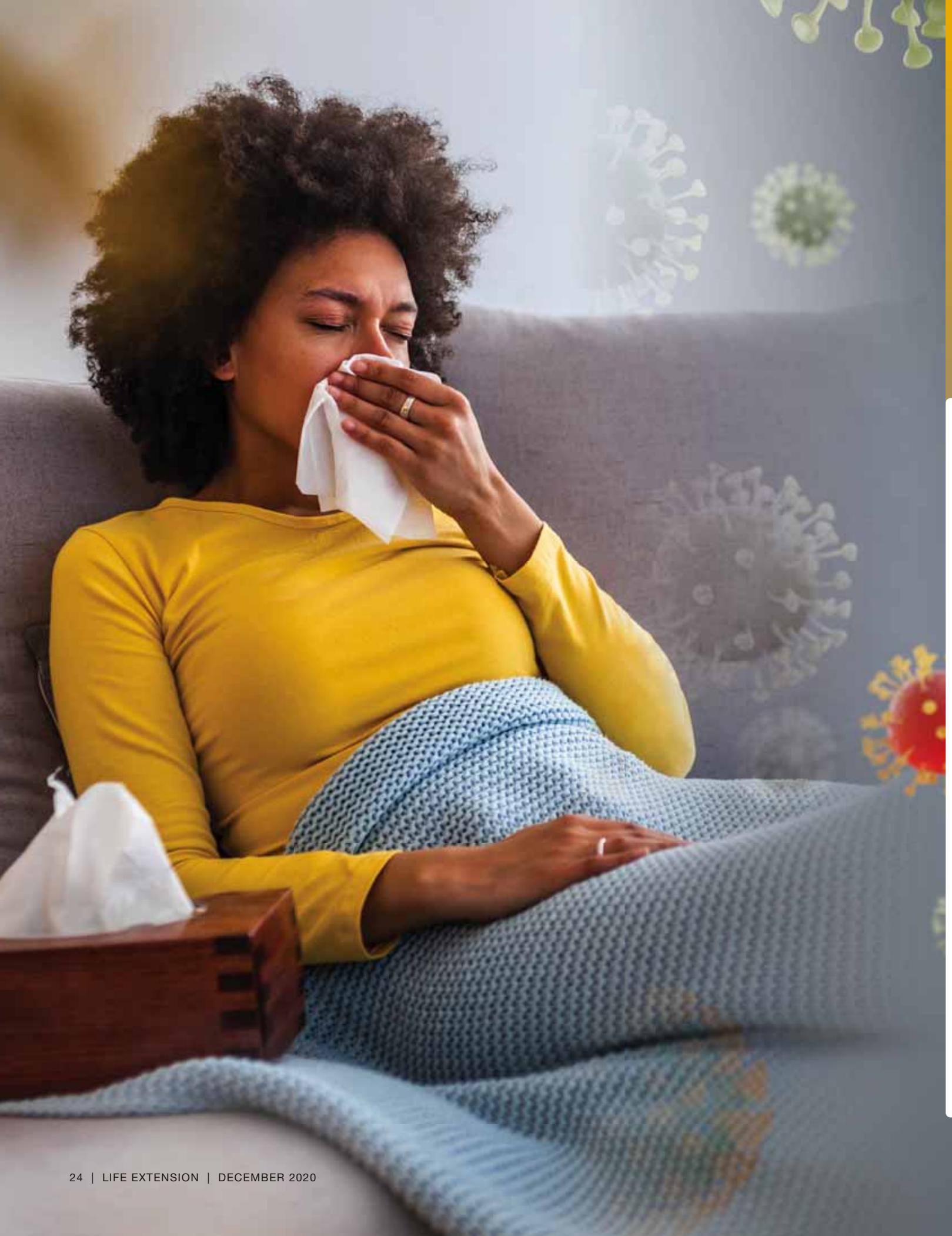


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1 bottle \$12

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IMMUNE SUPPORT for Quick Recovery

BY ISSAC RUTNER

Americans suffer from over **one billion colds** each year, an average of more than three per person.¹

The **flu** is less common but far more severe, killing **tens of thousands** of Americans annually.

Here's the good news: In the early stages of a cold or flu, it is still possible to **change the course of the illness**.

Three immune-supporting nutrients bolster your body's defenses, helping to reduce both the severity and duration of the illness.

In human studies:

- **Zinc** lozenges reduce the **duration** of colds by up to **44%** and the severity of symptoms by as much as **50%** when initiated soon after symptoms first appear,²
- **Elderberry** extract resolves upper respiratory symptoms up to **four days earlier** than a placebo,³ and
- **Vitamin C** can reduce the duration of colds by **9.4%** overall—and by **18%** in children.⁴

Zinc, elderberry, vitamin C and other interventions may reduce the impact of cold or flu, helping you recover and get back on your feet faster.

The Dangers of Cold and Flu

The **common cold** and the **flu** are two of the most frequent causes of acute illness, with no effective medical treatments to cure them.

More than **one billion** cases of cold, a viral infection of the nose and throat, occur in the U.S. each year, typically lasting a week to 10 days.^{1,5}

Up to **20%** of Americans contract the flu each year, a more severe viral infection that can lead to serious complications like **pneumonia**.¹

Annual **flu vaccines** can protect only against two or three strains of flu virus each season, and they do not protect against colds.

Three Nutrients That Help

Three nutrients have been shown to improve outcomes from cold and flu infections:

- **Zinc,**
- **Elderberry,** and
- **Vitamin C.**

Each has been shown, in clinical trials, to reduce the severity and/or duration of these common infections.



Zinc Shortens Colds

Zinc is a mineral required for the proper function of hundreds of enzymes in the body.

It can reduce the spread of viruses that cause **colds** in a number of different ways.

In order to cause disease, viruses must recognize, bind to, and then enter a host cell.

Zinc appears to coat the receptors that viruses use to bind to cells, preventing them from entering cells.⁶ If they can't enter the cells, viruses can't replicate out of control.

A number of trials have evaluated whether these anti-viral effects are clinically effective.

An analysis of human studies showed that, when started after the first sign of cold symptoms, taking **80 mg to 92 mg** of **dissolve-in-the-mouth zinc** in **divided doses** every few hours **reduces the duration** of symptoms by **25% to 44%**.²

In most cases, the severity of symptoms was also reduced, by up to **40% to 50%**.

Elderberry Fights Viruses

Elderberries are small, dark purple berries. They're packed with **anthocyanins**, pigments responsible for their color, which have antioxidant, anti-inflammatory, and antiviral properties.^{3,7}

Elderberries have long been used in traditional medicine to treat fevers, infection, and a variety of other ailments. Research has found that they help ward off **viral respiratory tract infections** such as colds and flu.³

Scientists determined that elderberry and its extracts have direct **antiviral** effects in cell cultures.⁸

In one study, healthy cells were incubated with the **H1N1 virus**, the virulent form of flu that caused the **1918 Spanish flu pandemic** and another outbreak in **2009**. Elderberry *reduced* the number of cells that became infected with the virus.

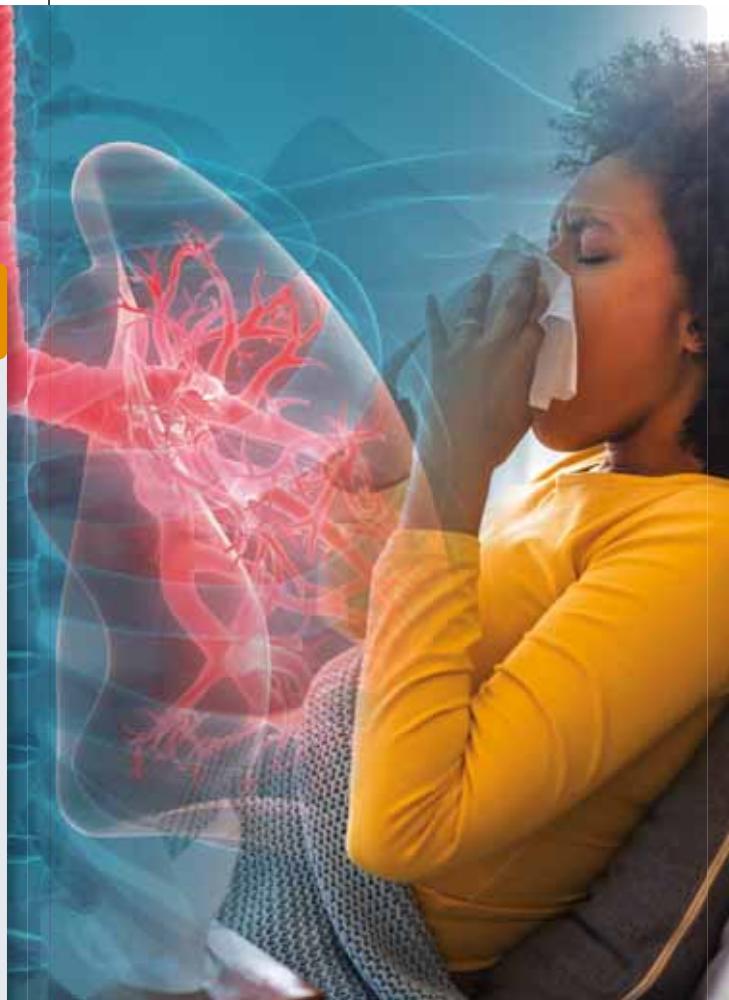
This happened in a **dose-dependent** manner, meaning that at low doses the elderberry *slightly* reduced the number of infected cells (by about **20%**). At higher doses it prevented **nearly 100%** of the cells from becoming infected.



WHAT YOU NEED TO KNOW

Boosting Immunity to Fight Colds and Flu

- **Cold** and **flu** viruses are two of the most common causes of acute respiratory illness.
- Three nutrients—**zinc**, **elderberry**, and **vitamin C**—have been shown to enhance the **immune response** to viral infections and reduce the severity and/or duration of illness.
- Taken for a short course at the first signs of symptoms, a blend of these nutrients may help people recover faster when illness does set in.



These experimental findings have carried over to human studies. A recent analysis of randomized clinical trials found that elderberry extract intake significantly **reduced the duration of illness** in people sick with **flu** or **cold** infections.³

In one of these studies, people suffering from upper respiratory symptoms who used elderberry extract had their symptoms resolve **four days earlier** than those taking a placebo.³

Vitamin C Boosts Immunity

Vitamin C has long been considered an important nutrient to boost immunity and defend against infection by viruses and other pathogens.

Viral infections often lead to an increased production of **free radicals**, which inflict additional inflammatory damage and increase disease severity.

By helping to neutralize excess free radicals, vitamin C helps limit the oxidative damage that occurs and **reduces the severity of illness**.

Vitamin C defends against infection in several ways.

For one, it helps to enhance the function of immune cells that fight infection.⁹

Vitamin C also helps increase levels of **interferons**, which are warning *signals* produced by the body that trigger the protective immune mechanisms against viral infections.⁹

Human studies indicate that vitamin C may be effective in treating viral respiratory tract infections. One large analysis that looked at close to **10,000** cases of the common cold found that vitamin C reduced the duration of colds by **9.4%** overall.⁴

When researchers evaluated adults and children separately, they found that the duration of colds was shortened by **8%** in adults and **18%** in children.

Numerous studies using varying dosage regimens have assessed the effects of **vitamin C** in the context of common colds. Some studies show reductions in common cold incidence¹⁰⁻¹² or duration of illness,^{4,13,14} while others have concluded that vitamin C supplementation has no or minimal effect.¹⁵⁻¹⁷ Some evidence suggests greater potential for benefit with *higher* vitamin C doses and if supplementation is started rapidly after symptom onset.^{18,19}

Summary

The common **cold** and the **flu** are two of the most frequent **viral illnesses**.

Research has found that **zinc**, **elderberry**, and **vitamin C** help support the immune system and can reduce the **severity** and **duration** of illness.

Each has been found to have immune-response-bolstering properties when taken at the first sign of symptoms of cold or flu. •

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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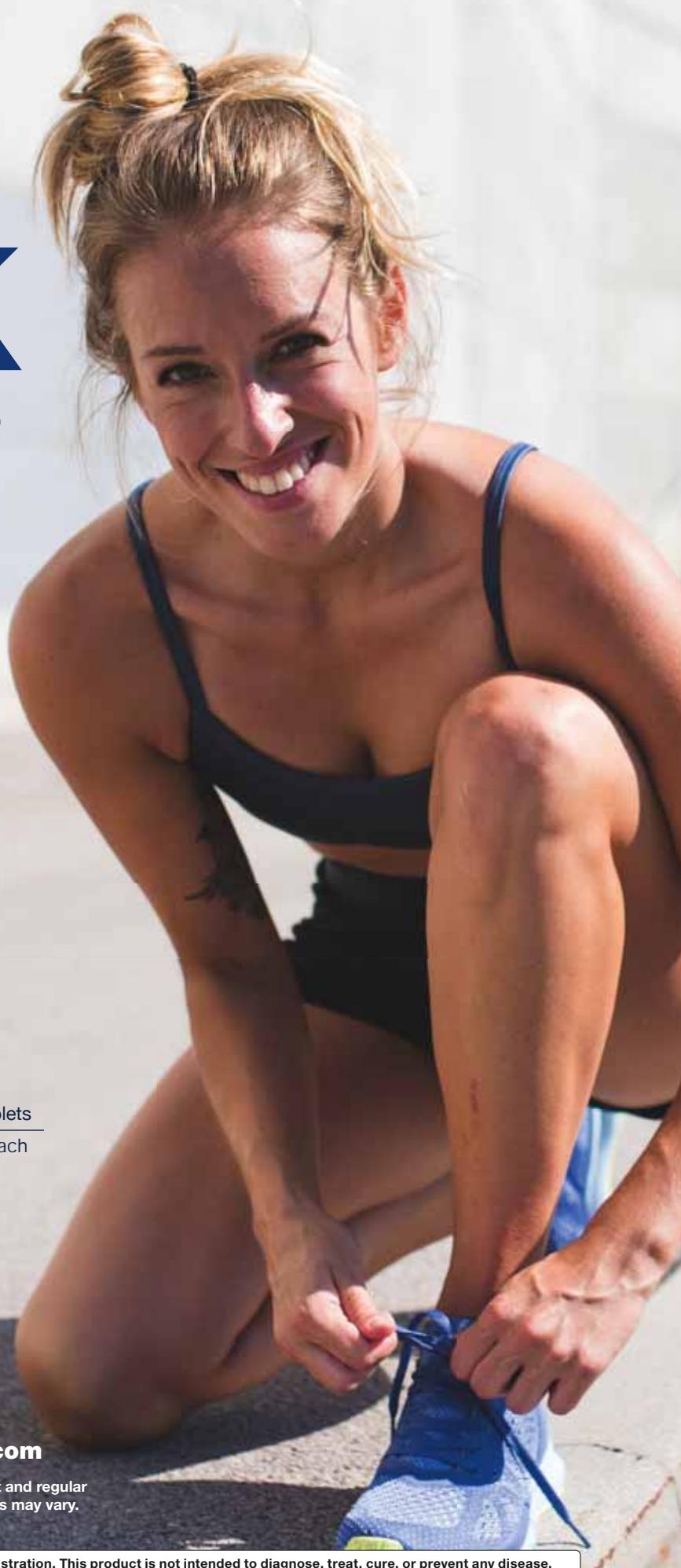


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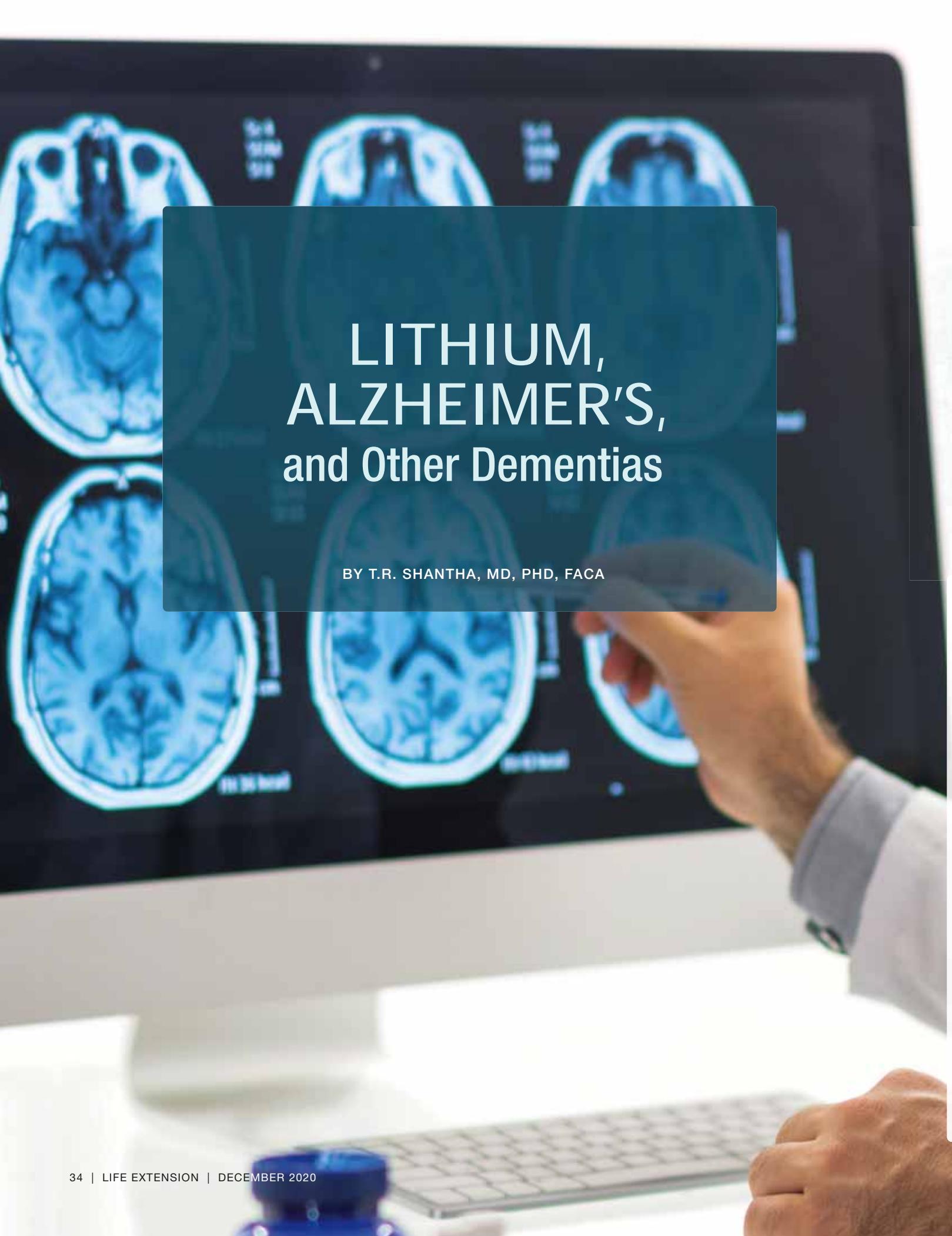
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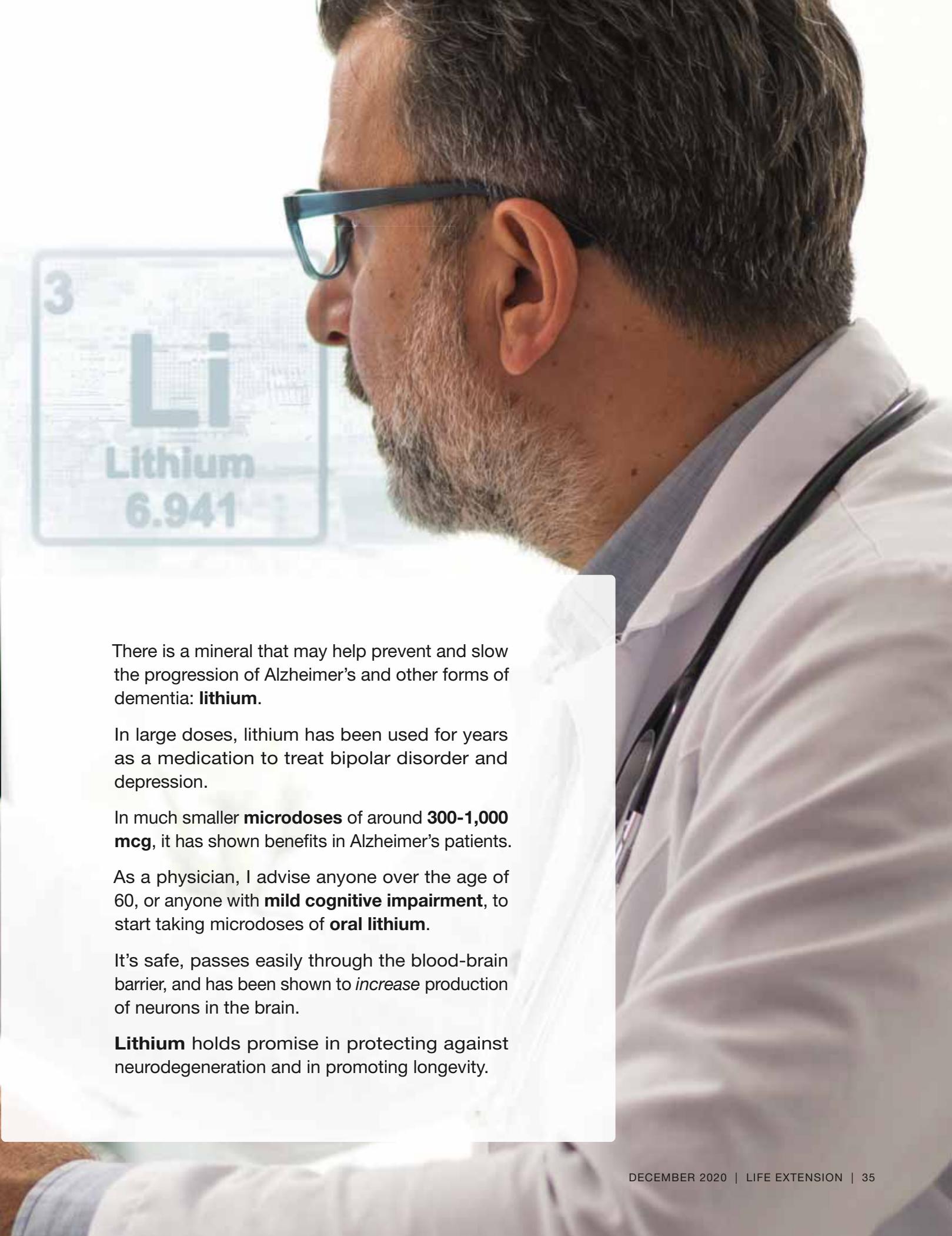


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LITHIUM, ALZHEIMER'S, and Other Dementias

BY T.R. SHANCHA, MD, PHD, FACA



3

Lithium
6.941

There is a mineral that may help prevent and slow the progression of Alzheimer's and other forms of dementia: **lithium**.

In large doses, lithium has been used for years as a medication to treat bipolar disorder and depression.

In much smaller **microdoses** of around **300-1,000 mcg**, it has shown benefits in Alzheimer's patients.

As a physician, I advise anyone over the age of 60, or anyone with **mild cognitive impairment**, to start taking microdoses of **oral lithium**.

It's safe, passes easily through the blood-brain barrier, and has been shown to *increase* production of neurons in the brain.

Lithium holds promise in protecting against neurodegeneration and in promoting longevity.

Where Lithium Comes From

Lithium is a mineral present in nearly all rocks and natural water sources.

Today, people get small amounts from natural spring water, grains, vegetables, eggs, and milk.

The World Health Organization considers lithium a nutritionally essential trace element, alongside zinc, iodine, and others.

Lower Rates of Dementia

Doctors have long used **high doses** of lithium to treat **bipolar disorder** and **depression**.

Scientists noticed that bipolar patients receiving lithium had *lower rates of cognitive decline* than patients on other medications.¹ That got them interested in whether lithium could be used to treat **neurodegenerative** disorders.

To test this observation, researchers compared the rates of **Alzheimer's disease** in 66 elderly bipolar patients using **chronic lithium** therapy with 48 similar patients who were *not* prescribed this mineral.

In patients receiving lithium, just **5%** had Alzheimer's, compared with **33%** in the non-lithium group.²

Two studies in Denmark confirmed similar results. Investigators surveyed the records of over **21,000**

patients who had received **lithium** treatment and found that it was associated with a reduced rate of Alzheimer's and other forms of dementia.^{3,4}

And in **2018**, researchers studying lithium levels in different regions of Texas discovered that rates of death from **Alzheimer's** disease were *higher* in areas with *low* levels of lithium in the water.⁵

This finding indicates that high lithium drug doses may not be needed to confer **neuroprotection**.

Based on findings from a **2020** study of Alzheimer's disease in rats, scientists from McGill University have suggested that **microdoses** of **lithium** could slow the progression of Alzheimer's in its initial stages and even *improve cognition*.⁶

How Lithium Protects the Brain

Experimental and clinical studies offer evidence of the many ways that lithium exerts **neuroprotective** effects.

Microdoses of lithium may help maintain the length of **telomeres**, protective caps on the ends of chromosomes.^{7,8} **Telomere length** has been linked to increased longevity and to warding off diseases, including Alzheimer's.





Research shows that lithium promotes the synthesis and release of two vital proteins, **brain-derived neurotrophic factor (BDNF)** and **neurotrophin-3**.⁹

These are both **neurotrophic** factors, which means they stimulate the growth, development, and repair of **brain cells**.^{9,10} This may explain why patients on lithium have a significantly higher volume of **gray matter**, the layer of the brain containing nerve cell bodies.^{11,12}

One study directly demonstrated that damaged nerve cells exposed to lithium respond with *increases* in the number and length of **dendrites**, the parts of neurons that receive signals from other neurons.¹³

Lithium *reduces* levels of an enzyme called **glycogen synthase kinase-3 (GSK-3)**. This enzyme is involved in the production of **neurofibrillary tangles**, which lead to the damaging plaques found in the brains of patients with Alzheimer's.¹⁴⁻¹⁶

Lithium also reduces oxidative stress and inflammation, providing additional neuroprotection.¹

Human Studies

A placebo-controlled trial was conducted on people with a form of **mild cognitive impairment** that made it difficult to learn or recall new information. The study found that low-dose lithium was associated with lower concentrations of abnormal **tau** proteins in cerebrospinal fluid.¹⁷

Lithium *improved* performance on multiple cognitive scales, suggesting that it may slow the progression of cognitive and functional deficits.¹⁷

WHAT YOU NEED TO KNOW

Lithium Protects the Brain

- Lithium is a mineral found in the earth's crust and in many natural bodies of water.
- Large doses of lithium have long been used to treat bipolar and other mood disorders.
- Some studies have found that bipolar patients on lithium therapy have *lower* rates of cognitive decline, Alzheimer's disease, and other forms of dementia than those not on lithium.
- Lithium works in a variety of ways to help the brain produce **new neurons** and to prevent the buildup of neurofibrillary tangles and plaques seen in the brains of Alzheimer's patients.
- Human studies demonstrate that **microdoses** of lithium improve cognitive performance in patients with mild cognitive impairment, and decrease cognitive decline in patients with Alzheimer's disease.

In another human study, just **300 mcg** of lithium daily **significantly decreased cognitive decline** in Alzheimer's patients compared to a placebo.¹⁸

In a third study, the cognitive function of patients with **early-stage dementia** who took lithium remained more stable than in those individuals who took a placebo.¹⁹

I believe that every patient with signs and symptoms of dementia should be on **microdoses** of oral **lithium**. Further experimentation in large-scale clinical trials is still required to assess the true ability of lithium to treat or prevent dementia and cognitive decline.

Summary

The mineral **lithium** has benefits in the brain. It has long been used to treat mood disorders, and there is evidence that its neuroprotective properties can help prevent and slow the progression of **Alzheimer's** and other forms of **dementia**.

Studies show that lithium stimulates the growth of neurons, inhibits the development of neurofibrillary tangles seen in the brains of Alzheimer's patients, maintains and increases the length of protective **telomeres**, and much more.

Every person above the age of 60 or 65, or anyone with signs of dementia, could benefit from **microdoses of oral lithium** to promote brain health and protect cognitive function.

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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Lithium's Little-Known History

Most people think of lithium as a treatment for mental illnesses. But it has a long history as a general health tonic, used to treat ailments as wide-ranging as asthma, gout, and migraines.

Lithium springs, where water contains naturally high amounts of the mineral, were popular destinations in the 19th and 20th centuries, visited by people from near and far, including famous people of the day.

Lithium was also used to fortify foods and beverages. In 1929, a soft drink inventor named Charles Leiper Grigg created a beverage called **Bib-Label Lithiated Lemon-Lime Soda**, now known as **7-Up**. The soda contained lithium until 1950 and was originally marketed for its potential to cure hangovers and lift the mood.

Its modern use in the treatment of mental disorders began in 1948 in Australia. The U.S. Food and Drug Administration first approved its use in 1970.

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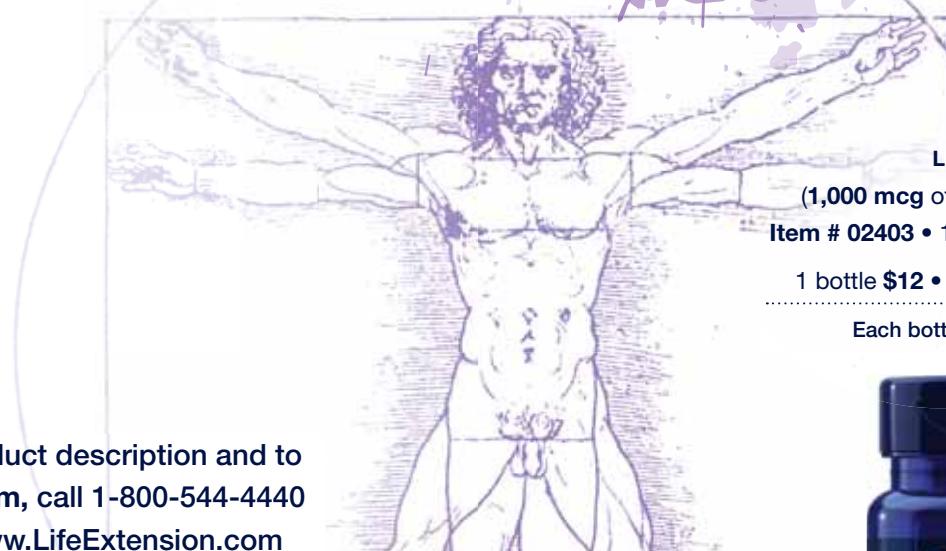
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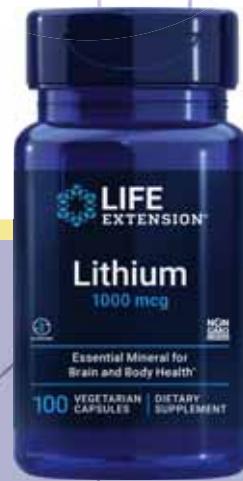
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^oDEF (Dietary Folate Equivalents)

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Oral Collagen Improves Skin and Joint Health

BY JOHN COOPER

Collagen makes up about **one-third** of all protein in the body.¹

In the **skin** and **joints**, collagen provides structural support, strength and resiliency.

In youth, damaged collagen is continually **repaired** and **replaced**.

But with age, the body's ability to replenish collagen stores declines by about **1.5% each year**.²

This loss of collagen is a major contributor to skin aging and loss of joint function.

Whole collagen is a large, complex protein that cannot be easily digested or absorbed into the body.

But scientists have discovered that *partially broken-down* collagen—known as **hydrolyzed collagen**—is highly **absorbable**.

Consumed orally, **hydrolyzed collagen** stimulates the production of new collagen in the skin and joints.³⁻⁵

What Is Collagen?

There are **connective tissues** throughout the body, in the skin, bone, cartilage, tendons, ligaments, and more. They give structure, strength, and support to tissues.

All connective tissues have protein fibers within them that influence the mechanics and strength of that tissue. **Collagen** makes up a large proportion of these fibers.

In humans, most of the collagen is present in three forms:²

- **Type I collagen** is especially prevalent in the skin, where it makes up over **80%** of all collagen. This collagen is the reinforcement structure of connective tissues. It has great tensile strength, resisting stretching and tearing. It is also prevalent in bone, tendons, and ligaments.
- **Type II collagen** is primarily found in cartilage, the connective tissue that protects the bones at the joints.
- **Type III collagen** is found in skin, cartilage, blood vessels, and throughout many other soft tissues.

Collagen is produced primarily by connective tissue cells called **fibroblasts** and by cartilage cells called **chondrocytes**.

But they produce *less* collagen as we age, gradually declining at a rate of about **1.5%** per year.²

In the skin, this loss of collagen has immediate, visible effects. Skin loses elasticity and strength, leading to sagging, fine lines, and wrinkles.⁶

In joints, age-related changes in the collagen structure means articular cartilage no longer functions effectively. This contributes, in part, to the joint stiffness and the movement limitations characteristic of patients with **osteoarthritis**.⁸

How Oral Collagen Works

Whole collagen is difficult to digest and too large to be absorbed into the body.

But scientists have found that if the collagen is prepared in such a way that it is *already* broken into fragments, as much as **95%** of it can be absorbed and distributed to tissues throughout the body.^{2,9}

Collagen formulated in this manner is known as **hydrolyzed collagen**. Once these collagen pieces reach the skin or cartilage, they stimulate repair and rejuvenation of tissues.

Researchers have identified at least two different mechanisms by which this happens:

- Collagen fragments directly activate **fibroblasts** and **chondrocytes**, stimulating them to increase their production of collagen and other connective tissue components.²⁻⁵
- **Immune system** cells recognize the collagen fragments and activate a process that stimulates fibroblasts, further energizing their production of collagen and other connective-tissue proteins.⁷

In **skin**, this improves age-related skin changes, increasing skin hydration and elasticity while reducing fine lines, wrinkles, and dryness.⁷

In **joints**, chondrocytes are stimulated to repair and replace damaged collagen, leading to less pain and greater mobility.³

Healthier, Younger-Looking Skin

Many clinical trials have assessed the ability of **oral collagen** to improve skin health and appearance. In just the last two years, a number of reviews have summarized their findings.^{7,10,11}

The vast majority of published studies have found that skin appearance and markers of skin health are improved after oral intake of collagen.⁷

Collectively, these studies show that collagen intake results in:

- Improved skin **hydration**,
- Improved skin **elasticity** (the ability to stretch and bounce back without sagging),
- Improved skin texture and condition, and
- Reduction of lines and wrinkles, including crow's feet.

Oral collagen also benefits the **nails**, improving flexibility and texture.

One joint Korean and Japanese study published in the journal *Nutrients* evaluated the use of **hydrolyzed collagen peptides** (short chains of amino acids that provide the building blocks for collagen) in adult women.¹²

Subjects were randomized to receive either the collagen or a placebo. After six weeks, measurements of **skin hydration** in the **collagen** group were **7.23-fold** greater than the **placebo** group.

By week 12, the visual improvement in **skin wrinkles** was **10.5-fold** greater in the collagen group than in the placebo group. Skin **elasticity** also improved significantly in the collagen group.

Other similar studies have shown comparable findings.^{2,7,10}

Several studies have evaluated collagen intake for skin conditions, including dryness, cellulite, and skin ulcers (open sores that don't heal properly).¹⁰

For all these conditions, oral **hydrolyzed collagen** has a positive impact. It accelerates skin healing, improves skin hydration, reverses signs of skin aging, and reduces cellulite.

Collagen and Joint Health

Joints are structures where two or more bones meet.

Cartilage keeps joints like the knee, elbow, fingers, shoulder, and hip working through a full range of motion without pain. This lubricated, rubber-like tissue lines the ends of the bones, cushioning them so that they can glide over each other smoothly without damaging each other.

With wear and tear, **joint cartilage** breaks down. Over time, it becomes thin, rough, and cracked, and can even erode completely, leaving bone on bone.

This condition is referred to as **osteoarthritis**, the most common form of arthritis. It results in inflammation, pain, and significant reduction in the range of motion of joints.

Osteoarthritis is a major source of chronic pain and disability in older adults. Knee osteoarthritis is the most common condition leading to surgical joint replacement.¹³

Collagen is vital to the structure and health of **cartilage**, along with other supportive structures around joints, such as ligaments and tendons.

Hydrolyzed collagen has been shown to protect cartilage and repair it in an animal model of osteoarthritis, and to improve measures of osteoarthritis severity and quality of life in a clinical trial.^{14,15}

In a mouse model of osteoarthritis, hydrolyzed collagen increased total cartilage area, increased the number of chondrocytes producing cartilage, and increased the **extracellular matrix**, which can be thought of as the scaffolding for surrounding tissues.

All of these benefits led to preserved cartilage volume and function.¹⁴ At the same time, it was associated with a reduction in signs of painful **inflammation** in the joint.



WHAT YOU NEED TO KNOW

Collagen for Healthy Skin and Strong Joints

- **Collagen** is the most prevalent protein in the body.
- Collagen lends strength and resilience to many tissues, including the **skin** and **joints**.
- With age, collagen production drops. In skin, this contributes to dryness and wrinkles. In joints, this leads to dysfunction and, over time, **osteoarthritis**.
- Oral collagen that has been partially broken down, known as **hydrolyzed collagen**, is easily absorbed into the body and distributed to tissues.
- Human studies have found that hydrolyzed collagen improves markers of skin aging and health, improving **hydration** and **elasticity** while reducing fine lines and wrinkles.
- Collagen has also been found to stimulate **cartilage** repair in joints, improving range of motion and reducing pain.

Collagen has also been tested in **human** subjects. A randomized, controlled trial evaluated the use of **collagen peptides** in patients suffering from **osteoarthritis**.¹⁵ Subjects receiving placebo had no change in the severity of their symptoms, including pain. But those receiving collagen had significant **reduction in pain**.

Individuals taking collagen also had improvements in other symptoms, like stiffness, physical function, and quality of life.

Summary

Collagen is the most prominent protein in the body. It gives form and strength to various tissues, including the **skin and joints**.

Collagen production declines with advancing age. In the skin, that leads to dryness and wrinkles. In joints, it causes a breakdown in cartilage that can result in **arthritis**.



A partially broken-down collagen, known as **hydrolyzed collagen**, is highly absorbable and can reach the skin and joints. There, it stimulates collagen production and improves the overall health and youthfulness of these tissues.

Clinical trials have demonstrated that intake of **hydrolyzed collagen** results in younger-looking skin, improving hydration and reducing wrinkles, while protecting joints and improving their function. •

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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- **Silicon**—For the formation of collagen and keratin molecules³



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Preserve MUSCLE and Improve Body Composition

BY MICHAEL DOWNEY

Americans are on a constant quest to improve body composition while increasing lean muscle.

It's why we diet, jog, and hit the gym.

Now research has shown that there's a compound that can help.

Beta-hydroxy-beta-methylbutyrate, better known as **HMB**, has been shown to improve muscle strength and quality in adults of all ages.^{1,2}

It stimulates **protein synthesis** and prevents muscle breakdown.¹

It even shows benefits in those who are practicing **intermittent fasting** while working out.³

HMB may help adults of any age achieve and maintain a **healthier body composition**.



Fat Vs. Muscle Mass

Having an ideal **body composition** isn't just about looking good.

The ratio of **fat** versus **lean mass** in the body can be an excellent indicator of overall health.⁴

According to the Director of PEAK Health and Wellness at the University of Utah, maintaining a healthy body composition:⁴

- Decreases the risk of cardiovascular disease, diabetes, and osteoporosis,
- Lowers the risk of metabolic syndromes,
- Maintains cognitive function and decreases stress,
- Boosts energy, and
- Enhances the ability to perform daily activities.

Being overweight and even aging itself are associated with a **body composition** of too much stored fat and not enough lean muscle mass.⁵

Body composition is influenced by our genetics, metabolism, or environment.⁶

As a result, researchers have been investigating ways to improve body composition.⁶

HMB Preserves Muscle

HMB (or **beta-hydroxy-beta-methylbutyrate**) is a compound formed naturally when your body breaks down the amino acid **leucine**.⁷

It's been shown to help prevent **sarcopenia**,⁸ the age-related loss of muscle mass.

Scientists have demonstrated that HMB works by exerting **pro-anabolic** (muscle-building) and **anti-catabolic** (breakdown-preventing) properties.⁹⁻¹⁴

With age, **HMB** levels drop, a decline that correlates with diminished lean muscle mass and strength.¹⁵

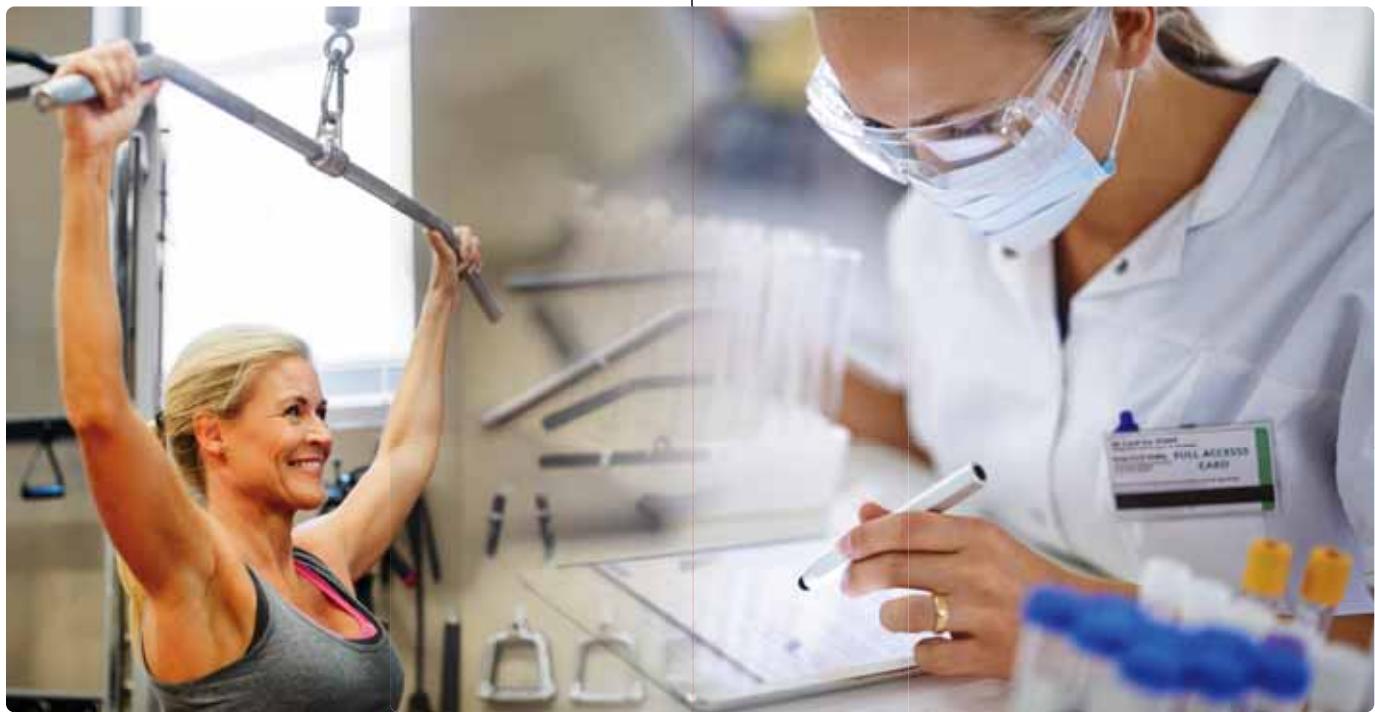
A wealth of evidence has shown that HMB can protect, and even restore, lean muscle mass in older people.^{2,14,16-18}

This led scientists to investigate whether **HMB** could protect or restore lean muscle mass in **younger** people—and whether it would work in those who are **overweight** or following muscle-decreasing **fasting** routines.

HMB in Overweight People

As of 2016, over **650 million** adults worldwide suffered from **obesity**. This amounted to **13%** of the world's adult population at that time.¹⁹

Scientists designed a clinical trial to investigate the effects of **HMB** on muscle strength in **overweight, sedentary** women, aged **20 to 45**. No exercise training was involved.¹



The study was the most rigorous type: randomized, placebo-controlled, and double-blind (in which neither the subjects nor the researchers know who's receiving the placebo or treatment).

Thirty-five women completed the study. All had a BMI (body mass index) between 25 and 29.9 kg/m², considered **overweight**.

They were randomly divided into two groups. One was given **2.5 grams** of **HMB** daily in two divided doses, while the other received a **placebo**.¹

After six weeks, the results showed that taking HMB **increased muscle strength** in these women. Without any resistance training, they were able to lift heavier weights (with both arms *and* legs) than those in the placebo group.¹

The study also concluded that HMB had a positive impact on various measures of **body composition**, including weight, waist and abdomen circumferences, and skin sagginess.¹

HMB During Fasting

Another team of scientists investigated how HMB would affect muscle mass in people trying a form of **intermittent fasting** known as **time-restricted feeding**.

So scientists set up a randomized, placebo-controlled, double-blind study to test whether taking **HMB** could prevent this loss in those practicing this form of intermittent fasting.³

The research team recruited healthy female volunteers between **18** and **30** years old. All subjects were required to have previously participated in regular resistance training for at least one year.

These **young, active women** were divided into three groups:³

- The control group took a placebo and maintained a normal eating schedule.
- A second group took a placebo and followed a time-restricted eating schedule, which permitted eating *only* between noon and 8 p.m.
- A third group took **3 grams** of **HMB** daily and followed the same time-restricted eating schedule as group two.

All groups participated in a resistance training program for three nonconsecutive days each week.



WHAT YOU NEED TO KNOW

Improve Body Composition with HMB and Vitamin D

- Maintaining a **healthy body composition** is vital for overall health.
- **HMB (beta-hydroxy-beta-methylbutyrate)**, a compound formed when the amino acid leucine breaks down, has previously been shown to prevent muscle-wasting in *older* people.
- New studies show that HMB preserves and increases lean muscle mass in adults of *all ages*. It also works in the overweight and in those on intermittent fasting programs.
- **Vitamin D** has also been shown to produce significantly greater muscle strength and performance.
- A *combination* of HMB and vitamin D could be a smart choice for anyone interested in maintaining optimal muscle mass and strength and achieving a healthy body composition.



After **eight weeks**, the researchers found in a subgroup analysis and compared to baseline that:³

- The control group had an average **2% increase** in body **fat** mass,
- Group two had an average **4% decrease** in body **fat** mass, and
- Group three, the time-restricted eating group that took **HMB**, had an average **7% decrease in body fat mass**.
- The greatest increases in **fat-free mass** also occurred in the **HMB** participants, who had a shift to a **healthier body composition**.³

Vitamin D Supports Muscle Strength

Like HMB, vitamin D also helps improve **muscle strength and performance**.^{20,21}

Scientists conducted a study involving 160 meno-pausal women, aged 50-65, who all had a history of falling.²² Falling is associated with inadequate muscle mass, in addition to a lack of coordination and balance.²³

The women were randomly assigned to receive either a placebo or **1,000 IU of vitamin D** daily.

After nine months, the vitamin D group experienced a **25.3% increase** in leg muscle strength.

Other investigators conducted a meta-analysis of 30 randomized, controlled trials, involving more than 5,600 people, to evaluate the effects of vitamin D on muscle performance.²⁰

The analysis showed that **vitamin D** had a significant positive effect on overall muscle strength.²⁰

Participants who had the *lowest* vitamin D levels at the beginning of the study (below **12 ng/mL**) and those who were relatively *older* saw the greatest benefits from vitamin D supplementation.²⁰

HMB Prevents Muscle-Wasting in Older Adults

Beginning around age 40, we lose an estimated **8%** of muscle mass per decade. After age 70, muscle mass decreases by about **15% per decade**.²⁸

This drastic decline leaves people weaker and more prone to falls and other injuries.

The medical term for this loss of skeletal muscle mass is **sarcopenia**, and studies show that **HMB** can help prevent it.

A meta-analysis of seven trials involving a total of 287 older adults found that **HMB** preserved muscle mass in older adults.¹⁷

One of the studies involved healthy older adults who voluntarily subjected themselves to 10 days of complete **bed rest**,¹⁸ a known cause of sarcopenia.^{29,30}

Participants took either a placebo powder or a powder providing **1.5 grams** of **HMB**, twice daily, starting five days before the bed rest period and continuing until the end of a rehabilitation phase.¹⁸

At the end of the 10 days, the placebo group had a reduction in total lean body mass of about **4.4 pounds**.

By contrast, those taking HMB lost a total of just **0.37 pounds**, showing a clear benefit in *preserving lean body mass*.

How Vitamin D Works

There are several ways in which vitamin D can have a beneficial effect on muscle.

Research has shown that **vitamin D**:

- Directly increases the ability of muscle cells to **contract**,^{24,25}
- Improves the function and health of the **mitochondria**, the power suppliers in every cell, which increases muscle strength,²⁶ and
- Reduces chronic **inflammation** that can lead to muscle pain and weakness.²⁷

Summary

Maintaining muscle mass is vital for a healthy body composition.

HMB has previously been shown to reduce muscle wasting in *older* adults.

Human studies now confirm that HMB works in adults of **all ages**, promoting muscle growth and function while leading to improvements in strength, lean muscle mass, and body composition.

Vitamin D has been shown to boost muscle performance and strength as well.

Vitamin D and HMB can help improve body composition, preserve and increase muscle mass, and promote strength.

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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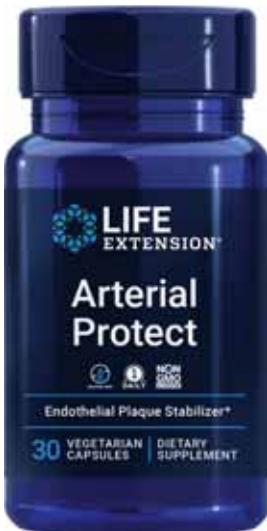




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Reference

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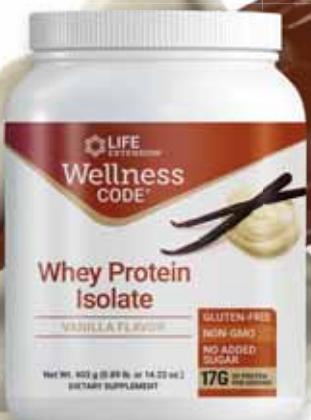
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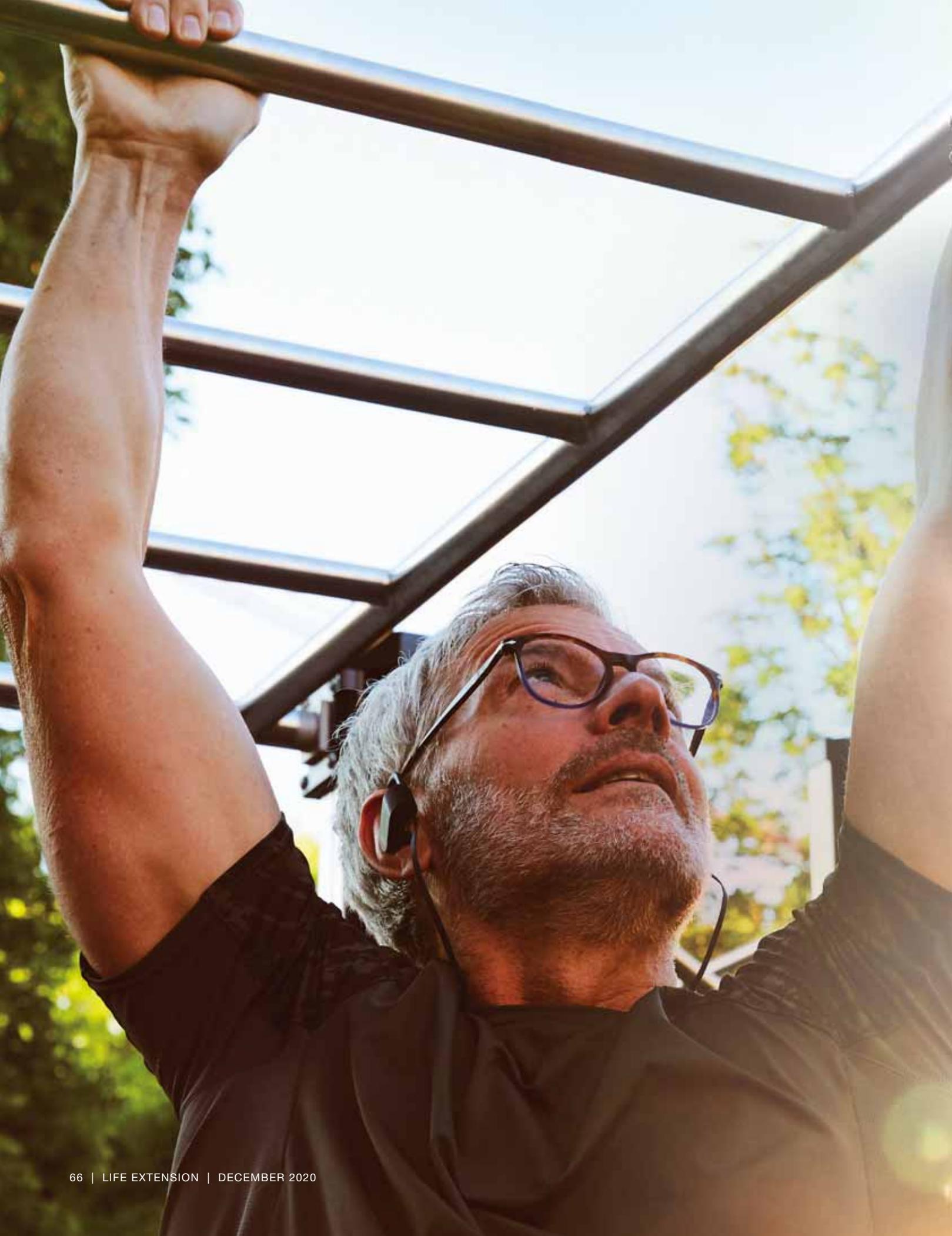
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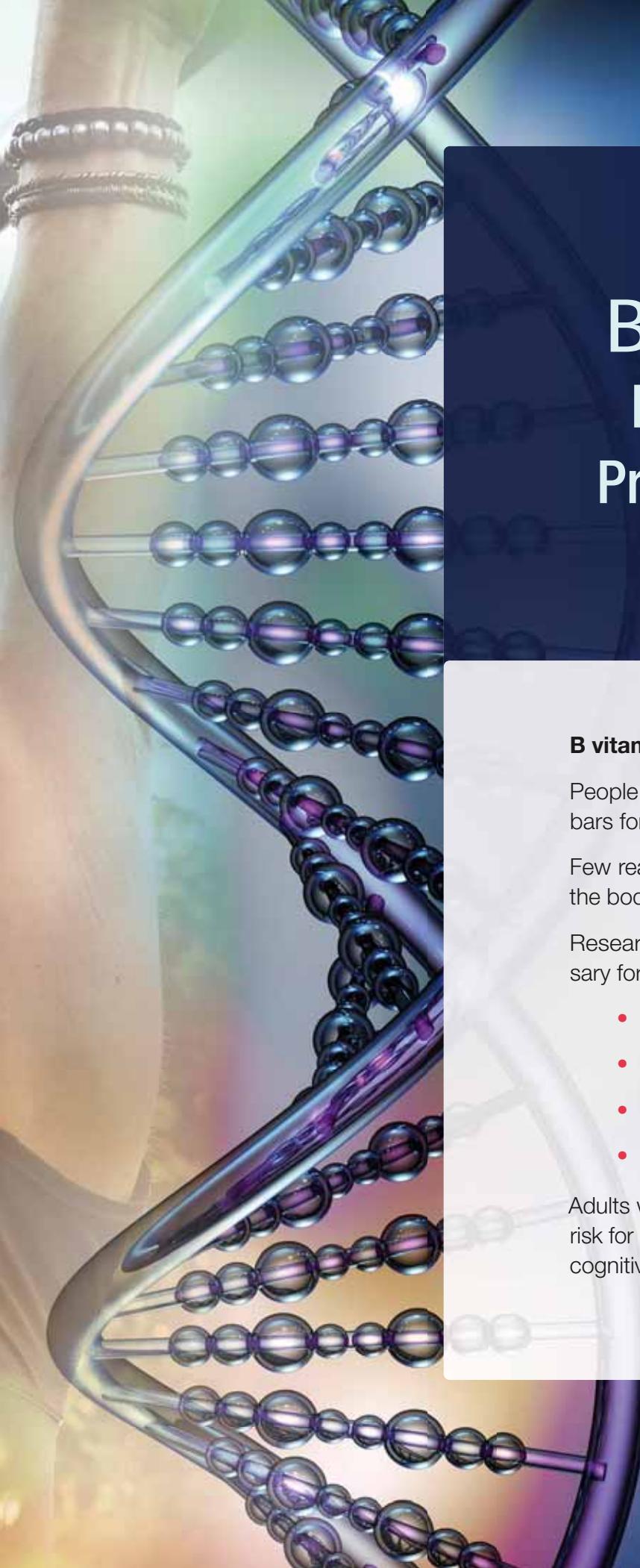
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B VITAMINS: More VITAL Than Previously Believed

BY CHANCELLOR FALOON

B vitamins are often thought of as *energy* vitamins.

People tend to look for them in drinks and nutrient bars for a mental or physical energy boost.

Few realize the crucial roles that B vitamins play in the body.

Research has shown that **B vitamins** are necessary for:¹

- DNA/RNA synthesis and repair,
- Proper immune function,
- Neurotransmitter synthesis, and
- Healthy DNA methylation.

Adults with a **low** B-vitamin status are at increased risk for developing age-related disorders, *particularly* cognitive and cardiovascular disease.¹



Vitamin B1 and the Brain

The first B vitamin identified was **vitamin B1**.²

Thiamine—another name for vitamin B1—is an important cofactor in the production of energy in the body, making it especially important in the brain.²

Research over the past century has shown that vitamin B1 deficiency, known as beriberi, is associated with several neurological problems.³

In humans, there are similarities between the memory deficits seen in thiamine deficiency and Alzheimer’s disease.⁴

A fat-soluble form of vitamin B1 called **benfotiamine** also shows potential benefits for the brain.⁵

In a 2018 study, researchers tested the impact of **benfotiamine** on a mouse model of **Alzheimer’s disease**.⁶

The researchers observed that mice given **benfotiamine** had:⁶

- Decreased numbers of neurofibrillary tangles.
- Significant preservation of motor neurons.
- Less inflammation and mitochondrial dysfunction.
- Significantly increased lifespan and improved behavior.

Skin Benefits of Boosting NAD⁺

Vitamin B3 exists in several forms that can convert into **nicotinamide adenine dinucleotide (NAD⁺)** in the body.^{7,8}

NAD⁺ is a cofactor for life-sustaining reactions in the body, and has garnered a reputation worldwide for its potential longevity benefits.⁹

Studies have also shown that vitamin B3 in the form of **nicotinamide** has the potential to treat a variety of dermatological conditions, including skin cancer.^{10,11}

One clinical trial included **386** individuals with a history of at least two non-melanoma skin cancers in the previous five years. They were randomly assigned to receive **500 mg** of **nicotinamide** twice daily or a placebo. At 12 months, the rate of non-melanoma skin cancers was reduced by **23%** in those receiving nicotinamide, compared to those who got the placebo.¹¹

It has been suggested that nicotinamide’s role in skin cancer may be related in part to its ability to promote NAD⁺ synthesis, thereby enhancing **DNA repair**. NAD⁺ is involved in the synthesis of **ATP**, the cellular energy currency that is much needed during energy-dependent cellular processes, including DNA repair.¹⁰

Vitamin B6 and Parkinson's Disease

Parkinson's disease is a disorder characterized by the loss of **dopaminergic neurons** in a part of the brain called the **substantia nigra**, and by the presence of Lewy bodies.^{12,13}

Studies have tested the effect of dietary intake of **vitamin B6** in Parkinson's disease. The main reason for this interest is largely the association between Parkinson's and elevated **homocysteine**.¹⁴

Vitamin B6 is important to properly metabolize homocysteine and prevent its dangerous buildup in the body.¹⁵

One meta-analysis suggests that *higher* dietary intake of **vitamin B6** may be associated with a **35%** reduced risk of getting Parkinson's disease, compared to those with low intake.¹⁴

The B Vitamin that Became a Drug

In a large prospective cohort study, the group with the *highest* levels of **vitamin B6** at the time of kidney cancer diagnosis had a **three-fold** reduction in renal cell carcinoma **mortality** compared to the group with lowest levels.¹⁶

Vitamin B6 comes in several forms, including **pyridoxal-5-phosphate** and **pyridoxamine**.

The **FDA** accepted a petition filed by a drug company to remove **pyridoxamine** from the market so

that it could be transformed into a **prescription drug**. This has caused pyridoxamine to be largely unavailable.

Pyridoxamine and pyridoxal-5-phosphate forms of B6 may provide similar benefits, but two clinical trials in the past decade have shown noteworthy results from pyridoxamine.

In a study of schizophrenic patients, high-dose pyridoxamine, as an add-on treatment, resulted in improvements in psychological symptoms.¹⁷

In a 24-week, double-blind, placebo-controlled trial, pyridoxamine supplementation significantly reduced pain scores and inflammatory markers in osteoarthritis patients.¹⁸

WHAT YOU NEED TO KNOW

B Vitamins Play Crucial Roles in the Body

- **B vitamins** are necessary for DNA repair and synthesis, proper immune function, neurotransmitter synthesis, and healthy DNA methylation.
- Low B-vitamin status *increases* the risk for age-related disorders, particularly cardiovascular and cognitive disease.
- **Vitamin B1** is an important cofactor in the production of energy, making it especially important in the brain.
- **Vitamin B3**, in the form of **nicotinamide**, has the potential to treat a variety of dermatological conditions, including skin cancer.
- **Folate (5-MTHF)** and **vitamins B6 (P5P)** and **B12 (methylcobalmin)** are important to properly metabolize homocysteine and prevent its dangerous buildup.
- Aging adults can attain these benefits through regular use of a high-quality multivitamin or a comprehensive **B-vitamin** complex.



Folate Can Reverse Epigenetic Aging

A common gene variant occurs in approximately **40%** of people.

It affects the activity of the enzyme needed to convert vitamin B9 (folate) into its active form: **5-methyltetrahydrofolate (5-MTHF)**.²¹

One adverse impact of this **methylation deficit** is elevated **homocysteine** blood levels that contribute to **atherosclerosis**.

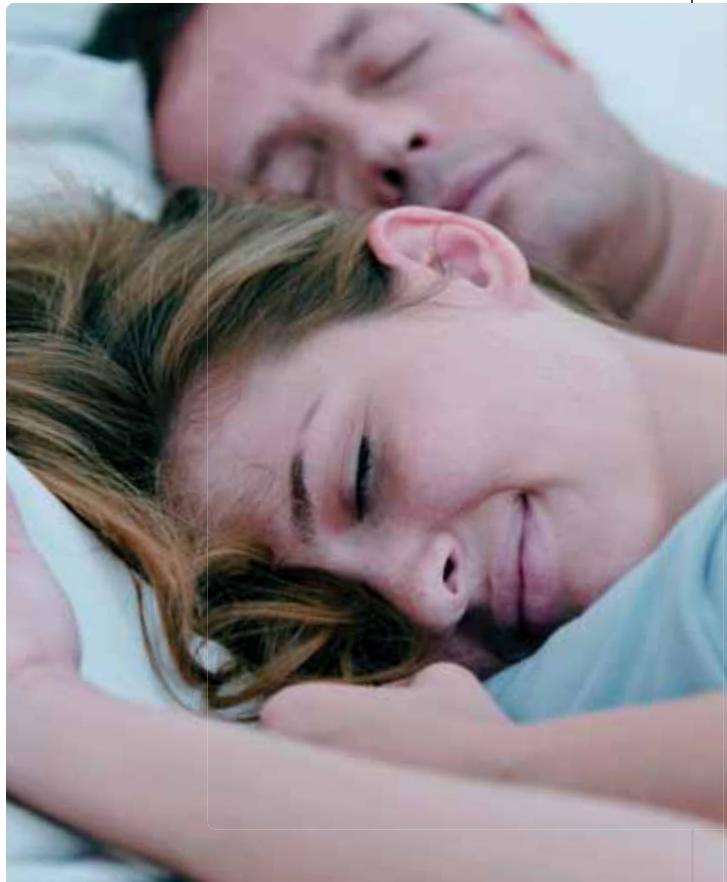
Vitamins B6 and **B12** work together with the **5-MTHF** form of folate in the **methylation cycle**.

Sufficient levels of these vitamins support the healthy transfer of **methyl groups** between the molecules, and steps involved in the methylation cycle.

When adequate levels of these vitamins are not present, the methylation cycle is impaired.¹⁹

Epigenetic clocks allow scientists to accurately predict future healthspan and lifespan.^{22,23}

A study published in **2018** tested the effect of **folate** plus **vitamin B12** supplementation in measuring changes in **epigenetic age** in older subjects (65–75). Each subject had different variants of MTHFR genes. Participants supplemented with **400 mcg** of **folic acid** and **500 mcg** of **vitamin B12** daily.²³



After two years, women with a particular **MTHFR** gene variant showed beneficially reduced epigenetic age.

Those with deleterious MTHFR variants should supplement with higher dosages of the **5-MHTF** form of folate, which is more effective than folic acid. They should also consider using the methylated form of vitamin B12, called **methylcobalamin**.

Decreasing Macular Degeneration Risk

A study was done to evaluate the impact of B vitamins on age-related **macular degeneration**. A combination of **folic acid** and **vitamins B6** and **B12** was used in a randomized, placebo-controlled trial in women over age 40 who were at high risk for cardiovascular disease. The study period lasted an average of **7.3** years.²⁴

Compared to the placebo group, the **B-vitamin** combination decreased the risk of **macular degeneration** by **34%** and decreased the risk of severe macular degeneration by **41%**.²⁴

B Complex Fights Insomnia

B vitamins are thought to have anti-depressant effects and play a range of biochemical roles that may help reduce psychological distress.

Although B vitamins are commonly added to caffeine supplements or drinks for a physical energy boost, they do not interfere with sleep. In fact, research suggests they may even help support healthy sleep.

In a recently published clinical trial, **60** people with diagnosed insomnia filled out a questionnaire which quantified the degree of insomnia they had. They were separated into two groups to receive either a placebo or a supplement containing melatonin, vitamins B6, B12, folate, and a form of magnesium. Both groups took their pills one hour before going to bed, for three months.²⁷

When the participants took the questionnaire again at the end of the study, the placebo group had a slight increase in the degree of insomnia, while those who received the combination supplement reported a nearly **30%** decrease in their insomnia scores.



The authors of the study suggest that their results support the hypothesis that elevated **homocysteine** levels may be causally related to age-related macular degeneration.

Protection Against Surgery-Induced Delirium

New evidence is showing that B vitamins may diminish a serious side effect of major surgery.²⁵

In a recent clinical trial, **138 patients** with vitamin B12 deficiency undergoing coronary artery **bypass surgery** were assigned into a control or an experimental group to receive a **B-complex solution** as part of the surgical procedure.²⁵

The researchers wanted to see if the B complex could reduce the incidence of **postoperative delirium** compared to controls.

Although open heart surgery is a lifesaving procedure, it also commonly causes serious side effects. One of the most frightening potential problems after such major surgeries is postoperative delirium, which is a state characterized by altered consciousness and orientation, and diminished memory, perception, and behavior.²⁶

Following surgery, **42%** of the patients in the control group experienced postoperative delirium, but only **26%** of those in the **B-complex** group did.²⁵

Enhance Healthy DNA Methylation

DNA methylation controls the activation of our genes.

Without proper **DNA methylation**, beneficial genes are deactivated while harmful genes can be over-expressed.

Healthy methylation allows gene expression to support youthful cellular functions. DNA methylation influences how your genes are expressed.¹⁹

Accurate estimates of biological age can be assessed through measurements of DNA methylation patterns in the blood.²⁰

This can be done using epigenetic clocks, a technology developed by UCLA researchers to measure DNA methylation patterns that provides an epigenetic or biological age estimate.

“Epigenetics” refers to external modifications that occur in gene expression as result of what we do to our bodies, as opposed to the genetic code we are born with.

Ingesting overcooked food or inhaling cigarette smoke causes deleterious epigenetic changes to DNA. Healthy lifestyles enable beneficial gene expression changes.

Deficits in certain **B vitamins** can also adversely impact healthy DNA methylation.

Summary

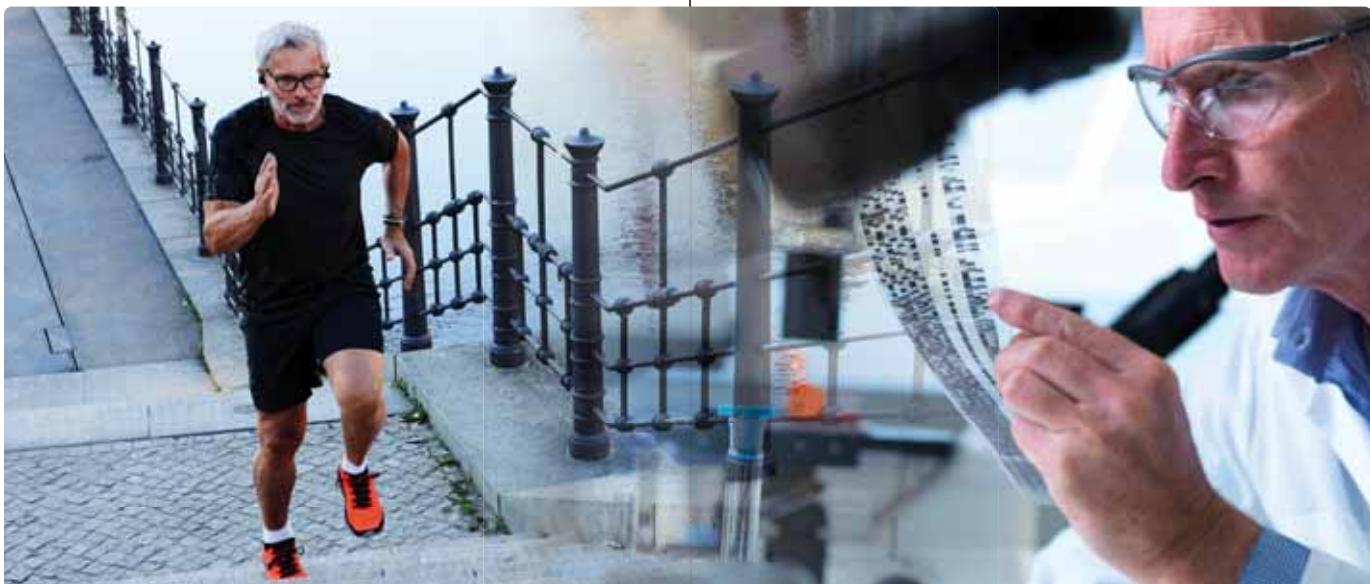
B vitamins are essential for multiple cellular functions, including facilitating vital **DNA repair**.

These benefits can be attained through regular use of a high-quality multivitamin, or taking a comprehensive B-complex supplement, preferably one that uses activated forms like **5-MTHF (folate)**, **methylcobalamin (B12)**, and **pyridoxal-5-phosphate (B6)**.

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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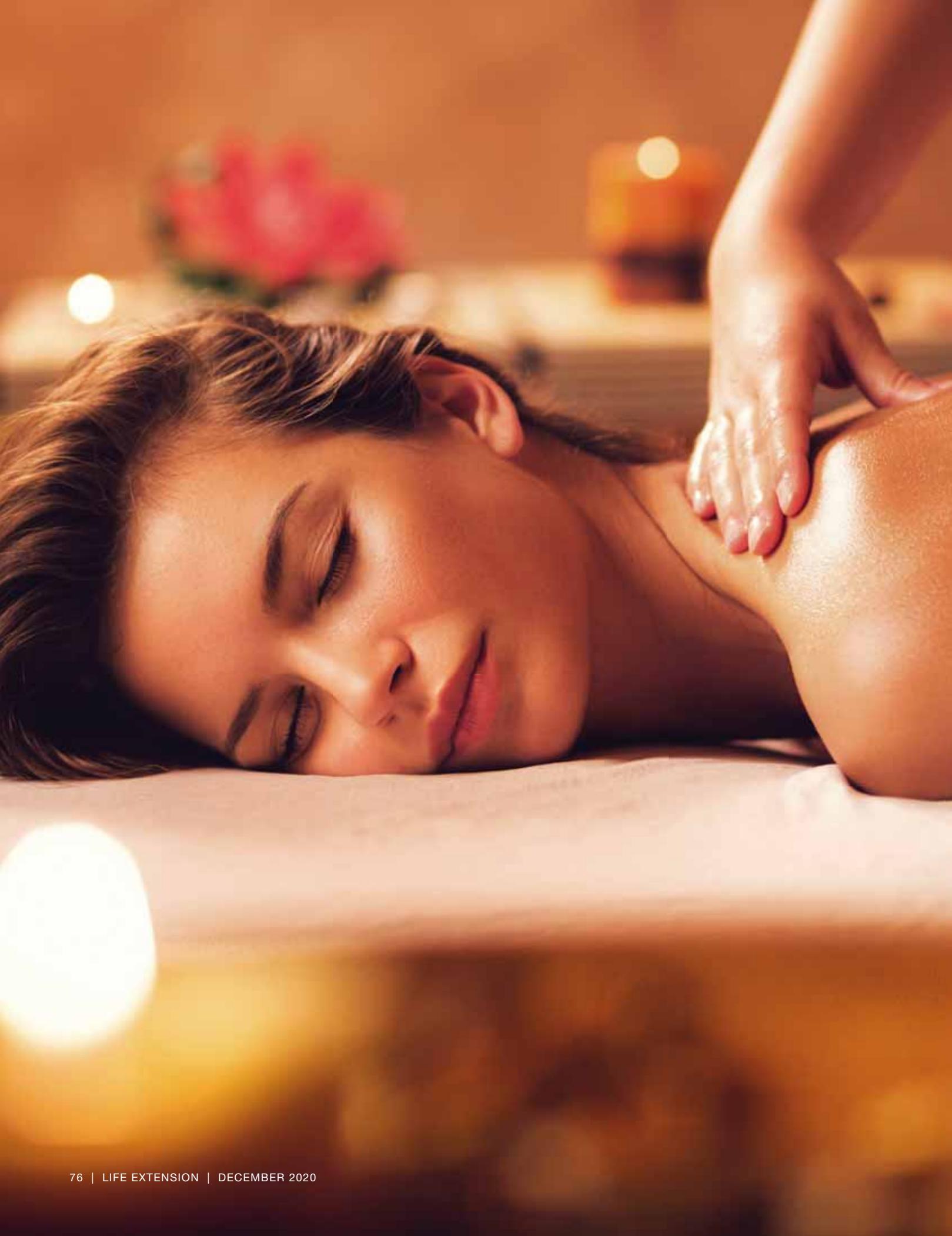
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Recent MASSAGE THERAPY Conferences

BY BEN BEST

Massage therapy can be of benefit for pain, fatigue, anxiety, stiffness, and many other ailments in addition to being relaxing and feeling good.

The **opioid crisis** (skyrocketing use of legal and illegal opioid drugs), in combination with increasing complaints of chronic pain, has caused many people to give more attention to non-drug therapies.

The preference for drug treatments over other therapies by medical professionals has been a consequence of FDA drug-centered medicine.

Only large drug companies can afford the large, clinical trials that the FDA requires to approve a drug therapy. No one is going to spend hundreds of millions of dollars on clinical trials for unpatentable therapies like massage, yoga, or acupuncture.

Reviews of massage clinical trials often conclude that the evidence is weaker than for drug-based clinical trials because large, well-funded trials have not been conducted for massage.



Massage therapy clinical trials face another disadvantage because the quality of massage treatment is not uniform. Massage therapists have different strengths, skills, and techniques. And there are different types of massage. Swedish (relaxation, stroking) massage can be better therapy for anxiety, deep tissue (more pressure) massage can be better therapy for pain or fatigue, and Thai (stretching) massage can be better therapy for stiffness.

Use of opioid drugs for pain has become such a prominent social issue that the problem created by FDA drug-centered medicine can no longer be ignored. Nor can drug companies facing ever-expanding lawsuits ignore the problem.

This article covers presentations on the scientific value of therapeutic massage given at recent massage conferences.

Opioid Crisis

Robert Kerns, PhD, (Professor of Psychiatry, Neurology and Psychology, Yale University, New Haven, Connecticut) believes that the opioid crisis could have been prevented if massage, exercise, yoga, progressive relaxation, and other forms of non-drug therapy

were used for treatment of pain.¹ Use of the prescription opioid drug oxycodone for cancer-related pain increased **four-fold** between 1997 and 2002. Illicit drug abuse of prescription opioid drugs now exceeds that of the illegal drugs heroin or cocaine.²



Robert Kerns, PhD

Opioid drugs can be beneficial for acute (short term) pain relief but have not proven beneficial for chronic (long term, over six months) pain. Common side effects of opioids include constipation, nausea, and excessive sleepiness.³ Long-term use of opioid drugs also produces tolerance (the patient requires an increase in the amounts of opioids necessary to relieve pain).⁴

Massage can be of benefit for pain, without side effects.⁵ Massage is particularly beneficial for cancer pain.⁶

Pain in Fascia

Helene Langevin, MD (Director, National Center for Complementary and Integrative Health, Bethesda, Maryland) has studied the cause and treatment of



Helene Langevin, MD

inflamed **fascia** (connective tissue surrounding organs) in chronic-pain conditions. Fascia can be infiltrated with nerves that contribute to the sensation of pain. She has shown an accumulation of additional connective tissue in areas of the back where patients experience lower-back pain.⁷ Dr. Langevin has shown that stretching

of connective tissue in the back, which could be done with massage or yoga, may reduce the inflammation and/or fibrosis seen in lower-back-pain subjects.⁸

Dr. Langevin believes a similar kind of inflammation is seen in repetitive-strain injury, as in lower back pain.⁹ Massage therapy can reduce inflammation and neural fibrosis due to repetitive-strain injury.¹⁰ Similarly, a combination of massage and trigger-point therapy

has been shown to be an effective treatment for carpal tunnel syndrome (a repetitive-strain injury of the wrist).¹¹ Persons suffering from repetitive-strain injury generally seek help after developing symptoms, but massage therapy to the affected tissues may **prevent** repetitive-strain injury before it happens.¹²

Massage for Breast Cancer Survivors

Jeanne Massingill, LMT (Owner, The Oaks Medical Massage Therapy Clinic, Rocky River, Ohio) has used massage therapy to treat breast cancer survivors.



Jeanne Massingill, LMT

Massage has been shown to relieve pain, anxiety, and improve the overall well-being of women whose breast has been removed due to cancer.¹³

Tendons join muscle to bone, ligaments join bone to bone, but fascia is a thin sheet of connective tissue that surrounds and encases every muscle, nerve, bone, blood

vessel and organ in the body, securing and linking them.¹⁴ Manual therapy can reduce fascial tightness and improve blood circulation.¹⁵ Stiffness of fascia has been associated with cancer growth.¹⁶

Up to **60%** of breast cancer surgery survivors experience chronic pain.¹⁷ **Myofascial massage** is a massage technique that applies pressure and stretching to fascia. Massingill conducted a clinical trial of myofascial massage on patients complaining of chronic pain following breast cancer surgery. Compared to Swedish massage or light touch, patients receiving myofascial massage had less pain, better mobility, and improved general health.¹⁸

Cervicogenic Headache

Til Luchau (Lead Instructor and Director of Advanced Trainings, Lafayette, Colorado) is concerned with treatment for cervicogenic headaches. A **cervicogenic headache** is a headache resulting from neck pain. An estimated **15%-20%** of headaches are cervicogenic.¹⁹ Women have cervicogenic headaches more frequently than men.²⁰ Massage therapy combined with neck exercises can relieve cervicogenic headache.²¹



Til Luchau

Benefit has also been reported for

manual therapy on trigger points of the muscle running from the back of the skull to the center of the chest (the sternocleidomastoid muscle).²²

Low Back Pain

Kathryn Stewart, BS, LMT (Professor, Family and Community Medicine, University of Kentucky College of Medicine, Lexington, Kentucky) is interested in

treatment for lower back pain. Lower back pain is a very common cause of disabilities, which is more frequently seen in persons of lower socioeconomic status.²³

Stewart is an advocate of evaluating massage therapy for lower back pain by having patients directly seek care from community massage therapists.²⁴ In one study involving 10 massage sessions, almost half of the patients showed reduced pain after 12 weeks, and **40%** continued to show relief at 24 weeks.²⁵



Kathryn Stewart, BS, LMT

Fibromyalgia

Julie Goodwin, LMT (Instructor, Massage Therapy Program, Pima Community College, Tucson, Arizona) specializes in massage therapy for patients with fibromyalgia. **Fibromyalgia** is characterized by widespread

pain, which can lead to sleep difficulties and general fatigue. There is a wide range of prevalence estimates, some as high as **12%**, in which females are about three times more likely to have the condition than males.²⁶ Systematic reviews of a variety of massage techniques show treatment of over five weeks to reduce pain, anxiety, and depression.²⁷ All massage techniques improved health-related quality of life.²⁸



Julie Goodwin, LMT



Massage for Athletes

Lee Stang, LMT (Owner, Bridges To Health Therapeutic Massage Center, Hendersonville, North Carolina) gives massage therapy to athletes. Massage has been shown to improve blood vessel function after exercise-induced muscle injury.²⁹ Triathlon athletes who received massage therapy after completion of a competition reported better recovery from pain and fatigue.³⁰ Massage has been used to relieve travel fatigue in athletes who have spent many hours confined to airplane seats across many time zones.³¹

In a well-controlled experiment, muscle samples were taken from both legs of healthy young males who had received massage on only one randomly selected leg after exercise. The massaged leg showed reduced inflammation and increased formation of energy-producing mitochondria cellular components, compared to the unmassaged leg.³²



Lee Stang, LMT

Manual Lymphatic Drainage

Judy Stahl, MA (Founder, Prescott Center for Massage Therapy, Prescott, Arizona) has expertise in the type of massage known as **manual lymphatic drainage (MLD)**.



Judy Stahl, MA

MLD is a watery fluid containing waste products that flows from body tissues to lymph nodes, and then to the heart, independent of the blood circulatory system. Lymph is weakly propelled by muscle contraction, so it moves much more slowly than blood. Lymph nodes break down debris in the lymph before the lymph is returned to the circulatory system (returned to the heart).³³

The brain has an independent lymphatic system known as the **glymphatic system**. The glymphatic system is most active during sleep, which is part of the reason why sleep deprivation reduces mental function.³⁴

MLD massage is used to compensate for insufficient fluid flow in the lymphatic system. Orthopedic (bone or muscle) injuries often result in impaired lymph flow, which can be improved by MLD.³⁵ Application of MLD prior to surgery for varicose veins can improve the outcome.³⁶ Cellulite has also been shown to be reduced by MLD.³⁷

Breast cancer surgery often removes lymph nodes and damages the lymphatic system. Up to **49%** of women whose breast has been removed experience lymphatic swelling.³⁸ MLD has been shown to reduce lymphatic swelling following breast cancer treatment.³⁹

Massage for Anxiety

Mark Hyman Rapaport, MD (Chairman, Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, Georgia) is interested in the effectiveness of Swedish massage therapy to



Mark Hyman Rapaport, MD

reduce anxiety or fatigue. Studies by earlier researchers have shown that massage can reduce anxiety.⁴⁰ A study of patients randomized to receive or not receive massage after cardiovascular surgery showed reduced pain, anxiety, and tension in the massaged patients.⁴¹

Dr. Rapaport has shown that six weeks of Swedish massage can

significantly reduce fatigue in cancer treatment survivors when compared to light touch.⁴² Measuring blood and saliva samples of persons who had received either 45 minutes of light touch or Swedish massage twice weekly for five weeks, Dr. Rapaport found an increase in the social-binding hormone oxytocin, and a decrease in the stress hormone cortisol.⁴³

Generalized anxiety disorder is a condition characterized by uncontrollably excessive worry. Dr. Rapaport conducted a clinical trial in which general-anxiety-disorder patients were randomly assigned to receive either Swedish massage or light touch twice weekly for six weeks. Compared to light touch, the patients receiving Swedish massage showed a significant reduction in worry beginning at the end of the third week, based on questionnaires they completed.⁴⁴

Concluding Remarks

Massage is not simply a self-indulgence, but it can be a valuable therapy for many conditions. Although studies proving the benefits of massage are often small, in size and funding, side effects are rare. Physicians should be encouraged to try massage therapy before trying drugs.

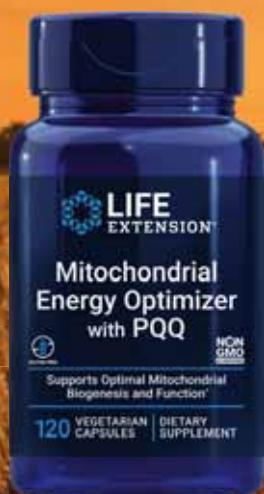
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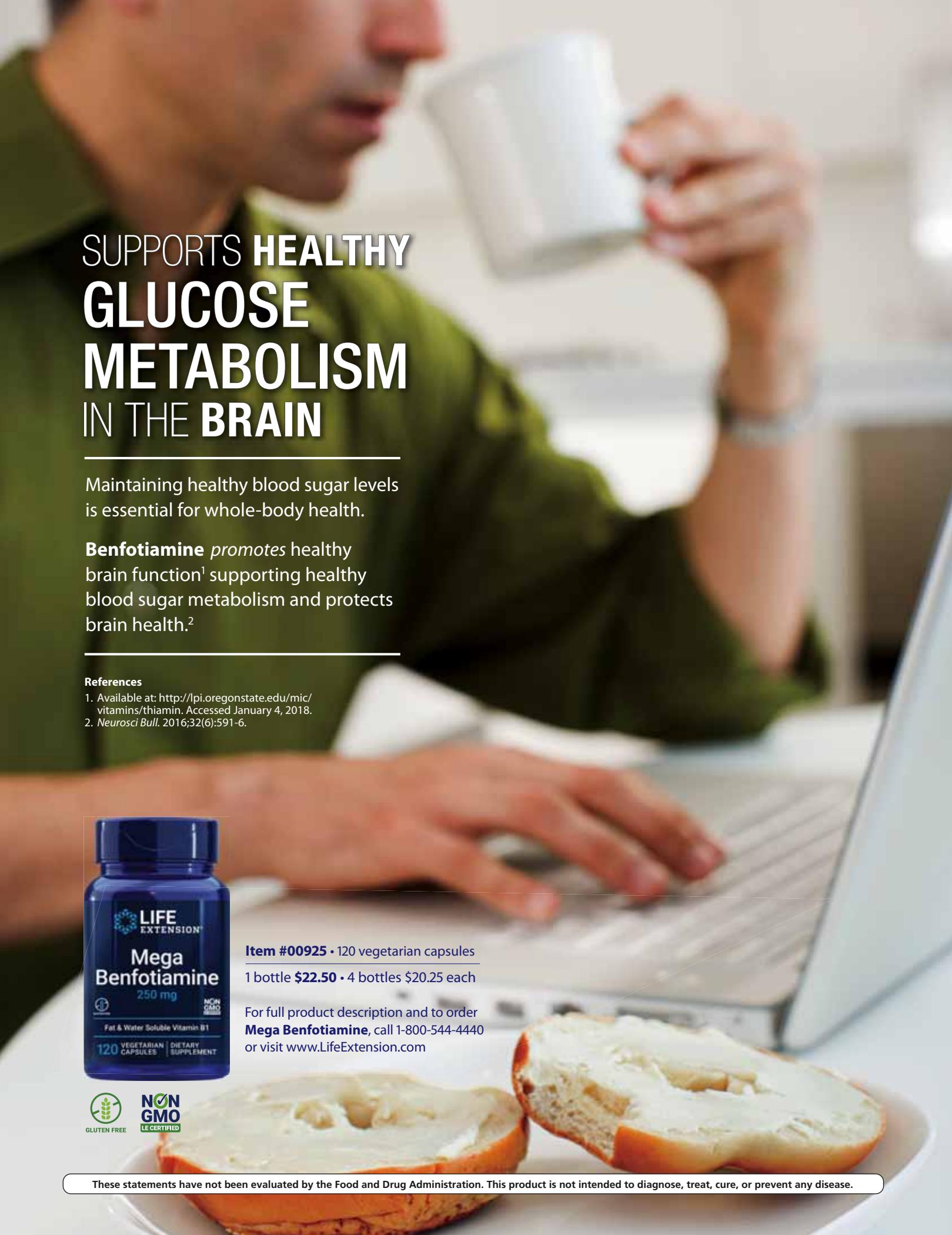
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PARSLEY-CUCUMBER SALAD WITH FETA, WALNUTS, AND POMEGRANATE

The main dish is typically the focus of our meals. But a tasty side dish can enhance—and sometimes even outshine—even the most delectable main attraction.

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The Side Dish Bible, from America's Test Kitchen, solves that problem with 1,001 recipes to help you find the perfect complementary dish for any meal.

Steamed broccoli is good—but Steamed Broccoli with Lime-Cumin Dressing sounds even better.

Roasted cauliflower might be tasty—but Braised Cauliflower with Garlic, Ginger, and Soy sounds much better.

If you only have a few ingredients on hand, *The Side Dish Bible* provides dozens of simple, tried-and-true recipes. For a little more adventure, consult the section called “Up Your Vegetable Game” for options such as Roman-Style Stuffed Braised Artichokes or Sautéed Baby Bok Choy with Miso Sauce.

If you prefer beans and lentils, you could try Mashed Fava Beans with Cucumbers, Olives, and Feta, or for a fresh salad, toss together a colorful Cherry Tomato Salad with Basil and Fresh Mozzarella.

With 1,001 recipes, *The Side Dish Bible* covers all the bases—including sections for dinner parties, potlucks, and casseroles, as well as recipes that utilize the grill, slow cooker, or pressure cooker.

Here, **Life Extension®** features four recipes to get you started.

—LAURIE MATHENA

Roasted Zucchini and Eggplant Medley

Serves 8

3 zucchini (about 1 1/2 pounds), quartered lengthwise and sliced crosswise into 3/4-inch-wide pieces

1/4 cup extra-virgin olive oil, divided, plus extra for serving

3/4 teaspoons table salt, divided

2 pinches pepper, divided

1 1/2 pounds eggplant, cut into 1inch cubes

1 onion, chopped fine

1 tablespoon minced fresh thyme or 1 teaspoon dried

3 garlic cloves, minced

12 ounces cherry tomatoes, quartered

1/4 cup coarsely chopped fresh basil

1 tablespoon lemon juice

1. Adjust oven rack 6 inches from broiler element and heat broiler. Line rimmed baking sheet with aluminum foil and spray with vegetable oil spray.

2. Toss zucchini with 1 tablespoon oil, 1/4 teaspoon salt, and pinch pepper. Spread zucchini in even layer on prepared sheet. Broil zucchini, stirring occasionally, until lightly charred around edges but slightly underdone, 7 to 10 minutes; transfer zucchini to shallow serving dish (or casserole dish). Repeat with eggplant, 1 tablespoon oil, 1/4 teaspoon salt and remaining pinch pepper; transfer to serving dish.



3. Heat remaining 2 tablespoons oil in 12-inch nonstick skillet over medium heat until shimmering. Add onion, thyme, and remaining 1/4 teaspoon salt and cook until lightly browned, about 10 minutes. Stir in garlic and cook until fragrant, about 30 seconds. Off heat, stir in tomatoes. Scatter onion-tomato mixture over broiled vegetables. Cover vegetables and let sit for 10 minutes.

4. Sprinkle with basil, lemon juice, and additional oil before serving. Serve warm or at room temperature.

Chickpea Salad with Carrots, Arugula, and Olives

Serves 4

2 (15-ounce) cans chickpeas, rinsed
1/4 cup extra-virgin olive oil
2 tablespoons lemon juice
3/4 teaspoon table salt
1/2 teaspoon pepper
Pinch cayenne pepper
3 carrots, peeled and shredded
1 ounce (1 cup) baby arugula, chopped
1/2 cup pitted kalamata olives, chopped

1. Microwave chickpeas in medium bowl until hot, about 1 minute 30 seconds. Stir in oil, lemon juice, salt, pepper, and cayenne and let sit for 30 minutes.

2. Add carrots, arugula, and olives and toss to combine. Season with salt and pepper to taste. Serve.

VARIATIONS

Chickpea Salad with Fennel and Arugula

Substitute 1 fennel bulb, stalks discarded, bulb halved, cored, and cut into 1/4-inch pieces, for carrots and olives.

Chickpea Salad with Roasted Red Peppers and Feta

Substitute 1/2 cup drained and chopped jarred roasted red peppers, 1/2 cup crumbled feta cheese, and 1/4 cup chopped fresh parsley for carrots, arugula, and olives.



Sautéed Green Beans with Mushrooms and Dukkah

Serves 4

5 teaspoons extra-virgin olive oil, divided
 1 garlic clove, minced
 2 tablespoons minced fresh parsley
 1 teaspoon grated lemon zest plus 2 teaspoons lemon juice
 8 ounces cremini mushrooms, trimmed and sliced thin
 3 shallots, halved and sliced thin
 1/2 teaspoon table salt
 1/8 teaspoon pepper
 1 pound green beans, trimmed and cut into 2-inch lengths
 1/4 cup water
 1/3 cup organic plain low-fat yogurt
 2 tablespoons dukkah
 (We prefer to use our homemade dukkah (see recipe opposite), but you can substitute store-bought dukkah if you wish.)

1. Combine 1 tablespoon oil, garlic, parsley, and lemon zest in bowl; set aside. Heat 1 teaspoon oil in 12-inch nonstick skillet over medium heat until shimmering. Add mushrooms, shallots, salt, and pepper, cover, and cook until mushrooms have released their liquid, about 5 minutes. Uncover, increase heat to high, and cook, stirring occasionally, until mushrooms are golden, about 8 minutes. Transfer to clean bowl.

2. Heat remaining 1 teaspoon oil in now-empty skillet over medium heat until shimmering. Add green beans



and cook, stirring occasionally, until spotty brown, 4 to 6 minutes. Add water, cover, and cook until green beans are bright green and still crisp, about 2 minutes.

3. Uncover, increase heat to high, and cook until water evaporates, 30 to 60 seconds. Stir in oil-garlic

mixture and mushrooms and cook until beans are crisp-tender, 1 to 3 minutes. Off heat, stir in lemon juice and season with salt and pepper to taste. Transfer to platter, drizzle with yogurt, and sprinkle with dukkah. Serve.

Parsley-Cucumber Salad with Feta, Walnuts, and Pomegranate

Serves 4 to 6

- 3 tablespoons extra-virgin olive oil
- 1 tablespoon pomegranate molasses
- 1 tablespoon red wine vinegar
- 1/4 teaspoon table salt
- 1/8 teaspoon pepper
- Pinch cayenne pepper
- 3 cups fresh parsley leaves
- 1 English cucumber, halved lengthwise and sliced thin
- 1 cup walnuts, toasted and chopped coarse, divided
- 1/2 cup pomegranate seeds, divided
- 4 ounces feta cheese, sliced thin

Whisk oil, molasses, vinegar, salt, pepper, and cayenne in large bowl until fully incorporated. Add parsley and cucumber and toss to coat. Add half of walnuts and half of pomegranate seeds and toss to combine. Season with salt and pepper to taste. Transfer to platter and top with feta, remaining walnuts, and remaining pomegranate seeds. Serve.

Dukkah

Makes 2 cups

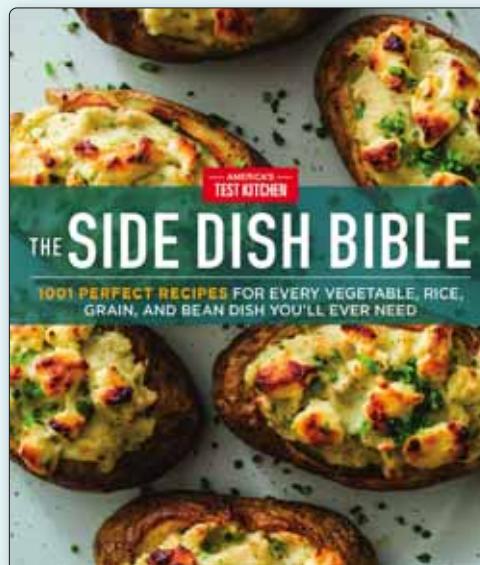
Dukkah is a Mediterranean condiment made from a blend of nuts, seeds, and spices. It makes a flavorful crunchy garnish for vegetables and salads.

- 1 (15-ounce) can chickpeas, rinsed and patted dry
- 1 teaspoon extra-virgin olive oil
- 1/2 cup shelled pistachios, toasted
- 1/3 cup black sesame seeds, toasted
- 2 1/2 tablespoons coriander seeds, toasted
- 1 tablespoon cumin seeds, toasted
- 2 teaspoons fennel seeds, toasted
- 1 1/2 teaspoons pepper
- 1 1/4 teaspoons table salt

Adjust oven rack to middle position and heat oven to 400 degrees. Toss chickpeas with oil and spread in single layer on rimmed baking sheet. Roast until browned and crisp, 40 to 45 minutes, stirring every 5-10 minutes; let cool completely.

Process chickpeas in food processor until coarsely ground, about 10 seconds; transfer to bowl. Pulse pistachios and sesame seeds in now-empty food processor until coarsely ground, about 15 pulses; transfer to bowl with chickpeas. Process coriander, cumin, and fennel seeds in again-empty food processor until finely ground, 2-3 minutes; transfer to bowl with chickpeas. Add pepper and salt and toss until well combined.

(Dukkah can be refrigerated for up to 1 month.)



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Spelt

BY LAURIE MATHENA



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Spelt is an ancient grain that was one of the first forms of wheat used to make bread. While it's been grown in Europe for hundreds of years, it only made its way to the United States about 100 years ago.

Because spelt has remained largely unaltered, it is considered to be a **healthier option** than ordinary wheat.

Spelt has more protein and fat than typical wheat, and it is a good source of fiber, iron, and zinc.

Two large meta-analyses found that having a high intake of whole grains like spelt, compared with a low intake, was associated with:

- **14%** reduced risk of stroke¹
- **12%** reduced risk of coronary heart disease²

Consuming high-fiber foods like spelt has been shown to lower total and LDL (bad) cholesterol,³ while increasing HDL (good) cholesterol.⁴ And supplementation with fiber has been shown to lower blood pressure.⁵

Because whole grain foods can slow digestion and reduce blood sugar spikes, studies suggest that they can reduce the risk of diabetes. In fact, one study showed that having a high intake of whole grains was associated with a reduced risk of type II diabetes.⁶

Eating spelt could also help with weight management, since high fiber foods can help you feel fuller longer.

Spelt flour can be substituted for wheat flour in recipes, although it does have a nuttier flavor. You can also enjoy whole spelt grains as a side dish, breakfast cereal, or in stews.

Since spelt is a type of wheat, it does contain gluten. This means it should be avoided by anyone with a gluten sensitivity or a condition such as celiac disease.

Be sure to choose whole grain spelt as opposed to refined spelt, which has a high glycemic index and can cause a rapid spike in blood sugar levels.

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- 01983 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract
- 01988 Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin

- 01982 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 softgels
 01985 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 60 enteric coated softgels
 01984 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 enteric coated softgels
 01986 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 240 softgels
 01812 Provinal® Purified Omega-7
 01640 Vegetarian DHA

FOOD

- 02008 California Estate Extra Virgin Olive Oil
 02170 Rainforest Blend Decaf Ground Coffee
 02169 Rainforest Blend Ground Coffee
 02171 Rainforest Blend Whole Bean Coffee
 00438 Stevia™ Organic Liquid Sweetner
 00432 Stevia™ Sweetener

GLUCOSE MANAGEMENT

- 01503 CinSulin® with InSea²⁰ and Crominex® 3+
 01620 CoffeeGenic® Green Coffee Extract
 02122 Glycemic Guard™
 00925 Mega Benfotiamine
 01803 Tri Sugar Shield®

HEART HEALTH

- 01066 Aspirin (Enteric Coated)
 01842 BioActive Folate & Vitamin B12 Caps
 01700 Cardio Peak™ with Standardized Hawthorn and Arjuna
 02121 Homocysteine Resist
 02018 Optimized Carnitine
 01949 Super-Absorbable CoQ10 Ubiquinone with d-Limonene • 50 mg, 60 softgels
 01951 Super-Absorbable CoQ10 Ubiquinone with d-Limonene • 100 mg, 60 softgels
 01929 Super Ubiquinol CoQ10
 01427 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 30 softgels
 01425 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 100 softgels
 01437 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 30 softgels
 01426 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 60 softgels
 01431 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 200 mg, 30 softgels
 01733 Super Ubiquinol CoQ10 with PQQ
 01859 TMG Liquid Capsules
 00349 TMG Powder

HORMONE BALANCE

- 00454 DHEA (Dehydroepiandrosterone) 15 mg, 100 capsules
 00335 DHEA (Dehydroepiandrosterone) 25 mg, 100 capsules
 00882 DHEA (Dehydroepiandrosterone) 50 mg, 60 capsules
 00607 DHEA (Dehydroepiandrosterone) 25 mg, 100 vegetarian dissolve in mouth tablets
 01689 DHEA (Dehydroepiandrosterone) 100 mg, 60 veg capsules
 02368 Optimized Broccoli and Cruciferous Blend
 00302 Pregnenolone • 50 mg, 100 capsules
 00700 Pregnenolone • 100 mg, 100 capsules
 01468 Triple Action Cruciferous Vegetable Extract
 01469 Triple Action Cruciferous Vegetable Extract with Resveratrol

IMMUNE SUPPORT

- 02411 5 Day Elderberry Immune
 00681 AHCC®
 02302 Bio-Quercetin
 02410 Black Elderberry + Vitamin C
 01961 Enhanced Zinc Lozenges
 01704 Immune Modulator with Tinofend®
 00955 Immune Protect with PARACTIN®
 02005 Immune Senescence Protection Formula™
 29727 Kinoko® Gold AHCC
 24404 Kinoko® Platinum AHCC
 00316 Kyolic® Garlic Formula 102
 00789 Kyolic® Reserve
 01681 Lactoferrin (Apolactoferrin) Caps
 01903 NK Cell Activator™
 01394 Optimized Garlic
 01309 Optimized Quercetin
 01811 Peony Immune
 00525 ProBoost Thymic Protein A
 01708 Reishi Extract Mushroom Complex
 01906 Standardized Cistanche
 13685 Ten Mushroom Formula®
 01097 Ultra Soy Extract
 01561 Zinc Lozenges

INFLAMMATION MANAGEMENT

- 01639 5-LOX Inhibitor with AprèsFlex®
 02324 Advanced Curcumin Elite™ Turmeric Extract, Ginger & Turmerones
 01709 Black Cumin Seed Oil
 02310 Black Cumin Seed Oil and Curcumin Elite™ Turmeric Extract
 00202 Boswella
 02467 Curcumin Elite™ Turmeric Extract • 30 veg capsules
 02407 Curcumin Elite™ Turmeric Extract • 60 veg capsules
 01804 Cytokine Suppress® with EGCG
 02223 Pro-Resolving Mediators
 00318 Serraflazyme
 01203 Specially-Coated Bromelain
 00407 Super Bio-Curcumin® Turmeric Extract
 01254 Zyflamend™ Whole Body

JOINT SUPPORT

- 02404 Arthro-Immune Joint Support
 02238 ArthroMax® Advanced NT2 Collagen™ & AprèsFlex®
 01617 ArthroMax® with Theaflavins & AprèsFlex®
 02138 ArthroMax® Elite
 00965 Fast-Acting Joint Formula
 00522 Glucosamine/Chondroitin Capsules
 01600 Krill Healthy Joint Formula
 01050 Krill Oil
 00451 MSM (Methylsulfonylmethane)
 02231 NT2 Collagen™

KIDNEY & BLADDER SUPPORT

- 00862 Cran-Max® Cranberry Whole Fruit Concentrate
 01424 Optimized Cran-Max® with Ellirose™
 01921 Uric Acid Control
 01209 Water-Soluble Pumpkin Seed Extract

LIVER HEALTH & DETOXIFICATION

- 01922 Advanced Milk Thistle • 60 softgels
 01925 Advanced Milk Thistle • 120 softgels
 02240 Anti-Alcohol Complex
 01651 Calcium D-Glucarate
 00550 Chlorella
 01571 Chlorophyllin
 01522 Milk Thistle • 60 veg capsules
 02402 FLORASSIST® Liver Restore™
 01541 Glutathione, Cysteine & C

- 01393 HepatoPro
- 01608 Liver Efficiency Formula
- 01534 N-Acetyl-L-Cysteine
- 00342 PectaSol-C® Modified Citrus Pectin Powder
- 01080 PectaSol-C® Modified Citrus Pectin Capsules
- 01884 Silymarin
- 02361 SOD Booster

LONGEVITY & WELLNESS

- 00457 Alpha-Lipoic Acid
- 01625 AppleWise Polyphenol Extract
- 02414 Bio-Fisetin
- 01214 Blueberry Extract
- 01438 Blueberry Extract and Pomegranate
- 02270 DNA Protection Formula
- 02405 Endocannabinoid System Booster
- 02119 GEROPROTECT® Ageless Cell™
- 02415 GEROPROTECT® Autophagy Renew
- 02133 GEROPROTECT® Longevity A.I.™
- 02401 GEROPROTECT® Stem Cell
- 02211 Grapeseed Extract
- 00954 Mega Green Tea Extract (decaffeinated)
- 00953 Mega Green Tea Extract (lightly caffeinated)
- 01513 Optimized Fucoidan with Maritech® 926
- 02230 Optimized Resveratrol
- 01637 Pycnogenol® French Maritime Pine Bark Extract
- 02210 Resveratrol
- 00070 RNA (Ribonucleic Acid)
- 02301 Senolytic Activator
- 01208 Super R-Lipoic Acid
- 01919 X-R Shield

MEN'S HEALTH

- 02209 Male Vascular Sexual Support
- 00455 Mega Lycopene Extract
- 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
- 02403 Lithium
- 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 vegetarian tablets
- 02176 SAMe (S-Adenosyl-Methionine) 400 mg, 30 enteric coated vegetarian tablets
- 02174 SAMe (S-Adenosyl-Methionine) 400 mg, 60 enteric coated vegetarian tablets

MULTIVITAMINS

- 02199 Children's Formula Life Extension Mix™
- 02498 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® Immune & Nasal Defense
- 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
- 80175 Advanced Probiotic-Fermented Eye Serum
- 80177 Advanced Retinol Serum
- 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
 80176 Collagen Boosting Peptide Cream
 80156 Collagen Boosting Peptide Serum
 02408 Collagen Peptides for Skin & Joints
 80169 Cucumber Hydra Peptide Eye Cream
 80141 DNA Support Cream
 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
 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
 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

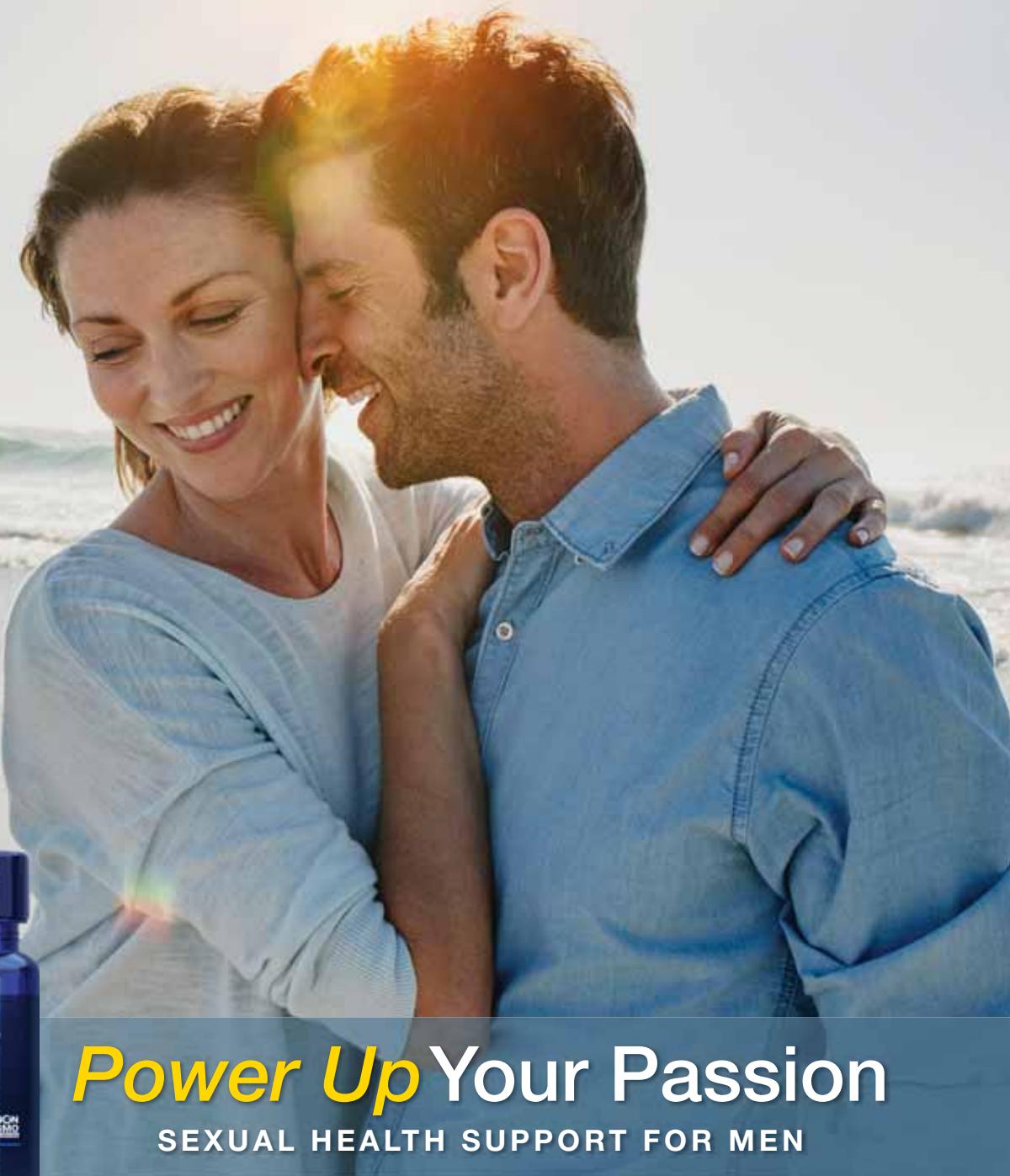
- 01533 Ascorbyl Palmitate
 00920 Benfotiamine with Thiamine
 00664 Beta-Carotene
 01945 BioActive Complete B-Complex
 00102 Biotin
 00084 Buffered Vitamin C Powder
 02229 Fast-C® and Bio-Quercetin Phytosome
 02075 Gamma E Mixed Tocopherol Enhanced with Sesame Lignans
 02070 Gamma E Mixed Tocopherol/Tocotrienols
 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
 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 Methylcobalamin
 01536 Vitamin B12 Methylcobalamin • 1 mg, 60 veg lozenges
 01537 Vitamin B12 Methylcobalamin • 5 mg, 60 veg lozenges
 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 • 25 mcg (1,000 IU), 90 softgels
 01751 Vitamin D3 • 25 mcg (1,000 IU), 250 softgels
 01713 Vitamin D3 • 125 mcg (5,000 IU), 60 softgels
 01718 Vitamin D3 • 175 mcg (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
 02478 DHEA Complete
 01738 Garcinia HCA
 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



Power Up Your Passion

SEXUAL HEALTH SUPPORT FOR MEN

A **ginger-like** root extract found in **Male Vascular Sexual Support** promotes **blood flow** and supports **sexual response**.

Item #02209 • 30 vegetarian capsules

1 bottle \$18

4 bottles \$16 each

Each capsule provides **100 mg** of **KaempMax™**, which is super-standardized ***Kaempferia parviflora***.

For full product description and to order

Male Vascular Sexual 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.



Does Your Fish Oil Provide Olive Polyphenols?

Omega-3s are widely used to protect heart health.

Olive oil also has vascular benefits.

Super Omega-3 provides **EPA/DHA** from ultra-pure fish oil plus standardized **polyphenols** from extra-virgin **olive oil**.



Item #01982 • 120 softgels
1 bottle \$24

4 bottles \$21 each



For full product description and to order **Super Omega-3 EPA/DHA Fish Oil with Sesame Lignans & Olive Extract**, call 1-800-544-4440 or visit www.LifeExtension.com

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IN THIS EDITION OF *LIFE EXTENSION® MAGAZINE*



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7 WHEN DRUGS BECOME DIETARY SUPPLEMENTS

A **B-vitamin** prescription drug cost **\$340** until it became a **dietary supplement** that now costs only **\$20**.

24 IMMUNE SUPPORT FOR QUICK RECOVERY

During cold and flu season, **zinc**, **elderberry**, and **vitamin C** help reduce *severity* and *duration* of respiratory illnesses.



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34 LITHIUM AND ALZHEIMER'S RISK

Low doses of the mineral **lithium** may slow progression of Alzheimer's and other neurodegenerative disorders.

44 ORAL COLLAGEN IMPROVES SKIN AND JOINTS

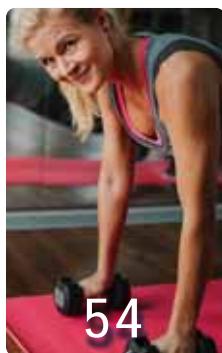
Hydrolyzed collagen boosts internal collagen production, enhancing skin appearance and improving joint function.

54 PRESERVE MUSCLE AND IMPROVE BODY COMPOSITION

Amino-acid-derived **HMB** improves muscle strength, growth, lean mass, and healthy body composition.

66 SYSTEMIC EFFECTS OF B VITAMINS

B vitamins provide systemic benefits including DNA repair, neurotransmitter synthesis, and healthy methylation.



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