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January 2017

Slash Risk of Deep Vein Thrombosis

Kill Harmful Bacteria in Your Intestinal Tract

Plant Polyphenols That Protect Against Cancer

Outwit Your Greatest Threat to Longevity

Boost Efficacy of Your Probiotic

Metformin Cuts Glaucoma Risk

SUPER SALE

Life Extension®'s annual **SUPER SALE** enables clients to obtain **premium-grade** nutrient formulas at the year's lowest prices. Long-term supporters know that the ***quality*** of the products are backed by **Life Extension**'s commitment to extended healthy human lifespans. Below are a few examples of the savings you can enjoy during the **SUPER SALE**:

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LifeExtension® Magazine

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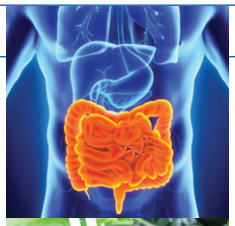

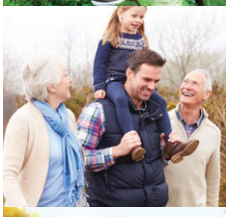

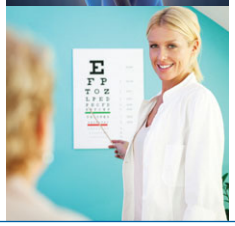

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36 NATURAL PREVENTION OF DEEP VEIN THROMBOSIS
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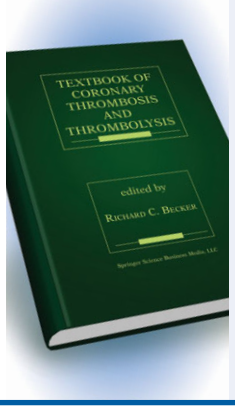
DEPARTMENTS



7 AS WE SEE IT: GREATEST THREAT TO LONGEVITY
According to the Surgeon General, **deep vein thrombosis** may cause up to **180,000** deaths each year. Those who spend time sitting are at the highest risk. Researchers have developed a nondrug approach for the prevention of **deep vein thrombosis**, utilizing two natural compounds that drastically *reduce* platelet aggregation-and fibrin-induced clots.

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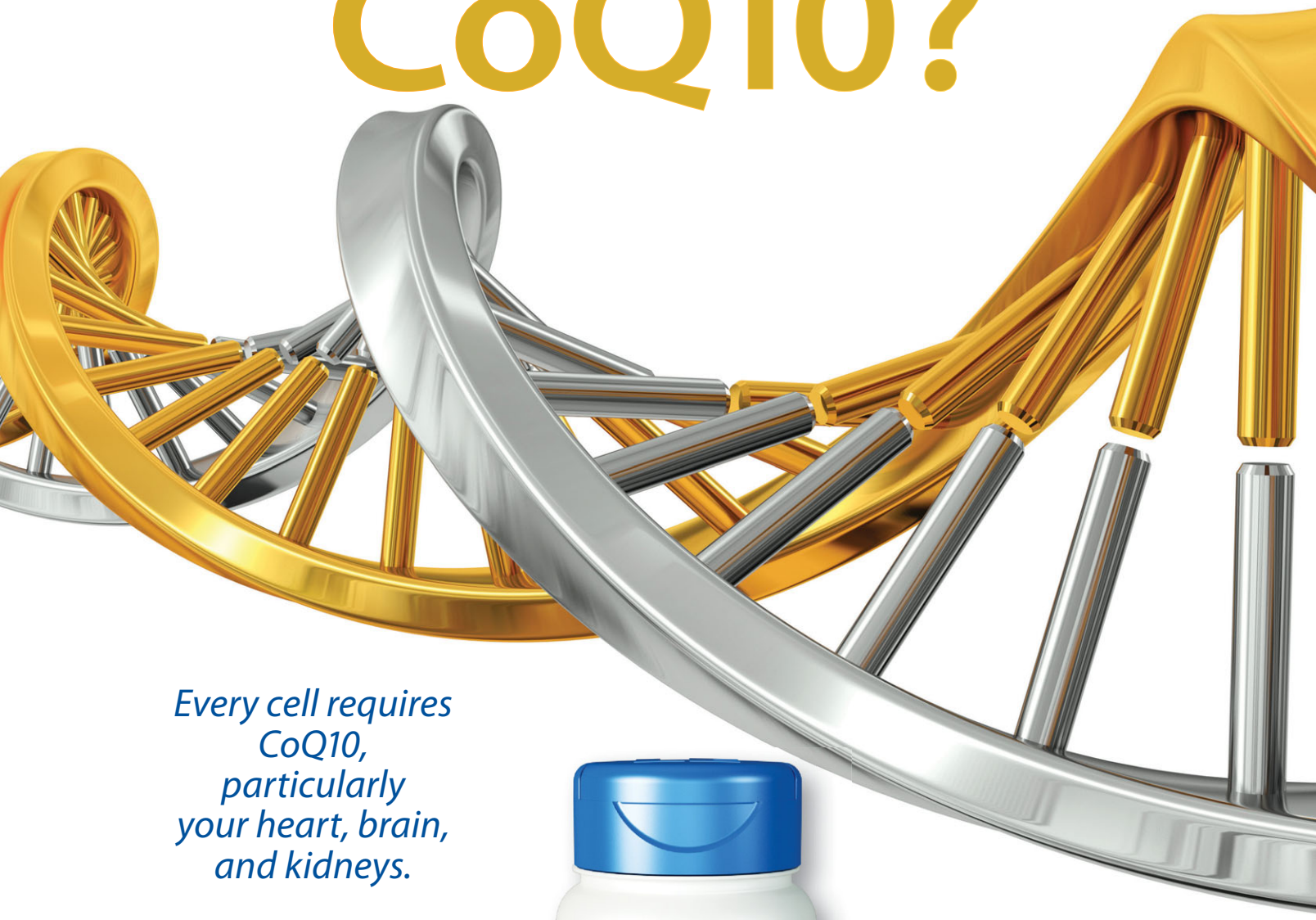

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References
1. *Regul Toxicol Pharmacol.* 2007;47(1):19-28.
2. *Exp Neurol.* 2004;188(2):491-4.
3. *Pharmacologyonline.* 2009;1:817-25.

To order Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support, call 1-800-544-4440 or visit www.LifeExtension.com

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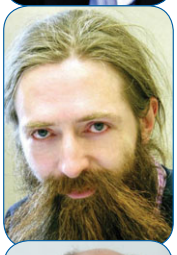

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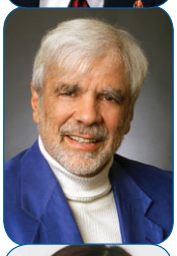

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Greatest Threat to Longevity

BY WILLIAM FALOON

Twenty years ago I was leaving a medical conference when one of our ardent supporters rushed up and handed me a huge textbook.[1] She begged I take it home to read.

She was adamant that ***Life Extension®*** make a greater effort to enlighten its readers about the underlying cause of most disability and death in persons over age 50.[1]

The threat described in the textbook occurs when an **abnormal blood clot** forms inside an artery or vein. The medical term is **thrombosis**.

Two disorders involving **arterial** thrombosis are:

- **Heart Attack**
- **Ischemic Stroke**

Two disorders involving **venous** thrombosis are:

- **Deep Vein Thrombosis (DVT)**
- **Pulmonary Embolism**

Those stricken with **cancer** are particularly susceptible to **venous thrombosis**.[2] Chemotherapy patients are up to **6-times** more vulnerable.[3]

One reason we've recommended **low-dose aspirin** since **1983** is its ability to inhibit platelet aggregation, a major factor involved in **arterial thrombosis**, leading to a **heart attack** or **ischemic stroke**.[4]

Recent studies show that **arterial thrombosis** occurs more frequently than previously thought.[5,6] Minor thrombotic events seldom display outward symptoms and, over time, predispose us to a host of degenerative illnesses including mind-robbing **mini-strokes**.[6,7]

Many of the **nutrients** you take have diverse **antiplatelet** effects. This is important in protecting against **arterial** thrombosis, but far less so for **venous** thrombosis.

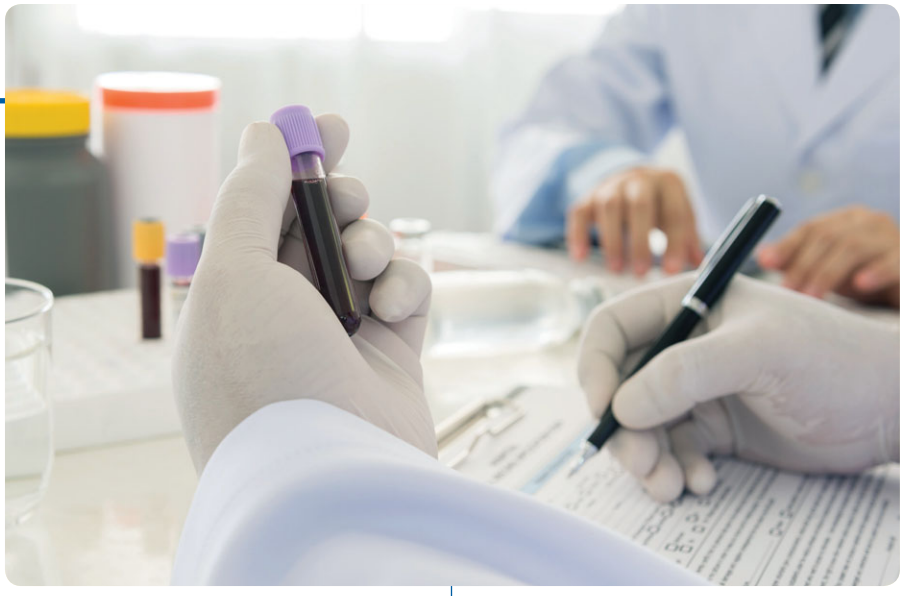
The Surgeon General published a report showing that **deep vein thrombosis** (and subsequent **pulmonary embolism**) may cause **100,000-180,000** deaths each year in the US.[8] To put this in perspective, **pancreatic cancer** is estimated to kill more than **41,000** Americans in 2016.[9] Pancreatic cancer has a decidedly deadly reputation, yet the public is largely unaware that **deep vein thrombosis** (and subsequent **pulmonary embolism**) poses a greater overall health risk.

The Surgeon General was highly critical of mainstream medicine for not recognizing patients at risk for **deep vein thrombosis** and taking appropriate preventive measures.

Longtime readers of this magazine should be comforted with the knowledge that they are already taking steps to reduce their **arterial thrombotic risk**.

This issue describes startling new data about **deep vein thrombosis**, and what can be done to help prevent it.

This is the 679-page textbook given to me by an enthusiastic **Life Extension®** supporter who wanted the world to know that thrombosis poses the greatest threat to healthy longevity.



People often take for granted that blood effortlessly flows through their arteries and veins like water moves through a hose.

The reality is that **blood flow** is highly dependent upon a complex interplay of different mechanisms, including **coagulation factors** that regulate the tendency of blood to form a clot.

For example, **platelets** play an important role in "plugging" holes in our circulatory system, helping to reduce bleeding in conjunction with other clotting factors.

Conversely, when platelets ***abnormally*** aggregate (clot) inside a blood vessel in response to arterial plaque and/or endothelial damage, the result is stoppage of blood flow to the affected part of the anatomy. An abnormal blood clot in a cerebral artery can lead to **ischemic stroke**, whereas a thrombus (clot) that forms in a coronary artery can result in a **heart attack**.

As humans age, mini-thrombotic events can occur to small arteries in the brain. This includes ***transient ischemic attacks*** (TIAs) in the brain that, over time, can cause damage to our cognitive abilities.

Preventing the development of these minor and major thrombotic episodes is critical for healthy longevity. The good news is that we know a lot about what causes pathologic **blood clotting** inside arteries and veins, and how to prevent it.

Role of Inflammation in Both Arterial and Venous Thrombosis

Inflammation sets in motion a sequence of events that can lead to arterial and venous **thrombosis**. Normal aging results in increasing levels of vascular inflammation, often without outward symptoms.

Readily obtainable blood markers that can reveal systemic inflammation are **homocysteine**,[10-12] **C-reactive protein**,[13,14] and **fibrinogen**.[15-17] Heightened levels of these inflammatory biomarkers are correlated with arterial thrombosis and subsequent risk of cardiovascular disease.[18,19]

Fish oil,[20] **vitamin D**,[21,22] **curcumin**,[23,24] and other plant extracts inhibit many underlying inflammatory factors that increase **C-reactive protein**. The biologically active form of **folic acid** (5-MTHF)[25,26] along with **vitamins B12**[27] and **B6**[27] can slash elevated **homocysteine** through two distinct detoxification pathways.[28]

In contrast to the association between risk of arterial thrombosis and C-reactive protein elevation, **C-reactive protein** is not very useful in predicting future **venous thrombosis** or **pulmonary embolism**. Recent evidence does point to the role of proinflammatory cytokines like **IL-8** and **tumor necrosis factor-alpha** in venous thrombosis risk.[29]

Nattokinase is an enzyme extracted from a Japanese food (natto) prepared from fermented soybeans.[30] Venous inflammation tends to raise **fibrinogen** levels, and **fibrinogen** is an important factor involved in **inflammation** as well as **venous thrombosis** formation.[31]

Nattokinase has been shown to decrease levels of **fibrinogen** along with clotting **factors VII** and **VIII**, which are involved in the formation of **venous** thrombosis.[32]

Epidemic of Deep Vein Thrombosis

Deep venous thrombosis and **pulmonary embolism** are major causes of disability and death.[39]

Each year, as many as **900,000** Americans may be affected by **venous thromboembolism**. Of those diagnosed, up to **30%** will die within one month, and the first symptom will be sudden death in about **25%** of those who have a pulmonary embolism.[40]

Venous thrombosis is the formation of a blood clot inside a vein that can obstruct flow in the localized affected part of the venous circulatory system. When a venous blood clot dislodges from its primary location and travels to block circulation in another body part, this is referred to as a **venous thromboembolism.** When a deep vein thrombosis dislodges and travels to the lungs, this worrisome and potentially life-threatening condition is called a **pulmonary embolism**.

Conventional Arterial Thrombotic Risk Factors

LDL cholesterol is a common factor involved in development of atherosclerotic plaque in arteries.[33]

Elevated LDL contributes to deposits of plaque that cause arterial pathways to gradually narrow until normal blood flow is disrupted. When this happens, there is a greater propensity for arterial clot formation (arterial thrombosis).[33]

Hypertension increases the velocity at which blood is thrust through the arterial system. As blood pressure elevates, platelets become more likely to aggregate and create a thrombotic event.[34]

Conventional cardiovascular and arterial thrombosis risk factors are diabetes, smoking, abdominal obesity, and hyperlipidemia (elevated LDL and triglycerides).[35-38] Some of these same factors are also associated with increased risk of deadly **venous thrombotic events.**

The encouraging news is that proven methods exist to control underlying causes of thrombosis and the vascular diseases that can develop acutely or chronically.

A variety of factors are implicated in the formation of venous thrombosis. Two major, related risks for the development of **deep vein thrombosis** are:

- **Hemostasis** (reduction/stagnation of blood flow)
- **Hypercoagulability** (propensity of blood to clot inside veins due to lifestyle, cancer or genetics)

The good news is that steps can be taken to reduce the risk of deep vein thrombosis, as well as thrombotic risks throughout the circulatory system. This means that strategies to protect against deep vein thrombosis may also confer protection against stroke and heart attack.

What Causes Blood Vessel Clots in Arteries?

To sustain life, blood must remain in a **fluid state** so that it can freely **circulate**, while simultaneously being able to properly **clot** at the site of a vascular injury.

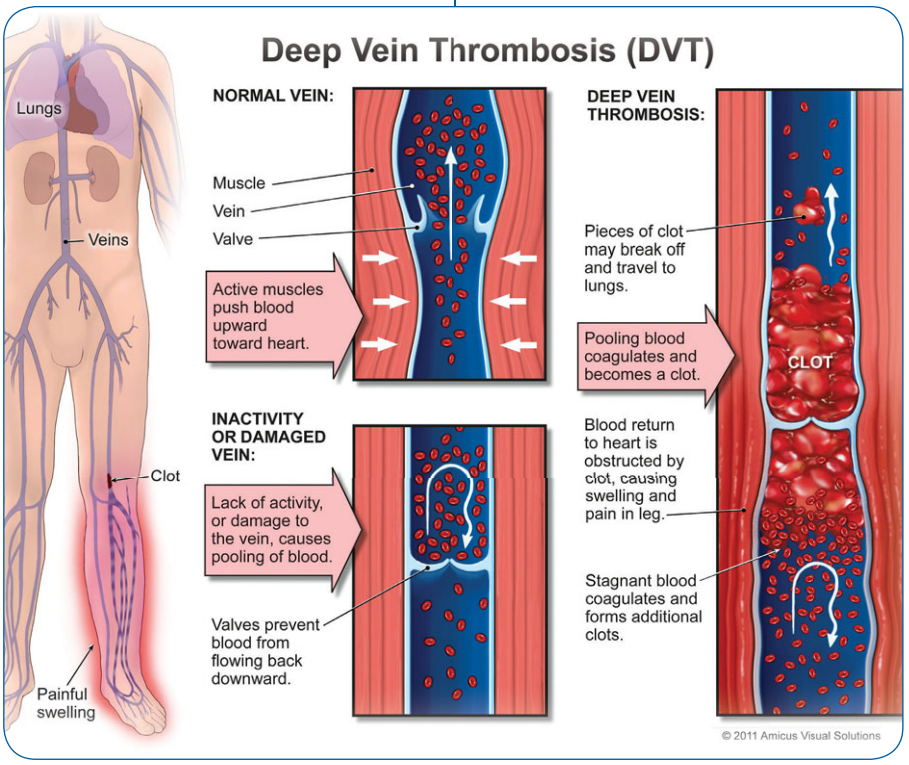
Any event that activates platelets can cause them to **aggregate** to form an occlusive **thrombus**.

As it relates to **aspirin**, **fish oil** and certain plant **polyphenols**, you'll often read about their "**antiplatelet**" properties. What this describes is their ability to interfere with platelet activity, adhesion, and aggregation, thereby reducing **arterial thrombotic risk**.

Antiplatelet therapies, however, can be sabotaged by dysfunction of our **endothelium** (inner arterial lining). A healthy endothelium produces substances that stabilize platelets and impede their unwanted adhesion.

When the endothelial lining is lost, platelets are exposed to parts of the arterial wall that cause them to aggregate. Protecting against ***endothelial dysfunction*** is thus essential to maintain vascular health as we age. This is where **pomegranate** and other plant **polyphenols** play a critical role.

Antiplatelet strategies employed today, utilizing certain medications and nutrients, can greatly mitigate these **arterial thrombotic** factors.



How Arterial and Venous Clots Differ

There are distinctions between the processes that cause arterial and venous thrombosis.

Arterial thrombosis largely involves **platelet aggregation** forming around clogged/jagged points in the arterial system, or in response to irregular heart beat (atrial fibrillation) or an artificial heart valve.

Deep vein thrombosis typically occurs due to **hemostasis** (reduction in venous blood flow) and **hypercoagulability** (tendency of the blood in veins to clot due to genetic, cancer or lifestyle factors).

One major cause of reduction in venous blood flow is **chronic venous insufficiency**. This frequently occurs from obesity, lack of physical activity/sitting with the legs in a dependent position, and previous deep vein thrombosis, which injures or destroys one or more of the **valves** that are located in the deep veins of the leg.

In order to efficiently return blood to the heart when a person is sitting or standing, veins contain tiny **valves** that open and close. Properly functioning valves prevent blood from flowing backward while muscles surrounding the veins compress them, helping pump venous blood back to the heart.[8]

Veins contain **valves** while **arteries** do not. When veins are damaged by prior venous clot, or physical inactivity leads to pooling of blood in the deep veins of the legs, venous blood flow decreases, setting the stage for venous thrombosis.

In contrast with the venous system, platelets in the arterial system are adversely activated as they bump into buildups of **plaque** along the arterial walls and interact with a *dysfunctional* endothelium. In this scenario, platelets begin to clump together, causing a cascade that can lead to blood flow being cut off to vital tissue (such as a portion of the heart muscle).

In the venous system, normal blood flow can slow, and if left to **stagnate** too long, the blood within these veins begins to coagulate (clot). The problem of deep vein thrombosis, however, extends beyond mere stagnating pools of blood in the lower legs.

Symptoms of Deep Vein Thrombosis

A blood clot in one of the deep veins can include the following symptoms:[83]

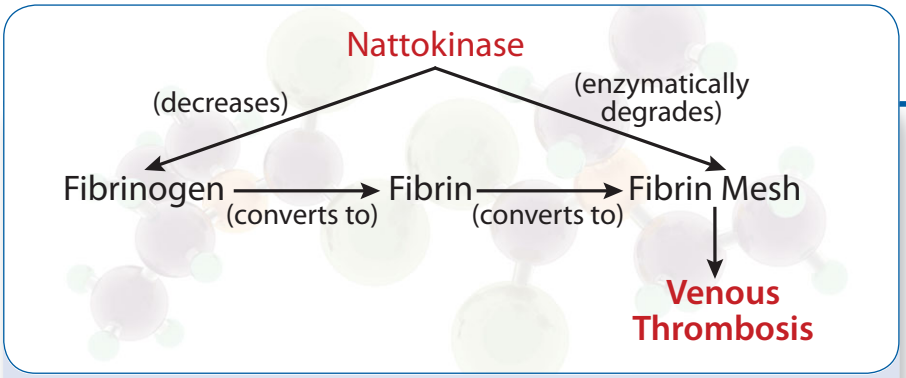
- Mild to severe pain in the affected arm or leg
- Swelling of an arm or leg
- Redness or color change
- Warmth of the skin

A venous blood clot that has traveled to the lung (called a pulmonary embolism) has symptoms that include:[83]

- Chest pain
- Shortness of breath
- Fast heartbeat

Nutrients that Help Protect Against Arterial Thrombosis

- Green tea[41,42]
- Fish oil[43-46]
- Olive polyphenols[47-51]
- Quercetin[52]
- Resveratrol[53-56]
- Grape seed extract[57-61]
- French maritime pine bark extract[62]
- Lycopene[63,64]
- Pomegranate[65]
- Garlic[66-72]
- Flax seed oil[73,74]
- Ginger[66,75-80]
- Curcumin[81,82]



Formation of Deep Venous Thrombosis

Fibrinogen converts to **fibrin** that creates a **fibrin mesh** inside a vein. Platelets and red blood cells adhere to fibrin mesh to cause deep vein thrombosis.

Nattokinase reduces **fibrinogen** and has **fibrinolytic** effects, which means it can *enzymatically* break down the **fibrin mesh** component of blood clots.

Beyond "Antiplatelet" Strategies

Inflammation and some other factors that contribute to **arterial thrombosis** (such as excess homocysteine) also are linked with an increased risk of **deep vein thrombosis**.[84,85] Several of these dynamics, however, play a ***larger*** role in the venous system than in arteries.

What happens with deep vein thrombosis is that **fibrinogen,** also a proinflammatory regulator**,** excessively converts to a **fibrin mesh** that traps red blood cells. In deep vein thrombosis, formation of **fibrin** is also linked with excess inflammation in veins.[86] This helps explain the limited efficacy of **antiplatelet drugs** (aspirin and Plavix®) in venous thrombosis, i.e., they don't stop the initiating phase of proinflammatory **fibrinogen** converting to red blood cell-trapping **fibrin**.

There are multiple underlying coagulation factors that can initiate a deep venous thrombosis. Some require preventive treatment using anticoagulant drugs (warfarin, Pradaxa®, Eliquis®, Xarelto®). There is a common venous thrombotic mechanism, however, that can be impeded with a low-cost nutrient.

Nattokinase has been shown to decrease fibrinogen levels and help dissolve **fibrin clots** that obstruct blood flow.[32,87]

The flow chart on this page shows a simplified version of the complex process of coagulation involved in thrombosis formation. The **fibrinogen/fibrin-dissolving** effects of **nattokinase** can help stop this coagulation cascade at several checkpoints.

Impressive Human Data!

A recent study highlighted the risk of **deep vein thrombosis** in response to conditions that predispose to stagnation of venous blood in the lower extremities (legs)—specifically, **air travel**.[96]

Many people are not aware that air travel, and associated pooling of venous blood in the legs due to inactivity during flight, is a major risk factor for **deep vein thrombosis** and potentially life-threatening **pulmonary embolism**.[97,98]

Using ultrasound imaging, the presence of venous thrombosis was detected in a startling **5%-7%** of passengers of flights lasting 7-8 hours.[96] *These passengers were asymptomatic, meaning they did not know they had developed a venous blood clot!*

When a nondrug approach for **prevention of deep vein thrombosis** was studied in this group of passengers, no lower leg venous clots were detected and lower leg edema (swelling) was drastically reduced.

Cancer-Related Thromboembolism

Cancer is associated with a **4.1-fold** increased risk of **venous thromboembolism**.[88]

Poor mobility, venous obstruction, and ongoing chemotherapy further increase risk of recurrence.[89,90] Venous thromboembolism is associated with advanced and more aggressive cancers.[91,92]

Cancer patients with **venous thromboembolism** have worse survival than cancer patients free of this complication.[91] For example, after a diagnosis of venous thromboembolism, the mortality rate at 6 months for cancer patients on anticoagulant therapy is **40%**.[92]

Cancer patients today are dying prematurely from **venous thromboembolism**. This is why ***Life Extension®*** long ago recommended **aspirin** and **low-molecular weight heparin** as adjuvant cancer therapies. Not only do overly-active platelets contribute to **thrombosis**, but they facilitate **metastasis**.[93-95]

What might surprise you is that **venous thromboembolisms** can be the first clinical manifestation of cancer somewhere in one's body. About **10%** of patients with unprovoked **venous thromboembolism** are diagnosed with **cancer**. Of these, more than **75%** are diagnosed within the first year after their thrombotic episode.[2]

Whenever you are faced with long-haul air travel, you should stand up every few hours and take a walk through the plane cabin. Consider obtaining high quality **compression stockings** to wear whenever you fly to reduce stagnation of blood in lower leg veins.[99]

As you will read in this month's issue, ingestion of two nutrients taken two hours before the plane departs and again six hours into the flight drastically reduced detection of venous blood clots and lower leg edema at the end of the flight. These nutrients have a dual effect of **inhibiting platelet aggregation** and helping to thwart **fibrin**-induced clots.

The fact that short-term dosing of these two nutrients demonstrated such a profound effect in protecting against **deep vein thrombosis** implies significant systemic benefits for those who supplement daily.

An intriguing article in this month's issue describes the robust benefits of these nutrients for reducing **deep vein thrombosis** risk.

The first article unveils a novel way of enhancing the efficacy of your **probiotic** by selectively killing off harmful intestinal bacteria.

Obtain Nutrient Formulas at Year's Lowest Prices

This is the time of year when we **discount** prices on *every* one of our advanced nutritional formulas.

Longtime supporters take advantage of the once-a-year **Super Sale** to stock up on their favorite nutrient formulas.

Those who have engaged in healthy lifestyle choices should find comfort knowing that nutrients they may have been using for decades confer considerable protection against **thrombosis**, which remains the most prevalent underlying cause of disability and death in persons over age 50.

Our Commitment

No organization is working harder to accelerate human age reversal research than **Life Extension**.

Your support enables scientists to engage in biomedical research that would have been inconceivable just a few years ago.

To order nutrients you need today at **Super Sale** prices, call **1-800-544-4440**.

For longer life,

William Faloon

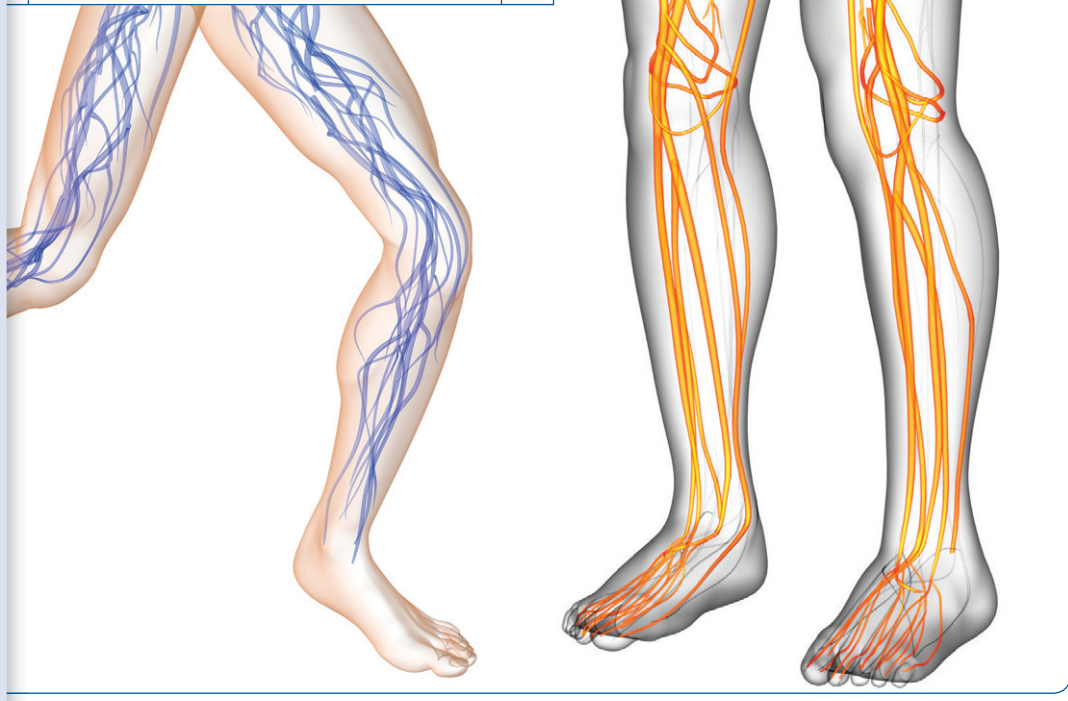
(References may be found on page 14.)

Surgeon General's Call to Action

In a report published 8 years ago, the Surgeon General stated:

"DVT [deep vein thrombosis] and PE [pulmonary embolism] are major public health problems in the United States. Much is known about how to reduce their burden, yet this knowledge is not being applied systematically today. Without a concerted effort to stem this public health crisis, the incidence and burden of these diseases will only grow larger as the population ages."[8]

Sadly, this medical neglect continues as hurried physicians are not doing enough to prevent **thrombotic** events that not only cause DVT/pulmonary embolism, but many strokes and heart attacks.



NEW BLOOD TEST PANEL!

Identify Common THROMBOTIC RISK Blood Factors

Special Introductory Price

Numerous factors in **blood** can contribute to ***abnormal*** blood clots.

Thrombosis is the term used to describe **clots** that form inside blood vessels.

Rather than wait for an acute stroke, coronary blockage, or deep vein thrombus, one can evaluate common **thrombotic risk factors** that are measured in the blood.

A new **low-cost** panel has been designed to detect abnormalities in one's blood that can be corrected before a disabling or lethal blood vessel clot develops.

One of these clotting factors is **fibrinogen** which markedly increases risk of **thrombosis**, especially **stroke**.

The new **Thrombotic Risk Panel** provides the following tests at a special introductory price of only $139 (if ordered before **January 31, 2017**):

Inflammatory/Clotting Markers

- Fibrinogen
- C-reactive protein
- Homocysteine
- PT/PTT/INR

Blood Cells

- Platelet count
- Red Blood Cell count
- Anemia markers
- White Blood Cell count (includes differentiation)

Insulin Resistance Markers

- Glucose
- Insulin
- Hemoglobin A1C

Lipid Markers

- Cholesterol (total)
- LDL
- HDL
- VLDL
- Triglycerides

Liver/Kidney Function and more!

Don't Delay— Order today, visit www.LifeExtension.com or call one of our knowledgeable Wellness Specialists at 1-866-864-3027.

This offer is good through January 31, 2017.

Fasting Not Required

Conventional protocol says that one should fast for 8-12 hours prior to a blood draw. The fast means no eating or drinking anything except water and taking one's prescription medications.

Life Extension® will soon make an announcement based on new evidence indicating that more valuable data may be obtained if one is NOT in a fasting state when their blood is drawn.

If you are used to fasting prior to a blood test you may continue this practice, but you now have the **option** of eating/drinking what you ***normally*** do in a typical day.

Just write down the time of your last meal and what it contained. This provides a snapshot of what your blood **normally** looks like on a typical day as opposed to what may be artificially different levels that occur during a **fasting** state.

Thrombotic Risk Panel • Item # LC100055
Retail: $259 • Introductory price: **$139**

Additional Blood Tests for Thrombosis

Unlike arterial thrombosis risk due to elevated LDL-C cholesterol and hs-CRP, as well as elevated arterial and venous thrombosis risk due to fibrinogen and homocysteine, some individuals suffer from other coagulation disorders that require additional blood tests to detect.

Additional tests available from your doctor for coagulation factors to evaluate for venous thrombosis risk include:

- Factor V Leiden (mutation)
- Prothrombin gene G20210A (mutation)
- Antiphospholipid antibodies (e.g. lupus anticoagulant, cardiolipin antibody, beta-2 glycoprotein antibody)
- Protein C antigen and activity
- Protein S antigen and activity

When Anticoagulant Drugs Are Needed

People with **artificial heart valves** or **atrial fibrillation** are at high risk for developing a thrombus that breaks loose and travels up a carotid artery, where it can cause an acute ischemia stroke.[100,101]

There are also inherited conditions in which blood clotting proteins improperly react, either causing blood to overcoagulate or preventing expression of normal clot dissolving factors. Some of these coagulation disorders that result in too much clotting include:

- Factor V Leiden
- Antithrombin III (ATIII) deficiency
- Protein C or protein S deficiency
- Prothrombin (PT) gene mutation
- Antiphospholipid antibody syndrome

Those in a hypercoagulable state are usually prescribed one of the four following anticoagulant drugs:

- Pradaxa®
- Eliquis®
- Xarelto®
- Coumadin® (warfarin)

The major side effect risk of these drugs is unwanted bleeding. These drugs also don't always prevent a thrombotic event. Those who choose the oldest of these drugs (warfarin) are subjected to severe **vitamin K deficiency** that rapidly **calcifies** tissues. This can lead to future degenerative illnesses (such as accelerated atherosclerosis and aortic valve stenosis).

Despite these side effect risks, those at high thrombotic risk should work closely with their physician to use the anticoagulant drug that best meets their individual needs. To review our detailed report on the pros and cons of each of these drugs, log on to:

LifeExtension.com/thrombosis

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Super Savings on TWO-PER-DAY™

Sample Ingredient Comparison	Centrum Silver® Adults 50+	Life Extension® Two-Per-Day
Vitamin A	2,500 IU	5,000 IU (beta-carotene + preformed)
Vitamin C	60 mg	500 mg
Vitamin D3	1,000 IU	2,000 IU
Vitamin E	50 IU (synthetic)	100 IU (natural)
Thiamine (vitamin B1)	1.5 mg	75 mg
Riboflavin (vitamin B2)	1.7 mg	50 mg (with riboflavin-5-phosphate)
Niacin	20 mg	50 mg
Vitamin B6	3 mg	75 mg (with pyridoxal-5-phosphate)
Folate	400 mcg (synthetic)	400 mcg (5-MTHF)
Vitamin B12	25 mcg	300 mcg
Biotin	30 mcg	300 mcg
Pantothenic acid	10 mg	100 mg
Calcium	220 mg	10 mg
Iodine	150 mcg	150 mcg
Magnesium	50 mg	100 mg
Zinc	11 mg	30 mg
Selenium	19 mcg (one form)	200 mcg (three forms)
Manganese	2.3 mg	2 mg
Chromium	50 mcg	200 mcg
Molybdenum	45 mcg	100 mcg
Potassium	80 mg	25 mg
Alpha lipoic acid	none	25 mg
Boron	none	3 mg
Choline (as bitartrate)	none	20 mg
Inositol	none	50 mg
Lutein	250 mcg	5,000 mcg (from marigold extract)
Zeaxanthin	none	155 mcg (from marigold extract)
Lycopene	300 mcg	1,000 mcg
Natural mixed tocopherols (providing gamma, delta, alpha, and beta tocopherols)*	none	20 mg
Apigenin	none	5 mg

The **Two-Per-Day** multinutrient formula is superior to commercial multivitamins because it provides vastly ***higher*** potencies of **vitamins**, **minerals** and **plant extracts**.

Two-Per-Day also provides optimal forms of vital nutrients such as:

- **5-MTHF:** Active form of **folate**—up to 7 times more bioavailable
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- **B-Vitamins:** Enzymatically active forms of **B2** and **B6**
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The retail price of a **60 day** supply of the new **Two-Per-Day** tablets is **$20**. (Item # 02115)

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Super Bio-Curcumin®

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Super Bio-Curcumin® features a patented extract from turmeric root that absorbs up to **7 times** better than standard curcumin. This product is ideal for those seeking to support normal cell-cycle growth and healthy inflammatory response.

Advanced Bio-Curcumin® contains the same optimal potency of **curcumin** with the added benefits of **ginger** and additional **turmeric** extracts.

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To order Super Bio-Curcumin® or Advanced Bio-Curcumin® with Ginger & Turmerones, call 1-800-544-4440 or visit www.LifeExtension.com

Omega-3
Heals the Heart

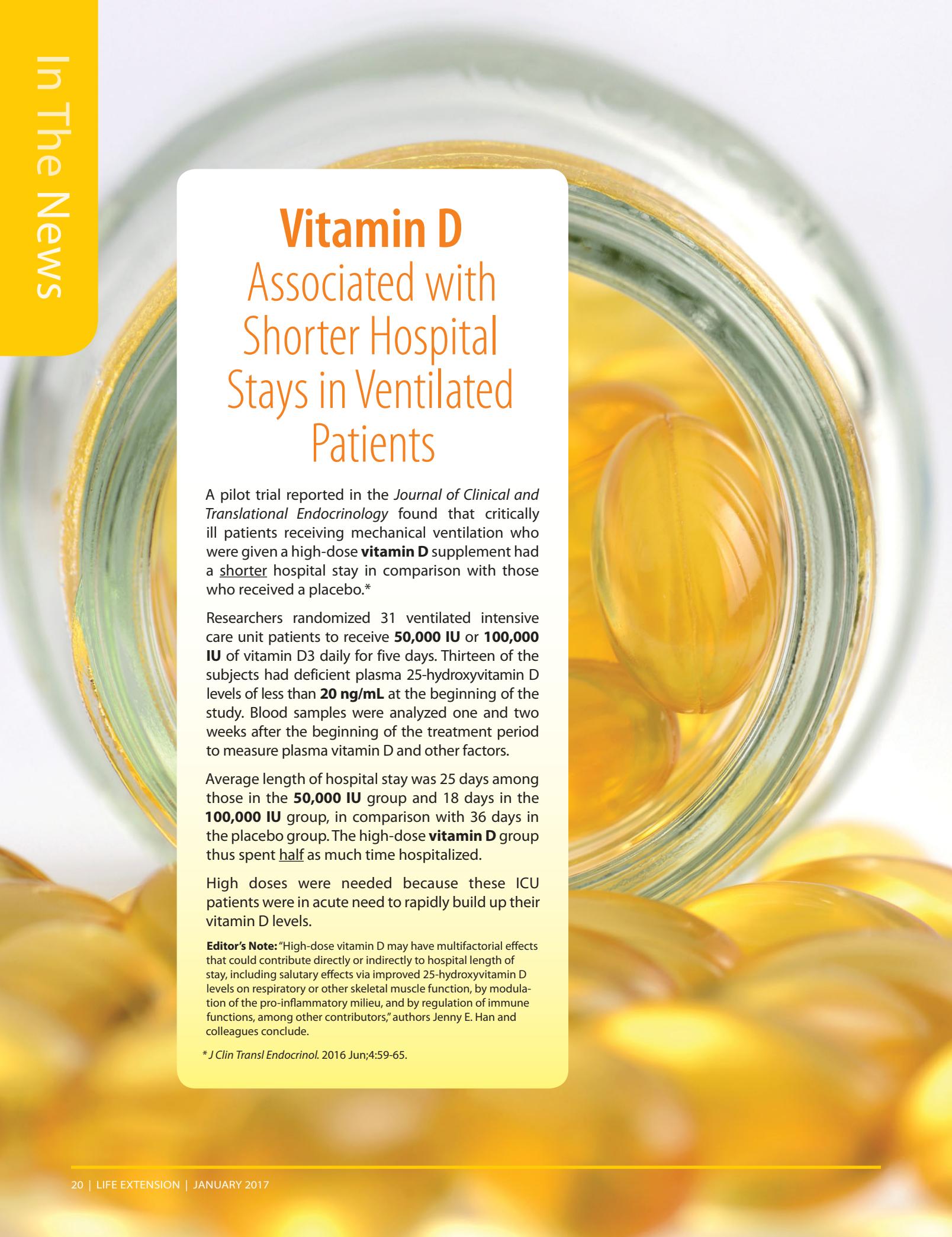
Results from a trial reported in the journal *Circulation* reveal improved heart function and less scarring in patients given **omega-3** fatty acids for six months following a heart attack.*

The trial included 360 heart attack survivors who received fish oil-derived omega-3 or a placebo within a month of the attack. At the beginning and end of the treatment period, blood samples were analyzed for omega-3 levels, inflammation biomarkers and other factors, while magnetic resonance imaging evaluated cardiac structure and tissue characteristics.

At the end of the study, participants whose omega-3 index rose to the top **25%** of subjects had a **13%** reduction in left ventricular systolic volume index (a marker of heart remodeling) compared to those whose omega-3 levels were among the lowest. Participants who received omega-3 experienced significant reductions in markers of **inflammation** and heart muscle **fibrosis**.

Editor's Note: The findings suggest a role for omega-3 in the prevention of cardiac remodeling, a condition characterized by alterations in heart shape and function that can occur after a heart attack, which is associated with heart failure.

* *Circulation.* 2016 Aug 1.



Vitamin D Associated with Shorter Hospital Stays in Ventilated Patients

A pilot trial reported in the *Journal of Clinical and Translational Endocrinology* found that critically ill patients receiving mechanical ventilation who were given a high-dose **vitamin D** supplement had a shorter hospital stay in comparison with those who received a placebo.*

Researchers randomized 31 ventilated intensive care unit patients to receive **50,000 IU** or **100,000 IU** of vitamin D3 daily for five days. Thirteen of the subjects had deficient plasma 25-hydroxyvitamin D levels of less than **20 ng/mL** at the beginning of the study. Blood samples were analyzed one and two weeks after the beginning of the treatment period to measure plasma vitamin D and other factors.

Average length of hospital stay was 25 days among those in the **50,000 IU** group and 18 days in the **100,000 IU** group, in comparison with 36 days in the placebo group. The high-dose **vitamin D** group thus spent half as much time hospitalized.

High doses were needed because these ICU patients were in acute need to rapidly build up their vitamin D levels.

Editor's Note: "High-dose vitamin D may have multifactorial effects that could contribute directly or indirectly to hospital length of stay, including salutary effects via improved 25-hydroxyvitamin D levels on respiratory or other skeletal muscle function, by modulation of the pro-inflammatory milieu, and by regulation of immune functions, among other contributors," authors Jenny E. Han and colleagues conclude.

* *J Clin Transl Endocrinol.* 2016 Jun;4:59-65.

Taurine and **Magnesium** Decrease Markers of Cardiovascular Disease Progression

The journal *Hypertension Research* reported finding an increase in endothelial progenitor cells and a decrease in free radicals in association with supplementation with **taurine** and **magnesium**.*

The body's endothelial progenitor cells repair the damage to the lining of the arteries that leads to cardiovascular disease. Free radical formation, when unchecked, is a factor involved in cardiovascular disease development.

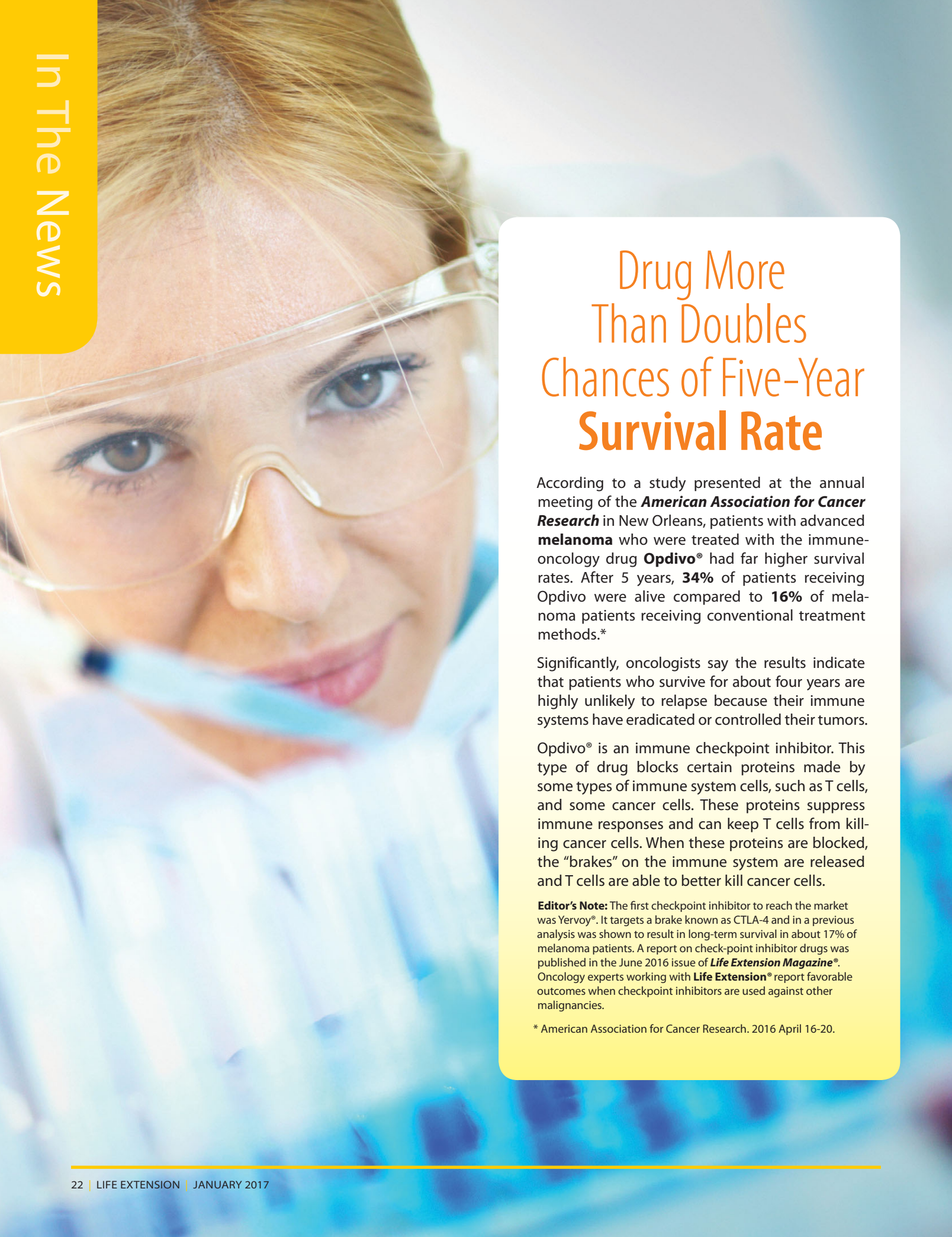
More than 100 healthy men between the ages of 18 and 25 received **3 grams** of taurine, **340 mg** of magnesium, or a placebo daily for two weeks. Taurine and magnesium supplementation decreased measures of free radical damage over this two week period.

In comparison with pretreatment levels, **endothelial progenitor** cell colony-formation numbers, which reflect the vascular repair function of endothelial progenitor cells, significantly increased in study participants supplementing with taurine and magnesium.

Editor's Note: "These findings indicate that the dietary intake of taurine and magnesium may prolong lifespan by facilitating the repair of impaired endothelial functions and thereby prevent the progression of cardiovascular diseases," the authors observe.

Progenitor cells come from **stem cells** and serve many functions in repairing and maintaining tissues throughout our bodies. Regenerating the **endothelial** lining of our arteries has huge potential in reducing **atherosclerosis** incidence. **Taurine** and **magnesium** are ultra-low cost nutrients.

* *Hypertens Res.* 2016 Jul 14.



Drug More Than Doubles Chances of Five-Year **Survival Rate**

According to a study presented at the annual meeting of the ***American Association for Cancer Research*** in New Orleans, patients with advanced **melanoma** who were treated with the immune-oncology drug **Opdivo®** had far higher survival rates. After 5 years, **34%** of patients receiving Opdivo were alive compared to **16%** of melanoma patients receiving conventional treatment methods.*

Significantly, oncologists say the results indicate that patients who survive for about four years are highly unlikely to relapse because their immune systems have eradicated or controlled their tumors.

Opdivo® is an immune checkpoint inhibitor. This type of drug blocks certain proteins made by some types of immune system cells, such as T cells, and some cancer cells. These proteins suppress immune responses and can keep T cells from killing cancer cells. When these proteins are blocked, the "brakes" on the immune system are released and T cells are able to better kill cancer cells.

Editor's Note: The first checkpoint inhibitor to reach the market was Yervoy®. It targets a brake known as CTLA-4 and in a previous analysis was shown to result in long-term survival in about 17% of melanoma patients. A report on check-point inhibitor drugs was published in the June 2016 issue of ***Life Extension Magazine®***. Oncology experts working with **Life Extension®** report favorable outcomes when checkpoint inhibitors are used against other malignancies.

* American Association for Cancer Research. 2016 April 16-20.

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Caution: Do not take this product if you are allergic to wheat or gluten.

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The new **Extend-Release Magnesium** provides an immediate release of **magnesium citrate** to the stomach and a slow 6-hour release of **magnesium oxide** for optimal intestinal absorption.

According to data from the **National Health and Nutrition Examination Survey** of 2005-2006, most Americans fail to consume the estimated average requirement of magnesium from food alone.*

Each capsule of the new **Extend-Release Magnesium** supplies **250 mg** of elemental **magnesium** designed for sustainable absorption into your bloodstream over a 6-hour period.

Those taking a multinutrient supplement that provides at least **100 mg** of elemental magnesium may need only one **Extend-Release Magnesium** capsule daily.

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Extend-Release Magnesium

Item #02107 • 60 vegetarian capsules

	Retail Price	Super Sale Price
1 bottle	$13	**$8.78**
4 bottles		**$7.88 each**

Reference

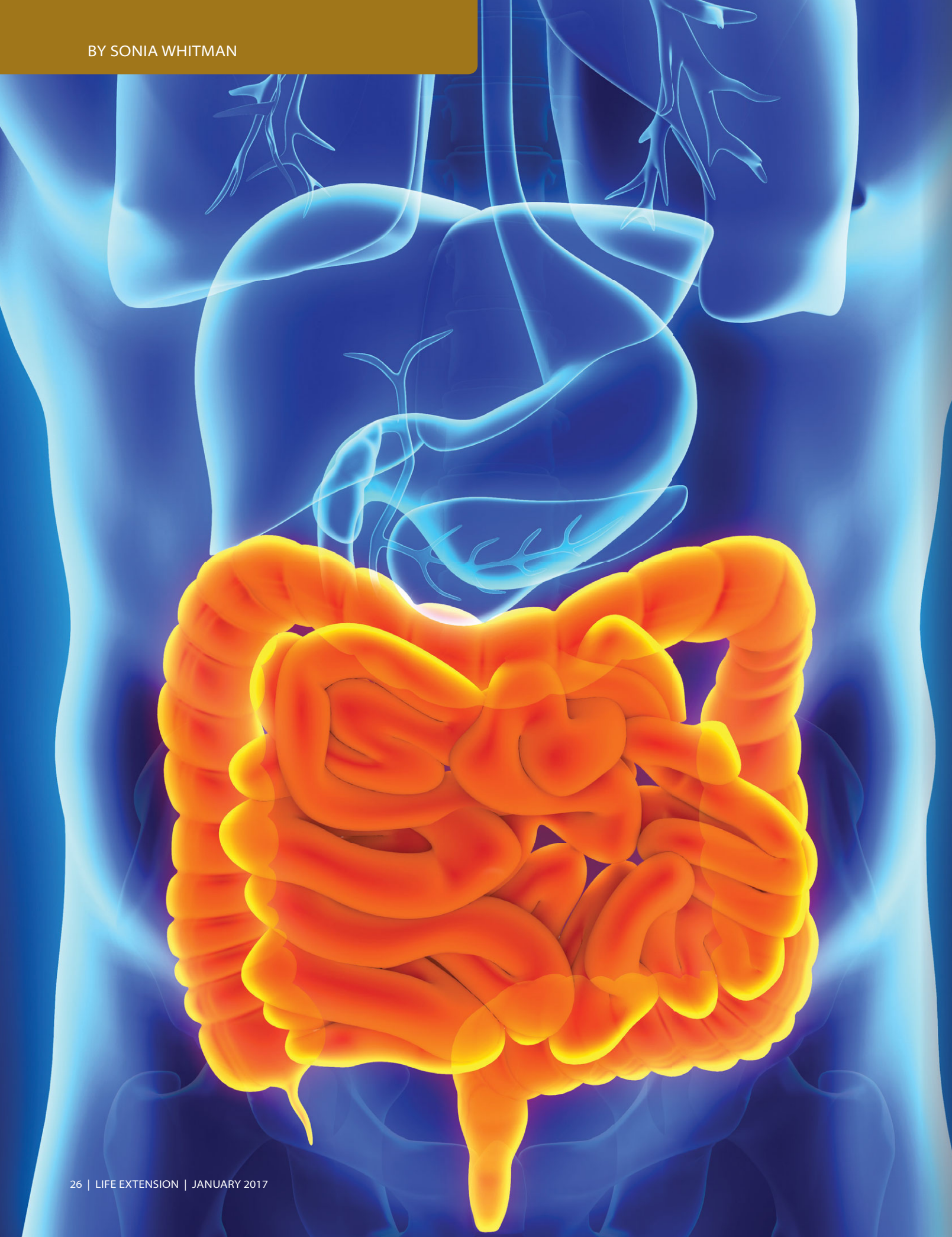
* Available at: https://www.ars.usda.gov/ARSUserFiles/80400530/pdf/0506/usual_nutrient_intake_vitD_ca_phos_mg_2005-06.pdf. Accessed September 6, 2016.

Non-GMO

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

To order **Extend-Release Magnesium**, call **1-800-544-4440** or visit **www.LifeExtension.com**

BY SONIA WHITMAN



Major Advance in INTESTINAL HEALTH

Probiotics are emerging as enormously popular health supplements.

When one ingests a **probiotic**, they add bacteria to their digestive tract that produce benefits ranging from alleviating **intestinal distress** to strengthening **immunity**.

Another virtue of **probiotics** is that they can slowly crowd out harmful **bacteria** strains in the intestines.

In a significant advance, a natural method of selectively killing undesirable **bacteria** has been developed.

When combined with a probiotic in the animal model, there was an exponential increase in beneficial bacteria with a parallel decrease in unfriendly flora like *E. coli*.[1-3]

This article describes a novel way of ***optimizing*** **probiotic** efficacy.

Most people in the United States have likely never heard of **phage therapy**. It was discovered in pre-World War I Eastern Europe, and for much of the pre-World War II era, it was thought to be a promising approach to controlling bacterial illnesses.[4-6]

In the 1940s, industrial giants like Eli Lily and L'Oréal developed bacteriophage "cocktails" aimed at treating a variety of bacterial infections. But the advent of antibiotics quickly cost **phages** the spotlight, though their effectiveness has never been in question.[7]

Phage therapy uses ***bacteriophages***, which are submicroscopic packages of DNA or RNA enclosed in a protein envelope that **selectively** target harmful bacteria.

The name **bacteriophage** literally means "***bacteria eating***." A bacteriophage attaches itself to a bacterial cell wall and then destroys the host bacteria.

Bacteriophages are ubiquitous in nature, meaning they can be found almost everywhere—from soil, hot springs and the ocean depths to the animal and human body.[8]

*The name **bacteriophage** literally means **"bacteria eating."***

Phages are a common and important component of gut flora and are found in various other parts of the human body such as the mouth and skin.[8,9] Phages are currently used in the food industry to control disease-causing organisms.[10-12]

Numerous phages are classed as GRAS—or "generally recognized as safe"—and are commonly used for a variety of different applications, from controlling *Listeria* in cheese and *E. coli* in meat and on food-contact surfaces, to *Salmonella* in food.

With the targeted use of **bacteriophages**, it is possible to seek out and effectively reduce specific populations of unhealthy organisms that have taken over the **intestinal microbiome**.

The use of bacteriophages allows an exceptionally specific approach to eliminating detrimental bacteria. This is in direct contrast to **antibiotics**, which employ a mass-killing technique that eliminates healthy and detrimental bacteria, leaving us vulnerable to attack by other organisms.[13]

By removing common pathogenic bacteria in one's gut, **bacteriophages** enable beneficial ***probiotic*** bacteria to thrive, allowing them to more effectively rebalance the microbiome.

When **phages** are combined with **probiotics** in animal models there are huge reductions in the targeted harmful bacteria with a simultaneous increase in **beneficial bacteria**.

The Importance of a Healthy Gut

When scientists speak of the intestinal ***microbiome***, they refer to the community of trillions of microorganisms that populate the human gut.[14] We're just now beginning to understand that this collection of microorganisms can determine our state of health and illness.

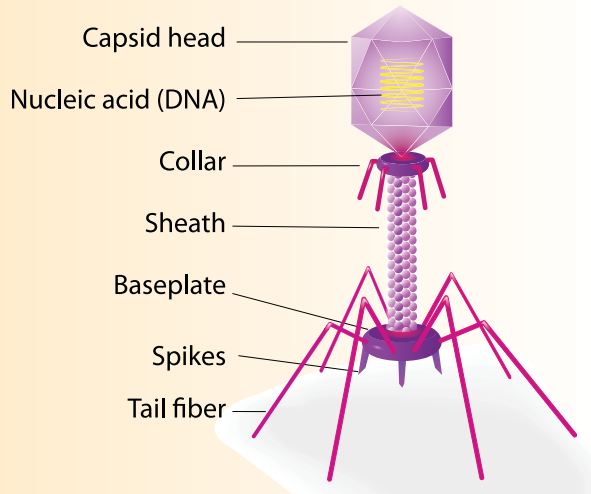
It is impossible to avoid all threats to our intestinal microbiome. The increase in our consumption of meats, fats, processed carbohydrates, preservatives, and other additives can alter our bacterial populations.[15-17] And, of course, the overuse of **antibiotics** kills both healthy and bad bacteria indiscriminately.[7,18,19] As a result, our delicate **microbiome** is becoming disrupted and imbalanced, which results in a condition called ***dysbiosis***.

Dysbiosis is associated with almost every known disease process, from obesity and cancer to cardiovascular disease, diabetes, allergic reactions, neurodegenerative disorders such as Alzheimer's, and even mental health issues such as depression.[20-22]

Imbalances in the intestinal microbiome steadily worsen with age,[23-26] and can be blamed for such common complaints as feeling generally unwell, reduced sleep quality, and feeling "foggy."[27-31]

The impact of an unbalanced microbiome can also lead to another disorder related to dysbiosis called ***small intestinal bacterial overgrowth***. People with this condition often have vague but persistent abdominal symptoms, such as pain, bloating, indigestion, gas, or cramping.[32,33] And in older adults, ***small intestinal bacterial overgrowth*** can contribute to malnutrition and eventual frailty, making the condition a major threat to the elderly.[32,34]

Structure of a bacteriophage



Giving Probiotics a Boost

Many people live in a state of **dysbiosis** or imbalance that not only threatens their long-term health, but may also contribute to sleep disorders, to a sense of malaise or "fogginess," and to a range of stomach distress issues that cannot be explained by a specific disease. Fortunately, many studies have shown that positively changing the **microbiome**—shifting it toward a healthy profile and away from ***dysbiosis***—can also change symptoms and disease risk.[14,35,36]

One important way of improving the intestinal microbiome is through the use of **probiotic bacteria**. Probiotics are a great ***additive therapy*** that increase the abundance of organisms that can rebalance an ailing microbiome. In some cases, however, probiotics by themselves have difficulty competing with the more aggressive microbes that contribute to dysbiosis in the first place.

A more comprehensive approach is to use **probiotics** in combination with another ***therapy***, one that selectively targets and reduces the troublesome bacteria that are taking over the microbiome. This approach of targeting harmful bacteria while replenishing beneficial bacteria can make way for **probiotics** to better help restore the microbiome to a healthy, balanced state. That is how **phage therapy** works.

Phage therapy reduces potentially troublesome organisms that are overabundant in the microbiome, allowing beneficial organisms to flourish. This helps restore the **microbiome** to a healthy, balanced state.[37]

Combating *E. coli* Bacteria

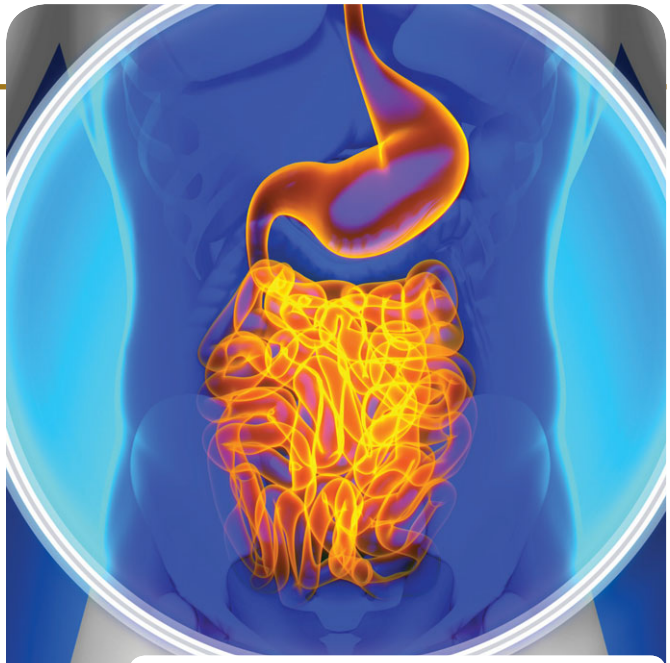
Escherichia coli (*E. coli*) is a bacterium that normally lives in our intestines. Most types of *E. coli* are harmless, but some can cause disease.

A troublesome strain of ***E. coli*** called **H10407** causes abdominal cramps, diarrhea, and gas.[38,39] This pathologic *E. coli* strain also suppresses growth of beneficial bacteria and produces a state of ***dysbiosis***.[40]

In an effort to help restore a balanced and healthy **microbiome**, researchers have developed a cocktail of **bacteriophages** that target dangerous strains of ***E. coli***.

Unlike typical pre- or probiotics, this **phage cocktail** is effective within hours, not days, and in very small doses.[40] It functions not only in the colon (large intestine), where **dysbiosis** is a problem, but also in the small intestine, where undesirable **bacterial overgrowth** occurs. It does not cause flatulence, a constant problem with fiber-containing prebiotics.[40]

Laboratory studies show that this form of **phage therapy** removes harmful bacteria, making way for beneficial **probiotic bacteria** to establish and form a healthy microbiome. This has been demonstrated—with impressive results.



What You Need to Know

The Revival of Phage Therapy

- **An imbalance in the intestinal microbiome (dysbiosis) is now associated with many serious age-related disorders. Studies show that it is prevalent in older people, particularly those with sleep disorders, vague abdominal complaints, and malaise.**
- **Changing the intestinal microbiome towards a state of improved health and function is a desirable solution, but until now options have been limited.**
- **Bacteriophages selectively target and destroy specific harmful bacteria.**
- **In combination with a mixture of probiotic bacteria, a cocktail of bacteriophages has been shown to reduce the abundance of undesirable bacteria, while freeing beneficial organisms to thrive and increase in numbers.**
- **Using this probiotic/bacteriophage mixture shows high promise in relieving the functional changes and tissue damage wrought by *dysbiosis*, and should be added to the regimen of anyone interested in rebalancing their microbiomes to feel better.**

Figure 1

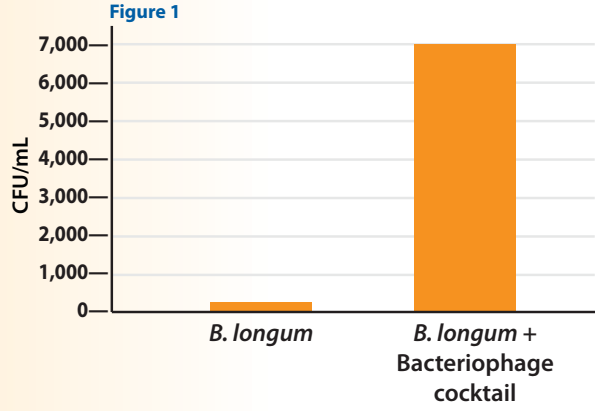


Figure 2

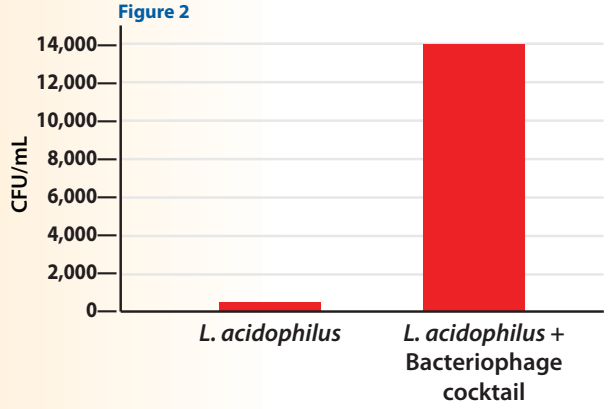


Figure 3

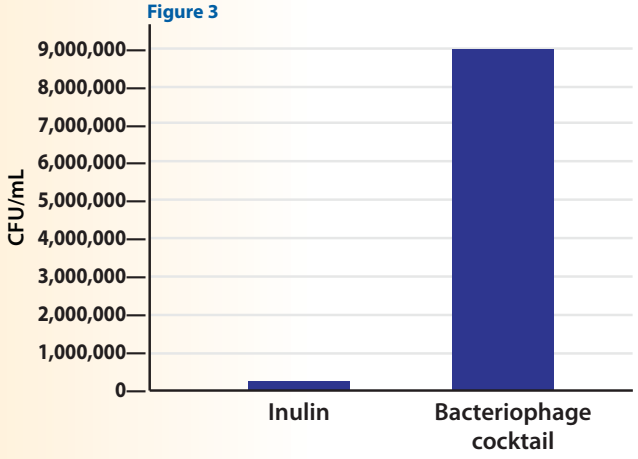


Figure 1: Beneficial *Bifidobacterium longum* grew nearly 7000 times better despite competition from *E. coli*, when the culture dish was treated with bacteriophage cocktail.[40]

Figure 2: Beneficial *Lactobacillus acidophilus* grew nearly 20 times better, despite competition from *E. coli*, when the culture dish was treated with bacteriophage cocktail.[40]

Figure 3: Beneficial *Lactobacillus paracasei* grew poorly in culture against competing bacteria when treated with prebiotic inulin (left). After treatment with bacteriophage cocktail, the desirable organism grew **nine million times** more vigorously than with inulin alone.[40]

Phage Cocktail Promotes Survival of Probiotic Organisms

In one experiment, culture dishes were prepared with a **beneficial bacteria** (*Bifidobacterium longum*), along with a competitive ***E. coli*** bacteria.[40]

A second set of dishes was prepared to which the **bacteriophage** mixture was added. After just 5 hours, there was a visible difference.

In the dishes without **bacteriophage**, there was little growth of the desirable *B. longum* organisms, indicating their inability to compete with *E. coli*.

In the dishes with the **bacteriophages**, colonies of *B. longum* skyrocketed to more than **7,000 times** their numbers compared to dishes without the bacteriophage. This study demonstrates that the competitive ***E. coli*** had been greatly removed from the picture by the **bacteriophage** (**Figure 1**).

In a related experiment, a probiotic organism (*Lactobacillus acidophilus*) was grown in culture, again in competition with *E. coli*.[40] In a very similar fashion, without the **phage cocktail**, the *E. coli* suppressed growth of the beneficial *L. acidophilus*. However, in the presence of the phage mixture, *L. acidophilus* thrived, reaching colony counts that were **20-fold** higher compared to the culture not receiving the **phages**. (**Figure 2**). In similar experiments, growth of the probiotic organism *L. rhamnosus* was enhanced **15-fold** and the beneficial *B. bifidum* was enhanced nearly **10-fold** when grown in culture with the **phage** cocktail.

These experiments demonstrate the value of the **phage** mixture in promoting the growth and survival of probiotic organisms.

In another Petri dish experiment, the common prebiotic *inulin* was used in an attempt to stimulate the growth of the beneficial probiotic *Lactobacillus paracasei*. When the prebiotic was used alone, it failed to ensure the survival of the desired organisms. But when the **phage** mixture was added, it produced an astonishing ***nine million-fold*** increase in growth of the probiotic *Lactobacillus paracasei* (**Figure 3**).

Phage Cocktail Decreases *E. coli* and Improves Normal Gastrointestinal Function

Moving out of the Petri dish and into the animal model, one group of laboratory mice was given the probiotic *B. longum* in combination with the disease-causing *E. coli* strain H10407.[41] A second group of mice was given the same mixture, but with the addition of the **phage cocktail** that targets *E. coli*.

After 24 hours, compared with the control group, animals in the **phage-treated** group gave powerful evidence of a ***reduction*** in the disease-causing bacteria as can be seen on the following page:

- About a **10-fold decrease** of *E. coli* in the small intestine
- About a **100-fold decrease** of *E. coli* in the colon (large intestine)
- About a **100-fold decrease** of *E. coli* in fecal matter

At the same time, the **phage-treated** animals showed remarkable *increases* in the beneficial (*B. longum*) bacteria as follows:

- About **100-fold increase** of *B. longum* in the small intestine
- About **100-fold increase** of *B. longum* in the colon
- About **40-fold increase** of *B. longum* in fecal matter

This study also revealed marked differences in the appearance of tissue samples and digestive function across the different groups of mice.

Mice treated with *E. coli* and *B. longum* alone were constipated, and intestinal segments showed swelling, redness, and leaks compared with healthy animals. The mice given ***B. longum*** and ***E. coli*** plus the **phage** mixture had normal bowel movements, while their intestinal tissues showed no detrimental changes.

Safety of Phage Therapy

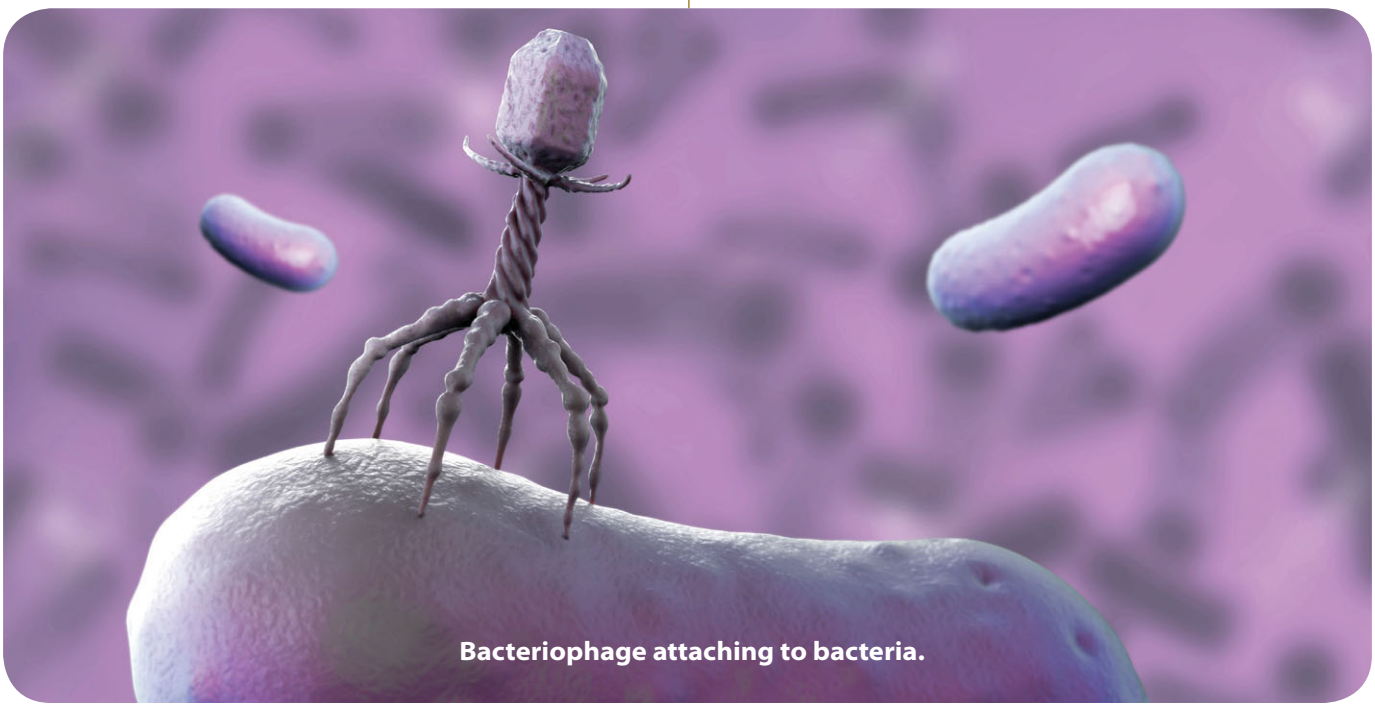
In 1981, Russian researchers reported the successful use of phage therapy to treat antibiotic-associated dysbiosis—displacement of normal intestinal bacteria with pathogenic bacteria—in 500 low-birth-weight infants.

The subjects had all been given antibiotics for at least two to three weeks to treat sepsis and pneumonia, killing off their gut bacteria. They were then administered both a specific bacteriophage and a probiotic (*Bifidobacteria*) strain. The infants experienced both depletion of their pathogenic bacteria and replenishment of healthy, intestinal bacteria.[42]

Phage therapy has been used for a wide variety of infections involving numerous pathogens. Therapies have included infections of the gastrointestinal tract, skin, head and neck, bone, chest, and abdomen—and have involved an array of pathogens such as *Staphylococcus*, *Streptococcus*, *E. coli*, *Salmonella*, and *Pseudomonas*. Success rates range up to **80%-95%** for phage therapy with either no, or only mild reversible, side effects.[5,42,43]

Bacteriophages were successfully used in numerous human clinical and therapeutic settings and demonstrated an extremely strong safety profile.[43-46]

The reason for the very safe interaction between phages and human tissue likely results from human exposure to vast numbers of phages over the entire course of evolution. This naturally high human tolerance to phages contrasts sharply with the risks inherent in compounds that are relatively novel in human evolution—such as drugs.[5]



Bacteriophage attaching to bacteria.

How "Phages" Differ from Antibiotics

Antibiotics are considered one of the 20th century's greatest scientific achievements.

But decades of widespread antibiotic use has created "***superbugs***" that are not easily killed by current pharmaceuticals. Many believe we have reached the end of the "**antibiotic era**."

In severe cases, physicians desperately search for alternatives to save their patients' lives.

This has prompted excitement about an innovative approach developed more than **100 years ago**, but overlooked with the advent of **antibiotics**.

In fact, long before **antibiotics** were discovered, Eastern European doctors were successfully neutralizing bacterial infections with **phage therapy**, a treatment aimed at **selectively** targeting and destroying harmful bacteria.

With the rise in **antibiotic-resistant** bacteria, **phage therapy** is experiencing a revival among the scientific community because of its effectiveness and safety profile. The potential for phage therapy is so great that just last year the **National Institutes of Health** sponsored a symposium titled:

"Bacteriophage Therapy: An Alternative Strategy to Combat Drug Resistance"

Phage cocktails have been shown to effectively treat common bacterial invaders, including ***staph, strep,*** and ***E. coli.***[1-3]

Phage therapy also beneficially encourages growth of healthy bacteria in the gut **microbiome**, which can also reduce harmful bacteria.

With so much scientific investigation into the multiple health benefits of a balanced microbiome, **phage therapy** is rapidly emerging as a new venue to enhance the benefits of **probiotics**.

Summary

In addition to being associated with major age-related disorders, an unbalanced intestinal **microbiome** (dysbiosis) can also be responsible for general "blah" feelings as well as vague but troubling intestinal symptoms that plague aging individuals.

A novel approach to bringing the gut **microbiome** back into a healthy balance uses safe **bacteriophages** to selectively reduce harmful bacteria while encouraging beneficial **probiotic** organisms to flourish.

Called **phage therapy**, this technique is harmless to humans, but deadly for specific, troublesome bacteria.

Studies show that when **probiotic** organisms are accompanied by targeted **phage** therapy, the beneficial bacteria grow up to **thousands of times** their baseline rate, thanks to the removal of the more aggressive microbes.

Phage therapy shows real promise in relieving the functional changes and tissue damage wrought by ***dysbiosis*** and could be especially valuable for aging individuals experiencing intestinal discomfort, sleep disturbances, or general malaise. ●

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

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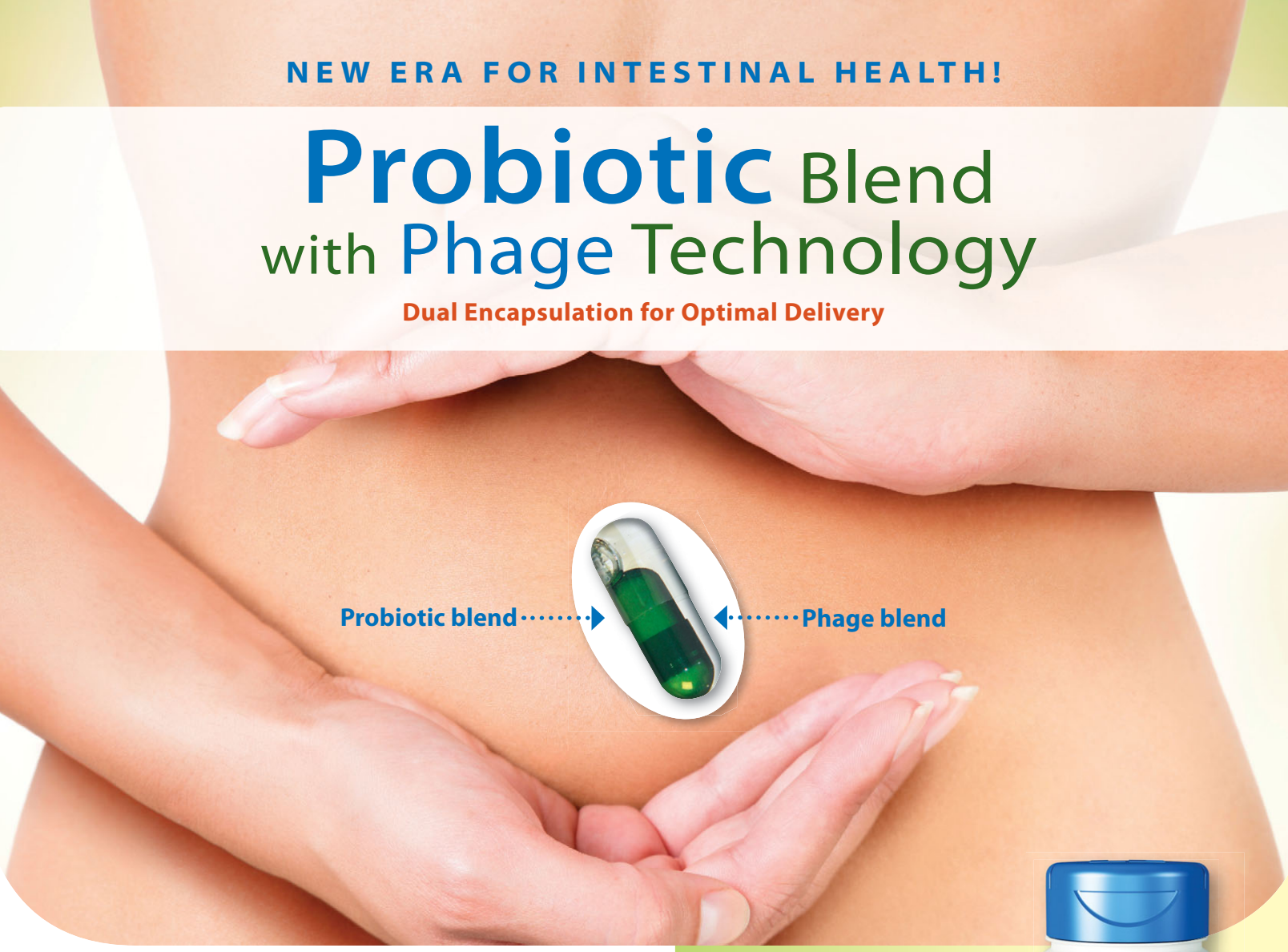

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BY MICHAEL DOWNEY

Natural Approach to Guard Against DEEP VEIN Thrombosis

Long periods spent sitting—behind a desk, in a car, on a long flight, or on a couch—increase the risk of **deep vein thrombosis (DVT)**, a blood clot that forms mainly in a deep vein in the leg, which can lead to a *pulmonary embolism*, a condition that is often fatal.[1,2]

Practically anyone can be at risk, and the statistics are frightening. According to the American College of Cardiology, those who **sit** more than **four hours** a day have a **48%** increased risk of mortality from blood clots that originate in the veins.[3]

Through a series of well-designed studies, scientists investigating certain natural extracts found that they can block these **blood clots** from forming and can help break down small clots before they grow.[4-7] They also found that these extracts safely restore the natural anti-clotting and clot-reversal processes, making a dangerous clot less likely to form and quicker to resolve if it does.[7-10]

When tested on **humans** in a placebo-controlled study, those taking a dual **plant extract** experienced **zero** cases of deep vein thrombosis compared to **5.4%** afflicted in the control group.[6]

Veins have valves, which work with the natural pumping action of the leg muscles to prevent backflow of blood into the lower limbs. With age those valves tend to leak. In people who don't move around much, blood tends to pool in their legs.

According to the Centers for Disease Control and Prevention (CDC), as many as **900,000** Americans could be affected by **venous thromboembolisms** (blood clots) every year.[11] Compare that to epidemics like all forms of **cancer**, which kill about **570,000** Americans annually.

As sedentary lifestyles become common, the threat of **deep vein thrombosis** continues to grow and claim an ever larger number of lives.

Research conducted by the American College of Cardiology found that individuals that spent four hours or more a day sitting compared to those who spent less than 2 hours had an approximate **125%** increase in risk of **cardiovascular** events. This association was independent of traditional risk factors like smoking, hypertension, physical activity, and body mass index.[3] Some even consider sitting to be the new smoking![12]

How Deadly Venous Thromboembolism Occurs

A deep **vein thrombosis** can occur quickly, often at first with no warning symptoms. But when this clot breaks apart, symptoms occur with a deadly vengeance. Large pieces of the clot travel silently through the circulatory system and eventually block blood flow into the **lungs**. This sudden event produces a **pulmonary embolism**, a blockage that can severely reduce, and even entirely stop, critical blood flow to the lungs—an event that is commonly fatal *within minutes*.

About **30%** of those with a venous thromboembolism will die within one month, and about **25%** of those fatalities will occur as sudden death. And about **33%** of survivors have a recurrence within 10 years.[11] Venous thromboembolisms are estimated to kill up to **100,000** Americans annually.[11]

Lifestyle changes can reduce the risk, such as quitting smoking, regularly exercising, and eating a healthy diet, but these are often insufficient to prevent a deadly catastrophe. Anticlotting drugs involve a risk of undesired bleeding, [13,14] and compression stockings have shown limited effectiveness.[15,16] The reason that these approaches provide limited protection is that with physical pooling of blood, natural clot-breakdown systems slowly lose pace with the body's clot-forming systems.[17,18]

Clearly, a new defensive strategy is needed.

Possible Symptoms of Deep Vein Thrombosis

Deep vein thrombosis often occurs without warning symptoms. But if you do notice any of the following indications, call your doctor, especially if they appear suddenly:[27]

- Swelling in one or both legs
- Tenderness or pain in one or both legs, even if it's only when standing or walking
- Warm skin on your leg
- Red or discolored skin on your leg
- Veins you can suddenly see
- Tired legs

A natural, dual plant extract formula has been studied based on its ability to simultaneously inhibit venous clot formation *and* promote venous wall elasticity.

Combating Deep Vein Thrombosis

After searching for natural, deep vein thrombosis-inhibiting interventions, scientists identified two ingredients that demonstrated powerful preventive effects:

1. **Nattokinase**, an enzyme extracted from soybeans fermented with the bacterium *Bacillus natto*, and
2. **French maritime pine bark**, a natural extract rich in polyphenols.

Nattokinase was shown in studies to break down ***fibrin***—long, strand-like molecules that make up the main protein found in clots—and its precursor, ***fibrinogen***, both of which are involved in **red blood cell-induced** clot formation.[8,19,20] Nattokinase decreased levels of other factors in the blood-clotting cascade, while raising levels of factors that prevent clotting. Specifically, nattokinase reduces the activity of two proteins (factor VIII and factor VII) that can produce unwanted clotting when elevated. No adverse effects or undesirable bleeding were reported.[4]

French maritime pine bark extract was demonstrated to reduce **platelet aggregation**, while increasing the activity of a blood flow-boosting *enzyme* that generates ***nitric oxide*** in blood vessels. Nitric oxide plays a critical role in regulating vascular function, which reduces thrombotic risks.

Nattokinase and **pine bark extract** were shown to work together to prevent clots as well as to improve the microcirculation of the legs.[9,21]

French maritime pine bark extract was also found to inhibit the action of "protein-melting" *matrix metalloproteinase* enzymes. These enzymes would otherwise degrade elastic proteins in the blood vessel walls, making them stiff and reducing blood flow.[10,22]

Given these observations, scientists recognized that these two extracts could result in significant prevention of deep vein thrombosis by:[4,7-10,19-22]

1. Inhibiting unwanted clot formation within veins,
2. Improving microcirculation in the veins of the legs, and
3. Promoting elasticity of vessel walls.
4. Inducing breakdown of fibrin clots.

Now let's look at a more detailed evaluation of these ingredients.

Nattokinase Breaks Down Blood Clots

Before designing human trials, scientists conducted animal studies that clearly demonstrated the beneficial effects of nattokinase.

Studies in dogs showed that nattokinase produces a mild—but steady—increase in the rate of fibrin degradation in the blood. This effect works to prevent clots and to reduce the size and toughness of any existing ones.[8]

When **nattokinase** was given to dogs with experimentally-induced blood clots, researchers were literally able to watch the clots break down in real time using a type of X-ray technology called angiography.[8]

What You Need to Know

Preventing Deep Vein Thrombosis

- **Spending long periods sitting can lead to deep vein thrombosis, which can suddenly, and without warning, trigger a pulmonary embolism.**
- **The medical establishment provides no safe or practical solutions to prevent this deadly risk.**
- **A formula has been developed from two natural extracts to help prevent deep vein thrombosis by inhibiting unhealthy clotting, promoting microcirculation, and enhancing vessel-wall elasticity.**
- **A placebo-controlled study on humans has shown that this dual-extract blend safely prevented deep vein thrombosis in all test volunteers, while also decreasing leg swelling.**
- **Venous thromboembolisms are defined as a deep vein thrombosis, a pulmonary embolism, or both.[26]**

Then, in spontaneously hypertensive rats—a standard model for studies of high blood pressure in humans—**nattokinase** was demonstrated to break down fibrinogen (the precursor to fibrin) in the blood. And by a related mechanism, nattokinase reduced blood pressure, potentially by preventing conversion of the hormone angiotensin into its active, blood pressure-boosting form.[23]

A human study evaluating the effects of nattokinase found that it improves markers of coagulation. For this study, researchers recruited volunteers comprised of healthy individuals, cardiovascular disease patients, and dialysis patients. On a daily basis for two months, subjects took two capsules of **nattokinase**, each containing **2,000 fibrinolytic units**.[4]

The researchers found that all three groups demonstrated significant decreases in procoagulation factors VII and VIII, and fibrinogen compared to baseline, suggesting that nattokinase works equally well in individuals with normal and impaired endothelial and coagulation function.[4]

No adverse effects were seen in this study,[4] and safety tests completed on nattokinase confirmed its low-risk status.[20]

Preventing Venous Thromboses with French Maritime Pine Bark Extract

Scientists also conducted human studies on French maritime pine bark extract's effects on the risks of venous thrombosis.

First, they enlisted 198 people at risk for deep or superficial venous thromboses during flights ranging from seven to 12 hours, with an average flight time of 8.25 hours.[5] Test subjects were randomly assigned to either the control or test group. The test group took two capsules, each containing **100 mg** of French maritime pine bark extract, two to three hours preflight, two more capsules six hours into the flight, and one capsule the day after. The controls took placebos at the same intervals. All subjects underwent ultrasound scans of their leg veins within 90 minutes before and after their flights to detect clots.

The French maritime pine bark extract-treated group showed **no** blood clots for an event rate of **0.0%**. But the placebo group showed **four** superficial venous thromboses and one deep venous thrombosis, equivalent to an event rate of **5.15%.** No adverse events were observed.[5] This study presented evidence to support that French maritime pine bark extract can prevent dangerous blood clots during prolonged sitting.[5]

Guarding against Lower Leg Fluid Accumulation

The same scientific team conducted a similar study to evaluate ankle swelling during long-haul air flights.[24] Aside from being uncomfortable, **ankle swelling** is an excellent indicator of poor blood return up the veins of the legs, making it a great way to assess the risk of deep vein thrombosis.

The team enlisted 169 volunteers at risk of deep vein thrombosis due to remaining seated during a long flight. The same dose of **200 mg** of French maritime pine bark extract was given at the same intervals as in the earlier study. Using standard measurements, edema (swelling) was measured before and after flights, as well as the rate of swelling.

Compared to preflight levels, the edema score in **placebo** subjects was increased by **58.3%**. The edema score in the French maritime pine bark extract-supplemented volunteers increased only **17.9%**. This dramatic decrease in edema score represented a significantly reduced thrombotic risk.[24] Similarly, the ankle swelling rate was increased during the flight by a mean of **91%** in controls, while the French maritime pine bark extract recipients showed only a **36%** increased ankle swelling rate, a much safer rate.[24]

These studies showed the capacity of French maritime pine bark extract to reduce the risk of deep vein thrombosis without any of the side effects of anti-clotting drugs. However, the question remained as to whether this extract was superior to compression stockings, which are known to be safe but not necessarily effective in reducing post-thrombotic syndrome. Post-thrombotic syndrome is a common complication of an otherwise localized deep vein thrombosis, in which blood pools in the affected leg because it cannot return to the heart—causing skin swelling, thinning, and discoloration and sometimes, painful, infection-prone leg ulcers.

To settle this issue, scientists conducted a study comparing French maritime pine bark extract to compression stockings in their ability to prevent post-thrombotic syndrome.[25] In this study, 156 patients who had experienced a single, major episode of deep vein thrombosis were divided into three groups. For 12 months, one group used the compression stockings, the second group took **50 mg** of French maritime pine bark extract three times daily, and the third group used both the stockings and the same daily French maritime pine bark extract regimen.[28] The researchers measured edema score, ankle circumference, and volume of the previously deep-vein thrombosis-afflicted leg compared with the other leg.

Risk Factors for Deep Vein Thrombosis

Deep vein thrombosis (DVT) and the deadly pulmonary embolism it can trigger (venous thromboembolism) is often the result of spending long periods sitting or standing. But other factors can put some individuals at an especially high risk. These risk factors include:[27]

- use of oral contraceptives,
- advanced age,
- smoking,
- pregnancy,
- severe obesity,
- limited mobility,
- recent surgery or trauma,
- sitting on long-haul flights, and
- cancer.

These confirmatory findings indicate that this novel dual-extract formula helps prevent deep vein thrombosis.

Their findings soundly confirmed the superior effectiveness of French maritime pine bark extract:[25]

1. In the **compression stocking-only** group, two new deep vein thrombosis cases occurred in the first six months, compared with no new deep vein thrombosis cases in either of the **pine bark** extract groups.
2. After the first six months, French maritime pine bark extract alone proved significantly more effective than compression stockings alone for relieving symptoms of edema (while the combination of both was better still).
3. Leg volume and ankle circumference measurements showed French maritime pine bark extract-plus-stockings to be superior to stockings alone.
4. In the microcirculation (blood flow in the tiniest vessels), French maritime pine bark extract—but not compression stockings—enhanced blood flow, raised oxygen levels in circulating blood, and decreased carbon dioxide levels, demonstrating improved function.

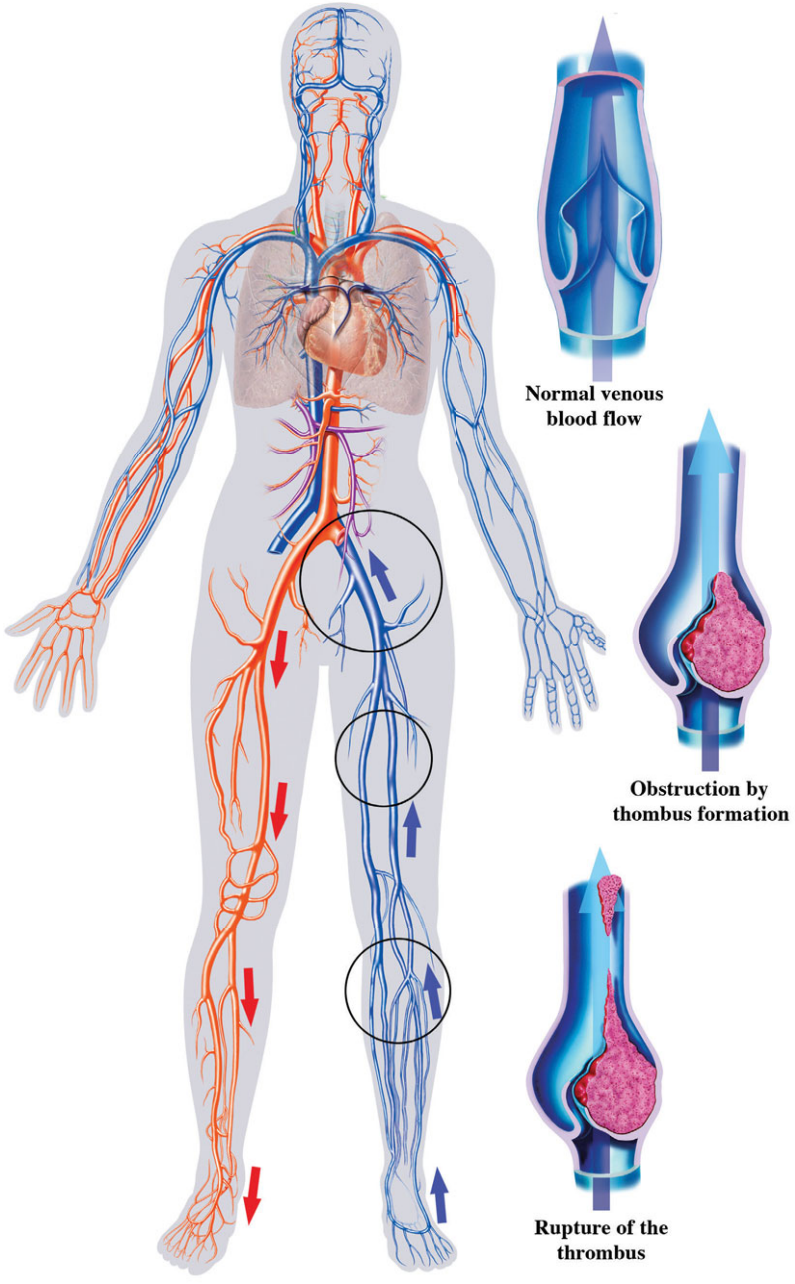
Human Clinical Trial Combining Nattokinase and French Maritime Pine Bark Extract

Scientists set out to test a formulation combining **nattokinase** and **French maritime pine bark** extract in a randomized, placebo-controlled human trial.[6] All 204 passengers on a New York-to-London flight were instructed in deep vein thrombosis-prevention techniques: isometric exercises, standing and moving for

five to ten minutes, and keeping hydrated. Passengers were randomly assigned to receive either capsules of placebo or capsules of the proprietary blend of nattokinase and French maritime pine bark extract. All subjects took the **blend** two hours predeparture and again six hours later. Ultrasound scans were done before and after the flight to detect clots.

Passengers taking the supplement had **zero** deep vein thrombosis cases. However, five of the control passengers developed a deep vein thrombosis, and two others developed superficial clots, for a total of **seven** events—a **5.4%** DVT rate among controls, compared to a **0.0%** rate among the test subjects.[6] The scientists also measured leg swelling, which was equal between the two groups preflight. Edema increased by **12%** in the controls. But edema *decreased* by **15%** in the supplemented passengers.[6]

These findings confirm that this novel dual-extract formula helps prevent deep vein thrombosis in individuals who spend long periods sitting and reduces the risk of sudden death from a resultant pulmonary embolism. No adverse side effects were reported.



Thromboembolism

This diagram illustrates normal venous blood flow, venous obstruction by a thrombus formation, and the rupture of the thrombus. A blood clot such as this forming in the leg of an individual with deep vein thrombosis (DVT) can break off without warning and lodge in the lungs or other organs, often resulting in death.

Summary

Deep vein thrombosis is a serious risk for anyone who spends long periods sitting and can lead to a deadly pulmonary embolism.

The two novel ingredients described in this article were shown to protect against venous thrombosis.

These extracts inhibit unwanted venous clot formation, improve leg microcirculation, and promote vessel-wall elasticity.

In a placebo-controlled human trial, these two nutrients prevented deep vein thrombosis in all volunteers who supplemented with it and *decreased* leg swelling.

While the medical establishment provides no safe or practical solutions, these two agents are available to augment the effects of taking frequent breaks from any kind of prolonged sitting. ●

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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Too Much TV Can Lead to Pulmonary Embolism

Our parents always used to say that watching too much TV wasn't good for us. It turns out they may have been more right than they realized. A recent study published in the journal *Circulation* found that a sedentary, couch-potato lifestyle can lead to fatal blood clots.[28]

Starting in 1988, researchers from Japan's Osaka University recruited more than 86,000 subjects and had them keep track of how much television they watched over a two-year period. After 19 years, researchers found that 59 study participants had died of a pulmonary embolism—a blood clot in their lungs. Lack of activity causes a person's blood flow to slow down, which can lead to a blood clot, usually in the pelvis or leg. The blood clot can then travel to the lungs and become wedged in a small blood vessel in the lungs with fatal results.

The researchers calculated that the study subjects had a **40%** increased risk of incurring a pulmonary embolism for every two hours of TV they watched each day beyond a threshold of **2.5** hours. The risk for participants who watched five hours or more was **2.5 times** greater than the risk for those who watched under **2.5** hours.

To avoid an embolism, study co-author Dr. Hiroyasu Iso recommends that, while watching TV, you get up "after an hour or so" and "stand up, stretch, walk around. Or while you're watching TV, tense and relax your leg muscles for five minutes."

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Super Omega-3 EPA/DHA with Sesame Lignans & Olive Extract • 120 softgels, Item #01982 A highly refined **fish oil blend** derived from pristine waters is formulated to remain exceptionally fresh. This purified **EPA/DHA** from Alaskan Pollock, plus **sesame** lignans and potent **olive** extract, provides essential components of the Mediterranean diet.	**$32**	**$18.90** (four-bottle purchase) **$15.35** (ten-bottle purchase)
Once-Daily Health Booster • 60 softgels, Item #01991 Just one softgel contains a variety of valuable nutrients, including two forms of vitamin K2, blueberry extract, gamma tocopherol, sesame lignans, chlorophyllin, lycopene, and a carotenoid blend that contains *trans*-zeaxanthin, *meso*-zeaxanthin, and lutein. Taken individually these ingredients would cost **2** to **3 times** more!	**$54**	**$34.20** (four-bottle purchase)
Ultra Natural Prostate • 60 softgels, Item #01928 Comprehensive support for an aging prostate gland utilizing pygeum, nettle root, beta-sitosterol, flower pollen, boron, saw palmetto, and lycopene.	**$38**	**$21.60** (ten-bottle purchase)
MacuGuard® Ocular Support • 60 softgels, Item #01992 Offers triple eye protection with *meso*-zeaxanthin, lutein, and *trans*-zeaxanthin. This product is not needed by those already taking **Health Booster**, which contains these same ingredients.	**$25**	**$15.75** (four-bottle purchase)

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Mitochondrial Energy Optimizer with BioPQQ® • 120 capsules, Item #01868 This ***glycation-protection*** formula helps maintain cellular function, protein structural integrity, and mitochondrial biogenesis. It contains high potency **carnosine** along with **R-lipoic acid**, **PQQ**, **benfotiamine**, **luteolin**, and **taurine**. These ingredients cost far more if taken separately.	$72	$43.20 (four-bottle purchase)
Mega Green Tea Extract • 725 mg, 100 lightly caffeinated vegetarian capsules, Item #00953 A highly concentrated **98%** polyphenol extract delivering **45%** of the health-promoting catechin EGCG.	$30	$16.20 (four-bottle purchase)
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Super K with Advanced K2 Complex • 90 softgels, Item #01834 Provides two forms of **vitamin K2** (**1,000 mcg** of immediate-release **MK-4** and **200 mcg** of long acting **MK-7**), along with **1,500 mcg** of **K1**.	$30	$18.23 (four-bottle purchase)
Triple Action Thyroid • 60 vegetarian capsules, Item #02003 A combination of ashwagandha, guggul, and Korean ginseng extract work in synergy to support healthy thyroid function.	$36	$21.60 (four-bottle purchase)
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BY RITA HAVEN

How Vegetable Extracts **Protect** Against Cancer

Apigenin is a polyphenol found in vegetables such as **parsley** and **celery**. It is receiving increased attention as a low-cost nutrient to protect against common cancers.

What makes **apigenin** so fascinating is how it functions to starve cancer cells, promote cancer cell destruction, and protect cellular DNA against environmental toxins (that can result in future malignancies).

Compounds such as **indole-3-carbinol (I3C)** are found in **cruciferous vegetables**. These cruciferous compounds have been shown to work in complementary ways with **apigenin** (non-cruciferous) to combat cancer and other age-related diseases.

According to a study published in the *International Journal of Oncology:*

"Cancer prevention through diet may be largely achievable by increased consumption of fruits and vegetables. Considerable attention has been devoted to identifying plant-derived dietary agents which could be developed as promising chemopreventives. One such agent is ***apigenin***."[1]

Apigenin Protects Cells from Cancer

Apigenin fights *oxidative stress* and *inflammation*—two factors that play a role in cancer development.[2-9] Oxidative stress and inflammation generate DNA damage that can lead to uncontrolled proliferation of nonfunctioning cells, i.e., cancer.[10,11] But that's just one aspect of how apigenin functions.

Unique mechanisms of apigenin have led researchers to intensely evaluate it.[12] What they've discovered is that ***apigenin*** has a host of other anticancer properties:

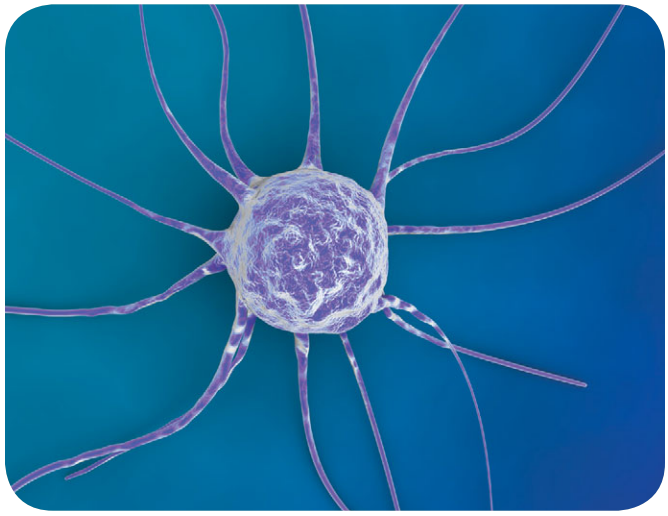
1. Apigenin Stops Cancer Cells from Replicating

Apigenin attacks cancer at a variety of stages and in different ways. At every step, apigenin seems to aggressively stop cancer's various pathways. Apigenin has the ability to stop cancer cells from replicating, to reduce their invasiveness, and to slow their growth. Scientists believe this is largely related to its ability to shut down **nuclear factor-kappa B** (NF-kB).[13,14] When activated, NF-kB leads to a flood of proinflammatory molecules that can promote tumor growth and the spread of cancer.[15,16]

In an animal study of nonmelanoma skin cancer, apigenin inhibited the production of inflammatory signaling molecules known to promote tumor proliferation.[17]

2. Apigenin Causes Cancer Cells to Die Off

In a cell study of chronic lymphocytic leukemia (a common malignancy in older adults), apigenin prevented the DNA mutations tied to cancer, while promoting the naturally-occurring cell death (***apoptosis***) that cancer cells otherwise evade.[18]



Apigenin may promote apoptosis by **reactivating** an important cancer-suppressor gene called **p53**.[19] *Inactivation* of p53 is a common feature of cancer cells, which results in the cell's loss of control over when to replicate and when to die naturally.[20] By restoring p53 activity, apigenin essentially allows cancer cells to die a natural death.[21]

3. Apigenin Cuts off Cancer Cells' Ability to Grow

In additional to causing cancer cells to die off naturally, studies have also shown that apigenin modulates a host of factors that can give cancer a promotional boost once it gets started.

Apigenin has repeatedly been shown to regulate the ***insulin-like growth factor*** signaling pathway known to promote the growth of prostate cancer cells when deregulated. Under the influence of apigenin, those cells quit their explosive growth and proceed to kill themselves off by apoptosis.[12]

4. Apigenin Starves Cancer Cells

Finally, apigenin appears capable of literally ***starving cancer cells into submission*** through several unrelated, but complementary, mechanisms.

First, apigenin suppresses the expression of a protein essential for transporting glucose into cancer cells.[22,23]

Apigenin further promotes this "energy crisis" by going after cancer cells' mitochondria, the tiny intracellular power plants that generate energy. When mitochondria from human liver cancer cells were treated with apigenin, their membranes became leaky to the extent that it destroyed affected cancer cells.[24]

Based on the mechanisms by which apigenin thwarts cancer at every turn, new human studies are needed to further explore this impressive cancer-destroying polyphenol. The **underlying mechanisms** discussed here have been found to be effective in animal models of **leukemia** and the following solid tumor malignancies:

- Prostate[14,25]
- Larynx (voice box)[22]
- Leukemia[18]
- Liver (hepatocellular carcinoma)[26]
- Pancreatic[9]
- Skin[17]
- Breast[27]

What You Need to Know

Apigenin Protects Brain Cells

Alzheimer's and Parkinson's are two common neurodegenerative diseases.[28-30] Together, they cause untold misery for patients, their families, and their other caregivers. Numerous studies show apigenin's ability to reduce some of the known contributors to neurodegeneration.

For example, apigenin fights ***excitotoxicity***, the neuronal damage that occurs over a lifetime of intense brain cell stimulation.[3,6] This is critical since excitotoxicity promotes brain cell death and dysfunction in both Alzheimer's and Parkinson's diseases.[31,32]

Apigenin also was shown to protect dopamine-producing cells of deep brain centers affected by Parkinson's disease. This important action reduces neuroinflammation and the activation of inflammatory cells in the brain.[33,34]

When applied to brain cells in culture, apigenin protected those cells from toxicity induced by **beta amyloid**, the toxic "junk" protein found in abundance in the Alzheimer's brain.[35]

Finally, given the importance of elevated blood sugar in the development of Alzheimer's (it has been called "Type III diabetes" by some researchers), it is interesting to note that apigenin attenuates the cognitive decline seen in adult diabetic rats.[4] Animals treated with apigenin have demonstrated improved learning and memory retention in a mouse model of Alzheimer's disease.[36]

Health Benefits of Vegetable Extracts

- **Vegetable extracts present in broccoli, celery, parsley, kale, Brussels sprouts, and many others—have long been revered for their health-promoting benefits.**
- **It is now recognized that four compounds, apigenin, I3C, DIM, and BITC, are responsible for the majority of that protection, and in very specific and complementary ways.**
- **All four have powerful cancer-protective effects, attacking and preventing malignancies through a multitude of overlapping mechanisms.**
- **Apigenin also has exceptional cardiovascular, metabolic, and neuroprotective properties, while I3C/DIM promote cardiovascular and liver health.**
- **Consumption of these plant compounds provides broad-spectrum protection against many of the most common symptoms of aging.**

Apigenin, I3C, DIM, and BITC are compounds found in vegetables that offer wide-ranging protection against the factors that damage our DNA.

Apigenin Promotes Cardiometabolic Health

Oxidative stress and inflammation are deadly to heart and blood vessel cells. Inflammation/oxidation can also induce the kind of damage in liver and fat tissues that can promote weight gain, diabetes, and other metabolic changes that raise cardiovascular disease risk. Apigenin can contribute substantially to protecting against all of these effects.

At the most fundamental level, apigenin has been shown to prevent new cholesterol molecules from being synthesized in liver cells, which can reduce the amount of cholesterol in circulation.[37] In a similar fashion, animal studies show that apigenin lowers blood sugar levels by decreasing insulin resistance, decreasing elevated insulin levels, and decreasing the formation of new glucose in the liver.[38,39]

Studies in diabetic rats reveal that apigenin can improve the function of the endothelial cells that line arteries and directly control blood flow and pressure.[39]

Preclinical studies show that apigenin helps protect the heart muscle against ischemia/reperfusion injury, the serious damage that occurs in the minutes to hours following a heart attack or stroke, when oxygen-starved (ischemic) tissue is suddenly flooded with oxygen-rich blood as circulation is restored (reperfusion).[40-42]

I3C: Complementary Tissue Protection from Cruciferous Vegetables

I3C (indole-3-carbinol) is a major component found in cruciferous vegetables. While I3C has many overlapping activities with apigenin, it also adds a substantial number of unique functions.[43] Many of these benefits are also produced by *3,3'-diindolylmethane* (**DIM**), a condensation product of I3C molecules.[44,45]

Through these unique functions, I3C and DIM provide complementary protection against cancer, heart disease, and more. Let's take a look.

I3C/DIM: Unique Protection against Cancer

The most promising of I3C's cancer-fighting properties has to do with its impact on enzymes that metabolize the sex hormones *estrogen* and *testosterone*.[46]

For example, I3C and DIM have been found to reduce a carcinogenic form of estrogen called ***16-alpha-hydroxyestrone*** while boosting beneficial ***2-hydroxyestrone.*** A large study of over 10,000 women showed that those with highest amounts of *2-hydroxyestrone* compared to 1*6-alpha-hydroxyestrone* had a remarkable **42%** lower risk of breast cancer.[47] Since hormone-dependent cancers such as breast and ovarian tumors thrive on unhealthy hormone balances, this is an important step in cancer prevention.[43,48-50]

There's also considerable evidence that I3C modifies the function and expression of estrogen receptors on cells. Studies show that I3C downregulates the expression of **estrogen receptor alpha**, which

is known to cause cancer-promoting cellular changes when it is overexpressed.[50-53] Turning down estrogen receptor alpha allows greater influence for the *protective* **estrogen receptor beta**, which further reduces estrogen-dependent cancer risk.[50]

I3C/DIM Promote Cardiometabolic Health

I3C and DIM have multiple antiobesity effects.

Obese mice treated with I3C showed decreased body weight, fat accumulation, fat-mediated release of inflammatory cytokines, and fat infiltration by inflammatory cells—all of which produce obesity-associated health risks.[54-57]

I3C and DIM also reduce blood sugar, insulin, and markers of sugar-induced protein damage in mice on high-fat diets. These are effects that contribute to reduced atherosclerosis and cardiovascular disease risks.[58,59]

I3C/DIM Provide Wide-Ranging Liver Protection

I3C and DIM also have impressive liver-protective properties. These are partly due to their ability to suppress oxidative stress, in part through their activation of AMPK, and in part through their anti-inflammatory properties.[60-62]

These mechanisms of action protect the liver against fat accumulation, inflammatory changes, malignancies, and even *fibrosis*, the scarring and toughening that precedes liver failure.[63]

In fact, animal studies show that I3C and DIM can prevent fatty liver disease caused both by alcohol and a high-fat diet.[60,61]

BITC Offers Complementary Cancer Protection

Benzyl isothiocyanate (**BITC**) is another compound found in cruciferous vegetables that provides cancer protection that complements those of other cruciferous compounds.

One of its most startling properties is its ability to inhibit **cancer stem cells**. Many malignancies recur or fail to respond to treatment because of just a few cancer stem cells that can "hide out" and emerge after treatment is complete.

Both lab and animal studies show that BITC inhibits breast cancer stem cells, while also suppressing cell signaling molecules that contribute to the "stemness" of such cells.[64-66] As a result, BITC has been found to be effective against numerous types of cancer.

For example, an animal study demonstrated that BITC reduced the number of prostate cancers in cancer-prone mice.[67] BITC also prevents the stimulation of breast cancer growth induced by high-fat diets, prevents invasion and new blood vessel formation in brain and head and neck cancers, and induces cell death by apoptosis in lung cancers.[68-71]

Summary

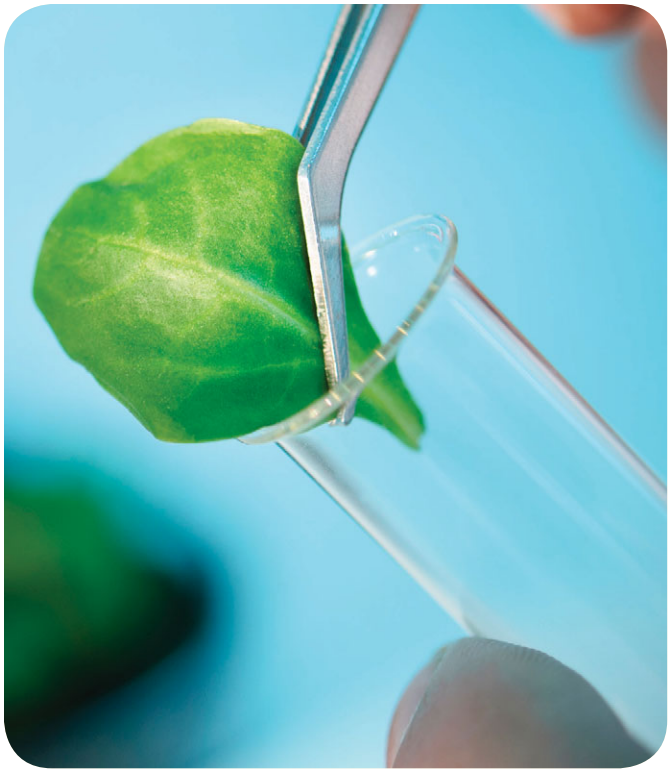
Apigenin, I3C, DIM, and BITC are compounds found in **vegetables** that offer wide-ranging protection against the factors that damage our DNA.

These compounds work in a complementary way to protect our bodies against cancer, cardiovascular and metabolic diseases, neurodegeneration, and even liver disease.

Together, these **botanical compounds** represent the virtues of consuming more healthy **vegetables** in ones' everyday diet.

For those who cannot consistently eat large amounts of celery, parsley and other vegetables, **apigenin** is available in low-cost multinutrient formulas that provide a wide variety of beneficial plant extracts. ●

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



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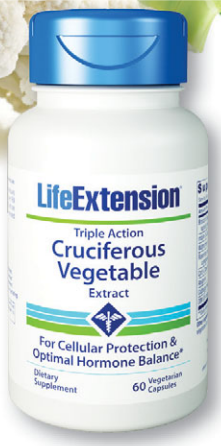

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BY SARAH LEWIS

Selenium's Impact on Cancer Reduction

Selenium is a trace mineral critical for human life.

While there are many different forms of selenium, not all of them provide the same health benefits. This article presents data on the unique benefits of **selenium-enriched yeast**.

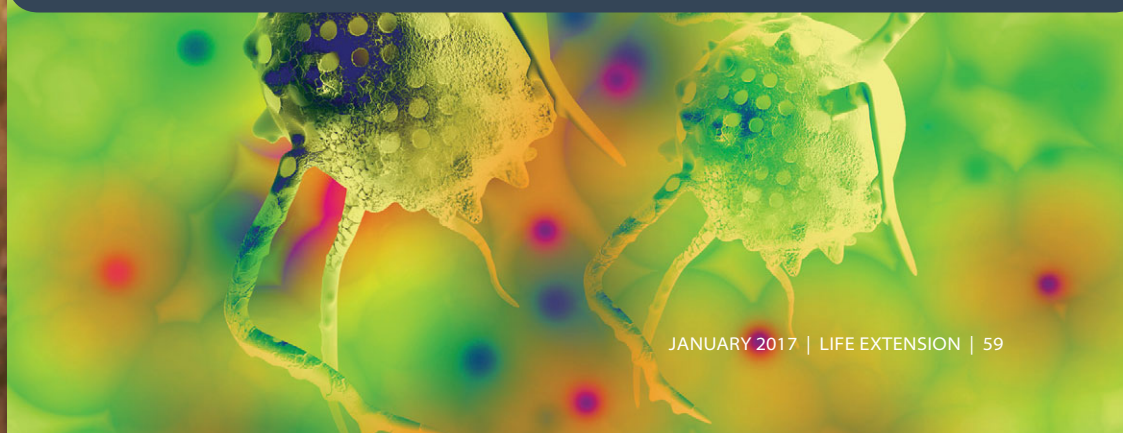
While selenium can be found in foods such as Brazil nuts, pinto beans, and beef, the amount of selenium that is obtained from our diet is highly uneven. This is because the amount of natural selenium in the soil fluctuates from region to region.

Many areas of the United States such as Texas, the Southwest, lower Southeast and Northwestern mountain states have selenium deficient soil. Therefore foods grown in these regions will not be rich in selenium.[1]

In the past year, two new studies reveal that selenium status is suboptimal in many people in the industrialized world, and that low selenium status raises the risk for colorectal cancers and cancers of the liver and gallbladder.[2,3]

Ample selenium has been shown to be a relevant factor in protecting against a uniquely male malignancy, prostate cancer.[4-9]

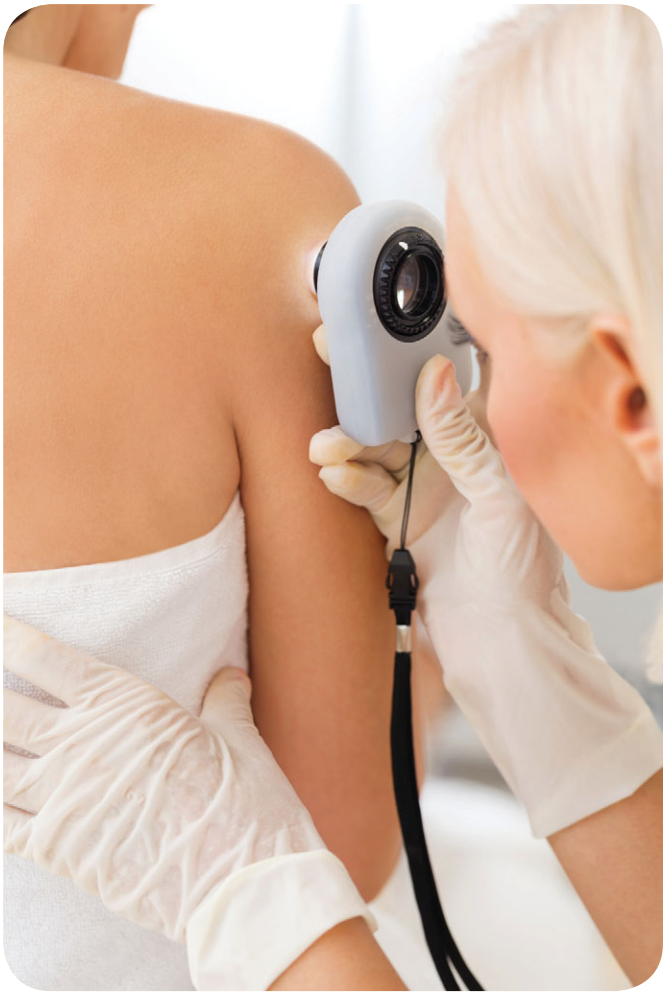
But men aren't the only ones at increased cancer risk when their selenium levels drop, and prostate cancer is far from the only cancer affected by poor selenium status.



Back in 1983, a group of researchers began a human study to examine the effects of **selenium-enriched yeast** on skin cancer.

The researchers found that subjects supplementing with this yeast-based selenium had an approximately **46%-63%** reduction in the risk of colorectal, lung, and prostate cancers, with a **50%** reduction in the risk of mortality for all cancers. The results were later published in the *Journal of the American Medical Association*[7] and made **headline news** stories around the world. This generated intense interest in the scientific community in the protective power of selenium.

Recent studies amplify the importance of maintaining satisfactory selenium levels and their impact on cancer risk reduction.



Selenium Lowers Cancer Risk

The association between inadequate selenium status and the risk for many different cancers naturally leads to the question, "***Can supplemental selenium reduce cancer risk?***"

The answer is that optimal selenium levels through supplementation provide a protective **function** against the risk of cancer.

Studies going back to the 1970s have generally supported supplemental selenium as a cancer risk-reducing intervention.

As mentioned near the beginning of this article, a randomized, controlled trial published in **1996** demonstrated that **200 mcg** of selenium daily from selenium-rich yeast was associated with a **50%** reduction in the risk of dying from cancer, a **37%** reduction in the risk of developing cancer, and reductions of **58%**, **63%**, and **46%** in the risks for developing colorectal, prostate, and lung cancers, respectively.[7]

Deeper analysis showed that, among men with baseline normal levels of prostate-specific antigen, or **PSA**, a marker of cancer risk, those in the treated group showed an overall **74%** reduction in their risks of prostate cancer.[8]

Colon cancer is a selenium-responsive malignancy, as shown in a placebo-controlled **2013** study that supplemented active subjects with **200 mcg** of selenium, along with zinc and vitamins A, C, and E over a 5-year period.[10]

These study subjects consisted of 411 people with ***polyps*** removed during screening colonoscopy, indicating their higher risk for colorectal cancers.

In the supplemented group, **38** had a recurrence of polyps, while **62** recurred in the placebo group.

This worked out to a **39%** reduction in the risk of recurrence in those who supplemented with selenium and vitamins, compared with un-supplemented placebo recipients.

A **2015** study shows that cervical cancer may also be preventable with selenium supplementation.[11]

In this study, 56 women diagnosed at biopsy with cervical intraepithelial neoplasia (precancerous lesions) were randomly assigned to receive **200 mcg** of selenium from yeast or a placebo, daily for 6 months.

The findings showed that **88%** of supplemented women had regression of their precancerous lesions, compared with only **56%** in the placebo group. This significant difference was accompanied by decreases in fasting blood sugar, insulin, and insulin resistance, all factors associated with increased cancer and metabolic risks.

Some insight into how selenium supplementation works to reduce cancer comes from a study of blood cells from hemodialysis patients, who are at known increased risk for DNA damage, the precursor of new cancers.[12]

Forty-two dialysis patients randomly received either **selenium-rich** yeast or a placebo of standard yeast for 3 months.

The dialysis patients had significantly lower selenium levels than did healthy controls, as expected, but these rose significantly with supplementation.

Markers of DNA damage in circulating white blood cells (a good indicator of damage throughout the body) were **three times higher** in dialysis patients than in controls at the outset. After 3 months of selenium supplementation, DNA damage markers fell in the dialysis patients, to levels **16%** lower than those in healthy controls.

No similar changes were seen in the placebo recipients.

What You Need to Know

Selenium

- **Selenium is a trace element and co-factor for more than 25 key enzymes that can't function without it.**
- **Most of those enzymes are involved in systems that protect cells and their DNA from oxidative stress that, unopposed, leads to cancer.**
- **Studies show that those with lower selenium blood levels are at substantially increased risk for cancers in a variety of organs.**
- **Selenium supplementation, on the other hand, has been shown effective at reducing cancer incidence and producing protective biochemical shifts that shield cells and DNA from damage.**
- **No single selenium form, however, provides all of the cancer-preventing benefits available from selenium.**
- **Instead, a thoughtful regimen that includes multiple forms of selenium is most likely to offer comprehensive cancer- prevention properties.**

Not All Selenium is the Same

There are several different forms of selenium and not all of them offer the same health benefits. For example, in a very large and well-publicized **2009** study, researchers from the Selenium and Vitamin E Cancer Prevention Trial (SELECT) reported that, after treating more than 35,000 men with one form of selenium (L-selenomethionine) alone (**200 mcg**), selenium plus vitamin E, or placebo, they found no significant differences in participants' risk for prostate cancer in any of the groups compared with placebo.[13]

Because this was such a large study, it garnered an outsized share of attention, and many scientists and other readers came away with the impression that selenium has no role in cancer prevention.

It should be noted that multiple scientific studies dating back to the 1970s show that different forms of selenium provide a spectrum of protection against cancer. **Life Extension®** long ago discussed the importance of including more than one form of selenium in one's daily supplement program.

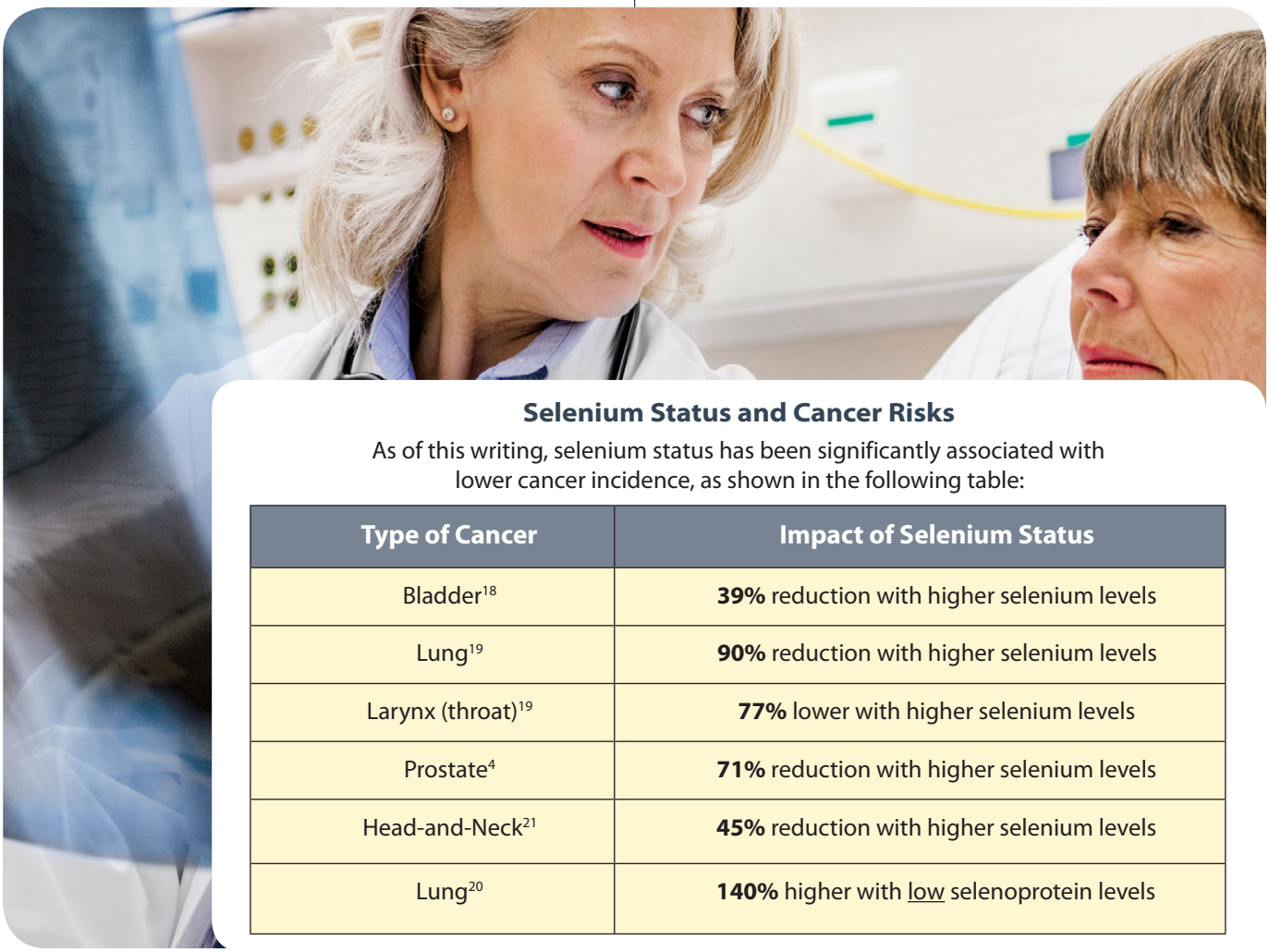
Selenium in a variety of forms has been shown to produce significant reductions in cancer risks.

One form of selenium that has received relatively little attention is **selenium-enriched yeast**, obtained from high-selenium brewer's yeast.

The study discussed near the beginning of this article, which involved 1,312 patients over a total of 8,271 person-years, found that daily supplementation with **selenium-enriched yeast** (200 mcg/day), had a **50%** reduced risk of dying from cancer, and a **37%** decreased risk of developing cancer, compared with placebo recipients.[7]

Further, with regard to specific cancers, the study found reductions of **46%**, **58%**, and **63%** in the risks of lung, colorectal, and prostate cancers, respectively.[7]

Selenium in its different forms has demonstrated cancer-preventive effects.



Selenium Status and Cancer Risks

As of this writing, selenium status has been significantly associated with lower cancer incidence, as shown in the following table:

Type of Cancer	Impact of Selenium Status
Bladder[18]	**39%** reduction with higher selenium levels
Lung[19]	**90%** reduction with higher selenium levels
Larynx (throat)[19]	**77%** lower with higher selenium levels
Prostate[4]	**71%** reduction with higher selenium levels
Head-and-Neck[21]	**45%** reduction with higher selenium levels
Lung[20]	**140%** higher with low selenoprotein levels

Different Forms of Selenium

The different forms of selenium have been shown to provide various protective properties against cancer, oxidative stress, DNA damage and even shielding against toxic metal poisoning. For this reason, it is recommended that it is best to ingest a **200 mcg** "cocktail" daily of various selenium forms to provide broad- spectrum coverage against the diseases of aging.[14,15]

Here are brief descriptions of well-studied forms, highlighting how each can contribute to selenium-based protection against cancer.

Sodium selenite is a simple chemical salt of sodium and selenium. This form of selenium has the ability to ramp up our natural immune system to find and destroy tumor cells.[16,17]

Selenium-methyl L-selenocysteine triggers cancer cell suicide (apoptosis) and also acts on more advanced cancer cells that have lost the fundamental "suicide gene."[14]

Selenium from yeast provides advanced protection against oxidative stress and resulting DNA damage, to reduce the risks that a cell will undergo transformation into a malignancy.[6]

Because optimum cancer prevention requires protection from DNA damage, enhanced self-destruction of malignant cells, and a boosted immune system, the benefits of using multiple forms of **selenium** are obvious.

Summary

Preventing cancer requires a multifactorial approach.

One mechanism involved in cancer development is oxidative stress and the DNA damage that it causes.

Selenium is a natural element capable of fighting oxidative stress and has been shown to be effective in preventing cancer and the biochemical changes that precede it.

But because one large study found no significant effects on prostate cancer risks using just one form of selenium (L-selenomethionine), many have turned away from this valuable mineral.

The fact is that selenium in its different forms has demonstrated strong cancer-preventive effects.

Recent studies amplify the importance of maintaining satisfactory selenium levels.

Don't be fooled by spurious science, often based on flawed studies. Selenium-enriched yeast supplements have demonstrated strong potential for reducing cancer risk. Other forms of selenium contribute to enhanced immunological destruction of early cancers, trigger cancer cell "suicide," and protect tissues from oxidative stress.

Overall, the evidence points to a daily **selenium** dose of **200 mcg** to reduce cancer risk, which should ideally utilize multiple forms to obtain comprehensive protection.

No single nutrient should be relied on to protect against cancer. This magazine consistently reminds readers of dietary and lifestyle factors that play huge roles in one's risk of developing malignant 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.

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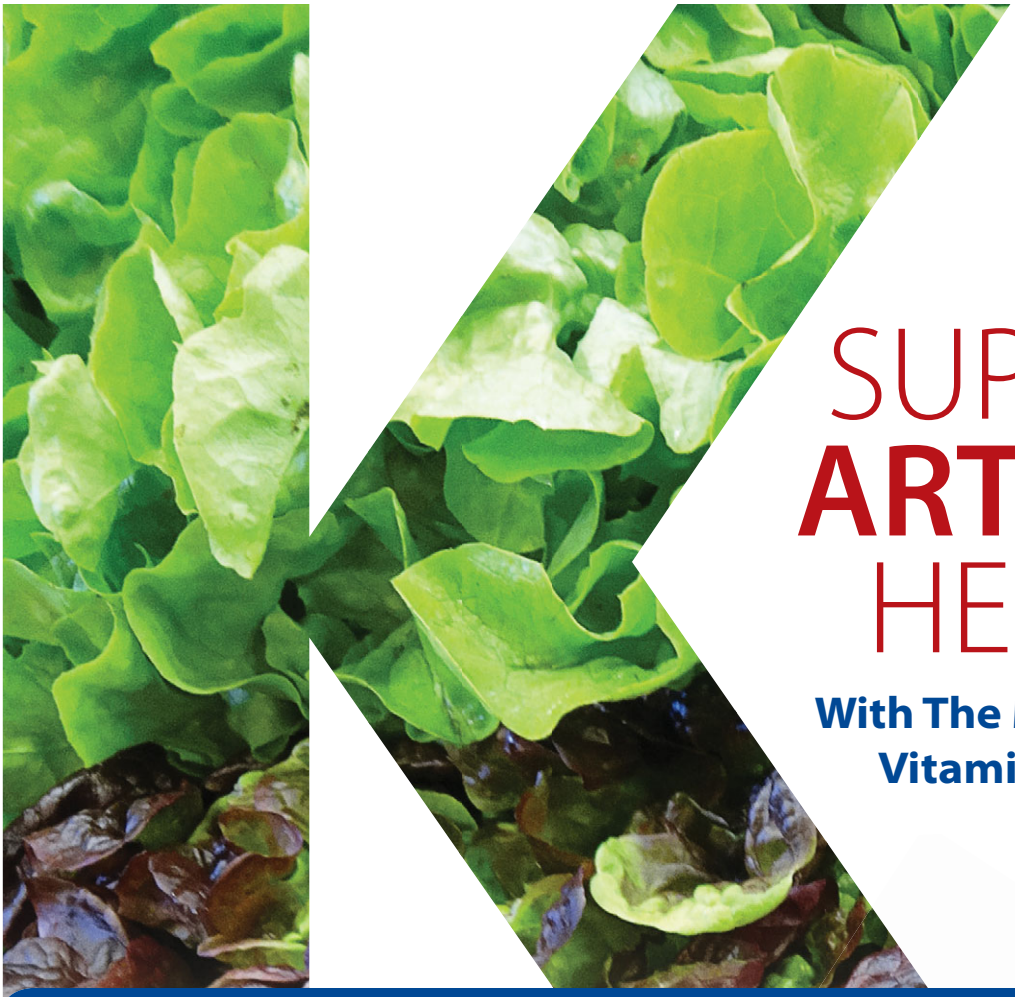

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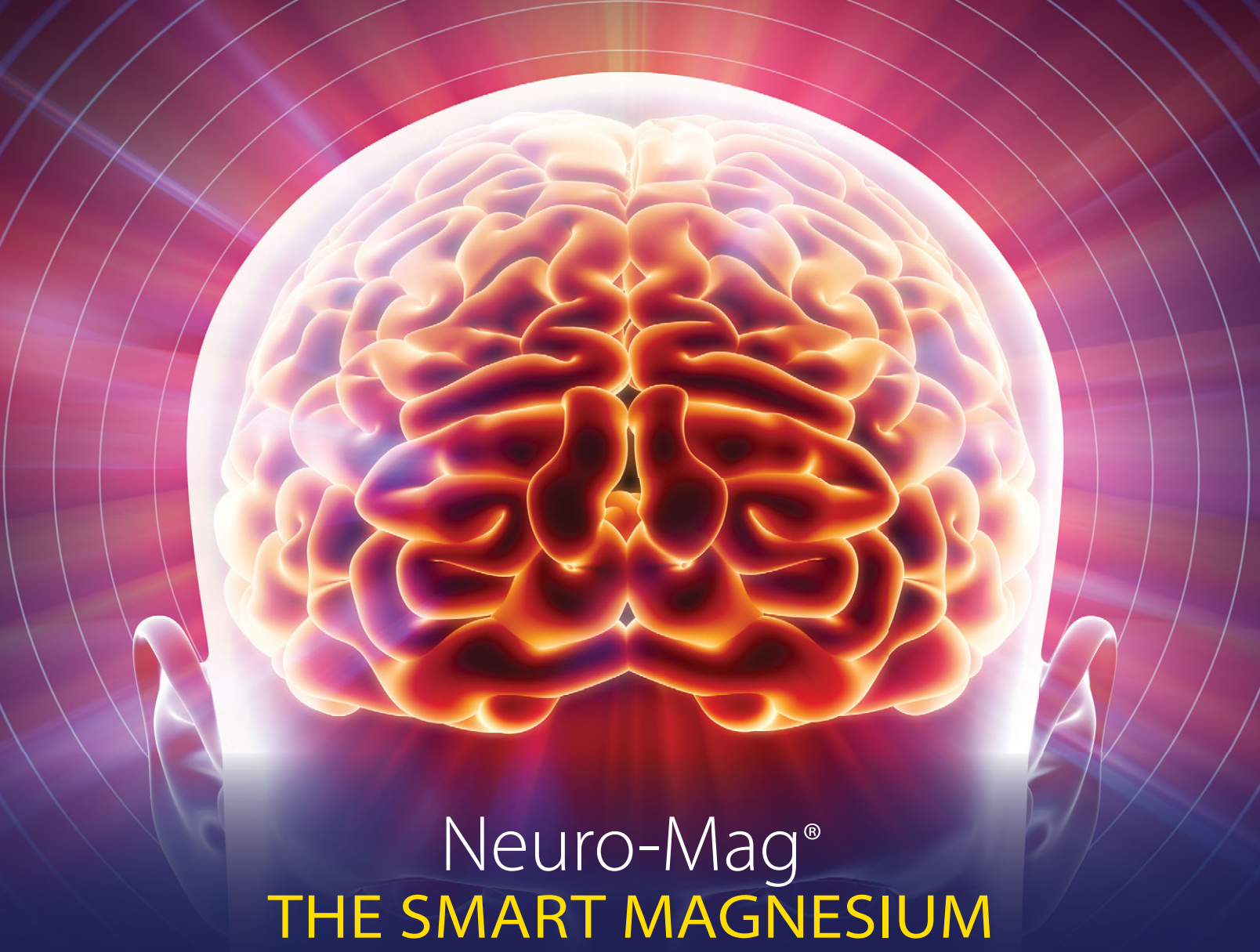

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BY MICHAEL DOWNEY

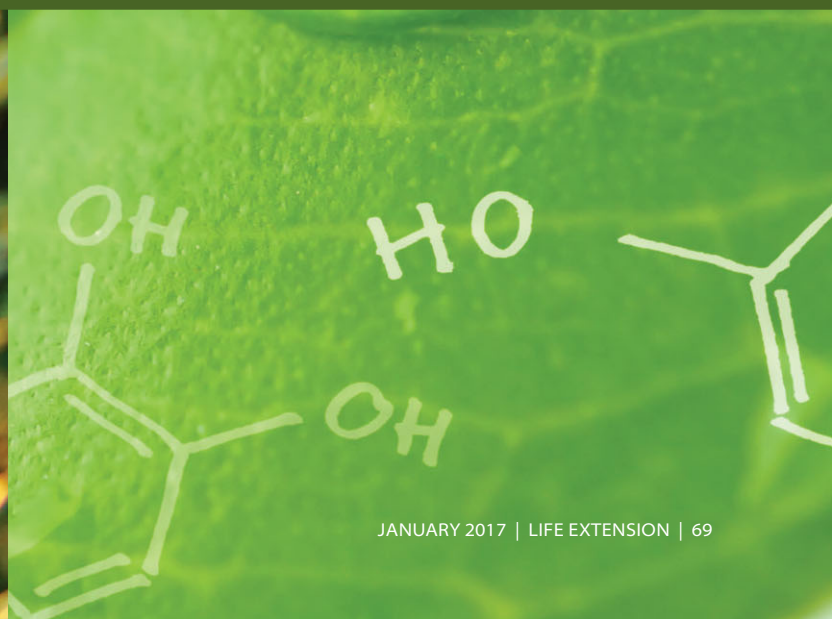
Quercetin
Protects Against Pesticides' Damaging Effects

While **pesticides** kill pests, they also pose danger to humans.

Unprotected human exposure has been linked to cancer, endocrine complications, respiratory disorders, and organ failure.[1]

More worrisome are studies showing pesticide exposure can increase risk of **neurodegenerative** diseases.[2-4]

A number of studies, some published in **2016**, indicate that the plant flavonoid **quercetin** can inhibit the damaging effects of pesticides.



Pesticides are found in our food, air and water. Harmful chemicals are so abundant in our environment that we often absorb them without eating food.

With advances in manufacturing, many pesticides are no longer sprayed on crops. Instead, *systemic pesticides* are mixed in with fertilizer and absorbed by plants through their vascular system. This makes it *impossible* for consumers to wash off pesticide residue because it's within the fruits and vegetables that you eat.

While everyone is vulnerable to the dangers of pesticides, those especially at risk include children, pregnant women, sick persons, and the elderly. Pesticide exposure can result in conditions ranging from learning disabilities to Parkinson's disease and cancer.[3-6] Because many different types of pesticides are used by farmers, exposure can overwhelm our efforts to stay healthy. Even everyday lawn chemicals pose risks and can remain in our body for decades.[7,8]

Quercetin, a flavonol occurring in certain fruits and vegetables,[9-11] shows promise in animal studies to protect against some of the dangers of pesticides.[12,13] Until farmers completely stop their use, we are always at risk. But initial studies in the laboratory show that quercetin can provide some measure of cellular protection.

Quercetin Protects Against Pesticides

In various studies conducted on rats, **quercetin** was shown to provide substantial protection against a number of pesticides.

A June **2016** study in the journal *Human & Experimental Toxicology* found that quercetin had protective effects against toxicity induced by a mixture of ***organophosphate*** pesticides, which were originally developed as biological warfare agents.

The United States Environmental Protection Agency has indicated that organophosphate pesticides are dangerous not only to humans but also to bees and wildlife.[14] The study showed that quercetin can protect against organophosphate pesticide toxicity through the following mechanisms:[13]

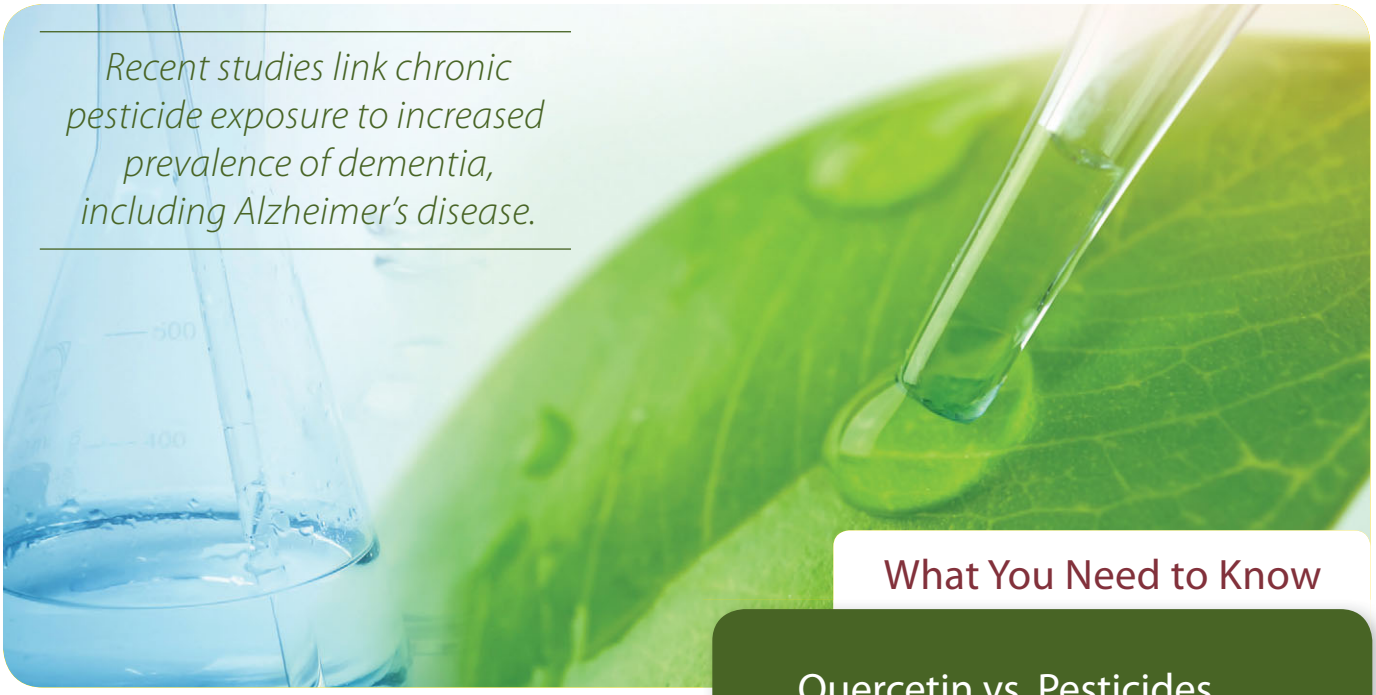
- Preserving energy, fatty acid, and sex hormone metabolism
- Inhibiting oxidative stress
- Protecting against DNA damage
- Preserving kidney and liver function

Also, although there is no specific treatment for poisoning by the pesticide ***paraquat,*** researchers are investigating quercetin's ability to minimize oxidative stress through its free-radical scavenging properties as a possible therapy.[15]

In a **2016** study, scientists demonstrated that quercetin protects cells against oxidative stress and cellular death caused by ***dichlorvos***, another organophosphate pesticide. In lab cells exposed to this pesticide, pretreatment with quercetin significantly reduced dichlorvos-induced cell death, inhibited ROS (reactive oxygen species) generation, reduced levels of malondialdehyde (a marker of oxidation), and modulated the activities of two primary antioxidants (catalase and superoxide dismutase).[16]

In the same year, another rat study produced very similar findings. Various parameters representing the negative health effects of a mixture of pesticides were ameliorated when quercetin was simultaneously administered.[17]

As the population ages, researchers have increasingly focused on the potentially devastating brain effects of pesticides.



Recent studies link chronic pesticide exposure to increased prevalence of dementia, including Alzheimer's disease.

Pesticides Linked to Alzheimer's Disease

About 5.4 million Americans live with Alzheimer's disease,[18] the sixth leading cause of death in the US.[19] After age 65, the risk of Alzheimer's disease or vascular dementia doubles every five years.[20]

Early-stage Alzheimer's disease patients are usually anxious, well aware that something is wrong. Short-term memory is poor and patients have difficulty finding ordinary words. Crippling depression sets in with the awareness that something is being lost that will never be regained.

A great deal of Alzheimer's disease research has gone into finding the genes that increase susceptibility. However, multiple other factors are implicated, including chronic infections, declining hormone levels, inflammation, mitochondrial dysfunction, oxidative stress—and toxic chemicals.[21-26] Chief among this latter group are the over 1,000 chemicals that comprise pesticides, use of which has ***quintupled*** since 1945.[27]

Recent studies link chronic pesticide exposure to increased prevalence of dementia, including Alzheimer's disease.[2,28] **Organophosphate** pesticides have been shown to lead to microtubule derangements and ***tau*** hyperphosphorylation—a hallmark of Alzheimer's disease. (Phosphorylation is the addition of a phosphate group to a molecule, which turns a protein enzyme on or off, altering its activity.) This mechanism of action suggests that, at the cellular and molecular level, these pesticides may at least partly account for the neurodegeneration of Alzheimer's disease.[28]

What You Need to Know

Quercetin vs. Pesticides

- **Although designed to kill pests, pesticide compounds can also trigger negative health effects in humans.**
- **Excessive or prolonged exposure to pesticides has been linked to cancer, endocrine complications, infertility, respiratory disorders, organ failure, birth defects, mood changes, and Alzheimer's disease.**
- **Prominent among the flavonoids produced by plants to protect themselves from destructive forces is the potent compound quercetin, which conveys similar protection to humans.**
- **Accumulating evidence demonstrates that quercetin protects against many of the biological effects of pesticides.**

Scientists evaluating 86 Alzheimer's disease patients and 79 controls found that serum levels of ***dichlorodiphenyldichloroethylene*** (DDE)—a metabolite of the pesticide ***dichlorodiphenyltrichloroethane*** (DDT)—were **3.8-fold higher** in Alzheimer's disease patients.[29]

Although banned in the US in 1972, people still come into contact with DDT through imported foods or by living near farmlands where DDT was formerly sprayed or near industrial sites where manufacturers dumped DDT-containing products.[30-33]

Similarly, exposure to the pesticide ***beta-hexachlorocyclohexane*** (beta-HCH) was found to be detectable in **76%** of Parkinson's disease patients, compared to **40%** of those without the disease. Based on serum levels of this pesticide, researchers could predict a Parkinson's diagnosis with a high degree of confidence.[34]

Quercetin's Broad Brain-Protective Effects

Exposure to pesticides can result in a range of very subtle neurological symptoms that are not commonly recognized by the medical community, but that can be devastating to the individual, especially over time. These include loss of memory, poor coordination, reduced stimuli-response speed, decreased vision, altered or uncontrollable moods or other behavior, and impaired motor skills.[35]

Rapidly accumulating evidence has identified quercetin as a potent neuroprotective nutrient.

Quercetin protects brain cells from excitotoxicity, the damage done by the repeated excitatory electrical impulses observed in Alzheimer's and other neurodegenerative diseases.[36-39] Its potent antioxidant mechanisms reduce toxicity of ***beta amyloid*** proteins that accumulate in the brain, eventually producing memory loss and dementia.[40,41] Quercetin has also been found to prevent brain-cell death in animal models of Parkinson's disease.[42]

The Alzheimer's Disease Risk in Your Home and How to Protect Yourself

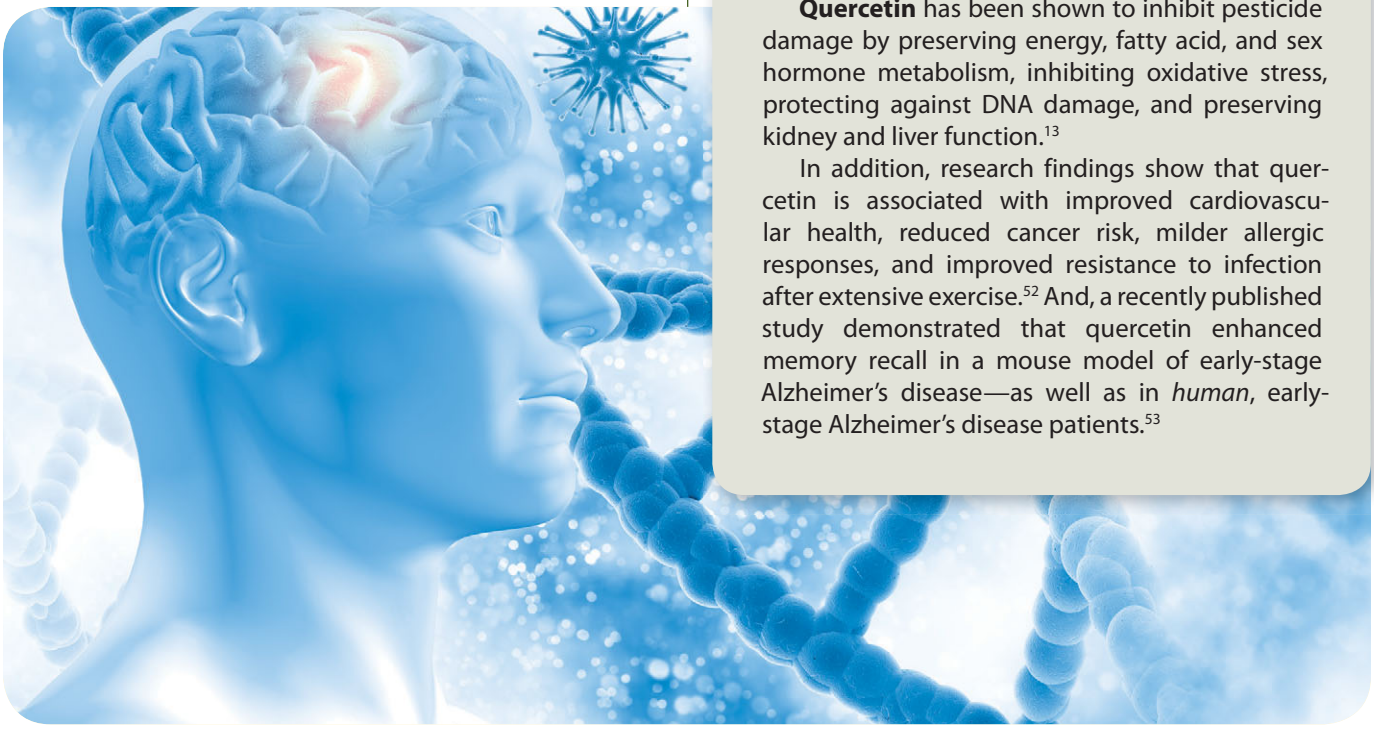
When thinking of **pesticides**, most people focus on the over 1,000 chemicals used in agriculture today. But these 1,000 chemicals have been formulated into over 20,000 products—a fifth of which are designed for nonagricultural uses—in homes, gardens, schools, playgrounds, offices, golf courses, and hospitals. So microscopic traces of pesticides easily drift into homes. Studies show that detectable levels of these compounds can be found in many people, even newborns.[27]

Just as they do in pests, pesticides can affect the human nervous system. These common pesticides include:[51]

- **Organophosphates**, a synaptic poison that damages the junction between two nerve cells,
- **Carbamates**, a synaptic poison,
- **Pyrethroids**, an axonic poison that damages axons that conduct impulses away from the cell,
- **Avermectins**, an axonic poison,
- **Imidacloprid**, a synaptic poison, and
- **Fipronil**, an axonic poison.

Quercetin has been shown to inhibit pesticide damage by preserving energy, fatty acid, and sex hormone metabolism, inhibiting oxidative stress, protecting against DNA damage, and preserving kidney and liver function.[13]

In addition, research findings show that quercetin is associated with improved cardiovascular health, reduced cancer risk, milder allergic responses, and improved resistance to infection after extensive exercise.[52] And, a recently published study demonstrated that quercetin enhanced memory recall in a mouse model of early-stage Alzheimer's disease—as well as in *human*, early-stage Alzheimer's disease patients.[53]



Oxidative stress and chronic brain inflammation eventually produce changes that can lead to neurodegeneration.

The brain has a powerful free-radical defense system that upgrades cellular defenses such as **glutathione** and prevents brain-cell death. This natural defensive shield has been found to be activated by **quercetin**.[43] The quercetin flavonol also increases brain expression of protective **paraoxonase 2** (PON2), which scavenges free radicals that damage mitochondrial membranes and cause them to lose their electrical potential.[44,45]

Oxidative stress and chronic brain inflammation eventually produce changes that can lead to neurodegeneration.[46] Quercetin can preserve vital brain-cell function in the face of those changes, limiting the cell death that produces neurodegenerative diseases.[47]

Not all free radical scavengers deliver the same defense as quercetin against the type of oxidative stress damage associated with Alzheimer's disease. In one study, isolated rat brain cells were exposed to either quercetin or vitamin C and then to hydrogen peroxide, which replicates the oxidative cell damage that occurs in Alzheimer's disease. Quercetin-treated brain cells showed significantly less damage to cellular membranes.[48]

Quercetin's Potent Neuroprotection

Additional to stimulating cellular defenses against oxidative stress, quercetin activates sirtuins (SIRT1) and induces autophagy (removal of cellular waste debris)—both possible mechanisms for its neuroprotection.[49]

This same review found that the neurotoxicity of several toxic agents, including ***polychlorinated biphenyls***, ***MPTP*** (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine)—and the insecticide **endosulfan**—was decreased by quercetin *in vivo*. Findings showed that *"…quercetin ameliorates Alzheimer's disease pathology and related cognitive deficits in an aged…Alzheimer's disease mouse model."*[49]

Quercetin was shown to protect brain mitochondria against **endosulfan**. This pesticide normally induces oxidative stress in brain mitochondria by significantly lowering levels of catalase, superoxide dismutase (SOD), and glutathione. In rats, the pesticide resulted in swelling of mitochondria and higher levels of the oxidative stress marker malondialdehyde.[50]

Pretreatment with **quercetin** was demonstrated to protect the brain mitochondria from oxidative stress, lipid peroxidation, and mitochondria swelling normally induced by **endosulfan**. The activities of the natural enzymes systems and the mitochondrial content of glutathione and malondialdehyde were all returned to healthy levels. The study author concluded:

"Thus, although endosulfan can have neurotoxic effects in brain[s of] rats, this toxicity can be prevented by quercetin."[50]

Summary

Pesticide compounds may increase the risk of diseases most commonly associated with aging, including **neurodegenerative** disorders.

Plants naturally produce molecules known as **flavonoids** to allow them to withstand a host of destructive forces, including chemical toxins.

New and accumulating evidence demonstrates that the plant flavonoid **quercetin** delivers protection—for the body and the mind—against many pathological effects associated with **pesticide** exposure.

The typical daily supplemental dose of quercetin is **150-400 mg**. It is often included in **resveratrol** formulas because of evidence showing that **quercetin** and **resveratrol** provide complementary health benefits when taken together. ●

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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* *J Clin Endocrinol Metab*. 2002 Feb;87(2):589-98.

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BY CHANCELLOR FALOON

PQQ Reduces Arthritis Inflammation

Pyrroloquinoline quinone, or PQQ, is a vitamin-like compound that has demonstrated impressive biological effects. It is found in tiny quantities in plant foods.[1]

PQQ is responsible for creating new mitochondria as well as maintaining existing mitochondria within the cell.[2] PQQ's unique abilities have led many researchers to believe it can slow down the progression of aging.

Past studies have shown that PQQ can improve cardiovascular and brain health.[3-8] More recent research has shown that PQQ can inhibit breakdown of healthy bone.

The latest findings indicate that PQQ has the potential to decelerate the deterioration of joints in **rheumatoid arthritis** and **osteoarthritis**.[10,11]

Arthritis is a leading cause of disability in the US.[12] An urgent need exists to find treatments to prevent or delay its onset. Recent studies published in the journal *Inflammation* indicate PQQ may very well exert a protective effect in the **joints**.[10,11]

Rheumatoid Arthritis

Rheumatoid arthritis occurs when the body's immune system mistakenly attacks the cells in its joints. This leads to the release of inflammatory cytokines and enzymes that damage not just the cartilage, but also the bone. The disease does not just manifest in the joints. It produces a dangerous amount of inflammation that affects the rest of the body. Rheumatoid arthritis increases the risk of cardiovascular disease. Those with rheumatoid arthritis suffer an approximately **40%** increased risk of overall mortality.[13,14]

In response to the immune system's attack on joints, cells called **fibroblast-like synoviocytes**, which are found in the joints' synovial fluid, release inflammatory molecules.[15] Fibroblast-like synoviocytes can circumvent healthy cell turnover and instead release inflammatory molecules via a protein complex called NF-kappaB.[10]

In one of the new studies from the journal *Inflammation*, researchers tested human fibroblast-like synoviocytes in vitro, or outside of the body. The scientists used an inflammatory agent to activate the release of cytokines from the fibroblast-like synoviocytes cells. In one of the groups of cells, PQQ was also added.[10] The group of cells that did not receive PQQ had increased levels of proinflammatory cytokines. The cells that received the PQQ had a decreased production of the proinflammatory cytokines. In addition, PQQ was also able to halt the activation of NF-kappaB. The researchers also noted that PQQ may be able to attenuate certain enzymes (such as matrix metalloproteinases) that degrade a protein called type-II collagen present in our joints.

In a second part of this study, the researchers tested the effects of PQQ on two groups of mice with an animal model of rheumatoid arthritis. The scientists gave intraperitoneal injections of PQQ to one group of mice but not the other. After 45 days there was a dramatic difference with the PQQ-administered mice showing remarkable protection against inflammatory degeneration. The researchers observed narrowing of space between joints, increased inflammatory cell infiltration, and cartilage damage in the group that did not receive PQQ. Due to these impressive results, the researchers hypothesized that PQQ may be helpful in the treatment of other inflammatory conditions as well.

Osteoarthritis

Approximately **33%** of Americans 65 and older are affected by osteoarthritis, making it the most common form of arthritis.[16] It was believed that osteoarthritis was simply the result of age-related "wear and tear" of the joints, as well as the body failing to produce enough cartilage.[17,18] Scientists now understand that the underlying causes of osteoarthritis are similar to that of rheumatoid arthritis.[19,20]

A group of researchers conducted a study to test the effects of PQQ for osteoarthritis treatment.[11] In this study, human chondrocytes, cells that produce and maintain cartilage, were tested in vitro. The researchers manipulated the environment of the cells to create inflammation and mimic the effects of osteoarthritis. One group of cells received PQQ before the researchers manipulated the environment while the other group did not. The researchers observed increased levels of **collagen-degrading** enzymes *(matrix metalloproteinase)* in the group that did not receive PQQ.

One of the pivotal biomarkers for inflammation is nitric oxide. Under normal physiological conditions nitric oxide acts as an anti-inflammatory as well as a vasodilator. But in certain circumstances, overproduction can lead to inflammation.[21] In the group of cells that received PQQ, there was a significant reduction in joint-degrading enzymes and nitric oxide.

In addition, the researchers tested the effects of PQQ on mice who underwent a surgical procedure to induce osteoarthritis. Prior to treatment, one group received injections of PQQ with additional injections daily. The other group did not receive any. The group that received PQQ had significantly less severe cartilage damage compared to the group that did not receive PQQ.

Practical Approaches for Arthritis

The studies thus far are laboratory models and not directly relevant to human arthritis patients. PQQ's most impressive results have been seen in studies showing its support for mitochondrial function, cardiovascular health, and brain health.[1,22,23]

For those seeking natural approaches to combat arthritis, there are natural anti-inflammatory compounds in widespread use today including: undenatured type II collagen, boswellia, and curcumin.

Derived from chicken cartilage, **undenatured type II collagen** has robust data showing reduction in pain and increase in function in dogs, horses, and humans.[24-27] Results from one study showed, in just 90 days, a **40%** reduction on a pain scale for osteoarthritis patients supplementing daily with undenatured type II collagen.[27]

Boswellia is an Indian plant that has demonstrated potent anti-inflammatory properties. It has been shown to inhibit the pro-inflammatory enzyme ***5-lipo-oxygenase*** or 5-LOX.[28,29] This enzyme is responsible for facilitating the production of leukotriene, a pro-inflammatory compound that damages joints and cartilage. Boswellia has also been shown to inhibit a type of ***matrix metalloproteinase*** cartilage-degrading enzyme.[30] An impressive study on osteoarthritis patients showed that daily boswellia supplementation caused a **40.1%** reduction on a pain scale compared to placebo in just 30 days.[31]

Curcumin is the most active constituent of the turmeric root. A study tested the effects of curcumin or a nonsteroidal anti-inflammatory drug (NSAID) on 45 humans during a flare-up of rheumatoid arthritis. The researchers tested the patients' blood for a systemic inflammatory marker called **C-reactive protein** and their pain score at the beginning of the study and then eight weeks afterwards. The results showed a **52%** drop in C-reactive protein in the curcumin group. In the group receiving the NSAID, C-reactive protein increased by **1.5%**. The NSAID group had a **42.1%** improvement in pain scores, which was similar to the curcumin group, which had a **44.5%** improvement (relief) in pain scores.[32]

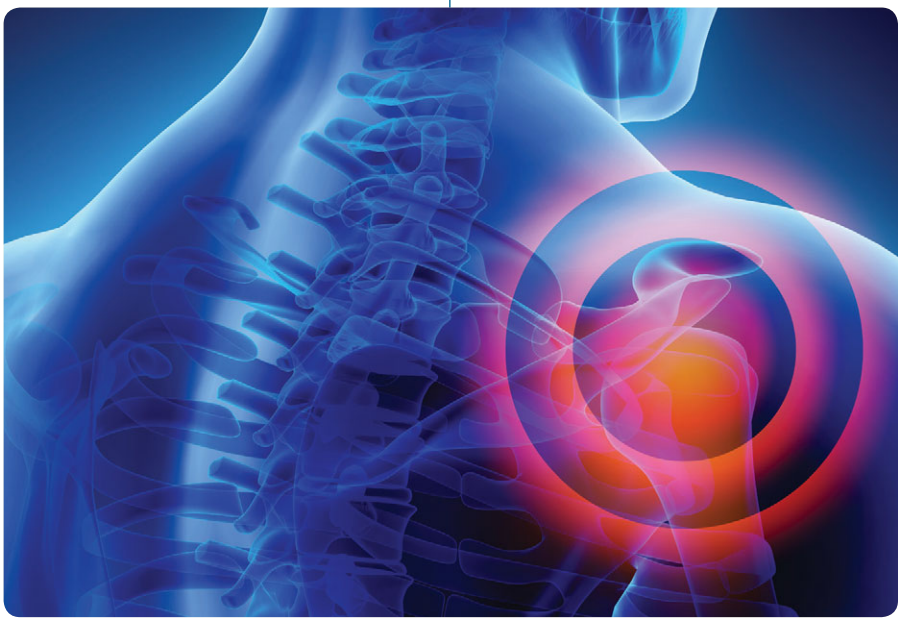
Summary

PQQ has been shown to promote mitochondrial biogenesis (creation of new mitochondria), which is essential for older cells to retain youthful energy output. PQQ also protects against mitochondrial damage.[2]

The two new studies described in this Research Update provide preliminary data to pave the way for human trials in arthritis patients. PQQ was effective at suppressing cartilage-degrading enzymes and inflammatory markers in human cells and in the laboratory mouse model.

These findings open a pathway for clinical studies to evaluate whether PQQ can benefit osteoarthritis and rheumatoid arthritis patients. Those seeking to relieve arthritis symptoms today, without resorting to drugs, have access to a variety of low-cost nutrients with clinically validated effects. ●

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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Metformin *and* Glaucoma

Glaucoma is the second leading cause of blindness in the world.[1]

A medical group submitted a report to ***Life Extension Magazine®*** that provides persuasive data that the **AMPK-activating** drug **metformin** may be of significant benefit in protecting the eyes against the threat of blindness from **open angle glaucoma**.

This report is written with some technical language that may make it challenging for some of our readers to understand.

We choose to publish it with the caveat that a succinct practical suggestion on how to use **metformin** to potentially reduce **glaucoma risk** be made in the introduction.

So here is what the medical group that authored this report recommends:

"Those with elevated intraocular pressure (IOP) and/or glaucoma should ask their doctor about prescribing a modest 250 mg-500 mg dose of metformin twice a day after meals as it may have unique beneficial mechanisms in protecting against this blinding disorder."

We welcome you to read the report beginning on the next page that describes underlying pathologies of **open angle glaucoma** and how **metformin** can help to counteract them.

BY JESSICA G. SHANTHA, MD AND T. R. SHANTHA, MD, PHD, FACA

METFORMIN
Reduces the Incidence of **Open Angle Glaucoma**

Metformin is a decades-old antidiabetic drug used by millions of type II diabetics all over the world. It is inexpensive, quite commonly prescribed, and its effectiveness in reducing elevated blood glucose is well established.

In addition to its antidiabetic properties, metformin has also been shown to provide a number of other health benefits, including weight reduction, promoting longevity, and reducing cancer incidence, as well as reducing or eliminating chronic pain.[2-7] It has **calorie restriction** mimetic cellular effects such as activating the energy enzyme **adenosine monophosphate activated protein kinase** (**AMPK**), and it favorably modulates certain **genes** thought to be involved in aging.[8,9]

Now, besides all these reported health effects, a new study reports metformin also reduces the development of **open angle glaucoma** (OAG).[10]

Aqueous Humor, Its Functions and Its Relation to Glaucoma Production

Glaucoma is a disease characterized by the increase of ***intraocular pressure*** due to various pathologies related to ***aqueous humor*** production, circulation, and drainage. In addition, the disease produces subsequent damage to the retina and atrophy of the **optic nerve** resulting in reduced visual acuity and ultimately leading to blindness.[11]

Aqueous humor is a transparent, watery fluid that provides nutrition to the front part of the eye. It also transports the metabolic debris produced there to the bloodstream, thus maintaining transparency of the lens and cornea so light rays can pass through cleanly and provide clear vision. Most importantly, it keeps the cornea inflated with hydrostatic pressure, like water in a balloon.

There are many varieties of glaucoma, the most common being **open angle glaucoma**, in which the angle where the cornea and the iris meet is as wide and open as it should be, but the aqueous humor drainage channels become blocked over time and aqueous humor builds up. This raises intraocular pressure.[12,13]

As pressure is exerted on the sensitive retina over time, it results in damage to nerve cells and their projection, the optic nerve.[11] Once the **optic nerve** is damaged, it can't be repaired, even if the raised ***intraocular pressure*** is corrected (figure 1).[14,15] Abnormally high pressure inside the eye usually causes this retinal and optic nerve damage.

Because **open angle glaucoma** occurs due to the effects of aging, it may be that the disease is treatable with **metformin**, because of the drug's general antiaging properties.

How Metformin Functions in the Body

Metformin works to reduce blood sugar in several ways. It decreases the amount of glucose made by the liver, decreases the amount of sugar absorbed into the body, and makes insulin receptors more sensitive. Metformin does not increase insulin levels as many antidiabetic medications do, which makes it unlikely to cause dangerously low drops in blood sugar.[16,17] It's therefore considered safe for nondiabetics to take.

Let's examine how metformin works as an antiaging therapeutic agent and extrapolate the findings in terms of its ability to fight **glaucoma**.

AMPK activation helps to mimic the beneficial effects of calorie restriction.

Metformin enhances the activity of an enzyme found within all our cells called ***adenosine monophosphate-activated protein kinase***, or AMPK for short. **AMPK activation** helps to mimic the beneficial effects of **calorie restriction** and exercise, the best documented method of slowing and reversing degenerative aging processes and biomarkers of human aging.[18]

The biological effects of increased **AMPK activity** include inhibition of **fat storage**, reduced **triglyceride synthesis,** and increased **glucose uptake** into muscle for metabolism.[19-27] AMPK activation also enhances destruction of diseased or dying cells as well as removal of intracellular metabolic debris – a method to slow and reverse degenerative aging processes of various organs.[9]

Further, experiments have shown that metformin, through **AMPK activation**, promotes the functional activity of the **sirtuin** family of **genes**, which is associated with **longevity**. Scientists have identified several signaling pathways involved in the regulation of aging processes that promote longevity. One of these signals, named **p53**, controls cell proliferation and is known as a **tumor-suppressor gene**. Loss of p53 predisposes normal cells to cancer. Metformin helps protect **functional p53** so cells are less likely to become **cancerous**.[9,28-31]

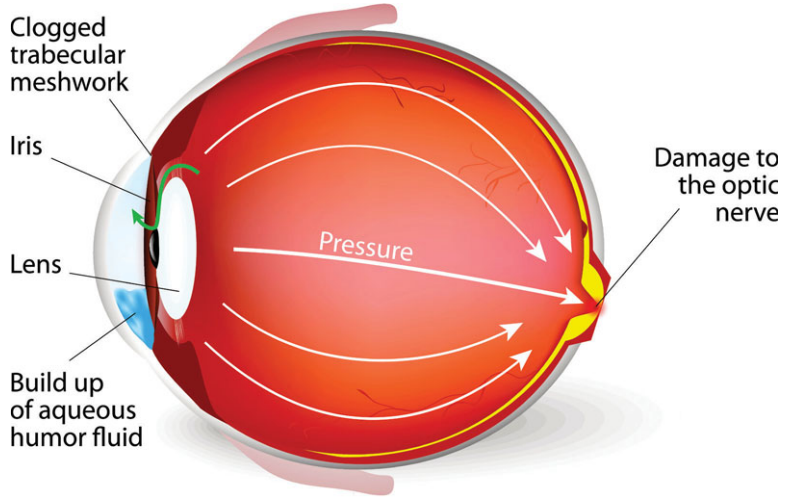


Figure 1 shows the production of aqueous humor by ciliary processes and obstruction to its drainage at trabecular meshwork exit channels. This results in raised intraocular pressure (arrows), pressing on the sensitive retina and optic nerve, resulting in glaucoma and ultimately loss of vision.

What You Need to Know

The Benefits of Metformin

- **Metformin has been prescribed for decades as an effective treatment against type II diabetes. But studies have shown metformin to have a number of other beneficial effects as well. These include promoting longevity, weight loss, and reduced cancer risk, as well as reducing chronic pain.[2-7] The drug also has antiaging effects that mimic calorie restriction, and it favorably modulates genes thought to be involved in aging.[8,9]**
- **Now, new research reveals metformin also reduces the development of open angle glaucoma, a progressive optic neuropathy and a leading cause of blindness.**
- **A University of Michigan study has found metformin to be linked with a 25% reduction in the risk of developing open angle glaucoma. Other medications used to treat type II diabetes did not have a similar benefit. Metformin is the only drug that has an intraocular pressure-reduction therapeutic effect.**
- **Everyone over age 50 would be well-advised to get tested for glaucoma and to ask their physician about possibly taking metformin, which could be preferable to typical antiglaucoma drugs, considering their common side-effects and lack of anti-aging properties.**

Metformin's Inflammation-Reducing Property

Nuclear factor-kappa B (NF-kB) is an internal cell signal that induces **chronic inflammation** responsible for many diseases, from cancer to heart attack, neurodegenerative diseases and even glaucoma.[32-35]

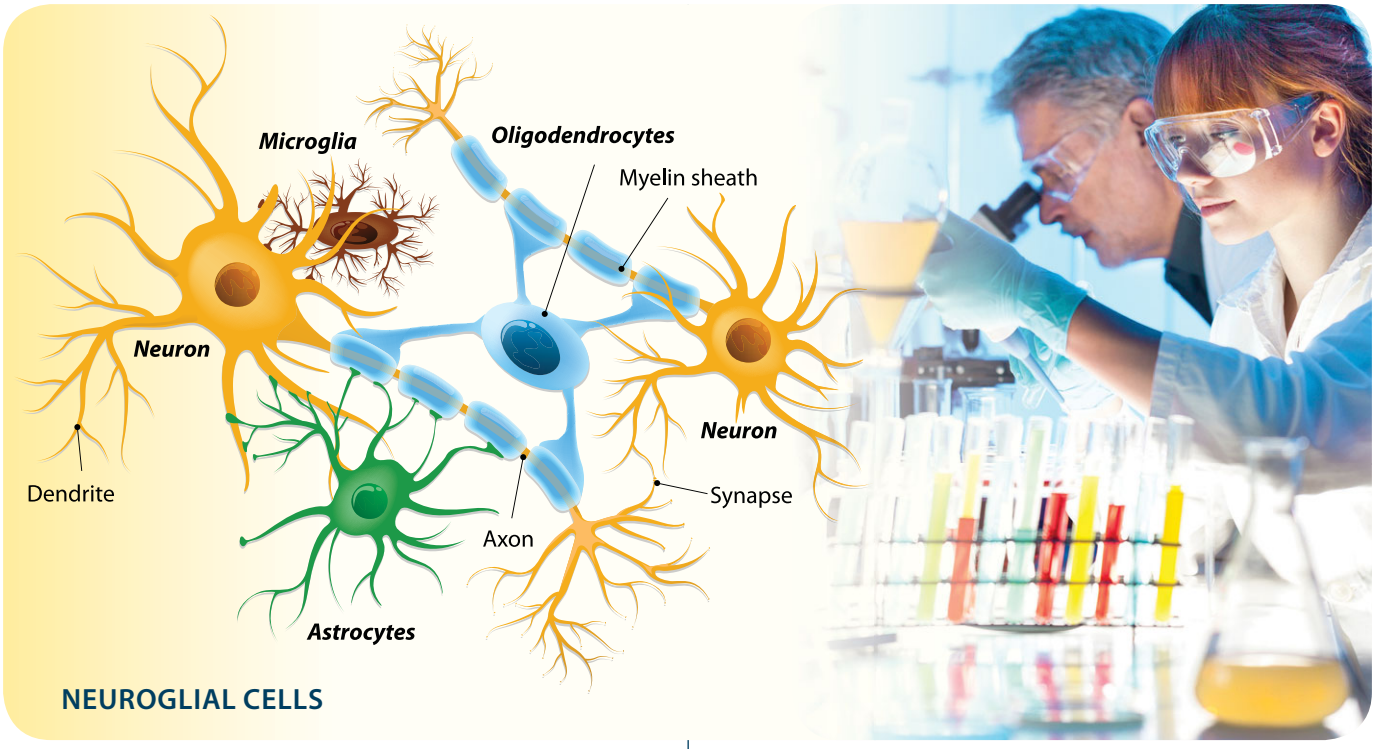
NF-kB activation is blamed for many chronic diseases that ravage us as we age. Metformin produces higher **AMPK activity** which decreases expression of **NF-kB**.[36]

By blocking NF-kB, metformin is thought to promote longevity by inhibiting systemic inflammatory processes in the body, which play havoc in all our vital organs including the brain and heart, as well as the eyes.

A recent study has found that metformin relieves neuropathic and other pain by decreasing the activation of microglial cells in the spinal cord that are an integral part of the central nervous system and its proper functioning as discussed below.[6]

Metformin's Effects on Nerve Cells (Neurons) and Their Physical Supporter-Glial Cells

Common characteristics for many neurodegenerative diseases include changes in glial cells, progressive neuronal loss, increased inflammation and oxidative stress.[37] Thus decreasing the activation of glial cells in the brain is one promising approach to reducing the inflammation in the brain responsible for various neurodegenerative diseases including Parkinson's and Alzheimer's disease. This is exactly what a group of researchers found in an animal model of neuropathic



pain treated with metformin—**glial cell** activation was decreased and chronic pain was reduced.[6] We believe these findings may have implications to decrease neuropathic pain in thousands of patients treated with the expensive drug gabapentin (Neurontin®).

Glial cells have multiple functions:[38,39]

1. They surround neurons and hold them in place.
2. They supply nutrients and oxygen to neurons.
3. They insulate one neuron from another.
4. They destroy pathogens and remove dead neurons with various processes, including production of inflammatory cytokines that, besides attacking the invading microorganism, can promote neurodegenerative diseases.
5. They transport the brain's interstitial fluids between neurons to the cerebrospinal fluid, through drainage channels they create called glymphatics.
6. They play a role in synapse formation and the transmission of electrical signals from one nerve cell to another, especially in memory centers of the brain. Basically, glial cells are caregivers to nerve cells and facilitate nerve cell activity in the central nervous system and maintain a homeostatic milieu for nerve cells to function properly.

Now let us examine how metformin can help fight glaucoma and age-related neurodegenerative diseases related to glial cell pathology.

Originally marketed as an agent for type II diabetes, metformin has been found to have a number of other uses in clinical practice, including, in one study, the ability to decrease the activation of glial cells in the spinal cord.[6] Researchers reported complete resolution of suffering in some rats with induced neuropathic pain. This study reveals the impact of metformin on the nervous system glial cells, which are believed to be associated with chronic pain. If that is the case, is it possible that metformin can protect other parts of the nervous system, such as the retinal ganglion cells, by inhibiting the activity of glial cells that produce inflammatory cytokines that are toxic to neurons? This would also explain our finding and the findings of other scientists that those on metformin have better cognition with reduction in dementia.[40,41] In our practice we routinely prescribe metformin for people over the age of 50 to be taken twice daily after meals to prevent future neurodegenerative diseases and aging.

How Does Metformin Reduce Glaucoma?

A recent study found that metformin reduces the intraocular pressure of primary open angle glaucoma.[10] Open angle glaucoma is a progressive optic neuropathy characterized by loss of retinal ganglion cells and optic nerve atrophy.[42] It's the most common

form of glaucoma and is often asymptomatic and may even go undetected for a while.[43] By the time vision is noticeably impaired, the loss is irreversible, because once the nerve cells are dead in the retina with degeneration of the connected nerve fibers, nothing can restore them.

Open angle glaucoma is a manifestation of aging along with other neurodegenerative diseases. Normally, through *autophagy*, our cells purge themselves of accumulated debris, often called "cellular metabolic junk." Autophagy is a natural mechanism that disassembles cells' unnecessary or dysfunctional components as they age and lose their function. But over time, our cells lose this housekeeping ability.[44,45] Metformin has been shown to promote this process.[46]

According to a study at the University of Michigan, metformin was associated with a **25%** reduction in the risk of developing **open angle glaucoma**. They also found that other oral antidiabetic medications used to treat type II diabetes did not confer a similar risk reduction. **Metformin** is the only drug endowed with this **intraocular pressure-reduction** therapeutic effect.

This retrospective cohort study was based on longitudinal data from more than 150,000 patients with type II diabetes and no preexisting record of open angle glaucoma. Forty percent filled at least one metformin prescription. During the 10-year study period, 5,893 (**3.9%**) of the patients of a large health care network developed the disease. The researchers compared users of metformin with nonusers, analyzing the data by means of regression modeling. Each model demonstrated substantial reductions in open angle glaucoma risk among those using metformin. In two years, a diabetic patient taking a daily **2,000 mg** dose of metformin would have a **20.8%** reduction in open angle glaucoma risk, compared with a diabetic patient who had no metformin exposure.[10]

*Metformin was associated with a **25%** reduction in the risk of developing **open angle glaucoma**.*

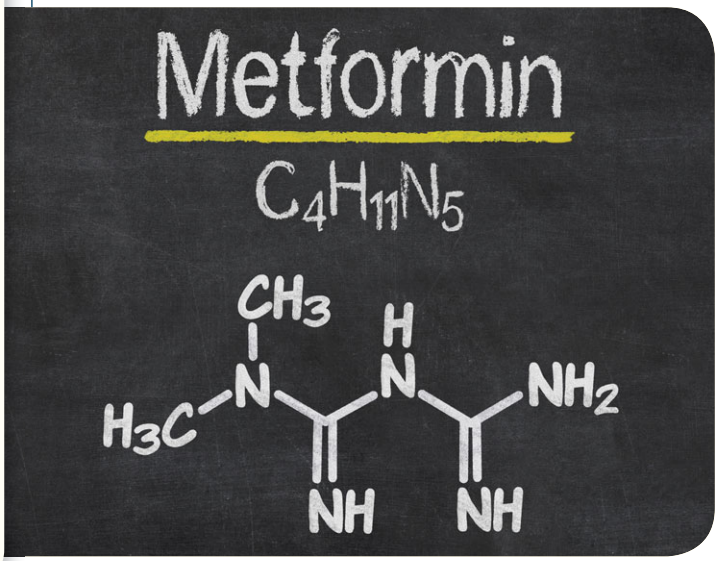
Glaucoma is the second leading causes of blindness in the world.[1] It is estimated that in excess of 2.5 million people have glaucoma in the United States, and that more than 120,000 people are legally blind from the disease.[42] Many people who have it aren't aware of it. Blindness from glaucoma is six to eight times more common in African Americans than Caucasians, and, after cataracts, is the leading cause of blindness among them.[43] We advise all those over the age of 50, especially African Americans and women, to get their eyes tested for glaucoma and ask their physician if it is appropriate to start taking metformin, not as an antidiabetic, but for its antiaging, antiglaucoma properties. Women have longer life expectancy and are more likely than men to develop age-related eye diseases like glaucoma.[47]

Autophagy: Cellular House Cleaning

Christian de Duve, 1974 Nobel Laureate in physiology or medicine, coined the term autophagy (meaning "self-eating") in 1963. This year, biologist Yoshinori Ohsumi, of the Tokyo Institute of Technology, has been awarded the Nobel Prize in physiology or medicine for his discoveries in autophagy, the process whereby a cell recycles part of its own cellular debris (cellular house cleaning).

Scientists had been aware of autophagy for decades, but knew little about how it worked—until Ohsumi's pioneering experiments in the 1990s. It's important because autophagy can eliminate invading intracellular bacteria. Disrupted autophagy has been linked to Parkinson's and Alzheimer's disease, type II diabetes and other disorders that particularly affect the elderly.

We know that metformin enhances autophagy, which is how it reduces diseases of aging such as Parkinson's and Alzheimer's, and may reduce the incidence of glaucoma. This is one more reason to prescribe metformin.



There are dozens of drugs available to treat glaucoma.[48,49] Many of them have systemic complications and lack the antiaging effect of metformin on the rest of the body. Wouldn't it make sense to prescribe metformin to prevent glaucoma and at the same time delay and/or reverse the ravages of aging?

Researchers at the University of Michigan Kellogg Eye Center have suggested a clinical trial protocol in which newly diagnosed glaucoma patients would be randomized to receive either an IOP (intraocular pressure)-lowering drug plus metformin or a glaucoma drug plus a placebo.[50] From our point of view, a randomized clinical trial which might take decades may not be needed. Metformin is inexpensive, widely used to treat type II diabetics, and has hardly any adverse effects.

Summary of How Metformin Wards Off Glaucoma

Given how aqueous humor is formed, how it circulates and exits the eye, there are numerous possible explanations for how metformin works. It may act to reduce open angle glaucoma risk at multiple levels, which need to be further examined. The possible mechanisms are:

1. Metformin, by inhibiting an inflammatory reaction and its related cytokines, may reduce aqueous humor production by ciliary processes, and bring it to stability.

2. By promoting autophagy, it may prevent exfoliated cells from blocking the aqueous humor drainage channels of the meshwork and the Schlemm's canal.

3. By AMPK activation, it may reverse the biomarkers of human aging in the uveal aqueous humor production structures and transportation channels of aqueous humor.

4. Due to increased AMPK activation, as the aqueous humor circulates, it comes in contact with trabecular meshwork and may cleanse the glycation around the endothelial cells of the trabecular meshwork, thus allowing the aqueous humor to pass to exits without resistance.

5. Metformin in the aqueous humor may cleanse and open the pores in the Schlemm's canal and uvea-scleral pathways by activation of AMPK, resulting in autophagy within the disease-afflicted lining cells of trabecular meshwork.

6. By autophagy, it may effectively cleanse the platelet clumps and lipid deposits in the trabecular meshwork and the Schlemm's canal that facilitates the easy drainage of the aqueous humor without increasing intraocular pressure.

7. Metformin protects the functional p53 gene while repressing and/or blocking the pro-inflammatory NF-kB by reversing or inhibiting inflammatory process in the body, including the eyes.[29,30,36] By reduction of inflammatory cytokines, it may protect the retina and prevent the degeneration of ganglion cells and optic nerve fibers, thus reducing the chances of blindness.

8. Metformin reduces resistance to insulin, thus helping uptake and metabolism of circulating sugar, and preventing the adverse effects of hyperglycemia such as glycation—the bonding of a protein or lipid molecule with a sugar molecule.[16,17,51]

9. Loss of ganglion cells in the retina is a leading cause of blindness in open angle glaucoma.[42] This could be prevented with metformin by decreasing activation of glial cells in the retina and optic nerve.

FDA Approves Human Trials on Metformin Antiaging Effects

Further studies will point out the multiple ways metformin reduces the incidence of open angle glaucoma in older people as it provides antiaging protection in other organs and tissues and possibly even prevents or reduces the incidence of age-related macular degeneration.

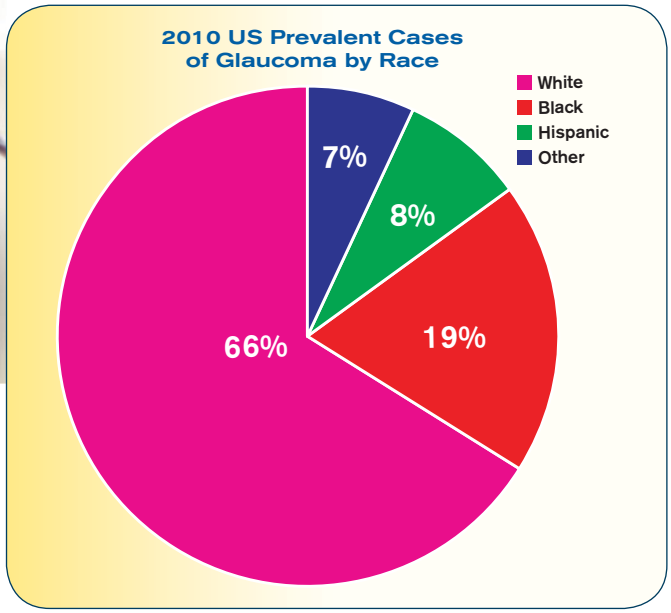
Interestingly, the FDA's approval of the first human trials to see if metformin can protect against diseases of aging was headlined in news media reports. We hope this study includes the drug's effect on the eyes of the aging population.

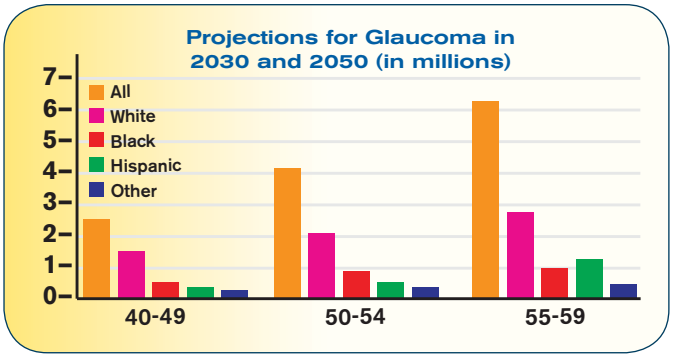
For decades, ***Life Extension*** has discussed the antiaging effects of metformin. Finally, the FDA has heard their call. This study may take decades to reveal its findings, hence our practice has started advocating for metformin use for people over the age of 50 to promote good health and reverse, inhibit, or stop the ravages of aging.

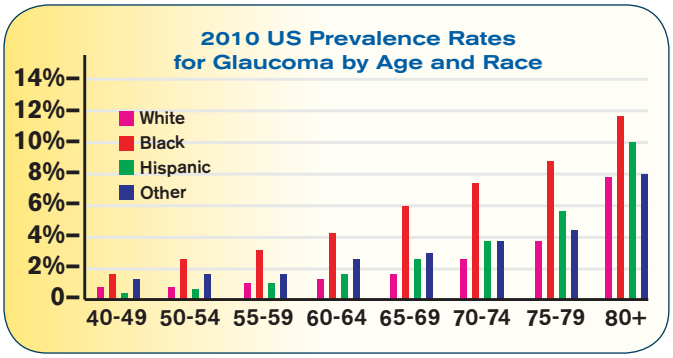
Although it can cause lactic acidosis if taken in doses that are much larger than required for treatment, metformin is essentially very safe. The public should demand that the FDA approve metformin for use without prescription as an over-the-counter medication, both in oral form and as ophthalmic drops.

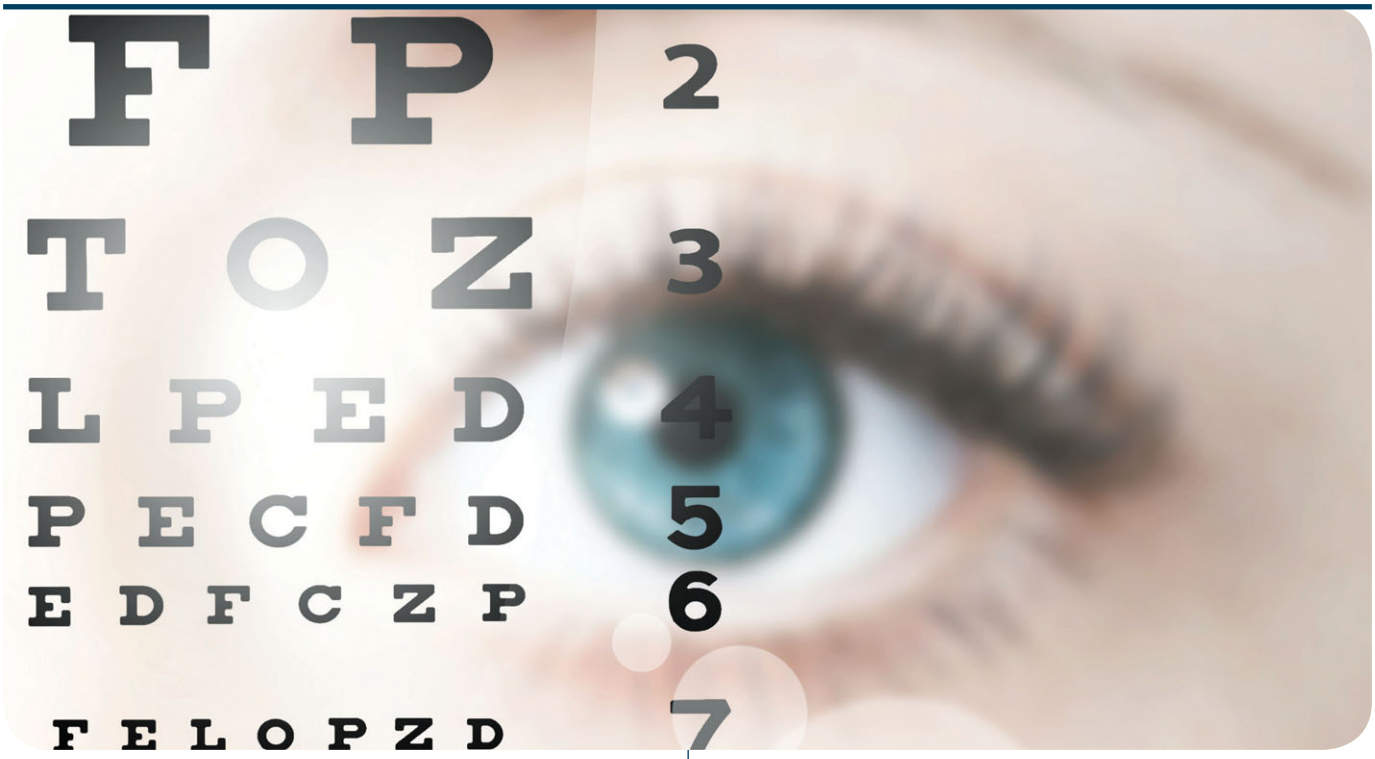
This will reduce medical cost and improve the health of many, with reduction in age-related diseases (which cost billions to care for). It will also bestow longevity, with probable reductions of neurodegenerative

Glaucoma Statistics and Data[47]









diseases such as Parkinson's and Alzheimer's, and at the same time provide good eyesight. Until that happens, the best alternative is for patients to ask their physicians to prescribe metformin for them and put it in writing that they, the patients, will not hold their doctors responsible for any untoward effects. Those with elevated intraocular pressure and/or glaucoma should ask their doctor about prescribing a modest **250 mg-500 mg** dose of **metformin** twice a day after meals.

When developed, metformin ophthalmic drops, besides preventing open angle glaucoma, may also prevent or delay the development of age-related macular degeneration and diabetic retinopathy, and restore good vision to the aging population inexpensively. We appeal to the pharmaceutical industry to develop metformin ophthalmic drops with other adjuvant therapeutic agents to treat various eye diseases such as open angle glaucoma, age-related macular degeneration, retinitis pigmentosa, diabetic retinopathy and uveitis. ●

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

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AMPK

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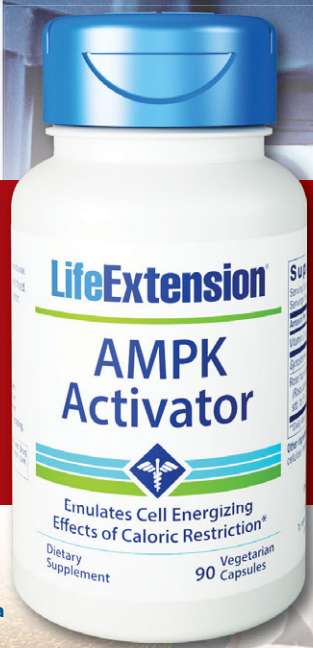

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Raw

Recipes for a Modern Vegetarian Lifestyle

BY GARRY MESSICK

Solla Eiríksdóttir is a celebrity chef in her native Iceland, famed for her TV shows and four restaurants which cater to fans of vegan and vegetarian dishes and raw food. She has published five cookbooks in Iceland, but *Raw: Recipes for a Modern Vegetarian Lifestyle* is her first cookbook in English.

Solla, 55, collaborated with her 36-year-old daughter, Hildur, on the new book, and the duo had a specific aim in mind. "What we're doing is transforming fruit and vegetables into real dishes instead of just making salad all the time," explains Solla. "We love the freshest raw materials so your taste buds are screaming for more."

Solla began investigating raw foods just after Hildur was born. She was suffering with a number of allergies at the time, and her doctor wanted to treat her ailments with drugs, but that would have required her to stop breast-feeding her infant daughter. She refused, and instead went to a nutritionist who put her on a vegan diet. Amazingly, Solla's allergies vanished within six months. From there, she got a job in a vegetarian restaurant, where she began to develop her cooking skills. She subsequently went on to study at the Living Light Culinary Institute in Fort Bragg, California.

Why raw? In the introduction to her new cookbook, the Icelandic chef explains that while most vegetables and fruits are rich in fiber, minerals, vitamins, antioxidants, phytonutrients, and enzymes, "Some of these compounds are sensitive to heat and a significant amount can be lost in the process of cooking." Enzymes, in particular, which catalyze digestion, denature with high heat, leading proponents of raw food to usually restrict application of heat in their cooking.

Raw features 75 recipes, all equally healthy and delicious. Solla and Hildur helpfully include symbols that denote when a particular dish is gluten-free, dairy-free, nut-free, raw or vegan. The following are four sample recipes from the book. Bon appetit!

Chia and Millet Flake Porridge

Serves 2

1 cup almond milk
3 tablespoons chia seeds
1 cup rolled millet flakes
1 teaspoon vanilla powder
1 teaspoon ground cinnamon
½ teaspoon lemon juice
A pinch of salt
½ banana, thinly sliced for topping

For the raspberry compote:

1 pear, peeled, cored, and chopped into small pieces or grated
1 cup raspberries (fresh or frozen)
1 tablespoon shredded fresh ginger root

Put the almond milk and chia seeds in a clean glass jar, put the lid on, and shake for 2-3 minutes, or until combined. Stir in the millet flakes, vanilla, cinnamon, lemon juice, and salt, then put the lid back on and set aside to rest for 15-30 minutes, or overnight.

For the compote, put the pear, raspberries, and ginger into a medium bowl and mash with a fork until it is the consistency you like. We like it slightly chunky. Alternatively, place the ingredients into a food processor and process using the pulse button.

When ready to serve, pour half the raspberry compote into a bowl or a glass jar, add the chia porridge, and top with a layer of thinly sliced banana. Spoon the remaining raspberry compote on top and eat.

Tofu Scramble with Kale and Avocado

Serves 2-3

2 tablespoons olive oil
½ onion, finely chopped
2 cloves of garlic, chopped
4 kale leaves, stems (stalks) removed

For the tofu marinade:

2-3 tablespoons almond milk
2 tablespoons nutritional yeast flakes
1 tablespoon tamari
1 tablespoon mustard
½ teaspoon ground turmeric
¼ teaspoon red pepper (chili) flakes
A pinch of salt
1 cup tofu

To garnish:

½ avocado sliced
Sprouts of your choice (optional)

Start by marinating the tofu. Stir the almond milk, nutritional yeast flakes, tamari, mustard, turmeric, red pepper (chili) flakes, and salt together in a bowl. Before adding the tofu, squeeze out all the liquid. A good way to do this is to wrap the tofu in a clean dish cloth and squeeze it gently so the water comes out through the cloth. Be gentle so the tofu doesn't become a paste. You may need to use 2 cloths because a lot of liquid is likely to come out. When all the water has been squeezed out, crumble the tofu into a bowl with all the remaining marinade ingredients, and mix to combine.

Heat the olive oil in a saucepan over medium heat. Add the onion and garlic and cook for 3-4 minutes, or until golden brown. Add the kale leaves, stir for 1 minute, then add the tofu and cook for another 4-5 minutes. Serve in a bowl and garnish with sliced avocado and sprouts, if using.

Rainbow Pasta with Pesto

Serves 3-4

1 rutabaga (swede)
1-2 carrots
1 beet (beetroot)
1 small zucchini (courgette)
2 tablespoons lemon juice
1 tablespoon olive oil

For the green pesto:
½ cup cashew nuts
1 handful of basil
2-3 kale leaves, stems (stalks) removed
1-2 tablespoons nutritional yeast flakes
1 large clove garlic
¼–½ teaspoon sea salt flakes
¼–½ teaspoon cold-pressed olive oil

For the pesto, put the cashew nuts in a bowl, pour in enough water to cover, and soak for about 2 hours. Drain and discard the soaking water.

Put the cashew nuts into a food processor with the remaining ingredients, except the olive oil, and blend. The texture of the pesto should be chunky. Transfer the pesto to a bowl and add the olive oil. Stir gently to mix together. Spoon into a clean glass jar and set aside.

Peel the rutabaga (swede), carrots, and beet (beetroot) and use a julienne peeler or spiralizer to shred the vegetables into spaghetti-like strips.

Put your vegetable spaghetti into a bowl and add the lemon juice and olive oil. Stir together, then cover with plastic wrap (Clingfilm) and leave for 15-25 minutes to let the "spaghetti" soften. Serve with green pesto.

Quinoa Pizza Crust

Makes 1 pizza

¾ cup quinoa
½ teaspoon sea salt flakes
1 clove garlic
½ teaspoon freshly ground black pepper
2 teaspoons dried oregano
¼ cup grated vegan cheese
1 tablespoon olive oil

For topping:

Scant ½ cup vegan cream cheese
½ zucchini (courgette), very thinly sliced
2-3 tablespoons pine nuts
3-4 sprigs rosemary
1 tablespoon truffle oil

Put the quinoa into a bowl, pour in enough water to cover, and let soak overnight.

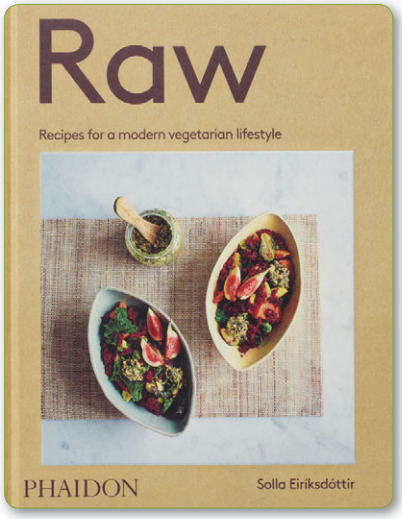
The next day, preheat the oven to 375 degrees and line a baking sheet with parchment (baking) paper.

Drain and rinse the quinoa, then put it into a blender together with ¼ cup water, the salt, garlic, black pepper, and oregano and blend until smooth. Pour the batter into a bowl and mix the cheese and olive oil.

Put a 9 inch tart ring on the prepared baking sheet and pour in the quinoa batter. Bake for 20 minutes, then remove from the oven. Wearing oven mitts, flip the crust over by covering it with another baking sheet, grasping both sides of the 2 baking sheets, and flipping the sheets with the crust between them. Bake on the second sheet for another 5-10 minutes.

Remove the crust from the oven and lower the temperature to 345 degrees. Spread the crust with the cream cheese, top with the zucchini (courgette) slices, and sprinkle with the pine nuts. Bake for another 8 minutes.

Meanwhile, in a small skillet, briefly cook the rosemary sprigs in the truffle oil over medium heat. When the pizza is ready, sprinkle with the fried rosemary and serve.



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

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1. *Int Angiol.* 2014 Feb;33(1):20-6.

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References

1. *J Natl Cancer Inst.* 2000 Dec 20;92(24):1966-7.
2. *Atherosclerosis.* 1999 May;144(1):117-22.
3. *J Nutr.* 1992 Dec;122(12):2440-6.
4. *Lipids.* 1995 Nov;30(11):1019-28.

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	B						
00920	**BENFOTIAMINE W/ THIAMINE** • 100 mg, 120 veg. caps	19.95	14.96	13.95			
00925	**BENFOTIAMINE** (Mega) • 250 mg, 120 veg. caps	30.00	22.50	20.25			
01206	**BERRY COMPLETE** • 30 veg. caps	21.00	15.75	14.00			
01496	**BERRY COMPLETE W/ACAI** (Enhanced) • 60 veg. caps	29.00	21.75	19.50			
00664	**BETA-CAROTENE** • 25,000 IU, 100 softgels	11.50	8.63				
01622	**BIFIDO GI BALANCE** • 60 veg. caps	20.00	15.00	13.50			
01873	**BILBERRY EXTRACT** • 100 mg, 90 veg. caps	36.00	27.00	24.00			
01512	**BIOACTIVE MILK PEPTIDES** • 30 caps	18.00	13.50	12.00			
01631	**BIO-COLLAGEN W/PATENTED UC-II®** • 40 mg, 60 small caps	36.00	27.00	24.00			
*01006	**BIOSIL™** • 5 mg, 30 veg. caps	19.99	15.99				
*01007	**BIOSIL™** • 1 fl oz	31.99	25.59				
00102	**BIOTIN** • 600 mcg, 100 caps	7.50	5.63	4.88			
01709	**BLACK CUMIN SEED OIL** • 60 softgels	16.00	12.00	10.50			
01710	**BLACK CUMIN SEED OIL W/BIO-CURCUMIN®** • 60 softgels	32.00	24.00	22.50			
01008	**BLAST™** • 600 grams of powder	26.95	20.21				
02025	**BLOOD PRESSURE** (Dual Action) • 60 veg. tabs	44.00	33.00	28.00			

SUBTOTAL OF COLUMN 1

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
70000	**BLOOD PRESSURE MONITOR (ACCUFIT™)** • med/lg cuff	79.99	49.99				
70004	**BLOOD PRESSURE MONITOR** • Digital wrist cuff	69.95	52.46				
02024	**BLOOD PRESSURE** (Triple Action AM/PM) • 60 veg. tabs	44.00	33.00	28.00			
01214	**BLUEBERRY EXTRACT** • 60 veg. caps	22.50	16.88	15.00			
01438	**BLUEBERRY EXTRACT W/ POMEGRANATE** • 60 veg. caps	30.00	22.50	20.25			
01506	**BONE FORMULA** (DR. STRUM'S INTENSIVE) • 300 caps	56.00	42.00	37.50			
01726	**BONE RESTORE** • 120 caps	22.00	16.50	14.25			
01727	**BONE RESTORE W/VITAMIN K2** • 120 caps	24.00	18.00	16.50			
01725	**BONE STRENGTH FORMULA W/KOACT®** • 120 caps	45.00	33.75	30.00			
00313	**BONE-UP®** • 240 caps	28.95	21.71	20.41			
01661	**BORON** • 3 mg, 100 veg. caps	5.95	4.46	3.94			
00202	**BOSWELLA** • 100 caps	38.00	28.50	22.50			
01802	**BRAIN SHIELD® GASTRODIN** • 300 mg, 60 veg. caps	33.00	24.75	22.50			
01253	**BRANCHED CHAIN AMINO ACIDS** • 90 caps	19.50	14.63	12.75			
01942	**BREAST HEALTH FORMULA** • 60 caps	34.00	25.50	22.50			
00893	**BRITE EYES III** • 2 vials, 5 ml each	34.00	25.50	24.00			
26576	**BROCCO MAX®** • 60 veg. caps	26.95	20.21				
01203	**BROMELAIN** (Specially-coated) 500 mg, 60 enteric coated tablets	21.00	15.75	14.25			
	C						
01653	**CALCIUM CITRATE W/VITAMIN D** • 300 caps	24.00	18.00	15.94			
01651	**CALCIUM D-GLUCARATE** • 200 mg, 60 veg. caps	18.00	13.50	11.25			
†01823	**CALREDUCE SELECTIVE FAT BINDER** 120 mint chewable tablets	45.00	33.75	28.50			
01700	**CARDIO PEAK™ w/STANDARDIZED HAWTHORN & ARJUNA** 120 veg. caps	36.00	27.00	24.00			
00916	**CARNITINE W/GLYCOCARN®** (Optimized) • 60 veg. caps	36.00	27.00	24.00			
01532	**L-CARNITINE** • 500 mg, 30 veg. caps	15.00	11.25	9.90			
01829	**CARNOSINE** • 500 mg, 60 veg. caps	36.00	27.00	24.00			
01687	**CARNOSINE** (Super) • 500 mg, 90 veg. caps	62.00	46.50	42.00			
01932	**CAT MIX** • 100 grams powder	14.00	10.50	8.25			
01899	**CHILDREN'S FORMULA LIFE EXTENSION MIX™** 100 chewable tablets	20.00	15.00	13.50			
00550	**CHLORELLA** • 500 mg, 200 tablets	23.98	17.99				
01571	**CHLOROPHYLLIN** • 100 mg, 100 veg. caps	24.00	18.00	15.00			
01359	**CHO-LESS™** • 90 capsules	35.00	26.25				
01910	**CHOL-SUPPORT™** • 60 liquid veg. caps	48.00	36.00	32.00			
01504	**CHROMIUM W/CROMINEX®** 3+ (Optimized) 500 mcg, 60 veg. caps	9.00	6.75	6.00			
01503	**CINSULIN® W/INSEA2® AND CROMINEX® 3+** • 90 veg. caps	38.00	28.50	25.50			
01906	***CISTANCHE*** (Standardized) • 30 veg. caps	20.00	15.00	12.00			
01818	**CITRIMAX®** (Super) • 180 veg. caps	40.00	30.00	28.50			
00818	**CLA BLEND W/SESAME LIGNANS** (Super) 120 softgels	36.00	27.00	24.75	19.75		
00819	**CLA BLEND W/GUARANA & SESAME LIGNANS** (Super) 120 softgels	42.00	31.50	28.75			
01896	**COGNITEX® W/BRAIN SHIELD®** • 90 softgels	60.00	45.00	39.00	36.00		
01897	**COGNITEX® W/PREGNENOLONE & BRAIN SHIELD®** 90 softgels	62.00	46.50	39.75	37.50		
01421	**COGNITEX® BASICS** • 60 softgels	38.00	28.50	26.25	24.00		

SUBTOTAL OF COLUMN 2

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01659	**COGNIZIN® CDP CHOLINE CAPS** • 250 mg, 60 veg. caps	36.00	27.00	25.50			
01945	**COMPLETE B-COMPLEX** (BioActive) • 60 veg. caps	12.00	9.00	8.00			
02098	**COMPREHENSIVE NUTRIENT PACKS ADVANCED** • 30 packs	90.00	67.50	61.50			
01949	**COQ10 w/*d*-LIMONENE** (Super-Absorbable) 50 mg, 60 softgels	25.00	18.75	16.50	15.00		
01948	**COQ10 w/*d*-LIMONENE** (Super-Absorbable) 100 mg, 100 softgels	46.00	34.50	28.00	26.25		
01929	**COQ10** (Super Ubiquinol) • 100 mg, 60 softgels	56.00	42.00	36.00	33.00		
01733	**COQ10 w/BIOPQQ®** (Super Ubiquinol) • 100 mg, 30 softgels	54.00	40.50	33.00	30.00		
01426	**COQ10 w/ENH MITOCHONDRIAL SUPPORT™** (Super Ubiquinol) • 100 mg, 60 softgels	62.00	46.50	39.00	36.00		
01425	**COQ10 w/ENH MITOCHONDRIAL SUPPORT™** (Super Ubiquinol) • 50 mg, 100 softgels	58.00	43.50	34.50	31.50		
01427	**COQ10 w/ENH MITOCHONDRIAL SUPPORT™** (Super Ubiquinol) • 50 mg, 30 softgels	20.00	15.00	12.00			
01431	**COQ10 w/ENH MITOCHONDRIAL SUPPORT™** (Super Ubiquinol) • 200 mg, 30 softgels	62.00	46.50	39.00	36.00		
00862	**CRAN-MAX®** • 500 mg, 60 veg. caps	17.50	13.13	11.25			
01424	**CRAN-MAX® WITH ELLIROSE™** (Optimized) • 60 veg. caps	18.00	13.50	12.00			
01529	**CREATINE CAPSULES** • 120 veg. caps	10.95	8.21	6.94			
01746	**CREATINE WHEY GLUTAMINE POWDER** • 454 grams (vanilla)	30.00	22.50	19.50			
01429	**CR MIMETIC LONGEVITY FORMULA** • 60 veg. caps	39.00	29.25	27.00			
00407	**CURCUMIN®** (Super Bio) • 400 mg, 60 veg. caps	38.00	28.50	26.25			
01924	**CURCUMIN® W/GINGER & TURMERONES** (Advanced Bio) 30 softgels	30.00	22.50	20.25			
01804	**CYTOKINE SUPPRESS™ W/EGCG** • 30 veg. caps	30.00	22.50	20.25			
	COSMESIS						
80157	**ADVANCED ANTI-GLYCATION PEPTIDE SERUM** • 1 oz	53.00	39.75	34.50			
80154	**ADVANCED LIGHTENING CREAM** • 1 oz	65.00	48.75	42.75			
80155	**ADVANCED PEPTIDE HAND THERAPY** • 4 oz	46.00	34.50	29.25			
80152	**ADVANCED TRIPLE PEPTIDE SERUM** • 1 oz	65.00	48.75	42.75			
80140	**ADVANCED UNDER EYE SERUM W/STEM CELLS** • .33 oz	49.00	36.75	31.50			
80139	**AMBER SELF MICRODERMABRASION** • 2 oz	49.00	36.75	31.50			
80158	**ANTI-AGING FACE OIL** • 1 oz	59.00	44.25	39.00			
80118	**ANTI-AGING MASK** • 2 oz	72.00	54.00	47.52			
80151	**ANTI-AGING REJUVENATING FACE CREAM** • 2 oz	65.00	48.75	42.75			
80153	**ANTI-AGING REJUVENATING SCALP SERUM** • 2 oz	46.00	34.50	29.25			
80134	**ANTI-GLYCATION SERUM W/BLUEBERRY & POMEGRANATE EXTRACTS** • 1 oz	33.00	24.75	23.51			
80133	**ANTIOXIDANT FACIAL MIST** • 2 oz	32.00	24.00	22.80			
80127	**ANTIOXIDANT REJUVENATING FOOT CREAM** • 2 oz	45.00	33.75	32.10			
80128	**ANTIOXIDANT REJUVENATING FOOT SCRUB** • 2 oz	59.00	44.25	38.94			
80117	**ANTIOXIDANT REJUVENATING HAND CREAM** • 2 oz	64.00	48.00	43.12			
80105	**ANTI-REDNESS & ADULT BLEMISH LOTION** • 1 oz	74.50	55.88	49.17			
80147	**BIOFLAVONOID CREAM** • 1 oz	46.00	34.50	29.25			
80144	**BROCCOLI SPROUT CREAM** • 1 oz	46.00	34.50	29.25			
80156	**COLLAGEN BOOSTING PEPTIDE SERUM** • 1 oz	59.00	44.25	39.00			
80120	**CORRECTIVE CLEARING MASK** • 2 oz	64.50	48.38	42.57			
80141	**DNA REPAIR CREAM** • 1 oz	49.00	36.75	31.50			
80108	**ESSENTIAL PLANT LIPIDS REPARATIVE SERUM** • 1 oz	74.95	56.21	49.46			

SUBTOTAL OF COLUMN 3

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
80163	**EYE LIFT CREAM** • 0.5 fl oz	59.00	44.25	39.00			
80123	**FACE REJUVENATING ANTIOXIDANT CREAM** • 2 oz	69.50	52.13	45.87			
80107	**FINE LINE-LESS** • 1 oz	74.50	55.88	49.17			
80131	**HAIR SUPPRESS FORMULA** • 4 oz	59.00	44.25	38.94			
80137	**HEALING FORMULA ALL-IN-ONE CREAM** • 1 oz	53.00	39.75	34.07			
80115	**HEALING MASK** • 2 oz	64.50	48.38	42.57			
80102	**HEALING VITAMIN K CREAM** • 1 oz	79.50	59.63	52.47			
80109	**HYALURONIC FACIAL MOISTURIZER** • 1 oz	58.00	43.50	38.28			
80110	**HYALURONIC OIL-FREE FACIAL MOISTURIZER** • 1 oz	58.00	43.50	38.28			
80138	**HYDRATING ANTIOXIDANT FACE MIST** • 4 oz	39.95	29.96	28.50			
80103	**LIFTING & TIGHTENING COMPLEX** • 1 oz	74.50	55.88	49.17			
80146	**LYCOPENE CREAM** • 1 oz	28.00	21.00	19.05			
80135	**MELATONIN CREAM** • 1 oz	33.00	24.75	20.33			
80114	**MILD FACIAL CLEANSER** • 8 fl. oz	59.00	44.25	38.94			
80159	**MULTI STEM CELL SKIN TIGHTENING COMPLEX** • 1 oz	59.00	44.25	39.00			
80122	**NECK REJUVENATING ANTIOXIDANT CREAM** • 2 oz	64.00	48.00	42.24			
80111	**PIGMENT CORRECTING CREAM** • 1/2 oz	74.00	55.50	48.84			
80106	**REJUVENATING SERUM** • 1 oz	74.50	55.88	49.17			
80150	**RENEWING EYE CREAM** • 1/2 oz	65.00	48.75	42.75			
80142	**RESVERATROL ANTI-OXIDANT SERUM** • 1 oz	46.00	34.50	29.25			
80112	**SKIN LIGHTENING SERUM** • 1/2 oz	85.00	63.75	56.10			
80130	**SKIN STEM CELL SERUM** • 1 oz	74.00	55.50	51.75			
80143	**STEM CELL CREAM W/ALPINE ROSE** • 1 oz	66.00	49.50	43.50			
80148	**TIGHTENING & FIRMING NECK CREAM** • 2 oz	39.00	29.25	26.25			
80161	**TRIPLE ACTION VITAMIN C CREAM** • 1 oz jar	59.00	44.25	39.00			
80162	**ULTIMATE MICRODERMABRASION** • 8 fl. oz	39.00	29.25	26.25			
80160	**ULTRA EYELASH BOOSTER** • 0.25 oz (2 units $39)	59.00	44.25				
80116	**ULTRA LIP PLUMPER** • 1/3 oz	64.00	48.00	42.24			
80101	**ULTRA WRINKLE RELAXER** • 1 oz	89.95	67.46	59.82			
80113	**UNDER EYE REFINING SERUM** • 1/2 oz	74.50	55.88	49.17			
80104	**UNDER EYE RESCUE CREAM** • 1/2 oz	74.50	55.88	49.17			
80129	**VITAMIN C SERUM** • 1 oz	85.00	63.75	56.10			
80136	**VITAMIN D LOTION** • 4 oz	36.00	27.00	25.25			
80145	**VITAMIN E-ESSENTIAL CREAM** • 1 oz	28.00	21.00	19.50			
80149	**YOUTH SERUM** • 1 oz	65.00	48.75	42.75			
	D						
00658	**7-KETO® DHEA METABOLITE** • 25 mg, 100 caps	28.00	21.00	18.00			
01479	**7-KETO® DHEA METABOLITE** • 100 mg, 60 veg. caps	40.00	30.00	27.00			
01640	**DHA** (Vegetarian) • 30 veg. softgels	20.00	15.00	13.50			
00607	**DHEA** • 25 mg, 100 tablets (Dissolve in mouth)	14.00	10.50	8.81			
01478	**DHEA COMPLETE** • 60 veg. caps	48.00	36.00	32.40			
00335	**DHEA** • 25 mg, 100 caps	16.00	12.00	11.00			
00454	**DHEA** • 15 mg, 100 caps	14.00	10.50	9.00			
00882	**DHEA** • 50 mg, 60 caps	19.00	14.25	12.75			
01689	**DHEA** • 100 mg, 60 veg. caps	24.00	18.00	16.50			
01358	**DIGEST RC®** • 30 tablets	19.95	14.96	12.75			

SUBTOTAL OF COLUMN 4

SUPER SALE SAVINGS ON ALL PRODUCTS

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: www.LifeExtension.com

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
02021	**DIGESTIVE ENZYMES** (Enhanced Super) • 60 veg. caps	22.00	16.50	15.00			
02022	**DIGESTIVE ENZYMES w/PROBIOTICS** (Enhanced Super) • 60 veg. caps	28.00	21.00	18.00			
01671	**D, L-PHENYLALANINE** • 500 mg, 100 veg. caps	18.75	14.06	12.00			
01540	**DMAE BITARTRATE** • 150 mg, 200 veg. caps	18.00	13.50	11.25			
01570	**DNA PROTECTION FORMULA** • 60 veg. caps	34.00	25.50	24.00			
01931	**DOG MIX** • 100 grams powder	18.00	13.50	11.25			
02006	**DOPA-MIND™** • 60 veg. tabs	48.00	36.00	32.00			
00321	**DR. PROCTOR'S ADVANCED HAIR FORMULA** • 2 oz	39.95	29.96	24.00			
00320	**DR. PROCTOR'S HAIR SHAMPOO** • 8 oz	24.95	18.71	16.50			
	E						
01528	**ECHINACEA EXTRACT** • 250 mg, 60 veg. caps	14.35	10.76	9.38			
01997	**ENDOTHELIAL DEFENSE™ w/POMEGRANATE COMPLETE AND CORDIART™** • 60 softgels	68.00	51.00	46.50			
00997	**ENDOTHELIAL DEFENSE™ w/GLISODIN®** • 60 veg. caps	54.00	40.50	36.00			
01937	**EPA/DHA** (Mega) • 120 softgels	20.00	15.00	13.50			
01737	**ESOPHAGEAL GUARDIAN** (Berry flavor) • 60 chewable tablets	36.00	27.00	24.00			
01042	**EUROPEAN LEG SOLUTION DIOSMIN 95** 600 mg, 30 veg. tabs	20.00	15.00	13.50			
01706	**EXTRAORDINARY ENZYMES** • 60 caps	26.00	19.50	18.00			
02008	**(CALIFORNIA ESTATE) EXTRA VIRGIN OLIVE OIL** • 500 ml (16.9 fl. oz)	33.00	24.75	22.50			
01514	**EYE PRESSURE SUPPORT W/MIRTOGENOL®** • 30 veg. caps	38.00	28.50	25.50			
	F						
*01054	**FACE MASTER® PLATINUM** • Facial Toning System	199.00	199.00				
00965	**FAST-ACTING JOINT FORMULA** • 30 caps	39.00	29.25	27.00			
01717	**FAST-C® W/DIHYDROQUERCETIN** • 120 veg. tabs	26.00	19.50	18.00			
20053	**FEM DOPHILUS®** • 30 caps	25.95	19.46				
20055	**FEM DOPHILUS®** • 60 caps	39.95	29.96				
01064	**FEMMENESSENCE MACAPAUSE®** • 120 veg. caps	34.99	26.24				
02007	**FIBER-IMMUNE SUPPORT** (Apple Cinnamon) • 235 grams	34.00	25.50	23.50			
00718	**FIBRINOGEN RESIST™** • 30 veg. caps	49.00	36.75	33.00			
01749	**FLAX SEED** (Organic golden) • 14 oz	11.67	8.75				
02125	**FLORASSIST® GI w/PHAGE TECHNOLOGY** • 30 liquid veg. caps	33.00	24.75	22.50			
01821	**FLORASSIST® HEART HEALTH** • 60 veg. caps	32.00	24.00	21.00			
02019	**FLORASSIST® ORAL HYGIENE** • 30 lozenges	18.00	13.50	12.75			
01825	**FLORASSIST® BALANCE** • 30 liquid veg. caps	32.00	24.00	21.00			
02000	**FLORASSIST® MOOD** • 60 caps	33.00	24.75	22.50			
01920	**FLORASSIST® THROAT HEALTH** • 30 lozenges	20.00	15.00	13.50			
01913	**FOLATE HIGH POTENCY** (Optimized) • 5,000 mcg, 30 veg. tablets	25.00	18.75	16.50			
01939	**FOLATE** (Optimized) • 1,000 mcg, 100 veg. tablets	19.00	14.25	12.75			
01842	**FOLATE + VITAMIN B12** (BioActive) • 90 veg. caps	12.00	9.00	8.00			
01544	**FORSKOLIN** • 10 mg, 60 veg. caps	16.00	12.00	10.50			
01513	**FUCOIDAN W/MARITECH® 926** (Optimized) • 60 veg. caps	36.00	27.00	24.75			
	G						
02070	**GAMMA E MIXED TOCOPHEROL/TOCOTRIENOLS** • 60 softgels	40.00	30.00	27.00			
02075	**GAMMA E MIXED TOCOPHEROL w/ENHANCED SESAME LIGNANS** • 60 softgels	32.00	24.00	21.75			
01394	**GARLIC** (Optimized) • 200 veg. caps	24.95	18.71	15.75			
02100	**GASTRO-EASE** • 60 veg. caps	44.00	33.00	30.00			

SUBTOTAL OF COLUMN 5

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
**01122	**GINGER FORCE®** • 60 liquid caps	34.95	26.21				
01658	**GINKGO BILOBA CERTIFIED EXTRACT™** 120 mg, 365 veg. caps	46.00	34.50	31.50			
00756	**GLA WITH SESAME LIGNANS** (Mega) • 60 softgels	19.50	14.63	13.50			
00345	**(L-) GLUTAMINE CAPSULES** • 500 mg, 100 veg. caps	14.95	11.21	10.13			
00141	**(L-) GLUTAMINE POWDER** • 100 grams	22.00	16.50	15.00			
00522	**GLUCOSAMINE/CHONDROITIN CAPSULES** • 100 caps	38.00	28.50	24.00			
01541	**GLUTATHIONE, CYSTEINE & C** • 100 veg. caps	20.00	15.00	13.50			
01669	**GLYCINE** • 1,000 mg, 100 veg. caps	12.00	9.00	8.10			
01411	**GRAPE SEED EXTRACT W/RESVERATROL & PTEROSTILBENE** 100 mg, 60 veg. caps	36.00	27.00	25.50			
01620	**GREEN COFFEE EXTRACT COFFEEGENIC®** 400 mg, 90 veg. caps	32.00	24.00	21.00			
00953	**GREEN TEA EXTRACT** (Mega) • lightly caffeinated, 100 veg. caps	30.00	22.50	18.00			
00954	**GREEN TEA EXTRACT** (Mega) • decaffeinated, 100 veg. caps	30.00	22.50	18.00			
	H						
01074	**5 HTP** • 100 mg, 60 caps	27.95	20.96				
**02002	**HAIR, SKIN & NAIL REJUVENATION FORM W/VERISOL®** 90 tabs	32.00	24.00	22.00			
01738	**HCA** (Garnicia) • 90 veg. caps	17.00	12.75	11.25			
29754	**HCACTIVE™ GARCINIA CAMBOGIA EXTRACT** • 90 caps	30.00	22.50				
01393	**HEPATOPRO** • 900 mg, 60 softgels	50.00	37.50	34.50			
01527	**HUPERZINE A** • 200 mcg, 60 veg. caps	40.00	30.00	27.00			
00661	**HYDRODERM®** • 1 oz	79.95	59.96	49.00			
	I						
01704	**IMMUNE MODULATOR W/TINOFEND®** • 60 veg. caps	17.00	12.75	11.25			
00955	**IMMUNE PROTECT W/PARACTIN®** • 30 veg. caps	29.50	22.13	19.91			
02005	**IMMUNE SENESCENCE PROTECTION FORMULA™** • 60 veg. tabs	40.00	30.00	27.00			
01049	**INNERPOWER™** • 530 grams powder	42.00	31.50				
01674	**INOSITOL CAPSULES** • 1,000 mg, 360 veg. caps	62.00	46.50	43.50			
01292	**INTEGRA-LEAN® AFRICAN MANGO IRVINGIA** 150 mg, 60 veg. caps	28.00	21.00	18.00			
01677	**IRON PROTEIN PLUS** • 300 mg, 100 caps	28.00	21.00	19.50			
01492	**IRVINGIA W/PHASE 3™ CALORIE CONTROL COMPLEX** (Optimized African Mango) • 120 veg. caps	56.00	42.00	36.00			
	J, K, L						
00056	**JARRO-DOPHILUS EPS®** • 60 veg. caps	22.95	17.21				
01834	**K W/ADVANCED K2 COMPLEX** (Super) • 90 softgels	30.00	22.50	20.25			
01600	**KRILL HEALTHY JOINT FORMULA** • 30 softgels	32.00	24.00	21.75			
01050	**KRILL OIL** • 60 softgels	33.95	25.46				
00316	**KYOLIC® GARLIC FORMULA 102** • 200 veg. caps	27.45	20.59				
00214	**KYOLIC® GARLIC FORMULA 105** • 200 caps	28.45	21.34				
00789	**KYOLIC® RESERVE** • 600 mg, 120 caps	28.95	21.71				
01681	**LACTOFERRIN** • 60 caps	44.00	33.00	30.00			
00020	**LECITHIN** • 16 oz granules	18.00	13.50	12.00			
02155	**LIFE EXTENSION MIX™** • 315 tablets	80.00	60.00	52.00	43.75		
02157	**LIFE EXTENSION MIX™ W/EXTRA NIACIN** • 315 tablets	80.00	60.00	52.00	43.75		
02154	**LIFE EXTENSION MIX™** • 490 caps	90.00	67.50	58.00	47.50		
02156	**LIFE EXTENSION MIX™ POWDER** • 14.81 oz	80.00	60.00	52.00	43.75		

SUBTOTAL OF COLUMN 6

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
02165	**LIFE EXTENSION MIX™** • 315 tablets w/o copper	80.00	60.00	52.00	43.75		
02164	**LIFE EXTENSION MIX™** • 490 caps w/o copper	90.00	67.50	58.00	47.50		
02166	**LIFE EXTENSION MIX™ POWDER** • 14.81 oz w/o copper	80.00	60.00	52.00	43.75		
01608	**LIVER EFFICIENCY FORMULA** • 30 veg. caps	18.00	13.50	12.00			
01639	**5-LOX INHIBITOR W/APRÈSFLEX®** • 100 mg, 60 veg. caps	22.00	16.50	15.00			
01678	**L-LYSINE** • 620 mg, 100 veg. caps	9.00	6.75	6.00			
00455	**LYCOPENE** (Mega) • 15 mg, 90 softgels	35.00	26.25	22.50			
	M						
01992	**MACUGUARD® OCULAR SUPPORT** • 60 softgels	25.00	18.75	17.50			
01993	**MACUGUARD® OCULAR SUPPORT w/ASTAXANTHIN** 60 softgels	44.00	33.00	30.00			
01459	**MAGNESIUM CAPS** • 500 mg, 100 veg. caps	12.00	9.00	7.50			
01682	**MAGNESIUM (CITRATE)** • 160 mg, 100 veg. caps	12.00	9.00	7.50			
02107	**(EXTEND-RELEASE) MAGNESIUM** • 60 veg. caps	13.00	9.75	8.75			
01908	**MEDITERRANEAN TRIM WITH SINETROL™-XPUR** 60 veg. caps	18.00	13.50	12.00			
01668	**MELATONIN** • 300 mcg, 100 veg. caps	5.75	4.31	3.75			
01083	**MELATONIN** • 500 mcg, 200 veg. caps	18.00	13.50	12.00			
00329	**MELATONIN** • 1 mg, 60 caps	5.00	3.75	3.47			
00330	**MELATONIN** • 3 mg, 60 veg. caps	8.00	6.00	5.16			
00331	**MELATONIN** • 10 mg, 60 veg. caps	28.00	21.00	18.00			
00332	**MELATONIN** • 3 mg, 60 veg. lozenges	8.00	6.00	5.16			
01734	**MELATONIN** (Fast-Acting Liquid) • 2 fl. oz (Citrus-Vanilla)	12.00	9.00	8.25			
01787	**MELATONIN TIMED RELEASE** • 300 mcg, 100 veg. tabs	12.00	9.00	8.25			
01788	**MELATONIN TIMED RELEASE** • 750 mcg, 60 veg. tablets	8.00	6.00	5.25			
01786	**MELATONIN TIMED RELEASE** • 3 mg, 60 veg. tabs	12.00	9.00	8.25			
02101	**MEMORY PROTECT** • 36 day supply	24.00	18.00	16.00			
01536	**METHYLCOBALAMIN** • 1 mg, 60 veg. lozenges (vanilla)	9.95	7.46	6.00			
01537	**METHYLCOBALAMIN** • 5 mg, 60 veg. lozenges (vanilla)	32.00	24.00	18.75	17.25		
00709	**MIGRA-EEZE™** (Butterbur) • 60 softgels	33.00	24.75	22.00			
01522	**MILK THISTLE** (European) • 60 veg. caps	34.00	25.50	22.50			
01922	**MILK THISTLE** (European) • 60 softgels	28.00	21.00	18.75			
01925	**MILK THISTLE** (European) • 120 softgels	44.00	33.00	30.00			
01940	**MIRAFORTE w/STANDARDIZED LIGNANS** (Super) • 120 veg caps	62.00	46.50	42.00			
01869	**MITOCHONDRIAL BASICS W/BIOPQQ®** • 30 caps	44.00	33.00	30.00			
01868	**MITOCHONDRIAL ENERGY OPTIMIZER w/BIOPQQ®** • 120 caps	72.00	54.00	48.00			
00065	**MK-7** • 90 mcg, 60 softgels	28.00	21.00	18.75			
00451	**MSM** (Methylsulfonylmethane) • 1,000 mg, 100 caps	14.00	10.50	8.96			
	N						
01534	**N-ACETYL-L-CYSTEINE** • 600 mg, 60 veg. caps	14.00	10.50	9.25			
01904	**NAD+ CELL REGENERATOR™** • 100 mg, 30 veg. caps	34.00	25.50	19.50			
00066	**NATTOKINASE** • 60 softgels	25.50	19.13				
01807	**NATURAL APPETITE SUPPRESS** (Advanced) • 60 veg. caps	38.00	28.50	25.50			
00984	**NATURAL BP MANAGEMENT** • 60 tablets	44.00	33.00	30.00			
01892	**NATURAL ESTROGEN** • 60 veg. tabs	38.00	28.50	25.50			
01626	**NATURAL SEX FOR WOMEN® 50+** (Advanced) • 90 veg. caps	59.00	44.25	34.00			
01444	**NATURAL SLEEP®** • 60 veg. caps	13.00	9.75	7.50			

SUBTOTAL OF COLUMN 7

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01551	**NATURAL SLEEP® w/ MELATONIN** (Enhanced) • 30 caps	22.00	16.50	15.00			
01511	**NATURAL SLEEP® W/O MELATONIN** (Enhanced) • 30 caps	20.00	15.00	13.50			
01445	**NATURAL SLEEP® MELATONIN** • 5 mg, 60 veg. caps	18.00	13.50	12.00			
00987	**NATURAL STRESS RELIEF** • 30 veg. caps	28.00	21.00	18.00			
30741	**NERVIA®** • 90 softgels	53.95	40.46				
01603	**NEURO-MAG® MAGNESIUM L-THREONATE** • 90 veg. caps	40.00	30.00	27.00			
01602	**NEURO-MAG® MAGNESIUM L-THREONATE w/CALCIUM & VITAMIN D3** • 25 grams • Lemon flavor	40.00	30.00	27.00			
01990	**NITROVASC w/CORDIART™** • 30 veg. caps	18.00	13.50	12.00			
01903	**NK CELL ACTIVATOR™** • 30 veg. tablets	45.00	33.75	31.50			
00373	**NO FLUSH NIACIN** • 800 mg, 100 caps	19.00	14.25	12.75			
	O						
01824	**OLIVE LEAF VASCULAR SUPPORT w/CELERY SEED EXTRACT** (Advanced) • 60 veg. caps	36.00	27.00	24.00			
01988	**OMEGA-3 PLUS EPA/DHA w/SESAME LIGNANS, OLIVE EXTRACT, KRILL & ASTAXANTHIN** (SUPER) • 120 softgels	45.00	33.75	31.50	24.75		
01983	**OMEGA-3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 60 softgels	18.00	13.50	12.00	9.38		
01982	**OMEGA-3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 120 softgels	32.00	24.00	21.00	17.05		
01984	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 120 enteric coated softgels	34.00	25.50	23.25	18.00		
01985	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 60 enteric coated softgels	20.00	15.00	13.50	10.50		
01986	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 240 small softgels	32.00	24.00	21.00	17.25		
01991	**ONCE-DAILY HEALTH BOOSTER** • 60 softgels	54.00	40.50	38.00			
02113	**ONE-PER-DAY** • 60 tablets	22.00	16.50	15.00			
01328	**ONLY TRACE MINERALS** • 90 veg. caps	15.00	11.25	9.38			
	P						
01789	**PALMETTOGUARD® SAW PALMETTO W/BETA-SITOSTEROL** 30 softgels	15.00	11.25	10.50	9.00		
01790	**PALMETTOGUARD® SAW PALMETTO/ NETTLE ROOT W/BETA-SITOSTEROL** • 60 softgels	28.00	21.00	19.50	18.00		
01323	**PEAK ATP® WITH GLYCOCARN®** • 60 veg. caps	54.00	40.50	37.50			
*00342	**PECTA SOL-C® MODIFIED CITRUS PECTIN** • 454 grams powder	109.95	93.46				
*01080	**PECTA SOL-C® MODIFIED CITRUS PECTIN** • 270 veg. caps	79.95	67.96				
01811	**PEONY IMMUNE** • 60 veg. caps	36.00	27.00	24.00			
00673	**PGX® PLUS MULBERRY** (WellBetX®) • 180 veg. caps	34.95	26.21				
01953	**POMEGRANATE COMPLETE** • 30 softgels	24.00	18.00	15.75			
00956	**POMEGRANATE FRUIT EXTRACT** • 30 veg. caps	19.50	14.63	13.16			
**01837	**POMI-T®** • 60 veg. caps	35.00	26.25	24.00			
01500	**PQQ CAPS W/BIOPQQ®** • 10 mg, 30 veg. caps	24.00	18.00	13.50	12.00		
01647	**PQQ CAPS W/BIOPQQ®** • 20 mg, 30 veg. caps	40.00	30.00	24.00	21.00		
00302	**PREGNENOLONE** • 50 mg, 100 caps	26.00	19.50	16.50			
00700	**PREGNENOLONE** • 100 mg, 100 caps	30.00	22.50	20.25			
**01373	**PRELOX® NATURAL SEX FOR MEN®** • 60 tablets	52.00	39.00	36.00			
01576	**PREVAGEN®** • 30 caps	60.00	45.00				
*01577	**PREVAGEN® ES** • 30 caps	70.00	60.00				
00525	**PROBOOST™ THYMIC PROTEIN A** • 30 packets	66.60	49.95				

SUBTOTAL OF COLUMN 8

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE

SUPER SALE SAVINGS ON ALL PRODUCTS

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: www.LifeExtension.com

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01441	**PROGESTA-CARE®** • 4 oz cream	36.39	27.29	25.72			
01928	**PROSTATE FORMULA** (Ultra NAT) • 60 softgels	38.00	28.50	26.25	24.00		
01909	**PROSTAPOLLEN™** (Triple strength) • 30 softgels	28.00	21.00	18.75			
01742	**PROTEIN-ISOLATE** (Whey) Vanilla • 403 grams	30.00	22.50	19.50			
01743	**PROTEIN-ISOLATE** (Whey) Chocolate • 437 grams	30.00	22.50	19.50			
01770	**PROTEIN CONCENTRATE** (New Zealand Whey) Vanilla 500 grams	30.00	22.50	19.95			
01771	**PROTEIN CONCENTRATE** (New Zealand Whey) Chocolate 640 grams	30.00	22.50	19.95			
01812	**PROVINAL® PURIFIED OMEGA-7** • 30 softgels	27.00	20.25	18.00			
01676	**PS CAPS** (Phosphatidylserine) • 100 mg, 100 veg. caps	54.00	40.50	36.00			
01508	**PTEROPURE®** Pterostilbene• 50 mg, 60 veg. caps	32.00	24.00	22.50			
01209	**PUMPKIN SEED EXTRACT** (Water-soluble) • 60 veg. caps	20.00	15.00	13.50			
01637	**PYCNOGENOL® FRENCH MARITIME PINE BARK EXTRACT** 100 mg, 60 veg. caps	64.00	48.00	45.00			
01217	**PYRIDOXAL 5'-PHOSPHATE** • 100 mg, 60 veg. caps	22.00	16.50	14.85			
	Q, R						
01309	**QUERCETIN** (Optimized) • 250 mg, 60 veg. caps	22.00	16.50	15.00			
01030	**RED YEAST RICE** (Bluebonnet) • 600 mg, 60 veg. caps	17.60	13.20				
00605	**REGIMINT** • 60 enteric-coated caps	19.95	14.96	14.00			
01708	**REISHI EXTRACT MUSHROOM COMPLEX** • 60 veg. caps	30.00	22.50	20.25			
01448	**REJUVENEX® BODY LOTION** • 6 oz	24.00	18.00	14.85	12.75		
01621	**REJUVENEX® FACTOR FIRMING SERUM** • 1.7 oz	65.00	48.75	37.50			
01220	**REJUVENEX®** (Ultra) • 2 oz	52.00	39.00	33.00	29.25		
00676	**REJUVENIGHT®** (Ultra) • 2 oz	39.95	29.96	27.00			
01410	**RESVERATROL W/PTEROSTILBENE** • 100 mg, 60 veg. caps	36.00	27.00	24.00			
02031	**RESVERATROL W/NICOTINAMIDE RIBOSIDE** (Optimized) • 30 veg. caps	42.00	31.50	27.00			
02030	**RESVERATROL** (Optimized) • 60 veg. caps	46.00	34.50	31.00			
00889	**RHODIOLA EXTRACT** • 250 mg, 60 veg. caps	14.00	10.50	9.00			
01900	**RIBOGEN™ FRENCH OAK WOOD EXTRACT** 200 mg, 30 veg. caps	36.00	27.00	24.75			
00972	**(D) RIBOSE POWDER** • 150 grams	27.50	20.63	18.56			
01473	**(D) RIBOSE TABLETS** • 100 veg. tabs	32.00	24.00	21.00			
01609	**RICH REWARDS® BREAKFAST GROUND COFFEE** • 12 oz. bag	13.00	9.75				
01730	**RICH REWARDS® BREAKFAST BLEND GROUND COFFEE** Natural Mocha • 12 oz. bag	15.00	11.25	10.50			
01729	**RICH REWARDS® BREAKFAST BLEND GROUND COFFEE** Natural Vanilla • 12 oz. bag	15.00	11.25	10.50			
01612	**RICH REWARDS® BREAKFAST BLEND WHOLE BEAN COFFEE** 12 oz. bag	13.00	9.75				
01610	**RICH REWARDS® DECAFFEINATED ROAST GROUND COFFEE** 12 oz. bag	14.00	10.50				
01208	**R-LIPOIC ACID** (Super) • 240 mg, 60 veg. caps	49.00	36.75	33.75			
00070	**RNA CAPSULES** • 500 mg, 100 caps	17.95	13.46	12.12			
	S						
01432	**SAFFRON W/SATIEREAL®** (Optimized) • 60 veg. caps	36.00	27.00	24.00			
01935	**SAMe** (S-ADENOSYL-METHIONINE) 200 mg, 30 enteric coated tablets	25.00	18.75	16.50			
01933	**SAMe** (S-ADENOSYL-METHIONINE) 400 mg, 30 enteric coated tablets	36.00	27.00	24.00			

SUBTOTAL OF COLUMN 9

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01934	**SAMe** (S-ADENOSYL-METHIONINE) 400 mg, 60 enteric coated tablets	66.00	49.50	45.00			
01740	**SEA-IODINE™** • 1,000 mcg, 60 veg. caps	8.00	6.00	5.40			
00046	**SELENIUM** • 2 fl. oz dropper	11.95	8.96				
01879	**SE-METHYL L-SELENOCYSTEINE** • 200 mcg, 90 veg. caps	11.00	8.25	7.50			
00318	**SERRAFLAZYME** • 100 tablets	18.00	13.50	12.00			
01938	**SHADE FACTOR** • 120 veg. caps	44.00	33.00	30.00			
01884	**SILYMARIN** • 100 mg, 90 veg. caps	14.00	10.50	9.50			
01249	**SINUS CLEANSER** • 4 oz. bottle	25.00	18.75				
01596	**SKIN RESTORING PHYTOCERAMIDES w/LIPOWHEAT®** 30 liquid veg. caps	25.00	18.75	17.25			
00961	**SODZYME® w/GLISODIN® & WOLFBERRY** • 90 veg. caps	28.00	21.00	18.00			
00657	**SOLARSHIELD® SUNGLASSES** • Smoke color	12.99	9.74	8.63			
00432	**STEVIA™** (Better) • 100 packets, 1 gram each	9.95	7.46				
00438	**STEVIA™ ORGANIC LIQUID SWEETENER** (Better) • 2 oz	11.00	8.25				
01476	**STRONTIUM** • 750 mg, 90 veg. caps	20.00	15.00	13.50			
01649	**SUPER ABSORBABLE SOY ISOFLAVONES** • 60 veg. caps	28.00	21.00	18.75			
01778	**SUPER SELENIUM COMPLEX** • 200 mcg, 100 veg. caps	14.00	10.50	9.00	8.25		
	T						
02023	**TART CHERRY W/CHERRYPURE®** 60 veg. caps	20.00	15.00	14.00			
01827	**TAURINE** • 1,000 mg, 90 veg. caps	13.00	9.75	9.00			
01918	**TEAR SUPPORT w/MAQUIBRIGHT®** • 60 mg, 30 veg. caps	18.00	13.50	12.00			
00133	**L-TAURINE POWDER** • 300 grams	20.00	15.00	12.66			
*13685	**TEN MUSHROOM FORMULA®** • 120 veg. caps	39.95	33.96				
01304	**THEAFLAVIN STANDARDIZED EXTRACT** • 30 veg. caps	18.00	13.50	12.00			
01683	**(L) THEANINE** • 100 mg, 60 veg. caps	24.00	18.00	15.38			
***01038	**THERALAC® PROBIOTICS** • 30 caps	47.95	35.96				
00668	**THYROID FORMULA** (Metabolic Advantage™) • 100 caps	21.95	16.46				
00349	**TMG POWDER** • 50 grams	14.00	10.50	8.25			
01859	**TMG** • 500 mg, 60 liquid veg. caps	13.00	9.75	9.00			
01400	**TOCOTRIENOLS** (Super-absorbable) • 60 softgels	30.00	22.50	21.00			
01278	**TOOTHPASTE** • 4 oz (Mint) tube	9.50	7.13	6.50			
01917	**TRANQUIL TRACT™** • 60 veg. caps	52.00	39.00	34.50			
01468	**TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT** 60 veg. caps	24.00	18.00	16.50			
01469	**TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT w/RESVERATROL** • 60 veg. caps	32.00	24.00	22.20			
02003	**TRIPLE ACTION THYROID** • 60 veg. caps	36.00	27.00	24.00			
01803	**TRI SUGAR SHIELD®** • 60 veg. caps	36.00	27.00	24.00			
01386	**TRUFIBER™** • 180 grams	32.95	24.71				
01389	**TRUFLORA® PROBIOTICS** • 32 veg. caps	42.95	32.21				
01722	**L-TRYPTOPHAN** • 500 mg, 90 veg. caps	33.00	24.75	22.50			
01721	**TRYPTOPHAN PLUS** (Optimized) • 90 veg. caps	32.00	24.00	21.75			
02116	**TWO-PER-DAY** • 60 tablets	10.50	7.88	7.13			
02115	**TWO-PER-DAY** • 120 tablets	20.00	15.00	13.50			
02114	**TWO-PER-DAY** • 120 caps	22.00	16.50	15.00			
00326	**L-TYROSINE** • 500 mg, 100 tablets	13.50	10.13				

SUBTOTAL OF COLUMN 10

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DEDUCT AN ADDITIONAL 10% ON ALL PRODUCTS DURING SUPER SALE

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
	U, V						
01921	**URIC ACID CONTROL** • 60 veg. caps	24.00	18.00	16.50			
00213	**VANADYL SULFATE** • 7.5 mg, 100 veg. tablets	15.00	11.25	9.38			
02102	**VENOFLOW** • 30 veg. caps	52.00	39.00	36.00			
00408	**VENOTONE** • 60 caps	18.95	14.21	12.00			
01327	**VINPOCETINE** • 10 mg, 100 veg. tablets	18.00	13.50	10.50			
00372	**VITAMIN B3 NIACIN** • 500 mg, 100 caps	7.65	5.74	4.99			
00098	**VITAMIN B5** • 500 mg, 100 caps (Pantothenic Acid)	10.50	7.88	7.04			
01535	**VITAMIN B6** • 250 mg, 100 veg. caps	12.50	9.38	8.25			
00361	**VITAMIN B12** • 500 mcg, 100 lozenges	8.75	6.56	5.44			
01634	**VITAMIN C w/DIHYDROQUERCETIN** 1,000 mg, 60 veg. tablets	10.00	7.50	6.75			
00927	**VITAMIN C w/DIHYDROQUERCETIN** 1,000 mg, 250 veg. tablets	25.50	19.13	17.44			
00084	**VITAMIN C POWDER** (BUFFERED) • 454 grams	23.95	17.96	16.50			
01736	**VITAMIN C-MAGNESIUM CRYSTALS** (EFFERVESCENT) 180 grams	20.00	15.00	13.50			
01732	**VITAMIN D3** • 2,000 IU, 1 fl. oz, Mint flavor	28.00	21.00	18.75			
01753	**VITAMIN D3** • 1,000 IU, 90 softgels	7.00	5.25	4.50			
01751	**VITAMIN D3** • 1,000 IU, 250 softgels	12.50	9.38	8.44			
01713	**VITAMIN D3** • 5,000 IU, 60 softgels	10.00	7.50	6.50			
01718	**VITAMIN D3** • 7,000 IU, 60 softgels	14.00	10.50	9.45			
01758	**VITAMIN D3 W/SEA-IODINE™** • 5,000 IU, 60 caps	14.00	10.50	9.38			
00864	**VITAMIN D3 LIQUID** • 2,000 IU, 1 fl. oz	28.00	21.00	18.75			
01840	**VITAMINS D AND K W/SEA-IODINE™** • 60 caps	24.00	18.00	16.50			
01863	**VITAMIN E** (Natural) • 400 IU, 90 softgels	28.00	21.00	19.50	18.00		
01936	**VITAMIN K2** (Low dose) • 45 mcg, 90 softgels	18.00	13.50	12.00			
	W						
01902	**WAIST-LINE CONTROL™** • 120 veg. caps	42.00	31.50	28.50			
	X, Y						
01919	**X-R SHIELD** • 90 veg. caps	15.00	11.25	9.75			
00409	**XYLIWHITE™ MOUTHWASH** • 16 oz	10.00	7.50				
	Z						
01813	**ZINC HIGH POTENCY** • 50 mg, 90 veg. caps	7.95	5.96	5.25			
01561	**ZINC LOZENGES** • 60 veg. lozenges	9.00	6.75	6.00			
01961	**ZINC LOZENGES** (Enhanced) • 30 veg. lozenges	12.00	9.00	6.00			
**01051	**ZYFLAMEND® WHOLE BODY** • 120 liquid veg. caps	72.95	54.71				
	BOOKS						
34002	**THE 30-DAY HEART TUNE-UP** by Steven Masley, MD • 2016	17.59	13.19				
33999	**THE MENOPAUSE CURE** by Jill D. Davey & Sergey Dzugan, MD • 2016	17.32	12.99				
33998	**THE RIGHT TO TRY** by Darcy Olsen • 2016	26.99	20.24				
33840	**THE CRWAY® TO GREAT GLUCOSE CONTROL CD** by Paul McGlothin and Meredith Averill • 2016	189.00	189.00				
33890	**FORTIFY YOUR LIFE** by Tieraona Low Dog, MD • 2016	28.89	21.67				
33885	**THE BLUE ZONES SOLUTION** by Dan Buettner • 2015	26.00	19.50				

SUBTOTAL OF COLUMN 11

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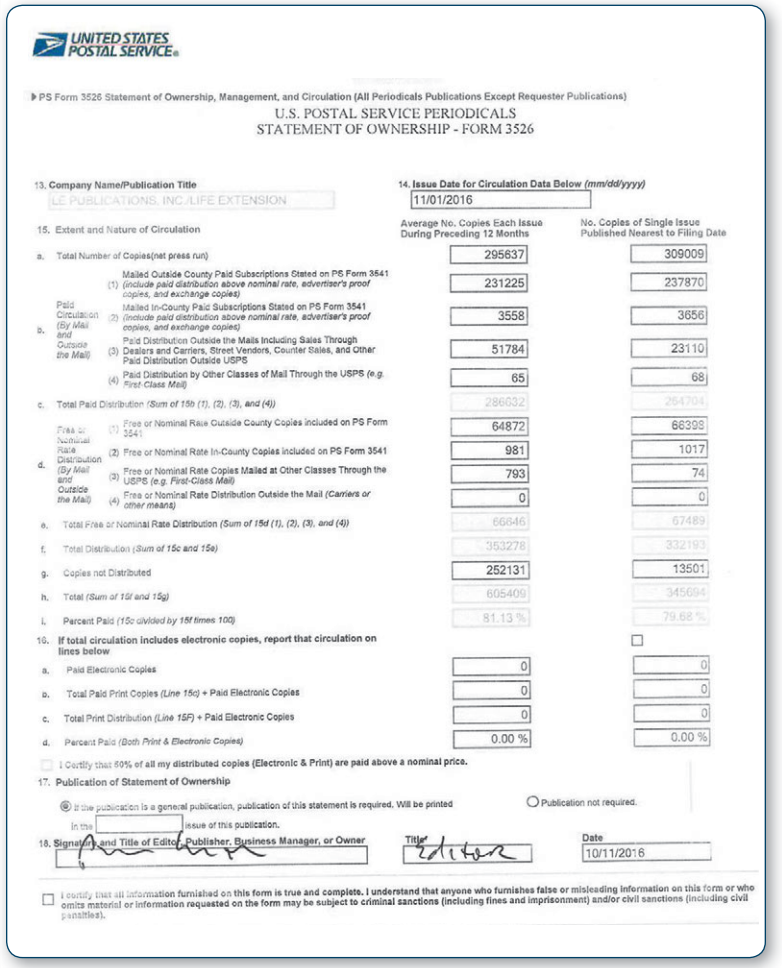

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Aging is characterized by inflammation, glycation, mitochondrial decay, and loss of cellular structure/function. **Mitochondrial Energy Optimizer** provides the following nutrients to help neutralize these changes:

- **CARNOSINE:** As humans age, proteins in their bodies become **damaged** by **glycation** reactions. *Glycation* can lead to alterations of normal cell function. **Carnosine** is a powerful **anti-glycating** agent, and protects **neurons** against protein carbonyl species associated with normal aging.[1-5]
- **PQQ:** This micronutrient has been shown to trigger the growth of new mitochondria in aging cells![7] PQQ also activates genes involved in protecting the delicate structures within the mitochondria.[8-11]
- **TAURINE:** Supports whole-body health and boosts new brain cell formation in the area of the brain connected to learning and memory.[6]
- **LUTEOLIN:** Systemic inflammation is involved in most consequences of aging. Culprits behind **inflammatory** reactions are pro-inflammatory **cytokines**, such as **interleukin-6** and **tumor necrosis factor-alpha**. *Luteolin* is a flavonoid that has been shown to help suppress these inflammatory cytokines.[12-16]
- **BENFOTIAMINE:** Benfotiamine blocks multiple destructive biochemical pathways, including AGEs' formation pathway,[17-21] which is induced by higher than desirable blood glucose levels.[22-23]
- **PYRIDOXAL 5'-PHOSPHATE:** **Pyridoxal 5'-phosphate** is the active form of vitamin B6 that has been shown to protect against both lipid and protein **glycation** reactions.[24-27]
- **R-LIPOIC ACID:** A microencapsulated Bio-Enhanced® **R-lipoic acid** facilitates youthful **mitochondrial energy output** while guarding against **free radicals**.[28-32]

Four capsules of **Mitochondrial Energy Optimizer** with BioPQQ® provide:

Carnosine	**1,000 mg**
L-Taurine	**800 mg**
R-Lipoic acid (as microencapsulated Bio-Enhanced®)	**150 mg**
Benfotiamine	**150 mg**
Vitamin B6 (as pyridoxal 5'-phosphate)	**100 mg**
BioPQQ® Pyrroloquinoline quinone disodium salt	**10 mg**
Luteolin	**8 mg**

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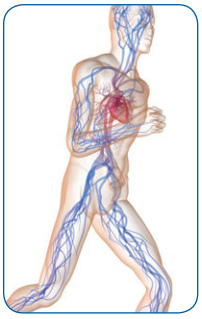
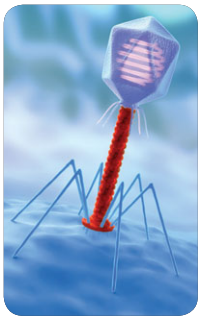


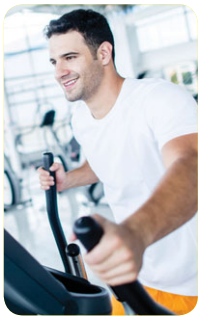
7 GREATEST THREAT TO LONGEVITY
The cause of most **disability** and **death** in persons over age 50 are abnormal **blood clots** that block **arteries** and **veins**. Fortunately, the healthy practices that readers of this magazine follow reduce risk of these occlusive **vascular** disorders.

86 METFORMIN REDUCES THE INCIDENCE OF OPEN-ANGLE GLAUCOMA
Scientists have discovered persuasive data that the **AMPK-activating** drug **metformin** may help protect against glaucoma. **Life Extension**® encourages those at risk to speak to their doctor about these findings.

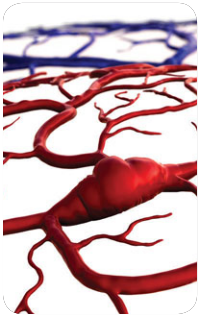
58 ACHIEVING OPTIMAL SELENIUM STATUS
Volumes of research reveal how different **selenium** compounds exert their own unique effects in impeding malignant transformation.



26 KILL HARMFUL BACTERIA IN YOUR INTESTINES
When bacteria-killing **phages** were added to **probiotics**, there was a **40-100-fold** increase in beneficial **intestinal flora** with huge reductions of pathogenic ***E.coli***. These findings represent a novel opportunity to achieve ***optimal*** intestinal flora balance.



48 CANCER PROTECTIVE VEGETABLE EXTRACT
Data show that **apigenin**, a polyphenol found in parsley and celery, can effectively starve cancer cells, guard DNA against toxins, and block malignant cell propagation.



36 PREVENTION OF DEEP VEIN THROMBOSIS
Sitting more than four hours a day increases the risk of potentially lethal blood clots, known as **deep vein thrombosis** (**DVT**), by **48%**. Researchers have developed two natural compounds that drastically *reduce* platelet aggregation- and fibrin-induced clots.