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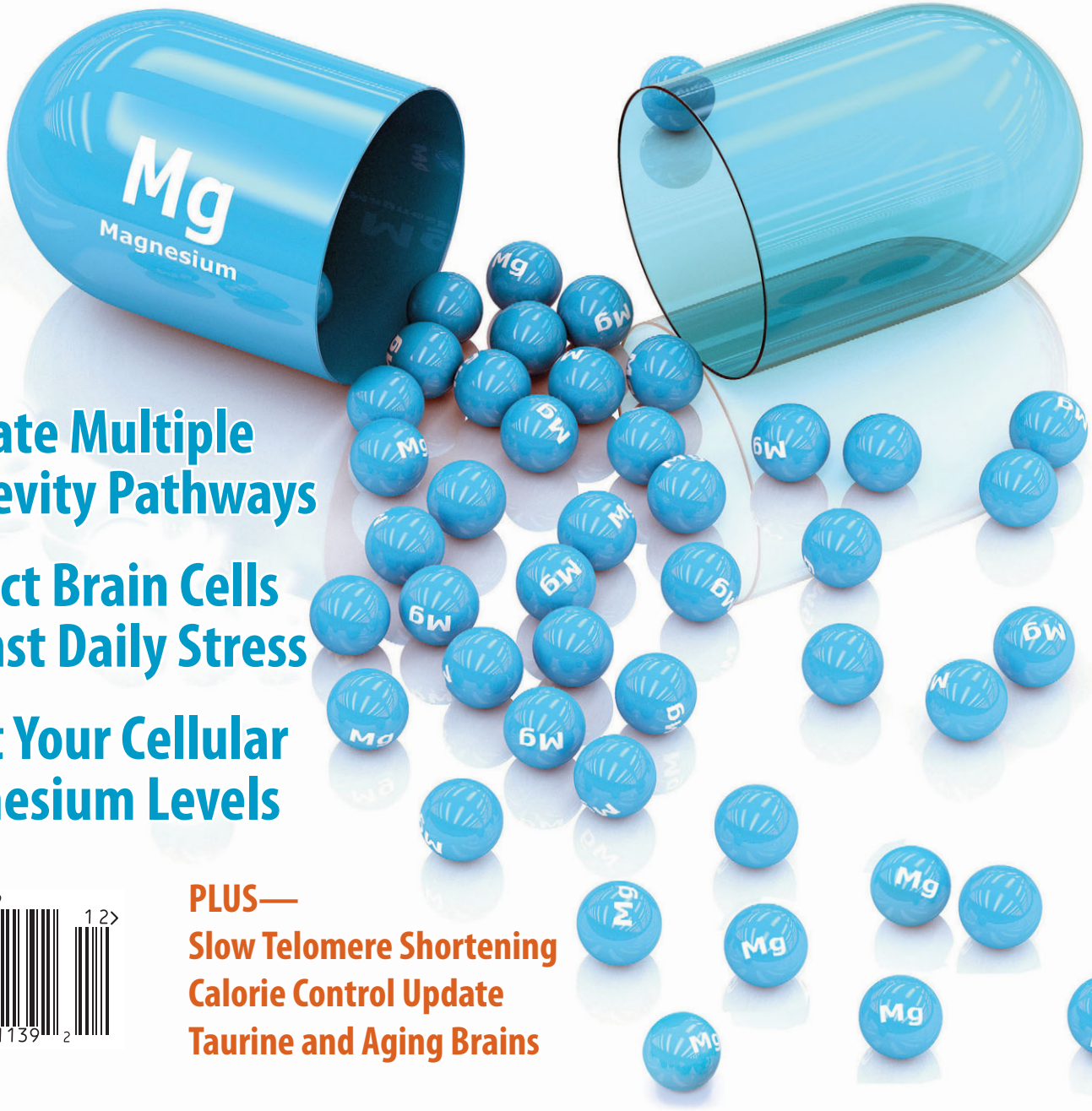

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1. *Br J Pharmacol.* 2004 Mar;141(5):825-30.

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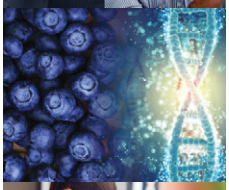

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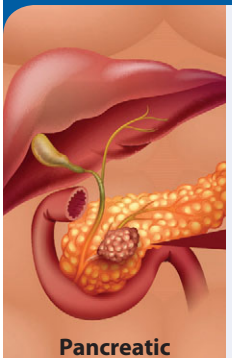
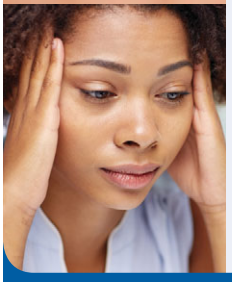
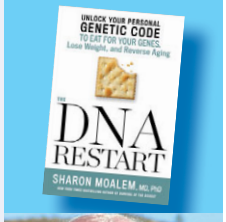
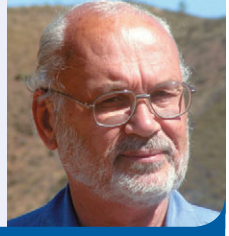


Pancreatic cancer







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Editorial offices: 954-766-8433 • fax: 954-491-5306

Customer Service: 800-678-8989
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LIFE EXTENSION (ISSN 1524-198X) Vol. 22, No. 12 ©2016 is published monthly except bi-monthly in April by LE Publications, Inc. at 3600 West Commercial Blvd., Fort Lauderdale, FL 33309-3338. Published 13 times a year. Subscription rate: $40 per year in the United States. US $47 in Canada. US $60 in other countries. Mail subscriptions or address changes to: LE Publications, Inc., P.O. Box 407198, Fort Lauderdale, FL 33340-7198, USA. Or phone us toll-free at: 1-800-841-5433. Canada Subscriptions: Publications mail agreement number 40028967. Return undeliverable Canadian addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill, ON L4B4R6. You will be sent your first issue within six weeks after LE Publications, Inc. receives your subscription fee. Periodicals Postage paid at Fort Lauderdale, FL and at additional mailing offices. POSTMASTER: Send address changes to Life Extension, P.O. Box 407198, Ft. Lauderdale, Florida 33340-7198, USA. Printed in USA.

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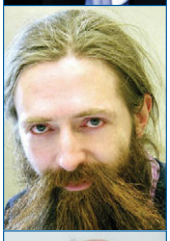

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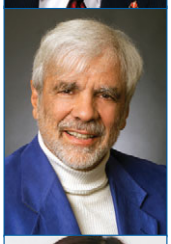

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Will Magnesium Become the Next Vitamin D?

BY WILLIAM FALOON

Vitamin D has emerged as a nutrient with astonishing value in disease prevention. Its **low cost** enables virtually everyone to supplement with enough potency to obtain broad-spectrum benefits.

Magnesium has similar attributes since it provides robust health effects, costs very little, and most Americans don't get enough.

The best way to summarize vitamin D is that people who are deficient suffer more degenerative illness and premature death. The same holds true for magnesium.

Scientists recognize **magnesium** mostly as it relates to protection against cardiovascular disorders. Higher magnesium intake is associated with reduced risks of sudden cardiac death,[1-3] stroke,[4-6] type II diabetes,[7-9] asthma,[10] metabolic syndrome,[11,12] heart disease,[13,14] hypertension,[15-19] and osteoporosis.[20,21]

What few publications discuss are findings showing **cancer risk** reductions in those who ingest ***higher*** amounts of magnesium.[22-24]

The challenge when assessing **dietary** magnesium intake is the inconsistency of the amount of magnesium contained in food.

Magnesium is not manufactured inside plants like disease-fighting polyphenols. This means the quantity of **dietary** magnesium is largely dictated by the amount of magnesium in the **soil** the food is grown in, or the mineral content of the **water** one drinks, both of which are highly variable.

In a landmark human study, there were marked reductions in **pancreatic cancer** risk in those who ingested *higher* amounts of **magnesium** primarily in dietary supplements. Other studies show **colon cancer** risk reductions in response to ***higher*** magnesium intake.

The totality of evidence supporting **magnesium**'s systemic benefits may soon transform this mineral into the next **vitamin D** as far as widespread public use is concerned.

This is great news for Americans, who face a phalanx of degenerative disorders that **magnesium** has been shown to protect against. It's regrettable that it has taken so long for this realization to manifest.

Before the sun sets today, about **145 Americans** will learn they have **pancreatic cancer**.[25] It will likely be the worst day of their lives.

There are no "good" treatment options. The newly diagnosed cancer patient faces a litany of "bad" choices that are unlikely to be curative, but will inflict horrific side effects.

In recognition of lack of curative therapies, **Life Extension Foundation®** is funding clinical studies aimed at identifying better treatments for this malignancy that kills more than **40,000** Americans every year.[25]

Until a treatment breakthrough emerges, the best way to avoid becoming a casualty of **pancreatic cancer** is to not develop it in the first place.

Diabetics at Higher Risk for Pancreatic Cancer

A high percentage of **pancreatic cancer** patients also have **type II diabetes**.[26-28] Research has shown that about **80%** of pancreatic cancer patients had diabetes or glucose intolerance upon their cancer diagnosis.[29,30]

These findings support current research showing elevated cancer risks in people with *higher* blood **glucose** levels.[31] In response to excess glucose, more **insulin** is secreted, which in turn fuels growth of malignant cells.[32]

An interesting finding we reported several years ago showed that **type II diabetics** that used the drug **metformin** had a **62%** lower pancreatic cancer risk compared to those who had not taken the drug.[33] One of metformin's properties is to improve insulin sensitivity by activating a cell-energy enzyme, **AMPK**.[34]

The risk of contracting **type II diabetes** is lower in those with ***higher*** intakes of **magnesium**. A meta-analysis of human studies found that for every **100 mg** increase in magnesium intake, risk of developing type II diabetes decreased by **15%**.[7]

This understanding has led researchers to investigate whether people who consume more **magnesium** have lower **pancreatic cancer** incidence.

Higher Magnesium Intake Lowers Pancreatic Cancer Risk

A landmark study meticulously evaluated data from a large group of adults and found that a modest increase in assessed **magnesium** intake from a combination of diet and supplements resulted in profound reductions in **pancreatic cancer** risk.[35]

What struck us about this study's findings is that it did not require a ***large*** amount of additional magnesium to produce a meaningful reduction in pancreatic cancer risk.

Researchers found that pancreatic cancer risk increased by **24%** for every **100 mg** decrease in **magnesium** intake below the recommended daily allowance (RDA). For example, an individual with a daily magnesium intake of **200 mg** has a **24%** increased risk of pancreatic cancer compared to a person who ingests **300 mg** a day. Both of these intakes (**200 mg** and **300 mg** a day) of magnesium are considered deficient even by government standards.

This study, published in late **2015**, evaluated data from the *VITamins And Lifestyle* (VITAL) trial involving more than 66,000 men and women aged 50-76 years who were followed for an eight-year period. The subjects were divided into the following three groups based upon their magnesium intake:

1. **Optimal Intake** - Defined as ingesting greater or equal to **100%** of the government RDA for magnesium (**420 mg** a day for males and **320 mg** a day for females)

2. **Sub-optimal Intake** - Daily intake of **75%** to **99%** of the government RDA for magnesium

3. **Deficient Intake** - Less than **75%** of the government RDA for magnesium (less than **315 mg** a day for males and less than **240 mg** a day for females)

Those who ingested **75%-99%** of the government's RDA for **magnesium** (sub-optimal intake) had a **42%** greater risk of **pancreatic cancer** incidence compared with those ingesting greater than or equal to **100%** of the magnesium RDA.

Those who ingested less than **75%** of the government's RDA for magnesium (deficient intake) had a striking **76%** greater risk of **pancreatic cancer** incidence compared to those whose intake of magnesium was equal to or greater than the government's (optimal intake) RDA.

When analyzing those who met or exceeded the government's RDA for total magnesium intake, only those who took **dietary supplements** containing **magnesium** were able to consistently achieve the benefits.

This led the authors to state that to gain the benefit of magnesium at least at the recommended daily allowance (RDA) level, that "***dietary magnesium intake alone may not be sufficient***."[35]

What's striking about these findings is that the amount of added magnesium needed to meet the government's RDA was exceedingly small. For most people, taking one magnesium capsule a day, or obtaining it in a scientifically formulated multinutrient formula is all that is needed to produce this robust preventive effect against pancreatic cancer.

This and other studies you're about to learn about are why we think that **magnesium supplementation** is destined to become as prevalent as **vitamin D** is today.

Prior Studies on Magnesium and Pancreatic Cancer

Previous studies sought to establish a link between magnesium ingestion and pancreatic cancer. Ascertaining the precise amount of magnesium ingested was challenging due to variability of magnesium content of food/water.

Urgent Need for Widespread Magnesium Supplementation

In the recent analysis, the researchers found that the beneficial relationship between magnesium intake and the incidence of pancreatic cancer disappeared in study volunteers not using supplements.

The researchers hypothesized that this lack of association was likely due to both a reduced magnesium dose and narrower range of achieved dietary magnesium intake, to which the researchers reasoned: ***"...to gain the benefit of magnesium intake... dietary magnesium intake alone may not be sufficient***."[35]

Most striking was the calculation that only a few hundred extra milligrams of magnesium taken each day markedly reduced pancreatic cancer risk. This small amount is readily available with low-cost supplements.

Two initial case-control studies showed an association between higher magnesium intake and lower pancreatic cancer rates,[36,37] whereas a similar case-control study found no association.[38]

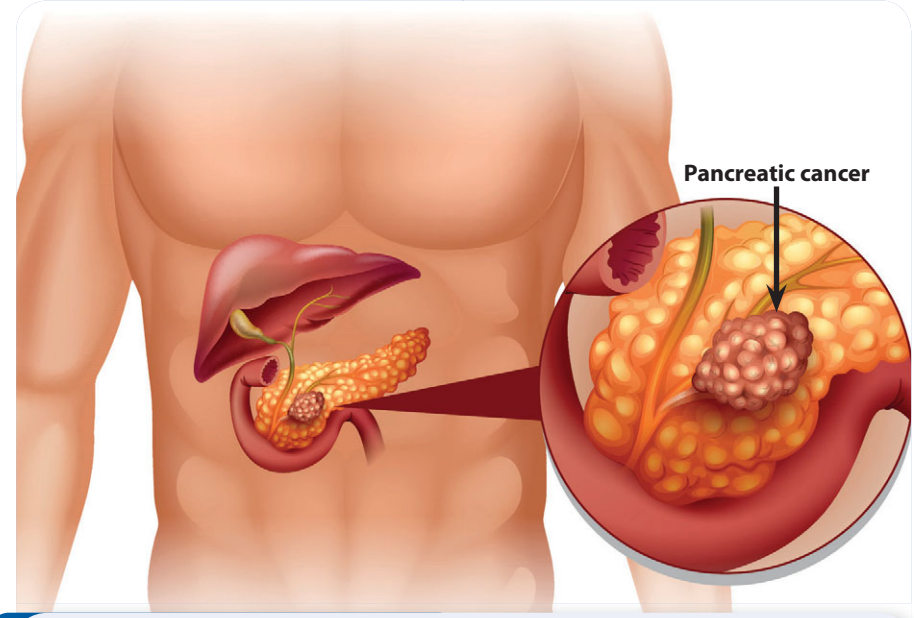
Other studies found a reduced rate of pancreatic cancer only in heavier men, which is significant because **obesity** is a pancreatic cancer risk factor.[39] One of these studies published in **2010** showed a reduction in pancreatic cancer in men with a body mass index (BMI) of **25 kg/m²** or more who consumed *higher* amounts of magnesium.[40]

This study showed a **33%** reduced pancreatic cancer risk in overweight men whose average daily magnesium intake was **423 mg** compared to **281 mg**.[40] Another study showed that for each **100 mg** increase in magnesium intake amongst overweight men, there was a **21%** decreased risk.[39]

Once again, a relatively small amount of magnesium supplementation would have placed all these men into the higher protective category.

Since the majority of aging men are **overweight**, this finding has significant public health implications.[41]

These findings corroborate the **2015** report showing only a small increase in ingested magnesium significantly reduces **pancreatic cancer** risk.



Lethal Nature of Pancreatic Cancer

Pancreatic cancer is the fourth leading cause of cancer-related mortality in the United States.[42]

Pancreatic cancer is rapidly fatal with little long term effective treatment and a 5-year survival rate of **7%**.[43]

Factors associated with pancreatic cancer risk include cigarette smoking,[44-46] diabetes,[47,48] obesity,[49,50] unhealthy dietary practices,[51-53] and low intake of specific nutrients such as vitamins E, C, B6, B12, carotenoids, folate, lycopene, and selenium.[54-56]

Until a cure is discovered, identification of modifiable risk factors is crucial to reduce pancreatic cancer mortality.

In observational studies, type II diabetes has been consistently associated with an elevated risk of pancreatic cancer.[26-28,57-60] Current findings support a role for glucose intolerance,[61-63] insulin resistance,[63,64] and excess blood insulin (hyperinsulinemia) in the development of pancreatic cancer.[65,66]

Studies with long follow-up periods have consistently found an association between elevated after-meal or fasting **glucose** levels and higher pancreatic cancer risk.[67,68]

Given that, the totality of studies on pancreatic cancer risk, dietary factors (such as magnesium) and drugs (such as metformin) that improve insulin sensitivity may exert a major impact on pancreatic cancer risk reduction.[33,35,69-71]

Magnesium and Colorectal Cancer

Colorectal cancer is expected to be diagnosed in almost **135,000** Americans and to cause about **50,000** deaths this year.[72] It is less feared than pancreatic cancer because treatments are less mutilating and cure rates far higher.

A large study evaluating Japanese men found that those with the highest dietary intake of **magnesium** were over **50%** less likely to contract **colon cancer**.[22]

A study emanating from the Netherlands showed that for each extra **100 mg** increase in magnesium intake, there was a **19%** reduction in colorectal adenomas (precursors to colon tumors).[24] The second part of this study found

that for each additional **100 mg** of magnesium, there was a **12%** reduction in colorectal cancer risk. Again, we're seeing a relatively modest increase in magnesium ingestion inducing meaningful cancer risk reductions.

Magnesium plays essential roles in regulating genome stability,[73,74] cell signaling,[75,76] insulin sensitivity,[77] systemic inflammation,[78-81] and DNA maintenance and repair.[73,74] It is therefore not surprising that low intake of magnesium is associated with increased risk of certain cancers.

Food Sources of Magnesium Are Not Reliable

A website for medical professionals lists magnesium-rich foods as "***Leafy vegetables, nuts, legumes, whole grains, fruits and fish***."[82]

While these fit into the "healthy food" category, one cannot reliably expect to obtain consistent and sufficient amounts of magnesium by ingesting them.

Magnesium content in vegetables has seen huge declines since pre-1950 levels.[83-87] Typical grain refining processes for bread and pasta remove **80%-95%** of total magnesium.[83]

There needs to be sufficient soil concentration of magnesium for plants to absorb it in the first place. In some instances, soils have too much potassium which competes for absorption of magnesium into the plant.

There are certain bottled waters that naturally contain high amounts of magnesium, but these are rare on the commercial marketplace.[88]

Urgent Need for Magnesium Supplementation

Life Extension first advocated for higher-dose magnesium supplementation in **1981**. Back in those days, **calcium** supplements were very popular, but few of them contained enough magnesium. Overlooked was the vital role that **magnesium** played in overall health including maintaining **bone density**.[20,21,89]

Most people today associate **magnesium** as a mineral that reduces **cardiovascular** risk. A wealth of published scientific data supports this.

With accumulating data showing that **magnesium** can slash risks of common **cancers**, we think the use of magnesium supplements will soon rise to the level of "***must have***" nutrients like **vitamin D**.

Similar to vitamin D, **magnesium** costs so little that it is readily affordable by almost everyone, which has huge implications in improving public health.

This month's issue contains an article that pays tribute to an early pioneer who advocated for higher magnesium ingestion. We also provide an update of the latest findings demonstrating the vital importance of obtaining sufficient magnesium to diminish risk of degenerative illness.

For longer life,

William Faloon

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

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

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

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Reference

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

Non-GMO

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

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Just one daily softgel of the new **MacuGuard® Ocular Support** formula provides:

Saffron	**20 mg**
Alpha-carotene	**1.24 mg**
Lutein	**10 mg**
***Trans*-Zeaxanthin/*Meso*-zeaxanthin**	**4 mg**
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Avoid use during pregnancy.

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Coffee Drinkers Have Longer Telomeres

An article in the *Journal of Nutrition* reveals that women who drink more **coffee** have longer white blood cell telomeres—protective caps at the ends of chromosomes whose length is considered a biomarker of aging.* Shorter telomeres have been associated with an increased risk of cardiovascular disease and other age-related conditions.

The study included participants in the Nurses' Health Study, which enrolled 121,700 female nurses beginning in 1976. The investigation was limited to 4,780 women with available data concerning coffee and caffeine intake and white blood cell telomere measurement.

In comparison with subjects who reported no coffee intake, women who consumed two cups of coffee per day had a **29%** higher chance of having average telomere length that was above the median of the group. For those who drank three cups or more daily, the odds were **36%** higher.

Editor's Note: When decaffeinated and regular coffee were separately examined, only regular coffee's effects were found to be significant. However, analysis of the association between caffeine from all dietary sources and telomere length suggests that compounds other than caffeine may be responsible for the association.

**J Nutr.* 2016 Jun 8.

Omega-3 Related to Shorter Hospital Stays

Researchers have found that cardiac patients who ingested **omega-3** supplements before undergoing surgery had shortened hospital stays and fewer postoperative heart arrhythmias compared with patients who received placebos.*

The meta-analysis, published in *Clinical Nutrition*, was based on a total of **1,038** subjects in 11 randomized controlled trials.

The researchers concluded that the reduced hospital stays for the omega-3 group—up to 2.4 days shorter—appeared to be due to a reduction in postoperative atrial fibrillation, a rapid and irregular heartbeat.

Study co-author Dr. Pascal L. Langlois said, "Omega-3s are well known for their benefits on cardiovascular health, including a reduced risk of arrhythmias and reduced mortality in patients with recent myocardial infarction or cardiac failure. Furthermore, they exhibit interesting anti-inflammatory properties and modulate the immune system."

Editor's Note: Besides lending support to an already large body of research supporting the cardiac benefits of omega-3, this study suggests a concurrent reduction in overall healthcare costs and hospital utilization.

* *Clin Nutr.* 2016 May 27.

Migraine Associated with Nutritional Deficiencies

Research reported at the 58th Annual Scientific Meeting of the American Headache Society in San Diego found deficiencies of several nutrients in a young population with migraine headaches.*

Based on previous studies, Suzanne Hagler, MD, and colleagues examined data from children, teenagers and young adults who had undergone blood testing for **riboflavin**, **folate**, **vitamin D** and **CoQ10**. About **89%** of the subjects had vitamin D of **40 ng/mL** or less, and **71%** had CoQ10 concentrations of **0.7 mcg/mL** or less—levels at which the researchers said that supplementation is suggested.

Dr. Hagler's team discovered a greater likelihood of vitamin D deficiency in boys and young men with migraine and an increase in CoQ10 deficiencies among girls and young women with the condition. Chronic migraine patients were likelier to be deficient in riboflavin and CoQ10 than subjects with sporadic migraines.

Editor's Note: "Further studies are needed to elucidate whether vitamin supplementation is effective in migraine patients in general, and whether patients with mild deficiency are more likely to benefit from supplementation," Dr. Hagler and colleagues concluded.

*58th Annual Scientific Meeting of the American Headache Society. 2016 June 10.

Insufficient Vitamin D Levels and Aggressive Prostate Cancer

The *Journal of Clinical Oncology* published findings from Northwestern University of an association between insufficient serum **vitamin D** levels and aggressive prostate cancer.*

The researchers utilized data from a larger study involving 1,760 subjects in the Chicago area, 190 of whom had undergone radical prostatectomies. Blood samples collected prior to surgery were analyzed for serum ***25-hydroxyvitamin D***.

Eighty-seven men had indications of aggressive disease at the time of their surgeries. Having an insufficient vitamin D level of less than **30 ng/mL** was associated with a **2.64 times** greater adjusted risk of adverse pathology compared with higher levels of the vitamin.

The findings could aid in deciding when patients would be appropriate candidates for active surveillance (aka watchful waiting), an option for those with nonaggressive disease.

Editor's Note: "Vitamin D deficiency may predict aggressive prostate cancer as a biomarker," commented Dr. Adam Murphy, an assistant professor of urology at Northwestern University Feinberg School of Medicine. "All men should be replenishing their vitamin D to normal levels. It's smart preventive health care."

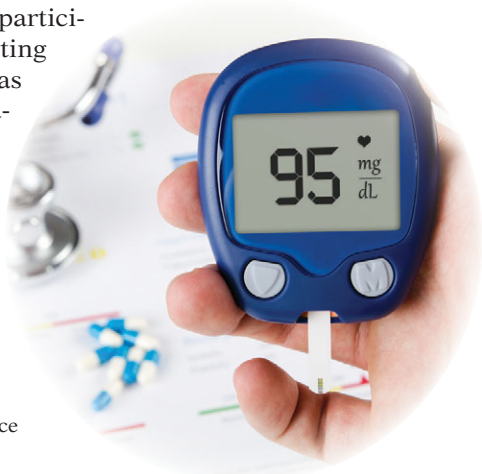
**J Clin Oncol.* 2016 Feb 22.

Zinc Linked with Better Glucose Handling in Prediabetics

A trial reported in *Diabetes Research and Clinical Practice* found that supplementing with **zinc** improved the ability of prediabetic men and women to handle glucose.*

The trial included 55 prediabetic patients residing in Bangladesh, one of the most zinc-deficient regions in the world. Subjects received **30 mg** of **zinc sulfate** or a placebo daily for six months. Fasting glucose, pancreatic beta cell function, insulin sensitivity and resistance, serum zinc, and lipids were measured at the beginning and end of the study.

At the end of the treatment period, participants who received zinc had lower fasting glucose compared to the placebo group as well as in comparison with levels measured in their own group at the beginning of the study. Beta cell function, insulin sensitivity and insulin resistance also improved among those who received zinc.



Editor's Note: As potential mechanisms, the authors note that zinc is needed for insulin's action, for carbohydrate metabolism, to moderate inflammatory cytokine levels that can destroy beta cells, for preventing human islet amyloid polypeptides from aggregating to form amyloid fibers that have a toxic effect on beta cells, to reduce oxidative stress and for other protective functions.

**Diab Res Clin Pract.* 2016 May.

Calorie Restriction Shown to Benefit the Non-Obese

The *JAMA Network Journals* reported on May 2, 2016, that a new study from the Pennington Biomedical Research Center in Baton Rouge, Louisiana, found that **calorie restriction** in non-obese adults is linked to a number of health benefits.*

The team, led by Corby K. Martin, PhD, focused on a variety of negative health effects that had been thought to be related to calorie restriction.

The clinical trial looked at 218 subjects, about **30%** men and **70%** women. All participants had a body mass index of 22 to 28. About two-thirds of the subjects had their caloric intake restricted by **25%** for two years, while the remainder ate as they liked. The results showed that the calorie-restricted group lost significant weight—**16.7 pounds** on average. More interestingly, compared with the control group, the calorie-restricted group had improved sleep after one year, as well as reduced tension, improved mood, increased energy and improved sex drive.

Editor's Note: The study's authors conclude that "calorie restriction among primarily overweight and obese persons has been found to improve QOL (quality of life), sleep and sexual function, and the results of the present study indicate that two years of CR (calorie restriction) is unlikely to negatively affect these factors in healthy adults; rather, CR is likely to provide some improvement."

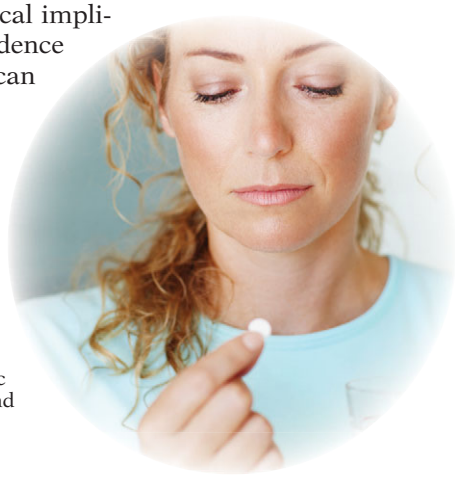
**JAMA Intern Med.* 2016 May.*

Study Demonstrates Cancer-Fighting Properties of Aspirin

In a new study published in *eLife*, scientists from the Gladstone Institutes identified a new mechanism by which **aspirin** could fight inflammation and cancer.*

The researchers discovered that **salicylic acid**, a major compound in aspirin, and **diflunisal**, an analgesic that's derived from salicylic acid, suppress two key proteins, **p300** and ***CREB-binding protein***. These epigenetic regulators are in charge of controlling levels of proteins that prompt inflammation or are instrumental in cell growth, both of which are related to the promotion of cancer.

The study could have significant clinical implications, as it represents the first solid evidence that CREB-binding protein and p300 can be targeted by drugs.



"Salicylic acid is one of the oldest drugs on the planet, dating back to the Egyptians and the Greeks, but we're still discovering new things about it," said senior author Eric Verdin, MD.

Editor's Note: Study coauthor Stephen D. Nimer, MD, stated, "We have conducted a clinical trial of salicylic acid in patients with hematologic cancers and found it to be safe. Thus, this collaborative effort to develop novel epigenetic therapies is an important step in our journey to find more effective treatment for leukemia patients."

**Elife.* 2016 May 31.*

High Triglycerides Tied to Fracture Risk

A new study suggests that as women with elevated levels of **triglycerides** approach menopause, they may have an increased risk of bone fractures.*

The study, published in the *Journal of Clinical Endocrinology and Metabolism*, followed over 2,000 premenopausal women who had never had any broken bones. After nearly 15 years, researchers found that women with high triglycerides suffered fractures more than twice as often as others. And an increase of **50 mg/dL** in blood triglycerides found during an annual exam was associated with a **31%** increased risk of fractures within the next two to five years.

Levels of triglycerides increase as women go through menopause, but researchers aren't sure if the rise in blood fats has a detrimental effect on bone strength. If so, it could explain the higher risk of fractures.

"This study suggests that women entering midlife should take action to lower elevated triglycerides," said senior study author Dr. Jennifer Lee.

Editor's Note: Naila Khalil, a community health researcher at Wright State University in Dayton, Ohio, suggests women can lower their risk of fractures by exercising regularly and getting adequate amounts of vitamin D and calcium.

**J Clin Endocrinol Metab.* 2016 Jun 13.*

Soy Isoflavones May Lower Insulin, LDL

An article in the *Journal of Clinical Endocrinology & Metabolism* reveals a potential benefit of **soy isoflavones** for women with polycystic ovary syndrome—a disorder characterized by mildly elevated male hormones and insulin which is associated with weight gain, infertility, and a greater risk of diabetes and coronary heart disease.*

For 12 weeks in a randomized trial, 70 women aged 18 to 40 years with polycystic ovary syndrome were assigned to consume **50 mg** per day of a soy isoflavone supplement or a placebo. Blood samples collected at the beginning and end of the study were analyzed for levels of hormones, lipids, and biomarkers of inflammation and insulin resistance.

At the end of the trial, participants who received soy isoflavones had lower insulin and markers of insulin resistance, free androgens, and serum triglycerides in comparison with those who received a placebo.

Editor's Note: Participants also experienced an increase in plasma glutathione and a decrease in malondialdehyde, a marker of oxidative stress.

**J Clin Endocrinol Metab.* 2016 Aug 4.

New Laser Treatment for Prostate Cancer

Options for treating prostate cancer may soon expand to include a laser technique, based on a recent study published in the *Journal of Neurology*.*

Researchers at the University of California, Los Angeles, have discovered that a laser-powered tool can safely treat tumors in patients with intermediate-risk prostate cancer. The process, called **focal laser ablation**, involves the insertion of a laser fiber into cancerous tissue, guided by magnetic resonance imaging. Laser-generated heat destroys the tumor.

No serious adverse effects in urinary or sexual function were found for a period of six months following the procedure.

A follow-up study presented at a meeting of the American Urology Association demonstrated the potential for the new technique to be performed in clinics using a device called the Artemis, which performs real-time imaging using a fusion of both magnetic resonance imaging and ultrasound. The Artemis has previously been used just for biopsies rather than treatment.

Editor's Note: "Our feeling was that if you can see prostate cancer using the fusion MRI and can put a needle in the spot to biopsy it, why not stick a laser fiber in the tumor the same way and kill it," said study senior author Dr. Leonard Marks. "What we are doing with prostate cancer now is like using a sledgehammer to kill a flea."

**J Urol.* 2015 Dec 31.

Doctors Misunderstand Cancer Risk of CT Scans

Many doctors and healthcare professionals aren't fully aware of the cancer risk of **CT scans** for patients, according to a new study published in the *Journal of Medical Imaging and Radiation Sciences*.*

Researchers from the University of Saskatchewan surveyed medical professionals and found that **73%** of doctors, **97%** of radiologists, and **76%** of technologists knew that a single abdominal-pelvic CT increases cancer risk. But while **48%** of doctors, **78%** of radiologists and **63%** of technologists either accurately estimated or overestimated how the dose from a CT scan compares to the amount of radiation from a chest X-ray, many underestimated it. The radiation exposure from one CT scan is equal to about 100 to 250 chest X-rays.

The survey also found that, while ultrasounds don't use ionizing radiation, **11%** of physicians think that they do.

Editor's Note: Lead researcher Dr. David Leswick observed that, although the risk from radiation exposure as used in medical imaging procedures is small, "it is real, as evidenced from atomic bomb survivors and nuclear industry workers showing significantly increased risk of malignancy after exposure to doses in the range of diagnostic CT." The risk of a fatal malignancy may be as high as one in 1,000 for an exposure that is the approximate dose of an abdominal-pelvic CT.

**JMIRS.* 2016, June 22.

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* US Patent 6,723,368.

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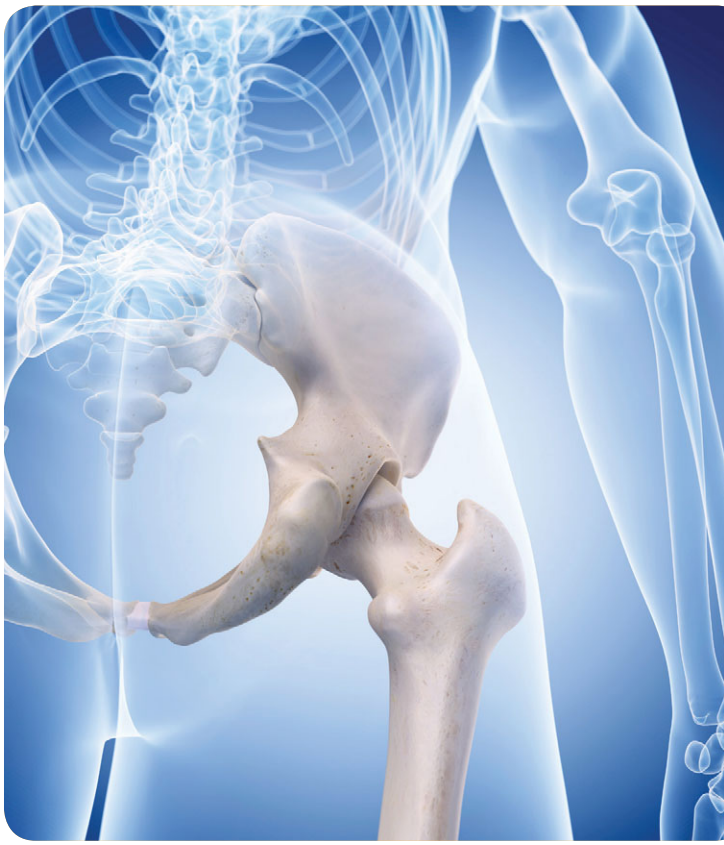

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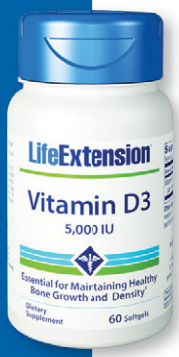

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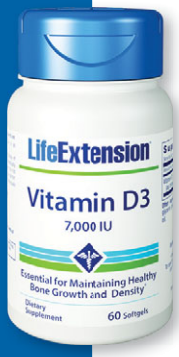

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BY CYNTHIA WYLIE

New Studies Validate Age-Delaying Effects of CARNOSINE

In year 2000, **Life Extension®** became the first organization to introduce the concept of ***high***-dose **carnosine** supplementation.

Before then, carnosine was available only in low doses (**50 mg**) that did not provide any benefit because *enzymes* in the blood rapidly degrade it.

There was compelling evidence 16 years ago to recommend **1,000 mg** a day of supplemental **carnosine**. What's transpired since then is nothing short of a major scientific advance. New human studies are demonstrating broad-spectrum properties of carnosine that exceed our original expectations.

For cost-conscious consumers, the price of carnosine has come down as more efficient ways have been discovered to produce it.

This article reveals new findings demonstrating the longevity potential when higher carnosine doses are utilized. This is especially important for those with less-than-optimal blood **glucose** levels, which happens to be most aging humans.

Carnosine Protects Tissues

Even at blood sugar levels considered "normal," glycation tissue damage occurs throughout the body.[1]

Glycation creates structure/function changes to blood vessels, skin, nerves, heart muscle and the brain. This leads to premature aging.[2-4]

It is especially important to protect the body against even temporary glucose elevations such as those following meals. High ***after-meal*** glucose levels are strongly correlated with heart disease and other systemic risks.[5]

Elevated blood glucose leads to *reduced* levels of **carnosine** in muscle tissue, especially prominent in those with type II diabetes.[6] A human study evaluated the impact of carnosine supplementation on a group of obese adults at risk for developing diabetes and cardiovascular disease.[7] Subjects were randomly assigned to receive very high-dose carnosine, **2,000 mg**/day, or a placebo, for 12 weeks.

In order to determine the effects of carnosine, researchers used models that quantify insulin resistance and insulin secretion (beta-cell function).[8,9]

After 12 weeks, both groups saw increases in insulin resistance and insulin secretion, but the increases were smaller in the carnosine group. **Insulin resistance** in the **placebo** group increased **3.8-fold** more than the **carnosine** group.

In order to overcome cellular **insulin resistance**, the pancreas responds by secreting lots of **insulin**. Numerous studies show excess insulin is highly undesirable, especially as it relates to **cancer**. In this study, placebo recipients increased insulin secretion by **36%**, whereas the increase in carnosine recipients was only **3%**.

Importantly, among subjects with impaired glucose tolerance (that is, those with "prediabetes," or "borderline high" blood sugar), carnosine supplementation decreased blood **glucose** to nondiabetic levels two hours after a glucose tolerance test, while unsupplemented subjects remained significantly higher, at more than **160 mg/dL**.

This study strongly supports the concept that **carnosine** supplementation can play a major role in preventing the development of type II diabetes and its multiple negative consequences.

These findings would hardly be surprising to scientists who have studied carnosine's antidiabetic effects for years, and are familiar with its abilities to protect tissues from **glycation**.

Carnosine Confers Systemic Protection

Animal studies show that carnosine supplementation delays diabetes-induced deterioration of heart, liver, and kidney functions, lowering blood sugar and lipid levels, and reducing lipid oxidation.[10] Carnosine also reduces levels of pro-inflammatory cytokines[10] and glycation-indicative tissue damage in diabetic animals.[11]

Laboratory studies show that carnosine, added to kidney cells in culture, can prevent the glucose-induced deposition of extracellular material that slows the kidney's filtering and cleansing functions. This is a common cause of kidney failure in diabetics.[12]

In the eye, carnosine supplementation delayed progression of cataracts, the clouding of the lens that can lead to blindness in diabetics, after just four weeks of supplementation.[11] Similarly, supplementation with carnosine prevented the blood vessel damage that leads to another cause of glucose-induced blindness, diabetic retinopathy.[13]

Elevated blood glucose damages cells in the immune system and in those involved in healing tissues, leading to delayed wound healing and even amputation in severe cases. But carnosine supplementation enhanced wound healing in diabetic rats through protection of cells against glucose-induced damage.[14]

The impact of glycation is felt throughout the body, and is not restricted to just those with diabetes. Carnosine supplementation may protect tissues most vulnerable to glucose-induced damage, including the heart and the brain.

What You Need to Know

Whole-Body Protection with Carnosine

- Tying together type II diabetes, cardiovascular disease, and age-related brain dysfunction is our bodies' chronic exposure to even mildly elevated glucose levels.
- Through the abnormal chemical reaction called ***glycation***, glucose binds to protein molecules, impairing their function and triggering low-grade inflammation.
- These factors, in turn, predispose us to further glucose intolerance (and hence, type II diabetes), blood vessel damage (and hence, cardiovascular disease), and, eventually, brain cell destruction arising from both glycation and diseased blood vessels in the brain (hence, neurodegenerative diseases and stroke).
- ***Carnosine***, composed of two amino acids, can intervene in this destructive cycle at its source, by both preventing sugar elevations, and protecting tissues against the resulting glycation.
- Human studies show that carnosine lowers blood sugar and insulin levels in people at risk for diabetes, enhances heart muscle function and life quality in congestive heart failure, and improves cognitive function.
- Animal and basic lab studies illustrate how carnosine achieves these results primarily through blocking oxidative and glycation-induced tissue damage.
- Carnosine is an outstanding means of providing comprehensive protection against glycation and its ill effects.

Carnosine Protects the Cardiovascular System

Carnosine has been found to prevent early oxidation of fats in the bloodstream, and reduces the resultant tissue damage and inflammatory responses in animal studies.[15] A human study has now validated those findings in living patients.

Basing their work on the high levels of carnosine found in healthy heart muscle and on studies in people showing that carnosine improves exercise performance, researchers studied 50 patients with stable **congestive heart failure**.[16] The goal was to determine if carnosine could improve exercise performance and quality of life in such patients.

Congestive heart failure results when an ailing heart cannot pump sufficient blood to meet the metabolic needs of tissues in the body. It can limit mobility and physical functioning, and severely impairs quality of life for its victims.

In the study, subjects were randomly assigned to receive standard congestive heart failure medical therapy alone, or with added carnosine, **500 mg**/day over a 6-month period.[16]

How Carnosine Works

Carnosine is a ***dipeptide***, a molecule composed of two amino acids, beta alanine and L-histidine, that is found naturally in human brain, nerve, muscle, and other energy-consuming tissues.[2,35]

One of carnosine's most important metabolic roles is to react with a variety of toxic molecules, including free radicals and those that develop following chronic exposure to high glucose levels.[3,35,36]

For example, carnosine inhibits the deleterious reaction of glucose molecules to proteins (***glycosylation***), and prevents proteins from forming stiff ***cross-linked*** bonds that interfere with their function.[35,36]

As a result, carnosine is capable of strongly opposing formation of the so-called ***advanced glycation end products***, aptly called "AGEs," that add to the glucose-induced protein damage seen throughout the bodies of diabetic patients.[3,35]

But carnosine's antiglycation actions don't stop there.

Studies show that carnosine can even protect cells and tissue against those toxic metabolic byproducts, including advanced glycation end products.[36] One remarkable result of this in brain cells is the prevention of toxicity caused by ***beta amyloid***, the "Alzheimer's protein" that leads to brain cell destruction and, ultimately, dementia and death.[28]

And, most recently, modulation of complex cellular regulators of aging and metabolism, of protein synthesis and breakdown, and of scavenging free radicals and products of glycation, have been added to carnosine's antiaging repertoire of effects.[35,37,38]

Historically, carnosine was among the earliest molecules shown to fight aging at the cellular level.[35-37]

In fact, because of its multiple effects throughout the body, carnosine has been referred to as a "Drug against aging."[36] This is supported by the observation that carnosine, in lab studies, slows the shortening of ***telomeres***, the strands of DNA at the ends of chromosomes that gradually shorten as aging proceeds.[39]

Compared with the patients not taking carnosine, the supplemented group significantly improved their physical condition in a number of ways. Patients saw improvement in their quality-of-life scores, their 6-minute walking distance, their peak exercise workload, and their ability to deliver oxygen for use in their tissues during exercise.[16]

Patients with congestive heart failure are among the most challenging to medically manage, and have a uniformly poor prognosis without complicated medication regimens. The finding that naturally-occurring carnosine has these dramatic effects in this population is an important milestone in our understanding of the disorder, and offers great hope for the future.

Numerous animal and basic science studies offer further insights into how carnosine benefits the heart and blood vessels.

Research has shown that carnosine inhibits formation of **advanced glycation end products (AGEs)**, the sugar-protein complexes that damage tissues and impair function. Carnosine also inhibits formation of **advanced lipoxidation end products**, while also rapidly neutralizing them when they form.[15,17,18] This is important, because advanced lipoxidation end products are oxygen-damaged fat molecules that can trigger inflammation and lay the foundation for the atherosclerotic plaques that damage blood vessels and impede blood flow, eventually resulting in a heart attack or stroke.[18,19]

Studies show that carnosine inhibits formation of the lipid-filled inflammatory cells called "foam cells" that play a large role in the formation of atherosclerotic plaque.[20] Furthermore, in an animal study, carnosine significantly prevented the development of the lipid abnormalities, high blood pressure, and kidney damage associated with cardiovascular diseases, and also preserved kidney function and prevented microscopic kidney damage related to hypertension.[17]

Remarkably, carnosine not only lowers plasma triglycerides, but it also promotes the removal of damaged fats from atherosclerotic lesions and stabilizes those lesions against catastrophic rupture, which suggests that it might be useful in treating patients with known atherosclerosis.[18,21]

Carnosine Supplementation Protects Brain Tissue

Brain cells are highly vulnerable to glycation-induced damage and to blood-flow impairments caused by atherosclerosis.

Carnosine helps prevent both of those problems. Scientists have now confirmed that carnosine supplementation has meaningful effects in the brain, especially in prevention of age-related disorders such as cognitive impairment and memory loss.

In a study of 51 adults 65 and older, subjects received a placebo or a carnosine-rich diet for 13 weeks.[22] Compared with the placebo group, subjects receiving the carnosine-rich diet performed significantly better by the end of the study on a variety of cognitive function and physical fitness scores. Intriguingly, supplemented subjects also lost weight.

Carnosine supplementation has now shown promising results in a variety of brain disorders. For example, 12 weeks of carnosine supplementation (given as **500 mg**, **1,000 mg**, and **1,500 mg**, increasing at 4 week intervals) lessened cognitive dysfunction in veterans suffering fatigue and pain from Gulf War Illness, a disorder thought to be related to toxic chemicals during that war.[23]

A preliminary study of schizophrenic patients also showed that carnosine, **2,000 mg**/day, could improve executive (decision-making) function, helping subjects perform faster and with improved strategy on tests of executive function.[24]

A Japanese study of "chicken essence," a traditional remedy for fatigue, rich in carnosine, found that supplementation, when administered to healthy men, improved cognitive performance following mental fatigue induced by a stressful task.[25]

These studies clearly demonstrate that carnosine provides direct benefit for the brain. Lab and animal studies suggest how.

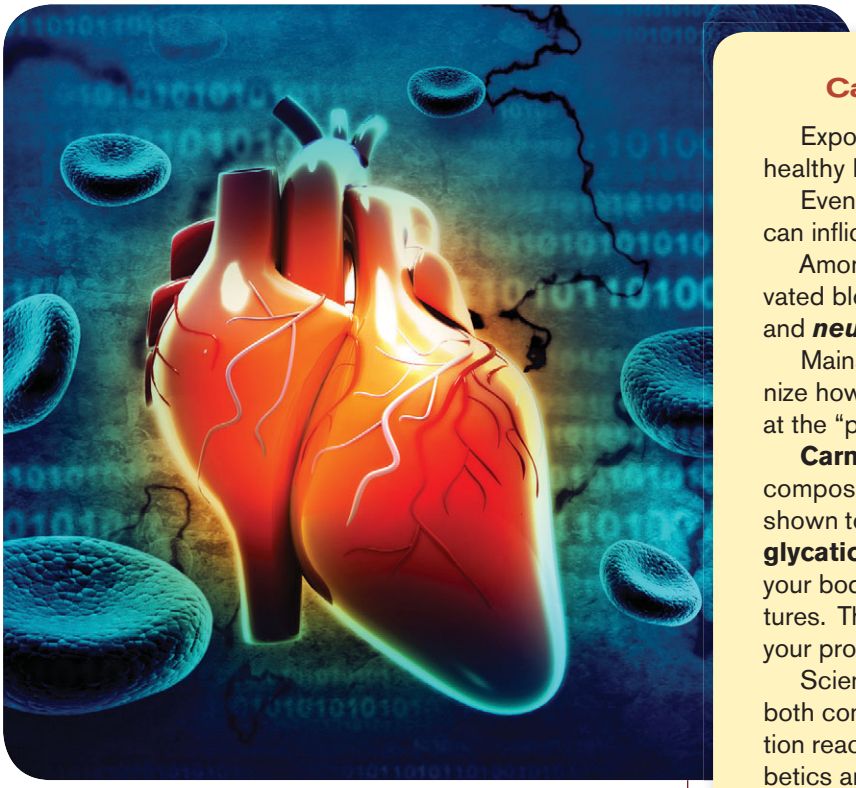
Healthy aging brains undergo changes in signaling molecules (neurotransmitters) and their receptors that impede normal thinking and information processing.[26,27] Carnosine supplementation can restore normal production and breakdown of the important neurotransmitter **serotonin**, which may in turn explain its ability to prevent age-induced cognitive decline.[26,27]

Neurodegenerative diseases such as Alzheimer's and Parkinson's can result from protein glycation and oxidative stress that leads to the accumulation of toxic abnormal proteins.[28,29] Carnosine treatment prevented the damage to tiny brain vessels induced by a chemical used to model Parkinson's disease in animals, and restored brain cells' ability to utilize energy.[29]

Stroke is another age-related threat to brain function and cognition. While there are few effective therapeutic options for treatment, carnosine may provide protection in the event of a stroke.[30]

Studies show that carnosine protects brain tissue against the abrupt loss, followed by abrupt restoration, of oxygen-rich blood that occurs during a stroke and can induce widespread brain damage and death.[30-32] Similar protection was seen against hemorrhagic stroke, another threat to older adults' memory and cognitive function.[33] Indeed, a collective analysis of multiple animal studies of ischemic stroke concluded that carnosine, either before or after the onset of a stroke, has robust effectiveness.[34]

Such studies make a strong case for maintaining ample carnosine blood levels in anyone at elevated risk for stroke.



Carnosine Fights Glycation

Exposure to elevated blood sugar shortens healthy lifespan.

Even at levels considered to be safe, sugar can inflict significant tissue damage.

Among the destructive consequences of elevated blood sugar are ***cardiovascular disease*** and ***neurodegeneration***.

Mainstream medicine is beginning to recognize how important it is to protect ourselves even at the "prediabetic" stage.[40]

Carnosine is a naturally-occurring compound composed of two amino acids. It has been shown to protect against the damaging effects of **glycation**, which occurs when sugar binds to your body's proteins to form nonfunctioning structures. The higher your blood glucose, the more your proteins suffer glycation injury.

Scientists have found that carnosine works by both controlling blood sugar elevations and glycation reactions. This benefit has been shown in diabetics and in people with borderline blood sugar.

Summary

Every adult, diabetic or not, suffers continuous, low-grade tissue damage from chronic exposure to the glucose that is needed to fuel our cells.

As a result, protein and fat in our body becomes damaged, dysfunctional, and, in fact, toxic, leading to increased inflammation. This leads to increased risks for type II diabetes, cardiovascular disease, and brain damage from stroke and neurodegenerative diseases.

That means that protecting against glucose-induced damage requires more than keeping blood sugar levels down.

Carnosine is coming to the forefront as a supplement capable of reducing risk for blood sugar damage and its consequences—renal failure, neuropathy, cardiovascular disease, and loss of brain function.

Human studies now demonstrate that carnosine can lower blood sugar and insulin levels even in nondiabetic adults, and thereby forestall blood vessel and heart muscle damage, while also preventing cognitive decline.

Rarely can a nutrient produce so many good results, but that's precisely what carnosine represents. It belongs in any thoughtful approach to a healthier aging process.

People taking **500 mg** of **carnosine** twice a day along with certain B-vitamins are likely to obtain optimal **anti-glycation** benefits.

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

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Note: Those who take the **Mitochondrial Energy Optimizer with BioPQQ®** are already consuming **1,000 mg** of L-carnosine, along with benfotiamine, the fat-soluble form of vitamin B1.

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1. *Ann N Y Acad Sci*. 2006 May;1067:369-74.
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- **TAURINE:** Supports whole-body health and boosts new brain cell formation in the area of the brain connected to learning and memory.[6]
- **PQQ:** This micronutrient has been shown to trigger the growth of new mitochondria in aging cells![7] PQQ also activates genes involved in protecting the delicate structures within the mitochondria.[8-11]
- **LUTEOLIN:** Systemic inflammation is involved in most consequences of aging. Culprits behind **inflammatory** reactions are pro-inflammatory **cytokines**, such as **interleukin-6** and **tumor necrosis factor-alpha**. *Luteolin* is a flavonoid that has been shown to help suppress these inflammatory cytokines.[12-16]
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- **PYRIDOXAL 5'-PHOSPHATE:** **Pyridoxal 5'-phosphate** is the active form of vitamin B6 that has been shown to protect against both lipid and protein **glycation** reactions.[24-27]
- **R-LIPOIC ACID:** A microencapsulated Bio-Enhanced® **R-lipoic acid** facilitates youthful **mitochondrial energy output** while guarding against **free radicals**.[28-32]

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

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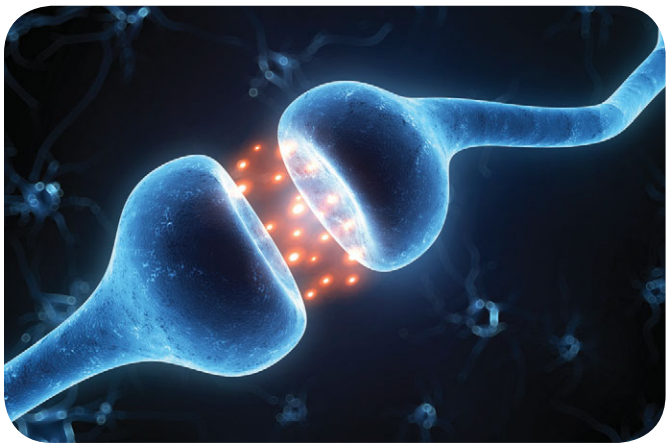
BY MAUREEN FIONA

TAURINE

Powerful Brain Protection

New discoveries are highlighting the roles that **taurine** plays in preserving the human mind. The importance of supporting brain taurine concentrations, which decline with aging, is rising to the forefront of cognitive science.[1,2] Taurine supplementation can help to mitigate age-related losses of memory and learning functions.[2]

In addition, recent studies show that this low-cost amino acid has brain-protective effects capable of preventing at least some of the cognitive changes associated with environmental toxins.



Taurine is one of the most abundant amino acids in our bodies. It plays special roles in the brain, where it meets many of the criteria for being a neurotransmitter (a molecule that transmits signals between brain cells).[3,4]

Scientists have recognized for a decade or more that taurine is critical for normal brain development.[5-7]

The basic science of taurine in the brain is rapidly emerging, demonstrating that it may prevent brain aging via the following mechanisms:

- Protects brain cells against environmental toxins including lead and organic pesticides[8]
- Prevents dysfunction of mitochondria within brain cells, thereby sustaining energy levels[9,10]
- Protects brain cells against excitotoxicity, the chemically stressful effects of overstimulated brain cells[9]
- Enhances the inhibitory systems driven by the "relaxing" neurotransmitter GABA, which directly opposes excitotoxic effects[11]
- Cooperates with other neurotransmitters to promote induction of ***long-term potentiation***, which is the neurological process by which memories are formed and retained during learning[2,12]
- Reduces brain inflammatory processes that are active in production of neurodegenerative disorders such as Alzheimer's and Parkinson's diseases[13]
- Stimulates proliferation and new neuron formation to sustain learning and memory[14-16]
- Protects brain cells against destruction following a stroke[17,18]
- Attenuates damage caused by beta amyloid protein, a major contributing factor in Alzheimer's disease[10,19]

Studies Reveal Taurine's Neuroprotective Effects

Supplemental taurine has a major impact on the adult brain as well as the developing brain, with the ultimate result that the taurine-supplemented brain appears to age more *slowly* than it might otherwise.

Environmental toxins, long known to contribute to congenital brain defects seen in newborns, are now increasingly recognized as factors in causation of adult neurodegenerative disorders including Parkinson's and Alzheimer's disease.[20-23]

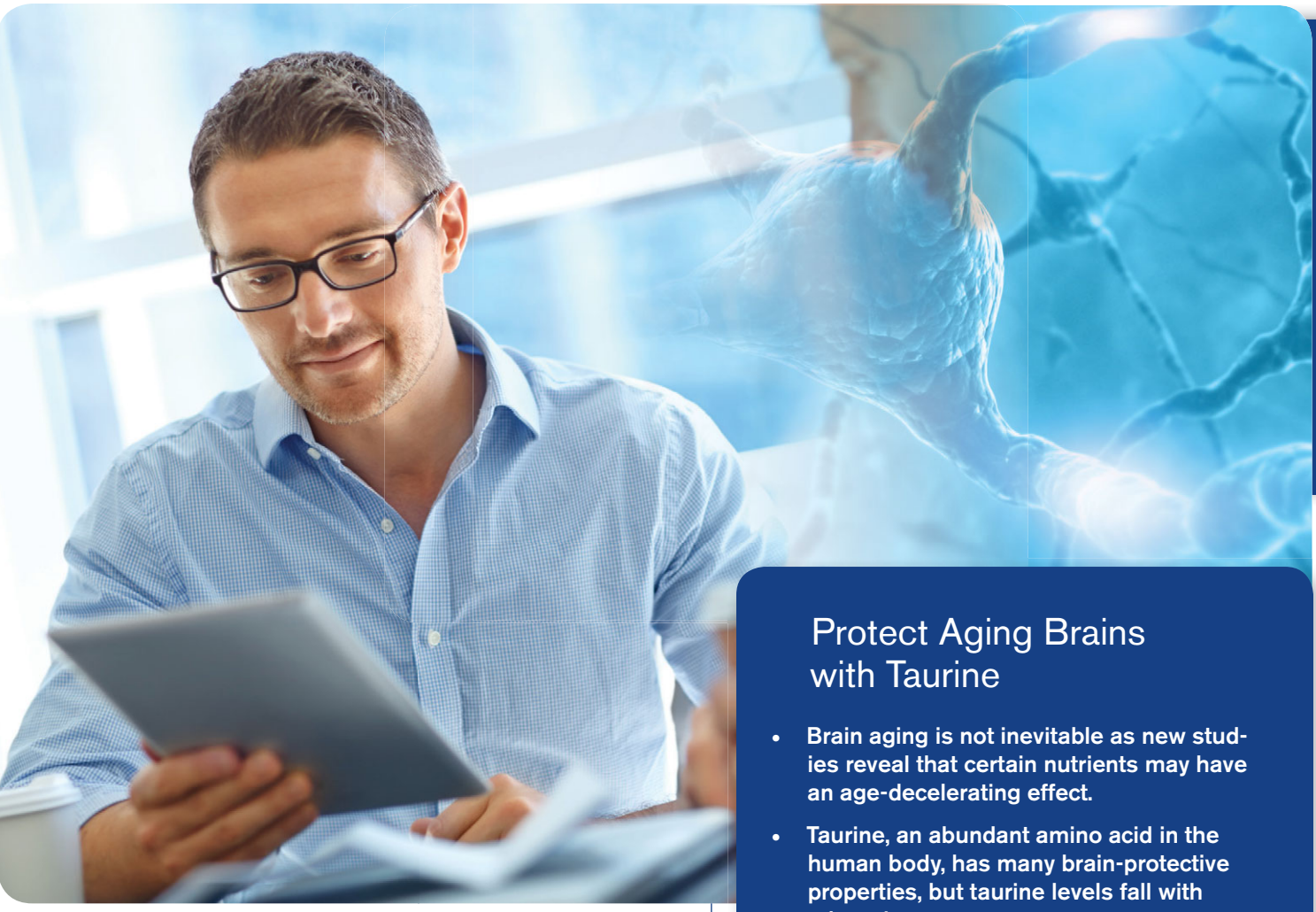
Taurine appears to play a role in protecting brain cells against a variety of environmental toxins.

A recent study showed that rats exposed to either a dangerous pesticide called CPF, lead acetate, or both toxins, showed biochemical damage leading to visible degeneration of brain tissue. When the animals were cotreated with taurine, those changes were prevented.[8]

These findings may have increased urgency as Americans discover just how our public infrastructure has failed to protect us against lead and other toxins in our water supplies.[24]

Taurine's multiple mechanisms of action fight brain aging in other important ways, particularly by protecting the brain against internal age-accelerating forces.

For decades, scientists believed that adult brain cells could not reproduce, nor could new brain cells be generated afresh. Studies with taurine are turning that dogma on its head.



New brain cell growth was demonstrated in an exciting study released in 2015. Swiss scientists discovered that feeding middle-aged mice taurine could trigger rapid growth in populations of stem cells in the brain and greatly promote their subsequent differentiation into functioning adult brain cells.[25] This effect had previously been shown in studies of cultured adult-mouse brain stem cells.[14] And another 2015 study demonstrated that human-brain stem cells in culture underwent the same type of proliferation and specialization demonstrated in the animal studies.[16]

Together, these studies mean that humans are likely to be able to stimulate new brain cell development, and foster rapid synaptic connections between them with taurine.

Neurodegenerative diseases rob aging adults of memory, function, and dignity. Taurine has significant favorable impact on the malformed and toxic proteins that accumulate in the aging brain, leading to Alzheimer's and Parkinson's diseases.

What You Need to Know

Protect Aging Brains with Taurine

- **Brain aging is not inevitable as new studies reveal that certain nutrients may have an age-decelerating effect.**
- **Taurine, an abundant amino acid in the human body, has many brain-protective properties, but taurine levels fall with advancing age.**
- **New studies show that taurine may play a major role in protecting the brain from exposure to toxic chemicals from water supplies and other environmental sources.**
- **Taurine stimulates new brain cell formation, providing a potential source for replacement of aging, damaged brain cells.**
- **Taurine supplementation may slow or prevent Alzheimer's disease by effects on toxic beta amyloid proteins, and also by improving blood sugar control.**
- **Taurine prevents brain cell death following a stroke, helping to preserve neurological function.**
- **Taurine is likely to emerge as a major component of modern regimens aimed at slowing brain aging.**

Taurine can prevent damage wrought on brain cells by the malformed Alzheimer's-related protein called ***beta amyloid***.[10] That mechanism may have been at work in a recent mouse model study of Alzheimer's, in which six weeks of taurine added to drinking water rescued mice from developing cognitive deficits. In this study **taurine** supplementation restored **cognitive** function to that of age-matched normal mice.[19]

Elevated blood glucose and insulin resistance severely damage the brain. Some researchers now refer to Alzheimer's as "type III diabetes."[26] In 2015, a study showed that taurine supplementation in mice could increase brain insulin receptors, an effect that might prove to be protective against the disease.[27]

Ischemic strokes are the result of an abrupt reduction in blood flow to specific brain regions. Strokes not only cause immediate symptoms, but also contribute to accelerated brain aging over the longer term.[28,29] Once again, a role for taurine supplementation is evident.

Taurine appears to protect brain cells from the oxidative stress induced during a stroke, and to slow subsequent brain cell death.[9,18] Chronic cellular destruction contributes to neurological problems in stroke survivors, so preventing it is an important approach to mitigating stroke damage. A mouse study has shown that adding taurine to another emerging stroke drug improved performance on neurological tests, while the drug alone was ineffective.[18]

Summary

Brains age for many reasons. Chronic toxin exposures, elevated blood sugar, accumulations of abnormal proteins and circulatory disruptions are known to accelerate brain aging.

Taurine is proving to have significant brain age-decelerating effects. Most recently, it has been shown to be protective against toxic exposures including lead and pesticides. It also inhibits ***beta amyloid*** formation associated with Alzheimer's and helps regulate the brain's control of glucose. Taurine also shows evidence of protection against the cognitive deficits induced by stroke.

And, in exciting news, taurine treatment enhanced formation of new brain cells.

Taurine is an ultra-low cost dietary supplement. ●

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

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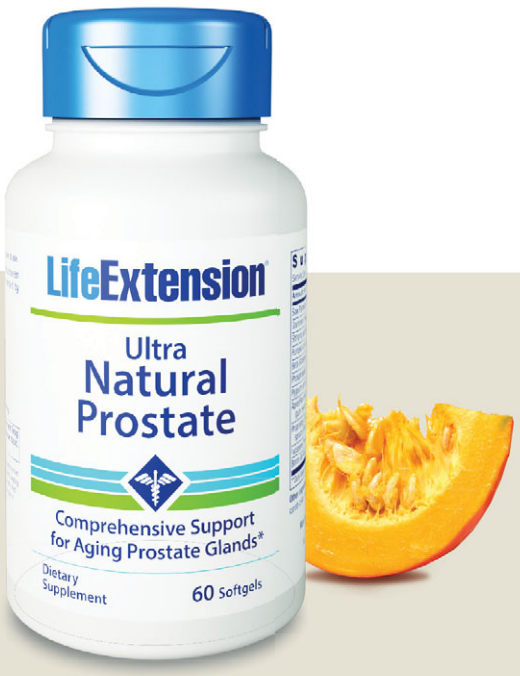

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BY STUART GREENFIELD

The National MAGNESIUM Crisis

The medical community does not yet understand the life-sustaining properties of **magnesium**.

In today's world of high drug prices, it's hard for physicians to conceive how an **inexpensive** mineral can provide such ***diverse*** health benefits.

Volumes of studies show that those with ***higher*** magnesium intake have sharply lower rates of hypertension[1] and heart disease,[2] fewer strokes,[3] better blood sugar control,[4] lower rates of kidney disease,[5] less risk of cognitive decline,[6] healthier bones and teeth,[7] and even lower risk of migraine headache.[8] As if this weren't enough, magnesium has also been linked to longevity.[9]

The majority of Americans do not obtain enough **magnesium** from dietary sources.[10] The result is an epidemic deficiency of a nutrient vital to protecting against degenerative aging.

Magnesium and Longevity

Magnesium is the fourth most abundant mineral in the human body. More than 300 enzymes require magnesium in order to function properly.[11]

Magnesium is crucial for converting chemical energy from food into useful energy for our bodies, and it has unique functions in regulating blood sugar, blood vessel health, heart function, and brain electrical activity. About half of our total body stores of magnesium are found in bone, which contributes to its strength and integrity.[7,11]

In fact, virtually every system in the body requires magnesium for its function.

Despite this fact, most of us are not getting enough magnesium to support good health. When humans got their water the old-fashioned way, from natural springs and wells, it was easy to get enough of this naturally-occurring mineral. But today's world of municipal water supplies and bottled, purified water has left us woefully deficient.

Of people over age 70, **80%** of men and **70%** of women fail to get the estimated average requirement (**350 mg**/day for men and **265 mg**/day for women) of magnesium from their diets.[12,13] Compounding the problem, magnesium levels decline with age, and low magnesium levels are commonly seen in age-related disorders.[6,14]

To make matters still worse, many common drugs are known to deplete the body of magnesium, further contributing to low levels.[15] Of these, the **proton-pump inhibitors** (PPIs)—drugs used by millions for heartburn relief—are the most notorious and widespread.[16,17]

Americans' low magnesium intake—coupled with declining magnesium status with age—represent major obstacles to optimal health and longevity.[11]

In fact, the risk of death from any cause is significantly ***higher*** in people 65 and older who have lower levels of magnesium intake or low blood levels of magnesium.[18,19] Basic lab studies show that low magnesium levels *accelerate the aging process* at the cellular level, increasing the number of senescent cells incapable of further replication or participation in healing.[9,20]

The good news is that ample magnesium intake and blood levels have been associated with reduced mortality. In one study, higher magnesium blood levels appeared to predict better outcomes among hospitalized patients who were critically ill. While **55%** of those who had low blood levels when they were admitted died, that figure was only **35%** in those with normal levels.[21] (Optimal levels may have conferred greater-life-protective effects.)

Magnesium has been long-neglected by mainstream physicians, much like higher-dose vitamin D. Like vitamin D, however, magnesium is suddenly coming into its own as a result of a multitude of recent studies showing its ability to promote cardiovascular health,[2] lower stroke risk,[3] regulate blood sugar levels,[4] help prevent osteoporosis,[7] and more.[8]

The Benefits of Magnesium

- **Magnesium is the fourth most common mineral in our bodies.**
- **Although it has been overlooked for years, magnesium is now emerging as a multi-targeted nutrient with myriad functions throughout the body.**
- **Magnesium is particularly important in electrically active cells, such as those in the brain, heart, muscles, and artery linings.**
- **70% to 80% of Americans fail to meet the estimated average requirements of magnesium from their diet, leaving them vulnerable to disorders linked to its deficiency.**
- **Studies now show that ample magnesium intake is protective against a host of age-related disorders, including cardiovascular disease and stroke, diabetes, osteoporosis, and more.**
- **For reliable, consistent daily intake of magnesium, look for a supplement that offers both immediate and extended release.**

Magnesium Promotes Cardiovascular Health

One of magnesium's most critical benefits is its ability to protect against the number one killer of Americans: cardiovascular disease. Studies show that people with the highest dietary intake of magnesium are **37%** less likely to die from a sudden cardiac death.[22] Even better, compared to those with the lowest intake, those with the highest intake were found to be **34%** less likely to die from any cause at all.[23]

Magnesium has numerous mechanisms of action that explain its ability to protect against cardiac deaths. The cardioprotective actions include magnesium's role in maintaining heartbeats and preventing arrhythmias, and in protecting blood vessels against the accumulation of calcium. This can help lower the risk of atherosclerosis, which is a well-known predictor of heart disease, stroke, and death.[22,24,25]

Studies show that for each **50 mg** increase in daily magnesium intake, calcification of the heart's main arteries decreased by **22%**, and calcification of the aorta—the body's main artery—fell by **12%**. As a result, those with the highest magnesium intake were **58%** less likely to have any calcification of the coronary arteries and **34%** less likely to have any calcification of the abdominal aorta.[26]

On the other hand, low dietary intakes and blood levels of magnesium are associated with elevated risk for cardiovascular diseases in general, and of **arterial calcification** specifically.[2,25,27,28] One study showed that those with the lowest levels of serum magnesium were **2.1 times** more likely to have coronary artery **calcification**.[29]

These studies showing the dangers of low magnesium levels—and the incredible benefits of obtaining adequate magnesium levels—make it clear that magnesium is an essential component of cardiovascular health.


NATURAL MAGNESIUM

Magnesium Supplements Vary

There is no single "optimal" form of magnesium for supplementation. Instead, it is important to consider the **reason** for the supplement.

One approach for ideal magnesium supplementation is to use a **2-part supplement** composed partly of *magnesium citrate* in a **quick-release form** and magnesium oxide in an **extended-release form**.

Magnesium oxide is highly concentrated, allowing a lot of magnesium to go into a relatively small pill. Because magnesium oxide is somewhat less bioavailable, it is ideal for an extended-release formulation, which gradually makes its way into the circulation.

Magnesium citrate, on the other hand, is less concentrated but is highly bioavailable, which allows for quick release of the mineral in a form that is readily absorbed.

This kind of innovative combination provides extended magnesium benefits in a single supplement.

Magnesium Lowers Stroke Risk

There are numerous factors that can lead to a stroke. For example, strokes can occur when blood pressure is too high, weakening cerebral arteries in a way that can induce bleeding in the brain (hemorrhagic stroke).

More common strokes occur when artery linings are damaged, setting up conditions for an artery-blocking clot (ischemic stroke). They also commonly occur when a heart arrhythmia or artificial heart valve creates a blood clot that travels into a cerebral artery and blocks vital blood flow (ischemic stroke).[30,31]

Maintaining consistent magnesium levels may help to prevent all of these processes.

In one study, men with the highest magnesium intake had significantly lower blood pressure and total cholesterol, and were **41%** less likely to have a stroke than those with the lowest magnesium intake.[3]

And according to a 24-year-long study of nearly 43,000 men, subjects with the highest supplemental magnesium intake had a **26%** lower stroke risk than those with the lowest intake.[32]

Studies in women have also shown the dangers of having low blood levels of this mineral. In one of these studies, women with the lowest blood levels of magnesium were found to be **34%** more likely to have an **ischemic stroke** than those with higher levels.[33]

And in another study, low blood magnesium levels were associated with an approximate **50%** greater likelihood of developing **atrial fibrillation** (a type of irregular heartbeat that can cause a blood clot that can lead to a stroke) compared to those with higher levels.[34]

Magnesium is so critical for helping maintain a regular heartbeat that hospitals use intravenous magnesium to prevent atrial fibrillation following heart bypass surgery.[35]

Magnesium Improves Blood Sugar Control

Aging and obesity induce ***insulin resistance***, which elevates blood sugar levels. High, or even "borderline high," blood sugar inflicts glycation damage to proteins throughout the body that prevents them from functioning properly. Controlling blood sugar—*even in nondiabetic people*—is a critical approach to preventing age-related diseases.

Magnesium supplementation improves the body's response to insulin, which takes sugar out of the bloodstream.

A comprehensive review of 21 smaller clinical trials showed that magnesium supplementation led to significant improvements in insulin resistance.[4] For example, after just four months, those supplementing with magnesium had an average of **13 mg/dL** lower blood sugar levels compared with placebo recipients. The longer the subjects took the magnesium, the greater the improvements in insulin resistance. The effects were greatest in those subjects whose magnesium levels were lowest at the beginning of the study.

Importantly, these improvements were seen in both diabetic and nondiabetic patients. This is critical because nondiabetics with borderline elevated blood sugar are at increased risk for developing diabetes. This study showed that magnesium is effective both for treating and for preventing diabetes.

Magnesium and Kidney Protection

The kidneys take a beating every day as they filter out waste products from blood. This leaves them particularly vulnerable to the effects of blood pressure and endothelial dysfunction, as well as the ravages of borderline or high glucose levels. Sustained over a lifetime, those factors raise the risk of serious kidney disease.

Kidney disease itself weakens the kidney's ability to regulate magnesium. This contributes to ongoing losses of magnesium and makes magnesium supplementation that much more critical.[36]

Researchers studied more than 13,000 middle-aged adults for over 20 years to find out if there was a connection between magnesium levels and kidney disease. They discovered that low magnesium levels are a strong, *independent* risk factor for chronic kidney disease.[5]

What they found was that, compared with those with the highest magnesium levels, those with the lowest magnesium levels had a **58% *greater*** risk of developing chronic kidney disease, and a nearly **2.4-fold** greater risk of developing end-stage renal disease, requiring dialysis to sustain life.[5]

Magnesium Supports Bone and Dental Health

While calcium is a well-known bone-protecting nutrient, few people recognize the important role magnesium plays in maintaining healthy bones. In fact, about half of total body magnesium is stored in bones.[7,11]

Because of that, low levels of magnesium directly lead to **osteoporosis** by depriving bone tissue of one of its most essential structural components.

Low magnesium also indirectly weakens bones by stimulating inflammatory cytokines that contribute to osteoporosis by increasing the breakdown of bones.[37,38]

The fact that **70%-80%** of Americans don't meet the daily average requirements of magnesium from their diet puts the large majority of the population at risk for this serious condition. Fortunately, assuring good magnesium intake helps protect against osteoporosis.

A large study of women demonstrated that those whose daily magnesium intake exceeded **423 mg** had greater hip and whole-body bone mineral density compared with those getting less than **207 mg** daily.[39]

This protection extends to teeth as well. Like bones, **teeth** also have high magnesium content and rely on its presence for their structure.[40] Because of this connection, magnesium supplementation has been found to improve **tooth attachment** and help subjects retain more teeth.[41]

Magnesium and Migraines

Low levels of magnesium are associated with increased risk for migraines.[8,42-45] This connection could be related to a genetic inability to properly manage magnesium in the gut and kidneys.[42]

While there is no cure for migraines, supplementing with magnesium has numerous benefits for those suffering from the condition.

A study of 81 migraine sufferers found that supplementing with magnesium for 12 weeks reduced the frequency of migraines by **41.6%**, decreased the number of days with a migraine, and slightly reduced the duration and intensity of the attacks.[46]

Other studies have shown that oral magnesium may prevent migraines, and that intravenous magnesium may be an effective treatment.[45]

Researchers have stated: "*Intravenous and oral magnesium should be adapted as parts of [a] multimodal approach to reduce migraine.*"[8]

How It Works

Magnesium is an absolute requirement for energy production from fats and carbohydrates and for synthesis of new proteins in our body.[47] Magnesium helps regulate the flow of other mineral ions in and out of cells in skeletal and heart muscle, in artery walls, and in brain and nerve cells.

As a result, it is related to conditions as diverse as **depression** (involving brain cells), **muscle cramps** (involving skeletal muscle), **heart arrhythmias** (involving heart muscle cells), and **hypertension** (often involving cells in arterial walls).[1,48-52]

Magnesium also fights against the chronic, low-grade ***inflammation*** associated with aging and unhealthy lifestyles.[53-55] This effect has been traced to magnesium's ability to reduce the activity of the "master inflammation regulator" called ***NF-kB***, which results in downstream shutdown of cytokines and other pro-inflammation signaling molecules.[56]

Inflammation is a major contributor to a wide range of chronic, age-related diseases. This explains in part why poor magnesium status is so closely associated with diabesity (diabetes and obesity) and metabolic syndrome, with cardiovascular disease, and neurodegenerative disorders such as Alzheimer's.[57-59]

The role of magnesium deficiency in chronic inflammatory stress led researchers to conclude that it should be considered a significant nutrient for health and well-being.[54]

Summary

Magnesium has been described as an "orphan nutrient," because so few people really understand its importance. Yet it is involved in hundreds of critical body processes.

Few Americans get adequate magnesium to support all of those processes, leaving them vulnerable to a host of potentially serious diseases. Fortunately, magnesium is a **low-cost** supplement available without the need of a doctor's prescription.

Magnesium is emerging as this generation's **vitamin D**—an overlooked nutrient that favorably alters human disease risk and improves quality of life. ●

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

Magnesium's Underappreciated Role in Healthy Longevity

When **Life Extension**® raised awareness of the need for higher-dose vitamin D, it was thought of only as a nutrient added to milk for strong bones and teeth.

Physicians are just now realizing that vitamin D plays a key role in everything from immunity and brain function to heart disease and diabetes.

Today, **Life Extension** continues to raise awareness of the essential nature of another nutrient that is vastly underappreciated, i.e., magnesium.

Since 1981, **Life Extension** has recommended higher magnesium intake, despite conventional medical authorities seeing little or no value to it.

This is regrettable, since magnesium is perhaps the most deficient mineral in the American diet.

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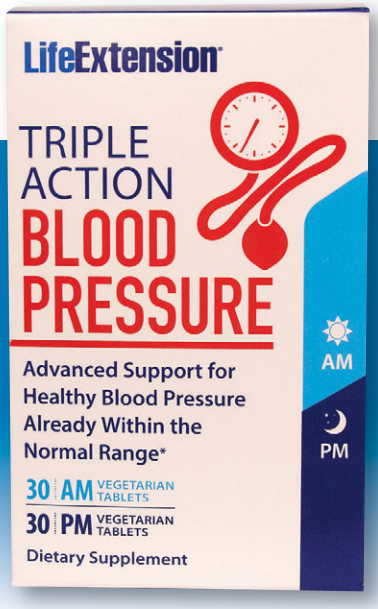

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Reference

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

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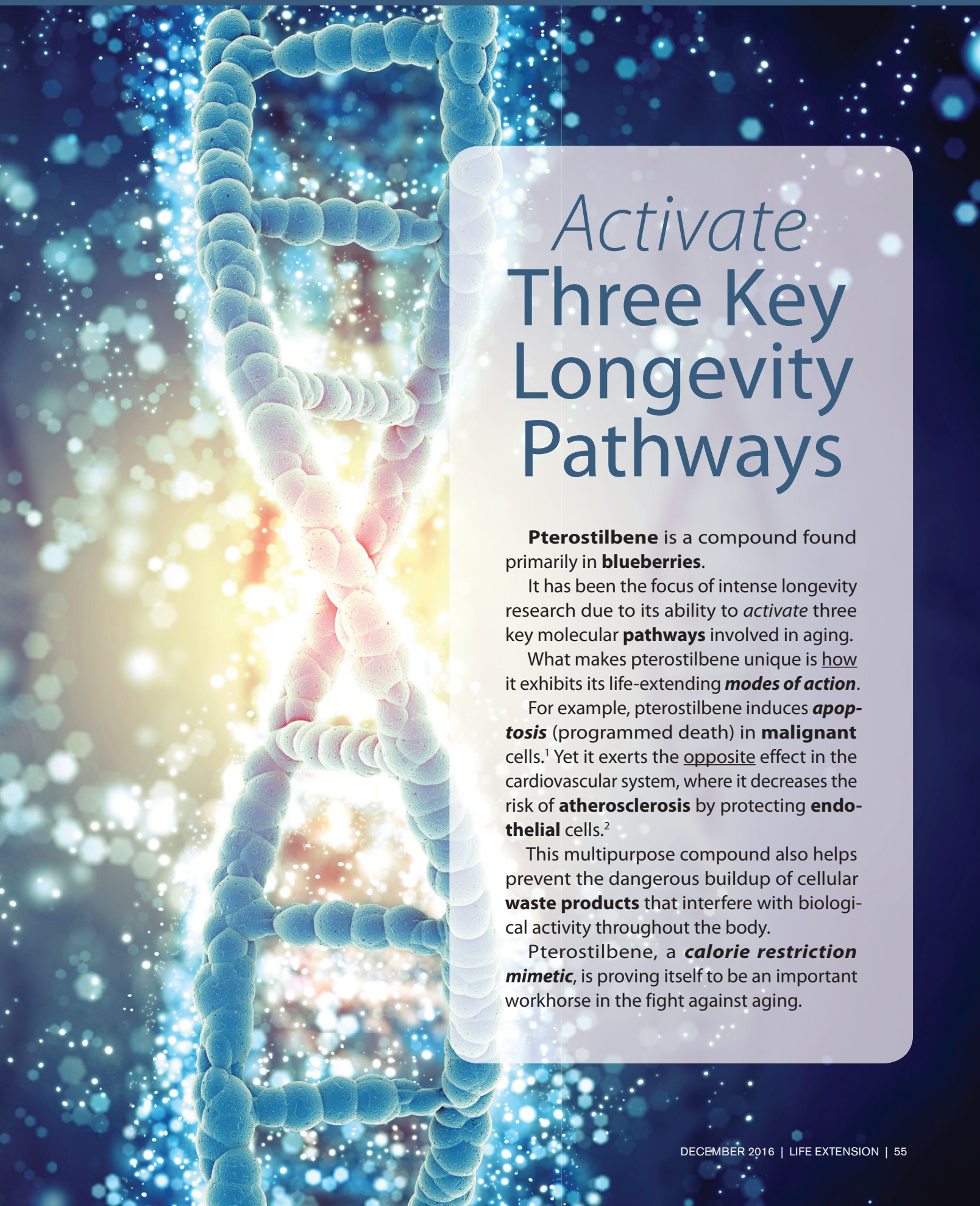
BY KRIS MASSEY



Activate Three Key Longevity Pathways

Pterostilbene is a compound found primarily in **blueberries**.

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For example, pterostilbene induces ***apoptosis*** (programmed death) in **malignant** cells.[1] Yet it exerts the opposite effect in the cardiovascular system, where it decreases the risk of **atherosclerosis** by protecting **endothelial** cells.[2]

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Pterostilbene, a ***calorie restriction mimetic***, is proving itself to be an important workhorse in the fight against aging.

Pterostilbene Mimics Calorie Restriction

One mechanism by which **calorie restriction** has been shown to beneficially extend lifespan is by "***turning on***" genes directly related to long-term survival.[3] Scientists have been intrigued to find that pterostilbene mimics many of the same broad preventive and therapeutic properties of calorie restriction.

In fact, pterostilbene impacts multiple antiaging factors involved in cardiovascular,[4] hematologic,[5] inflammatory,[6] metabolic,[7] and neurological disorders.[8] Preclinical studies suggest that pterostilbene acts as a potent antitumor compound in multiple malignancies.[9]

One reason why pterostilbene is so effective at promoting longevity is that, similar to calorie restriction, it activates **antiaging molecular pathways**. And multiple studies confirm pterostilbene's remarkable antiaging effects.[10-15]

Cell and animal studies have shown that pterostilbene can extend the lifespan of various animal models of human longevity by regulating **three** major pathways linked to longevity: **mTOR, AMPK,** and **sirtuins**.

Let's look at each individually.

Anti-Aging Pathway #1: mTOR

A molecular complex called **mammalian target of rapamycin** (mTOR) is currently a major focus of pharmacological research to slow aging—and for good reason. So far, reducing the expression of **mTOR** has been shown to *extend* lifespan across multiple species. Laboratory-bred mice whose expression of mTOR has been *reduced* to about **25%** enjoy an approximate **20%** increase in median lifespan.[16]

mTOR is a cellular signaling pathway that serves as a central regulator for cell growth, metabolism, survival, and proliferation.[17] This pathway is responsible for controlling many of the processes that use or generate large amounts of energy and nutrients.[18] When mTOR signaling goes awry, it triggers numerous harmful events, including those linked to a variety of cancers.[19-21]

Abnormal mTOR activation is a contributor to many of the chronic diseases of aging.[21-23] Scientists are aggressively seeking pharmaceutical approaches to *lower* the activity of mTOR.

Pterostilbene (as well as other CR mimetics and calorie restricted diets) has been found to naturally ***inhibit*** the mTOR pathway.[24] This reduction in mTOR provides a powerful way of regulating cellular growth and metabolism, and combatting some of the primary factors involved in aging and disease.

Anti-Aging Pathway #2: AMPK

While pterostilbene has been shown to naturally ***inhibit*** the mTOR pathway, it has been found to beneficially ***activate*** a separate important pathway associated with an increase in lifespan and a decrease in degenerative disease. Called **AMPK** (short for *adenosine monophosphate-activated protein kinase*), this cellular energy sensor regulates the ways our bodies use and transform energy.

When we're young, higher levels of activated AMPK are present, which helps protect us against many conditions, including obesity and diabetes. But with time, AMPK activation decreases, which can lead to weight gain and accelerated aging.[25]

By increasing AMPK activation through the use of various nutritional compounds including pterostilbene, we can achieve a reduction in many of the destructive factors of aging, enabling our cells to return to their youthful vitality. Preclinical research shows that enhanced AMPK activity is associated with an approximate **20%** increase in lifespan.[26] It has also been shown to shrink body-fat stores, lower blood sugar and lipid levels, and suppress chronic inflammation—all of which are key indicators of a reduction in the aging process.[25,27]

Activating AMPK can also help protect against Alzheimer's disease because it suppresses the formation of *beta-amyloid plaque* and *tau tangles*,[28] two of the primary markers of this neurodegenerative disease. It has also been found to limit oxidative stress that leads to hypertension,[29] increase cell survival during hypoxia (oxygen deprivation),[30] and promote autophagy to reduce memory impairment.[31]

Activating AMPK is a critical component for warding off degenerative disease. Pterostilbene helps activate this important longevity pathway.

Anti-Aging Pathway #3: Sirtuins

Pterostilbene regulates the activation of key *anti-aging molecules* known as **silent information regulators (SIR)**, or **sirtuins**. Sirtuins act across multiple cellular pathways that regulate gene expression, aging, DNA repair, metabolism and apoptosis.[32-34] Studies have also examined the vital role that sirtuins play in maintaining **telomere length**.[35]

These are critical longevity factors, since shortened telomeres are associated with reduced lifespan.

In a cell study model of ischemia-reperfusion injury, pterostilbene was found to protect heart cells from apoptosis by stimulating the activity and enhancing the expression of sirtuin-1. Study investigators concluded that pterostilbene could be used clinically to alleviate heart muscle injury due to a heart attack.[36]

Eliminating Cellular Garbage

Another way pterostilbene can extend lifespan and ameliorate age-related diseases is by preventing the buildup of age-related cellular waste products.[37] These aggregates of damaged and cross-linked proteins, known as **lipofuscin**, are detrimental to normal cell functions.[37,38]

The rate of lipofuscin formation is closely related to the level of cellular oxidative stress. Studies suggest that lipofuscin may be involved in the earliest stages of Alzheimer's disease by causing **mitochondrial dysfunction** and by activating an innate immune response that can damage neurons.[39]

What You Need to Know

Pterostilbene: A Powerful Compound Found in Blueberries

- **Pterostilbene, the lifespan-extending compound found in blueberries, has emerged from resveratrol's shadow as a CR mimetic with remarkably diverse antiaging effects.**
- **It possesses a dynamic mode of action that shifts depending upon where it works in the body and which pathological condition it's targeting.**
- **Pterostilbene impacts key molecular pathways involved in extending lifespan.**
- **Pterostilbene works synergistically with resveratrol to provide complementary health and longevity benefits.**

The body is equipped with small garbage disposals within cells called **lysosomes** that are designed to remove harmful lipofuscin.[40] When lysosomes stop working properly, it leads to the accumulation of lipofuscin. The progressive accumulation of this cellular debris is considered to be a reliable marker of aging.[41]

In addition to accelerating the aging process, these junk-laden cells contribute to neurodegenerative diseases like Alzheimer's and Parkinson's, and they have been found in vascular lesions in the retina.[42,43]

By preventing the buildup of cellular garbage, pterostilbene helps keep the body's systems running more smoothly and efficiently—an important factor in maintaining youthful vigor while also preventing age-related diseases.

Pterostilbene's Synergistic Effects

Pterostilbene is especially effective when combined with other specific antiaging compounds and CR (calorie restriction) mimetics.

One of the most significant relationships is with **resveratrol**. Pterostilbene and resveratrol are both *stilbene* compounds and are structurally related.

Pterostilbene and resveratrol naturally occur together in certain varieties of berries and grapes.[44,45] Both compounds have been shown to mimic the antiaging effects of caloric restriction, and multiple studies have confirmed their synergistic health benefits.[46-48]

Resveratrol is known for its potential ability to combat cancer and diabetes, while protecting against cardiovascular disease and Alzheimer's. Pterostilbene

affects longevity-related molecular pathways "downstream" from the sites activated by resveratrol, thereby increasing the antiaging effects. Together, these effects make these two compounds especially beneficial when taken together.

Combining pterostilbene with resveratrol has been shown to be a beneficial therapy for treating **estrogen receptor-alpha-negative breast cancer cells** when combined with standard-of-care antihormonal therapy.[49]

Additionally, combined treatment with pterostilbene and resveratrol has been shown to significantly and synergistically inhibit the growth of triple-negative breast cancer cells, a type of breast cancer that is especially aggressive and difficult to treat.[48] This cell study found no harmful effects of the treatment on healthy control breast cells, demonstrating the safety and effectiveness of the two compounds.

Pterostilbene's established ability to work in concert with other CR mimetics provides an opportunity to take advantage of the compound's **synergistic** lifespan-extending effects.

Potent Brain Benefits

Blueberries are the primary dietary source of pterostilbene. Study after study has shown that consuming blueberries can prevent and mitigate age-related cognitive disorders,[50,51] and higher intakes of blueberries have been found to reduce the rate of cognitive decline.[52]

While blueberries contain numerous compounds that contribute to these cognitive benefits, pterostilbene is one of the most important contributing factors. Studies have shown that pterostilbene can improve cognition in rats. It has also been shown to help prevent the loss of the neurotransmitter dopamine from memory centers in aged rats.[53]

This is an example of how pterostilbene can battle the effects of age-related diseases.

Summary

Multiple studies have shown that the health and longevity benefits of consuming blueberries are largely due to the presence of pterostilbene.[11] Although pterostilbene is structurally similar to the well-known red wine molecule resveratrol, the two CR mimetics work in complementary ways to boost lifespan extension.

Pterostilbene works on critical molecular pathways involved in lifespan extension, and it has been shown to work synergistically with resveratrol.

Pterostilbene has a wide range of preventive and therapeutic properties that allow it to beneficially impact factors involved in cardiovascular disease, neurodegenerative diseases, metabolic disorders, and cancer.

After spending years in the shadow of its more widely known and researched molecular cousin, resveratrol, pterostilbene has emerged as a powerful CR mimetic.

One can obtain **standardized** potencies of **pterostilbene** in supplemental form, often combined with **resveratrol**. ●

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

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BY AMY JOHNSTON

CURCUMIN *Reverses* the Cellular Damage of Chronic Stress

Stress causes destructive changes to our **brain**.

While we may feel anxious due to stress, those feelings are minor compared to **damage** done to our brain cells. Stress-induced brain changes often lead to anxiety or depression and worse.

Curcumin, a polyphenol derived from the turmeric spice plant, can ***reverse*** harmful brain changes induced by chronic stress.[1] Curcumin also stimulates the formation of **new brain cells** and their connections—two processes that can prevent or mitigate symptoms of depression.[2,3]

Curcumin has been in use for nearly 4,000 years to treat or prevent various illnesses.[2] New studies show that it can help protect mental health by combating stress-induced anxiety and depression.

This article describes preliminary laboratory research that led to **human** trials demonstrating the ability of **curcumin** to mitigate the adverse impact of **stress** on mental and physical health.

Controlling Stress at the Cellular Level

Researchers have come to realize that "emotional" or "psychological" stress negatively impacts our physical body, not just our sense of well-being.

Studies demonstrate close relationships between psychological stress and physically damaging effects.[4-6]

Animal studies of stress have been created that mimic the kinds of chronic, unpredictable stress that people now experience in their daily lives. These studies show that stress produces physical changes in the animals' bodies, such as increasing the size and weight of the adrenal glands, particularly the portions that make the stress-response hormone **cortisol**. Elevations in blood levels of cortisol can have long-term deleterious effects, such as the belly-fat weight gain that stressed humans also develop.[1,7,8]

At the cellular level, stress inhibits our natural antioxidant systems, promotes oxidative damage, and injures energy-producing structures inside mitochondria, where cellular energy is managed.[6,8]

In addition, stressed animals develop performance, memory, and cognitive deficits in precisely the same ways that humans do.[1,7] Chronic, unpredictable stress adversely affects production of brain-protective compounds. This may account for altered mental behaviors observed in response to stressful situations.[1,7,8]

Studies show that **curcumin** reverses these damaging changes to the body's physical systems.

When given orally to rats, curcumin has been shown to *restore* the cortisol balance and the adrenal glands to their normal function, and to *normalize* the animals' behaviors.[1,7,8] In mice, curcumin improves both the oxidative and energy-restricting effect of stress while again *restoring normal behavior*.[6] Recent studies show that curcumin can prevent the death of brain cells and promote new brain-cell connections, which become damaged from chronic stress.[9]

By protecting cellular structures from physical damage, curcumin is able to help remediate the longer-term impacts of stress, such as chronic anxiety and depression.

Let's take a look at the studies.

Curcumin Addresses Anxiety

Animal studies of stress-induced **anxiety** have demonstrated that oral curcumin can significantly prevent anxiety-like behaviors and improve mobility—effects that are triggered by acute stressors such as sleep deprivation or restraints.[10,11]

Studies of the **antidepressant** effects of curcumin are even more abundant. Animal models of depression have been developed to test new, single-targeted drugs. But these models have proven useful in studies of natural supplements as well.

Curcumin has been shown to favorably affect the behavioral, biochemical, and neurochemical effects of depression in animal models. It has been shown to normalize depressive behaviors such as helplessness, to improve levels of mood-determining neurotransmitters such as dopamine and serotonin, and to inhibit the enzymes that break them down.[12-15]

People suffering from stress-induced depression have reduced levels of biochemicals that protect or enhance normal brain-cell activity. Curcumin appears capable of increasing the production of these protective biochemicals.[3,15,16]

In fact, curcumin is so potent against stress-induced anxiety and depression that it may help to lower the dose of prescription antidepressant drugs.[13]

Human Studies Validate Curcumin's Anti-Stress Effects

A growing number of human studies are extending and validating what these animal studies have revealed.

For example, in a study of healthy, middle-aged people, taking an **enhanced-absorption curcumin formula** produced a wide array of health benefits, including reducing salivary *amylase* levels (a marker

of acute stress), increasing scavenging of free radicals, and lowering blood markers of brain deterioration—all effects that would be expected to reduce the impact of stress in the brain.[17]

Work-related stress can be extremely harmful to health. A study published in **2016** demonstrated curcumin's impact specifically in people suffering from occupational stress-related anxiety and fatigue.[18]

For the study, 60 adults with such occupational stress disorders were randomly assigned to take an enhanced-absorption curcumin formula, standard curcumin, or a placebo (all **500 mg** twice daily) for 30 days. Compared with the other two groups, those taking the **enhanced-absorption curcumin** experienced significant ***improvements*** in quality of life, stress reduction, anxiety, and fatigue. These improvements correlated with reduced evidence of oxidative damage.

Another study focused on anxiety in obese people at risk for both anxiety and depression.[19] Subjects took curcumin (**1,000 mg**/day) or a placebo. After 30 days, the curcumin-supplemented subjects experienced a significant reduction in mean **anxiety scores**.

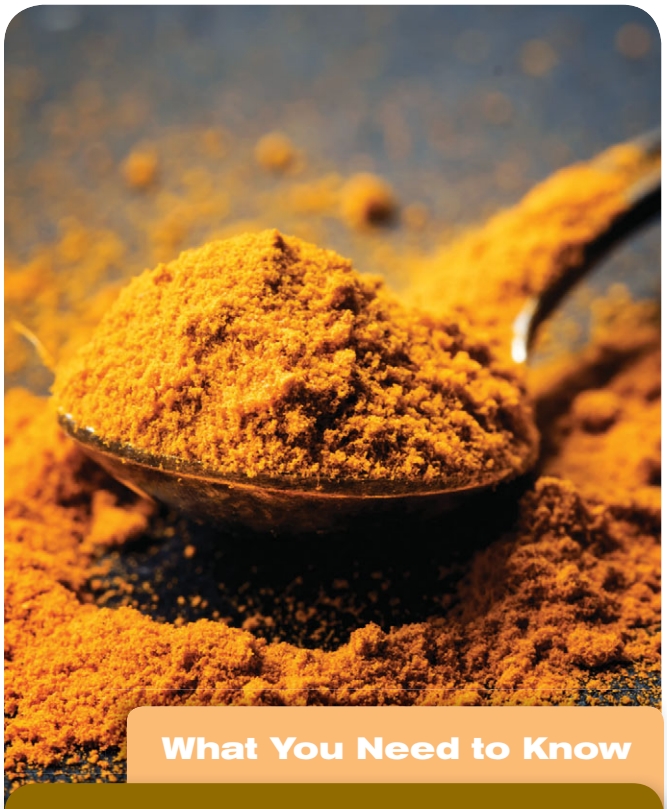
Curcumin's Antidepressant Effects

Oxidative stress in the brain can lead to low-grade inflammation—and eventually to cellular dysfunction and death. These processes can manifest as symptoms associated with depression.[4,5]

Curcumin's anti-inflammatory properties make it a strong candidate for use as a natural antidepressant.[19-21] And unlike common antidepressant drugs, it has no known major side effects.[22]

In one study, **curcumin** (**500 mg** twice daily) was found to be significantly more effective than **placebo** at improving symptoms of depression (sleep disturbances, fatigue, feelings of worthlessness, diminished ability to concentrate, weight changes, thoughts of death or suicide, irritability, loss of interest, anxiety) in adults with major depressive disorder.[21] This study showed that curcumin was the most effective in subjects with so-called ***atypical depression***, a type of depression in which positive events can improve mood.

Just last year, researchers published a study examining curcumin's effects on cognition and mood in healthy older adults. For this study, an enhanced-absorption form of curcumin (**400 mg**/day) was given to healthy adults aged 60 to 85.[23] This research focused on both acute treatment (meaning a single dose) and chronic treatment (meaning treatment over a period of time) with curcumin vs. placebo.



What You Need to Know

Curcumin Combats Anxiety and Depression

- **Stress produces cellular and molecular damage to tissues throughout the body, particularly the brain.**
- **Stress-induced brain changes often lead to anxiety or depressive disorders, which themselves can contribute to additional stress.**
- **Drug therapy is only partially effective and comes with significant side effects.**
- **Curcumin is now showing remarkable stress-relieving, anti-anxiety, and antidepressant effects in laboratory studies.**
- **Human studies demonstrate that oral curcumin, particularly in enhanced-absorption formulations, can augment or even replace prescription drug therapy.**
- **Anyone suffering from the effects of depression or anxiety should consider adding enhanced-absorption curcumin in order to help combat the impact of chronic stress.**

One hour after a **single dose**, curcumin-supplemented subjects scored better on tasks requiring sustained attention and working memory—functions commonly impaired by depression. Continuous supplementation with curcumin for four weeks also improved scores on working memory and mood (general fatigue, calmness, contentedness, and fatigue induced by psychological stress). And when subjects took a single acute dose during the chronic supplementation period, it led to even further improvements in alertness and contentedness.[23]

Most recently, a meta-analysis study of curcumin and depression was published in early **2016** that evaluated the pooled results of six previous smaller studies.[24] It showed that curcumin supplementation—especially in **enhanced-absorption formulations**—was significantly better than placebo at treating major depressive disorder. It also revealed that the effects appear greatest when given for longer periods of time, at higher doses, and to middle-aged people in particular.

Curcumin Enhances Prescription Medications

Several studies have now shown that taking curcumin in addition to prescription medications leads to *significantly greater improvement* in depression and anxiety than taking prescription meds alone. This is a vital area of research, given the damage such drugs can cause to both short- and long-term functioning, and also considering their limited efficacy at treating symptoms.[25,26]

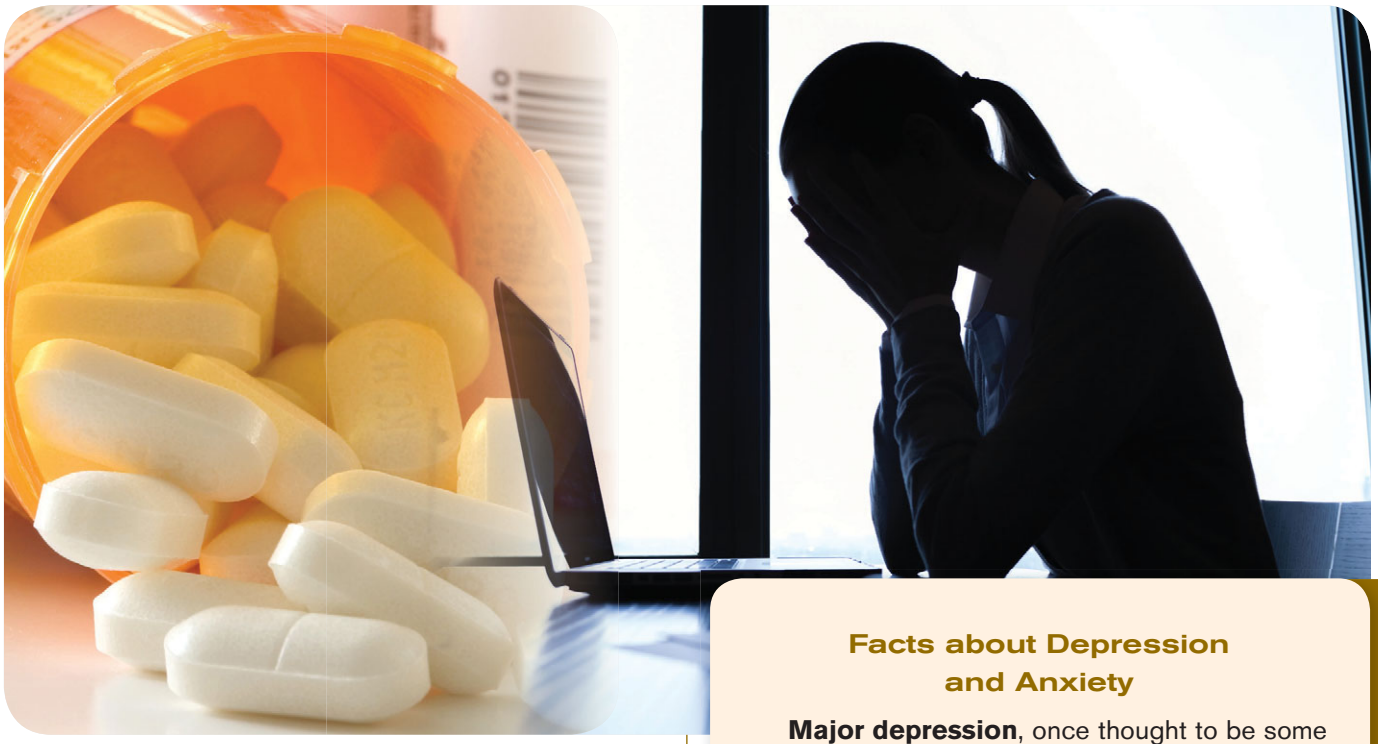
In one such study, researchers evaluated patients with major depressive disorder who were already taking standard antidepressant drugs. For six weeks, the patients either continued taking the standard treatment alone, or they took **enhanced-absorption curcumin** (**1,000 mg**/day) in addition to their prescription drugs.[25] Both groups experienced reductions in depression ratings by the end of the study. However, the group taking their antidepressants *plus* curcumin showed significantly greater improvement on scales of **anxiety** and **depression** as well as on scores of **cognitive** and **physical symptoms**.

Another study evaluated depressed men between 31 and 59 years old who took curcumin (**1,000 mg**/day) or a placebo for 6 weeks while continuing their existing antidepressant regimen.[26] By the end of the study period, the group taking the prescription drugs ***plus*** curcumin showed significant reductions in depression scores compared with those on standard drugs alone. The curcumin group also had significant reductions in markers of inflammation and stress, as well as enhanced levels of brain protective molecules.

Summary

Chronic stress has profound effects on our health and well-being. It is particularly associated with the development of anxiety and depression, both of which can be life-threatening conditions.

Drug treatment for anxiety and depression is far from adequate, and is fraught with potentially serious



side effects. The natural polyphenol **curcumin** acts by multiple biochemical pathways to ease the impact of stress on brain cells, and to prevent or mitigate stress-induced anxiety and depression.

Curcumin may be used alone, or in combination with prescription medications, to relieve symptoms and improve quality of life. Anyone suffering from stress, depression, and/or anxiety should consider supplementing with an ***enhanced-absorption*** curcumin in order to emulate the findings emanating from these recent human studies. ●

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

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Facts about Depression and Anxiety

Major depression, once thought to be some sort of "character flaw," is recognized as a debilitating psychiatric disorder. By the year 2020, major depression is expected to be the second most prevalent disease in humans.[27] Even now, it is the leading cause of disability in the US for ages 15 to 44. Nearly half of those diagnosed with depression also have diagnosable anxiety disorders, further impeding their ability to function well.

Generalized anxiety disorder, or GAD, affects more than **3%** of the US population. That's **6.8 million** adults, with women experiencing generalized anxiety disorder at twice the rate of men. The other anxiety disorders (social anxiety, panic disorder, post-traumatic stress disorder, obsessive-compulsive disorder, and others) affect millions more individuals.[28]

Drug treatment has become the mainstay of both antidepressant and anti-anxiety therapy, and drug companies are rushing to capitalize on newer combination formulas. But these drugs are associated with a wide array of side effects and interactions with other drugs and even foods, reducing their appeal for long-term use. Worse, about **30%** of patients fail entirely to respond to drug therapy, while the remaining **70%** have only partial responses.[27]

This gap in mainstream medicine has opened the door for natural alternatives to these dangerous and often ineffective drugs. Curcumin has been shown to have remarkable stress-relieving, anti-anxiety, and antidepressant effects in laboratory studies.

Enhanced-Absorption Curcumin Formula

Despite its powerful effect on myriad human disorders, curcumin is not readily absorbed from an oral dose.[29] This has led to numerous attempts to enhance its **absorption** by combining the curcumin molecule with others that are more readily absorbed.

One of the most promising of the enhanced-absorption formulations is one in which curcumin is complexed with components of its native turmeric root, which are typically lost during purification. When this compound is administered orally in healthy adults, the absorption of curcumin into the bloodstream is nearly **7-fold** that of curcumin alone.[29]

Given the superiority of enhanced-absorption curcumin, it seems prudent to seek such a preparation as part of a regimen that includes curcumin for its stress-reduction, antidepressant, and anti-anxiety effects.

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BY PAUL MCGLOTHIN

CALORIE RESTRICTION UPDATE

High-NORMAL BLOOD SUGAR *Harms Brain*

In September 2012, Australian researchers published findings showing blood **glucose** at the **high end of normal** resulted in significant **brain shrinkage**.[1,2] The shrinkage occurred in regions of the brain (hippocampus and amygdala) involved in memory and other critical functions. Atrophy (shrinkage) in these brain areas worsens memory.[1,2]

For this study, neuroscientists at Australian National University in Canberra studied 249 people in their early 60s. Each of them had blood sugar levels in the normal range. The study subjects' brains were scanned at the beginning of the study, and again four years later.

Comparing the before and after images, the researchers found significant **brain shrinkage** among those whose blood sugar levels were high but still below the World Health Organization's threshold for **prediabetes** (fasting glucose under **110 mg/dL**). The researchers report that these high-normal levels may account for a **6%** to **10%** decrease in the volume of the hippocampus and amygdala.

The lead researcher stated, "***It is this chronic exposure to high glucose levels that is more likely to lead to poorer brain health***." He cautioned that these findings should not be taken "lightly," as the association between **high-normal blood sugar** and **brain shrinkage** was "robust."[1,2]

This reinforces the need for people to suppress excess blood **glucose**, something that I've been teaching for years in my calorie control education courses.

Personalized Instruction

Controlling glucose naturally is a primary strategy for protecting and improving brain function, which is taught in *The CR Way® to Great Glucose Control* program. This is an adult education course that helps participants learn how to lower their blood sugar. Taught online and through teleconferences, the program attracts hundreds of participants every year.

Each person who signs up is a special someone to us—we try to get to know each one. Becoming familiar with participants helps us customize the program for their needs. We want to give all *Great Glucose Control* users the best opportunity to control their glucose levels naturally.

Many people now sign up for *The CR Way® to Great Glucose Control* classes to improve their brain function. Of course, diabetes and prediabetes are often the prime motivators.

Reversing Prediabetes and Type II Diabetes

When people with prediabetes or type II diabetes participate in the *Great Glucose Control* classes, they are often surprised to discover that their diabetes or prediabetes ***can be reversed***.

Make no mistake: we do not offer medical advice. We simply introduce ways of eating and living that reduce glucose levels naturally. Participants learn to apply the ideas through food choices, recipes, meal plans, and lifestyle changes. Many participants are able to control blood glucose better than they had dreamed possible.

We leave decisions about taking diabetes drugs up to the participants and their doctors.

When *The CR Way® to Great Glucose Control* participants who have prediabetes or type II diabetes began to turn their conditions around, at first I felt that they had been misdiagnosed. But I've been persuaded that the diagnoses were right and that the CR Way lifestyle is a very effective treatment.

Type II diabetes is often an acquired disease, not one that you are born with. It is frequently developed by people who are either overweight, depressed, relatively sedentary, eating high-simple-carbohydrate diets, or a combination of these. When these conditions are reversed by lifestyle changes, diabetes and prediabetes can change too. And *The CR Way® to Great Glucose Control* is all about beneficial lifestyle change.

Gut Dysbiosis Can Affect Glucose Control

In the most recent series of classes, we found that many participants had serious gut dysbiosis issues. That was not surprising since studies increasingly link glucose control to gut health.[3]

So we added foods and a special focus on helping participants to normalize their gut function and to include healthful foods in their diets more easily. This new material is slated to be part of this fall's *Great Glucose Control* program.

Getting Started

When participants start, they are given fasting and post-meal glucose goals to aim for:

- Fasting glucose: under **80 mg/dL**
- Post-meal glucose: under **120 mg/dL**

At first, these levels may seem unattainable. They did to me when I started glucose control 20 years ago. But by the end of the course, these glucose levels guide the normal daily practice for many participants.

Foods for Glucose Control, Optimal Health, and Longevity

The classes introduce delicious foods and recipes. These are not just run-of-the-mill health food selections. We have identified some of the most health-enhancing foods that will help with glucose control as well as improve longevity prospects.

A **delicious red cabbage soup**, for example, gets its floral aroma from a few teaspoons of tarragon and—depending on your preferences—can be made into a hearty meal by serving it over hulled barley, a very low-GI grain.

This recipe is flexible. It can be turned into a delicious **red cabbage spread** by combining the cooked cabbage and the red onion from the recipe with an avocado and a bit of lemon in a food processor. Whirl the combo for a couple of minutes and voilà—the red cabbage combo is ready to be spread over other favorite foods like sprouted grain bread or either bean or grain pasta, or it can be enjoyed as a side-dish on its own!

As we developed the video for the "Foods and Recipes" part of *The CR Way® to Great Glucose Control*, we realized that some of the foods had such impressive effects that we set up an opportunity to test one of them through special research at the University of Pittsburgh Medical Center. We await the results.

Lifestyle Plans

The "Foods and Recipes" are integrated into unique lifestyle plans that show participants how to control glucose from the time they get up until they go to sleep.

Instead of just meal plans, the lifestyle plans go beyond diet to include exercise, meditation, sun exposure, and other suggestions not normally included in meal plans or considered for glucose control. This evolved from the recognition that daily activities often make a big difference in glucose levels.

All the classes are taught live so we can respond personally to individual needs. Each lesson is introduced by a narrated slide show video to help *Great Glucose Control* participants understand and remember the key points. It is followed by a live class. The classes are recorded and class registrants receive the access numbers, so even the busiest people can find time to benefit from the program.

Community Meetings

Before the classes start, we hold community meetings where members, especially new ones, call in to join the live teleconferences. These friendly gatherings encourage participants to ask questions that are important to them. We want to hear about their glucose challenges so we can tailor the class material accordingly.

If you'd like to increase your likelihood to live in good health for a long time, visit www.LifeExtension.com/CRWay or call 1-800-544-4440 and ask for *The CR Way® to Great Glucose Control.* The normal price for a 6-week course is **$189**. ***Life Extension®*** readers are able to obtain this same educational program for **$159** if they act before November 29, 2016. ●

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

CR Way Pioneers

Paul McGlothin and Meredith Averill are a bridge, translating the research into the longevity benefits of low-calorie diets and into practical application of the results. Their CR Way® lifestyle is based on decades of research showing favorable changes in genes, gene expression, and other aging biomarkers. They've played a pivotal role in this research on aging at Washington University in St. Louis School of Medicine, and the University of California at both San Francisco and Riverside.

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TARRAGON CABBAGE

Prep time: 12 minutes, Cooking time: 40 minutes

If you are on the lookout for foods with extraordinary health benefits, red cabbage should be one of them. It is the centerpiece of several delicious CR Way recipes, such as this versatile combo. Bear in mind that while 40 minutes of cooking time may seem long, it provides you with time to do other things in the kitchen or elsewhere if your timer works well.

Ingredients: Organic, if possible

Pure water	3 quarts–Distilled, if possible
Red Cabbage	1 medium (**840 gram**)–Boiled, no salt
Onion	1 medium (**240 grams**)–Boiled, no salt
Tarragon	2 Tbsp–Dried
Avocado	1 medium (**200 gram**)–if you are making Tarragon Cabbage Spread

Preparation

Remove tough outer cabbage leaves.
Separate the leaves from the heart and other very fibrous pieces.
Cut the cabbage into bite-size pieces.
Peel and chop onion.
Peel and pit avocado–if using recipe to make spread

Cooking

1. Add water to a large cooking pot.
2. Add tarragon.
3. Add cabbage hearts and fibrous pieces.
4. Cook at low level of heat for 20 minutes.
5. Add onion and the rest of the cabbage.
6. Cook for another 20 minutes, allowing it to come to a slow boil.
7. Remove from heat.

Serving

Tarragon-Cabbage Soup
Dipper it into bowls and enjoy it!
Red-cabbage Side dish
Drain veggies and serve in side dishes
Or
Serve in side dishes with broth to retain heat longer
Red-cabbage Spread
Add veggies and an avocado to a food processor
Whirl it to your preferred consistency.
Serve as a side dish…
As a spread over sprouted grain bread, sprouted bean or grain pasta or as a dip for your favorite raw veggies

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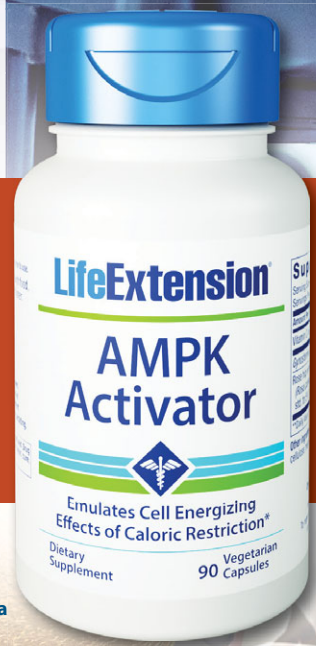

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1. *Mol Nutr Food Res*. 2011;55:198-208.
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This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results are not guaranteed and results may vary.

Note: The daily dose of CR Mimetic Longevity Formula provides **250 mg** of ***trans*-resveratrol**. Other resveratrol supplements are not needed for those taking **CR Mimetic Longevity Formula**.

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BY MILES MUELLER

Prevent Telomere Shortening

Like the burning of a fuse, telomeres at the ends of our chromosomes steadily shorten every time a cell replicates itself.[1,2]

A study from *The Lancet* evaluating telomere length on a group of individuals age 60 and over found that those with shorter telomeres had a **3.18-fold** higher mortality rate from heart disease and an **8.54-fold** higher mortality rate from infectious disease.[3]

Telomeres, which are made up of repeating units of DNA sequences, hold the key to biological aging.[4] Once telomeres reach a critically short length, further cellular replications are prevented, leading to aging (senescence) of the cell.[1,2,5]

These senescent cells eventually accumulate or die. Senescent cells no longer contribute to active tissue maintenance.[1,2] In fact, telomere length has become useful as a biomarker of cellular aging.[4-7]

Studies show plenty of triggers that accelerate telomere shortening, including oxidative stresses, inflammation, and obesity.[1,8] Shortened telomeres are found in people with age-related disorders such as cardiovascular disease, diabetes, neurodegeneration, and osteoporosis.[9,10] Not surprisingly then, the search is on for ways to preserve telomere length in normal cells, with the aim of sustaining cellular youth and healthy functioning.

Cells naturally contain an enzyme called telomerase, which adds new DNA to the ends of telomeres, helping to keep them long enough to support cellular activities.[11] In the past few years, scientists have accumulated an impressive array of evidence showing that one way of supporting healthy, long telomeres is to get an adequate intake of vitamins.[4,11-14]

There is now intriguing evidence demonstrating how supplemental vitamins can preserve telomere length and sustain more youthful cell functions.

B Vitamins Preserve Telomere Length

The B vitamins, including vitamins B6, B12, and folate, are essential factors in the metabolism of the molecules that make up DNA.[6] Their importance is therefore critical in supporting normal cellular replication. Low levels of B vitamins are common in aging adults, and are closely associated with risk for developing age-related diseases.[5,15]

Homocysteine is a molecule associated with increased cardiovascular disease risk and poor blood vessel function. B vitamins are necessary for normal disposal of homocysteine, which accumulates under conditions of B vitamin deficiency. Both elevated homocysteine levels and diminished B vitamin levels are closely associated with premature shortening of telomeres, leading to accelerated cellular aging.[5,15,16] Thus, homocysteine-induced telomere shortening may be the central connection between B vitamin deficiency, high homocysteine levels and cardiovascular disease.[16]

It has long been known that B vitamin supplementation reduces homocysteine levels, and it was recently shown that people whose B vitamin levels are low have shorter telomeres.[5,15]

Taken together, these findings suggest that keeping B vitamins at adequate levels is an effective means of both lowering toxic homocysteine levels and supporting longer telomeres.

Vitamin D Promotes Telomerase Activity

Long thought to be limited to promoting calcium absorption in the intestines, vitamin D has become known as one of the most versatile of nutrients.[10] Vitamin D receptors are found on cells throughout the body, suggesting that still more functions await discovery.[17]

Recently, a molecular link was found between vitamin D and DNA repair an action required for maintenance of telomere length.[18] Higher plasma vitamin D levels have been associated with longer telomeres.[19] These findings have triggered other studies of vitamin D and its role in telomere function.

For example, patients undergoing hemodialysis for kidney failure have both decreased telomere length and lower vitamin D levels compared with healthy controls.[12] But dialysis patients treated with vitamin D3 were shown to have longer telomeres than untreated patients, potentially explaining the beneficial health effects of supplementation in these individuals.[12]

In a more generalized study, vitamin D supplementation in a group of overweight Americans, at a dose of **2000 IU**/day, increased subjects' telomerase activity by more than **19%**.[1] This finding suggests that vitamin D plays an important role in supporting telomere lengthening and as a result has antiaging potential.

Vitamins C and E Preserve Telomere Length

Studies of **vitamin C** demonstrate that telomere shortening can be reduced by up to **62%** on untreated controls in cultures of human blood vessel cells.[20] The result was a significant extension of cellular lifespan, and reduction in physical changes associated with cell aging. This in turn was associated with sharp reductions in cellular free radicals.[20]

Near-identical results have now been shown in cultures of human heart-muscle cells, demonstrating that vitamin C can work to slow cardiovascular aging by preserving telomere length.[21]

A dramatic demonstration of the value of vitamin C's role in aging-deceleration was provided by a 2016 study of cellular model of Werner Syndrome, a premature aging disorder.[22] After testing

numerous compounds for their ability to slow or reverse the rapid aging, scientists identified vitamin C as the most efficient "rescue" for many premature aging characteristics of the cells.[22] Treated cells showed longer telomeres, reduced secretion of inflammatory cytokines, and improved integrity of their cellular nuclei, all features of much younger cells. Indeed, in a mouse model of Werner Syndrome, vitamin C rescued aging cells from premature death by altering expression of genes involved in the maintenance of DNA integrity.[22]

Vitamin E comes in a total of 8 different forms, four each in the tocopherol and tocotrienol categories. Alpha-tocopherol, one of the most-studied forms of vitamin E, dramatically slows age-related telomere shortening, even in the presence of powerful oxidant molecules such as hydrogen peroxide.[13,14] This has been proven to result from a tocopherol-induced increase in telomerase that persists even into middle-aged cells.[14] Similar results have been shown in cells treated with gamma-tocotrienol, which not only prevented telomere shortening but also enhanced the viability of older cells in culture.[23]

In a dramatic finding, incubating aging human cells with a tocotrienol-rich formulation ***reversed*** the aging-induced structural changes to cells to the point that they resembled younger cells, with less DNA damage and more cells ready for fruitful replication.[24] Here again, the effects were attributable to increased *telomerase* activity.[24]

Carotenoids Associated with Longer Telomeres

Carotenoids are yellow pigment molecules closely related to Vitamin A. Their molecular structures promote their powerful antioxidant actions, though they also appear to have other effects.

Studies show that older people with higher plasma levels of the carotenoids lutein and zeaxanthin have significantly longer telomeres than those with lower levels.[25] In people 20 years and older, a doubling of blood levels of alpha-carotene, beta-carotene, and beta-cryptoxanthin was associated with **2%** longer telomeres.[7] Those with the highest carotenoid levels had telomeres **5%** to **8%** longer than those in the lowest category.[7]

Intake of the carotenoid nutrients is also closely associated with longer telomeres, although this effect may depend to some extent on genetic factors related to carotene metabolism.[26]

Summary

While aging is a many-faceted process, a clear-cut biomarker for aging at the cellular level has been found in measurements of telomere length.

Shortening telomeres accelerate cellular aging, but nutrients that promote telomere repair and sustain telomere length have proven health benefits.

In recent years, we have learned that even common vitamins can have dramatic impact on the lengths of the telomeres in our cells, thereby powerfully decelerating aging at the cell, tissue, organ, and whole organism levels.

B vitamins preserve telomere length in part by lowering homocysteine, which accelerates telomere shortening.

Vitamin D promotes activity of telomerase, the repair enzyme that steadily adds to telomere length.

Vitamins C and E preserve telomere length by reducing the chemical stresses that contribute to telomere shortening. **Gamma-tocotrienol** in particular may reverse telomere shortening and attendant cellular aging.

Finally, the vegetable carotenoids, such as **lutein**, contribute to longer telomeres, though mechanisms for these effects remain to be discovered.

Without question, supporting a well-rounded diet with ample basic vitamins has emerged as an invaluable antiaging intervention. ●

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

Fish Oil Favorably Influences Telomere Length

A study measured **telomere length** in humans given **fish oil** supplements. The results showed that reducing plasma levels of **omega-6 fats** coupled with increased **omega-3s** (from fish oil) resulted in an increase in **telomere lengths**.[27]

The scientists attributed this **telomere length** increase to reductions in inflammatory cytokines and oxidative stress brought on by **higher** levels of **omega-3s** in relationship to pro-inflammatory **omega-6s**.

Omega-6 fats to avoid include corn, sunflower, and safflower oils, along with arachidonic acid found in red meat and egg yolks. **Olive oil**, rich in monounsaturated fats, should be substituted for omega-6 oils whenever possible. Dietary sources of omega-3s include coldwater fish, walnuts, and flax seed.

In this human study where **telomeres** were **lengthened**, scientists used between **1,250-2,500 mg** of EPA/DHA fish oil daily to boost **omega-3** plasma levels in relation to **omega-6s**.[27] Life Extension readers typically consume **2,400 mg** of **EPA/DHA** daily in their **fish oil** supplement.

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Cure Aging in Your Lifetime?

An ambitious project has been launched to develop proprietary therapies to reverse biological **aging** in humans.

Age Reversal Therapeutics, Inc. has been formed to initiate **clinical trials** aimed at transforming elderly **humans** into functionally ***younger*** individuals. Special emphasis will be made to meaningfully reverse **immune senescence**.

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Healthcare for elderly people will cost Medicare **trillions of dollars**. A therapy the restores youthful immune and other organ functions may enable meaningful reductions in future **Medicare** outlays.

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Opportunities to invest in this scientific endeavor are limited to **accredited investors**. This requires a minimum net worth of around **$1.5 million** and/or annual income over **$300,000**.

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Please visit our website www.agingcure.com where you can view a presentation made at a scientific conference about this **age reversal** initiative. You can also read the Private Placement Memorandum at the agingcure.com website.

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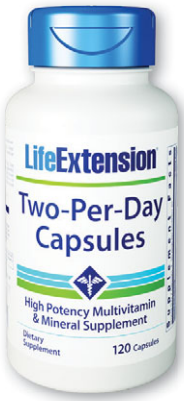

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* *Future Oncol*. 2013 Sep;9(9):1353-64

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BY JON VAN ZILE

EAT FOR YOUR GENES
The DNA Restart

With Sharon Moalem, MD, PhD

In his new book, *The DNA Restart*, Sharon Moalem, MD, PhD, describes an idea that seems obvious, but helps explain why so many millions of people fail to lose weight, reduce markers of disease, and reverse aging. According to Dr. Moalem, most diets and healthy lifestyle plans fail to take into account that every human on earth is not only genetically individual, but that we descended from unique gene pools that adapted to specific and diverse environments. Dr. Moalem created the DNA Restart program so we can each easily identify our unique genetic heritage and create a diet and lifestyle plan that caters to it.

LE: In your book, you write about how our modern lifestyles ignore the hard-won lessons of our own DNA. What's wrong with the way most people approach nutrition, dieting, and weight loss?

SM: Up until now, most people have essentially been eating blind, without any personalized genetic wisdom to guide us. Our modern lives are simply out of touch with our DNA. As a physician and scientist, I've spent the last 20 years researching the ways history, our genes, and the choices we make in our lifetimes intersect.

In researching for my book, I spent two years traveling the globe. The more I explored, the more I learned how ancient methods of food production and preparation, such as fire and fermentation, played a decisive hand in reshaping the genes our ancestors subsequently passed down to us.

Each one of our genetic ancestors faced the same challenge—survival. The results of each of these struggles are encoded in our genes today. A simple example is if you can enjoy dairy products as an adult, then it's a sign that your ancestors kept animals in order to drink their milk and they gave you the genetics to do so as well. But as we've come to see with the explosion of the availability of dairy products worldwide and the dietary problems this has created, we didn't all inherit the same genetic knowledge.

LE: Let's talk specifics. Your DNA Restart program is built on five pillars. The first one of these involves "genetic self-tests" that help people figure out exactly what they should be eating. How does this work without expensive genome testing?

SM: As you may know, most people who lose weight by dieting don't keep it off over the long term. As a physician, I have seen most diets fail because of two important flaws. The first is simply the mind-numbing, restrictive lack of a variety of food and meal choices. However, the second and most important is that, until now, there hasn't been a single diet that is designed with every single person on this planet in mind. Each one of us is completely unique.

What this means is that very few people are actually eating intentionally and methodically for their own genes. But that's about to change. My DNA Restart self-tests are designed to hit upon the highest-yielding, scientifically based results, and they can be done easily at home. Since genomic testing doesn't always tell you what your individual genes are doing within your body, I've developed functional genetic tests that let you know how your genes are actually behaving in real time and what that means for you and your diet.

As an example, the first and most important of these genetic self-tests is an incredibly powerful tool that allows you to individualize your carbohydrate intake levels. It all begins with your saliva. Many people have an enzyme within their saliva called amylase, which has the ability to cut apart big and bulky starch molecules into simpler sugars. So some of us have supercharged saliva full of amylase as a result of inheriting multiple copies of the gene *AMY1*, while some people don't have any at all. For those people with no *AMY1* genes and therefore no amylase, breaking down carbohydrates is metabolically daunting and physiologically stressful.

And guess what? The amount of amylase in your saliva is not random. It's actually highly dependent upon where your own unique genetic ancestors hail from. Simply put, if you come from ancestors who relied heavily on starches, such as farmers growing cereal grains, you'll likely have been gifted with the genetics to make more amylase by inheriting multiple copies of the gene *AMY1*. If your recent genetic ancestors, on the other hand, were more into meat than potatoes, you might not have the genetic knowledge to make as much amylase. The more starch your ancestors ate in their daily diet over generations, the more amylase you are likely to have in your saliva. It's as simple as that.

I believe that eating out of sync with our genes is the reason some people are more prone to developing obesity and insulin resistance than others, even when eating identical meals, in both portion-size and content, and research is beginning to back this up: people with the lowest amount of amylase are actually much more likely to be obese when eating a starch-heavy diet.

But here's the good news... you can test for how much amylase you have in your saliva with a simple at-home test using only an unsalted saltine cracker (or a dime-sized piece of potato if you're gluten free) and a timer. All you do is time how long it takes to detect a change in taste when you're chewing either the saltine or the potato. The faster the taste changes, the more carbohydrates you can handle.

LE: You write in your book that the DNA Restart program has helped people shed years and look younger. How does it accomplish this?

SM: When it comes to genetic aging, the latest complex genetic research can be distilled succinctly: the better you take care of both your mitochondrial and genomic DNA, the longer you will live. Over time, we all inevitably accumulate various types of damage to our inherited genetic material. We used to think this was an unavoidable consequence of life, but thankfully, when it comes to genetics, things are not always as they initially appear. We now know that our genetic code is much more robust, resilient, and malleable than we could have ever imagined. We are now discovering that it's even possible to reverse genetic aging.

To accomplish this, we have to do two things. The first is to prevent as much DNA-aging damage as possible, and the second is to powerfully activate your body's own innate antiaging system.

LE: How can people do this?

SM: When it comes to genetic aging, the balance is between damage and repair. Promoting repair is just as important as preventing damage in the first place.

The first step is consistently adhering to the DNA Restart approved exercise program, which can help turn back your genetic clock and lower your risk of becoming susceptible to certain cancers. Next comes eating a diet high in phytonutrients, which I outline in prescriptive detail in my book. Particular fruits, vegetables, and spices all contain a rich and varied cornucopia of phytonutrients. When we eat or drink specific phytonutrients, we're filling our bodies with their unique genetic and chemical wisdom.

Other important steps involve eating the right mix of fats, with an emphasis on omega-3 fatty acids, and consuming lots of high-quality extra virgin olive oil. We've only recently begun to understand that many of the benefits of extra virgin olive oil are actually happening on a genetic level. I also recommend eating four 1 ounce servings of nuts every week, along with DNA Restart approved legumes, which are a very unique and rich source of isoflavonoids and phytosterols.

Finally, it's important that we pay attention to how our food is prepared. Deep-fat frying is absolutely forbidden on The DNA Restart, for a variety of reasons which I expand upon in the book. I also caution against using high-temperature cooking. When food is exposed to temperatures as high as 400°F, it creates hundreds of new pro-inflammatory compounds which can cause DNA damage. Instead, I recommend stewing your proteins at lower temperatures whenever possible, which reduces the development of

pro-inflammatory advanced glycation end-products, and always marinating proteins in red wine or lemon juice prior to cooking. Why marinating? Research has shown that marinating with wine prior to cooking can reduce certain types of heterocyclic amines by up to **88%**. Lemon juice will also help, as making protein dishes more acidic has also been shown to reduce the amount of advanced glycation end-products.

LE: One of the really interesting parts of your program was the section on the "fifth" taste, or umami. Umami is the experience of when foods taste delicious or savory. You mention that umami is the "real linchpin" in the DNA Restart program and eating more will help get your diet sharply realigned with your genes. Why is umami so important?

SM: I call umami a "satiety bomb" for a good reason: it's one of the most potent ways to guide us back to increased feelings of satiety. It uniquely does this by imparting flavors that linger long and strong in our mouths, way after we're done eating. Natural umami signals our bodies through genetic means that the food we are consuming is abundantly nutritious and full of specific amino acids that are essential for a healthy life.

I believe that our genetic ability to taste umami, and the reason it triggers satiety, is that umami signals to our bodies that the food we are consuming contains important proteins that have been shattered into their basic amino acid building blocks. Umami is mainly triggered by the amino acids glutamate and to a lesser degree aspartate (as well as the 5-ribonucleic acids guanylate and inosinate). Glutamate and aspartate are naturally found in proteins and are released and trigger the taste of umami when the proteins that contain them have undergone some type of food preparation process.

Umami can be found in many foods, although many plants are not rich in umami (tomatoes are a giant exception). Umami-rich foods include mushrooms, miso and tamari, hard cheeses and fermented milk products like yogurt, anchovy paste and sardines, and many others. Overall, to get us to our ideal weight we need to be eating umami with each and every meal. ●

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

Sharon Moalem, MD, PhD, is a *New York Times* bestselling author and has been awarded more than 25 patents in the fields of biotechnology and human health. He has founded three biotechnology companies and served as associate editor for the *Journal of Alzheimer's Disease*. His scientific work led to the discovery of a novel class of antibiotic compounds directed against multiresistant or "super-bug" microorganisms such as MRSA. Dr. Moalem's current research focus illuminates how historical nutritional and dietary choices impacted and shaped genetic differences across human populations. Dr. Moalem and his research have been featured on *Good Morning America*, *Today*, CNN, and in the *New York Times*, *TIME* Magazine and *O: The Oprah Magazine*.

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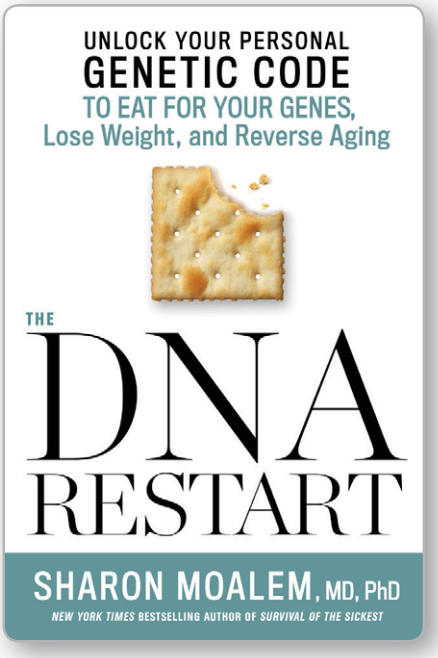

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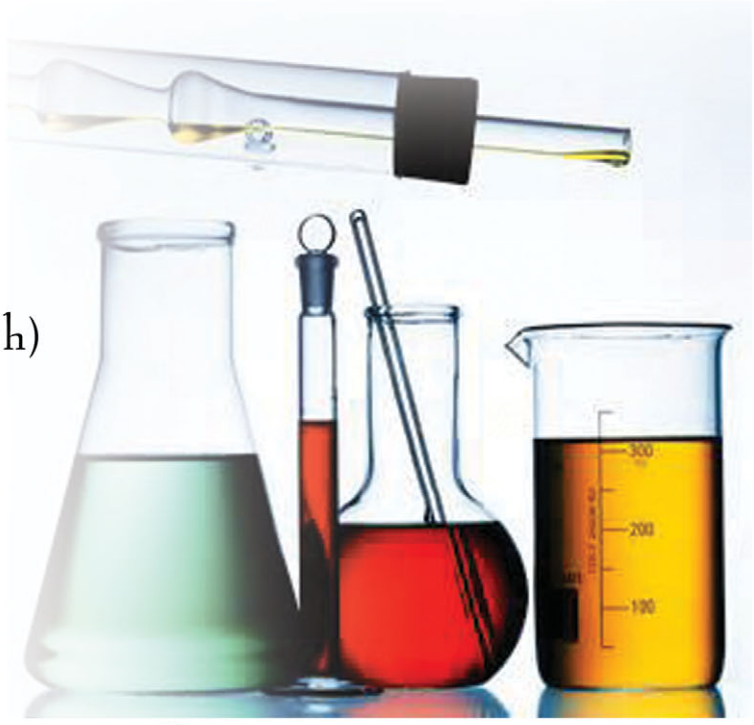

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BY MICHAEL DOWNEY

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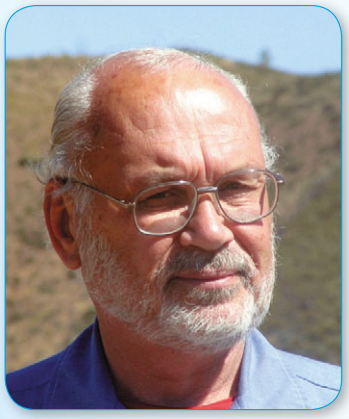


Paul Mason

For the past 25 years, **Paul Mason's** life mission has been to persuade the world to consume more **magnesium**.

His campaign is reminiscent of the slow battle to educate mainstream medicine that higher **vitamin D** levels are needed to reduce all-cause mortality.

Recently, Mason talked to ***Life Extension Magazine***® about his tireless efforts and how he discovered America's only known source of natural, magnesium-abundant, high-pH mineral water.

Paul Mason is an American hero who has tirelessly exposed the huge numbers of needless deaths caused by **magnesium deficiency** in the United States. One way Paul accomplished this was to amalgamate a number of published studies to show the lethal impact on human populations when there is insufficient magnesium in their drinking water.

Mason loves to point to recently published evidence demonstrating that universally increased magnesium intake could prevent an astounding **4.5 million deaths** worldwide, annually.[1] In an effort to stop this epidemic, he has distributed up to 15 million gallons of naturally sourced, magnesium-rich mineral water each year for the last 20 years from his Adobe Springs Water Company in the mountains of central California.

"And I'm now working to develop an additional 50 million gallons per year of magnesium-rich water from nearby lands," he told us.

For many years, he has tried to convince the FDA—to no avail—and producers of bottled water and soft drinks worldwide that simply adding magnesium to their beverages would provide most people with at least the government's recommended intake of this lifesaving mineral. If bottlers prefer to market bottled water that is naturally rich in magnesium, he will gladly supply them with bulk water from his state-licensed and inspected springs.

Discovering America's Richest Water-Source of Magnesium

Paul first began investigating how thoroughly widespread magnesium deficiency is—and collecting a vast online library of studies showing how magnesium greatly reduces the risk of cardiovascular disease—shortly after he accidentally discovered the magnesium-rich springs near Patterson, California. Crunching the numbers, he estimates his water saves about 90 lives a year by preventing heart attack and stroke.

It all started in 1992 when Paul bought a property in Central California named Adobe Canyon, which he says resembles a miniature Grand Canyon. After he cleared the property, he discovered it contained a huge underground spring. He had the water lab-tested to ensure it was safe. When the test came back showing high levels of magnesium, he asked the chemist, "Is that good or bad?" The chemist responded, "Oh that's good, but unheard of."

So Paul started emailing magnesium researchers that the Adobe Springs had unheard-of magnesium abundance of **110 mg** per liter, combined with an extremely low **6.3 mg**/L sodium content and a healthy pH of **8.4** and great flavor, too. Then the researchers started coming to see the Adobe Springs as a wonder of the world, and they convinced Paul Mason of the lifesaving benefits of magnesium.

It took five years of work at Adobe Springs to install tanks and 6" pipes, build a loading dock, and find the first bottler, which was challenging in 1992 when few people drank bottled water.

Paul notes that, in 2009, the World Health Organization finally recommended that all drinking water should contain at least **25 mg** of magnesium per liter to prevent heart attacks and stroke.[2]

Gathering the Evidence

Mason's online library now provides access to over 300 studies on magnesium, documenting that even small amounts of magnesium in drinking water—often just **5-20 mg** per liter—can reduce the incidence of mortality and heart disease. The underlying reason for this is the widespread magnesium deficiency that results from increased consumption of processed foods, water purification processes that remove natural minerals, and mineral-depleted soil.

For about 20 years, he has financially supported researchers worldwide who investigate magnesium and the critical need for

this mineral. He names several scientists who receive monthly grants from him and then adds:

"…in 2015, I created the Magnesium For Health Foundation and also brought together 12 magnesium scientists from all over the world to exchange knowledge at a conference in San Francisco—I hope to do the same thing in 2017."

Studies continue to validate Mason's urgent advice to the world that consuming more magnesium could save millions of lives every year. Regrettably, few have bothered to pay attention.

Public Awareness: "There Is a Long Way to Go"

Low blood levels of magnesium are considered to be one of the most underdiagnosed blood chemical deficiencies in modern medicine.[3] For this reason, it is important to have blood magnesium levels tested regularly and to supplement when necessary.

"***Life Extension Magazine*** has certainly helped raise public awareness," explains Mason. "But there is a long way to go."

Some pharmaceuticals change the way magnesium is utilized by the body by inhibiting nutrient absorption, synthesis, transport, metabolism, and excretion.[4,5] Processed and snack foods often have the magnesium processed right out of them.[6] Aging itself has been linked with declining magnesium in human cells.[7] And as Mason stresses, many Americans drink filtered or bottled water, which in the US contains only **10%** as much magnesium as bottled water in the rest of the world.[8]

Most Americans ingest an average of about **270 mg** of magnesium a day, well below the modest RDA levels—**420 mg** for adult males and **320 mg** for adult females—which will generate a substantial cumulative deficiency over months and years.[9] Older individuals are at elevated risk of becoming magnesium-depleted,[10] and substantial deficiency is common by age 50. Deficiency can reach severe levels among those with any condition that causes frequent loose stools, including celiac disease and bowel resection surgery. And as Mason points out, insufficient vitamin D levels can exacerbate magnesium deficiency.[11]

Compelling research shows that for each **0.25 mg/dL** increase in plasma magnesium, the risk of sudden cardiac death falls by **41%**.[13] Another study found that adults with a magnesium intake lower than the recommended amount were up to **1.75** times more likely to have elevated C-reactive protein,[14] a blood marker for inflammation that predicts the likelihood of a heart attack or stroke. Among adults already at high risk of cardiovascular disease, those who had the highest magnesium intakes were demonstrated to have a **34%** reduction in mortality risk relative to those having the lowest intake.[15]

Accumulating evidence also suggests that low magnesium intake and levels drastically accelerate the aging process and affect lifespan.[13,16-18] Lab culture studies show that low magnesium accelerates the senescence of some human cells,[19] prompting the scientists behind one study to write, "…***we propose that broadly correcting nutritional intakes of Mg might contribute to healthier aging and the prevention of age-related diseases***."[19] In fact, research suggests that magnesium is absolutely essential for repairing telomeres, the aging-timers found on DNA strands.[20]

Magnesium: Deficiency Symptoms and Dosage Information

Magnesium is the fourth most abundant electrolyte in the human body.[22] The recommended dietary allowance, or RDA, for magnesium is **420 mg** a day for adult men and **320 mg** a day for adult women. The magnesium RDA refers to elemental magnesium, defined as the amount of magnesium, regardless of its source or form.

Most people fail to achieve the RDA, which can cause magnesium deficiency.[9] Older individuals are at higher risk of deficiency.[10] Deficiency symptoms can include abnormal heart rhythms, restless leg syndrome, sleep disorders, insomnia, muscle spasm, confusion, and even seizures.[23]

The mineral water available at Adobe Springs contains **110 mg** of magnesium a liter, unparalleled among America-sourced mineral waters. Mineral water is defined by the FDA as water from a natural, protected, underground source that contains at least 250 parts per million, or **ppm**, (**mg/L**) of total dissolved solids consisting of minerals and trace elements–Adobe Springs water contains **500 ppm** (**mg/L**) of total dissolved solids.[24]

Magnesium supplements are among the least expensive nutrient. The most common adverse reaction from the use of magnesium supplements is diarrhea.[23]

Preventing 150,000 Deaths

According to the US National Academy of Sciences (1977), there have been more than 50 studies in nine countries that have indicated an inverse relationship between water hardness and mortality from cardiovascular disease. That is, people who drink water that is deficient in magnesium and calcium generally appear more susceptible to this disease. The US National Academy of Sciences has estimated that a nationwide initiative to add calcium and magnesium to soft water might reduce the annual cardiovascular death rate by 150,000 in the United States.[24]

Scientists have associated higher magnesium levels with a **40%** lower risk of death from cardiovascular disease,[12] a **77%** reduced risk of sudden cardiac death,[13] a **50%** decreased risk of cancer,[12] and **40%** lower risk of death from all causes.[12]

Reduced Magnesium Bioavailability from Food

These shocking statistics strongly support Mason's mission to increase magnesium intakes—especially in light of research reporting that, "*In developed countries, the magnesium intake is often marginal*."[21] But focusing on different dietary choices does not appear to be the answer.

"Magnesium in food is less bioavailable than from water because of interference from dietary fat, fiber, competing minerals, and so on," he explains. Research backs him up. One published study found that magnesium is more quickly and better absorbed from magnesium-rich **water** than from food.[21]

Most Americans don't have Mason's access to his Adobe Springs mineral water and the coffee he makes from it each day. But he added, "I also take **Life Extension®** magnesium supplements when I'm traveling," and he suggested that all Americans without access to his water do the same. He also invited readers who find themselves in the area to bring their own bottles to the Adobe Springs free spigot near Patterson, California, and load up on magnesium-rich water.

For most of us, however, mineral supplements are critical. Fortunately, they're among the least expensive on the market. Maybe that's why they're not generally promoted as the lifesaving nutrient they represent. And as Mason has experienced firsthand, the federal government has repeatedly suppressed magnesium's importance in countering today's heart attacks and strokes.

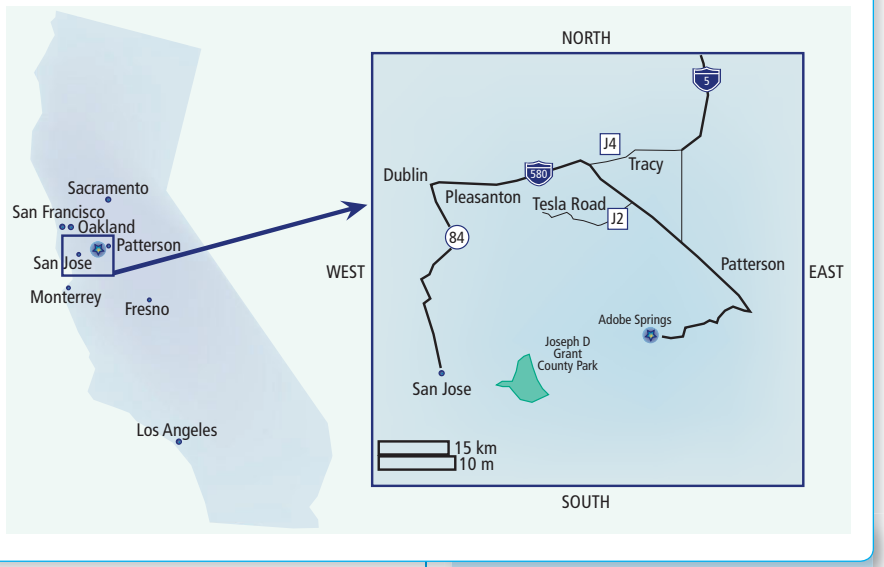
Although cheap magnesium supplements are an easy solution, this unsung hero would love to see more people with daily access to magnesium-rich, low-sodium, high-pH water. Both Mason and his staff have taken a vow to maintain modest lifestyles so that resources can stay focused on developing magnesium-rich water sources worldwide.

"I live in a 40-year-old doublewide and drive a 12-year-old pickup," he adds.

"I think there will be an increasing demand for magnesium-rich water, so I'm hoping to develop more sources from magnesium-rich aquifers. My fine crew at the Adobe Springs is onboard…and if any reader knows of a spring, creek, or aquifer having at least **25 mg** of magnesium per liter, I'd like to know about it—so we can save even more lives." ●

Readers can access Paul Mason's vast online collection of magnesium studies at http://www.mgwater.com/ and if in the area, can pick up Adobe Springs water at the free roadside spigot at 19,000 Del Puerto Canyon Road, Patterson, CA. See the map for directions.

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



Paul Mason invites readers to haul away all the personal-use, magnesium-rich water they want from the free spigot at Adobe Springs. For those who find themselves in that area, here is a map.

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LDH	

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Creatinine	Uric Acid

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Albumin	Albumin/Globulin Ratio

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White Blood Cell Count	Lymphocytes
Eosinophils	Platelet Count
Basophils	Hemoglobin
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Lymphs (Absolute)	MCV
Monocytes (Absolute)	MCH
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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 GliSODin®
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® Magnesium L-Threonate
Neuro-Mag® Magnesium L-Threonate with Calcium and Vitamin D3
Optimized Ashwagandha Extract
Prevagen™
PS (Phosphatidylserine) Caps
Vinpocetine

Cholesterol Management

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

Digestion Support

Artichoke Leaf Extract
Digest RC®
Effervescent Vitamin C - Magnesium Crystals
Enhanced Super Digestive Enzymes
Enhanced Super Digestive Enzymes w/Probiotics
Esophageal Guardian
Extraordinary Enzymes
Fem Dophilus
Fiber-Immune 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 GlycoCarn®
PQQ Caps with BioPQQ®
Rhodiola Extract
RiboGen™ French Oak Wood Extract
Triple Action Thyroid

Eye Health

Astaxanthin with Phospholipids
Brite Eyes III
Certified European Bilberry Extract
Eye Pressure Support with Mirtogenol®
MacuGuard® Ocular Support
MacuGuard® Ocular Support with Astaxanthin
Tear Support with MaquiBright®

Fish Oil & Omegas

OMEGA FOUNDATIONS® Mega EPA/DHA
OMEGA FOUNDATIONS® Mega GLA with Sesame Lignans
OMEGA FOUNDATIONS® Super Omega-3 EPA/DHA with Sesame Lignans & Olive Extract
OMEGA FOUNDATIONS® Super Omega-3 Plus EPA/DHA with Sesame Lignans, Olive Extract, Krill & Astaxanthin
OMEGA FOUNDATIONS® Provinal® Purified Omega-7
OMEGA FOUNDATIONS® Vegetarian DHA
Organic Golden Flax Seed

Food

California Estate Extra Virgin Olive Oil
Rich Rewards® Breakfast Blend
Rich Rewards® Breakfast Blend Natural Mocha Flavor
Rich Rewards® Breakfast Blend Natural Vanilla Flavor
Rich Rewards® Breakfast Blend Whole Bean Coffee
Rich Rewards® Decaf Roast
Stevia Sweetener

Glucose Management

CinSulin® with InSea2® and Crominex® 3+
Mega Benfotiamine
Natural Glucose Absorption Control
Tri Sugar Shield®

Heart Health

Aspirin (Enteric Coated)
BioActive Folate & Vitamin B12 Caps
Cardio Peak™ with Standardized Hawthorn and Arjuna
Fibrinogen Resist™ with Nattokinase
Optimized Carnitine with GlycoCarn®
Super Ubiquinol CoQ10
Super Ubiquinol CoQ10 with BioPQQ®
Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™
Super-Absorbable CoQ10 Ubiquinone with *d*-Limonene
TMG Powder
TMG Liquid Capsules

Hormone Balance

DHEA (Dehydroepiandrosterone)
Inner Power
Pregnenolone
Triple Action Cruciferous Vegetable Extract with Resveratrol
Triple Action Cruciferous Vegetable Extract

Immune Support

AHCC®
Echinacea Extract
Enhanced Zinc Lozenges
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®
Boswella
Cytokine Suppress™ with EGCG
Nervia®
Serraflazyme
Specially-Coated Bromelain
Super Bio-Curcumin®
Zyflamend® Whole Body

Joint Support

Arthro-Immune Joint Support
ArthroMax® Advanced with UC-II® & AprèsFlex®
ArthroMax® with Theaflavins & AprèsFlex®
ArthroMax® Herbal Joint Formula
Bio-Collagen with Patented UC-II®
Fast-Acting Joint Formula
Glucosamine/Chondroitin Capsules
Krill Healthy Joint Formula
MSM (Methylsulfonylmethane)

Kidney & Bladder Support

Cran-Max® Cranberry Whole Fruit Concentrate
Optimized Cran-Max® with Ellirose™
Uric Acid Control
Water-Soluble Pumpkin Seed Extract

Liver Health & Detoxification

Anti-Alcohol with HepatoProtection Complex
Calcium D-Glucarate
Chlorella
Chlorophyllin
European Milk Thistle
Glutathione, Cysteine & C
HepatoPro
Liver Efficiency Formula
N-Acetyl-L-Cysteine
PectaSol-C®
Silymarin
SODzyme® with GliSODin® & Wolfberry

Longevity & Wellness

Alpha-Lipoic Acid
AMPK Activator
AppleWise Polyphenol Extract
Berry Complete
Blueberry Extract
Blueberry Extract with Pomegranate

CR Mimetic Longevity Formula
DNA Protection Formula
Enhanced Berry Complete with Acai
Essential Daily Nutrients
Grapeseed Extract with Resveratrol & Pterostilbene
Mega Green Tea Extract (decaffeinated)
Mega Green Tea Extract (lightly caffeinated)
Optimized Fucoidan with Maritech® 926
Optimized Resveratrol
Optimized Resveratrol with Nicotinomide Riboside
pTeroPure®
Pycnogenol® French Maritime Pine Bark Extract
Resveratrol with Pterostilbene
RNA (Ribonucleic Acid)
Super R-Lipoic Acid
X-R Shield

Men's Health

Mega Lycopene Extract
PalmettoGuard® Saw Palmetto with Beta-Sitosterol
PalmettoGuard® Saw Palmetto/Nettle Root Formula with Beta-Sitosterol
Pomi-T®
Prelox® Natural Sex for Men®
Super MiraForte with Standardized Lignans
Triple Strength ProstaPollen™
Ultra Natural Prostate

Minerals

Boron
Extend-Release Magnesium
Iron Protein Plus
Magnesium (Citrate)
Magnesium Caps
Only Trace Minerals
Optimized Chromium with Crominex® 3+
Sea-Iodine™
Se-Methyl L-Selenocysteine
Super Selenium Complex
Vanadyl Sulfate
Zinc Caps

Miscellaneous

Solarshield® Sunglasses

Mood & Stress Management

5 HTP
L-Theanine
Natural Stress Relief
SAMe (S-Adenosyl-Methionine)

Multivitamins

Children's Formula Life Extension Mix™
Comprehensive Nutrient Packs ADVANCED
Life Extension Mix™ Capsules without Copper
Life Extension Mix™ Capsules
Life Extension Mix™ Powder without Copper
Life Extension Mix™ Powder
Life Extension Mix™ Tablets with Extra Niacin
Life Extension Mix™ Tablets without Copper
Life Extension Mix™ Tablets
Once-Daily Health Booster
One-Per-Day Tablets
Two-Per-Day Capsules
Two-Per-Day Tablets

Personal Care

Anti-Aging Rejuvenating Scalp Serum
Biosil
Dr. Proctor's Advanced Hair Formula
Dr. Proctor's Shampoo
European Leg Solution Featuring Certified Diosmin 95
Face Master Platinum Facial Toning System
Hair, Skin & Nail Rejuvenation Formula w/VERISOL®
Hair Suppress Formula
Life Extension Toothpaste
Sinus Cleanser
Venotone
Xyliwhite Mouthwash

Pet Care

Cat Mix
Dog Mix

Probiotics

Bifido GI Balance
BroccoMax®
FLORASSIST® Balance
FLORASSIST® Heart Health
FLORASSIST® Mood
FLORASSIST® Oral Hygiene
FLORASSIST® Throat Health
Theralac® Probiotics
TruFlora® Probiotics

Skin Care

Advanced Anti-Glycation Peptide Serum
Advanced Lightening Cream
Advanced Peptide Hand Therapy
Advanced Triple Peptide Serum
Advanced Under Eye Serum with Stem Cells
Amber Self MicroDermAbrasion
Anti-Aging Face Oil
Anti-Aging Mask
Anti-Aging Rejuvenating Face Cream
Anti-Glycation Serum with Blueberry & Pomegranate Extracts
Antioxidant Facial Mist
Anti-Oxidant Rejuvenating Foot Cream
Anti-Oxidant Rejuvenating Foot Scrub
Anti-Oxidant Rejuvenating Hand Cream
Anti-Redness & Adult Blemish Lotion
Bioflavonoid Cream
Broccoli Sprout Cream
Collagen Boosting Peptide Serum
Corrective Clearing Mask
DNA Repair Cream
Essential Plant Lipids Reparative Serum
Eye Lift Cream
Face Rejuvenating Anti-Oxidant Cream
Fine Line-Less
Healing Formula
Healing Mask
Healing Vitamin K Cream
Hyaluronic Facial Moisturizer
Hyaluronic Oil-Free Facial Moisturizer
Hydrating Anti-Oxidant Facial Mist
Hydroderm
Lifting & Tightening Complex
Lycopene Cream
Melatonin Cream
Mild Facial Cleanser
Multi Stem Cell Skin Tightening Complex
Neck Rejuvenating Anti-Oxidant Cream
Pigment Correcting Cream
Rejuvenating Serum
Rejuvenex® Body Lotion
RejuveneX® Factor Firming Serum
Renewing Eye Cream
Resveratrol Anti-Oxidant Serum
Shade Factor
Skin Lightening Serum
Skin Restoring Phytoceramides with Lipowheat®
Skin Stem Cell Serum
Stem Cell Cream with Alpine Rose
Tightening & Firming Neck Cream
Triple-Action Vitamin C Cream
Ultimate MicroDermabrasion
Ultra Eyelash Booster
Ultra Lip Plumper
Ultra Rejuvenex®
Ultra RejuveNight®
Ultra Wrinkle Relaxer
Under Eye Refining Serum
Under Eye Rescue Cream
Vitamin C Serum
Vitamin D Lotion
Vitamin E-ssential Cream
Youth Serum

Sleep

Bioactive Milk Peptides
Enhanced Natural Sleep® with Melatonin
Enhanced Natural Sleep® without Melatonin
Fast-Acting Liquid Melatonin
Glycine
L-Tryptophan
Melatonin
Optimized Tryptophan Plus

Sports Performance

Creatine Capsules
Creatine Whey Glutamine Powder (Vanilla Flavor)
New Zealand Whey Protein Concentrate (Natural Chocolate and Vanilla Flavor)
Tart Cherry with CherryPure®
Whey Protein Isolate (Chocolate and Vanilla Flavor)

Vitamins

Ascorbyl Palmitate
Benfotiamine with Thiamine
Beta-Carotene
BioActive Complete B-Complex
Biotin
Buffered Vitamin C Powder
Fast-C® with Dihydroquercetin
Gamma E Mixed Tocopherol Enhanced with Sesame Lignans
Gamma E Mixed Tocopherol/Tocotrienols
High Potency Optimized Folate
Inositol Caps
Liquid Emulsified Vitamin D3
Liquid Vitamin D3
Low-Dose Vitamin K2
Methylcobalamin
MK-7
Natural Vitamin E
No Flush Niacin
Optimized Folate (L-Methylfolate)
Pantothenic Acid (Vitamin B-5)
Pyridoxal 5'-Phosphate Caps
Super Absorbable Tocotrienols
Super Ascorbate C Capsules
Super Ascorbate C Powder
Super K with Advanced K2 Complex
Vitamin B12
Vitamin B6
Vitamin C with Dihydroquercetin
Vitamin D3 with Sea-Iodine™
Vitamin D3
Vitamins D and K with Sea-Iodine™

Weight Management

7-Keto® DHEA Metabolite
Advanced Anti-Adipocyte Formula
Advanced Natural Appetite Suppress
CalReduce Selective Fat Binder
DHEA Complete
Garcinia HCA
HCActive™ Garnicia Cambogia Extract
Integra-Lean®
Mediterranean Trim with Sinetrol™-XPur
Optimized Irvingia with Phase 3™ Calorie Control Complex
Optimized Saffron with Satiereal®
Super Citrimax®
Super CLA Blend with Guarana and Sesame Lignans
Super CLA Blend with Sesame Lignans
Waist-Line Control™

Women's Health

Advanced Natural Sex for Women® 50+
Breast Health Formula
Femmenessence MacaPause®
Natural Estrogen
Progesta-Care®
Super-Absorbable Soy Isoflavones
Ultra Soy Extract

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
	A						
01524	**ACETYL-L-CARNITINE** • 500 mg, 100 veg. caps	34.00	25.50	22.50			
01874	**ACETYL-L-CARNITINE ARGINATE** • 90 veg. caps	52.00	39.00	35.00			
01628	**ADRENAL ENERGY FORMULA** • 60 veg. caps	24.00	18.00	16.50			
01630	**ADRENAL ENERGY FORMULA** • 120 veg. caps	46.00	34.50	31.50			
01828	**ADVANCED LIPID CONTROL** • 60 veg. caps	30.00	22.50	20.25			
00681	**AHCC®** • 500 mg, 30 caps	59.98	44.99				
29727	**AHCC® (KINOKO® GOLD)** • 500 mg, 60 veg. caps	74.95	52.47				
00457	**ALPHA-LIPOIC ACID W/BIOTIN** • 250 mg, 60 caps	37.00	27.75	24.00			
01907	**AMPK ACTIVATOR** • 90 veg. caps	48.00	36.00	33.00			
01509	**ANTI-ADIPOCYTE FORMULA W/MERATRIM® & INTEGRA LEAN®** (Advanced) • 60 veg. caps	39.00	29.25	27.00			
02140	**ANTI-ALCOHOL w/HEPATOPRO COMPLEX** • 60 caps	22.00	16.50	15.00			
01625	**APPLEWISE POLYPHENOL EXTRACT** 600 mg, 30 veg. caps	21.00	15.75	14.25			
01039	**ARGININE/ORNITHINE** • 500/250, 100 caps	17.99	13.49				
00038	**ARGININE/ORNITHINE POWDER** • 150 grams	22.95	17.21	14.25			
01624	**(L)-ARGININE CAPS** • 700 mg, 200 veg. caps	26.50	19.88	17.44			
02004	**ARTERIAL PROTECT** • 30 veg. caps	48.00	36.00	33.00			
01617	**ARTHROMAX® W/THEAFLAVINS & APRÈSFLEX®** 120 veg. caps	44.00	33.00	30.00			
01618	**ARTHROMAX® ADVANCED W/UC-II® & APRÈSFLEX®** 60 caps	36.00	27.00	24.00			
02108	**ARTHROMAX® HERBAL JOINT FORMULA** • 60 veg. caps	40.00	30.00	27.00			
01404	**ARTHRO-IMMUNE JOINT SUPPORT** • 60 veg. caps	32.00	24.00	21.00			
00919	**ARTICHOKE LEAF EXTRACT** • 500 mg, 180 veg. caps	30.00	22.50	21.00			
01533	**ASCORBYL PALMITATE** • 500 mg, 100 veg. caps	22.50	16.88	15.00			
00888	**ASHWAGANDHA EXTRACT** (Optimized) • 60 veg. caps	10.00	7.50	6.75			
01805	**ASIAN ENERGY BOOST** • 90 veg. caps	24.00	18.00	16.50			
01066	**ASPIRIN** • 81 mg, 300 enteric coated tablets	6.00	4.50	4.00			
01923	**ASTAXANTHIN WITH PHOSPHOLIPIDS** • 4 mg, 30 softgels	16.00	12.00	10.50			
	B						
00920	**BENFOTIAMINE W/ THIAMINE** • 100 mg, 120 veg. caps	19.95	14.96	13.95			
00925	**BENFOTIAMINE** (Mega) • 250 mg, 120 veg. caps	30.00	22.50	20.25			
01206	**BERRY COMPLETE** • 30 veg. caps	21.00	15.75	14.00			
01496	**BERRY COMPLETE W/ACAI** (Enhanced) • 60 veg. caps	29.00	21.75	19.50			
00664	**BETA-CAROTENE** • 25,000 IU, 100 softgels	11.25	8.44				
01622	**BIFIDO GI BALANCE** • 60 veg. caps	20.00	15.00	13.50			
01873	**BILBERRY EXTRACT** • 100 mg, 90 veg. caps	36.00	27.00	24.00			
01512	**BIOACTIVE MILK PEPTIDES** • 30 caps	18.00	13.50	12.00			
01631	**BIO-COLLAGEN W/PATENTED UC-II®** • 40 mg, 60 small caps	36.00	27.00	24.00			
*01006	**BIOSIL™** • 5 mg, 30 veg. caps	18.95	15.16				
*01007	**BIOSIL™** • 1 fl oz	31.99	25.59				
00102	**BIOTIN** • 600 mcg, 100 caps	7.50	5.63	4.88			
01709	**BLACK CUMIN SEED OIL** • 60 softgels	16.00	12.00	10.50			
01710	**BLACK CUMIN SEED OIL W/BIO-CURCUMIN®** • 60 softgels	32.00	24.00	22.50			
01008	**BLAST™** • 600 grams of powder	26.95	20.21				
02025	**BLOOD PRESSURE** (Dual Action) • 60 veg. tabs	44.00	33.00	28.00			

SUBTOTAL OF COLUMN 1

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

SUBTOTAL OF COLUMN 2

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

SUBTOTAL OF COLUMN 3

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

SUBTOTAL OF COLUMN 4

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
02021	**DIGESTIVE ENZYMES** (Enhanced Super) • 60 veg. caps	22.00	16.50	15.00			
02022	**DIGESTIVE ENZYMES w/PROBIOTICS** (Enhanced Super) • 60 veg. caps	28.00	21.00	18.00			
01671	**D, L-PHENYLALANINE** • 500 mg, 100 veg. caps	18.75	14.06	12.00			
01540	**DMAE BITARTRATE** • 150 mg, 200 veg. caps	18.00	13.50	11.25			
01570	**DNA PROTECTION FORMULA** • 60 veg. caps	34.00	25.50	24.00			
01931	**DOG MIX** • 100 grams powder	18.00	13.50	11.25			
02006	**DOPA-MIND™** • 60 veg. tabs	48.00	36.00	32.00			
00321	**DR. PROCTOR'S ADVANCED HAIR FORMULA** • 2 oz	39.95	29.96	24.00			
00320	**DR. PROCTOR'S HAIR SHAMPOO** • 8 oz	24.95	18.71	16.50			
	E						
01528	**ECHINACEA EXTRACT** • 250 mg, 60 veg. caps	14.35	10.76	9.38			
01997	**ENDOTHELIAL DEFENSE™ w/POMEGRANATE COMPLETE AND CORDIART™** • 60 softgels	68.00	51.00	46.50			
00997	**ENDOTHELIAL DEFENSE™ w/GLISODIN®** • 60 veg. caps	54.00	40.50	36.00			
01937	**EPA/DHA** (Mega) • 120 softgels	20.00	15.00	13.50			
01737	**ESOPHAGEAL GUARDIAN** (Berry flavor) • 60 chewable tablets	36.00	27.00	24.00			
01042	**EUROPEAN LEG SOLUTION DIOSMIN 95** 600 mg, 30 veg. tabs	20.00	15.00	13.50			
01706	**EXTRAORDINARY ENZYMES** • 60 caps	26.00	19.50	18.00			
02008	**(CALIFORNIA ESTATE) EXTRA VIRGIN OLIVE OIL** • 500 ml (16.9 fl. oz)	33.00	24.75	22.50			
01514	**EYE PRESSURE SUPPORT W/MIRTOGENOL®** • 30 veg. caps	38.00	28.50	25.50			
	F						
*01054	**FACE MASTER® PLATINUM** • Facial Toning System	199.00	199.00				
00965	**FAST-ACTING JOINT FORMULA** • 30 caps	39.00	29.25	27.00			
01717	**FAST-C® W/DIHYDROQUERCETIN** • 120 veg. tabs	26.00	19.50	18.00			
20053	**FEM DOPHILUS®** • 30 caps	25.95	19.46				
20055	**FEM DOPHILUS®** • 60 caps	39.95	29.96				
01064	**FEMMENESSENCE MACAPAUSE®** • 120 veg. caps	34.99	26.24				
02007	**FIBER-IMMUNE SUPPORT** (Apple Cinnamon) • 235 grams	34.00	25.50	23.50			
00718	**FIBRINOGEN RESIST™** • 30 veg. caps	49.00	36.75	33.00			
01749	**FLAX SEED** (Organic golden) • 14 oz	11.67	8.75				
01821	**FLORASSIST® HEART HEALTH** • 60 veg. caps	32.00	24.00	21.00			
02019	**FLORASSIST® ORAL HYGIENE** • 30 lozenges	18.00	13.50	12.75			
01825	**FLORASSIST® BALANCE** • 30 liquid veg. caps	32.00	24.00	21.00			
02000	**FLORASSIST® MOOD** • 60 caps	33.00	24.75	22.50			
01920	**FLORASSIST® THROAT HEALTH** • 30 lozenges	20.00	15.00	13.50			
01913	**FOLATE HIGH POTENCY** (Optimized) • 5,000 mcg, 30 veg. tablets	25.00	18.75	16.50			
01939	**FOLATE** (Optimized) • 1,000 mcg, 100 veg. tablets	19.00	14.25	12.75			
01842	**FOLATE + VITAMIN B12** (BioActive) • 90 veg. caps	12.00	9.00	8.00			
01544	**FORSKOLIN** • 10 mg, 60 veg. caps	16.00	12.00	10.50			
01513	**FUCOIDAN W/MARITECH® 926** (Optimized) • 60 veg. caps	36.00	27.00	24.75			
	G						
02070	**GAMMA E MIXED TOCOPHEROL/TOCOTRIENOLS** • 60 softgels	40.00	30.00	27.00			
02075	**GAMMA E MIXED TOCOPHEROL w/ENHANCED SESAME LIGNANS** • 60 softgels	32.00	24.00	21.75			
01394	**GARLIC** (Optimized) • 200 veg. caps	24.95	18.71	15.75			
02100	**GASTRO-EASE** • 60 veg. caps	44.00	33.00	30.00			
**01122	**GINGER FORCE®** • 60 liquid caps	34.95	26.21				

SUBTOTAL OF COLUMN 5

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01658	**GINKGO BILOBA CERTIFIED EXTRACT™** 120 mg, 365 veg. caps	46.00	34.50	31.50			
00756	**GLA WITH SESAME LIGNANS** (Mega) • 60 softgels	19.50	14.63	13.50			
00345	**(L-) GLUTAMINE CAPSULES** • 500 mg, 100 veg. caps	14.95	11.21	10.13			
00141	**(L-) GLUTAMINE POWDER** • 100 grams	22.00	16.50	15.00			
00522	**GLUCOSAMINE/CHONDROITIN CAPSULES** • 100 caps	38.00	28.50	24.00			
01541	**GLUTATHIONE, CYSTEINE & C** • 100 veg. caps	20.00	15.00	13.50			
01669	**GLYCINE** • 1,000 mg, 100 veg. caps	12.00	9.00	8.10			
01411	**GRAPE SEED EXTRACT W/RESVERATROL & PTEROSTILBENE** 100 mg, 60 veg. caps	36.00	27.00	25.50			
01620	**GREEN COFFEE EXTRACT COFFEEGENIC®** 400 mg, 90 veg. caps	32.00	24.00	21.00			
00953	**GREEN TEA EXTRACT** (Mega) • lightly caffeinated, 100 veg. caps	30.00	22.50	18.00			
00954	**GREEN TEA EXTRACT** (Mega) • decaffeinated, 100 veg. caps	30.00	22.50	18.00			
	H						
01074	**5 HTP** • 100 mg, 60 caps	27.95	20.96				
**02002	**HAIR, SKIN & NAIL REJUVENATION FORM W/VERISOL®** 90 tabs	32.00	24.00	22.00			
01738	**HCA** (Garnicia) • 90 veg. caps	17.00	12.75	11.25			
29754	**HCACTIVE™ GARCINIA CAMBOGIA EXTRACT** • 90 caps	30.00	22.50				
01393	**HEPATOPRO** • 900 mg, 60 softgels	50.00	37.50	34.50			
01527	**HUPERZINE A** • 200 mcg, 60 veg. caps	40.00	30.00	27.00			
00661	**HYDRODERM®** • 1 oz	79.95	59.96	49.00			
	I						
01704	**IMMUNE MODULATOR W/TINOFEND®** • 60 veg. caps	17.00	12.75	11.25			
00955	**IMMUNE PROTECT W/PARACTIN®** • 30 veg. caps	29.50	22.13	19.91			
02005	**IMMUNE SENESCENCE PROTECTION FORMULA™** • 60 veg. tabs	40.00	30.00	27.00			
01049	**INNERPOWER™** • 530 grams powder	42.00	31.50				
01674	**INOSITOL CAPSULES** • 1,000 mg, 360 veg. caps	62.00	46.50	43.50			
01292	**INTEGRA-LEAN® AFRICAN MANGO IRVINGIA** 150 mg, 60 veg. caps	28.00	21.00	18.00			
01677	**IRON PROTEIN PLUS** • 300 mg, 100 caps	28.00	21.00	19.50			
01492	**IRVINGIA W/PHASE 3™ CALORIE CONTROL COMPLEX** (Optimized African Mango) • 120 veg. caps	56.00	42.00	36.00			
	J, K, L						
00056	**JARRO-DOPHILUS EPS®** • 60 veg. caps	22.95	17.21				
01834	**K W/ADVANCED K2 COMPLEX** (Super) • 90 softgels	30.00	22.50	20.25			
01600	**KRILL HEALTHY JOINT FORMULA** • 30 softgels	32.00	24.00	21.75			
01050	**KRILL OIL** • 60 softgels	33.95	25.46				
00316	**KYOLIC® GARLIC FORMULA 102** • 200 veg. caps	27.45	20.59				
00214	**KYOLIC® GARLIC FORMULA 105** • 200 caps	28.45	21.34				
00789	**KYOLIC® RESERVE** • 600 mg, 120 caps	28.95	21.71				
01681	**LACTOFERRIN** • 60 caps	44.00	33.00	30.00			
00020	**LECITHIN** • 16 oz granules	18.00	13.50	12.00			
02155	**LIFE EXTENSION MIX™** • 315 tablets	80.00	60.00	52.00	43.75		
02157	**LIFE EXTENSION MIX™ W/EXTRA NIACIN** • 315 tablets	80.00	60.00	52.00	43.75		
02154	**LIFE EXTENSION MIX™** • 490 caps	90.00	67.50	58.00	47.50		
02156	**LIFE EXTENSION MIX™ POWDER** • 14.81 oz	80.00	60.00	52.00	43.75		
02165	**LIFE EXTENSION MIX™** • 315 tablets w/o copper	80.00	60.00	52.00	43.75		

SUBTOTAL OF COLUMN 6

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
02164	**LIFE EXTENSION MIX™** • 490 caps w/o copper	90.00	67.50	58.00	47.50		
02166	**LIFE EXTENSION MIX™ POWDER** • 14.81 oz w/o copper	80.00	60.00	52.00	43.75		
01608	**LIVER EFFICIENCY FORMULA** • 30 veg. caps	18.00	13.50	12.00			
01639	**5-LOX INHIBITOR W/APRÈSFLEX®** • 100 mg, 60 veg. caps	22.00	16.50	15.00			
01678	**L-LYSINE** • 620 mg, 100 veg. caps	9.00	6.75	6.00			
00455	**LYCOPENE** (Mega) • 15 mg, 90 softgels	35.00	26.25	22.50			
	M						
01992	**MACUGUARD® OCULAR SUPPORT** • 60 softgels	25.00	18.75	17.50			
01993	**MACUGUARD® OCULAR SUPPORT w/ASTAXANTHIN** 60 softgels	44.00	33.00	30.00			
01459	**MAGNESIUM CAPS** • 500 mg, 100 veg. caps	12.00	9.00	7.50			
01682	**MAGNESIUM (CITRATE)** • 160 mg, 100 veg. caps	12.00	9.00	7.50			
02107	**(EXTEND-RELEASE) MAGNESIUM** • 60 veg. caps	13.00	9.75	6.50			
01908	**MEDITERRANEAN TRIM WITH SINETROL™-XPUR** 60 veg. caps	18.00	13.50	12.00			
01668	**MELATONIN** • 300 mcg, 100 veg. caps	5.75	4.31	3.75			
01083	**MELATONIN** • 500 mcg, 200 veg. caps	18.00	13.50	12.00			
00329	**MELATONIN** • 1 mg, 60 caps	5.00	3.75	3.47			
00330	**MELATONIN** • 3 mg, 60 veg. caps	8.00	6.00	5.16			
00331	**MELATONIN** • 10 mg, 60 veg. caps	28.00	21.00	18.00			
00332	**MELATONIN** • 3 mg, 60 veg. lozenges	8.00	6.00	5.16			
01734	**MELATONIN** (Fast-Acting Liquid) • 2 fl. oz (Citrus-Vanilla)	12.00	9.00	8.25			
01787	**MELATONIN TIMED RELEASE** • 300 mcg, 100 veg. tabs	12.00	9.00	8.25			
01788	**MELATONIN TIMED RELEASE** • 750 mcg, 60 veg. tablets	8.00	6.00	5.25			
01786	**MELATONIN TIMED RELEASE** • 3 mg, 60 veg. tabs	12.00	9.00	8.25			
02101	**MEMORY PROTECT** • 36 veg. caps	24.00	18.00	16.00			
01536	**METHYLCOBALAMIN** • 1 mg, 60 veg. lozenges (vanilla)	9.95	7.46	6.00			
01537	**METHYLCOBALAMIN** • 5 mg, 60 veg. lozenges (vanilla)	32.00	24.00	18.75	17.25		
00709	**MIGRA-EEZE™** (Butterbur) • 60 softgels	33.00	24.75	22.00			
01522	**MILK THISTLE** (European) • 60 veg. caps	34.00	25.50	22.50			
01922	**MILK THISTLE** (European) • 60 softgels	28.00	21.00	18.75			
01925	**MILK THISTLE** (European) • 120 softgels	44.00	33.00	30.00			
01940	**MIRAFORTE w/STANDARDIZED LIGNANS** (Super) • 120 veg caps	62.00	46.50	42.00			
01869	**MITOCHONDRIAL BASICS W/BIOPQQ®** • 30 caps	44.00	33.00	30.00			
01868	**MITOCHONDRIAL ENERGY OPTIMIZER w/BIOPQQ®** • 120 caps	72.00	54.00	48.00			
00065	**MK-7** • 90 mcg, 60 softgels	28.00	21.00	18.75			
00451	**MSM** (Methylsulfonylmethane) • 1,000 mg, 100 caps	14.00	10.50	8.96			
	N						
01534	**N-ACETYL-L-CYSTEINE** • 600 mg, 60 veg. caps	14.00	10.50	9.25			
01904	**NAD+ CELL REGENERATOR™** • 100 mg, 30 veg. caps	34.00	25.50	19.50			
00066	**NATTOKINASE** • 60 softgels	25.50	19.13				
01807	**NATURAL APPETITE SUPPRESS** (Advanced) • 60 veg. caps	38.00	28.50	25.50			
00984	**NATURAL BP MANAGEMENT** • 60 tablets	44.00	33.00	30.00			
01892	**NATURAL ESTROGEN** • 60 veg. tabs	38.00	28.50	25.50			
01626	**NATURAL SEX FOR WOMEN® 50+** (Advanced) • 90 veg. caps	59.00	44.25	34.00			
01444	**NATURAL SLEEP®** • 60 veg. caps	13.00	9.75	7.50			
01551	**NATURAL SLEEP® w/ MELATONIN** (Enhanced) • 30 caps	22.00	16.50	15.00			

SUBTOTAL OF COLUMN 7

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01511	**NATURAL SLEEP® W/O MELATONIN** (Enhanced) • 30 caps	20.00	15.00	13.50			
01445	**NATURAL SLEEP® MELATONIN** • 5 mg, 60 veg. caps	18.00	13.50	12.00			
00987	**NATURAL STRESS RELIEF** • 30 veg. caps	28.00	21.00	18.00			
30741	**NERVIA®** • 90 softgels	53.95	40.46				
01603	**NEURO-MAG® MAGNESIUM L-THREONATE** • 90 veg. caps	40.00	30.00	27.00			
01602	**NEURO-MAG® MAGNESIUM L-THREONATE w/CALCIUM & VITAMIN D3** • 25 grams • Lemon flavor	40.00	30.00	27.00			
01990	**NITROVASC w/CORDIART™** • 30 veg. caps	18.00	13.50	12.00			
01903	**NK CELL ACTIVATOR™** • 30 veg. tablets	45.00	33.75	31.50			
00373	**NO FLUSH NIACIN** • 800 mg, 100 caps	19.00	14.25	12.75			
	O						
01824	**OLIVE LEAF VASCULAR SUPPORT w/CELERY SEED EXTRACT** (Advanced) • 60 veg. caps	36.00	27.00	24.00			
01988	**OMEGA-3 PLUS EPA/DHA w/SESAME LIGNANS, OLIVE EXTRACT, KRILL & ASTAXANTHIN** (SUPER) • 120 softgels	45.00	33.75	31.50	24.75		
01983	**OMEGA-3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 60 softgels	18.00	13.50	12.00	9.38		
01982	**OMEGA-3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 120 softgels	32.00	24.00	21.00	17.05		
01984	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 120 enteric coated softgels	34.00	25.50	23.25	18.00		
01985	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 60 enteric coated softgels	20.00	15.00	13.50	10.50		
01986	**OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT** (Super) • 240 small softgels	32.00	24.00	21.00	17.25		
01991	**ONCE-DAILY HEALTH BOOSTER** • 60 softgels	54.00	40.50	38.00			
02113	**ONE-PER-DAY** • 60 tablets	22.00	16.50	15.00			
01328	**ONLY TRACE MINERALS** • 90 veg. caps	15.00	11.25	9.38			
	P						
01789	**PALMETTOGUARD® SAW PALMETTO W/BETA-SITOSTEROL** 30 softgels	15.00	11.25	10.50	9.00		
01790	**PALMETTOGUARD® SAW PALMETTO/ NETTLE ROOT W/BETA-SITOSTEROL** • 60 softgels	28.00	21.00	19.50	18.00		
01323	**PEAK ATP® WITH GLYCOCARN®** • 60 veg. caps	54.00	40.50	37.50			
*00342	**PECTA SOL-C® MODIFIED CITRUS PECTIN** • 454 grams powder	109.95	93.46				
*01080	**PECTA SOL-C® MODIFIED CITRUS PECTIN** • 270 veg. caps	79.95	67.96				
01811	**PEONY IMMUNE** • 60 veg. caps	36.00	27.00	24.00			
00673	**PGX® PLUS MULBERRY** (WellBetX®) • 180 veg. caps	34.95	26.21				
01953	**POMEGRANATE COMPLETE** • 30 softgels	24.00	18.00	15.75			
00956	**POMEGRANATE FRUIT EXTRACT** • 30 veg. caps	19.50	14.63	13.16			
01837	**POMI-T®** • 60 veg. caps	35.00	26.25	24.00			
01500	**PQQ CAPS W/BIOPQQ®** • 10 mg, 30 veg. caps	24.00	18.00	13.50	12.00		
01647	**PQQ CAPS W/BIOPQQ®** • 20 mg, 30 veg. caps	40.00	30.00	24.00	21.00		
00302	**PREGNENOLONE** • 50 mg, 100 caps	26.00	19.50	16.50			
00700	**PREGNENOLONE** • 100 mg, 100 caps	30.00	22.50	20.25			
**01373	**PRELOX® NATURAL SEX FOR MEN®** • 60 tablets	52.00	39.00	36.00			
01576	**PREVAGEN®** • 30 caps	60.00	45.00				
*01577	**PREVAGEN® ES** • 30 caps	70.00	60.00				
00525	**PROBOOST™ THYMIC PROTEIN A** • 30 packets	66.60	49.95				
01441	**PROGESTA-CARE®** • 4 oz cream	36.39	27.29	25.72			
01928	**PROSTATE FORMULA** (Ultra NAT) • 60 softgels	38.00	28.50	26.25	24.00		

SUBTOTAL OF COLUMN 8

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01909	**PROSTAPOLLEN™** (Triple strength) • 30 softgels	28.00	21.00	18.75			
01742	**PROTEIN-ISOLATE** (Whey) Vanilla • 403 grams	30.00	22.50	19.50			
01743	**PROTEIN-ISOLATE** (Whey) Chocolate • 437 grams	30.00	22.50	19.50			
01770	**PROTEIN CONCENTRATE** (New Zealand Whey) Vanilla 500 grams	30.00	22.50	19.95			
01771	**PROTEIN CONCENTRATE** (New Zealand Whey) Chocolate 640 grams	30.00	22.50	19.95			
01812	**PROVINAL® PURIFIED OMEGA-7** • 30 softgels	27.00	20.25	18.00			
01676	**PS CAPS** (Phosphatidylserine) • 100 mg, 100 veg. caps	54.00	40.50	36.00			
01508	**PTEROPURE®** Pterostilbene• 50 mg, 60 veg. caps	32.00	24.00	22.50			
01209	**PUMPKIN SEED EXTRACT** (Water-soluble) • 60 veg. caps	20.00	15.00	13.50			
01637	**PYCNOGENOL® FRENCH MARITIME PINE BARK EXTRACT** 100 mg, 60 veg. caps	64.00	48.00	45.00			
01217	**PYRIDOXAL 5'-PHOSPHATE** • 100 mg, 60 veg. caps	22.00	16.50	14.85			
	Q, R						
01309	**QUERCETIN** (Optimized) • 250 mg, 60 veg. caps	22.00	16.50	15.00			
01030	**RED YEAST RICE** (Bluebonnet) • 600 mg, 60 veg. caps	17.60	13.20				
00605	**REGIMINT** • 60 enteric-coated caps	19.95	14.96	14.00			
01708	**REISHI EXTRACT MUSHROOM COMPLEX** • 60 veg. caps	30.00	22.50	20.25			
01448	**REJUVENEX® BODY LOTION** • 6 oz	24.00	18.00	14.85	12.75		
01621	**REJUVENEX® FACTOR FIRMING SERUM** • 1.7 oz	65.00	48.75	37.50			
01220	**REJUVENEX®** (Ultra) • 2 oz	52.00	39.00	33.00	29.25		
00676	**REJUVENIGHT®** (Ultra) • 2 oz	39.95	29.96	27.00			
01410	**RESVERATROL W/PTEROSTILBENE** • 100 mg, 60 veg. caps	36.00	27.00	24.00			
02031	**RESVERATROL W/NICOTINAMIDE RIBOSIDE** (Optimized) • 30 veg. caps	42.00	31.50	27.00			
02030	**RESVERATROL** (Optimized) • 60 veg. caps	46.00	34.50	31.00			
00889	**RHODIOLA EXTRACT** • 250 mg, 60 veg. caps	14.00	10.50	9.00			
01900	**RIBOGEN™ FRENCH OAK WOOD EXTRACT** 200 mg, 30 veg. caps	36.00	27.00	24.75			
00972	**(D) RIBOSE POWDER** • 150 grams	27.50	20.63	18.56			
01473	**(D) RIBOSE TABLETS** • 100 veg. tabs	32.00	24.00	21.00			
01609	**RICH REWARDS® BREAKFAST GROUND COFFEE** • 12 oz. bag	13.00	9.75				
01730	**RICH REWARDS® BREAKFAST BLEND GROUND COFFEE** Natural Mocha • 12 oz. bag	15.00	11.25	10.50			
01729	**RICH REWARDS® BREAKFAST BLEND GROUND COFFEE** Natural Vanilla • 12 oz. bag	15.00	11.25	10.50			
01612	**RICH REWARDS® BREAKFAST BLEND WHOLE BEAN COFFEE** 12 oz. bag	13.00	9.75				
01610	**RICH REWARDS® DECAFFEINATED ROAST GROUND COFFEE** 12 oz. bag	14.00	10.50				
01208	**R-LIPOIC ACID** (Super) • 240 mg, 60 veg. caps	49.00	36.75	33.75			
00070	**RNA CAPSULES** • 500 mg, 100 caps	17.95	13.46	12.12			
	S						
01432	**SAFFRON W/SATIEREAL®** (Optimized) • 60 veg. caps	36.00	27.00	24.00			
01935	**SAMe** (S-ADENOSYL-METHIONINE) 200 mg, 30 enteric coated tablets	25.00	18.75	16.50			
01933	**SAMe** (S-ADENOSYL-METHIONINE) 400 mg, 30 enteric coated tablets	36.00	27.00	24.00			
01934	**SAMe** (S-ADENOSYL-METHIONINE) 400 mg, 60 enteric coated tablets	66.00	49.50	45.00			

SUBTOTAL OF COLUMN 9

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
01740	**SEA-IODINE™** • 1,000 mcg, 60 veg. caps	8.00	6.00	5.40			
00046	**SELENIUM** • 2 fl. oz dropper	11.95	8.96				
01879	**SE-METHYL L-SELENOCYSTEINE** • 200 mcg, 90 veg. caps	11.00	8.25	7.50			
00318	**SERRAFLAZYME** • 100 tablets	18.00	13.50	12.00			
01938	**SHADE FACTOR** • 120 veg. caps	44.00	33.00	30.00			
01884	**SILYMARIN** • 100 mg, 90 veg. caps	14.00	10.50	9.50			
01249	**SINUS CLEANSER** • 4 oz. bottle	25.00	18.75				
01596	**SKIN RESTORING PHYTOCERAMIDES w/LIPOWHEAT®** 30 liquid veg. caps	25.00	18.75	17.25			
00961	**SODZYME® w/GLISODIN® & WOLFBERRY** • 90 veg. caps	28.00	21.00	18.00			
00657	**SOLARSHIELD® SUNGLASSES** • Smoke color	12.99	9.74	8.63			
01097	**SOY EXTRACT** (Ultra) • 150 veg. caps	87.00	65.25	58.50			
00432	**STEVIA™** (Better) • 100 packets, 1 gram each	9.95	7.46				
00438	**STEVIA™ ORGANIC LIQUID SWEETENER** (Better) • 2 oz	11.00	8.25				
01476	**STRONTIUM** • 750 mg, 90 veg. caps	20.00	15.00	13.50			
01649	**SUPER ABSORBABLE SOY ISOFLAVONES** • 60 veg. caps	28.00	21.00	18.75			
01778	**SUPER SELENIUM COMPLEX** • 200 mcg, 100 veg. caps	14.00	10.50	9.00	8.25		
	T						
02023	**TART CHERRY W/CHERRYPURE®** 60 veg. caps	20.00	15.00	14.00			
01827	**TAURINE** • 1,000 mg, 90 veg. caps	13.00	9.75	9.00			
01918	**TEAR SUPPORT w/MAQUIBRIGHT®** • 60 mg, 30 veg. caps	18.00	13.50	12.00			
00133	**L-TAURINE POWDER** • 300 grams	20.00	15.00	12.66			
*13685	**TEN MUSHROOM FORMULA®** • 120 veg. caps	39.95	33.96				
01304	**THEAFLAVIN STANDARDIZED EXTRACT** • 30 veg. caps	18.00	13.50	12.00			
01683	**(L) THEANINE** • 100 mg, 60 veg. caps	24.00	18.00	15.38			
***01038	**THERALAC® PROBIOTICS** • 30 caps	47.95	35.96				
00668	**THYROID FORMULA** (Metabolic Advantage™) • 100 caps	21.95	16.46				
00349	**TMG POWDER** • 50 grams	14.00	10.50	8.25			
01859	**TMG** • 500 mg, 60 liquid veg. caps	13.00	9.75	9.00			
01400	**TOCOTRIENOLS** (Super-absorbable) • 60 softgels	30.00	22.50	21.00			
01278	**TOOTHPASTE** • 4 oz (Mint) tube	9.50	7.13	6.50			
01917	**TRANQUIL TRACT™** • 60 veg. caps	52.00	39.00	34.50			
01468	**TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT** 60 veg. caps	24.00	18.00	16.50			
01469	**TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT w/RESVERATROL** • 60 veg. caps	32.00	24.00	22.20			
02003	**TRIPLE ACTION THYROID** • 60 veg. caps	36.00	27.00	24.00			
01803	**TRI SUGAR SHIELD®** • 60 veg. caps	36.00	27.00	24.00			
01386	**TRUFIBER™** • 180 grams	32.95	24.71				
01389	**TRUFLORA® PROBIOTICS** • 32 veg. caps	42.95	32.21				
01722	**L-TRYPTOPHAN** • 500 mg, 90 veg. caps	33.00	24.75	22.50			
01721	**TRYPTOPHAN PLUS** (Optimized) • 90 veg. caps	32.00	24.00	21.75			
02116	**TWO-PER-DAY** • 60 tablets	10.50	7.88	7.13			
02115	**TWO-PER-DAY** • 120 tablets	20.00	15.00	13.50			
02114	**TWO-PER-DAY** • 120 caps	22.00	16.50	15.00			
00326	**L-TYROSINE** • 500 mg, 100 tablets	12.98	9.74				

SUBTOTAL OF COLUMN 10

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

SUBTOTAL OF COLUMN 11

ITEM No.	PRODUCT	Retail Each $	YOUR PRICE 1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
33880	**OUTSTANDING HEALTH:** THE 6 ESSENTIAL KEYS TO MAXIMIZE YOUR ENERGY AND WELL BEING by Michael Galitzer, MD & Larry Trivieri Jr. • 2015	24.95	18.71				
33878	**TESTOSTERONE REPLACEMENT THERAPY** by Dr. John Crisler • 2015	19.99	14.99				
33877	**THE TRUTH ABOUT MEN AND SEX** by Abraham Morgentaler, MD, FACS • 2015	16.99	12.74				
33876	***TOX*-SICK** • by Suzanne Somers • 2015	26.00	19.50				
33875	**DOCTORED: THE DISILLUSIONMENT OF AN AMERICAN PHYSICIAN** • by Sandeep Jauhar • 2015	26.00	19.50				
33874	**MISSING MICROBES** • by Martin J. Blaser, MD • 2014	28.00	21.00				
33873	**EATING ON THE WILD SIDE** • by Jo Robinson • 2014	16.00	12.00				
33872	**GET SERIOUS** • by Brett Osborn, MD • 2014	24.95	18.71				
33868	**TOXIN TOXOUT:** GETTING HARMFUL CHEMICALS OUT OF OUR BODIES AND OUR WORLD • by Bruce Lourie and Rick Smith • 2014	25.99	19.49				
33867	**THE COMPLETE MEDITERRANEAN DIET** by Michael Ozner, MD • 2014	19.95	14.96				
33869	**UNLEASH THE POWER OF THE FEMALE BRAIN** by Daniel Amen, MD • 2014	16.00	12.00				
33870	**MAGNIFICENT MAGNESIUM** by Dennis Goodman, MD • 2014	14.95	11.21				
DPT05	**DISEASE PREVENTION AND TREATMENT, EXPANDED FIFTH EDITION** (Hardcover) • 2014	69.95	39.95	36.00			
33865	**THE RESTORATION OF THE HUMAN BODY [IN 7 PARTS]** by Sergey A. Dzugan, MD, PhD • 2014	29.95	22.46				
33862	**I'M TOO YOUNG FOR THIS** • by Suzanne Somers • 2013	26.00	19.50				
33835	**PHARMOCRACY** • by William Faloon • 2011	24.00	9.60	8.00			
33958	**THE VITAMIN D SOLUTION** by Michael F. Holick, PhD, MD (Paperback) • 2013	16.00	12.00				
33838	**YOUR GUIDE TO HEALTHY SKIN THE NATURAL WAY** by Gary Goldfaden, MD • 2012	26.00	15.00				
33815	**KNOCKOUT** • by Suzanne Somers • 2009	25.99	17.00				
33809	**TESTOSTERONE FOR LIFE** by Abraham Morgentaler, MD • 2008	16.95	11.87				
33696	**LIFE EXTENSION REVOLUTION** by Philip Lee Miller, MD (Paperback)	16.00	12.00				
33805	**MIAMI MEDITERRANEAN DIET WITH 300 RECIPES** by Michael D. Ozner, MD, FACC, FAHA (Hardcover) • 2008	24.95	16.25				
33803	**WHAT YOUR DOCTOR MAY NOT TELL YOU ABOUT DIABETES** by Steven V. Joyal, MD • 2008	14.99	10.49				

SUBTOTAL OF COLUMN 12

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+ Colony forming units at time of manufacture.

References

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2. *Curr Top Microbiol Immunol*. 2013;358:273-89.
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