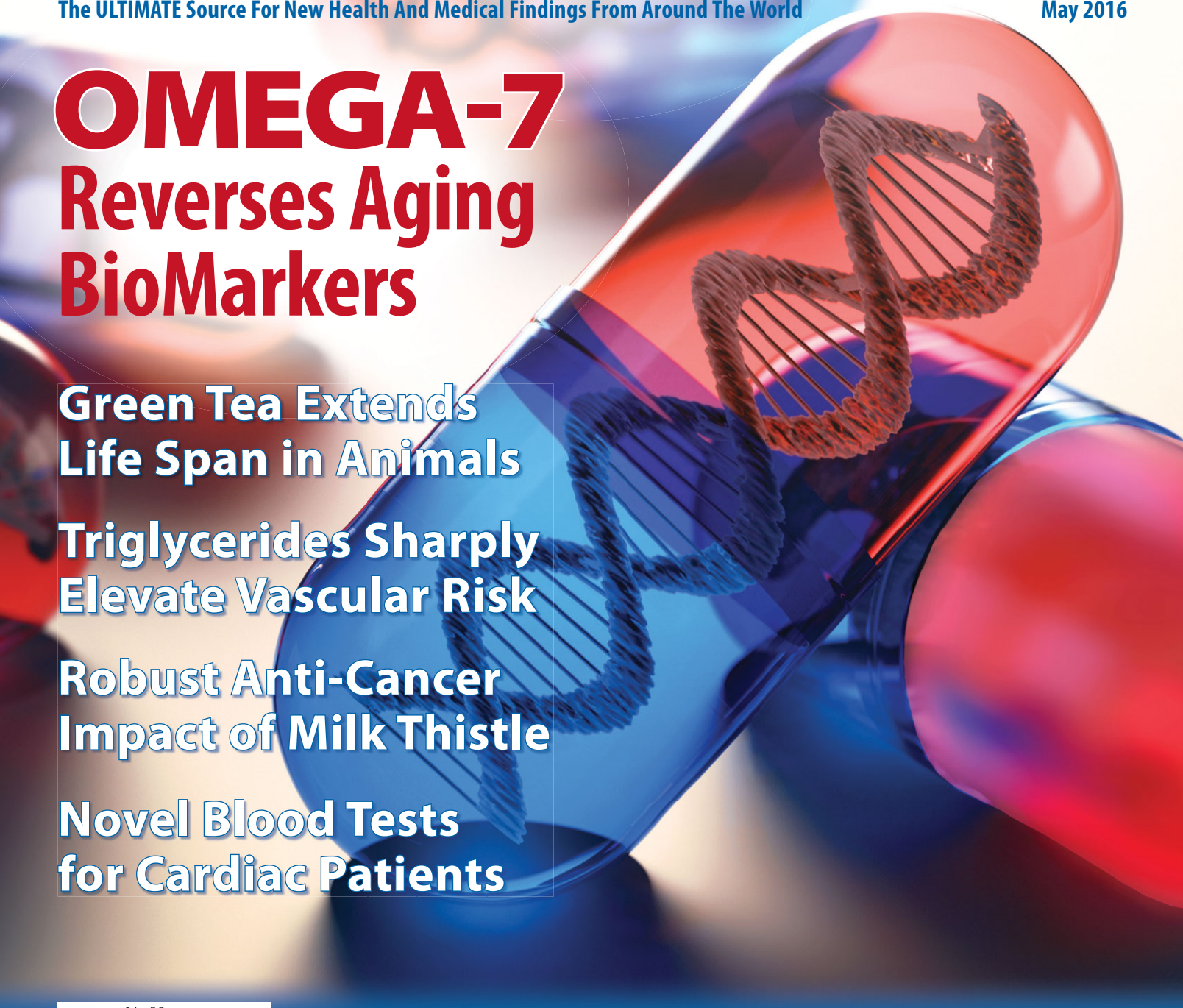
TESTOSTERONE IS SAFE AND BOOSTS SEX DRIVE

LifeExtension®

LifeExtension.com

The ULTIMATE Source For New Health And Medical Findings From Around The World

May 2016



OMEGA-7 Reverses Aging BioMarkers

Green Tea Extends Life Span in Animals

Triglycerides Sharply Elevate Vascular Risk

Robust Anti-Cancer Impact of Milk Thistle

Novel Blood Tests for Cardiac Patients

$4.99

05

0 09281 01139 2

PLUS—

Lactoferrin Supports Healing After Eye Surgery

Blood Tests Early in Life Predict Future Illnesses

Metformin Inhibits Pancreatic Cancer Progression

Does your multivitamin measure up?

Two-Per-Day beats Centrum® in 10 ways!

Are You Getting The Maximum Potency From Your Daily Vitamin?

Life Extension®'s **Two-Per-Day** formulas are the highest potency multivitamins on the market. Compared to **Centrum®** Silver® Adults 50+, **Two-Per-Day** provides:

Centrum® Can't Compete

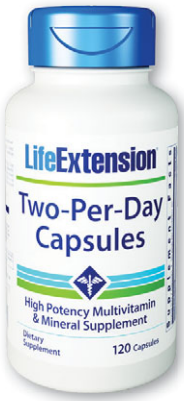
- 50 times more vitamin B1
- 12 times more vitamin B12
- 25 times more vitamin B6
- 10 times more biotin
- 10 times more selenium
- 8 times more vitamin C
- 2 times more vitamin D
- 2 times as much vitamin E
- 2.5 times as much vitamin B3
- 3 times as much zinc

Life Extension®'s **Two-Per-Day** contains superior forms of nutrients such as **5-MTHF** that is up to **7 times** more **bioavailable** than **folic acid**. These more **bioavailable** nutrients provide the body with greater biological **activity**, which is especially important as people age.

Two-Per-Day Capsules

Item #02014 • 120 capsules (**2-month** supply)

	Retail Price	Your Price
1 bottle	$22	**$16.50**
4 bottles		**$15** each



Two-Per-Day Tablets

Item #02015 • 120 tablets (**2-month** supply)

	Retail Price	Your Price
1 bottle	$20	**$15**
4 bottles		**$13.50** each

Non-GMO
Contains soybeans.

CAUTION: Individuals consuming more than 2,000 IU/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

For the complete list of ingredients, trademarks, cautions, references, dosage and use, please visit www.LifeExtension.com. Two-Per-Day provides a small amount of gamma tocopherols as part of natural mixed tocopherols, which include natural vitamin E. NIAGEN® is a registered trademark of ChromaDex, Inc., Patents see: www.ChromaDexPatents.com.

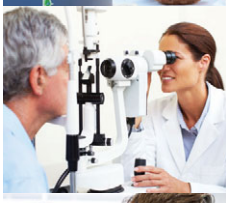
To order **Life Extension Two-Per-Day Tablets** or **Two-Per-Day Capsules**, call **1-800-544-4440** or visit **www.LifeExtension.com**

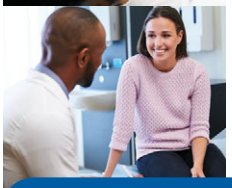
TABLE OF CONTENTS

LifeExtension® Magazine

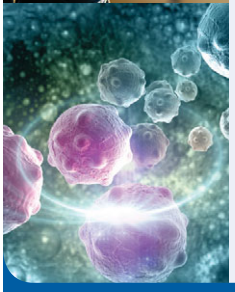
VOLUME TWENTY TWO / NUMBER FIVE • May 2016

REPORTS





DEPARTMENTS



LifeExtension® Magazine

VOLUME TWENTY TWO / NUMBER FIVE • May 2016

PUBLISHER • LE Publications, Inc.

CONNECT WITH LIFE EXTENSION ON THE WEB!

find us on facebook

Facebook.com/LifeExtension

For instant access to special offers and promotions, product news, and exclusive health and wellness information.

follow us on twitter

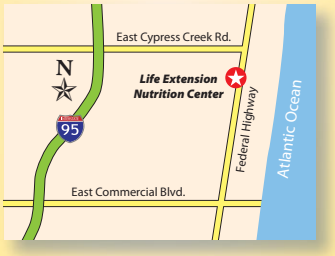
Twitter.com/LifeExtension

For up-to-the-minute health tips, breaking industry news, and the latest updates in medical research.

Customer care is available to take your calls **24 hours a day, 7 days a week.**

Visit the Life Extension Nutrition Center Store

- The Most Complete Line of Life Extension Supplements
- Blood Testing and Analysis
- Personal Consultation with Life Extension Product/Health Advisors



Nutrition Center of Florida, Inc.
5990 North Federal Highway,
Fort Lauderdale, FL 33308-2633 • 954-766-8144

Monday-Friday 9 am-8 pm,
Saturday 9 am-6 pm, Sunday 11 am-5 pm

CIRCULATION & DISTRIBUTION

Life Extension • 3600 West Commercial Blvd., Fort Lauderdale, FL 33309
Editorial offices: 954-766-8433 • fax: 954-491-5306

Customer Service: 800-678-8989
Email: customerservice@LifeExtension.com
Advisors: 800-226-2370 • Advisory email: advisory@LifeExtension.com

At *Life Extension Magazine*® we value your opinion and welcome feedback.
Please mail your comments to *Life Extension Magazine*®,
Attn: Letters to the Editor, PO Box 407198, Fort Lauderdale, FL 33340
or email us: LEmagazine@LifeExtension.com

LIFE EXTENSION (ISSN 1524-198X) Vol. 22, No.5 ©2016 is published monthly except bi-monthly in April by LE Publications, Inc. at 3600 West Commercial Blvd., Fort Lauderdale, FL 33309-3338. Published 13 times a year. Subscription rate: $40 per year in the United States. US $47 in Canada. US $60 in other countries. Mail subscriptions or address changes to: LE Publications, Inc., P.O. Box 407198, Fort Lauderdale, FL 33340-7198, USA. Or phone us toll-free at: 1-800-841-5433. Canada Subscriptions: Publications mail agreement number 40028967. Return undeliverable Canadian addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill, ON L4B4R6. You will be sent your first issue within six weeks after LE Publications, Inc. receives your subscription fee. Periodicals Postage paid at Fort Lauderdale, FL and at additional mailing offices. POSTMASTER: Send address changes to Life Extension, P.O. Box 407198, Ft. Lauderdale, Florida 33340-7198, USA. Printed in USA. For Canadian customers send change of address information and blocks of undeliverable copies to P.O. Box 1051, Fort Erie, ON L2A 6C7.

STRESSED OUT AND ANXIOUS?

Experience Tranquility with

Natural STRESS *Relief*

Daily stress disrupts our sense of well-being and shortens our telomeres.

The ingredients in **Natural Stress Relief** capsules, **lemon balm** and **L-theanine**, are clinically known to *naturally* reduce stress and promote relaxation. [1-3]

To order **Natural Stress Relief**,
call **1-800-544-4440**
or visit **www.LifeExtension.com**

Non-GMO

Contains rice.

References

1. *Journal of Functional Foods*. 2011;3(3):171-8.
2. *Asia Pac J Clin Nutr*. 2008;17 Suppl 1:167-8.
3. *Nutrients*. 2014 Oct 30;6(11):4805-21.

Natural Stress Relief

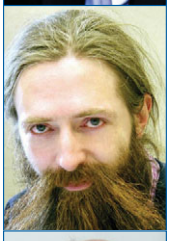
Item #00987 • 30 vegetarian capsules

	Retail Price	Your Price
1 bottle	$28	**$21**
4 bottles		**$18 each**

LifeExtension® Magazine

Örn Adalsteinsson, PhD, is chairman of the Life Extension® Scientific Advisory board. He holds a master's and doctorate from the Massachusetts Institute of Technology (MIT). He has specialized in human therapeutics including vaccines, monoclonal antibodies, product development, nutraceuticals, formulations, artificial intelligence, hormones, and nutritional supplementation. He has also authored articles and contributed to peer-reviewed publications and served as an editor for the *Journal of Medicinal Food*.

John Boik, PhD, is the author of two books on cancer therapy, *Cancer and Natural Medicine* (1996) and *Natural Compounds in Cancer Therapy* (2001). He obtained his doctorate at the University of Texas Graduate School of Biomedical Sciences with research at the MD Anderson Cancer Center, focusing on screening models to identify promising new anticancer drugs. He conducted his postdoctoral training at Stanford University Department of Statistics. He is currently president of New Earth BioMed, a nonprofit cancer research corporation that studies mixtures of natural products.



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

Frank Eichorn, MD, is a urologist specializing in prostate cancer for 10 years. He has a private practice in Bad Reichenhall, Germany, and is prostate cancer consultant at the Urologische Klinik Castringius, Planegg, Munich. In his integrative approach to prostate cancer he is working together with an international network of experts to improve treatment outcomes for prostate cancer patients with a special focus on natural and translational medicine.

Deborah F. Harding, MD, is founder of the Harding Anti-Aging Center. She is double board-certified in internal medicine and sleep disorder medicine. She also earned the Cenegenics certification in age management medicine. She is a faculty member of the new University of Central Florida Medical School.

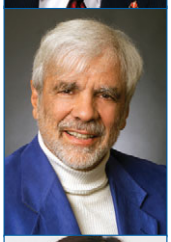
Steven B. Harris, MD, is president and director of research at Critical Care Research, a company that grew out of 21st Century Medicine in Rancho Cucamonga, CA. Dr. Harris participates in groundbreaking hypothermia, cryothermia, and ischemia research. His research interests include antioxidant and dietary-restriction effects in animals and humans.

Peter H. Langsjoen, MD, FACC, is a cardiologist specializing in congestive heart failure, primary and statin-induced diastolic dysfunction, and other heart diseases. A leading authority on coenzyme Q10, Dr. Langsjoen has been involved with its clinical application since 1983. He is a founding member of the executive committee of the International Coenzyme Q10 Association, a fellow of the American College of Cardiology, and a member of numerous other medical associations.

Dipnarine Maharaj MD, MB, ChB, FRCP (Glasgow), FRCP (Edinburgh), FRCPath., FACP
Dr. Dipnarine Maharaj is the Medical Director of the South Florida Bone Marrow Stem Cell Transplant Institute and is regarded as one of the world's foremost experts on adult stem cells. He received his medical degree in 1978 from the University of Glasgow Medical School, Scotland. He completed his internship and residency in Internal Medicine and Hematology at the University's Royal Infirmary.

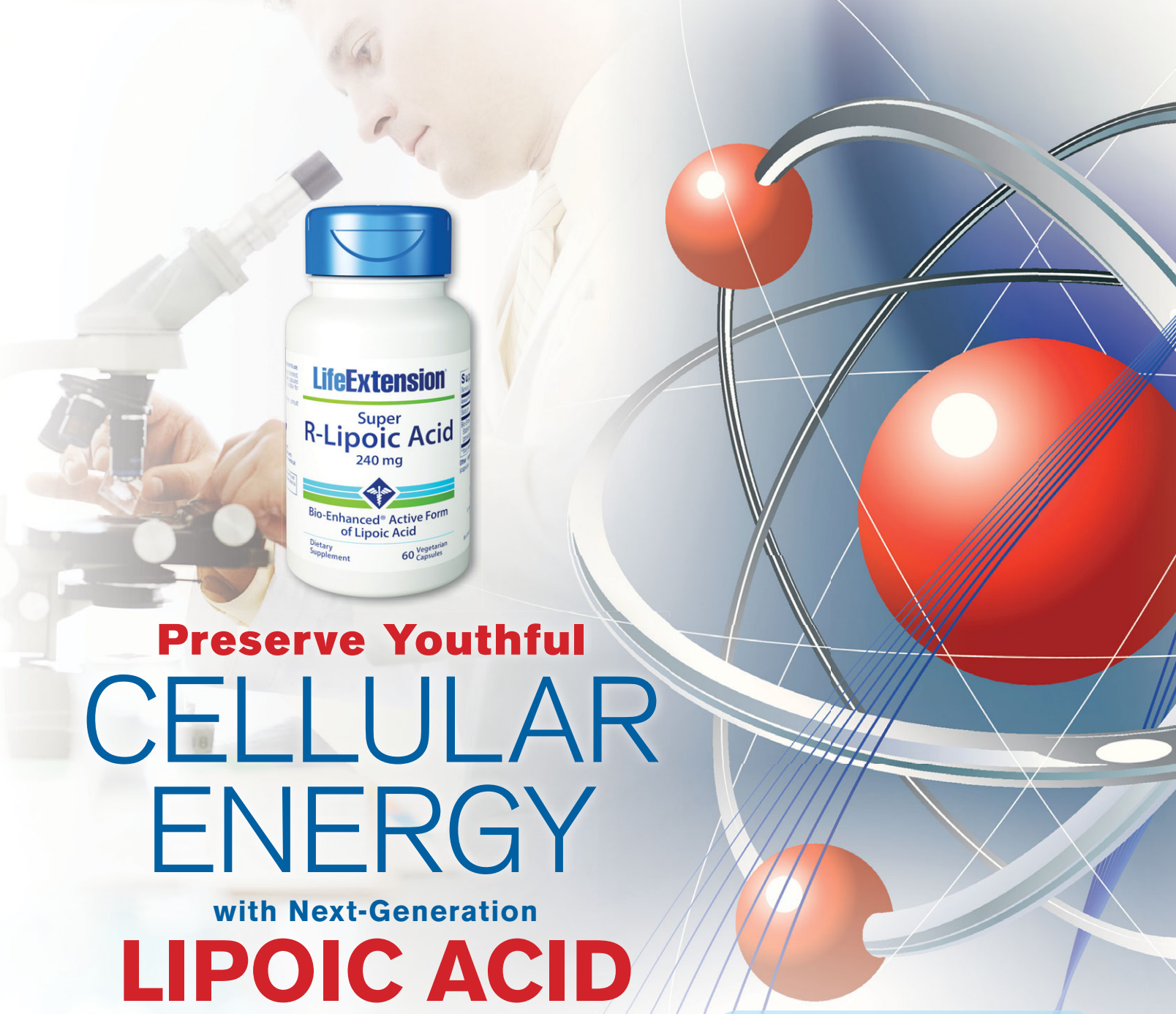
Ralph W. Moss, PhD, is the author of books such as *Antioxidants Against Cancer*, *Cancer Therapy*, *Questioning Chemotherapy*, and *The Cancer Industry*, as well as the award-winning PBS documentary "The Cancer War." Dr. Moss has independently evaluated the claims of various cancer treatments and currently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

Michael D. Ozner, MD, FACC, FAHA, is a board-certified cardiologist who specializes in cardiovascular disease prevention. He serves as medical director for the Cardiovascular Prevention Institute of South Florida and is a noted national speaker on heart disease prevention. Dr. Ozner is also author of *The Great American Heart Hoax,The Complete Mediterranean Diet* and *Heart Attack Proof*. For more information visit www.drozner.com.



Jonathan V. Wright, MD, is medical director of the Tahoma Clinic in Tukwila, WA. He received his MD from the University of Michigan and has taught natural biochemical medical treatments since 1983. Dr. Wright pioneered the use of bioidentical estrogens and DHEA in daily medical practice. He has authored or co-authored 14 books, selling over 1.5 million copies.

Xiaoxi Wei, PhD, is a chemist expert in supramolecular assembly and development of synthetic transmembrane nanopores with distinguished selectivity via biomimetic nanoscience. She has expertise in ion channel function and characterization. She founded X-Therma Inc., a company developing a radical new highway towards non-toxic, hyper-effective antifreeze agents to fight unwanted ice formation in regenerative medicine and reduce mechanical icing.



Preserve Youthful

CELLULAR ENERGY

with Next-Generation

LIPOIC ACID

Published studies have shown the critical importance of **lipoic acid** in supporting healthy mitochondrial function.

Unlike other forms of lipoic acid, **Super R-Lipoic Acid** is more bioavailable, stable, and potent, achieving **10-30 times** higher peak blood levels than pure R-lipoic acid.[1] This unique **sodium-R-lipoate** can help you reach peak plasma concentrations within just 10-20 minutes[2] of supplementation.

Super R-Lipoic Acid provides more of the active "R" form of lipoic acid than any other supplement.

To order **Super R-Lipoic Acid**,
call **1-800-544-4440**
or visit **www.LifeExtension.com**

Super R-Lipoic Acid
Item# 01208 • 60 vegetarian capsules

	Retail Price	Your Price
1 bottle	$49	**$36.75**
4 bottles		**$33.75 each**

Suggested dose is one to two capsules daily.

Non-GMO

References
1. Carlson DA, Young KL, Fischer SJ, Ulrich H. In: Packer L. Patel M. eds. *Lipoic Acid: Energy Production, Antioxidant Activity and Health Effects*. London: Taylor & Francis Publishers; 2008:235-70.
2. Carlson DA, Smith AR, Fischer SJ, Young KL, Packer L. *Altern Med Rev*. 2007 Dec;12(4):343-51.

CAUTION: If you are taking glucose-lowering medication, consult your health care provider before taking this product.

FDA Suffers Major Legal Defeat In Federal Court

BY WILLIAM FALOON

The FDA strictly ***regulates*** what drug makers are permitted to say about their products. Until lately, what could be said was limited to what the FDA allowed.

Recent federal court decisions involving the FDA have ruled ***against*** speech prohibition.

The latest victory over **FDA** censorship occurred when a maker of prescription drug **fish oil** sued the **FDA** to make a health claim about fish oil's potential to reduce **cardiovascular disease** risk.[1]

The FDA insisted it was **illegal** for the maker of this fish oil drug to state a **coronary disease** prevention claim until the FDA said so.

Fish oil has long been known to lower blood **triglyceride** levels. The FDA does not dispute this. What the FDA questions is whether persistently elevated ***triglyceride*** levels increase **heart attack** risk.

This article explores the FDA's defeat in **federal court** and provides startling revelations as to why the FDA is not convinced of the vascular dangers posed by elevated blood **triglycerides**.

What may surprise you is how backward thinking the agency responsible for **regulating** our health care has become.

What I've done here is weave the **science** behind **heart disease** and **triglycerides** together with the **FDA's** archaic interpretation of this data and the **federal court's** final decision.

You're going to read how an independent party (a federal judge) saw through the FDA's charade and ruled ***against*** the agency based on scientific and Constitutional grounds.

Triglycerides are a type of **fat** that can be measured in **blood**.

After eating, your body converts some calories it doesn't need to ***triglycerides*** that are stored in fat cells. Triglycerides are released from fat storage for energy production between meals. Your body also makes triglycerides.

Triglycerides themselves are not a component of **atherosclerotic** plaque. High triglyceride levels, however, create metabolic disturbances that increase **heart attack** and ischemic **stroke** risk.[2]

The FDA acknowledges that **triglyceride** levels over **500 mg/dL** are dangerous. The FDA allows a claim that **fish oil** drugs can reduce heart attack risk in people with triglycerides over **500 mg/dL**.

The scientific argument the FDA lost in federal court is whether persistently high triglyceride levels between **200 to 499 mg/dL** are a vascular risk factor.

What Are Optimal Triglyceride Readings?

Life Extension® has argued for the past 36 years that ***optimal*** triglyceride levels are below **100 mg/dL**. The **American Heart Association** concurs with Life Extension®'s position on what ideal triglyceride levels should be.[3]

To keep score, the box below shows the upper-limit triglyceride numbers being debated by various groups:

Organization	TRIGLYCERIDE Upper Limit
American Heart Association	Under **100 mg/dL**
Life Extension®	Under **100 mg/dL**
Conventional Reference Values	Under **150 mg/dL**
Food and Drug Administration (FDA)	Under **500 mg/dL**

As you can see, there is quite a difference of opinion on this issue.

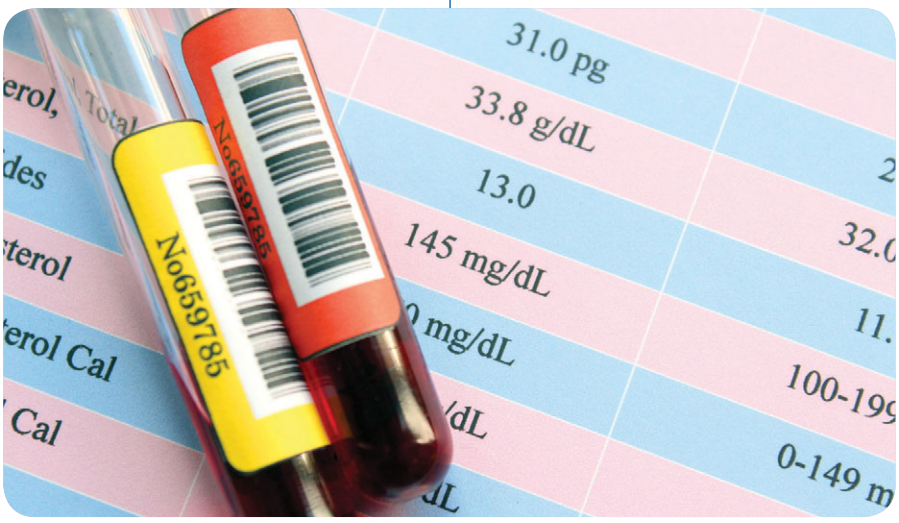
Fortunately, a federal judge ruled unconstitutional the FDA's position that a claim cannot be made for a health benefit when lowering triglyceride levels already below **500 mg/dL**.

One of the judge's reasons for this favorable ruling is that the evidence supporting the triglyceride-lowering effect of **fish oil** is truthful and non-misleading,[4-6] as is the totality of scientific evidence that reduction in triglycerides can reduce vascular disease risk.[7-9]

It helped that the FDA itself admitted these benefits of fish oil in the court proceedings. The agency nonetheless clung to its antiquated argument that it retained arbitrary power to censor the health claim, whether it is truthful or not! The judge disagreed that the FDA could prohibit truthful speech.

FDA argued that they could deny this health claim for fish oil because ***"…recent scientific studies have left it unclear whether reducing the triglyceride levels of persons with persistently high triglycerides reduces cardiovascular risk."***[10]

The judge respectfully disagreed with the FDA's interpretation of the scientific literature.



Why the Debate over Triglycerides?

In 1980, the ***New England Journal of Medicine*** published an article stating the evidence that ***triglycerides*** were an independent causative factor in vascular disease risk was "meager."[11] We at **Life Extension®** vehemently disagreed, but our organization was so tiny

back then that no one paid any attention.

Despite several decades of research, there is still a controversy as to whether persistently elevated triglycerides by themselves (independently) increase heart attack/stroke risk.

It has been challenging to pinpoint the exact lethality of high triglycerides. One reason is that people with elevated **triglycerides** often present with low HDL, insulin resistance, obesity, and type II diabetes.[12-15] **HDL** beneficially removes cholesterol from arterial walls, while **obesity** and poor **glycemic control** are proven vascular risk factors.[16-20]

So the question arises, if an **obese** and **diabetic** individual with low **HDL** suffers a **heart attack** and ***also*** has **high triglycerides**, was it the ***triglycerides*** or other factors that caused it? A quick answer in most cases is it was all of the above, plus other artery-clogging influences like **chronic inflammation**.

To further obscure the issue, high triglycerides are associated with dangerous **small-dense LDL particles**,[21] **very low-density lipoproteins** (VLDL),[22] and cholesterol-enriched **remnant lipoprotein particles**.[23] These are all known promoters of **atherosclerosis**.[24-26]

These and other confounding factors have made it challenging for the scientific community to agree on what triglyceride level predisposes people to cardiovascular diseases.

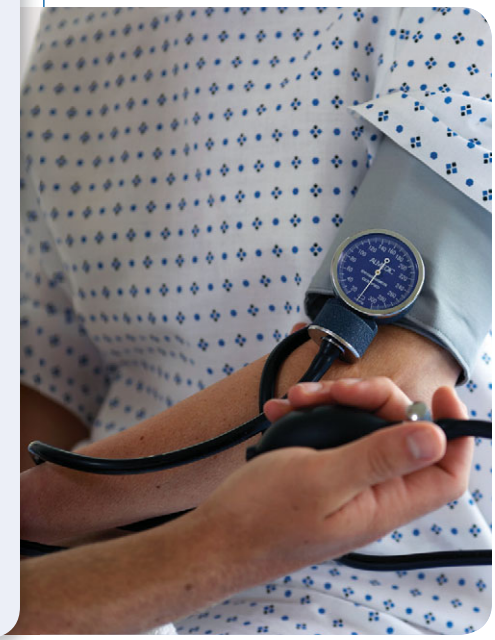
Life Extension® takes a rather simplistic view of this. We have tested the blood of thousands of younger individuals. If they are normal weight, their triglyceride levels are often below **70 mg/dL**. These young adults don't yet suffer outward vascular problems and are full of vitality. So why would anyone view triglyceride readings of **200** to **499 mg/dL** in older persons as acceptable?

We at Life Extension® want **blood profiles** to resemble healthy ***young*** people, not older individuals who often suffer from systemic **atherosclerosis**.

Human Data Reveals Dangers of High Triglycerides

Solid evidence about the dangers of triglycerides came from an analysis of a large and respected study (National Health and Nutrition Examination Survey, NHANES), that looked at all five components of **metabolic syndrome**, which include:

- Hypertension
- Insulin resistance
- Abdominal obesity
- Low HDL
- Elevated triglycerides



FDA Says Fish Oil Claims Are "Harmful"

The maker of a fish oil drug called **Vascepa**® wanted to present scientific evidence to doctors that lowering **persistently elevated** triglycerides might reduce **coronary artery disease** risk.

The FDA objected to this claim and argued that if doctors were told that lowering triglycerides below **500 mg/dL** might reduce coronary risk, then this ***"would be potentially harmful to the public health, and [the] FDA would consider such conduct to be potentially misleading or potential evidence of intended use."***[10]

The FDA defended its rationale that communicating this information about fish oil and coronary artery disease is potentially **"harmful"** because it:

"...could cause a physician to prescribe Vascepa® in lieu of promoting healthy dietary and lifestyle changes or prescribing statin therapy."[10]

The FDA's position was that if a claim about the fish oil drug lowering coronary risks were allowed, then doctors might ignore ***other*** atherosclerotic factors and prescribe only **fish oil**.

The FDA offered to compromise by stating that if the maker of the fish oil drug ***"agreed not to make the coronary heart disease claim, the FDA stated, there would no longer be a 'credible threat of prosecution,'"***[10] as the fish oil would no longer be potentially "harmful," according to the FDA's logic.

The results of the **NHANES** study showed that cardiovascular risk was most strongly associated with elevated **triglycerides**.[2] This finding, however, does not itself prove triglycerides are an independent vascular risk factor because other components of metabolic syndrome also inflict arterial damage.

More persuasive evidence comes from a meta-analysis that found for each **88.5 mg/dL** increase in **triglycerides** in men, there was a **32%** higher risk of cardiovascular disease. After adjusting for HDL, there was still a **14%** higher cardiovascular disease risk for each **88.5 mg/dL** increase in **triglycerides**.[27]

In women, the dangers of higher triglycerides were more pronounced. For each **88.5 mg/dL** increase in triglycerides, there was a **76%** increased cardiovascular risk and **37%** increased risk after adjusting for HDL.[27]

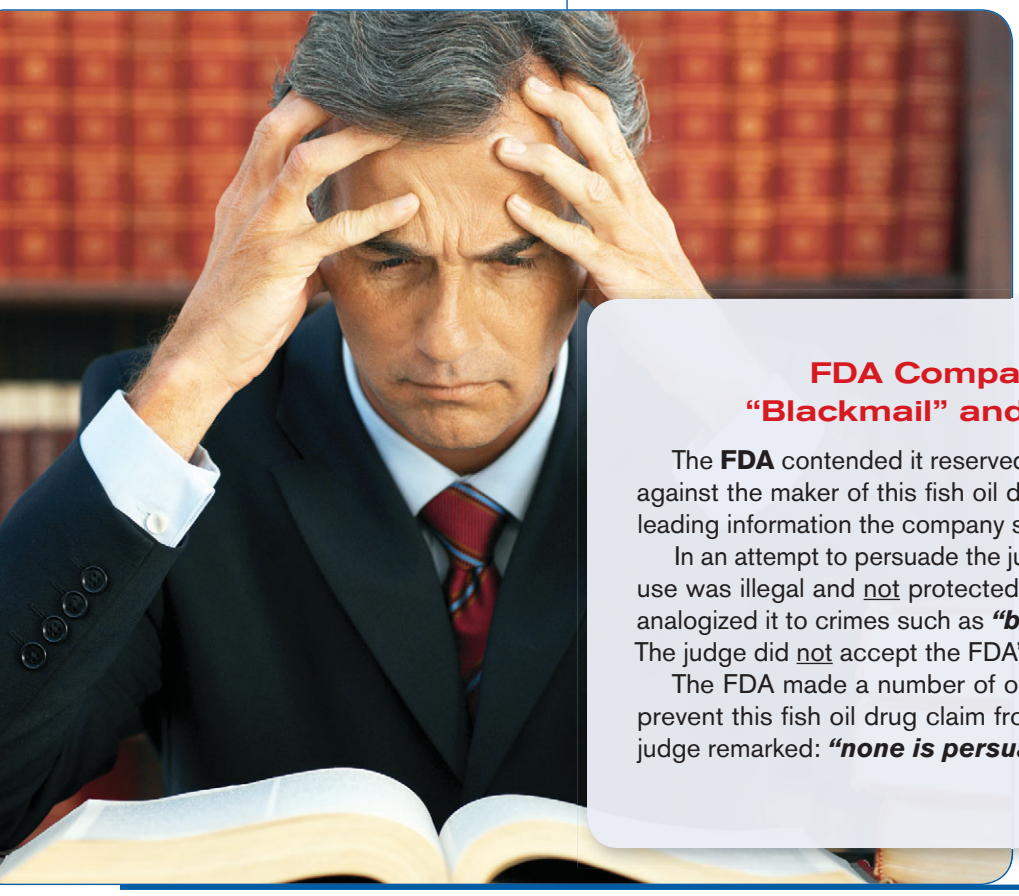
To put this data in perspective, the FDA says there is insufficient evidence to prove that triglyceride levels up to **499 mg/dL** are dangerous. Based on findings uncovered by the first meta-analysis, waiting for triglycerides to reach the **499 mg/dL** level poses an increased risk for **cardiovascular disease** of **63%** in men and **167%** in women.[27]

A second large meta-analysis (over 262,000 people) found a **72%** increased risk of cardiovascular disease in those in the upper third triglyceride blood level compared to the lowest.[8] This study further discredits the FDA's argument that up to **499 mg/dL** of triglycerides has not been proven hazardous, especially in light of Life Extension® and **American Heart Association** positions that ***optimal*** triglyceride levels are below **100 mg/dL**.

Based on this large study, the **5-fold** difference of opinion over what are safe upper-limit **triglyceride** levels means that those who choose to follow the **FDA's** recommendations may be at a **72%** increased risk of today's leading cause of death.

Perhaps the strongest triglyceride data comes from a study involving 13,953 men aged 26 to 45 who were followed up for 10.5 years. Baseline triglyceride levels in the top quintile were associated with a **4-fold** increased risk of cardiovascular disease compared with the lowest triglyceride quintile, even after adjustment for other risk factors, including HDL. An evaluation of the change in triglyceride levels over the first five years of this study and cardiovascular disease in the next five years found a direct correlation between increases in **triglyceride** levels and **cardiovascular** incidences.[28]

In world regions with lower cardiovascular risk (e.g., Spain, Japan, and Africa) triglyceride levels below **100 mg/dL** are commonly found.[29-31] Clinical trials consistently demonstrate the lowest risk of **cardiovascular disease** to be associated with the lowest fasting **triglyceride** levels.[28,32,33]



FDA Compares Fish Oil to "Blackmail" and "Jury Tampering"

The **FDA** contended it reserved the right to bring **criminal charges** against the maker of this fish oil drug based solely on truthful, non-misleading information the company sought to convey to doctors.

In an attempt to persuade the judge that communicating this off-label use was illegal and not protected by the **First Amendment**, the FDA analogized it to crimes such as ***"blackmail"*** and ***"jury tampering."***[10] The judge did not accept the FDA's warped analogy.

The FDA made a number of other irrelevant arguments seeking to prevent this fish oil drug claim from being made, to which the federal judge remarked: ***"none is persuasive."***[10]

To make matters worse, as Americans accumulate more body fat, average triglycerides have been steadily increasing. Overall, **31%** of adult Americans have triglyceride levels over **150 mg/dL**, a number that even standard reference labs say is too high.[3]

This data about the dangers of elevated **triglycerides** was argued for years in the federal court proceeding whereby the FDA threatened to bring criminal charges against the maker of a fish oil drug.

The judge ruled ***against*** the FDA on **scientific** grounds, which I find rather bizarre. Why are **federal judges** put in the position of making medical decisions like this? Isn't that what **physicians** are trained to do?

How Triglycerides Accelerate Atherosclerosis

Triglycerides are a form of fat in the blood that are either used for cellular energy production or stored as body fat. Triglycerides are not part of human atherosclerotic lesions.

What happens when triglycerides are persistently **elevated** is they can contribute to deadly low **HDL** and impede the ***ability of HDL*** to remove cholesterol from arterial walls.[12,34]

Elevated triglycerides also promote the formation of **byproducts** that are highly **atherogenic**.[21-23,35]

These triglyceride byproducts promote arterial **inflammation** and abnormal arterial **blood clotting** while impairing **endothelial function** and **insulin sensitivity**.[3,36-39] Triglycerides also have a deadly impact that contribute to **foam cells** accumulating in atherosclerosis lesions.[40]

This is why **Life Extension®** and the **American Heart Association** advise that triglyceride levels should ideally be below **100 mg/dL**.

It took a federal judge's order to prevent the FDA from bringing **criminal charges** against a company that wanted to promote its **fish oil** drug for use in people with ***triglyceride*** readings in the **200** to **499 mg/dL** range.

What Causes Elevated Triglycerides?

Factors that elevate blood triglyceride levels include a sedentary lifestyle, excess body weight (especially in the abdomen), unhealthy dietary patterns, and low intake of marine-derived ***omega-3*** fatty acids.[3,41]

What the FDA fails to understand is the association between triglyceride elevation and the **aging** process. For example, only **9.5%** of people aged **20** to **29** have triglyceride levels over **200 mg/dL**, whereas the number jumps to **22.6%** in persons **60** to **69** years.[3]

Higher triglycerides have been observed in type I and type II **diabetics**.[42-44] In **type I** diabetes, higher triglyceride levels correlate with poor glycemic control.[42] Elevated triglycerides predict progression towards **type II diabetes** in nondiabetics.[45]

In people of all ages, insufficient intake of **omega-3 fatty acids** contributes to higher **triglyceride** levels.[46] Fortunately, quality **fish oil** supplements are available with or without a prescription.

Various **genetic** defects can lead to very high triglyceride levels,[47] and in these instances, everyone (including the FDA) agrees that **fish oil** supplementation is essential to protect against heart attack,[48-51] ischemic stroke,[51-53] and lesser-known problems caused by elevated triglycerides like pancreatitis.[54-56]

An absurd argument the **FDA** made in the **federal court** case was that if a **fish oil** drug were allowed to be promoted to people with triglyceride levels between **200** to **499 mg/dL**, then healthy lifestyle/dietary changes would not be made, since patients would see their triglycerides drop in response to fish oil.

The court rejected the FDA's argument that sought to circumvent the **First Amendment**. The federal judge ruled that the maker of this **fish oil** drug had a **free speech** right to convey factual information without having to fear FDA prosecution.

© BRIDGES ADERHOLD

Dietary Factors Affecting Triglyceride Blood Levels

Huge numbers of clinical trials have been conducted to ascertain what components of the human **diet** elevate or reduce blood **triglyceride** levels.

Data from these studies show how one's triglyceride level can be modestly lowered by reducing the type and amount of unhealthy dietary fats, cholesterol-rich foods, and ***trans*** fats.

In a meta-analysis of 30 controlled feeding studies, a moderate-fat diet decreased triglycerides by **9.4 mg/mL**, whereas **type II diabetics** consuming this same modest-fat diet showed a striking **24.8 mg/dL** decrease in triglycerides.[57]

This data indicates how dangerous it is for *diabetics* to excessively eat the wrong **fats**. Diabetics suffer multiple metabolic disturbances that preclude them from safely burning/storing dangerous fats that wind up in their bloodstream as **triglycerides**.

To help lower **triglycerides** while boosting beneficial **HDL**, all aging individuals should avoid added **sugars** and restrict **total carbohydrate** consumption to below **60%** of one's diet.

To demonstrate the danger of **fast foods**, a feeding study found that consuming a meal with **15 grams** of fat boosted postprandial (after-meal) triglyceride levels by a modest **20%**, whereas **high-fat meals** (**50 grams** of fat), including those served in popular fast-food restaurants, increased triglyceride levels by at least **50%** beyond fasting levels.[58]

While standard **blood tests** are usually done in the **fasting** state, a number of recent studies show that chronically high ***after-meal*** blood levels of **triglycerides** and **glucose** are particularly dangerous.[59-61] This data adds to the growing body of evidence showing marked reductions in **disease risk** by following healthier eating patterns.[62-64]

Adherence to a **Mediterranean-style diet** lowers triglycerides **10%** to **15%** more than a strict **low-fat** diet.[65,66] Yet **triglyceride** reductions in response to dietary changes are not always as substantial as many aging people require.

In response to reduced **calorie intake**, there are consistent reductions in body fat and blood triglyceride levels. The more body weight shed, the greater the decline in **blood triglycerides**. The percent reduction, however, does not always result in people achieving **optimal** triglyceride levels, which is why **fish oil** is so important.

Most Direct Way of Slashing Triglycerides

Consumption of ***omega-3*** fatty acids has shown the most robust and consistent reductions in blood **triglyceride** levels.[6,67]

A comprehensive review of **human studies** showed that **triglyceride** levels dropped **25%** to **30%** in response to daily ingestion of **4,000 mg** of marine-derived omega-3s.[5]

This study found a dose-response relationship, with each **1,000 mg** of **EPA/DHA** producing a **5%** to **10%** reduction in blood **triglyceride** readings. The effects of fish oil in lowering triglycerides are more pronounced for individuals with higher beginning triglyceride levels.

Studies on **plant** sources of omega-3s have not produced consistent triglyceride-lowering effects. That's because plant-derived omega-3 comes in the form of ***alpha linolenic acid*** that requires an ***enzyme*** (delta-5-desaturase) to convert alpha linolenic acid to **EPA/DHA** in the body.[68] Activity of the ***delta-5-desaturase*** enzyme diminishes with aging.[69] Plant-based chia, flaxseed, and walnuts are healthy to eat, but don't expect them to lower triglycerides the same as **cold-water fish**.

When one ingests marine omega-3s, **EPA** and **DHA** are obtained directly without the need of enzymatic conversion. For the purpose of lowering triglycerides, omega-3s should come from marine-derived EPA and/or DHA, i.e. **fish oil concentrates**.

The **American Heart Association** recommends **2,000** to **4,000 mg** EPA/DHA a day to lower triglycerides, providing that the capsules are taken under a

physician's care. This recommendation is based on a large body of evidence showing triglyceride-lowering effects of marine-derived omega-3.[70-73]

A person with **blood triglyceride** levels above **100 mg/dL** can usually determine an appropriate omega-3 dose. Life Extension® recommends a Mediterranean-type diet and supplementation with about **2,400 mg** of **EPA/DHA** for overall health, which includes maintaining **triglyceride** levels in optimal ranges.

If triglycerides remain stubbornly high, then increase the amount of **fish oil** capsules and try to make healthier dietary and lifestyle choices.

The Prescription Fish Oil Drug

The name of the drug the FDA lost its legal case on is **Vascepa®**.

Unlike fish oil dietary supplements that contain **EPA** and **DHA**, Vascepa® contains only **EPA**. The reason for this is that while EPA and DHA both lower triglycerides, **DHA** omega-3 can ***slightly*** increase cholesterol.

Since cardiac patients often have cholesterol issues, a company obtained approval from the **FDA** to market **EPA**-only **fish oil** as an expensive **prescription drug**.

The FDA approved **Vascepa®** only in people with very high triglycerides (over **500 mg/dL**). When the company promoted Vascepa® to doctors for use in patients with triglyceride levels between **200** to **499 mg/dL**, the **FDA** threatened **criminal charges** because according to the FDA, there was insufficient evidence that lowering persistently elevated triglycerides (**200** to **499 mg/dL**) would produce a benefit to patients with coronary artery disease.

In response to exercising their **First Amendment** right to inform doctors of the benefit in lowering ***persistently elevated*** triglycerides, the FDA mystically transformed **Vascepa®** (EPA-fish oil) into a **misbranded drug** that subjected the company and its employees to **criminal** charges.

FDA Concerned about Its Regulatory Authority

The **FDA** argued in the court case it lost that it had the **authority** to censor a claim that this **fish oil** drug might reduce **coronary artery disease** risk.

The FDA warned that if the judge were to uphold the right of the fish oil drug maker to communicate this data to doctors, this would be a:

"frontal assault...on the framework for new drug approval that Congress created in 1962."[10]

FDA also argued it had not determined that the fish oil drug is safe and effective and therefore the FDA could bring **criminal charges** against the maker of this fish oil drug. The FDA said its enforcement against promotional statements for this fish oil drug would not **prohibit speech** and therefore not violate the **First Amendment**.

The maker of the fish oil drug countered that the FDA's threat to bring **misbranding charges** for off-label use was having a "chilling" effect that prevented doctors from receiving constitutionally protected speech. The fish oil drug maker asked the judge to grant a preliminary injunction against the FDA from taking enforcement action, or declaratory relief recognizing their First Amendment rights.

The judge ruled in ***favor*** of the **fish oil drug maker** and ***against*** the **FDA** on this Constitutional issue. He made it clear that the court was not denying the FDA's power to regulate, but merely allowing for the maker of this fish oil drug to communicate truthful and non-misleading speech under the **First Amendment**.

The company making **Vascepa®** filed a lawsuit against the FDA stating their claims were truthful and non-misleading. According to the company, the FDA was chilling free speech by claiming the company's promotion of Vascepa® for use in people whose triglycerides were **200** to **499 mg/dL** was **illegal**.

Recall that the **American Heart Association** and **Life Extension®** believe that optimal triglyceride levels for protecting cardiovascular health are under **100 mg/dL**. The FDA views are diametrically opposite to what is near consensus in the medical community, i.e. triglycerides levels should be no higher than **100** to **150 mg/dL** of blood.

What's Good and Bad about Vascepa®

Vascepa® is marketed to doctors as a **fish oil drug** that lowers **triglycerides** without raising **LDL cholesterol** levels.

To the physician, this may sound appealing compared to a competitive **fish oil drug** called **Lovaza®**, which contains **EPA** and **DHA**.

If you chose to use an expensive fish oil drug, **Lovaza®** might be the better choice. That's because of peer-reviewed findings showing **Lovaza®** lowered ***triglycerides*** by a median of **51.6%**, whereas Vascepa® lowered triglycerides by a median of **33.1%**, compared to placebo in both cases. Therefore, the studies examined found Lovaza® to be about **56%** more effective than Vascepa® at triglyceride lowering when comparing median percent changes.[74] The one benefit that Vascepa® has as stated on their website is:

"Vascepa®, EPA only, has been shown to lower triglycerides without raising LDL (bad) cholesterol."[75]

Inside the FDA's Brain

One of the FDA's scientific arguments against making a claim that **fish oil** reduces cardiovascular risks in people with **persistently high triglycerides** (**200** to **499 mg/dL**) is that clinical trials using ***other*** triglyceride-lowering therapies had no impact on this group of patients. An FDA advisory panel concluded:

"...that although...Vascepa® had reduced triglyceride levels in patients with persistently high triglycerides, there was 'substantial uncertainty' whether reducing triglyceride levels would significantly reduce the risk for cardiovascular events in such patients."[10]

We at Life Extension® do not see how these "other" triglyceride-lowering therapies relate to the vascular protective benefits conferred by **fish oil**. The FDA nonetheless argued this point as a reason for suppressing the **First Amendment** right of the maker of Vascepa®. The judge **rejected** the FDA's assertion.

The FDA further argued this point stating:

"These trials 'failed to demonstrate any additional benefit' of such drugs, and although some later analyses had suggested that patients with high triglycerides may benefit from using such drugs, 'this remains to be confirmed.'"[10]

The judge again **rejected** FDA's argument. Here is what the FDA wrote as a threat to bring criminal charges against the maker of **Vascepa®** if it stated a benefit in lowering persistently elevated triglycerides:

"This product [Vascepa®] may be considered to be misbranded under the [FDCA] if it is marketed with this change before approval of this supplemental application."[10]

In response to FDA threats of incarceration, the maker of Vascepa® brought a **First Amendment** lawsuit seeking to stop the FDA from prohibiting the company ***"...from making completely truthful and non-misleading statements about its product to sophisticated health care professionals..."***[1]

In other words, the maker of Vascepa® did not seek to promote their fish oil to consumers, but only to doctors. The FDA contended dissemination of truthful, non-misleading information to doctors was nonetheless "illegal" without FDA "approval" of the claims.

The FDA lost this argument and the federal judge issued a final order barring the **FDA** from bringing **criminal charges** against the maker of Vascepa®.

What doctors may not take the time to comprehend is that there is far more to consider than simply LDL cholesterol levels when comparing Vascepa® (EPA only) with Lovaza® (EPA+DHA).

Five direct-comparison studies from a large meta-analysis found **DHA** was more effective in reducing triglycerides than **EPA**. The same analysis also found DHA led to a **4.49 mg/dL** *increase* in HDL-C, while EPA did not.[76]

Although LDL cholesterol may rise to some extent with EPA plus DHA supplementation, a shortcoming of relying on EPA alone is that DHA may reduce the atherogenicity of LDL. This is because DHA has been shown to significantly increase the size of LDL particles compared with EPA.[77] Larger, more buoyant LDL particles are less likely to clog arteries with deadly plaque.[78]

In a large trial comparing EPA (Vascepa®) plus statin therapy to statins alone, rates of sudden cardiac death and coronary death were not reduced by EPA.[79]

In a separate large trial in which subjects were given EPA plus DHA (Lovaza®), a **45%** reduction in risk of sudden death was observed, along with a **20%** reduced risk of death from any cause.[80] However, not all trials of omega-3 fatty acids have shown these robust effects.[81,82]

International cardiovascular professional societies support the use of fish oil supplements.[3,83,84] The American Heart Association recommends **2** to **4 grams** of marine EPA plus DHA daily for high triglycerides.[3]

Dangers of a DHA Deficit

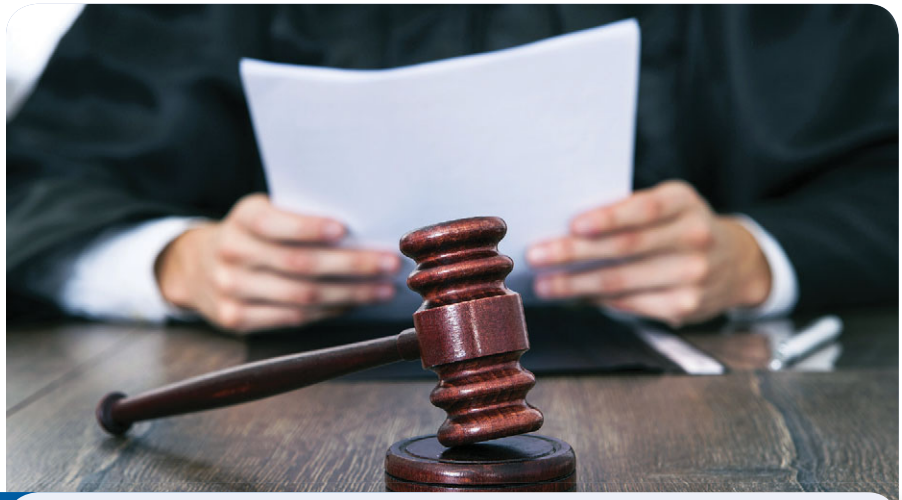
What we at **Life Extension**® are most troubled by is the fact that patients taking Vascepa® are unlikely to take other fish oil supplements, and therefore suffer a deficiency of the **DHA** component of the omega-3 family.

How important is **DHA**? To start with, it forms the major ***structural*** component of **brain cell** membranes. When looking at the overall health benefits of DHA compared to EPA, the clear winner is DHA. Some respected sources have even written that most people could derive virtually all of fish oil's benefits by taking only the **DHA** fraction.[76,85,86]

The cost for a one-month supply of Vascepa® is around **$250**. Lovaza® costs around **$300** a month. The same amounts of omega-3s can be obtained from high-quality **dietary supplements** for a fraction of these prices.

Even those with health insurance generous enough to cover prescription fish oil drugs will often find the **copays** for omega-3 prescription drugs exceed the low **free-market** price of high-quality fish oil supplements. Some insurance companies refuse to cover prescription drug fish oils and tell their policyholders to buy their fish oil from a dietary supplement company.

With the federal government committing billions of dollars a year to cover the full retail prices of prescription drugs for lower income individuals, we suspect that this is where many of the sales for Lovaza® and Vascepa® will come from. As a taxpayer, you should be outraged.



The Federal Judge's Final Ruling

After years of costly litigation, thousands of pages of documents produced, and huge amounts of productive time squandered, the court ruled in favor of a qualified health claim that could be made for the **fish oil drug** (Vascepa®) without the company exposing itself to criminal liability for **misbranding**.

The court based this ruling on the fact that the claim is truthful and non-misleading, that the FDA accepted this phrasing elsewhere in their regulatory labyrinth, and the First Amendment.

So here is the claim that is now allowed to be made to doctors about this prescription drug fish oil:

"Supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease. Vascepa® should not be taken in place of a healthy diet and lifestyle or statin therapy."[10]

That's it. After years of protracted disagreement that led to full blown litigation, the above statement is the primary outcome of this First Amendment victory over FDA censorship.

In the ruling, the judge quoted from prior cases that ***"'securing First Amendment rights is in the public interest'"*** and ***"'the government does not have an interest' in the unconstitutional enforcement of a law."***[10]

The judge's concluding remarks from this **68-page** ruling are:

"Finally, there is no basis to fear that promoting Vascepa® for this off-label purpose would endanger the public health. Vascepa® is a fish oil product. And it is already widely prescribed to treat patients with persistently high triglycerides. The FDA has acknowledged that it has no evidence that Vascepa® is harmful–indeed, it volunteered that it would not object to Vascepa®'s being marketed as a dietary supplement. The balance of equities and the public interest both thus overwhelmingly favor granting relief."[10]

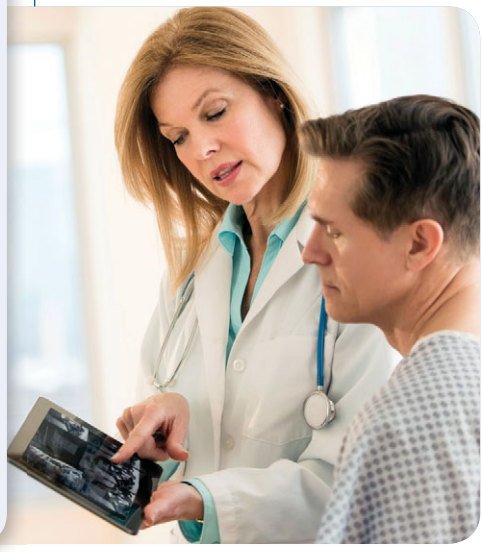
Become an Empowered Patient

Doctors are so inundated with new findings and suffocating bureaucracy that they cannot keep up with every aspect of medicine.

A growing shortage of practicing physicians mandates consumers take partial charge of their health care. When it comes to many of the known cardiovascular risk factors, ***taking charge*** is not difficult.

As it relates to ***triglycerides***, you want your **blood levels** to be under **100 mg/dL**. The comprehensive **Male** and **Female Blood Test Panels** offered by Life Extension® include a host of vascular disease markers, including ***triglycerides***.

If your triglyceride result comes back over **100 mg/dL**, you are welcome to bring this to the attention of your physician. You may also want to take some action on your own, such as increasing your intake of ***omega-3s*** and making lifestyle changes to safely push triglycerides (and other vascular risk markers) down. You can then proudly show your physician what you accomplished and spare his/her time for more important treatment issues you may face.



Annual Blood Test Super Sale

Most Americans delay getting lab tests until after outward symptoms of disease develop.

The reasons for deferring blood testing includes not knowing which tests to order, difficulty in finding a physician to prescribe proper blood tests, inability to access results, and lack of affordability.

Life Extension® resolved these problems **20 years ago** by offering **comprehensive blood test panels** direct to health-conscious consumers at **low prices** with quick turnaround times, free access to health advisors to review results, and convenient drawing time usually with no appointment needed.

Every year, we announce our **Blood Test Super Sale** that slashes the price of our comprehensive panels.

This annual event prompts health-conscious consumers to order our **Male** or **Female Blood Test Panels** to identify health problems in time to take corrective actions.

A complete description of our popular Male and Female Blood Test Panels appears on the next page. These panels provide comprehensive assessments of **heart attack/stroke** risk factors by measuring **total cholesterol**, **LDL** and **HDL**, **glucose**, **C-reactive protein**, **homocysteine**, **hormones**, and ***triglycerides***.

When you request these tests, we send you a pre-paid requisition receipt and a list of drawing stations in your area. You can then take the requisition to the nearest drawing station at your convenience.

To order the **Male** and/or **Female Blood Test Panel**, or any of the specialized tests Life Extension® offers at huge savings, call **1-800-208-3444** or log on to **LifeExtension.com/blood**

For longer life,

William Faloon

How a Consumer Revolt Protected Supplements Against FDA Censorship

The **FDA** has long argued that the **First Amendment** to the United States Constitution does not restrict the agency from **censoring** truthful, non-misleading information.

The **FDA** contends their **authority** to limit free speech ***protects*** the public.

Back in the early **1990s**, the American citizenry revolted against the FDA's attempt to ban **dietary supplements**. The result was passage of a federal law in **1994** that prohibited the FDA from censoring scientific information about nutrients shown to confer health benefits.[87]

This 1994 law did not extend to **prescription drugs**, even if the drug ingredient is identical to dietary supplements and available without a physician's prescription.

References

1. Available at: http://www.aboutlawsuits.com/wp-content/uploads/2015-5-8-Amarin-offlabel-lawsuit.pdf. Accessed February 9, 2016.
2. Ninomiya JK, L'Italien G, Criqui MH, et al. Association of the metabolic syndrome with history of myocardial iinfarction and stroke in the Third National Health and Nutrition Examination Survey. *Circulation.* 2004;109(1):42-6.
3. Miller M, Stone NJ, Ballantyne C, et al. Triglycerides and cardiovascular disease: a scientific statement from the American Heart Association. *Circulation.* 2011;123(20):2292-333.
4. Jacobson TA. Role of n-3 fatty acids in the treatment of hypertriglyceridemia and cardiovascular disease. *Am J Clin Nutr.* 2008;87(6):1981s-90s.
5. Harris WS. n-3 fatty acids and serum lipoproteins: human studies. *Am J Clin Nutr.* 1997;65(5 Suppl):1645s-54s.
6. Skulas-Ray AC, West SG, Davidson MH, et al. Omega-3 fatty acid concentrates in the treatment of moderate hypertriglyceridemia. *Expert Opin Pharmacother.* 2008;9(7):1237-48.
7. Kris-Etherton PM, Harris WS, Appel LJ, et al. Fish consumption, fish oil, omega-3 fatty acids, and cardiovascular disease. *Circulation.* 2002;106(21):2747-57.
8. Sarwar N, Danesh J, Eiriksdottir G, et al. Triglycerides and the risk of coronary heart disease: 10,158 incident cases among 262,525 participants in 29 Western prospective studies. *Circulation.* 2007;115(4):450-8.
9. Austin MA, Hokanson JE, Edwards KL. Hypertriglyceridemia as a cardiovascular risk factor. *Am J Cardiol.* 1998;81(4a):7b-12b.
10. Available at: http://www.fdalawblog.net/Amarin%20Decision%208-2015%20Off-Label.pdf. Accessed February 10, 2016.
11. Hulley SB, Rosenman RH, Bawol RD, et al. Epidemiology as a guide to clinical decisions. The association between triglyceride and coronary heart disease. *N Engl J Med.* 1980;302(25):1383-9.
12. Jeppesen J, Hein HO, Suadicani P, et al. Relation of high TG-low HDL cholesterol and LDL cholesterol to the incidence of ischemic heart disease. An 8-year follow-up in the Copenhagen Male Study. *Arterioscler Thromb Vasc Biol.* 1997;17(6):1114-20.
13. Ginsberg HN, Zhang YL, Hernandez-Ono A. Regulation of plasma triglycerides in insulin resistance and diabetes. *Arch Med Res.* 2005;36(3):232-40.
14. Carr MC, Brunzell JD. Abdominal obesity and dyslipidemia in the metabolic syndrome: importance of type 2 diabetes and familial combined hyperlipidemia in coronary artery disease risk. *J Clin Endocrinol Metab.* 2004;89(6):2601-7.
15. Kraegen EW, Cooney GJ, Ye J, et al. Triglycerides, fatty acids and insulin resistance--hyperinsulinemia. *Exp Clin Endocrinol Diabetes.* 2001;109(4):S516-26.
16. Bjornholt JV, Erikssen G, Aaser E, et al. Fasting blood glucose: an underestimated risk factor for cardiovascular death. Results from a 22-year follow-up of healthy nondiabetic men. *Diabetes Care.* 1999;22(1):45-9.
17. Whitmer RA, Gustafson DR, Barrett-Connor E, et al. Central obesity and increased risk of dementia more than three decades later. *Neurology.* 2008;71(14):1057-64.
18. Winter Y, Rohrmann S, Linseisen J, et al. Contribution of obesity and abdominal fat mass to risk of stroke and transient ischemic attacks. *Stroke.* 2008;39(12):3145-51.
19. Nicklas BJ, Cesari M, Penninx BW, et al. Abdominal obesity is an independent risk factor for chronic heart failure in older people. *J Am Geriatr Soc.* 2006;54(3):413-20.
20. Cucuianu M, Coca M, Hancu N. Reverse cholesterol transport and atherosclerosis. A mini review. *Rom J Intern Med.* 2007;45(1):17-27.
21. Austin MA, Breslow JL, Hennekens CH, et al. Low-density lipoprotein subclass patterns and risk of myocardial infarction. *Jama.* 1988;260(13):1917-21.
22. Berglund L, Brunzell JD, Goldberg AC, et al. Evaluation and treatment of hypertriglyceridemia: an endocrine society clinical practice guideline. *J Clin Endocrin Metab.* 2012;97(9):2969-89.
23. Nordestgaard BG, Benn M, Schnohr P, et al. Nonfasting triglycerides and risk of myocardial infarction, ischemic heart disease, and death in men and women. *JAMA.* 2007;298(3):299-308.
24. Hodis HN, Mack WJ, Dunn M, et al. Intermediate-density lipoproteins and progression of carotid arterial wall intima-media thickness. *Circulation.* 1997;95(8):2022-6.
25. Hodis HN, Mack WJ. Triglyceride-rich lipoproteins and progression of atherosclerosis. *Eur Heart J.* 1998;19 Suppl A:A40-4.
26. Austin MA, Krauss RM. LDl density and atherosclerosis. *JAMA.* 1995;273(2):115-.
27. Hokanson JE, Austin MA. Plasma triglyceride level is a risk factor for cardiovascular disease independent of high-density lipoprotein cholesterol level: a meta-analysis of population-based prospective studies. *J Cardiovasc Risk.* 1996;3(2):213-9.
28. Tirosh A, Rudich A, Shochat T, et al. Changes in triglyceride levels and risk for coronary heart disease in young men. *Ann Intern Med.* 2007;147(6):377-85.
29. Plans P, Ruigomez J, Pardell H, et al. Lipid distribution in the adult population of Catalonia. *Rev Clin Esp.* 1993;193(1):35-42.
30. Nakanishi N, Okamota M, Makino K, et al. Distribution and cardiovascular risk correlates of serum triglycerides in young Japanese adults. *Ind Health.* 2002;40(1):28-35.
31. Bovet P, Romain S, Shamlaye C, et al. Divergent fifteen-year trends in traditional and cardiometabolic risk factors of cardiovascular diseases in the Seychelles. *Cardiovasc Diabetol.* 2009;8:34.
32. Onat A, Sari I, Yazici M, et al. Plasma triglycerides, an independent predictor of cardiovascular disease in men: a prospective study based on a population with prevalent metabolic syndrome. *Int J Cardiol.* 2006;108(1):89-95.
33. Assmann G, Schulte H. Relation of high-density lipoprotein cholesterol and triglycerides to incidence of atherosclerotic coronary artery disease (the PROCAM experience). Prospective Cardiovascular Munster study. *Am J Cardiol.* 1992;70(7):733-7.
34. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Final Report. *Circulation.* 2002;106(25):3143.
35. Cohn JS, Tremblay M, Amiot M, et al. Plasma concentration of apolipoprotein E in intermediate-sized remnant-like lipoproteins in normolipidemic and hyperlipidemic subjects. *Arterioscler Thromb Vasc Biol.* 1996;16(1):149-59.
36. Ferreira AC, Peter AA, Mendez AJ, et al. Postprandial hypertriglyceridemia increases circulating levels of endothelial cell microparticles. *Circulation.* 2004;110(23):3599-603.
37. Liu L, Wen T, Zheng XY, et al. Remnant-like particles accelerate endothelial progenitor cells senescence and induce cellular dysfunction via an oxidative mechanism. *Atherosclerosis.* 2009;202(2):405-14.
38. de Man FH, Nieuwland R, van der Laarse A, et al. Activated platelets in patients with severe hypertriglyceridemia: effects of triglyceride-lowering therapy. *Atherosclerosis.* 2000;152(2):407-14.
39. Wang L, Gill R, Pedersen TL, et al. Triglyceride-rich lipoprotein lipolysis releases neutral and oxidized FFAs that induce endothelial cell inflammation. *J Lipid Res.* 2009;50(2):204-13.
40. Botham KM, Wheeler-Jones CP. Postprandial lipoproteins and the molecular regulation of vascular homeostasis. *Prog Lipid Res.* 2013;52(4):446-64.
41. Lungershausen YK, Abbey M, Nestel PJ, et al. Reduction of blood pressure and plasma triglycerides by omega-3 fatty acids in treated hypertensives. *J Hypertens.* 1994;12(9):1041-5.
42. Verges B. Lipid disorders in type 1 diabetes. *Diabetes Metab.* 2009;35(5):353-60.
43. Kreisberg RA. Diabetic dyslipidemia. *Am J Cardiol.* 1998;82(12a):67U-73U; discussion 85U-6U.
44. Krauss RM, Siri PW. Dyslipidemia in type 2 diabetes. *Med Clin North Am.* 2004;88(4):897-909, x.
45. Tirosh A, Shai I, Bitzur R, et al. Changes in triglyceride levels over time and risk of type 2 diabetes in young men. *Diabetes Care.* 2008;31(10):2032-7.
46. Harris WS, Connor WE, Inkeles SB, et al. Dietary omega-3 fatty acids prevent carbohydrate-induced hypertriglyceridemia. *Metabolism.* 1984;33(11):1016-9.

Turn to page 20 for more references.

MALE AND FEMALE BLOOD TEST PANELS

Unlike commercial blood labs that test only a few risk factors, Life Extension®'s **Male** and **Female Blood Test Panels** measure a wide range of blood markers that predispose people to age-related diseases. Just look at the **huge** number of parameters included in the **Male** and **Female Blood Test Panels**:

MALE PANEL

LIPID PROFILE
Total Cholesterol
LDL (low-density lipoprotein)
HDL (high-density lipoprotein)
Triglycerides

CARDIAC MARKERS
C-Reactive Protein (high sensitivity)
Homocysteine

HORMONES
Free and Total Testosterone
DHEA-S
Estradiol (an estrogen)
TSH (thyroid function)
Vitamin D (25-hydroxyvitamin D)

METABOLIC PROFILE
Glucose
Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio
Liver function tests: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase
Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron
Blood proteins: albumin, globulin, total protein, albumin/globulin ratio
Hemoglobin A1c

COMPLETE BLOOD COUNT (CBC)
Red Blood Cell count including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW
White Blood Cell count including: lymphocytes, monocytes, eosinophils, neutrophils, basophils
Platelet count

CANCER MARKER
PSA (Prostate Specific Antigen)

FEMALE PANEL

LIPID PROFILE
Total Cholesterol
LDL (low-density lipoprotein)
HDL (high-density lipoprotein)
Triglycerides

CARDIAC MARKERS
C-Reactive Protein (high sensitivity)
Homocysteine

HORMONES
Progesterone
Estradiol (an estrogen)
Free and Total Testosterone
DHEA-S
TSH (thyroid function)
Vitamin D (25-hydroxyvitamin D)

METABOLIC PROFILE
Glucose
Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio
Liver function tests: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase
Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron
Blood proteins: albumin, globulin, total protein, albumin/globulin ratio
Hemoglobin A1c

COMPLETE BLOOD COUNT (CBC)
Red Blood Cell count including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW
White Blood Cell count including: lymphocytes, monocytes, eosinophils, neutrophils, basophils
Platelet count

Blood Test Super Sale • March 28 through June 6, 2016.

Retail price: $400
Your Price: $199

To obtain these comprehensive Male or Female Panels at these low prices, call 1-800-208-3444 to order your requisition forms.

Then–at your convenience–you can visit one of the blood-drawing facilities provided by LabCorp in your area.

Blood testing services are available only in the continental United States and Anchorage, AK. Not available in Maryland. Restrictions apply for residents of MA, NY, NJ, RI, and PA.

LifeExtension®
National Diagnostics, Inc.

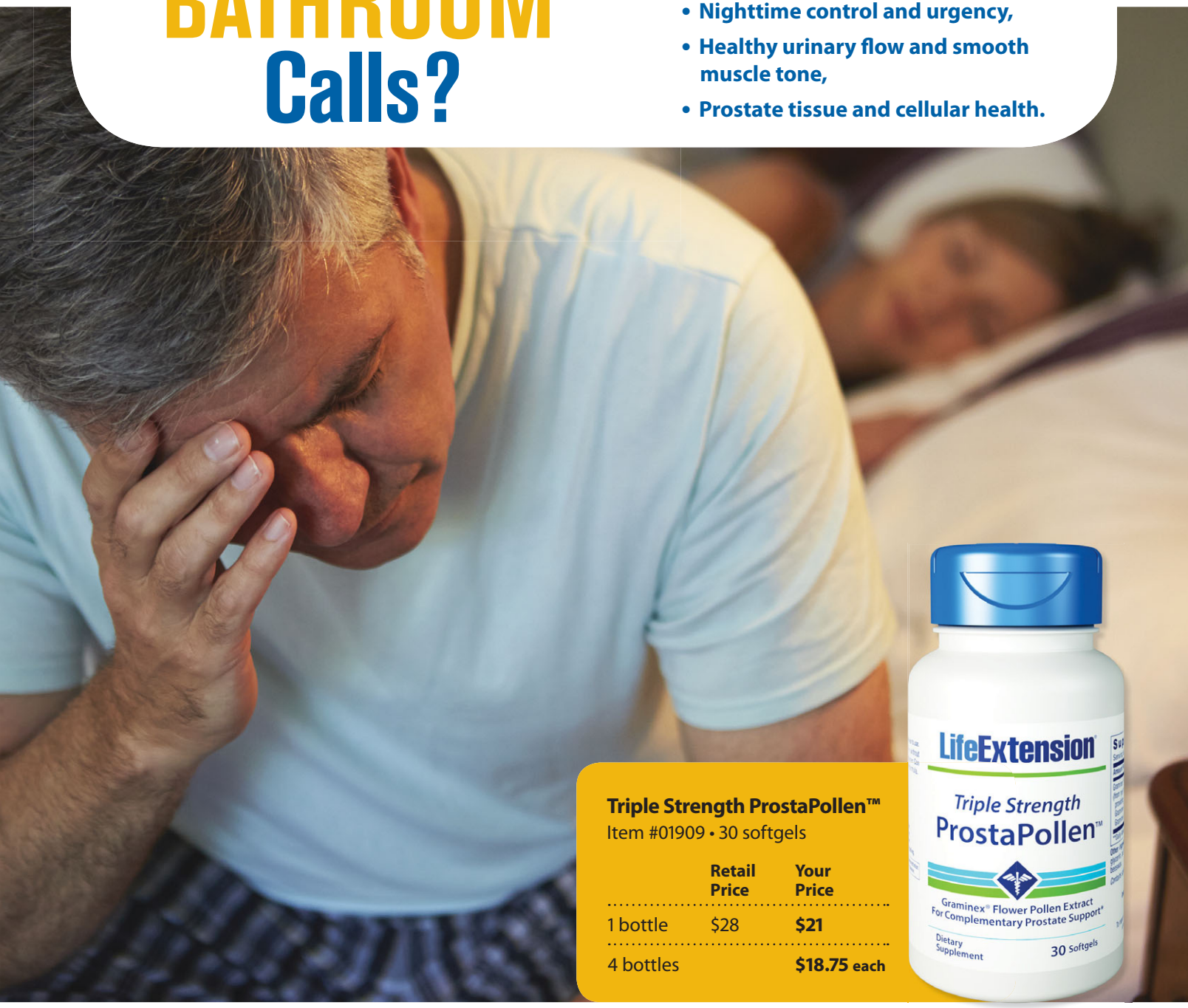
47. Pejic RN, Lee DT. Hypertriglyceridemia. *J Am Board Fam Med.* 2006;19(3):310-6.
48. Singh RB, Niaz MA, Sharma JP, et al. Randomized, double-blind, placebo-controlled trial of fish oil and mustard oil in patients with suspected acute myocardial infarction: the Indian experiment of infarct survival--4. *Cardiovasc Drugs Ther.* 1997;11(3):485-91.
49. Available at: http://www.fda.gov/SiteIndex/ucm108351.htm. Accessed February 15, 2016.
50. Bucher HC, Hengstler P, Schindler C, et al. N-3 polyunsaturated fatty acids in coronary heart disease: a meta-analysis of randomized controlled trials. *Am J Med.* 2002;112(4):298-304.
51. Zhang J, Sasaki S, Amano K, et al. Fish consumption and mortality from all causes, ischemic heart disease, and stroke: an ecological study. *Prev Med.* 1999;28(5):520-9.
52. Keli SO, Feskens EJ, Kromhout D. Fish consumption and risk of stroke. The Zutphen Study. *Stroke.* 1994;25(2):328-32.
53. Xun P, Qin B, Song Y, et al. Fish consumption and risk of stroke and its subtypes: accumulative evidence from a meta-analysis of prospective cohort studies. *Eur J Clin Nutr.* 2012;66(11):1199-207.
54. Park KS, Lim JW, Kim H. Inhibitory mechanism of omega-3 fatty acids in pancreatic inflammation and apoptosis. *Ann N Y Acad Sci.* 2009;1171:421-7.
55. Lei QC, Wang XY, Xia XF, et al. The role of omega-3 fatty acids in acute pancreatitis: a meta-analysis of randomized controlled trials. *Nutrients.* 2015;7(4):2261-73.
56. Foitzik T, Eibl G, Schneider P, et al. Omega-3 fatty acid supplementation increases anti-inflammatory cytokines and attenuates systemic disease sequelae in experimental pancreatitis. *JPEN J Parenter Enteral Nutr.* 2002;26(6):351-6.
57. Cao Y, Mauger DT, Pelkman CL, et al. Effects of moderate (MF) versus lower fat (LF) diets on lipids and lipoproteins: a meta-analysis of clinical trials in subjects with and without diabetes. *J Clin Lipidol.* 2009;3(1):19-32.
58. Dubois C, Beaumier G, Juhel C, et al. Effects of graded amounts (0-50 g) of dietary fat on postprandial lipemia and lipoproteins in normolipidemic adults. *Am J Clin Nutr.* 1998;67(1):31-8.
59. Bansal S, Buring JE, Rifai N, et al. Fasting compared with nonfasting triglycerides and risk of cardiovascular events in women. *JAMA.* 2007;298(3):309-16.
60. Batty GD, Kivimaki M, Davey Smith G, et al. Post-challenge blood glucose concentration and stroke mortality rates in non-diabetic men in London: 38-year follow-up of the original Whitehall prospective cohort study. *Diabetologia.* 2008;51(7):1123-6.
61. Glucose tolerance and cardiovascular mortality: comparison of fasting and 2-hour diagnostic criteria. *Arch Intern Med.* 2001;161(3):397-405.
62. Hu FB, Willett WC. Optimal diets for prevention of coronary heart disease. *JAMA.* 2002;288(20):2569-78.
63. Available at: http://www.heart.org/HEARTORG/HealthyLiving/HealthyEating/Nutrition/The-American-Heart-Associations-Diet-and-Lifestyle-Recommendations_UCM_305855_Article.jsp#.VsIPsBGFN9B. Accessed February 15, 2016.
64. Available at: http://www.ncbi.nlm.nih.gov/books/NBK11795/. Accessed February 15, 2016.
65. Rumawas ME, Meigs JB, Dwyer JT, et al. Mediterranean-style dietary pattern, reduced risk of metabolic syndrome traits, and incidence in the Framingham Offspring Cohort. *Am J Clin Nutr.* 2009;90(6):1608-14.
66. Vincent-Baudry S, Defoort C, Gerber M, et al. The Medi-RIVAGE study: reduction of cardiovascular disease risk factors after a 3-mo intervention with a Mediterranean-type diet or a low-fat diet. *Am J Clin Nutr.* 2005;82(5):964-71.
67. McKenney JM, Sica D. Role of prescription omega-3 fatty acids in the treatment of hypertriglyceridemia. *Pharmacotherapy.* 2007;27(5):715-28.
68. Welch AA, Shakya-Shrestha S, Lentjes MA, et al. Dietary intake and status of n–3 polyunsaturated fatty acids in a population of fish-eating and non-fish-eating meat-eaters, vegetarians, and vegans and the precursor-product ratio of -linolenic acid to long-chain n–3 polyunsaturated fatty acids: results from the EPIC-Norfolk cohort. *Am J Clin Nutr.* 2010;92(5):1040-51.
69. Maniongui C, Blond JP, Ulmann L, et al. Age-related changes in delta 6 and delta 5 desaturase activities in rat liver microsomes. *Lipids.* 1993;28(4):291-7.
70. Covington MB. Omega-3 fatty acids. *Am Fam Physician.* 2004;70(1):133-40.
71. Calder PC. The role of marine omega-3 (n-3) fatty acids in inflammatory processes, atherosclerosis and plaque stability. *Mol Nutr Food Res.* 2012;56(7):1073-80.
72. Davidson MH. Mechanisms for the hypotriglyceridemic effect of marine omega-3 fatty acids. *Am J Cardiol.* 2006;98(4a):27i-33i.
73. Goodfellow J, Bellamy MF, Ramsey MW, et al. Dietary supplementation with marine omega-3 fatty acids improve systemic large artery endothelial function in subjects with hypercholesterolemia. *J Am Coll Cardiol.* 2000;35(2):265-70.
74. Bradberry JC, Hilleman DE. Overview of omega-3 fatty acid therapies. *Pharm Ther.* 2013;38(11):681-91.
75. Available at: http://www.vascepa.com/different.html#. Accessed February 15, 2016.
76. Wei MY, Jacobson TA. Effects of eicosapentaenoic acid versus docosahexaenoic acid on serum lipids: a systematic review and meta-analysis. *Curr Atheroscler Rep.* 2011;13(6):474-83.
77. Mori TA, Burke V, Puddey IB, et al. Purified eicosapentaenoic and docosahexaenoic acids have differential effects on serum lipids and lipoproteins, LDL particle size, glucose, and insulin in mildly hyperlipidemic men. *Am J Clin Nutr.* 2000;71(5):1085-94.
78. Vakkilainen J, Steiner G, Ansquer JC, et al. Relationships between low-density lipoprotein particle size, plasma lipoproteins, and progression of coronary artery disease: the Diabetes Atherosclerosis Intervention Study (DAIS). *Circulation.* 2003;107(13):1733-7.
79. Yokoyama M, Origasa H, Matsuzaki M, et al. Effects of eicosapentaenoic acid on major coronary events in hypercholesterolaemic patients (JELIS): a randomised open-label, blinded endpoint analysis. *Lancet.* 2007;369(9567):1090-8.
80. Verboom CN. Highly purified omega-3 polyunsaturated fatty acids are effective as adjunct therapy for secondary prevention of myocardial infarction. *Herz.* 2006;31 Suppl 3:49-59.
81. Johansen O, Brekke M, Seljeflot I, et al. N-3 fatty acids do not prevent restenosis after coronary angioplasty: results from the CART study. Coronary Angioplasty Restenosis Trial. *J Am Coll Cardiol.* 1999;33(6):1619-26.
82. Nilsen DW, Albrektsen G, Landmark K, et al. Effects of a high-dose concentrate of n-3 fatty acids or corn oil introduced early after an acute myocardial infarction on serum triacylglycerol and HDL cholesterol. *Am J Clin Nutr.* 2001;74(1):50-6.
83. Howlett JG, McKelvie RS, Arnold JM, et al. Canadian Cardiovascular Society Consensus Conference guidelines on heart failure, update 2009: diagnosis and management of right-sided heart failure, myocarditis, device therapy and recent important clinical trials. *Can J Cardiol.* 2009;25(2):85-105.
84. Available at: http://www.goedomega3.com/index.php/files/download/304. Accessed February 16, 2016.
85. Mori TA, Bao DQ, Burke V, et al. Docosahexaenoic acid but not eicosapentaenoic acid lowers ambulatory blood pressure and heart rate in humans. *Hypertension.* 1999;34(2):253-60.
86. Kelley DS, Siegel D, Vemuri M, et al. Docosahexaenoic acid supplementation improves fasting and postprandial lipid profiles in hypertriglyceridemic men. *Am J Clin Nutr.* 2007;86(2):324-33.
87. Available at: https://ods.od.nih.gov/About/DSHEA_Wording.aspx. Accessed February 9, 2016.

Frustrated with Nightly BATHROOM Calls?

Triple Strength ProstaPollen™ with specialized plant extracts **G60™** and **NAX™** utilizes clinically demonstrated ingredients for the aging prostate.[1-3]

This innovative formula provides advanced support for:

- **Nighttime control and urgency,**
- **Healthy urinary flow and smooth muscle tone,**
- **Prostate tissue and cellular health.**



Triple Strength ProstaPollen™
Item #01909 • 30 softgels

	Retail Price	Your Price
1 bottle	$28	**$21**
4 bottles		**$18.75 each**

To order **Triple Strength ProstaPollen™**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Contains soybeans.

*Ultra Natural Prostate contains 252 mg of original Graminex® extract providing 60 mg of G60™ water-soluble fraction and 3 mg of NAX™ lipid-soluble fraction in two softgels. Men completely satisfied with the effects of the Ultra Natural Prostate formula may not need this new Triple Strength ProstaPollen.

** Graminex® is a registered trademark of Graminex LLC.

References

1. *Br J Urol.* 1989 Nov;64(5):496-9.
2. *Br J Urol.* 1993 Apr;71(4):433-8.
3. *Eur Urol.* 2009 Sep;56(3):544-51.

Highest Independent 5 Star Rating International Fish Oil Society For Over Nine Years

HIGHLY PURIFIED ALASKAN FISH OIL

Super Omega-3

FISH OIL + OLIVE EXTRACT + SESAME LIGNANS

*Broad-spectrum, Mediterranean health benefits of **fish oil**, **olive oil polyphenols**, and **sesame lignans** for heart and brain health.*

- Pure fish oil from sustainable sources in pristine waters in Alaska*, **highest 5-star rating** by leading independent third-party testing organization (**IFOS**).
- Provides the polyphenol equivalent of **8** to **12 tablespoons** of heart-healthy **extra virgin olive oil**.
- Specialized support against free radical oxidation with **sesame lignans**, a novel component of the heart-healthy **Mediterranean diet**.

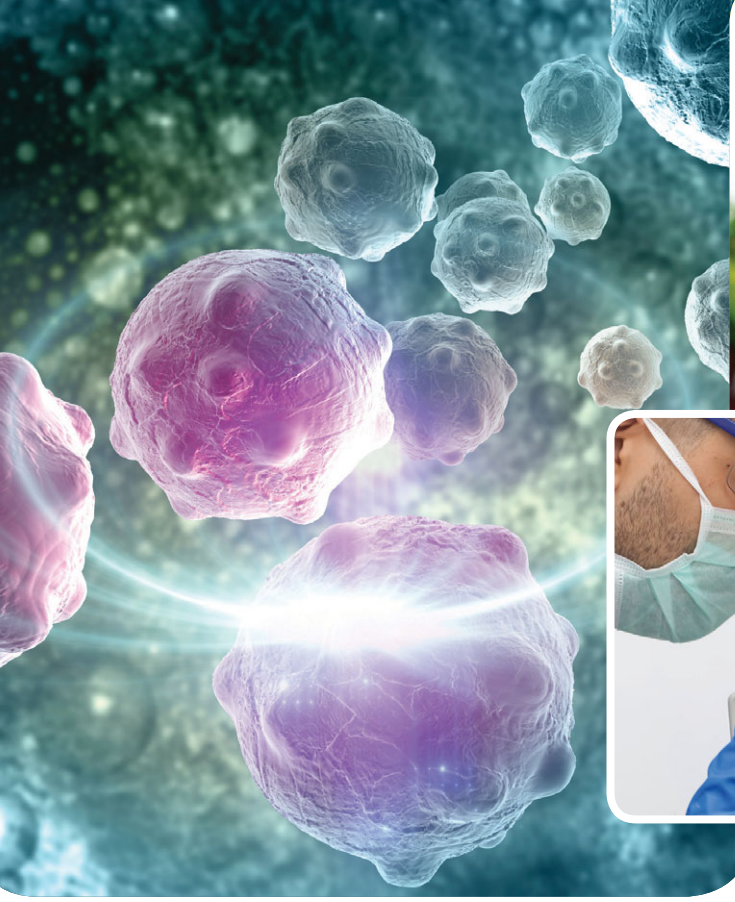
Super Omega-3
Item #01982 • 120 softgels

	Retail Price	Your Price
1 bottle	$32	**$24**
4 bottles		**$21 each**
10 bottles		**$17.05 each**

* Wild caught. Gently processed in the US. Non-GMO.

To order **Super Omega-3**, call **1-800-544-4440** or visit **www.LifeExtension.com**

CAUTION: If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.
Supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.



Metformin Inhibits Pancreatic Cancer Progression

A report published in *PLOS One* reveals the discovery of researchers at Massachusetts General Hospital of a mechanism supporting metformin's ability to reduce pancreatic cancer progression.*

Researchers examined the most common type of pancreatic cancer known as pancreatic ductal carcinoma, which is associated with type II diabetes and insulin resistance. The scientists first found that levels of hyaluronan, a component of the extracellular matrix, were **30%** lower in tumor samples from overweight or obese patients who were taking metformin to treat diabetes than in those who did not take the drug.

"We found that metformin alleviates desmoplasia, an accumulation of dense connective tissue and tumor-associated immune cells that is a hallmark of pancreatic cancer, by inhibiting the activation of the pancreatic stellate cells that produce the extracellular matrix and by reprogramming immune cells to reduce inflammation," reported co-senior author Dai Fukumura, MD, PhD. "We also found these effects only evident in tumors from overweight or obese individuals, who appear to have tumors with increased fibrosis."

Editor's Note: Earlier research has uncovered a lower risk of pancreatic cancer in diabetics treated with metformin, as well as a reduced risk of mortality among those who develop the disease. The **Life Extension Foundation** is currently funding a clinical study whereby metformin is a component of the pancreatic treatment protocol.

**PLOS One.* 2015 Dec 7.

Eating Fish Reduces Alzheimer's Risk

A new study published in *JAMA* found that eating fish and other seafood at least once a week may help lower the risk of Alzheimer's disease, despite higher levels of mercury in the brain from the fish.*

The study included 544 volunteers who answered weekly questionnaires for more than four years asking if they consumed a variety of seafood. A total of 286 of the participants allowed their brains to be autopsied after death.

Tissue samples from the autopsied brains were measured for brain metal concentrations and evidence of dementia, including strokes, plaques, tangles in the brain indicative of Alzheimer's disease, and Lewy bodies that are associated with Parkinson's disease.

Martha Clare Morris, professor of epidemiology at Rush University Medical Center, and colleagues revealed that even though participants who ate seafood once a week or more had higher levels of mercury in the brain, the pathological signs of Alzheimer's disease were lower. These findings were significant among people with the common genotype (ApoE4) linked to a higher risk of developing Alzheimer's disease and their risk was reduced when they ate a moderate amount of seafood.

Editor's Note: "A major concern in public health was whether the increased mercury exposure that comes from consuming seafood might have harmful effects on the brain as we age. This study provides evidence that the increased mercury exposure is not correlated with increased brain pathologies associated with dementia," said Morris. Highly purified **EPA/DHA** extracted from molecularly distilled fish oils has no detectable levels of mercury or other heavy metals. Whole seafoods, on the other hand, contain varying levels of heavy metals.

**JAMA*. 2016;315(5):489-97.

Vitamin D Supplementation Improves Premenstrual Symptoms

An article in the *Journal of Pediatric & Adolescent Gynecology* reveals women with premenstrual syndrome benefit by supplementing with vitamin D.*

The current trial included 158 young women with severe cognitive and emotional premenstrual syndrome symptoms and deficient serum 25-hydroxyvitamin D levels. Participants received a placebo or **200,000 IU** vitamin D followed by **25,000 IU** every two weeks for four months. Vitamin D levels were tested at the beginning of the study and monthly thereafter. All participants completed questionnaires that assessed symptoms during each of the four cycles included in the study.

Vitamin D levels significantly improved after one month among those who received the supplement. Subjects who received vitamin D showed improvement in anxiety, irritability, crying easily, sadness, and disturbed relationships by the end of the study, whereas no significant changes in symptom intensity were noted by those who received a placebo.

Editor's Note: "Based on the present findings," the authors write, "vitamin D therapy can be suggested as a safe, effective, and convenient method for reducing the intensity of premenstrual syndrome mood disorders and consequently improve the quality of life in young women with severe hypovitaminosis D and concomitant mood disorders associated to premenstrual syndrome."

**J Ped Adolesc Gynecol.* 2015 Dec 24.

Sleeping In On Weekends Reduces Diabetes Risk

An article published in *Diabetes Care* found that sleeping in on the weekend could counteract the increased risk of diabetes associated with short-term sleep restriction during the work week.*

Researchers at the University of Chicago sleep laboratory recruited 19 volunteers, all healthy young men. On the first occasion, they slept normally, spending 8.5 hours in bed for four nights. On another occasion, the same volunteers were allowed only 4.5 hours in bed for four consecutive nights. They spent an average of 4.3 of those hours asleep each night. They were then allowed two nights of extended sleep, during which they averaged 9.7 hours of sleep.

Investigators determined the subjects' insulin sensitivity—the ability of insulin to regulate blood sugars—and the disposition index, a predictor of diabetes risk. After four nights of sleep restriction, the volunteers' insulin sensitivity decreased by **23%** and their diabetes risk increased by **16%**.

After two nights of extended sleep, however, insulin sensitivity and the risk of diabetes returned to normal.

Editor's Note: An increased risk of diabetes is not the only health concern of too little sleep, say the authors. Chronically sleep-deprived people are more likely to develop other health problems such as increased inflammation, high blood pressure, and cognitive problems. They also tend to eat more, especially sweets and high-fat foods, a diabetes risk in itself.

**Diabetes Care*. 2016 Jan 19.

Brain Inflammation Occurs 20 Years Ahead of Alzheimer's Symptoms

Approximately 20 years before any symptoms of Alzheimer's disease appear, inflammation in the brain can be seen, according to a report published in the journal *Brain*.*

The findings of researchers at Sweden's Karolinska Institute suggest that activation of astrocytes (glial cells in the brain and spinal cord) at an early stage greatly influences the development of the disease.

Researchers recruited family members of people with Alzheimer's mutations who have a much higher risk of developing the disease. The researchers looked for and examined any changes that took place during the very early stages. They also recruited patients with non-inherited, "sporadic" Alzheimer's disease as a comparison group.

All participants in the study underwent memory tests and scans using PET (positron emission tomography), which allows radioactive tracer molecules to be introduced into the brain via injection into the blood.

Participants who carried the known mutations were found to have amyloid plaque and inflammatory changes almost two decades before the onset of cognitive problems. The number of astrocytes reached a peak when the amyloid plaque started to accumulate in the brain.

Furthermore, neuronal function, as measured by glucose metabolism, began to decline roughly seven years before disease symptoms.

Editor's Note: This study corroborates previous findings showing the devastating impact that inflammation inflicts on the brain.

**Brain.* 2016 Jan 26.

High-Rise Residents Have Higher Risk of Cardiac Death

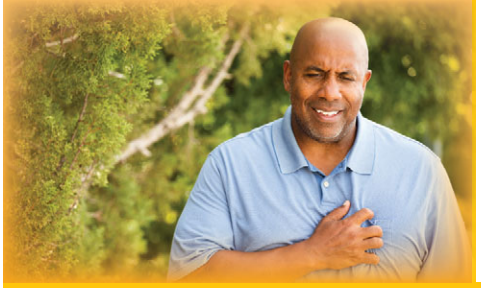
According to a study published in *Canadian Medical Association Journal*, residents who live on the first or second floor of a high-rise building have a higher survival rate from cardiac arrest than those who live above them.*

Of 8,216 people who had cardiac arrests in private residences and were treated by 911-initiated first responders, **3.8%** survived to be discharged from hospital. Of the 5,998 (**73%**) people living below the third floor who had cardiac arrests, 252 (**4.2%**) survived the arrest, but only 48 (**2.6%**) of the 1,844 people living above the third floor survived. When analyzed floor by floor, the researchers found a survival rate of only **0.9%** in those living above the 16th floor and no survivors in those living above the 25th floor.

The study looked at the interval from arrival of an emergency vehicle to 911-initiated first responders reaching a patient. Other studies have measured response time between the call to 911 and arrival of an emergency vehicle on scene, but not the time it took to actually reach the patient.

Editor's Note: The researchers outline several solutions to improve time to patient contact, such as giving 911-initiated first responders sole access to elevators for emergency service without public interference, similar to the access of firefighters during a fire; emergency alerts to building staff before arrival of the first responders; and better placement of defibrillators to increase bystander use.

**Can Med Assoc J.* 2016 Jan 18.

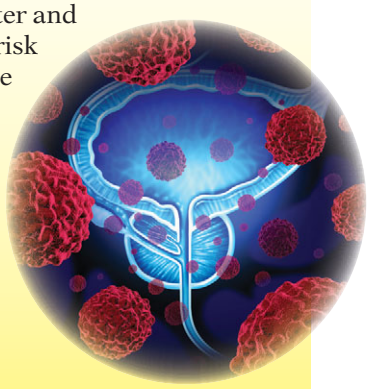


Lower Screening Rates Could Delay Early Onset Prostate Cancer Treatment

A study published in *The Journal of Urology*® provides a cautionary note to the recommendation by the US Preventive Services Task Force (USPSTF) against regular prostate specific antigen (PSA) screening for prostate cancer.*

The study found that men who did not have a PSA screening but later underwent a prostate needle biopsy had greater likeliness of being diagnosed with high-risk disease when compared with the time period prior to the USPSTF guidelines.

John M. Corman, MD, and colleagues examined data from 1,726 men who underwent needle biopsies of the prostate at Seattle's Virginia Mason Medical Center from 2004 to 2014. Among the 310 men whose biopsies were conducted after the USPSTF recommendation, prostate-specific antigen levels were greater and diagnosis with higher clinical state and high-risk cancer were more common compared to those whose biopsies were performed earlier.



Editor's Note: "The goal of prostate cancer screening is to maximize the benefit of screening tools such as prostate-specific antigen levels while minimizing the harm associated with over-diagnosis and overtreatment," Dr. Corman observed. "Rather than relegating prostate-specific antigen levels into oblivion, the balanced answer may be best found in the more intelligent use of available tools, implementation of shared decision making as recommended by the American Cancer Society, and development of more effective screening techniques."

**J Urol.* 2016 Jan;195(1):66-73.

Increased Flavonoids Linked with Lower Erectile Dysfunction Risk

An article in the *American Journal of Clinical Nutrition* unveiled the finding of an association between greater intake of flavonoids and a lower risk of erectile dysfunction.*

For the current investigation, Aedín Cassidy and colleagues utilized data from 25,096 participants in the Health Professionals Follow-Up Study. Dietary questionnaire responses collected every four years beginning in 1986 were analyzed to determine the intake of flavanones, anthocyanins, flavan-3-ols, flavonols, flavones, and polymers/oligomers. Erectile function was rated by participants during 2000, 2004, and 2008.

Over 10 years of follow-up, erectile dysfunction was reported by **35.6%** of subjects. Having an intake of flavones that was among the top **20%** of participants was associated with a **9%** lower adjusted risk of erectile dysfunction in comparison with the lowest **20%**, and for those among the top **20%** of flavanone and anthocyanin intake, the risk was **10%** and **9%** lower.

Beneficial foods include blueberries, cherries, blackberries, black currants, radishes, citrus, parsley, thyme, celery, and hot peppers.

Editor's Note: "We examined six main types of commonly consumed flavonoids and found that three in particular—anthocyanins, flavanones, and flavones—are beneficial," Dr. Cassidy observed. "Men who regularly consumed foods high in these flavonoids were **10%** less likely to suffer erectile dysfunction. In terms of quantities, we're talking just a few portions a week."

**Am J Clin Nutr.* 2016 Jan 13.

Cognitive Dysfunction Associated with Vitamin E Deficiency

An article that appeared in the *Journal of Nutritional Science and Vitaminology* describes a study conducted at Japan's Shibaura Institute of Technology that found an increase in cognitive dysfunction in vitamin E-deficient mice.* Animals that experienced long-term deficiency exhibited an increase in brain lipid peroxidation, indicating that a continual lack of vitamin E may accelerate brain oxidation.

The study included mice given either a standard diet or one that was vitamin E-deficient beginning at 1 month of age and continuing until the age of 3 or 6 months, followed by cognitive testing. Lipid peroxidation was measured in the cerebral cortex, cerebellum, and hippocampus, and serum cholesterol levels were assessed.

Deficient animals in both age groups showed impairments in cognitive function compared to mice that received a standard diet. They also had higher serum cholesterol levels in comparison with their age-matched controls.

Editor's Note: While brain lipid peroxidation was similar between deficient and nondeficient 3-month-old mice, 6-month-old deficient mice exhibited a greater amount of peroxidation in the cortex and cerebellum in comparison with nondeficient mice of the same age, indicating a significant effect in association with long-term deficiency.

**J Nutr Sci Vitaminol* (Tokyo). 2015;61 (5):362-8.

Vitamin B12 Deficiency Common among Long-Term Care Patients

An article published in *Applied Physiology, Nutrition, and Metabolism* reports a significant number of patients with deficient vitamin B12 levels in a sample of patients residing in Canadian long-term care facilities.* The finding adds evidence to the benefit of blood testing for levels of B12.

Heather H. Keller and colleagues at Ontario's University of Waterloo examined the charts of 412 long-term care residents over the age of 65 who had blood testing conducted upon admission. They found that **13.8%** of the patients had levels of vitamin B12 that were diagnostic of deficiency (below **212 pg/mL**) and less than half of the residents had normal levels greater than **407 pg/mL**. Another **4%** of the residents developed deficiencies within a year of admission. More favorable vitamin B12 status was strongly associated with supplementation, with **84%** of those with normal levels taking B12 supplements upon admission.

Editor's Note: "In spending time in long-term care homes, you often see depression and loneliness," observed lead author Kaylen Pfisterer, assistant research coordinator at the Schlegel-University of Waterloo Research Institute for Aging. "This is why we need to do everything in our power to enhance quality of life and quality of care in this setting. Screening for B12 deficiency is a first step to targeting B12 treatment to those who may benefit most."

**Appl Physiol Nutr Metab.* 2016 Jan 19:1-4.

Aged Garlic Extract Reduces Arterial Plaque Burden

A randomized trial reported in the *Journal of Nutrition* found a reduction in vulnerable plaque in the arteries of metabolic syndrome patients who supplemented with aged garlic extract.*

In the study, 55 men and women between the ages of 40 and 75 years were given **2,400 mg** of aged garlic extract or a placebo orally for a year. Cardiac computed tomography angiography screening was conducted at the beginning and end of the treatment period to assess coronary plaque volume, including total plaque volume, dense calcium, noncalcified plaque, and low-attenuation plaque, which is vulnerable to rupture.

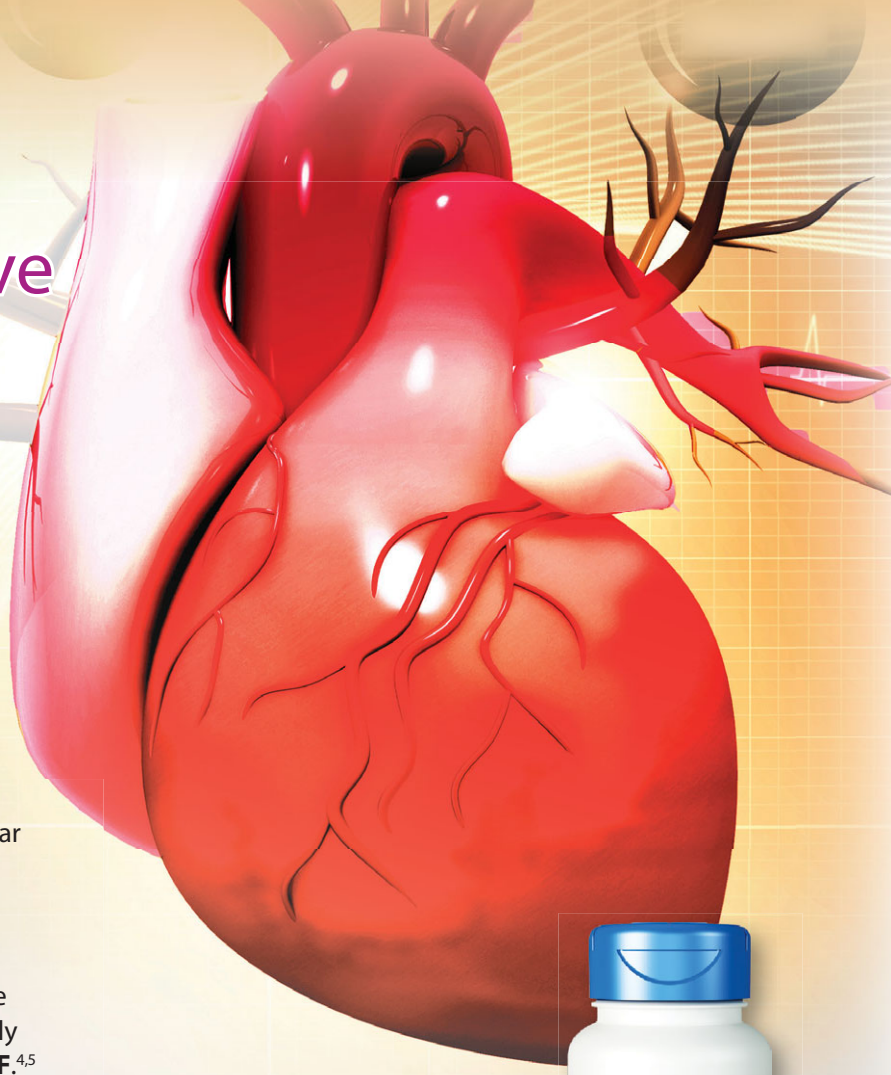
At the end of the study, participants who received aged garlic had experienced slower accumulation of total plaque compared to the placebo group, as well as regression of low-attenuation plaque.

Editor's Note: "This study is another demonstration of the benefits of this supplement in reducing the accumulation of soft plaque and preventing the formation of new plaque in the arteries, which can cause heart disease," commented lead researcher Matthew J. Budoff, MD. "We have completed four randomized studies, and they have led us to conclude that aged garlic extract can help slow the progression of atherosclerosis and reverse the early stages of heart disease."

**J Nutr.* 2016 Jan 13.

Metabolically Active FOLATE

Supports Cardiovascular Health



Folate helps maintain homocysteine levels within the normal range,[1] thereby promoting cardiovascular health.[2] Folate also supports neurotransmitter synthesis—which in turn helps maintain cognitive abilities.[3]

However, not everyone has sufficient activity of the **enzyme** required to convert folate to its biologically active form, **5-methyltetrahydrofolate**, or **5-MTHF**.[4,5]

For those whose homocysteine levels remain stubbornly high, the answer lies with the *bioactive* form of folate called **5-MTHF**, which is up to ***7 times*** more bioavailable than ordinary folic acid.[6] This unique compound requires no enzymatic conversion to become metabolically active[6]—providing maximum support for both cardiovascular and cognitive health.

Optimized Folate provides metabolically active **5-MTHF** folate in **1,000 mcg** or **5,000 mcg** strengths.

The demand for **5-MTHF** has surged as more consumers have discovered its potent **homocysteine-lowering** effects.

Non-GMO
Quatrefolic® is a registered trademark of Gnosis, S.p.A.
Patent number 7,947,662.

References
1. *Am J Clin Nutr.* 2006 Apr;83(4):842-50.
2. *Am J Ther.* 2014; Epub Nov 17.
3. *Innov Clin Neurosci.* 2011 Jan;8(1):19-28.
4. *Am J Hum Genet.* 2002 Mar;70(3):758-62.
5. *Coll Antropol.* 2004 Dec;28(2):647-54.
6. *Br J Pharmacol.* 2004 Mar;141(5):825-30.

Optimized Folate (1,000 mcg)

Item #01939 • 100 vegetarian tablets

	Retail Price	Your Price
1 bottle	$19	**$14.25**
4 bottles		**$12.75 each**

High Potency Optimized Folate (5,000 mcg)

Item #01913 • 30 vegetarian tablets

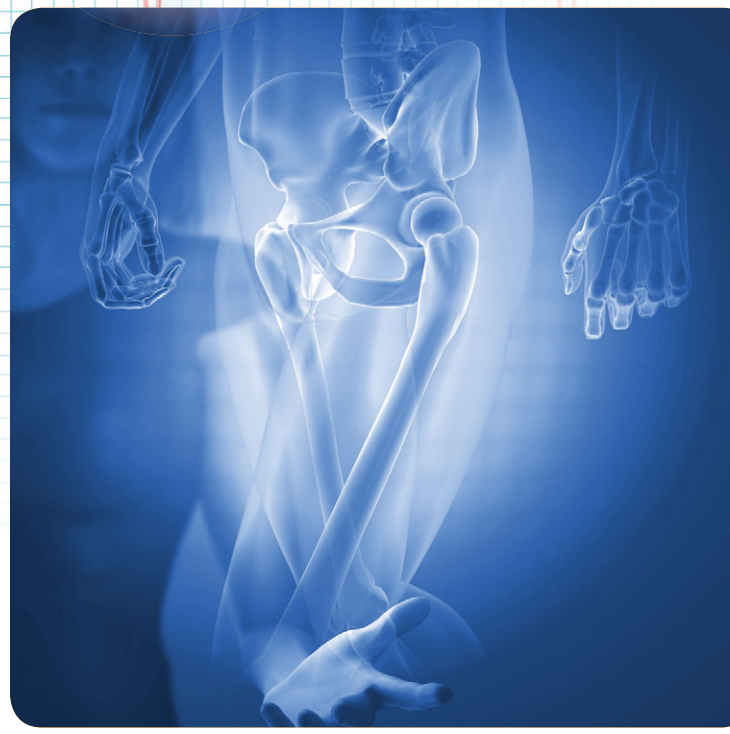
	Retail Price	Your Price
1 bottle	$25	**$18.75**
4 bottles		**$16.50 each**

Caution: Do not use this product if treated with methotrexate, fluorouracil, phenytoin, phenobarbital, primidone, or levodopa prior to consultation with your personal physician.

To order either of these **Optimized Folate** formulas, call **1-800-544-4440** or visit **www.LifeExtension.com**

VITAMIN D3

For **Heart Health, Strong Bones**, and a Vital **Immune System**

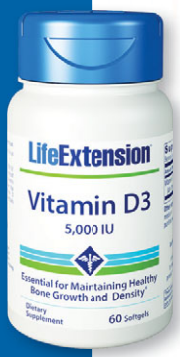


Vitamin D3 • 1,000 IU

Item #01751 • 250 softgels

Ideal for smaller individuals who also obtain **2,000-3,000 IUs** in a multi-formula

	Retail Price	Your Price
1 bottle	$12.50	**$9.38**
4 bottles		**$8.44 each**



Vitamin D3 • 5,000 IU

Item #01713 • 60 softgels

Ideal for most people who take a multi-formula that contains **2,000-3,000 IUs** of vitamin D

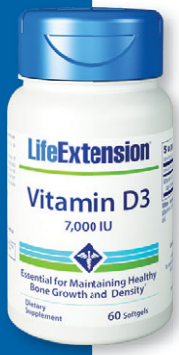
	Retail Price	Your Price
1 bottle	$10	**$7.50**
4 bottles		**$6.50 each**

Vitamin D3 • 5,000 IU With Sea Iodine™*

Item #01758 • 60 capsules

With **1,000 mcg** iodine, this is ideal for those who may be iodine-deficient due to a salt-restricted diet

	Retail Price	Your Price
1 bottle	$14	**$10.50**
4 bottles		**$9.38 each**



Vitamin D3 • 7,000 IU

Item #01718 • 60 softgels

For individuals who need higher levels, including those who weigh over 180 pounds

	Retail Price	Your Price
1 bottle	$14	**$10.50**
4 bottles		**$9.45 each**

Vitamin D3 • 2,000 IU (Natural Mint Flavor)

Item #01732 • 1 ounce

Great for traveling or for those who have trouble swallowing a softgel or capsule

(Also available without mint. Item #00864)

	Retail Price	Your Price
1 bottle	$28	**$21**
4 bottles		**$18.75 each**

Find the Formula That's Right for You!

New research on **vitamin D** emerges daily. A simple, cost-effective blood test can help you identify your individual vitamin D needs. Life Extension®'s huge selection of vitamin D supplements allows you to customize your dosage.

To order **Vitamin D3** supplements, call **1-800-544-4440** or visit **www.LifeExtension.com**

Caution: Individuals consuming more than 2,000 IU/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 10,000 IU per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

***If you have a thyroid condition or are taking anti-thyroid medications, do not use without consulting your health care practitioner.**

Low-Cost Biologically Active B-COMPLEX

Maintaining optimal **vitamin B** status becomes critical as we age.

B vitamins must be replenished *daily* because they are water soluble and easily depleted from the body. Stress,[1] alcoholic beverages,[2] and some medications[3] can quickly deplete B vitamins.

Enzymatically Active Vitamins

When conventional B vitamins are ingested, they must be ***enzymatically*** converted in the body to metabolically active forms.

BioActive Complete B-Complex provides *enzymatically active* forms of meaningful potencies of each B vitamin. This includes the ***pyridoxal 5'-phosphate*** form of vitamin B6 (the metabolically active form, shown to protect lipids and proteins against **glycation** reactions) *and* the most biologically active form of **folate** called ***5-methyltetrahydrofolate* (5-MTHF)**, which is up to **7 times** more bioavailable than folic acid and requires no enzymatic conversion to become metabolically active.[4]

BioActive Complete B-Complex
Item #01945 • 60 vegetarian capsules

	Retail Price	Your Price
1 bottle	$12	**$9**
4 bottles		**$8 each**

Non-GMO

References
1. *Hum Psychopharmacol.* 2011;26(7):470-6.
2. *Eur J Clin Nutr.* 2004;58(11):1518-24.
3. *Curr Concepts Nutr.* 1983;12:1-12.
4. *Br J Pharmacol.* 2004 Mar;141(5):825-30.

To order **BioActive Complete B-Complex**, call **1-800-544-4440** or visit **www.LifeExtension.com**

BY CYNTHIA RONEN

OMEGA-7
An Overlooked
Fatty Acid

"Fatty acids" are essential to human life because they are the cell's primary **energy** source. **Fatty acids** also serve as cellular structural components.

Ingesting the proper fatty acids confers significant health and longevity benefits.

The typical American diet contains plenty of **omega-6s**, but is woefully deficient in **omega-3s** and **monounsaturated** fats. This has led to a consensus to eat more foods rich in **omega-3s** (fish and some nuts) and monounsaturated fats (from olive oil and some nuts), less **saturated** fats, and no **hydrogenated** fats.

Scientists at **Harvard Medical School** and the **Cleveland Clinic** have been investigating a unique **fatty acid** that has not yet caught on in the mainstream.

This novel fatty acid called **omega-7** can help break the cycle of high blood sugar, elevated lipid levels, inflammation, and excess fat gain as well as enhance insulin sensitivity.[1-3]

Omega-7 has been shown to cause an increase in **fat** breakdown and an increase in the ***enzymes*** involved in **fat burning** for energy.[4] Additionally, omega-7 can reduce new fat synthesis in the body.[5]

Researchers at the **Cleveland Clinic** found that by taking omega-7 for just 30 days, patients had a **44%** reduction in **C-reactive protein** (inflammatory) levels.[1]

All these findings point to **omega-7** as a new chapter in the fight against ***metabolic disorders*** that underlie diabetes, cardiovascular disease, obesity, and cancer. Omega-7 is a strong complement to the cardiovascular and lipid benefits of omega-3s.

Proper use of **omega-7** provides an opportunity to conquer metabolic disturbances that precede the diseases of aging.

Impact of Surplus Fat

In the past two decades, the scientific understanding of body fat has undergone a dramatic change.

Scientists have discovered that body **fat** is a *living organ* and that fat tissue produces a vast array of destructive biochemical signaling molecules. Fat cells produce molecules called *adipokines,* which act on distant tissues to change their metabolic activity and result in higher levels of **inflammation**.[6]

Chronic, low-grade inflammation produced by increasing quantities of body fat leads to insulin resistance in tissues.[6] With insulin resistance, tissues lose the ability to respond to rising blood insulin levels.

Along with obesity and an excessively fatty diet, insulin resistance leads to further inflammation, even more insulin resistance, and ultimately the emergence of type II diabetes.[7,8]

Scientists have discovered that ***omega-7*** (palmitoleic acid) has special properties essential to regulation of blood sugar and fat metabolism.[2] Its metabolism-regulating properties have earned omega-7 the term ***lipokine***, which are hormone-like molecules that link distant body tissues to ensure optimal energy utilization and storage.[6,9,10]

In a recent human study, omega-7 produced precisely the kind of effects one might expect from a natural fat-regulating/sugar-regulating compound.

Cleveland Clinic Study

Based on reports regarding the metabolic benefits of omega-7, researchers at the prestigious Cleveland Clinic Wellness Institute in Ohio were inspired to perform the first randomized, controlled trial in humans of supplementation with purified **omega-7**. Their hypothesis was simple: Daily supplementation with this unique fatty acid would improve serum lipid profiles and decrease evidence of inflammation over a relatively short (30-day) period.[1]

The study was straightforward in design. Subjects were adults who were somewhat overweight or obese and had evidence of low- to moderate-grade inflammation with mildly abnormal blood lipid profiles. In other words, they were people with existing risk factors for cardiovascular disease and diabetes.

In the study, inflammation was defined as blood levels of **C-reactive protein** between **2** and **5 mg/L**.[1] The average C-reactive protein at baseline in this group was **4.3 mg/L**, which is considered "high risk" for cardiovascular disease.

Subjects were randomly assigned to receive either an **omega-7** supplement providing **220 mg** palmitoleic acid or a placebo.[1] The capsules were taken once daily, with a meal, and blood testing was done at the beginning of the study and again after 30 days.

At 30 days, the supplemented group showed a significant mean lowering in C-reactive protein of **1.9 mg/L**, a **44%** *reduction* compared with the control group. This resulted in the supplemented subjects' C-reactive protein dropping to **2.1 mg/L**, which is within the average-risk category for inflammation-induced cardiovascular or metabolic disease.

Omega-7-supplemented subjects also had significant **30 mg/dL** and **9 mg/dL** (**15%** and **8%**) reductions in **triglyceride** and **LDL-cholesterol**, respectively. There was a **2.4 mg/dL** (**5%**) increase in beneficial high-density lipoprotein (HDL, or "good") cholesterol, compared with the control group.[1]

This first-ever study demonstrated that supplementation with **omega-7** in adults at elevated risk for ***cardiometabolic disease*** (cardiovascular disease and diabetes) led to a decrease in inflammation and blood lipids, restoring their risk status to those of normal individuals.[1] And these changes took place using less than **250 mg** of omega-7 daily, which clearly indicates its function as a compound capable of precise metabolic modulation.

Additional Studies Show Benefit

Interest by the scientific community in omega-7 was just beginning to grow at the time of the Cleveland Clinic study. Human epidemiological research had already shown that blood omega-7 levels correlated significantly and positively with insulin sensitivity, even regardless of age, gender, and degree of body fat.[3] In other words, subjects in that study with the highest levels of omega-7 had the greatest sensitivity to insulin action, giving them an advantage in disposing of blood sugar safely.

In another study involving 3,736 adults, subjects with higher omega-7 levels had higher levels of HDL cholesterol (up **1.9%**), lower triglyceride levels (down **19%**), and a lower ratio of total-to-HDL cholesterol (by **4.7%**). As an added benefit, high omega-7 levels were associated with lower levels of the inflammatory marker C-reactive protein (by **13.8%**), and lower levels of insulin resistance (by **16.7%**).[11]

Perhaps more exciting, those with the highest circulating omega-7 levels were at a **62%** lower risk for developing type II diabetes, with those in the second-highest group having a risk reduction of **59%** for developing diabetes.[11]

And, in another study involving 3,630 American men and women,[12] researchers found that higher levels of omega-7 were strongly associated with numerous positive health factors. This includes lower LDL and higher HDL cholesterol levels, a lower total-to-HDL cholesterol ratio, and lower levels of the pre-clotting protein fibrinogen.

These studies demonstrated that people with higher levels of omega-7 had lower levels of inflammation and a lower risk of diabetes (as in the Cleveland Clinic study).

Animal Studies

Omega-7 was first tested in the animal model and the findings were remarkable.

The initial animal research demonstrated the multiple ways that omega-7 operates at fundamental cellular levels to turn "on" metabolic regulators that

What You Need to Know

Omega-7 Benefits Metabolic Health

- **The links between obesity, inflammation, and cardiometabolic diseases have never been clearer.**
- **Fat tissue pours out pro-inflammatory signals at a discouraging rate, contributing to insulin resistance and cardiovascular disease while building still larger fat deposits.**
- **Recently, researchers have discovered that omega-7 (palmitoleic acid) has positive health effects.**
- **Omega-7 switches on fundamental energy-regulating systems that create a more metabolically youthful milieu, resulting in greater fat and sugar burning and less storage of these molecules.**
- **A landmark human study now demonstrates that a small daily dose of omega-7 functions as a *lipokine*, a signaling molecule capable of shutting down inflammation and promoting normalization of lipid profiles, resulting in a net reduction of cardiovascular and diabetes risk.**
- **Omega-7 may soon become a standard part of a supplement regimen aimed at minimizing the risk of early death or disability related to overweight, obesity, or disturbed lipid profiles.**

favor energy utilization rather than storage as fat and sugar. The result is improved insulin sensitivity and reduced blood lipid levels.

The same basic mechanisms contribute to the reduction in inflammatory responses seen in the human participants in the Cleveland Clinic study.

Taken together, the sum of basic, animal, and human research now suggests that small (**250 mg** a day or lower) doses of **purified omega-7** will be an effective weapon in the fight to prevent, and perhaps even reverse, the inflammatory changes linked to obesity, and ultimately, to a reduction in the cardiovascular and metabolic consequences (heart attacks, strokes, diabetes) of that inflammation.

Summary

Dietary fats, long considered the enemy in terms of health, are beginning to show a positive side.

It is well recognized that ***omega-3*** polyunsaturated fats from fish oil have distinct health benefits on inflammation and cardiovascular risk. Now, research into a little-known fat called ***omega-7*** suggests potent new positive health effects.

Omega-7 was recently shown to significantly reduce cardiovascular risk factors in middle-aged people with early lipid disturbances. A surprisingly tiny dose, less than **250 mg** per day over 30 days, produced these significant effects.

Basic lab studies reveal the potential of omega-7. It functions as a ***lipokine***, transmitting information about fat tissue to muscle and liver tissues. This in turn amplifies these tissues to use fats and glucose to maintain healthy blood levels.

Together, these basic science findings coupled with recent human studies suggest that anyone at risk for heart attack, stroke, insulin resistance, or diabetes should consider a daily dose of omega-7 to lower their levels of chronic inflammation and reduce their risk of an early demise. ●

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

References

1. Bernstein AM, Roizen MF, Martinez L. Purified palmitoleic acid for the reduction of high-sensitivity C-reactive protein and serum lipids: a double-blinded, randomized, placebo controlled study. *J Clin Lipidol.* 2014;8(6):612-7.
2. Yang ZH, Miyahara H, Hatanaka A. Chronic administration of palmitoleic acid reduces insulin resistance and hepatic lipid accumulation in KK-Ay Mice with genetic type 2 diabetes. *Lipids Health Dis.* 2011;10:120.
3. Stefan N, Kantartzis K, Celebi N, et al. Circulating palmitoleate strongly and independently predicts insulin sensitivity in humans. *Diabetes Care.* 2010;33(2):405-7.
4. Bolsoni-Lopes A, Festuccia WT, Farias TS, et al. Palmitoleic acid (n-7) increases white adipocyte lipolysis and lipase content in a PPARalpha-dependent manner. *Am J Physiol Endocrinol Metab.* 2013;305(9):E1093-102.
5. Bolsoni-Lopes A, Festuccia WT, Chimin P, et al. Palmitoleic acid (n-7) increases white adipocytes GLUT4 content and glucose uptake in association with AMPK activation. *Lipids Health Dis.* 2014;13:199.
6. Queiroz JC, Alonso-Vale MI, Curi R, et al. Control of adipogenesis by fatty acids. *Arq Bras Endocrinol Metabol.* 2009;53(5):582-94.
7. Gerich JE. Is insulin resistance the principal cause of type 2 diabetes? *Diabetes Obes Metab.* 1999;1(5):257-63.
8. Groop LC. Insulin resistance: the fundamental trigger of type 2 diabetes. *Diabetes Obes Metab.* 1999;1 Suppl 1:S1-7.
9. Cao H, Gerhold K, Mayers JR, et al. Identification of a lipokine, a lipid hormone linking adipose tissue to systemic metabolism. *Cell.* 2008;134(6):933-44.
10. Foryst-Ludwig A, Kreissl MC, Benz V, et al. Adipose tissue lipolysis promotes exercise-induced cardiac hypertrophy involving the lipokine C16:1n7-palmitoleate. *J Biol Chem.* 2015;290(39):23603-15.
11. Mozaffarian D, Cao H, King IB, et al. Trans-palmitoleic acid, metabolic risk factors, and new-onset diabetes in U.S. adults: a cohort study. *Ann Intern Med.* 2010;153(12):790-9.
12. Mozaffarian D, Cao H, King IB, et al. Circulating palmitoleic acid and risk of metabolic abnormalities and new-onset diabetes. *Am J Clin Nutr.* 2010;92(6):1350-8.

MAINTAIN YOUTHFUL MITOCHONDRIAL ACTIVITY

with

CoQ10

Super Ubiquinol CoQ10 combines the energy-activating power of *shilajit* into a formula that's more potent than a stand-alone CoQ10.

- **Mitochondrial dysfunction is linked to accelerated brain aging.**
- **CoQ10 energizes aging cells and enhances mitochondrial function.**
- **Shilajit works with CoQ10 to increase cellular energy.**

Super Ubiquinol CoQ10
Item #01426 • 60 softgels

	Retail Price	Your Price
1 bottle	$62	**$46.50**
4 bottles		**$39 each**

Non-GMO

Kaneka QH Ubiquinol® is a registered trademark of Kaneka Corporation.
PrimaVie® is a registered trademark of Natreon, Inc.

To order **Super Ubiquinol CoQ10**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Enhanced Support for Healthy Inflammation Response

SUPER Bio-Curcumin®

Super Bio-Curcumin® features **BCM-95®**, a patented curcumin that absorbs up to **7 times** better than standard curcumin,[1] making this product ideal for those seeking to:

- Inhibit the pro-inflammatory effects of NF-kappaB activation,[2]
- Inhibit the pro-inflammatory activities of cyclooxygenase, lipoxygenase, and cytokines,[3]
- Support normal cell-cycle growth,[4]
- Maintain immune system health,[5]
- Promote healthy brain function,[6]
- Help maintain normal, healthy platelet function,[7]
- Support natural defenses against estrogen-mimicking chemicals,[8] and
- Benefit joint health and bowel function.[9]

Life Extension® also provides **Advanced Bio-Curcumin® with Ginger & Turmerones** for those seeking the additional benefits of added ginger:[10,11]

- Nearly *twice* the support for a healthy inflammatory response,
- Nearly *twice* the immune health support, and
- About *twice* the free radical fighting support.

Super Bio-Curcumin®

Item #00407 • 60 vegetarian capsules

Non-GMO.

	Retail Price	Your Price
1 bottle	$38	**$28.50**
4 bottles		**$26.25 each**

Advanced Bio-Curcumin® with Ginger and Turmerones

Item #01924 • 30 softgels

Non-GMO.

	Retail Price	Your Price
1 bottle	$30	**$22.50**
4 bottles		**$20.25 each**

References

1. *Indian J Pharm Sci*. 2008 Jul-Aug;70(4):445-9.
2. *AAPS J*. 2014 Jul;16(4):649-57.
3. *Ceska Slov Farm*. 2014 Feb;63(1):26-31.
4. *AAPS J*. 2009 Sep;11(3):495-510.
5. *Anesth Analg*. 2014 Jun;118(6):1336-44.
6. *Zhongguo Zhong Yao Za Zhi*. 2014 Oct;39(19):3846-9.
7. *Platelets*. 2011;22(4):270-6.
8. *Phytother Res*. 2014 Oct;28(10):1553-60.
9. *Pharmacol Res*. 2015 May-Jun;95-96C:71-81.
10. *Int J Pharmocol*. 2009;5(6):333-45.
11. *Food Nutr Res*. 2009;48(3):148-52.

CAUTION: Do not take if you have gallbladder problems or gallstones. If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

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

Omega-7

ENHANCES METABOLIC HEALTH

Support Healthy Metabolic Factors

Researchers at **Harvard Medical School** and **Cleveland Clinic** have been investigating **omega-7**, a fatty acid with body-wide benefits. Their focus has been on how omega-7 promotes a healthy metabolism.

Provinal® Omega-7 is becoming a popular nutrient used to enhance **omega-3s** by providing the following systemic effects:

- **Supports a healthy, stable weight**
- **Increases satiety hormones**
- **Regulates fat production within fat cells**
- **Helps smooth arterial walls**
- **Supports cardiovascular health**
- **Supports cellular glucose shuttling**
- **Supports insulin sensitivity**
- **Supports healthy triglyceride and cholesterol levels already within normal range**

Provinal® Purified Omega-7

Item #01812 • 30 softgels

	Retail Price	Your Price
1 bottle	$27	**$20.25**
4 bottles		**$18 each**

To order **Provinal® Purified Omega-7**, call **1-800-544-4440** or visit **www.LifeExtension.com**

GREEN TEA

BY HENRY JENKINS

Protection from **DNA Damage** and More

Degenerative aging is the result of the accumulation of pathological processes inflicted on cells, tissues, and organs.[1,2] By targeting each of these degenerative processes, premature aging can be slowed and life span prolonged.

Green tea protects against many age-accelerating factors, particularly **DNA damage**, while also promoting **DNA repair**. These systems work with extreme precision to identify, remove, and heal damaged DNA.[3,4]

A recent analysis showed that green tea polyphenols have **200 human target genes**, including those involved in inflammation, cancer, diabetes, neurodegenerative, muscular, and cardiovascular disease.[5]

In addition, green tea supplementation has been found to *significantly reduce* the risk of diabetes, stroke, and depression and improve blood levels of cholesterol and glucose.[6]

An exciting longevity study showed that rats supplemented with **epigallocatechin-3-gallate** (EGCG), the most bioactive component of green tea, lived an average of **14%** longer than control animals![7]

In this article is a top-level review of the most current data on ***green tea*** and ***epigallocatechin-3-gallate*** that demonstrates how they combat the underlying causes of aging and disease.

Protective Mechanisms That Prolong Life

Green tea (*Camellia sinensis*) provides powerful protection against two underlying processes that cause premature aging and disease: **oxidative stress** and **DNA damage**.[3,4]

Simply living on a planet that has highly reactive oxygen in the atmosphere imposes tremendous chemical stresses on virtually all molecules that come into contact with it. This results in damage to both cellular structure and function.

Similarly, all living things rely on their genetic blueprint, preserved in DNA (or sometimes RNA), to maintain healthy, renewable, functional molecules. This includes all of the structural proteins that hold us together and all of the enzymes that carry out the processes of life. DNA damage results from oxidative and other chemical stresses, from radiation, from environmental toxins, and myriad other sources. This poses a major threat to one's ability to remain robust and healthy.

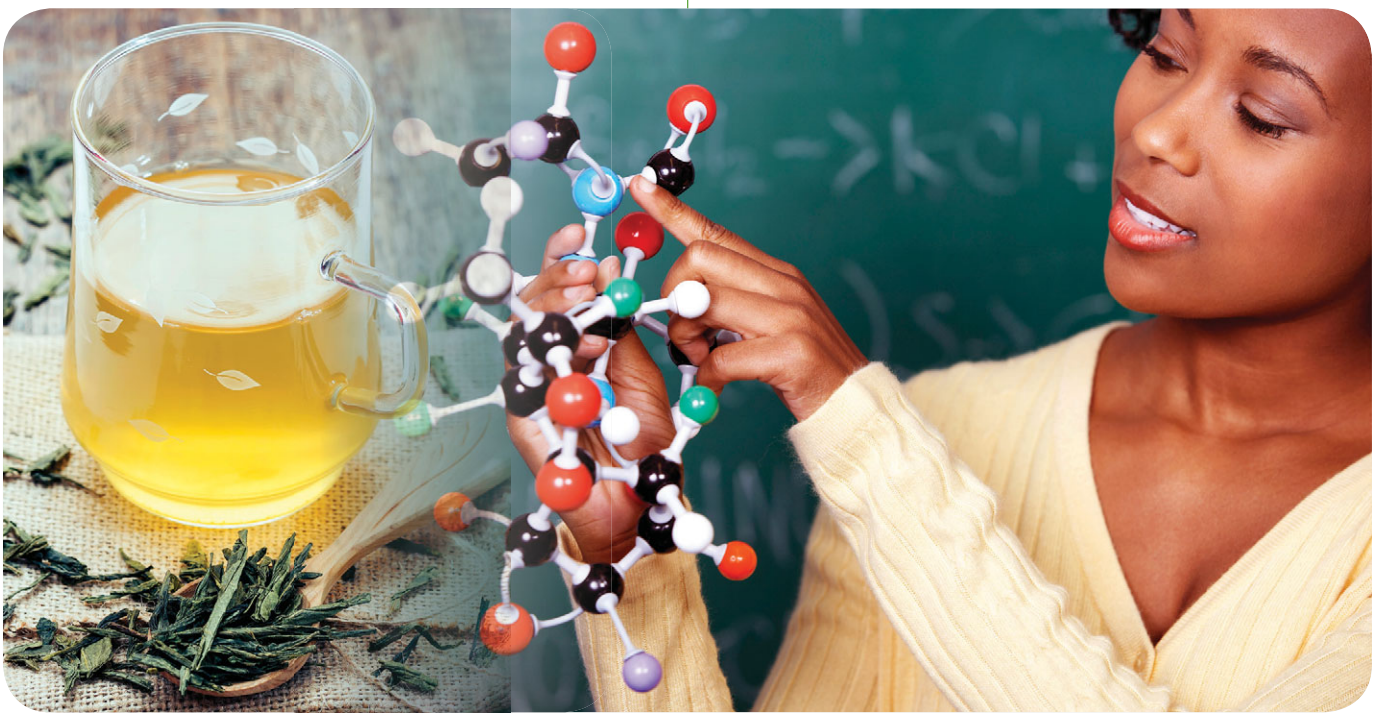
Studies in both animals and humans have now demonstrated the powerful effect of **green tea** on preventing, reducing, and repairing tissue damage caused by **oxidative stress**. Green tea enhances natural cellular protective systems, slows inflammatory responses to chemical stress, improves metabolic performance, and prevents cell death. Importantly, green tea has been shown to have these beneficial effects even during exposure to some of the most dangerous environmental contaminants, such as industrial chemicals and cigarette smoke.[8-12]

Green tea has equally broad-ranging effects on **DNA damage** and **repair**. For starters, it offers strong protection against a major cause of DNA damage: oxygen free radicals. But in addition to protecting against DNA *damage*, green tea also promotes DNA *repair* systems by regulating cellular stress response genes. These systems work with extreme precision to identify, remove, and heal damaged DNA.[3,4]

This was demonstrated in a recent human study in which green tea supplementation reduced DNA damage in white blood cells by **30%** after just a single dose. It maintained that level of protection during a week of supplementation.[3]

In fact, a recent analysis showed that 15 polyphenols from green tea have **200 human target genes**, including those involved in cancer, diabetes, neurodegenerative disease, cardiovascular disease, muscular disease, and inflammation.[5] This kind of broad-spectrum, multi-targeted action is precisely what is required if one wants to seriously reduce chronic, age-related disease and significantly prolong life.

A remarkable study demonstrates this longevity impact of green tea. Healthy rats supplemented from weaning onward with **epigallocatechin-3-gallate** from green tea lived an average of **14%** longer than control animals (105 weeks versus 92.5 weeks). They had significant reductions in oxidative stress, inflammation, and liver and kidney damage.[7] In addition, two important pro-longevity genes were sharply increased in supplemented animals.



A host of promising studies has appeared in just the last few years, all of which show green tea's ability to fight a wide spectrum of age-related disorders. Let's examine these now.

Green Tea Fights Metabolic Syndrome

By now, most Americans know that **metabolic syndrome** is a prominent threat to longevity. Nearly **35%** of adults and **50%** of those older than 59 are known to have the condition,[13] which is defined as having three or more of the following: excess abdominal fat, high blood pressure, abnormal lipid profiles, and elevated glucose.[14]

Having metabolic syndrome is dangerous because it raises the risk of developing heart attacks, strokes, diabetes, and cancer. In addition, it may be associated with other age-related, age-accelerating conditions including osteoporosis and neurodegenerative diseases.[15-17] This makes combating metabolic syndrome a major target for efforts to slow aging and prolong life span.

This is another way that green tea can ultimately help prolong life span. Numerous studies show that green tea extracts and epigallocatechin-3-gallate can prevent and mitigate metabolic syndrome. Here is a summary of major recent findings in humans:

- In a study of 56 obese and hypertensive people, daily supplementation with **379 mg** of **green tea extract** for three months significantly improved blood pressure, insulin resistance, and lipid profile.[18]
- A study of **green tea** consumption demonstrates both its benefits and the reason people might favor supplementation with extracts over drinking gallons of tea. Subjects who consumed 16 to 30 cups of green tea per week were **77%** less likely to have impaired fasting glucose, a measure of insulin resistance, compared with those who didn't drink tea.[19] Drinking this much green tea can be challenging, yet just one capsule a day of standardized high-potency **green tea extract** provides more bioavailable **epigallocatechin-3-gallate** than drinking 16 to 30 cups of green tea each week—and without the caffeine.
- Green tea extracts added to bread consumed by obese subjects for three months produced significant reductions in fat digestion and absorption.[20]
- Both green tea and a green tea extract significantly improved plasma antioxidant capacity and natural blood antioxidant systems in an eight-week study, compared with controls.[21]

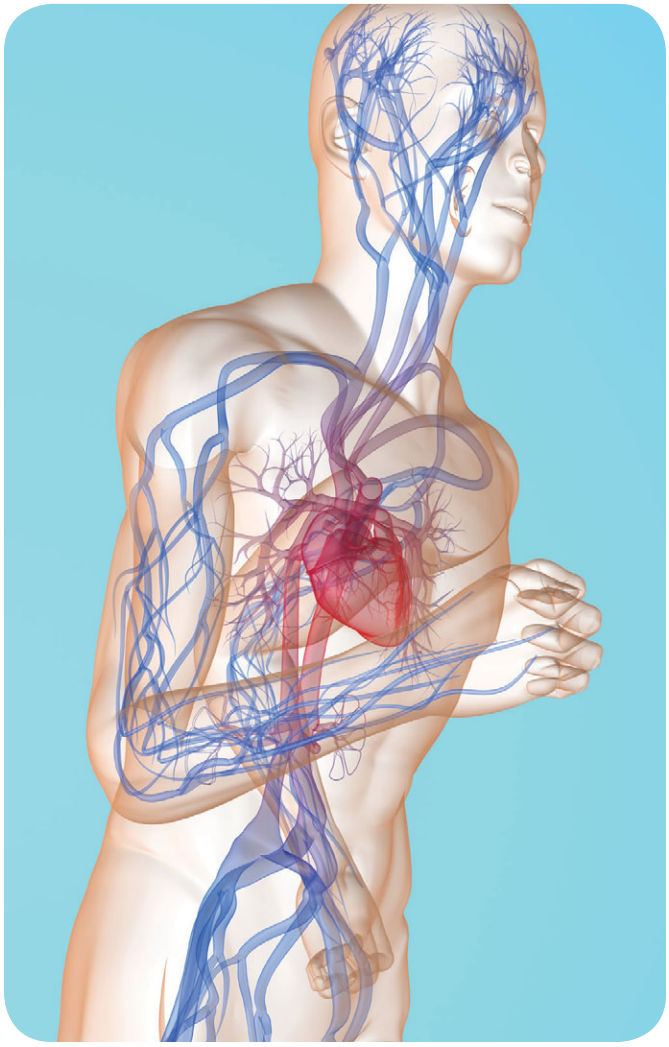
What You Need to Know

Green Tea Battles Age-Related Disorders

- **Green tea extracts rich in the polyphenol epigallocatechin-3-gallate have shown promise in protecting against a wide range of age-accelerating processes.**
- **Chronic oxidative stress, DNA damage, and inflammation all hasten the accumulation of molecular damage that we view as aging and the development of age-related disorders.**
- **Green tea and its constituents specifically fight these age-accelerating processes.**
- **As a result, green tea extracts and epigallocatechin-3-gallate are now demonstrating the ability to slow or prevent a wide range of symptoms of aging, including the development of metabolic syndrome, cardiovascular and neurodegenerative diseases, and osteoporosis.**
- **Regular supplementation with green tea extracts is a prudent approach to comprehensive deceleration of the aging process.**

A number of animal studies have given us insight into just how green tea and its extracts have such a major impact on metabolic syndrome. Take a look:

- In a rat study, green tea extracts enriched with epigallocatechin-3-gallate resulted in significant reductions in body weight, cholesterol, LDL cholesterol, glucose, and insulin.[22]
- In a mouse model of accelerated aging (the "SAMP8 mouse"), 12 weeks of epigallocatechin-3-gallate supplementation lowered insulin and glucose levels by modulating cellular transport systems that respond to insulin, while increasing production of new, power-generating, fat-burning mitochondria.[23]
- Studies in mice demonstrate that green tea extracts rich in epigallocatechin-3-gallate prevent fatty liver disease, a major manifestation of metabolic syndrome, while also improving insulin resistance and lipid profiles in blood.[24,25]



Non-alcoholic fatty liver disease affects more than **70 million** Americans, making prevention or mitigation by green tea a major advance.[26]

The greatest dangers posed by metabolic syndrome are vascular diseases like heart attack and stroke, which are today's leading killers.[27]

Green tea shows promise in preventing an array of cardiovascular disorders, as we'll see next.

Green Tea Lowers Cardiovascular Risk

Large-scale epidemiological studies show that people who regularly drink green tea are at a significantly reduced risk for **heart disease** and **stroke**.[28] One such study also showed that, compared with those who didn't drink tea, men who consumed the most green tea had a **64%** decrease in the risk of having **coronary artery disease**, the narrowing of heart blood vessels that precedes a heart attack.[29]

In a large meta-analysis published in the *International Journal of Cardiology*, researchers reviewed nine studies that included more than a quarter million individuals. They found that, compared to non-tea drinkers, those who drank one to three cups per day had a **19%** reduction in risk of heart attack and a **36%** reduction in stroke risk. The reduction in heart attack risk reached **32%** in those who consumed more than four cups per day.[30]

Several interacting and complementary mechanisms account for this impressive risk reduction. Laboratory studies show, for example, that the beneficial molecules found in green tea extract called *catechins* improve ***endothelial function***, which is the ability of cells lining arterial walls to modulate blood flow and pressure. It accomplishes this by increasing **nitric oxide**, a molecule that dilates the blood vessels and ultimately lowers blood pressure.[31] Improving endothelial dysfunction is critical because it is a major precursor of atherosclerosis and resulting heart disease and stroke.

In addition, epigallocatechin-3-gallate activates natural protective systems in the arteries. This has numerous beneficial effects, including removing a major impediment to ***nitric oxide*** production, and minimizing the inflammation-induced thickening of arterial walls.[32] As an added benefit, both epigallocatechin-3-gallate and **L-theanine** (another tea constituent) are capable of preventing blood cells from sticking to artery walls, which is another early step in the development of artery-blocking plaque.[33]

Recent human studies show that green tea's ability to reduce oxidative stress has additional benefits. In one study of 40 healthy adults, **500 mg** of green tea

catechin given orally significantly reduced plasma oxidized LDL by **19%** after four weeks. Importantly, this benefit occurred without any lifestyle modification.[34]

A similar study showed that using **1.5 grams** of ground green tea three times daily decreased the susceptibility of LDL cholesterol to oxidation, slowing the formation of oxidized LDL by **40%**.[35] These studies are significant because oxidized LDL is one of the triggers of arterial inflammation that contributes to the risk of plaque formation and loss of endothelial function. Reducing oxidized LDL is a proven means of reducing heart attack risk.[36,37]

As shown in the lab studies, reducing oxidative stress in arteries improves ***endothelial function*** and helps fight against atherosclerosis. This was verified in a very challenging group of human patients, regular smokers, whose total oxidative stress is massive. Subjects taking **580 mg** of green tea catechins daily had significant increases in a measure of endothelial function by two hours after the first dose. This effect persisted for the entire two weeks of the study.[28] As expected, this effect was accompanied by significant increases in ***nitric oxide***.

Green Tea Offers Premium Neuroprotection

Loss of brain function is one of the most dreaded consequences of aging. It can arise from either chronic chemical stress and overexcitation of brain cells or acute chemical stress that occurs during and immediately after a stroke. The good news is that green tea and its polyphenols offer significant protection against both kinds of brain cell injury.

Specifically, green tea polyphenols (including catechins and epigallocatechin-3-gallate) are now being strongly examined for their potential brain-protective effects against neurodegenerative diseases such as **Alzheimer's**.[38]

One factor that can lead to a decline in brain function is excessive mitochondrial oxidative stress. Studies show that green tea catechins help combat this by promoting more efficient **mitochondrial function**, thereby delaying cognitive decline.[39] Epigallocatechin-3-gallate also inhibits the inflammatory response of brain immune cells to chemical stresses by inhibiting a number of key inflammatory pathways.[40]

Another key way green tea protects against Alzheimer's is by its actions against *beta amyloid protein*. This abnormal protein accumulates into dangerous, inflammatory plaques in the brains of those with Alzheimer's disease and contributes to cell death.[38,41] In a lab study, epigallocatechin-3-gallate protected brain cells in culture from the toxic effects of beta amyloid plaque.[41]

And in an animal model of Alzheimer's induced by chemical toxicity, pretreating rats with green tea polyphenols reduced the accumulation of ***beta amyloid*** plaques and reduced microscopic brain damage. It also significantly improved the acute learning and memory impairments shown in unsupplemented animals.[38]

Parkinson's disease, like Alzheimer's, is the result of chronic excessive oxidative damage and inflammation. The difference is that they occur in a particular part of the brain that controls movement.[42,43] Lab studies have shown that green tea extracts and catechins can reverse those changes and improve Parkinson's-like behavior in rats.[42,43] In addition, green tea polyphenols can directly interfere with the clumping together of the toxic abnormal proteins found in the brains of animals with Parkinson's disease.[43]

Ischemic stroke (the kind caused by loss of blood flow) is by far the most common form of stroke. It occurs when arteries in the brain become blocked by atherosclerotic lesions or blood clots. This results in massive oxidative stress. In rat models of ischemic stroke, green tea supplementation has been found to protect the brain in numerous ways. It raises levels of natural antioxidant enzymes, reduces inflammation, minimizes the size of the infarcted (dead) areas of the brain, and reduces the cognitive effects of the injury.[44,45]

Finally, green tea extracts and epigallocatechin-3-gallate are emerging as powerful allies in the fight against nerve damage in diabetes (**diabetic neuropathy**), a major complication that leads to disability and early death. It results from the loss of pain-sensitive neurons in the spinal cord as a consequence of high blood sugar, producing severe oxidative stress.[46] Studies show that treatment with ***epigallocatechin-3-gallate*** in diabetic rats can normalize chemical stresses and reduce the extreme pain response seen in diabetic neuropathy.[46]

Green Tea Promotes Bone Health

Osteoporosis is a major health problem in postmenopausal women as well as in a substantial number of older men. In general, it results from excessive bone loss without sufficient new bone formation.[47] Studies show that much of the lack of new bone formation is a result of excessive oxidative stresses. This makes green tea an attractive candidate for the prevention of osteoporosis and its destructive consequences.[48]

And in fact, studies in rat models of menopause show that green tea polyphenols do indeed suppress bone breakdown and promote new bone formation as a result of their ability to fight oxidative stress. The result is an increase in bone mineral density, which is a measure of bone health.[49,50]

At a deeper molecular level, green tea catechins stimulate new bone-forming cells by modulation of gene expression.[47] In addition, epigallocatechin-3-gallate and green tea reduce the expression of inflammation-promoting molecules (cytokines) that contribute to bone loss.[51]

In humans, green tea polyphenols have been shown to reduce levels of oxidative stress in postmenopausal women. This effect was further improved by participation in Tai Chi exercises, which increase muscle strength.[52] Subsequent studies demonstrated significant reductions in markers of bone loss in supplemented women as well, combined with increased muscle strength. This is a vital factor in preventing falls that can lead to fractures.[53]

Summary

The body is under constant chemical and physical attack, eventually yielding, at the cellular and molecular levels, to damage that hastens aging. DNA damage and oxidative stress, caused by the very air one breathes, are prominent age-accelerating processes.

Polyphenols extracted from green tea (*Camellia sinensis*) are versatile and powerful phytochemicals. Their twin protection against oxidative stress and DNA damage, coupled with their ability to induce protective gene expression, makes them of profound interest in the anti-aging community.

Recent studies have shown that supplementation with **green tea extract** and its active compound

epigallocatechin-3-gallate can limit the underlying cell and tissue damage that contributes to metabolic syndrome, cardiovascular disease and stroke, neurodegenerative diseases, and even the bone loss that causes osteoporosis.

Green tea extracts, rich in epigallocatechin-3-gallate and other green tea components, offer a convenient and reliable means of attaining comprehensive, age-decelerating protection. High potency standardized tea extracts can be obtained for less than **25 cents a day**, making **green tea** one of the great bargains on the dietary supplement marketplace. ●

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

References

1. Salminen A, Ojala J, Kaarniranta K, et al. Mitochondrial dysfunction and oxidative stress activate inflammasomes: impact on the aging process and age-related diseases. *Cell Mol Life Sci.* 2012;69(18):2999-3013.
2. Stenvinkel P, Larsson TE. Chronic kidney disease: a clinical model of premature aging. *Am J Kidney Dis.* 2013;62(2):339-51.
3. Ho CK, Choi SW, Siu PM, et al. Effects of single dose and regular intake of green tea (Camellia sinensis) on DNA damage, DNA repair, and heme oxygenase-1 expression in a randomized controlled human supplementation study. *Mol Nutr Food Res.* 2014;58(6):1379-83.
4. Choi SW, Yeung VT, Collins AR, et al. Redox-linked effects of green tea on DNA damage and repair, and influence of microsatellite polymorphism in HMOX-1: results of a human intervention trial. *Mutagenesis.* 2015;30(1):129-37.
5. Zhang S, Shan L, Li Q, et al. Systematic analysis of the multiple bioactivities of green tea through a network pharmacology approach. *Evid Based Complement Alternat Med.* 2014;2014:512081.
6. Bhatti SK, O'Keefe JH, Lavie CJ. Coffee and tea: perks for health and longevity? *Curr Opin Clin Nutr Metab Care.* 2013;16(6):688-97.
7. Niu Y, Na L, Feng R, et al. The phytochemical, EGCG, extends life span by reducing liver and kidney function damage and improving age-associated inflammation and oxidative stress in healthy rats. *Aging Cell.* 2013;12(6):1041-9.
8. Al-Awaida W, Akash M, Aburubaiha Z, et al. Chinese green tea consumption reduces oxidative stress, inflammation and tissues damage in smoke exposed rats. *Iran J Basic Med Sci.* 2014;17(10):740-6.
9. Kuo YC, Lin JC, Bernard JR, et al. Green tea extract supplementation does not hamper endurance-training adaptation but improves antioxidant capacity in sedentary men. *Appl Physiol Nutr Metab.* 2015;40(10):990-6.
10. Lowe GM, Gana K, Rahman K. Dietary supplementation with green tea extract promotes enhanced human leukocyte activity. *J Complement Integr Med.* 2015;12(4):277-82.
11. Mahler A, Steiniger J, Bock M, et al. Metabolic response to epigallocatechin-3-gallate in relapsing-remitting multiple sclerosis: a randomized clinical trial. *Am J Clin Nutr.* 2015;101(3):487-95.
12. Pu X, Wang Z, Zhou S, et al. Protective effects of antioxidants on acrylonitrile-induced oxidative stress in female F344 rats. *Environ Toxicol.* 2015.
13. Aguilar M, Bhuket T, Torres S, et al. Prevalence of the metabolic syndrome in the United States, 2003-2012. *Jama.* 2015;313(19):1973-4.
14. Huang PL. A comprehensive definition for metabolic syndrome. *Dis Model Mech.* 2009;2(5-6):231-7.
15. Kim H, Oh HJ, Choi H, et al. The association between bone mineral density and metabolic syndrome: a Korean population-based study. *J Bone Miner Metab.* 2013;31(5):571-8.
16. Mauro C, De Rosa V, Marelli-Berg F, et al. Metabolic syndrome and the immunological affair with the blood-brain barrier. *Front Immunol.* 2014;5:677.
17. Okada-Iwabu M, Iwabu M, Ueki K, et al. Perspective of small-molecule adipoR agonist for type 2 diabetes and short life in obesity. *Diabetes Metab J.* 2015;39(5):363-72.
18. Bogdanski P, Suliburska J, Szulinska M, et al. Green tea extract reduces blood pressure, inflammatory biomarkers, and oxidative stress and improves parameters associated with insulin resistance in obese, hypertensive patients. *Nutr Res.* 2012;32(6):421-7.
19. Huang H, Guo Q, Qiu C, et al. Associations of green tea and rock tea consumption with risk of impaired fasting glucose and impaired glucose tolerance in Chinese men and women. *PLoS One.* 2013;8(11):e79214.
20. Lisowska A, Stawinska-Witoszynska B, Bajerska J, et al. Green tea influences intestinal assimilation of lipids in humans: a pilot study. *Eur Rev Med Pharmacol Sci.* 2015;19(2):209-14.
21. Basu A, Betts NM, Mulugeta A, et al. Green tea supplementation increases glutathione and plasma antioxidant capacity in adults with the metabolic syndrome. *Nutr Res.* 2013;33(3):180-7.
22. Ahmad RS, Butt MS, Sultan MT, et al. Preventive role of green tea catechins from obesity and related disorders especially hypercholesterolemia and hyperglycemia. *J Transl Med.* 2015;13:79.
23. Liu HW, Chan YC, Wang MF, et al. Dietary (-)-Epigallocatechin-3-gallate supplementation counteracts aging-associated skeletal muscle insulin resistance and fatty liver in senescence-accelerated mouse. *J Agric Food Chem.* 2015;63(38):8407-17.

24. Santamarina AB, Carvalho-Silva M, Gomes LM, et al. Decaffeinated green tea extract rich in epigallocatechin-3-gallate prevents fatty liver disease by increased activities of mitochondrial respiratory chain complexes in diet-induced obesity mice. *J Nutr Biochem.* 2015;26(11):1348-56.
25. Santana A, Santamarina A, Souza G, et al. Decaffeinated green tea extract rich in epigallocatechin-3-gallate improves insulin resistance and metabolic profiles in normolipidic diet--but not high-fat diet-fed mice. *J Nutr Biochem.* 2015;26(9):893-902.
26. Masterjohn C, Bruno RS. Therapeutic potential of green tea in nonalcoholic fatty liver disease. *Nutr Rev.* 2012;70(1):41-56.
27. Available at: http://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm. Accessed December 14, 2015.
28. Oyama J, Maeda T, Kouzuma K, et al. Green tea catechins improve human forearm endothelial dysfunction and have antiatherosclerotic effects in smokers. *Circ J.* 2010;74(3):578-88.
29. Wang QM, Gong QY, Yan JJ, et al. Association between green tea intake and coronary artery disease in a Chinese population. *Circ J.* 2010;74(2):294-300.
30. Pang J, Zhang Z, Zheng TZ, et al. Green tea consumption and risk of cardiovascular and ischemic related diseases: A meta-analysis. *Int J Cardiol.* 2016;202:967-74.
31. Bhardwaj P, Khanna D, Balakumar P. Catechin averts experimental diabetes mellitus-induced vascular endothelial structural and functional abnormalities. *Cardiovasc Toxicol.* 2014;14(1):41-51.
32. Liu PL, Liu JT, Kuo HF, et al. Epigallocatechin gallate attenuates proliferation and oxidative stress in human vascular smooth muscle cells induced by interleukin-1beta via heme oxygenase-1. *Mediators Inflamm.* 2014;2014:523684.
33. Yamagata K, Xie Y, Suzuki S, et al. Epigallocatechin-3-gallate inhibits VCAM-1 expression and apoptosis induction associated with LC3 expressions in TNFalpha-stimulated human endothelial cells. *Phytomedicine.* 2015;22(4):431-7.
34. Inami S, Takano M, Yamamoto M, et al. Tea catechin consumption reduces circulating oxidized low-density lipoprotein. *Int Heart J.* 2007;48(6):725-32.
35. Gomikawa S, Ishikawa Y, Hayase W, et al. Effect of ground green tea drinking for 2 weeks on the susceptibility of plasma and LDL to the oxidation ex vivo in healthy volunteers. *Kobe J Med Sci.* 2008;54(1):E62-72.
36. Kinlay S, Selwyn AP, Delagrange D, et al. Biological mechanisms for the clinical success of lipid-lowering in coronary artery disease and the use of surrogate end-points. *Curr Opin Lipidol.* 1996;7(6):389-97.
37. Leborgne L, Maziere JC, Maziere C, et al. Oxidative stress, atherogenesis and cardiovascular risk factors. *Arch Mal Coeur Vaiss.* 2002;95(9):805-14.
38. Li H, Wu X, Wu Q, et al. Green tea polyphenols protect against okadaic acid-induced acute learning and memory impairments in rats. *Nutrition.* 2014;30(3):337-42.
39. Assuncao M, Andrade JP. Protective action of green tea catechins in neuronal mitochondria during aging. *Front Biosci (Landmark Ed).* 2015;20:247-62.
40. Cai J, Jing D, Shi M, et al. Epigallocatechin gallate (EGCG) attenuates infrasound-induced neuronal impairment by inhibiting microglia-mediated inflammation. *J Nutr Biochem.* 2014;25(7):716-25.
41. Choi SM, Kim BC, Cho YH, et al. Effects of flavonoid compounds on beta-amyloid-peptide-induced neuronal death in cultured mouse cortical neurons. *Chonnam Med J.* 2014;50(2):45-51.
42. Bitu Pinto N, da Silva Alexandre B, Neves KR, et al. Neuroprotective properties of the standardized extract from Camellia sinensis (green tea) and its main bioactive components, epicatechin and epigallocatechin gallate, in the 6-OHDA model of Parkinson's disease. *Evid Based Complement Alternat Med.* 2015;2015:161092.
43. Caruana M, Vassallo N. Tea polyphenols in Parkinson's disease. *Adv Exp Med Biol.* 2015;863:117-37.
44. Schimidt HL, Vieira A, Altermann C, et al. Memory deficits and oxidative stress in cerebral ischemia-reperfusion: neuroprotective role of physical exercise and green tea supplementation. *Neurobiol Learn Mem.* 2014;114:242-50.
45. Zhang F, Li N, Jiang L, et al. Neuroprotective effects of (-)-epigallocatechin-3-gallate against focal cerebral ischemia/reperfusion injury in rats through attenuation of inflammation. *Neurochem Res.* 2015;40(8):1691-8.
46. Raposo D, Morgado C, Pereira-Terra P, et al. Nociceptive spinal cord neurons of laminae I-III exhibit oxidative stress damage during diabetic neuropathy which is prevented by early antioxidant treatment with epigallocatechin-gallate (EGCG). *Brain Res Bull.* 2015;110:68-75.
47. Byun MR, Sung MK, Kim AR, et al. (-)-Epicatechin gallate (ECG) stimulates osteoblast differentiation via Runt-related transcription factor 2 (RUNX2) and transcriptional coactivator with PDZ-binding motif (TAZ)-mediated transcriptional activation. *J Biol Chem.* 2014;289(14):9926-35.
48. Shen CL, Chyu MC, Yeh JK, et al. Green tea polyphenols and Tai Chi for bone health: designing a placebo-controlled randomized trial. *BMC Musculoskelet Disord.* 2009;10:110.
49. Shen CL, Cao JJ, Dagda RY, et al. Supplementation with green tea polyphenols improves bone microstructure and quality in aged, orchidectomized rats. *Calcif Tissue Int.* 2011;88(6):455-63.
50. Song D, Gan M, Zou J, et al. Effect of (-)-epigallocatechin-3-gallate in preventing bone loss in ovariectomized rats and possible mechanisms. *Int J Clin Exp Med.* 2014;7(11):4183-90.
51. Tominari T, Matsumoto C, Watanabe K, et al. Epigallocatechin gallate (EGCG) suppresses lipopolysaccharide-induced inflammatory bone resorption, and protects against alveolar bone loss in mice. *FEBS Open Bio.* 2015;5:522-7.
52. Qian G, Xue K, Tang L, et al. Mitigation of oxidative damage by green tea polyphenols and Tai Chi exercise in postmenopausal women with osteopenia. *PLoS One.* 2012;7(10):e48090.
53. Shen CL, Chyu MC, Yeh JK, et al. Effect of green tea and Tai Chi on bone health in postmenopausal osteopenic women: a 6-month randomized placebo-controlled trial. *Osteoporos Int.* 2012;23(5):1541-52.

Sweep Away Aging Cells

with **Optimized Quercetin**

Scientists have discovered that **quercetin**, a compound found in certain foods, can safely remove tired, aging (senescent) cells from the body,[1] thereby making room for younger, more vital cells.

A number of studies suggest that **quercetin** may slow aging and reduce the risk of age-related factors.[2,3]

Optimized Quercetin

Item #01309 • 60 vegetarian capsules

	Retail Price	Your Price
1 bottle	$22	**$16.50**
4 bottles		**$15 each**

References

1. *Aging Cell.* 2015 Aug; 14(4): 644–58.
2. *Exp Geronto.* 2010 Oct; 45(10):763-71.
3. *Rejuvenation Res.* 2011 Oct;14(5):525-34.

To order **Optimized Quercetin**, call **1-800-544-4440** or visit **www.LifeExtension.com**

RESTORE YOUTHFUL COGNITIVE HEALTH

Dopamine, a neurotransmitter that regulates cognition, declines in the aging brain due to increasing levels of the MAO-B enzyme. **Wild green oat extract** inhibits this MAO-B enzyme to promote healthy dopamine levels.[1-4]

The **wild green oat extract** in **Dopa-Mind™** is for aging individuals who wish to:

- **Maintain youthful mental performance**
- **Revive cognitive health**
- **Support longevity**

Dopa-Mind™
Item #02006 • 60 vegetarian tablets

	Retail Price	Your Price
1 bottle	$48	**$36.00**
4 bottles		**$32.00 each**

To order **Dopa-Mind™**, call **1-800-544-4440** or visit **www.LifeExtension.com**

References
1. *J Neurosci*. 2013 Jan 2;33(1):286-91.
2. *Psychol Med*. 2011 Feb;41(2):419-29.
3. *Am J Psychiatry*. 1998 Mar;155(3):344-9.
4. *J Altern Complement Med*. 2011 Jul;17(7):635-7.

Non-GMO

MEGA GREEN TEA EXTRACT

Powerful DNA Protection

FOR LESS THAN **25¢** A DAY!

Your body is under constant attack from toxins that cause cellular DNA damage and accelerate normal aging processes.

Each **725 mg** capsule of **Mega Green Tea Extract** is standardized to **98% polyphenols** that provide **326 mg** of **EGCG** to:

- Protect against DNA damage and oxidative stress[1]
- Support healthy blood sugar levels[2]
- Enhance heart health[3]
- Boost brain function[4]
- Support strong bones[5]
- Maintain healthy cholesterol levels already within normal range[6]

Each cost-effective bottle lasts over three months!

References

1. *Mutagenesis.* 2015;30(1):129-37.
2. *Curr Opin Clin Nutr Metab Care.* 2013;16(6):688-97.
3. *Circ J.* 2010;74(3):578-88.
4. *Nutrition.* 2014;30(3):337-42.
5. *BMC Musculoskelet Disord.* 2009;10:110.
6. *J Transl Med.* 2015;13:79.

Note: **EGCG** is the acronym for **epigallocatechin gallate**, which is the polyphenol in green tea that has demonstrated the most robust health benefits.

Mega Green Tea Extract Decaffeinated

Item #00954 • 100 vegetarian capsules

	Retail Price	Your Price
1 bottle	$30	**$22.50**
4 bottles		**$18 each**

Non-GMO

Mega Green Tea Extract Lightly Caffeinated

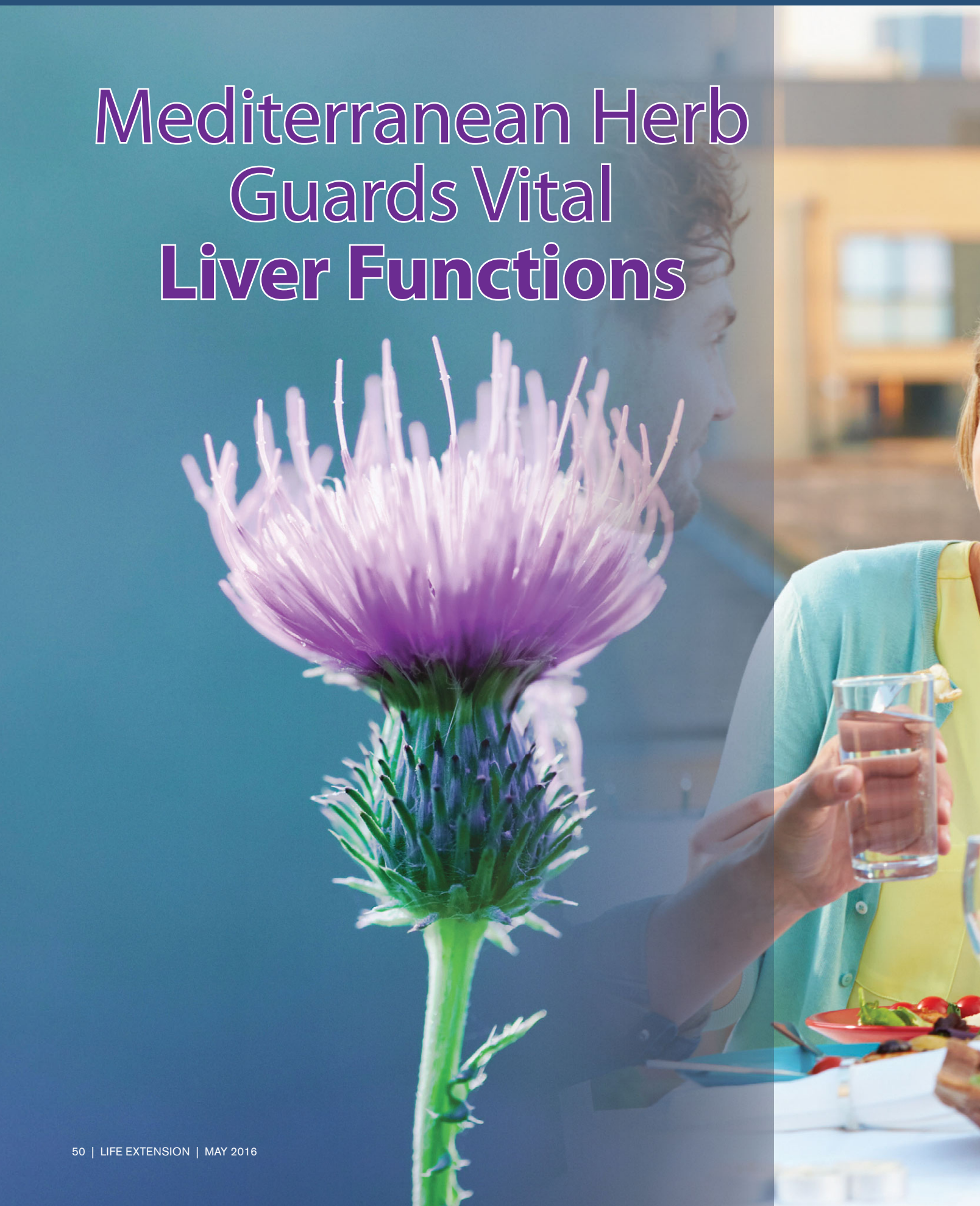
Item #00953 • 100 vegetarian capsules

	Retail Price	Your Price
1 bottle	$30	**$22.50**
4 bottles		**$18 each**

Non-GMO

To order **Mega Green Tea Extract**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Mediterranean Herb Guards Vital **Liver Functions**



BY LINDA NEVIS

The liver performs over 500 life-sustaining functions, including neutralizing toxins.[1]

Milk thistle, a plant native to the Mediterranean regions, has long been prized as a treatment for chronic **liver** ailments.[2,3]

Human and animal studies are confirming these benefits.

Researchers are now finding how **milk thistle** can protect against ***metabolic syndrome***, guard against fatty liver disease, and neutralize the hepatitis C virus.

Maintaining **liver function** is essential to overall health and longevity. The ability of **milk thistle** to protect the liver continues to be validated in the published literature.

The most exciting new data reveals that **milk thistle** may help protect against a broad array of common **malignancies**.

What Is Milk Thistle and How Does It Work?

Milk thistle seeds contain several compounds that exert beneficial biological effects, the most prominent of which are ***silybin*** and ***silymarin***.[2,4]

Unlike many pharmaceuticals, milk thistle extracts benefit **liver function** by multiple mechanisms of action. In this way, milk thistle extracts provide broad-spectrum benefits for supporting overall health.

Milk thistle's components help the liver cleanse the blood of toxins and shield liver cells from the barrage of free radicals, fats, sugars, and other compounds that lead to common liver ailments.

Metabolic Syndrome and Fatty Liver Disease

Too many Americans are destroying their livers due to obesity and excess ingestion of sugars, starches, and the wrong fats.

This deadly phenomenon is not limited to the United States. Populations around the world who adopt Western eating patterns are experiencing an epidemic of ***metabolic syndrome***. A diagnosis of metabolic syndrome is made when a person has a combination of abdominal obesity, hypertension, loss of blood sugar control, and blood lipid disturbances. While metabolic syndrome affects most organs in the body, it is potentially lethal to the **liver**.

Metabolic syndrome can change the way liver cells handle the continual flood of sugars and fats coming from the intestinal tract. This river of sugar and fats that accumulates in the liver can lead to ***non-alcoholic fatty liver disease (NAFLD)***. Unfortunately, people with non-alcoholic fatty liver disease are usually unaware of this deadly fat buildup in their liver until it is too late.

In its more advanced stages, non-alcoholic fatty liver disease can progress to ***non-alcoholic steatohepatitis (NASH)***. Non-alcoholic steatohepatitis is an even more dangerous, progressive condition involving inflammation and fibrosis of liver tissue, producing liver cirrhosis in **20%** of people and death in **12%**. Non-alcoholic steatohepatitis can also develop into liver failure and may progress to hepatocellular carcinoma, the deadliest and one of the most common forms of liver cancer.[5]

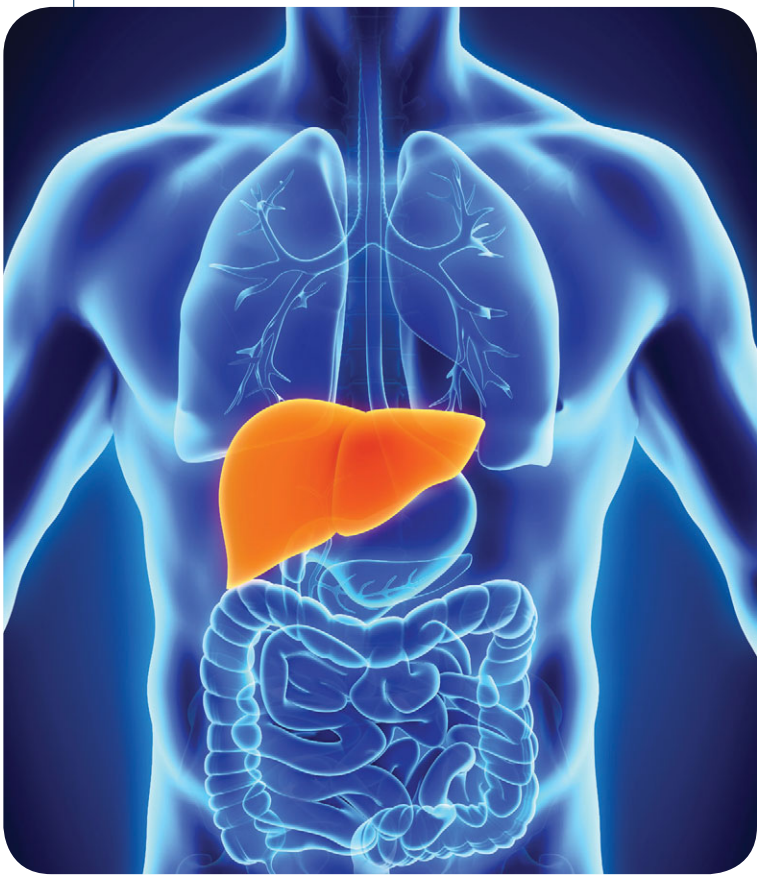
Combatting ***metabolic syndrome*** in its earliest stages protects the liver and can prevent the progression to non-alcoholic fatty liver disease and to non-alcoholic steatohepatitis.

Milk Thistle Protects against Fatty Liver Disease

Animal studies show that milk thistle and its extracts provide multi-targeted protection of the liver against both non-alcoholic fatty liver disease and non-alcoholic steatohepatitis.

For example, the milk thistle compound ***silybin*** was more effective than the antidiabetic drug ***rosiglitazone*** at stabilizing liver cells' damaged energy-handling metabolism, while improving insulin resistance and reducing oxidative stress.[6] Indeed, silybin's normalization of insulin resistance and reduction of cell damage proved beneficial to both heart and liver tissue in animals with non-alcoholic steatohepatitis.[7]

In addition to reducing insulin resistance, a major factor in progression of non-alcoholic fatty liver disease to non-alcoholic steatohepatitis, ***silybin*** has also been shown to target and reduce central obesity by regulating the expression of key enzymes and genes involved in the breakdown of lipids (lipolysis) and the formation of glucose (gluconeogenesis), leading to enhanced fat breakdown and inhibition of new glucose production.[8] Milk thistle extract also produces significant reductions in excess liver weight. This reduction in liver weight helps reduce the dangers of fat progression in the liver.[9]



What You Need to Know

Milk Thistle Benefits the Liver

- The liver is the largest solid internal organ and is critical to all human biological functions.
- A high rate of chemical reactions makes the liver uniquely susceptible to chemical stresses, inflammation, and loss of energy balance functions, leading to a number of deadly and progressive liver disorders.
- Milk thistle, an indigenous Mediterranean plant, has a long history of use as a liver tonic.
- Modern science has demonstrated beneficial effects of milk thistle extracts in liver diseases such as non-alcoholic fatty liver disease and its dangerous sequel, non-alcoholic steatohepatitis, which can, in turn, lead to deadly liver fibrosis and cirrhosis.
- Milk thistle blocks entry of hepatitis C viral particles into liver cells, while intravenous silybin from milk thistle can reduce the viral load in people already infected.
- Their myriad mechanisms of action give milk thistle extracts powerful cancer chemoprotective effects against liver cancers and several other cancer types.
- Exercise and a healthy lifestyle can promote liver health and reduce its threats, and the addition of daily milk thistle supplementation can augment those benefits.

More importantly, ***silymarin*** was shown in recent animal studies to suppress activation of liver inflammatory cells, which are implicated in progression of non-alcoholic fatty liver disease to non-alcoholic steatohepatitis.[10,11] Silybin treatment in a mouse model of non-alcoholic steatohepatitis counteracted this progression by regulating lipid metabolism in liver cells and suppressing oxidative stress-mediated toxicity.[11]

Human Studies

All of the previously discussed health-boosting properties of milk thistle have been demonstrated in humans, particularly when milk thistle is used in combination with vitamin E.

One human study has shown that in patients diagnosed with non-alcoholic fatty liver disease, supplementation with a ***silybin*** compound plus ***vitamin E*** produced significant improvements in blood markers of liver damage, insulin sensitivity, and the microscopic appearance of liver cells.[12] Overweight and obese participants (approximately **85%** of subjects) also saw a **15%** improvement in body mass index. In patients who also had hepatitis C viral infection, the supplement improved markers of liver fibrosis.

In a recent European study, patients with metabolic syndrome and non-alcoholic fatty liver disease participated in an open trial of silymarin plus vitamin E.[13] One group took this nutrient combination for 90 days, while another group received no treatment. All subjects followed a standard regimen of diet and exercise to reduce lifestyle contributions to the disease.

The supplemented group showed significantly greater reductions in abdominal circumference (**4.3%**), body mass index (**2.2%**), size of the liver (**5.5%**), and ultrasound measurements of fat accumulations in their livers (**34%**), compared with patients in the diet/exercise-only group.[13]

Liver Fibrosis and Cirrhosis

Liver fibrosis results from liver cell injury and leads to eventual liver scarring. Fibrosis is a common condition that can occur with progression of almost all chronic liver diseases.[14] When fibrosis takes over the entire liver, the liver begins to shut down. Physical changes in the liver start to restrict blood flow, cause backup of bile, and produce end-stage liver failure in the condition known as **liver cirrhosis**.[15,16] The onset of cirrhosis signals a very poor prognosis.[17]

Animal studies reveal that milk thistle extracts can be of use in slowing or even preventing liver fibrosis and progression to cirrhosis. Silybin can boost the function and number of mitochondria in liver cells, enhancing the cells' ability to handle nutrient molecules efficiently.[18] This protects liver cells from the damage induced by many chemical compounds, which can otherwise induce fibrosis.[14,19]

An early **human** study of patients with pre-existing cirrhosis showed that silymarin, **140 mg** three times daily, significantly increased four-year survival time from **39%** in untreated people to **58%** in silymarin-supplemented subjects.[20]

How Milk Thistle Works

Milk thistle's bioactive components work on different pathways to provide a broad range of liver support and protection including:

- Free radical protective properties that boost natural intracellular protection systems.[1,46,47]
- Suppression of key inflammatory signaling systems resulting in a reduction in markers of inflammation.[1,46-48]
- Ability to bind to excess iron, which when stored in the liver, can lead to cell death and dysfunction.[49]
- Increase of vital longevity-promoting control systems, including the potent AMPK (adenosine monophosphate activated protein kinase), which regulates how the body burns and stores fuel molecules such as fats and sugars and cleans up damaged proteins that promote aging.[48]
- Inhibition of the mammalian target of rapamycin (mTOR), a protein that promotes aging at the cellular level.[48]

Hepatitis C Virus Infection

Hepatitis C virus affects an estimated 170 million individuals worldwide and can result in hepatocellular carcinoma,[21] one of the most aggressive forms of liver cancer.[22]

Breakthrough medications that cure most cases of hepatitis C have recently been in the news, mainly because their cost ($84,000) is so overwhelming.

In a promising development, scientists using live-cell imaging and electron microscopy have discovered that silybin has now been shown to *inhibit* the entry of the hepatitis C virus into liver cells.[21]

Silybin accomplishes this protective benefit by *altering* the shape and function of cell membrane complexes that the hepatitis C virus uses to attach itself to the cell.[21] In other words, silybin prevents the hepatitis C virus from lodging and attaching itself in the liver. This finding suggests that silybin might have important preventive effects for people not yet infected with the virus, and possibly for those receiving liver transplants in the hope of preventing reinfection of the graft. Based on these findings, scientists reported that there might be future antiviral benefits of silybin yet to be discovered.

While we are waiting for large-scale human studies regarding silymarin's anti-hepatitis C benefits, there are promising studies using intravenous silybin.[23-25] Studies in human patients generally show that intravenous silybin is well-tolerated and has an important anti-hepatitis C virus effect by decreasing viral load, even in people who have not responded to standard therapy.[23,24,26-28] In 2015, the first case study was published showing that, in a single patient, intravenous silybin could successfully eliminate the hepatitis C virus after prolonged treatment.[29]

None of these remarkable findings mean that hepatitis patients should neglect the curative properties of drugs like **Sovaldi®**, assuming they can afford it. For helping to heal a damaged liver and further neutralizing hepatitis C infection, milk thistle supplementation should be considered.

Neutralizing Deadly Toxins

The liver receives blood from the intestinal tract, which means that it is the first to be exposed to a variety of toxins that we swallow. There are two major enzymatic liver detoxification systems, known as **Phase I** and **Phase II**. Silymarin regulates *both* of these detoxification systems, which greatly reduces the risk of a carcinogenic compound being released into the body.

Phase I enzymes break down a variety of potentially harmful molecules, including drugs, alcohol, and toxic compounds, rendering them harmless. But, on their way to their final state, those molecules undergo changes to form highly reactive compounds that can induce mutations in DNA, kill cells, produce birth defects, and promote cancer.[30] Silymarin's dual activity protects against these outcomes by inhibiting phase I enzymes and reducing their production of toxic intermediates and by activating phase II enzymes.[30-32]

Phase II liver enzymes, on the other hand, modify potentially toxic molecules that promote their secretion in the bile, leading to their eventual excretion from the body. Silymarin promotes Phase II enzyme activity, helping to hasten elimination of toxic and potentially carcinogenic materials.[30-32]

These powerful impacts on liver functions ultimately result in lower exposure to potentially cancer-inducing chemicals. This reduces the threat of cancer in parts of the body as distant from the liver as the breast, prostate, and lungs. **Silymarin** works through a number of important pathways and mechanisms to block the development of cancer.

These anti-cancer activities:

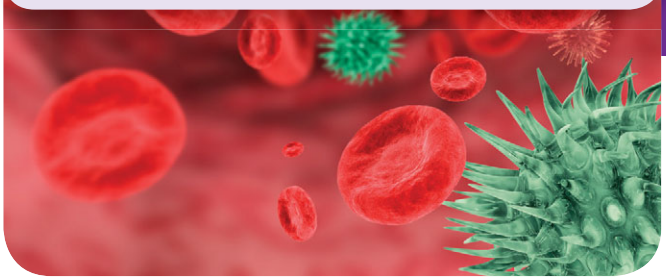
- Induce *apoptosis*, the programmed cell death process that normally controls excessive growth in tissues. This process of apoptosis is broken in cancer cells, which allows them to reproduce and spread without control.[33]
- Block invasion of healthy tissues by cancer cells.[33]
- Inhibit a molecular transcription factor known as pSTAT3, which is required for growth and metastasis in breast, colon, prostate, and non-small-cell lung cancers.[34]
- Regulate the cell division cycle that goes out of control in cancer.[35]
- Re-activate a colon tumor suppressor gene, CDX2, which is deactivated early in the process of colon carcinogenesis.[36]
- Become highly concentrated in breast cancer tissue when given orally, delivering it directly to one important site of action.[37]
- Inhibit glucose transport into cancer cells, starving them of their source of energy.[38]

Scientists Explore Milk Thistle's Anti-Aging Benefits

Silymarin was shown to increase the life span of an animal commonly used in aging research, the worm *C. elegans*, by as much as **25%.**[50] Intriguingly, in a *C. elegans* model of Alzheimer's disease, the worms have been modified to produce the toxic *beta amyloid* protein found in the brains of humans with the disease. The result is that these worms become paralyzed.[50]

Following treatment with silymarin, the animals showed a delay in onset of paralysis, and a resistance to beta amyloid-induced oxidative stress, raising the real possibility that silymarin might have a role in prevention of human Alzheimer's disease.[50]

Silymarin also has favorable impacts on cancer risk, not only in the liver, but throughout the body. A major portion of this benefit arises from its ability to regulate liver detoxification pathways in a coordinated fashion. This helps to reduce the activation of potential carcinogens, while enhancing their elimination from the body.



Protects against Primary Liver Cancer

Hepatocellular carcinoma is one of the most common and deadliest liver cancers and is increasing worldwide.[31] Treatment for hepatocellular carcinoma is limited, with liver transplantation being the best option.[39] Yet, even with liver transplantation, the prognosis remains grim.[1,31]

There is preliminary data suggesting that milk thistle extracts may be chemoprotective against hepatocellular carcinoma.[31,40] In a study of hepatocellular carcinoma in rats, silymarin favorably modified phase I and II liver enzymes and decreased malignant cell proliferation, reduced expression of proteins that interfere with normal cell death by apoptosis, and increased expression of proteins that promote natural apoptotic cell death, all effects that reduce growth and invasiveness of cancers.[31]

Increasing Milk Thistle Absorption

As beneficial as milk thistle is, there is one thing keeping it from reaching its fullest potential: **Silybin**, the star component of silymarin, does not dissolve well in water.[51,52] That gives it poor bioavailability, meaning it is difficult for it to reach tissues and cells in the body.[53-56]

But scientists have now developed a simple but effective technology to overcome silybin's poor bioavailability. The solution is to mix the silybin with a nutrient called phosphatidylcholine.

Phosphatidylcholine is a major component of cell membranes and can facilitate transport across the cells lining the intestines, making it an ideal "carrier molecule" for silybin.[53,57] Scientists believe that phosphatidylcholine molecularly bonds to the silybin molecule and wraps around it, ushering it through the membranes of cells in the intestinal tract.[53]

The **silybin-phosphatidylcholine complex** is absorbed nearly **5 times better** than silymarin alone, and its ultimate concentration to the liver, its target organ, is **10-fold greater** than silymarin alone.[54-56]

In a study of rats exposed to various liver toxins (including dry-cleaning fluid, acetaminophen, and alcohol), silybin plus phosphatidylcholine protected against the telltale rise in plasma levels of liver enzymes (a marker of liver damage), while the same doses of either nutrient alone had no detectable effect.[58]

A series of human trials has found that this complex also has better results than silymarin or silybin alone, lowering serum levels of liver enzymes and producing clinical improvement in studies of liver cirrhosis and hepatitis caused by alcohol, drugs, and viruses.[53]

Other animal studies demonstrate that silybin slows the growth of implanted human hepatocellular carcinoma tumors, the result of many different mechanisms of action.[41]

All of the general anticancer properties of milk thistle extracts bode well for cancer chemoprevention at sites throughout the body. No large human trials have been completed yet, but evidence from animal and basic science studies shows that milk thistle extracts, including silymarin and silybin, can:

- Slow the transition of cell types in lung tissue that precedes emergence of non-small-cell lung cancers.[42]
- Reduce cancer cell survival and inhibit growth of squamous cell cancers from the human pharynx.[43]
- Arrest the cell cycle and induce beneficial cancer cell death in human ovarian cancer cells.[44]
- Show affinity for prostate cancer cells and inhibit migration of malignant cells.[45]
- Reduce inflammatory changes and slow the cell replicative cycle in human colorectal cancer cells.[35]

Summary

The human liver engages in half a thousand unique chemical reactions that influence human health throughout the body. All of that chemical activity exposes liver tissue to unmatched levels of oxidative stress and inflammation, while modern lifestyles pile on abuse in the form of excessive fats, sugars, and chemical toxins.

As a result, liver diseases such as non-alcoholic fatty liver disease, non-alcoholic steatohepatitis, and liver fibrosis/cirrhosis are growing in frequency, as are rates of infection with hepatitis C virus and development of hepatocellular carcinoma. Even cancers in other parts of the body can result from the liver's improper handling of toxins and carcinogens.

Milk thistle, a flowering plant native to the Mediterranean regions, has long been used as a specific liver tonic. Today, scientific evidence abounds that milk thistle extracts, including silymarin and its chief component, **silybin**, indeed have multiple health-promoting properties that can benefit liver health.

Studies show that milk thistle extracts can mitigate non-alcoholic fatty liver disease, which can develop as a result of several causes, including metabolic syndrome. Extracts appear to help slow the progress

of non-alcoholic fatty liver disease to non-alcoholic steatohepatitis, a deadly consequence of progressive inflammation and fibrosis of the liver. There is early evidence that milk thistle also slows eventual progression of liver diseases to fibrosis and cirrhosis, which are life threatening.

Perhaps most exciting is the volume of pre-clinical data indicating how **milk thistle** extract may help protect against a broad array of common and deadly **malignancies**.

Care of the liver is essential for a long and healthy life. A lifestyle that limits ingestion of dangerous fat, sugar, starch, and alcohol calories along with increased physical activity is the first step. Regular supplementation with a high-quality milk thistle extract is an excellent addition to such a regimen.●

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

References

1. Shulman M, Nahmias Y. Long-term culture and coculture of primary rat and human hepatocytes. *Meth Molec Biol. (Clifton, N.J.).* 2013;945:287-302.
2. Mastron JK, Siveen KS, Sethi G, et al. Silymarin and hepatocellular carcinoma: a systematic, comprehensive, and critical review. *Anticancer Drugs.* 2015;26(5):475-86.
3. Toxicology and carcinogenesis studies of milk thistle extract (CAS No. 84604-20-6) in F344/N rats and B6C3F1 mice (Feed Studies). *Natl Toxicol Program Tech Rep Ser.* 2011(565):1-177.
4. Polyak SJ, Ferenci P, Pawlotsky J-M. Hepatoprotective and antiviral functions of silymarin components in HCV infection. *Hepatology (Baltimore, Md.).* 2013;57(3):1262-71.
5. McCullough AJ. The clinical features, diagnosis and natural history of nonalcoholic fatty liver disease. *Clin Liver Dis.* 2004;8(3):521-33, viii.
6. Yao J, Zhi M, Minhu C. Effect of silybin on high-fat-induced fatty liver in rats. *Braz J Med Biol Res.* 2011;44(7):652-9.
7. Salamone F, Galvano F, Marino Gammazza A, et al. Silibinin improves hepatic and myocardial injury in mice with nonalcoholic steatohepatitis. *Dig Liver Dis.* 2012;44(4):334-42.
8. Yao J, Zhi M, Gao X, et al. Effect and the probable mechanisms of silibinin in regulating insulin resistance in the liver of rats with non-alcoholic fatty liver. *Braz J Med Biol Res.* 2013;46(3):270-7.
9. Pais P, D'Amato M. In vivo efficacy study of milk thistle extract (ETHIS-094) in STAM model of nonalcoholic steatohepatitis. *Drugs R D.* 2014;14(4):291-9.
10. Kim M, Yang SG, Kim JM, et al. Silymarin suppresses hepatic stellate cell activation in a dietary rat model of non-alcoholic steatohepatitis: analysis of isolated hepatic stellate cells. *Int J Mol Med.* 2012;30(3):473-9.
11. Salamone F, Galvano F, Cappello F, et al. Silibinin modulates lipid homeostasis and inhibits nuclear factor kappa B activation in experimental nonalcoholic steatohepatitis. *Transl Res.* 2012;159(6):477-86.
12. Loguercio C, Andreone P, Brisc C, et al. Silybin combined with phosphatidylcholine and vitamin E in patients with nonalcoholic fatty liver disease: a randomized controlled trial. *Free Radic Biol Med.* 2012;52(9):1658-65.
13. Sorrentino G, Crispino P, Coppola D, et al. Efficacy of lifestyle changes in subjects with non-alcoholic liver steatosis and metabolic syndrome may be improved with an antioxidant nutraceutical: a controlled clinical study. *Drugs R D.* 2015;15(1):21-5.
14. Clichici S, Olteanu D, Nagy AL, et al. Silymarin inhibits the progression of fibrosis in the early stages of liver injury in CCl(4)-treated rats. *J Med Food.* 2015;18(3):290-8.
15. Available at: http://www.niddk.nih.gov/health-information/health-topics/liver-disease/cirrhosis/Pages/facts.aspx. Accessed February 8, 2016.
16. Bataller R, Brenner DA. Liver fibrosis. *J Clin Inves.* 2005;115(2):209-18.
17. Available at: http://www.medscape.com/viewarticle/572659. Accessed February 8, 2016.
18. Serviddio G, Bellanti F, Stanca E, et al. Silybin exerts antioxidant effects and induces mitochondrial biogenesis in liver of rat with secondary biliary cirrhosis. *Free Radic Biol Med.* 2014;73:117-26.
19. Ghaffari AR, Noshad H, Ostadi A, et al. The effects of milk thistle on hepatic fibrosis due to methotrexate in rat. *Hepat Mon.* 2011;11(6):464-8.
20. Ferenci P, Dragosics B, Dittrich H, et al. Randomized controlled trial of silymarin treatment in patients with cirrhosis of the liver. *J Hepatol.* 1989;9(1):105-13.
21. Blaising J, Levy PL, Gondeau C, et al. Silibinin inhibits hepatitis C virus entry into hepatocytes by hindering clathrin-dependent trafficking. *Cell Microbiol.* 2013;15(11):1866-82.
22. El-Tayeh SF, Hussein TD, El-Houseini ME, et al. Serological biomarkers of hepatocellular carcinoma in Egyptian patients. *Dis Markers.* 2012;32(4):255-63.
23. Barcena R, Moreno A, Rodriguez-Gandia MA, et al. Safety and anti-HCV effect of prolonged intravenous silibinin in HCV genotype 1 subjects in the immediate liver transplant period. *J Hepatol.* 2013;58(3):421-6.

24. Marino Z, Crespo G, D'Amato M, et al. Intravenous silibinin monotherapy shows significant antiviral activity in HCV-infected patients in the peri-transplantation period. *J Hepatol.* 2013;58(3):415-20.
25. Rendina M, D'Amato M, Castellaneta A, et al. Antiviral activity and safety profile of silibinin in HCV patients with advanced fibrosis after liver transplantation: a randomized clinical trial. *Transpl Int.* 2014;27(7):696-704.
26. Braun DL, Rauch A, Durisch N, et al. Efficacy of lead-in silibinin and subsequent triple therapy in difficult-to-treat HIV/hepatitis C virus-coinfected patients. *HIV Med.* 2014;15(10):625-30.
27. Ferenci P, Scherzer TM, Kerschner H, et al. Silibinin is a potent antiviral agent in patients with chronic hepatitis C not responding to pegylated interferon/ribavirin therapy. *Gastroenterology.* 2008;135(5):1561-7.
28. Socha L, Karpinska E, Jurczyk K, et al. Rescue therapy with intravenous silibinin in liver transplant recipients with recurrent HCV hepatitis - two case reports. *Ann Transplant.* 2014;19:161-4.
29. Dahari H, Shteingart S, Gafanovich I, et al. Sustained virological response with intravenous silibinin: individualized IFN-free therapy via real-time modelling of HCV kinetics. *Liver Int.* 2015;35(2):289-94.
30. Kiruthiga PV, Karthikeyan K, Archunan G, et al. Silymarin prevents benzo(a)pyrene-induced toxicity in Wistar rats by modulating xenobiotic-metabolizing enzymes. *Toxicol Ind Health.* 2015;31(6):523-41.
31. Gopalakrishnan R, Sundaram J, Sattu K, et al. Dietary supplementation of silymarin is associated with decreased cell proliferation, increased apoptosis, and activation of detoxification system in hepatocellular carcinoma. *Mol Cell Biochem.* 2013;377(1-2):163-76.
32. Liska DJ. The detoxification enzyme systems. *Altern Med Rev.* 1998;3(3):187-98.
33. Woo SM, Min KJ, Chae IG, et al. Silymarin suppresses the PGE2 -induced cell migration through inhibition of EP2 activation; G protein-dependent PKA-CREB and G protein-independent Src-STAT3 signal pathways. *Mol Carcinog.* 2015;54(3):216-28.
34. Bosch-Barrera J, Menendez JA. Silibinin and STAT3: A natural way of targeting transcription factors for cancer therapy. *Cancer Treat Rev.* 2015;41(6):540-6.
35. Eo HJ, Park GH, Song HM, et al. Silymarin induces cyclin D1 proteasomal degradation via its phosphorylation of threonine-286 in human colorectal cancer cells. *Int Immunopharmacol.* 2015;24(1):1-6.
36. Sangeetha N, Nalini N. Silibinin modulates caudal-type homeobox transcription factor (CDX2), an intestine specific tumor suppressor to abrogate colon cancer in experimental rats. *Hum Exp Toxicol.* 2015;34(1):56-64.
37. Lazzeroni M, Guerrieri-Gonzaga A, Gandini S, et al. A presurgical study of oral silybin-phosphatidylcholine in patients with early breast cancer. *Cancer Prev Res (Phila).* 2016;9(1):89-95.
38. Zhan T, Digel M, Kuch EM, et al. Silybin and dehydrosilybin decrease glucose uptake by inhibiting GLUT proteins. *J Cell Biochem.* 2011;112(3):849-59.
39. Available at: http://emedicine.medscape.com/article/197319-overview. Accessed February 11, 2016.
40. Ramakrishnan G, Elinos-Baez CM, Jagan S, et al. Silymarin down-regulates COX-2 expression and attenuates hyperlipidemia during NDEA-induced rat hepatocellular carcinoma. *Mol Cell Biochem.* 2008;313(1-2):53-61.
41. Cui W, Gu F, Hu KQ. Effects and mechanisms of silibinin on human hepatocellular carcinoma xenografts in nude mice. *World J Gastroenterol.* 2009;15(16):1943-50.
42. Cufi S, Bonavia R, Vazquez-Martin A, et al. Silibinin meglumine, a water-soluble form of milk thistle silymarin, is an orally active anti-cancer agent that impedes the epithelial-to-mesenchymal transition (EMT) in EGFR-mutant non-small-cell lung carcinoma cells. *Food Chem Toxicol.* 2013;60:360-8.
43. Su CH, Chen LJ, Liao JF, et al. Increase of phosphatase and tensin homolog by silymarin to inhibit human pharynx squamous cancer. *J Med Food.* 2013;16(9):778-84.
44. Fan L, Ma Y, Liu Y, et al. Silymarin induces cell cycle arrest and apoptosis in ovarian cancer cells. *Eur J Pharmacol.* 2014;743:79-88.
45. Snima KS, Arunkumar P, Jayakumar R, et al. Silymarin encapsulated poly(D,L-lactic-co-glycolic acid) nanoparticles: a prospective candidate for prostate cancer therapy. *J Biomed Nanotechnol.* 2014;10(4):559-70.
46. Ebrahimpour Koujan S, Gargari BP, Mobasseri M, et al. Effects of Silybum marianum (L.) Gaertn. (silymarin) extract supplementation on antioxidant status and hs-CRP in patients with type 2 diabetes mellitus: a randomized, triple-blind, placebo-controlled clinical trial. *Phytomedicine.* 2015;22(2):290-6.
47. Feng B, Meng R, Huang B, et al. Silymarin alleviates hepatic oxidative stress and protects against metabolic disorders in high-fat diet-fed mice. *Free Radic Res.* 2016;50(3):314-27.
48. Lovelace ES, Wagoner J, MacDonald J, et al. Silymarin suppresses cellular inflammation by inducing reparative stress signaling. *J Nat Prod.* 2015;78(8):1990-2000.
49. Moayedi B, Gharagozloo M, Esmaeil N, et al. A randomized double-blind, placebo-controlled study of therapeutic effects of silymarin in beta-thalassemia major patients receiving desferrioxamine. *Eur J Haematol.* 2013;90(3):202-9.
50. Kumar J, Park KC, Awasthi A, et al. Silymarin extends lifespan and reduces proteotoxicity in C. elegans Alzheimer's model. *CNS Neurol Disord Drug Targets.* 2015;14(2):295-302.
51. Kidd P, Head K. A review of the bioavailability and clinical efficacy of milk thistle phytosome: a silybin-phosphatidylcholine complex (Siliphos). *Altern Med Rev.* 2005;10(3):193-203.
52. Dixit N, Baboota S, Kohli K, et al. Silymarin: A review of pharmacological aspects and bioavailability enhancement approaches. *Indian J Pharmacol.* 2007;39(4):172-79.
53. Kidd PM. Bioavailability and activity of phytosome complexes from botanical polyphenols: the silymarin, curcumin, green tea, and grape seed extracts. *Altern Med Rev.* 2009;14(3):226-46.
54. Barzaghi N, Crema F, Gatti G, et al. Pharmacokinetic studies on IdB 1016, a silybin- phosphatidylcholine complex, in healthy human subjects. *Eur J Drug Metab Pharmacokinet.* 1990;15(4):333-8.
55. Morazzoni P, Montalbetti A, Malandrino S, et al. Comparative pharmacokinetics of silipide and silymarin in rats. *Eur J Drug Metab Pharmacokinet.* 1993;18(3):289-97.
56. Morazzoni P, Magistretti MJ, Giachetti C, et al. Comparative bioavailability of Silipide, a new flavanolignan complex, in rats. *Eur J Drug Metab Pharmacokinet.* 1992;17(1):39-44.
57. Available at: http://www.altmedrev.com/publications/7/2/150.pdf. Accessed February 8, 2016.
58. Conti M, Malandrino S, Magistretti MJ. Protective activity of silipide on liver damage in rodents. *Jpn J Pharmacol.* 1992;60(4):315-21.

IMPROVED FORMULA! LOW PRICE!

Turn Back the CLOCK and FEEL ENERGIZED

Aging robs us of the energy of our youth. Age-related impairment in cellular energy production occurs in our mitochondria, the critical energy power plant of our cells.

Mitochondrial Energy Optimizer with BioPQQ® provides the essential nutrients to help neutralize these changes.

Mitochondrial Energy Optimizer with BioPQQ®
Item #01868 • 120 capsules

	Retail Price	Your Price
1 bottle	$72	**$54**
4 bottles		**$48 each**

To order **Mitochondrial Energy Optimizer with BioPQQ®**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Promote Tear Production From The Inside Out

Everyday factors can lead to dry, itchy, irritated eyes.

Tear Support with MaquiBright® is a unique oral supplement that supports your body's own natural tear production for continuous, all-day comfort.

The secret is the maqui berry's rich source of **delphinidins**, a source of natural support for tear-producing glands. When human subjects took just **60 mg** a day of **Maqui berry extract**, there was a **45%** increase in lubricating tear production.[1,2]

To order **Tear Support with MaquiBright®**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Tear Support with MaquiBright®
Item #01918 • 30 vegetarian capsules

	Retail Price	Your Price
1 bottle	$18	**$13.50**
4 bottles		**$12 each**

Non-GMO
MaquiBright® is a registered trademark of MAQUI NEW LIFE S.A, Chile and ORYZA OIL & FAT CHEMICAL CO., LTD., Japan.

References
1. *Food Chem.* 2013;139(1-4):129-37.
2. *Panminerva Med.* 2014;56(3 Suppl 1):1-6.

EUROPEAN
MILK THISTLE

Ultimate Protection For Your Liver

Milk thistle extract—rich in ***silymarin***—is one of nature's most powerful weapons to support liver health. Scientific studies demonstrate silymarin's ability to provide potent protection for your liver. [1,2]

Life Extension®'s European Milk Thistle contains standardized, top-grade potencies of ***silymarin, silybin, isosilybin A***, and ***isosilybin B***, providing a full spectrum of liver-supportive compounds. This unique formula includes ***phosphatidylcholine***, a nutrient that promotes better absorption of milk thistle extract.[3]

The **silymarin** contained in **European Milk Thistle** is absorbed nearly **5 times** better than silymarin alone, and its bioavailability to the liver is **10 times** better.

European Milk Thistle
Advanced Phospholipid Delivery
Item #01922 • 60 Softgels

	Retail Price	Your Price
1 bottle	$28	**$21**
4 bottles		**$18.75 each**

Non-GMO

References
1. *Mol Nutr Food Res.* 2009 Apr;53(4):460-6.
2. *Environ Toxicol.* 2007 Oct;22(5):472-9.
3. Altern.Med Rev. 2009;14(3):226-46.

SILIPHOS® is a registered trademark of Indena S.p.A., Italy.

To order **European Milk Thistle Advanced Phospholipid Delivery** call **1-800-544-4440** or visit **www.LifeExtension.com**

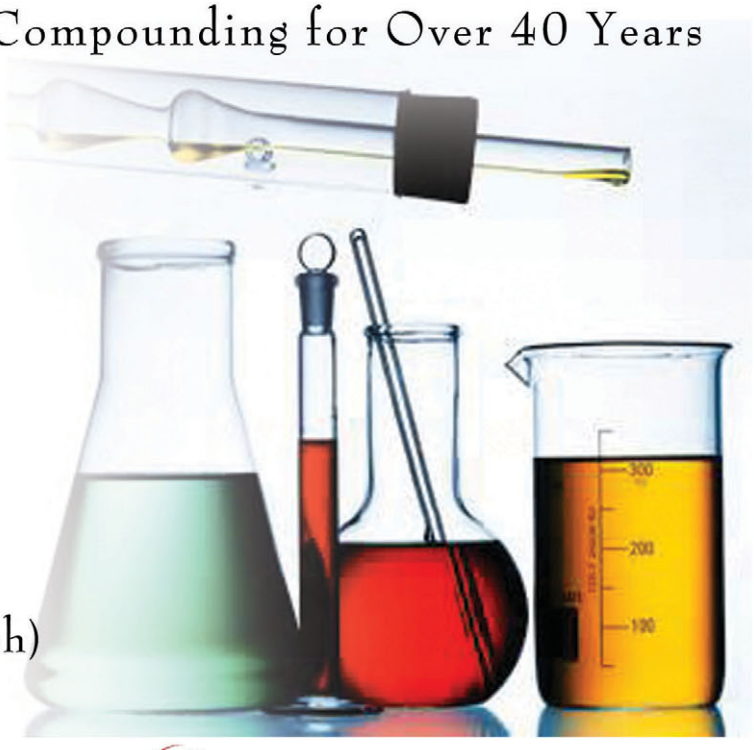
Welcome LifeExtensionRx® Welcome

THE WELLNESS CENTER AT
POST HASTE
Quality | Reliability | Integrity

Lowest Prices
Ask for LifeExtensionRx®
Customer Discount Pricing
1-877-877-9700

COMPOUNDING PHARMACY

Providing Trusted Prescription Compounding for Over 40 Years



- *Full Compounding Lab
- *Full Retail Pharmacy
- *Bio-identical Hormone Replacement Therapy
- *Free Standard Delivery/Shipping
- *Durable Medical Equipment
- *Trilingual (English, Spanish, French)
- *Licensed to ship into **37 States**

Proud members of PCCA Professional Compounding Centers of America & IACP International Academy of Compounding Pharmacists

PH:877-877-9700 FAX:877-877-9708

Renew Rx's online to receive $1 off each Rx
(cash RX's only)

4401 Sheridan St. | Hollywood, Fl 33021

www.POSTHASTEPHARMACY.com

BY MILES MUELLER

Lactoferrin Promotes **Healthy Healing** after Cataract Surgery

At least 3 million Americans undergo cataract surgery every year.[1] While for the most part, this is a simple surgery with a very high (**98%**) success rate and very few (**0.5%**) severe complications,[1] the procedure does result in "dry eye" (loss of tear film quantity and quality) for most patients.[2-4]

While dry eye is not generally considered a "serious" complication by researchers, it can produce symptoms such as pain, irritation, and poor vision even when mild or moderate.

Severe dry eye can damage a person's eye health and impair their general health, well-being, and quality of life.[3] While patients with pre-existing dry eyes often have the condition exacerbated by cataract surgery, dry eye may develop even for those who have never experienced it before.[5]

Supplement for Postoperative Dry Eyes

A recent study illustrates a novel means of overcoming dry eye in the days and weeks following cataract surgery. Ophthalmologists supplemented patients undergoing cataract surgery with ***lactoferrin***, starting on day one after the procedure and continuing for 60 days.[6] The procedure used was the most common form of cataract surgery, ***small incision cataract surgery***. Half of the patients supplemented with lactoferrin, while the other half received no special medication. All patients continued their normal medications, including the postoperative drops routinely given to all patients.

The primary outcome variable was the ***tear breakup time***, a commonly used measure of the quality of the tear film. Because tears consist of much more than simply water, this test is a measure of tear quality: The longer it takes for the tear film to break up, the higher the quality of the tears in terms of their ability to wet the surface of the eye (the cornea) and keep it lubricated and comfortable.

While the control group showed a steady decline in tear breakup time from the day of surgery to the 60-day mark, the **lactoferrin-supplemented** group, after an initial seven-day decline, demonstrated a steady rise in tear breakup time.[6] By day 14, the difference was a significant **26.4%** increase in the lactoferrin group compared to the controls, and by day 30, the difference between the two groups reached a significant **55.4%**. At the end of the study, 60 days after surgery, the lactoferrin group's tear breakup time exceeded that of the control group by **77%**.[6]

This improvement in tear quality was mirrored by a steady rise in tear quantity, as measured by a simple assessment called the Schirmer test, which determines the amount of tear fluid absorbed onto a filter paper strip in a set amount of time. It was not until day 30 that this test showed a significant difference, but on that day, the lactoferrin-supplemented patients were producing **65%** more tears than control subjects, and by day 60, the difference was **95%** in favor of the lactoferrin group.[6]

Since dry eye is largely a comfort-related measure when mild or moderate, it was important to measure the impact of supplementation on subjective symptoms as well as measures of tear quantity and quality. By the end of the study, **42.8%** of control patients still had at least mild symptoms of dry eye using a standard questionnaire, while only **26.6%** of supplemented patients did.[6] And no patient reported any side effects related to the lactoferrin oral supplement.

How Does Lactoferrin Prevent Postoperative Dry Eyes?

It is still under investigation as to why patients undergoing cataract surgery should be so prone to developing dry eyes after the procedure, though scientists have several educated guesses.[6] First, most cataract patients are older, and hence already predisposed to having dry eyes. In addition, the procedure requires distorting the surface of the eye and cutting nerves to the cornea (layer covering the eye), activating the inflammatory response common to all kinds of surgery.[6]

Since inflammation is a common response to injury or irritation to the eyes, it makes sense to look at natural components of tears in search of a soothing, anti-inflammatory molecule that is perfectly designed for addressing ocular inflammation.

Lactoferrin, a protein complex (*glycoprotein*) naturally present in tears, is known to have anti-inflammatory and antimicrobial properties. It also enhances cell growth for healing, suppresses excessive blood vessel development, and even prevents tumors.[6] In people with dry eyes for reasons other than surgery, lactoferrin levels are known to be low, and lactoferrin has been used successfully in managing dry eyes in the autoimmune condition called ***Sjögren's syndrome***.[6,7]

Animal studies provide further support for the use of lactoferrin to ameliorate dry eyes, particularly after the kind of controlled destruction produced in cataract surgery. Topical lactoferrin solution accelerated healing of eyes in mice whose corneas had been damaged.[8] In fact, within 24 hours, the damage to lactoferrin-treated animals was **100%** cleared, compared to **65%** to **70%** in animals treated with saline only or with another protein, **albumin**. Lactoferrin treatment was also shown to reduce inflammatory cell infiltration and levels of the inflammatory signaling molecule (cytokine) interleukin-1 (IL-1).

The human study described at the beginning of this article shows the importance of addressing the risk of dry eye. People preparing to undergo cataract surgery may consider initiating **350 mg** a day

Other Options for Non-Surgical Induced Dry Eye

For those that experience dry eyes, a proven remedy is the extract of the maqui berry, which is rich in *delphinidins*, molecules that naturally defend against chemical and light-induced damage to the tear-producing glands in the eyes.[9,10] Studies have shown that those supplementing with **60 mg** daily of maqui berry extracts experienced an increase in tear production and a reduction in symptoms of dry eye.[10]

of lactoferrin supplementation the day after the procedure and continue taking it for 60 days following the procedure.[6]

Summary

Cataract surgery has a **98%** success rate, but it often results in "dry eyes," the loss of tear film quantity and quality.

A recent study of cataract patients who supplemented immediately after surgery with lactoferrin found that those who took the supplement performed better on a test known as tear breakup time, which is used to measure dry eyes as well as the time it takes for tears to break up in the eye.

By day 30, this test showed a significant difference in the **lactoferrin-supplemented** patients, who produced **65%** more tears than control subjects. By the end of two months, the difference was **95%** in favor of the lactoferrin group. And no subjects who received lactoferrin reported any side effects.

Lactoferrin is a protein complex naturally present in tears. It is known to have anti-inflammatory and antimicrobial properties, while enhancing cell growth for healing.

Based on current science, patients preparing to undergo cataract surgery should begin supplementing with lactoferrin the day after the procedure and continue with it for 60 days following the operation. ●

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

References

1. Available at: http://www.statisticbrain.com/cataract-statistics/. Accessed January 7, 2016.
2. Cho YK, Kim MS. Dry eye after cataract surgery and associated intraoperative risk factors. *Korean J Ophthalmol.* 2009;23(2):65-73.
3. Kasetsuwan N, Satitpitakul V, Changul T, et al. Incidence and pattern of dry eye after cataract surgery. *PLoS One.* 2013;8(11):e78657.
4. Li XM, Hu L, Hu J, et al. Investigation of dry eye disease and analysis of the pathogenic factors in patients after cataract surgery. *Cornea.* 2007;26(9 Suppl 1):S16-20.
5. Sutu C, Fukuoka H, Afshari NA. Mechanisms and management of dry eye in cataract surgery patients. *Curr Opin Ophthalmol.* 2015.
6. Devendra J, Singh S. Effect of oral lactoferrin on cataract surgery induced dry eye: a randomised controlled trial. *J Clin Diagn Res.* 2015;9(10):Nc06-9.
7. Danjo Y, Lee M, Horimoto K, et al. Ocular surface damage and tear lactoferrin in dry eye syndrome. *Acta Ophthalmol (Copenh).* 1994;72(4):433-7.
8. Pattamatta U, Willcox M, Stapleton F, et al. Bovine lactoferrin promotes corneal wound healing and suppresses IL-1 expression in alkali wounded mouse cornea. *Curr Eye Res.* 2013;38(11):1110-7.
9. Tanaka J, Kadekaru T, Ogawa K, et al. Maqui berry (Aristotelia chilensis) and the constituent delphinidin glycoside inhibit photoreceptor cell death induced by visible light. *Food Chem.* 2013;139(1-4):129-37.
10. Hitoe S, Tanaka J, Shimoda H. Maqui-Bright standardized maqui berry extract significantly increases tear fluid production and ameliorates dry eye-related symptoms in a clinical pilot trial. *Panminerva Med.* 2014;56(3 Suppl 1):1-6.

ULTIMATE eye HYDRATION

Maintaining eye support is essential for optimal eye health.

Brite Eyes III provides a powerful dose of two well-established lubricants in every drop, soothing eye discomfort without irritation.

Hydroxymethyl-cellulose and **glycerin** are FDA-approved for ophthalmic use.

Brite Eyes III
Item #00893 • 2 vials (5 mL each)

	Retail Price	Your Price
1 box	$34	**$25.50**
4 boxes		**$24 each**

To order **Brite Eyes III**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Lactoferrin Supports Eye Protection After Eye Surgery

Lactoferrin provides support for the body's immune system.[1-2]

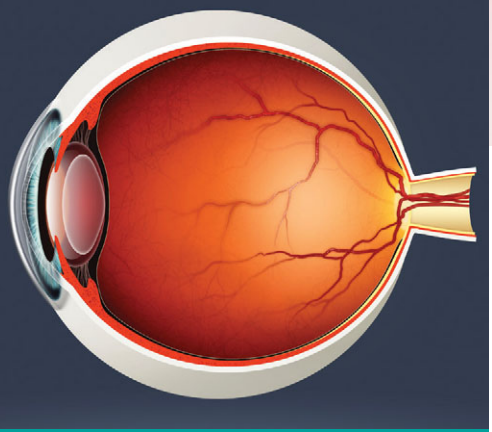
In addition, new research shows lactoferrin increases tear production following cataract surgery by **95%** and tear break-up time by **77%**, which promotes eye protection.[3]

Contains milk.

Bioferrin® is a registered trademark of Glanbia.

References

1. *Invest Ophthalmol Vis Sci*. 2009 Apr;50(4):1636-43.
2. *Curr Eye Res*. 2013 Nov;38(11):1110-7.
3. *J Clin Diagn Res*. 2015 Oct;9(10):NC06-9.



Lactoferrin (Apolactoferrin)
Item #01681 • 60 capsules

	Retail Price	Your Price
1 bottle	$52	**$39**
4 bottles		**$36 each**

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

BY CRAIG STAMOS

Why the **FDA** *Is* **WRONG** *about* **TESTOSTERONE**

In men aged 30 years and older, **testosterone** levels steadily fall at a rate of about **1%** per year.[1,2]

Researchers at the **National Institute on Aging**[3] have established low testosterone levels in:

- **20%** of men over age 60
- **30%** of men over age 70
- **50%** of men over age 80

These percentages understate the magnitude of this problem as they fail to consider the majority of aging men who fail to achieve optimal **testosterone** and **estrogen** balance.

By properly balancing **testosterone** and **estrogen**, a reversal in many age-related disorders has been found. This includes improvements in libido, bone density, muscle mass, strength, body composition, mood, red blood cell formation, cognition, quality of life, and cardiovascular disease.[2,4,5]

Yet despite these proven benefits, the FDA recently mandated a ***black box warning label*** be affixed to prescription testosterone drugs.[6] A black box warning is the strongest possible warning issued by the FDA and implies serious risks associated with a drug.

This irresponsible and scientifically invalid decision threatens to discourage millions of eligible men from taking advantage of the genuine benefits of testosterone replacement therapy.

The FDA's decision seems to be based on a small number of poorly designed, poorly conducted studies, some of which *appeared* to show an increased risk of heart attacks and strokes in men undergoing such therapy.[7-12] Yet the preponderance of the data shows marked decreases in heart attack and stroke risk in response to ***higher*** testosterone levels.

In a large study published in **2015**, men treated with **testosterone** had a **24%** reduction in heart attack risk and a **36%** reduction in risk of stroke.[13] The most exciting revelation about this new study was that the risk of dying from ***any*** cause was **56%** lower in treated men whose testosterone blood levels normalized, compared with untreated individuals.

With a wealth of studies showing positive benefits, and in the face of the FDA's irrational decision based on flawed studies, it is time to review the good science on this issue, and to make balanced recommendations about testosterone replacement therapy.

Benefits of Testosterone Replacement Therapy

Testosterone levels begin a gradual fall as men enter their 30s![1,2]

This matters because declining testosterone levels are associated with muscle atrophy and weakness, osteoporosis, reduced sexual functioning, increased fat mass, metabolic syndrome, diabetes risk, cognitive impairment, depression, and an increased risk of developing Alzheimer's disease.[14-16] Furthermore, men with low levels of testosterone are up to **51%** more likely to develop frailty, a condition associated with early death, compared to those with higher levels.[17]

Used appropriately, and with regular **blood tests**, testosterone replacement therapy can reverse many of these age-related disorders. Testosterone replacement therapy has been shown to improve libido and sexual function, bone density, muscle mass, strength, body composition, mood, red blood cell formation, cognition, and quality of life, as well as reduce cardiovascular disease.[2,4,5] It has even been suggested that testosterone replacement therapy preserves new brain cell growth in the hippocampus, the main memory area of the brain and the one that loses neurons with age.[13]

Perhaps most importantly, the life-shortening effects of low testosterone can be substantially reversed by **testosterone replacement** therapy in many men. By one estimate, testosterone replacement therapy can increase longevity by about **2%** per year.[18] After five years, survival rates are back in line with those of men with normal testosterone levels.[19]

Simply put, testosterone replacement therapy offers a wealth of health benefits for older men. It is approved by the FDA for patients with signs and symptoms of low testosterone who also have documented low blood levels of the hormone.[13,20] The diagnosis of age-related low testosterone is rising, with an estimated **2.4 million** American men 40 through 69 years old suffering from the condition.[13,21]

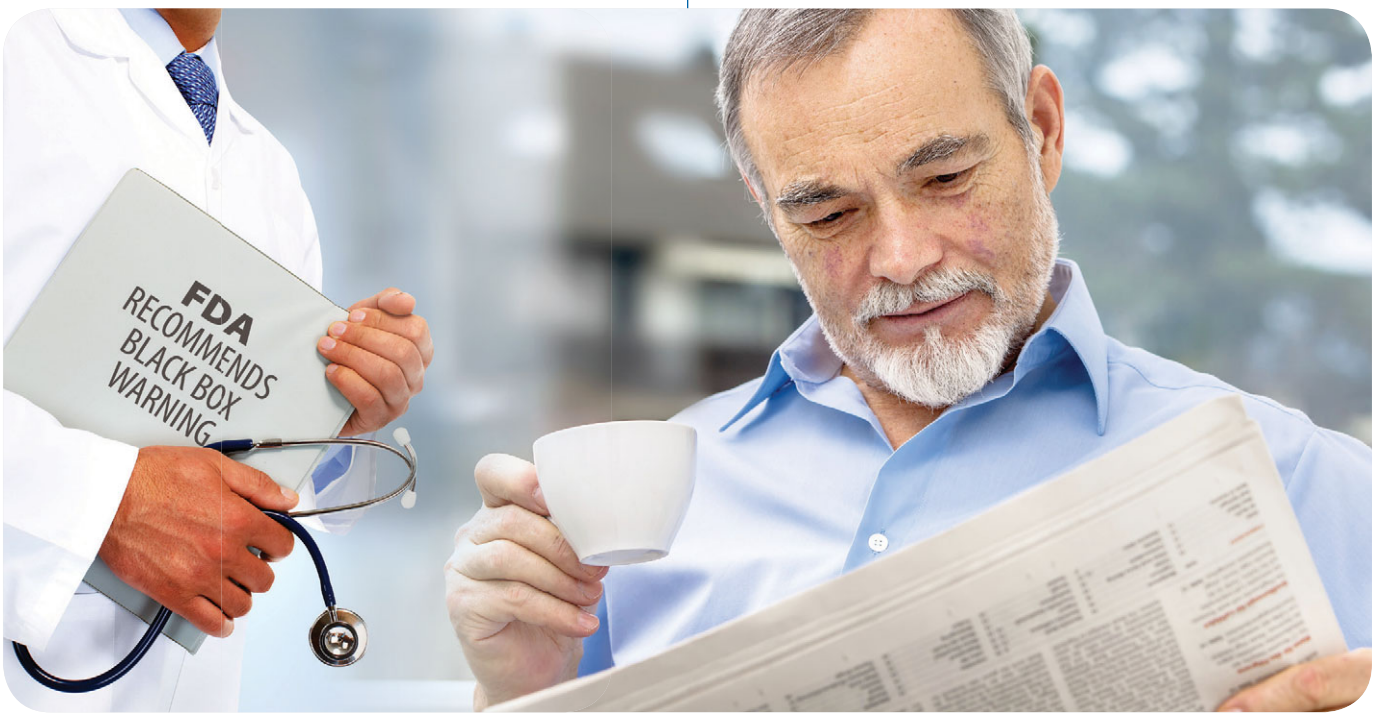
The FDA's approval criteria, however, excludes the majority of aging men who could benefit by boosting their testosterone level while suppressing excess estrogen when blood test results indicate.

All of this means that more men than ever could benefit from testosterone replacement. Unfortunately, many of these men—or their doctors—will avoid this beneficial therapy due to the FDA's recent black box warning.

FDA Sows Seeds of Unnecessary Fear

It seems evident that testosterone replacement therapy offers compelling benefits when given to men with genuine symptoms of age-related testosterone deficiency ***and*** documented low blood levels of the hormone.

Yet in mid-2015, when the FDA instituted a black box warning on testosterone replacement therapy for older men, they asserted that neither the safety nor the benefits of such therapy had been established, and cited, in particular, a "***possible increased risk of heart attacks and strokes***" in patients taking testosterone.[6]



Testosterone cannot be obtained without a prescription. In today's litigation-prone society, that black box warning is likely to dissuade physicians from prescribing testosterone replacement therapy.

But a careful examination of the published literature tells another story. Properly restoring sex hormone balance in aging men confers protection against heart attack and stroke via multiple mechanisms. The FDA chose to ignore these many studies showing disease risk reduction in men with higher testosterone blood levels.

When researchers evaluate the impact that a drug has on humans, the standard practice is to determine the levels of the drug in plasma or serum after administration of the drug. That common-sense design parameter was lacking in most of the studies on which the FDA based its labeling decision.

FDA actions are supposed to be based on multiple high-quality studies to assess safety and efficacy.[22] This "evidence-based-medicine" approach is now standard in peer-reviewed medical research and policymaking, but it was apparently overlooked by the FDA's decision-makers.

Instead, studies on which the **black box** labeling decision was made demonstrate considerable inconsistencies and very small clinically important treatment effects.[7-12]

Of the studies included, only two showed an association between testosterone replacement and increased risk of cardiovascular events. Here is a review of the studies apparently used by the FDA in its labeling decision.

Flawed Study #1

The first study was a retrospective, observational study by Rebecca Vigen, MD, MSCS, and colleagues published in the September 5, 2013, issue of the *Journal of the American Medical Association* (*JAMA*). The study suggests testosterone therapy may increase risk of death and certain cardiovascular events.[7] However, there are several significant shortcomings in the study's design and methodology, and the results conflict with the existing body of research.

The goal of testosterone restoration in most cases is to restore ***youthful*** blood levels of the hormone. Typically, Life Extension® suggests men target a blood level of total testosterone between **700** and **900 ng/dL** for optimal health.

In studies designed to assess the impact of testosterone replacement therapy, one of the most important considerations is to measure subjects' **blood levels** of testosterone regularly throughout the study period. This allows the scientists conducting the study to make sure subjects are taking their testosterone as directed and that their blood levels are rising as expected.

What You Need to Know

The Truth about Testosterone

- **Testosterone replacement therapy is well established as a means of improving an aging man's vigor, sexual performance, strength, bone density, and more.**
- **But recent black box warning labeling by the FDA is likely to frighten some physicians and patients away from this effective therapy, based on spurious concerns about cardiovascular risks.**
- **Careful review of the literature shows that studies prior to 2015 were poorly designed and many failed to check testosterone levels after treatment, a basic consideration in any therapeutic trial.**
- **A large study published in 2015 convincingly demonstrates that testosterone treatment produces a substantial reduction in the risk of dying and of having a heart attack or stroke in men whose testosterone levels normalized with therapy.**
- **Any man with symptoms of malaise, fatigue, diminished strength, lower sexual performance, cognitive problems, or a host of other symptoms ought to have total and free testosterone levels checked, and then initiate testosterone replacement therapy with proper monitoring of post-treatment levels.**

Unbelievably, in the flawed analysis by Vigen and colleagues, only **60%** of study subjects receiving testosterone had a follow-up blood test to assess their testosterone levels. Among them, average testosterone levels rose from a very low level of **175.5 ng/dL** at baseline to a still far-from-optimal level of **332.2 ng/dL** during testosterone therapy.

Raising testosterone levels from a paltry **175.5 ng/dL** to only **332.2 ng/dL** is unlikely to deliver robust health benefits. In fact, research has shown that restoring testosterone levels to **500 ng/dL** or higher is associated with pronounced health benefits, whereas benefits may be less evident at lower levels.[23,24]

One of the biggest perils facing aging men is the conversion of their testosterone into **estrogen** by the *aromatase* enzyme.[25]

Aromatase converts testosterone and other androgens into **estrogen**, primarily estradiol. Although some conversion of testosterone to estradiol is essential for health, too much conversion can have devastating consequences for men.

In one study, men with heart failure and high levels of estradiol had an increased risk of death compared to men whose levels of estradiol were in a balanced, middle range of **21.8** to **30.11 pg/mL**.[26] These findings support Life Extension®'s suggested optimal estradiol level of **20** to **30 pg/mL**. Moreover, excess estrogen promotes abnormal clot formation,[27] and high levels may be associated with an increased risk of stroke.[28]

When men take testosterone, there is a propensity for it to be converted into estradiol by aromatase, and this is especially so for aging men.[29] It is therefore important that men undergoing testosterone therapy monitor their estradiol levels regularly and take steps like using an *aromatase-inhibiting* drug to keep estradiol levels in the optimal range in order to protect against the health detriments of excess estrogen.

In the paper published by Vigen and colleagues, there was no report of the subjects' **estradiol** levels. If estradiol was not monitored during testosterone administration, this oversight means that the men receiving testosterone could have experienced a concurrent rise in estradiol levels. This may have compromised their cardiovascular health and could partially account for the increased risk observed in the testosterone-treated group.

Lastly, among the men in this flawed *JAMA* study, there was a statistically significant difference in baseline testosterone levels between the "testosterone therapy" (treatment) and "no-testosterone" (control) groups.

Among the control group, testosterone levels were higher at baseline (**206.5 ng/dL**), whereas the average level was significantly lower at baseline (**175.5 ng/dL**) for those who received a prescription for testosterone.

Steps to Restoring Youthful Testosterone Balance

1. Blood testing:

Life Extension®'s Optimal Levels

Free testosterone . . . . . **20-25 pg/mL**
Total testosterone . . . . . **700-900 ng/dL**
Estradiol . . . . . **20-30 pg/mL**
Prostate-specific antigen (PSA) . . . . . **<1.0 ng/mL**

These blood tests are all included in the Life Extension® Male Panel that most customers have performed annually.

2. Locate a doctor with knowledge about male hormone restoration. Life Extension® maintains lists of doctors who have knowledge about male hormone restoration. To locate a doctor in your area, log on to http://health.lifeextension.com/InnovativeDoctors/

3. Correct abnormal levels:
   - Consider compounded natural testosterone cream.
   - If estradiol is over **30 pg/mL**, doctors may also prescribe a very low-dose aromatase-inhibiting drug such as **0.5 mg** of **anastrozole** (Arimidex®) twice per week.

4. Retest in 45 days to ensure proper hormone balance.

The treatment group may have had significantly lower levels of testosterone than the control group for years prior to entering the study. The damage caused by years of potentially lower testosterone levels was not accounted for in the study and may have skewed the results.

Flawed Study #2

The second study by William Finkle, PhD, and colleagues was retrospective and observational. The design of this study limits the interpretation of the findings because subjects were treated in a clinical setting and were not randomized to treatment.[8]

The validity of this study is hampered by several methodological flaws. A striking concern is again the failure of the researchers to account for **estradiol** levels among the men who received a testosterone prescription. As mentioned previously, aging men quickly convert exogenous testosterone into estradiol via action of the *aromatase* enzyme. Studies have shown that cardiovascular risk correlates with higher estrogen/estradiol levels among men.[26,30,31]

Aromatase activity increases with age among men,[29] a paradigm whose repercussions are potentially highlighted by this flawed study. Older men (65 years and older) in this study were more likely to experience a non-fatal heart attack after receiving a testosterone prescription than younger men. This is potentially due to increased conversion of the added testosterone medication to estradiol among the older men.

It is concerning that conventional physicians and researchers continue to prescribe men testosterone without monitoring their estradiol levels and, if needed, prescribing an aromatase-inhibiting drug such as anastrozole (Arimidex®).

The researchers specifically acknowledged the potentially harmful cardiovascular-related effects of excess estrogen by stating:

"TT (testosterone therapy) also increases circulating estrogens…which may play a role in the observed excess of adverse cardiovascular-related events, given that estrogen therapy has been associated with this excess in both men and women… The mechanisms linking estrogens to thrombotic events (heart attacks) may be related to markers of activated coagulation, decreased coagulation inhibitors, and activated protein C resistance…"

Unfortunately, despite this acknowledgment, the researchers did not assess **estradiol** levels.

Interestingly, out of the five observational studies included in the FDA's decision to add a black label warning to testosterone treatment, the two flawed studies mentioned above apparently were the ones that prompted the decision, as the other two studies in the review showed a statistically significant **benefit** with testosterone replacement,[11,12] and the remaining study was inconclusive.[10]

If these were the only studies available to consider, the FDA might be pardoned for making a conservative decision out of an abundance of caution.

But several studies had already been published that showed either no effect, or genuine benefits, of testosterone replacement therapy on men's cardiovascular risks. Let's take a look.

Beneficial Studies Ignored by FDA

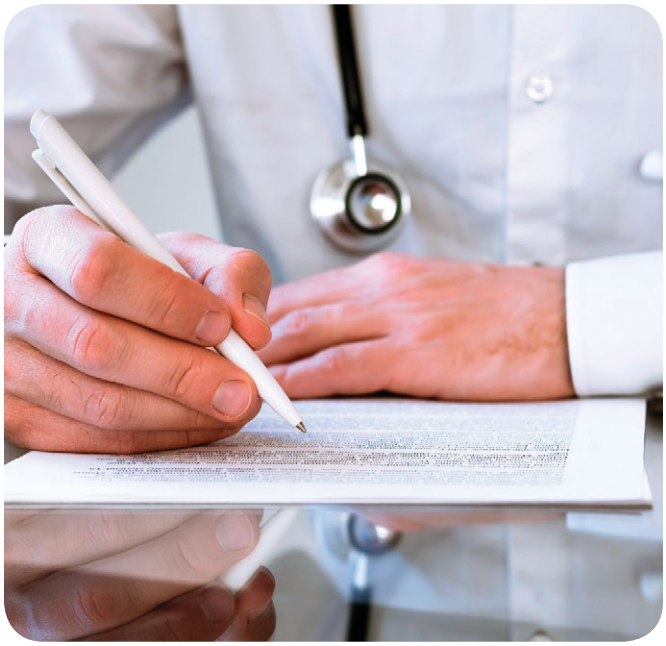
An observational study published in **2012** demonstrated *significant* reductions in total mortality in men who received testosterone replacement therapy.[11]

This study included 1,031 male veterans aged 40 and older, 398 of whom were treated with testosterone. All of the men had testosterone levels that were less than **251 ng/dL**. Among testosterone-treated men, **10.3%** died over the course of four years. In the untreated (no testosterone) group, twice that number (**20.7%**) died during the same period. After statistical adjustment for possible biasing factors, the testosterone-treated men were found to be **39%** less likely to **die** of any cause than were untreated men.

In another study based on a national sample of older Medicare beneficiaries, 6,355 patients received testosterone injections while 19,065 men did not receive treatment.[10] This study showed no association with risk for myocardial infarction (heart attack) over nearly eight years. In fact, in men who began the study with the highest calculated risk score for heart attack, testosterone therapy was associated with a **31%** *reduction* in risk.

Study Debunks FDA's Position and Shows Testosterone Benefits Heart Health

For the past 19 years, **Life Extension**® has published numerous articles on the proper use of testosterone restoration therapy. The FDA's insistence that testosterone drugs carry a **black box warning** is the antithesis of what the totality of the scientific literature clearly states on this critical issue for aging males.



A large study published in **2015** convincingly demonstrates the FDA's action of mandating a black box warning is based on junk science.

This study evaluated a cohort of male veterans receiving care at Veterans Health Administration facilities over a 13-year period.[13] Unlike many of the previous studies, this one was specifically designed to examine the effects of testosterone replacement therapy on specific cardiovascular outcomes (namely heart attack and stroke) as well as on all-cause mortality.

The most important difference between this and prior studies, in addition to its large size (83,010 total subjects), was that it determined, for each subject, whether blood testosterone levels normalized or not.[13] The researchers divided the subjects into three groups:

- Men whose total testosterone was normalized after treatment (43,931 men)
- Men whose total testosterone continued to be low even after treatment (25,701 men), and
- Men who were untreated with testosterone and continued to have low total testosterone (13,378 men).

The researchers then analyzed the rates of heart attack, stroke, and death from any cause between the three groups.[13]

This unique study design allowed for the first-ever comparison of men who attained normal testosterone levels with those who did not, as well as with those who were never treated at all. For the first time, it was possible to examine actual biological effects of therapy in considering whether such therapy was dangerous.

This is a rational and obvious approach, but one never taken before, including in any of the studies evaluated by the FDA for its ruling.

First, the researchers compared the largest group (men whose testosterone normalized with treatment) to the untreated subjects. They found that the treated group had a **24%** reduction in the risk of heart attack and a **36%** reduction in the risk of stroke.[13] This comparison also revealed that the risk of dying from any cause was a significant **56%** lower in treated men whose testosterone levels normalized, compared with untreated individuals.

Researchers also compared the group whose levels were normalized with those who were treated but had not achieved normal levels. In this comparison, the group whose levels were normalized experienced an **18%** reduction in the risk of heart attack, a **30%** reduction in stroke risk, and a **47%** reduced risk of death by all causes compared to those treated with testosterone therapy but who did not achieve normal levels. All of the results were statistically significant.

When comparing the treated group that did not achieve normal testosterone levels with the untreated group, the only significant difference was a modest **16%** reduction in all-cause mortality. No changes were seen between these groups in heart attack or stroke risk.

This study was enormous in terms of how many people it studied compared with the studies that preceded it. By tracking actual testosterone levels in response to treatment, the researchers were able to expose what is likely to be the biggest contributor to inconsistent results in previous studies. In those studies, failing to check testosterone **blood levels** essentially combined responders and non-responders together, leading to a failed study.

Even prior to this compelling and well-designed study based on data reviewed here and elsewhere, Dr. Abraham Morgentaler of Harvard Medical School, a renowned expert on testosterone and men's health, had concluded that:

"There is no convincing evidence of increased cardiovascular risks with testosterone therapy. On the contrary, there appears to be a strong beneficial relationship between normal testosterone and cardiovascular health that has not yet been widely appreciated."[32]

An Expert's Recommendations for Testosterone Replacement Therapy

After a recent World Meeting on Sexual Medicine in Chicago, Dr. Morgentaler summarized expert consensus regarding testosterone replacement therapy, especially in the context of these spurious concerns about cardiovascular health:[33]

1. All experts emphasized the essential role of symptoms for diagnosis of testosterone deficiency. (In other words, a low testosterone level without symptoms should not necessarily require testosterone therapy, but a high or normal level with symptoms should not rule it out.)
2. Blood levels of total testosterone indicating a deficiency are in the **350** to **400 ng/dL** range, but *free testosterone* should also be determined and was recommended by all experts for clinical decision-making.
3. Two tests of testosterone on separate occasions were recommended by most experts.
4. In men with symptoms but with normal total testosterone levels, a therapeutic trial of testosterone therapy, to be continued if beneficial effects are achieved, was considered potentially useful.
5. Recent studies suggesting an elevated cardiovascular risk with testosterone therapy were ***not found to be credible.***

Summary

There is no question that in men with symptoms of testosterone deficiency, testosterone replacement therapy produces substantial benefits.[13,32,33]

But a recent labeling action by the FDA is almost certain to frighten many men and their physicians away from using this important treatment. Unfortunately, this decision was based on junk science purporting to show an increased cardiovascular risk in men using the therapy.

We conducted a careful review of the evidence the FDA used to make this decision, coupled with results from recent large, carefully designed studies. What this shows is that in men who achieve normalization of their testosterone levels on replacement therapy, the risks of cardiovascular disease are not only no higher than average, but are in fact lower.

It is impossible to overstate the importance of:

- Getting hormone blood levels checked (including total and free testosterone and estradiol) for men with symptoms consistent with age-related testosterone deficiency.
- Repeating the tests after several months to determine whether levels are normalized. If levels are not normalized, raising the dose of testosterone and rechecking in another few months is ideal.[13]

There is no reason to let the FDA's scare tactics stand in the way of a proven means of improving men's quality of life, vigor, and sexual performance, while improving their cardiovascular status. All men with symptoms should have their levels checked and start on testosterone replacement therapy as indicated.

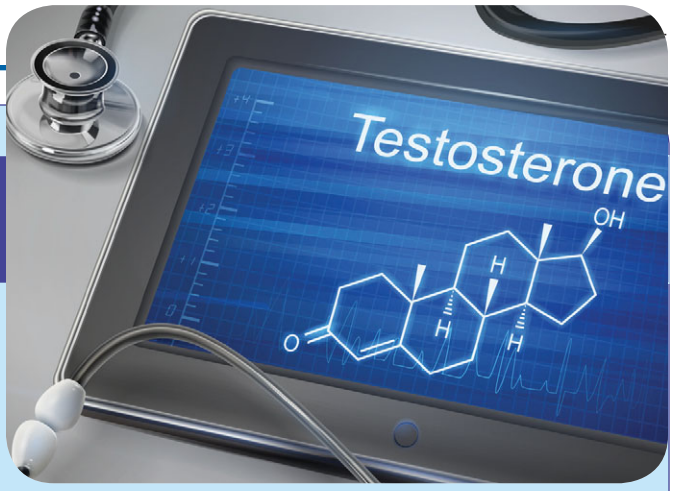
It should start with a comprehensive **blood test** panel that measures all sex hormones, PSA, liver function, and blood cell counts. With the results of this blood test in hand, a competent physician and an empowered patient can together safely restore youthful hormone balance. ●

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

References

1. Brawer MK. Testosterone replacement in men with andropause: an overview. *Rev Urol.* 2004;6(Suppl 6):S9-S15.
2. Kazi M, Geraci SA, Koch CA. Considerations for the diagnosis and treatment of testosterone deficiency in elderly men. *Am J Med.* 2007;120(10):835-40.
3. Harman SM, Metter EJ, Tobin JD, et al. Longitudinal effects of aging on serum total and free testosterone levels in healthy men. Baltimore Longitudinal Study of Aging. *J Clin Endocrinol Metab.* 2001;86(2):724-31.
4. Bassil N, Morley JE. Late-life onset hypogonadism: a review. *Clin Geriatr Med.* 2010;26(2):197-222.
5. Bassil N, Alkaade S, Morley JE. The benefits and risks of testosterone replacement therapy: a review. *Ther Clin Risk Manag.* 2009;5(3):427-48.
6. Available at: http://www.fda.gov/Drugs/DrugSafety/ucm436259.htm. Accessed December 15, 2015.
7. Vigen R, O'Donnell CI, Baron AE, et al. Association of testosterone therapy with mortality, myocardial infarction, and stroke in men with low testosterone levels. *JAMA.* 2013;310(17):1829-36.
8. Finkle WD, Greenland S, Ridgeway GK, et al. Increased risk of non-fatal myocardial infarction following testosterone therapy prescription in men. *PLoS One.* 2014;9(1):e85805.
9. Xu L, Freeman G, Cowling BJ, et al. Testosterone therapy and cardiovascular events among men: a systematic review and meta-analysis of placebo-controlled randomized trials. *BMC Med.* 2013;11:108.
10. Baillargeon J, Urban RJ, Kuo YF, et al. Risk of myocardial infarction in older men receiving testosterone therapy. *Ann Pharmacother.* 2014;48(9):1138-44.
11. Shores MM, Smith NL, Forsberg CW, et al. Testosterone treatment and mortality in men with low testosterone levels. *J Clin Endocrinol Metab.* 2012;97(6):2050-8.

New England Journal of Medicine Publishes Positive Testosterone Study



The prestigious ***New England Journal of Medicine*** recently published an important study that confirms the multiple benefits of testosterone therapy in aging men.[34]

With recent concerns about the safety and benefits of testosterone therapy raised by the FDA that resulted in an alarming black box warning, this clinical trial conducted by the Institute of Medicine confirmed that testosterone therapy benefits older men with low testosterone levels with regard to sexual function, activity, and performance.

The results of this study entirely vindicate those who have long recognized the value of appropriate testosterone replacement on men's sexual function and physical performance.

The study enlisted 790 men aged 65 years or older, who had *both* blood testosterone levels less than **275 ng/dL** *and* symptoms of low testosterone (that's important because men can have symptoms without low levels, and also low levels without symptoms, highlighting the need for blood testing before treatment). Men were treated with either a testosterone **1%** gel or placebo gel for one year. The starting dose was **5 grams** testosterone per day, which was adjusted after periodic blood testing to sustain blood testosterone levels within the normal range for younger men aged 19-40.

The findings were unequivocally in favor of the testosterone supplement.

First, treatment successfully raised blood testosterone levels to the mid-normal range for younger men, demonstrating that the dosing scheme was correct and appropriate.

Second, those increased testosterone levels were significantly associated with increased sexual activity, sexual desire, and erectile function (remember, the subjects were all older than 65 years). In addition, **20.5%** of men receiving testosterone had an increase in a six minute walking test of at least 50 meters (55 yards), significantly more than the **12.6%** of men receiving placebo. Men in the testosterone group also reported greater energy levels, and those with the largest increases in testosterone had a greater increase in a score of vitality (less fatigue).

Finally, men treated with testosterone demonstrated an improvement in mood and a reduction in depressive symptoms compared with those receiving placebo gel.

In summary, it is now clear that older men with proven low testosterone levels and associated symptoms stand to benefit from testosterone supplementation aimed at keeping their levels in line with those of much younger men.

This study also highlights the importance of blood testosterone measurement before and during testosterone treatment. While the risks of treatment appear to be low, this study did not have the statistical power to demonstrate a difference in risk between placebo and testosterone therapy, so it is imperative that men contemplating testosterone supplementation undergo testing and work with their physician to achieve optimal results.

The favorable findings in this trial likely would have been even better if the researchers had made a concerted effort to individualize treatment and target optimal ranges of **total testosterone** (Life Extension® suggests **700** to **900 ng/dL**) and free testosterone (Life Extension® suggests **20** to **25 pg/mL**) as well as balance **estradiol** levels within a range of **20** to **30 pg/mL** following testosterone restoration in these aging men. In this study, **estradiol** levels ballooned to nearly **50%** greater than baseline following testosterone administration. Life Extension® has long recognized the importance of controlling for estrogen balance in aging men. For example, a study published in the *Journal of the American Medical Association* measured blood estradiol in men with chronic heart failure. Compared to men in the balanced estrogen quintile, men in the highest quintile (estradiol levels of **37.40 pg/mL** or greater) were significantly more likely to die. Those in the lowest estradiol quintile (estradiol levels under **12.90 pg/mL**) also had an increased death rate compared to the group in **estrogen** balance. The men in the balanced quintile–with the fewest deaths–had serum estradiol levels between **21.80** and **30.11 pg/mL**[26] Life Extension® offers a convenient assessment of testosterone (both total and free), as well as estradiol, in our comprehensive **Male Blood Test Panel** offered at the discounted price of **$199** until **June 6, 2016**. The **Male Blood Test Panel** can be ordered by calling **1-800-208-3444** (24 hours).

12. Muraleedharan V, Marsh H, Kapoor D, et al. Testosterone deficiency is associated with increased risk of mortality and testosterone replacement improves survival in men with type 2 diabetes. *Eur J Endocrinol.* 2013;169(6):725-33.
13. Sharma R, Oni OA, Gupta K, et al. Normalization of testosterone level is associated with reduced incidence of myocardial infarction and mortality in men. *Eur Heart J.* 2015.
14. Ransome MI. Could androgens maintain specific domains of mental health in aging men by preserving hippocampal neurogenesis? *Neural Regen Res.* 2012;7(28):2227-39.
15. Moskovic DJ, Araujo AB, Lipshultz LI, et al. The 20-year public health impact and direct cost of testosterone deficiency in U.S. men. *J Sex Med.* 2013;10(2):562-9.
16. Ungureanu MC, Costache, II, Preda C, et al. Myths and controversies in hypogonadism treatment of aging males. *Rev Med Chir Soc Med Nat Iasi.* 2015;119(2):325-33.
17. Cawthon PM, Ensrud KE, Laughlin GA, et al. Sex hormones and frailty in older men: the osteoporotic fractures in men (MrOS) study. *J Clin Endocrinol Metab.* 2009;94(10):3806-15.
18. Comhaire F, Mahmoud A. The andrologist's contribution to a better life for ageing men: part 1. *Andrologia.* 2015.
19. Comhaire F. Hormone replacement therapy and longevity. *Andrologia.* 2015.
20. Bhasin S, Cunningham GR, Hayes FJ, et al. Testosterone therapy in men with androgen deficiency syndromes: an Endocrine Society clinical practice guideline. *J Clin Endocrinol Metab.* 2010;95(6):2536-59.
21. Araujo AB, O'Donnell AB, Brambilla DJ, et al. Prevalence and incidence of androgen deficiency in middle-aged and older men: estimates from the Massachusetts Male Aging Study. *J Clin Endocrinol Metab.* 2004;89(12):5920-6.
22. Available at: http://www.dartmouth.edu/~biomed/resources.htmld/guides/ebm_resources.shtml. Accessed December 22, 2015.
23. Aversa A, Bruzziches R, Francomano D, et al. Effects of testosterone undecanoate on cardiovascular risk factors and atherosclerosis in middle-aged men with late-onset hypogonadism and metabolic syndrome: results from a 24-month, randomized, double-blind, placebo-controlled study. *J Sex Med.* 2010;7(10):3495-503.
24. Ohlsson C, Barrett-Connor E, Bhasin S, et al. High serum testosterone is associated with reduced risk of cardiovascular events in elderly men. The MrOS (Osteoporotic Fractures in Men) study in Sweden. *J Am Coll Cardiol.* 2011;58(16):1674-81.
25. Jasuja GK, Travison TG, Davda M, et al. Age trends in estradiol and estrone levels measured using liquid chromatography tandem mass spectrometry in community-dwelling men of the Framingham Heart Study. *J Gerontol A Biol Sci Med Sci.* 2013;68(6):733-40.
26. Jankowska EA, Rozentryt P, Ponikowska B, et al. Circulating estradiol and mortality in men with systolic chronic heart failure. *JAMA.* 2009;301(18):1892-901.
27. Colmou A. Estrogens and vascular thrombosis. *Soins Gynecol Obstet Pueric Pediatr.* 1982(16):39-41.
28. Abbott RD, Launer LJ, Rodriguez BL, et al. Serum estradiol and risk of stroke in elderly men. *Neurology.* 2007;68(8):563-8.
29. Lakshman KM, Kaplan B, Travison TG, et al. The effects of injected testosterone dose and age on the conversion of testosterone to estradiol and dihydrotestosterone in young and older men. *J Clin Endocrinol Metab.* 2010;95(8):3955-64.
30. Phillips GB, Pinkernell BH, Jing TY. The association of hyperestrogenemia with coronary thrombosis in men. *Arterioscler Thromb Vasc Biol.* 1996;16(11):1383-7.
31. Phillips GB. Is atherosclerotic cardiovascular disease an endocrinological disorder? The estrogen-androgen paradox. *J Clin Endocrinol Metab.* 2005;90(5):2708-11.
32. Morgentaler A, Miner MM, Caliber M, et al. Testosterone therapy and cardiovascular risk: advances and controversies. *Mayo Clin Proc.* 2015;90(2):224-51.
33. Morgentaler A, Khera M, Maggi M, et al. Commentary: Who is a candidate for testosterone therapy? A synthesis of international expert opinions. *J Sex Med.* 2014;11(7):1636-45.
34. Snyder PJ, Bhasin S, Cunningham GR, et al. Effects of testosterone treatment in older men**.** *NEJM.* 2016; 374:611-24.

Your *Most Complete* PROSTATE PROTECTION

Ultra Natural Prostate is scientifically designed to support healthy prostate structure and function, as well as a more youthful **urinary** flow.

Ultra Natural Prostate provides a comprehensive blend of nutrients to combat issues associated with the aging prostate gland.

Ultra Natural Prostate provides validated potencies of the following nutrients:

- **Standardized lignans**
- **Beta-sitosterol**
- **AprèsFlex®** (an extract of **Boswellia)**
- **Graminex®** Flower Pollen Extract™
- **Saw palmetto CO2**
- **Lycopene**
- **Pygeum**
- **Phospholipids**
- **Pumpkin seed oil**
- **Boron**
- **Stinging and dwarf nettle root**

To order **Ultra Natural Prostate**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Ultra Natural Prostate
Item #01928 • 60 softgels • Non-GMO

	Retail Price	Your Price
1 bottle	$38	**$28.50**
4 bottles		**$26.25 each**

LIFE EXTENSION'S BEST-SELLING
DHEA PRODUCT!

DHEA

Supports Total-Body Health

DHEA is a critically important hormone, but its production declines sharply as we age. By the time you reach 70, your DHEA levels are likely to be **75%-80% *lower*** than when you were at your peak.[1-4]

Scientists are discovering numerous health benefits when aging people restore their **DHEA** to *youthful ranges*. **DHEA** therapy has been shown to:

- **Support healthy arterial structure and function**[5,6]
- **Support endothelial health by helping with blood flow**[7]
- **Promote insulin sensitivity**[8,9]
- **Benefit the normal aging brain**[10-12]
- **Improve mood and alleviate melancholy**[13]
- **Protect hip bone and spine bone mineral density**[14]
- **Enhance the increases in muscle mass and strength in the elderly with resistance exercise**[15]
- **Boost a broad array of immune system cells and signaling molecules**[16]

Life Extension's® convenient, economical **25 mg** capsules are a popular way to consume the **precise amount** of DHEA your body may need.

DHEA 25 mg

Item #00335 • 100 capsules

	Retail Price	Your Price
1 bottle	$16	**$12**
4 bottles		**$11 each**

Each bottle lasts a typical user over **three months**!

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

CAUTION: Do not use DHEA if you are at risk for or have been diagnosed as having any type of hormonal cancer, such as prostate or breast cancer.

Non-GMO

References

1. *J Clin Endocrinol Metab*. 1992 Oct;75(4):1002-4.
2. *J Clin Endocrinol Metab*. 1997 Aug;82(8):2396-402.
3. *Clin Chim Acta*. 2004 Mar;341(1-2):1-15.
4. *Am J Physiol Endocrinol Metab*. 2006 Nov;291(5):E1003-8.
5. *Atherosclerosis*. 2011 Jan;214(1):47-57.
6. *Clin Endocrinol (Oxf)*. 2006 Mar;64(3):260-4.
7. *J Clin Endocrinol Metab*. 2003 Jul;88(7):3190-5.
8. *Jama*. 2004 Nov 10;292(18):2243-8.
9. *Eur J Endocrinol*. 2001 Oct;145(4):457-61.
10. *Front Neuroendocrinol*.2009 Jan;30(1):65-91.
11. *Biogerontology*. 2008 Aug;9(4):235-46.
12. *Ann N Y Acad Sci*. 2006 Nov;1088:139-52.
13. *Psychopharmacology (Berl)*. 2006 Nov;188(4):541-51.
14. *J Clin Endocrinol Metab*. 2006 Aug;91(8):2986-93.
15. *Am J Physiol Endocrinol Metab*. 2006 Nov;291(5):E1003-8.
16. *J Gerontol A Biol Sci Med Sci*. 1997 Jan;52(1):M1-7.

Top Off Your TESTOSTERONE *Naturally*

Super Health. Super Libido. *Super Miraforte.*

Maintaining healthy **testosterone** levels helps men regain health and improve performance.

By the time a man is 70 years old, he may produce **60%** less testosterone than he did at age 40.* The time is now to add **Super Miraforte with Standardized Lignans** to your supplement regimen.

Super Miraforte with Standardized Lignans • Item #01698 • 120 capsules

	Retail Price	Your Price
1 bottle	$62	**$46.50**
4 bottles		**$42 each**

Non-GMO

Low Testosterone Levels May Lead to:

- **Reduced Sex Drive**
- **Less Energy**
- **Cloudy Thinking**
- **Weight Gain**
- **Cardiovascular Issues**

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

To order **Super Miraforte with Standardized Lignans** call **1-800-544-4440** or visit **www.LifeExtension.com**

Caution: If you are taking any medication, use only under physician supervision. Men with existing prostate cancer may not be able to use this product. Elevations in free testosterone can unmask an occult (hidden) prostate cancer. Anyone with this concern should have a baseline PSA prior to using this product and a follow-up PSA test 60 days later. If a significant elevation of PSA is found, discontinue this product and advise physician. Do not take more than 15 mg per day of Bioperine®.

BY CHASE FALCON

EARLY INTERVENTION *Delays Aging*

Humans behave in a rather bizarre manner when it comes to their health.

In youth, they often engage in reckless behaviors.

In later life, if they survive a heart attack, stroke, or malignancy, they may turn around their lifestyle and become health fanatics.

Years ago, **Life Extension**® reported on research showing that elevated vascular risk factors in ***youth*** predispose people to higher rates of heart attack and stroke as they age.[1]

These findings have been confirmed by a **Duke University** study published in the ***Proceedings of the National Academy of Sciences***.

This study showed that poor lifestyle choices in youth markedly ***accelerate*** pathological aging processes. None of this should surprise knowledgeable health-conscious individuals.

The take-home lesson is that younger individuals can take easy steps today to delay or avoid the most prevalent age-related ailments.

Measuring Human Aging

In the Duke University study,[2] 18 different health biomarkers were measured and tracked in a group of **954** younger people. Several additional tests were performed to assess each study subject's rate of **biological aging**.

This study's results reveal that ***lifestyle choices*** can affect the **rate of aging** and that the course of aging can be altered starting at a young age. In other words, humans exert a tremendous amount of control even early in life over the rate at which they physically degenerate.

In measuring biomarkers such as hemoglobin A1C, cholesterol, and blood pressure, the researchers found detectable "***deteriorations across multiple organ systems***" before the age of **38**.

To further measure the rate of aging, organ systems such as pulmonary, periodontal, cardiovascular, renal, hepatic, and immune function were evaluated.

The study found that those whose blood biomarkers detected **accelerated aging** were "***less physically able, showed cognitive decline and brain aging, self-reported worse health, and looked older***."

This data demonstrated a reliable and consistent correlation between the subject's **blood biomarkers** and the degree of change in their biological age. Everything from decreases in bodily performance to more apparent physical features of aging was detected in those who experienced unfavorable changes in **blood** composition.

Unique Opportunity to Delay Aging

Young people overlook the ***accelerating*** impact poor lifestyle choices exert on their aging process. This new data from **Duke University** should motivate individuals of all ages to take care of their health before degenerative illness manifests. The researchers who conducted this study state:

"Anti-aging therapies show promise in model organism research. Translation to humans is needed to address the challenges of an aging global population."

Summary

As people age over **40**, they not only begin to show outward senile appearances, but internally suffer a marked **acceleration** of pathological damage.

We now have solid evidence from Duke University that **comprehensive blood testing** can reveal if a person should alter their lifestyle, nutrient, and/or medication use. Using **blood tests** as a guide, one can initiate steps at any age to ***delay*** premature aging and correct factors that are ***accelerating*** one's physical decline.

The **Male** and **Female Blood Test Panel**s evaluate dozens of critical systems in your body to help assess whether your ***biological aging process*** is being decelerated or accelerated.

Commercial labs measure only a fraction of the many individual blood tests included in the **Male** or **Female Panels**. The retail price for either panel is **$400**, which is considerably lower than what you would pay elsewhere.

During the annual **Blood Test Super Sale** (March 28-June 6), the price of the **Male** or **Female Panels** is discounted to just **$199**.

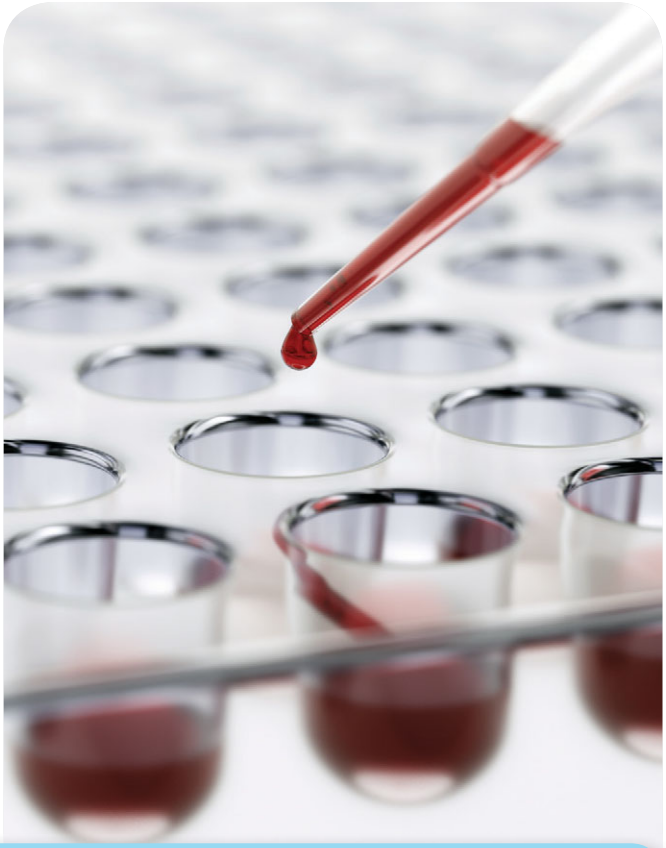
The addition of valuable **Rewards Dollars** reduces the cost even further.

To order the comprehensive **Male** or **Female Blood Test Panel** at these **ultra-low** prices, call **1-800-208-3444** (24 hours) or log on to LifeExtension.com/blood

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

References

1. Pletcher MJ, Bibbins-Domingo K, Liu K, et al. Nonoptimal lipids commonly present in young adults and coronary calcium later in life: the CARDIA (Coronary Artery Risk Development in Young Adults) study. *Ann Intern Med.* 2010;153(3):137-46.
2. Belsky DW, Caspi A, Houts R, et al. Quantification of biological aging in young adults. *Proc Natl Acad Sci U S A.* 2015;112(30):E4104-10.



High LDL Levels in *Early* Life Predict Coronary Calcification

A study published six years ago and reported on in ***Life Extension***® magazine alerted the public to the risks posed by elevated **low density lipoprotein** (LDL) in younger individuals.

Most heart attacks are caused by blockage of one or more coronary arteries that feed the heart muscle. This progressive coronary occlusion occurs in response to an accumulation of proven risk factors. If detected early in life, these pathologic factors are often reversible before a **heart attack** or **stroke** inflicts permanent damages.

A meticulous study published in the ***Annals of Internal Medicine*** looked at a large group whose blood was initially tested between ages **18-30**. Seven additional blood tests were done on each person over a **20-year** period.[1]

The results showed that those with the highest **LDL** (over **160 mg/dL**) were **5.6 times** more likely to have **calcium buildup** in their coronary arteries by age **45**.

LDL (low-density lipoprotein) transports cholesterol from the liver throughout the vascular system. In the presence of excess LDL, too much cholesterol saturates the blood and contributes to arterial occlusion.

This study in the *Annals of Internal Medicine* showed that over a 20-year period, those with even moderately elevated LDL (**100-129 mg/dL**) were **2.4 times** more likely to have coronary calcification.

In response to poor dietary practices and sedentary lifestyles, many younger individual have **LDL** levels above **100 mg/dL**.

This and other studies validate the need for everyone to have their blood tested for cardiac risk factors, including glucose levels, starting no later than age 18.

An individual under age **30** may not need the comprehensive **Male** or **Female Panels** that are so popular with more mature people.

A **CBC-Chemistry** blood panel provides an abundance of markers of organ function along with vascular and hematological health for the low cost of just **$26** when ordered through **Life Extension**® during our **Blood Test Super Sale**.

If your children or grandchildren have not had a recent **blood test**, consider asking them to call **1-800-208-3444** to order a **CBC-Chemistry** blood panel for only **$26**.

Emphasize to younger individuals that they can initiate steps now that may prevent them from ever having to contend with a disorders such as stroke, heart attack, and kidney failure.

AMPK

PROMOTES LONGEVITY FACTORS

Importance of AMPK

Studies show **increased** AMPK activity supports:

- Reduced fat storage,[1]
- New mitochondria production,[2]
- The promotion of healthy blood glucose and lipids already within normal range.[3]

AMPK Activator provides nutrients shown to significantly boost **AMPK** activity.

Gynostemma Pentaphyllum

In one study, researchers documented a 1-inch reduction in **abdominal circumference** in overweight individuals who took **450 mg** daily of *G. pentaphyllum* extract for 12 weeks.[4]

Trans-Tiliroside

Trans-tiliroside promotes healthy blood glucose levels and body weight already within normal range.[5]

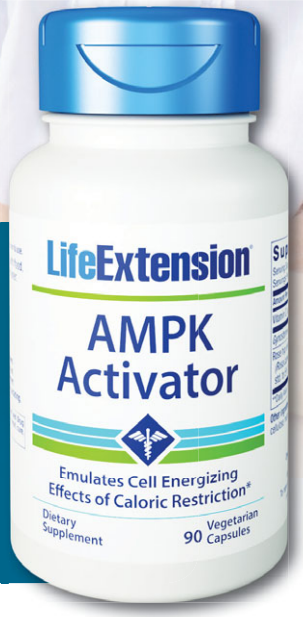
References

1. *Age (Dordr)*. 2014 Apr;36(2):641-63.
2. *Clin Sci (Lond)*. 2013 Apr;124(8):491-507.
3. *J Mol Med (Berl)*. 2011 Jul;89(7):667-76.
4. *Biotechnol Lett*. 2012 Sep;34(9):1607-16.
5. *Obesity (Silver Spring)*. 2014 Jan;22(1):63-71.

Non-GMO
ActivAMP® is a registered trademark of Gencor.

AMPK Activator
Item #01907 • 90 vegetarian capsules

	Retail Price	Your Price
1 bottle	$48	**$36**
4 bottles		**$33 each**



To order **AMPK Activator**, call **1-800-544-4440** or visit **www.LifeExtension.com**

This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results are not guaranteed and results may vary.

Standardized TART CHERRY Extract

STRONG SUPPORT FOR SORE MUSCLES

AFTER EXERCISE AND EVERYDAY EXERTION

Tart cherries are chockfull of compounds found to block **COX-1** and **COX-2** inflammatory enzymes.[1] Benefits of the fruit include:[2-5]

- **Rapid muscle recovery after exercise, and**
- **Fast relief from the minor aches, discomfort, and stiffness following everyday activities.**

ANTHOCYANINS

Anthocyanins—the powerful flavonoids found in dark-pigmented fruit—have been studied for their many advantages, including **heart**, **cellular**, and **cognitive health**.[6-8] Tart cherries have a higher content of anthocyanins than many other fruits.[1]

Life Extension® offers **100%** natural **Tart Cherry Extract with Standardized CherryPURE®**. This formulation provides all the muscle-supporting benefits of tart cherries and matches the anthocyanin dose used in successful clinical trials.[2,4]

Tart Cherry Extract with Standardized CherryPURE®

Item #01723 • 60 vegetarian capsules

	Retail Price	Your Price
1 bottle	$22	**$16.50**
4 bottles		**$15 each**

References
1. *Phytomedicine.* 2001 Sep;8(5):362-9.
2. *J Int Soc Sports Nutr.* 2010 May 7;7:17.
3. *Scand J Med Sci Sports.* 2010 Dec;20(6):843-52.
4. *Br J Sports Med.* 2006 Aug;40(8):679-83.
5. *Am J Vet Res.* 2009 Jun;70(6):758-63.
6. *Mol Nutr Food Res.* 2007 Jun;51(6):675-83.
7. *Biochemistry (Mosc).* 2004 Jan;69(1):75-80.
8. *Adv Nutr.* 2011 Jan;2(1):1-7.

Non-GMO

To order **Tart Cherry Extract with Standardized CherryPURE®**, call **1-800-544-4440** or visit **www.LifeExtension.com**

Fortify Your Immune System with AHCC®

A Unique, Clinically Validated Medicinal Mushroom Extract

Every year, 23 million days of work are lost due to people feeling under the weather. While most people view immune challenges as part of the cold weather season, they are not. Even though winter is far behind us, germs can spread all year round. In fact, many people manage to stay well all year round, even though they are exposed to the same environments as those who have weaker resistance. The reason is because the environment is not responsible for whether you feel well or not. Your immune system is.

Innate Versus Adaptive Immunity

You have two basic types of immunity: innate and adaptive. Your innate immunity launches an immediate, general attack against a threat. Your adaptive immunity takes longer to kick in, but produces a targeted, specific response to a threat. Very few natural compounds have the ability to augment both innate and adaptive immunity. AHCC (short for Active Hexose Correlated Compound) is one exception.*

How AHCC Works

AHCC is a patented, cultured, medicinal mushroom extract whose efficacy is **supported by over 20 human clinical research studies**. It has been shown to modulate immune response in several ways.

- **AHCC** increases the activity of natural killer (NK) cells, your innate immune system's first line of defense against invasion.*
- **AHCC** boosts populations of macrophages, the "street cleaners" of your immune system, which pick up foreign substances and cellular debris.*
- **AHCC** enhances the production of cytokines, the messengers of the immune system, so that your whole immune team can coordinate an organized response to outside threats.*
- **AHCC** raises levels of dendritic cells and T cells, key players in your adaptive immune system's highly specialized response to specific threats.*

To order, please call 1-800-544-4440
or visit www.LifeExtension.com

QUALITY OF LIFE®
Powered By Clinical Research™

877-937-2422 | www.qualityoflife.net

Facebook.com/QualityofLifeLabs @QOLsupplements

Quality of Life is proud to have taken the Natural Products Foundation "Truth in Advertising" Pledge, a formal commitment to disseminating only truthful, non-misleading, and substantiated information.

Item# 29727

Retail $74.95

30% OFF

Your Price $52.47

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

Garbanzo Beans

Nutritional Powerhouse of Mediterranean Diet

BY WILLIAM GAMONSKI

Even as a member of the healthy legume family, garbanzo beans stand out for their nutritional prowess. They boast an all-star cast of healthy compounds—including quercetin, chlorogenic acid, and isoflavones—along with rich amounts of beneficial unsaturated fatty acids, folate, manganese, and magnesium,[1,2] which is deficient in most American diets.[3,4] To top it off, garbanzo beans contain hefty doses of dietary fiber, protein, and resistant starch.[5]

Widely known as chickpeas, garbanzo beans are classified as a "pulse" or edible seed of legumes. They possess a mild nutty flavor that has been a mainstay of Mediterranean and Indian cuisine for thousands of years.[6] Garbanzo beans are often consumed as the main ingredient in hummus.

Rapidly accumulating research indicates that adding garbanzo beans to your daily diet can be a powerful weapon in warding off cardiovascular disease, diabetes, and cancer, while optimizing digestive health and acting as a valuable weight-loss aid by blunting hunger and reducing food cravings.

Combat Cardiovascular Disease

Cardiovascular disease continues to be the leading cause of death in the US—taking a person's life every **40** seconds—despite advances in cholesterol-lowering drugs and surgical interventions.[7] As a result, experts are increasingly recognizing the value of dietary modification to modulate major risk factors underlying endothelial dysfunction that precedes atherosclerosis.[8]

High circulating levels of LDL (low-density lipoprotein) cholesterol increase the likelihood of their oxidation and accumulation inside the endothelium wall—leading to an inflammatory cascade that forms foam cells that lay the foundation for early arterial plaque.[9-11] Research shows that by eating garbanzo beans, you can help reduce both absolute LDL level and LDL oxidation. Garbanzo beans' ability to lower LDL cholesterol stems from a dual mechanism involving its one-two combination of **polyunsaturated fatty acids** and **dietary fiber** (insoluble and soluble). One cup of garbanzo boosts your daily fiber intake.[12] The polyunsaturated fat in garbanzo beans increases cholesterol entry into cells,[13] while its fiber effectively binds to bile acids to boost cholesterol excretion.[14] This has produced both short- and long-term significant reductions in LDL levels.

In one study, when participants ate slightly **less than half a cup** of garbanzo beans daily for eight weeks, their LDL levels fell by **17.1%**.[15] In a separate study lasting just over a year, researchers discovered that **80%** of participants experienced more than a **15%** decrease in LDL levels when supplementing their diet with garbanzo beans.[16]

Equally as important as lowering LDL is preventing its oxidation. The presence of **quercetin**, **caffeic acid**, and **ferulic acid** in garbanzo beans exerts activity to reduce LDL susceptibility to oxidation.[17,18]

Garbanzo beans also contain folate and magnesium, which support cardiovascular health. Folate in the diet helps inhibit the build up of harmful homocysteine associated with free radical production, inflammation, and damage to endothelial cells.[19] Inadequate magnesium levels contribute to elevated blood pressure that diminishes the production of heart-protective **nitric oxide**, leaving the endothelium vulnerable to further damage.[20] This should be welcome news for the estimated **three-fourths** of Americans who fail to get enough magnesium in their diets.[21]

Curb Hunger and Reduce Food Cravings

Approximately **80%** of weight-loss programs are unsuccessful in keeping the pounds off long term.[22] One of the most prominent reasons for weight regain is increased hunger, which leads to mindless consumption of calorie-dense processed foods that in a vicious cycle further increases food cravings.[23]

Garbanzo beans have many attributes that can help you reduce hunger and food cravings to achieve permanent weight loss. They deliver a good dose of **protein** that boosts fullness more per calorie than carbohydrates and fat.[24] Increasing dietary protein intake has been associated with reduced appetite and waist circumference, as well as better weight-loss maintenance.[25,26]

The soluble fiber in garbanzo beans improves weight control by forming a viscous gel with water in the stomach to slow down gastric emptying and prolong feelings of fullness. This subsequently reduces food intake and bodyweight.[27]

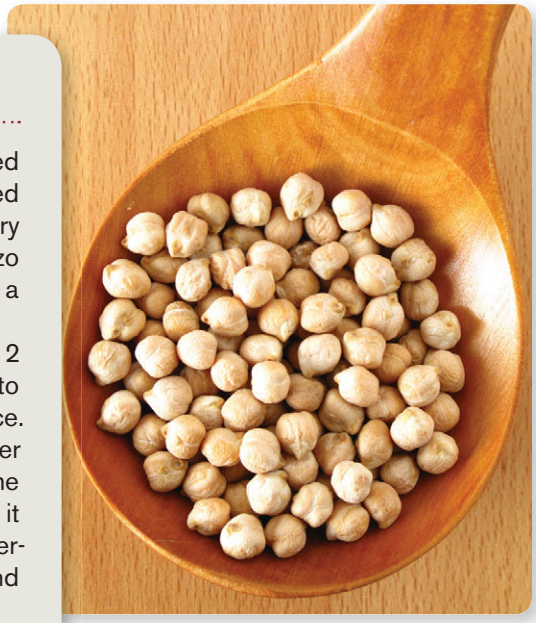
Both protein and dietary fiber favorably modulate appetite hormones to block hunger and increase feelings of fullness. They promote the gut secretion of satiety hormones such as **cholecystokinin** while at the same time inhibiting the release of hunger hormones

How to Cook and Use Garbanzo Beans

There are two main varieties of garbanzo beans, each differentiated by size and color. The **kabuli** type has large, round, cream-colored seeds. The **desi** type is much smaller and darker in color. Most grocery stores contain the kabuli type in dried and canned forms. Dry garbanzo beans can last for years if stored in an airtight container and kept in a cool, dark place.[46]

Dried garbanzo beans should be soaked in water for at least 12 hours before cooking. Make sure to rinse them thoroughly afterwards to remove most of the undigested carbohydrates and minimize flatulence. Combine the presoaked garbanzo beans with a small amount of water in a saucepan. After the pot reaches a boil, cover tightly, reduce the heat, and let simmer until tender. Although cooking times can vary, it takes approximately one hour. If you're in a pinch, opt for the canned version since they're already precooked and only need to be drained and rinsed.[46] Garbanzo beans can also be roasted for a crunchier texture.

Cooked garbanzo beans can be eaten as a snack, served as a side dish, and added to salads, sauces, and soups. You can also purée garbanzo beans together with tahini (sesame seed paste), lemon juice, and garlic to make a delicious hummus that can be used as a dip or spread for other foods.



like **ghrelin**.[28,29] This combined effect has proven to be a recipe for healthy weight loss.

In one study, a group of obese patients followed a calorie-restricted diet with or without four servings of legumes (like garbanzo beans) per week for two months.[30] Researchers found that the patients consuming the legumes experienced a **7.7%** decrease in bodyweight, whereas the control group had a **5.3%** reduction. The group eating the legumes also showed lower total cholesterol and had greater reductions in **oxidized LDL**, **F2-isoprostane**, and **malondialdehyde**—all markers of oxidative stress. These beneficial changes were credited to the effects of fiber and other compounds in garbanzo beans.

In a crossover study, scientists investigated the impact of garbanzo beans on appetite and food choices in men and women.[31] A group of volunteers followed their normal ad-libitum diet (eating for pleasure) for four weeks before following an ad-libitum diet supplemented with an average of **104 grams** per day of garbanzo beans for 12 weeks. The participants then returned to their normal ad-libitum diet for an additional four weeks. Scientists documented that during the garbanzo bean phase, participants reported greater satiety, ate less, and consumed fewer high-calorie processed foods. In addition, they showed improvements in bowel function. Once participants returned to their normal diet, however, these beneficial effects disappeared.

By decreasing food intake without conscious effort—especially high-palatability and reward foods—garbanzo beans can block food cravings that sabotage many weight-loss efforts.

Blood Sugar Management

Controlling blood sugar remains a daunting task for the majority of adults with prediabetes and diabetes. Increasing intake of garbanzo beans can be a safe and effective way to help restore glycemic control.

Garbanzo beans have a low-glycemic index (GI)—meaning they're absorbed slowly into the bloodstream. This prevents dangerous after-meal blood glucose surges that substantially increase the risk for various diseases.[32-34] Researchers found that after-meal glucose responses to garbanzo beans was **45%** lower than an equal amount of carbohydrates from other commonly consumed carbohydrates such as grains, cereals, and pasta.[35]

The low-glycemic value of garbanzo beans might be due to their gel-forming properties derived from soluble fiber. Evidence points to the fact that garbanzo beans contain **amylose**, a structural component of starch, that is resistant to digestion and therefore lowers glucose responses after meals.[36]

In clinical trials, garbanzo beans were found to reduce blood glucose and insulin levels alone or as part of a high-fiber or low-glycemic diet in both nondiabetics and diabetics.[37] When part of these diets for diabetics, garbanzo beans were demonstrated to reduce hemoglobin A1C, a marker of long-term glucose control, by an average of **0.48%**. Together, these findings suggest that garbanzo beans are effective at keeping both after-meal and long-term blood sugar levels at bay.

Improving Gut Health

Scientists have recently discovered that disturbances in the balance between beneficial and bad gut bacteria can put us on the fast track to a host of diseases such as inflammatory bowel disease, heart disease, and cancer.[38,39] Garbanzo beans contain a significant amount of indigestible **resistant starch** and oligosaccharides such as **raffinose** that work in tandem to restore a healthy and balanced gut microbiome.[40]

Cancer Defense

Since resistant starch and oligosaccharides in garbanzo beans cannot be digested in the gastrointestinal tract, good gut bacteria feeds on them to produce beneficial **short-chain fatty acids** such as propionate and butyrate.[41] The latter protects against cancer by inducing cell death (apoptosis),[42] reducing cell proliferation,[43] and cutting off the blood supply responsible for cancer growth.[44] This might explain the results of a study in which mice supplemented with garbanzo bean flour had a **64%** reduction in the number of aberrant crypt foci—precursors to colon cancer.[45]

Summary

Garbanzo beans provide an array of healthy compounds that include quercetin, chlorogenic acid, and isoflavones, along with key nutrients like B vitamins, iron, and magnesium that is deficient in most American diets.

Research has found that adding garbanzo beans to the diet can contribute to an increase in protein and fiber. In fact, garbanzo beans are becoming increasingly recognized for closing nutritional gaps in the American diet, while protecting against cardiovascular disease, diabetes, cancer, poor digestive health, and obesity. ●

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

References

1. Jukanti AK, Gaur PM, Gowda CL, et al. Nutritional quality and health benefits of chickpea (Cicer arietinum L.): a review. *Br J Nutr.* 2012;108 Suppl 1: S11-26.
2. Sreerama YN, Sashikala VB, Pratape VM. Variability in the distribution of phenolic compounds in milled fractions of chickpea and horse gram: evaluation of their antioxidant properties. *J Agric Food Chem.* 2010;58(14):8322-30.
3. Fulgoni VL, 3rd, Keast DR, Bailey RL, et al. Foods, fortificants, and supplements: Where do Americans get their nutrients? *J Nutr.* 2011;141(10): 1847-54.
4. Berner LA, Keast DR, Bailey RL, et al. Fortified foods are major contributors to nutrient intakes in diets of US children and adolescents. *J Acad Nutr Diet.* 2014;114(7):1009-22.e8.
5. Hirdyani H. Nutritional composition of chickpea (Cicerarietinum-L) and value added products - a review. *Indian J Comm Health*. 2014;26(Supp S2):102-6.
6. Rachwa-Rosiak D, Nebesny E, Budryn G. Chickpeas-composition, nutritional value, health benefits, application to bread and snacks: a review. *Crit Rev Food Sci Nutr*. 2015;55(8):1137-45.

7. Available at: https://www.heart.org/idc/groups/ahamah-public/@wcm/@sop/@smd/documents/downloadable/ucm_470704.pdf. Accessed February 22, 2016.
8. Eilat-Adar S, Sinai T, Yosefy C, et al. Nutritional recommendations for cardiovascular disease prevention. *Nutrients*. 2013;5(9):3646-83.
9. Davignon J, Ganz P. Role of endothelial dysfunction in atherosclerosis. *Circulation.* 2004;109(23 suppl 1):III-27-III-32.
10. Balligand JL. New mechanisms of LDL-cholesterol induced endothelial dysfunction; correction by statins. *Bull Mem Acad R Med Belg.* 2002;157(10-12):427-31; discussion 31-4.
11. Tontonoz P, Nagy L, Alvarez JG, et al. PPARgamma promotes monocyte/macrophage differentiation and uptake of oxidized LDL. *Cell*. 1998;93(2):241-52.
12. Available at: http://nutritiondata.self.com/facts/legumes-and-legume-products/4326/2. Accessed February 23, 2016.
13. Fernandez ML, West KL. Mechanisms by which dietary fatty acids modulate plasma lipids. *J Nutr*. 2005;135(9):2075-8.
14. Lattimer JM, Haub MD. Effects of dietary fiber and its components on metabolic health. *Nutrients*. 2010;2(12):1266-89.
15. Ghorai M, Mandal SC, Pal M, et al. A comparative study on hypocholesterolaemic effect of allicin, whole germinated seeds of bengal gram and guggulipid of gum gugglu. *Phytother Res*. 2000;14(3):200-2.
16. Mathur KS, Khan MA, Sharma RD. Hypocholesterolaemic effect of Bengal gram: a long-term study in man. *Br Med J.* 1968;1(5583):30-1.
17. Janisch KM, Williamson G, Needs P, et al. Properties of quercetin conjugates: modulation of LDL oxidation and binding to human serum albumin. *Free Radic Res.* 2004;38(8):877-84.
18. Nardini M, D'Aquino M, Tomassi G, et al. Inhibition of human low-density lipoprotein oxidation by caffeic acid and other hydroxycinnamic acid derivatives. *Free Radic Biol Med.* 1995;19(5):541-52.
19. Brown AA, Hu FB. Dietary modulation of endothelial function: implications for cardiovascular disease. *Am J Clin Nutr.* 2001;73(4):673-86.
20. Cunha AR, Umbelino B, Correia ML, et al. Magnesium and vascular changes in hypertension. *Int J Hypertens*. 2012;2012:754250.
21. Available at: http://apps.who.int/iris/bitstream/10665/43836/1/9789241563550_eng.pdf. Accessed February 23, 2016.
22. Wing RR, Phelan S. Long-term weight loss maintenance. *Am J Clin Nutr*. 2005;82(1 Suppl):222s-5s.
23. Elfhag K, Rossner S. Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain. *Obes Rev.* 2005;6(1):67-85.
24. Astrup A. The satiating power of protein-a key to obesity prevention? *Am J Clin Nutr*. 2005;82(1):1-2.
25. Leidy HJ, Clifton PM, Astrup A, et al. The role of protein in weight loss and maintenance. *Am J Clin Nutr*. 2015.
26. Brehm BJ, D'Alessio DA. Benefits of high-protein weight loss diets: enough evidence for practice? *Curr Opin Endocrinol Diabetes Obes.* 2008;15(5):416-21.
27. Slavin J. Fiber and prebiotics: mechanisms and health benefits. *Nutrients*. 2013;5(4):1417-35.
28. Karhunen LJ, Juvonen KR, Huotari A, et al. Effect of protein, fat, carbohydrate and fibre on gastrointestinal peptide release in humans. *Regul Pept*. 2008;149(1-3):70-8.
29. Bowen J, Noakes M, Trenerry C, et al. Energy intake, ghrelin, and cholecystokinin after different carbohydrate and protein preloads in overweight men. *J Clin Endrocrin Met.* 2006;91(4):1477-83.
30. Crujeiras AB, Parra D, Abete I, et al. A hypocaloric diet enriched in legumes specifically mitigates lipid peroxidation in obese subjects. *Free Radic Res*. 2007;41(4):498-506.
31. Murty CM, Pittaway JK, Ball MJ. Chickpea supplementation in an Australian diet affects food choice, satiety and bowel health. *Appetite*. 2010;54(2):282-8.
32. Jenkins DJ, Wolever TM, Taylor RH, et al. Glycemic index of foods: a physiological basis for carbohydrate exchange. *Am J Clin Nutr.* 1981;34(3):362-6.
33. Ceriello A. Impaired glucose tolerance and cardiovascular disease: the possible role of post-prandial hyperglycemia. *Am Heart J*. 2004;147(5):803-7.
34. Ceriello A. Mechanisms of tissue damage in the postprandial state. *Int J Clin Pract Suppl.* 2001(123):7-12.
35. Jenkins DJ, Wolever TM, Taylor RH, et al. Exceptionally low blood glucose response to dried beans: comparison with other carbohydrate foods. *Br Med J.* 1980;281(6240):578-80.
36. Nestel P, Cehun M, Chronopoulos A. Effects of long-term consumption and single meals of chickpeas on plasma glucose, insulin, and triacylglycerol concentrations. *Am J Clin Nutr*. 2004;79(3):390-5.
37. Sievenpiper JL, Kendall CW, Esfahani A, et al. Effect of non-oil-seed pulses on glycaemic control: a systematic review and meta-analysis of randomised controlled experimental trials in people with and without diabetes. *Diabetologia*. 2009;52(8):1479-95.
38. Guinane CM, Cotter PD. Role of the gut microbiota in health and chronic gastrointestinal disease: understanding a hidden metabolic organ. *Therap Adv Gastroenterol*. 2013;6(4):295-308.
39. Zhang YJ, Li S, Gan RY, et al. Impacts of gut bacteria on human health and diseases. *Int J Mol Sci.* 2015;16(4):7493-519.
40. Available at: http://www.pulsecanada.com/uploads/81/3c/813c7033c046e6b7812f21c3693bdbcf/PC_clinical_trials_rev_web1.pdf. Accessed February 23, 2016.
41. Topping DL, Clifton PM. Short-chain fatty acids and human colonic function: roles of resistant starch and nonstarch polysaccharides. *Physiol Rev*. 2001;81(3):1031-64.
42. Wang XM, Wang X, Li J, et al. Effects of 5-azacytidine and butyrate on differentiation and apoptosis of hepatic cancer cell lines. *Ann Surg.* 1998;227(6):922-31.
43. Zuo L, Lu M, Zhou Q, et al. Butyrate suppresses proliferation and migration of RKO colon cancer cells though regulating endocan expression by MAPK signaling pathway. *Food Chem Toxicol*. 2013.
44. Williams EA, Coxhead JM, Mathers JC. Anti-cancer effects of butyrate: use of microarray technology to investigate mechanisms. *Proc Nutr Soc.* 2003;62(1):107-15.
45. Murillo G, Choi JK, Pan O, et al. Efficacy of garbanzo and soybean flour in suppression of aberrant crypt foci in the colons of CF-1 mice. *Anticancer Res.* 2004;24(5a):3049-55.
46. Available at: http://www.pulsecanada.com/uploads/a3/a6/a3a6d7f53f7881244818e4b598842dd2/Guide-to-cooking-pulses.pdf. Accessed February 23, 2016.

RAISING THE STANDARD.

We have always been about Results.

Master Supplements is dedicated to providing you with digestive health products that **you can feel working.**

Our probiotics, enzymes and fiber supplements all help **restore and maintain digestive comfort and regularity.** A healthy gut means your microflora are in balance, which helps support digestive and immune health. If you try our products and are not satisfied, we offer a **100% money back guarantee.** Visit **trustpilot.com** to **see what other consumers are saying** about Master Supplements Inc.

100% MONEY BACK GUARANTEE RAISING THE STANDARD

WHAT SETS US APART?

- **VALUE:** Two probiotic capsules per week benefit the microbiome.
- **TECHNOLOGY:** Sixteen U.S. Patents ensure effectiveness.
- **QUALITY:** Online test results for every bottle.
- **RESULTS:** Fast-acting digestive relief*.

30 capsules	32 capsules	6.2 OZ
Item# 01038	Item# 01389	Item# 01386
Retail: $47.95	Retail: $42.95	Retail: $32.95
Your Price: $35.96	Your Price: $32.21	Your Price: $24.71

Call your *Life Extension®* advisor to learn more.

Call Life Extension to place your order today.
www.LifeExtension.com

1-800-544-4440

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

master-supplements.com
Master Supplements INCORPORATED

BY SCOTT FOGLE, ND

The Most Important **Blood Tests** Available for Assessing **Cardiovascular Risk**

LE: Are there better tests for checking cardiovascular risk than just the cholesterol test my doctor does every year?

SF: That is a great question that more people should be asking. Yes, there are several tests that are fantastic for assessing your cardiovascular risk. What is surprising to me is that more doctors aren't doing them!

While the cholesterol test your doctor does is important, it is just the tip of the iceberg regarding possible important information. That test is ancient technology, and it is like comparing an old rotary landline phone to a new state-of-the-art iPhone. Why keep using only very old technology when we have incredible new technology that provides a wealth of important health information?

For example, the standard cholesterol test that your doctor performs will give you a LDL value, which is important, but what few people realize is that this value is NOT the number of particles of LDL circulating in your blood. It is only the total amount of cholesterol found in the particles. It does NOT tell you if that amount of LDL is being carried by a large number of small LDL particles or carried by a small number of large particles. This difference is important because we now know that a higher amount of smaller particles is much more dangerous than a smaller amount of larger particles. It is important to know your LDL particle count. You want to have a low particle count. If yours is high, it is important to address the issue as soon as possible.

LE: I have heard about small dense LDL versus large buoyant LDL. Is that tied into particle count?

SF: Yes, both are important to know. Small dense LDL cholesterol is problematic because its small size allows it to more easily penetrate the blood vessel wall and start the process of plaque formation. That is not what you want if you hope to maintain good health. New blood testing technology can tell you both your particle count and the size of your LDL. The best result you can get is a low particle count combined with large buoyant LDL. The worst result is a high particle count with small dense LDL, which is a very bad combination.

LE: How can I get my particle size and count tested?

SF: A great test called NMR LipoProfile® provides this information using nuclear magnetic resonance (NMR) spectroscopy to directly measure particle count and size.

There are several key points to pay special attention to on the NMR LipoProfile®. The first is your LDL-P, which is your LDL particle count. Next is your small LDL-P, the number of **small** LDL particles. If either is high, there is a potential cardiovascular problem. The test also provides HDL-P, the particle count for HDL, which is your good cholesterol so you want that number high. Also, look at LDL size where bigger is better, meaning it correlates with large buoyant LDL, which is the better type of LDL as opposed to the bad, small, dense LDL. Pay attention to the LP-IR Score, which is an insulin resistance marker where the higher your number, the greater probability of insulin resistance: For optimal health you want that number lower. The report also includes a helpful particle concentration and size chart that reveals where lower cardiovascular disease risk is and where higher risk is. This is helpful in assessing the cardiovascular risk of your different numbers. To summarize, you want a low LDL-P, low small LDL-P, and low LP-IR Score combined with a high HDL-P and large LDL size for the lowest cardiovascular risk.

LE: I'm surprised more doctors aren't using this improved technology. Are there other tests regarding cholesterol that should be considered?

SF: Yes. Particle size and particle count represent huge improvements over your standard lipid panel. But there are more tests that round out your risk profile. These have to do with whether your LDL cholesterol is oxidized or glycated. Both are important because oxidized cholesterol is much more dangerous than non-oxidized cholesterol. A perfect example of oxidation occurs when you partially eat an apple and in 10 to 20 minutes, the core has turned an unpleasant brown color. This effect is due to oxidation from free radicals that are beginning the decaying process. The same thing can happen to your LDL particles. They start to oxidize just like the decaying apple, and that is not good. A key point to understand is that small dense particles are notorious for oxidizing faster. Oxidized LDL particles then penetrate the wall of your artery and start a cascade of inflammatory and reactionary events that lead to immune cells trying, mostly unsuccessfully, to get rid of them. All this inflammation and chaos in the wall of your artery eventually leads to foam cells building, which ultimately leads to the dreaded outcome of plaque buildup. If you can measure oxidized LDL and its related markers of inflammation, you have a better idea of what is really happening in your arteries.

LE: Can you test for oxidized LDL?

What About the VAP® Test?

The VAP® test was one of my favorite tests and they were in business for 20 years. But while writing this article I was shocked to hear they suddenly closed their doors. They cited "adverse changes in the regulatory environment, increased pressure from commercial insurance payors, and continued compression of profit margins" as the reason on their website. It is always painful for me to hear that regulatory and commercial interests destroyed a company that was advancing preventative medicine through cutting-edge testing. Medicine should be about helping people live longer and healthier, but too often regulatory and commercial interests corrupt that goal. The loss of the VAP® test left a terrible gap. Fortunately we recently negotiated a price decrease in the NMR LipoProfile® test, bringing it down to the same price as the VAP® test and providing much of the same information. There is hope that another company will pick up the VAP® test and we may be able to offer it in the future. However, the information is too important to hold off waiting and now that the NMR LipoProfile® price is the same as the VAP® test was, people should use that test instead. The information it provides for those who may be at cardiovascular risk is just too valuable.

SF: Yes, we now have the technology to do this and it is exciting. Only recently were we able to offer not only oxidized LDL testing but also F2-Isoprostanes and MPO (myeloperoxidase). Of the three tests, the oxidized LDL is the most important, but if you can, get all three tests.

MPO is an enzyme released by white blood cells when they attack. It causes death to microbes and amplifies inflammation and immune cell recruitment. This is great if there is a foreign invader, but it is terrible if it's happening in the arteries in response to oxidized LDL. It amplifies inflammation there and causes problems that increase plaque and often the worse kind of plaque, the soft vulnerable plaque that is prone to rupture. To make matters worse, MPO also oxidizes LDL, making it more plaque-promoting, and even oxidizes HDL (your good cholesterol) rendering it dysfunctional so it can no longer be helpful. These effects result in inflammation linked to plaque buildup inside the artery wall. Thus, MPO is a very interesting cardiovascular marker that is worth checking, especially in those with family history of cardiovascular disease or who make poor lifestyle choices.

F2-Isoprostanes are produced when free radicals react with neighboring molecules in a process called "oxidative stress," which causes a cascade of damage in the cells, initiating destructive pathways. F2-Isoprostanes may be elevated at the earliest stages of plaque development, and research has shown that people with high levels of F2-Isoprostanes are up to **30 times** more likely to develop heart disease. Note, this test is not a blood test. It is a urine test, but it's a very exciting test that is now finally available.

LE: You mentioned glycated LDL. How does that tie in with oxidized LDL?

SF: Glycation in the body signifies high insulin, high glucose, and dysfunctional glucose transporters. However, it also has a specific effect on LDL. If LDL is glycated, meaning a sugar molecule is inappropriately attached to it, it won't fit properly into the normal LDL receptor it is supposed to go into. This lack of fit poses a problem because it means that an LDL particle is now going to circulate more. This greater amount of time spent circulating means there is a greater chance for it to become oxidized. The more glycation happening to your LDL, the more problems you have due to increased oxidized LDL levels.

LE: Can you test for glycated LDL?

SF: Currently, there is not a good test that is commercially available. However, we can use the excellent HbA1c test instead. It measures hemoglobin that has a sugar attached to it, which happens more and more as a person's blood sugar level elevates. Red blood cells carry hemoglobin and they live about three months. Therefore, the HbA1c test is a fantastic way to look at the effects of average blood sugar over a three-month period. As a bonus, not only does it provide important information about sugar metabolism, it also allows us to assume that when it elevates, so does your glycated LDL. Thus, it provides an indirect prediction of glycated LDL levels.

LE: Can you sum up what are the best and worst results a person can have for these important cardiovascular risk markers?

SF: The best results are a low LDL-P, low small LDL-P, high HDL-P, high LDL size, low LP-IR Score, low oxidized LDL, low MPO, low F2-Isoprostanes, and low HbA1c. These are all associated with significantly lower cardiovascular risk.

The worst results are a high LDL-P, high small LDL-P, low HDL-P, low LDL size, high LP-IR Score, high-oxidized LDL, high MPO, high F2-Isoprostanes, and high HbA1c. That combination is a serious scenario that needs to be quickly addressed as a heart attack or stroke could be imminent.

LE: Do most Life Extension® customers have high-oxidized LDL?

SF: We expected that customers who are taking our quality products would have low levels and as it turns out, that's what we are seeing. This result is exactly what we want for our customers. We want them to have the lowest cardiovascular risk possible. We want them to exercise, make good dietary choices, reduce stress, and have access to premium quality supplements that can help support healthy blood biomarkers.

LE: Are there any new tests Life Extension® has recently added?

SF: Yes, we had numerous requests for MTHFR (methylenetetrahydrofolate reductase) gene testing, which deals with methylation, folate metabolism, and homocysteine levels. Originally, the pricing was just too high, around $300 dollars. We are also excited about COMT (catechol-O-methyltransferase), an innovative blood test that looks at how specific neurotransmitters are metabolized. Together, both tests can easily run around $600, providing you can find a doctor who knows about them and is willing

to administer these tests. Recently, we approved a new lab that will do both MTHFR and COMT. This test retails for **$198.66**. During our annual **Blood Test Super Sale**, the price for the MTHFR/COMT Genetic Methylation Profile is discounted to just **$111.75**.

LE: What do these tests tell you?

SF: MTHFR is a gene that produces an enzyme that activates folate (folic acid) and thus helps control homocysteine levels. It also relates to methylation in biochemical pathways. There are two main genetic variants that affect MTHFR levels, which are the C677T and A1298C variants. A person can have one or both variants and the C677T is the more powerful of the two. The more variants a person has, the more trouble he or she will have creating activated folate. As a result, this person will have higher homocysteine levels. These variants can even impact methotrexate medication users.

Also, since folate levels are directly related to memory scores and are even related to depressive symptoms, it is worth knowing your genetic status. The best result is a C/C for C677T and A/A for A1289C. If you are not a C/C and A/A, then you should use more activated folate, like 5-methyltetrahydrofolate acid (5-MTHF), instead of regular folic acid.

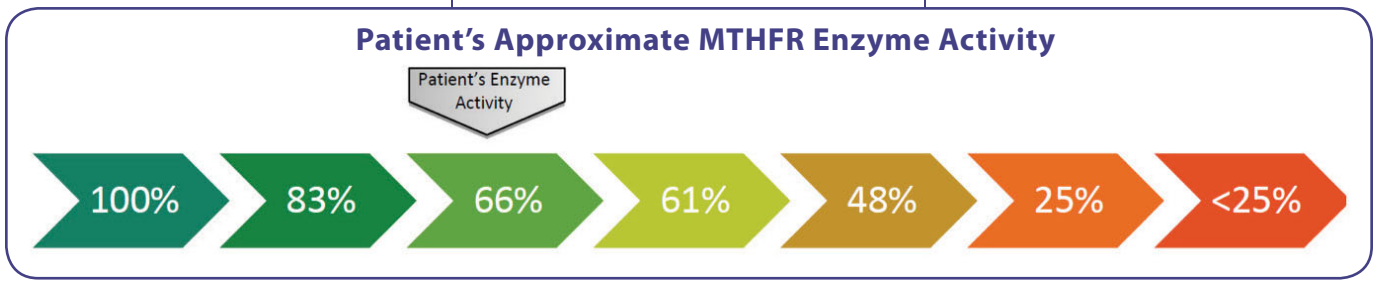
The COMT gene codes for an essential COMT enzyme that is involved in the inactivation of specific neurotransmitters such as dopamine and norepinephrine. The various genetic combinations of this gene can provide interesting information about an individual. For example, if you're a G/G, you exhibit higher enzyme activity that provides greater stress resiliency because you degrade stress neurotransmitters faster than most, but you also have lower dopamine levels. Those with G/G genetic makeup often have greater resistance to pain, yet may have a higher requirement for morphine in pain relief. It can even tell you about hormone metabolism since G/G carriers have a greater capacity to degrade estrogens and as a result have lower estradiol levels. The report is customized for your specific genetic carrier status and it relates to how you respond to things like stress, pain, hormones, emotions, short-term memory, abstract thinking, and behavior inhibition.

LE: Are there any underutilized cardiovascular tests Life Extension® offers that people should be using?

SF: Yes. There is a little known but very powerful test called the OmegaCheck™ that provides a wealth of information about omega-3s and omega-6s in a person's blood. It also provides very helpful information about total saturated fat levels (cheese, meat, butter), total monounsaturated fat levels (especially olive oil), and total polyunsaturated fat levels (plant and fish oils). This specialized test also measures total omega-6 and omega-3 fatty acids and uses that information to provide the incredibly important omega-6 to omega-3 ratio. A typical omega-6 to omega-3 ratio found in the US is around 8.1 (with some Americans even at a shockingly unhealthy 25 level). A ratio of 4 or less is ideal.

Resolvins are molecules generated from omega-3s and are growing in recognition for their ability to counter inflammation. In order for a person's body to manufacture these important compounds that stop inflammation, it is critical to have enough of the omega-3 building blocks on board to make them. Even if a person is taking fish oils, checking omega-3 levels and the critical omega-6 to omega-3 ratio can help customize a fish oil dose that is ideal for that person's unique biochemistry and physiology.

But the valuable information from this test doesn't stop there. The test also provides four important scores that are based on cardiovascular risk. The first is the whole blood score of long-chain omega-3 fatty acids and a higher score here is associated with a lower risk of sudden cardiac death (a score of 5.5 or greater is best). The second is an omega-3 equivalence score, where a result of greater than 7.2 is associated with a **32%** risk reduction in heart disease compared to a score of less than 5. The third is an EPA+DHA equivalence score where a number of 4.6 or greater is associated with a **70%** reduced risk of death from fatal ischemic heart disease.



Omega-3 Whole Blood Test Results

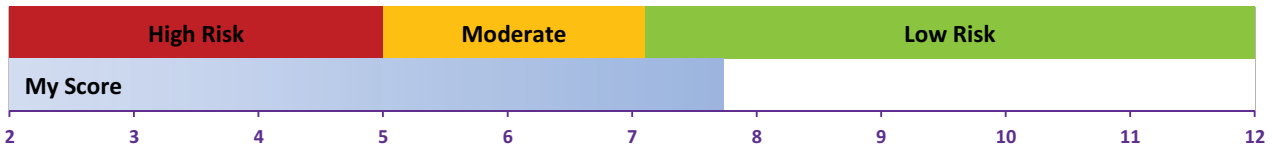
OmegaCheck

My Score: 5.00

Whole Blood scores demonstrate the amount of long chain omega-3 fatty acids found in the body, and also reflect supplementation and dietary intake. Higher scores are associated with lower risk of sudden cardiac death.[1]

Omega-3 Serum Equivalence Score

My Score: 7.74



An Omega-3 Serum Equivalence Score ≥7.2 is associated with a 32% risk reduction in heart disease compared to a score of < 5.0.[2]

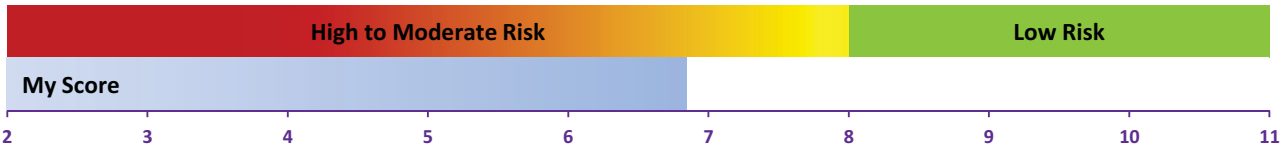
EPA + DHA Serum Equivalence Score *

My Score: 6.39

An EPA + DHA Serum Equivalence Score ≥ 4.6 is associated with a 70% reduced risk of death from fatal ischemic heart disease as compared to a score of < 3.5.[3]

Omega-3 Red Blood Cell Equivalence Score (Omega-3 Index) *

My Score: 6.85



An RBC omega-3 value of 8-11% offers the greatest protection against sudden myocardial infarction.[4]

References

1. Albert et al, 2002. *New England Journal of Medicine*; 346: 1113-1118
2. Simon et al, 1995. *American Journal Epidemiology*; 142: 469-476
3. Lemaitre et al, 2003. *American Journal of Clinical Nutrition*; 77: 319-325
4. Harris WS & Von Schacky C, 2004. *Preventive Medicine.* 39: 212-220; Von Schacky C & Harris WS, 2007. *Journal of Cardiovascular Medicine (Suppl)*; 546-599

The fourth cardiovascular score on the OmegaCheck™ is the very important Omega-3 Red Blood Cell Equivalence Score (Omega-3 Index). Here, red blood cells are measured for omega-3 content and a value of **8%** to **11%** offers the greatest protection against sudden myocardial infarction. This effect occurs because red blood cell composition reflects long-term intake of EPA and DHA. An important study by W. Harris and colleagues that came out in 2004 stated, "The omega-3 Index was inversely associated with risk for CHD [coronary heart disease] mortality." Since that time, many more studies using the omega-3 Index have come out. For example, a recent 2014 study concluded "…higher omega-3 Index is associated with increased insulin sensitivity and a more favorable metabolic profile in middle-aged overweight men." Recently, a 2015 study by K. Langlois and colleagues on Canadian adults found that "omega-3 Index levels among Canadian adults were strongly related to age, race, supplement use, fish consumption, smoking status, and obesity. Fewer than **3%** of adults had omega-3 Index levels associated with low risk for coronary heart disease." This is an alarming result and I suspect it would be even worse in the US.

If that weren't enough, the OmegaCheck™ also provides a

key marker of inflammation, which is the arachidonic acid (AA):EPA ratio. When this ratio is higher, there is preferred incorporation of AA into membranes over EPA, leading to a pro-inflammatory environment. While both of these fatty acids are essential to human health, the optimal ratio of AA: EPA is around 1.7. Far too many people have a ratio that is out of balance, mine included. I was surprised when I got my own results back and had to make adjustments to my supplement program.

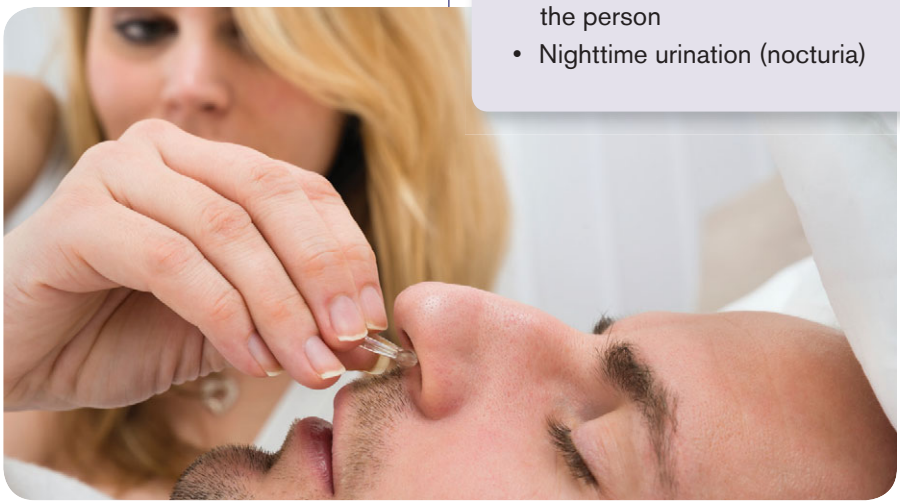
Thus, the OmegaCheck™ provides valuable and important information about cardiovascular risk including the omega-3 Index, a person's ability to make resolvins, their saturated fat status, the vital AA:EPA ratio, and the critical omega-6 to omega-3 ratio. For those not taking fish oil, it provides guidance on dietary gaps that need to be corrected. For those taking fish oil, it provides information about needed changes in dose, type, and quality of the fish oil they are taking.

LE: Beyond labs, what are the other top-three risks for cardiovascular disease we should look out for?

SF: There are many risk factors I would consider, but if I could only pick three, they would be family history, high blood pressure, and undiagnosed sleep apnea. I learned quickly in private practice to pay attention to family history because history really does repeat itself. For example, if a person has a strong family history of heart attacks or strokes at an early age, I would order all the tests previously mentioned.

Also, high blood pressure cannot be underestimated. The physiological damage that the pressure causes is due to shearing forces of the fluid pressure on the blood vessel walls. And it is worse where the blood vessel twists and turns. Just like flowing water can carve away rock over time, high pressure will cause damage on the arterial wall. It is at the site of this damage where plaque will build up first. Therefore, it is imperative to get high blood pressure under control.

The last of my top three is sleep apnea. Many years ago, I worked as a polysomnographic technician in a hospital sleeping disorder center. That experience was tremendously valuable to me as I quickly learned of the power of sleep and the incredible prevalence of sleep disorders that are robbing people of their lives. Many people are walking around with undiagnosed sleep disorders nowadays. Sleep apnea puts an incredible burden on the body and new studies are connecting it to cardiovascular disease. In fact, a recent 2016 study arrived at this conclusion: "It is important to evaluate sleep quality and sleep disorders, aiming at preventing and reducing unfavorable outcomes of cardiovascular disease, particularly for acute myocardial infarction patients." It is critically important to talk to your doctor if you have symptoms of sleep apnea or other sleeping disorder. ●



Dr. Scott Fogle is the Executive Director of Clinical Information and Laboratory Services at Life Extension®, where he oversees scientific and medical information and is in charge of the health advisors' knowledge and continuing education, as well as Life Extension®'s laboratory division.

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

Signs and Symptoms of Sleep Apnea

Daytime symptoms may include:

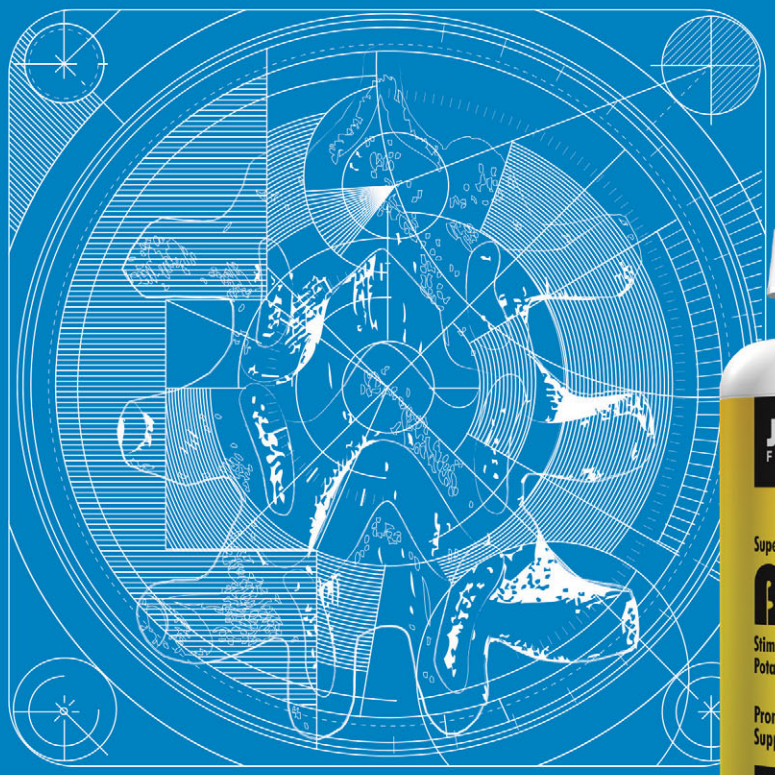
- Morning headache
- Dry or sore throat upon awakening
- Hypertension
- Daytime sleepiness
- Personality and mood changes (including anxiety and depression)
- Cognitive deficits
- Decreased libido and impotence

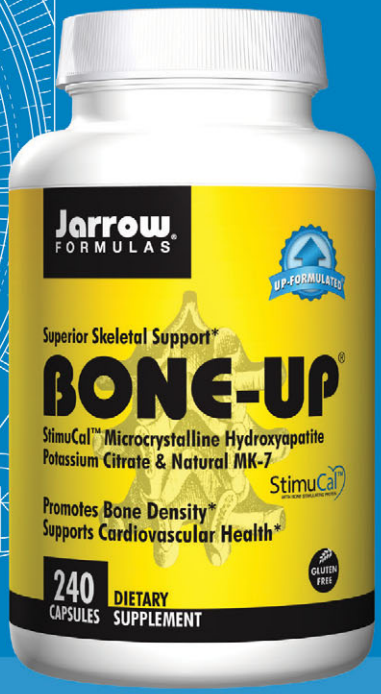
Nocturnal symptoms may include:

- Insomnia and restless sleep
- Snoring (loud and bothersome)
- Gasping sensation that can wake the person
- Nighttime urination (nocturia)

Better Bones by Design

2%-4% of your skeleton is "rebuilt" every year as calcium and minerals leave the bone and must be replaced.





Jarrow Formulas® Presents . . .

A Complete Multi-Nutrient Bone Health System!

Bone-Up® provides your body with much needed calcium as well as essential nutrients for building strong bones.* It utilizes the finest source of calcium available: New Zealand bovine bone hydroxyapatite from chemical-free, range grazed calves less than two years old.

Bone-Up® is an effective addition to any bone health regimen.* It features added vitamins and minerals that synergistically support healthy bone density and overall bone health*:

- **Stimucal™ Ossein Microcrystalline HydroxyApatite (MCHA):** Promotes calcium balance.*
- **Vitamin D_3:** Converts to calcitriol to enhance calcium absorption.
- **MK-7:** The more bioavailable form of Vitamin K_2, which is needed for building bone matrix and proper calcium distribution.*
- **Boron:** A trace mineral important in calcium retention.*
- **Manganese, Copper and Zinc:** Essential trace minerals involved in the formation of bone.*

To order **Jarrow Formulas® Bone-Up® 240 capsules,** Item # 00313
Call 1-800-544-4440 or visit www.LifeExtension.com
Retail price $28.95 **Your price $21.71**

www.Jarrow.com

Jarrow® FORMULAS

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

ANNUAL Blood Test

March 28 - June 6, 2016 SUPER SALE

LIFE EXTENSION'S SUGGESTIONS FOR ANNUAL SCREENING

For the past 35 years, the Life Extension Foundation® has stated that the most important step one can take to prevent disease cannot be found in a bottle of pills. The true cornerstone of any preventive health care program is annual blood screening. Proactive blood screening can help you greatly reduce your risk of disorders such as heart and kidney disease, stroke, liver conditions, anemia, and diabetes. Plus it's particularly valuable in helping you prevent and treat symptoms associated with hormone imbalance, such as fatigue, memory impairment, bone loss, weight gain, and depression. Blood testing remains one of the most important things you can do for yourself and your loved ones. More than any other measure, annual blood testing holds tremendous potential to protect both yourself and your loved ones.

Five Easy Steps:

1. Call **1-800-208-3444** to discuss and place your order with one of our knowledgeable health advisors. (This order form can also be faxed to 1-866-728-1050 or mailed.) Online orders can also be placed at **www.lef.org/blood**
2. After your order is placed, you will be mailed either a requisition form to take to your local LabCorp Patient Service Center or a Blood Draw Kit, whichever is applicable. (Please note: If a blood draw kit is used, an additional local draw fee may be incurred.)
3. Have your blood drawn.
4. Your blood test results will be mailed, emailed, or faxed directly to you by Life Extension.
5. Take the opportunity to discuss the results with one of our knowledgeable health advisors by calling 1-800-226-2370; or review the results with your personal physician.

It's that simple! Don't delay—call today!

For Our Local Members:

For those residing in the Ft. Lauderdale, Florida area, blood-draws are also performed at the Life Extension Nutrition Center from 9:00 am to 2:00 pm Monday through Saturday. Simply purchase the blood test and have it drawn with no wait! Our address is 5990 North Federal Highway, Ft. Lauderdale, FL, 33308-2633.

MEN'S ANNUAL BLOOD TESTING	RETAIL PRICE	SUPER SALE PRICE
○ **MALE LIFE EXTENSION PANEL (LC322582)** CBC/Chemistry Profile (description on next page) DHEA-S PSA (prostate-specific antigen) Homocysteine C-Reactive Protein (high-sensitivity) Free Testosterone Total Testosterone Estradiol TSH for thyroid function Vitamin D (25-hydroxyvitamin D) Hemoglobin A1c	$400	$199
○ **MALE HORMONE ADD-ON PANEL* (LCADDM)** **Pregnenolone and Dihydrotestosterone (DHT)** To provide an even more in-depth analysis of a man's hormone status, Life Extension has created this panel as an addition to the Male Life Extension Panel. This panel provides information about a testosterone metabolite that can affect the prostate; and the hormone pregnenolone that acts as a precursor to all other steroid hormones.	$160	$90
○ **THYROID ADD-ON PANEL (LCTHYROID)** **Free T3 & Free T4**.	$73.33	$36
○ **OMEGA CHECK™** (LCOMEGA)** Provides valuable information on your risk of developing heart disease, sudden heart attack, and cardiac death. The Omega Check™ also includes your AA:EPA ratio, allowing you to determine and track a major factor in total body inflammation.	$175	$99
○ **INSULIN (LC004333)** Helpful to assess insulin resistance.	$39.87	$24.42
○ **NMR LIPOPROFILE® (LC123810)** The NMR Lipoprofile® directly measures LDL particle size and number as well as HDL particle number, total cholesterol, and triglycerides. It also provides a calculation of one's risk of insulin resistance by assessing abnormalities in lipoprotein markers.	$132	$74.25
○ **ADVANCED OXIDIZED LDL PANEL*(LC100035)** This panel looks at vascular inflammatory biomarkers, beginning with lifestyle choices to the development of metabolic and cardiovascular disease as well as the formation of vulnerable plaque. The panel contains the following tests: F2-Isoprostanes, Myeloperoxidase and Oxidized LDL.	$380	$213.75
○ **FOOD SAFE ALLERGY TEST** (LCM73001)** This test measures delayed (IgG) food allergies for 95 common foods.	$264	$148.50

WOMEN'S ANNUAL BLOOD TESTING	RETAIL PRICE	SUPER SALE PRICE
○ **FEMALE LIFE EXTENSION PANEL (LC322535)** CBC/Chemistry Profile (description on next page) DHEA-S Estradiol Homocysteine C-Reactive Protein (high-sensitivity) Progesterone Free Testosterone Total Testosterone TSH for thyroid function Vitamin D (25-hydroxyvitamin D) Hemoglobin A1c	$400	$199
○ **FEMALE HORMONE ADD-ON PANEL* (LCADDF)** **Pregnenolone and Total Estrogen** To provide an even more in-depth analysis of a woman's hormone status, Life Extension has created this panel as an addition to the Female Life Extension Panel. This panel provides information about total estrogen status; and the hormone pregnenolone that acts as a precursor to all other steroid hormones.	$166.75	$93.75
○ **THYROID ADD-ON PANEL (LCTHYROID)** **Free T3 & Free T4**.	$73.33	$36
○ **OMEGA CHECK™** (LCOMEGA)** Provides valuable information on your risk of developing heart disease, sudden heart attack, and cardiac death. The Omega Check™ also includes your AA:EPA ratio, allowing you to determine and track a major factor in total body inflammation.	$175	$99
○ **INSULIN (LC004333)** Helpful to assess insulin resistance.	$39.87	$24.42
○ **NMR LIPOPROFILE® (LC123810)** The NMR Lipoprofile® directly measures LDL particle size and number as well as HDL particle number, total cholesterol, and triglycerides. It also provides a calculation of one's risk of insulin resistance by assessing abnormalities in lipoprotein markers.	$132	$74.25
○ **ADVANCED OXIDIZED LDL PANEL* (LC100035)** This panel looks at vascular inflammatory biomarkers, beginning with lifestyle choices to the development of metabolic and cardiovascular disease as well as the formation of vulnerable plaque. The panel contains the following tests: F2-Isoprostanes, Myeloperoxidase and Oxidized LDL.	$380	$213.75
○ **FOOD SAFE ALLERGY TEST** (LCM73001)** This test measures delayed (IgG) food allergies for 95 common foods.	$264	$148.50

NEW GENETIC AND SALIVA TESTING

○ **ADRENAL STRESS PROFILE-SALIVA** (LC100046)** Cortisol X4, DHEA-S, Cortisol AM/DHEA-S ratio, Secretory IgA.	$233.33	$131.25
○ **BASIC CORTISOL PROFILE-SALIVA** (LC100047)** Cortisol X4 to measure cortisol rhythm over time.	$172	$96.75
○ **SLEEP HORMONES PROFILE-SALIVA** (LC100048)** Cortisol and Melatonin plus ratio.	$233.33	$131.25
○ **MTHFR/COMT GENETIC METHYLATION PROFILE** (LC100045)** Tests for genetic mutations in MFHFR and COMT.	$198.66	$111.75

* This test requires samples to be shipped to the lab on dry ice for customers using a Blood Draw Kit and will incur an additional $35 charge. If the customer is having blood drawn at a LabCorp facility, this extra charge does not apply.

** This test is packaged as a kit.

OTHER POPULAR PANELS

	RETAIL PRICE	SUPER SALE PRICE
◯ **CBC/CHEMISTRY PROFILE (LC381822)** **Note: This CBC/Chemistry Profile is included in many Life Extension Panels. Please note panel descriptions.**	$47	$26

CARDIOVASCULAR RISK PROFILE

Total Cholesterol	Cholesterol/HDL Ratio
HDL Cholesterol	Estimated CHD Risk
LDL Cholesterol	Glucose
Triglycerides	

LIVER FUNCTION PANEL

AST (SGOT)	Total Bilirubin
ALT (SGPT)	Alkaline phosphatase
LDH	

KIDNEY FUNCTION PANEL

BUN	BUN/Creatinine Ratio
Creatinine	Uric Acid

BLOOD PROTEIN LEVELS

Total Protein	Globulin
Albumin	Albumin/Globulin Ratio

BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE

Red Blood Cell Count	Monocytes
White Blood Cell Count	Lymphocytes
Eosinophils	Platelet Count
Basophils	Hemoglobin
Neutrophils (Absolute)	Hematocrit
Lymphs (Absolute)	MCV
Monocytes (Absolute)	MCH
Eos (Absolute)	MCHC
Baso (Absolute)	Neutrophils
RDW	

BLOOD MINERAL PANEL

Calcium	Sodium
Potassium	Chloride
Phosphorus	Iron

	RETAIL PRICE	SUPER SALE PRICE
◯ **MALE ELITE PANEL (LC100016)*** Chem/CBC profile, Free and total Testosterone, Total Estrogens, Estradiol, DHEA-S, Progesterone, Pregnenolone, DHT, FSH, LH, TSH, Free T3, Free T4, Reverse T3, Free and Total PSA, IGF-1, SHBG, Vitamin D 25-OH, hs-CRP, ferritin, homocysteine.	$766.66	$431.25
◯ **FEMALE ELITE PANEL (LC100017)*** Chem/CBC profile, Free and total Testosterone, Total Estrogens, Estradiol, Estrone, DHEA-S, Progesterone, Pregnenolone, DHT, FSH, LH, TSH, Free T3, Free T4, Reverse T3, IGF-1, SHBG, Vitamin D 25-OH, hs-CRP, ferritin, homocysteine.	$766.66	$431.25
◯ **WEIGHT LOSS PANEL-BASIC (LC100027)** CBC/Chemistry profile (see description above), DHEA-S, free and total Testosterone, Estradiol, Progesterone, Cortisol, TSH, Free T3, Insulin and Hemoglobin A1c.	$173.33	$97.50
◯ **WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028)** CBC/Chemistry profile (see description above), DHEA-S, free and total Testosterone, Estradiol, Progesterone, Cortisol, TSH, Free T3, Free T4, Reverse T3, Insulin, Hemoglobin A1c, Vitamin D 25-hydroxy, C-reactive protein (high sensitivity), and Ferritin.	$366.66	$206.25
◯ **HEALTHY AGING PANEL-BASIC* (LC100025)** CBC/Chemistry profile (see description above), C-reactive protein (high sensitivity), Vitamin B12, Folate, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Ferritin, and Insulin.	$198.66	$111.75
◯ **HEALTHY AGING PANEL-COMPREHENSIVE* (LC100026)** CBC/Chemistry profile (see description above), C-reactive protein (high sensitivity), Vitamin B12, Folate, Homocysteine, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Free T3, Free T4, Ferritin, Urinalysis, Fibrinogen, and Insulin.	$332	$186.75
◯ **FEMALE COMPREHENSIVE HORMONE PANEL* (LC100011)** CBC/Chemistry Profile (see description at left), DHEA-S, Estradiol, Total Estrogens, Progesterone, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3. This panel now includes Free T4 and Cortisol with no increase in price!	$398.66	$224.25
◯ **MALE COMPREHENSIVE HORMONE PANEL* (LC100010)** CBC/Chemistry Profile (see description at left), DHEA-S, Estradiol, DHT, PSA, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3. This panel now includes Free T4 and Cortisol with no increase in price!	$398.66	$224.25
◯ **MALE BASIC HORMONE PANEL (LC100012)** DHEA-S, Estradiol, Total and Free Testosterone, PSA.	$100	$56.25
◯ **FEMALE BASIC HORMONE PANEL (LC100013)** DHEA-S, Estradiol, Total and Free Testosterone, Progesterone.	$100	$56.25
◯ **ANEMIA PANEL* (LC100006)** CBC/Chemistry Profile (see description), Ferritin, Total Iron Binding Capacity (TIBC), Vitamin B12, Folate.	$105.33	$59.25
◯ **DIABETES MANAGEMENT PROFILE – COMPREHENSIVE (LC100040)** Hemoglobin A1C, Glucose, Insulin, Lipid Panel, Glycomark.	$172	$96.75
◯ **DIABETES MANAGEMENT PROFILE – BASIC (LC100039)** Hemoglobin A1C, Glucose, Insulin.	$52	$29.25
◯ **AUTOIMMUNE DISEASE SCREEN (L100041C)** ANA screen, hs-CRP, TNFα, Immunoglobulins, IgA, IgG and IgM.	$265.33	$149.25
◯ **COMPREHENSIVE THYROID PANEL (LC100018)** TSH, T4, Free T4, Free T3, Reverse T3, TPO, ATA	$265.33	$149.25
◯ **LIFE EXTENSION THYROID PANEL (LC304131)** TSH, T4, Free T3, Free T4.	$100	$56.25
◯ **THYROID PANEL WITH REVERSE T3 (LC100044)** TSH, T4, Free T3, Free T4, Reverse T3	$120	$90

LE YOUR HEALTHY REWARDS

With **Your Healthy Rewards**, you earn **LE Dollars** back on every purchase you make — including blood tests!

See **www.LifeExtension.com/Rewards** for details.

Blood tests available in the continental United States only. Restrictions apply in NY, NJ, RI, and MA. Not available in Maryland. Kits not available in Pennsylvania.

This is NOT a complete listing of LE blood test services. Call **1-800-208-3444** for additional information.

ORDER LIFESAVING BLOOD TESTS FROM VIRTUALLY ANYWHERE IN THE US!

TERMS AND CONDITIONS

This blood test service is for informational purposes only and no specific medical advice will be provided. National Diagnostics, Inc., and the Life Extension Foundation contract with a physician who will order your test(s), but will not diagnose or treat you. Both the physician and the testing laboratory are independent contractors and neither National Diagnostics, Inc., nor the Life Extension Foundation will be liable for their acts or omissions. Always seek the advice of a trained health professional for medical advice, diagnosis, or treatment. When you purchase a blood test from Life Extension/National Diagnostics, Inc., you are doing so with the understanding that you are privately paying for these tests. There will be absolutely no billing to Medicare, Medicaid, or private insurance. I have read the above Terms and Conditions and understand and agree to them.

Signature of Life Extension Customer

X

◯ Male ◯ Female

Name

Date of Birth (required) / /

Address

City

State Zip

Phone

Credit Card No.

Expiration Date /

Mail your order form to:

LifeExtension® NATIONAL DIAGNOSTICS, INC.

3600 West Commercial Boulevard
Fort Lauderdale, FL 33309

Phone your order to: **1-800-208-3444**
Fax your order to: **1-866-728-1050**

PRODUCTS

Amino Acids

Arginine/L-Ornithine Capsules
Arginine Ornithine Powder
Branched Chain Amino Acids
D,L-Phenylalanine Capsules
L-Arginine Caps
L-Carnitine
L-Glutamine
L-Glutamine Powder
L-Lysine
L-Taurine Powder
L-Tyrosine Powder
Super Carnosine
Taurine

Blood Pressure & Vascular Support

Advanced Olive Leaf Vascular Support with Celery Seed Extract
Arterial Protect
Blood Pressure Monitor Arm Cuff
Endothelial Defense™ with Full-Spectrum Pomegranate™ and CORDIART™
Endothelial Defense™ with GliSODin®
Full-Spectrum Pomegranate™
Natural BP Management
NitroVasc with CORDIART™
Pomegranate Complete
Pomegranate Fruit Extract

Bone Health

Bone Restore
Bone Restore with Vitamin K2
Bone Strength Formula with KoAct®
Bone-Up™
Calcium Citrate with Vitamin D
Dr. Strum's Intensive Bone Formula
Strontium Caps

Brain Health

Acetyl-L-Carnitine
Acetyl-L-Carnitine Arginate
Blast
Brain Shield® Gastrodin
Cognitex® Basics
Cognitex® with Brain Shield®
Cognitex® with Pregnenolone & Brain Shield®
Cognizin® CDP-Choline Caps
DMAE Bitartrate (dimethylaminoethanol)
Dopa-Mind™
Ginkgo Biloba Certified Extract™
Huperzine A
Lecithin Granules
Migra-Eeze™
Neuro-Mag® Magnesium L-Threonate
Neuro-Mag® Magnesium L-Threonate with Calcium and Vitamin D3
Optimized Ashwagandha Extract
Prevagen™
PS (Phosphatidylserine) Caps
Vinpocetine

Cholesterol Management

Advanced Lipid Control
Cho-Less™
CHOL-Support™
Policosanol
Red Yeast Rice
Theaflavins Standardized Extract
Vitamin B3 Niacin Capsules

Digestion Support

Artichoke Leaf Extract
Carnosoothe with PicroProtect™
Digest RC®
Effervescent Vitamin C - Magnesium Crystals
Enhanced Super Digestive Enzymes
Enhanced Super Digestive Enzymes w/Probiotics
Esophageal Guardian
Extraordinary Enzymes
Fem Dophilus
FiberImmune Support
Ginger Force®
Organic Golden Flax Seed
Pancreatin
Regimint
Tranquil Tract™
TruFiber™
WellBetX PGX plus Mulberry

Energy Management

Adrenal Energy Formula
Asian Energy Boost
D-Ribose Powder
D-Ribose Tablets
Forskolin
Mitochondrial Basics with BioPQQ®
Mitochondrial Energy Optimizer with BioPQQ®
NAD+ Cell Regenerator™
Peak ATP® with GlycoCarn®
PQQ Caps with BioPQQ®
Rhodiola Extract
RiboGen™ French Oak Wood Extract
Triple Action Thyroid

Eye Health

Astaxanthin with Phospholipids
Brite Eyes III
Certified European Bilberry Extract
Eye Pressure Support with Mirtogenol®
MacuGuard® Ocular Support
MacuGuard® Ocular Support with Astaxanthin
Tear Support with MaquiBright®

Fish Oil & Omegas

OMEGA FOUNDATIONS® Mega EPA/DHA
OMEGA FOUNDATIONS® Mega GLA with Sesame Lignans
OMEGA FOUNDATIONS® Super Omega-3 EPA/DHA with Sesame Lignans & Olive Extract
OMEGA FOUNDATIONS® Super Omega-3 Plus EPA/DHA with Sesame Lignans, Olive Extract, Krill & Astaxanthin
Organic Golden Flax Seed
Provinal® Purified Omega-7
Vegetarian Sourced DHA

Food

Rich Rewards® Breakfast Blend
Rich Rewards® Breakfast Blend Natural Mocha Flavor
Rich Rewards® Breakfast Blend Natural Vanilla Flavor
Rich Rewards® Breakfast Blend Whole Bean Coffee
Rich Rewards® Decaf Roast
Stevia Sweetener

Glucose Management

CinSulin® with InSea$^{2®}$ and Crominex® 3+
Mega Benfotiamine
Natural Glucose Absorption Control
Tri Sugar Shield®

Heart Health

Aspirin (Enteric Coated)
Bio Active Folate & Vitamin B12 Caps
Cardio Peak™ with Standardized Hawthorn and Arjuna
Fibrinogen Resist™ with Nattokinase
Optimized Carnitine with GlycoCarn®
Super Ubiquinol CoQ10
Super Ubiquinol CoQ10 with BioPQQ®
Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™
Super-Absorbable CoQ10 Ubiquinone with *d*-Limonene
TMG Powder
TMG Liquid Capsules

Hormone Balance

DHEA (Dehydroepiandrosterone)
Inner Power
Pregnenolone
Triple Action Cruciferous Vegetable Extract with Resveratrol
Triple Action Cruciferous Vegetable Extract

Immune Support

AHCC®
Echinacea Extract
Enhanced Zinc Lozenges
i26 Hyperimmune Egg
Immune Modulator with Tinofend®
Immune Protect with PARACTIN®
Immune Senescence Protection Formula™
Kinoko® Gold AHCC
Kyolic® Garlic Formula 102
Kyolic® Garlic Formula 105
Kyolic® Reserve
Lactoferrin (apolactoferrin) Caps
NK Cell Activator™
Optimized Garlic
Optimized Quercetin
Peony Immune
ProBoost Thymic Protein A
Reishi Extract Mushroom Complex
Standardized Cistanche
Ten Mushroom Formula®
Zinc Lozenges

Inflammation Management

5-LOX Inhibitor with AprèsFlex®
Advanced Bio-Curcumin® with Ginger & Turmerones
Black Cumin Seed Oil with Bio-Curcumin®
Black Cumin Seed Oil
Boswella
Cytokine Suppress™ with EGCG
Nervia®
Serraflazyme
Specially-Coated Bromelain
Super Bio-Curcumin®
Zyflamend® Whole Body

Joint Support

Arthro-Immune Joint Support
ArthroMax® Advanced with UC-II® & AprèsFlex®
ArthroMax® with Theaflavins & AprèsFlex®
Bio-Collagen with Patented UC-II®
Fast-Acting Joint Formula
Glucosamine/Chondroitin Capsules
Krill Healthy Joint Formula
MSM (Methylsulfonylmethane)

Kidney & Bladder Support

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

Liver Health & Detoxification

Anti-Alcohol Antioxidants with HepatoProtection Complex
Calcium D-Glucarate
Chlorella
Chlorophyllin
European Milk Thistle
Glutathione, Cysteine & C
HepatoPro
Liver Efficiency Formula
Mega L-Glutathione Capsules
N-Acetyl-L-Cysteine
PectaSol-C®
Silymarin
SODzyme® with GliSODin® & Wolfberry

Longevity & Wellness

AMPK Activator
AppleWise Polyphenol Extract
Berry Complete
Blueberry Extract
Blueberry Extract with Pomegranate

CR Mimetic Longevity Formula
DNA Protection Formula
Enhanced Berry Complete with Acai
Essential Daily Nutrients
Grapeseed Extract with Resveratrol & Pterostilbene
Mega Green Tea Extract (decaffeinated)
Mega Green Tea Extract (lightly caffeinated)
Optimized Fucoidan with Maritech® 926
Optimized Resveratrol
Optimized Resveratrol with Nicotinomide Riboside
pTeroPure®
Pycnogenol® French Maritime Pine Bark Extract
Resveratrol with Pterostilbene
RNA (Ribonucleic Acid)
Super Alpha-Lipoic Acid
Super R-Lipoic Acid
X-R Shield

Men's Health

Mega Lycopene Extract
PalmettoGuard® Saw Palmetto with Beta-Sitosterol
PalmettoGuard® Saw Palmetto/Nettle Root Formula with Beta-Sitosterol
Pomi-T®
Prelox® Natural Sex for Men®
Super MiraForte with Standardized Lignans
Triple Strength ProstaPollen™
Ultra Natural Prostate

Minerals

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

Miscellaneous

Solarshield® Sunglasses

Mood & Stress Management

5 HTP
L-Theanine
Natural Stress Relief
SAMe (S-Adenosyl-Methionine)

Multivitamins

Children's Formula Life Extension Mix™
Comprehensive Nutrient Packs ADVANCED
Life Extension Mix™ Capsules without Copper
Life Extension Mix™ Capsules
Life Extension Mix™ Powder without Copper
Life Extension Mix™ Powder
Life Extension Mix™ Tablets with Extra Niacin
Life Extension Mix™ Tablets without Copper
Life Extension Mix™ Tablets
Once-Daily Health Booster
One-Per-Day Tablets
Two-Per-Day Capsules
Two-Per-Day Tablets

Personal Care

Anti-Aging Rejuvenating Scalp Serum
Biosil
Dr. Proctor's Advanced Hair Formula
Dr. Proctor's Shampoo
European Leg Solution Featuring Certified Diosmin 95
Face Master Platinum Facial Toning System
Hair, Skin & Nail Rejuvenation Formula w/VERISOL®
Hair Suppress Formula
Life Extension Toothpaste
Sinus Cleanser
Venotone
Xyliwhite Mouthwash

Pet Care

Cat Mix
Dog Mix

Probiotics

Bifido GI Balance
BroccoMax®
FLORASSIST® Heart Health Probiotic
FLORASSIST® Oral Hygiene
FLORASSIST® Balance
FLORASSIST® Mood
FLORASSIST® Throat Health
Theralac® Probiotics
TruFlora® Probiotics

Skin Care

Advanced Anti-Glycation Peptide Serum
Advanced Lightening Cream
Advanced Peptide Hand Therapy
Advanced Triple Peptide Serum
Advanced Under Eye Serum with Stem Cells
Amber Self MicroDermAbrasion
Anti-Aging Face Oil
Anti-Aging Mask
Anti-Aging Rejuvenating Face Cream
Anti-Glycation Serum with Blueberry & Pomegranate Extracts
Antioxidant Facial Mist
Anti-Oxidant Rejuvenating Foot Cream
Anti-Oxidant Rejuvenating Foot Scrub
Anti-Oxidant Rejuvenating Hand Cream
Anti-Redness & Adult Blemish Lotion
Bioflavonoid Cream
Broccoli Sprout Cream
Collagen Boosting Peptide Serum
Corrective Clearing Mask
DNA Repair Cream
Dual-Action MicroDermAbrasion
Enhanced FernBlock® with Red Orange Complex
Essential Plant Lipids Reparative Serum
Face Rejuvenating Anti-Oxidant Cream
Fine Line-Less
Healing Formula
Healing Mask
Healing Vitamin K Cream
Hyaluronic Facial Moisturizer
Hyaluronic Oil-Free Facial Moisturizer
Hydrating Anti-Oxidant Facial Mist
Hydroderm
Lifting & Tightening Complex
Lycopene Cream
Melatonin Cream
Mild Facial Cleanser
Multi Stem Cell Skin Tightening Complex
Neck Rejuvenating Anti-Oxidant Cream
Pigment Correcting Cream
Rejuvenating Serum
Rejuvenex® Body Lotion
RejuveneX® Factor Firming Serum
Renewing Eye Cream
Resveratrol Anti-Oxidant Serum
Skin Lightening Serum
Skin Restoring Phytoceramides with Lipowheat®
Skin Stem Cell Serum
Stem Cell Cream with Alpine Rose
Tightening & Firming Neck Cream
Ultra Eyelash Booster
Ultra Lip Plumper
Ultra Rejuvenex®
Ultra RejuveNight®
Ultra Wrinkle Relaxer
Under Eye Refining Serum
Under Eye Rescue Cream
Vitamin C Serum
Vitamin D Lotion
Vitamin E-ssential Cream
Youth Serum

Sleep

Bioactive Milk Peptides
Enhanced Natural Sleep® with Melatonin
Enhanced Natural Sleep® without Melatonin
Fast-Acting Liquid Melatonin
Glycine
L-Tryptophan
Melatonin
Optimized Tryptophan Plus

Sports Performance

Creatine Capsules
Creatine Whey Glutamine Powder (Vanilla Flavor)
New Zealand Whey Protein Concentrate (Natural Chocolate and Vanilla Flavor)
Tart Cherry Extract
Whey Protein Isolate (Chocolate and Vanilla Flavor)

Vitamins

Ascorbyl Palmitate
Benfotiamine with Thiamine
Beta-Carotene
BioActive Complete B-Complex
Biotin
Buffered Vitamin C Powder
Daily C+
Fast-C® with Dihydroquercetin
Gamma E Tocopherol with Sesame Lignans
Gamma E Tocopherol/Tocotrienols
High Potency Optimized Folate
Inositol Caps
Liquid Emulsified Vitamin D3
Liquid Vitamin D3
Low-Dose Vitamin K2
Methylcobalamin
MK-7
Natural Vitamin E
No Flush Niacin
Optimized Folate (L-Methylfolate)
Pantothenic Acid (Vitamin B-5)
Pyridoxal 5'-Phosphate Caps
Super Absorbable Tocotrienols
Super Ascorbate C Capsules
Super Ascorbate C Powder
Super K with Advanced K2 Complex
Vitamin B12
Vitamin B6
Vitamin C with Dihydroquercetin
Vitamin D3 with Sea-Iodine™
Vitamin D3
Vitamins D and K with Sea-Iodine™

Weight Management

7-Keto® DHEA Metabolite
Advanced Anti-Adipocyte Formula
Advanced Natural Appetite Suppress
CalReduce Selective Fat Binder
DHEA Complete
Garcinia HCA
HCActive™ Garnicia Cambogia Extract
Integra-Lean®
Mediterranean Trim with Sinetrol™-XPur
Optimized Irvingia with Phase 3™ Calorie Control Complex
Optimized Saffron with Satiereal®
Super Citrimax®
Super CLA Blend with Guarana and Sesame Lignans
Super CLA Blend with Sesame Lignans
Waist-Line Control™

Women's Health

Advanced Natural Sex for Women® 50+
Breast Health Formula
Femmenessence MacaPause®
Natural Estrogen
ProgestaCare® for Women
Super-Absorbable Soy Isoflavones
Ultra Soy Extract

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
	A						
01524	**ACETYL-L-CARNITINE** • 500 mg, 100 veg. caps	34.00	25.50	22.50			
01525	**ACETYL-L-CARNITINE ARGINATE** • 100 veg. caps	59.00	44.25	38.24			
01628	**ADRENAL ENERGY FORMULA** • 60 veg. caps	24.00	18.00	16.50			
01630	**ADRENAL ENERGY FORMULA** • 120 veg. caps	46.00	34.50	31.50			
01828	**ADVANCED LIPID CONTROL** • 60 veg. caps	30.00	22.50	20.25			
00681	**AHCC®** • 500 mg, 30 caps	59.98	44.99				
29727	**AHCC® (KINOKO® GOLD)** • 500 mg, 60 veg. caps	74.95	52.47				
00457	**ALPHA-LIPOIC ACID W/BIOTIN** (Super) • 250 mg, 60 caps	37.00	27.75	24.00			
01907	**AMPK ACTIVATOR** • 90 veg. caps	48.00	36.00	33.00			
01440	**ANTI-ALCOHOL ANTIOXIDANTS W/HEPATOPRO** • 100 caps	26.00	19.50	17.25			
01509	**ANTI-ADIPOCYTE FORMULA W/MERATRIM® & INTEGRA LEAN®** (Advanced) • 60 veg. caps	39.00	29.25	27.00			
01625	**APPLEWISE POLYPHENOL EXTRACT** 600 mg, 30 veg. caps	21.00	15.75	14.25			
01039	**ARGININE/ORNITHINE** • 500/250, 100 caps	17.99	13.49				
00038	**ARGININE/ORNITHINE POWDER** • 150 grams	22.95	17.21	14.25			
01624	**(L)-ARGININE CAPS** • 700 mg, 200 veg. caps	26.50	19.88	17.44			
02004	**ARTERIAL PROTECT** • 30 veg. caps	48.00	36.00	33.00			
01617	**ARTHROMAX® W/THEAFLAVINS & APRÈSFLEX®** 120 veg. caps	44.00	33.00	30.00			
01618	**ARTHROMAX® ADVANCED W/UC-II® & APRÈSFLEX®** 60 caps	36.00	27.00	24.00			
01404	**ARTHRO-IMMUNE JOINT SUPPORT** • 60 veg. caps	32.00	24.00	21.00			
00919	**ARTICHOKE LEAF EXTRACT** • 500 mg, 180 veg. caps	30.00	22.50	21.00			
01533	**ASCORBYL PALMITATE** • 500 mg, 100 veg. caps	22.50	16.88	15.00			
00888	**ASHWAGANDHA EXTRACT** (Optimized) • 60 veg. caps	10.00	7.50	6.75			
01805	**ASIAN ENERGY BOOST** • 90 veg. caps	24.00	18.00	16.50			
01066	**ASPIRIN** • 81 mg, 300 enteric coated tablets	6.00	4.50	4.00			
01923	**ASTAXANTHIN WITH PHOSPHOLIPIDS** • 4 mg, 30 softgels	16.00	12.00	10.50			
	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	11.25	8.44				
01622	**BIFIDO GI BALANCE** • 60 veg. caps	20.00	15.00	13.50			
01073	**BILBERRY EXTRACT** • 100 mg, 100 veg. caps	42.00	31.50	28.50			
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	18.95	15.16				
*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				
70000	**BLOOD PRESSURE MONITOR (ACCUFIT™)** • med/lg cuff	79.99	49.99				
70004	**BLOOD PRESSURE MONITOR** • Digital wrist cuff	69.95	52.46				

SUBTOTAL OF COLUMN 1

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
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			
01699	**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			
01258	**CARNOSOOTHE W/PICROPROTECT™** • 60 veg. caps	29.95	22.46	20.25			
01829	**CARNOSINE** • 500 mg, 60 veg. caps	36.00	27.00	24.00			
01687	**CARNOSINE** (Super) • 500 mg, 90 veg. caps	66.00	49.50	45.00			
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	23.50	17.63				
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			
01477	**CHROMIUM ULTRA** • 100 veg. caps	24.00	18.00	15.75			
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) 1,000 mg, 120 softgels	36.00	27.00	24.75	19.75		
00819	**CLA BLEND W/GUARANA & SESAME** (Super) 1,000 mg, 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		
01659	**COGNIZIN® CDP CHOLINE CAPS** • 250 mg, 60 veg. caps	36.00	27.00	25.50			

SUBTOTAL OF COLUMN 2

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
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			
00949	**COQ10 w/*d*-LIMONENE** (Super-absorbable) 50 mg, 60 softgels	25.00	18.75	16.50	15.00		
00950	**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	20.25			
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
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 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			
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						
01912	**DAILY C+ CITRUS FLAVOR** • 30 stick packs	21.00	15.75	14.25			
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 sourced) • 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			
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			

SUBTOTAL OF COLUMN 4

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
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			
00899	**DUAL-ACTION MICRODERMABRASION ADV. EXFOLIATE** • 2.4 oz	39.95	29.96	29.21			
	E						
01528	**ECHINACEA EXTRACT** • 250 mg, 60 veg. caps	14.35	10.76	9.38			
01997	**ENDOTHELIAL DEFENSE™ w/FULL-SPECTRUM POMEGRANATE™ 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			
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				
01728	**FERNBLOCK® W/RED ORANGE COMPLEX** (Enhanced) 30 veg. caps	42.00	31.50	28.50			
02007	**FIBERIMMUNE 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				
01821	**FLORASSIST® HEART HEALTH PROBIOTIC** • 60 veg. caps	32.00	24.00	21.00			
02011	**FLORASSIST® ORAL HYGIENE** • 30 lozenges	20.00	15.00	13.50			
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** (Bio Active) • 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						
00559	**GAMMA E TOCOPHEROL/TOCOTRIENOLS** • 60 softgels	42.00	31.50	27.75			
00759	**GAMMA E TOCOPHEROL W/SESAME LIGNANS** • 60 softgels	32.00	24.00	21.75			
01394	**GARLIC** (Optimized) • 200 veg. caps	24.95	18.71	15.75			
**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			

SUBTOTAL OF COLUMN 5

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
00756	**GLA WITH SESAME LIGNANS** (Mega) • 60 softgels	19.50	14.63	13.50			
00345	**(L-) GLUTAMINE CAPSULES** • 500 mg, 100 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			
00314	**L-GLUTATHIONE** (Mega) • 250 mg, 60 caps	39.64	29.73				
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/VERISON®** 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						
*01060	**I26 HYPERIMMUNE EGG** • 140 grams powder	54.99	46.75				
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	26.45	19.84				
00214	**KYOLIC® GARLIC FORMULA 105** • 200 caps	27.45	20.59				
00789	**KYOLIC® RESERVE** • 600 mg, 120 caps	27.95	20.96				
01681	**LACTOFERRIN** • 60 caps	52.00	39.00	36.00			
00020	**LECITHIN** • 16 oz granules	18.00	13.50	12.00			
02055	**LIFE EXTENSION MIX™** • 315 tablets	80.00	60.00	52.00	43.75		
02057	**LIFE EXTENSION MIX™ W/EXTRA NIACIN** • 315 tablets	80.00	60.00	52.00	43.75		
02054	**LIFE EXTENSION MIX™** • 490 caps	90.00	67.50	58.00	47.50		
02056	**LIFE EXTENSION MIX™ POWDER** • 14.81 oz	80.00	60.00	52.00	43.75		

SUBTOTAL OF COLUMN 6

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
02065	**LIFE EXTENSION MIX™** • 315 tablets w/o copper	80.00	60.00	52.00	43.75		
02064	**LIFE EXTENSION MIX™** • 490 caps w/o copper	90.00	67.50	58.00	47.50		
02066	**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						
01926	**MACUGUARD® OCULAR SUPPORT** • 60 softgels	22.00	16.50	14.85			
01927	**MACUGUARD® OCULAR SUPPORT w/ASTAXANTHIN** 60 softgels	42.00	31.50	28.50			
01459	**MAGNESIUM CAPS** • 500 mg, 100 veg. caps	12.00	9.00	7.50			
01682	**MAGNESIUM (CITRATE)** • 160 mg, 100 veg. caps	9.00	6.75	5.63			
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 veg. 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 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			
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	29.50	22.13	19.75			
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			
01698	**MIRAFORTE w/STANDARDIZED LIGNANS** (Super) • 120 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	10.13			
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			
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			

SUBTOTAL OF COLUMN 7

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
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			
01121	**NERVIA®** • 60 softgels	49.95	37.46				
01603	**NEURO-MAG® MAGNESIUM L-THREONATE** • 90 veg. caps	40.00	30.00	27.00			
01602	**NEURO-MAG® L-THREONATE W/CALCIUM & VITAMIN D3** 225 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		
01989	**ONCE-DAILY HEALTH BOOSTER** • 60 softgels	52.00	39.00	36.00			
02001	**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® SUPER 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	82.46				
01080	**PECTA SOL-C® MODIFIED CITRUS PECTIN** • 270 veg. caps	79.95	59.96				
01811	**PEONY IMMUNE** • 60 veg. caps	36.00	27.00	24.00			
00673	**PGX® PLUS MULBERRY** (WellBetX®) • 180 veg. caps	34.95	26.21				
01676	**PHOSPHATIDYLSERINE CAPS** • 100 mg, 100 veg. caps	54.00	40.50	36.00			
01436	**POLICOSANOL** • 10 mg, 60 veg. caps	20.00	15.00	11.25			
01953	**POMEGRANATE COMPLETE** • 30 softgels	24.00	18.00	15.75			
00956	**POMEGRANATE FRUIT EXTRACT** • 30 veg. caps	19.50	14.63	13.16			
01797	**POMI-T®** • 60 veg. caps	33.33	25.00	22.50			
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

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01441	**PROGESTACARE® FOR WOMEN** • 4 oz cream	35.50	26.63	24.38			
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 • 1 lb. powder	30.00	22.50	20.25			
01743	**PROTEIN-ISOLATE** (Whey) Chocolate • 1 lb. powder	30.00	22.50	20.25			
01770	**PROTEIN CONCENTRATE** (New Zealand Whey) Vanilla 520 grams	30.00	22.50	19.95			
01771	**PROTEIN CONCENTRATE** (New Zealand Whey) Chocolate 660 grams	30.00	22.50	19.95			
01812	**PROVINAL® PURIFIED OMEGA-7** • 30 softgels	27.00	20.25	18.00			
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	16.95	13.56				
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				
01679	**SE-METHYL L-SELENOCYSTEINE** • 200 mcg, 100 veg. caps	12.00	9.00	8.25			
00318	**SERRAFLAZYME** • 100 tablets	18.00	13.50	12.00			
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			
01097	**SOY EXTRACT** (Ultra) • 150 veg. caps	87.00	65.25	58.50			
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						
01723	**TART CHERRY EXTRACT W/STANDARDIZED CHERRYPURE®** 60 veg. caps	22.00	16.50	15.00			
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	29.96				
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			
02016	**TWO-PER-DAY** • 60 tablets	10.50	7.88	7.13			
02015	**TWO-PER-DAY** • 120 tablets	20.00	15.00	13.50			
02014	**TWO-PER-DAY** • 120 caps	22.00	16.50	15.00			
00326	**L-TYROSINE** • 500 mg, 100 tablets	12.98	9.74				

SUBTOTAL OF COLUMN 10

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			
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 EMULSION** • 2,000 IU, 1 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						
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				
33880	**OUTSTANDING HEALTH:** THE 6 ESSENTIAL KEYS TO MAXIMIZE YOUR ENERGY AND WELL BEING by Michael Galitzer, MD & Larry Trivieri Jr. • 2015	24.95	18.71				
33878	**TESTOSTERONE REPLACEMENT THERAPY** by Dr. John Crisler • 2015	19.99	14.99				

SUBTOTAL OF COLUMN 11

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
33877	**THE TRUTH ABOUT MEN AND SEX** by Abraham Morgentaler, MD, FACS • 2015	16.99	12.74				
33876	***TOX*-SICK** • by Suzanne Somers • 2015	26.00	19.50				
33875	**DOCTORED: THE DISILLUSIONMENT OF AN AMERICAN PHYSICIAN** • by Sandeep Jauhar • 2015	26.00	19.50				
33874	**MISSING MICROBES** • by Martin J. Blaser, MD • 2014	28.00	21.00				
33873	**EATING ON THE WILD SIDE** • by Jo Robinson • 2014	16.00	12.00				
33872	**GET SERIOUS** • by Brett Osborn, MD • 2014	24.95	18.71				
33868	**TOXIN TOXOUT:** GETTING HARMFUL CHEMICALS OUT OF OUR BODIES AND OUR WORLD • by Bruce Lourie and Rick Smith • 2014	25.99	19.49				
33867	**THE COMPLETE MEDITERRANEAN DIET** by Michael Ozner, MD • 2014	19.95	14.96				
33869	**UNLEASH THE POWER OF THE FEMALE BRAIN** by Daniel Amen, MD • 2014	16.00	12.00				
33870	**MAGNIFICENT MAGNESIUM** by Dennis Goodman, MD • 2014	14.95	11.21				
DPT05	**DISEASE PREVENTION AND TREATMENT, EXPANDED FIFTH EDITION** (Hardcover) • 2014	69.95	39.95	36.00			
33865	**THE RESTORATION OF THE HUMAN BODY [IN 7 PARTS]** by Sergey A. Dzugan, MD, PhD • 2014	29.95	22.46				
33862	**I'M TOO YOUNG FOR THIS** • by Suzanne Somers • 2013	26.00	19.50				
33835	**PHARMOCRACY** • by William Faloon • 2011	24.00	9.60	8.00			
33958	**THE VITAMIN D SOLUTION** by Michael F. Holick, PhD, MD (Paperback) • 2013	16.00	12.00				
33838	**YOUR GUIDE TO HEALTHY SKIN THE NATURAL WAY** by Gary Goldfaden, MD • 2012	26.00	15.00				
33815	**KNOCKOUT** • by Suzanne Somers • 2009	25.99	17.00				
33809	**TESTOSTERONE FOR LIFE** by Abraham Morgentaler, MD • 2008	16.95	11.87				
33696	**LIFE EXTENSION REVOLUTION** by Philip Lee Miller, MD (Paperback)	16.00	12.00				
33805	**MIAMI MEDITERRANEAN DIET WITH 300 RECIPES** by Michael D. Ozner, MD, FACC, FAHA (Hardcover) • 2008	24.95	16.25				
33906	**THE MIGRAINE CURE** • by Sergey Dzugan, MD, PhD • 2006	24.00	15.60				
33803	**WHAT YOUR DOCTOR MAY NOT TELL YOU ABOUT DIABETES** by Steven V. Joyal, MD • 2008	14.99	10.49				

SUBTOTAL OF COLUMN 12

* These products are not 25% off retail price.
** Due to license restrictions, this product is not for sale to customers outside of the USA.
*** Due to license restrictions, this product is not for sale to Canada.
† Due to license restrictions, this product is not for sale to customers outside of the USA and Canada.

Not sure exactly which supplements you need?

Talk to a Health Advisor toll-free at 1-800-226-2370

LifeExtension®

ORDER SUBTOTALS

SUBTOTAL COLUMN 1	
SUBTOTAL COLUMN 2	
SUBTOTAL COLUMN 3	
SUBTOTAL COLUMN 4	
SUBTOTAL COLUMN 5	
SUBTOTAL COLUMN 6	
SUBTOTAL COLUMN 7	
SUBTOTAL COLUMN 8	
SUBTOTAL COLUMN 9	
SUBTOTAL COLUMN 10	
SUBTOTAL COLUMN 11	
SUBTOTAL COLUMN 12	

ORDER TOTALS

SUBTOTAL OF COLUMNS 1 - 12	
POSTAGE & HANDLING (Any size order, in the U.S, includes Alaska & Hawaii)	$5.50
C.O.D.s (ADD $7 FOR C.O.D. ORDERS)	
SHIPPING UPS OVERNIGHT add $16, UPS 2nd DAY AIR add $7. For Puerto Rico, US Virgin Islands, add $7. CANADA UPS EXPRESS Flat rate $17.50, UK Flat rate $25 USD. ALL OTHER INTERNATIONAL AIR WILL BE ADDED.	
GRAND TOTAL (MUST BE IN U.S. DOLLARS)	

PLEASE MAIL TO: Life Extension
P.O. Box 407198 • Ft. Lauderdale, Florida 33340-7198
Or Call Toll Free 1-800-544-4440 • Fax: 866-728-1050

INTRODUCING

LE YOUR HEALTHY REWARDS

Because You Deserve More

Introducing Your Healthy Rewards—the exciting new program exclusively for Life Extension customers. Your Healthy Rewards earns you 2% LE Dollars back on every purchase you make*…and the best part is, Your Healthy Rewards is FREE—no membership involved, no commitment required. The reason behind Your Healthy Rewards is simple: we believe that you deserve more. (Former Life Extension members earn 4%.)

And earn even more benefits when you upgrade to Your Healthy Rewards *Premier*!

For $49.95, you get an immediate $50 LE Dollar enrollment bonus, double LE Dollars (4%) back on purchases, complimentary CHOICE unlimited standard shipping service†, and more. Your Healthy Rewards *Premier* is the ultimate way to earn LE Dollars and enjoy exclusive *Premier*-only perks! At the annual rate of just $49.95 US/$59.95 International, *Premier* pays for itself.

Learn more about YOUR HEALTHY REWARDS
Call toll-free 1-888-224-8239
www.LifeExtension.com/Rewards

* You earn LE Dollars on all your Life Extension purchases (except shipping fees, CHOICE and *Premier* program fees, *Life Extension* Magazine® subscriptions, or any purchases made with LE Dollars or gift card). Redeem LE Dollars for any purchase such as products, labs, sale items, and shipping fees at the rate of 1 LE Dollar being equal to $1 U.S Dollar at checkout. LE Dollars may not be redeemed for *Premier* program fees, CHOICE program fees, *Life Extension* Magazine® subscriptions, or to purchase Gift Cards. LE Dollars have no cash value and are not redeemable for cash, transferable, or assignable for any reason.

† CHOICE Standard pre-paid shipping offers unlimited shipping to any mailing address within the 50 U.S. states, excluding U.S. territories. CHOICE also gives you discounts on non-standard shipping, shipping outside of the United States, and expedited shipping costs. CHOICE pre-paid unlimited shipping excludes blood test products and gift cards. This offer is not available to international customers serviced by distributors of Life Extension products.

BILL TO ADDRESS

NAME E-MAIL

ADDRESS

CITY/STATE/ZIP-POSTAL CODE COUNTRY

PHONE FAX

VISA/MASTERCARD/AMEX/DISCOVER #

EXP. DATE

SIGNATURE

SHIP TO ADDRESS

NAME E-MAIL

ADDRESS

CITY/STATE/ZIP-POSTAL CODE

COUNTRY

PHONE FAX

SIGNATURE

Prices subject to change without notice.
Please notify Life Extension of any address change.

PREMIER

Giving more value to those we value most.

You already get 2% LE Dollars back on every purchase as a part of Your Healthy Rewards. But Premier gives you so much more:

12 months of FREE unlimited shipping. Anywhere in the United States … including Alaska and Hawaii.*

DOUBLE rewards. That's 4% LE Dollars back on every purchase — twice as much as regular customers.†

Instant $50 Dollar Bonus. This bonus offsets the cost of Premier, giving more value to those we value most.

Premier. Simply. More.

Just $49.95 | $59.95 for international customers

Call **1-888-224-8239** to enroll

Visit **www.LifeExtension.com/Premier** for details

Mention code **YRH604A**

LifeExtension® | LE PREMIER YOUR HEALTHY REWARDS

MKMZAV160301

No auto-renewal, no commitments. *FREE unlimited standard delivery (3 to 5 business days) to any mailing address within the 50 U.S. states, excluding U.S. territories. Also includes discounts on non-standard shipping and shipping outside of the U.S. Excludes blood test products and gift cards.

†Earn LE Dollars on all Life Extension purchases (except shipping fees, *Life Extension* Magazine® subscriptions, CHOICE and Premier program fees, and purchases made with LE Dollars or gift cards). Redeem LE Dollars to purchase products, blood tests, sale items, and shipping fees at the rate of 1 LE Dollar equal to $1 U.S. Dollar at checkout. LE Dollars cannot be redeemed for CHOICE and Premier program fees or to purchase gift cards or *Life Extension* Magazine® subscriptions. LE Dollars have no cash value and are not redeemable for cash, transferable or assignable for any reason. Offer not available to international customers serviced by distributors of Life Extension products.

LifeExtension®
LE PUBLICATIONS
PO BOX 407198
FORT LAUDERDALE, FLORIDA 33340-7198

WHAT'S INSIDE

Visit us at **www.LifeExtension.com**

LifeExtension® Magazine