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

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

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

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

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**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 anti-cancer 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 Eichhorn, 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 works 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.

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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.

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DHEA 25 mg
Item #00335 • 100 capsules

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Each bottle lasts a typical user over three months!

Non-GMO.

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.

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.
In the February 2000 issue of this magazine I wrote an editorial titled:

*Are We to Become Serfs of the Drug Monopoly?*

My article ignited a firestorm of activity in Congress aimed squarely at the FDA.

Back then, many members of Congress were upset that the FDA prohibited Americans from importing lower cost medications from other countries.

To underscore this consumer rip-off, I compiled a chart showing how much more Americans were paying for pharmaceuticals compared to Europeans.

This chart was enlarged by a congressman and shown on the floor of the House of Representatives. The purpose was to educate other lawmakers about the magnitude of the price-gouging.

The eventual result was passage of a bill by Congress and signed into law by President Bill Clinton. The bill allowed Americans to import prescription medications from countries that sold them at a fraction of the price Americans were paying.

The bill had one fatal loophole. If the FDA determined that it lacked the resources to ensure the safety of imported drugs, then the Secretary of Health and Human Services could nullify the bill with one stroke of a pen. And that’s exactly what Donna Shalala did in the final days of Bill Clinton’s term.

This cruel act of sabotage by an unelected bureaucrat set the stage for the staggering increases in generic drug prices that now make headline news.

The burden of high medical costs has reached a point that is unsustainable by the American economy. This problem will not abate until the public regains some control over Congress, which is currently dominated by pharmaceutical lobbyists.

As you’ll read in this article, the FDA wants to further benefit pharmaceutical interests by suffocating innovation in the dietary supplement industry.
No one has fought longer or harder against high drug prices than Life Extension®.

We’ve exposed how off-patent generic drugs whose active ingredients cost only pennies are sold to consumers for hundreds of dollars.

We have shown that this price gouging is caused by over-regulation of the prescription drug marketplace.

What’s sparked recent media outrage is that the healthcare burden now falls squarely on middle-class America. That represents the majority of citizens who are facing economic hardships via high medical insurance premiums, high deductibles, and restricted access to the best doctors.

Magnitude of Problem

There was a time not so long ago when most employers paid 100% of their employees’ health insurance premiums. This included the spouse and children of each employee.

If a serious medical issue arose, the company-paid insurance covered virtually 100% of the expenses. There was no such thing as first having to pay a large deductible, or being told of denial of coverage for a physician-prescribed therapy, or even denial of payment to the physician you chose.

Employees today pay a growing percentage of their own medical insurance premiums and usually 100% for their spouse and children. (Recall this was a free employee benefit just a few decades ago.)

In today’s upside-down world of so-called health “insurance,” the middle class is often limited to using physicians who are in their insurance company’s narrow “network.” These physicians relinquish decision-making regarding diagnostics and prescribing to what the insurance company permits, which is often substandard care based on Life Extension’s treatment protocols.

Before the insurance company covers anything, a deductible has to be paid out of pocket that can run $4,000-$6,000. This deductible must be paid every year for treating the same medical condition. (Deductibles vary considerably depending on the plan chosen.)

So what used to be a benefit for most working Americans is now a farce. The typical working person does not run up $4,000-$6,000 in medical expenses. So they may wind up paying 100% of the healthcare costs they do incur out of pocket—even though they are paying higher health insurance premiums!

High co-pays (ranging from 10%-40%) even after the annual deductible is met means that the middle-class cannot afford to fall ill, especially as skyrocketing premiums for substandard insurance deplete their savings. (Low-income individuals are eligible for government subsidies to offset many of these costs, which means they are borne instead by taxpayers.)

Alarming New Reports

Last year, a report published by the Brookings Institute revealed the nightmare facing middle-income Americans.

The findings showed that middle-income household spending on healthcare has risen 25% from 2007 to 2014. The only reason the middle class has survived this sharp price increase is that the costs of other necessities has plummeted during that same time period.

A Kaiser Family Foundation report confirmed this bleak picture. Deductibles for individual workers have risen 67% since 2010, which is roughly 7 times more than earnings growth over the same period.

A separate Kaiser analysis of tens of millions of insurance claims found that patient
“cost-sharing” has skyrocketed since 2004. This has been driven by a 256% surge in deductibles that consumers now have to bear.4,6 Recall that in the not-so-distant past, deductibles were only a few hundred dollars.

With many generic drugs now costing thousands of dollars, and some new medications costing $100,000, it is clear that only the wealthy or very poor have affordable access to healthcare in America. Very low-income individuals have Medicaid coverage which, after a small copayment, usually pays 100% of medical costs, even for expensive drugs that exceed $100,000 each year.7

Like those with today’s sub-standard insurance, however, Medicaid recipients are refused treatment by some of the better physicians. But at least they don’t have to pay large premiums and deductibles only to be told by their insurance carrier that the therapy they need to live is “not medically necessary” or “not approved by the FDA for their specific indication.”

These two excuses are routinely used by insurance carriers to deny seriously ill people access to drugs that published studies indicate are efficacious.

This healthcare cost crisis is projected to worsen as employers increasingly shift more healthcare costs to workers.

The Drug Rip-Off

In 2016, the media woke up to the magnitude of overpriced drugs. This prompted Congress to hold hearings about price gouging including a generic device used to save children who suffer allergic reactions.

The device is the EpiPen®, and its cost has risen about 550% since 2007.8,9 There is nothing unique about the drug (epinephrine) in this auto-injector (EpiPen®) that parents carry to save their child’s life. The maker nonetheless enjoys a virtual monopoly based on effective lobbying, aggressive legal defense against competitors, and the high costs of getting the FDA to approve competing versions of the identical drug.

The retail price for a pack of two EpiPens® is $608 (up from $94 in 2007).9 Many parents cannot afford this outlandish price and risk their children suffocating to death if an acute allergic reaction occurs.

In case you’re wondering what it costs to make this drug, experts are quoted as stating that “one milligram of epinephrine, which is three times more than what’s needed in an EpiPen, costs just a few bucks” and “the auto-injector is available for between $3 and $7.”10

With sterile quality control, this drug could be profitably sold for less than $100—if it were not for the power Congress bestows on the FDA to pick and choose who gets to make it.

In response to media backlash, the maker of the EpiPen® promised to make a generic version that costs only $300...which is still as much as one hundred times more than what it costs to make.11

The $300 price for a drug that may be needed multiple times each year is still unaffordable by many parents whose deductibles are thousands of dollars each year.

Why Generic Drug Prices Are Skyrocketing

Back in 2003, it cost less than $1 million to file a generic drug application with the FDA. That price was way too high, as most generics can easily copy the branded drug and deliver the same bioequivalence.12

Today’s cost of gaining FDA approval of a generic is $5 million and sometimes much higher. As a result of these oppressive approval costs, many generic drugs face no competition. This can result in consumers paying almost as much for the generic as the patented version’s previous price.
Excessive regulatory burdens have resulted in delaying new generics for years and needlessly driving up the costs of making them.

None of this excludes the probability of collusion amongst certain generic makers as many cease producing a generic even after paying the costs of FDA approval. This sometimes happens when one company pays another to cease production, at which time the remaining generic propels upwards in price.

There Is a Free Market Solution

We at Life Extension have long espoused an easy solution to drug price gouging, which is to amend the Food, Drug, and Cosmetic Act to allow competition in the generic marketplace. If enacted, generic prices will plummet to levels so low you won’t even worry about what percentage your insurance company pays.

When generic drugs drop this much, it will push down many patented pharmaceutical prices because generic substitutes often work as well as newer branded drugs.

Against us are pharmaceutical lobbyists who will do virtually anything to protect their lucrative monopoly against free-market competition.

On our side are 320 million American consumers, most of whom cannot afford to fall ill even if they have health insurance. That’s because the deductibles, copays, and exclusions result in enormous out-of-pocket expenses that are today’s leading cause of personal bankruptcies.

### Chart Published by Life Extension in 1999
Exposing Scandalous High Drug Prices
(This problem has exponentially worsened since then)

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The result was passage of the Dietary Supplement Health and Education Act in 1994. This Act spared many lives by providing consumers with affordable access to nutrients like coenzyme Q10 and higher-potency vitamin D.

Life Extension is now coordinating with other health freedom groups to stop Big Pharma from further monopolizing consumer access to affordable dietary supplements and conventional healthcare. We need the support of everyone reading this article to win this battle.

For those who think it’s not worth the effort, consider the consequences of failing to take action. Innovation in the natural ingredient marketplace will be stifled while pharmaceutical companies grab dietary supplements and gain FDA protection to sell them as prescription drugs.

Many retired seniors will have to take jobs to afford their medications. Those working full-time may have to find additional part-time work to pay the high premiums and many out-of-pocket expenses no longer covered by medical insurance.

These problems can be partially resolved if free-market competition is allowed in the generic drug and dietary supplement marketplaces.

Log on to Our Legislative Action Website

Life Extension is mobilizing a grass roots campaign to overwhelm the lobbyists that have dominated Congress and federal agencies.

We’ve updated our website with the current Representatives and Senators so you can easily send them an email protesting FDA’s draconian actions taken against your supplements and the unnecessary high cost of generic medications.

To let your voice be heard on Capitol Hill, please log on to:

LifeExtension.com/consumer

For longer life,

William Faloon
As We See It

ARE WE TO BECOME SERFS OF THE DRUG MONOPOLY?

The high cost of prescription drugs is causing major economic upheaval in the health care system and is forcing many of those without insurance to go broke paying for their medicines.

While politicians are trying to get Medicare (meaning “the taxpayers”) to shoulder part of this burden, The Life Extension Foundation has shown that inflated drug prices are a result of a protected monopoly the FDA grants to the pharmaceutical giants. As anyone familiar with free markets knows, lack of competition means the consumer pays exorbitant prices for lower quality products. In the case of prescription drugs, Americans pay the highest prices in the world and are often the last in the chain access to therapies that were long ago approved in other countries.

Up until now, HMOs and insurance companies have been subsidizing consumer prescription drug purchases through nominal “co-pay” arrangements. That price protection is rapidly vanishing, as most HMOs have lost money over the last three years and are raising premiums and co-pays on prescription drugs to cut the financial hemorrhage. In some cases, HMOs are going out of business because their premium base does not cover the skyrocketing costs of prescription drugs.

One problem has been that prescription drug prices are increasing at four times the rate of inflation because without free market competition, drug companies can raise prices at their discretion. Another reason for this pending health care crisis is that patients are succumbing to drug company advertising and demanding their

OUTRAGEOUSLY HIGH DRUG PRICES

When we established the FDA Museum in 1994, one of the areas of malfeasance we exposed was the inflated prices Americans pay for their medicines compared to citizens of other countries.

In March 1999, The Life Extension Foundation conducted a survey of popular European and U.S. drug prices to see what the actual difference was. We compared these drugs brand-name to brand name. We are reprinting the following chart to show just how badly Americans are being defrauded by the FDA-procured drug cartel:

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<td>$55.00</td>
<td>$31.00</td>
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</tbody>
</table>

References

As you grow older, age-related stiffness and discomfort in the joints becomes a fact of life. Activities once routine become a challenge as limited mobility hampers your every move.

**ArthroMax® Advanced with UC-II® & AprèsFlex®** is a multinutrient formula that supports healthy joint function.

Two clinically validated ingredients in this formula: AprèsFlex® and UC-II® maintain cartilage and ease inflammation and thus may promote comfortable joint structure and function.

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**Retail Price** | **Your Price**
---|---
1 bottle | $36 | **$27**
4 bottles | **$24** each

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**Non-GMO**

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New Zealand Whey Protein Concentrate

Maintain Healthy Lean Muscle Mass

New Zealand Whey Protein Concentrate is uniquely derived from grass-fed, free-range cows living healthy lives in New Zealand and not treated with growth hormone (rBST). Its naturally high content of branched-chain amino acids (BCAAs), lactoferrin, and immunoglobulins is ideal for those who wish to:

- Help maintain lean muscle mass,
- Support healthy immune function, and
- Protect against free radical attack.

Available in both natural chocolate and natural vanilla flavors.

References

Contains milk.
Non-GMO

To order New Zealand Whey Protein Concentrate, call 1-800-544-4440 or visit www.LifeExtension.com

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NEW ERA FOR INTESTINAL HEALTH!

Probiotic Blend with Phage Technology
Dual Encapsulation for Optimal Delivery

FLORASSIST® GI with Phage Technology combines four types of phages, along with six strains of probiotics that work within hours, not days.

The addition of phages is designed to remove unwanted bacteria in the intestines to make room for the beneficial probiotics.

FLORASSIST® GI with Phage Technology • Item #02125
30 liquid vegetarian capsules

<table>
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The suggested daily serving of one liquid vegetarian capsule of FLORASSIST® GI with Phage Technology provides:

Probiotic Blend • 15 Billion CFU**
- Lactobacillus acidophilus La-14
- Bifidobacterium lactis Bl-04
- L. paracasei Lpc-37

TetraPhage Blend • 15 mg **
- LH01 - Myoviridae
- LLS - Siphoviridae
- T4D - Myoviridae
- LL12 - Myoviridae

The probiotic blend in this formula is identical to the popular Florassist Balance. This new formula adds phages that promote the ability of beneficial bacteria to propagate.

To order FLORASSIST® GI with Phage Technology, call 1-800-544-4440 or visit www.LifeExtension.com

Non-GMO  † Colony Forming Units at time of manufacture.  ** Daily Value not established.

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You must mention Code YRX702A
Vitamins C and E Associated with Decreased Risk of Dementia

An article in the *Annals of Pharmacotherapy* reports an association between the intake of vitamin C and E supplements and a lower risk of developing cognitive decline among men and women aged 65 and older.*

The investigation included 5,269 men and women who were free of dementia upon enrollment in the Canadian Study of Health and Aging from 1991 to 2002. Follow-up examinations conducted during 1996-1997 and 2001-2002 provided post-enrollment diagnoses of dementia or cognitive impairment without dementia.

Over up to 11 years of follow up, 821 cases of all-cause dementia were diagnosed and 882 cases of cognitive impairment without dementia developed. In comparison with those who did not report supplementing with either vitamin, the use of vitamin C and/or vitamin E was associated with a **38% lower adjusted risk of dementia from any cause.**

**Editor’s Note:** For cognitive impairment without dementia, the adjusted risk was **23% lower** among those who used either or both vitamins. Evaluation of the effects of using either vitamin alone resulted in associations with similar risk reductions.


In an investigation published in Cell Reports, a team from the Buck Institute found that vitamin D extended median lifespan in the roundworm C. elegans by a third and helped support protein homeostasis, the ability of proteins to maintain shape and function.*

“Vitamin D3 reduced the age-dependent formation of insoluble proteins across a wide range of predicted functions and cellular compartments, supporting our hypothesis that decreasing protein insolubility can prolong lifespan," reported research team leader Karla Mark, PhD.

“Vitamin D engaged with known longevity genes. It extended median lifespan by 33% and slowed the aging-related misfolding of hundreds of proteins in the worm," explained senior author Gordon Lithgow, PhD.

“Our findings provide a real connection between aging and disease and give clinicians and other researchers an opportunity to look at vitamin D in a much larger context.”

Editor’s Note: “Vitamin D3, which is converted into the active form of vitamin D, suppressed protein insolubility in the worm and prevented the toxicity caused by human beta-amyloid which is associated with Alzheimer’s disease,” Dr. Lithgow added. “Given that aging processes are thought to be similar between the worm and mammals, including humans, it makes sense that the action of vitamin D would be conserved across species as well. Maybe if you’re deficient in vitamin D, you’re aging faster. Maybe that’s why you’re more susceptible to cancer or Alzheimer’s.”

In The News

Quercetin Improves Rheumatoid Arthritis Symptoms and Disease Activity

A recent report in the *Journal of the American College of Nutrition* found a remarkable benefit for supplementing with *quercetin* in a randomized, double-blind trial of women with rheumatoid arthritis.*

The trial included 40 female rheumatoid arthritis patients who were given 500 mg of quercetin or a placebo daily for eight weeks. Blood samples collected prior to and after the treatment period were analyzed for erythrocyte sedimentation rate and high-sensitivity tumor necrosis factor-alpha. These two blood tests are a measure of inflammation.

The findings of physician-administered examinations that determined the number of swollen and tender joints were combined with erythrocyte sedimentation rate results to calculate disease activity. Health assessment questionnaires assessed quality of life and disability.

At the end of the trial, women who received quercetin had less early morning stiffness, morning pain and pain after activity compared to pretreatment levels. In contrast, those who received a placebo experienced nonsignificant changes.

*Editor’s Note:* Disease activity scores, number of tender joints, health assessment questionnaire scores, and physician global assessments significantly improved in the quercetin group while remaining essentially unchanged among those who received a placebo. By the end of the study, erythrocyte sedimentation rate was slightly lower and tumor necrosis factor-alpha was significantly lower in quercetin-treated subjects, while no significant changes occurred in the placebo group.

A new study finds that older Americans are being gouged by the prices of brand-name drugs, which skyrocketed last year at a rate 130 times faster than inflation.*

Researchers at the nonprofit organization AARP discovered that the retail prices of 268 brand-name prescription drugs rose, on average, 15.5% in 2015 against a 0.1% increase in the rate of general inflation. The drugs, which are commonly taken by seniors, include 49 that are used to treat diabetes, high cholesterol, high blood pressure and other widespread, chronic conditions.

Debra Whitman, chief public policy officer at AARP, stated in a news release, “What’s particularly remarkable is that these incredibly high price increases are still occurring in the face of intense public and congressional criticism of prescription drug pricing practices.”

On average, the elderly take 4.5 prescriptions monthly. Couple that with the average cost of regular use for one brand-name drug, which rose to over $5,800, and that brings average annual drug costs to around $26,100. Medicare beneficiaries’ average median income is just $24,150.

“Prescription drug therapy is not affordable when its cost exceeds the patient’s entire income,” said report co-author Leigh Purvis. “Even if patients are fortunate enough to have good healthcare coverage, high prescription drug costs translate into higher out-of-pocket costs.”

Editor’s Note: According to the study, of the six drugs with the highest price increases, five were from Valeant Pharmaceuticals. The study’s authors found the price of Ativan, the company’s antianxiety drug, shot up over 2,800% between 2006 and 2015.

Former Drug Company Execs Charged in Price-Fixing Plot

As part of an ongoing Department of Justice investigation into the generic drug industry, charges have been brought against two ex-drug company executives for allegedly participating in a bid-rigging and price-fixing plot.*

Named in separate two-count felony cases were Jason Malek, the former president of Heritage Pharmaceuticals, and Jeffrey Glazer, the company’s former CEO. The alleged scheme involved two drugs: the diabetes medication glyburide and doxycycline hyclate, an antibiotic. According to court papers filed in Philadelphia, the scheme was in effect possibly dating back to April 2013 and continued to December 2015.

The cost of 500 tablets of doxycycline is reported to have gone from $20 in October 2013 to a whopping $1,845 in May 2014.

Deputy Assistant Attorney General Brent Snyder charged that the two executives entered into unlawful agreements to fix prices and “sought to enrich themselves at the expense of sick and vulnerable individuals who rely upon access to generic pharmaceuticals as a more affordable alternative to brand-name medicines.”

Heritage had fired both men in August following an internal investigation. Reacting to the charges, the company stated the former executives had engaged in “a variety of serious misconduct.”

Editor’s Note: In a prepared statement, Special Agent in Charge Michael Harpster of the FBI’s Philadelphia division commented, “Conspiring to fix prices on widely-used generic medications skews the market, flouts common decency, and very clearly breaks the law. It’s a sad state of affairs when these pharmaceutical executives are determined to further pad their profits on the backs of people whose health depends on the company’s drugs.”

Gastro-Ease contains a unique nutrient compound (zinc-carnosine) to help soothe the stomach lining while providing a beneficial bacteria (*Lactobacillus reuteri*) for optimal gastric health.

Suggested dose is one capsule twice daily, after breakfast and before bed.

**Gastro-Ease**

Item #02100 • 60 vegetarian capsules

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Non-GMO

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**Standardized TART CHERRY Extract**

**STRONG SUPPORT FOR SORE MUSCLES**

**After Exercise and Everyday Exertion**

_Tart cherries_ are chockfull of compounds found to block _COX-1_ and _COX-2_ inflammatory enzymes. Benefits of the fruit include:

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

**ANTHOCYANINS**

_A nthocyanins_—the powerful flavonoids found in dark-pigmented fruit—have been studied for their many advantages, including _heart, cellular, and cognitive health_.:

Tart cherries have a higher content of anthocyanins than many other fruits.

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

**References**


Non-GMO

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_Tart Cherry with CherryPURE®*_

Item #02023 • 60 vegetarian capsules

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

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

One way stress inflicts its deadly damage is by raising cortisol levels.¹

The result is accelerated aging that wreaks havoc throughout the body.

Increased cortisol levels not only age our internal organs, but make us appear older than our actual years.²

People with elevated levels of cortisol have higher mortality rates and face an increased risk for cardiovascular disease, diabetes, metabolic syndrome, and neurodegenerative disorders.³⁶

Too often, physicians prescribe a range of addicting pharmaceuticals in an effort to reduce a patient’s stress and anxiety. This provides a temporary fix, but tolerance to the drugs negates their effectiveness over time.

Fortunately, researchers have identified several natural compounds that have been shown in humans to produce a noticeable reduction in cortisol levels.

These natural compounds can help reduce the toxic response to stress and anxiety that underlies so many of today’s chronic health problems.
Life-Threatening Dangers of High Cortisol

Cortisol is a glucocorticoid hormone that is essential for life. However, in the presence of chronic stress, cortisol surges to unhealthy high levels, producing a major problem that threatens health and longevity.

Most disturbingly, recent studies have shown that chronically elevated cortisol levels are strongly associated with increased risks of dying. For example, one study showed that men with high cortisol levels were 63%, and women 82%, more likely to die than those with lower levels.7

The risks of dying specifically from cardiovascular disease are even more pronounced in those with high cortisol: one study found a five-fold increased risk of death, both among those with known cardiovascular disease and with people previously free of risk factors at baseline.3

High cortisol levels create havoc through the body’s systems and are associated with a long list of age-accelerating diseases including obesity, hypertension, type II diabetes, and cardiovascular risk, as well as increased risk of infection, osteoporosis, depression, and even neurodegenerative diseases like Alzheimer’s.2,3,7,12

Another study found that higher cortisol levels are associated with higher perceived age, that is, age as assessed from a facial photograph. People with higher levels of cortisol look older because they are experiencing accelerated aging that is beginning to show up in their facial features.2 Perceived age is well known to be associated with illness and the risk of death.2

There is even submicroscopic evidence that cortisol accelerates aging. Chronically high cortisol levels are associated with shortening of telomeres, the “fuse-like” stretches of DNA that cap the ends of our chromosomes.13,14 As telomeres shorten, the cells that bear them get closer and closer to the ends of their useful lives, eventually aging the tissues and organs in which they dwell.

Stress—emotional, psychological, physical, or biochemical—is detrimental in part because it raises levels of cortisol. Reducing stress is always a good idea, but much of the stress in our daily lives is unavoidable, and sometimes efforts to avoid it bring on more stress. That’s why it is so important to reduce the cortisol elevations induced by stress, even when we cannot eliminate the stress itself.

And that is what has scientists so excited about natural compounds capable of lowering cortisol levels. Let’s look at those now.

Lychee Polyphenols Lower Cortisol Levels

The lychee fruit has been grown in China since at least the 11th century.15 It is rich in polyphenols that promote a variety of biological activities, most notably the ability to fight oxidative stress, inflammation and lower cortisol levels.16

Most lychee polyphenol products available in stores contain long-chain polyphenols which are not easily absorbed in the intestinal tract. Using a proprietary process, scientists are now able to reduce the polyphenol size through steps that include the addition of green tea catechins.17 This allows the new molecule to be stable and highly bioavailable. When researchers tested the bioavailability of the lychee-green tea blend in humans, they found that the polyphenol content in blood was 3 times higher in comparison to ordinary lychee extract alone.18

Human studies show that the lychee-green tea blend can reduce circulating cortisol levels, and can also oppose other physiological effects of stress.

In one study, scientists enrolled 19 sedentary, but otherwise healthy, male volunteers.16 Subjects were randomly assigned to receive either a placebo or 100 mg of the new lychee-green tea blend in water each day for 4 weeks. Subjects underwent blood tests for cortisol, markers of inflammation, and other basic evaluations, before and after the supplementation period.

At the end of treatment, lychee-green tea blend recipients, but not placebo users, had significant decreases in cortisol level, as well as of the inflammatory cytokines IL-1beta and IL-6.
Because it is known that exercise raises both cortisol and inflammatory factors, subjects were also tested after exercise. The rate of increase in these compounds was significantly reduced in lychee-green tea blend-supplemented subjects, demonstrating that the lychee-green tea blend can suppress stress-induced, as well as baseline, cortisol levels.

That finding was supported by another study in which ten healthy male students were supplemented with 100 mg of the lychee-green tea blend, twice daily, for ten days prior to performing physical activity conducted under low oxygen conditions to bring out stress.\(^{19}\)

While both groups had similar cortisol levels prior to supplementation, the placebo group’s cortisol rose more after the stressful exercise, while the rise in the lychee and green tea blend-supplemented group was significantly less pronounced.

A third study demonstrated similar results using a different cortisol-raising stress: hot water. In this study, healthy young men received either a placebo or lychee-green tea blend, 100 mg, half an hour before immersing their lower legs in hot water for half an hour.\(^{20}\) Again, measurements of cortisol and inflammatory cytokines were made before and after the stress-inducer.

**Figure 1.** Cortisol levels measured in saliva pre- and post-exercise under low-oxygen stress conditions. Similar in both groups at baseline, cortisol levels soared in the placebo group following the exercise, while that rise was sharply blunted in subjects supplemented with a lychee-green tea blend.\(^{19}\)

**What You Need to Know**

**Benefits of Lowering Cortisol**

- While stress is unavoidable, it is now possible to do something about the resulting dangerous elevations in circulating cortisol levels.
- Cortisol is a stress-response hormone that is beneficial over short periods, but chronic stress leads to chronically high cortisol levels, which are dangerous.
- High cortisol produces all of the manifestations of overmedication with steroids: central obesity, rising blood sugar, hypertension, and lipid disturbances, while also softening bones and promoting neurodegeneration.
- A lychee-green tea blend provides highly bioavailable polyphenols with potent cortisol-lowering properties, as shown in multiple human studies.
- Extracts from the bark of the Magnolia and Phellodendron trees have been shown in combination to lower cortisol and reduce manifestations of stress.
- These compounds, used in combination, offer safe, effective reductions in circulating cortisol levels, thereby helping to promote improved metabolic health and supporting healthy aging.
The lychee-green tea blend recipients, compared to placebo subjects, had significantly lower cortisol concentrations, as well as levels of IL-1beta and IL-6, when measured after the heat stress. These effects persisted for up to two hours after the heat stress had ended.

Supplemented men experienced a significantly lower rise in skin and core body temperatures during the application of heat, indicating improved total body control over the stressful event.

These findings have been further borne out by subsequent studies showing that lychee-green tea blend supplementation prevents heat-induced body temperature elevations, beneficially reduces fluid losses from sweating under heat stress, and prevents stress-induced blunting of immune system responses.29-32

Tree Bark Extracts Help Lower Cortisol

Extracts of Magnolia officinalis bark have been previously studied for their anti-anxiety effects, but without the troubling side effects characteristic of anti-anxiety medications.33 An extract from the bark of the Asian tree Phellodendron amurense, has been tested in an animal model of stress, and demonstrated significant reductions in stress manifestations without sedation.33

Human studies of the combination of extracts have demonstrated both their stress-relieving properties and their ability to mitigate stress-induced cortisol elevations. In one such study, researchers enrolled 56 moderately stressed but otherwise healthy men and women.34 Subjects supplemented with 250 mg of the mixed bark extracts twice daily, or received a placebo, for a 4-week period.

After the supplementation period, cortisol levels were 18% lower in the supplemented group than in the placebo recipients. This reduction in cortisol levels was accompanied by improvements in mood and reductions in stress, depression, anger, and fatigue, all of which could be interpreted as related to the lower cortisol levels.

Two other studies have evaluated the combined bark extract supplement at a dose of 250 mg, three times daily. In one, conducted in otherwise healthy overweight, premenopausal women, the supplement significantly decreased anxiety as measured by a variety of scales and scores.33 In the other, the placebo group had significant weight gain over 6 weeks, which was prevented in the supplemented subjects.35

In both studies, the supplemented subjects also had reductions in cortisol levels compared with placebo, but the differences did not reach statistical significance, probably because of the relatively small sample size of these studies.

Life-Shortening Impact of Elevated Interleukin-6

As we age, the age-related decline in immune function not only compromises our ability to fight infections and malignancies but increases the risk of death.

In youth we are primed with an abundance of naïve T cells ready to destroy bacteria, viruses, and cancers. Once this cell performs its job, it then becomes a memory T cell that responds only to the same bacteria, virus, etc. This shift in immune cell populations is characterized by the abundance of memory T cells that emit pro-inflammatory signals that wreak havoc in every organ system.21

One of the deadliest of these inflammatory “signals” is a cytokine called interleukin-6 (IL-6).22

A human study evaluated the impact of lychee-green tea blend on cortisol and inflammatory markers such as IL-6. At the end of the study, researchers found that supplemented individuals had significant reductions in cortisol and IL-6 levels.16

Higher IL-6 levels are associated with a 2-fold increased risk of death.23 Higher levels are also involved with several degenerative processes, including frailty, that so many elderly suffer.24-27 It is important to note that a well-known trait of healthy centenarians is that they have unusually low levels of IL-6.28
Dangers of Elevated Cortisol Not New

The August 1984 issue of this publication (called Anti-Aging News) featured an in-depth report about the age-accelerating effects of elevated cortisol.

The article offered little in the way of available approaches to suppress cortisol other than vitamin C, aspirin, and drugs not approved in the United States.

Move forward 33 years and scientists have uncovered natural approaches to suppress excess blood cortisol levels.

This represents a significant advance in neutralizing a deadly factor involved in degenerative aging.

The front cover of the 1984 issue of Anti-Aging News describing dangers of cortisol appears after the scientific references to this article.

Summary

Everyday stress raises and keeps elevated levels of our stress-response hormone, cortisol.

Elevated cortisol brings with it components of the deadly metabolic syndrome, as well as additional threats such as immune suppression, osteoporosis, and neurodegeneration.

Now, it is possible to mitigate the impact of cortisol, even if we cannot eliminate the stress from our lives.

Lychee-green tea blend and bark extracts from Magnolia and Phellodendron trees have all been shown to lower cortisol levels in humans.

Lowering chronically-elevated cortisol levels can help mitigate this underlying cause of common disorders associated with aging.

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

References


Stress, Cortisol, Interferon
And “Stress” Diseases
I. Cortisol As The Cause Of “Stress” Diseases
By Dr. Alfred T. Sapse

One of the most influential ideas in modern medicine is Hans Selye’s theory of “stress” as an important contributing factor to diseases and aging. While other medical scientists of his time were searching for the “causes” of specific diseases, Selye focused his attention on how the body responds to environmental agents, which he called “stressors”. In doing so, he discovered a specific pattern of biochemical adaptation to environmental stress that can lead to disease, disorder, disability, and death.

Dr. Alfred Sapse has been studying the mechanisms by which the body adapts to stress for many years. In the process, he’s uncovered considerable evidence that cortisol — one of the primary hormones involved in the stress response may be a critical factor in the onset and expression of diseases associated with stress. The following article by Dr. Sapse is reprinted from the journal MEDICAL HYPOTHESES, Vol. 13, 31-44, 1984.
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Most of a coffee bean’s polyphenol content is destroyed during the roasting process. Among the most beneficial of these polyphenols is chlorogenic acid, a potent inhibitor of the glucose-6-phosphatase enzyme that stimulates excess gluconeogenesis.

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Natural Cortisol Balance for a greater sense of calm amid today's stressful challenges.

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**High Potency Optimized Folate** (5,000 mcg)  
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**References**  

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Ceramides
Create Youthful Skin from Within

Young people’s skin naturally contains ceramides that produce a moist, plump, wrinkle-free appearance.

Oral ceramides have grown in popularity because people feel the moist suppleness of youthful skin return within a short time after taking one small capsule each day.

Clinical studies have shown that an oral phytoceramide dramatically hydrates, smooths, and rejuvenates aging and wrinkled skin.

A proprietary oral ceramide can permeate the skin from the inside out to nourish aging dermal layers analogous to how young skin is maintained.
The four layers of the epidermis contain **ceramides** that play a critical role in creating the natural barrier that holds in moisture, keeps out infection—and prevents wrinkles.¹

First detected in 1884, ceramides have been added to some topical skincare creams since the early 1990s by major cosmetic companies to replenish age-related loss.¹ Touted as a way to diminish fine lines, wrinkles, and dryness, their effects were generally modest.²,⁴

To solve this problem, researchers developed an FDA-approved, **oral** ceramides capsule that delivers them *internally*—from the bloodstream—where they move up through the skin’s inner layers to dramatically hydrate, smooth, and rejuvenate aging and wrinkled skin.²,⁵

**Skin-Aging Effects of Declining Ceramide Levels**

Ceramides are major skin components that help form the “glue” that holds surface cells together.⁶,⁷ Aging skin progressively loses these natural lipids.⁸-¹⁰

Ceramide depletion not only causes skin to wrinkle, but also makes it more susceptible to moisture loss, environmental allergens and skin diseases such as atopic dermatitis.¹¹-¹³

To overcome the fact that topically-applied ceramides do not sufficiently reach the deeper skin layers, scientists have developed plant-derived ceramides—or **phytoceramides**—that can be taken orally. This ensures that these potent molecules are *absorbed* into the bloodstream and inner layers of the skin, effectively working from the inside out to hydrate, smooth, and rejuvenate aging and wrinkled skin.²,⁵

Additionally, unlike topical face creams, orally ingested phytoceramides reach skin *throughout the body*.

Until this development, the only way to get ceramides orally was through foods such as wheat and rice. These blood glucose-spiking foods do not provide sufficient **ceramide** quantities to optimally rejuvenate aging skin.¹,²

Early research focused on identifying potentially useful oral ceramides from animal sources.² Scientists switched to **phytoceramides** available in grains such as rice, corn, and wheat.²,³ Ultimately, researchers achieved success by using non-genetically modified wheat and produced an extract containing only purified oils.²

This game-changer is a proprietary, **wheat-derived** phytoceramide extract that can be taken orally to nourish skin cells via the body’s natural route—through the bloodstream into the deepest skin-cell layers and up to the extracellular matrix.²

**Effectiveness of Oral Phytoceramides**

Researchers then set out to investigate the effectiveness of this wheat-derived ceramide extract in scientific studies.²,³,¹⁴ They demonstrated in a laboratory cell study that this extract effectively hydrated human skin and restored its youthful structure—after the skin cells’ protective barrier function had been disrupted.¹⁴

In another study, wheat ceramides reduced levels of free radicals in the skin and inhibited elastase enzymes.¹⁵ These enzymes would ordinarily destroy elastin and contribute to increased wrinkling and loss of skin flexibility.¹⁶

Ceramides have also been shown to inhibit the process by which the skin produces the hyperpigmentation that appears outwardly as age spots and other discolorations of the skin. This suggests that by replacing ceramides from the inside out, oral wheat-derived phytoceramides may inhibit or reverse the uneven pigmentation of skin aging.¹⁷-¹⁹

These findings suggest that it is possible to dramatically rejuvenate aging skin—simply by swallowing a capsule. However, to conclusively demonstrate wheat-derived phytoceramides’ effectiveness, investigators needed to conduct experiments of the scientifically most rigorous type: double-blind, placebo-controlled human studies.
**Clinical Proof of Rejuvenation Effects**

In the first clinical trial, **200 mg** daily of either an oral placebo or an oral, powdered-phytoceramide extract was given, for three months, to women with dry to very dry skin. Skin hydration was then evaluated using three distinct methods: a special testing machine, a dermatologist’s examination, and the subjects’ own subjective scores.5

Women who had been taking the phytoceramide extract experienced substantial improvement in skin hydration as assessed by all three of these testing methods. These ceramide-taking volunteers also experienced significantly reduced dry patches, roughness, and itching. These changes were not observed in the placebo arm of the study.5

This placebo-controlled clinical trial provided a clear indication that the phytoceramides had successfully made their way through the bloodstream directly into the skin cells, where they provided a powerful rehydrating and rejuvenating effect.5

To secure further confirmation of these compelling results, scientists conducted a second double-blind clinical trial—but this time their aim was to evaluate this wheat-derived phytoceramide extract in its oil form.2

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**What You Need to Know**

**Restore Youthful Skin with Ceramides**

- Dropping years off your appearance is now possible thanks to an oral ceramide extract.
- Lipids known as ceramides, which naturally occur in the multiple layers of human skin, may provide the moist, plump, wrinkle-free appearance seen in the young.
- Expensive skin creams have contained ceramides for decades now, but aging individuals find that these surface ceramides deliver only modest improvement.
- A breakthrough, wheat-derived phytoceramide is now available that can be taken orally in capsule form, and studies show that it permeates the skin from the inside out—mirroring how a young person’s skin is nourished.
- Clinical studies have confirmed that this oral phytoceramide dramatically hydrates, smooths, and rejuvenates aging skin.
For this study, women with dry to very dry skin took 350 mg daily of either the wheat ceramide oil or a placebo, and results were assessed after three months of supplementation. To objectively measure skin hydration, the research team used a special technique known as corneometry. Results indicated that the ceramide oil supplement—but not the placebo—significantly increased hydration of the skin on the participants’ arms, legs, and the body overall. Skin hydration on the arms increased by over 35%, compared to less than 1% in the placebo group.

Next, volunteers were asked to rate their own personal perception of the effects of their treatments. At each point of measurement in the course of the study, the wheat phytoceramide oil extract was perceived to provide greater improvement in all factors—facial skin hydration, leg skin hydration, suppleness, roughness, uniformity of complexion, itchiness, and overall state of the skin. And these dramatic effects were noted without any significant adverse effects and with a superior level of acceptability.

Together, these placebo-controlled, clinical trials delivered clear confirmation that orally taken, wheat-derived phytoceramides substantially boost skin hydration, smoothness, and suppleness—reflecting substantial reversal of age-related skin wrinkling, dryness, and decline.

### Issue of Ceramide Insufficiency

Involved in much more than skin appearance, ceramides are bioactive lipids essential for full functionality of the skin. Their age-related decline represents more than a mere cosmetic problem. Full functionality of the skin helps regulate body temperature, synthesize optimum amounts of vitamin D, and provide critical sensory input from the environment.

With age, declining ceramide levels constitute a health risk due to greater susceptibility to contact dermatitis. Also, the outer layer (stratum corneum) in aging human skin has decreased moisture content with greater susceptibility to infection.

Research has shown that the loss of lipid content in human skin that occurs with aging, primarily in the form of a decreased level of ceramides, results in reduced structural integrity. Lost structural integrity exposes the skin to a greater threat from environmental assaults, such as low humidity, solvents, and detergents, and a much lower capacity to recover from them.

Scientists have also determined that the decline in ceramide content in mature skin may stem from a decline in the enzyme activity that normally promotes the delivery of ceramides in a usable form to the skin.
To inhibit this loss of ceramides—and the multiple health risks that occur as a result—it is important to boost ceramide levels not just on the upper surface where lotions sit, but deep inside the skin cells beneath the stratum corneum.

So maintaining youthful levels of ceramides in all layers of the skin achieves more than promoting a better appearance and feel—it powerfully blocks skin infections\(^2\) and other skin diseases.\(^9,31\)

**Preventing and Treating Skin Conditions**

Skin lipids, including ceramides, comprise a major part of an antimicrobial barrier, the first line of defense against infection. Investigators have found that age-related deterioration of this barrier increases the risk of numerous skin conditions.\(^31\)

For example, individuals with atopic dermatitis have diminished concentrations of ceramides in the outer skin layer (stratum corneum)\(^9\) and have higher concentrations of bacteria, especially *Staphylococcus aureus*, on the skin surface.\(^33\) One study confirmed that the increased *Staphylococcus aureus* colonization in atopic dermatitis is correlated with a corresponding reduction in ceramides content.\(^34\) These bacteria have substantial potential to cause infection if the skin barrier function is disrupted.\(^35-37\)

Another common cause of potentially serious skin infections is *Streptococcus pyogenes*, which can cause erysipelas and cellulitis, which are characterized by the spread of the bacteria into the deep layers of the skin.\(^38-40\) Also, skin wounds and functionally compromised areas of the skin can easily be infected by another opportunistic bacterium known as *Pseudomonas aeruginosa*.\(^41,42\)

The link between diminished ceramides and infection was confirmed when scientists showed that repairing the breakdown in the ceramide barrier, while continuing standard topical treatments, alleviated childhood atopic dermatitis.\(^43\) This is especially important, because the topical corticosteroids and other immunosuppressive agents that constitute the mainstays of traditional therapy have significant toxicity, particularly in children.

Further confirmation was documented when researchers treated patients who had contact or atopic dermatitis for eight weeks with a lipid mixture containing ceramides alone or in combination with topical corticosteroids until abatement. Compared to baseline, both treatment groups saw improvements at weeks 4 and 8. But those patients who received the ceramide combination with topical corticosteroids experienced a greater relief than those who used topical corticosteroids alone.\(^24\)

**Summary**

Our skin takes a beating day in and day out from solar exposure, pollutants, stress, and aging. Maintaining youthful, resilient skin is a challenge.

Since the early 1990s, expensive facial creams have boasted the addition of ceramides, bioactive lipids to help moisturize and protect the skin. There is little evidence, however, of the effectiveness of topical ceramides.

To solve this problem, researchers developed an oral plant-derived ceramide that moisturizes and supports skin from within the body.\(^2\)

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


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European Leg Solution with certified Diosmin 95 helps your legs look and feel great by:¹⁻⁴

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- Safeguarding collagen suppleness.

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References

Caution: If you are taking anticoagulant or antiplatelet medications, or have a bleeding disorder, consult your health care provider before taking this product.

To order European Leg Solution featuring Certified Diosmin 95, call 1-800-544-4440 or visit www.LifeExtension.com

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Working from the inside out, **Hair, Skin & Nails** is an oral supplement with nutrients shown to benefit the hair, skin, and nails to keep them looking vibrant and healthy. Rejuvenating nutrients include:

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- **Biotin**—Supports nail strength and integrity

- **Silicon**—For the formation of collagen and keratin molecules

**Hair, Skin & Nails Rejuvenation Formula with VERISOL®**

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To order **Hair, Skin & Nails Rejuvenation Formula with VERISOL®,** call 1-800-544-4440 or visit www.LifeExtension.com

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As skin ages, it loses suppleness and smoothness. A prime reason is loss of ceramides that are required for skin to retain its moisture.

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Skin Restoring Phytoceramides with Lipowheat® • Item #01596
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To order Skin Restoring Phytoceramides with Lipowheat®, call 1-800-544-4440 or visit www.LifeExtension.com

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Oral Health Prevents Systemic Disease

We often overlook the health of our teeth and gums as a strategy to protect against a wide range of diseases.\(^1\) Studies published in 2015 and 2016 confirm that poor oral health can result in disorders ranging from stroke and pancreatic cancer to obesity.\(^2-7\)

Brushing alone is not always sufficient to keep your mouth free of disease.

Researchers have identified natural compounds that can be used as topical oral agents (inside the mouth) to support dental and whole-body health.\(^8-14\)

These compounds help safeguard against periodontal disease—which affects about 70% of adult Americans aged 65 years and older.\(^15\) By using toothpaste and other oral products that contain these ingredients, risks of diseases originating in the mouth should be lowered.
Periodontitis, the disease of the gums and bones, induces inflammatory cytokines and may contribute to obesity by elevating *C-reactive protein*, which in turn causes fat cells (adipocytes) to store more fat and burn less energy.

**Cancer**

A study released November 2016 in the *International Journal of Cancer* suggested that periodontal disease is a risk factor for non-Hodgkin lymphoma. Also in 2016, three other studies found that periodontal disease increased the risk of developing colorectal, lung, and pancreatic cancer.

This pancreatic cancer link mirrors a number of previous studies. For example, Harvard researchers found a history of periodontal disease increased pancreatic cancer risk. And an 18-year study on over 48,000 men found significant associations between oral health status and pancreatic cancer, as well as lung, kidney, and blood cancers.

This latter study also found a link between periodontal disease and greater overall risk of cancer—even in those who’ve never smoked.

**Heart Disease and Stroke**

Two 2016 studies found an association between diagnosed periodontitis and the risk of ischemic *stroke* and of mortality from all causes including cardiovascular disease.

A 26-year study published in 2015 concluded that *gingival inflammation* is associated with stroke risk and that “results emphasize the role of oral health personnel in prevention (of stroke).” An earlier review concluded that periodontal disease among older people correlates with increased risk of systemic diseases—including heart attack, stroke, and diabetes mellitus.

Individuals with periodontal disease have elevated blood levels of C-reactive protein, an inflammatory marker linked to increased risk for cardiovascular disease. Research has shown that efforts to reduce the severity of periodontitis help lower systemic inflammation, which may reduce the risk of inflammation-linked cardiovascular events.
Blood Sugar Control

Diabetics who control their blood sugar have a lower risk of periodontal disease than those who do not.38

Periodontal disease can predispose individuals to diabetes or exacerbate existing diabetes.39 In patients with type II diabetes, severe periodontitis was strongly associated with an increased risk of poor blood-sugar control.40

One investigation revealed that hemoglobin A1C—a measure of long-term blood-sugar control—was higher in both people with type II diabetes and those with severe periodontal disease. This study showed that eliminating periodontal infection and reducing periodontal inflammation in diabetic patients produced significant improvements in their hemoglobin A1C levels. This suggests that optimizing dental health could help prevent the damaging consequences of diabetes.41

Respiratory Infections

A common consequence of poor oral health in older adults is an elevated risk of a particular type of pneumonia. This form of pneumonia occurs when periodontal bacteria in the secretions of the mouth and pharynx are aspirated into the lungs.42,43

One study that followed the rate of respiratory illness among a group of older adults in Japan demonstrated the importance of thorough oral hygiene as the best prevention strategy. During six months, only one in 98 aging adults who had their oral health cared for by dental hygienists came down with a respiratory infection, compared to nine out of 92 people who did not get the same dental care.44
Osteoporosis

Scientists are investigating whether treating or preventing periodontal disease may promote bone density, and therefore may help inhibit osteoporosis.16 Research so far shows a link in the opposite direction, meaning that osteoporosis is a risk factor for periodontal disease.45

This suggests that strategies for reducing osteoporosis risk, such as optimizing calcium, vitamin K and vitamin D intake, may also retard alveolar bone loss around the jawbone sockets that hold teeth roots.45

While bisphosphonate drugs used to treat osteoporosis, such as Boniva® and Fosamax®, might offer benefits for periodontal tissues, they are associated with side effects that range from stomach pain to diarrhea.46-48 Accordingly, safer strategies are needed that support both periodontal and body-wide bone health.

Low Birth-Weight Delivery

Observational studies provide compelling evidence that periodontal infections increase the risk for preterm delivery of low birth-weight babies.49 This link might result from cascading effects of inflammation in the mouth compromising the womb environment.49,50 Whatever the connection, controlling periodontal disease has become a potential strategy for reducing preterm labor.50

Topical Compounds That Deliver Optimal Oral Health

An optimal diet and supplement regimen may help promote general and oral health from the inside. Scientists have now identified a number of compounds that protect oral health when applied topically (inside the mouth). These substances can deliver complementary defenses when included as ingredients in toothpaste.

Green Tea

A 2016 study found that green tea extract protects against dental erosion, reducing wear and roughness.51

Other studies have demonstrated that green tea catechins exert direct antibacterial activity against Streptococcus mutans, one of the key microorganisms behind tooth decay. Green tea also inhibits a bacterial enzyme involved in the process that allows bacteria to stick to teeth. Further, it inhibits production of amylase, and since bacteria use this enzyme to break down starches into sugars, this action may help protect teeth.52,53

Evidence suggests that green tea reduces the invasiveness of oral cancer and decreases the production of a protein associated with oral cancer proliferation.54,55 Researchers also found that green tea arrests the growth of—and triggers apoptosis (self-destruction) of—oral carcinoma cells in the laboratory.56

Scientists then conducted a study to validate the usefulness of green tea in the improvement of periodontal disease. They applied green tea catechins to the mouths of patients with periodontal disease, once a week for 8 weeks, using special strips with a slow-release delivery system. It was shown that the green tea catechins killed a significant proportion of the bacteria causing periodontitis in these patients.57

Coenzyme Q10

Well known for its cardioprotective actions, CoQ10 has also been shown to improve symptoms of periodontitis when applied topically.5,58,59

Scientists conducted a placebo-controlled clinical trial in men with established periodontitis, and after six weeks of topical application of CoQ10, they found “significant improvements” in periodontal status, which were not seen in control subjects.8

Results from an early study on the effectiveness of CoQ10 against periodontitis were so impressive that the authors wrote, “Healing was so excellent 5-7 days post-biopsy that the biopsy sites were difficult to locate. The healing was viewed as extraordinarily effective.”60
More recently, scientists reviewed previous xylitol studies conducted on preteen children. They concluded, in the August 3, 2016, issue of the Cochrane Database of Systematic Reviews, that “There is moderate quality evidence showing that the prophylactic administration of xylitol among healthy children…can reduce the occurrence of AOM (acute otitis media).” This is the most common bacterial infection among young American children.68

**How Periodontal Disease Develops**

The starches and sugars in the food you eat interact with the bacteria in your mouth to form a bacteria-harboring, sticky film of plaque on your teeth and gums. If not properly removed by brushing with a good toothpaste, plaque hardens into tartar, which clings so tightly to the teeth and under the gum line that it can only be removed through professional cleaning.

There are two different types of periodontal disease—gingivitis and periodontitis. Gingivitis is an inflammation of the soft tissue surrounding the tooth. This is a direct immune response to microbial plaque attached to the surface of the tooth. The clinical manifestations of gingivitis are redness and swelling of the gums and bleeding on soft-touching or on probing. In the early stages, gingivitis does not significantly affect deeper structures, such as the periodontal ligaments and alveolar bone. Left untreated, however, gingivitis can lead to periodontitis.

Periodontitis occurs when pathogenic, gram-negative bacteria destroy the dental supportive structures of the teeth, leading to progressive destruction of periodontal ligaments and alveolar bone. The result is tooth loss.

Increasingly, scientists have found that periodontal diseases may trigger a range of illnesses throughout the body, ranging from cancer to heart disease.1,5,6,17-25

**Lactoferrin**

Lactoferrin—an immune-boosting protein involved in the body’s responses to infection and injury69—has been shown to halt growth of periodontitis-causing bacteria.12 In a 2015 study, researchers found that diabetic lactoferrin-deficient mice have a greater risk of developing periodontal infection.70

Lactoferrin appears to help fight infection and tissue damage associated with periodontal disease.
Hydrogen Peroxide

This well-known antiseptic can be used to fight plaque formation and to reduce gingivitis.13 Its bubbling action exposes oral bacteria that are difficult to reach with ordinary brushing and flossing—helping to lower bacteria levels and provide cleaner teeth and gums. When applied in diluted form by aerosol spray to the gums of patients with chronic periodontitis, hydrogen peroxide improved clinical periodontal status and plasma levels of inflammatory markers and “may be a promising method in periodontology.”71

Folic acid

Essential for the integrity of the gingival tissues, higher dietary intake of folic acid is associated with less gingival bleeding on probing.72 Similar results occurred when added to mouthwash. In patients with gum disease, folic acid-containing mouthwash significantly reduced gingival redness and gum bleeding.14

Summary

A frontline defense against systemic inflammation is excellent oral health.

Among the numerous diseases linked to poor oral health are type II diabetes, cancer, rheumatoid arthritis, atherosclerosis, heart disease, and obesity.

Research indicates that adding specific ingredients to toothpaste powerfully supports dental health and safeguards against periodontal disease. The expected systemic benefit is reduced risks of lethal diseases that can originate in the mouth.

Dietary Vitamin Supplements That Promote Oral Health Internally

In addition to brushing with fortified toothpaste, taking certain vitamin supplements may help promote gum health.

Vitamin C is crucial for the maintenance of healthy connective tissue, such as the gums. In fact, one of the clinical signs of scurvy—the disease associated with vitamin C deficiency—is bleeding gums.73 But vitamin C should not be applied directly to the teeth topically as ascorbic acid may erode enamel.

Taking the B vitamin folic acid promotes gingival health by reducing redness and bleeding in these delicate tissues.14

Vitamin D is also important for oral health.74 Since many people do not generate adequate levels of the “sunshine hormone,” supplementation with vitamin D may be necessary to help ensure gum health.

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

References


Maintaining good oral hygiene is important for overall health. Unfortunately, brushing and flossing may not be enough.

FLORASSIST® Oral Hygiene provides the beneficial S. salivarius BLIS M18™ oral probiotic that colonizes the mouth and inhibits the growth of unwanted bacteria.² ³

Just one great-tasting mint cherry lozenge of FLORASSIST® Oral Hygiene a day maximizes oral hygiene by optimizing oral pH, easing inflammation, and supporting healthy bacterial colonization throughout the mouth.⁴ ⁵

References

Contains milk.

BLIS M18™ (S. salivarius) is the trademark of BLIS Technologies Limited.

Promote Oral Health with Targeted Probiotic Blend

To order FLORASSIST® Oral Hygiene, call 1-800-544-4440 or visit www.LifeExtension.com
**NAD+ (nicotinamide adenine dinucleotide)** is found in every cell in the body and plays an essential role in regulating genes that control aging.

The suggested daily dose of one **NAD+ Cell Regenerator™** vegetarian capsule provides 100 mg of **NIAGEN® Nicotinamide Riboside.**

**NAD+ Cell Regenerator™**
Item #01904 • 30 vegetarian capsules

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Non-GMO

To order **NAD+ Cell Regenerator™**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

NIAGEN® is a registered trademark of ChromaDex, Inc. Patents see: [www.ChromaDexPatents.com](http://www.ChromaDexPatents.com).

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**Unique Ingredients in Life Extension® Toothpaste:**
- Coenzyme Q10
- Green tea extract
- Hydrogen peroxide
- Aloe vera
- Xylitol
- Folic acid
- Lactoferrin

**Life Extension® Toothpaste**
Item #01278 • 4-ounce tube

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Neuro-Mag® (Magnesium L-Threonate) was specifically formulated by MIT scientists to be uniquely absorbable by brain and nerve cells.

Supports Improvement in Overall Cognitive Ability*


To order Neuro-Mag® Magnesium L-Threonate or Neuro-Mag® Magnesium L-Threonate Powder with Calcium and Vitamin D3, call 1-800-544-4440 or visit www.LifeExtension.com

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EsophagCool™ neutralizes acid in the area of the esophagus where discomfort most often occurs.

With two acid-neutralizers (magnesium and calcium carbonate) along with proprietary GutGard™ licorice extract, EsophagCool™'s novel formula works rapidly to provide relief to the upper digestive tract.

Natural berry/vanilla-flavored EsophagCool™ tablets taste good without added simple sugars (only stevia and xylitol).

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CAUTION: If taken in high doses, magnesium may have a laxative effect. Due to potential interactions, take at least 4 hours apart from prescription medications. If you have an estrogen-dependent cancer, consult a healthcare professional before use. Do not take if pregnant or lactating.

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TOBACCO

More Lethal Than What Government Claims
How to Reduce Tobacco-Related Healthcare Costs

I’ve always been skeptical of government’s claim that 480,000 Americans die each year as a result of cigarette smoking.¹

My reason for questioning this government statistic is that tobacco use is associated with more illnesses than what are officially counted.²

Take kidney failure for instance. Smoking is associated with double the risk of death in kidney failure compared with nonsmokers.² Yet kidney failure is not counted in the official number of tobacco-related deaths.³,⁴

My suspicions have been further aroused by a study published in the New England Journal of Medicine. This report analyzed almost one million adults. These findings suggest cigarette smoking is associated with about 556,000 American deaths each year—higher than government estimates.¹,²

Deaths associated with cigarettes are not limited to those who smoke. The federal government admits that over 41,000 additional Americans die each year from secondhand smoke.³ I believe this number also underestimates the real number of second-hand smoke victims.

Overlooked are insidious diseases that kill former smokers long after they quit. This happens when genetic changes inflicted by tobacco use at younger ages manifest decades later as a lethal disease.

The United States faces a healthcare cost crisis. A significant percentage of medical outlays are caused by cigarette smoking. Tobacco taxes don’t cover the medical and lost productivity costs of current and former smokers, or victims of secondhand smoke.

Anti-tobacco campaigns are failing to sufficiently curb this deadly menace. This article describes the staggering number of excess tobacco-related deaths that are not officially counted.
Cigarette smoking remains the most dominant cause of preventable death and disability.

The percentage of Americans who smoke dropped by approximately half over a four decade period, from the mid-1950s to the mid-1990s.\(^5\)

Interventions such as warning mandates, tax hikes, and smoke-free environments have helped reduce the carnage.

The problem is that today nearly one out of every six American adults still smoke, nearly one out of five Americans who smoke have a disability, and at least 16 million Americans live with a smoking-related illness. Tobacco products are probably killing closer to 556,000 Americans each year.\(^1,2\)

Based on an article published in the New England Journal of Medicine titled, “"Smoking and Mortality—Beyond Established Causes" and accompanying analysis, the authors believe that at least 60,000 additional deaths per year may be associated with smoking that are not reported in government estimates.\(^2\)

Cigarette smokers also face sharply higher risks of nonlethal illnesses that further burden today’s inadequately staffed sick-care system.

A solution must be found to spare this nation's finances, as well as the lives of its citizenry.

New Study Exposes More Tobacco-Induced Carnage

Death rates among current smokers are two to three times higher compared to people who never smoked. Most of this higher mortality is explained by 21 common diseases officially recognized as caused by cigarette smoking (like lung cancer).\(^3\)

If cigarettes cause other diseases, however, then government claims of smoking-attributable mortality are being significantly underestimated.

A study of almost one million men and women over age 55 was begun in year 2000 with data collection extending to 2011. Confounding factors such as age and alcohol intake were factored into the mortality data.

The final results from this study were published by the New England Journal of Medicine in 2015. The data revealed that cigarette smoking kills far more Americans than official statistics indicate!\(^2\)

How Government Accounts for Tobacco-Induced Mortality

The 2014 Surgeon General’s report estimated that cigarette smoking causes more than 480,000 deaths in the US every year, including deaths from secondhand smoke.\(^1\)

This widely cited statistic, however, is an underestimate, as it only considers deaths from 21 diseases that have been formally recognized as caused by cigarette smoking. When looking at other diseases associated with cigarettes, an updated analysis suggests the number of excess deaths jumps by 60,000 to 120,000 each year.\(^2\)

This analysis published in the New England Journal of Medicine includes a total of 52 cause-of-death categories.\(^2\) The chart on the next page lists some of the illnesses not officially recognized as being caused by cigarette smoking. It then reveals the staggering increased risk of dying from these diseases in current smokers.

Many of the illnesses listed on the next page are caused by immune suppression,\(^6,7\) atherosclerosis,\(^8,9\) platelet aggregation,\(^10,11\) inflammation,\(^12,13\) and gene alterations,\(^14,15\) which are all related to cigarette smoking.
Relative Risk of Death from Specific Unofficial Causes Related to Smoking Status

This chart shows increases in deaths from specific causes in current cigarette smokers compared to a nonsmoking control group. These diseases are not factored in when the government estimates tobacco-induced mortality data.  

### Diseases Not Officially Increased Relative Risk Attributed to Smoking

<table>
<thead>
<tr>
<th>Disease</th>
<th>Increased Relative Risk for Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infections (all)</td>
<td>150% (females)</td>
</tr>
<tr>
<td></td>
<td>120% (males)</td>
</tr>
<tr>
<td>Hypertensive Heart Disease</td>
<td>90% (females)</td>
</tr>
<tr>
<td></td>
<td>190% (males)</td>
</tr>
<tr>
<td>Intestinal Ischemia</td>
<td>510% (females)</td>
</tr>
<tr>
<td></td>
<td>460% (males)</td>
</tr>
<tr>
<td>Kidney Failure</td>
<td>90% (females)</td>
</tr>
<tr>
<td></td>
<td>110% (males)</td>
</tr>
<tr>
<td>Prostate Cancer</td>
<td>40% (males)</td>
</tr>
<tr>
<td>Breast Cancer</td>
<td>30% (females)</td>
</tr>
<tr>
<td>Liver Cirrhosis</td>
<td>160% (females)</td>
</tr>
<tr>
<td></td>
<td>260% (males)</td>
</tr>
<tr>
<td>Respiratory (not included on Surgeon General’s list)</td>
<td>90% (females)</td>
</tr>
<tr>
<td></td>
<td>100% (males)</td>
</tr>
<tr>
<td>Rare cancers</td>
<td>10% (females)</td>
</tr>
<tr>
<td></td>
<td>60% (males)</td>
</tr>
<tr>
<td>Digestive Diseases (not included on Surgeon General’s list)</td>
<td>110% (females)</td>
</tr>
<tr>
<td></td>
<td>160% (males)</td>
</tr>
</tbody>
</table>

These increased estimates of associated deaths in smokers were not fully documented until these new findings were disclosed by the New England Journal of Medicine.

Later in this article we show a chart from this same New England Journal of Medicine study of the deaths from diseases that are officially recognized as being caused by cigarette smoking.
It’s Not Just the Lethal Diseases

Smokers are much more likely to contract viral infections (flu/cold) that leave them unproductive for extended time periods. One reason for this is that tobacco smoke adversely affects the immune system.

It also increases risk of acute myeloid leukemia which is sometimes curable after spending months in a hospital isolation unit undergoing aggressive chemotherapy followed by bone marrow transplants.16,17

The New England Journal of Medicine article reported on a host of wretched disorders that are far more prevalent in smokers that include:2

- Peptic ulcers
- Bowel obstructions
- Gallstones
- Diverticulitis
- Acute pancreatitis
- Gastric hemorrhage

Although these are not common direct causes of death, they account for millions of hospitalizations each year that the current healthcare system can no longer afford.

Research suggests that those who suffer pancreatitis are at higher risk of pancreatic cancer.18-20 Government statistics include pancreatic cancer as a smoking-attributable disease.2,3

Breast and Prostate Cancers

The Surgeon General has not yet concluded that cigarettes increase breast cancer risk. The New England Journal of Medicine report estimated the number of breast cancer deaths increased significantly based on smoking intensity and declined after cessation of smoking.2

The New England Journal of Medicine estimated the relative risk of death from prostate cancer to be about 40% higher among current smokers than among those who had never smoked.2

Interestingly, other studies show associations between smoking and progression of prostate cancer as well as prostate cancer-specific mortality among men with prostate cancer. These findings show the adverse impact of smoking on later stages of carcinogenesis, making it imperative that those with any malignancy stop smoking.21,22

Talking to Teenagers

When it comes to fulfilling my duty to educate teenagers to not start smoking, I tell them to not worry about all the terrible diseases they will inevitably get since that is so far into the future. I also tell them to not be concerned that the many economic costs associated with smoking as they could wind up squandering their money in other ways.

The one adverse guarantee I relate to teenagers is that once addicted, a smoker craves a new cigarette as often as every 30 minutes.23 In the old days, when smoking was permitted everywhere, this was not a problem.

Now that smoking is prohibited virtually everywhere, nicotine addicts spend most of their day suffering the miseries of unfulfilled cravings. A long plane flight represents a withdrawal nightmare, as does any form of indoor confinement for those who need to light up every 30 minutes or so.

The fact that a nicotine addict will be deprived most of the time they crave it has persuaded a number of younger individuals I know to never consider starting smoking.

I wish more schools emphasized this neglected reason (unfulfilled cravings) as a reason to never try a nicotine product.
Adding Up the Death Toll

Taking into account only 21 diseases known to be caused by smoking, the Surgeon General’s most recent report of smoking-attributable mortality appears to be a significant underestimate.

This is not meant to be a criticism of the Surgeon General. The table on the next page provides more than enough data on smoking-induced mortality to dissuade mature individuals from initiating this deadly habit.

The problem is that our society is failing to recognize the nearly 556,000 total annual deaths inflicted on Americans by all forms of tobacco. As a result, teenagers see stacks of attractively labeled tobacco packs sitting behind virtually every store checkout counter.

For a variety of illogical/illegal reasons, a startling number of teenagers gain access to these cigarettes on retail display while older smokers seeking to quit have 24 hour/day convenient access to their addictive drug.

How to Reduce Tobacco-Related Healthcare Costs

One reason smoking is so easily initiated, and why so many people are unable to quit, is that cigarettes are conveniently sold at retail outlets everywhere. It is a serious crime to sell a narcotic drug. Yet the most dangerous and highly addictive drug (nicotine laced cigarettes) is prominently displayed in pharmacies, grocery stores, gasoline stations, and convenience stores.

To legally buy cigarettes in most states, a person needs to be age 18. With such widespread retail distribution, however, underage smoking and its inherent addiction remains rampant.

The High Cost of Tobacco Addiction

• While the government puts the number of American deaths from cigarette smoking at 480,000, a recent New England Journal of Medicine report suggests that the real number is closer to 556,000.

• At least 41,000 Americans die yearly from secondhand smoke.

• Cigarette smoking is the most prominent cause of preventable death and disability.

• At least 16 million Americans struggle with a smoking-related illness, placing a further burden on Medicare and our inadequately staffed sick-care system.

• Aggressive efforts to reduce tobacco consumption would improve the health of countless people and reduce healthcare outlays almost immediately.

Smokers trying to quit suffer withdrawal agonies for weeks, but can easily succumb to temptation at a retail outlet where a pack of cigarettes can be purchased in seconds. Some retail outlets are open 24 hours a day, so the temptation for those trying to quit does not abate even when most other businesses are closed.

We think a substantial reduction in tobacco consumption would occur if more stores like CVS Pharmacy discontinued retail sales of cigarettes (and other tobacco products).

One reason I established the Life Extension Pharmacy® in 2008 is that I was infuriated that every major pharmacy chain had a wall of tobacco products behind the checkout counter of their stores. For a variety of bureaucratic reasons, our pharmacy did not generate enough sales to cover its overhead and we sold it to a quality compounding group (Posthaste Pharmacy) that does not sell cigarettes.
**Relative Risk of Death from Official Causes Related to Smoking Status**

This chart shows increases in deaths from specific causes in current cigarette smokers compared to a nonsmoking control group. These are the diseases the government counts when estimating tobacco-induced mortality.2

<table>
<thead>
<tr>
<th>Diseases Attributed to Smoking</th>
<th>Increased Relative Risk in Smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esophageal cancer</td>
<td>410% (females) 290% (males)</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>200% (females) 160% (males)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>50% (females) 60% (males)</td>
</tr>
<tr>
<td>Stroke (total)</td>
<td>110% (females) 90% (males)</td>
</tr>
<tr>
<td>Pancreatic cancer</td>
<td>90% (females) 60% (males)</td>
</tr>
<tr>
<td>Urinary bladder cancer</td>
<td>290% (females) 290% (males)</td>
</tr>
<tr>
<td>Atherosclerosis</td>
<td>110% (females) 400% (males)</td>
</tr>
<tr>
<td>Aortic aneurysm</td>
<td>910% (females) 650% (males)</td>
</tr>
<tr>
<td>Pneumonia, influenza, TB</td>
<td>90% (females) 100% (males)</td>
</tr>
<tr>
<td>COPD2</td>
<td>400% (females) 2,680% (males)</td>
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<tr>
<td>Colorectal cancer</td>
<td>60% (females) 40% (males)</td>
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<td>Lip/oral cancer</td>
<td>460% (females) 470% (males)</td>
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<tr>
<td>Liver cancer</td>
<td>80% (males) 130% (females)</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>2,190% (females) 2,430% (males)</td>
</tr>
</tbody>
</table>

If a terrorist group inflicted this kind of annual massacre on American citizens, our government would likely respond in a “nuclear” manner. Tobacco lobbyists continue to dominate government policies that could mitigate this critical public health issue.
Our mission at Life Extension® is to defeat aging and its degenerative processes. We are not in the anti-smoking advocacy business.

I only hope policymakers can find the fortitude to reject tobacco company payoffs and lobbying activities and intensify efforts to reduce the staggering carnage that tobacco addiction inflicts. It remains a major unresolved health issue.

Summary

Government figures underestimate the number of Americans who succumb to smoking-related death by 60,000 to 120,000 each year, according to an extensive analysis in the New England Journal of Medicine.

This study found that smokers, compared to non-smokers, have a significantly higher risk of dying from a number of diseases that are not formally recognized as being related to tobacco use, in addition to the 21 diseases that are officially recognized as related.

Also worth noting are the numerous nonlethal but nonetheless serious diseases that are more prevalent in smokers, such as bowel obstructions, peptic ulcers, gastric hemorrhage, and acute pancreatitis.

While various strategies such as tax hikes, warning mandates, and smoke-free zones have helped reduce deaths, almost one out of six Americans is a smoker, and one out of five smokers has a disability.

It’s absurd that while there are strict laws against the illicit sale of narcotics, nicotine-laced cigarettes—the most dangerous and highly addictive of drugs—are prominently displayed in stores and easily available.

We applaud businesses such as CVS Pharmacy, which has removed cigarettes from its stores. Other avenues to reduce tobacco consumption are urgently needed. The savings in both human lives and health-care costs would be enormous.

We Can’t Afford Tobacco-Induced Sick-Care Costs

The economic impact of widespread nicotine addiction is staggering. No matter how many taxes the government collects on cigarette sales, or how many people are employed in the tobacco industry, the healthcare costs borne by government and the private sector in treating sick smokers is always greater.

Medicare and other insurance programs face trillions of unfunded future liabilities that no one knows where the money will come from to pay. Cigarette smoking adds a significant burden to society’s future healthcare costs.

For this nation to remain solvent, creative ways of slashing future healthcare costs must be implemented.

Not a Trivial Matter

More aggressive means to reduce tobacco consumption will result in substantial reductions in healthcare outlays that would begin almost immediately.

By way of example, when indoor smoking bans were implemented in Ireland, sudden heart attacks requiring emergency room care dropped.24

Experts showed how walking through a room filled with tobacco smoke can induce acute angina or heart attack by constricting coronary arteries, causing blood to abnormally clot inside blood vessels and/or inducing rupture of unstable plaque inside coronary arteries.25,26

These startling data alone make it clear how injurious tobacco smoke is, and why huge healthcare savings will occur if smoking cessation programs were to succeed, something that is NOT happening enough today.

Relative to the nearly 556,000 annual deaths inflicted by tobacco in the United States, efforts to curb tobacco accessibility are woefully lacking.
If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.

References

Most commercial vitamin E supplements contain little, if any, gamma tocopherol. They instead rely on alpha tocopherol as the primary ingredient. However, it is gamma tocopherol (not the alpha form) that quenches peroxynitrite, the free radical that plays a major role in the development of age-related decline.¹

**SESAME LIGNANS: The Vitamin E Booster!**

Sesame and its lignans have been shown to protect against oxidation and help maintain already normal blood pressure.²,³

In addition, sesame lignans have been shown to increase gamma tocopherol in humans,⁴ which boosts its free radical fighting properties.

Suggested dose is one softgel daily.

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**References**

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As we age, **dopamine** levels in our brain decline due to excess levels of the **MAO-B enzyme**.

**Wild green oat extract** inhibits the MAO-B enzyme to promote healthy dopamine levels.¹-⁴

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

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

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**References**


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**Dopa-Mind™**

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

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Neuravena® is a registered trademark of Frutarom.
Zinc stimulates the activity of about 300 enzymes and fortifies the immune system.

Taking the best zinc lozenge is important for maintaining the body's natural defense system during the cold season—and throughout the year.

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References:

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Beneficial bacteria called *S. salivarius* K12 sustain throat health. Each FLORASSIST® Throat Health lozenge has 2 billion colony-forming units of *S. salivarius* K12 that:

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- Help provide probiotic balance for throat health
- Maintain overall good health

Naturally flavored with spearmint and cherry!

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Recent scientific findings indicate that aging is closely associated with a loss of the number and function of adult stem cells throughout the body.\textsuperscript{1-5}

Researchers have concluded that protecting those essential stem cells could play an important role in slowing and partially reversing aging.

Three studies published last year demonstrate that several nutraceutical compounds are capable of boosting stem cell function.

These studies revealed that extracts from berries and green tea, the dipeptide carnosine, and vitamin D—have the ability to favorably alter gene expression, and are capable of exerting powerful regulatory effects on stem cells and their environment.

These findings should help to crystallize the importance of utilizing natural molecules as a means of slowing aging.
Nutraceuticals Rescue Aging Stem Cells

Aging is associated with the loss of adult stem cell function (see sidebar). This has prompted interest in ways of improving stem cell functionality in maturing individuals.\(^6\)\(^-\)\(^8\)

It has been shown that connecting the circulation of an older animal with that of a younger one reduces the function of the younger animal’s muscle and brain stem cells and appears to accelerate aging.\(^4\)\(^,\)\(^7\) Components in the blood of the older animal interact with stem cells in the younger one, impairing their function.

Scientists at the James A. Haly Veterans Affair Hospital in Tampa tried to reverse that effect by treating older rats with a specific nutrient formulation, then observing the effects of the rats’ nutrient-rich blood on stem cells from other animals, both young and old.\(^7\)

They fed young and aged rats either a standard diet or a nutrient-rich diet composed of a mixture of blueberry, green tea, vitamin D, and carnosine—all nutrients with known cell-protective effects—for 28 days. At the end of that period, the researchers collected blood serum from the older, supplemented rats and applied it to cultures of adult rat stem cells. One group of stem cells came from the memory-intensive brain area called the hippocampus, and the other from bone marrow, where blood cells and platelets are formed.

Serum from aged rats that were on the control diet had the expected effect on the cultured stem cells: their division rates slowed dramatically, producing fewer new stem cells. But serum from the supplemented aged rats did not cause those changes, and in fact produced results not different from those of serum obtained from young rats. This study demonstrated that targeted nutrient supplementation alone could rescue aging stem cells involved in both brain and blood system functions.

Stem Cells and Aging

Stem cells, unlike any other cells in the body, can self-renew and differentiate into many different kinds of cells.\(^5\)

Early embryonic stem cells can differentiate into virtually any kind of cell, in any kind of tissue. Adults retain stem cells in all of their organs and tissues. Adult stem cells can still regenerate and differentiate, but usually only into mature cells in their particular tissue type.\(^4\)\(^,\)\(^5\)

When tissue is damaged, tissue-specific stem cells leap into action, quickly forming into functional replacements for the damaged cells.\(^4\)\(^,\)\(^5\)

In short, adult stem cells account for the healthy adult body’s ability to self-heal, and to retain its youthful vigor.

Recent studies now show that stem cell function declines with advancing age—falling victim to such threats as oxidative stress, inflammation, and DNA damage—and results in impaired ability of tissues and organs to repair themselves.\(^1\) In this way, aging itself is closely related to the accumulation of dysfunctional stem cells.\(^1\)\(^-\)\(^5\)

Fortunately, one of the very causes of stem cell dysfunction can now be leveraged to prevent or reverse such dysfunction. Regulation through favorable alterations in gene expression is considered a major means of establishing and maintaining normal stem cell activities.\(^2\)\(^,\)\(^4\) We can now provide to living stem cells substances that exert favorable changes.

A growing number of studies demonstrate that application of a number of molecules that support metabolic function, protect against oxidative stress, prevent inflammation, and protect DNA repair can enhance the numbers—and function—of aging stem cells.\(^9\)\(^,\)\(^11\)\(^,\)\(^12\)

The studies discussed in this article demonstrate that many commonly-used nutraceuticals may, in fact produce their age-decelerating, organ-protecting, and life-extending effects at least in part by protecting adult stem cells.

Hope for Multiple Sclerosis

The second important study recently published demonstrated the impact of vitamin D on brain stem cells in a mouse model of multiple sclerosis (MS). MS is an autoimmune disease that damages nerve cells by impairing their ability to conduct signals. While treatments can slow the disease, it is considered incurable.\(^8\)

Researchers used a mouse model of MS to determine whether vitamin D treatment could improve nerve function by protecting neuronal stem cells and by promoting their functions. Amazingly, they found that vitamin D supplementation reversed the nerve cell damage created by MS.\(^4\) Furthermore, they found that the supplement promoted the proliferation of neuronal stem cells, which contributed directly to improved brain function, and to their apparent recovery from MS. This study offered additional...
Research Update

insights into how vitamin D could directly contribute to alleviating a condition in which adult stem cell function is compromised.

**Beneficial Epigenetic Changes**

The third important study also focused on stem cells in the brain and the impact of specific nutrients on brain function. Here, the researchers based their work on the observation that the decline in aging brain stem cells appears to be closely associated with increased levels of inflammatory signaling molecules, or cytokines.6

They supplemented rats with carnosine, blueberry, green tea, and vitamin D, the same group of nutrients previously proven to rescue aging stem cells. They found that supplemented animals had a large number of changes in the expression of genes concerned with a range of cellular functions. More specifically, they helped reduce proinflammatory cytokines, while increasing anti-inflammatory cytokines. The reduction in inflammation would explain the beneficial effects of the nutrients on stem cell function demonstrated in previous experiments.9

But the researchers dug deeper and made a remarkable discovery—the nutrient combination increased the production of genes that prompt progenitor cells (stem-like cells living in brain tissue) into becoming functioning adult neurons. In other words, it helped create healthy new brain cells.

This study powerfully demonstrates how targeted nutrients can favorably alter the environment faced by tissue stem cells in the brain, reducing the risk that they will develop into impaired, aged stem cells, and promoting their development instead into functioning adult brain cells. This is especially important for those at risk for neurodegenerative diseases like Alzheimer’s and Parkinson’s. These diseases are known to be associated with declining rates of brain cell renewal, which we now recognize requires healthy stem cells.6,10

Together, these three recent studies strongly indicate that specific nutrients can produce tremendous effects on adult tissue stem cells, helping protect them against the destructive impact of environmental factors, and preserving their ability to naturally heal tissues and restore their youthful function.

Let’s now turn to a brief review of the stem cell-protecting properties of some other familiar nutrients.

**Nutrients Promote Stem Cell Vigor**

One large group of researchers has published extensively on their studies with a nutrient combination containing polyphenols from blueberry and green tea, as well as carnosine and vitamin D. Their work has shown that these nutrients promote the proliferation of healthy human adult stem cells, protect those cells from the destructive effects of oxidative stress, and produce improved cognitive and memory function in animals as a result of enhanced brain stem cell proliferation.9,11,12

Numerous other studies show that other common, readily-available nutritional supplements can also boost stem cell function in a meaningful way, to further slow stem cell-related aging. Let’s take a look at the highlights:

- In one study, a supplement containing green tea, astragalus, goji berry extracts, ellagic acid, and vitamin D fermented with a probiotic Lactobacillus species, was given to human volunteers twice daily for 2 weeks. Within a day, and continuing for the rest of the study, researchers detected significant increases in circulating bone marrow stem cells. They believe this was caused by stimulation of the body’s natural repair mechanisms (stem cells) by the nutraceutical combination.13
• **Blueberry extracts** are rich in polyphenols, which are highly protective molecules associated with a host of health benefits. A study in rats showed that supplementing animals in early life with a blueberry-enriched diet prevented bone loss (osteoporosis) at menopause.14 Closer examination of the protective effect revealed that the blueberry supplement stimulated bone-forming stem cells to mature into active bone-mineralizing cells. This action reduced the high post-menopausal rate of bone turnover that, in humans, results in easy fractures.14,15

• **Spirulina** is a blue-green algae that is known for its anti-inflammatory properties. A recent study showed that spirulina could prevent inflammation-induced decreases in brain stem cell proliferation that accumulates with aging.16 This resulted in improved functioning of stem cell mitochondria, which improved energy utilization and reduced oxidative stress.

**Summary**

Recent research has revealed the crucial role of adult stem cells in promoting healing and regeneration following damage. Over time, their loss of function deprives our tissues of their youthful ability to recover from damage and regenerate themselves. This contributes to the loss of function that we see as aging.

The good news is that rejuve- nating those adult stem cells can lead to a partial reversal of aging in our tissues. Even better, three landmark studies have shown us that rejuvenation of adult tissue stem cells is within our reach.

Supplementation with a variety of nutrients has been shown to restore the healing and regenerative capacities of aging adult stem cells, and results in the restoration of youthful function to the tissues where those stem cells reside.

The pace of scientific discovery in the nutrients realm continues to accelerate, opening the real possibility that many other nutraceuticals will be found to exert their health-promoting effects at least in part by stimulating stem cell recovery.

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

**References**

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- **Cordyceps**, promotes endurance⁸ and enhanced immune function,⁹ and

- **Holy basil**, supports balanced levels of neurotransmitters⁰ and blood sugar¹¹ for those already within the normal range, and enhances mood.¹²

**References**

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Super Foods

Teff
The Gluten Free Super Grain

Teff, a cereal grain grown mostly in Eritrea and Ethiopia, has been used for many centuries in African and Arabian countries, but has only begun gaining popularity in the US in recent years. As appreciation for Teff’s many nutritional benefits has grown, it has become widely available in health food stores and through various online sources. Teff, which thrives even in harsh climates, has a mild, nutty flavor.

Health benefits of teff include:

Gluten Sensitivity
Teff is gluten free, making it a good alternative grain for people who have gluten sensitivity or celiac disease.1-3

Amino Acids
Teff is an excellent source of lysine, among other essential amino acids. (Most other grains are lacking in lysine, making Teff unusual in that respect.) Lysine is an important building block of protein, and it may help maintain nitrogen balance in the body and help prevent the detrimental process of glycation.1,4

Essential Minerals
Essential minerals such as potassium and calcium are much more abundant in teff compared with other grains. Teff also is rich in fiber, and its iron content is easily absorbed by the body.1,5

Blood Sugar Control
For those who are diabetic or prediabetic, teff added to your diet could help blood glucose levels because it’s roughly 20% to 40% made up of resistant starches and has a low glycemic index.1,6

Vitamin C
Grains in general aren’t known for their vitamin content, and tend to be particularly lacking in vitamin C. The opposite is true for teff, which contains significant amounts of vitamin C,7 which is crucial for the immune system amongst other functions.

References
It’s not easy to get in five servings of vegetables a day—and even if you do, cooking can destroy many of the protective compounds found in broccoli, Brussels sprouts, cauliflower, and celery.

**Triple Action Cruciferous Vegetable Extract** combines vital plant extracts that have been shown to protect cellular DNA.

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Dr. Edward Rosick believes that illness should be stopped through prevention before it has a chance to infiltrate our bodies.

As a triple board-certified (in preventive medicine, holistic medicine and public health), physician and writer living in Michigan, Dr. Rosick says he is committed to helping as many people as possible to reach a state of optimum health and well-being, which he describes as “truly the basis for a joyful life.”

Dr. Rosick’s medical philosophy is simple and common-sense, yet grounded in cutting edge science. As he explains it, “Through a well-balanced diet, the appropriate supplements and hormones, a regular exercise regime and some type of stress reduction (be it meditation, prayer, yoga, etc.), the vast majority of chronic diseases, which are the top killers in the western world today—Alzheimer’s, cancer, heart disease, strokes, and type II diabetes—can be prevented, allowing people to live long, healthy, productive and happy lives.”

In this interview with Life Extension®, Dr. Rosick kindly consented to an in-depth discussion of his fascinating new book, Optimal Prevention: Common-Sense Ways to Avoid the Five Most Common Killer Diseases Today.
LE: What kind of a role can supplements play in preventive medicine? You occasionally see articles critical of them in the mainstream press.

ER: Yesterday, as I was checking out at my local grocery store, I picked up a copy of Reader's Digest and read an article warning people about the “dangers” of supplements. I don’t know where Reader’s Digest gets the authors to write these articles, but I do know from writing over three hundred articles on supplements and integrative medicine that not only is the wise use of supplements not harmful, it can help protect you from the diseases that affect and kill millions of people every year. Recently, the Lewin Group, a leading analytical firm, released information showing that the use of some simple, safe supplements could save over $24 billion in healthcare costs.

LE: What were some of the health benefits they found, and what would be the overall savings in healthcare costs for each?

ER: For example, if the 25% of American women of childbearing age who don’t take folic acid would do so, the number of neural tube defects in their children could be substantially reduced, saving $1.4 billion over the span of five years.

Another example—if men and women on Medicare began regularly taking calcium and vitamin D supplements, almost 800,000 hospitalizations for hip fractures could be prevented, saving more than $16 billion, again, over a five-year span.

One more—if more middle-aged and elderly people began taking omega-3 fatty acid supplements, about 375,000 hospitalizations and visits to doctors for heart disease could be prevented, saving over $3 billion a year.

LE: Let’s talk about some other specific supplements and their benefits. Magnesium, for instance.

ER: This common mineral has been shown in a number of studies to play an important role in preventing or treating a number of cardiovascular illnesses, including atherosclerosis, congestive heart disease, ischemic heart disease, sudden cardiac death, and cardiac arrhythmias. With an impressive résumé like that, it’s no wonder that magnesium is a front-line therapy for heart-disease prevention and a supplement that I recommend to almost all my patients.

LE: How about some relatively overlooked nutrients such as zeaxanthin?

ER: Zeaxanthin may be important in maintaining a healthy brain and avoiding Alzheimer’s. Researchers in France conducted a nine-year study on over 1,300 elderly men and women. The results showed that those men and women who had a decline in their cognitive abilities, which is often an early sign of Alzheimer’s, also had the lowest levels of zeaxanthin in their blood.

LE: There are also a lot of studies showing the benefits of carnosine, aren’t there?

ER: Carnosine is an extremely safe compound that’s composed of the amino acids beta-alanine and L-histidine and should be on your daily supplement list. Carnosine may help prevent Alzheimer’s by inhibiting advanced glycation end-product formation and fighting free radicals. It has also been shown (at least in lab studies) to protect against the ravages of beta-amyloid formation. While more definitive human studies need to be done to confirm its potential, I see no reason why carnosine shouldn’t be used in the fight to prevent Alzheimer’s.

LE: Diabetes is a growing problem in the US. Is it true that testosterone can help keep it at bay?
**ER:** I hope you read it from cover to cover and implement whatever is right for you. On a larger scale, learn more about prevention and then educate your friends, your relatives, and even your physician. Finally, in a perfect world, the government would wake from its bureaucratic stupor and realize that putting money into preventive medicine would save both lives and money. So write and call your congressional representatives and senators at both the state and national level—if there’s one thing politicians respond to, it’s an active and engaged populace!

**LE:** Let’s talk about pesticides. How hazardous are they?

**ER:** Walk into the gardening section of any large store and you’ll see row after row of pesticides. While you might think they must be safe or the government wouldn’t allow them to be sold, think again. A report published in the journal *Occupational and Environmental Medicine* shows that pesticide exposure may increase your risk of brain cancer. Yet despite this information, pesticides are still sold in abundance at most local gardening stores.

In a study of almost 700 adults with brain tumors in France, researchers found that in agricultural workers—who have a high exposure to commonly used pesticides—risk of developing brain cancer was 29% greater than it was in people without exposure to pesticides. Even more frightening, the researchers found that people who used pesticides around their house were twice as likely to be diagnosed with brain cancer as people who didn’t use pesticides.

**LE:** In closing, what message would you like to send to readers of your book?

**ER:** The evidence shows that optimal testosterone levels protect men against Alzheimer’s, heart disease, and strokes. But it also helps protect men against the ravages of diabetes, yes.

A review article in *The Diabetes Educator* gave a succinct overview on the use of testosterone replacement therapy to prevent diabetes in aging men. Studies have consistently shown that testosterone levels are significantly lower in men with type II diabetes. Just as important, other studies have shown that men with higher testosterone levels had a 42% lower risk of developing type II diabetes! Now I don’t know about you, but if a drug came out that could not only protect men against Alzheimer’s, heart disease, and strokes—and could decrease your chance of developing diabetes by 42%—men and their significant others would be breaking down their doctors’ doors to get a prescription for it. Fortunately, that substance—testosterone—is already here, so make sure your doctor is willing—and knowledgeable—about testosterone replacement therapy, then start preventing diabetes now!
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The Grain Bowl

Unlike commonly used grains such as wheat that are often refined and cause glucose to spike, whole grains have been increasingly recognized in recent years for their health benefits, including their association with lower cholesterol and blood pressure as well as cutting markers of inflammation. Touting the benefits of whole grains, Lilian Cheung, DSc, RD, a lecturer in nutrition at Harvard School of Public health, says, “You’re getting fiber, a healthy plant-based protein, vitamins, minerals, and a variety of phytochemicals that will improve your health” when you make whole grains a part of your diet.

Restaurateur Nik Williamson shares his sentiments. Around the world, restaurants have been adding more whole grain-based meals to their menus. In 2015, Williamson took the trend a step further by opening The Porridge Café in London’s fashionable East End. The eatery was a big success, featuring an entire menu of dishes based on a wide variety of grains—oats, rye, quinoa, chia, spelt, barley, buckwheat, amaranth, millet, and black rice. Now, he’s channeled his enthusiasm for grains into a new cookbook titled The Grain Bowl (Phaidon).

We present below a selection of recipes from The Grain Bowl that are as easy to prepare as they are delicious and nutritious.
Put the garlic, ginger, and olive oil into a mortar and use a pestle (or a small food processor) to grind them until you have a paste.

Put 2 cups of the broth (stock) into a medium pan and bring to a simmer. Add the black rice and allow to simmer, covered, over low heat for 30 minutes, or until almost all the broth has been absorbed. Remove from the heat, cover, and set aside.

Sprinkle the chicken with a little flour. Heat a small skillet (frying pan) over high heat, add a little olive oil, then the chicken thighs. Do not move the thighs or shake the pan; this allows caramelization to take place.

Turn the thighs after a couple of minutes. Reduce the heat a little and cook for another few minutes. Once cooked all the way through, remove the chicken thighs from the heat and shred the meat on a clean cutting board. Add the remaining ½ cup broth to the black rice, along with the garlic-ginger paste, and stir over low heat for 10 minutes.

Divide the rice between 2 bowls and top with chicken, nuts, soy sauce, and scallions. Season with salt and pepper to taste, and serve.

**Black Rice Chicken Congee**

Serves 2 • Preparation 5 minutes • Cooking 50 minutes

- 2 garlic cloves, peeled
- 2 tablespoons coarsely chopped fresh ginger
- 1 teaspoon olive oil, plus extra for frying
- 2 ½ cups chicken broth (stock)
- ½ cup black rice
- 2 large boneless chicken thighs
- All-purpose (plain) flour, for dusting
- 2 tablespoons salted peanuts or cashews, coarsely chopped
- 2 tablespoons light soy sauce
- 2 scallions, coarsely chopped
- Salt and black pepper
Farro with Beets, Feta, Poached Eggs, and Capers

Serves 2 • Preparation 10 minutes • Cooking 30-45 minutes

- 11 oz. cooked beets, not in vinegar
- 2 tablespoons vegetable oil
- ½ cup pearled Italian farro (pearled spelt)
- Splash of madeira
- 1 ¼ cups warm vegetable broth (stock)
- 2 eggs
- 2 tablespoons white wine vinegar
- 2 oz. feta, cubed
- 1 tablespoon capers
- Salt and black pepper

Put 9 oz. of the cooked beets into a food processor and puree. Cut the remaining beets into medium dice.

Place a medium pan over medium heat, add the oil and farro (pearled spelt). Stir and cook for 2 minutes. Add the madeira and the broth (stock). Cook for 20 minutes, stirring occasionally, until almost all the liquid has been absorbed. Add the beet puree and cook for 5-10 minutes, or until that also has almost been absorbed.

When the beet mixture is almost ready, bring a pan of water to simmer over medium heat, add the vinegar and stir the water clockwise with a spoon to create a whirlpool. Crack the eggs and drop them, one at a time, into the center of the swirling water but make sure they do not touch each other. The eggs should take 2-3 minutes to cook. The fresher the eggs, the more likely they are to form a perfectly poached egg. Use a slotted spoon to prod an egg white to see if it’s firm; if it is then immediately remove the eggs from the water and set aside on a plate lined with paper towels.

Divide the beet farro between 2 bowls. Top with the poached eggs, cubed feta, and diced beets and scatter with the capers. Season with salt and pepper to serve.
Rye and Barley with Sweet Peppers, Arugula, and Chile

Serves 2 • Preparation 5 minutes • Cooking 12-13 minutes

4 tablespoons olive oil
1 teaspoon dried oregano
1 small red chile, finely diced
½ onion, finely chopped
1 garlic clove, finely chopped
1 ½ cups mixed rye and barley flakes
2 ½ cups vegetable broth
1 teaspoon finely grated lemon zest
1 sweet pepper (preserved) cut into long strands
1 small handful of arugula
2 lemon wedges
Salt and black pepper

Place a heavy pan over medium heat and add 1 tablespoon of the olive oil, the oregano, chile, onion, and garlic and sweat for 2-3 minutes. Add the grains and cook for 3-4 minutes, stirring constantly to prevent the grains from burning.

Pour in the broth (stock), add the lemon zest, and season with salt to taste. Reduce the heat to low and simmer for 7-8 minutes, or until all the liquid has been absorbed and the grains are soft.

Divide the rye and barley between 2 bowls. Top with the sweet pepper strands, arugula (rocket), and the lemon wedges to serve.
Buckwheat with Crispy Bacon, Avocado, and Roasted Tomatoes

Serves 2 • Preparation 10 minutes • Cooking 1¼ hours

4 slices pancetta or lean bacon
1 lb. cherry tomatoes
4 tablespoons extra virgin olive oil
2 teaspoons dried oregano
2 tablespoons olive oil
1 onion, finely chopped
2 garlic cloves, finely chopped
1 cup buckwheat
¼ cup red wine
2 teaspoons grated parmesan
½ avocado, sliced
Salt and black pepper

Place a skillet over medium heat. Add the pancetta or bacon and allow to crisp, then turn over to crisp on other side. Remove from the heat, set aside on a plate lined with paper towels, then snip into small pieces.

Preheat the oven to 350°.

Put the tomatoes into a baking dish, add the extra virgin olive oil, and turn to coat them. Sprinkle with the oregano and some salt and pepper. Bake in the oven for 45 minutes, or until just black at the edges. Remove from the oven. Reserve a few tomatoes for the garnish and put the rest into a blender and blend to puree.

Place a medium pan over medium heat. Add 1 tablespoon of the olive oil, the onion and garlic, and cook for 2-3 minutes, or until translucent. Add the buckwheat and pour in the red wine. Allow the wine to be absorbed by the buckwheat, then add the tomato puree. Cook for 20 minutes, or until the puree has almost all been absorbed. Remove from the heat.

Stir in the Parmesan and divide the buckwheat between 2 plates. Top with avocado, pancetta or bacon, and reserved tomatoes. Sprinkle with a little salt and pepper to serve.
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With **1,000 mcg** iodine, this is ideal for those who may be iodine-deficient due to a salt-restricted diet

<table>
<thead>
<tr>
<th>Retail Price</th>
<th>Your Price</th>
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<td>$14</td>
<td>$10.50</td>
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<td>$9.38 each</td>
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**Vitamin D3 • 7,000 IU**
Item #01718 • 60 softgels
For individuals who need higher levels, including those who weigh over 180 pounds

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**Vitamin D3 • 2,000 IU (Natural Mint Flavor)**
Item #01732 • 1 ounce
Great for traveling or for those who have trouble swallowing a softgel or capsule
(Also available without mint. Item #00864)

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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.

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.
Dr. Robert Willix is the kind of guy who describes training for the IRONMAN triathlon in the brutal South Florida sun as “so much fun”—and this isn’t even the most surprising thing about his bid to compete in his second IRONMAN.

At 75 years old, Dr. Willix is pushing himself to the physical and mental limit to qualify for one of the hardest, most competitive athletic events in the world. He completed his first IRONMAN forty years ago and says he always thought it would be good to go back to Hawaii, where the renowned triathlon was founded in 1978.

“Finishing an IRONMAN is a life-changing event. Once you do it, it’s in your blood. I wanted to see if I could do it again. Would my body hold up? Would I get injured? Could I actually do it?”
Dr. Willix’s road to the IRONMAN began long before he landed in Hawaii decades ago. “When I was 35, I was operating on a 34-year-old and I had this sudden vision that he could have been me,” Willix said. “He was overweight. I was overweight. He had a high-stress job. I had a high-stress job.”

Hoping to change his life, Dr. Willix quit heart surgery, became a vegan, and began training for marathons and triathlons. He completed his first IRONMAN in 1984 at the age of 44. Back then, the IRONMAN was still relatively new, but it was no less grueling than it is today. Competitors swim 2.4 miles in the open ocean, compete in a 112-mile bike race, and run a full 26.2 mile marathon, all on the same day.

Unfortunately, Dr. Willix’s career in endurance sports ended only a year later, when he was involved in a serious car accident while training for another triathlon. After that, “life happened” as Dr. Willix built his career in medicine, later opening the Enlightened Medicine Clinic in Boca Raton, Florida. But he never lost his competitive fire—and never allowed his own conditioning and health to deteriorate.

Today, as he contemplates going back to Hawaii, he’s facing a very different challenge. Athletes have to compete in qualifying events to get an invitation, which means Dr. Willix will first have to clear the competitive field in his age group in a November qualifying triathlon. And with his son as his coach (also an endurance athlete), Dr. Willix is adjusting to a different kind of training regimen.

Since his first IRONMAN, training has dramatically changed. In the old days, training for a triathlon was all about logging distance. You swam a few miles, ran 40 miles a week, biked a few hundred miles—the distance was the goal.

Today, Dr. Willix says training is much more complex and strategic. “Where we used to aim for distance, now we aim for intensity, in part because most of us have jobs. I don’t have four hours a day to train, so I train for two hours a day, doing things like interval training, wind sprints. You aim for peak intensity.”

While the training has taken a toll on him—he suffered a partially separated shoulder earlier this year when he fell off his bike and then rode 14 miles home—he says the training is its own reward. “You feel great when you’re physically fit. That’s true at 40, 60, 70, or 90. I feel great right now. It’s more mental than physical.”

To support this rigorous training program, Dr. Willix has designed comprehensive and highly personalized supplements for himself. “Because I’m training, I have more inflammation. I’m concentrating on vegan supplements that reduce inflammation, like clary sage oil, turmeric, and curcumin. I also take coenzyme Q10.”

The foundation of his supplement program is a multivitamin he designed himself and has micro-encapsulized at an overseas supplier.
Wellness Profile

“...The multivitamin is a base of what you do,” he explains. “When it comes to a good multi, you really have to look at several things. Is there enough vitamin B? If not, add an additional vitamin B complex. Is there enough vitamin A? A multivitamin is when you really should be looking at what’s next in your life and what’s important at your age.”

Because most people don’t have the expertise to formulate their own supplements, Dr. Willix recommends the Life Extension® multivitamins, including the Two-Per-Day and Life Extension Mix™.

To boost his athletic performance, Dr. Willix also takes protein powders mixed into “green” drinks and is considering adding amino acids to support muscle recovery and building.

He recommends that adults get a vitamin D test and supplement with vitamin D to bring levels up to a safer blood concentration. “We know that most people are deficient in vitamin D,” he says.

For men, Dr. Willix is also a believer in supplements that reduce benign prostatic hyperplasia (BPH), including saw palmetto and pygeum, plus indole-3-carbinol or I3C to naturally support healthy testosterone levels.

When it comes to testosterone, Dr. Willix believes the best option for aging men is to “make it themselves whenever possible.” This might include testosterone-boosting herbs and regular exercise.

“They used to say you only needed to exercise three days a week, but now we’re finding it’s more like five days a week. The good news is that you don’t have to exercise for very long to get the benefits. Thirty minutes a day is plenty, but it’s so important.”

Ideally, men over 40 should start having regular tests for total testosterone, free testosterone, estradiol, luteinizing hormone, DHT, and sex-hormone binding globulin tests. If tests reveal a testosterone deficiency, they should take action to correct it.

“I think there’s pretty good evidence that males starting around age 30 begin to lose testosterone,” he said. “Normal testosterone levels should be where they were at when you were in your twenties.”

If exercise and supplementation doesn’t work to adequately raise testosterone levels, Dr. Willix recommends testosterone supplementation. In fact, testosterone supplementation is an important part of his personal health program.

“There’s strong evidence that bioidentical testosterone will preserve muscle mass and vigor,” he says. “And for men who are worried about prostate cancer, there’s absolutely no evidence that testosterone supplementation has anything to do with prostate cancer. That’s a myth that’s been in medicine for years and it’s dead wrong.”
Why Doctors Shouldn’t Look for “Disease”

No matter what happens at his qualifying race, Dr. Willix is still an inspiring example of what’s possible—and this is no accident. Dr. Willix believes that doctors should be the ultimate role models for health, and he relies on his own comprehensive approach to keep him in top shape. This includes physical fitness, nutrition, supplementation, hormone replacement therapy, stress control, and spirituality.

“I believe that physicians have to become the model for their patients. I live the lifestyle I want my patients to live.”

In many cases, this begins with education and helping patients understand how the environment affects their health. As an example, Dr. Willix points to the dangerous ingredients and synthetic hormones that pollute our food supply, not to mention the alarming lack of physical activity most people get and the many stresses of modern life.

“There are so many toxic things going on in the environment that we didn’t have 100 years ago,” he says.

The rampant use of hormones in agriculture and industry poses a special challenge. In his own practice, Dr. Willix has observed that 40-year-old men often have lower testosterone levels than men in their 60s and believes it’s due to the heavy use of hormones in meat and dairy farming that began in recent decades.

Overall, he believes good health is achieved through balance—eating a healthy diet of wholesome food, getting adequate daily exercise, reducing stress, maintaining a youthful hormone profile, having a strong spiritual connection, and visiting your doctor so you can keep track of your true measures of health.

“I’ve been teaching fitness, exercise, and nutrition since I left heart surgery,” he says. “It’s hard to motivate people. But if you can show them that they can get their energy back and bring their inner athlete back out, that’s a great motivation. People are almost always ready to change.”

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

For more information about Dr. Willix and Enlightened Living Medicine, please visit http://elmedicine.com/
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**Blood Testing The Ultimate Information**

**Most Popular Panels**

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<thead>
<tr>
<th>Panel Description</th>
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<td><strong>Comprehensive Panels</strong></td>
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<td>C-Reactive Protein</td>
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<td>Homocysteine</td>
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<td>DHEA-S</td>
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<tr>
<td>Free Testosterone</td>
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<td>TSH for thyroid function</td>
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<td>Total Testosterone</td>
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<td>Free Testosterone</td>
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<td>TSH for thyroid function</td>
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<td>Estradiol</td>
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<td>Vitamin B12 and Folate, Insulin</td>
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<td>Cortisol, Free T4, Reverse T3, Insulin,</td>
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<td>Hemoglobin AlC, Vitamin D 25-hydroxy, C-</td>
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<td>D 25-OH, hs-CRP, Ferritin, Homocysteine</td>
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<td>*<em>Male Hormone Add-on Panel (LCADDM)</em></td>
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<tr>
<td>Pregnenolone and Dihydrotestosterone (DHT)</td>
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<td>To provide an even more in-depth analysis of a man's hormone status, Life Extension has created this panel as an addition to the Male Life Extension Panel.</td>
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<td>*<em>Female Hormone Add-on Panel (LCADDf)</em></td>
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<tr>
<td>Pregnenolone and Total Estrogens</td>
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<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.</td>
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<td>TPO, ATA</td>
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**Cardiovascular Risk Profile**

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<td>HDL Cholesterol</td>
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<td>LDL Cholesterol</td>
<td>Glucose</td>
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<td>Triglycerides</td>
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**Liver Function Panel**

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<td>ALT (SGPT)</td>
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**Kidney Function Panel**

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<td>Uric Acid</td>
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**Blood Protein Levels**

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<td>Albumin</td>
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**Blood Count/red and White Blood**

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<tr>
<td>White Blood Cell Count</td>
<td>Lymphocytes</td>
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<tr>
<td>Eosinophils</td>
<td>Platelet Count</td>
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<tr>
<td>Basophils</td>
<td>Hemoglobin</td>
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<tr>
<td>Polys (Absolute)</td>
<td>Hematocrit</td>
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<tr>
<td>Lymphs (Absolute)</td>
<td>MCV</td>
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<tr>
<td>Monocyes (Absolute)</td>
<td>MCH</td>
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<tr>
<td>Eos (Absolute)</td>
<td>MCHC</td>
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<tr>
<td>Baso (Absolute)</td>
<td>Polynucleated Cells</td>
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**Rdv**

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<td>Calcium</td>
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<td>Potassium</td>
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<td>Phosphorus</td>
<td>Iron</td>
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**Blood Mineral Panel**

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<td>Calcium</td>
<td>Sodium</td>
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<tr>
<td>Potassium</td>
<td>Chloride</td>
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<tr>
<td>Phosphorus</td>
<td>Iron</td>
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**Male Comprehensive Hormone Panel* (LC100010)**

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<th>Description</th>
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<td>CBC/Chemistry Profile, DHEA-S, Estradiol, DHT, PSA, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3, Free T4, Cortisol.</td>
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**Female Comprehensive Hormone Panel* (LC100011)**

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<td>CBC/Chemistry Profile, DHEA-S, Estradiol, Total Estragons, Progesterone, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3, Free T4, Cortisol.</td>
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**Food Safe Allergy Test** (LCM73001)

This test measures delayed (IgG) food allergies for 95 common foods.

<table>
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<th>Test</th>
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**Stress Management Panel** (LC100043)

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<td>Cortisol AM/PM, DHEA-S, Glucose, Insulin, Progesterone, Free T3, LpId, Panel</td>
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**Adrenal Stress Profile* (LC100046)**

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<tr>
<td>Cortisol X4, DHEA-S, Cortisol AM/DHEA-S ratio, Secretory IgA</td>
<td></td>
</tr>
</tbody>
</table>

**Basic Cortisol Profile** (LC100047)

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortisol X4 to measure cortisol rhythm over time.</td>
<td></td>
</tr>
</tbody>
</table>

**Sleep Hormones Profile-Saliva** (LC100048)

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortisol and Melatonin plus ratio.</td>
<td></td>
</tr>
</tbody>
</table>

**Mthfr/Comt Genetic Methylation Profile** (LC100045)

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests for genetic mutations in MTHFR and COMT.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes:**

- Blood testing provides the ultimate information regarding correctable risk factors that may predispose you to disorders such as cancer, diabetes, cardiovascular disease, and more. Information about general health and nutritional status can also be gained through standard blood analysis. Standing behind the belief that blood testing is an essential component of any program designed to attain optimal health and longevity, Life Extension offers this innovative and convenient service at a very affordable price. Not only is comprehensive blood testing an important step in safeguarding your health, it is a simple process from virtually anywhere in the United States.

- The Ultimate Information provides the most comprehensive panel designs available. Each panel has been carefully designed to meet the needs of our customers. Please see a description of all panels on our web site or call us and one of our knowledgeable Wellness Specialists will be happy to help you select the panel that best suits your needs.

- The Price includes all tests listed on the panel. The Price does not include tests added to a panel or an additional local draw fee, if one is incurred (Please note: If a blood draw kit is used, an additional local draw fee may be incurred.)

- For the resident of Florida, please note that these tests,/results are not covered by your PPO insurance and are not eligible for preapproval.
**OTHER POPULAR TESTS AND PANELS**

<table>
<thead>
<tr>
<th>Panel Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTHY AGING PANEL-COMPREHENSIVE* (LC100026)</td>
<td>$249</td>
</tr>
<tr>
<td>HEALTHY AGING PANEL-BASIC* (LC100025)</td>
<td>$149</td>
</tr>
<tr>
<td>CBC/Chemistry profile, C-Reactive Protein (high sensitivity), Vitamin B12, Folate, Vitamin D 25-hydroxy, Hemoglobin A1C, TSH, Ferritin, and Insulin.</td>
<td></td>
</tr>
<tr>
<td>NMR LIPOPROFILE® (LC123810)</td>
<td>$99</td>
</tr>
<tr>
<td>The NMR LipopProfile® directly measures LDL particle size and number as well as HDL particle number, total cholesterol, and triglycerides. It also provides a calculation of one’s risk of insulin resistance by assessing abnormalities in lipoprotein markers.</td>
<td></td>
</tr>
<tr>
<td>ANEMIA PANEL* (LC100006)</td>
<td>$79</td>
</tr>
<tr>
<td>CBC/Chemistry Profile, Ferritin, Total Iron Binding Capacity (TIBC), Vitamin B12, Folate</td>
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<tr>
<td>AUTOIMMUNE DISEASE SCREEN* (LC100041)</td>
<td>$199</td>
</tr>
<tr>
<td>ANA screen, hs-CRP, TNF-alpha, Immunoglobulins, IgA, IgG, IgM</td>
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<tr>
<td>DIABETES MANAGEMENT PROFILE – COMPREHENSIVE (LC100040)</td>
<td>$129</td>
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<tr>
<td>Hemoglobin A1C, Glucose, Insulin, Lipid Panel, Glycmark</td>
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</tr>
<tr>
<td>DIABETES MANAGEMENT PROFILE – BASIC (LC100039)</td>
<td>$39</td>
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<tr>
<td>Hemoglobin A1C, Glucose, Insulin</td>
<td></td>
</tr>
<tr>
<td>ADVANCED CARDIAC BIOMARKERS</td>
<td>$285</td>
</tr>
<tr>
<td>ADVANCED OXIDIZED LDL PANEL* (LC100035)</td>
<td>$285</td>
</tr>
<tr>
<td>This panel looks at vascular inflammatory biomarkers, beginning with lifestyle choices to the development of metabolic as well as cardiovascular disease and the formation of vulnerable plaque. The panel contains the following tests: F2-Isoprostanes, Myeloperoxidase, and Oxidized LDL.</td>
<td></td>
</tr>
<tr>
<td>OXIDIZED LDL PANEL* (LC100034)</td>
<td>$175</td>
</tr>
<tr>
<td>This panel looks at vascular inflammatory biomarkers, beginning with the development of metabolic as well as cardiovascular disease and the formation of vulnerable plaque. The panel contains the following tests: Myeloperoxidase and Oxidized LDL.</td>
<td></td>
</tr>
<tr>
<td>OMEGA CHECK™ (LC0MEGA)</td>
<td>$131.25</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 ration allowing you to determine and track a major factor in total body inflammation.</td>
<td></td>
</tr>
</tbody>
</table>

**HORMONES**

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHEA-SULFATE (LC004020)</td>
<td>$61</td>
</tr>
<tr>
<td>Male BASIC HORMONE PANEL (LC100012)</td>
<td>$75</td>
</tr>
<tr>
<td>DHEA-S, Estradiol, Free and Total Testosterone, PSA</td>
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<tr>
<td>FEMALE BASIC HORMONE PANEL (LC100013)</td>
<td>$75</td>
</tr>
<tr>
<td>DHEA-S, Estradiol, Free and Total Testosterone, Progesterone</td>
<td></td>
</tr>
<tr>
<td>DIHYDROTESTOSTERONE (DHT)* (LC500142)</td>
<td>$50</td>
</tr>
<tr>
<td>ESTRADIOL (LC004515)</td>
<td>$33</td>
</tr>
<tr>
<td>For men and women. Determines the proper amount in the body.</td>
<td></td>
</tr>
<tr>
<td>INSULIN FASTING (LC004333)</td>
<td>$29.90</td>
</tr>
<tr>
<td>Can predict those at risk of diabetes, obesity, heart and other diseases.</td>
<td></td>
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<tr>
<td>PREGNENOLONE* (LC140707)</td>
<td>$116</td>
</tr>
<tr>
<td>Used to determine ovarian failure, hirsutism, adrenal carcinoma, and Cushing’s syndrome.</td>
<td></td>
</tr>
<tr>
<td>PROGESTERONE (LC004317)</td>
<td>$55</td>
</tr>
<tr>
<td>Primarily for women. Determines the proper amount in the body.</td>
<td></td>
</tr>
<tr>
<td>SEX HORMONE BINDING GLOBULIN (SHBG) (LC082016)</td>
<td>$33</td>
</tr>
<tr>
<td>This test is used to monitor SHBG levels which are under the positive control of estrogens and thyroid hormones, and suppressed by androgens.</td>
<td></td>
</tr>
</tbody>
</table>

**GENERAL HEALTH**

<table>
<thead>
<tr>
<th>Test</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>VITAMIN D (25OH) (LC081950)</td>
<td>$47</td>
</tr>
<tr>
<td>This test is used to rule out vitamin D deficiency.</td>
<td></td>
</tr>
<tr>
<td>FERRITIN (LC004598)</td>
<td>$28</td>
</tr>
<tr>
<td>Ferritin levels reflect your body's iron stores and is also a biomarker for insulin resistance.</td>
<td></td>
</tr>
<tr>
<td>PSA (PROSTATE SPECIFIC ANTIGEN) (LC010322)</td>
<td>$31</td>
</tr>
<tr>
<td>Screening test for prostate disorders and possible cancer.</td>
<td></td>
</tr>
</tbody>
</table>

**ORDER LIFESAVING BLOOD TESTS FROM VIRTUALLY ANYWHERE ANYWHERE IN THE US!**

This blood test service is for informational purposes only and no specific medical advice will be provided. National Diagnostics, Inc., and Life Extension® 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 Life Extension® 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.

**TERMS AND CONDITIONS**

**CUSTOMER NO.**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
</tr>
</tbody>
</table>

**Name**

**Date of Birth**

**Address**

**City**

**State**

**Zip**

**Phone**

**Credit Card No.**

**Expiration Date**

**Mail your order form to:**

LifeExtension
National Diagnostics, Inc.
3600 West Commercial Boulevard
Fort Lauderdale, FL 33309

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

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

With Your Healthy Rewards, you earn LE Dollars back on every purchase you make including blood tests! See www.LifeExtension.com/Rewards for details.

This is NOT a complete listing of LE blood test services. Call 1-800-208-3444 for additional information.
### Products

#### Amino Acids
- Arginine/L-Ornithine Capsules
- Arginine Ornithine Powder
- Branched Chain Amino Acids
- D,L-Phenylalanine Capsules
- L-Arginine Caps
- L-Carnitine
- L-Glutamine
- L-Glutamine Powder
- L-Lysine
- L-Taurine Powder
- L-Tyrosine Powder
- Super Carnosine
- Taurine

#### Blood Pressure & Vascular Support
- Advanced Olive Leaf Vascular Support with Celery Seed Extract
- Arterial Protect
- Blood Pressure Monitor Arm Cuff
- Dual Action Blood Pressure
- Endothelial Defense™ with Pomegranate Complete and CORDIART™
- Endothelial Defense™ with GlisDin®
- Natural BP Management
- NitroVasc with CORDIART™
- Pomegranate Complete
- Pomegranate Fruit Extract
- Triple Action Blood Pressure AM/PM
- Venoflow

#### Bone Health
- Bone Restore
- Bone Restore with Vitamin K2
- Bone Strength Formula with KoAct®
- Bone-Up™
- Calcium Citrate with Vitamin D
- Dr. Strum’s Intensive Bone Formula
- Strontium Caps

#### Brain Health
- Acetyl-L-Carnitine
- Acetyl-L-Carnitine Arginate
- Blast™
- Brain Shield®
- Gastrodin
- Cognitex® Basics
- Cognitex® with Brain Shield™
- Cognitex® with Pregnenolone & Brain Shield®
- Cognizin® CDP-Choline Caps
- DMAE Bitartrate (dimethylaminoethanol)
- Dopa-Mind™
- Ginkgo Biloba Certified Extract™
- Huperzine A
- Lecithin Granules
- Memory Protect
- Migra-Eeze™
- Neuro-Mag®
- Neuro-Mag® with Vitamin C
- Natural Vanilla Flavor
- Natural Vanilla Flavor
- Natural Vanilla Flavor
- Neuro Magnesium L-Threonate with Calcium and Vitamin D3
- Optimized Ashwagandha Extract
- PS (Phosphatidylserine) Caps
- Vinpocetine

#### Cholesterol Management
- Advanced Lipid Control
- Cho-Less™
- CHOL-Support™
- Red Yeast Rice
- Theaflavins Standardized Extract
- Vitamin B3 Niacin Capsules

#### Digestion Support
- Artichoke Leaf Extract
- Digest ROC®
- Effervescent Vitamin C
- Magnesium Crystals
- Enhanced Super Digestive Enzymes
- Enhanced Super Digestive Enzymes
- w/Probiotics
- Esophagel Guard™
- Extra-Enzymes
- Fem Dophilus
- Fiber-Impact Support
- Gastro-Ease
- Ginger Force®
- Organic Golden Flax Seed
- Pancreatin
- Regimint
- Tranquil Tract™
- TruFiber™
- WellBetX PGX plus Mulberry

#### Energy Management
- Adrenal Energy Formula
- Asian Energy Boost
- D-Ribose Powder
- D-Ribose Tablets
- Forskolin
- Mitochondrial Basics with BioPQQ®
- Mitochondrial Energy Optimizer with BioPQQ®
- NAD+ Cell Regenerator™
- Peak ATP® with GlycoCam®
- PQQ Caps with BioPQQ®
- Rhodiola Extract
- Riboflavin® 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®
- 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
- OMEGA FOUNDATIONS® Proval® Purified Omega-7
- OMEGA FOUNDATIONS® Vegetarian DHA

#### Food
- California Estate Extra Virgin Olive Oil
- 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 Cremix® 3+ 5 Mega Benfotiamine
- Natural Glucose Absorption Control
- Tru Sugar Shield™

#### Heart Health
- Aspirin (Enteric Coated)
- BioActive Folate & Vitamin B12 Caps
- Cardio Peak™ with Standardized Hawthorn and Arjuna
- 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
- Immune Modulator with Tinofend®
- Immune Protect with PARACTIN®
- Immune Senescence Protection Formula™
- Kinoko® Gold AHCC
- Kyolic® Garlic Formula 102
- Kyolic® Garlic Formula 105
- Kyolic® Reserve
- Lactoferrin (apolactoferrin) Caps
- NK Cell Activator™
- Optimized Garlic
- Optimized Quercetin
- Peony Immune
- ProBoost Thymic Protein A
- Reishi Extract Mushroom Complex
- Standardized Cistanche
- Ten Mushroom Formula®
- Zinc Lozenges

#### Inflammation Management
- 5-LOX Inhibitor with AprèsFlex®
- Advanced Bio-Curcumin® with Ginger & Turmerones
- Black Cumin Seed Oil
- Black Cumin Seed Oil with Bio-Curcumin®
- Boswelia
- Cytokine Suppressor™ with EGCG
- Serrafflazyme
- Specially-Coated Bromelain
- Super Bio-Curcumin®
- Zytliamend® Whole Body

#### Joint Support
- Arthro-Immune Joint Support
- ArthroMax® Advanced with UC-II® & AprésFlex®
- ArthroMax® with Theaflavins & AprésFlex®
- ArthroMax® Herbal Joint Formula
- Bio-Collagen with Patented UC-II®
- Fast-Acting Joint Formula
- Glucosamine/Chondroitin Capsules
- Kloral 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 with HepatoProtection Complex
- Calcium D-Glucarate
- Chlorella
- Chlorophyllin
- European Milk Thistle
- Glutathione, Cysteine & C
- HepatoPro
- Liver Efficiency Formula
- N-Acetyl-L-Cysteine
- PectaSol®
- Silymarin
- SODzyme® with GliSODin® & Wolfberry

#### Longevity & Wellness
- Alpha-Lipoic Acid
- AMPK Activator
- Apple/White Polyphenol Extract
- Berry Complete
- Blueberry Extract
- Blueberry Extract with Pomegranate
- CR Mimetic Longevity Formula
<table>
<thead>
<tr>
<th>ITEM No.</th>
<th>PRODUCT</th>
<th>Unit Each</th>
<th>Unit Each</th>
<th>Unit Each</th>
<th>QTY Total</th>
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</thead>
<tbody>
<tr>
<td>01524</td>
<td>ACETYL-L-CARNITINE  • 500 mg, 100 veg. caps</td>
<td>34.00</td>
<td>25.50</td>
<td>22.50</td>
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<tr>
<td>01874</td>
<td>ACETYL-L-CARNITINE ARGINATE  • 90 veg. caps</td>
<td>52.00</td>
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<td>35.00</td>
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<tr>
<td>01628</td>
<td>ADRENAL ENERGY FORMULA  • 60 veg. caps</td>
<td>24.00</td>
<td>18.00</td>
<td>16.50</td>
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<tr>
<td>01630</td>
<td>ADRENAL ENERGY FORMULA  • 120 veg. caps</td>
<td>46.00</td>
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<tr>
<td>01828</td>
<td>ADVANCED LIQUID CONTROL  • 60 veg. caps</td>
<td>30.00</td>
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<td>20.25</td>
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<tr>
<td>00681</td>
<td>AHCC®  • 500 mg, 30 caps</td>
<td>59.98</td>
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<tr>
<td>29727</td>
<td>AHCC® (KINOKO® GOLD)  • 500 mg, 60 veg. caps</td>
<td>74.99</td>
<td>52.47</td>
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<td>00457</td>
<td>ALPHA-LIPOIC ACID W/BIOTIN  • 250 mg, 60 caps</td>
<td>37.00</td>
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<tr>
<td>01907</td>
<td>AMPK ACTIVATOR  • 90 veg. caps</td>
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<tr>
<td>01509</td>
<td>ANTI-ADIPOCYTE FORMULA W/MERATRIM® &amp; INTEGRA LEAN® (Advanced)  • 60 veg. caps</td>
<td>39.00</td>
<td>29.25</td>
<td>27.00</td>
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<tr>
<td>02140</td>
<td>ANTI-ALCOHOL w/HEPATOMPRO COMPLEX  • 60 caps</td>
<td>22.00</td>
<td>16.50</td>
<td>15.00</td>
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<tr>
<td>01625</td>
<td>APPLEWISE POLYPHENOL EXTRACT  • 600 mg, 30 veg. caps</td>
<td>21.00</td>
<td>15.75</td>
<td>14.25</td>
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<tr>
<td>01039</td>
<td>ARGININE/ORINITHINE  • 500/250, 100 caps</td>
<td>17.99</td>
<td>13.49</td>
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<tr>
<td>00038</td>
<td>ARGININE/ORINITHINE POWDER  • 150 grams</td>
<td>22.95</td>
<td>17.21</td>
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<tr>
<td>01624</td>
<td>(L)-ARGININE CAPS  • 700 mg, 200 veg. caps</td>
<td>26.50</td>
<td>19.88</td>
<td>17.44</td>
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<tr>
<td>02004</td>
<td>ARTERIAL PROTECT  • 30 caps</td>
<td>48.00</td>
<td>36.00</td>
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<tr>
<td>01617</td>
<td>ARTHROMAX® W/THAFLAVINS &amp; APRÉSFLEX®  • 120 veg. caps</td>
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<tr>
<td>01618</td>
<td>ARTHROMAX® ADVANCED W/UC-II® &amp; APRÉSFLEX®  • 60 caps</td>
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<tr>
<td>02108</td>
<td>ARTHROMAX® HERBAL JOINT FORMULA  • 60 veg. caps</td>
<td>40.00</td>
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<tr>
<td>01404</td>
<td>ARTHRO-IMMUNE JOINT SUPPORT  • 60 veg. caps</td>
<td>32.00</td>
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<tr>
<td>00919</td>
<td>ARTICHOKE LEAF EXTRACT  • 500 mg, 180 veg. caps</td>
<td>30.00</td>
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<tr>
<td>01533</td>
<td>ASCORBYL PALMITATE  • 500 mg, 100 veg. caps</td>
<td>22.50</td>
<td>16.88</td>
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<tr>
<td>00888</td>
<td>ASHWAGANDHA EXTRACT (Optimized)  • 60 caps</td>
<td>10.00</td>
<td>7.50</td>
<td>6.75</td>
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<tr>
<td>01805</td>
<td>ASIAN ENERGY BOOST  • 90 veg. caps</td>
<td>24.00</td>
<td>18.00</td>
<td>16.50</td>
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</tr>
<tr>
<td>01966</td>
<td>ASPRIN  • 81 mg, 300 enteric coated tablets</td>
<td>6.00</td>
<td>4.50</td>
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<tr>
<td>01923</td>
<td>ASTAXANTHIN WITH PHOSPHOLIPIDS  • 4 mg, 30 softgels</td>
<td>16.00</td>
<td>12.00</td>
<td>10.50</td>
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<tr>
<td>00920</td>
<td>BENFOTIAMINE W/ THIAMINE  • 100 mg, 120 veg. caps</td>
<td>19.95</td>
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<td>13.95</td>
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<tr>
<td>00925</td>
<td>BENFOTIAMINE (Mega)  • 250 mg, 120 veg. caps</td>
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<td>22.50</td>
<td>20.25</td>
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</tr>
<tr>
<td>01206</td>
<td>BERRY COMPLETE  • 30 veg. caps</td>
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<td>01496</td>
<td>BERRY COMPLETE W/ACAI (Enhanced)  • 60 caps</td>
<td>29.00</td>
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<tr>
<td>00664</td>
<td>BETA-CAROTENE  • 25,000 IU, 100 softgels</td>
<td>11.50</td>
<td>8.63</td>
<td></td>
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</tr>
<tr>
<td>01622</td>
<td>BIFIDO GI BALANCE  • 60 veg. caps</td>
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<td>00102</td>
<td>BIFOTIN  • 600 mcg, 100 caps</td>
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<td>BLACK CUMIN SEED OIL W/BIO-CURCUMIN®  • 60 softgels</td>
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<td>02025</td>
<td>BLOOD PRESSURE (Dual Action)  • 60 veg. tabs</td>
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**SUBTOTAL OF COLUMN 1**

**SUBTOTAL OF COLUMN 2**
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<th>ITEM No.</th>
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<th>1 Unit Each</th>
<th>4 Unit Each</th>
<th>10 Unit Each</th>
<th>GTY Total</th>
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<td>01659</td>
<td>Cognizin® CDP Choline Caps • 250 mg, 60 veg. caps</td>
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<td>Complete B-Complex (BioActive) • 60 veg. caps</td>
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<td>02198</td>
<td>Comprehensive Nutrient Packs Advanced • 30 packs</td>
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<td>01929</td>
<td>COQ10 (Super Ubiquinol) • 100 mg, 60 softgels</td>
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<td>COQ10 w/BiopQQ® (Super Ubiquinol) • 100 mg, 30 softgels</td>
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<tr>
<td>01426</td>
<td>COQ10 w/ENH Mitochondrial Support™ (Super Ubiquinol) • 100 mg, 60 softgels</td>
<td>62.00</td>
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<td>CRAN-MAX® with Ellirhoes™ (Optimized) • 60 veg. caps</td>
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<tr>
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<td>Creatine Capsules • 120 veg. caps</td>
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<td>01746</td>
<td>Creatine Whey Glutamine Powder • 454 grams (vanilla)</td>
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<td>CR Mimetic Longevity Formula • 60 veg. caps</td>
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<td>Curtumin® (Super Bio) • 400 mg, 60 veg. caps</td>
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<td>Curtumin® W/Ginger &amp; Turmerones (Advanced Bio) 30 softgels</td>
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<td>01804</td>
<td>Cytokine suppress™ w/ESCG • 30 veg. caps</td>
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**SUBTOTAL OF COLUMN 3**

**TO ORDER ONLINE VISIT: www.LifeExtension.com**

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<th>ITEM No.</th>
<th>PRODUCT</th>
<th>Retail Each</th>
<th>1 Unit Each</th>
<th>4 Unit Each</th>
<th>10 Unit Each</th>
<th>GTY Total</th>
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<td>80116</td>
<td>eye lift cream • 0.5 fl oz</td>
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<tr>
<td>80123</td>
<td>Face rejuvenating antioxidant cream • 2 oz</td>
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<td>80107</td>
<td>Fine line Less • 1 oz</td>
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<tr>
<td>80131</td>
<td>Hair suppress formula • 4 oz</td>
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<td>80137</td>
<td>Healing cream all-in-one cream • 1 oz</td>
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<td>Lifting &amp; tightening complex • 1 oz</td>
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<td>Lycopenes cream • 1 oz</td>
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<td>80135</td>
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<td>80114</td>
<td>Mild facial cleanser • 8 fl oz</td>
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<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>80106</td>
<td>Rejuvenating serum • 1 oz</td>
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<td>80150</td>
<td>Renewing eye cream • 1/2 oz</td>
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<td>Resveratrol antioxidant serum • 1 oz</td>
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<td>80112</td>
<td>Skin lightening serum • 1/2 oz</td>
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<td>Stem cell cream w/alpine rose • 1 oz</td>
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<td>80148</td>
<td>Tightening &amp; firming neck cream • 2 oz</td>
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<td>Ultimate microdermabrasion • 8 fl oz</td>
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<td>Ultra eyelash booster • 0.25 oz (2 units $39)</td>
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<td>Ultra lip plumper • 1/3 oz</td>
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<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>Vitamin D lotion • 4 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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**SUBTOTAL OF COLUMN 4**

**MARCH 2017**

**RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS**

**YOUR PRICE**
<table>
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<tr>
<th>ITEM No.</th>
<th>PRODUCT</th>
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<th>10 Unit Each</th>
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<td>GLA WITH SESAME LIGNANS (Mega) • 60 softgels</td>
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<td>(L-) GLUTAMINE POWDER • 100 grms</td>
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<td>GLUCOSAMINE/CHONDROITIN CAPSULES • 100 caps</td>
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<td>GLUTATHIONE, CYSTEINE &amp; C • 100 veg. caps</td>
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<td>HYDRODERM® • 1 oz</td>
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<td>IMMUNE PROTECT W/Paracinet® • 30 veg. caps</td>
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<td>LIVER EFFICIENCY FORMULA • 30 veg. caps</td>
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<td>5-LOX INHIBITOR W/APRÈSFLEX® • 100 mg, 60 veg. caps</td>
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<td>MACUGUARD® OCULAR SUPPORT w/ASTAXANTHIN 60 softgels</td>
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<td>MAGNESIUM CAPS • 500 mg, 100 veg. caps</td>
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<td>01682</td>
<td>MAGNESIUM (CITRATE) • 160 mg, 100 veg. caps</td>
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<td>(EXTEND-RELEASE) MAGNESIUM • 60 veg. caps</td>
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<td>01803</td>
<td>MELATONIN • 500 mcg, 200 veg. caps</td>
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<td>00329</td>
<td>MELATONIN • 1 mg, 60 caps</td>
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<td>MELATONIN • 3 mg, 60 veg. caps</td>
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<td>00331</td>
<td>MELATONIN • 10 mg, 60 veg. caps</td>
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<td>00332</td>
<td>MELATONIN • 3 mg, 60 veg. lozenges</td>
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<td>MELATONIN (Fast-Acting Liquid) • 2 fl. oz (Citrus-Vanilla)</td>
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<td>MELATONIN TIMED RELEASE • 300 mcg, 100 veg. tabs</td>
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<td>MELATONIN TIMED RELEASE • 750 mcg, 60 veg. tablets</td>
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<td>MEMORY PROTECT • 36 day supply</td>
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<td>METHYLCOBALAMIN • 5 mg, 60 veg. lozenges (vanilla)</td>
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<td>MIGRA-EZZE™ (Butterbur) • 60 softgels</td>
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<td>MILK THISTLE (European) • 60 veg. caps</td>
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<td>MILK THISTLE (European) • 60 softgels</td>
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<td>MILK THISTLE (European) • 120 softgels</td>
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<td>MIRAFORTE w/STANDARDIZED LIGNANS (Super) • 120 veg caps</td>
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<td>MITOCHONDRIAL BASICS W/BIOPQQ™ • 30 caps</td>
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<td>MITOCHONDRIAL ENERGY OPTIMIZER w/BIOPQQ™•120 caps</td>
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<td>MK-7 • 90 mcg, 60 softgels</td>
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<td>00451</td>
<td>MSM (Methylsulfonylmethane) • 1,000 mg, 100 caps</td>
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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>NATTOKINASE • 60 softgels</td>
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<td>NATURAL APPETITE SUPPRESS (Advanced) • 60 veg. caps</td>
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<td>NATURAL BP MANAGEMENT • 60 tablets</td>
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<td>02012</td>
<td>NATURAL CORTISOL BALANCE • 30 veg. caps</td>
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<td>NATURAL ESTROGEN • 60 veg. tabs</td>
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**SUBTOTAL OF COLUMN 7**

**P**

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<td>PALMETTOGUARD® SAW PALMETTO/NETTLE ROOT W/BETA-SITOSTEROL • 60 softgels</td>
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<td>PEAK ATP® WITH GLYCOCARN® • 60 veg. caps</td>
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<td>PECTA SOL-C® MODIFIED CITRUS PECTIN • 454 grams powder</td>
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<td>PECTA SOL-C® MODIFIED CITRUS PECTIN • 270 veg. caps</td>
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<td>PENNY IMMUNE • 60 veg. caps</td>
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<td>PDX® PLUS MULBERRY (WellBetX®) • 180 veg. caps</td>
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<td>POMEGRANATE COMPLETE • 30 softgels</td>
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<td>POMEGRANATE FRUIT EXTRACT • 30 veg. caps</td>
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<td>POMI-1™ • 60 veg. caps</td>
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<td>PQO CAPS W/BIOPQQ™ • 10 mg, 30 veg. caps</td>
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<td>PQO CAPS W/BIOPQQ™ • 20 mg, 30 veg. caps</td>
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<td>PREGNENOLONE • 100 mg, 100 caps</td>
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<td>PRELOX® NATURAL SEX FOR MEN® • 60 tablets</td>
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<td>PROBOOST™ THYMIC PROTEIN A • 30 packets</td>
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<td>01441</td>
<td>PROGESTA-CARE® • 4 oz cream</td>
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**SUBTOTAL OF COLUMN 8**
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<td>RED YEAST RICE (Bluebonnet) • 600 mg, 60 veg. caps</td>
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<td>RICH REWARDS® DECAFENATED ROAST GROUND COFFEE 12 oz. bag</td>
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<td>01208</td>
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<td>49.00</td>
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<td>18.75</td>
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<td>SAMe (S-ADENOSYL-METHIONINE) 400 mg, 30 enteric coated tablets</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.
- † † These products are not 25% off retail price. Due to license restrictions this product is not for sale to customers outside of the USA.

Not sure exactly which supplements you need? Talk to a Wellness Specialist toll-free at 1-800-226-2370
**ORDER SUBTOTALS**

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<td>$5.50</td>
<td>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.</td>
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**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

**BILL TO ADDRESS**

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CITY/STATE/ZIP-POSTAL CODE COUNTRY

PHONE FAX

VISA/MASTERCARD/AMEX/DISCOVER #

EXP. DATE

SIGNATURE

**SHIP TO ADDRESS**

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CITY/STATE/ZIP-POSTAL CODE COUNTRY

PHONE FAX

SIGNATURE

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Enhanced Super Digestive Enzymes with Probiotics provides the same enzymes that are in Enhanced Super Digestive Enzymes—but with the added benefits of the probiotic B. coagulans.

This probiotic creates a natural protective shield that resists digestion in the stomach allowing it to fully colonize in the intestines to support digestive health and suppress less beneficial bacteria to improve digestive comfort.12

To order Enhanced Super Digestive Enzymes or Enhanced Super Digestive Enzymes with Probiotics, call 1-800-544-4440 or visit www.LifeExtension.com

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Cortisol, a stress hormone, accelerates aging and increases mortality. Researchers have identified natural compounds that safely reduce excess cortisol.

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Rejuvenating stem cells can partially reverse tissue aging. New studies reveal natural compounds that can boost stem cell function.