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A common misconception is that atherosclerosis is a modern-day phenomenon.

Studies using high-resolution images of mummified bodies from different world regions reveal the opposite. Atherosclerosis has plagued mankind for thousands of years.15

Atherosclerosis is the term used to describe damage and obstruction that occurs in the linings of our arteries.16

When arterial blood flow is impeded or blocked, the result can be death or disability from a stroke or heart attack.16

A misconception about atherosclerosis is that it did not exist in prior historic eras. I've heard so-called experts claim that people didn't suffer coronary artery disease in the past because their diets were so “natural.”

These “experts” do not have sufficient data and have no basis to claim that atherosclerosis is a recent phenomenon. All they can cite is that few people developed heart disease in the past compared to today.

The reason more people weren’t having heart attacks back then is that most died before the age of 40-60 from diseases that are now curable.

The advantage we have today is being able to delay atherosclerotic progression and reduce our risk of coronary heart attack and ischemic stroke.
Atherosclerosis in Ancient Cultures

A study published in 2011 found definitive or probable atherosclerosis present in mummified bodies that lived during every era of ancient Egypt studied.  

In 2013, The Lancet showed that mummified humans dating back 4,000 years and spanning several geographic locations/cultures all suffered from clogged arteries.  

According to the lead investigator of The Lancet study:

“The fact that we found similar levels of atherosclerosis in all of the different cultures we studied, all of whom had very different lifestyles and diets, suggests that atherosclerosis may have been far more common in the ancient world than previously thought.”

—Randall Thompson, MD

Modern Era Atherosclerosis

A 2021 Swedish study found a 1.8-times greater prevalence of atherosclerosis in people aged 60-64 compared to those 50-54 years old.

As we at Life Extension have long argued, atherosclerosis is a disease of aging that has long been prevalent.  

It took modern computed tomography imaging to document probable signs of heart disease in 34% of mummified humans whose estimated mean age at death was 43 years. Those who died at an estimated mean age of 32 years were less likely to show signs of atherosclerosis.  

These findings suggest that arterial disease has always been widespread. The encouraging news is that methods to prevent and even reverse it have been validated in modern clinical studies.

What Caused Atherosclerosis In The Mummified Bodies?

In seeking to identify what caused atherosclerosis in the mummified bodies, The Lancet researchers speculated that it could have been the high levels of inflammation these primitive people were exposed to from constant infections and a non-hygienic environment.

People with severe inflammatory conditions (like rheumatoid arthritis and lupus) suffer accelerated atherosclerosis.

Multiple studies of modern people link chronic inflammation as an independent risk factor for stroke and heart attack.

One study investigated a large group of older individuals who were followed for 17 years. Those with the highest levels of inflammatory blood markers were over three-times more likely to suffer sudden cardiac death compared to people with the lowest levels.

It’s comforting to live in an era where chronic inflammation can be identified with blood tests and corrective actions taken to suppress elevated inflammatory markers.
Why Is Atherosclerosis So Common?

We know that multiple factors can alter arterial function and damage the delicate arterial lining (endothelium). These negative factors include excess dietary intake of the wrong kinds of fats, sugars, high salt intake, and tobacco smoke.

Most of us are born with an intact endothelium that lines our arteries and protects against the formation of atherosclerosis.

As we age, our arterial lining endures chronic insult from internal and external factors that results in endothelial damage leading to atherosclerosis. Progressing blockage of blood vessels results in decreased blood flow to the heart, kidneys, and brain.

Health issues linked to atherosclerosis are a leading reason why most aging people die in the United States.

Those who understand the many causes of atherosclerosis should not be surprised that it is so common. What’s appalling is the number of people who continue to succumb to atherosclerotic diseases because of apathy and ignorance.

What Can You Do About It?

Endothelial dysfunction is one reason why atherosclerosis is such a common worldwide pathology.

As the inner arterial wall (the endothelium) becomes dysfunctional, it enables atherosclerotic lesions to initiate, progress, and eventually occlude blood flow.

As you will read on page 40 of this issue, a combination of low-cost nutrients has been shown to help modulate endothelial dysfunction and improve blood flow.

Annual Blood Test Sale

We at Life Extension® have long encouraged annual blood tests to screen for underlying arterial disease and take corrective actions when risk factors like homocysteine, C-reactive protein, and LDL are at dangerous levels.

Once a year, prices are discounted so our supporters can assess their status and initiate preemptive measures before illnesses strike.

On page 11 there is a description of the popular Male and Female Blood Test panels.

Commercial labs charge thousands for these tests, but readers of this publication obtain them for only $224 during the Blood Test Super Sale.

To order the Male or Female Blood Test Panel at these low prices, call 1-800-208-3444 (24 hours) or visit: www.LifeExtension.com/sales/lab-tests

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William Faloon, Co-Founder
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After you order and receive our form, you can visit a blood-draw facility we suggest at your convenience in your area or the Life Extension Nutrition Center in Ft. Lauderdale.

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For those residing in the Ft. Lauderdale, Florida, area, blood-draws are also performed at the Life Extension Nutrition Center from 9 a.m. to 2 p.m. Monday through Saturday. Simply purchase the blood test and have it drawn with no wait! Our address is:

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  • Vitamin D (25-hydroxyvitamin D) • Hemoglobin A1c • Insulin • Magnesium  
  $224

- FEMALE PANEL— NOW WITH FERRITIN (LC322535)  
  CBC/Chemistry/Lipids Panel • DHEA-S • Estradiol • Homocysteine • ApoB  
  • C-Reactive Protein (high sensitivity) • Progesterone • Free Testosterone  
  • Total Testosterone • TSH for thyroid function • Vitamin D (25-hydroxyvitamin D)  
  • Hemoglobin A1c • Insulin • Magnesium  
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New research published in the *Journal of Clinical Investigation* suggests that lithium may help protect against kidney decline.*

Inhibiting the glycogen synthase kinase 3-beta (GSK3-beta) enzyme in cells supports kidney health in preclinical models.

Lithium has been shown to inhibit GSK3-beta.

Researchers have also observed that psychiatric patients treated long-term with lithium carbonate exhibited better kidney function than age-matched patients who did not receive it.

Their research suggested that less than a third of the dose used for bipolar disorder significantly blocks GSK3-beta activity in the kidney.


Editor’s Note: Lithium has been used for many years as a treatment for bipolar disorder, and more recently was also found to extend the lifespan of roundworms and fruit flies.
N-Acetylcysteine Could Help in Older Patients’ Concussion Recovery

A pilot study revealed improvement in symptoms of concussion among older men and women with mild traumatic brain injury who received supplements containing N-acetylcysteine (NAC), the *Journal of Trauma Acute Care Surgery* reported.*

The study included 65 traumatic brain injury patients who were within three hours of trauma surgery service evaluation.

Thirty-four patients received standard treatments for traumatic brain injury plus **4 grams** of NAC within three hours of injury, followed by a 3-day period during which **2 grams** of NAC was administered twice per day and an additional 3 days during which **1.5 grams** of NAC was provided twice daily.

The remainder of the participants received standard treatment alone. Questionnaires that evaluated post-concussion symptoms were administered at the beginning of the study and at 7 and 30 days.

While questionnaire scores were similar at the beginning of the study, they were significantly better in the **NAC group** on days 7 and 30.

**Editor’s Note:** The authors concluded that, “N-acetylcysteine was associated with significant improvements in concussion symptoms in elderly patients with mild traumatic brain injury. These results justify further research into using NAC to treat traumatic brain injury.”

* J Trauma Acute Care Surg. 2022 Apr 8.*
Melatonin Improves Heart Failure Patients’ Lives

Stable heart failure patients with reduced ejection fraction (when left ventricle of the heart fails to contract normally) who consumed a nightly melatonin supplement, experienced a reduction in a marker of heart failure and better quality of life compared to patients who received a placebo, the journal Clinical Cardiology reported.*

The clinical trial included 85 patients who received 10 mg melatonin or a placebo nightly for 24 weeks.

Levels of NT-pro BNP which, when elevated, may be an indicator of heart failure, were similar in the melatonin-supplemented group and the placebo group at the beginning of the trial.

At the end of the trial, NT-pro BNP declined to 221.1 ng/L among participants who received melatonin compared to 332.1 ng/L among those who received a placebo.

Lower NT-pro BNP blood levels are an indicator of reduced heart failure severity.

Editor’s Note: Melatonin-supplemented participants also experienced significant improvements in clinical outcome, quality of life, and New York Heart Association classification of heart failure, compared to the placebo group.

* Clin Cardiol. 2022 Apr;45(4):417-426.
Compounds for Preserving Bone Health

Bone health is maintained by two key cells called osteoblasts, which differentiate into osteocytes (bone cells), and osteoclasts, which break down old bone so that osteoblasts can form new bone.

The health and function of osteoblasts and osteoclasts is regulated by pathways which have been found to be activated by ‘cellular’ proteins such as sirtuin 1, AMPK, and Nrf2.

Researchers have reviewed bone preserving mechanisms of specific nutrients that regulate these cellular proteins.*

SIRT1 is increased by melatonin, nicotinamide riboside, glucosamine and thymoquinone, found in black cumin seed oil. (Resveratrol long ago demonstrated potent SIRT1 activation.)

Nutrients such as gynostemma pentaphyllum and the drug metformin are compounds that activate AMPK.

Nrf2 regulates the cells’ defense against oxidative stress. Lipoic acid, melatonin, thymoquinone, astaxanthin and sulforaphane can promote Nrf2 activity.

Editor’s Note: “Regimens providing a selection of these nutraceuticals in clinically meaningful doses may have an important potential for preserving bone health,” the authors concluded. “Concurrent supplementation with taurine, N-acetylcysteine, vitamins D and K2, and minerals, including magnesium, zinc, and manganese, plus a diet naturally high in potassium, may also be helpful in this regard.”

* Int J Mol Sci. 2022 April 26;23(9):4776.
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A Solution for Urinary Symptoms in Women
For many women, frequent trips to the bathroom or needing to get up at night to urinate are a drain on quality of life.\textsuperscript{1,2}

Even a good laugh can lead to urinary incontinence. In an eight-week \textbf{clinical trial}, a blend of three \textbf{plant extracts} improved urination issues in women as follows:\textsuperscript{3}

- Incontinence episodes were \textbf{reduced} by 65%,
- Urinary urgency episodes \textbf{decreased} by 57%,
- Nighttime urination episodes were \textbf{reduced} by 43%, and
- Daytime urination frequency returned to \textbf{normal}.

A robust \textbf{79\%} of women who took the blend reported a significant \textbf{benefit}, compared to \textbf{17\%} who took a \textbf{placebo}.
Bladder Problems Worsen with Age

Urinary issues tend to become more common in women as they age. Onset of symptoms is usually observed over the age of 40.4

The prevalence and severity of symptoms are greater in women than in men. A population study with 40- to 99-year-old women participants from the U.S., UK, and Sweden revealed that:5

- 56% experience incontinence,
- 36% experience urinary urgency,
- 34% experience nighttime urination, and
- 25% experience frequent urination.

The median daytime urinary frequency is 3-4 hours (6-8 times daily).6 Those afflicted with an overactive bladder have to go to the bathroom more frequently (>8 times during the day and >1 time at night).2

According to a study, only 46% of symptomatic women have discussed any urinary concerns with their health care provider.4 Many are self-conscious about these symptoms but assume they are an unavoidable part of aging.7

Those who do seek medical advice are often prescribed drugs with minimal benefits at best. For example, only about 13% of participants taking drugs achieve urinary continence, and side effects prompt some patients to discontinue medication.3

In contrast, a clinical study found that a blend of three plant extracts3 was well-tolerated by participating women, improved urinary symptoms, and significantly improved participants' quality of life.

How Does this Herbal Combination Work?

In a rat model of overactive bladder, the herbal blend reversed the alterations in various biomarkers in the urine and lining of bladder and muscle, leading to improvement of urinary symptoms in:7

- Storage phase (e.g., urgency, frequency, nocturia)
- Voiding/Post-voiding phase (e.g., hesitancy, intermittency, weak stream, dribbling post-voiding)

The researchers suggest that the ability of these plant extracts to favorably alter markers of urinary changes in the rat model may explain the clinically significant benefits observed in the human study.7

Twenty Years in Development

More than 20 years ago, naturopath and medical herbalist Dr. Tracey Seipel began researching an effective solution to urinary problems for her patients.8 She sifted through the medical literature on plant compounds that had been traditionally used to treat bladder issues and gradually began incorporating some into her clinical practice.3

Eventually, Dr. Seipel’s experiential research allowed her to refine a treatment that included a blend of three plant extracts, each with a history of effectiveness and each from a different area of health care:

- Horsetail (Equisetum arvense) from Western herbal medicine,
- Lindera (Lindera aggregata) from Chinese medicine, and
- Three-leaf caper (Crateva nurvala) from Ayurvedic medicine.

Reduced Urinary Symptoms

To validate Dr. Seipel’s research on the blend of three plant extracts, scientists designed a randomized, placebo-controlled trial.3 They enlisted 88 women with an average age of 62 years who had at least two of the following symptoms:

- Daytime urination episodes of 10 or more per day,
- Incontinence episodes of one or more per day,
- Urinary urgency episodes of two or more per day, and
- Nighttime urination episodes of two or more per night.
The treatment group took 840 mg of the extract blend in the form of two capsules once daily. After just eight weeks:\(^3\)

- Daytime urination episodes were restored to normal levels, decreasing from an average of 11.59 times a day to an average of just 7.88 times a day.
- Incontinence episodes were reduced by 65%, from an average of 3.49 times a day to an average of only 1.21 times a day,
- Urinary urgency episodes decreased by 57%, from an average of 3.77 times a day to an average of just 1.61 times a day, and
- Nighttime urination episodes were reduced by 43%, from an average of 3.76 times a night to an average of 2.15 times a night.

**Improved Quality of Life**

Women taking the plant extract also reported impressive improvements in quality-of-life questionnaires, including a:\(^3\)

- 50% decrease in overactive bladder,
- 39% decrease in incontinence, and
- 39% decrease in urogenital distress.

A remarkable 79% of women who took the blend reported feeling a **significant benefit**, compared to 17% of women in the placebo group.

The extract blend produced these results **without the side effects** commonly seen with medications.\(^3\)

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**WHAT YOU NEED TO KNOW**

Help For Women’s Bladder Problems

- **Urinary symptoms** are common in women, especially after age 40. These include frequent urination, urinary incontinence, urinary urgency, and nighttime urination.
- A formula has been developed from extracts of **three** plants with a history of traditional use in addressing bladder disorders: **horsetail**, **lindera**, and **three-leaf caper**.
- In an animal model of overactive bladder, the herbal combination treatment reversed the detrimental shifts in bladder function parameters and in the levels of several tested biomarkers in the bladder epithelium and muscle.
- A placebo-controlled **clinical** trial has validated that this three-extract blend significantly improves urinary symptoms in women **without** harsh side effects.
- After eight weeks, this combination reduced daytime urination frequency to the **normal level** and incontinence episodes by 65%. It also significantly reduced urinary urgency and nighttime urination and improved quality of life.
Summary

Urinary problems are common in women as they age and can impact the quality of their life. In a clinical study, a blend of extracts from the plants horsetail, lindera, and three-leaf caper was shown to reduce daytime urinary frequency, urinary incontinence, urinary urgency, and nighttime urination in women. These benefits translate into improved quality of life, without the adverse side effects of drugs commonly prescribed for these problems.

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

References

Fast-Acting Liquid Melatonin is a popular way to achieve more rapid sleep onset.

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Some nutrients can reduce existing inflammation, while others may help resolve inflammation.

Winding down the flow of inflammation at its source is vital to maintain healthy, functional tissues.¹

Compounds that actively promote the resolution of inflammation are known as specialized pro-resolving mediators or SPMs.²

A clinical study published in 2022 demonstrates that taking SPM precursors along with bioavailable curcumin deliver significant relief of pain and discomfort.³

In just 30 days, the combination significantly reduced:

- Total pain,
- Pain intensity, and
- Pain severity.

After 60 days, a remarkable 79% of participants had an improvement in total pain.
New Human Study

Curcumin, a compound found in the turmeric plant, is well-established as a particularly powerful anti-inflammatory and an important nutrient to reduce inflammation.4,5

Specialized pro-resolving mediators (SPMs) are compounds produced in the body that resolve inflammation, helping return inflamed tissues back to their healthy state.2

Scientists wondered whether combining SPM precursors with curcumin might more thoroughly reduce inflammation and thus have an impact on pain.

A 2022 open-label clinical pilot study recruited healthy male and female adults with mild to moderate pain.3

Every day for 60 days, 29 participants were asked to take:

• One softgel containing 500 mg of a marine oil enriched with three SPM precursors, and
• One capsule containing 500 mg of a highly bioavailable (absorbable) curcumin.

Participants completed three well-known questionnaires used to measure pain, quality of life, and overall health:

• Short-Form McGill Pain Questionnaire (SF-MPQ),
• Short-Form 36 Health Survey (SF-36), and
• Medical Symptoms Questionnaire (MSQ).

Compelling Results

The results of the study were published in Translational Medicine Communications, a peer-reviewed medical journal.

The SF-MPQ (Short-Form McGill Pain Questionnaire) responses showed significant improvements in all aspects of the questionnaire within 30 days, especially in:

- **Total** pain,
- **Pain intensity**, and
- **Pain severity**.

The SF-36 (Short-Form 36 Health Survey) questionnaire showed significant improvements in:

- **Four** aspects of physical health, especially pain and **physical function**, and
- **Perceived health change**.

The MSQ (Medical Symptoms Questionnaire) results showed:

- Significant reduction in **joint/muscle pain**.

An impressive 62% of participants had an improved **total pain** score at 30 days, and 79% of participants showed improvement in **total pain** at 60 days.

No adverse events were reported.3

This strongly suggests that taking SPM precursors with a bioavailable form of curcumin delivers significant relief of pain and discomfort associated with inflammation.
Difference Between Anti-Inflammatories and SPMs

Curcumin and SPM precursors target inflammation in completely different ways.

Curcumin and other anti-inflammatories work to reduce body inflammation levels.

This is helpful but not enough to completely restore health, since inadequate resolution can lead to chronic inflammation, excessive tissue damage, and dysregulation of tissue healing, and may also lead to fibrosis.⁶

Hence, inflammation needs to be resolved, to get tissues back to their healthy, functional state.

Resolution of inflammation is a complex, active process guided by specific signaling compounds produced in the body.⁷,⁸ Among these compounds are specialized pro-resolving mediators.

How SPMs Resolve Inflammation

SPM precursors are predominantly derived from EPA and DHA, the omega-3 fatty acids found in fish oil.

The precursors needed to produce SPMs in the body include:⁹

• 18-HEPE (18-hydroxyeicosapentaenoic acid),
• 17-HDHA (17-hydroxydocosahexaenoic acid), and
• 14-HDHA (14-hydroxydocosahexaenoic acid).

The marine-blend softgels used in the 2022 study provided a total of 300 mcg of these three SPM precursors.³

These precursors are converted in the body into three different types of SPMs: resolvins, protectins, and maresins.³,¹⁰

These make up the bulk of the SPMs that target inflammation. They do so through three mechanisms:¹⁰-¹²

• Removing dead and dying cells, helping to clean up the aftermath of inflammatory cascades,
• Restoring inflammation balance by decreasing pro-inflammatory mediators and increasing anti-inflammatory compounds, and
• Renewing damaged tissue by promoting cellular regeneration.

Targeting Inflammation to Stop Pain

- Inflammation is a major risk factor for age-related disease and degenerative disorders. It is also a source of pain.

- Curcumin is a well-known anti-inflammatory, working to reduce inflammation.

- Other compounds called specialized pro-resolving mediators (SPMs) resolve inflammation, shutting off inflammation and returning tissues to a healthy state.

- A new clinical trial shows that combining a highly bioavailable curcumin with marine oil enriched with SPM precursors significantly reduces subjective levels of pain and discomfort.
Evidence for Curcumin and SPM Benefits

Before researchers tested the combined effects of SPM precursors and curcumin, many studies had shown that each had benefits alone.

**SPMs**

Animal data showed promising results from the use of SPMs, including improvements in obesity-related osteoarthritis\(^1\) and in inflammation-induced neuropathic pain\(^2\).

A clinical trial found that oral intake of omega-3s increased SPM levels in the body by 229% and significantly lowered levels of the inflammatory marker C-reactive protein\(^3\).

Another clinical study showed that taking marine oil enriched with a combination of SPM precursors (including 18-HEPE, 17-HDHA, and 14-HDHA) increased SPM levels and helped resolve inflammation\(^4\).

**Curcumin**

Curcumin is known for the curcuminoids and polyphenols found in the turmeric plant\(^5\).

A meta-analysis of eight human trials involving 606 patients found that curcuminoids significantly reduced pain severity from a variety of causes, including arthritis and muscle soreness\(^6\).

Another review paper concluded that curcumin was safe and has significant anti-inflammatory activity\(^7\).

Combining SPM precursors with a powerful anti-inflammatory like curcumin targets inflammation in multiple ways and results in clear pain reduction.

**Summary**

Curcumin is a powerful anti-inflammatory that reduces existing inflammation.

Specialized pro-resolving mediators (SPMs) help resolve inflammation, guiding tissues back to their healthy state.

A new human study shows that combining marine oil enriched with SPM precursors with a highly bioavailable curcumin improves subjective measures of pain and discomfort associated with inflammation.
References


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References

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Nitric Oxide Improves Blood Flow
Nitric oxide plays a major role in the dilation of blood vessels. It is vital for maintaining healthy blood flow, blood pressure, and platelet function. The problem is that internal nitric oxide production decreases with age. Low nitric oxide is associated with an increased risk of cardiovascular diseases, cognitive decline, and dementia. Nitric oxide has a short half-life. It gets metabolized and quickly eliminated from the bloodstream. Aronia berry and a long-acting form of L-arginine each work to boost and sustain higher nitric oxide production.
Importance of Nitric Oxide

Nitric oxide is produced by nearly every cell in the body. It’s needed to dilate blood vessels, allowing them to open up to increase blood flow. When we exercise or travel to higher altitudes, our bodies release more nitric oxide to relieve blood vessel constriction.

Nitric oxide is also produced in our nasal cavity when we breathe through our nose. This helps to combat viruses and bacteria. The 1998 Nobel Prize in Physiology or Medicine was awarded to scientists who discovered its role in maintaining cardiovascular health.

With age, nitric oxide levels decline. This can result in endothelial dysfunction, when these cells lining the inner walls of arteries don’t work properly. Blood vessels can’t widen when needed, reducing blood flow. That can lead to high blood pressure, atherosclerosis, abnormal clotting, and increased risk of heart attacks, strokes, and sudden cardiac death.

Endothelial dysfunction also increases the risk of dementia and cognitive dysfunction.

Long-Acting Form of L-Arginine

For the body to produce nitric oxide, no compound is more important than the amino acid L-arginine. It is the direct precursor nutrient that blood vessels use to make nitric oxide.

In a clinical trial, patients with high blood pressure were given either a placebo or a single dose of L-arginine. Measurements were taken of flow-mediated dilation, how much a blood vessel dilates in response to an increase in blood flow.

Participants who received the placebo had no change. But those given L-arginine had an average improvement in flow-mediated dilation from 1.7% to 5.9%.

Considering that each 1% improvement in flow-mediated dilation correlates with a 12% lower risk of cardiovascular events, this suggests a potential 50% reduction in risk for cardiovascular events.

A drawback with L-arginine has been that it takes about an hour to take effect and it does not stay in the bloodstream for long.

But scientists have developed a more bioavailable form of L-arginine called inositol-stabilized arginine silicate. It works within just 15 minutes and sustains L-arginine levels for up to six hours.

Flow-mediated dilation is the change in diameter of blood vessels in response to increased blood flow (such as exercise or high blood pressure).

It can assess vascular function and cardiovascular risk in an individual.

Research indicates that for every 1% increase in brachial artery flow-mediated dilation, the risk of cardiovascular events is reduced by 0.87%.

Inositol-stabilized arginine silicate appears to keep L-arginine levels higher for longer periods because it inhibits the enzyme arginase, which breaks down L-arginine.

This stabilized L-arginine form has demonstrated clinical benefits that standard L-arginine hasn’t been shown to achieve.

In three recent randomized, controlled trials, inositol-stabilized arginine silicate improved working memory, processing speed, concentration, and other measurements of cognition in young adults.

Effects of Aronia Berry

Aronia berries are native to North America and resemble cranberries. They have been thought of as a superfood due to their high content of vitamin C, anthocyanins, and other polyphenols.
Research indicates that low flow-mediated dilation of blood vessels is associated with a high risk of cardiovascular events.\(^2^0\) Research also suggests that **aronia berries** boost nitric oxide production by increasing the activation of an enzyme that converts **L-arginine** into endothelial **nitric oxide**.\(^2^8\)

In a randomized, controlled trial, a daily intake of 500 mg of aronia whole fruit berry and extract powder for 12 weeks resulted in a 1.2% improvement in **flow-mediated dilation** compared to placebo.\(^2^9\) This corresponds to a nearly 11% reduction in the risk for cardiovascular events.\(^1^9\)

In another clinical trial, 101 adults aged 40-60 years old were randomized to receive aronia berry extract or a placebo for 24 weeks. **Cognitive function** was assessed using tests including the **grooved pegboard test**, in which pegs must be precisely rotated to match a slot before they can be inserted.\(^3^0\) This measures **psychomotor speed**, the ability to quickly think and then perform a motor action.

The results showed that those who received **aronia berry extract** daily had significantly higher scores on the test after just six weeks than those taking a placebo.

Taking **aronia** extract along with the new form of **L-arginine** may lead to even greater levels of nitric oxide production, maximizing the cardiovascular and cognitive benefits.

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**Keeping Blood Vessels Healthy**

- The endothelium is a layer of cells lining the inside of blood vessels. It produces **nitric oxide**, a molecule that signals the vessel to dilate, allowing blood to flow through.

- With age, nitric oxide production tends to decline, contributing to **endothelial dysfunction**. This can increase the risk of heart attacks, strokes, cognitive decline, and dementia.

- **L-arginine** is a precursor the body needs to make nitric oxide. A new form, **inositol-stabilized arginine silicate**, improves its bioavailability and supports higher levels in the bloodstream for a longer time.

- **Aronia berries** help activate the enzyme that converts L-arginine into nitric oxide.

- Taking oral L-arginine improves blood vessel dilation enough to correlate with a 50% reduction in risk for cardiovascular events. It also improves several measures of cognition.

- In a clinical study, **aronia berry extract** also improved blood vessel dilation and significantly boosted scores on a test of cognitive function.

- Taking these two ingredients **together** may significantly boost nitric oxide production, reducing the risk for cardiovascular events and enhancing cognitive function.
Summary

Nitric oxide is needed to maintain the health of blood vessels. As production in the body decreases with age, the risk of cardiovascular diseases and cognitive deficits rises.

L-arginine and aronia berry extract have each been shown to increase nitric oxide production.

Research suggests that aronia berry increases the activation of an enzyme that converts the amino acid L-arginine into nitric oxide.

Clinical trials have shown that taking each has benefits for both cardiovascular and cognitive health.

Taking both together may result in ideal levels of nitric oxide production in the body for aging individuals.

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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References
2. BMJ. 2020;368:m456.

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References
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What is D-Ribose?

Normal aging results in a decline in muscle mass and energy production.$^{1,2}$

This energy *deficit* has an impact on heart health, cognitive function, and lifespan.$^2$

D-ribose helps restore energy production in the body.$^3$

It is a building block of adenosine triphosphate (ATP), the energy source for every cell.$^4$

By supporting the production of ATP, D-ribose can help replenish the metabolic energy needed by all cells, including those in major organs such as the **heart** and **brain**.$^3$

**ATP, Energy, and D-Ribose**

Energy in the body is produced in the form of adenosine triphosphate, ATP.$^5$

This takes place in mitochondria (powerhouse in each cell). ATP is the primary energy source for most biochemical and physiological processes, such as growth, movement and homeostasis.$^5$
What is D-Ribose?

In an open-label, early study, patients with fibromyalgia or chronic fatigue syndrome took 5 grams of D-ribose three times daily until they reached a total of 280 grams. The participants reported significant improvement in all five categories on a standard questionnaire: energy, sleep, mental clarity, pain intensity, and well-being. On average, patients reported a stunning 45% increase in self-reported energy levels.

Heart failure, Restless Leg Syndrome, and Fibromyalgia

Hope for Heart Failure

Heart failure means the heart muscle is failing to pump enough blood to meet the body’s metabolic requirements.

In heart failure, D-ribose production falls in heart muscle cells. This leads to a decrease in ATP production, resulting in cellular energy deficiency in the muscle cells of the organs that need energy the most.

Taking oral D-ribose can help create new ATP molecules and restore cardiac energy levels.

Clinical trials have shown that D-ribose taken orally can improve heart function in heart failure patients.

Fibromyalgia

There is evidence that defective production of ATP is the one potential culprit behind fibromyalgia (a condition that causes pain throughout the body) and chronic fatigue syndrome.

Restless Leg Syndrome

Restless leg syndrome is a disorder causing discomfort and pain in the legs. This condition progresses with age and often leads to insomnia. Disordered energy metabolism has been suggested as one possible cause of restless leg syndrome.

Based on that observation, researchers gave individuals with restless leg syndrome 5 grams of D-ribose, three times per day. Remarkably, daytime symptoms were completely eliminated, and nighttime symptoms were significantly reduced.

Lifestyle Modifications to Fight Fatigue

A constant feeling of tiredness or weakness is called fatigue. It can affect anyone, and most adults will experience fatigue at some point in their life. Some lifestyle modifications that may help:

- Exercise: even a 15-minute walk can give you an energy boost.
- Lose weight if overweight.
- Get optimal sleep.
- Relieve stress: meditate, work out, do yoga, listen to music, have social support.
- Limit alcohol and caffeine intake.
- Stay hydrated.

People with heart failure taking D-ribose were shown to improve blood flow through the heart and body and boost the exchange of oxygen and CO2 through the lungs, leading to improvements in breathing parameters.

Another study showed the ability of D-ribose to reduce symptoms and improve quality of life in heart failure patients.

In a review of studies in animals and humans, D-ribose has been shown to increase ATP production in heart muscle cells and improve cardiac function.

In clinical trials D-ribose enhanced cardiac function and improved quality of life in patients with heart failure.
Exercise Performance

D-ribose is a building block of ATP. It may help speed muscle recovery after high-intensity exercise.

- In a double-blind cross-over study of 26 athletes, subjects were given either a dextrose sugar control or 10 grams of D-ribose for two days. This was followed by three additional days of supplementation. During these three days, both groups underwent 60 minutes per day of high-intensity exercise. After five days, significant improvement in exercise performance and lower perceived exercise exertion were observed in the D-ribose group, compared to the placebo arm of the study.16

- In a study of healthy, active individuals, supplying fatigued muscle cells with D-ribose quickly restored ATP levels to normal.17

Summary

By restoring the body’s ability to produce energy, D-ribose leads to improved function for organs such as the heart and muscles.

D-ribose intake is especially valuable for heart failure patients and has been shown to produce meaningful improvements in cardiovascular function.

Because high doses of D-ribose are needed, most people find it more efficient to take 5 grams or more each day in a neutral-tasting powder form.●

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


What is ATP (adenosine triphosphate)?

- ATP is a molecule carrying energy, found in every cell of the body; it is vital for energy production.
- It has a nitrogenous base (adenine), and a sugar (ribose), attached to three phosphate molecules.
- Cells need energy to perform cellular functions, such as growth, nerve impulse propagation, and muscle cell contraction.
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**References**
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How ApoE Testing Helps Gauge Disease Risk

BY RICHARD EDWINS

Many people worry about Alzheimer’s disease. Few know there’s a simple genetic test that can tell you whether you’re at increased risk of developing it.

Apolipoprotein E (ApoE) is a protein that helps carry cholesterol, fats and fat-soluble vitamins in the blood.\(^1\) One type of ApoE helps predict one’s risk for Alzheimer’s dementia.

The gene that provides the instructions for making ApoE in humans has three different forms.

Studies have shown that one specific ApoE form increases risk for Alzheimer’s disease\(^ {1-3} \) and is also associated with increased risk for cardiovascular disease\(^ {1,3-5} \).

Another form of the gene reduces risk for Alzheimer’s disease\(^ {1-4,6} \).

Testing for different ApoE types is a tool that helps assess the risk of developing these conditions.
The ApoE gene exists in three different forms:  

- **ApoE e3** is the most common type. About 60% of the population has two copies of **ApoE e3**, one from each parent.
- **ApoE e4** is less common, and it is the problematic type. About 20%-30% of people have one or two copies of this form.
- **ApoE e2** is the least common form. Only about 10%-20% of people carry at least one copy of this gene.

### ApoE Types

The problematic **ApoE e4** form is present in approximately **25%** of the U.S. population. Genetic testing for ApoE status can be done with a simple cheek swab from home.

ApoE status does not tell you if you will or will not develop Alzheimer’s disease or other conditions, only whether you are at greater risk of having them.

If you are concerned about your risk of Alzheimer’s or cardiovascular disease or have a family history of either, consider testing your ApoE status, the sooner the better, so preventative measures can be taken if ApoE e4 is detected.

Your physician can also discuss how you can use the test results to make lifestyle changes to minimize your overall risk.

### ApoE Functions

ApoE is mainly synthesized in the liver, and it helps transport lipids, fat-soluble vitamins, and cholesterol into the lymph system and then into the blood.

In the brain, ApoE is mainly produced by **astrocytes** that help transport essential lipids and maintain healthy neuronal signaling.

The three forms of ApoE have different lipid-binding capacities that involve their abilities to bind or clear **amyloid beta plaques** that form around nerve cells.  

**ApoE** genes function to help control brain inflammation, and support removal of degenerated cell membranes and lipids that accumulate with aging.  

ApoE binds to LDL receptors in the liver to remove remnant lipoprotein particles (chylomicrons and VLDL) from circulation. Defects in ApoE result in an increase in plasma cholesterol and triglycerides due to impaired clearance of chylomicrons, VLDL and LDL.

One distinct feature of Alzheimer’s disease is the build-up of clumps of beta-amyloid in the brain. ApoE enhances beta-amyloid break-down, both within and between cells.

Unfortunately, the **ApoE e4** genetic variant is not as effective as the others at breaking down the beta-amyloid clusters, controlling brain inflammation, and protecting brain and nerve cells.

### Alzheimer’s Risk

In population studies, the **ApoE** genetic type correlates with risk for **Alzheimer’s disease** in the following ways:

- **ApoE e4**: The presence of even one copy of the e4 form of the gene increases the risk of developing Alzheimer’s disease. Typical estimates suggest one e4 gene increases the risk of Alzheimer’s disease two to three fold, whereas having two copies (one from each parent) is associated with 8 to 12 fold greater risk than average.

- **ApoE e3**: This gene form is not considered to have any impact on risk for Alzheimer’s disease.

- **ApoE e2**: The rarest form of the gene has been found to be protective, reducing risk of developing Alzheimer’s disease.

A study published in 2022 found that **ApoE e4** is linked to faulty cholesterol processing in the brain, which leads to defects in the protective coating around nerve fibers. That, in turn, may cause memory problems.
Having the e4 gene does not mean someone will develop Alzheimer’s disease. But it does mean there’s an increased risk of developing it. It also means there’s a greater risk of developing it at a younger age, and of having a faster decline in cognitive function as it progresses.2,6

A genetic test can identify which form of the ApoE gene a person has. Those who discover they’re at higher risk can make changes to reduce other risk factors for Alzheimer’s disease.1

Other Health Outcomes

ApoE status is associated with other health conditions.

Most notably, having the ApoE e4 gene form is associated with higher cholesterol levels and increased risk of cardiovascular diseases.1,3,5,10 It plays a role in glucose transport, neuronal signaling, and mitochondrial function. Independently, ApoE e4 may trigger inflammatory response causing neurovascular dysfunction.7

Genetic testing can identify those at higher risk for these conditions, allowing them to monitor their health and make changes that could help ward off disease.
Summary

Genetic testing to see which form of the apolipoprotein E (ApoE) gene you have can help assess your risk for certain chronic diseases, particularly Alzheimer’s disease.

Having the ApoE e4 form of the gene is considered a risk factor for Alzheimer’s and heart disease. On the other hand, possessing a copy of the e2 form indicates reduced risk of Alzheimer’s disease.

Genetic testing can allow people at greatest risk for developing Alzheimer’s and cardiovascular diseases to make healthy lifestyle choices to reduce the dangers.

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


What Dietary and Lifestyle Changes Can Be Beneficial for Alzheimer’s Disease? 14

- The Mediterranean diet has been linked to a reduced risk of Alzheimer’s and other neurodegenerative diseases. 14-16
- Aggressive dietary interventions demonstrated to be efficacious in reversing early Alzheimer’s dementia include eliminating red meat, processed foods, simple sugars and excess carbohydrates while increasing intake of healthy plant foods, fiber, overnight fasting, and exercise. 17,18
- Low-calorie diets have been linked to a reduced risk of cognitive decline. 15
- Avoiding smoking and protecting against hypertension, diabetes, dyslipidemia, and obesity, may help in the prevention of dementia. 15
- Regular exercise may directly benefit brain cells by increasing blood and oxygen flow in the brain. 14
- Limiting alcohol consumption. 16
- Engaging in late-life cognitive activities—being intellectually engaged by keeping the mind active—may benefit the brain. 16
- Supplement the brain with basic cognitive support—nutrients such as omega-3 fatty acids, curcumin, resveratrol, and magnesium. 15
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From 1991-2006, Katie Couric was the face of morning television as the co-host of the TODAY show on NBC.

Today, she has become the face of something even more important: colon cancer awareness.

In 1998, colon cancer changed Couric’s life forever when it claimed the life of her husband, Jay Monahan, at just 42 years old.

He was not diagnosed until it was in the advanced stages, and he died nine short months after.

Couric learned that routine colon screening could have saved her husband’s life, and for the past 20-plus years, she has devoted her life to spreading awareness, promoting routine screening, and raising money for cancer research.

More recently, due to an alarming increase in colorectal cancer cases in people under 50, the recommendations for routine screening have been lowered from age 50 down to 45.

Now, Couric is stepping out in new ways to promote screening to a younger generation.

**Spreading Awareness**

In Couric’s memoir, Going There, she gets deeply personal about the anger, frustration, hurt, and loss she experienced after her husband’s diagnosis and untimely death.

She laments the signs she overlooked—the sensitive stomach, the fatigue, the weight loss.

She talks about her search for a cure, her bargains with God, and the regret she had that she and her young daughters (ages five and one at the time of Jay’s death) wouldn’t have more time with their father.

Ultimately, she determined to honor Jay’s memory by becoming an advocate for cancer screening.

In 2000, Couric appeared before the U.S. Senate Select Committee on Aging in an effort to highlight the dangers of colon cancer and the importance of colon cancer screening.

“During this terrible struggle, I got a quick and painful education about this devastating disease. I learned that colon cancer is the second leading cancer killer. It kills more people than any other cancer,
with the exception of lung cancer,” Couric said in testimony before the Committee. “But I also learned that it has a 90% or better cure rate if detected early. That means that colon cancer screening is a critical weapon in the fight against a disease no one needs to die from.”

That same year, she co-founded the National Colorectal Cancer Research Alliance (NCCRA) with anticancer activist Lilly Tartikoff and the Entertainment Industry Foundation.

The goal of the NCCRA was to fund research to develop better tests, treatments, and ultimately a cure—as well as to promote the life-saving value of screening.

Nothing brought more awareness to the value of screening than when Couric herself underwent a colonoscopy live on the TODAY show.

“Of everything I’ve done in my career, here is the thing of which I’m most proud: Studying the impact a public figure can have on health issues, the University of Michigan reported a 20% jump in colonoscopy screenings as a result of my airing the procedure. They called it the Couric Effect,” she said in Going There. “But even more gratifying was unsolicited feedback from [my daughter] Ellie when she was just nine. ‘Mom, I’m so proud of the work you’re doing with colon cancer.’”

New Risks for a New Generation

Screening is critical because colorectal cancer typically doesn’t cause symptoms until it has already grown or spread, according to the American Cancer Society.

By the time symptoms appear—such as a change in bowel habits, blood in the stool, persistent abdominal discomfort, and unexplained weight loss—the cancer is often in advanced stages.

“Jay never really had any symptoms of colon cancer,” Couric said, “other than being tired all of the time, which we chalked up to a busy lifestyle, having young children, and his coast-to-coast trips providing legal analysis for NBC.”

This is why colon cancer continues to be one of the deadliest cancers—but it is also one of the most treatable when caught early with screening.

Colon cancer rates have been declining overall since the 1980s, no doubt due in part to Couric’s relentless campaigning for screening. Unfortunately, during that same time period, there has been an alarming increase in younger adults.

In adults ranging from 20-55 years of age, colon cancer incidence has been increasing by 1%-2% per year.

Rectal cancer rates are rising even faster, at 2%-3% per year.

According to research conducted by the American Cancer Society, people born after 1990 have double the risk of colon cancer and quadruple the risk of rectal cancer, compared to those born in 1950.

These increases have led the U.S. Preventive Services Task Force to change their screening guidelines from 50 years old down to 45 years old.

This change makes 45 million Americans above the age of 45 eligible for screening.

(Note: LifeExtension® has always advocated for colonoscopy screening to begin at age 40. We did not agree with conventional medicine’s guidelines to begin screening at age 50 nor do we concur with U.S. Preventive Services Health Task Force’s new recommendation to begin screening at age 45 instead of age 50.)
Colon Cancer Screening at Home

With a new generation facing alarmingly increased rates of colorectal cancer, Couric is on a renewed mission to make the younger generation aware of the importance of early screening.

“Screening wouldn’t have crossed our minds for Jay when he was diagnosed at 41,” said Couric. “My hope is that we figure out a way to do even broader screening and that we can save even more lives. But until then, people need to pay attention, they need to talk to their doctors… And they need to get screened.”

Couric, along with one of the organizations she co-founded, Stand Up To Cancer, is now promoting the at-home screening test, Cologuard®, in a national TV commercial.

This at-home test detects altered DNA or blood in stools and is 92% accurate at detecting cancers. However, it only detects about 42% of precancerous polyps. It also had a 13% false positive rate.

While this could be a stepping-stone for increasing awareness and compliance (due to its less invasive nature), a traditional colonoscopy remains the gold standard of testing.

Colonoscopies are more than 90% effective at identifying colon cancer and the presence of precancerous polyps that can turn into cancers.

One study in the British Medical Journal found that getting a colonoscopy was associated with a 67% reduced risk of dying from colorectal cancer.

In a recent interview with TODAY, Couric said, “The bottom line is that [early] screening saves lives. Early detection saves lives.”

ALARMING TREND

While colon cancer death rates have fallen in the general population, largely due to better screening, it has risen in younger people.¹

According to the American Cancer Society, 20% of new colon cancer diagnoses are people under 55. In 2023, it is estimated that there will be 19,500 new cases in people under 50. To make matters worse, these cases in younger people are being diagnosed at a more advanced stage of the disease.² Doctors are perplexed by this alarming trend.

One answer is obesity and high body mass index. A recent meta-analysis found 30% increased risk of colon cancer in males and 12% in females with each 5-unit increase in body mass index.³,⁴

And obesity is increasingly prevalent in the young.⁵

More screening is needed at a younger age along with diet and lifestyle modifications. Screening recommendations by the American Cancer Society includes annual stool tests followed by a colonoscopy every five years.²

A Legacy to Be Proud Of

Beyond promoting early detection through screening, Couric has poured her efforts into finding a cure.

In 2008, she cofounded Stand Up To Cancer, a program whose mission is to raise funds to accelerate the pace of groundbreaking translational research that can get new therapies to patients quickly and save lives now.

Couric says that, to date, they’ve raised over $600 million, and have helped gain FDA approval for nine new cancer drugs.

“I don’t like to think about my obituary too often,” said Couric. “But when I do, I hope the first line will be ‘Katie Couric was a tireless advocate for cancer awareness and research.’” •

References

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Dual-Encapsulation Delivery

Item #02125 • 30 liquid vegetarian capsules
1 bottle $24.75 • 4 bottles $22.50 each

Note: Color of inner capsule may vary but does not affect ingredients.

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

Ashwagandha has been shown to:
- Support a healthy response to everyday stress
- Promote emotional well-being
- Encourage already-healthy levels of cortisol, the stress hormone

Optimized Ashwagandha provides standardized leaf and root extracts at a low cost.

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

Sensoril® is protected under US Patent No. 7,318,938 and is a registered trademark of Natreon, Inc.

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

MacuGuard® Ocular Support provides:

- **Lutein, trans-zeaxanthin, and meso-zeaxanthin** help maintain structural integrity of the macula and retina.¹,⁶
- **Cyanidin-3-glucoside** assists with night vision.⁶,⁸
- **Saffron** has been shown to help support vision as demonstrated by doctors’ eye exams.¹
- **Alpha-carotene** further helps support macular density.¹

For full product description and to order either of these MacuGuard® formulas, call 1-800-544-4440 or visit www.LifeExtension.com

References

LuteinPlus® and Mz® are registered trademarks of NutriProducts Ltd., UK, licensed under U.S. Patent 8,623,428.

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.
Chronic liver disease is reported as one of the 15 leading causes of death in the U.S. In the year 2020 it contributed to over 50,000 fatalities.¹

These liver diseases include nonalcoholic fatty liver disease, alcoholic liver disease, viral hepatitis, and other toxic conditions. A large proportion of the population is at risk of long-term liver damage.

Researchers are intrigued by animal, preclinical and human data about the carotenoid astaxanthin and its potential ability to protect the liver in multiple ways.²⁻⁵

Studies show that this plant carotenoid can help defend the liver against injury and may help reverse damage that has already been done.²⁻³

Astaxanthin has been studied for potential clinical benefits, including for eye,⁶⁻⁸ heart,⁸⁻¹⁰ and brain health.⁸,¹¹ Protecting the liver is one more area where astaxanthin may prove valuable.²

Astaxanthin

Astaxanthin is a red carotenoid produced by marine microorganisms such as microalgae and phytoplankton. It is responsible for the pinkish color of shrimp, salmon, and flamingos, as a result of how much astaxanthin they consume.¹⁰

Astaxanthin is an anti-inflammatory and antioxidant.¹⁰ More recent research has found that astaxanthin protects against various forms of injury that can cause chronic liver disease.²⁻³
Role in Liver Fibrosis

Several factors can cause liver damage, including poor diet, metabolic disease, alcohol consumption, hepatitis viruses, and others. These lead to a cycle of chronic inflammation, and tissue destruction that over time can cause liver fibrosis (scarring).  

In the late stages of liver disease, this scarring becomes permanent. When large sections of the liver are replaced by scar tissue and can no longer function, it is known as cirrhosis. The end-stage result is liver failure. At this point, the only effective treatment is a liver transplant.

Several in vivo and in vitro studies have found that astaxanthin is protective against fibrosis.

With fibrosis, a certain type of liver cell becomes activated and begins synthesizing fibrous tissue. In animal models and human liver cells, astaxanthin prevents and reverses this process, blocking the activation of these cells and shutting down cells that have already been activated.

The chemical carbon tetrachloride is a powerful liver toxin. It causes severe liver damage, leading to fibrosis.

In an animal trial, with liver damage induced by this liver toxin, rats were given astaxanthin at a dose of 10 mg/kg. After two weeks it was observed that the liver in the treatment group was protected from oxidative damage induced by the toxin, with a significant reduction of inflammation and fibrosis.

Role in Fatty Liver Disease

A condition called nonalcoholic fatty liver disease causes the liver to accumulate fat, resulting in inflammation and damage that can lead to liver fibrosis and loss of function. More than 20% of adults in the U.S. and North America may suffer from this condition.

Preclinical studies show that astaxanthin may help to prevent or even reverse it.

Several rodent model studies have shown that astaxanthin can prevent and reverse the development of fatty liver changes. It also improved markers of metabolism and insulin sensitivity.

One group of scientists studying different models of fatty liver disease in mice found that giving them astaxanthin:

- Prevented fatty liver changes,
- Reversed existing changes, decreasing liver fat,
- Reduced inflammation and fibrosis, and
- Improved insulin sensitivity.

The same research group performed a preliminary study in humans with existing fatty liver. Subjects were randomized to receive either 12 mg of astaxanthin per day for 24 weeks or a placebo. Compared to the placebo, astaxanthin was able to reduce liver fat and slow the progression of fatty liver.

Several studies have illustrated some ways that astaxanthin can protect the liver. In addition to shielding against oxidative damage and inflammation, it inhibits the signaling proteins NF-κB and PPARs, which are both drivers of liver inflammation and formation of fatty deposits. These effects can even help decompose existing fat droplets in the liver.

Other Liver Benefits

Preclinical studies have found that astaxanthin administration holds promise for a wide range of liver disorders.

- One notable example is alcoholic liver disease—multiple changes that are normally seen in the liver with excessive alcohol intake—including inflammation, fatty change, fibrosis, and mitochondrial dysfunction.
Excessive alcohol intake over time is one of the most common causes of cirrhosis and liver failure. Several animal model studies have shown that astaxanthin protects against alcohol-induced liver damage. It was shown in a mouse model that by improving gut health and reducing inflammation and oxidative stress caused by alcohol, astaxanthin guarded against liver damage. 

- In a study of mice on a high-fat diet, astaxanthin inhibited the increases in body weight, and reduced liver weight, liver triglyceride, plasma triglyceride, and total cholesterol. This suggests astaxanthin might be of value in reducing the likelihood of obesity and metabolic syndrome.
- Even in a study of healthy older women, astaxanthin reduced liver enzymes in the blood, which can be markers of liver damage. This provides evidence that astaxanthin intake may protect the liver in people with or without any obvious signs of liver damage.

### Conclusion

The carotenoid astaxanthin is a powerful antioxidant as well as an anti-inflammatory. Preclinical models show that astaxanthin is protective of the liver, and some preliminary research in humans is also promising. Astaxanthin may guard against fatty liver changes, damage due to alcohol and other toxins, and liver fibrosis.

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

With age, synapses that connect our brain cells wither.

Formulated by MIT scientists, Neuro-Mag® Magnesium L-Threonate has been shown to improve synaptic density and other structural components of the brain.


Magtein® is a registered trademark of Magceutics, Inc. and is distributed exclusively by AIDP, Inc. Magtein® is protected under U.S. patents 8,178,118; 8,142,803; 8,163,301 and other patents pending.

For full product description and to order Neuro-Mag® Magnesium L-Threonate or Neuro-Mag® Magnesium L-Threonate Powder, call 1-800-544-4440 or visit www.LifeExtension.com
Uncomfortable after eating?

Digestive enzymes are specialized proteins that help you break down the foods you eat.

**Enhanced Super Digestive Enzymes** combines 10 vegetarian-friendly enzymes to help you break down hard-to-digest foods and encourage a healthy gastrointestinal balance...so you can feel good after you eat!

**Munch**

(Or breakfast, or dinner...)

Item #02021 • 60 vegetarian capsules

1 bottle $16.50 • 2 bottles $15.75 each

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
N-Acetyl-L-Cysteine (NAC) has been shown to support healthy immune response and respiratory function.

NAC supports healthy levels of glutathione that helps promote a healthy inflammatory response and protect cells from oxidative damage.
ASTAXANTHIN is a carotenoid that benefits the liver, heart, skin, and immune system. Research suggests that astaxanthin can play a role in promoting cardiovascular health.¹

Found naturally in seafood and algae, as little as 50% of astaxanthin is normally absorbed in the bloodstream.²,³

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

References

For full product description and to order ASTAXANTHIN 4 mg with Phospholipids, call 1-800-544-4440 or visit www.LifeExtension.com
### ACTIVE LIFESTYLE & FITNESS

- **01529** Creatine Capsules
- **02020** Super Carnosine
- **02023** Tart Cherry with CherryPURE®
- **02246** Wellness Code® Advanced Whey Protein Isolate Vanilla
- **02221** Wellness Code® Muscle Strength & Restore Formula
- **02127** Wellness Code® Plant Protein Complete & Amino Acid Complex
- **02261** Wellness Code® Whey Protein Concentrate Chocolate
- **02260** Wellness Code® Whey Protein Concentrate Vanilla
- **02243** Wellness Code® Whey Protein Isolate Chocolate
- **02242** Wellness Code® Whey Protein Isolate Vanilla

### AMINO ACIDS

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

### BLOOD PRESSURE & VASCULAR SUPPORT

- **01824** Advanced Olive Leaf Vascular Support
- **02004** Arterial Protect
- **02497** Endothelial Defense™ Pomegranate Plus
- **56885** Natto Activ Cardiovascular & Respiratory Support
- **02320** NitroVasc™ Boost
- **00984** Optimal BP Management
- **01953** Pomegranate Complete
- **00956** Pomegranate Fruit Extract
- **02024** Triple Action Blood Pressure AM/PM
- **02102** VenoFlow™

### BONE HEALTH

- **01726** Bone Restore
- **02123** Bone Restore Chewable Tablet
- **02416** Bone Restore Elite with Super Potent K2
- **01727** Bone Restore with Vitamin K2
- **01725** Bone Strength Collagen Formula
- **01963** Calcium Citrate with Vitamin D
- **01506** Dr. Strum’s Intensive Bone Formula
- **02417** Mega Vitamin K2
- **01476** Strontium Caps

### BRAIN HEALTH

- **01524** Acetyl-L-Carnitine
- **01974** Acetyl-L-Carnitine Arginate
- **02419** B12 Elite
- **02510** Brain Fog Relief
- **01659** CDP Choline
- **02321** Cognitex® Basics
- **02396** Cognitex® Elite
- **02397** Cognitex® Elite Pregnenolone
- **01540** DMAE Bitartrate
- **02006** Dopa-Mind™
- **02413** Dopamine Advantage
- **01658** Ginkgo Biloba Certified Extract™
- **01527** Huperzine A
- **00020** Lecithin
- **02101** Memory Protect

### CHOLESTEROL MANAGEMENT

- **01828** Advanced Lipid Control
- **01910** CHOL-Support™
- **01304** Theaflavins Standardized Extract
- **00372** Vitamin B3 Niacin Capsules

### DIGESTION SUPPORT

- **02412** Bloat Relief
- **01736** Effervescent Vitamin C - Magnesium Crystals
- **02021** Enhanced Super Digestive Enzymes
- **02022** Enhanced Super Digestive Enzymes and Probiotics
- **02033** Esophaguard™
- **01737** Esophageal Guardian
- **01706** Extraordinary Enzymes
- **02100** Gastro-Ease™

### ENERGY MANAGEMENT

- **01628C** Adrenal Energy Formula - 60 veg capsules
- **01630C** Adrenal Energy Formula - 120 veg capsules
- **00972** D-Ribose Powder
- **01473** D-Ribose Tablets
- **01900** Energy Renew
- **01544** Forskolin
- **01805** Ginseng Energy Boost
- **01869** Mitochondrial Basics with PQQ
- **01868** Mitochondrial Energy Optimizer with PQQ
- **01904** NAD+ Cell Regenerator™ - 100 mg, 30 veg capsules
- **02344** NAD+ Cell Regenerator™ 300 mg, 30 veg capsules
- **02348** NAD+ Cell Regenerator™ and Resveratrol Elite™
- **01500** PQQ Caps - 10 mg, 30 vegetarian capsules
- **01647** PQQ Caps - 20 mg, 30 vegetarian capsules
- **00889** Rhodiola Extract
- **02003** Triple Action Thyroid

### EYE HEALTH

- **01923** Astaxanthin with Phospholipids
- **00893** Brite Eyes III
- **02323** Digital Eye Support
- **01514** Eye Pressure Support with Mirtogenol®
- **01992** MacuGuard® Ocular Support with Saffron
- **01993** MacuGuard® Ocular Support with Saffron & Astaxanthin
- **01873** Standardized European Bilberry Extract
- **01918** Tear Support with MaquiBright®

### FISH OIL & OMEGAS

- **01937** Mega EPA/DHA
- **02218** Mega GLA Sesame Lignans
- **01983** Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 60 softgels
- **01988** Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin
- **01982** Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 120 softgels
- **01985** Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 60 enteric coated softgels
- **01984** Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 120 enteric coated softgels
**FOOD**

- Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 240 softgels
- Rainforest Blend Decaf Ground Coffee
- Rainforest Blend Whole Bean Coffee
- CoffeeGenic® Green Coffee Extract
- Glycemic Guard™
- Mega Benfotiamine
- Tri Sugar Shield®

**GLUCOSE MANAGEMENT**

- CinSulin® with InSea 2® and Crominex® 3+
- CoffeeGenic® Green Coffee Extract
- Glycemic Guard™
- Mega Benfotiamine
- Tri Sugar Shield®

**HEART HEALTH**

- Aspirin (Enteric Coated)
- Cardio Peak™
- Homocysteine Resist
- Omega-3 Fish Oil Gummy Bites
- Optimized Carnitine
- Super-Absorbable CoQ10 Ubiquinone with d-Limonene • 50 mg, 60 softgels
- Super-Absorbable CoQ10 Ubiquinone with d-Limonene • 100 mg, 60 softgels
- Super Ubiquinol CoQ10
- Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 20 softgels
- Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 100 softgels
- Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 200 mg, 30 softgels
- Super Ubiquinol CoQ10 with PQQ
- TMG Liquid Capsules
- TMG Powder

**HORMONE BALANCE**

- DHEA • 15 mg, 100 capsules
- DHEA • 25 mg, 100 capsules
- DHEA • 50 mg, 60 capsules
- DHEA • 25 mg, 100 vegetarian dissolve in mouth tablets
- DHEA • 100 mg, 60 veg capsules
- Optimized Broccoli and Cruciferous Blend
- Pregnenolone • 50 mg, 100 capsules
- Pregnenolone • 100 mg, 100 capsules
- Triple Action Cruciferous Vegetable Extract
- Triple Action Cruciferous Vegetable Extract and Resveratrol

**IMMUNE SUPPORT**

- 5 Day Elderberry Immune
- Bio-Qurcetin
- Black Elderberry + Vitamin C
- Echinacea Elite
- Enhanced Zinc Lozenges
- Immune Modulator with Tinofend®
- Immune Packs with Vitamin C & D, Zinc and Probiotic
- Fast Acting Relief
- Fast-Acting Joint Formula
- Fast-Acting Joint Formula
- Fast-Acting Relief
- Immune Modulator with Tinofend®
- Immune Senescence Protection Formula™
- Immune Modulator with Tinofend®
- Immune Packs with Vitamin C & D, Zinc and Probiotic
- Immune Senescence Protection Formula™

**INFLAMMATION MANAGEMENT**

- 5-LOX Inhibitor with AprèsFlex®
- Advanced Curcumin Elite™ Turmeric Extract, Ginger & Turmerones
- Black Cumin Seed Oil
- Black Cumin Seed Oil and Curcumin Elite™
- Curcumin Elite™ Turmeric Extract - 30 veg capsules
- Curcumin Elite™ Turmeric Extract - 60 veg capsules
- Cytokine Suppress® with EGCG
- Pro-Resolving Mediators
- Restore Activ Joint Muscle & Tissue
- Specially-Coated Bromelain
- Super Bio-Curcumin® Turmeric Extract

**JOINT SUPPORT**

- Arthro-Immune Joint Support
- ArthroMax® Advanced NT2 Collagen™ & AprèsFlex®
- ArthroMax® with Theaflavins & AprèsFlex®
- ArthroMax® Elite
- Fast-Acting Joint Formula
- Fast Acting Relief
- Glucosamine/Chondroitin Capsules
- Glucosamine Sulfate
- Joint Mobility
- Krill Healthy Joint Formula
- MSM (Methylsulfonylmethane)
- NT2 Collagen™

**KIDNEY & BLADDER SUPPORT**

- Cran-Max® Cranberry Whole Fruit Concentrate
- Uric Acid Control
- Water-Soluble Pumpkin Seed Extract

**LIVER HEALTH & DETOXIFICATION**

- Advanced Milk Thistle • 60 softgels
- Advanced Milk Thistle • 120 softgels
- Anti-Alcohol Complex
- Calcium D-Gluarate
- Chlorophyllin
- FLORASSIST® Liver Restore™
- Glutathione, Cysteine & C
- HepatoPro
- Liver Efficiency Formula
- Milk Thistle • 60 veg capsules
- N-Acetyl-L-Cysteine
- Silymarin
- SOD Booster
- SOD Booster

**LONGEVITY & WELLNESS**

- Alpha-Lipoic Acid
- AppleWise
- Bio-Fisetin
- Blueberry Extract
- Blueberry Extract and Pomegranate
02270  DNA Protection Formula
02431  Essential Youth - L-Ergothioneine
02119  GEROPROTECT® Ageless Cell™
02415  GEROPROTECT® Autophagy Renew
02401  GEROPROTECT® Stem Cell
02211  Grapeseed Extract
00954  Mega Green Tea Extract (decaffeinated)
00953  Mega Green Tea Extract (lightly caffeinated)
01513  Optimized Fucoidan with Maritech® 926
02230  Optimized Reservatrol Elite™
01637  Pycnogenol® French Maritime Pine Bark Extract
02210  Resveratrol Elite™
02301  Senolytic Activator™
01208  Super R-Lipoic Acid
01919  X-R Shield

LUNG HEALTH
02512  Healthy Lungs

MEN’S HEALTH
02209  Male Vascular Sexual Support
00455  Mega Lycopene Extract
02306  Men's Bladder Control
01789  PalmettoGuard® Saw Palmetto and Beta-Sitosterol
01790  PalmettoGuard® Saw Palmetto/Nettle Root Formula and Beta-Sitosterol
01837  Pomi-T®
01373  Prelox® Enhanced Sex for Men
01940  Super MiraForte with Standardized Lignans
02500  Testosterone Elite
01909  Triple Strength ProstaPollen™
02029  Ultra Prostate Formula

MINERALS
01661  Boron
02107  Extend-Release Magnesium
01677  Iron Protein Plus
02403  Lithium
01459  Magnesium Caps
01682  Magnesium (Citrate)
01328  Only Trace Minerals
01504  Optimized Chromium with Crominex® 3+
02309  Potassium with Extend-Release Magnesium
01740  Sea-Iodine™
01879  Se-Methyl L-Selenocysteine
01778  Super Selenium Complex
00213  Vanadyl Sulfate
01813  Zinc Caps

MISCELLANEOUS
00577  Potassium Iodide
00657  Solarshield® Sunglasses

MOOD & STRESS MANAGEMENT
02434  Calm-Mag
02312  Cortisol-Stress Balance
00987  Enhanced Stress Relief
01683  L-Theanine
02175  SAMe (S-Adenosyl-Methionine) 200 mg, 30 enteric coated vegetarian tablets
02176  SAMe (S-Adenosyl-Methionine) 400 mg, 30 enteric coated vegetarian tablets
02174  SAMe (S-Adenosyl-Methionine) 400 mg, 60 enteric coated vegetarian tablets
02429  Theanine XR™ Stress Relief

MULTIVITAMINS
02199  Children's Formula Life Extension Mix™
02354  Life Extension Mix™ Capsules
02364  Life Extension Mix™ Capsules without Copper
02356  Life Extension Mix™ Powder
02355  Life Extension Mix™ Tablets
02357  Life Extension Mix™ Tablets with Extra Niacin
02365  Life Extension Mix™ Tablets without Copper
02292  Once-Daily Health Booster - 30 softgels
02291  Once-Daily Health Booster - 60 softgels
02313  One-Per-Day Tablets
02428  Plant-Based Multivitamin
02317  Two-Per-Day Capsules - 60 capsules
02314  Two-Per-Day Capsules - 120 capsules
02316  Two-Per-Day Tablets - 60 tablets
02315  Two-Per-Day Tablets - 120 tablets

NERVE & COMFORT SUPPORT
02291  ComfortMAX™
02303  Discomfort Relief

PERSONAL CARE
02322  Hair, Skin & Nails Collagen Plus Formula
01278  Life Extension Toothpaste
00408  Venotone
02304C  Youthful Collagen
02252  Youthful Legs

PET CARE
01932  Cat Mix
01931  Dog Mix

PROBIOTICS
01622  Bifido GI Balance
01825  FLORASSIST® Balance
02421  FLORASSIST® Daily Bowel Regularity
02125  FLORASSIST® GI with Phage Technology
01821  FLORASSIST® Heart Health
02250  FLORASSIST® Mood Improve
02208  FLORASSIST® Immune & Nasal Defense
02120  FLORASSIST® Oral Hygiene
02203  FLORASSIST® Prebiotic
02505  FLORASSIST® Probiotic Women's Health

SKIN CARE
80157  Advanced Anti-Glycation Peptide Serum
80165  Advanced Growth Factor Serum
80170  Advanced Hyaluronic Acid Serum
80154  Advanced Lightening Cream
80175  Advanced Probiotic-Fermented Eye Serum
80177  Advanced Retinol Serum
80152  Advanced Triple Peptide Serum
80140  Advanced Under Eye Serum with Stem Cells
80137  All-Purpose Soothing Relief Cream
80139  Amber Self MicroDermAbrasion
80118  Anti-Aging Mask
80151  Anti-Aging Rejuvenating Face Cream
80179  Brightening Peptide Serum
80176  Collagen Boosting Peptide Cream
80156  Collagen Boosting Peptide Serum
80208  Collagen Peptides for Skin & Joints
80180  CoQ10 and Stem Cell Rejuvenation Cream
80169  Cucumber Hydra Peptide Eye Cream
02423  Daily Skin Defense
80163  Eye Lift Cream
PRODUCTS

SLEEP

01512 Bioactive Milk Peptides
02300 Circadian Sleep
01551 Enhanced Sleep with Melatonin
01511 Enhanced Sleep without Melatonin
02234 Fast-Acting Liquid Melatonin
01669 Glycine
02308 Herbal Sleep PM
01722 L-Tryptophan
01668 Melatonin • 300 mcg, 100 veg capsules
01083 Melatonin • 500 mcg, 200 veg capsules
00329 Melatonin • 1 mg, 60 capsules
02503 Melatonin • 3 mg, 60 gummies
00330 Melatonin • 3 mg, 60 veg capsules
00331 Melatonin • 10 mg, 60 veg capsules
00332 Melatonin • 3 mg, 60 veg lozenges
02201 Melatonin IR/XR
01787 Melatonin 6 Hour Timed Release 300 mcg, 100 veg tablets
01788 Melatonin 6 Hour Timed Release 750 mcg, 60 veg tablets
01721 Optimized Tryptophan Plus
01444 Quiet Sleep Melatonin • 3 mg, 60 veg capsules
01445 Quiet Sleep Melatonin • 5 mg, 60 veg capsules
02502 Rest & Renew

VITAMINS

01533 Ascorbyl Palmitate
00920 Benfotiamine with Thiamine
01945 BioActive Complete B-Complex
00102 Biotin
00084 Buffered Vitamin C Powder
02229 Fast-C® and Bio-Quercetin Phytosome

WEIGHT MANAGEMENT & BODY COMPOSITION

02479 7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules
02207 AMPK Metabolic Activator
02504 Body Trim and Appetite Control
02478 DHEA Complete
01738 Garcinia HCA
02506 Mediterranean Weight Management
01432 Optimized Saffron
00818 Super CLA Blend with Sesame Lignans
02511 Thermo Weight Control
02509 Waistline Control™

WOMEN’S HEALTH

01942 Breast Health Formula
01626 Enhanced Sex for Women 50+
01894 Estrogen for Women
02204 Menopause 731™
02319 Prenatal Advantage
01649 Super-Absorbable Soy Isoflavones
02513 Women’s Bladder Support
02507 Youthful Woman 40+ with B-Complex
A Therapeutic Foot Massage with every step

Wearing Kenkohs daily, even for short periods, can help improve blood circulation, keep your body aligned, relieve pain in the feet, ankles, knees, legs, hips and back, reduce swelling, relieve stress and enhance your overall mood. Kenkoh revitalizes and rejuvenates your whole body!

Relieve pain & improve your health now!

Take the 14 day Kenkoh challenge

Spirit Black/White Geo  
Serenity Brown  
Spirit Brown  
Grace Pewter  
Balance Black

“Massage Improves Circulation...”  
UNIVERSITY OF MIAMI SCHOOL OF MEDICINE

“Massage aids muscle recovery and speeds recovery times...”  
McMASTER UNIVERSITY, ONTARIO

“A daily foot massage lowers blood pressure and lowers triglyceride levels...”  
PUSAN NATIONAL UNIVERSITY, SOUTH KOREA

HappyFeet.com/KENKOH  
1-800-336-6657

Kenkoh  
The Original Massage Sandal
Top Rated Multivitamin by Consumer Labs

More Nutrients than Leading Brands*

50 times the VITAMIN B1
25 times the VITAMIN B6
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
3 times the VITAMIN B12
2 times the ZINC

For full product description and to order Two-Per-Day Multivitamin, call 1-800-544-4440 or visit www.LifeExtension.com

CAUTION: Individuals consuming more than 50 mcg (2000 IU)/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.
7 Atherosclerosis in Sweden
A startling 42% of Swedish study subjects without known heart disease were found to have atherosclerosis. Prevalence in Americans is likely higher. Blood tests can detect risk factors for atherosclerosis before major cardiovascular events strike.

22 A SOLUTION FOR URINARY SYMPTOMS IN WOMEN
A blend of plant extracts has been shown to reduce urinary episodes by 65% in women, with 79% reporting significant benefit.

30 RESOLVE PERSISTENT PAIN
A new study shows that marine oil-derived SPM precursors combined with bioavailable curcumin resolve and reduce inflammation-induced discomforts.

40 Nitric Oxide Improves Blood Flow
A form of L-arginine has been shown to boost endothelial nitric oxide production for improved cardiovascular health.

63 Katie Couric: A Tireless Advocate for Colon Cancer Awareness
In her memoir Going There, Katie Couric describes her relentless battle to honor her late husband’s memory by advocating for cancer screening and finding a cure.

69 Astaxanthin and the Liver
Known for its eye and brain benefits, preclinical studies show that astaxanthin can help protect the liver.