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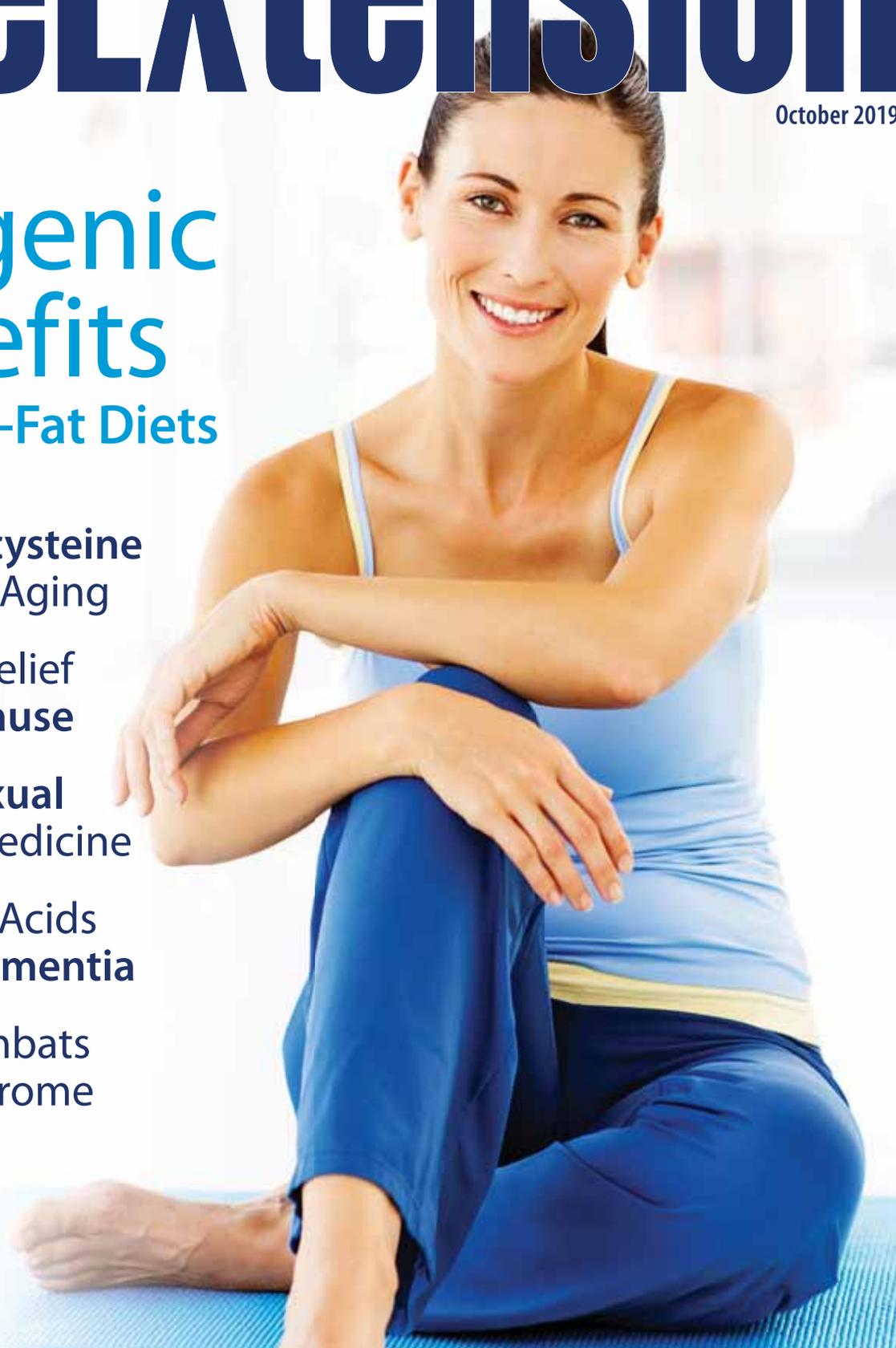
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Reference

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

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REPORTS



34 RHODIOLA COMBATS BURNOUT

The World Health Organization has classified **burnout** as a disease. A clinical trial shows that the herb **rhodiola** significantly improves all main symptoms of **burnout** within the **first week!**

43 CLOVE EXTRACT SAFELY LOWERS BLOOD SUGAR

A study published in **2019** demonstrated that polyphenol-rich **clove extract** significantly lowers *after-meal* blood sugar by **21.5%** in healthy people and by **27.2%** in **prediabetics**.

50 LOWER HOMOCYSTEINE TO SLOW BRAIN AGING

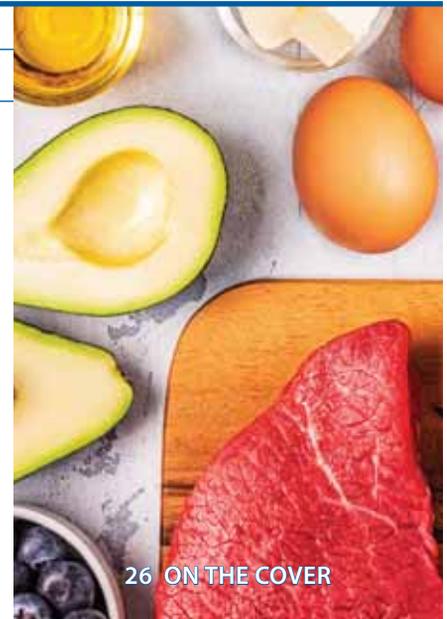
High **homocysteine** blood levels contribute to Alzheimer's, Parkinson's and other forms of dementia. The solution is a simple blood test and adding more bio-active **B-vitamins** if homocysteine is elevated.

60 ALLEVIATE MENOPAUSE SYMPTOMS WITHOUT HORMONES

Siberian rhubarb extract has been clinically shown to relieve **11** menopause symptoms up to **83%**. Hot flashes *decreased* from about **15** a day to an average of less than **1.4** a day.

68 RECENT SEXUAL MEDICINE CONFERENCES

Presentations at recent conferences by experts in sexual medicine included infertility, erectile dysfunction, older fathers, intercourse pain, bacterial vaginosis, polycystic ovary syndrome, premature ejaculation, and sexual assault.



26 ON THE COVER

HEALTHY WAY TO BENEFIT FROM KETONES

The low carb/high fat **ketogenic diet** has become a popular way to lose weight. But ingesting bad fats increases cardiovascular risks. Scientists have identified a healthy method to increase **ketones** without the difficulties of a **ketogenic diet**.

DEPARTMENTS



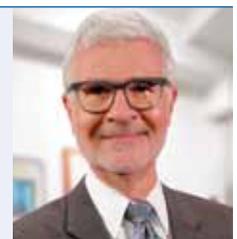
7 AS WE SEE IT
Is Memory Loss Optional?

In a landmark **2019** study, five **plasma nutrients** were associated with improved **cognitive performance** and **brain connectivity**.



19 IN THE NEWS
Hypertension tied to cognitive impairment; fish oil in pregnancy inhibits fatty liver in adult children; more consistent CT-radiation doses needed; omega-3 improves dry eye symptoms.

79 AUTHOR INTERVIEW
Steven Gundry, MD, author of *The Longevity Paradox: How to Die Young at a Ripe Old Age*, explains how he boosted patients' lifespan and healthspan by combining conventional medicine with nutritional therapy.



85 WELLNESS PROFILE
Celebrated nutrition and fitness expert Chris Mohr, PhD, RD, stresses exercise, a Mediterranean diet, and blood tests to know what's going on *inside* your body, for overall fitness as you age.



89 SUPERFOODS
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BY WILLIAM FALOON

Is Memory Loss Optional?

A wealth of data reveals that **cognitive decline** is not an inevitable consequence of growing older.¹

Maturing people can exert tremendous **control** over their **rate of brain aging**.

For those with **mild cognitive impairment**, effective protocols to reverse brain deterioration are being validated in **human** clinical trials.

When it comes to preventing or treating **dementia** there is no **single** approach.

Everyone should strive for **blood pressure** in the lowest tolerable ranges. I keep my blood pressure under **115/75 mmHg**. Others require somewhat higher blood pressure to push blood through their damaged circulatory systems.

Reducing **chronic inflammation** is essential for protecting aging brains. Most of you accomplish this via healthy behavior practices.



In a major finding published in **2019**, a group of elderly Americans underwent **cognitive testing**, MRI scans to assess **brain function**, and **blood tests** to assess **nutrient status**.²

The results identified five categories of **plasma nutrients** associated with enhanced **cognitive performance**.² The cognitive tests used in this study measured general intelligence, executive function, and memory.

The **plasma nutrients** associated with improved **cognitive performance** include carotenoids (like **lycopen**), homocysteine-lowering vitamins (**folate** and **B12**), **vitamin D**, and a healthy balance of **omega-3** to **omega-6** fatty acids.

MRI imaging revealed enhanced **brain network** connectivity in those with higher plasma **carotenoid** status and healthy balances of **omega-3** and **omega-6** fatty acids.

The authors of this **2019** study emphasize that despite abundant evidence in favor of a single **nutrient** or a few nutrients for cognitive health, **clinical trials** aimed at slowing **brain aging** are often unsuccessful.

They postulate this can be explained by the focus on **single** nutrients and a failure to consider the interactive effects of **nutrient combinations**.

In their study, **higher** levels of **nutrient combinations** measured in **blood plasma** were associated with enhanced cognitive performance and improved brain network efficiency.

The authors concluded that these findings contribute to ***“the development of novel nutritional therapies for the targeted treatment and clinical management of cognitive and neurological impairments in the aging brain.”***²

In an unprecedented **human** study, scientists from the University of Illinois used advanced analytical and imaging techniques to examine the relationship between groups of **nutrients** and their effects on **cognition** and **memory**. The study included 116 healthy adults with an average age of 69.²

The study found that combinations of related **plasma nutrients**, termed **nutrient biomarker patterns**, were strongly associated with **cognitive function** and **brain networking** efficiency.

This innovative research integrated three different types of measurements:

- 1) Specific **nutrient biomarker patterns** in blood (plasma),
- 2) **Cognitive function** as assessed by comprehensive mental tests, and
- 3) **Brain network connectivity** as measured by specialized functional MRI imaging.

How the Study Was Conducted

The scientists first measured levels of **plasma nutrients** and grouped them into *nutrient biomarker patterns*, or classes of related dietary compounds.

Testing **plasma nutrients** enables levels of **absorbed** nutrients to be precisely measured. In contrast, many dietary studies rely on self-reported questionnaires, which are notoriously unreliable.

In this study, the authors analyzed a set of 32 **plasma nutrient** biomarkers related to the **Mediterranean diet**.^{2,3} This enabled the scientists to determine which combinations of **nutrients** correlate with **healthy cognition** and **functional brain network** connectivity.



This technique provides a powerful method for capturing interactive effects of **multiple nutrients** as opposed to studying an **individual** nutrient in isolation.

After the blood draw to measure **plasma nutrients**, study subjects underwent comprehensive **cognitive testing** to measure overall intelligence, executive function, and memory.

Functional MRI imaging was then used to assess efficiency of **brain network connectivity**.

What the Study Uncovered

Specific **nutrient biomarker patterns** were associated with *better cognitive performance* as follows:

- A proper balance of certain **omega-3** and **omega-6** fatty acids was associated with higher function of two domains of memory;
- Higher levels of **lycopene** were correlated with better scores in three separate domains of memory and with better executive function;

- Higher levels of the **omega-3** fatty acids EPA, DHA, and DPA were strongly linked to better executive function and higher overall intelligence;
- **Carotenoids** including **trans-lutein** were positively associated with two measures of intelligence;
- The grouping of the homocysteine-reducing **B-vitamins** (vitamin B2, folate, B12) and **vitamin D** was associated with better executive function.

Additionally, **functional MRI** analysis revealed that three **nutrient biomarker patterns** significantly influenced the relationship between functional **brain connectivity** networks and measures of intelligence and cognitive function.

The study's findings regarding the benefits of **lycopene** on memory and executive function are not unexpected.

Human and animal studies have previously shown that **lycopene** may protect the brain against aging and

cognitive decline, and that higher levels are associated with lower Alzheimer's mortality and less severe dementia.^{4,6}

Higher **omega-3 status** was related with overall intelligence, while **omega-6** fatty acid balance and **lycopene** were associated with better executive function.

Impact of Excess Omega-6 Fats on The Brain

Most modern diets contain excessive amounts of **omega-6s** and insufficient amounts of **omega-3s**.

An unfavorable **omega-6 to omega-3 ratio** has an adverse impact on **brain function**.⁷

The 2019 published **human** study that measured **plasma nutrient** levels found that proper balance of **omega-6 to omega-3** fatty acids is associated with **higher** function of two measures of **memory**.

The optimal **omega-6 to omega-3** ratio approaches **4:1**. This means you want about four **omega-6** fatty acids for each one **omega-3** in your **blood plasma**.

This study found **higher** plasma levels of **omega-3s** to be strongly linked to better executive function and higher overall intelligence.

These findings corroborate the results of an earlier randomized controlled trial that found that supplementation with **omega-3** fatty acids improves brain structure, function, and cognitive outcomes.⁸ Additional studies link omega-3 fatty acids to global cognition,⁹⁻¹⁴ general intelligence,¹⁵ memory,¹⁶⁻¹⁸ and executive function.^{8,19,20}

The totality of this data provides a powerful basis for aging humans to alter their **dietary patterns** to preserve **neurological functions**.

The problem is that typical dietary ratios of **omega-6 to omega-3** fatty acids are far in excess of **optimal ratios** identified in this and other studies.

On average in the United States, the **omega-6 to omega-3** ratio is a disastrous **16:1**. This means that a typical American eats **16 times more** **omega-6** fats than **omega-3s**.

You can cut down on **omega-6** intake by reducing consumption of

processed and fast foods, fatty meats, cured meats and polyunsaturated vegetable oils (corn, sunflower, safflower, soybean, and cottonseed oils).

Use **extra virgin olive oil** for cooking and in salad dressings. Olive oil is a good substitute because it provides beneficial **monounsaturated fats** that can take the place of **omega-6** fats that are so pervasive in Western diets.

Eat more oily **fish** and take a high-potency **fish oil supplement** to boost your **omega-3 plasma** levels.

The Omega-6 Dilemma

Our brain and body require **omega-6** fatty acids to sustain life.

The problem with modern diets is excess consumption of **omega-6** fats and deficient intake of **omega-3s**.

Research suggests that too many **omega-6** fats increase risk of cardiovascular disease,²¹ cancer,^{22,23} inflammation,^{24,25} and neurodegeneration.²⁶⁻²⁹

For most people, the amount of dietary **omega-6** fats should be reduced and **omega-3** consumption increased.



AS WE SEE IT

Foods high in **omega-6 fats** include processed snacks and fast foods.

Refined **vegetable fats**, such as **soybean oil**, are used in cookies, crackers, sweets, salad dressings and most fried foods. **Soybean oil** is so ubiquitous that an astounding percent of calories in the American diet are estimated to come from this single **omega-6 source**.

Poultry (chicken, turkey, duck), which many people eat in lieu of red meat, is a rich source of **omega-6** fats. A **chicken leg** contains about **1,800 mg** of **omega-6** fatty acids.³⁰ **Turkey** contains almost as many **omega-6s** as chicken while **duck** contains less.

When a smaller amount of chicken is fried in vegetable oil and eaten as part of a **fast food chicken sandwich**, the amount of omega-6 fats surges to over **12,000 mg**.³¹

If you have a **salad** with a **soybean** or **safflower oil** dressing, you'd consume about **7,200 mg** of additional **omega-6** fats.³²

So, a meal from a **fast food** restaurant consisting of a fried **chicken sandwich** and **salad** can result in over **17,000 mg** of **omega-6** fats being eaten.

The ideal ratio of **omega-6 to omega-3** consumption is about **4 to 1**. This means for each **four omega-6s** you eat, you should compensate with **one omega-3**. This **4-to-1** ratio, however, is difficult for most people to accomplish.

A typical serving of **wild salmon** may provide **2,000 mg** of **omega-3s**.³³ As fish farming becomes more prevalent, however, the amount of omega-3s contained in fish meals has declined.³⁴

We at **Life Extension** recommend that people take about **2,400 mg** of omega-3s (EPA/DHA) from **fish oil** supplements each day.

So, if you include **omega-3 foods** in your diet **and** supplement with **fish oil**, you may provide yourself with around **4,000 mg** of **omega-3s** each day.

You then can ingest as many as **16,000 mg** of **omega-6s** each day and potentially achieve a healthy **4:1** plasma ratio of **omega-6** to **omega-3** fatty acids. This means **four omega-6** fats for every **one omega-3**.

To make sure you understand this, under this scenario, if you consume **16,000 mg** of **omega-6s** a day along with **4,000 mg** of **omega-3s**, your **plasma levels** may achieve a healthy **4-to-1** ratio.

In an ideal world, you'd want to ingest an almost equal number of **omega-6** and **omega-3** fatty acids. I personally strive towards a **1-to-1** ratio of ingested **omega-6** to **omega-3** fats but understand we each have differing **dietary patterns**.

When considering that the average American eats **16 times more omega-6** fats than **omega-3s** (**16:1** ratio), a **4-to-1** ratio (**4:1**) is a huge improvement.

The sidebar on the next page provides some examples of **foods** high in **omega-6s** that you may want to reduce or eliminate from your diet.



Foods High in Omega-6 Fatty Acids

Omega-6 fats are essential to sustain life. You cannot live without them.

The problem is that modern dietary practices provide too many **omega-6-rich foods** and not enough **omega-3s**.

Table 1 on this page reveals strikingly **high** amounts of **omega-6 fats** in common foods.

The sheer volume of ingested **omega-6 fats** contributes to a host of age-related diseases including **neurodegeneration**.

By reducing intake of foods high in **omega-6** fats, you can achieve a healthier **balance** of **fatty acids** in your plasma. This, in turn, has been shown to improve cognitive performance and brain health.

Below is a quote from the **2019** published study that measured **plasma nutrients** and correlated them to neurological performance/function:

“Accumulating evidence indicates that omega-6s confer beneficial effects on cognitive performance when their ratio with respect to omega-3 polyunsaturated fatty acids approaches one. The ratio of omega-6 to omega-3 NBPs [nutrient biomarker patterns] observed in the present study [approximates] the ideal ratio needed to confer benefits to cognitive performance and brain health.”²

Said differently, the authors of this 2019 study advocate for drastic **reductions** in ingested **omega-6** fats and increases in **omega-3s**. They advise that for each milligram of **omega-6** fat you eat, consume about an equal amount of **omega-3**.



Table 1. Omega-6 Content of Common Foods

Food	Omega-6 Content
Sweet and sour chicken, one serving (Chinese restaurant)	39,148 mg ³⁵
Crunchy onion rings, one serving (Applebee's)	30,989 mg ³⁶
Sunflower seeds, oil-roasted, 2 ounces	19,000 mg ³⁷
French fries, one serving (T.G.I. Friday's)	11,862 mg ³⁸
Coleslaw, one serving (Denny's)	6,690 mg ³⁹
Plain potato chips, 1 ounce	4,258 mg ⁴⁰
Taco salad, one serving (Taco Bell)	3,492 mg ⁴¹
Chocolate cake, small slice	1,114 mg ⁴²
Fried chicken breast (212 grams) (KFC)	12,271 mg ⁴³
Fried fish fillet, one serving (201 grams) (Denny's)	10,315 mg ⁴⁴
Macaroni and cheese, one serving (175 grams) (Cracker Barrel)	5,861 mg ⁴⁵
Single hamburger with cheese, one (236 grams) (Wendy's Classic Single)	2,697 mg ⁴⁶
Cream of mushroom soup, condensed, cup (128 grams) (Campbell's®)	3,576 mg ⁴⁷
Ramen noodle soup, one package (81 grams)	1,682 mg ⁴⁸
Edamame, one cup (155 grams)	2,773 mg ⁴⁹
Ready-to-drink nutritional shake, one serving (8 fl oz) (Ensure)	3,129 mg ⁵⁰
Pound cake, one serving (55 grams)	4,441 mg ⁵¹
Frozen red raspberries, one cup (140 grams)	21 mg ⁵²

Walnuts and Fish

When it comes to the **fatty acid** content of most foods, it is important to understand that most contain **omega-6s** and **omega-3s**.

For each **1 omega-6** fatty acid in **salmon** there are **7 to 20 omega-3** fatty acids.⁵³

Wild salmon contains more omega-3s compared to **farm-raised salmon**. Cold-water fish provide the highest amounts of dietary omega-3s compared to omega-6s.

Walnuts are high in an **omega-3** that can be converted to **EPA** and **DHA** in some, but not all people's bodies. Like other nuts, however, walnuts also contain lots of **omega-6s**.

For each **1 omega-3** fatty acid in **walnuts** there are **4 omega-6s**.⁵³

Walnuts represent a reasonable ratio of omega-3s to omega-6s for people to strive for, i.e. four omega-6s to each one omega-3.

Regular ingestion of walnuts is associated with cardiovascular and other health benefits.

If individuals were to subsist mostly on **fish-** and **walnut-**type foods, they would likely achieve a near-optimal **omega-6 to omega-3 ratio**.

The problem is that typical, overall diets are laden with omega-6s. **Peanut butter** contains a whopping **330 times more omega-6s** than **omega-3s**.

Table 2 reveals that even those who consume a lot of nuts are getting far more omega-6s than omega-3s.

To protect against cognitive decline, chronic inflammation and cardiovascular disorders, one should reduce ingestion of foods high in **omega-6** fats.

Since foods containing **high** amounts of **omega-6s** are so prevalent, ingesting **cold-water fish** and **omega-3 supplements** is virtually mandatory to achieve a healthy **plasma balance** of omega-3s and omega-6s.

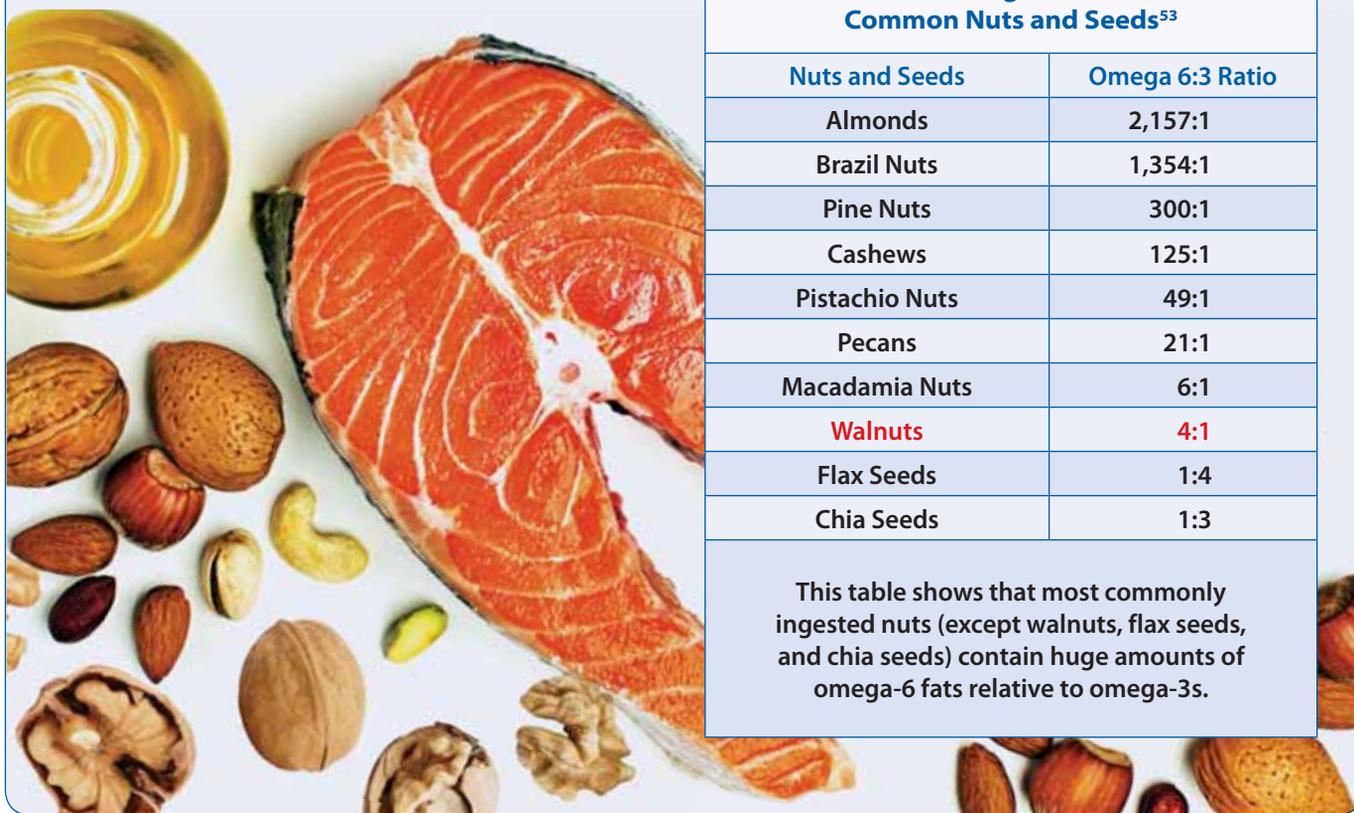
To reiterate, **omega-6 fats** are essential to sustain life and brain function. The dilemma is that even foods perceived as healthier, such as poultry, salad dressings and nuts, are often laden with omega-6 fats.

By offsetting dietary **omega-6** fats with **omega-3-rich foods** and **supplements**, one can enjoy a more diverse diet and still achieve a healthy **plasma balance** of omega-6 to omega-3 fatty acids.

Table 2. Omega 6:3 Ratio of Common Nuts and Seeds⁵³

Nuts and Seeds	Omega 6:3 Ratio
Almonds	2,157:1
Brazil Nuts	1,354:1
Pine Nuts	300:1
Cashews	125:1
Pistachio Nuts	49:1
Pecans	21:1
Macadamia Nuts	6:1
Walnuts	4:1
Flax Seeds	1:4
Chia Seeds	1:3

This table shows that most commonly ingested nuts (except walnuts, flax seeds, and chia seeds) contain huge amounts of omega-6 fats relative to omega-3s.





While Overall Rates of Dementia are Soaring There is a Huge Decline in Dementia Prevalence

FOUR PUBLISHED STUDIES REVEAL:

Dementia
Decline



20% decline (per decade) in **dementia** prevalence (1977-2008)¹

24% decline in expected British **dementia** cases (1991-2011)²

42% decline in **dementia** prevalence in Americans (1982-1999)³

24% decline in **dementia** prevalence in Americans (2000-2012)⁴

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A New Term: "Dementia Prevention"

In the 2019 study that measured levels of **plasma nutrients** in relationship to **brain function**, the term "**dementia prevention**" was used in the introductory text as follows:

*"Accumulating evidence indicates that diet and the many bioactive substances present in food are reasonable interventions to examine for dementia prevention."*²

Readers of this magazine should appreciate that these dietary positions are finally being promulgated by mainstream doctors.

Previous generations of medical professionals and scientists were often adamant that diet and healthy ingredients in food (such as carotenoids, vitamins and omega-3s) had no benefit for cognitive or overall health.

The 2019 published study adds to a growing volume of evidence that healthy **dietary** choices (including specific carotenoids,^{5,54-56} vitamins,⁵⁷ and fatty acids⁵⁸⁻⁶²) can help preserve **brain function** in aging people.

A larger study published later in 2019 examined data on 9,772 adults (up to age 79) and looked for associations between brain structure and vascular risk factors. Except for high cholesterol, they found all of the other

vascular risk factors (smoking, high blood pressure, high pulse pressure, diabetes, and obesity) to be linked to **brain changes** seen in dementia.⁶³

The more vascular risk factors, the poorer brain health. This was evidenced by **MRI imaging** showing greater **brain shrinkage** and less gray and white matter brain tissues.

Remarkable Declines in Dementia Prevalence

Although **dementia** impacts a large group of the aging population, the percent of Americans who lose **functional independence** as a result of dementia has been sharply **declining**, starting around the year 1980.

This is due to an increase in levels of education and better control over **cardiovascular risk** factors. Healthy steps taken to prevent **heart attack** risk also **decrease dementia** risk.

The overall number of Americans afflicted with **dementia** is expected to **triple** by the year 2050.⁶⁴

The **percent** of Americans who lose **functional independence** as a result of dementia, however, has been sharply **declining** starting around the year 1980.

Whether you become a **victim** has a lot to do with your **health behavior patterns**.

Validation of Healthy Lifestyle Behaviors

A study published in the *Journal of the American Medical Association* (2017) found that people who take steps to protect against **heart disease** also reduce their risk of **memory loss, vascular dementia, and Alzheimer's**.⁶⁵

Long-time readers of this publication have been urged to keep blood pressure, LDL cholesterol, glucose, and other **cardiovascular risk** factors (like **homocysteine**) in **low** normal ranges.

The **decreases** in dementia prevalence since year 1980 are a result of people practicing **healthy behavior patterns**. This includes the surging use of **nutritional supplements** that has occurred in recent decades.

Consumption of **fish** meals and **fish oil** supplements has grown exponentially since 1980, as well as intake of homocysteine-lowering **vitamins**.

An article in this month's issue describes how reducing **homocysteine** confers remarkable protective effects against premature **brain aging**.

Life Extension introduced **lycopene** as a dietary supplement (in 1985) and it is now included in a range of nutrient formulas sold by many commercial companies.

Those who follow **healthy lifestyle patterns** are reaping huge rewards by **winning the war** against degenerative **brain aging**.⁶⁶

The 2019 study correlating **higher plasma nutrient** levels with enhanced **brain function** and **cognitive performance** reveals the importance of following **science-based** dietary and supplement practices.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club



Huge Decline in Dementia Prevalence

REASONS FOR LESS DEMENTIA:

- Advances in general education levels
- Reduced tobacco use
- Better control of **cardiovascular risk factors**

Dementia Decline



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Overlooked Dementia Reduction Factors

HEALTHIER LIFESTYLE PATTERNS BEGINNING IN THE 1980S:

- Increased supplement use¹
- Bioidentical hormones^{2,3}
- Improved dietary patterns

Dementia Decline



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Brain Changes in Hypertensive Patients Linked to Mild Cognitive Impairment

A study published in the journal *Hypertension* has further confirmed the impact of **hypertension** on cognition.*

Researchers followed 345 individuals with high blood pressure for almost four years. They determined cognitive function using the Dementia Rating Scale, and they used MRIs to measure changes in the brain.

Study subjects who experienced **marked progression** in *periventricular* white matter hyperintensities had a **six-fold** higher incidence of mild cognitive impairment compared to individuals without this progression. They also experienced a decrease in global cognition.

Numerous studies link hypertension to accelerated brain aging. This study identified specific damage inflicted to the brains of people with high blood pressure over a relatively short time period (less than 4 years).

Editor's Note: Healthy blood pressure is less than **120/80 mmHg**, and **Life Extension®** recommends an optimal target of **115/75 mmHg**. Maintaining an optimal blood pressure may lower the progression of cerebral white matter lesions and result in a lower incidence of mild cognitive impairment.

* *Hypertension*. 2019;73:342–349.

Protective Effect of Fish Oil Supplementation During Pregnancy

Studies have shown that a mother's overeating during pregnancy increases the child's susceptibility, once they reach adulthood, to chronic diseases such as obesity, type II diabetes, and cardiovascular disease.*

Researchers wanted to find out if **fish oil supplementation** during pregnancy could prevent **fatty liver** in the offspring, which occurs when too much fat is stored in the liver cells.

For the study, rats were fed a **cafeteria diet**, which provided them with high-fat, high-salt, and low-fiber foods such as cookies, chips, and processed meat. This diet creates a more accurate model of human **metabolic syndrome** than the traditional high-fat diet used in models of diet-induced obesity.

Some rats received fish oil supplementation during the first half of pregnancy, some received it throughout pregnancy and lactation, and some got no fish oil at all.

The offspring of the rats fed the cafeteria diet without fish oil experienced increases in numerous markers that are indicative of fatty liver. However, these differences **disappeared** in rats whose mothers were supplemented with fish oil.

This study showed that supplementing with fish oil either during the first half of pregnancy, or throughout pregnancy and lactation, prevented **fatty liver** in adult male offspring in rats consuming highly palatable, energy-dense foods that are prevalent in Western society.

Editor's Note: Previous studies had shown that fish oil supplementation during pregnancy could reduce the risk of adult disease in the offspring, but this is the first study to show the protective effect of supplementation during just the first half of pregnancy.

* *Food Chem Toxicol.* 2019 Jan; 123:546-552.



Dry Eye Improvement with Omega-3 Supplementation

Results from a meta-analysis concluded that there was a benefit for supplementation with **omega-3** fatty acids in patients with dry eye disease, reported a study published in the journal *Cornea*.*

Researchers at the University of Bologna, in Italy, selected 17 randomized trials that evaluated the effects of omega-3 fatty acid supplementation in 3,363 participants with dry eye.

Subjects included men and women with dry eye disease caused by meibomian gland dysfunction, visual display terminal use, Sjögren syndrome, contact lens wear, rosacea and unspecified causes. Average follow-up periods ranged from one to 12 months.

In a pooled analysis of all participants, **omega-3** fatty acid supplementation was associated with a reduction in dry eye symptoms and corneal fluorescein staining (an indicator of corneal abrasion) in comparison with a placebo. Tear breakup time and Schirmer test values (a measure of tear production) increased in association with omega-3.

Editor's Note: "Based on current evidence available, omega-3 fatty acid supplementation may be recommended in clinical practice for treatment of this condition," the authors concluded.

* *Cornea*. 2019 May;38(5):565-573.



Scientists Call for More Consistent Radiation Doses from CT Scans

Computed tomography (CT) scans are beneficial because they help diagnose a range of conditions, but the **radiation** from CT scans is associated with an increased risk of cancer.* This makes it important to use the smallest radiation dose possible.

Studies have shown that radiation doses from CT scans vary widely. In many cases, they can be reduced by **50%** or more without reducing quality or accuracy.

To find out the underlying reasons for the variation, researchers analyzed more than **two million** CT scans from 151 institutions across seven countries.

They found that **how the scanners were used by the medical staff** was the primary factor responsible for the wide variation in radiation doses, as opposed to differences in the patients scanned, the specific machine used, or the type of institution using it.

Editor's Note: This study indicates that it is possible to establish more consistent radiation dose standards. Doing so will help ensure that patients aren't exposed to unnecessary radiation risks. When a CT scan is needed, ask for the lowest radiation intensity to be used.

* *BMJ*. 2019 Jan 2;364:k4931.

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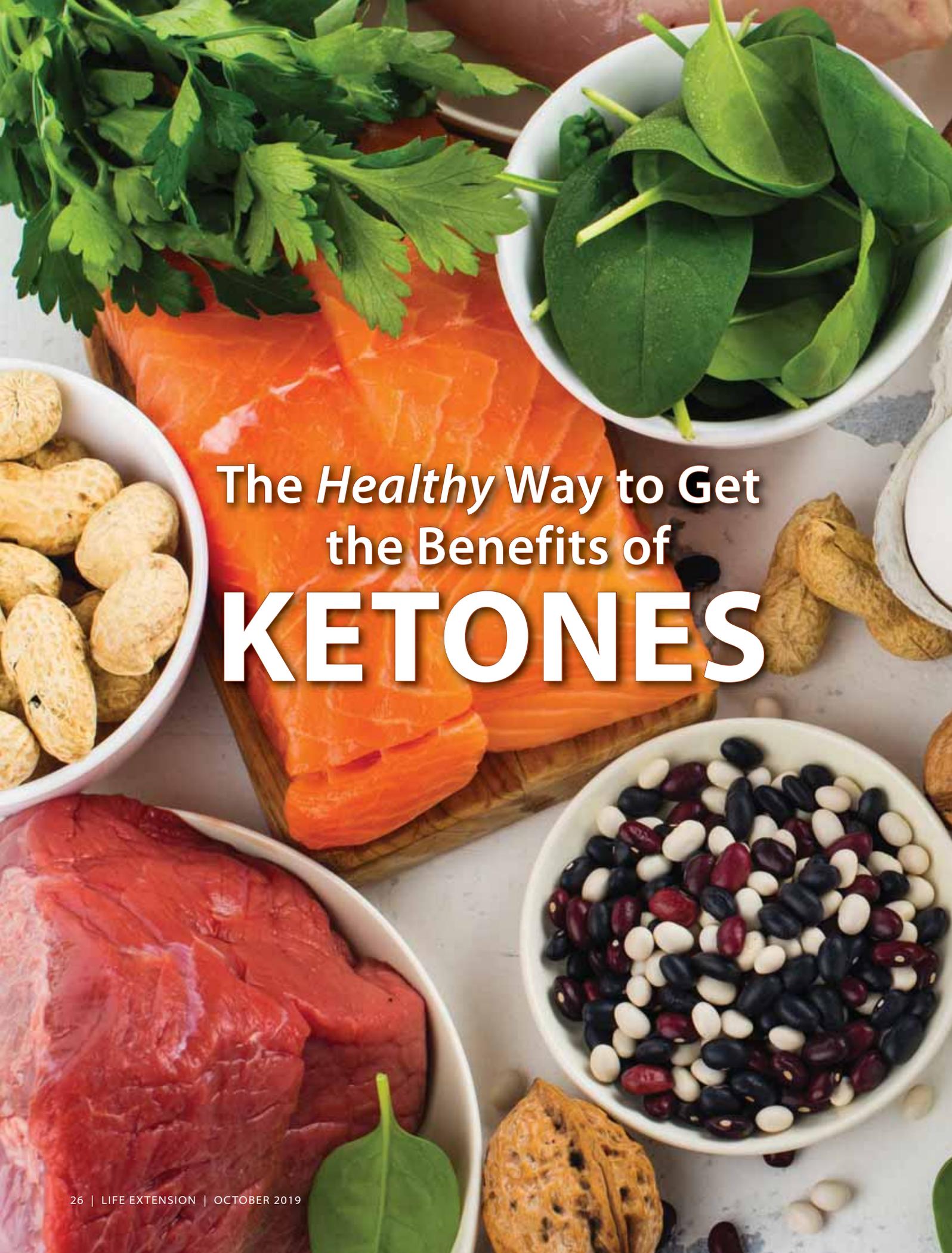


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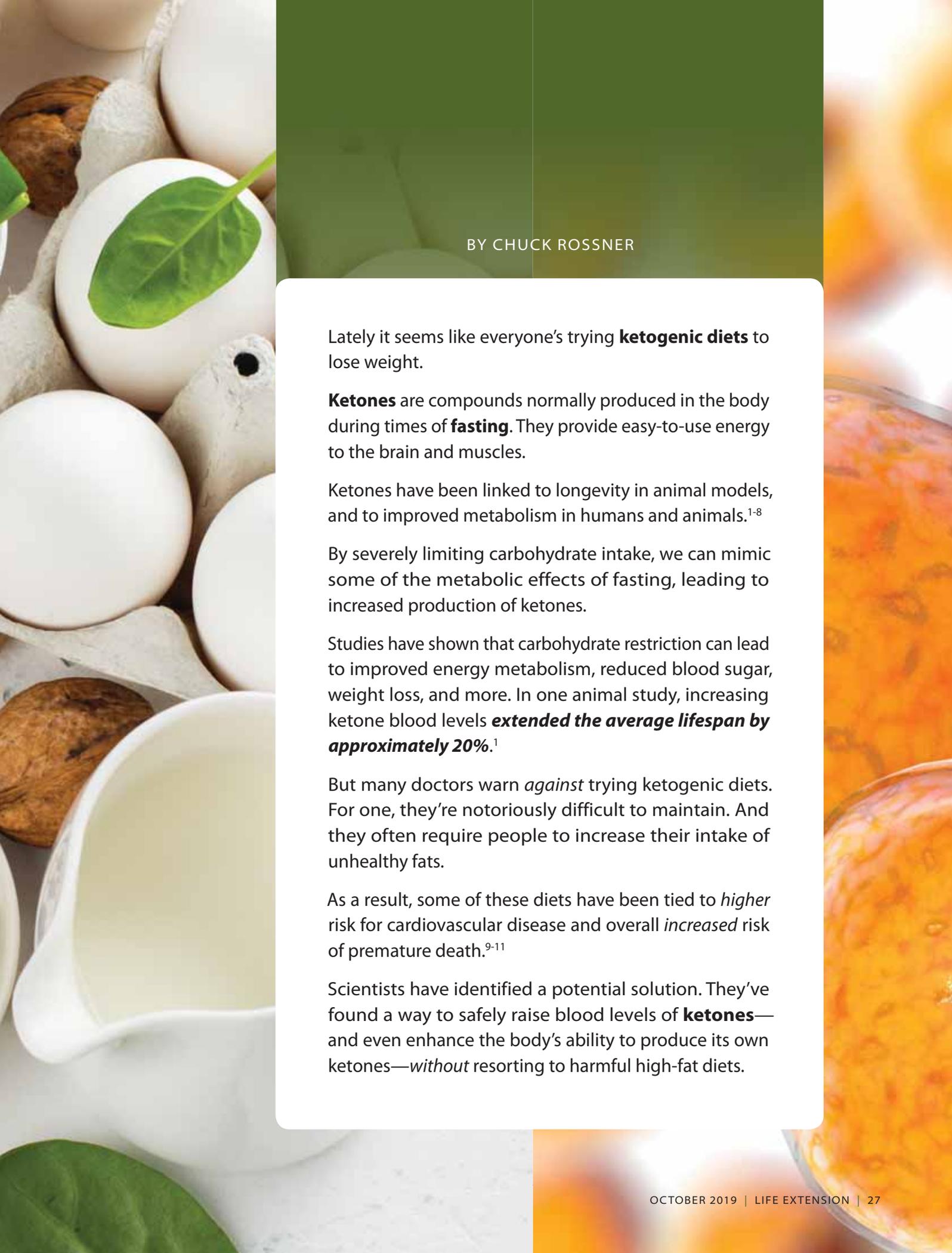
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A top-down view of various healthy ingredients. In the center is a large piece of fresh salmon on a wooden board. To its right is a white bowl filled with fresh spinach leaves. To its left is another white bowl containing almonds. Below the salmon is a white bowl with a mix of black, red, and white beans. In the bottom left corner is a white bowl with a piece of cooked salmon and a single spinach leaf. Scattered around are walnuts and other nuts. The background is a light-colored surface.

The *Healthy* Way to Get
the Benefits of
KETONES



BY CHUCK ROSSNER

Lately it seems like everyone's trying **ketogenic diets** to lose weight.

Ketones are compounds normally produced in the body during times of **fasting**. They provide easy-to-use energy to the brain and muscles.

Ketones have been linked to longevity in animal models, and to improved metabolism in humans and animals.¹⁻⁸

By severely limiting carbohydrate intake, we can mimic some of the metabolic effects of fasting, leading to increased production of ketones.

Studies have shown that carbohydrate restriction can lead to improved energy metabolism, reduced blood sugar, weight loss, and more. In one animal study, increasing ketone blood levels **extended the average lifespan by approximately 20%**.¹

But many doctors warn *against* trying ketogenic diets. For one, they're notoriously difficult to maintain. And they often require people to increase their intake of unhealthy fats.

As a result, some of these diets have been tied to *higher* risk for cardiovascular disease and overall *increased* risk of premature death.⁹⁻¹¹

Scientists have identified a potential solution. They've found a way to safely raise blood levels of **ketones**—and even enhance the body's ability to produce its own ketones—*without* resorting to harmful high-fat diets.

What Are Ketones?

Glucose, largely derived from carbohydrates, is the standard energy source for most cells.

In times of prolonged fasting, when glucose is low, the liver is forced to produce an alternative fuel source, **ketones**, which it makes from stored fats.

Science has found that ketones offer advantages over glucose. They're more energy efficient¹² and are effective energy sources for tissues with high metabolic rates like the **brain** and **muscles**.

Even more important, they've been linked to **increased longevity** in animal models and **improved metabolism** in human and animal studies.¹⁻⁸

Two of the principal ketones are **acetoacetate** and **beta-hydroxybutyrate** (BHB). These compounds can be broken down by cells to provide energy.

BHB, created from fatty acids in the liver, not only regulates energy expenditure, it also helps modulate metabolism.

Ketones are superior to other fuel sources for two main reasons:^{1,2,4,8}

1. Unlike carbohydrates, ketones do not raise blood glucose levels and do not stimulate insulin secretion.
2. Ketones require less processing than glucose to harness their energy. That means they consume less NAD⁺ in their metabolism, leaving more of it circulating in the body.¹³ NAD⁺ helps repair damaged DNA, and slow certain aging processes.

Ketones aren't just an alternative fuel source. They change our metabolism, mimicking many of the beneficial effects of caloric restriction, and intermittent-fasting diets. That reduces risk factors for metabolic disease, diabetes, and cardiovascular disease.^{3,4}

In addition, ketones have recently been discovered to be important **signaling compounds**, activating longevity pathways that protect cells from age-related damage and deterioration.^{1,2,5-8}

Increased Longevity

Ketones provide life-extending effects similar to those attributable to caloric restriction and fasting,^{1,2,8,14} including maintaining protective levels of NAD⁺ in cells.

NAD⁺ is critical for vital cellular processes. **Sirtuins** are proteins in cells that have lifespan-extending properties. **Sirtuins** require NAD⁺ to function properly.

In animal studies, increasing ketone levels in the body leads to higher levels of NAD⁺ and a boost in sirtuin function.² This reduces damage to DNA, which is associated with age-related disease and dysfunction.

For example, in one study¹ of the roundworm *C. elegans*, a common model organism for research on longevity, supplementing its diet with the ketone **beta-hydroxybutyrate** increased the average lifespan by approximately **20%**.

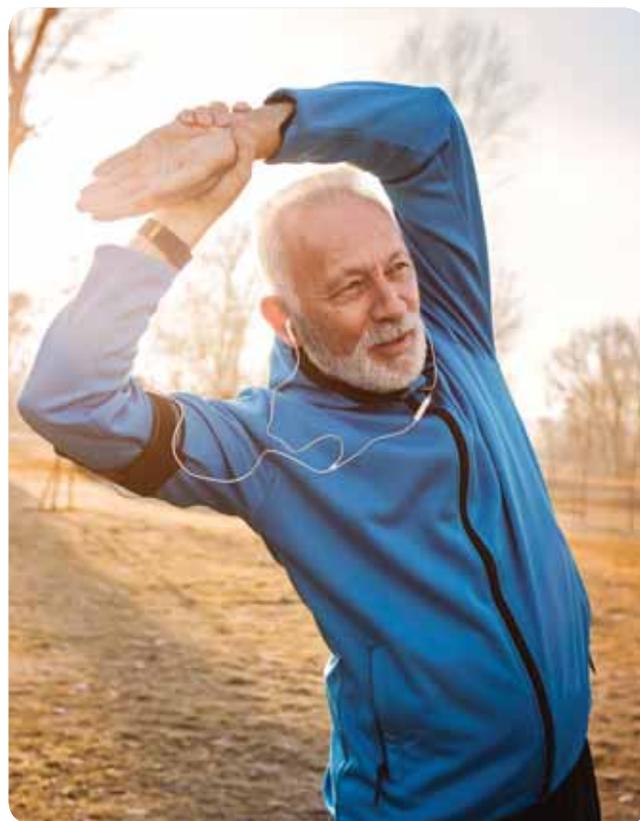
This effect has also been shown in mammals. In aging mice, diets that boost blood ketone levels extend lifespan by approximately **14%**.⁷ Even more importantly, ketones prolong *healthy* life, or **healthspan**.^{7,14}

Improved Metabolic and Physical Health

Using ketones as an energy source **improves** our **metabolism**, reducing risk factors for cardiovascular disease, diabetes, and other conditions. It also provides a potent fuel to muscles to enhance physical fitness.

In one study, rats were fed a diet in which **30%** of calories were derived from ketones.³ This caused a *reduction* in cholesterol *and* triglyceride levels.

The rats also showed a boost in physical ability: They ran an average of **32%** farther on a treadmill than rats fed a regular diet over a five-day period.





The metabolic benefits of ketones have been demonstrated in humans as well.

A study recently published in *The Journal of Physiology* found that healthy, young adults given a ketone supplement showed improvements in metabolism during an oral glucose tolerance test.⁴ After ketone supplementation, **beta-hydroxybutyrate** levels went up, total blood glucose elevation during the oral glucose tolerance test was lower, fatty acid levels decreased, and insulin sensitivity improved by about **11%**.

These findings suggest that acute ketone supplementation may improve markers of metabolic response to an oral glucose load.

A Boost in Brain Health

Ketones are easily used by the brain as a fuel source. Not only can this improve brain function, it can also have a **neuroprotective** effect, shielding against age-related cognitive decline.

In roundworms, the ketone **beta-hydroxybutyrate** helps protect against the harmful effects of two abnormal proteins that contribute to the development of **Alzheimer's** and **Parkinson's** disease.¹

In aging mice, memory and other cognitive functions are preserved and improved through dietary enhancement with ketones.^{3,7,14}

This link between ketones and brain function carries over to humans. People with **Alzheimer's disease**, the most common form of dementia, tend to have *lower* blood levels of ketones.¹⁵

Boost Ketones Without a Risky Diet

- **Ketones** are compounds produced by the liver during times of fasting or extremely low carbohydrate intake.
- Ketones are used as an alternative fuel by the brain and muscles. They also activate pathways linked to lifespan and health-span extension.
- The **ketogenic diet** stimulates ketone production but requires extremely high fat intake that has harmful health consequences.
- Safer alternatives directly supply ketones that can be absorbed and used by the body. **Beta-hydroxybutyrate** regulates energy expenditure and helps modulate metabolism. **Mangiferin** and a **resistant starch** also boost the body's ability to make its *own* ketones.
- It is now possible to obtain the benefits of ketones without the difficulties and downsides associated with prolonged fasting or the **ketogenic diet**.

In people with cognitive dysfunction, the brain's ability to use glucose as a fuel appears to be impaired.

A study published in *The Neurobiology of Aging* explored whether raising blood levels of the ketone **beta-hydroxybutyrate**, an alternative fuel, could improve their brain function.¹⁶

Subjects with Alzheimer's or mild cognitive impairment, a common precursor to Alzheimer's, were given a supplement drink that raised blood **ketone** levels. The increase in ketones in most study subjects correlated with **improvements in cognitive function**, particularly memory.¹⁶

Issues with the Ketogenic Diet

One way to raise ketone levels is by forcing the body to create more of them. That's the goal of the popular **ketogenic diet**. Severely restricting carbohydrate intake and replacing those calories with a large amount of fat makes the liver pump out ketones.

But there are several downsides to this strategy:

- Eliminating carbs means dramatically reducing intake of fruits, vegetables, and whole grains. These foods are a source of dietary fiber, which is critical for digestive health. Insufficient fiber has been linked to **gastrointestinal disorders** and **colorectal cancer**.^{17,18}
- Very low carbohydrate intake has been linked to **premature mortality**.¹¹
- A high-fat diet can cause elevated triglycerides, other lipid abnormalities, and detrimental metabolic changes, all risk factors for **cardiovascular disease**.^{10,19}
- In people on a ketogenic diet, the risk of **atherosclerotic plaque** development in arteries, which often leads to cardiovascular disease, may be increased.⁹

- High-fat, low-carb diets can negate or even *reverse* the brain benefits of ketones, leading to deterioration in attention, processing speed, and mood.¹⁰

In other words, the potential problems of the ketogenic diet may outweigh the benefits. It is *not* recommended for people unless they have a specific medical condition for which it is indicated.

Raise Ketones the Healthy Way

Scientists recently set out to create a healthier way to raise ketone levels without the risks of the ketogenic diet or prolonged fasting.

They accomplished this by combining the ketone **beta-hydroxybutyrate** with two other nutrients that aid in the body's ketone production.

When ingested orally, **beta-hydroxybutyrate** is easily absorbed into the bloodstream, providing the same benefits as ketones produced by the liver. **Beta-hydroxybutyrate** can increase blood levels to the range typically induced by a ketogenic diet.²⁰

Mangiferin is a compound found in plants, especially mangos—hence the name. It has been shown to help spur the production of more ketones by the body.

In one randomized trial, researchers demonstrated that **150 mg** of mangiferin per day significantly increased blood levels of ketones, presumably by stimulating the liver to boost production of them.²¹

In response to **mangiferin** supplementation, **beta-hydroxybutyrate** increased by about **18%** and acetate levels increased by approximately **10%**.

A **resistant starch**, like cassava, is a complex carbohydrate that is not efficiently broken down by our digestive enzymes.²²



Benefits of “Resistant Starch”

Other forms of starch are broken down into simpler carbohydrates, which raise blood sugar levels after a meal, triggering insulin secretion.

Because they are *not* digested rapidly by humans, resistant starches do *not* raise blood glucose or cause an insulin response.

Besides being a source of fiber, **resistant starches** have several other beneficial effects. They help support healthy gut bacterial growth, promote a feeling of fullness, increase insulin sensitivity, and preserve lean body mass.²³

Resistant starches also enhance the body’s production of **butyrate**, which is used to make more ketones, and to stimulate many of the same longevity-promoting pathways as ketones.^{5,24,25}

Summary

Ketones are an alternative fuel for our cells, with several advantages over **glucose**.

Normally produced by the liver during fasting, ketones are quicker and easier to metabolize than glucose and provide a **potent energy source** for the brain and muscles.

They also activate pathways tied to **improved healthspan** and **longevity**.

The most popular ways to increase production of ketones are by prolonged **fasting** or the **ketogenic diet**. High fat **ketogenic diets**, however, are potentially dangerous, negating the benefits of the increased ketones.

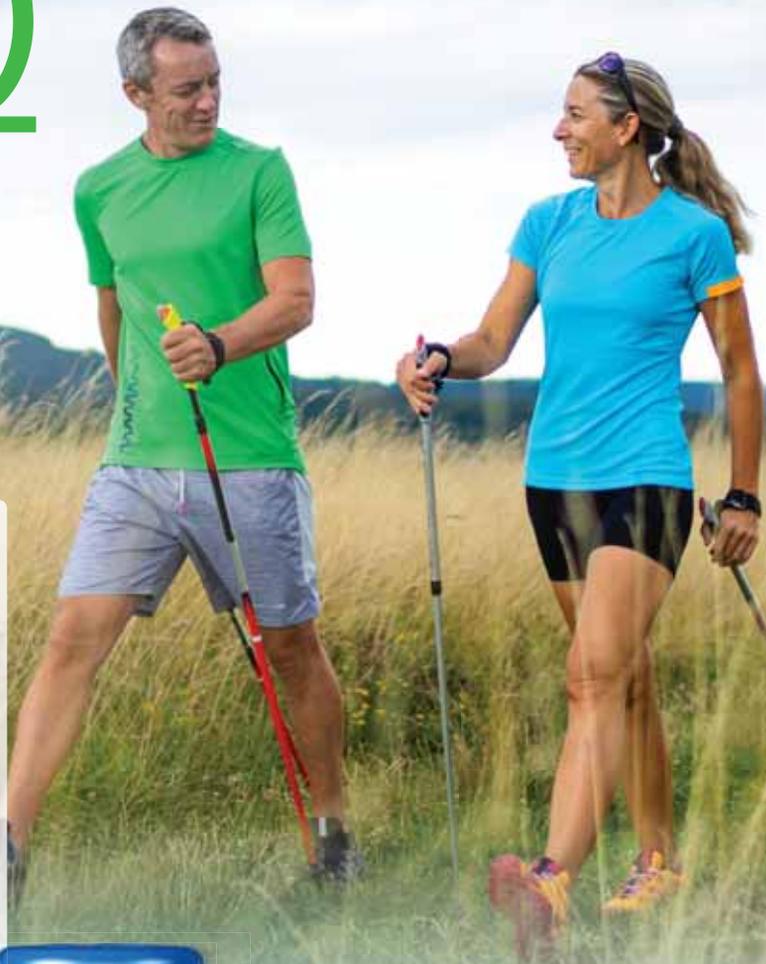
Scientists have now developed a safer alternative that directly supplies beneficial ketones *and* boosts the body’s ability to produce ketones. It does so without the harmful effects of ketogenic diets. ●

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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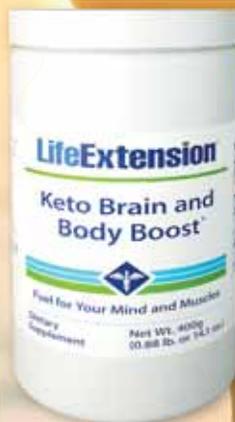
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RHODIOLA

Combats “Burnout” Syndrome

BY STEPHANIE STEVENS

Burnout is real.

In May 2019, the *World Health Organization* officially included it in its **International Classification of Diseases**.

This recognition confirmed that burnout was not a figment of the imagination, or something suffered only by “weak” or “unmotivated” people.¹

Medical treatments are limited. The Mayo Clinic recommends sleep and relaxation.²

But now there’s hope for the **30% to 72%** of working people who suffer from **burnout syndrome**.^{3,4}

In a recent, human trial, patients who took an extract of the herb **Rhodiola** had deep reductions in burnout symptoms **in just one week**.

That included a decrease in feelings of overload, tension, fatigue, and overall stress.

At the same time, **Rhodiola** led to *improvements* in high-level cognition and decision-making.⁵

This recent clinical trial plus *prior* studies show this **low-cost** plant extract provides a much-needed approach to **burnout syndrome**, which may encompass many aspects of normal **aging**.

The Truth About Burnout

Workplace stress is increasing around the world.⁶

The combination of work-related pressure, fatigue, and exhaustion has long been referred to, informally, as **burnout**. But until 2019, it had no official definition.

That changed with the recognition of occupational **burnout**, in the newest version of the International Classification of Diseases, as "**a syndrome...resulting from chronic workplace stress that has not been successfully managed.**"¹

The definition lists three symptoms of burnout:¹

- Feelings of low energy or **exhaustion**,
- Increased mental "distance" from one's job, or feelings of negativity or **cynicism** about the job, and
- Reduced professional **efficacy** (the ability to get a job done well).

Practically every working person is at risk for burnout. Rates run from **30%** in teachers and medical students to as high as **72%** among some highly-stressed professionals.^{3,4,6}

But because burnout wasn't even considered a real syndrome until recently, few treatments were available.

What Is Rhodiola?

Rhodiola rosea is an herb that grows in cold, mountainous regions of Europe and Asia.

Its roots are rich in beneficial compounds, including a group of substances with a wide variety of health benefits called **phenylpropanoids**. These include **rosavin**, **rosin**, and **rosarin**, that are found *only* in Rhodiola.⁵

Rhodiola root is known as an **adaptogen**, a plant that helps the body adapt to and resist physical, environmental, and oxidative **stress**.^{5,7}

Dried Rhodiola extract has been used for centuries to relieve stress and reduce fatigue.^{5,8,9}

Unlike drugs that stimulate the central nervous system, Rhodiola can enhance performance without a later "crash," or loss of work capacity.¹⁰⁻¹² Indeed, Rhodiola provides both emotional stabilization *and* mental stimulation.

Rhodiola Relieves Burnout

Burnout is brought on and exacerbated by **stress**. Because Rhodiola contains proven *anti-stress* properties,^{9,13-15} researchers decided to test whether it could relieve burnout syndrome.⁵

In a first-ever clinical trial exploring the impact of Rhodiola on burnout, Austrian researchers enrolled outpatients aged 30-60 who suffered from burnout symptoms.⁵



Patients were given **200 mg** of Rhodiola extract **twice daily** for three months. The 68 subjects who completed the study were assessed before starting, again on day seven, and at weeks four, eight, and 12.⁵

The study showed **significant decreases** in scores on a standard burnout measure over the course of the study.⁵

Self-reported symptoms of **stress** fell sharply in all seven categories measured, with the steepest decline in the **first week** of the study.

On a **Perceived Stress Questionnaire**, subjects showed significant improvement in all of the following categories:⁵

- Overall stress score
- Fatigue
- Feeling harassed
- Irritability
- Lack of joy
- Overload
- Tension
- Worry

Significant improvements were also seen in **sex life** and on a **Patient Sexual Function Questionnaire**, including ability to become aroused, frequency of sexual activity, ability to reach orgasm, and overall satisfaction with sex life.⁵

These findings are vital for sufferers of burnout, whose sexual enjoyment is often impaired, leading to more stress.¹⁶

Unlike anti-anxiety medications that can leave users with confusion or trouble concentrating, Rhodiola extract led to significant *improvements* on a test that assessed **executive function** (high-level cognition, decision-making, and sorting), that is impaired by burnout.¹⁷

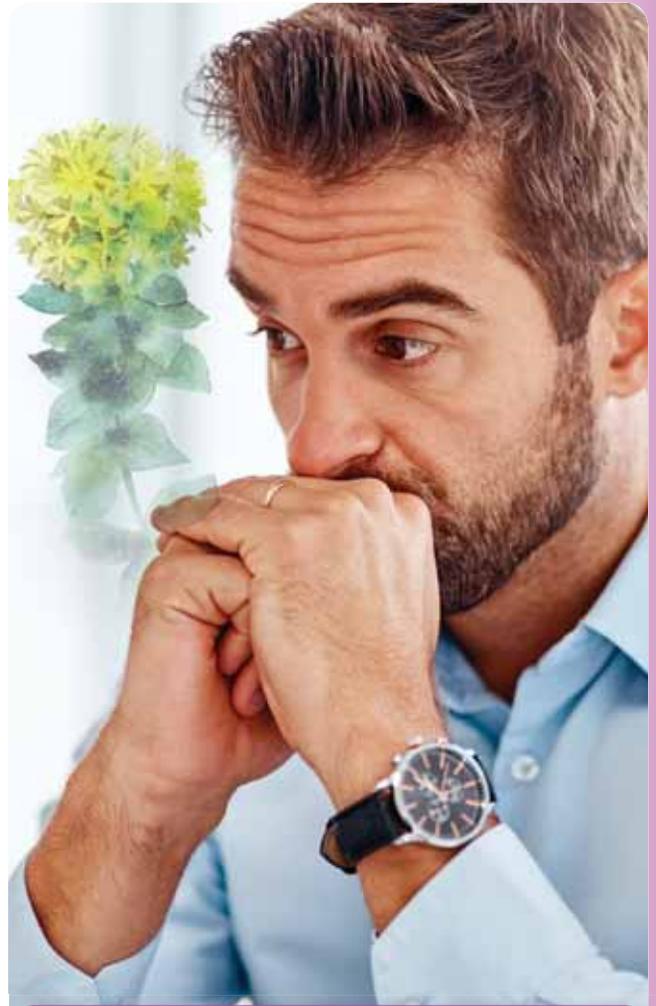
It also boosted overall **mood**, including feelings of alertness *and* calmness.⁵

Reducing Stress

A study showed for the first time that Rhodiola extract can ease the symptoms of **burnout**.

Many *past* studies have demonstrated that Rhodiola is an effective **stress** reliever.

Stress is a reaction to external threats or pressures, marked by symptoms of exhaustion, energy loss, irritability, and tension.⁹ Untreated **chronic stress** underlies burnout.



Battling Burnout

- **Burnout** is marked by feelings of workplace stress, frustration, and job dissatisfaction.
- A new study shows that an extract of the herb *Rhodiola rosea*, long used to relieve stress, safely and effectively reduces the symptoms of burnout.
- People with burnout who took **200 mg** of Rhodiola extract **twice daily** felt less tense and exhausted, and performed better on tests of executive function.
- Rhodiola extract is approved for stress relief by the European Committee on Herbal Medicinal Products and is an ideal therapeutic intervention for stress-related burnout.



Most anti-anxiety drugs come with undesirable side effects and potential for addiction. But studies conducted over the past decade have established that Rhodiola has an excellent safety profile, with no serious side effects of any kind.^{5,9,18}

Rhodiola rosea, an adaptogen approved by European authorities for use in stress, has been shown to be effective in reducing its symptoms.

In fact, because of its documented ability to safely **reduce the release of stress hormones** like cortisol, while also **boosting energy**,^{9,12,19} Rhodiola is now the main adaptogen approved for stress relief by the European Medicines Agency's Committee on Herbal Medicinal Products.

One clinical study revealed that doses of **200 mg twice daily** result in a significant reduction in stress symptoms.¹⁸ In another study, Rhodiola extract significantly reduced stress-related fatigue while increasing mental performance, especially the ability to concentrate.¹⁹

Summary

Burnout has officially been included by the *World Health Organization* in its **International Classification of Diseases**.

An extract of the herb *Rhodiola rosea*, an **adaptogen** approved by European authorities for use in stress, has been shown to be effective in reducing its symptoms.

People who took **200 mg** of Rhodiola extract **twice daily** for three months experienced improvements in all three main symptoms of burnout: exhaustion, cynicism, and lack of efficacy.

Rhodiola's burnout-fighting properties are tied to its ability to lower stress, which may be due in part to its ability to decrease excessive levels of the stress hormone cortisol.

In the recent study of burnout and Rhodiola, subjects also saw improvements in how well their brains functioned.

People feeling stressed and burned out now have hope, because this natural plant extract has been proven to help. ●

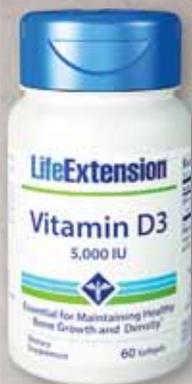
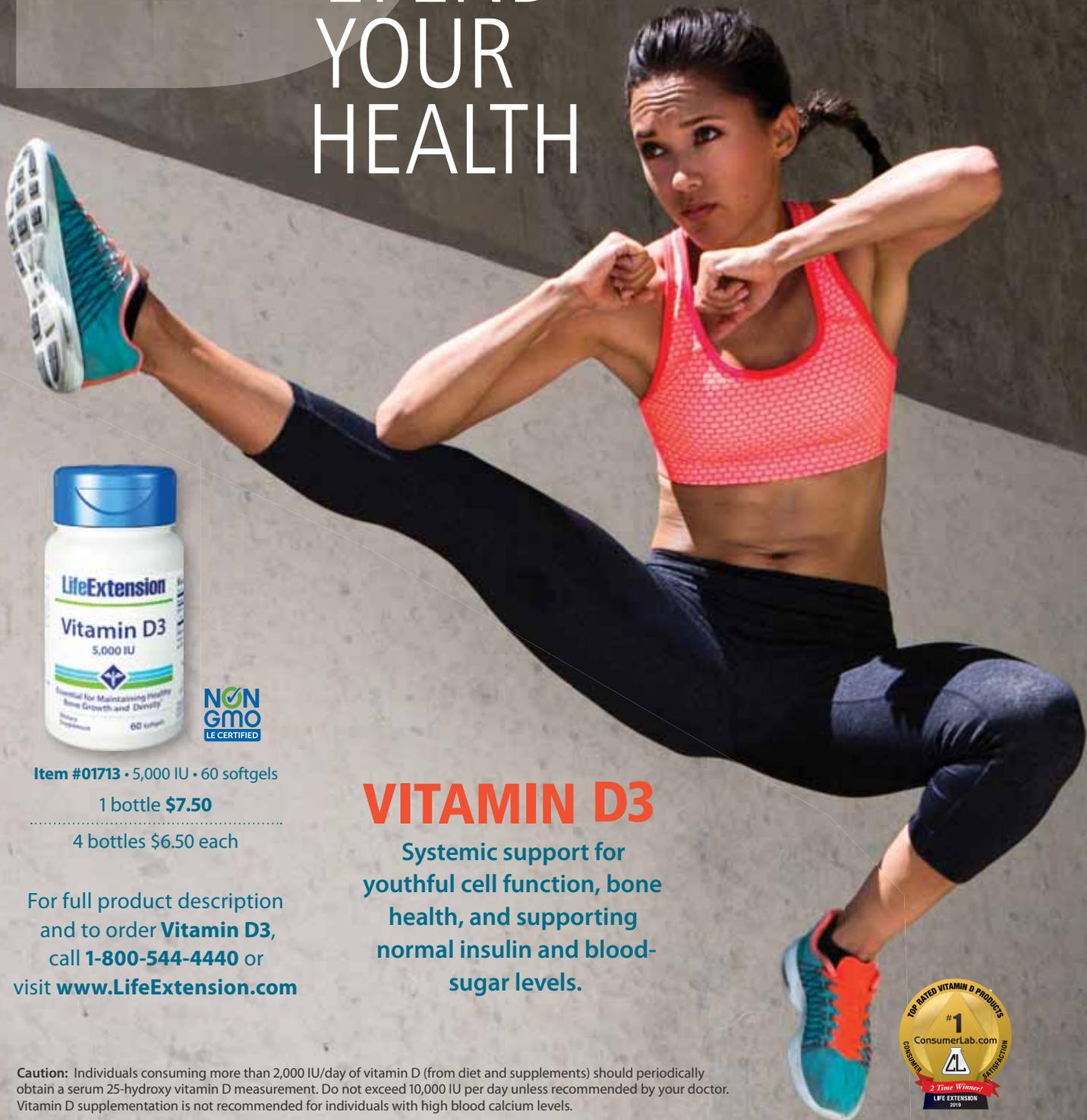
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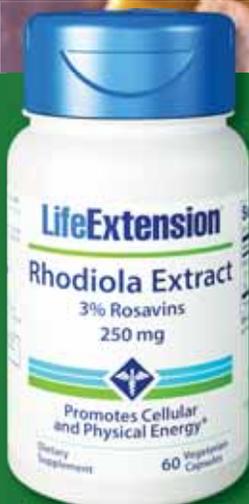
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Clove Extract *Lowers* Blood Sugar

BY LINDA CARRINGTON

When our ability to metabolize **blood sugar** breaks down, it sets off a cascade of harmful events that accelerates systemic **aging**.

Even “high normal” blood sugar raises **heart disease** and **stroke** risk.¹⁻³

This loss of **glucose** control motivated scientists to evaluate whether an extract from **cloves** can *lower* elevated blood sugar (glucose).

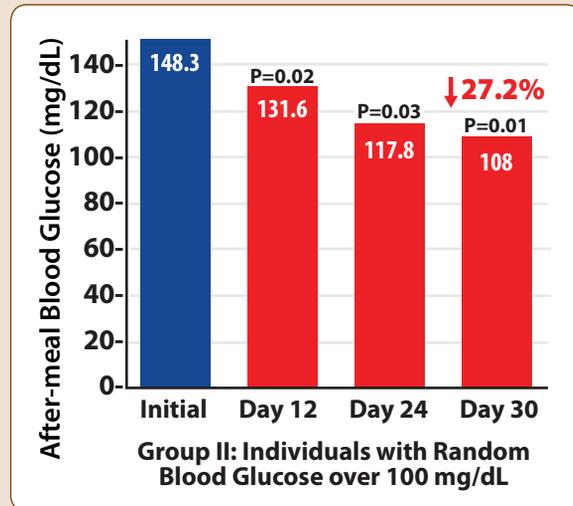
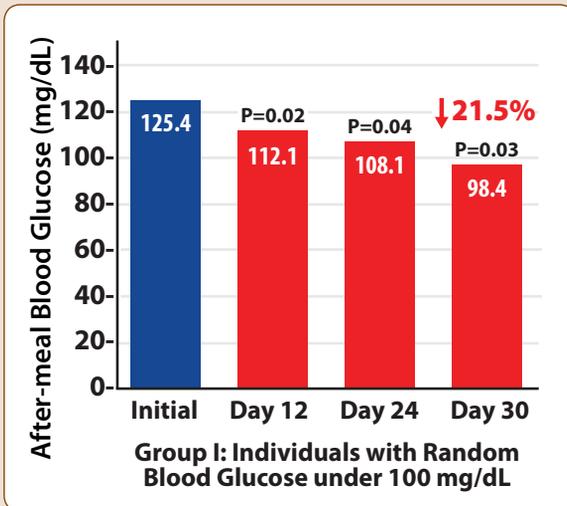
In a pilot study, a standardized **clove extract** was tested on healthy people and those with **prediabetes**.

The study results found lower **after-meal** blood sugar in healthy adults and prediabetics supplemented with polyphenol-rich **clove extract**.⁴

In the **prediabetic** part of the study, **fasting glucose** levels were also lowered in the clove-supplemented participants.

These findings indicate that a standardized **clove extract** can benefit aging individuals who have less-than-optimal **glucose** control.

This is especially important for **prediabetics**, who often suffer high **after-meal** glucose for years before the onset of type II diabetes or diabetic complications.

Clove Extract Reduces *After-Meal* Blood Glucose in Humans

Two groups of people were studied for 30 days. **Group I** had normal after-meal glucose. **Group II** had high after-meal glucose. Daily intake of **250 mg** of clove extract reduced after-meal glucose levels by **21.5%** in Group I and by **27.2%** in Group II.



Cloves

On day one, individuals ate a standard lunch immediately after the blood draw, and then right after lunch, all were given a **250 mg** capsule of **clove extract**. After two hours, a post-meal glucose measurement was taken. This pattern was repeated daily for 30 days, with pre- and post-meal glucose measurements taken on days 12, 24, and 30.

The results found that in those with **normal fasting glucose**, clove supplementation had no impact on **fasting glucose** (before-meal) sugar levels.

But in the **prediabetic group**, clove extract caused **significant reductions in pre-meal (fasting)**

glucose on days 24 and 30. This suggests that clove extract could help maintain normal blood sugar levels throughout the day in people with **prediabetes**—those at highest risk for cardiovascular events and for developing type II diabetes.⁴

In both study groups, **clove extract** significantly lowered *after-meal* blood sugar levels.

The average reduction in post-meal sugar levels over the 30-day study was **21.5%** (from **125.4 mg/dL** to **98.4 mg/dL**) in the healthy group, and **27.2%** (from **148.3 mg/dL** to **108 mg/dL**) in the prediabetes group.⁴

These results are impressive for several reasons. Unless one severely restricts the type and amount of food/drink ingested, there is an *after-meal* spike in blood **glucose** that silently inflicts cellular damage.

In those with higher *after-meal glucose* surges, the damage translates into increased risks of disorders associated with **prediabetes**. This includes micro-vascular complications such as neuropathy (burning feet), retinopathy (vision loss), and kidney impairment.

Prediabetic **glucose surges** also increase macro-vascular damage that results in coronary and cerebral artery disorders that cause **heart attack** and ischemic **stroke**.

Maqui Berry Provides Additional Support for Glucose Control

In looking for plant-based solutions to reducing the risks of high blood sugar, researchers have also identified additional benefits of the **maqui berry**.

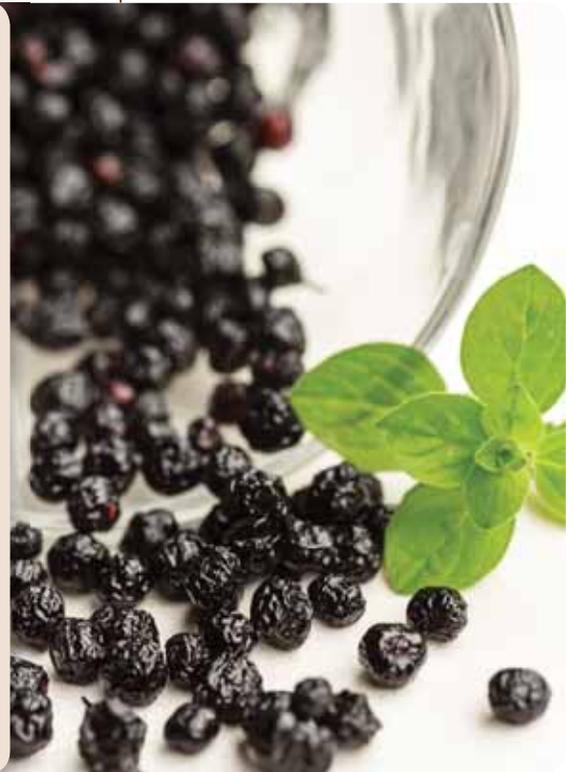
Maqui-berry extract has been shown to lower **after-meal** rise in both **glucose** and **insulin**.

Standardized extracts of **maqui berries** can deliver healthy polyphenolic compounds known as **delphinidins**.

Delphinidins *stimulate* a peptide that lowers postprandial (after-meal) blood **glucose** and can have a moderating influence on **insulin** spikes.²⁵

Maqui berry extract has also been shown to slow the rise of after-meal **insulin** levels.²⁶

In a separate study, standardized **maqui berry extract** showed promise in reducing **hemoglobin A1c** (HbA1c). **Hemoglobin A1c** levels declined at 60 days, and by 90 days, this marker of long-term glucose control (HbA1c) was down by **0.3%** from **5.65%** to **5.35%**.²⁷



How Cloves Work

Scientists added **polyphenol-rich clove extract** to cell cultures in a lab to study cell-level effects of the supplement.⁴

Clove extract was found to work through **three** different mechanisms as follows:⁴

- **Enhanced glucose uptake** into muscle cells by up to **63%**, providing them with metabolic fuel and removing sugar from circulation.
- **Inhibition of glucose production** in liver cells, an important site where excess sugar is released (gluconeogenesis).
- **Inhibition of two digestive enzymes** (alpha-glucosidase and alpha-amylase) from releasing glucose from compounds such as sucrose (table sugar) and starch.

These findings reveal how this **clove extract** can:

- Protect against *after-meal* blood sugar spikes in normal and prediabetic people,
- Decrease fasting glucose in prediabetics, and
- Increase glucose consumption by muscle cells.

No currently available drug can accomplish this.

Summary

Scientists have discovered that **extracts of cloves** have immediate and lasting impacts on blood sugar.

They slow glucose uptake from the intestine, reduce new glucose production in the liver, and boost glucose consumption by muscle cells—all actions that help lower blood sugar.

In a **2019** published study, **250 mg** of a **polyphenol-rich clove extract**, taken daily after lunch, significantly reduced *after-meal* glucose spikes in healthy and prediabetic people. After-meal glucose spikes are closely associated with cardiovascular disease.

The extract also lowered *pre-meal* sugar levels in prediabetics, protecting them from chronic blood sugar elevations that can lead to type II diabetes.

But clove extracts didn't lower *pre-meal* glucose in subjects with normal sugar levels, avoiding dangerous drops associated with some anti-diabetes medications.

Taking a daily **250 mg** clove extract before a meal with the most starches or sugars has the potential to help maintain healthy glucose metabolism. ●

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

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A Word of Caution for Those Using Blood Glucose Lowering Drugs

The findings presented in this article should be of interest to anyone concerned about blood sugar levels.

Life Extension believes that an optimal fasting blood glucose should be less than **86 mg/dL**.

The risk of hypoglycemia (low blood sugar) increases with intensive glycemic control.

Individuals currently receiving medications to control blood sugar should consult their doctor before adding ingredients like clove extract and should closely monitor their blood sugar levels.

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Lower HOMOCYSTEINE to Slow Brain Aging

BY SUSAN LANE

As baby boomers age past 65 years, record total numbers are afflicted with **dementias** that cause loss of mental faculties.

Alzheimer's, Parkinson's, and mild cognitive impairment are all associated with **brain aging**.

While these disorders have different causes, new studies reveal *one factor* that can contribute to them *all*—a high blood level of **homocysteine**.

Excess **homocysteine** has long been associated with poor **cardiovascular** health.

Recent research shows that by impeding brain **blood flow** and inflicting cell damage, **homocysteine** contributes to **cognitive deficits** and various forms of **dementia**.

The solution is simple.

Check **homocysteine** levels with a **blood test**.

If elevated, add more bio-active **B-vitamins** to your supplement program.^{1,2}



Homocysteine and Degenerative Brain Aging

The link between high homocysteine blood levels and increased **Alzheimer’s** and **vascular dementia** risks was demonstrated 20 years ago.^{3,4}

Since then, clinical studies continue to reveal that homocysteine contributes to degenerative **brain aging**.

In **2018**, using two decades of data, a group of experts published an international Consensus Statement in the *Journal of Alzheimer’s Disease*. They concluded that elevated homocysteine is:

“...a modifiable risk factor for development of cognitive decline, dementia, and Alzheimer’s disease in older persons.”⁵

In other words, if we *reduce* high homocysteine, we’ll likely slow **brain aging**.

How Homocysteine Speeds Brain Aging

Homocysteine damages the brain via:⁶⁻¹³

- Chronic **inflammatory** reactions,
- Formation of **atherosclerotic plaque** that obstructs blood flow,
- **Shrinkage of brain** areas like the **hippocampus** that are involved in memory formation,

- Development of the **neurofibrillary tangles** and **beta-amyloid** plaque that trigger cell death, and
- Hindrance of normal **DNA repair** needed for brain cell maintenance.

The link between **high** homocysteine and **vascular dementia** has been clear for several years.

Vascular dementia arises when blood vessels narrow, leading to diminished blood flow to vital brain areas.

Studies have shown that elevated homocysteine is associated with a **4.2-fold** to **10.5-fold** increased risk for **vascular dementia**.^{14,15}

New studies **published in 2019** also connect homocysteine levels to accelerated brain aging in **Alzheimer’s** and **Parkinson’s diseases**. Among their findings:

- **Alzheimer’s** patients have elevated homocysteine levels that correlate with the degree of cognitive impairment. Higher homocysteine levels are associated with delusion, agitation/aggression, and depression.¹⁶
- **Parkinson’s** disease patients with the *highest homocysteine* levels showed abnormal areas associated with poor brain blood flow.¹⁷

Homocysteine and Heart Disease

Back in 1981, *Life Extension*[®] urged readers to keep homocysteine levels low to protect against **heart attack** and **stroke**.

More than 38 years ago, researchers discovered that **homocysteine** was harmful to the **endothelium**, the lining of blood vessels throughout the body, impairing the endothelium's ability to respond to changes in blood flow and pressure.^{18,19}

These injuries accumulate, resulting in the development of **inflammatory plaque** that reduces, and eventually blocks, blood flow through the vessel. If that vessel is in the heart or brain, a catastrophic heart attack or stroke could occur.

High homocysteine has been identified as an **independent risk factor** associated with **atherosclerosis** and its consequences, raising the likelihood of vascular occlusion and sudden death.^{19,20}

One study of more than 3,000 patients with **chronic heart disease** found that high homocysteine levels were associated with **2.5 times higher** risk of coronary events. Each **5 μmol/L** increase in homocysteine produced a **25% increase** in risk.²⁰

Other studies show that high homocysteine predicts poor outcomes in people who have survived a heart attack or had stents placed.^{21,22}

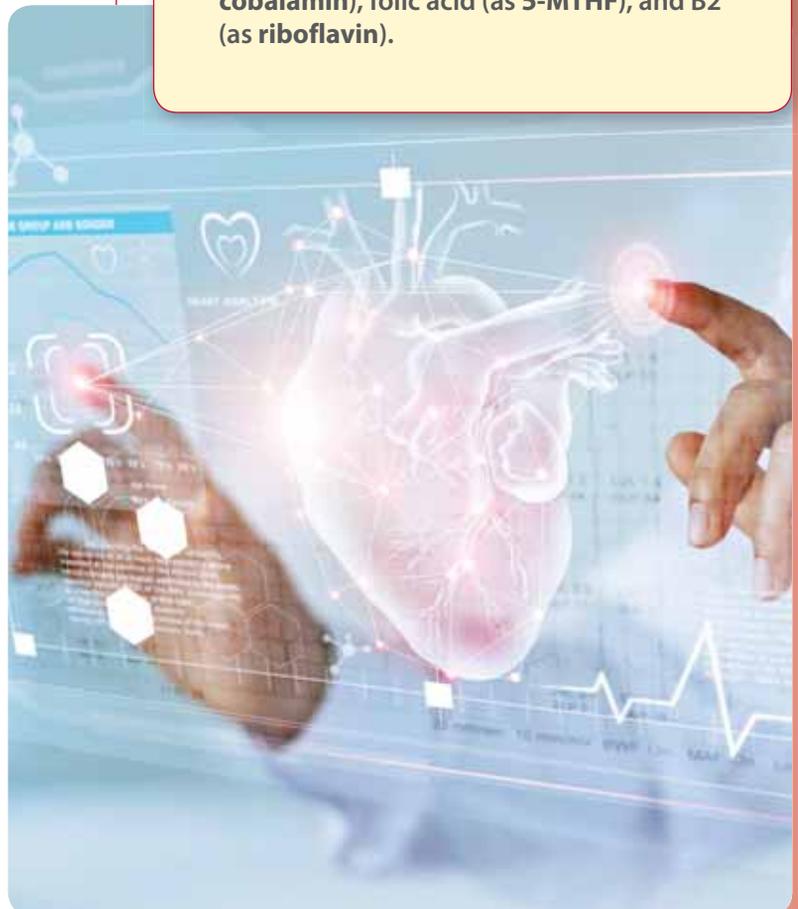
Impaired **endothelial function** is especially risky in patients with **diabetes**, whose vessels already have a tendency to stiffen and form clots because of glucose-induced vessel damage.¹⁸

Poor **endothelial function** caused or worsened by high homocysteine leads to a host of other dangerous problems, including:

- Reduced ability of the heart to create detours around a blocked vessel. This “collateral circulation” is vital in keeping the heart functioning as coronary arteries narrow.²³
- Reduced ability to counteract **abnormal clotting** inside an artery, which increases the risk of occlusive vascular events like ischemic stroke and acute heart attack.²⁴
- Increased **arterial stiffness**, a contributor to aortic stenosis, coronary artery disease, and ischemic stroke.²⁵

Fighting Back Against Brain Aging

- **Homocysteine** is an amino acid that is normally detoxified by processes that require **vitamins B6, B12, B2 and folic acid** to work. If there isn't enough of those compounds, homocysteine can build up.
- **High homocysteine** is associated with accelerated **brain aging** and **cardiovascular disease**. Lowering homocysteine is a priority for disease prevention.
- Getting an **annual blood test** for homocysteine is vital, especially for those with family histories of dementia, heart disease and stroke.
- Preventing homocysteine buildup or lowering high levels can be accomplished by increasing intake of vitamin B6 (as **pyridoxal 5'-phosphate**), B12 (as **methylcobalamin**), folic acid (as **5-MTHF**), and B2 (as **riboflavin**).



Lowering Homocysteine Levels

Homocysteine is easily measured using low-cost **blood tests**.

Life Extension® advises homocysteine levels below **12 µmol/L**, with ideal numbers being under **8 µmol/L**.

Conventional reference ranges do not flag a homocysteine problem until blood levels reach **15 µmol/L**. Published data reveal those with homocysteine blood levels between **10 µmol/L-15 µmol/L** are at *greater risk*.²⁶⁻²⁸

The proper combination of low-cost **B-vitamins** supports two different homocysteine detoxification (removal) pathways in your body.

If your **blood test** result shows less-than-optimal levels, initiate a **B-vitamin** regimen based on the **degree** of **homocysteine elevation**. In the next column are some B-vitamin dosing suggestions.

Homocysteine-Lowering Nutrients

Since B-vitamins are water soluble, those with stubbornly **high** homocysteine levels should take B-vitamin supplements twice daily. Here are daily B-vitamin supplement suggestions:

- **Folic acid** as activated **5-MTHF**, **1,000 mcg to 10,000 mcg**
- **Vitamin B6** as activated **pyridoxal 5'-phosphate**, **100 mg to 200 mg**
- **Vitamin B12** as **methylcobalamin**, **300 mcg to 1,000 mcg**
- **Vitamin B2** as riboflavin, **25 mg to 100 mg**

Retest your blood three months after initiating these supplements to ensure you are achieving optimal homocysteine levels.

(Article continues on page 56.)

Two Ways Homocysteine is Removed from Your Blood

Homocysteine is a byproduct mostly related to ingesting an amino acid called **methionine**.

Those who eat a lot of **red meat** often have *higher* homocysteine blood levels that are attributed to the methionine content of red meat.

Homocysteine is **detoxified** in the body via two independent pathways as follows:

1. **Methylation** (dependent on **folic acid, vitamin B12** and **B2**) and
2. **Transsulfuration** (dependent on **vitamin B6**)

Young people readily convert B-vitamins into active forms that readily metabolize homocysteine.

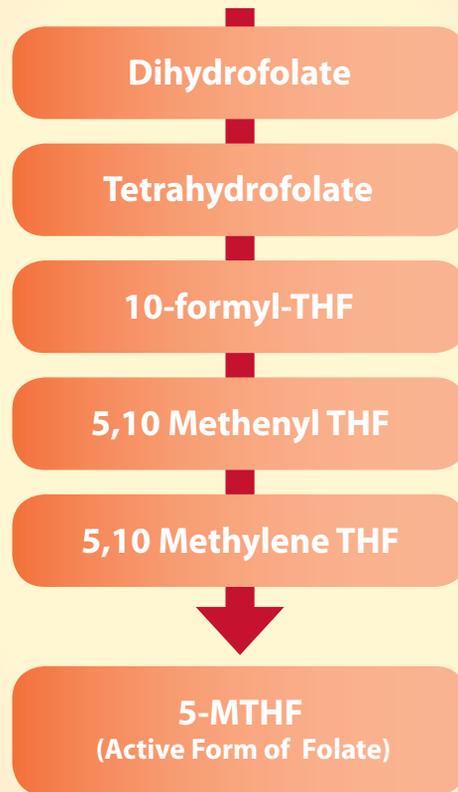
As we age, however, *enzymes* in our body needed to transform B-vitamins into their active forms are lost. This is one reason why people who had low homocysteine levels in *younger* years see homocysteine surge *higher* as they grow older.

The solution to escalating **homocysteine** is supplementation with active forms of folic acid (**5-MTHF**), vitamin B6 (**pyridoxal-5' phosphate**) and the neurologically-active form of B12 called **methylcobalamin**.

These forms of B-vitamins do not require enzymatic conversion in your body and are immediately available to detoxify homocysteine.

Synthetic Folic Acid

(Used in most commercial supplements must go through many *enzymatic* stages before converting to **5-MTHF**.)



(Older people can benefit more by taking active **5-MTHF** instead of folic acid.)

LOW-COST

HOMOCYSTEINE BLOOD TEST

Special OFFER!

Commercial labs like Quest charge up to \$227 for a **Homocysteine Blood Test**. Until **November 6, 2019**, you can order a **Homocysteine Blood Test** direct from **Life Extension®** for **\$54** and receive a complimentary **CBC/Chemistry Profile** that includes the following:

Lipid Profile:

Total cholesterol
Triglycerides
HDL cholesterol
LDL cholesterol (calc.)
VLDL cholesterol (calc.)
Total cholesterol/HDL ratio
Estimated Coronary Heart Disease risk

Liver Function:

Alkaline phosphatase
LDH (lactate dehydrogenase)
AST (aspartate aminotransferase)
ALT (alanine transaminase)
Total protein • Albumin • Globulin
Albumin/globulin ratio • Bilirubin

Electrolytes and Minerals:

Sodium • Potassium • Chloride
Calcium • Phosphorus • Iron

Blood Sugar:

Glucose

Kidney Function:

Uric acid
BUN (blood urea nitrogen)
Creatinine
BUN/creatinine ratio
eGFR (estimated glomerular filtration rate)

Complete Blood Count:

Red blood cell count
Hemoglobin • Hematocrit
MCV (mean corpuscular volume)
MCH (mean corpuscular hemoglobin)
MCHC (mean corpuscular hemoglobin concentration)
RDW (red blood cell distribution)
White blood cell count
Immune Cell Differentiation Count
Platelet count

The combined value of these tests exceeds **\$350** at a commercial lab like Quest. As a reader of this magazine, you can check your **homocysteine**, plus the additional blood markers included in the comprehensive **CBC/Chemistry Profile** for just **\$54**.

THIS SPECIAL OFFER ENDS NOVEMBER 6, 2019.

To order a **Homocysteine Blood Test** plus a complimentary **CBC/Chemistry Profile** for only **\$54 (LC100061)**, call **Life Extension** today at **1-800-208-3444** or order online at **www.LifeExtension.com/LabServices**

You'll be sent a list of drawing stations in your area along with a pre-paid requisition. You can walk into the drawing station nearest you at your convenience. You also have free access to our Wellness Specialists to help review your results. Blood test services are available only in the continental United States. Not available in Maryland. Restrictions apply in MA, NY, NJ, RI, and PA.

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Summary

Homocysteine is **toxic** and contributes to changes that increase risks of rapid **brain aging** and **cardiovascular** disorders.

Homocysteine tends to elevate with **aging** as **detoxification** systems in your body break down.

Low-cost **B-vitamins** can restore more youthful homocysteine detoxification via **methylation** and **transsulfuration** pathways in your body.

The ideal combination of B-vitamins turns on **both** these **homocysteine removal** pathways in your body.

Homocysteine can be lowered by increasing intake of: **B6** (as **pyridoxal 5'-phosphate**), **B12** (as **methylcobalamin**), **folic acid** (as **5-MTHF**), and **B2** (as **riboflavin**).

These vitamins help transform homocysteine into **non-toxic** compounds in your body.

For optimal protection against **homocysteine** buildup, have your **blood tested**. ●

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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1 bottle **\$28.50**

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- **Vegetable extracts** (broccoli, watercress, cabbage, rosemary) in one layer.
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Keep out of reach of children. Do not exceed recommended dose. When using nutritional supplements, please consult with your physician if you are undergoing treatment for a medical condition or if you are pregnant or lactating.

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A novel **phytosome** delivery technology markedly *increases* absorption to deliver *more quercetin* throughout one's body.

For daily quercetin supplementation, take just one of the new highly-absorbable **Bio-Quercetin Phytosome** capsules.

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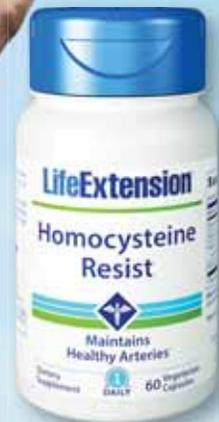
* Supplier Internal Study. Data on File. 2017

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Maintain Youthful **HOMOCYSTEINE LEVELS**

FOR BRAIN, HEART, AND HEARING HEALTH

Homocysteine Resist supports healthy levels of homocysteine, an unfavorable amino acid that can increase with normal aging.



Item #02121 • 60 vegetarian capsules

1 bottle **\$19.50**

4 bottles \$17.50 each

Just one daily capsule of **Homocysteine Resist** provides:

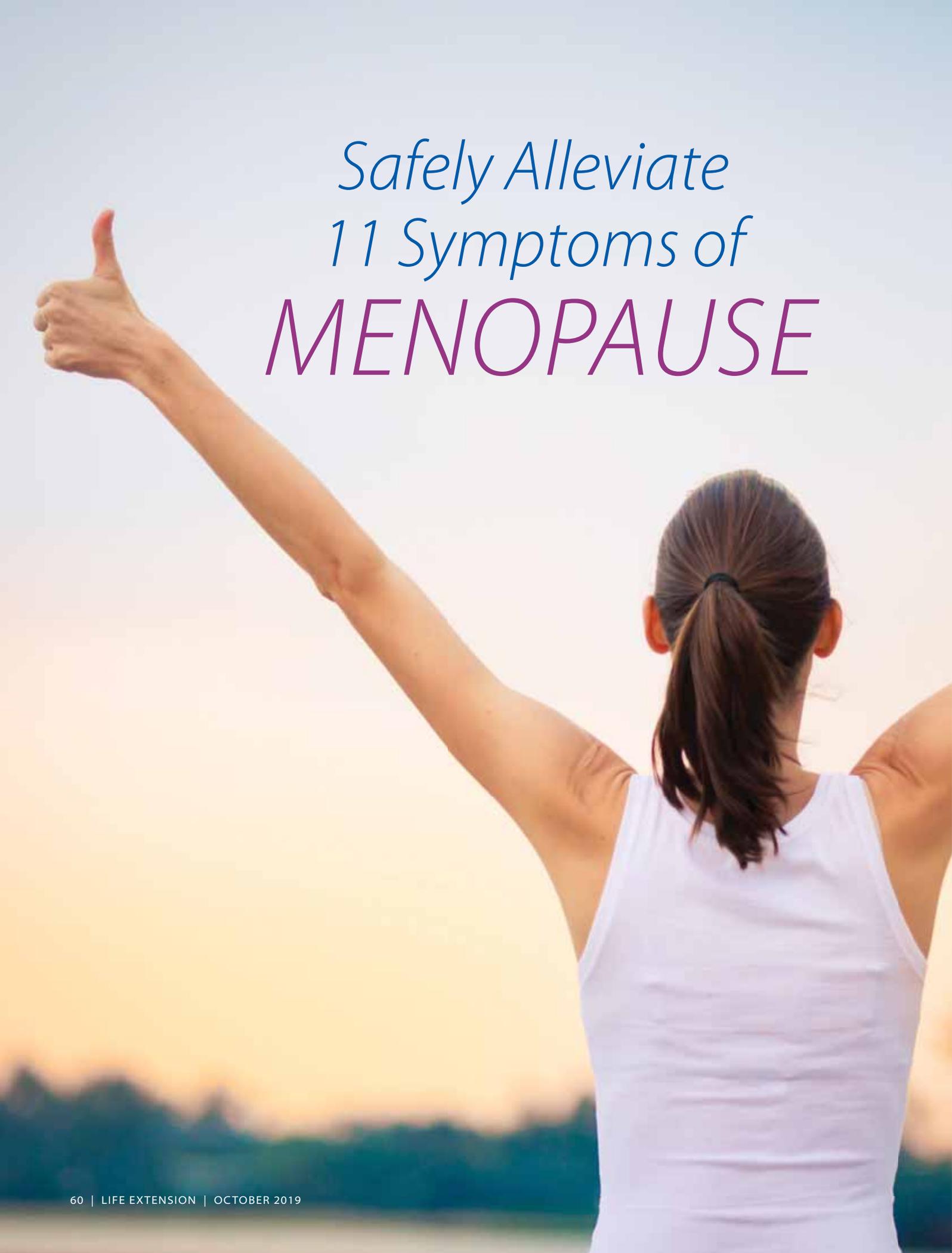
5-MTHF (activated folate)	5,000 mcg
Methylcobalamin (activated vitamin B12)	1,000 mcg
Pyridoxal 5'-phosphate (activated vitamin B6)	100 mg
Riboflavin (vitamin B2)	25 mg

Suggested dose: If your daily multi-vitamin contains activated B-vitamins, then take one capsule daily of **Homocysteine Resist** at a different time of the day.

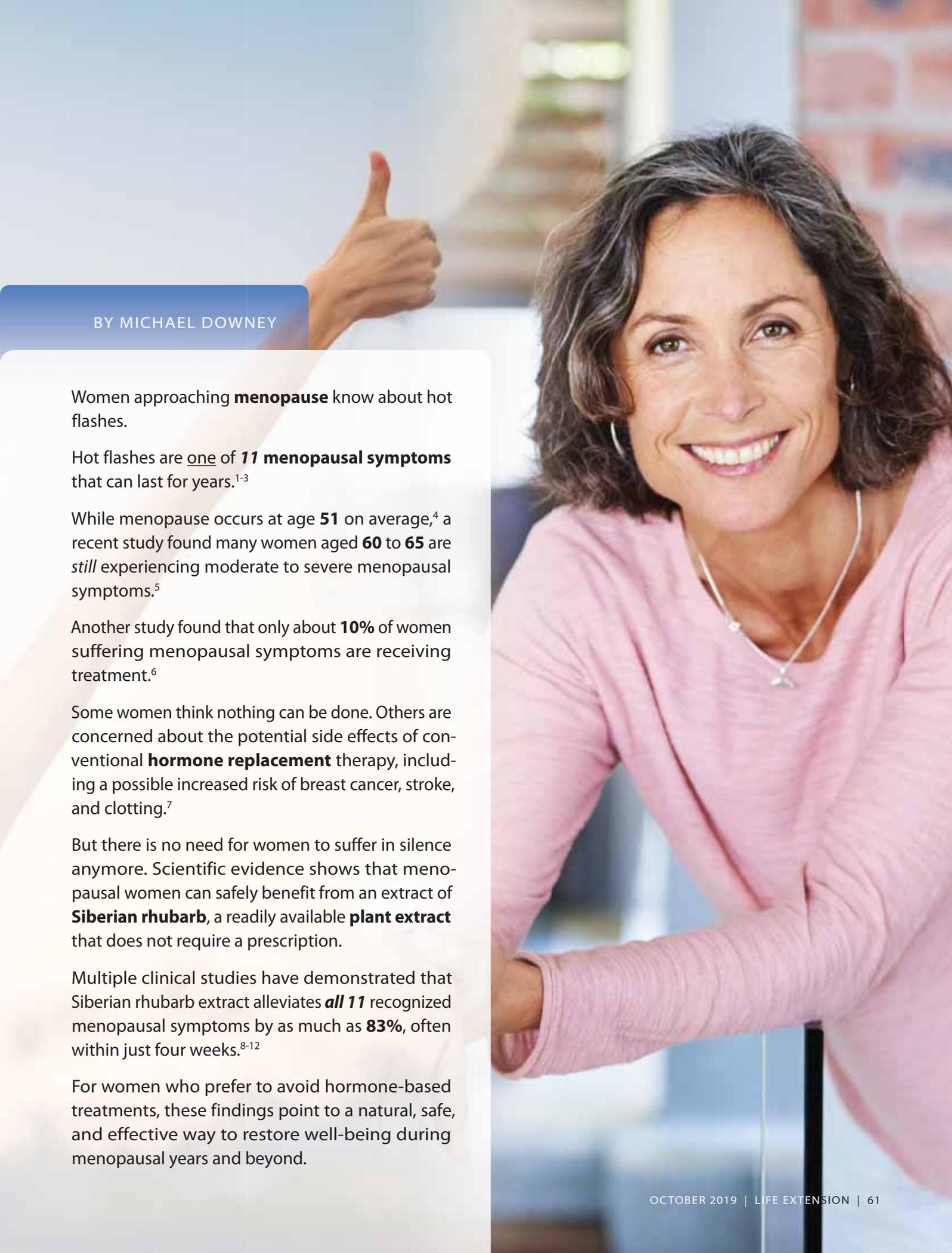


For full product description and to order **Homocysteine Resist**, call 1-800-544-4440 or visit www.LifeExtension.com

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A woman with her hair in a ponytail, wearing a white tank top, is seen from behind with her arms raised in a thumbs-up gesture. The background is a soft, warm sunset or sunrise over a body of water.

Safely Alleviate
11 Symptoms of
MENOPAUSE

A woman with shoulder-length, wavy grey hair is smiling warmly at the camera. She is wearing a light pink long-sleeved top and a simple necklace. Her right hand is raised in a thumbs-up gesture. The background is a bright, slightly blurred indoor setting with a brick wall visible on the right.

BY MICHAEL DOWNEY

Women approaching **menopause** know about hot flashes.

Hot flashes are one of **11 menopausal symptoms** that can last for years.¹⁻³

While menopause occurs at age **51** on average,⁴ a recent study found many women aged **60 to 65** are *still* experiencing moderate to severe menopausal symptoms.⁵

Another study found that only about **10%** of women suffering menopausal symptoms are receiving treatment.⁶

Some women think nothing can be done. Others are concerned about the potential side effects of conventional **hormone replacement** therapy, including a possible increased risk of breast cancer, stroke, and clotting.⁷

But there is no need for women to suffer in silence anymore. Scientific evidence shows that menopausal women can safely benefit from an extract of **Siberian rhubarb**, a readily available **plant extract** that does not require a prescription.

Multiple clinical studies have demonstrated that Siberian rhubarb extract alleviates **all 11** recognized menopausal symptoms by as much as **83%**, often within just four weeks.⁸⁻¹²

For women who prefer to avoid hormone-based treatments, these findings point to a natural, safe, and effective way to restore well-being during menopausal years and beyond.



The 11 Menopause Symptoms

While hot flashes and night sweats are the most well-known menopause symptoms, many women suffer from an array of others.

The **Menopause Rating Scale**, or **MRS**, was developed in 2004 as a way of evaluating all of these symptoms.

It allows women to rate 11 separate symptoms, graded in severity from **0** (the symptom is not present) to **4** or to **5** (“very severe”) on the revised **MRS II** scale.^{2,3,9}

The **11** potential menopause symptoms are:

- Hot flashes/sweating,
- Heart discomfort,
- Sleep problems,
- Depressive mood,
- Irritability,
- Anxiety,
- Physical and mental exhaustion,
- Sexual problems,
- Vaginal dryness,
- Bladder problems, and
- Joint and muscle discomfort.

Having even one of these symptoms can lead to a significantly lower quality of life.

How Siberian Rhubarb Works

Most symptoms of menopause are caused by a sharp drop in levels of the hormone **estrogen**.

That’s where **Siberian rhubarb** comes in. The root of this plant is rich in compounds that bind to cell receptors that normally bind to estrogen.^{9,10,13}

By doing this, they trigger beneficial **estrogen-like** effects throughout the body, helping to relieve menopause symptoms.

Siberian rhubarb extract has been successfully used in **Germany** since **1993** for treating menopause symptoms.¹⁰ To further validate its benefits, scientists conducted a series of controlled, clinical trials to determine the extract’s effectiveness.

Easing All 11 Menopause Symptoms

First, a research team enlisted 109 women who were suffering from multiple symptoms of **perimenopause**, a stage just before menopause when the ovaries gradually begin to make less estrogen. In this study, women received either a daily placebo or **4 mg** of Siberian rhubarb extract.^{9,11}

After 12 weeks, scientists evaluated the women by using the **MRS II**, a respected scale which rates menopause symptoms. The researchers documented a **54% decrease** in *total* symptom scores and significant improvements in *all* 11 symptom categories. There were no significant changes among the subjects receiving a **placebo**, who continued to experience all the same menopause symptoms.⁹

A similar study of 112 perimenopausal and symptomatic women found virtually identical results. After 12 weeks, patients receiving a placebo had no significant changes. But women getting **4 mg** of Siberian rhubarb extract daily showed:¹²

- A decrease of **54%** in overall MRS scores,
- Significant improvements in *all* MRS symptom categories, and
- An **83% reduction** in the median number of daily hot flashes.

By comparison, **conventional hormone therapy** was found, in a review of 24 placebo-controlled trials, to reduce the frequency of hot flashes by about **75%**.¹⁴ In other words, **Siberian rhubarb extract** improved hot flashes as much as, or even more than, conventional treatment.

Studies Confirm Long-Term Benefits

Next, investigators set out to validate these results with a larger group over a longer period.

A total of 252 women took part in a study that lasted six months. Notably, this group included women ranging from perimenopausal to postmenopausal, all of whom had concerning symptoms.¹⁰

Each of the women took **4 mg** of Siberian rhubarb extract daily, and at the end of the study, *each* of the 11 MRS symptoms was significantly reduced. There was also a **52% decrease** in overall MRS (Menopause Rating Scale) scores.¹⁰

The study team found that women with the most severe symptoms achieved the greatest overall improvements. In general, the most commonly improved symptoms were:¹⁰

- Hot flashes/sweating,
- Sleep problems,
- Irritability, and
- Depressed mood.

But menopause symptoms can last for years. So researchers set out to study whether this extract would be effective over a significantly longer term.

For a period of **96 weeks** scientists conducted a follow-up study.⁸ Women who had been taking the **Siberian rhubarb** in a previous, double-blind clinical trial were asked to continue supplementing, while the previous **placebo** group was asked to now start taking the **Siberian rhubarb** extract.

Menopause Relief

- Multiple, controlled, clinical studies have demonstrated that Siberian rhubarb extract substantially reduces the 11 most important menopausal symptoms, including hot flashes and sleep problems, without any significant safety issues.
- Siberian rhubarb extract has been used in Germany since 1993 to safely treat menopause symptoms.
- Women taking Siberian rhubarb extract can expect broad improvements in mood-related menopause symptoms that are not well-treated by conventional therapies, including depression and irritability.

What You Need to Know



SIBERIAN RHUBARB EXTRACT

After switching to the Siberian rhubarb, the former placebo group rapidly caught up to the supplementing test group. At the end of 96 weeks, they demonstrated identical results of a median **83% decrease** in total MRS II scores. What's more, hot flashes decreased from about **15** a day to an average of less than **1.4** a day.⁸

Improving Mood

Some of the most troubling menopause symptoms are **mood-related**: depression, anxiety, and irritability.

Although conventional hormone treatments address hot flashes and night sweats, they have not proven effective for improving mood symptoms. In fact, some evidence suggests they may even aggravate them.^{7,15}

Not Siberian rhubarb.^{9,12} In a randomized, controlled clinical trial, the extract led to a resolution of or improvement in depressed mood in more than **90%** of those taking it.¹¹

The group receiving the extract in this study also achieved a **66%** reduction in total scores on the Hamilton Anxiety Scale.¹¹

Why It's Safe

No relevant safety issues arose in *any* of the above studies of **Siberian rhubarb** extract, which involved more than **400** women in total.

No changes were seen in vital signs, or in breast, vaginal, or endometrial tissues.^{8-10,12} And from 1993-2014, an average of **6.7 million** doses of this extract were sold in Germany *every year*.¹⁶

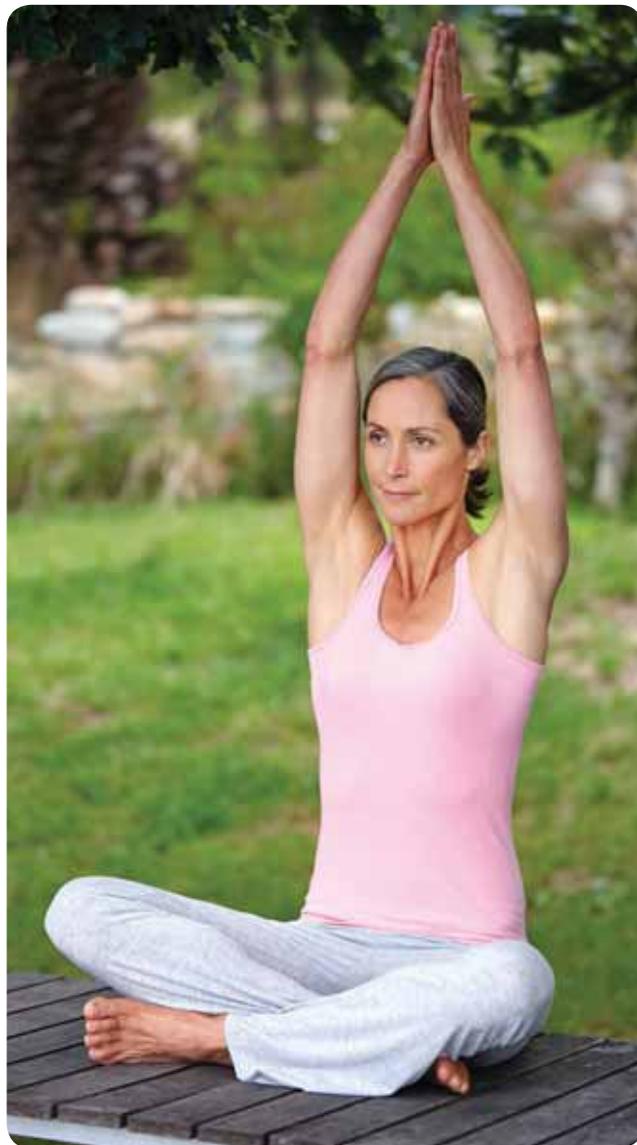
The remarkable safety record of Siberian rhubarb appears to be rooted in the fact that this unique extract *preferentially* binds to beneficial receptors (**ER-beta**) while binding only weakly to undesirable receptors (**ER-alpha**).^{13,17}

Within the body, there are two types of **cell receptors** to which estrogen normally binds:

- **Estrogen receptor-alpha** (ER-alpha)
- and
- **Estrogen receptor-beta** (ER-beta).

When estrogen lost during menopause is replaced by *non-selective* hormone drugs, both **ER-alpha** and **ER-beta** receptors are activated.¹⁸

The problem is that these two receptor types tend to be concentrated in different body tissues, and activating them leads to very different results.



Activating **ER-beta** receptors promotes beneficial estrogenic effects on skin, brain, bone, cardiovascular, and other tissues.

But activating **ER-alpha** receptors can produce *undesirable* growth in reproductive tissues, including initiating and promoting **cancer**. In fact, increased activity of the **ER-alpha** receptor is believed to cause the ill effects of conventional hormone therapy.¹⁸

When scientists performed lab studies with **Siberian rhubarb**, though, they discovered that its *desirable* activation of **ER-beta** receptors is **13.5-fold greater** than its *undesirable* activation of ER-alpha receptors.^{13,17}

When compared to other known natural compounds or even to natural estrogen itself, this standardized extract has the **highest selectivity** for **ER-beta** over **ER-alpha**.^{13,17}

Summary

Siberian rhubarb extract is a unique approach to controlling menopausal symptoms, and provides an alternative to hormone replacement therapy.

In clinical studies, including large, long-term trials, a daily dose of just **4 mg** of Siberian rhubarb extract significantly relieved the **11** most important menopausal symptoms, including hot flashes, exhaustion, bladder problems, and more.

Bioidentical hormone-replacement therapy can be effective for many women for hot flashes. But rhubarb extract provides an effective option for those interested in broad, **non-hormonal** relief of all known menopausal symptoms.

These clinical trials with **Siberian rhubarb extract** show a notable improvement in mood symptoms like depression, a benefit conventional hormone therapy does not provide. And this plant extract has been demonstrated to be safe. ●

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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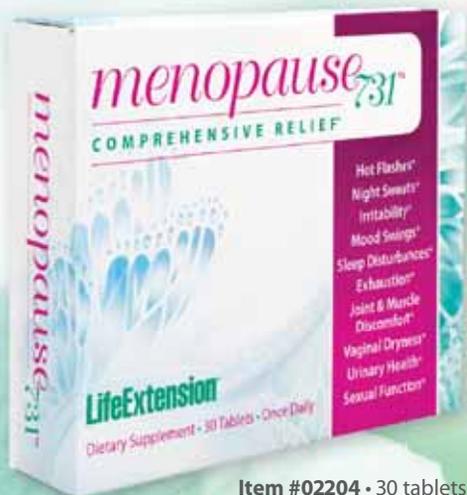


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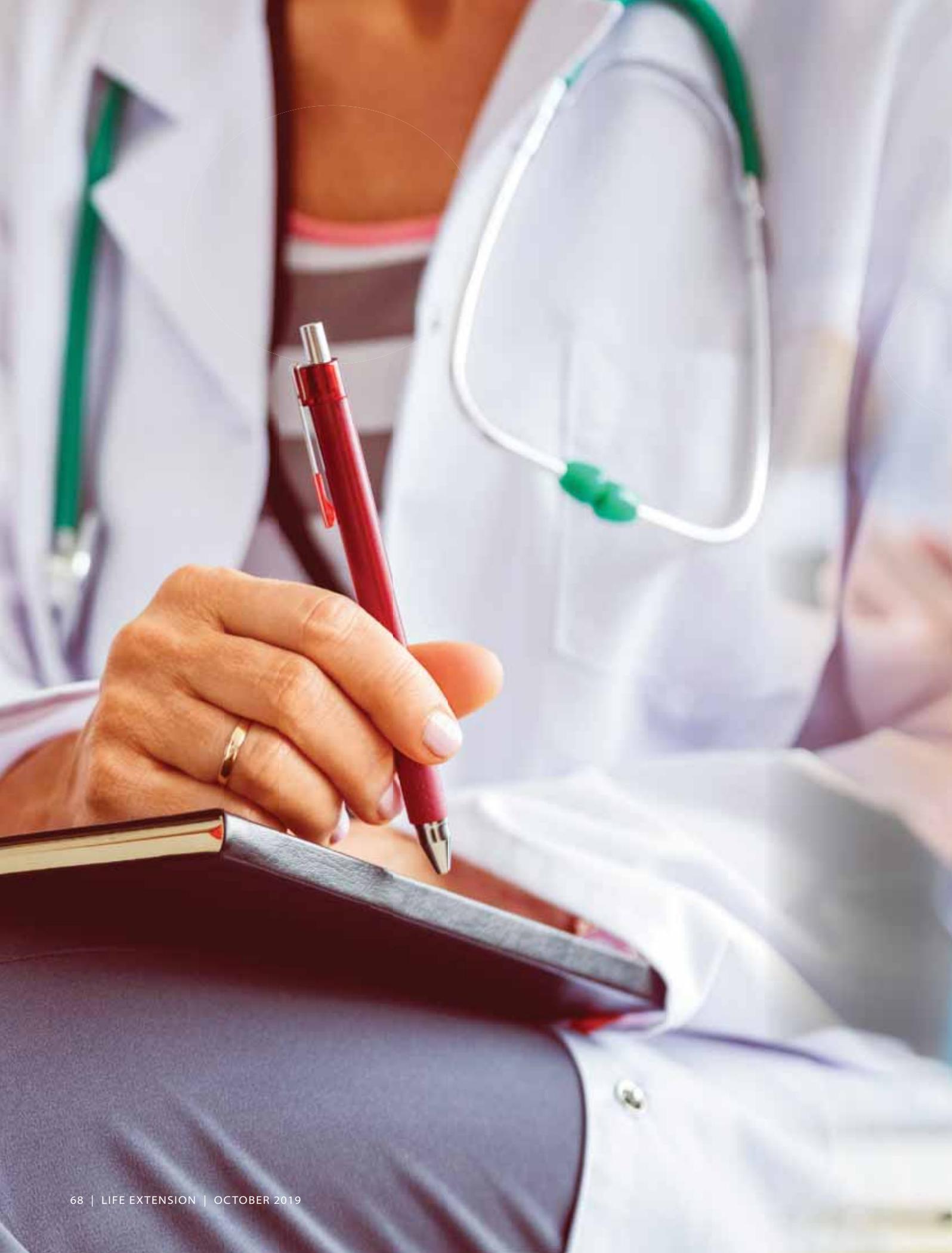
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RECENT Sexual Health *and* Medicine CONFERENCES



BEN BEST

Communication about sexual problems with health professionals is often prevented by embarrassment or expectations of bias. Health professionals may fear being inappropriate or at risk for malpractice for mishandling communication about sexual matters with their patients. Yet the various aspects of sexual health and sexual medicine impact important areas of our lives.

The following report contains a review of topics presented at recent conferences by experts in the fields of sexual medicine and sexual health.

Infertility

Elizabeth Grill, PsyD (Associate Professor of Psychology, Weill Cornell Medical College, New York City) is concerned with infertility (involuntary childlessness) in couples. According to the U.S. Department of Health & Human Services, in about one-third of infertility cases, male infertility is the problem. Female infertility accounts for another one-third. The remaining cases are caused either by a combination of male and female problems or by unknown causes.¹ Obesity and smoking reduce fertility in both males and females.²⁻⁵ Athletes who take anabolic androgenic steroids to improve their performance and appearance reduce their fertility.⁶ Infertility in women accelerates with age from about 5% at age 25 to about 50% at age 41.⁷



Grill

Infertile couples often exhibit anxiety, depression, or anger, which may be a cause or consequence of the infertility.⁸ Couples often feel their masculinity, femininity, or social acceptability is affirmed by their ability to have children, which adds to their distress concerning infertility.⁹ In vitro fertilization is an option for some infertile couples, but the procedure is expensive.

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Bacterial Vaginosis

Sujatha Srinivasan, PhD (Senior Staff Scientist, Fred Hutchinson Cancer Research Center, Seattle) is an authority on **bacterial vaginosis**, the most common vaginal infection among women of reproductive age.¹⁰ At any given time, about one-third of women have this infection.¹¹ Symptoms include vaginal discharge, fishy odor, and reduced vaginal acidity. In about half of cases there are no symptoms. Why symptoms occur in some women, but not in others is unknown.¹²



Srinivasan

Bacterial vaginosis is associated with an increased transmission and acquisition of sexually transmitted infections.¹³

Douching is a common cause of bacterial vaginosis.¹⁴ Smoking is associated with bacterial vaginosis.¹⁵ Bacterial vaginosis often recurs despite antibiotic treatment, but oral treatment with the probiotic *Lactobacillus crispatus* has been shown to reduce recurrence.¹⁶

Effects of Breast Cancer Treatment

Lisa Larkin, MD (Owner and President of Lisa Larkin MD and Associates, Mariemont, Ohio) treats women dealing with symptoms related to breast cancer treatment. Women with no risk factors for breast cancer have a 12% lifetime risk of the disease, whereas those with a genetic disposition for the disease are more likely than not to develop breast cancer.¹⁷ Surgical



Larkin

removal of both breasts almost completely eliminates the extra risk of breast cancer caused by genetic predisposition.¹⁸

Many young breast cancer survivors given chemotherapy develop menopausal symptoms, including vaginal dryness, painful urination, and painful sexual activity.¹⁹ Concern over increasing cancer risk by the use of vaginal estrogens often motivates the use of non-hormonal lubricants, but these lubricants can increase the risk of infection.²⁰ The Women's Health Initiative Observational Study showed no increased risk of cancer for women using low-dose estrogens applied as a cream, ring, or tablet directly to the vagina.²¹





Erectile Dysfunction

Sharon Parish, MD (Internal Medicine, Weill Cornell Psychiatry Specialty Center, White Plains, New York) gave a presentation on erectile dysfunction. By one estimate, the inability to achieve an erection affects **5%** of men aged 40 and triples to **15%** by age 70.²² Another study showed that erectile dysfunction increases with age, affecting almost **40%** of men 70 and older.²³ Obesity, physical inactivity, and smoking are among the risk factors for erectile dysfunction.^{24,25}



Parish

Phosphodiesterase type 5 (PDE5) inhibitors, such as sildenafil (Viagra®) tend to be more effective in younger than in older men,²⁶ but can have unpleasant side effects.²⁷ Stem cell therapy,²⁴ exercise,²⁸ testosterone,²⁹ and low intensity shockwaves³⁰ may be effective treatments.

Polycystic Ovary Syndrome (PCOS)

Andrea Dunaif, MD (Professor of Medicine, Mount Sinai, New York City) is a specialist in polycystic ovary syndrome (PCOS), which she believes should be renamed “metabolic reproductive disorder.” PCOS is the leading cause of missed menstrual periods and infertility in women.³¹ Women with PCOS are commonly obese and have high blood levels of male hormones (androgens).³² Women with PCOS often experience excessive body hair and difficulty losing weight.³³



Dunaif

Weight loss is an effective treatment when it can be achieved. Possible drug treatments include metformin³⁴ and androgen-blockers (including hormonal contraception).^{35,36} Women with PCOS often report a lack of empathy from their physicians, who may argue with them while not providing useful advice.³⁷

Older Fathers

Dolores Lamb, PhD (Vice Chair, Department of Urology, Weill Cornell Medicine, New York City) is concerned about the fact that birth rates for men under age 30 have been declining, whereas birth rates for men over 35 have been increasing. Genetic material (DNA) becomes increasingly fragmented as the age of the father increases.³⁸ On average, the offspring of a 40-year-old father have twice as many genetic mutations as the offspring of a 20-year-old father.³⁹ Miscarriage is more than twice as likely for a father over 55 than for a father under 36.⁴⁰ Children of older fathers are more likely to suffer from cancer, dwarfism, autism, schizophrenia, and other abnormalities.⁴¹



Lamb

As an aside, Dr. Lamb commented that a woman in her 20s marrying a wealthy man in his 70s is unlikely to refrain from becoming a mother based on this information. In vitro fertilization with screening of embryos could be an option in such cases.⁴²

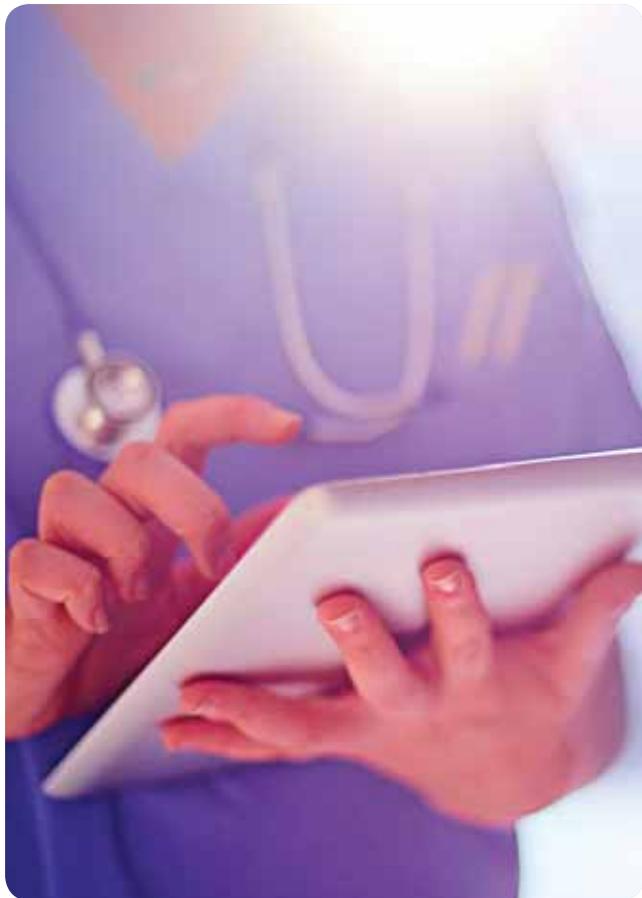
Intercourse Pain in Women (Dyspareunia)

Lindsay Phillips, LMSW (Clinical Social Worker, University of Michigan, Ann Arbor, Michigan) does psychological counseling with women who report pain during intercourse, a condition which affects **10% to 28%** of women (different studies have shown different frequencies).⁴³ Just over half of women affected seek medical treatment.⁴⁴ Most women with the **condition** continue regular penetrative activities with a sexual partner, motivated by a desire for closeness or fear of losing their partner. Inflammation and certain contraceptives can cause the pain, but often there is no identifiable cause.⁴⁵



Phillips

Men are far less likely to have pain during intercourse, and when such pain does occur, it is usually due to inflammation of the prostate or bladder.⁴⁶



Low Sexual Desire in Women

Brooke Faught, DNP (Clinical Director of the Women’s Institute for Sexual Health, Nashville, Tennessee) counsels women who suffer from distress



due to low sexual desire. Nearly **40%** of women in the United States report low sexual desire, but in only **12%** of cases is this accompanied by distress.⁴⁷ The most common cause of distress is feeling “less connectedness” with a partner.⁴⁸ In general, sexual desire in women tends to decrease with increasing age, but associated dis-

tress also decreases with increasing age.⁴⁹

Menopause not only reduces estrogen and progesterone hormones, but androgens as well (reducing sexual desire).⁵⁰ Postmenopausal women receiving testosterone as part of hormone replacement therapy show improved sexual function and reduced cancer risk.^{51,52} Intermediate rather than high doses of testosterone produce the best results. Excessive body hair was the major complaint of the women receiving the testosterone.⁵¹ The hormone oxytocin, available from compounding pharmacies, may also be beneficial.⁵³

Premature Ejaculation

Ege Can Serefoglu, MD (Associate Professor, Bahceci Health Group, Istanbul, Turkey) is a specialist in the subject of premature ejaculation. Men typically ejaculate between four to eight minutes after sexual penetration. Approximately **5%** of men ejaculate in less than two minutes after penetration.⁵⁴ About **90%** of men seeking treatment for premature ejaculation ejaculate within one minute after penetration.⁵⁵



In a few cases there is a readily treatable cause, such as excessive thyroid hormone.⁵⁵ Drugs can be effective, but in most cases a combination of psychotherapy and drugs produces the best results,⁵⁶ because men who ejaculate prematurely often have emotional problems. Low level of serotonin is the most well-validated cause of premature ejaculation that can be treated with drugs, but patients usually discontinue taking these drugs because of side effects (including a loss of interest in sex).⁵⁷ Modafinil, a drug used to treat narcolepsy, has shown better results.⁵⁸

*... Fewer than **25%** of people will seek help from a health professional for sexual problems*

Sexual Assault

Andrea Holmes, MD (Forensic Medical Examiner, Galway Sexual Assault Treatment Unit, Galway, Ireland) examines rape victims for evidence of assailant DNA and administers contraceptives and medications to prevent sexually transmitted disease. An



estimated **17%-25%** of women and **1%-3%** of men have been sexually assaulted in their lifetime.⁵⁹ Women are more likely to report being raped than men. Of women rape victims, **16%** to **25%** report the incident to police, up to **30%** contract a sexually transmitted disease, and **5%** become pregnant. Rape by

a stranger is more likely to be reported, although this is only a small proportion of all rapes.⁶⁰ Rape is the most common cause of posttraumatic stress disorder (PTSD) in women,⁵⁹ and PTSD is the most common mental health consequence of sexual violence.⁶¹

Concluding Remarks

Poor communication or lack of communication with health care professionals is a recurring theme in sexual medicine. According to one survey, fewer than **25%** of people will seek help from a health professional for sexual problems.⁶²

In 2017, female students enrolling in American medical schools outnumbered males for the first time in the history of American medicine. Lack of understanding of and empathy for women's medical problems was characteristic of medicine when the profession was almost entirely dominated by men. A greater proportion of female physicians may result in better communication of sexual problems by women.

More generally, health problems that are sexual are often taken too personally. Shame, guilt, and fear over sexual health issues that could potentially be treated can cause those problems to become chronic physical and psychological wounds.

It is my hope that this report will encourage people to have the courage to be more open about sexual issues, resulting in greater resolution of those problems. ●

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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The Longevity Paradox: How to Die Young at a Ripe Old Age

By Steven Gundry, M.D.

There's a traditional saying that goes, "Youth is wasted on the young."

People are living longer due to medical procedures, drugs, and other treatments, but they're often too sick to really enjoy the wisdom that comes with age.

"We're living longer, but we're not living better," said world-renowned heart surgeon Dr. Steven Gundry. "This is another paradox of aging."

But it doesn't have to be that way. In his latest book, *The Longevity Paradox*, Gundry outlines his plan for extending both lifespan and healthspan, and it all centers around one thing: *bacteria*.

Your gut microbiome contains bacteria ("gut buddies," as Gundry calls them) that impact everything from your weight and the appearance of your skin, to autoimmune disease, heart disease, and cancer.

"As a heart surgeon, I have done my part to extend the lives of tens of thousands of individuals. I'm proud of the fact that I've helped so many people live longer lives," said Gundry. "But I quit my job as professor and head of cardiothoracic surgery at Loma Linda University School of Medicine when I learned that much of what I'd been taught about health and longevity—information that many leading doctors still believe is true—was simply wrong."

Now, Gundry treats his patients with a combination of conventional medicine and nutritional therapy that focuses on strengthening the gut microbiome.

He's developed a unique program designed specifically with the gut in mind that he's used successfully with thousands of his patients.

"Over and over I've seen incredible results," Gundry said. "When my patients treat their gut buddies right, they are able to dramatically increase their lifespans."

More importantly, they're healthier, too. Gundry has seen his patients "age in reverse," as they've improved their heart health, slowed or reversed the progression of cancer and dementia, and even resolved autoimmune diseases like multiple sclerosis and lupus.

Now, in *The Longevity Paradox*, Gundry maps out the same plan he's successfully used with his patients. This **Longevity Paradox Program** includes a detailed list of foods to eat and ones to avoid, meal plans, and recipes, while also teaching you how to implement strategies like "brain washes."

In this interview with **Life Extension**[®], Gundry explains how bacteria can have such a big impact on your health and shares key tips from his Longevity Paradox Program.

By utilizing these practical tools, you'll be arming yourself with the same anti-aging weapons Gundry has shared with so many of his patients with one simple goal in mind: To die young at a ripe old age.

—LAURIE MATHENA

LE: How do bacteria impact both our lifespan and our healthspan?

Dr. Gundry: As shocking as it may seem, most of what has happened to us, and what will continue to happen to us in the future, is determined by the state of the bacteria in our gut, mouth, and skin. When we learn how to be a good host to our microbes, we can gain a lot of control over how well we will age and how long we will live. Your fate does not lie in your genes at all—it lies in your microbiome, and many of your daily decisions about food and personal care products influence how happy or unhappy they will be in their home.

Your good microbes (or “gut buddies,” as I like to call them) are there to help you. Those gut bugs don’t just impact a few health outcomes; they directly influence the health and longevity of every part of your body, from your skin to your hormones to your cellular energy levels. And they play a huge role in determining how well and how long you’ll live.

A recent study from the China Institute collected and analyzed gut bacteria from more than 1,000 healthy Chinese participants ranging in age from three years to over 100. They found that a healthy gut is a key indicator of individuals who live past age 100.

LE: What role does the gut microbiome play in the body?

Dr. Gundry: The inhabitants of your gut microbiome are quite busy day and night. They are involved with regulating major aspects of your immune system, your nervous system, and your hormonal (endocrine) system around the clock. But perhaps their most important role is in supporting your digestive system. Your gut buddies digest the foods you eat and manufacture and deliver vitamins, minerals, polyphenols, hormones, and proteins to where they are needed in your body.

For years we had no idea how important the gut microbiome was for digestion, let alone the manufacture of vitamins and hormones.

Now we know that if the bacteria in your gut can’t process the food you eat, you don’t benefit from the nutrition or the information in that food, no matter how good for you it may be.

LE: How do bacteria specifically impact, say, your brain?

Dr. Gundry: From those seemingly innocuous “senior moments” to more serious neurological conditions such as Parkinson’s disease, dementia, and Alzheimer’s disease, all cognitive decline stems from the same root cause: neuroinflammation. And where does inflammation start? In the gut.

Research on mice clearly shows that certain changes to the gut microbiome lead to neuroinflammation and therefore, cognitive decline. Even in humans, we can see how specific bacterial populations contribute to Alzheimer’s disease. When my colleagues looked at the gut biomes of patients who were cognitively impaired and compared them to the bacteria in patients without such impairments, they found that the cognitively impaired group had an abundance of proinflammatory bad bugs and a reduction in anti-inflammatory gut buddies.

LE: What steps need to be taken to ensure healthy gut bacteria?

Dr. Gundry: When it comes to your gut bacteria, you have two priorities. First, you need to make the good ones so happy that they’ll want to stick around and keep their home lovely and well cared for and make the bad ones so unhappy that they’ll flee the premises for good. This will give you the ideal population and diversity of gut buddies that you need for a long lifespan and healthspan.



Second, it's just as essential to have a strong gut lining, which I and other researchers refer to as the border or mucosal barrier, to keep those gut buddies where they should be (in your intestinal tract) so they can protect you from foreign invaders and avoid being mistaken for invaders themselves.

LE: What are some of the biggest threats to a healthy microbiome?

Dr. Gundry: The compounds that create the most problems for your gut buddies are called lectins. They are a type of “sticky protein” that plants produce as a defense against being eaten.

Over the last 50 years or so, things have gotten much, much worse for your gut buddies as humans have largely abandoned traditional methods of eating and preparing lectin-rich foods, such as soaking and fermenting, opting instead for quick, cheap options. Our diets have changed more rapidly over the last half century than ever before in history. We now eat far more [lectin-rich foods such as] wheat, corn, and other grains, as well as soybeans—often in the form of processed foods—than unprocessed foods such as leafy greens and other vegetables.

During this same time period our food system has been compromised by an onslaught of herbicides, biocides, drugs, fertilizers, and food additives. And chemicals from personal care products, factory-produced furniture, and household cleaners have invaded our homes.

There is simply no way for your gut buddies to catch up and adapt to all of these changes so quickly. And that chemical overload, along with drastic changes to our diet, is sending our gut buddies away in droves and making it possible for the bad guys take over.



LE: You mentioned having a strong gut lining. Why is this so important?

Dr. Gundry: Having the right gut buddies in your gut microbiome is only half of the equation. The second half is making sure they stay on their side of the intestinal border. When pieces of their cell walls called lipopolysaccharides (LPSs) cross the border from your gut to your organs, tissues, lymph, or blood, it doesn't matter if they're gut buddies or bad bugs. Any bacteria, LPSs, or other invaders lurking where they don't belong trigger an immune response that generates widespread inflammation and lays the groundwork for accelerated aging and illness. This is the definition of “leaky gut.” A strong, impermeable barrier is the key to avoiding many of the diseases we associate with “normal” aging.

LE: Do lectins impact the gut lining as well?

Dr. Gundry: Lectins pry apart the tight bonds between the mucosal cells that line your intestinal wall. Once across the border, these foreign proteins are recognized as foreign by sophisticated bar-code scanners called toll-like receptors (TLRs) located on your immune cells, especially your T cells. Off go the air-raid sirens, an all-points bulletin is called out, and the race is on for the cops to apprehend these interlopers! Now, imagine this happening every minute of every day, and presto—chronic inflammation!

When lectins poke holes in the fence, they're not the only ones that can make it through—they also clear the way for other invaders, including the bad bugs in your gut.

LE: Lectins clearly are a major threat to gut health, but it seems difficult to avoid them completely. Is there a way to protect yourself?

Dr. Gundry: Despite our best efforts, we all sometimes find ourselves in situations in which we must—or we accidentally—eat foods that contain major amounts of lectins. The good news is that there are a number of helpful lectin-absorbing compounds on the market.

You could take glucosamine and methylsulfonylmethane (MSM) in tablet form, which bind lectins. Also consider taking D-mannose in a dose of **500 mg** twice a day, particularly if you are prone to urinary tract infections.

LE: You designed your Longevity Paradox Program to restore a healthy gut microbiome and help maintain the integrity of the gut wall. What are some of the key elements of this program?

Dr. Gundry: Some elements of the Longevity Paradox Program may be familiar, such as eating lots of certain vegetables and getting the right amounts of exercise and sleep, while others, such as tricking your body into thinking it's winter year-round to stimulate your stem cells and spacing out your meals to “wash” your brain at night, are brand new.

Exposure to cold temperatures stimulates your gut buddies to produce more of two beneficial neurotransmitters, GABA and serotonin, both of which help extend lifespan. To take advantage of these benefits, I recommend taking a daily “Scottish shower.” This may not sound like fun, but it will certainly wake you up in the morning and force your body to stay energized and activated throughout the day. To do so, start your shower with warm water as usual and then gradually cool the water down. By the last couple of minutes of your shower, you should

be running nothing but cold water. I promise you'll get used to this fairly quickly.

LE: What about the brain wash?

Dr. Gundry: Deep sleep is when your glymphatic system “washes” your brain, scrubbing it of junk and debris so it doesn't build up an accumulation of the amyloid plaques that can eventually lead to Alzheimer's and other neurodegenerative diseases. I have incorporated a “brain wash” day into the Longevity Paradox Program. Once a week (or more), when it is convenient for you, you will skip dinner to make sure your blood can flow freely to your brain as soon as you fall asleep.

LE: What results have you seen with the Longevity Paradox Program?

Dr. Gundry: These strategies have helped my patients lower their blood pressure and cholesterol markers, significantly reduce symptoms of arthritis and other joint issues, resolve MS, lupus, and other autoimmune conditions, improve heart health, and slow or reverse the progression of cancer and dementia—not to mention lose weight and look decades younger!

If you follow my plan, within just a few weeks you'll have more gut buddies and far fewer squatters, and you'll start to see and feel a difference in your energy levels, in your lack of symptoms of many of the most common diseases of aging, on your skin, and on the scale.

As Hippocrates famously and wisely said, “All disease begins in the gut.” The good news is that all disease can be stopped there as well. ●

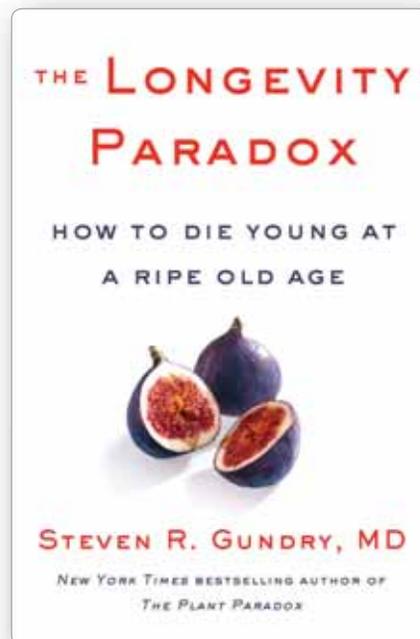
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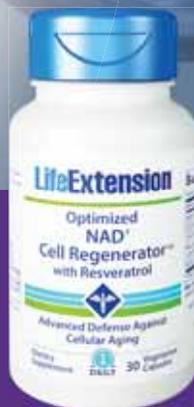
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Mohr Results:

Nutrition and Fitness Expert
Chris Mohr Helps People
Get the MOST Out of Life

BY LAURIE MATHENA

Dr. Christopher Mohr has spoken on health, nutrition, and fitness at the White House and the Central Intelligence Agency, to major corporations like Under Armour® and Deloitte, and on television programs like *The Talk*.

He's also worked as the consulting sports nutritionist for the National Football League's Cincinnati Bengals.

But despite the wide range of audiences, Mohr says that most people need the same overall message when it comes to improving their health. And he is passionate about bringing that message to aging individuals—not just to help them live longer—but to help them enjoy every minute of their longevity.

In the process, Mohr has built his passion for helping people into a wellness empire, with a message that has reached tens of thousands of individuals from all walks of life, in nearly 50 states and in more than 10 countries around the world.

Transforming Lives

Long before he started helping people transform their lives, Mohr went through his own transformation. As a boy in middle school, Mohr loved playing football. But by the time he reached eighth grade, he was over the weight limit to play, and he had a decision to make: lose weight or don't play.

It was an easy decision for Mohr. "The process of losing 20 pounds got me interested in fitness and nutrition," said Mohr. "I started reading fitness magazines. And when it came time to apply for college, the only thing I was interested in was nutrition."

That initial interest has shaped Mohr's career. He went on to get a Master of Science in Nutrition from the University of Massachusetts, and a PhD in Exercise Physiology from the University of Pittsburgh.

Early in his career, Mohr wrote a column for *Men's Fitness Magazine*, he also wrote for Discovery Health's medical TV program, and currently he is on the Men's Health Advisory Board.

But it wasn't until he met his wife that their business, Mohr Results, really took off.

Named one of the top weight loss doctors in the country by *Prevention Magazine*, Dr. Kara Mohr also earned a PhD in Exercise Physiology from the University of Pittsburgh. She was a professor, teaching at the University of Louisville, before leaving to join forces with Chris.

This dynamic duo started and ran the number one fitness bootcamp in Louisville, Kentucky, for six years. During that time, they reached nearly 1,000 women, helping them take control of their health. Then the couple turned their attention to coaching and speaking to larger groups around the world.

"Together we have a unique combination of exercise physiology, nutrition, and behavior change—three pillars that make for a nice complement for helping people make sustainable lifestyle changes," said Chris Mohr.

More Movement

Whether he is speaking to an audience in London or having a one-on-one in your living room, Mohr's message on fitness boils down to this: Do what you love and what is realistic for your abilities—and do just enough exercise to get the result and no more.

"Most people don't have an hour or two to spend at the gym every day. I know I don't," he said. "I can talk until I'm blue in the face about the benefits of resistance training, but if you have zero interest in that, you're not going to do it."

Instead, Mohr says to start by including more movement throughout the day—like using the bathroom upstairs when you're downstairs, and parking farther away from the entrance at the supermarket.

"These activities can sound so basic, and it's easy to discount them," said Mohr. "But added together, those simple things help so much because the more you do, the more you'll be able to do. I want you to move as much as possible, then exercise just as much as you need. Movement and exercise are different."

In addition to achieving your own personal goals, one of the biggest benefits to moving on a regular basis is getting more energy.

"When you get your blood flow going, and when you fuel your body a little bit better, you'll regain much of the energy that you had when you were younger," said

Mohr. "The best part is that you don't have to overhaul your entire lifestyle to achieve these results."

Lessons from the Blue Zones

"Fitness keeps you young," said Mohr. "It is what allows you to not just live a long life, but to be able to enjoy it. Nutrition is equally important. What you put in your body is what you will get out of your body."

Mohr doesn't recommend fad diets or getting caught up in the latest trends. Instead, he advocates following a basic Mediterranean-diet lifestyle that includes lots of color from fruits and vegetables, as well as lean protein and grains.

These recommendations are based on the latest science and follow the example of people who live in the areas of the world where people live longest: the blue zones.



There are five blue zones, where communities of people routinely live to be older than 100. When evaluating the habits of these centenarians, researchers have found that many follow a Mediterranean-style diet.

For example, the individuals living in Ikaria, Greece, an island eight miles off the coast of Turkey, have some of the lowest rates of middle-aged mortality in the world. Researchers attribute this longevity to their diet, which is rich in fruits, vegetables, and healthy fats, and low in dairy, meat, and sugar.

And in the Ogliastra mountain region of the Italian island of Sardinia, which boasts the highest concentration of centenarian men in the world, people regularly consume a diet rich in home-grown fruits and vegetables, cheese that comes from grass-fed sheep, and goat's milk.

But diet isn't the only factor in these societies' longevity.

"The other huge component is the social aspect," Mohr said. "A huge benefit that keeps popping up is the connection among people. Older people can often lose community and connection. They retire, and don't feel like they have a purpose anymore."

The centenarians living on the Nicoya Peninsula of Costa Rica are a perfect example of the benefits of staying connected. Next to Sardinia, Nicoya has the second highest population of male centenarians, and in this case, their longevity is attributed to their strong faith communities and deep social networks.

The Key to Lasting Change

"At the end of the day, you can make the changes, but if you don't have the behaviors to support them, you won't maintain them long-term,"

said Mohr. "Otherwise it's like a New Year's resolution."

Defining your "why" is a key step in creating sustainable change in your life, he explained. "You have to dig down to how someone feels. Rather than wanting to weigh a specific weight, or even wanting to lower your risk of heart disease, you have to identify why."

For example, do you want to lose weight so that you'll have more energy to play on the floor with your grandkids? So that you can join the local pickleball league? So that you can be more active during retirement with your spouse?

"Each of us has our unique why," said Mohr. "It's something that makes it tangible to you."

Taking a Peek Inside Your Body

Many trainers emphasize how the outside of your body looks, but Mohr stresses that what's going on inside is as important—or more.

"You might know your body weight, but what's going on with your cholesterol, your hormones, or your vitamin D levels?" he said.

That's why, in addition to teaching his clients about proper nutrition, Mohr recommends blood panel tests available through **Life Extension**®.

"Everything we've talked about is great for your physical health, but you don't know what's going on inside your body unless you test it," he said. "The blood panel test is a very simple way to get a comprehensive assessment that will let you know if there's something you need to work on."

Most doctors test for markers such as cholesterol and triglycerides, but the **Life Extension**® blood panel test is much more comprehensive, evaluating a dozen

or more markers (depending on the specific test), such as steroid hormones like testosterone and DHEA-S, prostate markers like PSA, and cardiac markers like C-reactive protein and homocysteine.

Once you know what's going on inside your body, you can take steps to improve it.

"I start with recommendations around nutrition, exercise, and sleep, since they all have a huge impact on blood panels," Mohr said. "Then I add in supplements. I call them 'complements,' because they should complement a quality diet. Where nutrition may not do all that's needed, supplements can potentially help effect change."

But for those of you who don't have Mohr to personally guide you based on your test results, **Life Extension** provides free access to trained wellness specialists, who can make recommendations tailored to your individual needs.

Targeted Health Advice

When Mohr got his blood drawn for the **Male Elite Panel Blood Test**, the technician drew 10 vials of blood—far more than a typical blood draw.

The lab technician was curious about this and she asked for more information, including the cost.

"I told her it was about \$430, and she was shocked. She said that if you just got vitamin D tested alone, it would cost about \$280," said Mohr. "So, when you consider that this particular test includes more than 28 important measurements, you can see that it's really cost effective."

Life Extension works hard to negotiate the best lab test prices for its customers. Regular blood testing is a core ingredient of the **Life Extension** philosophy of being proactive about your health.

The results of Mohr's male blood panel test revealed that his vitamin D levels were below optimal, at **34 ng/mL**. This is technically within "normal" limits according to current recommendations. But the latest research recommends aiming for levels of **50-80 ng/mL** in order to attain vitamin D's disease-lowering benefits.

"I was surprised by these results because I had been taking **3,000 IUs** of vitamin D during the winter months, and I thought I was getting enough sunlight during the summer to get all the vitamin D I needed," Mohr said. "This test showed me that there's more I can do to achieve optimal vitamin D levels."

As a result, he added additional vitamin D to his regimen, which includes omega-3s, a multivitamin, and a whey protein supplement. He plans to have his levels retested after a few months.

"If you get targeted answers, you can choose targeted supplements and not blind recommendations," said Mohr. "My vitamin D results are the perfect example of that."

Getting the Most Out of Life

Mohr stays active doing resistance training, swimming, and playing tennis. When he's working from home, upstairs, he walks two floors down to use the bathroom there, in order to get more movement, just like he encourages his clients to do.

"I get in as much movement as I can outside structured exercise," said Mohr. "During the summer I enjoy playing basketball with my daughters and going for a walk in the evening. Anything to get that movement in consistently."

The nutrition aspect is equally important. His family follows

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- Ferritin
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a Mediterranean-style diet that includes lots of fruits, vegetables, and lean protein, plus plenty of fibrous greens.

"We also stress that it's not just about what you eat and how much, but about the social aspect," said Mohr.

That's why every Friday night he shares a meal with a group of friends.

"Food connects us," he said. "We see the social benefits from people living in the blue zones, and we try to practice that ourselves."

These are important lessons Mohr instills in his daughters, and it's what he teaches his clients as well. After all, "Mohr Results" might be his business, but helping people get the *most* out of life is his mission.

"At the end of the day, all we have is our body," Mohr said. "How

we take care of it is what's going to carry us on, not just for living longer, but for having energy and vitality to live a great life, longer." ●

Christopher Mohr, PhD, RD, has a Bachelor and a Master of Science degree in Nutrition from The Pennsylvania State University and University of Massachusetts, respectively. He earned his PhD in exercise physiology from the University of Pittsburgh and is a Registered Dietitian. For more information or to hire Mohr for a speaking engagement, visit www.MohrResults.com.

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

Mint

BY LAURIE MATHENA

Mint is commonly found in products like toothpaste, chewing gum, and breath mints, but there is more to this tasty herb than its breath-freshening qualities.

Mint's use as an herbal medicine dates back to at least 1,000 BC, when the ancient Egyptians used it for its antibacterial properties.¹ More recently, studies have shown that compounds found in mint can have beneficial effects on conditions including nasal congestion, digestion, and memory.

Respiratory Conditions

Menthol, the most abundant compound found in mint, is what gives the herb its signature flavor. Menthol also has numerous health benefits, especially in the area of respiratory disorders. Traditional Chinese medicine has used mint as a treatment for respiratory diseases for hundreds of years. In a study, lozenges containing menthol were found to improve nasal sensation of airflow in people suffering from nasal congestion associated with the common cold.²

Digestion

The same compound, menthol, has been shown to help with digestion. In an animal study, giving menthol to rats produced gastroprotective and anti-diarrheal activities.³ Menthol also has antispasmodic effects that can relieve indigestion and abdominal pain.⁴

Cognitive Benefits

One study showed that people who chew gum with mint as the major active ingredient had higher levels of memory retention and alertness than those who didn't. In fact, another study showed that simply inhaling the aroma of mint is an effective way to boost memory and mood.⁵

Mint makes a delicious tea and can add a fresh flavor to a variety of salads.

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3. *Chem Biol Interact*. 2013 Nov 25;206(2):272-8.
4. *Molecules (Basel, Switzerland)*. 2019;24(9):1675.
5. *Int J Neurosci*. 2008 Jan;118(1):59-77.



AN AUTHENTIC Extra Virgin Olive Oil YOU CAN TRUST

California Estate Organic Extra Virgin Olive Oil is American grown and lab-tested to be *extremely* high in polyphenols—over **800 mg per kg**—as well as organic, authentic, and unadulterated.

This unfiltered **extra virgin olive oil** is:

- Cold-extracted at a small family farm in Yolo County, California, within *hours* of harvesting,
- Made entirely from green olives, *handpicked* to avoid bruising,
- Rich in distinctive and fruity flavor,
- Documented to have an exceptionally high content of potent **polyphenols**.

California Estate Organic Extra Virgin Olive Oil

Item #02008 • 500 ml

1 bottle **\$24.75**

4 bottles \$22.50 each



For full product description and to order **California Estate Organic Extra Virgin Olive Oil**, call **1-800-544-4440** or visit www.LifeExtension.com

Higher Potency CARNOSINE

Protect Against Aldehyde Damage



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

Item #01829 • 60 vegetarian capsules

1 bottle \$27

4 bottles \$24 each

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



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

Item #02020 • 60 vegetarian capsules

1 bottle \$30

4 bottles \$27 each

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



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

Item #01868 • 120 capsules

1 bottle \$51

4 bottles \$45 each

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

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

Bio-Enhanced® is a registered trademark of Geronova Research, Inc.



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

ACTIVE LIFESTYLE & FITNESS

- 01529 Creatine Capsules
- 02318 Keto Brain and Body Boost
- 02020 Super Carnosine
- 02023 Tart Cherry with CherryPURE®
- 02146 Wellness Bar—Chocolate Brownie
- 02147 Wellness Bar—Cookie Dough
- 02246 Wellness Code® Advanced Whey Protein Isolate Vanilla
- 02221 Wellness Code® Muscle Strength & Restore Formula
- 02127 Wellness Code® Plant Protein Complete & Amino Acid Complex
- 02261 Wellness Code® Whey Protein Concentrate Chocolate
- 02260 Wellness Code® Whey Protein Concentrate Vanilla
- 02243 Wellness Code® Whey Protein Isolate Chocolate
- 02242 Wellness Code® Whey Protein Isolate Vanilla
- 02220 Wellness Shake • Chocolate
- 02219 Wellness Shake • Vanilla

AMINO ACIDS

- 01039 Arginine & Ornithine Capsules
- 00038 Arginine Ornithine Powder
- 01253 Branched Chain Amino Acids
- 01829 Carnosine
- 01671 D,L-Phenylalanine Capsules
- 01624 L-Arginine Caps
- 01532 L-Carnitine
- 00345 L-Glutamine
- 00141 L-Glutamine Powder
- 01678 L-Lysine
- 00133 L-Taurine Powder
- 00326 L-Tyrosine Powder
- 01827 Taurine

BLOOD PRESSURE & VASCULAR SUPPORT

- 01824 Advanced Olive Leaf Vascular Support with Celery Seed Extract
- 02004 Arterial Protect
- 70000 Blood Pressure Monitor Arm Cuff
- 70004 Blood Pressure Monitor Digital Wrist Cuff
- 02097 Endothelial Defense™ Pomegranate Complete
- 00997 Endothelial Defense™ with GliSODin®
- 02090 NitroVasc™
- 00984 Optimal BP Management
- 01953 Pomegranate Complete
- 00956 Pomegranate Fruit Extract
- 02024 Triple Action Blood Pressure AM/PM
- 02102 Venoflow™

BONE HEALTH

- 01726 Bone Restore
- 02123 Bone Restore-Sugar-Free
- 01727 Bone Restore with Vitamin K2
- 01725 Bone Strength Formula with KoAct®
- 00313 Bone-Up™
- 01963 Calcium Citrate with Vitamin D
- 01506 Dr. Strum's Intensive Bone Formula
- 01476 Strontium Caps

BRAIN HEALTH

- 01524 Acetyl-L-Carnitine
- 01974 Acetyl-L-Carnitine Arginate
- 01008 Blast™
- 02321 Cognitex® Basics
- 02396 Cognitex® Elite
- 02397 Cognitex® Elite Pregnenolone
- 01659 Cognizin® CDP-Choline Caps
- 01540 DMAE Bitartrate (dimethylaminoethanol)
- 02006 Dopa-Mind™
- 02212 Focus Tea™

- 01658 Ginkgo Biloba Certified Extract™
- 01527 Huperzine A
- 00020 Lecithin Granules
- 02101 Memory Protect
- 00709 Migra-Eeze™
- 01603 Neuro-Mag® Magnesium L-Threonate Caps
- 02032 Neuro-Mag® Magnesium L-Threonate Powder
- 00888 Optimized Ashwagandha Extract
- 01676 PS (Phosphatidylserine) Caps
- 01327 Vinpocetine

CHOLESTEROL MANAGEMENT

- 01828 Advanced Lipid Control
- 01359 Cho-Less™
- 01910 CHOL-Support™
- 01030 Red Yeast Rice
- 01304 Theaflavins Standardized Extract
- 00372 Vitamin B3 Niacin Capsules

DIGESTION SUPPORT

- 53348 Betaine HCl
- 54160 Black Vinegar
- 30747 Digest RC®
- 07136 Effervescent Vitamin C - Magnesium Crystals
- 02021 Enhanced Super Digestive Enzymes
- 02022 Enhanced Super Digestive Enzymes W/Probiotics
- 02033 EsophaCool™
- 01737 Esophageal Guardian
- 01706 Extraordinary Enzymes
- 02100 Gastro-Ease™
- 01122 Ginger Force™
- 00605 Regimint
- 01386 TruFiber®

ENERGY MANAGEMENT

- 01628 Adrenal Energy Formula • 60 veg caps
- 01630 Adrenal Energy Formula • 120 veg caps
- 01805 Asian Energy Boost
- 00972 D-Ribose Powder
- 01473 D-Ribose Tablets
- 01544 Forskolin
- 00668 Metabolic Advantage Thyroid Formula™
- 01869 Mitochondrial Basics with PQQ
- 01868 Mitochondrial Energy Optimizer with PQQ
- 01904 NAD+ Cell Regenerator™ • 100 mg
- 02144 NAD+ Cell Regenerator™ • 250 mg
- 02148 Optimized NAD+ Cell Regenerator™ with Resveratrol
- 01500 PQQ Caps • 10 mg
- 01647 PQQ Caps • 20 mg
- 00889 Rhodiola Extract
- 01900 RiboGen™ French Oak Wood Extract
- 02003 Triple Action Thyroid

EYE HEALTH

- 01923 Astaxanthin with Phospholipids
- 00893 Brite Eyes III
- 01514 Eye Pressure Support with Mirtogenol®
- 01992 MacuGuard® Ocular Support with Saffron
- 01993 MacuGuard® Ocular Support with Saffron & Astaxanthin
- 01873 Standardized European Bilberry Extract
- 01918 Tear Support with MaquiBright®

FISH OIL & OMEGAS

- 00463 Flaxseed Oil
- OMEGA FOUNDATIONS®
- 02311 Clearly EPA/DHA
- 01937 Mega EPA/DHA
- 02218 Mega GLA with Sesame Lignans
- 01983 Super Omega-3 EPA/DHA with Sesame Lignans & Olive Extract

- 01988 Super Omega-3 Plus EPA/DHA with Sesame Lignans, Olive Extract, Krill & Astaxanthin
- 01982 Super Omega-3 EPA/DHA w/ Sesame Lignans & Olive Extract • 120 softgels
- 01985 Super Omega-3 EPA/DHA w/ Sesame Lignans & Olive Extract • 60 enteric coated softgels
- 01984 Super Omega-3 EPA/DHA w/ Sesame Lignans & Olive Extract • 120 enteric coated softgels
- 01986 Super Omega-3 EPA/DHA w/ Sesame Lignans & Olive Extract • 240 easy-to-swallow 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 Sweetener
- 00432 Stevia™ Sweetener

GLUCOSE MANAGEMENT

- 01503 CinSulin® with InSea²® 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, 30 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

- 00607 DHEA (Dehydroepiandrosterone) 25 mg, 100 tablets (dissolve in mouth)
- 00454 DHEA (Dehydroepiandrosterone) 15 mg, 100 capsules
- 00335 DHEA (Dehydroepiandrosterone) 25 mg, 100 capsules
- 00882 DHEA (Dehydroepiandrosterone) 50 mg, 60 capsules
- 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

- 00681 AHCC®
- 02302 Bio-Quercetin
- 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®
- 01924 Advanced Bio-Curcumin® with Ginger & Turmerones Turmeric Extract
- 01709 Black Cumin Seed Oil
- 01710 Black Cumin Seed Oil with Bio-Curcumin®
- 00202 Boswella
- 01804 Cytokine Suppress® with EGCG
- 00318 Serrafazyme
- 01203 Specially-Coated Bromelain
- 00467 Super Bio-Curcumin® Turmeric Extract 400 mg, 30 veg capsules
- 00407 Super Bio-Curcumin® Turmeric Extract 400 mg, 60 veg capsules
- 01254 Zyflamend™ Whole Body

JOINT SUPPORT

- 01404 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

- 02240 Anti-Alcohol HepatoProtection Complex
- 01651 Calcium D-Glucarate
- 00550 Chlorella
- 01571 Chlorophyllin
- 01922 European Milk Thistle • 60 softgels
- 01925 European Milk Thistle • 120 softgels
- 01522 European Milk Thistle • 60 veg capsules
- 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

LONGEVITY & WELLNESS

- 00457 Alpha-Lipoic Acid
- 01625 AppleWise Polyphenol Extract
- 01214 Blueberry Extract
- 01438 Blueberry Extract with Pomegranate
- 02270 DNA Protection Formula
- 02119 GEROPROTECT® Ageless Cell™
- 02133 GEROPROTECT® Longevity A.I.™
- 02211 Grapeseed Extract
- 02109 Mediterranean Whole Food Blend
- 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
- 01459 Magnesium Caps
- 01682 Magnesium (Citrate)
- 01328 Only Trace Minerals
- 01504 Optimized Chromium with Crominex® 3+
- 02309 Potassium with Extend-Release Magnesium
- 01740 Sea-Iodine™
- 01879 Se-Methyl L-Selenocysteine
- 01778 Super Selenium Complex
- 00213 Vanadyl Sulfate
- 01813 Zinc Caps

MISCELLANEOUS

- 00577 Potassium Iodide
- 00657 Solarshield® Sunglasses

MOOD & STRESS MANAGEMENT

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

MULTIVITAMINS

- 02199 Children's Formula Life Extension Mix™
- 02398 Comprehensive Nutrient Packs ADVANCED
- 02364 Life Extension Mix™ Capsules without Copper
- 02354 Life Extension Mix™ Capsules
- 02356 Life Extension Mix™ Powder
- 02357 Life Extension Mix™ Tablets with Extra Niacin
- 02365 Life Extension Mix™ Tablets without Copper
- 02355 Life Extension Mix™ Tablets
- 02092 Once-Daily Health Booster • 30 softgels
- 02091 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
- 02000 FLORASSIST® Mood
- 02208 FLORASSIST® Nasal
- 02120 FLORASSIST® Oral Hygiene
- 02203 FLORASSIST® Prebiotic
- 01920 FLORASSIST® Throat Health
- 52142 Jarro-Dophilus® for Women
- 00056 Jarro-Dophilus EPS® • 60 veg capsules
- 21201 Jarro-Dophilus EPS® • 120 veg capsules
- 01038 Theralac® Probiotics
- 01389 TruFlora® Probiotics

SKIN CARE

- 80157 Advanced Anti-Glycation Peptide Serum
- 80165 Advanced Growth Factor Serum
- 80170 Advanced Hyaluronic Acid Serum
- 80154 Advanced Lightening Cream
- 80155 Advanced Peptide Hand Therapy
- 80152 Advanced Triple Peptide Serum
- 80140 Advanced Under Eye Serum with Stem Cells
- 80137 All-Purpose Soothing Relief Cream
- 80139 Amber Self MicroDermAbrasion
- 80118 Anti-Aging Mask
- 80151 Anti-Aging Rejuvenating Face Cream
- 80153 Anti-Aging Rejuvenating Scalp Serum
- 80133 Anti-Oxidant Facial Mist Hydrator
- 80156 Collagen Boosting Peptide Serum
- 80169 Cucumber Hydra Peptide Eye Cream

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

SLEEP

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

VITAMINS

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

WEIGHT MANAGEMENT & BODY COMPOSITION

- 00658 7-Keto® DHEA Metabolite • 25 mg, 100 capsules
- 01479 7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules
- 01509 Advanced Anti-Adipocyte Formula
- 01807 Advanced Appetite Suppress
- 02207 AMPK Metabolic Activator
- 01823 CalReduce Selective Fat Binder
- 01478 DHEA Complete
- 01738 Garcinia HCA
- 29754 HCActive Garcinia Cambogia Extract
- 01292 Integra-Lean®
- 01908 Mediterranean Trim with Sinetrol™ -XPur
- 01492 Optimized Irvingia with Phase 3™ Calorie Control Complex
- 01432 Optimized Saffron with Satiereal®
- 00818 Super CLA Blend with Sesame Lignans
- 01902 Waist-Line Control™
- 02151 Wellness Code® Appetite Control

WOMEN'S HEALTH

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

✓ Innovative.

✓ Clinically Studied.

✓ Industry Leading.



Superior Probiotics from Jarro Formulas®

The proper balance of microflora in the intestines is crucial for health and well-being. **Jarro Formulas®** probiotic dietary supplements are designed to maintain a healthy balance of these microflora to maximize your digestive and immune system.*

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

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

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

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

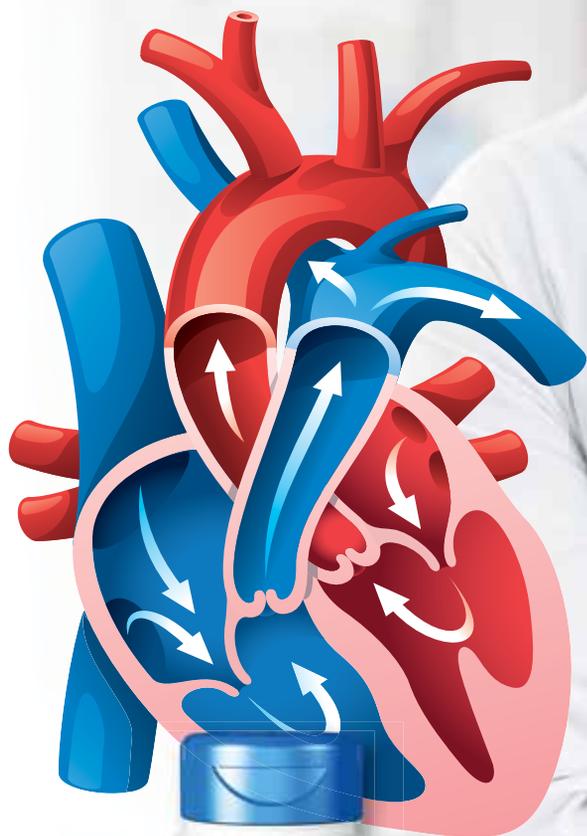
www.Jarro.com

Jarro
FORMULAS®

* 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.

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Has Your Doctor Recommended CoQ10?



*2019 Consumer Satisfaction, Rated #1 Catalog/Internet Supplement Brand.
Ratings based on results of the 2019 ConsumerLab.com Survey of Supplement Users.
More information at consumerlab.com/survey2019.



Item #01426 • 60 softgels • 1 bottle \$46.50 • 4 bottles \$39 each

For full product description and to order **Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™**, call 1-800-544-4440 or visit www.LifeExtension.com

Q+®, Kaneka Ubiquinol™, and the quality seal™ are registered or pending trademarks of Kaneka Corp. PrimaVie® is a registered trademark of Natreon, Inc.

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WHAT'S INSIDE

Visit us at www.LifeExtension.com

LifeExtension® Magazine



7 IS MEMORY LOSS OPTIONAL?

In a landmark **2019** study, five **plasma nutrients** were associated with improved **cognitive performance** and **brain connectivity**.



34 RHODIOLA COMBATS BURNOUT

The herb **Rhodiola** *significantly* improved all main symptoms of **burnout** within the **first week** in a recent clinical trial!



50 LOWER HOMOCYSTEINE TO SLOW BRAIN AGING

High **homocysteine** contributes to Alzheimer's, Parkinson's and other forms of dementia. A simple blood test detects elevated **homocysteine** levels that can be reduced with bio-active **B-vitamins**.



26 HEALTHY WAY TO BENEFIT FROM KETONES

Scientists have identified a method to increase **ketones** without the difficulties of a low carb/high fat **ketogenic diet**.



43 CLOVE EXTRACT LOWERS BLOOD SUGAR

A polyphenol-rich **clove extract** has been shown to lower *after-meal* blood sugar by **21.5%** in healthy people and **27.2%** in **prediabetics**.



60 ALLEVIATE MENOPAUSE SYMPTOMS WITHOUT HORMONES

A standardized **plant extract** relieved **11** menopause symptoms in a controlled study. Hot flashes *decreased* from **15** a day to less than **1.4** a day.