TESTOSTERONE IS SAFE AND BOOSTS SEX DRIVE

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

PLUS—
Lactoferrin Supports Healing After Eye Surgery
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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:

- 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

**Centrum® Can’t Compete**

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)

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**Two-Per-Day Tablets**

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

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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

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• Personal Consultation with Life Extension
• Blood Testing and Analysis
• The Most Complete Line of Life Extension Supplements

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Natural STRESS Relief

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

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Non-GMO
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References

Beware of Imitations: The L-theanine used in Natural Stress Relief is Suntheanine®, the only pure form of L-theanine protected by 40 U.S. and international patents and scientifically validated in clinical studies to be safe and efficacious. Independent laboratory analysis has verified that certain other products on the market claiming to contain “L-theanine” are only half L-theanine, the other half being a different form of theanine known as “D-theanine” which has not been scientifically evaluated in published studies.

Cyracos® uses a non-selective traditional extraction process preserving the plant’s phytochemical synergy.

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Cyracos® is a registered trademark of Naturex.

Natural Stress Relief
Item #00987 • 30 vegetarian capsules

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Gustavo Tovar Baez, MD, operates the Life Extension Clinic in Caracas, Venezuela. He is the first physician in Caracas to specialize in anti-aging medicine.

Ricardo Bernales, MD, is a board-certified pediatrician and general practitioner in Chicago, IL. He focuses on allergies, bronchial asthma, and immunodeficiency.

Mark S. Bezzeck, MD, FACP, FAARM, FAEM, is board certified in internal medicine, emergency medicine, and anti-aging/regenerative medicine. He is the director of Med-Link Consulting, which specializes in bioidentical hormone replacement therapy, natural alternatives, anti-aging, and degenerative diseases. He holds US patents for a multivitamin/mineral supplement, an Alzheimer's/dementia compilation, and a diabetic regimen.

Anna M. Cabeca, DO, FACOG, ABAARM, is a board-certified Gynecologist and Obstetrician, as well as board certified in Anti-Aging and Regenerative Medicine, an expert in Functional Medicine, and an expert in women's health. She specializes in bioidentical hormone replacement therapy and natural alternatives, successful menopause and age management medicine.

Thomas F. Crais, MD, FACS, is a board-certified plastic surgeon, was medical director of the microsurgical research and training lab at Southern Baptist Hospital in New Orleans, LA, and currently practices in Sun Valley, ID.

William Davis, MD, is a preventive cardiologist and author of Wheat Belly: Lose the Wheat, Lose the Weight and Find Your Path Back to Health. He is also medical director of the online heart disease prevention and reversal program, Track Your Plaque (www.trackyourplaque.com).

Martin Dayton, MD, DO, practices at the Sunny Isles Medical Center in North Miami Beach, FL. His focus is on nutrition, aging, chelation therapy, holistic medicine, and oxidative medicine.

John DeLuca, MD, DC, is a 2005 graduate of St. George's University School of Medicine. He completed his Internal Medicine residency at Monmouth Medical Center in Long Branch, NJ, in 2008 and is board certified by the American Board of Internal Medicine. Dr. DeLuca is a Diplomate of the American Academy of Anti-Aging Medicine and has obtained certifications in hyperbaric medicine, pain management, nutrition, strength and conditioning, and manipulation under anesthesia.

Serger A. Dzugan, MD, PhD, was formerly chief of cardiovascular surgery at the Donetsk Regional Medical Center in Donetsk, Ukraine. Dr. Dzugen’s current primary interests are anti-aging and biological therapy for cancer, cholesterol, and hormonal disorders.

Patrick M. Fratellone, MD, RH, is the founder and executive medical director of Fratellone Associates. He completed his Internal Medicine and Cardiology Fellowship at Lenox Hill Hospital in 1994, before becoming the medical director for the Atkins Center for Complementary Medicine.

Carmen Fusco, MS, RN, CNS, is a research scientist and clinical nutritionist in New York City who has lectured and written numerous articles on the biochemical approach to the prevention of aging and degenerative diseases.

Norman R. Gay, MD, is proprietor of the Bahamas Anti-Aging Medical Institute in Nassau, Bahamas. A former member of the Bahamian Parliament, he served as Minister of Health and Minister of Youth and Sports.

Mitchell J. Ghen, DO, PhD, holds a doctorate in holistic health and anti-aging and serves on the faculty of medicine at the Benemerita Universidad Autonoma De Puebla, Mexico, as a professor of cellular hematopoietic studies.

Gary Goldfaden, MD, is a clinical dermatologist and a lifetime member of the American Academy of Dermatology. He is the founder of Academy Dermatology of Hollywood, FL, and COSMESIS Skin Care.

Miguelangelo Gonzalez, MD, is a certified plastic and reconstructive surgeon at the Miguelangelo Plastic Surgery Clinic, Cabo San Lucas.

Garry F. Gordon, MD, DO, is a Payson, AZ-based researcher of alternative approaches to medical problems that are unresponsive to traditional therapies. He is president of the International College of Advanced Longevity Medicine.

Richard Heifetz, MD, is a board-certified anesthesiologist in Santa Rosa, CA, specializing in the delivery of anesthesia for office-based plastic/cosmetic surgery, chelation therapy, and pain management.

Roberto Marasi, MD, is a psychiatrist in Brescia and in Piacenza, Italy. He is involved in anti-aging strategies and weight management.

Maurice D. Marholin, DC, DO, is a licensed Chiropractic Physician and Board Certified Osteopathic Family Physician. While training at the University of Alabama, he completed Fellowships in Clinical Nutrition and Behavioral Medicine. He is currently in private practice in Clermont, Fl.

Prof. Francesco Marotta, MD, PhD, Montenapoleone Medical Center, Milan, Italy. Gastroenterologist and nutrigenomics expert with extensive international university experience. Consulting Professor, WHO-affiliated Center for Biotech & Traditional Medicine, University of Milan, Italy. Hon. Res. Professor, Human Nutrition Dept., TWU, USA. Author of over 130 papers and 400 congress lectures.

Philip Lee Miller, MD, is founder and medical director of the Los Gatos Longevity Institute in Los Gatos, CA.

Michael D. Seidman, MD, FACS, is the director of otolaryngology-head and neck surgery for the Bloomfield satellite of Henry Ford Health System (HFHS), Detroit, MI, co-director of the Tinnitus Center, and co-chair of the Complementary/Alternative Medicine Initiative for HFHS.

Ronald L. Shuler, BS, DDS, CCN, LN, is involved in immunoncology for the prevention and treatment of cancer, human growth hormone secretagogues, and osteoporosis. Board certified in Anti-Aging medicine.

Paul Wand, MD, Fort Lauderdale, FL, is a clinical neurologist with special expertise in treating and reversing diabetic peripheral neuropathy and brain injuries from various causes.
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 XTherma 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.
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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. This unique sodium-R-lipoate can help you reach peak plasma concentrations within just 10-20 minutes of supplementation.

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

Suggested dose is one to two capsules daily.

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FDA Suffers Major Legal Defeat In Federal Court

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.

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.

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

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<th>Organization</th>
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<td>American Heart Association</td>
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<tr>
<td>Life Extension®</td>
<td>Under 100 mg/dL</td>
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<tr>
<td>Conventional Reference Values</td>
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<tr>
<td>Food and Drug Administration (FDA)</td>
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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, as is the totality of scientific evidence that reduction in triglycerides can reduce vascular disease risk.

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.”

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.” 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. HDL beneficially removes cholesterol from arterial walls, while obesity and poor glycemic control are proven vascular risk factors.

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, very low-density lipoproteins (VLDL), and cholesterol-enriched remnant lipoprotein particles. These are all known promoters of atherosclerosis.

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.

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.”

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.”

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,’” as the fish oil would no longer be potentially “harmful,” according to the FDA’s logic.

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
The results of the NHANES study showed that cardiovascular risk was most strongly associated with elevated triglycerides. 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.

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.

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. 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. 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.

In world regions with lower cardiovascular risk (e.g., Spain, Japan, and Africa) triglyceride levels below 100 mg/dL are commonly found. Clinical trials consistently demonstrate the lowest risk of cardiovascular disease to be associated with the lowest fasting triglyceride levels.
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.1

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

**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.
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. Activity of the delta-5-desaturase enzyme diminishes with aging.

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 growing body of evidence showing marked reductions in disease risk by following healthier eating patterns.

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.

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.

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.

This data adds to the growing body of evidence showing marked reductions in disease risk by following healthier eating patterns.

Adherence to a Mediterranean-style diet lowers triglycerides 10% to 15% more than a strict low-fat diet. 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.

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

A person with blood triglyceride levels above 100 mg/dL can usually determine an appropriate omega-3 dose. Life Extension\textsuperscript{®} 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\textsuperscript{®}.

Unlike fish oil dietary supplements that contain EPA and DHA, Vascepa\textsuperscript{®} 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\textsuperscript{®} only in people with very high triglycerides (over 500 mg/dL). When the company promoted Vascepa\textsuperscript{®} 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\textsuperscript{®} (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.”\textsuperscript{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.

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.”

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.’”

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.”

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.”

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’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. 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.”
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.
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.

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.”

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.”

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.”
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 Falloon

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.
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.
Frustrated with Nightly BATHROOM Calls?

**Triple Strength ProstaPollen™** with specialized plant extracts **G60™** and **NAX™** utilizes clinically demonstrated ingredients for the aging prostate.¹³

This innovative formula provides advanced support for:

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

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**References**


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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.

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To order **Triple Strength ProstaPollen™**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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

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* 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.

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.
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.

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.


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.”


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.


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 likelihood 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.”


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 flavonones, 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.”

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.  


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.”


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.”

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.

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

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

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. This unique compound requires no enzymatic conversion to become metabolically active—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

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

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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.

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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, alcoholic beverages, and some medications 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.

**BioActive Complete B-Complex**

Item #01945 • 60 vegetarian capsules

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"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. 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. 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%).

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.

And, in another study involving 3,630 American men and women, 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

**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

Mitochondrial dysfunction is linked to accelerated brain aging.

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Shilajit works with CoQ10 to increase cellular energy.

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

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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:

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- Increases satiety hormones
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- Helps smooth arterial walls
- Supports cardiovascular health
- Supports cellular glucose shuttling
- Supports insulin sensitivity
- Supports healthy triglyceride and cholesterol levels already within normal range

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GREEN TEA: PROTECTION FROM DNA DAMAGE

GREEN TEA
Degenerative aging is the result of the accumulation of pathological processes inflicted on cells, tissues, and organs.\textsuperscript{1,2} By targeting each of these degenerative processes, premature aging can be slowed and life span prolonged.

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

A recent analysis showed that green tea polyphenols have \textbf{200 human target genes}, including those involved in inflammation, cancer, diabetes, neurodegenerative, muscular, and cardiovascular disease.\textsuperscript{5}

In addition, green tea supplementation has been found to \textit{significantly reduce} the risk of diabetes, stroke, and depression and improve blood levels of cholesterol and glucose.\textsuperscript{6}

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

In this article is a top-level review of the most current data on \textbf{green tea} and \textbf{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, which is defined as having three or more of the following: excess abdominal fat, high blood pressure, abnormal lipid profiles, and elevated glucose.

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. 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.
- 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. 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.
- 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.

**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**


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A number of studies suggest that quercetin may slow aging and reduce the risk of age-related factors.¹,²,³

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**References**

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

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To order Mega Green Tea Extract, call 1-800-544-4440 or visit www.LifeExtension.com
Mediterranean Herb Guards Vital Liver Functions
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.²³

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.
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

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

Combating 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.
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 patients (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. This protects liver cells from the damage induced by many chemical compounds, which can otherwise induce fibrosis.

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.

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.
- Suppression of key inflammatory signaling systems resulting in a reduction in markers of inflammation.
- Ability to bind to excess iron, which when stored in the liver, can lead to cell death and dysfunction.
- 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.
- Inhibition of the mammalian target of rapamycin (mTOR), a protein that promotes aging at the cellular level.

Hepatitis C Virus Infection

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

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. 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. 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. 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. 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.

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. 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. 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.

- Block invasion of healthy tissues by cancer cells.

- 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.

- Regulate the cell division cycle that goes out of control in cancer.

- Re-activate a colon tumor suppressor gene, CDX2, which is deactivated early in the process of colon carcinogenesis.

- Become highly concentrated in breast cancer tissue when given orally, delivering it directly to one important site of action.

- Inhibit glucose transport into cancer cells, starving them of their source of energy.

**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%. 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.

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.

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.
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 liver disease by:

- 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
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 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.


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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.¹²

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

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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.

References

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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.\(^5\) 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.\(^5\)

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. 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%.

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.

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. 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. 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.

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. 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.

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. 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. 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.

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.

References


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.

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.
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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.\(^3\)

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References

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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 Aging3 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.
Why the FDA is Wrong about Testosterone

Testosterone levels begin a gradual fall as men enter their 30s.1-3

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.4-6 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.7

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.8-10 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.11

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.12 After five years, survival rates are back in line with those of men with normal testosterone levels.13

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.14,15 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.16,17

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.

Benefits of Testosterone Replacement Therapy

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. 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.

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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.
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.
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.”

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.

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. 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.10

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

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. 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).
WHY THE FDA IS WRONG ABOUT TESTOSTERONE


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- Lycopene
- Pygeum
- Phospholipids
- Pumpkin seed oil
- Boron
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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
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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

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Each bottle lasts a typical user over three months!

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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.

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

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

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Low Testosterone Levels May Lead to:
- Reduced Sex Drive
- Less Energy
- Cloudy Thinking
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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, 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 Panels 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

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.
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Importance of AMPK
Studies show increased AMPK activity supports:
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AMPK Activator provides nutrients shown to significantly boost AMPK activity.

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

References

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

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

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**References**


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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.

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- **AHCC** raises levels of dendritic cells and T cells, key players in your adaptive immune system’s highly specialized response to specific threats.*

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Garbanzo Beans
Nutritional Powerhouse of Mediterranean Diet

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. As a result, experts are increasingly recognizing the value of dietary modification to modulate major risk factors underlying endothelial dysfunction that precedes atherosclerosis.

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. 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. The polyunsaturated fat in garbanzo beans increases cholesterol entry into cells, while its fiber effectively binds to bile acids to boost cholesterol excretion. 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%. 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.

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.

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. Inadequate magnesium levels contribute to elevated blood pressure that diminishes the production of heart-protective nitric oxide, leaving the endothelium vulnerable to further damage. This should be welcome news for the estimated three-fourths of Americans who fail to get enough magnesium in their diets.

Curb Hunger and Reduce Food Cravings

Approximately 80% of weight-loss programs are unsuccessful in keeping the pounds off long term. 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.

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. Increasing dietary protein intake has been associated with reduced appetite and waist circumference, as well as better weight-loss maintenance.

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.

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.
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. 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.

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.

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.

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. 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, 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. 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. 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.
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.\textsuperscript{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 \textbf{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.\textsuperscript{38,39} Garbanzo beans contain a significant amount of indigestible \textbf{resistant starch} and oligosaccharides such as \textbf{raffinose} that work in tandem to restore a healthy and balanced gut microbiome.\textsuperscript{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 \textbf{short-chain fatty acids} such as propionate and butyrate.\textsuperscript{41} The latter protects against cancer by inducing cell death (apoptosis),\textsuperscript{42} reducing cell proliferation,\textsuperscript{43} and cutting off the blood supply responsible for cancer growth.\textsuperscript{44} This might explain the results of a study in which mice supplemented with garbanzo bean flour had a \textbf{64\%} reduction in the number of aberrant crypt foci—precursors to colon cancer.\textsuperscript{45}

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\textsuperscript{®} Health Advisor at 1-866-864-3027.

**References**

7. Available at: https://www.heart.org/ide/groups/ahamah-public@wcm@ sop@smd/documents/downloadable/ucm_470704.pdf. Accessed February 22, 2016.


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**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.

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

*BY SCOTT FOGLE, ND*
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 (methylene-tetrahydrofolate 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.

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leagues 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

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
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:
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**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.**

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2. After your order is placed, you will be emailed 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.

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**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.

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**MEN’S ANNUAL BLOOD TESTING**

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<td>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.</td>
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<td><strong>INSULIN</strong> (LC004333)</td>
<td>$39.87</td>
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<td><strong>NMR LIPOPROFILE</strong> (LC123810)</td>
<td>$132</td>
<td>$74.25</td>
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<td>$80</td>
<td>$213.75</td>
</tr>
<tr>
<td>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.</td>
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**NEW GENETIC AND SALIVA TESTING**

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<td><strong>ADRENAL STRESS PROFILE</strong> (LC100046)</td>
<td>$233.33</td>
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<tr>
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<tbody>
<tr>
<td><strong>MTHFR/COMT GENETIC METHYLATION PROFILE</strong> (LC100045)</td>
<td>$198.66</td>
<td>$111.75</td>
</tr>
<tr>
<td>Tests for genetic mutations in MFHR and COMT.</td>
<td></td>
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**WOMEN’S ANNUAL BLOOD TESTING**

<table>
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<tr>
<th>Test Description</th>
<th>Retail Price</th>
<th>Super Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FEMALE LIFE EXTENSION PANEL</strong> (LC322535)</td>
<td>$400</td>
<td>$199</td>
</tr>
<tr>
<td>CBC/Chemistry Profile (description on next page)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DHEA-S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estradiol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homocysteine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-Reactive Protein (high-sensitivity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progesterone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free Testosterone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Testosterone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free T3 &amp; Free T4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSH for thyroid function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin D (25-hydroxyvitamin D)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemoglobin A1c</td>
<td></td>
<td></td>
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<tr>
<td><strong>FEMALE HORMONE ADD-ON PANEL</strong> (LCADDFF)</td>
<td>$166.75</td>
<td>$93.75</td>
</tr>
<tr>
<td>Pregnenolone and Total Estrogen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
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<tr>
<td><strong>THYROID ADD-ON PANEL</strong> (LCTHYROID)</td>
<td>$73.33</td>
<td>$36</td>
</tr>
<tr>
<td>Free T3 &amp; Free T4</td>
<td></td>
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<tr>
<td><strong>OMEGA CHECK</strong> (LCOMEGA)</td>
<td>$175</td>
<td>$99</td>
</tr>
<tr>
<td>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.</td>
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<tr>
<td><strong>SLEEP HORMONES PROFILE</strong> (LC100048)</td>
<td>$233.33</td>
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<td>Cortisol and Melatonin plus ratio.</td>
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OTHER POPULAR PANELS

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<tr>
<td>CBC/Chemistry Profile (LC381822)</td>
<td>$47</td>
<td>$26</td>
</tr>
<tr>
<td>Note: This CBC/Chemistry Profile is included in many Life Extension Panels.</td>
<td></td>
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<td>Please note panel descriptions.</td>
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CARDIOVASCULAR RISK PROFILE

- Total Cholesterol
- Cholesterol/HDL Ratio
- HDL Cholesterol
- LDL Cholesterol
- Triglycerides

LIVER FUNCTION PANEL

- AST (SGOT)
- ALT (SGPT)
- Total Bilirubin
- Alkaline phosphatase
- LDH
- Total Protein
- Globulin
- Albumin
- Albumin/Globulin Ratio

BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE

- Red Blood Cell Count
- White Blood Cell Count
- Hemoglobin
- MCV
- Monocytes
- Eosinophils
- Basophils
- Neutrophils
- Absolute
- MCH
- MCHC
- Eos
- Neutrophil
- Baso
- Absolute
- Neutrophils

BLOOD MINERAL PANEL

- Calcium
- Sodium
- Potassium
- Chloride
- Phosphorus
- Iron

MALE ELITE PANEL (LC100016)*

- Chem/CBC profile, Free and Total Testosterone
- Total Estradiol, Estradiol, DHEA-S, Progesterone, Pregnenolone, DHT, FSH, LH, TSH, Free T4, T3, Free T3, Free T4, T3, Free T4, T3, Free T4
- Reverse T3, Free T3, Free T4, T3, Free T4, T3, Free T4
- TSH, T4, Free T3, Free T4, T3, Free T4, T3, Free T4
- Reverse T3, Free T3, Free T4
- Ferritin, Total Iron Binding Capacity (TIBC), Vitamin D 25-OH, hs-CRP, ferritin, homocysteine.

FEMALE ELITE PANEL (LC100017)*

- Chem/CBC profile, Free and Total Testosterone
- Total Estradiol, Estradiol, DHEA-S, Progesterone, Pregnenolone, DHT, FSH, LH, TSH, Free T4, T3, Free T3, Free T4, T3, Free T4, T3, Free T4
- Reverse T3, Free T3, Free T4, T3, Free T4, T3, Free T4
- Ferritin, Total Iron Binding Capacity (TIBC), Vitamin D 25-OH, hs-CRP, ferritin, homocysteine.

WEIGHT LOSS PANEL-BASIC (LC100027)

- CBC/Chemistry profile (see description above), DHEA-S, free and total Testosterone, Estradiol, Cortisol, TSH, Free T3, Insulin and Hemoglobin A1c.

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.

HEALTHY AGING PANEL-BASIC (LC100025)

- CBC/Chemistry profile (see description above), C-reactive protein (high sensitivity), Vitamin B12, Folate, Hemocytocyte, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Free T3, Free T4, Ferritin, Urinalysis, Fibrinogen, and Insulin.

HEALTHY AGING PANEL-COMPREHENSIVE (LC100026)

- CBC/Chemistry profile (see description above), C-reactive protein (high sensitivity), Vitamin B12, Folate, Hemocytocyte, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Free T3, Free T4, Ferritin, Urinalysis, Fibrinogen, and Insulin.

FEMALE COMPREHENSIVE HORMONE PANEL* ($398.66 $244.25)

- CBC/Chemistry Profile (see description at left), DHEA-S, Estradiol, Total Estradiol, Progesterone, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3. This panel now includes Free T4 and Cortisol with no increase in price!

MALE COMPREHENSIVE HORMONE PANEL* ($398.66 $244.25)

- CBC/Chemistry Profile (see description at left), DHEA-S, Estradiol, Total and Free Testosterone, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3. This panel now includes Free T4 and Cortisol with no increase in price!

FEMALE BASIC HORMONE PANEL (LC100013) $100 $56.25

- DHEA-S, Estradiol, Total and Free Testosterone, Progesterone.

MALE BASIC HORMONE PANEL (LC100012) $100 $56.25

- DHEA-S, Estradiol, Total and Free Testosterone, PSA.

DIABETES MANAGEMENT PROFILE – COMPREHENSIVE (LC100040)


DIABETES MANAGEMENT PROFILE – BASIC (LC100039)


AUTOIMMUNE DISEASE SCREEN (L100041C) $149.25

- ANA screen, hs-CRP, TNFα, Immunoglobulins, IgA, IgG and IgM.

COMPREHENSIVE THYROID PANEL $149.25

- TSH, T4, Free T3, Free T4, Reverse T3, TP0, ATA

LIFE EXTENSION THYROID PANEL (LC304131) $56.25

- TSH, T4, Free T3, Free T4

THYROID PANEL WITH REVERSE T3 (LC100044) $120 $90

- TSH, T4, Free T3, Free T4, Reverse T3

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:

Life Extension

3600 West Commercial Boulevard

Fort Lauderdale, FL 33309

Phone your order to: 1-800-208-3444

Fax your order to: 1-866-728-1050

This is NOT a complete listing of LE blood test services. Call 1-800-208-3444 for additional information.
### 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®
- Cognizin® CDP-Choline Caps
- DMAE Bitartrate (dimethylaminoethanol)
- Dopa Mind™
- Ginkgo Biloba Certified Extract™
- Huperzine A
- Lecithin Granules
- Migra-Ex®
- Neuro-Mag® Magnesium L-Theronate
- Neuro-Mag® Magnesium L-Theonate 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 Nicacin Capsules

### Digestion Support
- Artichoke Leaf Extract
- CannoStoothe with PicroProtect™
- Digest RC®
- Effervescent Vitamin C • Magnesium Crystals
- Enhanced Super Digestive Enzymes
- Enhanced Super Digestive Enzymes w/Probiotics
- Esophageal Guardian
- Extraordinary Enzymes

### 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 GlycoCam®
- POQ Caps with BioPQQ®
- Rhodiola Extract
- RibfGen™ 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
- ProViflax® Purified Omega-7
- Vegetarian Sourced DHA

### Food
- Rich Rewards® Breakfast Blend
- Rich Rewards® Breakfast Blend Natural Mocha Flavor
- Rich Rewards® Breakfast Blend Whole Bean Coffee
- Rich Rewards® Decaf Roast
- Stevia Sweetener

### Glucose Management
- CInSulin® with InSea2® and Crominex3+ 3+
- Mega Benfotamamine
- 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
- Fribogen Resist™ with Nattokinase
- Optimized Carnitine with GlycoCam®
- 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
- 26 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 & Turmericines
- Black Cumin Seed Oil with Bio-Curcumin®
- Black Cumin Seed Oil
- Boswellia
- Cytokine Suppressor™ with EGCG
- Nerva®
- Serrafflazyme
- 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
PRODUCTS

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 Nicotinamide
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 (Citrato)
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
Venetone
Xylitol White 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 FemBlock® 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 Rejuvening Phytoecramides 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 Repair Cream
Vitamin C Serum
Vitamin D Lotion
Vitamin E-Essential 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
Buffed Vitamin C Powder
Daily C+ Fast-C® with Dihydroquercetin
Gamma E Tocopherol with Sesame Lignans
Gamma E Tocopherol/Tocotrienols
High Potency Optimized Folate
Inositol Capsules
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 Capsules
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
HCAActive™ Garmicia Cambogia Extract
Integra-Lean®
Mediterranean Trim with Sinetrol™-XPur
Optimized Irvingia with Phase 3rd Calorie Control Complex
Optimized Saffron with Satireal®
Super Citrimax®
Super CLA Blend with Guarana and Sesame Lignans
Super CLA Blend with Sesame Lignans Wist-Line Control™

Women’s Health
Advanced Natural Sex for Women® 50+
Breast Health Formula
Femmenessence MacaPulse®
Natural Estrogen
ProgestaCare® for Women
Super-Absorbable Soy Isoflavones
Ultra Soy Extract
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<tr>
<th>ITEM No.</th>
<th>PRODUCT</th>
<th>1 Unit Each</th>
<th>4 Unit Each</th>
<th>10 Unit Each</th>
<th>QTY Total</th>
<th>YOUR PRICE</th>
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<td>01524</td>
<td>ACETYL-L-CARNITINE • 500 mg, 100 veg. caps</td>
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<td>ANTI-ALCOHOL ANTIOXIDANTS W/HEPATOPIRO • 100 caps</td>
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<td>ANTI-ADIPOCYTE FORMULA W/MERATRIM+ &amp; INTESTA LEAN® (Advanced) • 60 veg. caps</td>
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<td>01039</td>
<td>ARGinine/ORNithine • 500/250, 100 caps</td>
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<td>ARGinine/ORNithine POWder • 150 grams</td>
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<td>ASCORBYL PALMITATE • 500 mg, 100 veg. caps</td>
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<td>ASHWAGANDHA EXTRACT (Optimized) • 60 veg. caps</td>
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<td>01666</td>
<td>ASPIRIN® • 81 mg, 300 enteric coated tablets</td>
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<td>ASTAXANTHIN WITH PHOSPHOLIPIDS • 4 mg, 30 softgels</td>
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**SUBTOTAL OF COLUMN 1**

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<thead>
<tr>
<th>ITEM No.</th>
<th>PRODUCT</th>
<th>1 Unit Each</th>
<th>4 Unit Each</th>
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<th>QTY Total</th>
<th>YOUR PRICE</th>
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<tr>
<td>00920</td>
<td>BENEFOTIAMINE W/THIAMINE • 100 mg, 120 veg. caps</td>
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<td>BETA-CAROTENE • 25,000 IU, 100 softgels</td>
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<td>BIFIDO GI BALANCE • 60 veg. caps</td>
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<td>BILBERRY EXTRACT • 100 mg, 100 veg. caps</td>
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<td>BIOACTIVE MILK PEPTIDES • 30 caps</td>
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<td>01631</td>
<td>BIO-COLLAGEN W/PATENTED UC-II® • 40 mg, 60 small caps</td>
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<td>BIOSIL® • 5 mg, 30 veg. caps</td>
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<td>01709</td>
<td>BLACK CUMIN SEED OIL • 60 softgels</td>
<td>$16.00</td>
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<td>BLACK CUMIN SEED OIL W/BIO-CURCUMIN® • 60 softgels</td>
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<td>70000</td>
<td>BLOOD PRESSURE MONITOR (ACCUTUIT®) • med/lg cuff</td>
<td>$79.99</td>
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<td>BLOOD PRESSURE MONITOR • Digital wrist cuff</td>
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**SUBTOTAL OF COLUMN 2**
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<td>80123</td>
<td>FACE REJUVENATING ANTIOXIDANT CREAM • 2 oz</td>
<td>69.50 52.13 45.87</td>
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<tr>
<td>80107</td>
<td>FINE LINE-LESS • 1 oz</td>
<td>74.50 55.88 49.17</td>
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<tr>
<td>80131</td>
<td>HAIR SUPPRESS FORMULA • 4 oz</td>
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<tr>
<td>80137</td>
<td>HEALING FORMULA ALL-IN-ONE CREAM • 1 oz</td>
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<td>80115</td>
<td>HEALING MASK • 2 oz</td>
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<td>80102</td>
<td>HEALING VITAMIN K CREAM • 1 oz</td>
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<td>80109</td>
<td>HYALURONIC FACIAL MOISTURIZER • 1 oz</td>
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<td>80110</td>
<td>HYALURONIC OIL-FREE FACIAL MOISTURIZER • 1 oz</td>
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<td>80138</td>
<td>HYDRATING ANTIOXIDANT FACE MIST • 4 oz</td>
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<td>80103</td>
<td>LIFTING &amp; TIGHTENING COMPLEX • 1 oz</td>
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<td>80146</td>
<td>LYCOPENE CREAM • 1 oz</td>
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<td>80135</td>
<td>MELOTINUM CREAM • 1 oz</td>
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<td>80114</td>
<td>MILD FACIAL CLEANSER • 8 oz</td>
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<td>80159</td>
<td>MULTI STEM CELL SKIN TIGHTENING COMPLEX • 1 oz</td>
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<td>NECK REJUVENATING ANTIOXIDANT CREAM • 2 oz</td>
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<td>PIGMENT CORRECTING CREAM • 1/2 oz</td>
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<td>REJUVENATING SERUM • 1 oz</td>
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<td>RENEWING EYE CREAM • 1/2 oz</td>
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<td>RESVERATROL ANTI-OXIDANT SERUM • 1 oz</td>
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<td>SKIN LIGHTENING SERUM • 1/2 oz</td>
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<td>SKIN STEM CELL SERUM • 1 oz</td>
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<td>80143</td>
<td>STEM CELL CREAM W/ALPINE ROSE • 1 oz</td>
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<td>TIGHTENING &amp; FIRMING NECK CREAM • 2 oz</td>
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<td>80162</td>
<td>ULTRA EYELASH BOOSTER • 0.25 oz (2 units $39)</td>
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<td>80116</td>
<td>ULTRA LIP PLUMPER • 1/3 oz</td>
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<td>80101</td>
<td>ULTRA WRINKLE RELAXER • 1 oz</td>
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<td>UNDER EYE REFINING SERUM • 1/2 oz</td>
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<td>80104</td>
<td>UNDER EYE RESCUE CREAM • 1/2 oz</td>
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<td>VITAMIN C SERUM • 1 oz</td>
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<td>VITAMIN E-ESSENTIAL CREAM • 1 oz</td>
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<td>YOUTH SERUM • 1 oz</td>
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<th>PRODUCT</th>
<th>YOUR PRICE</th>
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<td>DAILY C + CITRUS FLAVOR • 30 stick packs</td>
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<td>7-KETO® DHEA METABOLITE • 25 mg, 100 caps</td>
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<td>DHA (Vegetarian sourced) • 30 veg. softgels</td>
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<td>DHEA • 25 mg, 100 tablets (Dissolve in mouth)</td>
<td>14.00 10.50 8.51</td>
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<td>DHEA COMPLETE • 60 veg. caps</td>
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<td>DHEA • 25 mg, 100 caps</td>
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<td>DHEA • 15 mg, 100 caps</td>
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<td>DHEA • 50 mg, 60 caps</td>
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<tr>
<td>01689</td>
<td>DHEA • 100 mg, 60 veg. caps</td>
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<td>01358</td>
<td>DIGEST RCT® • 30 tablets</td>
<td>19.95 14.96 12.75</td>
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<td>DIGESTIVE ENZYMES (Enhanced Super) • 60 veg. caps</td>
<td>22.00 16.50 15.00</td>
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<td>DIGESTIVE ENZYMES w/PROBIOTICS (Enhanced Super) • 60 veg. caps</td>
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<td>---------</td>
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<td>01658</td>
<td>GINKGO BILOBA CERTIFIED EXTRACT™ 120 mg, 365 veg. caps</td>
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<td>00550</td>
<td>GAMMA E TOCOPHEROL/TOCOTRIENOLS • 60 softgels</td>
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<td>GAMMA E TOCOPHEROL W/SESAME LIGNANS • 60 softgels</td>
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<td>01394</td>
<td>GARLIC (Optimized) • 200 veg. caps</td>
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<td>01122</td>
<td>GINGER FORCE® • 60 liquid caps</td>
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<td>GARLIC (Optimized) • 200 veg. caps</td>
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<td>01122</td>
<td>GINGER FORCE® • 60 liquid caps</td>
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**SUBTOTAL OF COLUMN 6**

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<th>4 Unit Each</th>
<th>10 Unit Each</th>
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<td>GLA WITH SESAME LIGNANS (Mega) • 60 softgels</td>
<td>19.50</td>
<td>14.63</td>
<td>13.50</td>
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<td>00345</td>
<td>(L-GLUTAMINE CAPSULES • 500 mg, 100 caps</td>
<td>14.95</td>
<td>11.21</td>
<td>10.13</td>
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<td>00141</td>
<td>(L-GLUTAMINE POWDER • 100 grams</td>
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<td>15.00</td>
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<td>10.00</td>
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<tr>
<td>00522</td>
<td>GLUCOSAMINE/CHONDROITIN CAPSULES • 100 caps</td>
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<td>24.00</td>
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<td>GLUTATHIONE, CYSTEINE &amp; C • 100 veg. caps</td>
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<td>L-GLUTATHIONE (Mega) • 250 mg, 60 caps</td>
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<td>GLYCINE • 1,000 mg, 100 veg. caps</td>
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<td>GRAPE SEED EXTRACT W/RESVERATROL &amp; PTEROSTILBENE 100 mg, 60 veg. caps</td>
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<td>GREEN COFFEE EXTRACT COFFEEGENIC® 400 mg, 90 veg. caps</td>
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<td>00953</td>
<td>GREEN TEA EXTRACT (Mega) • lightly decaffeinated, 100 veg. caps</td>
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**SUBTOTAL OF COLUMN 5**
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<th>Unit 10</th>
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<td>02065</td>
<td>LIFE EXTENSION MIX™ • 315 tablets w/o copper</td>
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<td>02066</td>
<td>LIFE EXTENSION MIX™ • 490 caps w/o copper</td>
<td>90.00</td>
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<td>02067</td>
<td>LIFE EXTENSION MIX™ POWDER • 14.81 oz w/o copper</td>
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<td>01608</td>
<td>LIVER EFFICIENCY FORMULA • 30 veg. caps</td>
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<td>01639</td>
<td>5-LOX INHIBITOR W/APRÈSFLEX® • 100 mg, 60 veg. caps</td>
<td>22.00</td>
<td>16.50</td>
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<td>01678</td>
<td>L-LYSINE • 620 mg, 100 veg. caps</td>
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<td>00455</td>
<td>L-YCOPENE (Mega) • 15 mg, 90 softgels</td>
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**M**

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<th>Unit 4</th>
<th>Unit 10</th>
<th>GTY Total</th>
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<tr>
<td>01926</td>
<td>MACUGUARD® OCULAR SUPPORT • 60 softgels</td>
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<tr>
<td>01927</td>
<td>MACUGUARD® OCULAR SUPPORT w/ASTAXANTHIN 60 softgels</td>
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<td>01459</td>
<td>MAGNESIUM CAPS • 500 mg, 100 veg. caps</td>
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<td>MAGNESIUM (CITRATE) • 160 mg, 100 veg. caps</td>
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<td>MELATONIN • 1 mg, 60 veg. caps</td>
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<td>MELATONIN (Fast-Acting Liquid) • 2 oz (Citrus-Vanilla)</td>
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<td>01787</td>
<td>MELATONIN Timed Release • 300 mcg, 100 veg. tabs</td>
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<tr>
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<td>MELATONIN Timed Release • 750 mcg, 60 veg. caps</td>
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<tr>
<td>01786</td>
<td>MELATONIN Timed Release • 3 mg, 60 veg. tabs</td>
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<td>METHYLCOBALAMIN • 1 mg, 60 veg. lozenges (vanilla)</td>
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<td>METHYLCOBALAMIN • 5 mg, 60 veg. lozenges (vanilla)</td>
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<td>MIGRA-EEZ™ (Butterbur) • 60 softgels</td>
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<td>MILK THISTLE (European) • 60 veg. caps</td>
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<td>MILK THISTLE (European) • 120 softgels</td>
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<td>MIRAFORTE w/STANDARDIZED LIGNANS (Super) • 120 caps</td>
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<td>MK-7 • 90 mcg, 60 softgels</td>
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<td>MSM (Methylsulfonylmethane) • 1,000 mg, 100 caps</td>
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**N**

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<th>Unit 1</th>
<th>Unit 4</th>
<th>Unit 10</th>
<th>GTY Total</th>
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<td>N-ACETYL-L-CYSTEINE • 600 mg, 60 veg. caps</td>
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<td>NAD+ CELL REGENERATOR™ • 100 mg, 30 veg. caps</td>
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<td>NATURAL APPETITE SUPPRESS (Advanced) • 60 veg. caps</td>
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<td>NATURAL SEX FOR WOMEN® 50+ (Advanced) • 90 veg. caps</td>
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**SUBTOTAL OF COLUMN 7**

**SUBTOTAL OF COLUMN 8**
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<th>1 Unit Each</th>
<th>4 Unit Each</th>
<th>10 Unit Each</th>
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<td>PROSTATE FORMULA (Ultra NAT) • 60 softgels</td>
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<td>PROSTAPHIN® (Trio strength) • 30 softgels</td>
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<td>21.00</td>
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<td>01742</td>
<td>PROTEIN-ISOLATE (Whey) Vanilla • 1 lb. powder</td>
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<td>PROTEIN-ISOLATE (Whey) Chocolate • 1 lb. powder</td>
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<td>PROVINAL® PURIFIED OMEGA-7 • 30 softgels</td>
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<td>01290</td>
<td>PUMPKIN SEED EXTRACT (Water-soluble) • 60 veg. caps</td>
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<td>01637</td>
<td>PYCNOGENOL® FRENCH MARITIME PINE BARK EXTRACT 100 mg, 60 veg. caps</td>
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<td>PYRIDOXAL 5'-PHOSPHATE • 100 mg, 60 veg. caps</td>
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<tr>
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<td>QUERCETIN (Optimized) • 250 mg, 60 veg. caps</td>
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<td>RED YEAST RICE (Bluebonnet) • 600 mg, 60 veg. caps</td>
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<td>REJUVENEX® FACTOR FIRMING SERUM • 1.7 oz</td>
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<td>RESVERATROL W/NICOTINAMIDE RIBOSIDE (Optimized) • 30 veg. caps</td>
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<td>(D) RIBOSE POWDER • 150 grams</td>
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<td>(D) RIBOSE TABLETS • 100 veg. tabs</td>
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**SUBTOTAL OF COLUMN 9**

**SUBTOTAL OF COLUMN 10**
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<td>Vitamin D3 • 2,000 IU, 1 fl oz, Mint flavor</td>
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<td>Vitamin D3 • 5,000 IU, 60 softgels</td>
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| SUBTOTAL OF COLUMN 11 | | | | | | |
| 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
## ORDER SUBTOTALS

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### 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)

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.

### SHIPPING

**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

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### SIGNATURE

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Giving more value to those we value most.
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Visit www.LifeExtension.com/Premier for details
Mention code YRH604A
30 OMEGA-7 REVERSES BIOMARKERS OF AGING
Scientists at Harvard and the Cleveland Clinic have shown that omega-7 can increase fat breakdown, reduce C-reactive protein by 44%, and help conquer metabolic disturbances.

50 MEDITERRANEAN HERB PROTECTS LIVER FUNCTION
Milk thistle helps the liver cleanse the blood of toxins, combats metabolic syndrome, and may help confer protection against common malignancies.

68 THE FDA IS WRONG ABOUT TESTOSTERONE
Testosterone therapy is well-documented to inhibit heart disease, metabolic disorders, lowered libido, loss of muscle mass, and quality of life. The FDA ignored overwhelming solid research and based on flawed studies, added black-box label to testosterone.

7 FDA SUFFERS MAJOR LEGAL DEFEAT
The FDA tried to censor a claim that prescription fish oil reduced cardiovascular risk. A federal court ruled against the FDA and allowed the health claim!

38 GREEN TEA PROMOTES HEALTHY DNA
Green tea polyphenols favorably influence 200 human genes that can protect against DNA damage and age-related disease while promoting longevity.

63 LACTOFERRIN REDUCES DRY EYE AFTER CATARACT SURGERY
When the protein compound lactoferrin was given to cataract patients one day after surgery, they saw a 95% increase in tear quality and quantity, thereby promoting healing.