PLUS: New Method to Boost Nitric Oxide

Restore YOUTHFUL Arterial Function

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L-arginine increases nitric oxide, which enables arteries to expand with youthful elasticity.¹ Back in the 1980s, there was excitement about using the amino acid L-arginine to prevent and treat atherosclerosis.

Boosting nitric oxide improves circulation throughout the body.² A drug company obtained a patent to sell an L-arginine powder to cardiologists for coronary heart disease patients.

Others promoted the sex-enhancing effects of improved blood flow to male and female genitalia.

L-arginine, however, has some major limitations. Much of it gets degraded by enzymes before being converted to nitric oxide in the arterial wall.³ With age, the activity of arginine-degrading enzymes increases in many tissues, most notably the cardiovascular system.⁴,⁵

I was pleased to learn of a novel method to protect L-arginine from degrading in the stomach and enhance nitric oxide availability. This new formula utilizes a low-dose arginine compound to sustain higher arginine plasma levels, plus a berry extract that helps stabilize endothelial nitric oxide.

The berry extract alone was shown to increase a validated measure of circulation.⁶ Low-dose, sustainable L-arginine combined with aronia berry extract offers intriguing potential to support circulatory health. Cardiologists may eventually prescribe this novel approach now that longer-acting, low-dose arginine plus aronia polyphenols can be conveniently taken together.

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L-arginine has demonstrated other benefits, such as accelerating wound healing, and helping to maintain kidney function.\textsuperscript{16-18}

After more than four decades of study, it appears that the most important role of L-arginine is its ability to produce nitric oxide, and thus protect against endothelial dysfunction (and subsequent atherosclerosis).\textsuperscript{19-21}

The elderly often suffer from accelerated atherosclerosis.\textsuperscript{22}

One reason is that nitric oxide-blocking compounds in the body increase with age, thus causing disruption to the artery’s endothelial lining.

It is encouraging to know that arginine is able to help reverse this particular atherogenic event.\textsuperscript{20}

Reversing Arterial Stiffness

The age-related decline in L-arginine bioavailability reduces nitric oxide production.\textsuperscript{4,5}

The result is a disruption of healthy endothelial function and structure.\textsuperscript{22}

Endothelial dysfunction inhibits the ability of arteries to expand and contract (vasodilation). This contributes to hypertension.\textsuperscript{23}

Arginase is an enzyme present in multiple tissues in the body.\textsuperscript{24}

In the intestinal tract, the arginase enzyme degrades about 40% of ingested arginine before it can be absorbed into the bloodstream.

Once in the bloodstream, L-arginine is further degraded by three other enzymes with only a small amount remaining that can be converted to nitric oxide.\textsuperscript{3,25}

In one study, when the arginase enzyme was blocked in rat arteries, L-arginine levels went up.
vascular disorders, and how fast they sometimes accelerate after initial diagnosis.

One problem up to now has been that people could not obtain arginine’s benefits because of its rapid enzymatic degradation in the intestines and blood.3

Protect Against Endothelial Dysfunction

Aging people can slow the breakdown of their delicate endothelium (inner artery wall linings).

Folate, vitamin C, fish oil, lipoic acid, and pomegranate are a few of the nutrients that help maintain healthy endothelial function.29-36

It is no coincidence that these same nutrients have been shown in some studies to reduce the incidence of cardiovascular pathology in animals and humans.37-42 Statin drugs and agents that suppress chronic inflammation also help protect the endothelium.43-46
Dual Combination to Boost Nitric Oxide

In a significant advance, a form of arginine has been shown to decrease the arginase enzyme, allowing L-arginine to remain present in the plasma for a greater length of time.47

In a preclinical study, polyphenols from aronia berries demonstrate the ability to increase activation of an enzyme called endothelial nitric oxide synthase that is responsible for producing nitric oxide from arginine.48

In addition, these polyphenols have been shown, in another preclinical study, to stimulate nitric oxide formation in coronary arteries.49

This means that lower doses of L-arginine can be used to enable more sustained nitric oxide synthesis needed for healthy endothelial function.

Support for Aging Arteries

People who follow a healthy lifestyle often develop a false sense of security that they will not suffer the circulatory disorders that are the leading killers in the Western world.

One reason for this optimism is that heart disease death rates have declined dramatically since 1980.50 Much of this can be attributed to reduced tobacco use, improved diets and medical treatments, better control of hypertension, along with increased use of supplements, and drugs that lower heart attack risk.51

A lot of people who would have suffered from blocked coronary arteries or a heart attack around age 50 are delaying this problem until later in life.

Atherosclerosis is usually associated with heart attack risk, but many of the disorders of aging, including kidney impairment and memory loss, are related to circulatory disorders.52-54

Sales of sex-enhancing drugs are strong mainly because so many men suffer from endothelial dysfunction that causes erectile dysfunction.55

In this issue of Life Extension®, we describe a novel approach to help prevent and/or partially reverse endothelial dysfunction. Life Extension® readers take aggressive steps to maintain healthy circulation, but haven’t had access to a slowly released, continuous flow of L-arginine to boost nitric oxide.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club

References


47. Komorowski J, Perez Ojavo S, Sylla S, et al. Arginase inhibition by inositol-stabilized arginine silicate (ASI; Nitrosigine); a novel mechanism by which ASI enhances arginine bioavailability. American Society for Nutrition’s Annual Meeting 2018; 2018; Boston, MA.


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In the News

Atrial Fibrillation and Heart Failure Risk are Lower with Better Oral Hygiene

How well you take care of your teeth is linked to your risk of atrial fibrillation and heart failure, a study published in the European Journal of Preventive Cardiology* reported.

Better oral hygiene is associated with a lower risk of atrial fibrillation and heart failure, researchers concluded.

The study subjects were 161,286 men and women from the National Health Insurance System-Health Screening Cohort in Korea, aged 40 to 79, with no prior history of atrial fibrillation, heart failure, or cardiac valvular diseases. They were examined by dentists to note the presence of periodontal disease, condition of teeth, and missing teeth, and they completed a questionnaire about their oral hygiene behavior and dental symptoms.

The median follow-up was 10.5 years, during which there were 4,911 (3%) cases of atrial fibrillation and 7,971 (4.9%) cases of heart failure.

Brushing teeth three times a day or more was associated with a 10% reduced risk of atrial fibrillation and a 12% reduced risk of heart failure.

Editor’s Note: “Poor oral hygiene can provoke transient bacteremia and systemic inflammation, a mediator of atrial fibrillation and heart failure,” the authors stated.

The journal *Inflammopharmacology* reported the outcome of a randomized, double-blind trial that revealed the safety and efficacy of supplementation with PEA (palmitoylethanolamide) for individuals with knee osteoarthritis.*

The trial included 111 men and women with mild to moderate osteoarthritis in one or both knees who were given either a placebo, 300 mg of PEA or 600 mg of PEA daily for eight weeks. Pain, stiffness and other factors were evaluated at the beginning and end of the trial.

In comparison with the placebo group, participants who received PEA experienced significant reductions in pain (up to 57.6%) and stiffness (up to 53.7%) scores. Function significantly improved among those who received 600 mg of PEA. Both doses of PEA were associated with improvements in pain intensity scores and anxiety.

By week eight, the number of participants reporting no pain had increased by more than two and a half times in both groups, while decreasing slightly among the placebo group compared to the beginning of the study.

*Editor’s Note:* Palmitoylethanolamide is a fatty acid that is naturally produced in the body as part of a healthy immune response.


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**PEA Safe, Effective for Knee Osteoarthritis**
Drinking Tea Supports a Healthy Brain

Research reported in the journal Aging revealed a brain benefit in association with regularly drinking tea.*

Acting on the results of previous research that found a reduction in the risk of cognitive decline among daily tea drinkers, the current study compared 15 tea drinkers aged 60 and older to 21 participants in the same age group who did not regularly consume tea.

Neuropsychological tests evaluated cognitive function and magnetic resonance imaging assessed brain connectivity. Participants who regularly consumed tea had better organized brain regions and cognitive function compared to those who were not tea drinkers.

The authors noted that, “Tea has been a popular beverage since antiquity, with records referring to consumption dating back to the dynasty of Shen Nong (approximately 2700 BC) in China.” They went on to say that drinking tea has become increasingly popular in western countries today.

The study was led by Research Assistant Professor Feng Lei, of the National University of Singapore School of Medicine, with collaborators from the University of Essex and University of Cambridge.

Editor’s Note: “Our results offer the first evidence of positive contribution of tea drinking to brain structure and suggest that drinking tea regularly has a protective effect against age-related decline in brain organization,” said Dr. Feng Lei.

Blueberry Intake May Reduce Cardiovascular Disease Risk

A study reported in the American Journal of Clinical Nutrition found a lower risk of cardiovascular disease among men and women with metabolic syndrome who consumed the equivalent of a cup of blueberries daily for six months.*

A total of 138 participants were randomized to groups that received 26 grams of powdered blueberries (equivalent to a cup of fresh blueberries), 13 grams of powdered blueberries plus ½ cup of a mock blueberry placebo, or 26 grams of the placebo.

Insulin resistance, flow mediated dilatation (a measure of endothelial function), augmentation index (which measures arterial stiffness), cholesterol, and other factors were measured before and after the intervention.

The researchers observed an improvement in endothelial function and arterial stiffness in the group that received 26 grams of blueberry powder.

Editor's Note: "The simple and attainable message to consume one cup of blueberries daily should be given to those aiming to improve their cardiovascular health," the authors concluded.

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When L-arginine is ingested, about 40% is degraded in the digestive tract by the arginase enzyme.

After absorption, arginine encounters further degradation, leaving little for conversion into nitric oxide.

A patented compound resists enzymatic decline to provide more bioavailable arginine.*

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For full product description and to order FLORASSIST® Oral Hygiene, call 1-800-544-4440 or visit www.LifeExtension.com

References

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Blueberries provide health-boosting benefits shown to:

- Enhance heart health
- Maintain brain function
- Sustain healthy blood-sugar levels already within normal range
- Support smooth, firm skin
- Improve movement and coordination

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

Blueberry extract is more potent than the whole berry, providing greater metabolic support throughout the body and without the excess sugar of raw fruit.

Item #01214 • 60 vegetable capsules
1 bottle $16.88
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AuroraBlue® is a registered trademark of Denali Bio Technologies, Inc.

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Nitric oxide is a substance your body naturally produces.

It signals blood vessels to widen, allowing blood to flow through freely.

But nitric oxide production decreases with age.¹

This contributes to endothelial dysfunction that leads to the initiation and progression of arterial disease.²⁻⁵

The consequences of endothelial dysfunction are:

1. Diminished circulation
2. High blood pressure
3. Thrombosis (clots inside blood vessels)
4. Atherosclerosis

These are major causes of stroke and heart attack.⁵⁻⁸

We can’t get nitric oxide directly from diet or supplements.

The good news is that L-arginine and aronia berries help the body make more of it.
How L-Arginine Helps

Unfortunately, we can’t simply take nitric oxide as a supplement. It has an extremely short half-life, which means it’s too quickly metabolized and eliminated from the bloodstream to be useful.

To work properly, blood vessels must make nitric oxide for themselves. To do so, they need a precursor compound. This precursor is an amino acid called L-arginine.

Aware of this link between L-arginine and nitric oxide production, researchers evaluated whether increasing intake of L-arginine improves blood vessel dilation, lowering risk for disease.13-17

One of the main ways to test this is to measure how much a blood vessel widens in response to an increase in blood flow, something called flow-mediated dilation.

In a landmark clinical trial published in the International Journal of Cardiology, scientists gave patients with high blood pressure a single dose of either L-arginine or a placebo.15 While the placebo group had no change in their blood vessel function, those receiving L-arginine had an improvement in their flow-mediated dilation from an average of 1.7% to 5.9%.

Considering that each 1% improvement in flow-mediated dilation correlates with a 12% lower risk of cardiovascular events like heart attacks and strokes,18,19 this would suggest a 50% reduction in risk of cardiovascular events if the effect is sustained over time.

Other longer-term clinical studies have shown that taking L-arginine can lower blood pressure and reduce symptoms associated with coronary artery disease.16,20

A New, Better Form of L-Arginine

Life Extension® has written about L-arginine for the past 38 years. But in the last few years, scientists have developed and tested a new form.

Known as inositol-stabilized arginine silicate, this novel form is more bioavailable, which means more of it is absorbed into the bloodstream after ingestion.

Studies show that L-arginine blood levels increase within one hour after supplementation with inositol-stabilized arginine silicate and stay there for many hours.21,22

It appears to do this by inhibiting the enzyme arginase, which breaks down L-arginine in the digestive tract, allowing more of the L-arginine to enter and circulate in the blood longer.23
Aronia Berry Improves Endothelial Function

Aronia berries are small, dark purple berries native to North America. They’re high in anthocyanins, beneficial polyphenols. Scientists discovered that like L-arginine, aronia can improve endothelial function.

While L-arginine provides the precursor needed to form nitric oxide, polyphenols from aronia berries appear to increase the activity of the enzyme that converts the L-arginine into nitric oxide. It does this by inducing the modification of the enzyme, called endothelial nitric oxide synthase, in a way that turns the enzyme “on.”

In one randomized, controlled trial, daily supplementation with 500 mg of aronia whole fruit berry for 12 weeks resulted in improved flow-mediated dilation. Subjects taking the aronia had a 0.9% improvement in flow-mediated dilation compared to those taking a placebo.

That may sound small, but bear in mind that each 1% improvement in flow-mediated dilation correlates with a 12% lower risk of cardiovascular events, suggesting that this corresponds to a nearly 11% reduction in risk for cardiovascular events.

The enhanced bioavailability of inositol-stabilized arginine silicate coupled with the increased endothelial nitric oxide synthase activity from aronia berries make this a potent duo in the production of nitric oxide.

Boost Nitric Oxide to Support Endothelial Function

- The endothelium is a layer of cells lining the inside of blood vessels. It produces nitric oxide, a gas that signals the vessel to dilate, allowing blood to flow through and preventing abnormal clotting.
- With age and other risk factors, nitric oxide production declines, contributing to endothelial dysfunction. This increases risk for the development of cardiovascular disease events, including heart attack and stroke.
- 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.
- These two ingredients work to boost nitric oxide production, helping blood vessels dilate more efficiently. This may significantly reduce risk for heart attack, stroke, and other cardiovascular events.
Summary

Our bodies produce nitric oxide, which signals blood vessels to dilate. With age, its production declines, contributing to endothelial dysfunction. Endothelial dysfunction increases the risk of cardiovascular disease, including heart attacks and strokes. Two ingredients, L-arginine and aronia berries, boost the body’s production of nitric oxide.

Human studies show that they improve the flow of blood through the vessels, which can reduce the risk for cardiovascular disease.

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

Maintain Youthful

HOMOCYSTEINE LEVELS

FOR BRAIN, HEART, AND HEARING HEALTH

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

Just one daily capsule of Homocysteine Resist provides:

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

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

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

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Enzymatically Active Vitamins

BioActive Complete B-Complex provides enzymatically active forms of meaningful potencies of each B vitamin.

This includes the pyridoxal 5′-phosphate form of vitamin B₆ shown to protect lipids and proteins against glycation and the most biologically active form of folate called 5-methyltetrahydrofolate (5-MTHF), which is up to 7 times more bioavailable than folic acid.*

Item #01945 • 60 vegetarian capsules
1 bottle $9
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For full product description and to order BioActive Complete B-Complex, call 1-800-544-4440 or visit www.LifeExtension.com

Reference
NitroVasc™ Boost

BOOST VASCULAR NITRIC OXIDE

NitroVasc™ supports endothelial nitric oxide production, promoting vasodilation and healthy circulation.

One stick pack delivers 1,500 mg of a patented arginine complex providing greater absorbability and 500 mg of aronia berry.

Mix one (1) stick pack in 8 oz of water for a tasty, berry-flavored drink.

Drink on an empty stomach, or as recommended by a healthcare practitioner.

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Super R-Lipoic Acid is more bioavailable, stable, and potent, achieving 10-30 times higher peak blood levels. This unique sodium-R-lipoate can help you reach peak plasma concentrations within just 10-20 minutes of supplementation.

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MacuGuard® Ocular Support provides:

1. Lutein, trans-zeaxanthin, and meso-zeaxanthin to help maintain structural integrity of the macula and retina.¹-⁵
2. Alpha-carotene to further help support macular density.³
3. Cyanidin-3-glucoside to assist with night vision.⁶-⁸
4. Astaxanthin for comprehensive eye health support and to fight eye fatigue.⁹
5. Saffron to help support vision, based on study subjects seeing an average of two additional lines on eye chart used by doctors to test vision.¹

References

Item #01993 • 60 softgels
1 bottle $33
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Each bottle lasts for two months.

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

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How Men Can Fight OSTEOPOROSIS
Osteoporosis has long been viewed as a disease that primarily affects women, turning their bones weak and prone to fractures as they age.

But men are at a far higher risk of osteoporosis than most realize. About one-third of all hip fractures worldwide occur in men.¹

And while women do get osteoporosis more frequently, fractures in men result in more severe, and deadly complications.²-⁴

The rate of bone loss in osteoporosis is closely associated with increased mortality.⁵-⁸

And all men can strengthen bones and help prevent fractures with a few simple measures, including increased physical activity, weight-bearing exercises, resistance training, and ensuring proper intake of nutrients including magnesium, calcium, vitamin D, vitamin K, and more.

Together, these actions can help maintain healthy bones well into advanced age.
Osteoporosis in Men

Healthy bone is constantly being remodeled. This means that old bone is broken down and new bone is formed.

For people with osteoporosis, bone loss outweighs bone growth. The result is low bone mass, deterioration of bone tissue, and bone fragility that leads to increased fracture risk.\(^9,10\)

Osteoporosis usually produces no symptoms until a fracture occurs,\(^2,11-13\) so it remains underdiagnosed and undertreated. Many men, in particular, believe osteoporosis affects mostly aging women and ignore their own risks.\(^14\)

But rates in men are striking:

- Up to 1/3 of all hip fractures worldwide occur in men.\(^1\)
- Half of male hip fractures occur before the age of 80.\(^1,15\)

Hip fractures are the most serious of all broken bones resulting from osteoporosis.\(^2\)

In a study in men aged 60 and over, the mortality rate at one year from hip fractures was 37.5%,\(^3\) while another study found that men are more than twice as likely as women to die from infection during the first two years after a hip fracture.\(^4\)

Fractures of the spinal vertebrae are much harder to detect than hip fractures. They may cause little pain at first, but can gradually lead to severe discomfort and risk of serious spinal cord injury.\(^2,16\)

Assessing Fracture Risk

Osteoporosis in men usually results from a combination of risk factors, rather than from a single cause (like menopause in women).\(^2\)

The most frequent causes of osteoporosis in men are alcohol abuse, excessive use of corticosteroids (medications often used to treat inflammatory disorders), and low testosterone and estrogen from aging, or from androgen-deprivation therapy for prostate cancer.\(^2\)

Once osteoporosis has developed, many factors raise the risk of bone fractures in men, including:\(^1,2,9,12\)

- Increasing age,
- Low body mass index,
- A history of fragility fractures in the individual or a parent,
- Low testosterone and estrogen,
- Prolonged immobilization or inactivity,
- High alcohol intake,
- Smoking,
- Glucocorticoid treatment,
- Type I diabetes,
- Rheumatoid arthritis,
- Thyroid disorders, and
- Chemotherapy treatment for cancer.
Weight-bearing and resistance exercises help build strong bones. And there are a variety of nutrients that can help slow bone loss and prevent fractures.

**Nutrients to Promote Bone Strength**

The standard nutritional “building blocks” of bone are **calcium** and **vitamin D3**.

Calcium provides the bulk of the mineral content of bones, and vitamin D promotes calcium uptake from the gut.

But bones aren’t simple structures that can be built and left alone. They’re dynamic, living tissue, with all the vulnerabilities to damage as any other tissue. It’s now recognized that healthy bones require additional nutritional support.

- **Magnesium** regulates calcium movement into and between bone cells, increasing bone mineral density.
- **Zinc** stimulates new bone formation and helps calcium consolidate in bone.
- **Manganese** functions as an essential cofactor (helper molecule) for enzymes that promote the growth of bone and prevent damaging oxidative stress.
- **Silicon** improves the quality of bone matrix (the non-mineral part of bone composed of collagen and other proteins) and facilitates the bone-building process known as mineralization.
- **Boron** regulates the proper metabolism of calcium and other bone-forming minerals and influences the metabolism of vitamin D.
- **Vitamin K** is essential for activating a bone hormone (osteocalcin) needed to maintain bone strength. Low vitamin K status is associated with decreased bone density and increased fracture risk.

New evidence is also emerging for two other compounds that support bone health.

1. **Curcumin**, an extract of the **turmeric** plant, has powerful anti-inflammatory properties. Chronic systemic inflammation is now being recognized as a contributor to osteoporosis risk.

**WHAT YOU NEED TO KNOW**

**Building and Protecting Strong Bones**

- **Osteoporosis** is no longer thought of as a disease that just affects older women. About one-third of all hip fractures worldwide occur in men.
- Men have a **higher death rate** from hip fractures than women, and higher rates of bone loss are associated with higher mortality.
- All men can benefit from ensuring adequate intake of vitamins and minerals that build up bone strength and help minimize risk of fracture, including **calcium**, **vitamin D3**, **vitamin K**, **magnesium**, **manganese**, **zinc**, **silicon**, and **boron**.
- The nutrients **curcumin** and **PQQ** also play important roles in reducing the oxidative stress and inflammation that contribute to bone loss.
Newer studies have found that curcumin acts in multiple ways to increase bone mineral density and boost resistance to fractures.\textsuperscript{31-35} In one human study, curcumin in combination with calcium added to the effects of a prescription osteoporosis drug, alendronate.\textsuperscript{34}

2. PQQ (pyrroloquinoline quinone) is a vitamin-like nutrient with anti-aging properties related to its ability to help mitochondria (the “powerhouses” of the cells) use energy more efficiently.\textsuperscript{36}

Studies of PQQ in osteoporosis-prone mice show that it enhances the activity of bone-forming osteoblast cells while reducing the activity of bone-destroying osteoclast cells, resulting in increased bone mass and density.\textsuperscript{36-39}

Ensuring adequate daily intake of all these nutrients can minimize the risk of developing osteoporosis and related fractures.

**Summary**

Osteoporosis is a progressive loss of bone density and strength, leading to sharply raised risk of fractures. It was once thought mostly to affect older women. But about one-third of all hip fractures worldwide occur in men.

And because of the high osteoporosis risk, all men should regularly exercise to strengthen their bones, and should ensure they are getting the nutrients required to build and maintain strong bones.

Those include calcium, vitamin K, and vitamin D3, along with the minerals magnesium, manganese, zinc, silicon, and boron.

Further bone support can be obtained from curcumin and PQQ, which fight inflammation, improve bone cell energy use, and produce stronger bones.

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

**References**


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<th>Vitamin K1</th>
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For full product description and to order Super K, call 1-800-544-4440 or visit www.LifeExtension.com

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VITAMIN D3

Systemic support for youthful cell function, bone health, and normal insulin and blood-sugar levels.

CAUTION: Individuals consuming more than 50 mcg (2000 IU) of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 10000 IU per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

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Digestion is a complicated process.

*Enzymes* are needed to break down *each* of the major food groups: carbohydrates, proteins, and fats.

The recent trend toward eating more plant-based foods has brought along with it the need for *additional* enzymes to break down hard-to-digest, fiber-rich foods.

As we age, internal production of digestive enzymes declines. As a result, undigested foods may pass into the large intestine, causing *bloating, gas, diarrhea, and cramping*.

Researchers have identified *additional enzymes* that specifically promote digestion of high-fiber plant foods. When combined with a specific *probiotic*, these benefits can be further enhanced.
Common Causes of Digestive Problems

Many health problems plaguing aging adults, including digestive discomfort like gas and diarrhea, impaired immunity, and nutritional deficiencies, can often be attributed to poor digestion.

Two important causes of digestive problems are:1-5

1. Age-related declines in production of endogenous digestive enzymes, and

2. Imbalances in the gut microbiota.

Digestive enzymes are needed to break down the foods we eat and extract essential nutrients from them. And a proper balance of bacteria must be present in the gut to prevent bloating, gas, and other unpleasant digestive symptoms.

Drugs such as Alka-Seltzer® and Pepto-Bismol® can temporarily relieve some symptoms but do nothing to address the underlying problem.

The Power of Digestive Enzymes

To help break down food more completely by the time it reaches the end of our small intestine, substantial amounts of all required digestive enzymes are needed.

This helps prevent undigested food from passing into the colon and causing gastrointestinal problems.

About 70 years ago, scientists first discovered6 that taking digestive enzymes orally leads to more complete digestion of foods in the stomach. Since then, studies have validated the beneficial effects of digestive enzyme supplementation.7-8

Optimal digestion of major food types, including proteins, fats, dairy, and plant cellulose (fiber), requires different digestive enzymes, such as:

- Protease,
- Lipase,
- Lactase,
- Cellulase, and
- Bromelain.

The Challenge of Plant-Based Diets

In recent years, diets have changed. More people are reducing their meat and other animal-derived food intake and increasing their intake of plant-based foods.

The cell walls of these foods contain complex polysaccharides and fibers. While fiber is an important part of a healthy diet, it may also bind to minerals and other nutrients, blocking their bioavailability and preventing their absorption.

Humans do not produce the enzymes required to break down fiber and depend on enzymes produced by intestinal microorganisms.10,11
**Boost Digestion**

- Poor digestion can result in bloating, gas, and discomfort, and compromises the absorption of key nutrients.
- Digestive problems can be caused by an age-related decline in digestive enzymes and an imbalance in the all-important gut microbial ecosystem.
- Increasing your intake of plant-based foods creates special challenges to your digestion but special enzymes that specifically target these high-fiber foods can help your body better handle a plant-based diet.
- Digestive enzymes can help break down and digest food while preventing gastrointestinal distress and promoting better overall health.
- Adding *Bacillus coagulans* to a broad range of digestive enzymes may provide protection against several gastrointestinal discomforts.

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**Protease 3.0** is an enhanced form of the protease enzyme that helps digest gliadin found in wheat.

To properly break down other plant-based foods requires:

- Alpha-galactosidase,
- Hemicellulase,
- Cellulase,
- Xylanase, and
- Pectinase.

**General Purpose Enzymes**

The enzymes described next have long been used to improve digestion. Each has a specific, targeted function that helps break down complex foods into nutrient components that can be readily absorbed.

**Protease**

Protease breaks down proteins. Research shows that giving protease to animals enhances their digestion. Aging individuals may receive tremendous potential benefits from supplementing with protease enzymes in order to increase the efficiency of protein digestion.

**Lactase**

Lactase breaks down lactose, or milk sugar. Older people are often deficient in this enzyme, resulting in cramps, bloating, gas, and diarrhea after consuming dairy products. But avoiding dairy can cause calcium deficiency, increasing the risk of osteoporosis and bone fractures.

Studies show that taking lactase reduces or eliminates post-meal abdominal cramping, belching, flatulence, bloating, and diarrhea in people with lactase insufficiency. It also promotes better overall nutrition.

**Lipase**

Lipase breaks down fat into individual fatty acids and related substances. It helps the body absorb vital fat-soluble nutrients, such as omega-3 fatty acids, carotenoids like lycopene and lutein, and vitamins A, D, K, and E.
Without sufficient lipase, incompletely digested fats can cause greasy, fatty stools and cramping. Inadequate fat digestion also blocks absorption of key vitamins, leading to deficiencies.

Taking oral lipase promotes fat digestion. In one study, pancreatic lipase enzymes were given to subjects eating a high-fat meal, resulting in significant reductions in bloating and gas.22

**Bromelain**

Bromelain is extracted from pineapple stem and fruit. It helps with digestion of proteins.23,25

Scientists studied adults with an inability to fully digest and absorb fats and proteins. Taking an enzyme mix containing bromelain improved digestion and absorption of both these food groups.25

**Digestive Enzymes to Support Plant-Based Diets**

The enzymes described so far support basic digestion. But the trend toward plant-based foods means additional enzymes can help improve the breakdown of hard-to-digest types of plant fibers.

The following digestive enzymes deliver potent support for high-fiber, plant-based diets.

**Protease 3.0**

Traditional protease breaks down most proteins. But a specialized protease known as protease 3.0 is even better at promoting the digestion of proteins in acidic conditions such as those found in the stomach.

This enzyme may also help some people with gluten sensitivity or intolerance since it specifically promotes digestion of gliadin, a protein found in gluten in wheat and some other grains.

**Alpha-Galactosidase**

Alpha-galactosidase is a digestive enzyme that breaks down oligosaccharides, carbohydrates found in plant foods including beans and cruciferous vegetables (such as cauliflower, broccoli, and cabbage).

Taking this enzyme substantially reduces bloating, discomfort, and flatulence associated with eating these foods.26,27

In one study, scientists recruited volunteers with irritable bowel syndrome (IBS). For three days they ate a diet high in a type of oligosaccharide that triggers IBS symptoms. The group that took oral alpha-galactosidase had a clinically significant reduction in gastrointestinal symptoms compared to a placebo group.28

**Cellulase**

Cellulase is not produced naturally in the human body. It allows humans to digest most cellulose, or plant fiber.

This allows for smoother digestion of tough vegetable fiber and minimizes the excessive flatulence that deters many people from eating healthy, high-fiber foods like broccoli and beans.
Hemicellulase, Xylanase, and Pectinase

Additional digestive support is found in three enzymes specific for the breakdown of plant foods high in fiber:

- **Hemicellulase** breaks down hemicellulose, a complex carbohydrate that is a major component of cell walls in plants.
- **Xylanase** breaks down xylan, another complex sugar found in plant cell walls. When undigested, xylan can impair nutrient absorption.29
- **Pectinase** breaks down pectin, a naturally occurring substance found in pears, apples, guavas, plums, oranges, and other fruits.

An optimal selection of enzymes should include:

- The full range of traditional digestive enzymes, and additional enzymes that target high-fiber and gas-producing plant foods.

A Probiotic for Digestive Health

Even greater digestive health is possible with the addition of a targeted probiotic.

Probiotics are microorganisms that, taken in adequate amounts, have a health benefit. Like enzymes, they are vital to the digestion process.

One particular probiotic, *Bacillus coagulans* strain MTCC 5856, has been shown to effectively treat both constipation and diarrhea, along with other symptoms of irritable bowel syndrome.30,31

In a double-blind, placebo-controlled study, patients with irritable bowel syndrome took tablets containing 2 billion spores of *Bacillus coagulans* strain MTCC 5856 daily. This led to a significant decrease in bloating, vomiting, diarrhea, abdominal pain and discomfort, and stool frequency.31

Addition of this probiotic strain to a broad range of digestive enzymes may provide comprehensive protection against several types of gastrointestinal discomfort.

Summary

As we age, the levels of digestive enzymes in our bodies decline. This triggers digestive problems, including bloating, gas, and diarrhea, and prevents absorption of nutrients.

The recent shift toward eating more plant-based foods can increase this problem, because the increased amount of difficult-to-digest plant fiber components requires specialized enzymes.

Digestive enzymes can boost the body’s ability to fully break down food and may prevent gastrointestinal distress and promote better overall health.

Addition of the probiotic *Bacillus coagulans* to a broad range of digestive enzymes may provide a high level of protection against several gastrointestinal discomforts.
References


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The body’s production of digestive enzymes decreases with age, leading to diminished nutrient absorption and bloating, as well as other intestinal discomfords—especially after eating a large meal.

Enhanced Super Digestive Enzymes and Probiotics provides a broad range of enzymes required to help break down proteins, fats, carbohydrates, and other food nutrients—including enzymes that specifically target the cell structures of plant-based foods.

This comprehensive digestive support formula provides the added benefits of the probiotic Lactospore® B. coagulans.

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As we age, our skin loses two natural compounds that keep it smooth, moisturized, and youthful looking:

1. **Collagen** and
2. **Hyaluronic acid**.1,2

The loss of these skin components leads to **wrinkles**, **sagging**, and **dryness**.1,2

But there’s a way to prevent and even **reverse** these changes. Scientists have clinically demonstrated that:

- **Oral** use of a **collagen peptide** improves **skin elasticity** by an average of 7%³ and reduces the volume of **eye wrinkles** by 20%.⁴

- **Oral** use of **hyaluronic acid** significantly increases skin moisture in those with chronically dry, rough skin after just **3-6 weeks**.¹

Researchers have now devised a way to deliver clinically effective doses of these two nutrients together in a tasty, fruit-flavored gummy. Working from the inside out, they can rejuvenate the skin and return it to optimal health.
Collagen Keeps Skin Youthful

The word collagen comes from the Greek kola, “glue.” Essentially, collagen—the most abundant protein in the human body—is the glue that holds the entire body together.

It’s the main component of most connective tissues, like tendons and muscle, and makes up 70% of the inner layer of skin by weight.\(^5,6\)

Collagen provides strength and resilience and is integrated with elastin fibers, the protein that gives skin flexibility and elasticity. Elastin allows the skin to return to its original shape after it’s been stretched.\(^7\)

But collagen production begins to decline around age 25. The cells that produce collagen fibers slow down, and the remaining fibers can stiffen, break, and lose proper shape over time. Elastin fibers also begin to fray and lose elasticity.

It is no coincidence that visible skin aging occurs in many people around age 25, which is when collagen production begins to drop.

Adults lose about 1% of their skin collagen each year.\(^8\)

While this may not seem like a lot, after several decades, we may have lost half the skin collagen we had at age 18.\(^8,9\)

This decline accelerates faster in women after menopause. Factors such as smoking, high blood sugar, and sun exposure also decrease collagen levels.\(^10-14\)

Reduced collagen production has a devastating effect on the skin, resulting in thinning, sagging, and wrinkles.\(^8,9\)

To solve this problem, scientists developed collagen peptides that provide the building blocks for collagen.

Taken orally, they stimulate the production of new collagen and elastin in the skin. This leads to increased suppleness and elasticity and reduces wrinkles.\(^4\)

Results from Human Study

After four weeks, the volume of eye wrinkles for the collagen group had decreased by 7.2%, compared with placebo recipients. After the full eight-week trial, those taking oral collagen peptides showed a stunning 20.1% reduction in the size of eye wrinkles.\(^4\)

In the same trial, scientists studied how collagen peptides affected the synthesis of the dermal matrix, the structural framework responsible for skin renewal and vitality. They did so by measuring structural proteins in the matrix. The more proteins, the healthier and more youthful the skin appears.\(^4\)

The study found that subjects taking collagen had a 65% increase in essential type-I pro-collagen and an 18% increase in elastin fibers.\(^4\)

Collagen Fiber

Oral Collagen Research

In animal studies, scientists showed that hydrolyzed (or partially broken-down) collagen peptides boosted the creation and activity of collagen.\(^15\)

Collagen peptides also decreased the activity of a “protein-melting” enzyme (matrix metalloproteinase 2) that degrades collagen and hastens skin aging.\(^15\)

Human trials have now demonstrated that an oral collagen peptide is clinically effective in improving skin appearance.\(^3,4\)

Scientists evaluated the effectiveness of collagen peptides on skin elasticity. One group of volunteers received 2.5 grams of oral collagen daily, one received 5 grams daily, and a third received a placebo.\(^3\)

After eight weeks, both groups taking the oral collagen had an average 7% improvement in skin elasticity. Remarkably, those subjects retained higher elasticity than the placebo group even four weeks after the last dose. The improvement in skin elasticity was found to be greater in women over age 49.\(^3\)

Next, researchers tested collagen on skin wrinkles. In a double-blind, placebo-controlled trial, they gave oral collagen peptides to 114 women, aged 45 to 65, in daily doses of 2.5 grams.\(^4\)
Hyaluronic Acid Moisturizes Skin

Hyaluronic acid is equally critical for maintaining and restoring youthful-looking skin.

It’s a carbohydrate present in most body tissues. More than 50% of it is found in the skin, where it helps hold in moisture. In fact, hyaluronic acid can hold up to 1,000 times its weight in water.

Hyaluronic acid is an essential part of the extracellular matrix, a network that provides structural integrity and cohesion to skin. It supports skin hydration, stimulates synthesis of collagen and elastin, promotes tissue repair, and combats the effects of ultraviolet radiation.

In other words, the skin needs hyaluronic acid to maintain a healthy and youthful appearance.

But the body produces less of it as we age. This problem is worsened by environmental stress, particularly chronic sun exposure. The result is wrinkling, dryness, and sagging.

In a dramatic finding, however, scientists have demonstrated that oral hyaluronic acid can slow—and even reverse—these effects.

Oral Hyaluronic Acid Rehydrates Skin

Scientists conducted an in-depth analysis of several previous studies of hyaluronic acid. In most, volunteers had been diagnosed with “chronically rough and dry skin,” which was not substantially improved by moisturizers or other treatments.

But hyaluronic acid made a radical difference. Compared to volunteers who received a placebo, those taking oral hyaluronic acid had a significant increase in skin moisture after just three to six weeks. And the moisturizing effects continued for a full two weeks after they stopped taking it.

Hyaluronic acid also reduced itching that comes with dry skin.

WHAT YOU NEED TO KNOW

Get Healthier, Younger-Looking Skin

- Collagen and hyaluronic acid are two nutrients vital to the health and youthful appearance of our skin. The body produces less of them as we age, causing wrinkling, sagging, and dryness.

- Taking oral collagen peptides spurs the synthesis of new collagen, improving skin elasticity, boosting essential structural proteins, and reducing the size of eye wrinkles by as much as 20%.

- Hyaluronic acid taken orally has been shown to reverse the loss of moisture in aging skin, effectively treating dry, itchy skin and helping to restore a more youthful appearance.

- Taking these two nutrients together at clinically effective doses can lead to healthier, smoother, and younger-looking skin.
In fact, the scientists concluded that skin dryness is caused by a decrease in hyaluronic acid due to aging, sun exposure, smoking, and other factors. Their study found that hyaluronic acid safely and effectively moisturizes the skin and improves its health.1

You can now orally replenish the skin’s diminishing supplies of both collagen and hyaluronic acid. These two nutrients have been shown to:

- Increase skin moisture,
- Improve elasticity,
- Decrease wrinkle depth,
- Boost levels of the skin’s structural proteins, and
- Provide more youthful-looking skin.

Summary

Collagen and hyaluronic acid keep our skin smooth, supple, moisturized and youthful looking. But, as we age, we lose both these nutrients.

Taking oral collagen peptides boosts the synthesis of new collagen in the skin. That improves skin structure and elasticity, reduces eye wrinkle depth up to 20%, and increases levels of proteins that provide strength and resilience to the dermal matrix.

Oral hyaluronic acid also protects and nourishes skin by boosting moisture content. That can help treat dry, itchy skin, and make it healthier and younger looking.

Both of these nutrients can now be taken together in clinically effective doses, quickly providing noticeable improvements in the appearance of aging skin.●

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


Magnesium is a critically important mineral, yet most Americans do not obtain enough from their diet.

Magnesium helps:\cite{1,2}

- Keep heart rhythm steady.
- Promote normal blood pressure.
- Maintain normal muscle and nerve function.
- Support a healthy immune system.
- Keep bones strong.
- Maintain blood sugar levels already within normal range.

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References

Caution: If taken in high doses, magnesium may have a laxative effect. If this occurs, divide dosing, reduce intake, or discontinue product.

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Oral ingestion of collagen peptides and hyaluronic acid boosts these rejuvenating factors in normal, aging skin.

Clinical results reveal improved skin elasticity, increased moisture, and a 20% reduction in the appearance of eye wrinkles.

The new Gummy Science™ Youthful Collagen formula provides clinically studied doses with daily intake of 4 tasty chewable gummies.

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Our bones are constantly remodelled by removing old bone and replacing it with new bone. It’s how bones stay strong and youthful.

But as we age, the creation of new bone doesn’t always keep up with the destruction of old bone.

That’s osteoporosis, and it causes bones to become brittle, weak, and prone to fractures that can be fatal.1

It’s alarmingly common, striking 30% of women aged 50 or older and more than 77% of women over 80.

In men, about 16% of those 50 or above have osteoporosis, and more than 46% of those over 80 have it.2

Many people are careful to ensure they get enough of the building blocks of bone, including calcium, vitamins D3 and K, and other essential bone nutrients.3-8

However, building new bones is a complex operation. Research shows that a protein called lactoferrin gives bones the instructions they need to both reduce bone loss and increase the building of new bone.

The results can be dramatic. In one study, a lactoferrin combination product increased markers of bone-forming activity by 24% more than a placebo.9

Osteoporosis plagues millions of older adults, weakening bones and leading to fractures.
Lactoferrin and Osteoporosis

To create and maintain strong bones, we need certain nutrients as building blocks and cofactors (or “helper molecules”).

**Calcium and vitamin D3** are the best known. We also need sufficient **vitamin K** (which turns on bone-building proteins) and the minerals **magnesium, boron, zinc, manganese, and silicon**.3-8 These vitamins and minerals provide the raw material for healthy bones.

But rebuilding weak bones caused by **osteoporosis** requires something more.

As we age, **senescent cells** accumulate in our bones and throughout our bodies. These are old, unhealthy cells that can no longer divide and refuse to die off to make way for new, healthy cells.

Worst of all, they secrete harmful signaling molecules that actively **weaken bones** and hasten body aging.10

These signaling molecules increase the activity of cells called **osteoclasts** that absorb bone and decrease the activity of **bone-forming** cells called **osteoblasts**. The result: Our bones become weaker, more porous, and prone to fractures.

But **lactoferrin**, a protein found in milk,11 has the power to **activate bone-building signals** that normally shut down or weaken with age.12-18

When it comes to bone strength, one lactoferrin combination product was shown to counter the kinds of signals that result in weakened bone, meaning lactoferrin could **reduce bone breakdown** and **increase new bone formation**.9

**Results of Human Studies**

Human studies show how effectively lactoferrin can restore a proper, healthy balance between bone resorption and new bone production.

In one study, researchers gave healthy, **postmenopausal women** either a placebo or **125 mg/day of lactoferrin** coupled with an enzyme from milk called ribonuclease.9

Both groups also received **100% of the recommended daily allowance of calcium**.9

After 180 days, women who took the lactoferrin-ribonuclease combination had a **decrease** in a marker of bone-resorption osteoclast activity by **15.6%** compared with placebo recipients, and an **increase** in markers of bone-forming osteoblast activity by **7%-33%**.9

Another study examined the effect of direct application of lactoferrin alone in a rare but troubling side effect of bisphosphonate drugs used to build bone. This bone-destroying side effect is called **osteonecrosis of the jaw**.19

In this condition, bone in the lower jaw dies for unknown reasons, often poking through the gums and skin and allowing infection to set in.20 Generally, dead bone has to be removed surgically. Then a gauze dressing is applied while the wound heals.19

In this study, researchers saturated the gauze dressing with **lactoferrin** and applied it after surgery, exposing the healing bone directly to lactoferrin.19

The surgical wounds healed in just **one to two weeks**, compared with **two to three months** under usual treatment,19 a dramatic demonstration of the powers of lactoferrin to drive healthy, new bone formation.

Animal studies also show that lactoferrin promotes stronger, fracture-resistant bones with increased mineral density.18,21-24 These bones have a more youthful structure, with more of the tiny “I-beams” called **trabeculae** that internally support bone.18,22
Lactoferrin is a natural component of milk, nature’s baby food. Many of its properties promote cell growth and differentiation (when stem cells mature and develop into specialized cell types), which is required in infancy and early childhood. Lactoferrin can promote bone health by:

- Preserving bone mass and improving bone micro-architecture,
- Preventing the stress-induced death of bone-building osteoblast cells,
- Promoting the differentiation of stem cells into bone-building osteoblast cells, while suppressing their differentiation into bone-resorption osteoclasts,
- Enhancing the growth of new cartilage cells in-vitro, potentially benefiting joint health,
- Activating youthful signaling that stimulates growth of new bone, suppresses the death of bone cells, and promotes differentiation leading to new bone,
- Activating transforming growth factor-beta (TGF-beta), a signaling protein most active in youth, which promotes new bone formation.

Researchers are continuing to investigate additional benefits of lactoferrin in promoting youthful cellular activity. But it’s already shown great promise in fighting against the bone loss that has too often been considered an inevitable part of aging.

## How Lactoferrin Strengthens Bones

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


HEALTHY BONES
HEALTHY HEART

Vitamin K helps support calcium balance in bones, heart valves, and arteries.

Super K Elite introduces two new forms of vitamin K2 called MK-6 and MK-9.

Super K Elite provides clinically studied doses of vitamin K1. Plus four subtypes of vitamin K2:

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<tr>
<td>Vitamin K2 (MK-9)</td>
<td>43 mcg</td>
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Item #02335 • 30 softgels

1 bottle $18
4 bottles $16 each

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

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Lactoferrin, a component of whey protein, is best known for its immune benefits.

New data reveal how lactoferrin turns on bone-building signals in the body.

This enables better utilization of calcium, magnesium, and other skeletal structural components.

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WHILE SUPPORTING HEALTHY IMMUNE FUNCTION

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There are 3 mg of boron in the daily dose of each of the following Life Extension™ formulas:

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- Ultra Prostate Formula
- Life Extension Mix™

The suggested daily dose for most adults is 6-9 mg of boron. If you are already obtaining this potency in your multi-nutrient formulas, you may not need additional boron.

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References
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- Newly Diagnosed
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- contain **no added sugar**,
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<tr>
<td>1 container <strong>$22.50</strong> • 4 containers <strong>$19.50</strong> each</td>
<td>1 container <strong>$22.50</strong> • 4 containers <strong>$19.50</strong> each</td>
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**Whey Protein Concentrate**
- Vanilla or chocolate flavor
- Delivers **20 grams** of protein
- Item # 02260 - Whey Protein Concentrate (Vanilla) • 500 grams (17.64 oz.)
- Item # 02261 - Whey Protein Concentrate (Chocolate) • 640 grams (22.56 oz.)
- 1 container **$22.50** • 4 containers **$19.50** each

**Advanced Whey Protein Isolate**
- Vanilla flavor
- Delivers **14 grams** of protein
- Provides **3 grams** of L-glutamine to promote exercise recovery
- Contains **2 grams** of creatine monohydrate to support strength and high-intensity exercise performance
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True Israeli home cooking doesn’t start in the home. It starts in the shuk—the local open-air market.

Dotted throughout Israel’s towns and cities, shuks are lively mazes of stalls that sell the freshest seasonal ingredients, including fruit and vegetables, meats and fish, nuts and spices, fresh herbs, cheeses and yogurts, and everything in between.

The shuk is a feast for your senses as much as it is for your appetite.

What makes Israeli food unique is its fusion of Middle Eastern cuisine, combined with the recipes of immigrants from many countries.

Celebrating this melting pot of culture and cuisine, *Shuk: From Market to Table, the Heart of Israeli Home Cooking* contains 140 Israeli dishes that have roots in Persia, Yemen, Libya, the Balkans, and more—and includes favorites such as hummus, tabbouleh, shakshukas, chopped salad, and couscous.

All of the recipes are based on fresh ingredients that could be found in any local shuk.

In this issue, *Life Extension* Magazine features four flavorful recipes that bring the heart of the shuk into your own kitchen.

—LAURIE MATHENA
Cauliflower Tabbouleh with Crunchy Seeds

SERVES 4 TO 6

- 3 tablespoons sesame seeds
- Olive oil, for frying
- 3 tablespoons pine nuts
- 3 tablespoons hulled pumpkin seeds (pepitas)
- 3 tablespoons hulled sunflower seeds
- 1 medium cauliflower, cored and cut into large florets
- 1 tablespoon nigella seeds
- 2 tablespoons finely chopped fresh cilantro
- 2 tablespoons finely chopped fresh mint
- 2 tablespoons finely chopped fresh parsley
- 3 tablespoons fresh lemon juice, plus more as needed
- 3 tablespoons extra-virgin olive oil, plus more as needed
- 1 teaspoon kosher salt, plus more as needed
- Freshly ground black pepper
- 1/3 cup (60 g) fresh pomegranate seeds, for garnish (optional)

Toast the sesame seeds in a dry medium skillet over medium heat, stirring continuously, for a couple of minutes, until golden. Transfer to a small plate and let cool.

Line a plate with paper towels. Heat a thin layer of oil in the same skillet over medium-low heat. Add the pine nuts and sauté, shaking the skillet frequently, until they just turn light golden, 3 to 4 minutes. Use a slotted spoon to transfer them to the paper towels.

Fry the pumpkin and sunflower seeds in the same manner; transfer them to the paper towels as well.

Pulse the cauliflower florets in a food processor until they are broken down to couscous-size crumbles. Transfer the cauliflower to a large bowl. If there are any large pieces left, return them to the food processor and pulse until they reach the desired size, then add them to the bowl. Add the sesame seeds, pine nuts, pumpkin seeds, sunflower seeds, nigella seeds, cilantro, mint, and parsley to the bowl with the cauliflower.

Add the lemon juice, oil, salt, and some energetic twists of pepper and toss to combine. Taste and adjust the seasoning, adding more salt, pepper, lemon juice, and/or oil as needed to make the salad yummy and bright.

Sprinkle the pomegranate seeds on top (if using) and serve promptly.
Masabacha

Whole Chickpeas in Warm, Spicy Tahini Sauce

SERVES 6 TO 8

2 cups (370 g) dried chickpeas
½ teaspoon baking soda
¼ cup (60 ml) boiling water
¾ cup (180 ml) best-quality raw tahini
1 teaspoon kosher salt

DRESSING
¼ cup (60 ml) extra-virgin olive oil
3 medium garlic cloves, minced or grated
½ jalapeño chili, cored, seeded, and finely chopped
¼ cup (60 ml) fresh lemon juice
1 teaspoon ground cumin
Kosher salt and freshly ground black pepper

FOR GARNISH
Chopped fresh parsley
Extra-virgin olive oil

Pick through the dried chickpeas and discard any little stones (yes, that can happen) or peas that look very irregular in color or in shape. Rinse the chickpeas thoroughly under cold water. Transfer the chickpeas to a large bowl and add cold water to cover them by 3 to 4 inches (7.5 to 10 cm). Add ¼ teaspoon of the baking soda. Soak for at least 12 and up to 24 hours.

Drain and rinse the soaked chickpeas under cold water until the water runs clear. Transfer the chickpeas to a large pot, pour in 3 quarts (3 L) cold water, and add the remaining ¼ teaspoon baking soda. Bring to a boil over high heat, reduce the heat to medium, and cook at a lively simmer, uncovered, for 1 to 1½ hours. Use a slotted spoon to skim off any skins that float to the surface. The chickpeas are ready when they are completely soft, slightly broken down, and can easily be smooshed with your fingers. Drain the chickpeas thoroughly and return them to the pot.

Add the boiling water, tahini, and salt. Cook over medium heat for a couple of minutes, just until the chickpeas are warmed through.

Meanwhile, make the dressing:
Whisk together the oil, garlic, jalapeño, lemon juice, and cumin in a small bowl and season with salt and pepper.

Ladle the warm chickpea mixture into a large serving bowl or individual plates and pour the dressing over the top. Garnish with chopped parsley and a generous drizzle of oil and serve at once.

TIP
Masabacha is delicious only when it is really warm, so many hummus makers keep the cooked chickpeas and tahini over a double boiler until serving and add the dressing at the last moment.
Green Shakshuka with Chard, Kale, Spinach, and Feta

SERVES 4 TO 6

¼ cup (60 ml) extra-virgin olive oil
2 leeks, white parts chopped, and green tops very thinly sliced
3 medium garlic cloves, thinly sliced
1 small jalapeño chili, cored, seeded, and thinly sliced
5 or 6 Swiss chard leaves, leaves coarsely chopped, stems thinly sliced
1 small bunch Tuscan kale (also called lacinato or dinosaur), stemmed, leaves coarsely chopped
3 cups baby spinach or trimmed and coarsely chopped regular spinach
1 teaspoon ground caraway
1 teaspoon ground cumin
Kosher salt and freshly ground black pepper
½ cup (120 ml) homemade or low-sodium store-bought chicken stock or vegetable stock or water
1 tablespoon fresh lemon juice
6 to 8 large eggs

TO SERVE
5 ounces (140 g) feta cheese, coarsely crumbled
Extra-virgin olive oil
Crusty bread or challah

Heat the oil in a large skillet over medium heat. Add the leeks, garlic, jalapeño, and chard stems and sauté until softened and lightly caramelized, 10 to 12 minutes (take care not to brown the garlic). Add the kale, spinach, and the chard leaves and cook, stirring often, until wilted and soft, 3 to 4 minutes. Add the caraway and cumin, and season very lightly with salt (the feta is quite salty) and several twists of pepper.

Add the stock and the lemon juice and cook for 5 to 7 minutes, then reduce the heat to low and cook for another few minutes, until the greens meld into a thick, dark green, stewy sauce. Taste and adjust the seasoning.

Use a large spoon to create little wells in the greens’ mixture. Carefully break 1 egg into a cup or ramekin, then slip it into one of the wells; repeat with the remaining eggs. (Cracking the egg into a cup first lets you inspect it for any runaway bits of shell.) Cover and simmer until the egg whites are set but the yolks are still a little runny, about 7 minutes. Remove the skillet from the heat.

Sprinkle the shakshuka with the feta, drizzle with oil, and sprinkle generously with za’atar. Serve the shakshuka directly from the skillet, with plenty of crusty bread or challah.

Spicy Fish in Cherry Tomato and Harissa Sauce

SERVES 6

½ cup (80 ml) vegetable oil
10 garlic cloves, smashed
¼ cup tomato paste
1 jalapeño chili, cored, seeded, and thinly sliced
1 tablespoon harissa, store-bought or homemade
3 tablespoons sweet paprika
1 teaspoon ground caraway
1½ teaspoons ground cumin
2 pints (910 g) cherry tomatoes
Kosher salt
½ cup (120 ml) water
1 large bunch fresh cilantro
Freshly ground black pepper
6 (7 to 9 ounce/200 to 255 g) fillets flaky white-fleshed fish (grouper, bass, snapper, and halibut are all nice), skin-on, if possible
Challah or couscous, for serving
Pour the vegetable oil into a relatively deep, large skillet. Immediately add the smashed garlic cloves and cook over very low heat just until fragrant, 3 to 4 minutes. Watch the pan closely to make sure the garlic doesn’t brown, or it will become bitter.

Increase the heat to medium-high, add the tomato paste, half the jalapeño, 1½ teaspoons of the harissa, and all the paprika, caraway, and cumin and stir for a minute or two, until fragrant. Add 1½ pints (680 g) of the cherry tomatoes (reserve the rest for later) and season with salt. Reduce the heat to medium and cook, stirring occasionally, until the tomatoes start to break down, 7 to 8 minutes. Pour in the water, bring to a simmer, cover, and cook over low heat for about 30 minutes, or until thick and saucy.

Remove about 3 tablespoons of whole leaves from the cilantro bunch and reserve them for garnish. Tear up the rest of the bunch and toss into the pan. Give it a minute to blend with the sauce, then taste and adjust the seasoning with salt, pepper, and the remaining jalapeño and 1½ teaspoons harissa if you want more heat. Bear in mind that once you add the fish, you won’t be able to stir the sauce and play with the seasonings—make sure the flavor and level of spiciness are to your liking.

Add the fish fillets, skin-side up, tucking them gently into the sauce. Sprinkle the remaining ½ pint (225 g) cherry tomatoes on top of the fish.

Bring to a simmer over medium heat. Reduce the heat to low, cover, and simmer, without stirring, until the fish is cooked through, 7 to 8 minutes. Thicker fillets, like halibut, will need 2 to 3 minutes more. To check the fish for doneness, make a small incision in the thickest part of the fish and make sure the flesh is opaque and flaky.

Serve straight out of the pan, garnished with the reserved whole cilantro leaves, with a lot of bread alongside or with couscous.

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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Calorie restriction [is] now established to be the most powerful intervention to delay aging and increase longevity in diverse species, from yeast to mammals.

Wouldn’t it be great if losing weight, easing chronic conditions, and staying healthier, longer was as simple as flipping a switch?

As James Clement reveals in his new book, *The Switch*, it is.

Our bodies contain a metabolic switch that, when activated, initiates fat burning, removes damaged and dysfunctional cells, and dampens inflammation.

As a result, activating this switch can help promote weight loss, reduce the risk of major diseases, and slow down the aging process.

In this interview with *Life Extension*, Clement shares a few of the specific details from his highly acclaimed book on how to activate your body’s anti-aging switch.

—Laurie Mathena
LE: What would you say is the secret to living a long, healthy life?

Clement: In your own grasp of the “secrets” of living a good, long life, what comes to mind? My bet is that you think of blood sugar balance, healthy weight, and physical fitness.

Those are all appropriate goals to achieve, but they miss the main point—they are merely a means of sparking a prominent antiaging process: autophagy.

[Autophagy is] how the body removes and recycles dangerous, damaged organelles and particles, as well as pathogens, from inside cells, thus aiding your immune system and greatly reducing your risk of developing cancer, heart disease, chronic inflammation, osteoarthritis, and neurological disorders from depression to dementia.

Autophagy makes us more physiologically efficient by getting rid of defective parts, promoting healthy metabolism, stopping cancerous growths, and preventing metabolic disorders such as obesity and diabetes—which means that by boosting your body’s autophagy, you dampen inflammation, slow down the aging process, reduce your risk of developing certain diseases, and optimize your biological function.

LE: What is the connection between this switch and lifespan?

Clement: Virtually all health-extending and lifespan-extending interventions that we know of have their effects because of their actions to suppress this switch.

Much of [my] book [details] how these various interventions, some of which you may have heard of and others of which you haven’t, act on this pathway and ultimately regulate this important switch, periodically turning on autophagy in the process.

The information is meant to help reverse this hastening of aging and put us back onto a more natural path of consumption and exercise that keeps the Switch (mTOR and autophagy) in balance and prevents the age-related diseases that were rare centuries ago but are widespread now.

LE: In your book, you talk about a few specific ways to change the direction of this metabolic switch: calorie restriction, intermittent fasting, and very-low-carb diets.

Clement: Researchers discovered nearly 80 years ago that both calorie restriction and intermittent fasting greatly extended the lives of test animals, often by reducing their vulnerability to cancer and heart disease.

A ketogenic (very-low-carbohydrate) diet, widely used for the treatment of neurological diseases, showed somewhat similar anticancer and anti-heart-disease benefits, although it has been investigated much less than calorie restriction or intermittent fasting.

After three months of reading through more than 500 scientific papers, it finally dawned on me that all of the papers I’d been reading...
Another way to encourage autophagy is through calorie restriction. Can you explain that in more detail?

Clement: By definition, calorie restriction involves the consumption of fewer calories without malnutrition or deprivation of essential nutrients. Although the molecular mechanisms that control the effects of calorie restriction are still being studied and debated, there is more widespread acceptance of the hypothesis that calorie restriction and lifespan extension involve a dialing down of insulin signaling and a dialing up of autophagy. Calorie restriction [is] now established to be the most powerful intervention to delay aging and increase longevity in diverse species, from yeast to mammals. It is also the most potent and reproducible physiological intervention to protect against cancer specifically in mammals.

LE: What happens in the body when it’s deprived of an abundance of calories?

Clement: Intermittent fasting (a form of which is called time-restricted eating) works because it activates the hormone glucagon, which functions opposite of insulin to keep your blood glucose levels balanced.

Here’s a visual to really grasp this concept. Picture a seesaw: when one person goes up, the other goes down. This analogy is frequently used to explain the biological insulin-glucagon relationship. In your body, if the insulin level goes up, the glucagon level goes down and vice versa.

When you give your body food, your insulin level rises and your glucagon level decreases. But the opposite happens when you don’t eat: your insulin level goes down and your glucagon level rises.

When your glucagon level rises, it triggers autophagy. This is why temporarily denying your body nutrients through the safe practice of intermittent fasting is one of the best ways to boost the integrity of your cells.

Aside from maintaining your cells’ youth, research has shown that intermittent fasting promotes greater energy, increased fat burning, and decreased risk of developing diseases such as diabetes and heart disease, all due to its ability to activate autophagy.

LE: How do you put intermittent fasting into practice?

Clement: You can start with a very comfortable 12-hour fast just by avoiding eating after 7 p.m. (No midnight snacking!) Then you can stretch it to 16 hours and eventually forgo “break-fast” (breakfast) the next morning, so your first meal of the day is around 11 a.m.
You’ll want to dial up autophagy for eight months of the year and dial it down during the other four months. It doesn’t really matter how you break up those months (e.g., you can do two months with autophagy on and one month off, then repeat for a full calendar year).

Remember, autophagy is an action plan or tool for cellular self-fortification, but it also demands a balance as with so many other things in life: too much or not enough can be harmful to the cell, and thus to you.

LE: How does this relate to autophagy?

Clement: When you reduce your protein intake, especially animal proteins, you will lower your insulin levels and in turn boost your glucagon level and activate autophagy. This explains why protein cycling, or reducing your protein intake in cyclical fashion, has an effect similar to that of fasting.

In addition to enhancing autophagy, protein cycling alongside calorie restriction and intermittent fasting will help reduce your risk of developing the diseases I’ve covered: diabetes, cancer, and heart disease.

Protein cycling could become your most powerful tool for making over your metabolism and increasing your chances of living a long, disease-free life. This is especially helpful for people who find it unrealistic to commit to the rigors of calorie restriction and fasting.

LE: These sound like great ways to keep the Switch turned off. Is this something that should be practiced all the time?

Clement: As with most everything in life, you’ll want to strike a balance between your Switch being on and being off. The body needs periods of rest from its internal cleansing mechanisms so you can more easily build tissues, keep your weight in check (not lose too much), and maintain your immune system.

LE: How does protein restriction factor in?

Clement: Another key dietary strategy that is often ignored is protein restriction. That’s right: you don’t want to be eating too much protein.

Although the practice of general calorie restriction has benefits for body weight, it’s really the protein restriction that creates the health benefits.

If cutting way back on your calorie consumption sounds like a horrendous proposition and you don’t need to lose weight, I’ve got good news for you: restriction of protein consumption—without restricting calories—is among the most promising interventions that have emerged to promote healthy aging in humans. And it’s not going to feel as though you’re “restricting” yourself, which is why it’s better to call it protein cycling.

I cannot emphasize the following enough: protein stimulates insulin release as much as carbohydrate does! We often don’t think about that because we tend to relate insulin release with only sugar.

One of insulin’s jobs is to send amino acids from broken-down proteins into lean tissues such as muscle. But here’s the difference: protein doesn’t supply glucose rapidly, as carbohydrate does.

LE: How does this relate to autophagy?
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<td>Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ - 100 mg, 60 softgels</td>
</tr>
<tr>
<td>01431</td>
<td>Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ - 200 mg, 30 softgels</td>
</tr>
<tr>
<td>01733</td>
<td>Super Ubiquinol CoQ10 with PQQ</td>
</tr>
<tr>
<td>01859</td>
<td>TMG Liquid Capsules</td>
</tr>
<tr>
<td>00349</td>
<td>TMG Powder</td>
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**HORMONE BALANCE**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>00454</td>
<td>DHEA (Dehydroepiandrosterone) - 15 mg, 100 capsules</td>
</tr>
<tr>
<td>00335</td>
<td>DHEA (Dehydroepiandrosterone) - 25 mg, 100 capsules</td>
</tr>
<tr>
<td>00882</td>
<td>DHEA (Dehydroepiandrosterone) - 50 mg, 60 capsules</td>
</tr>
<tr>
<td>00607</td>
<td>DHEA (Dehydroepiandrosterone) - 25 mg, 100 tablets (dissolve in mouth)</td>
</tr>
<tr>
<td>01689</td>
<td>DHEA (Dehydroepiandrosterone) - 100 mg, 60 veg capsules</td>
</tr>
<tr>
<td>02368</td>
<td>Optimized Broccoli and Cruciferous Blend</td>
</tr>
<tr>
<td>00302</td>
<td>Pregnenolone - 50 mg, 100 capsules</td>
</tr>
<tr>
<td>00700</td>
<td>Pregnenolone - 100 mg, 100 capsules</td>
</tr>
<tr>
<td>01468</td>
<td>Triple Action Cruciferous Vegetable Extract</td>
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<tr>
<td>01469</td>
<td>Triple Action Cruciferous Vegetable Extract with Resveratrol</td>
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</tbody>
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**IMMUNE SUPPORT**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>00681</td>
<td>AHCC®</td>
</tr>
<tr>
<td>02302</td>
<td>Bio-Quercetin</td>
</tr>
<tr>
<td>01961</td>
<td>Enhanced Zinc Lozenges</td>
</tr>
<tr>
<td>01704</td>
<td>Immune Modulator with Tinosfend®</td>
</tr>
<tr>
<td>00955</td>
<td>Immune Protect with PARACTIN®</td>
</tr>
<tr>
<td>02005</td>
<td>Immune Senescence Protection Formula™</td>
</tr>
<tr>
<td>29727</td>
<td>Kinoko® Gold AHCC</td>
</tr>
<tr>
<td>24404</td>
<td>Kinoko® Platinum AHCC</td>
</tr>
<tr>
<td>00316</td>
<td>Kyolic® Garlic Formula 102</td>
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<tr>
<td>00789</td>
<td>Kyolic® Reserve</td>
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<tr>
<td>01681</td>
<td>Lactoferrin (Apolactoferrin) Caps</td>
</tr>
<tr>
<td>01903</td>
<td>NK Cell Activator™</td>
</tr>
<tr>
<td>01394</td>
<td>Optimized Garlic</td>
</tr>
<tr>
<td>01309</td>
<td>Optimized Quercetin</td>
</tr>
<tr>
<td>01811</td>
<td>Peony Immune</td>
</tr>
<tr>
<td>00525</td>
<td>ProBoost Thymic Protein A</td>
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<tr>
<td>01708</td>
<td>Reishi Extract Mushroom Complex</td>
</tr>
<tr>
<td>01906</td>
<td>Standardized Cistanche</td>
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<tr>
<td>13685</td>
<td>Ten Mushroom Formula®</td>
</tr>
<tr>
<td>01097</td>
<td>Ultra Soy Extract</td>
</tr>
<tr>
<td>01561</td>
<td>Zinc Lozenges</td>
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</tbody>
</table>

**INFLAMMATION MANAGEMENT**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01639</td>
<td>5-LOX Inhibitor with AprèsFlex®</td>
</tr>
<tr>
<td>02324</td>
<td>Advanced Curcumin Elite™ Turmeric Extract, Ginger &amp; Turmerones</td>
</tr>
<tr>
<td>01709</td>
<td>Black Cumin Seed Oil</td>
</tr>
<tr>
<td>02310</td>
<td>Black Cumin Seed Oil and Curcumin Elite™ Turmeric Extract</td>
</tr>
<tr>
<td>00202</td>
<td>Boswellia</td>
</tr>
<tr>
<td>02467</td>
<td>Curcumin Elite™ Turmeric Extract - 30 veg capsules</td>
</tr>
<tr>
<td>02407</td>
<td>Curcumin Elite™ Turmeric Extract - 60 veg capsules</td>
</tr>
<tr>
<td>01804</td>
<td>Cytokine Suppress® with EGCG</td>
</tr>
<tr>
<td>02223</td>
<td>Pro-Resolving Mediators</td>
</tr>
<tr>
<td>00318</td>
<td>Serrafrazyme</td>
</tr>
<tr>
<td>01203</td>
<td>Specially-Coated Bromelain</td>
</tr>
<tr>
<td>01254</td>
<td>Zyflamend™ Whole Body</td>
</tr>
</tbody>
</table>

**JOINT SUPPORT**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>02404</td>
<td>Arthro-Immune Joint Support</td>
</tr>
<tr>
<td>02238</td>
<td>ArthroMax® Advanced NT2 Collagen™ &amp; AprèsFlex®</td>
</tr>
<tr>
<td>01617</td>
<td>ArthroMax® with Theaflavins &amp; AprèsFlex®</td>
</tr>
<tr>
<td>02138</td>
<td>ArthroMax® Elite</td>
</tr>
<tr>
<td>00965</td>
<td>Fast-Acting Joint Formula</td>
</tr>
<tr>
<td>00522</td>
<td>Glucosamine/Chondroitin Capsules</td>
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<tr>
<td>01600</td>
<td>Krill Healthy Joint Formula</td>
</tr>
<tr>
<td>01050</td>
<td>Krill Oil</td>
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<tr>
<td>00451</td>
<td>MSM (Methylsulfonylmethane)</td>
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<tr>
<td>02231</td>
<td>NT2 Collagen™</td>
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</table>

**KIDNEY & BLADDER SUPPORT**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>00862</td>
<td>Cran-Max® Cranberry Whole Fruit Concentrate</td>
</tr>
<tr>
<td>01424</td>
<td>Optimized Cran-Max® with Ellirose™</td>
</tr>
<tr>
<td>01921</td>
<td>Uric Acid Control</td>
</tr>
<tr>
<td>01209</td>
<td>Water-Soluble Pumpkin Seed Extract</td>
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**LIVER HEALTH & DETOXIFICATION**

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>02240</td>
<td>Anti-Alcohol HepatoProtection Complex</td>
</tr>
<tr>
<td>01651</td>
<td>Calcium D-Glucarate</td>
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<tr>
<td>00550</td>
<td>Chlorella</td>
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<tr>
<td>01571</td>
<td>Chlorophyllin</td>
</tr>
<tr>
<td>01922</td>
<td>European Milk Thistle - 60 softgels</td>
</tr>
<tr>
<td>01925</td>
<td>European Milk Thistle - 120 softgels</td>
</tr>
<tr>
<td>01522</td>
<td>European Milk Thistle - 60 veg capsules</td>
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<tr>
<td>02402</td>
<td>FLORASSIST® Liver Restore™</td>
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<tr>
<td>01541</td>
<td>Glutathione, Cysteine &amp; C</td>
</tr>
<tr>
<td>01393</td>
<td>HepatoPro</td>
</tr>
<tr>
<td>01608</td>
<td>Liver Efficiency Formula</td>
</tr>
<tr>
<td>01534</td>
<td>N-Acetyl-L-Cysteine</td>
</tr>
</tbody>
</table>
LONGEVITY & WELLNESS

PRODUCTS

400 mg, 60 enteric coated tablets

200 mg, 30 enteric coated tablets

30731  Ionic Selenium
01919  X-R Shield
01208  Super R-Lipoic Acid
02301  Senolytic Activator
00070  RNA (Ribonucleic Acid)
02210  Resveratrol
01637  Pycnogenol® French Maritime Pine

01513  Optimized Fucoolidan with Maritech® 926
02230  Optimized Resveratrol
01637  Pycnogenol® French Maritime Pine Bark Extract
02210  Resveratrol
00070  RNA (Ribonucleic Acid)
02301  Senolytic Activator
01208  Super R-Lipoic Acid
01919  X-R Shield

MEN'S HEALTH

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

MINERALS

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

MISCELLANEOUS

00577  Potassium Iodide
00657  Solarshield® Sunglasses

MOOD & STRESS MANAGEMENT

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

LIFE EXTENSION MIX TABLETS

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

PROBIOTICS

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

SKIN CARE

80157  Advanced Anti-Glycation Peptide Serum
80165  Advanced Growth Factor Serum
80170  Advanced Hyaluronic Acid Serum
80154  Advanced Lightening Cream
80155  Advanced Peptide Hand Therapy
80175  Advanced Probiotic-Fermented Eye Serum
80152  Advanced Triple Peptide Serum
80140  Advanced Under Eye Serum with Stem Cells
80137  All-Purpose Soothing Relief Cream
80139  Amber Self MicroDermAbrasion
80118  Anti-Aging Mask
80151  Anti-Aging Rejuvenating Face Cream
80153  Anti-Aging Rejuvenating Scalp Serum
VITAMINS
01533 Ascorbyl Palmitate
00920 Benfotiamine with Thiamine
00664 Beta-Carotene
01945 BioActive Complete B-Complex
00102 Biotin
00084 Buffered Vitamin C Powder
02229 Fast-C* and Bio-Quercetin Phytosome
02075 Gamma E Mixed Tocopherol Enhanced with Sesame Lignans
02070 Gamma E Mixed Tocopherol/Tocotrienols
01913 High Potency Optimized Folate
01674 Inositol Caps Liquid Emulsified
02244 Liquid Vitamin D3 • 2,000 IU, 1 fl oz
02232 Liquid Vitamin D3 • 2,000 IU, 1 fl oz, mint
01936 Low-Dose Vitamin K2
01536 Methylcobalamin • 1 mg, 60 veg lozenges
01537 Methylcobalamin • 5 mg, 60 veg lozenges
00065 MK-7
00373 No Flush Niacin
01939 Optimized Folate (L-Methylfolate)
01217 Pyridoxal 5’-Phosphate Caps
01400 Super Absorbable Tocotrienols
02334 Super K
02335 Super K Elite
01863 Super Vitamin E
02028 Vitamin B5 (Pantothenic Acid)
01535 Vitamin B6
00361 Vitamin B12
02228 Vitamin C and Bio-Quercetin Phytosome
1,000 mg, 60 veg tablets
02227 Vitamin C and Bio-Quercetin Phytosome
1,000 mg, 250 veg tablets
01753 Vitamin D3 • 25 mcg (1,000 IU), 90 softgels
01751 Vitamin D3 • 25 mcg (1,000 IU), 250 softgels
01713 Vitamin D3 • 125 mcg (5,000 IU), 60 softgels
01718 Vitamin D3 • 175 mcg (7,000 IU), 60 softgels
01758 Vitamin D3 with Sea-Iodine™
02040 Vitamins D and K with Sea-Iodine™

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

WOMEN’S HEALTH
01942 Breast Health Formula
01626 Enhanced Sex for Women 50+
01894 Estrogen for Women
01064 Femmenessence MacaPause®
02204 Menopause 731™
02319 Prenatal Advantage
01441 Progesta-Care®
01649 Super-Absorbable Soy Isoflavones
Carnosine is a unique dipeptide that can inhibit glycation throughout the body, thereby helping to slow normal aging processes. Suggested dose is one 500 mg Carnosine cap taken twice daily.

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

Mitochondrial Energy Optimizer provides 1,000 mg of carnosine in each four-capsule dose along with R-lipoic acid, benfotiamine, taurine, and PQQ to provide broad-spectrum support.
NAD+ levels plummet with age but increase in response to nicotinamide riboside.

Optimized NAD+ Cell Regenerator™ combines 300 mg of nicotinamide riboside with resveratrol and other plant extracts.

For those already taking resveratrol, we also offer NAD+ Cell Regenerator™ that provides 300 mg of nicotinamide riboside.

The only online source of these NAD+ formulas is LifeExtension.com (or by calling 1-800-544-4440).

For full product description and to order NAD+ Cell Regenerator™ or Optimized NAD+ Cell Regenerator™ with Resveratrol, call 1-800-544-4440 or visit www.LifeExtension.com

* For pricing available to readers of this magazine, call 1-800-544-4440 or visit LifeExtension.com/NAD

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IN THIS EDITION OF LIFE EXTENSION® MAGAZINE

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L-arginine rapidly degrades in the body. This caused it to fall out of favor with cardiologists. A new low-dose, sustainable L-arginine offers support for circulatory health.

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A blend of aronia berries and an innovative form of L-arginine boosts production of nitric oxide, helping to improve blood flow.

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65 LACTOFERRIN HELPS BUILD NEW BONES
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