Safe Relief from ACUTE PAIN

PLUS: PAGE 79
Harvard Scientist Describes The Mindspan Diet
The annual SUPER SALE enables premium nutrient formulas to be obtained at the year’s lowest prices.

Long-term supporters know that the quality of the products is backed by Life Extension’s commitment to extended healthy lifespans.

Below are examples of SUPER SALE savings:

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin D3</td>
<td>125 mcg (5,000 IU), 60 softgels • Item #01713</td>
<td>$5.85</td>
</tr>
<tr>
<td>N-Acetyl-Cysteine</td>
<td>600 mg, 60 capsules • Item #01534</td>
<td>$8.33</td>
</tr>
<tr>
<td>Super K</td>
<td>90 softgels • Item #02334 (3-month supply)</td>
<td>$18.23</td>
</tr>
<tr>
<td>BioActive Complete B-Complex</td>
<td>60 vegetarian capsules • Item #01945</td>
<td>$7.20</td>
</tr>
<tr>
<td>Zinc Caps</td>
<td>90 vegetarian capsules • Item #01813</td>
<td>$5.40</td>
</tr>
<tr>
<td>AMPK Metabolic Activator</td>
<td>30 vegetarian tablets • Item #02207</td>
<td>$21.60</td>
</tr>
<tr>
<td>Vitamin C 24-Hour Liposomal</td>
<td>60 vegetarian capsules • Item #02501</td>
<td>$20.70</td>
</tr>
<tr>
<td>Senolytic Activator</td>
<td>36 vegetarian capsules • Item #02301 (3-month supply)</td>
<td>$16.20</td>
</tr>
<tr>
<td>Super Omega-3 Fish Oil, Sesame Lignans, Olive Extract, Krill &amp; Astaxanthin</td>
<td>120 softgels • Item #01988</td>
<td>$28.35</td>
</tr>
<tr>
<td>FLORASSIST® GI with Phage Technology</td>
<td>30 liquid capsules • Item #02125</td>
<td>$20.25</td>
</tr>
<tr>
<td>Curcumin Elite</td>
<td>500 mg, 60 vegetarian capsules • Item #02407</td>
<td>$19.80</td>
</tr>
</tbody>
</table>

Customers traditionally take advantage of the SUPER SALE to stock up on a year’s supply of their favorite supplements. To place your order, call 1-800-544-4440 or visit www.LifeExtension.com (SUPER SALE pricing available only to customers in the US, Canada, and England.)

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Americans spend more than half their waking time sitting, which can lead to deep vein thrombosis. Clinical studies have shown two plant extracts reduce leg swelling and prevent venous clots.

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TAP THE POWER OF
N-ACETYL-L-CYSTEINE
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N-Acetyl-L-Cysteine (NAC) has been shown to support a healthy immune response and respiratory function.

NAC supports healthy levels of glutathione that helps promote a healthy inflammatory response and protect cells from oxidative stress.

CAUTION: Those who supplement with NAC should drink 6 to 8 glasses of water daily in order to prevent cysteine renal stones. Cysteine renal stones are rare but do occur.

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Aubrey de Grey, PhD, is a biomedical gerontologist and Editor-in-Chief of Rejuvenation Research, the world’s highest-impact, peer-reviewed journal focused on intervention in aging. He received his BA and PhD from the University of Cambridge in 1985 and 2000 respectively. Dr. de Grey is a Fellow of both the Gerontological Society of America and the American Aging Association and sits on the editorial and scientific advisory boards of numerous journals and organizations.

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Ralph W. Moss, PhD, is the author of books such as Antioxidants Against Cancer, Cancer Therapy, Questioning Chemotherapy, and The Cancer Industry, as well as the award-winning PBS documentary The Cancer War. Dr. Moss has independently evaluated the claims of various cancer treatments and currently directs The Moss Reports, an updated library of detailed reports on more than 200 varieties of cancer diagnoses.

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Xiaoxi Wei, PhD, is a chemist, expert in supramolecular assembly and development of synthetic transmembrane nanopores with distinguished selectivity via biomimetic nanoscience. She has expertise in ion channel function and characterization. She founded X-Therma Inc., a company developing a radical new highway towards non-toxic, hyper-effective antifreeze agents to fight unwanted ice formation in regenerative medicine and reduce mechanical icing.
If you experience general fatigue, it may be due to the decline of NAD+, an important coenzyme found in every cell.

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Between 1999 and 2019, nearly 500,000 people died from an overdose involving natural and synthetic opioids.\(^7\)

CDC data show that drug-related overdose deaths in 2020 hit a record high of 93,331 Americans.\(^8,9\)

As you can see by the chart on this page, overdose deaths have surged higher since widespread prescribing of opioid drugs began around 1999.

Poisonings inflicted by non-opioid pain drugs continue to disable and kill.

This editorial describes an alternative that has been shown to work as well as acetaminophen for acute pain, without the side effects.

The leading cause of acute liver failure in the United States is acetaminophen toxicity.\(^1\)

Each year, this popular drug is responsible for thousands of emergency room visits and hundreds of deaths in the United States.

It took decades for groups like Life Extension to force the FDA to mandate a warning on the label of acetaminophen drugs about liver toxicity.

Regular use of acetaminophen is associated with increased risk of kidney damage, kidney cancer, and dementia, yet nothing on the label warns of these dangers.\(^2-4\)

Ibuprofen is another over-the-counter drug that pain sufferers often take daily. Regular use can inflict stomach and kidney injuries.\(^5\)

In 1995, OxyContin\(^6\) was approved for routine pain relief. Makers of this drug recognized the potential to cause addiction and the resistance they would face from doctors.\(^6\)

The company developed a fraudulent marketing campaign designed to promote OxyContin\(^6\) as a time-released drug that was less prone to abuse.\(^6\)

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Combining acetaminophen with alcohol to relieve a hangover can damage your liver. In the 1980s, one of our medical advisors suggested that we make a product that combined acetaminophen with N-Acetyl-L-Cysteine (NAC) to protect against glutathione depletion.

The challenge is the FDA requires expensive clinical trials when combining a drug with a nutrient. There is no acetaminophen + N-Acetyl-L-Cysteine combination available today. Those who rely on acetaminophen may choose to take a 600 mg capsule of NAC with each acetaminophen dose.

Our Position on Routine Pain Relief

Acetaminophen, opioids, and some other analgesic drugs work in the central nervous system to dull the sense of pain. We at Life Extension have advocated for decades that it is more efficient to neutralize underlying causes. This includes pain resulting from joint cartilage degeneration or inflammation-induced musculoskeletal pain.

Reliance on drugs that block pain signals to the brain can enable the degenerative causes to worsen, leading many to increase their daily use of toxic pain relievers. Many people find long-term relief using nutrients such as glucosamine, gamma linolenic acid (GLA) and/or omega-3s.

For those with acute discomfort, a novel nutrient blend has been shown to work as effectively as acetaminophen without the toxic side effects.

Excess Dietary Omega-6 Fats Cause Painful Inflammation

The American diet is loaded with omega-6 fats that are contributors to chronic inflammatory reactions. Processed foods often contain fats high in omega-6s, like safflower, cottonseed, soybean, and corn oils.

When one ingests an omega-6 fat, there are two major pathways it follows in the body.

As shown on the chart on the next page, a common pathway is for an enzyme called delta-5-desaturase to convert omega-6s into pain-inducing prostaglandin E2 and leukotrienes.

The desired pathway for omega-6 fats is for enough of them to convert to an anti-inflammatory compound called prostaglandin E1.
This makes sense, as the nutrients combat underlying causes of musculoskeletal pain whereas acetaminophen works by blocking pain signals to the brain.

When assessing total pain relief endpoints in this study, the results showed the nutrient blend worked as well as acetaminophen.

**Fast- versus Slow-Acting Nutrients**

Nutrients like glucosamine and omega-3s do not provide immediate relief.

In contrast, a blend of black sesame oil plus turmeric and Boswellia extracts was shown to reduce pain scores to a similar degree as acetaminophen, starting day one.

These data indicate a potential for acute-pain sufferers to find fast-acting relief, and an opportunity for chronic-pain sufferers to use this nutrient blend for an extended period, as there are no toxicity concerns.

**Young Bodies Heal Fast**

Children’s injuries usually heal quickly.

Healing rates in older adults are so slow that there are those who suffer immobility caused by injuries and persistent inflammation.

Elderly individuals suffer musculoskeletal pain caused by degenerative processes that can be exacerbated by past or current injuries.
Chronic reliance on pain-relieving drugs can lead to side effects.

A better solution is to restore older persons to more youthful functionality, to reverse frailty, and to extinguish inflammatory fires that typically accompany aging. Those suffering from musculoskeletal pain may consider a proprietary blend of black sesame oil-turmeric-Boswellia and also:

- Reduce ingestion of dietary omega-6 fats,
- Consume more omega-3s, and
- Reduce all forms of sugar intake.

In this month’s issue...

The article on page 50 of this month’s issue describes the research demonstrating pain relief in response to a combination of black sesame oil, turmeric and Boswellia.

Page 35 discusses a 2021 study showing that vinpocetine (used to boost cognitive function) can also help reverse certain forms of hearing loss.

Migraine sufferers continue to benefit from magnesium and a study described on page 70 of this issue further corroborates this.

Anti-Aging Update

In November 2020, headline news stories around the world announced findings from a hyperbaric oxygen study that lengthened telomeres by 20% in study subjects. The media proclaimed aging had been reversed for the first time in humans.

To achieve these telomere elongation benefits, study subjects underwent hyperbaric oxygen therapy plus breathing in pure oxygen five days a week for three consecutive months.

Telomeres are tips at the end our chromosomes that shorten with each cell division. When there is no more telomere structure, cells die.

We’ve been informed that a study will soon be published showing hyperbaric therapy combined with healthy behavior patterns elongated telomeres an average of 40% in older people!

We are carefully monitoring this research and interacting with the scientists to validate whether this telomere elongation is associated with indicators of systemic age reversal.

In the meantime, you can reduce your rate of telomere shortening by:

- Engaging in healthy lifestyles
- Doing high-intensity interval training
- Ensuring adequate antioxidant intake
- Consuming high amounts of omega-3s
- Including walnuts in your diet
- Restricting your calorie intake

Healthy choices you make today help protect against a wide range of degenerative disorders, including reducing inflammatory pain and maintaining longer telomeres.

Your support of Life Extension helps us fund research that aims to reestablish youthful structure and function in our aging bodies.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club

Published in the Journal Aging on November 18, 2020

Hyperbaric oxygen therapy increases telomere length and decreases immunosenescence in isolated blood cells: a prospective trial

"Results: Telomeres length of T helper, T cytotoxic, natural killer and B cells increased significantly by over 20% following hyperbaric oxygen therapy (HBOT).... There was a significant decrease in the number of senescent T helpers by -37.30%±33.04 post-HBOT. T-cytotoxic senescent cell percentages decreased significantly by -10.96%±12.59 post-HBOT.

In conclusion, the study indicates that HBOT may induce significant senolytic effects including significantly increasing telomere length and clearance of senescent cells in the aging populations.”

https://www.aging-us.com/article/202188/text
In 1995, the FDA approved a time-released opioid drug called OxyContin® that purportedly was less prone to addiction and abuse compared to other prescription opioids.

Aggressive promotion of OxyContin® along with the FDA’s approval led to an epidemic of opioid addictions that continue to destroy the lives of millions of Americans. Many endure the agonies of opioid withdrawal only to succumb to the powerful addicting properties and resume using prescription opioids or turn to street opioids like heroin and fentanyl.

The financial success of OxyContin® led about a dozen other pharma companies (including a subsidiary of Johnson & Johnson) to create their own opioid brands that were approved by the FDA and aggressively marketed to medical doctors and dentists.

The media blames opioid makers like Purdue Pharma for deliberately downplaying the addiction risk to doctors and illegally encouraging widespread prescribing.

While the actions of Purdue and other opioid makers are deplorable, I continue to argue that it was the FDA’s approval of the opioid drugs that enabled the criminal behaviors of Big Pharma to occur.

Physicians’ prescribing practices are largely based on whether the drug is approved by the FDA to treat a specific indication. In the case of extended-release opioid prescription drugs, the FDA approved them for pain relief and said they were less prone to addiction and abuse.26 Hurried physicians trusted the FDA’s approval process, even though it was later discovered that two FDA-employed doctors who pushed OxyContin® through the approval process went to work for Purdue Pharma soon after. (This is known as the “revolving door” that breeds corruption throughout Congress and governmental agencies.)

Had the FDA recognized that any opioid carries an addiction risk, this drug class would never have been approved for widespread use.

Even after addiction and overdose deaths became apparent, the FDA continued to approve other opioid drugs that were then inappropriately marketed to physicians for widespread use.

Authors of Hyperbaric Study Describe Other Methods Shown to Preserve Telomere Length

- High consumption of omega-3s
- Diet rich in walnuts
- Calorie restriction

Healthy lifestyles
- High-intensity interval training
- Antioxidants

Novel Hyperbaric Oxygen Protocol Extends Telomere Length and Improves Immune Markers

- Some immune-cell telomeres elongated by over 20%.
- Some senescent immune cells reduced by 37%.
- Improved immune markers.

https://www.aging-us.com/article/202188/text
https://www.aging-us.com/article/202188/text
References


Increase AMPK to Better Manage Body Weight

Most people today consume excess calories. This results in mTOR constantly running at high gear, which is a factor in unwanted fat storage.

Studies show that increasing AMPK activity turns down excess mTOR.¹

Reduce Cell Fat Storage

Scientific studies show that increasing AMPK activity can encourage cells to store less fat and burn it as energy.²,³

AMPK Metabolic Activator was formulated based on data showing reduced belly fat in response to just one of its ingredients (Gynostemma pentaphyllum).³

This Gynostemma pentaphyllum + hesperidin formula is designed to support healthy AMPK cellular activation.

References

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

This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results are not guaranteed, and results may vary. Actiponin® is a trademark of TG Biotech Co., Ltd.
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Use code **BOOKSALE** | Offer ends December 27, 2021
Whey Protein Improves Microvascular Function in Heart Failure Patients

Heart failure patients supplemented with whey protein showed improvement in systemic microvascular circulation, according to a report in the Brazilian Journal of Medical and Biological Research.*

A randomized, placebo-controlled trial included 25 participants, average age 66, who had New York Heart Association class I or II heart failure. Participants received whey protein or a placebo for 12 weeks.

“Our results suggested that dietary supplementation with whey protein improved microvascular endothelial function and possibly smooth muscle structure in patients with heart failure,” the authors concluded.

Editor’s Note: The endothelium is the lining of the body’s arteries, whose function may be impaired in cardiovascular diseases, thereby reducing the arteries’ ability to relax, which adversely affects circulation.

Greater Magnesium Intake Linked with Lower Liver Cancer Risk

Increased intake of magnesium has a protective effect against the risk of developing liver cancer, an article published in *The American Journal of Clinical Nutrition* reported.*

Researchers at Vanderbilt University Medical Center examined data from 536,359 participants in the National Institutes of Health-American Association of Retired Persons (NIH-AARP) Diet and Health Study cohort. Food-frequency questionnaire responses during 1995 to 1996 were analyzed for total magnesium intake from supplements and food. The subjects were followed through 2011.

Among those whose total magnesium intake was among the top 25% of participants, there was a 35% lower adjusted risk of developing liver cancer in comparison with participants whose intake was among the lowest 25%.

**Editor’s Note:** During the time of the study, 1,067 cases of liver cancer were diagnosed among the participants.

A form of intermittent fasting called time-restricted eating may have a role in the prevention of chronic metabolic diseases, according to an article in *Endocrine Reviews*.*

Time-restricted eating is a technique in which all daily calories are consumed within a period of eight to 10 hours or less. Maintaining a long overnight fast is one way to conceptualize time-restricted eating. Long fasting periods have been associated with reduced chronic disease risk.

Research suggests that adopting a short window of feeding daily helps support healthy circadian rhythms. Circadian rhythms dictate the activity of genes, hormones, and metabolism at different times during a 24-hour day. Aligning when we eat with the body’s internal clock optimizes health.

*Editor’s Note:* “Intermittent fasting can improve sleep and a person’s quality of life as well as reduce the risk of obesity, diabetes and heart disease,” said senior author Dr. Satchidananda Panda.

*Endocr Rev. 2021 Sep 22;bnab027.*
A meta-analysis of randomized, controlled trials revealed lower combined risk of stroke, heart attack and vascular death, as well as a reduction in homocysteine levels, in stroke patients who received supplements containing B vitamins, compared to a placebo.*

Researchers selected eight trials that included a total of 8,513 stroke patients. Trials were limited to those that evaluated homocysteine levels and recurrence of stroke, recurrence of cardiovascular disorders, and vascular death (separately or combined) among participants who received a placebo or vitamin B6, vitamin B12 and folate.

Analysis of the trials’ results found a significant reduction in average homocysteine levels among B-vitamin-supplemented participants compared to those who received placebo. When the combined risks of heart attack, stroke and vascular death were examined, there was an 11% lower risk among participants who received the vitamins compared to the placebo.


Editor’s Note: Homocysteine is an amino acid formed in the body which, when elevated, is a risk factor for cardiovascular disease and numerous other conditions.
Testosterone builds muscle, maintains sexual health, supports cardiac function, strengthens bones, and nourishes brain cells.\(^1,2\)

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- **Luteolin** increases a protein for testosterone synthesis and inhibits aromatase, an enzyme that breaks down testosterone.\(^4,6\)

- Just one capsule a day.

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**References**


\(^\dagger\) This product is intended to support testosterone levels but does not contain testosterone. **Tesnor** is a trademark of Laila Nutra and Gencor.

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Risks of Sitting Too Long
According to a study that evaluated sedentary behaviors, Americans spend \textit{more than half} their waking hours sitting, whether at work, commuting, or at home.\textsuperscript{1}

Any extended period of sitting increases the risk of \textit{deep vein thrombosis}.\textsuperscript{2}

These dangerous clots commonly develop in the legs,\textsuperscript{3,4} but can break loose and travel to the lungs. They cause as many as \textbf{300,000 deaths} in the U.S. annually.\textsuperscript{5}

Scientists have identified two ingredients—the enzyme \textit{nattokinase} and an extract of \textit{French maritime pine bark}—that help prevent clotting and break down clots that start to form.\textsuperscript{6-9}

A combination of these compounds has been proven in \textit{clinical studies} to help prevent \textit{venous clots} even in high-risk individuals.\textsuperscript{10}
Sitting Too Long Can Be Deadly

Long, uninterrupted periods of sitting are a health hazard, even for those who exercise daily.11
When we sit, our calf muscles aren’t contracting to help propel spent blood in the veins back up to the heart.12

Prolonged sitting can reduce blood flow by up to two-thirds in the legs.13 When blood collects in the blood vessels of the legs, a thrombus (clot) is more likely to form.14

A clot that develops in the deep veins of the body is called deep vein thrombosis (DVT).3

If the clot breaks free and lodges in the arteries of the lungs, it can cause a pulmonary embolism, sometimes signaled by shortness of breath or chest pain. This urgent medical condition is fatal in up to 10% of cases.4,15

About half of individuals with deep vein thrombosis don’t have warning symptoms,16 like leg swelling or pain. That doesn’t mean they’re not in danger.17

The Risk Factors

Deep vein thrombosis can be triggered by long hours traveling in cramped conditions, such as those found on airplanes.13 This increased risk is highest within the two weeks after a long flight.18

Deep vein thrombosis may also develop after hours spent sitting at the computer.19

Other risk factors include recent orthopedic surgery, limited mobility, acute infections, taking estrogen or contraceptive pills, diabetes, hypertension, elevated cholesterol and homocysteine, dehydration, smoking, obesity, and pregnancy.20

Though anyone can be affected, the risk of deep vein thrombosis increases after age 40.3

As we get older, our clot-formation systems start to outpace our clot-breakdown systems, making us more prone to clots.21

Researchers have found a potential solution to this problem: a combination of nattokinase and French maritime pine bark extract.

Anti-Clotting Activity of Nattokinase

Nattokinase is an enzyme extracted from fermented soybeans (natto).7

Scientists found that the anti-clotting power of nattokinase is stronger than any other enzyme in 173 different natural foods tested.22

Nattokinase combats unwanted clotting in several different ways, including by:

- Decreasing the activation of pro-clotting factors,
- Breaking apart fibrin, the main protein in clots,
- Reducing the conversion of fibrinogen (a fibrin precursor) to fibrin, and
- Inhibiting platelets from clumping to form a clot.

These actions add up to powerful defense against deep vein thrombosis.

Putting Nattokinase to the Test

In a placebo-controlled study, 12 healthy men were given a single dose of 2,000 fibrinolytic units of nattokinase.23

Markers of the anti-clotting and clot-disrupting properties of nattokinase were detected in the subjects’ blood samples within two hours of just one single dose.

Other placebo-controlled human studies have shown that nattokinase can help decrease high blood pressure.25,26 In addition to increasing the risk of heart attacks and strokes, high blood pressure may raise the risk of clots.27,28
Defend Against Deep Vein Thrombosis

- Prolonged periods of sitting increase the risk of deep vein thrombosis or clots, particularly in the legs.
- These clots can break free and move to the lungs, where they can be fatal.
- A combination of the enzyme nattokinase and French maritime pine bark extract provides a safe, natural approach to combating leg swelling and clotting.
- This plant-based duo works in several different ways to inhibit clot formation, disrupt existing clots, decrease edema, and support circulation.
- In a controlled trial of people prone to deep vein thrombosis, a blend of nattokinase and French maritime pine bark extract completely prevented thrombotic events on a long flight, while 5.4% of the placebo group developed deep vein clots.

Complete Relief

In a recent study, researchers tested nattokinase in 153 adults who sought medical treatment for deep vein thrombosis or related vascular disorders.6 All subjects took a daily dose of 2,000 fibrinolytic units of nattokinase, either after a month-long course of an anticoagulant drug or after vascular surgery.

Nattokinase reduced symptoms beyond the previous drug or surgical treatment. It led to complete remission of subjects’ remaining vascular symptoms.

The nattokinase produced these benefits without side effects.6 By contrast, medications for thrombosis carry a risk of adverse events like internal bleeding.29,30
**How French Maritime Pine Bark Helps**

Extracts of French maritime pine bark are rich in plant compounds called procyanidins.31 These components provide antioxidant, anti-inflammatory, and platelet-regulating benefits, which help protect blood vessels.10,31-33

Another way the extract may help support veins is by promoting nitric oxide production.31 This gaseous molecule is found in the endothelium (lining) of blood vessels. It promotes healthy blood flow.34

In a preclinical screening of 13 polyphenol-rich plant extracts, only French maritime pine bark improved nitric oxide availability in both healthy and dysfunctional endothelial cells of veins.35

**Stop Swelling**

Edema (swelling) in the lower legs is a common problem for individuals with deep vein thrombosis.

Normally, the one-way valves in leg veins prevent blood from flowing backwards and pooling in the lower legs. These valves also help move venous blood back to the heart. In people with deep vein thrombosis, the valves become damaged.36

Doctors commonly recommend compression stockings to help reduce edema, but many people find them uncomfortable.37

In a 12-month study, 156 patients with a history of a single, major thrombotic event were assigned either to take French maritime pine bark extract daily, wear compression socks, or do both.38

The extract was significantly more effective than compression socks, from six months onward, for decreasing leg edema.

Two new incidents of deep vein thrombosis developed in the compression-sock group within three to six months. No new thrombosis happened in the groups taking the pine bark extract.38

**Prevent DVT Recurrence**

Approximately one-third of people who experience deep vein thrombosis have another episode within 10 years.39

The highest risk of recurrence is within the first year. But a heightened risk remains for the rest of a person’s life.39

Lingering symptoms after recovery from deep vein thrombosis, called post-thrombotic syndrome, also occur in 43% of cases within two years. These symptoms can include chronic leg pain, swelling, discoloration, and new varicose veins.3,40

In an extensive study, scientists tested 815 people every six months for six years after their initial deep vein thrombosis.41
More Powerful Together

Combining nattokinase and French maritime pine bark extract provides defense against deep vein thrombosis.10

In a randomized, controlled study of 204 people taking long international flights, researchers gave half the group a blend of nattokinase and French maritime pine bark extract two hours before their flight, and again six hours later. The other half were given placebos.10

All subjects were at high risk for deep vein thrombosis, based on their past medical history, including previous episodes of the condition. Preflight, the two groups had equal levels of leg edema.

Exercise and hydration suggestions were given to both groups. The exercise plan consisted of mild, mainly isometric exercise including standing and moving legs for 5 to 10 minutes every hour. The hydration suggestion was to drink 3.4 to 5 oz. of water every hour.

While 5.4% of the placebo group developed flight-related deep vein thrombosis, the treatment group had no cases.

In addition, the placebo group had a 12% increase in ankle edema while the treatment group had a 15% decrease.

This study demonstrates the ability of the combination of nattokinase and French maritime pine bark extract to prevent edema and thrombosis.

Summary

The deep veins of our legs are prone to develop clots when we sit for long periods of time, such as on airplanes or at work.

Besides causing uncomfortable leg swelling, deep vein thrombosis carries the risk of the clot breaking free, traveling to the lungs, and causing a potentially fatal embolism.

Nattokinase and French maritime pine bark extract work together to promote healthy blood flow and inhibit venous blood clots.

Clinical trials have proven the protective circulatory benefits of these plant compounds in high-risk groups, including people on long flights and those with a history of deep vein thrombosis.

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


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Promotes healthy mitochondria, the cellular structures that produce energy needed by the entire body.

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SUPER SALE PRICE
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Vitamin K (four forms), vision guarding carotenoids, plus cell-protecting tocotrienols, lycopene and chlorophyllin.

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VINPOCETINE Improves Hearing Capacity

BY CHANCELLOR FALOON

Vinpocetine is a derivative of a compound found in the periwinkle plant.¹

It has demonstrated benefits for a range of conditions, including cerebral vascular disorders, seizures, and hearing loss.¹,²

In a clinical study published in 2021, vinpocetine was tested on patients with sensorineural hearing loss, which is caused by damaged hair cells in the inner ear.² Twelve months of vinpocetine intake (30 mg/day) significantly reduced the rate of deterioration and improved hearing capacity.

The effects of vinpocetine on increasing brain blood flow, reducing injury to blood vessels, and enhancing cerebral metabolism were uncovered decades ago.¹

In preclinical models, vinpocetine has shown protective effects against ischemia-reperfusion injury, the damage that occurs to tissues and organs when, following blockage of an artery, the oxygen-rich blood flow is restored.¹
New studies are now paving the way for further investigations into vinpocetine:

- In a cell culture study, vinpocetine reduced inflammation caused by the bacteria responsible for otitis media (middle ear infection).6
- In an animal model of Alzheimer’s disease, vinpocetine protected against deterioration in certain brain regions and reduced levels of beta-amyloid and phosphorylated tau proteins, both associated with Alzheimer’s disease severity.7

Vinpocetine provides wide-reaching benefits for brain and nervous system health. Research continues to uncover additional uses.

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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References

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Maintain Better Memory Function

VINPOCETINE

A compound originally found in the leaf of the periwinkle plant, vinpocetine has been shown to support brain health and memory function as people age.

Among its many benefits, vinpocetine has been shown to:

• Provide support for age-related cognitive decline
• Support healthy blood flow inside the brain

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Nearly 50% of adults aged 65 and older suffer from early-stage memory deficits, mild cognitive impairment, or worse.\(^1\)

Over 30% of those suffering from early cognitive decline will progress to full-blown dementia within just five years.\(^2\)

But there’s good news: Two nutrients have been shown in clinical studies to help protect cognitive function, stop memory loss and even possibly reverse early symptoms of cognitive decline.\(^3-6\)

In one study following patients over four years, a trend was observed in which low-dose lithium lowered the risk of mild cognitive impairment progressing to dementia by nearly half, compared to those who took a placebo.\(^3\)

In another, 54% of patients with early-stage Alzheimer’s who took a proline-rich peptide complex had improvements in their cognitive scores over the course of a year, while those taking a placebo deteriorated.\(^5\)
A Progressive Condition

The risk for cognitive decline increases with age. It is also progressive, meaning it grows over time with symptoms that include confusion and memory loss.

Only about 3% of people aged 65 to 74 have a diagnosis of full-blown dementia. But that number jumps to nearly 30% in those 85 and older.7

No approved drugs have been shown to significantly improve brain function once a diagnosis of dementia is made.

But scientists have found that some nutrients may slow the progression of the disease, and possibly halt or reverse its progression.3,6,8,9

Two of these nutrients, lithium and a proline-rich polypeptide complex, work by targeting the changes that occur in the brain with aging.

Brain Changes and Dementia

The brain undergoes structural changes as normal aging progresses.

These changes cause death and dysfunction of brain cells, shrinking the volume of the brain. This damage is associated with the memory deficits seen with mild cognitive impairment and dementia.

One of the most notable structural changes in the aging brain is the buildup of toxic protein clumps.

In youth, cells have means of clearing abnormal or damaged proteins. With older age, these cleaning mechanisms become less efficient, and the protein deposits build up.

Over time, these toxic proteins damage the brain and kill brain cells. They have generally been thought to interfere with brain function and healthy cognition.

A key player in brain aging is an enzyme known as glycogen synthase kinase 3 (GSK-3).

Ordinarily, this enzyme plays a role in the management of glucose metabolism. But in older age it can become overactive.10

Excess GSK-3 activity is a significant contributor to the formation of toxic protein clumps.11,12

Much research has been dedicated to finding ways to prevent the buildup of toxic proteins and to normalize GSK-3 activity. Two nutrients have been identified that do just that.

Lithium Protects the Brain

Very high doses of lithium have long been used to treat the psychiatric condition bipolar disorder.

But research shows that lithium in low doses is important for overall health and cognition.6

One of the ways lithium can work to preserve mental function and prevent cognitive decline is by improving the brain’s ability to clear amyloid proteins. In a mouse model of Alzheimer’s, lithium treatment increased brain clearance of amyloid by 31% while reversing long-term memory deficits.13

Other studies show that low-dose lithium reduces toxic protein clumps in the brain as well.14
Additional animal and cell studies have shown that lithium also protects the brain by helping to improve cellular “housekeeping,” mitochondrial function, production of brain growth factors, and more.15

**Human Trials of Lithium**

Lithium may help slow the worsening of cognitive decline.

In one clinical study, a micro-dose of just 300 mcg of lithium daily was found to significantly decrease cognitive decline in Alzheimer’s patients, compared to a placebo.6

Another study evaluated low-dose lithium in older adults with mild cognitive impairment and memory loss.3 These patients are at high risk of progressing to worse cognitive function and, eventually, dementia.

Subjects were randomized to receive either lithium or a placebo for two years. The placebo group showed significant functional and cognitive decline on dementia scales over the study period.

The lithium group, on the other hand, remained stable, with better performance on memory and attention tasks.

Researchers continued to follow these patients for a total of four years and compared them to those who took a placebo. They observed a trend in which low-dose lithium lowered the risk of mild cognitive impairment progressing to dementia by nearly half.

**Help Prevent Brain Aging**

- Memory loss and cognitive decline are extremely common in older age. They often progress to full-blown dementia.

- Small doses of the mineral lithium inhibit the enzyme GSK-3, associated with risk for cognitive dysfunction and the progression of structural damage to the brain.

- A proline-rich polypeptide complex derived from milk has been shown in preclinical studies to reduce amyloid and tau protein deposition in the brain, as well as the resulting loss of brain cells.

- Clinical studies show that untreated individuals with mild cognitive impairment or Alzheimer’s disease tend to worsen significantly over time. But those given lithium or a proline-rich polypeptide complex remain stable or even experience improvement in cognitive function.
Looking for further evidence of brain protection with lithium, researchers reviewed randomized controlled trials, prospective observational studies, and meta-analyses published in the medical literature.

They found level 1 evidence—the highest level of scientific evidence—that lithium use is associated with greater beneficial brain gray-matter volume.

In cognitive decline, the volume of gray matter (where brain cells reside) typically shrinks over time due to cell death. Lithium appears to preserve brain volume in multiple brain regions, including the hippocampus, which is critical for the formation of new memories.

In laboratory studies, this polypeptide complex mimics the effects of nerve growth factors by causing changes in some cells, including helping immature cells mature into functional cells. This increases the growth of nerve fibers.

In a mouse model of accelerated aging, use of the proline-rich polypeptide complex improved learning and memory and extended average lifespan by 26%.

Human Studies of Proline-Rich Polypeptides

In a randomized controlled trial, subjects with early-stage Alzheimer's disease received either the proline-rich polypeptide complex or a placebo. Cognitive impairment was evaluated by scores on the Mini-Mental State Examination.

After one year, those in the placebo group had a significant reduction in Mini-Mental State Examination scores.

But an astonishing 54% of those taking the polypeptides had improvements in their cognitive scores. The remainder were stable, without any worsening of cognitive function.

Those who had milder symptoms at the start of the study showed the greatest improvement on average, suggesting that starting to take the complex early is most beneficial.

Proline-Rich Polypeptides Fight Brain Aging

Colostrum is the early milk that mothers produce after a baby is born. Peptides (protein fragments) isolated from mother's milk contain large amounts of the amino acid proline.

This proline-rich polypeptide complex has been found to help aging brains resist those harmful structural changes.

Intake of this polypeptide complex alters expression of genes associated with the production of amyloid and the abnormal modification of tau proteins that lead to neurofibrillary tangles.
Both have shown that they help block the progression of the amyloid and tau protein structural damage that occurs in aging brains.

In human studies, the nutrients stabilize or even reverse signs of cognitive dysfunction, while those taking a placebo tend to deteriorate over time.

Many readers of this magazine take low-dose (1,000 mcg) lithium daily for potential longevity benefits, as well as neurological protection.

Those who want to take a combination of 300 mcg of lithium plus proline-rich polypeptide can safely continue supplementing with 1,000 mcg of lithium.

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

Summary

Memory loss and cognitive decline are common with advancing age. Many people with mild cognitive dysfunction eventually progress to Alzheimer’s disease or other forms of dementia.

Currently available medications do little to slow the progression of cognitive dysfunction. However, low doses of the trace mineral lithium and a milk-derived proline-rich polypeptide complex show great promise in clinical trials.

The same group of researchers performed another study that followed subjects for a longer period, some for as long as 28 months. At every time interval tested, cognitive function scores continued to improve for those in the proline-rich polypeptide group.

Patients with an Alzheimer’s diagnosis typically deteriorate over any period of observation. To see an improvement in cognitive function is a remarkable achievement.

The proline-rich polypeptide complex and lithium work in very different ways to preserve cognitive function. Taking these nutrients in combination may maximize their ability to help protect the brain.

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

References


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Dancing. Laughing. Smiling. These are your special moments … and they should be memories you will cherish for many years to come.
FAST RELIEF for Acute Pain
BY MARSHA MCCULLOCH, MS, RD

Scientists have identified three plant extracts that work together to relieve musculoskeletal pain:

- Turmeric extract,
- *Boswellia serrata* extract, and
- Black sesame seed oil.

In a 2020 human study, a combination of these extracts relieved acute musculoskeletal pain *as quickly and effectively as acetaminophen*.

This study showed this herbal blend to be 8.57 times better than acetaminophen at relieving the emotional strain and unpleasantness of pain.
Acute Musculoskeletal Pain

Acute musculoskeletal pain refers to stiffness or aching in the muscles, bones, joints, ligaments, or tendons that develops suddenly and is caused by something specific.2

Causes may include falls, repetitive strain, incorrect posture, sudden exertion (like lifting something heavy), or simple wear and tear over time.3

People have turned to herbal remedies for pain relief since ancient times.

Modern science has now verified three plant extracts that effectively relieve musculoskeletal inflammation and pain:

- **Black sesame seeds** are rich in bioactive compounds, including sesamin, which has anti-inflammatory actions.1,4
- **Turmeric** is a spice rich in curcumin, a compound known for its anti-inflammatory and free-radical-scavenging properties.5,6
- **Boswellia serrata** is a tree resin long used as a traditional Ayurvedic pain remedy.7 Also known as Indian frankincense, it contains the anti-inflammatory compound AKBA (3-O-acetyl-11-keto-beta-boswellic acid).1

Pain-Relieving Plants

Researchers have conducted human studies to individually evaluate turmeric, Boswellia, and black sesame seed for their pain-relief benefits.1,5,8

In a meta-analysis of eight randomized controlled trials involving 606 patients, scientists found that curcuminoids from turmeric significantly reduced pain severity from a variety of causes, including arthritis and exercise-induced muscle soreness.6

A meta-analysis of seven trials involving 545 osteo-arthritis patients showed that *Boswellia serrata* extract relieved pain and stiffness and improved joint function better than a placebo.8

In a controlled two-month trial of 50 patients (ages 50-70) with mild to moderate knee osteoarthritis, black sesame seeds significantly improved the signs and symptoms of knee pain. Scores on a standard test of mobility also significantly improved.8

Encouraged by these and other studies, scientists began testing a combination of the three plant extracts for acute pain.

In preclinical research, the three ingredients relieved acute pain and inflammation better together than the individual components did at a similar dosage.1
Testing the Combination

People need pain relief fast. Scientists conducted the first randomized controlled human trial of a combination of turmeric, *Boswellia serrata*, and black sesame seed oil extracts.¹

This study lasted seven days, and it was designed to determine if the herbal combination was as effective as the commonly used pain medication acetaminophen.

Researchers recruited 88 healthy men and women (ages 18-65) who had developed acute musculoskeletal pain within the past 24 hours and hadn’t taken any treatment.¹

People with arthritis or other chronic pain were excluded. In some cases, the pain was caused by musculoskeletal injuries, though in most of the cases it was simply described variously as muscle aches, neck pain, limb pain, low back pain, or joint pain.

At the start of the study, subjects rated their pain intensity on a scale from 0 (no pain) to 10 (the worst pain imaginable).

All participants started with a “distressing” level of pain that was 5 or above. That reflects a level they couldn’t stop thinking about and that interfered with their daily activities.

The treatment group received 1,000 mg of the proprietary herbal blend daily for one week. The control group received 1,000 mg of acetaminophen daily.

The plant extract combination worked as fast and as effectively as acetaminophen in relieving acute pain, starting on day one!
Reduced Pain Intensity

In this study, the proprietary herbal combination and acetaminophen groups also experienced a similar reduction in pain intensity.

Both acetaminophen and the plant extract combination achieved this result. Compared to baseline, 66% of subjects in the herbal group achieved at least 50% pain relief within six hours on the first day of treatment, which was similar to the acetaminophen group.¹

Based on the degree of pain relief in the study, about 73% of subjects in the proprietary herbal combination group were considered positive responders to the treatment, which was similar to that of the acetaminophen group.

What stands out about this human trial is that acetaminophen is a toxic drug that can acutely kill when combined with alcoholic beverages. Its destructive effects are too long to list but include kidney and liver failure in long-term users.¹⁰-¹³

Yet there are few warning labels on acetaminophen drugs and those who suffer acute or chronic pain often take large doses of acetaminophen not realizing it generates tissue-damaging free radicals.

Superior To Medication

Pain is more than just a physical experience. It also causes emotional strain.¹⁴

In this study, the short-form McGill Pain Questionnaire was used to evaluate the physical and emotional experience of pain on days one, three, and seven of the study.¹

The questionnaire asks subjects to evaluate their pain experience on a scale of 0 (none) to 3 (severe) in terms of 15 descriptive words in two categories:¹⁵

- **Sensory (physical):** throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, and splitting.
- **Affective (emotional):** tiring-exhausting, sickening, fearful, and punishing-cruel.

Both groups in the study experienced equivalent physical pain relief, according to the McGill score.

But the plant extract combination was 8.57 times better than acetaminophen at relieving the emotional distress and unpleasantness of acute pain.¹
How It Works

Researchers chose the turmeric, Boswellia, and sesame seed extracts based on their previous history of effective pain relief, as well as their mechanisms of action.

Curcumin in turmeric and AKBA in Boswellia both inhibit 5-lipoxygenase (5-LOX).

5-LOX is the key enzyme that converts the omega-6 fatty acid arachidonic acid into proinflammatory leukotrienes.1

Curcumin also indirectly inhibits cyclooxygenase-2 (COX-2), an enzyme that promotes the production of inflammatory prostaglandins.

Black sesame seed oil works to inhibit delta-5-desaturase, an enzyme that produces arachidonic acid from omega-6 fats.1 That decreases the amount of arachidonic acid available to make inflammatory cytokines in the first place.

The herbal combination was better at reducing pain and inflammation compared with each individual component when tested in animals. The combination inhibits multiple pro-inflammatory pathways in the body that produce prostaglandins and leukotrienes. These are the two main inflammatory facilitators that can trigger pain symptoms.

The sesamin in sesame oil may also promote the body’s absorption of the other pain-relieving components in the blend.1

Free From Side Effects

The use of acetaminophen and non-steroidal anti-inflammatory drugs (NSAIDs) like aspirin and ibuprofen has been associated with adverse effects.

For example, NSAIDs use can affect the gastric mucosa, the cardiovascular, hepatic, hematologic (blood), and renal systems.16

The best-known danger of acetaminophen is the potential for acute liver damage.17 It is also extremely easy to overuse because it comes in many over-the-counter and prescription medications, including some used for coughs and colds.18 Long-term use increases risk of kidney cancer and organ damage.19-21

In the study that used the proprietary plant extract blend, “There was no adverse event reported by any subject in the study.”1

The combination of turmeric, Boswellia, and black sesame seed oil extracts provides a plant-based option for rapid pain relief.
Summary

People reach for acetaminophen or NSAIDs like ibuprofen to treat acute aches and pains. These painkillers carry the risk of harmful side effects. A controlled clinical study has shown that a combination of turmeric, *Boswellia serrata*, and black sesame seed oil extracts is as fast and effective as a standard dose of acetaminophen for reducing acute pain in healthy adults.

This proprietary herbal blend was superior to acetaminophen for relieving the emotional strain and unpleasantness aspects of pain.

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 Probiotic That Lowers Cholesterol

BY MICHAEL DOWNEY

Over 35 million Americans take statin drugs to reduce their cholesterol.¹

Yet some people are still unable to get their cholesterol under control,² and heart disease remains the leading killer of Americans.³

Science has found a novel way to help reduce cholesterol.

Probiotics are beneficial bacteria that can help keep the microorganisms in your gut balanced.

Clinical research has revealed that a specific probiotic strain lowers LDL ("bad") cholesterol and total cholesterol.²⁴

In just nine weeks, daily intake of this probiotic:²
- Lowered LDL cholesterol by nearly 12%,
- Lowered total cholesterol by more than 9%, and
- Lowered the ratio of LDL ("bad") to HDL ("good") cholesterol by more than 13%.

Using a probiotic to reduce cholesterol can be beneficial to those who are challenged to tolerate high-dose statins, as well as those who are unable to manage their cholesterol through diet and lifestyle.

Life Extension encourages most individuals to maintain LDL cholesterol levels less than 80 mg/dL and to take other actions, like lowering homocysteine and glucose, to help reduce risk of heart attack and stroke.

Individuals with preexisting conditions or at high risk for cardiovascular disease should aim for even lower levels of less than 70 mg/dL.
The Importance of Gut Bacteria

It may sound surprising that bacteria in the gut can lower cholesterol.

But in recent years, research has shown that the gut microbiome plays a key role in maintaining optimal health throughout the body.

An imbalance in the types of bacteria and other microorganisms that make up our gut flora are strongly associated with the development of a host of diseases.5,6

Research has shown that different probiotics can safely promote digestive, immune, and oral health. This field has now emerged as an important strategy for reducing the risk of cardiovascular disease.7,8

Scientists have shown that the probiotic strain Lactobacillus reuteri NCIMB 30242 has the ability to safely reduce cholesterol levels. It does so by:9,10

- Increasing cholesterol removal from the body, into the stool, and

- Increasing the metabolism (breakdown) of cholesterol in the liver.

Lowering Cholesterol in Human Studies

Researchers enlisted adults with high cholesterol. Some consumed regular yogurt, while others consumed yogurt with the probiotic strain L. reuteri NCIMB 30242.

After six weeks, the volunteers taking L. reuteri NCIMB 30242 had:4

- A nearly 5% reduction in total cholesterol,
- A nearly 9% reduction in LDL cholesterol, and
- Significant reductions in concentration of apolipoprotein B (apoB), a marker of LDL particle numbers and a known risk factor for cardiovascular disease.11-13

In another randomized, controlled trial of adults with high cholesterol, nine weeks of taking L. reuteri NCIMB 30242 capsules resulted in:72

- A nearly 12% reduction in LDL cholesterol,
- A greater than 9.1% reduction in total cholesterol,
- A greater than 8.4% reduction in apoB-100, and
- A 13.4% reduction in the LDL-to-HDL cholesterol ratio.

Benefits Beyond Cholesterol

The nine-week study also showed that L. reuteri NCIMB 30242 intake reduced levels of C-reactive protein and fibrinogen.2

C-reactive protein is a marker of inflammation that is often used to evaluate the risk of developing coronary artery disease, the most common cause of heart attacks.14

Fibrinogen is a protein produced by the liver that promotes clotting. High levels are associated with an increased risk of harmful clots, heart disease, and strokes.15-18

The high-cholesterol volunteers who took L. reuteri NCIMB 30242 were found to have:2

- 62% reductions (or reductions of 1.05 mg/L) in C-reactive protein (CRP), and
- 14% reductions in fibrinogen.
In patients who began the study with average or high-risk CRP:\(^2\)

- 27.1\% of those taking *L. reuteri* NCIMB 30242 reduced their risk by one or more categories (from high to average risk, for example, or from high to low risk), compared to just 1.7\% of control subjects, and

- 22\% of the *L. reuteri* NCIMB 30242 group decreased their CRP risk by one category, compared to just 2\% of controls.

Beyond these heart-health benefits, *L. reuteri* NCIMB 30242 has been shown to:

- Increase circulating bile acid levels, which may help prevent various chronic diseases,\(^2,19\)

- Boost vitamin D levels by more than 25\%, potentially further reducing the risk of cardiovascular and other diseases,\(^20\) and

- Significantly improve diarrhea symptoms and scores in gastrointestinal health surveys.\(^21\)

**Protect the Heart with a Probiotic**

- **Cardiovascular disease** is the leading cause of death for adults in America, partially driven by high levels of LDL ("bad") cholesterol and total cholesterol.

- **Statins** lower LDL cholesterol, but they produce some side effects that may cause some people to stop taking the drugs.

- Human studies show that the probiotic strain *L. reuteri* NCIMB 30242 has the ability to lower total cholesterol by more than 9\%, reduce LDL cholesterol by nearly 12\%, and significantly improve other cardiovascular risk factors.

- Shown to be safe and effective, *L. reuteri* NCIMB 30242 helps lower high or even normal cholesterol levels.

- Blood tests should be used to measure cardiovascular risk factors like LDL to ensure optimal levels (under 80 mg/dL) are being achieved.
How *L. Reuteri* NCIMB 30242 Works

One of the main functions of the gallbladder is to release a fluid called **bile**. Bile breaks down fats and oils in the intestinal tract, making cholesterol available for digestion.

This is important, because cholesterol is needed by the body to form cell membranes, create hormones, and perform other functions.

But cholesterol levels can become too high due to excess dietary intake, excess cholesterol release from the liver, or genetic predisposition. **Higher** blood levels of cholesterol raise the risk of **cardiovascular disease**.13,22

The probiotic strain *L. reuteri* NCIMB 30242 can produce an enzyme called **bile salt hydrolase**. This enzyme breaks certain chemical bonds of cholesterol and bile acids. This makes cholesterol less water-soluble and **less absorbable**.23

As a result, instead of entering the bloodstream (and then the walls of arteries), excess cholesterol becomes trapped in the gut. It is eventually excreted from the body in feces, **reducing cholesterol levels** in the blood.23

*L. reuteri* NCIMB 30242 may provide a second mechanism for cholesterol reduction.

When the enzyme released by this probiotic strain helps breaks down cholesterol, the resulting bile acids act as potent signaling molecules. These molecules regulate **cholesterol metabolism**, accelerating the breakdown and excretion of cholesterol.24-27

The end result is that *L. reuteri* NCIMB 30242 reduces total and LDL cholesterol levels.

Proven Safety

Many bacteria of the *Lactobacillus* family are classed as GRAS, or “generally recognized as safe,” by the U.S. Food and Drug Administration.

*Lactobacillus reuteri* NCIMB 30242, in particular, has undergone extensive laboratory characterization and safety testing.

*L. reuteri* NCIMB 30242 has demonstrated **no adverse effects** associated with its consumption.28,29

It is a safe and effective way to reduce cholesterol and lower risk of heart disease.

Summary

With advancing age, virtually every American is at risk for **atherosclerotic** disorders.

Clinical evidence shows that the probiotic strain *L. reuteri* NCIMB 30242 has the ability to lower **total cholesterol** by more than 9% and high-risk **LDL cholesterol** by almost 12%, while improving other cardiovascular risk factors like elevated **C-reactive protein**. •
A PROBIOTIC THAT LOWERS CHOLESTEROL

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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In clinical trials, the probiotic *Lactobacillus reuteri* NCIMB 30242 found in FlorAssist® Heart Health has been shown to support cholesterol levels already within normal range.\(^1,2\)

Additionally, *Lactobacillus reuteri* NCIMB 30242 supports healthy levels already within the normal range of:

- C-reactive protein
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References

MAGNESIUM
Mitigates Migraines
Migraines are among the leading causes of disability worldwide.¹

Roughly $78 billion is spent annually in medical costs for treatment.²

People who suffer from migraine commonly have low magnesium levels, especially during an attack.³⁻⁵

According to the National Health and Nutrition Examination Survey, about 48% of Americans are not reaching their magnesium minimum daily requirements.⁶

Magnesium helps to reduce arrhythmia, heart disease, and stroke risks, and helps maintain better bone density.⁷⁻⁸ Over 300 enzymes in the body rely on magnesium to function.⁹

New clinical trials have uncovered encouraging evidence for magnesium’s role in reducing migraine headaches.
MAGNESIUM MITIGATES MIGRAINES

Magnesium vs Conventional Medication

Two clinical trials published in 2021 compared the effect of magnesium to that of different types of conventional migraine medications.

In the first study, people with frequent migraines were randomized to receive either valproate sodium, a drug used to prevent migraines or 500 mg of oral magnesium every 12 hours for eight weeks.10

The number of migraine attacks, days, and the mean duration significantly decreased in both groups, leading the authors to conclude that magnesium “appears to be effective in migraine prophylaxis similar to valproate sodium without significant adverse effect.”

A second trial compared intravenous magnesium to two conventional intravenous migraine medications, prochlorperazine and metoclopramide.11

This study evaluated 157 patients, most of them female, who had to visit an emergency department due to the severity of their migraines.

Results showed that migraine pain decreased in all groups after 60 minutes, with none of the treatments showing clear superiority over the others.

Women are disproportionately affected by migraines12, and a new analysis of data suggests that increasing magnesium intake is particularly effective for treating migraines in women.13

A Successful Combined Approach

Preventing and treating migraines sometimes requires a multifaceted approach.

Several nutrients that work via different mechanisms have shown clinical benefits.

Riboflavin (vitamin B2) and coenzyme Q10 have shown good results in people who suffer frequent migraines.

Riboflavin’s migraine benefits have been known for decades, and a comprehensive review of the medical literature concluded that riboflavin reduces migraine frequency.14

CoQ10 lowers levels of calcitonin gene-related peptide, which is a neuropeptide that causes the progression of migraines.15,16

In a clinical trial of patients suffering three or more migraines a month, patients were randomized to receive either a placebo or an oral combination of 600 mg magnesium, 400 mg riboflavin, and 150 mg CoQ10 daily along with a multivitamin with minerals for three months.17

Compared to those taking the placebo, patients receiving the nutrient combination reduced the number of days with migraines by almost two and had significantly reduced intensity of migraine pain.

Taken together, the data suggest that for many people, increasing magnesium intake could help prevent migraine attacks, and lessen their duration and severity.
**Summary**

Migraines are debilitating headaches that can last up to three days. Clinical trials have shown that magnesium can prevent and relieve migraines and is even more beneficial when combined with riboflavin and CoQ10. Magnesium is one of the most important minerals in the human body, but almost half of all Americans are not getting enough.

Increasing magnesium intake may help many people prevent migraines and lessen their severity and duration.

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

**Migraine Relief at Last**

- **Migraines** are severe, throbbing headaches that can last from a few hours to as long as three days.
- Oral magnesium has been shown to decrease the number of migraine attacks as well as their duration and severity.
- In two clinical trials, oral and intravenous magnesium were found to be as effective as different conventional migraine treatments.
- A combination of magnesium, riboflavin (vitamin B2) and CoQ10 led to significantly decreased migraine pain intensity.
References

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The Mindspan Diet: Reduce Alzheimer’s Risk, Minimize Memory Loss, and Keep Your Brain Young

Neurodegenerative disorders are on the rise in the U.S., Europe, and in most affluent nations of the world.

According to a recent study, deaths from Alzheimer’s disease and other dementias rose more than three-fold, and deaths from Parkinson’s disease doubled globally between 1990 and 2010.

Fortunately, scientific evidence indicates that we have substantial control over our risk for neurodegenerative diseases.

Dr. Preston Estep is an esteemed geneticist and the director of gerontology at the Personal Genome Project at Harvard Medical School.

In this interview with Life Extension®, Dr. Estep highlights the secrets of the “Mindspan Elite”—those populations that live longest with low levels of dementia.

Studying these populations—along with recent scientific evidence—has given Dr. Estep insights on how to extend both lifespan and mindspan.

He shares many of those ideas here for Life Extension® readers.

—LAURIE MATHENA
**LE:** Can you explain the difference between lifespan and mindspan?

**Dr. Estep:** Lifespan measures how long we live, but how fulfilling that life is depends on how well your mind works during that time. I use the term “mindspan” to capture this essential idea.

Lifespan refers only to longevity, while mindspan refers to the mind’s length of life plus its breadth and height of performance.

This pinnacle of living isn’t just a long lifespan, it is a **maximum mindspan**.

**LE:** Can you tell us about people you refer to as the Mindspan Elite?

**Dr. Estep:** People are living longer than ever. While this trend is good, there is a serious downside: Record numbers of people are experiencing greater levels of cognitive decline and other brain disorders in later life.

But some people seem mostly immune to such problems. I call these people the Mindspan Elite.

They live very long lives and remain as alert, active, and autonomous as people decades younger. Important discoveries from many sources have shed substantial light on the keys to their success, and now show the rest of us the way.

**LE:** After studying the Mindspan Elite, does it seem like their longevity is a result of genes or environment?

**Dr. Estep:** It is commonly believed that centenarians and supercentenarians have special genes that allow them to age slowly. Most experts agree that the contribution of genes explains only a small fraction of typical longevity, and a higher percentage of extreme longevity—maybe between 25% and 40% of extreme longevity.

That means environment is responsible for the remaining majority of the longevity equation, and diet is a major component of the environment.

When Japanese (who are part of the Mindspan Elite) move to other countries, their health typically goes downhill.

Japanese in the U.S. with the highest rates of disease, including Alzheimer’s disease and other dementias, have a more Western eating pattern. Their rates of dementia are similar to those of Americans of European ancestry.

So bad diet produces bad results—but luckily, this works both ways.

Many studies have shown that people who adopt healthy Asian and Mediterranean-style diets have lower levels of disease.

**LE:** What are some core diet commonalities of the Mindspan Elite?

**Dr. Estep:** Here is a short list:

- Less red meat and added sugar.
- Less liquid milk (moderate amounts of cheese, butter, sour cream).
- Moderate to fairly high amounts of fish and seafood, typically not deep-fried.
- More beans and other legumes.
- Fat consumption varies, but if it is high, then it is mostly monounsaturated (typically olive oil).
- Alcohol consumption varies but is routine, usually with meals, and is not extreme among the longest-lived.
- Abundant dietary phytochemicals, such as polyphenols and tannins, consumed with meals and present in fruits and vegetables, red wine, coffee, and tea.
- More fermented, pickled, and preserved foods, such as vinegar and dried fish.
- More greens. Key Mediterranean cuisines feature an abundance of greens and herbs. In Japan, sea vegetables (seaweed, kelp, etc.) are found in many meals.

**LE:** Many people erroneously promote a high-protein, low-carb diet. What can the Mindspan Elite teach us about protein?

**Dr. Estep:** Relatively low animal protein intake is a shared dietary attribute among Mindspan Elite regions and subcultures.
Research shows that animals raised on low-protein diets live longer than animals eating diets with typical amounts of protein.

The China Study, a well-known study done in the 1980s, found that dietary protein intake is a primary determinant of diseases in later life, including cardiovascular disease and cancers.

**LE:** What are key biomarkers we can use to determine our longevity and mindspan?

**Dr. Estep:** Some biomarkers are simply symptoms of a certain state or underlying process. But other biomarkers, such as telomere length, are more than just markers; they play critical roles in setting the pace of aging and senescence.

Telomeres are specialized stretches of DNA that protect the ends of chromosomes. Long, stable telomeres are robust predictors of good health and longevity. As we age, telomeres get broken down and become shorter.

In general, the shorter your telomeres are, the shorter your lifespan.

Most long-lived people in their eighties and nineties have telomeres as long as or longer than most people in their seventies.

**LE:** How can you influence the length of your telomeres?

**Dr. Estep:** The shortening of telomeres can be accelerated by certain environmental variables—including diet.

But here is the positive flip side: good diet and lifestyle factors can counteract this erosion.

Higher intake of omega-3 fats, good sleep, low stress, and routine exercise are all associated with longer telomere length.

**LE:** What other key biomarkers should people be testing?

**Dr. Estep:** Two of the most important and commonly measured cardiovascular biomarkers are cholesterol and triglyceride levels. If these are moderately elevated on their own, it's not necessarily reason for alarm.

Longevity and mindspan are at much greater risk if these high biomarker levels are accompanied by high blood iron levels, which accelerate the oxidation of LDL cholesterol.

High oxidation plus high LDL is deadly for both your heart and your brain.

**LE:** Isn’t iron beneficial for the body?

**Dr. Estep:** Of all the dangerous double-edged swords, iron cuts the deepest of all.

The peril posed by iron is unique among all dietary minerals. It’s the most abundant and potent oxidant in the body, but your body doesn’t have a way to get rid of excess iron, unlike other minerals.

You can compare iron to a match in the presence of fuel and oxygen. In control, warmth and light are produced; out of control, the result is like a persistent, wind-driven wildfire.

Consider a car analogy: Dietary fats and sugars, like gasoline, are hydrocarbons that produce energy. Your body mixes this fuel with oxygen and then ignites it to create useful energy and heat.

We need iron to carry oxygen throughout the body for this essential process. But just as an older car rusts, so does your body.

Its rust comes in the form of deposits of “garbage”—for example, hemosiderin, lipofuscin, and amyloid plaques in the brain that are primary drivers of Alzheimer’s disease.

Rust also comes in the form of “damage,” such as oxidized components of cells and tissues (e.g., DNA and proteins), and iron is a primary driver in the creation of this garbage and damage.

The higher the iron burden in your body, the greater the burden of accumulated garbage and damage over time, especially to brain neurons.

**LE:** How does excess iron impact the brain specifically?

**Dr. Estep:** In youth, iron is a critical nutrient for proper brain development.

However, high body iron stores in adulthood increase the risk of Alzheimer’s disease, Parkinson’s disease, ALS (Lou Gehrig’s disease), stroke, and other diseases of the brain and nervous system.

In other words, we need lots of iron in youth, but as we get older, these amounts become harmful.

The brain typically has a higher concentration of iron than any other metal. Specific brain regions affected by very different neurodegenerative diseases have one commonality: They show high levels of iron deposits.

**LE:** Why do so many people have excess iron?

**Dr. Estep:** Because red meat consumption remains too high, and because of iron fortification. In the U.S. today, about half of dietary iron is obtained through fortified grain products.

Iron fortification is done with the best of intentions, but it is clear that low but sufficient iron poses no clear health risk to adults.
They further found that the APOE e4 variant was associated with higher cerebrospinal fluid ferritin, more evidence that the e4 variant is responsible for raising iron load in the brain and driving cellular damage, tissue loss, and plaque formation.

**LE:** What about APP?

**Dr. Estep:** The gene for APP (amyloid precursor protein) causes the plaque (known as amyloid beta) seen in brains afflicted with Alzheimer’s disease. Research suggests that the job of APP in the brain is to protect cells and tissue from iron’s oxidative damage. The APP gene protects the brain, but in the long run also harms the brain through the long-term consequences of this mode of protection.

There is a basic formula:

$$\text{GENES} + \text{ENVIRONMENT} = \text{TRAIT}.$$  

Dietary iron is the key environmental co-conspirator. So, in this case:

$$\text{COMMON APP VARIANT} + \text{HIGH IRON} = \text{ALZHEIMER'S DISEASE}.$$  

Adding APOE e4 to the equation increases risk. Reducing dietary iron improves the ENVIRONMENT part of the equation and also reduces Alzheimer’s risk.

This is extremely important because more than 99% of us carry the common variant of APP, and our best option right now for reducing risk of Alzheimer’s disease is to exert control through environmental regulators of risk.

**LE:** Are there other genes we should be concerned about?

**Dr. Estep:** Other problematic variants are found in genes governing absorption of iron from food, and some of these are very common.
About a quarter of the U.S. population has at least one copy of the APOE e4 variant, but another quarter has one or more variants in the HFE gene that increase absorption of iron from food, increasing the risk of iron overload, or hemochromatosis. The HFE gene is involved in regulating how much iron is absorbed from food, and the body has no natural mechanism for regulating iron balance by getting rid of iron once it is absorbed. So, it is critical to measure iron levels to ensure that overload is avoided preventively, because it is difficult to reverse iron overload, although blood donation (phlebotomy) and the use of iron chelators are helpful.

**LE:** While too much iron can clearly be problematic, low iron levels can cause their own concerns, such as anemia and increased susceptibility to infections. What is the ideal range of iron levels in the body?

**Dr. Estep:** Again, ferritin is the main iron storage protein in the body, and serum ferritin is a key biomarker that provides the best non-invasive measure of the amount of iron stored in the body.

For men and women, aim for 10 to 40 ng/mL (standard units), or micrograms per liter (international units) for maximum health benefits. This range is based on historical levels in Japanese women. They have the lowest iron levels in the developed world, the longest lives, and low rates of Alzheimer’s disease.

**LE:** What’s your key takeaway for readers to help understand extending their mindspan?

**Dr. Estep:** When *The Mindspan Diet* was published a few years ago lots of evidence pointed to iron as a key regulator of mindspan, but it was mostly circumstantial and provided statistical association but not clear evidence of causation. More recently, the largest and most advanced studies of human longevity* have strongly supported my conclusions about the importance of iron, showing that excess iron reduces longevity and that it isn’t merely associated with, but is a primary cause, of accelerated aging.

Recent research also indicates that Alzheimer’s disease is a close second to cancer as a cause of death in developed nations, and excess iron increases the risk of both these and other leading causes of death.

So, the bottom line is that iron is a critical nutrient for proper functioning of the body and mind, but I can’t emphasize enough that most adults in developed countries get far too much of it. And the only way for someone to know if they are at risk is to test serum ferritin and other critical markers of iron. When your life depends on it, don’t guess, test.

**LE:** Please tell us about your current projects.

**Dr. Estep:** In early 2020 I was planning the launch of a venture fund focused on starting and investing in biotech companies involved in increasing longevity and enhancing mindspan, but like many other people my plans changed as the pandemic unfolded. My main focus for the past year-and-a-half has been the Rapid Deployment Vaccine Collaborative (Radvac). As the pandemic gradually winds down I’m returning to focus on longevity/mindspan biotech startups and venture funding.


Dr. Preston Estep received his doctorate from Harvard University. He is Director of Gerontology and advisor to the Personal Genome Project at Harvard Medical School. He has founded or is a scientific adviser to many leading biotech startup companies. He is the author of the book *The Mindspan Diet* and has addressed professional and lay audiences around the world on a range of topics in biomedicine including mindspan, genetic testing and whole genome DNA sequencing, vaccines, and space biomedicine.

*The Mindspan Diet* was published by Ballantine Books, an imprint of Random House, a division of Penguin Random House LLC. Excerpts reprinted by permission.

To order a copy of *The Mindspan Diet* visit Amazon.com

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* 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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<td>of trans-resveratrol, quercetin (150 mg), and complementary plant extracts.</td>
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<td>pygeum, nettle, flower pollen, and saw palmetto, plus boron, beta-sitosterol, and</td>
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John Robbins
The Remarkable Legacy of the Baskin-Robbins Heir

BY LAURIE MATHENA

Not many people would turn down a billion-dollar family business to help promote the health and wellness of people and the planet. But that’s exactly what John Robbins, presumed heir to the Baskin-Robbins ice cream empire, did when he was only 21 years old.

Instead of profiting from a business that promotes obesity and disease by selling a food high in sugar and saturated fat, Robbins has dedicated his life to helping provide healthy, ethical, sustainable food for people around the world.

He has written 10 books about healthy living that have sold millions of copies, founded EarthSave International, and co-founded Food Revolution Network.

He has made countless TV and radio appearances—including the shows Oprah and Donahue—and has received numerous awards for his humanitarian efforts.

At 74 years old, Robbins is the epitome of good health, showing that eating a plant-based diet, living with purpose, and taking targeted supplements are key elements to an optimal-longevity lifestyle.
Walking Away from the Family Business

Burt Baskin, John Robbins’ uncle and co-owner of Baskin-Robbins, died of a heart attack at the age of 54.

When Robbins questioned whether or not there was a connection between the amount of ice cream Burt had consumed and this fatal incident, the reply from Robbins’ father Irv, the other co-owner of the business, was a stern “no.”

“Different families have different taboo topics that don’t get discussed. In my family, it was that there could be any connection between food and health,” said Robbins. “My father didn’t want to think that the product he was selling was hurting anybody, much less that it could have contributed to the death of his beloved partner. But I was starting to believe that the more ice cream you ate, the more likely you were to have heart disease, diabetes, and obesity.”

He was also appalled by the cruelty he saw, first-hand, to the factory-farmed cows used to make the ice cream—animals that were unable to move, covered in flies, and standing in excrement up to their knees.

“I didn’t want to make my living from selling a product that was undermining people’s health,” said Robbins. “I also didn’t want to make a living selling a product that was based in such cruelty to animals.”

That’s why Robbins not only walked away from the family business—but also from any trust fund, or any other reliance on a fortune made from contributing to the poor health of millions.

A Legacy Better than Ice Cream

Robbins’ father Irv had developed a number of serious health problems, including type II diabetes and hypertension.

“His doctor told him all they could do was juggle his medications, control some of the side effects, and make his few remaining years more comfortable,” said Robbins. “But then he also gave him a copy of my book (without knowing the author was his son) and told him that if he was willing to consider making major changes in how he lived, there could be a different outcome.”

The book, called Diet for a New America: How Your Food Choices Affect Your Health, Happiness, and the Future of Life on Earth, was nominated for the Pulitzer Prize for General Nonfiction in 1987 and has been described as the single most eloquent argument for a vegetarian lifestyle ever published.

Irv had never believed in the connection between food and health. But after hearing this recommendation from his renowned cardiologist, he decided to read the book and put his son’s health advice into practice.

After just two years, his diabetes had reversed, and his blood pressure had normalized.

By simply making gradual changes to his diet, he no longer needed insulin, diabetic pills, or hypertension drugs.

“He lived another 20 healthy years after that. In the long run I felt I had been able to give him something more important than inventing a 32nd flavor,” said Robbins, referring to the famous 31 flavors of Baskin-Robbins.

Now, Robbins is working hard to create success stories like these for people all over the world.
Changing the World One Bite at a Time

In 2012, Robbins teamed up with his son, Ocean, to found Food Revolution Network, an organization dedicated to “healthy, ethical, sustainable food for all.”

It has grown to include half a million members, and their goal is to empower individuals and transform food systems to support healthy people and a healthy planet.

Robbins is passionate about educating people about the health consequences of eating processed foods, the cruelty to animals in industrialized feedlots, and the detrimental effects to the earth caused by factory farming.

“The data are clear that the highly processed foods that most of us are eating and drinking cause an enormous amount of physical disease,” said Robbins. “On the other hand, we have very convincing data that people who eat whole food, plant-based diets—and who don’t eat the factory-farmed meat and the industrially processed food—live longer and healthier. Their lifespan is increased, but even more importantly, their healthspan is increased.”

Industrialized farming is also causing enormous consequences to the planet, including the erosion of topsoil, depletion of groundwater, and the emission of greenhouse gases.

But simply eating a healthier diet can promote a healthier planet.

“One study showed that greenhouse gas emissions could be lowered more by eating a plant-based diet than by driving an electric car,” said Robbins.

One practical way Food Revolution Network is working to provide healthy food for all is by fighting to end the subsidies that spend tens of billions of taxpayer dollars in ways that bring down the price of white bread, high fructose corn syrup, and factory-farmed animal products.

“These are the very foods that every credible health authority is telling us we should be eating less of. If the government is going to subsidize anything, it should subsidize fruits, vegetables, nuts and seeds, and legumes—the foods that tens of thousands of medical studies are telling us we should be eating more of,” said Robbins.

They are also working to have taxes placed on soda and other grossly unhealthy foods and beverages, and then using the revenue to bring down the cost of healthy foods like fruits and vegetables.

“Steps like this would help make healthy food more affordable, more accessible, and more available to everyone, which is our ultimate goal,” said Robbins.

Let Food be Thy Medicine

Robbins is also taking steps to have nutritional education taught in medical schools.

“I once had a Harvard doctor tell me that if food was medicine, he would have learned about it in medical school,” said Robbins. “This highlights the total lack of nutritional education in medical schools, which is quite disturbing.”
To address this issue, Robbins and his team at Food Revolution Network have joined with The American College of Lifestyle Medicine in a campaign to get nutritional education questions added to the licensure exams given to medical school graduates. They’ve gotten more than 1,000 approved questions added to the bank that medical schools can draw from, and these lifestyle medicine questions are already beginning to be used.

The goal is that in the coming years, questions on food and nutrition will come to make up 10% (or more) of the questions that are used. This would ultimately cause all medical schools to begin teaching food nutrition to their students.

**Living a Vibrant Life**

Robbins’ own personal health journey is just as remarkable as his professional accomplishments.

After walking away from the Baskin-Robbins business, Robbins moved to a small island off the coast of British Columbia, Canada, built a one-room log cabin, and grew most of his own food. He lived off less than $500 per year.

But long before that, as a child, he had polio and was confined to a wheelchair for a period of time—something that has caused him to never take movement for granted.

For years he ran marathons and competed in triathlons. Now, at age 74, he still loves to hike, work out in his home gym, and do yoga.

He eats the same whole-food, plant-based diet that he promotes with the Food Revolution Network.

“I wake up in a body that’s vital and vibrant, and that wants to live, where the energy is expansive,” said Robbins.

He also takes targeted supplements for increased healthspan and lifespan.

“Even those of us who work really hard at eating a clean diet are still breathing polluted air and are still surrounded by toxic materials. It’s also very hard today to get all your nutrients from food,” said Robbins. “Because of this, I see a real role for supplements.”

As part of his daily routine, Robbins takes nearly a dozen supplements, including vitamins D, B12, and K, melatonin, R-lipoic acid, N-acetyl L-cysteine, L-theanine, ubiquinol, and more.

When people wonder how making simple food choices—like eating plant-based food instead of factory-farmed meat, or choosing to eat organic—could have such a major impact on their lives and the world, Robbins simply tells them this:

“Everybody needs to eat in order to live, and every bite you take is essentially a vote. You’re voting for the health you want and for the world you want. The votes you cast with your food choices literally change the course of your destiny and have a powerful impact on the future of life on earth.

“In addition to improving your lifespan and healthspan, you’re contributing to a world with fewer animals being tortured in factory farms, less erosion of our topsoil, and less depletion of our groundwater. You’ll be helping to create a world that will be healthier and more beautiful for future generations.”

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

To learn more about Food Revolution Network, visit www.foodrevolution.org

John Robbins has written 10 books on healthy living that have sold millions of copies and been translated into 30 languages. He founded EarthSave International and co-founded Food Revolution Network with his son, Ocean. He has been a keynote speaker at conferences sponsored by Physicians for Social Responsibility, the United Nations Environmental Program, UNICEF, and more. He has appeared on national shows including Oprah, Donahue, and Geraldo. And he is the recipient of the Rachel Carson Award, the Albert Schweitzer Humanitarian Award, the Peace Abbey’s Courage of Conscience Award, and lifetime achievement awards from groups including Green America.
Fennel is an herb that originated from the Mediterranean region. It is commonly used in Greek cooking for its licorice-like flavor, and its favorable effects on digestive, endocrine, reproductive, and respiratory issues.

Benefits can be derived from both the fennel bulb and the seeds. Fennel is a rich source of health-promoting plant compounds, including the polyphenols rosmarinic acid, quercetin, and apigenin. In-vitro and in-vivo studies show that these compounds have antimicrobial, antiviral, anti-inflammatory, anti-mutagenic, anti-spasmodic, anti-thrombotic, hypoglycemic, memory-enhancing, and stress-relieving properties.

People in many cultures chew fennel seeds after meals to help with digestion and eliminate bad breath. And in Ayurvedic medicine, fennel seeds are used as a laxative, because they help move food through the intestines and promote excretion.

Fennel may be eaten raw in salads and snacks, and it can be stewed, boiled, grilled, or baked. It can also be used in the preparation of herbal teas or as an essential oil.

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<td>00318</td>
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<td>01203</td>
<td>Specially-Coated Bromelain</td>
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<td>00407</td>
<td>Super Bio-Curcumin® Turmeric Extract</td>
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<td>01254</td>
<td>Zyflamend™ Whole Body</td>
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<td>02404</td>
<td>Arthro-Immune Joint Support</td>
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<td>02238</td>
<td>ArthroMax® Advanced NT2 Collagen™ &amp; AprèsFlex®</td>
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<tr>
<td>01617</td>
<td>ArthroMax® with Theaflavins &amp; AprèsFlex®</td>
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<td>02138</td>
<td>ArthroMax® Elite</td>
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<td>00965</td>
<td>Fast-Acting Joint Formula</td>
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<td>02430</td>
<td>Fast Acting Relief</td>
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<td>00522</td>
<td>Glucosamine/Chondroitin Capsules</td>
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<td>02420</td>
<td>Glucosamine Sulfate</td>
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<td>Joint Mobility</td>
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<td>01600</td>
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<td>Krill Oil</td>
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<td>00451</td>
<td>MSM (Methylsulfonylmethane)</td>
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<td>NT2 Collagen™</td>
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<td>00862</td>
<td>Cran-Max® Cranberry Whole Fruit Concentrate</td>
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<td>01424</td>
<td>Optimized Cran-Max® with Ellirose™</td>
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<td>01921</td>
<td>Uric Acid Control</td>
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<td>01209</td>
<td>Water-Soluble Pumpkin Seed Extract</td>
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<td>01922</td>
<td>Advanced Milk Thistle • 60 softgels</td>
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<td>Advanced Milk Thistle • 120 softgels</td>
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<td>02240</td>
<td>Anti-Alcohol Complex</td>
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<td>01651</td>
<td>Calcium D-Glucarate</td>
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<td>01571</td>
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<td>Water-Soluble Pumpkin Seed Extract</td>
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<td>01080</td>
<td>PectaSol-C® Modified Citrus Pectin Capsules</td>
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<td>FLOR ASSIST® Liver Restore™</td>
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<td>Glutathione, Cysteine &amp; C</td>
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<td>01541</td>
<td>N-Acetyl-L-Cysteine</td>
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<td>00884</td>
<td>Silymarin</td>
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<td>01542</td>
<td>Silymarin</td>
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LONGEVITY & WELLNESS
- Alpha-Lipoic Acid
- AppleWise
- Bio-Fisetin
- Blueberry Extract
- Blueberry Extract and Pomegranate
- DNA Protection Formula
- Endocannabinoid System Booster
- GEROPROTECT® Ageless Cell™
- GEROPROTECT® Autophagy Renew
- GEROPROTECT® Longevity A.I.™
- GEROPROTECT® Stem Cell
- Grapeseed Extract
- Mega Green Tea Extract (decaffeinated)
- Mega Green Tea Extract (lightly caffeinated)
- Optimized Fucoidan with Maritech® 926
- Optimized Resveratrol
- Pycnogenol® French Maritime Pine Bark Extract
- Resveratrol
- RNA (Ribonucleic Acid)
- Senolytic Activator®
- Super R-Lipoic Acid
- X-R Shield

MEN’S HEALTH
- Male Vascular Sexual Support
- Mega Lycopene Extract
- Men’s Bladder Control
- PalmettoGuard® Saw Palmetto and Beta-Sitosterol
- PalmettoGuard® Saw Palmetto/Nettle Root Formula
- Pomi-T®
- Prelox® Enhanced Sex for Men
- Super MiraForte with Standardized Lignans
- Testosterone Elite
- Triple Strength ProstaPollen™
- Ultra Prostate Formula

MINERALS
- Boron
- Extend-Release Magnesium
- Iron Protein Plus
- Lithium
- Magnesium Caps
- Magnesium (Citrate)
- Only Trace Minerals
- Optimized Chromium with Crominex® 3+
- Potassium with Extend-Release Magnesium
- Sea-Iodine™
- Se-Methyl L-Selenocysteine
- Super Selenium Complex
- Vanadyl Sulfate
- Zinc Caps

MISCELLANEOUS
- Potassium Iodide
- Solarshield® Sunglasses

MOOD & STRESS MANAGEMENT
- Cortisol-Stress Balance
- Enhanced Stress Relief
- 5 HTP
- L-Theanine
- SAMe (S-Adenosyl-Methionine)
- SAMe (S-Adenosyl-Methionine)
- SAMe (S-Adenosyl-Methionine)
- Theanine XR™ Stress Relief

MULTIVITAMINS
- Children’s Formula Life Extension Mix™
- Comprehensive Nutrient Packs ADVANCED
- Life Extension Mix™ Capsules
- Life Extension Mix™ Capsules without Copper
- Life Extension Mix™ Powder
- Life Extension Mix™ Tablets
- Life Extension Mix™ Tablets with Extra Niacin
- Life Extension Mix™ Tablets without Copper
- Once-Daily Health Booster - 30 softgels
- Once-Daily Health Booster - 60 softgels
- One-Per-Day Tablets
- Plant-Based Multivitamin
- Two-Per-Day Capsules - 60 capsules
- Two-Per-Day Capsules - 120 capsules
- Two-Per-Day Tablets - 60 tablets
- Two-Per-Day Tablets - 120 tablets

NERVE & COMFORT SUPPORT
- ComfortMAX™
- Discomfort Relief

PERSONAL CARE
- Biosil™ - 5 mg, 30 veg capsules
- Biosil™ - 1 fl oz
- Dr. Proctor’s Advanced Hair Formula
- Dr. Proctor’s Shampoo
- Hair, Skin & Nails Collagen Plus Formula
- Life Extension Toothpaste
- Venotone
- Xyliwhite Mouthwash
- Youthful Collagen
- Youthful Legs

PET CARE
- Cat Mix
- Dog Mix

PROBIOTICS
- Bifido GI Balance
- FLORASSIST® Balance
- FLORASSIST® Daily Bowel Regularity
- FLORASSIST® GI with Phage Technology
- FLORASSIST® Heart Health
- FLORASSIST® Mood Improve
- FLORASSIST® Immune & Nasal Defense
- FLORASSIST® Oral Hygiene
- FLORASSIST® Prebiotic
- FLORASSIST® Throat Health
- FLORASSIST® Winter Immune Support
- Jarro-Dophilus® for Women
- Jarro-Dophilus EPS® - 60 veg capsules
- Jarro-Dophilus EPS® - 120 veg capsules
- Theralac® Probiotics
- TruFlora® Probiotics

SKIN CARE
- Advanced Anti-Glycation Peptide Serum
- Advanced Growth Factor Serum
- Advanced Hyaluronic Acid Serum
- Advanced Lightening Cream
- Advanced Peptide Hand Therapy
- Advanced Probiotic-Fermented Eye Serum
- Advanced Retinol Serum
- Advanced Triple Peptide Serum
- Advanced Under Eye Serum with Stem Cells
- All-Purpose Soothing Relief Cream
- Amber Self MicroDermAbrasion
- Anti-Aging Mask
- Anti-Aging Rejuvenating Face Cream
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<tr>
<th>Products</th>
<th>Description</th>
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<tr>
<td>80153 Anti-Aging Rejuvenating Scalp Serum</td>
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<td>80179 Brightening Peptide Serum</td>
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<td>80176 Collagen Boosting Peptide Cream</td>
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<td>80156 Collagen Boosting Peptide Serum</td>
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<td>02408 Collagen Peptides for Skin &amp; Joints</td>
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<td>80180 CoQ10 and Stem Cell Rejuvenation Cream</td>
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<tr>
<td>80169 Cucumber Hydra Peptide Eye Cream</td>
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<td>02423 Daily Skin Defense</td>
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<td>80141 DNA Support Cream</td>
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<td>80163 Eye Lift Cream</td>
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<td>80123 Face Rejuvenating Anti-Oxidant Cream</td>
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<tr>
<td>80109 Hyaluronic Facial Moisturizer</td>
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<tr>
<td>80110 Hyaluronic Oil-Free Facial Moisturizer</td>
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<tr>
<td>80138 Hydrating Anti-Oxidant Facial Mist</td>
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<tr>
<td>00661 Hydroderm</td>
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<td>55495 Intensive Moisturizing Cream</td>
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<td>80103 Lifting &amp; Tightening Complex</td>
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<tr>
<td>80168 Melatonin Advanced Peptide Cream</td>
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<td>80114 Mild Facial Cleanser</td>
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<td>80172 Multi Stem Cell Hydration Cream</td>
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<td>80159 Multi Stem Cell Skin Tightening Complex</td>
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<td>80122 Neck Rejuvenating Anti-Oxidant Cream</td>
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<td>80174 Purifying Facial Mask</td>
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<td>80150 Renewing Eye Cream</td>
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<td>80142 Resveratrol Anti-Oxidant Serum</td>
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<td>01938 Shade Factor™</td>
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<td>02129 Skin Care Collection Anti-Aging Serum</td>
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<td>02130 Skin Care Collection Day Cream</td>
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<td>02131 Skin Care Collection Night Cream</td>
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<td>80166 Skin Firming Complex</td>
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<td>02096 Skin Restoring Ceramides</td>
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<td>80130 Skin Stem Cell Serum</td>
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<td>80164 Skin Tone Equalizer</td>
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<td>80143 Stem Cell Cream with Alpine Rose</td>
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<td>80148 Tightening &amp; Firming Neck Cream</td>
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<td>80161 Triple-Action Vitamin C Cream</td>
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<td>80162 Ultimate MicroDermabrasion</td>
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<td>80173 Ultimate Peptide Serum</td>
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<td>80178 Ultimate Telomere Cream</td>
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<td>80160 Ultra Eyelash Booster</td>
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<td>80101 Ultra Wrinkle Relaxer</td>
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<td>80113 Under Eye Refining Serum</td>
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<td>80104 Under Eye Rescue Cream</td>
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<td>80171 Vitamin C Lip Rejuvenator</td>
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<td>80129 Vitamin C Serum</td>
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<td>80136 Vitamin D Lotion</td>
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<td>80102 Vitamin K Cream</td>
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**SLEEP**

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<tr>
<th>Code</th>
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<tr>
<td>01512</td>
<td>Bioactive Milk Peptides</td>
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<tr>
<td>02300</td>
<td>Circadian Sleep</td>
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<tr>
<td>01551</td>
<td>Enhanced Sleep with Melatonin</td>
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<td>01511</td>
<td>Enhanced Sleep without Melatonin</td>
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<td>02234</td>
<td>Fast-Acting Liquid Melatonin</td>
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<td>01669</td>
<td>Glycine</td>
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<td>02308</td>
<td>Herbal Sleep PM</td>
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<td>01722</td>
<td>L-Tryptophan</td>
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<tr>
<td>01668</td>
<td>Melatonin • 300 mcg, 100 veg capsules</td>
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<td>01083</td>
<td>Melatonin • 500 mcg, 200 veg capsules</td>
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<tr>
<td>00329</td>
<td>Melatonin • 1 mg, 60 capsules</td>
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<tr>
<td>00330</td>
<td>Melatonin • 3 mg, 60 veg capsules</td>
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<tr>
<td>00331</td>
<td>Melatonin • 10 mg, 60 veg capsules</td>
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<td>00332</td>
<td>Melatonin • 3 mg, 60 veg lozenges</td>
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<td>02201</td>
<td>Melatonin IR/XR</td>
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<td>01787</td>
<td>Melatonin 6 Hour Timed Release 300 mcg, 100 veg tablets</td>
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<td>01788</td>
<td>Melatonin 6 Hour Timed Release 750 mcg, 60 veg tablets</td>
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**PRODUCTS**

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<td>Melatonin 6 Hour Timed Release 3 mg, 60 veg tablets</td>
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<td>01721</td>
<td>Optimized Tryptophan Plus</td>
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<td>01444</td>
<td>Quiet Sleep</td>
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<td>01445</td>
<td>Quiet Sleep Melatonin</td>
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<td>02502</td>
<td>Rest &amp; Renew</td>
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**VITAMINS**

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<tr>
<td>01533</td>
<td>Ascorbyl Palmitate</td>
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<td>00920</td>
<td>Benfotiamine with Thiamine</td>
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<td>00664</td>
<td>Beta-Carotene</td>
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<td>01945</td>
<td>BioActive Complete B-Complex</td>
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<td>00102</td>
<td>Biotin</td>
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<td>00084</td>
<td>Buffered Vitamin C Powder</td>
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<tr>
<td>02229</td>
<td>Fast-C® and Bio-Quercetin Phytosome</td>
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<tr>
<td>02075</td>
<td>Gamma E Mixed Tocopherol Enhanced with Sesame Lignans</td>
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<td>02070</td>
<td>Gamma E Mixed Tocopherol &amp; Tocotrienols</td>
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<td>01913</td>
<td>High Potency Optimized Folate</td>
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<td>01674</td>
<td>Inositol Caps</td>
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<tr>
<td>02244</td>
<td>Liquid Vitamin D3 • 50 mcg (2000 IU)</td>
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<td>02232</td>
<td>Liquid Vitamin D3 (Mint) • 50 mcg (2000 IU)</td>
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<td>01936</td>
<td>Low-Dose Vitamin K2</td>
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<td>00065</td>
<td>MK-7</td>
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<td>00373</td>
<td>No Flush Niacin</td>
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<td>01939</td>
<td>Optimized Folate (L-Methylfolate)</td>
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<td>01217</td>
<td>Pyridoxal 5'-Phosphate Caps</td>
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<td>01400</td>
<td>Super Absorbable Tocotrienols</td>
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<td>02334</td>
<td>Super K</td>
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<td>02335</td>
<td>Super K Elite</td>
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<td>01863</td>
<td>Super Vitamin E</td>
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<td>02422</td>
<td>Vegan Vitamin D3</td>
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<td>02028</td>
<td>Vitamin B5 (Pantothenic Acid)</td>
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<td>01535</td>
<td>Vitamin B6</td>
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<td>00361</td>
<td>Vitamin B12 Methylcobalamin</td>
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<td>01536</td>
<td>Vitamin B12 Methylcobalamin • 1 mg, 60 veg lozenges</td>
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<tr>
<td>01537</td>
<td>Vitamin B12 Methylcobalamin • 5 mg, 60 veg lozenges</td>
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<tr>
<td>02228</td>
<td>Vitamin C and Bio-Quercetin Phytosome • 60 veg tablets</td>
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<tr>
<td>02227</td>
<td>Vitamin C and Bio-Quercetin Phytosome • 250 veg tablets</td>
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<tr>
<td>01753</td>
<td>Vitamin D3 • 25 mcg (1000 IU), 90 softgels</td>
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<tr>
<td>01751</td>
<td>Vitamin D3 • 25 mcg (1000 IU), 250 softgels</td>
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<tr>
<td>01713</td>
<td>Vitamin D3 • 125 mcg (5000 IU), 60 softgels</td>
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<tr>
<td>01718</td>
<td>Vitamin D3 • 175 mcg (7000 IU), 60 softgels</td>
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<tr>
<td>01758</td>
<td>Vitamin D3 with Sea-Iodine™</td>
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<tr>
<td>02040</td>
<td>Vitamins D and K with Sea-Iodine™</td>
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**WEIGHT MANAGEMENT & BODY COMPOSITION**

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<th>Code</th>
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<tr>
<td>02479</td>
<td>7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules</td>
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<td>01509</td>
<td>Advanced Anti-Adipocyte Formula</td>
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<td>01807</td>
<td>Advanced Appetite Suppress</td>
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<td>02207</td>
<td>AMPK Metabolic Activator</td>
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<td>DHEA Complete</td>
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<td>01738</td>
<td>Garcinia HCA</td>
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<td>01908</td>
<td>Mediterranean Trim with Sinetrol™ -XPur</td>
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<tr>
<td>01432</td>
<td>Optimized Saffron</td>
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<td>00818</td>
<td>Super CLA Blend with Sesame Lignans</td>
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**WOMEN’S HEALTH**

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<td>01942</td>
<td>Breast Health Formula</td>
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<tr>
<td>01626</td>
<td>Enhanced Sex for Women 50+</td>
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<tr>
<td>01894</td>
<td>Estrogen for Women</td>
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<tr>
<td>01064</td>
<td>Femmenessence MacaPause®</td>
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<td>02204</td>
<td>Menopause 731™</td>
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<tr>
<td>02319</td>
<td>Prenatal Advantage</td>
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<tr>
<td>01441</td>
<td>Progesta-Care®</td>
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<tr>
<td>01649</td>
<td>Super-Absorbable Soy Isoflavones</td>
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</tbody>
</table>
Fisetin has a range of benefits that may increase lifespan. Most impressively, it’s better than other plant compounds at clearing out senescent cells that are no longer functioning effectively. Our Bio-Fisetin formula is up to 25 times more bioavailable than other fisetin formulas—another way to reverse the clock!
More Nutrients  
Higher Potencies

LIFE EXTENSION®
TWO-PER-DAY MULTIVITAMIN

Compared to Centrum® Two-Per-Day Provides:
- 50 times the VITAMIN B1
- 25 times the VITAMIN B6
- 12 times the VITAMIN B12
- 10 times the BIOTIN
- 10 times the SELENIUM
- 8 times the VITAMIN C
- 2.5 times the VITAMIN B3
- 2 times the VITAMIN D
- 3 times the VITAMIN E
- 2 times the ZINC

Two-Per-Day Multivitamin Tablets
SUPER SALE PRICE
Item #02315 • 120 tablets (two-month supply)
1 bottle $15.53 • 4 bottles $13.95 each

Two-Per-Day Multivitamin Capsules
SUPER SALE PRICE
Item #02314 • 120 capsules (two-month supply)
1 bottle $16.20 • 4 bottles $14.40 each

Each bottle provides a two-month supply.
For full product description and to order Two-Per-Day Multivitamin, call 1-800-544-4440 or visit www.LifeExtension.com

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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.
IN THIS EDITION OF LIFE EXTENSION MAGAZINE®

24 RISKS OF SITTING TOO LONG
Americans spend more than half their waking time sitting, which can lead to deep vein thrombosis.

35 VINPOCETINE IMPROVES HEARING CAPACITY
A 2021 clinical study found that vinpocetine, a brain-boosting compound, also improved hearing capacity.

40 NUTRIENTS THAT PROTECT AGAINST MEMORY LOSS
Two nutrients have been clinically shown to improve memory function and stabilize cognitive dysfunction.

50 SAFE RELIEF FROM ACUTE PAIN
A 2020 human study shows a plant extract combination relieved musculoskeletal pain as quickly as acetaminophen.

60 PROBIOTIC THAT LOWERS CHOLESTEROL
In a clinical trial, a unique probiotic reduced LDL by 12% and total cholesterol by 9% in nine weeks.

70 MAGNESIUM MITIGATES MIGRAINES
Magnesium combined with riboflavin and CoQ10 helps prevent migraines and lessens their duration and severity.

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